

**HOWELL TOWNSHIP PLANNING COMMISSION
REGULAR MEETING - RESCHEDULED**

3525 Byron Road
Howell, MI 48855
September 5, 2024
6:30 pm

1. Call to Order
2. Roll Call: () Wayne Williams - Chair () Paul Pominville
 () Robert Spaulding – Vice Chair () Tim Boal
 () Mike Newstead – Secretary () Chuck Frantjeskos
 () Matthew Counts – Board Rep.
3. Pledge of Allegiance
4. Approval of the Agenda:
Planning Commission Regular Meeting: September 5, 2024
5. Approval of the Minutes:
Regular Meeting: July 23, 2024
6. Zoning Board of Appeals Report:
Regular Meeting: August 20, 2024
7. Township Board Report:
Regular Meeting: August 12, 2024
8. Scheduled Public Hearings:
9. Other Matters to be Reviewed by the Planning Commission:
10. Old Business:
 - A. Chestnut Self Storage, PC2024-11, N. Burkhart Rd. Howell, MI 48855, Parcel # 4706-29-200-029. Final Site Plan Review.

 - B. Wrangler’s Saloon Restaurant, PC2024-10, 4020 W. Grand River Ave. Howell, MI 48855, Parcel #s 4706-20-400-004, 4706-20-201-017, 4706-20-201-018. Final Site Plan Review.

 - C. Storage Container Ordinance – Discussion

 - D. ADU Ordinance - Discussion
11. New Business:
12. Call to the Public:
13. Adjournment

**This meeting is open to all members of the public under Michigan’s Open Meetings Act.
Persons with disabilities who need accommodations to participate in this meeting should contact the Township Clerk’s Office
at 517-546-2817 at least two (2) business days prior to the meeting.**

DRAFT

**HOWELL TOWNSHIP PLANNING COMMISSION
REGULAR MEETING MINUTES**

3525 Byron Road Howell, MI 48855

July 23, 2024

6:30 P.M.

MEMBERS PRESENT:

Wayne Williams	Chair
Robert Spaulding	Vice Chair
Mike Newstead	Secretary
Matthew Counts	Board Rep.
Paul Pominville	Commissioner
Tim Boal	Commissioner
Chuck Frantjeskos	Commissioner

MEMBERS ABSENT:**Also in Attendance:**

Township Planner Paul Montagno, Zoning Administrator Jonathan Hohenstein

Chairman Williams called the meeting to order at 6:30 pm. The roll was called. Chairman Williams requested members rise for the Pledge of Allegiance.

APPROVAL OF THE AGENDA:

Motion by Counts, **Second** by Newstead, "**To approve.**" Motion carried.

APPROVAL OF THE MEETING MINUTES:

June 25, 2024

Commissioner Counts requested correction to members present to include himself and remove Board Representative Alternate Bob Wilson.

Motion by Spaulding, **Second** by Pominville, "**The approval of the June 25th Planning Commission minutes with the note stating that Mr. Counts was here instead of Mr. Wilson.**" Motion carried.

ZONING BOARD OF APPEALS REPORT:

None

TOWNSHIP BOARD REPORT:

Draft minutes are included in the packet. Commissioner Frantjeskos had a question regarding the Oakland Tactical lawsuit.

SCHEDULED PUBLIC HEARINGS:

None.

OTHER MATTERS TO BE REVIEWED BY THE PLANNING COMMISSION:

None.

OLD BUSINESS:

Chairman Williams inquired on the previous ordinance discussions for storage containers and ADUs.

NEW BUSINESS:

A. Preliminary Site Plan Review – Cornerstone Group 4706-28-301-034

Planner Montagno gave an overview of the site plan from Cornerstone Group. Clarification is needed from the applicant on the use of this project, the plan states self-storage units, Township staff had been told they were to be leased to contractors. Neither of these uses is permitted in the Industrial Zoning District. Other small items are addressed in the Planner’s report. Applicant Jim Witkowski clarified that two of the buildings are leased multi-tenant for manufacturing industrial use and the third building is to be leased warehousing space. Commissioner Pominville inquired as to how applicant will distinguish between storage and manufacturing and contractors. Commissioner Boal indicated that he had met with Mr. Witkowski at a separate unrelated event. Commissioner Boal inquired about the unregulated wetland discussed in the Planner’s report. Commissioner Spaulding spoke about his concern that these units would become used for self-storage. Commissioner Newstead inquired about ownership staff being on-site and how much oversight ownership will provide. Commissioner Spaulding inquired about REUs and capacity at the site and it was discussed that the Township does not have an IPP and only normal sewage is to go into the sewer, all process and cooling water needs to be collected and hauled away.

Motion by Newstead, **Second** by Frantjeskos, **“For preliminary site plan approval Cornerstone Group 4706-28-301-034 contingent on all items listed in the Planner’s report dated July 17, 2024, the Engineer’s report dated July 12, 2024, and the Fire report dated July 11, 2024.** Motion carried.

CALL TO THE PUBLIC:

None.

ADJOURNMENT:

Motion by Spaulding, **Second** by Newstead, **“To adjourn.”** Motion carried. The meeting was adjourned at 7:15 p.m.

Date

Mike Newstead
Planning Commission Secretary

Jonathan Hohenstein
Recording Secretary

HOWELL TOWNSHIP ZONING BOARD OF APPEALS

 UNAPPROVED MINUTES: August 20th 2024

 3525 BYRON RD. HOWELL TOWNSHIP HALL, HOWELL MI 48855 (517-546-2817)

MEMBERS PRESENT:**MEMBERS ABSENT:**

Ken Frenger	Chairman
Carol Weaver	Vice Chair
Jim McEvoy	Secretary
Wayne Williams	PC – Rep.
Jeff Smith	Board Rep
Jonathan Hohenstein	Zoning Administrator

Ken Frenger called the meeting to order at 6:30 p.m. The roll was called.

APPROVAL OF AGENDA: **MOTION** by Smith seconded by Weaver, “**To approve the August 20,2024 Zoning Board of Appeals Agenda**” Motion carried.

APPROVAL OF MINUTES: **MOTION** by Williams, seconded by Weaver, “**To Approve the May 21 ,2024 Zoning Board of Appeals Minutes as Presented**” Motion carried.

TOWNSHIP BOARD REPORT: Synopsis was given by Smith no questions.

PLANNING COMMISSION REPORT: Williams reviewed the minutes from the planning commission meeting. No questions

NEW BUSINESS:

- A. Public Hearing: Rebecca and Dustin Briscoe, **PZBA-2024-04, Parcel # 4706-08-400-017**, 4201 N. Burkhart Rd. Howell, MI 48855 Section 14.07 –

Accessory Building Provisions

Request: Applying for a variance from 14.07-G. to split the existing property leaving the accessory buildings on the vacant lot with the intent to build a house behind the accessory buildings requiring an eight-hundred fifty (850) foot dimensional variance from 14.07-B

Rebecca and Dustin Briscoe, presented the reasons for the request. Discussion between board members and Dustin’s ensued. Board members raised questions, given guidance from zoning administrator on issues of the property split, free standing structures (2 barns), and the potential ramification of the success or failure to complete the intended reason for the variance.

The requested change by the Dustin’s is based on split being approved; selling the existing Home on 1 (one) acre parcel. The approval of the variance 14.07G and 14.07-B would be required to achieve the desired split, and not have free standing structures (2 barns) on vacant land.

After discuss by board member and Zoning Administer

For the variance to be approved, there would be a \$5000 (5- thousand dollars) escrow funding,

requirement. This escrow is In the case where the construction (foundation of structure) is not in place in a timely manner (approximately 1 year). Escrow fund is to destroy the free-standing structures. (not desired outcome.)

In the case of Hardship, failure to sell split parcel, financial distress, unforeseen issues. The Dustin’s can apply for extension(s), for a “reasonable” period of time. Further an additional remedy would be to rejoin the split properties to their original acreage.

The desire of the board is to keep the appearance of the community intact, which the proposal would accomplish while achieving the Dustin’s goals of a new home on remaining acreage.

- B. **Motion** to approve **PZBA-2024-04, Parcel # 4706-08-400-017**, 4201 N. Burkhardt Rd. Howell, MI 48855 Section 14.07-G-B is contingent on an escrow being established for the split of acreage of \$5000 (5- thousand dollars). Motion Weaver, second McEvoy Roll was called, Williams – Yes, Frenger – Yes, Weaver – Yes, McEvoy – Yes, Smith-Yes: Motion carried.

OLD BUSINESS: **None**

OTHER BUSINESS: **None**

CALL TO THE PUBLIC: **No Response.**

ADJOURNMENT: Meeting adjourned at 7:30 P.M.

Approved: _____

As Presented: _____

Jim McEvoy, Secretary

As Amended: _____

As Corrected: _____

Dated: _____

DRAFT

**HOWELL TOWNSHIP REGULAR BOARD
MEETING MINUTES**
3525 Byron Road Howell, MI 48855
August 12, 2024
6:30 P.M.

MEMBERS PRESENT:

Mike Coddington	Supervisor
Sue Daus	Clerk
Jonathan Hohenstein	Treasurer
Matthew Counts	Trustee
Jeff Smith	Trustee
Harold Melton	Trustee
Bob Wilson	Trustee

MEMBERS ABSENT:**Also in Attendance:**

14 people were in attendance.

Supervisor Coddington called the meeting to order at 6:30 p.m. The roll was called. Supervisor Coddington requested members rise for the Pledge of Allegiance.

CALL TO THE BOARD:

Trustee Melton requested the letter he submitted to be added to the board packet.

APPROVAL OF THE AGENDA:

August 12, 2024

Motion by Melton, **Second** by Smith, **“To approve the agenda as presented.”** Motion carried.

APPROVAL OF BOARD MEETING MINUTES:

July 8, 2024

REGULAR BOARD MEETING MINUTES

Motion by Hohenstein, **Second** by Melton, **“To accept the minutes from July 8th as presented.”** Motion carried, 1 dissent.

CALL TO THE PUBLIC:

Curt Hamilton, 1367 Crestwood Lane: Spoke about the Shiawassee River, EPA report is available, would like it added to the September Board agenda.

Shane Fagan, 30 Santa Rosa Drive: Spoke about Tooley Rd development, sound system installation and Zoning Ordinance Enforcement.

Tim Boal, 66 Santa Rosa Drive: Spoke on Trustee Wilson.

Andrew Hamm, 14 Santa Rosa Drive: Spoke on Tim Boal.

UNFINISHED BUSINESS:

A. Salary Resolution- Clerk

Supervisor Coddington noted that at the previous meeting the resolution for the Clerk's salary did not receive support prior to voting on the resolution.

Motion by Hohenstein, **Second** by Smith, **"To accept resolution 04.07.24.538 for a 4.2% increase in salary for the Clerk as presented."** Roll call vote: Wilson- no, Hohenstein- yes, Melton- yes, Smith- yes, Daus- yes, Counts- yes, Coddington- yes. Motion carried 6-1.

B. Spicer Engineering Contract- Oak Grove Road Sidewalk

Treasurer Hohenstein discussed the easements to install sidewalks on Oak Grove Road, and the agreement from Spicer Group to proceed with the survey work to be done. Trustee Smith questioned the timeframe to allocate funds for the project. **Motion** by Hohenstein, **Second** by Counts, **"To accept agreement with Spicer Group for the Oak Grove Road sidewalk easement as presented and utilizing ARPA funds to do so."** Motion carried.

NEW BUSINESS:

A. Howell Area Parks and Recreation Authority: Tim Church, Executive Director of Howell Parks and Recreation, reported on the failed millage and requesting to continue in supporting Recreation Authority. **Motion** by Hohenstein, **Second** by Smith, **"To continue Township support with the Howell Area Park and Rec. Authority for the benefit of the citizens of Howell Township."** Discussion followed. Motion carried

B. Township Fall Event- Proposal: Treasurer Hohenstein discussed the fall event proposed by Deputy Treasurer Murrish with Township staff providing all supplies. **Motion** by Counts, **Second** by Smith, **"To accept Howell event proposal as presented."** Motion carried.

C. Tooley Road Park- Proposal: Treasurer Hohenstein discussed the Tooley Road Park plan and the end of the year transfer of funds from the Sewer and Water fund to the General fund and the request to transfer that money from the General Fund to the Park and Rec. Fund. A Conservation Easement on the park property was also discussed. **Motion** by Hohenstein, **Second** by Counts, **"To add Deputy Treasurer Teresa Murrish to the Park and Recreation Committee."** Discussion followed. Motion carried, 1 dissent. **Motion** by Hohenstein, **Second** by Smith, **"To accept recommendation to transfer 1.2 million dollars from the General Fund to the Park and Recreation funds for the Tooley Road Park."** Roll Call: Hohenstein- yes, Melton- yes, Wilson- no, Smith- yes, Daus- yes, Coddington- yes, Counts- yes. Motion carried 6-1.

D. Sound System: Trustee Wilson is requesting that the Township seek quotes for a new sound system for the Boardroom. Treasurer Hohenstein discussed adding the audio recording of the Board meetings to the Township website. **Motion** by Wilson, **Second** by Melton, **"To get quotes."** Clarification was requested. **"To get prices on a sound system so we can allow these people to hear, I think six speakers and microphones up here. I'd like to see a video, I'd like to be able to put videos online, other than just mine and Shane's. I'd like to get quotes on a system."** Motion carried.

E. Township Walking Path: Trustee Wilson discussed quotes for mowing the walking path, treatment for spraying the walking path, and leveling the ground around the Township walking path. It was brought to the Board's attention that we already have a contract to mow the Township property and to spray the walking path.

- F. Ordinance Enforcement and General Grievance: Trustee Wilson discussed that he would like to see more personal contact with the Ordinance Officer, does not like how Shane Fagan was violated under the Ordinance. Trustee Wilson would like Trustee Melton to be the Township Zoning Ordinance Officer. Trustee Counts requested that Trustee Wilson provide his evidence including names and addresses of people that have complained to Trustee Wilson about Zoning Administrator Hohenstein.

CALL TO THE PUBLIC:

John Mills, 1750 Oak Grove Rd.: Spoke about the Oak Grove Rd. sidewalk, Tooley Rd. Park, sound system for the Boardroom.

Curt Hamilton, 1367 Crestwood Ln.: Spoke about Tooley Rd. Park, Shiawassee River contamination, sound system and posting audio on the Township website.

Shane Fagan, 30 Santa Rosa Dr.: Spoke about Tooley Rd. Park.

Tim Boal, 66 Santa Rosa Dr.: Spoke on Santa Rosa Dr. and civil matters.

Andrew Hamm, 14 Santa Rosa Dr.: Spoke on Santa Rosa Dr. and civil matters.

Jordan Lamb, 1312 Edgebrook Dr.: Spoke on Tooley Rd. Park, sidewalks throughout the Township.

Jeff Demaske, 3180 Warner Rd.: Spoke on Tooley Rd. Park.

Shane Fagan, 30 Santa Rosa Dr.: Spoke on agreement with Trustee Wilson to work on the Township property.

Jeff Demaske, 3180 Warner Rd.: Spoke on Tooley Rd. Park.

Andrew Hamm, 14 Santa Rosa Dr.: Spoke on Tooley Rd. Park.

REPORTS:

A. SUPERVISOR:
No report

B. TREASURER:
Treasurer Hohenstein reported on the quarterly report from G2G, collection of taxes

C. CLERK:
No report

D. ZONING:
See Zoning Administrator Hohenstein's report

E. ASSESSING:
See Assessor Kilpela's report

F. FIRE AUTHORITY:
Supervisor Coddington reported on the Fire Authority

G. MHOG:

Trustee Counts reported on MHOG

H. PLANNING COMMISSION:

See draft minutes

I. ZONING BOARD OF APPEALS (ZBA):

No report

J. WWTP:

Treasurer Hohenstein discussed pump station 70, the modification to the MHOG operating agreement needed due to the new storage buildings MHOG is working on, and a project to fix the clarifier scum drains. **Motion** by Hohenstein, **Second** by Counts, **“Move to accept the quote from Kennedy Industries for \$19,825 for a backup pump for station number 70 as presented.”** Discussion followed. Motion carries.

Motion by Hohenstein, **Second** by Melton, **“Move to accept the modification to the agreement with MHOG as presented.”** Discussion followed. Motion rescinded due to needing more clarification.

Motion by Hohenstein, **Second** by Smith, **“Move to accept the scum drain project from Vince D’Angelo, D’Angelo Brothers, for \$11,971 as presented.”** Motion carried.

H. HAPRA:

No report

I. PROPERTY COMMITTEE:

No report

J. PARK & RECREATION COMMITTEE:

No report. Trustee Wilson inquired as to public comment on the Tooley Road park. It was indicated that public input was sought as part of the Park and Recreation Master Plan.

K. SHIAWASSEE RIVER COMMITTEE:

Supervisor Coddington reported that the Committee have had discussions, EPA report has been received, looking to get a meeting with the Committee members along with the County Drain Commissioner, and EGLE, trying to get an in-depth explanation of the EPA report.

DISBURSEMENTS: REGULAR PAYMENTS AND CHECK REGISTER:

Motion by Hohenstein, **Second** by Melton, **“Move to accept the disbursements as presented and any normal and customary payments for the month.”** Motion carried.

ADJOURNMENT: **Motion** by Counts, **Second** by Smith, **“To adjourn.”** Motion carried. The meeting was adjourned at 8:20 pm.

Sue Daus, Howell Township Clerk

Mike Coddington, Howell Township Supervisor

Tanya Davidson, Recording Secretary

HOWELL TOWNSHIP
Application for Site Plan Review
 3525 Byron Road Howell, MI 48855
 Phone: 517-546-2817 ext. 108
 Email: inspector@howelltownshipmi.org

File # PC2024-11

Parcel ID #: 4706- 29 200 029 Date 07/23/24

Applicant Name MEGA/Mark Melchi Applicant Address 298 Veterans Dr. Fowlerville, MI 48836

Phone o: (517)223-3512 Fax _____ Email mmelchi@monumentengineering.com

Property Owner Name Chestnut Development LLC

Phone (888)425-1820 Fax _____ Email permits@chestnutdev.com

Please list all recipients to receive information and/or reports:

Name: Al Pruss Email apruss@monumentengineering.com

Name: Britney Shea Email bshea@monumentengineering.com

Name: Kelly Ralko Email permits@chestnutdev.com

Location of Property Burkhart Road btw. G. River & Lambert Dr. Current Zoning Classification IFZ

Existing Use vacant Proposed Use self-storage

Check One:

- | | |
|---|--|
| <input type="checkbox"/> Preliminary Site Plan Review (20.06) | <input checked="" type="checkbox"/> Final Site Plan Review (20.07) |
| <input type="checkbox"/> Temporary Use (14.34) | <input type="checkbox"/> Commercial/Industrial Development |
| <input type="checkbox"/> Subdivision/Site Plan Condo | <input type="checkbox"/> Multi-Family/Condo |
| <input type="checkbox"/> Planned Unit Development (PUD) Type: | 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> |

Applicant needs to provide the following site plan drawings: four (4) full size copies, eight (8) - 11" x 17" copies, and an electronic set (either on an USB drive or provide an online link) for the preliminary site plan drawings. Drawings shall be submitted with an application for site plan review (20.06 a) thirty (30) days prior to the meeting.

The site plan is to contain the following information or the drawing submitted under the Land Use Permit can be utilized if it also contains the following information and is accurately drawn to scale:

- a. The date, north arrow and scale. The scale shall be not less than 1" = 20' for property under three (3) acres and at least 1" = 100' for those (3) acres or more.
- b. Statistical data including number of dwelling units, size of dwelling units, if any, and total gross acreage involved. In the case of a mobile home park, the size and location of each mobile home site shall be shown.
- c. The location and height of all existing and proposed structures on and within 100' of the subject property's boundary.
- d. All lot and/or property lines are to be shown and dimensioned, including building setback lines on corner lots.
- e. The location and dimensions of all existing and proposed drives, sidewalks, curb openings, signs, exterior lighting, curbing, parking areas (show dimensions of a typical parking space), unloading areas and recreation areas.
- f. Vehicular traffic and pedestrian circulation features within and without the site.
- g. The location of all proposed landscaping, fences, or walls.
- h. Size and location of existing and proposed utilities, including proposed connection to public sewer or water supply system.
- i. A location map indicating the relationship of the site to the surrounding land uses.
- j. The location and pavement width and right-of-way width of all abutting roads, streets, alleys, or easements.
- k. Show properties and respective zoning abutting the subject property.
- l. The location and size of all surface water drainage facilities.
- m. Contour intervals shall be shown at a maximum of 2' intervals, with 1' intervals preferred for topographic features of the site.

By signing below the applicant understands and acknowledges the following statements:

- a. The Planning Commission has sixty (60) days from filing date to approve or deny site plan.
- b. Approval of preliminary site plan is valid for a period of one (1) year from date of approval.
- c. A one (1) year extension may be granted upon written request of the applicant and approval by the Planning Commission.
- d. Approval of preliminary site plan shall expire one year after approval of final site plan unless zoning permit has been obtained.
- e. Approval of the final site plan expires six (6) months after approval unless a land use permit application is applied for and granted.

- f. The final site plan approval shall expire one (1) year following the date of approval unless construction has begun on the property in accordance with the plan.
- g. Applicant may appeal the Planning Commission's ruling of the final site plan to the Board of Appeals within ten (10) days of the Planning Commission's decision on all matters except use of the land, use of buildings, or structures.
- h. The Planning Commission has sixty (60) days from the date of the Planning Commission meeting at which the final site plan was received to approve or deny the final site plan.
- i. Improvements not in conformance with the final site plan shall be deemed a violation of the ordinance and be subject to the penalties of the ordinance.
- j. Sewer system and water system tap in fees, if applicable, must be paid prior to issuance of a land use permit.

Applicant hereby deposes and says that all the above statements and information contained in this application and any statements submitted herewith or on the site plan are true and accurate.

St G
 Owner Signature

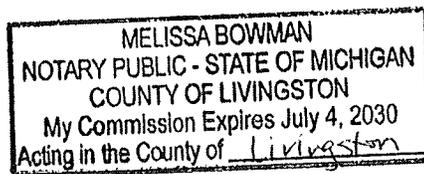
STEVEN GRONOW
 Print Name

7/22/2024
 Date

Subscribed and sworn to before me this 22 day of July, 2024.

Melissa Bowman Livingston County, Michigan
 Notary Public

My Commission Expires: July 4, 2030.



**Howell Township
Reimbursement Agreement**

The applicant accepts responsibility for all expenses at actual cost for professional services related to the application required by the Township for the issuance of any permits, approvals, reviews and attendance at meetings by the Township's Planner, Landscape Architects, Legal Counsel, Engineering and Administrative Staff, over and above the fees listed in the Howell Township fee schedule.

Information for Additional Billing:

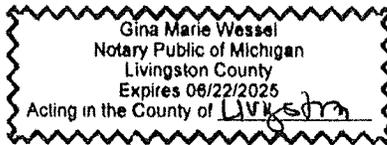
Name Kelly Ralko, Agent of Chestnut Address Chestnut Dev LLC, 6253 G. River, Ste 700, Brighton 48114

Phone (888) 425-1820 Email permits@chestnutdev.com

I have read and agree to the reimbursement agreement as presented between myself/my company and Howell Township.

Applicant Signature *Melissa Gynneman* - agent of Chestnut Date 3/25/24

[Signature]
Notary Public
Livingston County, Michigan
My Commission Expires: 6.22.25



Owner Signature Same as above Date _____

Notary Public

County, Michigan
My Commission Expires: _____

LEGAL DESCRIPTION (AS PROVIDED)

(PER CISLO TITLE COMPANY, PRELIMINARY TITLE COMMITMENT NO. 24-91731-5, DATED JANUARY 18, 2024)

PARCEL TAX NUMBER: 06-29-200-029

the following parcel of land situated in the Township of Howell, County of Livingston, State of Michigan, described as follows:

Part of the Northeast 1/4 of Section 29, Town 3 North, Range 4 East, Township of Howell, Livingston County, Michigan, more particularly described as follows: Beginning at the Northeast corner of Section 29; thence along the East line of Section 29 and the centerline of Burkhart Road, South 00 degrees 54 minutes 50 seconds East 638.41 feet; thence South 89 degrees 05 minutes 10 seconds West, 797.11 feet; thence along the Northeasterly Right of Way of the Chesapeake & Ohio Railroad on the following two (2) courses; 1) North 45 degrees 24 minutes 50 seconds West, 572.57 feet, 2) Northwesterly on an arc left, having a length of 361.97 feet, a radius of 3149.50 feet, a central angle of 06 minutes 35 minutes 06 seconds, and a long chord which bears North 48 degrees 42 minutes 23 seconds West, 361.78 feet; thence along the North line of Section 29, North 89 degrees 35 minutes 42 seconds East (recorded as North 89 degrees 35 minutes 04 seconds East), 1466.47 feet to the Point of Beginning.

Part of the Northeast 1/4 of Section 29, Town 3 North, Range 4 East, Township of Howell, Livingston County, Michigan, described as follows: Commencing at the Northeast corner of Section 29; thence along the East line of Section 29 and the centerline of Burkhart Road, South 00 degrees 54 minutes 50 seconds East 638.41 feet to the point of beginning of the parcel to be described; thence continuing along the East line of Section 29 and the centerline of Burkhart Road, South 00 degrees 54 minutes 50 seconds East 200.00 feet; thence South 89 degrees 05 minutes 10 seconds West 600.58 feet (recorded as West 600.30 feet); thence along the Northeasterly right of way of the Chesapeake and Ohio Railroad, North 45 degrees 24 minutes 50 seconds West 280.41 feet; thence North 89 degrees 05 minutes 10 seconds East 797.11 feet to the point of beginning.

BEARING REFERENCE

BEARINGS ARE BASED ON PROJECT COORDINATE SYSTEM: MICHIGAN STATE PLANE COORDINATE SYSTEM, NAD83 (CONUS) (MOL) (GRS80), SOUTH ZONE 2113, INTERNATIONAL FEET, GROUND.

LAND USE SUMMARY		
LAND USE DATA	EXISTING CONDITIONS	PROPOSED CONDITIONS
CHARACTERISTIC		
TOTAL DEVELOPMENT AREA (AC)	19.75 AC	19.75 AC
IMPERVIOUS AREA (AC)	0.00 AC	10.45 AC
TOTAL PERVIOUS AREA (AC)	19.75 AC	9.30 AC
PERVIOUS AREA BREAKDOWN BY COVER TYPE		
MEADOW/FALLOW/NATURAL AREAS (NON-CULTIVATED)	19.75 AC	0.00 AC
PREDOMINANT NRCS SOIL TYPE (A, B, C, OR D)	TYPE C = 19.75 AC	N/A
IMPROVED AREAS (TURF GRASS, LANDSCAPE, ROW CROP)	0.00 AC	9.30 AC
PREDOMINANT NRCS SOIL TYPE (A, B, C, OR D)	N/A	TYPE C = 9.30 AC
WOODED AREAS	0.00 AC	0.00 AC
PREDOMINANT NRCS SOIL TYPE (A, B, C, OR D)	N/A	N/A
CPVC VOLUME CALCULATED (CF)		52,007 CF
CPVC VOLUME PROVIDED (CF)		0 CF
CPRC VOLUME PROVIDED (CF)		76,010 CF
THE PROFESSIONAL ENGINEER WHO SIGNS AND SEALS THIS SITE PLAN CERTIFIES THAT THE VALUES IN THIS TABLE REFLECT THE WRC STORMWATER CALCULATIONS REQUIRED FOR THIS DEVELOPMENT AND THAT GEOTECHNICAL INVESTIGATIONS WERE PERFORMED THAT PROVIDE CONCLUSIVE DOCUMENTATION THAT DEMONSTRATES WHETHER INFILTRATION (I.E. CPVC VOLUME CONTROL) IS PRACTICABLE.		

DESIGN ENGINEER/SURVEYOR

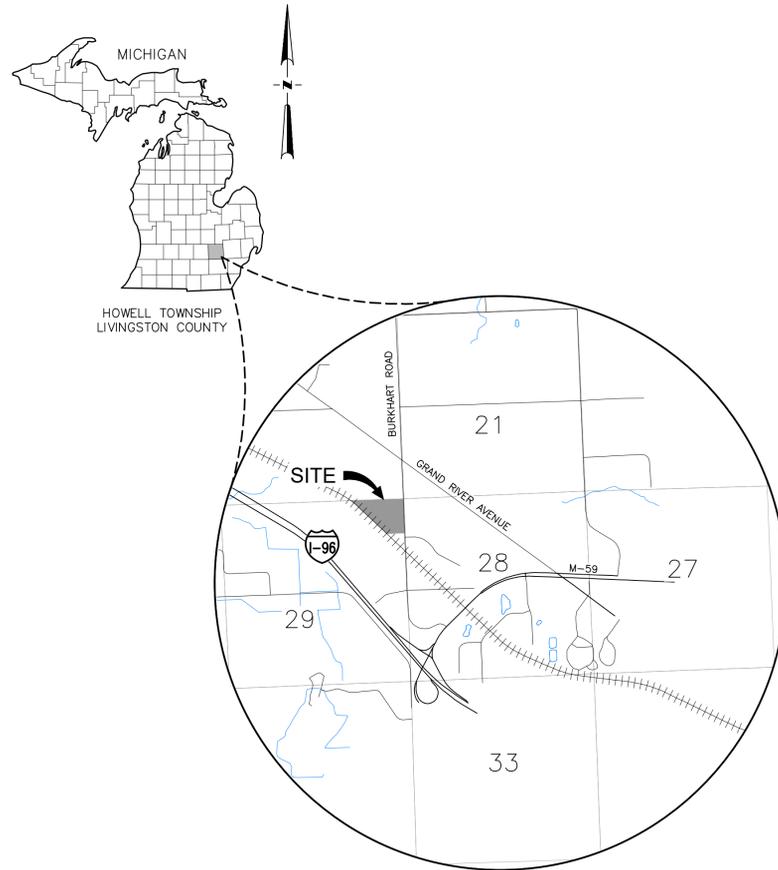


MONUMENT ENGINEERING GROUP ASSOCIATES, INC

INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS

298 VETERANS DRIVE, FOWLERVILLE, MI 48836
PHONE: 517-223-3512

FINAL SITE PLAN DRAWINGS FOR CHESTNUT SELF STORAGE

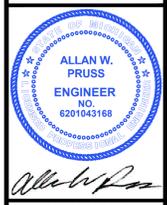


LOCATION MAP

CLIENT

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MICHIGAN 48843
POC: STEVE GRONOW
PHONE: 517-552-2489

SHEET INDEX	PLAN SUBMITTALS			
	PRELIMINARY/FINAL SITE PLAN SUBMITTAL	REVISED SITE PLAN SUBMISSION	FINAL SITE PLAN SUBMISSION	
	5/28/2024	5/30/2024	07/23/24	
INCLUDED SHEETS				
GENERAL				
SHEET G-1.0	COVER	•	•	•
SURVEY				
SHEET V-1.0	TOPOGRAPHIC SURVEY (OVERVIEW)	•	•	•
SHEET V-1.1	TOPO SURVEY & DEMO PLAN - WEST	•	•	•
SHEET V-1.2	TOPO SURVEY & DEMO PLAN - EAST	•	•	•
SHEET V-1.3	TOPO SURVEY & DEMO PLAN - SOUTH	•	•	•
SHEET V-1.4	OFF-SITE TOPOGRAPHIC SURVEY	•	•	•
SITE PLAN				
SHEET C-1.0	DIMENSION AND PAVING PLAN - OVERALL	•	•	•
SHEET C-1.1	DIMENSION AND PAVING PLAN - WEST	•	•	•
SHEET C-1.2	DIMENSION AND PAVING PLAN - EAST	•	•	•
SHEET C-1.3	DIMENSION AND PAVING PLAN - SOUTH	•	•	•
VEHICLE CIRCULATION				
SHEET C-2.0	EMERGENCY VEHICLE CIRCULATION	•	•	•
SHEET C-2.1	REFUSE VEHICLE CIRCULATION	•	•	•
SHEET C-2.2	WB-67 TRUCK & TRAILER CIRCULATION	•	•	•
UTILITY				
SHEET C-3.0	SANITARY AND WATER MAIN PLAN - OVERALL	•	•	•
SHEET C-3.1	SANITARY AND WATER MAIN PLAN - WEST	•	•	•
SHEET C-3.2	SANITARY AND WATER MAIN PLAN - EAST	•	•	•
SHEET C-3.3	SANITARY AND WATER MAIN PLAN - SOUTH	•	•	•
SHEET C-3.4	SANITARY SEWER PROFILES	•	•	•
SHEET C-3.5	SANITARY SEWER PROFILES	•	•	•
SHEET C-3.6	WATER MAIN PROFILES	•	•	•
SHEET C-3.7	WATER MAIN PROFILES	•	•	•
SHEET C-6.1	STORM SEWER PLAN - WEST	•	•	•
SHEET C-6.2	STORM SEWER PLAN - EAST	•	•	•
SHEET C-6.3	STORM SEWER PLAN - SOUTH	•	•	•
SHEET C-6.4	STORM SEWER PROFILES	•	•	•
SHEET C-6.5	STORM SEWER PROFILES	•	•	•
SHEET C-6.6	STORM SEWER PROFILES	•	•	•
SHEET C-6.7	STORM SEWER PROFILES	•	•	•
GRADING				
SHEET C-7.1	GRADING PLAN - WEST	•	•	•
SHEET C-7.2	GRADING PLAN - EAST	•	•	•
SHEET C-7.3	GRADING PLAN - SOUTH	•	•	•
SOIL EROSION & SEDIMENTATION CONTROL (SESC)				
SHEET C-8.0	SESC PLAN	•	•	•
SHEET C-8.1	LCDC SESC NOTES AND DETAILS	•	•	•
SHEET C-8.2	LCDC SESC DETAILS	•	•	•
STORM WATER MANAGEMENT				
SHEET C-9.0	DRAINAGE AREA PLAN	•	•	•
SHEET C-9.1	STORM WATER CALCULATIONS	•	•	•
SHEET C-9.2	DETENTION BASIN DETAILS	•	•	•
DETAILS				
SHEET C-11.0	DETAILS	•	•	•
SHEET C-11.1	DETAILS	•	•	•
SPECIFICATIONS				
SHEET C-12.0	SPECIFICATIONS	•	•	•
SHEET C-12.1	SPECIFICATIONS	•	•	•
LANDSCAPE				
SHEET LS-1	LANDSCAPE PLANTING DETAIL	•	•	•
SHEET LS-2	PLANT DETAILS AND LANDSCAPE NOTES	•	•	•
SHEET LS-3	SOD AND SEEDING REFERENCE PLAN	•	•	•
SITE LIGHTING				
SHEET V1	PHOTOMETRIC LAYOUT	•	•	•
ARCHITECTURAL				
SHEET A-1.0	TYPICAL FLOOR PLANS & ELEVATIONS	•	•	•
HOWELL TOWNSHIP, LIVINGSTON COUNTY STANDARD DETAILS				



Call MISS DIG 3 full working days before you dig. Michigan's One-Call Utility Notification Organization. 1-800-482-7171 www.missdig.org. THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE INDIVIDUALLY RESPONSIBLE FOR DETERMINING THE EXACT UTILITIES, LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CLIENT : CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843
POC: STEVE GRONOW
517-552-2489

COVER
CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	REVISIONS
5/28/2024	PRELIMINARY/FINAL SITE PLAN SUBMITTAL
5/30/2024	REVISED SITE PLAN SUBMISSION
7/23/2024	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE: 02/29/2024

PROJECT NO: 22-286

SCALE: N/A
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

G-10

NOT FOR CONSTRUCTION



BENCHMARKS

DATUM: NAVD88

BM A:
TOP OF FLANGE BOLT OF HYDRANT, 57'± NORTH OF ROAD CATCH BASIN, 33'± WEST OF THE CENTERLINE OF BURKHART ROAD.
ELEV =936.19

BM B:
TOP OF FLANGE BOLT OF HYDRANT, 14'± NORTH OF ROAD CATCH BASIN, 30'± WEST OF THE CENTERLINE OF BURKHART ROAD.
ELEV =938.22

BM C:
TOP OF FLANGE BOLT OF HYDRANT, 79'± NORTH OF ROAD CATCH BASIN, 30'± WEST OF THE CENTERLINE OF BURKHART ROAD.
ELEV =941.72

SOILS INFO

SOIL TYPES ARE ACCORDING TO THE USDA SOIL SURVEY WEB SITE (<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>)

SOIL TYPE LIMIT AND LABEL

- MoB: WAWASEE LOAM, 2-6% SLOPES
- CvraaB: CONOVER LOAM, 0 TO 4% SLOPES
- MrB: MIAMI-CONOVER LOAMS, 2-6% SLOPES

EXISTING PARKING

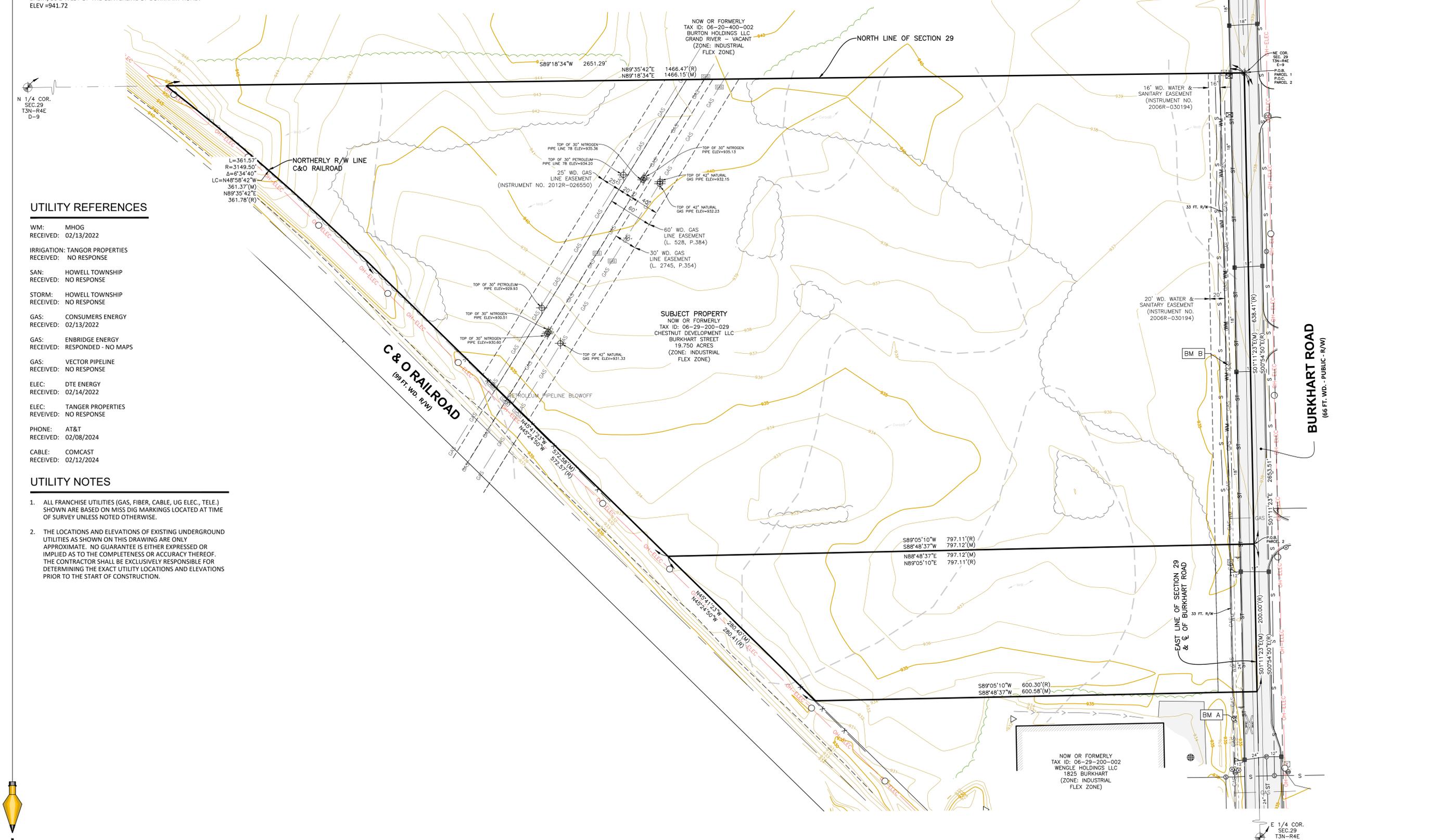
THERE ARE NO STRIPED PARKING SPACES ON THE SUBJECT PROPERTY.

WETLAND NOTE

ACCORDING TO THE NATIONAL WETLAND INVENTORY WEBSITE ([HTTP://WWW.FWS.GOV/WETLANDSDATAMAPPER.HTML](http://www.fws.gov/wetlandsdatamapper.html)), THERE ARE NO NOTED WETLANDS ON THE SUBJECT PARCEL.
WETLAND FLAGGING WAS NOT OBSERVED DURING THE FIELD SURVEY. AN OFFICIAL STUDY FOR THE PRESENCE OF WETLANDS WAS NOT CONDUCTED BY MONUMENT ENGINEERING GROUP ASSOCIATES.

FLOOD ZONE

FEMA MAP SCALES DO NOT SUPPLY SUFFICIENT LEVEL OF DETAIL TO PLOT ACCURATELY. ZONES IF PLOTTED HEREIN ARE APPROXIMATE.
BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THE SUBJECT PROPERTY APPEARS TO LIE ENTIRELY IN ZONE (X) AREA OF MINIMAL FLOOD HAZARD ACCORDING TO THE FLOOD INSURANCE RATE MAP FOR THE COUNTY OF LIVINGSTON, COMMUNITY PANEL NO. (26093C0188D), EFFECTIVE DATE SEPTEMBER 17, 2008.



UTILITY REFERENCES

WM: MHOG
RECEIVED: 02/13/2022

IRRIGATION: TANGOR PROPERTIES
RECEIVED: NO RESPONSE

SAN: HOWELL TOWNSHIP
RECEIVED: NO RESPONSE

STORM: HOWELL TOWNSHIP
RECEIVED: NO RESPONSE

GAS: CONSUMERS ENERGY
RECEIVED: 02/13/2022

GAS: ENBRIDGE ENERGY
RECEIVED: RESPONDED - NO MAPS

GAS: VECTOR PIPELINE
RECEIVED: NO RESPONSE

ELEC: DTE ENERGY
RECEIVED: 02/14/2022

ELEC: TANGER PROPERTIES
RECEIVED: NO RESPONSE

PHONE: AT&T
RECEIVED: 02/08/2024

CABLE: COMCAST
RECEIVED: 02/12/2024

UTILITY NOTES

- ALL FRANCHISE UTILITIES (GAS, FIBER, CABLE, UG ELEC., TELE.) SHOWN ARE BASED ON MISS DIG MARKINGS LOCATED AT TIME OF SURVEY UNLESS NOTED OTHERWISE.
- THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

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ALLAN W. PRUSS
ENGINEER
NO. 6201043168

Allan W. Pruss

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www.missdig.org

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

TOPOGRAPHIC SURVEY (OVERVIEW)

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E, HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	PLAN SUBMITTALS/REVISIONS
5/28/2024	PRELIMINARY/FINAL SITE PLAN SUBMITTAL
5/30/2024	REVISED SITE PLAN SUBMISSION
7/23/2024	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

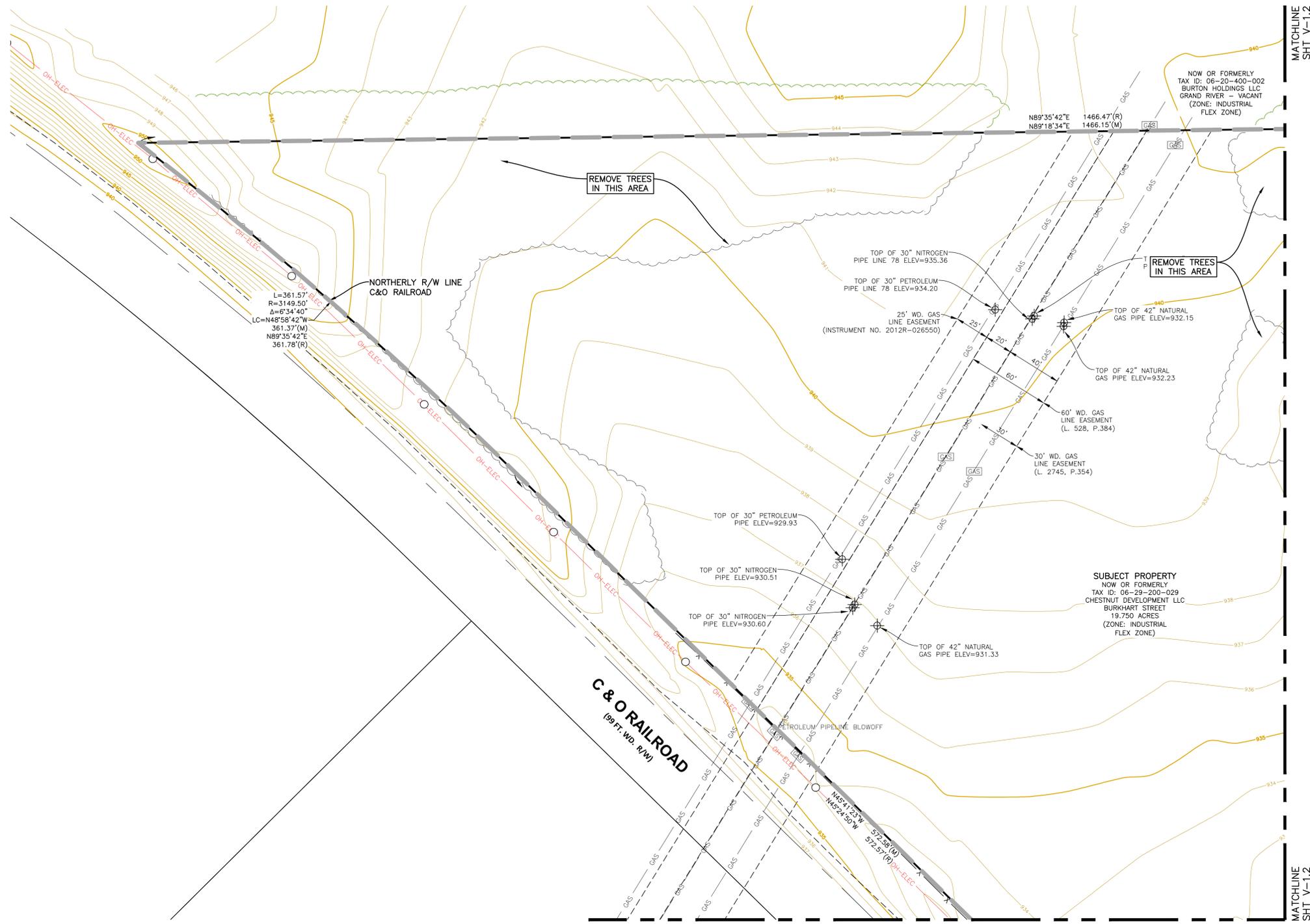
SCALE: 1" = 60'

0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

V-10

NOT FOR CONSTRUCTION



EXISTING LEGEND

	DECIDUOUS TREE, CONIFEROUS TREE, SHRUB TREE LINE/ CANOPY
	DITCH/ DRAINING COURSE
	UG TELE, MH, TELE PED, CABLE PED UG FIBER, PED, LINE MARKER, VAULT UG ELEC, MH, TRANSFORMER, AC UNIT, METER, BOX OH ELEC, UTIL. POLE, GUY WIRE GROUND LIGHT, POLE, W/ ARM LT LIGHT MH, LT CTRL BOX, PARK. METER, CAR CHARGER ELEC HAND HOLE, OUTLET, SIGNAL MH, SIGNAL BOX UG GAS, MH, VALVE, LINE MARKER GAS WELL, METER, VENT WATER MAIN, MH, VALVE IN BOX, HYDRANT, FDC WATER WELL, METER, STOP BOX, POST INDICATOR VALVE IRRIGATION CONTROL VALVE, SPRINKLER HEAD STORM SEWER, MH, CB, INLET, YARD DRAIN, DOWN SPOUT CULVERT/ END SECTION SANITARY SEWER, MH, CLEAN OUT COMBINED SEWER, MH STEAM LINE, MH MISC. MANHOLE, HAND HOLE, HAND BOX PARKING BLOCK, SIGN, FLAG POLE, POST, ROCK, MAIL BOX SECTION LINE, SECTION CORNER FOUND IRON ROD (FIR), FD MON, FD PK SET IRON ROD (SIR), SET PK, MAG NAIL FINISH FLOOR ELEVATION, SPOT ELEVATION CONTOUR
	FENCE GUARD RAIL RAILROAD SIGNAL, SIGNAL BOX SOIL BORING
	EX. ASPHALT EX. CONCRETE EX. GRAVEL

DEMOLITION LEGEND

	ABANDON IN PLACE
	ABANDON LINEAR FEATURE
	SAWCUT
	REMOVE LINEAR FEATURE
	LIMITS OF DISTURBANCE
	REMOVE OBJECT
	REMOVE PAVEMENT

DEMOLITION NOTES

- UTILITY OBJECTS SUCH AS GAS METER, TRANSFORMER, TELEPHONE PEDESTAL, UTILITY POLE & WIRES ARE TO BE REMOVED BY OTHERS IF APPLICABLE.
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 ENGINEER
 NO. 6201043168

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
 3800 CHILSON ROAD
 HOWELL, MI 48843

POC: STEVE GRONOW
 517-552-2489

TOPO SURVEY & DEMO PLAN - WEST

CHESTNUT SELF STORAGE
 TAX ID# 06-29-200-029
 PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
 HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
 02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 40'

FIELD:
 DRAWN BY: CD
 DESIGN BY: BS
 CHECK BY: AP

V-11

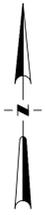
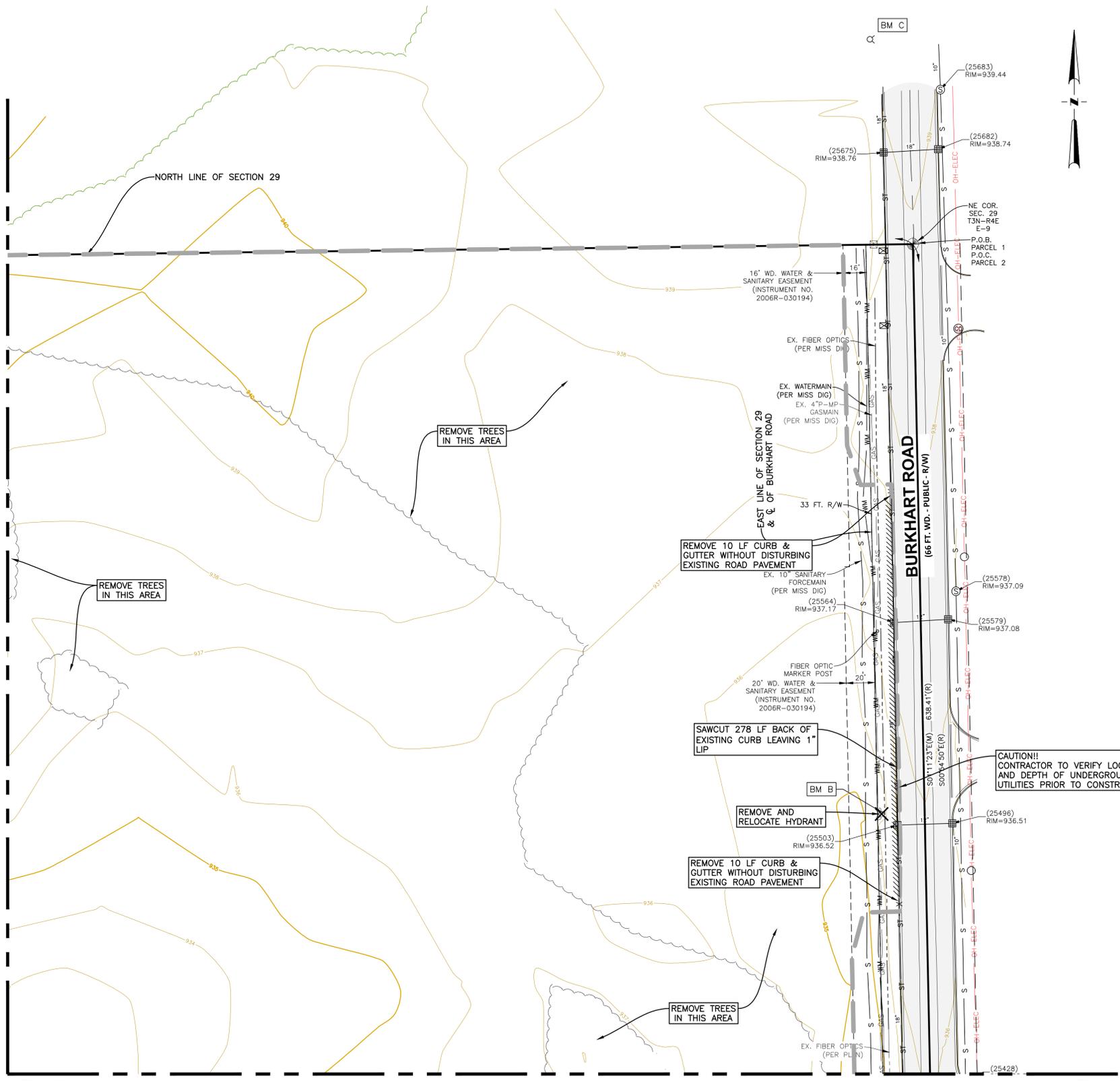
NOT FOR CONSTRUCTION



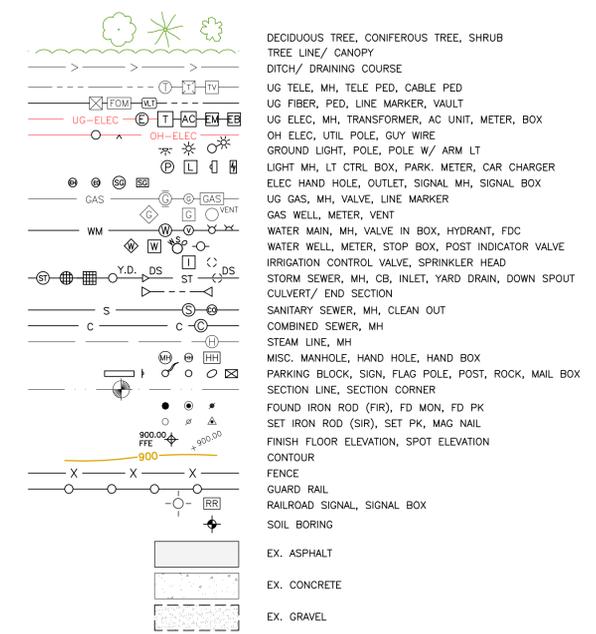
MATCHLINE
SHT V-1.1

MATCHLINE
SHT V-1.1

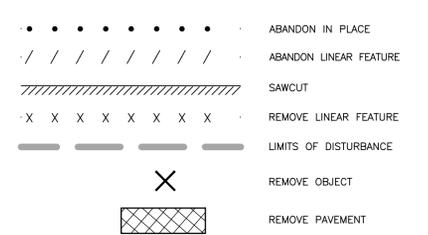
MATCHLINE
SHT V-1.3



EXISTING LEGEND



DEMOLITION LEGEND



DEMOLITION NOTES

- UTILITY OBJECTS SUCH AS GAS METER, TRANSFORMER, TELEPHONE PEDESTAL, UTILITY POLE & WIRES ARE TO BE REMOVED BY OTHERS IF APPLICABLE.
- ANY TREES NOT MARKED PER PLAN ARE TO BE PROTECTED & PRESERVED DURING CONSTRUCTION.

STRUCTURE SCHEDULE

EX. SANITARY SEWER			EX. STORM SEWER		
STRUCTURE	RIM ELEV.	PIPES	STRUCTURE	RIM ELEV.	PIPES
(25303) SMH	934.28	12" E IE= 922.78 12" W IE= 920.08 12" S IE= 920.08	(25313) CBS	935.27	24" E IE= 930.38 24" N IE= 930.37 12" W IE= 931.57
(25318) SMH	935.31	12" W IE= 922.51 12" E IE= 922.61 10" N IE= 922.71	(25317) STMH	935.57	12" E IE= 930.47 24" W IE= 929.57 24" S IE= 929.57
(25428) SMH	935.71	10" S IE= 921.91 10" N IE= 921.91 10" E IE= 922.31	(25402) CBS	935.39	24" S IE= 930.60 18" N IE= 930.80 12" E IE= 931.40 12" W IE= 932.00
(25578) SMH	937.09	10" S IE= 922.71 10" N IE= 924.79	(25410) CBS	935.26	12" W IE= 931.66
(25683) SMH	939.44	10" N IE= 926.24 10" S IE= 926.14	(25496) CBS	936.51	12" W IE= 931.91
			(25503) CBS	936.52	18" S IE= 931.32 12" E IE= 931.52 18" N IE= 931.52
			(25530) CBS	935.10	12" W IE= 930.70
			(25564) CBS	937.17	18" S IE= 932.27 12" E IE= 932.67 18" N IE= 932.27
			(25579) CBS	937.08	12" W IE= 932.68
			(25675) CBS	938.76	18" S IE= 933.46 18" E IE= 933.46 18" N IE= 933.46
			(25682) CBS	938.74	18" W IE= 933.54

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www.missdig.org

CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

TOPO SURVEY & DEMO PLAN - EAST

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	DESCRIPTION
5/28/2024	PRELIMINARY/FINAL SITE PLAN SUBMITTAL
5/30/2024	REVISED SITE PLAN SUBMISSION
7/23/2024	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 40'
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

V-12

NOT FOR CONSTRUCTION

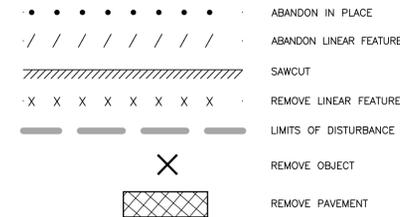


STRUCTURE SCHEDULE

EX. SANITARY SEWER		
STRUCTURE	RIM ELEV.	PIPES
(25303) SMH	934.28	12" E IE= 922.78 12" W IE= 920.08 12" S IE= 920.08
(25318) SMH	935.31	12" W IE= 922.51 12" E IE= 922.61 10" N IE= 922.71
(25428) SMH	935.71	10" S IE= 921.91 10" N IE= 921.91 10" E IE= 922.31
(25578) SMH	937.09	10" S IE= 922.71 10" N IE= 924.79
(25683) SMH	939.44	10" N IE= 926.24 10" S IE= 926.14

EX. STORM SEWER		
STRUCTURE	RIM ELEV.	PIPES
(25313) CBS	935.27	24" E IE= 930.38 24" N IE= 930.37 12" W IE= 931.57
(25317) STMH	935.57	12" E IE= 930.47 24" W IE= 929.57 24" S IE= 929.57
(25402) CBS	935.39	24" S IE= 930.60 18" N IE= 930.80 12" E IE= 931.40 12" W IE= 932.00
(25410) CBS	935.26	12" W IE= 931.66
(25496) CBS	936.51	12" W IE= 931.91
(25503) CBS	936.52	18" S IE= 931.32 12" E IE= 931.52 18" N IE= 931.52
(25530) CBS	935.10	12" W IE= 930.70
(25564) CBS	937.17	18" S IE= 932.27 12" E IE= 932.67 18" N IE= 932.27
(25579) CBS	937.08	12" W IE= 932.68
(25675) CBS	938.76	18" S IE= 933.46 18" E IE= 933.46 18" N IE= 933.46
(25682) CBS	938.74	18" W IE= 933.54

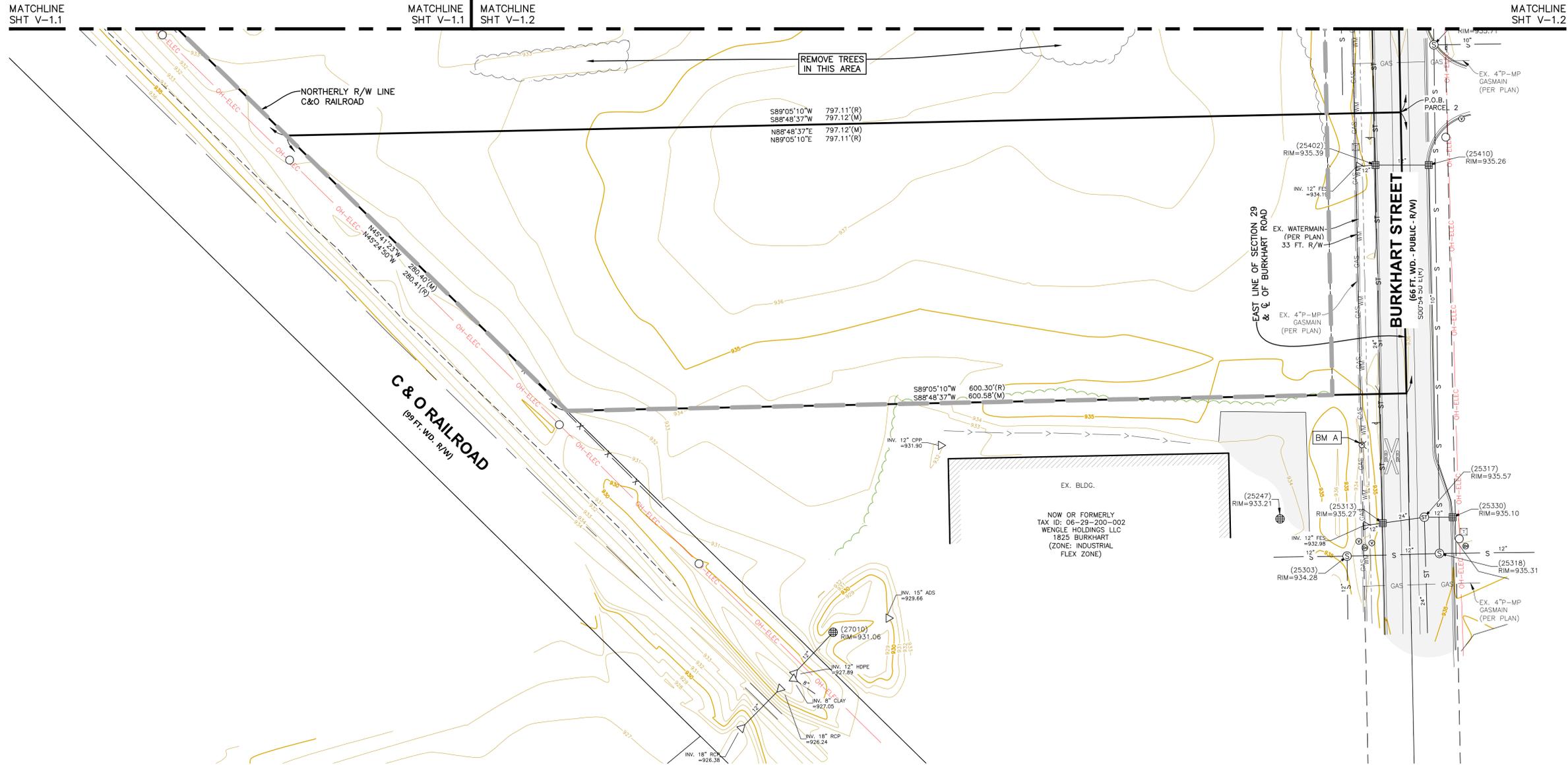
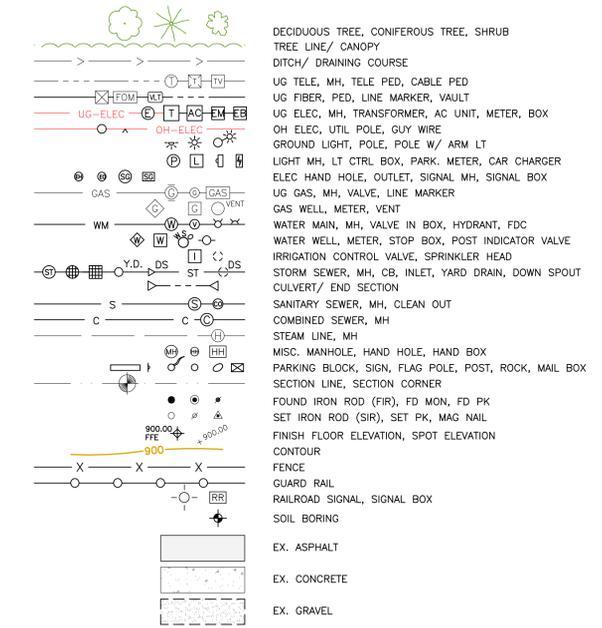
DEMOLITION LEGEND



DEMOLITION NOTES

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EXISTING LEGEND



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ALLAN W. PRUSS
ENGINEER
NO. 6201043168

Allan W. Pruss

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

TOPO SURVEY & DEMO PLAN - SOUTH

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	PLAN SUBMITTALS/REVISIONS
5/28/2024	PRELIMINARY/FINAL SITE PLAN SUBMITTAL
5/30/2024	REVISED SITE PLAN SUBMISSION
7/23/2024	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE:
02/29/2024

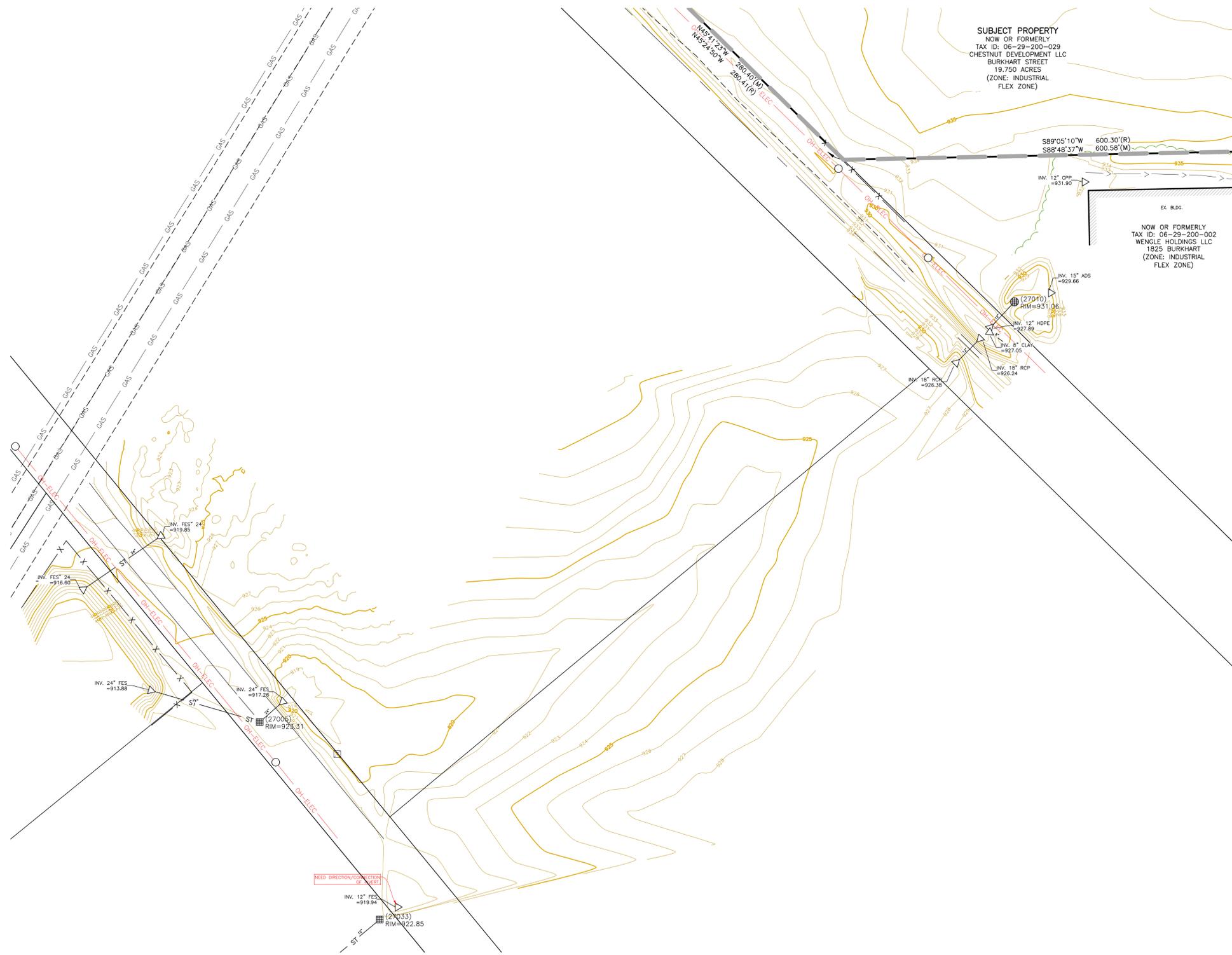
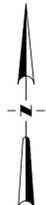
PROJECT NO: 22-286

SCALE: 1" = 40'

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

V-13

NOT FOR CONSTRUCTION



EXISTING LEGEND

- DECIDUOUS TREE, CONIFEROUS TREE, SHRUB
- TREE LINE/ CANOPY
- DITCH/ DRAINING COURSE
- UG TELE, MH, TELE PED, CABLE PED
- UG FIBER, PED, LINE MARKER, VAULT
- UG ELEC, MH, TRANSFORMER, AC UNIT, METER, BOX
- OH ELEC, UTIL POLE, GUY WIRE
- GROUND LIGHT, POLE, POLE W/ ARM LT
- LIGHT MH, LT CTRL BOX, PARK. METER, CAR CHARGER
- ELEC HAND HOLE, OUTLET, SIGNAL MH, SIGNAL BOX
- UG GAS, MH, VALVE, LINE MARKER
- GAS WELL, METER, VENT
- WATER MAIN, MH, VALVE IN BOX, HYDRANT, FDC
- WATER WELL, METER, STOP BOX, POST INDICATOR VALVE
- IRRIGATION CONTROL VALVE, SPRINKLER HEAD
- STORM SEWER, MH, CB, INLET, YARD DRAIN, DOWN SPOUT
- CULVERT/ END SECTION
- SANITARY SEWER, MH, CLEAN OUT
- COMBINED SEWER, MH
- STEAM LINE, MH
- MISC. MANHOLE, HAND HOLE, HAND BOX
- PARKING BLOCK, SIGN, FLAG POLE, POST, ROCK, MAIL BOX
- SECTION LINE, SECTION CORNER
- FOUND IRON ROD (FIR), FD MON, FD PK
- SET IRON ROD (SIR), SET PK, MAG NAIL
- FINISH FLOOR ELEVATION, SPOT ELEVATION
- CONTOUR
- FENCE
- RAILROAD SIGNAL, SIGNAL BOX
- SOIL BORING
- EX. ASPHALT
- EX. CONCRETE
- EX. GRAVEL

STRUCTURE SCHEDULE

EX. SANITARY SEWER			EX. STORM SEWER		
STRUCTURE	RIM ELEV.	PIPES	STRUCTURE	RIM ELEV.	PIPES
(25303) SMH	934.28	12" E IE= 922.78 12" W IE= 920.08 12" S IE= 920.08	(25313) CBS	935.27	24" E IE= 930.38 24" N IE= 930.37 12" W IE= 931.57
(25318) SMH	935.31	12" W IE= 922.51 12" E IE= 922.61 10" N IE= 922.71	(25317) STMH	935.57	12" E IE= 930.47 24" W IE= 929.57 24" S IE= 929.57
(25428) SMH	935.71	10" S IE= 921.91 10" N IE= 921.91 10" E IE= 922.31	(25402) CBS	935.39	24" S IE= 930.60 18" N IE= 930.80 12" E IE= 931.40 12" W IE= 932.00
(25578) SMH	937.09	10" S IE= 922.71 10" N IE= 924.79	(25410) CBS	935.26	12" W IE= 931.66
(25683) SMH	939.44	10" N IE= 926.24 10" S IE= 926.14	(25496) CBS	936.51	12" W IE= 931.91
			(25503) CBS	936.52	18" S IE= 931.32 12" E IE= 931.52 18" N IE= 931.52
			(25530) CBS	935.10	12" W IE= 930.70
			(25564) CBS	937.17	18" S IE= 932.27 12" E IE= 932.67 18" N IE= 932.27
			(25579) CBS	937.08	12" W IE= 932.68
			(25675) CBS	938.76	18" S IE= 933.46 18" E IE= 933.46 18" N IE= 933.46
			(25682) CBS	938.74	18" W IE= 933.54

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

OFF-SITE TOPOGRAPHIC SURVEY

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 40'
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

V-14

NOT FOR CONSTRUCTION

ZONING INFORMATION

THIS ZONING INFORMATION IS TAKEN FROM HOWELL TOWNSHIP ZONING ORDINANCE
DATED: JANUARY 4, 2021

SUBJECT PARCEL ZONING: (IFZ) INDUSTRIAL FLEX ZONE	SUBJECT PARCEL		PROPOSED BUILDING		MAXIMUM HEIGHT OF BUILDING		BUILDING SETBACKS (FT)			PARKING SETBACKS (FT)			SIGN SETBACK (FT)	MAXIMUM % OF IMPERVIOUS SURFACE
	AREA (AC)	WIDTH AT BUILDING SITE (FT)	BLDG A AREA (SF)	BLDG B AREA (SF)	IN STORIES	IN FEET	FRONT (E)	SIDE (N,S)	REAR (W)	FRONT (E)	SIDE (N,S)	REAR (W)		
REQUIRED	2.0	120	N/A	N/A	N/A	70	50	10 MIN, 25 TOTAL	10	35	10 MIN, 25 TOTAL	10	10	75%
PROVIDED	19.75	N/A	6400	2400	-	-	51.7	10 MIN, 25 TOTAL	10	35	10 MIN, 25 TOTAL	10	-	52.9%

ADJACENT ZONING

NORTH: (IFZ) INDUSTRIAL FLEX ZONE
SOUTH: (IFZ) INDUSTRIAL FLEX ZONE
EAST: BURKHART ROAD R.O.W.
WEST: C & O RAILROAD R.O.W.

% OF IMPERVIOUS SURFACES

BUILDINGS AND IMPERVIOUS SURFACES:
ASPHALT PAVEMENT = 267,502 SF
STORAGE BUILDINGS = 187,600 SF
TOTAL IMPERVIOUS = 455,102 SF

SUBJECT PARCEL AC * 43,560 SF/AC = SUBJECT PARCEL SF
19.75 AC * 43,560 SF/AC = 860,310 SF

SUM OF IMPERVIOUS SURFACES SF / SUBJECT PARCEL SF = XX%
455,102 SF / 860,310 SF = 0.5289 = 52.9%

PAVEMENT LEGEND

- EX. ASPHALT
- EX. CONCRETE
- EX. GRAVEL
- PR. STANDARD DUTY ASPHALT
- PR. HEAVY DUTY ASPHALT
- PR. CONCRETE
- PR. GRAVEL
- STANDARD CURB AND GUTTER
- REVERSE CURB AND GUTTER

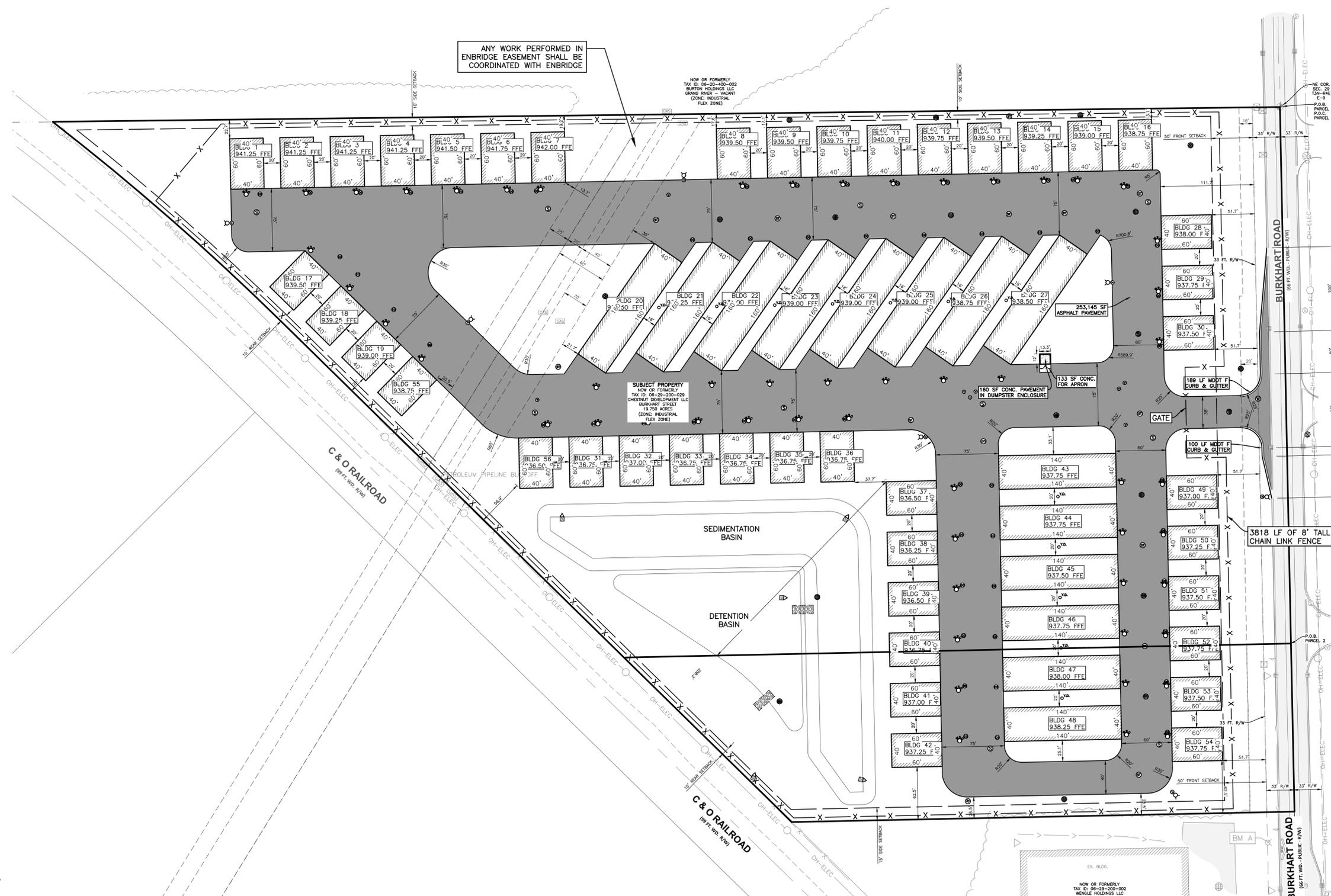
NOTES

- DUMPSTER ENCLOSURES SHALL BE CONSTRUCTED OF THE SAME BRICK MATERIAL AS THE ADJACENT BUILDINGS.
- SCREENING SHALL BE PROVIDED FOR ALL MECHANICAL EQUIPMENT.

HEAVY DUTY HMA PAVEMENT SECTION

Applies to: On-Site Pavement

- 2" MDOT 13A WEARING COURSE
- 3" MDOT 13A LEVELING COURSE
- 8" MDOT 21A CRUSHED AGG. BASE COURSE COMPACTED TO 95% MAX. DENSITY (ASTM D-1557)
- SUBGRADE COMPACTED TO 95% MAXIMUM DENSITY (ASTM D-1557 (MODIFIED PROCTOR))



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CLIENT:
CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843
POC: STEVE GRONOW
517-552-2489

DIMENSION AND PAVING PLAN-OVERALL
CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	DESCRIPTION
5/28/2024	PRELIMINARY/FINAL SITE PLAN SUBMITTAL
5/30/2024	REVISED SITE PLAN SUBMISSION
7/23/2024	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 60'
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-10

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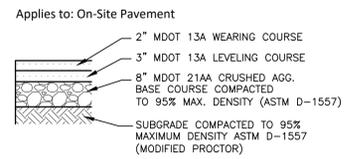
PAVEMENT LEGEND

	EX ASPHALT
	EX CONCRETE
	EX GRAVEL
	PR STANDARD DUTY ASPHALT
	PR HEAVY DUTY ASPHALT
	PR CONCRETE
	PR GRAVEL
	STANDARD CURB AND GUTTER
	REVERSE CURB AND GUTTER

NOTES

- DUMPSTER ENCLOSURES SHALL BE CONSTRUCTED OF THE SAME BRICK MATERIAL AS THE ADJACENT BUILDINGS.
- SCREENING SHALL BE PROVIDED FOR ALL MECHANICAL EQUIPMENT.

