



**Planning Commission
Special Meeting
August 28, 2017
7:00p.m.**

1. CALL MEETING TO ORDER
2. PLEDGE OF ALLEGIANCE
3. ROLL CALL
4. APPROVAL OF MINUTES
 - August 15, 2017 Regular P.C. Minutes
5. CORRESPONDENCE / BOARD REPORTS
 - Boards and Commissions Expiration Dates
6. APPROVAL OF AGENDA
7. PUBLIC COMMENT: Restricted to (3) minutes regarding issues not on this agenda
8. PUBLIC HEARINGS
9. NEW BUSINESS
 - A. SPR 2017-06 Burch Welding and Tank Inc. 2253 Enterprise Dr. *Action: Final Approval*
10. OTHER BUSINESS
11. EXTENDED PUBLIC COMMENT: Restricted to 5 minutes regarding any issue
12. FINAL BOARD COMMENT
13. ADJOURNMENT



Peter Gallinat, Township Planner
pgallinat@uniontownshipmi.com
2010 South Lincoln
Mt. Pleasant, MI 48858
Phone 989-772-4600 Ext. 241
Fax 989-773-1988

NEW Business

SUBJECT: A) SPR 2017-06 Burch Welding and Tank Inc. 2253 Enterprise Dr.

Applicant: Lapham Associates

Owner: Burch Welding and Tank Inc.

Location: 2253 Enterprise Dr. MT PLEASANT, MI 48858

Current Zoning: I-2 (General Industrial District)

Adjacent Zoning: I-2 to the north, I-2 to the east, I-2 to the west across the road, I-2 to the south.

Future Land Use/Intent: Industrial: Areas for factories and research facilities

Current Use: Bulk tank trailer manufacturer and maintenance center

Reason for Request: Expansion for office and storage.

History: Burch Welding and Tank Inc. proposes an expansion for additional office and storage space. This requires the demolition of two existing structures and constructing a new 200' x 110' addition. The project has been reviewed and approved for the purpose of site plan approval by the Mt. Pleasant fire Department, Township Utility Department, Isabella County Drain office for Storm Water management, Isabella County Transportation Commission, and the Isabella County Road Commission. Project complies with requirements of section 10, 12, 27, and 29 of the zoning ordinance.

Objective of board: The Planning Commission shall study the site plan and shall, within sixty days of its submittal to the Zoning Official, either approve or disapprove the proposed site plan. If the site plan is disapproved, the reasons for disapproval shall be stated.

Recommend at this time approval of SPR 2017-06. Planning Commission may decide to waive installation of sidewalks as shown on plan until a later time.

Peter Gallinat
Twp Planner

CHARTER TOWNSHIP OF UNION
Planning Commission
Regular Meeting

A regular meeting of the Charter Township of Union Planning Commission was held on August 15, 2017 at the Township Hall.

Meeting was called to order at 7:00 p.m.

Roll Call

Present: Buckley, Squattrito, Strachan, Webster, Woerle, & Zerbe

Excused: Fuller, Mielke, & Robinette

Others Present

Township Planner, Peter Gallinat and Secretary, Jennifer Loveberry

Approval of Minutes

Woerle moved Webster supported the approval of the July 18, 2017 regular meeting minutes with correction. **Vote: Ayes: 6 Nays: 0. Motion carried.**

Correspondence / Reports

Woerle updates from the Board of Trustees

Approval of Agenda

Webster moved Woerle supported approval of the agenda as presented. **Vote: Ayes: 6 Nays 0. Motion carried.**

Public Comment – Open 7:07 p.m.

No comments were offered.

Public Hearing

- **SUP 2017-07 Rooming Boarding Dwellings and Boarding Dwellings Single Unit. Universal Financial Services Inc, 1466 E. Pickard Rd. PID 14-017-001-08**

Brief description for the rezone request was given by Township Planner.

Letters read by Township Planner:

Tim Throop, 1970 Chadwick Rd. – Opposes multi family

Mark McDonald, 1720 Pickard Rd. – Opposes SUP

Jim Engler, 2003 Amber Ln. – Opposes SUP

Public Hearing open 7:15 p.m.

Kristi Fuller, 834 E. Pickard Rd. – Opposes SUP

James Thering, 1975 Chadwick Rd. – Opposes SUP

Brian Clark, 2218 Wieferich Meadows Ln. – Opposes SUP

Jake Rowley, 2275 Wieferich Meadows Ln. – Opposes SUP

Nancy Timmermann, 1305 E. Pickard Rd. – Questions regarding SUP use

Public Hearing closed 7:19 p.m.

New Business

A. SUP 2017-07 Rooming Boarding Dwelling and Boarding Dwellings Single Unit. Universal Financial Services, Inc. 1466 E. Pickard Rd. PID 14-017-10-001-08.

The applicant is proposing to use a one-family dwelling as a rooming and boarding dwelling single unit.

Township Planner gave a brief history of the property.

Discussion was held by the Planning Commissioners.

Buckley moved **Zerbe** supported to recommend denial of SUP 2017-07 Rooming Boarding Dwelling and Boarding Dwellings Single Unit. Universal Financial Services, Inc. 1466 E. Pickard Rd. PID 14-017-10-001-08 to the Charter Township Board of Trustees stating reasons from section 30.3A.1-10 numbers 1, 2, 4, & 8. **Vote: Ayes: 5 Nays 1. Motion carried.**

B. Sidewalk and Pathways Prioritization Committee Appointments

Sidewalk and Pathway Ordinance- *Ordinance No. 2009-03 Adopted: December 30, 2009.* Section 129.005 states the duties and explains the composition of the committee.

Webster moved to nominated herself as Planning Commission Representative to the Sidewalk and Pathway Prioritization Committee **Buckley** supported the appointment. **Vote: Ayes: 6 Nays 0. Motion carried.**

Webster moved **Buckley** supported to appoint Sherrie Teall as the Township Resident Representative to the Sidewalk and Pathway Prioritization Committee for a 2 year term.

Vote: Ayes: 6 Nays 0. Motion carried.

Woerle moved **Webster** supported to appoint Barbara Anderson as the Member at Large Representative to the Sidewalk and Pathway Prioritization Committee for a 2 year term.

Vote: Ayes: 6 Nays 0. Motion carried.

C. Discussion of LSL Planning and Bids for Zoning Review Update.

Discussion was held by the Board.

Other Business

Extended Public Comment –open 8:55 p.m.

No Comments were offered.

Final Board Comment

Adjournment – Chairman Squattrito adjourned the meeting at 8:56 p.m.

APPROVED BY:

Alex Fuller - Secretary
John Zerbe – Vice Secretary

(Recorded by Jennifer Loveberry)



Union Township Site Plan Review Application 2015 Revision BY: JL

FILL OUT THE FOLLOWING

- I. This application is for (circle one) Preliminary Site Plan Review Final Site Plan Review
- II. Applicant Name Jeff Harrison
- III. Applicant Address 2253 Enterprise Drive
- IV. Applicant Phone 989-772-6266 Owner Phone _____
- V. Applicant is (circle) Contractor Architect/Engineer Developer Land Owner (skip V& VI) Other
- VI. Land Owner Name Jeff Harrison
- VII. Land Owner Address 2253 Enterprise Drive
- VIII. Project/Business Name Burch Tank
- IX. Fill out check list that follows. You must check off that each item has been included in the drawing. If an item is not going to be included in the construction, note that in the comment area. For the first three items, check off if you have made the required submittals to other reviewing agencies.

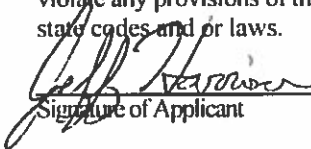
SUBMITTALS TO OTHER AGENCIES		Off
Storm water management plan approval prior to application. Reviewed by the County Engineer	✓	Copy of Union Township Storm Water Management Plan available upon request. Submit (2) copies of plan and calculations directly to the Isabella County Engineer, contact Bruce Rohrer at (989) 772 0911, ext. 231. Any review fees are additional.
All curb cuts, acceleration/deceleration lanes, additional drives, and other matters pertaining to roads to be approved by MDOT or Isabella County Road Commission prior to application.	N/A	MDOT (M 20, BR 127 sites) at (989) 773 7756. Contact Isabella County Road Commission (all other county roads) at (989) 773 7131. Submit (3) copies.
Mt. Pleasant Fire Dept.	✓	Sgt Randy Keeler (989) 779-5122, (2) copies
Isabella Co Transportation Commission (ICTC)	N/A	Rick (989) 773 2913, (2) copies
WELLHEAD PROTECTION REPORTING FORMS (Required for all Site Plans)		
Hazardous Substances Reporting Form Part I and II (Forms included in this packet)	✓	Kim Smith (989) 772-4600 ext 224 ksmith@uniontownshipmi.com
PERMIT INFORMATION - DEQ Check List		
SITE PLAN REQUIREMENTS	I Of	Comments - (also indicate any features which will not be included in the development or are not applicable)
Name and addresses of Property Owner	✓	
Name and Address of Applicant		
Provide Construction Type (per Mi Building Code) and if sprinkled, (assume Type IVb, un-sprinkled if not provided)	✓	

Union Township Site Plan Review Application 2015 Revision

<p>The date, north arrow and scale. The scale shall be not less than 1"= 20' for property under three (3) acres and not more than 1"=40' for property greater than three acres.</p>	<p align="center">✓</p>	
<p>All lot and/or property lines are to be shown and dimensioned, including building setback lines</p>	<p align="center">✓</p>	
<p>The location and dimensions of all existing and proposed: fire hydrants (within 400 feet of building) - - - - drives, ----- sidewalks, (required) ----- curb openings, ----- acceleration/deceleration lanes, ----- signs, ----- exterior lighting on buildings and parking lots, - - parking areas (Including handicapped parking spaces, barrier-free building access, unloading areas), ----- recreation areas, ----- common use areas, ----- areas to be conveyed for public use and purpose. -</p>	<p align="center">✓</p>	
<p>Elevation of building front, side, and back. Include Sign size, height, and design. Canopy heights extending over driveways accommodate Public Transportation</p>	<p align="center">✓</p>	
<p>Source of utilities. Public water and sewer approval by Union Township Utility Coordinator prior to application.</p>	<p align="center">✓</p>	<p>Note: Union Township policy is to issue sewer and water permits after application for a building permit. Applicant is advised to contact the utility department for availability prior to site plan review. The township does not coordinate other utility matters. Applicant to assure himself that site is suitable for septic systems, contact Central Michigan District Health Department</p>
<p>All dumpsters shall be screened from public view with an opaque fence or wall no less than six feet in height. Show location. (Note most refuse contractors require concrete pad to place dumpsters upon)</p>	<p align="center">N/A</p>	
<p>The location and right-of-way width of all abutting roads, streets, alleys and easements.</p>	<p align="center">✓</p>	
<p>A locational sketch drawn to scale giving the section number and the nearest crossroads.</p>	<p align="center">N/A</p>	

Union Township Site Plan Review Application 2015 Revision

I submit the site plan and this application as a true representation of existing and proposed conditions. I agree to install all features as shown and to abide by conditions placed upon approval of this plan by the Union Township Planning Commission . False or inaccurate information placed upon this plan may be cause for revocation of any permits issued pursuant to site plan approval and / or removal of work installed. Any changes to the Site Plan now or in the future must be approved by the Union Township Planning Commission or Zoning Administrator. Approval of this plan shall not constitute the right to violate any provisions of the Union Township Zoning Ordinance 1991-5, or other applicable building or state codes and or laws.



Signature of Applicant

7/31/17

Date

Signature of Owner (if other than applicant)

Date

PLEASE PLACE OUR REVIEW ON THE 8/15/17 (INSERT DATE)
PLANNING COMMISSION MEETING. An owners representative WILL / WILL NOT attend. You
will not receive a reminder of the scheduled meeting.

Union Township Site Plan Review Application 2015 Revision

<u>Township use</u>	Review Comments
File # _____	_____
Fee Paid initial _____	_____
Receipt # _____	_____
Date received _____	_____
Date review completed by Zoning Administrator _____	
Place on the _____ Planning Commission Agenda	
Planning Commission Decision _____	

Peter Gallinat

From: Kim Smith
Sent: Friday, August 18, 2017 1:17 PM
To: Peter Gallinat
Cc: Mark Stuhldreher; Alan Craighead
Subject: RE: Burch Tank Site Plans
Attachments: RE: Burch Tank Site Plans; RE: Burch Tank Site Plan Review; RE: Burch Tank Site Plan Review; RE: Burch Tank Site Plan Review

Peter,

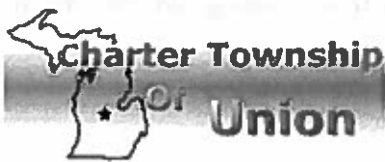
Good afternoon, I have reviewed the site plan for Burch Tank located on Enterprise Drive which you forwarded to me on August 9, 2017, while I was on vacation, and upon my request provided a paper copy to me on Tuesday August 15, 2017. For the purpose of site plan approval only this parcel has water available on the west side of Enterprise Drive and sewer available on the east side of Enterprise Drive. A proposed layout for the onsite water and sewer was provided on this drawing.

On August 16, 2017, I requested copies of the water and sewer plans from Lapham and Associates to be used for the Public Works Department review. Three sets of these plans were provided on August 17, 2017. These plans will be reviewed by my department and must be approved prior to the water and sewer and building permits being issued. Review of these plans could take up to six weeks and final approval could take up to twelve weeks.

If you have any questions please let me know.

Thank you,

Kim Smith



Department of Public Works
Charter Township of Union
2010 S. Lincoln Road
Mt. Pleasant, MI 48858
Phone (989) 772-4600 ext. 224
Fax (989) 773-1988
Visit us on the Web at
<http://www.uniontownshipmi.com>

"This institution is an equal opportunity provider, and employer."

FIRE HYDRANTS

Date: 8/3/17

Address: 2253 Enterprise Dr.

1. **Building Construction Type: Type IIB/IIB Building Use F-2**
2. **Building Square Footage: Overall including existing: 38,788 sq. ft.**
3. **Fire Flow Required: 4250gpm**
4. **Number of Fire Hydrants Required: @ 4250gpm - 5 hydrants non-sprinkled building**
5. **Spacing allowed between fire hydrants: 5-hydrants 300' average spacing between hydrants: Site plan meets requirements.**
6. **Maximum distance from any street or road frontage to a hydrant: 180'**
7. **Building sprinkled or non-sprinkled: Building Classified as F2 which omits a sprinkler system.**
8. **Distance from fire hydrant to the remote part of the building: 400'**
9. **Standpipes – Hydrant within 100' of FDC: N/A**



Mount Pleasant Fire Department
804 E. High Street
Mount Pleasant, Mi 48858

Union Township Site Plan Review

Friday August 4, 2017

Burch Tank & Truck Inc,
2253 Enterprise DR
Mt. Pleasant, MI 48858

A Site Plan Review was conducted on Thursday August 3, 2017 and revealed the following requirements listed below.

ORDER TO COMPLY: Since these conditions are contrary to code, you must correct them upon receipt of this notice. Please provide our department the documentation that verifies compliance with the code.

This list shall not be considered all-inclusive, as other requirements may be necessary, additional requirements are located in Chapter 5 and appendixes B, C, and D of the 2012 Edition of the International Fire Code.

If you have any questions regarding this matter, please feel free to contact me at (989) 779-5122.

Violation Code

1 PROPERTY Identification

Burch Tank & Truck inc.
2253 Enterprise Dr.
Mt. Pleasant, MI 48858

Print Project Number: E170199

Proposed 22,713 square ft. expansion to existing 16,075 square ft. building:
Total Building Area = 38,788

ACCESS AND WATER Road and Water Supply

When fire apparatus access roads or water supply for fire protection is required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except when approved alternative methods of protection are provided. Temporary street signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles in accordance with Section 505.2 of the 2012 Edition of the International Fire Code.

ACCESS ROAD 150 FT Buildings within 150ft of Access Road

All portions of a building are required to be within 150 feet of an approved Fire Department access road, in accordance with Chapter 5, Section 503.1.1 of the 2012 Edition of the International Fire Code.

Union Township Site Plan Review

Must show fire department access road around building in the gravel area.

ACCESS ROAD LOAD Designed and Maintained to Support the

All fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities in accordance with Chapter 5, Sections 503.2.3 and 503.4 of the 2012 Edition of the International Fire Code.

TWO ACCESS ROADS (HEIGHT) Buildings More Than 30 ft or 3

Commercial / Industrial buildings more than 30 feet in height or 3 stories require two or more separate fire department apparatus access roads. Fire department access roads are required to be a minimum of 26 feet wide. At least one of the required access roads shall be located within 15 feet and a maximum of 30 feet from the building and shall be positioned parallel to one entire side of the building, the side of the building which the aerial fire apparatus access road is positioned shall be approved by the fire code official as in accordance with Appendix D, Sections D104 and D105 of the 2012 Edition of the International Fire Code.

Building height exceeds 30'. Show on print that the rear access area meets above requirements.

BUILDING IDENTIFICATION Buildings Shall Have Address

Provide address identification numbers in accordance with Chapter 5, Sections 505.1 of the 2012 Edition of the International Fire Code or applicable to the City of Mt. Pleasant code of ordinances 150.01 Land Usage.

DUMPSTERS Dumpster Locations

Dumpster's and containers with an individual capacity of 1.5 cubic yards or more shall not be stored in buildings or placed within 5 feet of combustible walls, openings or combustible roof eave lines in accordance with Chapter 3, Section 304, and 304.3.3 of the 2012 Edition of the International Fire Code.

HYDRANT DISTANCE Hydrant maximum distance from buildings

Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (122 m) from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official. Exceptions: 1. For Group R-3 and Group U occupancies, the distance requirement shall be 600 feet (183 m). 2. For buildings equipped throughout with an approved automatic sprinkler system

Union Township Site Plan Review

installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 600 feet (183 }

Site Plan meets requirements

KNOX BOX Knox Box Requirements and Location

Provide a Knox Key entry device and install it in approved location by the Fire Code Official, as in accordance with Chapter 5, Section 506.1, 506.1.1 and 506.2 of the 2012 Edition of the International Fire Code. (Go to Knoxbox.com and search by fire department or zip code - select "Mt. Pleasant Fire Department" and place order for the type of Knox box desired.)

SECURITY GATE Installation of Security Gate

The installations of security gates across a fire apparatus access road shall be approved by the fire chief. Where security gates are installed, they shall have an approved means of emergency operation. The security gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200 and in accordance with Chapter 503 of the 2012 International Fire Code and appendix D103.5.

WATER SUPPLY (GPM) Capable of Supplying the Required Fire

Provide fire hydrants capable of supplying the required fire flow in accordance with Chapter 5, Section 507 of the 2012 Edition of the International Fire Code. The number and spacing of fire hydrants is based on the construction type and square footage of the building in accordance with Appendix B and C and tables B105.1 and C105.1 of the 2012 Edition of the International Fire Code. (Contact Fire Department to verify locations.)

Site Plan meets requirements:
See attached fire hydrant work sheet.

GENERAL STATEMENT List Not All-Inclusive

This list shall not be considered all-inclusive, as other requirements may be necessary, additional requirements are located in Chapter 5 and appendixes B, C, and D of the 2012 Edition of the International Fire Code.

ACCESS ROAD SIGNAGE Signage Requirements

All fire apparatus access roads shall be conspicuously posted with uniform "NO PARKING" or "FIRE LANE" signs in keeping with the standard established in applicable law, or as prescribed by the fire code Official and erected on both

Union Township Site Plan Review

sides of the fire apparatus access roads. Signs shall be erected no further than 100 feet apart in all areas designated as fire apparatus access roads. Signs shall be maintained in a clean and legible condition at all times and be replaced or repaired when necessary to provide adequate visibility, in accordance with Chapter 5, Section 503.3 of the 2012 Edition of the International Fire Code. Fire Prevention Ordinance 93.02(E)

Keeler, Randy
Lieutenant
Mount Pleasant Fire Department

Peter Gallinat

From: Rick Collins [rcollins@ictcbus.com]
Sent: Tuesday, August 15, 2017 12:20 PM
To: 'Alan Craighead'; Kim Smith
Cc: Jim Kreamsreiter; Josh Melnek; Peter Gallinat
Subject: RE: Burch Tank Site Plan Review

I have no issue with the plans.



Rick Collins | Executive Director
2100 E. Transportation Dr | Mt. Pleasant, MI 48858
Phone 989.773.6766 | Fax 989.773.1873
rcollins@ictcbus.com
Visit our website at ictcbus.com

From: Alan Craighead [mailto:alan.craighead@laphamassoc.com]
Sent: Tuesday, August 15, 2017 11:38 AM
To: Kim Smith <ksmith@unionshipmi.com>; Rick Collins <rcollins@ictcbus.com>
Cc: Jim Kreamsreiter <jkremsreiter@jbscontracting.com>; Josh Melnek <jmelnek@jbscontracting.com>; Peter Gallinat <pgallinat@unionshipmi.com>
Subject: Burch Tank Site Plan Review

Good Morning,

I was hoping to receive an update regarding your review of the Burch Tank Addition site plans off of Enterprise Drive. I have attached the site plans and building elevations for your use. If you have any questions, please feel free to contact me.

Thank you,

Alan Craighead, PE
[Lapham Associates](http://laphamassociates.com)
515 E. Fifth Street
Clare, MI 48617
Phone: (989) 386-7774

Sam **B**er **E**ngineering

Bruce Rohrer P.E.
957 Morey Drive
Mt. Pleasant, Michigan 48858
(989) 330-2150

August 14, 2017

Peter Galliant
Union Township Zoning Administrator
2010 S. Lincoln Road
Mt. Pleasant, MI 48858

RE: Storm Water Management Plan for Burch Welding & Tank Co./JBS Contracting

Dear Mr. Galliant:

I have reviewed the revised Storm Water Management Plan dated 08-7-17 prepared by Alan Craighead, P.E., Lapham Associates for the above captioned project located in part of the NE1/4 of Section 13, Union Township at 2253 East Enterprise Drive, Mt. Pleasant, MI.

The proposed plan is consistent with the Union Township Storm Water Ordinance. The new site improvements are in compliance with the Storm water standards.

If you have any questions or need any further information, please feel free to contact me in my office.

Sincerely,



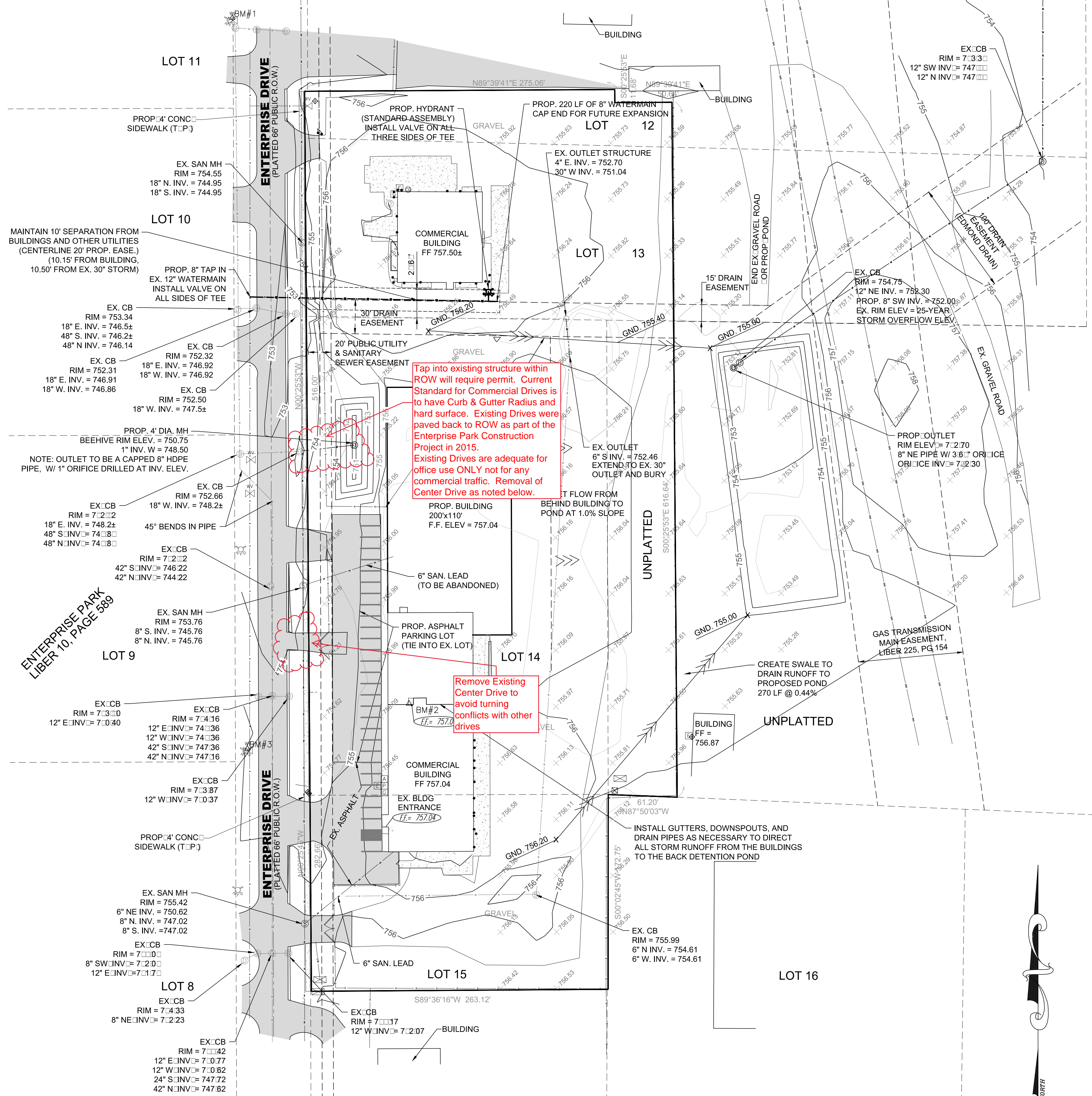
Bruce E. Rohrer, P.E.
Consulting Engineer
Isabella County

BER/taw

cc: Alan Craighead, P.E.,
Lapham Associates

PROPOSED SITE & GRADING PLAN

PROPRIETOR:
BURCH WELDING & TANK, INC.
 2253 E ENTERPRISE DRIVE
 MT. PLEASANT, MICHIGAN 48858



LEGEND:

- ☐ FIRE HYDRANT
- ☐ WATER VALVE
- ☐ DRAINAGE STRUCTURE
- ☐ SANITARY MANHOLE
- ☐ CLEANOUT
- ☐ RISER
- ☐ TRANSFORMER / CONTROL PANEL
- ☐ AIR CONDITIONING UNIT
- ☐ ELECTRIC METER
- ☐ GAS METER
- ☐ PHONE SERVICE AT BUILDING
- BOLLARD POST
- ☐ FINISHED FLOOR ELEVATION
- ☐ BENCHMARK
- ☐ PROPOSED GRADING POINT

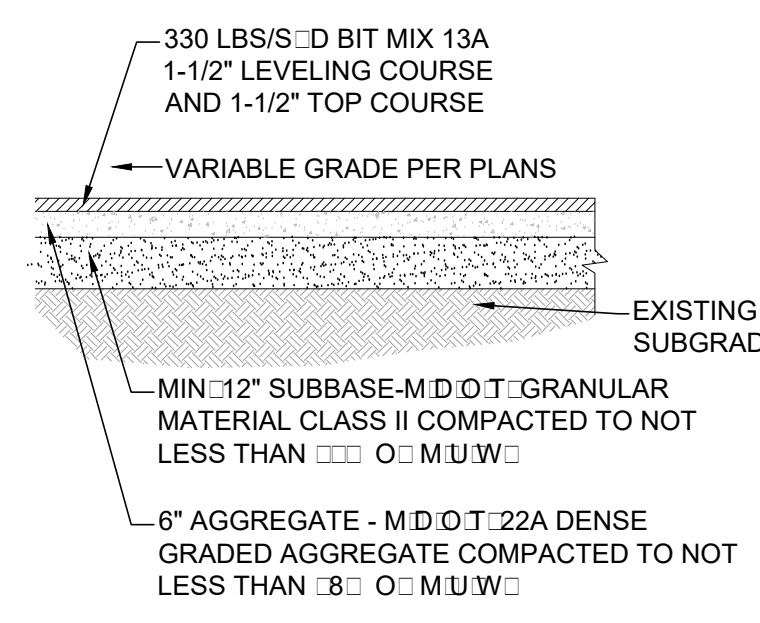
SITE PLAN NOTES:

- These plans and specifications are subject to modification, that if during construction, conditions develop that were not apparent during the design and preparation of these plans. All modifications must be approved by local jurisdiction prior to construction and/or implementation.
- In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.
- Should it appear that the work to be done or any matter relative thereto is not sufficiently detailed or explained on these plans, the contractor shall contact the engineer for such further explanations as may be necessary.
- Before commencement of work, the contractor shall review all plans and specifications and the job site. The contractor shall notify the owner and the engineer of any discrepancies that may require modification to these plans or of any field conflicts.
- Contractor agrees that in accordance with generally accepted construction practices, the 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. This requirement shall be made to apply continuously and not be limited to normal working hours.
- Contractor shall obtain all necessary permits prior to commencing construction involving right-of-ways, and for the construction, modification, or connection to facilities. All workmanship, equipment and materials shall conform to local jurisdiction standards and specifications.
- Traffic control shall be provided in accordance with local jurisdiction.
- The contractor shall provide all lights, signs, barricades, flag men, or other devices necessary to provide for public safety.
- Where soil or geologic conditions encountered in grading operations are different from those anticipated in the soil and geological investigation report, if provided, or where conditions warrant changes to the recommendations contained therein, a revised soil and geologic report shall be submitted for approval and shall be accompanied by an engineer's opinion as to the safety of the site from the possibility of land slippage, settlement and seismic activity.
- Meet all current applicable ADA requirements for parking, signage, ramps, sidewalks, and warning notification on sidewalks approaching drives as required.

