



**CITY OF ROMULUS – CITY COUNCIL
REGULAR MEETING AGENDA
July 12, 2021
7:30 PM**

Pledge of Allegiance

Roll Call

1. Agenda

- A. Approval of Agenda

2. Minutes

- A. Approval of minutes from the regular meeting held on Tuesday, July 6, 2021, at 7:30 p.m.

3. Petitioner

4. Chairperson's Report, John Barden, Mayor Pro-Tem

- A. Approval of the Chairperson's Report

5. Mayor's Report – LeRoy D. Burcroff, Mayor

- A. Request to Adopt Revised Engineering Standards
- B. The Senior Alliance 2022 Annual Implementation Plan
- C. Introduction of Budget Amendment 21/22-1
Motor Vehicle Public Safety

6. Clerk's Report – Ellen L. Craig-Bragg, Clerk

- A. Public Hearing request by TIFA Director Merrie Druyor for August 23, 2021, at 6:30 p.m.

7. Treasurer's Report – Stacy Paige, Treasurer

8. Public Comment - Citizens are to limit their comments to three (3) minutes. All citizens wishing to speak will be heard.

9. Unfinished Business

10. New Business

11. Warrant

- A. Approval of Warrant #: 21-13 Checks presented in the amount of \$754,103.83

12. Communication

13. Adjournment



RULES REGARDING THE PUBLIC ADDRESSING A CITY MEETING

Any member of the public shall have the right to address the City Council, Board or Commission on any item on the agenda under the following conditions:

1. Individuals requesting to address City Council, a Board or Commission on an agenda item or under public comment must fill out a “*Request to Address*” card provided – listing name, address, phone number and agenda item on which comments are desired to be made and present it to the Clerk or recording secretary.
2. When the agenda item is reached, the clerk or recording secretary shall call upon the person or persons who filed the request to speak. A member of the public shall not be permitted to enter into debate with a petitioner.
3. Individuals that would like to address City Council under the public comment portion of the agenda, must raise their hand and when recognized by the chair, the person shall approach the microphone and state their name and address.
4. Remarks shall be limited to three (3) minutes, subject to being extended an additional three (3) minutes by consent of the chair. There shall be no personal attacks. Remarks shall not contain any profanity, racial, ethnic, religious, sexual or national origin slurs or overtones. Anyone making such remarks shall lose his/her right to address the City Council, Board or Commission.
5. No person shall be permitted to address the group on any item more than once at any one meeting without the approval of a majority of the quorum present.
6. All of the foregoing does not apply to a person previously granted a hearing at the meeting in question.
7. This rule does not permit members of the public to join in debate or discussion with petitioners, members of the body or with other members of the public present at such meeting.
8. Once a motion is on the floor, discussion from the public shall no longer be permitted on that agenda item.
9. The public may make a request to the Chairperson of the Council on a form provided by the Clerk, to be added to the agenda of a future Council meeting to address a subject that Council would have authority to address. If the Chairperson denies the request, the request may be made to the entire Council under the Public Comment section of the Council’s agenda. If the request is granted by a majority of the Council, it will be added as an agenda item at the next regular meeting of the Council.

The meeting will be held in the City Council Chambers, Romulus City Hall, 11111 South Wayne Road, Romulus, MI 48174. NOTE: Anyone planning to attend the meeting who has need of special assistance under the Americans with Disabilities Act (ADA), is asked to contact the Clerk’s Office (734-942-7540) 48 hours prior to the meeting – the staff will be pleased to make the necessary arrangements.



City of Romulus

Agenda

Council Meeting Held: **July 12, 2021**

Item No. A.

General Description: Approval of Agenda

Resolution No. _____

<i>Moved by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Seconded by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

<i>Ayes:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Nays:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Abstain:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED



City of Romulus

Minutes

Council Meeting Held: **July 12, 2021**

Item No. A.

General Description: Approval of minutes from the regular meeting held on Tuesday, July 6, 2021, at 7:30 p.m.

Resolution No. _____

<i>Moved by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Seconded by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

<i>Ayes:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Nays:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Abstain:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED



MINUTES OF THE REGULAR ROMULUS CITY COUNCIL MEETING

July 6, 2021

Romulus City Hall Council Chambers, 11111 Wayne Rd, Romulus, MI 48174

The meeting was called to order at 7:30 p.m. by Chairperson Tina Talley.

Pledge of Allegiance

Roll Call

Present: Tina Talley, Virginia Williams, Eva Webb, William Wadsworth

Absent / Excused: Kathy Abdo, John Barden, Celeste Roscoe

Administrative Officials in Attendance:

LeRoy Burcroff, Mayor

Ellen L. Craig-Bragg, Clerk

Administrative Staff in Attendance:

D'Sjonaun Hockenhull - Deputy Clerk; Stephen Hitchcock - City Attorney; Julie Wojtylko - Chief of Staff;

Robert Pfannes - Chief of Police; Kevin Krause - Director of Fire & Emergency Services

1. Agenda

- A. Moved by **Eva Webb**, seconded by **William Wadsworth** to accept the Approval of Agenda

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams

Nays - None

Motion Carried Unanimously.

2. Minutes

- A. **Res. #21-190** Moved by **William Wadsworth**, seconded by **Eva Webb** to approve the minutes from the regular meeting held on Monday, June 28, 2021, at 7:30 p.m.

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams

Nays - None

Motion Carried Unanimously.

- B. **Res. #21-191** Moved by **Eva Webb**, seconded by **Virginia Williams** to approve the minutes from the special meeting(s) held on Monday, June 28, 2021, at 6:45 p.m. to discuss the enhancement and enrollment into WRAP Option 1 Program.

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams

Nays - None

Motion Carried Unanimously.

3. Petitioner

4. Chairperson's Report, John Barden, Mayor Pro-Tem

Res. #21-192 Moved by **Virginia Williams**, seconded by **William Wadsworth** to adopt Memorial resolution for the family of Janie Cousar-Kinloch.

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams

Nays - None

Motion Carried Unanimously.

Res. #21-193 Moved by **Virginia Williams**, seconded by **William Wadsworth** to adopt a memorial resolution for the family of Mary Elizabeth Krampitz.

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams
Nays - None
Motion Carried Unanimously.

A.

Moved by **Virginia Williams**, seconded by **William Wadsworth** to accept the Chairperson's Report.

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams
Nays - None
Motion Carried Unanimously.

5. Mayor's Report – LeRoy D. Burcroff, Mayor

- A. Res. #21-194** Moved by **William Wadsworth**, seconded by **Eva Webb** to concur with administration and grant authorization for the Mayor and Clerk to enter into the Lease Agreement with Detroit Metro Airport Center L.L.C., for 3,125 square feet of temperature-controlled storage space for the City Clerk's Office and the Police Department with a monthly split costs of \$1,236.98 until such time as a 30 day written notice of cancellation is given by either party.

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams
Nays - None
Motion Carried Unanimously.

- B. Res. #21-195** Moved by **Eva Webb**, seconded by **William Wadsworth** to concur with the administration and consent to piggyback on the NCPA Contract #02-60 for the replacement of the carpet in the hallways and the report writing/office room of the police department in the amount of \$11,948.48 with Engineered Floors LLC (dba J&J Flooring Group and dba EF) with additional necessary supplies needed from ProSource Wholesale in the amount of \$1,055.12 and \$6,750.00 required for the installation of the carpet by Total Binding Floors (total costs of the project \$19,753.60).

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams
Nays - None
Motion Carried Unanimously.

- C. Res. #21-196** Moved by **William Wadsworth**, seconded by **Virginia Williams** to concur with the administration and consent to extend the contract from ITB 20/21-05 with Davenport Masonry Inc., for the repairs of the final portion of the south elevation structural at a cost of \$51,700.00 and the west elevation structural repairs in the amount of \$23,700.0 of Fire Station #4 located at 28777 Eureka Road. Additionally, the remaining budget allocation of \$2,300.00 is being requested as a contingency for unforeseen necessary repairs.

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams
Nays - None
Motion Carried Unanimously.

6. Clerk's Report – Ellen L. Craig-Bragg, Clerk

- A. FOR YOUR INFORMATION:** Memo from Clerk's Department regarding DocuSign Contract

7. Treasurer's Report – Stacy Paige, Treasurer

8. Public Comment -

A resident addressed the City Council regarding the signage of Infinity Homes/Builders at Fairways at Gateway subdivision.

9. Unfinished Business

10. New Business

11. Communication

Councilperson Williams requests that the administration send something to the state delegation representing the city regarding insurance company's practices after natural disasters so that citizens, especially senior citizens, aren't victimized. She also reminded residents that Forgotten Harvest will be at the high school every Tuesday at 11:00 a.m. Councilperson Webb concurred with Councilperson William's request and also requested that Director McCraight be involved in the conversation on drafting a response to the state delegation as he was involved in the discussion around FEMA's flood maps.

12. Adjournment

Moved by **William Wadsworth**, seconded by **Eva Webb** to adjourn the meeting at 8:21 p.m.

Roll Call Vote: Ayes - Tina Talley, William Wadsworth, Eva Webb, Virginia Williams

Nays - None

Motion Carried Unanimously.

I, Ellen L. Craig-Bragg, Clerk for the City of Romulus, Michigan do hereby certify the foregoing to be a true copy of the minutes of the regular meeting of the Romulus City Council held on July 6, 2021.



Ellen L. Craig-Bragg, City Clerk
City of Romulus, Michigan



City of Romulus

Petitioner

Council Meeting Held:

July 12, 2021

Item No. 6

General Description: _____

Resolution No. _____

Moved by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Seconded by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Ayes: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Nays: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Abstain: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED



City of Romulus

Chairperson's Report, John Barden, Mayor Pro-Tem

Council Meeting Held: **July 12, 2021**

Item No. A.

General Description: Approval of the Chairperson's Report

Resolution No. _____

<i>Moved by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Seconded by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

<i>Ayes:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Nays:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Abstain:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED



City of Romulus

Mayor's Report – LeRoy D. Burcroff, Mayor

Council Meeting Held: **July 12, 2021**

Item No. A.

General Description: Request to Adopt Revised Engineering Standards

Resolution No. _____

<i>Moved by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Seconded by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

<i>Ayes:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Nays:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Abstain:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED

City of Romulus

INTEROFFICE MEMORANDUM

TO: The Honorable Romulus City Council
FROM: Mayor LeRoy D. Burcroff
SUBJECT: Request to Adopt Revised Engineering Standards
DATE: July 6, 2021

I concur with the recommendation of Roberto Scappaticci, DPW Director and the City engineering firm Orchard Hiltz & McCliment, and respectfully request that Council adopt the revised Engineering Standards Manual and Detail Sheets.

Motion by _____, supported by _____,
to concur with the administration to adopt the revised Engineering Standards Manual and Detail Sheets.

Interoffice Memorandum

TO: Mayor LeRoy D. Burcroff

FROM: Roberto J. Scappaticci, Director of Public Works

CC: Kathy Hood, Assistant DPW Director
Robert McCraight, Director of Public Services and Econ Dev.
Carol Maise, Director of Planning

DATE: June 28th, 2021

SUBJECT: City of Romulus Engineering Standards Update

Dear Mayor,

Attached are the revised Engineering Standards for the City of Romulus. The DPW has incorporated all the feedback we have received from our Study Session held on June 7th, 2021. In addition, the following revisions have been included from feedback we received from Council:

1. Detention basins with less than 1:6 side slope and retaining no water, if commercial, require no fencing. All other commercial detention basins require fencing or a waiver from City Council.
2. Residential Subdivision Detention basins shall be fenced regardless on the side slopes and water level or whether dry or wet. A waiver from this requirement shall be required from City Council.

This in short summarizes the major changes made to the standards. As mentioned previously, there are many small edits made to the type of pipe, etc., bond requirements, and updates to text and language which are not summarized within this letter.

At this time the DPW recommends presenting these changes to City Council for approval of use.

Thank you,



Roberto J. Scappaticci, Director of Public Works

y:\admin documents\director's file\engineering standards\standards letter.docx



City of Romulus **Engineering Design and Construction Standards Manual**



City of Romulus
Michigan
Home of Opportunity

City of Romulus
11111 Wayne Road
Romulus, Michigan 48174

Adopted March 1992
Revised September 2002
Revised February 2006
Revised May 2009
Revised June 2021

Prepared by OHM



TABLE OF CONTENTS

I.	GENERAL REQUIREMENTS AND PROCEDURES.....	2
A.	Title and Purpose	2
B.	Definitions	2
C.	Compliance with Ordinances and Public Acts	3
D.	Standard Details	4
E.	General Plan Review Procedures.....	4
F.	Engineering Requirements for Site Plan.....	4
G.	Permit Requirements.....	12
H.	Fees	14
I.	Insurance.....	15
J.	Pre-Construction Meeting.....	16
K.	Construction Observation	16
L.	Bonds	17
M.	Easements	17
N.	Project Completion/Final Acceptance	18
II.	GENERAL REQUIREMENTS FOR ENGINEERING REVIEWS.....	19
A.	General Procedures	19
B.	General Plan Requirements	20
III.	TOPOGRAPHY	22
A.	General.....	22
IV.	SOIL EROSION	23
A.	Sites Requiring Permits	23
B.	Intent of Permit	23
C.	Plan Requirements	23
D.	Construction Observation	23
V.	WATER MAIN	24
A.	General.....	24
B.	Sizes and Distribution.....	25
C.	Valves	26
D.	Automatic Fire Sprinkler Service Connections	27
E.	Hydrants.....	27
F.	Wood Frame Construction.....	29
G.	Dedication of Water System and Easements	29
H.	Joint Restraint	29
I.	Meters	30
J.	Testing and Sterilization	30
K.	Backflow Prevention.....	30
L.	Utility Crossings	30
M.	Road and Railroad Crossings.....	30
N.	Materials	30

VI.	SANITARY SEWER	36
A.	General	36
B.	Design	36
C.	Grade.....	37
D.	Manholes.....	37
E.	Depth of Sewers	38
F.	Location	38
G.	Leads	38
H.	Plan and Profile.....	39
I.	Drop Connections	40
J.	Septic Systems	40
K.	Materials	40
L.	Infiltration and Exfiltration Testing	41
M.	Pump Stations	41
N.	Force Mains	42
VII.	STORM SEWER AND DETENTION.....	43
A.	General.....	43
B.	Structures	44
C.	Storm Sewer Design	45
D.	Plan and Profile.....	47
E.	Taps.....	48
F.	Detention.....	48
G.	Pump Stations	55
H.	Public Storm Sewer	56
I.	Materials	56
VIII.	PAVING.....	59
A.	General.....	59
B.	Public Roads Under Wayne County Jurisdiction	60
C.	Public Roads Under the City's Jurisdiction.....	60
D.	Private Drives	63
E.	Parking Lot Pavements (Non-industrial)	63
F.	Industrial Parking Lots.....	64
G.	Drainage In Right-of-Way	64
H.	Sidewalks	64
I.	Driveways	65
IX.	GRADING	67
A.	General	67
B.	Commercial/Industrial	68
C.	Subdivisions.....	68
X.	CONSTRUCTION SPECIFICATIONS	70
A.	General Requirements.....	70
B.	Earthwork.....	72
C.	Storm Sewer Construction	79

D. Sanitary Sewer Construction 83

E. Water Main Construction..... 93

Appendices

A. **Additional Checklists**

Pre-Construction Meeting Materials and Checklist
Record Drawings Requirement Checklist
Record Plan Submission Requirements

B. **Bonds and Maintenance Documents**

Maintenance and Guarantee Bond - Site Development
Long Term Maintenance Agreement for Storm Water Detention/Retention System and Storm
Sewer System

C. **Unit Use Factors**

Sanitary Sewer Unit Assignment Table

D. **Sample Easements**

Sample Water Main Easement
Sample Sanitary Sewer Easement
Sample Safety Path Easement

E. **Grading**

Notice of City of Romulus Final Grading Certificate Policy
City of Romulus Site Grading/Setback Certification

F. **Retaining Wall**

A Guide for Structure Reviews

G. **U.S. Department of Transportation F.A.A. Advisory Circular – Hazardous Wildlife Attractants on or near Airports**

H. **Pump and Lift Stations**

City of Romulus Telemetry Specifications
Miscellaneous Provisions to be Included in Development Agreement

I. **Supplemental Specifications for Trenchless Water Main Installation**

Directional Drilling
Static Pipe Bursting

I. General Requirements and Procedures

A. Title and Purpose

These guidelines shall be known and may be cited as the City of Romulus Engineering Design and Construction Standards. The City of Romulus Engineering Standards are intending to be a minimum guideline on the design and preparation of construction plans. The City reserves the right to require additional measures beyond these standards when special circumstances or site restrictions are present.

B. Definitions

The following words, terms and phrases, when used in this manual, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning.

AASHTO:

American Association of State Highway and Transportation Officials

ANSI:

American National Standards Institute

ASTM:

American Society for Testing and Materials

AWWA:

American Water Works Association

BZA:

The City of Romulus Board of Zoning Appeals

CITY:

The City of Romulus, Michigan; represented by the Mayor.

CITY ENGINEER:

The consulting engineers employed by the City of Romulus.

DETENTION POND:

An open water facility used to manage and control storm water flows leaving a site via an engineered controlled outlet. Note: Wayne County uses the term 'Detention Basin'.

DPW:

City of Romulus Department of Public Works

EASEMENT:

The right of an owner of property by reason of such ownership, to use the property of another for purposes of ingress, egress, utilities, drainage and similar uses.

GLUMRB:

Recommended Standards for Sewage Works, (Ten States Standards); standards for use as a guide in the design and preparation of plans and specifications for sewage works, prepared by the Standards Committee of the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers.

EGLE:

Michigan Department of Environment, Great Lakes, and Energy

MDOT:

Michigan Department of Transportation

MDPH:

Michigan Department of Public Health

MIOSHA:

Michigan Occupational Safety and Health Act

POND:

General term referring to open water facility used to manage and control storm water. General term includes both RETENTION and DETENTION PONDS as defined herein.

STANDARD DETAILS DRAWINGS (SDD):

Refers to the City of Romulus Standard Details Drawings for water mains, storm sewers, sanitary sewers and soil erosion adopted by the City. They are considered a part of these standards.

RETENTION POND:

A facility used to collect storm water flows on a site and hold until diffused by infiltration and evaporation. No outlet exists as with a DETENTION POND.

SUBDIVISION:

A subdivision as used in this manual shall be equivalent to a subdivision as defined in the City of Romulus Subdivision Regulations Ordinance, latest edition. A site condominium consisting entirely of single-family detached condominium units shall be equivalent to a subdivision as used in this manual.

WCDPS:

Wayne County Department of Public Services

C. Compliance with Ordinances and Public Acts

All construction shall be in compliance with the procedural and substantive requirements of Ordinance 128, Zoning Ordinance; Ordinance 140, Subdivision Control Ordinance; Ordinance 159, Soil Erosion Control; Ordinance 207, Private Roads, Ordinance 212, Sidewalk, Driveway, Drainage Course and Right-of-Way Openings Ordinance; the Land Division Act, Act No. 288 of the Public Acts of Michigan of 1967, the Condominium Act 59 of 1978, as Amended, and all other applicable statutes and ordinances, in addition to the requirements contained in this manual.

D. Standard Details

All utilities described and contained in this manual shall be constructed in accordance with the City's "Standard Details Drawings" (SDD) which are included with this manual and copies of which shall be kept in the office of the City Department of Public Works (DPW), available for Construction Observation and distribution to the public. Reproducible copies are available upon payment of a fee.

E. General Plan Review Procedures

1. The plan review and approval process generally consists of three phases. All must be completed before construction starts.
 - a. Phase I – Site Plan

The first phase includes review of the site plan and culminates in approval of the site plan by the Planning Commission. This includes any site improvements and/or roadwork and any private utility installation.

The applicant must contact the Planning Department for the required forms, fees and detailed explanation of the process.
 - b. Phase II – Engineering Plan

The second phase begins after the Planning Commission approves the plan and the City Planner signs off on the plans implementing all conditions of approval. The developer then submits detailed engineering plans, building permit application and fees to the Building Department. The Building Department distributes the plans to the appropriate City departments and consultants who perform a detailed review of the plans. The Building Department issues a building permit when all of the review agents have given final approval to the plans and the developer pays the required fees. (See pages 19 – 67).
 - c. Phase III – Soil Erosion Control Plan

The third phase begins after the Planning Commission approves the plan and the City Planner signs off on the plans implementing all the conditions of approval. The developer then submits the soil erosion control plan to Wayne County with completed application and fees paid.
2. Additional review steps are needed for single-family or site condominiums and subdivision reviews per the City of Romulus Zoning Ordinance.
3. The building permit application(s) shall be obtained from the Building Department webpage section for completion and submittal to the City.

F. Engineering Requirements for Site Plan

1. The applicant must follow the procedures of the Planning Department in order to achieve site plan approval. Information on the procedures must be obtained from the Planning Department.

2. The site plan must conform to the following engineering checklist in addition to the items required by the City Planning Department and City Ordinances.
3. The DPW and the City Engineer will review the site plan in accordance with the following checklist as a part of the planning process. Special engineering design considerations may also be addressed at this time.

Site Plan Checklist

General Requirements

- [] 1. Submitted on 24" x 36" paper with a minimum horizontal scale of 1" = 50' and vertical of 1" = 5'. Oversize plans will not be accepted.
- [] 2. General plan at 1" = 100' or 1" = 200' when size of site prohibits a single plan sheet. Show street names, units, utilities, pavement, site dimensions, phase lines. All scales must be graphical.
- [] 3. Plan completion date with most recent revision date.
- [] 4. Location map showing section number and major thoroughfares.
- [] 5. Lot number, parcel dimensions and adjoining rights-of-way (existing and proposed) clearly shown.
- [] 6. Professional engineer seal (State of Michigan) for all site civil drawings.
- [] 7. Name, address and phone number of engineer, architect and the owner.
- [] 8. Title block, scale and north arrow for each sheet.
- [] 9. Legal description of property that closes within acceptable limits. Provide legal description of R.O.W. dedication, if applicable. Confirm lot and right-of-way consistent with current Tax I.D. Maps and future Right-of-Way Map.
- [] 10. Dimensional plan for parking lot.
- [] 11. Loading spaces indicated.
- [] 12. Building use indicated and other uses of property including any outdoor storage areas.
- [] 13. City Traffic Engineer to review plans. Traffic study may be required based on existing conditions. The latest version of 'Evaluating Traffic Impact Studies, a Recommended Practice for Michigan Communities', shall be used as a guide for when a traffic study is required and how to evaluate traffic studies.
- [] 14. Separate landscape plan. Verify no trees in existing or proposed public easements.
- [] 15. Based on the extent of the improvements, a note shall be added to the plans if a batch plant is necessary onsite or adjacent to the development. Zoning Board of Appeals approval required if this is the case. Note on cover sheet regardless.
- [] 16. Underground utilities shall not be located closer than 10' from any building or structure.

- [] 17. For residential sites, all private utilities (i.e. gas, electric, etc.) shall be placed in backyards. A note shall be added to the site plan.
- [] 18. Phasing limits shall be clearly identified on the plans.
- [] 19. Minimum throat width at driveways is 30'. Minimum radius of 35'; 45' if tractor-trailers will enter the site. Truck circulation plan provided with turning movements shown for the largest vehicle.
- [] 20. For residential or multi-unit development, a Development Agreement/Association/Master Deed document with "Exhibit B" must be submitted with maintenance outlined for all improvements.
- [] 21. The applicant is strongly encouraged to meet with the Wayne County Permit Office early in the site plan process to discuss items under their jurisdiction (e.g. County Drain, County right-of-way, stormwater management). The County may raise significant site layout issues.

Topographical Survey

- [] 22. A separate current existing conditions and topography plan sheet shall be submitted, sealed by a Professional Surveyor or Engineer licensed to practice in the State of Michigan.
- [] 23. Indicate USGS NAVD 88 benchmarks (minimum of two).
- [] 24. Property lines shown by bearing and distance (Lines to match legal description).
- [] 25. Existing off-site elevations at a minimum of 50' and 100' around the property. Elevations at property corners and along property lines and sufficient on-site elevations or contours to establish site drainage.
- [] 26. Show existing conditions; ditches, culverts, utilities (invert and casting elevations), sidewalks, power poles, easements (include liber & page), and finish grade of adjacent buildings.
- [] 27. Show the locations of all existing gas, electric, cable and telephone lines.
- [] 28. Indicate the zoning of all adjacent parcels.
- [] 29. Show existing adjacent roads with both existing right-of-way and future right-of-way per the master plan. Grades must be shown at ditch centerline, top of bank, edge of shoulder, edge of pavement (or top of curb) and pavement centerline. Grades must be shown on both sides of road.
- [] 30. Limits of existing wetlands, regulated or unregulated, shall be shown and any impacts indicated and quantified. If none are located within the influence of the site a note shall be added on the plans.

- [] 31. In accordance with the Huron Watershed Council, the natural drainage pattern of land shall not be altered in any way that might cause adverse effects to existing wetlands.
- [] 32. County drains identified by name with easements shown. "Natural Drainage Courses" also identified (MDEQ jurisdiction).

Water Main

- [] 33. Public water main shall be located within a greenbelt whenever feasible including new gate wells. In the event that the majority of public main is proposed under pavement, a note shall be added to the plan indicating it's the property owner's responsibility for any pavement repairs as a result of City maintenance.
- [] 34. Minimum size water main is 8". Maximum dead-end main lengths are: 40' for 6" fire hydrant lead; 400' for 8" main; 1,000' for 12" main all originating from water main of equal or greater size. Loop mains if these minimums cannot be met, with a gate valve and well provided between the two connection points.
- [] 35. All dead end mains must end with a flushing hydrant then a gate valve and well.
- [] 36. Water main shall extend to adjacent properties as necessary to facilitate future development.
- [] 37. Show water service and size. No private services are allowed from 6" hydrant lead or water main larger than 24" in diameter.
- [] 38. A 10' horizontal separation must be maintained between the water main and sanitary or storm sewers.
- [] 39. Minimum 12' wide public easement must be shown on the plans. Permanent structures of any type, including but not limited to, trees, light poles, drainage structures, etc. will not be allowed within the influence of public easements. Easement edge shall be minimum 10' from buildings. Verify against landscape plan.
- [] 40. Valve spacing: In the event of a breakage; three valves to isolate break, four maximum, no more than two hydrants out of service, no more than 24 single-family units or 30 multiple units out of service. Gate valve and wells shall be placed near intersections wherever practical.
- [] 41. Hydrant spacing: Maximum of 500' or as determined by Fire Department.
- [] 42. No parking within a 15' radius of a hydrant.
- [] 43. Water main pipe material shall be shown (see Section V).
- [] 44. For new developments with proposed cul-de-sacs, water main shall be extended around the entire cul-de-sac to facilitate service taps.

- [] 45. For any new water service, the anticipated water consumption shall be provided.
- [] 46. Any public water main proposed on adjacent properties will require a public easement. A letter of understanding with sketch shall be provided from the adjacent owner prior to site plan approval.

Sanitary Sewer

- [] 47. Verify that existing sanitary system has capacity to handle the new sanitary flow. Applicant to provide preliminary calculations for City Engineer.
- [] 48. Public sanitary sewer shall be located in a greenbelt whenever feasible including new manholes. In the event that the majority of public sewer is proposed under pavement, a note shall be added to the plan indicating it's the property owner's responsibility for any pavement repairs as a result of City maintenance.
- [] 49. Sanitary sewer shall extend to adjacent properties as necessary to facilitate future development. Adequate depth must be provided for service area.
- [] 50. Minimum 20' wide, public easement must be shown on the plans. Wider easement may be required based on depth of sewer. Permanent structures of any type, including but not limited to, trees, light poles, drainage structures, etc. will not be allowed within influence of public sewer easement. Verify against landscape plan.
- [] 51. Pump stations/lift stations will not be accepted unless there is no other feasible alternative. If a pump station is proposed, special language and requirements will be needed in the Development Agreement and on plans (see Appendix M). The owner or Association is responsible for all monthly utility bills (e.g. electric, phone).
- [] 52. Show building lead size and location (6" Sch. 40 at minimum 1.0% slope).
- [] 53. Provide minimum of 10' of separation from other utilities.
- [] 54. Sanitary sewer pipe material shall be shown (see Section VI).
- [] 55. Any public sanitary sewer proposed on adjacent properties will require a public easement. A letter of understanding with sketch shall be provided from the adjacent owner prior to site plan approval.

Storm Sewer

- [] 56. Underground storm sewer systems are required for new developments (12" minimum diameter). Private easements indicated as necessary.
- [] 57. Proposed collection points, system layout, sizes and outlets must be shown on the site plan. Also show preliminary invert and rim elevations.

- [] 58. Pump stations will not be accepted unless there is no other feasible alternative. Pump stations must be labeled as private with easements indicated and appropriate maintenance language in the Development Agreement/Association/Master Deed documents. Utility bills and maintenance costs are the responsibility of the developer and/or association.
- [] 59. If connecting to an existing system, provide calculations showing capacity of existing system based on as-built information.
- [] 60. All sump pump drains shall be indicated and must connect to a storm structure.
- [] 61. Minimum 2.5' of cover over system.
- [] 62. Storm sewer pipe material shall be shown (see Section VII).
- [] 63. Upstream/offsite drainage must be accommodated.

Detention

- [] 64. Supply preliminary calculations for site plan review per Wayne County Storm Water Management Standards latest edition. Detention volume required and provided calculations shall be shown.
- [] 65. Verify that a permanent four (4) foot water level is provided in the detention pond and is not included in storage volume calculations, except where a dry pond is required per FAA requirements.
- [] 66. Acceptable means of detention are open basins, underground storage systems, bioswales, and rain gardens.
- [] 67. A sediment forebay or other treatment structure (e.g. CDS System, Vortechtechnics) is required for all new detention systems.
- [] 68. Aerators shall be incorporated into detention basins and noted on the drawings.
- [] 69. Location and size of detention ponds shown with side slopes indicated.
- [] 70. Fencing is not required for dry detention ponds when the pond storage depth does not exceed five (5) feet, the side slopes are less than 1V:6H and the property is not a residential development. Building Department may require additional safety measures or external indemnification from applicant based on pond location and depth.
- [] 71. All detention ponds with a permanent pool shall be fenced as well as any dry ponds where side slopes exceed 1V:6H, the pond storage depth exceeds five (5) feet or the pond is located within a residential development. The detention pond fencing requirement may only be waived by City Council. Waivers shall be recommended by the Planning Commission.

Paving and Right-of-Way Improvements

- [] 72. On-site paving requirements:
 - a. Pavement cross-section must be shown. Minimums are:
 - [] 73. Commercial and multiple: 4" asphalt on 6" aggregate base or 6" concrete on 6" aggregate base.
 - [] 74. Industrial: 4" asphalt on 8" aggregate base or 8" concrete on 6" aggregate base.
 - [] 75. Minimum slope:
 - 1) Asphalt: 1.0%
 - 2) Concrete: 0.5%
 - [] 76. Maximum slope:
 - 1) Asphalt: 6.0%
 - 2) Concrete: 6.0%
 - [] 77. Concrete curb for entire perimeter of drive or parking areas.
- [] 78. Public right-of-way (City):
 - a. Pavement cross-sections must be shown with 6" aggregate base. Minimums are:
 - 1) Concrete major/collector road: 8" concrete.
 - 2) Asphalt major/collector road: 9 ½" asphalt.
 - 3) Concrete local road: 7" concrete.
 - 4) Asphalt local road: 8 ½" asphalt.
 - 5) "Class A" roads must adhere to county standards.
 - b. All public roads must have curb and gutter unless otherwise approved by the Administrative Review Committee.
 - c. Turning improvements, center-turn lane, acceleration lane and taper, deceleration lane and taper as necessary to facilitate traffic flow.

- [] 79. Sidewalks required along the frontage of all roads except in districts zoned “RE”.
 - a. Located 1’ from ultimate right-of-way line.
 - b. Sidewalk ramps noted, in accordance with A.D.A. standards.
 - c. All structures, hydrants, poles, etc., noted and moved or adjusted as necessary.

Site Grading

- [] 80. Sufficient proposed grades indicated to ensure that:
 - a. Drainage is adequately discharged offsite consistent with current drainage pattern.
 - b. No upstream drainage is restricted.
 - c. Paving slopes are adequate.
 - d. The site generally drains without standing water.
- [] 81. Elevation representing the brick ledge, finished grade and the first floor grade must be indicated.
- [] 82. Proposed grading will meet abutting property line elevations. Differentials in grade must incorporate a one on four maximum slope to the abutting property line.
- [] 83. Temporary easement from adjacent property owner will be required for any grading necessary on off-site property. Appropriate notes shall be added to the site plan if this is applicable with a letter of understanding submitted.
- [] 84. Location of any proposed retaining walls shall be shown on plans. Walls separating a grade differential of more than 18” are considered retaining walls and require a structural engineering design and review. Design engineer must supply calculations with engineering plan submittal (see Appendix F for retaining wall review guidelines).

G. Permit Requirements

Prior to scheduling a pre-construction meeting, the applicant must obtain all required permits and storm water maintenance agreements.

1. Building Permit:

Before any construction can begin, a building permit must be obtained from the City of Romulus. This permit will not be issued until construction plans have been approved by the Building Department, Department of Public Works, the City Engineer, and the Fire Department.

2. Soil Erosion and Sediment Control Permit:

Application and fee must be deposited with Wayne County. A permit from Wayne County for soil erosion is required before engineering plan approval.

3. City Right-of-Way Procedures and Fees Ordinance:

Anyone wishing to work in a City of Romulus right-of-way must apply for and obtain an approval from the DPW. This includes, but is not limited to, driveway construction and reconstruction and private utility work.

4. Michigan Department of Environment, Great Lakes, and Energy (Water Main):

Construction of a public water main requires a construction permit from the Michigan Department of Environment, Great Lakes, and Energy as well as the approval of the City of Romulus. Projects meeting certain criteria may also require approval from the Detroit Water & Sewerage Department. The proprietor will submit four (4) sets of plans and detail sheets, signed and sealed by the Michigan registered professional civil engineer responsible for the preparation of plans and specifications. A completed EGLE permit application must also be submitted. In addition, a tabulation of water mains consisting of their size, location, type and length will be prepared by the proprietor's engineer and submitted to the City.

A current EGLE permit application can be found at <http://www.michigan.gov/egle/>.

5. Michigan Department of Environment, Great Lakes, and Energy (Sanitary):

Construction of public sanitary sewer requires a construction permit from EGLE as well as the approval of the City of Romulus. Approval is also required from the Wayne County Department of Public Services (Wayne County checklist available at <http://www.waynecounty.com>) or the Downriver Utility Wastewater Authority (DUWA) checklist available at <https://duwauthority.org/>) depending on the project location within the City. The proprietor will submit three (3) sets of plans and specifications signed and sealed by the Michigan registered professional civil engineer responsible for the preparation of the plans and specifications. In addition, design flow computations for the proposed sewers and a tabulation of the capacities of the proposed sewers and the existing outfall sewer will be submitted by the proprietor's engineer, as well as one (1) copy of the completed EGLE permit application. The City Engineer will send three (3) sets of plans to Wayne County or DUWA as required by the project location and request

approval for an EGLE permit.

Wayne County reviews require a fee, payable by the developer.

A current EGLE permit application can be found at <http://www.michigan.gov/egle/>.

6. Wayne County Department of Public Services, (Roads):

All work in roads under the jurisdiction of Wayne County requires a permit from the Wayne County DPS.

7. Wayne County Department of Public Services, (Storm Drainage):

a. Connections to County Drains and Sewers:

A Wayne County construction permit is required for any connection to a county drain or enclosed storm system or for any other proposed work within a County drainage easement.

b. Connections to County Drains and Sewers in Wayne County Road Right-of-Way:

Wayne County policy requires that proposed storm sewer connections to existing storm sewers in the Wayne County right-of-way be maintained by the City of Romulus under a drainage permit issued to the City of Romulus by the Wayne County DPS (See Appendix B). The City must provide the County with a council resolution whereby the City agrees to accept jurisdiction and maintenance responsibility for the storm sewer connection and authorize a City official to sign the permit.

c. The City of Romulus will require a letter of agreement from the developer stating that he will reimburse the City for any costs incurred in the maintenance of the storm sewer if it becomes necessary.

8. Michigan Department of Environment, Great Lakes, and Energy (EGLE) (Wetlands, Inland Lakes and Streams):

It is the developer's responsibility to obtain EGLE permits as required under Part 303 (Wetland Protection Permit) and Part 301 (Inland Lakes and Streams Permit).

A current EGLE permit application can be found at <http://www.michigan.gov/egle/>.

9. Other Permits:

Other agencies from which the developer may need a permit must be designated on the approved plan. These permits are the applicant's responsibility and will be required prior to construction. Other possible agencies include, but are not limited to:

Michigan Department of Environment, Great Lakes, and Energy – N.P.D.E.S.

Wayne County Airport Authority

U.S. Dept. of Trans.-Federal Aviation Administration (See Appendix G)

Michigan Department of Transportation

Wayne County Health Department

H. Fees

All fees must be submitted to the appropriate department prior to beginning any plan reviews.

1. Site Plan Review Fee – paid to the Planning Department (contact the Planning Department).
2. Engineering Plan Review Fee – paid to the Building Department:
 - a. This fee must be deposited with the Building Dept. prior to plan review. This fee is non-refundable and approval cannot be given without its receipt.
 - b. The fee will be in accordance with the chart below. The total construction costs shall include grading/earthwork, water main, sanitary sewer, pavement, storm sewers and detention basins.

Construction Estimate	Consultant Review Fee	Bldg. Administrative Fee	Total Review Fee
<\$25,000	5.0%	0.50%	5.50%
\$25,000-\$50,000	4.0%	0.50%	4.50%
\$50,000-\$75,000	3.0%	0.50%	3.50%
>\$75,000	2.0%	0.50%	2.50%

- c. An itemized, unit cost estimate of the work activities listed above must be provided to the Building Department with the original engineering application and plan sets. This estimate must be signed and sealed by an engineer registered in the State of Michigan and must be approved by the City Engineer.
 - d. In the event this fee is not adequate, the applicant must submit an additional payment to cover further reviews. After notification by the City Engineer that this additional payment is needed, it must be posted with the next submittal at the Building Department. The review process will be put on hold until this payment is received.
 - e. All engineering reviews must be submitted to the Building Department for processing. The Building Department will forward plans to the City Engineer.
3. Soil Erosion Plan Review and Construction Observation Fee (Contact Wayne County).

4. Construction Observation Fee – paid to the Department of Public Works:

This fee must be deposited prior to construction to cover the costs of City Construction Observation. The fee is based on the construction cost of all water mains, sanitary sewers, storm sewers, and paving and sidewalks that require engineering Construction Observation. The construction cost will be defined as either the signed contract for the work or a sealed engineer's itemized estimate for the work approved by the City Engineer.

If Construction Observation services are needed by the City Engineer, a construction escrow shall be deposited as follows:

<u>Construction Cost</u>	<u>Inspection Escrow</u>
\$0 to \$25,000	10%
\$25,000 to \$100,000	\$3,000 + 7% of amount over \$25,000
\$100,000 to \$250,000	\$8,000 + 5% of amount over \$100,000
Over \$250,000	\$15,000 + 4% of amount over \$250,000

The construction escrow will be placed in an account and any unused monies will be refunded. If the construction escrow is not sufficient to cover the project costs, an additional fee shall be required prior to the acceptance of the infrastructure by the City or issuance of a final certificate of occupancy.

5. Building Permit Fee – paid to the Building Department (contact Building Department).

I. Insurance

Prior to construction, the owner and contractor must procure public liability and property damage insurance with a responsible insurance company. The insurance shall be maintained during the term of the project. This insurance must meet the approval of the City of Romulus and be in such amounts to adequately protect the public, the City of Romulus' interest, and will not be less than the limits set forth herein.

1. Type of insurance:

- a. Workmen's Compensation Insurance and Employer's Liability.
Limit: As required by laws of the State of Michigan

b. Public Liability and Property Damage:

- 1) Bodily Injury: Each Occurrence: \$500,000
Aggregate: \$1,000,000
- 2) Property Damage: Each Occurrence \$250,000
Aggregate \$500,000

Owner's and Contractor's Protective Liability and Property Damage:

- 1) Bodily Injury: Each Occurrence \$1,000,000
- 2) Property Damage: Each Occurrence \$250,000
- 3) Aggregate \$500,000 or combined single limit of \$1,500,000

Motor Vehicle, (including Owner, Hired and Non-Owned Vehicles):

- 4) Bodily Injury: Each Occurrence \$500,000
- 5) Property Damage: Each Occurrence \$200,000
- 6) Combined single limit: \$1,000,000

Policies must be provided to the City of Romulus for examination as to their validity and any undesirable exclusions deemed improper by legal opinion rendered to the City. Underground construction, where applicable, will be specified in the coverage. Certificates of coverage signed by the insurance carriers will include a guarantee that 30 days written notice will be given by the insurance carrier to the City of Romulus prior to cancellation of, or any change in the respective policies. In the event that the insurance is cancelled, operations will cease prior to the cancellation date and will not resume until evidence is provided that proper insurance is again in effect. Additional Named Insured under Owners and Contractors Protective & Public Liability and Property Damage Insurance will include the City of Romulus, the City Engineer and members of their staff, employees and agents for the City.

J. Pre-Construction Meeting

Prior to construction of any improvements, a pre-construction meeting will be scheduled by the applicant through the Romulus DPW to discuss the various project requirements. Prior to scheduling a pre-construction meeting, items such as insurance binders, permits, storm agreements, approved plan sets must be submitted for review and approved by the DPW. The owner, design engineer, underground contractor, paving contractor, and any other interested parties shall attend. Additionally, City department heads shall be invited by the DPW.

See Appendix A for pre-construction meeting guidelines.

K. Construction Observation

1. Full-time Construction Observation shall be required during the construction of subdivisions, private utilities within public right-of-way, site plan improvements and utility systems and roads located within the City. Such construction and improvements shall include, but not be limited to, water mains, sanitary sewers, storm sewers, storm water holding facilities, street paving, driveway pavements and pumping stations. Observation personnel shall be provided by the City or the City Engineer. All estimated costs to be incurred for services must be paid prior to the start of construction by the proprietor, owner or developer of the project to be constructed. All costs incurred by the City for observation shall be paid by the proprietor prior to final acceptance of the project by the City.

2. Three (3) working days prior to beginning any work, the owner or his contractor must notify the City DPW Construction Observation Coordinator at (734) 942-7579.
3. It shall be the owner's responsibility to provide soil and material testing to ensure that all construction methods and materials meet requirements of these standards. Such testing will be performed by a qualified testing laboratory or registered professional engineer acceptable to the City and/or the City Engineer. All testing shall be subject to the direction and review of the City Engineer.
4. Failure by the owner or his contractors or agents to strictly adhere to these standards, to use good engineering judgment during any phase of the work, or to conduct the work in accordance with the approved plans may cause the City or City Engineer to consider the work unacceptable.
5. Generally, one observer will be assigned to a particular project and will be responsible for that project until its completion. The contractor and the inspector may make arrangements for day-to-day Construction Observation. Any interruption or moratorium on the flow of work may result in a re-assignment of that inspector to another project and require the normal 2 working days notice before work is resumed.
6. The DPW and City Engineer will perform a final inspection at completion of construction. No infrastructure will be accepted by the DPW until all punch list items are complete. At the time of final inspection for all public improvements, the owner or his contractor will provide all necessary labor and equipment to allow the DPW to inspect the system. See Project Completion/Final Acceptance guidelines later in this section.

L. Bonds

A Performance Bond must be provided to the DPW prior to the scheduling of a pre-construction meeting unless waived by the DPW Director. The bond amount shall be 100% of the proposed site improvements including all utilities, paving, earthwork, and landscaping.

Before the City accepts the improvements, a two-year Maintenance and Guarantee Bond (see Appendix B), in an amount equal to 50% of the infrastructure construction cost, must be posted by the proprietor. Subdivisions require three-year bonds equal to 35% of the construction cost.

M. Easements

The applicant shall provide the City with necessary easements prior to final acceptance of infrastructure to allow maintenance of any water mains and/or sanitary sewers that are to be located on developed property and maintained by the City. The form of such easements shall be subject to approval of the City Engineer and the City Attorney. Sample easements are included in Appendix D. Sufficient evidence of title shall be provided by the grantor along with the easement in the form of a policy of title insurance, acceptable to the City Attorney, to show that the grantor of the easement is the owner of the property. All parties having a legal interest in the property shall execute and grant the easement. Water main easements shall be of a minimum 12-foot width. Sanitary sewer easements shall be of a minimum 20-foot width.

N. Project Completion/Final Acceptance

The following items must be completed before improvements are accepted by the City:

1. For public roads constructed as part of a subdivision or otherwise, the following shall apply. In no case will a partial acceptance of any street be made for maintenance.
 - a. Quit Claim Deed and necessary easement documents recorded, or final plat recorded.
 - b. Approximately 80% of the homes constructed for subdivisions.
 - c. All City utility structure covers including water service shut-off boxes and sewer cleanouts installed and adjusted to final grade.
 - d. Developer's engineer must issue certification letter to the DPW with a copy to the City Engineer that improvements have been made per the approved plan.
 - e. Right-of-way restoration complete with vigorous growth within greenbelts.
 - f. Public utilities within right-of-way accepted (see below).
 - g. Storm sewers completely cleaned with soil erosion measures removed.
 - h. Striping and signing complete.
 - i. Releases provided from all other permit agencies.
 - j. See items 2 – 9 below.
2. Final Inspection scheduled and completed by the DPW and City Engineer with all punch list items addressed.
3. Maintenance and Guarantee Bond, submitted for all new infrastructure (see Appendix B). Subdivisions require three-year bond at 35%. Other developments require two-year bond at 50%.
4. All easement documents must be submitted to the DPW for review prior to recording (see Appendix D).
5. Public sanitary sewer and public storm sewer must be taped, reviewed and approved by the DPW.
6. As-built plans must be submitted to the DPW in electronic form for review and approval. (see Appendix A).
7. Storm maintenance agreements must be signed by all parties.
8. Site Grading/Setback Certification submitted by the developer's engineer (see Appendix E).
9. Any outstanding fees must be paid.

II. General Requirements for Engineering Reviews

A. General Procedures

1. Prior to the issuance of a building permit, the plans must first receive approval from the Building Department, DPW, City Engineer, and Fire Department.
2. One (1) complete set of site engineering plans and an electronic file of the plans will be required, depending on the various agencies influenced by the proposed development. The plans will be received at the Building Department, 12600 Wayne Road. All plans must be signed and sealed by an engineer registered to practice in the State of Michigan.
3. One (1) copies of a detailed, itemized construction cost estimate for all earthwork, water main, sanitary sewer, paving and drainage improvements must be submitted to the Building Department at the time of plan submittal. The estimate must be signed and sealed by an engineer registered to practice in the State of Michigan.
4. On all projects for which phasing of construction is intended, a separate plan sheet shall be included in the construction drawings which breaks down all improvement quantities by item; items shall include sidewalks, storm sewer, landscaping, pavement base and wearing courses, and utilities for each phase. Such phasing limits shall match those approved by the City Planning Commission.
5. The Building Department will forward the plans to all other concerned departments that may have jurisdiction over a certain phase or area of the site. The review comments of these other departments will need to be addressed by the developer as a part of the review process.
6. After completing the review, the City Engineer will issue a review letter to the design engineer with revisions and/or corrections. Revisions and/or corrections may include notes and/or markups on the electronic plans and forwarded to the design engineer for clarification. Directions will be given at that time as to how many plans must be resubmitted.
7. The plans will be reviewed again and revisions must be made as required.
8. Prior to engineering plan approval, all permits and storm water agreements must be forwarded to the City Engineer.
9. Upon Engineering, DPW, and Fire Department approval, notification will be given to the Building Department that the site-engineering plan is approved. An approved plan will be returned to the Building Department, the DPW and owner.
10. Partial approvals will generally not be given. All revisions on all elements of the project must be made prior to engineering approvals.
11. Approval will not be given until all required fees have been deposited.

B. General Plan Requirements

1. Construction cost estimate shall be submitted with plans. The estimate shall be sealed by the design engineer. City Engineer will review estimate. Approved estimate will be sent to DPW Inspection Coordinator.
2. Submittal on 24" x 36" white paper having blue or black lines with a minimum horizontal scale of 1" = 50' and vertical of 1" = 5'. Other acceptable scales are 1" = 20', 1" = 30' and 1" = 40'. Scales shall be shown with graphical bar scale.
3. General plan at 1" = 100' or 1" = 200' when size of site prohibits a single plan sheet. Show street names, units, utilities, pavement, site dimensions, phase lines, lot lines and lot numbers. Scales shall be shown with graphical bar scale.
4. Location map showing section number and major thoroughfares, drawn with appropriate scale not greater than 1" = 100' nor smaller than 1" = 2000'.
5. Lot number, parcel dimensions and adjoining rights-of-way.
6. Plans must be prepared under, signed and sealed by a professional engineer registered in the State of Michigan. All correspondence concerning the design of the site will be directed to the engineer whose seal appears on the plan.
7. Title sheet showing:
 - a. Project title
 - b. Location map
 - c. Index of plan sheets
 - d. Symbol legend
 - e. Plan completion date with most recent revision dates
 - f. Name, address and phone number of engineer and the owner
8. Legal description of property that closes within acceptable limits.
9. Setbacks and building separations noted in accordance with zoning requirements.
10. Striping plan for parking lot areas in accordance with zoning requirements.
11. Walls or berms, as required by zoning, must be shown in cross-section. Walls separating a grade differential of more than 18" are considered retaining walls and require a structural engineering design and review. Design Engineer must supply calculations with engineering plan submittal. (See Appendix F for retaining wall review guidelines)
12. The storm sewer, sanitary sewer and water main shall be shown on the same plan view.
13. Title block for each sheet.

14. Include landscape plans. Plantings must not interfere with utilities.
15. Adequate space must be provided to allow for turning movements of vehicles including trucks and fire engines.
16. North arrow, graphical bar scale, and MISS DIG notice on all sheets.
17. Concrete pads provided for trash dumpsters. Trash dumpsters cannot be closer than 15' to buildings.
18. Utilities must be a minimum of 10' from buildings.
19. Proposed locations of gas, electric, cable, phone, etc. must be shown on the plans. These must be located in rear yards on residential sites.
20. BZA approval is required for batch plants located in or around the development.
21. If final site plan is approved prior to engineering approval and changes are made to easements, right-of-way., etc., the final site plan and master deed will need to be revised.

III. Topography

A. General

1. A complete topographical survey is required for all sites. Existing off-site elevations must be given at a minimum of 50' and 100' outside the entire perimeter of the site. Grades will be indicated at all property corners and along all property lines. On-site, intermittent elevations or defined contours are required to establish the existing site drainage.
2. All existing conditions will be indicated. Locations and elevations must be given on the following:
 - a. Existing drainage courses, ditches and culverts.
 - b. Sidewalks.
 - c. Finished grades of all adjacent buildings.
 - d. All easements.
 - e. Trees.
3. Show existing utilities (invert and casting elevations), gas main, electric lines, phone lines, cable lines, and power poles.
4. Two USGS NAVD 88 benchmarks are required. All elevations shown on plan must be to USGS datum.
5. Road topography will extend across the entire site with grades shown on both sides of the street for:
 - a. Property line.
 - b. Ditch centerline.
 - c. Top of bank.
 - d. Edge of shoulder.
 - e. Edge of pavement or top of curb.
 - f. Crown or centerline.
 - g. Existing and proposed right-of-way. per the Master Plan.
6. Property lines must be indicated by distances and bearings where applicable.
7. Existing and proposed rights-of-way of adjacent roads must be indicated.

IV. Soil Erosion

A. Sites Requiring Permits

All sites having a construction area of one or more acres require a Soil Erosion Permit. All sites within 500' of a natural drainage course require a Soil Erosion Permit. Wayne County Department of Environment handles the soil erosion reviews and inspections within the City of Romulus.

B. Intent of Permit

The intent of this requirement is to ensure that no silt or sediment enters the public stream or watercourses. This is accomplished through means of silt fences, filters, diversions, etc.

C. Plan Requirements

Contact Wayne County Department of Environment. See <http://www.waynecounty.com> for more information.

D. Construction Observation

1. Construction Observation will be made periodically by Wayne County throughout construction on the maintenance and effectiveness of soil erosion control methods.
2. If Construction Observation reveals that the controls are not being implemented, a cease and desist order on all site construction may be issued.

V. Water Main

A. General

1. When construction of a public water main is proposed, the City of Romulus standard water main detail sheets must accompany the plans.
2. A quantity list itemizing all proposed public water main construction must appear on the cover sheet or first sheet of the plan set.
3. Open trench water main pipe shall be installed with a continuous, 12 gauge copper wire, Copperhead sheathed wire (part #1230-HS), or Engineer approved equal. Tracer wire shall have an average tensile strength break load of 400 pounds minimum and shall be insulated with a minimum 30 mil HDPE coating. See Appendix J for additional tracer wire requirement on trenchless pipe installations.
4. Provide 6 feet of cover below existing pavement centerline or ground at water main location, whichever is lowest when proposed water main is within 32 feet of centerline on section line roads, or within 19 feet of centerline on ¼ line roads. Provide 6 feet cover below existing road centerline or ground at water main location, whichever is lowest at all other locations unless otherwise noted.
5. Use of 90° bends placement must be approved in writing by the City.
6. Vertical separation shall be at least eighteen (18) inches between the water main and other utilities (top of pipe and bottom of pipe elevations must be indicated at crossings). A minimum lateral separation of ten (10) feet shall be maintained between the water main and sewers.
7. Water mains will be located so that they provide unrestricted access for maintenance and inspection. The water main and sanitary sewer will be located on opposite sides of the street wherever possible.
8. Water mains shall, whenever feasible, be constructed outside of paved parking areas, streets and drives. Water mains shall not be placed under any building foundations. The distance between water main and building structures shall be a minimum of ten (10) feet.
9. Water main shall be located along property lines where feasible. Otherwise, water main stubs shall be provided to property lines at locations designated by the DPW or City Engineer for future extension.
10. All water main crossing paved public streets shall be bored and jacked unless otherwise approved by the DPW Director or City Engineer. Length, size and invert of the casing pipe shall be shown at all bore locations.
11. No secondhand or salvaged materials or equipment will be permitted. Pipes and fittings must be made in the U.S.A.
12. Where required by the City Engineer or DPW, exploratory borings and laboratory tests shall be provided by the developer. Boring locations shall be indicated on the plans.

13. Water main design, relative to pipe bedding and locations, shall reflect the proper selection of materials and construction method compatible with the field conditions. Areas which show unsatisfactory ground material for pipe bearing or possible chemical deterioration due to soils shall be avoided, or the pipe shall be suitably installed on adequately designed bedding and enclosed in protective wrap or coating.
14. All mains, fittings, valves, and hydrants shall be dimensioned from property lines, right-of way lines, buildings or another coordinate system.
15. Profile views are required for water mains larger than twelve (12) inches in diameter, for water mains parallel to major and collector streets, at crossings with other utilities and for other sizes when determined necessary by the City Engineer or DPW Director. Profiles shall include the following information:
 - a. Length between appurtenances, type and class of pipe.
 - b. Top of casting elevation on gate wells.
 - c. Special backfill areas. (i.e. sand)
 - d. Utility crossings (18" minimum clearance).
 - e. Existing and proposed ground elevations.
 - f. Progressive numbering system of structures.
16. Pipe size, length between appurtenances, and type of pipe shall be shown in plan view.
17. Water mains in cul-de-sacs shall extend around proposed cul-de-sacs so that each lot has a public water main across the front. Water main shall be not be constructed under pavement in cul-de-sacs.
18. Hydrants and valves shall be located on extensions of lot lines whenever possible.

B. Sizes and Distribution

1. The minimum size diameter of water main allowed in the City of Romulus is eight (8) inches. Six (6) inch mains may be used only for single fire hydrant leads having a maximum length of 40 feet. Ten (10) inch mains and fourteen (14) inch mains are not allowed. Maximum dead-end mains are as follows:
 - a. 400' for 8" mains.
 - b. 1,000' for 12" mains.
2. Six (6) inch water mains are not permitted. Hydrant leads shall be not less than six (6) inches in diameter. Six (6) inch leads shall be not more than 40 feet in length. Eight (8) inch leads will be required on rights-of-way wider than 40 feet when the hydrant is located on the side opposite the main. No hydrant leads may be connected to six (6) inch dead-end mains. All hydrant leads shall have a valve.

3. Reducers shall not be used to meet the dead-end requirements.
4. A twelve (12) inch water main may be considered as minimum for internal transmission on industrial and multiple sites, major streets, collector streets and elsewhere as design dictates and/or as recommended by the City of Romulus' most recent water system study.
5. All dead-end mains must end with a flushing hydrant then a gate valve and well.
6. Looping of mains is required with a gate valve that must be well positioned between two connection points ("true loop").
7. Show water service and size. No private services are allowed from 6" hydrant lead or water mains larger than 24" in diameter.
8. The extension of water main will be required across the entire frontage of the site.

C. Valves

1. Valve operation shall be in accordance with the ordinance of the City of Romulus, section 62 – 369 to 378.
2. Gate valve spacing will be generally regulated by providing the following provisions in event of a breakage:
 - a. No more than a 24 single family units will lose service.
 - b. No more than 30 multiple units will lose service.
 - c. No more than two hydrants will be out of service.
 - d. No more than four valves will have to be closed to isolate the break. Where possible, three valves should isolate the break.
 - e. On line valve spacing will be a maximum of 800'.
3. Gate valves shall be located near intersections and positioned outside of sidewalks or driveways.
4. Curb stop and boxes shall be located outside of paved areas.
5. All gate valves except those at hydrants shall be installed in wells. Gate valves at hydrants shall be installed with a three-piece adjustable valve box.
6. Valves and wells shall be placed on all dead-end mains for future extensions.
7. Plans shall indicate finished grades for tops of all gate well castings.
8. Connection of new mains to existing mains shall be provided with a tapping sleeve, valve and well unless the connection can be made without interrupting service on the main.

D. Automatic Fire Sprinkler Service Connections

1. Where building fire suppression is required, a separate fire protection line shall be provided in addition to a domestic service for each building. Individual shutoff valves shall be provided within a public water main easement. Fire lines shall be a minimum of six (6) inches. For more information on the requirements for fire protection the applicant should contact the City of Romulus Fire Department.
2. Where building fire suppression is required, an eight (8) inch diameter water main must be provided on the property with a fire hydrant within 75 feet of the Fire Dept. connection to the building fire suppression system. A Fire Department five (5) inch Storz connection must be provided.
3. In no case should hydrants be placed downstream of any backflow device used for automatic sprinkler protection.
4. Building fire suppression systems are not a substitute for standard requirements for hydrants.
 - a. Flow meters on private water systems including those for fire suppression purposes must include RPZ and meter which measures flows in cubic feet.
 - b. Meters greater than 2" will require DPW approval.
 - c. Installation of any meter greater than 2" shall be observed by the DPW

E. Hydrants

1. In all cases, the visibility of the hydrant shall be considered. No parking shall be permitted within a fifteen (15) feet radii of the hydrant. Additionally, hydrants shall be placed no further than 20' off edge of pavement/curb for road projects.
2. Fire hydrants shall be located so that immediate access can be made by the fire fighters and fire apparatus. Obstructions such as fences, bushes, trees, walls, or other similar objects shall not be permitted for new or existing installations. Fire Department will comment on hydrant locations.
3. Hydrants shall not be located within a bermed area. Hydrants shall be located on building side of berm.
4. A five (5) inch Storz connection shall face the street centerline unless otherwise directed by the Fire Chief or designee for public mains. When hydrants are installed on private mains or serving commercial industrial, and/or multiple residential areas, a five (5) inch Storz connection shall face the Fire Department access route (drivable surface) as approved by the Fire Department.
5. All hydrants shall be accessible by a hard surfaced roadway, capable of supporting fire apparatus and equipment weighing up to 40 tons.
6. All adjustment of hydrants shall be completed prior to pressure testing.

7. Fire Lanes shall be designated by the Fire Chief when deemed necessary.
8. Plans shall indicate finished grades for all hydrants.
9. Public Right-of-Way

Spacing of Hydrants:

The process of locating and spacing fire hydrants shall be as directed by the Fire Chief or designee. In streets serving detached single and two family dwelling unit buildings, maximum hydrant spacing shall be 500 feet. In streets serving all other land uses the maximum spacing shall be 500 feet. Spacing of hydrants shall be along normal drive routes. Placing of Hydrants:

Where near a street intersection, hydrants shall be located 15 feet from the intersecting street right-of-way. Hydrants shall be placed within 15 feet of the curb line or shoulder with 3 to 5 feet preferred to allow access by Fire Department equipment. Where a ditch lies between the hydrant and curb or shoulder, a culvert (minimum length 20 feet) shall be installed in the ditch and placed to allow access to the hydrant. The hydrant shall be located within 5 feet of a hard surface property access drive. In all cases hydrants shall be located in highly visible and accessible locations and be consistent with existing patterns when in accordance with these guidelines.

A minimum of two (2) fire hydrants are required for a development with a proposed cul-de-sac or dead end. One shall be located at the intersection and one at the end of the cul-de-sac or dead end.

10. Private Sites

Coverage:

- a. Detached single and two-family dwelling unit buildings and buildings less than 5,000 square feet and moderate to light fire loading: Hydrants shall be placed in the street right-of-way so that all parts of the building are within a 500 foot radius of the hydrant.
- b. All other developments, buildings and structures: No part of any building or structure shall be more than 250 feet from a hydrant unless the structure has an internal sprinkling system and Fire Department approval is given. The distance shall be measured along the shortest feasible and drivable exterior route for laying fire hose.
- c. The distance measured for laying hose to off-site hydrants shall be the route required for the Fire Department vehicle to drive from the fire to the hydrant. Only public hydrants will be considered for off-site use. If off-site hydrants are within fifteen (15) feet of vehicle access from the subject property, the access points must become an easement dedicated to the City. If access roads to hydrants cross property lines, fire lanes must be established.

Placing of Hydrants:

Hydrants shall be located at least fifty (50) feet from the exterior wall of the building unless building height dictates otherwise (height plus 1/3). Driveways capable of accepting Fire Department equipment shall be provided adjacent to the hydrants. Hydrants shall be placed no closer than five (5) feet to walls, earth mounds, berms, fences and other such obstructions. Four (4) inch diameter steel pipes filled with concrete shall be provided in parking lot and drive areas to protect hydrants from damage by vehicular traffic. Such pipes shall be four (4) feet above the ground and four (4) feet below the ground for a total of eight (8) feet in length. The arrangement of the pipes is subject to approval by the Fire Department. The Fire Department may allow curbing in lieu of the pipes.

F. Wood Frame Construction

No building permits will be issued for wood frame construction above the foundation for any development prior to the required mains and hydrants being put into service. Adequate access for fire fighting equipment must also be provided. No occupancy will be allowed without the required mains, hydrants and sprinklers in active service.

G. Dedication of Water System and Easements

1. All water main systems (excluding building service leads) shall be dedicated to the City for maintenance and operation, unless the system is intended to be private. The dedication of the water system must be in accordance with the Project Completion/Final Acceptance guidelines outlined earlier in this manual. Private water systems must be metered at property line ("Hot Box" or approved equal).
2. All public water mains must be located in an easement or public right-of-way. Sample easement forms are included in Appendix D. The minimum easement width will be twelve (12) feet. Easements shall extend to front, rear, or side property lines when applicable to extend future water main. The City's Engineer will review the easement documents once the water main is installed.
3. The dedication of the easement will be required prior to City acceptance of the system.
4. Permanent structures of any type, including but not limited to, trees, light poles, drainage structures, etc., will not be allowed within the influence of public easements.
5. The easement descriptions shall encompass hydrant leads and shall extend a minimum of ten (10) feet beyond the hydrant on any lead. The easement documents shall contain a provision prohibiting the construction of or locating of any above ground structures within the limits of such easements.

H. Joint Restraint

Approved restraint systems will be provided at all bends of 11 ¼ degrees or greater, behind tee outlets, at hydrant shoes, at plugs or caps, and at any crosses where necessary to prevent lateral movement of the pipe. Field Lock joints are preferred over thrust blocks. Where thrust blocks are approved for use by the DPW Director, they will bear against undisturbed earth in all

instances and will have enough bearing area to develop the full resultant axial thrust of the pipe at test pressure. See Division N for description of approved joint restraint systems.

I. Meters

Meters up to two (2) inches are provided by and installed by the Romulus DPW. Meters larger than two (2) must be provided by the developer and be current Neptune technology with radio read and installation witnessed by the City of Romulus. Exterior meters for private water systems must be housed in “Hot Boxes” or approved equal. No secondary or deduct meters are allowed.

J. Testing and Sterilization

- a. (See Chapter X – Construction Specifications)

K. Backflow Prevention

All lawn sprinkler, irrigation systems, and commercial (non-residential) water services connected to the municipal water supply system must be equipped with suitable RPZ backflow preventer in compliance with the Michigan Department of Public Health and the Wayne County Health Department and Romulus Building Department.

L. Utility Crossings

1. A minimum of eighteen (18) inches of clearance shall be provided between the water main and existing underground utility unless otherwise allowed by the DPW Director or City Engineer.
2. Whenever a main is installed under any existing utility line such as gas, buried electric power, telephone line, sewer or water, provisions shall be made to properly support or distribute any concentrated load to avoid settlement and possible failure of the lower main. Such provisions shall consist of concrete bedding of the main, complete concrete encasement, or some other method as shown on the plans.

M. Road and Railroad Crossings

1. Where water main is to cross under a railroad, the water main shall be installed within an encasement pipe as specified by the railroad. Details must be provided which include encasement pipe thickness and diameter, skid supports, depth of bury and all other information required by the railroad.
2. Where water main is to cross under a road, the water main shall be installed within an encasement pipe as specified by the agency having jurisdiction of the road. Details must be provided which include encasement pipe thickness and diameter, skid supports, depth of bury and all other information required.

N. Materials

1. Mains – Ductile Iron

- a. Ductile iron pipe will be manufactured in accordance with ANSI A21.51 and AWWA C-151, latest revision thereof. Pipe will be standard wall thickness Class 54 for pipe diameter of three (3) inch through twelve (12) inch inclusive. Pipe shall be Class 56 for diameters sixteen (16) inches and larger. Poly-wrap will be required to protect the pipe as directed by the City Engineer.
 - b. Pipe interior will be standard cement double thickness lined in accordance with AWWA Specifications C-104 and ANSI Standard A21.4, latest revision thereof. Pipe exterior shall be seal-coated with an approved bituminous seal coat.
- 2. Mains – Fusible polyvinyl chloride (PVC)
 - a. Pipe shall be blue in color.
 - b. C 900 Fusible PVC Pipe, DR-14:
 - c. 4" – 12": ANSI/AWWA C900, FM 1612;
 - d. Pipe Compound: ASTM D1784 Cell class 12454
 - e. Gasket: Fusible
 - f. Testing: 4" – 12": ASTM D-638
 - g. Certifications: ASNI/NSF Standard 61; 4" – 12": NSF14 and 61
 - h. Hydrostatic Testing: AWWA C605 and manufacturer provisions for water allowances per gasket/joint.
 - i. Installation: AWWA C605 (latest version).
 - j. Use of bell and spigot PVC pipe is not allowed unless authorized in writing by the City of Romulus.
- 3. Joints
 - a. Joints for ductile iron pipe will be push-on type conforming to ANSI A21.11 and AWWA C-111 standard specifications. Sealing gaskets and lubricants for joints will meet pipe manufacturer's specifications.
 - b. Joints between plain end PVC pipes shall be made by butt fusion, using only procedures that are recommended by the pipe Manufacturer. External beads shall not be removed.

Joints between any combination of PVC, HDPE, or ductile iron shall be made with ductile iron fittings. Where joint restraint is required, mechanical joints incorporating the restraint (Megalug) system will be used. Joint restraint fittings shall be clearly marked or color coded for use with DI or PVC pipe accordingly.

Ductile Iron Pipe: MEGALUG Series 1100 joint restraint for Ductile Iron as manufactured by EBAA Iron, Inc. or approved equal.

PVC Pipe: MEGALUG Series 2000 joint restraint for PVC as manufactured by EBAA Iron, Inc. or approved equal.

- c. Mechanical type joints shall be in conformity to AWWA C-111 and ANSI A21.11 "Rubber Gasket Joints for Ductile Iron Pressure Pipe and Pipe Fittings." The bolts shall be of the high strength, low alloy steel type.
- d. Ductile iron "Swivel" Ells, adaptors and glands, as manufactured by Tyler Pipe, shall be utilized for fire hydrant connections.
- e. "Foster Adaptor" valve and fitting restraints may be utilized to facilitate joint assemblies.

4. Fire Hydrants

- a. Fire hydrants shall be EJ model 5-BR 250 conforming to AWWA C-502 Standard for Dry Barrel Hydrants or approved equal.
- b. Hydrants shall open counterclockwise with a directional arrow cast in the bonnet. Operating nut shall be a 1-1/8 inch P/F pentagon. Hydrants shall have a 5 1/4 inch seat valve, a 6 inch mechanical joint hub and double operating stem O-ring seals.
- c. Hydrants shall be equipped with one 3 3/4 inch I.D. pumper nozzles and one 5-inch Storz with solid cap and chain. Hydrants shall be suitable for a 6 foot bury and be painted red.
- d. Contractor must use fittings to achieve a 6 foot bury.
- e. Hydrants must be placed vertical and plumb.
- f. There must be 21 inches from finish grade (ground) to the center of the pentagon on cap of nozzle outlet.
- g. All hydrants will be constructed with a companion gate valve in a three-piece, adjustable cast iron valve box.
- h. Plans will indicate the finish grade of all hydrants.

5. Gate Valves

- a. Gate valves shall be manufactured in conformance with the requirements of AWWA C515.

The valves shall be ductile iron body with bronze stems. The valves shall be of the resilient wedge type. Valves shall be non-rising stem type, arranged with two-inch square nuts for key operation. Stuffing boxes shall be equipped with two O-rings on the stem located above the thrust collar that are replaceable under pressure. Valves are to open in a clockwise (right) direction.

All parts of the valves that affect opening and closing of the mechanism shall be in accordance with the American Water Works Association standards.

Wedges shall be ductile iron and fully rubber encapsulated in accordance with ASTM D429.

6. Tapping Sleeve and Valve

- a. Tapping sleeves shall be JCM Style 432 all stainless-steel tapping sleeve or approved equal.

7. Valve Wells

- a. All gate wells will be constructed of concrete, precast reinforced concrete sections in accordance with City standard details. Precast reinforced concrete gate well sections shall conform to ASTM C478.
- b. Gate well floors will be of 3500 psi reinforced concrete with at least three (3) inches protruding from the periphery of the well wall. The minimum floor thickness will be eight (8) inches.
- c. Gate well covers and frames will be EJ #1040Z frame with 1040C cover or approved equal. Covers will have the words "DEPT OF WATER SUPPLY" in two (2) inch letters spaced in from the periphery of the cover.
- d. Valves in gate wells will be at least six (6) inches above floor of gate well, supported with either brick or formed concrete.
- e. Extension stems and stem guides shall be provided in each valve well wherein the valve operating nut is further than five (5) feet below the top of the valve well cover. Extension stems shall extend to within five (5) feet of the top-of-cover elevation.
- f. Brick shall, as a minimum, conform to ASTM C32, Grade MS, or ASTM C55, Grade U-L.
- g. Manhole steps shall be reinforced polypropylene plastic No. PS2-PFS as manufactured by M.A. Industries, Inc., cast iron No. 8500 as manufactured by EJ, or approved equal.
- h. Grade rings shall conform to ASTM C478 and shall have a minimum thickness of three (3) inches.
- i. Mortar for use in structures shall conform to MDOT Specification 702, Type R-2.
- j. Corporation stops shall be installed in gate well on both sides of the valve.

8. Thrust Blocks

- a. Where specifically allowed by the DPW Director, thrust blocks will be made of 3000 psi concrete and be of adequate size and shape to resist all design working and surge pressures to which the main will be subjected.
- b. Where specifically allowed by the DPW Director, thrust blocks must be provided where necessary to prevent lateral movement of the pipe. Thrust blocks shall bear against undisturbed earth in all instances and shall have sufficient bearing area to develop the full resultant axial thrust of the pipe at test pressure.

Water Services

- a. Water services up to two (2) inches shall be Type K seamless copper tubing conforming to ASTM B-88 Standard Specification for Seamless Copper Water Tube. Services three (3) inches and larger shall be ductile iron Class 54.
- b. Polyethylene must be used for services longer than 100 feet. Polyethylene water service tubing shall conform to AWWA C901 Standard for Polyethylene Pressure Pipe and Tubing. Tubing shall be of a minimum 200 psi pressure class with a minimum burst pressure of 630 psi. Tubing shall be of the same outside diameter as copper and be compatible to existing copper lines.
- c. A minimum size of one (1) inch will be required for residential construction. Other allowable sizes are one and one half (1- ½) inch and two (2) inch. Three (3) inch, four (4) inch, six (6) inch and eight (8) inch services may be used for commercial and industrial construction.
- d. A tracing wire must be installed with polyethylene services.

9. Fittings

Fittings will conform to AWWA C110 (ANSI-A21.10) standard specifications for gray or ductile iron fittings or AWWA C153 (ANSI 21.53) for compact fittings.

10. Curb Stop and box

Curb Box shall be two-piece Minneapolis style EJ , Ford Meter BoxEM Series, Mueller H Series, or approved equal.

Curb Stop Valves shall be Minneapolis style, compression fitting, copper tube size, Mueller Mark II Oriseal Series, Ford Meter Box B44 Series, or approved equal.

The City shall be notified within 24 hours of any water main tie-in. In no meter is installed at the time of tie-in, a per day fee will be assessed until a meter is installed.

VI. Sanitary Sewer

A. General

1. Where public sewer construction is proposed, the City of Romulus standard sanitary sewer detail sheets must accompany the plans.
2. Public sanitary sewers (10" min.) are required when two or more connections are made to the same sewer. In most instances, including multiple unit developments, the sewer may have to be public even though the project has one owner. Multiple connections (more than one) to a sanitary lead or riser are not acceptable.
3. Open trench sewer pipe shall be installed with a continuous, 12 gauge copper wire, Copperhead sheathed wire (part #1230-HS), or Engineer approved equal. Tracer wire shall have an average tensile strength break load of 400 pounds minimum. The wire shall be insulated with a minimum 30 mil HDPE coating. See Appendix J for additional tracer wire requirement on trenchless pipe installations.
4. Public sanitary sewers require permitting through Wayne County or Downriver Utility Wastewater Authority, and EGLE.
5. The extension of the sanitary sewers will generally be required across the entire frontage of the site.
6. All construction must conform to the current Standards and Specifications of the City of Romulus.
7. A quantity summary itemizing all proposed public sanitary sewer construction must appear on the cover sheet or first sheet of the plans.
8. Downspouts, weep tile, footing drains, or any conduit that carries storm or groundwater will not be allowed to discharge into the sanitary sewer system.

B. Design

1. Sewer design flow computations must be submitted to the City Engineer for approval with a map of the area to be serviced. Developmental phases, present and future, with acreages and off-site areas contributing, must be shown with the number of lots included. This information must be shown on the plans.
2. Sewer capacities will be based upon 400 gallons per capita per day for laterals and 300 gallons per capita per day for trunks. In general, the current "G.L.U.M.R.B. Recommended Standards for Sewage Works" for the design of sanitary sewers will be followed.
3. For residential developments of single homes, design population will be at least 3.5 persons per prospective building.

In developments for housing of other types, institutions, commercial, and industrial developments, see the Unit Use Factor table in Appendix C.

4. Minimum size for residential sanitary sewer will be ten (10) inches in diameter. Minimum size for industrial sanitary sewer will be twelve (12) inches in diameter.
5. Minimum design velocity for sanitary sewers will be 2.0 feet per second with pipe flowing full. The 0.8 depth flow line of sewers will be matched at manholes when changing sizes of sewers.
6. Flows shall be compared to existing downstream sewer capacity to assure available capacity present for proposed development.
7. Maximum design velocity for sanitary sewers will be 12 feet per second with pipe flowing full.
8. Hydrogen sulfide protection shall be provided where applicable. The extent of the protection will be determined by the DPW on a case-by-case basis.

C. Grade

1. The following table represents the minimum and maximum grade for public sanitary sewers. Note that these are minimum and maximum requirements and will generally be used only when topography requires it.

Size	Standard Grade	Minimum Grade	Maximum Grade
10"	0.60%	0.30%	6.2%
12"	0.40%	0.22%	6.0%
15"	0.24%	0.16%	3.6%
18"	0.18%	0.12%	2.8%
21"	0.14%	0.10%	2.2%

2. All upstream dead-end sewers will have a minimum last run grade of 1.0%.

D. Manholes

1. The minimum size of a manhole shall be 48" in diameter.
2. Manholes will generally be placed at intervals of 300 feet, at every change of grade, direction, pipe size and at each junction of sewers. Maximum distance between manholes will be 400 feet for sewers 36" diameter and smaller.
3. Whenever there is an increase in pipe size, the grade will match at a line 0.8 of the diameters above the inverts.
4. An allowance of 0.1 feet in grade will be made for loss of head through a manhole at deflections of 30 degrees or more.
5. Manholes shall not be located in the influence of sidewalks or drive approaches.
6. All structures shall be dimensioned from property corners, property lines, right-of-way lines and buildings or another coordinate system.

E. Depth of Sewers

1. Minimum depth of cover to top of pipe will be four (4) feet.
2. Generally, the minimum depth of invert below finish grade of the building to be served will be 10 feet unless otherwise approved. Deep setbacks or unusual conditions may require more depth.
3. The maximum depth to invert of any sanitary sewer will not exceed the depth recommended by the manufacturer for each size and class of pipe.

F. Location

1. Sanitary sewers will be located so that they provide unrestricted access for maintenance and Construction Observation. A minimum alignment separation of ten feet must be maintained between the sewer and all water mains. The water main and sanitary sewer will be located on opposite sides of the street wherever possible.
2. The distance between sanitary sewer and building structures shall be a minimum of ten (10) feet.
3. All public sewers must be located in a public right-of-way or an easement. Sample easement forms are included in Appendix D. The easement size will vary individually as required for maintenance and access. The minimum width of sanitary sewer easement will be 20 feet. The City's Engineer will review the easement documents once the sanitary sewer is installed. The dedication of the easement will be required prior to City acceptance of the system for continuous maintenance and service. (See Project Completion/Final Acceptance guidelines)
4. Permanent structures of any type, including but not limited to, trees, light poles, drainage structures, etc., will not be allowed within the influence of public easements.

G. Leads

1. Service leads will be a minimum of six (6) inches in diameter with a minimum slope of 1%. Service leads shall be made of PVC schedule 40 pipe.
2. Private sanitary sewer leads of excessive length, although not a public sewer, may require inspection and testing. Each site will be considered individually by the DPW.
3. Cleanouts will be provided within 5 feet of foundation walls, at all bends, and at intervals no greater than 100 feet.
4. Invert elevations at the building or the finished floor grade of the building shall be indicated on the plans.
5. Sanitary lead connections shall be made on the public sanitary line. Connections may not be made at a manhole.
6. Show building lead length, size, location and invert elevation at building and finish grade of building. Check for conflicts in elevation with other utilities.

