



Triangle Place JSP13-53

Triangle Place, JSP13-53

Consideration of the request of Trowbridge Companies for Preliminary Site Plan and Stormwater Management Plan approval. The subject property is located in Section 36, on the east side of Haggerty Road, north of Eight Mile Road in the B-3, General Business District (with a Planned Rezoning Overlay). The subject property is 0.48 acres and the applicant is proposing a 2,420 square foot speculative office and retail building.

REQUIRED ACTION

Approval/denial of the Preliminary Site Plan and Stormwater Management Plan.

REVIEW	RESULT	DATE	COMMENTS
Planning	Approval recommended	07/29/13	Items to address on the revised Final Site Plan
Engineering	Approval recommended	07/29/13	Items to address on the revised Final Site Plan
Traffic	Approval recommended	07/25/13	<ul style="list-style-type: none"> • Waiver of Traffic Impact Assessment recommended • Items to address on the revised Final Site Plan
Landscaping	Approval recommended	07/29/13	Items to address on the revised Final Site Plan submittal
Façade	Approval recommended	07/29/13	<ul style="list-style-type: none"> • Section 9 waiver recommended for the overage of asphalt shingles • Items to be addressed on the revised Final Site Plan submittal
Fire	Approval recommended	07/13/13	No additional items to address

Motion sheet

Approval – Preliminary Site Plan

In the matter of Triangle Place, JSP13-53, motion to **approve** the Preliminary Site Plan based on and subject to the following:

- a. Waiver of the required Traffic Impact Assessment, which is hereby granted;
- b. Section 9 façade waiver for the overage of asphalt shingles, which is hereby granted;
- c. The findings of compliance with Ordinance standards in the staff and consultant review letters and the conditions and the items listed in those letters being addressed on the revised Final Site Plan; and
- d. *(additional conditions here if any)*

This motion is made because the plan is otherwise in compliance with the approved PRO concept plan and PRO Agreement and Article 15, Article 24 and Article 25 of the Zoning Ordinance and all other applicable provisions of the Ordinance.)

-AND-

Approval – Stormwater Management Plan

In the matter of Triangle Place, JSP13-53, motion to **approve** the Stormwater Management Plan, subject to:

- a. The findings of compliance with Ordinance standards in the staff and consultant review letters and the conditions and the items listed in those letters being addressed on the revised Final Site Plan; and
- b. *(additional conditions here if any)*

This motion is made because the plan is otherwise in compliance the approved PRO concept plan and PRO Agreement and with Chapter 11 of the Code of Ordinances and all other applicable provisions of the Ordinance.)

-OR-

Denial

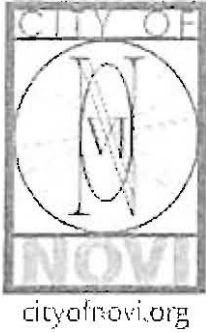
In the matter of Triangle Place, JSP13-53 motion to **deny** the Preliminary Site Plan, for the following reasons...(because the plan is not in compliance with the approved PRO concept plan and PRO Agreement and the plan is not in compliance with Article 15, Article 24 and Article 25 of the Zoning Ordinance.)

-AND-

Denial Stormwater Management Plan

In the matter of Triangle Place, JSP13-53, motion to **deny** the Stormwater Management Plan, for the following reasons...(because the plan is not in compliance with the approved PRO concept plan and PRO Agreement and the plan is not in compliance with Chapter 11 of the Ordinance.)

PLANNING REVIEW



PLAN REVIEW CENTER REPORT

July 29, 2013

Planning Review

Triangle Place

JSP13-53

Petitioner

Trowbridge Companies

Review Type

Preliminary and Final Site Plan

Property Characteristics

- Site Location: East side of Haggerty Road, north of Eight Mile Road
- Site Zoning: B-3, General Business with Planned Rezoning Overlay
- Adjoining Zoning: North: Haggerty Road, OSC; East: ES (City of Farmington Hills); West: OSC; South: FS
- Site Use(s): Vacant
- Adjoining Uses: Northwest: Haggerty Road, Pump House, Michigan Heritage Bank; Northeast: Benihana, Coney Island (Farmington Hills); West: Regional detention basin, Sheraton Hotel (further west); South: Detention basin, Toco Bell (further south); East: Hotel (Farmington Hills)
- Proposed Use: General Office/Retail
- Site Size: 0.48 acres
- Plan Date: 05-23-13

Project Summary

The parcel in question is located on the east side of Haggerty Road, north of Eight Mile Road in Section 36 of the City of Novi. The property totals 0.48 acres and contains an existing 20' utility easement which runs through the center. The applicant is proposing the construction of an approximately 2,420 sq. ft. single story building.

This property was rezoned with a Planned Rezoning Overlay (PRO) from FS to B-3, General Business. The Planning Commission gave a positive recommendation for approval of the concept plan and rezoning to City Council on June 27, 2007. The rezoning with PRO appeared before the City Council on August 13, 2007. At that meeting, City Council granted preliminary approval of the plan and rezoning. On December 17, 2007, City Council granted final approval of the Rezoning with PRO and PRO Agreement. Several extensions to the PRO Agreement have been granted by the City Council with an extension for this year to be placed on an upcoming City Council agenda.

A site plan (consistent with the PRO Agreement) was previously stamped approved for this site in December of 2008. The plan was never constructed and the site plan approval has since expired. Planning Commission approval of the Preliminary Site Plan is required.

Recommendation

Approval of the *Preliminary Site Plan only is recommended*. The plan is in compliance with most Ordinance requirements and most of the conditions set forth in the Planned Rezoning Overlay Agreement. However, there are several items (in this and other review letters) that need to be addressed on a revised Final Site Plan review prior to the applicant proceeding to Stamping Set submittal.

Planned Rezoning Overlay

The rezoning with a Planned Rezoning Overlay was granted final approval by City Council on December 17, 2007. The PRO acts as a zoning map amendment, creating a "floating district" with a conceptual plan attached to the rezoning of the parcel. As a part of the PRO, the underlying zoning is changed, in this case to B-3 as requested by the applicant, and the applicant enters into a PRO Agreement with the City, whereby the City and applicant agree to any deviations to the applicable ordinances and tentative approval of a conceptual plan for development for the site. The following ordinance deviations were included in the PRO Agreement

1. The required rear yard building setback is twenty feet. Four feet has been provided. This ordinance deviation has been included in the PRO Agreement.
2. The required front yard parking setback is twenty feet. Ten feet has been provided. This ordinance deviation has been included in the PRO Agreement.
3. The required rear yard parking setback is ten feet. Four feet has been provided. This ordinance deviation has been included in the PRO Agreement.
4. Loading zones should be located in the rear or interior side yard. The loading zone is located in the front yard. This ordinance deviation has been included in the PRO Agreement.
5. A twenty foot greenbelt is required adjacent to the proposed parking. Ten feet has been provided. This ordinance deviation has been included in the PRO Agreement.

When a PRO is proposed, applicants are required to demonstrate a public benefit above and beyond what would be associated with the normal development of the site. This public benefit is included in the PRO Agreement. The public benefits associated with the subject property are as follows:

1. The list of permissible permitted uses was limited as part of the PRO Agreement. ***This was included in the PRO Agreement and should be reflected on the plans on Sheet 1.***
2. The developer agreed to extend the public sidewalk for 180 linear feet along the adjacent property to the south of the subject property to complete the sidewalk connection. *This has not been shown on the plan set. **The applicant must add a 6' sidewalk totaling 180' in length on the adjacent property to the site plan.***
3. The developer agreed to provide additional landscaping along the adjacent property to the south. ***This has not been included on the landscape plan and must be provided with the next plan submittal.***
4. The developer agreed to extend the public sidewalk 500 linear feet along the City owned property on the west side of Haggerty road provided an agreement could be reached with the adjacent property owner to allow the stormwater generated by the subject property to discharge into the stormwater retention area on the west side of Haggerty Road. *It is our understanding that such an agreement has not been reached and the developer will not provide this additional benefit. It is not shown and is not required to be shown on the site plan.*

The PRO runs with the land, so future owners, successors, or assignees are bound by the terms of the agreement, absent modification by the City of Novi.

Ordinance Requirements

This project was reviewed for conformance with the Zoning Ordinance with respect to Article 15 (B-3, General Business District), Article 24 (Schedule of Regulations), Article 25 (General Provisions) and any other applicable provisions of the Zoning Ordinance. Items in **bold** below must be addressed by the applicant.

1. PRO Items: **The applicant must add the required information to meet the standards of the PRO Agreement as outlined in the section above.**
2. Haggerty Road Sidewalk: The City has recently updated its non-motorized standards requiring 6' sidewalks instead of the previously required 5'. **The sidewalk on Haggerty Road should be increased to 6' in width.**
3. Dumpster Details: **Dumpster details meeting the requirements outlined in the Zoning Ordinance and City Code (and summarized in the planning review chart) must be included in the plan set.**
4. Site Lighting: **A photometric plan meeting the requirements of Section 2511 must be provided.** A lighting review chart summarizing those requirements has been attached for reference.
5. Miscellaneous Items: **There are several minor items that should be addressed by the applicant that are outlined in the planning review summary chart.** Additionally, the architectural and engineering plans appear to be inconsistent. For example, the architectural plans show an additional entrance to the building but a sidewalk to that entrance has not been included on the engineering plan. **The applicant should review the plans to ensure these small details are consistent and have been addressed throughout the plan set.**
6. Traffic Study: The traffic review letter references the need for a Traffic Impact Assessment. **Given that the generalized use and layout have already been approved as part of the PRO Agreement, the Planning Division recommends the applicant request and the Planning Commission grant a waiver of the Traffic Impact Assessment.**
7. Signage: Exterior Signage is not regulated by the Planning Division or Planning Commission. Please contact Jeannie Niland (248.347.0438) for information regarding sign permits.

Response Letter

A letter from either the applicant or the applicant's representative addressing comments in this, and in the other review letters, is requested to be submitted prior to the Planning Commission meeting and with the next set of plans addressing each of the comments listed above and in other review letters.

Street and Project Name

This project may need approval from the Street and Project Naming Committee. Please contact Richelle Leskun (248-347-0579) in the Community Development Department for additional information.

Chapter 26.5

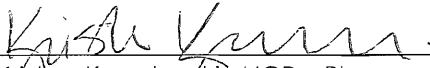
Chapter 26.5 of the City of Novi Code of Ordinances generally requires all projects be completed within two years of the issuance of any starting permit. Please contact Sarah Marchioni at 248-347-0430 for additional information on starting permits. The applicant should review and be aware of the requirements of Chapter 26.5 before starting construction.

Pre-Construction Meeting

Prior to the start of any work on the site, Pre-Construction (Pre-Con) meetings must be held with the applicant's contractor and the City's consulting engineer. Pre-Con meetings are generally held after Stamping Sets have been issued and prior to the start of any work on the site. There are a variety of requirements, fees and permits that must be issued before a Pre-Con can be

scheduled. If you have questions regarding the checklist or the Pre-Con itself, please contact Sarah Marchioni [248.347.0430 or smarchioni@cityofnovi.org] in the Community Development Department.

If the applicant has any questions concerning the above review or the process in general, do not hesitate to contact me at 248.347.0586 or kkapelanski@cityofnovi.org.



Kristen Kapelanski, AICP – Planner
kkapelanski@cityofnovi.org or 248-347-0586

Attachments: Planning Review Chart
Lighting Review Chart

Planning Review Chart

Triangle Place JSP#13-53

Preliminary Site Plan

Plan Date: 05-23-13

Item	Required	Proposed	Meets Requirements?	Comments
Master Plan	Community Commercial	No change		This property was rezoned from FS, Freeway Service to B-3, General Business as part of the Haggerty Road Development Planned Rezoning Overlay.
Zoning	B-3, General Business	No change		
Proposed Use (Sec. 1501 and Sec. 1502)	Uses permitted listed in Section 1501 and 1502	2,420 square foot retail/office building	Yes	Tenants should check with Community Development Department prior to leasing space to ensure use is permitted.
Building Height (Sec. 2400)	30 feet	Approximately 28'	Yes	
Building Setbacks (Sec. 2400)				
Front (west)	30 feet	30 feet	Yes	
Side (north)	15 feet	15 feet +	Yes	
Side (south)	15 feet	15 feet +	Yes	
Rear (east)	20 feet	4 feet	No	This ordinance deviation was included in the PRO agreement.
Parking Setbacks (Sec. 2400, Schedule of Regulations)				

Item	Required	Proposed	Meets Requirements?	Comments
Front (west)	20 feet	10 feet	No	This ordinance deviation was included in the PRO agreement.
Side (north)	10 feet	10 foot +	Yes	
Side (south)	10 feet	10 feet	Yes	Applicant should confirm setback is measured to back of curb.
Rear (east)	10 feet	4 feet	No	This ordinance deviation was included in the PRO agreement.
Number of Parking Spaces (Sec. 2505(14)c(1))	Office :1 space per 222 sq. ft. of gross leasable area 2,420 sq. ft./222 = 11 spaces required Retail: 1 space per 200 sq. ft. of gross leasable area 2,420 sq. ft./200 = 12 spaces required	13 spaces	Yes	
Parking Space Dimensions (Sec. 2506)	90 degree parking- 9 feet by 19 feet (17 feet permitted with a 4" curb and 2' overhang)	Spaces sized appropriately throughout the site.	Yes	Applicant should indicate a 4" curb wherever 17' spaces are proposed. See the traffic review letter for additional information.
Maneuvering Lanes (Sec. 2506)	24 feet required	24' maneuvering lanes provided.	Yes	
Barrier Free Spaces (ADA standard)	1 van accessible space required	1 van accessible provided	Yes	
Barrier Free Space Dimensions (Barrier Free Code)	8 feet wide with an 8 foot wide access aisle for van accessible	8 feet wide with a 8 foot wide access aisle (to the face of curb)	No	The 8' wide access aisle should be measured and provided to the face of the curb.

Item	Required	Proposed	Meets Requirements?	Comments
Barrier Free Signs (Barrier Free Design Graphics Manual)	One barrier free sign is required per space	No signs shown	No	Barrier free signage must be included. See the traffic review letter for additional information.
Loading Spaces (Sec. 2507.2)	Loading space must be provided in the rear yard or interior side yard if a double fronted lot.	Loading zone shown in the front yard.	No	The ordinance deviation was included in the PRO agreement.
Sidewalks (Sec. 1607.11)	A 6' sidewalk is required along Haggerty Road. 6' sidewalk totaling 180' in length required along adjacent property to the south per PRO Agreement	5' walk shown along Haggerty Road only	No	The sidewalk along Haggerty Road should be changed to 6'. A 6' sidewalk totaling 180' in length should be provided on the property to the south.
Dumpster Requirements (Chapter 21, Section 21-145)	Screening of not less than 5 feet on 3 sides of dumpster required, interior bumpers or posts must also be shown. Screening should be 1 foot taller than dumpster.	No dumpster details provided.	No	Applicant should provide dumpster details.
Dumpster Setbacks (Sec. 2503.1.d)	Accessory structures shall be set back the same as the parking setback and 10 feet from the main building unless structurally attached to the building.	Structurally attached to building.	Yes	
Lighting (Section 2511)	Exterior lighting plan needed at time of Final Site Plan review	Photometric plan not provided.	No	Applicant should provide required photometric plan.

Lighting Review Summary Chart

Triangle Place JSP13-53

Site Plan Review

Plan Date:

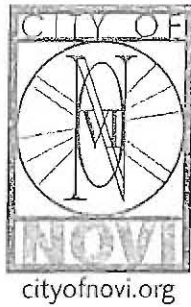
Item	Required	Meets Requirements?	Comments
Intent (Section 2511.1)	Establish appropriate minimum levels, prevent unnecessary glare, reduce spillover onto adjacent properties, reduce unnecessary transmission of light into the night sky		
Lighting plan (Section 2511.2.a.1)	Site plan showing location of all existing and proposed buildings, landscaping, streets, drives, parking areas and exterior lighting fixtures		
Lighting Plan (Section 2511.2.a.2)	Specifications for all proposed and existing lighting fixtures including: <ul style="list-style-type: none"> ▪ Photometric data ▪ Fixture height ▪ Mounting & design ▪ Glare control devices ▪ Type and color rendition of lamps ▪ Hours of operation ▪ Photometric plan 		
Required conditions (Section 2511.3.a)	Height not to exceed maximum height of zoning district (30 feet) or 25 feet where adjacent to residential districts or uses.		
Required Notes	- Electrical service to		

Item	Required	Meets Requirements?	Comments
(Section 2511.3.b)	light fixtures shall be placed underground - No flashing light shall be permitted - Only necessary lighting for security purposes and limited operations shall be permitted after a site's hours of operation.		
Required conditions (Section 2511.3.e)	Average light level of the surface being lit to the lowest light of the surface being lit shall not exceed 4:1.		
Required conditions (Section 2511.3.f)	Use of true color rendering lamps such as metal halide is preferred over high and low pressure sodium lamps.		
Minimum Illumination (Section 2511.3.k)	- Parking areas- 0.2 min - Loading and unloading areas- 0.4 min - Walkways- 0.2 min - Building entrances, frequent use- 1.0 min - Building entrances, infrequent use- 0.2 min		
Maximum Illumination adjacent to Non-Residential (Section 2511.3.k)	When site abuts a non-residential district, maximum illumination at the property line shall not exceed 1 foot candle		
Cut off Angles (Section 2511.3.1 (2))	All cut off angles of fixtures must be 90 degrees when adjacent to residential districts		

Prepared by Kristen Kapelanski, AICP
kkapelanski@cityofnovi.org

(248) 347-0586

ENGINEERING REVIEW



PLAN REVIEW CENTER REPORT

July 29, 2013

Engineering Review

Triangle Place
JSP13-0053

Petitioner

ACR Investments LLC, property owner

Review Type

Preliminary/Final Site Plan

Property Characteristics

- Site Location: E of Haggerty Rd. and N of Eight Mile Rd
- Site Size: 0.48 acres
- Plan Date: May 23, 2013

Project Summary

- Construction of a 2,420 square foot retail/office building and associated parking. Site access would be provided by a single access on Haggerty Road.
- Water service would be provided by extending a 2-inch lead from the existing 12-inch water main along the west side of Haggerty Rd. No new hydrants are proposed at this time.
- Sanitary sewer service would be provided by extending a 6-inch lead from the existing 10-inch sanitary sewer along the west side of Haggerty Road.
- Storm water would be collected by an on-site storm sewer system and routed through a subsurface treatment structure and then to an underground detention system sized for the 100-year storm. This system would discharge at controlled rates to the Orchard Hill Place basin immediately south of the site.

Recommendation

Approval of the Preliminary Site Plan is recommended.

Approval of the Final Site Plan is NOT recommended.

Comments:

The Preliminary Site Plan meets the general requirements of Chapter 11 of the Code of Ordinances, the Storm Water Management Ordinance and/or the Engineering Design Manual.

The Final Site Plan does not meet the general requirements of Chapter 11 of the Code of Ordinances, the Storm Water Management Ordinance and/or the Engineering Design Manual. The following must be addressed prior to resubmittal:

General

1. Provide the City's standard detail sheets for water main (2 sheets-6/15/98), sanitary sewer (Sheet 1-6/15/98 and Sheet 2-4/24/06), storm sewer (1 Sheet-6/15/98) and paving (1 Sheet-12/15/00) at the time of the Stamping Set submittal.
2. Provide a minimum of two ties to established section or quarter section corners.
3. Verify the proposed site activity, specifically the utility crossings, do not violate conditions in the easements for the liquid petroleum pipelines.
4. Provide horizontal and vertical scales for each of the utility profiles.
5. Provide a utility crossing table indicating that at least 18-inch vertical clearance will be provided.

Water Main

6. Revise the Domestic Service Lead Stop Box location to the Right-of-Way or public water main easement versus on private property as currently provided.

Sanitary Sewer

7. Provide an access easement for the sanitary monitoring manhole on the plan set.
8. Revise the sanitary sewer lead material to 6" SDR 23.5 versus 6" SDR 35 as provided.

Storm Sewer

9. Label the 10-year HGL on the storm sewer profiles, and ensure the HGL remains at least 1-foot below the rim of each structure.
10. Use a pattern on the storm sewer profiles to highlight where compacted sand backfill is required under the influence of pavement. CSB is currently not labeled in a couple required locations.
11. Revise the storm sewer alignment to discharge into the four (4) diameter storm sewer structure within the Right-of-Way versus the two separate outlets on the south side of the property.
12. Revise the plan set to indicate that **all** storm sewer shall be constructed of ASTM C76 Class IV reinforced concrete pipe versus portions of the storm sewer constructed of C76 plastic pipe as provided.
13. Provide a two (2) foot deep sump wherever the difference in pipe invert elevations exceeds two (2) feet.

Storm Water Management Plan

14. The Storm Water Management Plan for this development shall be designed in accordance with the Storm Water Ordinance and Chapter 5 of the new Engineering Design Manual.
15. Remove the 6" San Lead and 2" W.M. callouts from the Storm Water Management Plan.