ZONING INFORMATION:

ZONED: I-2 (GENERAL BUSINESS DISTRICT)
 SETBACK REQUIREMENTS:
 FRONT YARD: 0' EET
 SIDE YARD: 20' EET
 REAR YARD: 0' EET

NOTE: REMOVE ALL TOPSOIL, ROOTS AND GRASS IN AREAS TO BE PAVED
 APPLICABLE IN ALL ASPHALT PARKING/DRIVE AREAS AND APPROACHES

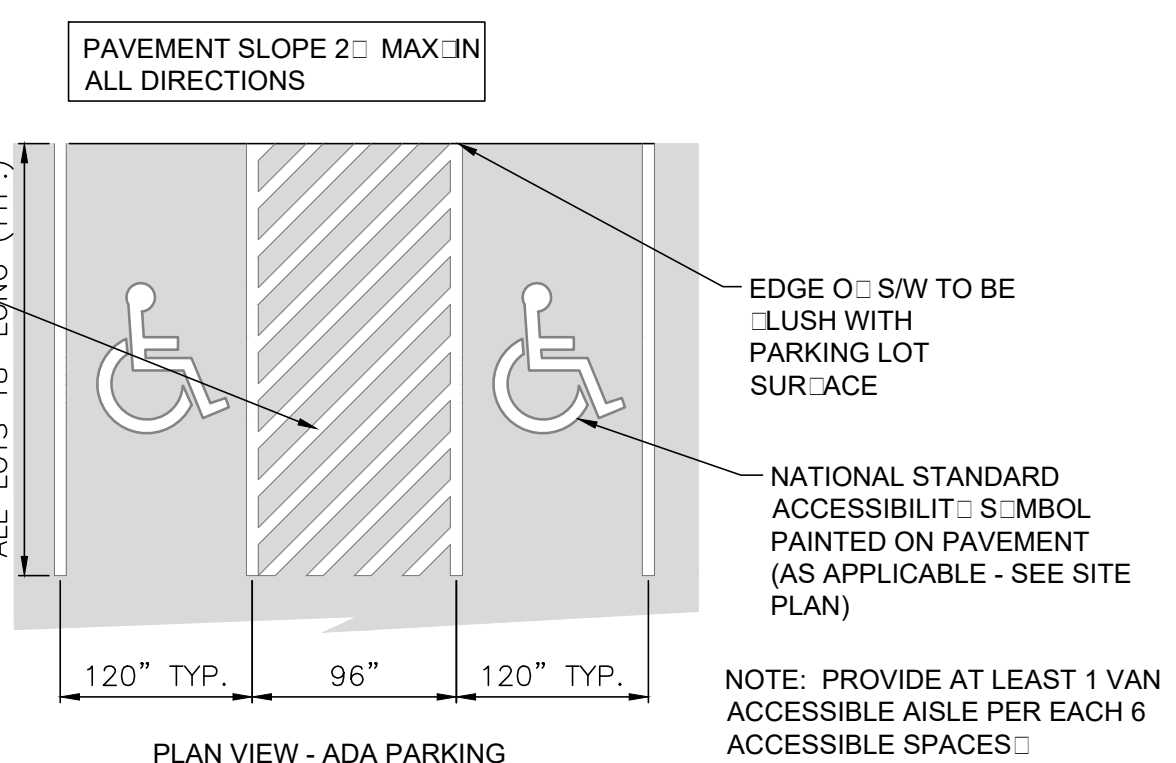
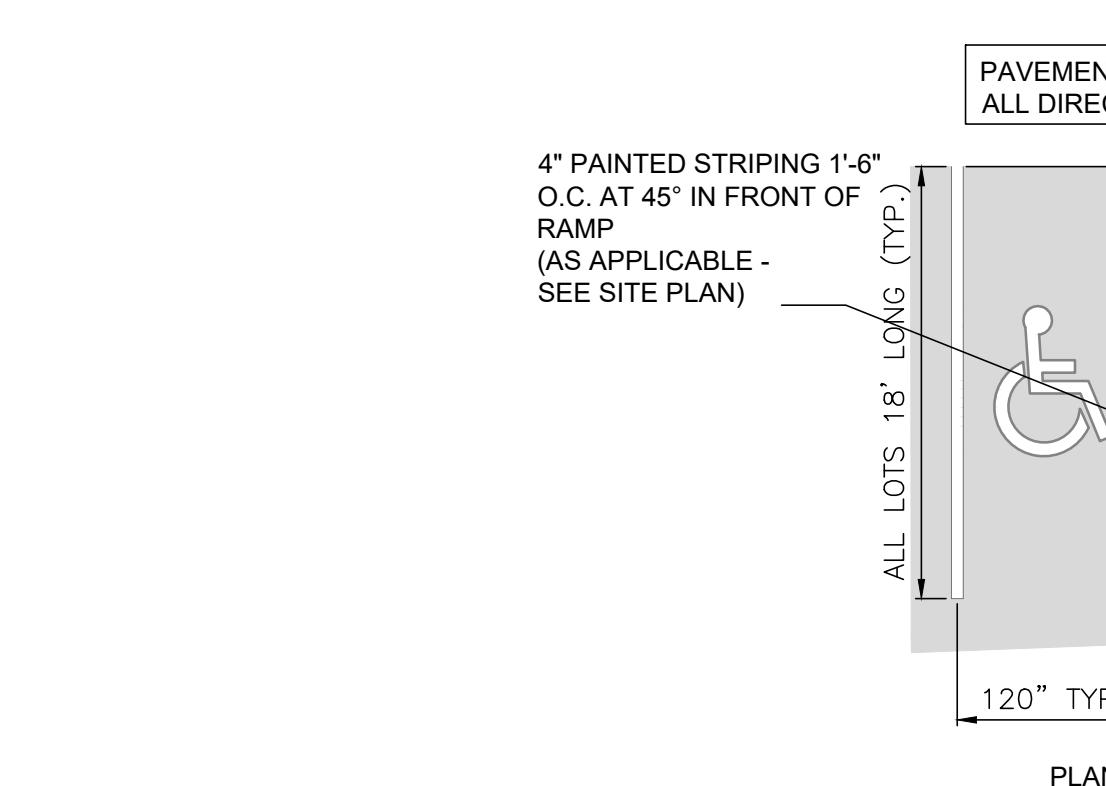


PARKING REQUIREMENTS:

Parking Spaces Required:	
Manufacturing:	
1 S	3 P
0 E	0 S
Total Required	7
Accessible Spaces Provided	
Total Spaces	29

BITUMINOUS PAVEMENT DETAIL

SCALE: NONE



PROPOSED SITE PLAN

SCALE: 1" = 10'

PARKING STALL DETAIL

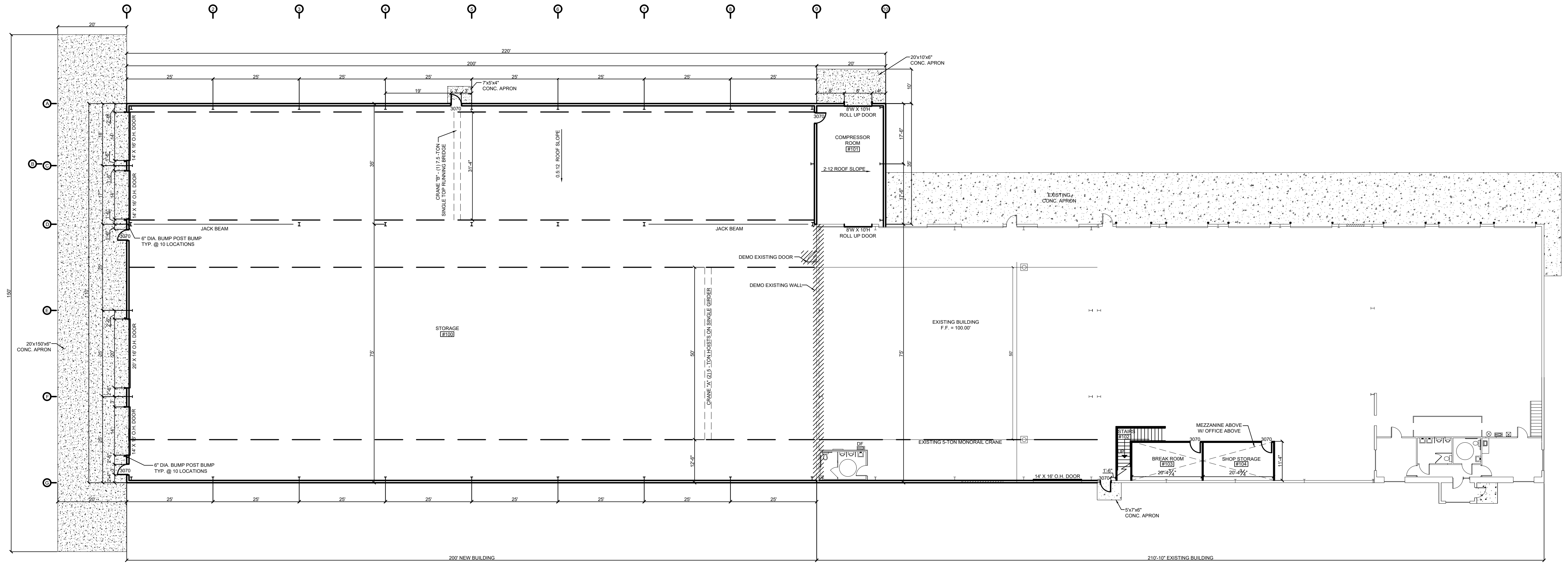
SCALE: NONE

PROJECT NUMBER: E1701	DRAWN BY: A.C.	SCALE: 1" = 10'
ENGINEER: A.C.	DATE: JUL 27, 2017	SHEET C-3
REVISED: 8/7/17 - U	REVISED: 8/17/17 - Add'd S	
REVISED: 8/17/17 - Add'd S		

PREPARED FOR:
JBS CONTRACTING
 1680 GOVER PARKWAY
 MT. PLEASANT, MICHIGAN 48858

LAPHAM ASSOCIATES SURVEYING
 ENGINEERING
 ENVIRONMENTAL
 SURVEYING
 P.O. BOX 386-7774
 MT. PLEASANT, MI 48858-7774
 TEL: (810) 486-7112
 FAX: (810) 486-7112
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APPROVED USE FOR:	C-3
PRELIMINARY	
PERMIT BID	
CONSTRUCTION	
FINAL RECORD	



FLOOR PLAN
SCALE: 1/16" = 1'-0"

JBS JOB NUMBER:
DRAWING NAME: FLOOR PLAN
DRAWN BY: DKG
REVIEWED BY:
FIELD SUPERVISOR:
DATE: 7-19-17

ENGINEER'S SEAL

BURCH TANK
MT. PLEASANT, MI

COMMERCIAL/INDUSTRIAL
CONSTRUCTION

JBS Contracting Inc.
1680 COVER PARKWAY
MT. PLEASANT, MI 48858
PH: (989) 772-9170
FAX: (989) 772-9272

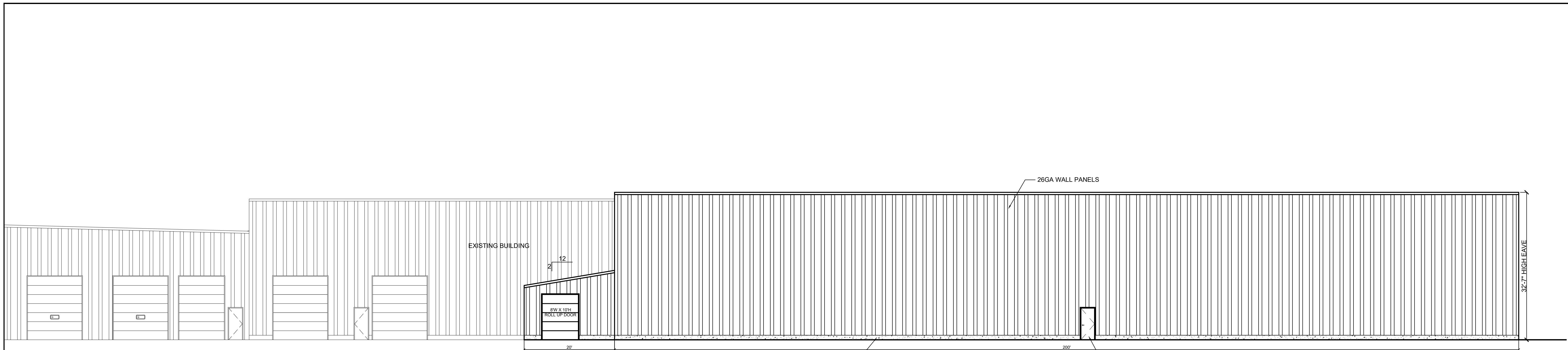
REVISIONS		
TAG:	DATE:	CHANGE:

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

A1

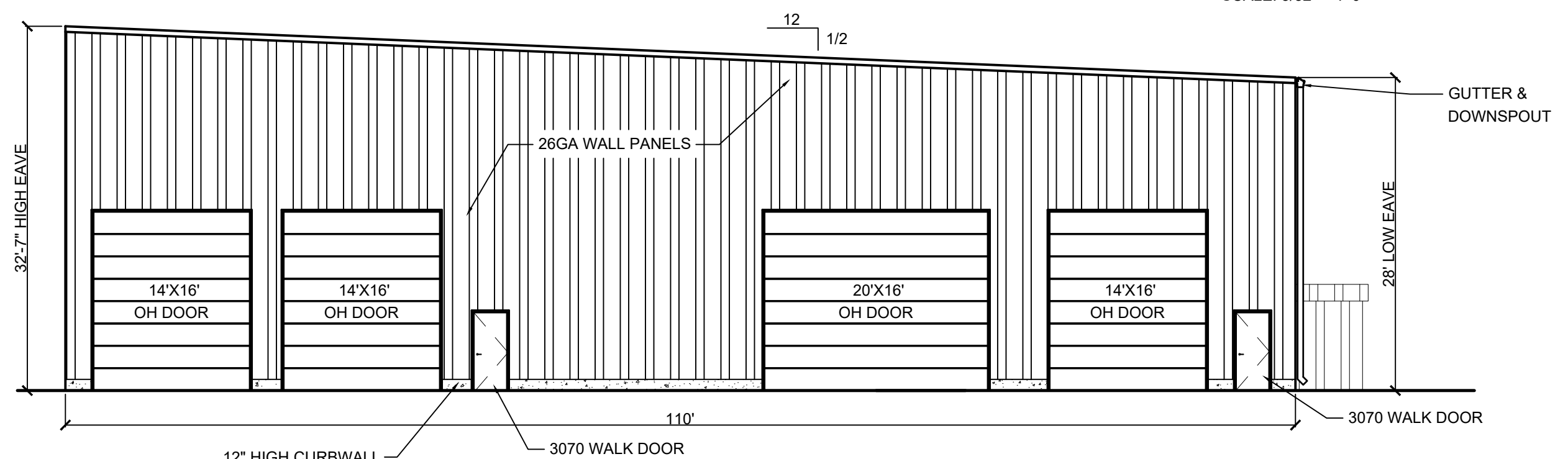
BURCH TANK





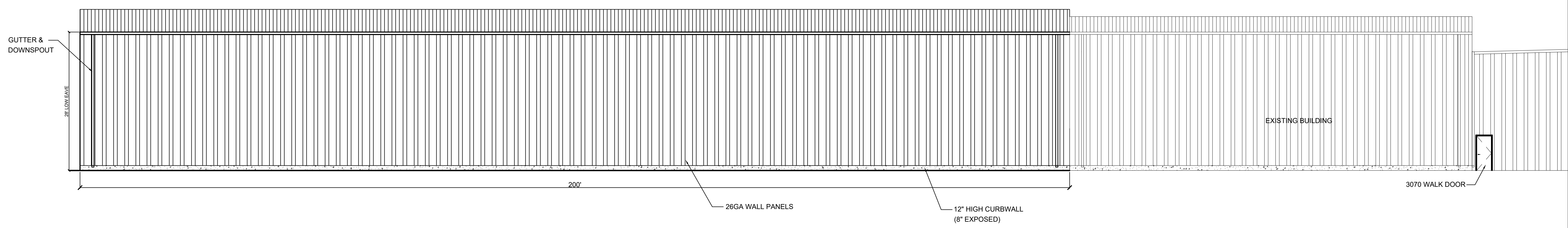
12" HIGH CURBWALL (8' EXPOSED) 3070 WALK DOOR

EAST ELEVATION
SCALE: 3/32" = 1'-0"



12" HIGH CURBWALL (8' EXPOSED) 3070 WALK DOOR

NORTH ELEVATION
SCALE: 3/32" = 1'-0"



26GA WALL PANELS 12" HIGH CURBWALL (8' EXPOSED) 3070 WALK DOOR

WEST ELEVATION
SCALE: 3/32" = 1'-0"

JBS JOB NUMBER:
DRAWING NAME: ELEVATION
DRAWN BY: DKG
REVIEWED BY:
FIELD SUPERVISOR:
DATE: 6-28-17

ENGINEER'S SEAL

BURCH TANK
MT. PLEASANT, MI

COMMERCIAL/INDUSTRIAL
CONSTRUCTION

JBS Contracting Inc.
1680 COVER PARKWAY
MT. PLEASANT, MI 48858
PH: (989) 772-9270
FAX: (989) 772-9272

REVISIONS		
TAG:	DATE:	CHANGE:

SCALE:
3/32" = 1'-0"

A2

BURCH TANK



COVER SHEET AND PLAT INFORMATION

PROPRIETOR:
BURCH WELDING & TANK, INC.
 2253 E ENTERPRISE DRIVE
 MT. PLEASANT, MICHIGAN 48858

PROPERTY DESCRIPTIONS:

PROPERTY DESCRIPTION:

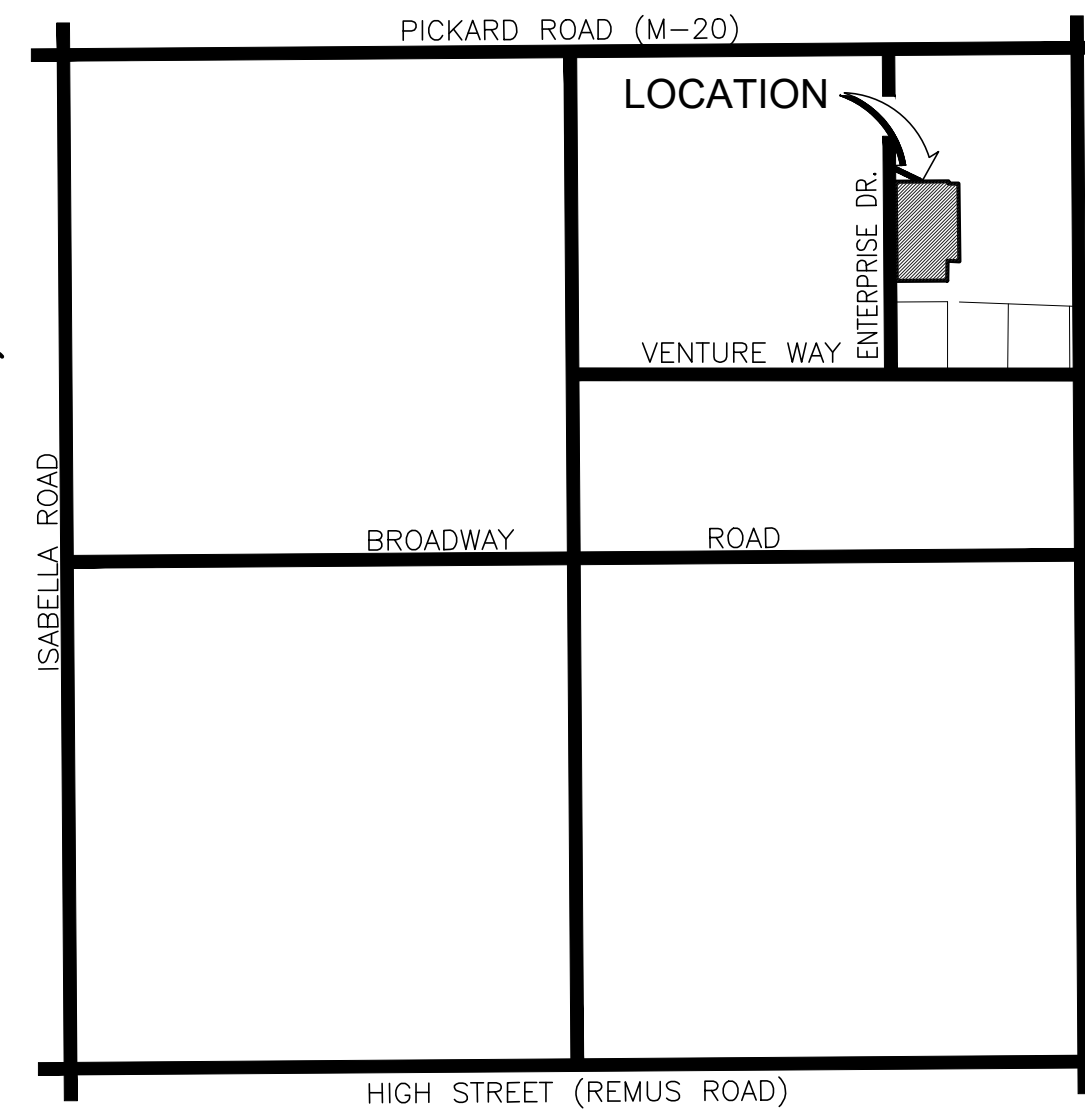
LOT 14 AND PART OF LOTS 12, 13 & 15 ENTERPRISE PARK AND PART OF THE NE 1/4 SEC 13 T14N R4W COM AT E 1/4 COR OF SAID SEC 13 T14N R4W COM AT E 1/4 SAID SEC 13 TH N 00D 23M 05S W 12'2.62" TH N 87D 00M 03S W ALG THE N LINE OF LOTS 16 & 17 OF ENTERPRISE PARK 623'00" TO POB TH CONTINUING N 87D 00M 03S W 61'2" TO THE NW COR OF SAID LOT 16 TH S 00D 2M 4' S W 172'7" TH S 8' D 36M 16S W 263'12" TH N 00D 2' M 4' S W 282'66" TH N 00D 2' M 3' S W 16'00" TH N 8' D 3' M 41S E 27'06" TH S 00D 2' M 3' S E 11'68" TH N 8' D 3' M 41S E 10'64" TH S 00D 2' M 3' S E 616'84" TO POB COMBINATION OR 2012 FROM 1:2-00-014-01 & 1:2-00-014-02 TO 1:2-00-014-03 DESCRIPTION FROM ISABELLA COUNTY GIS

DRAINAGE EASEMENT:

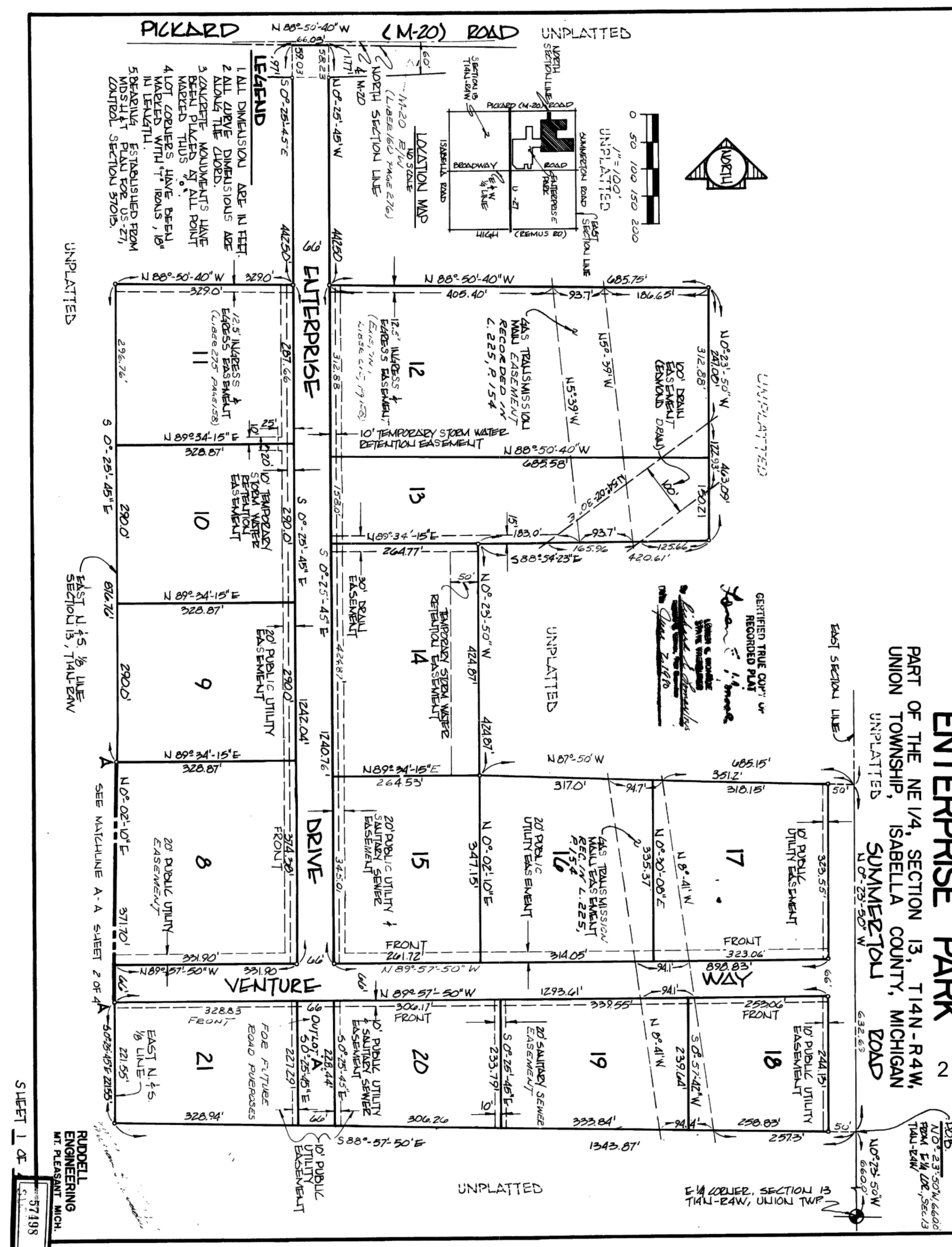
BEGINNING N 00°23'50" W, ALONG THE EAST SECTION LINE, 1292.62 FEET AND N 87°50'35" W, ALONG THE NORTH LINE AND NORTH LINE EXTENDED OF LOTS 16 & 17 OF ENTERPRISE PARK; PART OF THE NE 1/4 SECTION 13 T14N R4W UNION TOWNSHIP ISABELLA COUNTY MICHIGAN AS RECORDED IN LIBER 10 PAGE 8 ISABELLA COUNTY MICHIGAN PUBLIC RECORDS, 623.95 FEET FROM THE EAST ONE-QUARTER CORNER OF SAID SECTION 13; THENCE N 00°25'53" W, 426.01 FEET TO THE SOUTH LINE OF LOT 13 OF SAID ENTERPRISE PARK; THENCE S 88°54'23" E, ALONG SAID SOUTH LINE, 122.09 FEET; THENCE S 05°39'06" E, ALONG THE WESTERLY RIGHT OF WAY LINE OF GAS TRANSMISSION LINE RECORDED IN LIBER 225, PAGE 154 ISABELLA COUNTY, MICHIGAN PUBLIC RECORDS, 250.00 FEET; THENCE S 39°22'01" W, 226.21 FEET BACK TO THE POINT OF BEGINNING; DESCRIPTION WRITTEN UTILIZING ENTERPRISE PARK PLAT INFORMATION

SECOND PARCEL OWNED BY BURCH TANK (FOR DRAINAGE EASEMENT):

T14N R4W PART OF LOTS 12 & 13 ENTERPRISE PARK AND PART OF THE NE 1/4 SEC 13 BEG N 00D 23M 05S W 12'2.62" FROM THE E 1/4 COR SEC 13 TH CONTINUING N 00D 23M 05S W 82'00" TH N 87D 00M 03S W 264'17" TH N 00D 23M 05S W 302'00" TH S 87D 00M 03S E 264'17" TH N 00D 23M 05S W 100'00" TH N 88D 00M 36S W 264'01" TH N 00D 23M 05S W 82'00" TH S 88D 00M 36S E 264'01" TH N 00D 23M 05S W 100'00" TH N 88D 00M 36S W 640'20" TH S 00D 23M 17S E 182'00" TH N 88D 04' M 27S W 30' 84" TH S 00D 2' M 3' S E 26' 82" TH N 8' D 3' M 41S E 27'06" TH S 00D 20M 1' S E 11'68" TH N 8' D 3' M 41S E 10'64" TH S 00D 2' M 3' S E 616'84" TH S 87D 00M 03S E 623'00" TO POB 1:20 A M L COMBINATION/SPLIT OR 2007 FROM 013-20-002-00 & 013-20-003-00 & 013-20-044-00 & PART OF 013-20-04-00 & PART OF 1:2-00-012-00 & PART OF 1:2-00-013-00 TO 1:2-00-012-01 & 1:2-00-014-02



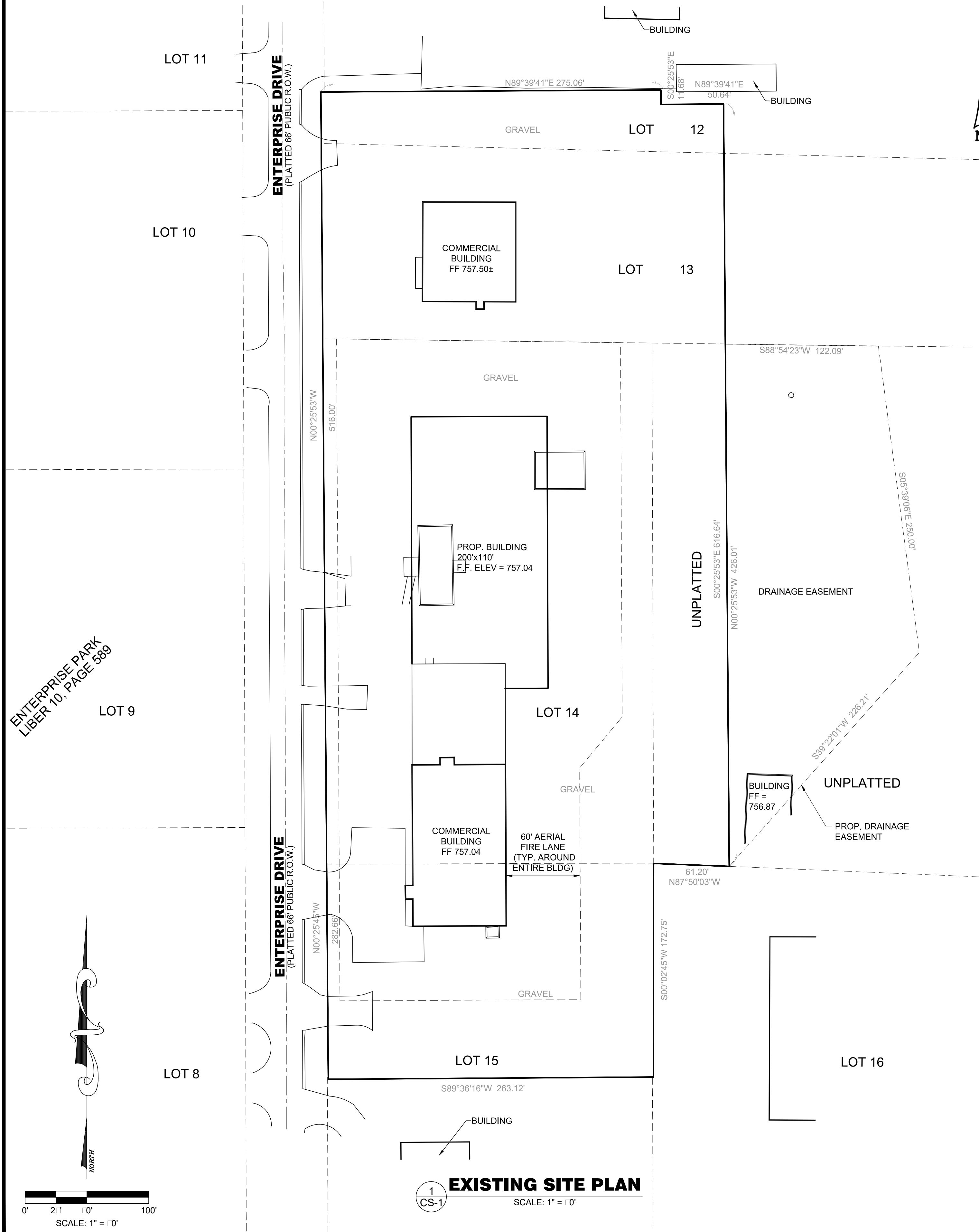
SECTION 13 T14N R4W UNION TOWNSHIP
 ISABELLA COUNTY MICHIGAN
LOCATION MAP
 (NO SCALE)



ENTERPRISE PARK PLAT MAP
 SCALE: 1" = NONE

SHEET INDEX

COVER SHEET AND PLAT INFORMATION	CS-1
EXISTING TOPOGRAPHIC SURVEY	C-1
DEMOLITION PLAN	C-2
PROPOSED SITE & GRADING PLAN	C-3
STORMWATER MANAGEMENT PLAN	C-4
SWMP DETAILS	C-5
UTILITY PLAN	C-6
WATERMAIN PLAN & PROFILE	C-7
SOIL EROSION AND SEDIMENTATION CONTROL PLAN	C-8
SESC DETAILS	C-9



EXISTING SITE PLAN
 SCALE: 1" = 100'

PROJECT NUMBER: E1701	DRAWN BY: A.C.	SCALE: 1" = 10'
ENGINEER: A.S.	DATE: JUL 27 2017	SHEET CS-1
REVISED: 8/7/17 - U		
REVISED: 8/17/17 - Add'd S		

PREPARED FOR:
JBS CONTRACTING
 1680 GOVER PARKWAY
 MT. PLEASANT, MICHIGAN 48858

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 C (810) 386-7112
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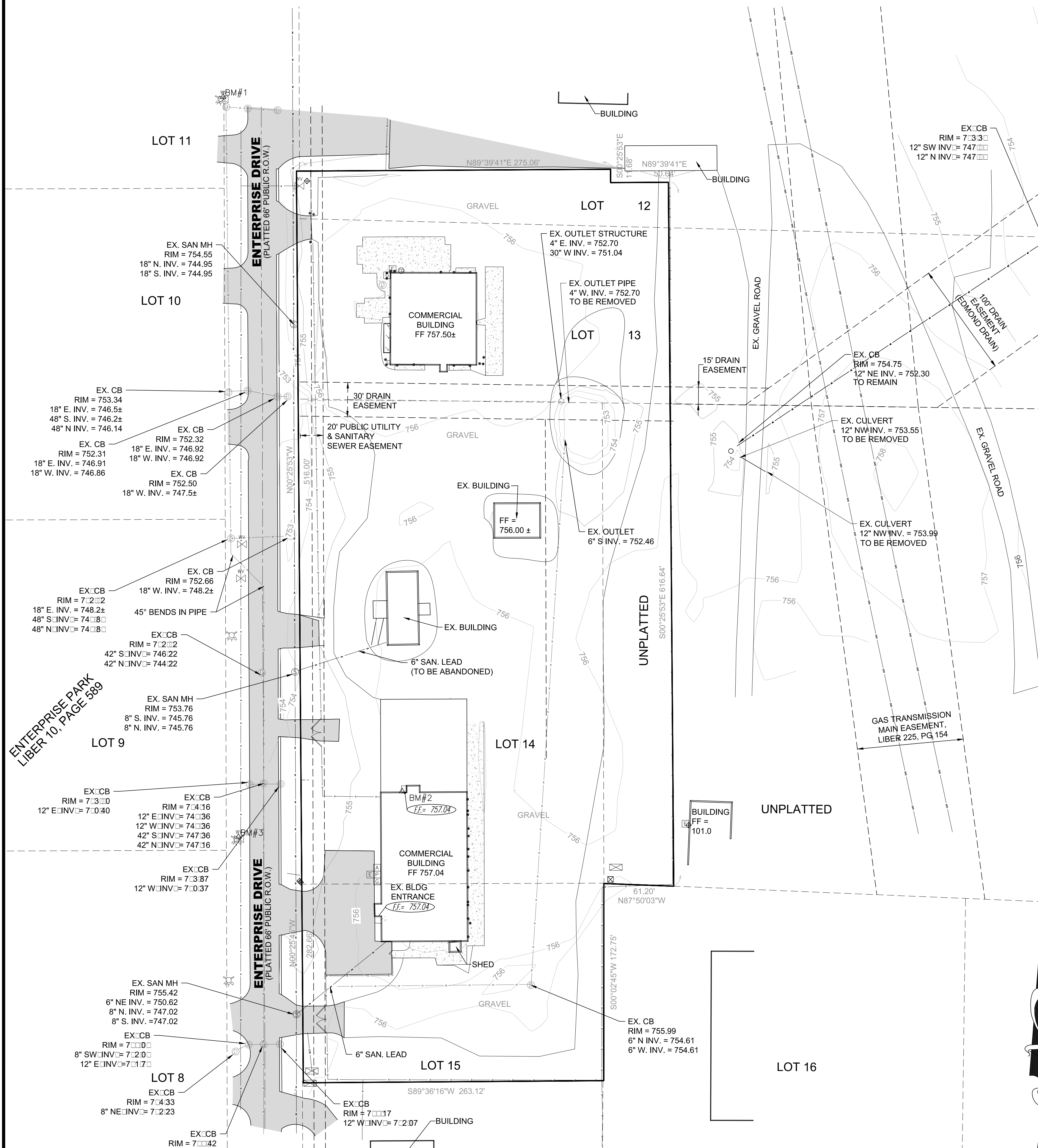
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CS-1



Know what's below.
 Call before you dig.

EXISTING TOPOGRAPHIC SURVEY

PROPRIETOR:
BURCH WELDING & TANK, INC.
 2253 E ENTERPRISE DRIVE
 MT. PLEASANT, MICHIGAN 48858



1
 C-1
EXISTING SITE PLAN
 SCALE: 1" = 10'

LEGEND:

- FIRE HYDRANT
- ⊗ WATER VALVE
- ⊙ DRAINAGE STRUCTURE
- ⊙ SANITARY MANHOLE
- ⊙ CLEANOUT
- ◆ RISER
- ⊠ TRANSFORMER / CONTROL PANEL
- ⊠ AIR CONDITIONING UNIT
- ⊠ ELECTRIC METER
- ⊠ GAS METER
- ⊠ PHONE SERVICE AT BUILDING
- BOLLARD POST
- ⊠ FINISHED FLOOR ELEVATION
- △ BM#3 BENCHMARK

GENERAL NOTES:

- 1) UNDERGROUND UTILITY LINES SHOWN REFLECT INFORMATION COLLECTED FROM UTILITY OWNERS AND VISIBLE MARKERS FOUND AT THE TIME OF SURVEY. SHOWN LOCATIONS ARE NOT INTENDED TO BE EXACT AND CONTRACTOR MUST VERIFY LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
- 2) DRAWING GENERATED BY AUTOCAD RELEASE 2017. COPYING OR REPRODUCTION MAY DISTORT SCALE. DO NOT SCALE. FOR LAYOUT OR CONSTRUCTION.
- 3) ANY INFORMATION OR DATA ON THIS DRAWING IS NOT INTENDED TO BE SUITABLE FOR REUSE BY ANY PERSON, FIRM OR CORPORATION OR ANY OTHERS ON EXTENSIONS OF THIS PROJECT OR FOR ANY USE ON AN OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION AND ADAPTATION BY THE SURVEYOR OR ENGINEER FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO THE SURVEYOR OR ENGINEER.
- 4) BENCHMARKS:
BM#1: NW 1/4 BOLT OF FIRE HYDRANT ELEVATION: 756.80
BM#2: FINISHED FLOOR OF BURCH WELDING AT THE NORTH ENTRANCE ELEVATION: 757.04
BM#3: NW 1/4 BOLT OF FIRE HYDRANT ELEVATION: 755.33

ZONING INFORMATION:

ZONED: I-2 (GENERAL BUSINESS DISTRICT)
 SETBACK REQUIREMENTS:
 FRONT YARD: 7 FEET
 SIDE YARD: 20 FEET
 REAR YARD: 0 FEET

UTILITY INFORMATION:

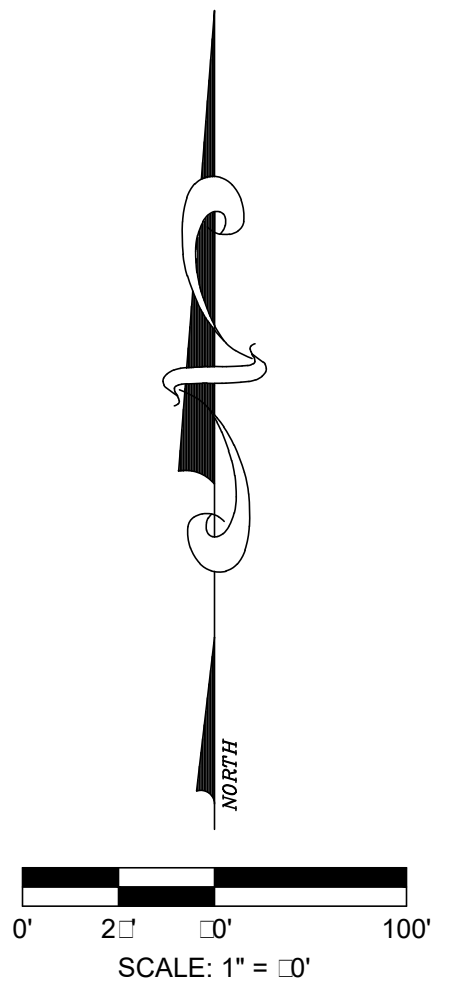
ELECTRIC POWER C: 132' W, 48801 A: (888) 466-4261 P: (800) 482-7171 (M.D.)	DEPARTMENT OF PUBLIC WORKS (WATER & SANITARY) C: 2010 S L... Rd M: (810) 488-8... P: (810) 772-4600
NATURAL GAS DTE O: 48801 D: MI 48226 P: (800) 477-4747	ISABELLA COUNTY DRAIN COMMISSION 200 N... S... M: (810) 488-8... P: (810) 772-0111
TELEPHONE/COMMUNICATIONS V: 48801 34 N... A... A: MI 48801 P: (810) 463-0321 P: (800) 482-7171 (M.D.)	ISABELLA COUNTY ROAD COMMISSION 2261 E... Rd M: (810) 488-8... P: (810) 773-7131
CABLE TELEVISION C: ... E: ... M: ... P: (810) 77-6846	

PROJECT NUMBER: E1701	DRAWN BY: A.C.	SCALE: 1" = 10'
ENGINEER: A.C.	DATE: JUL 27 2017	SHEET C-1
REVISED: 8/7/17 - U... REVISED: 8/17/17 - Add'd S...		

PREPARED FOR:
JBS CONTRACTING
 1680 GOVER PARKWAY
 MT. PLEASANT, MICHIGAN 48858

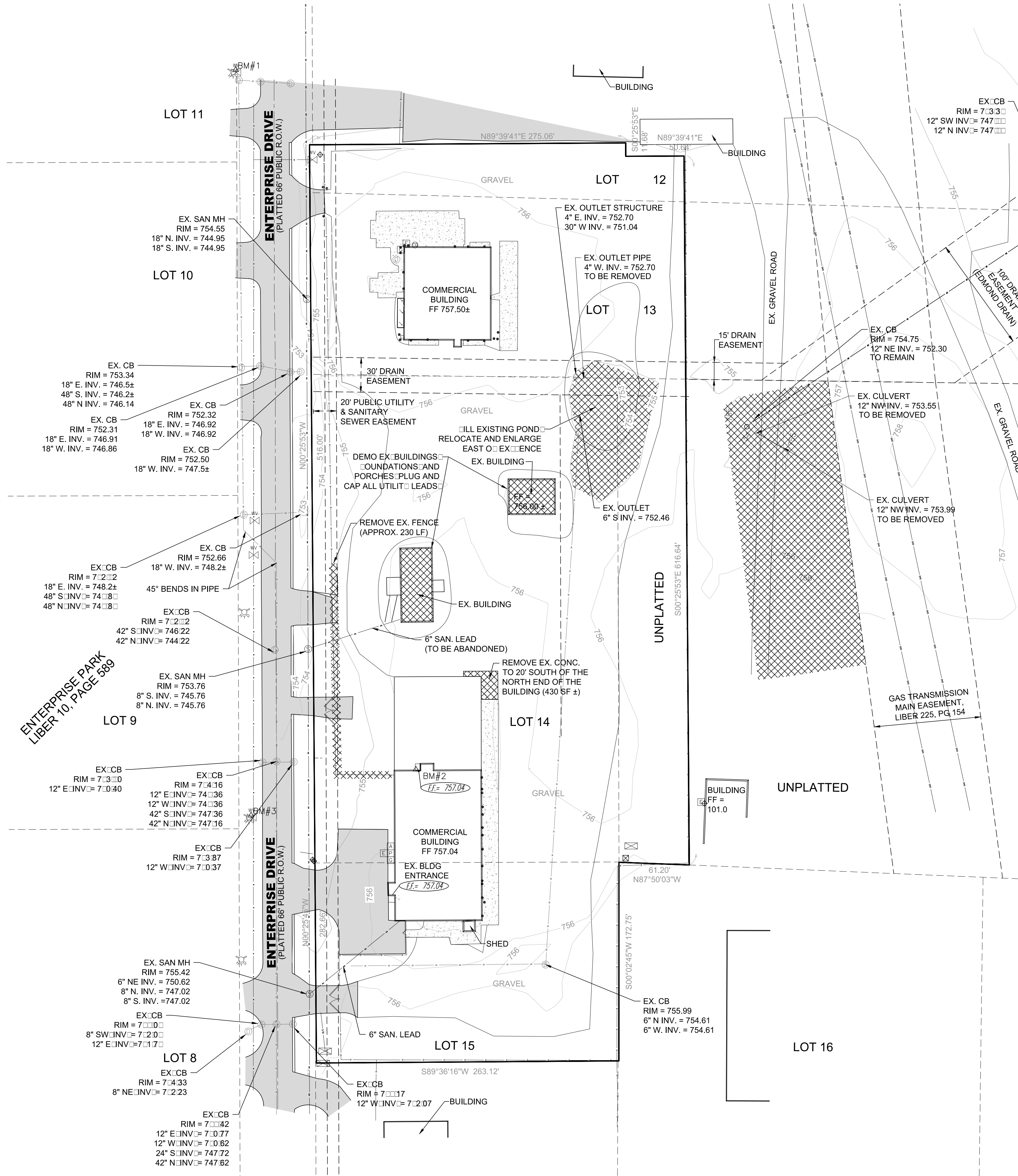
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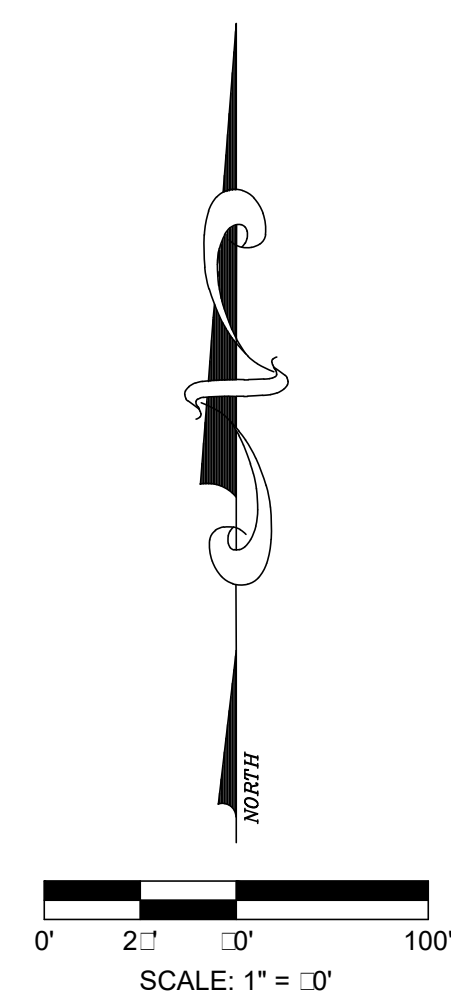
DEMOLITION PLAN

PROPRIETOR:
BURCH WELDING & TANK, INC.
 2253 E ENTERPRISE DRIVE
 MT. PLEASANT, MICHIGAN 48858



LEGEND:

- FIRE HYDRANT
- WATER VALVE
- DRAINAGE STRUCTURE
- SANITARY MANHOLE
- CLEANOUT
- RISER
- TRANSFORMER / CONTROL PANEL
- AIR CONDITIONING UNIT
- ELECTRIC METER
- GAS METER
- PHONE SERVICE AT BUILDING
- BOLLARD POST
- FINISHED FLOOR ELEVATION
- BENCHMARK
- AREA WHERE DEMOLITION WORK IS TO OCCUR
 NOTE: TOTAL AREA OF DEMOLITION = 25000± SQ. FT.