HEAVY DUTY HMA PAVEMENT SECTION



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ALLAN W. PRUSS
ENGINEER
NO. 6201043168

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CLIENT :

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3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

DIMENSION AND PAVING PLAN - WEST

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE: 02/29/2024

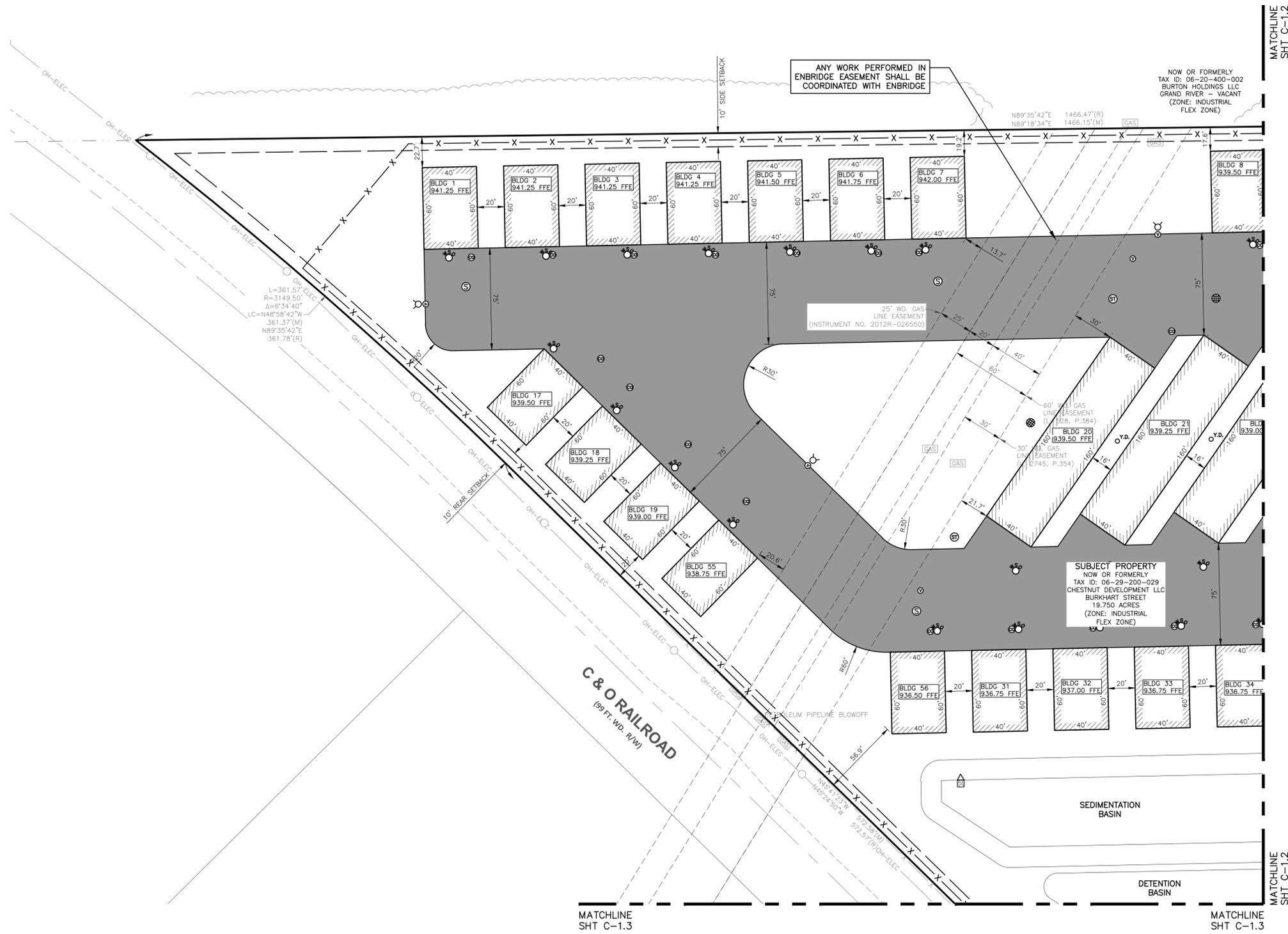
PROJECT NO: 22-286

SCALE: 1" = 40'

FIELD: DRAWN BY: CD, DESIGN BY: BS, CHECK BY: AP

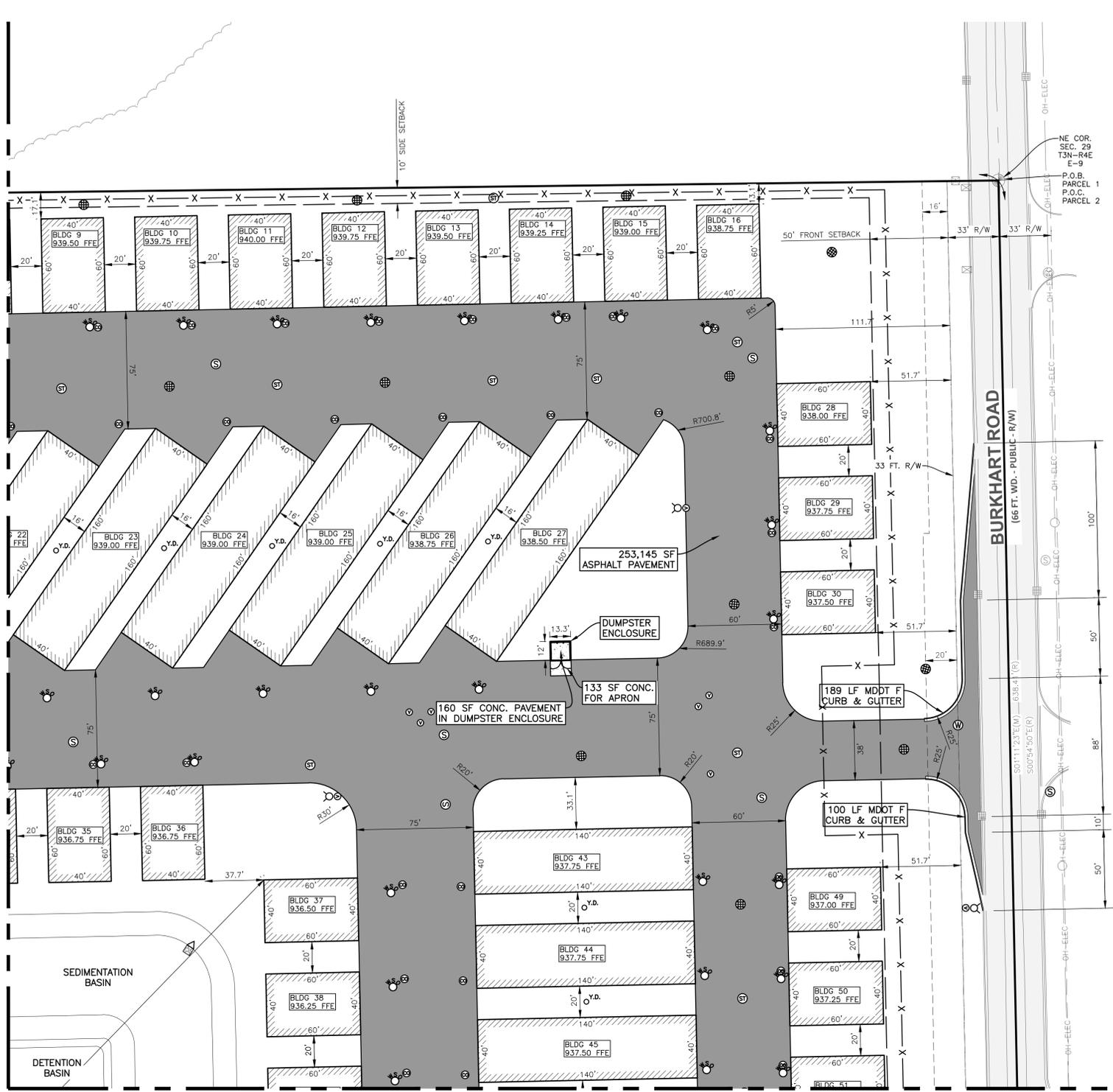
C-11

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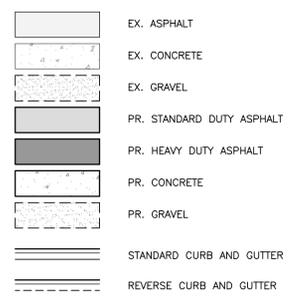
L=361.57'
R=3149.50'
Δ=9°34'40"
LC=N48°58'42"W
361.37'(M)
N89°35'42"E
361.78'(R)

MATCHLINE
SHT C-1.1

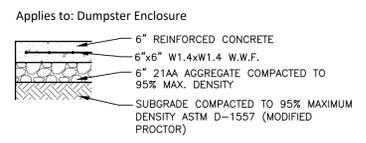


MATCHLINE
SHT C-1.3

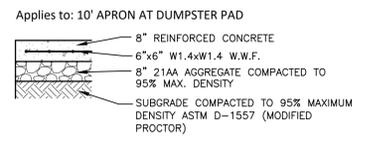
PAVEMENT LEGEND



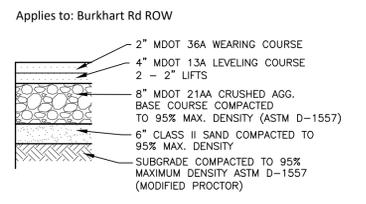
DUMPSTER PAVEMENT SECTION



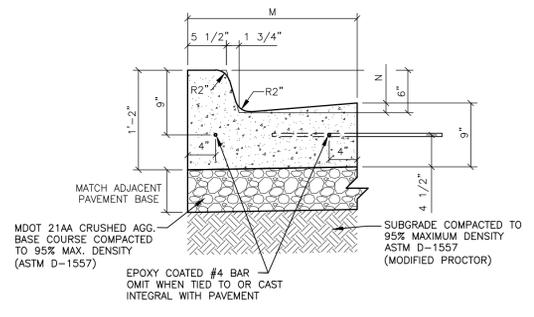
HEAVY DUTY CONCRETE PAVEMENT SECTION



STANDARD DUTY HMA PAVEMENT SECTION



CURB AND GUTTER DETAIL - MDOT - FX - WITH TABLE



DETAIL	DIMENSION		LANE TIES	CONCRETE CYD / LFT
	M	N		
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

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CLIENT :

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HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

DIMENSION AND PAVING PLAN - EAST

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	DESCRIPTION
5/28/2024	PRELIMINARY/FINAL PLAN SUBMITTAL
5/30/2024	REVISED SITE PLAN SUBMISSION
7/23/2024	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 40'

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-12

NOT FOR CONSTRUCTION



PAVEMENT LEGEND

- EX. ASPHALT
- EX. CONCRETE
- EX. GRAVEL
- PR. STANDARD DUTY ASPHALT
- PR. HEAVY DUTY ASPHALT
- PR. CONCRETE
- PR. GRAVEL
- STANDARD CURB AND GUTTER
- REVERSE CURB AND GUTTER

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Allan W. Pruss

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

DIMENSION AND PAVING PLAN - SOUTH

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE: 02/29/2024

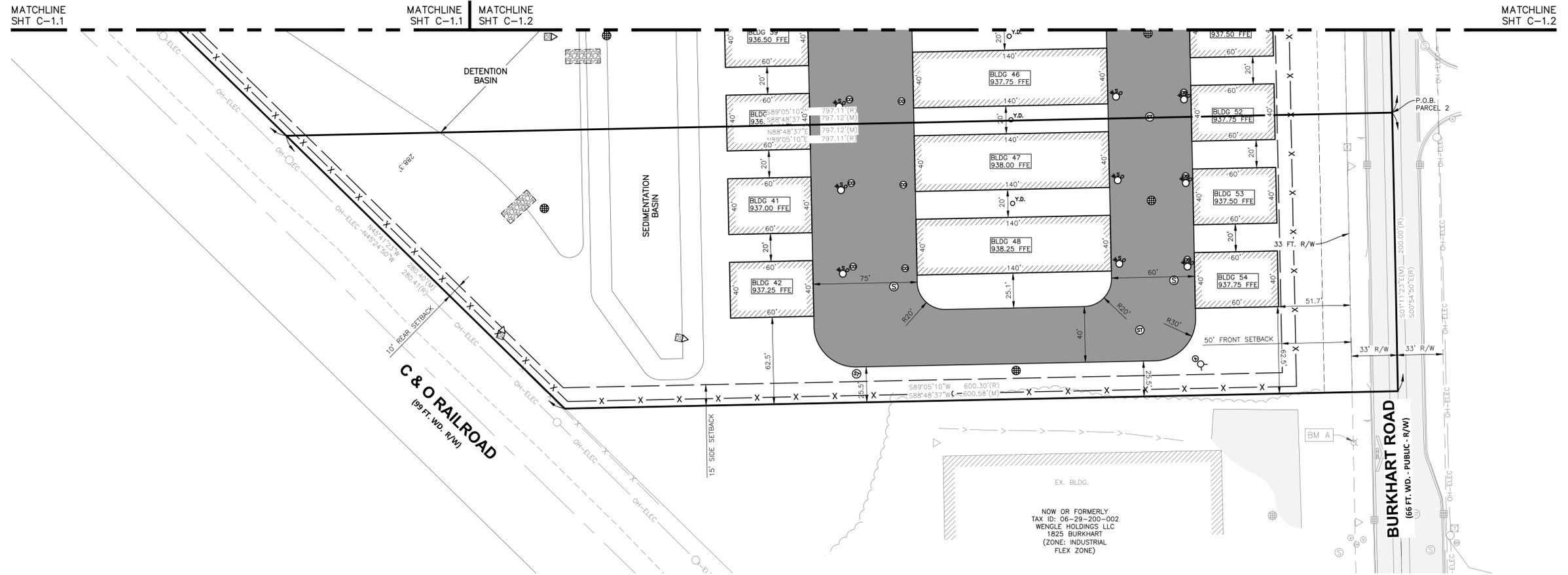
PROJECT NO: 22-286

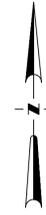
SCALE: 1" = 40'

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-13

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EMERGENCY VEHICLE

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

EMERGENCY VEHICLE CIRCULATION

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
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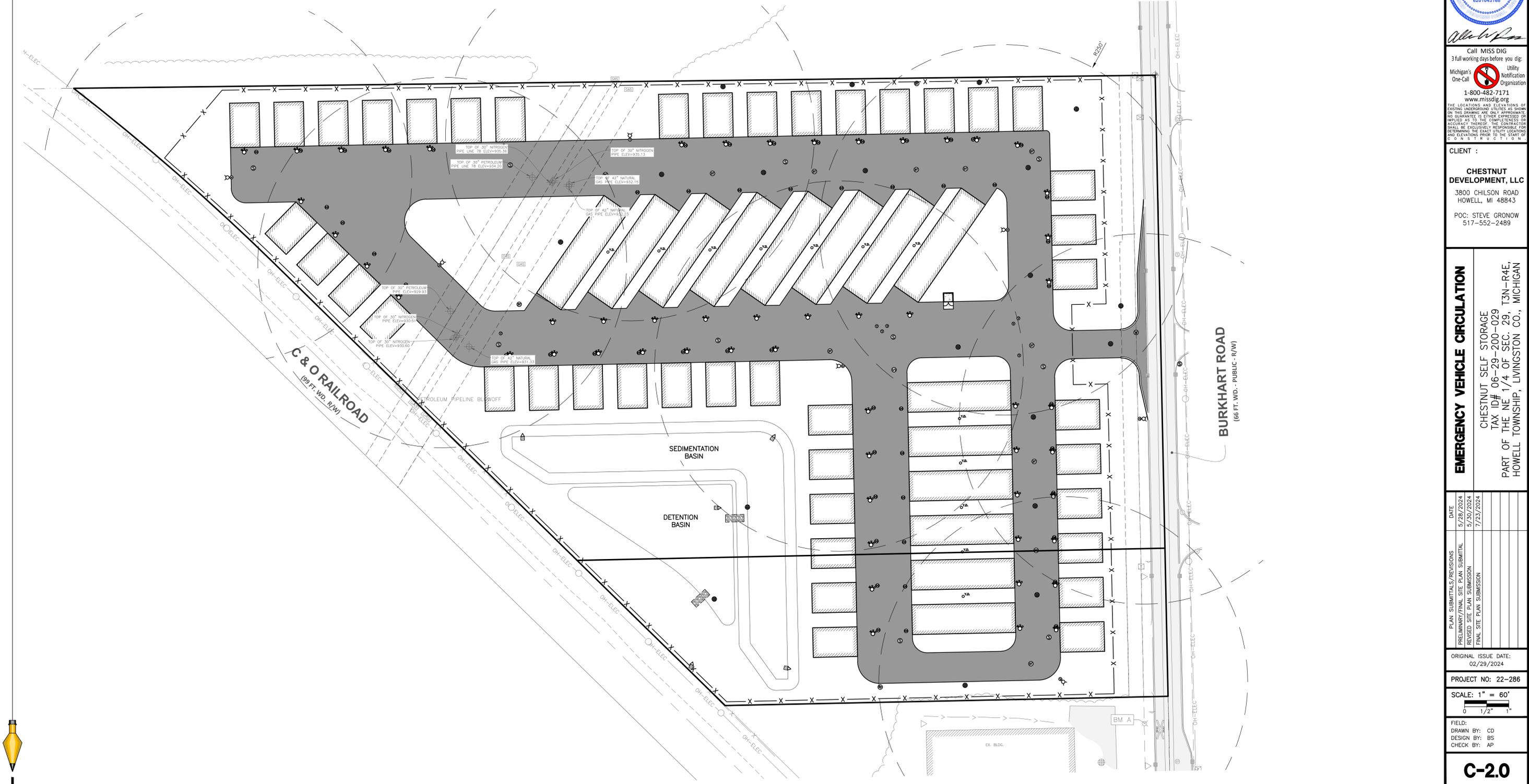
SCALE: 1" = 60'

0 1/2" 1"

FIELD:
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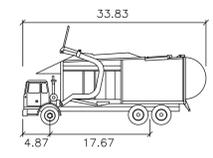
C-2.0

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REFUSE VEHICLE



Wayne Titan
FEET
WIDTH : 8.46
TRACK : 8.00
LOCK TO LOCK TIME: 6.0
STEERING ANGLE : 45.0

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ALLAN W. PRUSS
ENGINEER
NO. 6201043168

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POC: STEVE GRONOW
517-552-2489

REFUSE VEHICLE CIRCULATION

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
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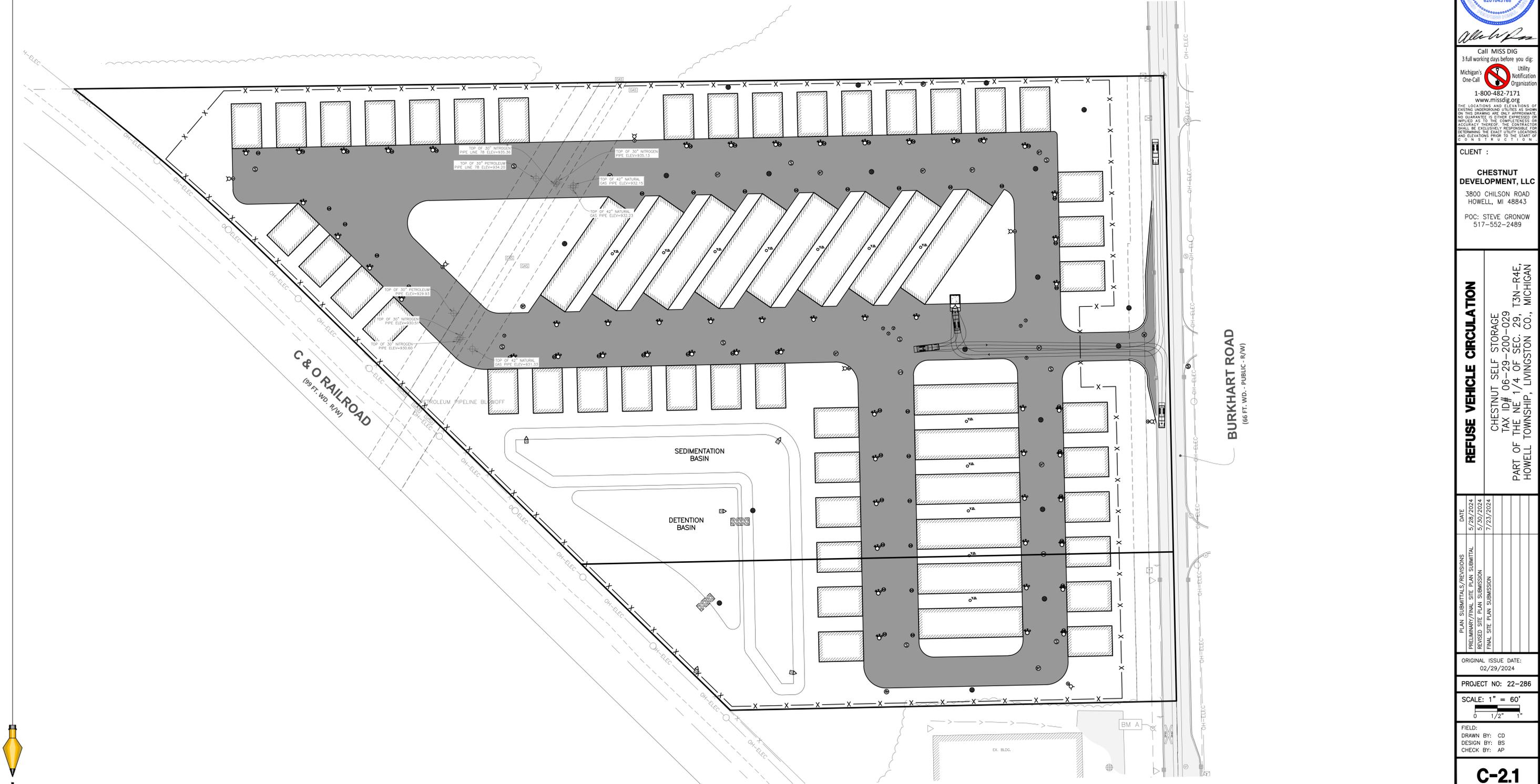
PROJECT NO: 22-286

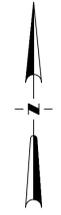
SCALE: 1" = 60'

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

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WB-67 TRUCK & TRAILER

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517-552-2489

WB-67 TRUCK & TRAILER CIRCULATION

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TAX ID# 06-29-200-029
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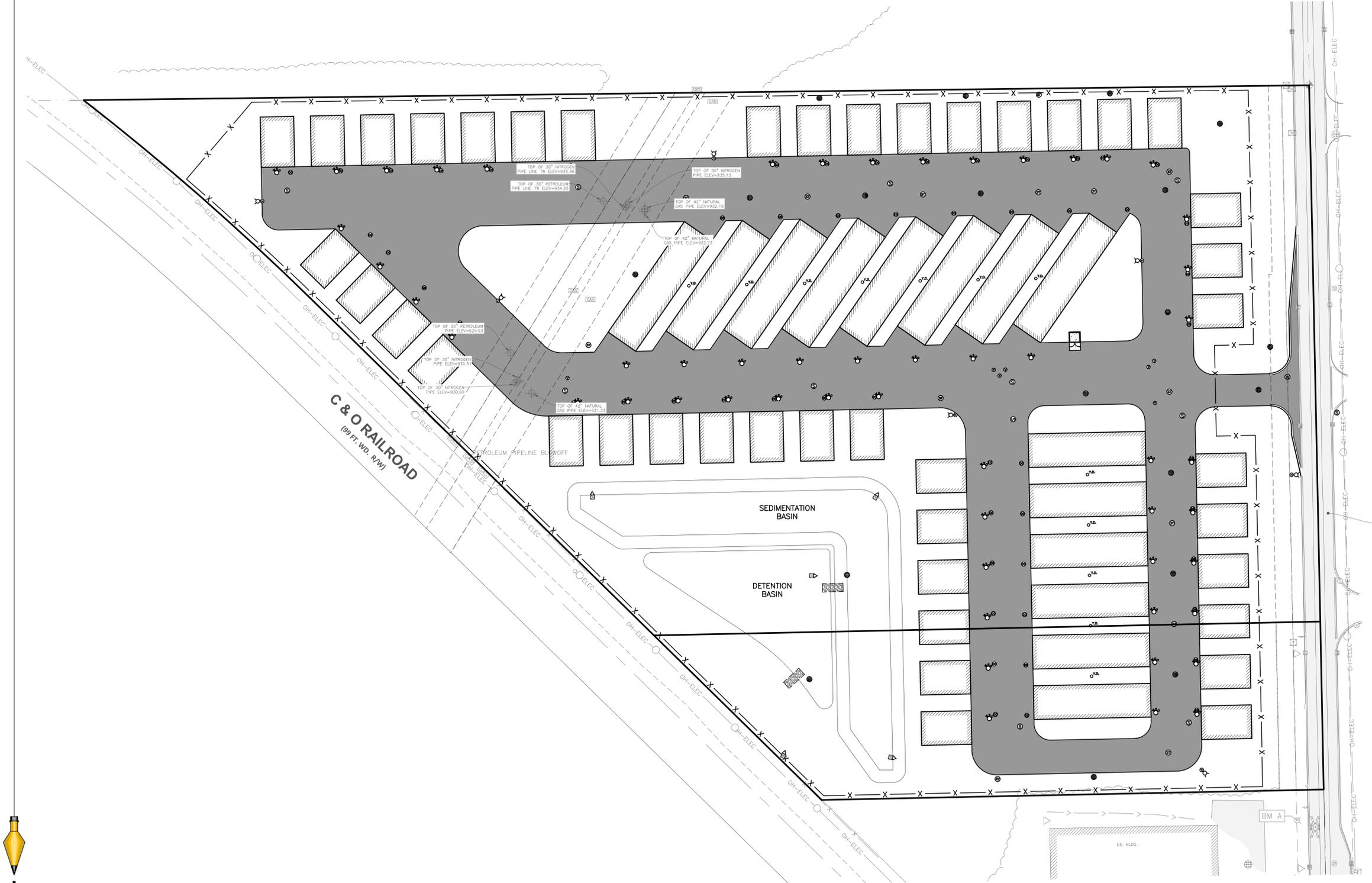
PROJECT NO: 22-286

SCALE: 1" = 60'

FIELD:
DRAWN BY: CD
DESIGN BY: BS
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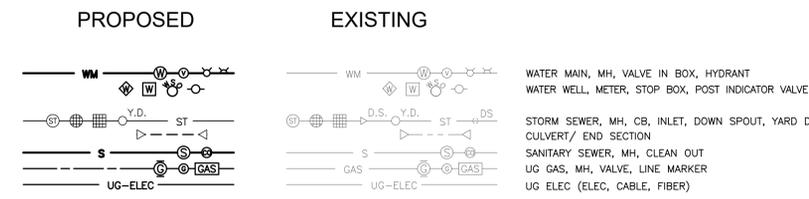
C-2.2

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UTILITY LEGEND



HYDRANT LEADS		
NAME	LENGTH 6" D.I. CL.54 (FT)	LENGTH 8" D.I. CL.54 (FT)
HYD-5	17	0
HYD-6	22	0
HYD-8	15	15
HYD-9	15	34
HYD-13	15	44
HYD-14	15	66

SANITARY SEWER NOTES

- 1. SANITARY "MH" SHALL HAVE EIJJ 1020 FRAME WITH TYPE A COVER.

WATER NOTES

- 1. WATER MAIN TO BE MIN 5.5' DEEP PER MHOG DESIGN STANDARDS.

WATERLEADS			SANITARY LEADS			
UNITNO	LENGTH (FT)	I.E. AT BLDG	UNITNO	LENGTH (FT)	I.E. AT BLDG	
1	13	936.00	1	28	1.00%	936.00
2	14	936.00	2	29	1.00%	936.00
3	14	936.25	3	29	1.00%	936.25
4	15	936.50	4	30	1.00%	936.50
5	15	936.50	5	30	1.00%	936.50
6	16	936.75	6	31	1.00%	936.75
7	16	937.00	7	31	1.00%	937.00
8	19	935.50	8	34	1.00%	935.50
9	19	935.50	9	34	1.00%	935.50
10	20	936.75	10	35	1.00%	936.75
11	20	936.00	11	36	1.00%	936.00
12	21	936.75	12	36	1.00%	936.75
13	21	936.50	13	36	1.00%	936.50
14	22	936.25	14	37	1.00%	936.25
15	22	935.00	15	37	1.00%	935.00
16	28	934.75	16	38	1.00%	934.75
17	42	932.75	17	71	1.00%	932.75
18	51	932.25	18	70	1.00%	932.25
19	39	932.00	19	70	1.00%	932.00
20	36	932.00	20	68	1.00%	932.00
21	37	932.25	21	67	1.00%	932.25
22	37	932.00	22	66	1.00%	932.00
23	37	935.00	23	65	1.00%	935.00
24	37	932.00	24	65	1.00%	932.00
25	37	932.00	25	65	1.00%	932.00
26	37	931.75	26	64	1.00%	931.75
27	37	931.50	27	63	1.00%	931.50
28	62	934.00	28	13	1.00%	934.00
29	62	933.75	29	13	1.00%	933.75
30	62	933.50	30	13	1.00%	933.50
31	45	933.00	31	30	1.00%	933.00
32	45	933.00	32	29	1.00%	933.00
33	44	932.75	33	29	1.00%	932.75
34	44	932.75	34	29	1.00%	932.75
35	44	932.75	35	29	1.00%	932.75
36	44	932.75	36	29	1.00%	932.75
37	43	933.50	37	58	1.00%	933.50
38	43	933.25	38	58	1.00%	933.25
39	43	933.50	39	58	1.00%	933.50
40	43	933.75	40	58	1.00%	933.75
41	43	934.00	41	58	1.00%	934.00
42	43	934.25	42	58	1.00%	934.25
43	12	933.75	43	17	1.00%	933.75
44	12	933.75	44	17	1.00%	933.75
45	12	933.50	45	17	1.00%	933.50
46	12	933.75	46	17	1.00%	933.75
47	12	934.00	47	17	1.00%	934.00
48	12	934.25	48	17	1.00%	934.25
49	63	933.00	49	13	1.00%	933.00
50	63	933.25	50	12	1.00%	933.25
51	63	933.50	51	12	1.00%	933.50
52	63	933.75	52	12	1.00%	933.75
53	63	934.00	53	12	1.00%	934.00
54	63	933.75	54	12	1.00%	933.75

INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS

MEGA

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ALLAN W. PRUSS
ENGINEER
NO. 6201043168

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Utility Notification Organization

1-800-482-7171
www.missdig.org

CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

SANITARY SEWER & WM PLAN

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	DESCRIPTION
5/28/2024	PRELIMINARY/FINAL SITE PLAN SUBMITTAL
5/30/2024	REVISED SITE PLAN SUBMISSION
7/23/2024	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE:
02/29/2024

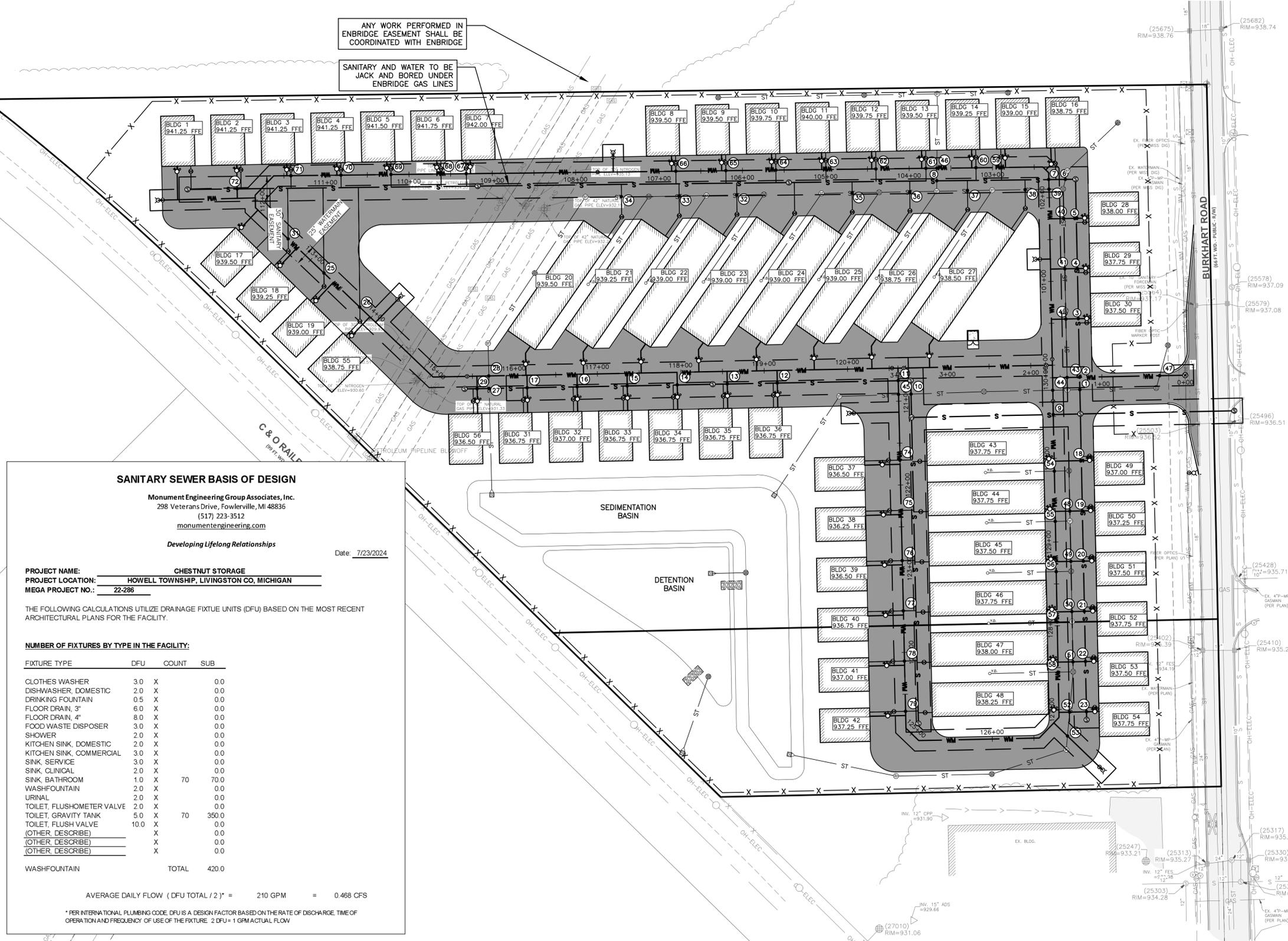
PROJECT NO: 22-286

SCALE: 1" = 40'

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-3.0

NOT FOR CONSTRUCTION



ANY WORK PERFORMED IN ENBRIDGE EASEMENT SHALL BE COORDINATED WITH ENBRIDGE

SANITARY AND WATER TO BE JACK AND BORED UNDER ENBRIDGE GAS LINES

SANITARY SEWER BASIS OF DESIGN

Monument Engineering Group Associates, Inc.
298 Veterans Drive, Fowlerville, MI 48836
(517) 223-3512
monumentengineering.com

Developing Lifelong Relationships

Date: 7/23/2024

PROJECT NAME: CHESTNUT STORAGE
PROJECT LOCATION: HOWELL TOWNSHIP, LIVINGSTON CO, MICHIGAN
MEGA PROJECT NO.: 22-286

THE FOLLOWING CALCULATIONS UTILIZE DRAINAGE FIXTURE UNITS (DFU) BASED ON THE MOST RECENT ARCHITECTURAL PLANS FOR THE FACILITY.

NUMBER OF FIXTURES BY TYPE IN THE FACILITY:

FIXTURE TYPE	DFU	COUNT	SUB
CLOTHES WASHER	3.0	X	0.0
DISHWASHER, DOMESTIC	2.0	X	0.0
DRINKING FOUNTAIN	0.5	X	0.0
FLOOR DRAIN, 3"	6.0	X	0.0
FLOOR DRAIN, 4"	8.0	X	0.0
FOOD WASTE DISPOSER	3.0	X	0.0
SHOWER	2.0	X	0.0
KITCHEN SINK, DOMESTIC	2.0	X	0.0
KITCHEN SINK, COMMERCIAL	3.0	X	0.0
SINK, SERVICE	3.0	X	0.0
SINK, CLINICAL	2.0	X	0.0
SINK, BATHROOM	1.0	X	70
WASHFOUNTAIN	2.0	X	0.0
URINAL	2.0	X	0.0
TOILET, FLUSHOMETER VALVE	2.0	X	0.0
TOILET, GRAVITY TANK	5.0	X	350.0
TOILET, FLUSH VALVE	10.0	X	0.0
(OTHER DESCRIBE)	X		0.0
(OTHER DESCRIBE)	X		0.0
(OTHER DESCRIBE)	X		0.0
WASHFOUNTAIN		TOTAL	420.0

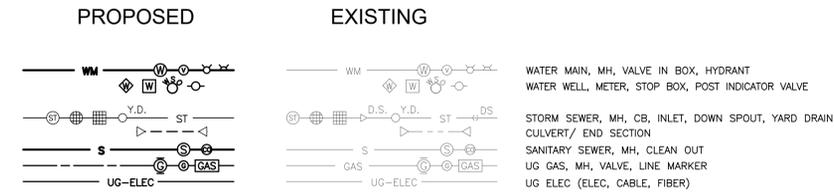
AVERAGE DAILY FLOW (DFU TOTAL / 2) * = 210 GPM = 0.468 CFS

* PER INTERNATIONAL PLUMBING CODE, DFU IS A DESIGN FACTOR BASED ON THE RATE OF DISCHARGE, TIME OF OPERATION AND FREQUENCY OF USE OF THE FIXTURE. 2 DFU = 1 GPM ACTUAL FLOW





UTILITY LEGEND



SANITARY SEWER NOTES

- SANITARY "MH" SHALL HAVE EJIW 1020 FRAME WITH TYPE A COVER.

WATER NOTES

- WATER MAIN TO BE MIN 5.5' DEEP PER MHOG DESIGN STANDARDS.

INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS

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(OFFICE) 517-223-3512
MONUMENTENGINEERING.COM

SERVICE DISABLED VETERAN OWNED
SMALL BUSINESS (SDVOSB)

ALLAN W. PRUSS
ENGINEER
NO. 6201043168

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Michigan's Utility One-Call Notification Organization

1-800-482-7171
www.missdig.org

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

CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

SANITARY SEWER & WM PLAN - WEST

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	DESCRIPTION
5/28/2024	PLAN SUBMITTALS/REVISIONS
5/30/2024	PRELIMINARY/FINAL SITE PLAN SUBMITTAL
7/23/2024	REVISED SITE PLAN SUBMISSION
	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE: 02/29/2024

PROJECT NO: 22-286

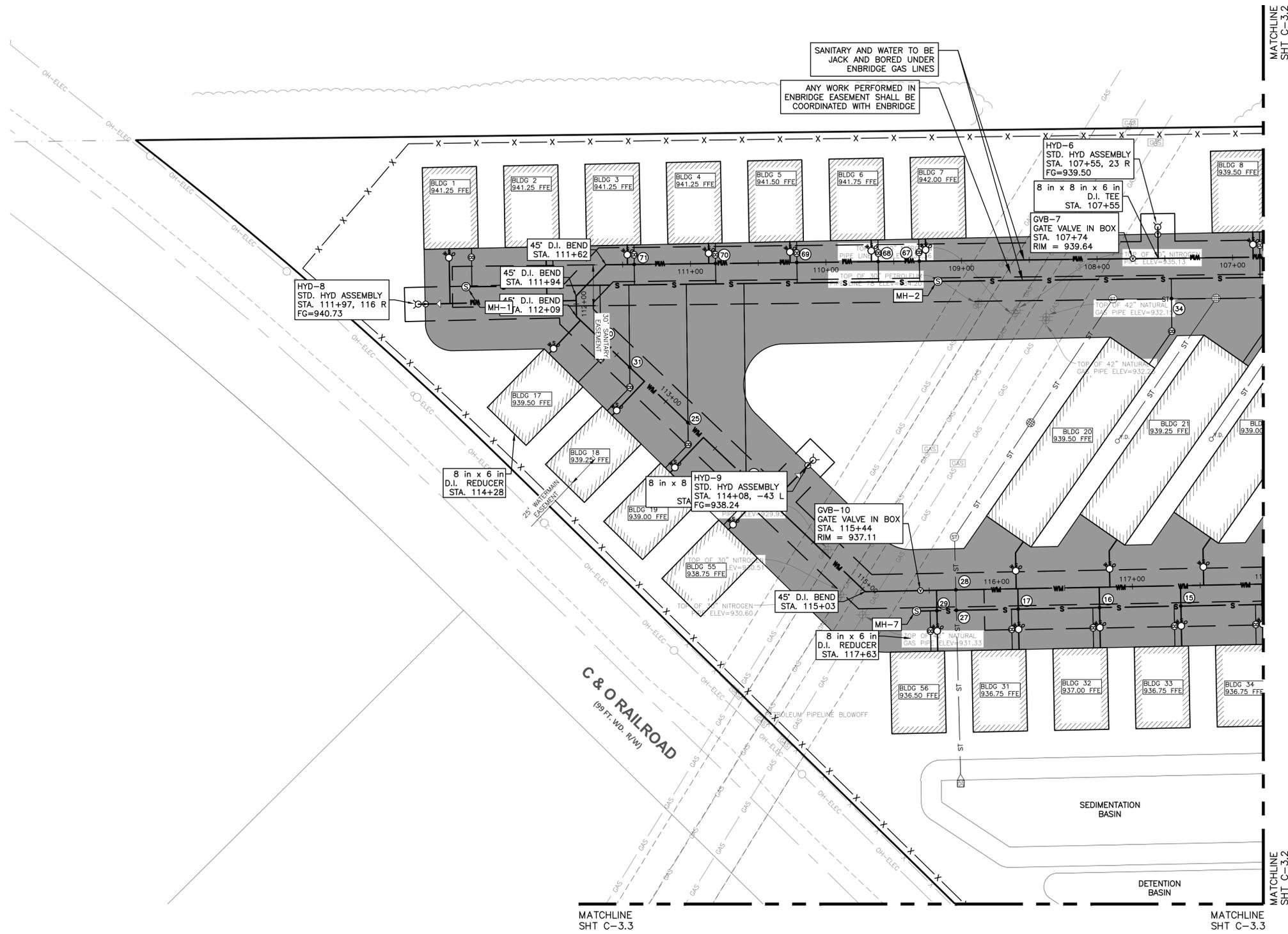
SCALE: 1" = 40'

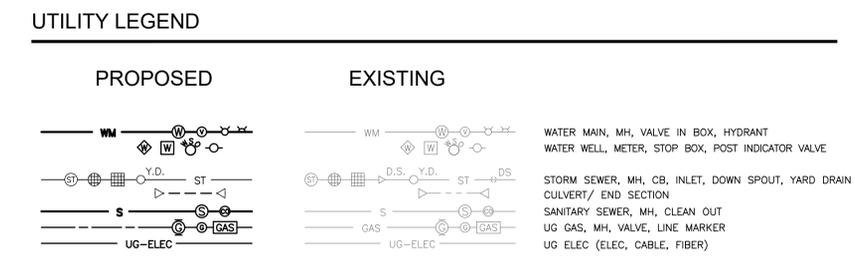
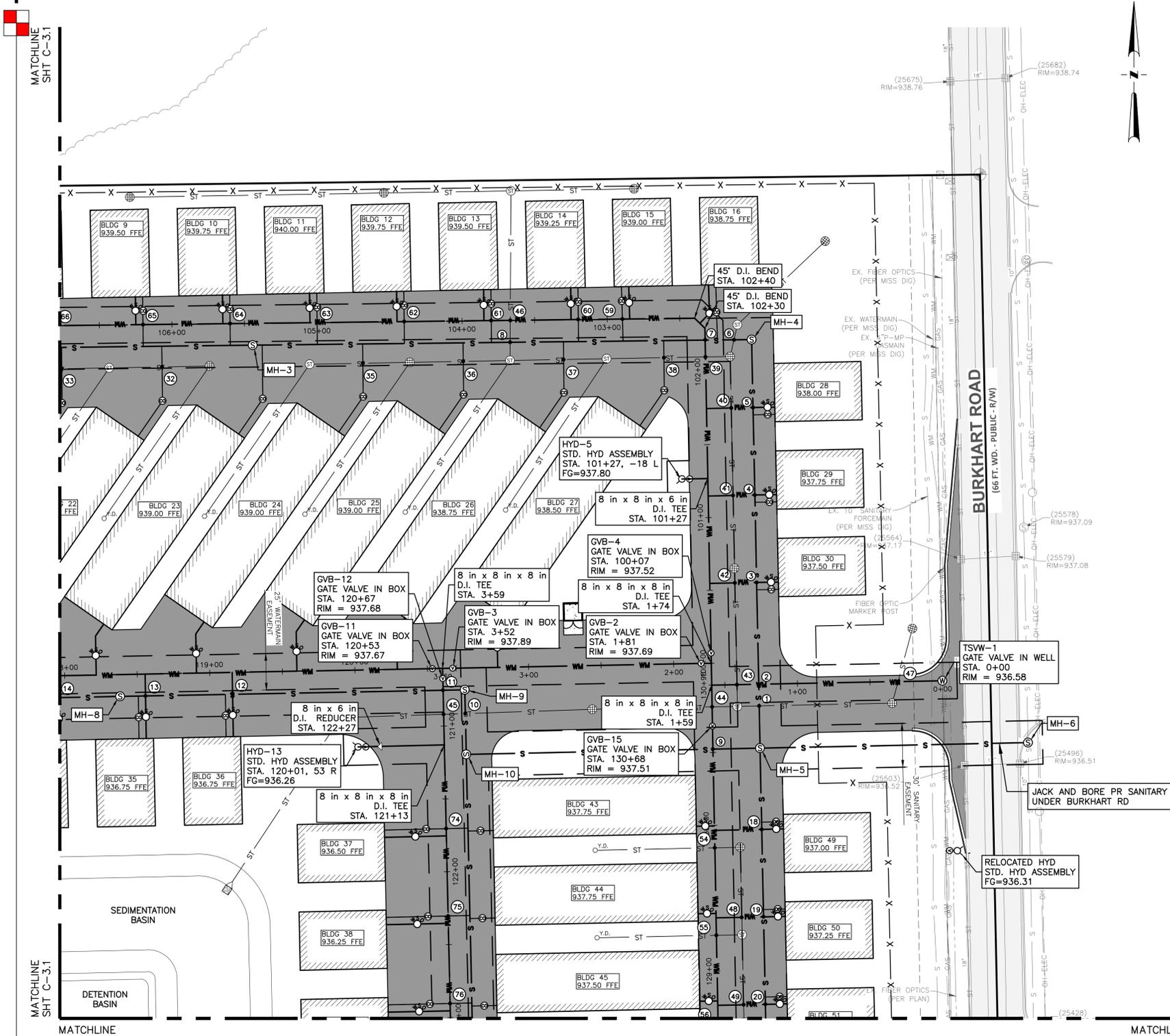
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-3.1

NOT FOR CONSTRUCTION





INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS

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MONUMENT ENGINEERING GROUP ASSOCIATES, INC.

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MONUMENTENGINEERING.COM

SERVICE DISABLED VETERAN OWNED
SMALL BUSINESS (SDVOSS)

ALLAN W. PRUSS
ENGINEER
NO. 6201043168

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

SANITARY SEWER & WM PLAN - EAST

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 40'

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-3.2

NOT FOR CONSTRUCTION



UTILITY LEGEND

PROPOSED	EXISTING	
		WATER MAIN, MH, VALVE IN BOX, HYDRANT
		WATER WELL, METER, STOP BOX, POST INDICATOR VALVE
		STORM SEWER, MH, CB, INLET, DOWN SPOUT, YARD DRAIN
		CULVERT/ END SECTION
		SANITARY SEWER, MH, CLEAN OUT
		UG GAS, MH, VALVE, LINE MARKER
		UG ELEC (ELEC, CABLE, FIBER)

INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS

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(OFFICE) 517-223-3512
MONUMENTENGINEERING.COM

SERVICE DISABLED VETERAN OWNED
SMALL BUSINESS (SDVOSS)

ALLAN W. PRUSS
ENGINEER
NO. 6201043168

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CLIENT :

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3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

SANITARY SEWER & WM PLAN - SOUTH

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

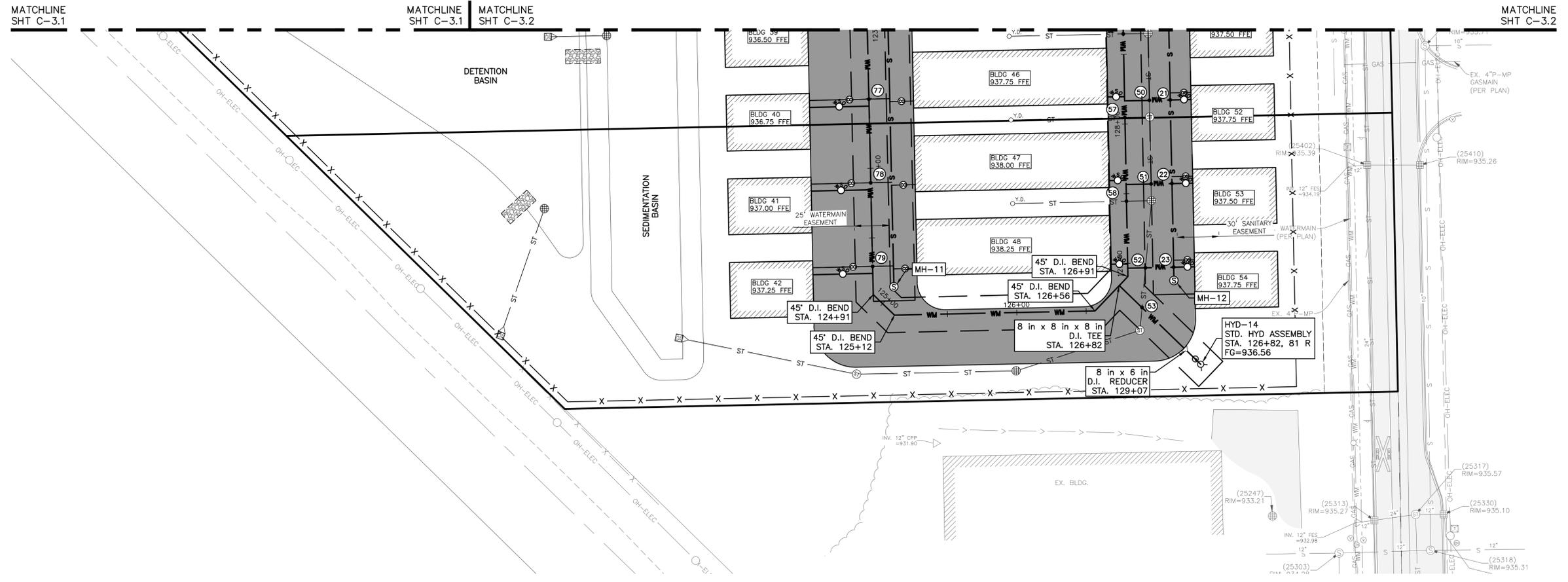
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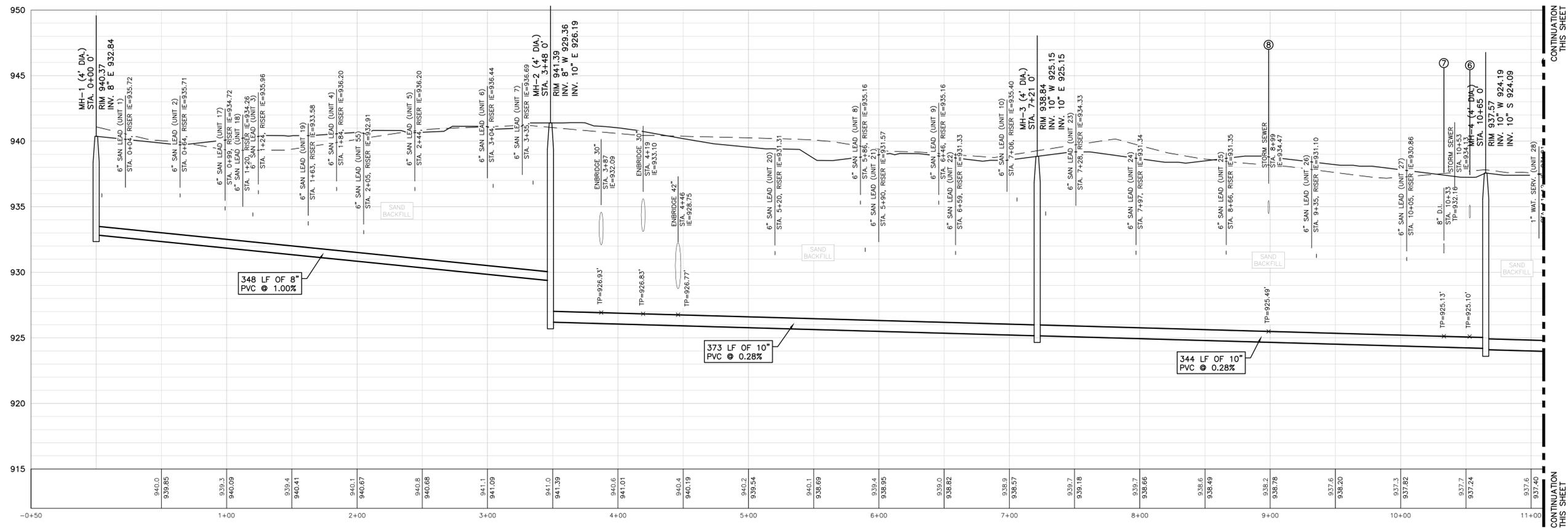
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DESIGN BY: BS
CHECK BY: AP

C-3.3

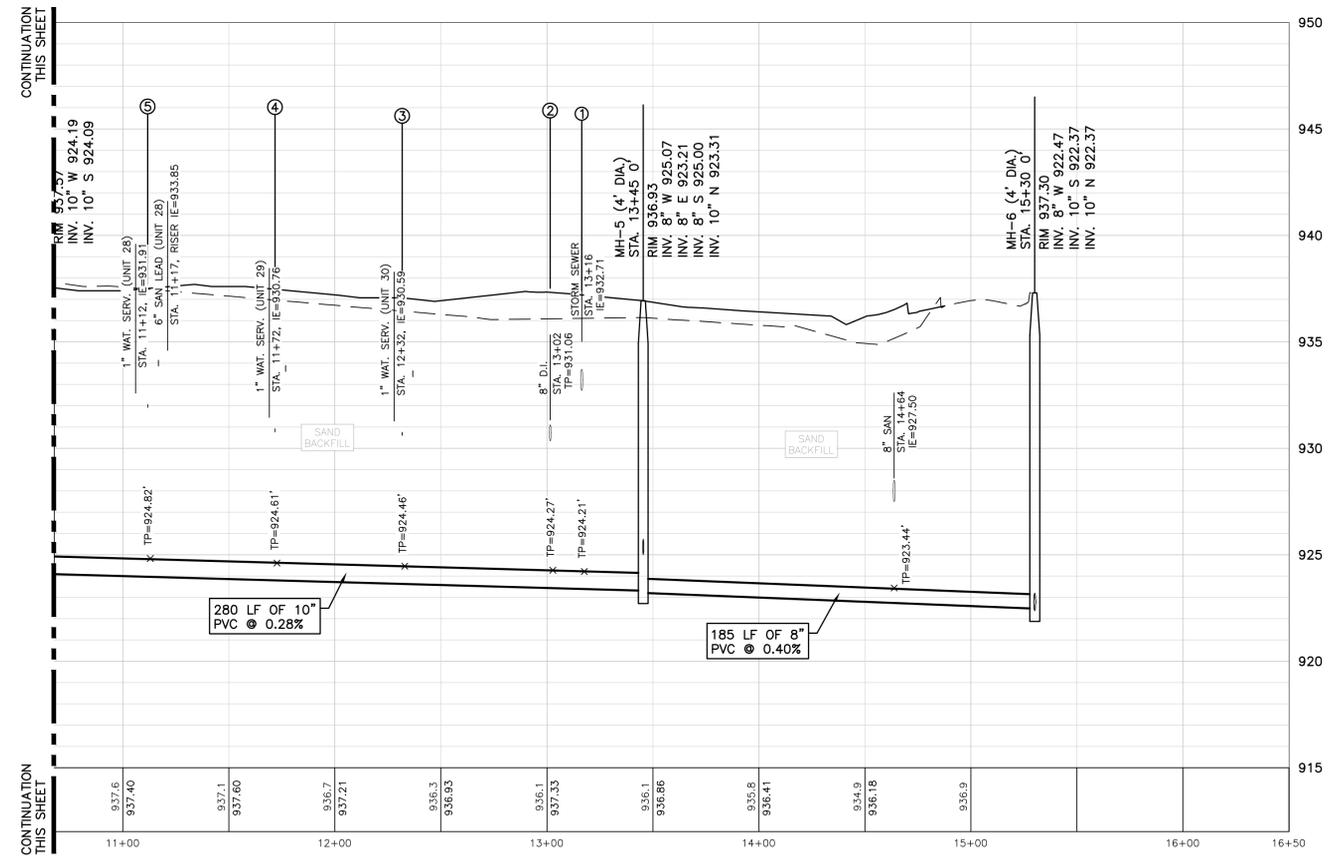
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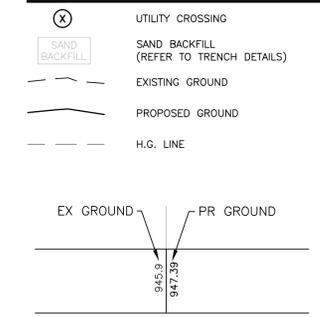
PR SSWR - MH-1 TO MH-6

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'

PROFILE LEGEND



NOTES

- SAND BACKFILL AND BEDDING TO BE MDOT CL II.
- MAINTAIN MINIMUM 18" VERTICAL CLEARANCE BETWEEN ALL UTILITIES.

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 MONUMENTENGINEERING.COM
 SERVICE DISABLED VETERAN OWNED
 SMALL BUSINESS (SDVOBS)

ALLAN W. PRUSS
 ENGINEER
 NO. 6201043168

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 www.missdig.org

CLIENT :
CHESTNUT DEVELOPMENT, LLC
 3800 CHILSON ROAD
 HOWELL, MI 48843
 POC: STEVE GRONOW
 517-552-2489

SANITARY SEWER PROFILES
 CHESTNUT SELF STORAGE
 TAX ID# 06-29-200-029
 PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
 HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

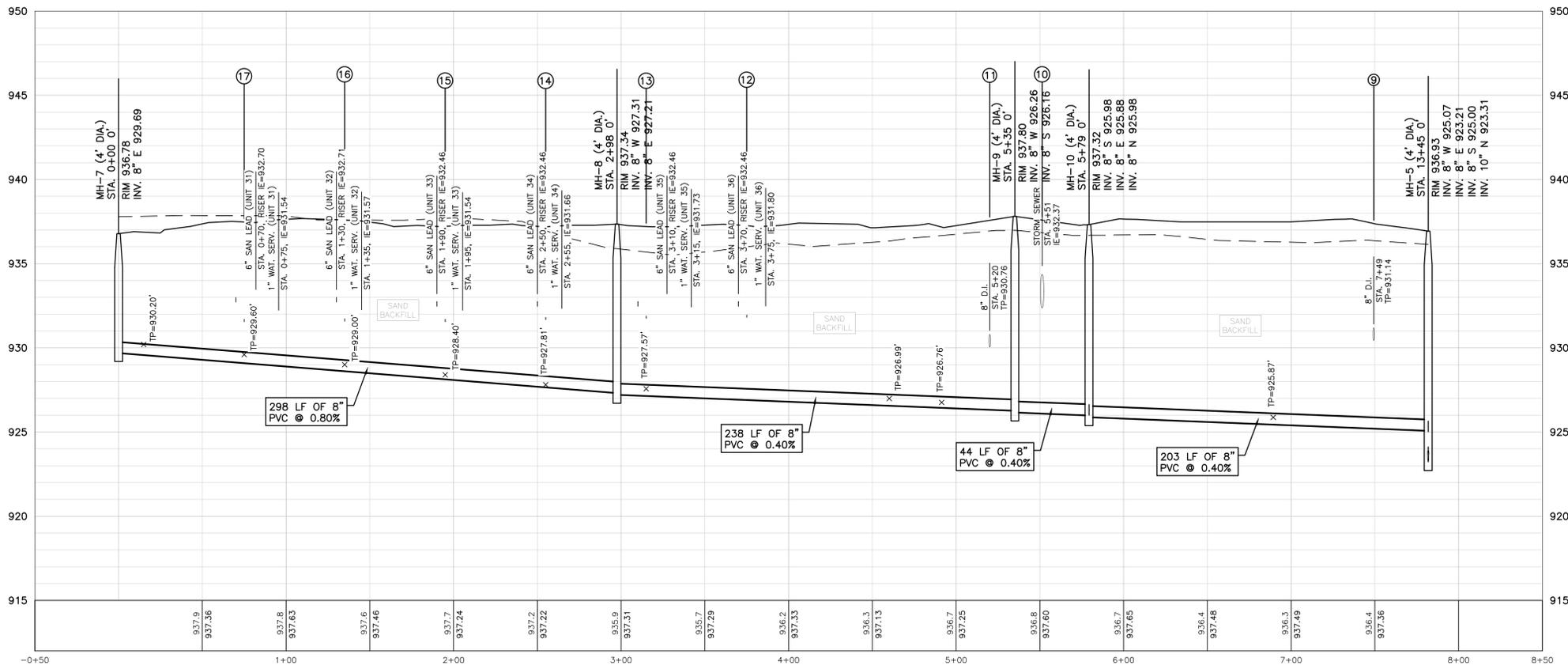
PROJECT NO: 22-286

SCALE: 1" = 40'

FIELD:
 DRAWN BY: CD
 DESIGN BY: BS
 CHECK BY: AP

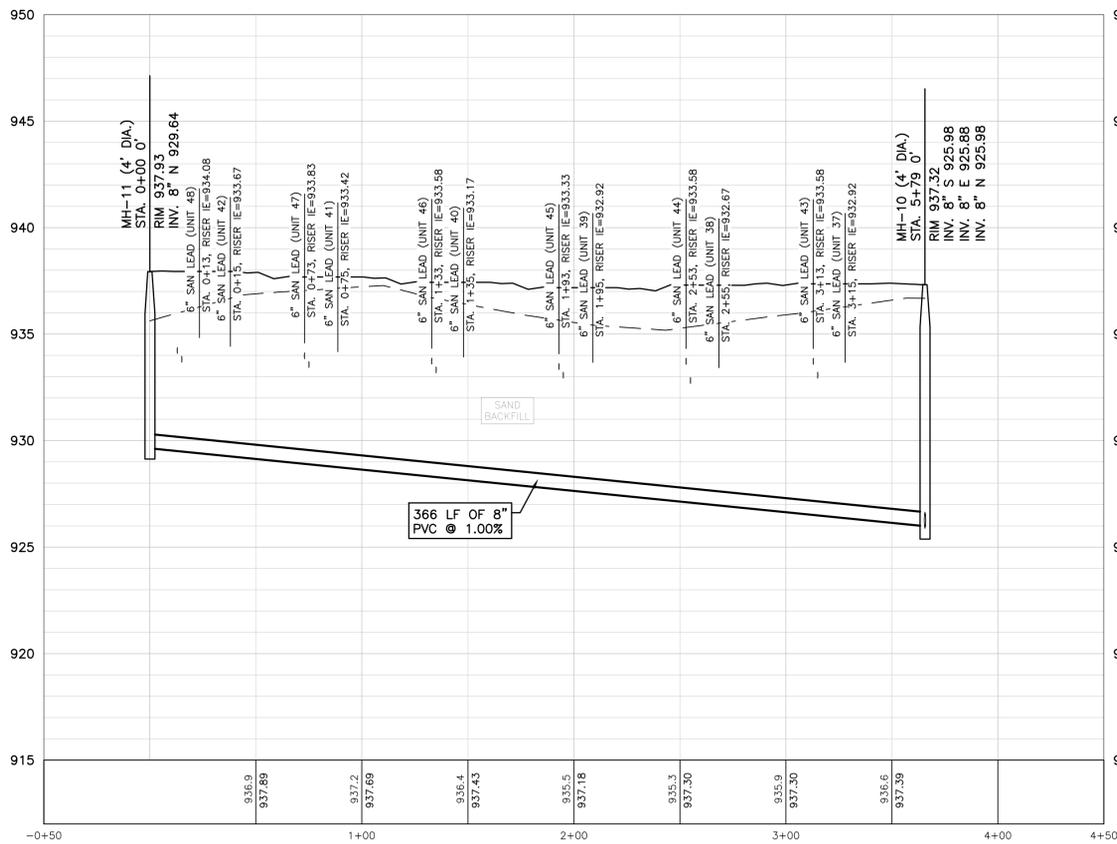
C-3.4

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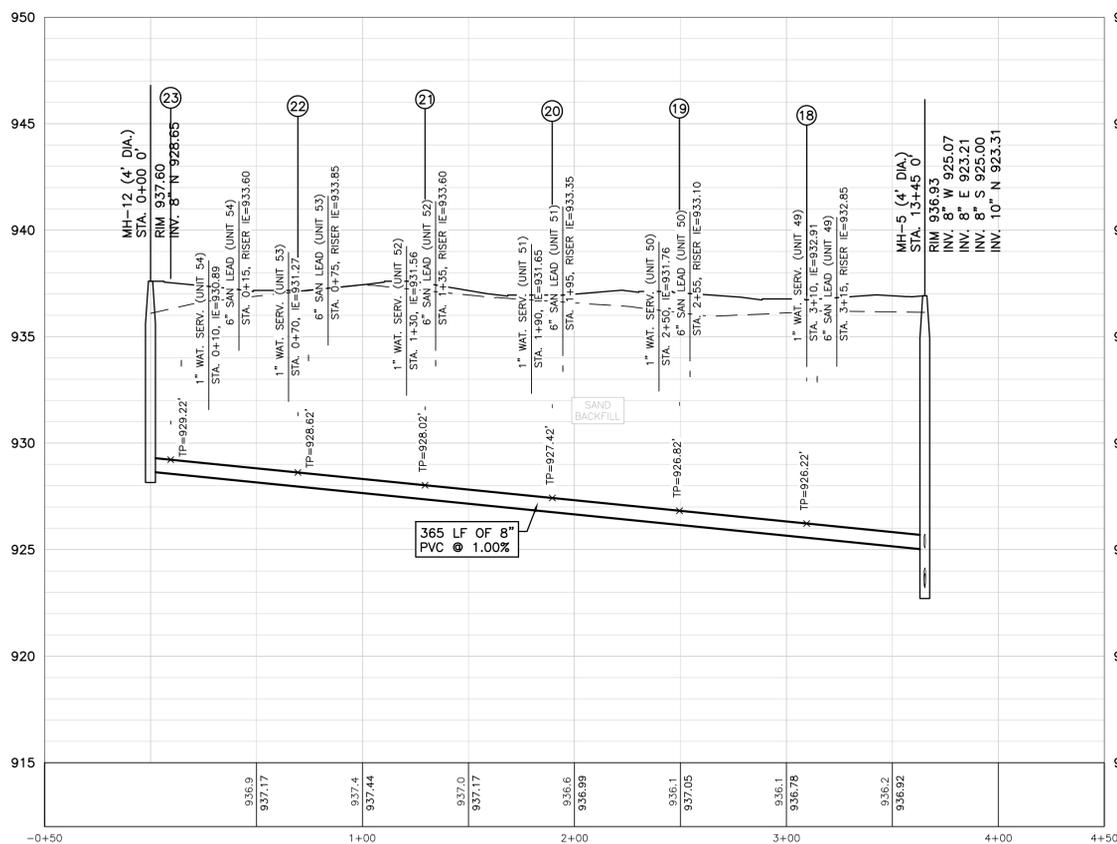
PR SSWR - MH-7 TO MH-5

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PR SSWR - MH-11 TO MH-10

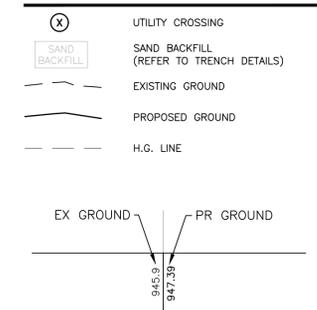
PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PR SSWR - MH-12 TO MH-5

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'

PROFILE LEGEND



NOTES

- SAND BACKFILL AND BEDDING TO BE MDOT CL II.
- MAINTAIN MINIMUM 18" VERTICAL CLEARANCE BETWEEN ALL UTILITIES.



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517-552-2489

SANITARY SEWER PROFILES
CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

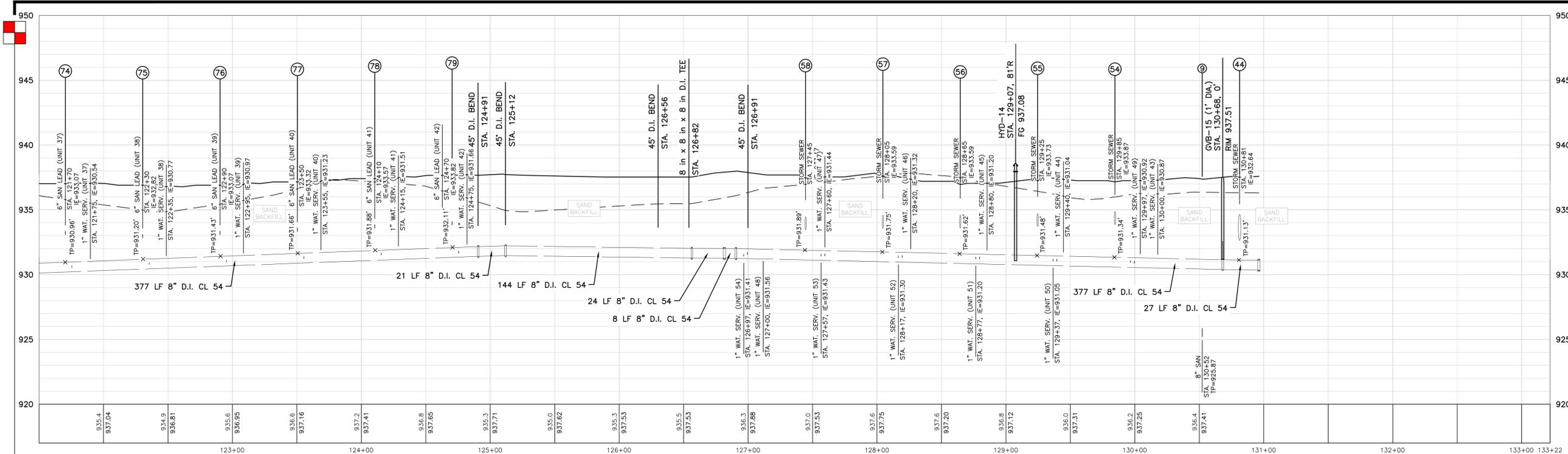
PROJECT NO: 22-286

SCALE: 1" = 40'
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

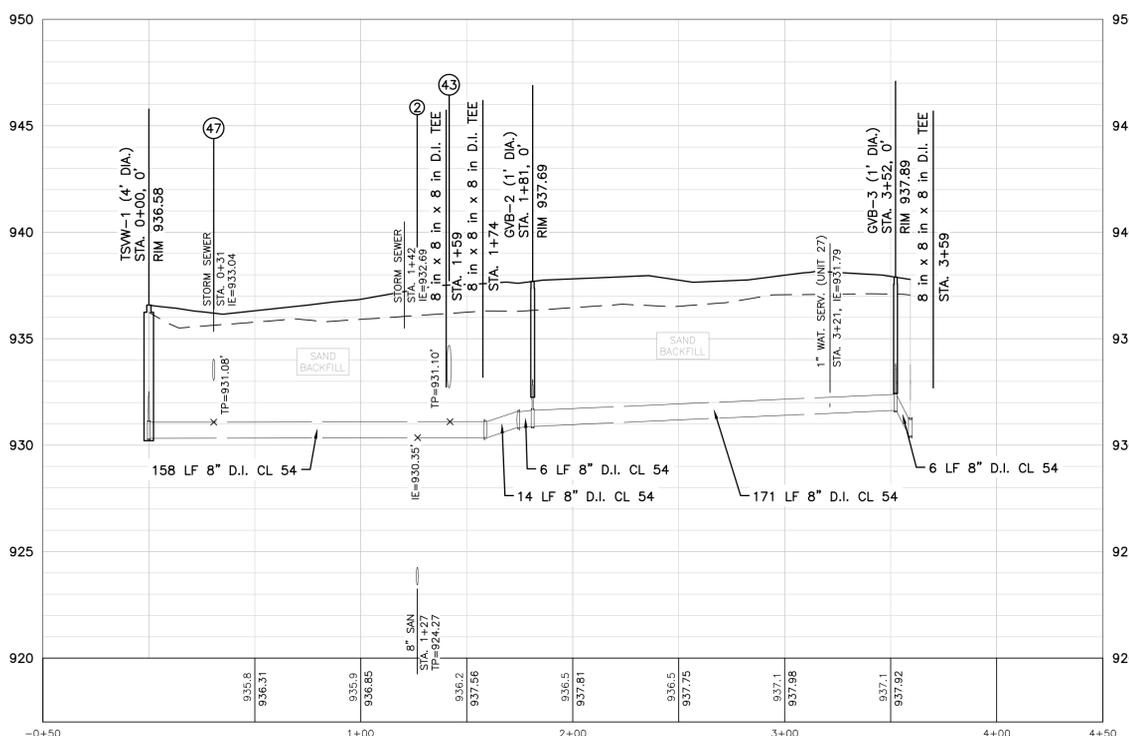
C-3.5

NOT FOR CONSTRUCTION



PR WM - STA 100+00 TO 133+22

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'

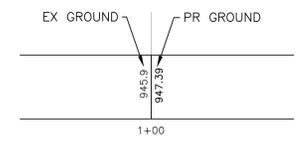


PR WM - STA 0+00 TO 3+59

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'

PROFILE LEGEND

- UTILITY CROSSING (REFER TO TRENCH DETAILS)
- SAND BACKFILL (REFER TO TRENCH DETAILS)
- EXISTING GROUND
- PROPOSED GROUND
- H.G. LINE



NOTES

1. SAND BACKFILL AND BEDDING TO BE MDOT CL II.
2. MAINTAIN MINIMUM 18" VERTICAL CLEARANCE BETWEEN ALL UTILITIES.

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Engineering Group Associates, Inc.

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SERVICE DISABLED VETERAN OWNED
SMALL BUSINESS (SDVOSB)

ALLAN W. PRUSS
ENGINEER
NO. 6201043168

Allan W. Pruss

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

WATER MAIN PROFILES

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 40'
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-3.7

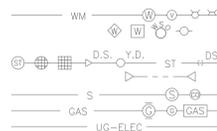
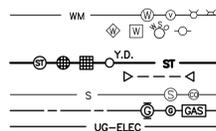
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UTILITY LEGEND

PROPOSED

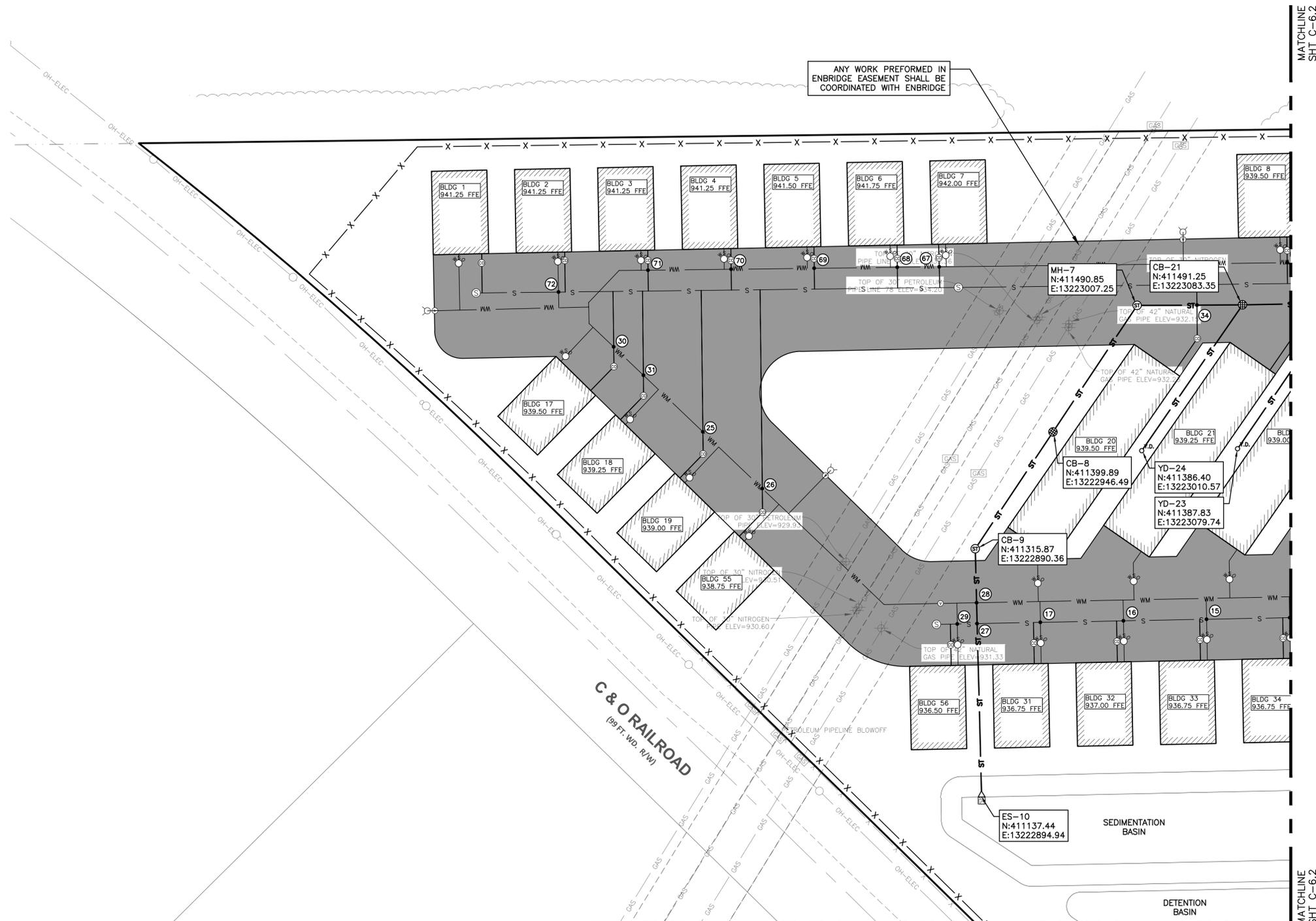
EXISTING



WATER MAIN, MH, VALVE IN BOX, HYDRANT
WATER WELL, METER, STOP BOX, POST INDICATOR VALVE
STORM SEWER, MH, CB, INLET, DOWN SPOUT, YARD DRAIN
CULVERT/ END SECTION
SANITARY SEWER, MH, CLEAN OUT
UG GAS, MH, VALVE, LINE MARKER
UG ELEC (ELEC, CABLE, FIBER)



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MATCHLINE SHT C-6.2

MATCHLINE SHT C-6.3

MATCHLINE SHT C-6.3

STORM SEWER NOTES

- "IN" & "CB" STRUCTURES SHALL HAVE EJIW 1020 FRAME WITH TYPE M1 GRATE.
- CURB "IN" & "CB" STRUCTURES SHALL HAVE EJIW 7010 FRAME WITH TYPE M1 GRATE.
- STORM "MH" STRUCTURES SHALL HAVE EJIW 1040 FRAME WITH TYPE A PERFORATED COVER.
- END SECTIONS 18" AND LARGER SHALL HAVE ANIMAL GRATES.

INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS

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ALLAN W. PRUSS
ENGINEER
NO. 6201043168

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

STORM SEWER QUANTITIES

QTY	UNIT	ITEM
3,509	LF	12" HDPE
535	LF	15" HDPE
862	LF	18" HDPE
1,035	LF	24" HDPE
138	LF	36" HDPE
14	EA	YARD DRAIN
8	EA	2' INLET
35	EA	4' MANHOLE
1	EA	12" FLARED END SECTION
1	EA	18" FLARED END SECTION
2	EA	24" FLARED END SECTION
1	EA	36" FLARED END SECTION

NOTE

SEE PROFILES ON SHEETS C-6.4 TO C-6.8 FOR QUANTITY DETAILS

STORM SEWER PLAN - WEST

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	DESCRIPTION
5/28/2024	PLAN SUBMITTALS/REVISIONS
5/30/2024	PRELIMINARY/FINAL SITE PLAN SUBMITTAL
7/23/2024	REVISED SITE PLAN SUBMISSION
7/23/2024	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE: 02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 40'

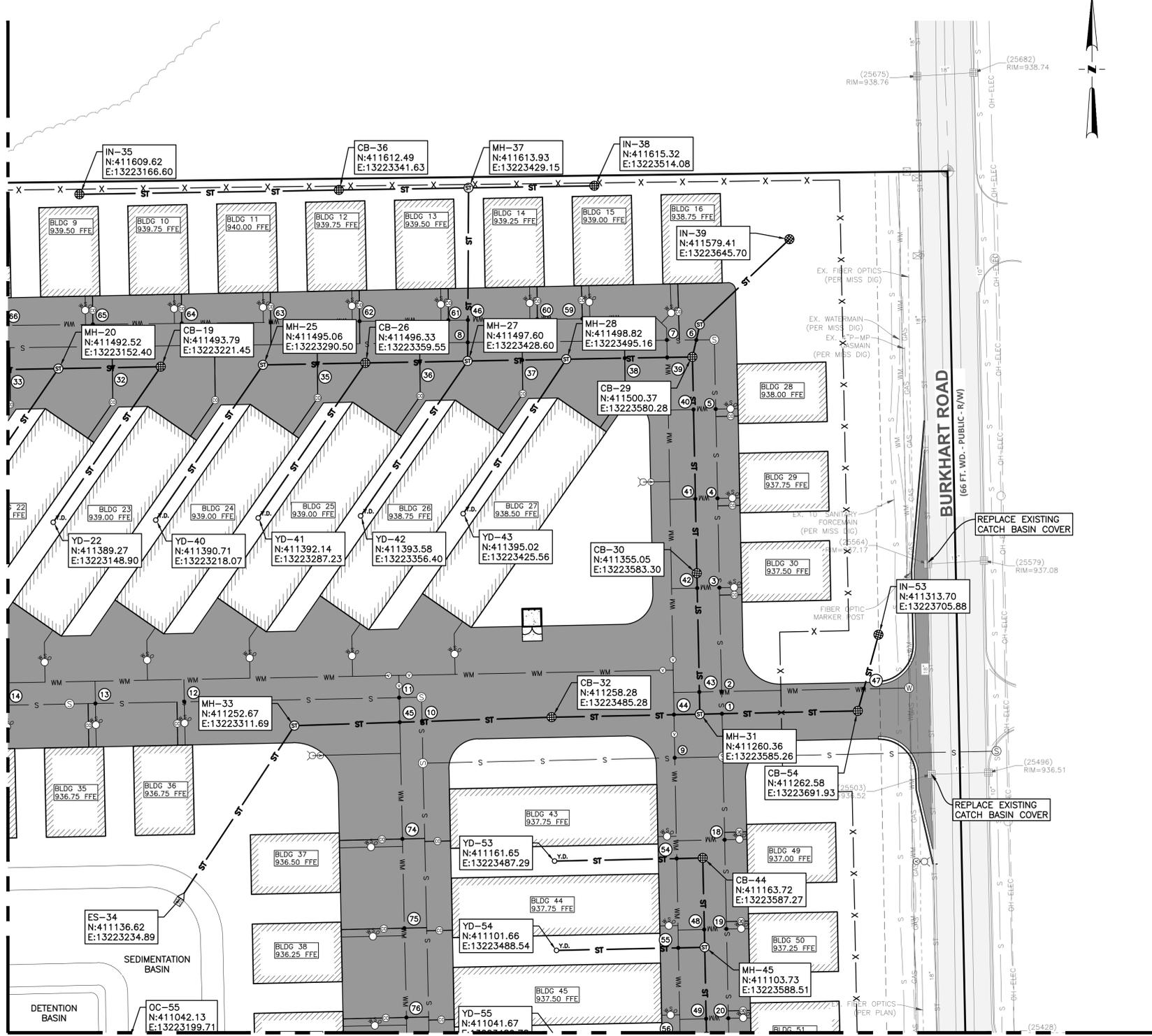
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DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-6.1

NOT FOR CONSTRUCTION

MATCHLINE
SHT C-6.1

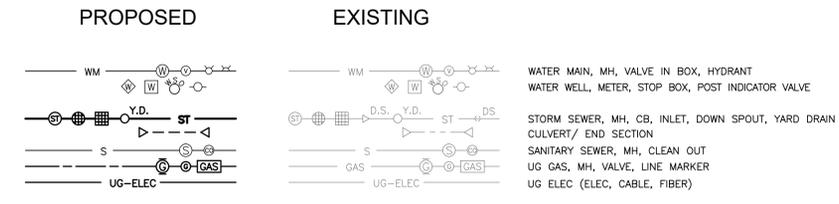
MATCHLINE
SHT C-6.1



MATCHLINE
SHT C-6.3

MATCHLINE
SHT C-6.3

UTILITY LEGEND



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ALLAN W. PRUSS
ENGINEER
NO. 6201043168

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

STORM SEWER PLAN - EAST

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

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FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 40'
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-6.2

NOT FOR CONSTRUCTION



UTILITY LEGEND

PROPOSED	EXISTING	
WM	WM	WATER MAIN, MH, VALVE IN BOX, HYDRANT
Y.D.	Y.D.	WATER WELL, METER, STOP BOX, POST INDICATOR VALVE
ST	ST	STORM SEWER, MH, CB, INLET, DOWN SPOUT, YARD DRAIN
S	S	CULVERT/ END SECTION
GAS	GAS	SANITARY SEWER, MH, CLEAN OUT
UG-ELEC	UG-ELEC	UG GAS, MH, VALVE, LINE MARKER
		UG ELEC (ELEC, CABLE, FIBER)

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POC: STEVE GRONOW
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STORM SEWER PLAN - SOUTH

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
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FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

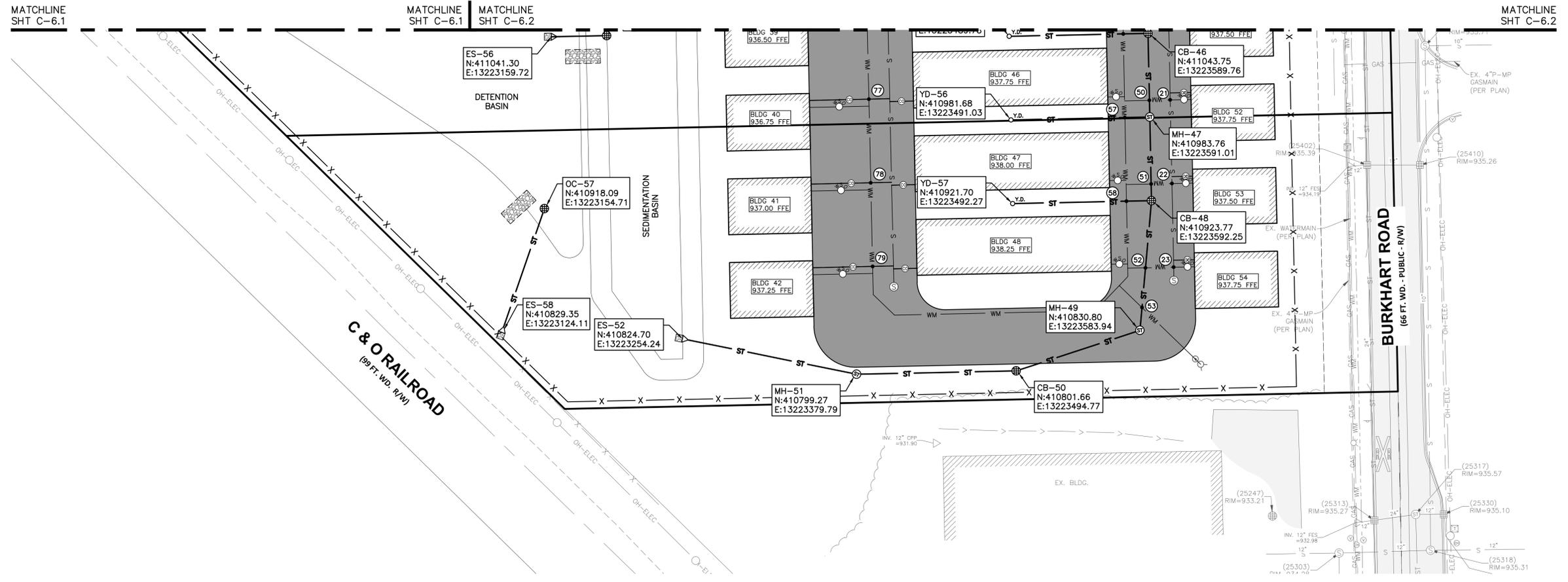
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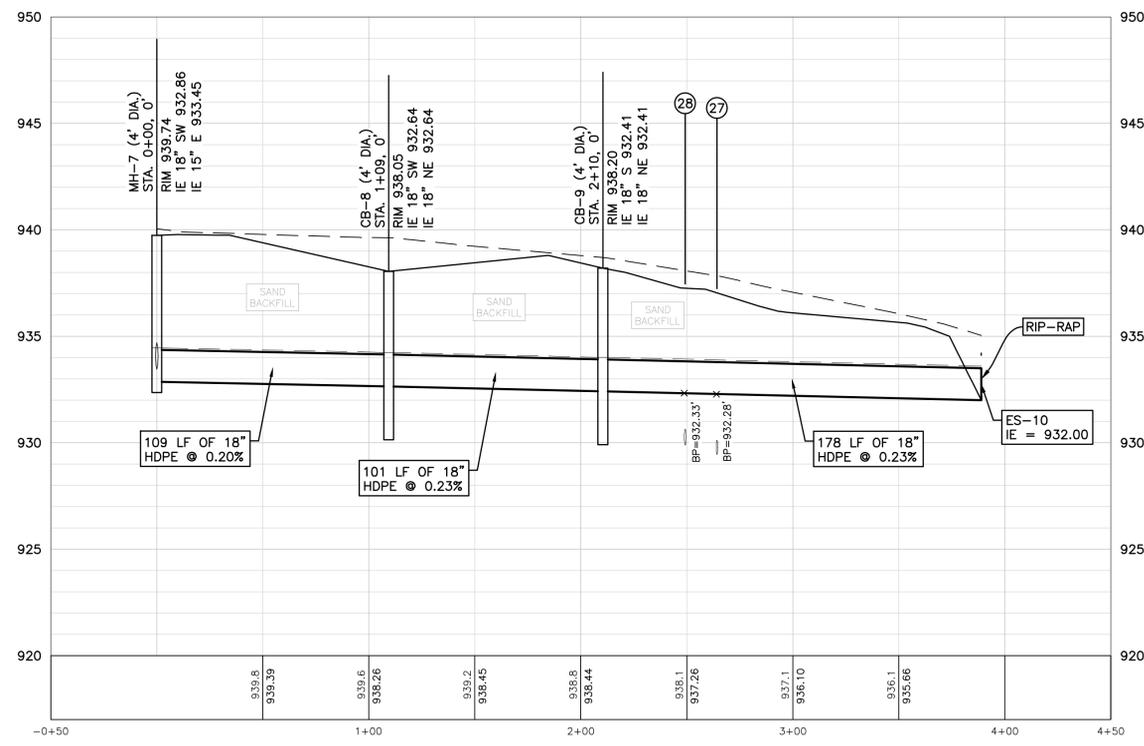
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DESIGN BY: BS
CHECK BY: AP

C-6.3

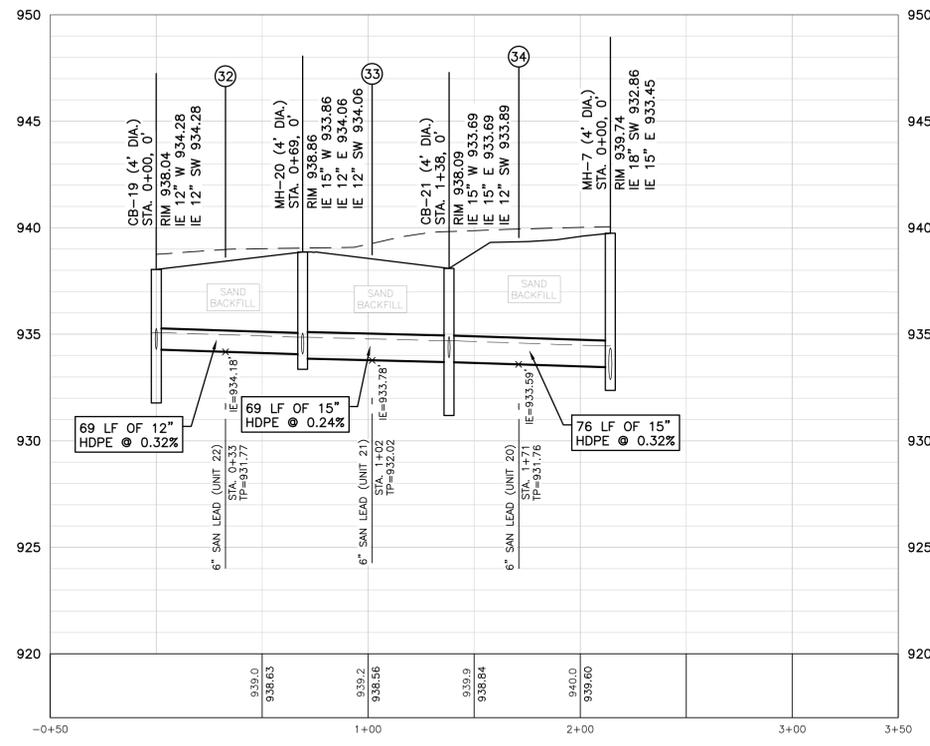
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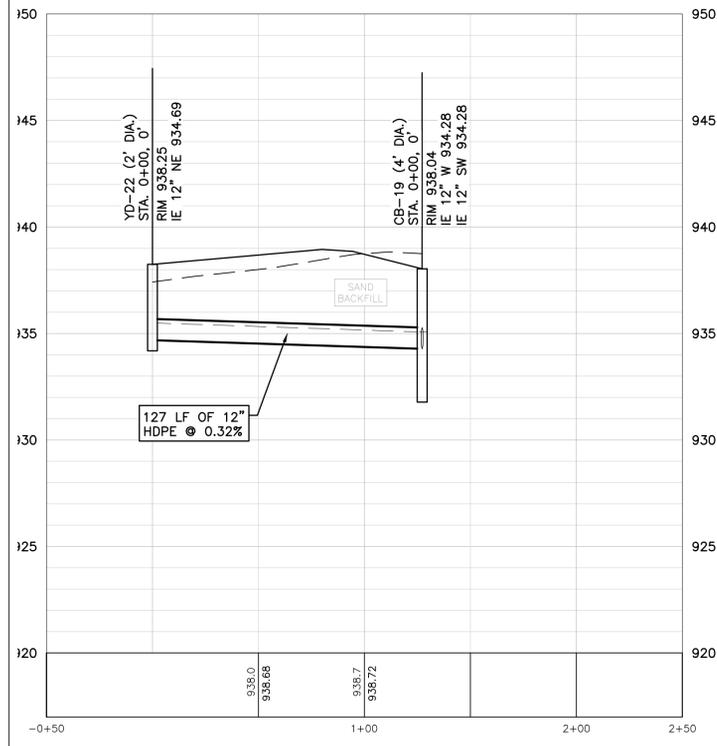
PR STRM - IN-1 TO ES-10

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



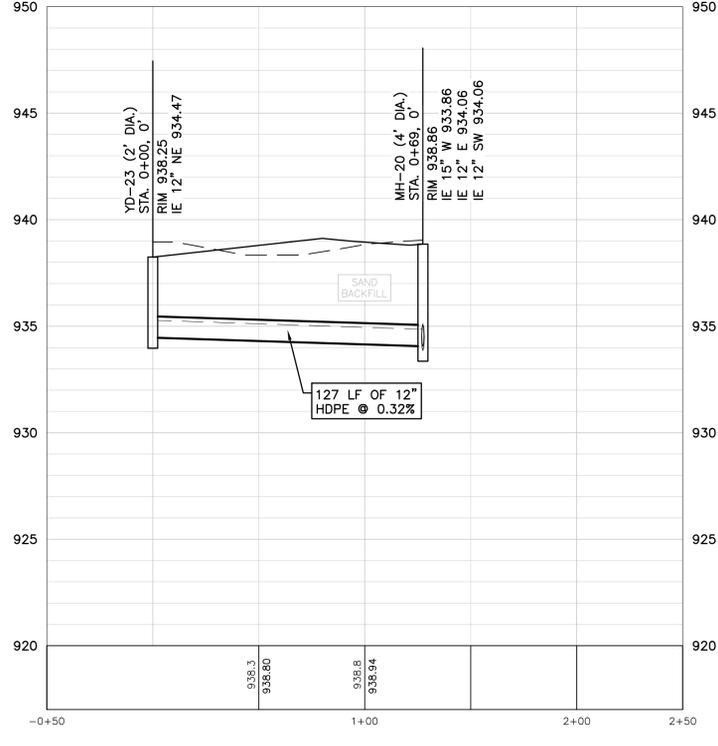
PR STRM - CB-19 TO MH-7

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



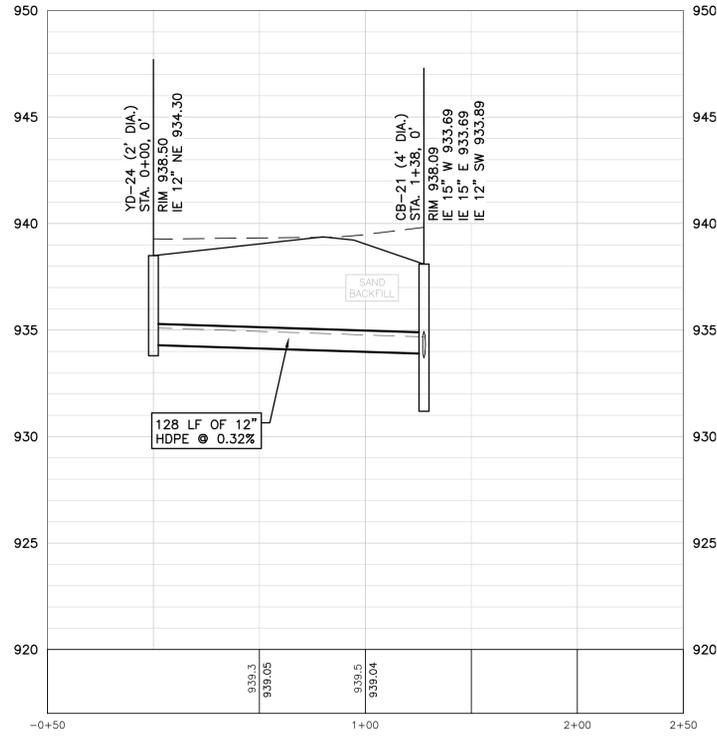
PR STRM - YD-22 TO CB-19

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PR STRM - YD-23 TO MH-20

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PR STRM - YD-24 TO CB-21

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'

PROFILE LEGEND

- (X) UTILITY CROSSING
- SAND BACKFILL (REFER TO TRENCH DETAILS)
- EXISTING GROUND
- PROPOSED GROUND
- H.G. LINE

EX GROUND PR GROUND

1+00

- NOTES**
- SAND BACKFILL AND BEDDING TO BE MDOT CL.II.
 - MAINTAIN MINIMUM 18" VERTICAL CLEARANCE BETWEEN ALL UTILITIES.

INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS

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ENGINEER
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3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

STORM SEWER PROFILES

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

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FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

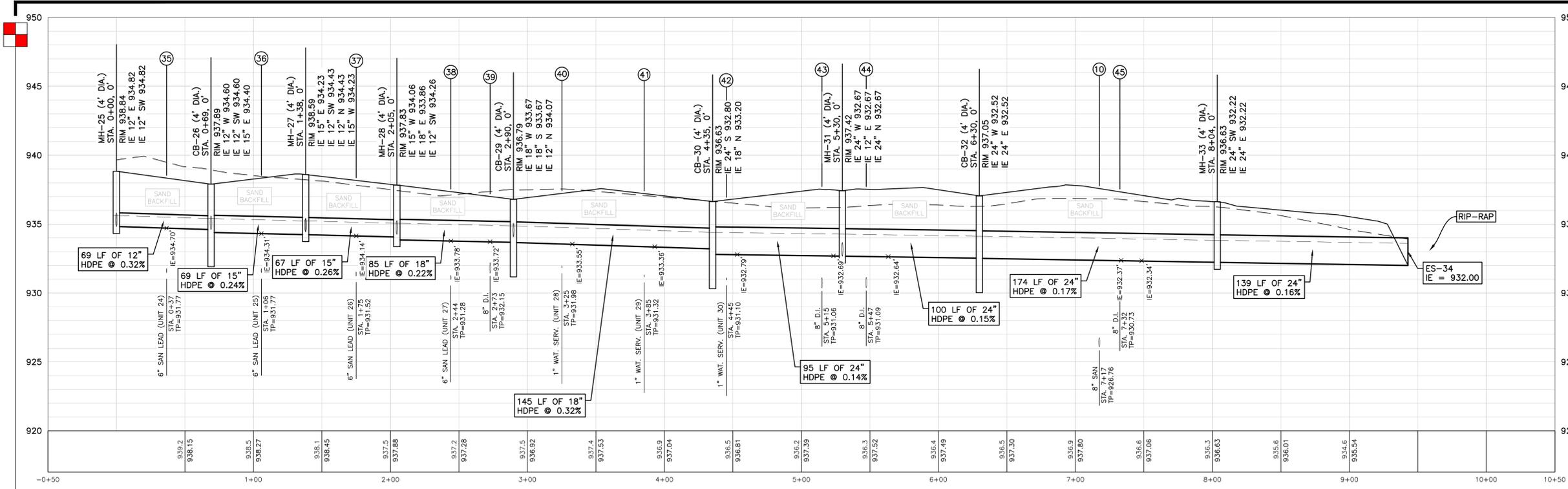
SCALE: 1" = 40'

0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

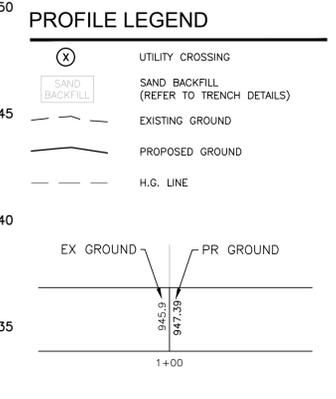
C-6.4

NOT FOR CONSTRUCTION



PR STRM - MH-25 TO ES-34

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



- NOTES**
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INNOVATIVE GEOSPATIAL & ENGINEERING SOLUTIONS

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Engineering Group Associates, Inc.