16. Revise the drainage coefficient for all impervious and turf lawn areas to 0.95 and 0.35, respectively, versus 0.9 and 0.2 as provided.
17. Revise the underground detention system to provide open chambers or runs of pipe to accommodate a 100-year storm event. Modular cell systems are not an approved means of providing underground detention.
18. Denote an overland route for storm water that would occur in the event that the underground system cannot accept flow. This route shall be directed to a recognized drainage course or drainage system. Verify that any structures accepting overland flow are capable of handling the 100-year flood capacity.
19. Provide a soil boring in the vicinity of the proposed underground detention system to determine the bearing capacity and high water elevation of the groundwater table.
20. Provide critical elevations (bankfull and 100-year storm hydraulic grade lines) on the underground detention system cross-section and storm sewer profile demonstrating that the detention system is 3 feet above ground water and has the required 1 foot of freeboard between the high water elevation and the subgrade below the pavement.
21. Provide the calculation used for determining the Allowable Discharge Rate. The stormwater discharge rate shall not exceed 0.15 cfs per contributing acre.
22. Revise the storm water detention calculations to demonstrate that bankfull volumes shall be retained in the detention facility for a minimum of 24 hours and no more than 40 hours.

Paving & Grading

23. Revise sheet 1 to reference the correct location of the "M" curb detail versus referencing sheet 9 (not included in plan set) as provided.
24. Differentiate between concrete and hot-mixed asphalt pavement areas on the grading plan by use of shading, notation, etc.
25. Revise the plan set to provide a continuous sidewalk through the driveway approach versus breaking the
26. Provide a minimum of 6 spot elevations where the pathway crosses each driveway (one at each corner and two in the center of the driveway on each side of the pathway). Spot elevations shall also be provided to demonstrate a level landing adjacent to each side of the pathway crossing.
27. No more than ¼" vertical obstacle shall be allowed at each transition between the pathway and the drive approach.
28. Revise the pathway cross-section to indicate a maximum cross-slope of 2%.
29. Provide spot elevations at the intersection of the proposed pathway with the existing pathway.

30. Provide a ROW side walk cross-section indicating 4" thick of 4000 psi concrete (8" thick through commercial/industrial drives) over 6" thick of 21AA crushed limestone meeting MDOT gradation specifications. The stone base shall extend a minimum of 6" beyond the forms. Sand is not an allowed sub base within the right-of-way.
31. Remove the detectable warning surfaces from the plan. These are not required based on the anticipated driveway traffic volumes.
32. Revise the pedestrian safety path width along Haggerty Rd six (6) feet versus five (5) feet as provided.

The following must be submitted with the Revised Final Site Plan:

33. A letter from either the applicant or the applicant's engineer must be submitted with the Stamping Set highlighting the changes made to the plans addressing each of the comments listed above and indicating the revised sheets involved. **Additionally, a statement must be provided stating that all changes to the plan have been discussed in the applicant's response letter.**
34. An itemized construction cost estimate must be submitted to the Community Development Department for the determination of plan review and construction inspection fees. This estimate should only include the civil site work and not any costs associated with construction of the building or any demolition work. ***The estimate must be itemized*** for each utility (water, sanitary, storm sewer), ***on-site paving (square footage), right-of-way paving (including proposed right-of-way)***, grading, and the storm water basin (basin construction, control structure, pretreatment structure and restoration).

The following must be submitted with the Stamping Set:

(Please note that all documents must be submitted together as a package with the Stamping Set submittal. Partial submittals will not be accepted).

35. A draft copy of the Storm Drainage Facility Maintenance Easement Agreement, as outlined in the Storm Water Management Ordinance, must be submitted to the Community Development Department. Once the form of the agreement is approved, this agreement must be approved by City Council and shall be recorded in the office of the Oakland County Register of Deeds. This document is available on our website.
36. A draft copy of the 20-foot wide access easement for the sanitary sewer monitoring manhole to be constructed on the site must be submitted to the Community Development Department. This document is available on our website.

The following must be addressed prior to construction:

37. A pre-construction meeting shall be required prior to any site work being started. Please contact Sarah Marchioni in the Community Development Department to setup a meeting (248-347-0430).
38. A City of Novi Grading Permit will be required prior to any grading on the site. This permit will be issued at the pre-construction meeting (no application

- required). A grading permit fee in the amount of \$125.00 must be paid to the City Treasurer's Office.
39. Material certifications must be submitted to Spalding DeDecker for review prior to the construction of any utilities on the site. Contact Ted Meadows at 248-844-5400 for more information.
 40. Construction inspection fees in the amount of \$20,882.64 must be paid to the City Treasurer's Office. Note, this amount may change based upon changes in the revised set submittal.
 41. A storm water performance guarantee in the amount of \$135,000.00 (equal to 150% of the cost required to complete the storm water management facilities) as specified in the Storm Water Management Ordinance must be posted at the Treasurer's Office. Note, this amount may change based upon revisions to the submitted plan set.
 42. Water and Sanitary Sewer Fees must be paid prior to the pre-construction meeting. Contact the Water & Sewer Department at 248-735-5642 to determine the amount of these fees.
 43. A street sign financial guarantee in the amount of \$400.00 (\$400 per traffic control sign proposed) must be posted at the Treasurer's Office. Signs must be installed in accordance with MMUTCD standards. Note, this amount may change based upon revisions to the submitted plan set.
 44. A Soil Erosion Control Permit must be obtained from the City of Novi. Contact Sarah Marchioni in the Community Development Department, Building Division (248-347-0430) for forms and information. The financial guarantee and inspection fees will be determined during the SESC review.
 45. A permit for work within the right-of-way of Haggerty Rd must be obtained from the City of Novi. The application is available from the City Engineering Department and should be filed at the time of Final Site Plan submittal. Please contact the Engineering Department at 248-347-0454 for further information.
 46. A permit for work within the right-of-way of Haggerty Rd must be obtained from the Road Commission for Oakland County. Please contact the RCOC (248-858-4835) directly with any questions. The applicant must forward a copy of this permit to the City. Provide a note on the plans indicating all work within the right-of-way will be constructed in accordance with the Road Commission for Oakland County standards.
 47. An inspection permit for the sanitary sewer tap must be obtained from the Oakland County Water Resource Commissioner.
 48. Permits for the construction of each retaining wall must be obtained from the Community Development Department (248-347-0415).

The following must be addressed prior to issuance of a Temporary Certificate of Occupancy approval for the development:

49. The amount of the incomplete site work performance guarantee for this development at this time is \$223,962.50 (equal to 1.5 times the amount required to complete the site improvements, excluding the storm water facilities) as specified in the Performance Guarantee Ordinance. This guarantee will be posted prior to TCO, at which time it may be reduced based on percentage of construction completed. Note, this amount may change based upon revisions to the submitted plan set.
50. All easements and agreements referenced above must be executed, notarized and approved by the City Attorney and City Engineer.
51. Spalding DeDecker will prepare the record drawings for this development. The record drawings will be prepared in accordance with Article XII, Design and Construction Standards, Chapter 11 of the Novi Code of Ordinances.
52. A letter of credit or cash in an amount of \$9,000.00 (10% of the cost of storm water facilities for projects of less than \$100,000, or 5% for the cost of projects over \$100,000) must be posted for the storm water facilities. This deposit will be held for one year after the date of completion of construction and final inspection of the storm water facilities. Note, this amount may change based upon revisions to the submitted plan set.
53. Submit an up-to-date Title Policy (dated within 90 days of City Council consideration of acceptance) for the purpose of verifying that the parties signing the Easement documents have the legal authority to do so. Please be sure that all parties of interest shown on the title policy (including mortgage holders) either sign the easement documents themselves or a Subordination Agreement. Please be aware that the title policy may indicate that additional documentation is necessary to complete the acceptance process.

Prior to preparing stamping sets, the Applicant is advised to provide any revised sheets directly to the Engineering Department for an informal review and approval.

Please contact Adam Wayne at (248) 735-5648 with any questions.



cc: Ben Croy, Engineering
Brian Coburn, Engineering
Kristen Kapelanski, Community Development Department
Michael Andrews, Water & Sewer Dept.
Sheila Weber, Treasurer's
T. Meadows, B. Allen; Spalding DeDecker

TRAFFIC REVIEW

July 25, 2013

Barbara McBeth, AICP
Deputy Director of Community Development
City of Novi
45175 W. Ten Mile Rd.
Novi, MI 48375

**SUBJECT: Triangle Place / Haggerty Retail Development, JSP13-0053,
Traffic Review of Preliminary Site Plan, PSP13-0122, and Final Site Plan, PSP13-0123**

Dear Ms. McBeth:

At your request, we have reviewed the above and offer the following recommendation and supporting comments.

Recommendation

We recommend approval of only the preliminary site plan, subject to the items shown below in bold being satisfactorily addressed on a revised final site plan.

Special Comment

It should be noted for the record that the P.R.O. concept plan for this site (copy attached) underwent significant improvements as it worked its way in 2008 to a final stamping set that has since expired (copy also attached). The plan now under review, however, largely deletes those improvements, and for this reason alone, should not be approved as a final site plan.

Site Description

What is the applicant proposing, and what are the surrounding land uses and road network?

1. The applicant is proposing to construct a 2,420-s.f. retail building with no specific planned use indicated. The site plan shows a total of 13 parking spaces served by a single access drive, but states that 12 spaces are required and 12 are provided. Since the one required and proposed barrier-free space should be included in the total parking count, **the plan should list 13 spaces as being provided.**
2. Immediately east of the subject site, in the City of Farmington Hills, there is a large mixed-use commercial site served by a single access drive on Haggerty Road (see attached photos). That site features a Holiday Inn Express, gas station, car wash, and fast-food restaurant.
3. Haggerty Road is a five-lane, 45-mph arterial under the jurisdiction of the Road Commission for Oakland County. There is a traffic signal serving other commercial drives roughly 300 ft to the south, a wide gravel shoulder along most of the site frontage, and a short deceleration lane for the neighboring commercial property to the east and north.

Trip Generation and Traffic Impact Study

How much new traffic would be generated? Was a traffic study completed and was it acceptable?

- The P.R.O. concept plan for this site apparently was approved in the 2008-2008 timeframe (when we were not the City’s traffic consultant) without the benefit of either a trip generation forecast or traffic study. We have therefore developed the following table to show the wide range of potential trip generation.

Potential Driveway Trips for 2,420-s.f. Retail Building¹

Land Use	ITE Use	Weekday	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Specialty Retail	826	107	1	1	2	3	4	7
Convenience Market	851	1,786	81	81	162	65	62	127
Coffee/Donut Shop w/o Drive-Through Window	936	Unknown	134	128	262	49	50	99

¹ A trip is a one-directional movement into or out of the site. Forecasted trips based on the latest ITE data and methodology, but do not reflect credit for pass-by trips not new to Haggerty Road. ITE’s average Shopping Center rate assumed for Specialty Retail in the AM peak hour.

- As can be seen above, the site’s potential trip generation varies widely, depending on the specific use. **The Planning Commission should discuss the building’s potential use with the applicant, and based on the above trip forecasts, decide to either require or waive the City’s ordinary requirement for a traffic impact study** (by published City policy, the numbers for a convenience market require an impact assessment, and the AM numbers for a coffee/donut shop require a full traffic impact statement).

Vehicular Access Locations

Do the proposed driveway locations meet City spacing standards?

- Yes. As now designed, the proposed access drive would be about 284 ft south of the nearest existing drive to the north and 318 ft north of the nearest existing drive to the south (near-curb to near-curb, versus a minimum required spacing of 230 ft for the 45-mph speed limit). There are no opposite-side drives within the City’s minimum spacing of 200 ft to the right (north) or 150 ft to the left (south).

Vehicular Access Improvements

Will there be any improvements to the abutting road(s) at the proposed access point(s)?

- No. A left-turn lane already exists on Haggerty, and neither the City nor RCOC has warrants for adding a right-turn lane on a multi-lane road.

Access Drive Design and Control

Are the proposed design, pavement markings, and signage satisfactory?

8. No. The following improvements, most already made in the previously approved final site plan, need to be made in the current plan:
 - a. The driveway width should be increased to the City standard of 30 ft (back-to-back).
 - b. The entering (south) curb return should transition to the curb return into the first parking space via a straight taper (this is too short a section for a reverse curve).
 - c. A 24-inch STOP (R1-1) sign should be posted for exiting traffic, 4 ft in advance (east) of the Haggerty sidewalk.

Pedestrian Access

Are pedestrians safely and reasonably accommodated?

9. No. We offer four comments on this issue, two already accommodated in the previously approved final site plan, one needing to be made in the current plan, and one that we believe should be considered for incorporation in the current plan:
 - a. As indicated in principle in the still-valid P.R.O. concept plan, there should be a sidewalk connection between the proposed building and the Haggerty Road sidewalk. However, that connection should occur north of the truck turnaround bay, so as to ensure that vehicles using that bay do not block this pedestrian route.
 - b. Given that the proposed north building elevation shows what appears to be a customer entrance on that end, the sidewalk along the west side of the building needs to be extended to serve that entrance.
 - c. The City standard width for a conventional right-of-way sidewalk is now 6 ft, so the proposed 5-ft-wide walk along Haggerty must be widened by 1 ft.
 - d. We recommend that serious consideration be given to providing a sidewalk stub to at least the east property line, in line with one of the paint stripes between hotel parking spaces. Most businesses occupying the proposed new building would likely benefit from also seeing that stub extended another 27 ft to the hotel parking lot proper.

Circulation and Parking

Can vehicles safely and conveniently maneuver through the site?

10. Per the previously approved final site plan, the sidewalk along the north side of the parking lot should be monolithic and at least 7 ft wide (not 6 ft as now proposed). Both a plan note and the needed elevation data should show this walk as rising only 4 inches above the adjacent pavement, so as to maximize vehicle overhang and allow the use of 17-ft-long abutting parking spaces (not 19.5 ft as now proposed).
11. The proposed 23.5-ft-wide parking aisle must be widened to the 24-ft standard.

12. The curb along the south side of the parking lot should be limited to a 4-inch height, and the abutting parking spaces shortened to 17 ft (to face of curb). On a related note, supporting elevation data should show that the top of the nearby retaining wall either will not rise more than 4 inches above grade, or will be 2 ft or more south of the revised back of curb.
13. The truck turnaround path now illustrated is for a single-unit truck only 26 ft long. At a minimum, the 30-ft-long AASHTO single-unit truck should be accommodated on-site. Alternatively, if the City Fire Marshal so-requests, the City's largest fire truck should be accommodated (reasonably approximated by an AASHTO template for a full-size bus).
14. Per the previously approved final site plan, the positions of the barrier-free parking space and accompanying access aisle should be transposed (since most wheelchair lifts are on the right side of the vehicle).
15. The type of sidewalk ramp now proposed at the end of the barrier-free access aisle lacks the required 4-ft-deep landing at the top, and should be replaced by a MDOT Type P ramp, where the sidewalk ramps down to the access aisle from the sides.
16. Only a VAN ACCESSIBLE supplemental sign has been proposed. Both a MMUTCD-standard RESERVED PARKING [wheelchair symbol] ONLY sign (R7-8) and an accompanying VAN ACCESSIBLE sign (now called R7-8P rather than R7-8a) are needed. A detail should be provided for these signs, showing a reasonable facsimile of the two signs and a minimum mounting height (given their proximity to the sidewalk) of 7 ft under the main sign and 6 ft 3 inches under the supplemental sign.
17. The larger of the two turnaround bays, generally west of the building, should be bordered on its south side and crosshatched with 4-inch yellow striping, said hatching 4-ft on-center. A NO PARKING LOADING ZONE (R7-8) sign should be proposed at least 2 ft behind the east curb or north sidewalk (applicant's choice of locations).
18. The deeper-than-normal turnaround tail at the east end of the parking lot should be bordered on its west side and crosshatched with 4-inch yellow striping, said hatching 4-ft on center. A NO PARKING ANY TIME sign (R7-1, with double-ended arrow at its bottom) should be proposed 1 ft inside the east property line (to provide maximum space for possible vehicle overhang).
19. A plan note is required specifying that the barrier-free parking space and accompanying access aisle will be marked in blue; the International Symbol of Accessibility (wheelchair) shown on the pavement marked in white; and undesignated parking spaces marked in white. Also per the MMUTCD, where the relocated access aisle abuts the first undesignated space, there should be abutting blue and white lines.

20. A Signing Quantities Table is required, listing each sign by description, MMUTCD sign code, size (where applicable, such as the requested 24-inch STOP sign), and quantity.

Sincerely,
CLEARZONING, INC.