H. Plan and Profile

1. All sewers and services over 8" in diameter must be shown in profile.
2. The following information will be indicated on the sanitary sewer profile:
 - a. Length of run between manholes.
 - b. Type and class of pipe between manholes.
 - c. Size and slope of pipe between manholes.
 - d. Top of casting and invert elevations of all manholes, manhole type, and diameter.
 - e. Existing and proposed ground elevation along the route of the sewer. Existing profile obtained from actual field survey data.
 - f. Progressive numbering system (increasing in direction opposite of the direction of flow).
 - g. All utility crossings, (minimum clearance 18").
 - h. Location, by station, of all building sewers, wyes branches or tee inlets, to be constructed or installed concurrently with proposed sewer construction.
 - i. Required risers, with control elevations.
 - j. Invert elevation at property line for building sewers to be included with sewer construction.
 - k. The elevation of the lowest floor and corresponding lot number to be served by the sanitary sewer if the depth of sewer is less than ten (10) feet.
 - l. Special backfill areas (i.e. sand)
 - m. Provisions for infiltration testing.
 - n. Adjacent existing or proposed utilities plotted where parallel and may conflict with sewer leads.
 - o. All existing sewer inverts must be field measured and so noted on the plans.
3. The following must be shown in plan view:
 - a. Length between structures.
 - b. Type, class and size of pipe.
 - c. Slope of sewer; direction of flow.
 - d. Top of casting elevation.

- e. Easement where required.
- f. Progressive numbering system increasing in direction opposite to the direction of flow.
- g. Invert elevations if sewer is not also shown in profile.

I. Drop Connections

An internal or an external drop connection will be required where the invert of the outlet pipe is 18" or more below the invert of the inlet pipe. Each case shall be reviewed and the connection alternative determined by the DPW.

J. Septic Systems

Septic systems are strongly discouraged due to infiltration from septic systems into the storm water drainage system.

K. Materials

1. Main Line Sewer Pipe

Sanitary sewer pipe will conform to the following current American Society for Testing and Materials Specifications.

- a. PVC concrete truss pipe shall meet be 200 PSI pipe stiffness as manufactured by Contech Construction Products, Inc., or equal; conforming to the requirements of ASTM D-2680, latest revision.
- b. PVC pipe and fittings, conforming to requirements of ASTM D3034 (SDR 26), latest revision for depths less than 15 feet. Deflection of pipe will be limited to a maximum of 5%.

2. Pipe Joints

Pipe joints will conform to the following requirements depending on the allowable type of pipe used:

- a. Joints on PVC truss pipe will consist of PVC couplings chemically cemented to the ends of the pipe being connected. Solvents and methods used in making the chemical bond will be in accordance with ASTM D2680 and manufacturer's printed instructions.
- b. Joints for PVC pipe push-on gasketed type will conform to ASTM Specification D3212, latest revision.

3. Manholes

Manholes will be constructed of precast reinforced concrete sections in accordance with the City's standard details.

- a. Precast reinforced concrete manhole sections will conform to requirements of the ASTM 478 "Specifications for Precast Reinforced Concrete Manhole Sections."
- b. Precast manhole joints shall be assembled using butyl rope conforming to ASTM C990.
- c. Manhole steps will be type PS2-PFS as manufactured by M. A. Industries or approved equal.
- d. Where manholes are located outside of pavements and sidewalks, final grade adjustments will be made with precast concrete grade adjustment rings. Brick construction will not be allowed except where located in paved surfaces. Grade rings will be a minimum of 3" thick and reinforced with two full circles of 3/16" diameter steel reinforcing wire. Manhole casting frame and concrete adjustment rings will be secured to precast cone section with a minimum of four 5/8" diameter cadmium coated threaded studs or bolts. All joints in the assembly will be sealed with rubber O-ring gaskets when outside of paved areas.
- e. Manhole covers and frame will be EJ 1040 ZPT frame with 1040 APTGS cover in easement areas. Manhole covers and frame will be EJ #1040 Z Frame with 1040 AGS cover or approved equal for roadways. Covers will be cast with the words "SANITARY SEWER". All manholes shall include "Cadillac" brand rubber wrap and elastomeric seal or approved equal.

L. Infiltration and Exfiltration Testing

See Chapter X - Construction Specifications

M. Pump Stations

1. Wherever possible, sewer systems shall flow by gravity. Pump stations will be considered for approval only where there is no feasible alternative.
2. Pump stations shall be designed in accordance with "10-State Standards Recommended Standards for Wastewater Facilities."
3. There will be a minimum of two (2) pumps in a pumping station and minimum size of the discharge lines shall provide adequate cleaning velocities and shall conform to Michigan Department of Environment, Great Lakes, and Energy requirements. The pump station must be able to handle peak flows with the largest pump out of service.
4. All pumping station plans must be reviewed by the City Engineer (Water Resources and Construction Groups). The Design Engineer shall furnish all design data on the pumps, including calculations and pump performance curves. Plans will be subject to the review and approval of the DPW.
5. Provisions must be included for a permanent auxiliary power source and must include a telemetered alarm system (see Appendix H).
6. A generator (portable or permanent based on the DPW's preference) must be provided for any pump station. The owner or association will be responsible for all monthly utility

bills (e.g. electric, phone).

7. A telephone notification system must be indicated for any pump station.
8. Electrical systems and components shall be designed per section 42.35 of “10-State Standards Recommended Standards for Wastewater Facilities.”
9. Hydrogen sulfide protection shall be provided on proposed wet wells as well as the first downstream discharge manhole. The extent of the protection will be determined by the DPW on a case by case basis.

N. Force Mains

1. All force mains require review by the City Engineer.
2. Pipe for force mains will be designed to withstand both internal pressures and external trench and live loads. Design computations will be submitted by the proprietor’s engineer for review and approval.
3. Pipe material for force mains will be ductile iron pipe or HDPE (High Density Polyethylene) pipe. Ductile iron pipe will be cement lined. Joints and fittings will be equal to the requirements for pressure pipe used in the domestic water distribution system. Force mains will be pressure tested for water tightness to a test pressure equal to twice the total system head but no less than 50 psi held for a minimum one hour period. Amount of leakage will be limited to not more than 25 gallons per inch diameter per mile of pipe per 24 hours at required test pressure.
4. At design pumping rates, a cleansing velocity of at least 2 feet per second should be maintained. The minimum force main diameter for raw wastewater shall not be less than 4 inches.
5. An air relief valve shall be placed at high points in the force main to prevent air locking. Vacuum relief valves may be necessary to relieve negative pressures on force mains. The force main configuration and head conditions should be evaluated as to the need for and placement of vacuum relief valves.
6. Force mains should enter the gravity sewer systems at a point not more than 2 feet above the flow line of the receiving manhole.
7. Pipe and joints shall be equal to water main strength materials suitable for design conditions. The force main, reaction blocking, and station piping shall be designed to withstand water hammer pressures and associated cyclic reversal of stresses that are expected with the cycling of wastewater lift stations. Surge protection chambers should be evaluated.

VII. Storm Sewer and Detention

A. General

1. All construction must conform to the current standards and specifications of the City of Romulus. In addition, plans must conform to the Wayne County Storm Water Management Standards Manual, latest edition.
2. Where construction of storm sewer is proposed, the City of Romulus standard storm sewer detail sheets must accompany the plans.
3. Underground drainage facilities will generally be required. All storm water must be accommodated and discharged in a controlled manner. The minimum pipe size is twelve (12) inches.
4. In subdivisions where lots drain to rear yards, a rear yard drainage system is required.
 - a. Rear yard inlets, without sumps, shall be installed at low points and intermediate points as required.
 - b. The minimum size rear yard inlet lead shall be twelve (12) inches.
 - c. Each rear yard inlet shall serve not more than six hundred (600) linear feet total of rear yard easement with a maximum of three hundred (300) linear feet in one (1) direction.
 - d. No rear easement drainage shall be carried around any easement deflection in excess of twenty (20) degrees.
5. For all subdivisions, a drainage system must be provided along rear lot lines to accommodate sump pump discharges.
6. Sump pump discharge must be directed into the storm sewer via an enclosed system. A minimum of four (4) inch schedule 40 pipe will be utilized and will also be allowed to discharge unrestricted. Sump pump discharges must connect to a storm structure. Blind taps are discouraged.
7. Depth of Sewer:

The minimum allowable coverage over pipe is two feet and six inches (2'-6"). Where depth between 2'-6" and 4', a low-head structure is required. The maximum depth to the invert of the storm sewer shall not exceed the depth recommended by the manufacturer for each size and class of pipe.
8. Wayne County and the City require a Public Right-of-Way Storm Sewer Agreement for connection to storm sewers in public roads. As a general policy, the Wayne County DPS does not permit discharge of storm water runoff from improved property abutting a County road into the County road storm drain system.
9. A ten (10) foot horizontal separation is required between storm sewer and water main.

10. An 18-inch minimum clearance is required between storm sewer and water main. Top of pipe and bottom of pipe elevations shall be provided at all crossings.
11. Trench drains shall not be permitted without written permission from the DPW Director.

B. Structures

1. Inlets at the upstream end of the system will be a minimum of 24" in diameter. Catch basins with an inlet pipe will have a minimum diameter of 48" with 24" sump. All manholes and public catch basins will be a minimum of 48" in diameter. Low-head structures shall be required if the cover is less than four (4) feet at a structure. Plan and profile shall specify low-head structures where necessary.
2. The first structure upstream from a public system within the confines of the private development will be 48" in diameter and have a 24" sump.
3. Manholes will be located at:
 - a. All changes in alignment.
 - b. Points where the sewer changes size.
 - c. Points where the grade changes.
 - d. Junction of sewer lines.
4. The maximum distance between manholes will be 300 feet for sewers 30" in diameter and smaller, 400 feet for 36" diameter, and 600 feet for diameters greater than 36".
5. All manholes to be dimensioned to property lines, right-of-way lines and/or buildings or another coordinate system.
6. Where possible, a drop of 0.10 feet shall be made for loss of head through a structure. If the storm sewer changes size through a structure, the 0.8 flow line of the sewers shall be matched.
7. All structures receiving storm runoff shall have a two (2) foot sump.
8. Structures shall not be located in sidewalks or drive approaches.
9. Catch basins will be located as follows:
 - a. At all low points.
 - b. 5 feet away from the end of radius in roads.
 - c. No more than 150 feet of street drainage will be allowed to flow around a corner.
 - d. A relief basin will be required at the highest end of radius where drainage is required to cross an intersection longitudinally.
 - e. At intermediate points along the street, the maximum distance drainage will be

allowed to flow is 500 feet.

- f. Multiple catch basins may be required at a low point depending upon drainage area.

C. Storm Sewer Design ¹

1. Storm sewer will be designed using the Manning Equation for pipes flowing full ($n = 0.013$ min). Runoff will be determined using the Rational Method:

($Q = CIA$) with an intensity formula of $I = 151.8 \div (t+19.9)$.

Time of concentration (t) shall be determined as follows:

For the most upstream end of the storm water management system, the time of concentration is referred to as the initial time of concentration. An initial time of concentration of 15 minutes must be used for multiple and commercial/industrial land use while 20 minutes must be used for single-family residential land use.

The initial time of concentration for unimproved lands is given as follows:

$$t_o = \frac{L}{60 \times V} \quad \text{and } V = 0.48 \times S^{1/2}$$

where t_o = initial time of concentration (minutes)

L = length of the overland flow route (feet)

S = slope of the overland flow route (%)

V = velocity of the overland flow (ft/sec)

For all other downstream locations in the storm water management system, the time of concentration (t) shall be the sum of the initial time of concentration, plus the travel time from the upstream end to the location being analyzed.

2. Storm sewer design computations must be included on the plan set. The velocity will be a minimum of 2.5 feet per second and will not exceed 8 feet per second.

¹ Some text in this section is taken from the Wayne County Storm Water Management Standards Manual

The minimum and general maximum gradients in percent slope for each size pipe listed will be as follows:

Pipe Diameter	Minimum	Maximum
12"	0.34	3.10
15"	0.26	2.30
18"	0.20	1.80
21"	0.16	1.45
24"	0.14	1.22
27"	0.12	1.05
30"	0.10	0.90
36"	0.08	0.70
42"	0.06	0.58
48"	0.05	0.48

3. Sufficient capacity shall be provided in the storm system to handle upstream drainage. All upstream drainage must be accommodated on site and shall be based on ultimate improvements and run-off.
4. The hydraulic grade lines (HGLs) of closed conduits must meet both of the following requirements.
 - a. The hydraulic grade line must be calculated based on 10-year storm flows and starting with the crown elevation at the outlet, or the permanent pool water level, whichever is higher. This gradient must not be higher than 2.5 feet below the rim elevation at any upstream manhole location.
 - b. The rim elevation at any manhole location along the closed conduit upstream of a detention basin must be at least one (1) foot above the design water level of the detention basin.
5. Composite run-off coefficients shall be determined for each individual drainage area and calculations for each drainage area must be submitted as part of the design computations. The following will be used as minimum coefficients:

MINIMUM ACCEPTABLE RUNOFF COEFFICIENTS			
Type of Surface	Runoff Coefficient (C)		
Water Surfaces	1.0		
Roofs	0.95		
Asphalt or concrete pavements	0.95		
Gravel, brick, or macadam surfaces	0.85		
Semi-pervious: lawns, parks, playgrounds			
	Slope <4%	Slope 4-8%	Slope >8%
Hydrologic Soil Group A	0.15	0.20	0.25
Hydrologic Soil Group B	0.25	0.30	0.35
Hydrologic Soil Group C	0.30	0.35	0.40
Hydrologic Soil Group D	0.45	0.50	0.55

6. Along with the storm sewer design computations, the design engineer must submit a storm district map showing all drainage districts within the development. The district limits must be overlaid on a proposed grading plan for the site. The design computation sheet must be sealed by the registered engineer who supervised the computations.
7. All upstream drainage must be accommodated on-site. Allowances for upstream area must be based on ultimate improvements and run-off.
8. Discharge must not be diverted onto abutting properties. The outlet must be in accordance with the existing natural drainage courses in the area.

D. Plan and Profile

1. All existing sewer inverts shall be field measured and so noted on the plans.
2. The following must be shown in plan view:
 - a. Length between structures.
 - b. Type, class and size of pipe.
 - c. Slope of sewer and direction of flow.
 - d. Top of casting elevation.
 - e. Easement where required.
 - f. Progressive numbering system on structures increasing in direction opposite to the direction of flow.
 - g. Invert elevations for sewers not also shown in profile.
 - h. Sump pump leads, wye branches, or tee inlets to be constructed or installed concurrently with locations at easement and/or property lines. Length, size and end-of-lead invert elevations shall be shown on the plan for each lead.
3. All storm sewers must be shown in profile.
4. The following must be shown in profile:
 - a. Length of run between manholes and catch basins.
 - b. Type and class of pipe between manholes and catch basins.
 - c. Size and grade of sewer between manholes and catch basins.
 - d. Top of casting elevations for all manholes and catch basins; structure type and dimensions. Low-head structures identified.
 - e. Inverts of all pipes at manholes and catch basins.
 - f. Proposed and existing ground elevations along the route of the sewer.

- g. Progressive numbering system on all manholes and catch basins. (Increasing in direction opposite to direction of flow)
- h. All utility crossings. (18" minimum clearance)
- i. Special backfill areas. (i.e. sand)
- j. Hydraulic gradient for the 10-year design storm.
- k. Adjacent existing or proposed utilities plotted where parallel.

E. Taps

Connections must be made at manholes. Blind taps are not allowed.

F. Detention

1. Plans must conform to the more restrictive of the Wayne County Storm Water Management Standards Manual, latest edition, or the following:
2. Any site that utilizes an unimproved outlet for drainage must detain the increased run-off on-site. Acceptable means of detention can be achieved through detention ponds, retention ponds, underground storage facilities, or other acceptable means of treatment such as bioswales and raingardens.
3. Sediment forebays or mechanical sediment treatment structures are also required prior to detention.
4. Sufficient detention volume must be provided so that the allowable discharge rate during the design storm is not exceeded.
5. Fencing around an open detention basin is not required if all the following criteria is met:
 - a. The pond is designated as a dry detention pond, i.e. it will not include a permanent pool of water.
 - b. The pond storage depth is less than five (5) feet.
 - c. The side slopes of the pond are less than or equal to one vertical to six horizontal.
 - d. The property is not a residential development. Any deviation from this criterion on a residential development may only be waived by City Council.

Building Department may require additional safety measures based on pond location and depth.

6. Any open detention ponds which include a permanent pool, have a storage depth greater than five (5) foot, have side slopes exceeding one vertical to six horizontal or are proposed within a residential development must be fenced. For fenced ponds, the maximum side slope is one vertical to three horizontal. Fences must be a minimum of

forty-two inches in height and black or green vinyl coated non-climbable chain link with a locking access gate, minimum eight (8) foot wide. Ornamental fences meeting the same dimension criteria are preferred. The detention pond fencing requirement may only be waived by City Council. Waivers shall be recommended by the Planning Commission.

7. Per Wayne County, the ponds must be constructed to retain a minimum four (4) feet deep permanent water pool. The design water level must not exceed five (5) feet above the permanent pool water level. Indemnification by the applicant shall be provided for all sites with detention or retention ponds. Refer to Appendix G: U.S. Department of Transportation F.A.A. Advisory Circular – Hazardous Wildlife Attractants on or near Airports for further requirements.
8. A minimum of twelve (12) inches of freeboard must be maintained with a positive, non-erodible overflow capable of handling the capacity of a 100-year storm.
9. A Long Term Maintenance Agreement for Storm Water Detention/Retention System and Storm Sewer System will be required for all detention systems (see Appendix B).
10. Aerators shall be incorporated into detention basins with detail provided.
11. A buffer strip, 25-foot wide minimum, must be established and/or preserved along the edge of any surface water or watercourse approved by the County.
12. Per the Huron Watershed Council, bioretention islands are allowed and encouraged in parking lots to reduce pollution from parking lot runoff.
13. Design Criteria:
 - a. The allowable discharge must be determined by one of the following:
 - 1) Discharge approved by agency having jurisdiction over outlet, i.e. Wayne County Department of Public Services, MDOT (approval must be submitted).
 - 2) S.C.S. Technical Release No. 55 “Urban Hydrology for Small Water Sheds” (calculations must be provided).
 - 3) Allowable flows for which the outlet was designed (previous calculations must be submitted).
 - 4) When the above methods are not available, the maximum discharge rate shall be 0.15 cubic feet per second per acre.
 - b. The storage volume required will be equal to, or greater than, the volume computed using the formulas provided below. For drainage areas of 5 acres or more, the rate of storm water runoff must not exceed 0.15 cfs/acre for a 100-year storm. For drainage areas less than 5 acres, the rate of runoff must not exceed 0.15 cubic feet per second per acre for a 10-year storm.

1) Definition of terms:

A = Contributing acreage
C = Coefficient of imperviousness
Q_o = Maximum allowable outflow per acre imperviousness (cfs/AC).
T = Storage time, defined as the interval of time at the instant storage begins until peak storage is attained (min.).
V_s = Maximum volume of water stored in the detention basin per acre imperviousness (cft./AC).
V_t = Maximum volume of water stored in the detention basin (cft).

2) Storage volume formulas for gravity orifice flow (variable rate discharge) for 100-year storm (areas greater than 5 acres).

$V_s = \frac{17,649T}{T + 45} - 40 Q_o T$
Where $T = -45 + \sqrt{\frac{19,845}{Q_o}}$
And $Q_o = \frac{\text{Allowable maximum discharge rate}}{A \times C}$
$V_t = V_s \times A \times C$

3) Storage volume formulas for gravity orifice flow (variable rate discharge) for 10-year storm (areas five acres or less).

$V_s = \frac{9,108T}{T + 19.9} - 40 Q_o T$
Where $T = -19.9 + \sqrt{\frac{4530}{Q_o}}$
And $Q_o = \frac{\text{Allowable maximum discharge rate}}{A \times C}$
$V_t = V_s \times A \times C$

- c. Detention basins are designed to provide water resource protection by capturing and treating the bank full flood within the lowest portion of the flood control storage volume, and releasing it through a basin outlet with a cross-sectional flow area that varies with the water level in the basin. The outlet is sized to dewater the facility within the time frames specified.

The runoff from the bank full flood must be treated by capture in a detention basin, or in an alternative facility approved by the County, and gradually released over a period of no more than 40 hours.

The first flush volume must be treated by capture in a forebay provided at each detention basin inlet, or in an alternative facility approved by the County, and gradually released over a period of at least 24 hours.

The storage volume required to capture and treat the bank full flood should be based on the following relationship:

$$V_{tbf} = 5,160 \times A \times C$$

V_{tbf} = volume of bank full flood storage volume (cft)

A = Drainage area (ac)

C = runoff coefficient

The portion of the bank full flood storage volume that represents first flush should be based on the following relationship:

$$V_{tff} = 1815 \times A \times C$$

V_{tff} = volume of first flush storage volume (cft)

In order to ensure that any constructed detention basin performs its required function with minimal maintenance, and does not become a safety hazard or eyesore, the following additional requirements must also be met:

- 1) Each basin must have a minimum four (4) foot deep permanent pool that allows for removal of urban pollutants through settling and biological uptake. The volume of the permanent pool does not satisfy any portion of the storage volume requirements previously discussed.
- 2) The design water level of a detention basin must not exceed five (5) feet above the permanent pool water level.
- 3) Side slopes for a detention basin and forebay shall not be steeper than 1:6 unless the basin is fenced.
- 4) Basins must be accompanied by a landscape plan that gives preference to native species. Plantings must be monitored for two years after establishment. Replacement will be necessary as determined by the agency having jurisdiction over the basin. Basins should be stabilized as soon as possible to mitigate erosion effects.

- 5) A minimum of one (1) foot of freeboard is required above the design water level.
- 6) Detention basins and forebays may not be located within a watercourse or surface water.
- 7) Inlets and outlets from detention basins must be designed as described below.

Wayne County also may recommend additional design elements. For example:

- 1) For detention basins with sufficient depth to result in thermal stratification, a special outlet design may be recommended to draw water from the coolest part of the pond.
- 2) Gravity flow is preferred to a pump outlet for all detention facilities.
- 3) Innovative designs such as regional detention facilities are strongly encouraged.

d. Basin Inlets/Outlets

When designing detention basins, the distance between the basin inlet and outlet pipes should be maximized to enhance water quality treatment within the proposed storm water management system. This may be accomplished by increasing the length to width ratio of the basin or the dry weather flow path within the detention basin.

Each basin inlet must have a sediment forebay to provide energy dissipation and to trap incoming sediments, instead of allowing them to enter the basin where eventual removal is more difficult and costly. The sediment forebay should be designed for particulate settling without causing sedimentation problems. Innovative solutions such as providing a permanent pool, using stone filters, or designing a sump in front of the forebay outlet are recommended. The forebay is not included as part of the detention volume requirements as it functions as a separate cell.

The distance between the forebay outlet and the basin riser outlet should be maximized to enhance water quality treatment within the proposed storm water management system. This may be accomplished by increasing the length to width ratio of the basin or increasing the dry weather flow path within a constructed wetland.

A riser outlet is required in each detention basin. The riser should be placed near or within the embankment to provide ready maintenance access. Inlet and outlet barrels and risers must be constructed of materials that will reduce the future maintenance requirements. A recommended outlet riser design is included in the Wayne County manual. All riser type outlets must include a simple oil/water separator consisting of a “T” or elbow shaped pipe.

For flood control, basin outlets must be designed to restrict outflow from the

detention basin such that the maximum outflow rate at the design water level will not exceed the maximum allowable outflow rate. For water resources protection, the riser outlet must be designed to gradually release the bank full flood storage volume over a period of no more than forty (40) hours. The 40-hour average allowable outflow rate must be determined based on the following relationship:

$$Q_{ave\ bf} = \frac{V_{t\ bf}}{144,000}$$

where $Q_{ave\ bf}$ = 40-hour avg. allowable outflow rate (cfs)
 $V_{t\ bf}$ = volume of bank full storage volume (cft)

Rip rap must be provided around the inlet and outlet pipes.

The following standard orifice equation is used to size the orifice restrictors within the riser pipe:

$$Q = CA\sqrt{2gh}$$

Q = maximum allowable outflow rate (cfs)
 C = orifice coefficient
 A = area of orifice (ft²)
 g = gravity constant = 32.2 ft/s²
 h = maximum head condition at the design storage level (feet)

When sizing orifice restrictors to limit the detention basin outflow to the maximum allowable outflow rate or flood control, the head term in the Orifice Equation must reflect the maximum water level in the basin, which is the design water level. When sizing orifice restrictors to limit the detention basin outflow to the 40-hour average allowable outflow rate for the bank full flood, the head term must reflect the average head within the bank full flood storage volume.

An overflow spillway or outlet structure must be provided at the design water level. For all detention basins, the outlet pipe or drainage path must be designed to carry a 10-year storm.

All closed conduits entering or exiting a detention basin or sediment forebay require an end treatment and soil erosion protection, and some enclosures may also require a grate to prevent children and animals from entering the enclosure.

- e. Forebays must be designed to capture and treat the first flush for the area tributary to the forebay. The storage volume required to capture the first flush must be calculated based on the following relationship:

$$V_{t\ ff} = 1815 \times A \times C$$

$V_{t\ ff}$ = volume of first flush storage volume (cft)
 A = Drainage area (ac)
 C = runoff coefficient

- f. A riser outlet is required in each forebay. The riser outlet must be designed to gradually release the first flush storage volume over a period of at least twenty-four (24) hours. The 24-hour average allowable outflow rate must be determined based on the following relationship:

$$Q_{\text{ave ff}} = \frac{V_{\text{t ff}}}{86,400}$$

where $Q_{\text{ave ff}}$ = 24-hour avg. allowable outflow rate (cfs)

$V_{\text{t ff}}$ = volume of first flush storage volume (cft)

- g. Forebay Outlets

Forebay riser outlets must be placed near or within the embankment to provide ready maintenance access and must be constructed of materials that minimize future maintenance requirements.

Riser outlets must include a simple oil/water separator consisting of a “T” shaped pipe.

When sizing the orifice restrictors to limit outflow from the forebay to the 24-hour average allowable outflow rate, the head term must reflect the average head within the first flush storage volume.

Forebays must have an overflow spillway or outlet structure at the top of the forebay storage volume. The overflow spillway or outlet structure from the forebay into the detention basin must be designed to convey the peak flow rate tributary to the forebay for the 10-year storm.

Side slopes for a forebay must not be steeper than 1:6 unless the basin is fenced.

Forebays may not be located within a watercourse or surface water.

All closed conduits entering or exiting a forebay should have an end treatment and adequate soil erosion protection. Some enclosures should also be covered with a grate to prevent children and animals from entering the enclosure.

- h. Detention basin and forebay outlets should be designed as follows:

The riser must be constructed of 36 inch diameter 12- gage Corrugated Metal Pipe (CMP) conforming to ASTM A760.

Holes must be 1 inch minimum diameter at minimum 4 inch spacing, on center, predrilled prior to galvanizing. Forebay riser pipes must have a minimum of 6 rows of holes.

If modifications to the riser pipe are required in the field, repair must be performed in accordance with ASTM A780-01.

Riser and overflow structure must have a two (2) foot deep sump and a concrete base of six (6) inch minimum thickness. The riser must be securely attached to

the base either by embedding it in concrete or by an approved fastening method.

The top of the standpipe must be equipped with a steel grate. Openings must be a minimum of three (3) inches square and a maximum of four (4) inches square.

The stone filter backfill adjacent to the standpipe must consist of three (3) inch diameter stone, with an outer blanket of MDOT 6A stone.

The overflow spillway shall be designed to prevent erosion of the embankment material. Suggested options for stabilizing the spillway include riprap, trilock, geoweb with infill material, reinforced turf, etc.

The outlet "Tee" is to be equipped with a removable cap in the horizontal direction. The vertical leg is to serve as an oil separator. The horizontal leg is to be used as a clean out.

The minimum outlet pipe diameter is four (4) inches.

It is recommended that an anti-seepage collar be provided on each outlet pipe.

- i. Any volume of water provided below invert of the gravity outfall pipe will not be considered as detention.

G. Pump Stations

1. Wherever possible, sewer systems shall flow by gravity. Pump and/or lift stations will be considered for approval only where there is no feasible alternative.
2. For private site development, pump stations will be private with easements indicated and appropriate maintenance language in the Development/Association/Master Deed documents. The owner or association will be responsible for all maintenance activities and costs as well as monthly utility bills (e.g. electric, phone).
3. There will be a minimum of two (2) pumps in a pump station and minimum size of the discharge lines shall provide adequate cleaning velocities. Each pump shall be rated at the allowable discharge rate, appropriate for storm water applications, abrasion resistant, and provided with an automatic control system to operate the pumps on alternating periodic cycles. The pump station must be able to handle peak flows with the largest pump out of service. The pump control system will also contain a manual override control.
4. All pump station plans must be reviewed by the City engineer. The design engineer shall furnish all design data on the pumps including calculations and pump performance curves. Plans will be subject to the review and approval of the DPW.
5. Provisions must be included for a permanent auxiliary power source and must include a telemetered alarm system to the association contact with notification given to the DPW.
6. A telephone notification system must be indicated for any pump station.
7. Appropriate measures should be taken to minimize the amount of erosion that will affect the receiving waters such as riprap set in a mortar mix.

H. Public Storm Sewer

All public storm sewers must be located in a public right-of-way or an easement. Standard easement forms are included in Appendix D. The easement size will vary as required for maintenance and access. The minimum storm sewer easement width will be 12 feet. The dedication of the easement will be required prior to City acceptance of the system for continuous maintenance and service. (See Project Completion/Final Acceptance guidelines) All Storm Sewer pipe shall be installed with tracer wire.

I. Materials

1. Sewer Pipe

a. Concrete Pipe

Storm sewer pipe will conform to the current ASTM “Standard Specifications for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe,” ASTM C-76 (Class IV min.) for circular pipe, or ASTM C-507 for horizontal elliptical pipe, latest revision.

b. HDPE Pipe

Piping shall be ADS N-12 piping or approved equal. Storm sewer pipe and fittings must meet the requirements of ASTM F2306 (12” – 60”) - “Standard Specification for 12 to 60 in. Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications”, AASHTO M-252 (3” – 10”) “Standard Specification for Corrugated Polyethylene Drainage Pipe”, or ASTM F949 – “Standard Specification for Corrugated Sewer Pipe with a Smooth Interior and Fittings”.

2. Tracer Wire

- a. Open trench sewer pipe shall be installed with a continuous, 10 gauge copper, Copperhead, copper sheathed wire (part #1230-HS), or Engineer approved equal. Tracer wire shall have an average tensile strength break load of 400 pounds minimum. The wire shall be insulated with a minimum 30 mil HDPE coating. See Appendix J for additional tracer wire requirement on trenchless pipe installations.

3. Pipe Joints:

Pipe joints will conform to one of the following requirements:

- a. Modified Grooved Tongue (MGT), pipe will have a rubber gasket snapped into a groove cast into the tongue. The modified groove or bell end of the pipe will be made smooth and will have not over a 3.5 degree slope for sizes 10 to 24 inches, or a 2 degree slope for sizes 27 inches to 108 inches, tapered to fit the rubber gasket to tolerances as determined by the gasket manufacturer. MGT joints will be lubricated and coupled in accordance with the pipe manufacturer’s printed instructions.

- b. Rubber gasket joints will be in accordance with ASTM C443 “Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets”. Rubber gasket joints will be lubricated and coupled in accordance with pipe manufacturer’s printed instructions.
- c. Bituminous joints will be made on pipe having plain tongue and groove ends and will be sealed with a non-hardening bituminous compound applied to both ends of the joint just prior to laying. The compound will be applied at a sufficient rate to completely fill the joint.
- d. Joints for plastic pipe shall be push-on type conforming to ASTM D3212 and ASTM F477.

4. Manholes

Manholes will be constructed of precast reinforced concrete sections in accordance with the City of Romulus standard details.

- a. Precast reinforced concrete manhole sections will conform to the requirements of the ASTM C478 “Standard Specification for Precast Reinforced Concrete Manhole Sections”. Wall thickness will depend on depth and will be subject to the approval of the City engineer.
- b. Brick for casting adjustment will conform to the requirements of the MDOT “Standard Specifications for Construction,” Section 913, latest revision. Wall thickness will depend on depth and will be subject to the approval of the City’s engineer.
- c. Precast manhole joints shall be assembled using butyl rope.
- d. A minimum of three or a maximum of five courses of brick will be placed above the top of the cone section on all precast structures.
- e. Manhole covers and frames will be EJ #1010 Z, frame with #1000 B perforated cover for roadways, and #1000 Z frame with #1000 B perforated cover for easement areas.
- f. Manhole steps will be type PS2-PFS as manufactured by M.A. Industries or approved equal.

5. Catch Basins

- a. Catch basins will be constructed of precast reinforced concrete manhole sections or PVC drainage basins in accordance with the City of Romulus standard details.

PVC drainage basins shall be manufactured from PVC pipe stock, utilizing a thermo-molding process to reform the pipe stock to the specified configuration. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer

plastic pipe using flexible elastomeric seals. The pipe bell spigot shall be joined to the main body of the drain basin or catch basin. The pipe stock used to manufacture the main body and pipe stubs of the surface drainage inlets shall meet the mechanical property requirements for fabricated fittings as described by ASTM D3034, Standard for Sewer PVC Pipe and Fittings and ASTM F1336, Standard for PVC Gasketed Sewer Fittings.

- b. Catch basin and inlet frame and covers will be EJ No. 5080 Z frame with 5000 M1 grate or equivalent when located in pavement edge or gutter line.
- c. Catch basin and inlet frame and covers will be EJ No. 1000 Z frame with 1000 M1 grate or equivalent when located in paved areas other than edge gutter line.
- d. Catch basin and inlet frame and covers will be EJ No. 1000 Z frame with 1000 N oval grate or equivalent when located in ditch or yard areas.
- e. The grates furnished for all PVC drainage basins shall be ductile iron grates for sizes 8", 10", 12", 15", 18", 24" and 30" (12" and 15" frames are cast iron) shall be made specifically for each basin so as to provide a round bottom flange that closely matches the diameter of the surface drainage inlet. Grates for drain basins shall be capable of supporting H-25 wheel loading for heavy-duty traffic or H-10 loading for pedestrian traffic. 12" and 15" grates will be hinged to the frame using pins. Metal used in the manufacture of the castings shall conform to ASTM A536 grade 70-50-05 for ductile iron and ASTM A-48-83 class 30B for 12" and 15" cast iron frames. Grates shall be provided painted black.
- f. Each frame and cover assembly shall have "NO DUMPING – DRAINS TO RIVER" forged in at least one visible location.

VIII. Paving

A. General

1. All pavement will conform to the current standards and ordinances of the City of Romulus, Wayne County, and the MDOT Standard Specifications for Construction (current edition), as applicable.
2. Hot Mix Asphalt (HMA) mixes, depths, commercial traffic, and binder shall follow the MDOT Local Agency Program HMA Section Guidelines when applicable.
3. Any road improvements in Wayne County right-of-way are subject to the review and approval of Wayne County. A permit must be secured from Wayne County for construction prior to engineering plan approval.
4. Any road improvements in MDOT right-of-way are subject to the review and approval of MDOT. A permit must be secured from MDOT for construction prior to engineering plan approval.
5. Cross sections of all proposed pavement must be shown on the plans with thickness and materials clearly indicated.
6. For parking lots, the minimum surface grade for asphalt paving will be 1%. The minimum surface grade for concrete paving will be 0.5%. In general, pavement grades shall not exceed 6%.

For streets, the minimum gradient shall be 0.5% and the maximum gradient 4%.
7. Concrete curbs will be required for all paved drives or parking lots. A detail shall be provided on the plans.
8. Concrete curb will be required on all roads unless otherwise approved by the Administrative Review Committee.
9. Edge drains are required for all public roads with curb and gutter.
10. City ordinances and design standards of Wayne County will apply for horizontal and vertical alignment of all roadways. The more conservative shall govern.
11. All signage shall be in accordance with the Michigan Manual of Uniform Traffic Control Devices – Latest edition.
12. Soil borings must be taken and analyzed by a professional engineering firm qualified to do such work at the locations of all proposed public roads. Copies of the report must be submitted to the DPW and the City Engineer. It is recommended that soils investigations be done and a report prepared for all areas where pavement is proposed.
13. Sufficient proposed grades must be shown on the plan to clearly demonstrate the drainage patterns.
14. Parking spaces, maneuvering lanes, and driveways will conform in size and configuration

to City ordinances.

15. Turning improvements, acceleration lanes and tapers and deceleration lanes and tapers will be required in accordance with City Engineer and Wayne County Standards.
16. The minimum requirements, which follow, are based on adequate subgrade, subgrade drainage and average live loads. Each site must be examined individually, and additional pavement thickness and/or base requirements may be necessary.

B. Public Roads Under Wayne County Jurisdiction

Public roads under Wayne County jurisdiction must conform to Wayne County standards. Plans must be reviewed by Wayne County. A permit must be obtained from Wayne County for construction.

C. Public Roads Under the City's Jurisdiction

Public roads under the City's jurisdiction must conform to the following minimum requirements:

1. Subgrade Requirements:

All subgrade, prior to placement of aggregate base course, must be compacted via proof-roll. When unstable subgrade materials, i.e., peat, muck, marl, wet clays, etc., are encountered, excavation and removal of such unstable materials and replacement to plan subgrade with approved materials compacted in place will be required. Approved materials will include crushed aggregate, or other materials approved by the City Engineer.

Should it be found that the excavation, removal and replacement of unstable subgrade material is impractical due to excessive depths, alternate pavement structure designs must be submitted to and approved by the City Engineer prior to pavement installation.

Edge drain is required for all new public roads.

2. Base Requirements:

Minimum 6" compacted thickness of 21AA crushed limestone aggregate base course material will be placed for all roadways. Base shall be compacted to at least 95% of maximum dry density as determined by AASHTO T-99.

3. Residential Roads

a. Curbed concrete:

- 1) R.O.W. width: 60'.
- 2) Pavement width: 27' back to back of curbs.
- 3) Pavement thickness: 7" non-reinforced uniform concrete with integral mountable curb.

- 4) Concrete: 3,500 psi, MDOT Spec. 601, grade P1.
 - 5) Longitudinal “B” or “D” joints at 9’ spacing. Tie Bars at 41” on center.
 - 6) Transverse weakened plane joints at 12.5’ spacing.
- b. Concrete with open ditches:
- 1) R.O.W. width: 60’.
 - 2) Pavement width: 24’.
 - 3) Pavement thickness: 7” non-reinforced uniform concrete.
 - 4) Shoulders: MDOT 23A aggregate; 5” thick; 5’ wide.
 - 5) Concrete: 3,500 psi, MDOT Spec. 601, grade P1
- c. Asphalt pavement with open ditches:
- 1) R.O.W. width: 60’.
 - 2) Pavement width: 24’.
 - 3) Pavement thickness: 2” wearing course, MDOT 13A, LVSP or 36A; 4” base course MDOT 13A (two lifts).
 - 4) Shoulders: MDOT 23A aggregate; 5: thick; 5’ wide.
- d. Asphalt with concrete curb and gutter:
- 1) R.O.W. width; 60’.
 - 2) Pavement width: 27’ back to back of curbs.
 - 3) Pavement thickness: 2” wearing course, MDOT 13A, LVSP, or 36A; 4” base course MDOT 13A (two lifts).
 - 4) Curb: 2.5’ wide; 6” roll or 4” mountable.
4. Quarter Line or Collector Road – houses fronting on road:
- a. Asphalt:
- 1) R.O.W. width: 86’.
 - 2) Pavement width: 41’ back to back of curbs.
 - 3) Pavement thickness: 2” bituminous wearing course, MDOT 5E- (determined based on commercial traffic count); 6” (2 lifts) bituminous base course, MDOT ,3E-(determined based on commercial traffic count).

- 4) Curb: 2.5' wide; 6" roll or 4" mountable.
 - b. Concrete:
 - 1) R.O.W. width: 86'.
 - 2) Pavement width: 39' back to back of curbs.
 - 3) Pavement thickness: 8" uniform non-reinforced concrete w/integral curb.
 - 4) Concrete: Minimum 3,500 psi, MDOT Spec. 601; Grade P1.
5. Quarter Line or Collector Road – no houses fronting on road:
- a. Concrete:
 - 1) R.O.W. width: 86'.
 - 2) Pavement width: 39' back to back of curbs.
 - 3) Pavement thickness: 8" uniform non-reinforced concrete with integral curb.
 - 4) Concrete: Minimum 3,500 psi, MDOT Spec. 601; Grade P1.
6. Primary or Potential Primary – Class A:
- a. Concrete:
 - 1) R.O.W. width: 120'.
 - 2) Pavement width: 63'.
 - 3) Pavement thickness: 10" uniform non-reinforced concrete with integral curb.
 - 4) Curb: 6" straight.
 - 5) Concrete: Minimum 3,500 psi, MDOT Spec. 601; Grade P1.
7. Industrial – Quarter Line Road:
- a. Concrete:
 - 1) R.O.W. width: 86'.
 - 2) Pavement width: 48' back to back of curbs.
 - 3) Pavement thickness: 10" uniform non-reinforced concrete with integral curb.

- 4) Curb: 6" straight.
 - 5) Concrete: Minimum 3,500 psi, MDOT Spec. 601; Grade P1.
- 8. Industrial – Non-quarter Line Road:
 - a. Curbed concrete:
 - 1) R.O.W. width: 60'.
 - 2) Pavement width: 27' back to back of curbs.
 - 3) Pavement thickness: 10" uniform non-reinforced concrete with integral curb.
 - 4) Curb: 6" roll.
 - 5) Concrete: Minimum 3,500 psi, MDOT Spec. 601; Grade P1 or approved equal.

D. Private Drives

- 1. Private residential, commercial and office drives serving more than one property will conform to the preceding requirements for public road construction except for right-of-way requirements.
- 2. Private industrial drives will conform to the preceding requirements for public industrial roads, non-quarter line, except for right-of-way requirements.

In addition, the following option will be allowed:

- a. Asphalt with concrete curb and gutter:
 - 1) Pavement width: 27' back to back of curbs.
 - 2) Pavement thickness: 1 ½" wearing course, MDOT 13A or 36A; 7" MDOT 13A.
 - 3) Curbs: 2.5' wide; 6" roll or 4" mountable.

E. Parking Lot Pavements (Non-industrial)

Pavement will consist of the following minimum design granular soil subbase, base courses and wearing courses. (Gravel lots are not permitted unless BZA approval is obtained).

1. Aggregate Base:
 - a. 6" compacted thickness: MDOT 21AA.
2. HMA Courses:
 - a. Base Course- 2" compacted thickness of bituminous aggregate, MDOT 13A or 36A placed over 21AA aggregate base course. Minimum 4" thick HMA base course required for truck access lanes and locations.
 - b. Wearing Course-2 compacted thickness of bituminous aggregate, MDOT 13A or 36A.
3. Concrete Pavement Alternative:

6" non-reinforced concrete pavement; Minimum 3,500 psi, MDOT Spec. 601; mixture P1 placed on 6" aggregate base.

F. Industrial Parking Lots

Parking lots for industrial uses will be reviewed on an individual basis with consideration given to intended use, type and volume of traffic and subsoil data furnished by the developer. In no case will the minimum design standards be less than 4" asphalt on 6" 21AA or 8" concrete on 6" 21AA.

6" concrete curb is required around all paving. 36" x 12" modified concrete curb for trailer parking and storage areas shall be provided for curb adjacent to such uses. The required cross section is provided in the standard details.

Industrial lots serving as trailer storage shall either be concrete or provide a minimum 10' concrete apron to accommodate the trailer landing gear. Wider aprons may be required for angle storage areas.

Gravel lots are not permitted unless allowed by the Planning Commission or approval granted by the Board of Zoning Appeals.

G. Drainage In Right-of-Way

1. Enclosures of drainage ditches across the frontage of the site will generally not be permitted. However, DPW may require enclosure if adequate controls on pavements and shoulders cannot be maintained and the safety of the general public is endangered.
2. Side slopes on open ditch drainage will be three (3) minimum horizontal to one (1) vertical. The ditch bottom must be two (2) feet wide.

H. Sidewalks

1. Sidewalks are required along the frontage of all roads (except in districts zoned "RE" with Planning Commission approval). They must be located in the right-of-way, one (1)

foot from the ultimate right-of-way line.

2. The walk must be five (5) foot wide constructed of 4" of concrete (MDOT 701, Grade S2) on 4" of compacted sand. The walk must be continued through driveway sections where it will be increased in thickness to 8" on major thoroughfares and collector roads and 6" in all other instances. Curbs must be tapered to meet the walk. Cross slopes on the sidewalk will be 1/4" per foot toward the street. Contraction joints must be spaced every five (5) feet and expansion joints must be spaced every forty (40) feet. One-inch thick, six-inch deep expansion joints must be constructed wherever the sidewalk touches a street curb.
3. Proposed grades must be indicated along the property line, driveways, and intermittent locations along the length of the walk.
4. Any structures, hydrants, poles, etc., that are existing along the alignment of the walk, must be adjusted or relocated at the expense and coordination of the developer.
5. All sidewalk construction will be in accordance with the AASHTO Guide for the Development of Bicycle Facilities, latest revision and the specifications of the A.D.A.
6. Sidewalks must be a minimum of 7' wide where parking is adjacent to the walk and buildings.

I. Driveways

1. Residential Driveways (Single Family):
 - a. Concrete driveways must be 6" thick from the back of curb to the property line. Concrete will conform to MDOT 701, Grade S2.
 - b. Bituminous driveways will consist of a minimum compacted thickness of 2" of bituminous pavement placed over a 6" compacted thickness of 21AA aggregate base course. The bituminous mixture will conform to MDOT 13A or 36A.
 - c. Gravel Drives: Where the public road does not have a hard surface, the driveway may be constructed of 22A gravel. The gravel will be a minimum 6" compacted thickness within the road right-of-way and at least 5" thick on private property.
 - d. The maximum width of a driveway cut, at the roadway edge, will not exceed 40% of the overall lot frontage width or 24', whichever is less. In the event more than one residential lot is combined to allow construction of a single family residence, the driveway cut at the roadway edge will not exceed 40% of the total lot frontage width or 24', whichever is less.
 - e. Where two driveway cuts are proposed for a single residence, the following conditions must be met prior to submittal of the plot plan to the City for approval:
 - 1) Minimum lot frontage: 100'.

- 2) Maximum cut: 40% overall lot frontage; not to exceed total combined width of 48'; also not to exceed maximum 24' for a single cut.
- 3) Minimum between drives (edge to edge): 48'.
- f. The driveway cannot be located closer than 2' from the property line.
- g. The driveway approach at the roadway edge cannot extend beyond the property line extended, thereby creating an encumbrance across the frontage of the adjacent properties.
- h. The driveway approach at the roadway edge must be in front of the house or garage.
- i. All applicable ordinances of the City of Romulus, the County of Wayne, and the Michigan Department of Transportation, dependent upon jurisdictional responsibilities, must be complied with.

IX. Grading

A. General

1. All proposed developments will be graded such that storm water runoff will be intercepted within the boundaries of the site and conducted through a storm sewer system to an approved point of discharge. Open drainage ditches may be approved only where enclosed storm sewer systems are not feasible, as determined by the City Engineer.
2. No storm water runoff from developed property will be allowed to flow onto the adjacent lands of others. Filling and grading must not create a barrier causing entrapment of water on adjacent lands.
3. The developer will provide for overland flow of storm water from adjacent properties where the existing off-site land slopes to the site. The amount of runoff to be accommodated from off-site lands will be at least equal to the amount of runoff from the land in the undeveloped state.
4. Grading plans will take into account the desirable natural features and the character of the land, which must be preserved wherever possible.
5. No filling will be allowed in any areas of land within a proposed subdivision or other type of development which lie either wholly or in part within the flood plain of a river, stream, creek, or lake unless it is done under the terms of a permit granted by the EGLE.
6. Trees and stumps (removed due to grading operations), excess topsoil, surplus materials, construction debris, etc., must be removed from the site and properly disposed of by the developer.
7. Elevation representing the brick ledge, finished grade, and the first floor grade must be indicated for all houses or buildings.
8. Sufficient proposed grades indicated to ensure that:
 - a. Drainage is adequately discharged offsite with proper detention.
 - b. No upstream drainage is restricted.
 - c. Paving slopes are adequate.
 - d. The site in general drains without standing water.
9. Proposed grading must meet abutting property line elevations. Differentials in grade must incorporate a minimum four (4) horizontal to one (1) vertical slope to the abutting property line.
10. Retaining walls are generally discouraged. Any wall separating a differential grade of more than 18" will be considered a retaining structure and will require a structural engineering design and review (see Appendix F for retaining wall review guidelines).
11. Easement from adjacent property owner will be required for any grading necessary on

off-site property no later than engineering plan submittal.

B. Commercial/Industrial

1. Asphalt surface parking lots and roadways will be graded to a minimum 1% slope, (1' per 100') except where concrete curb and gutters are to be provided. Where concrete curb and gutters are to be used, the traverse slope to the gutter will be a minimum of 1% for parking lots and ¼" per foot for roadway crowns. Longitudinal gutter grades will be a minimum of 0.5% for concrete. In general, pavement grades must not exceed 6% for parking areas. The maximum longitudinal grade for roads is 4%.
2. All areas within 25' of buildings must slope away from the building at a minimum slope of 2%. All other areas must have a minimum of 1% slope.
3. All lawn or landscaped areas must drain to parking lots or swales.
4. Catch basins must be placed at all low points in parking lots and swales.
5. For industrial/commercial development, the plans should include a sufficient number of spot elevations and drainage arrows to adequately represent the direction of overland flow.
6. Existing elevations shall be provided at fifty (50) foot intervals along all site boundary lines.
7. Proposed elevations shall be provided for pavement, sidewalks, top of curbs, parking islands and additional locations as required by the City Engineer.

C. Subdivisions

1. The owner shall certify that the as-built site grading and building setbacks conform to the City-approved site and engineering drawings at the completion of the improvements. This certification shall be prepared by and bear the seal of a professional land surveyor licensed in the State of Michigan. The certification shall be submitted as directed on forms provided by the City. The following conditions shall be noted:
 - a. No certificate of occupancy will be granted until grading certificates are received and approved for each lot.
 - b. After a grading certificate is submitted, funds may be pulled from the Construction Observation escrow to have the City Engineer spot-check grades at the City's discretion. The detention pond grades may be verified at this time as well.
 - c. The Building and Zoning Official has the right to waive all or some of these grading requirements.
2. Stationing of centerline of street pavements, pavement elevations at fifty (50) foot intervals, and at all high points and all low points must be shown.
3. Top of curb or shoulder elevation opposite each front lot corner (and side lot corner for

corner lots) to hundredths (100ths) of a foot must be shown.

4. Proposed ground elevation at each lot corner (front and rear) and side lot elevations to tenths (10ths) of a foot must be shown.
5. Each single-family lot will be graded to drain away from the house to swales constructed along the lot lines. Swales will discharge to a catch basin.
6. Finished house or building grades and first floor elevations for each lot/parcel (to hundredths of a foot) must be shown inside rectangular boxes drawn comparable to a typical house to be built in the subdivision and placed within each lot according to the front yard setback.
7. Whenever swales for lot drainage are called for on the plan, swale elevations at the high point adjacent to the house, the back of the house, and the front of the house shall be provided. General flow direction of swales shall be shown with arrows. Include a typical lot-grading scheme.
8. The minimum swale from the house to the front property line or proposed sidewalk shall be one (1) percent, and the normal maximum grade shall not exceed two (2) percent.
9. The minimum grade from the house to the rear of the lot shall be one (1) percent and the maximum grade shall be three (3) percent.
10. If existing adjacent elevations to perimeter lots result in more than three (3) percent slope from the house to the rear property line, the lot will be graded from the house toward the rear at a maximum slope of two (2) percent to a point, then the remaining difference in elevation shall be at the rate of one (1) foot vertical to four (4) feet horizontal and sodded. The toe of this bank shall not extend into the easement proposed along the rear lot line.
11. The minimum longitudinal slope along the rear lot lines shall be sixty-one hundredths (0.60) feet per one hundred (100) feet.

X. Construction Specifications

A. General Requirements

1. Payment of Fees

All benefit charges, trunk line and transmission charges, tap fees and the construction observation fee deposit must be paid prior to the start of any construction.

2. Insurance

Certificates in accordance with the “General Requirements” chapter of this document must be submitted to and approved by the City prior to the start of construction.

3. Pre-construction Meeting

A pre-construction meeting must be held prior to the start of construction for all projects that involve site improvements. The proprietor will make all arrangements and schedule the meeting at least 10 days prior to start of work. Those in attendance should include representatives of:

Proprietor
Proprietor's engineer
Development coordinator
Contractors and subcontractors
Fire Chief
City Engineer
DPW
Representatives of public utilities affected

4. Shop Drawings

Shop drawings must be furnished to the City for all special fabricated structural and mechanical parts of the system as determined by the City. Operation manuals will be furnished for all water booster pump stations, sanitary lift stations, and similar installations.

5. Specifications by Reference

Whenever reference is made to generally recognized specifications, such as those promulgated by AASHTO, ANSI, MDOT, etc., such specifications shall apply and be binding as if fully set forth in this manual.

6. Prohibition of Salvaged Materials

All sewer pipes, water mains, precast structures, castings and appurtenances shall meet or exceed the specifications required in this manual. No secondhand or salvaged material will be permitted.

7. Staking

All proposed utilities, appurtenances and roads shall be properly staked for location and elevation prior to construction under the supervision of a land surveyor or engineer licensed in the state. This information shall be provided to the City prior to the start of construction.

8. Site Grading

In new developments, the entire site shall be positively graded to within six (6) inches of proposed finished grade prior to construction of any permanent improvements other than permanent soil erosion and sedimentation control facilities.

9. Trench Backfill Testing

All trench density testing will be provided by the proprietor through his engineer or an independent testing company to verify the compaction requirements to the satisfaction of the City. A sieve analysis of the backfill material will be furnished to the City for approval.

10. Trench Enclosures

All trenches shall normally be backfilled at the end of the working day. Only under special conditions and with the approval of the City shall trenches be left open overnight. Trenches which are allowed to be left open overnight shall be completely enclosed with suitable fencing and lighted barricades. When the trench contains water or when required by the City, the exposed end of the pipe shall be securely closed with a watertight plug. The end of the pipe shall be properly staked with a two-inch by two-inch marker extending to within six (6) inches of the ground surface.

11. Cleanup

General clean-up, including completion of rough grading of filled trench areas, shall continuously progress along with, and shall lag no further than one hundred (100) feet behind, the pipe installation operations. Fine grading and restoration work not dependent on weather or subject to seasonal limitation shall also progress concurrently with and shall lag no further than five hundred (500) feet behind, the pipe installation operations.

12. Construction Observation

No work on infrastructure will proceed without the presence of a city inspector or City Engineer. The contractor or representative of the proprietor will notify the DPW at (734) 942-7579 72 hours prior to start of construction.

Any work installed without Construction Observation will not be accepted by the City and will not be allowed to connect to the system.

All work shall be subject to a final Construction Observation prior to acceptance by the City.

13. Final Construction Observation

Prior to acceptance for use and maintenance by the municipality, final Construction Observations and all necessary tests of the system must be made. Any tests that fail must be repeated after repairs have been made. Any portions of the work found to be unacceptable will be repaired or replaced prior to acceptance.

14. Abandoned Utilities

All castings, hydrants, valves and similar items to be abandoned shall become the property of the City Department of Public Works and shall be returned to them.

15. Safety

Construction operations and equipment must conform to the requirements of the Michigan Occupational Safety and Health Act (MIOSHA).

B. Earthwork

1. Pavement Replacement, Temporary

All pavement removed in crossing and/or paralleling paved streets, alleys, drives and parking areas shall be temporarily replaced by the contractor immediately following completion of backfilling operations. Temporary pavements for streets and alleys shall conform to the Wayne County specifications for underground construction. Temporary pavement for driveways, including approaches and parking areas, shall consist of a minimum of three (3) inches of compacted cold patch asphalt over a minimum of seven (7) inches of compacted MDOT 22A aggregate base. All temporary pavements, including those constructed for streets, alleys, drives and parking areas, shall be maintained in good condition by the contractor until the final pavement replacement is made.

2. Pavement Cuts

Where a trench must be cut through pavement, driveway, or sidewalk, particular care shall be taken to avoid unnecessary damage to adjoining areas of the pavement, driveway or sidewalk. All cuts through existing surfaces shall be made full-depth with a concrete saw. Cuts in concrete pavement shall be made parallel with longitudinal and transverse construction or contraction joints.

Saw cuts in concrete pavement shall not be nearer than five feet (5'-0") to a transverse joint, to the centerline of pavement, or to the edge of pavement or curb, i.e., no existing or replacement pavement shall be less than five feet (5'-0") to a joint or centerline of pavement, or to edge of pavement, surfacing or curb, removal and replacement shall be extended to said joint, centerline, edge of pavement, surfacing, or curb. These same requirements shall apply to the saw cutting and replacement of concrete driveways. If a square or block of sidewalk is cut, broken, or cracked, the entire square or block shall be removed and replaced.

3. Methods of Excavation in Earth

All excavation shall be by open cut from the surface, except in special cases where boring/jacking under pavement or structures may be required, or where boring/jacking under the root system will be required for tree root protection. All excavation shall be made in such a manner and to such depth, length, and width as will give ample room for building the structures, bracing, sheeting and supporting the sides of the excavation, pumping and drainage of ground water and sewage which may be encountered, and removal of all materials excavated. Special care shall be taken so that the soil below the bottom of structures to be built shall be left undisturbed so that a firm bed will be provided for construction. Any voids shall be backfilled with suitable granular material and shall be properly compacted.

4. Trench Excavation

a. General

Excavation shall be of sufficient width and depth to provide adequate room for construction and installation of the work to the lines, grades and dimensions called for on the plans. Unless otherwise called for on the City's standard details, the width of a trench from the invert to a height twelve (12) inches above the top of the pipe barrel shall be indicated as follows:

<u>Pipe Size</u>	<u>Maximum Trench Width</u>
4" through 12"	30"
Larger than 12"	O.D. +24"

If the maximum trench width as specified above is exceeded, unless otherwise shown on the drawings, the contractor shall install, at his own expense, such concrete cradling or other bedding as is approved by the City, to support the added load of the backfill.

Where trench excavation is in granular material, the last six (6) inches of trench depth shall be carefully excavated and trimmed by hand to the exact elevation and contour of pipe. Where trench excavation is in rock or clay soil, the trench bottom shall be undercut a minimum of four (4) inches below the final elevation of pipe. The bedding material as hereinafter specified shall be placed and compacted to the underside of the pipe.

Excavation for structures shall be made to the outside lines and surfaces of such structures wherever it is practicable to build directly against the sides and bottoms of excavations. In such cases, care shall be taken not to disturb the original foundation or backing. Final trimming shall be done by hand just before construction of the structure. If excess excavation is made, or the material becomes disturbed so as to require removal beyond the prescribed limits, the resulting space shall be refilled with bedding, as specified hereinafter, and solidly machine tamped into place to 95 percent of maximum unit weight before the construction work proceeds.

Excavation for structures shall be extended sufficiently beyond the limits of the structure to provide ample room for form construction and other construction methods to be followed, wherever necessary.

b. Bedding

Where the subgrade below the bottom of the pipe is disturbed during the construction, the space shall be refilled with sand or pea gravel bedding material solidly tamped to form a firm foundation for the pipe. Sand or pea gravel bedding material shall be extended to one (1) foot above the pipe. Bedding shall be exclusively pea gravel to the springline for pipe 36-inch and greater in diameter.

c. Amount of Trench Opening

Not more than 50 feet of trench shall be open at one time in advance of the pipe unless permitted by the City. The length of street that may be occupied by the construction work at any one time shall be subject to the direction of the City and will be based on requirements of the use of the street by the public. No more than 600 consecutive feet of street length shall be occupied at one time, and vehicle traffic through the street shall not be entirely stopped without permission of the City.

After placement of the utility line, the contractor shall backfill the trench promptly in order to minimize the length of open trench and avoid any unsafe conditions.

5. Stone Refill

In locations where soil at the bottom of trench is unstable, the contractor shall excavate (undercut) below the trench bottom and refill with MDOT 6A crushed aggregate.

6. Excavation & Trench Dewatering

The contractor shall maintain any excavation or trench free of water during construction of any structures and/or pipelines.

The contractor shall take adequate precautions to control the discharge of dewatering pumps so as to prevent soil erosion or sedimentation of drainage ditches, structures, storm sewers, culverts, natural drainage courses, ponds, lakes or wetlands.

The contractor shall ensure that discharge from any dewatering operations has a suitable outlet and that it will not cause any damage to adjacent dwellings or property. Water and discharge hoses shall be placed and/or controlled so as to prevent a hazard to pedestrians or motor vehicles passing in the vicinity of the construction site.

Electric pumps shall have suitable power supply appurtenances meeting NEC requirements and properly fused and grounded to prevent electrical shock hazards to on-site personnel.

Internal combustion engine driven pumps, if operated 24 hours per day, shall have adequate exhaust silencers in good repair to muffle engine noise to an acceptable level for

the area where located.

7. Diverting Existing Sewers

Where existing sewers or drains are encountered in the work, adequate provision shall be made for diverting flow in the existing sewers so that the excavation will be kept dry during the progress of the construction work. Upon completion of the construction work, the existing sewers shall be restored or otherwise provided with an adequate outlet as directed by the City.

8. Sheeting, Bracing & Shoring

Where required to properly support the surfaces of excavations to protect the construction work, adjacent work or workers, sheeting, bracing and shoring shall be provided. In removing the sheeting and bracing after the construction has been completed, special care shall be taken to prevent any caving of the sides of the excavation and injury to the completed work or to the adjacent property.

9. Crossing Existing Structures/Pipes

During construction, it may be necessary to cross under certain sewers, drains, culverts, water lines, gas lines, electric conduits and other underground structures. Every effort shall be made to prevent damage to such structures. Wherever such structures are disturbed or broken, they shall be restored to good condition. Specified granular backfill shall be placed as described in item 11, Backfilling. MDOT Grade 30S concrete can be utilized where approved by the City. Either granular backfill or concrete shall be brought to the spring line of the higher utility.

10. Tunneling Trees

Trees eight (8) inches in diameter or less will require a minimum tunnel length of eight (8) feet. Trees over eight (8) inches in diameter, measured four (4) feet above the ground surface, will require a minimum tunnel length equal to one foot for each inch of tree diameter.

Trees shall be tunneled whenever any portion of an excavation approaches within a distance equal to one-half the required tunnel length except as otherwise noted on the plans.

Tunneling under trees may be accomplished by one of the following methods:

- a. Boring and jacking casing pipe along with placement of a carrier pipe.
- b. Boring and jacking sewer pipe or water main without a casing pipe.
- c. Jacking sewer pipe or water main without boring and without a casing pipe.

11. Backfilling

a. General

Backfilling shall include all work required as hereinafter specified. The placement of various pipe, including bedding and building of structures, shall be completed prior to backfilling.

The contractor shall backfill trenches and/or other excavations with suitable excavated material (not including gray or blue clay) replaced into the trench or excavation and compacted to not less than 95 percent of maximum unit weight as determined at existing moisture content during backfilling. Compaction shall be provided by means of suitable mechanical compaction equipment.

If the moisture content of cohesive backfill material exceeds the optimum moisture content for maximum density by more than three percent (3%), the contractor shall dry the material to meet the foregoing moisture content limitation or provide, at his own expense, MDOT Granular Material Class III. No sloppy or wet backfill will be allowed.

Maximum unit weight will be determined by current methods of Test for Compaction and Density of Soil, AASHTO Designation T-180 or by the Cone Density Method developed by MDOT, as the material may require.

The CONTRACTOR shall make compaction tests at all locations requiring granular backfill.

Any depression resulting from settlement of any backfill shall be brought to the proper grade and surface and made to match the adjacent surface.

b. Compaction

Backfill material shall be placed in layers not to exceed 12 inches in thickness unless the contractor can demonstrate to the satisfaction of the City Engineer that he can consistently attain the specified density on thicker lifts.

Specified compaction shall be obtained with the use of a bulldozer, sheepsfoot roller, mechanical tamper or other similar and effective equipment. Specified compaction means not less than 95 percent (not average 95 percent) of maximum unit weight when tested in accordance with current MDOT Specifications.

If excavated material is not suitable to obtain 95 percent minimum compaction, the contractor shall remove unsuitable materials or add granular materials, or both, to obtain ninety-five percent (95%) minimum compaction as specified.

c. Backfilling Trenches

Bedding

The type of bedding required is shown on the detail drawings.

Bedding shall be worked under the haunches of the pipe to provide firm continuous support.

Bedding placed on the sides of and above the pipe shall be compacted by machine tamping to not less than ninety-five percent (95%) of maximum unit weight in layers not exceeding 12 inches in depth.

Trench or Excavated Area

All trenches in paved streets, shoulders, traveled roadways, parking areas and driveways shall be backfilled with suitable excavated backfill or granular backfill, as shown on the drawings from one (1) foot above top of pipe up to the required subgrade elevation which will allow for placement of the required gravel base and/or pavement surface. The approved excavated backfill or granular backfill shall be placed and thoroughly and uniformly compacted by machine tamping to the specified compaction. With the approval of the City engineer, water jetting may be accepted in lieu of tamping for granular backfill only.

Specified compaction shall be required of the entire trench when the edge of trench is within three (3) feet of edge of pavement. On road crossings, specified compaction shall extend ten (10) feet beyond the edge of pavement for paved roadways with gravel shoulders or shall extend three (3) feet beyond the back of curb for roadways with curb.

Trenches under concrete sidewalks and bike paths shall be backfilled from one foot above top of pipe to a level four (4) inches below finished grade of the sidewalk with approved suitable excavated backfill or granular backfill and compacted to ninety-five percent (95%) maximum density.

Trenches not in paved streets, shoulders, traveled roadways, parking areas, driveways or under sidewalks, shall be backfilled from one (1) foot above the top of the pipe up to the ground surface with suitable excavated backfill and shall require compaction equal to adjacent undisturbed earth.

Wherever gas mains, water mains, sewers, or other utilities are located in the trench area, granular backfill shall be used for backfill from bottom of the trench up to the springline of the pipes. Granular backfill shall be placed across the full trench width and extend far enough either side of the existing pipe to allow specified compaction so as to thoroughly support the pipe within the trench area.

d. Backfilling Around Structures

As soon as practicable after concrete structures have set, forms and debris shall be removed and the surface of the concrete pointed. After the structure has been inspected and approved, the excavated area around the structure shall be backfilled up to specified subgrade with granular material or suitable excavated material as called for on the drawings for the adjacent trench. The fill shall be thoroughly compacted by machine tamping. No large boulders or masonry shall be placed in backfill. No backfill will be placed against manhole walls within 48 hours after the plaster coat has been applied to the outside of the walls nor shall

backfill be placed about concrete structures until concrete has attained at least 75 percent of its design strength and approval of the City has been obtained.

12. Disposal of Excavated Material

After all suitable excavated material has been used on site, the contractor shall be responsible for properly removing and disposing of the excess.

The contractor shall also be responsible for disposing of all other excavated materials that are unsuitable for use as fill or backfill. Unsuitable materials may include, but are not limited to, broken concrete, asphalt, rock, stone, and other related debris. The contractor shall be required to obtain his own disposal areas and permits.

Any agreements that the contractor makes with local residents concerning the placement of fill on private property shall be the sole responsibility of the contractor.

Placement of fill on private property may require that the resident or contractor obtain a grading permit or fill permit from the City.

13. Final Cleanup & Grading

Upon completion of the construction, the CONTRACTOR shall restore his working area to as clean a condition as existed before his operations were started. He shall go over the entire line and refill any place that may have settled. He shall then re-grade and put in shape all backfilled trenches, all fills he may have made from excess excavated materials, and all other areas that may have been disturbed through all operations.

14. Contractor Safety Requirements

The excavation and trenching operations shall be conducted by the contractor in a manner that will provide safe working conditions for all persons on the site who may be affected by the Work. The contractor shall also conduct his operations in a manner that will protect adjacent property from damage.

Trench sides shall be either cut back to the slope as necessitated by soil and ground water conditions which will provide stable sides or supporting systems shall be installed that are capable of restraining the earth sides from movement. A qualified employee of the contractor shall design the trench supporting systems.

The contractor shall employ, at all times at the site of the work, a qualified person who will be responsible for the safety of both the work and workmen, and who will make all the decisions relevant to the stability of trenches, the adequacy of any and all protective devices, proper operation of equipment, and all other matters related to safety.

The contractor shall not store, along and adjacent to the trench, excavated material, heavy equipment, backfill materials, sewer pipe, or other construction materials which may impose too great a load on the earth and cause displacement or caving of the earth. The contractor shall, at all times, provide a safe means of emergency exit from all trench excavations.

C. Storm Sewer Construction

1. Certification & Construction Observation

All pipe and precast structures delivered to the job shall be accompanied by certification papers showing they have been tested in accordance with applicable specifications and that they meet the specifications for the project. All pipes and precast structures will be inspected upon delivery to the job site. Any cracked, damaged or broken pieces or sections will be immediately removed from the site.

2. General

Excavation, bedding, and backfill for sewers and related structures shall be accomplished in accordance with requirements in the Earthwork Section.

Excavations shall be of sufficient widths and depths to provide adequate room for the construction and installation of the work to the lines, grades, and dimensions called for on the plans.

If the maximum trench width specified in the Earthwork Section is exceeded (unless otherwise shown on the plans), the CONTRACTOR shall install such concrete cradling or other bedding as approved by the City to support the added load of the backfill.

Install pipe, fittings, and appurtenances in strict accordance with the manufacturer's recommendations and these Specifications.

3. Laying Pipe

a. Handling Pipe & Fittings

All pipes and castings shall be unloaded and distributed along the line of work in such manner and with such care as will effectually avoid damage to any pipe or fitting. Dropping pipe or fittings directly from the truck will not be permitted. Care must also be taken to prevent abrasion of the pipe.

b. Placement of Pipe

Each pipe shall be inspected for defects prior to being lowered into the trench. The inside of the pipe and the outside of the spigot shall be cleaned of any dirt or foreign matter.

Construction shall begin at the outlet end and proceed upgrade with spigot ends pointing in the direction of flow. Pipes shall be laid on a minimum four (4) inch sand cushion. A six (6) inch sand cushion shall be provided if called for on the plan details. If the subgrade has been disturbed so that refilling is necessary to bring the pipe to grade, such refilling shall be done with sand or gravel thoroughly tamped in place. Bell holes shall be excavated so that the full length of the pipe barrel will bear uniformly on the sand cushion.

Pipes shall be centered in bells or grooves and pushed tight together to form a smooth and continuous invert. After laying pipe, care shall be taken so as not to

disturb its line and grade. Any pipe found off grade or out of line shall be re-laid properly by the CONTRACTOR.

c. Line and Grade

All pipe shall be laid to line and grade called for on the plans. Each pipe, as laid, shall be checked by the contractor with line and grade pole or other device to ensure this result is obtained. The finished work shall be straight and shall be sighted through the pipe between manholes.

d. Excavation Below Bottom of Pipe

As a result of the CONTRACTOR's construction procedure or where excavation has not uncovered a stable foundation subgrade at a depth of six (6) inches below the bottom of pipe, the CONTRACTOR shall continue to excavate downward below the bottom of pipe to reach stable foundation soil. The space resulting from such excavation and the pipe bedding shall be filled and constructed with MDOT 6A crushed aggregate and bedding as specified in the Earthwork section.

e. Laying and Bedding of PVC Pipe

Bedding of PVC pipe shall be in accordance with current ASTM specifications.

Potential damage can occur to exterior walls of PVC pipe, particularly under cold weather conditions if rocks, frozen material, or large objects strike the pipe. The contractor shall carefully avoid dumping any materials other than approved bedding sand or stone on the pipe until a 12-inch cover is placed on it. Pipe walls and joints shall also be protected from abrasion and damage during handling and shall be fully inspected just prior to placing in the trench.

Care shall be taken during bedding compaction to avoid distorting the shape of the pipe or damaging its exterior wall.

Cutting of pipe, where required, shall be performed by the use of tools or equipment that will provide a neat, perpendicular cut without damage to the pipe material.

Bowing or warping of pipe can occur with temperature fluctuations. The contractor shall store and protect the pipe to minimize bowing. Nominal 12'-6" pipe lengths that have deviations from straight greater than one (1) inch shall not be used.

f. Concrete Cradle for Pipe

Where required, pipe shall be installed with a concrete cradle of MDOT Grade 30S concrete.

Each pipe shall rest on a 6-inch minimum thickness bed of dry mix concrete that is shaped to fit the bottom of the pipe. The dry mix concrete shall be MDOT Grade 30S.

After setting the pipe, the space between the outside of the pipe and the undisturbed trench bank shall be filled to a level equal to a point 1/3 of the diameter above the pipe invert with MDOT Grade S2. The concrete shall have a five (5) inch slump and be mechanically vibrated to insure complete filling of the annular space between the excavated face of the original ground and the outside face of the pipe.

g. Jointing

Where pipe is laid in wet trenches, trenches with running sand, or in trench conditions where manual means will not allow pushing the pipe home, the CONTRACTOR shall provide and use mechanical means for pulling the pipe home and holding the pipe joints tight until completion of the line. Mechanical means shall consist of a cable placed inside the pipe with a suitable winch, jack, or come-along for pulling the pipe home and holding the pipe in position.

All joints on elliptical concrete pipe (42-inch equivalent diameter and larger) shall be cement mortar pointed on the inside. On bituminous mastic joints the compound shall be removed to a depth of three-quarters (3/4) of an inch from the inside of the joint before pointing.

h. Backfill

All storm sewer shall be constructed over four (4) inches of AASHTO Class I angular stone bedding material solidly tamped to form a firm foundation for the pipe. AASHTO Class I angular stone material shall be extended to one (1) foot above the pipe and constructed in accordance with the Earthwork section.

4. Storm Drainage Structures

Construction methods for drainage structures shall conform to MDOT Specifications, except as herein provided.

All precast sections shall bear the stamp of an approved laboratory as having been tested and delivered from tested stock of the manufacturer.

Precast sections shall be constructed so that no more than fifty (50) percent of the circumference, measured on the inside face, is deleted on any horizontal plane for sewer pipe openings. There shall be no less than twelve (12) inches of residual concrete measured on any horizontal plane between pipe openings.

PVC drainage basins shall be installed using conventional flexible pipe backfill materials and procedures. The backfill material shall be class I angular stone as defined in ASTM D2321. The surface drainage inlets shall be bedded and back-filled uniformly in accordance with ASTM D2321. The drain basin body will be cut at the time of the final grade so as to maintain a one piece, leak proof structure. No brick, stone or concrete block will be used to set the grate to the final grade height. For H-25 Load rated installations, an 8" to 10" thick concrete ring will be poured under the grate and frame as recommended by details provided by the manufacturer.

Excavation shall be carried to the depth required to permit the construction of the base in

accordance with the requirements of the standard details. The excavation shall be sufficiently wide to allow for shoring, bracing, or formwork, should any or all be necessary. Also, the excavation shall allow for accessibility in plastering the exterior of all brick masonry. The bottom of the excavation shall be trimmed to a uniform horizontal bed to receive the concrete base. The excavated section shall be completely dewatered before any concrete is placed therein.

With the exception of drainage structures having sumps, the bottom of the structures shall be channeled to provide for smooth flow through the manhole. Channels shall be formed using MDOT Grade S2 concrete.

Connections to manholes shall be properly supported and braced where not resting on original ground so that any settlement will not disturb the connection.

5. Final Grade Adjustments

Final grade adjustments may be made using either brick and mortar construction or precast concrete adjustment rings at the option of the contractor.

The maximum allowable grade adjustment using grade rings shall be fifteen (15) inches. Final grade adjustment for manholes located in pavements and sidewalks shall be made with brick and mortar. A minimum of three (3) or maximum of six (6) courses of brick shall be placed on top of the precast cone section.

6. Stubs, Connections, and Bulkheads

Existing sewers shall be connected where called for on the plans. Bulkheads shall be placed or removed where called for on the plans.

Unless otherwise noted on the plans, stubs twelve (12) inches or larger in diameter shall consist of one full length of concrete storm sewer pipe, minimum length eight (8) feet, with watertight brick and mortar bulkhead. Unless otherwise noted on the plans, stubs four inches (4-inch) to ten inches (10-inch) in diameter shall consist of one full length of plastic storm sewer pipe, minimum length of eight (8) feet, with an expandable plug or removable cap.

7. Cleaning

All sewers shall be thoroughly cleaned and videotaped before final acceptance.

8. Testing

a. General

The contractor shall provide all necessary equipment and labor for making the tests and cost of same shall be incidental to the unit price bid for sewer.

b. Deflection Test for Plastic Pipe

The allowable maximum deflection shall be five (5) percent of internal pipe diameter. A Deflection Test Gauge (Go, No-Go) as manufactured by Hurco

Technologies, Cherne Industries, or approved equal shall be used to verify that the maximum allowable deflection standard is met. The test gage must have a minimum of 9 points. Proving rings must be provided to verify the gauge diameter. The gauge must be pulled through manually. Force will not be allowed. The test shall be performed no sooner than 30 days after the pipe installation. Pipe with deflections greater than five (5) percent will be considered unacceptable and shall be replaced by the CONTRACTOR.

c. Videotaping (Public Storm Sewers)

As a means of ensuring that pipe laying was done properly and that all joints are in a "home" position, the contractor shall provide for videotaping of the pipe laid (pipe 36" diameter and smaller). The City shall indicate which pipe runs are to be videotaped. The videotaping shall be done no sooner than thirty (30) days after sewer installation is complete. The CONTRACTOR shall provide twenty-four (24) hours notice to the City prior to videotaping so that a representative may be present. A satisfactory review of the videotape by the City shall be a condition for sewer acceptance by the City. Typical items to be reviewed on the videotape will include pipe deflection, pipe settlement, connections, joints and pipe cleanliness. If the videotape review reveals unsatisfactory conditions, the contractor shall correct the conditions and shall re-videotape the affected pipe sections for review by the City.

D. Sanitary Sewer Construction

1. Certification & Construction Observation

All pipe and precast structures delivered to the job shall be accompanied by certification papers showing they have been tested in accordance with applicable specifications and that they meet the specifications for the project. All pipes and precast structures will be inspected upon delivery to the job site. Any cracked, damaged or broken pieces or sections will be immediately removed from the site.

2. General

Excavation, bedding, and backfill for sewers and related structures shall be accomplished in accordance with requirements in the Earthwork section.

Excavations shall be of sufficient width and depth to provide adequate room for the construction and installation of the work to the lines, grades, and dimensions as called for on the plans.

If the maximum trench width specified in the Earthwork section is exceeded, unless otherwise shown on the plans, the contractor shall install, at his own expense, such concrete cradling or other bedding as approved by the City engineer to support the added load of the backfill.

Install pipe, fittings and appurtenances in strict accordance with the manufacturer's recommendations and these Specifications.