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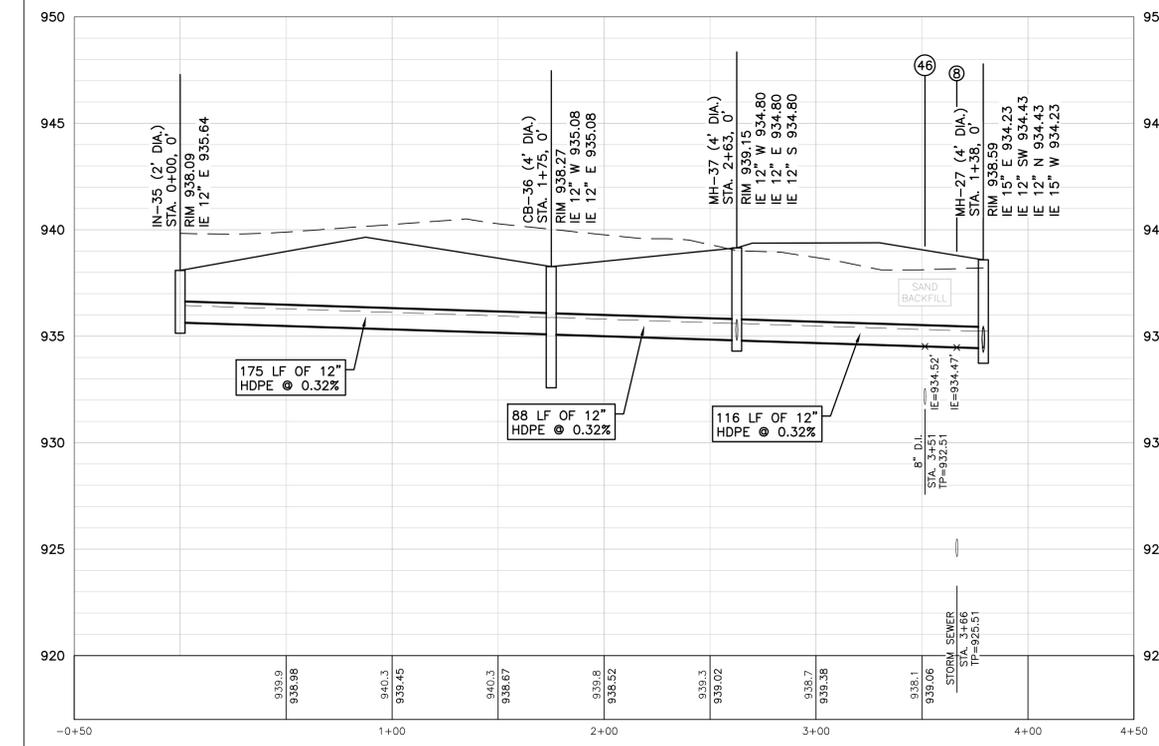
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CLIENT :

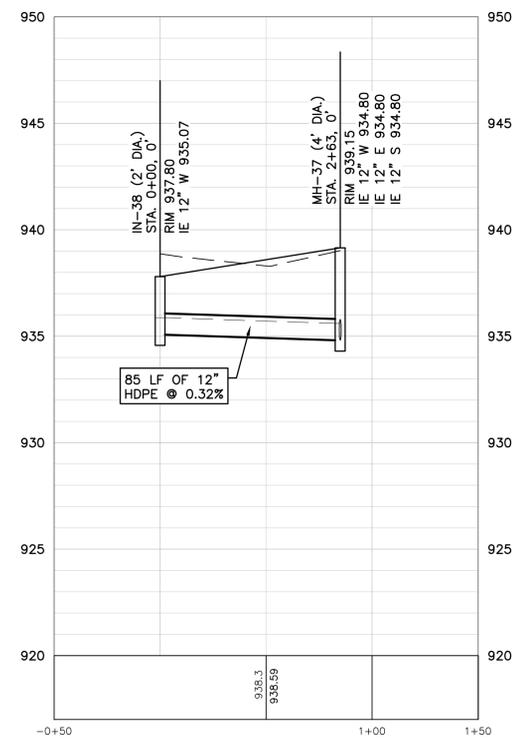
CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489



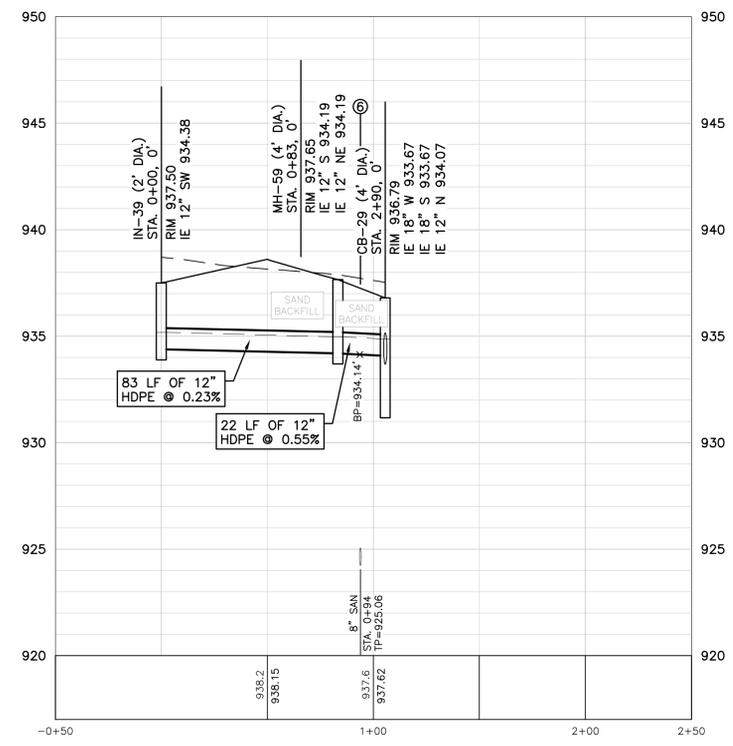
PR STRM - IN-35 TO MH-27

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PR STRM - IN-38 TO MH-37

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PR STRM - IN-39 TO CB-29

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'

STORM SEWER PROFILES

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
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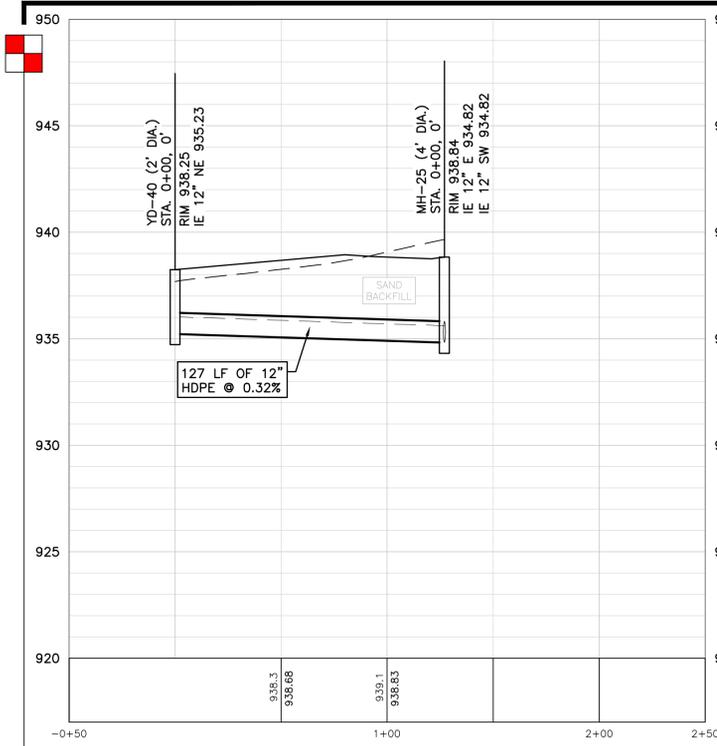
PROJECT NO: 22-286

SCALE: 1" = 40'
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
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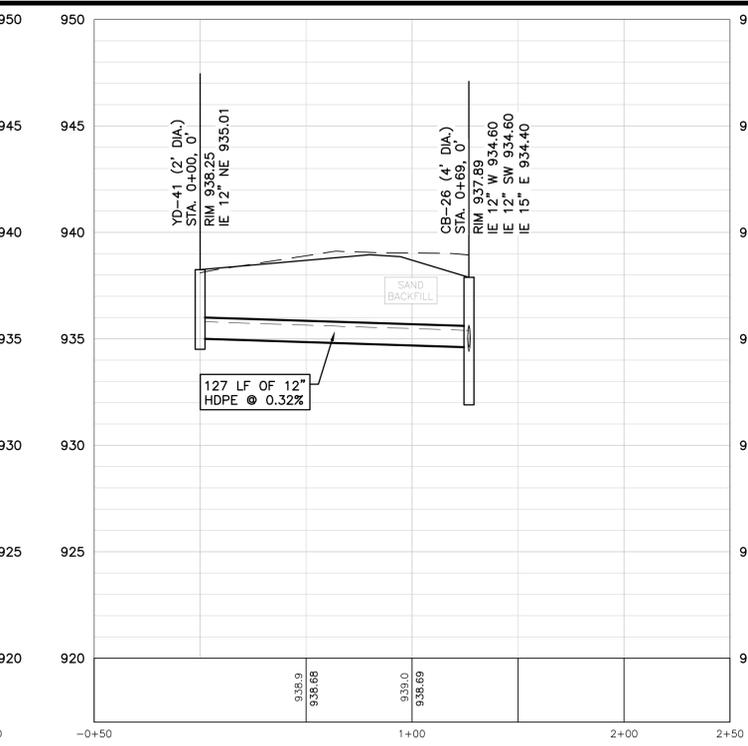
C-6.5

NOT FOR CONSTRUCTION



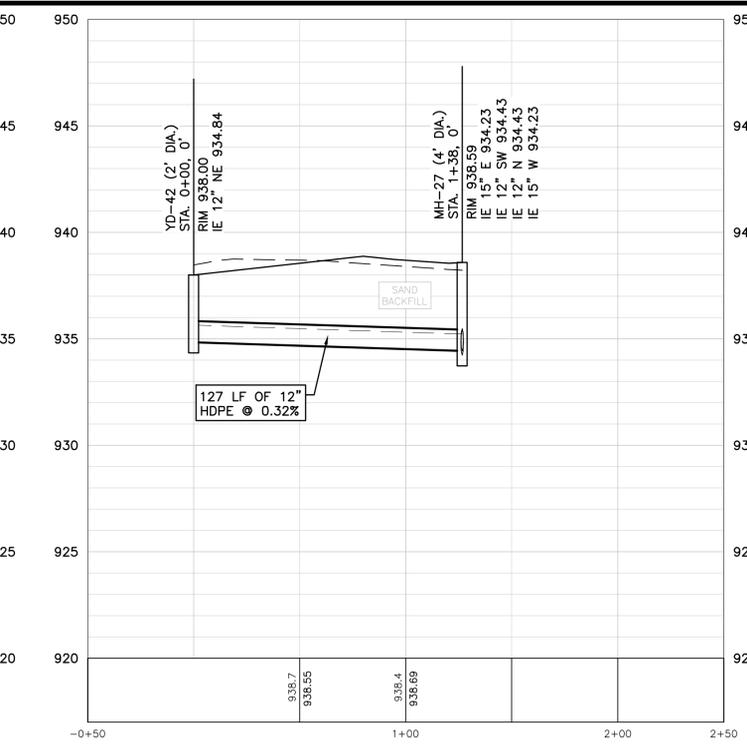
PR STRM - YD-40 TO MH-25

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



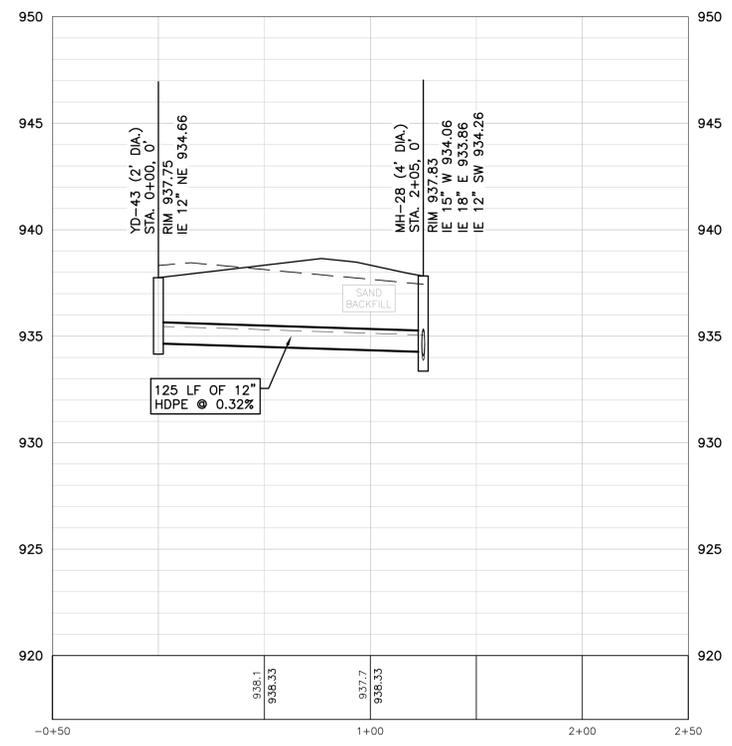
PR STRM - YD-41 TO CB-26

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



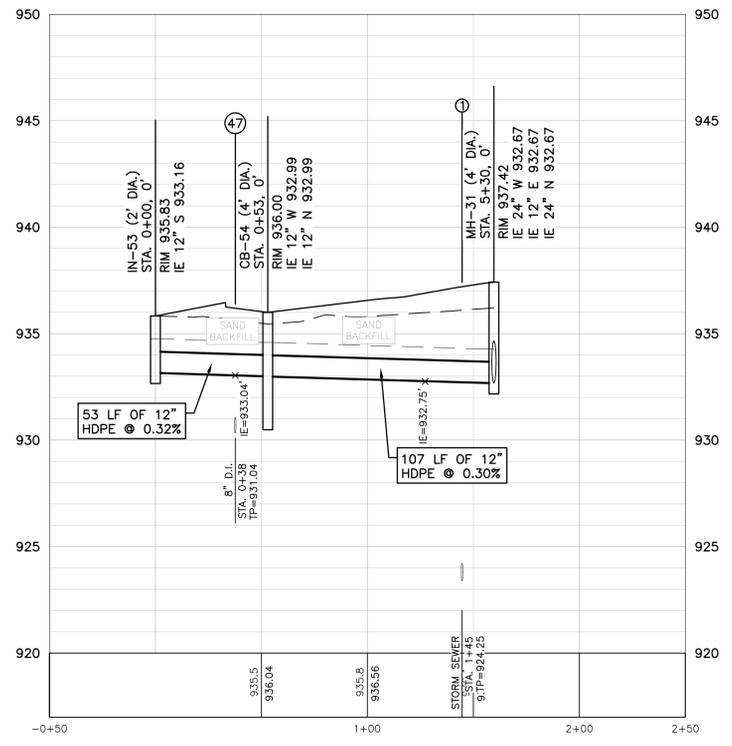
PR STRM - YD-42 TO MH-27

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



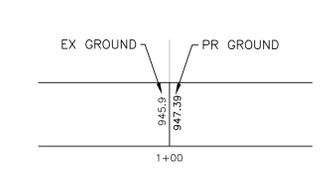
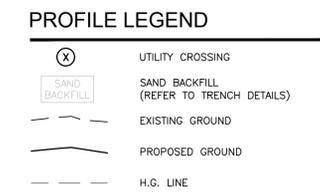
PR STRM - YD-43 TO MH-28

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PR STRM - IN-53 TO MH-31

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



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HOWELL, MI 48843

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517-552-2489

STORM SEWER PROFILES

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
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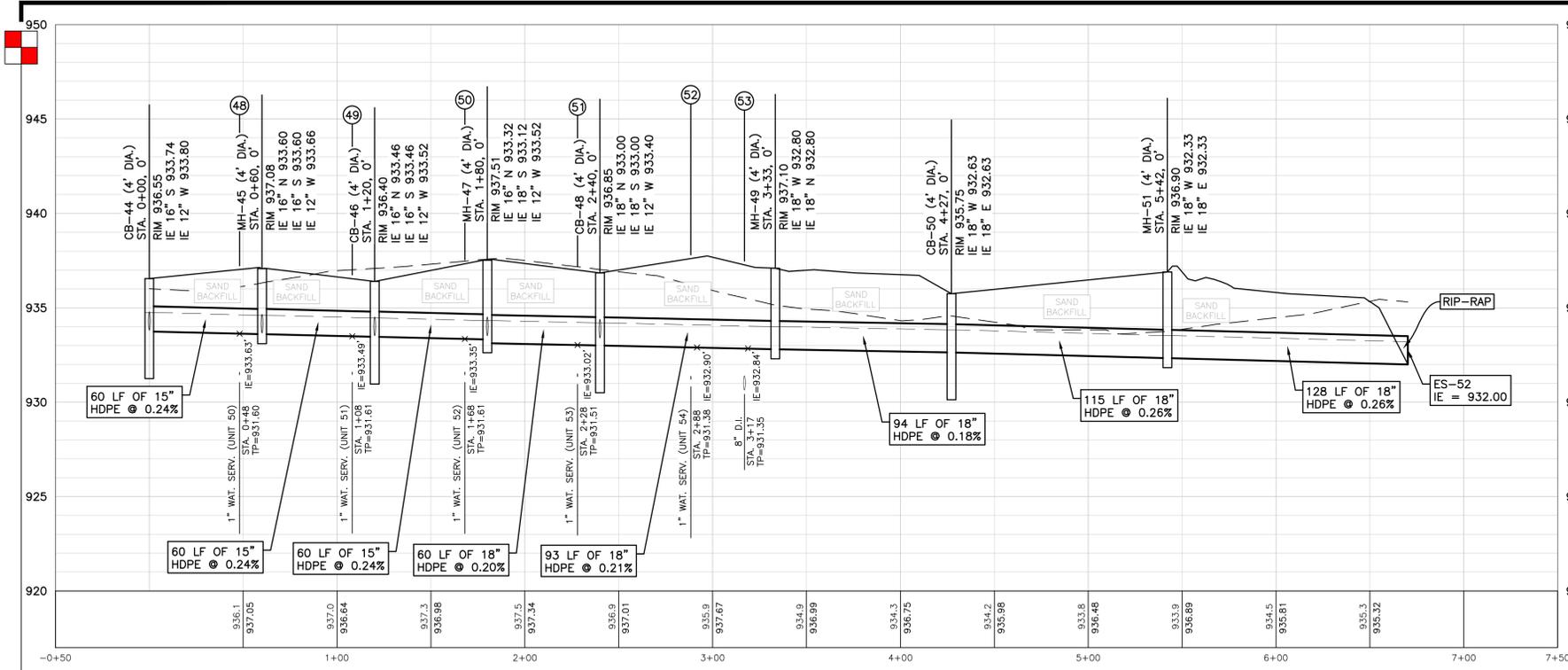
PROJECT NO: 22-286

SCALE: 1" = 40'

FIELD:
DRAWN BY: CD
DESIGN BY: BS
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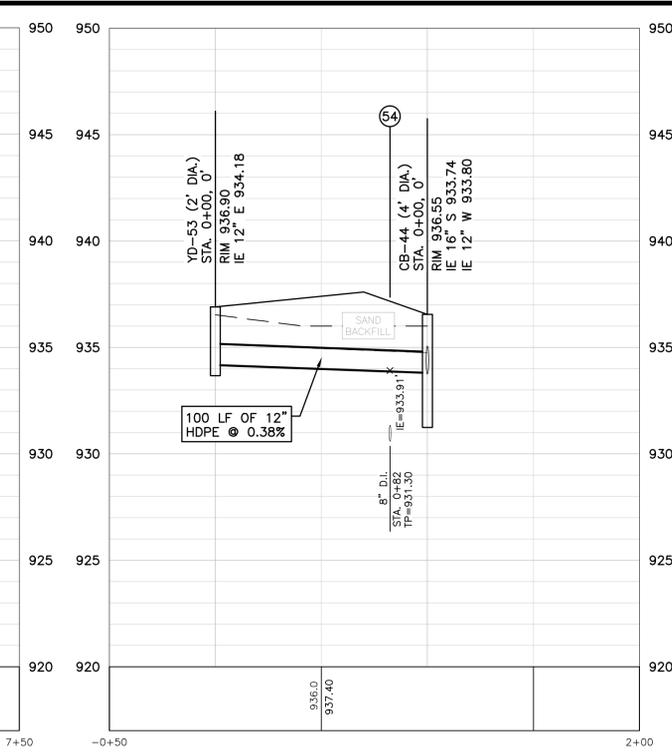
C-6.6

NOT FOR CONSTRUCTION



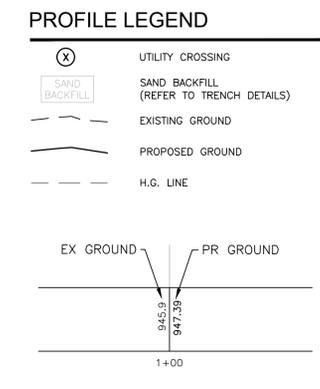
PR STRM - CB-44 TO ES-52

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'

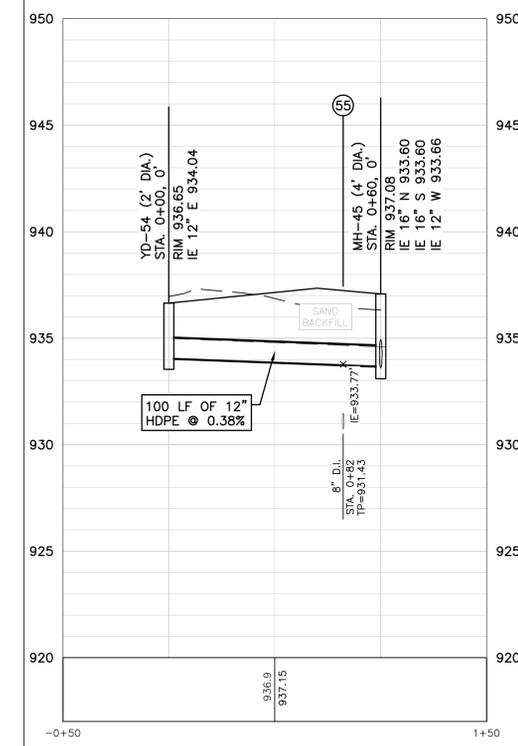


PR STRM - YD-53 TO CB-44

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'

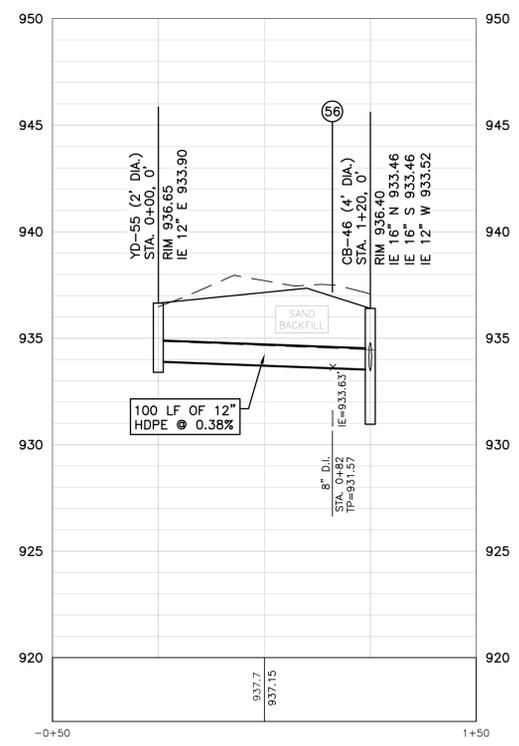


- NOTES**
- SAND BACKFILL AND BEDDING TO BE MDOT CL.II.
 - MAINTAIN MINIMUM 18" VERTICAL CLEARANCE BETWEEN ALL UTILITIES.



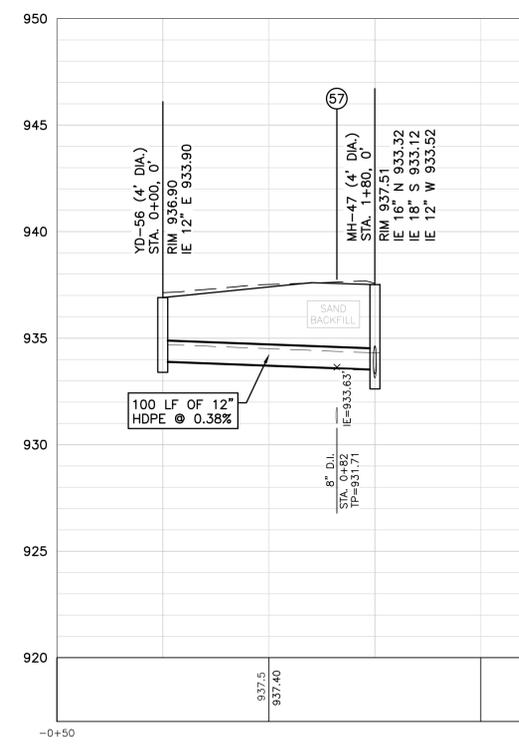
PR STRM - YD-54 TO MH-45

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



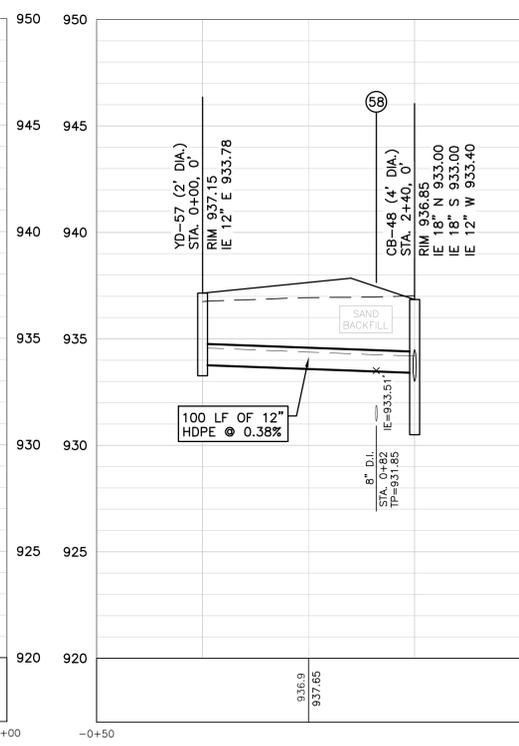
PR STRM - YD-55 TO CB-46

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PR STRM - YD-56 TO MH-47

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'



PR STRM - YD-57 TO CB-48

PROFILE SCALE
HORIZ: 1"=40'
VERT: 1"=4'

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FIELD:
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C-6.7

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BENCHMARKS

DATUM: NAVD88

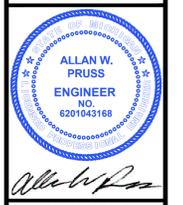
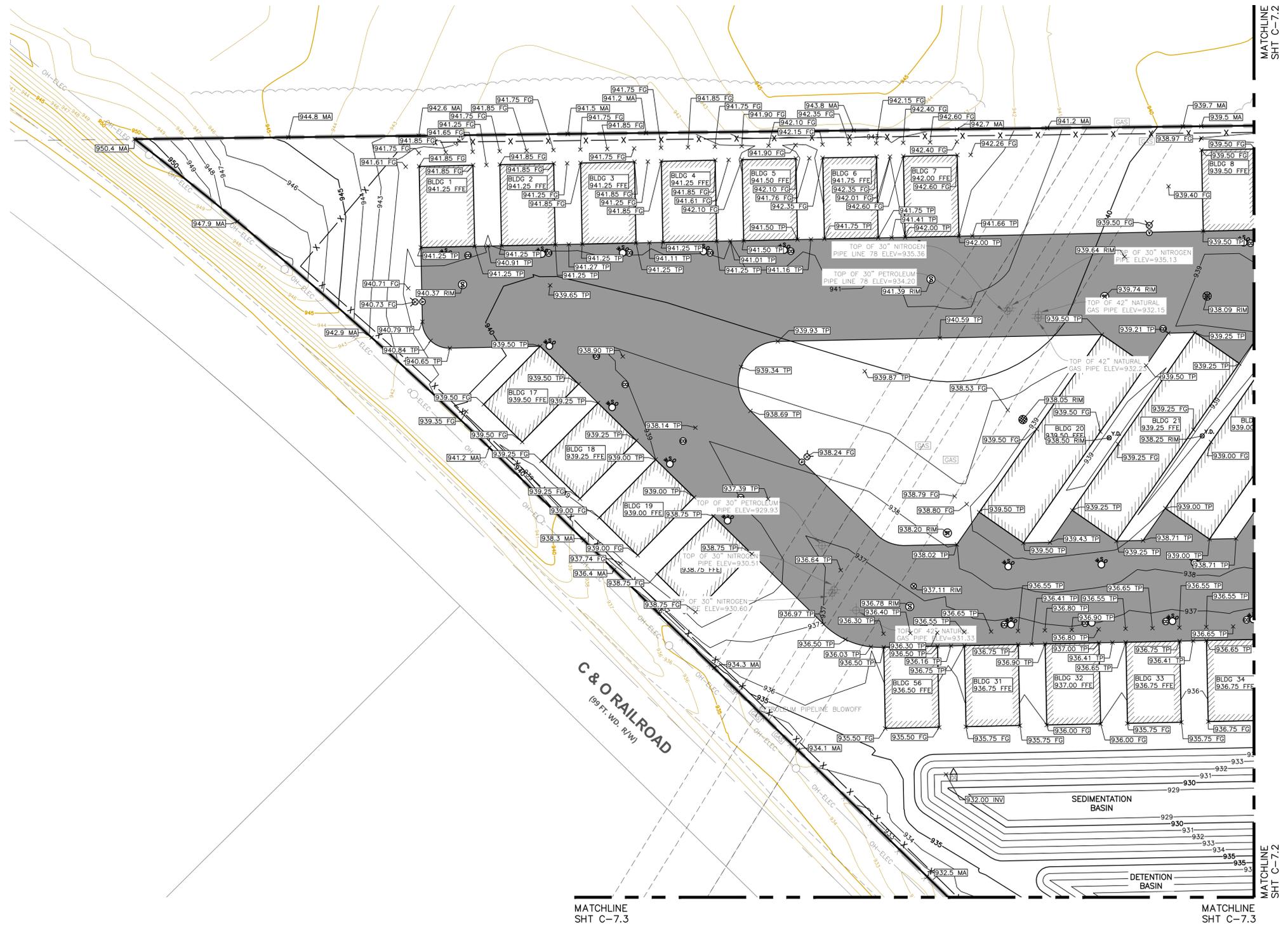
BM A:
TOP OF FLANGE BOLT OF HYDRANT. 57'± NORTH OF ROAD CATCH BASIN, 33'± WEST OF THE CENTERLINE OF BURKHART ROAD.
ELEV =936.19

BM B:
TOP OF FLANGE BOLT OF HYDRANT. 14'± NORTH OF ROAD CATCH BASIN, 30'± WEST OF THE CENTERLINE OF BURKHART ROAD.
ELEV =938.22

BM B:
TOP OF FLANGE BOLT OF HYDRANT. 79'± NORTH OF ROAD CATCH BASIN, 30'± WEST OF THE CENTERLINE OF BURKHART ROAD.
ELEV =941.72

GRADING LEGEND

- X 940.00 TP PROPOSED TOP OF PAVEMENT GRADE
- X 940.00 SW PROPOSED SIDEWALK GRADE
- X 940.00 FG PROPOSED FINISH GRADE
- X 940.00 TC PROPOSED TOP OF CURB GRADE
- X 940.00 GP PROPOSED GUTTER PAN GRADE
- X 940.00 TW PROPOSED TOP OF WALL GRADE
- X 940.00 BW PROPOSED BOTTOM OF WALL GRADE
- X 940.0 MA MATCH EXISTING GRADE
- X 940.0 FFE PROPOSED FINISH FLOOR GRADE
- X 940.0 RIM PROPOSED RIM GRADE
- X 940.00 ADJ-RIM ADJUSTED RIM GRADE
- X 940.00 INV PROPOSED INVERT GRADE
- R ADA COMPLIANT SIDEWALK RAMP
- L ADA COMPLIANT SIDEWALK LANDING
- 900 EXISTING CONTOUR
- 900 PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- OVERFLOW ROUTE



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CLIENT:
CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843
POC: STEVE GRONOW
517-552-2489

GRADING PLAN - WEST
CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE: 02/29/2024

PROJECT NO: 22-286

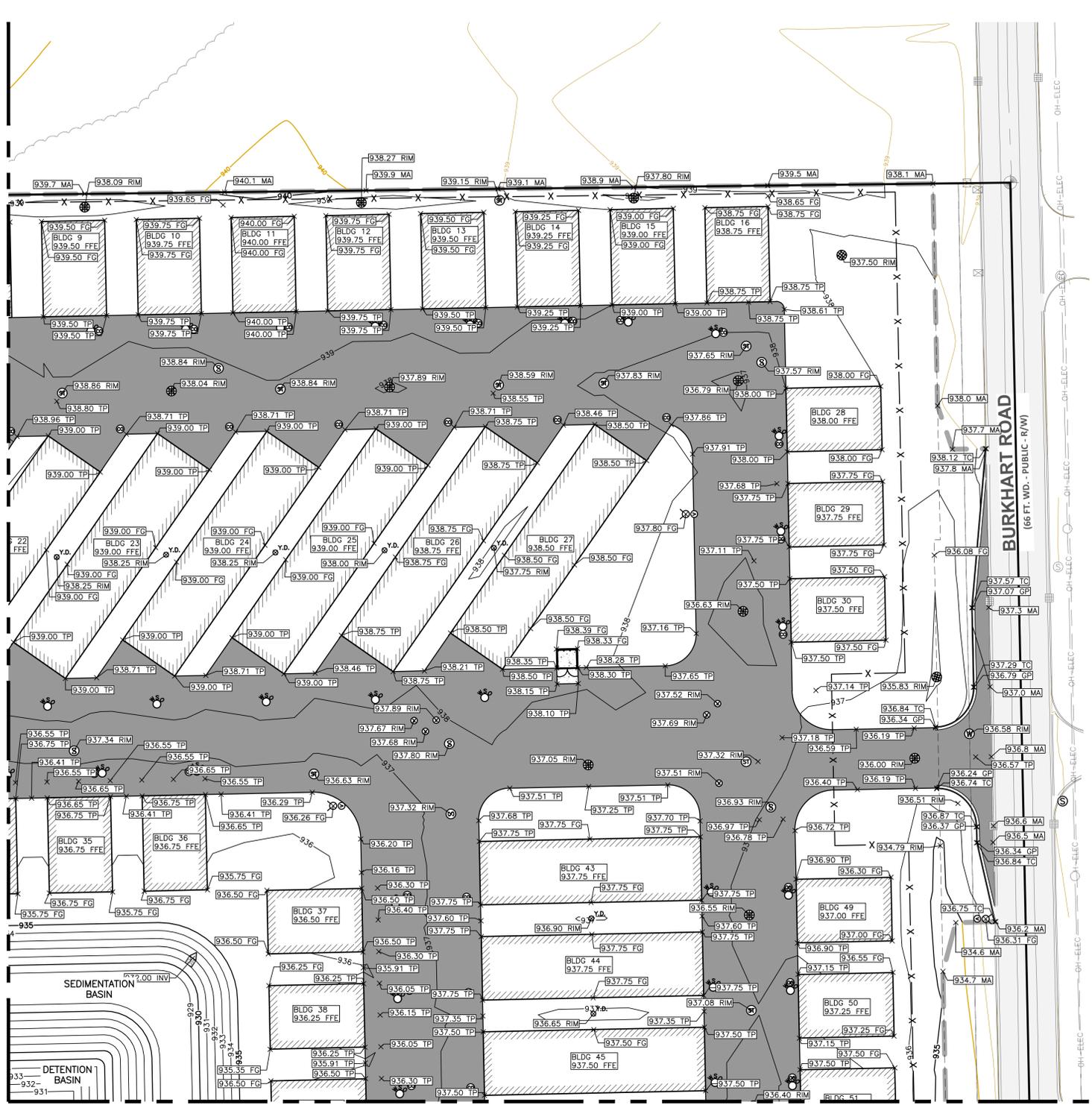
SCALE: 1" = 40'
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-7.1

NOT FOR CONSTRUCTION

MATCHLINE
SHT C-7.1



MATCHLINE
SHT C-7.3

MATCHLINE
SHT C-7.3

GRADING LEGEND

- X 940.00 TP PROPOSED TOP OF PAVEMENT GRADE
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- 900 EXISTING CONTOUR
- 900 PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- ⚡ OVERFLOW ROUTE

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ENGINEER
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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

GRADING PLAN - EAST

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

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PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 40'
0 1/2" 1"

FIELD:
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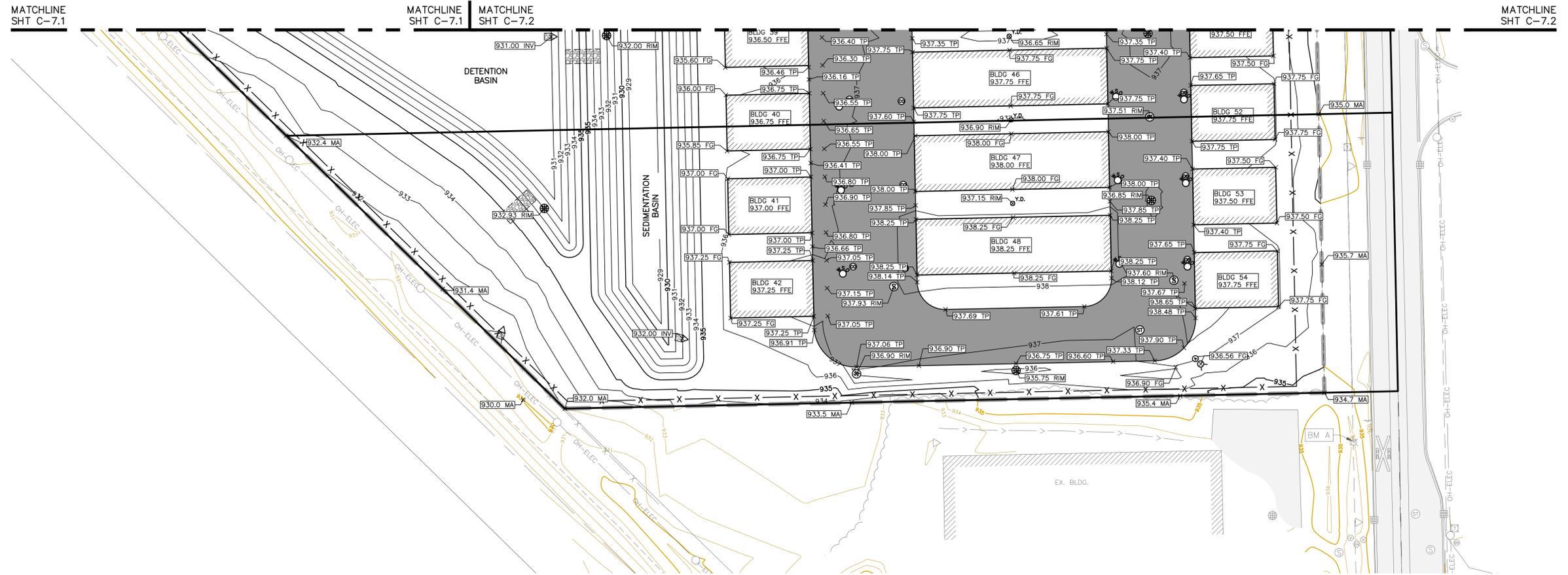
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GRADING LEGEND

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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

GRADING PLAN - SOUTH

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

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PROJECT NO: 22-286

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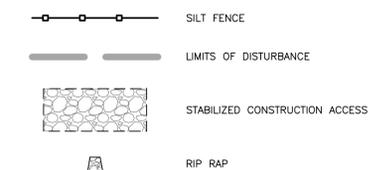
CONSTRUCTION SEQUENCE	OPERATION TIME SCHEDULE -- BEGINNING JUNE 2024					
	JUN	JUL	AUG	SEP	OCT	NOV
1 CONTRACTOR SHALL INSTALL SILT FENCE AS SHOWN ON APPROVED PLANS.						
2 DETENTION BASIN SHALL BE EXCAVATED, TOP SOILED, AND SEEDED IMMEDIATELY AFTER DEMOLITION WORK IS COMPLETED.						
3 REMOVE ALL TOPSOIL AND ORGANIC MATTER. TOPSOIL MAY BE STORED ON SITE IN DESIGNATED AREA TO BE USED FOR FUTURE PLANTING AND FILL AREAS. TRUCK REMAINING TOP SOIL OFFSITE AND PROPERLY DISPOSE.						
4 ROUGH GRADE AND INSTALL NEW UNDERGROUND UTILITIES. PLACE INLET FILTERS AT PROPOSED CATCH BASINS THROUGHOUT SITE.						
5 CONSTRUCT BUILDING(S).						
6 FINISH GRADE AROUND BUILDING(S) AND STABILIZE AS SOON AS POSSIBLE. STABILIZE ALL DISTURBED AREAS WITH CLASS A SEED AND MULCH. IN AREAS OF SLOPES OF 1:4 OR STEEPER, CONTRACTOR TO SEED AND INSTALL PEGGED IN PLACE EROSION CONTROL BLANKETS.						
7 REPAIR/CLEAN INLET FILTERS AS REQUIRED.						
8 INSTALL FINAL LANDSCAPING PER SEPARATE LANDSCAPE PLAN.						
9 STONE AROUND OUTLET STANDPIPE STRUCTURE SHALL BE REFRESHED.						
10 REMOVE TEMPORARY SOIL EROSION MEASURES ONCE SEEDING VEGETATION HAS BEEN ESTABLISHED. CLEAN ALL AFFECTED STORM STRUCTURES AS NECESSARY.						

SOILS INFO

SOIL TYPES ARE ACCORDING TO THE USDA SOIL SURVEY WEB SITE (<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>)

- MoB: WAWASEE LOAM, 2-6% SLOPES
- CvraaB: CONOVER LOAM, 0 TO 4% SLOPES
- MrB: MIAMI-CONOVER LOAMS, 2-6% SLOPES

SESC LEGEND



EROSION CONTROL QUANTITIES

Disturbed Area: 18.99 Acres

QTY	UNIT	ITEM
3,935	LF	SILT FENCE
46	EA	INLET FILTER
1	EA	STABILIZED CONSTRUCTION ACCESS
99	SY	RIP-RAP

NOTE: QUANTITIES ARE FOR ENTIRE SITE

DTMB SOIL EROSION & SEDIMENTATION CONTROL MEASURES

MICHIGAN DEPARTMENT OF TECHNOLOGY, MANAGEMENT, AND BUDGET (DTMB)

EROSION CONTROLS

KEY	BEST MANAGEMENT PRACTICES	SYMBOL	WHERE USED
E6	MULCH		FOR USE IN AREAS SUBJECT TO EROSION SURFACE FLOWS OR SEVERE WIND OR ON NEWLY SEEDS AREAS.
E8	PERMANENT SEEDING		STABILIZATION METHOD UTILIZED ON SITES WHERE EARTH CHANGE HAS BEEN COMPLETED (FINAL GRADING ATTAINED).

SEDIMENT CONTROLS

KEY	BEST MANAGEMENT PRACTICES	SYMBOL	WHERE USED
S51	SILT FENCE		USE ADJACENT TO CRITICAL AREAS, TO PREVENT SEDIMENT LAIDEN SHEET FLOW FROM ENTERING THESE AREAS.
S53	STABILIZED CONSTRUCTION ACCESS		USED AT EVERY POINT WHERE CONSTRUCTION TRAFFIC ENTERS OR LEAVES A CONSTRUCTION SITE.
S55	SEDIMENT BASIN		AT THE OUTLET OF DISTURBED AREAS AND AT THE LOCATION OF A PERMANENT DETENTION BASIN.
S58	INLET PROTECTION FABRIC DROP		USE AT STORMWATER INLETS, ESPECIALLY AT CONSTRUCTION SITES.

EROSION & SEDIMENT CONTROLS

KEY	BEST MANAGEMENT PRACTICES	SYMBOL	WHERE USED
ES31	CHECK DAM		USED TO REDUCE SURFACE FLOW VELOCITIES WITHIN CONSTRUCTED AND EXISTING FLOW CORRIDORS.

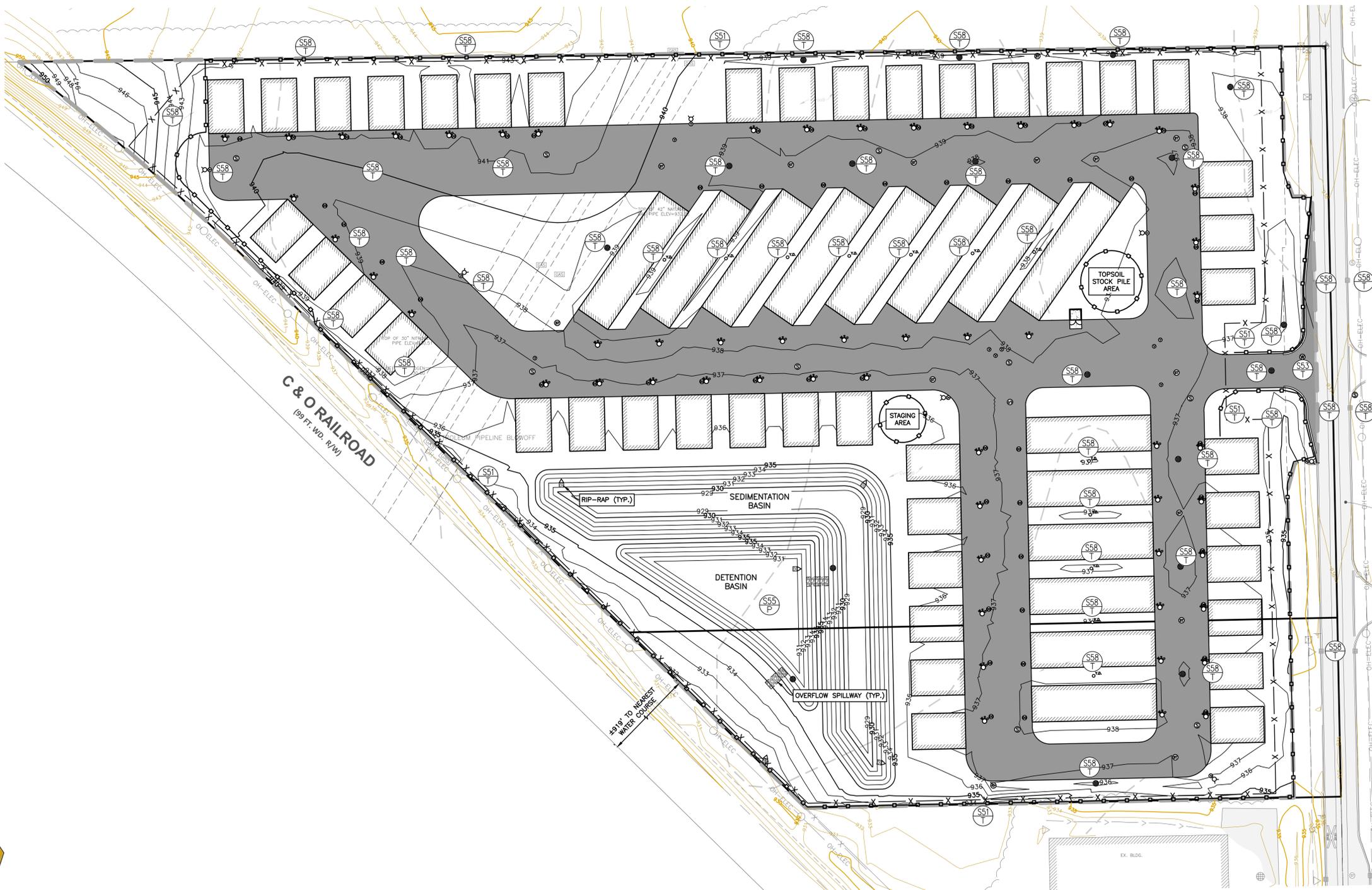
XX TEMPORARY XX PERMANENT

EROSION CONTROL STANDARDS

- ALL EROSION AND SEDIMENT CONTROL WORK SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE.
- DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR FOR EFFECTIVENESS OF EROSION AND SEDIMENTATION CONTROL MEASURES, AND ANY NECESSARY REPAIRS SHALL BE PERFORMED WITHOUT DELAY.
- EROSION AND ANY SEDIMENTATION FROM WORK ON THIS SITE SHALL BE CONTAINED ON THE SITE AND NOT ALLOWED TO COLLECT ON ANY OFF-SITE AREAS OR IN WATERWAYS. WATERWAYS INCLUDE BOTH NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.
- CONTRACTOR SHALL APPLY TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES WHEN REQUIRED AND AS DIRECTED ON THESE PLANS. CONTRACTOR SHALL REMOVE TEMPORARY MEASURES AS SOON AS PERMANENT STABILIZATION OF SLOPES, DITCHES AND OTHER CHANGES HAS BEEN ACCOMPLISHED.
- STAGING OF THE WORK WILL BE DONE BY THE CONTRACTOR AS DIRECTED IN THESE PLACES AND AS REQUIRED TO INSURE PROGRESSIVE STABILIZATION OF DISTURBED AREAS.
- SOIL EROSION CONTROL PRACTICES WILL BE ESTABLISHED IN EARLY STAGES OF CONSTRUCTION BY THE CONTRACTOR. SEDIMENT CONTROL PRACTICES WILL BE APPLIED AS A PERIMETER DEFENSE AGAINST ANY TRANSPORTING OF SILT OFF THE SITE.
- A CERTIFIED STORM WATER OPERATOR WILL BE NAMED ON THE MDEQ NOTICE OF COVERAGE FOR NPDES AS REQUIRED.
- ALL DISTURBED AREAS ARE TO BE TOP SOILED AND SEEDED WITH THE FOLLOWING MIN RATIO: TOP-SOIL 3" IN DEPTH, GRASS SEED 218 LBS PER ACRE, FERTILIZER 150 LBS PER ACRE, STRAW MULCH 3" DEPTH 1.5 TO 2 TONS PER ACRE.
- HYDRO-SEEDING IS NOT ACCEPTABLE FOR SLOPES EXCEEDING 1%. ON SLOPES OVER 1%, STABILIZATION SHALL BE DONE WITH SEED AND STRAW MULCH WITH A TACKIFIER, OR STRAW BLANKETS PEGGED IN PLACE.

SOIL EROSION CONTROL MAINTENANCE SCHEDULE AND NOTES.

- CONTRACTOR MUST OBTAIN A SOIL EROSION AND SEDIMENTATION CONTROL PERMIT FROM THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE PRIOR TO COMMENCING WORK.
- EARTHWORK SHALL BE LIMITED TO THE PROPOSED SITE AS SHOWN ON THE PLAN.
- CONTRACTOR SHALL INSPECT THE SOIL EROSION/SEDIMENTATION CONTROL DEVICES ONCE A WEEK AND/OR WITHIN 24 HOURS OF A RAINFALL EVENT WHICH RESULTS IN A STORM WATER DISCHARGE FROM THE SITE. ANY DAMAGE TO EROSION CONTROL MEASURES MUST BE REPAIRED IMMEDIATELY.
- ALL MUD OR DEBRIS TRACKED ONTO EXISTING PUBLIC ROADS FROM THE SITE DUE TO CONSTRUCTION SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR.
- SILT FENCE MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY BUILT-UP SEDIMENT WHEN THE SEDIMENT HEIGHT ACCUMULATES TO 1/3 TO 1/2 OF THE HEIGHT OF THE FENCE. THE CONTRACTOR IS RESPONSIBLE TO REMOVE, REPLACE, RETRENCH OR RE-BACKFILL THE SILTATION FENCE SHOULD IT FAIL OR BE DAMAGED DURING CONSTRUCTION.
- PERMANENT STABILIZATION MUST BE COMPLETED WITHIN 30 DAYS OF FINAL GRADING.
- ACCESS ROADS MUST BE MAINTAINED AS NECESSARY, TO KEEP THEM EFFECTIVE, NEW LAYERS OF STONE MAY BE ADDED AS OLD LAYERS BECOME COMPACTED. STEPS SHOULD ALSO BE TAKEN TO REPAIR THE ACCESS ROADS IF RUTS OR PONDING WATER APPEARS.
- INLET FILTERS SHOULD BE INSPECTED FOR BUILDUP OF SILT AND OTHER DEBRIS. THIS IS EVIDENT IF GEOTEXTILE/SOD STRUCTURE IS CAUSING FLOODING. MAINTENANCE WOULD CONSIST OF REMOVING DEBRIS WITH A STIFF BRISTLE BROOM OR SQUARE POINT SHOVEL. IF INLET FILTER IS BEYOND THIS LEVEL OF REPAIR, IT MAY BE NECESSARY TO REPLACE BOTH THE SOD AND GEOTEXTILE FILTER.
- IF SOIL EROSION/SEDIMENT CONTROL MEASURES ARE INADEQUATE FOR THE SITE. THE PROPER EROSION CONTROL AUTHORITY MUST BE NOTIFIED.
- ANY DEWATERING REQUIRED SHALL HAVE A DEWATERING PLAN SUBMITTED PRIOR TO STARTING THE ACTIVITY AND MAY REQUIRE EGLE APPROVAL.



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CLIENT :

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3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

SESC PLAN

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

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5/30/2024	REVISED SITE PLAN SUBMISSION
7/23/2024	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 60'

0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-8.0

NOT FOR CONSTRUCTION

LCDC NOTES

Top Soil & Soil Storage Areas:

- Top soil or soil storage areas shall be seeded and mulched, or matted with straw, immediately after the stripping process is completed, to prevent wind and water erosion.

Slopes and Ditches:

- 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.
- Side slopes in excess of 3' horizontal to 1' vertical shall not be used except with a mechanical device such as a retaining wall, or terracing.
- Ditches with steep grades will need "stone flow checks" to prevent scouring of the ditch bottoms. They may be used as a temporary measure and removed once sufficient stabilization has been established. These shall be depicted on plans by the engineer. Indicate flow checks on all slopes 3.00% and greater.

Detention/Retention, Sedimentation Ponds:

- New land developments within Livingston County shall be equipped with detention/retention facilities for storm water in accordance with the Drainage Policies of the Livingston County Drain Commissioner.
- Inlets into detention ponds must not discharge at the same location as the outlet structure.
- Detention Pond Stand Pipe Outlet Detail must be the Livingston County Drain Commissioner's standard Detention Pond outlet, e.g. orifice outlets without sedimentation control devices are prohibited.
- Stand pipe structure must have a 2 ft. sump.
- Detention Pond stand pipe structure shall show staggering of outlet holes at different elevations. This will minimize plugging and provide for more effective filtering.
- The stone around the stand pipe structure shall be refreshed with clean stone prior to completion of the project.
- Detention/Retention, Sedimentation Ponds shall be excavated, top soiled, seeded, mulched and tacked prior to the start of massive earth disruption.
- Inlets into Detention/Retention Ponds must be located within two feet of the bottom floor of the pond.

Detention Pond Spillway:

- Rip-rap proposed in the construction of the emergency spillway must be placed over keyed-in geo-fabric blanket.

Silt Fence:

- All commercial projects constructed in Livingston County shall install 36" high silt fence.

Inlet Protection:

- Sedimentation protection for catch-basin inlets. Silt sacks are the preferred choice in the winter months, because they are less likely to be disturbed by the process of snow plowing.
- Open-Pipe, inlet protection must be provided with straw bales, stone or geo-fabric.

Outlet Protection:

- All storm drains 15" in diameter or larger shall have animal guards installed to prevent entrance to the system.
- All rip-rap must be placed over keyed in geo-fabric.
- 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 over keyed in filter fabric. Silt traps shall be inspected after each storm.
- Splash blocks may be required depending on the outley flow rate or velocity.

Tracking onto public roadway:

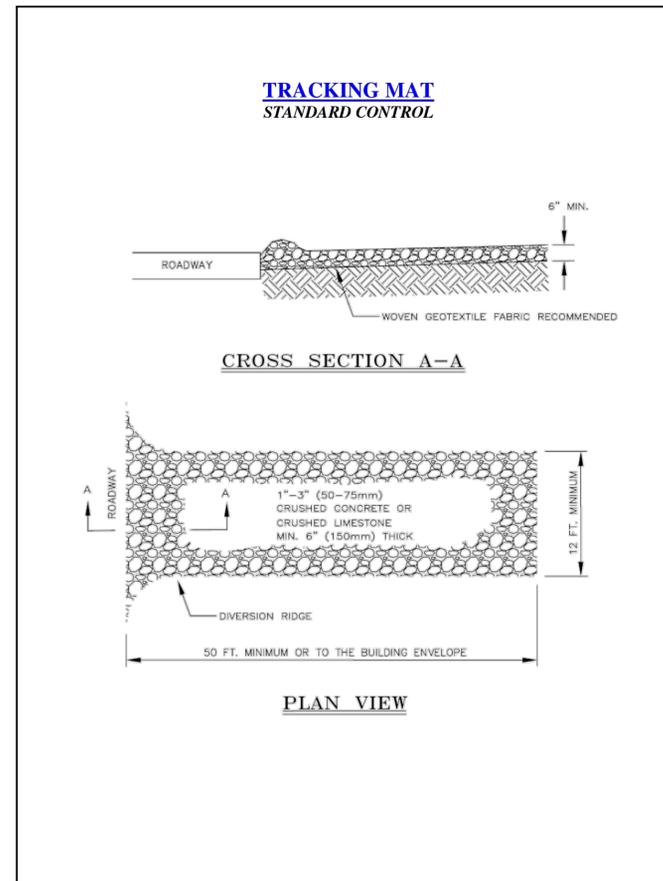
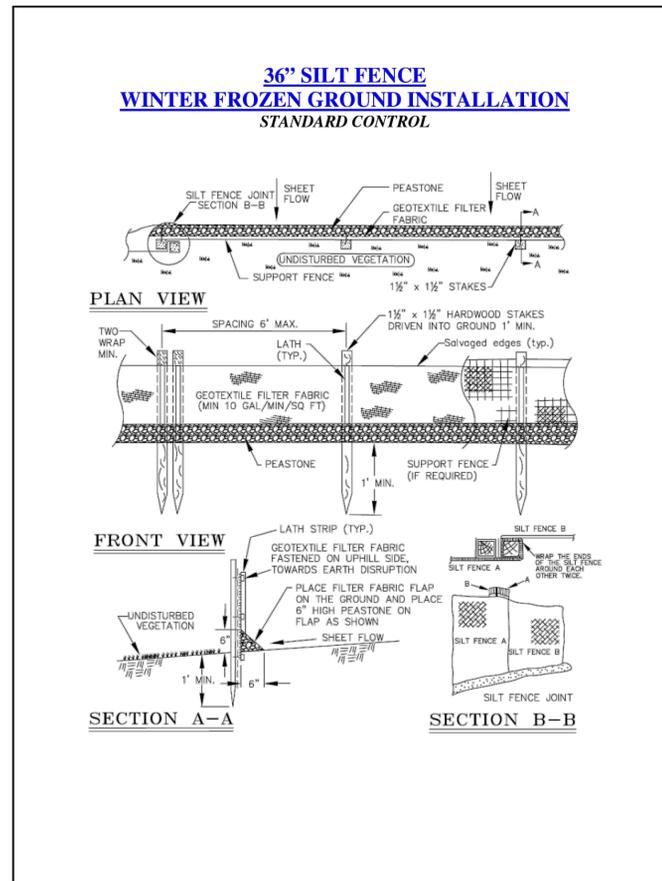
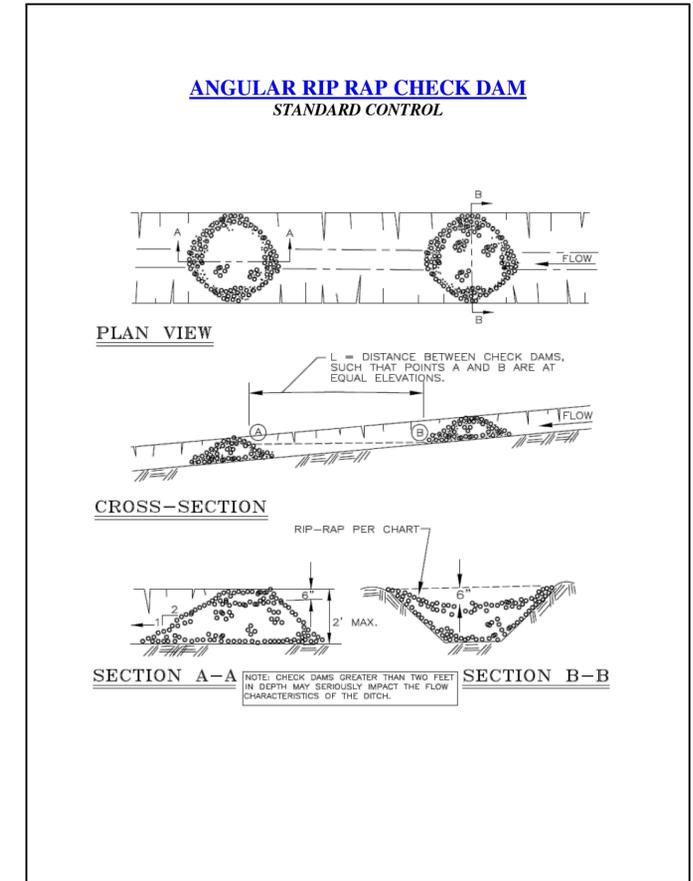
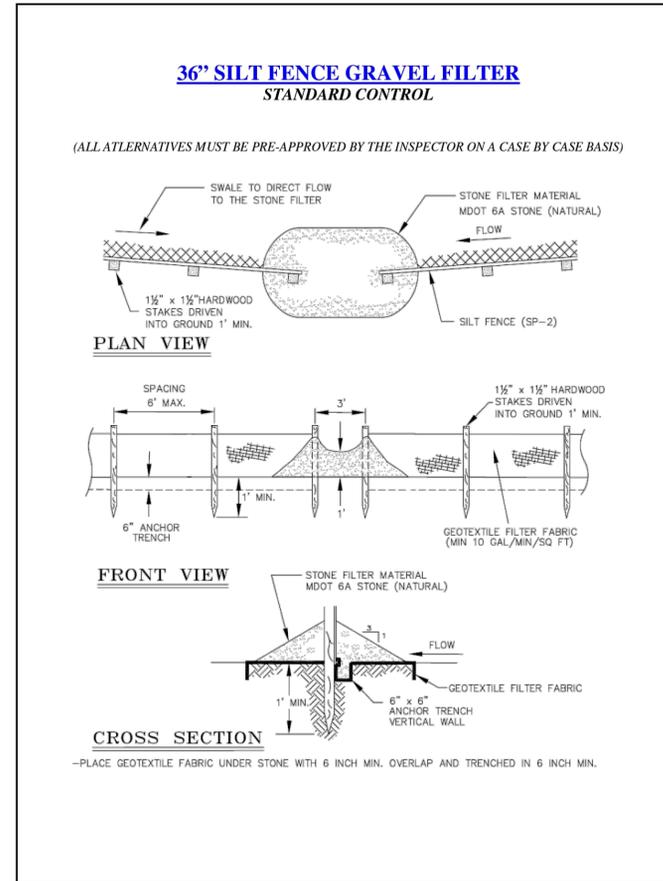
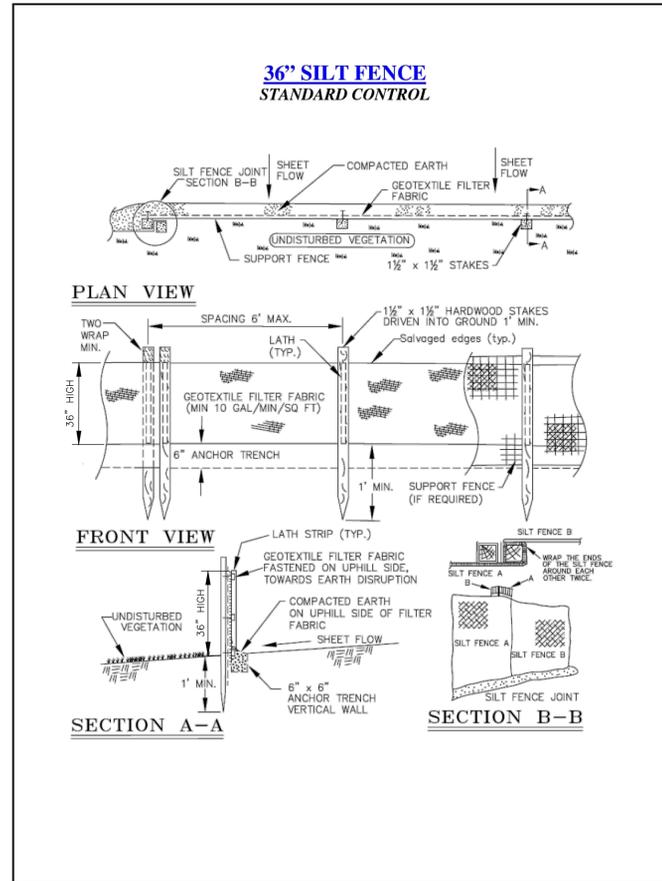
- It is required that each development have an ingress/egress of crushed stone to restrict tracking of material onto the Public Roadway. All commercial construction sites require a minimum 75-foot tracking mat shown at ingress/egress.

Stabilization Standards:

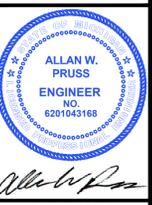
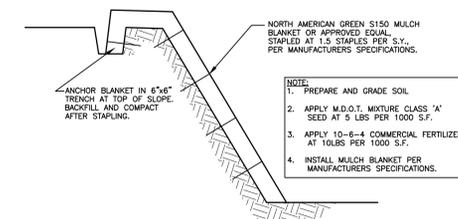
- For subdivision and site condominium developments: As of May 01, 2000, it is required that temporary stabilization of the entire site be completed and approval from the Livingston County Drain Commissioner's Office obtained prior to the issuance of single family dwelling permits.
- For commercial or industrial sites, common areas shall be called out on plans, in accordance with Part 17, prescribed by R 323.1709 and R 323.1710, pursuant to PART 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act (Previously known as P.A. 347 of 1972) of Act 347, Public Acts OF 1972, as amended) indicating areas to be stabilized after 15 days of grade work. Areas to be outlined are as follows: detention/retention, drainage easements, utility easements, boulevards, etc.

Seeding, Fertilizer and Mulch Bare Ground Ratio:

- This information shall be detailed on the construction plans.
- Top Soil 3" in depth
- Grass Seed 217.84 lbs per acre
- Fertilizer 150 lbs per acre
- Straw Mulch 3" in depth (All mulching must have a tie down)
- Hydroseeding is not acceptable for slopes exceeding 1%, in such cases stabilization shall be done with seed and and straw mulch with a tackifier.



EROSION CONTROL BLANKET DETAIL



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LCDC SECC NOTES AND DETAILS

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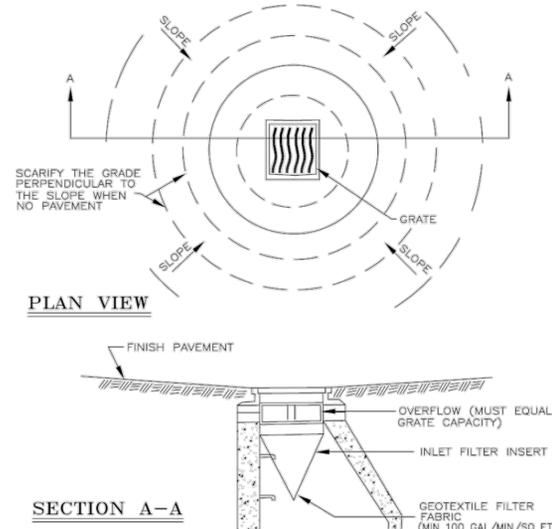
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SILT SACK OR APPROVED EQUAL LOW POINT/YARD INLET FILTER

STANDARD CONTROL YEAR ROUND OR WINTER USE

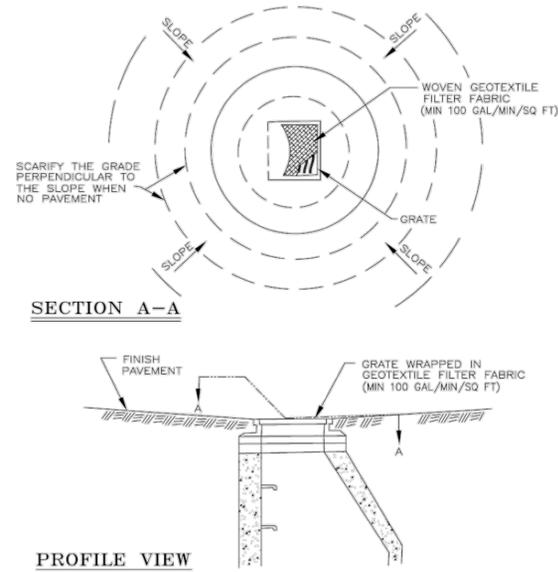
APPROVED FOR USE DURING WINTER MONTHS OR IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING



GEOTEXTILE FABRIC LOW POINT/YARD INLET FILTER

STANDARD CONTROL NON-WINTER USE

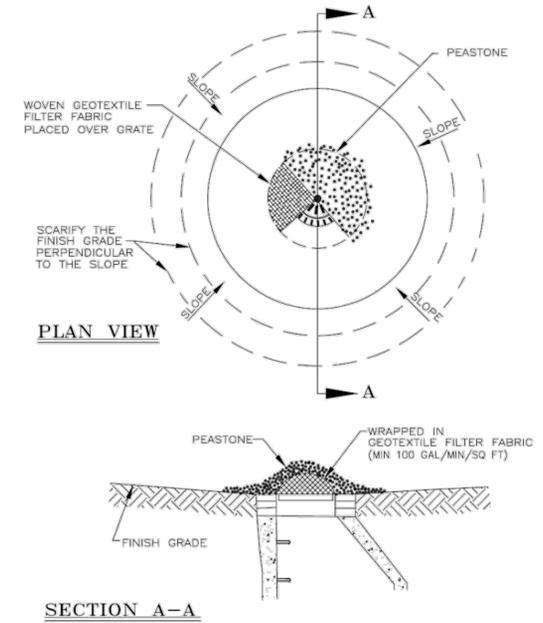
NOT FOR USE IN WINTER MONTHS OR IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING



GEOTEXTILE & PEASTONE LOW POINT/YARD INLET FILTER

STANDARD CONTROL NON-WINTER USE

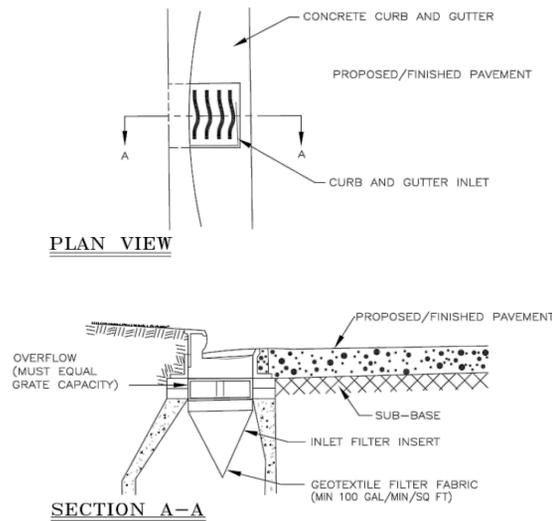
NOT FOR USE IN WINTER MONTHS OR IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING



SILT SACK OR APPROVED EQUAL CURB AND GUTTER INLET FILTER

STANDARD CONTROL YEAR ROUND OR WINTER USE

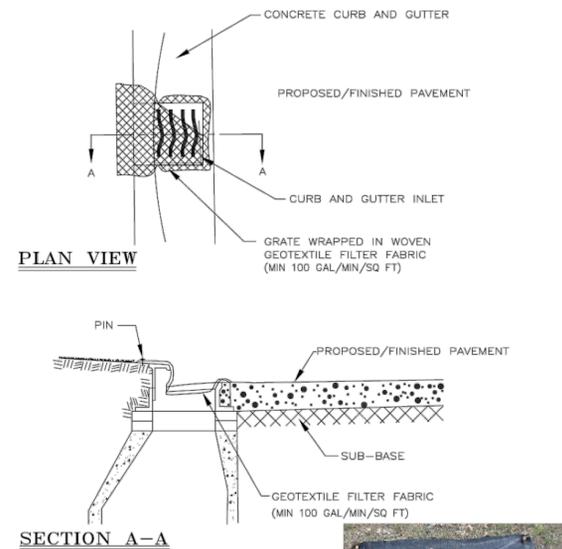
APPROVED FOR USE DURING WINTER MONTHS OR IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING



GEOTEXTILE FABRIC CURB AND GUTTER INLET FILTER

STANDARD NON-WINTER USE

NOT FOR USE IN WINTER MONTHS OR IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING



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

CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

LCDC SESC DETAILS

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

DATE	DESCRIPTION
5/28/2024	PLAN SUBMITTAL
5/30/2024	PRELIMINARY/FINAL SITE PLAN SUBMISSION
7/23/2024	REUSED SITE PLAN SUBMISSION
	FINAL SITE PLAN SUBMISSION

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: N/A
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

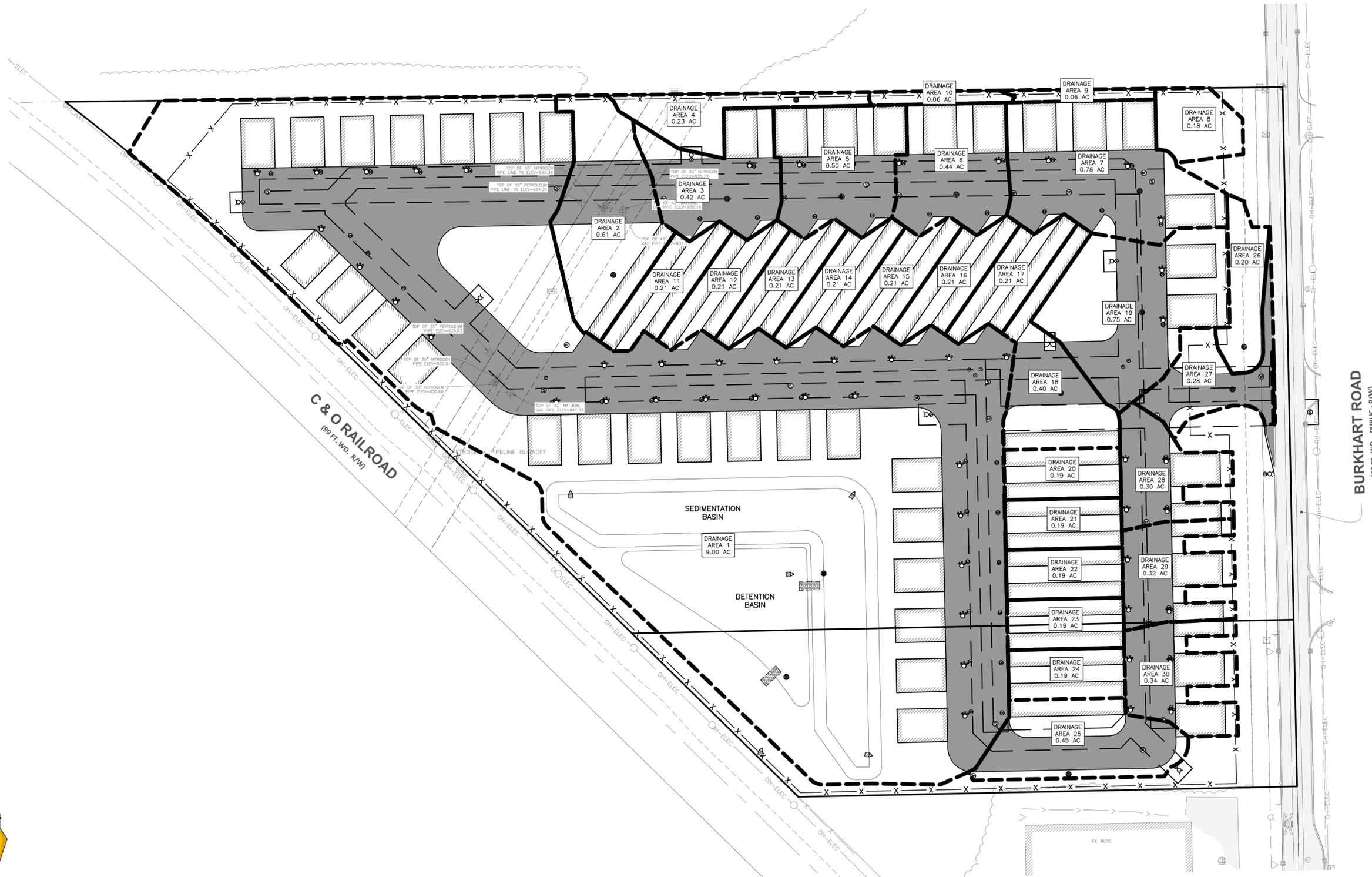
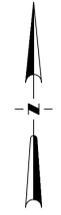
C-8.2

NOT FOR CONSTRUCTION



UTILITY LEGEND

PROPOSED	EXISTING	
		WATER MAIN, MH, VALVE IN BOX, HYDRANT
		WATER WELL, METER, STOP BOX, POST INDICATOR VALVE
		STORM SEWER, MH, CB, INLET, DOWN SPOUT, YARD DRAIN
		CULVERT/ END SECTION
		SANITARY SEWER, MH, CLEAN OUT
		UG GAS, MH, VALVE, LINE MARKER
		UG ELEC (ELEC, CABLE, FIBER)



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CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843

POC: STEVE GRONOW
517-552-2489

DRAINAGE AREA PLAN

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1" = 60'
0 1/2" 1"

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-9.0

NOT FOR CONSTRUCTION

**COMPOUND RUNOFF COEFFICIENT**

	AREA (SF)	AREA (AC)	C	A x C
OVERALL	817,285	18.76		
CONTRIBUTING FLOWING OFF	778,025	17.86		
	39,260	0.90		
EX BUILDING	0	0.00	0.90	0
EX PAVEMENT	0	0.00	0.90	0
PR BUILDING	192,400	4.41	0.90	173,160
PR PAVEMENT	271,112	6.19	0.90	244,001
GRASS	314,513	7.21	0.20	62,903
TOTALS	778,025	17.86		480,063

$$COMPOUND C = \frac{TOTAL A \times C}{CONTRIBUTING AREA} = \frac{480,063}{778,025} = 0.62$$

SITE INFO

OVERALL AREA	=	18.76 AC
CONTRIBUTING AREA (A)	=	17.86 AC
ALLOWABLE DISCHARGE (Qa)	=	0.20 CFS/AC
COMPOUND C	=	0.62

REQUIRED WATER QUALITY VOLUME

$$V_{wq} = \frac{1}{12} \times 43560 \times A \times C = 40005 \text{ CF}$$

REQUIRED CHANNEL PROTECTION VOLUME

$$V_{cp} = \frac{1.3}{12} \times 43560 \times A \times C = 52007 \text{ CF}$$

REQUIRED FOREBAY VOLUME

WITH DOWNSTREAM INFILTRATION $V_f = V_{wq}$

$$V_f = 40005 \text{ CF}$$

REQUIRED EXTENDED DETENTION VOLUME

$$V_{ED} = \frac{1.9}{12} \times 43560 \times A \times C = 76010 \text{ CF}$$

EXTENDED DETENTION DISCHARGE RATE

$$Q_{ED} = \frac{V_{ED}}{172800} = 0.44 \text{ CFS}$$

100 YR STORM INLET RATE

$$Q_{100in} = C \times A \times \frac{30.2033 \times 100^{0.2203}}{(T_c + 9.1747)^{0.8069}} = 58.74 \text{ CFS}$$

100 YR STORM ALLOWABLE OUTLET RATE

$$Q_{100out} = A \times Q_a = 3.57 \text{ CFS}$$

STORAGE CURVE FACTOR

$$R = 0.206 - 0.15 \ln\left(\frac{Q_{100out}}{Q_{100in}}\right) = 0.63$$

100 YR STORM VOLUME IN

$$V_{100in} = 18985 \times C \times A = 209229 \text{ CF}$$

100 YR STORM STORAGE VOLUME

$$V_{100det} = V_{100in} \times R - V_{cp} = 78969 \text{ CF}$$

REQUIRED DETENTION VOLUME

$$100 \text{ YR STORM STORAGE VOLUME CONTROLS} = 78969 \text{ CF}$$

VOLUME SUMMARY

FOREBAY VOLUME	V_f	=	40,005 CF
EXTENDED DETENTION VOLUME	V_{ED}	=	76,010 CF
100-YEAR VOLUME	V_{100}	=	78,969 CF

STORAGE ELEVATIONS

FOREBAY ELEVATION	=	933.00	VOLUME 1	34,090
ELEVATION	=	934.00	VOLUME 2	75,001
F ELEVATION (Zf)	=	933.14	Vf	40,005
EXTENDED DETENTION ELEVATION	=	933.00	VOLUME 1	24,025
ELEVATION	=	934.00	VOLUME 2	40,613
ED ELEVATION (Zed)	=	933.72	Ved	36,005
100-YEAR ELEVATION	=	933.00	VOLUME 1	24,025
ELEVATION	=	934.00	VOLUME 2	40,613
100 ELEVATION (Z100)	=	933.90	V100	38,964

PROPOSED SEDIMENTATION BASIN VOLUME

ELEVATION	AREA (FT)	AVG AREA (FT)	INC VOLUME (CF)	VOLUME (CF)
932	30,719	34,090	34,090	34,090
933	37,461	40,911	34,090	34,090
934	44,360	47,888	40,911	75,001
935	51,416	55,922	47,888	122,889

PROPOSED DETENTION BASIN VOLUME

ELEVATION	AREA (FT)	AVG AREA (FT)	INC VOLUME (CF)	TTL VOLUME (CF)
931	9,262	10,592	10,592	10,592
932	11,922	13,433	10,592	10,592
933	14,944	16,588	13,433	24,025
934	18,231	19,956	16,588	40,613
935	21,681	24,025	19,956	60,569

OUTLET CONTROL STRUCTURE ORIFICE CALCULATIONS**CHANNEL PROTECTION RATE CONTROL (EXTENDED DETENTION)**

$$Q_{ED} = \frac{V_{ED}}{T_{48}} = \frac{V_{ED}}{48 \times 3600} = 0.440 \text{ CFS}$$

OPENINGS AT BOTTOM OF STORAGE ELEVATION

$$Z_{bttm} = 932.00$$

$$H_{avg} = \frac{2}{3} \times (Z_{ED} - Z_{bttm}) = 1.148 \text{ FT}$$

$$A_{ED} = \frac{Q_{ED}}{0.62 \sqrt{2 \times g \times H_{avg}}} = 0.083 \text{ SF}$$

1" DIA HOLE HAS AN AREA OF

$$1 \times 1 = 0.083 = 0.0055 \text{ SF}$$

DETENTION TIME FOR FIFTEEN (15) 1" DIA HOLE

$$Q_{ED(ACTUAL)} = A_{125} \times 0.62 \sqrt{2 \times g \times h} = 0.4362 \text{ CFS}$$

$$T_{ED} = \frac{V_{ED}}{Q_{ED} \times 3600} = 48.41 \text{ HRS}$$

100 YEAR VOLUME CONTROL**FLOW THROUGH ED CONTROLS AT 100 YEAR STORM**

$$H_{EDavg} = \frac{2}{3} \times (Z_{100} - Z_{bttm}) = 1.27 \text{ FT}$$

$$Q_{ED(100yr)} = A_{125} \times 0.62 \sqrt{2 \times g \times h} = 0.0305 \text{ CFS}$$

$$Q_{rem} = Q_a - Q_{ED(100yr)} = 3.5417 \text{ CFS}$$

$$H_{100} = \frac{2}{3} \times (Z_{100} - Z_{ED}) = 0.1189 \text{ FT}$$

$$A_{100} = \frac{Q_{rem}}{0.62 \sqrt{2 \times g \times H_{100}}} = 2.0642 \text{ SF}$$

3" DIA HOLE HAS AN AREA OF

$$3 \text{ INCH} = 0.250 \text{ FT} = 0.0491 \text{ SF}$$

$$41 \text{ HOLES} = 2.0126 \text{ SF}$$

ACTUAL FLOW THROUGH ALL RESTRICTORS

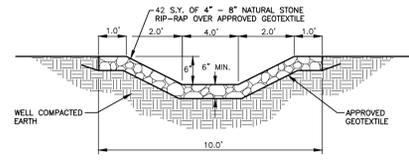
$$Q_{100(ACTUAL)} = A_{2X4} \times 0.62 \sqrt{2 \times g \times h} = 3.4532 \text{ CFS}$$

$$Q_{100(TOTAL)} = Q_{100(ACTUAL)} + Q_{ED(100yr)} = 3.4837 \text{ CFS}$$

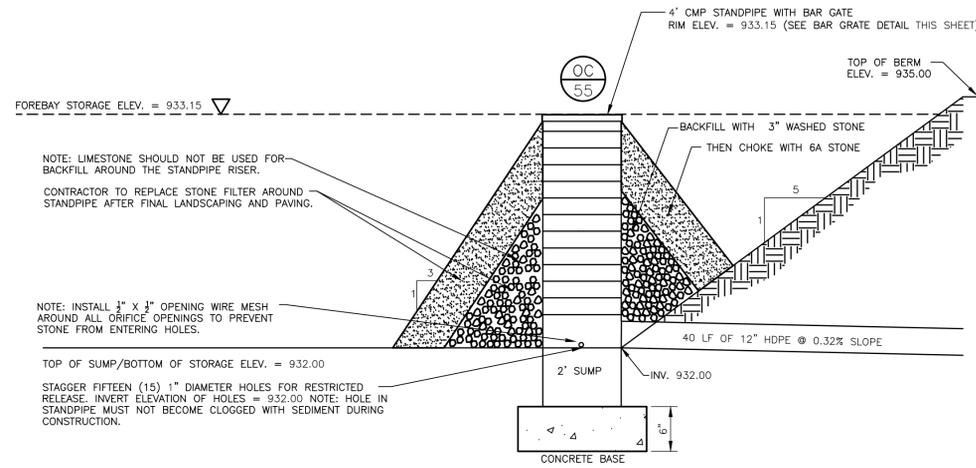
STORM SEWER DESIGN												MONUMENT ENGINEERING GROUP ASSOCIATES, LLC												
Q = C I A Q = A x 1.486/n x R ^{2/3} x S ^{1/2} I = 175/(t+25)												298 VETERANS DRIVE FOWLERVILLE, MI 48836 517-223-3512												
t = 20 n1 = 0.01 HDPE & PVC n2 = 0.013 CONC.																								
FROM STR TO STR	AREA A	COEFF. C	A x C	AREA TOTAL At	TOTAL C x A	TIME t	INT. I	FLOW Q	PIPE CAP	PIPE AREA	PIPE LENGTH	PIPE DIA	PIPE SLOPE	MIN PIPE SLOPE	H.G. SLOPE	VEL FULL	TIME FLOW	H.G. ELEV. UP STREAM	DOWN STREAM	INVERT ELEV. UP STREAM	DOWN STREAM	RIM ELEV. UP STREAM	RIM ELEV. DOWN STREAM	
ac.				ac.		min.	in/hr	cfs.	cfs.	sq.ft.	ft.	in.	%	%	ft/sec	min.								
MAIN RUN	MH7-CB8	0.00	0.62	0.000	1.550	0.961	20.00	3.89	3.74	4.69	1.77	109	18	0.20	0.18	0.20	2.66	0.68	934.06	933.84	932.86	932.64	939.17	938.41
	CB8-MH9	0.52	0.62	0.322	2.070	1.283	20.68	3.83	4.92	5.03	1.77	101	18	0.23	0.18	0.23	2.85	0.59	933.84	933.61	932.64	932.41	938.41	938.33
	MH9-ES10	0.00	0.62	0.000	2.070	1.283	21.27	3.78	4.85	5.03	1.77	179	18	0.23	0.18	0.23	2.85	1.05	933.61	933.20	932.41	932.00	938.33	938.33
LATERAL	CB19-MH20	0.50	0.62	0.310	0.710	0.440	20.00	3.89	1.71	2.01	0.79	69	12	0.32	0.30	0.32	2.56	0.45	934.69	934.47	1.43	1.21	938.04	938.86
	MH20-CB21	0.00	0.62	0.000	0.920	0.570	20.83	3.82	2.18	3.16	1.23	69	15	0.24	0.23	0.24	2.58	0.45	934.47	934.31	1.01	0.84	938.86	938.09
	CB21-MH7	0.42	0.62	0.260	1.550	0.961	21.27	3.78	3.63	3.65	1.23	76	15	0.32	0.23	0.32	2.98	0.43	934.31	934.06	0.84	0.60	938.09	940.01
LATERAL	YD22-CB19	0.21	0.62	0.130	0.210	0.130	20.00	3.89	0.51	2.01	0.79	127	12	0.32	0.30	0.32	2.56	0.83	935.10	934.69	1.84	1.43	938.25	938.04
LATERAL	YD23-MH20	0.21	0.62	0.130	0.210	0.130	20.00	3.89	0.51	2.01	0.79	127	12	0.32	0.30	0.32	2.56	0.83	934.88	934.47	1.62	1.21	938.25	938.86
LATERAL	YD24-CB21	0.21	0.62	0.130	0.210	0.130	20.00	3.89	0.51	2.01	0.79	128	12	0.32	0.30	0.32	2.56	0.83	934.71	934.31	1.45	1.04	938.50	938.09

STORM SEWER DESIGN												MONUMENT ENGINEERING GROUP ASSOCIATES, LLC												
Q = C I A Q = A x 1.486/n x R ^{2/3} x S ^{1/2} I = 175/(t+25)												298 VETERANS DRIVE FOWLERVILLE, MI 48836 517-223-3512												
t = 20 n1 = 0.01 HDPE & PVC n2 = 0.013 CONC.																								
FROM STR TO STR	AREA A	COEFF. C	A x C	AREA TOTAL At	TOTAL C x A	TIME t	INT. I	FLOW Q	PIPE CAP	PIPE AREA	PIPE LENGTH	PIPE DIA	PIPE SLOPE	MIN PIPE SLOPE	H.G. SLOPE	VEL FULL	TIME FLOW	H.G. ELEV. UP STREAM	DOWN STREAM	INVERT ELEV. UP STREAM	DOWN STREAM	RIM ELEV. UP STREAM	RIM ELEV. DOWN STREAM	
ac.				ac.		min.	in/hr	cfs.	cfs.	sq.ft.	ft.	in.	%	%	ft/sec	min.								
MAIN RUN	MH25-CB26	0.00	0.62	0.000	0.210	0.130	20.00	3.89	0.51	2.01	0.79	69	12	0.32	0.30	0.32	2.56	0.45	935.62	935.40	934.62	934.60	938.84	937.89
	CB26-MH27	0.44	0.62	0.273	0.860	0.533	20.83	3.62	2.04	3.16	1.23	69	15	0.24	0.23	0.24	2.58	0.45	935.40	935.23	934.40	934.23	937.89	938.59
	MH27-MH28	0.00	0.62	0.000	1.420	0.860	22.46	3.69	3.25	3.29	1.23	67	15	0.26	0.23	0.26	2.68	0.42	935.23	935.06	934.23	934.06	938.59	937.83
	MH28-CB29	0.00	0.62	0.000	1.530	1.011	22.88	3.66	3.69	4.69	1.77	93	18	0.20	0.18	0.20	2.66	0.58	935.06	934.87	933.96	933.67	937.83	936.87
	CB29-CB30	0.78	0.62	0.484	2.590	1.606	23.46	3.61	5.80	5.94	1.77	146	18	0.32	0.18	0.32	3.96	0.72	934.87	934.40	933.67	933.20	936.87	936.38
	CB30-MH31	0.75	0.62	0.465	3.340	2.071	24.19	3.56	7.37	8.46	3.14	95	24	0.14	0.12	0.14	2.69	0.59	934.40	934.27	932.80	932.67	936.38	937.33
	MH31-CB32	0.00	0.62	0.000	3.820	2.368	24.77	3.52	8.33	8.46	3.14	108	24	0.14	0.12	0.14	2.69	0.67	934.27	934.12	932.67	932.52	937.33	937.05
	CB32-MH33	0.40	0.62	0.248	4.220	2.616	25.44	3.47	9.08	9.32	3.14	174	24	0.17	0.12	0.17	2.97	0.98	934.12	933.82	932.52	932.22	937.05	936.63
	MH33-ES34	0.00	0.62	0.000	4.220	2.616	26.42	3.40	8.90	9.04	3.14	139	24	0.16	0.12	0.16	2.88	0.80	933.82	933.60	932.22	932.00	936.63	932.00
LATERAL	IN35-CB36	0.23	0.62	0.143	0.230	0.143	20.00	3.89	0.55	2.01	0.79	175	12	0.32	0.30	0.32	2.56	1.14	936.44	935.88	935.64	935.06	938.09	938.27
	CB36-MH37	0.06	0.62	0.037	0.290	0.180	21.14	3.79	0.68	2.01	0.79	88	12	0.32	0.30	0.32								

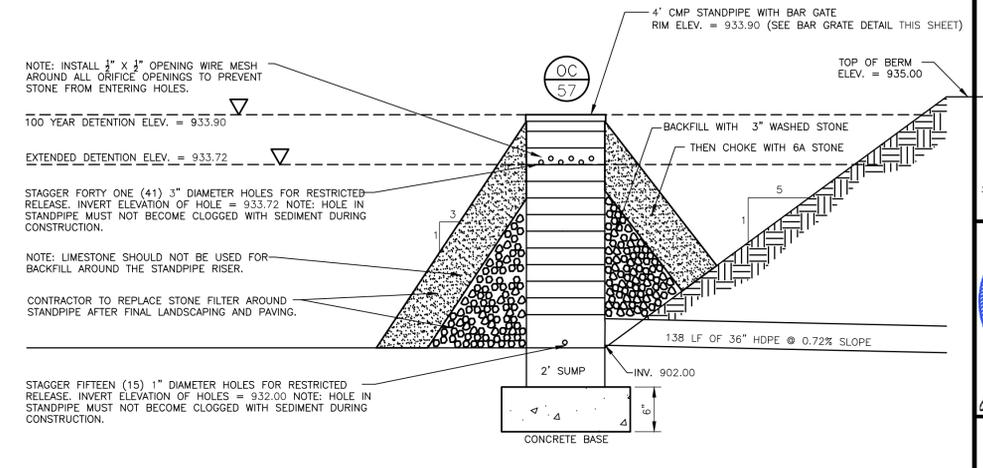
SPILLWAY DETAIL - OVERFLOW - RIP RAP



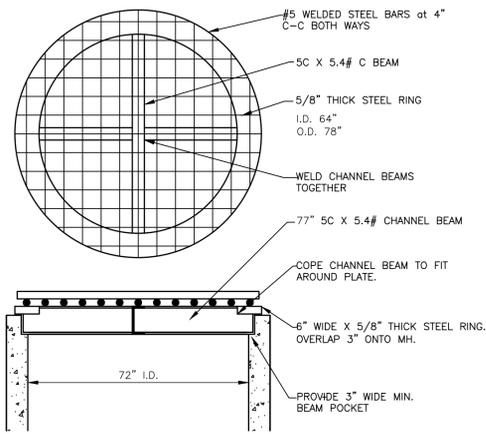
FOREBAY OUTLET CONTROL STRUCTURE DETAIL



DETENTION BASIN OUTLET CONTROL STRUCTURE DETAIL

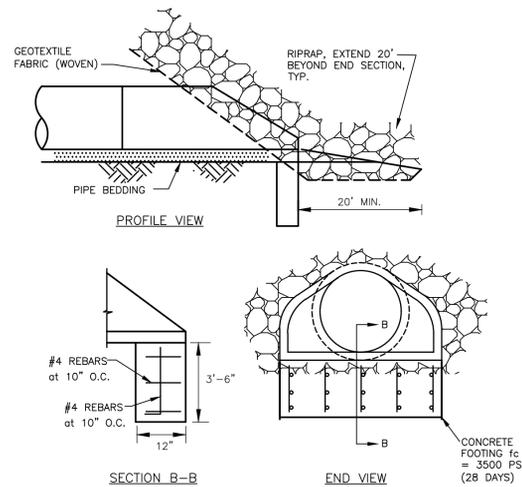


BAR GRATE DETAIL - FOR OVERFLOW STRUCTURE

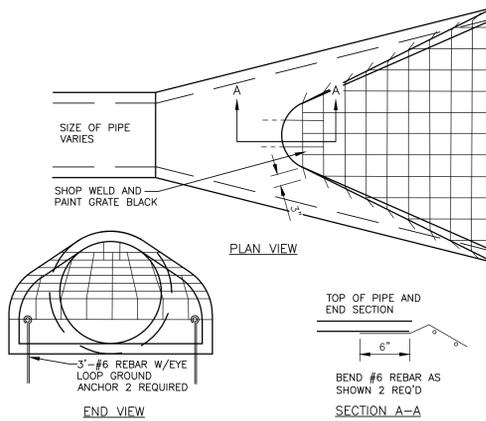


- NOTES:
1. A MINIMUM OF 1/4" WELDS REQUIRED.
 2. AFTER ASSEMBLY, HOT DIP TO GALVANIZE GRATE AND WELDS.
 3. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS PRIOR TO CONSTRUCTION.