Rodney L. Arroyo, AICP
President



William A. Stimpson, P.E.
Director of Traffic Engineering

Attachments

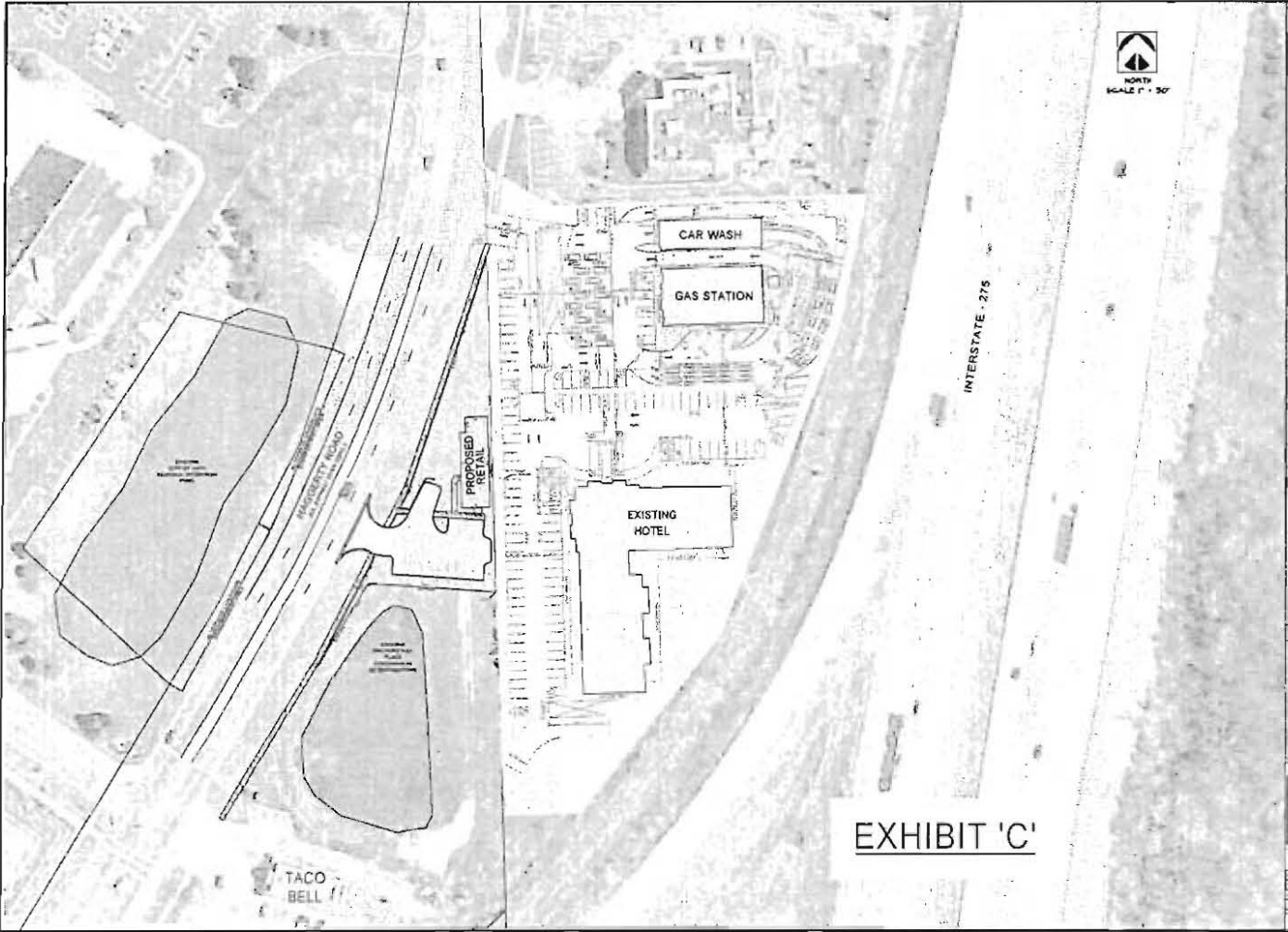
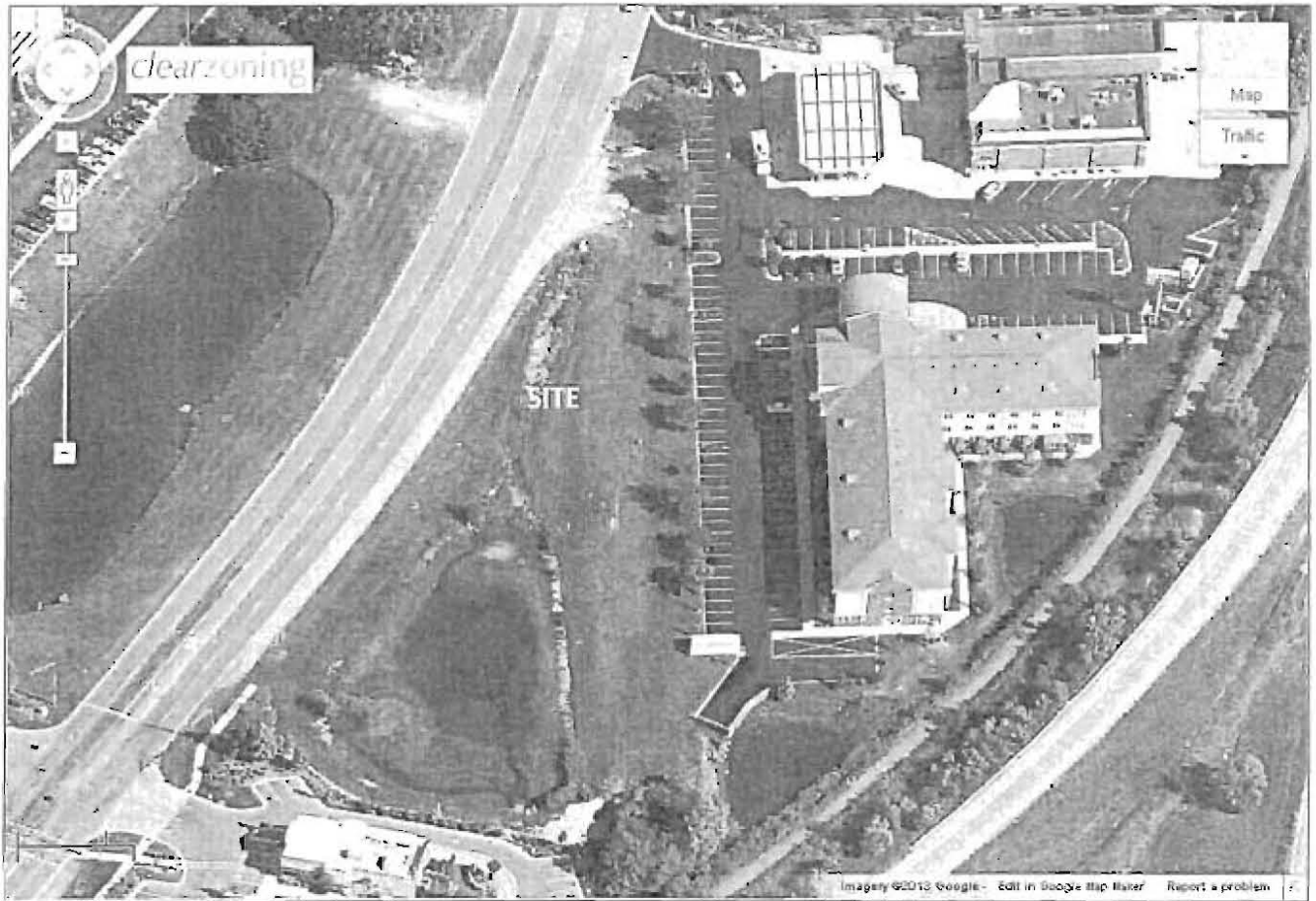
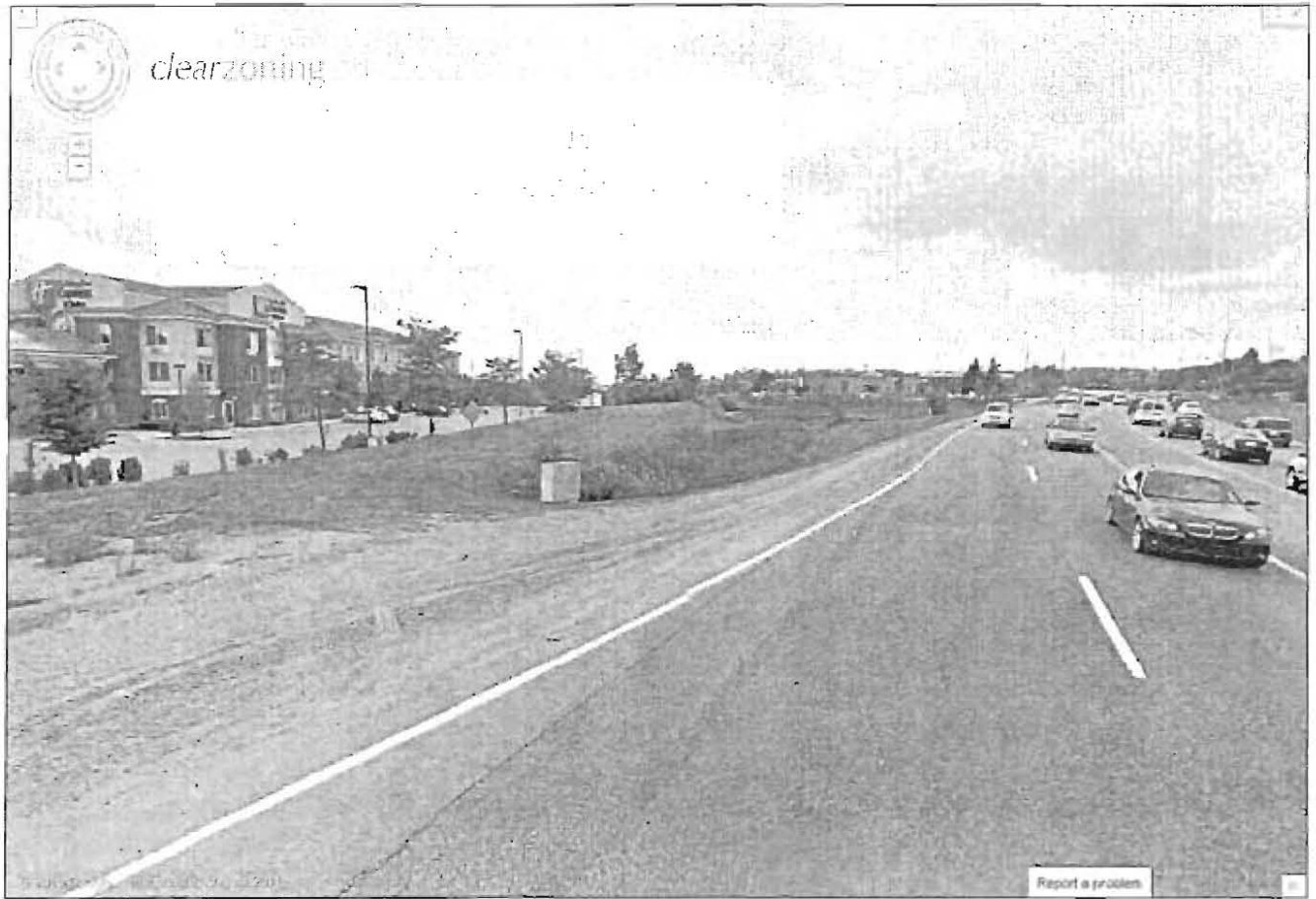


EXHIBIT 'C'

		DIFFIN Development Consultants CIVIL ENGINEERING • SURVEYING • CONSTRUCTION SERVICES PH: (248) 243-8244, F: (248) 243-8247 10000 W. BIRCHWOOD BLVD., SUITE 100, GAYLARD COUNTY, GEORGIA 30543	
DDC		DDC	
PROJECT NO. 15-001	DRAWING NO. 15-001-01	DATE 07/27/15	CITY/STATE GAYLARD COUNTY, GEORGIA
PROJECT DESCRIPTION PROPOSED RETAIL DEVELOPMENT OVERLAY PLAN EXHIBIT 'C'			
SHEET NO. 15-001-01			
TOTAL SHEETS 02			
SCALE AS SHOWN			
DATE 07/27/15			
DRAWN BY J. B. BROWN			
CHECKED BY J. B. BROWN			
APPROVED BY J. B. BROWN			
2 OF 2			

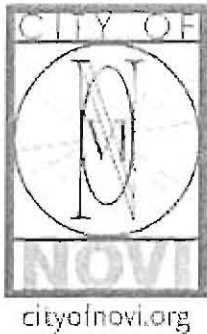


Site Aerial for Proposed Triangle Place Retail Development



Looking South at Site Proposed for Triangle Place

LANDSCAPE REVIEW



PLAN REVIEW CENTER REPORT
July 29, 2013
Preliminary & Final Landscape Review
Triangle Development – JSP13-53

Petitioner

Trowbridge Companies

Review Type

Preliminary and Final Site Plan

Property Characteristics

Site Location: East side of Haggerty Road, north of Eight Mile Road
Site Zoning: B-3, General Business with Planned Rezoning Overlay
Adjoining Zoning: North: Haggerty Road, OSC; East: ES (City of Farmington Hills); West: OSC; South: FS
Site Use(s): Vacant
Adjoining Uses: Northwest: Haggerty Road, Pump House, Michigan Heritage Bank; Northeast: Benihana, Coney Island (Farmington Hills); West: Regional detention basin, Sheraton Hotel (further west); South: Detention basin, Taco Bell (further south); East: Hotel (Farmington Hills)
Proposed Use: General Office/Retail
Site Size: 0.48 acres
Plan Date: 05-23-13

Recommendation

Approval of the Preliminary Site Plan for Triangle Place JSP13- 53 is recommended. Approval of the Final Site cannot be recommended until the Applicant can address the concerns listed below.

Please note that this project was previously approved. The plan was approved under a PRO agreement and included significant landscape. That approved site plan lapsed due to the extended period under which no site work commenced. The currently approved plan proposes 50% of the plantings originally proposed and approved.

Please address the concerns noted below upon subsequent submittal. Please respond in writing to document any site plan revisions made in regard to the concerns listed below.

Ordinance Considerations

Adjacent to Residential – Buffer (Sec. 2509.3.a.)

1. The project site is not adjacent to residential property.

Adjacent to Public Rights-of-Way – Berm (Wall) & Buffer (Sec. 2509.3.b.)

1. A 3' tall landscape buffer berm is required along the Haggerty Road frontage. Please depict the berm on the landscape plan.
2. The Landscape Design Manual requires shrub plantings on buffer berms to be staggered in a minimum two rows. Please adjust the plantings and add plants as necessary.
3. One canopy tree per 40 l.f. is required along the berm area. This requirement has been met.
4. One subcanopy tree per 35 l.f. is required along the frontage of Meadowbrook Road. These have been provided.

Street Tree Requirements (Sec. 2509.3.b.)

1. One street tree is required per 45 l.f. of road frontage. This requirement has been met directly on the project site. However, a stipulation in the PRO agreement called for the extension of the sidewalk and street tree plantings from the southern boundary of the site to the next intersection. This extenuation has not been shown. Please include the extended sidewalk and street tree plantings on the landscape plan.

Parking Landscape (Sec. 2509.3.c.)

1. Calculations have been provided for the required Parking Lot Landscape Area per Ordinance requirement. The Applicant is required to install a total of 438 square feet of Interior Parking Lot Landscape Area. This requirement has been met.
2. Perimeter Parking Lot Canopy Trees are required at one per 35 LF. Existing healthy trees and trees counted toward interior parking lot landscape may be counted toward this requirement. By virtue of the existing and proposed trees, the Applicant meets the perimeter planting requirement.
3. Existing canopy trees adjacent to the east boundary of the site must be protected with tree protection fencing.

Building Foundation Landscape (Sec. 2509.3.d.)

1. Building foundation landscape should be continued along the west and north foundations at a minimum. A minimum 4' wide landscape bed is required.

Plant List (LDM)

1. The Plant List meets the requirements of the Ordinance and Landscape Design Manual.

Planting Details & Notations (LDM)

1. Planting Details and Notations meet the requirements of the Ordinance and Landscape Design Manual.

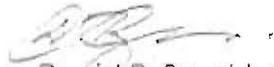
Irrigation (Sec. 2509 3.f.(6)(b))

1. All landscape areas are required to be irrigated. A note has been provided stating that the existing irrigation system will be appropriately modified in the area of the addition.

General

1. Please see woodland and wetland reviews for additional comments.

Please follow guidelines of the Zoning Ordinance and Landscape Design Guidelines. This review is a summary and not intended to substitute for any Ordinance. For the landscape requirements, see the Zoning Ordinance landscape section on 2509, Landscape Design Manual and the appropriate items in the applicable zoning classification. Also see the Woodland and Wetland review comments.



Reviewed by: David R. Beschke, RLA

FAÇADE REVIEW



July 29, 2013

City of Novi Planning Department
 45175 W. 10 Mile Rd.
 Novi, MI 48375-3024

Attn: Ms. Barb McBeth – Director of Community Development

Re: FACADE ORDINANCE – Preliminary & Final Site Plan Review
Triangle Place, PSP13-0122

Façade Region: 1, Zoning District: FS, Building Size: 2,420 S.F.

Dear Ms. McBeth:

The following is the Façade Review for Preliminary and Final Site Plan Approval of the above referenced project based on the drawings prepared by MGA Architects, dated June 28, 2013. The percentages of materials proposed for each façade are as shown on the table below. The maximum percentages allowed by the Schedule Regulating Façade Materials of Ordinance Section 2520 are shown in the right hand column. Materials in non-compliance with the Façade Schedule, if any, are highlighted in **bold**.

Façade Region	West (Front)	South	East	North	Ordinance Maximum (Minimum)
Brick	30%	66%	47%	66%	100% (30% Min)
Asphalt Shingles	48%	7%	46%	7%	25%
Stone	6%	0%	0%	0%	50%
EIFS	2%	1%	0%	1%	25%
Painted Trim	3%	15%	2%	15%	15%
Split Faced CMU	4%	6%	5%	6%	10%
Awnings (Standing Seam Metal?)	7%	5%	0%	5%	10%

As shown above the percentage of Asphalt Shingles exceeds the maximum percentage allowed by the Façade Ordinance on the west and east façades. A Section 9 Waiver is required for this deviation from the Façade Chart.

No sample board was provided for this project. The material used for the awnings is not specified; it is assumed to be Standing Seam Metal for this review. The material used on the upper wall of the north elevation is not specified; it is assumed to be Brick. This project falls under the PRO Agreement, recorded in Oakland County, liber 40345, page 245, on 5/30/2008. The PRO states that “The building design, façade, and elevations shall be substantially similar (as determined by the City) to that submitted as part of the Owner’s final approval request, as depicted in Exhibit B.”

Recommendation – The percentage of Asphalt Shingles is consistent with the Section 9 Waiver previously granted by the Planning Commission during their April 30, 2008 meeting. A condition of that approval was that all wood siding be replaced with brick. It is our recommendation that the overall architectural design is consistent with the intent and purpose of the Façade Ordinance. A Section 9 Waiver is recommended for the overage of Asphalt Shingles. This is contingent upon the applicant providing the following prior to the Planning Commission Meeting;

1. A sample board indicating carefully coordinated earth tone colors for all façade materials.
2. Clarification that the awnings are in fact standing seam metal.
3. Clarification that the upper wall of the north elevation is in fact brick (the use of wood siding or similar material would be inconsistent with the original Section 9 Waiver).

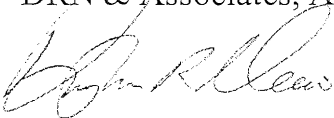
With respect to the PRO Agreement, while the proposed façade represents a different style of architecture and utilizes materials other than those depicted in Exhibit B of the PRO Agreement, we believe that the overall aesthetic quality of the proposed design is generally consistent to the PRO façade.

Notes to the Applicant: Façade Ordinance requires inspection(s) for all projects. Materials displayed on the approved sample board will be compared to materials delivered to the site. It is the applicant's responsibility to request the inspection of each façade material at the appropriate time. Inspections may be requested using the Novi Building Department's Online Inspection Portal with the following link. Please click on "Click here to Request an Inspection" under "Contractors", then click "Façade".

<http://www.cityofnovi.org/Services/CommDev/OnlineInspectionPortal.asp>.

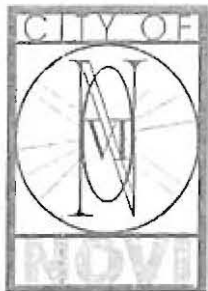
If you have any questions regarding this project please do not hesitate to call.

Sincerely,
DRN & Associates, Architects PC

A handwritten signature in black ink, appearing to read "Douglas R. Necci". The signature is fluid and cursive, written over the printed name below.

Douglas R. Necci, AIA

FIRE REVIEW



July 10, 2013 ,

TO: Barbara McBeth, Deputy Director of Community Development

RE: Triangle Place, (f.k.a. Haggerty Road Development)
Final Site Plan

CITY COUNCIL

Mayor
Bob Gatt

Mayor Pro Tem
Dave Staudt

Terry K. Margolis

Andrew Mutch

Justin Fischer

Wayne Wrobel

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City Manager
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Chief of Police
David E. Molloy

Director of EMS/Fire Operations
Jeffery R. Johnson

Assistant Chief of Police
Victor C.M. Lauria

Assistant Chief of Police
Jerrod S. Hart

SP#: SP07-22B
PSP13-0122

Project Description:

This project was previously reviewed on 5/31/2007, 4/3/2008, and 9/18/2008. All reviews were approved at that time.

Comments:

No changes have been made since last review.

Recommendation:

The above plan has been re-reviewed and is recommended for
APPROVAL.

Sincerely,

Andrew Copeland – FPO/Inspector II - CFPE
City of Novi – Fire Dept.

cc: file

APPLICANT RESPONSE LETTER

ACR INVESTMENTS, LLC

2617 Beacon Hill Drive
Auburn Hills, Michigan 48326

August 19, 2013

Ms. Kristen Kapelanski, AICP
Planner
City of Novi
45175 West Ten Mile Road
Novi, Michigan 48375

Subject: Triangle Place
Review comments

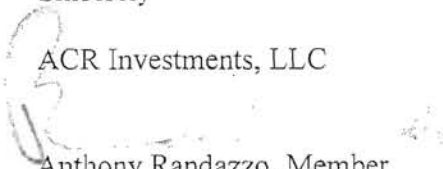
Dear Kristen:

We are in receipt of the Novi review letters received from your office via email on July 31, 2013.

We intend to comply with the notations and requests contained in these review letters.

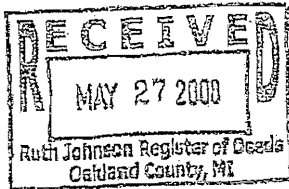
Sincerely

ACR Investments, LLC


Anthony Randazzo, Member

PLANNED REZONING
OVERLAY AGREEMENT

LIBER 40345 PG 245



107141
LIBER 40345 PAGE 245
\$63.00 MORTGAGE
\$4.00 RENOVATION
05/20/2008 09:28:36 A.M. RECEIPT# 42768
PAID RECORDED - OAKLAND COUNTY
RUTH JOHNSON, CLERK/REGISTER OF DEEDS

PLANNED REZONING OVERLAY (PRO) AGREEMENT
HAGGERTY ROAD DEVELOPMENT

AGREEMENT, by and among ACR Investments, LLC, a Michigan limited liability company whose address is 2617 Beacon Hill, Auburn Hills, MI 48326 (referred to as "Developer"); and Jeffrey Rotberg, whose address is 2640 Heathfield Road, Bloomfield Hills, MI 48301 ("Fee Owner"); and the City of Novi, 45175 West Ten Mile Road, Novi, MI 48375-3024 ("City").

RECITATIONS:

- I. Fee Owner is the fee owner of the "Land" described on Exhibit A, attached and incorporated herein. Developer has an option to purchase the Land. Fee Owner and Developer shall be referred to jointly in this Agreement as the Owner. The representations contained herein and the Underialdings set forth shall apply with equal force and effect as to each.
- II. For purposes of improving and using the Land for an approximately 2,500 square foot office or retail building, Owner petitioned the City for an amendment of the Zoning Ordinance, as amended, so as to reclassify the Land from FS, Freeway Service District, to B-3, General Business District. The FS classification shall be referred to as the "Existing classification" and B-3 shall be referred to as the "Proposed Classification."
- III. The Proposed Classification would provide the Owner with certain material development options not available under the Existing Classification, and would be a distinct and material benefit and advantage to the Owner.
- IV. The City has reviewed and approved the Owner's proposed petition to amend the zoning district classification of the Land from the Existing Classification to the Proposed Classification under the terms of the Planned Rezoning Overlay (PRO) provisions of the City's Zoning Ordinance; has reviewed the Owner's proposed PRO Plan (including building façade, elevations, and design) attached hereto and incorporated herein as Exhibit B (the "PRO Plan"), which is a conceptual or illustrative plan for the potential development of the Land under the Proposed Classification, and not an approval to construct the proposed improvements as

Handwritten initials

Handwritten initials in a circle

O.K.-A.N.

shown; and has further reviewed the proposed PRO conditions offered or accepted by the Owner.

- V. In proposing the Proposed Classification to the City, Owner has expressed as a firm and unalterable intent that Owner will develop and use the Land in conformance with the following undertakings by Owner, as well as the following forbearances by the Owner (each and every one of such undertakings and forbearances shall together be referred to as the "Undertakings"):
- A. Owner shall develop and use the Land solely for an approximately 2,500 square foot office or retail building (with appropriate parking and site improvements), to the extent permitted under the Proposed Classification. Owner shall forbear from developing and/or using the Land in any manner other than as authorized and/or limited by this Agreement.
 - B. Owner shall develop the Land in accordance with all applicable laws and regulations, and with all applicable ordinances, including all applicable height, area, and bulk requirements of the Zoning Ordinance as relates to the Proposed Classification, except as expressly authorized herein. The PRO Plan is acknowledged by both the City and Owner to be a conceptual plan for the purpose of depicting the general area contemplated for development. Some deviations from the provisions of the City's ordinances, rules, or regulations are depicted in the PRO Plan are approved by virtue of this Agreement; however, except as to such specific deviations enumerated herein the Owner's right to develop the office or retail building under the requirements of the Proposed Classification shall be subject to and in accordance with all applications, reviews, approvals, permits, and authorizations required under applicable laws, ordinances, and regulations, including, but not limited to, site plan approval, storm water management plan approval, woodlands and wetlands permits, façade approval, landscape approval, and engineering plan approval, except as expressly provided in this Agreement. The building design, façade, and elevations shall be substantially similar (as determined by the City) to that submitted as part of the Owner's final approval request, as depicted in Exhibit B.
 - C. In addition to any other ordinance requirements, Owner shall seek, obtain approval for, and use best management practices and efforts with respect to all storm water and soil erosion requirements and measures throughout the site during the design and construction phases, and subsequent use, of the development contemplated in the Proposed Classification.
 - D. The following deviations from the standards of the zoning ordinance are hereby authorized pursuant to §3402.D.1.c of the City's zoning ordinance.