3. Laying Pipe

a. Handling Pipe & Fittings

All pipes and castings shall be unloaded and distributed along the line of work in such manner and with such care as will effectually avoid damage to any pipe or fitting. Dropping pipe or fittings directly from the truck will not be permitted. Care must also be taken to prevent abrasion of the pipe.

b. Placement of Pipe

Each pipe shall be inspected for defects prior to being lowered into the trench. The inside of the pipe and the outside of the spigot shall be cleaned of any dirt or foreign matter.

Construction shall begin at the outlet end and proceed upgrade with spigot ends pointing in the direction of flow. Pipes shall be laid on a minimum four (4) inch sand cushion. A six (6) inch sand cushion shall be provided if called for on the plan details. If the subgrade has been disturbed so that refilling is necessary to bring the pipe to grade, such refilling shall be done with sand or gravel thoroughly tamped in place. Bell holes shall be excavated so that the full length of the pipe barrel will bear uniformly on the sand cushion.

Pipes shall be centered in bells or grooves and pushed tight together to form a smooth and continuous invert. After laying pipe, care shall be taken so as not to disturb its line and grade. Any pipe found off grade or out of line shall be relaid properly by the contractor.

c. Line and Grade

All pipe shall be laid to the line and grade called for on the plans. Each pipe, as laid, shall be checked by the CONTRACTOR with line and grade pole or other device to ensure this result is obtained. The finished work shall be straight and shall be sighted through the pipe between manholes.

d. Excavation Below Bottom of Pipe

As a result of the contractor's construction procedure or where excavation has not uncovered a stable foundation subgrade at depth of six (6) inches below the bottom of pipe, the contractor shall continue to excavate downward below the bottom of pipe to reach stable foundation soil. The space resulting from such excavation and the pipe beddings shall be filled with MDOT 6A crushed aggregate and bedding material.

e. Laying and Bedding of the PVC and PVC Truss Pipe

Bedding of PVC Pipe shall be in accordance with current ASTM specifications.

Potential damage can occur to exterior walls of PVC pipe, particularly under cold

weather conditions, if rocks, frozen material, or large objects strike the pipe. The CONTRACTOR shall carefully avoid dumping any materials other than approved bedding sand or stone on the pipe until a 12-inch cover is placed on it. Pipe walls and joints shall also be protected from abrasion and damage during handling and shall be fully inspected just prior to placing in the trench.

Care shall be taken during bedding compaction to avoid distorting the shape of the pipe or damaging its exterior wall.

Cutting of pipe where required, shall be performed using tools or equipment that will provide a neat, perpendicular cut without damage to the pipe material.

Bowing or warping of pipe can occur with temperature fluctuations. The contractor shall store and protect the pipe to minimize bowing. Nominal 12' - 6" pipe lengths that have deviations from straight greater than one (1) inch shall not be used.

f. Concrete Cradle for Pipe

Where called for on the drawings, or otherwise required, pipe shall be installed with a concrete cradle of MDOT Grade S2 concrete.

Each pipe shall rest on a six (6)-inch minimum thickness bed of dry mix concrete that is shaped to fit the bottom of the pipe. The dry mix concrete shall be MDOT Grade S2.

After setting the pipe, the space between the outside of the pipe and the undisturbed trench bank shall be filled to a level equal to a point 1/3 of the diameter above the pipe invert with MDOT Grade S2 concrete. The concrete shall have a five (5) inch slump and be mechanically vibrated to insure complete filling of the annular space between the excavated face of the original ground and the outside face of the pipe.

g. Jointing

Where pipe is laid in wet trenches, trenches with running sand, or in trench conditions where manual means will not allow pushing the pipe home, the CONTRACTOR shall provide and use mechanical means for pulling the pipe home and holding the pipe joints tight until completion of the line. Mechanical means shall consist of a cable placed inside the pipe with a suitable winch, jack, or come-along for pulling the pipe home and holding the pipe in position.

All joints on pipe thirty-six (36) inches and larger shall be cement mortar pointed on the inside. On bituminous mastic joints the compound shall be removed to a depth of three-quarters (3/4) of an inch from the inside of the joint before pointing.

h. Backfill

Backfill shall be placed in accordance with the Earthwork section.

4. Sanitary Structures

a. General

Construction methods for sanitary structures shall conform to MDOT 403, except as herein provided.

All precast sections shall bear the stamp of an approved laboratory as having been tested and delivered from tested stock of the manufacturer.

Precast sections shall be constructed so that no more than fifty (50) percent of the circumference, measured on the inside face, is deleted on any horizontal plane for sewer pipe openings. There shall be no less than twelve (12) inches of residual concrete measured on any horizontal plane between pipe openings.

Excavation shall be carried to the depth required to permit the construction of the base in accordance with the requirements of the standard details. The excavation shall be sufficiently wide to allow for shoring, bracing, or formwork, should any or all be necessary. The excavation shall allow accessibility for plastering the exterior of all brick masonry. The bottom of the excavation shall be trimmed to a uniform horizontal bed to receive the concrete base. The excavated section shall be completely dewatered before any concrete is placed therein.

With the exception of sanitary structures having sumps, the bottom of the structures shall be channeled to provide for smooth flow through the manhole. Channels shall be formed using MDOT Grade S2 concrete.

Connections to manholes shall be properly supported and braced where not resting on original ground so that any settlement will not disturb the connection.

b. Drop Manholes

Exterior drop manhole connections shall be constructed on sanitary manholes in conformance with the standard details whenever a sewer enters a manhole at an elevation of eighteen (18) inches or more above the invert of the outlet sewer pipe.

c. Test Manholes

The first manhole upstream from the point of connection to the existing sanitary sewer system shall have a one (1) foot deep sump that shall be filled with concrete and channeled upon successful completion of infiltration testing.

The outlet pipe from this manhole shall be plugged with a waterproof stopper to prevent discharge to the existing system until acceptance of the new system by the City. The requirement to provide a sump may be waived by the City where testing is to be done by either low pressure air testing or by exfiltration testing.

d. Final Grade Adjustments

Where sanitary manholes are located outside of pavements and sidewalks, final grade adjustments shall be made with precast concrete grade rings. Brick construction will not be allowed except where located in paved surfaces and approved by the City. The manhole casting frame and concrete adjustment rings shall be secured to precast cone section with a minimum of four (4) five-eighths (5/8) inch diameter cadmium coated threaded studs or bolts. All joints in the assembly shall be sealed with either rubber O-ring gaskets or butyl rope as called for on the City's standard details. The maximum allowable grade adjustment using grade rings shall be fifteen (15) inches. Final grade adjustment for manholes located in pavements and sidewalks shall be made with brick and mortar. A minimum of three (3) or maximum of six (6) courses of brick shall be placed on top of the precast cone section.

The contractor shall provide a rubber wrap, elastomeric seal, or approved equal for water tightness around the chimney.

5. Stubs, Connections, and Bulkheads

Existing sewers shall be connected in where called for on the plans. Bulkheads shall be placed or removed where called for on plans.

Unless otherwise noted on the plans, stubs shall consist of one length of sewer pipe with watertight stopper bulkhead or, where approved by the City, a brick and mortar bulkhead. Pipe stubs shall be of the same material as the sewer to which they connect unless specified otherwise.

6. Service Leads

a. Wyes and Risers

Wye branches, tees, or stubs fitted with suitable stoppers shall be set for each lot shown, and at such other points as called for on the plans.

Risers shall be six (6) inch pipe and shall be constructed where shown on the plans. They shall connect to wye branches and shall be constructed as shown on the City's standard detail sheet to a depth of 8 feet below the surface of the ground unless otherwise instructed by the City. A pipe stopper shall be placed in the top bell. Fittings and stoppers shall be equipped with the allowable type of joint used on the sewer. Backfill at all risers shall be carefully placed and tamped sufficiently to insure against damage from backfill settlement.

b. House Connections

The contractor shall construct house connections as shown on the plans. A pipe stopper shall be placed in the end of the connection. Pipe and stopper shall be equipped with the allowable type of joint used on the sewer.

The invert of the house connections at the point of terminus shall be a minimum of 8 feet below grade at the property line (for basement service) except where

otherwise directed by the City.

c. Markers

The contractor shall also furnish and place a three (3) inch minimum diameter wood or plastic marking post, three (3) feet in length, to be set directly above the end of the house connection or riser. Each marker shall be set so it will be in a vertical position when backfill is completed. The top of marker shall be 3 feet below the ground surface.

d. "Inserta Tee" service connections, or approved equal, may be used where service leads are needed and there is no existing wye or riser.

7. Cleaning

All sewers shall be thoroughly cleaned before final acceptance.

8. Sanitary Sewer Acceptance Tests

a. General

All sanitary sewers shall be subjected to infiltration, exfiltration or low pressure air tests, or a combination thereof prior to final acceptance by the City. In addition, all PVC plastic sewers shall be subjected to deflection testing by means of a nine-point deflection test mandrel.

The City inspector shall be present for all testing operations. If testing is to be done by the contractor, only properly trained personnel shall be allowed to perform the testing work. If testing is to be done by municipal agency work forces, then the contractor shall be responsible for coordinating with the inspector in order to schedule the testing.

In the event that the sewer pipe fails any of the required tests, the CONTRACTOR shall be responsible for repairing the pipe and repeating the test until acceptable results are achieved.

The method of testing and measurement shall be approved by the City. The CONTRACTOR shall provide all necessary equipment and labor for making the tests.

b. Infiltration Test

All sanitary sewers shall be subjected to an infiltration test.

The infiltration rate for all sanitary sewers shall not exceed a maximum of one hundred (100) gallons per inch diameter per mile of sewer per twenty-four (24) hours.

c. Low Pressure Air Test

All sanitary sewers that are twenty-four (24) inches in diameter or smaller and where the ground water level is seven (7) feet or less above the top of the sewer

shall be subjected to a low pressure air test.

The procedure for air testing of sewers shall be as follows:

The sewer line shall be tested in increments between manholes. The line shall be cleaned and plugged at each manhole. Such plugs shall be designed to hold against the test pressure and shall provide an airtight seal. One of the plugs shall have an orifice through which air can be introduced into the sewer. An air supply line shall be connected to the orifice. The supply line shall be fitted with suitable control valves and a pressure gauge for continually measuring the air pressure in the sewer. The pressure gauge shall have a minimum diameter of three and one-half (3-1/2) inches and a range of 0 – 10 PSIG. The gauge shall have minimum divisions of 0-10 PSIG and accuracy of plus or minus (+/-) 0.04 PSIG.

The sewer shall be pressurized to 4 PSIG greater than the greatest back pressure caused by ground water over the top of the sewer pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize between three and one half (3.5) and four (4) PSIG. If necessary, air shall be added to the sewer to maintain a pressure of 3.5 PSIG or greater.

After the stabilization period, the air supply control valve shall be closed so that no more air will enter the sewer. The sewer air pressure shall be noted and timing for the test begun. The test shall not begin if the air pressure is less than three and one half (3.5) PSIG, or such other pressure as is necessary to compensate for ground water level.

The time required for the air pressure to decrease one (1.0) PSIG during the test shall not be less than the time shown in the following Air Test Tables. The CONTRACTOR shall use the appropriate test table based upon the sewer pipe material.

Table SA-2
Air Test Table for Vitrified Clay and Concrete Pipe

Specification Time (min:sec) Required for Pressure Drop from 3-1/2 to 2-1/2 PSIG When Testing One Pipe Diameter Only Pipe Diameter, Inches																
Length of Line, Feet		4	6	8	10	12	15	18	21	24	27	30	33	36	39	42
	25	0:04	0:10	0:18	0:22	0:27	0:32	0:36	0:45	0:54	1:03	1:12	1:21	1:30	1:39	1:50
	50	0:09	0:21	0:36	0:45	0:54	1:03	1:12	1:30	1:48	2:06	2:24	2:42	3:00	3:18	3:39
	75	0:14	0:32	0:54	1:08	1:21	1:34	1:48	2:15	2:42	3:09	3:36	4:03	4:30	4:57	5:29
	100	0:18	0:42	1:12	1:30	1:48	2:06	2:24	3:00	3:36	4:12	4:48	5:24	6:00	6:36	7:18
	125	0:22	0:52	1:30	1:52	2:15	2:38	3:00	3:45	4:30	5:15	6:00	6:45	7:30	8:15	9:08
	150	0:27	1:03	1:48	2:15	2:42	3:09	3:36	4:30	5:24	6:18	7:12	8:06	9:00	9:54	10:57
	175	0:32	1:14	2:06	2:38	3:09	3:40	4:12	5:15	6:18	7:21	8:24	9:27	10:30	11:33	12:47
	200	0:36	1:24	2:24	3:00	3:36	4:12	4:48	6:00	7:12	8:24	9:36	10:48	12:00	13:12	14:36
	225	0:40	1:34	2:42	3:22	4:03	4:44	5:24	6:45	8:06	9:27	10:48	12:09	13:30	14:51	16:26
	250	0:45	1:45	3:00	3:45	4:30	5:15	6:00	7:30	9:00	10:30	12:00	13:30	15:00	16:30	18:16
	275	0:50	1:56	3:18	4:08	4:57	5:46	6:36	8:15	9:54	11:33	13:12	14:51	16:30	18:09	20:06
	300	0:54	2:06	3:36	4:30	5:24	6:18	7:12	9:00	10:48	12:36	14:24	16:12	18:00	19:48	21:54
	350	1:03	2:27	4:12	5:15	6:18	7:21	8:24	10:30	12:36	14:42	16:48	18:54	21:00	23:06	25:33
	400	1:12	2:48	4:48	6:00	7:12	8:24	9:36	12:00	14:24	16:48	19:12	21:36	24:00	26:24	29:12
	450	1:21	3:09	5:24	6:45	8:06	9:27	10:48	13:30	16:12	18:54	21:36	24:18	27:00	29:42	32:51
	500	1:30	3:30	6:00	7:30	9:00	10:30	12:00	15:00	18:00	21:00	24:00	27:00	30:00	33:00	36:30

Note: Table SA-2 is taken from the National Clay Pipe Institute (NCPI) tables which are based upon ASTM C828 “Test Method for Low Pressure Air Test for Vitrified Clay Pipe Lines” and ASTM C924 “Standard Practice for Testing Concrete Pipe Sewer Lines by Low Pressure Air Test Method”.

Table SA-3
Air Test Table For PVC Pipe
Minimum Specified Time Required for a 1.0 PSIG Pressure Drop
For Size and Length of Pipe Indicated for Q=0.0015 *

Pipe Dia., Inches	Minimum Time, (min:sec)	Length for Minimum Time, ft.	Time for Longer Length, seconds	Specified Time for Length (L) Shown, (min:sec)							
				100 feet	150 feet	200 feet	250 feet	300 feet	350 feet	400 feet	450 feet
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:43	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	203:46

Note: Table SA-3 is taken from ASTM F1417 “Standard Test Method for Installation and Acceptance of Plastic Gravity Sewer Lines Using Low Pressure Air Test”. ASTM F1417 conforms to Uni-Bell “Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe” (UNI-B-6-98).

Q is the allowable leakage rate in cubic feet/minute/square foot of inside surface are of pipe.

d. Exfiltration Test

Exfiltration or leakage from the sewer line can be measured by recording the water level drop over a given period of time in a standpipe placed and connected in the upstream manhole. The measured drop in the time period can be converted by calculations to the leakage rate in terms of gallons per inch of pipe diameter per mile per day.

Exfiltration tests may be substituted for low pressure air tests where approved by the City engineer. Exfiltration tests will not be allowed where the external water pressure exceeds four (4) feet.

For the purpose of exfiltration testing, the internal water level shall be equal to the external water level plus four (4) feet as measured from the top of the highest pipe in the system being tested. This could be either a house lead or a lateral. However, the maximum total height of water above the invert of the pipe at the lower end shall not exceed sixteen (16) feet. A prospective test that would exceed this sixteen (16) foot limit should not be taken. The line under construction can be broken down into smaller sections such that the maximum head of sixteen (16) feet will not be exceeded.

The maximum exfiltration rate shall be the same as that permitted for the infiltration test. The exfiltration test procedure is summarized as follows:

- 1) All service laterals, stubs and fittings into the sewer line(s) being tested should be properly capped or plugged, and carefully braced to resist the thrust actions developed by the internal water pressure. In preparing the blocking of plugs or end caps, it is extremely important to recognize that the five (5) to ten (10) feet of head in the standpipe will exert considerable thrust against the plugs or caps.
- 2) A plug is inserted and tightened in the inlet pipe of the downstream manhole to which the water supply connection is made for filling the pipe.
- 3) The upper manhole is plugged and securely tightened for connection to the standpipe. The standpipe is then placed in this manhole and connected to the tapped plug. The standpipe must be capable of handling from five (5) to ten (10) feet of water head to determine the tightness and soundness of the sewer line, as specified and directed by the City Engineer.
- 4) Water is introduced into the line at the downstream (lower) manhole until the standpipe in the upstream manhole has been completely filled. By filling the line from the lowest level, the air in the line is easily pushed ahead and, finally expelled through the standpipe at the upper end of the test section. Care should be taken to minimize entrapped air that will give distorted test results. The rate of drop in the standpipe may be quite rapid until the air has been expelled.
- 5) After filling with water, the line must be allowed to stand for at least four (4) hours before beginning the test. During this time some water absorption into the manhole structures and sewer pipe will take place. After the water absorption has stabilized, the water level in the standpipe is checked and water added if necessary.
- 6) The test is now ready to begin. The drop in the standpipe is measured and recorded over a fifteen (15) minute period. To verify the first results, a second fifteen (15) minute test is suggested. This will also verify whether a stable condition exists in the line.
- 7) The measured drops in the standpipe are converted to leakage in terms of gallons per inch diameter per mile per day.
- 8) Another commonly used method of conducting water exfiltration testing is to utilize the manhole in lieu of a standpipe. The test procedure is exactly as outlined for using the standpipe. However, since the manhole is larger in diameter than the standpipe, this method normally requires a minimum two (2) hour test period in order to be able to record a

measurable water level drop. Manhole leakage must also be considered in the leakage rate and test results.

- 9) Caution should be taken about conducting exfiltration tests on sewer lines laid on steep grades. Consideration must be given to the downstream portion of the system to prevent excessive pressures in these lower lines. For these installations and where the upstream manholes are very deep, it is not advisable to fill the standpipe or manhole to the top when performing the test.

e. Deflection Test for Plastic Pipe

The allowable maximum deflection shall be five (5) percent of internal pipe diameter. A deflection test gauge (Go, No-Go Gauge) as manufactured by Hurco Industries, Cherne Industries, or approved equal shall be used to verify that the maximum allowable deflection standard is met. The test gauge must have a minimum of 9 points. Proving rings must be provided to verify the gauge diameter. The gauge must be pulled through manually. Force will not be allowed. The test shall be performed no sooner than 30 days after the pipe installation. Pipe with deflections greater than five (5) percent will be considered unacceptable and shall be re-laid by the CONTRACTOR.

f. Videotaping

As a means of insuring that pipe laying was properly done and that all joints are in a "home" position, the CONTRACTOR shall provide videotaping of all of the pipe laid that is thirty-six (36) inches in diameter and smaller. This videotaping shall be done no sooner than thirty (30) days after sewer installation is complete. The CONTRACTOR shall provide twenty-four (24) hours notice to the City prior to videotaping so that a representative may be present. A satisfactory review of the videotape by the City shall be a condition for sewer acceptance by the City. Typical items to be reviewed on the videotape will include pipe deflection, pipe settlement, lead connections, joints and pipe cleanliness. If the videotape review reveals unsatisfactory conditions, the CONTRACTOR shall correct the conditions and shall re-videotape the affected pipe sections for review by the City. Two copies of the videotape must be given to the DPW.

E. Water Main Construction

1. Agency Standards

The contractor shall install all pipe materials according to AWWA Standard.

2. Certification & Construction Observation

All pipe and fittings delivered to the job shall be accompanied by certification papers showing that pipe and fittings have been tested in accordance with the applicable specifications and that pipe and fittings meet the specifications for this project. All pipe and fittings will be inspected upon delivery to the job site. No cracked, broken or damaged pipe or fitting will be allowed in this work. Rejected pipe and fittings will be immediately removed from the job site by the contractor at his expense.

Pipe ends shall be capped and placed on pallets when stored onsite.

Each piece of ductile iron pipe shall have its own weight and class designation conspicuously painted or cast on it. All other pipe materials shall have the class designation painted thereon. Where required, other designation marks shall be painted on the pipe or fittings to indicate correct location in the pipe line in conformity to a detailed laying schedule.

3. General

Excavation, bedding, and backfill for water main related structures shall be accomplished in accordance with requirements in the Earthwork section.

Excavations shall be of sufficient width and depth to provide adequate room for the construction and installation of the work to the lines, grades, and dimensions as called for on the plans.

Install pipe, fittings and appurtenances in strict accordance with manufacturer's recommendations and these specifications.

4. Laying Pipe

a. Line and Grade

Pipe shall be carefully laid to line and grade and shall have bearing over its entire length except at joints where the joint hole shall be of such size as to give adequate room for working. Pipe shall be laid with a minimum cover as shown on the standard details.

b. Preparation of Trench Bottom

Trench bottom preparation and backfilling shall be as follows: The trench width shall be a minimum of thirty (30) inch wide or as called for in the City's standard details. Trench depths shall be as shown on the plans and generally shall provide not less than five and one half (5.5) feet of cover from top of water main to final surface grade above such mains. The bottom of trench in rock or cohesive soil shall be excavated neatly to the required grade. The trench bottom shall be filled with approved granular material in accordance with the standard details and shall be thoroughly compacted by tamping before the pipe is laid. The bedding shall be dug out at each bell end of the pipe to conform to the shape of the bell. Blocking under pipe is strictly prohibited.

c. Handling Pipe & Fittings

All pipes and castings shall be unloaded and distributed along the line of work in such manner and with such care as will effectually avoid damage to any pipe or fitting. Pipe ends shall be capped. Dropping pipe or fittings directly from the truck will not be permitted. Care must also be taken to prevent abrasion of the pipe coating. Wherever the coating may have been rubbed off, the part shall be recoated as may be required by the nature of the pipe coating.

d. Installation of Pipe

Installation of water main shall be made in accordance with the published installation guide of the pipe manufacturer except as otherwise specified herein. Whenever instructions given by the manufacturer are at variance with the provisions specified herein, the laying standards provided herein shall govern.

Proper tools, including pipe pullers, special cutters, spacing yokes, machining tools, test caps, ring feeler gauges, etc. shall be provided at the site of the work for installation of the pipe.

Immediately before laying each section of pipe or fitting, it shall be thoroughly cleaned of all debris; dirt or other accumulated foreign material. It shall be inspected for damage to the coating or pipe material and repairs shall be made where required. If deemed irreparable by the City, then it shall be removed from the job site. Care shall be taken to keep the interior of previously laid pipe clean and free from dirt and other foreign material. Bulkheads or other means shall be used at the open end of the previously laid pipe for this purpose.

After a length of pipe is placed in the trench, the spigot shall be centered in the bell of the adjacent pipe, the pipe shoved into proper position in the collar or bell and brought into true alignment. The pipe shall then be secured with earth that is carefully tamped under and on each side of the pipe.

e. Excavation Below Bottom of Pipe

As a result of the contractor's construction procedure or where excavation has not uncovered a stable foundation subgrade at depth of six (6) inches below the bottom of pipe, the contractor shall continue to excavate downward below the bottom of pipe to reach stable foundation soil. The space resulting from such excavation and the pipe beddings shall be filled with MDOT 6A crushed aggregate and bedding.

f. Backfill

Backfill shall be placed in accordance with the Earthwork section.

5. Defective Pipe & Fittings

No pipe or fittings known to be defective shall be laid in the work. Any piece found to be defective after it has been laid shall be removed by the contractor and replaced with a sound piece. If the major part of a defective pipe is sound, the good end may be cut off and used. Every such cut shall be square and ground smooth. Cut surfaces of ductile iron pipe shall be painted with two coats of approved asphaltum metal protective paint where required by the City.

6. Joint Restraint

All pipe deflections greater than or equal to 11.25 degrees and all tees shall be restrained, tied or harnessed in a manner acceptable to the City. The restraint shall be applied to joints each way from the deflection or tee an adequate distance to resist the axial thrust of

the test pressure. Details of all proposed joint restraint, showing type and locations, shall be submitted to the City for approval.

Where specifically allowed by the DPW Director, thrust blocks may be used at tees, bends, and ends as shown in the standard details.

Acceptable methods of joint restraint shall be as listed below unless otherwise specified on the construction plans.

a. Ductile Iron Pipe

MEGALUG Series 1100 joint restraint for Ductile Iron as manufactured by EBAA Iron, Inc. or approved equal.

b. PVC Pipe

MEGALUG Series 2000 joint restraint for PVC as manufactured by EBAA Iron, Inc. or approved equal.

7. Service Connections & Taps

Water mains shall be tapped for corporation stops where shown on the plans or required for testing and sterilization of completed water mains. For ductile iron pipe, stops shall be threaded directly into the pipe.

8. Fittings, Valves, Hydrants & Adapters

Valves, fittings and hydrants shall be installed using current standards for joints. Wherever adapters are required to connect the proposed water main with an existing pipe of another material, the nominal I.D. of the adapter shall not be smaller in diameter than either of the adjacent pipes. Special machine-faced parts shall be provided where required to connect to existing mains.

Air release valves shall be provided at high points in the water main line.

9. Setting Hydrants

At points indicated on drawings, a hydrant assembly shall be installed consisting of a hydrant, six (6) inch gate valve, cast iron valve box, and all pipe necessary for a complete job. Valves shall be located three (3) feet from the hydrant or as shown on typical setting detail on the standard details.

If hydrants are furnished with drain outlets, the outlets shall be permanently capped or plugged.

Each hydrant shall be set truly plumb and held firmly braced in this position. Connection of the hydrant to the branch and the joint restraint shall be made according to the standard details.

After hydrants have been set and tested, the part above ground shall be painted with two coats of first quality metal protective paint (red in color).

10. Final Grade Adjustments

Final grade adjustments may be made using either brick and mortar construction or precast concrete adjustment rings at the option of the contractor.

The maximum allowable grade adjustment using grade rings shall be fifteen (15) inches. Final grade adjustment for manholes located in pavements and sidewalks shall be made with brick and mortar. A minimum of three (3) or maximum of six (6) courses of brick shall be placed on top of the precast cone section.

11. Hydrant Testing

Each hydrant assembly shall be tested by the contractor. Test shall consist of flushing the hydrant for a minimum of ten (10) minutes. During test period, the six (6) inch gate valve shall be closed and opened. The contractor shall furnish necessary hoses for disposal of water. A testing schedule and method of disposing of flushing water shall be submitted to the City for approval. The contractor shall coordinate the testing schedule with the Fire Department and the City.

The contractor shall provide all necessary equipment and labor for making the tests.

12. Connection to Existing Mains

Where shown on the plans, connection of existing mains to new mains will be done only after the new mains have been satisfactorily pressure-tested and are shown to be sterile by results of the bacteriological analysis.

13. Flushing of Water Mains

Prior to disinfections and hydrostatic testing, newly constructed water mains less than twenty-four (24) inches in diameter shall be thoroughly flushed to remove all accumulated debris that may have entered the line during construction. Flushing shall include the use of a "polly pig" or approved equal equipment, to remove accumulated deposits. The frequency of running the "polly pig" through the water mains shall be determined by the debris discharging from the effluent. Several passes with the "polly pig" through the newly constructed system may be required before the main is acceptable. Procedures for use of the "polly pig", or approved equal equipment, shall be per the manufacturer's specifications. Mains twenty-four (24) inches in diameter and larger shall be manually cleaned and inspected during installation.

14. Sterilization of Mains

After flushing, the water mains shall be chlorinated in accordance with AWWA C651 "Disinfecting Water Mains," (latest revision).

The three methods for chlorination that are described in AWWA C651 are summarized as follows:

- | | | |
|----|-------------------------------|--|
| a. | Tablet
Method: | Requires an average
chlorine dose of approximately 24 ppm over 24 hours. |
| b. | Continuous
Feed
Method: | Requires an initial concentration of 25 ppm
and a residual of not less than 10 ppm after
24 hours. |
| c. | Slug
Method: | Requires an initial concentration of 100 ppm for
at least 3 hours. |

After the applicable retention period, heavily chlorinated water should not remain in prolonged contact with the pipe. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system or is acceptable for domestic use.

After final flushing and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least twenty-four (24) hours apart shall be collected from the new main. At least one set of samples shall be collected from every 1,200 feet (366 meters) of the new water main, plus one set from the end of the line and at least one set from each branch. All samples shall be tested for bacteriological quality and shall show the absence of coliform organisms. Analysis of each sample must be made by a laboratory approved by the EGLE.

If this analysis shows the presence of harmful bacteria, the CONTRACTOR shall repeat the sterilization process until such time as the mains are shown to be sterile by the results of the bacteriological analysis.

The contractor shall furnish chlorine and all necessary labor and equipment for its application. The contractor shall make suitable arrangements with the City for bacteriological analysis. The contractor shall dispose of high residual chlorine water by a method approved by the City.

Mains twenty-four (24) inches in diameter and larger shall be chlorinated in sections between main line valves. Chlorine solution shall be renewed and transferred to the next adjacent section of pipe minimizing the volume of water needed to sterilize the main.

15. Hydrostatic Testing of Water Mains

Within a reasonable length of time following pipe-laying and backfilling, the contractor shall complete all work necessary to perform hydrostatic testing.

The hydrostatic testing shall be conducted in accordance with AWWA C600 "Installation of Ductile Iron Water Mains and Their Appurtenances" (latest revision).

The contractor shall perform all necessary preliminary hydrostatic tests and shall make all necessary repairs, including the repair of all visible leaks and cracks, and retests with his own forces to ready the water mains for final hydrostatic Construction Observation and

testing. Immediately after the water mains have passed such preliminary tests, the contractor shall perform a final hydrostatic Construction Observation and test.

The hydrostatic test shall be conducted before the new water main is connected to the existing water system, except as specified below. The contractor shall furnish all necessary personnel, temporary blow-offs, plugs, bracing, test pumps and all other necessary apparatus for conducting the test. Testing shall be conducted under the observation of the City.

At the option of the City, the contractor may test against closed valves providing that the new main to be tested and the testing apparatus shall have first been flushed and chlorinated in accordance with accepted procedure. After chlorination and subsequent flushing, a sample of water must show safe bacteriological results through a test by a recognized laboratory. In the event of an unsatisfactory hydrostatic test the contractor will cut the new main, install caps or plugs, pressure test and re-chlorinate.

Before applying test pressure, all air shall be expelled from the pipe. If necessary to accomplish this, taps shall be made at points of highest elevation in the pipe and such openings subsequently closed, prior to test, with tight threaded brass plugs.

For ductile iron water main, test pressure shall be maintained at 150 psi at the point of highest elevation in the test section by pumping potable water into the pipe for a period of at least two (2) hours and in all cases long enough to permit assurance of a satisfactory test. Leakage is measured by the quantity of water pumped into the pipe to maintain 150 psi.

According to AWWA C600, for ductile iron water main, the leakage during the test shall not exceed a rate of:

$$L = \frac{S * D \sqrt{P}}{133,200}$$

Where:

L = Allowable Leakage (gallons per hour)

S = Length of Pipe Tested (feet)

D = Nominal Pipe Diameter (inches)

P = Average Test Pressure (psi)

Minimum size pressure gauge is to be three and one-half (3-1/2) inch in one (1) pound increments. Any faulty pipe, fittings, gate valves or other accessories disclosed by testing shall be replaced with sound materials and the test shall be repeated as often as necessary until the specified requirements have been met.

If a pipeline is predominantly comprised of Fusible PVC® pipe joined with butt-fusion joints, it will not have any gaskets to allow for leakage. Leakage testing and “test allowance” is intended for those sections that contain gasket-seal connections and

fittings. A method that has been used to modify the “test allowance” for a pipeline comprised of both Fusible PVC® pipe joints and gasketed connections is to use a leak-rate-per-gasket based on the “test allowance” in AWWA C605 and AWWA C600(12). The table below includes allowable leakage values, per gasket, based on a stated test pressure and nominal pipe size. This table can be used to calculate an allowable leakage rate for a given pipe segment by determining how many gaskets are present in the segment to be tested and multiplying that number by the appropriate value from the table based on the test pressure and pipe diameter. This information is valid for both PVC and ductile iron pressure pipe joints and fittings.

Hydrostatic Test Makeup Water Allowances per Gasket for Pressure Pipe (US gal/hr)									
Avg. Test Pressure (psi)	Nominal Pipe Diameter (in)								
	6	8	10	12	14	16	18	20	24
300	0.014	0.019	0.023	0.028	0.033	0.037	0.042	0.047	0.056
275	0.013	0.018	0.022	0.027	0.031	0.036	0.04	0.045	0.054
250	0.013	0.017	0.021	0.026	0.03	0.034	0.038	0.043	0.051
225	0.012	0.016	0.02	0.024	0.028	0.032	0.036	0.041	0.049
200	0.011	0.015	0.019	0.023	0.027	0.031	0.034	0.038	0.046
175	0.011	0.014	0.018	0.021	0.025	0.029	0.032	0.036	0.043
150	0.01	0.013	0.017	0.02	0.023	0.026	0.03	0.033	0.04
125	0.009	0.012	0.015	0.018	0.021	0.024	0.027	0.03	0.036
100	0.008	0.011	0.014	0.016	0.019	0.022	0.024	0.027	0.032
75	0.007	0.009	0.012	0.014	0.016	0.019	0.021	0.023	0.028
50	0.006	0.008	0.01	0.011	0.013	0.015	0.017	0.019	0.023

Table for Hydrostatic test make-up water allowance per gasket for PVC pressure pipe based on the allowances included in AWWA C605.

16. Water Usage

The contractor shall furnish all water used on this project including water used for hydrostatic testing, chlorination and flushing. He shall pay for the full-metered amount at the current water rate for the system used.

17. River Crossings

River crossing shall be made with a freely deflecting locked joint pipe. Pipe shall be ductile iron with bell ball type joint. Pipe shall be the same class and grade as called for on the plans and in the laying schedule. Ball joint river crossing pipe may be installed by pulling or floating across the river.

Trench shall be backfilled with clean washed stone.

APPENDIX A

ADDITIONAL CHECKLISTS

**City of Romulus
PRE-CONSTRUCTION MEETING
SIGN IN SHEET**

Project: _____ **Date:** _____

OHM Project No: 0155-_____

Please print the following information and provide a business card to the OHM representative.

NAME	COMPANY	PHONE	E-MAIL OR FAX

Note: Contact City of Romulus Department of Public Works at 734-955-8741, Monday through Friday 8 am – 4 pm to schedule inspection at least 2 working days prior to start of construction.

All persons listed above will receive a copy of this information packet via fax.

Please include the Project Name and OHM Project Number on all correspondence.

CONSTRUCTION CONTACT INFORMATION

Project Name: _____

Location (include section #): _____ **Project Supervisor:** _____

OHM Project No.: _____ **Municipality Project No.:** _____

Developer/Owner		Phone:	
Street Address		Fax:	
City, State & Zip		Email:	
Contact Person:		Emergency:	

(If a different professional engineer/professional surveyor is going to complete the record drawings, please list them here)

Design Engineer		Phone:	
Street Address		Fax:	
City, State & Zip		Email:	
Contact Person:		Emergency:	

Prime Contractor		Phone:	
Street Address		Fax:	
City, State & Zip		Email:	
Contact Person:		Emergency:	
Safety Officer:			

CONSTRUCTION CONTACT INFORMATION *continued*

Mass grading/soil		Phone:	
Street Address		Fax:	
City, State & Zip		Email:	
Contact Person:		Emergency:	
 Underground		Phone:	
Street Address		Fax:	
City, State & Zip		Email:	
Contact Person:		Emergency:	
 Paving		Phone:	
Street Address		Fax:	
City, State & Zip		Email:	
Contact Person:		Emergency:	
 Landscape		Phone:	
Street Address		Fax:	
City, State & Zip		Email:	
Contact Person:		Emergency:	
 Other: Concrete		Phone:	
Street Address		Fax:	
City, State & Zip		Email:	
Contact Person:		Emergency:	

PRIOR TO THE START OF CONSTRUCTION: Mark N/A if the item is not applicable to this project.

Check below if an issue is present and either write the issue or reference an attachment.

_____Electricity: _____

_____Natural Gas: _____

_____Telephone: _____

_____Cable TV: _____

_____City of Romulus: _____

The following should address any other Municipality concerns, including other possible interested parties:

_____City of Romulus: _____

_____Adjacent Municipality: _____

_____Road Commission: _____

_____Drain Commission: _____

_____MDOT: _____

_____Railroad: _____

_____County: _____

_____Residential: _____

X _____Community Development Agency: Developer to pay close attention to approved landscape plan.

_____Other: _____

PRIOR TO THE START OF CONSTRUCTION *continued*:

The following checked items must be submitted to the Municipality and OHM:

_____ **PERMITS:** Copies of permits may be faxed to the OHM Construction Department at 734-522-6427.

_____ Soil Erosion
Permit # _____ Expiration Date: _____

_____ NPDES (National Pollution Discharge Elimination System - MDEQ)
Permit # _____ Expiration Date: _____

_____ Water Main (Michigan Department of Environmental Quality)
Permit # _____ Expiration Date: _____

_____ Sanitary Sewer (Michigan Department of Environmental Quality)
Permit # _____ Expiration Date: _____
Sanitary Tap County Permit # _____ Expiration Date: _____

_____ Storm Sewer (Michigan Department of Environmental Quality)
Permit # _____ Expiration Date: _____

_____ Right of Way (agency: _____)
Permit # _____ Expiration Date: _____

_____ Wetland/Floodplain: (Michigan Department of Environmental Quality)
Permit # _____ Expiration Date: _____

_____ Other: _____ (agency: _____)
Permit # _____ Expiration Date: _____

_____ ✓ A Performance Guarantee of \$ _____ must be posted with the City of Romulus. A performance bond must be provided to the Department of Public Works. The bond amount shall be 100% of the construction cost per the approved engineer's estimate.

_____ ✓ Escrow Fee in the amount of \$ _____ must be paid to the City of Romulus. Send a copy of the paid fee receipt to The City of Romulus, Department of Public Works.

_____ ✓ Any work after 4:00 for an inspector or a foreman will result in overtime charges against the escrow account.

_____ ✓ Owner's and Contractor's Protective Public Liability and Property Damage Insurance shall include the following additional named insured:
1. City of Romulus
2. Orchard, Hiltz & McCliment, Inc. its employees, agents
3. Any other entities impacted

_____ ✓ Proof of Prime Contractor's general liability insurance (project name appearing in description area) shall name as additionally insured and be submitted to the City of Romulus and Orchard Hiltz & McCliment, Inc.

PRIOR TO THE START OF CONSTRUCTION continued:

- ✓ **SCHEDULE:** Please provide a schedule of work including the anticipation of duration for major elements such as: mass grading, water main installation, sanitary sewer, storm installation, lead installations, paving activities, and landscape restoration. Fax to OHM Construction Department at 734-522-6427 and to the City of Romulus Department of Public Works at (734) 247-4823.
- ✓ **PRE-CONSTRUCTION VIDEO TAPING:** If this section is checked, this project requires the work-site to be videotaped prior to the start of construction and a copy of the video to be mailed to the City of Romulus, Attn Kristi Hooper.
- ✓ **TYPE OF MATERIALS:** Please list the type and class of the materials to be used for this project and provide a copy of the testing orders (suppliers and materials) to the inspector on site.
- | | | |
|-------|-----------------|-------|
| _____ | Sand | _____ |
| _____ | Aggregate | _____ |
| _____ | Bituminous | _____ |
| _____ | Concrete | _____ |
| _____ | Sanitary Sewer | _____ |
| _____ | Water Main | _____ |
| _____ | Storm Sewer | _____ |
| _____ | Manholes | _____ |
| _____ | Hydrants | _____ |
| _____ | Brass/Fittings: | _____ |
| _____ | Castings | _____ |
| _____ | Signs | _____ |
| _____ | Posts | _____ |
- ✓ _____ Contractor shall provide material certifications to the inspector for any of the above applicable items and any other related items used in the site construction work.
- ✓ _____ Shop drawings shall be submitted for review for all water main pipe, pipe fittings, hydrants, valves, gate wells, gate well castings, water services, stop boxes; sanitary sewer pipe, wyes, manholes, castings, and sewer leads; public storm sewer pipe, structures and castings; any other materials utilized within the public right-of-way or easements, or as requested by the City. All submitted shop drawings shall be approved by the applicants engineer prior to City review.
- ✓ _____ Excess material should be legally disposed of off-site.

PRIOR TO THE START OF CONSTRUCTION continued:

- ✓ At the request of the City of Romulus, inspection is required for the following: water main, sanitary sewer, storm sewer, private paving, restoration, landscaping.
- ✓ Two (2) working days notice is required (not including weekends/holidays) to schedule inspection. Applies to construction start and any time that work is suspended for two days or more, contact the City of Romulus Department of Public Works, Mondays through Fridays 8 am to 4 pm. (734) 955-8741
- ✓ Utilities must be staked and dated cut sheets given to inspector before construction may start. This includes water, sanitary, storm and road (where applicable). Fax cut sheets to the City of Romulus Department of Public Works at (734) 247-4823. Hennessey
- ✓ Notify MISS DIG (800-482-7171) at least three (3) full working days in advance. Keep your reference number for complaints on improperly staked utilities or if no staking was done.
- ✓ Density testing will be performed by an independent testing company and not by the City of Romulus. The Owner/Developer is responsible for arranging this service as well as the cost for this service.
- ✓ Any field problems or design changes shall be directed to the Developer's Engineer for re-design then submitted to OHM for approval. All changes must be submitted for approval, approved and distributed before construction will be allowed. Note the revision number and date on all plans.
- ✓ Any water used on site, originating from a public fire hydrant or water source, must be metered and a backflow-preventer must be used. Meters may be rented from the City of Romulus Department of Public Works at (734) 995-8741.
- ✓ Public and private streets must be maintained in a clean condition and free of debris at all times. In the event that a public roadway becomes dirty, the Contractor shall clean it immediately. The question of the cleanliness of roads and streets will be determined solely by the Municipal road agency or its authorized representative.
- ✓ It is the Contractor's responsibility to comply with all current MIOSHA/OSHA standards where applicable including confined space regulations for new construction. Attendance at the pre-construction meeting by the Contractor's representative acknowledges understanding of this obligation. The Municipality and its engineering consultant (OHM) will not oversee the Contractor's operations from the stand point of safety and are not obligated to act as the Contractor or Subcontractor's safety officer.
- ✓ Traffic control must be in compliance with the Michigan Manual of Uniform Traffic Control Devices in conjunction with local construction permit requirements or stipulations and any detour, staging or traffic control diagrams incorporated into approved plans.
- ✓ Sidewalk Ramps – Sidewalk ramps are to be installed per the latest approved details (MDOT R-28-I) per the Americans with Disabilities Act (ADA). Any ramps placed that do not meet the latest approved details per the ADA will be removed and replaced at the developer's or contractor's expense.

PRIOR TO THE START OF CONSTRUCTION continued:

✓ WATER MAIN

- ✓ Water main shall be constructed per the City of Romulus Standard Water Main Details. Where conflicts occur between the general plans and the standard details, the conditions in the standard details shall govern. Poly Wrap not to be used as requested by the City.
- ✓ Pressure testing will be conducted by the contractor and witnessed by the City of Romulus. Water main testing shall be per AWWA Standards. Notify the City of Romulus (Site Coordinator) of schedule (2 working days prior to test).
- ✓ No bacterial tests will be performed until pressure tests have been passed and DEQ permit in hand. Bacteria samples (two consecutive days) will be obtained by the City of Romulus Inspector, with the Contractor present. The City of Romulus will decide where the samples will be tested. Hard copy results must be on file at OHM prior to any tie-in. Paragon
- ✓ No water main tie-ins are allowed until bacteria and pressure tests have been passed and DEQ permit is on file. When a tie-in does occur, all flushing of the main will have been stopped, all apparatus disconnected, and all valves opened. No thrust blocks required where megalug restrained joints are provided.

✓ SANITARY SEWER

- ✓ Sanitary sewer should be constructed per the City of Romulus Standard Sanitary Sewer Details. Where conflicts occur between the general plans and the standard details, the conditions in the standard details shall govern. Cadilloc Brand Rubber Wrap, Elastometric Seal or approved equal to be used on all san Man Holes.
- ✓ Sanitary taps into existing structures will be inspected by the City of Romulus along with the County (if applicable). Contractor shall contact the City of Romulus Department of Public Works (Site Coordinator). See sanitary sewer permit for further details.
- ✓ Sanitary Air Test will be witnessed by the City of Romulus. Contact the City of Romulus Department of Public Works (Site Coordinator) to set up test date.
- ✓ Prior to any air testing, structures must be complete and sight tubes must be in place for at least 24 hours, if ground water is present.
- ✓ Videotaping of the sanitary sewer is to be performed no sooner than 30 days after completion of backfill and a copy must be on file with OHM prior to acceptance. DVD's to be provided

PRIOR TO FINAL ACCEPTANCE OF PROJECT

- ☒ After all contract items of work have been completed, OHM and/or the City of Romulus will prepare a preliminary punch list of work items that require corrective action/repairs, and shall transmit this punch list to the Developer and their Contractor. The Contractor shall have thirty (30) days to rectify all items on the punch list. Failure to do so may result in the temporary or permanent Certificate of Occupancy to be withheld. All punch list items will have to be addressed before the project is accepted.
- ☒ During the final site inspection, the Contractor must operate and pump out each hydrant per the direction of the City of Romulus or its authorized representative.
- ☒ All water meters greater than 2" in diameter shall be inspected by the Romulus DPW. Meters shall report water usage by the cubic foot.
- ☒ City shall be notified of any water main tie-in. Per day charge will be assessed if tie in occurs before meter installed.

ITEMS REQUIRED FOR RECOMMENDATION OF PROJECT CLOSEOUT

Check all that apply:

- ☒ **As-builts:** reviewed and approved
- ☒ **Grading certificate:** signed and sealed
- ☒ **Easements Required:**
 - ☒ Water Main ☒ Sanitary Sewer ☐ Storm Sewer
 - ☐ Safety Path ☐ Ingress/Egress
 - ☒ Other _____
- ☐ **Maintenance and Guarantee Bond**

A maintenance and guarantee bond for 50% of applicable Public Works based on the Engineers Estimate of \$_____ for a duration of **2** years shall be submitted to the City of Romulus once all punch list items have been addressed. The amount required for this project is \$_____. A blank form will be forwarded to the Developer once final inspection has passed. Please be aware that the duration of the maintenance bond is determined on the date of final acceptance.
- ☒ **Passing Final Inspection**

ADDITIONAL NOTES:

All landscaping to be installed per approved landscape plans.

[illegible]

RECORD DRAWING REQUIREMENT CHECKLIST

JOB NAME: _____ REVIEWED BY: _____

JOB NUMBER: _____ DATE REVIEWED: _____

NOTE: Tie down measurements and top of casting elevations to all utility structures or building corners will also be the responsibility of the engineer providing the record drawings. The use of coordinates alone to locate structures is not acceptable.

The Orchard, Hiltz & McCliment, Inc project number must be printed in the lower right hand corner of all plan sheets.

SANITARY SEWER

COMMENTS

I. PLAN VIEW

OHM USE ONLY

- | | | | |
|----|--------|--------|---|
| A. | [NEED] | [O.K.] | Lengths between manholes |
| B. | [NEED] | [O.K.] | Size of pipe |
| C. | [NEED] | [O.K.] | Lengths of casing pipe |
| D. | [NEED] | [O.K.] | Ties to manholes |
| E. | [NEED] | [O.K.] | Type & class of pipe & joint ("O" ring, slip, solvent weld, etc.) |
| F. | [NEED] | [O.K.] | T/casting grades |
| G. | [NEED] | [O.K.] | Wye locations |
| H. | [NEED] | [O.K.] | Permit numbers (County & MDEQ) |
| I. | [NEED] | [O.K.] | Manufacturer of pipe |
| J. | [NEED] | [O.K.] | Manufacturer of manhole |
| K. | [NEED] | [O.K.] | Manhole numbering (sequential) |
| L. | [NEED] | [O.K.] | Show all sanitary sewer easements on plans |
| M. | [NEED] | [O.K.] | Provide sketch and legal description of sanitary sewer easements |

II. PROFILE VIEW (REQUIRED FOR PIPE 12" & LARGER)

OHM USE ONLY

- | | | | |
|----|--------|--------|---|
| A. | [NEED] | [O.K.] | Lengths between manholes |
| B. | [NEED] | [O.K.] | Size of pipe |
| C. | [NEED] | [O.K.] | Lengths of casing pipe |
| D. | [NEED] | [O.K.] | Depth of wye & riser |
| E. | [NEED] | [O.K.] | Invert grades |
| F. | [NEED] | [O.K.] | Type & class of pipe & joint ("O" ring, slip, solvent weld, etc.) |
| G. | [NEED] | [O.K.] | T/casting grades |
| H. | [NEED] | [O.K.] | Wye locations |
| I. | [NEED] | [O.K.] | Percent slope between manholes (as-built) |
| J. | [NEED] | [O.K.] | Manhole numbering (sequential) |

STORM SEWER

COMMENTS

I. PLAN VIEW

OHM USE ONLY

A.	[NEED]	[O.K.]	Lengths between manholes/catch basins/inlets
B.	[NEED]	[O.K.]	Size of pipe
C.	[NEED]	[O.K.]	Ties to manholes/catch basins/inlets
D.	[NEED]	[O.K.]	Type & class of pipe & joint
E.	[NEED]	[O.K.]	T/casting grades
F.	[NEED]	[O.K.]	Structure numbering (sequential)
G.	[NEED]	[O.K.]	Special structures (low head, 5' dia., 6' dia., 2' sump, etc.)
H.	[NEED]	[O.K.]	Show all easements for storm sewer
I.	[NEED]	[O.K.]	Provide sketch and legal description of storm sewer easements

II. PROFILE VIEW (REQUIRED FOR PIPE 12" & LARGER)

OHM USE ONLY

A.	[NEED]	[O.K.]	Lengths between manholes
B.	[NEED]	[O.K.]	Size of pipe
C.	[NEED]	[O.K.]	Type & class of pipe & joint
D.	[NEED]	[O.K.]	Invert grades
E.	[NEED]	[O.K.]	T/casting grades
F.	[NEED]	[O.K.]	Structure numbering (sequential)
G.	[NEED]	[O.K.]	Percent slope between manholes (as-built)

WATER MAIN

COMMENTS

I. PLAN VIEW

OHM USE ONLY

A.	[NEED]	[O.K.]	Lengths between gate valve & wells, hydrants and fittings
B.	[NEED]	[O.K.]	Size of pipe
C.	[NEED]	[O.K.]	Ties to gate valve & wells, hydrants and fittings
D.	[NEED]	[O.K.]	Ties to hydrants
E.	[NEED]	[O.K.]	Ties to stop boxes
F.	[NEED]	[O.K.]	Ties to building or offsets to pipe
G.	[NEED]	[O.K.]	Type and class of pipe w/or without Polywrap
H.	[NEED]	[O.K.]	Finish grade of hydrants
I.	[NEED]	[O.K.]	T/Casting grades
J.	[NEED]	[O.K.]	Horizontal bend locations
K.	[NEED]	[O.K.]	Location of thrust blocks & types of restraints
L.	[NEED]	[O.K.]	Sequentially numbered G.V. & wells
M.	[NEED]	[O.K.]	Permit numbers (County & MDEQ)
N.	[NEED]	[O.K.]	Manufacturer of pipe
O.	[NEED]	[O.K.]	Manufacturer of hydrant
P.	[NEED]	[O.K.]	Show all water main easements on plan
Q.	[NEED]	[O.K.]	Provide sketch and legal description of water main easements

WATER MAIN (continued)

II. PROFILE VIEW (REQUIRED FOR PIPE 12" & LARGER)

OHM USE ONLY

- | | | | |
|----|--------|--------|---|
| A. | [NEED] | [O.K.] | Lengths between grade changes |
| B. | [NEED] | [O.K.] | Size of pipe |
| C. | [NEED] | [O.K.] | Type and class of pipe |
| D. | [NEED] | [O.K.] | G.V.. & well location |
| E. | [NEED] | [O.K.] | Hydrant location (identify special structures such as blow off) |
| F. | [NEED] | [O.K.] | Air relief valves/blow off valve locations |
| G. | [NEED] | [O.K.] | Vertical bend locations |
| H. | [NEED] | [O.K.] | T/Casting grades |

PAVEMENT

COMMENTS

I. Width and station of pavement (measured from centerline)

OHM USE ONLY

- | | | | |
|----|--------|--------|----------------------------------|
| A. | [NEED] | [O.K.] | At end of radius at intersection |
| B. | [NEED] | [O.K.] | At beginning of taper |
| C. | [NEED] | [O.K.] | At end of taper |
| D. | [NEED] | [O.K.] | Any changes in alignment |
| E. | [NEED] | [O.K.] | Radius @ intersection |
| F. | [NEED] | [O.K.] | Right-of-way survey data |

II. Drives

OHM USE ONLY

- | | | | |
|----|--------|--------|----------------|
| A. | [NEED] | [O.K.] | location |
| B. | [NEED] | [O.K.] | Width |
| C. | [NEED] | [O.K.] | Radius, if any |

III. Sidewalk

OHM USE ONLY

- | | | | |
|----|--------|--------|---|
| A. | [NEED] | [O.K.] | Location |
| B. | [NEED] | [O.K.] | Width |
| C. | [NEED] | [O.K.] | Changes in alignment |
| D. | [NEED] | [O.K.] | Ramps |
| E. | [NEED] | [O.K.] | Provide sketch and legal description for safety path & sidewalk easements |

RECORD PLAN SUBMISSION REQUIREMENTS

The following digital submission specifications are being provided as minimum requirements and guidelines for consultants' and developers' reference. Should you have any questions or comments please contact your community representative.

A. Digital Format of CAD Files

The acceptable digital format for as-built drawing files shall be in AutoCAD format according to the following specifications:

- AutoCAD version 2008 or later
- Layer naming (shown in Table A) is to remain unaltered
- Lines shall not be unnecessarily segmented
- Intersecting lines segments must have common end points

B. Layering Scheme

Key mapping features shall be stored on unique CAD layers. Related text shall be included with each layer (i.e., storm pipes on a single layer and storm pipe annotation on a separate single layer). See Table A for layer names and descriptions. Submitted drawings will go through a quality check and the layers will be verified. Drawings found not to comply will be modified by the City or the City representative to bring them in compliance with City layering standards. Any submittals requiring modification will result in an additional fee to the consultant/developer. Submittals needing substantial modifications will result in the rejection of the digital file.

C. Coordinate System

All drawings shall contain adequate geodetic reference to Michigan South State Plane NAD83. Units must be described as either being US survey feet or international feet.

Drawings will conform to having one of the following references:

- (a) A drawing will reference a section corner/quarter-corner with distance and bearing data relating this point to the site plan
- (b) A minimum of two (2) drawing locations will be identified with NAD83 coordinates established by field survey techniques (i.e., GPS or total station). Geographic coordinates shall appear in the drawing as text of a readable size and shall be in either Michigan South State Plane NAD83 or geographic coordinates of sufficient resolution to derive state-plane coordinates within 1/10 of a foot.

D. Media for Delivery

File transfer media shall be one of two options:

- CDROM or CD-R
- Flash Drive/Micro USB
- Electronic (Internet) file transfer

CADD/GIS Standard Naming Convention

Description	Layer name
Utilities	
cable lines	e_cable
cable point	e_cable_pt
cable symbol	e_cable_sym
cable text	e_cable_txt
electric utility lines	e_elec
point layer for electric symbols	e_elec_pt
electric utility symbols	e_elec_sym
electric utility text	e_elec_txt
existing force main lines	e_fm
existing force main point	e_fm_pt
existing force main symbol	e_fm_sym
existing force main text	e_fm_txt
gas utility lines	e_gas
point layer for gas symbols	e_gas_pt
gas utility symbols	e_gas_sym
gas utility text	e_gas_txt
sanitary utility lines	e_san
point layer for sanitary symbols	e_san_pt
sanitary symbols	e_san_sym
sanitary utility text	e_san_txt
storm utility lines	e_stm
point layer for storm symbols	e_stm_pt
storm symbols	e_stm_sym
storm utility text	e_stm_txt
telephone lines	e_tel
point layer for telephone symbols	e_tel_pt
telephone symbols	e_tel_sym
telephone utility text	e_tel_txt
misc. utility lines	e_util
point layer for misc. utility symbols	e_util_pt
misc. utility symbols	e_util_sym
misc. utility text	e_util_txt
water main utility lines	e_wm
point layer for water main structure symbols	e_wm_pt
water main structure symbols	e_wm_sym
water main text	e_wm_txt
proposed cable lines	p_cable
proposed cable symbol	p_cable_sym
proposed cable text	p_cable_txt
proposed electric lines	p_elec
proposed electric symbol	p_elec_sym
proposed electric text	p_elec_txt
proposed force main	p_fm
proposed force main text	p_fm_txt
proposed gas lines	p_gas
proposed gas symbol	p_gas_sym
proposed gas text	p_gas_txt
proposed jack & bore	p_jbore
proposed jack & bore text	p_jbore_txt
proposed sanitary	p_san
proposed sanitary symbol	p_san_sym
proposed sanitary text	p_san_txt
proposed storm	p_stm
proposed storm text	p_stm_txt
proposed storm symbol	p_stm_sym
proposed structure text	p_str_txt
proposed telephone lines	p_tel
proposed telephone symbol	p_tel_sym
proposed telephone text	p_tel_txt
proposed underdrain	p_udrain
proposed underdrain text	p_udrain_txt
proposed water main	p_wm
proposed water main symbol	p_wm_sym
proposed water main text	p_wm_txt
*insert the utility name here (stm, san, wm etc)	

APPENDIX B

BONDS & MAINTENANCE DOCUMENTS

MAINTENANCE AND GUARANTEE BOND-SITE DEVELOPMENT

(This should be drafted on legal size paper)

Obligee Review or Project No. _____ Bond No. _____
(if applicable)

KNOW ALL MEN BY THESE PRESENTS:

That we, the developer, _____ (hereinafter called Principal), and _____ (hereinafter called Surety), a corporation organized under the laws of the State of _____ and authorized to do a surety business in the State of Michigan, are held and firmly bound unto the municipal/public agency known as _____ (hereinafter called Obligee) in the full and just sum of _____ Dollars and _____ Cents (\$ _____), lawful money of the United States of America, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has constructed or caused to have constructed the following described public improvements in a public easement and/or right-of-way:

(Check all applicable items)

_____ ft. Storm Sewer System	_____ ft. Roadway
_____ ft. Sanitary Sewer System	_____ ft. Sidewalk or Pathway
_____ ft. Water Main System	_____ Other: _____

which have been or are about to be accepted by the Obligee for the project known as _____ and located in Section _____, T _____, and R _____; more specifically at _____.

AND WHEREAS, it is required that the Principal should guarantee the project from defects caused by faulty materials or workmanship for a period of _____ year(s) from and after the date of acceptance of same by the Obligee.

The Obligee shall notify the Principal in writing of any defect for which the Principal is responsible and shall specify in said notice a reasonable period of time within which the Principal shall have to correct said defect. If the Principal fails to correct such defect within the time specified in said notice, then the Surety shall have sixty (60) days thereafter within which to take such action as it deems necessary to insure performance of the Principal's obligation. If such defect is not corrected after the expiration of such sixty-day period, then the Obligee shall have the right to correct such defect and the Principal and Surety, jointly and severally, shall pay all costs and expenses incurred by Obligee in correcting such defect; including but not limited to, the engineering, legal, administration and other costs, together with any damages either direct or consequential, which the Obligee may sustain on account of the Principal's failure to correct such defect. In addition, the Obligee shall have the right to contract for the correction of such defect and, upon acceptance of the lowest responsible bid, the Principal and Surety shall become immediately liable for the amount of the said bid.

If any repair is necessary to be made at once to protect life and property, then and in that case, the Obligee may take immediate steps to repair or barricade such defects without notice to the Principal or Surety. In such accounting, the Obligee shall not be held to obtain the lowest figures for the doing of the work, or any part thereof, but all sums actually paid therefore shall be charged to the Principal or Surety. In this instance, the judgment of the Obligee is final and conclusive.

The Principal shall fully indemnify, defend and save harmless the Obligee, and its agents, consultants, employees and officers from all suits and actions for damages of every name and description brought or claimed against them for, or on account of, any injury or damage to person or property received or sustained by any party or parties, by or from any of the acts or omissions or through the negligence of said Principal, and its servants, agents

or employees, in the prosecution of the work, and from any and all claims arising under the Workman's Compensation Act, so-called, of the State of Michigan.

NOW, THEREFORE, if the said Principal shall for a period of ____ year(s) from and after the date of acceptance of the completed project by the Oblige replace any and all defects arising in said work whether resulting from defective materials or defective workmanship, then the above obligation shall be null and void; otherwise to remain in full force and effect for ____ year(s) from the date of acceptance by the Oblige.

IN WITNESS WHEREOF, the parties have caused this instrument to be signed and sealed by their respective authorized officers this _____ day of _____, 20____.

WITNESS

Name: _____

PRINCIPAL

(seal)

By: _____

Name: _____

Title: _____

Address: _____

Phone: _____

Fax: _____

SURETY

(seal)

By: _____

Name: _____

Name: _____

Title: _____

Address: _____

Phone: _____

Fax: _____

**LONG TERM MAINTENANCE AGREEMENT FOR
STORM WATER DETENTION/RETENTION SYSTEM AND STORM SEWER SYSTEM**
(This should be drafted on legal size paper)

Address _____

Sidwell No. _____

THIS INDENTURE made the _____ day of _____ A.D. between

Party of the first part, and the **City of Romulus**, 11111 Wayne Road, Romulus, Michigan 48174-1485, a Municipal Corporation of the **County of Wayne**, State of Michigan, party of second part.

WITNESSETH: That said parties of the first part, owns certain real property located in the City of Romulus, Wayne County, Michigan, as more particularly described in **Exhibit "A"**, attached hereto, on which owner intends to develop _____

WHEREAS, to facilitate approval of the final construction plans, the City and Owner wish to enter into an Agreement for the benefit of said property regarding the construction and maintenance of a **Storm Water Retention/Detention and Discharge System** (part of the surface water drainage system necessary to facilitate this development, as indicated on the plan of grading and storm drainage), as well as the **Storm Sewer System** on the real property particularly described in **Exhibit "A"**, attached hereto and made a part hereof (such property and improvements hereinafter referred to collectively as the **"System"**).

NOW THEREFORE, in consideration of the forgoing and of the final approval of the construction plans by the City of Romulus and of the mutual covenants contained herein, the parties hereto agree as follows:

Owner shall construct and continually maintain the **System**, including all parts constituting same, on the real property described in **Exhibit "A,"** and as outlined in the LongTerm Maintenance Plan (the "Plan") at **Exhibit "B,"** in accordance with plans previously submitted and approved by the City and in compliance with all applicable state and local laws, which system shall be utilized for drainage and/or water retention as approved by the City. Reference is made to plans for

Project: _____

Prepared by: _____

Dated: _____

Approved by: _____

All landscaping, planting or other items on the entire site, **Exhibit "A,"** shall be placed and continually maintained so as not to interfere, impede, or obstruct the flow of water and/or the purpose of the system.

In an effort to control the West Nile Virus property owner and/or Homeowners Association agrees to utilize mosquito control in the Detention Ponds on a yearly basis and provide the City with proof of efforts and what was used in the ponds. If the Department of Public Works does not receive proof of mosquito control by the property owner and/or Homeowners Association on a yearly basis the City shall perform the work and bill the property owner and/or Homeowners Association for materials, time, and labor.

Owner hereby conveys to the City an easement over, on, and in the property described in **Exhibit "A"**, attached hereto and made a part hereof, which easement shall be for the purpose of access to the **System** for maintenance, renovation or repair thereof should the Owner fail to properly maintain same after notice to do so from the City.

In the event that the owner shall at any time fail to maintain any part of the **System** in reasonable order and condition, as outlined in **Exhibit "B,"** the City may serve written notice upon Owner at the address as shown on the City tax rolls setting forth the manner in which the owner has failed to maintain the **System** in reasonable condition and said notice shall include a demand that deficiencies of maintenance be cured within a reasonable time as stated therein. If the deficiencies set forth in the original notice or in the modifications thereof shall not be cured within the said time limits, the City, in order to preserve the taxable values of the property and to prevent the **System**, or any part thereof, from becoming a public or private nuisance, may enter upon said **System** and may repair and maintain same. The cost of such repair and/or maintenance by the City, including reasonable administrative costs, shall be assessed against the property described in Exhibit "A" on the same basis as City taxes are collected. The City, at the time of entering upon said **System** for the purpose of repair and/or maintenance may file a notice of lien in the office of the Registrar of Deeds of the County of Wayne upon the property affected by the lien. If said costs are not paid by the owner, the City may pursue the collection of same through appropriate court actions and in such case the owner shall pay, in addition to said costs, all costs of litigation including legal fees.

The City's right to entry and right to correct deficiencies, as set forth herein, shall in no way be construed as an obligation to do so. The City in no way waives immunity and assumes no liability and no responsibility for any damages incurred from any acts or omissions regarding entry and/or correction of said deficiencies.

The Owner acknowledges that the City may have outstanding agreements with the County of Wayne regarding maintenance of all or part of the **System** whereby it may have agreed to assume responsibility for such maintenance, for purposes of obtaining permits, constructing within a right-of-way, or otherwise. Notwithstanding any such agreements, the Owner agrees to indemnify and hold harmless the City for any failure to maintain the **System** or any part thereof, including any and all reasonable costs, interest, and attorney fees.

The Agreement shall be recorded so that the Agreement runs with the land as described in **Exhibit "A"**. The land described in **Exhibit "A"** shall be subject to this Agreement and the covenants and obligations contained herein shall be binding on the owner, subsequent purchasers, heirs, successors, assignees and lessors.

Invalidation of any one of these covenants and restrictions by judgment or court order shall in no way affect the validity of any other provisions, which shall remain in full force and effect.

The parties whose signatures appear below, hereby represent and warrant that they have the authority and capacity to sign this Agreement and bind the respective parties hereto.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals the day and year first above written.

IN PRESENCE OF:

OWNER:

Signature: _____
Print Name Here>

Signature: _____
Print Name Here>

Signature: _____
Print Name Here>

Signature: _____
Print Name Here>

IN PRESENCE OF:

CITY OF ROMULUS:
A Michigan Municipal Corp.

Signature: _____

Signature of DPW Director: _____

Print Name Here>

Print Name Here>

Signature: _____
Print Name Here>

Signature of Clerk: _____
Print Name Here>

STATE OF MICHIGAN) SS
COUNTY OF WAYNE)

On this _____ day of _____, _____, before me,
the subscriber, a Notary Public in and for said County, personally appeared:

Owner

AND

Owner

City of Romulus

City of Romulus

To me known to be the same persons described in and who executed the within instrument, and who have
acknowledged the same to be their free act and deed.

DRAFTED BY:

Notary Public, Wayne County, Michigan

My commission expires on _____

WHEN RECORDED RETURN TO:
The City of Romulus
Director of Department of Public Works
12600 Wayne Road
Romulus, MI 48174

APPENDIX C

UNIT USE FACTORS

SANITARY SEWER UNIT ASSIGNMENT TABLE

TYPE OF USE	UNIT USE FACTORS
Single Family Residential	Base unit rate
Auto Dealers	1.00 unit + 0.20 unit per thousand square feet.
Auxiliary dining room (open not than 20 hours per week)	2.00 unit per thousand square feet
Bar - See Restaurant	
Barber Shops	1.00 unit + 0.10 unit per chair
Beauty Shops	1.00 unit + 0.50 unit per booth
Boarding House	0.20 unit per bed
Boarding Schools	0.20 unit per bed
Bowling Alleys	1.50 unit per thousand square feet of general building area plus restaurant, bar, etc. at their respective unit factors
Car Wash do-it-yourself (coin operated, 10 gal of less per car)	1.00 unit per stall
Car Wash mechanical (without conveyor over 10 gals per car)	10.00 unit per stall
Car Wash conventional (with conveyor)	10.00 unit per twenty feet of conveyor
Churches	0.40 unit thousand square feet
Cleaners	1.00 unit per thousand square feet plus 1.50 unit per press
Convalescent Homes or Assisted Living complexes	1.00 unit + 0.50 unit per bed
Convents	0.20 unit per bed
Country Clubs	1.50 unit per thousand square feet of general building area plus restaurant, bar, swimming pool areas, etc. at their respective unit factors
Drug Stores	1.00 unit per thousand square feet
Factories (exclusive of industrial waste)	0.75 unit per thousand square feet (industrial waste will be assigned such sanitary use factor units as shall be appropriate in each individual instance, upon petition to the Township for such assignment)
Fraternal Organizations	0.50 unit per thousand square fee of general building area plus restaurant, bar, swimming pool area, etc. at their respective unit factor.
Grocery Stores - Supermarkets	0.80 unit per thousand square feet
Hospitals	1.00 unit + 0.50 unit per bed
Hotels and Motels	1.00 unit + 0.25 unit per bedroom plus restaurant, bar, swimming pool areas, etc. at their respective unit factors
Laundry	0.50 unit per washer
Mobile Home Parks	Base unit rate per mobile space occupied or unoccupied

Multiple Family Residences	1.00 unit per unit
Office building	0.75 unit per thousand square feet
Public Institutes other than hospitals	0.75 unit per thousand square feet
Research Facility	0.75 unit per thousand square feet (Industrial wastes will be assigned such sanitary use factor units as shall be appropriate in each individual instance, upon petition to the Township for such assignment.
Restaurants or Bars (dinner and/or drinks)	4.00 unit per thousand square feet
Schools without showers and/or pool	1.00 unit per classroom
Schools (shower and/or pool)	1.50 unit per classroom
Service Station	1.00 unit + 0.15 unit per pump
Snack Bars, Drive-ins, etc.	4.00 unit per thousand square feet
Stores (other than specifically listed)	0.35 unit per thousand square feet
Swimming pool (net area of pool- see Country clubs)	3.00 unit per thousand square feet
Theaters	1.00 unit + 0.01 unit per seat
Theaters - Drive In	1.00 unit + 0.20 unit per car
Warehouses	0.15 unit per thousand square feet

The fee per unit means one (1) unit factor times the base unit rate, other than single family residential. If only water is connected, the unit factor is one (1) times the unit factor for water systems charge. If only sewer is connected, the unit factor is one (1) times the unit factor for sewage systems charge.

In the case of a single family dwelling or any other single building, the trunk and transmission fees shall be paid prior to the application for a building permit.

An additional Trunk and Transmission fee will be collected when a commercial site requests a building addition permit, based on size and use.

APPENDIX D

SAMPLE EASEMENTS

WATER MAIN EASEMENT
(This should be drafted on legal size paper)

KNOW ALL MEN BY THESE PRESENTS, that, _____
_____ whose address is _____
_____ hereinafter referred to as “Grantor”, being title
holder to the following described parcel of land, to wit:

Description of Parcel:

See Exhibit “A”

[Commonly known as: Property Address Here.]

Tax Identification Number: _____

For and in consideration of One (\$1.00) Dollar, receipt of which is hereby acknowledged, does hereby grant and convey to the City of Romulus, a Michigan Municipal Corporation, whose address is 11111 Wayne Road, Romulus, MI 48174, hereinafter referred to as “Grantee”, a perpetual easement for a water main, over, upon, across, in, through, and under the following described real property to wit:

Easement Description:

See Exhibit “B”

and to enter upon sufficient land adjacent to said water main easement for the purpose of exercising the rights and privileges granted herein. A sketch of said water main easement is attached hereto and incorporated herein.

Grantee may install, repair, replace and maintain water main lines, and all necessary appurtenances thereto, within the easement herein granted.

Grantor agrees not to build or to convey to others permission to build any permanent structures on the above-described easement.

Grantee will not be responsible for replacing pavement, trees or any other physical objects within the easement herein granted.

The premises so disturbed by reason of the exercise of any of the foregoing powers, rights and privileges, shall be reasonably restored to its prior condition by Grantee except as noted above.

This instrument shall be binding upon and inure to the benefit of the parties hereto, their heirs, representatives, successors and assigns.

IN WITNESS WHEREOF, the undersigned Grantor(s) has affixed
signature (s) this _____ day of _____ A.D., 20____

WITNESSES:

CORPORATION:

Signature: _____

By: _____

Signature

Print: _____

Signature: _____

Its:

Printed Name and Title

Print: _____

STATE OF MICHIGAN)
)SS
COUNTY OF WAYNE)

On this _____ day of _____, A.D., 20____, before me, a Notary Public in and for said County, appeared _____, and to me known personally known, who, being by me duly sworn, did each for himself say that they are respectively the _____ and _____ of _____, the corporation named in and which executed the within instrument and, that the seal affixed to said instrument was signed and sealed in behalf of said corporation by authority of its board of trustees; and acknowledged said instrument the free act and deed of said corporation.

Notary Public, Wayne County, MI

My commission expires_____

This instrument drafted by:

Tax Identification Number:_____

WHEN SIGNED RETURN A COPY TO:

City of Romulus Department of Public Works
12600 Wayne Road
Romulus, MI 48174

WHEN RECORDED RETURN A COPY TO:

City of Romulus-Clerk
11111 Wayne Road
Romulus, MI 48174

City of Romulus Department of Public Works
12600 Wayne Road
Romulus, MI 48174

Orchard Hiltz & McCliment, Inc.
34000 Plymouth Road
Livonia, MI 48150

SANITARY SEWER EASEMENT
(This should be drafted on legal size paper)

KNOW ALL MEN BY THESE PRESENTS, that, _____
_____ whose address is _____
_____ hereinafter referred to as “Grantor”, being title
holder to the following described parcel of land, to wit:

Description of Parcel:

See Exhibit “A”

[Commonly known as: Property Address Here.]

Tax Identification Number: _____

For and in consideration of One (\$1.00) Dollar, receipt of which is hereby acknowledged, does hereby grant and convey to the City of Romulus, a Michigan Municipal Corporation, whose address is 11111 Wayne Road, Romulus, MI 48174, hereinafter referred to as “Grantee”, a perpetual easement for sanitary sewer, over, upon, across, in, through, and under the following described real property to wit:

Easement Description:

See Exhibit “B”

and to enter upon sufficient land adjacent to said sanitary sewer easement for the purpose of exercising the rights and privileges granted herein. A sketch of the said sanitary sewer easement is attached hereto and incorporated herein.

Grantee may install, repair, replace and maintain sanitary lines, and all necessary appurtenances thereto, within the easement herein granted.

Grantor agrees not to build or to convey to others permission to build any permanent structures on the above-described easement.

Grantee will not be responsible for replacing pavement, trees or any other physical objects within the easement herein granted.

The premises so disturbed by reason of the exercise of any of the foregoing powers, rights and privileges, shall be reasonably restored to its prior condition by Grantee except as noted above.

This instrument shall be binding upon and inure to the benefit of the parties hereto, their heirs, representatives, successors and assigns.

IN WITNESS WHEREOF, the undersigned Grantor(s) has affixed
signature (s) this _____ day of _____ A.D., 20 ____

WITNESSES:

CORPORATION:

Signature: _____

By: _____

Signature

Print: _____

Signature: _____

Its: _____

Printed Name and Title

Print: _____

STATE OF MICHIGAN)
)SS
COUNTY OF WAYNE)

On this _____ day of _____, A.D., 20____, before me, a Notary
Public in and for said County, appeared _____, and to me known personally known,
who, being by me duly sworn, did each for himself say that they are respectively the ____
and _____ of _____, the
corporation named in and which executed the within instrument and, that the seal affixed to said
instrument was signed and sealed in behalf of said corporation by authority of its board of trustees; and
acknowledged said instrument the free act and deed of said corporation.

Notary Public, Wayne County, MI

My commission expires _____

This instrument drafted by:

Tax Identification Number: _____

WHEN SIGNED RETURN A COPY TO:

City of Romulus Department of Public Works
12600 Wayne Road
Romulus, MI 48174

WHEN RECORDED RETURN A COPY TO:

City of Romulus-Clerk
11111 Wayne Road
Romulus, MI 48174

City of Romulus Department of Public Works
12600 Wayne Road
Romulus, MI 48174

Orchard Hiltz & McCliment, Inc.
34000 Plymouth Road
Livonia, MI 48150

SAFETY PATH EASEMENT
(This should be drafted on legal size paper)

KNOW ALL MEN BY THESE PRESENTS, that _____
, whose address is _____, (hereinafter referred to as
“Grantor”), being title holder to the following described parcel of land, to wit:

Description of Parcel: (Include address of parcel)

Tax Identification Number: _____

for and in consideration of One (\$1.00) Dollar, receipt of which is hereby acknowledged,
does hereby grant and convey to the _____, a
Michigan Municipal Corporation, whose address is
_____, (hereinafter
referred to as “Grantee”), a perpetual easement for a safety path, over, upon, across, in,
through, and under the following described real property to wit:

Easement Description

and to enter upon sufficient land adjacent to said safety path easement for the purpose of
exercising the rights and privileges granted herein.

Grantee may install, repair, replace and maintain safety path, and all necessary
appurtenances thereto, within the easement herein granted.

Grantor agrees not to build or to convey to others permission to build any
permanent structures on the above-described easement.

The premises so disturbed by reason of the exercise of any of the foregoing
powers, rights and privileges, shall be reasonably restored to its prior condition by
Grantee.

The Grantee shall indemnify and hold harmless the Grantor from any and all liability for personal property damage and/or any and all damages and/or injuries resulting from the Grantee's construction, use, maintenance and/or repair of the safety path, except any injuries and/or damages caused by the negligence of the Grantor.

This instrument and the rights and obligations contained herein shall run with the land described herein and shall be binding upon and inure to the benefit of the parties hereto, their heirs, representatives, successors and assigns.

IN WITNESS WHEREOF, the undersigned Grantor(s) has affixed
signature (s) this _____ day of _____ A.D., 20
_____.

CORPORATION: _____
Name

By: _____
Signature

Its: _____
Printed Name & Title

By: _____
Signature

Its: _____
Printed Name & Title

STATE OF MICHIGAN)
)SS
COUNTY OF)

On this _____ day of _____ A.D., 20____, before me, a
Notary Public in and for said County, appeared _____ and ____
_____ to me known personally known, who, being by me
duly sworn, did each for himself say that they are respectively the _____
and _____ of

_____ the corporation named in and which
executed the within instrument, and that the seal affixed to said instrument was signed
and sealed in behalf of said corporation by authority of its board of directors; and
acknowledged said instrument to be the free act and deed of said corporation.

County, MI

Notary Public, _____

My commission expires _____

This instrument drafted by:
Name of Engineer (*not* OHM)
Address

Tax Identification Number:_____

WHEN RECORDED RETURN TO:
CITY OF ROMULUS -DPW
12600 Wayne Road
Romulus, MI 48174

APPENDIX E

GRADING

**NOTICE OF CITY OF ROMULUS
FINAL GRADING CERTIFICATE POLICY**

Requirements for Final “As-Built” Grading Certificates include **field verification of final “as-built” grades and elevations** for all in-fill residential, condominium, and platted residential subdivisions, and commercial/industrial development will be fully implemented.

The Building Department can issue no Final Certificate of Occupancy under this policy until a Final “As-Built” Grading Certificate prepared by a licensed builder, land surveyor or engineer has been submitted and approved.