1
 C-2
DEMOLITION PLAN
 SCALE: 1" = 40'

PROJECT NUMBER: E1701	DRAWN BY: A.T.C.	SCALE: 1" = 40'
ENGINEER: A.T.C.	DATE: JUL 27, 2017	SHEET C-2
REVISION: 8/17/17 - U		
REVISION: 8/17/17 - Add S		

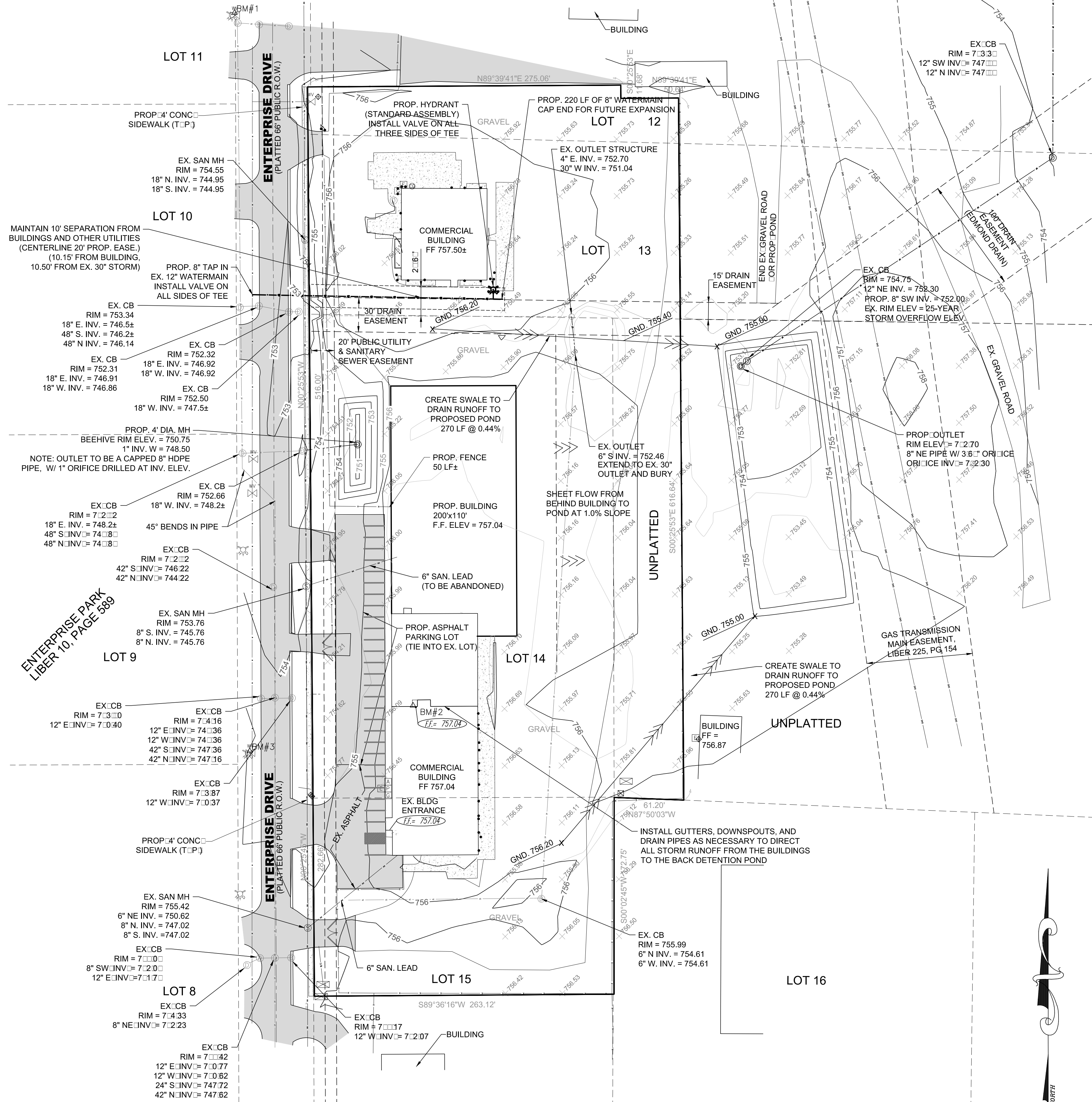
PREPARED FOR:
JBS CONTRACTING
 1680 GOVER PARKWAY
 MT. PLEASANT, MICHIGAN 48858

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PROPOSED SITE & GRADING PLAN

PROPRIETOR:
BURCH WELDING & TANK, INC.
 2253 E ENTERPRISE DRIVE
 MT. PLEASANT, MICHIGAN 48858



LEGEND:

- ☐ FIRE HYDRANT
- ☐ WATER VALVE
- ☉ DRAINAGE STRUCTURE
- ☉ SANITARY MANHOLE
- ☉ CLEANOUT
- ☐ RISER
- ☒ TRANSFORMER / CONTROL PANEL
- ☐ AIR CONDITIONING UNIT
- ☐ ELECTRIC METER
- ☐ GAS METER
- ☐ PHONE SERVICE AT BUILDING
- BOLLARD POST
- ☐ FINISHED FLOOR ELEVATION
- ☐ BENCHMARK
- ☐ PROPOSED GRADING POINT

SITE PLAN NOTES:

- These plans and specifications are subject to modification, that if during construction, conditions develop that were not apparent during the design and preparation of these plans. All modifications must be approved by local jurisdiction prior to construction and/or implementation.
- In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.
- Should it appear that the work to be done or any matter relative thereto is not sufficiently detailed or explained on these plans, the contractor shall contact the engineer for such further explanations as may be necessary.
- Before commencement of work, the contractor shall review all plans and specifications and the job site. The contractor shall notify the owner and the engineer of any discrepancies that may require modification to these plans or of any field conflicts.
- Contractor agrees that in accordance with generally accepted construction practices, the 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. This requirement shall be made to apply continuously and not be limited to normal working hours.
- Contractor shall obtain all necessary permits prior to commencing construction involving right-of-ways, and for the construction, modification, or connection to facilities. All workmanship, equipment and materials shall conform to local jurisdiction standards and specifications.
- Traffic control shall be provided in accordance with local jurisdiction.
- The contractor shall provide all lights, signs, barricades, flag men, or other devices necessary to provide for public safety.
- Where soil or geologic conditions encountered in grading operations are different from those anticipated in the soil and geological investigation report, if provided, or where conditions warrant changes to the recommendations contained therein, a revised soil and geologic report shall be submitted for approval and shall be accompanied by an engineer's opinion as to the safety of the site from the possibility of land slippage, settlement and seismic activity.
- Meet all current applicable ADA requirements for parking, signage, ramps, sidewalks, and warning notification on sidewalks approaching drives as required.

ZONING INFORMATION:

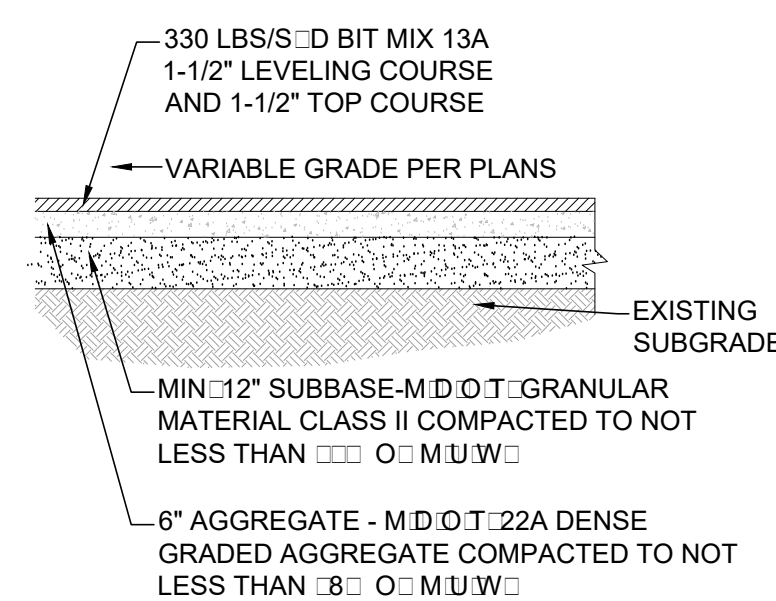
ZONED: I-2 (GENERAL BUSINESS DISTRICT)

SETBACK REQUIREMENTS:

FRONT YARD: 20' EET
 SIDE YARD: 20' EET
 REAR YARD: 10' EET

NOTE: REMOVE ALL TOPSOIL, ROOTS AND GRASS IN AREAS TO BE PAVED

APPLICABLE IN ALL ASPHALT PARKING/DRIVE AREAS AND APPROACHES



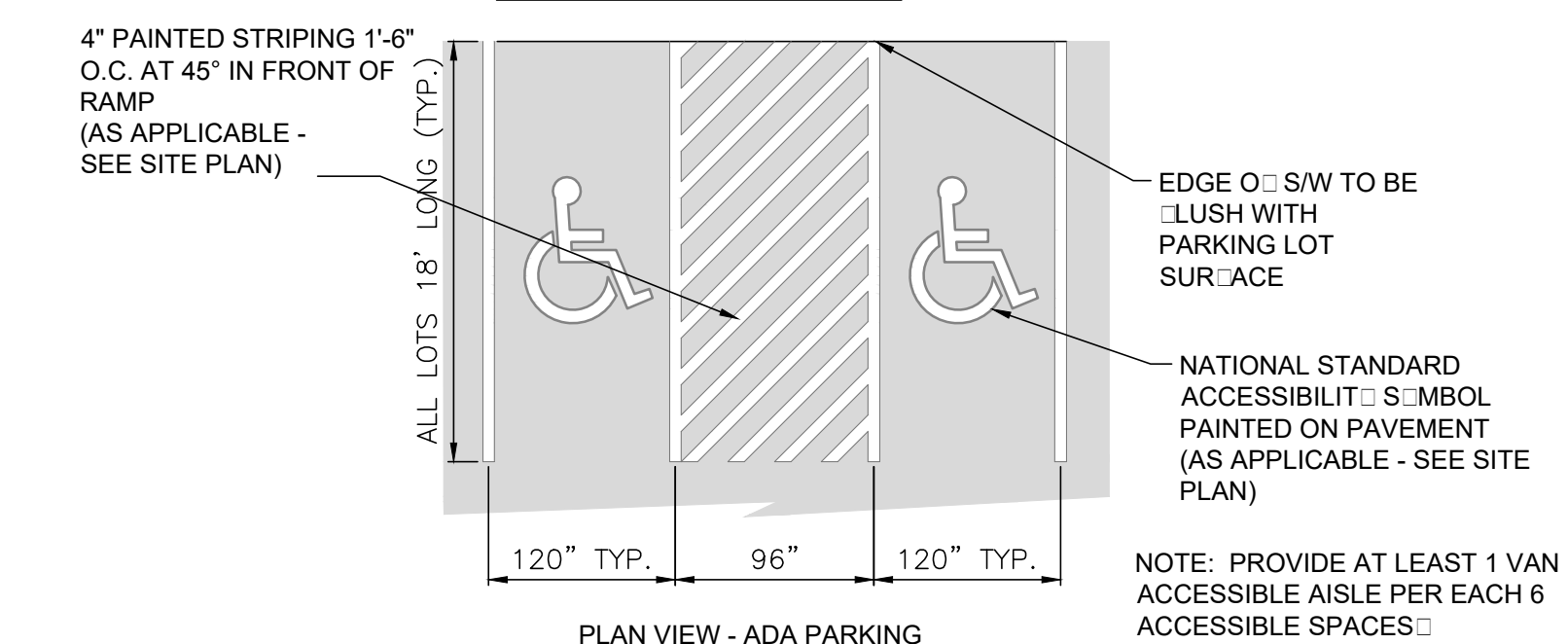
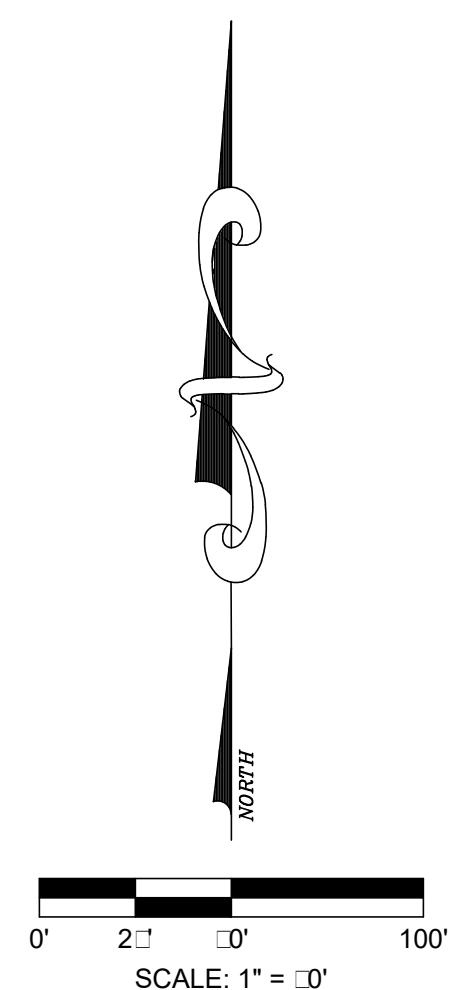
PARKING REQUIREMENTS:

Parking Spaces Required:

Category	Count
Manufacturing	20
Total Required	7
Accessible Spaces Provided	2
Total Spaces	29

BITUMINOUS PAVEMENT DETAIL

SCALE: NONE



PARKING STALL DETAIL

SCALE: NONE

PROPOSED SITE PLAN

SCALE: 1" = 10\''

PROJECT NUMBER: E1701	DRAWN BY: A.C.	SCALE: 1" = 10'
ENGINEER: A.C.	DATE: JUL 27, 2017	SHEET C-3
REVISED: 8/7/17 - U.P.	REVISED: 8/17/17 - Add'd S	

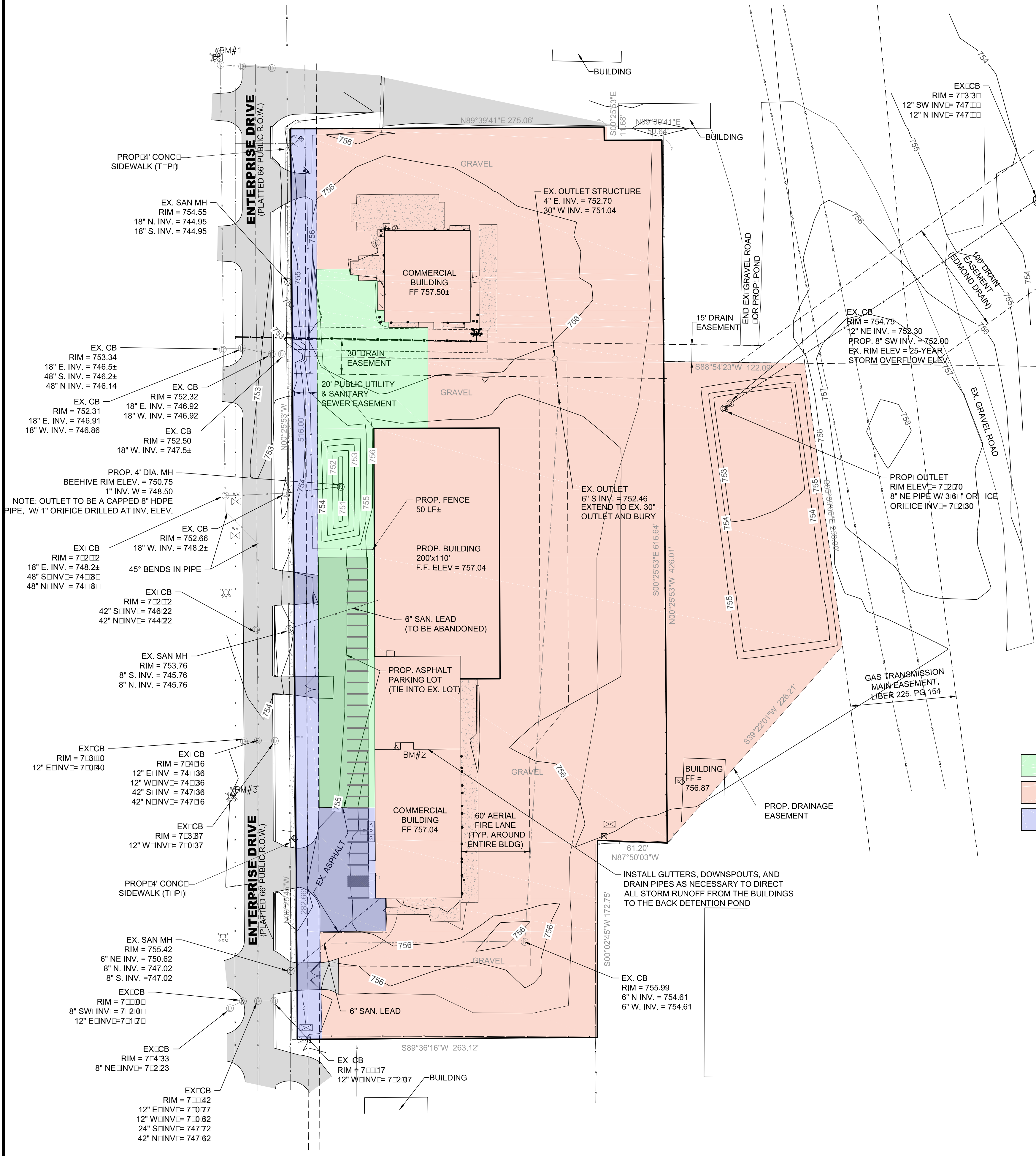
PREPARED FOR:
JBS CONTRACTING
 1680 GOVER PARKWAY
 MT. PLEASANT, MICHIGAN 48858

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STORM WATER MANAGEMENT PLAN

PROPRIETOR:
BURCH WELDING & TANK, INC.
 2253 E ENTERPRISE DRIVE
 MT. PLEASANT, MICHIGAN 48858



WEIGHTED COEFFICIENT - Front Area - SWMP Area #1

COEFFICIENT	AREA	COEFFxAREA
IMPERVIOUS 0.95	0.22	0.21
PERVIOUS 0.35	0.13	0.05
GRAVEL 0.85	0.29	0.24
TOTAL	0.63	0.50
WEIGHTED COEFFICIENT		0.78

WEIGHTED COEFFICIENT - Back Pond - SWMP Area #2

COEFFICIENT	AREA	COEFFxAREA
IMPERVIOUS 0.95	1.08	1.03
PERVIOUS 0.35	0.75	0.26
GRAVEL 0.8	3.33	2.66
TOTAL	5.16	3.95
WEIGHTED COEFFICIENT		0.77

Appendix B Recommended IDF Estimates



NOTE: R... M...
 ... MDOT MS4 R...
 R... Ar... 6...
 ... Ar... 6...

Zone 6	Duration (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
5	0.33	0.41	0.46	0.53	0.58	0.64	0.64
10	0.51	0.63	0.71	0.82	0.90	0.97	0.97
15	0.61	0.75	0.86	1.00	1.10	1.19	1.19
30	0.82	1.03	1.19	1.40	1.55	1.70	1.70
60 (1-hr)	1.11	1.42	1.66	2.09	2.36	2.62	2.62
120 (2-hr)	1.31	1.68	1.99	2.46	2.81	3.16	3.16
180 (3-hr)	1.45	1.85	2.19	2.47	2.83	3.20	3.20
360 (6-hr)	1.67	2.12	2.50	3.09	3.54	4.02	4.02
720 (12-hr)	1.92	2.42	2.85	3.46	3.96	4.49	4.49
1080 (18-hr)	2.10	2.63	3.08	3.76	4.31	4.88	4.88
1440 (24-hr)	2.50	3.12	3.64	4.44	5.08	5.77	5.77

BURCH TANK - SWMP Area #1

DETERMINATION OF REQUIRED DETENTION - 25 YEAR STORM
 RATIONAL METHOD
 DRAINAGE AREA 0.63 ACRES
 ALLOWABLE RELEASE RATE 0.063 CFS
 COMPOSITE RUNOFF COEFFICIENT 0.78

NOTE: IN THE CASE OF STORM EVENT EXCEEDING THE 25-YEAR DESIGN STORM, THE POND BANK WILL BE OVERTOPPED AND THE EXCESS RUNOFF WILL FLOW TO THE DITCH AND ROAD CATCH BASINS ALONG ENTERPRISE DRIVE

STORM DURATION (HOURS)	INTENSITY FOR 25-YEAR STORM (IN/HR)	INFLOW RATE ON SITE (CFS)	RELEASE RATE (CFS)	STORED RATE (CFS)	RESERVOIR SIZE (ACRE-FEET)	RESERVOIR SIZE (CFT)
0.08	5	6.36	3.15	0.06	3.09	0.0213
0.17	10	4.92	2.44	0.06	2.37	0.0327
0.25	15	4	1.98	0.06	1.92	0.0396
0.50	30	2.80	1.39	0.06	1.32	0.0547
1.00	60	2.09	1.04	0.06	0.97	0.0804
2.00	120	1.23	0.61	0.06	0.55	0.0903
3.00	180	0.82	0.41	0.06	0.34	0.0855
6.00	360	0.52	0.26	0.06	0.19	0.0953
12.00	720	0.29	0.14	0.06	0.08	0.0790
18.00	1080	0.21	0.10	0.06	0.04	0.0611
24.00	1440	0.19	0.09	0.06	0.03	0.0569

OUTLET VELOCITY FROM ORIFICE

Orifice Equation = $CFS = C^*A \sqrt{2gH}$
 Diameter of Line (D) = Inches 1.00
 Diameter of Line (D) = Feet 0.08
 Area of Orifice (A) = ft² 0.01
 Orifice Coefficient (C) = 0.62
 Gravity Acceleration (G) = ft/s² 32.20
 Depth of Orifice (H) = ft 4.20
 Orifice Equation = $CFS = 0.06$
 Velocity = ft/sec = 10.20

Stage Storage Volume Table

Contour Elev...	Contour Area...	Incremental Depth (ft)	Avg. End Area Incr...	Avg. End Area Cu...
751.000	180.04	N/A	N/A	0.00
752.000	877.55	1.000	528.79	528.79
753.000	1,777.04	1.000	1327.29	1856.08
754.000	2,877.01	1.000	2327.02	4183.11

BURCH TANK - SWMP Area #2

DETERMINATION OF REQUIRED DETENTION - 25 YEAR STORM
 RATIONAL METHOD
 DRAINAGE AREA 5.16 ACRES
 ALLOWABLE RELEASE RATE 0.516 CFS
 COMPOSITE RUNOFF COEFFICIENT 0.77

NOTE: IN THE CASE OF STORM EVENT EXCEEDING THE 25-YEAR DESIGN STORM, EXCESS RUNOFF WILL OVERTOP THE EXISTING OUTLET CONNECTED TO THE COUNTY DRAIN SYSTEM. RUNOFF NOT CONTROLLED IN THE COUNTY DRAIN WILL SHEET FLOW NORTH AND THEN NORTH EAST AFTER GETTING NORTH OF THE RAISED AREA ABOVE THE EXISTING GAS LINES

STORM DURATION (HOURS)	INTENSITY FOR 25-YEAR STORM (IN/HR)	INFLOW RATE ON SITE (CFS)	RELEASE RATE (CFS)	STORED RATE (CFS)	RESERVOIR SIZE (ACRE-FEET)	RESERVOIR SIZE (CFT)
0.08	5	6.36	25.48	0.52	24.96	0.1719
0.17	10	4.92	19.71	0.52	19.20	0.2644
0.25	15	4	16.03	0.52	15.51	0.3204
0.50	30	2.80	11.22	0.52	10.70	0.4422
1.00	60	2.09	8.37	0.52	7.86	0.6494
2.00	120	1.23	4.93	0.52	4.41	0.7292
3.00	180	0.82	3.30	0.52	2.78	0.6896
6.00	360	0.52	2.06	0.52	1.55	0.7672
12.00	720	0.29	1.15	0.52	0.64	0.6325
18.00	1080	0.21	0.84	0.52	0.33	0.4840
24.00	1440	0.19	0.74	0.52	0.23	0.4466

OUTLET VELOCITY FROM ORIFICE

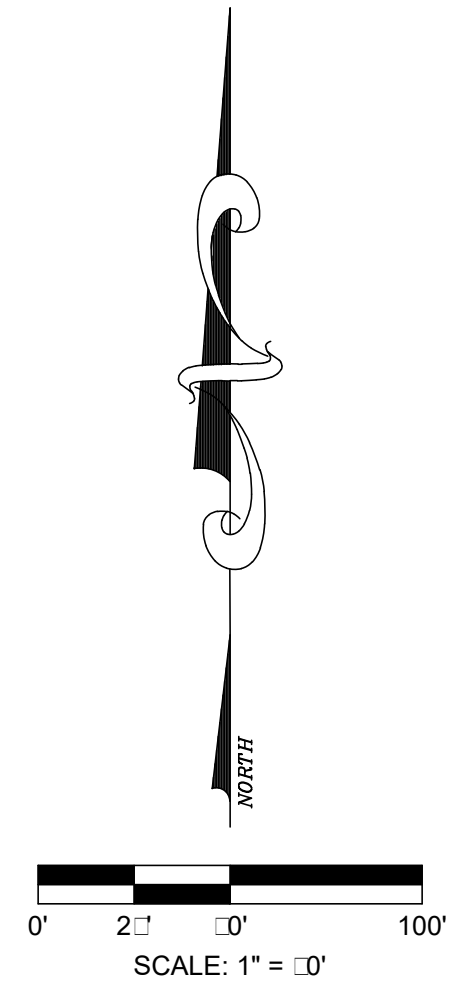
Orifice Equation = $CFS = C^*A \sqrt{2gH}$
 Diameter of Line (D) = Inches 3.65
 Diameter of Line (D) = Feet 0.30
 Area of Orifice (A) = ft² 0.07
 Orifice Coefficient (C) = 0.62
 Gravity Acceleration (G) = ft/s² 32.20
 Depth of Orifice (H) = ft 2.05
 Orifice Equation = $CFS = 0.52$
 Velocity = ft/sec = 7.12

Stage Storage Volume Table

Contour Elev...	Contour Area...	Incremental Depth (ft)	Avg. End Area Incr...	Avg. End Area Cu...
752.700	13.25	N/A	N/A	0.00
753.000	7,115.14	0.300	1069.26	1069.26
753.500	16,130.13	0.500	5811.32	6880.58
754.750	19,190.48	1.250	22075.39	28955.96
755.000	21,122.61	0.250	5039.14	33955.10

STORM WATER MANAGEMENT PLAN

SCALE: 1" = 10'



PROJECT NUMBER: E1701
 ENGINEER: A...
 REVISIONS: 8/7/17 - U...
 SCALE: 1" = 10'
 DRAWN BY: A.C.
 DATE: JUL 27, 2017
 SHEET C-4