1. A 16-foot rear yard setback deviation (20 feet required, 4 feet provided).
2. A 10-foot deviation for front yard parking setback (20 feet required, 10 feet provided).
3. A 6-foot deviation for rear yard parking setback (10 feet required, 4 feet provided).
4. Placement of the loading zone on the west side of the building in the front yard (rear yard placement required under §2507 of the zoning ordinance).
5. At the Owner's option, but subject to approval by the City, either a screening wall in lieu of the required berm (wall to be 6 feet high and constructed of decorative masonry or brick matching the building façade materials) or landscaping to provide an aesthetically appropriate screening or separation.
6. Placement of a 10-foot wide greenbelt along the northern most side of the parking lot, rather than the 20-foot greenbelt (with 3-foot high berm with 2-foot wide crest) along the Haggerty Road frontage of the parking lot.

E. The following PRO Conditions shall apply to the Land and/or be undertaken by Owner:

1. The following principal permitted uses and/or special uses listed in the B-3 zoning district regulations are *not permitted* on the property:
 - Off-street parking lots
 - Restaurants having the character of a drive in or having a drive-through window
 - Theaters, assembly halls, concert halls, museums or similar places of assembly when conducted completely within enclosed buildings
 - Business schools and colleges or private schools operated for profit
 - Day Care Centers and Adult Day Care Centers
 - Private clubs, fraternal organizations, and lodge halls
 - Hotels and motels
 - Mortuary establishments
 - Auto wash
 - Bus passenger stations
 - New and used car salesroom, showroom, or office
 - Tattoo parlors
 - Outdoor space for exclusive sale of new or used automobiles, campers, recreation vehicles, mobile homes, or rental of trailers or automobiles
 - Businesses in the character of a drive-in or open front store

- Plant materials nursery for the retail sale of plant materials and sales of lawn furniture, playground equipment and garden supplies
 - Public or private indoor recreational facilities
 - Mini-lube or quick oil change establishments
 - Gasoline service station and automobile repair
 - Motels, hotels, and transient lodging facilities
2. Owner shall extend public sidewalk for approximately 180 linear feet along the adjacent property to the south of the subject property to complete the sidewalk connection, as shown on the PRO plan.
 3. Owner shall provide additional landscaping along the adjacent property (if permitted by the adjacent property owner) as shown on the PRO plan. If the adjacent property owner does not allow such landscaping, Owner shall provide an equivalent amount of landscaping along City-owned property on the west side of Haggerty Road, as shown on the attached alternate plan, Exhibit C. After the maintenance and guarantee period for such landscaping, Owner shall not be responsible for its maintenance or upkeep.
 4. If Owner is able to secure approval to discharge stormwater from the Land to the stormwater retention area on the west side of Haggerty Road (as opposed to dealing with it through typical on-site retention), Owner shall extend the public sidewalk approximately 500 linear feet along the City-owned property on the west side of Haggerty Road, as shown on the PRO plan.

NOW, THEREFORE, IT IS AGREED AS FOLLOWS:

1. Upon the Proposed Classification becoming final following entry into this Agreement:
 - a. The Undertakings shall be carried out by Owner on and for the Land;
 - b. Owner shall act in conformance with the Undertakings;
 - c. The Owner shall forbear from acting in a manner inconsistent with the Undertakings; and
 - d. The Owner shall commence and complete all actions necessary to carry out all of the PRO Conditions.
2. In the event Owner attempts to or proceeds with actions to complete improvement of the Land in any manner other than as an approximately 2,500 square foot office or commercial building as shown on Exhibit B, the City shall be authorized to

revoke all outstanding building permits and certificates of occupancy issued for such building and use.

3. Owner acknowledges and agrees that the City has not required the Undertakings. The Undertakings have been voluntarily offered by Owner in order to provide an enhanced use and value of the Land, to protect the public safety and welfare, and to induce the City to rezone the Land to the Proposed Classification so as to provide material advantages and development options for the Owner.
4. All of the Undertakings represent actions, improvements, and/or forbearances that are directly beneficial to the Land and/or to the development of and/or marketing of the office or retail building on the Land. The burden of the Undertakings on the Owner is roughly proportionate to the burdens being created by the development, and to the benefit which will accrue to the Land as a result of the requirements represented in the Undertakings.
5. In addition to the provisions in Paragraph 2, above, in the event the Owner, or its respective successors, assigns, and/or transferees proceed with a proposal for, or other pursuit of, development of the Land in a manner which is in material violation of the Undertakings, the City shall, following notice and a reasonable opportunity to cure, have the right and option to take action using the procedure prescribed by law for the amendment of the Master Plan and Zoning Ordinance applicable to the Land to amend the Master Plan and zoning classifications of the Land to a reasonable classification determined appropriate by the City, and neither the Owner nor its respective successors, assigns, and/or transferees, shall have any vested rights in the Proposed Classification and/or use of the Land as permitted under the Proposed Classification, and Owner shall be estopped from objecting to the rezoning and reclassification to such reasonable classifications based upon the argument that such action represents a "downzoning" or based upon any other argument relating to the approval of the Proposed Classification and use of the Land; provided, this provision shall not preclude Owner from otherwise challenging the reasonableness of such rezoning as applied to the Land.
6. By execution of this Agreement, Owner acknowledges that it has acted in consideration of the City approving the Proposed Classification on the Land, and Owner agrees to be bound by the provisions of this Agreement.
7. After consulting with an attorney, the Owner understands and agrees that this Agreement is authorized by and consistent with all applicable state and federal laws and Constitutions, that the terms of this Agreement are reasonable, that it shall be estopped from taking a contrary position in the future, and, that the City shall be entitled to injunctive relief to prohibit any actions by the Owner inconsistent with the terms of this Agreement.
8. This Agreement shall be binding upon and inure to the benefit of the parties to this Agreement and their respective heirs, successors, assigns and transferees, and

an affidavit providing notice of this Agreement may be recorded by either party with the office of the Oakland County Register of Deeds.

- 9. The Zoning Board of Appeals (ZBA) shall have no jurisdiction over the Property or the application of this Agreement until after site plan approval and construction of the development as approved therein.
- 10. No waiver of any breach of this Agreement shall be held to be a waiver of any other or subsequent breach. All remedies afforded in this Agreement shall be taken and construed as cumulative, that is, in addition to every other remedy provided by law.
- 11. This Agreement shall be governed by the laws of the State of Michigan, both as to interpretation and performance. Any and all suits for any and every breach of this Agreement may be instituted and maintained in any court of competent jurisdiction in the County of Oakland, State of Michigan.
- 12. This Agreement may be signed in counterparts.

WITNESSES:

Leonora Rotberg
 Print Name:

 Print Name:

FREE OWNER

JEFFREY ROTBERG
 By: [Signature]
 Jeffrey Rotberg

STATE OF MICHIGAN)
) ss.
 COUNTY OF OAKLAND)

On this 5th day of May, 2008, before me appeared Jeffrey Rotberg, who states that he has signed this document of his own free will duly authorized on behalf of the company.

[Signature]
 Notary Public ANNA M. SIGURDSON
 Notary Public, State of Michigan
 County of Oakland
 My Commission Expires Apr. 26, 2012
 Acting in the County of Oakland

WITNESSES:

DEVELOPER

Rachel Mares
Print Name: Rachel Mares

ACR INVESTMENTS, LLC,
a Michigan limited liability company

Print Name: _____

By: Anthony Randazzo
Its: Managing Member

STATE OF MICHIGAN)
) ss.
COUNTY OF OAKLAND)

On this 2nd day of May, 2008, before me appeared Anthony Randazzo of Managing Member of ACR Investments, LLC, a Michigan limited liability company, who states that he has signed this document of his own free will duly authorized on behalf of the company.

RACHEL MARESH
Notary Public, State of Michigan
County of Oakland
My Commission Expires Feb. 11, 2013
Acting in the County of Oakland

Rachel Mares
Notary Public

Charlene McLean
Print Name: Charlene McLean

CITY OF NOVI
By: David B. Landry
David B. Landry, Mayor

Marvin S. Troutman
Print Name: MARVIN S. TROUTMAN

Print Name: _____

By: Maryanne Cornelius
Maryanne Cornelius, Clerk

Print Name: _____

STATE OF MICHIGAN)
) ss.
COUNTY OF OAKLAND)

On this 6th day of MAY, 2008, before me appeared David B. Landry Mayor and Maryanne Cornelius, who stated that they had signed this document of her own free will on behalf of the City of Novi in their respective official capacities, as stated above. & Clerk

LIBER 40345 PG252

Marilyn A. Gontms
Notary Public

Drafted by:

Thomas R. Schultz
30903 Northwestern Highway
Farmington Hills, MI 48334

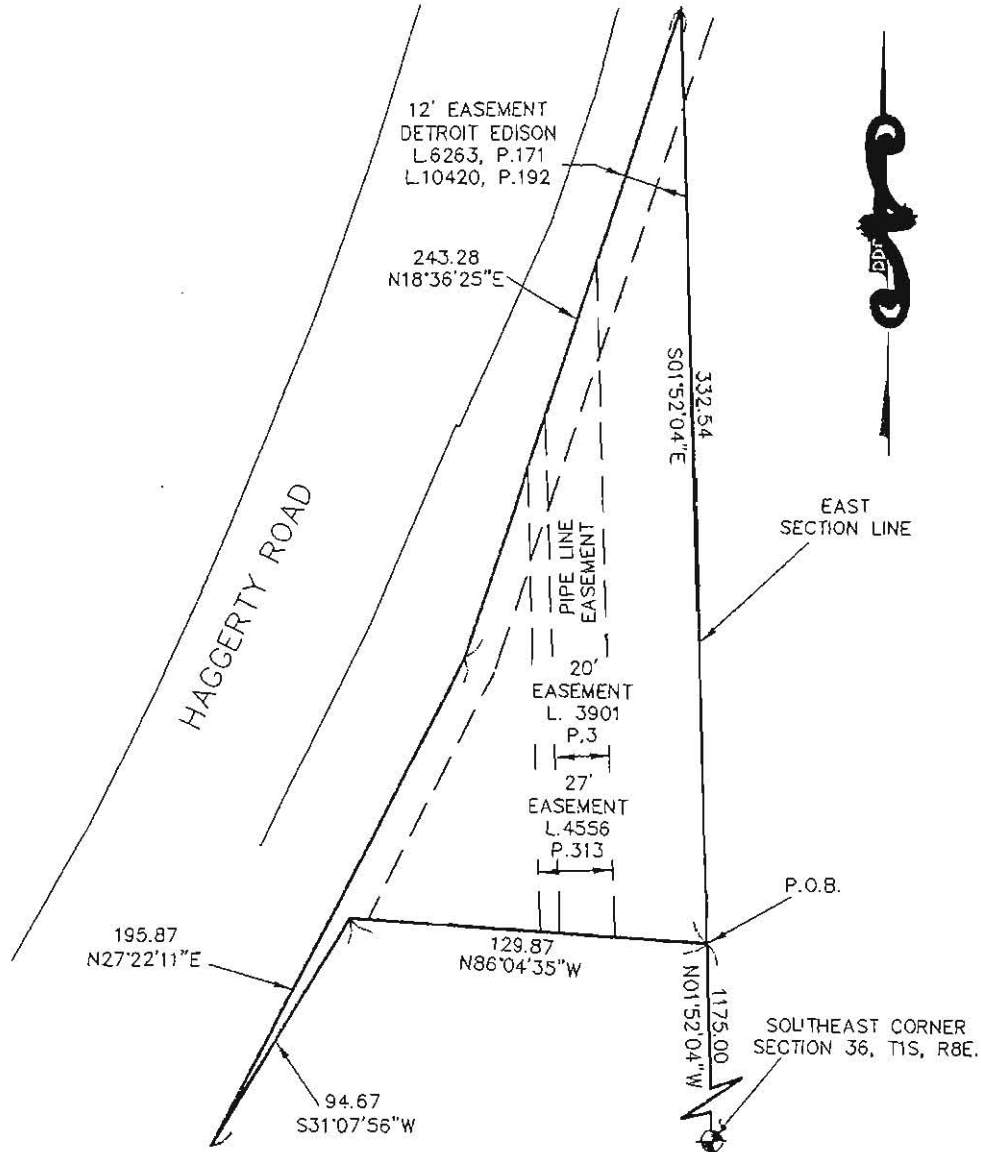
When recorded return to:

Maryanne Cornelius, Clerk
City of Novi
45175 West Ten Mile Road
Novi, MI 48375-3024

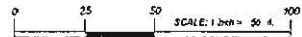
1033962

SECTION 36, T. 1 S., R. 8 E.
 CITY OF NOVI
 OAKLAND COUNTY, MICHIGAN

EXHIBIT A
 SURVEY / LEGAL DESCRIPTION



A PARCEL OF LAND IN THE SOUTHEAST 1/4 OF SECTION 36, TOWN 1 NORTH, RANGE 8 EAST, IN THE CITY OF NOVI, OAKLAND COUNTY, MICHIGAN BEGINNING AT THE POINT DISTANT NORTH 01 DEGREES 52 MINUTES 04 SECONDS WEST 1175.00 FEET FROM THE SOUTHEAST SECTION CORNER, THENCE NORTH 86 DEGREES 04 MINUTES 35 SECONDS WEST 129.87 FEET, THENCE SOUTH 31 DEGREES 07 MINUTES 56 SECONDS WEST 94.67 FEET TO EASTERLY RIGHT OF WAY LINE, HAGGERTY ROAD, THENCE NORTH 27 DEGREES 22 MINUTES 11 SECONDS EAST 195.67 FEET, THENCE NORTH 18 DEGREES 36 MINUTES 25 SECONDS EAST 243.28 FEET TO THE EAST SECTION LINE, THENCE SOUTH 01 DEGREES 52 MINUTES 04 SECONDS EAST 332.54 FEET TO THE POINT OF BEGINNING.



○ - Found Survey Corner
 ● - Set Survey Corner
 Sheet 1 of 1

SURVEY EXHIBIT

HAGGERTY OFFICE
 COMPLEX
 CITY OF NOVI, OAKLAND
 COUNTY, MICHIGAN

Date: 2-16-07
 Drawn By: SD
 Approved By: MD
 Project No.: 060610
 Drawing No.: 1

DDC

DIFFIN Development Consultants

CIVIL ENGINEERING • SURVEYING • CONSTRUCTION SERVICES
 22660 TRILLIUM DRIVE, NOVI MI 48375
 PH: (248) 943-8244, FAX: (866) 690-4307
 WEB: diffindevelopment.com



SITE PLAN

MAPS
Location
Zoning
Future Land Use
Natural Features

Triangle Place JSP13-53

Location



Map Author: Kristen Kapelanski
 Date: 08-21-13
 Project: Triangle Place JSP13-53
 Version #: V1.0

Map Legend

Subject Property



City of Novi

Planning Division
 Community Development
 45175 W Ten Mile Rd
 Novi, MI 48375
cityofnovi.org

MAP INTERPRETATION NOTICE

Map information displayed is not intended to constitute a substitute for any other engineering survey. This map was prepared to assist National Map Accuracy Standards, and was the result of aerial photography available to the property of the City of Novi. Boundary measurements and area calculations are approximate and should not be construed as being measurements performed by a Licensed Michigan Surveyor as defined by Michigan Public Act 332 of 1978 or otherwise. Please contact the City GIS Manager for further source and accuracy information related to this map.



1 inch = 225 feet

Triangle Place JSP13-53 Zoning



Map Author: Kirsten Kupelands
Date: 05-21-13
Project: Triangle Place JSP13-53
Version #: V1.0

Map information displayed is not intended to constitute an offer of insurance. The map does not constitute a contract. The information is provided for informational purposes only. The information is not intended to be used as a basis for any insurance policy. The information is not intended to be used as a basis for any insurance policy. The information is not intended to be used as a basis for any insurance policy.

Map Legend

Subject Property

- B-3: General Business with PRO
- FS: Freeway Service District
- OSC: Office Service Commercial



City of Novi
Planning Division
Community Development
45175 W Ten Mile Rd
Novi, MI 48375
city@novi.org






Triangle Place JSP13-53

Future Land Use



Map Author: Kristen Kapelanski
 Date: 08-21-13
 Project: Triangle Place JSP13-53
 Version #: V1.0

Map Legend

-  Subject Property
-  Office Commercial
-  Community Commercial

MAP INTERPRETATION NOTICE

This information is provided as a guide only and is not intended to constitute an offer or solicitation for any particular investment. This information is intended to assist investors in making their own investment decisions. Investors should consult their own legal and financial advisors before making any investment decisions. This information is not intended to constitute an offer or solicitation for any particular investment. This information is intended to assist investors in making their own investment decisions. Investors should consult their own legal and financial advisors before making any investment decisions.



City of Novi

Planning Division
 Community Development
 45175 W Ten Mile Rd
 Novi, MI 48375
 cityofnovi.org



1 inch = 225 feet

Triangle Place JSP13-53

Natural Features



Map Author: Kristen Kopolanski
 Date: 08-21-13
 Project: Triangle Place JSP13-53
 Version #: V1.0

Map Legend

-  Subject Property
-  Wetlands
-  Woodlands

MAP INTERPRETATION NOTICE

Map information depicted is not intended to replace or substitute for an official or certified survey. This map was prepared to meet National Map Accuracy Standards and was prepared using available information available to the public of the City of Novi. Boundary measurements and area calculations are approximate and should not be considered an engineering measurement performed by a Registered Michigan Surveyor as defined in Michigan Public Act 112 of 1970 or otherwise. Please contact the City GIS Manager for further details and queries related to this map.



City of Novi

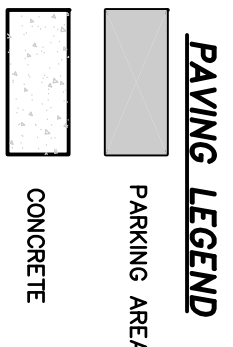
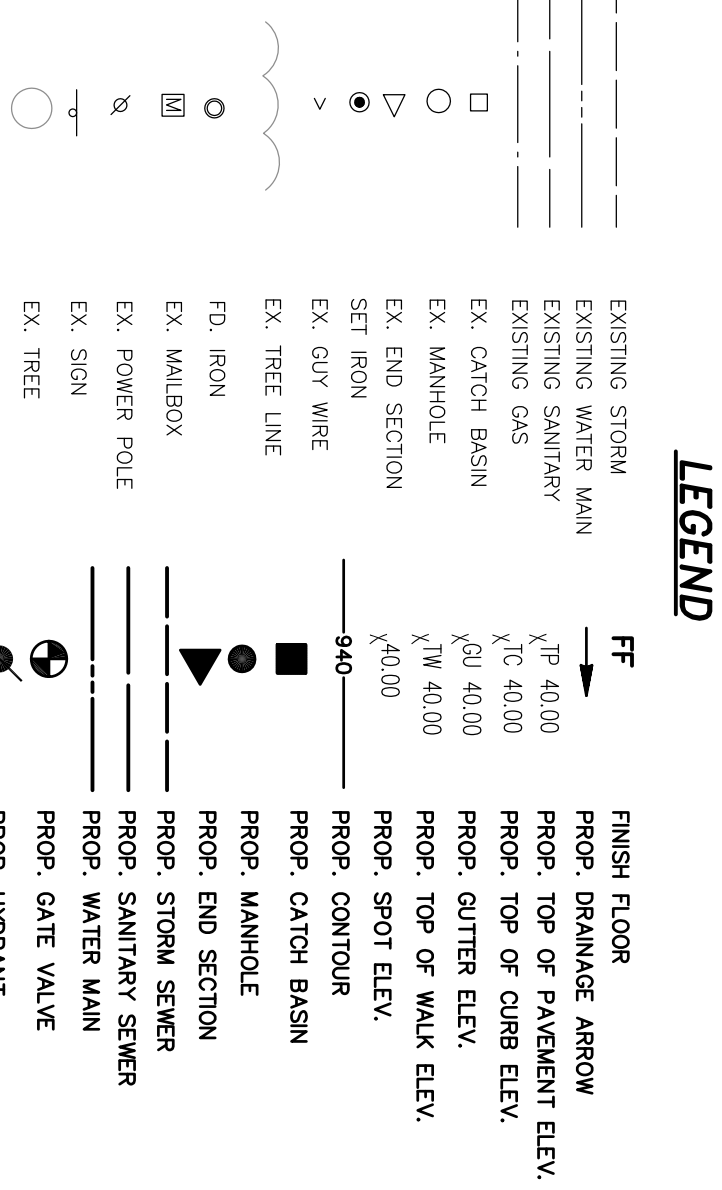
Planning Division
 Community Development
 45175 W Ten Mile Rd
 Novi, MI 48375
cityofnovi.org



1 inch = 225 feet

HAGGERTY RETAIL DEVELOPMENT

FINAL SITE PLAN
CITY OF NOVI, OAKLAND COUNTY



LEGAL DESCRIPTION

A PARCEL OF LAND IN THE SOUTHEAST 1/4 OF SECTION 36, TOWN 1 NORTH, RANGE 8 EAST, IN THE CITY OF NOVI, OAKLAND COUNTY, MICHIGAN BEGINNING AT A POINT DISTANT NORTH 07 DEGREES 52 MINUTES WEST 100.00 FEET FROM THE EAST CORNER OF SECTION 35 SECONDS WEST 129.87 FEET, THENCE SOUTH 31 DEGREES 07 MINUTES 56 SECONDS WEST 94.87 FEET TO THE EASTERLY RIGHT OF WAY LINE, HAGGERTY ROAD, THENCE NORTH 27 DEGREES 22 MINUTES 11 SECONDS EAST 195.67 FEET, THENCE NORTH 18 DEGREES 36 MINUTES 25 SECONDS EAST 243.28 FEET TO THE EAST SECTION LINE, THENCE SOUTH 01 DEGREES 52 MINUTES 04 SECONDS EAST 332.54 FEET TO THE POINT OF BEGINNING.