END SECTION DETAIL - WITH FOOTING - WITHOUT TABLE



END SECTION DETAIL - WITH BAR GRATE



- NOTES:
1. TO BE INSTALLED ON ALL END SECTIONS 15" AND LARGER.
 2. #6 REBAR @ 6" O.C. BOTH WAYS, WELDED EXTEND 3" (BOTH SIDES) BEYOND OPENING AND BEND TO FIT SIDES.



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DETENTION BASIN DETAILS
CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
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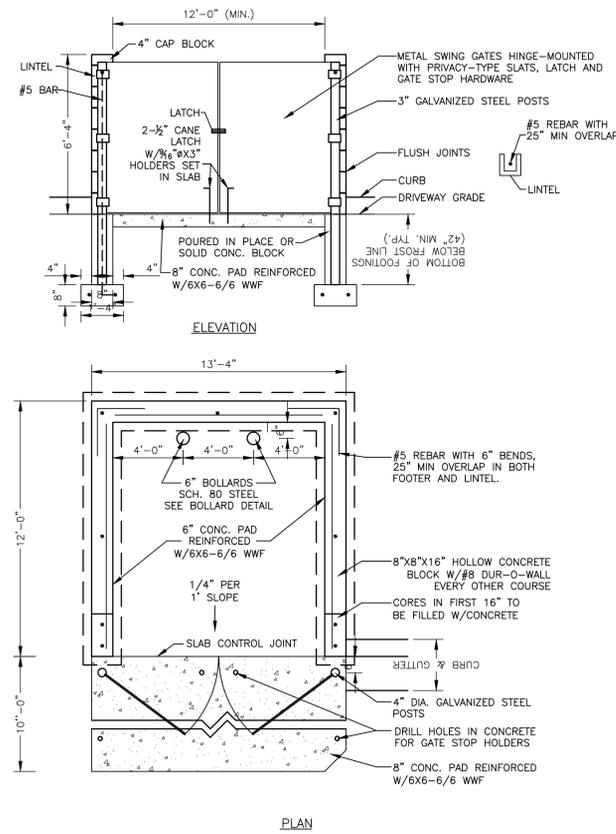
SCALE: 1" = 60'
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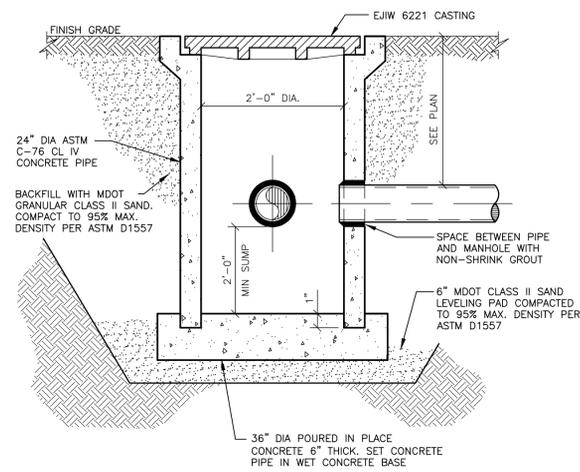
C-9.2

NOT FOR CONSTRUCTION

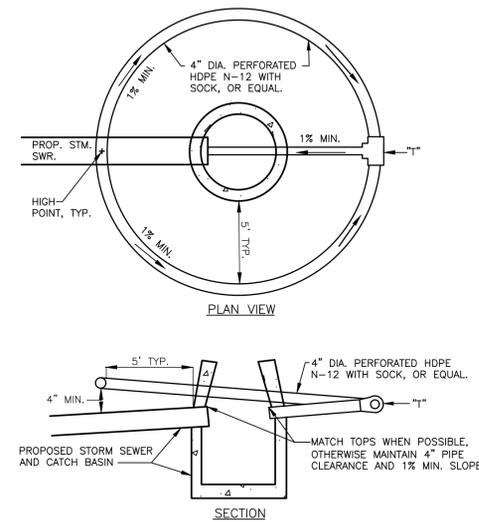
DUMPSTER ENCLOSURE DETAIL - CONCRETE WALL - SINGLE



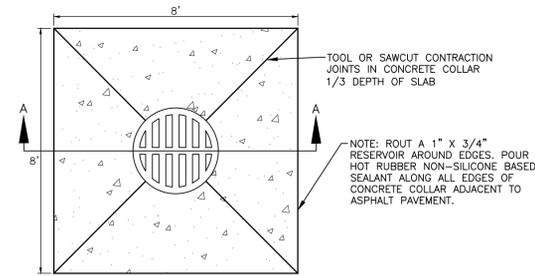
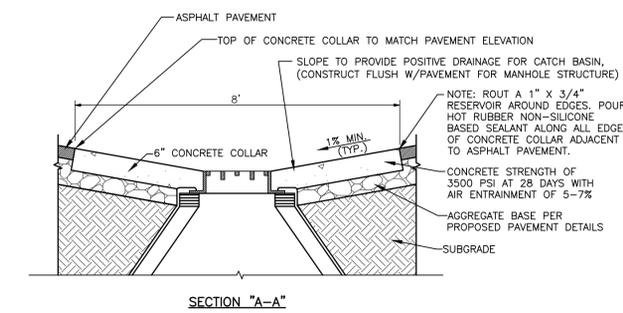
YARD BASIN DETAIL (2' DIA.)



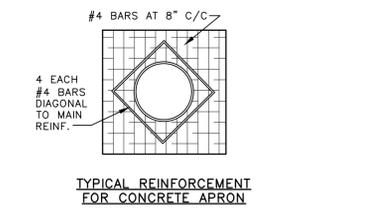
UNDERDRAIN DETAIL - RADIAL



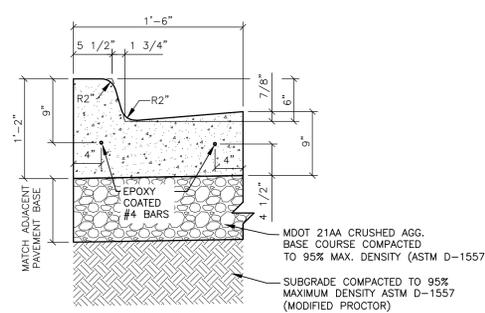
APRON DETAIL - CONCRETE AROUND CATCH BASIN



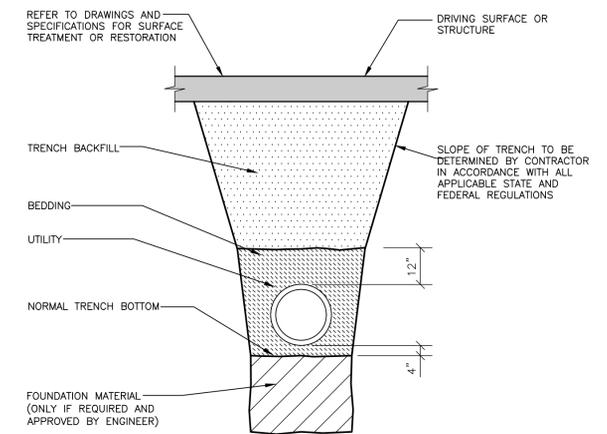
APRON DETAIL - CONCRETE AROUND MANHOLE



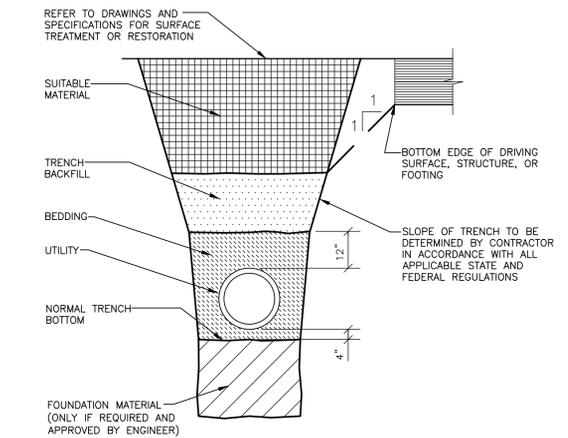
CURB AND GUTTER DETAIL - CONCRETE - STANDARD - 18" W 6" H 14" D



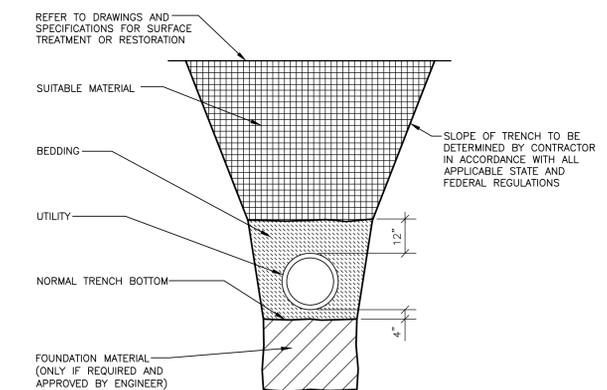
TRENCH DETAIL - BELOW DRIVING SURFACE OR STRUCTURE



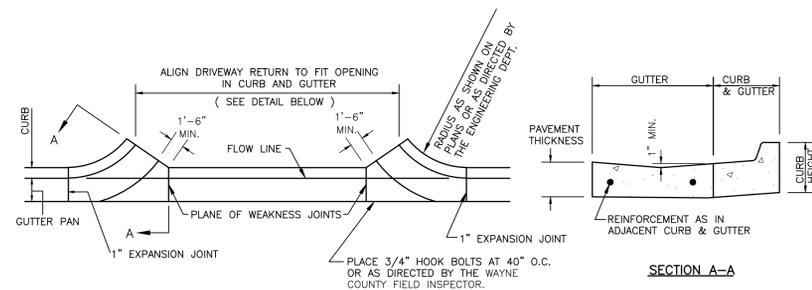
TRENCH DETAIL - ADJACENT TO DRIVING SURFACE OR STRUCTURE



TRENCH DETAIL - NOT ADJACENT TO DRIVING SURFACE OR STRUCTURE



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CLIENT:
CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843
POC: STEVE GRONOW
517-552-2489

DETAIL
CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

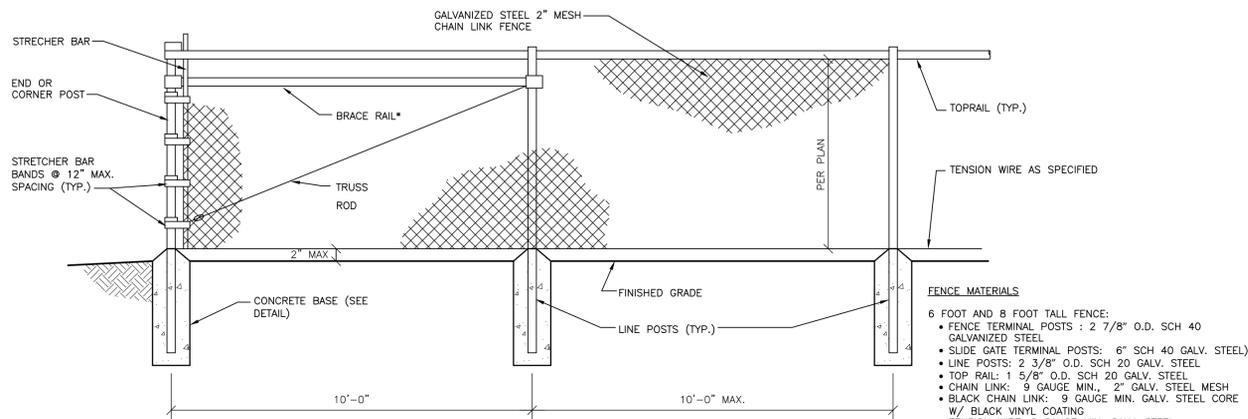
DATE	DESCRIPTION
5/28/2024	DATE
5/30/2024	REVISIONS
7/23/2024	REVISIONS

ORIGINAL ISSUE DATE: 02/29/2024
PROJECT NO: 22-286
SCALE: N/A
FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-11.0

NOT FOR CONSTRUCTION

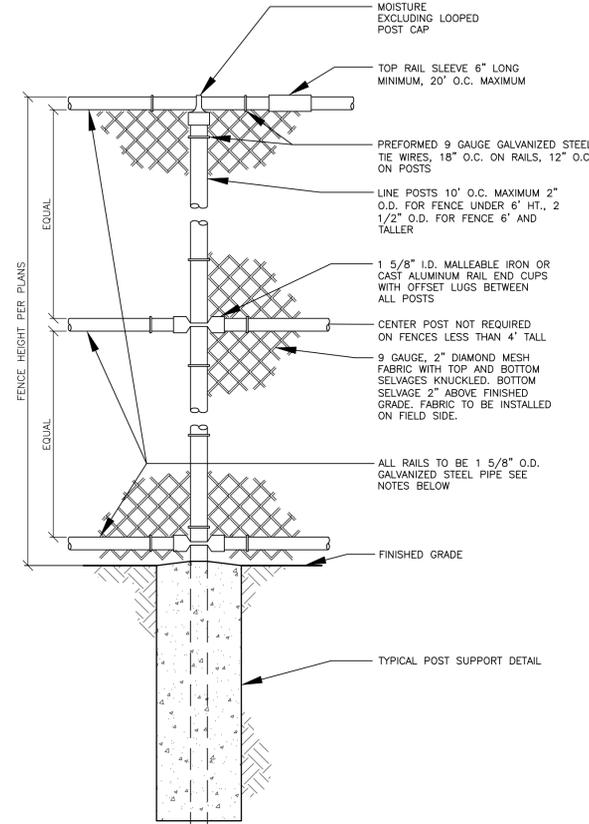
FENCE DETAIL - CHAIN LINK - STRAIGHT SEGMENT WITHOUT BARBED WIRE



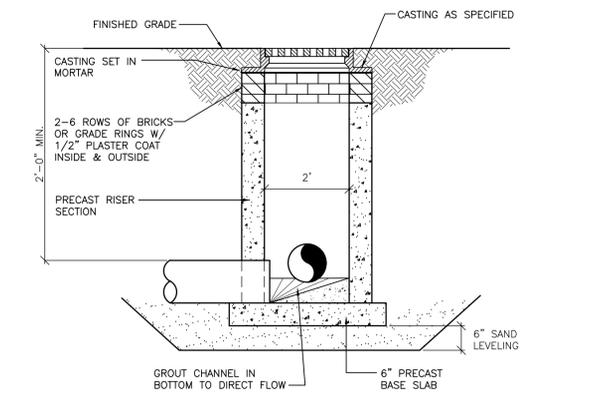
- NOTES:
- FENCE ALONG PUBLIC RIGHT OF WAY TO BE BLACK VINYL COATED.
 - OMIT BRACE RAIL ON 4' TALL CHAIN LINK FENCE OR FENCE LENGTHS UNDER 100 FEET.

- FENCE MATERIALS
- 6 FOOT AND 8 FOOT TALL FENCE:
- FENCE TERMINAL POSTS: 2 7/8" O.D. SCH 40 GALVANIZED STEEL
 - SLIDE GATE TERMINAL POSTS: 6" SCH 40 GALV. STEEL
 - LINE POSTS: 2 3/8" O.D. SCH 20 GALV. STEEL
 - TOP RAIL: 1 5/8" O.D. SCH 20 GALV. STEEL
 - CHAIN LINK: 9 GAUGE MIN., 2" GALV. STEEL MESH
 - BLACK CHAIN LINK: 9 GAUGE MIN. GALV. STEEL CORE W/ BLACK VINYL COATING
 - TENSION WIRE: 9 GAUGE MIN. GALV. STEEL
 - TIES: 9 GAUGE MIN. ALUMINUM WIRE
- 4 FOOT TALL FENCE:
- TERMINAL POSTS: 2 3/8" O.D. SCH 40 GALV. STEEL
 - LINE POSTS: 1 7/8" O.D. SCH 20 GALV. STEEL
 - TOP RAIL: 1 5/8" O.D. SCH 20 GALV. STEEL
 - MESH/WIRE SAME AS ABOVE.

FENCE DETAIL - CHAIN LINK - STANDARD

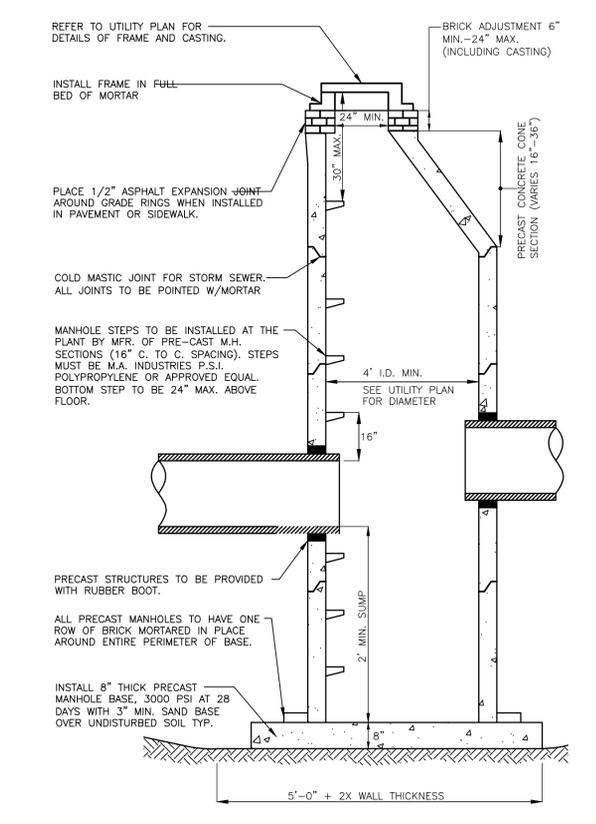


CATCH BASIN DETAIL - 2' DIA. - WITHOUT SUMP - UNPAVED AREA

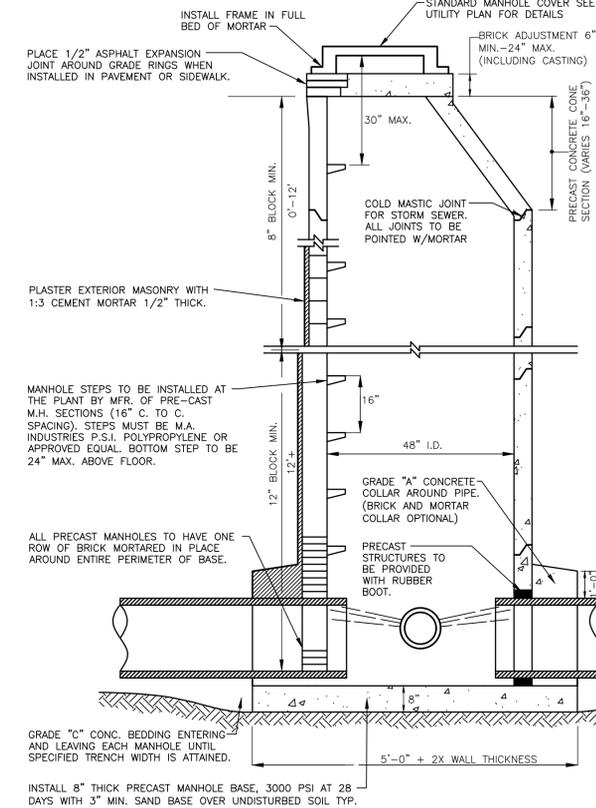


- NOTES:
- CATCH BASINS ALSO CAN BE CONSTRUCTED OF RADIAL CONCRETE BLOCKS WITH PRE-CAST CONCRETE OR POURED IN PLACE CONCRETE BASE SLAB.
 - ALL CATCH BASIN LEADS ARE 12" RCP UNLESS NOTED OTHERWISE.

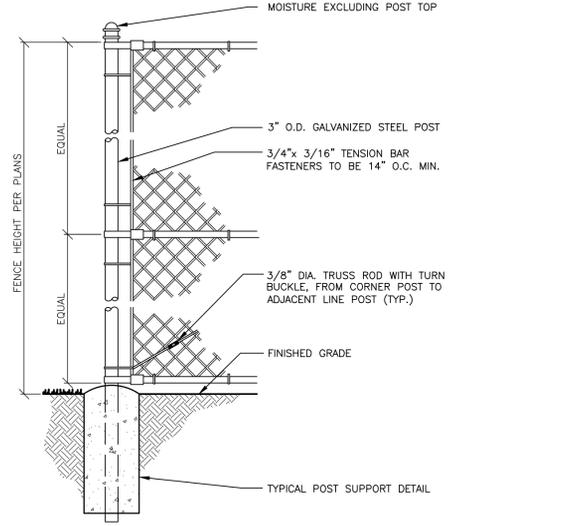
CATCH BASIN DETAIL - 4' DIA. - WITH SUMP - STANDARD



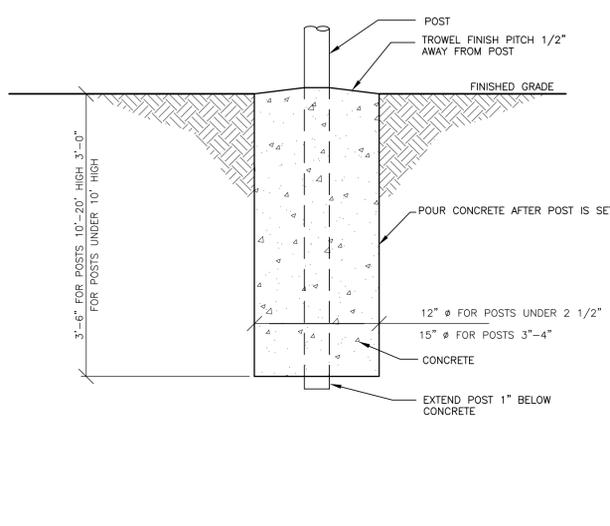
STORM MANHOLE DETAIL - 4' DIA. - STANDARD



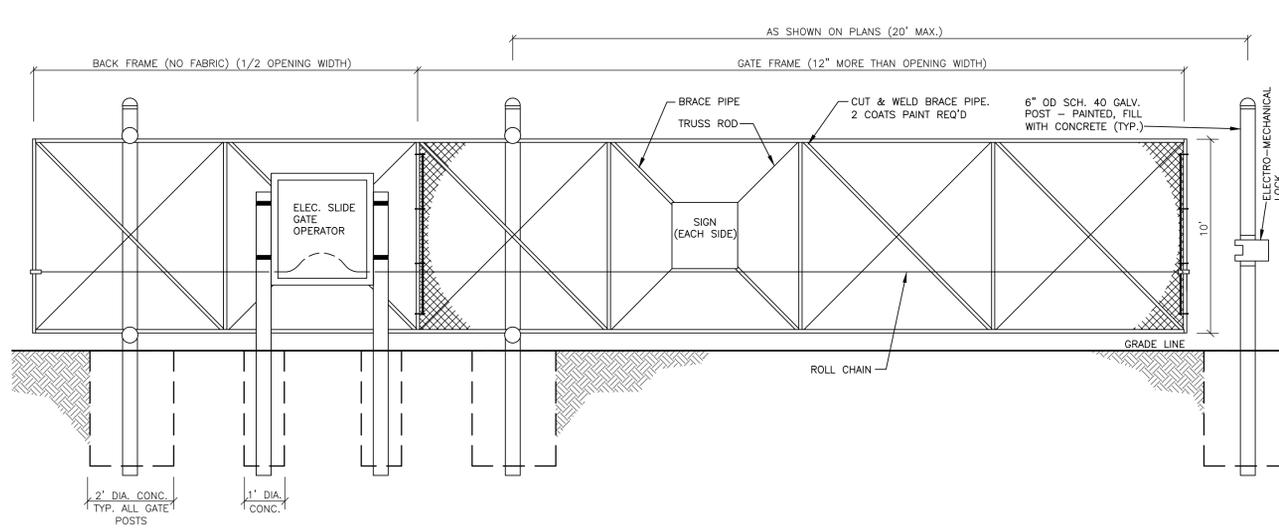
FENCE DETAIL - CHAIN LINK - TERMINAL-CORNER POST



FENCE DETAIL - POST SUPPORT



GATE DETAIL - CANTILEVER - SINGLE



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

CLIENT :

CHESTNUT DEVELOPMENT, LLC
3800 CHILSON ROAD
HOWELL, MI 48843
POC: STEVE GRONOW
517-552-2489

DETAIL

CHESTNUT SELF STORAGE
TAX ID# 06-29-200-029
PART OF THE NE 1/4 OF SEC. 29, T3N-R4E,
HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE: 02/29/2024

PROJECT NO: 22-286

SCALE: N/A

FIELD:
DRAWN BY: CD
DESIGN BY: BS
CHECK BY: AP

C-11.1

NOT FOR CONSTRUCTION



GENERAL NOTES

- 1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE LOCAL MUNICIPALITY, THE LOCAL WATER AND/OR SEWER AUTHORITY, THE COUNTY DRAINAGE COMMISSIONER, MICHIGAN DEPARTMENT OF TRANSPORTATION, MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES AND ENERGY, THE STATE OF MICHIGAN, AND THE COUNTY ROAD COMMISSIONER WHERE APPLICABLE.
2. RULES, REGULATIONS OR LAWS OF ANY CONTROLLING GOVERNMENTAL AGENCY SHALL GOVERN, WHEN THEY ARE MORE STRINGENT THAN THE REQUIREMENTS OF THESE SPECIFICATIONS.
3. SHOULD THE CONTRACTOR ENCOUNTER A CONFLICT BETWEEN THESE PLANS AND SPECIFICATIONS EITHER AMONG THEMSELVES OR WITH THE REQUIREMENTS OF ANY AND ALL REVIEWING AND PERMIT-ISSUING AGENCIES, CONTRACTOR SHALL SEEK CLARIFICATION IN WRITING FROM THE ENGINEER BEFORE COMMENCEMENT OF CONSTRUCTION. FAILURE TO DO SO SHALL BE AT SOLE EXPENSE TO THE CONTRACTOR.
4. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR AND EQUIPMENT TO COMPLETE THE TYPE OF WORK WHICH IS BID, IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS, DETAILS AND TO THE SATISFACTION OF THE OWNER AND OWNER'S REPRESENTATIVE.
5. CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL HOURS, AND CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE DESIGN PROFESSIONAL.
6. ANY WORK WITHIN STREET OR HIGHWAY RIGHT-OF-WAYS SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE GOVERNMENTAL AGENCIES HAVING JURISDICTION AND SHALL NOT BEGIN UNTIL PERMITS HAVE BEEN ISSUED BY THESE GOVERNING AUTHORITIES.
7. ALL NECESSARY PERMITS, BONDS, INSURANCES, ETC., SHALL BE PAID FOR BY THE CONTRACTOR.
8. ALL ELEVATIONS SHOWN ARE BASED ON BENCHMARKS PROVIDED BY THE LOCAL MUNICIPALITY UNLESS OTHERWISE NOTED ON THE DRAWINGS.
9. ALL ITEMS OF WORK NOT SPECIFICALLY INDICATED AS PAY ITEMS ON THE DRAWINGS OR IN THE BID PACKAGE SHALL BE CONSIDERED INCIDENTAL ITEMS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL DURING THE PERIODS OF CONSTRUCTION.
11. AT LEAST THREE (3) WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL CONTACT MISS DIG ((1-800-482-7171)) TO VERIFY THE LOCATION OF ANY EXISTING UNDERGROUND UTILITIES AND SHALL NOTIFY REPRESENTATIVES OF OTHER UTILITIES IN THE VICINITY OF THE WORK.
12. ALL PROPERTIES OR FACILITIES IN THE SURROUNDING AREAS, PUBLIC OR PRIVATE, DESTROYED OR OTHERWISE DISTURBED DURING CONSTRUCTION SHALL BE REPLACED AND/OR RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.
13. MANHOLE, CATCH BASIN, GATE WELLS RIMS AND HYDRANT FINISH GRADE ELEVATIONS MUST BE AS-BUILT AND APPROVED BY THE ENGINEER BEFORE THE CONTRACTOR'S WORK IS CONSIDERED COMPLETE. AGENCY REQUIREMENTS FOR RECORD DRAWINGS ALSO APPLY.
14. CONTRACTOR SHALL REMOVE AND DISPOSE OF OFF-SITE ANY TREES, BRUSH, STUMPS, TRASH OR OTHER UNWANTED DEBRIS, AT THE OWNER'S DIRECTION, INCLUDING OLD BUILDING FOUNDATIONS AND FLOORS, THE BURNING OR BURYING OF TRASH, STUMPS OR OTHER DEBRIS WILL NOT BE ALLOWED.
15. ALL REFERENCES TO M.D.O.T. SPECIFICATIONS REFER TO THE MOST CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
16. ALL CONTRACTORS BIDDING THIS PROJECT SHALL HAVE VISITED THE SITE TO BECOME THOROUGHLY FAMILIAR WITH THE SITE AND THE CONDITIONS IN WHICH THEY WILL BE CONDUCTING THEIR OPERATIONS, ANY VARIANCE FOUND BETWEEN THE PLANS AND EXISTING CONDITIONS SHALL BE REPORTED IMMEDIATELY TO THE DESIGN ENGINEER.
17. THE LOCATIONS AND DIMENSIONS SHOWN ON THE PLANS FOR EXISTING UNDERGROUND FACILITIES ARE IN ACCORDANCE WITH AVAILABLE INFORMATION PROVIDED BY THE UTILITY COMPANIES AND GOVERNMENTAL AGENCIES WITHOUT UNCOVERING AND MEASURING THE DESIGN ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION OR THAT ALL EXISTING UNDERGROUND FACILITIES ARE SHOWN.
18. THE OWNER MAY EMPLOY AND PAY FOR THE SERVICES OF AN ENGINEER TO CONDUCT ON-SITE INSPECTION AND VERIFY IN THE FIELD THAT ALL BACKFILL, PAVEMENTS AND CONCRETE CURB AND GUTTER HAVE BEEN PLACED AND COMPACTED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. IF, IN THE OPINION OF THE ENGINEER, THE WORK DOES NOT MEET THE TECHNICAL OR DESIGN REQUIREMENTS STIPULATED FOR THE WORK, THE CONTRACTOR SHALL MAKE ALL NECESSARY ADJUSTMENTS AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL MAKE NO DEVIATIONS FROM THE CONTRACT DOCUMENTS WITHOUT SPECIFIC WRITTEN APPROVAL OF THE OWNER.
19. ALL EXCAVATED MATERIAL REMOVED FROM THE SANITARY SEWER, STORM SEWER AND WATER MAIN TRENCHES UNDER, THROUGH AND WITHIN 3 FEET OF THE 45° ZONE OF INFLUENCE LINE OF EXISTING OR PROPOSED PAVING, SIDEWALK AREAS AND OTHER PLANS, NOT SUITABLE FOR BACKFILL, SHALL BE REMOVED FROM THESE AREAS AND DISPOSED OF.
20. THE CONTRACTOR SHALL RESTORE TO THEIR PRESENT CONDITIONS ANY PAVEMENT OR PUBLIC RIGHTS-OF-WAY THAT IS DISTURBED BY THE OPERATIONS OF THE CONTRACTOR. ALL RESTORATION WORK IN PUBLIC RIGHTS-OF-WAY SHALL BE PERFORMED TO THE SATISFACTION OF THE GOVERNMENT AGENCIES HAVING JURISDICTION.
21. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE AND LIGHTS TO PROTECT THE WORK AND SAFELY MAINTAIN TRAFFIC, IN ACCORDANCE WITH LOCAL REQUIREMENTS AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST EDITION).
22. O.S.H.A. SAFETY REQUIREMENTS - ALL WORK, WORK PRACTICE, AND MATERIALS SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL SAFETY, OCCUPATIONAL HEALTH AND ENVIRONMENTAL REGULATIONS AND ALSO NFPA AND ANSI CODES AS APPLICABLE. ALL WORK INSIDE A CONFINED SPACE SUCH AS MANHOLES OR UNDERGROUND STRUCTURES SHALL BE COORDINATED WITH UTILITY OWNER AND ALL WORKER SAFETY REGULATIONS STRICTLY ENFORCED. LAND SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
23. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE FOR OR SUPPLY TEMPORARY WATER SERVICE, SANITARY FACILITIES AND ELECTRICITY.
24. CONTRACTOR SHALL PROVIDE FOR THE CONTINUOUS OPERATION OF EXISTING FACILITIES WITHOUT INTERRUPTION DURING CONSTRUCTION UNLESS SPECIFICALLY AUTHORIZED OTHERWISE BY THE RESPECTIVE AUTHORITY.
25. THE CONTRACTOR SHALL NOTE EXISTING UNDERGROUND UTILITIES IN THE PROJECT PLANS. TRENCH BACKFILL FOR EXISTING UTILITIES SHALL BE EXAMINED CRITICALLY. ANY TRENCH WHICH, IN THE OPINION OF THE SOILS ENGINEER ARE FOUND TO BE SOFT, UNSTABLE MATERIAL SHALL BE COMPLETELY EXCAVATED AND BACKFILLED WITH SUITABLE MATERIAL. SAND BACKFILL SHALL BE USED UNDER PAVEMENT OR WITHIN 3 FEET OF THE 45° INFLUENCE LINE OF PAVEMENT OR STRUCTURES.

EROSION CONTROL STANDARDS

- 1. ALL EROSION AND SEDIMENT CONTROL WORK SHALL CONFORM TO STANDARDS AND SPECIFICATIONS OF THE JURISDICTIONAL AGENCY UNDER PART 91 OF ACT 451 OF 1994, AS AMENDED.
2. UNDER "MICHIGAN'S PERMIT-BY-RULE FOR CONSTRUCTION ACTIVITIES", PROMULGATED UNDER ACT 245, PUBLIC ACTS OF 1929 AS AMENDED, AN NPDES STORM WATER DISCHARGE COVERAGE PERMIT IS REQUIRED FOR ANY CONSTRUCTION ACTIVITY THAT DISTURBS 1 ACRE OR MORE OF LAND. A CERTIFIED STORM WATER OPERATOR IS REQUIRED FOR THE SUPERVISION AND INSPECTION OF THE SOIL EROSION CONTROL MEASURES AT THE CONSTRUCTION SITE IN ACCORDANCE WITH THE PROVISIONS OF THESE RULES.
3. DAILY INSPECTIONS SHALL BE MADE BY CONTRACTOR WHILE WORKING TO DETERMINE THE EFFECTIVENESS OF EROSION AND SEDIMENT CONTROL MEASURES. ANY REPAIRS, REPAIRS SHALL BE PERFORMED WITHOUT DELAY. ALL SOIL EROSION CONTROL PROVISIONS SHALL BE PROPERLY MAINTAINED DURING CONSTRUCTION.
4. EROSION AND ANY SEDIMENTATION FROM WORK ON THIS SITE SHALL BE CONTAINED ON THE SITE AND NOT ALLOWED TO COLLECT ON ANY OFF-SITE AREAS OR IN WATERWAYS. WATERWAYS INCLUDE BOTH NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES, AND PONDS.
5. CONTRACTOR SHALL APPLY TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES WHEN REQUIRED AND AS DIRECTED ON THESE PLANS. CONTRACTOR SHALL REMOVE TEMPORARY MEASURES AS SOON AS PERMANENT STABILIZATION OF SLOPES, DITCHES, AND OTHER EARTH CHANGE AREAS HAVE BEEN COMPLETED.

EROSION CONTROL STANDARDS CONTINUED

- 6. STAGING THE WORK WILL BE DONE BY THE CONTRACTOR AS DIRECTED IN THESE PLANS AND AS REQUIRED TO ENSURE PROGRESSIVE STABILIZATION OF DISTURBED EARTH.
7. SOIL EROSION CONTROL PRACTICES WILL BE ESTABLISHED IN EARLY STAGES OF CONSTRUCTION BY THE CONTRACTOR. SEDIMENT CONTROL PRACTICES WILL BE APPLIED AS A PERIMETER DEFENSE AGAINST ANY TRANSPORTING OF SILT OFF THE SITE.
8. DUST SHALL BE CONTROLLED BY WATERING OR BY OTHER APPROVED MEANS THROUGHOUT ALL CONSTRUCTION OPERATIONS.
9. ALL WATER FROM DEWATERING OR SURFACE DRAINAGE FROM THE CONSTRUCTION SITE SHALL BE CONTROLLED TO ELIMINATE SEDIMENT CONTAMINATION OF OFF-SITE WATERWAYS OR STORM SEWERS. SUCH MEASURES SHALL BE APPROVED BY THE ENGINEER PRIOR TO ANY DEWATERING OR LAID DISTURBANCE.
10. PERMANENT SOIL EROSION CONTROL MEASURES FOR SLOPES, CHANNELS, DITCHES OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN 5 CALENDAR DAYS AFTER FINAL GRADING OR THE FINAL EARTH CHANGE HAS BEEN COMPLETED. WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA AFTER AN EARTH CHANGE HAS BEEN COMPLETED OR WHERE SIGNIFICANT EARTH CHANGE HAS BEEN COMPLETED OR WHERE SIGNIFICANT EARTH CHANGE ACTIVITY CEASES, TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED WITHIN 5 CALENDAR DAYS. ALL TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND ESTABLISHED BEFORE A CERTIFICATE OF COMPLIANCE IS ISSUED.

STORM SEWER SPECIFICATIONS

- 1. THESE SPECIFICATIONS SHALL BE USED IN CONJUNCTION WITH THE GENERAL SPECIFICATIONS AND THE SPECIFICATIONS AND DETAIL SHEETS OF THE GOVERNING AGENCIES. IF ANY CONFLICT IS FOUND BETWEEN THE SPECIFICATIONS, THE STRICTER SPECIFICATIONS SHALL BE FOLLOWED.
2. CONTRACTOR SHALL FURNISH CERTIFIED EVIDENCE THAT ALL MATERIAL TESTS AND INSPECTIONS HAVE BEEN PERFORMED AND THAT THE PRODUCT HAS BEEN MANUFACTURED IN COMPLIANCE WITH THE APPLICABLE SPECIFICATIONS.
3. PROPER IMPLEMENTS, TOOLS AND FACILITIES SHALL BE PROVIDED AND USED FOR UNLOADING AND DISTRIBUTING MATERIALS ALONG THE LINE OF WORK. ANY PIPE OR FITTING DAMAGED IN TRANSPORTATION OR HANDLING SHALL BE REJECTED AND IMMEDIATELY REMOVED FROM THE JOB SITE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFE STORAGE OF ALL MATERIAL INTENDED FOR THE WORK. HE SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO MATERIALS, EQUIPMENT AND WORK.
5. PIPE BEDDING, UNLESS OTHERWISE INDICATED, SHALL BE CL. II SAND, CRUSHED STONE OR ROUNDED GRAVEL. BEDDING MATERIAL SHALL HAVE 95% PASSING A 3/4" SIEVE AND AT LEAST 50% RETAINED ON A NO. 4 SIEVE.
6. POROUS FILTER MATERIAL FOR PERFORATED SUBSURFACE DRAINS SHALL BE CRUSHED ROCK OR GRAVEL GRADED BETWEEN 1-1/2" AND 3/4" OR PER PLANS AND DETAILS.
7. BACKFILL, UNLESS OTHERWISE NOTED, SHALL BE COARSE SAND, FINE GRAVEL OR GRAVEL HAVING A LOW PLASTICITY INDEX, FREE OF ROCKS, DEBRIS AND OTHER FOREIGN MATERIALS AND DEFINED AS ALL PASSING THROUGH A 3/8" SIEVE AND NOT MORE THAN 10% BY VOLUME PASSING THROUGH A 200-MESH SIEVE.
8. STORM SEWER PIPING AND FITTINGS SHALL BE OF THE SIZE AND TYPE INDICATED ON THE DRAWINGS AND SHALL CONFORM TO THE FOLLOWING:
A. POLYVINYL CHLORIDE (PVC) AND ACRYLONITRILE BUTADIENE STYRENE (ABS) FOR PIPE UP TO AND INCLUDING 10" IN DIAMETER, SHALL CONFORM TO ASTM D3034, SDR 23.5 FOR PVC PIPE AND ASTM D2751 FOR ABS PIPE WITH ELASTOMERIC GASKET JOINTS CONFORMING TO ASTM D3212 OR CHEMICALLY WELDED PIPE JOINTS CONFORMING TO ASTM F545.
B. REINFORCED CONCRETE PIPE, FOR PIPE 12" IN DIAMETER AND UP, SHALL CONFORM TO ASTM C-76. JOINTS SHALL BE MODIFIED GROOVED TONGUE WITH RUBBER GASKET CONFORMING TO ASTM C-443.
C. PERFORATED SUBSURFACE DRAIN PIPE SHALL BE PVC CONFORMING TO ASTM D-2729 OR PERFORATED, CORRUGATED HIGH DENSITY POLYETHYLENE PIPE CONFORMING TO ASTM D-2610. UNLESS OTHERWISE NOTED, POLYETHYLENE PIPE SHALL BE PREFABRICATED COUPLING WITH SOLVENT WELD.
9. MANHOLES, CATCH BASINS, AND INLETS SHALL BE OF THE SIZE AND TYPE INDICATED ON THE DRAWINGS AND SHALL BE CONSTRUCTED OF THE FOLLOWING:
A. REINFORCED PRE-CAST CONCRETE MANHOLE SECTIONS INCLUDING CONCENTRIC OR ECCENTRIC CONES AND GRADE RINGS SHALL BE 4000 PSI CONCRETE AND CONFORM TO ASTM C-478-84T.
B. BRICK SHALL BE SOUND, HARD-BURNED THROUGHOUT AND OF UNIFORM SIZE AND QUALITY AND SHALL BE IN ACCORDANCE WITH AASHTO M 91, GRADE MS.
C. CONCRETE MASONRY SHALL BE SOLID PRE-CAST SEGMENTAL UNITS CONFORMING TO ASTM C-139.
10. IRON CASTINGS SHALL CONFORM TO ASTM A-48, CLASS 30. BEARING SURFACES BETWEEN CAST IRON FRAMES, COVERS AND GRATES SHALL BE MACHINED, FITTED TOGETHER AND MATCHED-MARKED TO PREVENT ROOKING. SYSTEM IDENTIFYING LETTERS 2" HIGH SHALL BE STAMPED OR CAST INTO ALL COVERS SO THAT THEY ARE PLAINLY VISIBLE. SEE MUNICIPALITY STANDARDS FOR ACTUAL WORDING.
11. CASTINGS SHALL BE MANUFACTURED BY EAST JORDAN IRON WORKS, INC., NEENAH FOUNDRY COMPANY OR EQUAL.
12. CONCRETE AND MASONRY MATERIALS FOR CONSTRUCTION OF STORM DRAINAGE STRUCTURES SHALL CONSIST OF THE FOLLOWING:
A. PORTLAND CEMENT SHALL BE STANDARD BRAND OF PORTLAND CEMENT CONFORMING TO ASTM C-150, TYPE I OR IA.
B. FINE AND COARSE AGGREGATES FOR CONCRETE SHALL BE PER ASTM C-33.
C. AGGREGATE FOR CEMENT MORTAR SHALL BE CLEAN, SHARP SAND CONFORMING TO ASTM C-144.
D. HYDRATED LIME SHALL COMPLY WITH ASTM C-207, TYPE S.
E. WATER SHALL MEET THE REQUIREMENTS OF MDT SPEC SECTION 911.
F. REINFORCING STEEL FOR CONCRETE SHALL BE INTERMEDIATE-GRADE NEW BILLET STEEL CONFORMING TO ASTM A-615, GRADE 40.
13. CONCRETE, UNLESS OTHERWISE NOTED, SHALL HAVE COMPRESSIVE STRENGTH AFTER 28 DAYS OF 3000 PSI MINIMUM WITH 3" MAXIMUM SLUMP.
A. CONCRETE FILL BELOW GRADE MAY BE 2500 PSI AT 28 DAYS.
B. CONCRETE, WHERE EXPOSED TO THE WEATHER, SHALL BE AIR-ENTRAINED. AIR ENTRAINMENT SHALL BE ACCOMPLISHED BY THE USE OF ADTIVES CONFORMING TO ASTM C-260. AIR CONTENT SHALL BE 6% + 1% ADDITIVE SHALL BE USED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S PRINTED DIRECTIONS.
C. READY-MIX CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-94.
14. MORTAR SHALL BE SPECIFIED HEREINAFTER. USE METHOD OF MIXING MORTAR AT JOB SO THAT SPECIFIED PROPORTIONS OF MORTAR MATERIALS CAN BE CONTROLLED AND ACCURATELY MAINTAINED DURING WORK PROGRESS. MORTAR SHALL NOT BE MIXED IN GREATER QUANTITIES THAN REQUIRED FOR IMMEDIATE USE, WITH AMOUNT OF WATER CONSISTENT WITH SATISFACTORY WORKABILITY. RE-TAMPERING OF MORTAR IS NOT PERMITTED.
A. MORTAR FOR LAYING BRICK OR CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C-270, TYPE M. AVERAGE COMPRESSIVE STRENGTH 3500 PSI MINIMUM AT 28 DAYS. MORTAR MIX SHALL BE PROPORTIONED BY VOLUME.
B. MORTAR FOR PLASTERING SHALL CONSIST OF 1 PART PORTLAND CEMENT AND 2-1/2 PARTS SAND.
C. MORTAR FOR GROUTING OF RIP-RAP SHALL CONSIST OF 1 PART PORTLAND CEMENT AND 3-1/2 PARTS SAND.

STORM SEWER SPECIFICATIONS, CONTINUED

- 16. OPEN NO MORE TRENCH IN ADVANCE OF PIPE LAYING THAN IS NECESSARY TO EXPEDITE THE WORK.
17. CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED ON DRAWINGS. WHERE EXCESSIVE OR UNAUTHORIZED EXCAVATION TAKES PLACE, THE OVERDEPTH SHALL BE BACKFILLED TO THE PROPER GRADE WITH COMPACTED BEDDING MATERIAL, AT NO EXPENSE TO THE OWNER.
18. WHERE UNSTABLE SOIL IS ENCOUNTERED, CONTRACTOR SHALL NOT PLACE PIPE UNTIL A SOLID BED HAS BEEN PROVIDED.
19. EXCAVATION FOR DRAINAGE STRUCTURES SHALL EXTEND A SUFFICIENT DISTANCE FROM THE WALLS AND FOOTINGS TO ALLOW FOR FORMS, CONSTRUCTION OF WALLS, CONNECTIONS AND FOR INSPECTION.
20. PROVIDE REQUIRED TIMBER SHEETING, BRACING AND SHORING TO PROTECT SIDES OF EXCAVATION. DO NOT BRACE SHEETING AGAINST PIPE. PROVIDE SUITABLE LADDERS FOR SAFE ENTRY TO AND EXIT FROM EXCAVATION.
21. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE PILED IN AN AVOID MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF TRENCHES TO AVOID OVERLOADING, AND TO PREVENT SLIDES OR CAVE-INS.
22. WHEN WET EXCAVATION IS ENCOUNTERED, THE TRENCH SHALL BE DE-WATERED UNTIL THE PIPE HAS BEEN LAID AND BACKFILLED TO A POINT AT LEAST 1 FOOT ABOVE TOP OF PIPE.
23. MANHOLES AND CATCH BASINS SHALL BE CONSTRUCTED OF BRICK, CONCRETE MASONRY UNITS OR PRE-CAST CONCRETE WITH CAST IRON FRAMES, COVERS AND MANHOLE STEPS.
24. THE WALL THICKNESS OF MANHOLES AND CATCH BASINS CONSTRUCTED OF VARIOUS MATERIALS AND SET AT VARIOUS DEPTHS SHALL MEET THE MINIMUMS, ADHERE TO REQUIREMENTS OF THE GOVERNING AGENCY IF THEY EXCEED THESE THICKNESSES:
* DEPTH BRICK CONCRETE BLOCK PRE-CAST CONCRETE
* 0' - 10' 8" 6" 6"
* 10' - 16' 12" 8" 8"
* 16' - 25' 16" 12" 12"
25. WHENEVER EXISTING MANHOLES OR SEWER PIPE ARE TO BE TAPPED, DRILL HOLES 4" CENTER, TO CENTER, AROUND THE PERIPHERY OF OPENINGS TO CREATE A PLANE OF WEAKNESS JOINT BEFORE BREAKING SECTION OUT.
26. MANHOLE STEPS SHALL BE BUILT INTO AND THOROUGHLY ANCHORED TO WALLS. STEPS SHALL BE FACTORY INSTALLED IN PRE-CAST STRUCTURES.
27. ALL PIPING ENTERING OR LEAVING DRAINAGE STRUCTURES SHALL BE ADEQUATELY SUPPORTED BY POURED IN-PLACE CONCRETE FILL FROM PIPE CENTER TO UNDISTURBED GROUND.
28. SET FRAMES IN FULL BED OF STIFF MORTAR OR BITUMINOUS MASTIC JOINTING COMPOUND AT FINAL ELEVATION.
29. ALL TIMBER SHEETING BELOW A PLANE 12" ABOVE TOP OF PIPE SHALL REMAIN IN PLACE IN ORDER NOT TO DISTURB PIPE GRADING. BEFORE BACKFILLING, REMOVE ALL OTHER SHEETING BRACING AND SHORING.
30. BEDDING USED FOR TRENCH BOTTOM SHALL BE EXTENDED UP THE SIDES AND CAREFULLY PLACED AROUND AND OVER PIPE IN 6" MAXIMUM LAYERS. EACH LAYER SHALL BE THOROUGHLY AND CAREFULLY COMPACTED TO 95% OF MAXIMUM DRY DENSITY AS PER ASTM D-1557 (MODIFIED PROCTOR) UNTIL 12" OF COVER EXISTS OVER PIPE.
31. REMAINDER OF TRENCH SHALL BE BACKFILLED WITH SPECIFIED BACKFILL MATERIAL TO SPECIFIED SUBGRADE ELEVATION. BACKFILLING SHALL BE COMPACTED TO 90% OF MAXIMUM DRY DENSITY PER ASTM D-1557.
32. WITHIN 3' OF THE 45° INFLUENCE LINE OF THE SUBGRADE OF STREETS, DRIVES, PARKING LOTS AND OTHER AREAS TO HAVE OR HAVING IMPROVED HARD SURFACES, BACKFILL SHALL BE MATERIAL SPECIFIED AND SHALL BE DEPOSITED IN 6" LOOSE LAYERS AT OPTIMUM MOISTURE CONTENT (±2%) AND COMPACTED TO 95% OF MAXIMUM DRY DENSITY PER ASTM D1557. (MODIFIED PROCTOR) SUITABLE MATERIALS FOUND ON SITE MAY BE USED.
33. BEFORE BACKFILLING AROUND DRAINAGE STRUCTURES, ALL FORMS, TRASH AND DEBRIS SHALL BE REMOVED AND CLEARED AWAY. SELECTED EXCAVATED MATERIAL SHALL BE PLACED SYMMETRICALLY ON ALL SIDES IN 8" MAXIMUM LAYERS; EACH LAYER SHALL BE MOISTENED AND COMPACTED WITH MECHANICAL OR HAND TAMPERS.
34. AFTER INSTALLATION OF PIPES AND DRAINAGE STRUCTURES, CLEAN THEM, AND ADJUST TOPS TO FINISH GRADE. PIPE SHALL BE STRAIGHT BETWEEN STRUCTURES WITH THE FULL INSIDE DIAMETER VISIBLE WHEN SIGHTING BETWEEN STRUCTURES.
35. ENDS OF HEADWALL AND END SECTIONS FOR PIPES LARGER THAN 6 INCHES, SHALL BE FITTED WITH A #4 ROUNDED MINIMUM WELDED STEEL ROD GRATING. RODS SHALL BE SPACED 6" O.C. MAXIMUM. WELD ROD AT ALL INTERSECTIONS. GRATE SHALL BE REMOVABLE FOR ACCESS AND CLEANING.
36. RIP-RAP SHALL BE LAID FROM THE BOTTOM UPWARD; STONES SHALL BE LAID BY HAND WITH #8 MINIMUM DIMENSION PERPENDICULAR TO GRADE WITH WELL-BROKEN JOINTS, COMPACTED AS IT GOES, TRUE TO LINE. ALL JOINTS SHALL BE FILLED WITH CEMENT MORTAR. SURFACE STONE TO BE EXPOSED. CLEAN JOINTS WITH WIRE BRUSH.
37. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
38. ALL CONNECTIONS TO EXISTING SEWERS SHALL BE PER MUNICIPAL REQUIREMENTS, AND ALL COSTS INCLUDING TESTING AND/OR VIDEO OF SEWERS SHALL BE INCIDENTAL TO THE JOB.
39. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
40. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
41. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
42. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
43. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
44. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
45. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.

WATER MAIN SPECIFICATIONS

- 1. WATER MAIN SPECIFICATIONS SHALL BE USED IN CONJUNCTION WITH THE GENERAL SPECIFICATIONS, THE WATER MAIN SPECIFICATIONS, AND THE DETAIL SHEETS OF THE GOVERNING AGENCIES. IF ANY CONFLICT IS FOUND BETWEEN THE SPECIFICATIONS, THE STRICTER SPECIFICATIONS SHALL BE FOLLOWED.
2. DUCTILE IRON PIPE, 16" DIAMETER AND SMALLER, SHALL CONFORM TO ANSI/AWWA SPECIFICATION C151/A21.51, CLASS 54. DUCTILE IRON FITTINGS SHALL CONFORM TO ANSI/AWWA SPECIFICATION C153/A21.53 FOR COMPACT FITTINGS. DUCTILE IRON PIPE AND FITTINGS SHALL HAVE A DOUBLE THICKNESS CEMENT MORTAR LINING CONFORMING TO ANSI SPECIFICATION A21.4.
3. JOINTS FOR DUCTILE IRON WATER MAIN SHALL BE U.S. PIPE AND FOUNDRY COMPANY "TYTON JOINT" OR APPROVED EQUAL.
4. POLYVINYL CHLORIDE (PVC) WATER MAIN SHALL CONFORM TO AWWA C900 FOR PIPE SIZES 4 TO 12 INCHES, AND SHALL CONFORM TO AWWA C905 FOR PIPE SIZES 14 TO 24 INCHES. ALL PIPES SHALL HAVE A MINIMUM DIMENSION RATIO OF (DR) OF 18 CORRESPONDING TO A WORKING PRESSURE OF 235 PSI FOR PVC TYPE 1120 PIPE.
4.1. RESTRAINTS FOR PVC PIPE SHALL BE EBA IRON SERIES 200PV, UNIFLANGE SERIES 1350C, 1390C, 1500 OR APPROVED EQUAL.
4.2. SERVICES SHALL BE INSTALLED WITH ALL STAINLESS STEEL SADDLES SUCH AS SMITH-BEAR 372, FORD F5303, CASCADE C522, OR APPROVED EQUAL.
4.3. ALL PVC PIPE USED FOR POTABLE WATER SHALL BE BLUE IN COLOR, MANUFACTURED WITHIN THE LAST 12 MONTHS AS DETERMINED FROM THE DATE STAMP ON THE PIPE, AND FREE FROM DEFECTS.
4.4. ALL PIPES SHALL BE MARKED WITH THE MANUFACTURER'S NAME, DATE, NOMINAL SIZE, TYPE OF PLASTIC AND PRESSURE RATING. PIPE O.D. SHALL BE EQUIVALENT TO DUCTILE IRON PIPE OF THE SAME NOMINAL SIZE.
4.5. FITTING SHALL CONFORM TO AWWA C907 AND C908, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. ALL WATER MAIN SHALL BE INSTALLED WITH A MINIMUM COVER OF FIVE FEET, OR AS SPECIFIED BY THE LOCAL GOVERNING MUNICIPALITY, BELOW FINISH GRADE UNLESS OTHERWISE NOTED IN THE PLANS. WHEN WATER MAINS MUST DIP TO PASS UNDER A STORM SEWER OR SANITARY SEWER, THE SECTIONS WHICH ARE DEEPER THAN NORMAL SHALL BE KEPT TO A MINIMUM LENGTH BY THE USE OF VERTICAL 11-1/4 BENDS PROPERLY ANCHORED.
6. SEE THE WATER MAIN STANDARD DETAIL SHEETS OF THE GOVERNING AGENCY FOR THE SPECIFIC TYPE OF HYDRANTS AND VALVES TO BE USED FOR THIS PROJECT. THESE DETAIL SHEETS ARE INCLUDED AS PART OF THE PLANS.
7. PRIOR TO HYDROSTATIC TESTING AND BEFORE PLACING THE WATER MAIN IN SERVICE, ALL NEW WATER PIPELINES SHALL BE CHLORINATED IN ACCORDANCE WITH AWWA C651. VERIFICATION OF DISINFECTION SHALL BE PERFORMED BY A CERTIFIED TESTING LABORATORY.

WATER MAIN SPECIFICATIONS, CONTINUED

- 8. BEFORE ANY WATER MAIN WILL BE ACCEPTED BY THE GOVERNING AGENCY, IT MUST PASS A HYDROSTATIC PRESSURE TEST IN ACCORDANCE WITH AWWA C605 AND COMPLYING WITH THE CURRENT SPECIFICATIONS AND PROCEDURES OF THE AGENCY.
9. PRIOR TO BEING PLACED INTO SERVICE, WATER MAIN SHALL BE FLUSHED OF CHLORINATED WATER AND FILLED WITH WATER FROM THE DISTRIBUTION SYSTEM. CLEAN WATER SHALL BE PUMPED INTO THE SANITARY SEWER. NO CHLORINATED WATER SHALL BE ALLOWED IN THE STORM SEWER OR DISCHARGED TO SURFACE WATERS.
10. BEFORE ANY WATER MAIN SYSTEM WILL BE ACCEPTED BY THE GOVERNING AGENCY, THE FIRE HYDRANTS MUST BE PAINTED AS INDICATED ON THE WATER MAIN STANDARD DETAIL SHEETS.
11. TWO INCH (2") DIAMETER CORPORATION STOPS SHALL BE PROVIDED IN BOTH THE EXISTING WATER MAIN AND THE NEW WATER MAIN AT ALL NEW CONNECTIONS.
12. ALL TEES, BENDS CONNECTIONS, ETC. ARE INCIDENTAL TO THE JOB.
13. PHYSICAL CONNECTIONS SHALL NOT BE MADE BETWEEN EXISTING AND NEW WATERMANS UNTIL TESTING IS SATISFACTORILY COMPLETED.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFE STORAGE OF ALL MATERIAL INTENDED FOR THE WORK. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO MATERIALS EQUIPMENT AND WORK.
15. PIPE BEDDING, UNLESS OTHERWISE INDICATED, SHALL BE CRUSHED STONE OR ROUNDED GRAVEL. BEDDING MATERIAL SHALL BE 95% PASSING A 3/4" SIEVE AND 50% RETAINED ON A NO. 4 SIEVE; LOAD FACTOR SHALL BE 1.9.
16. BACKFILL, UNLESS OTHERWISE NOTED, SHALL BE COARSE SAND, FINE GRAVEL OR EARTH HAVING A LOW PLASTICITY INDEX, FREE OF ROCKS, DEBRIS AND OTHER FOREIGN MATERIALS AND DEFINED AS ALL PASSING THROUGH A 3/8" SIEVE AND NOT MORE THAN TEN PERCENT (10%) BY VOLUME PASSING THROUGH A 200 MESH SIEVE.
17. GATE WELLS SHALL BE REINFORCED PRE-CAST CONCRETE SECTIONS INCLUDING CONCENTRIC CONES AND GRADE RINGS SHALL BE 4000 PSI CONCRETE AND CONFORM TO ASTM C-478.
18. THRUST BLOCKS, IF REQUIRED BY THE MUNICIPALITY, SHALL BE MADE OF 3000 PSI CONCRETE WET MIX.
19. THE MAXIMUM WIDTH OF TRENCH TO TOP OF PIPE SHALL BE AS FOLLOWS:
* PIPE DIAMETER TRENCH WIDTH
* THROUGH 12" 36"
* 15" THROUGH 36" O.D. PLUS 24"
* 42" THROUGH 60" O.D. PLUS 30"
* 66" AND LARGER O.D. PLUS 36"
20. OPEN NO MORE TRENCH IN ADVANCE OF PIPE LAYING THAN IS NECESSARY TO EXPEDITE THE WORK.
21. CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED ON DRAWINGS. WHERE EXCESSIVE OR UNAUTHORIZED EXCAVATION TAKES PLACE, THE OVERDEPTH SHALL BE BACKFILLED AT THE PROPER GRADE WITH COMPACTED BEDDING MATERIAL, AT NO EXPENSE TO THE OWNER.
22. PROVIDE REQUIRED TIMBER SHEETING, BRACING AND SHORING TO PROTECT SIDES OF EXCAVATION. DO NOT BRACE SHEETING AGAINST PIPE. PROVIDE SUITABLE LADDERS FOR SAFE ENTRY TO AND EXIT FROM EXCAVATION.
23. WHERE UNSTABLE SOIL IS ENCOUNTERED, CONTRACTOR SHALL NOT PLACE PIPE UNTIL A SOLID BED HAS BEEN PROVIDED.
24. EXCAVATION FOR STRUCTURES SHALL EXTEND A SUFFICIENT DISTANCE FROM THE WALLS AND FOOTINGS TO ALLOW FOR FORMS, CONSTRUCTION OF WALLS, CONNECTIONS AND FOR INSPECTION.
25. GATE WELLS SHALL BE CONSTRUCTED OF BRICK, CONCRETE MASONRY UNITS OR PRE-CAST CONCRETE WITH CAST IRON FRAMES, COVERS AND MANHOLE STEPS, AS INDICATED ON DRAWINGS AND SPECIFIED HEREIN.
A. COMPLETELY FILL JOINTS ON PRE-CAST CONCRETE SECTIONS WITH BITUMINOUS MASTIC JOINTING COMPOUND OR JOINTS SHALL BE MADE WITH CEMENT MORTAR.
B. GATE SHALL BE WET WHEN LAID. LAY BRICK OR CONCRETE MASONRY IN ONE OPERATION, WITH JOINTS NOT MORE THAN 3/8" WIDE EXCEPT WHEN BRICKS OR CONCRETE MASONRY UNITS ARE LAID RADIALLY, IN WHICH CASE THE NARROWEST PART OF JOINT SHALL NOT EXCEED 1/4". LAY IN TRUE LINE AND, WHENEVER PRACTICAL, JOINTS SHALL BE CAREFULLY STRUCK AND POINTED ON INSIDE.
C. PROTECT FRESH BRICK WORK FROM FREEZING, FROM DRYING EFFECTS OF SUN AND WIND, AND FOR SUCH TIME AS DIRECTED BY THE GEOTECHNICAL ENGINEER, IN FREEZING WEATHER, HEAT SUFFICIENTLY TO REMOVE ICE AND FROST FROM BRICK WORK.
26. GATE WELL STEPS SHALL BE BUILT INTO AND THOROUGHLY ANCHORED TO WALLS.
27. ALL PIPING ENTERING OR LEAVING GATE WELLS SHALL BE ADEQUATELY SUPPORTED BY POURED-IN-PLACE CONCRETE FILL FROM PIPE CENTER TO UNDISTURBED GROUND.
28. THE OUTSIDE SURFACES OF BRICK OR CONCRETE MASONRY PORTION OF GATE WELLS SHALL BE PLASTERED AND TROWELED SMOOTH WITH 1/2" LAYERS OF CEMENT MORTAR.
29. SET FRAMES IN FULL BED OF STIFF MORTAR OR BITUMINOUS MASTIC JOINTING COMPOUND AT FINAL ELEVATION.
30. IF REQUIRED BY THE MUNICIPALITY, PLACE HORIZONTAL AND/OR VERTICAL THRUST BLOCKS AT ALL JOINTS AND FITTINGS. THE COST OF THRUST BLOCKS SHALL BE INCLUDED IN THE PRICE BID PER FOOT FOR WATER MAIN. THRUST BLOCKS SHALL NOT BE BACKFILLED PRIOR TO OBSERVATION BY THE CONTROLLING GOVERNMENTAL AGENCY. IF THRUST BLOCKS ARE NOT UTILIZED, ALL FITTINGS SHALL HAVE RESTRAINED JOINTS PER THE MANUFACTURER.
31. IN UNSTABLE SOIL CONDITIONS, THRUST BLOCKS SHALL BE SUPPORTED BY PILING DRIVEN TO SOLID FOUNDATIONS OR BY REMOVAL OF THE UNSTABLE SOILS AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THE THRUSTS. THE COST OF PILING OR BALLAST AT THRUST BLOCKS SHALL BE INCLUDED IN THE PRICE BID FOR WATER MAIN.
32. PLACE ALL CONCRETE ANCHORAGES AND ENCASMENTS, AS CALLED FOR ON THE DRAWINGS. THE COST OF RESTRAINED JOINTS OR ANCHORAGE AND ENCASMENTS SHALL BE INCLUDED IN THE PRICE BID FOR WATER MAIN.
33. BEDDING USED FOR TRENCH BOTTOM SHALL BE EXTENDED UP THE SIDES AND CAREFULLY PLACED AROUND AND OVER PIPE IN 6" MAXIMUM LAYERS. EACH LAYER SHALL BE THOROUGHLY AND CAREFULLY COMPACTED TO 95% OF MAXIMUM DRY DENSITY AS PER ASTM D-1557(MODIFIED PROCTOR) UNTIL 12" OF COVER EXISTS OVER PIPE.
34. REMAINDER OF TRENCH SHALL BE BACKFILLED WITH SPECIFIED BACKFILL MATERIAL TO SPECIFIED SUBGRADE ELEVATION. BACKFILLING SHALL BE COMPACTED TO 90% OF MAXIMUM DRY DENSITY PER ASTM D-1557.
35. WITHIN 3' OF THE 45° INFLUENCE LINE OF THE SUBGRADE OF STREETS, DRIVES, PARKING LOTS AND OTHER AREAS TO HAVE OR HAVING IMPROVED HARD SURFACES, BACKFILL SHALL BE MATERIAL SPECIFIED AND SHALL BE DEPOSITED IN 6" LOOSE LAYERS AT OPTIMUM MOISTURE CONTENT (±2%) AND COMPACTED TO 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557 (MODIFIED PROCTOR).
36. BEFORE BACKFILLING AROUND STRUCTURES, ALL FORMS, TRASH AND DEBRIS SHALL BE REMOVED AND CLEARED AWAY. SELECTED EXCAVATED MATERIAL SHALL BE PLACED SYMMETRICALLY ON ALL SIDES IN 8" MAXIMUM LAYERS; EACH LAYER SHALL BE MOISTENED AND COMPACTED WITH MECHANICAL OR HAND TAMPERS.
37. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
38. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
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41. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
42. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
43. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
44. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
45. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORK HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.

SANITARY SEWER SPECIFICATIONS

- 1. THESE SPECIFICATIONS SHALL BE USED IN CONJUNCTION WITH THE GENERAL SPECIFICATIONS AND THE SANITARY SEWER SPECIFICATIONS AND DETAIL SHEETS OF THE GOVERNING AGENCIES. IF ANY CONFLICT IS FOUND BETWEEN THE SPECIFICATIONS, THE STRICTER SPECIFICATIONS WILL BE FOLLOWED.
2. THE GOVERNING AGENCY WILL INSPECT THE INSTALLATION OF ALL SANITARY SEWER PIPING.
3. PROPER IMPLEMENTS, TOOLS AND FACILITIES SHALL BE PROVIDED AND USED FOR UNLOADING AND DISTRIBUTING MATERIALS ALONG THE LINE OF WORK. ANY PIPE OR FITTING DAMAGED IN TRANSPORTATION OR HANDLING SHALL BE REJECTED AND IMMEDIATELY REMOVED FROM THE JOB SITE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFE STORAGE OF ALL MATERIAL INTENDED FOR THE WORK. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO MATERIALS, EQUIPMENT AND WORK.
5. THE CONTRACTOR SHALL DO ALL REQUIRED EXCAVATION AND TRENCHING WORK AND THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPLETION OF THE WORKS HEREIN REGARDLESS OF THE NATURE OF MATERIALS ENCOUNTERED DURING THE COURSE OF THE WORK. THE OWNER WILL NOT BE LIABLE FOR ANY COSTS WHATSOEVER ASSOCIATED WITH, BUT NOT LIMITED TO, THE PRESENCE OF ROCK, PEAT, SUBTERRANEAN STREAMS, EXCESSIVE WATER OR OTHER DIFFICULT OR UNANTICIPATED SUB-SURFACE PHENOMENA.
6. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE AND SCHEDULE THE SANITARY SEWER INSTALLATION WITH THE GRADING, EXCAVATION AND OTHER SITE UTILITY SUBCONTRACTORS AND THE OWNERS REPRESENTATIVE SO AS TO PROVIDE FOR A SMOOTH AND ORDERLY PROGRESSION OF THE WORK.
7. SANITARY SEWER PIPING AND FITTINGS SHALL BE OF THE SIZE AND TYPE INDICATED ON THE DRAWINGS AND SHALL CONFORM TO THE REQUIREMENTS OF THE GOVERNING AGENCY.
8. REINFORCED PRE-CAST CONCRETE MANHOLE SECTIONS INCLUDING CONCENTRIC CONES AND GRADE RINGS SHALL BE 4000 PSI CONCRETE AND CONFORM TO ASTM C-478 OR AASHTO M-199.
9. OPEN NO MORE TRENCH IN ADVANCE OF PIPE LAYING THAN IS NECESSARY TO EXPEDITE THE WORK.
10. CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED ON DRAWINGS. WHERE EXCESSIVE OR UNAUTHORIZED EXCAVATION TAKES PLACE, THE OVERDEPTH SHALL BE BACKFILLED AT THE PROPER GRADE WITH COMPACTED BEDDING MATERIAL, AT NO EXPENSE TO THE OWNER.
11. PROVIDE REQUIRED TIMBER SHEETING, BRACING AND SHORING TO PROTECT SIDES OF EXCAVATION. DO NOT BRACE SHEETING AGAINST PIPE. PROVIDE STAGING AND SUITABLE LADDERS WHERE REQUIRED.
12. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE PILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF TRENCHES TO AVOID OVERLOADING, AND TO PREVENT CAVE-INS.
13. WHEN WET EXCAVATION IS ENCOUNTERED, THE TRENCH SHALL BE DE-WATERED UNTIL THE PIPE HAS BEEN LAID AND BACKFILLED TO A POINT AT LEAST 1 FOOT ABOVE TOP OF PIPE.
14. SANITARY SEWER CROSSINGS SHALL BE MADE WITH 18" OF VERTICAL CLEARANCE FROM ANOTHER UTILITY AND SHALL BE MADE WITHOUT PLACING POINT LOADS ON EITHER PIPE. CONSTRUCT SADDLES, OR PLACE PROTECTIVE CONCRETE CAP TO PREVENT DAMAGE.
15. ALL CONNECTION BRANCHES IN THE SEWER PIPE SHALL BE SECURELY AND COMPLETELY MADE UP TO THE POINT OF CONNECTION AND SHALL BE MADE DURING THE COURSE OF MANUFACTURE. ALL PIPE CONTAINING SUCH CONNECTION BRANCHES SHALL BE INSTALLED WITH THE MAIN SEWER. THE PROPOSED LOCATION OF THE WYE SHALL BE PER PLAN OR AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.
16. SERVICE LEADS SHALL TERMINATE (WITH AN APPROVED STOPPER) PER PLANS OR AS DIRECTED BY OWNER OR OWNER'S REPRESENTATIVE.
17. EACH RISER AND/OR SERVICE LEAD SHALL BE MARKED WITH A 2 INCH X 2 INCH X 8 FOOT LONG HARDWOOD MARKER, PLACED VERTICALLY AT THE END OF THE PIPE.
18. DOWNSPOUTS, WEEP TIE, FOOTING DRAINS, OR ANY CONDUIT, THAT CARRIES STORM OR GROUND WATER SHALL

GRADING AND EARTHWORK SPECIFICATIONS

- ALTHOUGH A SUB-SURFACE INVESTIGATION MAY HAVE BEEN MADE BY THE OWNER, THE BIDDER AND ANY SUB-CONTRACTORS SHALL MAKE A PERSONAL INVESTIGATION OF SITE AND EXISTING SURFACE AND SUB-SURFACE CONDITIONS. THE CONTRACTOR IS RESPONSIBLE TO ACCOUNT HIMSELF WITH CONDITIONS OF THE WORK AREA. THE CONTRACTOR IS ADVISED TO DETERMINE THE SUB-SURFACE SOIL CONDITIONS AND GROUND WATER CONDITIONS TO HIS OWN SATISFACTION PRIOR TO BIDDING. NO MODIFICATIONS TO THE UNIT PRICES BID FOR ANY ITEM WILL BE MADE DUE TO VARIABLE SUB-SURFACE CONDITIONS. DETERMINING IF DETERMINED NECESSARY BY THE CONTRACTOR, BY WELL POINTING OR DEEP WELLS WILL BE INCIDENTAL TO THE INSTALLATION COST OF THE ITEM.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING DETERMINED TO HIS SATISFACTION PRIOR TO THE SUBMISSION OF HIS BID THE CONFIRMATION OF THE GROUND, THE CHARACTER AND QUALITY OF THE SUBSTRATA, THE TYPES AND QUANTITIES OF MATERIALS TO BE ENCOUNTERED, THE NATURE OF THE GROUNDWATER CONDITIONS, THE PROSECUTION OF THE WORK, THE GENERAL AND LOCAL CONDITIONS INCLUDING CLIMATIC CHANGES, THE TIME OF YEAR IN WHICH CONSTRUCTION WILL TAKE PLACE AND ALL OTHER MATTERS WHICH CAN IN ANY WAY AFFECT THE WORK UNDER THIS CONTRACT.
- PRIOR TO COMMENCING THE EXCAVATION THE CONTRACTOR SHALL SUBMIT A PLAN OF HIS PROPOSED OPERATIONS AND TIME SCHEDULE TO THE OWNER & OWNER'S REPRESENTATIVE FOR THEIR APPROVAL.
- THE CONTRACTOR SHALL CONSIDER, AND HIS PLAN FOR EXCAVATION SHALL REFLECT, THE EQUIPMENT AND METHODS TO BE EMPLOYED IN THE EXCAVATION AND WHAT METHODS WILL BE USED WHEN WET CONDITIONS ARE ENCOUNTERED REQUIRING GROUNDWATER CONTROL OR OTHER MOISTURE CONDITIONING. THE CONTRACTOR SHALL SUBMIT AN OUTLINE OF HIS EARTHWORK METHODS WHICH SHALL TAKE INTO ACCOUNT THE OVERALL CONSTRUCTION SCHEDULE AND THE PRICES ESTABLISHED IN THE PROPOSAL FOR THE WORK TO BE DONE SHALL REFLECT ALL COSTS PERTAINING TO THE WORK. NO CLAIMS FOR EXTRAS BASED ON SUBSTRATA OR GROUNDWATER TABLE CONDITIONS OR MOISTURE CONDITIONING WILL BE ALLOWED.
- THE CONTRACTOR SHALL KEEP INFORMED AND THE OWNER'S REPRESENTATIVE INFORMED AT ALL TIMES AS TO A "FILL SURPLUS OR SHORTAGE" SITUATION. SHORTAGE OR SURPLUS OF SUITABLE MATERIAL AT THE CONCLUSION OF THE GRADING AND EARTHWORK OPERATION SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND HE WILL BE RESPONSIBLE TO THE AGENCY WHOSE PROPERTY OR DISPOSE OF THE SURPLUS WITHOUT ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL REMOVE VEGETATION, DEBRIS, UNSATISFACTORY SOIL MATERIALS, OBSTRUCTIONS, AND OTHER DELETERIOUS MATERIALS FROM GROUND SURFACE PRIOR TO CUT OR FILL OPERATIONS. SUCH MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR TO BE DISPOSED OF IN A LEGAL MANNER OFF SITE.
- MATERIALS FOR FILL OR BACKFILL REQUIRED TO GRADE THE SITE AND ACHIEVE DESIGN ELEVATIONS SHALL BE EITHER ON OR OFF-SITE SLOES WHICH ARE FREE OF ORGANIC MATTER AND DEBRIS. NO TOPSOIL SHALL BE USED AS ENGINEERED FILL.
- NO FILL MAY BE PLACED UNTIL THE EXPOSED SURFACES HAVE BEEN APPROVED BY THE GEOTECHNICAL ENGINEER. ALL FILL MATERIALS SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT.
- IF ANY UNKNOWN SUBSURFACE STRUCTURES ARE ENCOUNTERED DURING CONSTRUCTION, THEY SHALL BE REPORTED TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE AND DESIGN ENGINEER PRIOR TO PROCEEDING.
- ALL FILL MATERIAL SHALL BE PLACED AND COMPACTED AT THE OPTIMUM MOISTURE CONTENT OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- NO FROZEN MATERIAL SHALL BE USED AS FILL NOR WILL ANY FILL BE PLACED ON A FROZEN BASE.
- NO ROCK OR SIMILAR MATERIAL GREATER THAN 6" DIAMETER SHALL BE PLACED IN THE FILL UNLESS RECOMMENDATIONS FOR SUCH PLACEMENT HAVE BEEN SUBMITTED BY THE GEOTECHNICAL ENGINEER IN ADVANCE AND APPROVED BY THE OWNER AND OWNER'S REPRESENTATIVE.
- COMPACT FILL MATERIAL TO AT LEAST THE FOLLOWING PERCENTAGE OF MAXIMUM DRY DENSITY, AS DETERMINED BY ASTM D-1557 (MODIFIED PROCTOR). NO DEVIATION FROM THESE COMPACTATION DENSITIES WILL BE ALLOWED UNLESS SPECIFICALLY RECOMMENDED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE OWNER AND OWNER'S REPRESENTATIVE.

FILL AREAS	% OF MAXIMUM DRY DENSITY
FILL UNDER BUILDING (EXTENDING 5' BEYOND FOOTINGS AT A SLOPE OF 1 ON 1)	98%
FILL UNDER PAVEMENT OR SIDEWALKS	95%
FILL PLACED UNDER OR BEHIND RETAINING WALLS	95%
ALL OTHER FILL	90%
- ALL FILL MATERIAL SHALL BE PLACED AND COMPACTED IN LIFTS, THAT WILL NOT EXCEED THE DEPTH OF THE COMPACTATION EQUIPMENT CAPABILITY. THE MAXIMUM DENSITY REQUIRED FOR THE ENTIRE DEPTH OF THE MATERIAL PLACED IN THE LIFT.
- ALL AREAS WHERE FILL HAS BEEN PLACED OR THE EXISTING SOILS HAVE BEEN DISTURBED SHALL BE SUBJECT TO COMPACTATION TESTING BY THE GEOTECHNICAL ENGINEER AND SHOWN TO BE TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER, OWNER AND OWNER'S REPRESENTATIVE.
- FILL MATERIAL UNDER PAVEMENTS OR STRUCTURES SHALL BE FREE OF ORGANIC OR DELETERIOUS MATERIALS IT SHALL BE SUITABLE FOR SUPPORTING PAVEMENTS AND STRUCTURES WITHOUT ADVERSE SHRINKING OR SWELLING.
- FILL MATERIAL IN BERMS AND LANDSCAPE AREAS SHALL BE SUITABLE TO SUPPORT GROWTH OF THE LANDSCAPING MATERIALS (TYPICAL FOR THE LOCAL CLIMATE) AND AS PROPOSED BY THE LANDSCAPE ARCHITECT.
- THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF, IN A LEGAL MANNER, ANY TREES, BRUSH OR DEBRIS THAT ARE WITHIN THE DESIGNATED CUTTING AND FILLING AREAS TO BRING THE SITE TO PROPOSED GRADES.
- THE CONTRACTOR SHALL STOCKPILE EXCAVATED MATERIAL ONLY IN DESIGNATED AREAS AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.
- DURING THE PERFORMANCE OF SITE GRADING OPERATIONS, THE SUBGRADE SHALL BE EXAMINED CRITICALLY, AND ANY AREAS DISCOVERED WHICH, IN THE OPINION OF THE OWNER'S REPRESENTATIVE OR GEOTECHNICAL ENGINEER, ARE SOFT AND UNSTABLE, SHALL BE EXCAVATED TO SUCH DEPTHS AS MAY BE NECESSARY TO INSURE SATISFACTORY SUPPORTING PROPERTIES AS DETERMINED BY THE GEOTECHNICAL ENGINEER. THESE AREAS OF EXCAVATION SHALL BE BACKFILLED IMMEDIATELY AND SHALL BE BROUGHT BACK TO THE ELEVATION OF THE SURROUNDING AREAS WITH APPROVED FILL MATERIAL AND IN ACCORDANCE WITH THE EARTH FILL CONSTRUCTION PROCEDURE.
- NEWLY GRADED AREAS SHALL BE PROTECTED FROM THE ACTION OF THE ELEMENTS. ANY SETTLEMENT, DISPLACEMENT, PONDING OR CRACKING THAT MAY OCCUR PRIOR TO COMMENCING THE NEXT PHASE OF CONSTRUCTION SHALL BE REPAIRED, AND GRADES REESTABLISHED TO THE REQUIRED ELEVATIONS AND SLOPES.
- THE FINISHED SUBGRADE SURFACE SHALL BE SHAPED TO INDICATED PROFILES AND SHALL BE REASONABLY SMOOTH AND FREE FROM IRREGULAR SURFACE CHANGES AND SHALL BE NO MORE THAN 1 INCH ABOVE OR BELOW THE INDICATED SUBGRADE ELEVATIONS.
- THE GRADING CONTRACTOR SHALL BACKFILL ALL PARKING LOT PLANTERS AND LAWN AREAS TO WITHIN 2 INCHES OF THE TOP ADJACENT CURB GRADES. THE TOP 4 INCHES MINIMUM SHALL BE TOPSOIL, FREE FROM DEBRIS AND STONES LARGER THAN 1 INCH IN DIAMETER.
- THE CONTRACTOR SHALL PROVIDE ALL NECESSARY PUMPS, DITCHING, WELL POINT SYSTEMS AND OTHER MEANS FOR REMOVING WATER FROM EXCAVATIONS, TRENCHES, SUBGRADES AND OTHER PARTS OF THE WORK. THE CONTRACTOR SHALL CONTINUE DE-WATERING OPERATIONS UNTIL THE WATER HAS BEEN REMOVED ENTIRELY. UPON COMPLETION OF WATER REMOVAL THE CONTRACTOR SHALL TAKE APPROPRIATE ACTION TO DRY, STABILIZE, REGRADE TO PROPOSED ELEVATIONS AND COMPACT SOILS TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER AND OWNER'S REPRESENTATIVE.
- THE CONTRACTOR SHALL DISPOSE OF WATER IN A SAFE AND SANITARY WAY TO PREVENT FLOODING OR INJURY TO PUBLIC OR PRIVATE PROPERTY AND SHALL OBTAIN APPROVAL FROM THE APPROPRIATE AUTHORITY BEFORE DISCHARGING RUN-OFF WATER TO THEIR SYSTEM. SEE EROSION CONTROL NOTES FOR ADDITIONAL REQUIREMENTS.
- THE CONTRACTOR SHALL PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING GRADES AND NEW GRADES.

BITUMINOUS PAVING SPECIFICATIONS

- REFERENCE SPECIFICATIONS WHERE APPLICABLE TO WORK UNDER THIS SECTION ARE REFERRED TO BY ABBREVIATION AS FOLLOWS:
 - AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO).
 - THE ASPHALT INSTITUTE (TAI)
 - MICHIGAN DEPARTMENT OF TRANSPORTATION/ CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION (MDOT)
 - AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)
- AGGREGATE BASE COURSE SHALL MEET THE REQUIREMENTS OF SECTION 902 OF THE MDOT STANDARD SPECIFICATION FOR CONSTRUCTION AND SHALL CONSIST OF 21AA CRUSHED AGGREGATE. THE USE OF SLAG IS PROHIBITED.
- TACK COAT SHALL BE EMULSIFIED ASPHALT MEETING REQUIREMENTS OF MDOT SECTION 904, GRADE CSS-1H.
- AGGREGATE SHALL CONSIST OF CRUSHED STONE, CRUSHED GRAVEL, A MIXTURE OF UNCRUSHED GRAVEL WITH EITHER CRUSHED STONE OR CRUSHED GRAVEL, OR OTHER INERT MATERIAL HAVING SIMILAR CHARACTERISTICS. IT SHALL BE COMPOSED OF CLEAN, TOUGH, DURABLE FRAGMENTS FROM AN EXCESS OF FLAT OR ELONGATED PIECES, AND SHALL BE FREE OF ORGANIC MATTER AND DELETERIOUS SUBSTANCES AND MEET THE REQUIREMENTS OF MDOT STANDARD SPECIFICATIONS, SECTION 902, 21AA. CONTRACTOR MAY USE CRUSHED HMA AGGREGATE SCREENED TO MEET THE REQUIREMENTS OF MDOT 21AA MATERIAL.
- FINE AGGREGATE SHALL BE WELL GRADED FROM COARSE TO FINE AND CONSIST OF NATURAL SAND, STONE SCREENINGS, OR A BLEND OF NATURAL SAND AND STONE SCREENINGS. IT SHALL BE COMPOSED OF ROUGH SURFACED AND ANGULAR GRAINS OF QUARTZ OR OTHER HARD DURABLE ROCK AND MEET THE REQUIREMENTS OF MDOT STANDARD SPECIFICATIONS, SECTION 902 FOR CLASS II OR CLASS III GRANULAR MATERIAL. CONTRACTOR MAY USE CRUSHED HMA AGGREGATE SCREENED TO MEET THE REQUIREMENTS OF MDOT CLASS II OR CLASS III MATERIAL.
- ASPHALT CEMENT SHALL COMPLY WITH THE REQUIREMENTS OF MDOT SECTION 904.
- HOT MIXED ASPHALT (HMA) SHALL COMPLY WITH MDOT SECTION 501 OF STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- BITUMINOUS LEVELING COURSE SHALL BE MDOT HMA, 13A, UNLESS OTHERWISE REQUIRED BY THE MUNICIPALITY OR ROAD AGENCY WITH JURISDICTION.
- BITUMINOUS WEARING COURSE SHALL BE MDOT HMA, 36A UNLESS OTHERWISE REQUIRED BY THE MUNICIPALITY OR ROAD AGENCY WITH JURISDICTION. CONTRACTOR MAY SUBSTITUTE 13A WITH THE APPROVAL OF THE OWNER AND ENGINEER.
- THE CONTRACTOR SHALL SUBMIT, TO THE OWNER, TWO COPIES OF MATERIALS CERTIFICATES SIGNED BY MATERIAL PRODUCER AND CONTRACTOR. CERTIFICATES SHALL STATE THAT EACH MATERIAL ITEM MEETS SPECIFIED REQUIREMENTS.
- THE CONTRACTOR SHALL SUBMIT TO THE GEOTECHNICAL ENGINEER, JOB-MIX FORMULAS FOR EACH REQUIRED ASPHALT AGGREGATE MIXTURE. MIX DESIGNS SHALL BE WITHIN ALLOWABLE TOLERANCES AS SPECIFIED BY MDOT FOR THE PARTICULAR APPLICATION.
- SUBGRADE PREPARATIONS SHALL CONSIST OF THE FINAL MACHINING OF THE SUBGRADE IMMEDIATELY PRIOR TO PLACING THE BITUMINOUS BASE COURSE. THE SUBGRADE SHALL BE COMPACTED PER PLANS AND DETAILS. THE SUBGRADE SHALL BE TRUE TO LINE AND GRADE.
- CRUSHED AGGREGATE BASE COURSE SHALL BE COMPACTED TO A DENSITY EQUAL TO AT LEAST 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557 (MODIFIED PROCTOR).
- BITUMINOUS CONCRETE PAVEMENT CONSTRUCTION METHODS SHALL CONFORM TO THE SPECIFIC REQUIREMENTS OF SECTION 501 OF THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- THE CONTRACTOR SHALL NOT PLACE THE AGGREGATE BASE COURSE OR THE BITUMINOUS BASE COURSE PRIOR TO THE APPROVAL OF THE SUBGRADE BY THE GEOTECHNICAL ENGINEER.
- EACH LIFT AND COURSE OF BITUMINOUS CONCRETE SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER, PRIOR TO THE PLACEMENT OF A SUCCESSING COURSE OR LIFT.
- APPLY BITUMINOUS TACK COATS ONLY WHEN TEMPERATURE HAS NOT BEEN BELOW 35 DEGREES F. FOR 12 HOURS IMMEDIATELY PRIOR TO APPLICATION. CONSTRUCTION OF BITUMINOUS CONCRETE WEARING COURSE ONLY WHEN ATMOSPHERIC TEMPERATURE IS ABOVE 40-DEGREES F AND RISING, AND PROCEEDING COURSE OR LIFT IS CLEAN AND DRY. BASE COURSE MAY BE LAID WHEN TEMPERATURE IS ABOVE 35 DEGREES F, AND RISING AND APPROVED BY THE GEOTECHNICAL ENGINEER.
- THE BITUMINOUS CONCRETE SHALL BE TRANSPORTED FROM THE MIXING PLANT TO THE POINT OF USE IN VEHICLES CONFORMING TO THE REQUIREMENTS OF SECTION 501 OF THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION. DELIVERIES SHALL BE SCHEDULED SO THAT SPREADING AND ROLLING OF ALL BITUMINOUS CONCRETE PREPARED FOR ONE DAY'S RUN CAN BE COMPLETED DURING DAYLIGHT, UNLESS ADEQUATE ARTIFICIAL LIGHTING IS PROVIDED. HAULING OVER FRESHLY PLACED BITUMINOUS MAT SHALL NOT BE PERMITTED UNTIL THE BITUMINOUS CONCRETE HAS BEEN COMPACTED, AS SPECIFIED, AND ALLOWED TO COOL TO ATMOSPHERIC TEMPERATURE.
- UPON ARRIVAL, THE BITUMINOUS CONCRETE SHALL BE SPREAD TO A THICKNESS NOT TO EXCEED 3-INCHES AND TO THE FULL WIDTH BY AN APPROVED BITUMINOUS PAYER. IT SHALL BE STRUCK OFF IN A UNIFORM LAYER OF SUCH DEPTH THAT, WHEN THE WORK IS COMPLETED, IT SHALL HAVE THE REQUIRED THICKNESS AND CONFORM TO THE GRADE AND CONTOUR INDICATED. THE SPEED OF THE PAYER SHALL BE REGULATED TO ELIMINATE PULLING AND TEARING OF THE BITUMINOUS MAT, UNLESS OTHERWISE SPECIFIED. THE BITUMINOUS CONCRETE SHALL BE PLACED IN CONSECUTIVE ADJACENT STRIPS HAVING A MINIMUM WIDTH OF 10 FEET, EXCEPT WHERE EDGE LANES REQUIRE LESS WIDTH TO COMPLETE THE AREA. TRANSVERSE JOINTS IN ADJACENT LANES SHALL BE OFFSET A MINIMUM OF 10 FEET. WHERE POSSIBLE, JOINTS SHALL BE LOCATED AT THE LANE ENDINGS.
- ON AREAS WHERE IRREGULARITIES OR UNAVOIDABLE OBSTACLES MAKE THE USE OF MECHANICAL SPREADING AND FINISHING EQUIPMENT IMPRACTICAL, THE BITUMINOUS CONCRETE MAY BE SPREAD AND RAKED BY HAND TOOLS.
- THE BITUMINOUS CONCRETE SHALL BE PLACED AT A TEMPERATURE OF NOT LESS THAN 250 NOR HIGHER THAN THE RECOMMENDED TEMPERATURE OF THE BINDER PRODUCER OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- THE BITUMINOUS CONCRETE MIXTURE SHALL BE THOROUGHLY AND UNIFORMLY COMPACTED BY ROLLING. THE SURFACE SHALL BE ROLLED WHEN THE BITUMINOUS MAT HAS ATTAINED SUFFICIENT STABILITY SO THAT THE ROLLING DOES NOT CAUSE UNIFORM DISPLACEMENT, CRACKING AND SHOWING. THE SEQUENCE OF ROLLING OPERATIONS SHALL BE AT THE DISCRETION OF THE CONTRACTOR.
- THE SPEED OF THE ROLLER SHALL, AT ALL TIMES, BE SUFFICIENTLY SLOW TO AVOID DISPLACEMENT OF THE HOT BITUMINOUS CONCRETE. ANY DISPLACEMENT OCCURRING AS A RESULT OF REVERSING DIRECTION OF THE ROLLER, OR FROM ANY OTHER CAUSE, SHALL BE CORRECTED AT ONCE.
- SUFFICIENT ROLLERS SHALL BE FURNISHED TO HANDLE THE OUTPUT OF THE PLANT. ROLLING SHALL CONTINUE UNTIL ALL ROLLER MARKS ARE ELIMINATED, THE SURFACE IS OF UNIFORM TEXTURE AND TRUE TO GRADE AND CROSS-SECTION, AND THE REQUIRED FILL DENSITY IS OBTAINED.
- TACK COAT SHALL BE APPLIED TO THE SURFACE OF PREVIOUS LIFTS AND COURSES OF BITUMINOUS CONCRETE AND TO SURFACES ABUTTING OR PROJECTING INTO THE BITUMINOUS CONCRETE.
- IMMEDIATELY BEFORE PLACING A SUCCESSING LIFT OR COURSE OF BITUMINOUS CONCRETE THE PRECEDING LIFT OR COURSE SHALL BE CLEARED OF ANY DEBRIS OR STANDING WATER BY APPROPRIATE METHODS.
- TO PREVENT ADHESION OF THE BITUMINOUS CONCRETE TO THE ROLLER, THE WHEELS SHALL BE KEPT PROPERLY MOISTENED, BUT EXCESSIVE WATER WILL NOT BE PERMITTED.
- IN AREAS NOT ACCESSIBLE TO THE ROLLER, THE BITUMINOUS CONCRETE SHALL BE THOROUGHLY COMPACTED WITH HOT HAND TAMPERS.
- ANY BITUMINOUS CONCRETE THAT BECOMES LOOSE AND BROKEN, MIXED WITH DIRT, OR IN ANY WAY DEFECTIVE SHALL BE REMOVED AND REPLACED WITH FRESH HOT BITUMINOUS CONCRETE AND IMMEDIATELY COMPACTED TO CONFORM TO THE SURROUNDING AREA. THIS WORK SHALL BE DONE AT THE CONTRACTOR'S EXPENSE. SKIN PATCHING SHALL NOT BE ALLOWED.
- THE CONTRACTOR SHALL PROVIDE AT LEAST TWO ROLLERS FOR EACH PAYER OPERATING ON THE WORK. THE CONTRACTOR SHALL USE ADDITIONAL ROLLERS AS REQUIRED TO OBTAIN THE SPECIFIED PAVEMENT DENSITY.