Final “As-Built” Grading Certificates must meet **all of the following requirements:**

1. Must be drawn in ink to scale with all required lot lines, boundaries, existing structures and buildings, hardscape improvements, retaining walls, utility easements, natural or man-made drains or similar topographic features.
2. Be labeled as a “Final As-Built Grading Certificate” showing that all required improvements have been constructed, installed or placed on the property in conformance with an approved Plot or Site Plan.
3. Must show that final grading conditions and elevations on site fully conform to the City’s Grading Standards in Section 54-147 of the Romulus City Code. **No exceptions will be allowed!**
4. Clearly show any and all deviations from proposed and final grading plans, and the existing conditions on the lot or site.
5. Be signed with a raised Land Surveyor’s, or Engineer-of-Record seal/license and full legal signature or by a Licensed Builder, with the following printed declaration:

**“I HEREBY CERTIFY THE “AS-BUILT” GRADING ELEVATIONS
SHOWN WERE FIELD VERIFIED AND THAT ADEQUATE SURFACE
DRAINAGE HAS BEEN PROVIDED”**

6. **Be submitted in two (2) signed originals for all in-fill residential buildings** to the Building Department for joint review and approval by the Building Department and City Planner. **Three (3) such copies** are required for Commercial/Industrial Sites and Condominium/Platted Subdivisions (the third copy is required for the City Engineer’s Records).
7. Substitute owner or unlicensed builder declarations will not be accepted. A Licensed builder’s certificate is only acceptable for homes built on residential in-fill single lots outside condominium or platted subdivisions and for certain commercial/industrial buildings.

CITY OF ROMULUS

Date: _____

Robert McCraight, Building Director
City of Romulus
11111 Wayne Road
Romulus, Michigan 48174 -1485

SITE GRADING / SETBACK CERTIFICATION

Regarding: Development: _____
 Owner's Address: _____
 Telephone: _____
 Building Permit Number: _____

I certify that I have checked the distances from the side, rear, and front lot lines of the building(s) as well as building elevations, site and easement grades and find that the construction conforms with the City approved engineering plans, except as specifically noted below.

Printed Name of Professional Land Surveyor

Michigan Registration Number

Date



Seal and Signature of Professional
Land Surveyor

Cc: Orchard, Hiltz & McCliment, Inc., 34000 Plymouth Road, Livonia, Michigan 48150

APPENDIX F

RETAINING WALL

A Guide for Structure Reviews

In an effort to develop consistent and uniform criteria for structural reviews for private developments and site plans for municipal clients, we have developed the following submittal guidelines. Generally, the review will be based on the following information, however additional data, calculations, and information may be requested to provide for a more extensive review. Any missing items may be grounds for a request for re-submittal.

Contract construction drawings (24" x 36") bearing the seal and signature of an engineer licensed in the state of Michigan shall be submitted to the Municipality/City/Village, etc. The name of the person/company responsible for the project and the estimate of cost for the structure should accompany the plan. The construction documents, as a minimum, shall have the following data noted or referenced on the drawings:

Concrete Walls/Structures

- Clearly identified location of structure in site (plan view) with a location map (200 scale or equivalent)
- Top and bottom of wall elevation (plan view)
- Finished grades adjacent to the structure
- Grading plan corresponds to proposed structure
- Minimum and maximum wall height (cross section)
- Notes identifying or referencing material types and specifications
- Design loads including vehicular impact and surcharge loadings where applicable
- Structural dimensions and footing depth
- Wall and footing thickness
- Steel (reinforcing) grade, cover and spacing
- Bearing pressures (noted or referenced) and soil bearing capacities
- Openings in walls
- Protective guard requirements (required within two feet of pedestrians)
- Drainage requirements
- Filter wrapped drain tile and outlets specified
- Utility conflicts – noted with owner contact information
- Soil boring information & Geotechnical analysis

Block & Timber Retaining Walls

- All of the above except steel reinforcing data
- Segmental wall dimensions and soil reinforcing (if applicable)
- Manufacturer specifications (Block only) – compare to plans
- Geo-grid length noted, dimensioned and labeled on plans
- Embedment depth
- Boulder wall not exceeding four feet in height

In all cases, a signed and sealed letter from the engineer of record certifying that structures have been designed in accordance with applicable structural design codes with the codes identified; that all applicable safety factors, standards and codes (identify safety factors) have been met or exceeded; and that the soil conditions have been reviewed by a qualified geotechnical engineer.

APPENDIX G

U.S. DEPARTMENT OF TRANSPORTATION F.A.A. ADVISORY CIRCULAR HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: Hazardous Wildlife Attractants on or
near Airports

Date: 02/21/2020

AC No: 150/5200-33C

Initiated By: AAS-300

Change:

1 **Purpose.**

This Advisory Circular (AC) provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. It also discusses airport development projects (including airport construction, expansion, and renovation) affecting aircraft movement near hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

2 **Cancellation.**

This AC cancels AC 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports*, dated August 28, 2007.

3 **Application.**

The Federal Aviation Administration recommends the guidance in this AC for land uses that have the potential to attract hazardous wildlife on or near public-use airports. This AC does not constitute a regulation, is not mandatory, and is not legally binding in its own right. It will not be relied upon as a separate basis by the FAA for affirmative enforcement action or other administrative penalty. Conformity with this AC is voluntary, and nonconformity will not affect rights and obligations under existing statutes and regulations, except as follows:

1. Airports that hold Airport Operating Certificates issued under Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart D, may use the standards, practices and recommendations contained in this AC as one, but not the only, acceptable means of compliance with the wildlife hazard management requirements of Part 139.
2. The FAA recommends the guidance in this AC for airports that receive funding under Federal grant assistance programs, including the Airport Improvement Program. See Grant Assurance #34.

3. The FAA recommends the guidance in this AC for projects funded by the Passenger Facility Charge program. See PFC Assurance #9.
4. The FAA recommends the guidance in this AC for land-use planners and developers of projects, facilities, and activities on or near airports.

4 **Principal Changes.**

Changes are marked with vertical bars in the margin. Change in this AC include:

1. Clarification by the FAA that non-certificated airports are recommended to conduct a Wildlife Hazard Assessment (Assessment) or a Wildlife Hazard Site Visit (Site Visit);
2. Table 1, Ranking of Hazardous Species, has been moved to Advisory Circular 150/5200-32, *Reporting Wildlife Aircraft Strikes* (5/31/2013);
3. Consolidation and reorganization of discussion on land uses of concern; and updated procedures for evaluation and mitigation. Discussion addresses off-airport hazardous wildlife attractants, followed by discussion of on-airport attractants. It also clarifies language regarding the applicability of the AC.

5 **Background.**

1. Information about the risks posed to aircraft by certain wildlife species has increased a great deal in recent years. Improved reporting, studies, documentation, and statistics clearly show that aircraft collisions with birds and other wildlife are a serious economic and public safety problem. While many species of wildlife can pose a risk¹ to aircraft safety, they are not equally hazardous². These hazard rankings can help focus hazardous wildlife management efforts on those species or groups that represent the greatest risk to safe air and ground operations in the airport environment. Used in conjunction with a site-specific Assessment that will determine the relative abundance and use patterns of wildlife species, these rankings combined with a systematic risk analysis can help airport operators better understand the general threat level (and consequences) of certain wildlife species. Also, the rankings can assist with the creation of a “high risk” list of hazardous species that warrant immediate attention.
2. Most public-use airports have large tracts of open, undeveloped land that provide added margins of safety and noise mitigation. These areas can also present potential hazards to aviation if they encourage wildlife to enter an airport’s approach or departure airspace or aircraft operations area. Constructed or natural areas— such as

¹ Risk is the relationship between the severity and probability of a threat. It is the product of hazard level and abundance in the critical airspace, and is thus defined as the probability of a damaging strike with a given species.

² Hazardous wildlife are species of wildlife (birds, mammals, reptiles), including feral and domesticated animals, not under control that may pose a direct hazard to aviation (i.e., strike risk to aircraft) or an indirect hazard such as an attractant to other wildlife that pose a strike hazard or are causing structural damage to airport facilities (e.g., burrowing, nesting, perching).

poorly drained locations, detention/retention ponds, roosting habitats on buildings, landscaping, odor-causing rotting organic matter (putrescible waste) disposal operations, wastewater treatment plants, agricultural or aquaculture activities, surface mining, wetlands, or some conservation-based land uses — can provide wildlife with ideal locations for feeding, loafing, reproduction, and escape. Even small facilities, such as fast food restaurants, taxicab staging areas, rental car facilities, aircraft viewing areas, and public parks, can produce substantial attractions for hazardous wildlife.

3. During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives worldwide, as well as billions of dollars in aircraft damage. Hazardous wildlife attractants on and near airports can jeopardize future airport expansion, making proper community land-use planning essential. This AC provides airport operators and those parties with whom they cooperate with the guidance they need to assess and address potentially hazardous wildlife attractants when locating new facilities and implementing certain land-use practices on or near public-use airports.

6 **Memorandum of Agreement Between Federal Resource Agencies.**

The FAA, the U.S. Air Force, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture - Wildlife Services signed a Memorandum of Agreement (MOA) to acknowledge their respective missions in protecting aviation from wildlife hazards. Through the MOA, the agencies established procedures necessary to coordinate their missions to address more effectively existing and future environmental conditions contributing to collisions between wildlife and aircraft (wildlife strikes) throughout the United States. These efforts are intended to minimize wildlife risks to aviation and human safety while protecting the Nation's valuable environmental resources.

7 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.



John R. Dermody
Director of Airport Safety and Standards

CONTENTS

Paragraph	Page
Chapter 1. General Separation Criteria for Hazardous Wildlife Attractants on or Near Airports	1-1
1.1 Introduction.....	1-1
1.2 Airports Serving Piston-Powered Aircraft.....	1-1
1.3 Airports Serving Turbine-Powered Aircraft.....	1-2
1.4 Protection of Approach, Departure, and Circling Airspace.....	1-2
Chapter 2. Land-Use Practices on or Near Airports that Potentially Attract Hazardous Wildlife	2-1
2.1 General.....	2-1
2.2 Waste Disposal Operations.	2-2
2.3 Water Management Facilities.....	2-4
2.4 Wetlands.	2-8
2.5 Dredge Spoil Containment Areas.....	2-10
2.6 Agricultural Activities.	2-10
2.7 Aquaculture.....	2-12
2.8 Golf Courses, Landscaping, Structures and Other Land-Use Considerations...	2-14
2.9 Habitat for State and Federally-Listed Species on Airports.....	2-16
2.10 Synergistic Effects of Surrounding Land Uses.....	2-17
Chapter 3. Procedures for Wildlife Hazard Management by Operators of Public-Use Airports and Conditions for Non-Certificated Airports to Conduct Wildlife Hazard Assessments and Wildlife Hazard Site Visits	3-1
3.1 Introduction.....	3-1
3.2 Coordination with Qualified Airport Wildlife Biologists.....	3-1
3.3 Wildlife Hazard Management at Airports: A Manual For Airport Personnel.....	3-1
3.4 Wildlife Hazard Site Visits and Wildlife Hazard Assessments.....	3-2
3.5 Wildlife Hazard Management Plan.....	3-2
3.6 Local Coordination.....	3-3
3.7 Operational Notifications of Wildlife Hazards.....	3-3
3.8 Federal and State Depredation Permits.....	3-4

Chapter 4. Recommended Procedures for the FAA, Airport Operators and Other Government Entities Regarding Off-Airport Attractants	4-1
4.1 FAA Notification and Review of Proposed Land-Use Practice Changes in the Vicinity of Public-Use Airports.....	4-1
4.2 Waste Management Facilities.	4-2
4.3 Other Land-Use Practice Changes.	4-3
4.4 Coordination to Prevent Creation of New Off-Airport Hazardous Wildlife Attractants.	4-4
4.5 Coordination on Existing Off-Airport Hazardous Wildlife Attractants.	4-5
4.6 Prompt Remedial Action.	4-5
4.7 FAA Assistance.....	4-5
Appendix A. Definitions of Terms Used in this Advisory Circular.....	A-1
Appendix B. Additional Resources.....	B-1

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CHAPTER 1. GENERAL SEPARATION CRITERIA FOR HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS

1.1 Introduction.

- 1.1.1 Airport operators should maintain an appropriate environment for the safe and efficient operation of aircraft, which entails mitigating wildlife strike hazards by fencing, modifying the landscape in order to deter wildlife or by hazing or removing wildlife hazardous to aircraft from congregating on airports. When considering proposed land uses, operators and sponsors of airports certificated under Part 139, local planners, and developers must take into account whether the proposed land uses, including new development projects, will increase wildlife hazards. Land-use practices that attract or sustain hazardous wildlife populations on or near airports, specifically those listed in Chapter 2, can significantly increase the potential for wildlife strikes.
- 1.1.2 The FAA urges regulatory agencies and planning and zoning agencies to evaluate proposed new land uses within the separation criteria and prevent the creation of land uses that attract or sustain hazardous wildlife within the separation distances.
- 1.1.3 The FAA recommends the use of minimum separation criteria outlined below for land-use practices that attract hazardous wildlife to the vicinity of airports. Please note that FAA criteria include land uses that cause movement of hazardous wildlife onto, into, or across the airport's approach or departure airspace or aircraft operations area. (See the discussion of the synergistic effects of surrounding land uses in Paragraph 2.8 of this AC.). For the purpose of evaluating distance criteria, the delineation of the aircraft operations area may also consider future airport development plans depicted on the Airport Layout Plan (e.g., planned runway extension).
- 1.1.4 The separation distances are based on (1) flight patterns and performance criteria of piston-powered aircraft and turbine-powered aircraft, (2) the altitude at which most strikes happen (78 percent occur under 1,000 feet and 90 percent occur under 3,000 feet above ground level), and (3) National Transportation Safety Board recommendations.

1.2 Airports Serving Piston-Powered Aircraft.

Airports that do not sell Jet-A fuel normally serve piston-powered aircraft. Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 5,000 feet from these airports for any of the hazardous wildlife attractants discussed in Chapter 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between the closest point of the airport's aircraft operations area and the hazardous wildlife attractant. Figure 1 depicts an example of the 5,000-foot separation distance measured from the nearest aircraft operations area.

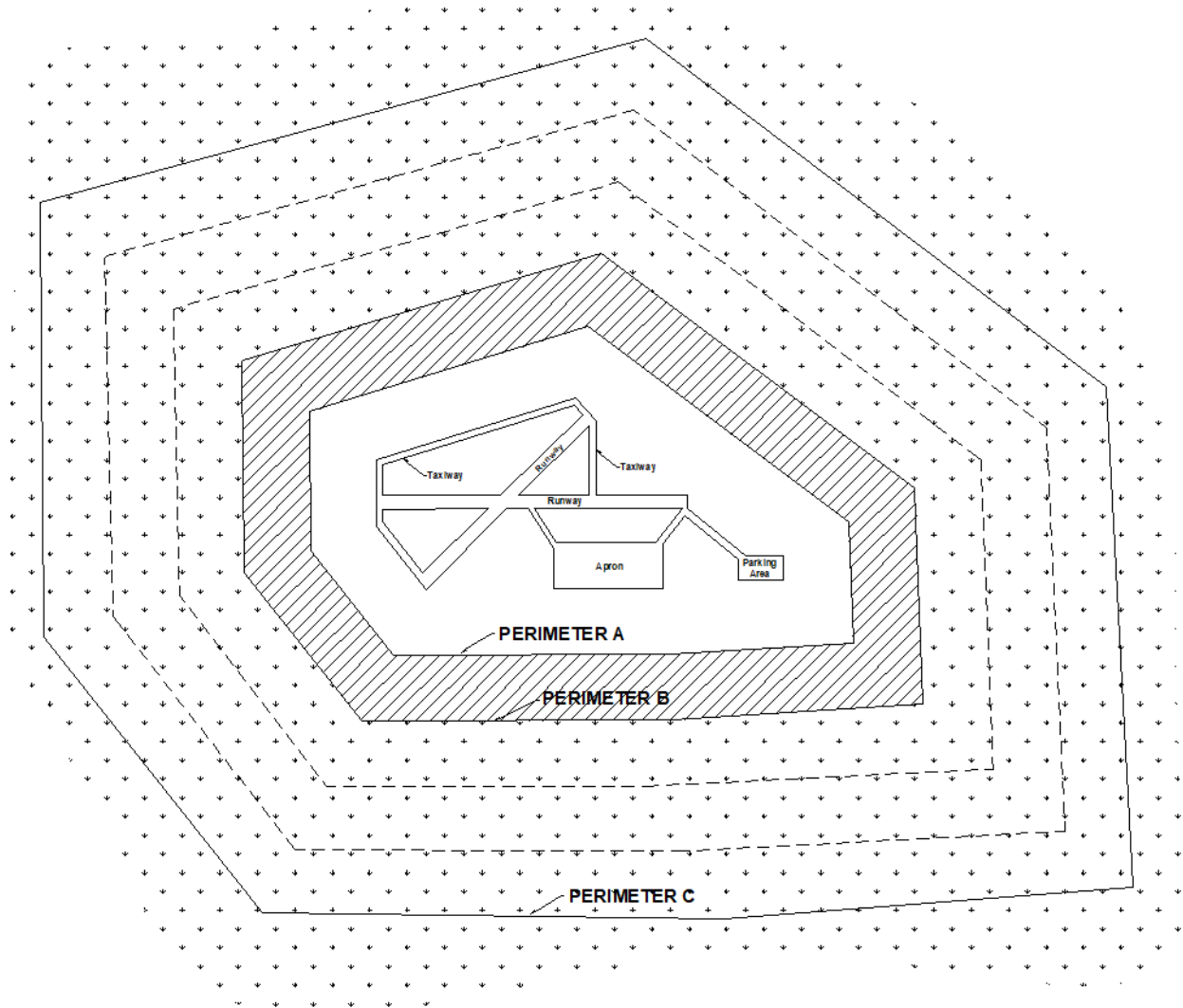
1.3 Airports Serving Turbine-Powered Aircraft.

For airports serving turbine-powered aircraft, the FAA recommends a separation distance of 10,000 feet from these airports for any of the hazardous wildlife attractants discussed in Chapter 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between the closest point of the airport's aircraft operations area and the hazardous wildlife attractant. Figure 1 depicts an example of the 10,000-foot separation distance from the nearest aircraft movement areas.

1.4 Protection of Approach, Departure, and Circling Airspace.

For all airports, the FAA recommends a distance of 5 miles between the closest point of the airport's aircraft operations area and the hazardous wildlife attractant. Special attention should be given to hazardous wildlife attractants that could cause hazardous wildlife movement into or across the approach or departure airspace. Figure 1 depicts an example of the 5-mile separation distance measured from the nearest aircraft operations area.

Figure 1. Example of recommended separation distances described in Chapter 1 within which hazardous wildlife attractants should be avoided, eliminated, or mitigated.



PERIMETER A: For airports serving piston-powered aircraft, it is recommended hazardous wildlife attractants be 5,000 feet from the nearest aircraft operations area.

PERIMETER B: For airports serving turbine-powered aircraft, it is recommended hazardous wildlife attractants be 10,000 feet from the nearest aircraft operations area.

PERIMETER C: Recommended for all airports, 5-mile range to protect approach, departure and circling airspace.

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CHAPTER 2. LAND-USE PRACTICES ON OR NEAR AIRPORTS THAT POTENTIALLY ATTRACT HAZARDOUS WILDLIFE

2.1 General.

2.1.1 Many types of vegetation, habitats and land use practices can provide an attractant to animals that pose a risk to aviation safety. Hazardous wildlife use the natural or artificial habitats on or near an airport for food, water or cover. The wildlife species and the size of the populations attracted to the airport environment vary considerably, depending on several factors, including land-use practices on or near the airport. In addition to the specific considerations outlined below, airport operators should refer to *Wildlife Hazard Management at Airports* manual, prepared by FAA and U.S. Department of Agriculture (USDA) staff. (This manual is available in English, Spanish, and French). This manual, as well as other helpful resources can be viewed and downloaded free of charge from the Wildlife Strike Resources section of the FAA's wildlife hazard mitigation web site:

http://www.FAA.gov/airports/airport_safety/wildlife).

2.1.1.1 The USDA / Animal and Plant Health Inspection Service (APHIS) / Wildlife Services developed a new publication series on wildlife damage management and is available online. The Wildlife Damage Management Technical Series highlights wildlife species or groups of wildlife species that cause damage to agriculture, property and natural resources, and/or impact aviation and human health and safety. The publications can be found at:
https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/sa_reports/ct_wildlife+damage+management+technical+series.

2.1.1.2 Additional resources have been provided by the USDA / APHIS / Wildlife Services National Wildlife Research Center (NWRC) at:
https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nwrc/sa_publications/ct_research_gateway. The NWRC Research Gateway contains research articles, reports, factsheets, technical notes, data and other materials on wildlife hazard mitigation, risk reduction, animal ecology, habitats, and advanced technologies and methodologies.

2.1.2 This section discusses land-use practices having the potential to attract hazardous wildlife and threaten aviation safety. The FAA has determined that the land uses listed below are generally not compatible with safe airport operations when they are located within the separation distances provided in Paragraphs 1.2 through 1.4.

2.1.3 As a reminder, these types of land uses or facilities often require permits from the appropriate permitting agency. The FAA may work with the permitting agency to include conditions for monitoring and mitigation measures, if necessary. Ultimately, the permittee is responsible for compliance to these conditions and the permitting agency is responsible for tracking compliance.

2.2 Waste Disposal Operations.

Municipal solid waste landfills (municipal landfills) are known to attract large numbers of hazardous wildlife, particularly birds. Because of this, these operations, when located within the separations identified in the siting criteria in Paragraphs 1.2 through 1.4, are considered incompatible with safe airport operations.

2.2.1 Siting for New Municipal Solid Waste Landfills Subject to AIR 21.

- 2.2.1.1 Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (P. L. 106-181) (AIR 21), 49 U.S.C. § 44718(d), prohibits the construction or establishment of a new municipal landfill within 6 miles of certain public-use airports. Before these prohibitions apply, both the airport and the landfill must meet the very specific conditions described below. These restrictions do not apply to airports or landfills located within the state of Alaska.
- 2.2.1.2 The airport must (1) have received a Federal grant(s) under 49 U.S.C. § 47101, et. seq.; (2) be under control of a public agency; (3) serve some scheduled air carrier operations conducted in aircraft with less than 60 seats; and (4) have total annual enplanements consisting of at least 51 percent of scheduled air carrier enplanements conducted in aircraft with less than 60 passenger seats.
- 2.2.1.3 The proposed municipal landfill must (1) be within 6 miles of the airport, as measured from airport property line to the landfill property line, and (2) have started construction or establishment on or after April 5, 2001. Section 44718(d) only limits the construction or establishment of some new landfills. It does not limit the expansion, either vertical or horizontal, of existing landfills.
- 2.2.1.4 Regarding existing municipal landfills and lateral expansions of landfills, 40 CFR § 258.10 requires owners or operators of a landfill units located within the separation distances provided in Paragraphs 1.2 through 1.4 to demonstrate that the unit is designed and operated so that it does not pose a bird hazard to aircraft. To accomplish this, follow the instructions provided in Paragraphs 3.2 and 3.3, document the wildlife monitoring and mitigation procedures that are cooperatively developed, and place this documentation in the operating permit of the facility.

2.2.2 Siting for New Municipal Landfills Not Subject to AIR 21.

If an airport and a municipal landfill do not meet the criteria of § 44718(d), then FAA recommends against locating the landfill within the separation distances identified in Paragraphs 1.2 through 1.4. In determining this distance separation, measurements should be made from the closest point of the airport property boundary to the closest point of the landfill property boundary.

2.2.3 Considerations for Existing Waste Disposal Facilities Within the Limits of Separation Criteria.

The FAA recommends against airport development projects that would increase the number of aircraft operations or accommodate larger or faster aircraft near landfill operations located within the separations identified in Paragraphs 1.2 through 1.4. In addition, in accordance with 40 CFR § 258.10, owners or operators of existing landfill units that are located within the separations listed in Paragraphs 1.2 through 1.4 must demonstrate that the unit is designed and operated so it does not pose a bird hazard to aircraft. (See Paragraph 4.3.2 of this AC for a discussion of this demonstration requirement.)

2.2.4 Enclosed Trash Transfer Stations.

Enclosed waste-handling facilities that receive garbage behind closed doors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles generally are compatible with safe airport operations, provided they are constructed and operated properly and are not located on airport property or within the Runway Protection Zone. These facilities should not handle or store putrescible waste outside or in a partially enclosed structure accessible to hazardous wildlife. Trash transfer facilities that are open on one or more sides; or store uncovered quantities of municipal solid waste outside, even if only for a short time; or use semi-trailers that leak or have trash clinging to the outside; or do not control odors by ventilation and filtration systems (odor masking is not acceptable) do not meet the FAA's definition of fully enclosed trash transfer stations. The FAA considers fully enclosed waste-handling facilities constructed or operated incorrectly incompatible with safe airport operations if they are located closer than the separation distances specified in Paragraphs 1.2 through 1.4.

2.2.5 Composting Operations on or near Airport Property.

Composting operations that accept only yard waste (e.g., leaves, lawn clippings, or branches) generally do not attract hazardous wildlife. Sewage sludge, woodchips, and similar material are not municipal solid wastes and may be used as compost bulking agents. The compost, however, must never include food or other municipal solid waste. Composting operations should not be located on airport property unless effective, risk-reducing mitigations are in place. Off-airport property composting operations should be located no closer than the greater of the following distances: 1,200 feet from any aircraft operations area or the distance called for by airport design requirements (see AC 150/5300-13, *Airport Design*). This spacing should prevent material, personnel, or equipment from penetrating any Object Free Area, Obstacle Free Zone, Threshold Siting Surface, or Clearway. Airport operators should monitor composting operations located in proximity to the airport to ensure that steam or thermal rise does not adversely affect air traffic.

2.2.6 Underwater Waste Discharges.

The FAA recommends against the underwater discharge of any food waste (e.g., fish processing offal) within the separations identified in Paragraphs 1.2 through 1.4 because it could attract scavenging hazardous wildlife.

2.2.7 Recycling Centers.

Recycling centers that accept previously sorted non-food items, such as glass, newspaper, cardboard, aluminum, electronic, and household wastes such as paint, batteries, and oil, are, in most cases, not attractive to hazardous wildlife and are acceptable.

2.2.8 Construction and Demolition Debris Facilities.

2.2.8.1 Construction and demolition landfills generally do not attract hazardous wildlife and are acceptable if maintained in an orderly manner, admit no putrescible waste, and are not co-located with other waste disposal operations. However, construction and demolition landfills have similar visual and operational characteristics to putrescible waste disposal sites. When co-located with putrescible waste disposal operations, construction and demolition landfills are more likely to attract hazardous wildlife because of the similarities between these disposal facilities.

2.2.8.2 Therefore, a construction and demolition landfill co-located with another waste disposal operation should be located outside of the separations identified in Paragraphs 1.2 through 1.4.

2.2.8.3 Airport operators should be aware that on-site storage of construction and maintenance debris, as well as out-of-service aircraft or aircraft components, may provide an attractant for hazardous species (e.g., nesting or perching locations). The FAA recommends these on-site areas be monitored and/or mitigated, if necessary.

2.2.9 Fly Ash Disposal.

2.2.9.1 The incinerated residue from resource recovery power/heat-generating facilities that are fired by municipal solid waste, coal, or wood is generally not a wildlife attractant because it no longer contains putrescible matter. Landfills accepting only fly ash are generally not considered to be wildlife attractants and are acceptable as long as they admit no putrescible waste of any kind, and are not co-located with other disposal operations that attract hazardous wildlife.

2.2.9.2 Since varying degrees of waste consumption are associated with general incineration (not resource recovery power/heat-generating facilities), the FAA considers the ash from general incinerators a regular waste disposal by-product and, therefore, a hazardous wildlife attractant if disposed of within the separation criteria outlined in Paragraphs 1.2 through 1.4.

2.3 **Water Management Facilities.**

Drinking water intake and treatment facilities, storm water and wastewater treatment facilities, associated retention and settling ponds, ponds built for recreational use, ponds

and fountains for ornamental purposes, and ponds that result from mining activities often attract large numbers of potentially hazardous wildlife. Development of new open water facilities within the separation criteria identified in Paragraphs 1.2 through 1.4 should be avoided to prevent wildlife attractants. If necessary, land-use developers and airport operators may need to develop management plans, in compliance with local and state regulations, to support the operation of storm water management facilities on or near all public-use airports to ensure a safe airport environment. The FAA recommends these plans be developed in consultation with a Qualified Airport Wildlife Biologist³, to minimize hazardous wildlife attractants.

2.3.1 Existing Stormwater Management Facilities.

- 2.3.1.1 On-airport stormwater management facilities allow the quick removal of surface water, including discharges related to aircraft deicing, from impervious surfaces, such as pavement and terminal/hangar building roofs. Existing on-airport detention ponds collect stormwater, protect water quality, and control runoff. Because they slowly release water after storms, they may create standing bodies of water that can attract hazardous wildlife. Where the airport has developed a Wildlife Hazard Management Plan, Part 139 regulations require the immediate correction of any wildlife hazards arising from existing stormwater facilities located on or near airports using appropriate wildlife hazard mitigation techniques. Airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a Qualified Airport Wildlife Biologist.
- 2.3.1.2 Where possible, airport operators should modify stormwater detention ponds to allow a maximum 48-hour detention period for the design storm. The combination of open water and vegetation is particularly attractive to waterfowl and other hazardous wildlife. Water management facilities holding water longer than 48 hours should be maintained in a manner that keeps them free of both emergent and submergent vegetation. The FAA recommends that airport operators avoid or remove retention ponds and detention ponds featuring dead storage to eliminate standing water. Detention basins should remain totally dry between rainfalls. Where constant flow of water is anticipated through the basin, or where any portion of the basin bottom may remain wet, the detention facility should include a concrete or paved pad and/or ditch/swale in the bottom to prevent vegetation that may provide nesting habitat. Drainage basins with a concrete or paved pad should be maintained to prevent or remove any sediment build-up to prevent vegetation growth.
- 2.3.1.3 When it is not possible to drain a large detention pond completely, airport operators may use physical barriers, such as bird balls, wire grids, pillows,

³ See Advisory Circular 150/5200-36, *Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports.*

or netting, to deter birds and other hazardous wildlife. When physical barriers are proposed, airport operators must evaluate their use, effectiveness and maintenance requirements. Airport operators must also ensure physical barriers will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, airport operators must get approval from the appropriate FAA Regional Airports Division Office.

- 2.3.1.4 The FAA recommends that airport operators encourage off-airport stormwater treatment facility operators to incorporate appropriate wildlife hazard mitigation techniques into stormwater treatment facility operating practices when their facility is located within the separation criteria specified in Paragraphs 1.2 through 1.4.

2.3.2 New Stormwater Management Facilities.

The FAA recommends that storm water management systems located within the separations identified in Paragraphs 1.2 through 1.4 be designed and operated so as not to create above-ground standing water. Stormwater detention ponds should be designed, engineered, constructed, and maintained for a maximum 48-hour detention period after the design storm and to remain completely dry between storms. To facilitate the control of hazardous wildlife, the FAA recommends the use of steep-sided, rip-rap or concrete lined, narrow, linear-shaped water detention basins. When it is not possible to place these ponds away from an airport's aircraft operations area (but still on airport property), airport operators may use physical barriers, such as bird balls, wire grids, floating covers, vegetation barriers (bottom liners), or netting, to prevent access of hazardous wildlife to open water and minimize aircraft-wildlife interactions. Caution is advised when nets or wire grids are used for deterring birds from attractants. Mesh size should be < 5 cm (2") to avoid entangling and killing birds and should not be made of a monofilament material. Grids installed above and across water to deter hazardous birds (e.g., waterfowl, cormorants, etc.) are different than using a small mesh covering but also provides an effective deterrent. Grid material, size, pattern and height above water may differ on a case-by-case basis. When physical barriers are used, airport operators must evaluate their use and ensure they will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, a review by a Qualified Airport Wildlife Biologist should be conducted, prior to approval from the appropriate FAA Regional Airports Division Office. All vegetation in or around detention basins that provide food or cover for hazardous wildlife should be eliminated. If soil conditions and other requirements allow, the FAA encourages the use of underground storm water infiltration systems because they are less attractive to wildlife.

2.3.3 Existing Wastewater Treatment Facilities.

- 2.3.3.1 The FAA recommends that airport operators immediately correct any wildlife hazards arising from existing wastewater treatment facilities located on or near the airport.

2.3.3.2 Where required, a wildlife management plan will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should encourage wastewater treatment facility operators to incorporate measures, developed in consultation with a Qualified Airport Wildlife Biologist, to minimize hazardous wildlife attractants. Airport operators should also encourage those wastewater treatment facility operators to incorporate these mitigation techniques into their standard operating practices. In addition, airport operators should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.

2.3.4 New Wastewater Treatment Facilities.

The FAA recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in Paragraphs 1.2 through 1.4. Appendix 1 defines wastewater treatment facility as “any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes.” The definition includes any pretreatment involving the reduction or elimination of pollutants prior to introducing such pollutants into a treatment facility. When a wastewater treatment facility is proposed within the separation criteria, the airport operator, project proponent, and local jurisdiction should discuss the proposed project location with regard to its location near the airport and the separation distances identified in Paragraphs 1.2 through 1.4. If possible, a more suitable location for the proposed facility should be identified. If no other suitable location exists, FAA recommends that the proposed facility plans be reviewed by a Qualified Airport Wildlife Biologist to identify measures to avoid or reduce the facility’s potential to attract hazardous wildlife. If appropriate measures cannot be incorporated to reduce potential wildlife hazards, airport operators should document their opposition in a letter to the local jurisdiction.

2.3.5 Artificial Marshes.

In warmer climates, wastewater treatment facilities sometimes employ artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. The FAA recommends against establishing artificial marshes within the separations identified in Paragraphs 1.2 through 1.4.

2.3.6 Wastewater Discharge and Sludge Disposal.

The FAA recommends careful consideration regarding the discharge of wastewater or biosolids (i.e., secondarily treated sewage sludge) on airport property. Such discharges might improve soil moisture and quality on unpaved areas and lead to improved turf growth. Depending on the airfield plant communities and habitats present, this can be an attractive food source for many species of animals or, conversely, could result in limited attractiveness to hazardous wildlife. Also, improved turf requires more frequent mowing and could attract geese. Airports should improve their turf with the goal of a monoculture of turf that is least attractive to wildlife. Wastewater or biosolids

applications might assist in achieving this goal. Caution should be exercised when discharges saturate airfield areas adjacent to paved surfaces. The resultant soft, muddy conditions could restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

2.4 Wetlands.

Wetlands provide a variety of functions and can be regulated by local, state, and Federal laws. Wetlands can be attractive to many types of wildlife, including many which rank high on the list of hazardous wildlife species (Table 1 - AC 150/5200-32). Some types of wetlands are not as attractive to wildlife as others and they should be reviewed on a case-by-case basis to determine the likelihood of proposed wetlands increasing the numbers of hazardous wildlife at the airport. Factors such as size, shape, location, canopy cover and vegetative composition among other things should be considered when determining compatibility.

Note: If questions exist as to whether an area qualifies as a wetland, contact the District Office of the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, or a wetland consultant qualified to delineate wetlands.

2.4.1 Existing Wetlands on or near Airport Property.

If wetlands are located on or near airport property, airport operators should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations. At public-use airports, the FAA recommends immediately correcting, in cooperation with local, state, and Federal regulatory agencies, any wildlife hazards arising from existing wetlands located on or near airports within 5 miles of the aircraft operations area. Where required, a wildlife management plan will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a FAA Qualified Airport Wildlife Biologist.

2.4.2 New Airport Development.

Whenever possible, the FAA recommends locating new airports using the separations from wetlands identified in Paragraphs 1.2 through 1.4. Where alternative sites are not practicable, or when airport operators are expanding an existing airport into or near wetlands, a Qualified Airport Wildlife Biologist, in coordination with the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the state wildlife management agency should evaluate the wildlife hazards and prepare a wildlife management plan that indicates methods of minimizing the hazards.

2.4.3 Mitigation for Wetland Impacts from Airport Projects.

Wetland mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects or projects required to correct wildlife hazards from wetlands. Wetland mitigation must be designed so it does not create a wildlife hazard. The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Paragraphs 1.2 through 1.4.

2.4.3.1 Onsite Mitigation of Wetland Functions.

Wetland mitigation/conservation easements must not inhibit the airport operator's ability to effectively control hazardous wildlife on or near the mitigation site or effectively maintain other aspects of safe airport operations. Enhancing such mitigation areas to attract hazardous wildlife must be avoided. The FAA will review any onsite mitigation proposals to determine compatibility with safe airport operations and grant assurance compliance. Early coordination with the FAA is encouraged for any proposal to use airport land for wetland mitigation. A Qualified Airport Wildlife Biologist should evaluate any wetland mitigation projects that are needed to protect unique wetland functions and that must be located in the separation criteria in Paragraphs 1.2 through 1.4 before the mitigation is implemented. A wildlife management plan should be developed to reduce the wildlife hazards.

2.4.3.2 Offsite Mitigation of Wetland Functions.

- 2.4.3.2.1 The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Paragraphs 1.2 through 1.4 unless they provide unique functions that must remain onsite (see 2.4.3.1). Agencies that regulate impacts to or around wetlands recognize that it may be necessary to split wetland functions in mitigation schemes. Therefore, regulatory agencies may, under certain circumstances, allow portions of mitigation to take place in different locations.
- 2.4.3.2.2 The FAA encourages landowners or communities supporting the restoration or enhancement of wetlands to do so only after critically analyzing how those activities would affect aviation safety. To do so, landowners or communities should contact the affected airport sponsor, FAA, and/or a Qualified Airport Wildlife Biologist.
- 2.4.3.2.3 Those parties should work cooperatively to develop restoration or enhancement plans that would not worsen existing wildlife hazards or create such hazards. See Paragraphs 4.1.1 – 4.1.3 for land-use modifications evaluation criteria.
- 2.4.3.2.4 If parties develop a mutually acceptable restoration or enhancement plan, the landowner or community proposing the restoration or enhancement must monitor the restored or enhanced site. This monitoring must verify that efforts have not worsened or created hazardous wildlife attraction or activity. If such attraction or activity occurs, the landowner or community should work with the airport sponsor, or a Qualified Airport Wildlife Biologist to reduce the hazard to aviation.

2.4.3.3 **Mitigation Banking.**

Wetland mitigation banking is the creation or restoration of wetlands in order to provide mitigation credits that can be used to offset permitted wetland losses. Mitigation banking benefits wetland resources by providing advance replacement for permitted wetland losses; consolidating small projects into larger, better-designed and managed units; and encouraging integration of wetland mitigation projects with watershed planning. This last benefit is most helpful for airport projects, as wetland impacts mitigated outside of the separations identified in Paragraphs 1.2 through 1.4 can still be located within the same watershed. Wetland mitigation banks meeting the separation criteria offer an ecologically sound approach to mitigation in these situations. Airport operators should work with local watershed management agencies or organizations to develop mitigation banking for wetland impacts on airport property.

2.5 **Dredge Spoil Containment Areas.**

The FAA recommends against locating dredge spoil containment areas (also known as Confined Disposal Facilities) within the separations identified in Paragraphs 1.2 through 1.4 if the containment area or the spoils contain material that would attract hazardous wildlife. Proposals for new dredge spoil containment areas located within the separation distances should be reviewed on a case-by-case basis to determine the likelihood of resulting in an increase in hazardous wildlife. The FAA recommends that airport sponsors work with a Qualified Airport Wildlife Biologist and/or the FAA to review proposals for dredge spoil containment areas located within separation criteria.

2.6 **Agricultural Activities.**

Many agricultural crops can attract hazardous wildlife and should not be planted within the separations identified in Paragraphs 1.2 through 1.4. Corn, wheat, and other small grains in particular should be avoided. If the airport has no financial alternative to agricultural crops to produce the income necessary to maintain the viability of the airport, then the airport should consider growing crops that hold little food value for hazardous wildlife, such as grass hay. Attractiveness to hazardous wildlife species during all phases of production, from planting through harvest and fallow periods, should be considered when contemplating the use of airport property for agricultural production. Where agriculture is present, crop residue (e.g., waste grain) should not be left in the field following harvest. Also, airports should consult AC 150/5300-13, *Airport Design*, to ensure that agricultural crops do not create airfield obstructions or other safety hazards. Before planning or initiating any agricultural practices on airport property, operators should get approval from the appropriate FAA regional Airports Division Office and demonstrate that the additional cost of wildlife control and potential accidents is offset by revenue generated by agricultural leases. Annual review of the Airport Certification Manual by the Certification Inspector does not constitute approval and is insufficient to meet this requirement.

2.6.1 Livestock Production.

Confined livestock operations (i.e., feedlots, dairy operations, hog or chicken production facilities, or egg laying operations) often attract flocking birds, such as blackbirds, starlings, or pigeons that pose a hazard to aviation. Therefore, the FAA recommends against such facilities within the separations identified in Paragraphs 1.2 through 1.4. The airport operator should be aware of any wildlife hazards that appear to be attracted to off-site livestock operations and consider working with a Qualified Airport Wildlife Biologist to identify reasonable and feasible measures that may be proposed to landowners to reduce the attractiveness of the site to the potentially hazardous wildlife species.

2.6.1.1 In exceptional circumstances, and following FAA review and approval, livestock may be grazed on airport property as long as they are off the airfield and separated behind fencing where they cannot pose a hazard to aircraft. The livestock should be fed and watered as far away from the airfield and approach/departure space as possible because the feed and water may attract birds. The wildlife management plan should include monitoring and wildlife mitigation for any areas where the livestock and their feed/water is located in case a wildlife hazard is detected. Airports without wildlife management plans should equally consider monitoring and mitigation protocols to identify and address any wildlife hazards associated with livestock and their feeding operations.

2.6.2 Alternative Uses of Agricultural Land.

2.6.2.1 Habitat modification both on and surrounding an airfield is one of the best and most economical long term mitigation strategies to decrease risk that wildlife pose to flight safety. Alternative land uses (e.g., solar and biofuel) at airports could help mitigate many of the challenges for the airport operator, developers, and conservationists. However, careful planning must first determine that proposed alternative energy production at airports does not create wildlife attractants or other hazards.

2.6.2.2 Some airports are surrounded by vast areas of farmed land within the distances specified in Paragraphs 1.2 through 1.4. Seasonal uses of agricultural land for activities such as hunting can create a hazardous wildlife situation. In some areas, farmers will rent their land for hunting purposes. Rice farmers, among others, flood their land to attract waterfowl or for conservation efforts. This is often done during waterfowl hunting season to obtain additional revenue by renting out duck blinds.

2.6.2.3 The waterfowl hunters then use decoys and call in hundreds, if not thousands, of birds, creating a threat to aircraft safety. It is recommended that a Qualified Airport Wildlife Biologist review, in coordination with local farmers and producers, these types of seasonal land uses and incorporate mitigating measures into the wildlife management plan, when possible.

2.7 Aquaculture.

Aquaculture is the breeding, rearing, and harvesting of fish, shellfish, and plants in all types of water environments including ponds, rivers, lakes, and the ocean. Aquaculture is used to produce food fish, sport fish, bait fish, ornamental fish, and to support restoration activities. Aquacultured species are grown in a range of facilities including tanks, cages, ponds, and raceways. When an aquaculture facility is proposed within the separation criteria, the airport operator, project proponent, and local jurisdiction should discuss the proposed project location with regard to its attraction to hazardous species, location near the airport and the separation distances identified in Paragraphs 1.2 through 1.4. If a facility is identified as a possible significant attraction, a more suitable location for the proposed facility should be identified. If no other suitable location exists, it is recommended that the proposed facility plans be reviewed by a Qualified Airport Wildlife Biologist to identify measures to avoid or reduce the facility's potential to attract hazardous wildlife.

2.7.1 Freshwater Aquaculture.

2.7.1.1 Freshwater aquaculture activities (e.g., catfish, tilapia, trout or bass production) are typically conducted outside of fully enclosed buildings in constructed ponds or tanks and are inherently attractive to a wide variety of birds and therefore pose a significant risk to airport safety when within the separation distances specified in Paragraphs 1.2 through 1.4. Freshwater aquaculture should only be considered if extensive mitigation measures have been incorporated to eliminate attraction to hazardous birds. Examples of such mitigation include:

1. Netting or other material to exclude hazardous birds (e.g., eagles, osprey, gulls, cormorants);
2. Acoustic hazing including pyrotechnics, propane cannons, directional sonic/hailing devices and other similar technologies;
3. Feeding procedure cleanliness, exclusion techniques prohibiting birds from perching or accessing food; efficiency of feeding operation procedures that reduce fish food attraction to hazardous birds;
4. Operation procedure efficiency transferring live fish to and from enclosures or removal of dead fish; maintenance and upkeep of facility;
5. Monitoring, mitigation and communication protocols with nearby airports as a proactive safety feature in response to specific hazardous species in the event they are identified at the facility in unacceptable numbers.

2.7.2 Marine Aquaculture.

Marine aquaculture (Mariculture) refers to the culturing of species that live in the ocean. When appropriately managed and mitigated as necessary, mariculture facilities do not pose a significant risk to airport safety.

2.7.2.1 Finfish Mariculture.

2.7.2.1.1 U.S. finfish mariculture primarily produces salmon and steelhead trout as well as lesser amounts of cod, moi, yellowtail, barramundi, seabass, and seabream. Maricultures use rigid and non-rigid enclosures (e.g., cages) at the surface or submerged in the water column. These enclosures may be fully enclosed, or be open at the top or covered with netted material to negate losses from depredation by birds or other predators. Different facilities employ different designs and operational protocols.

2.7.2.1.2 While mariculture operations typically do not pose a significant attractant to hazardous birds, design and operational features can be incorporated as permit conditions to mitigate attraction and effectively reduce this risk. Examples of such mitigation include:

1. Fully enclosed cages using netting or other material to exclude hazardous birds (e.g., gulls, cormorants, pelicans) and to insure retention of fish;
2. Submerged enclosures to reduce attraction to hazardous birds;
3. Feed barge cleanliness, exclusion techniques prohibiting birds from perching or accessing food; efficiency of feeding operation procedures that reduce fish food attraction to hazardous birds;
4. Operation procedure efficiency transferring live fish to and from enclosures or removal of dead fish; maintenance and upkeep of facility;
5. Monitoring, mitigation and communication protocols with nearby airports as a proactive safety feature in response to specific hazardous species in the event they are identified at the facility in unacceptable numbers.

2.7.2.2 Shellfish Mariculture.

U.S. shellfish mariculture primarily produces oysters, clams, mussels, lobster and shrimp. Shellfish may be grown directly on the bottom, in submerged cages or bags, or on suspended lines. These types of mariculture operations do not typically present a significant attractant to hazardous birds. For those operations that are found to pose a significant risk, design and operation features that diminish possible attraction to hazardous bird species (e.g., reducing areas for perching or feeding) can effectively reduce this risk.

2.7.2.3 Plant Mariculture.

2.7.2.3.1 Microalgae, also referred to as phytoplankton, microphytes, or planktonic algae constitute the majority of cultivated algae. Macroalgae, commonly known as seaweed, also have many commercial and industrial uses.

- 2.7.2.3.2 While few commercial seaweed farms exist, the sector is growing. These types of mariculture operations do not typically present an attractant to hazardous birds.

2.8 **Golf Courses, Landscaping, Structures and Other Land-Use Considerations.**

2.8.1 Golf Courses.

The large grassy areas and open water found on most golf courses are attractive to hazardous wildlife, particularly Canada geese and some species of gulls. These species can pose a threat to aviation safety. If golf courses are located on or near airport property, airport operators should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations. Accordingly, airport operators should develop, at a minimum, onsite measures to minimize hazardous wildlife attraction in consultation with a Qualified Airport Wildlife Biologist. Existing golf courses located within these separations that have been documented to attract hazardous wildlife are encouraged to develop a program to reduce the attractiveness of the sites to species that are hazardous to aviation safety. The FAA recommends against construction of new golf courses within the separations identified in Paragraphs 1.2 through 1.4 if determined that the new facility would create a significant wildlife hazard attractant by a Qualified Airport Wildlife Biologist. Airport operators should ensure these golf courses are monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be immediately implemented.

2.8.2 Landscaping and Landscape Maintenance.

2.8.2.1 Depending on its geographic location, landscaping can attract hazardous wildlife. The FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. Vegetation that produces seeds, fruits, or berries, or that provides dense roosting or nesting cover should not be used. Airports should develop a landscape plan to include approved and prohibited plants. The landscape plan should consider the watering needs of mature plants. A Qualified Airport Wildlife Biologist should review all landscaping plans. Airport operators should also monitor all landscaped areas on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be immediately implemented.

2.8.2.2 Turf grass areas on airports have the potential to be highly attractive to a variety of hazardous wildlife species. Research conducted by the USDA Wildlife Services' National Wildlife Research Center has shown that no one airfield vegetation management regimen will deter all species of hazardous wildlife in all situations. The composition and height of airfield grasslands should be properly managed to reduce their attractiveness to hazardous wildlife. In many situations, an intermediate height, monoculture turf grass might be most favorable. In cooperation with a

Qualified Airport Wildlife Biologist, airport operators should develop airport turf grass management plans on a prescription basis, including cultivar selection during reseeding efforts, that is specific to the airport's geographic location, climatic conditions, and the type of hazardous wildlife likely to frequent the airport.

- 2.8.2.3 Airport operators should ensure that plant varieties attractive to hazardous wildlife are not used on the airport. Disturbed areas or areas in need of re-vegetating should not be planted with seed mixtures containing millet or any other large-seed producing grass. For airport property already planted with seed mixtures containing millet, rye grass, or other large-seed producing grasses, the FAA recommends disking, plowing, or another suitable agricultural practice to prevent plant maturation and seed head production. Plantings should follow the specific recommendations for grass management and seed and plant selection made by the State University Cooperative Extension Service, the local office of Wildlife Services, or a Qualified Airport Wildlife Biologist. Airport operators should also consider developing and implementing a preferred/prohibited plant species list, reviewed by a Qualified Airport Wildlife Biologist, which has been designed for the geographic location to reduce the attractiveness to hazardous wildlife for landscaping airport property.

2.8.3 Structures.

- 2.8.3.1 Certain structures attract birds for loafing and nesting. Flat rooftops can be attractive to many species of gulls for nesting, hangars provide roosting / nesting opportunities for rock doves, towers, light posts and navigation aids can provide loafing / hunting perches for raptors and aircraft can provide loafing / nesting sites for European starlings, blackbirds and other species. These structures should be monitored and mitigated, if located on-site. Off-site structural attractions may require additional coordination to effectively mitigate their use by hazardous species.

- 2.8.3.2 Cellular communications towers are becoming increasingly more attractive to large birds (e.g., osprey, eagles, herons, vultures) for nesting and rearing their young. This problem is a growing concern because once the young fledge from nests built on manmade structures they are more likely to return to these kinds of sites to reproduce in future years.

2.8.4 Other Hazardous Wildlife Attractants.

Other land uses (e.g., conservation easements, parks, wildlife management areas) or activities not addressed in this AC may have the potential to attract hazardous wildlife. Regardless of the source of the attraction, when hazardous wildlife is noted on a public-use airport, each certificate holder must take prompt remedial action(s) to protect aviation safety and all non-certificated airports should take prompt remedial action(s) to protect aviation safety.

2.9 **Habitat for State and Federally Listed Species on Airports.**

An airport's air operations area is an artificial environment that has been created and maintained for aircraft operations. Because an aircraft operations area can be markedly different from the surrounding native landscapes, it may attract wildlife species that do not normally occur, or that occur only in low numbers in the area. Some of the grassland species attracted to an airport's aircraft operations area are at the edge of their natural ranges, but are attracted to habitat features found in the airport environment. Also, some wildlife species may occur on the airport in higher numbers than occur naturally in the region because the airport offers habitat features the species prefer. Some of these wildlife species are Federal or state-listed threatened and endangered species or have been designated by state resource agencies as species of special concern.

2.9.1 State-Listed Species Habitat Concerns.

- 2.9.1.1 Many state wildlife agencies have requested that airport operators facilitate and encourage habitat on airports for state-listed threatened and endangered species or species of special concern. Airport operators should exercise caution in adopting new management techniques because they may increase wildlife hazards and be inconsistent with safe airport operations. Managing the on-airport environment to facilitate or encourage the presence of hazardous wildlife species can create conditions that are incompatible with, or pose a threat to, aviation safety.
- 2.9.1.2 Not all state-listed threatened and endangered species or species of concern pose a direct threat to aviation safety. However, these species may pose an indirect threat and be hazardous because they attract other wildlife species or support prey species attractive to other species that are directly hazardous. Also, the habitat management practices that benefit these state-listed threatened and endangered species and species of special concern may attract other hazardous wildlife species. On-airport habitat and wildlife management practices designed to benefit wildlife that directly or indirectly create safety hazard where none existed before are incompatible with safe airport operations.

2.9.2 Federally Listed Species Habitat Concerns.

- 2.9.2.1 The FAA supports efforts to protect threatened and endangered species, as a matter of principle and consistent with the Endangered Species Act of 1973. The FAA must balance these requirements with our requirements and mission to maintain a safe and efficient airport system. Requests to enhance or create habitat for threatened and endangered species often conflict with the safety of the traveling public and may place the protected species at risk of mortality by aircraft collisions. The FAA does not support the creation, conservation or enhancement of habitat or refuges to attract endangered species on airports. If endangered species are present on an airport, specific obligations may apply under the Endangered

Species Act, 16 U.S.C. § 1531 et seq. and the airport operator should contact the Airports District Office Environmental Protection Specialist.

- 2.9.2.2 The designation of critical habitat for listed species under the Endangered Species Act on airport lands may be an incompatible land use in conflict with the intended and dedicated purpose of airport lands and may limit or preclude the ability of the airport to develop new infrastructure and growth capacity to meet future air carrier service demand. In addition, depending on the listed species (primarily but not limited to avian species), the designation of critical habitat within the separation distances provided in paragraphs 1.2 - 1.4 can represent a hazardous wildlife attractant in conflict with 14 CFR Part 139.337.

2.10 Synergistic Effects of Surrounding Land Uses.

There may be circumstances where two or more different land uses would not, by themselves, be considered hazardous wildlife attractants or are located outside of the separations identified in Paragraphs 1.2 through 1.4 but collectively may create a wildlife corridor directly through the airport and/or surrounding airspace. An example involves a lake located outside of the separation criteria on the east side of an airport and a large hayfield on the west side of an airport. These two land uses, taken together, could create a flyway for Canada geese directly across the airspace of the airport. Airport operators must consider the entire surrounding landscape and community when developing the wildlife management plan.

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CHAPTER 3. PROCEDURES FOR WILDLIFE HAZARD MANAGEMENT BY OPERATORS OF PUBLIC-USE AIRPORTS AND CONDITIONS FOR NON-CERTIFICATED AIRPORTS TO CONDUCT WILDLIFE HAZARD ASSESSMENTS AND WILDLIFE HAZARD SITE VISITS

3.1 Introduction.

In recognition of the increased risk of serious aircraft damage or the loss of human life that can result from a wildlife strike, the FAA recommends all airports conduct a Wildlife Hazard Site Visit or Wildlife Hazard Assessment unless otherwise mandated after an initial triggering events defined in Part 139 Section 139.337. After the airport has completed the site visit or assessment and implemented a wildlife management plan, investigations should be conducted following subsequent triggering events to determine if the original assessment and plan adequately address the situation or if conditions have changed that would warrant an update to the plan. In this section, airports that are certificated under 14 C.F.R. § 139.337 are referred to as “certificated airports” and all others are referred to as “non-certificated airports.” When a statement refers to both certificated and non-certificated airports, “airport” or “all airports” is used.

3.2 Coordination with Qualified Airport Wildlife Biologists.

Hazardous wildlife management is a complex discipline and conditions vary widely across the United States. Therefore, only airport wildlife biologists meeting the qualification requirements in Advisory Circular 150/5200-36, *Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports*, can conduct Site Visits and Assessments. Airports must maintain documentation that the Qualified Airport Wildlife Biologist meets the qualification requirements in Advisory Circular 150/5200-36.

3.3 Wildlife Hazard Management at Airports: A Manual For Airport Personnel.

- 3.3.1 The Wildlife Hazard Management at Airports manual, prepared by FAA and USDA Wildlife Services staff, contains a compilation of information to assist airport personnel in the development, implementation, and evaluation of wildlife management plans at airports. The manual includes specific information on the nature of wildlife strikes, legal authority, regulations, wildlife management techniques, Assessments, Plans, and sources of help and information. The manual is available in three languages: English, Spanish, and French. It can be viewed and downloaded free of charge from the FAA’s wildlife hazard mitigation web site: https://www.faa.gov/airports/airport_safety/wildlife. This manual only provides a starting point for addressing wildlife hazard issues at airports. FAA recommends that airports consult with a Qualified Airport Wildlife Biologists to assist with development of a wildlife management plan and the implementation of management actions by airport personnel.

- 3.3.2 There are many other resources complementary to this manual for use in developing and implementing wildlife management plans. Several are listed in the manual's bibliography or on the FAA Wildlife Mitigation website:
https://www.faa.gov/airports/airport_safety/wildlife

3.4 Wildlife Hazard Site Visits and Wildlife Hazard Assessments.

- 3.4.1 Operators of certificated airports are encouraged to conduct an initial assessment regardless of whether the airport has experienced one of the triggering events. Doing so would allow the airport to take proactive action and mitigate the wildlife risk before experiencing an incident. All other airports are encouraged to conduct an assessment or site visit (as defined in FAA Advisory Circular 150/5200-38) conducted by a Qualified Airport Wildlife Biologist (as defined in FAA Advisory Circular 150/5200-36). Part 139 certificated airports are currently required to ensure that an assessment is conducted consistent with 14 C.F.R. § 139.337.
- 3.4.2 The intent of a site visit is to provide an abbreviated analysis of an airport's wildlife hazards and to provide timely information that allows the airport to expedite the mitigation of these hazards. The FAA also recommends that airports conduct an assessment or site visit as soon as practicable in order to identify any immediate wildlife hazards and/or mitigation measures.
- 3.4.3 Non-certificated airports should submit the results of the site visit or assessment to the FAA for review. The FAA will review the submitted site visit or assessment and make a recommendation regarding the development of a wildlife management plan. A wildlife management plan can be developed based on a site visit and will be required if the non-certificated airport is going to request federal grants for the purpose of mitigating wildlife hazards.

3.5 Wildlife Hazard Management Plan.

- 3.5.1 The FAA will consider the results of the assessment, along with the aeronautical activity at the airport and the views of the airport operator and airport users, in determining whether a wildlife management plan is needed for certificated airports, or recommended for non-certificated airports.
- 3.5.2 If the FAA determines that a wildlife management plan is needed for a certificated airport, the airport operator must formulate a plan, using the assessment as its basis and submit to the FAA for approval. If the FAA recommends that a non-certificated airport develop a plan, either an assessment or a site visit can be used as the basis for the wildlife management plan. Airports should consult AC 150/5200-38, *Protocol for the Conduct and Review of Wildlife Hazard Site Visits, Wildlife Hazard Assessments, and Wildlife Hazard Management Plans*, for further information on preparation and implementation requirements for their wildlife management plan.

- 3.5.3 The goal of an airport's wildlife management plan is to minimize the risk to aviation safety, airport structures or equipment, or human health posed by populations of hazardous wildlife on and around the airport. For wildlife management plans to effectively reduce wildlife hazards on and near airports, accurate and consistent wildlife strike reporting is essential. Airports should consult AC 150/5200-32, *Reporting Wildlife Aircraft Strikes*, for further information on responsibilities and recommendations concerning wildlife strikes.
- 3.5.4 The wildlife management plan must identify hazardous wildlife attractants on or near the airport and the appropriate wildlife management techniques to minimize the wildlife hazard. It must also prioritize the management measures.

3.6 Local Coordination.

The FAA recommends establishing a Wildlife Hazards Working Group to facilitate the communication, cooperation, and coordination of the airport and its surrounding community necessary to ensure the effectiveness of the wildlife management plan. The cooperation of the airport community is essential to prevent incompatible development in the airport vicinity. Whether on or off the airport, input from all involved parties must be considered when a potentially hazardous wildlife attractant is being proposed. Based on available resources, airport operators should undertake public education activities with the local planning agencies because some activities in the vicinity of an airport, while harmless under normal conditions, can attract wildlife and present a danger to aircraft (see Paragraphs 4.5 to 4.8). For example, if public trails are planned near wetlands or in parks adjoining airport property, the public should know that feeding birds and other wildlife in the area may pose a risk to aircraft.

3.7 Operational Notifications of Wildlife Hazards.

- 3.7.1 Operational notifications include active correspondence addressing wildlife issues on or near an airport, notifications and alerts. If an existing land-use practice creates a wildlife hazard and the land-use practice or wildlife hazard cannot be immediately eliminated, airport operators must issue a Notice to Airmen (NOTAM) and encourage the land owner or manager to take steps to control the wildlife hazard and minimize further attraction. Permanent attractions that cannot be eliminated or mitigated may be noted in the Airport/Facility Directory. NOTAMS and Airport/Facility Directory notifications are not appropriate for short-term or immediate advisories that can be relayed via Pilot Reports, direct air traffic control voice communications, or temporary Automated Terminal Advisory System alerts. Care should be given to avoid the continual broadcast of general warnings for extended periods of time. General warnings such as "birds in the vicinity of the aerodrome" offer little timely information to aid pilots and eventually may be ignored if not updated.
- 3.7.2 The Automated Terminal Advisory System (ATIS) is a continuous broadcast of recorded aeronautical information for aerodromes and their immediate surroundings. ATIS broadcasts contain essential information, such as current weather information,

active runways, available approaches, wildlife hazards and any other information required by the pilots. They indicate significant (moderate or severe) wildlife activity, as reported by an approved agency that presents temporary hazards on the ATIS broadcast. Pilots take notice of available ATIS broadcasts before contacting the local control unit, which reduces the controllers' workload and relieves frequency congestion. The recording is updated in fixed intervals or when there is a significant change in the information. Although ATIS broadcasts involving wildlife should be timely and specific, pilots do not need to know species-specific information. General descriptive information detailing size and number of animals, locations and timing of occurrence provides useful, actionable information for pilots.

- 3.7.3 A pilot report (PIREP) is reported by a pilot to indicate encounters of hazardous weather (e.g., icing or turbulence) and hazardous wildlife. Pilot reports are short-lived warnings providing immediate information on pilot observations that are transmitted in real-time to air traffic control. Large animals near active surfaces, soaring vultures and raptors within approach/ departure corridors and waterfowl such as geese feeding in grassy areas next to runways are all examples of pilot reports generated by pilots.

3.8 Federal and State Depredation Permits.

The FAA recommends that airports maintain federal and state depredation permits to allow mitigation and/ or removal of hazardous species. All protected species require special permits for lethal mitigation or capture and relocation procedures. Similarly, endangered or threatened species mitigation also requires special permits. The FAA recommends that airports work closely with a Qualified Airport Wildlife Biologist during the U.S. Fish and Wildlife Service consultation and permitting process. The following Orders can help airports reduce risks from hazardous species by allowing private citizens to control hazardous species off airport properties without the need for a Federal depredation permit.

3.8.1 Standing Depredation Orders.

- 3.8.1.1 Federal law allows people to protect themselves and their property from damage caused by migratory birds. Provided no effort is made to kill or capture the birds, a depredation permit is not required to merely scare or herd depredating migratory birds other than endangered or threatened species or bald or golden eagles (50 CFR 21.41).
- 3.8.1.2 In addition, certain species of migratory birds may be mitigated without a federal permit under specific circumstances, many of which relate to agricultural situations. The following Standing Depredation Orders have applicability near airports:
- 50 CFR § 21.49- Control Order for Resident Canada Geese at Airports and Military Airfields.
 - 50 CFR § 21.50- Depredation Order for Resident Canada Geese Nests and Eggs.

- 50 CFR § 21.43 - Depredation Order for Blackbirds, Cowbirds, Crows, Grackles, and Magpies.
- 50 CFR § 21.54 - Control Order for Muscovy Ducks in the United States.
- 50 CFR § 21.55 - Control Order for Invasive Migratory Birds in Hawaii.

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CHAPTER 4. RECOMMENDED PROCEDURES FOR THE FAA, AIRPORT OPERATORS AND OTHER GOVERNMENT ENTITIES REGARDING OFF-AIRPORT ATTRACTANTS

4.1 FAA Notification and Review of Proposed Land-Use Practice Changes in the Vicinity of Public-Use Airports.

4.1.1 For projects that are located within 5 miles of the airport's aircraft operations area, the FAA may review development plans, proposed land-use changes, operational changes, major federal actions or wetland mitigation plans to determine if such changes increase risk to airport safety by attracting hazardous wildlife on and around airports. The FAA is not a permitting agency for land use modifications that occur off airport properties, therefore, such reviews are typically initiated by state or federal permitting agencies seeking FAA input on new or revised permits. Each of the land uses listed in Chapter 2 of this AC has the potential to pose a risk to airport operations when they are located within the separation distances provided in Paragraphs 1.2 through 1.4.

4.1.2 Off-site land use modifications near airports may include an assessment of risk for facilities and land-use changes and, if necessary, mitigation strategies that may reduce risk to an acceptable level. However, the FAA recognizes that individual facilities or land-use modifications may present a range of attractants to different species, resulting in varying levels of risk. Therefore, the FAA considers each proposal on a case-by-case basis.

4.1.3 The FAA analyzes each land-use modification or new facility proposal prior to its establishment or any significant planned changes to design or operations that may increase the risk level. As part of a review, the FAA considers several factors that include, but are not limited to:

1. Type of attractant;
2. Size of attractant;
3. Location/distance of attractant from airport;
4. Design (e.g., construction, material, mitigation techniques employed into design);
5. Operation (e.g., cleanliness, constancy/ volume of use, seasonality, time of day);
6. Monitoring protocols (e.g., frequency, documentation, evaluation, species identification and number thresholds that trigger actions of communication or mitigation, baseline wildlife data);
7. Mitigation protocols (e.g., responsibilities, methods, intensity, pre-determined objectives, documentation, evaluation); and
8. Communication protocols to airport and/ or air traffic control tower;

4.1.4 The review of these factors may result in FAA recommended additions or modifications to a conditional use permit that allows the permitting agency to track compliance with the permittee obligations. Such conditions placed within a permit

may involve a comprehensive outline and recognition of individuals responsible for monitoring, communication, and mitigation measures if certain action thresholds are met. Action thresholds are defined in this instance as those pre-determined parameters (e.g., number, location, behavior, time of day) of specific hazardous species that would trigger a mitigation response. Additionally, baseline data should be used to determine the effect, if any, on wildlife populations at the proposed off-site location and/or at the airport.

- 4.1.5 Baseline data may need to be collected, depending on the existence of useful data and timeline for site modification. If, after taking into account the factors above, FAA determines that a facility poses a significant risk to airport safety, FAA will object to its establishment or renewal.
- 4.1.6 For projects that are located within 5 miles of the airport's aircraft operations area, the FAA Airport District Office may review development plans, proposed land-use changes, operational changes, major federal actions or wetland mitigation plans to determine if such changes present potential wildlife hazards to aircraft operations. The FAA considers sensitive airport areas as those that lie under or next to approach or departure airspace. This brief examination should indicate if further investigation is warranted.
- 4.1.7 Where a Qualified Airport Wildlife Biologist has conducted a further study to evaluate a site's compatibility with airport operations, the FAA may use the study results to make a determination.

4.2 Waste Management Facilities.

4.2.1 Notification of New/Expanded Project Proposal.

- 4.2.1.1 49 U.S.C. § 44718(d), prohibits the construction or establishment of new municipal landfills within 6 miles of certain public-use airports, when both the airport and the landfill meet specific conditions. See Paragraph 2.2 of this guidance for a more detailed discussion of these restrictions.
- 4.2.1.2 The Environmental Protection Agency (EPA) requires any landfill operator proposing a new or expanded waste disposal operation within 5 miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal. See 40 CFR § 258, *Criteria for Municipal Solid Waste Landfills*, Section 258.10, *Airport Safety*. The EPA also requires owners or operators of new landfill units, or lateral expansions of existing MSWLF landfill units, that are located within 10,000 feet of any airport runway end used by turbine-powered aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft. (See 4.3.2 below.)

- 4.2.1.3 When new or expanded municipal landfills are being proposed near airports, landfill operators must notify the airport operator and the FAA of the proposal as early as possible pursuant to 40 CFR § 258.
- 4.2.1.4 The FAA discourages the development of waste disposal and other facilities, discussed in Chapter 2, located within the separation criteria specified in Paragraphs 1.2 through 1.4. To show that a waste-handling facility sited within the separations identified in Paragraphs 1.2 through 1.4 does not attract hazardous wildlife and does not threaten aviation, the developer must establish the facility will not handle putrescible material other than that as outlined in 2.2.4. The FAA recommends against any facility other than those outlined in 2.2.4 (enclosed transfer stations). The FAA will use this information to determine if the facility will be a hazard to aviation.

4.3 Other Land-Use Practice Changes.

- 4.3.1 The FAA encourages operators of public-use airports who become aware of proposed land use practice changes that may attract hazardous wildlife within 5 miles of their airports to notify their assigned Airport Certification Safety Inspector or Airports District Office Program Manager. The FAA also encourages proponents of such land use changes to notify the FAA as early in the planning process as possible. Advanced notice affords the FAA an opportunity (1) to evaluate the effect of a particular land-use change on aviation safety and (2) to support efforts by the airport sponsor to restrict the use of land next to or near the airport to uses that are compatible with the airport.
- 4.3.2 The airport operator, project proponent, or land-use operator may use FAA Form 7460-1, Notice of Proposed Construction or Alteration, or other suitable documents similar to FAA Form 7460-1 to notify the appropriate FAA Regional Airports Division Office. Project proponents can contact the appropriate FAA Regional Airports Division Office for assistance with the notification process prior to submitting Form 7460-1.
- 4.3.3 It is helpful if the notification includes a 15-minute quadrangle map of the area identifying the location of the proposed activity. The land-use operator or project proponent should also forward specific details of the proposed land-use change or operational change or expansion. In the case of solid waste landfills, the information should include the type of waste to be handled, how the waste will be processed, and final disposal methods.
- 4.3.4 Airports that have Received Federal Assistance.
Airports that have received Federal assistance are required under their grant assurances to take appropriate actions to restrict the use of land next to or near the airport to uses that are compatible with normal airport operations. See Grant Assurance 21. The FAA recommends that airport operators oppose off-airport land-use changes or practices, to

the extent practicable, within the separations identified in Paragraphs 1.2 through 1.4, which may attract hazardous wildlife. Failure to do so may lead to noncompliance with applicable grant assurances. The FAA will not approve the placement of airport development projects pertaining to aircraft movement in the vicinity of hazardous wildlife attractants without appropriate mitigating measures. Increasing the intensity of wildlife control efforts is not a substitute for preventing, eliminating or reducing a proposed wildlife hazard. Airport operators should identify hazardous wildlife attractants and any associated wildlife hazards during any planning process for airport development projects.

4.4 Coordination to Prevent Creation of New Off-Airport Hazardous Wildlife Attractants.

Airport operators should work with local and regional planning and zoning boards to be aware of proposed land-use changes, or modification of existing land uses, that could create hazardous wildlife attractants within the separations identified in Paragraphs 1.2 through 1.4. Pay particular attention to proposed land uses involving creation or expansion of wastewater treatment facilities, development of wetland mitigation sites, or development or expansion of dredge spoil containment areas. At the very least, it is recommended that airport operators are on the notification list of the local planning board or equivalent review entity for all communities located within 5 miles of the airport, so they will receive notification of any proposed project and have the opportunity to review it for attractiveness to hazardous wildlife. This may be accomplished through one or more of the following:

4.4.1 Site-specific Criteria.

The airport should establish site-specific criteria for assessment of land uses attractive to hazardous wildlife and locations that would be of concern based on wildlife strikes and on wildlife abundance and activity at the airport and in the local area. These criteria may be more selective, but should not be less restrictive than this guidance.

4.4.2 Outreach.

Airports should actively seek to provide educational information and/ or provide input regarding local development, natural resource modification or wildlife-related concerns that affect wildlife hazards and safe air travel.

4.4.2.1 External Outreach.

Airport operators and a Qualified Airport Wildlife Biologist should consider outreach to local planning and zoning organizations on land uses of concern or to local organizations responsible for natural resource management (including wildlife, wetlands, and parks.) Airports should also consider developing and distributing position letters and educational materials on airport-specific concerns regarding wildlife hazards, wildlife activity and attraction. Finally, airports should provide formal comments on local procedures, laws, ordinances, plans, and regulatory actions such as permits related to land uses of concern.

4.4.2.2 **Internal Outreach.**

Airports should consider developing and distributing position letters and educational materials on airport-specific concerns regarding species identification and mitigation procedures, wildlife hazards, wildlife activity and attraction to employees and personnel with access to the aircraft operations area.

4.5 **Coordination on Existing Off-Airport Hazardous Wildlife Attractants.**

Airports are encouraged to work with landowners and managers to cooperatively develop procedures to monitor and manage hazardous wildlife attraction. If applicable, these procedures may include:

1. Conducting a wildlife hazard site visit by a wildlife biologist meeting the qualification requirements of Advisory Circular 150/5200-36, *Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports*
2. Conducting regular, standardized, wildlife monitoring surveys;⁴
3. Establishing threshold numbers of wildlife which would trigger certain actions and/or communications;
4. Establishment of procedures to deter or remove hazardous wildlife.

4.6 **Prompt Remedial Action.**

For attractants found on and off airport property, and with landowner or manager cooperation, Part 139 certificated airports must take immediate action in accordance with their Airport Certification Manual and the requirements of Part 139.337, to alleviate wildlife hazards whenever they are detected. It is also recommended that non-certificated airports take immediate action to alleviate wildlife hazards whenever they are detected. In addition, airports should take prompt action to identify the source of attraction and cooperatively develop procedures to mitigate and monitor the attractant. **For Part 139 Certificated airports, immediate actions are required in accordance with 139.337(a).**

4.7 **FAA Assistance.**

If there is a question on the implementation of any of the guidance in this section, contact the FAA Regional Airports Division for assistance.

⁴ Recommended survey protocols can be found in AC 150/5200-38, *Protocol for the Conduct and Review of Wildlife Hazard Site Visits, Wildlife Hazard Assessments, and Wildlife Hazard Management Plans*, and DeVault, T.L., B.F. Blackwell, and J.L. Belant, eds. 2013. *Wildlife in Airport Environments: Preventing Animal–Aircraft Collisions through Science-Based Management*. Johns Hopkins University Press, Baltimore, MD, USA. 181 pp.

4.7.1 Airport Documentation Procedures.

Airports should document on-site and off-site wildlife attractants as part of their “Wildlife Hazard Management Plan Annual Review,” “Wildlife Hazard Management Plan Review Following a Triggering Event,” and the airport’s Continual Monitoring Annual Report (as outlined in FAA Advisory Circular 150/5200-38). As a best management practice, airports may choose to keep a log to track contacts from landowners or managers, permitting agencies, or other entities concerning land uses near the airport.

APPENDIX A. DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR**A.1 General.**

This appendix provides definitions of terms used throughout this AC.

1. **Air operations area.** Any area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron.
2. **Airport operator.** The operator (private or public) or sponsor of a public-use airport.
3. **Approach or departure airspace.** The airspace, within 5 statute miles of an airport, through which aircraft move during landing or takeoff.
4. **Bird balls.** High-density plastic floating balls that can be used to cover ponds and prevent birds from using the sites.
5. **Certificate holder.** The holder of an Airport Operating Certificate issued under 14 C.F.R. Part 139.
6. **Construct a new municipal landfill.** To begin to excavate, grade land, or raise structures to prepare a municipal solid waste landfill as permitted by the appropriate regulatory or permitting agency.
7. **Detention ponds.** Storm water management ponds that hold storm water for short periods of time, a few hours to a few days.
8. **Establish a new municipal landfill.** When the first load of putrescible waste is received on-site for placement in a prepared municipal solid waste landfill.
9. **Fly ash.** The fine, sand-like residue resulting from the complete incineration of an organic fuel source. Fly ash typically results from the combustion of coal or waste used to operate a power generating plant.
10. **General aviation aircraft.** Any civil aviation aircraft operating under 14 CFR Part 91.
11. **Hazardous wildlife.** Species of wildlife (birds, mammals, reptiles), including feral and domesticated animals, not under control that may pose a direct hazard to aviation (i.e., strike risk to aircraft) or an indirect hazard such as an attractant to other wildlife that pose a strike hazard or are causing structural damage to airport facilities (e.g., burrowing, nesting, perching).
12. **Municipal Landfill.** A publicly or privately owned discrete area of land or an excavation that receives household waste and that is not a land application unit, surface impoundment, injection well, or waste pile, as those terms are defined under 40 CFR § 257.2. A municipal landfill may receive other types wastes, such as commercial solid waste, non-hazardous sludge, small-quantity generator waste, and

industrial solid waste, as defined under 40 CFR § 258.2. A municipal landfill can consist of either a stand-alone unit or several cells that receive household waste.

13. **New municipal landfill.** A municipal solid waste landfill that was established or constructed after April 5, 2001.
14. **Piston-powered aircraft.** Fixed-wing aircraft powered by piston engines.
15. **Piston-use airport.** Any airport that does not sell Jet-A fuel for fixed-wing turbine-powered aircraft, and primarily serves fixed-wing, piston-powered aircraft. Incidental use of the airport by turbine-powered, fixed-wing aircraft would not affect this designation. However, such aircraft should not be based at the airport.
16. **Public agency.** A state or political subdivision of a state, a tax-supported organization, or an Indian tribe or pueblo (49 U.S.C. § 47102(19)).
17. **Public airport.** An airport used or intended to be used for public purposes that is under the control of a public agency; and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft is publicly owned (49 U.S.C. § 47102(20)).
18. **Public-use airport.** An airport used or intended to be used for public purposes where the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft may be under the control of a public agency or privately owned and used for public purposes (49 U.S.C. § 47102(21)).
19. **Putrescible waste.** Solid waste that contains organic matter capable of being decomposed by micro-organisms and of such a character and proportion as to be capable of attracting or providing food for birds (40 CFR §257.3-8).
20. **Putrescible-waste disposal operation.** Landfills, garbage dumps, underwater waste discharges, or similar facilities where activities include processing, burying, storing, or otherwise disposing of putrescible material, trash, and refuse.
21. **Retention ponds.** Storm water management ponds that hold water for more than 48 hours.
22. **Risk.** Risk is the relationship between the severity and probability of a threat. It is the product of hazard level and abundance in the critical airspace, and is thus defined as the probability of a damaging strike with a given species.
23. **Runway protection zone.** An area off the runway end to enhance the protection of people and property on the ground (see AC 150/5300-13). The dimensions of this zone vary with the airport design, aircraft, type of operation, and visibility minimum.
24. **Scheduled air carrier operation.** Any common carriage passenger-carrying operation for compensation or hire conducted by an air carrier or commercial operator for which the air carrier, commercial operator, or their representative offers in advance the departure location, departure time, and arrival location. It does not include any operation that is conducted as a supplemental operation under 14 CFR Part 119 or as a public charter operation under 14 CFR Part 380 (14 CFR § 119.3).