NOTES:

- 1) ROOFTOP EQUIPMENT MUST BE SCREENED PER ORDINANCE REQUIREMENTS
- 2) EXTERIOR LIGHTING MUST COMPLY WITH SECTION 2911 OF THE CITY OF NOVI CODE.
- 3) RIGHT OF WAY PERMIT IS REQUIRED FROM THE ROAD COMMISSION FOR OAKLAND COUNTY FOR ANY WORK IN THE HAGGERTY ROAD RIGHT-OF-WAY.
- 4) ALL SIGNS SHALL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES (CHAPTER 28) OF THE CITY OF NOVI, AND WHERE REQUIRED SHALL BE REVIEWED AND APPROVED BY THE DEPARTMENT OF BUILDING AND SAFETY AND A PERMIT ISSUED.
- 5) ALL PARKING AND TRAFFIC CONTROL SIGNS SHALL COMPLY WITH THE DESIGN AND PLACEMENT REQUIREMENTS OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD).
- 6) NOTIFY THE CITY OF NOVI A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
- 7) ALL CONSTRUCTION MUST BE CONFORMING TO THE CURRENT STANDARDS AND SPECIFICATIONS ADOPTED BY THE CITY OF NOVI.
- 8) ALL UTILITIES TO BE UNDERGROUND.
- 9) CALL MISS DIG (800) 482-7171 A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
- 10) ALL SOIL EROSION AND SILT MUST BE CONTROLLED AND CONTAINED ON-SITE.
- 11) ALL EXCAVATION UNDER OR WITHIN A 1 ON 1 INFLUENCE OF PUBLIC PAVEMENT EXISTING OR PROPOSED, SHALL BE BACKFILLED AND COMPACTED WITH SAND (CLASS II MDOT).
- 12) THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES.
- 13) PRIOR TO ISSUANCE OF AN OCCUPANCY PERMIT, ENGINEERING SITE INSPECTION IS REQUIRED.
- 14) NO DEWATERING IS ANTICIPATED. IF ANY DEWATERING IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR WILL BE REQUIRED TO PROVIDE A DRAINAGE PLAN TO THE CITY FOR REVIEW AND APPROVAL.

FIRE DEPARTMENT NOTES:

- 1) THE BUILDING ADDRESS IS TO BE POSTED FACING THE STREET THROUGHOUT CONSTRUCTION. THE ADDRESS IS TO BE AT LEAST 3 INCHES HIGH ON A CONTRASTING BACKGROUND.

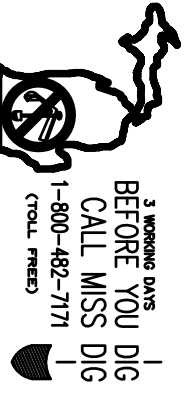
FLOODPLAIN NOTE:

ACCORDING TO THE NATIONAL FLOOD INSURANCE RATE MAP COMMUNITY PANEL NUMBER 2601750006G DATED MAY 3, 1993 THE SUBJECT PARCEL IS LOCATED IN ZONE "C" WHICH IS NOT A DESIGNATED FLOOD HAZARD AREA.

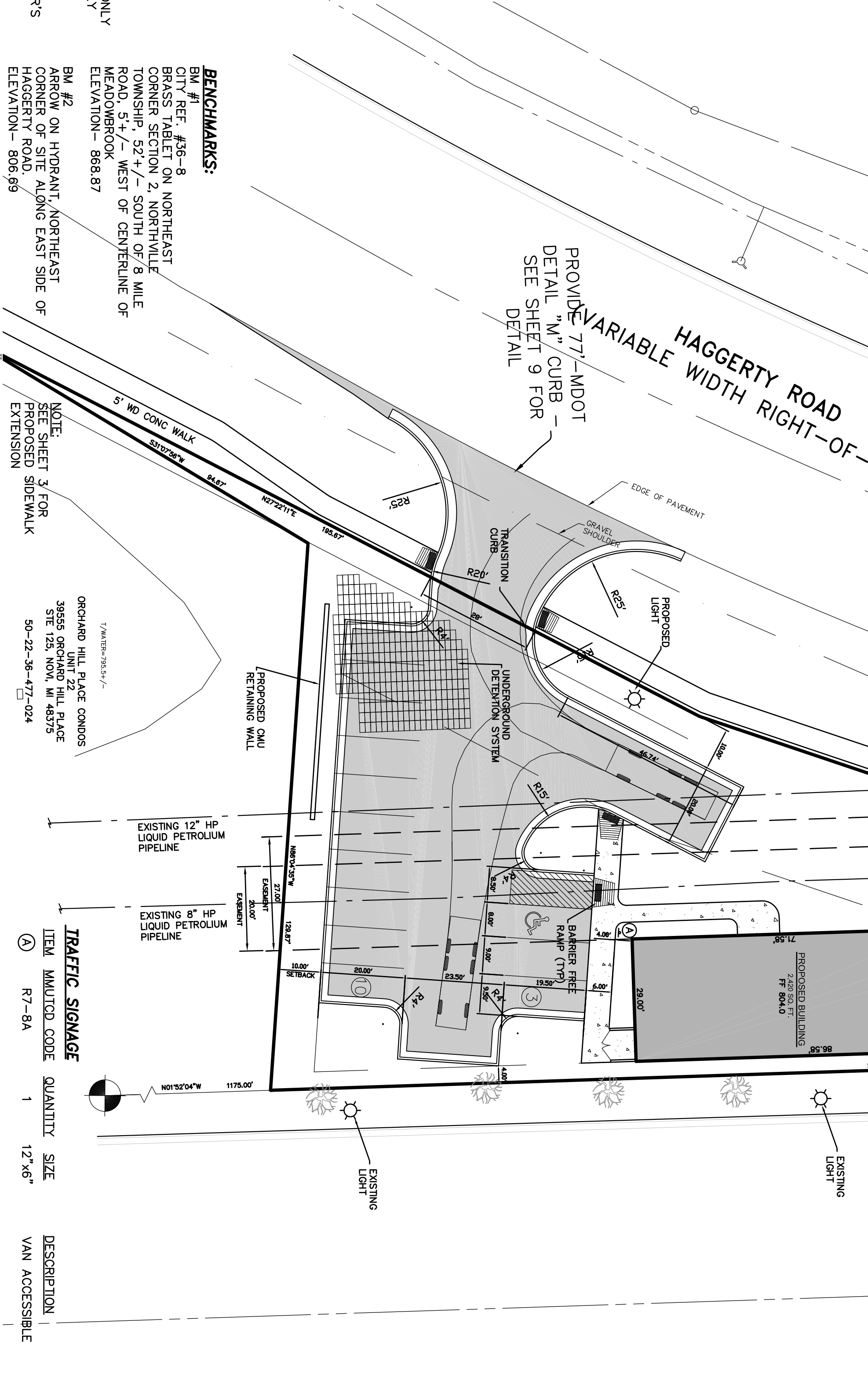
NOTICE:

CONSTRUCTION, SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AS DISCLOSED BY AVAILABLE UTILITY COMPANY RECORDS AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE COMPANY. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PREPARE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY IF A CONFLICT IS APPARENT.



CITY OF NOVI
45175 TEN MILE ROAD
NOVI, MI 48375
50-22-36-477-005



BENCHMARKS:

BM #1 REF. #36-8 BRASS TABLET ON NORTHEAST CORNER SECTION 2, NORTHVILLE TOWNSHIP, 52+/- SOUTH OF 8 MILE ROAD, 5+/- WEST OF CENTERLINE OF MEADOWBROOK ELEVATION- 868.87

BM #2 ARROW ON HYDRANT, NORTHEAST CORNER OF SITE ALONG EAST SIDE OF HAGGERTY ROAD. ELEVATION- 806.69

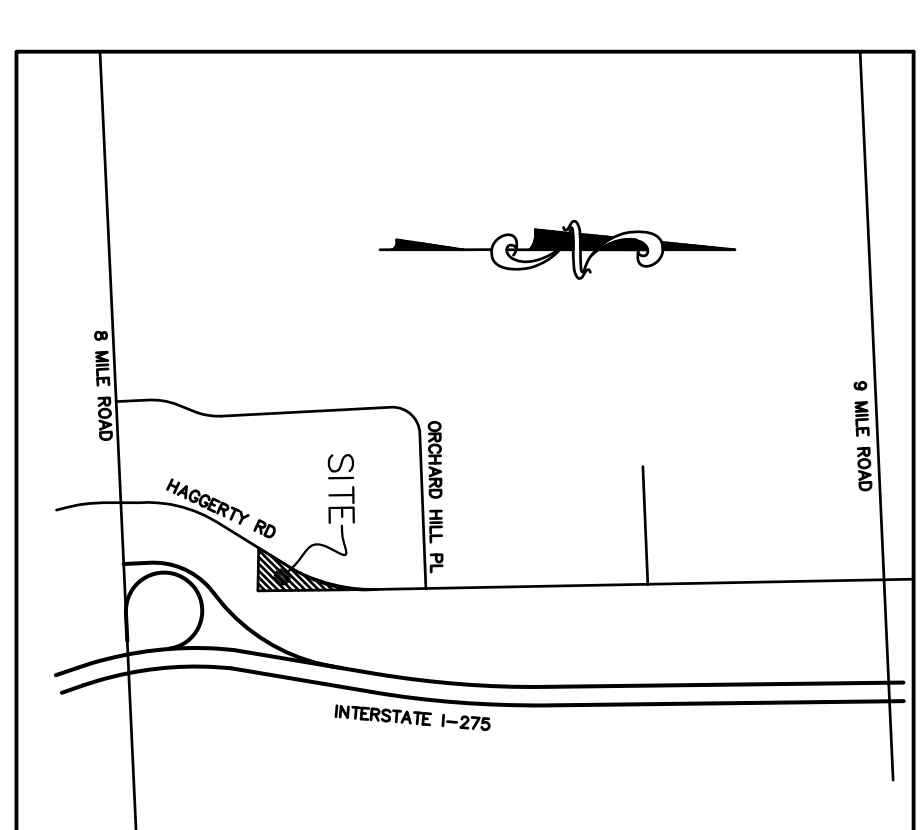
NOTE: SEE SHEET 3 FOR PROPOSED SIDEWALK EXTENSION

TRAFFIC SIGNAGE
ITEM MAINTENANCE CODE
R7-8A

QUANTITY
1

SIZE
12"x6"

DESCRIPTION
VAN ACCESSIBLE



OWNER/APPLICANT:

TROWBRIDGE COMPANIES
2617 BEACON HILL
AUBURN HILLS, MI 48326
(248) 373-4603 PH
(248) 373-6280 FAX

ENGINEER:

ANC ENGINEERING, INC.
4091 HIGHCREST
BRIGHTON, MI 48116
(248) 921-3942

SITE DATA:

EXISTING ZONING: B-3 (P.R.O.)
TAX IDENTIFICATION: 50-22-36-476-006
GROSS ACREAGE: 0.48 AC
EXISTING WETLANDS: NONE
EXISTING WOODLANDS: NONE
BUILDING SETBACKS REQUIRED:
HAGGERTY ROAD SIDE: 30' MIN
EAST SIDE: 4' MIN
SOUTH SIDE: 20' MIN
PARKING SETBACKS REQUIRED:
HAGGERTY ROAD SIDE: 10' MIN
EAST SIDE: 4' MIN
SOUTH SIDE: 10' MIN

PARKING REQUIRED

ONE SPACE PER 200 SF OF GROSS FLOOR AREA:
BUILDING AREA: 2,420 SF
TOTAL BUILDING AREA: 2,420 SF
TOTAL PARKING REQUIRED: 2,420/200 = 12 SPACES
TOTAL PARKING PROVIDED: 12 SPACES
TOTAL BARRIER FREE PARKING PROVIDED: 1 SPACES

SHEET INDEX

1	SITE PLAN
2	EXISTING CONDITIONS PLAN
3	GRADING PLAN
4	UTILITY PLAN
5	SPECIALTY STORMWATER STRUCTURES
6	SOIL EROSION CONTROL PLAN
7	STORM WATER MANAGEMENT PLAN
8	LANDSCAPE PLAN
9	FLOOR PLAN
10	BUILDING ELEVATIONS
11	BUILDING ELEVATIONS
12	CITY OF NOVI SANITARY SEWER DETAILS
13	CITY OF NOVI SANITARY SEWER DETAILS
14	O.C.P.W SANITARY SEWER DETAILS
15	CITY OF NOVI STORM SEWER DETAILS

CLIENT: TROWBRIDGE COMPANIES SITE PLAN HAGGERTY RETAIL DEVELOPMENT SECTION: TOWNSHIP: RANGE: CITY OF NOVI OAKLAND COUNTY MICHIGAN	3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1.800.482.7171 (TOLL FREE)	RESIDENTIAL SUBDIVISIONS SITE CONDOMINIUM MULTI-FAMILY PLOT PLANS CONSTRUCTION LAYOUT	SURVEYING ALTA SURVEYS BOUNDARY SURVEYS TOPOGRAPHIC SURVEYS PARCEL SPLITS	COMMERCIAL SITE PLANNING SITE ENGINEERING INDUSTRIAL & MULTI-UNIT LAND SURVEYING CONSTRUCTION LAYOUT
		ANC Engineering, Inc. Civil Engineers & Land Surveyors		

DATE: 5-23-13	CHECKED BY: D.L.	DRAWN BY: D.L.	SCALE: 1"=20' FT
1			
12-153			

Heavy Duty R-Tank Specifications

Dimensions

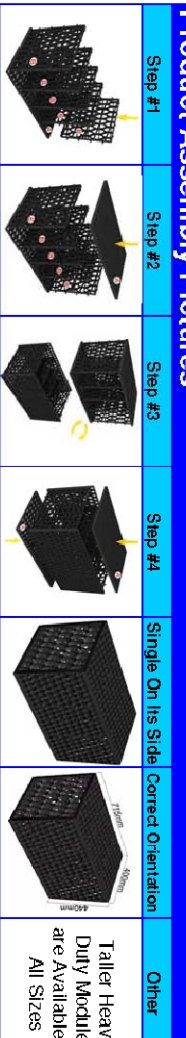
Model	Width (mm)	Width (inches)	Length (mm)	Length (inches)	Height (mm)	Height (inches)
AS-2	1000	39.4	1500	59.1	1000	39.4
AS-3	1000	39.4	2000	78.7	1000	39.4
AS-4	1000	39.4	2500	98.4	1000	39.4
AS-5	1000	39.4	3000	118.1	1000	39.4
AS-6	1000	39.4	3500	137.8	1000	39.4
AS-7	1000	39.4	4000	157.5	1000	39.4
AS-8	1000	39.4	4500	177.2	1000	39.4
AS-9	1000	39.4	5000	196.9	1000	39.4
AS-10	1000	39.4	5500	216.6	1000	39.4
AS-11	1000	39.4	6000	236.3	1000	39.4
AS-12	1000	39.4	6500	256.0	1000	39.4

Details

Model	1 Tank Volume (gal)	2 Tank Volume (gal)	3 Tank Volume (gal)	4 Tank Volume (gal)	5 Tank Volume (gal)
AS-2	1000	2000	3000	4000	5000
AS-3	1000	2000	3000	4000	5000
AS-4	1000	2000	3000	4000	5000
AS-5	1000	2000	3000	4000	5000
AS-6	1000	2000	3000	4000	5000
AS-7	1000	2000	3000	4000	5000
AS-8	1000	2000	3000	4000	5000
AS-9	1000	2000	3000	4000	5000
AS-10	1000	2000	3000	4000	5000
AS-11	1000	2000	3000	4000	5000
AS-12	1000	2000	3000	4000	5000

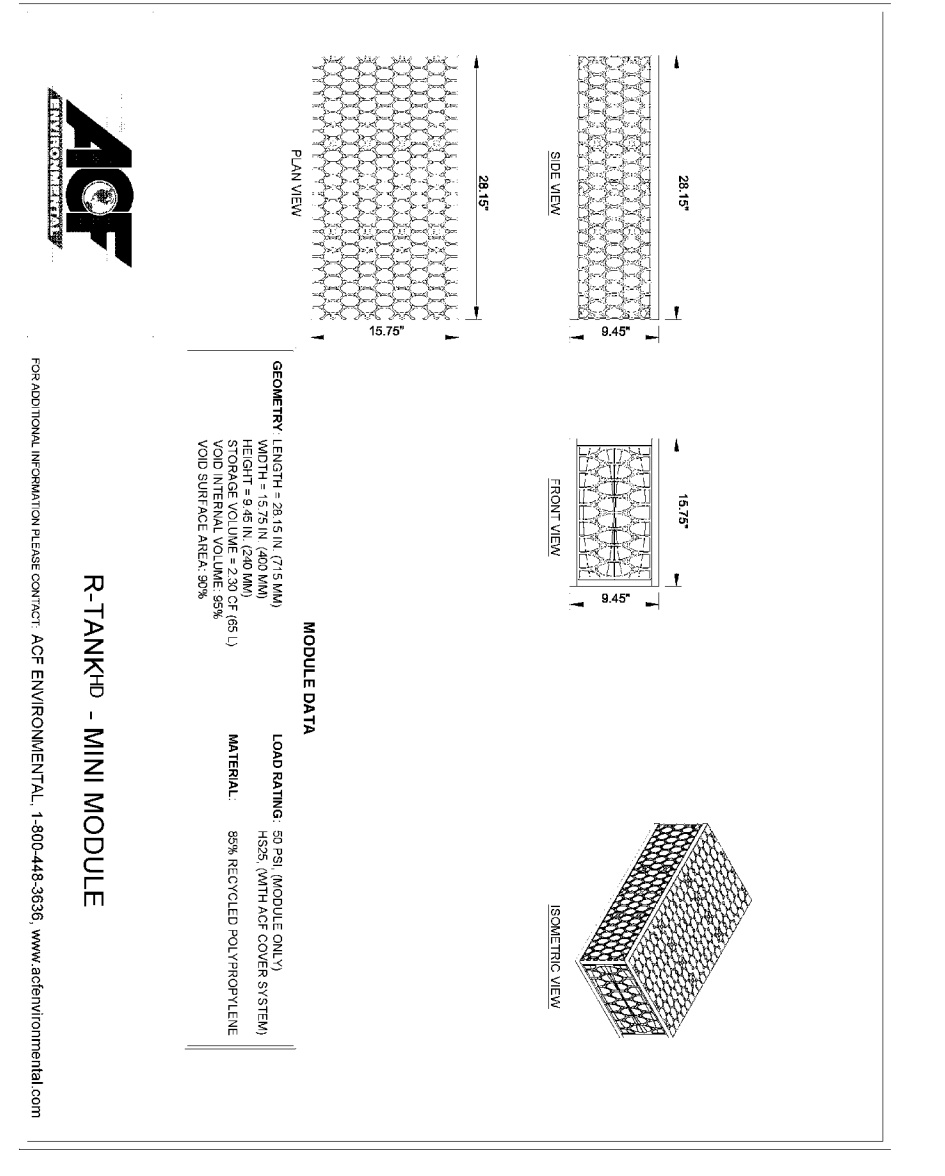
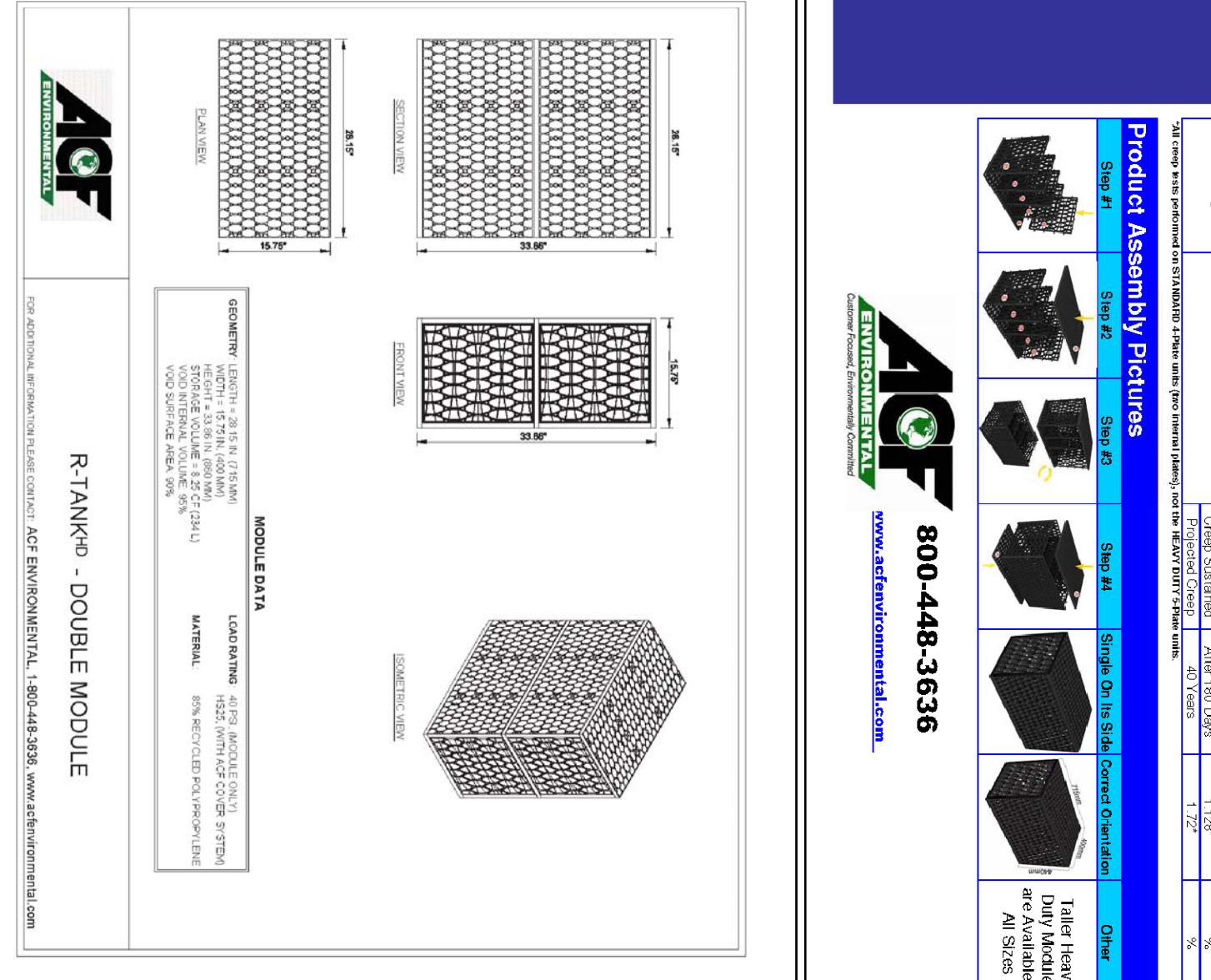
Specifications