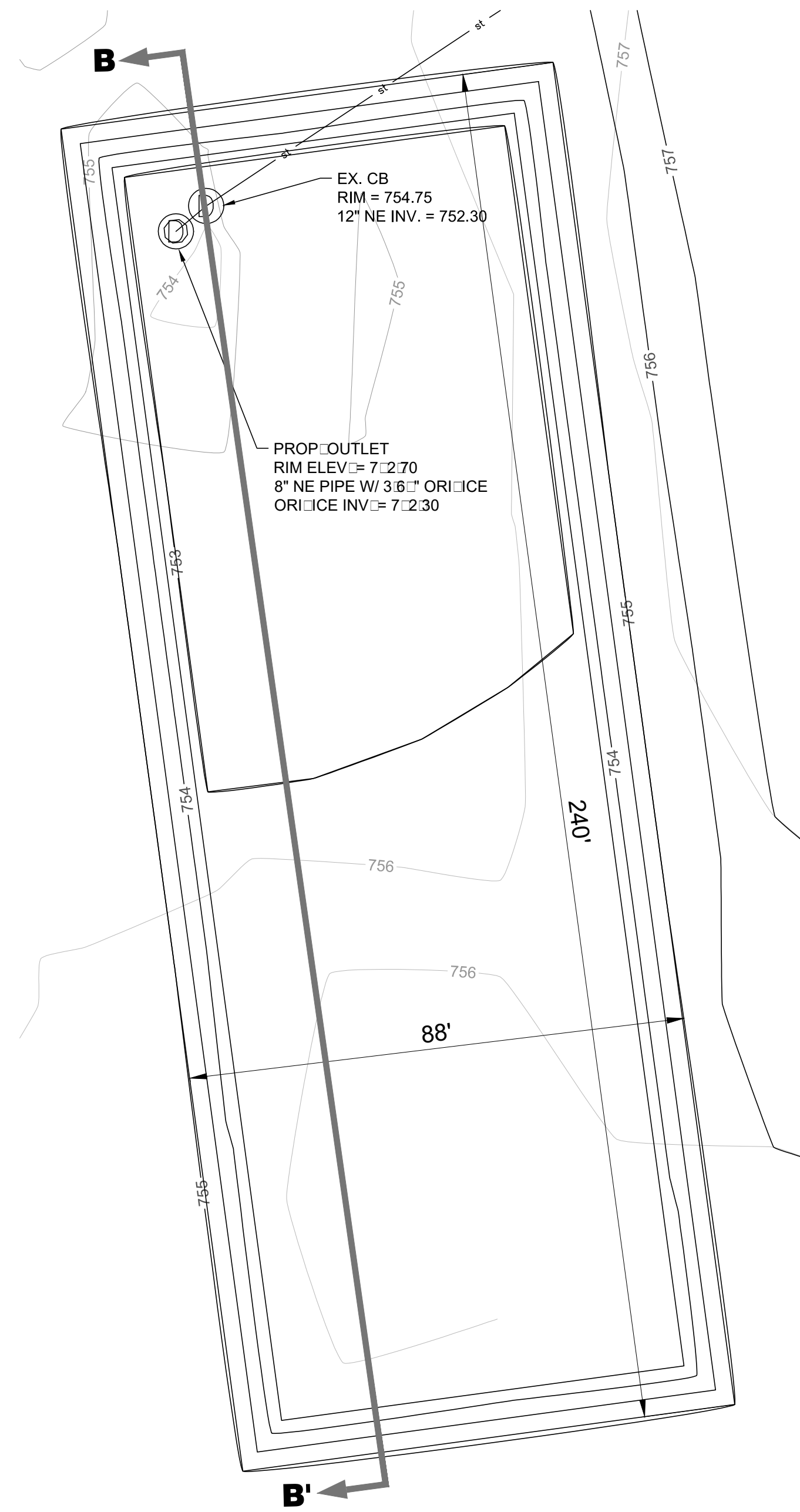
PREPARED FOR:
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 1680 GOVER PARKWAY
 MT. PLEASANT, MICHIGAN 48858

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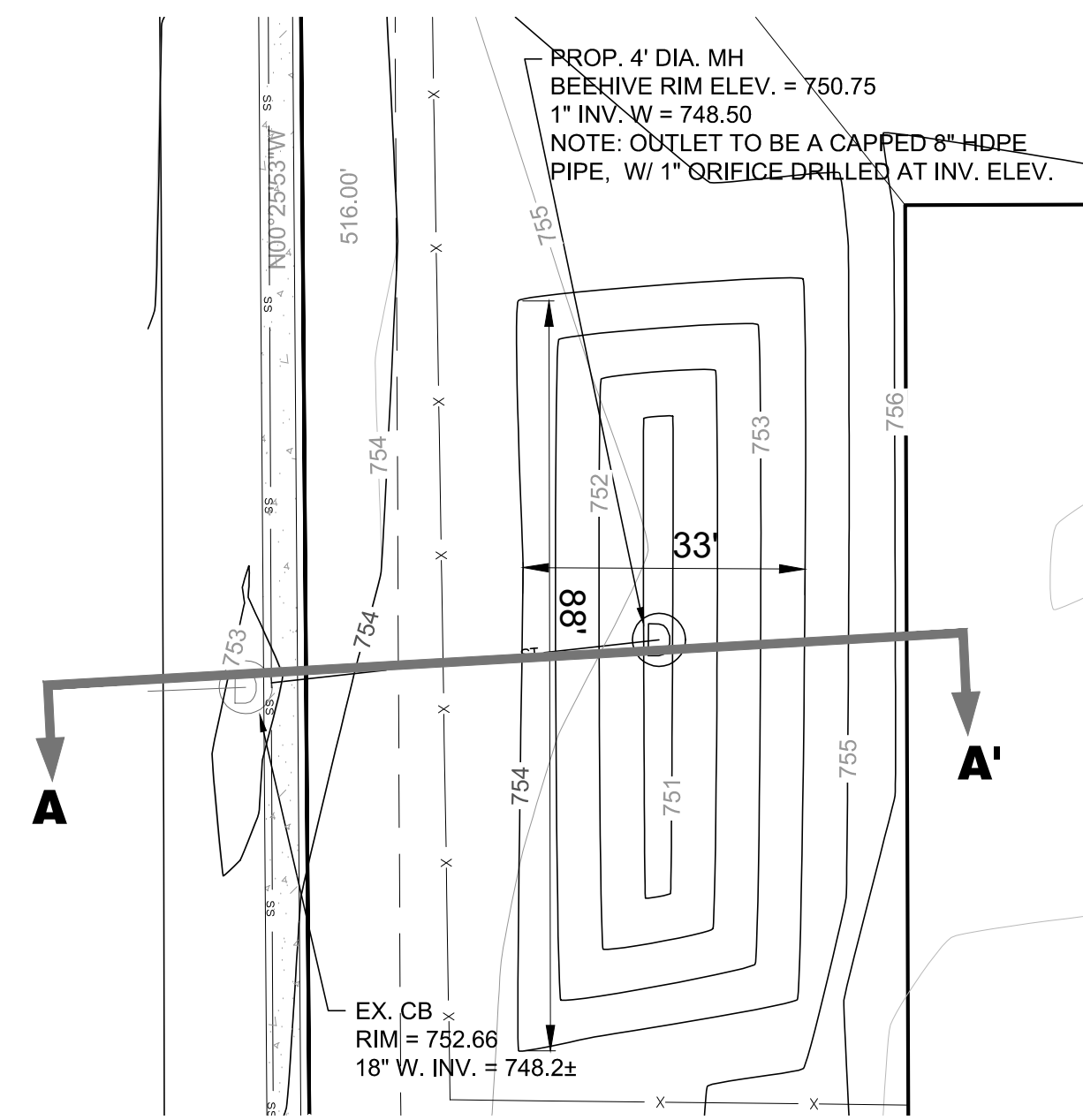
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C-4

STORMWATER MANAGEMENT PLAN DETAILS

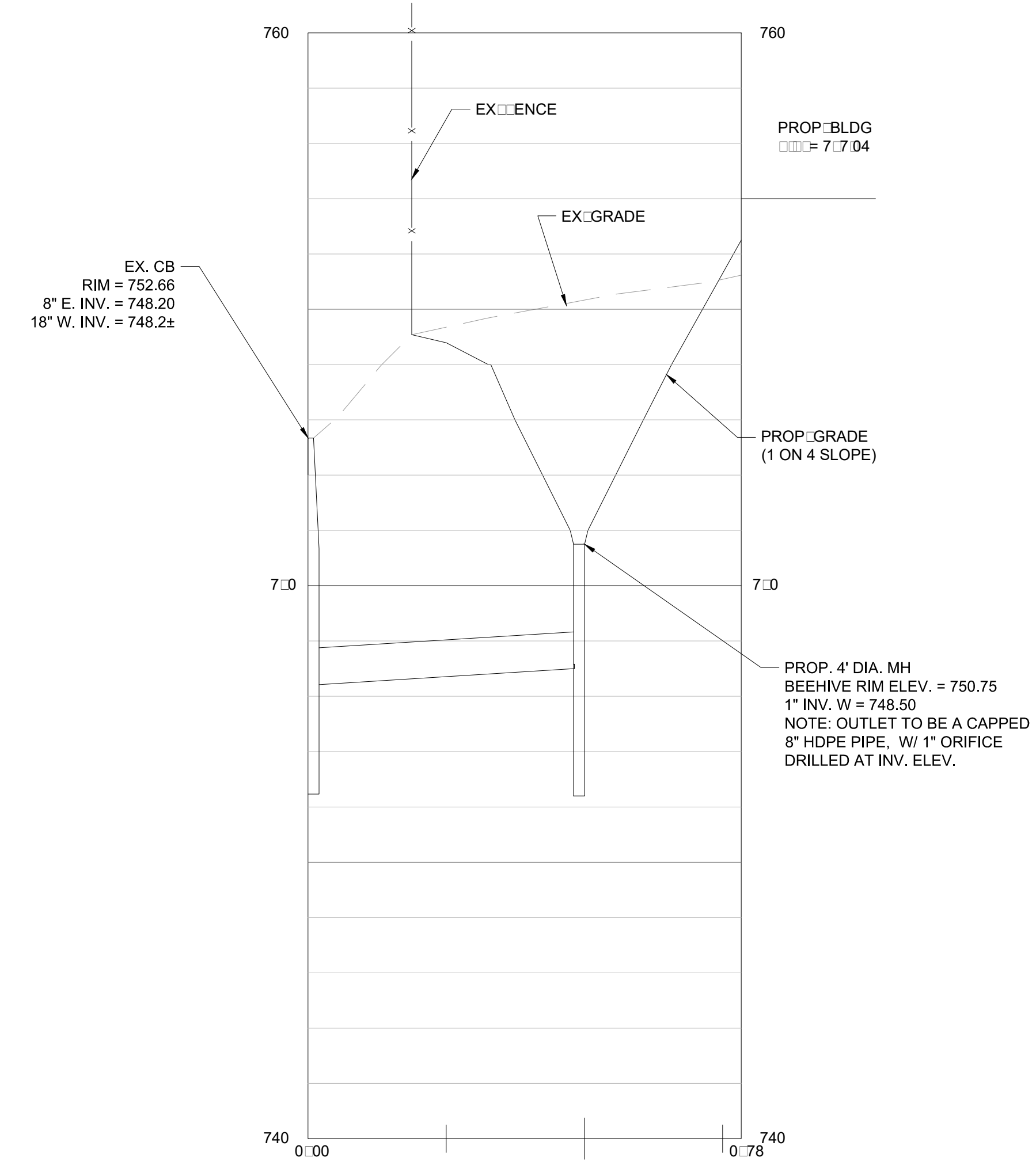
PROPRIETOR:
BURCH WELDING & TANK, INC.
 2253 E ENTERPRISE DRIVE
 MT. PLEASANT, MICHIGAN 48858



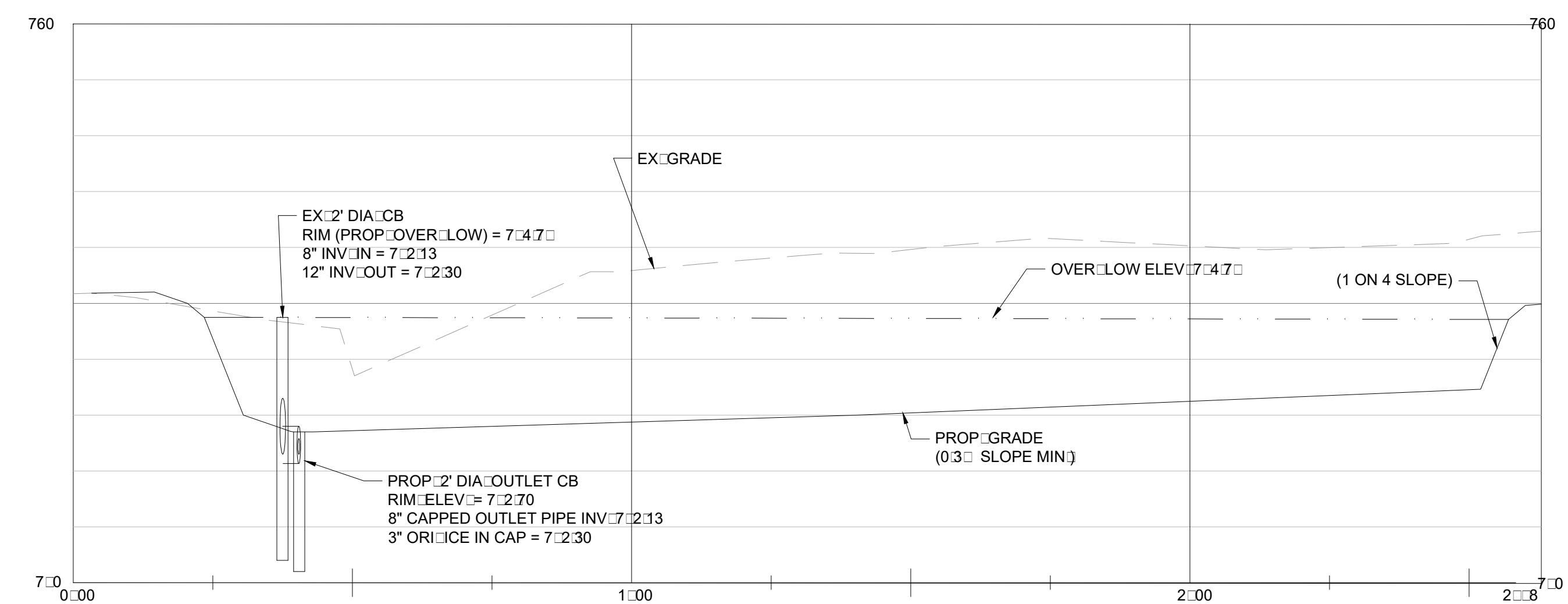
3
STORMWATER MANAGEMENT AREA #2 POND DETAIL
 SCALE: 1" = 20'



1
STORMWATER MANAGEMENT AREA #1 POND DETAIL
 SCALE: 1" = 20'



2
POND #1 CROSS-SECTION A-A'
 SCALE: HORIZONTAL = 20' VERTICAL = 2'



4
POND #2 CROSS-SECTION B-B'
 SCALE: HORIZONTAL = 20' VERTICAL = 2'

PROJECT NUMBER: E1701	DRAWN BY: A.C.	SCALE: 1" = 20'
ENGINEER: A.C.	DATE: JUL 27 2017	SHEET C-5
REVISED: 8/7/17 - U		
REVISED: 8/17/17 - Add'd S		

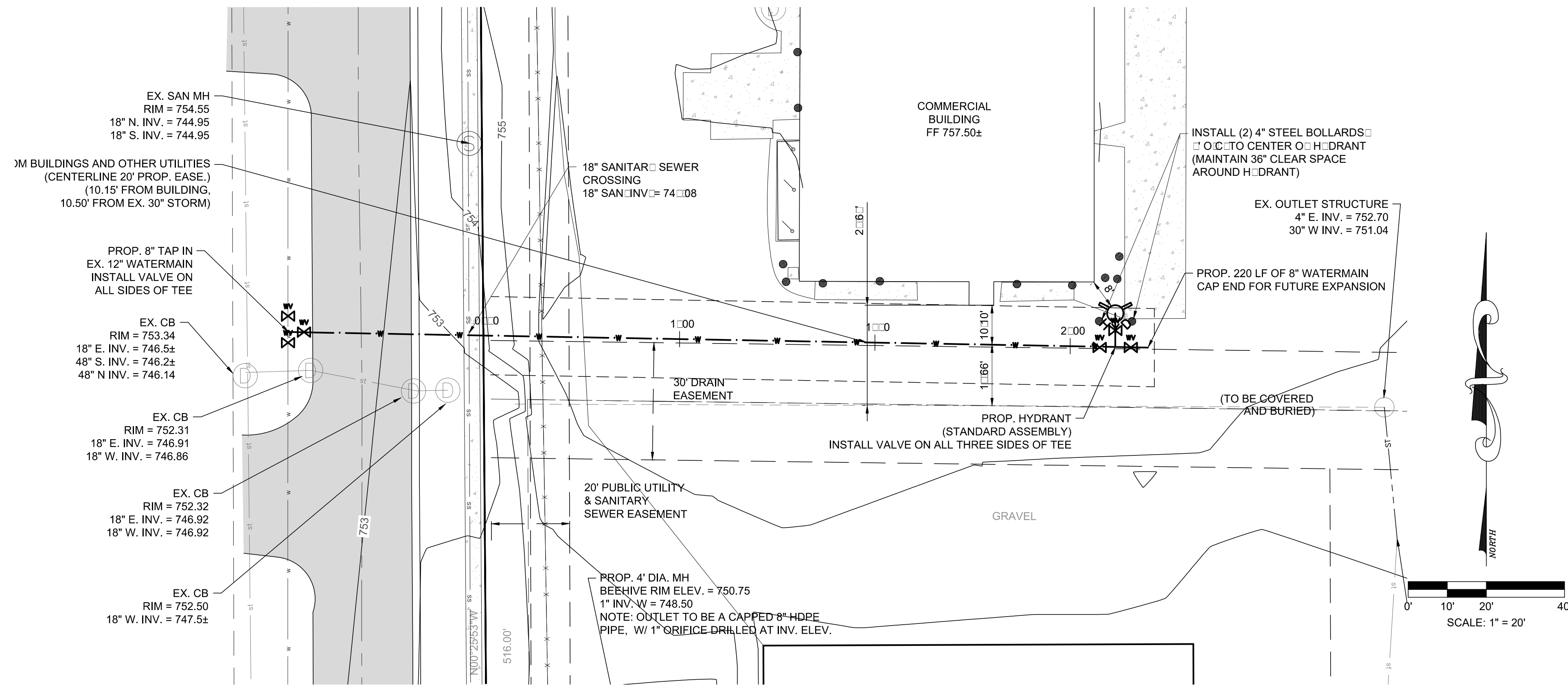
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C-5

WATERMAIN PLAN & PROFILE

PROPRIETOR:
BURCH WELDING & TANK, INC.
 2253 E ENTERPRISE DRIVE
 MT. PLEASANT, MICHIGAN 48858



1
C-6
WATER MAIN SITE PLAN
SCALE: 1" = 20'

- LEGEND:**
- FIRE H-DRANT
 - ⊗ WATER VALVE
 - ⊙ DRAINAGE STRUCTURE
 - ⊙ SANITARY MANHOLE
 - ⊙ CLEANOUT
 - ⊙ RISER
 - ⊗ TRANSFORMER / CONTROL PANEL
 - ⊙ AIR CONDITIONING UNIT
 - ⊙ ELECTRIC METER
 - ⊙ GAS METER
 - ⊙ PHONE SERVICE AT BUILDING
 - BOLLARD POST
 - FF= 101.17 ◻ FINISHED FLOOR ELEVATION
 - △ BM#3 BENCHMARK

UTILITY NOTES:

DIRECTIONAL DRILLING IS AN ACCEPTABLE ALTERNATE TO TRENCHING AND BORE & JACKING INSTALLATION METHODS.

ALL ACCEPTANCE TESTING MUST BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF UNION TOWNSHIP.

INSTALLATION OF ANY WATER MAIN, H-DRANT, VALVES, SANITARY SEWER, AND APPURTANCES MUST BE INSPECTED BY UNION TOWNSHIP DURING INSTALLATION AND SCHEDULED WITH UNION TOWNSHIP UTILITIES DEPARTMENT (810) 772-4600 EXT. 224 AT LEAST 48 HOURS IN ADVANCE OF ANY WORK COMMENCING.

INSTALLATION OF WATER AND SEWER MUST BE IN ACCORDANCE WITH CHARTER TOWNSHIP OF UNION SPECIFICATIONS WHICH CAN BE FOUND AT WWW.UNIONTOWNSHIPMI.COM

BACKFLOW PREVENTION SHALL BE IN ACCORDANCE WITH STATE OF MICHIGAN CROSS CONNECTION RULES, STATE OF MICHIGAN PLUMBING CODE AND CHARTER TOWNSHIP OF UNION CROSS CONNECTION RULES.

ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE TOWNSHIP'S CURRENT STANDARDS, SPECIFICATIONS AND DETAILS.

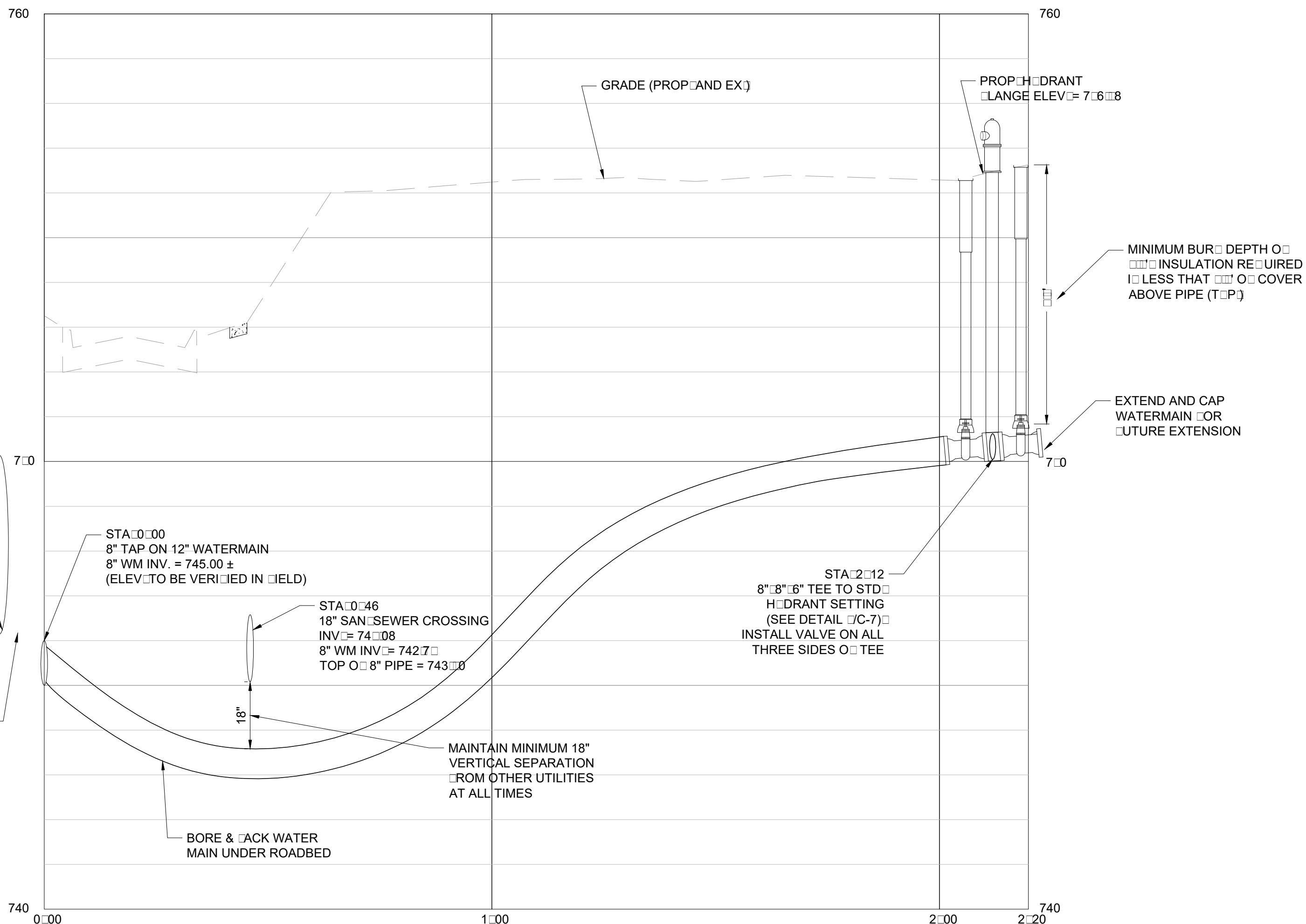
ALL ELEVATIONS SHALL BE BASED ON USGS OR NGVD DATUM.

NO CONNECTION RECEIVING STORM WATER OR GROUNDWATER SHALL BE MADE TO SANITARY SEWER.

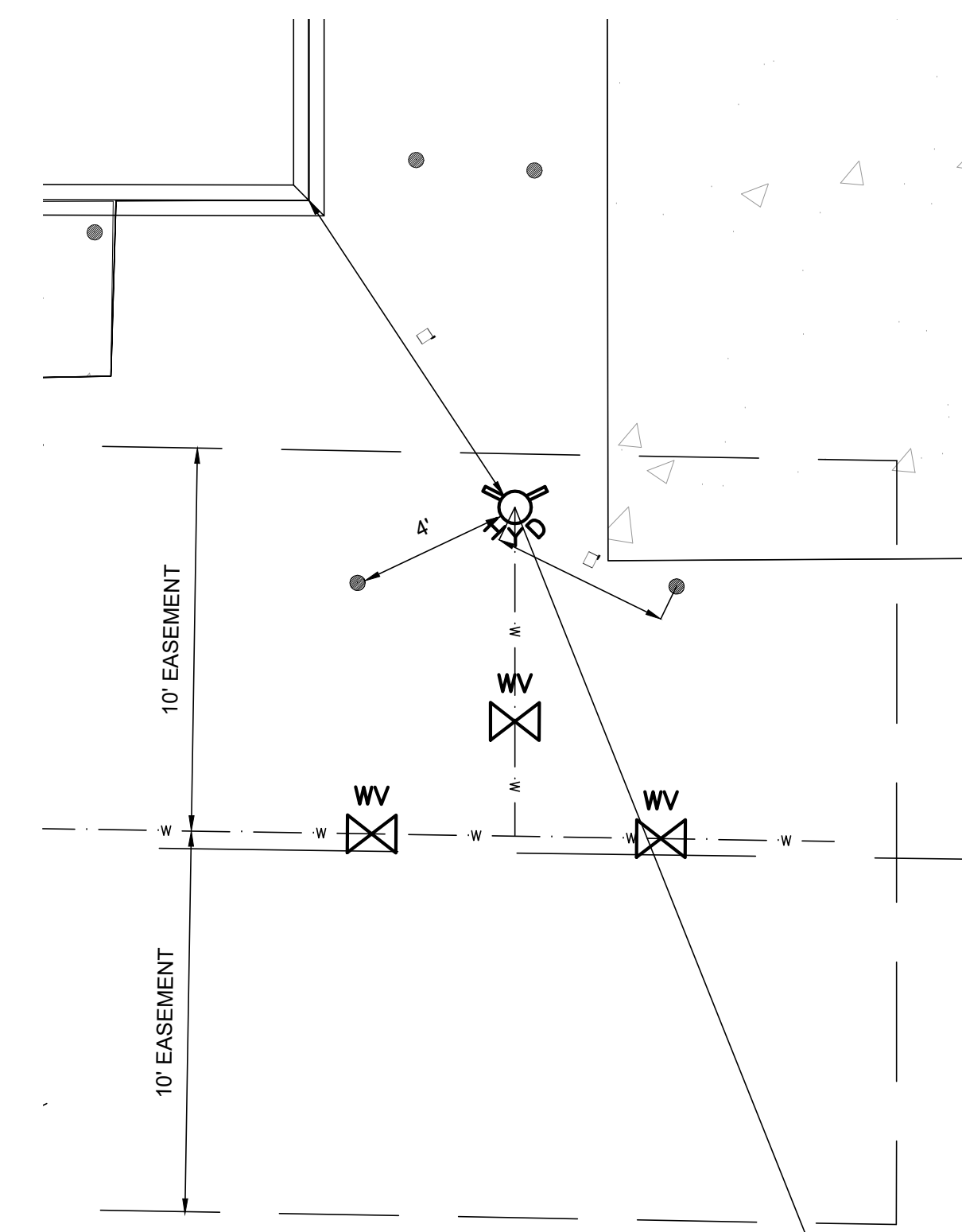
18" MINIMUM VERTICAL SEPARATION AND 10' MINIMUM HORIZONTAL SEPARATION BETWEEN CROSSINGS IN ACCORDANCE WITH MICHIGAN CHARTER TOWNSHIP OF UNION/TEN STATE STANDARDS.