25. **Sewage sludge.** Any solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works. (40 CFR § 257.2)
26. **Sludge.** Any solid, semi-solid, or liquid waste generated from a municipal, commercial or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. (40 CFR § 257.2).
27. **Solid waste.** Any garbage, refuse, sludge, from a waste treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including, solid liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Clean Water Act, or source, special nuclear, or by product material as defined by the Atomic Energy Act of 1954.(40 CFR § 257.2).
28. **Turbine-powered aircraft.** Aircraft powered by turbine engines including turbojets and turboprops but excluding turbo-shaft rotary-wing aircraft.
29. **Turbine-use airport.** Any airport that sells fuel for fixed-wing turbine-powered aircraft.
30. **Wastewater treatment facility.** Any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes, including publicly owned treatment works, as defined by Section 212 of the Clean Water Act. This definition includes any pretreatment involving the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a publicly owned treatment system. (See 40 CFR § 403.3 (q), (r), & (s)).
31. **Wildlife.** Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring thereof. 50 CFR § 10.12. As used in this AC, wildlife includes feral animals and domestic animals out of the control of their owners (14 CFR Part 139, Certification of Airports).
32. **Wildlife attractants.** Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the landing or departure airspace or the airport's aircraft operations area. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining, or wetlands.

33. **Wildlife hazard.** A potential for a damaging aircraft collision with wildlife on or near an airport.
34. **Wildlife strike.** A wildlife strike is deemed to have occurred when:
- a. A strike between wildlife and aircraft has been witnessed;
 - b. Evidence or damage from a strike has been identified on an aircraft;
 - c. Bird or other wildlife remains, whether in whole or in part, are found:
 - i. Within 250 feet of a runway centerline or within 1,000 feet of a runway end unless another reason for the animal's death is identified or suspected, unless another reason for the animal's death is identified or;
 - ii. On a taxiway or anywhere else on or off airport that there is reason to believe was the result of a strike with an aircraft.
 - d. The presence of birds or other wildlife on or off the airport had a significant negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, aircraft left pavement area to avoid collision with animal).

APPENDIX B. ADDITIONAL RESOURCES

B.1 Regulations

- 14 CFR § 139.337, *Wildlife Hazard Management*
- 40 CFR § 258, *Criteria for Municipal Solid Waste Landfills*

B.2 Advisory Circulars

- AC 150/5200-32, *Reporting Wildlife Aircraft Strikes*
- AC 150/5200-33, *Hazard Wildlife Attractants on or Near Airports*
- AC 150/5200-34, *Construction or Establishment of New Landfills Near Public Airports*
- AC 150/5200-36, *Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculum for Airport Personnel Involved in Controlling Wildlife Hazards on Airports*
- AC 150/5200-38, *Protocol for the Conduct and Review of Wildlife Hazard Site Visits, Wildlife Hazard Assessments, and Wildlife Hazard Management Plans*
- AC 150/5220-25, *Airport Avian Radar Systems*
- AC 150/5210-24, *Airport Foreign Object Debris (FOD) Management*

B.3 Certification Alerts

- Certalert No. 97-09, *Wildlife Hazard Management Plan Outline* (11/17/1997)
- Certalert No. 98-05, *Grasses Attractive To Hazardous Wildlife* (9/21/1998)
- Certalert No. 06-07, *Requests by State Wildlife Agencies to Facilitate and Encourage Habitat for State Listed Threatened and Endangered Species and Species of Special Concern on Airports* (11/21/2006)
- Certalert No. 13-01, *Federal and State Depredation Permit Assistance* (1/30/2013)
- Certalert No.14-01, *Seasonal Mitigation of Hazardous Species at Airports: Attention to Snowy Owls* (2/26/2014)
- Certalert No. 16-03, *Recommended Wildlife Exclusion Fencing* (8/2016)

B.4 Airport Cooperative Research Program Reports

These, and other wildlife / aviation reports, are available from the Transportation Research Board of the National Academies (TRB) at

<http://www.trb.org/Publications/Publications.aspx>.

- ACRP Research Report 198: Wetland Mitigation, Volume 2, A Guidebook for Airports (2019)
- ACRP Synthesis 92: Airport Waste Management and Recycling Practices (2018)
- ACRP Research Report 174: Guidebook and Primer (2018)
- ACRP Report 122: Innovative Airport Responses to Threatened / Endangered Species (2015)
- ACRP Report 125: Balancing Airport Stormwater and Bird Hazard Management (2015)
- ACRP Report 145: Applying an SMS Approach to Wildlife Hazard Management (2015)
- ACRP Synthesis 39 Report: Airport Wildlife Population Management (2013)
- ACRP Synthesis 52 Report: Habitat Management to Deter Wildlife at Airports (2014)
- ACRP Synthesis 23 Report: Bird Harassment, Repellent, and Deterrent Techniques for Use on and Near Airports (2011)
- ACRP Report 32: Guidebook for Addressing Aircraft/Wildlife Hazards at General Aviation Airports (2010)

B.5 Manuals

- Wildlife Hazard Management at Airports - A Manual for Airport Personnel (2005)

B.6 Orders

- 50 CFR § 21.49, Control Order for Resident Canada Geese at Airports and Military Airfields
- 50 CFR § 21.50, Depredation Order for Resident Canada Geese Nests and Eggs
- 50 CFR § 21.43, Depredation Order for Blackbirds, Cowbirds, Crows, Grackles, and Magpies
- 50 CFR § 21.54, Control Order for Muscovy Ducks in the United States
- 50 CFR § 21.55, Control Order for Invasive Migratory Birds in Hawaii

Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Safety and Operations Division, Federal Aviation Administration ATTN: AAS-300, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of AAS-300 at (202) 267-5257.

Subject: AC 150/5200-33C

Date: _____

Please check all appropriate line items:

- ☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.
- ☐ Recommend paragraph _____ on page _____ be changed as follows:
- _____
- _____
- _____
- ☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)
- _____
- _____
- _____
- ☐ Other comments:
- _____
- _____
- _____
- ☐ I would like to discuss the above. Please contact me at (phone number, email address).

Submitted by: _____

Date: _____

APPENDIX H

PUMP AND LIFT STATIONS

CITY OF ROMULUS TELEMETERY SPECIFICATION

INTERFACE EQUIPMENT

These specifications cover all signal interface equipment including telemetering, transmitting and transducing. The data pertaining to signal requirements and enclosures are given on the drawings.

TELEMETERING

For the purposes of this specification, the term "Telemetering" shall be limited to those methods of signal transmission using audio tone/radio modem via **Motorola ACE3600**.

CONTROLLING DEVICES

EQUIPMENT AT THE REMOTE SITES

Equipment located at remote sites shall be mounted in a J.I.C. steel enclosure. Equipment contained in this common control cabinet shall consist of but not necessarily be limited to, the following: Motorola ACE3600, mounting racks, chassis, terminal strips, jumper wire, selector switches, fuses, relays, circuit boards, modem, panel heater with thermostat, etc., and all related instrumentation equipment required to make this a complete and operable system.

The Motorola ACE3600 hardware shall be equipped with battery back up to accommodate at least eight (8) hours of uninterruptible service. The batteries shall be able to produce 12 VDC. Batteries shall be of the gel cell type complete with battery charger to maintain a constant charge on the battery.

The programmable controller shall be a Motorola ACE3600 of sufficient size to accommodate all digital inputs and outputs as well as analog inputs and outputs to make a complete and operable stand-alone control system. Programmable controller shall be manufactured by Motorola.

The PLC "program" shall be furnished by the Owner's system integrator (*UIS SCADA, Inc.*, contact Ken Wesley, phone number 734-424-1200 ext. 301 or 800-277-5740) at the station Contractor's expense.

The Hand Off Auto selector switch position, pump status, wetwell level, generator status, etc. shall be displayed on the Owners' existing computer system. The screen shall display a graphic view of the overall picture of the remote sites with valve status, pressure, etc., and be provided by the Owner's system integrator (*UIS SCADA, Inc.*) at lift station Contractor's expense.

Level transducer/transmitter (where required) shall be non-fouling submersible level transmitter . They shall have a pressure range of 0-20 Ft (subject to review by engineer) and an output signal of 4-20mA DC and be UL certified intrinsically safe. These instruments shall be mounted where shown on the drawings and connected to the common control panel as a Motorola input.

Flow meters (where required) shall be ABB Watermaster. They shall have a flow range of at least x2 the true capacity of the station (subject to review by engineer), a flow-tube liner and electrode suitable for sewage, and an output signal of 4-20mA DC. These instruments shall be mounted where shown on the drawings and connected to the common control panel as a Motorola input.

SERVICE AND START-UP

The lift station Contractor shall retain (at the Contractor's cost) the services of the Owner's system integrator (*UIS SCADA, Inc.*) from which qualified technical service personnel and parts may be dispatched upon call.

The Contractor shall provide for: checking the system, starting up his equipment and instructing the Owner's personnel in the operation and maintenance of the system.

The time listed shall be exclusive of time spent on warranty items.

Where additional time is required by the owner, the Contractor shall include per diem charges for the service in his proposal.

Substitutions

References made in these specifications to specific manufacturers' products are intended to serve as a guide to type, construction and materials. Substitutions may be made only if the Engineer gives prior approval of shop drawings or descriptions of items wished to be substituted.

Except as specifically stated otherwise in this specification, any and all of the manufacturers herein listed for each of the listed products are approved. The manufacturers listed under the "Standardization" section of this specification shall be the only manufacturers allowed to supply the entire package.

MISCELLANEOUS PROVISIONS TO BE INCLUDED IN DEVELOPMENT AGREEMENT

1. **Hydrogen Sulfide Protection for Certain Sewer Structures** - The Developer agrees to provide hydrogen sulfide protected structures at the pump station wet well and the first downstream manhole which the associated force main sewer outlets and as determined by the DPW. **Methods and product must be submitted for City review.**
2. **Temporary Access Road for Pump Station** - The Developer agrees to install a 14-foot wide, 10" thick gravel pathway for access to the pump station. The gravel for the pathway will be MDOT 21AA compacted to 95% of its maximum density as measured using a modified proctor test. This pathway will be maintained in a reasonable and usable condition at all times. This shall include plowing or other snow clearing as necessary until a permanent roadway is installed in subsequent phases. In the event Developer or the homeowner's association at any time fails to maintain or preserve such access road, in accordance with this Agreement, the City may serve written notice upon the Developer and/or the homeowner's association, as applicable, setting forth the deficiencies in the maintenance and/or preservation of the access road. Said written notice shall include a demand that deficiencies in maintenance and/or preservation be cured within thirty (30) days of the date of said notice. If the deficiencies set forth in the original notice, or any subsequent notice thereto, are not cured within such thirty (30) day period or any extension thereof, the City in order to prevent the access road from becoming a nuisance, may perform the required maintenance and/or preservation to cure the deficiencies. The City's cost to perform any such maintenance and/or preservation, together with a fifteen (15) percent surcharge for administrative costs, shall be assessed to the owner of the site (which, in the case of the association, may be deemed to be the members of the association) at the time such maintenance and/or preservation is performed or its successors or assigns, placed on the next City roll as a special assessment and collected in the same manner as general property taxes.
3. **Lift Station Maintenance Agreement** - The Developer and the City recognize that the installation of a lift station for the Development creates additional maintenance burden for the City DPW. The Developer agrees to include provisions within the subdivision association documents to have the association pay all costs associated with the maintenance of the lift station. If use of the lift station is granted to other users outside of the Development, the costs will be reallocated on the basis of prorated flow as determined using the City's engineering standards. The City will be responsible for all negotiations and agreements with other parties.

A lift station maintenance agreement between the City and the Developer must be signed by all parties prior to issuance of any connection permits for the Development.

4. **Lift Station Appurtenances** - The Developer agrees to install the telemetry system, permanent natural gas generator and any other lift station appurtenances as indicated on the approved plan and the City's Engineering Standards. **Lift Stations and generators shall meet the City Noise Ordinances.**

APPENDIX I

**SUPPLEMENTAL SPECIFICATIONS FOR TRENCHLESS
WATER MAIN INSTALLATION**

SUPPLEMENTAL SPECIFICATION FOR DIRECTIONAL DRILLING

I. GENERAL

Description of Work

The work specified in this Section documents the approved construction methods, procedures and materials for Directional Boring, also commonly called Horizontal Directional Drilling (DD).

DD is a trenchless method for installing a product that serves as a direct conduit for liquids or gases, or a duct for pipe, cable, or wire line products. It is a multistage process consisting of drilling a pilot bore along a predetermined path and then pulling the desired product back through the drilled space.

The vertical profile of the bore alignment is typically in the shape of an inverted arc. When necessary, enlargement of the pilot bore hole to accommodate a product larger than the pilot bore cross section is accomplished by back reaming. This is done at the same time the product is being pulled back through the pilot borehole.

Steering the bore is accomplished by proper orientation of the drill bit head as it is being drilled and pushed along an alignment by an above-ground hydraulic jack. Orientation and tracking of the drill bit is determined by an above-ground radio detection device that receives a signal generated from a radio transmitter contained within the drilling bit. This radio signal is translated into depth and alignment.

In order to minimize friction and provide a soil-stabilizing agent, a drilling fluid is introduced into the annular space created during the boring operation. The rotation of the bit in the soil wetted by the drilling fluid creates slurry. This slurry acts to stabilize the surrounding soil and prevents collapse of the borehole and loss of lubrication. Drilling fluids must be designed for the soil and ground water conditions.

In order to confine any free-flowing slurry at the ground surface during pull back or drilling, sump areas are created to contain any escaping slurry that might damage surrounding areas. All residual slurry shall be removed from the surface and the site shall be restored to preconstruction conditions.

II. QUALIFICATIONS

Required qualifications for this project can be found in the Supplemental Instructions to Bidders section of the bid documents.

III. MATERIALS

Materials must meet or exceed the following standards:

A. C 900 Fusible PVC Pipe:

4" – 12":	ANSI/AWWA C900, FM 1612;
Pipe Compound:	ASTM D1784 Cell class 12454
Gasket:	Fusible
Testing: 4" – 12":	ASTM D-638
Certifications:	ASNI/NSF Standard 61; 4" – 12": NSF14 and 61
Installation:	AWWA C605; Underground Solutions Installation Guide DR-14

B. Drilling Fluids

A mixture of bentonite clay or other approved slurry and potable water shall be used as the cutting and soil stabilization fluid. The CONTRACTOR shall identify the source of fresh water for mixing the drilling mud. Approvals and permits are required for such sources as streams, rivers, ponds, or fire hydrants. Any water source other than potable water may require a pH test.

The drilling fluid reservoir shall be minimum 1000 gallons.

Monitoring of the drilling fluids such as the pumping rate, pressures, viscosity, and density is required during the pilot bore, back reaming, and pipe installation stages, to ensure adequate removal of soil cuttings and the stability of the borehole. Relief holes can be used as necessary to relieve excess pressure down hole. To minimize heaving during pull-back, the pull-back rate is determined in order to maximize the removal of soil cuttings without building excess down-hole pressure. Excess drilling fluids shall be contained at entry and exit points until they are recycled or removed from the site. Entry and exit pits shall be of sufficient size to contain the expected return of drilling fluids and soil cuttings.

The CONTRACTOR shall ensure that all drilling fluids are disposed of or recycled in a manner acceptable to the local, state and federal regulatory agencies. When drilling in suspected contaminated ground, the drilling fluid shall be tested for contamination and disposed of appropriately. Any excess material shall be removed upon completion of the bore.

C. Tracing Wire

All PVC piping shall be installed with a continuous, two (2) 8 gauge copper, Copperhead Steel core, copper sheathed wire (part #1245-EHS), or Engineer approved equal. Copperhead wire shall have an average tensile strength break load of 1150 pounds. The wire shall be insulated with a minimum 45 mil HDPE jacket.

Trace Wire Connections: Connection shall be made using 3M DBR direct bury splice kit with moisture resistant grease, Snakebite Splice Connectors manufactured by Copperhead Industries or Engineer approved equal.

Tracer wire shall be connected and secured to the top step of each valve well and top of hydrant boxes. Tracers wire shall be attached to the inside of well or valve boxes clear of the operating nut and not interfere with opening and closing of the valve.

Additional tracer wire access/test locations shall be SnakePit® (CD14TP), Magnetized Tracer Boxes, Test and Monitoring Stations or approved equal.

IV. CONSTRUCTION

A. Site Requirements

1. Excavation for entry, recovery pits, slurry sump pits, or any other excavation shall be carried out as specified in the Earthwork section. Sump areas are required to contain drilling fluids.
2. After completing installation of the product, the work site shall be restored. The work site shall be cleaned of all excess slurry left on the ground. Removal by Vactor truck or other approved methods and final disposition of excess slurry or spoils as the product is introduced, shall be the responsibility of the CONTRACTOR.
3. Excavated areas shall be restored in accordance with the Restoration section. The cost of restoring damaged pavement, curb, sidewalk, driveways, lawns, storm drains, landscape, and other facilities that are beyond the construction limits shall be the responsibility of the CONTRACTOR.
4. The CONTRACTOR shall be responsible for contacting MISS DIG to arrange for staking of all underground utilities that are located in the vicinity of the proposed horizontal directionally drilled hole.

B. Quality Control

1. A representative of the CONTRACTOR must be in control at all times. The representative must have a thorough knowledge of the equipment and the procedures to be performed, and be present at the job site during the installation.
2. The ENGINEER must be notified at least 72 hours in advance of starting work. The installation shall not begin until the ENGINEER's representative is present at the job site and agrees that proper preparations have been made.

C. Specific Requirements

1. Drilling Fluids & Reamer Hole Diameter

A mixture of bentonite clay or other approved slurry and potable water shall be used as the cutting and soil stabilization fluid. The viscosity shall be varied to best fit the soil conditions encountered. Water shall be clean and fresh, with a minimum pH of 6.

2. Testing

When there is any indication a pipe has sustained damage and may leak, the work is to be stopped and the damage investigated. The ENGINEER may require a pressure test. The testing may consist of one of the following methods but shall always meet or exceed the OWNER's testing requirements:

- a. The Manufacturer's pressure testing recommendations for the type of pipe being installed shall be followed. The ENGINEER's Representative shall be notified of any planned testing procedures, and may wish to be present during the test for review of the results for compliance. The pressure test shall be performed within 24 hours. A copy of the test results shall be furnished to the ENGINEER. If the pipe is not in compliance with specifications, the ENGINEER may require it to be filled with flowable fill and abandoned.
- b. Hydrostatic pressure testing shall be conducted in accordance with AWWA C605 "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water". The test pressure shall be 150 psi, the final test period shall be one (1) hour. The pipe section shall pass, if no visual leakage is observed, and pressure during the test phase remains steady (within 5% of the test phase pressure) for the one (1) hour test phase period. For safety reasons, hydrostatic testing only will be used. The maximum test length of pipe shall be 1000 feet, unless prior approval by ENGINEER or OWNER is granted.
- c. Product carrier pipes installed without a casing must meet pressure requirements set by the OWNER. A copy of the test results shall be furnished to the ENGINEER. If the pipe is not in compliance with specifications, the ENGINEER may require it to be filled with flowable fill and abandoned.

3. Locating and Tracking

The CONTRACTOR shall describe the method of locating and tracking the drill head during the pilot bore. The intended tracking system such as walkover, wire line, and wire line with surface grid verification (i.e., True-Trac) must be approved by the ENGINEER. The locating and tracking system shall be capable of ensuring that the proposed pipe is installed as intended. If an area of radio signal interference is expected to exceed 5 feet, the ENGINEER may specify the use of a suitable tracking system.

The locating and tracking system shall provide information on:

- a. Clock and pitch
- b. Depth
- c. Transmitter temperature
- d. Battery status
- e. Position (x,y)
- f. Azimuth, where direct overhead readings (walkover) are not possible (such as underwater or major roadway).

- g. Before commencement of a directional drilling operation, proper calibration of the equipment shall be undertaken, if required.
- h. Alignment readings or pilot points shall be taken and recorded every five feet.

All facilities shall be installed in such a way that their location can be readily determined by electronic designation after installation. For nonconductive installations, this shall be accomplished by attachment of a continuous conductive material, either externally, internally, or integrally with the product. Either a copper wire line or a coated conductive tape for this material may be used. Any break in the conductor must be connected by electrical clamp of brass or solder and coated with a rubber or plastic insulator to maintain the integrity of the connection from corrosion.

4. Excavation

The number of launching and receiving pits shall be minimized. All work shall be completed within the street right-of-ways or applicable easements.

5. Monitoring of Settlement and Heaving

The CONTRACTOR shall monitor the drilling operation to avoid/minimize road impacts. This would include monitoring of the drilling fluids such as pumping rate, pressures, viscosity, and density during the pilot bore, back reaming and pipe installation stages, to ensure adequate removal of soil cuttings and the stability of the borehole. Relief holes may be used as necessary to relieve excess pressure down hole. To minimize heaving during pull-back, the pull-back rate is determined in order to maximize the removal of soil cuttings without building excess downhole pressure. Excess drilling fluids shall be contained at entry and exit points until they are recycled or removed from the site. Entry and exit pits shall be of sufficient size to contain the expected return of drilling fluids and soil cuttings.

Monitoring of the pavement shall also be conducted during drilling operations. Any increase or decrease due to the contractor's means and methods greater than 0.05 feet directly above the proposed water main shall be reported to the engineer immediately for further evaluation.

Restoration of any existing structures that are damaged due to heaving, settlement, escaping drilling fluid, or the directional drilling operation is the responsibility of the CONTRACTOR including any heaving or settlement damage of existing pavement.

Maximum Back-Ream Hole Diameter	
Nominal Inside Pipe Diameter (Inches)	Back-Ream Hole Diameter (Inches)
2	4
3	6
4	8
6	10
8	12
10	14
12 and greater	Maximum Product OD plus 6"

D. Equipment Requirements

The CONTRACTOR shall ensure that appropriate equipment is provided to facilitate the installation as follows:

Equipment				
System Description	Pipe (1) Diameter (in.)	Bore Length (feet)	Torque (ft./lbs.)	Thrust/Pullback (lbs.)
Maxi-DD	18 & greater	1,000+	10,000+	70,000+
Midi-DD	Up to 16	Up to 1,000	1,900 to 9,999	20,001 to 69,000
Mini-DD	Up to 6	Up to 600	Up to 1,899	Up to 20,000

Equipment shall be matched to the size of pipe being installed. Installations differing from the above chart must be approved by the ENGINEER. The CONTRACTOR is responsible for ensuring that the drill rod can meet the bend radius required for the proposed installation.

Multiple pipe or conduit installations shall not exceed the total outside pipe diameters stated above.

E. Documentation Requirements

1. Boring Path Report

The CONTRACTOR shall furnish a Bore Path Report to the ENGINEER within 14 days after completion of each bore path. A completed record plan shall be made for directional boring work and shall be finalized after the Bore Path Record has been delivered to the ENGINEER. The report shall contain:

- a. Location of project and project number including the permit number when assigned.
- b. Name of person collecting data, including the title, position, and company name.
- c. Investigation site location (contract plans station number or reference to a permanent structure within the project right-of-way).
- d. Identification of the detection method used.
- e. Record Plan drawings showing roadway plan and profile, cross section, boring location and subsurface conditions as defined in Bore Path Drawings below. Plan elevations shown shall be referenced to an MDOT Benchmark when associated with an MDOT project, otherwise to a USGS grid system and datum. These drawings shall be done to the same scale as the contract plans. Submittal of electronic plans data in lieu of hard-copy plans may be approved by the ENGINEER if compatible with the ENGINEER's software.

- f. The PVC water main has specific radius tolerances that must be followed during installation and in final placement. Elevation and slope in ten foot increments will be provided as part of the boring report to ensure the final placement is not at radiuses more the pipe manufacturer recommends or authorizes.

2. Boring Path Drawings

Boring Path Drawings shall be dimensionally correct copies of the contract plans. Notes shall be included on each drawing stating the final bore path diameter, facility diameter, drilling fluid composition, composition of any other materials used to fill the annular void between the bore path and the facility, as well as the facility placed out of service. If the facility is a casing, this shall be noted, as well as the size and type of carrier pipes to be placed within the casing as part of the contract work. The drawings shall be produced as follows:

- a. The contract plan view shall show the center-line location of each facility that is installed to an accuracy within 1 inch.
- b. As directed by the ENGINEER, either a profile drawing for each bore path, or a cross section of the roadway at a station specified by the ENGINEER, or a roadway centerline profile, shall be provided. They shall show the existing ground or pavement surface as well as the crown elevation of each facility installed. Bore path profile information shall be referenced to the project plan stationing.
- c. If an obstruction is encountered during installation, which prevents installation of the pipe in accordance with this specification, the pipe may be left in place at the discretion of the ENGINEER and be filled with flowable fill and abandoned. A new installation procedure and revised plans must be submitted to and approved by the ENGINEER before work can resume. If a bore path is abandoned without installing a facility, the drawings shall show the abandoned bore path along with the final bore path. The abandoned bore path shall be noted as "Abandoned Bore Path." They shall also show the location of the drill head and any drill stems not removed from the bore path. If conditions warrant removal of the materials installed in the abandoned bore path, as determined by the ENGINEER, the cost and responsibility shall be borne by the CONTRACTOR.
- d. On all of the drawings, show the crown elevation, diameter, and material type of all utilities encountered and physically observed during the subsoil investigation. For all other obstructions encountered during a subsoil investigation or the installation, show the type of material, horizontal and vertical location, top elevation and lowest elevation observed, and note if the obstruction continues below the lowest point observed.

**SUPPLEMENTAL SPECIFICATIONS
FOR
WATER MAIN REPLACEMENT BY
STATIC PIPE BURSTING METHOD**

I. GENERAL

DESCRIPTION OF WORK

- a) The work specified in this section is construction methods, procedures, and materials for pipe bursting method installation with pre-chlorination method. Unless otherwise stated, new pipe material shall be 12" Polyvinyl Chloride (PVC) Pipe, and the existing pipe is 6" or 8" diameter primarily cast iron. All work shall be completed in accordance with the City of Romulus Water Main Standards, Michigan Department of Environmental Quality (MDEQ) Standards and requirements, or as specified herein.
- b) The CONTRACTOR shall furnish all labor, materials and equipment required to construct water main by pipe bursting method, and all necessary appurtenant work as herein specified. The work shall also comply with the appropriate requirements of Technical Specification - Water Main, and Special Provision - Horizontal Directional Drilling that are part of this contract.
- c) Water main sections requiring the pipe bursting method are identified on the plans.
- d) No water mains shall be accepted until the water mains have passed the system acceptance tests as herein specified and described in Technical Specification - Water Main and Special Provision – Horizontal Directional Drilling. Pipe bursting operations for water main, including the pre-chlorination method shall follow the requirements of this Special Provision, as well as any other requirements of the MDEQ that may be required as part of the MDEQ PA 399 Permit approval.

There are strict requirements and timelines as part of the pipe bursting procedure. Acceptable time-frame for pipe bursting installation is 7 am – 7 pm, Monday through Friday only, no exceptions. Water service must be restored by no later than 7 pm daily for all residents/businesses.

II. QUALIFICATIONS

Required qualifications for this project can be found in the Supplemental Instructions to Bidders section of the bid documents.

III. SUBMITTALS

The Contractor shall submit the following information:

- 1. Pipe manufacturer's technical data showing complete information on the material composition, physical properties, and dimensions of the new PVC pipe and fittings. This shall also include the manufacturer's recommendations for handling, storage, and repair of damaged pipe and fittings.

2. Detailed drawings and written descriptions of the entire pipe bursting procedure to install pipe, including pit locations and sizes, pit construction and shoring, bursting tool sizes and capacities, traffic control, adjacent utilities and dewatering. This written description shall clearly state whether the pre-chlorination method will be used or if temporary water service will be provided. In either case the procedure to be utilized shall be approved by the engineer prior to any pipe bursting operation commencing on this project by the Contractor.
3. Certification of training for workers who are installing pipe. This shall also include evidence acceptable to the Owner that the Contractor is licensed by the patent holder to use the pipe bursting methodology.
4. If the CONTRACTOR determines that modification to the method and equipment as stated in the original submittal is necessary during construction, the CONTRACTOR shall submit a plan describing such modifications, including the reasons for the modification.
5. Fusion technician requirements and fusion joint data shall be submitted as required per the Supplemental Instructions to Bidders.
6. Methods of construction, reconnection, and restoration of existing service laterals.
7. Contingency plans for the following potential conditions:
 - a) Loss of water service to residents/businesses as part of the pre-chlorination and pipe bursting installation procedure. If re-instatement of water service does not take place by 7:00 PM, the Contractor shall be responsible for providing potable water to all residents/businesses at the Contractor's cost, to the satisfaction of the City. If acceptable potable water service cannot be provided to the resident, the Contractor shall provide at Contractor expense, alternate living quarters to the resident that are acceptable to the City. Any loss of potable water service to businesses resulting in financial loss may be incurred by the contractor based on actual damages to the business.
 - b) Unforeseen obstructions causing burst stoppage, such as unanticipated changes in host pipe material, repair section, concrete encasement (or cradles), buried or abandoned manholes, or changes in direction not depicted on maps/plans provided by the Owner.
 - c) Any surface heaving or settlement caused by pipe bursting operation.
 - d) Repairing damage to existing utilities including service connections (including gas, water, electric, cable, sewer) to residents and businesses.
 - e) Replacement of new water main damaged as a result of the installation process.
 - f) Loss and return to line and grade.
8. Emergency response plan including contact information for utility owners.

9. Safety Plan as it related to pipe bursting operation (unless submitted as part of an overall safety plan for entire project).
10. Contractor's 24-hour emergency contact person.

IV. MATERIALS

Materials must meet or exceed the following standards:

C 900 Fusible Polyvinyl Chloride (PVC):

4" – 12":	ANSI/AWWA C900, FM 1612;
Pipe Compound:	ASTM D1784 Cell class 12454
Gasket:	Fusible
Testing: 4" – 12":	ASTM D-638
Certifications:	ASNI/NSF Standard 61; 4" – 12": NSF 14 and 61
Installation:	AWWA C605; Underground Solutions Installation Guide DR-14

All pipe shall be made of virgin material. No rework shall be allowed except that obtained from the manufacturer's own production of the same formulation shall be used.

The physical appearance of deformities in the pipe such as concentrated ridges, discoloration, excessive spot roughness, pitting, varying wall thickness, etc., shall constitute sufficient basis for rejection. The pipe shall be homogeneous throughout, free from visible cracks, foreign inclusions, and other defects. Pipe with gashes, nicks, abrasions or any such physical damage which may have occurred during storage and/or handling which are wider or deeper than 10% of the wall thickness, shall not be used and must be removed from the construction site. Any pipe that has been damaged or does not meet the approval of the Owner shall be replaced at the Contractor's expense.

Sizes of the insertions to be used shall be such as to rehabilitate the water main to its original flow capacity or greater.

Temporary Water Service

1. If required, temporary water system must be tested and approved for potable water.

Tracing Wire

1. All PVC piping for bursting operation shall be installed with a continuous, two (2) 7 x 7 stranded copper clad steel, tracer wire, Copperhead "SoloShot Xtreme" type, or Engineer approved equal. Tracer wire for pipe busting shall have an average tensile strength break load of 4700 pounds. The wire shall be insulated with a minimum 50 mil HDPE jacket.
2. Trace Wire Connections: Connection shall be made using 3M DBR direct bury splice kit with moisture resistant grease, Snakebite Splice Connectors manufactured by Copperhead Industries or Engineer approved equal.

3. Tracer wire shall be connected and secured to the top step of each gate valve well and top of hydrant boxes. Tracer wire shall be attached to the inside of well or valve boxes clear of the operating nut and not interfere with opening and closing of the valve.
4. Additional tracer wire access/test locations shall be SnakePit® (CD14TP), Magnetized Tracer Boxes, Test and Monitoring Stations or approved equal.

V. CONSTRUCTION

Before work is started, it shall be the responsibility of the Contractor to check with MISS DIG in order to determine the locations of other nearby utility lines which may be affected by the proposed work. Any damage caused by the Contractor to adjacent utilities shall be properly repaired by the Contractor at no additional expense to the Owner. All necessary traffic control devices shall be set in accordance with the Michigan Manual of Uniform Traffic Control Devices before work is begun.

A. DELIVERY, STORAGE AND HANDLING OF PIPE

The Contractor shall transport, handle, and store pipe and fittings as recommended by manufacturer.

If new pipe and fittings become damaged before or during installation, they shall be repaired as recommended by the manufacturer or replaced as required by the Engineer at the Contractor's expense before proceeding further.

Deliver, store, and handle other materials as required to prevent damage.

B. PIPE BURSTING TOOL

The pipe bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall be static and shall generate sufficient force to burst and expand the existing pipeline. Refer to the manufacturer's specifications for what size tool should be used in what diameter of pipe as well as parameters of tool size and the percentage of upsize allowed.

The pipe bursting tool shall be pulled through the old line by means of a winch cable or pulling rod assembly that is located at the upstream manhole. The bursting unit shall pull the new PVC pipe with it as it moves forward. The bursting head shall incorporate a shield/expander to prevent collapse of the hole ahead of the PVC pipe insertion. The pipe bursting unit shall be remotely controlled.

C. LAUNCHING/RETRIEVAL PITS

The location and number of launching/retrieval pits have been indicated on the plans for illustrative purposes but shall be proposed by the Contractor and approved by the Owner prior to excavation. The pits shall be located such that their number shall be minimized and the footage of the new pipe installed in a single pull shall be maximized.

All work is to be completed within existing street rights-of-way or utility easements.

Where it is necessary to excavate to an additional depth for the placement and use of a fusion machine, or other reasons, the Contractor shall furnish and install trench shoring or bracing in compliance with OSHA standards.

Open excavations shall be kept secure at all times with appropriate lights, signs, barricades, construction tape, etc.

D. INSERTION OF PIPE

All buried utilities adjacent to the pipe operation shall be reviewed, and where necessary, be excavated to relieve transient loading during the insertion operation. If any utilities are running parallel and within 24" of the pipe to be burst, the Contractor shall excavate a pit at the location to check clearance. If adequate clearance does not exist between the existing water line and the affected utility, the Contractor shall employ substitute means to rehabilitate the existing water line.

For utilities crossing within 6" of the existing water line to be burst, soil shall be excavated and removed to relieve loading during the bursting operation.

Any concrete encasements shall be excavated and broken out prior to the bursting operation to allow the steady and free passage of the pipe bursting head. All in-line valves and fittings shall be removed prior to the bursting operation.

The new PVC pipe shall be inserted immediately behind the bursting head in accordance with the manufacturer's recommended procedures. The mole shall be specifically designed and manufactured for the type of insertion process being used. It shall be utilized to guide and assist the bursting head during the operation. A pushing machine may be utilized to aid pipe insertion from the rear.

A backhoe or other heavy equipment shall be driven above the bursting head to reduce or prevent pavement heaving.

E. PIPE JOINING

The PVC pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak-proof joint. All joints shall be inspected by the Owner before insertion. The pipe shall be joined on site in appropriate working lengths near the launching pit.

All equipment and procedures used shall be used in strict compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by a manufacturer of PVC pipe and/or fusing equipment. Sections of the PVC pipe shall be assembled and joined on the job site above the ground. Hot fusion joining of PVC end sections, service taps and fittings may be performed in the excavations.

The butt-fused joint shall be true alignment and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure.

The fused joint shall be watertight and shall have tensile strength equal to that of the pipe. All joints shall be subject to acceptance by the Engineer and/or representative prior to

insertion. All defective joints shall be cut out and replaced at no cost to the Owner. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling as determined by the Engineer and/or representative shall be discarded and not used.

F. SERVICE CONNECTIONS

All service connections on the existing water main that is to be burst or will be taken out of service shall be back in service by 7 pm each working day or an alternate water source provided for each residence/business to be out of service.

Water Service lines will be replaced as part of this project from the water main to the resident shut-off box located near the property line. The City of Romulus requires that the contractor provide prices for private lead water service removal and replacement from the curb stop and box to the water meter. Property Owners may elect to hire the contractor to replace the portion of the service on private property upon receipt of contractor provided pricing.

If a non-copper services is encountered, the CONTRACTOR shall notify the City and the Construction Observer. The affected homeowner shall be notified as soon as possible. See Appendix E for sample notices.

Information related to lead service testing and notification is included in Appendix E.

G. TESTING AND DISINFECTION

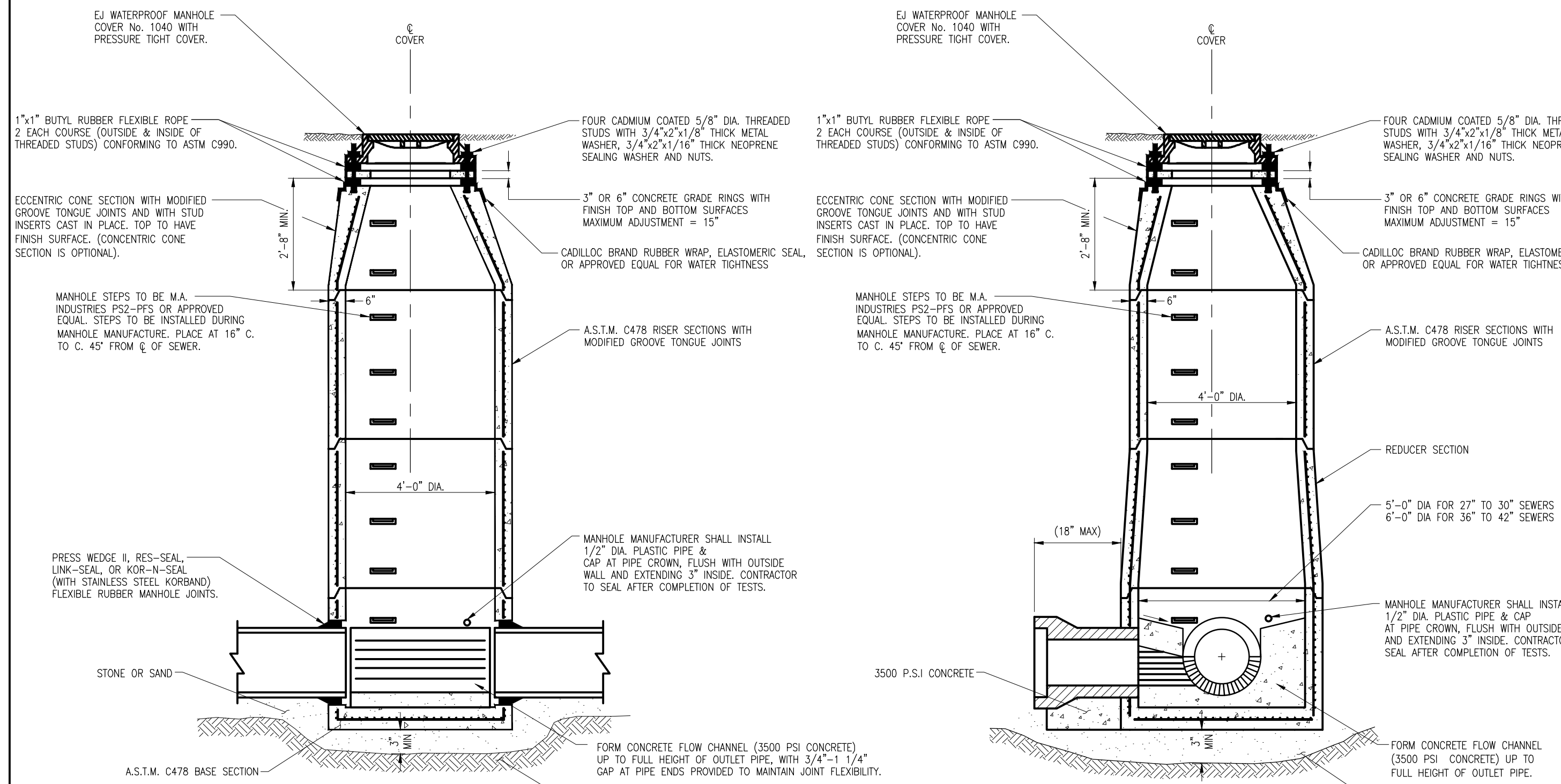
1. Hydrostatic pressure testing shall be conducted in conformance with the Special Provision - Horizontal Directional Drilling on this project. Hydrostatic pressure testing shall be completed on the surface prior to the installation of the new PVC water main by pipe bursting procedure if temporary water is not being used. In the event temporary is being used the pressure test maybe performed after installation.
2. Initial Chlorination Procedure and Bacteriological Testing shall be conducted in conformance with the Technical Specification - Water Main on this project.
3. Once testing noted above in Items A and B of this section have been satisfactorily completed and accepted by the Engineer, install the section of PVC water main by pipe bursting procedure. After the PVC pipe has been installed by the pipe bursting procedure, the pipe shall be re-chlorinated using a slug method where 300 mg/l of chlorine will be slowly moved through the new pipe. After the chlorine solution has been removed from the pipe, another bacteriological sample must be collected and tested at a certified laboratory.
4. Once the new section of installed pipe is connected to an adjacent water main already in service (on one side only), and the water services for houses/businesses are connected,

precautionary boil water advisories shall be issued to all residents/businesses in the affected area. Each of the boil water advisories must be hand delivered, and all reasonable efforts to contact each house/building owner must be performed. The boil water advisory must remain in effect until the result of the additional bacteriological sample is reported as non-detected from a certified laboratory.

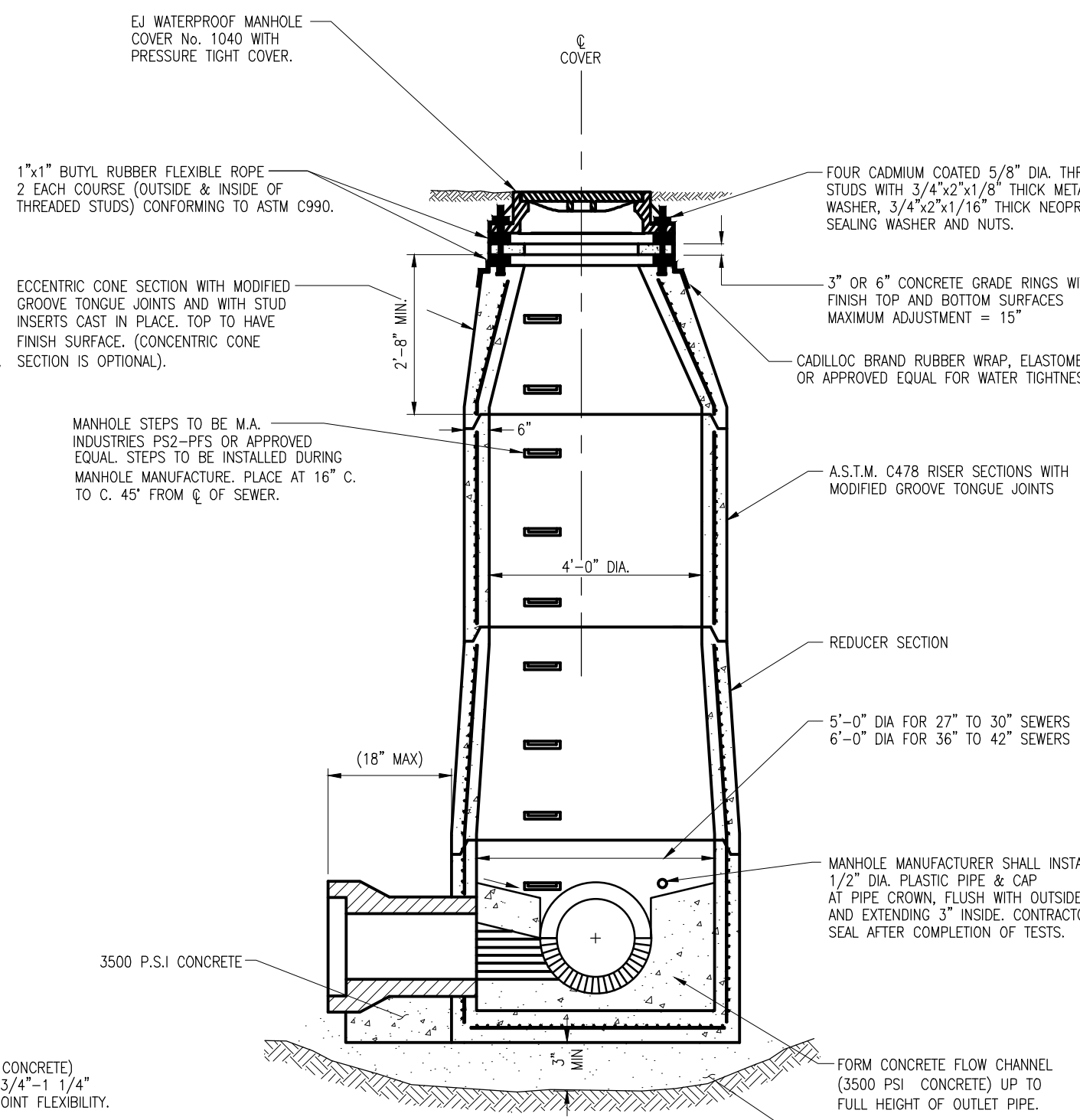
5. Prior to the time that any boil water advisory is rescinded, connection of the water main on only one side of the newly installed section can be completed and opened (no dual feed). A final connection on the other side of the newly installed water main can only be connected and opened once the additional bacteriological sample is reported as non-detected from a certified laboratory.
6. If required, temporary water supply system shall be chlorinated, flushed and bacteriological tested per the requirements of the Michigan Department of Environmental Quality and AWWA C651 prior to being placed into service and prior to reestablishing service with the connecting of water service leads

H. CLEAN UP AND RESTORATION

Upon completion of the pipe bursting work, the Contractor shall clean up and restore the work site to match the original site conditions. This work shall include restoration of items such as grass, shrubs, fences, and paved surfaces as well as gate valves, hydrants, or other appurtenances that were affected by the pipe bursting work. Removal of the temporary water service system shall also be done as part of the clean up work. Clean up and restoration shall be considered as incidental to the pipe bursting work unless separate pay items have been included in the Bid Form for restoration.

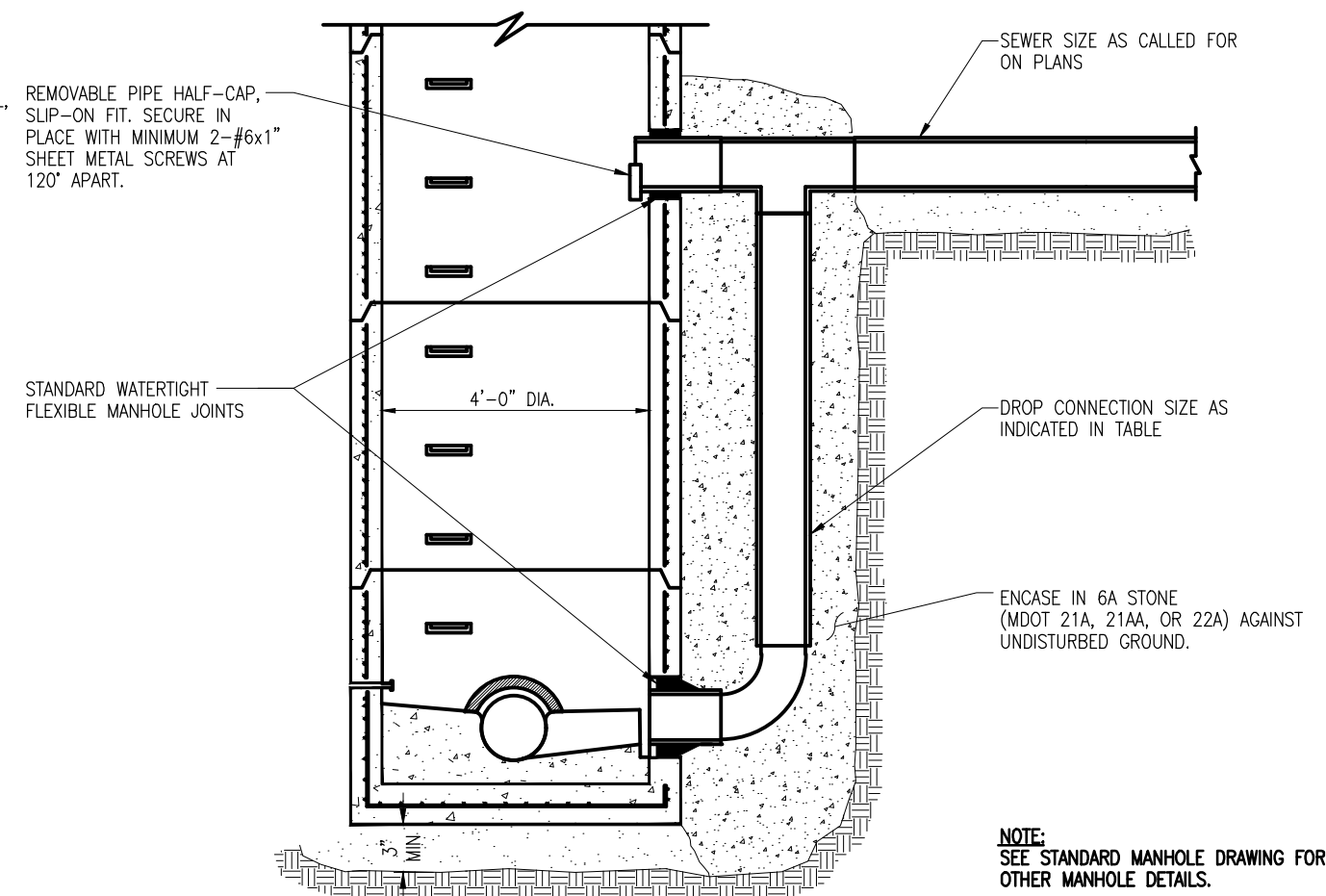


STANDARD SANITARY MANHOLE FOR 10" THROUGH 24" SEWERS

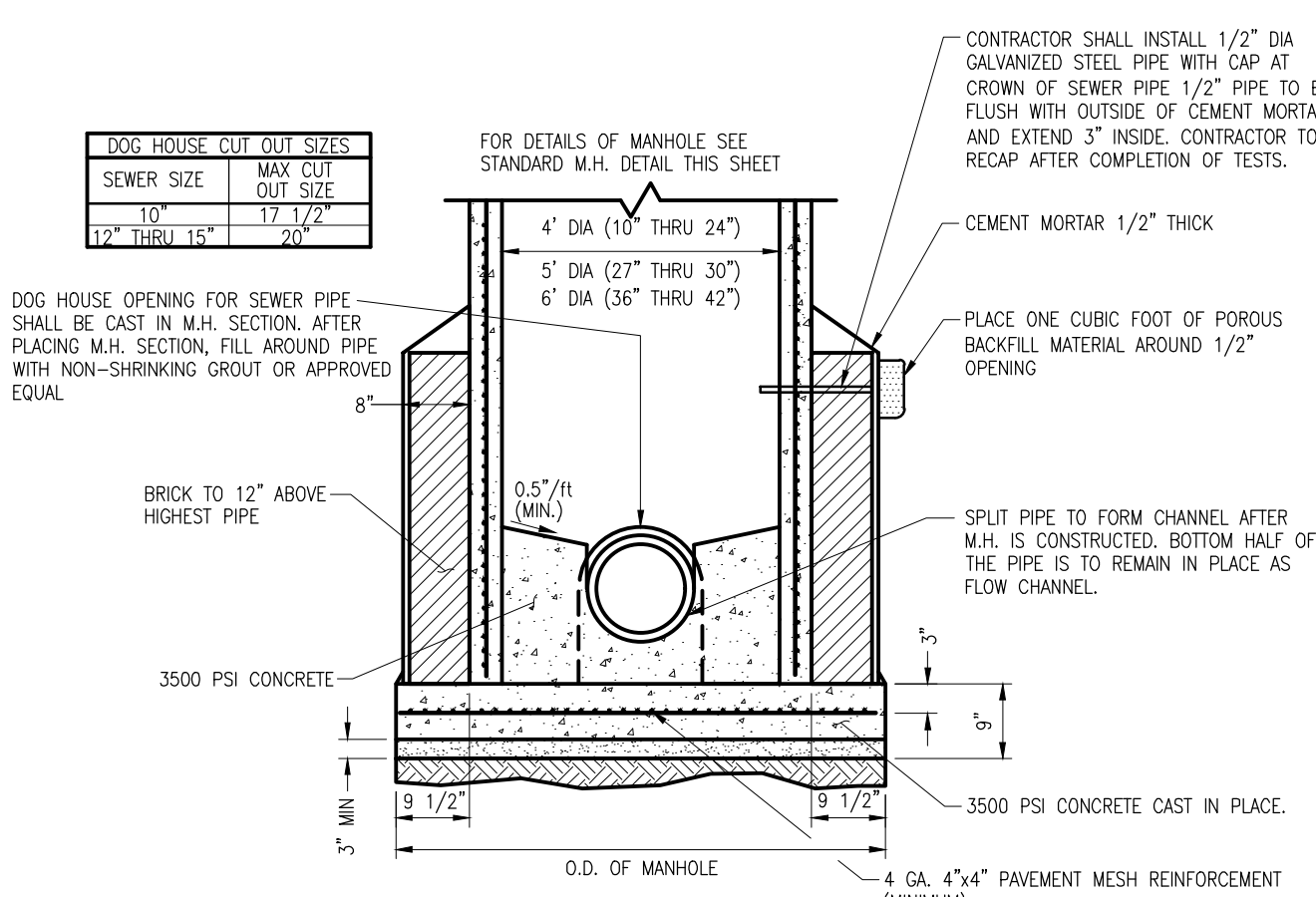
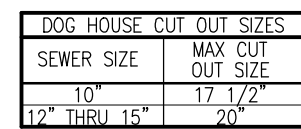


STANDARD SANITARY MANHOLE FOR 27" THRU 42" SEWERS

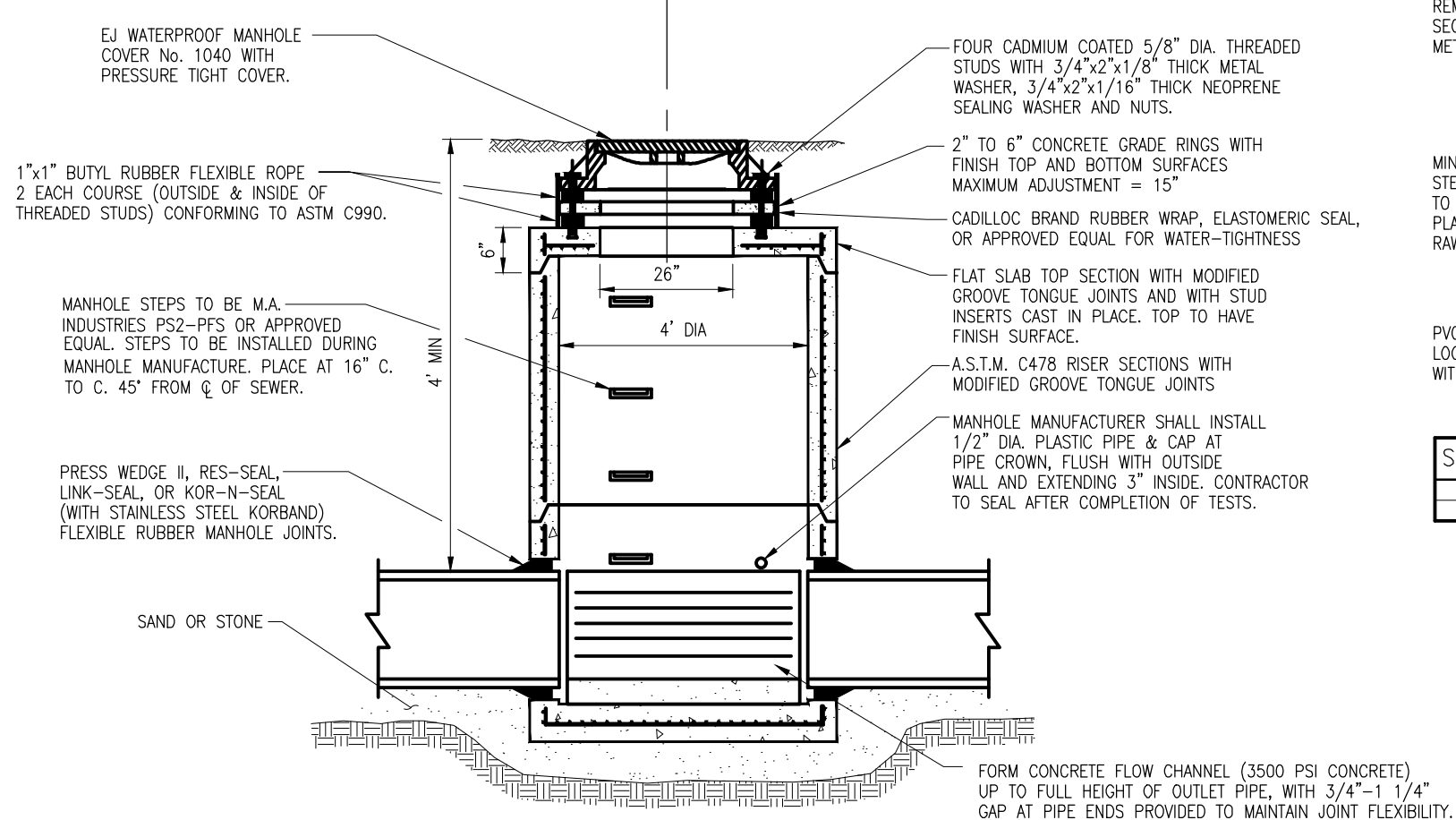
DIA OF SEWER	DIA OF DROP CONNECTION
8" & 10"	8"
12", 15", & 18"	12"
21", 24", & 30"	18"
36" & 42"	24"



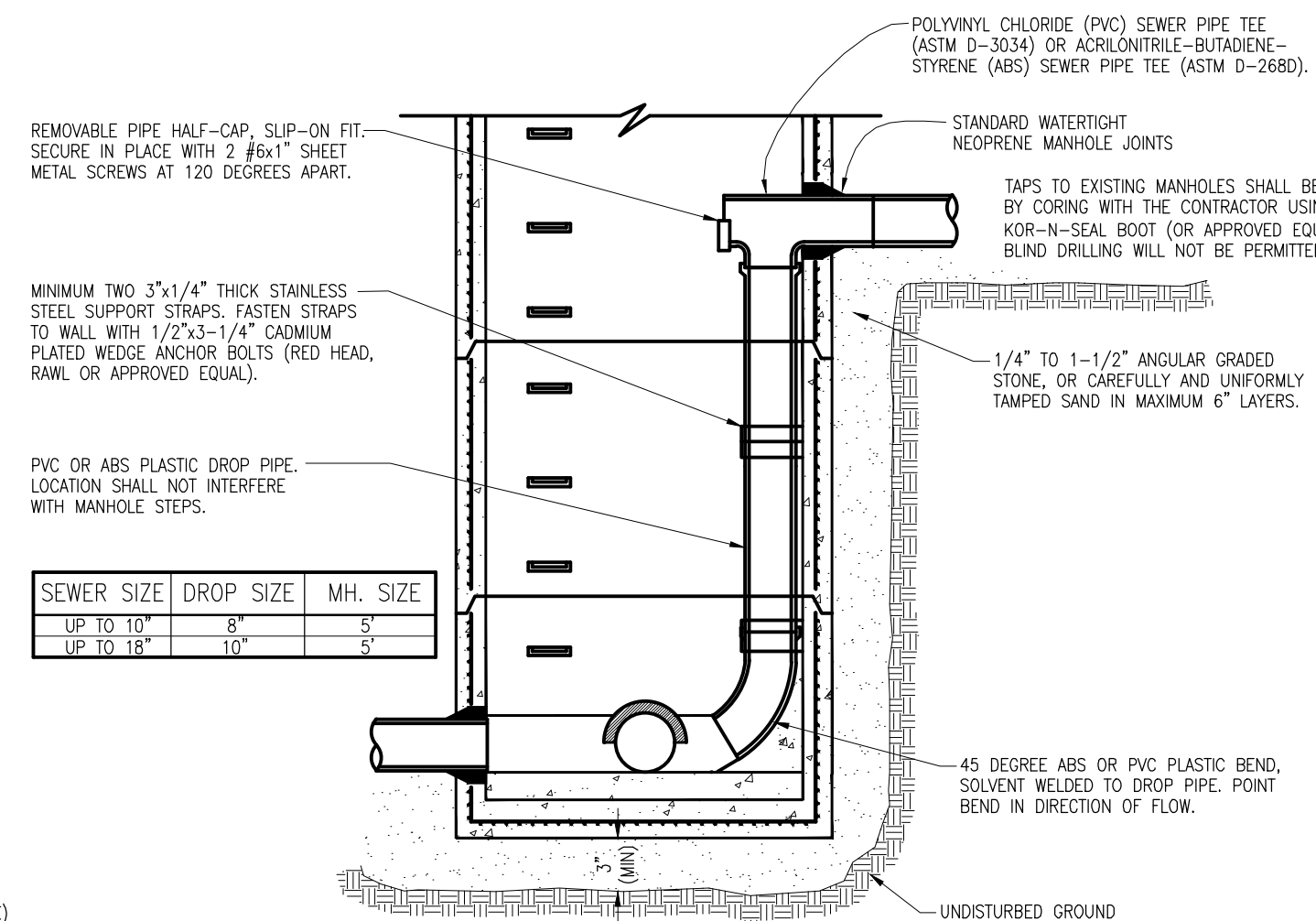
EXTERNAL PRE-CAST DROP MANHOLE CONNECTION
WITH STEEL REINFORCING PER ASTM C-478
(ONLY AS APPROVED BY CITY OF ROMULUS)



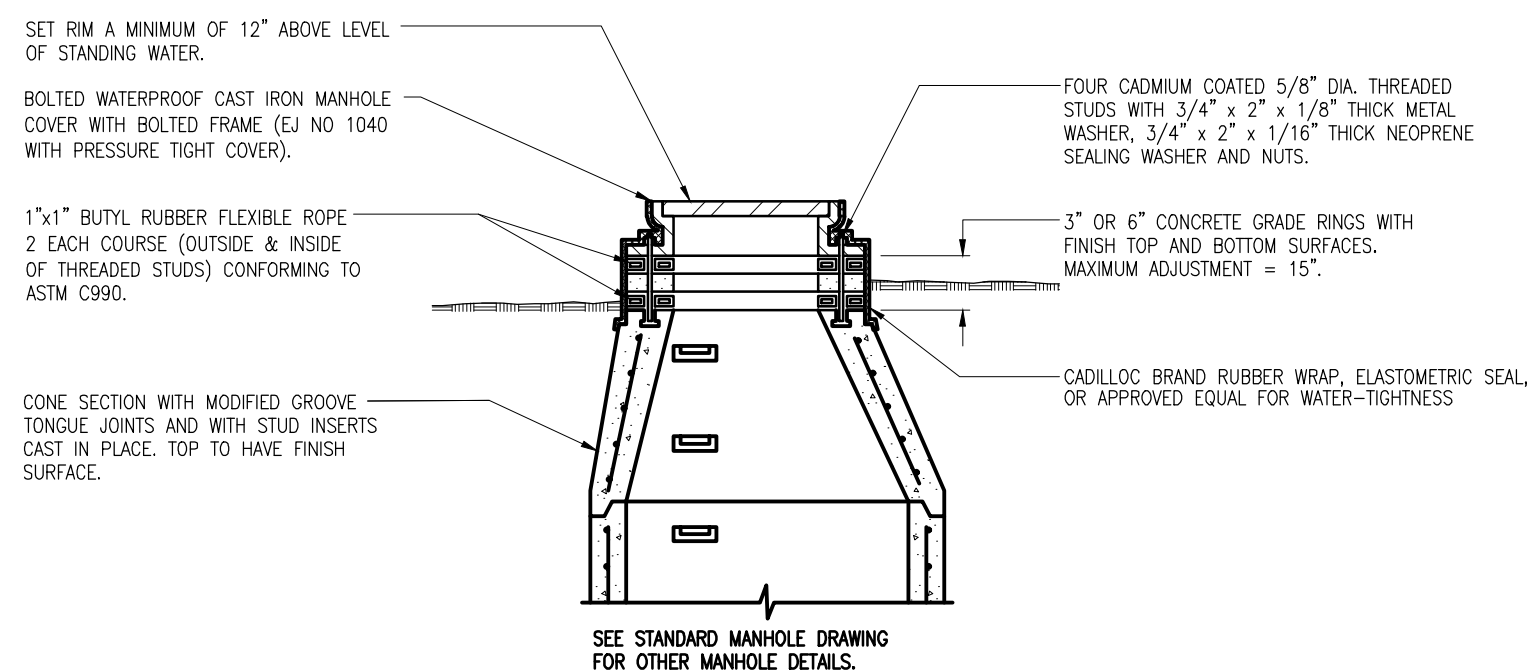
STANDARD SANITARY MANHOLE
ON EXISTING 10" THROUGH 42" DIAMETER SEWERS



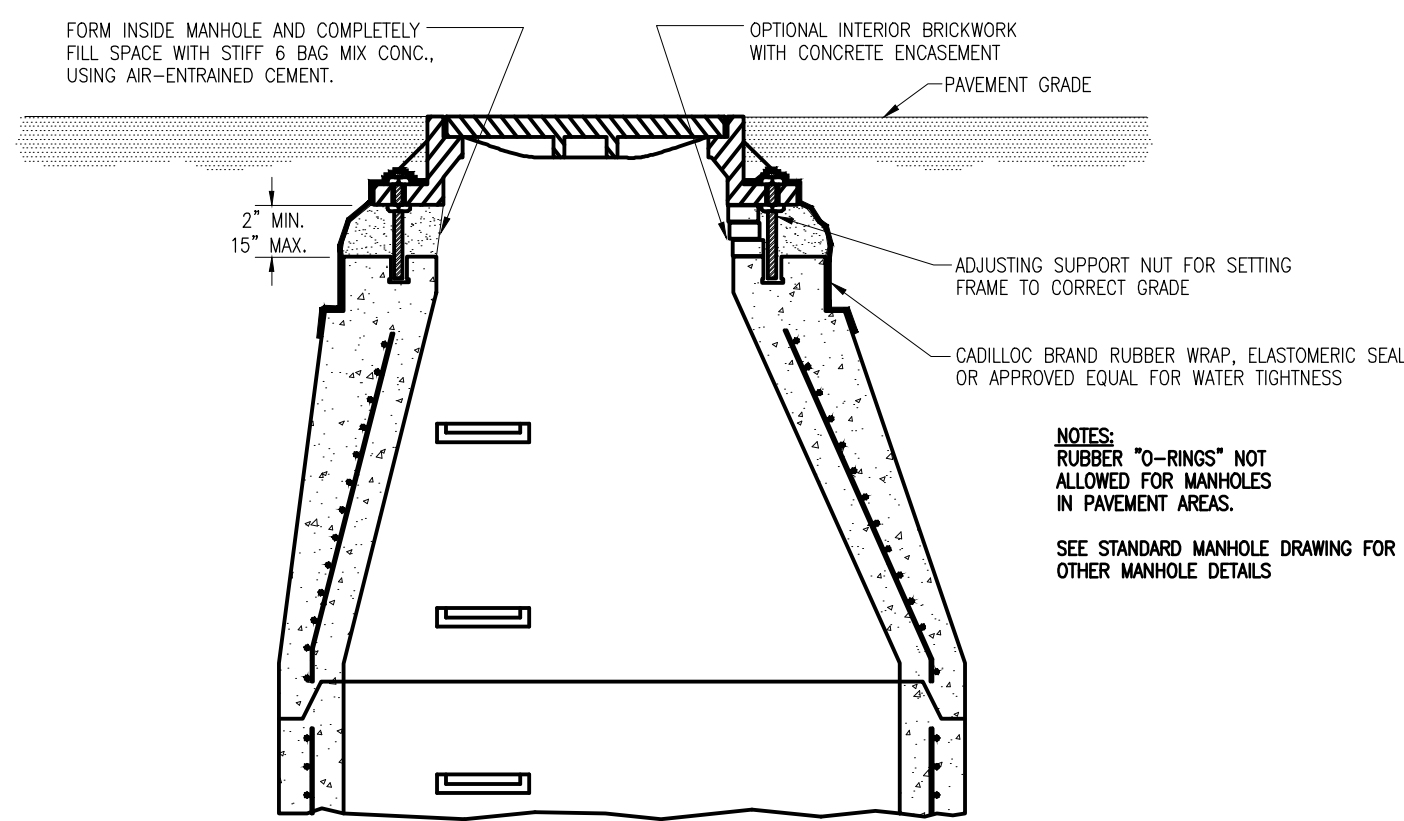
FLAT TOP MANHOLE FOR SHALLOW MANHOLE INSTALLATIONS



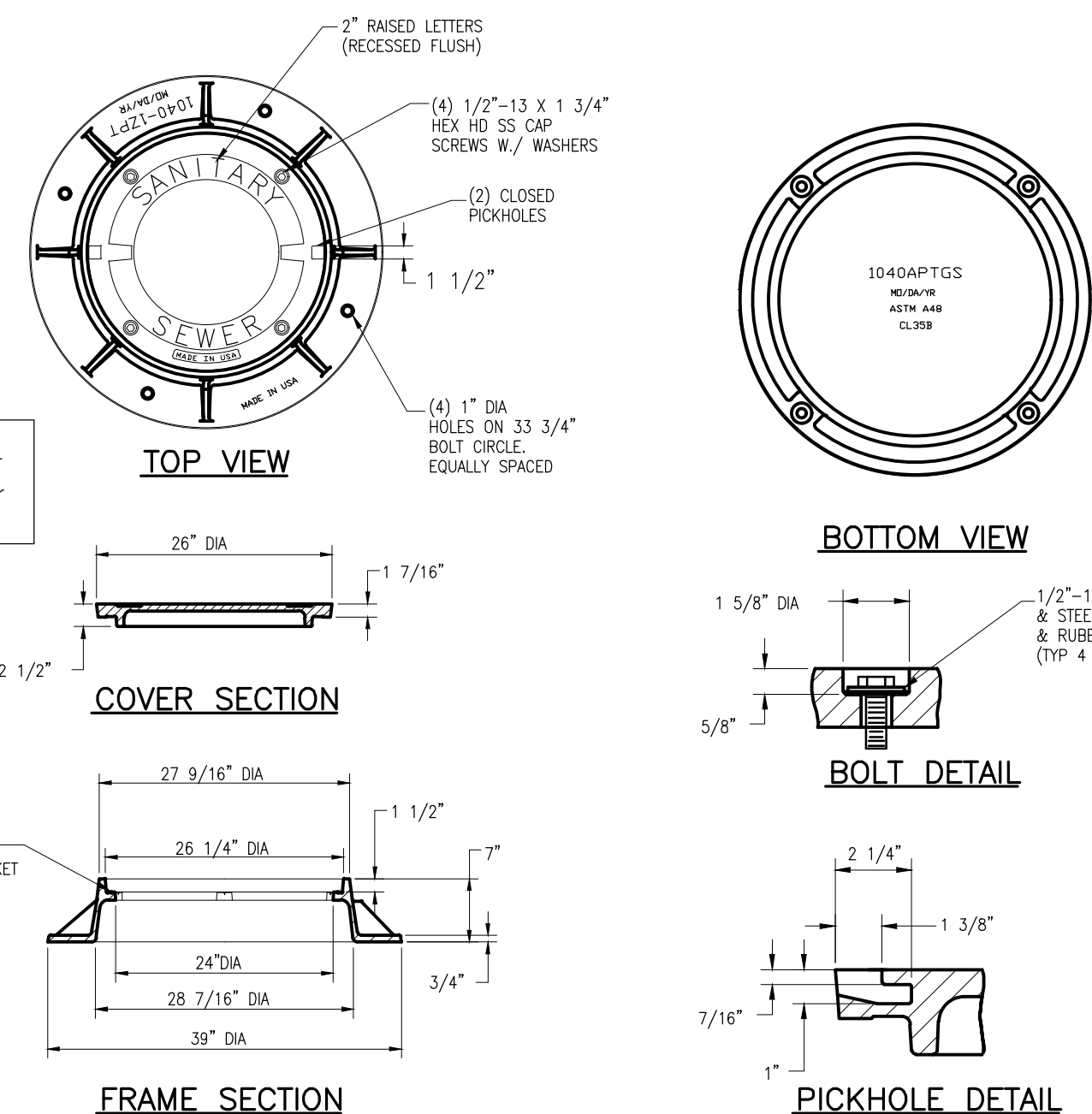
INTERNAL DROP MANHOLE CONNECTION
FOR
DROP CONNECTIONS GREATER THAN 20 FEET DEPTH
(ONLY AS APPROVED BY CITY OF ROMULUS)



CONSTRUCTION DETAILS FOR MANHOLE TOPS WITHIN FLOOD PRONE AREAS

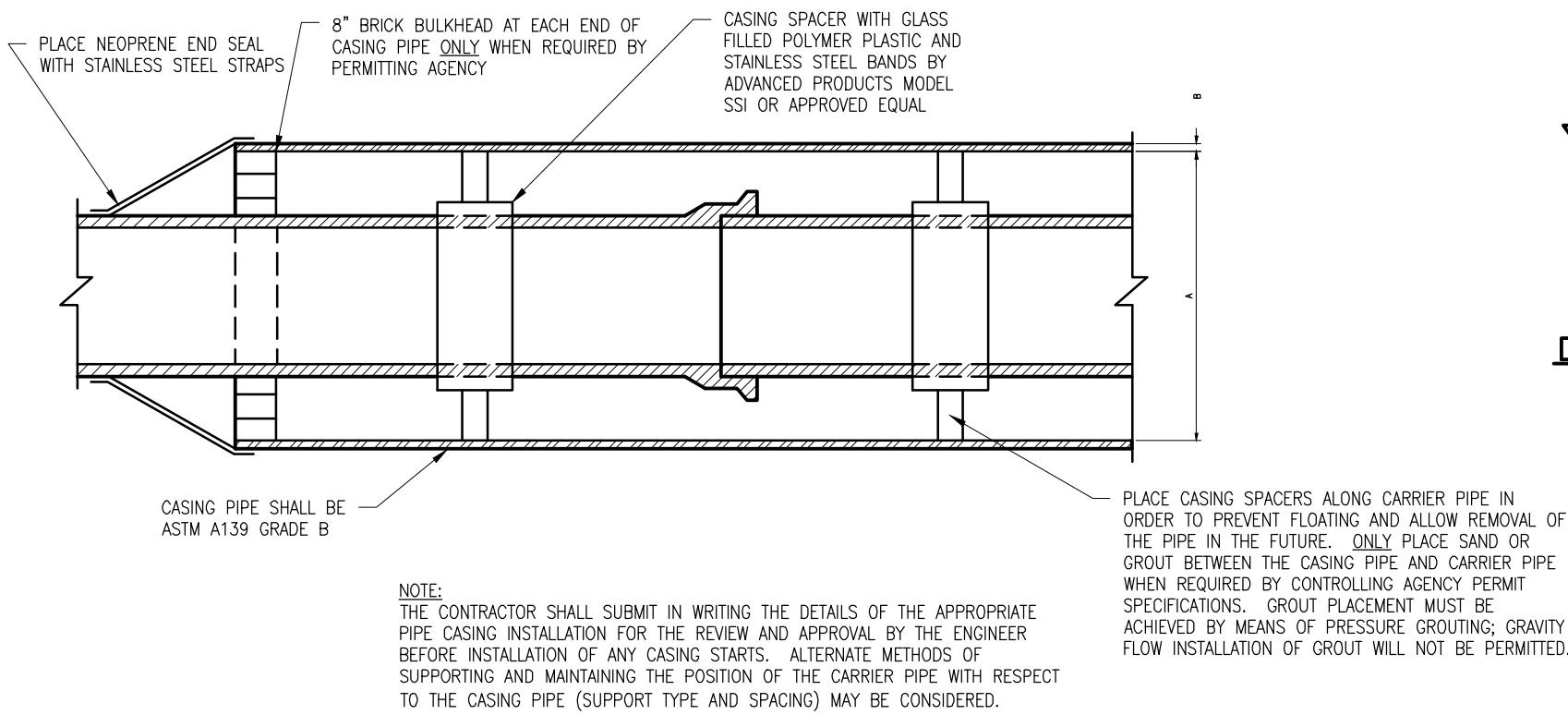
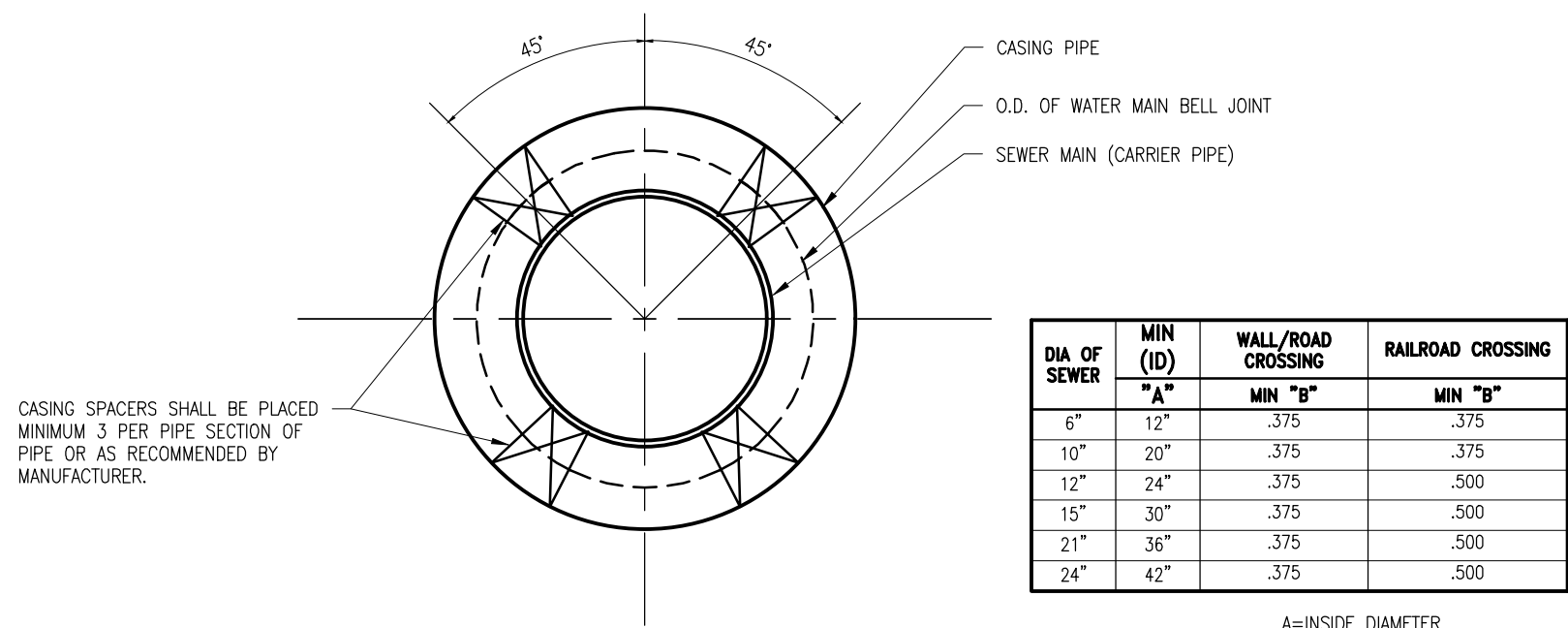