BITUMINOUS PAVING SPECIFICATIONS, CONTINUED

- THE CONTRACTOR SHALL CAREFULLY MAKE JOINTS BETWEEN OLD AND NEW PAVEMENTS, OR BETWEEN SUCCESSIVE DAYS' WORK, TO ENSURE A CONTINUOUS BOND BETWEEN ADJOINING WORK. CONTRACT JOINTS TO HAVE THE SAME TEXTURE, DENSITY AND SMOOTHNESS AS OTHER SECTIONS OF THE BITUMINOUS CONCRETE COURSE. THE CONTRACTOR SHALL CLEAN CONTACT SURFACES OF SAND, DIRT, OR OTHER OBJECTIONABLE MATERIAL AND APPLY TACK COAT BEFORE MAKING THE JOINT.
 - THE CONTRACTOR SHALL TEST THE FINISHED SURFACE OF EACH BITUMINOUS CONCRETE COURSE FOR SMOOTHNESS, USING A 10 FOOT STRAIGHTEDGE APPLIED PARALLEL WITH AND AT RIGHT ANGLES TO CENTERLINE OF PAVED AREA. SURFACE SHALL NOT BE ACCEPTABLE IF EXCEEDING THE FOLLOWING TOLERANCES FOR SMOOTHNESS.
 - LEVELING COURSE SURFACE: 1/4 INCH, PLUS OR MINUS 1/4 INCH.
 - SURFACE COURSE: 1/4 INCH
 - THE CONTRACTOR SHALL TEST CROWNED SURFACES WITH A CROWN TEMPLATE, CENTERED AND AT RIGHT ANGLES TO THE CROWN. SURFACES WILL NOT BE ACCEPTABLE IF THE FINISHED CROWN SURFACES VARY MORE THAN 1/4 INCH FROM THE CROWN TEMPLATE.
 - AFTER FINAL ROLLING, THE CONTRACTOR SHALL NOT PERMIT VEHICULAR TRAFFIC ON THE BITUMINOUS CONCRETE PAVEMENT UNTIL IT HAS COOLED AND HARDENED, AND IN NO CASE SOONER THAN SIX HOURS OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
 - THE AGGREGATE BASE MUST EXTEND A MINIMUM OF 1' BEHIND THE BACK-OF-CURB OR BEYOND EDGE OF PAVEMENT WHEN NO CURB IS PROPOSED.
- THESE SPECIFICATIONS SHALL GOVERN THE CONSTRUCTION OF ALL PAVEMENTS, CURB AND GUTTER, SIDEWALKS, SERVICE WALKS, DRIVEWAY APPROACHES, AND LOADING DOCK AREAS, AS INDICATED ON THE DRAWINGS.
 - REFERENCE SPECIFICATIONS WHERE APPLICABLE TO WORK UNDER THIS SECTION ARE REFERRED BY ABBREVIATION AS FOLLOWS:
 - AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO).
 - AMERICAN CONCRETE INSTITUTE (ACI)
 - MICHIGAN DEPARTMENT OF TRANSPORTATION/ CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION (MDOT)
 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
 - THE FINE AGGREGATE SHALL MEET ALL REQUIREMENTS OF SECTION 902 OF MDOT SPECIFICATION FOR 2MS NATURAL SAND.
 - THE COARSE AGGREGATE SHALL MEET ALL REQUIREMENTS OF SECTION 902 OF M.D.O.T. SPECIFICATIONS FOR 6AA COARSE AGGREGATE.
 - THE CONTRACTOR SHALL SUBMIT, TO THE OWNER, TWO COPIES OF MATERIALS CERTIFICATES SIGNED BY MATERIAL PRODUCER AND CONTRACTOR. CERTIFICATES SHALL STATE THAT EACH MATERIAL ITEM MEETS SPECIFIED REQUIREMENTS.
 - THE CONTRACTOR SHALL SUBMIT TO THE GEOTECHNICAL ENGINEER, JOB-MIX FORMULAS FOR EACH REQUIRED CEMENT-AGGREGATE MIXTURE. MIX DESIGNS SHALL BE WITHIN ALLOWABLE TOLERANCES AS SPECIFIED FOR THE PARTICULAR APPLICATION.
 - HOT WEATHER PROTECTION: WHEN THE TEMPERATURE OF THE ATMOSPHERE IS 90-DEGREES F. AND ABOVE, OR DURING OTHER CLIMATIC CONDITIONS WHICH WILL CAUSE TOO RAPID DRYING OF THE CONCRETE, THE CONCRETE SHALL BE PROTECTED BY WINDBREAKS, SHADING, FOG SPRAYING LIGHT COLORED MOISTURE RETAINING COVERING, OR A COMBINATION THEREOF AS REQUIRED TO MAINTAIN THE TEMPERATURE OF THE CONCRETE BELOW 90-DEGREE F. AND IN A MOST CONDITION CONTINUOUSLY FOR THE CONCRETE CURING PERIOD. HOT WEATHER PROTECTION SHALL MEET THE REQUIREMENTS OF ACI 308R "HOT WEATHER CONCRETING".
 - WATER USED IN CONCRETE SHALL MEET THE REQUIREMENTS OF MDOT SECTION 911.
 - AIR ENTRAINING ADMIXTURE SHALL BE SELECTED FROM THE MDOT QUALIFIED PRODUCTS LIST.
 - ALL READY-MIXED CONCRETE SUPPLIERS MUST BE APPROVED BY THE OWNER AND MEET THE CURRENT REQUIREMENTS OF THE NATIONAL READY MIX CONCRETE ASSOCIATION (NRMA). IF REQUESTED BY THE OWNER, SUBMIT A WRITTEN DESCRIPTION OF PROPOSED READY-MIXED CONCRETE MANUFACTURER, GIVING QUALIFICATIONS OF PERSONAL, LOCATION OF BATCHING PLANT, LIST OF PROJECTS SIMILAR IN SCOPE OF SPECIFIED WORK, AND OTHER INFORMATION AS MAY BE REQUESTED BY THE OWNER.
 - THE CONTRACTOR SHALL SUBMIT A STATEMENT OF PURCHASE FOR READY-MIXED CONCRETE. PRIOR TO ACTUAL DELIVERY OF CONCRETE, SUBMIT TO THE GEOTECHNICAL ENGINEER FOUR COPIES OF STATEMENT OF PURCHASE, GIVING THE DRY WEIGHTS OF CEMENT AND SATURATED SURFACE DRY WEIGHTS OF FINE AND COARSE AGGREGATES AND QUANTITIES, TYPE AND NAME OF ADMIXTURES (IF ANY) AND OF WATER PER CU.YD., THAT WILL BE USED IN THE MANUFACTURE OF THE CONCRETE. THE CONTRACTOR SHALL ALSO FURNISH EVIDENCE SATISFACTORY TO THE GEOTECHNICAL ENGINEER THAT THE MATERIALS TO BE USED IN ACCORDANCE WITH THE PROPORTIONS SELECTED WILL PRODUCE CONCRETE OF THE QUALITY SPECIFIED. WHATSOEVER STRENGTHS ARE OBTAINED, THE QUANTITY OF CEMENT USED SHALL NOT BE LESS THAN THE MINIMUM SPECIFIED.
 - READY-MIXED CONCRETE DELIVERY TICKETS: SUBMIT ONE COPY OF EACH DELIVERY TICKET TO THE GEOTECHNICAL ENGINEER AND CONTRACTOR IN ACCORDANCE WITH SECTION 16 OF ASTM C94.
 - READY-MIXED CONCRETE SHALL BE BATCHED, MIXED AND TRANSPORTED IN ACCORDANCE WITH ASTM C94, AND COMPLY WITH ACI 304 "RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING AND PLACING CONCRETE," EXCEPT AS OTHERWISE SPECIFIED HEREIN.
 - READY-MIXED CONCRETE SHALL BE MIXED AND DELIVERED TO THE POINT OF DISCHARGE AT THE JOB BY MEANS OF A READY MIX CONCRETE TRUCK.
 - NO WATER FROM THE TRUCK WATER SYSTEM OR ELSEWHERE SHALL BE ADDED AFTER THE INITIAL INTRODUCTION OF THE MIXING WATER FOR THE BATCH. UNDER NO CIRCUMSTANCES SHALL THE APPROVED MAXIMUM WATER CONTENT BE EXCEEDED NOR SHALL THE SLUMP EXCEED THE MAXIMUM SPECIFIED.
 - DISCHARGE OF THE CONCRETE SHALL BE COMPLETED WITHIN 1-1/2 HOURS OR BEFORE THE DRUM HAS REVOLVED 300 REVOLUTIONS, WHICHEVER COMES FIRST. AFTER THE INTRODUCTION OF THE MIXING WATER TO THE CEMENT AND AGGREGATES OR THE INTRODUCTION OF THE CEMENT TO THE AGGREGATES.
 - IN HOT WEATHER (AIR TEMPERATURE 80-DEGREES F. AND ABOVE) OR UNDER CONDITIONS CONTRIBUTING TO QUICK STIFFENING OF THE CONCRETE, THE TIME SHALL BE REDUCED TO ONE HOUR.
 - CONCRETE DELIVERED IN COLD WEATHER (AIR TEMPERATURE 45-DEGREES F. AND LOWER) SHALL HAVE A TEMPERATURE NOT LESS THAN 60-DEGREES F. AT THE POINT OF DISCHARGE AT THE JOB, AND IN COMPLIANCE WITH ACI 308R "COLD WEATHER CONCRETING". CONCRETE PLACING WILL NOT BE PERMITTED WHEN THE AIR TEMPERATURE IS 35-DEGREES F. OR LOWER.
 - CONCRETE DELIVERED UNDER HOT WEATHER CONDITIONS CONTRIBUTING TO QUICK STIFFENING OF CONCRETE, OR IN AIR TEMPERATURE OF 80-DEGREES F. AND OVER, SHALL HAVE A TEMPERATURE BETWEEN 60- AND 80-DEGREES F. AT THE POINT OF DISCHARGE AT THE JOB, AND IN ACCORDANCE WITH ACI 308R "HOT WEATHER CONCRETING".
 - IN NO CASE SHALL THE MIXER OR TRUCK BE FLUSHED OUT ONTO THE STREET PAVEMENT IN A CATCH BASIN OR SEWER MANHOLE, OR IN ANY PUBLIC RIGHT-OF-WAY. SEE SOIL EROSION CONTROL PLAN FOR CONCRETE WASHOUT LOCATION.
 - REINFORCEMENT BARS SHALL BE PER MDOT SECTION 905.
 - THE WIRE SHALL BE BLACK, ANNEALED STEEL WIRE, NOT LESS THAN 16 GAUGE.

CONCRETE CURB, SIDEWALK AND PAVEMENT SPECIFICATIONS, CONTINUED

- BAR SUPPORTS SHALL CONFORM TO THE BAR SUPPORT SPECIFICATIONS CONTAINED IN CONCRETE REINFORCING STEEL INSTITUTE'S (CRS) "MANUAL OF STANDARD PRACTICE." PROVIDE CHAIRS, SPACERS AND OTHER DEVICES SUITABLE FOR PROPER SPACING SUPPORTING AND FASTENING REINFORCING BARS.
- WHEN FORMS ARE USED AND THE CURB RADIUS IS LESS THAN 200 FEET, THE CURVED ALIGNMENT SHALL BE PROVIDED FOR BY EITHER STANDARD STEEL FORMS EQUIPPED WITH FLEXIBLE LINES OR BY FLEXIBLE FORMS. THE FORMS SHALL BE OF THE FULL DEPTH OF THE SECTION. CURB AND GUTTER FORMS SHALL BE SO CONSTRUCTED AS TO PERMIT THE INSIDE OF THE FORMS TO BE SECURELY FASTENED TO THE OUTSIDE FORMS.
- ALL NEW CURB SHALL BE PLACED ONLY ON A PREPARED SUBGRADE, SMOOTH AND LEVELED TO THE GRADES ESTABLISHED BY THE ENGINEER.
- COMPACT AND CUT-TO-GRADE SUBGRADE UNDER FORMS SO THAT FORMS WHEN SET WILL BE UNIFORMLY SUPPORTED FOR THE ENTIRE LENGTH. SECURELY STAKE AND BRACE OR THE FORMS TO PREVENT LEAKAGE OF MORTAR. BRACING WITH EARTH WILL NOT BE PERMITTED.
- COAT SURFACES OF FORMS TO BE IN CONCRETE WITH A LIGHT CLEAR PARAFFIN OIL OR PARTING COMPOUND WHICH WILL NOT STAIN THE CONCRETE.
- THE INTERIOR SURFACES OF CONCRETE CONVEYING EQUIPMENT SHALL BE MAINTAINED FREE OF HARDENED CONCRETE, DEBRIS, WATER, SNOW, ICE AND OTHER DELETERIOUS MATERIALS.
- CURBING MAY BE CONSTRUCTED EITHER BY USE OF FORMS OR BY A MECHANICAL CURB AND GUTTER PAYER, PROVIDED THE REQUIRED FINISH, AND CROSS-SECTION, ARE OBTAINED. FORMS OR PAYER SHALL BE PROTECTED FROM DAMAGE. PROVIDE ONE COURSE MONOLITHIC STRUCTURE WITHOUT THE USE OF MORTAR TOPPING OR SAND-CEMENT DRYER. CONCRETE SHALL BE SPADED OR VIBRATED SUFFICIENTLY TO ENSURE SATISFACTORY CONSOLIDATION.
- PROVIDE REINFORCEMENT FOR CONCRETE CURB AS SHOWN ON THE DRAWINGS. REINFORCEMENT SHALL BE KEPT CLEAN AND FREE FROM OBJECTIONABLE RUST, BENDS OR KINKS IN REINFORCING BARS SHALL BE CORRECTED BEFORE PLACING. ALL REINFORCEMENT SHALL BE ACCURATELY LOCATED IN FORMS AND SECURELY HELD IN PLACE BEFORE AND DURING CONCRETE PLACING, BY SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.
- THE CONCRETE CURB SURFACE SHALL BE STRUCK OFF THE REQUIRED CROSS-SECTION ALL TRAFFIC LANE AND PARKING LOT MARKINGS AS INDICATED IN THE CONSTRUCTION DOCUMENTS. THE CURB HAS BEEN FLOATED TO AN EVEN SURFACE, THE CONTRACTION JOINT SHALL BE CUT AND ALL SLAB EDGES ROUNDED WITH A 1/2 INCH RADIUS EDGING TOOL THAT WILL FINISH TO A WIDTH OF 2 INCHES. AFTER THE CONCRETE HAS SLIGHTLY SET, A BROOM SHALL BE BROUGHT LIGHTLY ACROSS THE SURFACE PARALLEL TO FORMS SO AS TO IMPART A ROUGH FINISH.
- CONTRACTION JOINTS SHALL BE CUT IN CONCRETE CURBING AT MINIMUM 10' INTERVALS. THE JOINT SHALL CUT 1/4 INCH WIDE BY 1/3 THE DEPTH OF THE CONCRETE CURB SECTION. JOINTS SHALL ALSO BE LOCATED ADJACENT TO CURB DROPS.
- ISOLATION JOINTS SHALL BE PLACED IN CURBING AT TANGENT POINTS IN CURB RETURNS AT INTERSECTIONS, AT BOTH SIDES OF STRUCTURES LOCATED IN THE CURB AND IN CURBING AT INTERSECTIONS NOT EXCEEDING 400 FEET. ISOLATION JOINTS SHALL BE 1" THICK PRE-FORMED JOINT FILLER STRIPS. THE STRIPS SHALL EXTEND THE FULL DEPTH OF THE CONCRETE CURB SECTION. ISOLATION JOINTING SHALL BE PLACED IN CURB AT THE END OF EACH DAY'S POUR AND WHEN ABUTTING PREVIOUSLY POURED CURB.
- THE CURING COMPOUND SHALL BE A WHITE PARAFIN BASED COMPOUND SELECTED FROM MDOT'S QUALIFIED PRODUCTS LIST APPLIED AT 200 SQ.FT./GAL.
- CONTRACTION JOINTS IN CONCRETE CURB SECTIONS SHALL BE SEALED WITH EITHER HOT POURING JOINT SEALER OR COLD POURING JOINT SEALER.
- SLIGHTLY UNDERFILL JOINT GROOVE WITH JOINT SEALER TO PREVENT EXTRUSION OF THE SEALER UNDER EXCESS JOINT SEALER MATERIALS AS SEEN AFTER SEALING AS POSSIBLE.
- FRESHLY PLACED CONCRETE SHALL BE PROTECTED AS REQUIRED TO MAINTAIN THE TEMPERATURE OF THE CONCRETE AT NOT LESS THAN 50 DEGREES F. NOR MORE THAN 80 DEGREES F. AND IN A MOST CONDITION CONTINUOUSLY FOR THE PERIOD OF CURING, OR A COMBINATION THEREOF AS REQUIRED TO MAINTAIN THE TEMPERATURE OF THE CONCRETE DURING CURING SHALL BE AS UNIFORM AS POSSIBLE AND SHALL NOT EXCEED 5 DEGREES F. IN ANY ONE HOUR, NOR 50 DEGREES F. IN ANY 24 HOUR PERIOD.
- COLD WEATHER PROTECTION: WHEN THE TEMPERATURE OF THE ATMOSPHERE IS 40-DEGREES F. AND BELOW, THE CONCRETE SHALL BE PROTECTED BY HEATING, INSULATION, WINDING, OR COMBINATION THEREOF AS REQUIRED TO MAINTAIN THE TEMPERATURE OF THE CONCRETE AT OR ABOVE 50-DEGREES F. AND IN A MOST CONDITION CONTINUOUSLY FOR THE CONCRETE CURING PERIOD. COLD WEATHER PROTECTION SHALL MEET THE REQUIREMENTS OF ACI 308R "COLD WEATHER CONCRETING".
- HOT WEATHER PROTECTION: WHEN THE TEMPERATURE OF THE ATMOSPHERE IS 90-DEGREES F. AND ABOVE, OR DURING OTHER CLIMATIC CONDITIONS WHICH WILL CAUSE TOO RAPID DRYING OF THE CONCRETE, THE CONCRETE SHALL BE PROTECTED BY WINDBREAKS, SHADING, FOG SPRAYING LIGHT COLORED MOISTURE RETAINING COVERING, OR A COMBINATION THEREOF AS REQUIRED TO MAINTAIN THE TEMPERATURE OF THE CONCRETE BELOW 90-DEGREE F. AND IN A MOST CONDITION CONTINUOUSLY FOR THE CONCRETE CURING PERIOD. HOT WEATHER PROTECTION SHALL MEET THE REQUIREMENTS OF ACI 308R "HOT WEATHER CONCRETING".
- ALL FORMS, RAILS AND STAKES SHALL BE REMOVED WITHIN 24 HOURS AFTER PLACING OF CURB. EXPOSED EDGES OF CONCRETE SHALL BE IMMEDIATELY BACKFILLED OR SPRAYED WITH CURING COMPOUND.
- AFTER COMPLETION OF CONCRETE CURBING IN AN AREA, REMOVE ALL WEATHER PROTECTION MATERIALS, RUBBISH AND DEBRIS RESULTING FROM SPECIFIED WORK, SWEEP CONCRETE CURBS CLEAN, AND SEAL JOINTS.
- ALL CEMENT USED IN SIDEWALK CONSTRUCTION SHALL BE PORTLAND CEMENT, TYPE I OR IA ASTM C-150.
- ALL NEW WALKS AND CONCRETE PAVEMENTS SHALL BE PLACED ONLY ON A PREPARED SUBGRADE, SMOOTHED AND LEVELED TO THE GRADES ESTABLISHED BY THE ENGINEER. IN AREAS NOT ACCESSIBLE TO THE ROLLER, THE CONCRETE SHALL BE PLACED IN AREAS NOT ACCESSIBLE TO THE ROLLER, THE BITUMINOUS CONCRETE SHALL BE THOROUGHLY COMPACTED WITH HOT HAND TAMPERS.
- CONSTRUCT CONCRETE SURFACE COURSE ONLY WHEN GROUND TEMPERATURE IS ABOVE 35 DEGREES F. AND BASE IS DRY.
- SIDEWALKS SHALL PITCH TOWARD THE STREET OR AWAY FROM BUILDINGS WITH A MAXIMUM CROSS SLOPE OF 1/4-INCH PER FOOT OF WIDTH AND A MINIMUM CROSS SLOPE OF 1/8-INCH PER FOOT OF WIDTH. CROSS SLOPE DIRECTION TRANSITIONS SHALL BE ACCOMPLISHED IN LENGTHS OF 10 FEET OR LESS.
- PRIOR TO PLACING THE CONCRETE, ALL DEBRIS, STONES, DIRT, ETC., SHALL BE REMOVED FROM THE SUBGRADE. THE SUBGRADE SHALL BE MOISTENED WITH WATER IN SUCH A MANNER AS TO THOROUGHLY WET THE MATERIAL WITHOUT FORMING PUDDLES OR POCKETS OF WATER. NO CONCRETE SHALL BE PLACED ON FROZEN SUBGRADE.
- FORMS SHALL BE METAL OR WOOD AND OF AN APPROVED SECTION. THEY SHALL BE STRAIGHT, FREE FROM DISTORTION AND SHALL SHOW NO VERTICAL VARIATION GREATER THAN 1/8 INCH IN 10-FOOT LENGTH. THE TRUE PLANE SURFACE ON THE TOP OF THE FORMS WHEN TESTED WITH A 10-FOOT STRAIGHTEDGE, AND SHALL SHOW NO LATERAL VARIATION GREATER THAN 1/4-INCH IN 10-FEET FROM THE TRUE PLANE SURFACE OF THE LATERAL FACE OF THE FORM WHEN TESTED WITH A 10-FOOT STRAIGHTEDGE. THEY SHALL BE OF THE DEPTH SPECIFIED FOR THE SIDEWALK, OR CONCRETE PAVEMENT PER PLANE AND DETAILS, AND BE SECURELY HELD IN PLACE AND TRUE TO LINE AND GRADE.
- THE CONCRETE SHALL BE DEPOSITED CONTINUOUSLY IN THE FORMS IN SUCH A MANNER AS TO AVOID SEGREGATION AND IT SHALL BE THOROUGHLY TAMPED OR VIBRATED SO THAT THE FORMS ARE ENTIRELY FILLED AND THE CONCRETE THOROUGHLY CONSOLIDATED. THE SLABS SHALL BE PLACED IN SECTIONS OR BLOCKS IN ONE OPERATION AS A MONOLITH.
- THE CONCRETE SURFACE SHALL BE STRUCK OFF TO A PLANE SURFACE WITH A STRAIGHTEDGE. AFTER THE CONCRETE HAS BEEN FLOATED TO AN EVEN SURFACE, THE CONTRACTION JOINT SHALL BE CUT AND ALL SLAB EDGES ROUNDED WITH A 1/2-INCH RADIUS EDGING TOOL THAT WILL FINISH TO A WIDTH OF 2-INCHES. AFTER THE CONCRETE HAS SLIGHTLY SET, A BROOM SHALL BE BRUSHED LIGHTLY ACROSS THE SURFACE AT RIGHT ANGLES TO FORMS SO AS TO IMPART A ROUGH FINISH.
- CONTRACTION JOINTS SHALL BE PLACED AT RIGHT ANGLES TO THE EDGE OF THE SIDEWALK OR CONCRETE PAVEMENT AND PERPENDICULAR TO THE SURFACE. AT A DEPTH OF AT LEAST 1/4 THE SLAB THICKNESS WITH A MINIMUM DEPTH OF 1-1/4-INCHES FOR SIDEWALKS AND 3-INCHES FOR CONCRETE PAVEMENT SLABS.
- REINFORCEMENT BARS SHALL BE PER MDOT SECTION 905.
- THE WIRE SHALL BE BLACK, ANNEALED STEEL WIRE, NOT LESS THAN 16 GAUGE.

CONCRETE CURB, SIDEWALK AND PAVEMENT SPECIFICATIONS, CONTINUED

- ISOLATION PAPERS SHALL BE OF THE PRE-MOLDED, NON-EXTRUDING, ASPHALT IMPREGNATED TYPE, NOT LESS THAN 1/2-INCH THICK. THE LENGTH SHALL BE EQUAL TO THE WIDTH OF THE SLAB, AND THE DEPTH EQUAL TO THE THICKNESS OF THE SLAB PLUS 1-INCH.
 - ISOLATION JOINTS SHALL BE PLACED AT THE FOLLOWING LOCATION FOR SIDEWALKS AND CONCRETE PAVEMENTS:
 - AT THE BACK OF THE CURB AND FRONT EDGE OF THE SIDEWALKS AND PAVEMENT SLABS ADJACENT TO EACH DRIVEWAY APPROACH AND SERVICE WALK.
 - AT INTERVALS NOT TO EXCEED 50-FEET IN ALL PUBLIC SIDEWALKS.
 - AT THE BACK OF THE CURB WHERE THE RAMPS EXTEND FROM THE KEY FLAG TO THE PAVEMENT.
 - BETWEEN THE KEY FLAG AND THE RAMP IN ALL CASES, EXCEPT WHERE THERE ARE EXISTING EXPANSION JOINTS AT THE INTERSECTIONS OF THE SIDEWALKS AND THE KEY FLAG.
 - AT ANY PLACE WHERE A SIDEWALK OR CONCRETE PAVEMENT ABUTS A BUILDING OR FIXED STRUCTURE.
 - AT ANY OTHER LOCATIONS INDICATED ON THE PLAN.
 - CONTRACTION JOINTS IN THE CONCRETE PAVEMENT WILL BE AS FOLLOWS:
 - TRANSVERSE JOINTS SHALL BE AT MAXIMUM 10-FOOT INTERVALS OR AS SHOWN ON PLANS AND DETAILS.
 - LONGITUDINAL JOINTS SHALL BE AT MAXIMUM 12-FOOT INTERVALS OR AS SHOWN ON PLANS AND DETAILS.
 - PRIOR TO APPLYING JOINT SEALER, CLEAN JOINT GROOVE OF FOREIGN MATTER AND LOOSE PARTICLES, AND DRY SURFACE.
- ### TRAFFIC LANE AND PARKING LOT MARKING
- PROVIDE ALL MATERIALS, LABOR, EQUIPMENT, AND SERVICES NECESSARY TO COMPLETE ALL TRAFFIC LANE AND PARKING LOT MARKINGS AS INDICATED IN THE CONSTRUCTION DOCUMENTS.
 - WORK INCLUDES, BUT NOT LIMITED TO PAINTING OF LETTERS, MARKINGS, STRIPES AND ISLANDS ON THE PAVEMENT SURFACE APPLIED IN ACCORDANCE WITH THIS SPECIFICATION AND AT THE LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
 - TRAFFIC MARKING PAINT SHALL MEET THE REQUIREMENTS OF FEDERAL SPECIFICATION TT-PP-855F, WITH OR WITHOUT REFLECTORIZED BEADS AS REQUIRED ON THE PLANS. PAINT SHALL BE A PRODUCT FROM THE CURRENT MDOT QUALIFIED PRODUCTS LIST.
 - COLOR SHALL BE AS SPECIFIED ON THE PLANS OR AS FOLLOWS:
 - TRAFFIC LANE STRIPING SHALL BE WHITE OR YELLOW REFLECTORIZED, AS SHOWN ON THE PLANS.
 - TRAFFIC MARKING AND CURB FACES SHALL BE WHITE UNLESS NOTED OTHERWISE.
 - PARKING LOT STRIPING SHALL BE WHITE, UNLESS NOTED OTHERWISE.
 - HANDICAP STALL STRIPING MEETING CURRENT ADA REQUIREMENTS SHALL BE BLUE UNLESS NOTED OTHERWISE.
 - THE PAINTING SHALL BE PERFORMED ONLY WHEN THE EXISTING SURFACE IS DRY AND CLEAN, WHEN THE ATMOSPHERIC TEMPERATURE IS ABOVE 40-DEGREES F. AND WHEN THE WEATHER IS NOT EXCESSIVELY WINDY, DUSTY OR FOGGY AND WHEN RAIN IS NOT FORECASTED FOR AT LEAST 2 HOURS AFTER PAINT IS APPLIED.
 - ALL EQUIPMENT FOR THE WORK SHALL BE APPROVED BY THE CONTRACTOR AND SHALL INCLUDE THE APPARATUS NECESSARY TO PROPERLY CLEAN THE EXISTING SURFACE, A MECHANICAL MARKING MACHINE, AND SUCH AUXILIARY HAND EQUIPMENT AS MAY BE NECESSARY TO SATISFACTORILY COMPLETE THE JOB.
 - THE MECHANICAL MARKER SHALL BE AN APPROVED ATOMIZING SPRAY-TYPE MARKING MACHINE FOR APPLICATION OF TRAFFIC PAINT. IT SHALL BE ADJUSTED TO PRODUCE AN EVEN AND UNIFORM FILM THICKNESS AT THE REQUIRED COVERAGE AND SHALL BE DESIGNED SO AS TO APPLY MARKINGS OF UNIFORM CROSS-SECTIONS AND CLEAR-CUT EDGES WITHOUT RUNNING OR SPATTERING WITHIN THE LIMITS FOR STRAIGHTNESS SET FORTH HEREIN. WHEN NEEDED, A DISPENSER SHALL BE FURNISHED, WHICH IS PROPERLY DESIGNED FOR ATTACHMENT TO THE MECHANICAL MARKER AND SUITABLE FOR DISPENSING THE REQUIRED QUANTITY OF REFLECTIVE BEADS.
 - SUITABLE ADJUSTMENTS SHALL BE PROVIDED ON THE SPRAYER/SPRAYSERS OF A MACHINE FOR STRIPING TO SERVE AS A GUIDE. SUITABLE MULTIPLE PARALLEL PASSES TO THE PAINT SHALL NOT BE ALLOWED.
 - IMMEDIATELY BEFORE APPLICATION OF THE PAINT, THE EXISTING SURFACE SHALL BE DRY AND ENTIRELY FREE FROM DIRT, GREASE, OIL, ACIDS, DEBRIS, OR OTHER FOREIGN MATTER WHICH WOULD REDUCE THE BOND BETWEEN THE COAT OF PAINT AND THE PAVEMENT. THE SURFACE SHALL BE THOROUGHLY CLEANED BY SWEEPING AND BLOWING AS REQUIRED TO REMOVE ALL DIRT, DEBRIS AND LOOSE MATERIALS. AREAS WHICH CANNOT BE SATISFACTORILY CLEANED BY BROOMING AND BLOWING SHALL BE SCRUBBED AS DIRECTED WITH A WATER SOLUTION OF PROPYLUM PHOSPHATE (USE BY WEIGHT) OR APPROVED EQUAL SOLUTION. AFTER SCRUBBING, THE SOLUTION SHALL BE RINSED OFF AND THE SURFACE DRIED PRIOR TO PAINTING.
 - EXISTING MARKINGS OR STRIPES WHICH ARE TO BE ABANDONED OR REMOVED SHALL BE OBLITERATED OR OBBURED BY THE BEST METHODS SUITED FOR THE PURPOSE AND TO THE SATISFACTION OF THE OWNER OR OWNER'S REPRESENTATIVE.
 - THE CONTRACTOR IS RESPONSIBLE FOR LAYING OUT A SAMPLE SECTION OF STRIPING WHICH IS TO BE APPROVED BY THE OWNER OR OWNER'S REPRESENTATIVE AS TO QUALITY BEFORE THE CONTRACTOR MAY PROCEED WITH THE STRIPING. THE CONTRACTOR IS TO INSURE THAT ALL SUBSEQUENT STRIPING MEETS THE QUALITY OF THE APPROVED SAMPLE APPLICATION.
 - ON THOSE SECTIONS OF PAVEMENTS WHERE NO PREVIOUSLY APPLIED FIGURES, MARKINGS OR STRIPING IS TO BE REMOVED OR OBLITERATED, THE MARKING LAYOUTS AND LINES OF PROPOSED STRIPES SHALL BE SPOTTED IN ADVANCE OF THE PAINT APPLICATION. CONTROL POINTS SHALL BE SPACED AT SUCH INTERVALS AS WILL ENSURE ACCURATE LOCATION OF ALL MARKINGS.
 - THE CONTRACTOR SHALL PROVIDE AN EXPERIENCED TECHNICIAN TO SUPERVISE THE LOCATION ALIGNMENT, LAYOUT, DIMENSIONS AND APPLICATION OF THE PAINT.
 - MARKINGS SHALL BE APPLIED AT THE LOCATIONS AND TO THE DIMENSIONS AND SPACING INDICATED ON THE PLANS OR AS SPECIFIED. PAINT SHALL NOT BE APPLIED UNTIL THE INDICATED ALIGNMENT LAYOUT AND THE CONDITIONS OF THE EXISTING SURFACE HAVE BEEN APPROVED BY THE OWNER OR OWNER'S REPRESENTATIVE.
 - THE PAINT SHALL BE MIXED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS BEFORE APPLICATION. THE PAINT SHALL BE THOROUGHLY MIXED AND APPLIED TO THE SURFACE OF THE PAVEMENT WITH THE MARKING MACHINE AT ITS ORIGINAL CONSISTENCY WITHIN THE SPECIFIED TOLERANCES. IF THE PAINT IS APPLIED BY BRUSH, THE SURFACE SHALL RECEIVE TWO (2) COATS; THE FIRST COAT SHALL BE THOROUGHLY DRY BEFORE THE SECOND COAT IS APPLIED.
 - A MINIMUM OF ONE (1) WEEK SHALL ELAPSE BETWEEN APPLICATION OF THE BITUMINOUS SEAL COAT, SLURRY SEAL OR THE PLACEMENT OF THE BITUMINOUS SURFACE COURSE AND THE MARKING OF THE PAVEMENT. THE PAINT SHALL NOT BLEED EXCESSIVELY, CURL, OR DISCOLOR WHEN APPLIED TO BITUMINOUS OR CONCRETE SURFACES. CURING COMPOUND MUST BE REMOVED FOR THE ENTIRE WIDTH OF THE PAINTED STRIPE OR SYMBOL PRIOR TO PAINTING NEW CONCRETE.
 - IN THE APPLICATION OF STRAIGHT STRIPES, ANY DEVATION IN THE EDGES EXCEEDING 1/2-INCH IN 50-FEET SHALL BE OBLITERATED AND THE MARKING CORRECTED. THE WIDTH OF THE MARKINGS SHALL BE AS DESIGNATED WITHIN A TOLERANCE OF 5 PERCENT (5%). ALL PAINTING SHALL BE PERFORMED TO THE SATISFACTION OF THE OWNER OR OWNER'S REPRESENTATIVE BY COMPETENT AND EXPERIENCED EQUIPMENT OPERATORS, LABORERS, AND ARTISANS IN A NEAT AND WORKMANLIKE MANNER.
 - PAINT SHALL BE APPLIED UNIFORMLY BY SUITABLE EQUIPMENT AT A RATE OF 0.0094 GAL./S.F. FOR STENCILS AND 0.00313 GAL./FT. FOR STRIPING. PAINT APPLICATION SHALL PRODUCE AN AVERAGE WET FILM THICKNESS OF 0.015-INCHES.
 - AFTER APPLICATIONS OF THE PAINT, ALL MARKINGS SHALL BE PROTECTED WHILE THE PAINT IS DRYING. THE FRESH PAINT SHALL BE PROTECTED FROM INJURY OR DAMAGE OF ANY KIND. THE CONTRACTOR SHALL BE DIRECTLY RESPONSIBLE AND SHALL ERECT OR PLACE SUITABLE WARNING SIGNS, FLAGS, OR BARRICADES. PROTECTIVE SCREENS OR COVERINGS AS REQUIRED. ALL SURFACES SHALL BE PROTECTED FROM DISFIGUREMENT BY SPATTER, SPLASHES, SPILLAGE, DRIPPINGS OF PAINT OR OTHER MATERIAL.

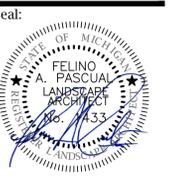
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ALLAN W. PRUSS
ENGINEER
6201043168



client:
Chestnut Development, LLC
 3800 Chilson Road
 Howell, Michigan 48843

project:
Chestnut Self Storage

project location:
 Howell Township,
 Michigan
 Burkhart Road

sheet title:
LANDSCAPE PLANTING DETAIL

job no. / issue / revision date:
 LS24.051.04 SPA 4-29-2024

drawn by:
JP
 checked by:
FP
 date:
4-20-2024

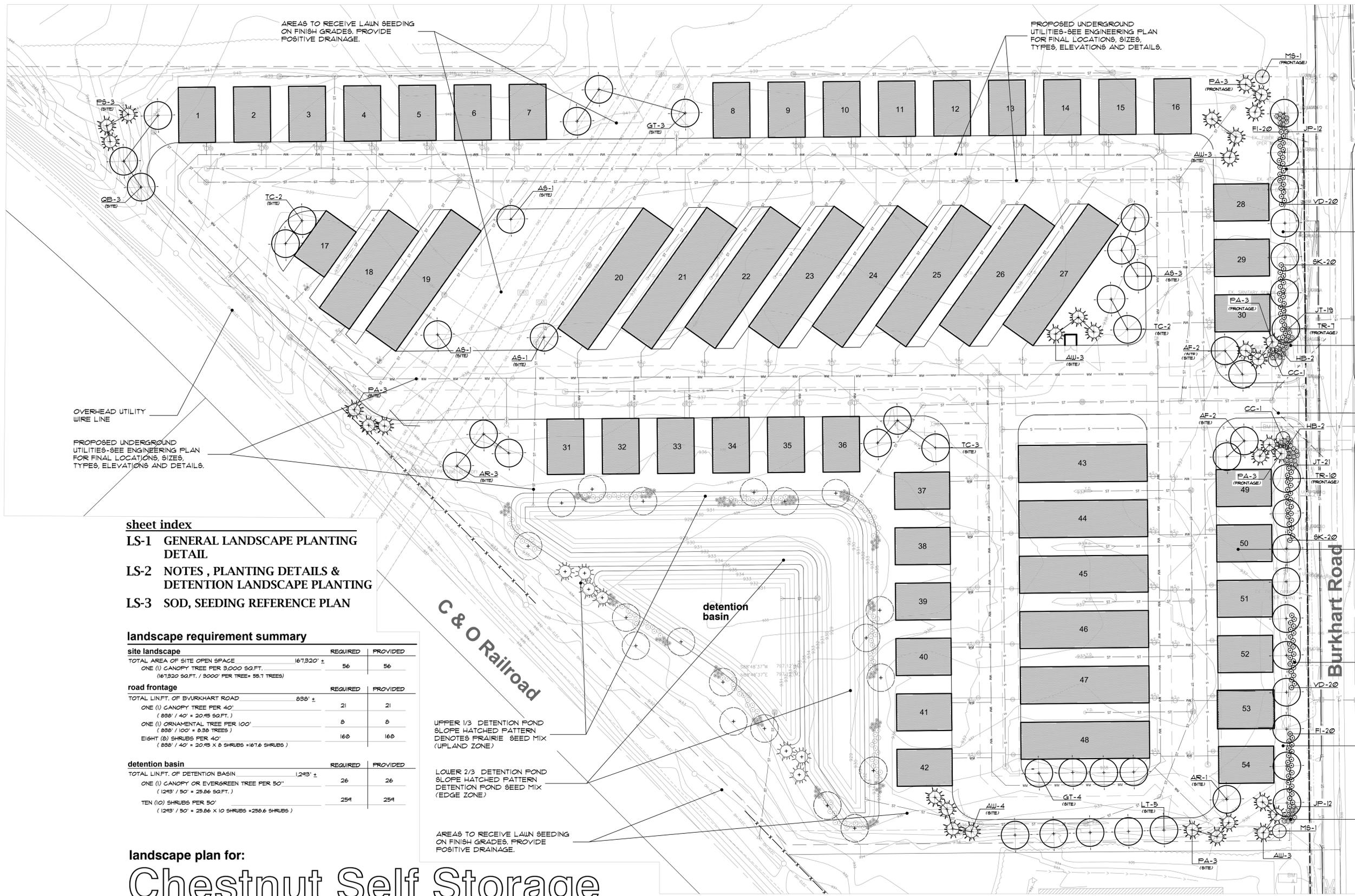
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 Do Not scale drawings. Use figured dimensions only



The location and elevations of existing underground utilities as shown on this drawing are only approximate. no guarantee is either expressed or implied as to the completeness of accuracy. contractor shall be exclusively responsible for determining the exact location and elevation prior to the start of construction.

project no:
LS24.051.04

sheet no:
LS-1 of 3



- sheet index**
- LS-1 GENERAL LANDSCAPE PLANTING DETAIL
 - LS-2 NOTES, PLANTING DETAILS & DETENTION LANDSCAPE PLANTING
 - LS-3 SOD, SEEDING REFERENCE PLAN

landscape requirement summary

site landscape	REQUIRED	PROVIDED
TOTAL AREA OF SITE OPEN SPACE	167,520' ±	
ONE (1) CANOPY TREE PER 3,000 SQ.FT. (167,520 SQ.FT. / 3,000' PER TREE = 55.7 TREES)	56	56
road frontage		
TOTAL LINFT. OF BURKHART ROAD	838' ±	
ONE (1) CANOPY TREE PER 40' (838' / 40' = 20.95 TREES)	21	21
ONE (1) ORNAMENTAL TREE PER 100' (838' / 100' = 8.38 TREES)	8	8
EIGHT (8) SHRUBS PER 40' (838' / 40' = 20.95 X 8 SHRUBS = 167.6 SHRUBS)	168	168
detention basin		
TOTAL LINFT. OF DETENTION BASIN	1,243' ±	
ONE (1) CANOPY OR EVERGREEN TREE PER 50" (1,243' / 50' = 25.86 TREES)	26	26
TEN (10) SHRUBS PER 50" (1,243' / 50' = 25.86 X 10 SHRUBS = 258.6 SHRUBS)	254	254

UPPER 1/3 DETENTION POND SLOPE HATCHED PATTERN DENOTES PRAIRIE SEED MIX (UPLAND ZONE)

LOWER 2/3 DETENTION POND SLOPE HATCHED PATTERN DETENTION POND SEED MIX (EDGE ZONE)

AREAS TO RECEIVE LAWN SEEDING ON FINISH GRADES. PROVIDE POSITIVE DRAINAGE.

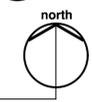
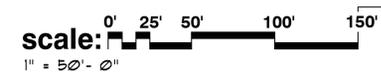
landscape maintenance notes:

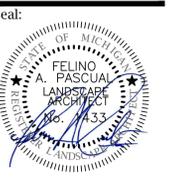
LANDSCAPE MAINTENANCE PROCEDURES AND FREQUENCIES TO BE FOLLOWED SHALL BE SPECIFIED ON THE LANDSCAPE PLAN, ALONG WITH THE MANNER IN WHICH THE EFFECTIVENESS, HEALTH AND INTENDED FUNCTIONS OF THE VARIOUS LANDSCAPE AREAS ON THE SITE WILL BE ENSURED.

- LANDSCAPING SHALL BE KEPT IN A NEAT, ORDERLY AND HEALTHY GROWING CONDITION, FREE FROM DEBRIS AND REFUSE.
- PRUNING SHALL BE MINIMAL AT THE TIME OF INSTALLATION, ONLY TO REMOVE DEAD OR DISEASED BRANCHES. SUBSEQUENT PRUNING SHALL ASSURE PROPER MATURATION OF PLANTS TO ACHIEVE THEIR APPROVED PURPOSE.
- ALL DEAD OR DISEASED PLANT MATERIAL SHALL BE REMOVED AND REPLACED WITHIN 90 (90) DAYS AFTER IT DIES OR IN THE NEXT PLANTING SEASON, WHICHEVER OCCURS FIRST. THE PLANTING SEASON FOR DECIDUOUS PLANTS SHALL BE BETWEEN MARCH 15 AND NOVEMBER 15 OR UNTIL THE PREPARED SOIL BECOMES FROZEN. THE PLANTING SEASON FOR EVERGREEN PLANTS SHALL BE BETWEEN MARCH 1 AND JUNE 1. PLANT MATERIAL INSTALLED TO REPLACE DEAD OR DISEASED MATERIAL SHALL BE AS CLOSE AS PRACTICAL TO THE SIZE OF THE MATERIAL IT IS INTENDED TO REPLACE.

landscape plan for:
Chestnut Self Storage
Howell Township, Michigan

note:
 unless noted otherwise, numerical value on landscape quantities specified on plan take precedence over graphic representation.





client:
Chestnut Development, LLC
 3800 Chilson Road
 Howell, Michigan 48843

project:

Chestnut Self Storage

project location:

Howell Township, Michigan
 Burkhart Road

sheet title:

PLANT DETAILS AND LANDSCAPE NOTES

job no. / issue / revision date:

LS24.051.04 SPA 4-29-2024

drawn by:
JP

checked by:
FP

date:
4-20-2024

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For free location of public utility lines

The location and elevations of existing underground utilities as shown on this drawing are only approximate. No guarantee is either expressed or implied as to the completeness of accuracy. Contractor shall be exclusively responsible for determining the exact location and elevation prior to the start of construction.

project no:
LS24.051.04

sheet no:
LS-2 of 3

general landscape notes:

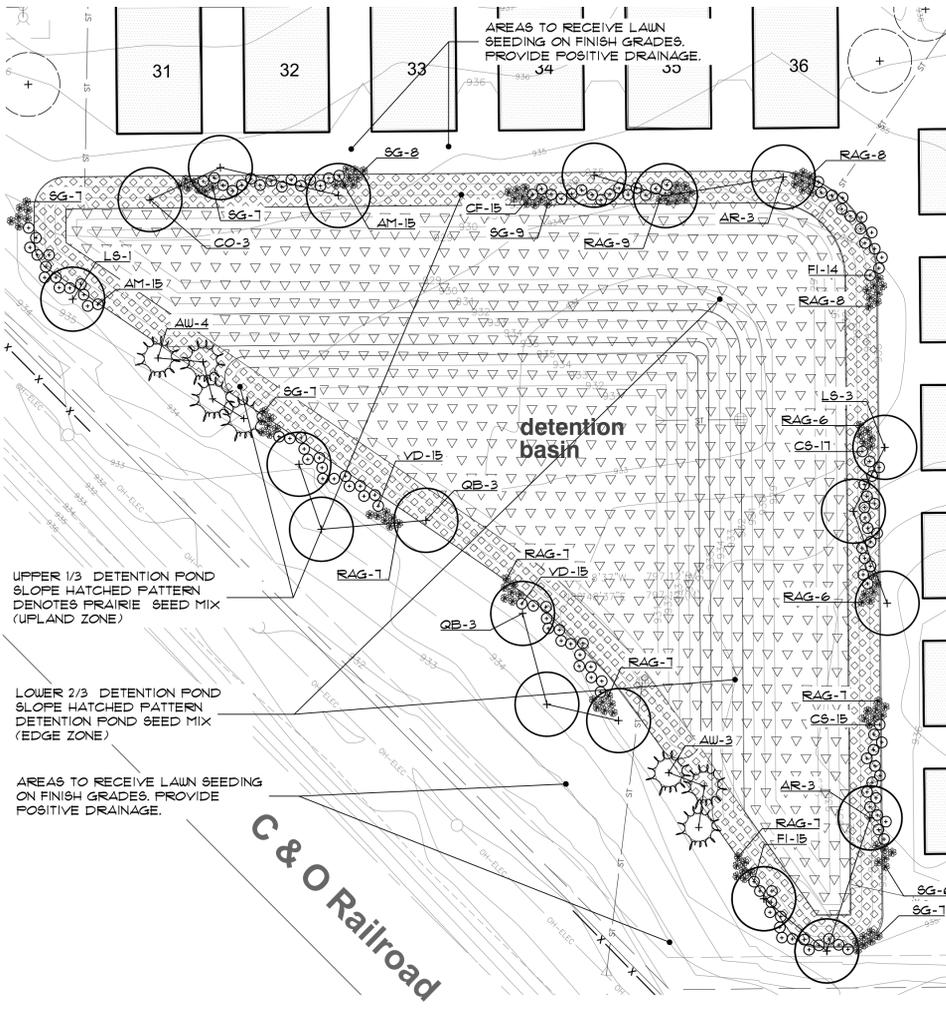
- LANDSCAPE CONTRACTOR SHALL VISIT THE SITE, INSPECT EXISTING CONDITIONS, REVIEW PROPOSED PLANTINGS AND RELATED WORK, CONTACT THE OWNER AND/OR LANDSCAPE ARCHITECT WITH ANY CONCERNS OR DISCREPANCY BETWEEN THE PLAN, PLANT MATERIAL LIST, AND/OR SITE CONDITIONS.
- PRIOR TO BEGINNING OF CONSTRUCTION ON ANY WORK, CONTRACTORS SHALL VERIFY LOCATIONS OF ALL ON-SITE UTILITIES, GAS, ELECTRIC, TELEPHONE, CABLE TO BE LOCATED BY CONTACTING MISS DIG 1-800-482-7171. ANY DAMAGE OR INTERRUPTION OF SERVICES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. COORDINATE ALL RELATED WORK ACTIVITIES WITH OTHER TRADES AND REPORT ANY UNACCEPTABLE JOB CONDITIONS TO OWNER PRIOR TO COMMENCING.
- NUMERICAL VALUE ON THE LANDSCAPE QUANTITIES SPECIFIED ON THE PLAN TAKE PRECEDENCE OVER GRAPHIC REPRESENTATION. VERIFY ANY CONCERN/DISCREPANCY WITH LANDSCAPE ARCHITECT.
- ALL CONSTRUCTION AND PLANT MATERIAL LOCATION TO BE ADJUSTED ON-SITE IF NECESSARY.
- ALL SUBSTITUTIONS OR DEVIATIONS FROM THE LANDSCAPE PLAN MUST BE APPROVED BY HOWELL TOWNSHIP AND LANDSCAPE ARCHITECT IN WRITING.
- ALL LARGE TREES AND EVERGREENS TO BE STAKED, GUYED AND WRAPPED AS DETAIL SHOWN ON PLAN.
- PLANT BEDS TO BE DREESSED WITH MIN. 4" OF FINELY DOUBLE SHREDDED HARDBARK MULCH.
- DIG SHRUB FITS 1' LARGER THAN SHRUB ROOT BALLS AND TREE FITS 2' LARGER THAN ROOT BALL. BACK FILL WITH ONE PART TOP SOIL AND ONE PART SOIL FROM EXCAVATED PLANTING HOLE.
- REMOVE ALL TUINE, WIRE AND BURLAP FROM TREE AND SHRUB EARTH BALLS, AND FROM TREE TRUNKS. 4" THICK BARK MULCH FOR TREES IN 4" DIA. CIRCLE WITH 3" PULLED AWAY FROM TRUNK. 4" THICK BARK MULCH FOR SHRUBS AND 2" THICK BARK MULCH FOR PERENNIALS.
- PLANT MATERIAL QUALITY & INSTALLATION SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN ASSOCIATION OF NURSERYMEN LANDSCAPE STANDARDS.
- PROVIDE SOD FOR ALL NEW AND DISTURBED LAWN AREAS UNLESS NOTED OTHERWISE. NO FEAT SOD.
- ALL PLANTING AREAS TO BE PREPARED WITH APPROPRIATE SOIL MIXTURES AND FERTILIZER BEFORE PLANT INSTALLATION.
- PLANT TREES AND SHRUBS GENERALLY NO CLOSER THAN THE FOLLOWING DISTANCES FROM SIDEWALKS, CURBS AND PARKING STALLS:
 - SHADE TREES 5 FT.
 - ORNAMENTAL AND EVERGREEN TREES 10 FT.
 - SHRUBS THAT ARE LESS THAN 1 FOOT TALL AND WIDE AT MATURITY 2 FT.
- NO TREES OR EVERGREENS TO BE INSTALLED OVER ANY PROPOSED OR EXISTING UTILITY LINES AS SHOWN ON THE OVERALL LANDSCAPE PLAN. SEE ENGINEERING PLANS FOR LOCATION AND DETAILS.
- ALL NEW LAWN AREAS AND NEW LANDSCAPE BEDS TO BE FULLY IRRIGATED WITH A AUTOMATIC UNDERGROUND SYSTEMS. IRRIGATION SYSTEM TO HAVE SEPARATE ZONES FOR LAWN AREAS, PARKING ISLANDS, AND SHRUB BEDS WITH DIFFERENT CONTROL. MOISTURE LEVEL ADJUSTMENT PER ZONE AS REQUIRED. IRRIGATION PLAN TO BE PROVIDED DURING FINAL SITE PLAN APPROVAL.
- UNLESS NOTED OTHERWISE, LANDSCAPE BEDS ADJACENT TO LAWN TO RECEIVE EDGING. EDGING SHALL BE 4" X 1/8" METAL (FINISH BLACK OR GREEN) OR APPROVED EQUAL AND TO BE INSTALLED WITH HORIZONTAL METAL STAKES AT 32" O.C. OR PER MANUFACTURER'S SPECIFICATION.
- ALL NEW PARKING ISLANDS AND LANDSCAPE BEDS ADJACENT AND NEXT TO BUILDING SHALL BE EXCAVATED OF ALL BUILDING MATERIALS AND POOR SOILS A MIN. OF 16"-18" DEPTH. BACK FILL WITH GOOD, MEDIUM TEXTURED PLANTING SOILS. ADD A MIN. 4" OF TOPSOIL OVERFILL TO FINISH GRADE. PROVIDE POSITIVE DRAINAGE.
- WATERING OF ALL PLANTS AND TREES TO BE PROVIDED IMMEDIATELY AND MULCHING WITHIN 24 HOURS AFTER INSTALLATION.
- ALL TREE PITS TO BE TESTED FOR PROPER DRAINAGE PRIOR TO TREE PLANTING. PROVIDE APPROPRIATE DRAINAGE SYSTEM AS REQUIRED IF THE TREE PIT DOES NOT DRAIN SUFFICIENTLY.
- THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL LANDSCAPE PLANT MATERIALS AND IRRIGATION INSTALLATION FOR A PERIOD OF TWO YEAR BEGINNING AFTER THE COMPLETION OF LANDSCAPE INSTALLATION DATE APPROVED BY THE CITY OR LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL REPLACE DURING AND AT THE END OF THE GUARANTEE PERIOD, ANY DEAD OR UNACCEPTABLE PLANTS, AS DETERMINED BY THE TOWNSHIP OR LANDSCAPE ARCHITECT, WITHOUT COST TO THE OWNER.

plant material list (general)

key	quant. LS-1A	botanical name	common name	size	comments
DECIDUOUS AND EVERGREEN TREES					
QB	3	QUERCUS BI-COLOR	WHITE SWAMP OAK	2 1/2" BB	
TR	11	TILIA AMERICANA 'REDMOND'	REDMOND LINDEN	2 1/2" BB	
TC	1	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LINDEN	2 1/2" BB	
LT	5	LIRIODENDRON TULIPIFERA	TULIPTREE	2 1/2" BB	
AR	4	ACER R. 'FRANKSRED'	RED SUNSET RED MAPLE	2 1/2" BB	
AF	4	ACER X FREEMANII 'JEFFERSRED'	AUTUMN BLAZE RED MAPLE	2 1/2" BB	
AS	6	ACER SACCHARUM	SUGAR MAPLE	2 1/2" BB	
GT	1	GLEDITSIA TRI. INERMIS 'SKYCOLE'	SKYLINE HONEY LOCUST	2 1/2" BB	
SHRUBS					
M8	2	MALUS SARGENTII	SARGENT CRABAPPLE	2" BB	
CC	5	CERCIS CANADENSIS	EASTERN REDBUD	2" BB	
PERENNIALS AND GRASSES					
AUW	13	ABIES CONCOLOR	CONCOLOR FIR	8' BB	
PS	3	PINUS STROBUS	EASTERN WHITE PINE	8' BB	
PA	15	FICIA ABIES	NORWAY SPRUCE	8' BB	
JT	40	JUNIPERUS S. 'TAMARISAFOLIA'	TAM'S JUNIPER	30" CONT.	42" O.C. SPACING
HB	4	HYDRANGEA PANICULATA 'ILVOBO'	BOBO HYDRANGEA	30" CONT.	42" O.C. SPACING
FI	20	FORSYTHIA X INTERMEDIA	BORDER FORSYTHIA	3" BB	60" O.C. SPACING
JP	24	JUNIPERUS CHINENSIS 'PFITZERIANA COMPACTA'	COMPACT PFITZER COMPACT	30" CONT.	42" O.C. SPACING
VD	40	VIBURNUM DENTATUM	ARROWWOOD VIBURNUM	3" BB	60" O.C. SPACING
SK	40	SYRINGA PATULA 'MISS KIM'	MISS KIM DWARF LILAC	3" BB	60" O.C. SPACING
CKF	-	CALAMAGROSTIS X.A. 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS	3" CONT.	48" O.C. SPACING
M8M	-	MISCANTHUS SINENSIS 'MORNING LIGHT'	MORNING LIGHT JAPANESE SILVER GRASS	3" CONT.	48" O.C. SPACING

plant material list (detention)

key	quant. LS-2A	botanical name	common name	size	comments
DECIDUOUS AND EVERGREEN TREES					
QB	6	QUERCUS BI-COLOR	WHITE SWAMP OAK	2 1/2" BB	
LS	4	LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	2 1/2" BB	
CO	3	CELTIS OCCIDENTALIS	COMMON HACKBERRY	2 1/2" BB	
AR	6	ACER RUBRUM	RED MAPLE	2 1/2" BB	
SHRUBS					
AUW	1	ABIES CONCOLOR	CONCOLOR FIR	8' BB	
VD	30	VIBURNUM DENTATUM	ARROW WOOD VIBURNUM	30" CONT.	60" SPACING O.C.
FI	43	FORSYTHIA X INTERMEDIA	BORDER FORSYTHIA	30" CONT.	60" SPACING O.C.
CS	32	CORNUS STOLONIFERA	REDTIG DOGWOOD	30" CONT.	60" SPACING O.C.
CF	15	CORNUS FLAVIRAMEA	YELLOWTIG DOGWOOD	30" CONT.	60" SPACING O.C.
RAG	12	RHUS AROMATICA 'GRO-LOW'	GRO-LOW FRAGRANT SUMAC	24" CONT.	42" SPACING O.C.
AM	30	ARONIA ARBUTIFOLIA 'BRILLIANTISSIMA'	RED CHOCBERRY	30" CONT.	60" SPACING O.C.
SG	51	SPIRAEA J. 'GOLDMOUND'	GOLDMOUND SPIREA	24" CONT.	42" SPACING O.C.

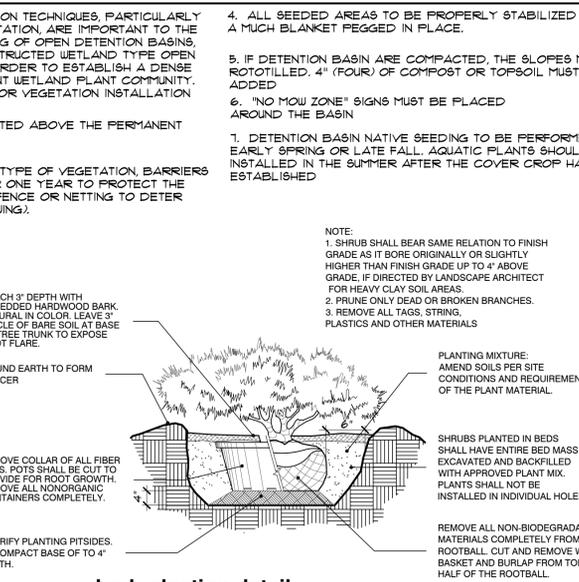
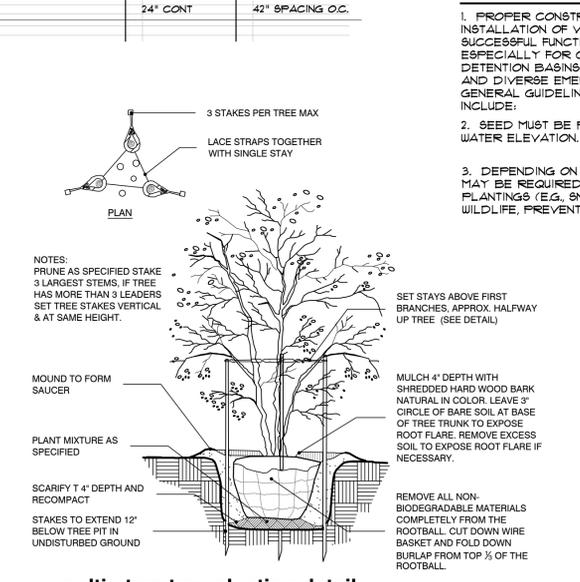
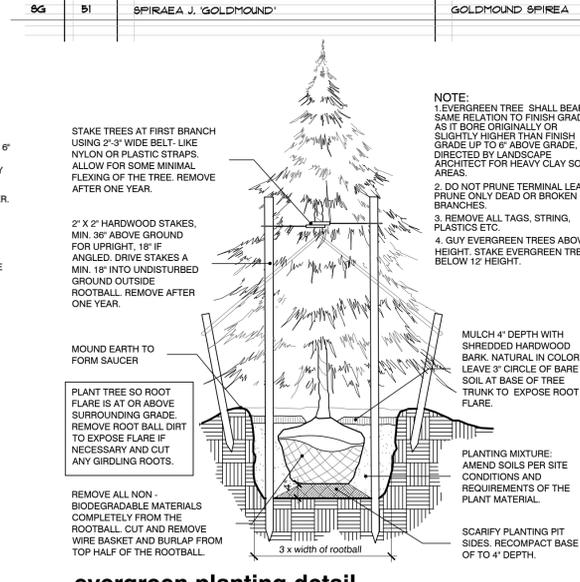
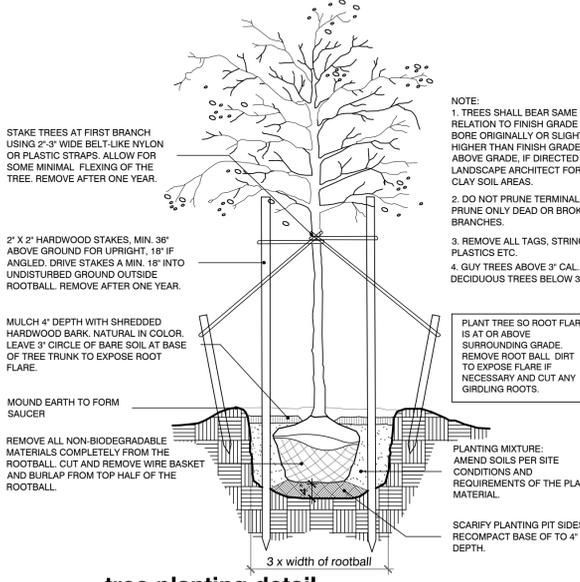


(2A) detention landscape planting plan
 SCALE: 1" = 40'-0"

detention basin	REQUIRED	PROVIDED
TOTAL LIN. FT. OF DETENTION BASIN	1,243' ±	
ONE (1) CANOPY OR EVERGREEN TREE PER 50'	26	26
(1243' / 50' = 25.86 SQ.FT.)		
TEN (10) SHRUBS PER 50'	254	254
(1243' / 50' = 25.86 X 10 SHRUBS = 258.6 SHRUBS)		

basin construction notes

- PROPER CONSTRUCTION TECHNIQUES, PARTICULARLY INSTALLATION OF VEGETATION, ARE IMPORTANT TO THE SUCCESSFUL FUNCTIONING OF OPEN DETENTION BASINS, ESPECIALLY FOR CONSTRUCTED WETLAND TYPE OPEN DETENTION BASINS IN ORDER TO ESTABLISH A DENSE AND DIVERSE EMERGENT WETLAND PLANT COMMUNITY. GENERAL GUIDELINES FOR VEGETATION INSTALLATION INCLUDE:
 - SEED MUST BE PLANTED ABOVE THE PERMANENT WATER ELEVATION.
 - IF DETENTION BASIN ARE COMPACTED, THE SLOPES MUST BE ROTOTILLED. 4" (FOUR) OF COMPOST OR TOPSOIL MUST BE ADDED AROUND THE BASIN.
 - DETENTION BASIN NATIVE SEEDING TO BE PERFORMED IN EARLY SPRING OR LATE FALL. AQUATIC PLANTS SHOULD BE INSTALLED IN THE SUMMER AFTER THE COVER CROP HAS ESTABLISHED.
- ALL SEEDING AREAS TO BE PROPERLY STABILIZED WITH A MICH BLANKET PEGGED IN PLACE.
- IF DETENTION BASIN ARE COMPACTED, THE SLOPES MUST BE ROTOTILLED. 4" (FOUR) OF COMPOST OR TOPSOIL MUST BE ADDED AROUND THE BASIN.
- "NO MOW ZONE" SIGNS MUST BE PLACED AROUND THE BASIN.





client:
Chestnut Development, LLC
 3800 Chilson Road
 Howell, Michigan 48843

project:
Chestnut Self Storage

project location:
 Howell Township,
 Michigan
 Burkhart Road

sheet title:
SOD AND SEEDING REFERENCE PLAN

job no. / issue / revision date:
 LS24.051.04 SPA 4-29-2024

drawn by:
JP
 checked by:
FP
 date:
4-20-2024

notice:
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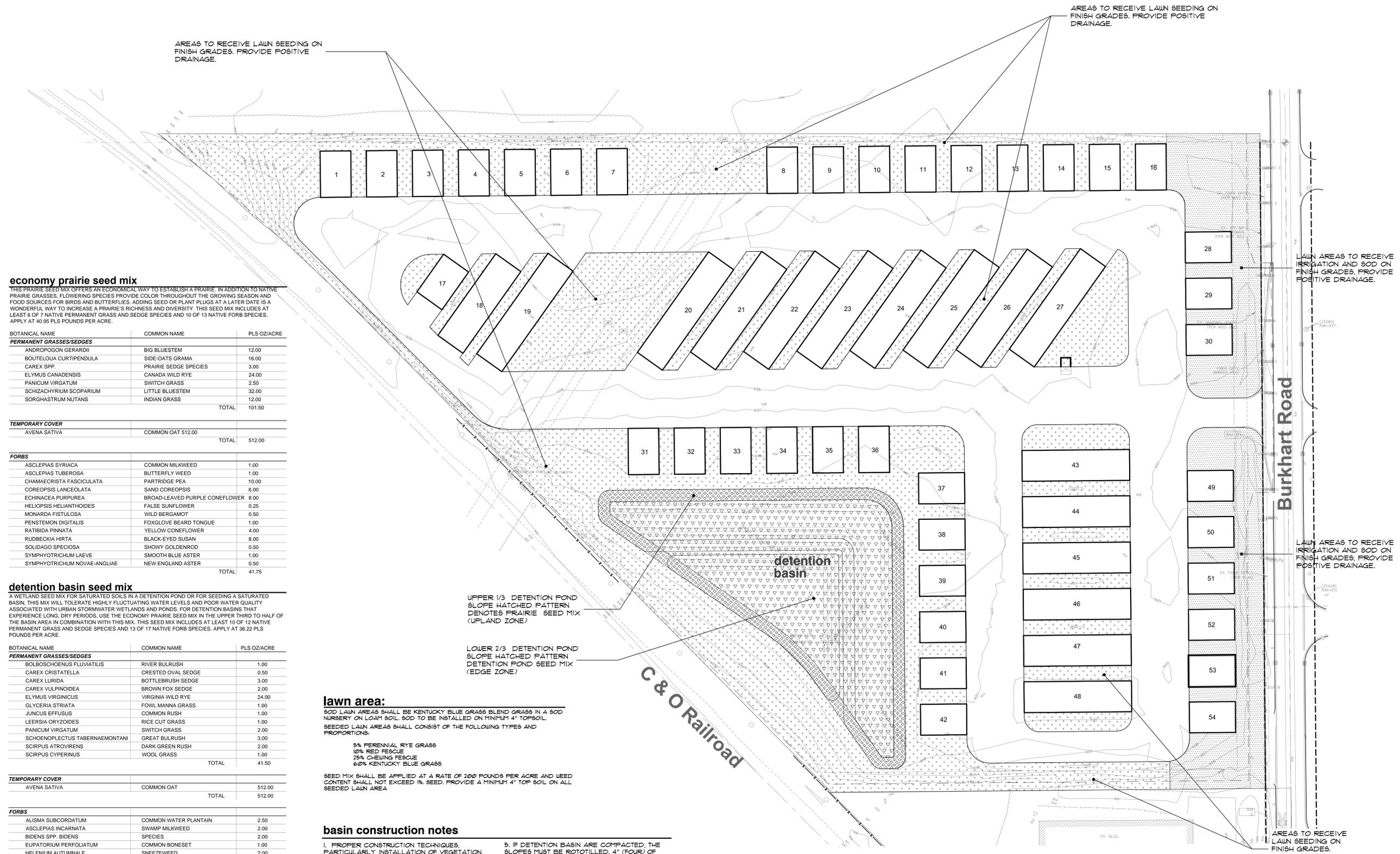
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project no:
LS24.051.04

sheet no:
LS-3 of 3



economy prairie seed mix
 THIS PRAIRIE SEED MIX OFFERS AN ECONOMICAL WAY TO ESTABLISH A PRAIRIE. IN ADDITION TO NATIVE PRAIRIE GRASSES, FLOWERING SPECIES PROVIDE COLOR THROUGHOUT THE GROWING SEASON AND FOOD SOURCES FOR BIRDS AND BUTTERFLIES. ADDING SEED OR PLANT PLUGS AT A LATER DATE IS A WONDERFUL WAY TO INCREASE A PRAIRIE'S RICHNESS AND DIVERSITY. THIS SEED MIX INCLUDES AT LEAST 6 OF 7 NATIVE PERMANENT GRASS AND SEDGE SPECIES AND 10 OF 13 NATIVE FORB SPECIES. APPLY AT 40.95 PLS POUNDS PER ACRE.

BOTANICAL NAME	COMMON NAME	PLS OZ/ACRE
PERMANENT GRASSES/SEDGES		
ANDROPOGON GERARDII	BIG BLUESTEM	12.00
BOUTELOUJA CURTIPENDULA	SIDE-OATS GRAMA	16.00
CAREX SPP.	PRAIRIE SEDGE SPECIES	3.00
ELYMUS CANADENSIS	CANADA WILD RYE	24.00
PANICUM VIRGATUM	SWITCH GRASS	2.50
SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	32.00
SORGHASTRUM NUTANS	INDIAN GRASS	12.00
	TOTAL	101.50

TEMPORARY COVER		
AVENA SATIVA	COMMON OAT 512.00	
	TOTAL	512.00

FORBS		
ASCLEPIAS SYRIACA	COMMON MILKWEED	1.00
ASCLEPIAS TUBEROSA	BUTTERFLY WEED	1.00
CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	10.00
COREOPSIS LANCEOLATA	SAND COREOPSIS	6.00
ECHINACEA PURPUREA	BROAD-LEAVED PURPLE CONEFLOWER	8.00
HELIOPSIS HELIANTHOIDES	FALSE SUNFLOWER	0.25
MONARDA FISTULOSA	WILD BERGAMOT	0.50
PENSTEMON DIGITALIS	FOXGLOVE BEARD TONGUE	1.00
RATIBIDA PINNATA	YELLOW CONEFLOWER	4.00
RUDBECKIA HIRTA	BLACK-EYED SUSAN	8.00
SOLIDAGO SPECIOSA	SHOWY GOLDENROD	0.50
SYMPHYOTRICHUM LAEVE	SMOOTH BLUE ASTER	1.00
SYMPHYOTRICHUM NOVAE-ANGLIAE	NEW ENGLAND ASTER	0.50
	TOTAL	41.75

detention basin seed mix
 A WETLAND SEED MIX FOR SATURATED SOILS IN A DETENTION POND OR FOR SEEDING A SATURATED BASIN. THIS MIX WILL TOLERATE HIGHLY FLUCTUATING WATER LEVELS AND POOR WATER QUALITY ASSOCIATED WITH URBAN STORMWATER WETLANDS AND PONDS. FOR DETENTION BASINS THAT EXPERIENCE LONG, DRY PERIODS, USE THE ECONOMY PRAIRIE SEED MIX IN THE UPPER THIRD TO HALF OF THE BASIN AREA IN COMBINATION WITH THIS MIX. THIS SEED MIX INCLUDES AT LEAST 10 OF 12 NATIVE PERMANENT GRASS AND SEDGE SPECIES AND 13 OF 17 NATIVE FORB SPECIES. APPLY AT 36.22 PLS POUNDS PER ACRE.

BOTANICAL NAME	COMMON NAME	PLS OZ/ACRE
PERMANENT GRASSES/SEDGES		
BOLBOSCHOENUS FLUVIATILIS	RIVER BULRUSH	1.00
CAREX CRISTATELLA	CRESTED OVAL SEDGE	0.50
CAREX LURIDA	BOTTLEBRUSH SEDGE	3.00
CAREX VULPINODEA	BROWN FOX SEDGE	2.00
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	24.00
GLYCERIA STRATA	FOWL MANNA GRASS	1.00
JUNCOUS EFFUSUS	COMMON RUSH	1.00
LEERSIA ORYZOIDES	RICE CUT GRASS	1.00
PANICUM VIRGATUM	SWITCH GRASS	2.00
SCHOENOPLECTUS TABERNAEMONTANI	GREAT BULRUSH	3.00
SCIRPUS ATROVIRENS	DARK GREEN RUSH	2.00
SCIRPUS CYPERINUS	WOOL GRASS	1.00
	TOTAL	41.50

TEMPORARY COVER		
AVENA SATIVA	COMMON OAT	512.00
	TOTAL	512.00

FORBS		
ALISMA SUBCORDATUM	COMMON WATER PLANTAIN	2.50
ASCLEPIAS INCARNATA	SWAMP MILKWEED	2.00
BIDENS SPP. BIDENS	SPECIES	2.00
EUPATORIUM PERFORIATUM	COMMON BONESET	1.00
HELIANIUM AUTUMNALE	SNEEZEWEED	2.00
IRIS VIRGINICA V. SHIREVEI	BLUE FLAG	4.00
LYCOPUS AMERICANUS	COMMON WATER HOREHOUND	0.50
MIMULUS RINGENS	MONKEY FLOWER	1.00
PENTHORUM SEDOIDES	DITCH STONECROP	0.50
PERSCARIA SPP.	PINKWEED SPECIES	2.00
RUDBECKIA SUBTOMENTOSA	SWEET BLACK-EYED SUSAN	1.00
RUDBECKIA TRILOBA	BROWN-EYED SUSAN	1.50
SAGITTARIA LATIFOLIA	COMMON ARROWHEAD	1.00
SENNA HEBECARPA	WILD SENNA	2.00
SYMPHYOTRICHUM LANCEOLATUM	PANICLED ASTER	0.50
SYMPHYOTRICHUM NOVAE-ANGLIAE	NEW ENGLAND ASTER	0.50
THALICTRUM DASYCARPUM	PURPLE MEADOW RUE	2.00
	TOTAL	26.00

lawn area:
 SOD LAWN AREAS SHALL BE KENTUCKY BLUE GRASS BLEND GRASS IN A SOD NURSERY ON LOAM SOIL. SOD TO BE INSTALLED ON MINIMUM 4" TOPSOIL.
 SEEDED LAWN AREAS SHALL CONSIST OF THE FOLLOWING TYPES AND PROPORTIONS:
 5% PERENNIAL RYE GRASS
 10% RED FESCUE
 25% CHEWING FESCUE
 60% KENTUCKY BLUE GRASS
 SEED MIX SHALL BE APPLIED AT A RATE OF 200 POUNDS PER ACRE AND WEED CONTENT SHALL NOT EXCEED 1%. SEED. PROVIDE A MINIMUM 4" TOP SOIL ON ALL SEEDED LAWN AREA.

basin construction notes

1. PROPER CONSTRUCTION TECHNIQUES, PARTICULARLY INSTALLATION OF VEGETATION, ARE IMPORTANT TO THE SUCCESSFUL FUNCTIONING OF OPEN DETENTION BASINS, ESPECIALLY FOR CONSTRUCTED WETLAND TYPE OPEN DETENTION BASINS IN ORDER TO ESTABLISH A DENSE AND DIVERSE EMERGENT WETLAND PLANT COMMUNITY. GENERAL GUIDELINES FOR VEGETATION INSTALLATION INCLUDE:
 2. SEED MUST BE PLANTED ABOVE THE PERMANENT WATER ELEVATION.
 3. ALL SEEDED AREAS TO BE PROPERLY STABILIZED WITH A MICH BLANKET FEGGED IN PLACE.
 4. DEPENDING ON THE TYPE OF VEGETATION, BARRIERS MAY BE REQUIRED FOR ONE YEAR TO PROTECT THE PLANTINGS (E.G., SNOW FENCE OR NETTING TO DETER WILDLIFE, PREVENT MOWING).
5. IF DETENTION BASIN ARE COMPACTED, THE SLOPES MUST BE ROTOTILLED, 4" (FOUR) OF COMPOST OR TOPSOIL MUST BE ADDED
6. "NO MOW ZONE" SIGNS MUST BE PLACED AROUND THE BASIN
7. DETENTION BASIN NATIVE SEEDING TO BE PERFORMED IN EARLY SPRING OR LATE FALL. AQUATIC PLANTS SHOULD BE INSTALLED IN THE SUMMER AFTER THE COVER CROP HAS ESTABLISHED

sod & seeding reference plan
 SCALE: 1" = 60'-0"



WPX LED Wall Packs

Specifications

Introduction: The WPX LED wall packs are energy-efficient, cost-effective, and aesthetically appealing solutions for both wall pack replacement and new construction opportunities. Available in three sizes, the WPX family offers a 100% DALI dimmable with a wide, uniform distribution.

The WPX calculations fully cover the footprint of the LED glass wall packs that they replace, providing a true replacement and an upgraded appearance. Reliable construction and excellent ETL luminaire performance ensure a long service life. The WPX family offers a wide range of options to meet your specific lighting requirements.

Ordering Information

Label	Quantity	Manufacturer	Part Number	Description
W	153	Lithonia Lighting	WPX1 LED 40K Mvlt	WPX1 LED wallpack 4000K color temperature 120-277 Volts

EXAMPLE: WPX1 LED 40K MVOLT DOBBD

RSX1 LED Area Luminaire

Specifications

Introduction: The RSX1 LED Area Luminaire is a sleek, fully integrated LED luminaire for building exterior applications. It features a sleek, modern design and is available in two sizes to provide energy-efficient lighting with a variety of optical and control options for customized performance.

With an expected service life of over 20 years, RSX1 offers the most reliable lighting solution for exterior applications. The RSX1 Series LED Area Luminaire is available in two sizes to provide energy-efficient lighting with a variety of optical and control options for customized performance.

Ordering Information

Label	Quantity	Manufacturer	Part Number	Description
S1	4	Lithonia Lighting	RSX1 LED 40K	RSX1 LED Area Luminaire Size 1 Lumen Package 4000K CCT

EXAMPLE: RSX1 LED 40K 1000 40K 13M TMOVT DOBBD

D-Series Size 1 LED Wall Luminaire

Specifications

Introduction: The D-Series Wall Luminaire is a sleek, fully integrated LED luminaire for building exterior applications. It features a sleek, modern design and is available in two sizes to provide energy-efficient lighting with a variety of optical and control options for customized performance.

With an expected service life of over 20 years, D-Series offers the most reliable lighting solution for exterior applications. The D-Series Wall Luminaire is available in two sizes to provide energy-efficient lighting with a variety of optical and control options for customized performance.

Ordering Information

Label	Quantity	Manufacturer	Part Number	Description
A	27	Lithonia Lighting	DSXW1 LED 40K Mvlt	DSXW1 LED, 4000K

EXAMPLE: DSXW1 LED 40K MVOLT DOBBD

General Note

- SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
- SEE LUMINAIRE SCHEDULE FOR LIGHT LOSS FACTOR.
- CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: 0' - 0" & 5' - 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 REQUIREMENTS DEFINED IN ASHRAE 90.1 2013. FOR SPECIFIC INFORMATION CONTACT GBA CONTROLS GROUP AT ASG@GASSERBUSH.COM OR 734-266-6705.

Alternates Note

THE USE OF FIXTURE ALTERNATES MUST BE RESUBMITTED TO THE CITY FOR APPROVAL.

Ordering Note

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

Drawing Note

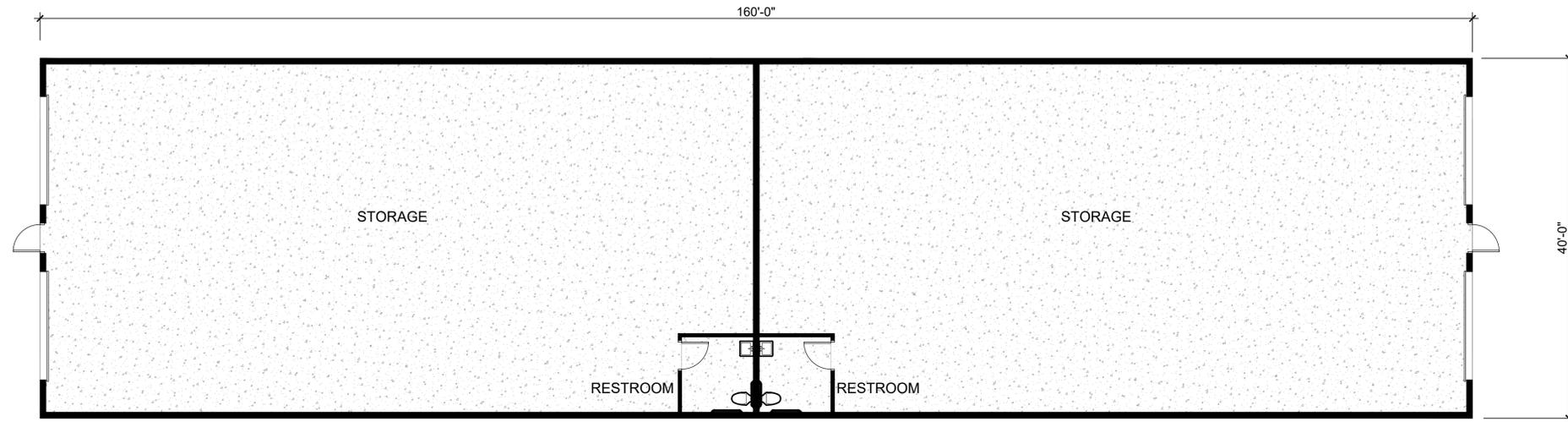
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Mounting Height Note

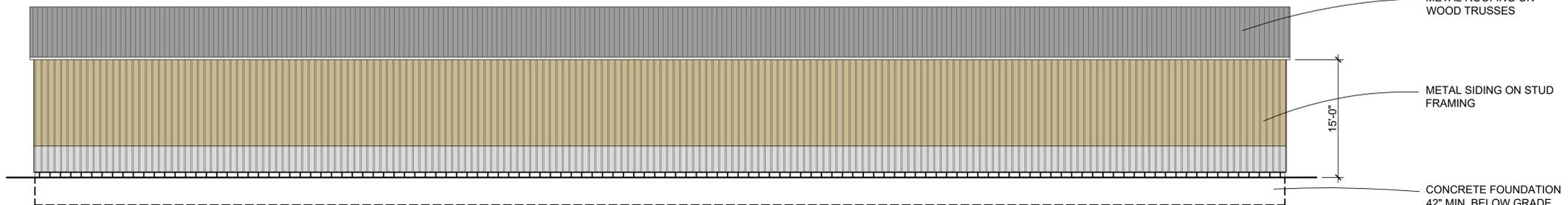
MOUNTING HEIGHT IS MEASURED FROM GRADE TO FACE OF FIXTURE. POLE HEIGHT SHOULD BE CALCULATED AS THE MOUNTING HEIGHT LESS BASE HEIGHT.

Symbol	Label	QTY	Manufacturer	Catalog	Description	LLF	Mounting Height
□	S1	4	Lithonia Lighting	RSX1 LED 40K	RSX LED Area Luminaire Size 1 Lumen Package 4000K CCT	0.9	25'
□	S2	2	Lithonia Lighting	RSX1 LED40K	RSX LED Area Luminaire Size 1 Lumen Package 4000K CCT	0.9	25'
▭	W	153	Lithonia Lighting	WPX1 LED 40K Mvlt	WPX1 LED wallpack 4000K color temperature 120-277 Volts	0.9	12'
▭	A	27	Lithonia Lighting	DSXW1 LED 40K MVOLT	DSXW1 LED, 4000K	0.9	16'

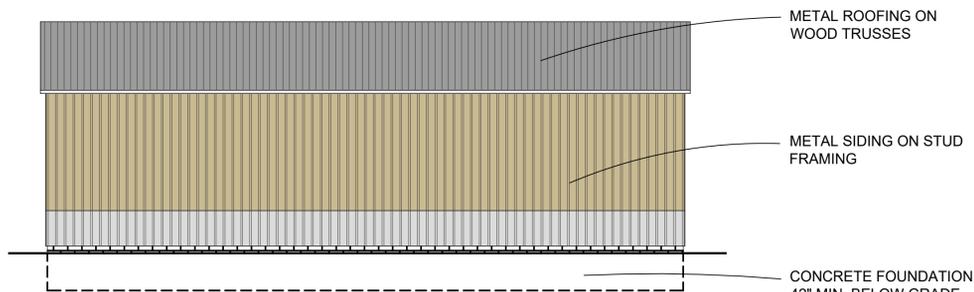
Statistics						
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Overall	+	0.4 fc	4.9 fc	0.0 fc	N/A	N/A
Property Line	+	0.0 fc	0.6 fc	0.0 fc	N/A	N/A
Main Drive Lane	✳	0.7 fc	4.5 fc	0.0 fc	N/A	N/A



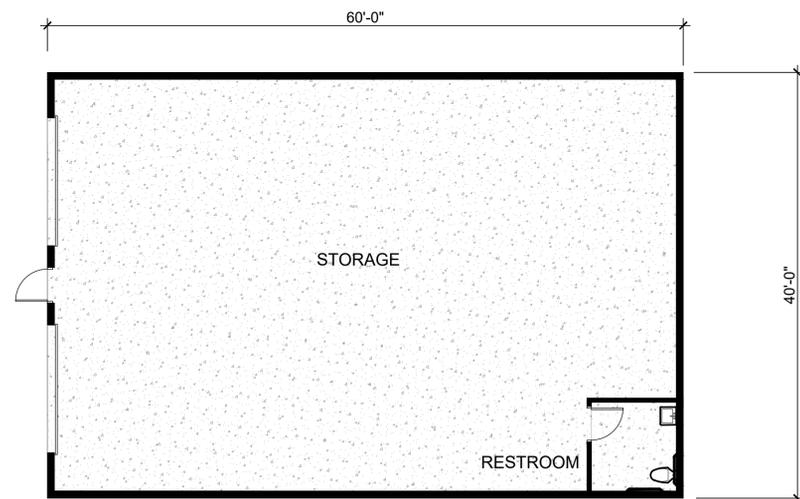
Floor Plan-40' X 160' Building
Scale: 1/8"=1'-0"



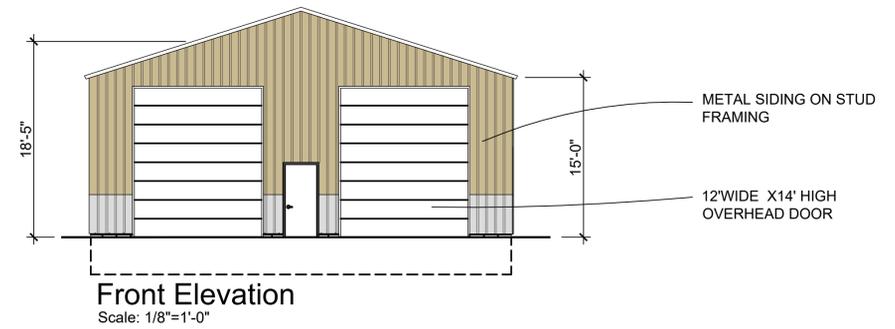
Side Elevation-40' X 160' Building
Scale: 1/8"=1'-0"



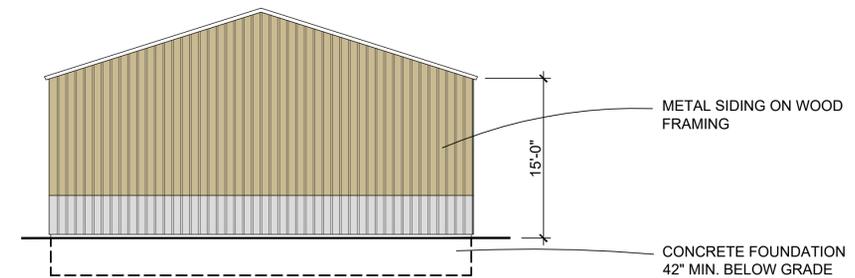
Side Elevation-40' X 60' Building
Scale: 1/8"=1'-0"



Floor Plan-40' X 60' Building
Scale: 1/8"=1'-0"



Front Elevation
Scale: 1/8"=1'-0"



Rear Elevation
Scale: 1/8"=1'-0"

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

CLIENT :
CHESTNUT DEVELOPMENT, LLC
 3800 CHILSON ROAD
 HOWELL, MI 48843
 POC: STEVE GRONOW
 517-552-2489

TYPICAL FLOOR PLAN & ELEVATIONS
 CHESTNUT SELF STORAGE
 TAX ID# 06-29-200-029
 PART OF THE NE 1/4 OF SEC. 29, T3N-R4E, HOWELL TOWNSHIP, LIVINGSTON CO., MICHIGAN

PLAN SUBMITTALS/REVISIONS	DATE
PRELIMINARY/FINAL SITE PLAN SUBMITTAL	5/28/2024
REVISED SITE PLAN SUBMISSION	5/30/2024
FINAL SITE PLAN SUBMISSION	7/23/2024

ORIGINAL ISSUE DATE:
02/29/2024

PROJECT NO: 22-286

SCALE: 1/8"=1'-0"
 0 1/2" 1"

FIELD:
 DRAWN BY: CD
 DESIGN BY: BS
 CHECK BY: AP

A-10

NOT FOR CONSTRUCTION



Carlisle | Wortman
ASSOCIATES, INC.

117 NORTH FIRST STREET SUITE 70 ANN ARBOR, MI 48104 734.662.2200 734.662.1935 FAX

Date: June 19, 2024

Site Plan Review For Howell Township, Michigan

Applicant:	Chestnut Development, LLC
Project Name:	Chestnut Self Storage
Plan Date:	May 30, 2024
Location:	South of W Grand River Ave & N Burkhart Intersection
Zoning:	Industrial Flex Zone (IFZ)
Action Requested:	Preliminary Site Plan Approval

PROJECT AND SITE DESCRIPTION

The applicant has submitted a preliminary site plan dated May 30, 2024, that proposes the construction of a self-storage facility located at the vacant parcel #06-29-200-029. Proposed construction of fifty-four (54) storage structures includes thirty-eight (38) 40'x60' storage structures, nine (9) 40'x160' storage structures, six (6) 40'x140' storage structures and one (1) 40'x130' storage structure.

All structures are proposed to be connected to utilities and include a restroom. The site is proposed to be enclosed by a 3,848 lineal foot chain link fence that is eight (8) feet in height.