THE GRADES OF THE EXISTING UTILITIES SHOWN ARE APPROXIMATE AND NEED TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR. GRADES OF BURIED UTILITIES ARE DERIVED FROM PLANS PROVIDED BY THE ISABELLA COUNTY ROAD COMMISSION FROM THE DEERFIELD ROAD RECONSTRUCTION DATED DECEMBER 2013.

ALL PROFILES HAVE GRID LINES SPACED AT 2' FOOT INTERVALS.



2
C-6
WATER MAIN PROFILE
SCALE: HORIZONTAL 1" = 20' VERTICAL 1" = 2'



3
C-6
HYDRANT ISOLATION
SCALE: 1/4" = 1'

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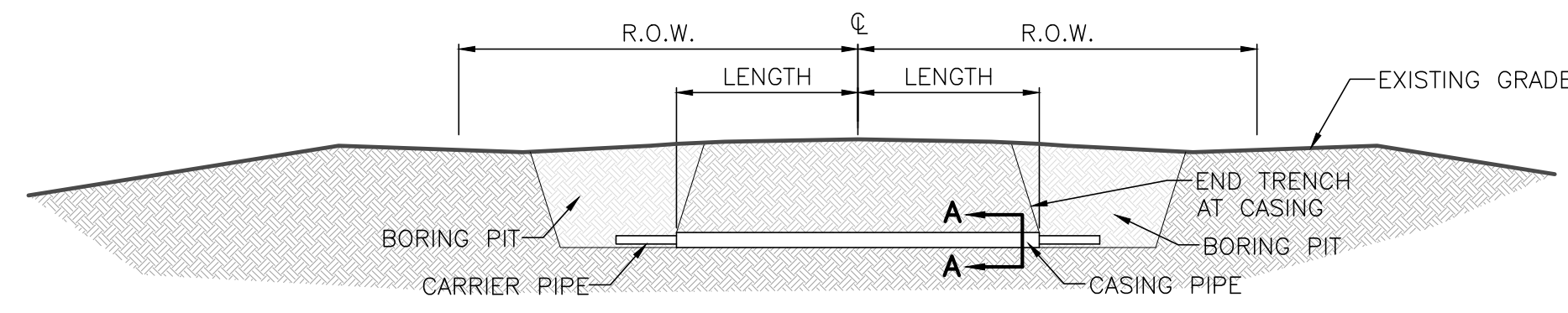
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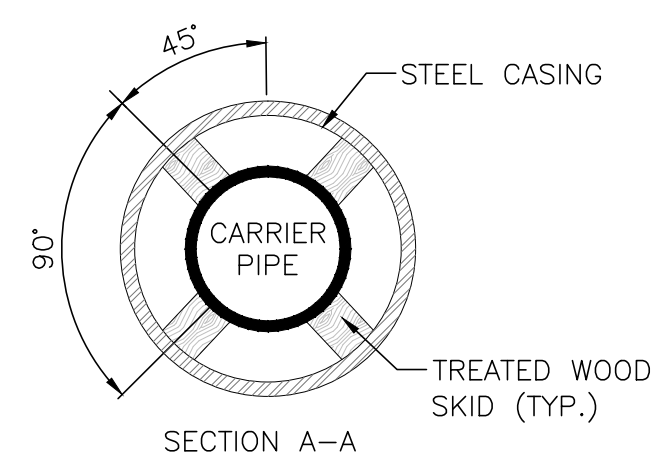
C-6

PROJECT NUMBER: E1701
 DRAWN BY: A.C.
 ENGINEER: A.C.
 REVISIONS: 8/7/17 - U
 REVISIONS: 8/17/17 - Add'd S
 SCALE: 1" = 20'
 DATE: JUL 27 2017
 SHEET C-6

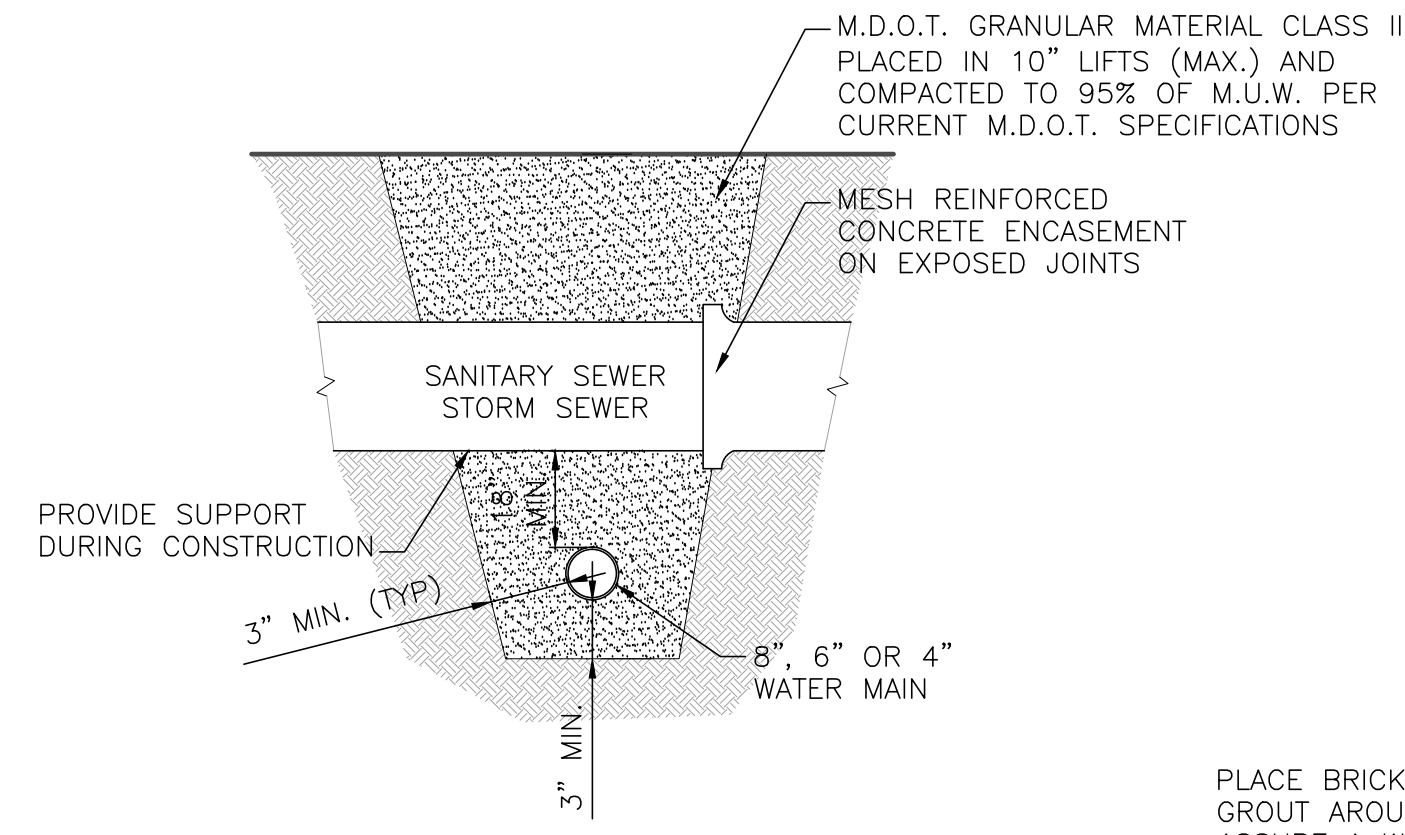
WATER DETAIL SHEET



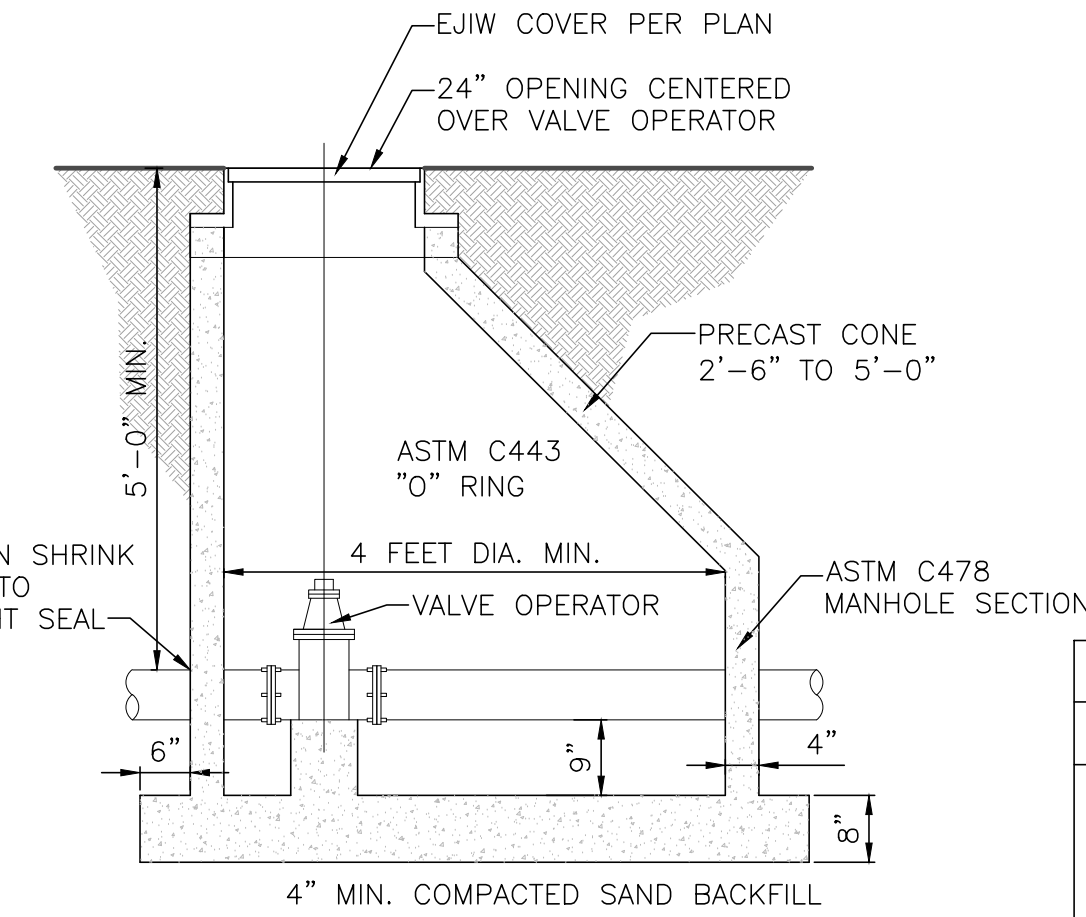
DATA TABLE	8" CARRIER PIPE	CASING PIPE	4" CARRIER PIPE	CASING PIPE
CONTENTS HANDLED	WATER	PIPE	WATER	PIPE
OUTSIDE DIAMETER	8.4"	15"	4.2"	8"
PIPE MATERIAL	PVC-DR35	STEEL	C900 PVC200	STEEL
SPECIFICATIONS	ASTM D3034 PVC	35,000 psi	AWA-C900 PVC-PC200	35,000 psi
WALL THICKNESS (MIN.)	-	0.25"	-	0.125"
ACTUAL WORKING PRESSURE	0	0	0	0
TYPE OF JOINTS	SLIP JOINT	WELDED	SLIP JOINT	WELDED
TYPE, SIZE AND SPACING OF INSULATORS OR SUPPORTS	TREATED WOOD RAILS AT 90°	NONE	TREATED WOOD RAILS AT 90°	NONE
METHOD OF INSTALLATION	INSERTED	DRILLING	INSERTED	DRILLING



PLUG ENDS OF CASING WITH BRICK AND MORTAR. PLACE 1" OF MASTIC INSULATION BETWEEN PVC AND BRICK. BIND WOOD SKIDS TO PIPE WITH ADEQUATE STEEL STRAPS. NOTCH SKIDS TO ISOLATE STEEL STRAPS FROM CASING. MAXIMUM UNSUPPORTED PIPE LENGTH SHALL BE 6 FEET. FILL BOTTOM 90° BETWEEN CASING AND CARRIER PIPE WITH CLEAN SAND.



2 C-7 SCALE: NONE

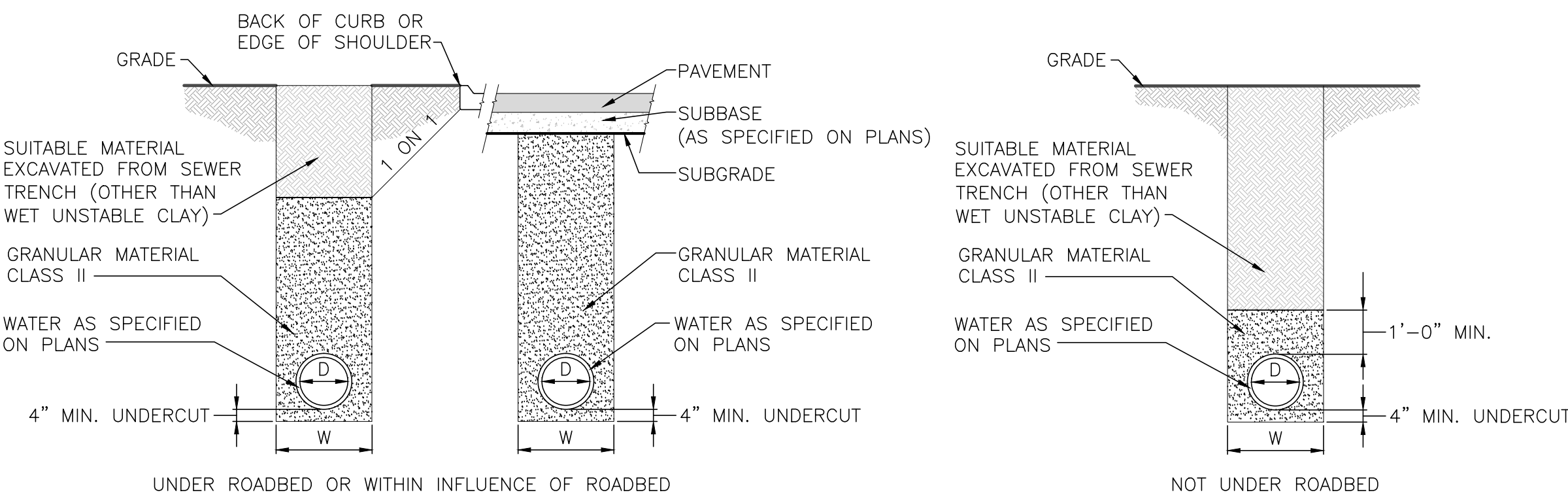


STANDARD VALVES	
SLEEVE SIZE	MIN. BASIN SIZE
6 IN.	BOX-3 PIECE
8 IN. UNPAVED	BOX-3 PIECE
8 IN. PAVED	4" DIA. MH.
10 IN.	4" DIA. MH.
16 IN. - 20 IN.	5" DIA. MH.
24 IN.	6" DIA. MH.
30 IN. - 42 IN.	8" DIA. MH.

PRESSURE TAPPING SLEEVES AND VALVES	
SLEEVE SIZE	MIN. BASIN SIZE
12 IN. x 12 IN.	5" DIA. MH.
16 IN. x 12 IN.	6" DIA. MH.
24 IN. x 12 IN.	8" DIA. MH.

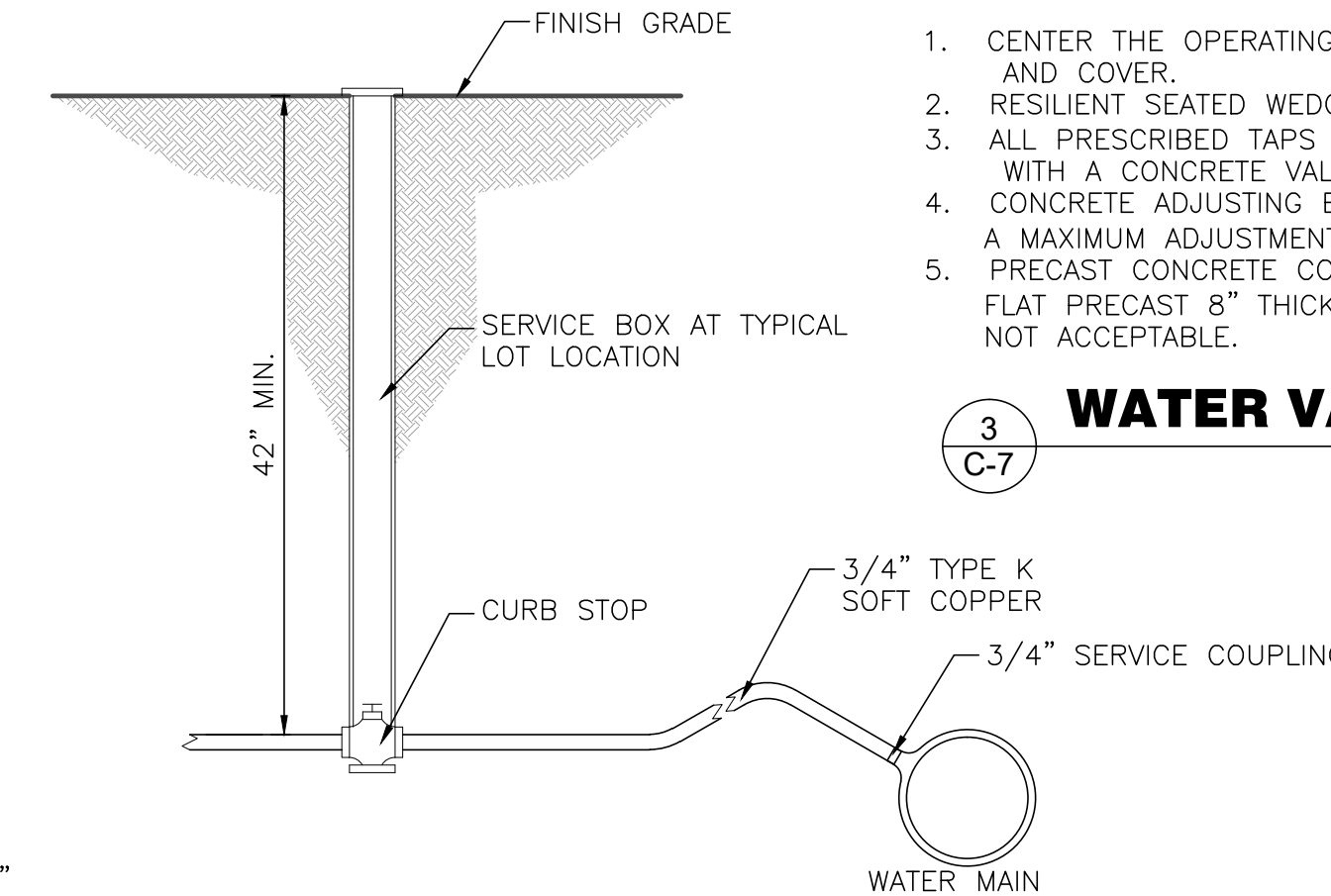
- NOTES:
- CENTER THE OPERATING NUT IN THE MIDDLE OF THE FRAME AND COVER.
 - RESILIENT SEATED WEDGE GATE VALVES ARE PREFERRED.
 - ALL PRESCRIBED TAPS 4" AND LARGER MUST BE ENCLOSED WITH A CONCRETE VALVE MANHOLE.
 - CONCRETE ADJUSTING BRICK OR RINGS ALLOWABLE TO A MAXIMUM ADJUSTMENT OF 18"
 - PRECAST CONCRETE CONE SECTIONS PER A.S.T.M. C-478. FLAT PRECAST 8" THICK CONCRETE GROOVED TOPS ARE NOT ACCEPTABLE.

3 C-7 SCALE: NONE

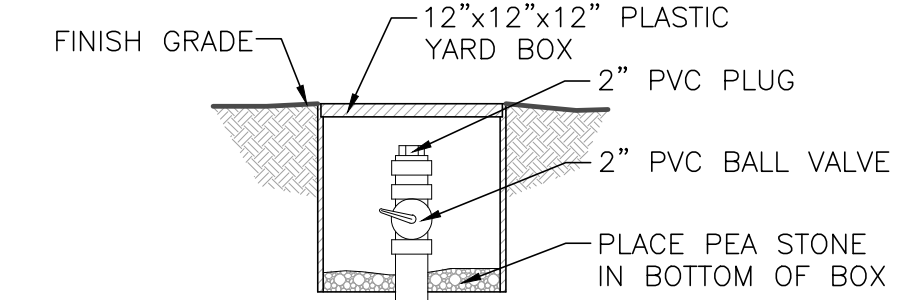


MINIMUM TRENCH WIDTHS						
I.D. PIPE SIZE (INCHES)	LESS THAN 18	21	24	30	36	
"W" TRENCH WIDTH (FEET)	3.0	3.5	4.0	5.0	6.0	
I.D. PIPE SIZE (INCHES)	42	48	54	60	66	72
"W" TRENCH WIDTH (FEET)	7.0	8.0	9.5	10.0	10.5	11.0
I.D. PIPE SIZE (INCHES)	78	84	90	96	102	108
"W" TRENCH WIDTH (FEET)	11.5	12.0	12.5	13.0	13.5	14.0