OPTIONAL CONSTRUCTION DETAILS
FOR
MANHOLE TOPS WITHIN PAVEMENT AREAS

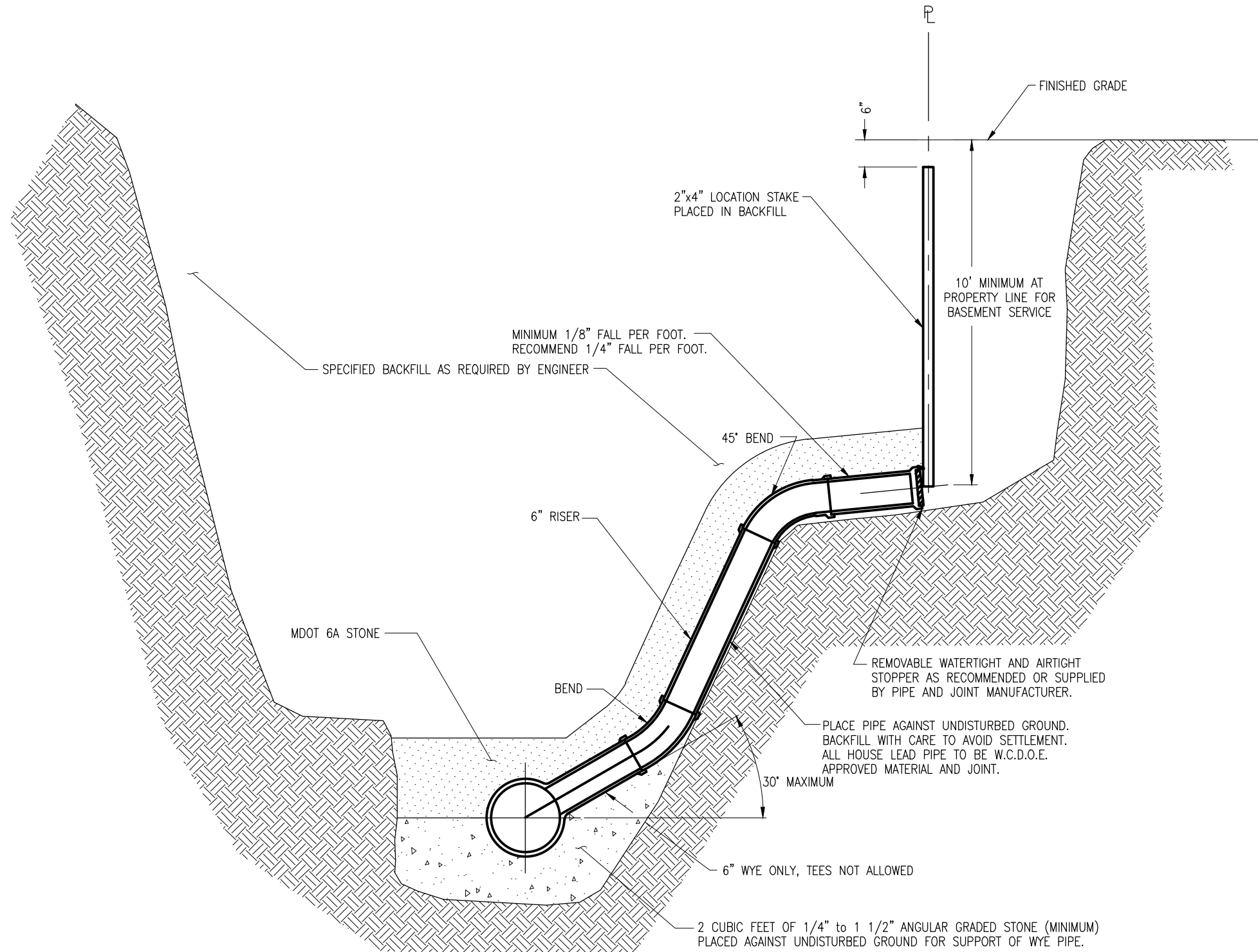


CAST IRON MANHOLE COVER
EJ 1040 TYPE "APT" SOLID COVER

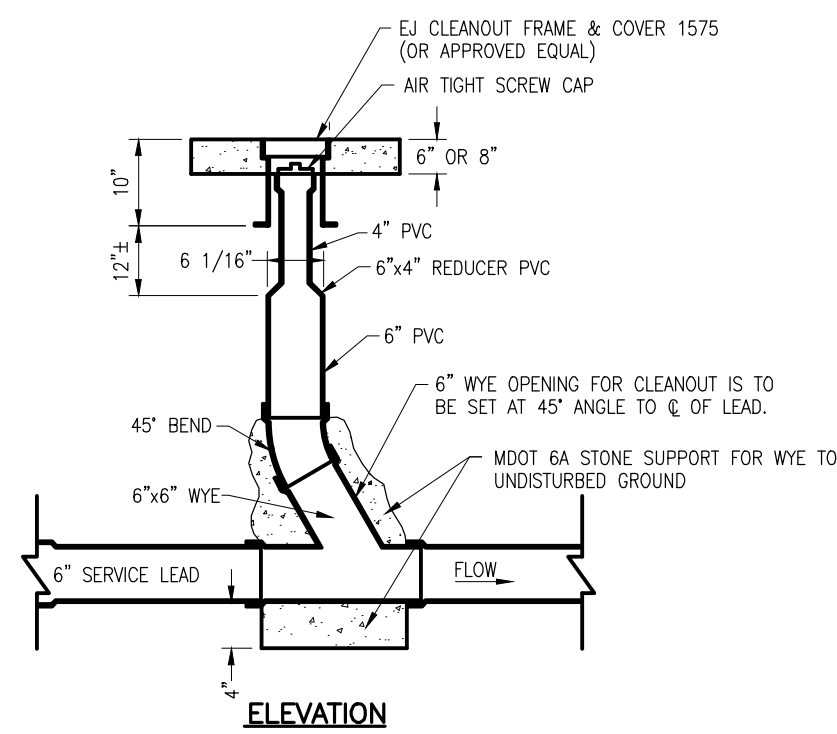
1. ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF ROMULUS AND THE WAYNE COUNTY DEPARTMENT OF ENVIRONMENT (W.C.D.O.E.) OR DOWNRIVER UTILITY WASTEWATER AUTHORITY (D.U.W.A.). ALL SANITARY SEWER CONSTRUCTION SHALL HAVE FULL TIME INSPECTION PROVIDED BY THE CITY OF ROMULUS.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY NECESSARY INSPECTION PERMITS AND TO COMPLY WITH ANY COUNTY OR CITY REQUIREMENTS. THE SANITARY SEWER CONTRACTOR SHALL NOTIFY THE WAYNE COUNTY DEPARTMENT OF PUBLIC SERVICES ENGINEERING DIVISION PERMIT OFFICE AT (734) 595-6504 AT LEAST 48 HOURS PRIOR TO BEGINNING OF CONSTRUCTION. THE CONTRACTOR SHALL ALSO NOTIFY THE CITY OF ROMULUS AT LEAST 3 WORKING DAYS BEFORE THE START OF CONSTRUCTION.
3. ALL SANITARY SEWER AND STUBS SHALL BE SUBJECT TO INFILTRATION/EXFILTRATION OR AIR TESTING. INFILTRATION AND EXFILTRATION FOR ANY SECTION OF SANITARY SEWER BETWEEN MANHOLES SHALL NOT EXCEED 100 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOUR PERIOD. AIR TESTS IN LIEU OF INFILTRATION TESTS SHALL BE AS SPECIFIED BY ASTM TEST F1417 (PLASTIC PIPE). FINAL AIR TESTS MUST BE WITNESSED BY CITY PERSONNEL AND MUST BE SCHEDULED IN ADVANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CITY AND COUNTY CHARGES AND SHOULD CONTACT THEM PRIOR TO BIDDING TO CONFIRM THESE FEES AND CHARGES.
4. A DIGITAL VIDEO (WITH LOG AND LEAD LOCATIONS) SHALL BE SUBMITTED TO AND APPROVED BY THE CITY OF ROMULUS PRIOR TO FINAL SEWER ACCEPTANCE. SAID DIGITAL VIDEO SHALL BE PERFORMED A MINIMUM OF 30 DAYS AFTER CONSTRUCTION IS COMPLETED. IN ADDITION, A NINE-POINT MANDEL TEST IS REQUIRED FOR ALL FLEXIBLE PIPES AND SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 33.85C OF THE CURRENT EDITION OF THE RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES. THE COMPLETED INSTALLATION SHALL HAVE NO PIPE DEFLECTIONS GREATER THAN 5%. IF THE PIPE FAILS ANY OF THE REQUIRED TESTS OR DIGITAL VIDEO REVIEW, THE CONTRACTOR SHALL FIX OR REPAIR THE NONCONFORMITY AT HIS COST. THE CONTRACTOR SHALL THEN RE-TEST AND RE-TELEVIEW THE SEWER AT HIS COST UNTIL FINAL ACCEPTANCE OF THE SEWER IS ACHIEVED.
5. THREE (3) WORKING DAYS PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL TELEPHONE MISS DIG (1-800-482-7171) FOR UNDERGROUND FACILITIES LOCATIONS.
6. ALL ELEVATIONS SHALL BE BASED UPON NATIONAL GEODETIC SURVEY DATUM (NGS)
7. AT ALL CONNECTIONS TO AN EXISTING SEWER OR TO EXTENSIONS THERETO, A WATERTIGHT BULKHEAD WITH A CAPPED 1 INCH DIAMETER PIPE SHALL BE PROVIDED TO PERMIT MEASURING INFILTRATION. A TEMPORARY 12 INCH DEEP SUMP SHALL ALSO BE PROVIDED IN THE FIRST MANHOLE UPSTREAM FROM THE CONNECTION, WHICH WILL BE FILLED IN AFTER SUCCESSFUL COMPLETION OF ANY INFILTRATION TEST UP TO THE STANDARD FILLET PROVIDED FOR THE FLOW CHANNEL.
8. PRECAST MANHOLE JOINTS SHALL BE ASSEMBLED USING BUTYL ROPE CONFORMING TO ASTM C990 OR AS APPROVED EQUAL.
9. ALL BUILDING LEADS AND RISERS SHALL BE 6 INCH, SDR 26 PVC WITH RUBBER GASKET JOINT, OR AN APPROVED EQUAL PIPE AND JOINT. SEWER PIPE WYE OPENINGS SHALL CONTAIN FACTORY INSTALLED PREMIUM JOINT MATERIAL OF THE TYPE IDENTICAL TO THAT OF THE BUILDING LEAD PIPE USED. BUILDING LEADS TO BE FURNISHED WITH REMOVABLE AIRTIGHT AND WATERTIGHT STOPPERS.
10. ALL SEWER PIPE SHALL BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE BEDDING DETAILS.
11. ALL NEW MANHOLES SHALL HAVE APPROVED FLEXIBLE, WATERTIGHT SEALS WHERE PIPES PASS THROUGH WALLS. MANHOLES SHALL BE PRECAST SECTIONS WITH MODIFIED GROOVE TONGUE AND RUBBER GASKET TYPE JOINTS. PRECAST MANHOLE SECTIONS SHALL BE W.C.D.O.E. APPROVED MODIFIED ECCENTRIC CONE (OR OPTIONAL CONCENTRIC CONE). ALL MANHOLES SHALL BE PROVIDED WITH BOLTED, WATERTIGHT COVERS.
12. MANHOLES SHALL BE CONSTRUCTED WITH FLOW CHANNEL WALLS THAT ARE FORMED TO THE FULL HEIGHT OF THE CROWN OF THE OUTLET SEWER. A BENCH SHALL BE PROVIDED ON EACH SIDE OF THE MANHOLE FLOW CHANNEL AND SHALL HAVE A SLOPE OF NOT LESS THAN 0.5 INCHES PER FOOT. (REFER TO SECTIONS 34.4 AND 34.5 OF THE CURRENT EDITION OF THE RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES.)
13. WHEREVER EXISTING MANHOLES ARE TO BE TAPPED, THE TAP SHALL BE MADE BY CORING. THE CONTRACTOR SHALL PLACE A KOR-N-SEAL BOOT (OR APPROVED EQUAL) AFTER CORING IS COMPLETED. BLIND DRILLING WILL NOT BE PERMITTED IN LIEU OF CORING.
14. AT ALL SEWER CONNECTIONS TO MANHOLES, DROP CONNECTIONS WILL BE REQUIRED WHEN THE DIFFERENCE IN INVERT ELEVATIONS EXCEEDS 18 INCHES. DROP CONNECTIONS WILL REQUIRE REVIEW AND APPROVAL FROM THE CITY.
15. THE ELEVATION DIFFERENTIAL OF EXCAVATION AROUND EXISTING MANHOLES MUST NOT EXCEED 6 FEET.
16. MANHOLES CONSTRUCTED OR ADJUSTED AS PART OF THE SYSTEM MAINTAINED BY THE CITY OF ROMULUS SHALL BE PROVIDED WITH COVERS READING "SANITARY SEWER" PER THE DETAIL.
17. NO GROUND WATER, STORM WATER, CONSTRUCTION WATER, DOWNSPOUT DRAINAGE, FOOTING, OR WEEP TILE DRAINAGE SHALL BE ALLOWED TO ENTER ANY SANITARY SEWER INSTALLATION.
18. 18 INCH MINIMUM VERTICAL SEPARATION AND 10' MINIMUM HORIZONTAL SEPARATION MUST BE MAINTAINED BETWEEN SANITARY SEWER AND WATER MAIN.
19. NO CLAY PIPE WILL BE ALLOWED FOR MAIN LINE SANITARY SEWER OR FOR SANITARY SEWER LEADS.
20. WHERE SANITARY SEWER CLEANOUTS FALL WITHIN A PAVED AREA (PARKING LOT, SERVICE DRIVE AREA, ETC.), THE CLEANOUT SHALL HAVE A CAST IRON COVER THAT IS CENTERED IN A 2'x2'x6" CONCRETE SLAB HAVING A COMPRESSIVE STRENGTH OF 3500 PSI AT 28-DAY CURE TIME.



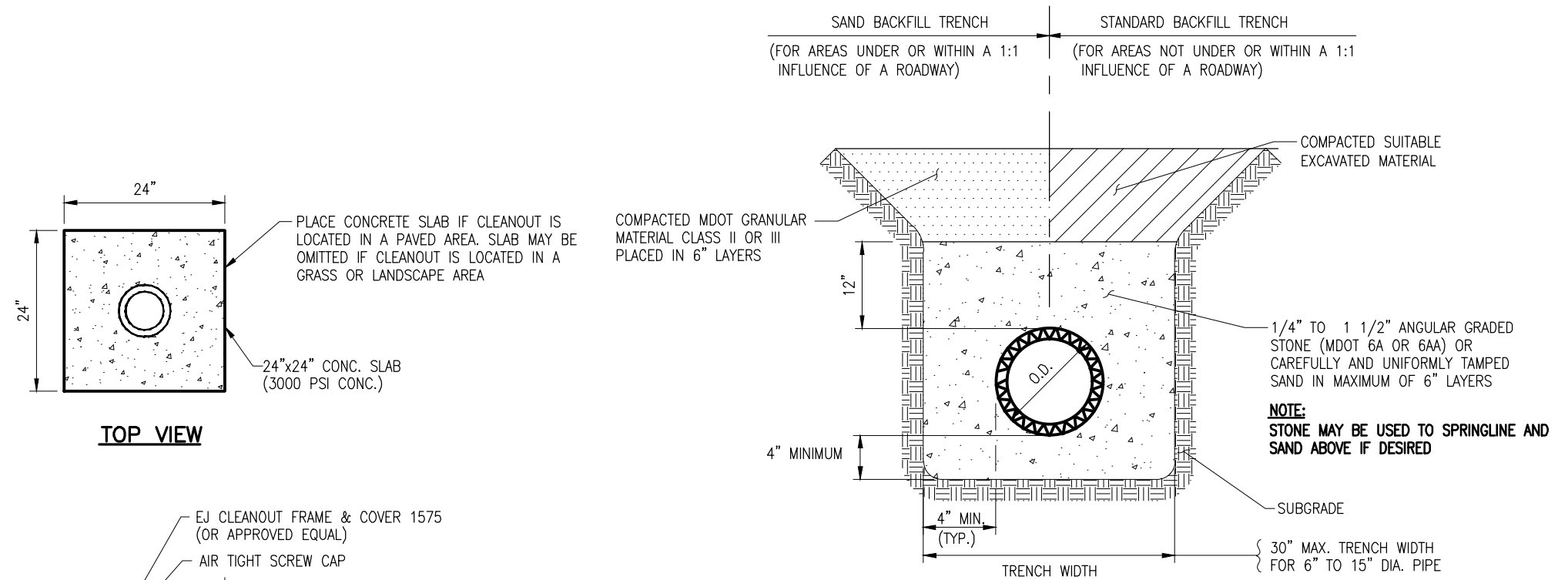
STANDARD CASING DETAIL



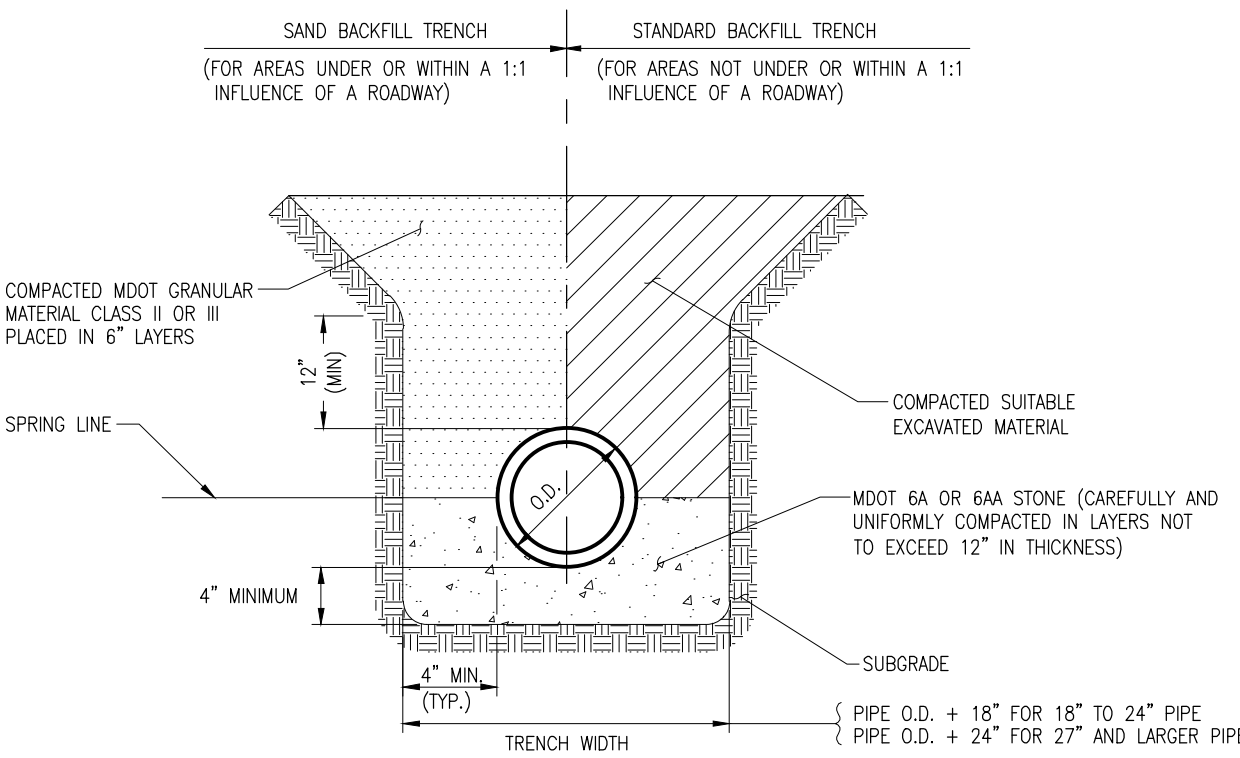
HOUSE LEAD DETAIL



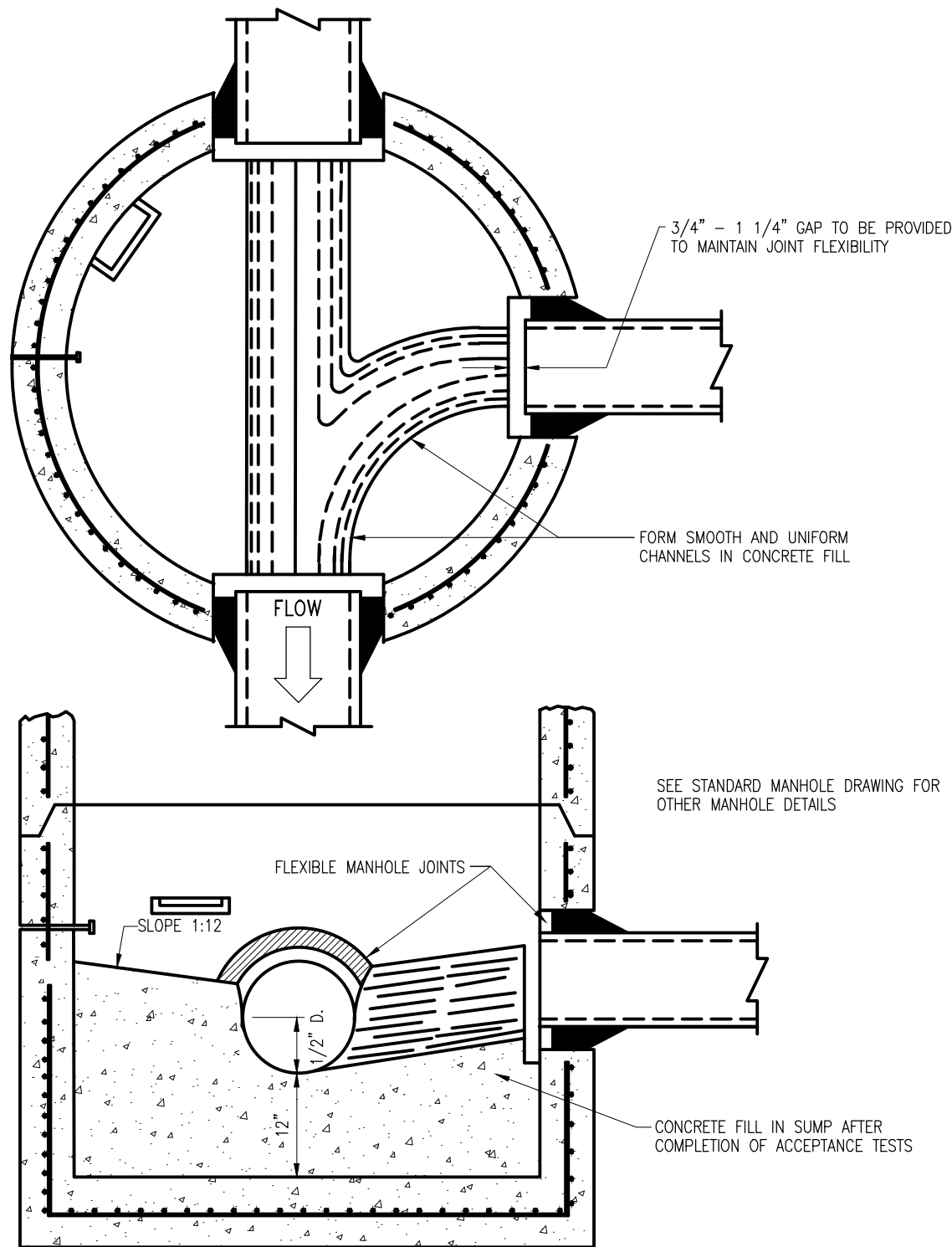
DETAIL OF SANITARY SEWER CLEANOUT



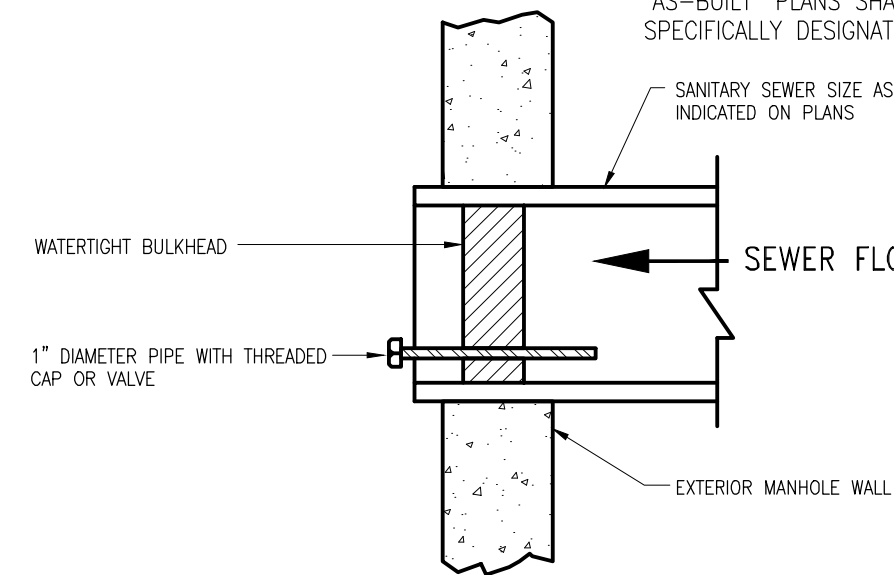
FLEXIBLE PIPE (10" OR 15" DIA ABS TRUSS OR PVC TRUSS) STANDARD BEDDING AND TRENCH BACKFILL DETAIL



RIGID PIPE (18" DIAMETER AND LARGER CONCRETE) STANDARD BEDDING AND TRENCH BACKFILL DETAIL



SUMP MANHOLE FOR TESTING, CLEANING & DEWATERING



AT ALL CONNECTIONS TO AN EXISTING SEWER OR EXTENSIONS THEREOF A WATERTIGHT BULKHEAD WITH A CAPPED 1 INCH DIAMETER PIPE TO PERMIT MEASURING INFILTRATION SHALL BE PROVIDED. A TEMPORARY 12 INCH DEEP SUMP SHALL ALSO BE PROVIDED IN THE FIRST MANHOLE UPSTREAM FROM THE CONNECTION WHICH WILL BE FILLED IN AFTER SUCCESSFUL COMPLETION OF ANY INFILTRATION TEST UP TO THE STANDARD FILLET PROVIDED FOR THE FLOW CHANNEL.

SPECIFICATIONS FOR SANITARY SEWERS

1. MATERIALS AND CERTIFICATIONS

PIPING SHALL BE POLYVINYL CHLORIDE (PVC) TRUSS PIPE AND FITTINGS PER CURRENT ASTM DESIGNATION D2680. PVC PIPE AND FITTINGS, CONFORMING TO REQUIREMENTS OF ASTM D3034, SDR 26, LATEST REVISION MAYBE USED FOR DEPTHS LESS THAN 15 FEET.

6" HOUSE CONNECTION SEWERS SHALL BE PVC SDR-26 PER ASTM D3034 OR PVC SCHEDULE 40 OR ABOVE CONFORMING TO THE CURRENT ASTM DESIGNATION D1785 STANDARD SPECIFICATION FOR POLYVINYL CHLORIDE (PVC) PLASTIC PIPE SCHEDULES 40, 80, AND 120. SOLID WALL PIPE SHALL BE INSTALLED IN ACCORDANCE WITH BEDDING REQUIREMENTS OUTLINED BELOW.

ALL PIPE SHALL BE CERTIFIED BY THE MANUFACTURER TO MEET THE APPLICABLE ASTM SPECIFICATION REQUIREMENTS. CERTIFICATION FORMS, TOGETHER WITH A REPORT OF THE TEST RESULTS, SHALL BE PROVIDED TO THE INSPECTOR WITH PIPE DELIVERIES AND COPIES SHALL BE FORWARDED TO THE ENGINEER OR THE OWNER. CERTIFICATION FORMS SHALL INCLUDE PROJECT NAME, LOCATION, CONTRACTOR, AND TEST LOT NUMBER. LOT TESTS SHALL BE ACCEPTABLE TO THE ENGINEER.

ALL PIPE AND FITTINGS SHALL BE SUITABLY MARKED TO PROVIDE MANUFACTURER'S NAME, EXTRUSION CODE (INCLUDING DATE AND LOCATION OF MANUFACTURE), ASTM DESIGNATION, TYPE OF PLASTIC, NOMINAL DIAMETER, AND SDR NUMBER, WHERE APPLICABLE. FITTINGS HOWEVER, NEED NOT CONTAIN THE EXTRUSION CODE. PIPE SHALL HAVE A "HOME" MARK. TRUSS PIPE WITH AN ABSENCE OF FILLER MATERIAL AT THE ENDS GREATER THAN 1/4" DEEP SHALL BE SUBJECT TO REJECTION OR ACCEPTABLE REPAIR.

2. BEDDING

BEDDING FOR TRUSS PIPE AND PVC SOLID WALL PIPE SHALL BE IN ACCORDANCE WITH THE CURRENT ASTM DESIGNATION D2321 AND AS SHOWN IN THE STANDARD BEDDING DETAILS EXCEPT THAT FLOODING OR PUDDLING SHALL NOT BE USED. THE USE OF FLEXIBLE AND SEMI-FLEXIBLE PIPE REQUIRES THAT THE BEDDING PROVIDE UNYIELDING SIDE SUPPORT AND COMPLETE CONTACT UNDER PIPE HAUNCHES. BEDDING MATERIAL MUST BE PROPERLY PLACED AND COMPACTED TO PROVIDE LATERAL RESTRAINT AGAINST DEFLECTION IN THE PIPE DIAMETER. PIPE MUST BE BEDDED TO THE TRUE LINE AND GRADE THROUGHOUT ITS LENGTH. BELL HOLES SHALL BE PROVIDED WHERE REQUIRED. BEDDING FOR RIGID PIPE SHALL BE IN ACCORDANCE WITH ASTM DESIGNATION C12.

WHERE UNSTABLE BOTTOMS ARE ENCOUNTERED, THE CONTRACTOR SHALL PROVIDE A FOUNDATION CONSISTING OF AN APPROVED GRADED AND PROCESSED ANGULAR STONE OR GRAVEL TO ACT AS AN IMPERVIOUS MAT TO PREVENT MIGRATION OR VERTICAL MOVEMENT OF UNSTABLE SOILS OR BEDDING MATERIALS. WHERE TRENCH SHEETING, PLATES, OR A TRENCH BOX ARE USED DUE TO SEVERE GROUND CONDITIONS, ALL VOIDS TO THE SIDE AND BELOW THE TOP OF THE PIPE CAUSED BY THE SHEETING, PLATES, OR BOX WITHDRAWAL SHALL BE COMPLETELY FILLED OR THE SUPPORTS LEFT IN PLACE BELOW THE TOP OF THE PIPE.

CONCRETE CRADLE BEDDING SHALL NOT BE USED WHERE ALLOWABLE TRENCH WIDTHS ARE EXCEEDED. IN LIEU OF CONCRETE CRADLE BEDDING, STANDARD PIPE BEDDING SHOWN SHALL BE PROVIDED TO THE FULL WIDTH BETWEEN UNDISTURBED TRENCH WALLS OR AT LEAST 2.5 PIPE DIAMETERS ON BOTH SIDES OF THE PIPE.

DUE TO POTENTIAL DAMAGE TO EXTERIOR WALLS OF TRUSS PIPE IF ROCKS, FROZEN MATERIALS, OR LARGE OBJECTS STRIKE THE PIPE, THE CONTRACTOR SHALL CAREFULLY AVOID DUMPING ANY MATERIALS OTHER THAN APPROVED BEDDING SAND OR STONE ON THE PIPE UNTIL 24" COVER IS PLACED ON IT, PARTICULARLY UNDER COLD WEATHER CONDITIONS. PIPE WALLS AND ENDS SHALL ALSO BE PROTECTED FROM ABRASION AND DAMAGE DURING HANDLING, AND SHALL BE FULLY INSPECTED JUST PRIOR TO PLACING IN THE TRENCH.

CARE SHALL BE TAKEN DURING BEDDING COMPACTION TO AVOID DISTORTING THE SHAPE OF THE PIPE OR DAMAGING ITS EXTERIOR WALL. MOBILE EQUIPMENT SHALL NOT BE USED OVER THE PIPE TRENCH UNTIL 48" OF COVER HAS BEEN PLACED.

FIELD TAPS OF EXISTING SANITARY SEWERS SHALL BE MADE BY INSTALLING A WYE FITTING FOR A HOUSE LEAD CONNECTION. FERNCO FITTINGS WITH STAINLESS STEEL BANDS SHALL BE USED TO SECURE THE WYE FITTING TO THE SANITARY SEWER PIPE. BEDDING FOR HOUSE CONNECTION SEWERS SHALL BE EQUAL TO THAT OF THE MAIN SEWER BEDDING. RISERS IN DEEP AND UNSTABLE TRENCHES SHOULD BE BEDDED IN 6A OR 6AA ANGULAR STONE TO AVOID SETTLEMENT. CONCRETE SHALL NOT BE USED FOR BEDDING. END CAPS OR PLUGS SHALL BE BRACED OR ANCHORED TO WITHSTAND AIR TEST PRESSURES. CAPS OR PLUGS SHALL NOT BE CHEMICALLY WELDED IN PLACE.

3. BACKFILL

BACKFILL SHALL BE COMPACTED ABOVE PIPE OR AS INDICATED ON CONSTRUCTION DRAWINGS. TRENCH BACKFILL SHALL BE A SUITABLE MATERIAL AND SHALL BE FREE OF ANY ORGANIC MATERIALS AND LARGE ROCKS. UNDER ROAD SURFACES, PAVEMENT, SIDEWALKS, CURBS, DRIVEWAYS AND AREAS WHERE TRENCH IS WITHIN A 1:1 INFLUENCE OF THE PAVEMENT, SAND BACKFILL SHALL BE USED WHICH SHALL CONSIST OF MDOT GRANULAR MATERIAL CLASS II OR III COMPACTED IN LAYERS NOT TO EXCEED 12" IN THICKNESS TO A DENSITY OF 95% AS DETERMINED BY AASHTO T99. ALL BACKFILL PLACED WITHIN 3' OF STRUCTURES SHALL BE APPROVED SAND, PLACED IN 1' LAYERS AND COMPACTED. TRENCHES WHICH ARE TO BE LEFT OPEN OVERNIGHT SHALL BE ENCLOSED WITH SUITABLE FENCING AND LIGHTED BARRICADES, UNLESS OTHERWISE APPROVED BY THE CITY.

4. CHEMICALLY WELDED JOINTS

JOINTS FOR TRUSS PIPE SHALL BE CHEMICALLY WELDED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION AND THE CURRENT ASTM DESIGNATIONS D2680 AND D2235. ADDITIONALLY, ALL EXPOSED ENDS OF TRUSS PIPE SHALL BE FULLY AND THOROUGHLY COATED WITH PLASTIC JOINTING CEMENT PRIOR TO MAKING JOINTS SO AS TO SEAL ENDS AND ELIMINATE THE POSSIBILITY OF FALSE LOW PRESSURE AIR TESTS. CARE SHALL BE TAKEN TO INSURE ALL JOINTS ARE PUSHED TO THE FULL "HOME" POSITION AND HELD TIGHTLY IN THE "HOME" POSITION DURING ANY GRADE OR LINE ADJUSTMENTS. PIPE SHALL BE ROTATED DURING JOINT INSERTION TO INSURE A COMPLETE SPREAD OF JOINTING CEMENT. LABELED CONTAINERS "JOHNNY MOPS" OR SIMILAR SWAB TYPE APPLICATORS SHALL BE USED TO APPLY PRIMER AND CEMENT. OPENED CONTAINERS IN THE TRENCH SHALL BE PROTECTED FROM DIRT, WATER, AND OTHER CONTAMINANTS.

5. ELASTOMERIC GASKET JOINTS

JOINTS FOR PVC TRUSS PIPE AND PVC SOLID WALL FITTINGS SHALL BE OF THE ELASTOMERIC GASKET PUSH-ON TYPE. SUCH JOINTS SHALL CONFORM TO THE CURRENT ASTM DESIGNATION D3212 AND THE PIPE MANUFACTURER SHALL FILE WITH THE CITY OF ROMULUS A COPY OF CERTIFIED TEST RESULTS OF ITS JOINTING SYSTEM PRIOR TO USE. GASKET JOINTS SHALL BE INSTALLED IN ACCORDANCE WITH PROCEDURES SPECIFIED BY THE PIPE MANUFACTURER, SUCH THAT THE GASKET WILL BE COMPRESSED (NOT DISPLACED) IN THE JOINT TO FORM A POSITIVE SEAL. CARE SHALL BE TAKEN TO INSURE ALL JOINTS BE PUSHED TO THE FULL "HOME" POSITION AND HELD TOGETHER IN THE "HOME" POSITION DURING ANY GRADE OR LINE ADJUSTMENTS.

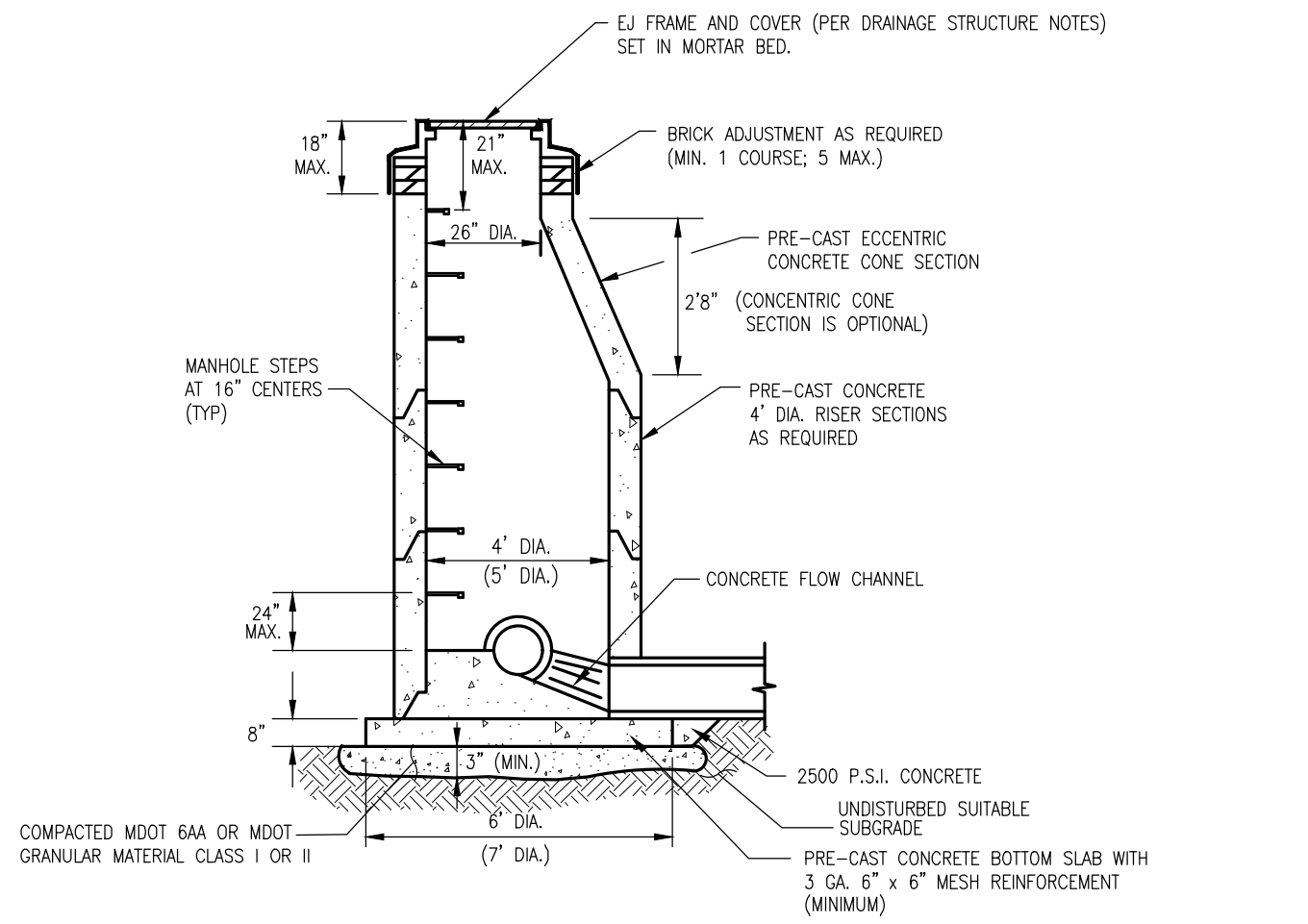
CUTTING AND HANDLING

6. CUTTING OF PIPE LENGTHS, WHERE REQUIRED, SHALL BE PERFORMED WITH TOOLS OR EQUIPMENT THAT WILL PROVIDE A NEAT, PERPENDICULAR CUT WITHOUT DAMAGE TO THE PLASTIC OR THE FILLER MATERIAL. BOWING OR WARPING OF TRUSS PIPE CAN OCCUR WITH TEMPERATURE FLUCTUATIONS. THE CONTRACTOR SHALL STORE AND PROTECT THE PIPE TO MINIMIZE BOWING. NOMINAL 12"6" OR LONGER PIPE LENGTHS HAVING DEVIATIONS FROM STRAIGHT GREATER THAN 1", AS MEASURED ALONG A STRAIGHT LINE, SHALL NOT BE USED.

7. SPECIAL CONDITIONS

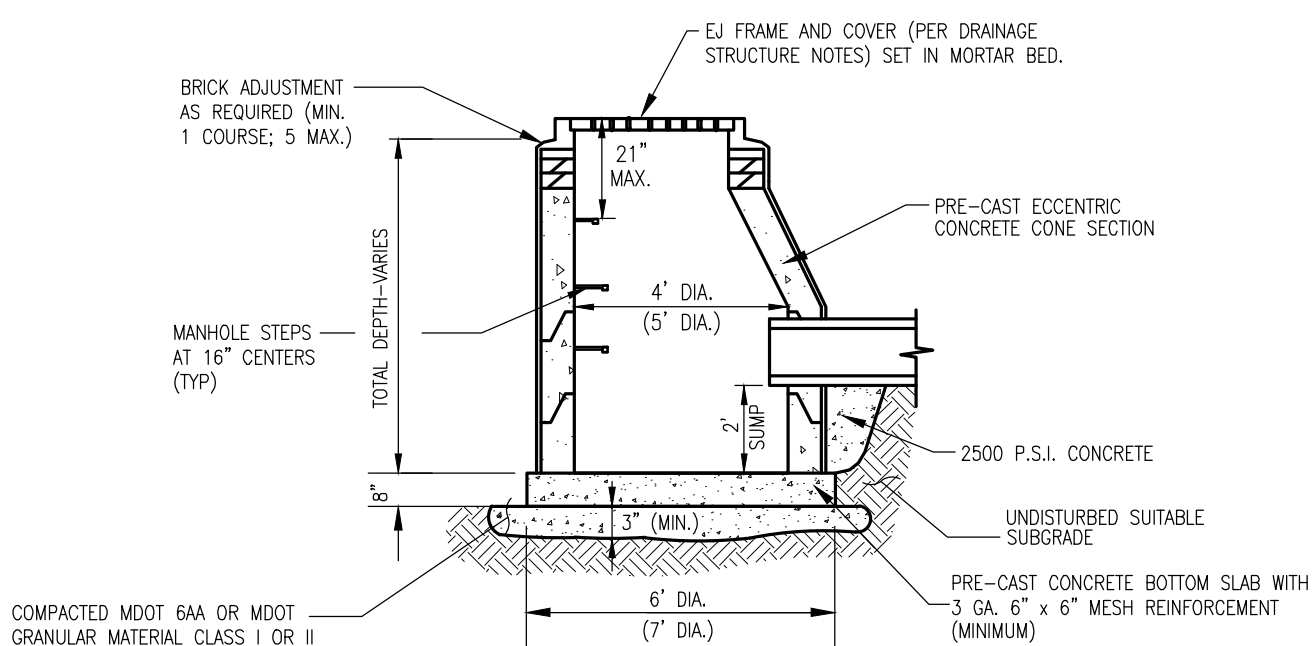
TO MAINTAIN THE FLEXIBILITY OF THE PIPE MATERIALS, CONCRETE ENCASEMENT OF DROP CONNECTIONS SHALL NOT BE USED. DROP CONNECTIONS SHALL BE ENCASED IN ANGULAR GRADED STONE (MDOT 21A, 21AA, 6A, OR 22A). WHERE ADAPTERS TO OTHER MATERIALS ARE REQUIRED, ONLY APPROVED ADAPTERS AND JOINTS MAY BE USED. WHERE THE CONNECTIONS ARE MADE TO EXISTING MANHOLES, A RUBBER WATERSTOP SHALL BE USED AROUND THE PIPE.

"AS-BUILT" PLANS SHALL BE PROVIDED TO THE CITY OF ROMULUS BY THE ENGINEER AND "AS-BUILT" PLANS SHALL SPECIFICALLY DESIGNATE WHERE ABS TRUSS OR PVC TRUSS SEWER PIPE WAS INSTALLED.

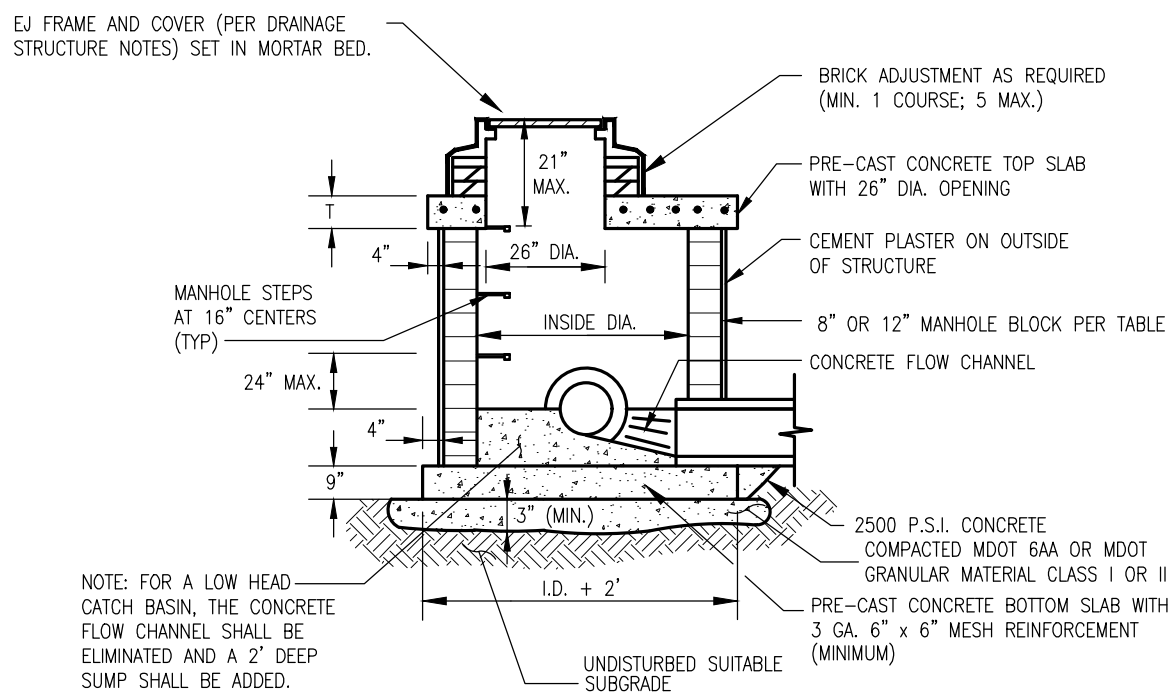


PRE-CAST MANHOLE

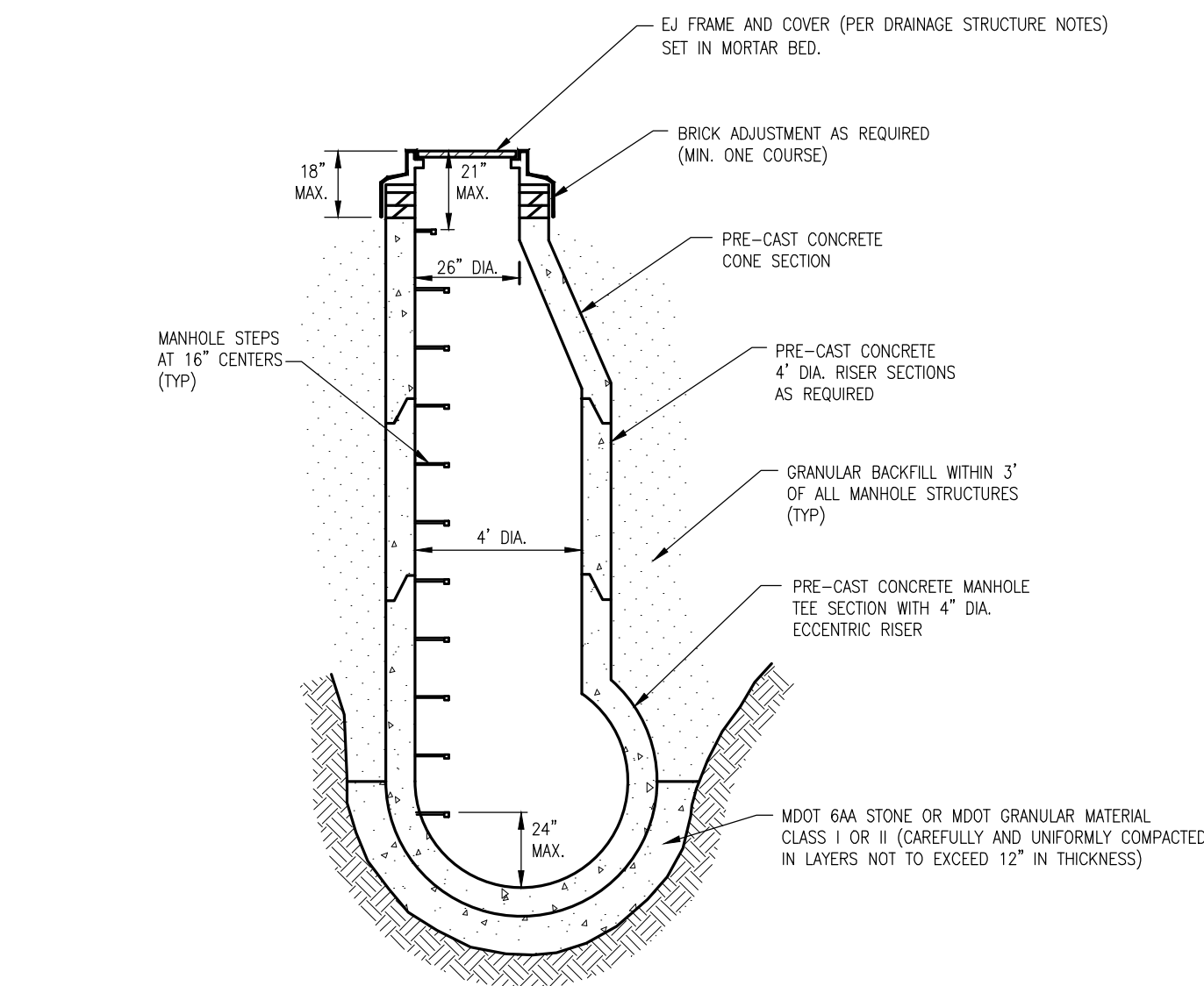
NOTE: FOR PRE-CAST MANHOLES WITH AN OUTLET SEWER OF 24" DIAMETER OR SMALLER, THE CONCRETE FLOW CHANNEL SHALL BE OMITTED AND A 2" DEEP SUMP SHALL BE ADDED.



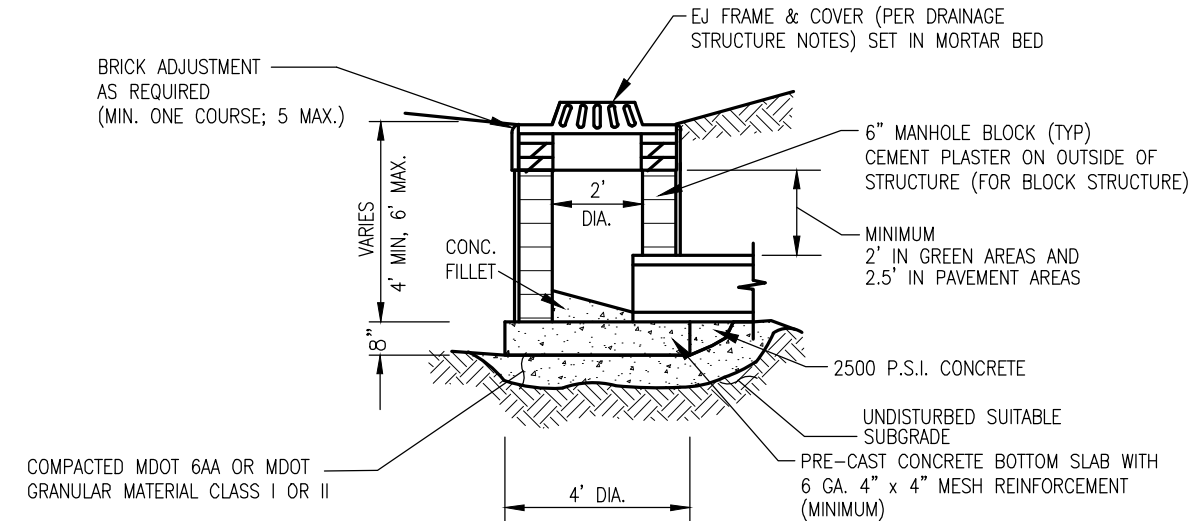
PRECAST CATCH BASIN



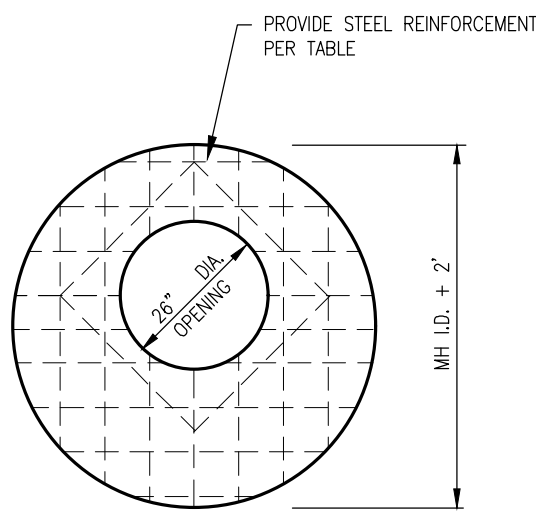
PROFILE VIEW



PRE-CAST TEE MANHOLE DETAIL



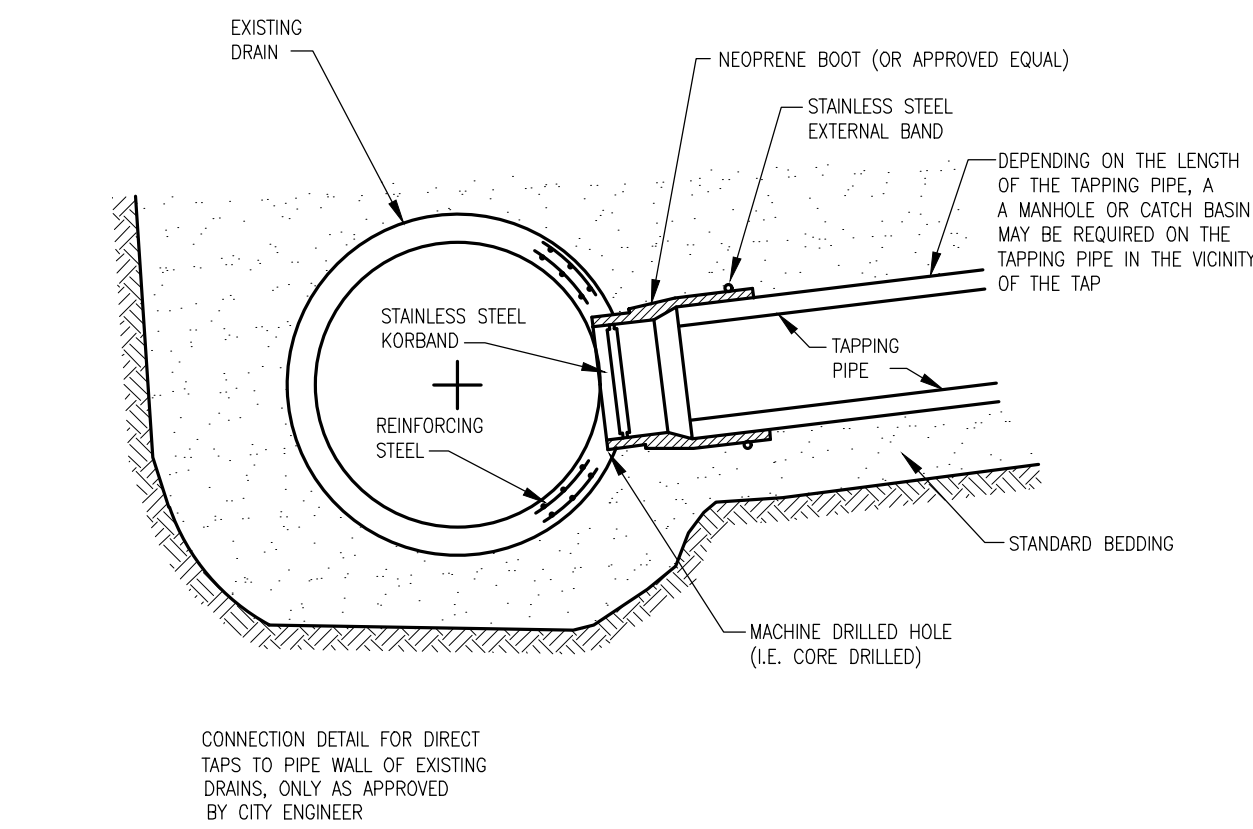
2' DIA. INLET DETAIL



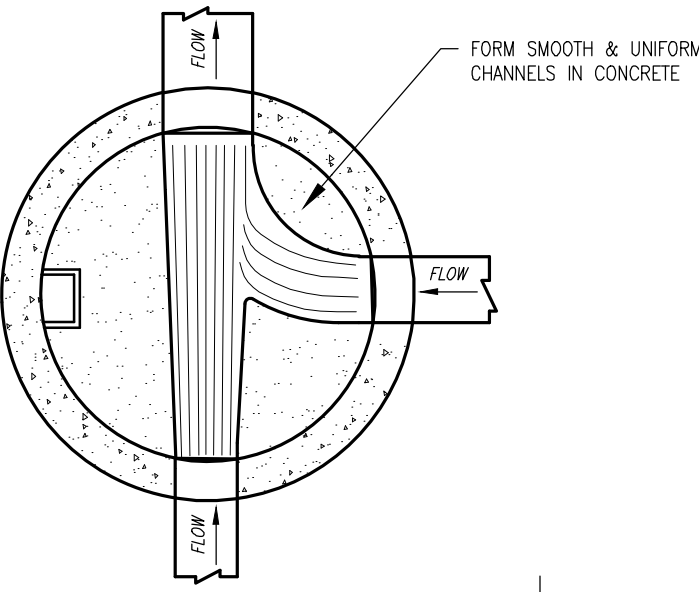
PRE-CAST CONCRETE TOP SLAB DETAIL

OUTLET PIPE DIA.	M.H. I.D.	TOP SLAB "I"	MH BLOCK	TOP SLAB
** 24" OR LESS	4'	9"	8"	#6 @ 9" EA. WAY
30"	4'	9"	8"	#6 @ 9" EA. WAY
36"	4'	9"	12"	#6 @ 9" EA. WAY
42"	5'	10"	12"	#6 @ 9" EA. WAY
48"	6'	11"	12"	#7 @ 9" EA. WAY
54"	7'	12"	12"	#7 @ 9" EA. WAY
60"	8'	12"	12"	#8 @ 9" EA. WAY

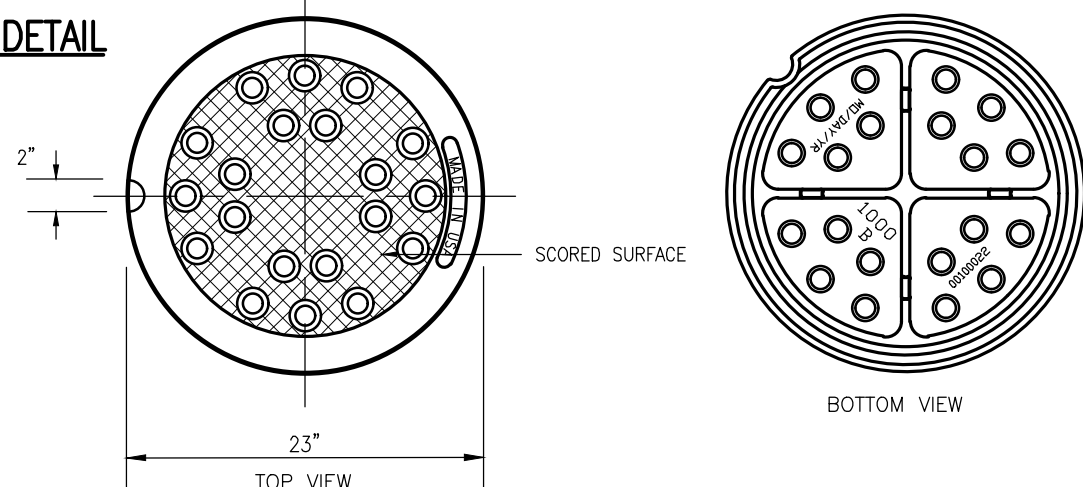
STEEL REINFORCEMENT TABLE



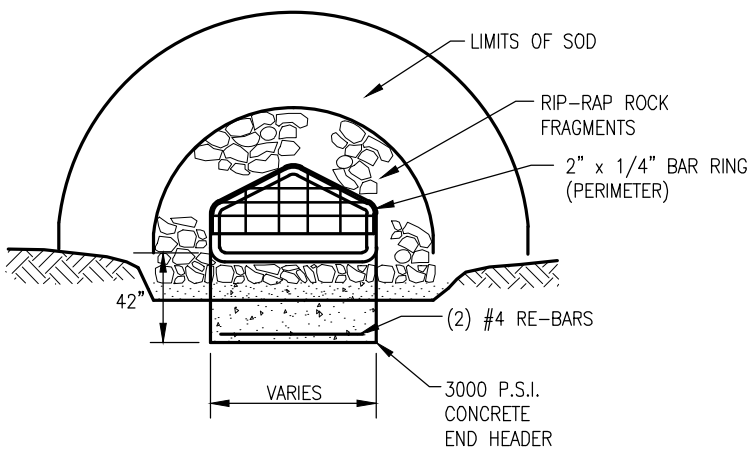
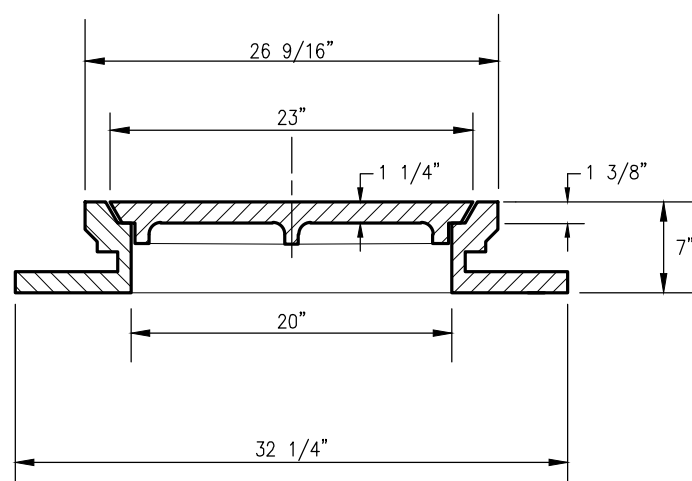
KOR-N-TEE TAP FOR CONCRETE PIPE



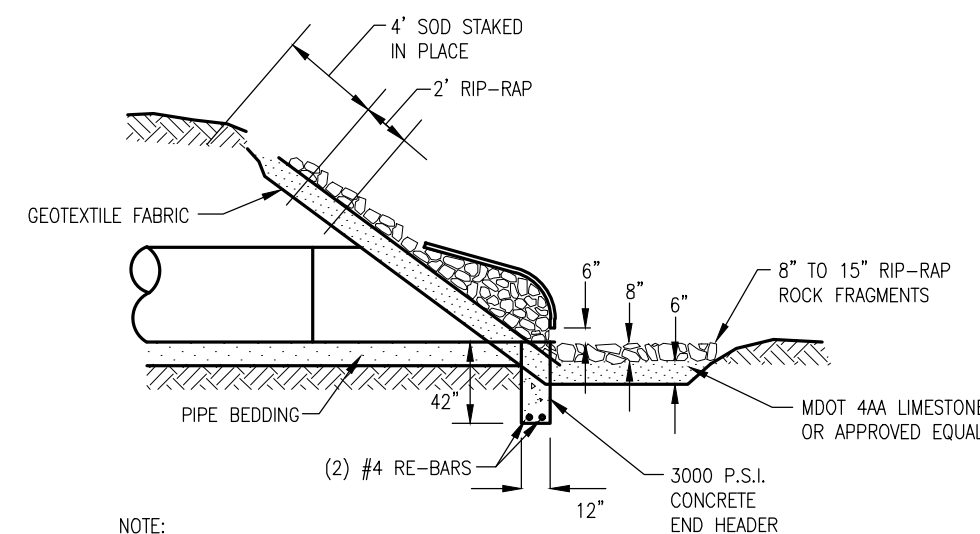
CHANNEL DETAIL



CAST IRON MANHOLE COVER EJ 1010 FRAME AND TYPE B PERFORATED COVER



END VIEW



PROFILE VIEW

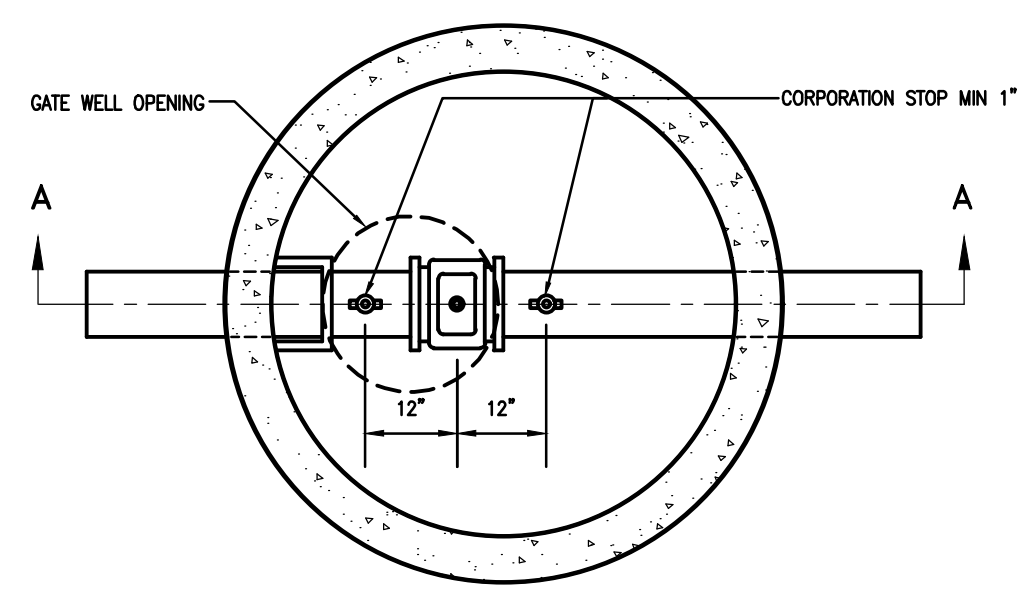
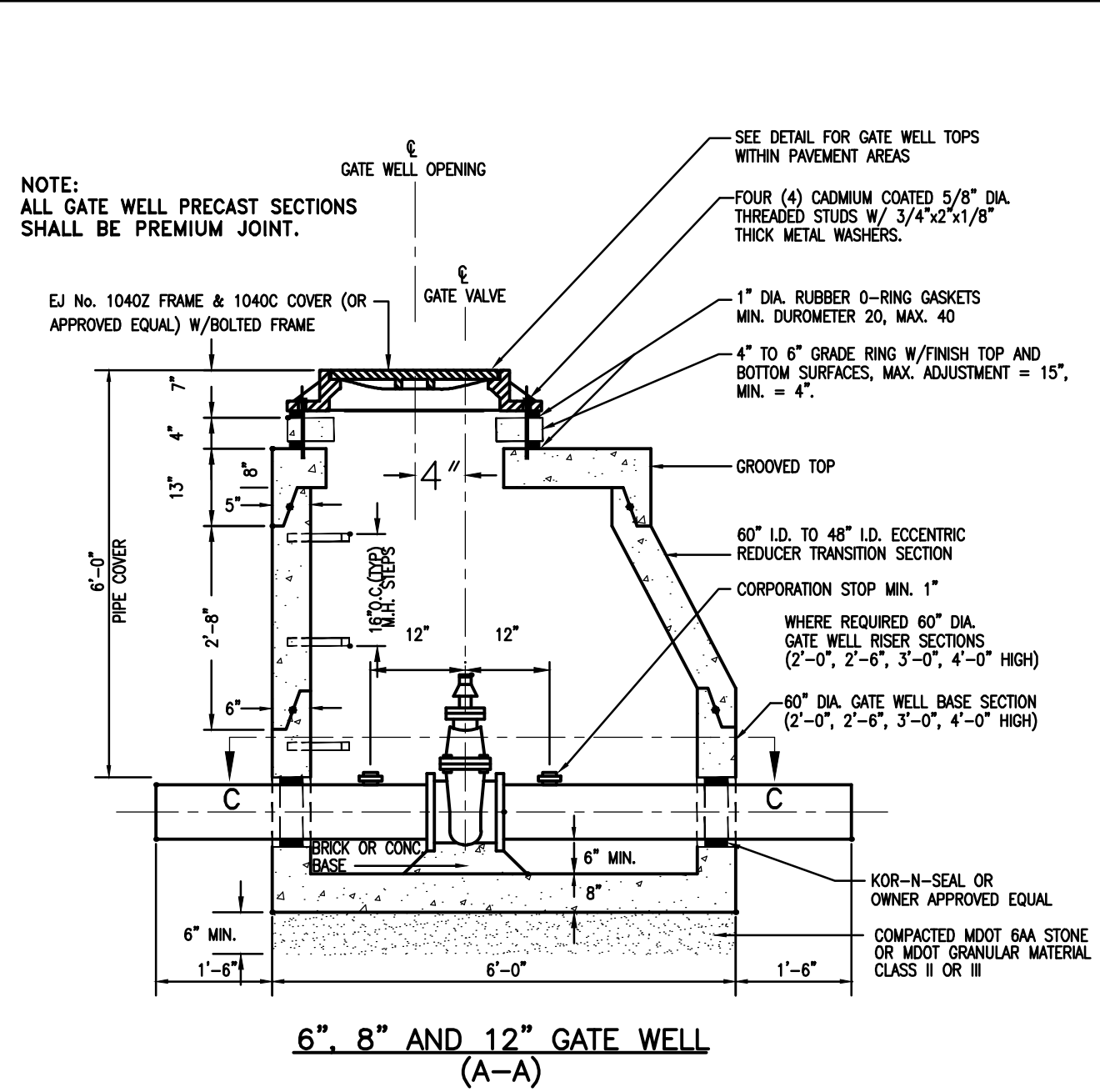
END SECTION AND BAR SCREEN DETAIL 18" & LARGER

GENERAL NOTES FOR STORM SEWER CONSTRUCTION

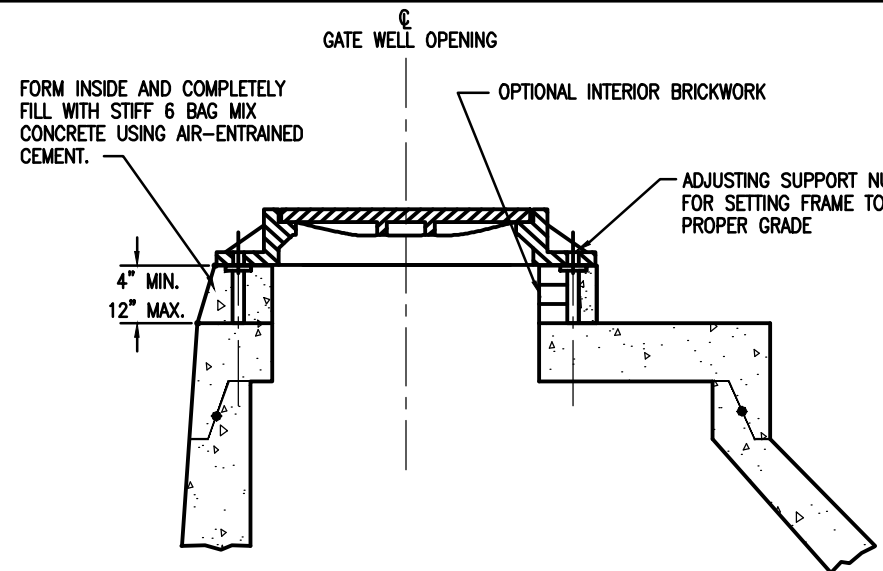
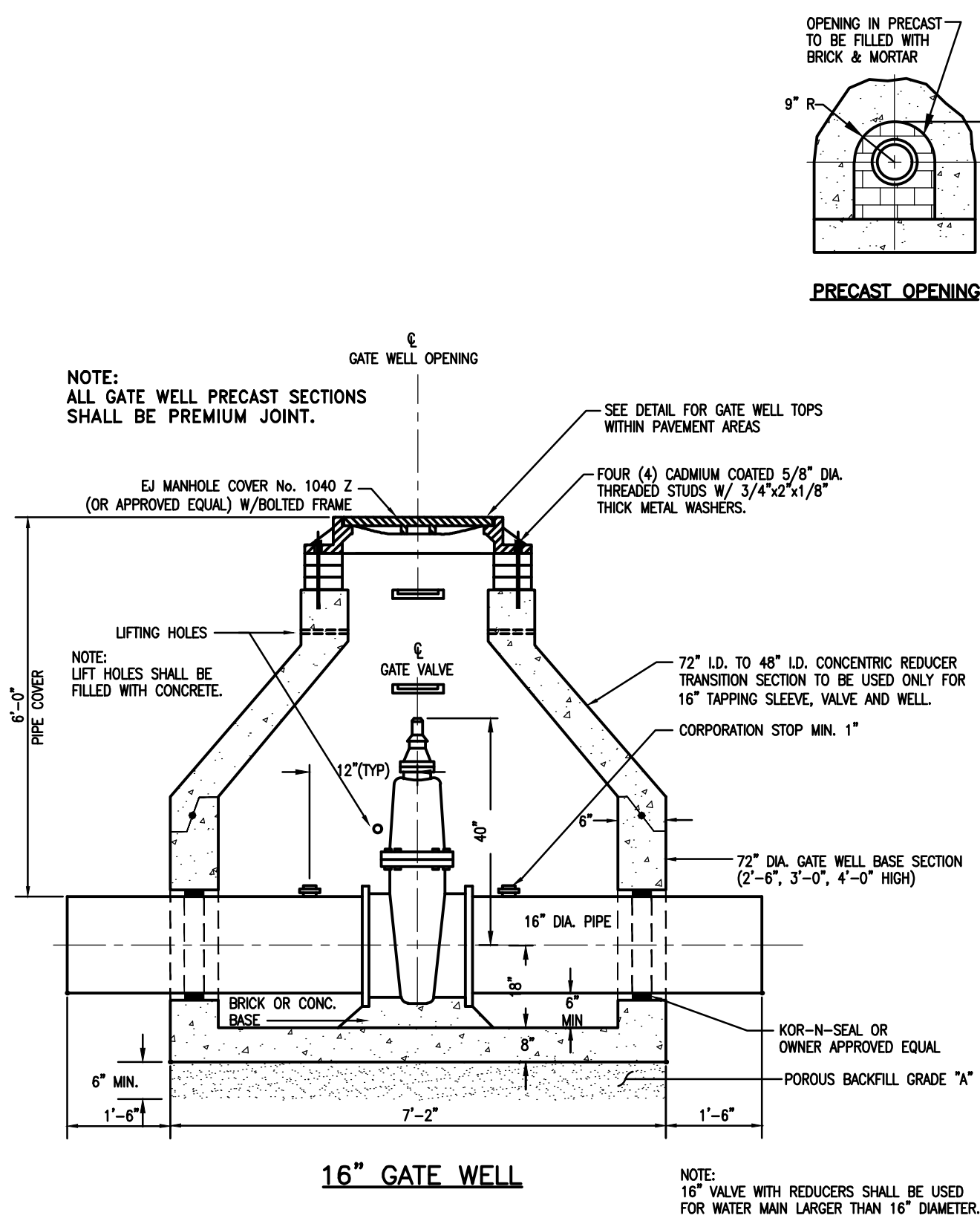
- All materials and workmanship shall be in accordance with the standards and specifications of the City of Romulus.
 - Type and class of pipe shall be as specified on plans.
 - Bedding shall be used as called for on the details.
 - All end sections 18" and larger shall be provided with a galvanized bar screen.
- Contractor shall construct manholes with precast reinforced concrete in lieu of concrete, brick and block manholes in accordance with the following conditions:
 - No openings shall be made in precast units which would leave less than 12" of undisturbed precast structure wall between pipes (as measured between outside pipe walls) or would remove more than 40% of the circumference along any horizontal plane.
 - Structures for sewers larger than 18", or those not meeting the opening requirements, may be built of block or brick up to a minimum of 8" above the top of sewer, with precast units being used above this point. Where precast units rest on the block or brick, the groove in the precast unit shall be filled with mortar.
 - Openings for the outlet sewer shall be precast with a diameter of 3 inches larger than the outside diameter of the outlet pipe. All other openings shall be made in the field after the manhole has been constructed.
- All vertical openings in concrete block structure walls shall be completely filled with mortar. All vertical wall joints shall be cement pointed.
- Concrete pipe requirements:
 - The contractor shall provide reinforced concrete pipe as specified on the plans.
 - All round reinforced concrete pipe shall meet the requirements of ASTM C76 with modified grooved tongue and rubber gasket meeting the requirements of ASTM C443.
 - Where unstable ground conditions are encountered, stone bedding shall be used as directed by the Engineer in order to provide a stable foundation for pipe and manholes.
 - All pipes entering or leaving a manhole shall be adequately supported by pouring 250 psi concrete fill from undisturbed earth to springline or with approved crushed aggregate.
- Pipe bedding and backfilling:
 - Bedding shall extend a minimum of 4" below pipe, unless otherwise noted on construction plans. Bedding shall be uniform in gradation. However, if the existing native soils meet the requirements for MDOT granular material Class II (minimum 4" thick), then the storm sewer may be laid directly on the compacted native subgrade soils.
 - Backfill shall be compacted above pipe or as indicated on construction drawings. Trench backfill shall be of a suitable material and shall be free of any organic materials and rocks larger than 3" in size. Backfill shall be ramped into trench and compacted with a small dozer or other approved methods. Where trench is within a 1:1 influence of streets, alleys, sidewalks, driveways and parking areas, sand backfill shall be used which shall consist of MDOT granular material Class II or III compacted in layers not to exceed 12" in thickness to a density of 95% as determined by AASHTO T99. A minimum of 12" of MDOT granular material Class II is required above the pipe. All backfill placed within a 1:1 influence of structures shall be approved sand, placed in 1' layers and compacted. No frozen material shall be buried more than 4' below the final elevation of the ground.
 - Trenches which are to be left open overnight shall be enclosed with suitable fencing and lighted barricades, unless otherwise approved by the City.
- Sump pump lead requirements:
 - Sump pump leads shall be minimum 4" SDR 35, non-perforated, solid wall, PVC, ARMC0 Truss Pipe, or approved equal, with premium joints.
 - Sump collection system pipes shall be connected at drainage structures. However, if approved by the engineer, taps to 12" storm sewer may be made with a Fernco E2 Tap or approved equal. Taps to other size storm sewer may be made with a Romac saddle, KOR-N-TEE lateral connector for concrete pipe, or approved equal.
 - All sump pump leads shall be taken to the property line, easement line or as indicated on the plan.
 - Sump pump cleanouts shall be a minimum inside diameter of 24" and be constructed at changes of alignment, ends of sump pump mains or as indicated on the plan.
- A Digital Recording (with log) shall be submitted to and approved by the City of Romulus prior to final public sewer acceptance. Said Digital Recording shall be performed a minimum of 30 days after construction is completed. If the pipe fails Digital Recording review, the contractor shall fix or repair the nonconformity at his cost. The contractor shall then re-televis the sewer at his cost until final acceptance of the sewer is achieved.