The proposed mini-warehousing facility is a permitted principal use in the Industrial Flex Zone. However, we question the need to have bathrooms in each unit. We have concerns that this could lead to uses with the units that are not permitted in the district. The Planning Commission

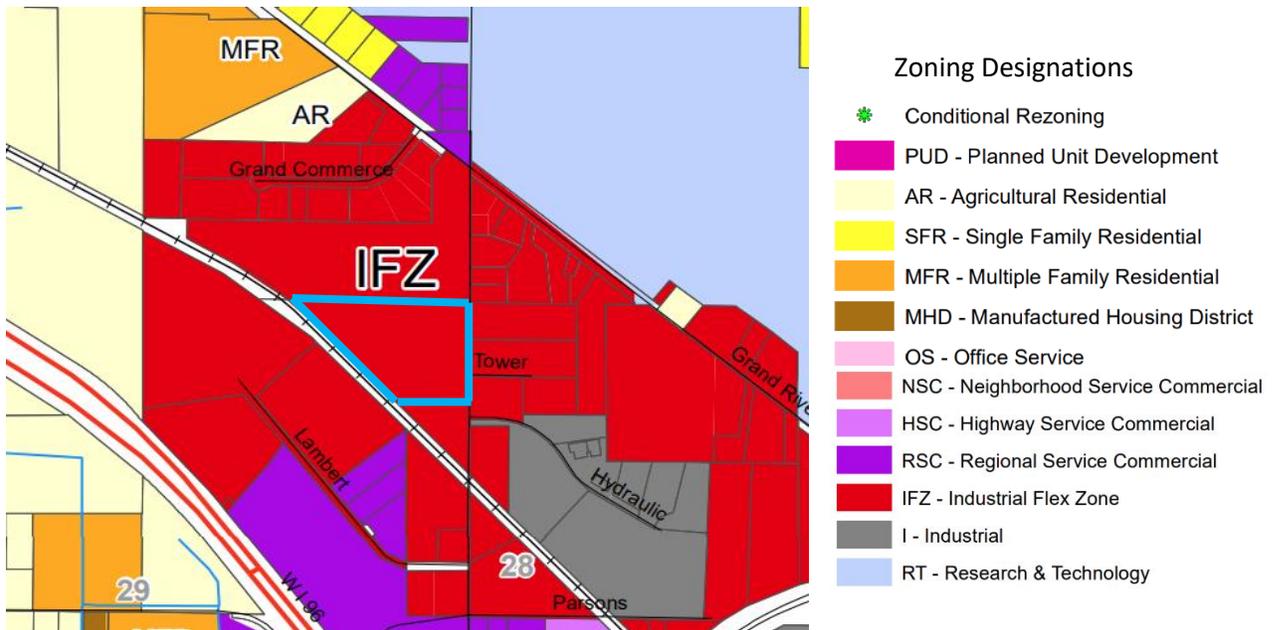
may want to discuss with the applicant the need for individual bathrooms vs. one common facility for customers. Figure 1 provides an aerial image of the current site outlined in blue.

Figure 1. Aerial Image of Subject Site and Vicinity



Source: NearMap

Figure 2. Zoning Map



Items to be Addressed: The Planning Commission may want to discuss with the applicant the need for individual bathrooms in each unit.

NEIGHBORING ZONING, LAND USE AND MASTER PLAN

Neighboring zoning designations are summarized in Table 1.

Table 1. Zoning, Land Use and Master Plan Designations

	Zoning
Subject Site	IFZ- Industrial Flex Zone
North	IFZ- Industrial Flex Zone
South	IFZ= Industrial Flex Zone
East	IFZ= Industrial Flex Zone
West	C & O Railway / IFZ= Industrial Flex Zone

Items to be Addressed: None.

AREA, WIDTH, HEIGHT, SETBACKS

The following table summarizes the Density, Placement, and Height Regulations for the site plan associated with the use. The proposed structures appear to meet all dimensional regulations of the zoning ordinance.

Table 2. Density, Placement, and Height Regulations

	Required	Provided
Lot Area	2 Acres	19.75 Acres
Lot Width	200 Feet	>200 Feet
Front Setback	35 Feet	35 Feet
Side Setback	10 Feet Minimum (Minimum Total of Both Sides=25 Feet)	>25 Feet
Rear Setback	10 Feet Minimum or 50 Feet Minimum Abutting AR, SFR, MFR	10 Feet
Lot Coverage	75 % Max	52.9%
Building Height	70 Feet Max	15 Feet

Items to be Addressed: None.

BUILDING LOCATION AND SITE ARRANGEMENT

The facility will be accessible from Burkhart Road. The proposed layout allows proper vehicular circulation and continued access to an existing Enbridge easement that crosses the site. The plan includes the creation of a sedimentation basin and a detention basin on the Southwest corner of the parcel abutting the railway.

Items to be Addressed: *None.*

PARKING, LOADING

The applicant is not proposing any parking at this site. Per section 18.02.G.30, which sets requirements for Mini Warehoused, five (5) parking spaces shall be provided adjacent to the office, in addition to any parking which may be required for other permitted uses on the same site (Sec. 18.02.G.30 – Mini Warehouses). No office is being proposed. However, it is unclear if any employee will be on site. Parking should be provided for all employees at a maximum shift.

Typically, users of self-storage facilities park immediately outside their unit. Because units are accessed infrequently and the drive isles in the proposed development appear to be wide enough, we don't foresee issues with this approach.

Items to be Addressed: *Demonstrate adequate parking is available for the number of employees at maximum employment.*

FENCING

The applicant is proposing 3848 lineal feet of perimeter fencing at eight (8) feet high. This is in compliance with the Industrial Districts fencing requirements of a maximum of twelve (12) feet in height.

Items to be Addressed: *None.*

SITE ACCESS AND CIRCULATION

The applicant provides a refuse vehicle circulation and emergency vehicle circulation plan which demonstrate proper vehicular traffic flow.

We defer to Engineering and the Fire Chief for further consideration.

Items to be Addressed: *None.*

NATURAL FEATURES

The site plan calls out that the National Wetland Inventory notes no wetlands on the subject parcel and that wetland flagging was not observed during the field survey. The site plan also

details that the subject property appears to be entirely in zone (X) area with minimal flood hazard according to the flood insurance rate map for the County of Livingston Community Panel NO. (26093C0188D), effective date 9/17/2008.

Approval from EGLE will not be required for construction as it is evident that there are no wetlands shown for the property through the EGLE wetland database.

Items to be Addressed: None.

LANDSCAPING

The applicant has provided a landscape plan, as shown in the following table.

Table 3. Landscaping Requirements RSC District

Landscaped Area	Requirement	Factor	Required	Provided
Road Frontages Burkhart	1 deciduous or evergreen tree per 40 linear feet	838	21	21
	1 ornamental tree per 100 linear feet		8	8
	Min. of 8 shrubs per every 40 linear feet		168	168
Stormwater Detention/ Retention Areas	1 deciduous or evergreen tree per 50 feet of perimeter	1293	26	26
	10 shrubs per 50 feet of perimeter		259	259
Open Space Landscaping	1 canopy tree per 3000 square feet	167320	56	56

Items to be Addressed: 1) Provide the location of all trees with a diameter at breast height of six (6) inches or more 2) Provide boundaries of woodlots and shrub masses if applicable.

LIGHTING

A sufficient lighting plan has been provided. A photometric plan indicates that the light levels at property lines are acceptable. Planned lighting includes floodlights spaced throughout the lot, area luminaire lighting along vehicular traffic ways, and wall packs along the storage structures. There are 25 wall mounted flood lights that the angle of the light appears to be adjustable. These should be replaced with a permanent horizontal fixture.

Items to be Addressed: Replace fixtures RSXF1 LED 40K with a permanent horizontal fixture.

SIGNS

Site plan does not indicate any signage proposed on the site.

If added, signs will require a separate permit from the Zoning Administrator. A sign application must be filed with the Zoning Administrator, at which time the zoning administrator will determine if the signs meet the requirements of the ordinance.

Items to be Addressed: None.

FLOOR PLAN AND ELEVATIONS

Floor plan and elevation sheets have been included in the site plan on sheets A-1.0.

Items to be Addressed: None.

TRASH ENCLOSURE

The applicant has indicated that a garbage receptacle will be placed near the entrance off of Burkhart on the East side of the property.

Items to be Addressed: Provide trash enclosure details.

RECOMMENDATIONS

We recommend the following items be addressed before the Planning Commission takes action on the preliminary site plan:

1. The Planning Commission may want to discuss with the applicant the need for individual bathrooms in each unit
2. Demonstrate adequate parking is available for the number of employees at maximum employment.
3. Provide the location of all trees with a diameter at breast height of six (6) inches or more.
4. Provide boundaries of woodlots and shrub masses where applicable.
5. Replace fixtures RSXF1 LED 40K with a permanent horizontal fixture.
6. Provide trash enclosure details.



CARLISLE/WORTMAN ASSOC., INC.
Paul Montagno, AICP
Principal



CARLISLE/WORTMAN ASSOC., INC.
Grayson Moore
Community Planner



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298 Veterans Drive, Fowlerville, MI 48836 (HQ)
(517) 223-3512



Date: 07/23/2024

Attn: Mr. Jonathan Hohenstein, Howell Township Planning & Zoning Administrator

Re: **Chestnut Self Storage**

Engineer's Response Letter to Carlisle Wortman Site Plan Review

MEGA Job Number 22-286

Howell Township. Parcel No. 06-29-200-029

See responses below to Carlisle Wortman review letter dated June 19, 2024.

RECOMMENDATIONS FROM CARLISLE | WORTMAN:

We recommend the following items be addressed before the Planning Commission takes action on the preliminary site plan:

Note: The Planning Commission approved the Preliminary Site Plan at its meeting on June 25th, 2024.

1. The Planning Commission may want to discuss with the applicant the need for individual bathrooms in each unit
This was discussed at the Planning Commission meeting on 6/25/24.
2. Demonstrate adequate parking is available for the number of employees at maximum employment.
There will be no full-time employees onsite. The owner will do periodic visits to the site to monitor activity.
3. Provide the location of all trees with a diameter at breast height of six (6) inches or more.
As discussed at the Planning Commission meeting on 6/25/24, the Township does not have ordinance requirements regarding natural features, and the planning consultant stated that this requirement could be waived by the PC.
4. Provide boundaries of woodlots and shrub masses where applicable.
Boundaries of wooded areas are shown on the survey-Sheet V-1.0
5. Replace fixtures RSXF1 LED 40K with a permanent horizontal fixture.
These fixtures have been replaced with a fixed permanent horizontal fixture.
6. Provide trash enclosure details.
Trash enclosure detail is shown on Sheet C-11.0.

Note: In addition to these recommendations, it was noted at the meeting on June 25th that the front setback is required to be 50' because Burkhart Road is classified as a County Primary Road. The adjustment to this setback has been made.



Carlisle | Wortman
ASSOCIATES, INC.

117 NORTH FIRST STREET SUITE 70 ANN ARBOR, MI 48104 734.662.2200 734.662.1935 FAX

Date: June 19, 2024
Revised: August 2, 2024

Site Plan Review For Howell Township, Michigan

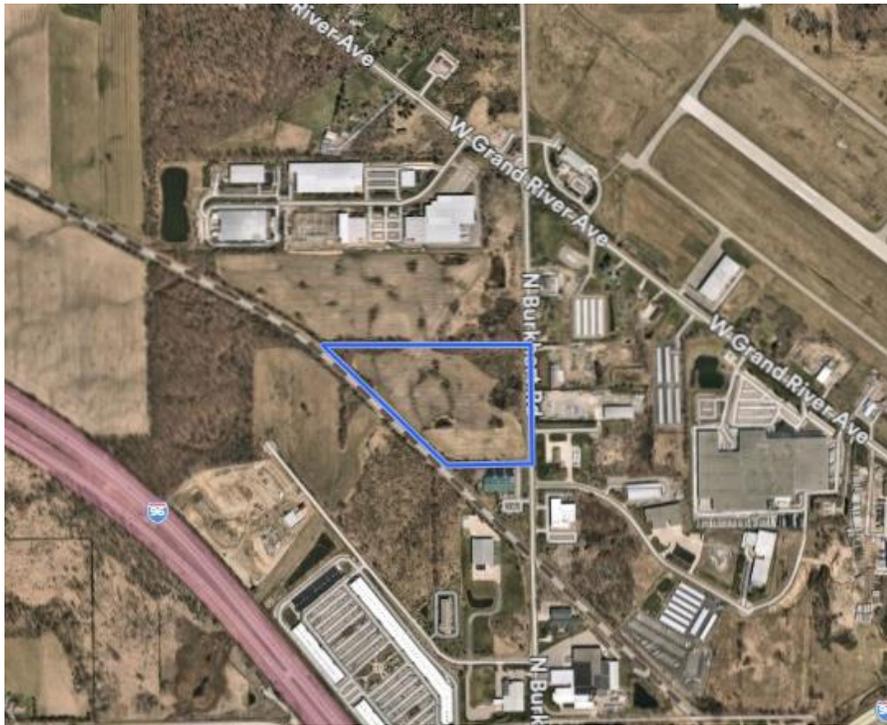
Applicant:	Chestnut Development, LLC
Project Name:	Chestnut Self Storage
Plan Date:	Preliminary: May 28, 2024 Revised: May 30, 2024 Final: July 23, 2024
Location:	South of W Grand River Ave & N Burkhart Intersection
Zoning:	Industrial Flex Zone (IFZ)
Action Requested:	Final Site Plan Approval

PROJECT AND SITE DESCRIPTION

The applicant has submitted a final site plan dated July 23, 2024, that proposes the construction of a self-storage facility located at the vacant parcel #06-29-200-029. Proposed construction of fifty-four (54) storage structures includes thirty-eight (38) 40'x60' storage structures, nine (9) 40'x160' storage structures, six (6) 40'x140' storage structures and one (1) 40'x130' storage structure.

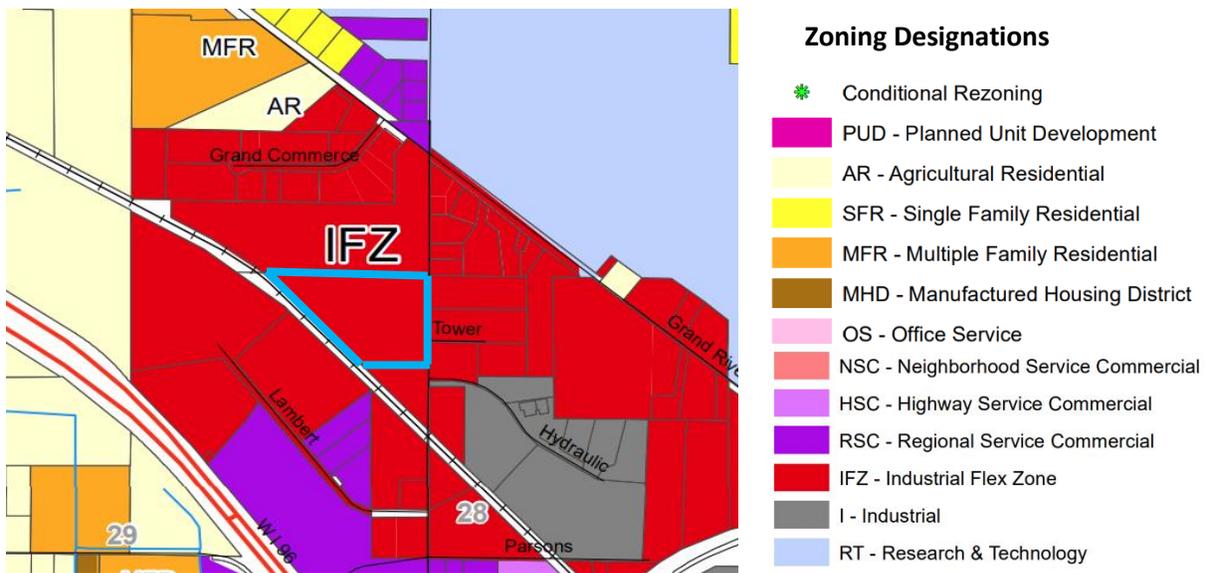
All structures are proposed to be connected to utilities and include a restroom. The site is proposed to be enclosed by a 3,848 lineal foot chain link fence that is eight (8) feet in height. The proposed mini-warehousing facility is a permitted principal use in the Industrial Flex Zone. Figure 1 depicts an aerial image of the site.

Figure 1. Aerial Image of Subject Site and Vicinity



Source: NearMap

Figure 2. Zoning Map



Items to be Addressed: None.

NEIGHBORING ZONING, LAND USE AND MASTER PLAN

Neighboring zoning designations are summarized in Table 1.

Table 1. Zoning, Land Use and Master Plan Designations

	Zoning
Subject Site	IFZ- Industrial Flex Zone
North	IFZ- Industrial Flex Zone
South	IFZ- Industrial Flex Zone
East	IFZ- Industrial Flex Zone
West	C & O Railway / IFZ- Industrial Flex Zone

Items to be Addressed: None.

AREA, WIDTH, HEIGHT, SETBACKS

The following table summarizes the Density, Placement, and Height Regulations for the site plan associated with the use. The proposed structures appear to meet all dimensional regulations of the zoning ordinance.

Table 2. Density, Placement, and Height Regulations

	Required	Provided	Compliance
Lot Area	2 Acres	19.75 Acres	Complies
Lot Width	200 Feet	>200 Feet	Complies
Front Setback	35 Feet	51.7 Feet	Complies
Side Setback	10 Feet Minimum (Minimum Total of Both Sides=25 Feet)	North side: 13.1 Feet >25 Feet	Complies
Rear Setback	10 Feet Minimum or 50 Feet Minimum Abutting AR, SFR, MFR	10 Feet	Complies
Lot Coverage	75 % Max	52.9%	Complies
Building Height	70 Feet Max	15 Feet	Complies

Items to be Addressed: None.

BUILDING LOCATION AND SITE ARRANGEMENT

The facility will be accessed from a single drive on Burkhart Road. The proposed layout allows proper vehicular circulation and continued access to an existing Enbridge easement that crosses

the site. The plan includes the creation of a sedimentation basin and a detention basin on the Southwest corner of the parcel abutting the railway.

Items to be Addressed: None.

PARKING, LOADING

The applicant is not proposing any parking at this site. Per section 18.02.G.30, which sets requirements for Mini Warehoused, five (5) parking spaces shall be provided adjacent to the office, in addition to any parking which may be required for other permitted uses on the same site (Sec. 18.02.G.30 – Mini Warehouses). No office is being proposed and no employees will be on site. There will be an automated gate at the entrance on Burkhart Road.

Typically, users of self-storage facilities park immediately outside their unit. Because units are accessed infrequently and the drive isles in the proposed development appear to be wide enough, we don't foresee issues with this approach.

Items to be Addressed: None.

FENCING

The applicant is proposing 3848 lineal feet of perimeter fencing at eight (8) feet high. This is in compliance with the Industrial Districts fencing requirements of a maximum of twelve (12) feet in height.

Items to be Addressed: None.

SITE ACCESS AND CIRCULATION

The applicant provides a refuse vehicle circulation and emergency vehicle circulation plan which demonstrate proper vehicular traffic flow.

We defer to Engineering and the Fire Chief for further consideration.

Items to be Addressed: None.

NATURAL FEATURES

The site plan calls out that the National Wetland Inventory notes no wetlands on the subject parcel and that wetland flagging was not observed during the field survey. The site plan also details that the subject property appears to be entirely in zone (X) area with minimal flood hazard according to the flood insurance rate map for the County of Livingston Community Panel NO. (26093C0188D), effective date 9/17/2008.

Approval from EGLE will not be required for construction as it is evident that there are no wetlands shown for the property through the EGLE wetland database.

Items to be Addressed: None.

LANDSCAPING

The applicant has provided a landscape plan. The plan appears to be in compliance with the regulation in the Zoning Ordinance, as shown in the following table.

Table 3. Landscaping Requirements IFZ District

Landscaped Area	Requirement	Factor	Required	Provided
Road Frontages Burkhart	1 deciduous or evergreen tree per 40 linear feet	838	21	21
	1 ornamental tree per 100 linear feet		8	8
	Min. of 8 shrubs per every 40 linear feet		168	168
Stormwater Detention/ Retention Areas	1 deciduous or evergreen tree per 50 feet of perimeter	1293	26	26
	10 shrubs per 50 feet of perimeter		259	259
Open Space Landscaping	1 canopy tree per 3000 square feet	167320	56	56

Items to be Addressed: None.

LIGHTING

A sufficient lighting plan has been provided. A photometric plan indicates that the light levels at property lines are acceptable. Planned lighting includes floodlights spaced throughout the lot, area luminaire lighting along vehicular traffic ways, and wall packs along the storage structures. Fixture details indicate that all lighting will have horizontal lenses that are recessed and downward directed.

Items to be Addressed: None.

SIGNS

Site plan does not indicate any signage proposed on the site.

If added, signs will require a separate permit from the Zoning Administrator. A sign application must be filed with the Zoning Administrator, at which time the zoning administrator will determine if the signs meet the requirements of the ordinance.

Items to be Addressed: None.

FLOOR PLAN AND ELEVATIONS

Floor plan and elevation sheets have been included in the site plan on sheets A-1.0.

Items to be Addressed: None.

TRASH ENCLOSURE

The applicant has indicated that a garbage receptacle will be placed near the entrance off Burkhardt on the East side of the property equipped with metal swing gates.

Items to be Addressed: None.

RECOMMENDATIONS

We recommend the Planning Commission approve the final site plan dated July 23, 2024.



CARLISLE/WORTMAN ASSOC., INC.
Paul Montagno, AICP
Principal



CARLISLE/WORTMAN ASSOC., INC.
Grayson Moore
Community Planner

July 10, 2024

Jonathan Hohenstein
Howell Township
3525 Byron Road
Howell, MI 48855

RE: Chestnut Self Storage
Parcel #06-29-200-029 Howell Township
Preliminary/ Final Site Plan Review

Mr. Hohenstein,

We have received and reviewed the preliminary / final site plans for Chestnut Self Storage. The plans were prepared by MEGA and are dated May 30, 2024. Based on our review, we offer the following comments:

General

The site is currently vacant, and the proposed use is self-storage. The parcel is zoned Industrial Flex Zone (IFZ). The proposed site use for self-storage is appropriate for this zoning. However, as noted by the Township Planner in Carlisle Wortman's site plan review letter (dated 6/19/2024) the intent of having sanitary and water service to each unit may promote use of the site in a way that is not compliant with the zoning.

The project plans do not include architectural plan drawings or renders of the storage units or office building.

The plans have been signed and sealed by a professional engineer.

The appropriate location maps and legends are shown on the plans.

The setbacks listed on the plans are correct. The proposed building height should be included on pages C-1.0 and A-1.0.

A legal description has been provided that includes bearings, distances and closes within acceptable tolerances.

There appear to be several proposed storm sewer structures and piping in the setback area. These include IN-14 to IN-16, IN-11 to CB-12, and IN-35 to IN-38. This may require a variance. We defer determination on the acceptability of these items to the planning commission.

Grading and Drainage

A topographical survey with 1-foot contours is included.

The plans include 3 benchmarks and property lines including bearings and distances. The coordinate system listed on G-1.0 is NAD83, however, the datum for the benchmarks is listed on sheet V-1.0 as

July 10, 2024
2 of 5

NAVD88. The benchmarks should have a consistent datum and should be based on either NAD83 or NGVD88.

The existing site generally drains to the South and ultimately to the Howell County Drain.

It appears that not all the proposed storm sewers or their structures (catch basins and manholes) meet L.C.D.C. minimum requirements for cover (3.5').

The plans should include details for all proposed storm structures. A detail for the yard basins is provided on sheet C-11.0. Provide details for Catch basins and yard basin

The plans should include pipe lengths, diameters, slopes, rim elevations, and inverts on the plan sheets C-6.1, C-6.2, and C-6.3.

The plans callout 16-inch sewers on sheet C-6.8, this should be corrected to 15-inch.

The full hydraulic head should be used in the design calculations for the control structure orifices.

A maximum discharge rate of 0.15 CFS/acre should be used for stormwater calculations.

The volume below elevation 932.00 (outlet elevation) should not be included in the detention basin volume calculation.

A land use summary table should be included on the cover sheet per LCDC requirements.

The plans should include rip-rap overflow spillways for both the sedimentation and detention basins. Rip-rap aprons should also be included for all end sections and indicated on the plans.

The plans should include the outlet pipes in the profiles and in the calculation tables.

There appears to be a typo on the detention basin outlet control structure detail on sheet C-9.2, the invert elevation at the structure is incorrectly labeled as INV. 902.00.

All utility crossings should be shown in the profiles. Include the existing gas pipeline utility crossings in the profiles between structures MH-6 and MH-7 on sheet C-6.4.

The culverts downstream of the should have their sizes verified to validate the storm water design calculations.

A stormwater maintenance agreement should be executed, and the plans should indicate that the proposed drainage system is to be maintained by the property owner.

Sanitary Sewer

The plans should include the pipe length, size, type, and class as well as rim elevations and invert elevations for the plan views on sheets C-3.1, C-3.2, and C-3.3.

July 10, 2024
3 of 5

All utility crossings should be shown in the profiles. Please include the gas pipeline crossings in the profiles between structures MH-2 and MH-3 on sheet C-3.4

Bore and jack locations should be identified on profile sheet C-3.4. Sanitary plan view sheets (C-3.1 and C-3.2) should include the bore pit locations, bore pit dimensions, and casing start and end points. All Enbridge requirements must be satisfied for work performed within their easement.

It appears that a new sanitary manhole (MH-6) is to be constructed on the existing sanitary sewer along Burkhart Road (C-3.2) to accept the wastewater from the self-storage site. The proposed manhole location shown is extremely close to Burkhart Road and based on the depth of the connection and existing sewer main, will impact Burkhart Road as well as Tower Drive.

The sanitary sewer basis of design has not been provided in these plans. The sanitary sewer basis of design should be included.

Currently, MHOG standard sanitary detail sheets are included in the plan set. Howell Township sanitary detail sheets are to be utilized for the project.

Per the record drawings the existing sanitary on the west side of Burkhart Road is 10" forcemain. Currently it is shown as an 8" sanitary sewer.

Site Access and Paving

The proposed dimensions of the Burkhart Road approach meet the LCRC design requirements.

The proposed road cross section for the approach must match the existing cross section for Burkhart Road.

Adjust and replace the cover of the existing curb catch basin on Burkhart Road north of the entrance.

There are no parking stalls indicated on the plans.

The provided vehicle circulation plans adequately demonstrate that emergency vehicles and refuse vehicles can navigate the site without issue. We defer to the Fire Marshal for further comment.

We defer to the Livingston County Road Commission for further comments on the Burkhart Road approach.

Landscaping

A landscaping plan is provided. We defer to the Township planner to comment on the Landscaping plan.

Lighting

Building lighting and light poles are proposed and details are provided. A photometric plan was provided and shows that minimal light leaves the property on the west side of the site. We defer all further comments on the landscaping and lighting plans to the Township Planner.

Recommendations

We recommend the Township withhold approval, pending the following items and our subsequent review:

1. Review and approval of the plans by:
 - a. Howell Township Planner
 - b. Fire Marshal
 - c. Livingston County Drain Commissioner
 - d. MHOG
 - e. Livingston County Road Commission
2. Provide proposed building heights
3. The Township should review the current zoning of this property in relation to the proposed intended use of the site.
4. Provide architectural plan drawings of the storage units and office buildings with include floor plans, exterior elevations and façade renderings.
5. Ensure that the coordinate systems are consistent.
6. Ensure that all storm sewers have appropriate cover.
7. Include details for all proposed storm structures
8. Include pipe lengths, diameters, slopes, rim elevations, and inverts on the plan and profile sheets.
9. Include a land use summary table on the cover sheet per LCDC requirements
10. Include rip-rap overflow spillways for both the sedimentation and detention basins. Rip-rap aprons should also be included for all end sections and indicated on the plans.
11. Include the storm sewer outlet pipes in the profiles and in the calculation tables.
12. Include all utility crossings in profiles.
13. Consult the Township Planner on set back implications (if any) for the construction of proposed storm sewer at locations IN-14 to IN-16, IN-11 to CB-12, and IN-35 to IN-38.
14. Provide sanitary sewer basis of design
15. Demonstrate to the Township and LCRC how Burkhart Road will be protected during the construction of MH-6. Provide construction notes and details for the work.
16. Bore and jack locations should be identified on profile sheet C-3.4. Sanitary plan view sheets (C-3.1 and C-3.2) should include the bore pit locations, bore pit dimensions, and casing start and end points. All Enbridge requirements must be satisfied for work performed within their easement.
17. Replace the MHOG standard sanitary detail sheets with the Howell Township sanitary detail sheets.
18. Revise the existing sanitary sewer size shown along the west side of Burkhart Road to be 10". Also, label utility as forcemain. This applies to sheet C-3.5 and sheet C-3.2.
19. Adjust and replace the cover of the existing curb catch basin on Burkhart Road north of the entrance.
20. Provide parking stall calculations and show locations on the plans if needed for patrons or employees.

July 10, 2024
5 of 5

If you have any questions or need anything further, please feel free to contact our office.

Sincerely,



Adam C. Jacquain
Phone: (989) 598-6196
Mailto: adamj@spicergroup.com



John W. Bradley
Phone: (517) 719-5503
Mailto: johnbradley@spicergroup.com

SPICER GROUP, INC.
1595 W Lake Lansing Rd Suite 200
East Lansing, MI 48823

CC: SGI File
Jonathan Hohenstein, Howell Township Planner
Ken Recker, Livingston County Chief Deputy Drain Commissioner
Paul Montagno, Carlisle Wortman
Bryan Hager, Howell Township Fire Inspector
Al Pruss, MEGA



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298 Veterans Drive, Fowlerville, MI 48836 (HQ)
(517) 223-3512



Date: 07/23/2024

Attn: Mr. Jonathan Hohenstein, Howell Township Planning & Zoning Administrator

Re: **Chestnut Self Storage**

Engineer's Response Letter to Spicer Group Site Plan Review

MEGA Job Number 22-286

Howell Township. Parcel No. 06-29-200-029

See responses below to Spicer Group review letter dated July 10, 2024.

We recommend the Township withhold approval, pending the following items and our subsequent review:

1. Review and approval of the plans by:
 - a. Howell Township Planner
Responses to the planner's review comments are included in this resubmission
 - b. Fire Marshal
Petitioner will comply with requirements of the Fire Marshal. No comments have yet been received from them. We understand the Township will provide the Fire Marshal with the submission drawings for review. Emergency vehicle circulation is shown on Sheet C-2.0.
 - c. Livingston County Drain Commissioner
Petitioner applied for Drain Commission review on 4/15/24. The first review letter was received on 4/26/24. We anticipate approval from them based on email responses and subsequent meetings. We understand that Final Site Plan approval will be contingent upon receipt of LCDC final approval.
 - d. MHOG
Petitioner understands that Final Site Plan approval will be contingent upon approval by MHOG for sewer and water connections.
 - e. Livingston County Road Commission
Petitioner applied for Road Commission review on 4/19/24. Review markups of the drawings were received on 4/23/24. Responses to their comments are incorporated into the updated drawings included in this submission. They have approved the driveway location. We understand that Final Site Plan approval will be contingent upon receipt of their final approval.
2. Provide proposed building heights
Building heights, floor plans and elevations were included in the initial drawing submission on Sheet A-1.0.
3. The Township should review the current zoning of this property in relation to the proposed intended use of the site.
The planning consultant has confirmed that the current zoning allows for this use.
4. Provide architectural plan drawings of the storage units and office buildings with floor plans, exterior elevations and façade renderings.
Architectural floor plans and rendered elevations were included in the initial drawing submission on Sheet A-1.0.
5. Ensure that the coordinate systems are consistent. *Noted*
6. Ensure that all storm sewers have appropriate cover. *Noted*
7. Include details for all proposed storm structures. *Included on Sheet C-11.1*

8. Include pipe lengths, diameters, slopes, rim elevations, and inverts on the plan and profile sheets. **Included on profile Sheets C-6.4 through C-6.7**
9. Include a land use summary table on the cover sheet per LCDC requirements **Included on Cover Sheet**
10. Include rip-rap overflow spillways for both the sedimentation and detention basins. Rip-rap aprons should also be included for all end sections and indicated on the plans. **Included and shown on drawings**
11. Include the storm sewer outlet pipes in the profiles and in the calculation tables. **Included and shown on drawings**
12. Include all utility crossings in profiles. **Included and shown on drawings**
13. Consult the Township Planner on set back implications (if any) for the construction of proposed storm sewer at locations IN-14 to IN-16, IN-11 to CB-12, and IN-35 to IN-38. **Noted**
14. Provide sanitary sewer basis of design **Included and shown on drawings**
15. Demonstrate to the Township and LCRC how Burkhart Road will be protected during the construction of MH-6. Provide construction notes and details for the work. **This was noted on the LCRC review and is clarified on Sheet C-3.2**
16. Bore and jack locations should be identified on profile sheet C-3.4. Sanitary plan view sheets (C-3.1 and C-3.2) should include the bore pit locations, bore pit dimensions, and casing start and end points. **Noted All Enbridge requirements must be satisfied for work performed within their easement. The Petitioner has been working with Enbridge representatives. We are aware of their requirements and are prepared to comply with them.**
17. Replace the MHOG standard sanitary detail sheets with the Howell Township sanitary detail sheets. **Noted**
18. Revise the existing sanitary sewer size shown along the west side of Burkhart Road to be 10". Also, label utility as forcemain. This applies to sheet C-3.5 and sheet C-3.2. **Included and shown on drawings**
19. Adjust and replace the cover of the existing curb catch basin on Burkhart Road north of the entrance. **Included and shown on drawings**
20. Provide parking stall calculations and show locations on the plans if needed for patrons or employees. **This was discussed as part of Preliminary Site Plan approval, which was granted on June 25th. Patrons will park adjacent to their units, and there are no permanent employees**

August 22, 2024

Jonathan Hohenstein
Howell Township
3525 Byron Road
Howell, MI 48855

RE: Chestnut Self-Storage
Parcel #06-29-200-029 Howell Township
Final Site Plan Review

Mr. Hohenstein,

We have received and reviewed the final site plans for Chestnut Self-Storage. The plans were prepared by MEGA and are dated July 23, 2024. Based on our review, we offer the following comments:

General

The site is currently vacant, and the proposed use is self-storage. The parcel is zoned Industrial Flex Zone (IFZ). The proposed site use for self-storage is appropriate for this zoning. However, as noted by the Township Planner in Carlisle Wortman's site plan review letter (dated 6/19/2024) the intent of having sanitary and water service to each unit may promote use of the site in a way that is not compliant with the zoning. This was discussed at the planning commissions June 25, 2024 meeting. The Planning Commission agreed to allow the individual bathrooms and requested the Zoning Administrator to determine if nonpermitted uses are taking place. The Township should review the proposed use of the site and provide final determination if said use does or does not meet the current zoning classification of the site.

The project plans include architectural drawings of the proposed storage units. An additional 18'-5" dimension was added on the renderings on sheet A-1.0, it is unclear what this dimension is indicating. The maximum height of the structure should be shown for each of the storage buildings

The plans have been signed and sealed by a professional engineer.

The appropriate location maps and legends are shown on the plans.

The setbacks listed on the plans are correct. The proposed building height should be included on pages C-1.0 and A-1.0.

A legal description has been provided that includes bearings, distances and closes within acceptable tolerances.

There appear to be proposed storm sewer structures and piping in the setback area. These include IN-35 to IN-38 IN-53 to CB-54. A majority of the proposed perimeter fence is also located within the setback area. We defer to the Township Planner and Planning Commission for comment and determination on the acceptability of these items to be installed in the setback area.

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There are several instances on the plans where labels overlap and make some of them difficult or impossible to read. Specifically on sheets C-3.0, C-3.1. Please adjust the labels so that all of them are visible.

Grading and Drainage

The storm sewer layout was adjusted in this set of plans to avoid crossing the Enbridge utilities. The northwest corner of the site now generally sheet flows to the east, across the site and is then collected into the proposed storm sewer network.

The adjusted grading was reviewed and there appears to be some low points and flat areas between the buildings. Please add more point elevations or adjust grading to ensure that no ponding will occur.

A topographical survey with 1-foot contours is included.

Several of the items from Spicer Group's July 10, 2024 review and the Livingston County Drain Commissioners letter dated April 26, 2024 have not been addressed. No changes have been made to reflect detention calculations, outlet rate, site grading, or stormwater management of the 26 acres of offsite drainage contributing to the site.

The project propose that stormwater be conveyed off-site by crossing the privately owned CSX railroad easement through a cross culvert under the railroad tracks that is submerged on both ends, then sheet flow across two privately owned parcels and ultimately discharging into Tanger Outlet's detention pond. Has the Developer secured all the appropriate easements or agreements from each privately owned entity to achieve the desired stormwater conveyance? What alternatives have been explored if the current design cannot be achieved? We defer to LCDC for further comment and consideration of this matter.

Several of the storm sewers and their structures (catch basins and manholes) do not meet the LCDC minimum requirements for cover (3.5') as noted in Comment #6 of LCDC's April 26, 2024 review letter.

A topographical survey with 1-foot contours is included.

The plans include three (3) benchmarks and property lines including bearings and distances. The coordinate system listed on G-1.0 is NAD83, however, the datum for the benchmarks is listed on sheet V-1.0 as NAVD88. The benchmarks should have one (1) consistent datum. Only utilize NAD88 or NGVD88.

The plans should include pipe lengths, diameters, as well as rim elevations, and inverts for each structure on the plan sheets C-6.1, C-6.2, and C-6.3.

The plans callout 16-inch sewers on sheet C-6.7. This should be corrected to 15-inch.

The full hydraulic head should be used in the design calculations for the control structure orifices.

A maximum discharge rate of 0.15 CFS/acre should be used for stormwater calculations.

The volume below elevation 932.00 (outlet elevation) should not be included in the detention basin volume calculation.

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The plans should include rip-rap overflow spillways for both the sedimentation and detention basins. Rip-rap aprons should also be included for all end sections. These should be identified on the plans, including dimensions.

There appears to be a typo on the detention basin outlet control structure detail on sheet C-9.2, the invert elevation at the structure is incorrectly labeled as INV. 902.00.

The culverts downstream of the site should have their sizes verified to ensure that they can sufficiently manage the increased flow.

A stormwater maintenance agreement should be executed, and the plans should indicate that the proposed drainage system is to be maintained by the property owner.

We defer to LCDC for further comment on storm water management.

Sanitary Sewer

The sanitary plan sheets should include the pipe length, size, type, and class as well as rim elevations and invert elevations for the sanitary structures on sheets C-3.1, C-3.2, and C-3.3.

A note indicating that the connection to MH-6 will be made via a bore and jack operation is included on C-3.2. Sanitary plan view sheets (C-3.1 and C-3.2) should include the bore pit locations, bore pit dimensions, and casing start and end points. The limits of the jack and bore installation, bore pit locations, and casing limits should be identified on profile sheet C-3.4. Utility crossings have been included in the profiles. All Enbridge requirements must be satisfied for work performed within their easement.

It appears that a new sanitary manhole (MH-6) is to be constructed on the existing sanitary sewer along Burkhart Road (C-3.2) to accept the wastewater from the self-storage site. The proposed manhole location shown is extremely close to Burkhart Road and based on the depth of the connection and existing sewer main. Please relocate or provide a narrative on how this will be constructed without compromising Burkhart Road or Tower Drive.

Record drawings indicate that there is an existing sanitary manhole structure in the northeast radius of Tower Street. This may be an opportunity to avoid the installation of a new manhole, if the proposed sanitary sewer alignment can be modified. The existing sanitary manhole structure should be located, surveyed, and included on the plans on sheets C-3.0 and C-3.2. It is the Township's preference that the developer to utilize the existing manhole structure if at all possible.

A sanitary sewer basis of design has been included on sheet C-3.0. The basis of design should be in accordance with the Howell Township Wastewater Collection and Treatment System Ordinance. It is our recommendation that REU determination be made utilizing "Multiple Family Residences" or "Single Family Residences" categorization from the sewer ordinance Equivalent User Table which would assign 1.0 REU per Unit for a total of 70 REUs.

Currently, MHOG standard sanitary detail sheets are included in the plan set. Howell Township sanitary detail sheets are to be utilized for the project.

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Per the record drawings the existing sanitary on the west side of Burkhart Road is 10" forcemain. Currently it is shown as an 8" sanitary sewer on sheet C-3.4. The profile should be adjusted to show the correct crossing utility.

Site Access and Paving

The proposed dimensions of the Burkhart Road approach meet the LCRC design requirements.

The cross section for proposed approach must match the existing cross section for Burkhart Road.

Adjust and replace the covers of the existing curb catch basins on Burkhart Road north and south of the entrance and indicate this on the plans on sheets C-1.0 and C-1.2.

Please add notes identifying the MDOT M-opening on C-1.0 and C-1.2.

The provided vehicle circulation plans adequately demonstrate that emergency vehicles and refuse vehicles can navigate the site without issue. We defer to the Fire Marshal for further comment.

We defer to the Livingston County Road Commission for further comments on the Burkhart Road approach.

Landscaping

A landscaping plan is provided. We defer to the Township planner to comment on the Landscaping plan.

Lighting

Building lighting and light poles are proposed and details are provided. A photometric plan was provided and shows that minimal light leaves the property on the west side of the site. We defer all further comments on the landscaping and lighting plans to the Township Planner.

Recommendations

We recommend the Township withhold approval, pending the following items and our subsequent review:

1. Review and approval of the plans by:
 - a. Howell Township Planner
 - b. Fire Marshal
 - c. Livingston County Drain Commissioner
 - d. MHOG
 - e. Livingston County Road Commission
2. The Zoning Administrator should review the proposed use of the site and provide final determination if said use does or does not meet the current zoning classification of the site.
3. The architectural drawings of the storage units should include the maximum height of the structures for each of the storage buildings
4. Ensure that none of the proposed structures are in the setback area.
5. Please adjust labels so that they are all able to be read.
6. Ensure that the coordinate systems are consistent.
7. Ensure that all storm sewers have appropriate cover.

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8. Please add more point elevations or adjust grading to ensure that no ponding will occur between the buildings.
9. Include pipe lengths, diameters, slopes, rim elevations, and inverts on the plan and profile sheets.
10. Correct the labels on sheet C-6.7 to show the correct pipe diameters.
11. Please use the full hydraulic head in the design calculations for the control structure orifices.
12. Please use a maximum discharge rate of 0.15 CFS/acre for stormwater calculations.
13. Include dimensions for rip-rap overflow spillways for both the sedimentation and detention basins. Rip-rap aprons should also be included for all end sections and indicated on the plans.
14. Please correct the typo on sheet C-9.2 showing that the invert elevation on the detentions basin outlet control structure detail is 902.0
15. Consult the Township Planner on setback implications (if any) for the construction of proposed storm sewer and fences.
16. Bore and jack locations should be identified on profile sheet C-3.4. Sanitary plan view sheets (C-3.1 and C-3.2) should include the bore pit locations, bore pit dimensions, and casing start and end points.
17. Demonstrate to the Township and LCRC how Burkhart Road will be protected during the construction of MH-6. Provide construction notes and details for the work.
18. Revise the sanitary sewer basis of design table on sheet C-3.0 to reflect 1 REU per Unit.
19. Included the existing sanitary structure in the northeast radius of Tower Drive.
20. Include the Howell Township sanitary detail sheets.
21. Revise the 8-inch sanitary sewer crossing showing the profile on sheet C-3.4 to 10-inch forcemain.
22. Adjust and replace the covers of the existing curb catch basins on Burkhart Road north and south of the entrance and indicate this on the plans on sheets C-1.0 and C-1.2.

If you have any questions or need anything further, please feel free to contact our office.

Sincerely,



Adam C. Jacqmain
Phone: (989) 598-6196
Mailto: adamj@spicergroup.com



John W. Bradley
Phone: (517) 719-5503
Mailto: johnbradley@spicergroup.com

SPICER GROUP, INC.
1595 W Lake Lansing Rd Suite 200
East Lansing, MI 48823

August 22, 2024
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CC: SGI File
Jonathan Hohenstein, Howell Township Planner
Ken Recker, Livingston County Chief Deputy Drain Commissioner
Mitch Dempsey, Livingston County Chief Deputy Drain Commissioner
Paul Montagno, Carlisle Wortman
Bryan Hager, Howell Township Fire Inspector
Al Pruss, MEGA
Mark Melchi, MEGA
Paul Lewsley, SDA



Howell Area Fire Department Fire Marshal Division

1211 W Grand River Ave Howell, MI 48843
office: 517-546-0560 fax: 517-546-6011
firemarshal@howellfire.net

DATE: June 6, 2024

TO: Jonathan Hohenstein
Howell Twp Zoning Administrator
3525 Byron Rd
Howell, MI 48855

FROM: Bryan Hager-Fire Inspector

PROJECT: Chestnut Self Storage, **Howell Township**

REF: Site Plan Review - **Approved w/concerns noted**

CONCERNS:

I have reviewed the above listed site plan and find that it is **satisfactory** as presented as long as the **following conditions** are met:

1. Building(s) shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property.
 1. These numbers/letters shall be at least 6" high and shall contrast with their background.
2. A Knox Box is required on any main business office. A Knox Gate Key or Knox Lock will also be required if gating the entrance off Burkart Road. Knox Box and/or Knox Gate Key or Lock ordering can be done on-line at www.knoxbox.com.
3. Where the road is 20' wide to 26' wide, "No Parking-Fire Lane" signs would be required on both sides of the street. Where the road is between 27' and 32' wide, "No Parking this side of street" signs would be required on the hydrant side of the street.
4. An approved fire apparatus access road shall be within 150 feet of all portions of the grade level floor.
 - a) The fire department access (driveway) shall meet the following conditions:
 - b) The minimum unobstructed width shall be 20 feet.
 - c) The minimum unobstructed height shall be 13 feet.
 - d) The driveway shall be accessible at all times (i.e. snow removal).
 - e) The driveway shall be constructed so it can support up to 100,000 pound fire apparatus. (IFC 2018:503.2.3)



Howell Area Fire Department Fire Marshal Division

1211 W Grand River Ave Howell, MI 48843

office: 517-546-0560 fax: 517-546-6011

firemarshal@howellfire.net

5. Site plans do not reference any enclosed buildings or temperature-controlled buildings with suppression systems. If automatic sprinkler system are provided throughout any portions of the buildings, please advise the owner that according to 2015 MBC that this suppression system **SHALL** be monitored by an alarm company.
6. The total height/stories and dimensions of each of the 54 buildings need to be noted.
7. Fire extinguishers shall be installed along each storage building, spaced no more than 150 feet apart and be a Dry Chemical 4A:80B:C type, at a minimum.
8. A final inspection of the whole building and site shall be performed by the fire department before a C of O is issued.

Any changes in this site plan shall be submitted to the Howell Area Fire Department for additional approval. If there is anything further that you need, please feel free to give me a call.



Brian Jonckheere

Livingston County Drain Commissioner

2300 E. Grand River Ave., Ste. 105

Howell, MI 48843-7581

Phone: 517-546-0040 FAX: 517-545-9658

Website: www.livgov.com/drain Email: drain@livgov.com

April 26, 2024

Mr. Mark Melchi
Monument Engineering
298 Veterans Drive
Fowlerville, Michigan 48836

Re: Chestnut Self Storage
Construction Plans
Northeast 1/4 of Section 29 of Howell Township

Dear Mr. Melchi:

I received Construction Plans for the above referenced site on April 18, 2024. The submitted information has been reviewed for conformance with the current L.C.D.C. "Procedures and Design Criteria for Stormwater Management Systems." Due to the nature and extent of these observations, this review should be considered preliminary in nature. My comments on the proposed drainage design are as follows:

- 1.) Drainage System Ownership - The Construction Plans should include a general note stating that "The proposed drainage system is to be owned and properly maintained by the property owner." A Stormwater Maintenance Agreement, similar to that found in Appendix K of the current L.C.D.C. Design Criteria, should be executed with Howell Township prior to final project approval.
- 2.) Overall Drainage Concept - The currently vacant 19.75 acre site is located on the west side of Burkhart Road and the north side of the C&O Railroad approximately 1,300 feet north of Lambert Drive. The proposed site improvements are to consist of 54 self storage buildings, their associated access drives and a stormwater detention basin. Runoff from the site currently sheet drains toward the south, flows under the C&O Railroad through an 18" (possibly 24") culvert, continues flowing south under Lambert Drive, through the Tanger Outlets stormwater detention basin, and under I-96, ultimately discharging into the Howell County Drain. Runoff from the developed site is to be routed by proposed storm sewers to the new detention basin, which is to outlet to the existing ditch along the north side of the C&O Railroad Right-of-Way.
- 3.) Topographic Survey - Sheets V-1.0 through V-1.4 should show the site's property lines, with their bearings and distances, as stated in the

Legal Description found on the Cover Sheet of the plans. The following additional Topographic Survey related items should also be addressed on the plans:

- a.) The ownership, sizes and depths of the existing petroleum pipelines crossing the site should be indicated, as they may conflict with the proposed storm sewer draining the site.
 - b.) The 18" diameter R.C.P. culvert shown flowing under the C&O Railroad should be field verified, as it has been previously indicated on several other plans to be a 24" diameter clay pipe culvert. Observations of the culvert indicate it is submerged on both the upstream and downstream sides which will affect its capacity to convey flows.
 - c.) The adjacent railroad track should be shown together with its existing top of rail grades.
 - d.) Lambert Drive and the Tanger Outlet's stormwater detention basin should be identified on Sheet V-1.4.
 - e.) The sizes of the existing storm sewers along the site's Burkhart Road frontage should also be verified. The L.C.R.C. roadway plans indicate the pipe between CBS 25402 and 25503 to be 24" diameter and the pipes to the north and east of CB 25675 to be 15" diameter.
- 4.) Drainage Areas Plan - A review of previous records, and the current Livingston County GIS aerial contours confirms that there is approximately 26 acres of offsite drainage area located to the north of the site which should be delineated on Sheet C-9.0 and accounted for in the site's proposed storm sewer design. Also, the proposed storm sewers and drainage structure numbers should be indicated on the Drainage Areas Plan Sheet C-9.0.
- 5.) Stormwater Detention/Infiltration - The Preliminary Infiltration Study previously submitted for this site states that the existing soils located within the proposed stormwater basin area are not suitable for infiltration. Therefore no credit should be taken for infiltrating the Channel Protection Volume when calculating the site's required 100 Year Frequency Storm storage volume. The loss of the CPV credit results in insufficient storage volume being available in the proposed basin as it is currently designed. The following additional stormwater detention related items should also be addressed on the plans:
- a.) The proposed detention basin discharge rate should not exceed the site's pro-rata share of the most restrictive crossing downstream of the site, which appears to be the 18" culvert flowing under the C&O Railroad. In no case, should the proposed discharge rate exceed 0.15 CFS/acre.

- b.) There appears to be blockage in the existing railroad ditch immediately downstream of the proposed detention basin discharge point. A C&O Railroad permit is required for the proposed basin outlet construction and for the necessary ditch cleanout downstream of it.
- c.) The Detention Basin Storage Volume Provided calculations shown on Sheet C-9.1 should not include any volume below its 932.00 outlet elevation.
- d.) Design calculations and profiles should be provided for the forebay and detention basin outlet pipes.
- e.) Rip-rap lined overflow spillways should be shown for both the forebay and detention basin which are capable of conveying their 10 Year Storm runoff and which have their crest elevations set at least 6" above their outlet structure rim elevations and 6" below their freeboard elevations.
- f.) The full hydraulic head should be used in designing the detention basin's 100 Year Storm outlet orifice.
- g.) A Land Use Summary Table, similar to that found in Appendix J of the L.C.D.C. Design Criteria, should be included on the Cover Sheet of the plans.

6.) Storm Sewers - Many of the proposed drainage structures are currently shown with less than the 3.5 foot minimum depth required by the L.C.D.C. Design Criteria. This is of particular concern, given the proposed use of HDPE pipe and its impact on the constructability of the structures. The following additional storm sewer related items should also be addressed on the plans:

- a.) An initial time of concentration of 15 minutes should be used in the proposed storm sewer design calculations.
- b.) The proposed storm sewer pipe lengths, diameters and slopes should be shown on the Storm Sewer Plan Sheets C-6.1 through C-6.3. The proposed storm sewer structure diameters, castings, rim and invert elevations should also be shown on Sheets C-6.1 through C-6.3.
- c.) Rip-rap aprons should be specified and shown at all discharge end sections on both the storm sewer plans and profiles. The plans should include an End Section Apron Detail specifying at least 10 S.Y. of angular rip-rap placed over keyed-in geotextile fabric.
- d.) The existing petroleum pipeline crossings should be shown on the storm sewer profile found on Sheet C-6.4. The pipeline elevations at the crossings should be field verified, as they may significantly affect the proposed storm sewer design.

- e.) The proposed 16" storm sewer inverts shown on the profiles on Sheet C-6.8, should be revised to be 15" diameter inverts.
- f.) The plans should include construction details for the proposed yard basins, inlets, catch basins and storm manholes. A low-head catch basin detail should also be provided.

7.) Site Grading - The Grading Plans should include proposed grades between the buildings to indicate how the surface runoff will be directed away from the buildings and toward the drainage structures. The following additional grading related items should also be addressed on the plans:

- a.) In many cases, the proposed finished grade surrounding the buildings is shown at or only slightly below, the building finished floor grade. We recommend the outside finished grade be set at least 4" below the finished floor grade, except at the doorways.
- b.) The Grading Plans should indicate how the roof runoff from the buildings along the Burkhart Road frontage will be directed to the stormwater management system, as is currently shown on the Drainage Areas Plan.

8.) Offsite Drainage Easement - I recommend that an offsite drainage easement be obtained from the property owner to the south of the C&O Railroad, to avoid any potential disputes concerning the increased volume of runoff which will flow across the property as a result of the Chestnut Self Storage development.

I am withholding approval of the Construction Plans for Chestnut Self Storage until the above mentioned items have been addressed.

Very truly yours,



Kenneth E. Recker, II, P.E.
Chief Deputy Drain Commissioner

CC: Paul Lewsley, Spaulding DeDecker
Jonathan Hohenstein, Howell Township
John Bradley, Spicer Group
Gary Markstrom, Tetra Tech
Steve Gronow, Chestnut Crossing



Brian Jonckheere

Livingston County Drain Commissioner

2300 E. Grand River Ave., Ste. 105

Howell, MI 48843-7581

Phone: 517-546-0040 FAX: 517-545-9658

Website: www.livgov.com/drain Email: drain@livgov.com

August 23, 2024

Mr. Mark Melchi
Monument Engineering
298 Veterans Drive
Fowlerville, Michigan 48836

Re: Chestnut Self Storage
Construction Plans
Northeast 1/4 of Section 29 of Howell Township

Dear Mr. Melchi:

I received revised Construction Plans for the above referenced site via email on August 20, 2024. The submitted information has been reviewed for conformance with the current L.C.D.C. "Procedures and Design Criteria for Stormwater Management Systems" and with our office's review letter dated April 26, 2024. Most of the items mentioned in the letter remain to be addressed including the following:

- 1.) Drainage System Ownership - The Construction Plans should include a general note stating that "The proposed drainage system is to be owned and properly maintained by the property owner." A Stormwater Maintenance Agreement, similar to that found in Appendix K of the current L.C.D.C. Design Criteria, should be executed with Howell Township prior to final project approval.
- 2.) Topographic Survey - The 18" diameter R.C.P. culvert shown flowing under the C&O Railroad should be field verified, as it has been previously indicated on several other plans to be a 24" diameter clay pipe culvert.
 - a.) The adjacent railroad track should be shown together with its existing top of rail grades.
 - b.) Lambert Drive and the Tanger Outlet's stormwater detention basin should be identified on Sheet V-1.4.

- c.) The sizes of the existing storm sewers along the site's Burkhart Road frontage should also be verified. The L.C.R.C. roadway plans indicate the pipe between CBS 25402 and 25503 to be 24" diameter and the pipes to the north and east of CB 25675 to be 15" diameter.
- 3.) Drainage Areas Plan - A review of previous records, and the current Livingston County GIS aerial contours confirms that there is approximately 26 acres of offsite drainage area located to the north of the site which should be delineated on Sheet C-9.0 and accounted for in the site's proposed storm sewer design. Also, the proposed storm sewers and drainage structure numbers should be indicated on the Drainage Areas Plan Sheet C-9.0.
- 4.) Stormwater Detention/Infiltration - The Preliminary Infiltration Study previously submitted for this site states that the existing soils located within the proposed stormwater basin area are not suitable for infiltration. Therefore, no credit should be taken for infiltrating the Channel Protection Volume when calculating the site's required 100 Year Frequency Storm storage volume. The loss of the CPV credit results in insufficient storage volume being available in the proposed basin as it is currently designed. The following additional stormwater detention related items should also be addressed on the plans:
- a.) The proposed detention basin discharge rate should not exceed the site's pro-rata share of the most restrictive crossing downstream of the site, which appears to be the 18" culvert flowing under the C&O Railroad. In no case, should the proposed discharge rate exceed 0.15 CFS/acre.
 - b.) There appears to be blockage in the existing railroad ditch immediately downstream of the proposed detention basin discharge point. A C&O Railroad permit is required for the proposed basin outlet construction and for the necessary ditch cleanout downstream of it which should be shown on the plans.

- c.) The Detention Basin Storage Volume Provided calculations shown on Sheet C-9.1 should not include any volume below its 932.00 outlet elevation.
 - d.) Design calculations and profiles should be provided for the forebay and detention basin outlet pipes.
 - e.) The 8 foot wide rip-rap lined overflow spillways shown for both the forebay and detention basin should have design calculations documenting their capacity to convey their 10 Year Storm runoff and should have their crest elevations set at least 6" above their outlet structure rim elevations and 6" below their freeboard elevations.
 - f.) The full hydraulic head should be used in designing the detention basin's 100 Year Storm outlet orifice.
- 5.) Storm Sewers - Many of the proposed drainage structures are currently shown with less than the 3.5 foot minimum depth required by the L.C.D.C. Design Criteria. This is of particular concern, given the proposed use of HDPE pipe and its impact on the constructability of the structures. The following additional storm sewer related items should also be addressed on the plans:
- a.) An initial time of concentration of 15 minutes should be used in the proposed storm sewer design calculations.
 - b.) The proposed storm sewer pipe lengths, diameters and slopes should be shown on the Storm Sewer Plan Sheets C-6.1 through C-6.3. The proposed storm sewer structure diameters, castings, rim and invert elevations should also be shown on Sheets C-6.1 through C-6.3.
 - c.) The plans should include an End Section Apron Detail specifying at least 10 S.Y. of 8" minimum diameter angular rip-rap placed over keyed-in geotextile fabric.
 - d.) The proposed 16" storm sewer inverts shown on the profiles on Sheet C-6.8, should be revised to be 15" diameter inverts.
 - e.) The plans should include a low-head catch basin construction detail.

- 6.) Site Grading - The Grading Plans should include proposed grades between the buildings to indicate how the surface runoff will be directed away from the buildings and toward the drainage structures. The following additional grading related items should also be addressed on the plans:
- a.) In many cases, the proposed finished grade surrounding the buildings is shown at or only slightly below, the building finished floor grade. We recommend the outside finished grade be set at least 4" below the finished floor grade, except at the doorways.
 - b.) The Grading Plans should indicate how the roof runoff from the buildings along the Burkhart Road frontage will be directed to the stormwater management system, as is currently shown on the Drainage Areas Plan.
- 7.) Offsite Drainage Easement - We recommend that an offsite drainage easement be obtained from the downstream property owner south of the C&O Railroad, to avoid any potential disputes concerning the increased volume of runoff which will flow across the property as a result of the Chestnut Self Storage development.

I am withholding approval of the Construction Plans for Chestnut Self Storage until the above mentioned items have been addressed.

Very truly yours,



Kenneth E. Recker, II, P.E.
Chief Deputy Drain Commissioner

CC: Paul Lewsley, Spaulding DeDecker
Jonathan Hohenstein, Howell Township
John Bradley, Spicer Group
Shelby Byrne, Tetra Tech
Steve Gronow, Chestnut Crossing



August 28, 2024

Mr. Greg Tatara
MHOG SWATH
2911 Dorr Road
Brighton, MI 48116

**Re: Chestnut Self Storage
Construction Plan Review No. 1**

Dear Mr. Tatara:

Tetra Tech conducted a review of the proposed Chestnut Self Storage construction plans last dated July 23, 2024. The construction plans were prepared by Monument Engineering Group Associates, Inc. on behalf of Chestnut Development, LLC. The site includes 54 storage units that are proposed with water and sewer services. The plans call for approximately 3,840 feet of public 8-inch water main and 6 hydrants. We offer the following comments for your consideration:

WATER MAIN

1. It may be appropriate for the proposed on-site water main to be privately owned. Storage units served with municipal water service is not typical for MHOG's water distribution system and the proposed plans currently do not meet the following MHOG design standards:
 - a. For rental units, MHOG requires that tenants be metered individually by the property owner with one master meter that is billed through MHOG. This master meter and meter manifold would need to be in an interior heated area with direct access for MHOG. For this project the number of meters required would be high and MHOG would not be able to guarantee units are heated, as they are not continually occupied.
 - b. A wide Enbridge easement crosses the west side of the site. MHOG would require that HDPE DR 11 be used for a minimum of 40 feet from each edge of the Enbridge easement to protect it from the gas and oil transmission mains' anode bed. Any water services or hydrants would need to be outside of this 40-foot buffer.
 - c. MHOG prefers curb stops to be in green space, but this site would require all curb stops to be in pavement. Any proposed curb stop in pavement would need to be protected in a valve box per MHOG standards.
2. If the proposed on-site water main is private, the plans should be revised to show a 6-inch master meter in a vault at the edge of the public road right of way near the site entrance. If the site is served with private water main MHOG will not need to submit an EGLE water permit application, but the Owner would need to confirm any requirements for having a private water distribution system with EGLE. Alternatively, the development could use public water main from MHOG to serve the proposed fire hydrants and provide fire protection for the site, while sub metering the proposed storage units on a separate smaller, private water main.

Tetra Tech

3497 Coolidge Road, East Lansing, MI 48823
Tel 517.316.3930 Fax 517.484.8140 www.tetrattech.com

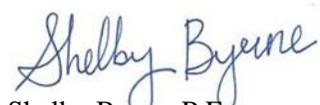
3. If a portion of the on-site water main remains public, the following comments would apply:
 - a. The following notes should be added to the plans:
 - i. Water improvements shall be constructed in accordance with current Marion, Howell, Oceola, and Genoa (MHOG) design standards and specifications.
 - b. MHOG standard details should be included in the plan set.
 - c. Meter closets should be shown with a detail on the manifold to individual units.
 - d. Proposed hydrants should be protected with bollards or curb.
 - e. Sheet C-3.1 has multiple callouts for reducers in the wrong location.
 - f. The existing water main on North Burkhardt Road is 12-inch diameter and should be labeled.
 - g. The proposed hydrant to be relocated should be labeled with its MHOG ID which is WTH-0617.
 - h. Hydrant 9 should be located at a high point.
 - i. A hydrant will be required between station 115+50 and 120+50 to eliminate the high point without a hydrant.
 - j. Eliminate the high point near station 112+10.
 - k. Eliminate the high point near station 109+00.
 - l. Eliminate the high point near station 3+50.
 - m. Eliminate the high point near station 125+00.

RECOMMENDATION

We recommend the construction drawings be revised to address the above comments if private or public ownership is specified and the plans be resubmitted electronically to MHOG at planreview@mhog.org for additional review.

Please call if you have any questions.

Sincerely,



Shelby Byrne, P.E.
Project Engineer



Monument Engineering Group Associates, Inc.

Developing Lifelong Relationships

monumentengineering.com

298 Veterans Drive, Fowlerville, MI 48836 (HQ)
(517) 223-3512



Date: 08/23/2024

Attn: Mr. Jonathan Hohenstein, Howell Township Planning & Zoning Administrator

Re: **Chestnut Self Storage**

Response Letter to Carlisle Wortman, Howell Area Fire Department and Spicer Group Final Site Plan reviews

MEGA Job Number 22-286

Howell Township. Parcel No. 06-29-200-029

From Carlisle Wortman letter Dated 8/2/24:

RECOMMENDATIONS

We recommend the Planning Commission approve the final site plan dated July 23, 2024.

Response to Howell Area Fire Department letter dated 6/6/24:

I have reviewed the above listed site plan and find that it is **satisfactory** as presented as long as the **following conditions** are met:

1. Building(s) shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property.
 - a) These numbers/letters shall be at least 6" high and shall contrast with their background. **Noted**
2. A Knox Box is required on any main business office. A Knox Gate Key or Knox Lock will also be required if gating the entrance off Burkart Road. Knox Box and/or Knox Gate Key or Lock ordering can be done on-line at www.knoxbox.com. **Noted**
3. Where the road is 20' wide to 26' wide, "No Parking-Fire Lane" signs would be required on both sides of the street. Where the road is between 27' and 32' wide, "No Parking this side of street" signs would be required on the hydrant side of the street. **Noted**
4. An approved fire apparatus access road shall be within 150 feet of all portions of the grade level floor. **Noted**
 - a) The fire department access (driveway) shall meet the following conditions:
 - b) The minimum unobstructed width shall be 20 feet.
 - c) The minimum unobstructed height shall be 13 feet.
 - d) The driveway shall be accessible at all times (i.e. snow removal).
 - e) The driveway shall be constructed so it can support up to 100,000 pound fire apparatus. (IFC 2018:503.2.3)

Items a). through e). are Noted

5. Site plans do not reference any enclosed buildings or temperature-controlled buildings with suppression systems. If automatic sprinkler system are provided throughout any portions of the buildings, please advise the owner that according to 2015 MBC that this suppression system SHALL be monitored by an alarm company. **Any fire suppressed buildings shall be monitored**
6. The total height/stories and dimensions of each of the 54 buildings need to be noted. **Building footprint dimensions are shown on Sheet C-1.0. All buildings will be single story and the same height: 15' at the eve and 22' at the ridge. See Sheet A-1.0 for elevations and dimensions**
7. Fire extinguishers shall be installed along each storage building, spaced no more than 150 feet apart and be a Dry Chemical 4A:80B:C type, at a minimum. **Noted**
8. A final inspection of the whole building and site shall be performed by the fire department before a C of O is issued. **Noted**

Response to Spicer Group review letter dated 8/2/24:

We recommend the Township withhold approval, pending the following items and our subsequent review:
The petitioner requests approval of the final site plan contingent upon finalizing the items below.

1. Review and approval of the plans by:
 - a. Howell Township Planner
The Howell Township Planner has recommended approval of the Final Site Plan without comments
 - b. Fire Marshal
The Howell Township Fire Department has recommended approval with conditions. See itemized responses above
 - c. Livingston County Drain Commissioner
The petitioner has been working with the Drain Commission office and received an updated review letter on 8/23. We understand that Final Site Plan approval will be contingent upon receipt of LCDC final approval.
 - d. MHOG
MHOG is currently reviewing the drawings. Petitioner understands that Final Site Plan approval will be contingent upon approval by MHOG for water connections.
 - e. Livingston County Road Commission
The Petitioner has been working with the Road Commission and received an updated review letter on 8/22/24. We understand that Final Site Plan approval will be contingent upon receipt of their final approval.
2. The Zoning Administrator should review the proposed use of the site and provide final determination if said use does or does not meet the current zoning classification of the site. **The Preliminary Site Plan and use was approved at the planning commission meeting on June 25th.**
3. The architectural drawings of the storage units should include the maximum height of the structures for each of the storage buildings **All buildings will be single story and the same height: 15' at the eve and 22' at the ridge. Per Ordinance Article II Definitions, Section 2.02, building height is measured to the midpoint between eve and ridge, or 18'-6" as shown on Sheet A-1.0.**
4. Ensure that none of the proposed structures are in the setback area. **As requested in item #15 below, we will get input from the Township Planner.**
5. Please adjust labels so that they are all able to be read. **Noted**
6. Ensure that the coordinate systems are consistent. **Noted**
7. Ensure that all storm sewers have appropriate cover. **Noted. LCDC will approve the storm piping**
8. Please add more point elevations or adjust grading to ensure that no ponding will occur between the buildings. **Noted**

9. Include pipe lengths, diameters, slopes, rim elevations, and inverts on the plan and profile sheets. **Noted**
10. Correct the labels on sheet C-6.7 to show the correct pipe diameters. **Noted**
11. Please use the full hydraulic head in the design calculations for the control structure orifices. **Noted**
12. Please use a maximum discharge rate of 0.15 CFS/acre for stormwater calculations. **Noted**
13. Include dimensions for rip-rap overflow spillways for both the sedimentation and detention basins. Rip-rap aprons should also be included for all end sections and indicated on the plans. **Noted**
14. Please correct the typo on sheet C-9.2 showing that the invert elevation on the detentions basin outlet control structure detail is 902.0 **Noted**
15. Consult the Township Planner on setback implications (if any) for the construction of proposed storm sewer and fences. **Noted.**
16. Bore and jack locations should be identified on profile sheet C-3.4. Sanitary plan view sheets (C-3.1 and C-3.2) should include the bore pit locations, bore pit dimensions, and casing start and end points. **We are working with the Road Commission on this issue**
17. Demonstrate to the Township and LCRC how Burkhart Road will be protected during the construction of MH-6. Provide construction notes and details for the work. **We are working with the Road Commission on this issue**
18. Revise the sanitary sewer basis of design table on sheet C-3.0 to reflect 1 REU per Unit. **Noted**
19. Included the existing sanitary structure in the northeast radius of Tower Drive. **Noted**
20. Include the Howell Township sanitary detail sheets. **Noted**
21. Revise the 8-inch sanitary sewer crossing showing the profile on sheet C-3.4 to 10-inch forcemain. **Noted**
22. Adjust and replace the covers of the existing curb catch basins on Burkhart Road north and south of the entrance and indicate this on the plans on sheets C-1.0 and C-1.2. **Noted**

HOWELL TOWNSHIP
Application for Site Plan Review

3525 Byron Road Howell, MI 48855
Phone: 517-546-2817 ext. 108
Email: inspector@howelltownshipmi.org

File # PC2024-10

Parcel ID #: 4706- 20 - 201 - 201-018 & 017 & 400-004 Date _____

Applicant Name Josh Hendershot Applicant Address 10465 Citation Drive

Phone 810-227-5668 Fax _____ Email jlh@lindhout.com

Property Owner Name WD Realty / Winfreid Dahm

Phone 810-626-8561 Fax _____ Email holly2fogs@gmail.com

Please list all recipients to receive information and/or reports:

Name: Patrick Cleary Email patrickc@bosseng.com

Name: Kathleen Graham Email kathleen@grvent.com

Name: _____ Email _____

Location of Property 4020 W Grand River Ave Current Zoning Classification RSC

Existing Use Restaurant Proposed Use Restauraunt

Check One:

- Preliminary Site Plan Review (20.06)
- Final Site Plan Review (20.07)
- Temporary Use (14.34)
- Commercial/Industrial Development
- Subdivision/Site Plan Condo
- Multi-Family/Condo
- Planned Unit Development (PUD) Type: 1 2 3 4 5

Applicant needs to provide the following site plan drawings: four (4) full size copies, eight (8) - 11" x 17" copies, and an electronic set (either on an USB drive or provide an online link) for the preliminary site plan drawings. Drawings shall be submitted with an application for site plan review (20.06 a) thirty (30) days prior to the meeting.

The site plan is to contain the following information or the drawing submitted under the Land Use Permit can be utilized if it also contains the following information and is accurately drawn to scale:

- a. The date, north arrow and scale. The scale shall be not less than 1" = 20' for property under three (3) acres and at least 1" = 100' for those (3) acres or more.
- b. Statistical data including number of dwelling units, size of dwelling units, if any, and total gross acreage involved. In the case of a mobile home park, the size and location of each mobile home site shall be shown.
- c. The location and height of all existing and proposed structures on and within 100' of the subject property's boundary.
- d. All lot and/or property lines are to be shown and dimensioned, including building setback lines on corner lots.
- e. The location and dimensions of all existing and proposed drives, sidewalks, curb openings, signs, exterior lighting, curbing, parking areas (show dimensions of a typical parking space), unloading areas and recreation areas.
- f. Vehicular traffic and pedestrian circulation features within and without the site.
- g. The location of all proposed landscaping, fences, or walls.
- h. Size and location of existing and proposed utilities, including proposed connection to public sewer or water supply system.
- i. A location map indicating the relationship of the site to the surrounding land uses.
- j. The location and pavement width and right-of-way width of all abutting roads, streets, alleys, or easements.
- k. Show properties and respective zoning abutting the subject property.
- l. The location and size of all surface water drainage facilities.
- m. Contour intervals shall be shown at a maximum of 2' intervals, with 1' intervals preferred for topographic features of the site.

By signing below the applicant understands and acknowledges the following statements:

- a. The Planning Commission has sixty (60) days from filing date to approve or deny site plan.
- b. Approval of preliminary site plan is valid for a period of one (1) year from date of approval.
- c. A one (1) year extension may be granted upon written request of the applicant and approval by the Planning Commission.
- d. Approval of preliminary site plan shall expire one year after approval of final site plan unless zoning permit has been obtained.
- e. Approval of the final site plan expires six (6) months after approval unless a land use permit application is applied for and granted.

- f. The final site plan approval shall expire one (1) year following the date of approval unless construction has begun on the property in accordance with the plan.
- g. Applicant may appeal the Planning Commission's ruling of the final site plan to the Board of Appeals within ten (10) days of the Planning Commission's decision on all matters except use of the land, use of buildings, or structures.
- h. The Planning Commission has sixty (60) days from the date of the Planning Commission meeting at which the final site plan was received to approve or deny the final site plan.
- i. Improvements not in conformance with the final site plan shall be deemed a violation of the ordinance and be subject to the penalties of the ordinance.
- j. Sewer system and water system tap in fees, if applicable, must be paid prior to issuance of a land use permit.

Applicant hereby deposes and says that all the above statements and information contained in this application and any statements submitted herewith or on the site plan are true and accurate.

[Handwritten Signature]
Owner Signature

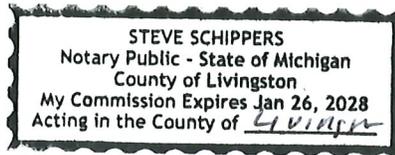
Winfried Dahn
Print Name

8/20/24
Date

Subscribed and sworn to before me this 20th day of August, 2024

[Handwritten Signature] Livingston County, Michigan
Notary Public

My Commission Expires: 1-26, 2028



Howell Township Reimbursement Agreement

The applicant accepts responsibility for all expenses at actual cost for professional services related to the application required by the Township for the issuance of any permits, approvals, reviews and attendance at meetings by the Township's Planner, Landscape Architects, Legal Counsel, Engineering and Administrative Staff, over and above the fees listed in the Howell Township fee schedule.

Information for Additional Billing:

Name JULIE HAAPALA Address 118A WEST GRAND RIVER HOWELL, MI 48843
Phone 248-891-9024 Email TWOPLLC@GMAIL.COM

I have read and agree to the reimbursement agreement as presented between myself/my company and Howell Township.

Applicant Signature [Signature] Date 8/20/24

Notary Public
[Signature] County, Michigan
My Commission Expires: 1-26-28

Owner Signature [Signature] Date 8/20/24

Notary Public
[Signature] County, Michigan
My Commission Expires: 1-26-28

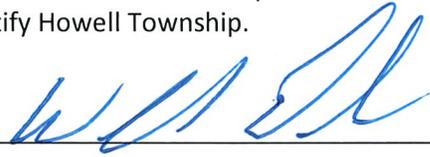
STEVE SCHIPPERS
Notary Public - State of Michigan
County of Livingston
My Commission Expires Jan 26, 2028
Acting in the County of Livingston

HOWELL TOWNSHIP
Industrial/Commercial Sewer Audit User Survey

3525 Byron Road Howell, MI 48855
Phone: 517-546-2817 ext. 108
Email: inspector@howelltownshipmi.org

Parcel ID #: 4706- <u>20</u> - <u>201</u> - <u>018</u>	Date <u>8-20-24</u>
Corporate Name <u>WD Realty</u>	Corporate Address _____
Facility Name <u>WRANGLERS</u>	Facility Address <u>4020 West Grand River</u>
Name and Title of Applicant <u>WINFRIED DAHM</u>	
Phone <u>810-626-8561</u>	Fax <u>—</u> Email <u>HOLLYZFOGS@GMAIL.COM</u>
Date this Company First Opened for Business <u>TBD</u>	

I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. If operational changes result in modifications to this questionnaire, please notify Howell Township.

Signature  Date 8/20/24

Print Name and Title WINFRIED DAHM

1. What type of work is performed at this location?

RESTAURANT / BAR

2. Are operations subject to seasonal variation? Yes No
If yes, indicate seasonal dates, number of personnel, shifts and flow:

3. Number of bathrooms, toilets, urinals, sinks:

8 TOILETS, 3 URINALS, 7 LAVS, 1 SHOWER

4. What types of wastes do you discharge to the sanitary system?

Sanitary ~~Only~~

Wash Water

Rinse Water

Process Water

Scrubber Water

Cooling Water

Other, explain: _____

5. Does a third-party haul waste from your facility to be treated off-site?

No

Yes

If yes:

Name of Industrial Waste Hauler _____

License Number _____ Last Pick-up Date _____ Amount _____

Types of Waste _____

6. Hazardous Material Information:

Do you, or will you, use or store any acids, bases, or hazardous materials that are listed on the attached Priority Pollutants/Critical Materials list and are of a quantity larger than 5 gallons?

No

Yes

7. Do you, or will you, discharge any of the above mentioned materials to the sanitary sewer?

No

Yes

If yes, list pollutants and amounts on the following table (attach additional pages if necessary)

Material	Volume	Type of Storage	Location

8. Are there any floor drains located near chemical?

No

Yes

9. Do you have any grease traps?

No

Yes

If yes, how many? 1

10. Does your industry pre-treat the wastewater produced before discharging it into the sewer?

No

Yes

If yes, explain _____

11. Has your industry ever had your wastewater tested by a lab?

No

Yes

If yes, what were the results (attach lab reports):



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

June 25, 2024

Jonathan Hohenstein, Zoning Administrator
Howell Township
3525 Byron Road
Howell, MI 48855

Re: Wrangler's Saloon – Final Site Plan Submittal

Jonathan

We have received the review letter from Carlisle Wortman review dated 4-17-24. Additional verbal comments were received from the Plan Commission at the 4-23-24 meeting. Spicer Group review comments dated 4-5-24 were received 5-8-24. We offer the following responses.

Planner Review Letter - Carlisle Wortman:

1. Building Height Clarification: The building height of 39'-6-1/2" has been added to the Site Statistical Data summary on the Site Plan, Sheet C3A. Also shown on the architectural plans.
2. Rear Setback: A 50-ft rear yard setback has been added to the drawings as per Planner email dated 4-23-24 and accepted by the Plan Commission on 4-23-24.
3. No Parking in Setback: There is no parking in the setbacks.
4. Proposed Signage: Acknowledged. Signage will be separately submitted for permitting.

Engineer Review Letter – Spicer:

General

1. RSC Zoning Over Project Parcels: Acknowledged. No planner issues on this received.
2. Signing & Sealing of Plans: Submitted plan set signed & sealed on the Cover Sheet.

Grading and Drainage:

1. Grading: Additional spot elevations have been added and others adjusted to eliminate potential ponding in unpaved areas and north end of the parking area.

Parking and Landscaping:

1. Pavement Details Review: Acknowledged these will be reviewed for Final Site Plan.
2. Drive Approaches – LCRC Review/Approval: Preliminary sight distance and intersection distance approvals were obtained on 4-8-22. Formal driveway permit applications have been submitted.
3. Lighting and Landscape Planner Deferment: Acknowledged. No planner issues on these aspects received.

Utilities:

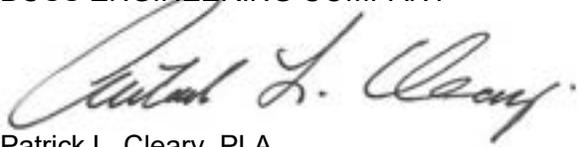
1. Sanitary & Water Lead Sizing: Information has been added to the utility plan
2. Underground Storm Detention Review: Acknowledged these will be reviewed for Final Site Plan.

Additional Approvals by Fire Marshal, Township Planner, LCDC, & LCRC – Acknowledged. Being submitted.

Please contact us with additional questions, or if you are in need additional information.

Regards,

BOSS ENGINEERING COMPANY

A handwritten signature in black ink, reading "Patrick L. Cleary". The signature is written in a cursive style with a large initial "P" and a long, sweeping underline.

Patrick L. Cleary, PLA

Senior Associate

Patrickc@bosseng.com

PROPERTY DESCRIPTION:

GENERAL INFORMATION:

PARCEL NOS.: 4706-20-201-018, 4706-20-201-017, 4706-20-400-004
 ZONING: RSC (REGIONAL SERVICE COMMERCIAL)
 AREA: +-3.20 ACRES (139,350 SQFT) (NET 2.52 ACRES EXCLUSIVE OF R.O.W.)

LEGAL DESCRIPTION:

LEGAL DESCRIPTION PER ATA NATIONAL TITLE GROUP, LLC, ISSUED BY OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY, COMMITMENT NO: 47-20712773-SCM, WITH A COMMITMENT DATE OF MAY 27, 2020 AT 8:00 A.M.:

The land referred to in this commitment is described as follows: Township of Howell, County of Livingston, State of Michigan
 Parcel 1:
 A part of the East 1/2 of the Southeast 1/4 of Section 20, Town 3 North, Range 4 East, Howell Township, Livingston County, Michigan, described as follows: Beginning 1229.4 feet South of the East 1/4 post of said Section 20; thence South 308.8 feet to the centerline of Highway US-16; thence North 52 degrees West 490 feet along center of said highway; thence East 383.3 feet to the piece of beginning.

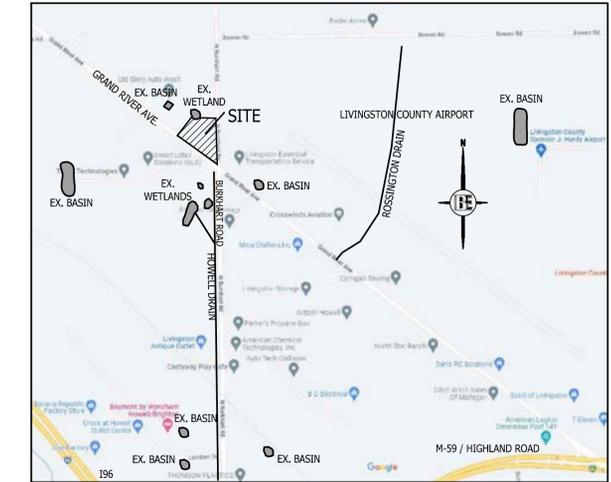
Parcel 2:
 Lots 1 and 26, Newman's Grand View Estates, as recorded in Liber 8, Page 24 of Plats, Livingston County Records.

CONSTRUCTION NOTES

THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING NOTES AND ANY WORK INVOLVED SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.

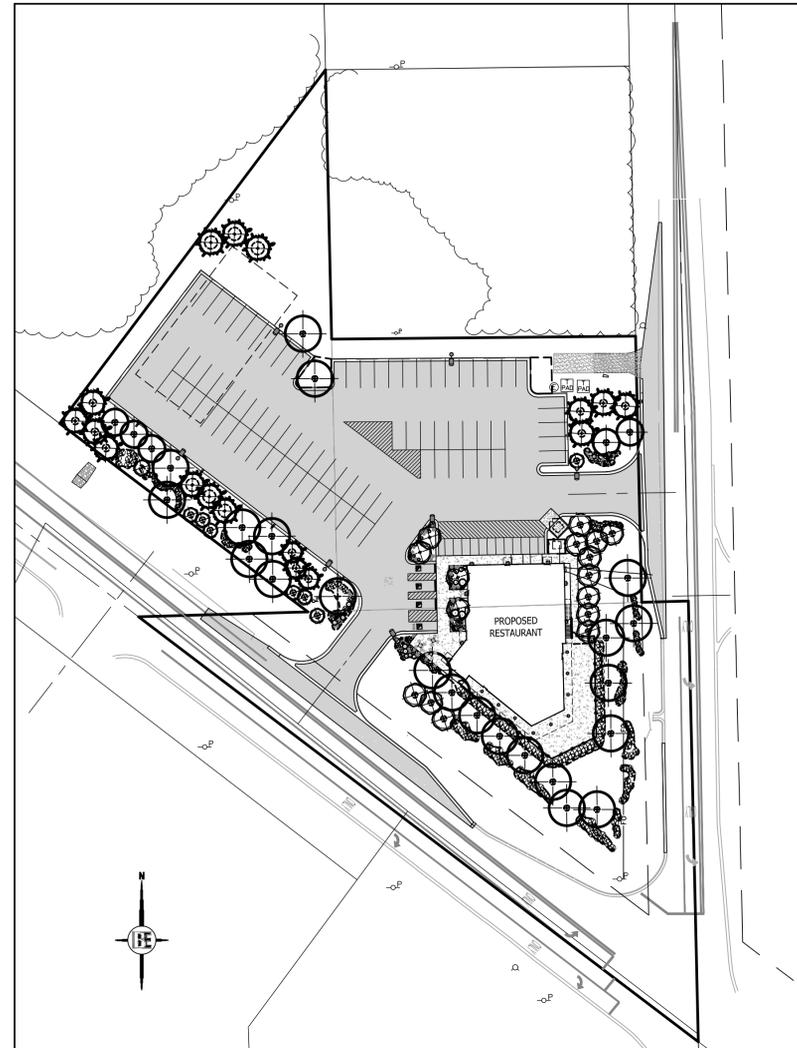
1. THE CONTRACTOR SHALL HOLD HARMLESS THE DESIGN PROFESSIONAL, MUNICIPALITY, COUNTY, STATE AND ALL OF ITS SUB CONSULTANTS, PUBLIC AND PRIVATE UTILITY COMPANIES, AND LANDOWNERS FOR DAMAGES TO INDIVIDUALS AND PROPERTY, REAL OR OTHERWISE, DUE TO THE OPERATIONS OF THE CONTRACTOR AND/OR THEIR SUBCONTRACTORS.
2. DO NOT SCALE THESE DRAWINGS AS IT IS A REPRODUCTION AND SUBJECT TO DISTORTION.
3. A GRADING PERMIT FOR SOIL EROSION-SEDIMENTATION CONTROL SHALL BE OBTAINED FROM THE GOVERNING AGENCY PRIOR TO THE START OF CONSTRUCTION.
4. IF DUST PROBLEM OCCURS DURING CONSTRUCTION, CONTROL WILL BE PROVIDED BY AN APPLICATION OF WATER, EITHER BY SPRINKLER OR TANK TRUCK.
5. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH LOCAL MUNICIPAL STANDARDS AND SPECIFICATIONS.
6. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED TOWNSHIP, COUNTY, AND STATE OF MICHIGAN PERMITS.
7. PAVED SURFACES, WALKWAYS, SIGNS, LIGHTING AND OTHER STRUCTURES SHALL BE MAINTAINED IN A SAFE, ATTRACTIVE CONDITION AS ORIGINALLY DESIGNED AND CONSTRUCTED.
8. ALL BARRIER-FREE FEATURES SHALL BE CONSTRUCTED TO MEET ALL LOCAL, STATE AND A.D.A. REQUIREMENTS.
9. 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 BEFORE BEGINNING CONSTRUCTION.
10. THE CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHTS-OF-WAY, PUBLIC OR PRIVATE, PRIOR TO THE START OF CONSTRUCTION.
11. 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.
12. THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE UPON COMPLETION OF THE PROJECT.
13. 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.
14. THE CONTRACTOR SHALL KEEP THE AREA OUTSIDE THE "CONSTRUCTION LIMITS" BROOM CLEAN AT ALL TIMES.
15. THE CONTRACTOR SHALL CALL MISS DIG A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
16. ALL EXCAVATION UNDER OR WITHIN 3 FEET OF PUBLIC PAVEMENT, EXISTING OR PROPOSED SHALL BE BACKFILLED AND COMPACTED WITH SAND (MDOT CLASS II).
17. 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.
18. THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES.
19. 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 IN 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.
20. DURING THE CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL NOT PERFORM WORK BY PRIVATE AGREEMENT WITH PROPERTY OWNERS ADJACENT TO THE PROJECT.
21. 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.
22. NO TREES ARE TO BE REMOVED UNTIL MARKED IN THE FIELD BY THE ENGINEER.
23. 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.
24. ALL AREAS DISTURBED BY MAINE CONTRACTOR BEYOND THE NORMAL CONSTRUCTION LIMITS OF THE PROJECT SHALL BE SOODED OR SEEDED AS SPECIFIED OR DIRECTED BY THE ENGINEER.
25. 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.
26. 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.
27. 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.
28. AFTER REMOVAL OF TOPSOIL, THE SUBGRADE SHALL BE COMPACTED TO 95% OF ITS UNIT WEIGHT.
29. 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.
30. NO SEEDING SHALL BE DONE AFTER OCTOBER 15 WITHOUT APPROVAL OF THE ENGINEER.
31. ANY EXISTING APPURTENANCES SUCH AS MANHOLES, GATE VALVES, ETC. SHALL BE ADJUSTED TO THE PROPOSED GRADE AND SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
32. SOIL EROSION MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL VEGETATION HAS BEEN RE-ESTABLISHED.
33. 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.

FINAL SITE PLAN FOR WRANGLER'S SALOON 4020 WEST GRAND RIVER AVENUE PART OF THE SE QUARTER, SECTION 20 HOWELL TOWNSHIP, LIVINGSTON COUNTY, MICHIGAN



LOCATION MAP
SCALE: +1"=1,000'

SURFACE WATER & COUNTY DRAINS	
WETLAND	- AT NORTH PROPERTY LINE
WETLANDS	- 3+ CLUSTER, APPROX. 425-FT SOUTH, WEST OF BURKHART RD.
LAKE	- APPROX. 3.74 MI SOUTHEAST TO THOMPSON LAKE
STREAM	- APPROX. 5,700-FT EAST TO SHAWASSEE RIVER TRIBUTARY
BASIN	- APPROX. 1,950-FT WEST AT THE LIVINGSTON COMMERCE CENTER
BASIN	- APPROX. 3,300-FT EAST AT LIVINGSTON COUNTY AIRPORT
BASIN	- APPROX. 270-FT NORTHWEST AT OLD GLORY CARWASH
BASIN	- APPROX. 650-FT SOUTHEAST AT L.E.I.T.S. FACILITY
DRAIN	- APPROX. 200 FT SOUTH TO HOWELL COUNTY DRAIN, BURKHART RD.
DRAIN	- APPROX. 1,750-FT SOUTHEAST TO ROSSINGTON COUNTY DRAIN



OVERALL SITE MAP
1"=60'

PERMITS & APPROVALS

AGENCY	DATE SUBMITTED	DATE APPROVED
• TOWNSHIP PRELIM. SITE PLAN APPROVAL	3-26-24	4-23-24
• TOWNSHIP FINAL SITE PLAN APPROVAL	6-27-24	-
• LCDC - SIGHT DISTANCE/PRELIM. APPROVAL	4-5-23	4-8-22
• LCDC - DRIVE PERMIT	6-27-24	-
• LCRC	6-27-24	-
• FAA	6-27-24	-
• SESO	-	-
• PRIVATE STORM EASEMENT - TONON	-	6-30-23 (SIGNED)
• PRIVATE STORM EASEMENT - LIV COMM CNTR	-	7-20-23 (SIGNED)

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.