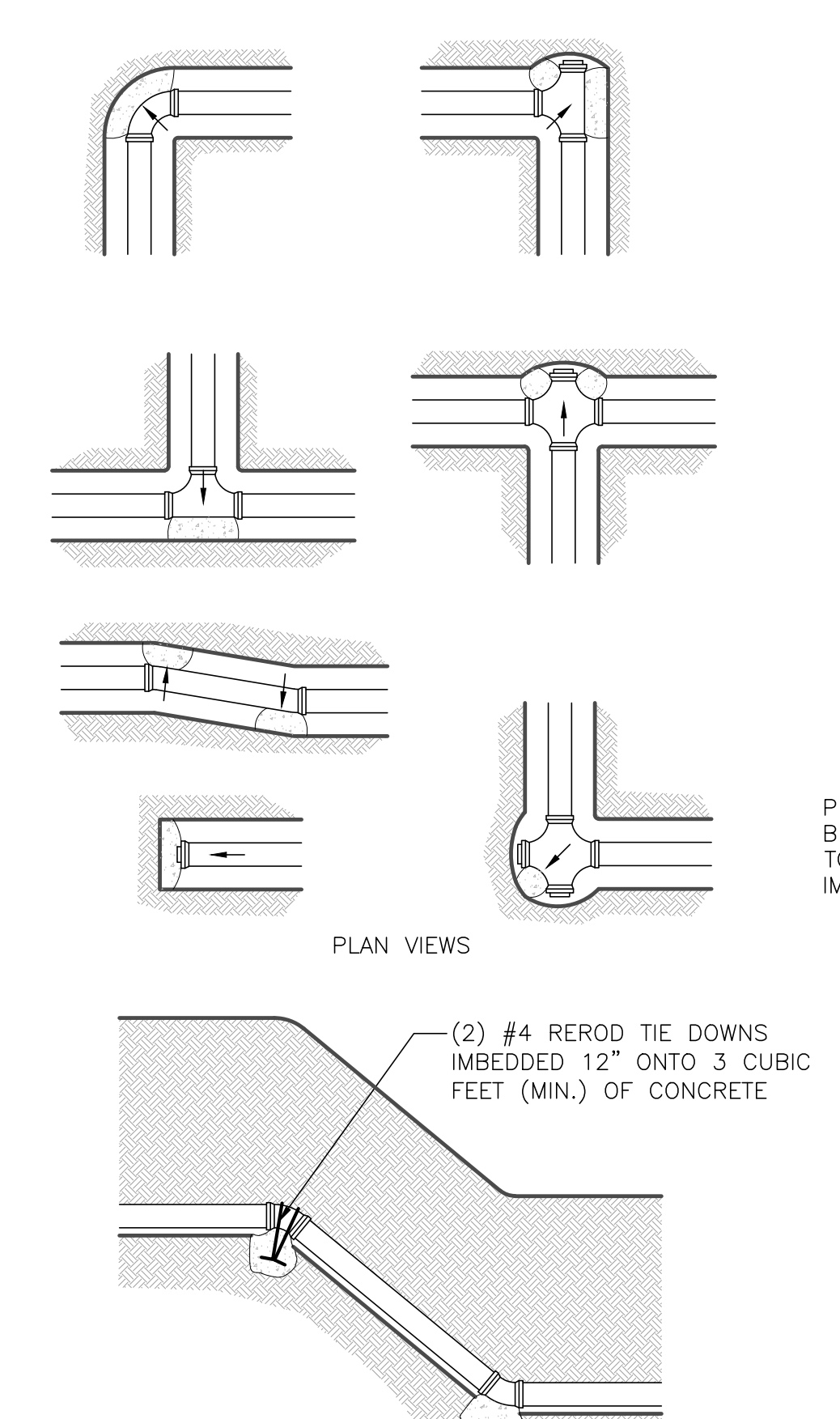
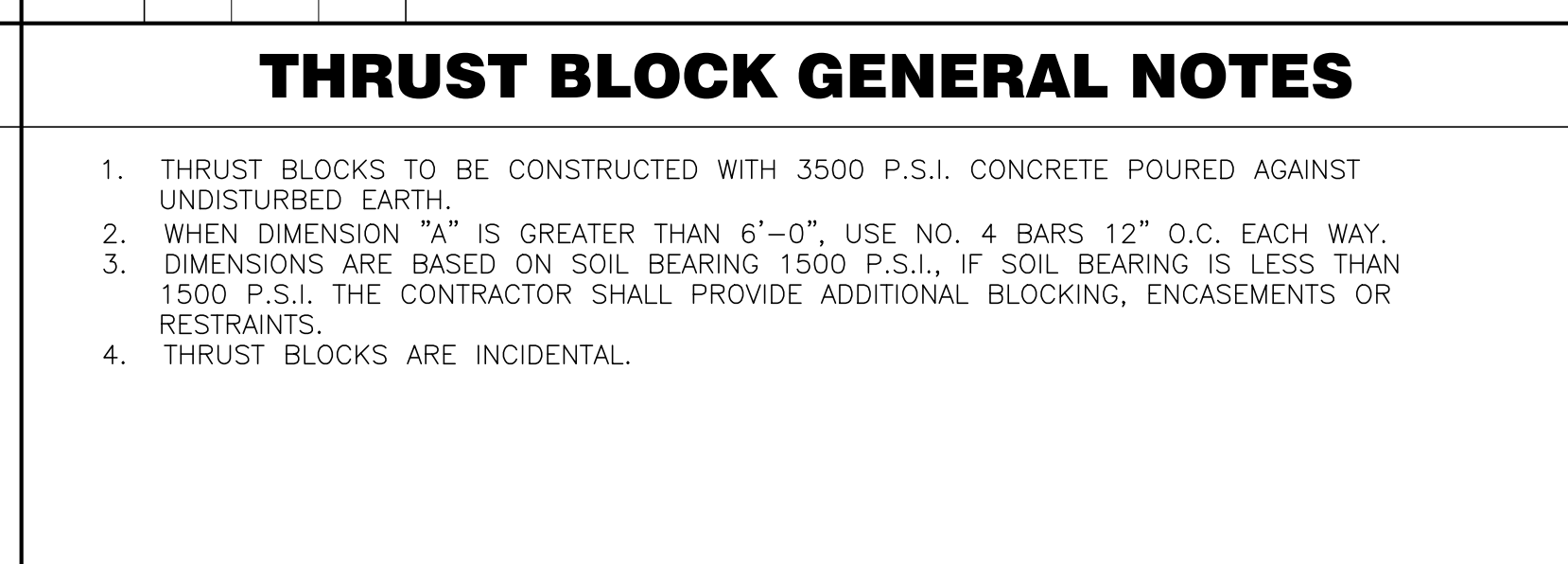
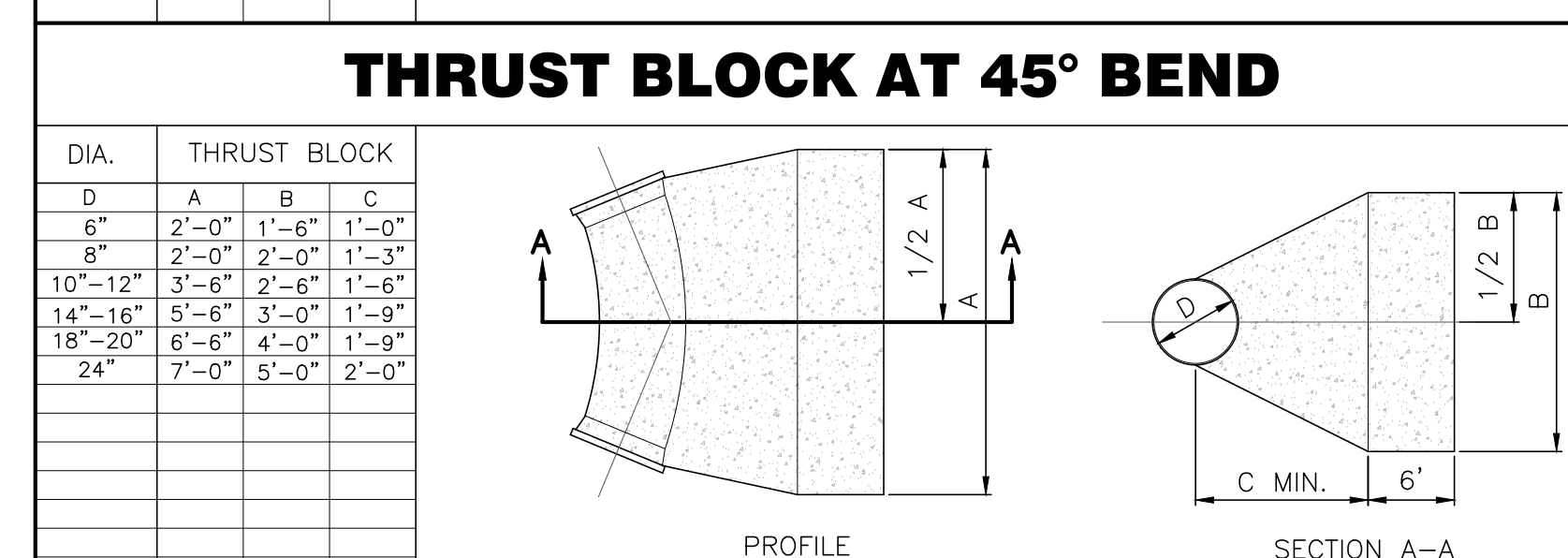
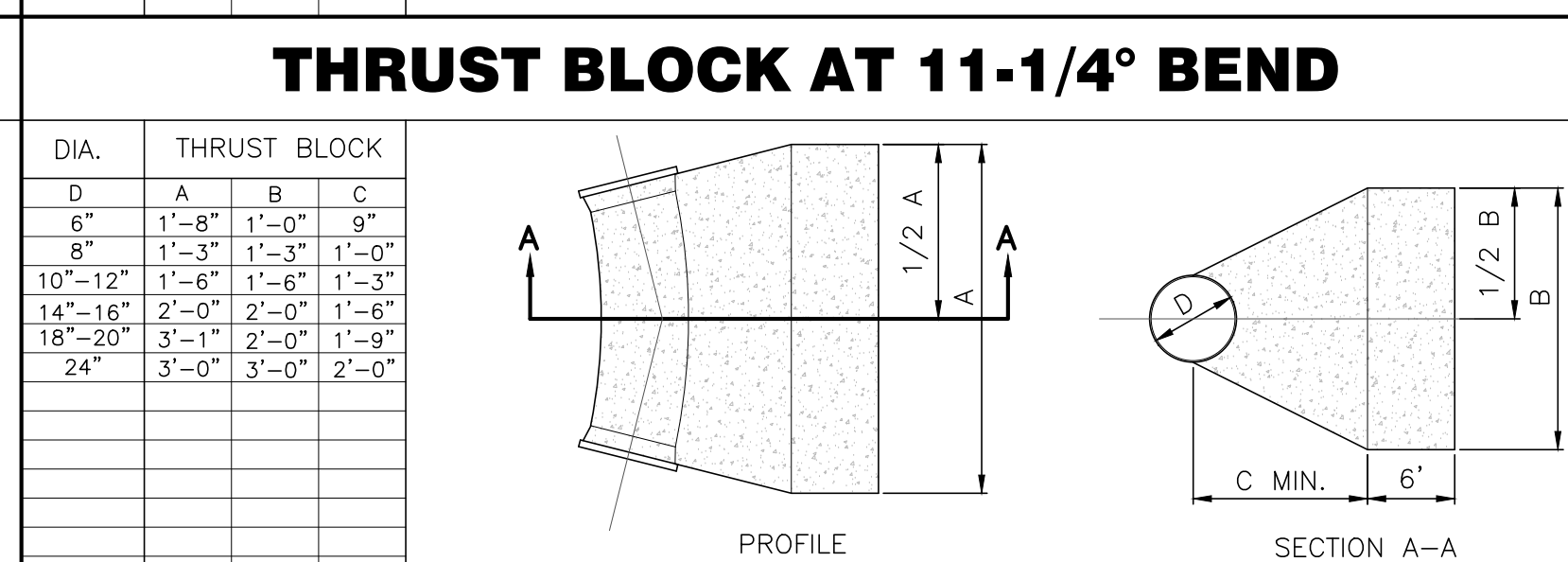
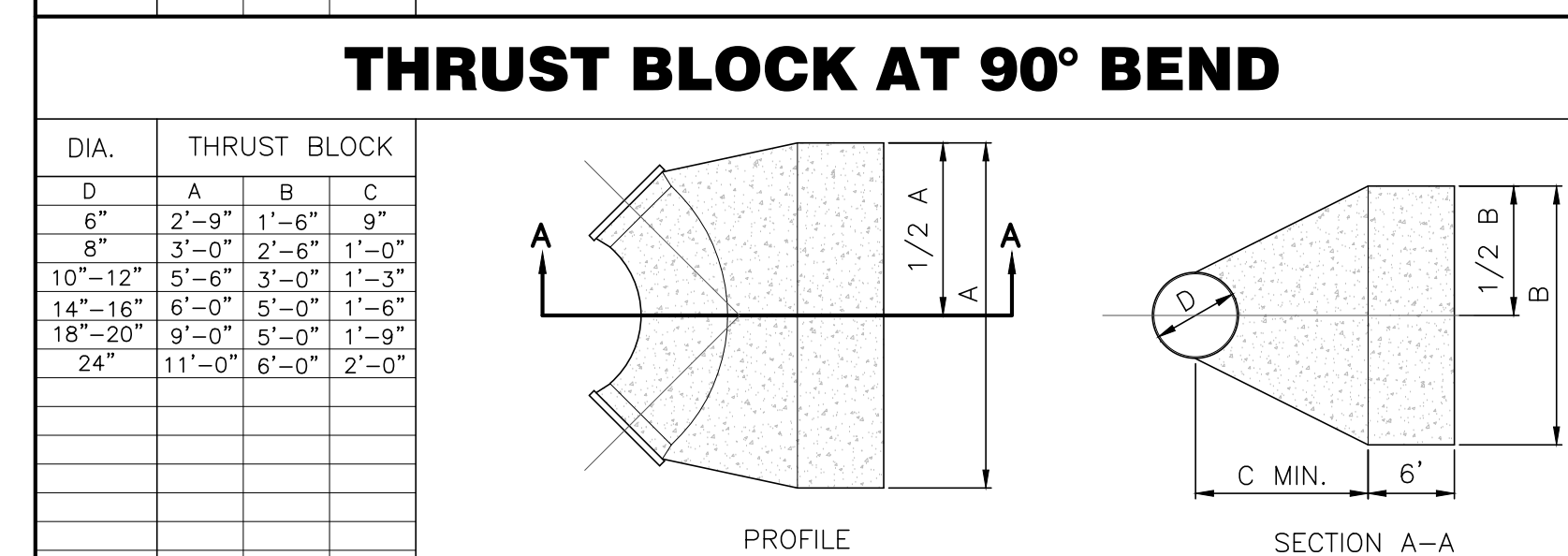
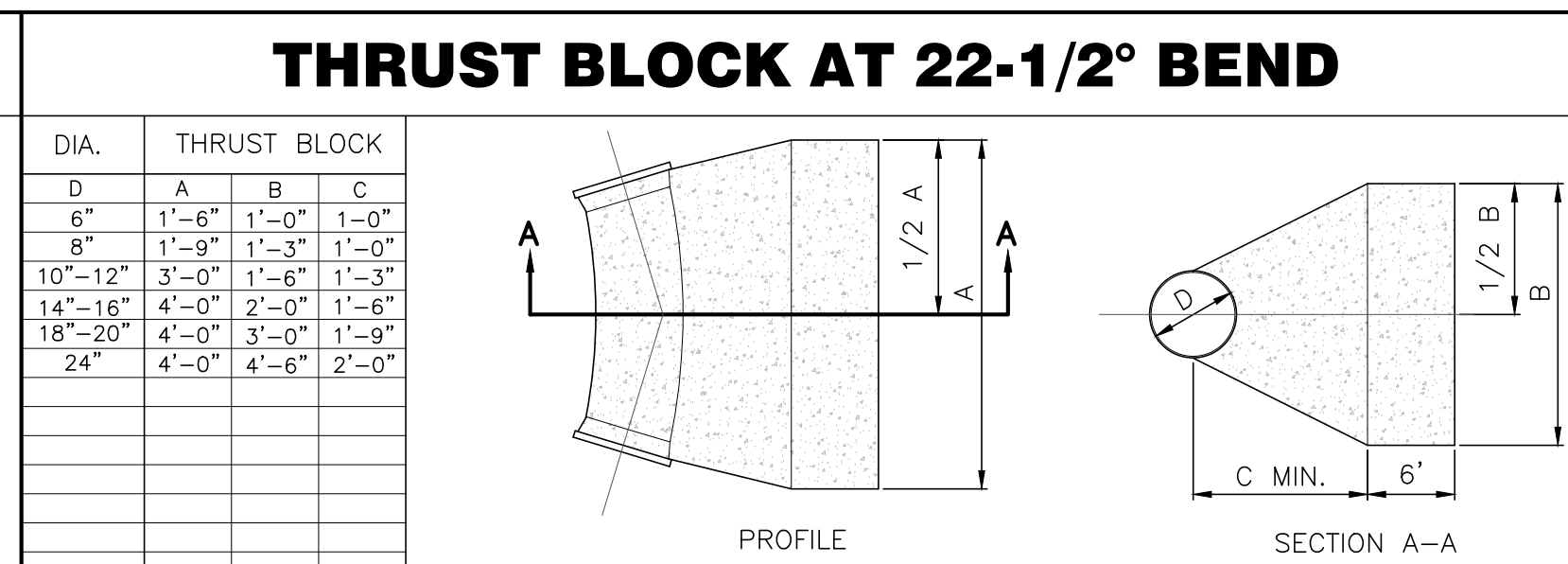
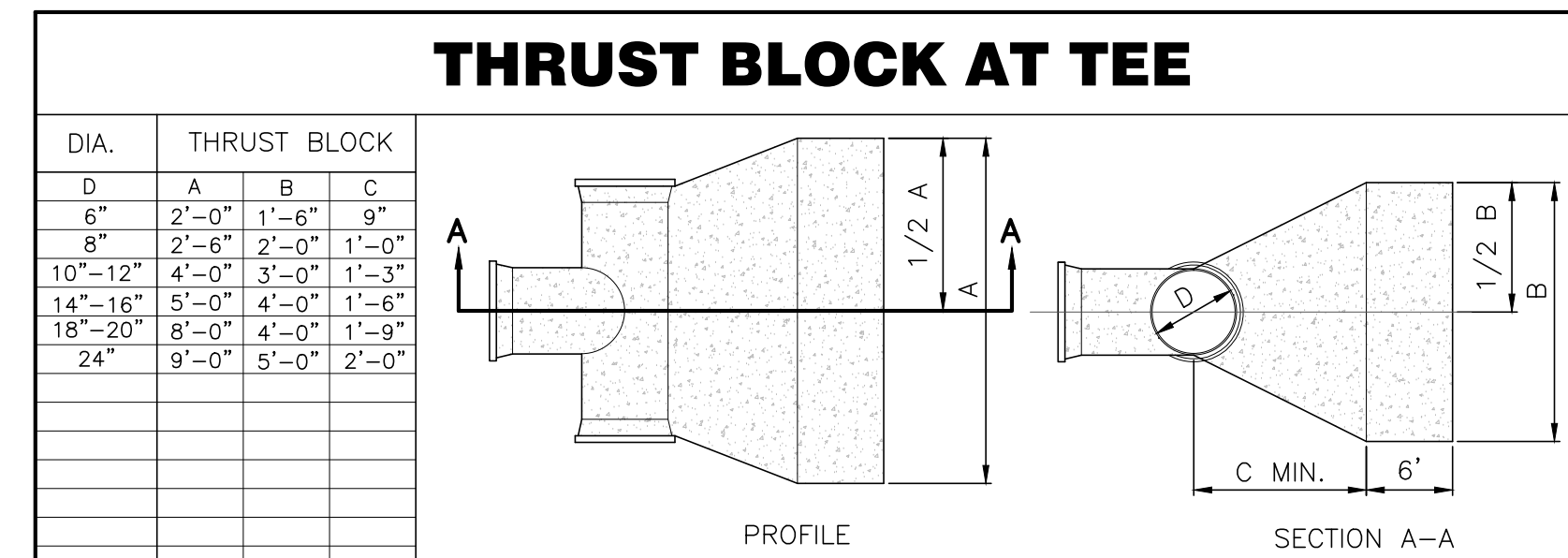
ESTIMATED PAVEMENT REMOVAL WIDTH IS TO BE TRENCH WIDTH "W" PLUS 1'-0" EACH SIDE OF THE TRENCH (6'-0" MINIMUM)



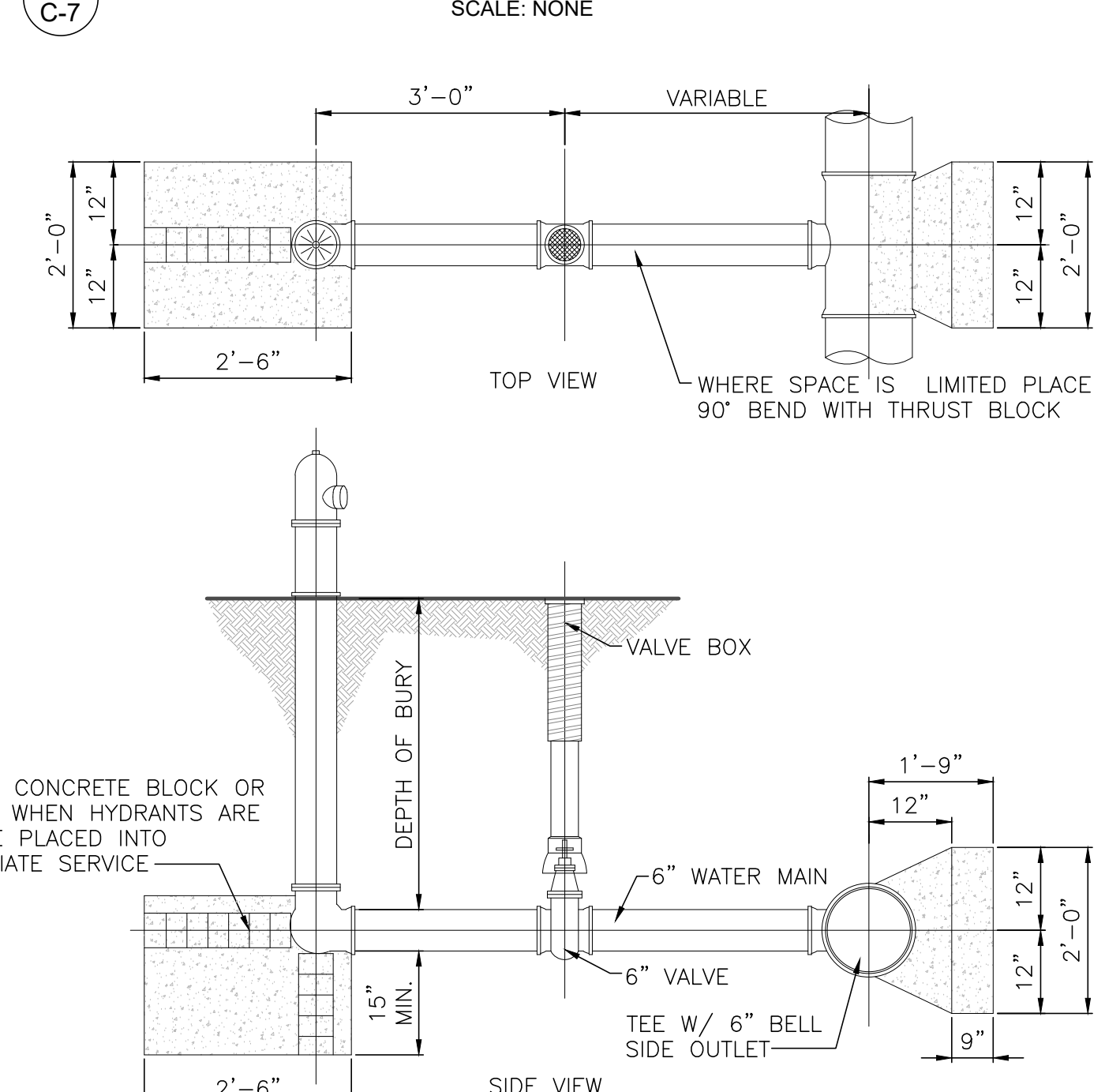
4 C-7 SCALE: NONE



5 C-7 SCALE: NONE



8 C-7 SCALE: NONE



- GENERAL HYDRANT NOTES:
- INSTALL ADDITIONAL FITTINGS & SPIGOT PIPE AS NECESSARY BETWEEN WATER MAIN AND VALVE BOX TO ADJUST OR PROPER LOCATION AND GRADE OF HYDRANT.
 - VERTICAL ANCHORS WILL BE REQUIRED ON ALL VERTICAL HYDRANT BENDS IN EXCESS OF 1-1/4'.
 - WHERE HYDRANTS ARE INSTALLED ON EXISTING MAINS THAT ARE TO BE PLACED BACK INTO SERVICE IMMEDIATELY PLACE CONCRETE BLOCK OR BRICK TO UNDISTURBED SOIL AND ENCASE WITH CONCRETE.
 - ALL CONCRETE TO BE 3000 P.S.I. CONCRETE POURED AGAINST UNDISTURBED SOIL.
 - RESTRAINTS PER TOWNSHIP SPECIFICATIONS.

9 C-7 SCALE: NONE

1 C-7 SCALE: NONE

6 C-7 SCALE: NONE

7 C-7 SCALE: NONE

PROJECT NUMBER: E1701
 ENGINEER: A. J. ...
 REVISIONS: 8/1/17 - U. ...
 REVISIONS: 8/1/17 - Add'l S...

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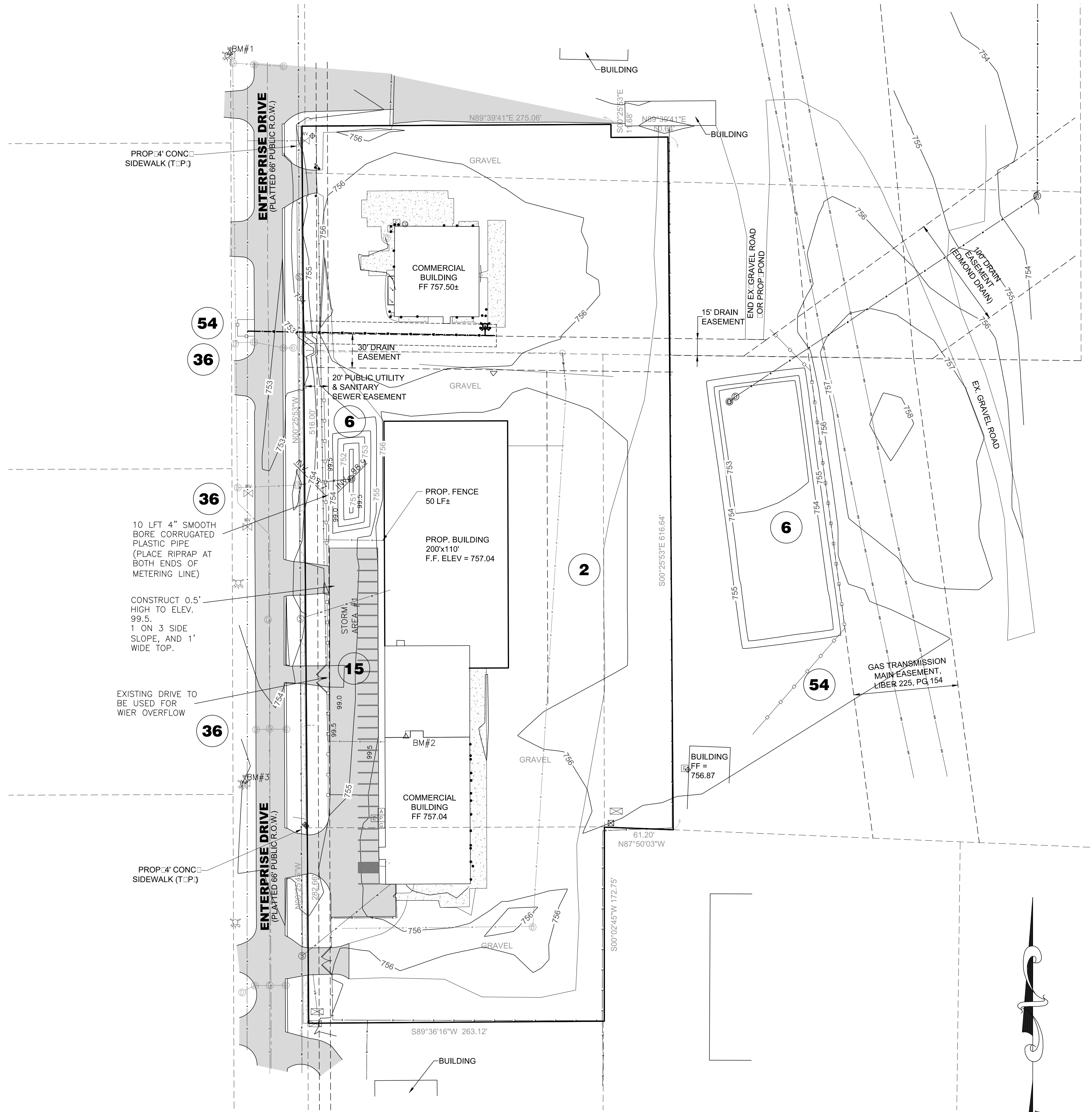
SOIL EROSION & SEDIMENTATION CONTROL PLAN