DRAINAGE STRUCTURE REQUIREMENTS:

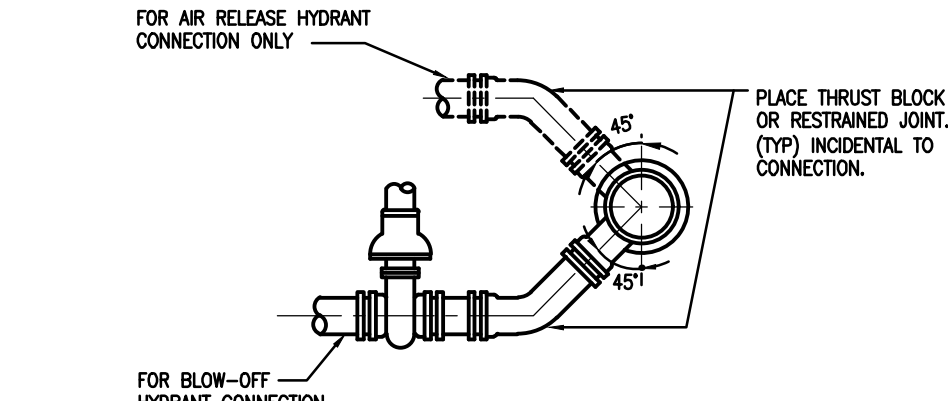
- All manholes and catch basins shall be 4' or 5' in diameter unless otherwise indicated on construction drawings. Larger diameter drainage structures (6', 7', 8', 10', 12' diameter) may be needed for large storm sewer pipe or for situations where the angles between entering pipes require a larger diameter structure in order to maintain at least 1' of structure wall between the pipes. 2' diameter inlets may be used where approved by the City Engineer.
- Manhole and catch basin steps shall be steel, encased with polypropylene plastic or approved equivalent. Acceptable steps include M.A. Industries, Inc., PS2-PFS or approved equal. Manhole steps shall be set at 16" centers.
- Manhole frame and cover shall be EJ 1010, type "B" perforated cover or as per construction drawings.
- Catch Basin and inlet frame and cover shall be:
 - EJ 5080Z, type "M1" sinusoidal cover for areas with straight face or integral curb and gutter.
 - EJ 1000, type "M1" cover for low points in paved parking areas.
 - EJ 1000, type "M1" cover to be used in open ditches and swales.
- Manhole and Catch Basin Frames shall be set in full bed of mortar and the side shall be overlapped to prevent leakage.
- Each frame and cover assembly shall have "NO DUMPING - DRAINS TO RIVER" forged in at least one visible location.
- A proper channel shall be constructed within the existing manhole or other structure at which the connection is to be made in order to direct the flow to the existing outlet in a manner which will tend to create the least amount of turbulence. The channel shall be constructed to the same size as the inside diameter of the existing pipes, and shall be built to height of 1/3 the existing pipe diameter with a minimum of 2% slope on the benches.
- Standard Brick Adjustment: minimum of 3 courses and a maximum of 6 courses of brick.
 - All bricks and blocks used for adjustment shall be concrete.
 - Block used for standard catch basins and manholes shall be 8" (for 0'-15' deep) and 12" (for 15'-25' deep). Block used for 2' diameter inlets and catch basins shall be 6".
 - Precast reinforced concrete section as minimum shall conform to ASTM C-478.
 - Concrete base for manhole, catch basin, and inlet shall be MDOT grade 30P (Min.), 8" thick, 3000 psi.
- Plaster all outside masonry surfaces with 1:2 1/2 masonry cement (type II) 1/2" thick.
- When tapping into an existing structure, a brick collar shall be placed 12" thick around the pipe and extended 12" beyond the opening. If pre-cast section is tapped, bend mesh and use as reinforcement with brick collar.
- All precast riser(s) shall be placed in a full bed or mortar. All joints & liftholes shall be pointed up with mortar on the outside and inside.
- Hinged bar grates will be required for headwalls per MDOT standards.
 - All vertical and horizontal bars shall be tack-welded to the angle frame.
 - The bar grate screen shall be hot-dipped galvanized after fabrication is complete.

[illegible]

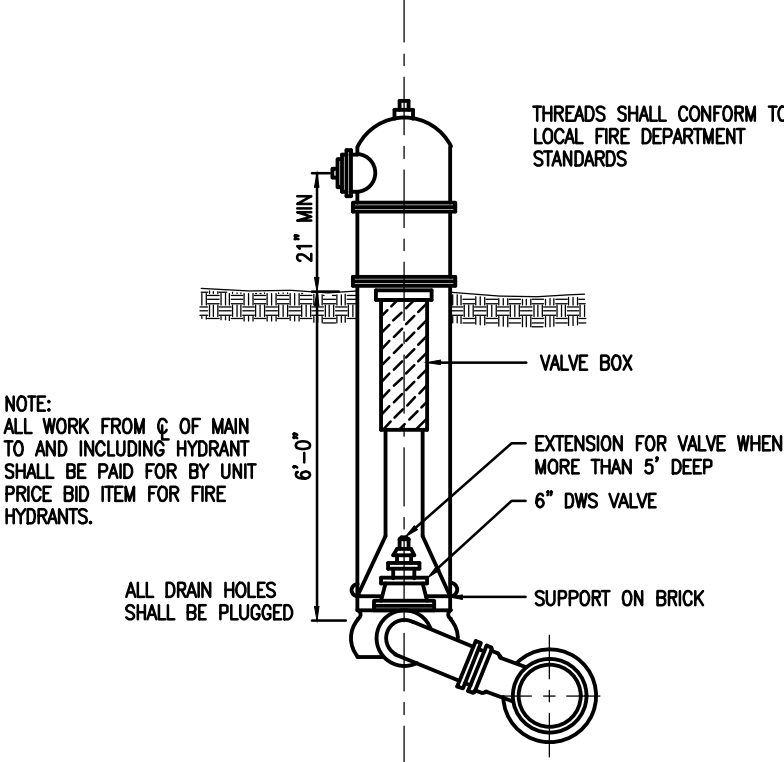
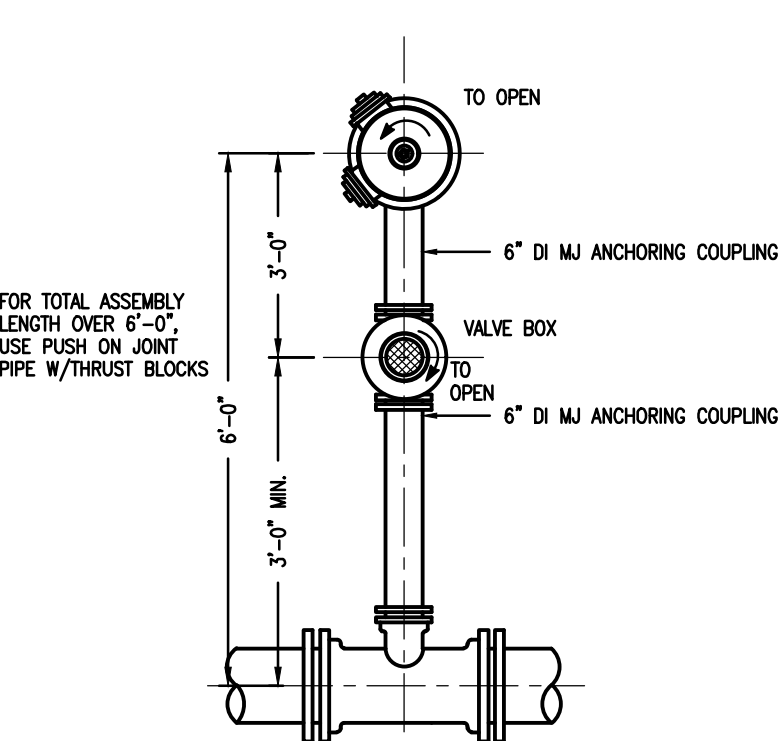
6", 8" AND 12" GATE WELL TYPICAL
(PLAN VIEW, C-C)



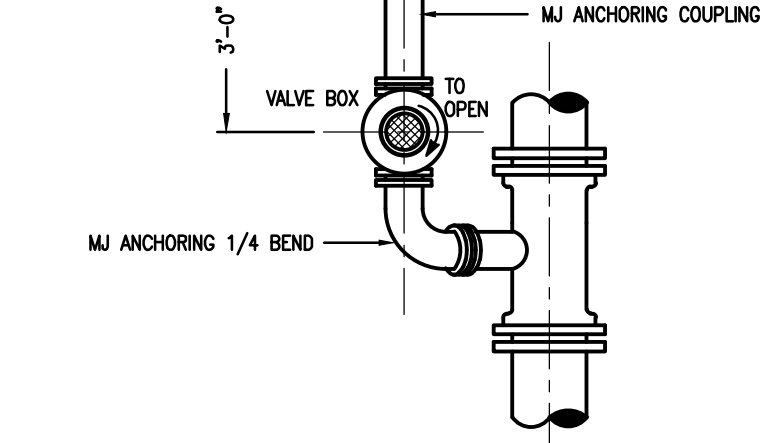
GATE WELL TOPS WITHIN PAVEMENT AREAS



AIR RELEASE AND BLOW-OFF CONNECTION

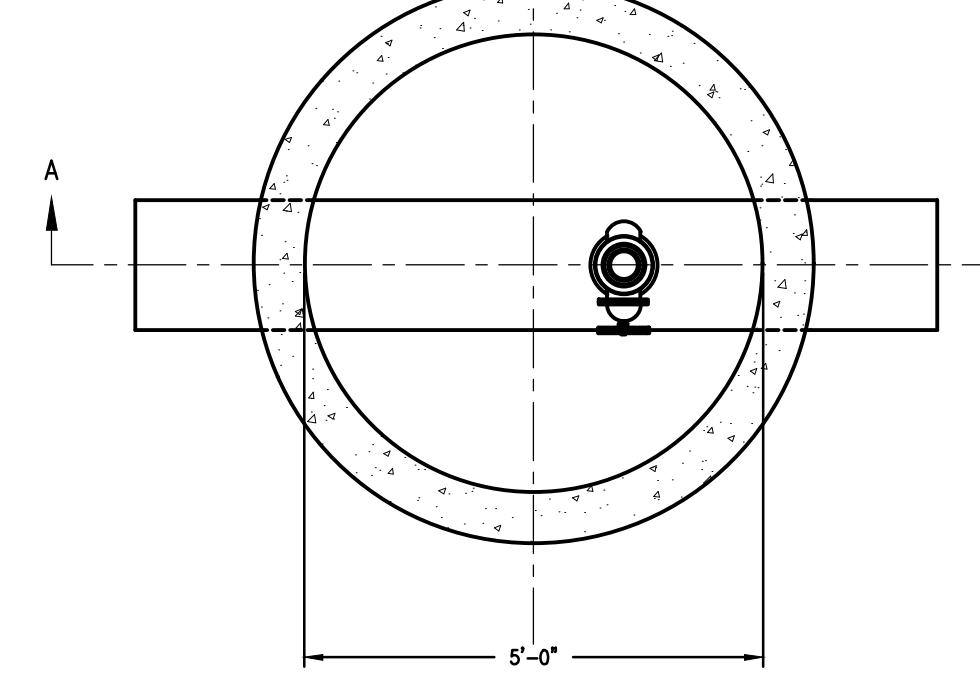
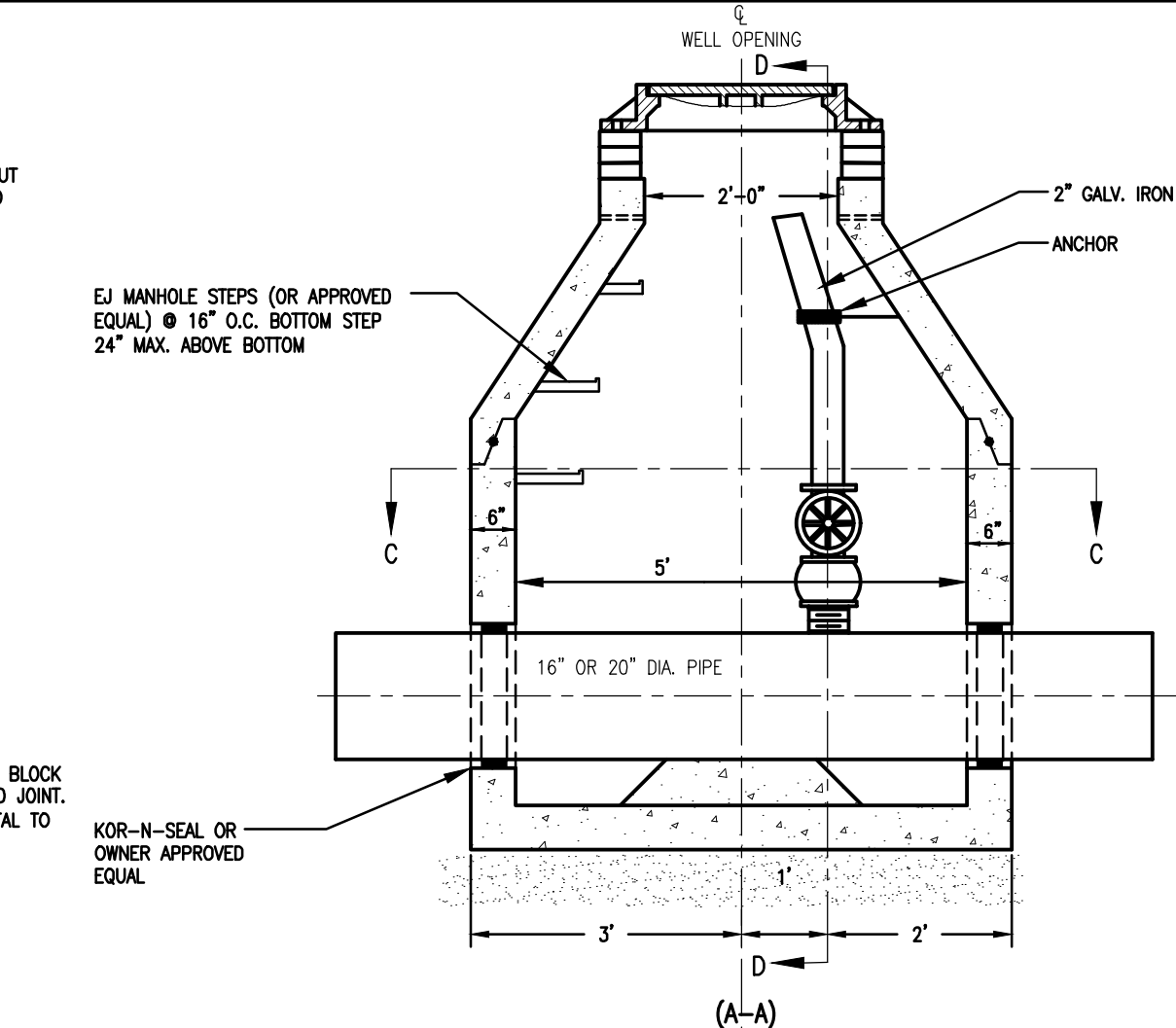


EJ MODEL 5-BR 250



NOTE:
MECHANICAL JOINT (MJ) FITTINGS FOR ALL HYDRANT
INSTALLATIONS SHALL BE "SWIVEL" FITTINGS AS
MANUFACTURED BY TYLER PIPE, OR APPROVED EQUAL.

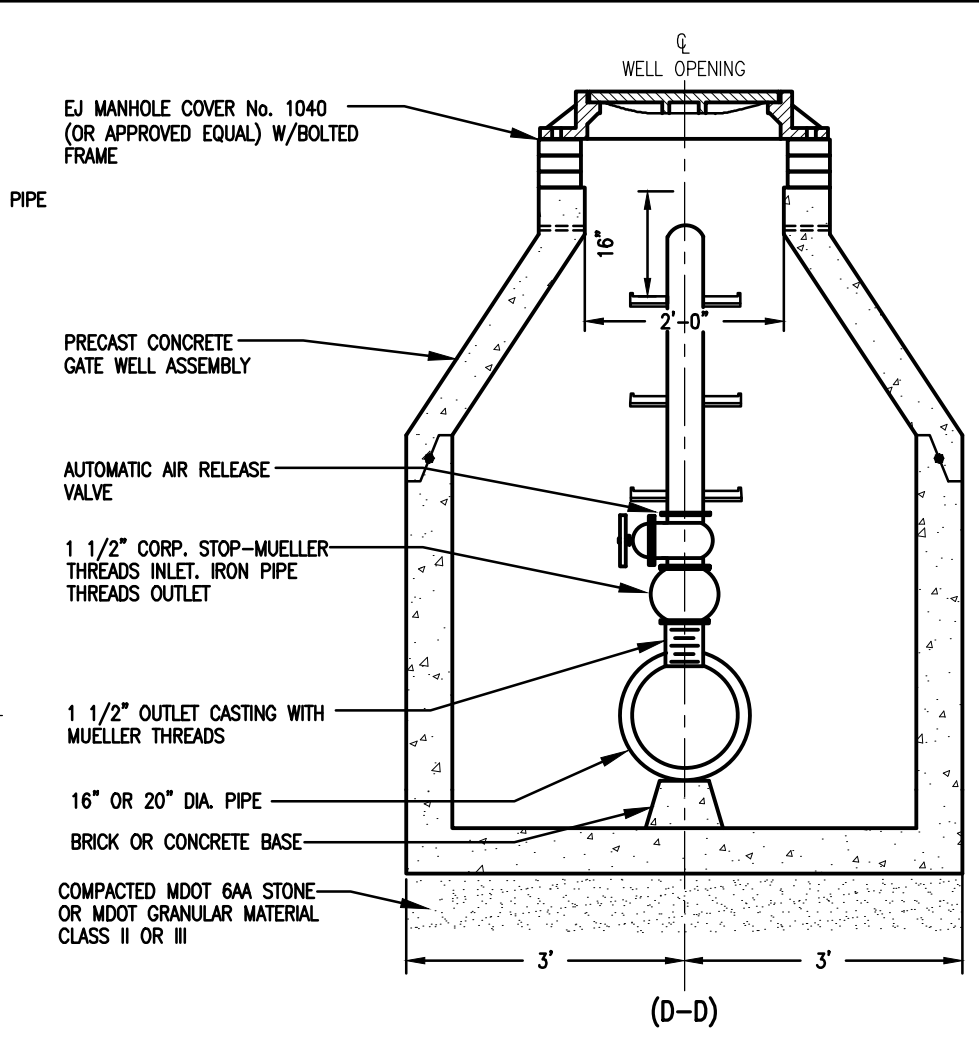
DETAIL OF HYDRANT SETTING



(PLAN VIEW, C-C)

STANDARD AIR RELEASE VALVE & WELL
FOR 16" & 20" WATER MAIN
(FOR PLACEMENT AT HIGH POINTS IN
WATER MAIN SYSTEM AS DIRECTED
BY THE CITY ENGINEER)

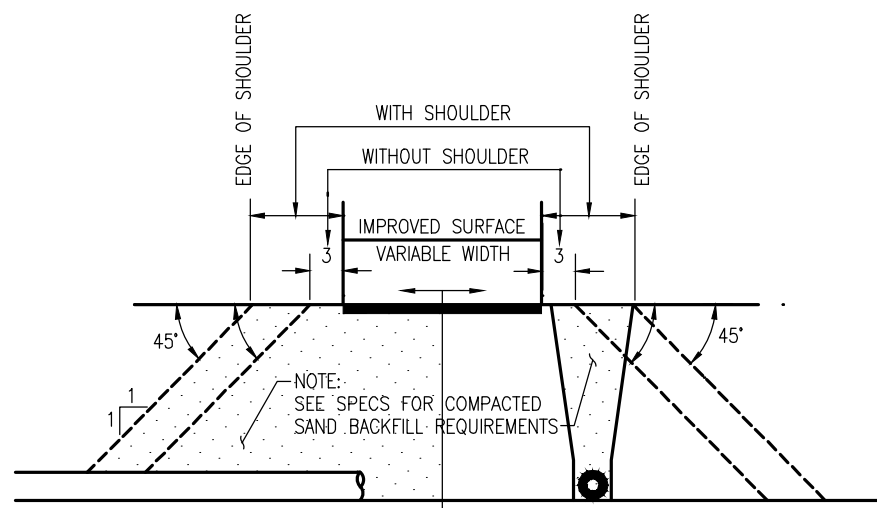
1. All construction procedures and materials used on all water main projects shall conform to Great Lakes Water Authority and The City of Romulus current Standards and Specifications.
2. All hydrants shall be EJ #5-BR 250-Traffic Model and shall conform to AWWA Specification C502 as amended, and shall have a minimum 6" valve opening which closes with the water pressure. Hydrants shall open counter-clockwise. Hydrants shall be traffic style with breakable flange and coupling. Hydrants shall have a swivel flange to allow bonnet to be turned 360 degrees without removing the bonnet, and barrel flanges shall be integrally cast with the barrel. Inlet shoe shall have a bronze valve seat, which can be removed without digging. Inlet connection shall be 6" mechanical joint, ASA-A21-11. Stem threads shall be sealed with double "O" rings and shall be permanently lubricated with all weather grease. Hose connections: One (1) 3/4" I.D. pumper nozzles with City of Detroit Fire Department (DFD) threads. One nozzle shall be a 5" storm with solid cap and chain. Operating Nut: (1) 1/8" P-F pentagon, open left. All hydrants shall have a Carroll drain. Hydrants shall be painted red above the ground and black below, with a finish coat of Glamoxet 501 enamel or approved equal. Nozzle caps shall be painted per Romulus Fire Dept. requirements.
3. All water mains shall be ductile iron ANSI 1-A21.5 (AWWA-C151) or Fusible PVC C900, Ductile iron pipe shall be double cement lined with bituminous seal coat Class 54 for sizes 3" through 12" and Class 56 for 16" pipe. Fusible PVC shall be AWWA C900 and DPE size SDR-14. All water main shall have tracer wires. Fusible Polyvinyl Chloride (PVC) must be listed and approved for use with potable water under ANSI/ASTM Standards 14 and 61 and bear the NSF-PW identification. The pipe shall also be approved unless NSF-pw or otherwise be marked to state that the pipe has been certified to the Standards 14 and 61 requirements.
4. Gate Valves shall be iron body, fully bronze mounted, resilient wedge, non-rising stem, operating clockwise per AWWA C515. All gate valves with operating nuts at a distance greater than 5' below ground surface shall be provided with an extension stem. The length of the extension shall be such that it will be within 5' of ground surface when an extension stem is used. It shall be held in place by two extension stem guide assemblies. Each assembly shall be comprised of a "J" bracket and "L" bracket supplied by EJ. The stem guides shall be located opposite from each other, and shall be suitably fastened to the wall of the gate well. In addition, a "stop" shall be welded to the extension stem in a location that will prevent the extension stem from slipping off the operating nut. Details of extension stem and method of installation shall be approved by the engineer prior to installation. All precast concrete gate well sections shall be manufactured to conform with ASTM C478, standard specifications for precast reinforced concrete manhole sections, except wall thickness, shall be shown on these details. All joints for precast concrete gate well sections shall be "modified grooved tongue" with gasket manufactured to conform with ASTM C443, standard specification for joints for circular concrete sewer and culvert pipe rubber gaskets. All gate well covers shall be EJ #1040 Z with bolted and have words "Dept of Water Supply" in raised letters on the frame cover, or approved equal.
5. Tapping sleeve shall be stainless steel, mechanical joint with DWS Mechanical Joint Tapping Gate Valve. Lead joint sleeves shall not be used.
6. No installation of water main shall be attempted without City's inspector being present. Unless otherwise specified on plans, top of all water mains shall be 6 ft. below existing or proposed road centerline, or 6 ft. below existing or proposed ground, whichever results in lower elevation. An 18" minimum vertical clearance between storm or sanitary sewer, shall be maintained.
7. The design engineer shall furnish The City of Romulus with "As-Built" water main plans in both full sized hard copy, electronic PDF format and files using the most recent release of AutoCad, upon job completion. Plans shall locate all water mains, hydrants and gate valves and wells.
8. All required cross connection devices shall be installed as required by the local plumbing inspector and in accordance with the standards of the Michigan Department of Public Health.
9. Three (3) working days before you dig, dial MISS DIG at 1-800-482-7171.
10. Where work is to be performed in the vicinity of a Great Lakes Water Authority (GLWA) water main, separate approval is required from GLWA.
11. All pipe and all pipe fittings shall be made in the U.S.A.
12. All bolts on all flanged and mechanical joint fittings shall be domestic origin high strength, low alloy COR-BLUE steel bolts or approved equal. These bolts shall meet the current provisions of American National Standard ANSI/AWWA C111/A21.11-90 for Rubber Gasket Joints for Ductile Iron Pressure Pipes and Fittings. Bolt manufacturer's certificate of compliance must accompany each shipment.
13. A minimum of two brass wedges shall be installed at each joint.
14. BACKFILL NOTE: Under road surfaces, pavement, sidewalk, curb, driveways and where the edge of the trench is within 3 (three) feet of the pavement or as called for on the plans, the trench depth shall be 4 (four) inches lower than the proposed water main elevation. The trench width shall be the outside diameter plus 16 (sixteen) inches for pipe diameters up to 36 (thirty-six) inches and larger. The trench shall be backfilled by placing MDOT granular material Class II by the "controlled Density Method" or other means having approval of the engineer and compacting it to 95 (ninety-five) percent of its maximum unit weight.
15. Polywrap shall be placed as required by the City.
16. Where water main is located under pavement, the City shall not be responsible for repairing pavement within the easement in the event that maintenance or repairs to the water main become necessary.
17. All water mains shall be restrained with Field Locking Gaskets and Meglugs per D.I.P.R.A.
18. Partial Replacement of Lead or Galvanized Services is not allowed.
19. Allowable leakage for hydrostatic pressure testing shall be in accordance with the latest version of the AWWA Standard 600 and 605 Specifications. Water Main that is primarily Fusible PVC shall use an allowable leakage amount based on number of gaskets in the system.
20. Water mains shall be disinfected in accordance with AWWA standard C651, most current version, prior to being put into service. Bacteriological sampling shall be in accordance with R235.11110 of the administrative rules promulgated under Michigan Safe Drinking Water Act, 1976 PA 399, as amended.



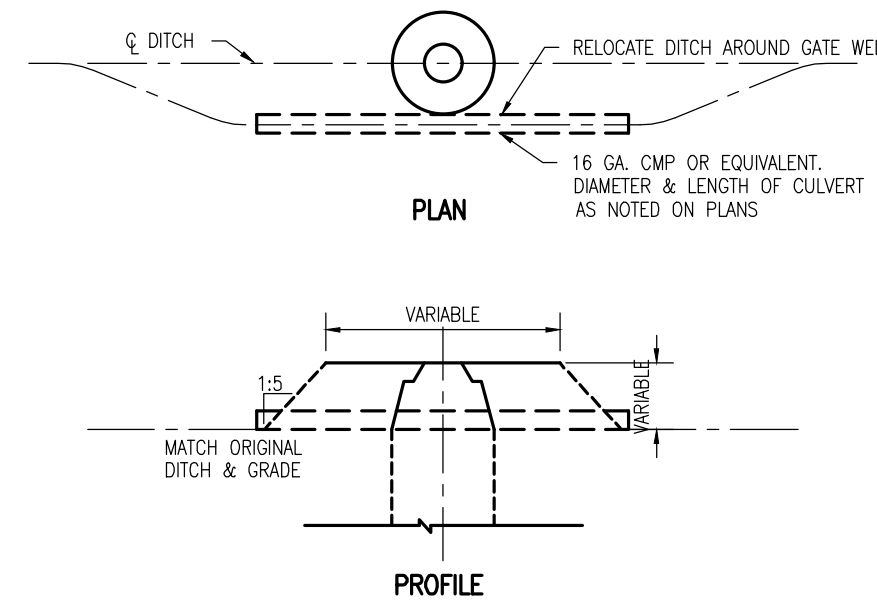
NOTES:

ALL AIR RELEASE WELLS SHALL BE PRECAST STRUCTURES.

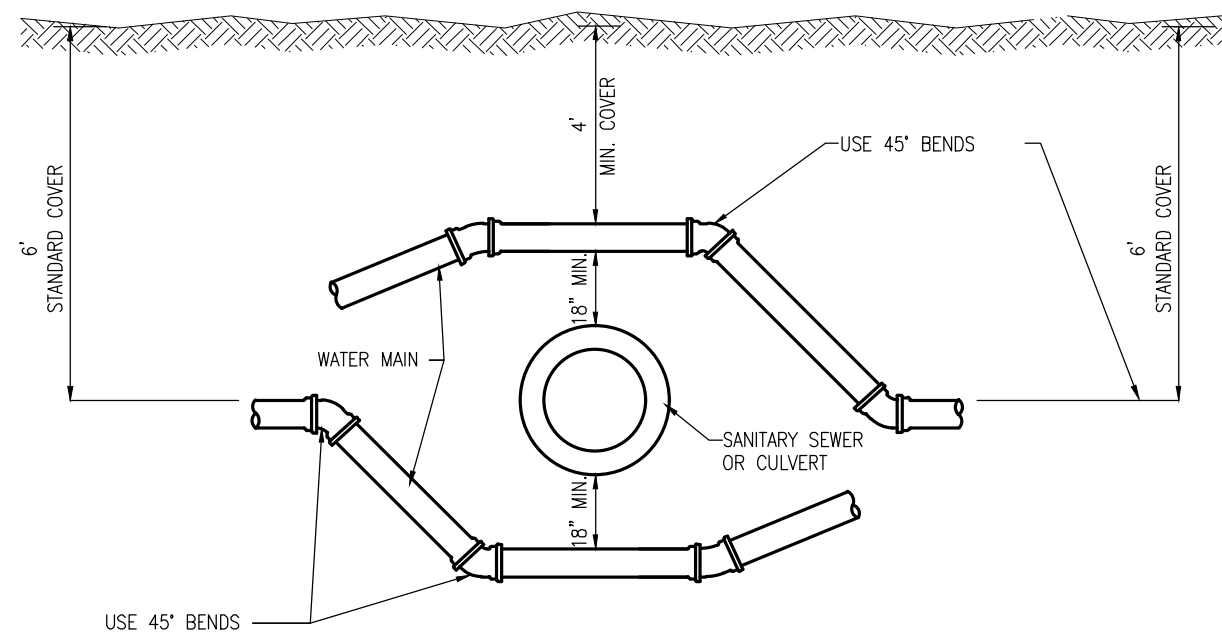
ALL AIR RELEASE VALVES SHALL BE AUTOMATIC PER ROMULUS DPW REQUIREMENTS.



BACKFILL IN THE AREA OF STREETS, ALLEYS
SIDEWALKS, DRIVES & PARKING LOTS

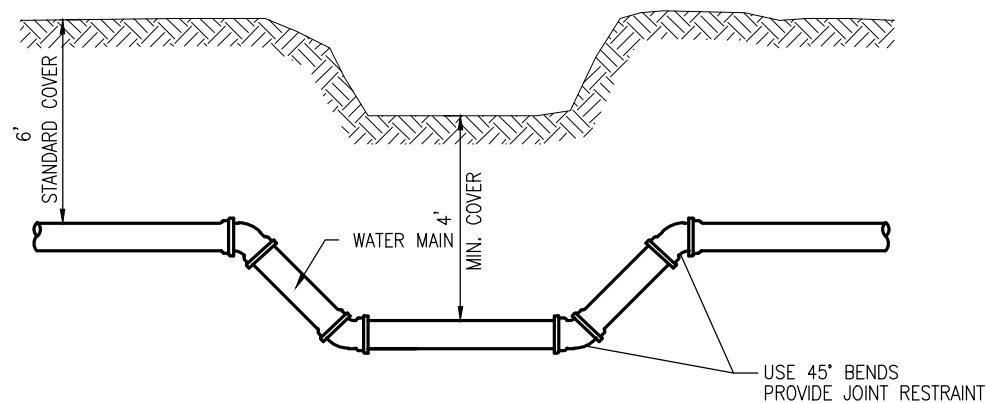


DITCH ENCLOSURE AT GATE WELL OR HYDRANT

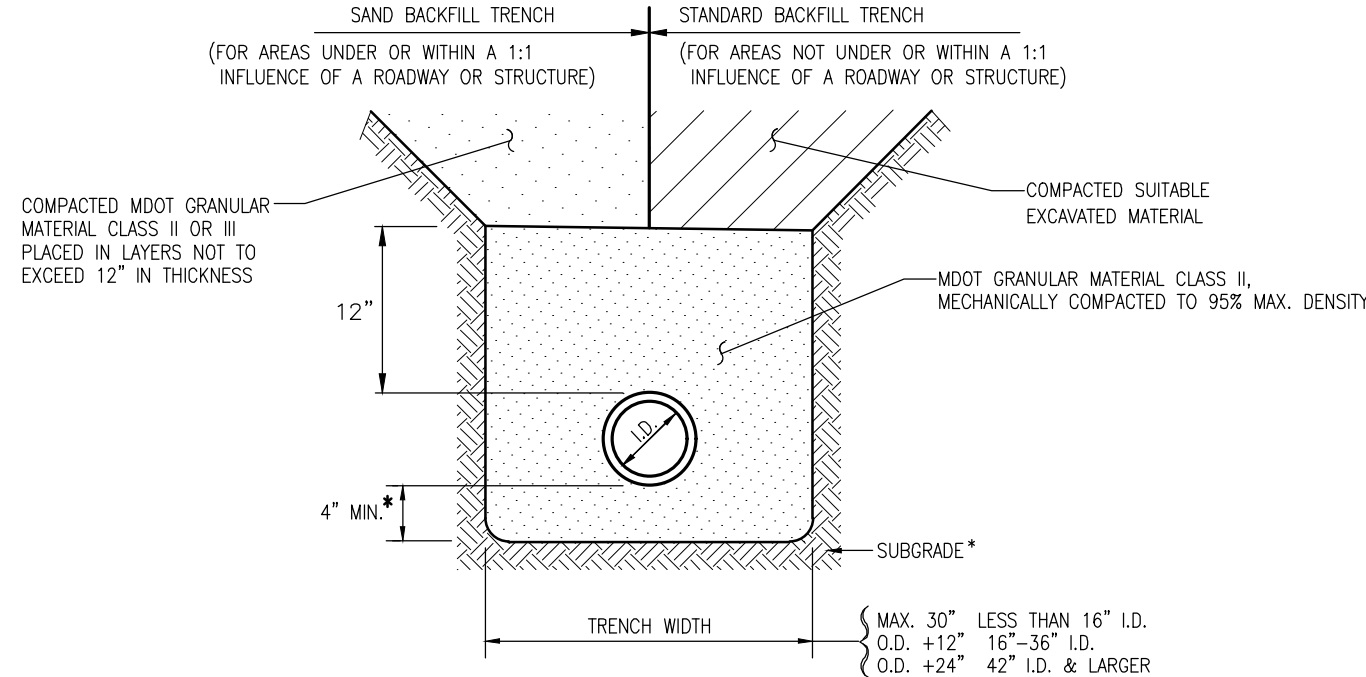


SEWER OR CULVERT CROSSING

- NOTE:
1. BENDS CAN BE ELIMINATED FOR MINOR VERTICAL DEFLECTIONS IN DUCTILE IRON PIPE (1 DEGREE OR LESS). IN THIS CASE, THE PIPE MAY BE DEFLECTED UP TO 4" PER JOINT.
 2. PLACE AND COMPACT GRANULAR MATERIAL CLASS II BETWEEN PIPES IN THE VICINITY OF THE CROSSING.
 3. PROVIDE JOINT RESTRAINT

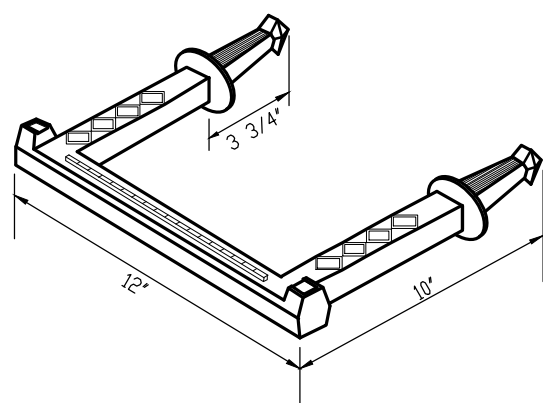


DITCH OR STREAM CROSSING

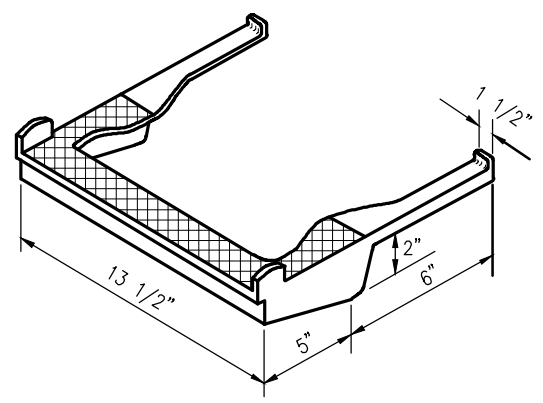


STANDARD BEDDING AND TRENCH BACKFILL DETAIL
FOR WATER MAIN

- * NOTE: IF THE EXISTING SUBGRADE SOILS MEET THE REQUIREMENTS FOR MDOT GRANULAR MATERIAL CLASS II (MINIMUM 4" THICK), THEN THE WATER MAIN MAY BE LAID DIRECTLY ON THE COMPACTED NATIVE SUBGRADE SOILS.

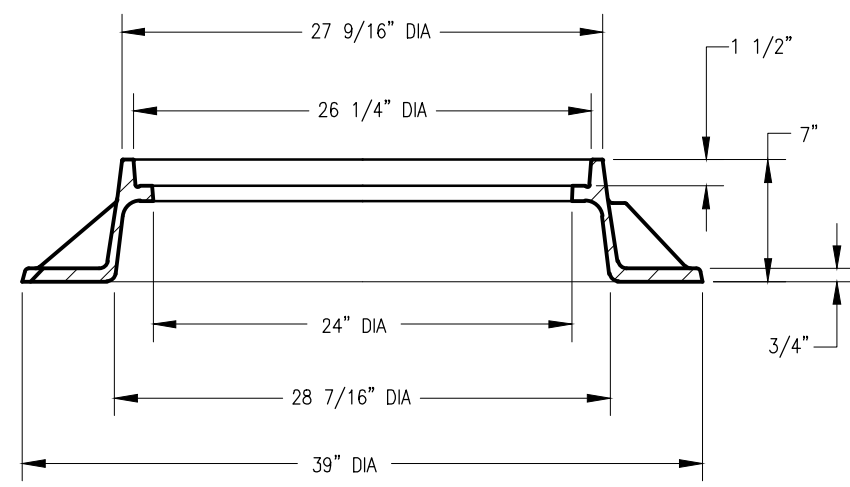
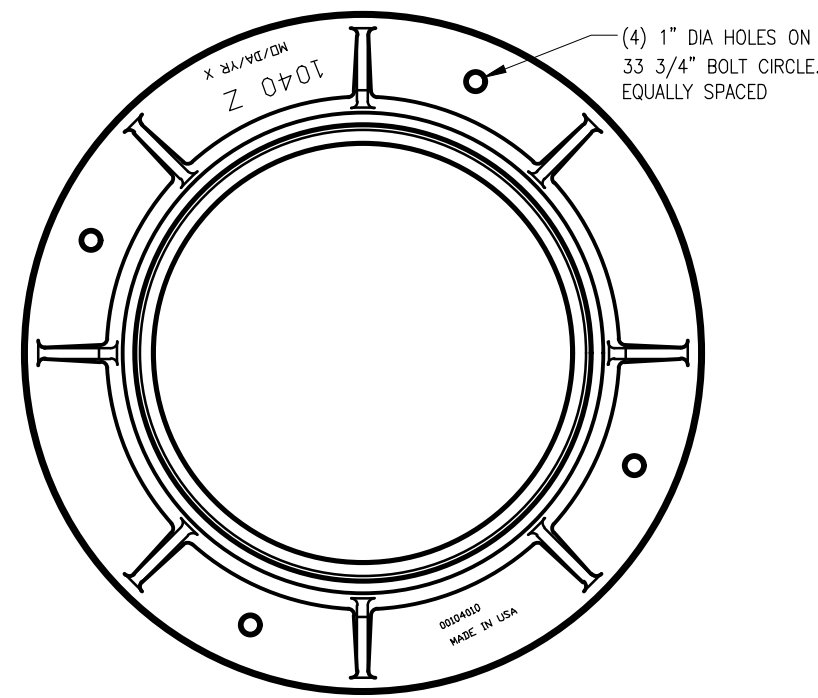


M.A. INDUSTRIES PS2-PFS

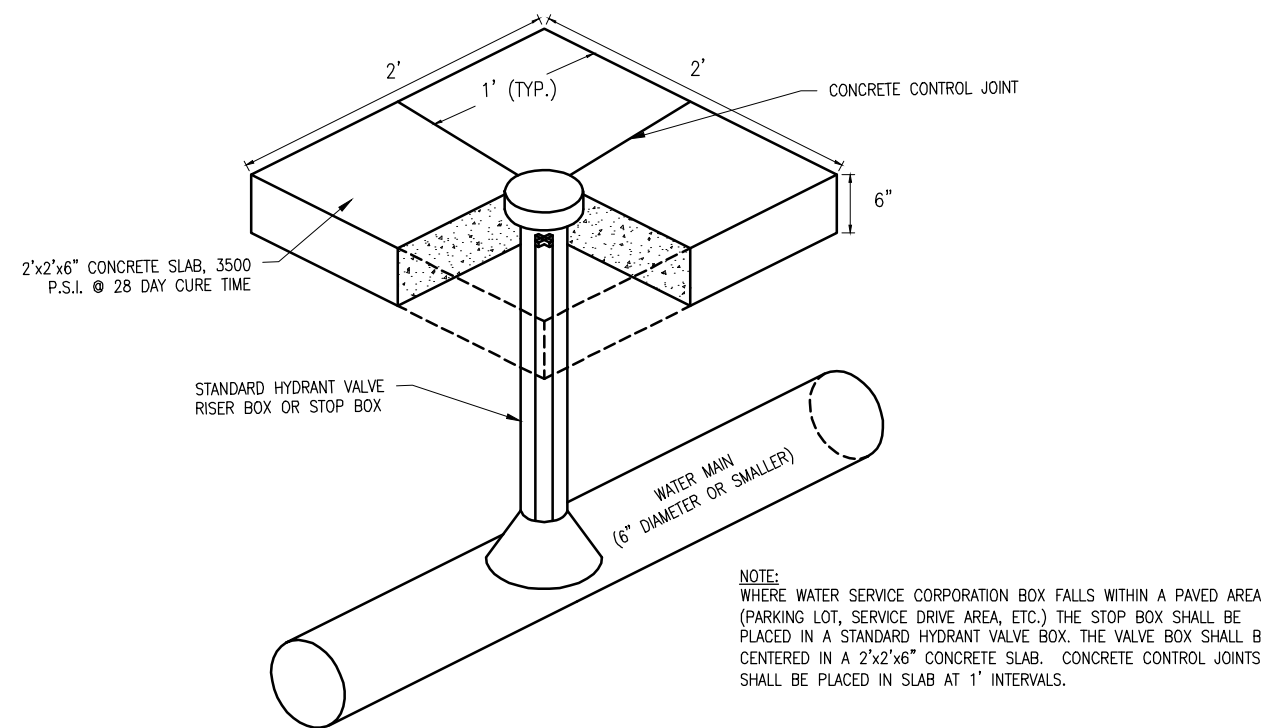


FJ 8500

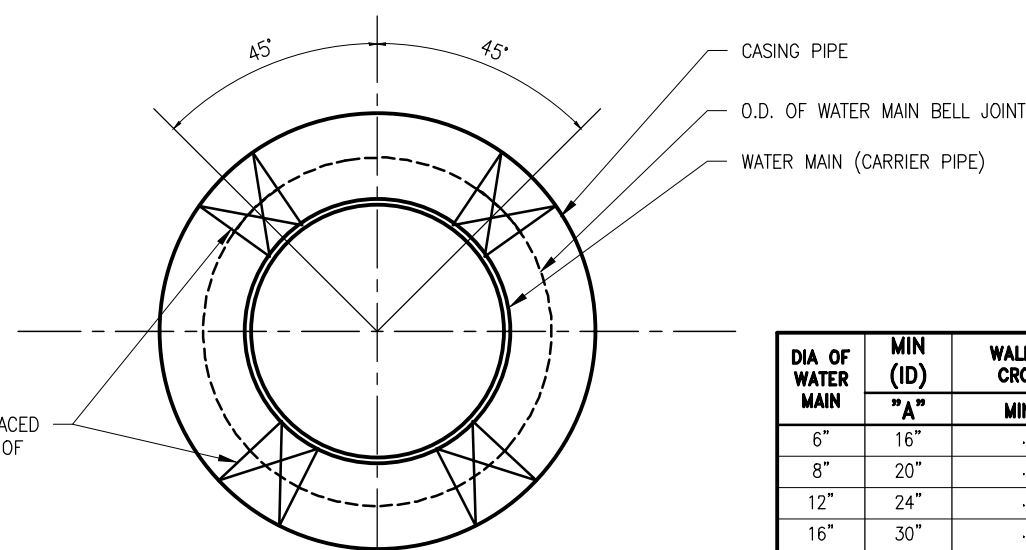
STANDARD MANHOLE STEP



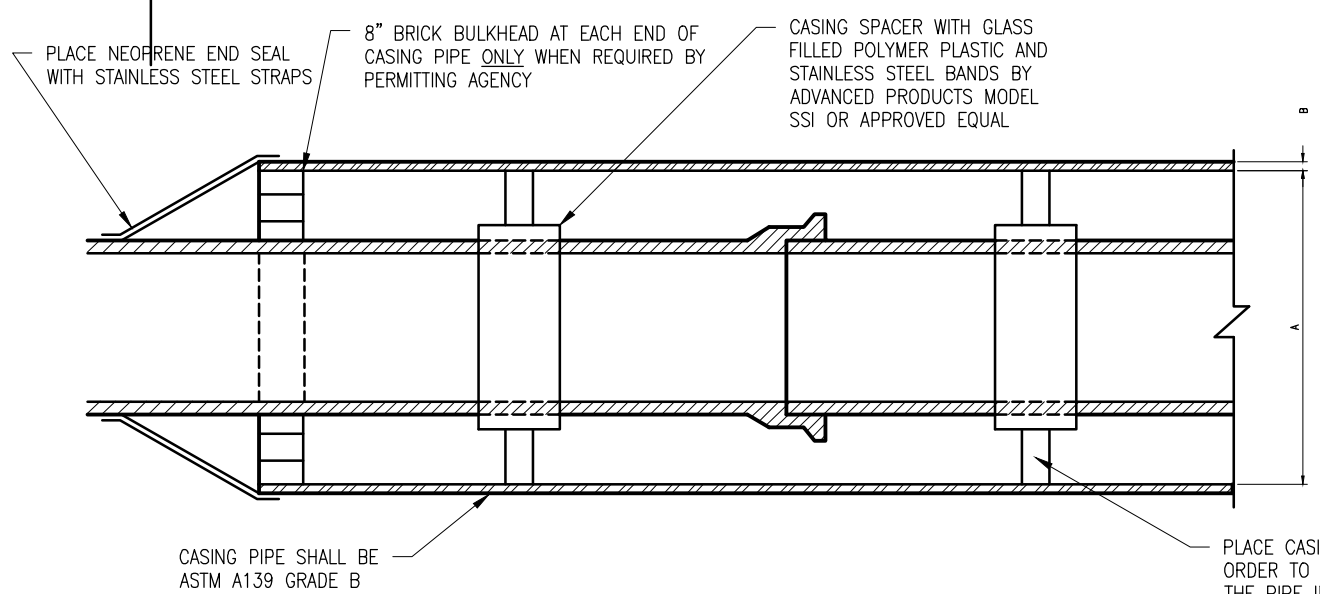
FRAME SECTION



STOP BOX IN PAVEMENT DETAIL



CASING SPACERS SHALL BE PLACED MINIMUM 3 PER PIPE SECTION OF PIPE OR AS RECOMMENDED BY MANUFACTURER.

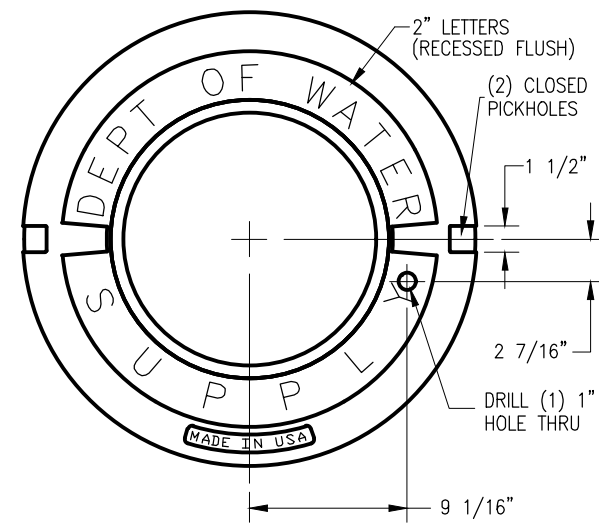


- NOTE:
- THE CONTRACTOR SHALL SUBMIT IN WRITING THE DETAILS OF THE APPROPRIATE PIPE CASING INSTALLATION FOR THE REVIEW AND APPROVAL BY THE ENGINEER BEFORE INSTALLATION OF ANY CASING STARTS. ALTERNATE METHODS OF SUPPORTING AND MAINTAINING THE POSITION OF THE CARRIER PIPE WITH RESPECT TO THE CASING PIPE (SUPPORT TYPE AND SPACING) MAY BE CONSIDERED.

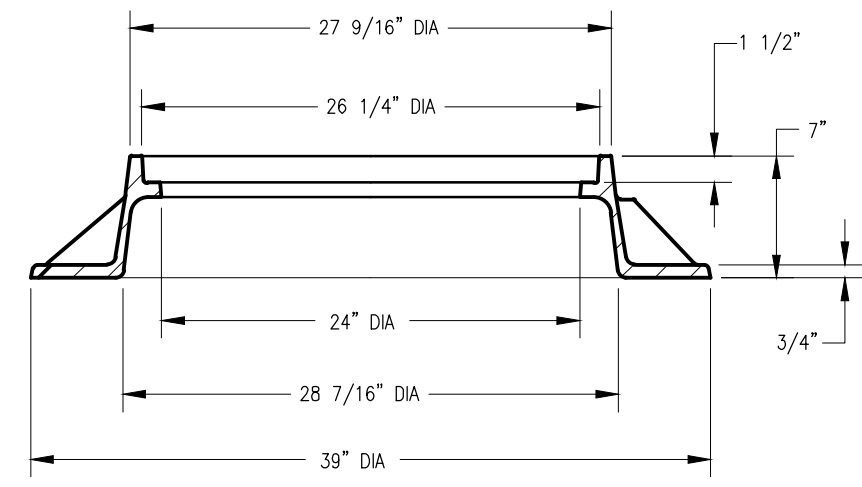
STANDARD CASING DETAIL

DIA OF WATER MAIN	MIN (ID) "A"	WALL/ROAD CROSSING		RAILROAD CROSSING	
		MIN "B"	MIN "B"	MIN "B"	MIN "B"
6"	16"	.375	.375	.375	.375
8"	20"	.375	.375	.375	.375
12"	24"	.375	.375	.500	.500
16"	30"	.375	.375	.500	.500
20"	36"	.375	.375	.500	.500
24"	42"	.375	.375	.500	.500

A=INSIDE DIAMETER
B=WALL THICKNESS

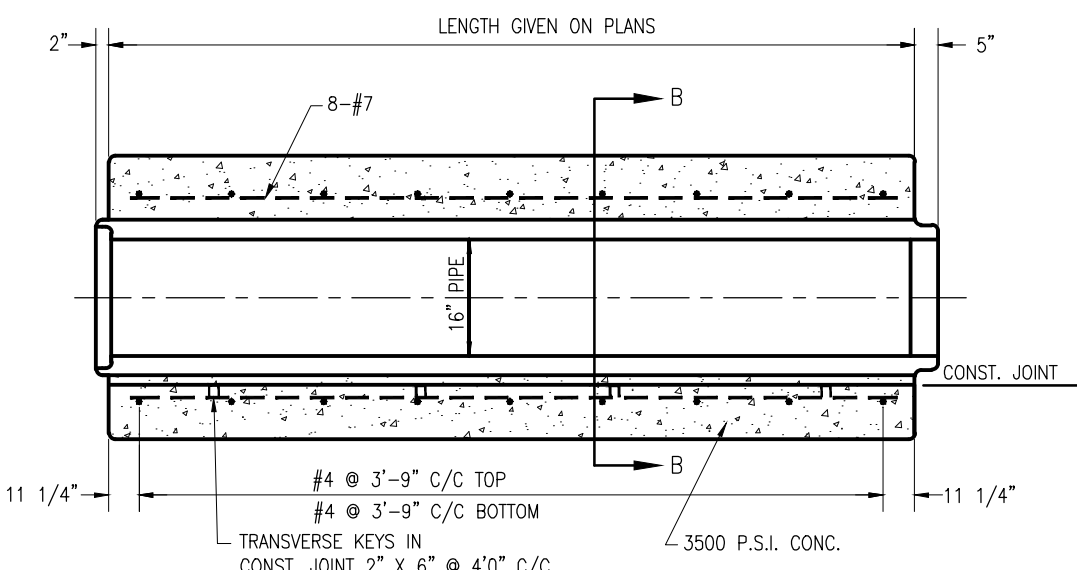


COVER SECTION



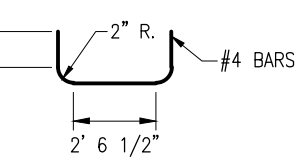
FRAME SECTION

CAST IRON GATE WELL COVER
EJ 1040 TYPE "C" SOLID COVER

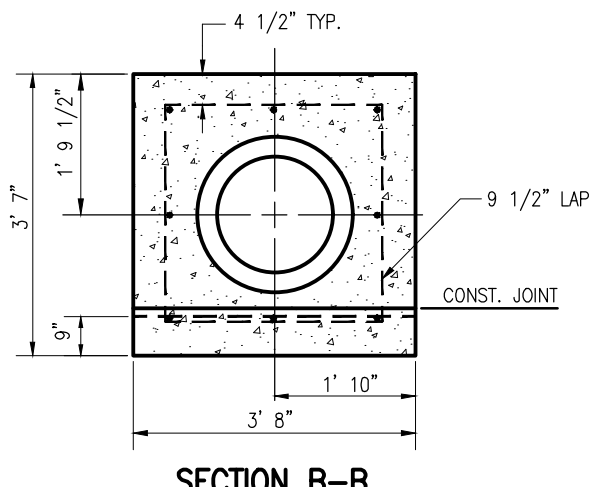


PROFILE

LENGTH OF TOP BARS = 7' 1 1/2"
LENGTH OF BOT. BARS = 5' 8 1/2"



BAR BENDS



SECTION B-B

16" WATER MAIN ENCASEMENT
UNDER DRAINS & DITCHES



City of Romulus

Mayor's Report – LeRoy D. Burcroff, Mayor

Council Meeting Held: **July 12, 2021**

Item No. B.

General Description: The Senior Alliance 2022 Annual Implementation Plan

Resolution No. _____

<i>Moved by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Seconded by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

<i>Ayes:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Nays:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Abstain:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED

City of Romulus

INTEROFFICE MEMORANDUM

TO: The Honorable Romulus City Council
FROM: Mayor LeRoy D. Burcroff
SUBJECT: The Senior Alliance 2022 Annual Implementation Plan
DATE: July 7, 2021

I concur with the recommendation of Rose Swidan, Senior Services Director, and Steve Hitchcock, City Attorney and respectfully request Council adopt the attached The Senior Alliance 2022 Annual Implementation Plan for Aging Services. The draft plan outlines activities the agency is pursuing to achieve goals in service delivery to persons aged 60 and older in southern and western Wayne County.

Motion by _____, supported by _____, to concur with the administration and adopt the attached The Senior Alliance 2022 Annual Implementation Plan for Aging Services.

INTEROFFICE MEMORANDUM

TO: Mayor LeRoy D. Burcroff
FROM: Rose Swidan, Senior Services Director
SUBJECT: The Senior Alliance 2022 Annual Implementation Plan
DATE: July 6, 2021

The Senior Alliance (TSA) provides services to older adults in the 34 communities of Southern and Western Wayne County including Romulus. To electronically view the FY 2022 AIP, please visit: <https://thesenioralliance.org/wp-content/uploads/2021/05/Draft-2022-Annual-Implementation-Plan.pdf>

The Michigan Office of Services to the Aging requires that TSA request a resolution of approval of the Implementation plan by the local units of government. Steve Hitchcock has reviewed the document and finds it acceptable. I have also reviewed the document and should you concur, I request that this information be forwarded to City Council for a resolution (attached) in support of the Senior Alliance FY 2022 Annual Implementation Plan.

If you have any questions or require further information, please feel free to contact me.

C Maria Lambert, Director of Resident Services
Julie Wojtylko, Chief of Staff



June 29, 2021

The Honorable LeRoy Burcroff
City of Romulus
11111 Wayne Road
Romulus, MI 48174

Dear Mayor Burcroff,

As you know, The Senior Alliance, Area Agency on Aging 1-C (TSA), assists people to thrive as they live, age and grow. With that objective in mind, The Senior Alliance's Board of Directors approved the agency's 2022 Annual Implementation Plan (AIP) on June 24, 2021. The AIP outlines the agency's goals for Older Americans Act and state funded services during the coming fiscal year.

The State of Michigan's Aging & Adult Services Agency (AASA) requires TSA to request a resolution approving our AIP from each of the 34 municipalities in our planning and service area. **A sample resolution is enclosed.** The final AIP document is available on our website: <https://thesenioralliance.org/wp-content/uploads/2021/05/Draft-2022-Annual-Implementation-Plan.pdf>. A copy of the AIP can be sent to you via U.S. postal mail or email upon your request.

Please share this document with your municipality's legislative body and consider a resolution approving TSA's 2022 Annual Implementation Plan no later than July 30, 2021. We are also requesting that you email notification of your approval or related concerns regarding the AIP as soon as possible.

If you have any questions regarding the 2022 AIP, please contact me by phone (734-516-0470) or via email at jmaciejewski@thesenioralliance.org.

Your community's continued support of The Senior Alliance's vision to lead our region toward a healthy future where all have the opportunity to engage, connect and contribute is deeply appreciated.

Thank you in advance for your consideration of approving a resolution in support of our 2022 Annual Implementation Plan.

Sincerely,

Jason Maciejewski

Jason Maciejewski
Chief Advocacy & Planning Officer
The Senior Alliance, Area Agency on Aging 1-C

Enclosure

**The Senior Alliance
Fiscal Year 2022
Annual Implementation Plan
Approval & Resolution Request Form**

Municipality Name			
Street Address		City:	Zip Code:
Phone Number			
Contact Person			
Email Address			
Please share this document and the 2022 Annual Implementation Plan (AIP) with your municipality's legislative body and consider a resolution approving TSA's MYP no later than July 31, 2021. We are also requesting that your local unit of government send email notification of your approval or related concerns regarding the AIP as soon as possible. A sample resolution is enclosed. To electronically view the FY 2022 AIP, please visit: https://thesenioralliance.org/wp-content/uploads/2021/05/Draft-2022-Annual-Implementation-Plan.pdf			
Please select one	_____ We hereby acknowledge receipt of and approve the 2022 Annual Implementation Plan (AIP) for The Senior Alliance: Planning and Service Area I-C. Date of Resolution Vote: _____		
	_____ We hereby acknowledge receipt of and approve the 2022 Annual Implementation Plan (AIP) for Planning and Service Area I-C with recommendations as noted in the comments section of this form. Date of Resolution Vote: _____		
	_____ We hereby acknowledge receipt of and disapprove of the proposed 2022 Annual Implementation Plan (AIP) for The Senior Alliance: Planning and Service Area I-C.		

Authorized Official Signature

Date

COMMENTS ON THE FY 2022 ANNUAL IMPLEMENTATION PLAN

Please list any comments and/or describe any recommendations on the
2022 Annual Implementation Plan.

**Please e-mail this form with any applicable comments to The Senior Alliance
with a copy of your municipality's resolution by Friday, July 30, 2021**

E-Mail Resolution to: jmaciejewski@thesenioralliance.org

U.S Mail an original copy of the Resolution to:

The Senior Alliance
Attention: Planning Dept.
5454 Venoy
Wayne, MI 48184

If you have any questions or would like more information, please contact
Jason Maciejewski, Chief Advocacy & Planning Officer
(734) 516-0470 or jmaciejewski@thesenioralliance.org

Resolution # _____

RESOLUTION OF CITY/TOWNSHIP COUNCIL OF THE CITY/TOWNSHIP
OF _____ AFFIRMING APPROVAL OF
THE SENIOR ALLIANCE **2022 ANNUAL IMPLEMENTATION PLAN** FOR AGING SERVICES

WHEREAS, the City/Township Council of the City/Township of _____, Wayne County, Michigan recognizes the role of The Senior Alliance as the designated Area Agency on Aging for Southern and Western Wayne County to be responsible for planning, developing, coordinating, monitoring, and managing a comprehensive organized service delivery system of services for older adults and caregivers.

WHEREAS, the 34 communities of Southern and Western Wayne County, including the City/Township of _____ comprises the Planning and Service Area to the agency's governing body.

WHEREAS, the Aging and Adult Services Agency require local Area Agencies on Aging to request approvals of their Annual Implementation Plan from their local governments.

WHEREAS, The Senior Alliance has submitted the plan to this honorable body in accordance with federal and state laws.

WHEREAS, The Senior Alliance has held a public hearing for client, caregiver, and service provider population feedback which contributed to the development of the Annual Implementation Plan for Fiscal Year (FY) 2022.

NOW, THEREFORE, BE IT RESOLVED, that this honorable body of _____ approves the Annual Implementation Plan for Fiscal Year (FY) 2022, as presented to the City/Township.

APPROVED AND ADOPTED, by the City/Township Council on _____, 2021.

Motion:

Second:

Ayes:

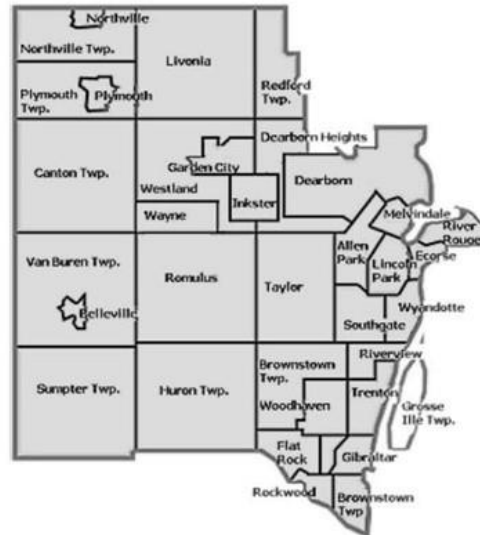
Signed:

Dated:

I attest that the foregoing is true and correct copy of a resolution approved at the _____
held in _____ on _____.

2020-2022 Multi Year Plan
FY 2022 ANNUAL IMPLEMENTATION PLAN
THE SENIOR ALLIANCE, INC. 1-C

DRAFT



Planning and Service Area
Serves all Wayne County
(Excluding areas served by Region 1-A)

The Senior Alliance, Inc. 1-C
5454 Venoy Road
Wayne, MI 48184
734-722-2830
1-800-815-1112 (SE Mich only)
734-722-2836 (fax)
Tamera Kiger, CEO
www.aaa1c.org

Field Representative Laura McMurtry
mcmurtryl@michigan.gov
517-284-0174

DRAFT



The Senior Alliance

2022 Annual Implementation Plan Public Hearing Notice

The Senior Alliance, Area Agency on Aging 1-C will host a public hearing to gather input on the organization's Fiscal Year 2022 Annual Implementation Plan (AIP). The plan outlines activities the agency is pursuing to achieve goals in service delivery to persons aged 60 and older in southern and western Wayne County.

Due to the COVID-19 pandemic, the public hearing will be held remotely on the Zoom meeting platform.

The 2022 AIP Public Hearing will be conducted on **Wednesday, June 14, 2021 at 9:30 a.m.**

Information on how to join the meeting by Zoom can be found at www.thesenioralliance.org or by calling 734-727-2058 prior to June 14, 2021

The draft 2022 AIP will be made available for public review online at www.thesenioralliance.org beginning on May 28, 2021. The public hearing will include a brief overview of the draft 2022 AIP, followed by public comment. Written comments will be accepted until 4:00 p.m. on Monday June 14, 2021. Written comments can be emailed to advocacy@thesenioralliance.org or sent via U.S. mail to:

The Senior Alliance
Attn: AIP Public Comment
5454 Venoy Rd
Wayne, MI 48184

The Senior Alliance is a non-profit 501(c)(3) established in 1980 and designated by the Michigan Commission on Services to the Aging as the Area Agency on Aging (AAA) for the 34 communities of southern and western Wayne County. As the state designated Area Agency on Aging, The Senior Alliance is the link to information, resources and services for over 200,000 older adults.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Table of Contents

Executive Summary	2
County/Local Unit of Government Review	8
Public Hearings	9
Regional Service Definitions	10
Access Services	11
Approved MYP Program Development Objectives	14
Supplemental Documents	25

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Executive Summary

Include a brief description of the planning and service area and any significant changes to the current area plan: (A) Any significant new priorities, plans or objectives set by the area agency for the use of Older Americans Act (OAA) and state funding during FY 2022. If there are no new activities or changes, note that in your response. (B) Include changes, if any, to the access, in-home and community-based services and supports provided within the plan. (C) Address the agency's response to the COVID-19 pandemic emergency, including a description of the challenges and continuing needs brought on by this emergency. (D) Current information about contingency planning for potential reduced federal funding (if plans include the pursuit of alternative funding, identify specific funding sources). (E) A description of progress made through advocacy efforts to date and focus of advocacy efforts in FY 2022.

The Senior Alliance (TSA) is a 501 c(3) non-profit organization responsible for planning and coordinating a network of services as the designated Area Agency on Aging (AAA) for region 1C. As an AAA we serve approximately 215,000 older adults (U.S. Census 2017 Community Survey data) residing in southern and western Wayne County. Founded in 1980, TSA's mission is, "Assisting people to thrive as they live, age and grow." We envision our role as "Leading our community toward a healthy future where all have the opportunity to engage, connect and contribute." Our foundation is built upon enabling access to the network of home and community based long term supports and services available through Older Americans Act funding. These services include nutrition programs, Care Management, Case Coordination & Support, Information & Assistance, Transportation, Medicare Medicaid Assistance Program (MMAP), the Long-Term Care Ombudsman, Adult Day Care, evidence-based health & wellness programs, legal assistance and telephonic Friendly Reassurance. A particular focus is given to advocating for the needs of older adults and individuals living with a disability in our service area.

In March 2020 the lives of older adults and people living with a disability were dramatically impacted by COVID-19 and the urgent public health measures that were taken in response to a fast-spreading global pandemic. The population we serve as an Area Agency on Aging quickly proved to be the most vulnerable to this illness, brought on by a nouvelle coronavirus that is readily transmitted in congregate settings.

In response to the COVID-19 pandemic TSA quickly transitioned to a 100% remotely based workforce on Friday, March 13, 2020. Since then TSA has invested in technological tools including laptops, printers, hotspots and cell phones to further empower staff working remotely. Microsoft Teams has been deployed and adopted as a software tool to routinely connect and engage TSA staff in their day-to-day work, improving productivity. TSA immediately responded to aid older adults in our Planning & Service Area (PSA) by addressing the food needs of older adults during the stay-at-home orders.

To address an initial immediate need in our regular congregate nutrition program, The Senior Alliance purchased and distributed 950 food bags in partnership with Firehouse Subs. These bags contained shelf-stable items along with a few treats such as Oreo cookies and fruit snacks. Our agency then reached out to Gleaners Community Food Bank and purchased 1,650 food boxes and distributing them to older adults in PSA 1C.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

TSA also collaborated with Gleaners to obtain and distribute 1,850 food boxes obtained by the Aging & Adult Services Agency (AASA). Another effort with Gleaners involved distribution of 2,200 food boxes donated by The Ralph Wilson Foundation. In total TSA distributed 5,700 food boxes to older adults in our service area during fiscal year 2020. Each Gleaners food box weighed 26 pounds and included all shelf-stable items such as: pasta, pasta sauce, oatmeal, corn flakes, canned vegetables, canned fruit, tuna fish, canned chicken, chicken broth, peanut butter and other food items.

Working with the AASA, TSA distributed 1,000 produce boxes shipped by LaGrasso Brothers and 2,450 produce boxes shipped by Van Eerden. Each participating older adult received one box of fruit (oranges, pears, and apples) and one box of vegetables (carrots, potatoes, zucchini, cucumbers, green peppers, and tomatoes).

These food and produce boxes were distributed via home deliveries, contactless drive-thru food distributions that took place in The Senior Alliance parking lot and Wyandotte's Yack Arena. Deliveries were made to various senior residences, senior centers and our faith-based community. TSA also distributed boxes through partnerships with the City of Westland, Plymouth Township, Goodfellows of Huron Township and the Muslim Community of Western Suburbs organization.

A volunteer based emergency grocery shopping program was developed to fill an identified food gap. This connection also enabled TSA to provide referrals to other community resources for participants. As of mid-May 2021, 204 shopping trips were provided, paid for by grant funds.

Many older adults in PSA 1C were in desperate need of food during these trying times. Some lacked transportation to get to the grocery store to purchase items. Others were ill, frail or too frightened to venture outside of their homes. Therefore, The Senior Alliance continues to distribute food boxes in fiscal year 2021 with 3,350 boxes handed-out and another 300 anticipated.

TSA's contracted nutrition programs vendor, Wayne County Senior Services (WCSS), converted from the regular five-day per week hot meal program to a one-day per week delivery of a frozen five-meal pack for home-delivered meals clients. This distribution method has continued into the summer of 2021. WCSS's congregate meal sites suspended operations on Monday, March 16, 2020. In response TSA stepped in to contact the approximately 200 regular congregate participants to identify needs. In response, TSA conducted a shelf-stable five-meal pack food distribution on April 9, 2020 in partnership with Firehouse Subs. WCSS resumed serving impacted clients in the summer of 2020 with five-pack meal boxes each Monday via a touchless curbside pick-up opportunity. WCSS adjusted liquid nutrition distribution dates after working with sites that had closed under the Stay-Home, Stay-Safe Executive Order. The Halal home-delivered program continued to operate as normal under the sub-contractor, Country Kitchen.

Personal Protection Equipment (PPE) was distributed to our vendor network and older adults during the pandemic. In fiscal year 2020 TSA distributed over 25,000 PPE items. As of mid-May, 13,599 pieces of PPE had been distributed to our vendors and older adults, in fiscal year 2021.

In January 2021, by utilizing funds from the Personal Care-Essential Care Box Project Grant (AASA Transmittal Letter - TL #2020-429), TSA worked with STEP to procure and assemble 1,100 personal care boxes. These boxes were then distributed to home-delivered meals recipients in our targeted communities.

The Senior Alliance, Inc.

FY 2022

Our Care Management and Case Coordination programs have addressed needs amongst participants by conducting a variety of initiatives. At the outset of the pandemic staff conducted initial check-ins and then shifted to routine services. With the addition of new staff, TSA is increasing enrollment into Care Management and Case Coordination & Support by an average of six per week.

A Regional Direct Service Request, *Care Management Personal Care Units for COVID-19 Pandemic*, was approved by AASA for fiscal year 2021 and the agency intends to continue this service in fiscal year 2022. In fiscal year 2021 this allowed TSA to provide 494 personal care bags in October 2020 containing items such as toilet paper, paper towels, laundry detergent, soap, hand soap, dish soap, shampoo, toothpaste, toothbrush, hand sanitizer, a face covering, and similar items for Care Management program participants who were not able to purchase routine items during the pandemic because they are unable to go to the store. A monthly supply delivery was added for Care Management and Case Coordination participants who suffer from incontinence followed. As of May 2021 TSA has secured the delivery of 5,990 packs of briefs, absorbent bed-pads and sanitary wipes to 312 program participants and counting. Total distribution of Personal Care Bags and incontinence briefs totaled 74.6% of the program's total participant population at that time.

TSA was a leader in distributing robotic Joy-for-All Companion pets to older adults who displayed indicators of social isolation or loneliness. As of mid-May 2021, 297 pets have been distributed to Care Management participants. Additionally, 512 personal-protective masks have been mailed or delivered to program participants and older adults in the community who were in need. Regular snow removal service was provided to 71 Care Management and Case Coordination & Support program participants, for a total of 659 separate clearings of sidewalks, driveways, front walks and porch steps during the winter of 2021. In addition, TSA is committed to providing regular, weekly lawn service for 88 participants.

In the spring of 2021, TSA Supports Coordinators identified participants living with significant mobility issues and barriers to accessing the community as ideal candidates for accessibility ramps, doorway widening and threshold modifications. By mid-May 2021 eight home modification projects had been completed, totaling over \$46,000, with an additional 14 projects in process. TSA also allocated \$67,000 towards supplying lift chairs for participants who require assistance with transferring from a sitting to standing position.

Two support coordinators from the Care Management team trained and received Tailored Care (TCARE) certification in May 2021, an evidenced-based solution to help prevent family caregiver burnout.

TSA's Information & Assistance (I&A) team quickly moved to a work-from-home operation, quickly returning calls left on a common voice mail. I&A added COVID specific resources to their Resource Database, including: COVID-19 Hotline, COVID19 Public Information Line and COVID-19 Test Finder. TSA community transportation spreadsheet was updated with COVID specific resource information. To accommodate the increased requests for food and meals, online applications for home delivered meals were filled out by I&A in collaboration with callers. Food pantry, food distribution and holiday meal resources were updated to provide more options when food insecurities were identified. One-hundred and forty-five check-in participants were referred to the agency via the Michigan Department of Health & Human Services (MDHHS) website registry. As of mid-May 2021 a total of 53 additional Friendly Reassurance participants have been added to the program in fiscal year 2021, most citing social isolation and loneliness due to COVID-19. I&A has also been monitoring, documenting and sharing COVID-19 vaccine opportunities for community and homebound participants. In fiscal

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

year 2022 I&A will continue to expand and update resources in the Resource Database and make it database accessible to the public online. Our I&A team will also continue to monitor re-openings and service changes in PSA 1C, including transportation resources.

The top ten resources inquired about by callers contacting I&A in fiscal year 2020 were, in order:

1. In-Home Health Care
2. Home Delivered Meals/Food Assistance
3. Housing
4. Transportation
5. Referrals to other AAA's
6. Legal Assistance
7. I&A Requests for MMAP
8. Veterans Benefits Assistance
9. TSA General Information & Assistance
10. Medic Alert Systems

MMAP also quickly switched to a full remote telephonic operation. This change occurred in large part due to the dedication of our volunteers. MMAP team members conducted a new pre-Annual Open Enrollment individual telephonic outreach campaign to reach former clients, connecting with 353 individuals to inform them about current scams, including COVID-19 related. Info was also provided about how to access services via telephone. On the operations side, the MMAP coordinators changed our call system to an online based system that insured counselors could access quickly the info about client in need.

Utilizing a Michigan No Wrong Door / Aging & Disability Resource Center (COVID-19) grant through AASA, TSA has launched the development of an innovative model to combat the rise in social isolation during the COVID-19 pandemic. By using evidence-based assessments and screening tools in order to provide person-centered services this model strives to meet physical, emotional or social needs - leading to positive mental health and quality of life outcomes.

Some Older Americans Act programs have been impacted by the COVID-19 pandemic. TSA's internal ride-of-last-resort transportation program suspended operations on Monday, March 23, 2020 and remains offline. However, a new vehicle fleet is being purchased with new communicable safety standards in mind. All of TSA's evidence based disease prevention programs are contracted to vendors. The National Kidney Foundation of Michigan began offering online workshops in June 2020. Adult Day Care (ADC) services were also suspended by our vendors. All senior centers in 1C's service area closed their buildings to the public in mid-March 2020. Some are now going through a limited re-opening process. The Long-Term Care Ombudsperson worked with TSA staff to advocate that the Wayne County Public Health Office should conduct testing of all long-term care facility residents and staff in the fall of 2020.

TSA will continue utilizing a Regional Service Definition, *Enhanced Adult Day Services for COVID-19 Pandemic*, which was approved in our 2021 AIP. This Regional Service Definition allows contracted Adult Day programs to provide weekly/regular check-in phone calls, activity packets, socialization through video interactions, and other non-traditional activities to support caregivers and clients while traditional program participation is not an option during the pandemic. Contracted ADC centers submitted requests for equipment, including PPE and cleaning supplies, in order to expand the services they are providing under the service

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

definition. One ADC was able to safely open with limited services late in fiscal year 2020. Another contracted ADC contracted remains closed and providing services remotely. Both ADC centers will continue to provide remote services to those in need or who are unable to receive services in-person.

During the COVID-19 pandemic the Long Term Care Ombudsman (LTCO) completed 286 contacts for general COVID -19 information, assisting people to locate information on COVID-19 guidance and the operating status of long term care facilities. Residents that have consistent access to a telephone and feel comfortable calling have been able to access the LTCO, but other residents must rely on family members to access services - if they can at all.