SHEET INDEX	
SHEET NO.	DESCRIPTION
C1	CIVIL DRAWINGS
C2A	COVER SHEET
C2B	EXISTING CONDITIONS PLAN
C2C	SITE DEMOLITION PLAN
C3A	SITE PLAN
C3B	EMERGENCY VEHICLE CIRCULATION & HYDRANT COVERAGE PLAN
C4	GRADING AND DRAINAGE PLAN
C5A	UTILITY PLAN
C5B	STORM SEWER PLAN & PROFILE
C6	LIGHTING PHOTOMETRIC PLAN
C7	SOIL EROSION & SEDIMENTATION CONTROL PLAN
C8	LANDSCAPE PLAN
C9	LANDSCAPE AND EROSION CONTROL DETAILS
C10	STORM SYSTEM DETAILS
C11	MISC. CONSTRUCTION DETAILS
C12	MISC. CONSTRUCTION DETAILS
C13	M.H.O.G. STANDARD DETAILS - WATER (1)
C14	M.H.O.G. STANDARD DETAILS - WATER (2)
C15	HOWELL TOWNSHIP STANDARD SANITARY DETAILS

PREPARED FOR:

ARCHITECT:
 LINDHOUT ASSOCIATES
 ARCHITECTS, AIA, PC
 10465 CITATION DRIVE
 BRIGHTON, MI 48116
 CONTACTS:
 JOSH HENDERSHOT
 JLH@LINDHOUT.COM
 (810) 227-5668

PROPERTY OWNER:
 WD REALTY / WINFREID DAHM
 118A GRAND RIVER AVE.
 HOWELL, MI 48843
 CONTACT: KATHLEEN GRAHM
 (810) 626-8561
 KATHLEEN@GRVENT.COM

PREPARED BY:

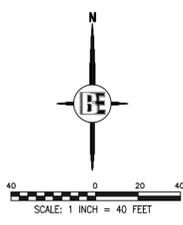
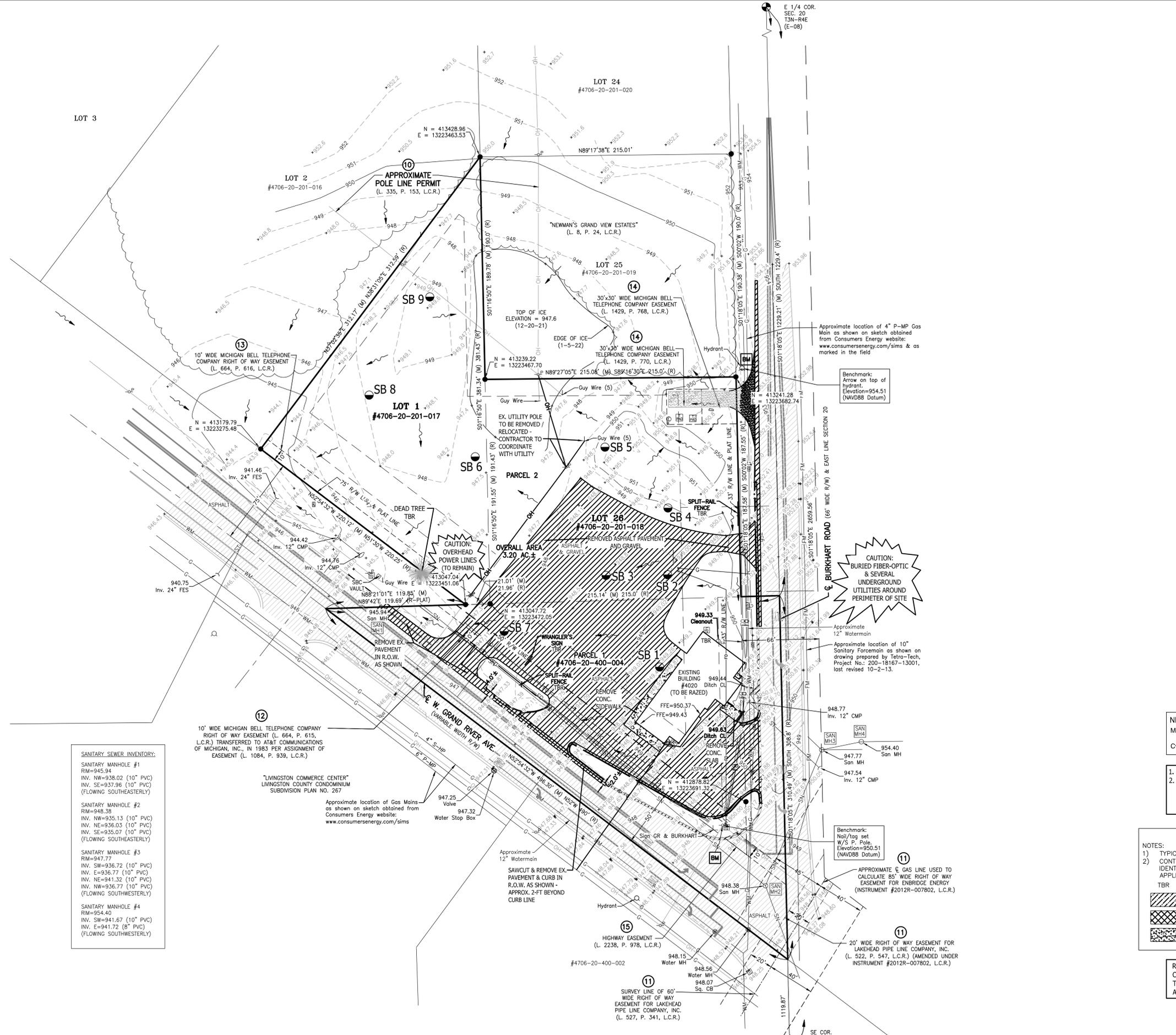
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 517.546.4836 FAX 517.548.1670
 CONTACT: PATRICK CLEARY
 EMAIL: PATRICKC@BOSSENG.COM



NO	BY	CK	REVISION	DATE	JOB NO: 21-550

C1

ISSUE DATE: 6/25/24



LEGEND

- 900- EXISTING CONTOUR
- 922.00- EXISTING SPOT ELEVATION
- P- POWER POLE
- I- GUY WIRE
- Transformer Pad
- Electrical Meter
- Air Conditioning Unit
- Hydrant
- Water Gate Valve
- Water Manhole
- Manhole
- Cleanout
- Storm Manhole
- Storm Catch Basin (Round or Beehive)
- Storm Catch Basin (Square)
- Storm Invert
- Gas Meter
- U.G. Gas Marker
- Cable TV Riser
- Sign
- Steel Rod Set
- Steel Rod or Pipe Found
- Section Corner
- Sanitary Sewer
- Water Main
- Storm Sewer
- Gas Main
- Electric
- Fiber Optic
- Overhead Wires
- Fence
- San MH
- Sanitary Manhole
- ST MH
- Storm Manhole
- Centerline
- Liber
- Page
- L.C.R.
- Livinston County Records
- (M&R)
- Measured and Record
- P.O.B.
- Point of Beginning
- FFE
- Finished First Floor Elevation
- CMP
- Corrugated Metal Pipe
- Asphalt
- Concrete
- Existing Drainage Flow

NRCS EXISTING SOILS DATA:
 MoB MIAMI LOAM, 2-6% SLOPES
 CvraaB CONOVER LOAM, 0-4% SLOPES

1. REFER TO BORING LOCATIONS THIS SHEET
2. REFER TO SOILS INVESTIGATION REPORT (DATED 7-12-22) & INFILTRATION STUDY (6-27-22) BY McDOWELL & ASSOCIATES (JOB NO. 22-229)

DEMOLITION LEGEND

- NOTES:
 1) TYPICAL - DEMOLITION ITEMS NOTED & SHOWN IN **BOLD**
 2) CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF IDENTIFIED ITEMS FROM THE SITE IN ACCORDANCE WITH APPLICABLE LOCAL, COUNTY, STATE, & FEDERAL STATUTES
- TBR TO BE REMOVED
 - ASPHALT TO BE REMOVED
 - CONCRETE TO BE REMOVED
 - GRAVEL TO BE REMOVED
 - TREE TO BE REMOVED

REFER TO THE SOIL EROSION & SEDIMENTATION CONTROL PLAN AND LANDSCAPE PLAN FOR TEMPORARY CONTROLS DURING CONSTRUCTION AND RESTORATION AFTER

- SANITARY SEWER INVENTORY:**
- SANITARY MANHOLE #1
RIM=945.94
INV. NW=938.02 (10" PVC)
INV. SE=937.96 (10" PVC)
(FLOWING SOUTHEASTERLY)
 - SANITARY MANHOLE #2
RIM=948.58
INV. NW=935.13 (10" PVC)
INV. NE=936.03 (10" PVC)
INV. SE=935.07 (10" PVC)
(FLOWING SOUTHEASTERLY)
 - SANITARY MANHOLE #3
RIM=947.77
INV. SW=936.72 (10" PVC)
INV. E=936.77 (10" PVC)
INV. NE=941.32 (10" PVC)
INV. NW=936.77 (10" PVC)
(FLOWING SOUTHWESTERLY)
 - SANITARY MANHOLE #4
RIM=954.40
INV. SW=941.67 (10" PVC)
INV. E=941.72 (8" PVC)
(FLOWING SOUTHWESTERLY)

10' WIDE MICHIGAN BELL TELEPHONE COMPANY RIGHT OF WAY EASEMENT (L. 664, P. 615, L.C.R.) TRANSFERRED TO AT&T COMMUNICATIONS OF MICHIGAN, INC., IN 1985 PER ASSIGNMENT OF EASEMENT (L. 1084, P. 939, L.C.R.)

"LIVINGSTON COMMERCE CENTER"
LIVINGSTON COUNTY CONDOMINIUM SUBDIVISION PLAN NO. 267

Approximate location of Gas Mains as shown on sketch obtained from Consumers Energy website: www.consumersenergy.com/sims

SAWCUT & REMOVE EX. PAVEMENT & CURB IN R.O.W. AS SHOWN - APPROX. 2-FT BEYOND CURB LINE

SURVEY LINE OF 60' WIDE RIGHT OF WAY EASEMENT FOR LAKEHEAD PIPE LINE COMPANY, INC. (L. 527, P. 341, L.C.R.)

Approximate location of 4" P-MP Gas Main as shown on sketch obtained from Consumers Energy website: www.consumersenergy.com/sims & as marked in the field

Benchmark: Arrow on top of hydrant. Elevation=954.51 (NAVD88 Datum)

Approximate location of 10" Sanitary Forcemain as shown on drawing prepared by Tetra-Tech, Project No.: 200-18167-13001, last revised 10-2-13.

Benchmark: Nail/flag set W/S P. Pole. Elevation=950.51 (NAVD88 Datum)

APPROXIMATE G. GAS LINE USED TO CALCULATE 85' WIDE RIGHT OF WAY EASEMENT FOR ENBRIDGE ENERGY (INSTRUMENT #2012R-007802, L.C.R.)

20' WIDE RIGHT OF WAY EASEMENT FOR LAKEHEAD PIPE LINE COMPANY, INC. (L. 522, P. 547, L.C.R.) (AMENDED UNDER INSTRUMENT #2012R-007802, L.C.R.)

BEFORE YOU BEGIN ANY CONSTRUCTION, YOU MUST OBTAIN ALL NECESSARY PERMITS FROM THE LOCAL, STATE, AND FEDERAL AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CHANGES TO THE LOCATION OR DEPTH OF UTILITIES SHOWN ON THESE DRAWINGS AS ONLY APPROXIMATE. NO GUARANTEE IS MADE AS TO THE LOCATION OR DEPTH OF UTILITIES SHOWN ON THESE DRAWINGS AS ONLY APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CHANGES TO THE LOCATION OR DEPTH OF UTILITIES SHOWN ON THESE DRAWINGS AS ONLY APPROXIMATE. NO GUARANTEE IS MADE AS TO THE LOCATION OR DEPTH OF UTILITIES SHOWN ON THESE DRAWINGS AS ONLY APPROXIMATE.

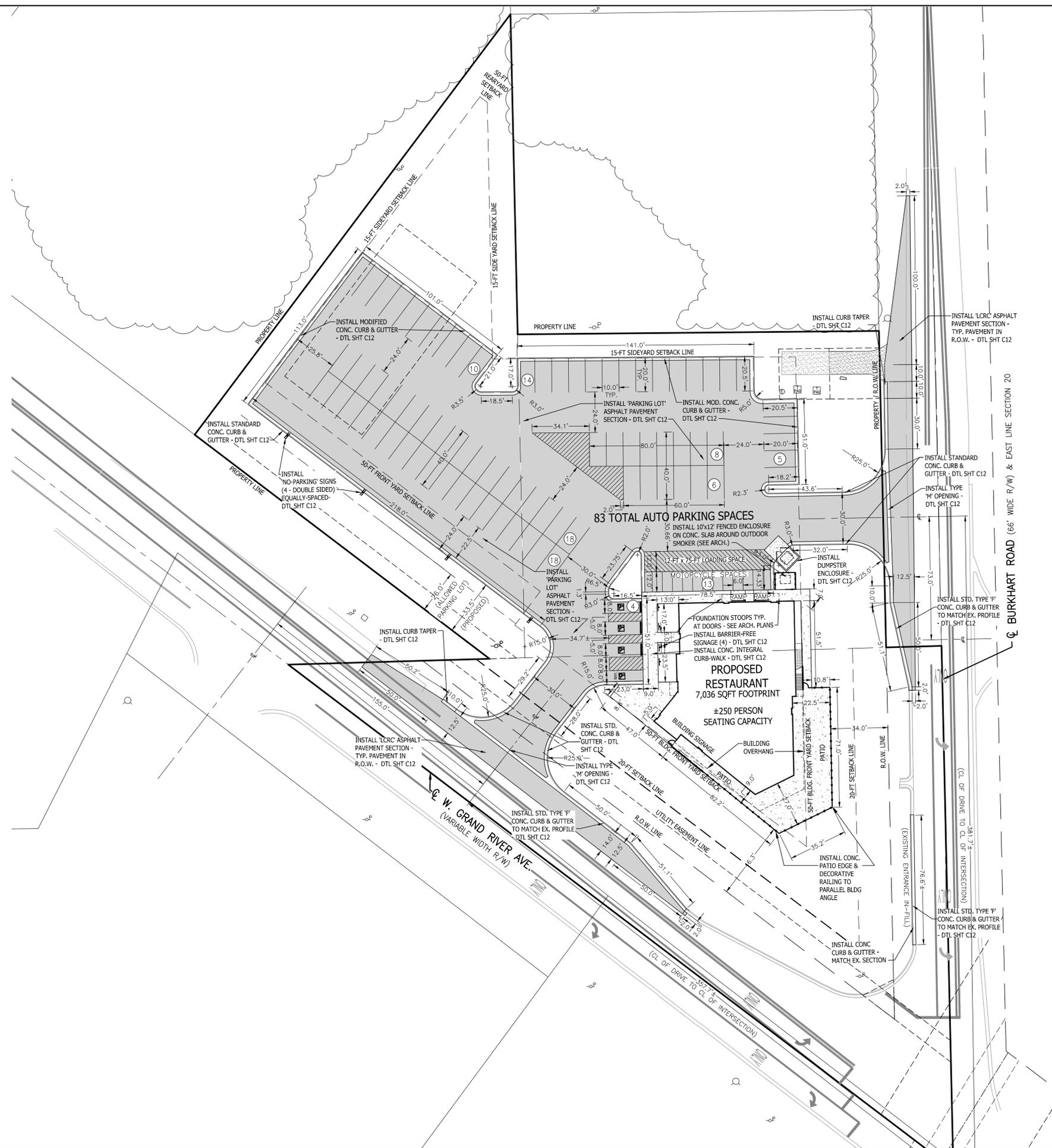
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 3121 E. GRAND RIVER AVE.
 HOWELL, MI. 48843
 517.546.4836 FAX 517.548.1670

WRANGLER'S SALOON
 LINDHOUT ASSOCIATES ARCHITECTS, AIA, PC
 10469 CITATION DRIVE
 BRIGHTON, MI 48116
 810-227-5668

SITE DEMOLITION PLAN

NO.	BY	DATE	REVISION	REVISION

DRAWN BY: AEB
 FIELD CREW: TAG/PB
 CHECKED BY:
 SCALE: 1" = 40'
 JOB NO. 21-550
 DATE 6-18-24
 SHEET NO. **C2B**



LEGEND

PROPOSED (PR)	EXISTING (EX)	CONTOUR
-900-	-922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FS	FS	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RM	RM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REAR YARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATE VALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
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
G	G	GAS
T	T	TELEPHONE
F	F	FENCE
S	S	SILT FENCE
W	W	WETLAND BOUNDARY
L	L	LIMITS OF GRADING/CLEARING
M	M	MANHOLE
I	I	INLET / CATCHBASIN
F	F	FLARED END-SECTION
G	G	GATE VALVE
H	H	HYDRANT
U	U	UTILITY POLE
S	S	NOT FIELD VERIFIED TO BE REMOVED
NV	NV	NOT FIELD VERIFIED TO BE REMOVED
TBR	TBR	TERRAIN BOUNDARY
SS	SS	SANITARY SEWER LABEL
SS	SS	STORM SEWER LABEL
WM	WM	WATER MAIN LABEL
SE	SE	SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
C	C	CONCRETE
A	A	ASPHALT
M	M	MODIFIED CURB

SITE STATISTICAL DATA:
 ZONING: "RSC" - REGIONAL SERVICE COMMERCIAL
 DEVELOPMENT TYPE/USE: RESTAURANT 2-STORY STRUCTURE (MAX HGT TBD)
 GROSS SITE AREA: #3.20 AC (139,350 SQFT) (NET 2.52 AC EXCL OF R.O.W.)
 BUILDING SQUARE FOOTAGE (FOOTPRINT): 7,036 (5.0%)
 IMPERVIOUS SURFACE (EXCLUSIVE OF BUILDING): 1.11 ACRES (34.7%)
 PERVIOUS SURFACE: 1.23 ACRES (27.2%)

MIN. SETBACKS REQUIRED:
 FRONT: 50-FT (SOUTH - GRAND RIVER)
 FRONT: 50-FT (NORTHEAST CORNER - SUBJECT TO VERIFICATION)
 REAR: 50-FT (NO ADJACENT RESIDENTIAL)
 SIDES: 15-FT (WEST) & 15-FT (NORTH)
 MIN LOT SIZE: 40,000 SQFT; MIN LOT WIDTH 120 LFT (MUNICIPAL SERVICES)
 MAX BLDG. HGT: 70-FT

PROPOSED BUILDING:
 FRONT (SOUTH): 59.33-FT (MIN.)
 FRONT (EAST): 71.50-FT (MIN.)
 REAR: N.A.
 SIDE (WEST): 264.50-FT
 SIDE (NORTH): 140.75-FT
 LOT COVERAGE: 5.0% (BUILDING)
 MAX BLDG. HGT: 39-FT - 6-1/2-INCHES - TOP OF ORNAMENTAL ARCHED PARAPET; 33-FT-6-1/2-INCHES TOP OF MAIN PARAPET (SEE ARCH PLANS)

PARKING CALCULATION:
 RESTAURANT = 1 SPACE / 4 CUSTOMERS + 1 SPACE / EMPLOYEE MAX SHIFT
 250 / 4 = 63 + 20 EMPLOYEES
 TOTAL SPACES REQUIRED: 83

LOADING SPACE: MIN 1, 10-FT X 55-FT SPACE REQUIRED
 + 13 MOTORCYCLE SPACES

PROVIDED PARKING: 83 VEHICULAR SPACES INCL 4 BARRIER-FREE SPACES
 + 13 MOTORCYCLE SPACES

PROVIDED LOADING: 1, 12-FT X 78-FT SPACE PROVIDED

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 HOWELL, MI. 48843
 517.546.4836 FAX 517.548.1670

BEBOSS
 Engineering
 Engineers Surveyors Planners Landscape Architects

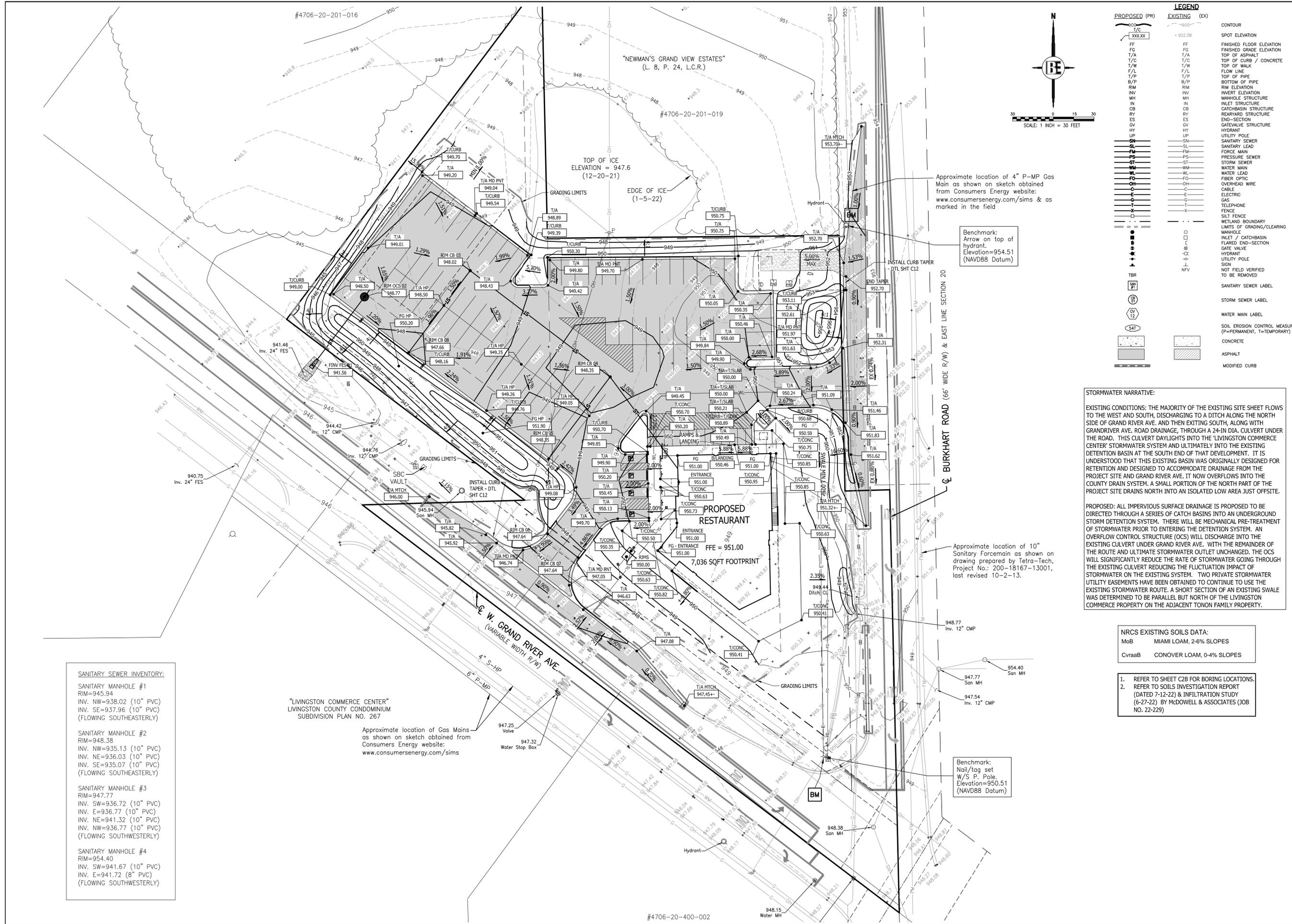
PROJECT: WRANGLER'S SALOON
 PREPARED FOR: LINDHOUT ASSOCIATES ARCHITECTS AIA PC
 10468 CITATION DRIVE
 BRIGHTON, MI 48116
 810.227.5668

TITLE: SITE PLAN

NO	BY	DATE	REVISION PER

DESIGNED BY: PC
 DRAWN BY: PC
 CHECKED BY:
 SCALE: 1" = 30'
 JOB NO: 21-550
 DATE: 6-25-24
 SHEET NO. **C3A**

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS MADE AS TO THE ACCURACY OF THE LOCATION AND ELEVATION OF EXISTING UTILITIES. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS BEFORE THE LOCATION OR DEPTH OF ANY UTILITIES SIGNIFICANTLY FROM THE PLANS.



LEGEND

PROPOSED (PR)	EXISTING (EX)	DESCRIPTION
900	900	CONTOUR
T/C	T/C	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
T/A	T/A	FINISHED GRADE ELEVATION
T/C	T/C	TOP OF ASPHALT
T/W	T/W	TOP OF CURB / CONCRETE
F/L	F/L	TOP OF WALK
T/P	T/P	FLOW LINE
B/P	B/P	TOP OF PIPE
RM	RM	BOTTOM OF PIPE
INV	INV	RIM ELEVATION
MH	MH	INVERT ELEVATION
IN	IN	MANHOLE STRUCTURE
CB	CB	INLET STRUCTURE
RY	RY	CATCHBASIN STRUCTURE
ES	ES	REARWARD STRUCTURE
OV	OV	END-SECTION
HY	HY	GATEVALVE STRUCTURE
UP	UP	HYDRANT
SN	SN	UTILITY POLE
SL	SL	SANITARY SEWER
FM	FM	SANITARY LEAD
PS	PS	FORCE MAIN
ST	ST	PRESSURE SEWER
WM	WM	STORM SEWER
WL	WL	WATER MAIN
OH	OH	WATER LEAD
C	C	FIBER OPTIC
T	T	OVERHEAD WIRE
X	X	CABLE
□	□	ELECTRIC
○	○	GAS
○	○	TELEPHONE
○	○	FENCE
○	○	SILT FENCE
○	○	WETLAND BOUNDARY
○	○	LIMITS OF GRADING/CLEARING
○	○	INLET / CATCHBASIN
○	○	FLARED END-SECTION
○	○	GATE VALVE
○	○	HYDRANT
○	○	UTILITY POLE
○	○	SON
○	○	NOT FIELD VERIFIED
○	○	TO BE REMOVED
○	○	SANITARY SEWER LABEL
○	○	STORM SEWER LABEL
○	○	WATER MAIN LABEL
○	○	SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
○	○	CONCRETE
○	○	ASPHALT
○	○	MODIFIED CURB

STORMWATER NARRATIVE:

EXISTING CONDITIONS: THE MAJORITY OF THE EXISTING SITE SHEET FLOWS TO THE WEST AND SOUTH, DISCHARGING INTO A DITCH ALONG THE NORTH SIDE OF GRAND RIVER AVE. AND THEN EXITING SOUTH, ALONG WITH GRAND RIVER AVE, ROAD DRAINAGE, THROUGH A 24-IN DIA. CULVERT UNDER THE ROAD. THIS CULVERT DAYLIGHTS INTO THE 'LIVINGSTON COMMERCE CENTER' STORMWATER SYSTEM AND ULTIMATELY INTO THE EXISTING DETENTION BASIN AT THE SOUTH END OF THAT DEVELOPMENT. IT IS UNDERSTOOD THAT THIS EXISTING BASIN WAS ORIGINALLY DESIGNED FOR RETENTION AND DESIGNED TO ACCOMMODATE DRAINAGE FROM THE PROJECT SITE AND GRAND RIVER AVE. IT NOW OVERFLOWS INTO THE PROJECT DRAIN SYSTEM. A SMALL PORTION OF THE NORTH PART OF THE PROJECT SITE DRAINS NORTH INTO AN ISOLATED LOW AREA JUST OFFSITE.

PROPOSED: ALL IMPERVIOUS SURFACE DRAINAGE IS PROPOSED TO BE DIRECTED THROUGH A SERIES OF CATCH BASINS INTO AN UNDERGROUND STORM DETENTION SYSTEM. THERE WILL BE MECHANICAL PRE-TREATMENT OF STORMWATER PRIOR TO ENTERING THE DETENTION SYSTEM. AN OVERFLOW CONTROL STRUCTURE (OCS) WILL DISCHARGE INTO THE EXISTING CULVERT UNDER GRAND RIVER AVE. WITH THE REMAINDER OF THE ROUTE AND ULTIMATE STORMWATER OUTLET UNCHANGED, THE OCS WILL SIGNIFICANTLY REDUCE THE RATE OF STORMWATER GOING THROUGH THE EXISTING CULVERT REDUCING THE FLUCTUATION IMPACT OF STORMWATER ON THE EXISTING SYSTEM. TWO PRIVATE STORMWATER UTILITY EASEMENTS HAVE BEEN OBTAINED TO CONTINUE TO USE THE EXISTING STORMWATER ROUTE. A SHORT SECTION OF AN EXISTING SWALE WAS DETERMINED TO BE PARALLEL BUT NORTH OF THE LIVINGSTON COMMERCE PROPERTY ON THE ADJACENT TONON FAMILY PROPERTY.

NRCS EXISTING SOILS DATA:

MoB MIAMI LOAM, 2-6% SLOPES
 Cvrab CONOVER LOAM, 0-4% SLOPES

- REFER TO SHEET C28 FOR BORING LOCATIONS.
- REFER TO SOILS INVESTIGATION REPORT (DATED 7-12-22) & INFILTRATION STUDY (6-27-22) BY McDOWELL & ASSOCIATES (JOB NO. 22-229)

SANITARY SEWER INVENTORY:

MANHOLE #	RIM	INVERT	PIPE	DIRECTION		
SANITARY MANHOLE #1	RIM=945.94	INV. NW=938.02 (10" PVC)	INV. SE=937.96 (10" PVC)	(FLOWING SOUTHEASTERLY)		
SANITARY MANHOLE #2	RIM=948.38	INV. NW=935.13 (10" PVC)	INV. NE=936.03 (10" PVC)	INV. SE=935.07 (10" PVC)	(FLOWING SOUTHEASTERLY)	
SANITARY MANHOLE #3	RIM=947.77	INV. SW=936.72 (10" PVC)	INV. E=936.77 (10" PVC)	INV. NE=941.32 (10" PVC)	INV. NW=936.77 (10" PVC)	(FLOWING SOUTHWESTERLY)
SANITARY MANHOLE #4	RIM=954.40	INV. SW=941.67 (10" PVC)	INV. E=941.72 (8" PVC)	(FLOWING SOUTHWESTERLY)		

"LIVINGSTON COMMERCE CENTER"
 LIVINGSTON COUNTY CONDOMINIUM
 SUBDIVISION PLAN NO. 267

Approximate location of Gas Mains
 as shown on sketch obtained from
 Consumers Energy website:
www.consumersenergy.com/sims

Approximate location of 4" P-MP Gas
 Main as shown on sketch obtained
 from Consumers Energy website:
www.consumersenergy.com/sims &
 as marked in the field

Benchmark:
 Arrow on top of hydrant.
 Elevation=954.51
 (NAVD88 Datum)

Approximate location of 10"
 Sanitary Force main as shown on
 drawing prepared by Tetra-Tech,
 Project No.: 200-18167-13001,
 last revised 10-2-13.

Benchmark:
 Nail/tag set
 W/S P. Pole.
 Elevation=950.51
 (NAVD88 Datum)

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

WRANGLER'S SALOON
 LINDHOUT ASSOCIATES ARCHITECTS AIA PC
 10469 CATTATION DRIVE
 BRIGHTON, MI 48116
 810.227.5668

PROJECT	DATE			
WRANGLER'S SALOON				
PREPARED FOR				
LINDHOUT ASSOCIATES ARCHITECTS AIA PC				
TITLE				
GRADING AND DRAINAGE PLAN				
NO	BY	REVISION	PER	DATE
DESIGNED BY:	PC			
DRAWN BY:	PC			
CHECKED BY:				
SCALE:	1" = 30'			
JOB NO:	21-550			
DATE:	6-25-24			
SHEET NO.	C4			

UTILITY NOTES:

- ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF HOWELL TOWNSHIP, LIVINGSTON COUNTY, AND THE STATE OF MICHIGAN.
- ALL STORM SEWER PIPE SHALL BE C-76 CLASS IV RCP.
- CONTRACTOR TO VERIFY DEPTH AND LOCATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING ANY WORK.
- TYPICAL INSTALLATION OF ALL UNDERGROUND UTILITIES SHALL BE BY THE OPEN-CUT METHOD - SUBJECT TO REVIEW AND VERIFICATION AT THE TIME OF CONSTRUCTION.
- THE PROPOSED DRAINAGE SYSTEM IS TO BE OWNED AND PROPERLY MAINTAINED BY THE PROPERTY OWNER.

REFER TO THE SITE SELECTIVE DEMOLITION PLAN, SHEET C2C FOR DEMOLITION OF SPECIFIC STORM UTILITIES

REFER TO THE GRADING AND DRAINAGE PLAN, SHEET C4, FOR STORM WATER NARRATIVE

REFER TO THE STORMWATER PLAN AND PROFILE, SHEET CSB, FOR THE STORM STRUCTURE TABLE

LIVINGSTON COUNTY DETENTION BASIN CALCULATIONS

AREA (ACRES)	IMPERVIOUS FACTOR	IMPERVIOUS
1.24	0.9	1.12
0.02	0.7	0.01
0.21	0.2	0.04

COMPOUND C: 0.80
TOTAL DRAINAGE AREA: 1.47 ACRES

WATER QUALITY VOLUME
V₁₀ = 3,650(CVA) = 4289 FT³
Are upstream infiltration BMP's provided? NO
V₁₀ = 0.15(V₁₀) = 642 FT³

WATER QUALITY RATE FOR MECHANICAL STRUCTURE
T_c = MAX TIME OF CONCENTRATION = 18.23 MIN
Q₁₀ = (CA)(30.2)(T_c+1.1)^{-1.48} = 2.54 CFS

CHANNEL PROTECTION VOLUME CONTROL - REQUIRED
V₁₀ = 4,719(CVA) = 5550 FT³

CHANNEL PROTECTION VOLUME CONTROL - PROVIDED
In-Situ infiltration rate = 0 INHR
Are upstream infiltration BMP's provided? NO
Basin Footprint Infiltration Area Required = NO INFILTRATION FT²
V₁₀ = 0 FT³

CHANNEL PROTECTION RATE CONTROL (EXTENDED DETENTION VOLUME)
V₁₀ = 6,880(CVA) = 8111 FT³

EXTENDED DETENTION OUTLET RATE
Q₁₀ = V₁₀(4880) = 0.047 CFS
H₁₀ = V₁₀(4,800)(H₁₀)^{-1.48} = 2.29 FT
E₁₀ = 943.98 FT

100-YEAR ALLOWABLE OUTLET RATE
Q₁₀₀ = Restricted Drain Rate = 0.1 CFS/ACRE
Q₁₀₀ = 1.1065 - 0.206(N/A) = 1.000 CFS/ACRE
Q₁₀₀ = (LESSER OF Q₁₀₀ & Q₁₀₀)A = 0.147 CFS

100-YEAR DETENTION VOLUME
V₁₀₀ = 18985 (CVA) = 22326 FT³
Q₁₀₀ = (CA)(48.3)(T_c+1.1)^{-1.48} = 7.00 CFS
R = 0.206 - 15(Infiltration/1000) = 0.7854
V₁₀₀ = 17536 (YES) = 17536 FT³
In V₁₀₀ > V₁₀? YES
V₁₀₀ = 17536 FT³

BASIN STORAGE PROVIDED

ELEVATION (FT)	VOLUME (FT ³)	DHWL
945.67	185	18.094
945	732	16.680
945	12,814	12.814
944	764	8.290
943	665	3.873
942	333	518
941.67	0	0

PROVIDED FOOTPRINT OF BASIN BOTTOM AREA = 6488 FT²

OUTLET CONTROL STRUCTURE
Q₁₀ ACTUAL = 1 (1" HOLES)
A₁₀ = 0.0055 FT²
Q₁₀ ACTUAL = (A₁₀)(0.62)(2 × 32.2 × H₁₀^{1.5}) = 0.041 CFS

OUTLET
Q₁₀ ACTUAL = Q₁₀ - Q₁₀ ACTUAL = 0.106 CFS
A₁₀ = Q₁₀ ACTUAL / (0.62)(2 × 32.2 × (E₁₀ - E₁₀ ACTUAL)^{1.5}) = 0.013 FT²
AREA OF 1 INCH DIAMETER ORIFICE = 0.005 FT²
ORIFICES = A₁₀ / 0.005 = 2.0 ORIFICES

BASIN SIZE REQUIRED = 17536 FT³
BASIN SIZE PROVIDED = 18,094 FT³

ORIFICE DESIGN SUMMARY

ELEVATION	# OF HOLES	DIAMETER OF HOLES
941.67	1.0	1-INCH
943.98	2.0	1-INCH

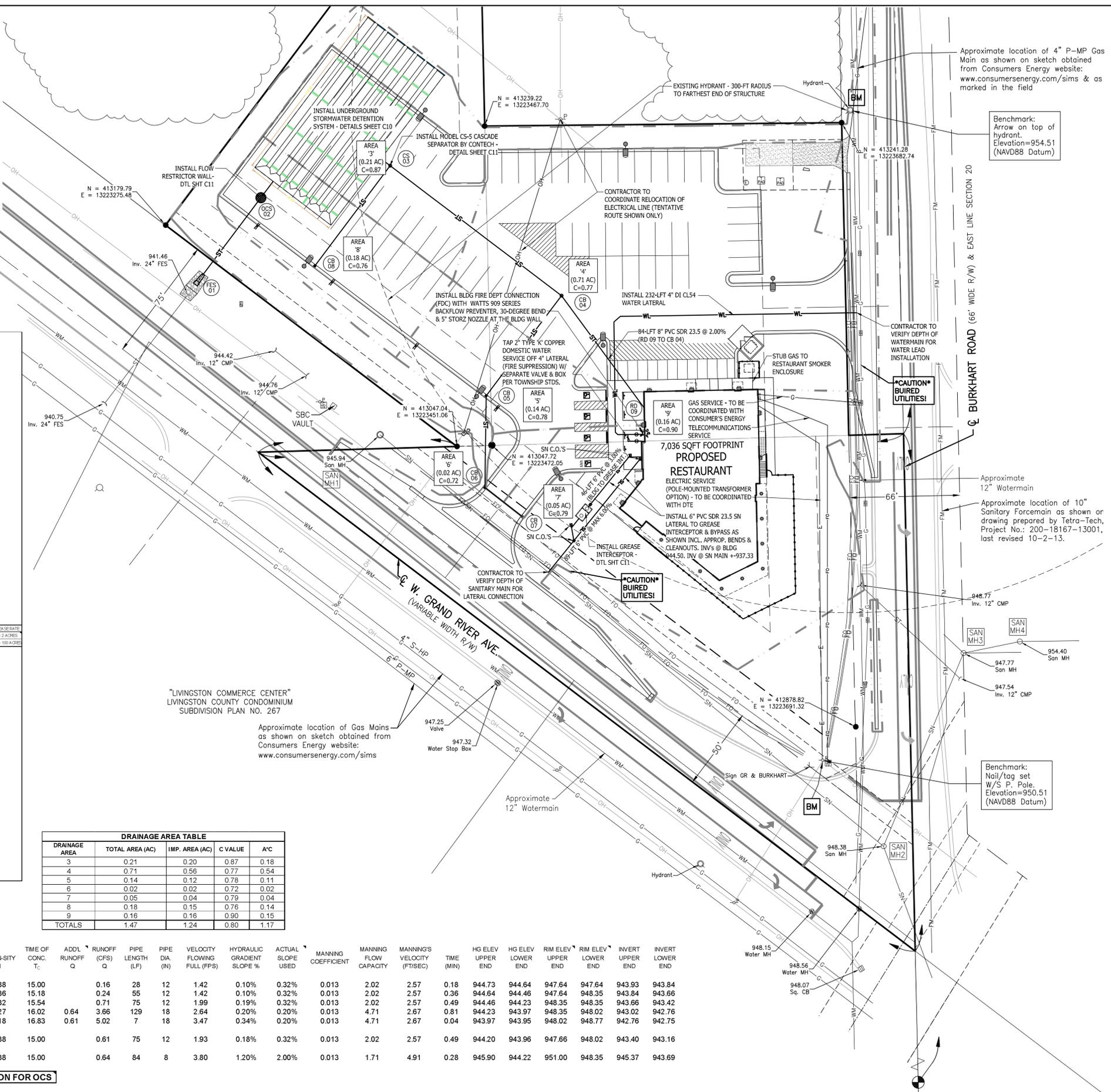
DRAINAGE AREA TABLE

DRAINAGE AREA	TOTAL AREA (AC)	IMP. AREA (AC)	C VALUE	A'C
3	0.21	0.20	0.87	0.18
4	0.71	0.56	0.77	0.54
5	0.14	0.12	0.78	0.11
6	0.02	0.02	0.72	0.02
7	0.05	0.04	0.79	0.04
8	0.18	0.15	0.76	0.14
9	0.16	0.16	0.90	0.15
TOTALS	1.47	1.24	0.80	1.17

100-YEAR PIPE FLOW CALCULATION FOR OCS

FROM	TO	DRAIN AREA	ACRES	RUNOFF COEFF	EQUIV. AREA A * C	INTENS-SITY I	TIME OF CONC. T _c	ADD'L RUNOFF 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	
7	6	7	0.05	0.79	0.04	4.38	15.00	0.16	28	12	1.42	0.10%	0.32%	0.013	2.02	2.57	0.18	944.73	944.64	947.64	947.64	943.93	943.84	
6	5	6	0.02	0.72	0.02	4.36	15.18	0.24	55	12	1.42	0.10%	0.32%	0.013	2.02	2.57	0.36	944.64	944.46	947.64	948.35	943.84	943.66	
5	4	5	0.14	0.78	0.11	4.32	15.54	0.71	75	12	1.99	0.19%	0.32%	0.013	2.02	2.57	0.49	944.46	944.23	948.35	948.35	943.66	943.42	
4	3	4	0.71	0.77	0.54	4.27	16.02	3.66	129	18	2.64	0.20%	0.20%	0.013	4.71	2.67	0.81	944.23	943.97	948.35	948.02	943.02	942.76	
3	BASIN	3	0.21	0.87	0.18	4.18	16.83	0.61	5.02	7	18	3.47	0.34%	0.20%	0.013	4.71	2.67	0.04	943.97	943.95	948.02	948.77	942.76	942.75
8	3	8	0.18	0.76	0.14	4.38	15.00	0.61	75	12	1.93	0.18%	0.32%	0.013	2.02	2.57	0.49	944.20	943.96	947.66	948.02	943.40	943.16	
9	4	9	0.16	0.90	0.15	4.38	15.00	0.64	84	8	3.80	1.20%	2.00%	0.013	1.71	4.91	0.28	945.90	944.22	951.00	948.35	945.37	943.69	

BASIN	OCS 02	ALL	1.47	0.80	1.17	6.31	15.00	7.40	12	24	2.97	0.17%	0.14%	0.013	8.49	2.70	0.07	943.29	943.27	948.77	948.77	941.67	941.65
OCS 02	FES 01	OCS 02	-	-	-	15.07	7.40 <td>63 <td>24 <td>2.97 <th>0.17%</th> <th>0.14%</th> <th>0.013</th> <th>8.49</th> <th>2.70</th> <th>0.39</th> <th>943.29</th> <th>943.16</th> <th>948.77</th> <th>948.77</th> <th>-</th> <th>941.56</th> </td></td></td>	63 <td>24 <td>2.97 <th>0.17%</th> <th>0.14%</th> <th>0.013</th> <th>8.49</th> <th>2.70</th> <th>0.39</th> <th>943.29</th> <th>943.16</th> <th>948.77</th> <th>948.77</th> <th>-</th> <th>941.56</th> </td></td>	24 <td>2.97 <th>0.17%</th> <th>0.14%</th> <th>0.013</th> <th>8.49</th> <th>2.70</th> <th>0.39</th> <th>943.29</th> <th>943.16</th> <th>948.77</th> <th>948.77</th> <th>-</th> <th>941.56</th> </td>	2.97 <th>0.17%</th> <th>0.14%</th> <th>0.013</th> <th>8.49</th> <th>2.70</th> <th>0.39</th> <th>943.29</th> <th>943.16</th> <th>948.77</th> <th>948.77</th> <th>-</th> <th>941.56</th>	0.17%	0.14%	0.013	8.49	2.70	0.39	943.29	943.16	948.77	948.77	-	941.56	



LEGEND

PROPOSED (PR)	EXISTING (EX)
900	+922.08
FF	FF
T/A	T/A
T/C	T/C
F/L	F/L
B/P	B/P
RM	RM
INV	INV
MH	MH
IN	IN
CB	CB
RY	RY
ES	ES
OV	OV
HY	HY
UP	UP
SN	SN
SL	SL
FM	FM
PS	PS
ST	ST
WM	WM
WL	WL
FO	FO
OH	OH
C	C
G	G
T	T
X	X
SN	SN
SL	SL
FM	FM
PS	PS
ST	ST
WM	WM
WL	WL
FO	FO
OH	OH
C	C
G	G
T	T
X	X
SN	SN
SL	SL
FM	FM
PS	PS
ST	ST
WM	WM
WL	WL
FO	FO
OH	OH
C	C
G	G
T	T
X	X

SANITARY SEWER INVENTORY:

SANITARY MANHOLE #1
RIM=945.94
INV. NW=938.02 (10" PVC)
INV. SE=937.96 (10" PVC)
(FLOWING SOUTHEASTERLY)

SANITARY MANHOLE #2
RIM=948.38
INV. NW=935.13 (10" PVC)
INV. NE=936.03 (10" PVC)
INV. SE=935.07 (10" PVC)
(FLOWING SOUTHWESTERLY)

SANITARY MANHOLE #3
RIM=947.77
INV. SW=936.72 (10" PVC)
INV. E=936.77 (10" PVC)
INV. NE=941.32 (10" PVC)
INV. NW=936.77 (10" PVC)
(FLOWING SOUTHWESTERLY)

SANITARY MANHOLE #4
RIM=954.40
INV. SW=941.67 (10" PVC)
INV. E=941.72 (8" PVC)
(FLOWING SOUTHWESTERLY)

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10468 CITATION DRIVE
BRIGHTON, MI 48116
810-227-5668

UTILITY PLAN

PROJECT	DATE
WRANGLER'S SALOON	

DESIGNED BY:	DATE
PC	

DRAWN BY:	DATE
PC	

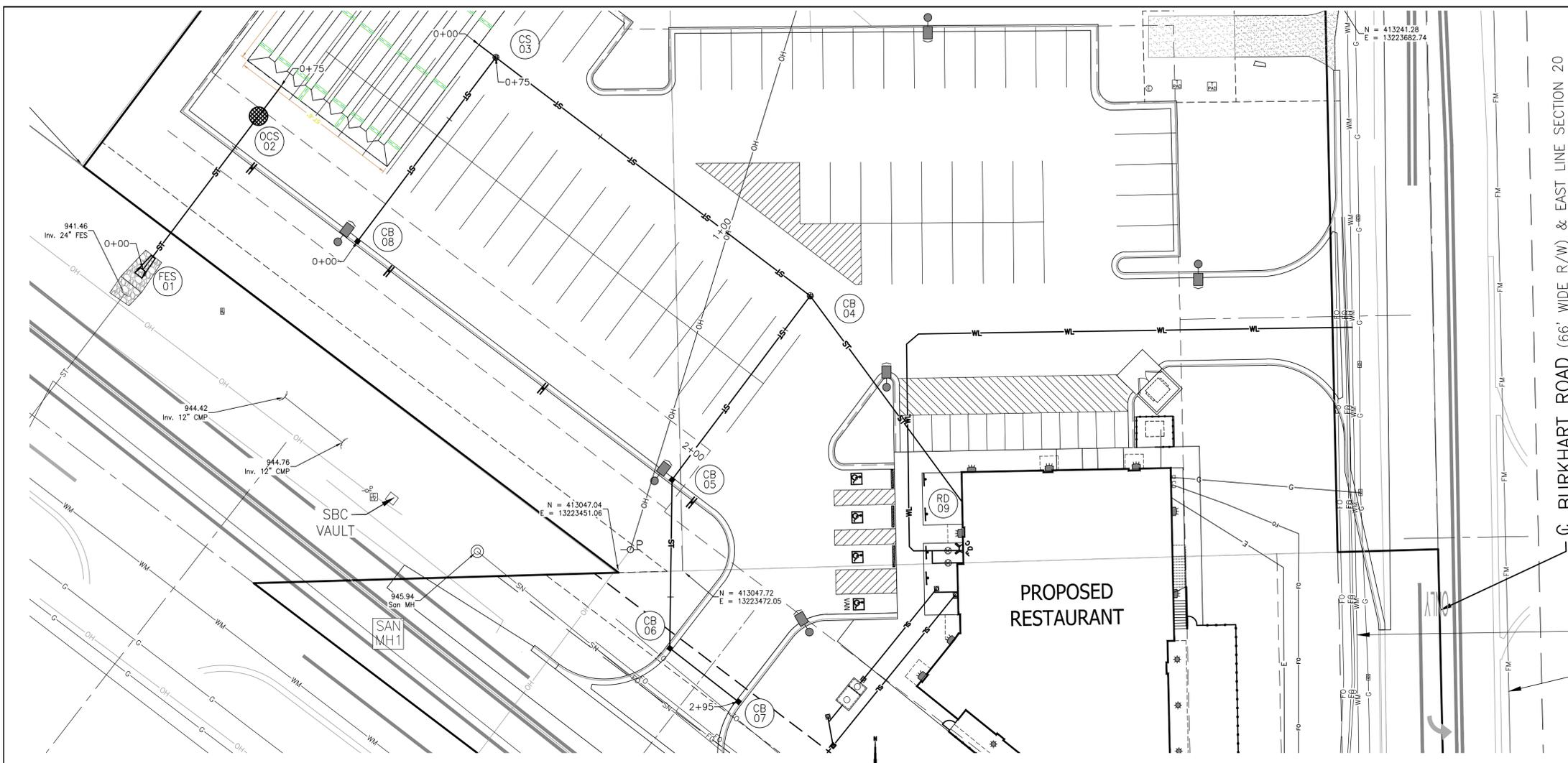
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SCALE:	DATE
1" = 30'	

JOB NO:	DATE
21-550	

DATE:	REVISION PER
6-25-24	

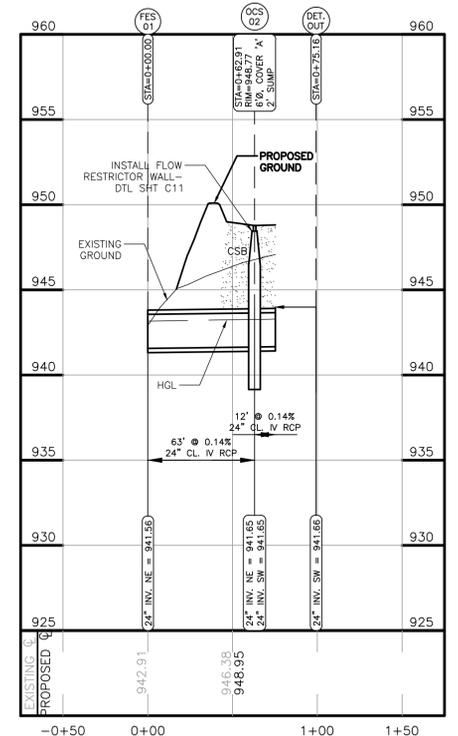
SHEET NO.	DATE
C5A	



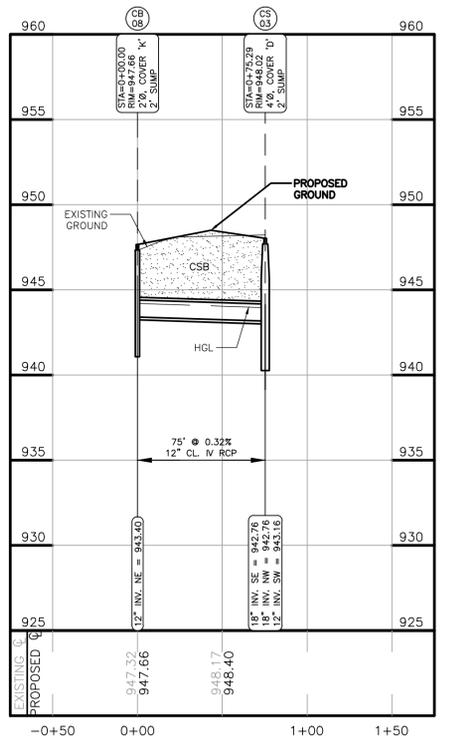
BURKHART ROAD (66' WIDE R/W) & EAST LINE SECTION 20

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- REFER TO THE GRADING AND DRAINAGE PLAN, SHEET C4, FOR STORM WATER NARRATIVE
- REFER TO THE UTILITY PLAN, SHEET C5A, FOR ADDITIONAL INFORMATION

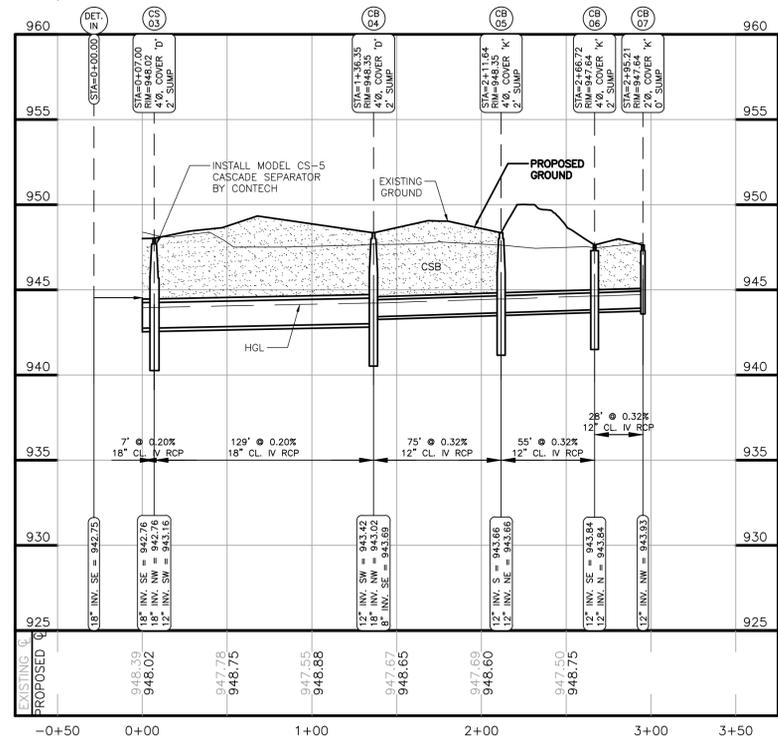
STRUCTURE FRAMES & COVERS				
COVER	TYPE	USE	EAST JORDAN (OR EQUAL)	TYPE OF COVER OR GRATE
A	MH	ALL	1040	TYPE 'B'
B	CB & INLET	TYPE C2 CURB	7065	TYPE 'M1'
K	CB & INLET	TYPE C & F CURB	7045	TYPE 'M1' GRATE 7050 TYPE 'T1' BACK
G	CB & INLET	VALLEY CURB	7065	7045 TYPE 'M1' GRATE 7060 TYPE 'T1' BACK
D	CB & INLET	PARKING LOTS	1040	5105 TYPE 'M1' GRATE
E	CB & INLET	LAWN AREA OR DITCH	1040	TYPE 'O2'



DETENTION OUTLET TO FES 01

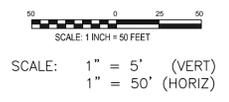


CB 08 TO CS 03



CB 07 TO DETENTION INLET

STORM STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
CB 04	48"Ø, COVER 'D' 2" SUMP RIM = 948.35 12" INV SW = 943.42 8" INV SE = 943.69 N = 413137.51 E = 13223513.98 18" INV NW = 943.02
CB 05	48"Ø, COVER 'K' 2" SUMP RIM = 948.35 12" INV SW = 943.66 12" INV NE = 943.66 N = 413077.42 E = 13223468.61
CB 06	48"Ø, COVER 'K' 2" SUMP RIM = 947.64 12" INV SE = 943.84 12" INV N = 943.84 N = 413022.35 E = 13223457.88
CB 07	24"Ø, COVER 'K' 0' SUMP RIM = 947.64 12" INV NW = 943.93 N = 413004.89 E = 13223490.38
CB 08	24"Ø, COVER 'K' 2" SUMP RIM = 947.66 12" INV NE = 943.40 N = 413155.36 E = 13223365.37
CS 03	48"Ø, COVER 'D' 2" SUMP RIM = 948.02 12" INV SE = 942.76 12" INV SW = 943.16 18" INV NW = 942.76 N = 413215.45 E = 13223410.74
DET. IN	18" INV SE = 942.75 N = 413219.66 E = 13223405.16
DET. OUT	24" INV SW = 941.66 N = 413206.03 E = 13223340.25
FES 01	24" INV NE = 941.56 N = 413146.08 E = 13223294.93
OCS 02	72"Ø, COVER 'A' 2" SUMP RIM = 948.77 24" INV NE = 941.65 24" INV SW = 941.65 N = 413196.26 E = 13223332.86



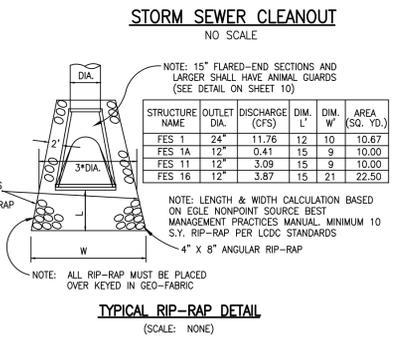
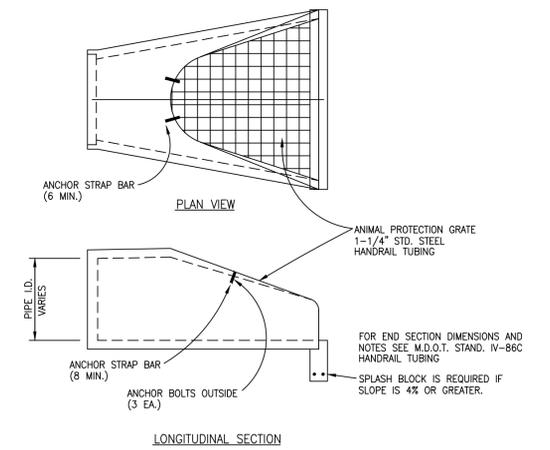
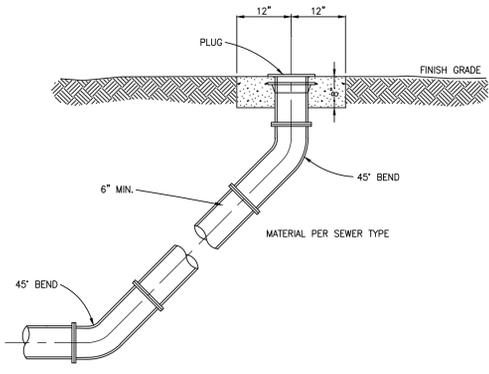
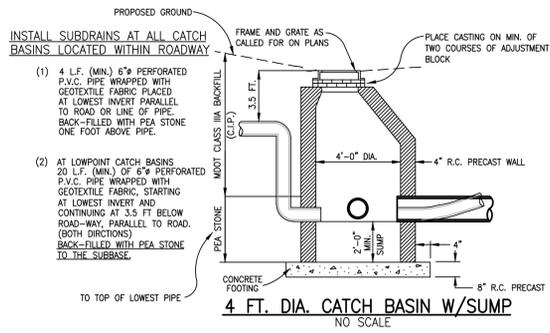
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WRANGLER'S RESTAURANT
LINDHOUT ASSOCIATES ARCHITECTS AIA PC
10468 CITATION DRIVE
BRIGHTON, MI 48116
810.227.5668

PROJECT: WRANGLER'S RESTAURANT
PREPARED FOR: LINDHOUT ASSOCIATES ARCHITECTS AIA PC
TITLE: STORM SEWER PLAN & PROFILE

NO	BY	DATE	REVISION

DESIGNED BY: NL
DRAWN BY: NL
CHECKED BY:
SCALE: VARIES
JOB NO: 21-550
DATE: 6-25-24
SHEET NO. **C5B**



STRUCTURE FRAMES & COVERS				
COVER	TYPE	USE	EAST JORDAN (OR EQUAL)	TYPE OF COVER OR GRATE
A	MH	ALL	1040	TYPE 'B'
D	CB & INLET	TYPE C & F CURB	7065	TYPE 'M1'
K	CB & INLET	TYPE C & F CURB	7045	TYPE 'M1' GRATE 7050 TYPE 'T1' BACK
G	CB & INLET	VALLEY CURB	7065	7045 TYPE 'M1' GRATE 7060 TYPE 'T1' BACK
D	CB & INLET	PARKING LOTS	1040 5100	TYPE 'M1' GRATE 5105 TYPE 'M1' GRATE
E	CB & INLET	MIN. AREA OR OTHER	1040	TYPE '102'

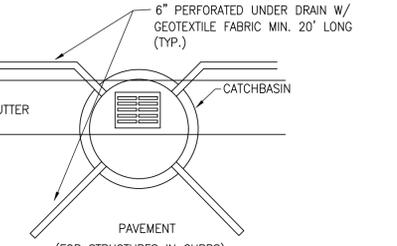
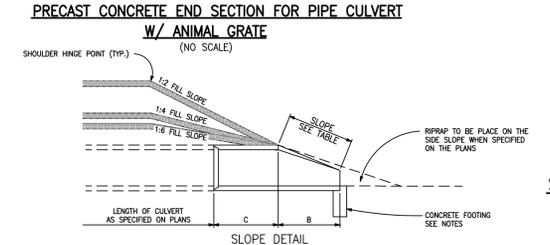
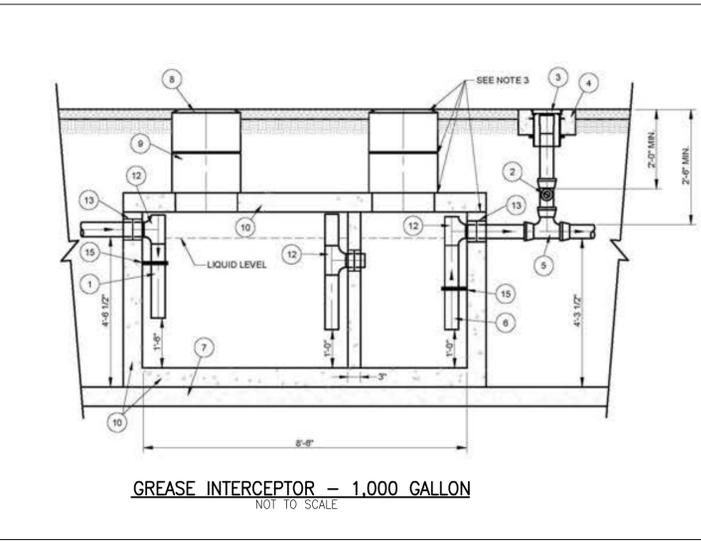
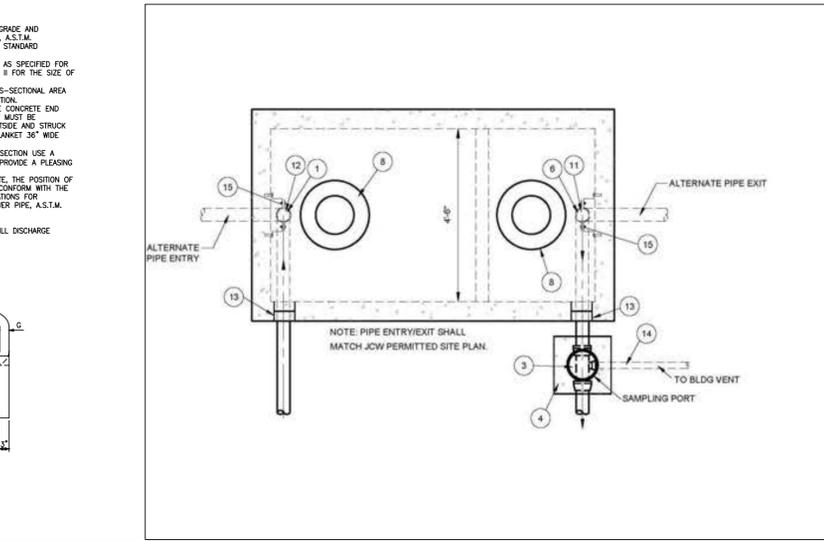
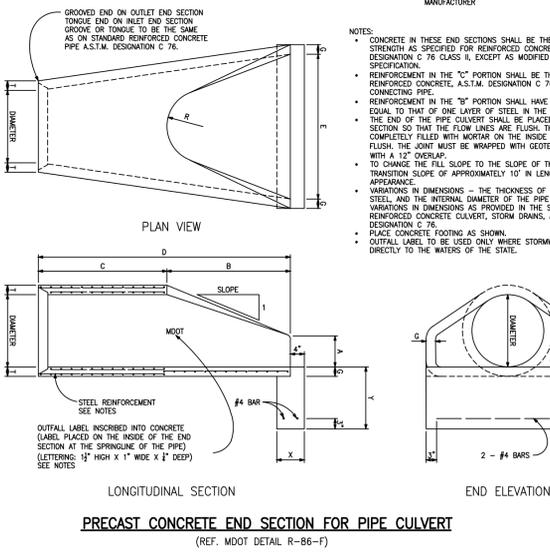
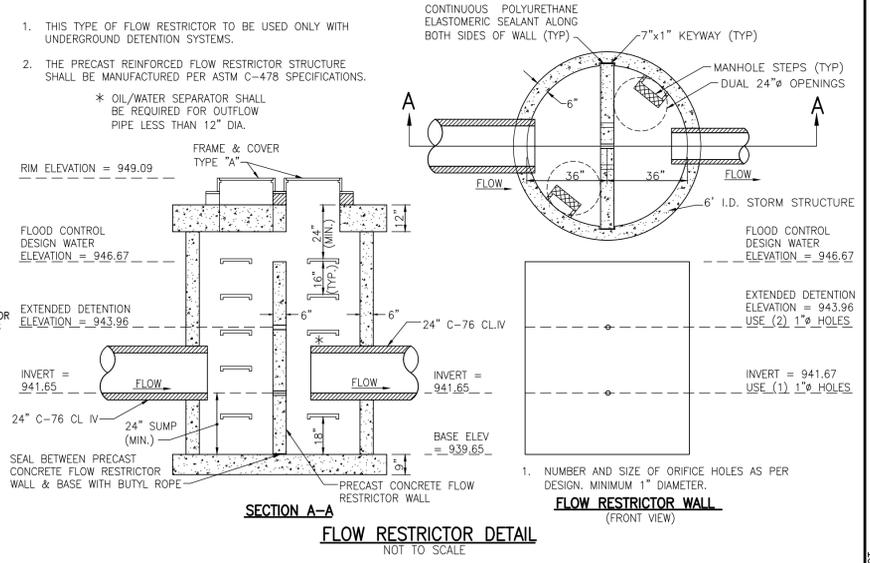
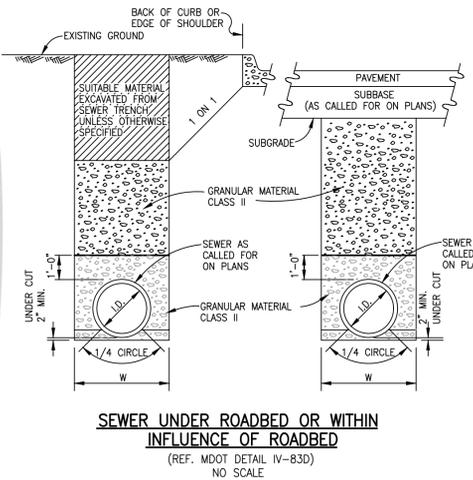
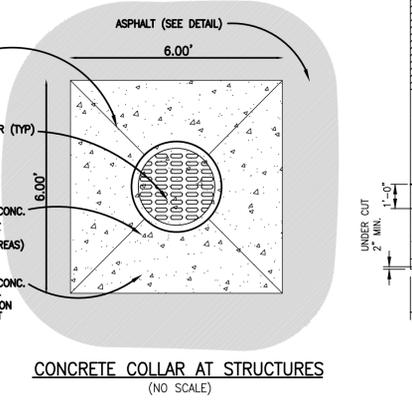
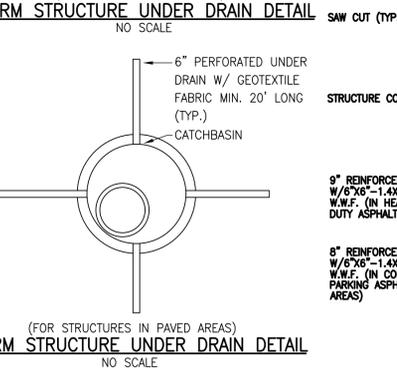


TABLE OF DIMENSIONS											
PIPE DIAMETER (INCHES)	APPROX. SLOPE	T (INCHES)	A (INCHES)	B (INCHES)	C (INCHES)	D (INCHES)	E (INCHES)	R (INCHES)	X (INCHES)	Y (INCHES)	Z (INCHES)
12	2.4 TO 1	2	4	24	49	73	24	2	9	8	18
15	2.4 TO 1	2-1/4	6	27	46	73	30	2-1/4	11	8	18
18	2.3 TO 1	2-1/2	9	27	46	73	36	2-1/2	12	8	18
21	2.4 TO 1	2-3/4	9	36	37-1/2	73-1/2	42	2-3/4	13	8	18
24	2.5 TO 1	3	9-1/2	43-1/4	30-1/2	73-3/4	48	3	14	8	18
27	2.5 TO 1	3-1/4	10-1/2	49-1/4	24-1/2	73-3/4	54	3-1/4	14-1/2	8	18
30	2.5 TO 1	3-1/2	12	54	19-3/4	73-3/4	60	3-1/2	15	8	18
36	2.5 TO 1	4	15	63	34-3/4	97-3/4	72	4	20	8	18
42	2.5 TO 1	4-1/2	21	63	35	98	78	4-1/2	22	10	24
48	2.5 TO 1	5	24	72	36	98	84	5	22	10	24
54	2.0 TO 1	5-1/2	27	63	33-1/4	98-1/4	90	5-1/2	24	10	24
60	1.8 TO 1	6	35	60	39	99	96	6	24	12	24
66	1.7 TO 1	6-1/2	30	72	27	99	102	6-1/2	24	12	24
72	1.8 TO 1	7	36	78	21	99	108	7	24	12	24
78	1.8 TO 1	7-1/2	36	90	21	111	114	6-1/2	24	12	24
84	1.6 TO 1	8	36	90-1/2	21	111-1/2	120	6-1/2	24	12	24



ITEM	DESCRIPTION
1	4" PVC INLET PIPE
2	4"x4" TEE WITH 2" PIPE TO BUILDING VENT
3	THREADED C/O CAP JOSAM 5880 OR APP EQUAL
4	CONCRETE PAD
5	4"x4" TWO-WAY CLEANOUT TEE
6	4" PVC OUTLET
7	4" x 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 PIPEWALL CONNECTOR
14	2" VENT PIPE (IDENTIFY PIPE TYPE, CLASS & JOINT AS REQUIRED FOR PROJECT)
15	STAINLESS STEEL PIPE SUPPORT CLAMP

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

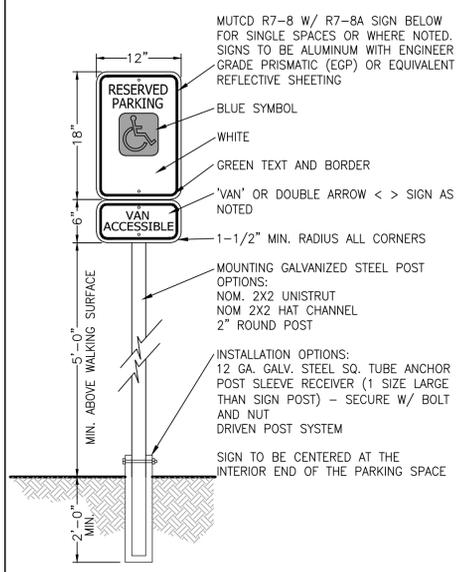
WRANGLER'S SALOON
 LINDHOUT ASSOCIATES ARCHITECTS AIA PC
 10466 CITATION DRIVE
 BRIGHTON, MI 48116
 810.227.5668

MISCELLANEOUS CONSTRUCTION DETAILS

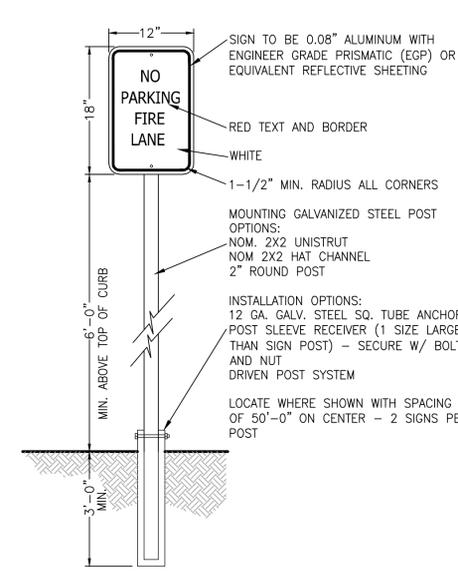
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TITLE	REVISION PER	NO. BY

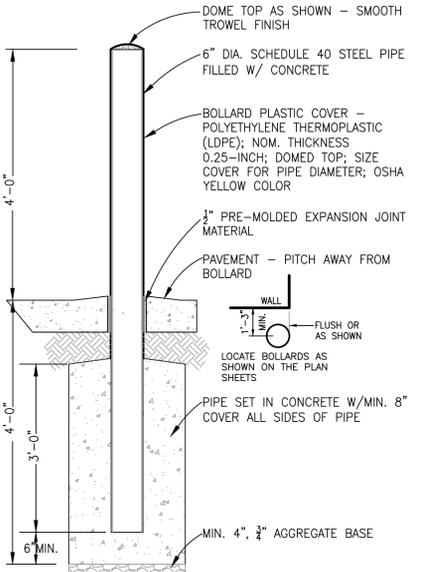
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 SCALE: AS NOTED
 JOB NO: 21-550
 DATE: 6-25-24
 SHEET NO. C11



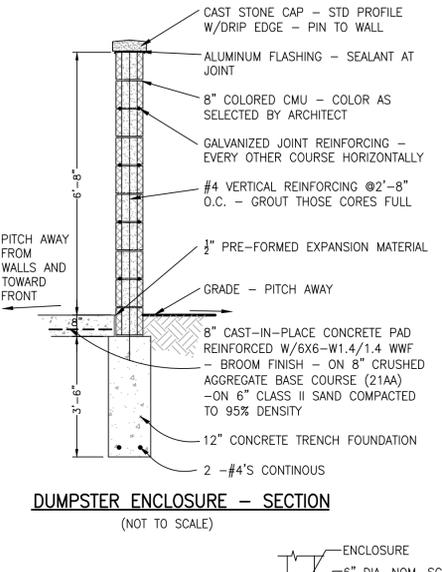
ADA HANDICAP SPACE SIGN DETAIL
(NOT TO SCALE)



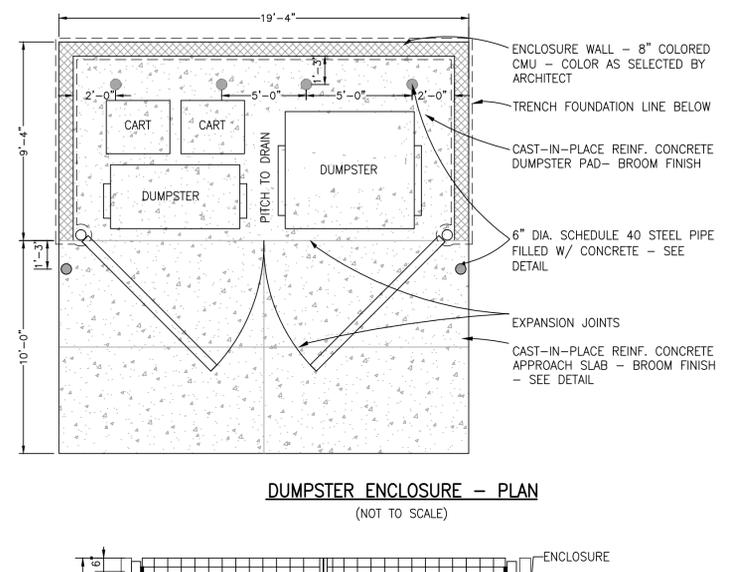
'ONE-WAY' & 'NO PARKING' SIGN DETAILS
(NOT TO SCALE)



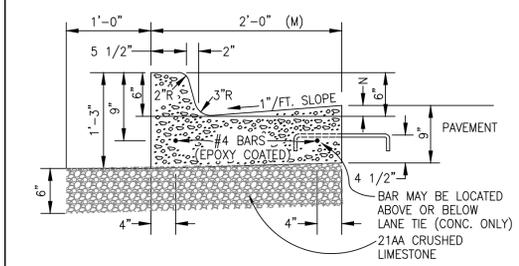
PIPE BOLLARD DETAIL
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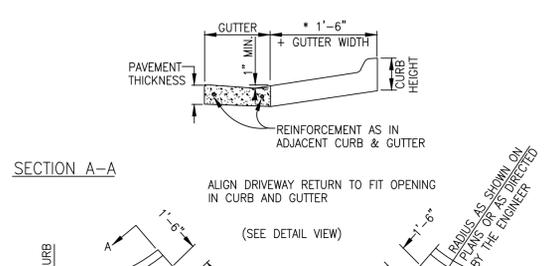
DUMPSTER ENCLOSURE - SECTION
(NOT TO SCALE)



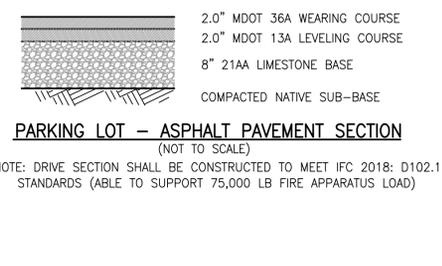
DUMPSTER ENCLOSURE - PLAN
(NOT TO SCALE)



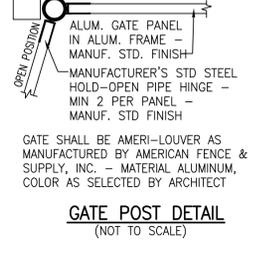
CONC. CURB & GUTTER - TYPE F
(NO SCALE)



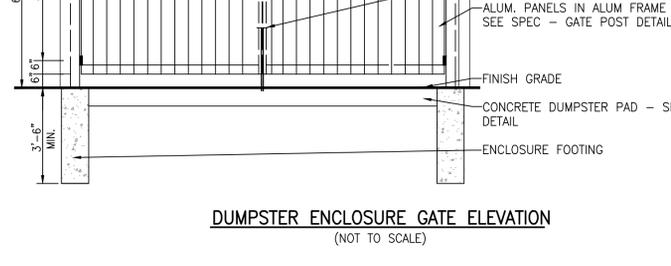
CONCRETE DRIVEWAY OPENING - MDOT STANDARD II-42, DETAIL 'M'
(NO SCALE)



PARKING LOT - ASPHALT PAVEMENT SECTION
(NOT TO SCALE)



GATE POST DETAIL
(NOT TO SCALE)

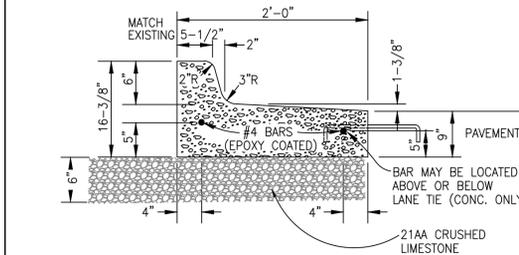


DUMPSTER ENCLOSURE GATE ELEVATION
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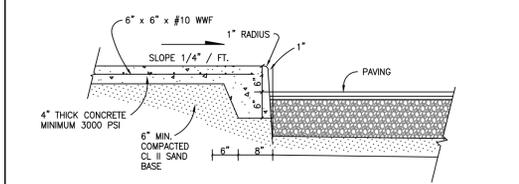
DETAIL	M	N	LANE TIES	CONCRETE CU.YD./LIN.FT.
F1	1'-6"	7/8"	AS SHOWN	0.0484
F2	1'-6"	7/8"	OMITTED	0.0484
F3	2'-0"	1 3/8"	AS SHOWN	0.0610
F4	2'-0"	1 3/8"	OMITTED	0.0610
F5	2'-6"	1 7/8"	AS SHOWN	0.0737
F6	2'-6"	1 7/8"	OMITTED	0.0737

NOTE: WHITE MEMBRANE CURING COMPOUND PER ASTM C-309 TYPE SPRAYED AS DIRECTED

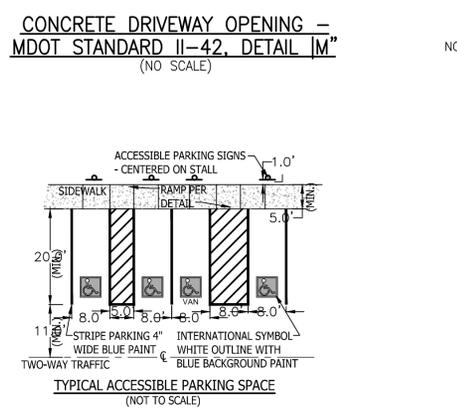
CONC. CURB & GUTTER - TYPE F
(NO SCALE)



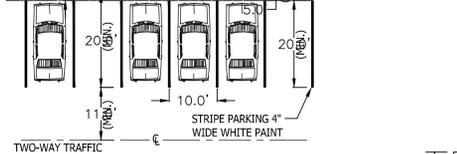
CINC. CURB & GUTTER - TYPE F - MODIFIED
(NO SCALE)



INTEGRAL CONCRETE WALK / CURB DETAIL
(NO SCALE)

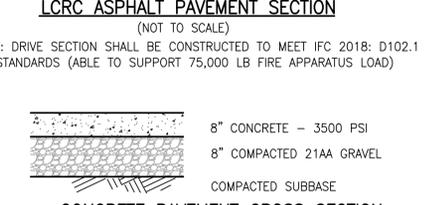


TYPICAL ACCESSIBLE PARKING SPACE
(NOT TO SCALE)

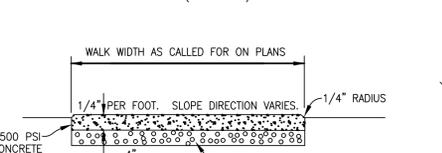


TYPICAL PARKING SPACE
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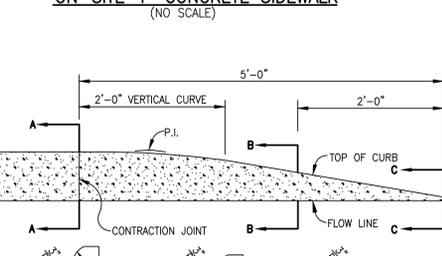
HOWELL TOWNSHIP



LCRC ASPHALT PAVEMENT SECTION
(NOT TO SCALE)

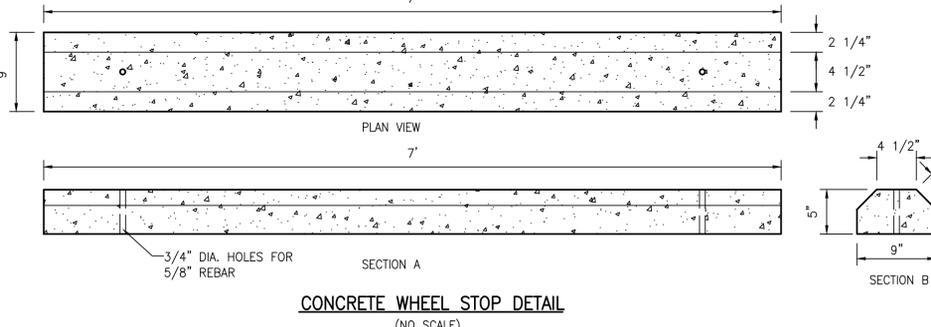


CONCRETE PAVEMENT CROSS SECTION
(NO SCALE)

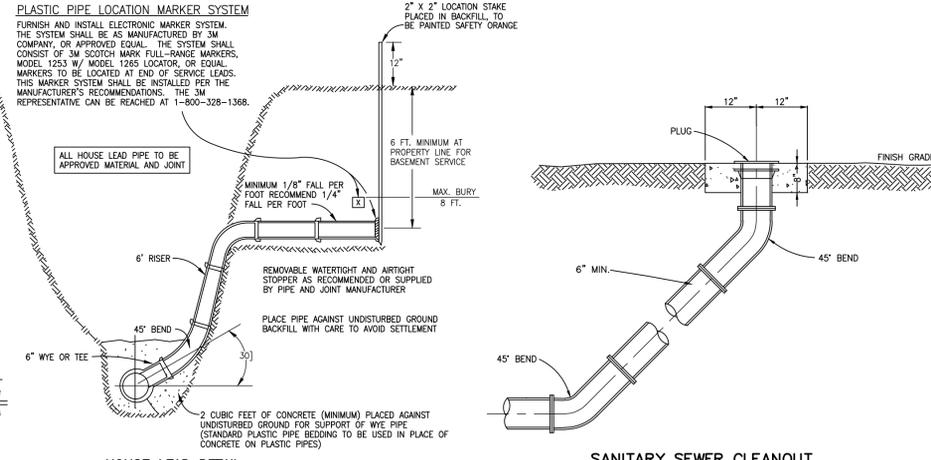


ON-SITE 4\"/>

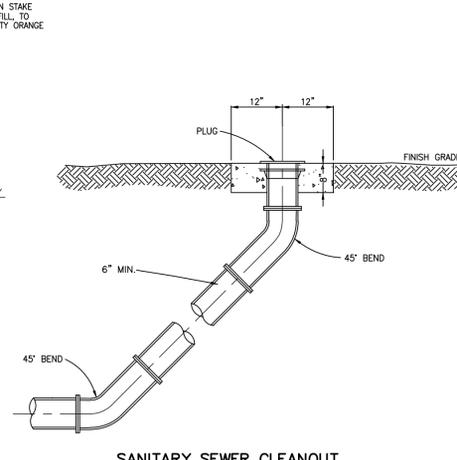
CONCRETE CURB AND GUTTER TAPER / ENDINGS
(NO SCALE)



CONCRETE WHEEL STOP DETAIL
(NO SCALE)



HOUSE LEAD DETAIL
(NO SCALE)



SANITARY SEWER CLEANOUT
NO SCALE

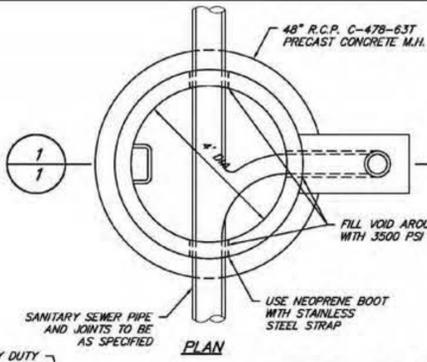
BEBOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
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WRANGLER'S SALOON
LINDHOUT ASSOCIATES ARCHITECTS AIA PC
10498 CATTATION DRIVE
BRIGHTON, MI 48116
810.227.5668

PROJECT: _____ PREPARED FOR: _____ TITLE: _____ DATE: _____

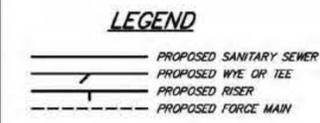
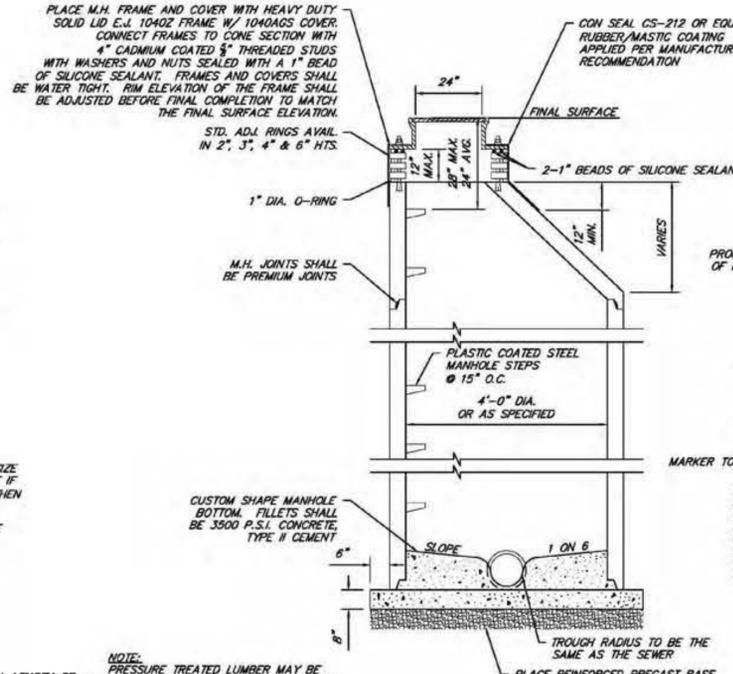
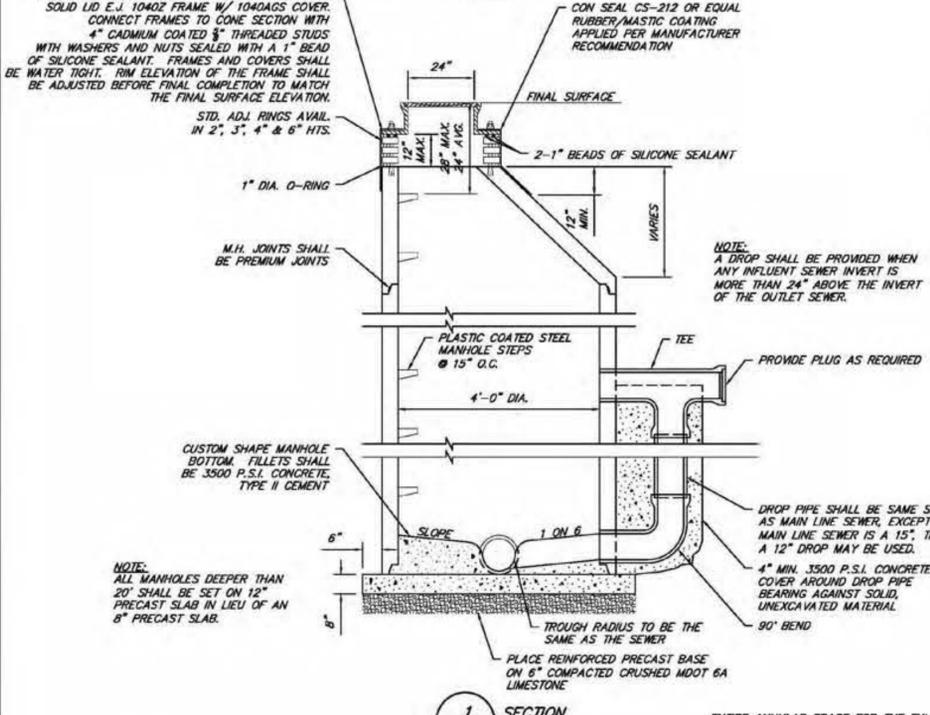
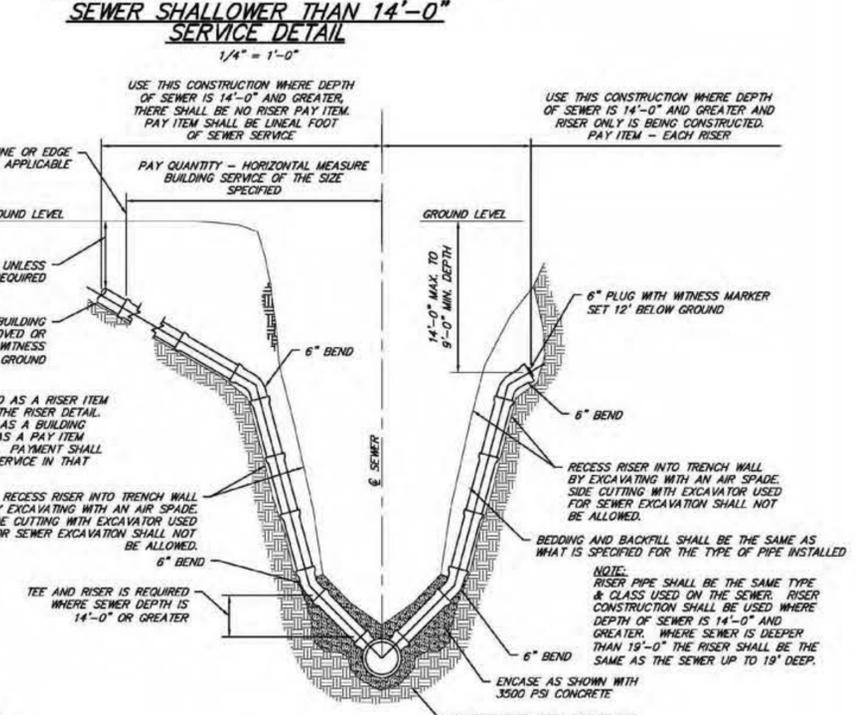
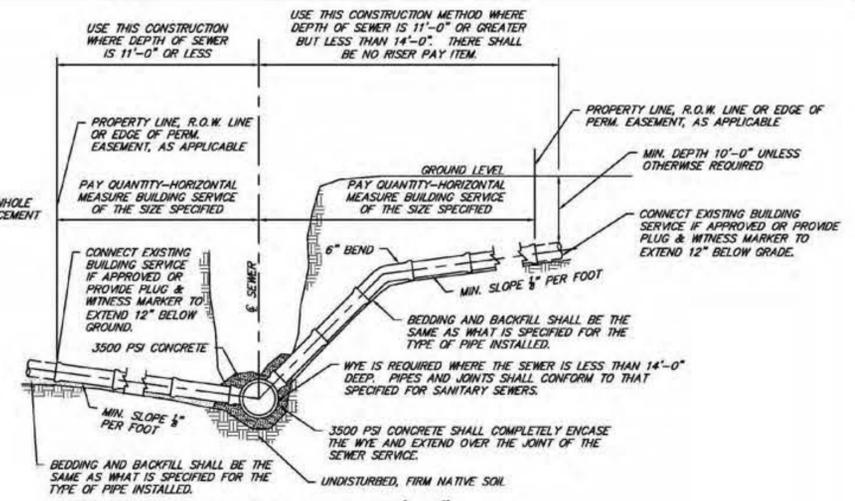
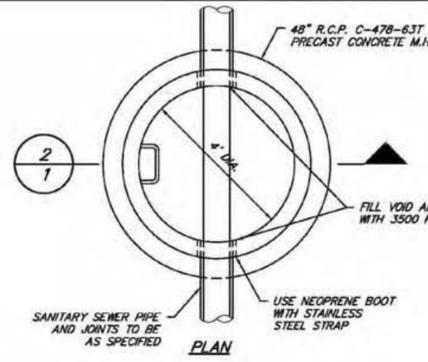
NO.	BY	REVISION PER

DESIGNED BY: PC
DRAWN BY: PC
CHECKED BY: _____
SCALE: AS NOTED
JOB NO: 21-550
DATE: 6-25-24
SHEET NO. **C12**



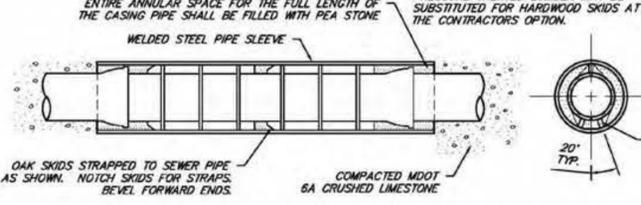
TRENCH WIDTH CHART

PIPE SIZE	MINIMUM	MAXIMUM
8" & 10"	24"	30"
12" & 15"	30"	36"
18"	36"	42"
24"	42"	48"
30"	48"	54"
36"	54"	60"
LARGER THAN 36"	36" +20"	I.D. +24"

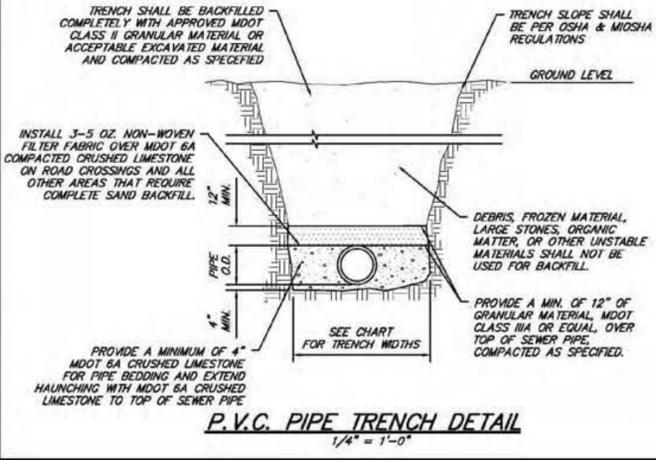


STANDARD DROP MANHOLE
SCALE: 1/2" = 1'-0"

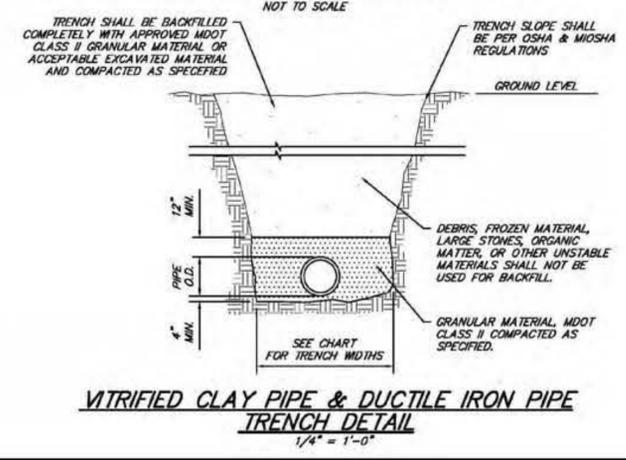
STANDARD MANHOLE
SCALE: 1/2" = 1'-0"



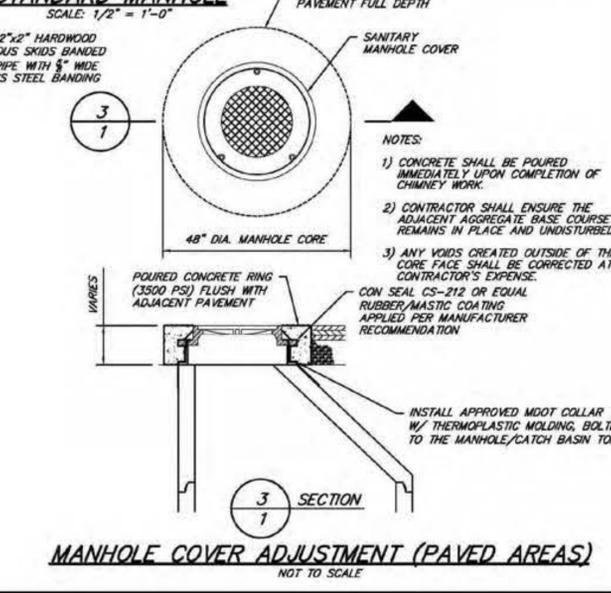
SEWER IN SLEEVE DETAIL
NOT TO SCALE



P.V.C. PIPE TRENCH DETAIL
1/4" = 1'-0"



VITRIFIED CLAY PIPE & DUCTILE IRON PIPE TRENCH DETAIL
1/4" = 1'-0"



MANHOLE COVER ADJUSTMENT (PAVED AREAS)
NOT TO SCALE

DE. BY: SGI CH. BY: SGI PROJECT NO.
 DR. BY: SGI APP. BY: SGI

STDS. DS-1156-2A SHEET 1 OF 1
 DATE: SEPTEMBER 2017 FILE NO. DS-1156-2A
 SCALE: NOT TO SCALE

Spicer group

SAGINAW OFFICE
 230 S. Washington Ave.
 Saginaw, MI 48602
 Tel. 989-754-4717
 Fax. 989-754-4440
 www.SpicerGroup.com

BEBOSS Engineering
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 HOWELL, MI. 48843
 517.546.4836 FAX 517.548.1670

WRANGLER'S SALOON
 LINDHOUT ASSOCIATES ARCHITECTS AIA PC
 10468 CATTARAUGUS DRIVE
 BRIGHTON, MI 48116
 810.227.5668

PROJECT: PREPARED FOR: TITLE: HOWELL TOWNSHIP STANDARD DETAILS - SANITARY

NO.	REVISION PER	DATE

DESIGNED BY: BY OTHERS
 DRAWN BY: BY OTHERS
 CHECKED BY:
 SCALE: AS NOTED
 JOB NO: 21-550
 DATE: 6-25-24
 SHEET NO. **C15**



Carlisle | Wortman
ASSOCIATES, INC.