PROPRIETOR:
BURCH WELDING & TANK, INC.
 2253 E ENTERPRISE DRIVE
 MT. PLEASANT, MICHIGAN 48858

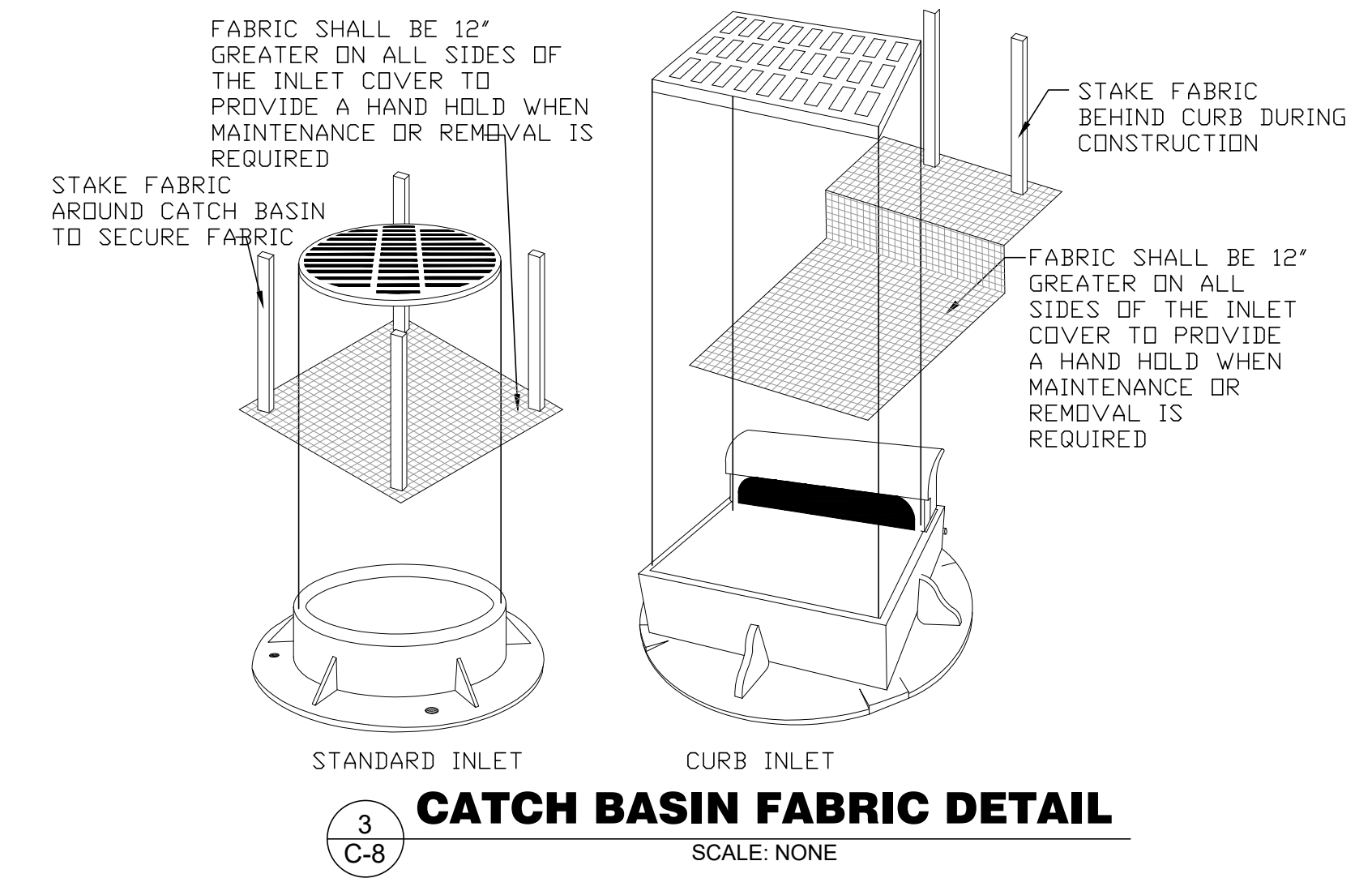
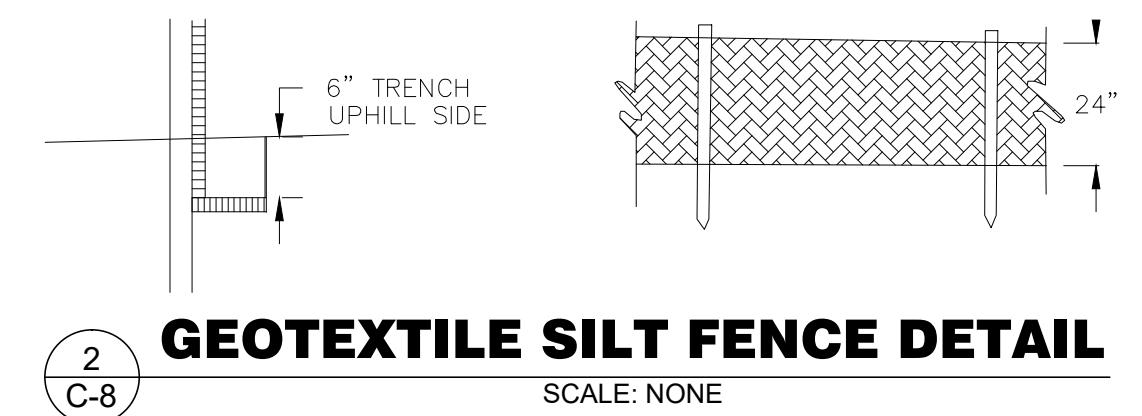
SESC Plan Notes:

- This project shall be constructed in compliance with the Isabella County Community Development requirements for Soil Erosion and Sedimentation Control, authorized under part 91 of act 451 of 1994, as amended, the soil erosion and sedimentation control act.
- All erosion and sedimentation control work shall conform to the standards and specifications of the local controlling jurisdiction.
- 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.
- Staging the work will be done by the landowner or landowner's representative as directed in these plans and as required to ensure progressive stabilization of disturbed earth change.
- The landowner or landowner's representative shall be responsible for installation and maintenance of soil erosion and sedimentation control devices.
- The landowner or landowner's representative shall implement and maintain the soil erosion control measures as shown on the plans before and at all times during construction on this project. Any modifications or additions to soil erosion control measures due to construction or changed conditions shall be complied with as required or directed by the local jurisdiction.
- If any of the SESC measures on the site are deemed inadequate or ineffective, the Union Township Zoning Official has the right to require additional SESC measures at the expense of the landowner.
- During dry periods, all disturbed areas shall be watered for dust control.
- Permanent soil erosion control measures for all 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 earth change activity ceases, temporary soil erosion control measures shall be implemented immediately. All temporary soil erosion control shall be maintained until permanent soil erosion control measures are implemented.
- Final grade, establish vegetation and or landscape all disturbed areas not built or paved upon.
- No dewatering is planned for this project. If any dewatering is needed, it shall be discharged in accordance with the rules and regulations of the local jurisdiction. The contractor shall be responsible for obtaining any necessary permits for dewatering prior to discharge.
- Remove all temporary soil erosion devices after permanent stabilization is established.
- Build up of sediment shall be removed when sediment accumulates to 1/3 to 1/2 of the height of the silt fence.
- If silt fence decomposes or becomes ineffective prior to the end of expected usable life and the barrier is still required, the silt fence shall be replaced promptly.
- Silt fence shall be inspected weekly under normal conditions, within 24 hours of rainfall and daily during a prolonged rain event. Required maintenance shall be provided promptly.
- Inlet filters shall be inspected weekly under normal conditions, within 24 hours of a rainfall and daily during prolonged rain event.

17. SESC C-11



1 EROSION AND SEDIMENTATION CONTROL PLAN
 SCALE: 1" = 10'



PROJECT NUMBER: E170	DRAWN BY: A.C.	SCALE: 1" = 10'
ENGINEER: A.C.	DATE: JUL 27 2017	SHEET C-8
REVISED: 8/7/17 - U		
REVISED: 8/17/17 - Add: S		

PREPARED FOR:
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 1680 GOVER PARKWAY
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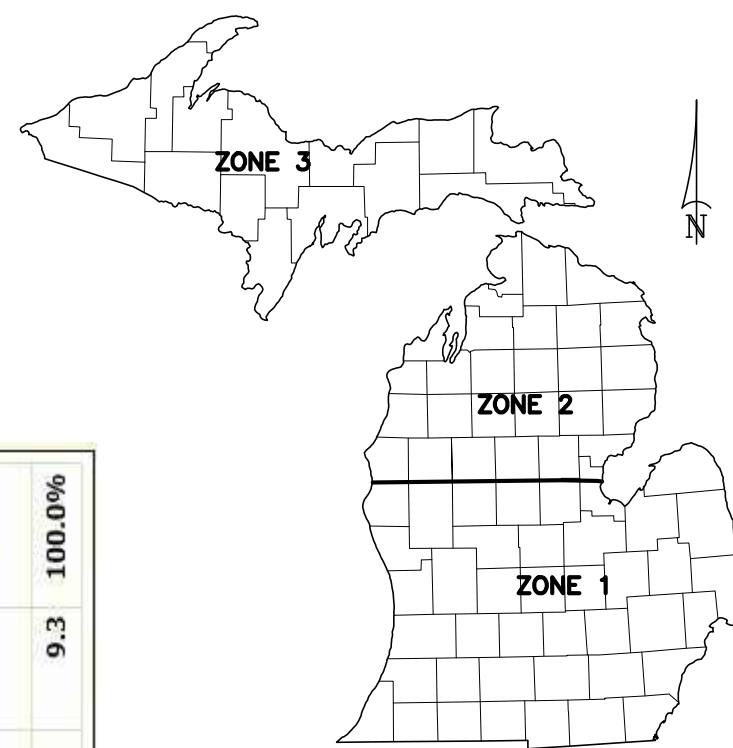
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MICHIGAN SOIL EROSION & SEDIMENTATION CONTROL GUIDEBOOK

FEBRUARY 1975 FIGURE 2



Isabella County, Michigan (M10793)	Percent of AOT	100.0%
Map Unit Name	Acres in AOT	9.3
Map Unit Symbol	Acres in AOT	9.3
61A Selfridge sand, 0 to 3 percent slopes	Totals for Area of Interest	9.3



RATE OF APPLICATION (ALL ZONES)

TYPE OF SEED	PER/1000 SF	PER ACRE
SPRING OATS/BARLEY OR DOMESTIC RYEGRASS	2 LBS	3 BU
DOMESTIC RYEGRASS	1/2 LB	20-25 LBS
SUDANGRASS	1 LB	30-40 LBS
RYE OR PERENNIAL RYE	3 LBS	2-3 BU
WHEAT	1/2 LB	20-25 LBS
	3 LBS	2-3 BU

PERMANENT SEEDING GUIDE

	APR	MAY	JUN	JUL	AUG	SEP	OCT	
IRRIGATED AND/OR MULCH WITHOUT IRRIGATION OR MULCH								ZONE 1
IRRIGATED AND/OR MULCHED WITHOUT IRRIGATION OR MULCH								ZONE 2
IRRIGATED AND/OR MULCHED WITHOUT IRRIGATION OR MULCH								ZONE 3

TEMPORARY SEEDING GUIDE

ZONE 1		ZONE 2		ZONE 3	
TYPE OF SEED	APR/MAY/JUN/JUL/AUG/SEP/OCT	TYPE OF SEED	APR/MAY/JUN/JUL/AUG/SEP/OCT	TYPE OF SEED	APR/MAY/JUN/JUL/AUG/SEP/OCT
SPRING OATS/BARLEY OR DOMESTIC RYEGRASS	[Shaded]	SPRING OATS/BARLEY OR DOMESTIC RYEGRASS	[Shaded]	SPRING OATS/BARLEY OR DOMESTIC RYEGRASS	[Shaded]
SUDANGRASS	[Shaded]	SUDANGRASS	[Shaded]	SUDANGRASS	[Shaded]
RYE OR PERENNIAL RYE	[Shaded]	RYE OR PERENNIAL RYE	[Shaded]	RYE OR PERENNIAL RYE	[Shaded]
WHEAT	[Shaded]	WHEAT	[Shaded]	WHEAT	[Shaded]

SOIL EROSION & SEDIMENTATION CONTROL KEY

SESC GENERAL NOTES:

- CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TEMPORARY AND PERMANENT CONTROL MEASURES UNTIL VEGETATION HAS BEEN ESTABLISHED ON ALL DISTURBED AREAS. MAINTENANCE SHALL INCLUDE PERIODIC INSPECTIONS, REMOVING ACCUMULATED SEDIMENT AND REPAIRING OR REPLACING DAMAGED CONTROL MEASURES. INSPECTIONS SHALL BE PERFORMED DURING THE CONSTRUCTION PROCESS. FOLLOWING CONSTRUCTION INSPECTIONS SHALL BE PERFORMED AT LEAST ON A WEEKLY BASIS AND AFTER EVERY SIGNIFICANT RAIN EVENT UNTIL VEGETATION HAS BEEN ESTABLISHED.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF TEMPORARY CONTROL MEASURES AFTER ALL DISTURBED AREAS HAVE BEEN RESTORED AND VEGETATION HAS BEEN ESTABLISHED. INSTALL FILTER FABRIC UNDER ALL CATCH BASIN GRATES UNTIL PERMANENT SOIL EROSION MEASURES HAVE TAKEN EFFECT. INSTALL SILT FENCES PRIOR TO ANY SITE WORK.
 - THE OWNER SHALL BE RESPONSIBLE FOR MAINTENANCE OF PERMANENT CONTROL MEASURES AFTER THE ESTABLISHMENT OF VEGETATION ON DISTURBED AREAS. THE OWNER SHALL MAKE PERIODIC INSPECTIONS AND REPLACE OR REPAIR DAMAGED PERMANENT CONTROL MEASURES AS REQUIRED.
 - TIMING SEQUENCE AND CONSTRUCTION SCHEDULE:
 - PHASE ONE - EARTH GRADE CHANGE; CONSTRUCT DITCHES; UTILITIES; PARKING LOT SUBGRADE; PLACE AND MAINTAIN TEMPORARY CONTROL MEASURES DURING THIS CONSTRUCTION PHASE:
 - COVER CATCH BASINS
 - GEOTEXTILE SILT FENCE AND/OR STRAW BALES
 - PHASE TWO - FINAL RESTORATION; GRAVEL INSTALLATION AND BITUMINOUS PAVING MAINTAIN TEMPORARY AND PERMANENT CONTROL MEASURES PLACE PERMANENT CONTROL MEASURE
 - TOPSOIL SEED, MULCH AND FERTILIZE IN ACCORDANCE WITH CURRENT MDT STANDARDS AND SPECIFICATIONS. PERMANENT SEEDING REQUIRED BETWEEN MARCH 1 THROUGH OCTOBER 31. DORMANT SEEDING REQUIRED AFTER NOVEMBER 1 BUT NOT ON FROZEN GROUND.
- ANTICIPATED START CONSTRUCTION DATES: 10/1/2017 TO 12/31/2017
- PERMANENT CONTROL MEASURES SHALL BE COMPLETED WITHIN 1 CALENDAR DAYS AFTER FINAL EARTH CHANGE IS COMPLETED.
- TEMPORARY SEEDING OR DORMANT SEEDING SHALL BE UTILIZED FOR "WINTER STABILIZATION"

* INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS

KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
1	STRIPPING & STOCKPILING TOPSOIL	TOPSOIL MAY BE STOCKPILED ABOVE BORROW AREAS TO ACT AS A DIVERSION. STOCKPILE SHOULD BE TEMPORARILY SEEDED.	*				*	*	
2	SELECTIVE GRADING & SHAPING	WATER CAN BE DIVERTED TO MINIMIZE EROSION. FLATTER SLOPES EASE EROSION PROBLEMS.	*				*	*	*
3	GRUBBING OMITTED	SAVES COST OF GRUBBING, PROVIDES NEW SPROUTS, RETAINS EXISTING ROOT MAT SYSTEM, REDUCES WIND FALLOUT, DISCOURAGES EQUIPMENT ENTRANCE.	*				*	*	*
4	VEGETATIVE STABILIZATION	MAY UTILIZE A VARIETY OF PLANT MATERIAL. STABILIZES SOIL. SLOWS RUNOFF VELOCITY. FILTERS SEDIMENT FROM RUNOFF.	*	*			*	*	*
5	SEEDING	INEXPENSIVE AND VERY EFFECTIVE. STABILIZES SOIL, THIS MINIMIZING EROSION. PERMITS RUNOFF TO INFILTRATE SOIL. REDUCING RUNOFF VOLUME SHOULD INCLUDE PREPARED TOPSOIL BED.	*	*			*	*	*
6	SEEDING WITH MULCH AND/OR MATING	FACILITATES ESTABLISHMENT OF VEGETATIVE COVER. EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY. EASILY PLACED IN SMALL QUANTITIES BY INEXPERIENCED PERSONNEL. SHOULD INCLUDE PREPARED TOPSOIL BED.	*	*			*	*	*
7	HYDRO-SEEDING	EFFECTIVE ON LARGE AREAS. MULCH TACKING AGENT USED TO PROVIDE IMMEDIATE PROTECTION UNTIL GRASS IS ROOTED. SHOULD INCLUDE PREPARED TOPSOIL BED.	*	*			*	*	*
8	SODDING	PROVIDES IMMEDIATE PROTECTION. CAN BE USED ON STEEP SLOPES WHERE SEED MAY BE DIFFICULT TO ESTABLISH. EASY TO PLACE. MAY BE REPAIRED IF DAMAGED. SHOULD INCLUDE PREPARED TOPSOIL BED.	*	*			*	*	*
9	VEGETATIVE BUFFER STRIP	SLOWS RUNOFF VELOCITY. FILTERS SEDIMENT FROM RUNOFF. REDUCES VOLUME OF RUNOFF ON SLOPES.	*	*			*	*	*
10	MULCHING	USED ALONE TO PROTECT EXPOSED AREAS FOR SHORT PERIODS. PROTECTS SOIL FROM IMPACT OF FALLING RAIN. PRESERVES SOIL MOISTURE AND PROTECTS GERMINATING SEED FROM TEMPERATURE EXTREMES.	*				*	*	*
11	ROUGHENED SURFACE	REDUCES VELOCITY AND INCREASES INFILTRATION RATES. COLLECTS SEDIMENT. HOLDS WATER, SEED, AND MULCH BETTER THAN SMOOTH SURFACES.	*				*	*	*
12	COMPACTION	HELPS HOLD SOIL IN PLACE, MAKING EXPOSED AREAS LESS VULNERABLE TO EROSION.	*				*	*	*
13	RIPRAP, RUBBLE, GABIONS	USED WHERE VEGETATION IS NOT EASILY ESTABLISHED. EFFECTIVE FOR HIGH VELOCITIES OR HIGH CONCENTRATIONS. PERMITS RUNOFF TO INFILTRATE SOIL. DISSIPATES ENERGY FLOW AT SYSTEM OUTLETS.	*	*			*	*	*
14	AGGREGATE COVER	STABILIZES SOIL SURFACE, THIS MINIMIZING EROSION. PERMITS CONSTRUCTION TRAFFIC IN ADVERSE WEATHER. MAY BE USED AS PART OF PERMANENT BASE CONSTRUCTION OF PAVED AREAS.	*				*	*	*
15	PAVING	PROTECTS AREAS WHICH CANNOT OTHERWISE BE PROTECTED, BUT INCREASES RUNOFF VOLUME AND VELOCITY. IRREGULAR SURFACE WILL HELP SLOW VELOCITY.	*				*	*	*
16	CURB & GUTTER	KEEPS HIGH VELOCITY RUNOFF ON PAVED AREAS FROM LEAVING PAVED SURFACE. COLLECTS AND CONDUCTS RUNOFF TO ENCLOSED DRAINAGE SYSTEM OR PREPARED DRAINAGEWAY.	*				*	*	*
17	BENCHES	REDUCES RUNOFF VELOCITY BY REDUCING EFFECTIVE SLOPE LENGTH. COLLECTS SEDIMENT. PROVIDES ACCESS TO SLOPES FOR SEEDING, MULCHING AND MAINTENANCE.	*				*	*	*
18	DIVERSION BERM	DIVERTS WATER FROM VULNERABLE AREAS. COLLECTS AND DIVERTS WATER TO PREPARED DRAINAGEWAYS. MAY BE PLACED AS PART OF NORMAL CONSTRUCTION OPERATION.	*				*	*	*

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KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
19	DIVERSION DITCH	COLLECTS AND DIVERTS WATER TO REDUCE EROSION POTENTIAL. MAY BE INCORPORATED IN PERMANENT PROJECT DRAINAGE SYSTEMS.	*				*	*	*
20	BERM & DITCH	DIVERTS WATER TO A PREPARED DRAINAGEWAY. MAY BE USED AT INTERVALS ACROSS SLOPE FACE TO REDUCE EFFECTIVE SLOPE LENGTH.	*				*	*	*
21	FILTER BERM	CONSTRUCTED OF GRAVEL OR STONE. INTERCEPTS AND DIVERTS RUNOFF TO STABILIZED AREAS OR PREPARED DRAINAGE SYSTEM. SLOWS RUNOFF AND COLLECTS SEDIMENT.	*	*			*	*	*
22	BRUSH FILTER	USES SLASH AND LOGS FROM CLEARING OPERATIONS. CAN BE COVERED AND SEEDED RATHER THAN REMOVED. ELIMINATES NEED FOR BURNING OR REMOVAL OF MATERIAL FROM SITE.					*	*	*
23	BARE CHANNEL	LEAST EXPENSIVE FORM OF DRAINAGEWAY. MAY BE USED ONLY WHERE GRADIENT IS VERY LOW AND WITH SOILS OF MINIMUM EROSION POTENTIAL.					*	*	*
24	GRASSSED WATERWAY	MUCH MORE STABLE FORM OF DRAINAGEWAY THAN BARE CHANNEL. GRASS TENDS TO SLOW RUNOFF AND FILTER OUT SEDIMENT. USED WHERE BARE CHANNEL WOULD BE DESIRED.					*	*	*
25	SLOPE DRAIN (SURFACE PIPE)	PREVENTS EROSION ON SLOPES WHEN RUNOFF CANNOT BE DIVERTED TO EDGE OF SLOPE AREA. USUALLY PERMANENT. CAN BE CONSTRUCTED OR EXTENDED AS GRADING PROGRESSES.	*				*	*	*
26	SLOPE DRAIN (PIPE CHUTE)	PREVENTS EROSION ON SLOPES WHEN RUNOFF CANNOT BE DIVERTED TO EDGE OF SLOPE AREA. USUALLY PERMANENT. CAN BE CONSTRUCTED OR EXTENDED AS GRADING PROGRESSES.	*				*	*	*
27	SLOPE DRAIN (SUBSURFACE PIPE)	PREVENTS EROSION ON SLOPES WHEN RUNOFF CANNOT BE DIVERTED TO EDGE OF SLOPE AREA. USUALLY PERMANENT. CAN BE CONSTRUCTED OR EXTENDED AS GRADING PROGRESSES.	*				*	*	*
28	DROP SPILLWAY	SLOWS VELOCITY OF FLOW, REDUCING EROSION CAPACITY.		*	*		*	*	*
29	PIPE DROP	REDUCES RUNOFF VELOCITY. REMOVES SEDIMENT AND TURBIDITY. CAN BE DESIGNED TO HANDLE LARGE VOLUMES OF FLOW.		*	*		*	*	*
30	PIPE SPILLWAY	REMOVES SEDIMENT AND TURBIDITY FROM RUNOFF. MAY BE PART OF PERMANENT EROSION CONTROL PLAN.		*	*		*	*	*
31	ENERGY DISSIPATER	SLOWS RUNOFF VELOCITY TO NON-EROSIVE LEVEL. PERMITS SEDIMENT COLLECTION FROM RUNOFF.	*				*	*	*
32	LEVEL SPREADER	CONVERTS COLLECTED CHANNEL OR PIPE FLOW BACK TO SHEET FLOW. AVOIDS CHANNEL CLOGGINGS AND CONSTRUCTION OFF PROJECT SITE. SIMPLE TO CONSTRUCT.		*	*		*	*	*
33	SEDIMENTATION TRAP	MAY BE CONSTRUCTED OF A VARIETY OF MATERIALS. TRAPS SEDIMENT AND REDUCES VELOCITY OF FLOW. CAN BE CLEANED AND EXPANDED AS NEEDED.		*	*		*	*	*
34	SEDIMENT BASIN	TRAPS SEDIMENT. RELEASES RUNOFF AT NON-EROSIVE RATES. CONTROLS RUNOFF AT SYSTEM OUTLETS. CAN BE VISUAL MONITORED.		*	*		*	*	*
35	STORM SEWER	SYSTEM REMOVES COLLECTED RUNOFF FROM SITE, PARTICULARLY FROM PAVED AREAS. CAN ACCEPT LARGE CONCENTRATIONS OF RUNOFF. CONDUCTS RUNOFF TO MUNICIPAL SEWER SYSTEM OR STABILIZED OUTFALL LOCATION. USE CATCH BASINS TO COLLECT SEDIMENT.		*	*		*	*	*
36	CATCH BASIN, DRAIN INLET	COLLECTS HIGH VELOCITY CONCENTRATED RUNOFF. MAY USE FILTER CLOTH OVER INLET.		*	*		*	*	*

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KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
37	SOD FILTER	INEXPENSIVE AND EASY TO CONSTRUCT. PROVIDES IMMEDIATE PROTECTION. PROTECTS AREAS AROUND INLETS FROM EROSION.				*			
38	STRAW BALE FILTER	INEXPENSIVE AND EASY TO CONSTRUCT. CAN BE LOCATED AS NECESSARY TO COLLECT SEDIMENT. MAY BE USED IN CONJUNCTION WITH SNOW FENCE FOR ADDED STABILITY.				*			*
39	ROCK FILTER	CAN UTILIZE MATERIAL FOUND ON SITE. EASY TO CONSTRUCT. FILTERS SEDIMENT FROM RUNOFF.				*			*
40	INLET SEDIMENT TRAP	EASY TO SHAPE. COLLECTS SEDIMENT. MAY BE CLEANED AND EXPANDED AS NEEDED.				*			*
41	STONE AND ROCK CROSSING	MAY BE ROCK OR CLEAN RUBBLE. MINIMIZES STREAM TURBIDITY. INEXPENSIVE. MAY ALSO SERVE AS DITCH CHECK OR SEDIMENT TRAP.				*			*
42	TEMPORARY CULVERT	ELIMINATES STREAM TURBULENCE AND TURBIDITY. PROVIDES UNOBSTRUCTED PASSAGE FOR FISH AND OTHER WATER LIFE. CAPACITY FOR NORMAL FLOW CAN BE PROVIDED WITH STORM WATER FLOWING OVER ROADWAY.				*			*
43	CULVERT SEDIMENT TRAP	EASY TO INSTALL AT INLET. KEEPS CULVERT CLEAN AND FREE FLOWING. MAY BE CONSTRUCTED OF LUMBER OR LOGS.				*			*
44	CULVERT SEDIMENT TRAP	DEFLECTS CURRENTS AWAY FROM STREAMBANK AREAS.				*			*
45	TEMP. STREAM CHANNEL CHANGE	NEW CHANNEL KEEPS NORMAL FLOWS AWAY FROM CONSTRUCTION. REQUIRES STATE PERMIT.				*			*
46	SHEET PILING	PROTECTS EROSION PRONE AREAS FROM STREAM CURRENTS DURING CONSTRUCTION. MINIMAL DISRUPTION WHEN REMOVED.				*			*
47	COFFERDAM	WORK CAN BE CONTINUED DURING MOST ANTICIPATED STREAM CONDITIONS. CLEAR WATER CAN BE PUMPED DIRECTLY BACK INTO STREAM.				*			*
48	CONSTRUCTION DAM	PERMITS WORK TO CONTINUE DURING NORMAL STREAM STAGES. CONTROLLED FLOODING CAN BE ACCOMPLISHED DURING PERIODS OF INACTIVITY.				*			*
49	CHECK DAMS	REDUCES FLOW VELOCITY. EROSION RESISTANT. CAN BE CONSTRUCTED OF LOGS, STRAW, HAY, ROCK, LUMBER, MANSURY, OR SAND BAGS.				*			*
50	WEIR	CONTROLS SEDIMENTATION IN LARGE STREAMS. CAUSES MINIMAL TURBIDITY.				*			*
51	RETAINING WALL	REDUCES GRADIENT WHERE SLOPES ARE EXTREMELY STEEP. PERMITS RETENTION OF EXISTING VEGETATION, KEEPING SOIL STABLE IN CRITICAL AREAS. MINIMIZES MAINTENANCE.				*			*
52	SEEPAGE CONTROL	PREVENTS PIPING AND SOIL SLURPAGE ON CUT SLOPES.				*			*
53	WINDBREAK	MINIMIZES WIND EROSION. MAY BE SNOW FENCE.				*			*
54	SILT FENCE	USES GEOTEXTILE FABRIC AND POSTS OR POLES. EASY TO CONSTRUCT AND LOCATE AS NECESSARY.				*			*

PROJECT NUMBER: E1701
 DRAWN BY: A.C.
 SCALE: 1" = 50'
 SHEET C-9
 ENGINEER: A.C.
 REVISION: 8/7/17 - U
 REVISION: 8/17/17 - Add: S

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