In March, 2020 the LTCO received numerous communications through providers and community members of COVID-19 outbreaks at facilities in PSA 1C. The region was experiencing a lack of PPE and COVID testing supplies. The LTCO discussed concerns with TSA's Leadership Team, which led to letters of concern and requests for COVID-19 testing targeted at long term care facilities being sent to elected officials and the Wayne County Health Department. The LTCO and TSA staff also discussed advocacy strategies with Leading Age Michigan. The LTCO has been collecting facility visitation policies and their plans to vaccinate unvaccinated residents against COVID-19. As of mid-May 2021 this information has been collected from 22 nursing homes and 9 Homes for the Aged so far. The LTCO contacted all the municipalities participating in the Wayne County Health Department's homebound vaccination program to confirm whether they would be willing to give COVID-19 vaccines to those in a long term care setting. As a result, the LTCO has connected at least 3 nursing homes with this opportunity to access the COVID-19 vaccine. This initiative also aided in the development of a relationship between the LTCO and the Deputy Health Officer at the Wayne County Health Department.

Weekly conference call meetings were held with Purchase-Of-Service (POS) vendors over the first few months of the pandemic to discuss a variety of challenges. Discussion topics included PPE usage, steps for reporting participant/worker COVID-19 exposure, and prioritizing services for high risk individuals. PPE supplies were distributed by TSA to 50 different vendors on multiple occasions throughout the pandemic. TSA staff worked with subcontractors who could no longer provide direct services during the pandemic and needed to alter service definitions to include remote/virtual activities. TSA also diligently worked with our nutrition services provider to ensure that food delivery continued throughout the pandemic at a level that meets emergency operating standards. In fiscal year 2022 TSA will continue to offer resources and support to our vendors and subcontractors.

For many years Coogan Terrace, a residence for older adults and individuals living with a disability in Melvindale, has held a Health/Resource Fair in their courtyard. COVID-19 forced a cancelation of this event last year - but this year the fair is scheduled for August 26, 2021. The Senior Alliance is looking forward to opportunities like this resource sharing event as we re-engage with in-person outreach activities.

As our community continues to adapt during the COVID-19 pandemic, TSA and our vendor network will continue to identify needs and collaborate on solutions.

A Regional Service Definition is being requested in this AIP for Gap Filling Services. This will give TSA some flexibility in our ability to quickly respond to urgent unmet needs that we find occurring in PSA 1C – especially in situations where individual's ability to live in the community cannot be addressed by other programs or services.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

In 2020 and 2021 TSA's Board of Directors approved an Advocacy Platform covering a variety of issues important to older adults and individuals living with a disability. The 2021 Advocacy Platform planks covered:

FEDERAL ADVOCACY POSITIONS -

- Increase Funding for Home-Delivered and Congregate Meals
- Preserve "Safety Net" Programs that Impact Older Adults and People Living with a Disability
- Expand State Health Insurance Program (SHIP)
- Address the Direct Care Workforce Shortage

STATE ADVOCACY POSITIONS -

- Eliminate Wait Lists for In-Home & Nutrition Services
- Shift Senior Community Service Employment Program (SCSEP) to ACL
- Increase MI Choice Waiver Funding to Support Direct Care Workforce
- Preserve & Rebalance the Community-Based Long Term Services and Supports (LTSS) Model
- Publicly Evaluate MI Health Link Before MLTSS Expansion
- Grow Transportation Options
- Combat Elder Abuse, Exploitation & Neglect
- Expand Housing Options and Accessibility
- Develop Outreach, Information and Services for Underserved Populations
- Access to Broadband Internet Service for All Michiganders

In July 2020 TSA began publication of a monthly advocacy email newsletter, Colloquy. This update routinely includes information on legislation, administrative action and appropriations developments impacting older adults and individuals living with a disability.

TSA also launched a new podcast series, *Inside The Senior Alliance*, with the first episode posted in October 2020. Available on all major podcasting platforms, the series is informational in nature, providing information on resources, programs and services. Episodes are less than 15 minutes in length and have been useful for potential program participants, caregivers and agency staff. Topics to date include: What is The Senior Alliance?, MI Choice Waiver, MMAP, Information & Assistance, Housing Coordination, the Long Term Care Ombudsman and the role of Supports Coordinators.

During the COVID-19 pandemic in-person advocacy visits became telephone and video meetings. TSA continued to engage with federal, state and county legislators on a variety of aging-related topics. Traditional written communications were sent to federal and state elected officials on a variety of topics since the beginning of the pandemic, including: COVID-19 emergency funding, COVID-19 testing, response and older adult needs during the pandemic, the direct care worker wage increase, the 2020 U.S. Census, nursing home recommendations, kinship caregiver legislation and the criminal background check bill.

TSA staff played a leading role in planning Older Michiganders Day (OMD) 2021 with the Area Agency on Aging Association of Michigan. The virtual nature of OMD 2021 lent itself to the creation of a Senior Action Week, with a focus on one of the five OMD advocacy planks each day. TSA staff served on the steering and platform committees, and served as host during the OMD LiveStream event on May 12th that was well attended by people from across the state.

The Senior Alliance will continue its contracted work as a vendor to the Integrated Care Organization's

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

operating MI Health Link in FY 2022.

Grants will again be pursued to support TSA's Holiday Meals efforts and COVID-19 response, as they become available.

The agency anticipates applying for a Michigan Health Endowment Fund grant in the summer of FY 2021 to support work on a model addressing social isolation amongst older adults with complex social needs and co-morbid health challenges, such as psychiatric or medical conditions.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

County/Local Unit of Government Review

The Area Agency on Aging must send a request to the chairperson of each County Board of Commissioners within the Planning and Service Area (PSA), for approval of the final AIP by August 2, 2021. Notification can be sent via US mail or by electronic means, with delivery and signature confirmation, by no later than June 30, 2021. Describe the efforts made to distribute the AIP to, and gain support from, the appropriate county and/or local units of government.

The Senior Alliance (TSA) will inform each chief elected official of the 34 local units of government comprising the Planning & Service Area (PSA) 1-C of southern and western Wayne County about the availability of the draft 2022 Annual Implementation Plan (AIP) for review via on the TSA's website by Wednesday, June 30, 2021. This notice will be sent in a letter sent via the U.S. Mail, with delivery and signature confirmation, and contain information on how to access, view and print the 2022 AIP document. This letter will also advise that a printed copy of TSA's 2022 AIP can be sent via U.S. Mail, or as an electronic copy via email, if requested. The letter will also note that TSA's Chief Executive Officer and Chief Advocacy & Planning Officer are available to discuss the 2022 AIP, if requested. Email notification from the local unit of government of their approval of the 2022 AIP or their related concerns will be requested in the letter, with a due date of Friday, July 30, 2021.

Notification of the 2022 AIP's availability will also be sent to TSA's Board of Directors prior to the public hearing on Monday, June 14, 2021. TSA's Board of Directors is partly comprised of individuals appointed by the Conference of Western Wayne (CWW) and the Downriver Community Conference (DCC). The memberships of the CWW and DCC are constituted of chief elected officials within PSA 1C.

TSA's Community Focal Points will receive the 2022 AIP Public Hearing notice and a link to the draft 2022 AIP. The Community Focal Points will be encouraged to share the draft 2022 AIP and the public hearing notice within their communities.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Public Hearings

Complete the chart below regarding your public hearing(s). Include the date, time, number of attendees and the location and accessibility of each public hearing. Please scan any written testimony (including emails received) as a PDF and upload on this tab. A narrative description of the public input strategy and hearing(s) is also required. Please describe the strategy/approach employed to encourage public attendance and testimony on the AIP. Describe all methods used to gain public input and the resultant impact on the AIP. Indicate whether the meeting complied with the Michigan Open Meetings Act. (See Transmittal Letter 2021-448.)

Date	Location	Time	Barrier Free?	No. of Attendees
06/14/2021	Virtual	09:30 AM	Yes	0

A public hearing on the draft 2022 Annual Implementation Plan (AIP) will be held on Monday, June 14, 2021 at 9:30 a.m. The public hearing will be part of TSA's Advisory Council meeting.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Regional Service Definitions

If the area agency is proposing to fund a new (not previously approved in this multi-year planning cycle) service category that is not included in the Operating Standards for Service Programs, then information about the proposed service category must be included in this section. Enter new regional service name, identify the service category and fund source, include unit or service, minimum standards and why activities cannot be funded under an existing service definition.

Service Name/Definition

Gap Filling Services

Rationale (Explain why activities cannot be funded under an existing service definition.)

Gap Filling Services address barriers to independence, health, or safety that require immediate attention when other resources are not available or accessible. Gap Filling Services are a one-time last resort option that provide flexible, cost effective, and person-centered resources to address unmet needs of older adults and caregivers in an effort to create and/or maintain a safe living environment in the community.

Service Category	Fund Source	Unit of Service
☐ Access ☐ In-Home ☒ Community	☒ Title III PartB ☐ Title III PartD ☒ Title III PartE ☐ Title VII ☐ State Alternative Care ☐ State Access ☐ State In-home ☐ State Respite ☐ Other _____	One hour

Minimum Standards

- Services will be based on an intake and assessment conducted by Information & Assistance, Care Management, Case Coordination & Support or Supports Coordination staff.
- Staff will identify a lack of available services, programs or resources to address the issue.
- Recipients of Gap Filling Services will be encouraged to share in the cost of provided Gap Filling Services.
- Gap Filling Services may include, but are not limited to: minor home modification/home safety equipment, household/yard chore, extermination service, moving assistance, major decluttering, personal care training, specialized medical or communications equipment and technologies, accessibility ramps, utility assistance, supplies and other services deemed necessary to enable an older adult to remain living in the community.
- Chief Clinical Officer must approve use of gap filling services.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Access Services

Select from the list of access services those services the area agency plans to provide directly during FY 2022, and provide the information requested. Specify, in the appropriate text box for each service category, the planned goals and activities that will be undertaken to provide the service.

The Area Plan Grant Budget that is uploaded and saved in AMPS must include each access service to be provided directly in the Direct Service Budget details tab. The funding identified in this tab should correspond to the funding (federal OAA Title III or VII and state funds) identified in the Area Plan Grant Budget's Support Services Detail tab. The method of provision must be specified in the Service Summary tab.

Care Management

Starting Date 10/01/2021 Ending Date 09/30/2022

Total of Federal Dollars Total of State Dollars

Geographic area to be served

PSA 1C

Specify the planned goals and activities that will be undertaken to provide the service.

GOAL: Provide quality Care Management (CM) services throughout the entire PSA 1-C.

ACTIVITIES:

1. CM clients will receive comprehensive assessment and the desired level of assistance with coordination of services most appropriate to their needs and wishes. Enrollment continues on an ongoing basis.
2. Program quality will be monitored on an ongoing basis. As necessary, program improvements will be made. Staff training will be identified through quality assurance activities and training will be provided , as needed.
3. Analyze results of the Quality Aging Matrix survey , which provided a standard measure of global wellbeing by measuring outcomes rather than outputs. Information was gathered in 15 domains: Daily Functioning, Physical Health, Nutrition, Informal Supports, Social Connections, Mental Health, Substance Abuse, Access to Health Care, Financial Resources, Access to Services, Housing, Safety, Transportation, Legal Status and Caregiver Supports. Staff can use the survey results to prioritize focus areas utilizing a person centered planning philosophy.
4. TSA recognizes falls are a serious issue for older adults with 80% of their falls occurring in the bathroom. TSA will take a proactive approach in fall prevention by identifying those who lack bathroom safety equipment and provide and install necessary items, if funding is available. TSA provides Personal Emergency Response units and also offers enhanced units that have fall detectors.

Number of client pre-screenings:	Current Year:	755	Planned Next Year:	800
Number of initial client assesments:	Current Year:	154	Planned Next Year:	180
Number of initial client care plans:	Current Year:	154	Planned Next Year:	180

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Total number of clients (carry over plus new):	Current Year: 561	Planned Next Year: 600
Staff to client ratio (Active and maintenance per Full time care	Current Year: 1:61	Planned Next Year: 1:60

Case Coordination and Support

<u>Starting Date</u>	10/01/2021	<u>Ending Date</u>	09/30/2022
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Total of Federal Dollars	Total of State Dollars
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Geographic area to be served

PSA 1C

Specify the planned goals and activities that will be undertaken to provide the service.

GOAL: To provide quality Case Coordination and Support (CCS) services for older adults within the PSA 1-C.

ACTIVITIES:

1. Clients who do not currently need a nursing facility level of service, but are at-risk of needing that level of care; will receive support to prevent or slow a further medical or functional decline. As of April 1, 2019, 306 individuals have been served through CCS. Enrollment continues on an ongoing basis.
2. Program quality will be monitored on an ongoing basis. As necessary, program improvements will be made. Staff training will be identified through quality assurance activities and trainings will be provided , as needed.
3. Implement Quality Aging Matrix survey which will provide a standardized measure of global well being by measuring outcomes rather than outputs. Information is gathered in 15 domains: Daily Functioning, Physical Health, Nutrition, Informal Supports, Social Connections, Mental Health, Substance Abuse, Access to Health Care, Financial Resources, Access to Services, Housing, Safety, Transportation, Legal Status and Caregiver Supports. Staff can use the survey to prioritize focus areas utilizing a person centered planning philosophy .
4. TSA has increased staffing in the CCS program to reduce the wait list and serve more participants . TSA will continue to evaluate in the upcoming program years.

Information and Assistance

<u>Starting Date</u>	10/01/2021	<u>Ending Date</u>	09/30/2022
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Total of Federal Dollars	Total of State Dollars
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Geographic area to be served

PSA 1C

Specify the planned goals and activities that will be undertaken to provide the service.

GOAL: Provide quality Information and Assistance (I&A) services to the entire PSA 1-C through the continued engagement and increased partnerships with community-based organizations, local governments, health care entities, community focal points, and local senior centers to gain relevant and up-to-date information on the needs of the community.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

ACTIVITIES:

1. Provide up-to-date information to the entire PSA 1-C by offering appropriate resources and referrals.
2. Update and expand the new I&A resource database utilized by the Information Services department through the use of Interns and I&A staff.
3. Continue to measure the quality of calls through ongoing phone monitoring and mentoring sessions with I&A staff and random database checks.
4. Monitor type and quantity of calls coming into the I&A department and set benchmarks for I&A Specialists to strive for.
5. Create a new call flow process allowing internal calls to be transferred and simple requests to be answered while allowing fully trained I&A Specialists to handle the more complex calls and provide Options Counseling when required.
6. Update the I&A internal home health care procedures and staff training process to more effectively make referrals for Care Management, Case Coordination and Support, Targeted Care Management, MI Choice Waiver, MMAP for MI Health Link Options Counseling and any other home health care related assistance.
7. Increase I&A staff involvement in community outreach activities.

1.

Transportation (for MATF only)

<u>Starting Date</u>	10/01/2021	<u>Ending Date</u>	09/30/2022
Total of Federal Dollars		Total of State Dollars	
Geographic area to be served			
PSA 1C			

Specify the planned goals and activities that will be undertaken to provide the service.

GOAL: Provide TSA's ride-of-last-resort transportation to clients that are unable to access and/ or afford private transportation in and to areas where SMART or other local transportation companies are unable to service.

ACTIVITIES:

1. Residents of the planning service area (PSA) 1-C will have an improved transportation options to access non-emergency medical, housing transitions, benefit application, and enrollment appointments.
2. In collaboration with the I&A department, identify additional community resource options to meet the growing need for transportation services.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Approved MYP Program Development Objectives

Program development goals and objectives previously set by the area agency and approved by the CSA in this multi-year planning cycle are included as read-only. For each of these established program development objectives, a text box is included for the area agency to provide information on progress toward the objectives to date. This text box is editable. Please provide information on progress to date for each established objective under the section tab entitled "Progress."

For the Diversity, Equity and Inclusion (DEI) objective, include progress on trainings for staff and subcontractors in DEI and unconscious bias. Discuss efforts to ensure that programming and outreach is culturally sensitive and welcoming to all participants, including non-English speaking persons. Discuss efforts to ensure that providers are trained to adapt to diverse cultural needs.

Area Agency on Aging Goal

A. Advocate, inform and empower those we serve.

Objectives

1. Serve as an information resource for elected officials on programs and services that impact the lives of older adults and their caregivers.

Timeline: 10/01/2019 to 09/30/2022

Progress

In 2020 and 2021 TSA's Board of Directors approved an Advocacy Platform covering a variety of issues important to older adults and individuals living with a disability. Copies of the platform were sent to all federal, state and county elected officials serving PSA 1C.

The 2021 Advocacy Platform planks covered:

FEDERAL ADVOCACY POSITIONS -

Increase Funding for Home-Delivered and Congregate Meals

Preserve "Safety Net" Programs that Impact Older Adults and People Living with a Disability

Expand State Health Insurance Program (SHIP)

Address the Direct Care Workforce Shortage

STATE ADVOCACY POSITIONS -

Eliminate Wait Lists for In-Home & Nutrition Services

Shift Senior Community Service Employment Program (SCSEP) to ACL

Increase MI Choice Waiver Funding to Support Direct Care Workforce

Preserve & Rebalance the Community-Based Long Term Services and Supports (LTSS) Model

Publicly Evaluate MI Health Link Before MLTSS Expansion

Grow Transportation Options

Combat Elder Abuse, Exploitation & Neglect

Expand Housing Options and Accessibility

Develop Outreach, Information and Services for Underserved Populations

Access to Broadband Internet Service for All Michiganders

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Federal, state, county and local elected officials receive TSA's monthly advocacy newsletter, Colloquy, via email.

During the COVID-19 pandemic in-person advocacy visits became telephone and video meetings. TSA continued to engage with federal, state and county legislators on a variety of aging-related topics. Notable discussion occurred in 2021 with Congresswoman Debbie Dingell, State Representative Abdullah Hammoud, State Rep. Laurie Pohutsky, State Representative Cara Clemente, State Representative Matt Koleszar, State Representative Mary Cavanagh, State Representative Karen Whitsett, State Representative Jewell Jones, State Senator Erika Geiss, State Senator Stephanie Chang and State Senator Sylvia Santana.

Communications were sent to federal and state elected officials on a variety of topics since the beginning of the pandemic, including:

COVID-19 Emergency Federal Funding (March 2020)
Letter to Governor Gretchen Whitmer on COVID-19 response & needs of older adults (May 2020)
Nursing Home Testing Advocacy with Long-Term Care Ombudsman (May 2020)
COVID-19 Stimulus Funding (May 2020)
Direct Care Worker Wage Increase (June 2020)
U.S. Census Deadline Extension (August 2020)
Governor's Nursing Task Force Recommendation (September 2020)
Kinship Caregiver Bills (September 2020)
Criminal Background Check Bill – HB 6124 (September 2020)
COVID-19 Relief & Federal FY 2021 Budget (December 2020)
Direct Care Worker Wage Increase (February 2021)
Criminal Background Check Bill – HB 4325 (March 2021)

TSA staff drafted a Resolution, introduced by State Representative Cara Clemente, outlining the impact and contributions of older adults and declaring May 12, 2021 as Older Michiganians Day. H.R. 105 was unanimously approved.

2. Advocate on behalf of older adults for increased appropriations to the community-based LTSS, including the MI Choice Medicaid Waiver Program.
Timeline: 10/01/2019 to 09/30/2022

Progress

TSA's 2020 and 2021 Advocacy Platform contains two planks on the MI Choice Waiver program:

Increase MI Choice Waiver Funding to Support Direct Care Workforce -
Work with other organizations to advocate for an increased MI Choice Waiver appropriation focused on raising rates paid to the in-home services vendor network that provides direct care services. Data from PHI shows that in 2019, on average, home health and personal care aides in Michigan earned \$ 11.58 per hour. This is less than they can make in entry-level retail sector positions. Increased service delivery rates will attract needed employees and result in an improved workforce, giving more adults with a nursing home level of care need the choice to receive care in their home.

Preserve & Rebalance the Community-Based Long Term Services and Supports (LTSS) Model -
Advocate to preserve and strengthen the home and community-based model of service delivery for individuals

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

receiving long-term services and supports (LTSS) by building upon the successes achieved by Area Agencies on Aging in their role as administrators of the MI Choice Medicaid Waiver program. Rebalance Medicaid Long Term Services and Supports (LTSS) funding so at least 60% goes to Home and Community Based Services (HCBS). In fiscal year 2016, 57% of Medicaid LTSS care delivered in the U.S. was through HCBS. In Michigan only 40% went to HCBS in fiscal year 2016, while 60% went to care in institutional settings. Michigan's HCBS program, known as MI Choice, has demonstrated that care delivered in the home is more than 55% less expensive than having the same person moved into a nursing facility or institutional setting.

Each year TSA staff produce an informational handout on the impact of the MI Choice Waiver program, including the cost effectiveness of community-based care versus institutional care. This handout is distributed to state and federal elected officials in PSA 1C.

In July 2020 TSA began publication of a monthly advocacy newsletter, Colloquy. This email update routinely includes updates on legislation, administrative action and appropriations developments around the MI Choice Waiver program.

TSA's new podcast series, Inside The Senior Alliance, dedicated two episodes to exploring the MI Choice Waiver program. While a third episode featured a discussion with a Supports Coordinator in the program. These podcasts are informational in nature and are used as a tool to educate policy makers, potential program participants, caregivers and the public about this important community-based program.

TSA staff have also participated in advocacy conversations with state legislators focusing on the MI Choice Waiver program.

3. Advocate on behalf of older adults for increased appropriations to the State of Michigan Aging & Adult Services Agency (AASA).

Timeline: 10/01/2019 to 09/30/2022

Progress

TSA's Board of Directors has approved an Advocacy Platform in 2020 and again in 2021. The platform includes AASA funding related planks:

Eliminate Wait Lists for In-Home & Nutrition Services -

With the Silver Key Coalition, advocate for a \$4.75 million increase in the in-home and nutrition services line items within the Michigan Department of Health and Human Services budget for Fiscal Year 2022. This funding will continue progress toward the goal of making Michigan a "no-wait state". While our service area does not currently have a wait list for nutrition services, a long wait list exists for MDHHS allocated in-home services.

Grow Transportation Options -

support policies and advocate to expand the availability, affordability and accessibility of transportation options that enable people to work, volunteer, socialize, recreate, access services, keep clinical appointments, attend religious activities and spend time with family. Lack of transportation leads many older adults to miss both critical and routine medical appointments, resulting in adverse health impacts and higher medical costs. The Family Caregiver Alliance reports that 78% of caregivers have provided or arranged transportation for their loved one.

Expand Housing Options and Accessibility -

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

The Senior Alliance supports policies and appropriations to improve the affordability of housing for older adults and people living with a disability, further enabling individuals to live in the community they choose. A Harvard University study finds that 2.4 million of the poorest older adults will have no access to affordable housing by 2038. Models that bring together housing accessibility and available community-based services should be encouraged and enabled.

Develop Outreach, Information and Services for Underserved Populations

The Senior Alliance supports policies and appropriations to expand outreach, resource information and services to underserved populations, including low-income, racial and ethnic minorities, immigrants, refugees, isolated individuals and those identifying as LGBTQ.

In July 2020 TSA began publication of a monthly advocacy newsletter, Colloquy. This email update routinely includes updates on legislation, administrative action and appropriations developments involving AASA funded programs.

TSA's new podcast series, Inside The Senior Alliance, has dedicated multiple episodes to AASA funded programs. Topics have included Information & Assistance, Medicare Medicaid Assistance Program, Housing Coordination, the Long Term Care Ombudsman and advocacy through the Michigan Senior Advocates Council. These podcasts are informational in nature and are used as a tool to educate policy makers, potential program participants, caregivers and the public about these important community-based programs and services.

TSA staff have also participated in advocacy conversations with state legislators focusing on appropriations for AASA programs.

4. Inform and empower older adults, caregivers and stakeholders on issues impacting the lives of older adults in PSA 1C.

Timeline: 10/01/2019 to 09/30/2022

Progress

In 2020 and 2021 TSA's Board of Directors approved an Advocacy Platform covering a variety of issues important to older adults and individuals living with a disability. This platform document was distributed to the agencies Advisory Council, stakeholders and elected officials. The platform is also available on TSA's website. It serves as a guidepost for advocacy action that can be undertaken by older adults, caregivers and stakeholders.

In July 2020 TSA began publication of a monthly advocacy newsletter, Colloquy - which means, "a conversation." Colloquy provides recipients an overview of aging related legislation, appropriations process updates and information on public policy actions in the aging sector.

TSA also periodically issues Advocacy Action Alerts to empower people with background information and advocacy points if they desire to contact their legislators on important issues. Over the past year alerts have been issued on COVID-19 Relief, Kinship Caregiver legislation and a Direct Care Worker Wage Increase through the state.

Every meeting of TSA's Advisory Council includes an agenda item for advocacy updates from staff and an update from the agency's Michigan Senior Advocates Council. The Advisory Council serves as an important link to others in our community that advocate on aging issues.

The Senior Alliance, Inc.

FY 2022

B. Promote elder and vulnerable adult rights and justice.

Objectives

1. Provide information and education to older adults, caregivers and stakeholders to raise awareness about elder abuse.

Timeline: 10/01/2019 to 09/30/2022

Progress

I&A provides information to older adults, caregivers and stakeholders about resources for elder abuse, such as APS, elder abuse prevention through Neighborhood Legal Services or assistance with financial exploitation through legal assistance or through the Success After Financial Exploitation program (SAFE) at Wayne State University. Referrals are made to the Long Term Care Ombudsman when concerns are about an individual in a nursing facility. I&A shares information, resources and intervenes when necessary.

TSA's I&A Team has a direct working relationship with the State of Michigan Adult Protective Services (APS). APS makes referrals to TSA for program and service assistance, while TSA makes reports to APS when there is concern for the safety and well-being of an individual.

The LTCO attended and participated in Attorney General Dana Nessel's Elder Abuse Task Force town halls on December 13, 2019 at the Livonia Senior Center and on January 24, 2020 the Woodhaven Recreation Center. Information provided MLTCOP resident rights fact sheets, resident right bookmarks and pamphlets and elder abuse literature.

The LTCO presented "Elder Abuse, Neglect and Exploitation, Recognizing, Reporting and Prevention" on February 8, 2021 to TSA's Advisory Council and on March 17, 2021 to the Wayne County Senior Services Nutrition Site Managers.

The MMAP Team reached out to 2,630 Medicare beneficiaries and their caregivers related to fraud, waste and abuse in Medicare in fiscal year 2020. Similarly, 1,530 individuals in fiscal year 2021 have been educated via outreach efforts as of May 20, 2021.

In fiscal year 2021, the MMAP team has reached out to the community 35 times in various ways to educate individuals via community presentations, Facebook posts and an online podcast describing our services. In fiscal year 2020 the MMAP team reached out to the community 47 times with info and resources.

2. The Long Term Care Ombudsman will work to increase coordinated and collaborative approaches to assisting older adults and their caregivers understand long-term care.

Timeline: 10/01/2019 to 09/30/2022

Progress

The LTCO assisted 5 resident transfers into the community, referring residents to transition and MI Health Link services.

The LTCO had 155 information and assistance contacts for long term care options, 62 information and assistance

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

contacts Medicaid options and 43 contacts of information and assistance for transitions services.

On May 20, 2021 the LTCO presented to Elder Law and Advocacy Section on "Back to Basics Webinar Series of Alternatives to Long Term Care". Presentation discussed community options providing services for individuals to remain in the community or the least restrictive environment possible.

3. Advocate at the state and federal levels for the rights of older adults.

Timeline: 10/01/2019 to 09/30/2022

Progress

LTCO worked with the office of State Representative Laurie Pohutsky and Attorney General Dana Nessel's Elder Abuse Task Force on a town hall event held on December 13, 2019 in Livonia.

The LTCO worked with the offices of State Representative Darrin Camilleri, State Senator Stephanie Chang and Attorney General Dana Nessel's Elder Abuse Task Force on a town hall event held on January 24, 2020 in Woodhaven.

TSA's 2020 and 2021 Advocacy Platform contains two plank on elder abuse prevention:

Support Elder Justice Act Initiatives -

Support initiatives authorized by the federal Elder Justice Act (EJA). The EJA implements a comprehensive national strategy to address elder abuse, neglect and exploitation. Services delivered by Adult Protective Services and Long Term Care Ombudsmen are critical to assisting the victims of abuse.

Combat Elder Abuse, Exploitation & Neglect -

Collaborate with partners in the aging network to support state-level policies to combat all forms elder abuse, exploitation and neglect. Elder abuse is all too common with 1 in 10 older adults becoming the victims of abuse. Some victims suffer physically, many others bear psychological and emotional scars.

C. Provide municipalities with technical assistance in pursuit of Communities for a Lifetime designation.

Objectives

1. Provide all 34 municipalities in PSA 1C information on Communities for a Lifetime designation.

Timeline: 10/10/2019 to 09/30/2020

Progress

On October 1, 2019 a detailed letter was sent to the Mayors and Township Supervisors in 32 of the 34 municipalities in region 1C. The letter provided a detailed overview of the CFL initiative and offered technical assistance with the designation process. No municipalities expressed interest in pursuing CFL.

The City of Inkster holds CFL designation. The City of Livonia began pursuing AARP Age Friendly Community designation in partnership with St. Mary's Livonia Hospital, but paused the initiative at the onset of the COVID-19 pandemic.

The Senior Alliance, Inc.

FY 2022

2. Provide technical assistance to any municipality electing to pursue Community for a Lifetime designation.
Timeline: 10/01/2019 to 09/30/2020

Progress

On October 1, 2019 a detailed letter was sent to the Mayors and Township Supervisors in 32 of the 34 municipalities in region 1C. The letter provided a detailed overview of the CFL initiative and offered technical assistance with the designation process. No municipalities expressed interest in pursuing CFL.

The City of Inkster holds CFL designation.

The City of Livonia is pursuing AARP Age Friendly Community designation in partnership with St. Mary's Livonia Hospital. The Senior Alliance is a member of the committee facilitated by St. Mary's Livonia Hospital working on AARP Age Friendly Community designation.

D. Help older adults maintain their health and independence at home and in their community.

Objectives

1. Implement use of the Quality Aging Matrix survey in the Care Management program.
Timeline: 10/01/2019 to 09/30/2022

Progress

The Quality Aging Matrix was fully implemented on October 1st, 2019. As of April 1st, 2021, staff had conducted 1,090 surveys. Responses were collected at each initial assessment and again during the participant's first reassessment. Management initiated follow-up with support coordinators whose monthly assessment data did not correlate with new Quality Aging Matrix entries. Data collection continues on a month-to-month basis as the agency remains partnered with the survey's administrators within the Southeast Michigan Senior Regional Collaborative.

With a significant sample size, focus has shifted to the data analysis phase of the survey's implementation. Domains of concern for intake staff, deserving special attention during assessments, were identified as Daily Functioning, Physical Health and Access to Services. Between the initial assessment and first reassessment, program interventions are correlated with a 39.8% improvement in Daily Functioning and 40.1% improvement in Access to Services domains. The agency has also identified movement within the Social Connections domain, quantifying the worrying impact of the pandemic and related social distancing. 74.7% of program participants were not able to improve their level of social connectedness, with 11.7% seeing a reduction to crisis level.

TSA will continue to monitor crisis domains during intake and reassessments, with a focus on social connection interventions.

2. Provide and install bathroom safety equipment for Care Management program participants to reduce fall risk, as funding is available.
Timeline: 10/01/2019 to 09/30/2022

Progress

Meetings were held with local vendors and Care Management staff to develop plans for effective bathroom safety equipment service delivery. Shower chairs, raised commodes, fixed-grab bars and similar sample equipment

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

were purchased to educate staff and vendors on available, high-priority items. A database was created to improve service ordering efficiency, organizing participants who need equipment by their geographic location.

In December of 2019, the agency renewed focus on immediately available equipment to mitigate fall risk. Care Management staff were re-trained on available fall detection Personal Emergency Response Systems as a program intervention. The topic became a standing agenda item at monthly program staff meetings.

With the suspension of in-home visits in March of 2020, Care Management Staff began direct shipment of shower chairs and transfer benches to participants identified as a fall risk without appropriate safety equipment. As of mid-May, 38 additional participants now have this safety equipment in their bathroom. TSA continues to offer this equipment to new program enrollees and current participants who develop indicators of fall risk as they age in place.

3. Train agency staff to understand and meet the changing needs of older adults and individuals living with disabilities to ensure quality, coordinated care, and accessibility of available services throughout PSA 1-C.
Timeline: 10/01/2019 to 09/30/2022

Progress

TSA has provided all staff trainings on the following topics:

- Gift of Life - Information pertaining to organ donation by Gift of Life Organization (October 2019)
- Cultural Diversity – ACCESS (November 2019)
- MI-DDI and MI-OCEAN Presentation by Wayne State University (January 2020)
- Successful Aging through Financial Empowerment by Wayne State University Institute of Gerontology (February 2020)
- QPR – Question Persuade Refer Training by Hegira Health (February 2020)
- DEI LGBTQ Training by SAGE (December 2020)
- Alzheimer's & Dementia overview by Alzheimer's Association (January 2021)
- Various ALZ and Dementia optional workshops by Alzheimer's Association (February & March 2021)
- COVID-19 Vaccine Information by Michigan Medicine Physician Dr. Cinti (February 2021)
- Pathways for Suicide Prevention by Hegira Health (March 2021)
- Emergency Needs Program by Hannan Center (March 2021)
- Successful Aging through Financial Empowerment by Wayne State University (April 2021)

TSA's monthly staff meetings include agency include updates on programs, services, resources, as well as compliance reminders and COVID-19 information.

The Information & Assistance Team has attended the following trainings:

- Older Adult Crisis Management During COVID-19
- Older Adult Mental Health
- QPR Suicide Prevention Training
- LGBT Cultural Sensitivity Training
- Alzheimer's/Dementia Training
- I&A Manager and CCD Housing Coordinator attended a PACE presentation
- Summer 2021 scheduled trainings are on PACE, MI Choice Waiver, CM/CCS and MI Health Link
- Future trainings include: Hoarding, Mental Health First Aid, Motivational Interviewing

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

The CM/CCS Team has attended the following trainings:

- Michigan Elder Law – Aging in Michigan Conference (October 2019)
- Challenging Geriatric Behaviors (December 2019)
- A meaningful life with Alzheimer's disease (November 2020)
- Making of a Victim/Institute of Gerontology-Wayne State University (December 2020)
- Alzheimer's Association Michigan Chapter Presents: 10 Warning Signs (February 2021)
- Issues in Aging Conference/Institute of Gerontology-Wayne State University (April 2021)

The LTCO held virtual trainings with 8 TSA employees on the Michigan Long Term Care Ombudsman Program.

MMAF conducts monthly update trainings for all MMAF team members. Initial MMAF volunteer trainings are held in 10 out of 12 months each year.

4. Provide basic needs outreach (housing, food resources, social isolation) to promote successful aging-in-place.
Timeline: 10/01/2019 to 09/30/2022

Progress

Friendly Reassurance is one of TSA's programs designed to help combat social isolation and aging-in-place through regular telephone contacts to provide interaction and assure the participant's well-being and safety. Outreach to promote this program has included: 1) Friendly Reassurance flyers taken to all outreach events in the community; 2) Presentations for TSA staff, community seniors and professionals; 3) Flyers included in a holiday envelope going to every holiday meals recipient; 4) Flyers delivered, mailed or emailed during the pandemic.

The outcome of the outreach has been positive since the beginning of fiscal year 2020, with the increased social need due to the COVID-19 pandemic. In fiscal year 2020 calls were made to 180 unduplicated Friendly Reassurance participants compared to 127 in fiscal year 2019. In addition, 145 MDHHS check-in calls were made.

Starting in May 2020, a comprehensive social isolation contacts and resources list was shared with agency staff. Care Management Support Coordinators were trained to cover the topic on subsequent participant contact calls.

In 2021, Care Management Support Coordinators began tracking COVID-19 vaccination progress for their participants. An inter-agency hub for current vaccine opportunities by municipality is maintained and shared with program participants and the community at large. Special outreach to the homebound population and access to visiting vaccine appointments remains a focus.

The Michigan Long Term Care Ombudsman Program initiated the Companion Pet Project, with the LTCO contacting 24 nursing homes for interest. The LTCO delivered 3 pets to residents who relocated to other nursing homes.

MMAF Program Materials were distributed at TSA Food Distribution events to approximately 1,600 individuals. Information including the Extra Help program and the Medicare Savings Program.

MMAF has established an easier process for volunteer counselors to refer to TSA's Information & Assistance Department when a client who may need services is identified. Beginning in October 2020, MMAF Counselors utilize a fillable form on Microsoft Teams that is accessible and easy to use.

The Senior Alliance, Inc.

FY 2022

The Senior Alliance delivered 1,015 holidays meals at Thanksgiving 2019 and 1,156 at Christmas 2019 using a network of volunteers.

The COVID-19 pandemic required a shift from our normal program. TSA coordinated with Wayne County Senior Services to deliver the holiday meal with the normal meals delivery. TSA provided a frozen holiday themed meal to each meals on wheels recipient for Easter 2020 and 2021 and Thanksgiving & Christmas 2020. Over 2,000 meals were provided per holiday along with a holiday themed message/card.

E. Improve the accessibility of services to Michigan's communities and people of color, immigrants and LGBTQ+ individuals

Objectives

1. Establish outreach partnerships with key local organizations to understand the caregiver cultural needs within each minority population.

Timeline: 10/01/2020 to 09/30/2022

Progress

TSA has developed a focus group process to engage communities of color, immigrants and LGBTQ+ individuals. Outreach has been conducted to ACCESS, Sage and the NAACP for the conducting of focus groups in late FY 2021 and FY 2022.

TSA conducted a virtual focus group with eight representatives from the faith-based community in PSA 1C on November 18, 2020. A regular, larger faith-based event is planned to occur each year to reach all denominations and minority populations in PSA 1C.

TSA has Advisory Council representation from ACCESS and is currently seeking additional members from other minority communities and organizations.

2. Develop and distribute outreach materials to educate participants and caregivers of immigrants, LGBTQ+ people and communities of color on available programs and services.

Timeline: 10/01/2020 to 09/30/2022

Progress

TSA has maintained tele-interpreter capabilities through Language Line Services in order to communicate effectively with non-English speakers who contact the agency.

With information gained from the focus groups, TSA will develop and distribute brochures, presentations and other outreach materials based on input and recommendations.

3. Provide annual diversity, equity, and inclusion training to contracted organizations and TSA staff.

Timeline: 10/01/2020 to 09/30/2022

Progress

TSA has been engaged in several DEI trainings with staff. A DEI consultant has been hired and is currently leading trainings with management, staff, the Advisory Council and the Board of Directors.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Six staff members attended the following AIRS trainings: Diversity, Equity and Inclusion at the Personal and Organizational Level; What COVID Uncovered About Privilege; Personal Freedom from Cultural Myths.

SAGE LGBT cultural sensitivity training was provided for all staff.

Four staff members trained in SAGE Metro Detroit's "Act. Reflect. Commit." curriculum, consisting of 9 online learning modules totaling over 3 hours of licensed Social Worker continuing education.

ACCESS provided a staff training on Arabic culture and the Arab American National Museum.

MI-DDI and MI-OCEAN presentation on disabilities.

In FY 2022 staff will complete SAGE LGBT online intensives and continue Diversity Equity and Inclusion trainings with the consultant.

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Supplemental Documents

This year, the completion of the Quality Outcome Measures Reporting Form (six-month report) and the Emergency Management and Preparedness document are required and may be found in the Document Library.

Supplemental Documents A through F are presented in the list below. Select the applicable supplemental document(s) from the list on the left. Provide all requested information for each selected document. Note that older versions of these documents will not be accepted and should not be uploaded as separate documents.

- A. Policy Board Membership - Required
- B. Advisory Council Membership - Required
- C. Proposal Selection Criteria - *should only be completed if there are new or changed criteria*
- D. Cash-In-Lieu-Of-Commodity Agreement - *should only be completed if there are new or changed criteria*
- E. Waiver of Minimum Percentage of a Priority Service Category - *should only be completed if there are new or changed criteria*
- F. Request to Transfer Funds - *should only be completed if there are new or changed criteria*

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

SUPPLEMENTAL DOCUMENT A

Board of Directors Membership

	Asian/Pacific Islander	African American	Native American/ Alaskan	Hispanic Origin	Persons with Disabilities	Female	Total Membership
Membership Demographics	1	0	0	0	1	4	13
Aged 60 and Over	1	0	0	0	1	2	7

Board Member Name	Geographic Area	Affiliation	Membership Status
Tom Jankowski	Canton	At-Large Wayne State Institute of Gerontology	Appointed
David Ippel	Dearborn Heights	At-Large Retired	Appointed
Doug Hull	Plymouth Township	Conference of Western Wayne Retired	Appointed
Frank Vaslo	Lincoln Park	Downriver Community Conference Retired	Appointed
Jack Frucci	Grosse Ile	At-Large Retired	Appointed
Michael Harris	Westland	At-Large Michigan Paralyzed Veterans	Appointed
Ann Hatley	Wyandotte	At-Large Small Business	Appointed
Vicki Ashker	Dearborn Heights	Conference of Western Wayne Madonna Univ.	Appointed
Kathleen McIntyre	Livonia	At-Large Livonia City Council	Appointed
Roger Myers	Canton	At-Large Presbyterian Villages of Michigan	Appointed
Syed Taj	Canton	Conference of Western Wayne Medical Doctor	Appointed
Gregory Genter	Grosse Ile	Downriver Community Conference Investment Mgr	Appointed

STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

Denise Brothers	Livonia	Advisory Council Madonna University	Appointed
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STATE OF MICHIGAN
Michigan Department of Health & Human Services
AGING AND ADULT SERVICES AGENCY

FY2020-2022 Multi Year Plan

FY 2022 Annual Implementation Plan

The Senior Alliance, Inc.

FY 2022

SUPPLEMENTAL DOCUMENT B

Advisory Board Membership

	Asian/ Pacific Islander	African American	Native American/A laskan	Hispanic Origin	Persons with Disabilities	Female	Total Membership
Membership Demographics	0	3	0	0	1	13	16
Aged 60 and Over	0	1	0	0	1	7	8

Board Member Name	Geographic Area	Affiliation
Denise Brothers	Livonia	Madonna University
Joan Siavrakas	Livonia	Wayne County Senior Services
Rosemarie Shim	Canton	Social Work
Jean Barnas	Livonia	Alzheimer's Association of Michigan
Lois Beerbaum	Canton	MMAP/Faith-Based
Jack Bird	Canton	MMAP
Sandy Bonavero	Westland	Retired
Tim Cokley	Westland	Faith-Based
Marti Coplai	Livonia	Angela Hospice
Thomas J. Jankowski	Westland	Retired (former First Responder)
Ayana King	Wyandotte	Communications
Carolyn Marengere	Southgate	Social Work - Housing Sector
Dianne Neihengen	Canton	Retired (former Senior Center Director)
Ann Randolph	Trenton	Retired (former Caregiver)
Susan Rowe	Wayne	Retired (former Elected Official)
Amne Darwish Talab	Dearborn	Community Services Organization

Quality Outcome Measures Reporting Form

(6 Month Report Due April 15, 2021 and Annual Final Report Due November 15, 2021)

1. Participant Satisfaction Level

Measure: The percentage of the total participant satisfaction survey question responses that are positive; negative; or neutral for:

Care Management	Positive	97%	Negative	0%	Neutral	3%
Case Coordination & Support	Positive	86%	Negative	7%	Neutral	7%

2. Participant Quality of Life Satisfaction Level Before and After Receiving Services

Measure: The percentage of the total participant satisfaction survey question responses about quality of life before and after receiving services that are positive; negative; or neutral (based on these two questions to be added to the area agency survey):

A. My quality of life prior to receiving services was:

Care Management	Positive	21%	Negative	55%	Neutral	24%
Case Coordination & Support	Positive	5%	Negative	70%	Neutral	25%

B. My quality of life after receiving services is:

Care Management	Positive	89%	Negative	0%	Neutral	11%
Case Coordination & Support	Positive	83%	Negative	9%	Neutral	9%

3. Prevalence of Social Isolation

Measure: The percentage of all participants who are alone for long periods of time or always AND who also report feeling lonely -OR- Participants who are distressed by declining social activity, 90 days prior to assessment/reassessment (or since last assessment if less than 90 days) for:

Care Management	15%	Case Coordination & Support:	24%
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4. Prevalence of Emergency Room Visits and Hospital Stays

Measure: The percentage of all participants who have had one or more hospitalizations or emergency room visits during the last 90 days before the assessment/reassessment (or since last assessment if less than 90 days) for:

Care Management:	31%	Case Coordination & Support:	20%
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5. Prevalence of Inadequate Meals and Dehydration

Measure: The percentage of all participants who in at least 4 of last 7 days prior to assessment/reassessment ate one or fewer meals for:

Care Management:	1%	Case Coordination & Support:	1%
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Measure: The percentage of all participants who in the last 3 days prior to assessment/reassessment had fluid intake less than 1,000 cc per day (less than four 8 oz. cups/day) for:

Care Management:	2%	Case Coordination & Support:	2%
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EVIDENCE-BASED PROGRAMS PLANNED FOR FY 2022

Funded Under Disease Prevention Health Promotion Service Definition

Provide the information requested below for Evidence-Based Programs (EBDP) to be funded under Title III-D.

Title III-D funds can only be used on health promotion programs that meet the highest-level criteria as determined by the Administration for Community Living (ACL) Administration on Aging (AoA). Please see the "List of Approved EBDP Programs for Title III-D Funds" in the Document Library. Only programs from this list will be approved beginning in FY 2020. If funding has been allocated as a single amount for all Title III-D programs for a provider, enter on first line under "Funding Amount for This Service."

Program Name	Provider Name	Anticipated No. of Participants	Funding Amount for Service
<i>Example</i>	<i>Example: List each provider offering programs on a single line as shown below.</i>	<i>Example: Total participants for all providers</i>	<i>Example: Funding total for all providers</i>
Arthritis Exercise Program	1) Forest City Senior League Program 2) Grove Township Senior Services 3) Friendly Avenue Services	80	\$14,000

B. Nutrition providers shall work with the respective area agency to develop a written emergency plan. The emergency plan shall address, but not be limited to the following elements:

1. Uninterrupted delivery of meals to home-delivered meals participants, including, but not limited to use of families and friends, volunteers, shelf-stable meals and informal support systems.

2. Provision of at least two, and preferably more, shelf-stable meals and instructions on how to use for home-delivered meal participants. Every effort should be made to assure that the emergency shelf-stable meals meet the nutrition guidelines. If it is not possible, shelf-stable meals will not be required to adhere to the guidelines.

3. Backup plan for food preparation if usual kitchen facility is unavailable.

4. Agreements in place with volunteer agencies, individual volunteers, hospitals, long-term care facilities, other nutrition providers, or other agencies/groups that could be on standby to assist with food acquisition, meal preparation, and delivery.

5. Communications system to alert congregate and home-delivered meals participants of changes in meal site/delivery.

6. The plan shall cover all the sites and home-delivered meals participants for each nutrition provider, including sub-contractors of the AAA nutrition provider.

7. The plan shall be reviewed and approved by the respective area agency and submitted electronically to AASA for review.

From: [Steve Hitchcock](#)
To: [Lambert, Jill](#)
Cc: [Burcroff, Leroy](#); [Wojtylko, Julie](#)
Subject: RE: TSA's 2022 Annual Implementation Plan tsacleartext
Date: Thursday, July 1, 2021 7:50:59 AM

Jill,

The resolution is fine. I recommend it for approval by Council. The "Plan" is not included by should be provided to Council.

Steve Hitchcock

Giarmarco, Mullins & Horton, P.C.
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www.gmhlaw.com



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From: Lambert, Jill <jlambert@romulusgov.com>
Sent: Wednesday, June 30, 2021 12:52 PM
To: Steve Hitchcock <sjh@gmhlaw.com>
Subject: FW: TSA's 2022 Annual Implementation Plan tsacleartext

Steve can you please review the attached?

Thank you!
Jill

From: Burcroff, Leroy
Sent: Tuesday, June 29, 2021 5:45 PM
To: Wojtylko, Julie <jwojtylko@romulusgov.com>; Lambert, Jill <jlambert@romulusgov.com>; Swidan, Rose <rswidan@romulusgov.com>
Subject: Fwd: TSA's 2022 Annual Implementation Plan tsacleartext

Sent from my iPad

Begin forwarded message:

From: Jason Maciejewski <JMaciejewski@thesenioralliance.org>
Date: June 29, 2021 at 5:03:01 PM EDT

To: "Burcroff, Leroy" <lburcroff@romulusgov.com>

Cc: "Craig-Bragg, Ellen" <ebragg@romulusgov.com>

Subject: TSA's 2022 Annual Implementation Plan

tsacleartext

Hello!

Attached for your review is a letter and sample resolution regarding The Senior Alliance's 2022 Annual Implementation Plan.

Thank you!

Avery Jackson-Kelley

Office Assistant



The Senior Alliance, Area Agency on Aging 1C
5454 Venoy Rd. Wayne, MI 48184
AJackson@thesenioralliance.org
Direct: 734.722.2830 Fax: 734.722.2836



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City of Romulus

Mayor's Report – LeRoy D. Burcroff, Mayor

Council Meeting Held: July 12, 2021

Item No. C.

General Description: Introduction of Budget Amendment 21/22-1

Motor Vehicle Public Safety

Resolution No. _____

<i>Moved by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Seconded by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

<i>Ayes:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Nays:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Abstain:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED

City of Romulus

INTEROFFICE MEMORANDUM

TO: The Honorable Romulus City Council
FROM: Mayor LeRoy D. Burcroff
SUBJECT: Introduction of Budget Amendment 21/22 - 1
DATE: July 6, 2021

I am hereby requesting introduction of Budget Amendment 21/22-1 for fire fleet upgrades to recognize the lease to purchase Fire Rescue #2.

No payments until 22/23 FY based on financing/purchase/lease.

Motion by _____, supported by _____ to concur with the administration and introduce budget amendment 21/22-1 for fire fleet upgrades to recognize the lease to purchase Fire Rescue #2.

MEMORANDUM

TO: Mayor LeRoy D. Burcroff

FROM: Finance Department

DATE: July 2, 2021 MEF

SUBJECT: Budget Amendment 21/22 - 1

<u>FUND/DEPT.</u> <u>ACCOUNT NO.</u>	<u>ACCOUNT NAME</u>	<u>CURRENT</u> <u>FUND BALANCE</u>	<u>AMENDMENT</u>	<u>AMENDED</u> <u>BUDGET</u>
Motor Vehicle Public Safety				
<u>Fund Balance</u>				
661-000-395.000	Retained Earnings	-	(200,000)	200,000
205-000-393-336	Fleet upgrades	-	(17,740)	17,740
<u>Expense</u>				
661-000-393.336	Motor Vehicle -Fleet Upgrades	17,740	200,000	217,740

No payments until 22/23 FY Based on Financing/purchase/lease
Agreement

BUDGET AMENDMENT FORM

INCREASE		DECREASE	
Account Number /Name	Amount	Account Number /Name	Amount
Motor Vehicle Fund Fleet Upgrade 661-000-393.336	\$ 17,740.18	Public Safety Fund Fire Fleet Upgrades 205-000-393-336	\$ 17,740.18
Motor Vehicle Fund Fleet Upgrade 661-000-393.336	\$ 200,000	Motor Vehicle Fund Retained Earnings 661-000-395.000	\$ 200,000.00
TOTAL	\$ 217,740	TOTAL	\$ 217,740

PURPOSE:

Fire Fleet upgrades to recognize the lease to purchase of Fire Rescue #2
No payments until 22/23 FY Based on Financing/purchase/lease
Agreement

DATE: 6/24/2021

Department Head Signature:

Mayor's Authorization:

THIS FORM IS TO BE USED WHEN THE TOTAL AMOUNT OF EXPENDITURES WITHIN A DEPARTMENT IS REQUESTED TO BE INCREASED. IT REQUIRES PRIOR APPROVAL FROM THE MAYOR AND THE FINANCE DEPARTMENT WILL DETERMINE IF THE FUNDS ARE AVAILABLE EITHER FROM FUND BALANCE/RETAINED EARNINGS OR YOU MAY ALSO REQUEST FUNDS TO BE TRANSFERRED FROM ANOTHER ONE OF YOUR DEPARTMENTAL BUDGETS. THIS REQUEST REQUIRES COUNCIL APPROVAL.



City of Romulus

Clerk's Report – Ellen L. Craig-Bragg, Clerk

Council Meeting Held: **July 12, 2021**

Item No. A.

General Description: Public Hearing request by TIFA Director Merrie Druyor for August 23, 2021, at 6:30 p.m.

Resolution No. _____

<i>Moved by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Seconded by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

<i>Ayes:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Nays:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Abstain:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED



MEMORANDUM

To: Honorable City Council

From: Ellen L. Craig-Bragg, City Clerk

Date: July 12, 2021

Re: Public Hearing Request

Merrie Druyor, TIFA Director, is requesting a thirty (30) minute public hearing for August 23, 2021 at 6:30pm for the purpose of declaring an exemption of property under MCL 211.7tt exemption of real property taxes.

The date and time are available for the public hearing request.

MEMORANDUM

TO: Honorable City Council

FROM: Merrie Druyor, Economic Development Coordinator/Director of
Authorities for DDA and TIFA

DATE: July 6, 2021

SUBJECT: Public Hearing request regarding MCL 211.7tt exemption of real property
taxes

I respectfully request a public hearing for Monday, August 23rd at 6:30 p.m. for the purpose of declaring exemption of property under MCL 211.7tt exemption of real property taxes. At the February 10, 2021 Tax Increment Finance Authority meeting, the Tax Increment Finance Authority Board passed a resolution 21-TIFA-815 to pursue the tax exemption of the TIFA owned property on Wahrman. Parcel 80-130-99-0013-702 totaling 7.280 acres was purchased in 2007 for 1.1 million dollars for the purpose of reconstructing the Wahrman and Eureka Roads corridor.

21-TIFA-815

Motion by Morris, supported by Long to proceed with the tax exemption process for the TIFA property on Wahrman. Motion carried.

Information will be submitted for the meeting packet for review. If I can be of any further assistance to you regarding this matter, please contact me.



City of Romulus

Warrant

Council Meeting Held: **July 12, 2021**

Item No. A.

General Description: Approval of Warrant #: 21-13 Checks presented in the amount of \$754,103.83

Resolution No. _____

<i>Moved by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Seconded by:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

<i>Ayes:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Nays:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams
<i>Abstain:</i>	Abdo	Barden	Roscoe	Talley	Wadsworth	Webb	Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED

CITY OF ROMULUS

WARRANT REGISTER SUMMARY

Council Meeting Date: July 12, 2021

Warrant Number: 21-13

TOTAL WARRANT REGISTER

754,103.83

P.O.#	CHECK #	PAYEE	AMOUNT

TOTAL DELETIONS

TOTAL ADJUSTED WARRANT (IF ANY DELETIONS)

REWARRANTED ITEMS: (not included in above totals)

P.O.#	CHECK #	PAYEE	AMOUNT

COUNCIL AUTHORIZATION

DATE

The obligations of transfer of funds described on the attached warrant register including the required interfund advances have been authorized by the Council. We hereby authorize the Treasurer of the City of Romulus to disburse funds as listed in payment thereof with the exception of deleted items listed above.

MAYOR

CLERK

07/07/2021

CHECK DISBURSEMENT REPORT FOR CITY OF ROMULUS

CHECK DATE FROM 06/24/2021 - 07/07/2021

Fund		Amount
Total for fund 101	General Fund	98,514.35
Total for fund 202	Major Street Fund	32,556.42
Total for fund 203	Local Street Fund	2,328.68
Total for fund 205	Public Safety Fund	118,793.48
Total for fund 218	Merriman Rd. Spec. Assess	1,661.84
Total for fund 260	Michigan Indigent Defense Fund	20,077.33
Total for fund 268	Narc Forfeiture - State	154.20
Total for fund 271	Library Fund	5,609.98
Total for fund 295	DDA	2,440.08
Total for fund 297	T.I.F.A. District #2	31,061.67
Total for fund 401	Court Building Construction Fund	15,662.00
Total for fund 592	Water & Sewer Fund	311,256.04
Total for fund 661	Motor Vehicle	19,684.06
Total for fund 664	Technology Services	561.77
Total for fund 676	Retiree's Ins. Benefits	13,304.92
Total for fund 677	Prop & Liability Ins Fund	8,297.00
Total for fund 701	Revolving Fund	802.75
Total for fund 702	General Tax Fund	23,450.63
Total for fund 703	Current Tax	35,810.42
Total for fund 750	Payroll Fund	12,076.21
TOTAL - ALL FUNDS		754,103.83

07/07/2021

CHECK REGISTER FOR CITY OF ROMULUS
CHECK DATE FROM 06/24/2021 - 07/07/2021

Check Date	Bank	Check	Vendor Name	Description	Amount
Bank POOL POOLED CASH					
06/24/2021	POOL	664(E)	COMERICA COMM. CARD SERV.	MARCH 2021 SALES TAX REIMBURSEMENT FROM	2.00
07/07/2021	POOL	665(E)	CITY OF ROMULUS	28777 EUREKA WATER BILL, 5/1-5/30/2021	161.70
07/07/2021	POOL	666(E)	CITY OF ROMULUS	35255 GODDARD FINAL WATER BILL 5/1- 5/30	25.23
07/07/2021	POOL	667(E)	CITY OF ROMULUS	11147 HUNT WATER BILL, 5/1 - 5/30/2021	18.21
07/07/2021	POOL	668(E)	CITY OF ROMULUS	7221 MIDDLEBELT WATER BILL, 5/1 - 5/30/2	137.28
07/07/2021	POOL	669(E)	CITY OF ROMULUS	37230 NORTHLINE WATER BILL, 5/1 - 5/30/2	106.73
07/07/2021	POOL	670(E)	CITY OF ROMULUS	11165 OLIVE B WATER BILL, 5/1 - 5/30/202	43.55
07/07/2021	POOL	671(E)	CITY OF ROMULUS	11165 OLIVE A WATER BILL, 5/1 - 5/30/202	67.99
07/07/2021	POOL	672(E)	CITY OF ROMULUS	11189 SHOOK WATER BILL, 5/1 - 5/30/2021	18.21
07/07/2021	POOL	673(E)	CITY OF ROMULUS	11111 WAYNE WATER BILL, 5/1 - 5/30/2021	283.86
07/07/2021	POOL	674(E)	CITY OF ROMULUS	11121 WAYNE WATER BILL, 5/1 - 5/30/2021	76.49
07/07/2021	POOL	675(E)	CITY OF ROMULUS	12600 WAYNE WATER BILL, 5/1 - 5/30/2021	209.92
07/07/2021	POOL	676(E)	CITY OF ROMULUS	6900 WAYNE WATER BILL 5/1 - 5/30/2021	106.73
07/07/2021	POOL	677(E)	CITY OF ROMULUS	36525 BIBBINS WATER BILL, 5/1 - 5/30/202	64.28
07/07/2021	POOL	678(E)	CITY OF ROMULUS	36525 BIBBINS WATER BILL, 5/1 - 5/30/202	64.28
07/07/2021	POOL	679(E)	CITY OF ROMULUS	12300 WAYNE WATER BILL, 5/1 - 5/30/2021	131.16
07/07/2021	POOL	680(E)	CITY OF ROMULUS	37200 GODDARD WATER BILL, 5/1 - 5/30/202	31.34
07/07/2021	POOL	681(E)	CITY OF ROMULUS	MERRIMAN SAD 2 WATER BILL, 10/14/2020 -	1,075.24
07/07/2021	POOL	682(E)	CITY OF ROMULUS	MERRIMAN SAD 1 WATER BILL, 5/1 - 5/30/20	586.60
07/07/2021	POOL	683(E)	COMERICA COMM. CARD SERV.	Inventory Order	55.28
07/07/2021	POOL	684(E)	DTE ENERGY	MARY ANN BANKS (RESTROOM) - 37350 GODDAR	15.96
				MARY ANN BANKS PARK - MAY 20 - JUNE 18,	29.23
				PAVILION DOWNTOWN DDA - 36095 GODDARD MA	24.97
				PUMP STATION - 16326 HARRISON - MAY 19 -	66.02
				7930 AMBER PUMP STATION - MAY 19 - JUN 1	37.42
				36525 BIBBINS -SR CTR MAY 14 - JUN 14	1,483.73
				7690 WAYNE WATER PUMP - MAY 18 - JUN 16,	71.79
				35257 GODDARD - AMBULANCE BUILDING - MA	28.47
				10942 WAYNE - WELCOME TO ROMULUS SIGN -	16.95
				28777 EUREKA - FS #4 MAY 14 - JUN 14,	1,023.01
				11165 OLIVE - POLICE STATION MAY 14 - JU	2,887.06
				12600 WAYNE - DPW- MAY 14 - JUN 14, 202	2,385.46
				38834 HURON RIVER DR - WATER PUMP MAY 8	60.01
					8,130.08
07/01/2021	POOL	75599	DELTA DENTAL PLAN OF MICHIGAN	JULY 2021 DELTA DENTAL INSURANCE	14,118.45
07/07/2021	POOL	75600	AMAZON	NETWORK CABLING EQUIPMENT - TECH SERVICE	561.77
				5 WIRELESS KEYBOARDS	222.50
				4/ 3 HOLE PUNCH	29.36
				CHAMBER EXECUTIVE DESK CHAIR	169.98
				NOTARY SEAL EMBOSSER	21.99
					1,005.60
07/07/2021	POOL	75601	AMAZON CAPITAL SERVICES	11 X 17 SLANT-D RING BINDER 1 1/2" CAP B	18.51
				OFFICE CHAIR	109.98
				OFFICE CHAIR	109.98
				FILLING STATION VERSATILE	1,604.80
				SUPPLIES	56.95
					1,900.22
07/07/2021	POOL	75602	AMERI-TIME LLC	RENEWAL MAINTENANCE AGREEMENT TIME CLOCK	525.00
				RENEWAL MAINTENANCE AGREEMENT TIME CLOCK	350.00
					875.00
07/07/2021	POOL	75603	ANIMAL MAGIC, INC	PERFORMANCE AT LIBRARY ON 3/24/2021	375.00
07/07/2021	POOL	75604	ANN SZLINIS	ANN SZLINIS- JULY 2021	336.41
07/07/2021	POOL	75605	ASCAP	ANNUAL MUSIC LICENSING FEES FOR DOWNTOW	10.00

07/07/2021	POOL	75606	ASSOCIATED NEWSPAPERS OF MICHIGAN	ITB 20/21-10 20/21 INVERTED P.O 01-01-2	154.43
				ITB 20/21-10 20/21 INVERTED P.O 01-01-2	154.53
				ITB 20/21-10 20/21 INVERTED P.O 01-01-2	118.43
				ITB 20/21-10 20/21 INVERTED P.O 01-01-2	67.17
				ITB 20/21-10 20/21 INVERTED P.O 01-01-2	60.22
				ITB 20/21-10 20/21 INVERTED P.O 01-01-2	116.33
				ITB 20/21-10 20/21 INVERTED P.O 01-01-2	610.93
					1,282.04
07/07/2021	POOL	75607	AT&T		556.18
07/07/2021	POOL	75608	ATCHINSON FORD SALES, INC.	20/21 BLANKET PO MISC VEHICLE REPAIRS -	50.88
				20/21 BLANKET PO MISC VEHICLE REPAIRS -	281.14
				20/21 BLANKET PO MISC VEHICLE REPAIRS -	250.19
				20/21 BLANKET PO MISC VEHICLE REPAIRS -	100.00
					682.21
07/07/2021	POOL	75609	AUTO VALUE OF ROMULUS	20/21 BLANKET PO FOR MISC MECHANIC PURCH	5.49
				20/21 BLANKET PO FOR MISC MECHANIC PURCH	129.80
				20/21 BLANKET PO FOR MISC MECHANIC PURCH	136.89
				20/21 BLANKET PO FOR MISC MECHANIC PURCH	(75.00)
					197.18
07/07/2021	POOL	75610	BELCHER LAW, PLLC	31.35 SERVICE HOURS, MIDC PROGRAM JUNE 2	3,135.00
07/07/2021	POOL	75611	BEVERLY MCMILLAN	HISTORICAL PARK RENTAL DEPOSIT REFUND RE	25.00
07/07/2021	POOL	75612	BSB COMMUNICATIONS, INC.	HANDSETS AND COIL CORDS - PART REPLACEME	165.52
07/07/2021	POOL	75613	CAMERON ZVARA	COMEDY MAGIC SHOW ON 7/20/21 FOR LIBRARY	425.00
07/07/2021	POOL	75614	COMCAST	BUSINESS CABLE JUN 25 - JUL 24,2021 ACC	124.48
07/07/2021	POOL	75615	CONTRACTORS CONNECTION	Inventory Order	97.45
				Inventory Order	287.75
					385.20
07/07/2021	POOL	75616	CROVA SALES & SERVICE	20/21 BLANKET PO FOR CROVA SALES - DPW	63.50
07/07/2021	POOL	75617	DAMIAN HULL	CLASSES 23610-PAPP540 & 24095-PAPP582	4,860.00
07/07/2021	POOL	75618	DEMCO	LIBRARY SUPPLIES CUSTOMER BILLING: 21002	93.00
07/07/2021	POOL	75619	DETROIT SALT COMPANY	ITB-FH-17/18-2062, MITN COOPERATIVE BID	16,256.80
07/07/2021	POOL	75620	DOCUSIGN, INC.	PIGGYBACK MIDEAL CONTRACT 071B6600041 ES	3,260.00
07/07/2021	POOL	75621	ANNE E. DUGGAN	GIVING TALK FAIRY TALED AND US THE CASE	125.00
07/07/2021	POOL	75622	DOWNRIVER UTILITY WASTEWATER AUTH	WASTEWATER DISPOSAL CHARGES APRIL 2021	222,045.21
07/07/2021	POOL	75623	ELECTROCYCLE, INC	SHREDING SERVICES FOR COMMUNITY SHRED DA	750.00
07/07/2021	POOL	75624	ENGRAVING CONNECTION	BADGE - TEE TO JAKE QTY: 5	39.00
07/07/2021	POOL	75625	FERGUSON WATERWORKS #3386	20/21 BLANKET PO FOR MISC METER REPAIR P	595.86
07/07/2021	POOL	75626	FOSTER BLUE WATER OIL, LLC	20/21 INVERTED PO - ITB 19/20-21 2 YEAR	60.00
07/07/2021	POOL	75627	G.V. CEMENT CONTRACTING CO.	ITB 19/20-22 SMITH AND VINING REHABILITA	29,500.00
07/07/2021	POOL	75628	GALE/CENGAGE LEARNING	ACCT# 194418 BESTSELLER CHOICE 3 PLAN -	123.16
07/07/2021	POOL	75629	GREAT LAKES POWER & LIGHTING	MEETING TO DISCUSS DAMAGE TO AIRPORT HOT	268.00
				REPAIR OUTLETS IN ENGINE BAY @ FIRE STAT	298.00
					566.00
07/07/2021	POOL	75630	HERITAGE CRYSTAL CLEAN LLC	20 GALLON DRUM USED PARTS CLEANER - MECH	250.45
07/07/2021	POOL	75631	HIGHWAY MAINTENANCE & CONST, CO.	PIGGYBACKING WIXOM BID ITB 20-15 CHIP SE	40,879.00
07/07/2021	POOL	75632	HOME DEPOT	20/21 BLANKET PO - HOME DEPOT - FIRE DEP	316.79
				20/21 BLANKET PO - HOME DEPOT - FIRE DEP	297.94
					614.73
07/07/2021	POOL	75633	JAMES HORNE	ST JOHN'S LODGE PARK RENTAL REFUND REF:	25.00
07/07/2021	POOL	75634	JEFFREY E. BOWDICH	34 SERVICE HOURS, MIDC PROGRAM JUNE 202	3,400.00
07/07/2021	POOL	75635	JOHN THIEDE	ST OF MI EMS LICENSE RENEWAL FEE	25.00
07/07/2021	POOL	75636	JULIE SEALE	ANIMAL STERILIZATION REF: CASE NO # 21-0	25.00
				ANIMAL STERILIZATION REF: CASE NO # 21-0	25.00
					50.00

07/07/2021	POOL	75637	LAMBERT & CO.	FY 20/21 PR SERVICES FOR COM DEV, DDA &	4,685.00
07/07/2021	POOL	75638	LANE, SUSAN	UB refund for account: 006127	496.33
07/07/2021	POOL	75639	LAW OFFICE OF DANIEL A. BITAR, PLLC	22.3 SERVICE HOURS, MIDC PROGRAM JUNE 20	2,230.00
07/07/2021	POOL	75640	LAW OFFICES OF	30.75 SERVICE HOURS, MIDC PROGRAM JUNE 2	3,075.00
07/07/2021	POOL	75641	PIRTEK METRO DETROIT	20/21 BLANKET PO FOR HYDRAULIC TUBING -	17.92
07/07/2021	POOL	75642	LENA MCINTEE	ELMER JOHNSON PARK RENTAL DEPOSIT REFUN	25.00
07/07/2021	POOL	75643	MARY ELLEN BOHN	MDIC ADMINISTRATIVE ASSISTANT JUNE 2021	504.00
07/07/2021	POOL	75644	MARY OAKLEY	7/1/2021 THRU 12/31/2021 RETIREE HEALTH	2,018.46
07/07/2021	POOL	75645	MAURER'S TEXTILE RENTAL SERVICES	20/21 INVERTED PO FOR EMPLOYEE UNIFORM E	28.89
				20/21 INVERTED PO FOR EMPLOYEE UNIFORM E	2.23
				20/21 INVERTED PO FOR EMPLOYEE UNIFORM E	28.89
				20/21 INVERTED PO FOR EMPLOYEE UNIFORM E	26.77
				20/21 INVERTED PO FOR EMPLOYEE UNIFORM E	106.49
				20/21 INVERTED PO FOR EMPLOYEE UNIFORM E	2.23
				20/21 INVERTED PO FOR EMPLOYEE UNIFORM E	26.77
				20/21 INVERTED PO FOR EMPLOYEE UNIFORM E	28.89
				INVERTED PO - FY 20/21, BUILDING DEPT U	18.23
				INVERTED PO - FY 20/21, BUILDING DEPT U	18.23
				INVERTED PO - FY 20/21, BUILDING DEPT U	18.23
				INVERTED PO - FY 20/21, BUILDING DEPT U	18.23
					324.08
07/07/2021	POOL	75646	MEADOWBROOK INSURANCE AGENCY	RENEWAL 7/11/2021-7/11/2022	8,297.00
07/07/2021	POOL	75647	METRO ALARM SYSTEMS LLC	SYSTEM INSTALLATION AND MONITORING - DPW	1,867.88
07/07/2021	POOL	75648	MICHIGAN DEPARTMENT OF TREASURY	2020 MSHDA DISTRIBUTION	35,810.42
07/07/2021	POOL	75649	MIDWEST TAPE	CUSTOMER # 2000005771 QTY:9	113.97
				CUSTOMER # 2000005771 QTY:6	106.44
				189 DIGITAL ITEMS CUSTOMER# 2000015943	132.97
					353.38
07/07/2021	POOL	75650	MINUTEMAN INTERNATIONAL INC.	VACUUM BAGS FOR CLEANING BUILDINGS	79.40
07/07/2021	POOL	75651	AIR COMFORT PRO	BD Payment Refund	175.00
07/07/2021	POOL	75652	CORY THOMPSON	BD Bond Refund	200.00
07/07/2021	POOL	75653	HOLLIE VONLINSOWE	MOB OPERA BAND FOR JULY 9, 2021 FOR SOUN	800.00
07/07/2021	POOL	75654	NYE UNIFORM CO	ITB 20/21-06 INVERTED FIREFIGHTER UNIFORM	608.47
				ITB 20/21-06 INVERTED FIREFIGHTER UNIFORM	34.50
				ITB 20/21-06 INVERTED FIREFIGHTER UNIFORM	16.00
					658.97
07/07/2021	POOL	75655	ORCHARD, HILTZ & MCCLIMENT	PROFESSIONAL SERVICES THROUGH 3/13/2021	3,470.75
				PROFESSIONAL SERVICES THROUGH 5/8/2021 -	1,458.75
				PROFESSIONAL SERVICES THROUGH 3/13/2021	356.25
				PROFESSIONAL SERVICES THROUGH 5/8/2021 M	315.00
				PROFESSIONAL SERVICES THROUGH 3/13/2021	243.75
				PROFESSIONAL SERVICES THROUGH 3/13/2021	2,274.00
				PROFESSIONAL SERVICES THROUGH 5/8/2021 E	4,846.50
				PROFESSIONAL SERVICES THROUGH 3/13/2021	1,013.75
				PROFESSIONAL SERVICES THROUGH 5/8/2021 P	1,013.75
				PROFESSIONAL SERVICES THROUGH 5/8/2021 C	17,461.25
				PROFESSIONAL SERVICES THROUGH 5/8/2021 C	260.00
				GLWA WICK ROAD 48" WATER MAIN 0155-19-01	14,082.25
				ITB 19/20-25 2020 SANITARY REPAIRS/ INSP	12,362.50
				BEVERLY ROAD PHASE III DESIGN	15,839.75
				OZGA SANITARY SEWER PROJECT	5,611.75
				2021 BARTH ROAD WATER MAIN DESIGN	19,467.00
					100,077.00
07/07/2021	POOL	75656	OSBORNE CONCRETE COMPANY INC.	20/21 BLANKET PO FOR MISC. PURCHASES	895.40
				20/21 BLANKET PO FOR MISC. PURCHASES	1,127.00
					2,022.40

07/07/2021	POOL	75657	OUTDOOR EXPERTS, INC	W.C. PRIVATE PROPERTY AND WAYNE COUTNY M W.C. PRIVATE PROPERTY AND WAYNE COUTNY M	5,143.53 528.06
					5,671.59
07/07/2021	POOL	75658	PARAGON LABORATORIES INC	29016 ECORSE	75.00
07/07/2021	POOL	75659	POWERDMS, INC	CLOUD BASE SOFTWARE SERVICE FOR POLICE	6,208.26
07/07/2021	POOL	75660	PREMIER RELOCATIONS, LLC	RELOCATE 34TH DISTRICT COURT OFFICES	15,662.00
07/07/2021	POOL	75661	RAY'S NURSERY & LANDSCAPING	REF HYDRANT METER #70318389	1,792.59
07/07/2021	POOL	75662	ROMULUS COMMUNITY SCHOOLS	2019 MSHDA DISTRIBUTION	8,988.56
07/07/2021	POOL	75663	ROWE PROFESSIONAL SERVICES COMPAN	2020 BEVERLY ROAD RECONSTRUCTION - PHASE	707.46
07/07/2021	POOL	75664	SHARON GRIER	19 SERVICE HOURS, MIDC PROGRAM JUNE 2021	1,900.00
07/07/2021	POOL	75665	SITE ONE LANDSCAPE SUPPLY	20/21 BLANKET- SPRINKLER PARTS AND SUPPL	0.87
07/07/2021	POOL	75666	WEX BANK	JUN 2021 SPEEDWAY FUEL ACCOUNT # 0462-00	18,100.00
07/07/2021	POOL	75667	THE BANK OF NEW YORK MELLON	ACCOUNT #ROMULUS16 PAYING AGENT FEE FOR	750.00
07/07/2021	POOL	75668	THE HARTFORD-PRIORITY ACCOUNTS	JULY 2021 HARTFORD CUST # 008758520001	7,115.22
07/07/2021	POOL	75669	THE LIBRARY NETWORK	ROMS #22 100M INTERNET APR 1 THRU JUN 20	1,645.13
07/07/2021	POOL	75670	TERESA PATTON	20/21 INVERTED PO FOR MIDC 34TH DISTRICT	5,833.33
07/07/2021	POOL	75671	THERESA LANG	MARY ANN BANKIS PARK RENTAL DEPOSIT REFU	25.00
07/07/2021	POOL	75672	TISHA PRUSAK	ANIMAL STERILIZATION REF: CASE #21-034 P	25.00
07/07/2021	POOL	75673	TWO THE RESCUE LLC	MFFTC SITUATIONAL AWARENESS CLASS 06/24/	1,200.00
07/07/2021	POOL	75674	VRC COMPANIES LLC	SCANNED NEWSPAPER SRVCS 5/01/2021 - 5/31	2,354.82
07/07/2021	POOL	75675	GRAINGER INC.	20/21 BLANKET PO - FOR MISCELLANEOUS PUR 20/21 BLANKET PO FOR MISC SUPPLIES FOR F	209.46 210.80
					420.26
07/07/2021	POOL	75676	WAL-MART COMMUNITY	ACCT# 624081 STATEMENT # 1636203806 ACCT# 624081 STATEMENT # 1636203806	154.20 62.32
					216.52
07/07/2021	POOL	75677	WAYNE COUNTY DEPT OF ENVIRONMENT	2021 ASSESSMENT - ALLIANCE OF DOWNRIVER	34,084.05
07/07/2021	POOL	75678	WAYNE COUNTY REGISTER OF DEEDS	REGISTER OF DEEDS RECORDING FEE - 34TH	24.00
07/07/2021	POOL	75679	WAYNE COUNTY TREASURER	2020 MSHDA DISTRIBUTION	14,462.07
07/07/2021	POOL	75680	CITY OF WAYNE	36345 VAN BORN SEWER CONS 5/1 - 5/31/202	2,301.95
07/07/2021	POOL	75681	WINDER POLICE EQUIPMENT, INC.	20/21 BLANKET PO FOR MISC PARTS FOR EMER	195.00
07/07/2021	POOL	75682	WOLVERINE FREIGHTLINER WESTSIDE	20/21 BLANKET PO FOR MECHANICS PARTS	51.55
07/07/2021	POOL	75683	MOTOROLA SOLUTIONS, INC.	PROJECT MIA211122A DOWNPAYMENT LEASE AGR	100,000.00
POOL TOTALS:					
Total of 106 Checks:					754,103.83
Less 0 Void Checks:					0.00
Total of 106 Disbursements:					754,103.83



City of Romulus

Treasurer's Report

Council Meeting Held:

July 12, 2021

Item No. 7.

General Description: _____

Resolution No. _____

Moved by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Seconded by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Ayes: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Nays: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Abstain: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED



City of Romulus

Public Comment

Council Meeting Held:

July 12, 2021

Item No. 8.

General Description: _____

Resolution No. _____

Moved by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Seconded by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Ayes: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Nays: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Abstain: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED



City of Romulus

Unfinished Business

Council Meeting Held:

July 12, 2021

Item No. 9.

General Description: _____

Resolution No. _____

Moved by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Seconded by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Ayes: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Nays: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Abstain: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED



City of Romulus

New Business

Council Meeting Held:
Item No. 10.

July 12, 2021

General Description: _____

Resolution No. _____

Moved by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Seconded by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Ayes: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Nays: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Abstain: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED



City of Romulus

Communication

Council Meeting Held:
Item No. 12

July 12, 2021

Councilperson Abdo: _____

Councilperson Barden: _____

Councilperson Roscoe: _____

Councilperson Talley: _____

Councilperson Wadsworth: _____

Councilperson Webb: _____

Councilperson Williams: _____



City of Romulus

Adjournment

Council Meeting Held:

July 12, 2021

Item No. 13

General Description: _____

Resolution No. _____

Moved by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Seconded by: Abdo Barden Roscoe Talley Wadsworth Webb Williams

Ayes: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Nays: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

Abstain: All Abdo Barden Roscoe Talley Wadsworth Webb Williams

MOTION CARRIED
UNANIMOUSLY

MOTION CARRIED

MOTION FAILED