117 NORTH FIRST STREET SUITE 70 ANN ARBOR, MI 48104 734.662.2200 734.662.1935 FAX

Date: April 17, 2024
Revised: July 16, 2024

Site Plan Review For Howell Township, Michigan

Applicant:	WD Realty
Project Name:	Wranglers Saloon
Plan Date:	April 15, 2024
Revised Plan Date:	June 15, 2024
Location:	4020 W Grand River Ave
Zoning:	Regional Service Commercial District (RSC)
Action Requested:	Final Site Plan Approval

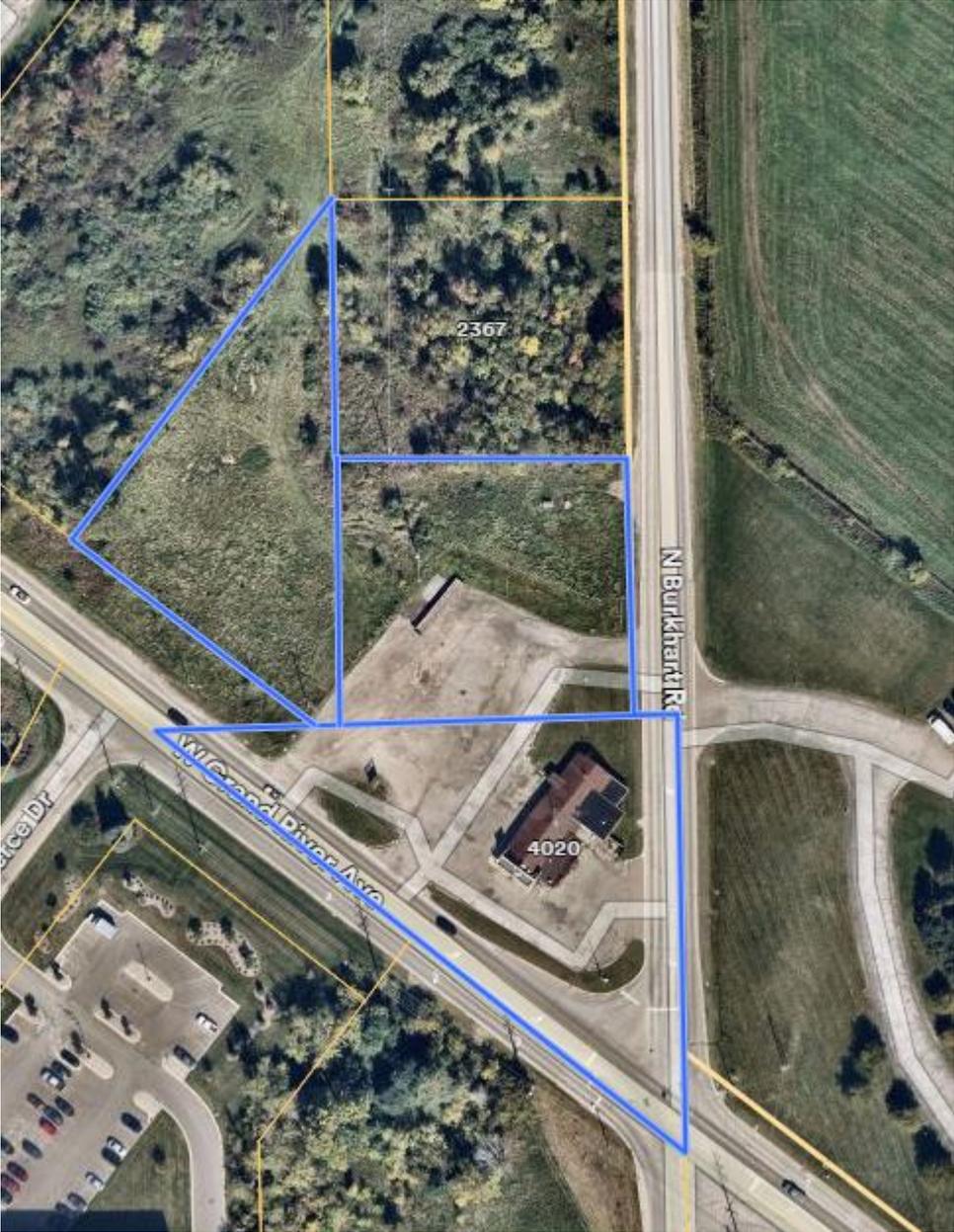
PROJECT AND SITE DESCRIPTION

The applicant has submitted a final site plan dated March 26, 2024, that proposes removal of the existing building and erection of a proposed restaurant with 250-person seating capacity located at 4020 W Grand River Ave otherwise known as parcels #4706-20-201-017, 4706-20-201-018, and 4706-20-400-004. To accommodate the proposed building of Wranglers Saloon, a 7,036 square foot building with the associated parking is proposed. Removal of the existing building and asphalt parking lot are proposed for prior demolition.

The site is currently zoned Regional Service Commercial District (RSC) and is vacant. The proposed restaurant use is a permitted use in the RSC zoning district . Figure 1 provides an arial image of the current site outlined in blue.

Benjamin R. Carlisle, *President* John L. Enos, *Vice President* Douglas J. Lewan, *Principal*
David Scurto, *Principal* Sally M. Elmiger, *Principal* R. Donald Wortman, *Principal* Craig Strong, *Principal*
Paul Montagno, *Principal* Megan Masson-Minock, *Principal* Laura Kreps, *Senior Associate*
Richard K. Carlisle, *Past President/Senior Principal*

Figure 1. Aerial Image of Subject Site and Vicinity



Source: Nearmap

Items to be Addressed: None.

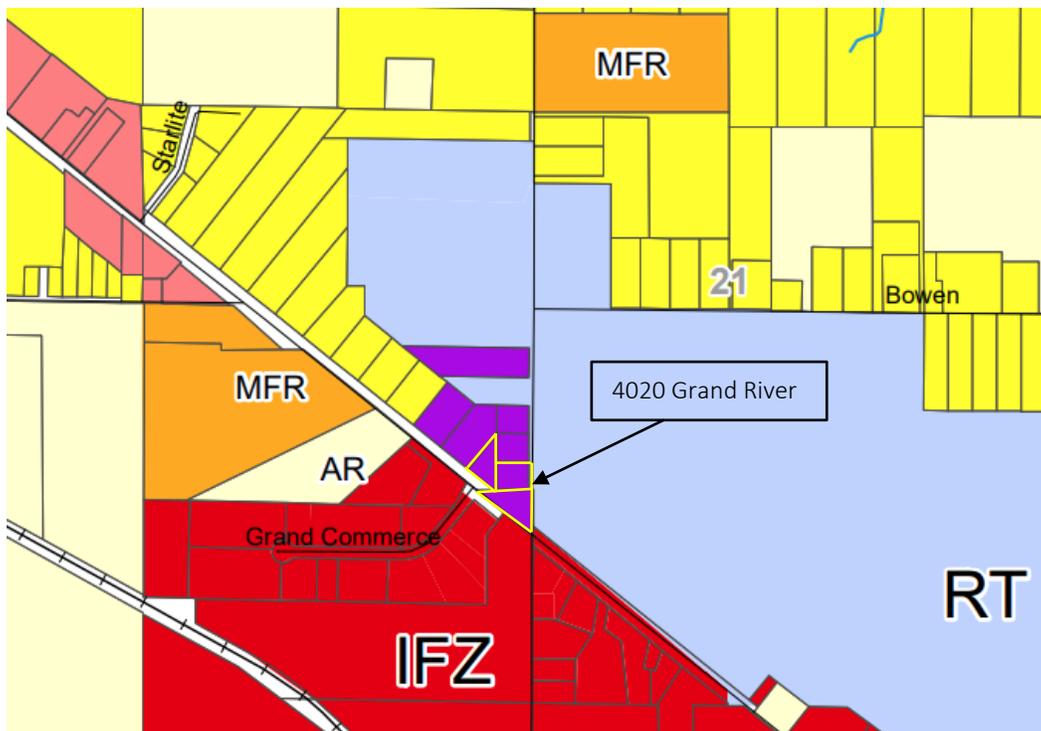
NEIGHBORING ZONING, LAND USE AND MASTER PLAN

Neighboring zoning designations are summarized in Table 1.

Table 1. Zoning District

	Zoning
Subject Site	RSC – Regional Service Commercial
North	RSC- Regional Service Commercial
South	IFZ- Industrial Flex Zone
East	RT-Research and Technology
West	RSC – Regional Service Commercial

Zoning Map



Zoning Designation	
★ Conditional Rezoning	NSC - Neighborhood Service Commercial
PUD - Planned Unit Development	HSC - Highway Service Commercial
AR - Agricultural Residential	RSC - Regional Service Commercial
SFR - Single Family Residential	IFZ - Industrial Flex Zone
MFR - Multiple Family Residential	I - Industrial
MHD - Manufactured Housing District	RT - Research & Technology
OS - Office Service	

Items to be Addressed: None.

AREA, WIDTH, HEIGHT, SETBACKS

The following table summarizes the Density, Placement, and Height Regulations for the site plan associated with the use.

Table 2. Density, Placement, and Height Regulations

	Required	Provided	Compliance
Lot Area	2 Acres	3.20 Acres	Complies
Lot Width	200 Feet	240 Feet	Complies
Front Setback	35 Feet	59 Feet South 71.5 Feet East	Complies
Side Setback	10 – 25 Feet (10 ft. min with a combine total of 25 ft.)	264.5 Feet West 140.75 Feet North	Complies
Rear Setback	50 Feet	50 Feet	Complies
Lot Coverage	75 % Max	39.7 %	Complies
Building Height	70 Feet Max	39 Feet 6.6 Inches	Complies

Section 18.02.E.1 states that all off-street parking spaces shall not be closer than the required front, side and rear yard setbacks in the zoning district in which they are located to any property line.

The building height has been included on Sheet C3A in the table Site Statistical Data. The rear yard setback of fifty (50) feet is now shown on Sheet C3A.

Items to be Addressed: None.

BUILDING LOCATION AND SITE ARRANGEMENT

The proposed building is located at the corner of North Burkhart and W Grand River Avenue. The building placement utilizes the corner to highlight the building and make it a prominent feature of the site with the parking in the back. We feel that the location is appropriate as it appears to honor the historic location of the previous building that was on site.

Items to be Addressed: None.

PARKING, LOADING

The applicant is proposing to demolish the current asphalt parking area to be replaced with 83 vehicular spaces including four (4) barrier-free spaces and thirteen (13) motorcycle spaces. Per section 18.02.G.22, which sets requirements for Restaurants, Beer Parlors, Taverns, Cocktail Lounges, Night Clubs, and Privat Clubs, one (1) space for each four (4) customer seats, plus one (1) parking space for each employee working during maximum employment hours.

Barrier-Free Spaces

There are four (4) proposed barrier-free spaces.

Motorcycle Spaces

There are thirteen (13) proposed motorcycle spaces.

Vehicular Spaces

There are sixty-six (66) proposed vehicular spaces.

Loading Space

There is one (1) loading space proposed.

With the maximum number of employees working during maximum employment hours being twenty (20), one (1) space per four (4) customers being equal to fifty-three (53), the currently proposed eighty-three (83) parking spaces meet the Ordinance requirements.

Items to be Addressed: None.

SITE ACCESS AND CIRCULATION

The applicant provided an emergency vehicle circulation plan which demonstrates proper vehicle traffic flow.

We defer to Engineering and the Fire Chief for further consideration.

Items to be Addressed: None.

NATURAL FEATURES

The location and arrangement of the site post development will see an increase in impervious surfaces which will be mitigated through a series of catch basins in addition to an underground detention basin.

The site plan calls out that the National Wetland Inventory notes no wetlands on the subject parcel and that wetland flagging was not observed during the field survey.

Stamped approval from EGLE will not be required for construction as it is evident that there are no wetlands shown for the property through the EGLE wetland database.

Items to be Addressed: None.

LANDSCAPING

The applicant has provided a landscape plan, as shown in the following table.

Table 3. Landscaping Requirements RSC District

Landscaped Area	Requirement	Factor	Required	Provided
Road Frontages Grand River	1 deciduous or evergreen tree per 40 linear feet	478	12	12
	1 ornamental tree per 100 linear feet		4	5
	Min. of 8 shrubs per every 40 linear feet		96	96
Road Frontages Burkhart	1 deciduous or evergreen tree per 40 linear feet	286	7	7
	1 ornamental tree per 100 linear feet		2	3
	Min. of 8 shrubs per every 40 linear feet		57	57
Foundations	1 ornamental tree per 35 feet of building frontage	359	10	10
	5 shrubs per 35 feet of building frontage		51	51
Stormwater Detention/ Retention Areas	1 deciduous or evergreen tree per 50 feet of perimeter	N/A	N/A	N/A
	10 shrubs per 50 feet of perimeter		N/A	N/A

Berm Landscaping Adjacent to Roads	1 deciduous or evergreen tree per 40 feet of road frontage	Grand River 232	8	8
	1 ornamental tree per 100 feet of road frontage		5	5
	8 shrubs per 40 feet of road frontage		8	8
Berm Landscaping Adjacent to Roads	1 deciduous or evergreen tree per 40 feet of road frontage	Burkhart 56	2	2
	1 ornamental tree per 100 feet of road frontage		1	1
	8 shrubs per 40 feet of road frontage		2	2

The site plan does not propose the removal of any trees on site. Sheet C8 shows the proposed plant list with botanical and common names listed. The above table reflects the count of proposed landscaping.

Items to be Addressed: None.

LIGHTING

The lighting plan provided on sheet C6, indicates the average lighting level at 0.3 footcandles, with a maximum light level on site being 8.5 footcandles. The lighting level at the boarder around the proposed site is 0.0 footcandles meeting Ordinance standards. Fixture details indicate downward directed light fixtures mounted at a height of 20 feet.

Items to be Addressed: None.

SIGNS

The Site plan references proposed signage but is not reflected in the plans.

If added, signs will require a separate permit from the Zoning Administrator. A sign application must be filed with the Zoning Administrator, at which time the zoning administrator will determine if the signs meet the requirements of the ordinance.

Items to be Addressed: None.

FLOOR PLAN AND ELEVATIONS

Floor plan and elevation sheets have been included in the site plan on sheets A1.0, A2.0, A2.1, A3.0, and A3.1.

Items to be Addressed: None.

TRASH ENCLOSURE

The applicant has indicated that a garbage enclosure will be placed and stored outside the building on the East side near the Burkhard entrance. The current plans outline the screening of the receptacle on sheet C12 with appropriate screening provided.

Items to be Addressed: None.

RECOMMENDATIONS

The plans appear to meet all requirements from a zoning perspective. We recommend the final site plan be approved by the Planning Commission.



CARLISLE/WORTMAN ASSOC., INC.
Paul Montagno, AICP
Principal



CARLISLE/WORTMAN ASSOC., INC.
Grayson Moore
Community Planner

308-2401

cc: Jonathan Hohenstein, Township Treasurer
John Bradley, Township Engineer

August 12, 2024

Jonathan Hohenstein, Treasurer
Howell Township
3525 Byron Road
Howell, MI 48855

RE: Wrangler's Saloon
4020 West Grand Avenue
Final Site Plan Review

Dear Mr. Hohenstein,

We have received and reviewed the site plan for Wrangler Saloon at 4020 West grand River Avenue. The plans were prepared by Boss Engineering and are dated June 27, 2024. Based on our review, we offer the following comments:

General

The site consists of three parcels zoned Regional Service Commercial (RSC). The three (3) parcels need to be combined into a singular parcel. The proposed use is consistent with the zoning.

The plans include the project name, name of Howell Township, Livingston County, Michigan, proprietor's, engineer's, and architect's name, address, phone and fax number, a location map with north arrow, a table with agency approvals required, and a plan sheet index.

Portions of the patio and paved area are situated in the setback, we defer to the Township Planner to determine if this is acceptable.

A title block is present on each plan sheet

Legal descriptions that close within acceptable tolerances should be provided for each of the three (3) parcels on Cover Sheet C1.

The Cover Sheet (C1) must have the seal and signature of a professional engineer licensed in the state of Michigan.

Sanitary

New sanitary lead, including a proposed grease interceptor, and clean outs are shown connecting to the sanitary main parallel to Grand River Avenue.

Details of the proposed Grease Interceptor is included on sheet C11 and meets the requirements of the Howell Township Engineering Standards.

A basis of design for the proposed wastewater contribution from this development to the Township's existing sanitary sewer along West Grand River Avenue is not provided on the plans.

August 12, 2024

Page 2 of 4

Water

The sheet C5A shows a proposed 4" ductile iron water lead connecting to a 12-inch watermain that runs parallel to Burkhart Road.

We defer to MHOG for comments on the water lead and connection.

Grading and Drainage

The existing topography of the site indicates that surface runoff flows to the southwest and appears to drain to the southern Grand River Avenue right-of-way via a 24-inch culvert.

Proposed grading is shown with 1' contours and spot elevations. The paved portion of the site drains to several catch basins located in the parking lot. Stormwater then is conveyed to an underwater detention system and outlets to the Grand River Avenue R.O.W. The unpaved portion of the site generally sheet flows to the Grand River Avenue ROW.

As noted in Living County Drain Commissioner's July 19, 2024 Review Letter (Item #3), The entirety of the tributary area should be included in the storm water management calculations and should be directed to the underground detention system's outlet structure and pass through at 0.10 cfs/ acre. The proposed patio areas drainage should be directed to the proposed stormwater management system and be included in the calculations. Due to the adjustments that will be required as a result of the issues in the above comments, the stormwater calculations were not reviewed at this time and will be evaluated in subsequent reviews.

A detail of the proposed Contech CS-5 Cascade Separator is included on sheet C11. The capacity of the separator should be indicated on the plans.

Storm sewer profiles have been provided for proposed utility installation except for RD 09 to CB 04.

Access manholes should be indicated on the plans to ensure that the proposed underground detention system can be accessed for future maintenance.

Pavement and Parking

The proposed hard surfaces for this site include HMA parking area with a Type-F curb and gutter perimeter. There is also proposed concrete patio area and sidewalk with integral curb. Details for these pavement sections are provided on sheet C12 and are appropriate.

The Grand River Avenue and Burkhart Road approaches should be adjusted to ensure the 11-foot wide westbound lane for Grand River Avenue and southbound lane of Burkhart Road are not impeded. Additionally, the north end of the taper at the Burkhart Road approach should start at the northernmost end of the existing drive per the comments from the Livingston County Road Commission's July 7, 2024 Review Letter.

The detail from the LCRC Asphalt Pavement Section should be amended to include the appropriate sand subbases to match the abutting roadways.

August 12, 2024

Page 3 of 4

An emergency vehicle circulation plan is provided that demonstrates that a Howell Township fire truck can navigate the site. We defer to the Howell Township Fire Marshal for comment on the circulation and hydrant coverage plan.

On site parking is shown on the plans, we defer to the Township Planner for comment on the parking plan.

Landscaping

A landscaping plan is included. We defer to the Township Planner for comment on the landscaping plan.

Lighting

A lighting plan is included. It appears that no Light leaves the site. We defer to the Township Planner for comment on the lighting plan.

Recommendation

We recommend the Township withhold approval, pending the following items and our subsequent review:

1. Plans should be reviewed and approved by:
 - a. Fire Marshal
 - b. Township Planner
 - c. Livingston County Drain Commissioner
 - d. Livingston County Road Commission
2. The three (3) existing parcels must be combined into a single parcel.
3. Confirm with Township Planner that proposed patio currently shown in setback area is acceptable.
4. Provide a legal description on the cover with bearings and distances that close within acceptable tolerances.
5. Include the seal and signature of a Professional Engineer licensed in the state of Michigan on the cover sheet.
6. Provide a detailed summary (basis of design) for the proposed wastewater contribution of the project. The wastewater contribution is required to ensure there are no capacity constraints of the Township's sanitary sewer or the downstream pump station to which the sanitary sewer discharges to. The basis of design should correlate with determination of required REU's (Residential Equivalency Units) for the site, in accordance with the Township's Sanitary Sewer Ordinance (Ordinance 21). Include the basis of design summary on the Title Sheet (Sheet C1).
7. Ensure that the tributary area from the offsite drainage (approximately 4 acres) is directed to the outlet structure and that the discharge rate does not exceed 0.10 cfs/acre
8. Revise project plans and associated stormwater calculations to capture the surface runoff from the concrete patio area. This area must be captured by the proposed stormwater management system.
9. Please include the capacity of the Cascade Separator.
10. Provide profile view for RD 09 to CB 4 on Sheet C5B. Include crossing utilities (IE proposed 4-inch water service) to ensure that there are no conflicts.

August 12, 2024

Page 4 of 4

11. Access manholes should be added for maintenance of the proposed underground detention system.
12. Please adjust the layout of the Burkhart approach to avoid the existing drive being in the taper and adjust both approaches to maintain the 11-foot width of Grand Avenue and Burkhart Road and
13. Please update the asphalt pavement section detail to include subbases consistent with the abutting roadways.

If you have any questions or need anything further, please feel free to contact our office.

Sincerely,



Adam C. Jacqmain

Phone: (989) 598-6196

Mailto: adamj@spicergroup.com



John W. Bradley

Phone: (517) 719-5503

Mailto: johnbradley@spicergroup.com

SPICER GROUP, INC.

1595 W Lake Lansing Rd Suite 200

East Lansing, MI 48823

CC: SGI File
Kim Hiller, Livingston County Road Commission
Jonathan Hohenstein, Howell Township Planner
Ken Recker, Livingston County Chief Deputy Drain Commissioner
Paul Montagno, Carlisle Wortman
Bryan Hager, Howell Township Fire Inspector
Patrick Cleary, Boss Engineering

PROPERTY DESCRIPTION:

GENERAL INFORMATION:

PARCEL NOS.: 4706-20-201-018, 4706-20-201-017, 4706-20-400-004
 ZONING: RSC (REGIONAL SERVICE COMMERCIAL)
 AREA: +-3.20 ACRES (139,350 SQFT) (NET 2.52 ACRES EXCLUSIVE OF R.O.W.)

LEGAL DESCRIPTION:

LEGAL DESCRIPTION PER ATA NATIONAL TITLE GROUP, LLC, ISSUED BY OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY, COMMITMENT NO: 47-20712773-SCM, WITH A COMMITMENT DATE OF MAY 27, 2020 AT 8:00 A.M.:

The land referred to in this commitment is described as follows: Township of Howell, County of Livingston, State of Michigan

Parcel 1:
 A part of the East 1/2 of the Southeast 1/4 of Section 20, Town 3 North, Range 4 East, Howell Township, Livingston County, Michigan, described as follows: Beginning 1229.4 feet South of the East 1/4 post of said Section 20; thence South 308.8 feet to the centerline of Highway US-16; thence North 52 degrees West 490 feet along center of said highway; thence East 383.3 feet to the piece of beginning.

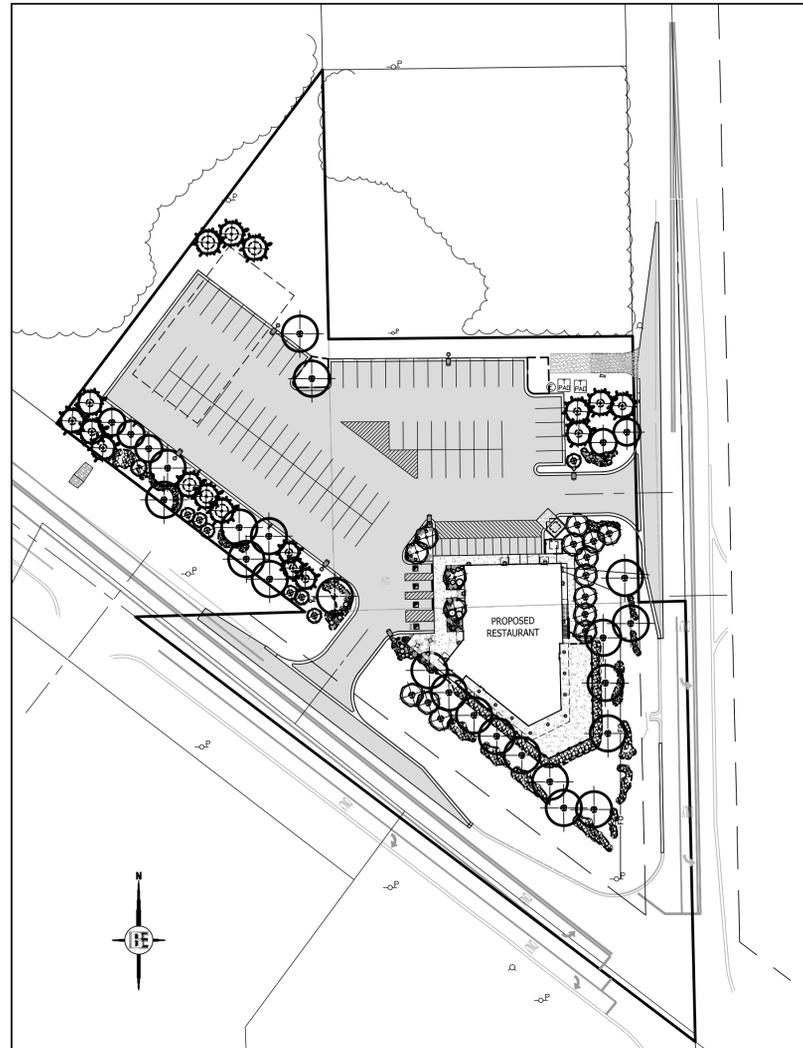
Parcel 2:
 Lots 1 and 26, Newman's Grand View Estates, as recorded in Liber 8, Page 24 of Plats, Livingston County Records.

CONSTRUCTION NOTES

THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING NOTES AND ANY WORK INVOLVED SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.

1. 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.
2. DO NOT SCALE THESE DRAWINGS AS IT IS A REPRODUCTION AND SUBJECT TO DISTORTION.
3. A GRADING PERMIT FOR SOIL EROSION-SEDIMENTATION CONTROL SHALL BE OBTAINED FROM THE GOVERNING AGENCY PRIOR TO THE START OF CONSTRUCTION.
4. IF DUST PROBLEM OCCURS DURING CONSTRUCTION, CONTROL WILL BE PROVIDED BY AN APPLICATION OF WATER, EITHER BY SPRINKLER OR TANK TRUCK.
5. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH LOCAL MUNICIPAL STANDARDS AND SPECIFICATIONS.
6. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED TOWNSHIP, COUNTY, AND STATE OF MICHIGAN PERMITS.
7. PAVED SURFACES, WALKWAYS, SIGNS, LIGHTING AND OTHER STRUCTURES SHALL BE MAINTAINED IN A SAFE, ATTRACTIVE CONDITION AS ORIGINALLY DESIGNED AND CONSTRUCTED.
8. ALL BARRIER-FREE FEATURES SHALL BE CONSTRUCTED TO MEET ALL LOCAL, STATE AND A.D.A. REQUIREMENTS.
9. 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 BEFORE BEGINNING CONSTRUCTION.
10. THE CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHTS-OF-WAY, PUBLIC OR PRIVATE, PRIOR TO THE START OF CONSTRUCTION.
11. 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.
12. THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE UPON COMPLETION OF THE PROJECT.
13. 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.
14. THE CONTRACTOR SHALL KEEP THE AREA OUTSIDE THE "CONSTRUCTION LIMITS" BROOM CLEAN AT ALL TIMES.
15. THE CONTRACTOR SHALL CALL MISS DIG A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
16. ALL EXCAVATION UNDER OR WITHIN 3 FEET OF PUBLIC PAVEMENT, EXISTING OR PROPOSED SHALL BE BACKFILLED AND COMPACTED WITH SAND (MDOT CLASS II).
17. 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.
18. THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES.
19. 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 IN 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.
20. DURING THE CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL NOT PERFORM WORK BY PRIVATE AGREEMENT WITH PROPERTY OWNERS ADJACENT TO THE PROJECT.
21. 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.
22. NO TREES ARE TO BE REMOVED UNTIL MARKED IN THE FIELD BY THE ENGINEER.
23. 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.
24. ALL AREAS DISTURBED BY MAINE CONTRACTOR BEYOND THE NORMAL CONSTRUCTION LIMITS OF THE PROJECT SHALL BE SOODED OR SEEDED AS SPECIFIED OR DIRECTED BY THE ENGINEER.
25. 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.
26. 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.
27. 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.
28. AFTER REMOVAL OF TOPSOIL, THE SUBGRADE SHALL BE COMPACTED TO 95% OF ITS UNIT WEIGHT.
29. 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.
30. NO SEEDING SHALL BE DONE AFTER OCTOBER 15 WITHOUT APPROVAL OF THE ENGINEER.
31. ANY EXISTING APPURTENANCES SUCH AS MANHOLES, GATE VALVES, ETC. SHALL BE ADJUSTED TO THE PROPOSED GRADE AND SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
32. SOIL EROSION MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL VEGETATION HAS BEEN RE-ESTABLISHED.
33. 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.

FINAL SITE PLAN FOR WRANGLER'S SALOON 4020 WEST GRAND RIVER AVENUE PART OF THE SE QUARTER, SECTION 20 HOWELL TOWNSHIP, LIVINGSTON COUNTY, MICHIGAN



OVERALL SITE MAP

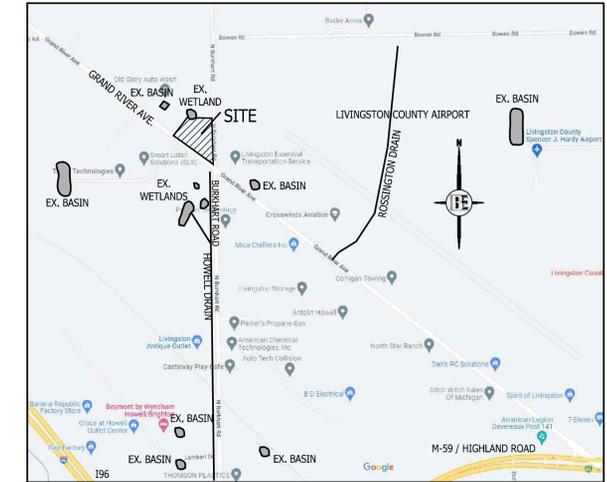
1"=60'

PERMITS & APPROVALS

AGENCY	DATE SUBMITTED	DATE APPROVED
• TOWNSHIP PRELIM. SITE PLAN APPROVAL	3-26-24	4-23-24
• TOWNSHIP FINAL SITE PLAN APPROVAL	6-27-24	-
• LCDC - SIGHT DISTANCE/PRELIM. APPROVAL	4-5-23	4-8-22
• LCDC - DRIVE PERMIT	6-27-24	-
• LCRC	6-27-24	-
• FAA	6-27-24	-
• SESO	-	-
• PRIVATE STORM EASEMENT - TONON	-	6-30-23 (SIGNED)
• PRIVATE STORM EASEMENT - LIV COMM CNTR	-	7-20-23 (SIGNED)

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.



LOCATION MAP

SCALE: +1"=1,000'

SURFACE WATER & COUNTY DRAINS	
WETLAND	- AT NORTH PROPERTY LINE
WETLANDS	- 3+ CLUSTER, APPROX. 425-FT SOUTH, WEST OF BURKHART RD.
LAKE	- APPROX. 3.74 MI. SOUTHEAST TO THOMPSON LAKE
STREAM	- APPROX. 5,700-FT EAST TO SHAWASSEE RIVER TRIBUTARY
BASIN	- APPROX. 1,950-FT WEST AT THE LIVINGSTON COMMERCE CENTER
BASIN	- APPROX. 3,300-FT EAST AT LIVINGSTON COUNTY AIRPORT
BASIN	- APPROX. 270-FT NORTHWEST AT OLD GLORY CARWASH
BASIN	- APPROX. 650-FT SOUTHEAST AT L.E.T.S. FACILITY
DRAIN	- APPROX. 200 FT SOUTH TO HOWELL COUNTY DRAIN, BURKHART RD.
DRAIN	- APPROX. 1,750-FT SOUTHEAST TO ROSSINGTON COUNTY DRAIN

SHEET INDEX	
SHEET NO.	DESCRIPTION
C1	CIVIL DRAWINGS
C2A	COVER SHEET
C2B	EXISTING CONDITIONS PLAN
C3A	SITE DEMOLITION PLAN
C3B	SITE PLAN
C3C	EMERGENCY VEHICLE CIRCULATION & HYDRANT COVERAGE PLAN
C4	GRADING AND DRAINAGE PLAN
C5A	UTILITY PLAN
C5B	STORM SEWER PLAN & PROFILE
C6	LIGHTING PHOTOMETRIC PLAN
C7	SOIL EROSION & SEDIMENTATION CONTROL PLAN
C8	LANDSCAPE PLAN
C9	LANDSCAPE AND EROSION CONTROL DETAILS
C10	STORM SYSTEM DETAILS
C11	MISC. CONSTRUCTION DETAILS
C12	MISC. CONSTRUCTION DETAILS
C13	M.H.O.G. STANDARD DETAILS - WATER (1)
C14	M.H.O.G. STANDARD DETAILS - WATER (2)
C15	HOWELL TOWNSHIP STANDARD SANITARY DETAILS

PREPARED FOR:

ARCHITECT:
 LINDHOUT ASSOCIATES
 ARCHITECTS, AIA, PC
 10465 CITATION DRIVE
 BRIGHTON, MI 48116
 CONTACTS:
 JOSH HENDERSHOT
 JLH@LINDHOUT.COM
 (810) 227-5668

PROPERTY OWNER:
 WD REALTY / WINFREID DAHM
 118A GRAND RIVER AVE.
 HOWELL, MI 48843
 CONTACT: KATHLEEN GRAHM
 (810) 626-8561
 KATHLEEN@GRVENT.COM

PREPARED BY:



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

CONTACT: PATRICK CLEARY
 EMAIL: PATRICKC@BOSSENG.COM



LCRC Comments 07/03/2024

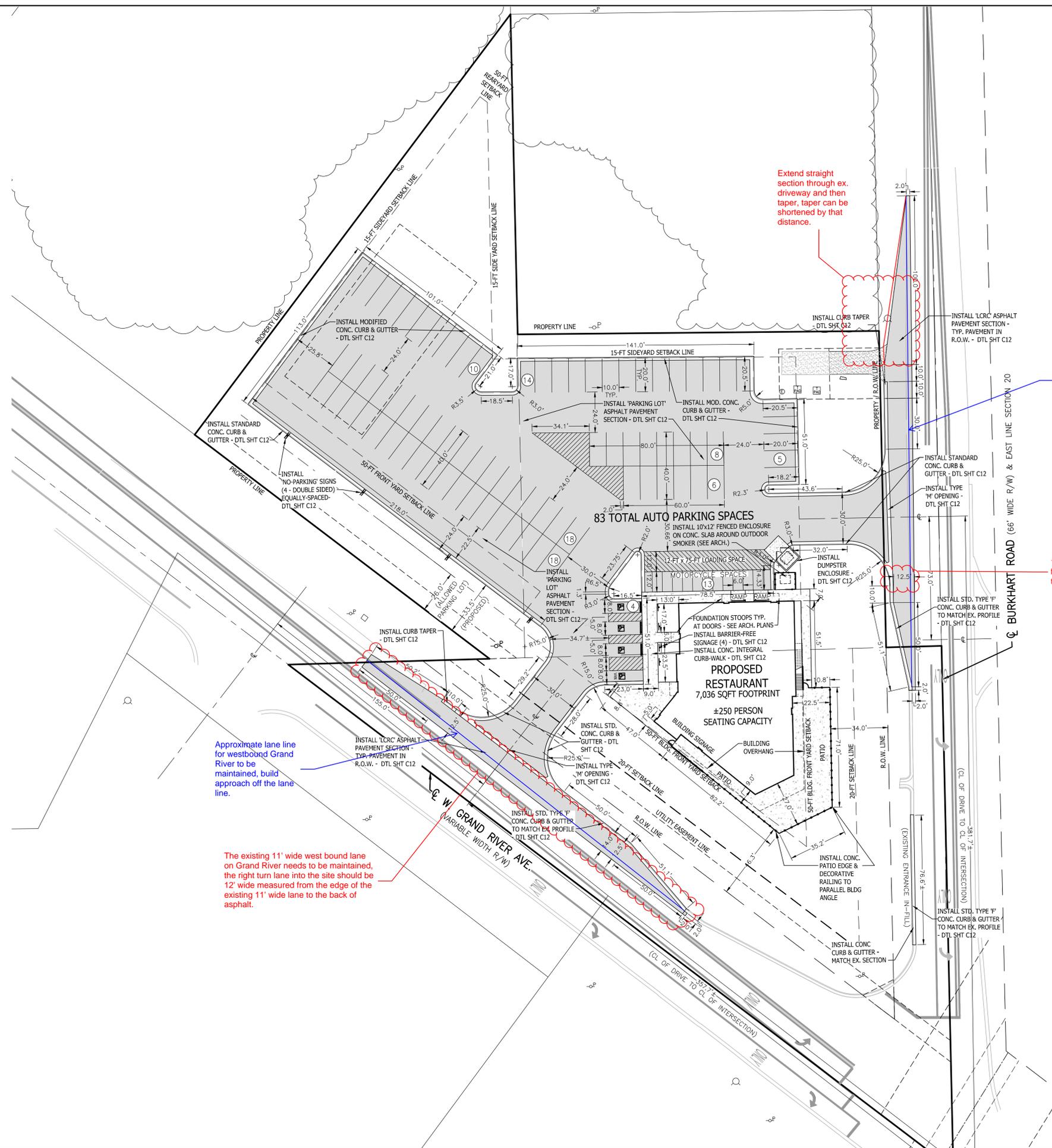
Land Use Summary		
Characteristic	Existing Conditions	Proposed Conditions
Total Drainage Area (ac)		
Impervious Area (ac)	2.52	1.47 AC
Total Pervious Area (ac)	0.96	1.13
	1.56	0.04
Pervious Area Breakdown by Cover Type		
Meadow/fallow/natural areas (non-cultivated)		
Predominant NRCS Soil Type (A, B, C, or D)	1.46	0
	D	D
Improved areas (turf grass, landscape, row crops)		
Predominant NRCS Soil Type (A,B,C, or D)	0.1	0.04
	D	D
Wooded Areas		
Predominant NRCS Soil Type (A,B,C, or D)	0	0
	N/A	N/A
CPVC Volume Calculated (cubic feet)		5550
CPVC Volume Provided (cubic feet)		0
CPRC Volume Provided (cubic feet)		8111

The Professional Engineer who signs and seals this site plan certifies that the values in this table reflect the WRC stormwater calculations required for this development and that geotechnical investigations were performed that provide conclusive documentation that demonstrates whether infiltration (i.e., CPVC Volume Control) is practicable.

NO	BY	CK	REVISION	DATE	JOB NO:
					21-550

C1

ISSUE DATE: 6/25/24



Extend straight section through ex. driveway and then taper, taper can be shortened by that distance.

Approximate lane line for southbound Burkhardt to be maintained, build approach off the lane line.

12' wide measured from existing lane line to back of asphalt.

Approximate lane line for westbound Grand River to be maintained, build approach off the lane line.

The existing 11' wide west bound lane on Grand River needs to be maintained, the right turn lane into the site should be 12' wide measured from the edge of the existing 11' wide lane to the back of asphalt.



LEGEND		
PROPOSED (PR)	EXISTING (EX)	
-900-	+922.08	CONTOUR
FF	FF	FINISHED FLOOR ELEVATION
FS	FS	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RM	RM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REAR YARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATE VALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
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
F	F	FENCE
S	S	SILT FENCE
W	W	WETLAND BOUNDARY
L	L	LIMITS OF GRADING/CLEARING
M	M	MANHOLE
I	I	INLET / CATCHBASIN
F	F	FLARED END-SECTION
G	G	GATE VALVE
H	H	HYDRANT
U	U	UTILITY POLE
V	V	NOT FIELD VERIFIED TO BE REMOVED
N	N	NOT FIELD VERIFIED TO BE REMOVED
S	S	SANITARY SEWER LABEL
SS	SS	STORM SEWER LABEL
WM	WM	WATER MAIN LABEL
SEM	SEM	SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
C	C	CONCRETE
A	A	ASPHALT
M	M	MODIFIED CURB

SITE STATISTICAL DATA:
 ZONING: "RSC" - REGIONAL SERVICE COMMERCIAL
 DEVELOPMENT TYPE/USE: RESTAURANT 2-STORY STRUCTURE (MAX HGT TBD)
 GROSS SITE AREA: ±3.20 AC (139,350 SQFT) (NET 2.52 AC EXCL OF R.O.W.)
 BUILDING SQUARE FOOTAGE (FOOTPRINT): 7,036 (5.0%)
 IMPERVIOUS SURFACE (EXCLUSIVE OF BUILDING): 1.11 ACRES (34.7%)
 PERVIOUS SURFACE: 1.23 ACRES (27.2%)

MIN. SETBACKS REQUIRED:
 FRONT: 50-FT (SOUTH - GRAND RIVER)
 FRONT: 50-FT (NORTHEAST CORNER - SUBJECT TO VERIFICATION)
 REAR: 50-FT (NO ADJACENT RESIDENTIAL)
 SIDES: 15-FT (WEST) & 15-FT (NORTH)
 MIN LOT SIZE: 40,000 SQFT; MIN LOT WIDTH 120 LFT (MUNICIPAL SERVICES)
 MAX BLDG. HGT: 70-FT

PROPOSED BUILDING:
 FRONT (SOUTH): 59.33-FT (MIN.)
 FRONT (EAST): 71.50-FT (MIN.)
 REAR: N.A.
 SIDE (WEST): 264.50-FT
 SIDE (NORTH): 140.75-FT
 LOT COVERAGE: 5.0% (BUILDING)
 MAX BLDG. HGT: 39-FT - 6-1/2-INCHES - TOP OF ORNAMENTAL ARCHED PARAPET; 33-FT-6-1/2-INCHES TOP OF MAIN PARAPET (SEE ARCH PLANS)

PARKING CALCULATION:
 RESTAURANT = 1 SPACE / 4 CUSTOMERS + 1 SPACE / EMPLOYEE MAX SHIFT
 250 / 4 = 63 + 20 EMPLOYEES
 TOTAL SPACES REQUIRED: 83

LOADING SPACE: MIN 1, 10-FT X 55-FT SPACE REQUIRED
 PROVIDED PARKING: 83 VEHICULAR SPACES INCL 4 BARRIER-FREE SPACES + 13 MOTORCYCLE SPACES

PROVIDED LOADING: 1, 12-FT X 78-FT SPACE PROVIDED

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

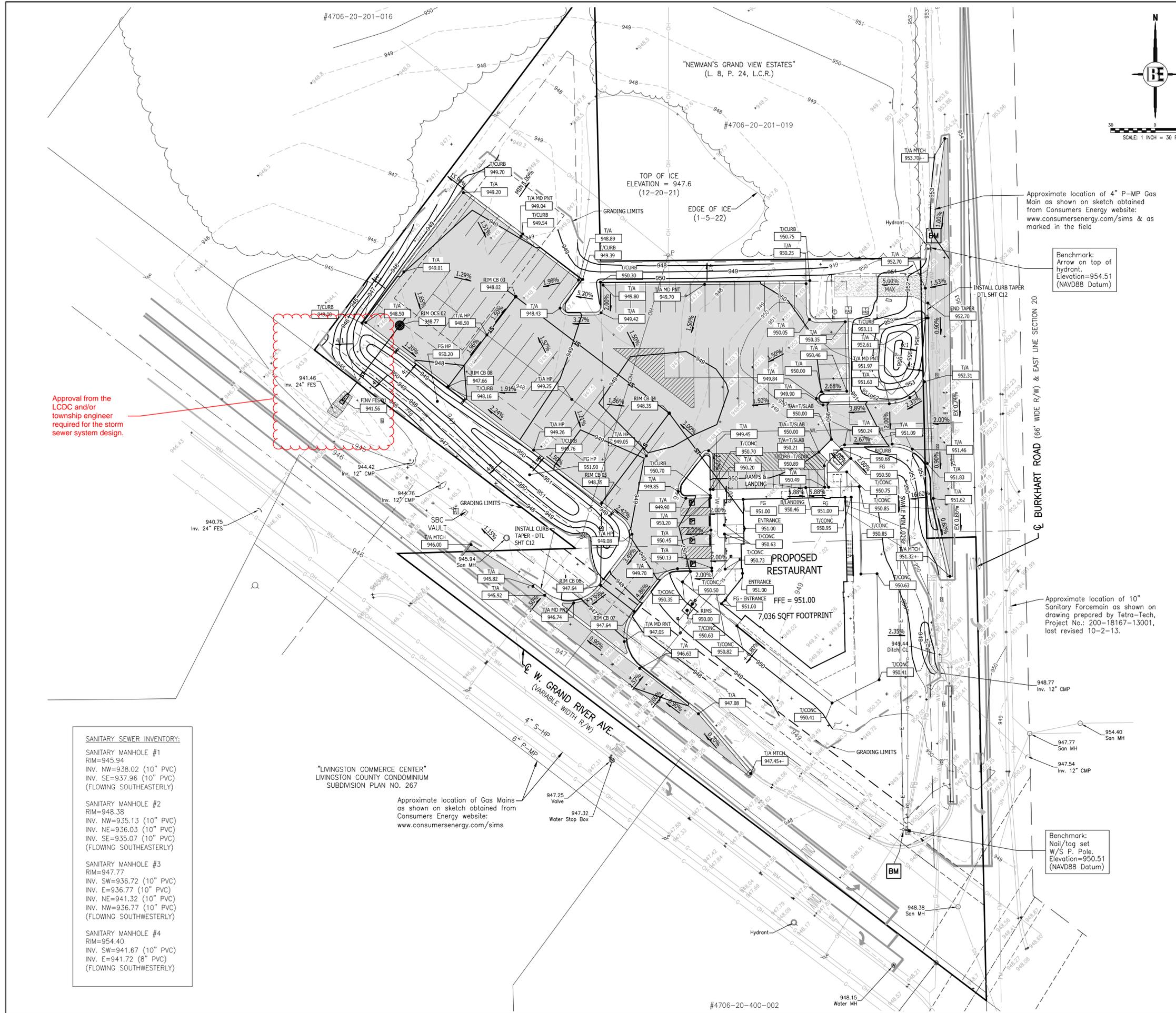
WRANGLER'S SALOON
 LINDHOUT ASSOCIATES ARCHITECTS AIA PC
 10469 CITATION DRIVE
 BRIGHTON, MI 48116
 810.227.5668

PROJECT	PREPARED FOR	TITLE	DATE
WRANGLER'S SALOON	LINDHOUT ASSOCIATES ARCHITECTS AIA PC	SITE PLAN	

NO	BY	REVISION	PER

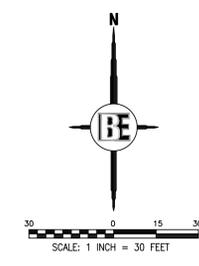
DESIGNED BY: PC
 DRAWN BY: PC
 CHECKED BY:
 SCALE: 1" = 30'
 JOB NO: 21-550
 DATE: 6-25-24

SHEET NO. **C3A**



LEGEND

PROPOSED (PR)	EXISTING (EX)	DESCRIPTION
900	900	CONTOUR
T/C	T/C	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
T/A	T/A	FINISHED GRADE ELEVATION
T/C	T/C	TOP OF ASPHALT
T/W	T/W	TOP OF CURB / CONCRETE
F/L	F/L	TOP OF WALK
T/P	T/P	FLOW LINE
B/P	B/P	TOP OF PIPE
RM	RM	BOTTOM OF PIPE
INV	INV	RIM ELEVATION
MH	MH	INVERT ELEVATION
IN	IN	MANHOLE STRUCTURE
CB	CB	INLET STRUCTURE
RY	RY	CATCHBASIN STRUCTURE
ES	ES	REARWARD STRUCTURE
OV	OV	END-SECTION
HY	HY	GATEVALVE STRUCTURE
UP	UP	HYDRANT
SN	SN	UTILITY POLE
SL	SL	SANITARY SEWER
FM	FM	SANITARY LEAD
PS	PS	FORCE MAIN
ST	ST	PRESSURE SEWER
WM	WM	STORM SEWER
WL	WL	WATER MAIN
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
T	T	TELEPHONE
F	F	FENCE
S	S	SILT FENCE
W	W	WETLAND BOUNDARY
L	L	LIMITS OF GRADING/CLEARING
IN	IN	INLET / CATCHBASIN
FL	FL	FLARED END-SECTION
GV	GV	GATE VALVE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	NOT FIELD VERIFIED
SL	SL	TO BE REMOVED
SS	SS	SANITARY SEWER LABEL
SS	SS	STORM SEWER LABEL
WM	WM	WATER MAIN LABEL
SC	SC	SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
CON	CON	CONCRETE
ASP	ASP	ASPHALT
MOD	MOD	MODIFIED CURB



Approximate location of 4" P-MP Gas Main as shown on sketch obtained from Consumers Energy website: www.consumersenergy.com/sims & as marked in the field

Benchmark: Arrow on top of hydrant. Elevation=954.51 (NAVD88 Datum)

BURKHART ROAD (66' WIDE R/W) & EAST LINE SECTION 20

Approximate location of 10" Sanitary Forcemain as shown on drawing prepared by Tetra-Tech, Project No.: 200-18167-13001, last revised 10-2-13.

Benchmark: Nail/tag set W/S P. Pole. Elevation=950.51 (NAVD88 Datum)

STORMWATER NARRATIVE:

EXISTING CONDITIONS: THE MAJORITY OF THE EXISTING SITE SHEET FLOWS TO THE WEST AND SOUTH, DISCHARGING TO A DITCH ALONG THE NORTH SIDE OF GRAND RIVER AVE. AND THEN EXITING SOUTH, ALONG WITH GRAND RIVER AVE, ROAD DRAINAGE, THROUGH A 24-IN DIA. CULVERT UNDER THE ROAD. THIS CULVERT DAYLIGHTS INTO THE 'LIVINGSTON COMMERCE CENTER' STORMWATER SYSTEM AND ULTIMATELY INTO THE EXISTING DETENTION BASIN AT THE SOUTH END OF THAT DEVELOPMENT. IT IS UNDERSTOOD THAT THIS EXISTING BASIN WAS ORIGINALLY DESIGNED FOR RETENTION AND DESIGNED TO ACCOMMODATE DRAINAGE FROM THE PROJECT SITE AND GRAND RIVER AVE. IT NOW OVERFLOWS INTO THE PROJECT DRAIN SYSTEM. A SMALL PORTION OF THE NORTH PART OF THE PROJECT SITE DRAINS NORTH INTO AN ISOLATED LOW AREA JUST OFFSITE.

PROPOSED: ALL IMPERVIOUS SURFACE DRAINAGE IS PROPOSED TO BE DIRECTED THROUGH A SERIES OF CATCH BASINS INTO AN UNDERGROUND STORM DETENTION SYSTEM. THERE WILL BE MECHANICAL PRE-TREATMENT OF STORMWATER PRIOR TO ENTERING THE DETENTION SYSTEM. AN OVERFLOW CONTROL STRUCTURE (OCS) WILL DISCHARGE INTO THE EXISTING CULVERT UNDER GRAND RIVER AVE. WITH THE REMAINDER OF THE ROUTE AND ULTIMATE STORMWATER OUTLET UNCHANGED, THE OCS WILL SIGNIFICANTLY REDUCE THE RATE OF STORMWATER GOING THROUGH THE EXISTING CULVERT REDUCING THE FLUCTUATION IMPACT OF STORMWATER ON THE EXISTING SYSTEM. TWO PRIVATE STORMWATER UTILITY EASEMENTS HAVE BEEN OBTAINED TO CONTINUE TO USE THE EXISTING STORMWATER ROUTE. A SHORT SECTION OF AN EXISTING SWALE WAS DETERMINED TO BE PARALLEL BUT NORTH OF THE LIVINGSTON COMMERCE PROPERTY ON THE ADJACENT TONON FAMILY PROPERTY.

NRCS EXISTING SOILS DATA:

MoB	MIAMI LOAM, 2-6% SLOPES
CvraaB	CONOVER LOAM, 0-4% SLOPES

- REFER TO SHEET C28 FOR BORING LOCATIONS.
- REFER TO SOILS INVESTIGATION REPORT (DATED 7-12-22) & INFILTRATION STUDY (6-27-22) BY MCDOWELL & ASSOCIATES (JOB NO. 22-229)

SANITARY SEWER INVENTORY:

SANITARY MANHOLE #1	RIM=945.94 INV. NW=938.02 (10" PVC) INV. SE=937.96 (10" PVC) (FLOWING SOUTHEASTERLY)
SANITARY MANHOLE #2	RIM=948.38 INV. NW=935.13 (10" PVC) INV. NE=936.03 (10" PVC) INV. SE=935.07 (10" PVC) (FLOWING SOUTHEASTERLY)
SANITARY MANHOLE #3	RIM=947.77 INV. SW=936.72 (10" PVC) INV. E=936.77 (10" PVC) INV. NE=941.32 (10" PVC) INV. NW=936.77 (10" PVC) (FLOWING SOUTHWESTERLY)
SANITARY MANHOLE #4	RIM=954.40 INV. SW=941.67 (10" PVC) INV. E=941.72 (8" PVC) (FLOWING SOUTHWESTERLY)

"LIVINGSTON COMMERCE CENTER"
LIVINGSTON COUNTY CONDOMINIUM
SUBDIVISION PLAN NO. 267

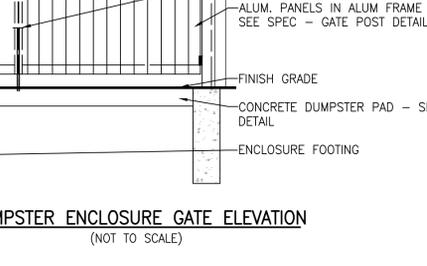
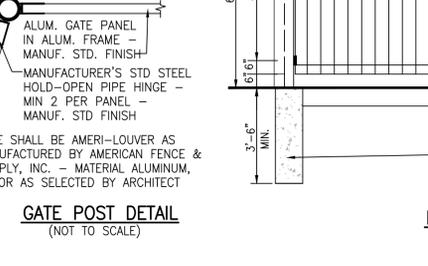
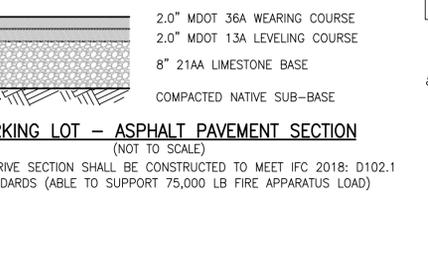
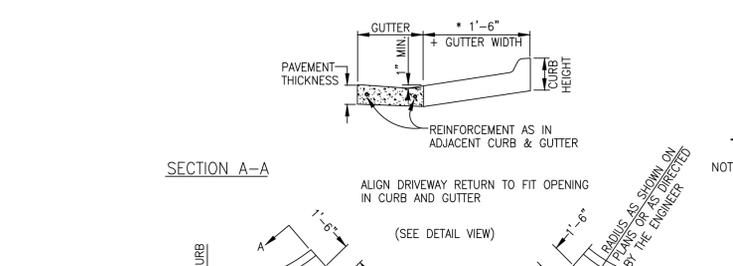
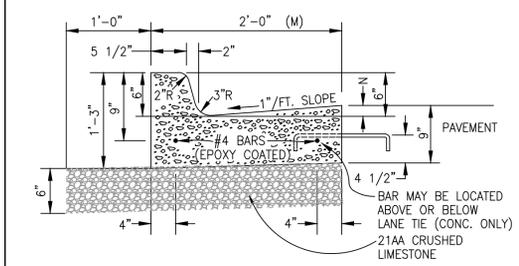
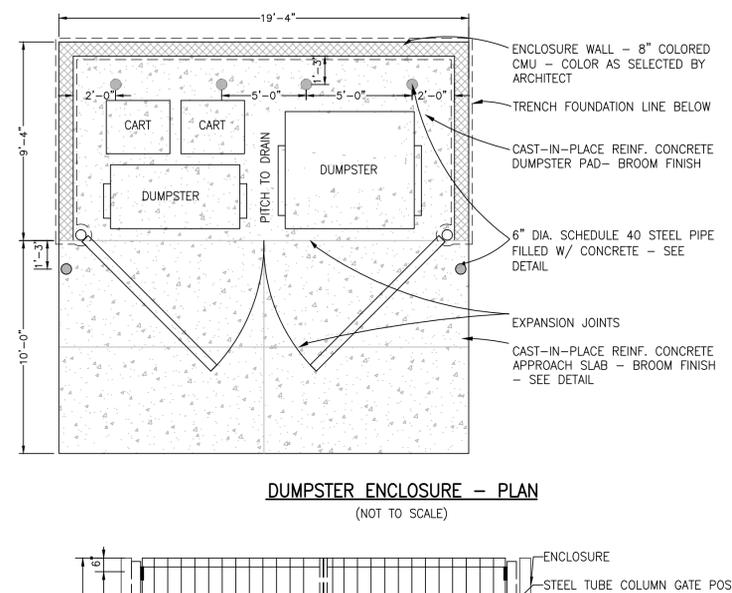
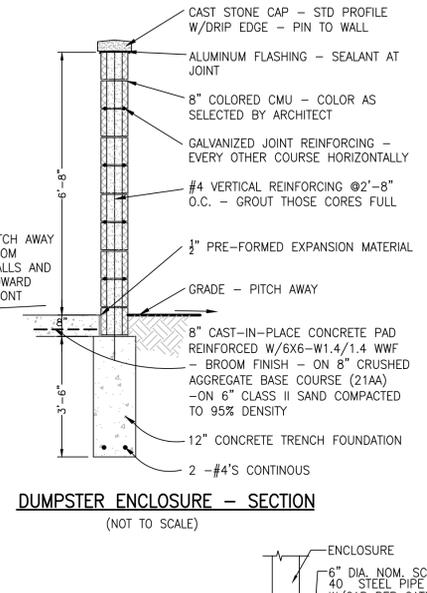
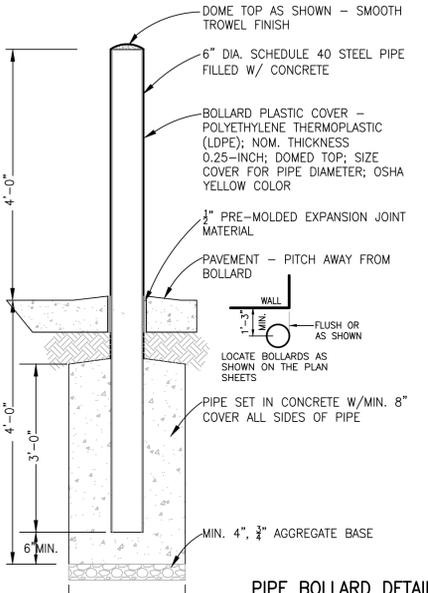
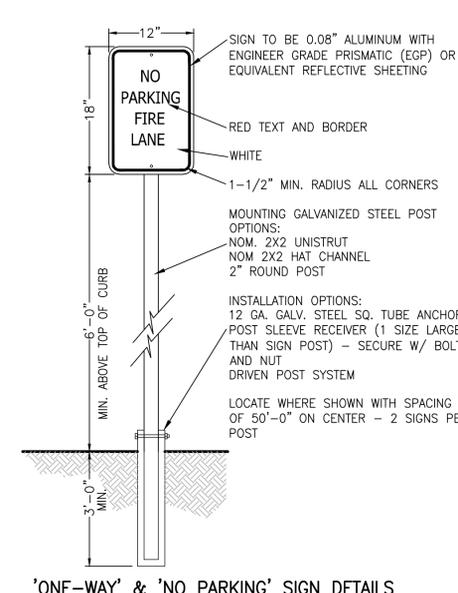
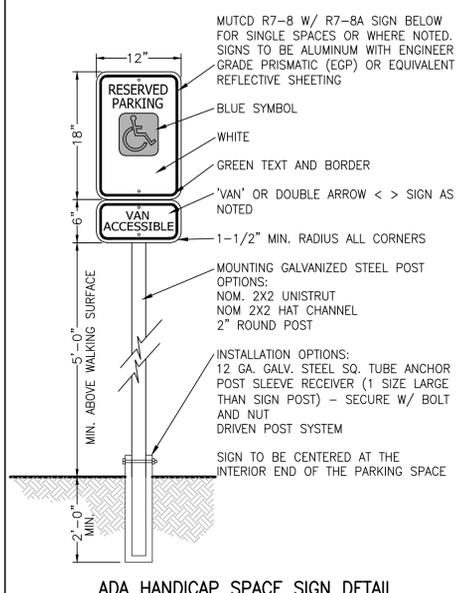
Approximate location of Gas Mains as shown on sketch obtained from Consumers Energy website: www.consumersenergy.com/sims

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WRANGLER'S SALOON
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10469 CATTATION DRIVE
BRIGHTON, MI 48116
810.227.5668

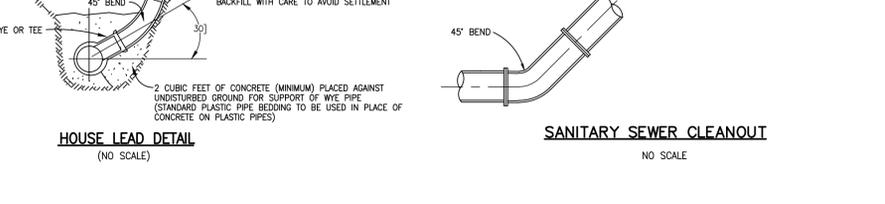
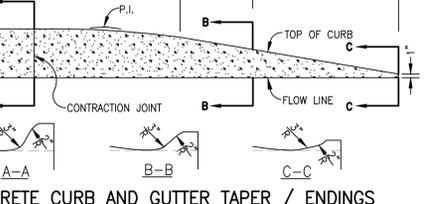
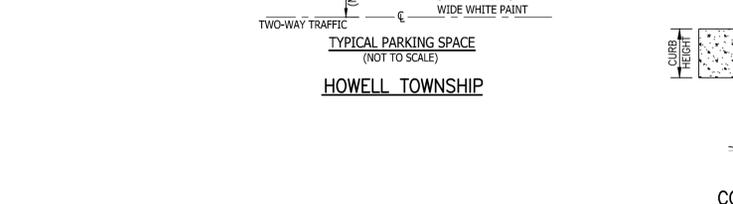
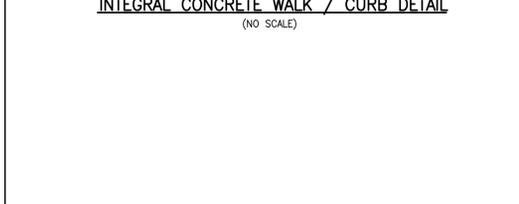
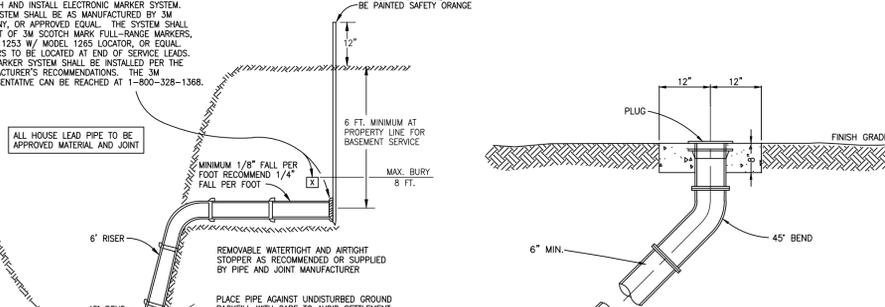
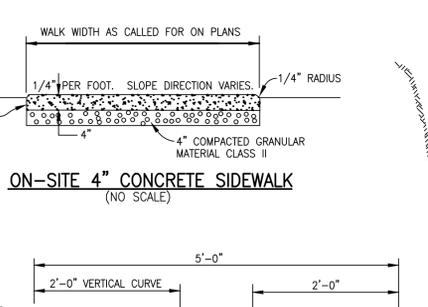
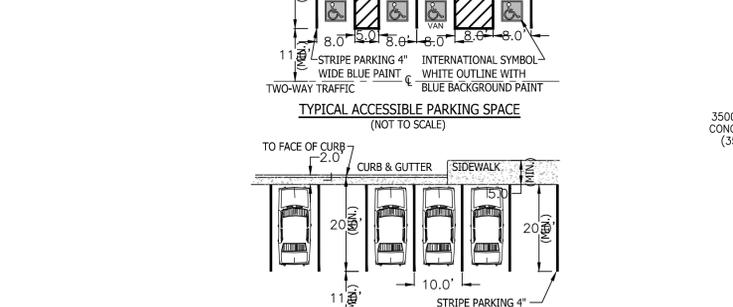
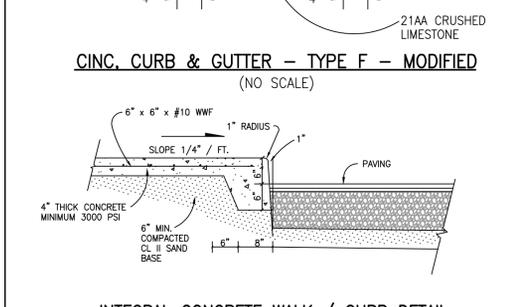
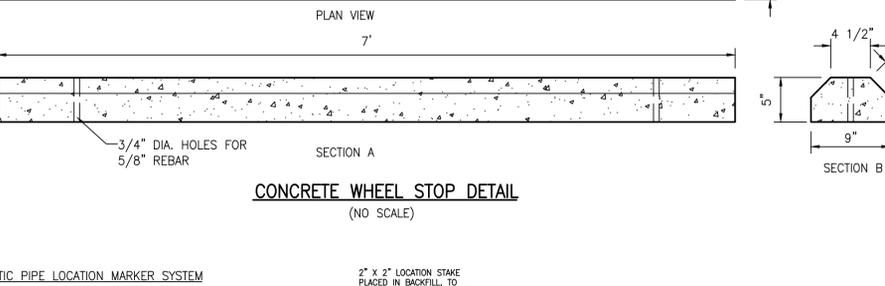
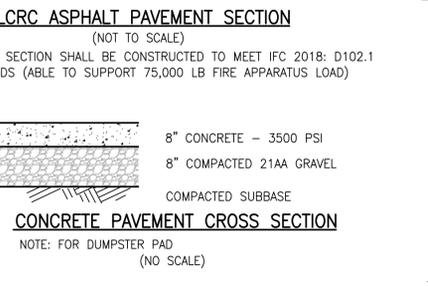
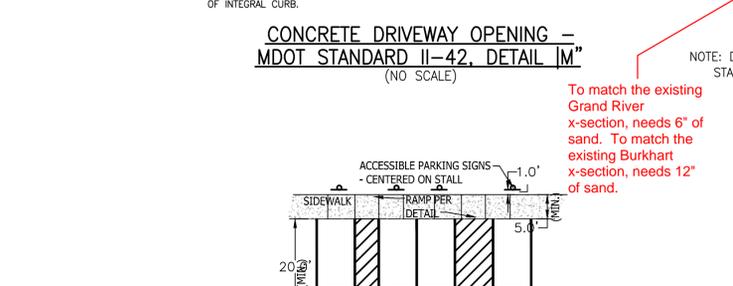
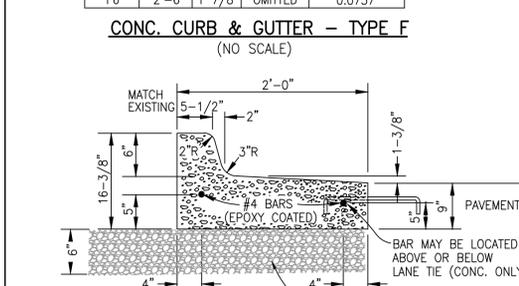
GRADING AND DRAINAGE PLAN

PROJECT	DATE			
WRANGLER'S SALOON				
PREPARED FOR				
LINDHOUT ASSOCIATES ARCHITECTS AIA PC				
TITLE				
GRADING AND DRAINAGE PLAN				
NO	BY	REVISION	PER	DATE
DESIGNED BY:	PC			
DRAWN BY:	PC			
CHECKED BY:				
SCALE:	1" = 30'			
JOB NO:	21-550			
DATE:	6-25-24			
SHEET NO.	C4			



DETAIL	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

NOTE: WHITE MEMBRANE CURING COMPOUND PER ASTM C-309 TYPE SPRAYED AS DIRECTED



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Engineers Surveyors Planners Landscape Architects
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WRANGLER'S SALOON
LINDHOUT ASSOCIATES ARCHITECTS AIA PC
10498 CATTATION DRIVE
BRIGHTON, MI 48116
810.227.5668

PROJECT: WRANGLER'S SALOON
PREPARED FOR: LINDHOUT ASSOCIATES ARCHITECTS AIA PC
TITLE: MISCELLANEOUS CONSTRUCTION DETAILS

NO.	BY	REVISION PER	DATE

DESIGNED BY: PC
DRAWN BY: PC
CHECKED BY:
SCALE: AS NOTED
JOB NO: 21-550
DATE: 6-25-24
SHEET NO. **C12**



Brian Jonckheere

Livingston County Drain Commissioner

2300 E. Grand River Ave., Ste. 105

Howell, MI 48843-7581

Phone: 517-546-0040 FAX: 517-545-9658

Website: www.livgov.com/drain Email: drain@livgov.com

July 19, 2024

Mr. Patrick Cleary
Boss Engineering
3121 Grand River
Howell, Michigan 48843

Re: Wrangler's Saloon
Construction Plans
Southeast 1/4 of Section 20
Howell Township

Dear Mr. Cleary:

I received Construction Plans, an Infiltration Study and Offsite Easement Documents for the above referenced site on July 3, 2024. The submitted information has been reviewed for conformance with the current L.C.D.C. "Procedures and Design Criteria for Stormwater Management Systems." My comments on the proposed drainage design are as follows:

- 1.) Drainage System Ownership - Utility Note #5 found on Sheets C5A and C5B correctly states that "The proposed drainage system is to be owned and properly maintained by the property owner." A stormwater maintenance agreement, similar to that found in Appendix K of the L.C.D.C. Design Criteria, should be executed with Howell Township prior to the final project approval.
- 2.) Overall Drainage Concept - The 3.20 acre project site, located on the northwest corner of W. Grand River Avenue and Burkhart Road, currently contains the existing Wrangler's Saloon building and its asphalt parking lot, both of which are to be demolished. The proposed construction includes a new larger restaurant building, and a larger asphalt parking lot with an underground stormwater detention system.

Runoff from the site currently sheet drains from north to south into the Grand River Avenue Road ditch which flows under Grand River Avenue through a 24" culvert and into the Livingston Commerce Center drainage system. This drainage

system includes a stormwater detention basin which outlets to south through an 18" culvert under the CSX railroad and into the Howell County Drain. Runoff from most of the developed site is to be routed by new storm sewers to a stormwater treatment structure located immediately upstream of the proposed underground detention system which is to discharge to the existing 24" culvert flowing under Grand River Avenue. Drainage easements along the flow path downstream of Grand River Avenue have been obtained by the property owner.

- 3.) Drainage Areas Plan - There appears to be approximately 4 acres of offsite tributary to the north of the site whose boundary, acreage and "C" value should be shown on Sheet C5A of the plans. The runoff from this offsite area should be passed through the underground detention system's outlet structure upper orifice row at the same 0.10 cfs/acre discharge rate used for the site's drainage. The proposed patio drainage tributary area boundary located on the east and south sides of the building should also be delineated, quantified and its runoff directed to the proposed stormwater management system.
- 4.) Stormwater Detention/Infiltration - Since the Infiltration Study submitted with the plans indicates that the site's underlying soils are not conducive to infiltration, no infiltration measures have been incorporated into the site's drainage design. While the design calculations shown on the plans have correctly determined the required Water Quality Volume, Channel Protection Volume, Extended Detention Volume and 100 Year Storm Volume based on the indicated 1.47 acre tributary area, this tributary area should be increased to include the patio area as discussed above. The following additional stormwater detention/infiltration related items should also be addressed on the plans:
 - a.) The incremental storage volumes listed in the Storage Volume Provided Tabulation shown on Sheet C5A are incorrect and should be revised.
 - b.) The stormwater treatment capacity of the CS-6 Cascade Separator should be indicated on Sheet C11 and should equal or exceed the required Water Quality Treatment Rate of 2.54 cfs.
 - c.) A footer pipe and access manholes should be provided at the four corners of the proposed underground stormwater storage system to facilitate its future maintenance.
- 5.) Storm Sewers - A drainage outlet should be provided for the offsite runoff currently flowing onto the site at the

northwest corner of Lot 26. The proposed grading shown in this area will block the existing drainage pattern and result in ponded water without such an outlet. A construction detail should be included on the plans for the rip-rap apron shown at FES 01. This detail should specify a minimum of 10 S.Y. of 6" minimum diameter angular stone placed over keyed-in geotextile fabric.

- 6.) Site Grading - If acceptable to the Livingston County Road Commission, a spillway with a non-erodible surface should be provided at the northwesterly end of the W. Grand River Avenue driveway approach and the existing 12" C.M.P. culvert located to its northwest should be removed.

I am withholding approval of the Construction Plans for Wrangler's Saloon until the abovementioned items have been addressed.

Very truly yours,



Kenneth E. Recker, II, P.E.
Chief Deputy Drain Commissioner

C: Paul Lewsley, Spalding DeDecker
John Bradley, Spicer Group
Adam Jacqmain, Spicer Group
Gary Markstrom, Tetra Tech
Jonathan Hohenstein, Howell Township Zoning
Kim Hiller, Livingston County Road Commission
Kathleen Grahm, WD Realty
Holly Fletcher, WD Realty

MODIFY SECTION 2.02 TO INCLUDE PORTABLE STORAGE CONTAINERS AND CARGO CONTAINERS IN DEFINITIONS

Portable Storage Containers. Portable, weather-resistant receptacle designed and used for the temporary storage and/or shipment of household goods or building materials (i.e. PODS or MODS), which are typically leased on a short-term basis.

Cargo Containers. A primarily metal weather-resistant container designed to store or ship goods or building materials. Such containers include reusable steel boxes, freight and bulk shipping containers, and those with similar qualities which are intended for use as an accessory structure.

MODIFY SECTION 14.07 TO INCLUDE CARGO CONTAINER PROVISIONS

Section 14.07 ACCESSORY BUILDING PROVISIONS.

Accessory buildings, except as otherwise permitted in this Ordinance, shall be subject to the following regulations:

A. *Any Residential accessory* structure having two-hundred (200) square feet or less of internal floor area, which is used for any purpose other than the housing of humans, but is primarily to be use for the housing of non human purpose such as pets, yard equipment, yard maintenance supplies, tools, toys, including motorized or non motorized bicycles and types of household equipment, and which buildings do not have to meet the requirements of the Livingston County Construction Code and will not be built on a structural foundation as required in the Construction Code for other types of buildings, shall ~~be excluded from the requirements of this Section and any required still adhere to the requirements of this section including the need for a~~ zoning permits and payment of fees required under other provisions of this Ordinance except for placement requirements in subsection B. below.

B. Detached accessory buildings shall be located entirely in the rear yard outside of the side and rear setback ~~with the following exceptions; unless said building is being constructed pursuant to a Special Use Permit, and in that case, the Township Board after receiving the recommendation of the Planning Commission may authorize the location of the accessory building in any required yard. In no instance shall an accessory building be located within a dedicated easement right-of-way.~~

1. Said building is being constructed pursuant to a Special Use Permit, and in that case, the Township Board after receiving the recommendation of the Planning Commission may authorize the location of the accessory building in any required yard.
2. For accessory structures to a residential use, if the primary residence is situated in the rear portion of a parcel over 2 acres, an accessory structure may be in the front yard if it:
 - a. Is setback at least 100 feet from the front property line.
 - b. Meets the required side yard setback.

- c. Is designed to be architecturally compatible with the principal structure, or screening that provides 80% opacity is provided between the structure and immediately adjacent neighbor properties and the road.
- d. Has a roof overhang or eave of not less than twelve (12) inches on all sides, or alternatively with windowsills or roof drainage systems concentrating roof drainage at collection points along the sides of the structure.
- e. In no instance shall an accessory building be located within a dedicated easement right-of-way.

C. Accessory buildings located on lots and parcels in all Zoning Districts shall be subject to the following regulations:

LOT OR PARCEL AREA REGULATION	REGULATION	MAXIMUM SQUARE FOOTAGE*
12,000 sq. ft. to 0.9 acre	4% of lot area	800 sq. ft.
1 acre to 1.9 acres	4% of lot area	2000 sq. ft.
2 acre to under 19.9 acres	4% of lot area, except that commercial agricultural farm operations shall be excluded from this regulation	3000 sq ft.
20 acres and above	Subject to Max lot coverage	No limit

D. No detached accessory building – shall be located closer than ten (10) feet to any main building.

E. No detached accessory building in AR, SFR, MFR, NSC, OS Districts shall exceed one (1) story or twenty (20) feet in height. Accessory buildings in all other districts may be constructed to equal the permitted maximum height of structures in said districts. Height shall be measured in accordance with Article II Definition 24.

F. When accessory buildings or structures are located on a corner lot, they shall not be located in any front yard or side yard, but if it is determined by the Zoning Administrator that there is insufficient rear yard in which to locate them, the Zoning Administrator ~~shall~~ shall have the authority to but not be obligated to determine the most appropriate location for them and allow for them in the side yard with minimum encroachment upon the required side yard setback area.

G. In no instance shall an accessory building be allowed until there is a principal building or structure located on the lot or parcel of land.

H. No accessory building or structure shall be used as a dwelling, lodging or sleeping quarters for human beings, except as otherwise permitted in this Ordinance.

I. Additional standards for Cargo Containers to be used as an accessory structure to a residential use.

1. Containers shall not be stacked above the height of a single container.

2. The exterior appearance of all cargo containers shall be well maintained and absent of unwarranted rust, holes, and other evidence of aging.
3. No writing, advertising, or graphics are permitted on the exterior of the container.
4. Cargo containers shall be completely screened from view of abutting properties and/or rights-of-ways by a fence or vegetative screening that meets the requirements of Section 14.26 Fences and 28.03 Specific Landscaping Requirements for Zoning Districts.
5. Cargo containers shall be located upon a foundation that will support the weight of the structure and prevents rodent infestation.
6. No plumbing or electricity may be connected to a cargo container.
7. No livestock or pets may be housed in a cargo container.
9. Cargo containers shall not be used to store hazardous materials, as defined by the Michigan Fire Prevention Code, 1941 PA 107, MCL 29.1 et seq.

MODIFY SECTION 14.20 TO INCLUDE PORTABLE STORAGE CONTAINER PROVISIONS

Temporary buildings and structures are permitted during the period of construction, and sales involving change of ownership or rental occupancy. Such buildings, and structures shall be removed upon completion or abandonment of construction, sale or rental activities and prior to occupancy and use of the building or structure for permitted uses.

Also refer to Sections 14.28 and 16.09 for permits to park or use mobile homes on a temporary basis.

A. Portable Storage Container may be permitted as a temporary structure subject to the following conditions:

1. No portable storage container may be stacked on top of another or any other object.
2. No electricity or plumbing may be connected to a portable storage container.
3. Portable storage containers must be placed on a driveway, gravel or paved area.
4. No portable storage container shall be used for living quarters.
5. No livestock or pets may be stored in a portable storage container.
6. Portable storage containers may be placed on a vacant lot only if that lot is associated with an approved building construction project.
7. Portable storage containers shall not be used to store hazardous materials, as defined by the Michigan Fire Prevention Code, 1941 PA 107, MCL 29.1 et seq.
8. No portion of a portable storage container shall be placed in a location which may cause hazardous conditions or constitute a threat to public safety.

[9. Portable storage containers in non-residential districts or which are associated with a non-residential use shall not occupy required off-street parking, loading or landscaping areas.](#)

MODIFY SECTION 4.04 TO INCLUDE CARGO CONTAINERS AS PERMITTED ACCESSORY USES WITHIN THE AGRICULTURAL RESIDENTIAL DISTRICT

SECTION 4.04 PERMITTED ACCESSORY USES.

- A. Buildings and structures customarily incidental to the operation of an agricultural enterprise.
- B. Accessory buildings and structures customarily incidental to single family residential.
- C. Signs related to the permitted agricultural enterprise, provided that all such signs shall conform to the requirements of this Ordinance.
- D. House Hold Pets

[E. Cargo Containers, subject to Section 14.07](#)

MODIFY SECTION 5.04 TO INCLUDE CARGO CONTAINERS AS PERMITTED ACCESSORY USES WITHIN THE RESEARCH AND TECHNOLOGY DISTRICT

Section 5.04 PERMITTED ACCESSORY USES

- A. Normal accessory uses to all permitted uses in Sections 5.02 and 5.03 above.

[B. Cargo Containers, see Section 14.07](#)

MODIFY SECTION 8.04 TO INCLUDE CARGO CONTAINERS AS PERMITTED ACCESSORY USES WITHIN THE OFFICE SERVICE DISTRICT

Section 8.04 PERMITTED ACCESSORY USES.

- A. Normal accessory uses to “Permitted Principal Uses.”
- B. Normal accessory uses to approved “Permitted Principal Special Uses.”
- C. Incidental commercial services that serve only the occupants of the offices and have access only from inside the building in which the occupants are located.
- D. See Section 14.34.

[E. Cargo Containers, subject to Section 14.07](#)

MODIFY SECTION 10.04 TO INCLUDE CARGO CONTAINERS AS PERMITTED ACCESSORY USES WITHIN THE REGIONAL SERVICE COMMERCIAL DISTRICT

Section 10.04 PERMITTED ACCESSORY USES.

- A. Normal accessory uses to all “Permitted Principal Uses.”
- B. Normal accessory uses to all “Permitted Principal Special Uses.” See Section 14.34. 14.
- [C. Cargo Containers, subject to Section 14.07](#)

MODIFY SECTION 11.04 TO INCLUDE CARGO CONTAINERS AS PERMITTED ACCESSORY USES WITHIN THE HIGHWAY SERVICE COMMERCIAL DISTRICT

Section 11.04 PERMITTED ACCESSORY USES.

- A. Normal accessory uses to all “Permitted Principal Uses.”
- B. Normal accessory uses to all “Permitted Principal Special Uses.”
- [C. Cargo Containers, subject to Section 14.07](#)

MODIFY SECTION 12.04 TO INCLUDE CARGO CONTAINERS AS PERMITTED ACCESSORY USES WITHIN THE INDUSTRIAL FLEX ZONE

Section 12.04 PERMITTED ACCESSORY USES.

- A. All normal accessory uses to all “Permitted Principal Uses” and “Permitted Principal Special Uses” including:
 - 1. Restaurants.
 - 2. Cafeterias.
 - 3. Medical and health care facilities.
 - 4. Office facilities.
 - 5. Warehouse and storage facilities.
 - 6. Physical fitness facilities.
 - 7. Work clothing sales and service facilities.
 - 8. Banking facilities.

9. Education, library and training facilities.
10. Research and experimentation facilities.
11. Truck or other vehicular and equipment service maintenance, repair and storage facilities conducted completely within a building, or structure.
12. Indoor sales display areas.
13. See Section 14.34.

[14. Cargo Containers, subject to Section 14.07](#)

MODIFY SECTION 13.04 TO INCLUDE CARGO CONTAINERS AS PERMITTED ACCESSORY USES WITHIN THE INDUSTRIAL DISTRICT

Section 13.04 PERMITTED ACCESSORY USES.

- A. Normal accessory uses to all Permitted Principal Uses.
- B. Normal accessory uses to all Permitted Principal Special Uses.
- C. See Section 14.34

[D. Cargo Containers, see Section 14.07](#)

SECTION 1 MODIFY SECTION 2.02 TO INCLUDE DWELLING, ACCESSORY TO DEFINITIONS

Dwelling, Accessory (ADU): A supplemental, smaller dwelling unit either developed within an existing single-family house such as a basement, attic, or as an attached addition. ~~or as a smaller detached accessory building in which at least a 15-foot wall is shared with the Principal Dwelling Unit.~~

SECTION 3 MODIFY SECTION 14.10 ACCESSORY BUILDING AS DWELLING TO INCLUDE BASEMENT AS DWELLING AND ADDITIONAL REGULATIONS

No building or structure on the same lot with a principal building shall be used for dwelling purposes, ~~except as follows: specifically permitted in this Ordinance.~~

Accessory dwelling units (ADU's), except as otherwise permitted in this Ordinance, shall be subject to Section 14.07 and the following regulations:

- A. **Authorization:** No ADU shall be established prior to the issuance of a land use permit for the ADU. The applicant shall submit the following information for review to the Zoning Administrator:
 1. A plot plan showing the location of the proposed accessory dwelling unit, lot identification (address and property number), size of lot, dimension of lot lines, existing improvements on the lot, location of structures on adjacent lots, abutting streets, driveways, and parking areas.
 2. Sufficient architectural drawings or clear photographs to show the exterior building alterations proposed.
 3. Interior floor plans showing the floor area of the proposed accessory dwelling unit and the primary dwelling.
- B. **Dimensions & Setbacks:** ADU's must meet lot dimensions and setbacks of the corresponding zoning district.
- C. **Lot Coverage:** ADU's shall adhere to the lot coverage requirements of the corresponding zoning district.
- D. **Floor Area:** The floor area of an ADU shall be no more than 1000 Square feet. ~~25% of the floor area of the principle residence.~~
- E. **Amount of ADUs per Parcel:** No more than 1 ADU per parcel shall be constructed. ADUs are only permitted on lots with a single-family dwelling. ADUs are not permitted on parcels with existing duplexes/apartments.
- F. **Occupancy/Bedroom Requirements:** An ADU shall have no more than four (4) individuals including those less than 18 years of age residing and no more than two (2) bedrooms within the ADU.
- G. **Access:**
 1. ~~Attached~~ ADUs are permitted to have up to two access points where one is located in a common entrance foyer and the other is an exterior entrance located on the side or rear of the ADU.

~~2. Detached ADUs are permitted to have a main entrance located on the front of the dwelling and an additional side/rear yard entrance.~~

H. **Design Characteristics:** The ADU shall be designated so that the appearance of the building will remain that of a single-family dwelling. The ADU shall not detract from the appearance of the lot as a place of one (1) residence and shall be aesthetically compatible in appearance with other single-family dwellings in the immediate area based on architectural design and exterior materials.

I. **Driveway and Parking:** Shall provide a combined off-street parking for a minimum of four (4) automobiles for the parcel. An ADU shall not be permitted to have a separate driveway.

J. **Renting an ADU:** Leasing or renting an ADU for shorter than thirty (30) days is prohibited. The ADU shall not otherwise be made available to any one (1) person for periods less than thirty (30) days.

K. **Utilities:**

1. An ADU shall be connected to potable water and sanitary facilities in compliance with the Livingston County Health Department.

~~2. Utility service to an ADU shall rely on the same metering and service panel as those that serve the Primary Dwelling Unit except as otherwise required by the building inspector.~~

L. **Garage:** A garage may be erected to serve an ADU subject to the following requirements:

1. An ADU garage shall be part of the same structure as the ADU

2. An ADU garage shall be no greater than 450 square feet in gross floor area.

3. An ADU garage shall be no higher than seventeen (17) feet as measured to the highest point of the roof. Shall be a maximum of one (1) story and at no time taller than the Principal Dwelling Unit.

4. An ADU garage shall comply with the same setback standards as required for an ADU in the corresponding zoning district.

5. No more than one (1) ADU garage shall be erected on a lot.

6. At no time shall the garage be used as a dwelling.

M. **Principal Dwelling Unit:**

1. Must be owner occupied.

2. The Principal Dwelling Unit and the ADU must share common water, septic, and electric facilities, in compliance with state and county codes.

3. No basement structure shall be used for an ADU, unless a completed story is situated immediately above the basement structure and is used as an owner-occupied dwelling, apart from underground homes designed and built in accordance with the Construction Code in effect in the Township.

~~N. Detached ADU:~~

~~1. Shall only be located in the rear yard, outside of rear and side setbacks with a minimum of 10 feet behind the Principal Dwelling Unit.~~