Item	Specification	Notes
Material	304 Stainless Steel	
Surface Area	As per drawing	
Weight	As per drawing	
Installation	As per drawing	
Warranty	10 Years	

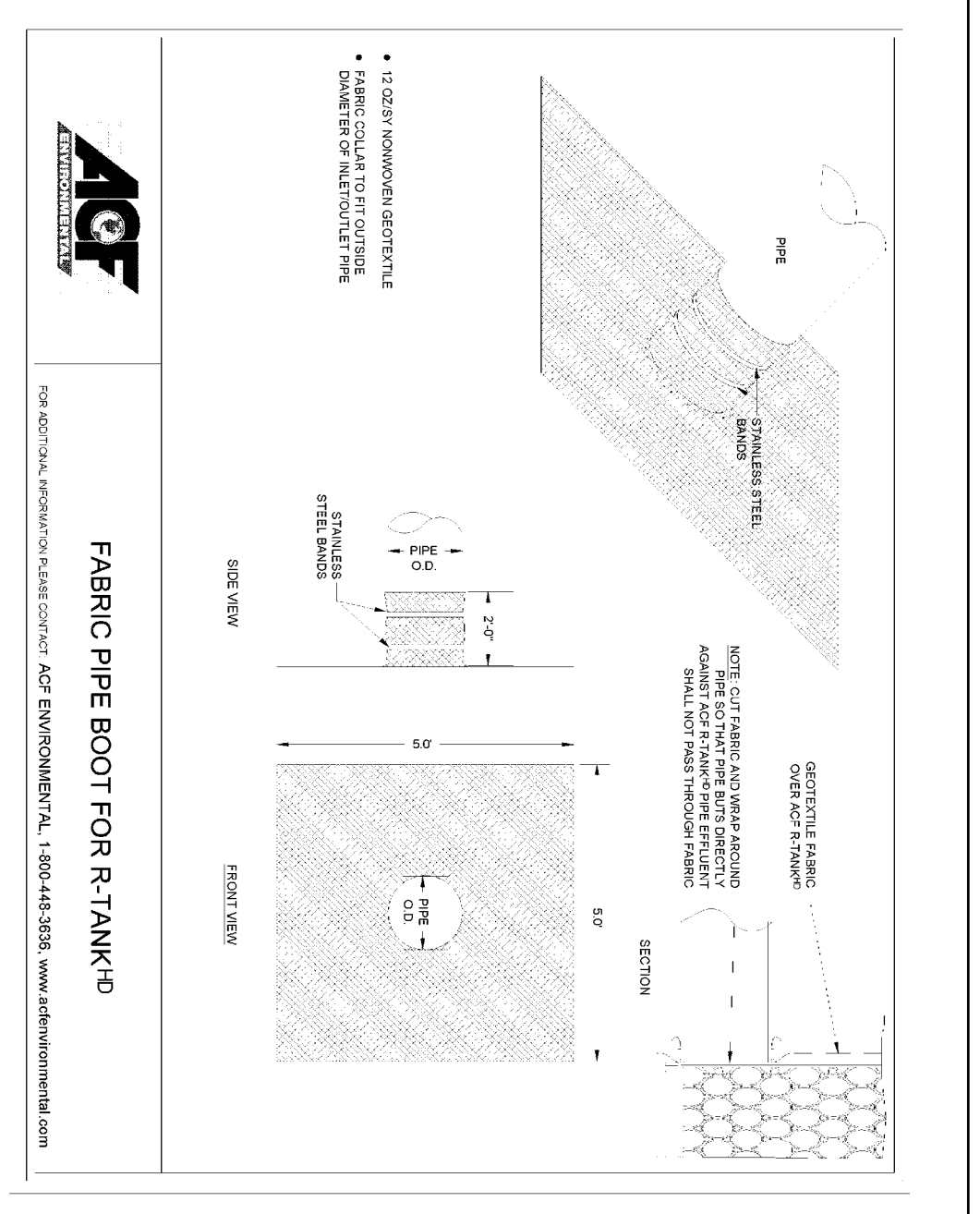
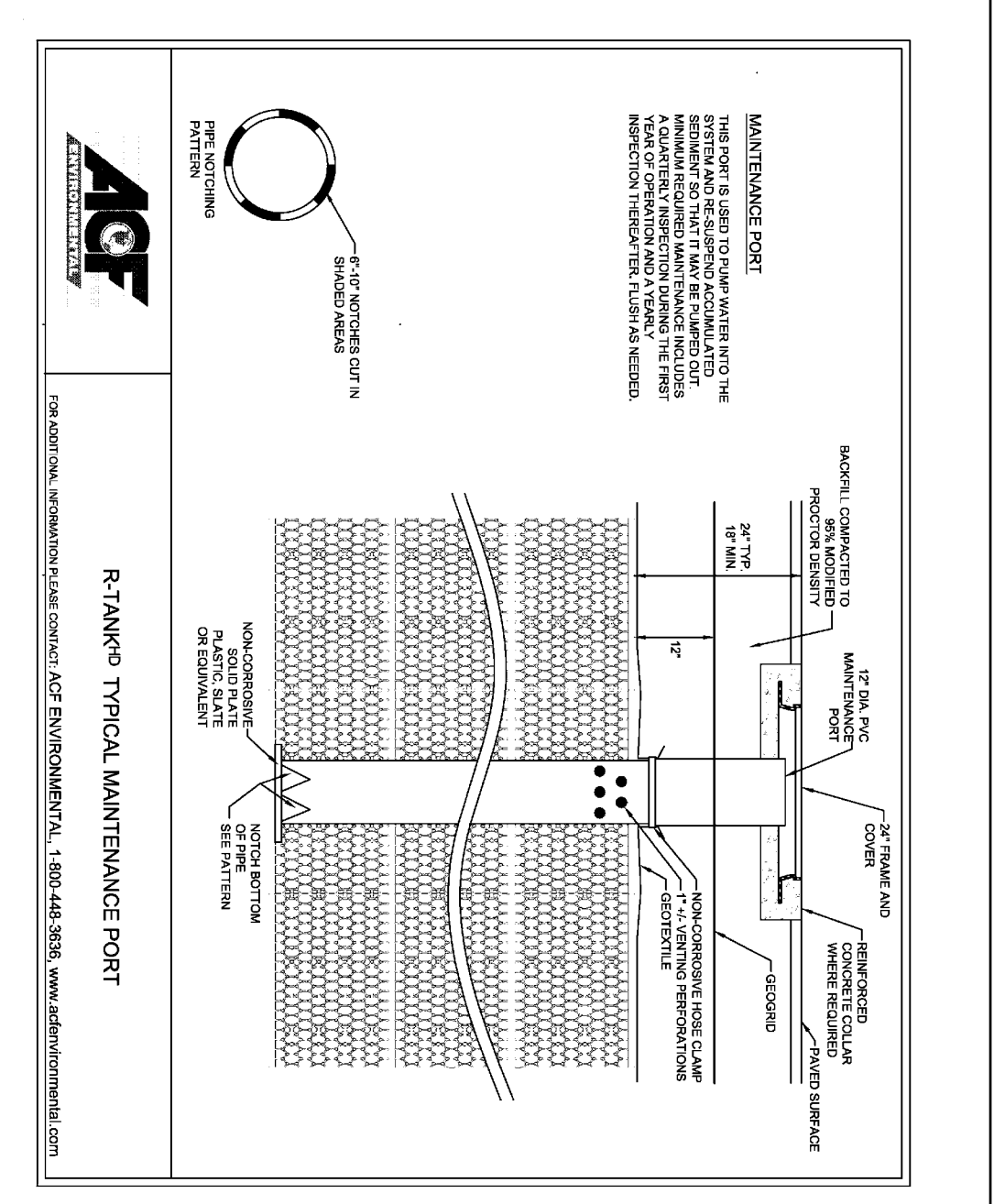
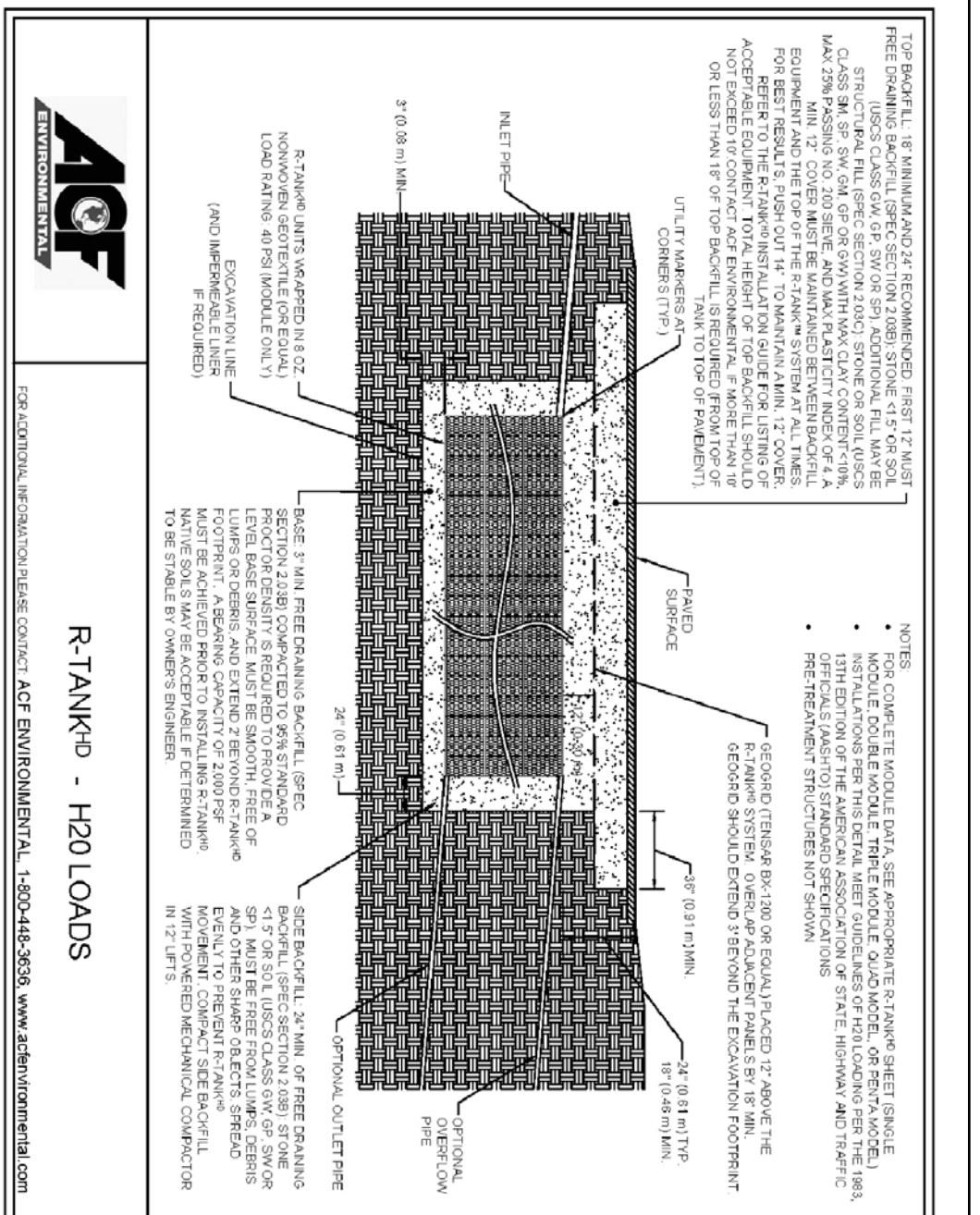


AGF
800-448-3636
www.aquashield.com

Technical

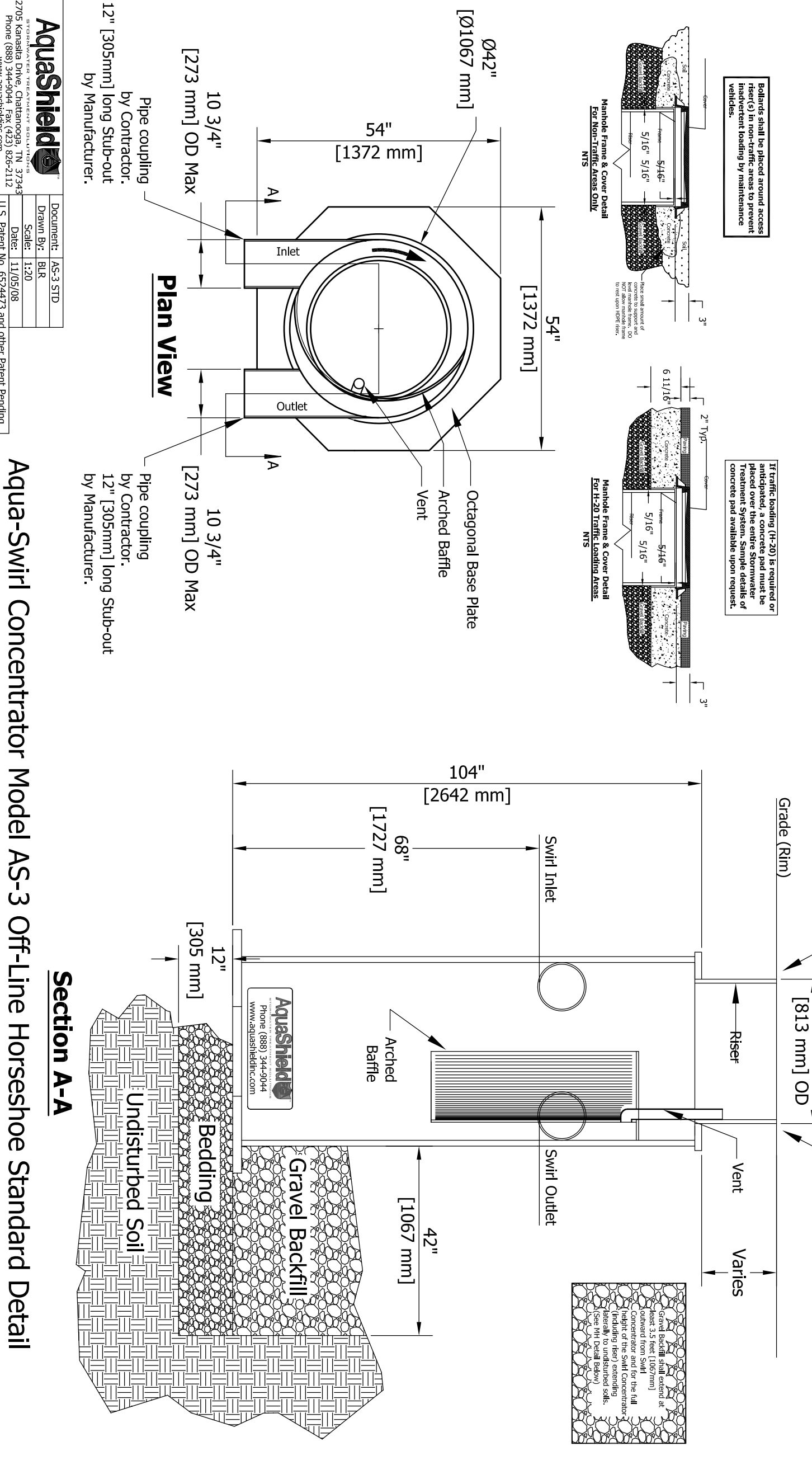


- NOTES:**
- 1) PROPOSED UNDERGROUND DETENTION SYSTEM TO INCLUDE A TOTAL OF 294 DOUBLE PLUS MINI HEAVY DUTY R-TANK MODULES.
 - 2) INSTALL R-TANK MODULES IN THE GEOMETRY AS INDICATED ON SHEET 4.
 - 3) R-TANK MODULES TO BE INSTALLED ON 3" OF MDOT 22A AGGREGATE BASE AND COMPLETELY ENCASED BY A GEOTEXTILE FILTER FABRIC. MINIMUM 18" OVERLAP ON ALL FILTER FABRIC JOINTS.
 - 4) BACKFILL PERIMETER OF R-TANK SYSTEM WITH MINIMUM OF 2" MDOT 22A AGGREGATE COMPACTED WITH A PLATE COMPACTOR IN 12" LIFTS.
 - 5) BACKFILL TOP OF R-TANK SYSTEM WITH MDOT 22A AGGREGATE TO BASE OF PAVEMENT SECTION. (SEE PAVEMENT SECTION - SHEET 3)



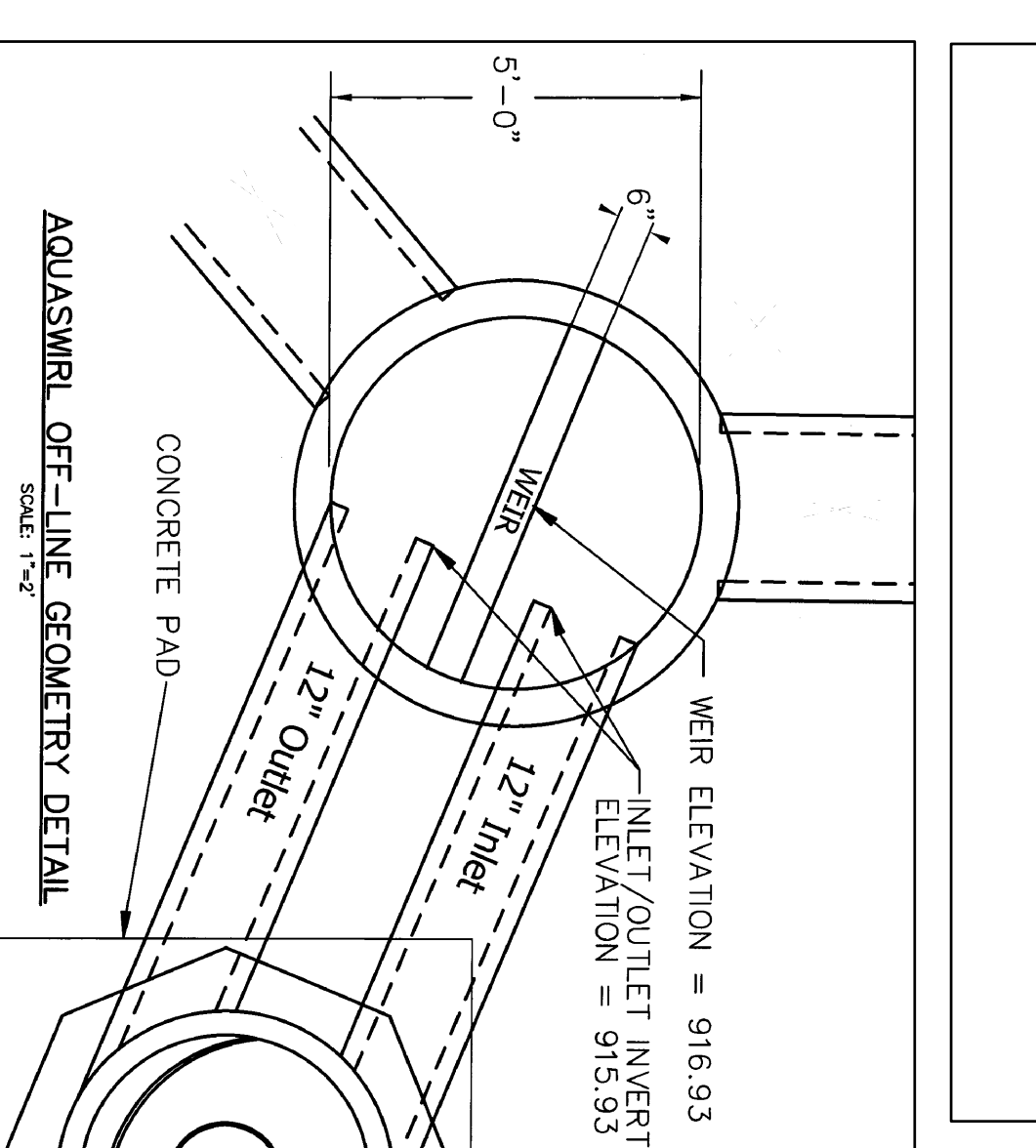
STANDARD NOTE:

1. System shall be designed for the following capacities:
 Sediment Storage: 20 ft³ (0.6 m³)
 Oil/Dieul Storage: 110 gal (416 L)



AQUA-SWIRL™ SPECIFICATION NOTES

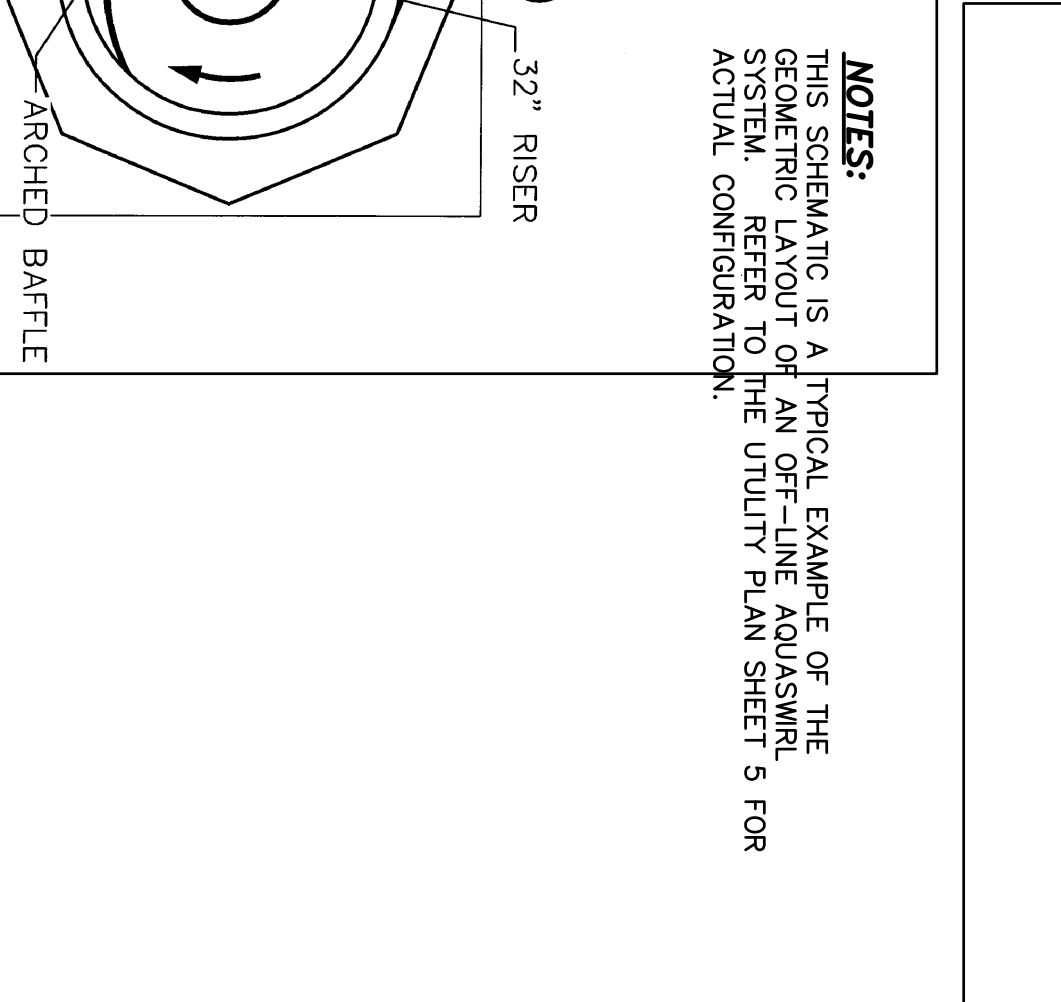
1. Manufacturer shall be responsible for complete assembly of Swirl Concentrator.
2. Swirl Concentrator shall be fabricated from high-density polyethylene (HDPE) ASTM F 1216. The swirl concentrator shall be fabricated from 1/2" thick HDPE. The swirl concentrator shall be fabricated from 1/2" thick HDPE.
3. The swirl concentrator shall be fabricated from 1/2" thick HDPE.
4. All fittings and pipe shall be fabricated from 1/2" thick HDPE.
5. Manufacturer shall supply steel access to Swirl Concentrator via 2" x 2" x 1/4" steel plate.
6. Contractor shall supply pipe coupling to connect Swirl Concentrator to existing 12" pipe.
7. Contractor shall prepare excavation and install Swirl Concentrator. Contractor is responsible for all backfill and compaction.
8. Swirl Concentrator shall be installed on a concrete pad.
9. Where traffic loading (H-20) is required or where the Swirl Concentrator is to be installed in a confined space, the contractor shall provide a reinforced concrete design as calculated by Engineer.
10. Unless other traffic barriers are present, the contractor shall provide a reinforced concrete design as calculated by Engineer.
11. Excavation shall be backfilled with recommended bedding material.
12. Bedding shall be backfilled with recommended bedding material.
13. The design and construction of the Swirl Concentrator shall be in accordance with the manufacturer's specifications.
14. The design and construction of the Swirl Concentrator shall be in accordance with the manufacturer's specifications.
15. The design and construction of the Swirl Concentrator shall be in accordance with the manufacturer's specifications.



Aqua-Swirl™ Sizing Chart (English)

Aqua-Swirl™ Model	Swirl Diameter (ft)	Maximum Outer Diameter (ft)	Water Quality (gpd)	Oil/Dieul Capacity (gpd)	Sediment Capacity (ft ³)
AS-2	2.50	8	1.1	37	10
AS-3	3.25	10	1.8	110	20
AS-4	4.25	12	3.2	190	32
AS-5	5.00	14	4.4	270	45
AS-6	6.00	16	6.3	390	65
AS-7	7.00	18	8.6	540	90
AS-8	8.00	20	11.2	710	115
AS-9	9.00	22	14.2	910	145
AS-10	10.0	24	17.5	1130	180
AS-12	12.0	28	25.2	1698	270
AS-XX	Custom	Custom	2.25

The design and construction of the Aqua-Swirl™ primary wetlands from design of construction. For representative wetland design, see the Aqua-Swirl™ design manual. The design and construction of the Aqua-Swirl™ primary wetlands shall be in accordance with the manufacturer's specifications.



CLIENT: TROWBRIDGE COMPANIES
STORMWATER MANAGEMENT SPECIALTY STRUCTURES PLAN
 HAGGERTY RETAIL DEVELOPMENT
 SECTION: TOWNSHIP: RANGE:
 CITY OF NOV OAKLAND COUNTY MICHIGAN

3. WORKING DAYS BEFORE YOU DIG. CALL MISS DIG 1.800.482.7171 (TOLL FREE)

AGC Engineering, Inc.
 Civil Engineers & Land Surveyors
 4091 HIGHCREST BRIGHTON, MICHIGAN 48116
 Phone: (248) 921-3942

DATE: 5-23-13
 DRAWN BY: DLK
 CHECKED BY: DLK

SCALE: 1/8" = 1'-0" FT
5
 12-153

RESIDENTIAL SUBDIVISIONS
 SITE CONDOMINIUM MULTI-FAMILY
 PLOT PLANS CONSTRUCTION LAYOUT

SURVEYING ALTA SURVEYS BOUNDARY SURVEYS TOPOGRAPHIC SURVEYS PARCEL SPLITS

COMMERCIAL SITE PLANNING SITE ENGINEERING INDUSTRIAL & MULTI-UNIT CONSTRUCTION LAYOUT

STORM WATER DETENTION CALCULATIONS

RUNOFF COEFFICIENT CALCULATION

LAND USE	AREA (A) (acres)	RUNOFF COEFFICIENT (C)
BLDG & WALKS	0.07	0.90
PAVEMENT & PARKING	0.15	0.90
OFF-SITE PAVEMENT	0.03	0.90
OPEN SPACE AREA	0.10	0.20
TOTAL AREA	0.35	

CALCULATE THE WEIGHTED RUNOFF COEFFICIENT:

$$C_{SUM} = (A_1 \times C_1) / A + (A_2 \times C_2) / A + (A_3 \times C_3) / A + (A_4 \times C_4) / A$$

$$C_{SUM} = (0.07 \times 0.90) / 0.35 + (0.15 \times 0.90) / 0.35 + (0.03 \times 0.90) / 0.35 + (0.10 \times 0.20) / 0.35$$

$$C_{SUM} = 0.70$$

100 YEAR STORM DETENTION DESIGN (OAKLAND COUNTY DESIGN METHOD)

Contributing Area (A): 0.35 acres
 Allowable Discharge (Qa): 0.07 cfs
 Coefficient of Runoff (C): 0.70

Calculation of Required Discharge/Acre
 $Qa = (Qa) / (A) \times C$
 $Qa = 0.29$ cfs/acre imperv.

$T = 25 + (10312.5 / Qa) / 0.5$
 $T = 164.98$ min.

Storage Volume Required:
 $Vs = (16500(T)(C)) / 2.25$
 $Vs = 400$ cf

$Vt = (Vs) / (C)$
 $Vt = 3,049$ cf

First Flush Volume (Sedimentation Basin)
 Contributing Area (A): 0.35 acres
 Coefficient of Runoff (C): 0.70
 $V_{ff} = 1815 \times A \times C$
 $V_{ff} = 445$ cf

Storage Tank Volume Calculation - Detention

Required Storage Volume V = 3,049

Use R-Tank Double Plus Mini 5 Plate Module

Tank Module Height	3.54	FT
Module Area	3.08	Sq Ft
Tank Volume Efficiency	95	%
Module Storage Volume	10.36	Cubic Feet
Bottom of Tank Elev	796.75	= Storage Elev.
Top of Tank Elev	800.29	
Overall System Area	906	Sq Ft
Number of Modules Required	294	UNITS
N = V / Unit Volume =		

Storage Tank Volume Calculation - First Flush

First Flush Volume Required: 445 Cubic Feet
 First Flush Storage Depth: 0.49 Ft
 First Flush Elevation: 797.24

ALLOWABLE DISCHARGE RATE:
 ALLOWABLE DISCHARGE RATE = 0.07 cfs
 RESTRICTOR INVERT = FREEBOARD ELEVATION = 796.79
 CALCULATE AVERAGE HEAD:
 $h_{avg} = 0.697 \times (Z_1 - Z_2)$
 $h_{avg} = 2.33$ ft
 DETERMINE ORIFICE AREA NEEDED BASED ON THE ORIFICE EQUATION:
 $A = Q_a / (0.62 \times \sqrt{2 \times g \times h_{avg}})$
 DETERMINE # OF ORIFICE REQUIRED BASED ON AN ORIFICE DIAMETER OF:
 REQUIRED NUMBER OF ORIFICE = 2
 CALCULATE ACTUAL AVERAGE RELEASE RATE:
 $Q_{act} = 0.62 \times A \times \sqrt{2 \times g \times h_{avg}}$
 $Q_{act} = 0.07$ cfs

OUTLET SIZING FOR FIRST FLUSH
 RELEASE FIRST FLUSH VOLUME FROM DETENTION BASIN OVER A PERIOD OF AT LEAST 24 HOURS
 CALCULATE AVERAGE RELEASE RATE WHICH WILL SATISFY THIS REQUIREMENT:
 $Q_{avg} = V / 86400$ sec
 PLACE RESTRICTOR AT OUTLET INVERT OF THE OUTLET CONTROL STRUCTURE
 CALCULATE AVERAGE HEAD:
 $h_{avg} = 0.697 \times (Z_1 - Z_2)$
 DETERMINE ORIFICE AREA NEEDED BASED ON THE ORIFICE EQUATION:
 $A = Q_{avg} / (0.62 \times \sqrt{2 \times g \times h_{avg}})$
 DETERMINE # OF ORIFICE REQUIRED BASED ON AN ORIFICE DIAMETER OF:
 REQUIRED NUMBER OF ORIFICE = 1
 CALCULATE ACTUAL AVERAGE RELEASE RATE:
 $Q_{act} = 0.62 \times A \times \sqrt{2 \times g \times h_{avg}}$
 CALCULATE ACTUAL HOLDING TIME:
 $T = V / (Q_{act})$
 $T = 24.6$ hours

CHECK OVERFLOW WEIR
 ASSUME HEAD = 0.20 ft
 CALCULATE LENGTH OF OVERFLOW STRUCTURE:
 $LENGTH = 2 \times P \times R$
 $LENGTH = 5.00$ ft
 CALCULATE CAPACITY OF OVERFLOW STRUCTURE USING WEIR EQUATION:
 $Q = 3.957 \times L \times H^{1.5}$
 $Q = 1.51$ cfs
 ACTUAL 10 YR FLOW THROUGH SYSTEM IS 1.11 CFS. THEREFORE IN THE EVENT THE RESTRICTORS WERE PLUGGED THE SYSTEM WILL PASS A 10 YR STORM EVENT THROUGH THE OVERFLOW STRUCTURE WITH A HEAD OF APPROXIMATELY 0.2 FT OVER THE WEIR

FROM POINT	TO POINT	INVERT	PIPE	DIAMETER	LENGTH	GRADE	START	STOP	VERTICAL CURVE	ACTUAL	VALVE	TYPE	LOC	LOC	COORDINATE	INVERT	MARK
1	2	802.24	12"	12"	100'	0.30%	802.24	801.76		0.30%	12"	12"	801.76	801.76	801.76	801.76	801.76
2	3	801.76	12"	12"	100'	0.30%	801.76	801.28		0.30%	12"	12"	801.28	801.28	801.28	801.28	801.28
3	4	801.28	12"	12"	100'	0.30%	801.28	800.80		0.30%	12"	12"	800.80	800.80	800.80	800.80	800.80
4	5	800.80	12"	12"	100'	0.30%	800.80	800.32		0.30%	12"	12"	800.32	800.32	800.32	800.32	800.32
5	6	800.32	12"	12"	100'	0.30%	800.32	799.84		0.30%	12"	12"	799.84	799.84	799.84	799.84	799.84
6	7	799.84	12"	12"	100'	0.30%	799.84	799.36		0.30%	12"	12"	799.36	799.36	799.36	799.36	799.36
7	8	799.36	12"	12"	100'	0.30%	799.36	798.88		0.30%	12"	12"	798.88	798.88	798.88	798.88	798.88
8	9	798.88	12"	12"	100'	0.30%	798.88	798.40		0.30%	12"	12"	798.40	798.40	798.40	798.40	798.40
9	10	798.40	12"	12"	100'	0.30%	798.40	797.92		0.30%	12"	12"	797.92	797.92	797.92	797.92	797.92
10	11	797.92	12"	12"	100'	0.30%	797.92	797.44		0.30%	12"	12"	797.44	797.44	797.44	797.44	797.44
11	12	797.44	12"	12"	100'	0.30%	797.44	796.96		0.30%	12"	12"	796.96	796.96	796.96	796.96	796.96
12	13	796.96	12"	12"	100'	0.30%	796.96	796.48		0.30%	12"	12"	796.48	796.48	796.48	796.48	796.48
13	14	796.48	12"	12"	100'	0.30%	796.48	796.00		0.30%	12"	12"	796.00	796.00	796.00	796.00	796.00
14	15	796.00	12"	12"	100'	0.30%	796.00	795.52		0.30%	12"	12"	795.52	795.52	795.52	795.52	795.52
15	16	795.52	12"	12"	100'	0.30%	795.52	795.04		0.30%	12"	12"	795.04	795.04	795.04	795.04	795.04
16	17	795.04	12"	12"	100'	0.30%	795.04	794.56		0.30%	12"	12"	794.56	794.56	794.56	794.56	794.56
17	18	794.56	12"	12"	100'	0.30%	794.56	794.08		0.30%	12"	12"	794.08	794.08	794.08	794.08	794.08
18	19	794.08	12"	12"	100'	0.30%	794.08	793.60		0.30%	12"	12"	793.60	793.60	793.60	793.60	793.60
19	20	793.60	12"	12"	100'	0.30%	793.60	793.12		0.30%	12"	12"	793.12	793.12	793.12	793.12	793.12
20	21	793.12	12"	12"	100'	0.30%	793.12	792.64		0.30%	12"	12"	792.64	792.64	792.64	792.64	792.64
21	22	792.64	12"	12"	100'	0.30%	792.64	792.16		0.30%	12"	12"	792.16	792.16	792.16	792.16	792.16
22	23	792.16	12"	12"	100'	0.30%	792.16	791.68		0.30%	12"	12"	791.68	791.68	791.68	791.68	791.68
23	24	791.68	12"	12"	100'	0.30%	791.68	791.20		0.30%	12"	12"	791.20	791.20	791.20	791.20	791.20
24	25	791.20	12"	12"	100'	0.30%	791.20	790.72		0.30%	12"	12"	790.72	790.72	790.72	790.72	790.72
25	26	790.72	12"	12"	100'	0.30%	790.72	790.24		0.30%	12"	12"	790.24	790.24	790.24	790.24	790.24
26	27	790.24	12"	12"	100'	0.30%	790.24	789.76		0.30%	12"	12"	789.76	789.76	789.76	789.76	789.76
27	28	789.76	12"	12"	100'	0.30%	789.76	789.28		0.30%	12"	12"	789.28	789.28	789.28	789.28	789.28
28	29	789.28	12"	12"	100'	0.30%	789.28	788.80		0.30%	12"	12"	788.80	788.80	788.80	788.80	788.80
29	30	788.80	12"	12"	100'	0.30%	788.80	788.32		0.30%	12"	12"	788.32	788.32	788.32	788.32	788.32
30	31	788.32	12"	12"	100'	0.30%	788.32	787.84		0.30%	12"	12"	787.84	787.84	787.84	787.84	787.84
31	32	787.84	12"	12"	100'	0.30%	787.84	787.36		0.30%	12"	12"	787.36	787.36	787.36	787.36	787.36
32	33	787.36	12"	12"	100'	0.30%	787.36	786.88		0.30%	12"	12"	786.88	786.88	786.88	786.88	786.88
33	34	786.88	12"	12"	100'	0.30%	786.88	786.40		0.30%	12"	12"	786.40	786.40	786.40	786.40	786.40
34	35	786.40	12"	12"	100'	0.30%	786.40	785.92		0.30%	12"	12"	785.92	785.92	785.92	785.92	785.92
35	36	785.92	12"	12"	100'	0.30%	785.92	785.44		0.30%	12"	12"	785.44	785.44	785.44	785.44	785.44
36	37	785.44	12"	12"	100'	0.30%	785.44	784.96		0.30%	12"	12"	784.96	784.96	784.96	784.96	784.96
37	38	784.96	12"	12"	100'	0.30%	784.96	784.48		0.30%	12"	12"	784.48	784.48	784.48	784.48	784.48
38	39	784.48	12"	12"	100'	0.30%	784.48	784.00		0.30%	12"	12"	784.00	784.00	784.00	784.00	784.00
39	40	784.00	12"	12"	100'	0.30%	784.00	783.52		0.30%	12"	12"	783.52	783.52	783.52	783.52	783.52
40	41	783.52	12"	12"	100'	0.30%	783.52	783.04		0.30%	12"	12"	783.04	783.04	783.04	783.04	783.04
41	42	783.04	12"	12"	100'	0.30%	783.04	782.56		0.30%	12"	12"	782.56	782.56	782.56	782.56	782.56
42	43	782.56	12"	12"	100'	0.30%	782.56	782.08		0.30%	12"	12"	782.08	782.08	782.08	782.08	782.08
43	44	782.08	12"	12"	100'	0.30%	782.08	781.60		0.30%	12"	12"	781.60	781.60	781.60	781.60	781.60
44	45	781.60	12"	12"	100'	0.30%	781.60	781.12		0.30%	12"	12"	781.12	781.12	781.12	781.12	781.12
45	46	781.12	12"	12"	100'	0.30%	781.12	780.64		0.30%	12"	12"	780.64	780.64	780.64	780.64	780.64
46	47	780.64	12"	12"	100'	0.30%	780.64	780.16		0.30%	12"	12"	780.16	780.16	780.16	780.16	780.16
47	48	780.16	12"	12"	100'	0.30%	780.16	779.68		0.30%	12"	12"	779.68	779.68	779.68	779.68	779.68
48	49	779.68	12"	12"	100'	0.30%	779.68	779.20		0.30%	12"	12"	779.20	779.20	779.20	779.20	779.20
49	50	779.20	12"	12"	100'	0.30%	779.20	778.72		0.30%	12"	12"	778.72	778.72	778.72	778.72	778.72
50	51	778.72	12"	12"	100'	0.30%	778.72	778.24		0.30%	12"	12"	778.24	778.24	778.24	778.24	778.24
51	52	778.24	12"	12"	100'	0.30%	778.24	777.76		0.30%	12"	12"	777.76	777.76	777.76	777.76	777.76
52	53	777.76	12"	12"	100'	0.30%	777.76	777.28		0.30%	12"	12"	777.28	777.28	777.28	777.28	777.28
53	54	777.28	12"	12"	100'	0.30%	777.28										

general landscape notes:

- LANDSCAPE CONTRACTOR SHALL VISIT THE SITE, INSPECT EXISTING CONDITIONS, REVIEW PROPOSED PLANTINGS AND RELATED WORK. CONTACT THE OWNER AND/OR LANDSCAPE ARCHITECT WITH ANY CONCERNS OR DISCREPANCY BETWEEN THE PLAN, PLANT MATERIAL LIST, AND/OR SITE CONDITIONS.
- PRIOR TO BEGINNING OF CONSTRUCTION ON ANY WORK, CONTRACTORS SHALL VERIFY LOCATIONS OF ALL ON-SITE UTILITIES, GAS, ELECTRIC, TELEPHONE, CABLE TO BE LOCATED BY CONTACTING MISS DIG 1-800-482-7171. ANY DAMAGE OR INTERRUPTION OF SERVICES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. COORDINATE ALL RELATED WORK ACTIVITIES WITH OTHER TRADES AND REPORT ANY UNACCEPTABLE JOB CONDITIONS TO OWNER PRIOR TO COMMENCING WORK.
- NUMERICAL VALUE ON THE LANDSCAPE QUANTITIES SPECIFIED ON THE PLAN TAKE PRECEDENCE OVER GRAPHIC REPRESENTATION. VERIFY ANY CONCERN/DISCREPANCY WITH LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION AND PLANT MATERIAL LOCATION TO BE ADJUSTED ON-SITE IF NECESSARY.
- ALL SUBSTITUTIONS OR DEVIATIONS FROM THE LANDSCAPE PLAN MUST BE APPROVED BY CITY OF NOVI AND LANDSCAPE ARCHITECT.
- ALL LARGE TREES AND EVERGREENS TO BE STAKED, GUYED AND WRAPPED AS DETAIL SHOWN ON PLAN.
- PLANT BEDS TO BE DRESSED WITH MIN. 3" OF FINELY DOUBLE SHREDDED HARDWOOD MULCH.
- DIG SHRUB PITS 1' LARGER THAN SHRUB ROOT BALLS AND TREE PITS 2' LARGER THAN ROOT BALL. BACK FILL WITH ONE PART TOP SOIL AND ONE PART SOIL FROM EXCAVATED PLANTING HOLE.
- REMOVE ALL TWINE, WIRE AND BURLAP FROM TREE AND SHRUB EARTH BALLS, AND FROM TREE TRUNKS.
- NATURAL COLOR, FINELY SHREDDED HARDWOOD BARK MULCH REQUIRED FOR ALL PLANTINGS. 4" THICK BARK MULCH FOR TREES IN 4" DIA. CIRCLE WITH 3" PULLED AWAY FROM TRUNK. 3" THICK BARK MULCH FOR SHRUBS AND 2" THICK BARK MULCH FOR PERENNIALS.
- PLANT MATERIAL QUALITY & INSTALLATION SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN ASSOCIATION OF NURSERYMEN LANDSCAPE STANDARDS.
- PROVIDE PEAT SOD FOR ALL NEW AND DISTURBED LAWN AREAS UNLESS NOTED OTHERWISE.
- ALL PLANTING AREAS TO BE PREPARED WITH APPROPRIATE SOIL MIXTURES AND FERTILIZER BEFORE PLANT INSTALLATION.
- PLANT TREES AND SHRUBS GENERALLY NO CLOSER THAN THE FOLLOWING DISTANCES FROM SIDEWALKS, CURBS AND PARKING STALLS:
 - SHADE TREES _____ 5 FT.
 - ORNAMENTAL AND EVERGREEN TREES (CRAB, PINE, SPRUCE, ETC.) _____ 10 FT.
 - SHRUBS THAT ARE LESS THAN 1 FOOT TALL AND WIDE AT MATURITY _____ 2 FT.
- NO TREES OR EVERGREENS TO BE INSTALLED OVER ANY PROPOSED OR EXISTING UTILITY LINES AS SHOWN ON THE OVERALL LANDSCAPE PLAN. SEE ENGINEERING PLANS FOR EXACT LOCATION AND DETAILS.
- ALL LAWN AREAS AND LANDSCAPE BEDS TO BE FULLY IRRIGATED WITH A AUTOMATIC UNDERGROUND SYSTEMS. IRRIGATION SYSTEM TO HAVE SEPARATE ZONES FOR LAWN AREAS, PARKING ISLANDS, AND SHRUB BEDS WITH DIFFERENT CONTROL MOISTURE LEVEL ADJUSTMENT PER ZONE AS REQUIRED. UNLESS NOTED OTHERWISE, LANDSCAPE BEDS ADJACENT TO LAWN TO RECEIVE EDGING. EDGING SHALL BE 4" X 1/8" METAL (FINISH BLACK OR GREEN) OR APPROVED EQUAL AND TO BE INSTALLED WITH HORIZONTAL METAL STAKES AT 32" O.C. OR PER MANUFACTURER'S SPECIFICATION.

- ALL LANDSCAPE BEDS ADJACENT AND NEXT TO BUILDING SHALL BE EXCAVATED OF ALL BUILDING MATERIALS AND POOR SOILS A MIN. OF 12" DEPTH. BACK FILL WITH GOOD, MEDIUM TEXTURED PLANTING SOILS. ADD A MIN. 2" OF TOPSOIL OVERFILL TO FINISH GRADE. PROVIDE POSITIVE DRAINAGE.
- WATERING OF ALL PLANTS AND TREES TO BE PROVIDED IMMEDIATELY AND MULCHING WITHIN 24 HOURS AFTER INSTALLATION.
- ALL TREE PITS TO BE TESTED FOR PROPER DRAINAGE PRIOR TO TREE PLANTING. PROVIDE APPROPRIATE DRAINAGE SYSTEM AS REQUIRED IF THE TREE PIT DOES NOT DRAIN SUFFICIENTLY.
- THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL LANDSCAPE PLANT MATERIALS AND IRRIGATION INSTALLATION FOR A PERIOD OF ONE YEAR BEGINNING AFTER THE COMPLETION OF LANDSCAPE INSTALLATION DATE APPROVED BY THE TOWNSHIP/CITY OR LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL REPLACE DURING AND AT THE END OF THE GUARANTEE PERIOD, ANY DEAD OR UNACCEPTABLE PLANTS, AS DETERMINED BY THE TOWNSHIP/CITY OR LANDSCAPE ARCHITECT, WITHOUT COST TO THE OWNER.

landscape requirements:

street trees	REQUIRED	PROVIDED
ROW (HAGGERTY ROAD) 345' LIN. FT.		
1-LARGE CANOPY TREE PER 45' ROAD FRONTAGE (345/45 = 7.7 TREES)	8	8
greenbelt requirements	REQUIRED	PROVIDED
GREENBELT (HAGGERTY ROAD) 345' LIN. FT.		
1-LARGE CANOPY OR EVERGREEN TREE PER 40' (345/40 = 8 TREES)	8	8
1-SUBCANOPY TREE PER 30' (345/30 = 11.5 TREES)	14	14
building foundation	REQUIRED	PROVIDED
BUILDING FOUNDATION LANDSCAPE AREA (231.6' PERIMETER) X 8' = 1,849.3 SQFT.	1,849.3 SQFT.	1,850.0 SQFT.
parking lot trees (OFFICE-CATEGORY-1)	REQUIRED	PROVIDED
PARKING SPACE AREA 2,398 SQFT.	2,398 SQFT.	2,398 SQFT.
PARKING AREA FORMULA (2,398 SQFT. X .10 (10%) = 239.8 SQFT.)	239.8 SQFT.	239.8 SQFT.
VEHICULAR ACCESS AREA 3,920 SQFT.	3,920 SQFT.	3,920 SQFT.
VEHICULAR AREA FORMULA (3,920 SQFT. X .05 (5%) = 199 SQFT.)	199 SQFT.	199 SQFT.
TOTAL AREA OF INTERIOR LANDSCAPE ISLANDS AREA (239.8 SQFT. + 199 SQFT. = 438.8 SQFT.)	REQUIRED	PROVIDED
438.8 SQFT.	438.8 SQFT.	678 SQFT.
TOTAL NO. OF PARKING LOT TREES (438.8 SQFT. LANDSCAPE ISLANDS / 75 = 5.85 TREES)	REQUIRED	PROVIDED
6 TREES	6 TREES	6 TREES

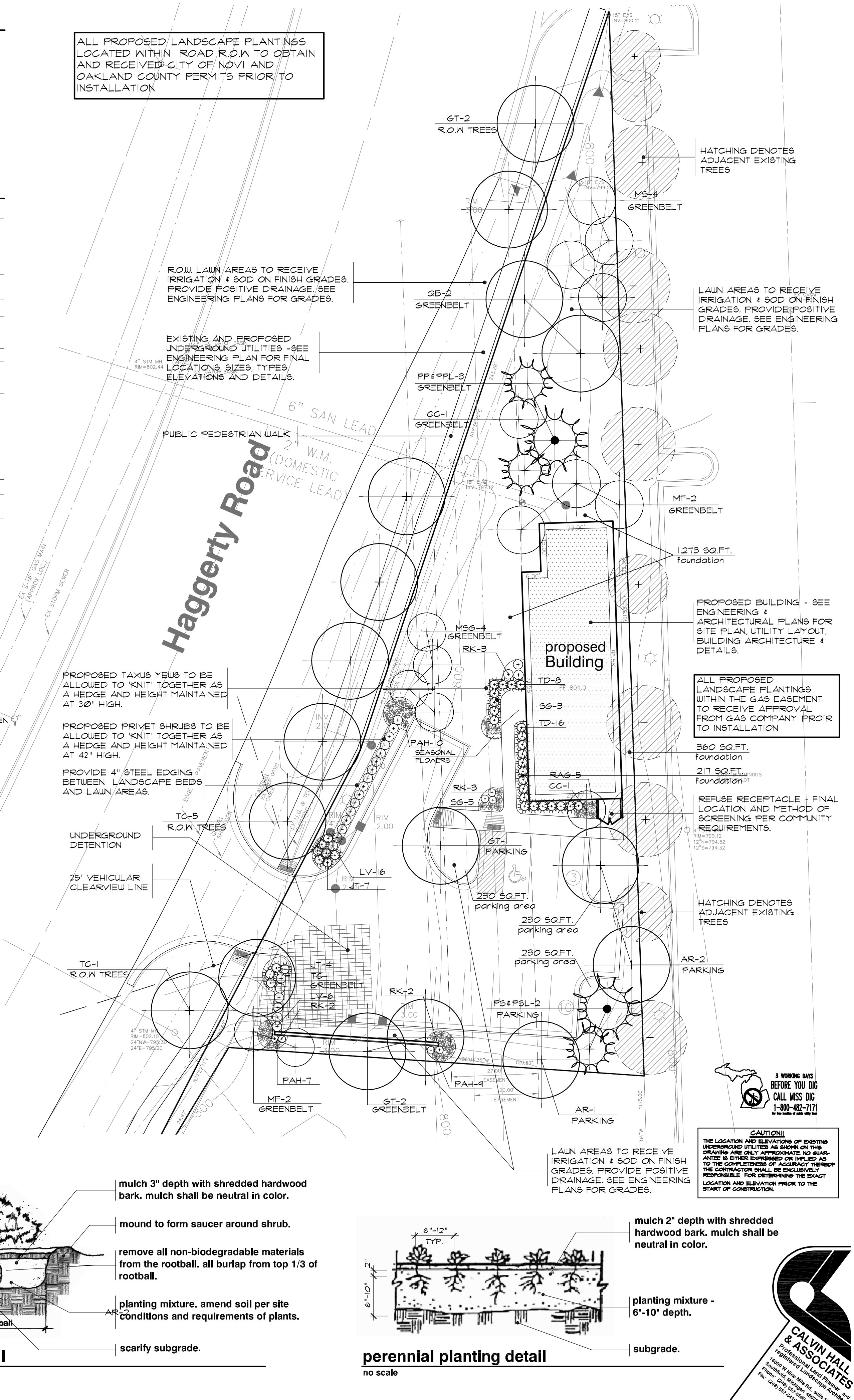
landscape maintenance notes:

- THE OWNER OF THE PROPERTY SHALL BE RESPONSIBLE FOR ALL MAINTENANCE OF SITE LANDSCAPING, AS FOLLOWS:
- LANDSCAPE MAINTENANCE PROCEDURES AND FREQUENCIES TO BE FOLLOWED SHALL BE SPECIFIED ON THE LANDSCAPE PLAN. ALONG WITH THE MANNER IN WHICH THE EFFECTIVENESS, HEALTH AND INTENDED FUNCTIONS OF THE VARIOUS LANDSCAPE AREAS ON THE SITE WILL BE ENSURED.
 - LANDSCAPING SHALL BE KEPT IN A NEAT, ORDERLY AND HEALTHY GROWING CONDITION, FREE FROM DEBRIS AND REFUSE.
 - PRUNING SHALL BE MINIMAL AT THE TIME OF INSTALLATION, ONLY TO REMOVE DEAD OR DISEASED BRANCHES. SUBSEQUENT PRUNING SHALL ASSURE PROPER MATURATION OF PLANTS TO ACHIEVE THEIR APPROVED PURPOSE.
 - ALL DEAD OR DISEASED PLANT MATERIAL SHALL BE REMOVED AND REPLACED WITHIN SIX (6) MONTHS AFTER IT DIES OR IN THE NEXT PLANTING SEASON, WHICHEVER OCCURS FIRST. THE PLANTING SEASON FOR DECIDUOUS PLANTS SHALL BE BETWEEN MARCH 1 AND JUNE 1 AND FROM OCTOBER 1 UNTIL THE PREPARED SOIL BECOMES FROZEN. THE PLANTING SEASON FOR EVERGREEN PLANTS SHALL BE BETWEEN MARCH 1 AND JUNE 1. PLANT MATERIAL INSTALLED TO REPLACE DEAD OR DISEASED MATERIAL SHALL BE AS CLOSE AS PRACTICAL TO THE SIZE OF THE MATERIAL IT IS INTENDED TO REPLACE.
 - THE APPROVED LANDSCAPE PLAN SHALL BE CONSIDERED A PERMANENT RECORD AND INTEGRAL PART OF THE SITE PLAN APPROVAL, UNLESS OTHERWISE APPROVED IN ACCORDANCE WITH THE AFOREMENTIONED PROCEDURES. ANY REVISIONS TO OR REMOVAL OF PLANT MATERIALS WILL PLACE THE PARCEL IN NON-COMFORMITY WITH THE APPROVED LANDSCAPE PLAN, AND SHALL BE VIEW AS A VIOLATION OF THIS ORDINANCE AND THE AGREED UPON TERMS OF THE FINAL SITE PLAN APPROVAL.

cost estimate summary

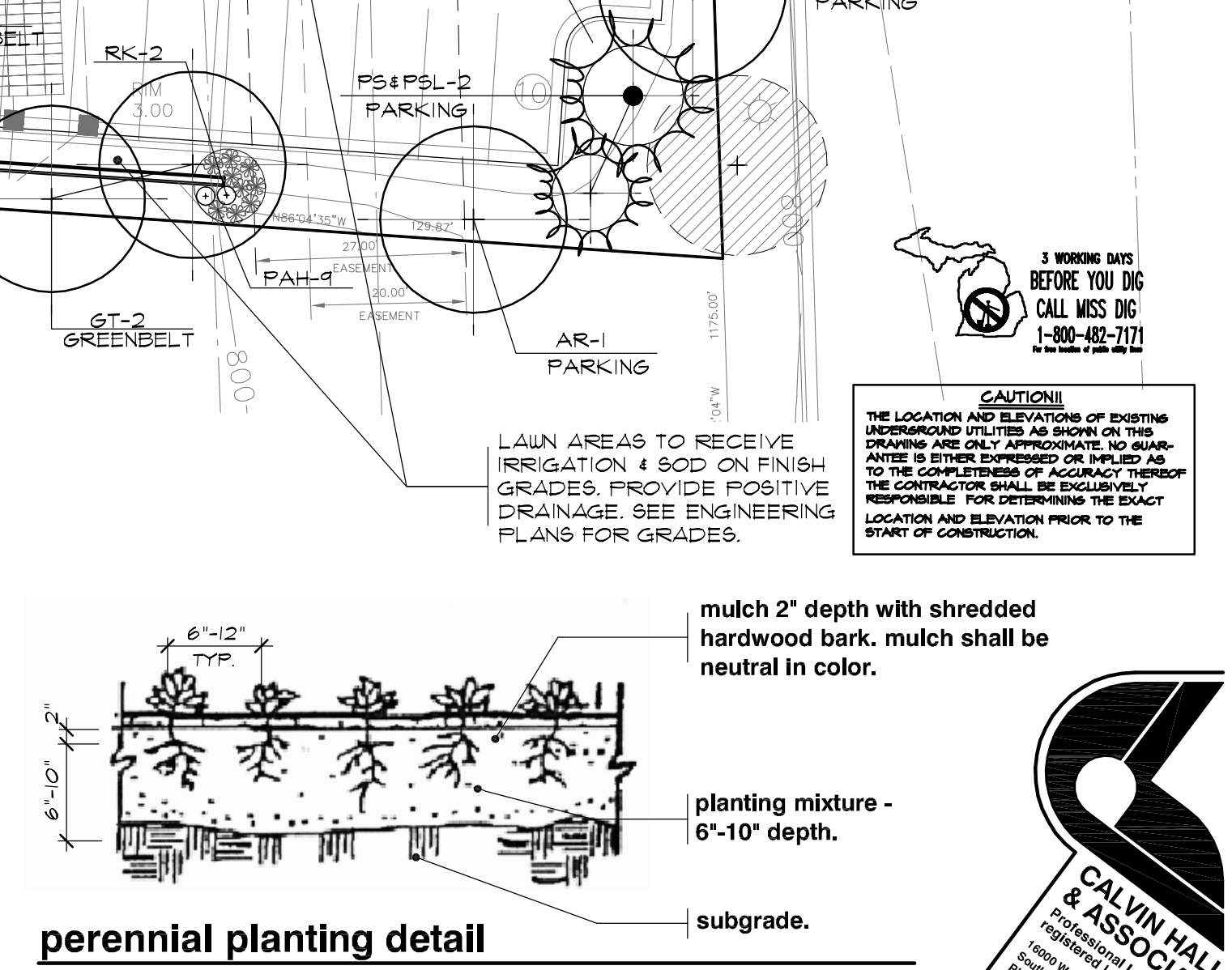
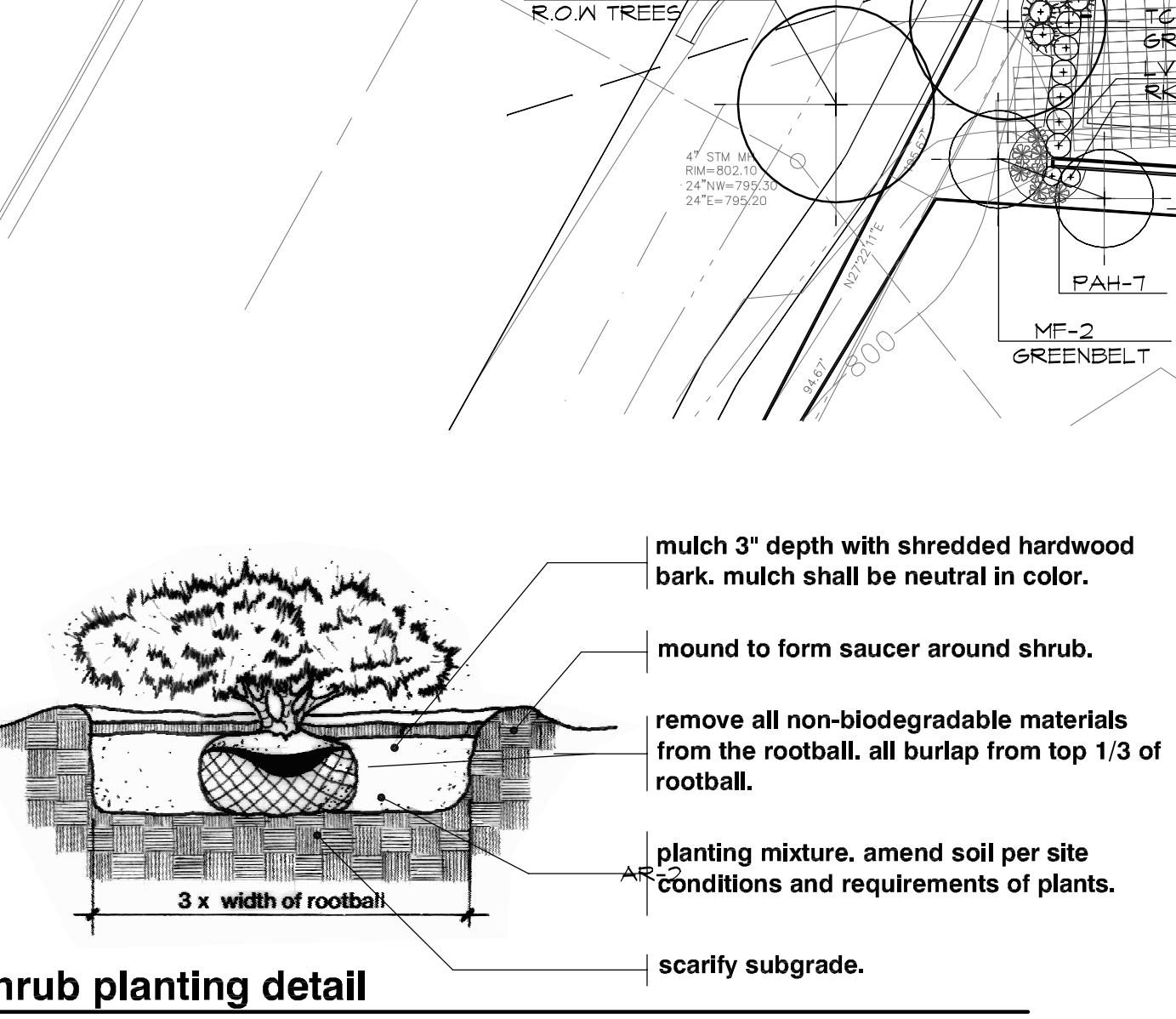
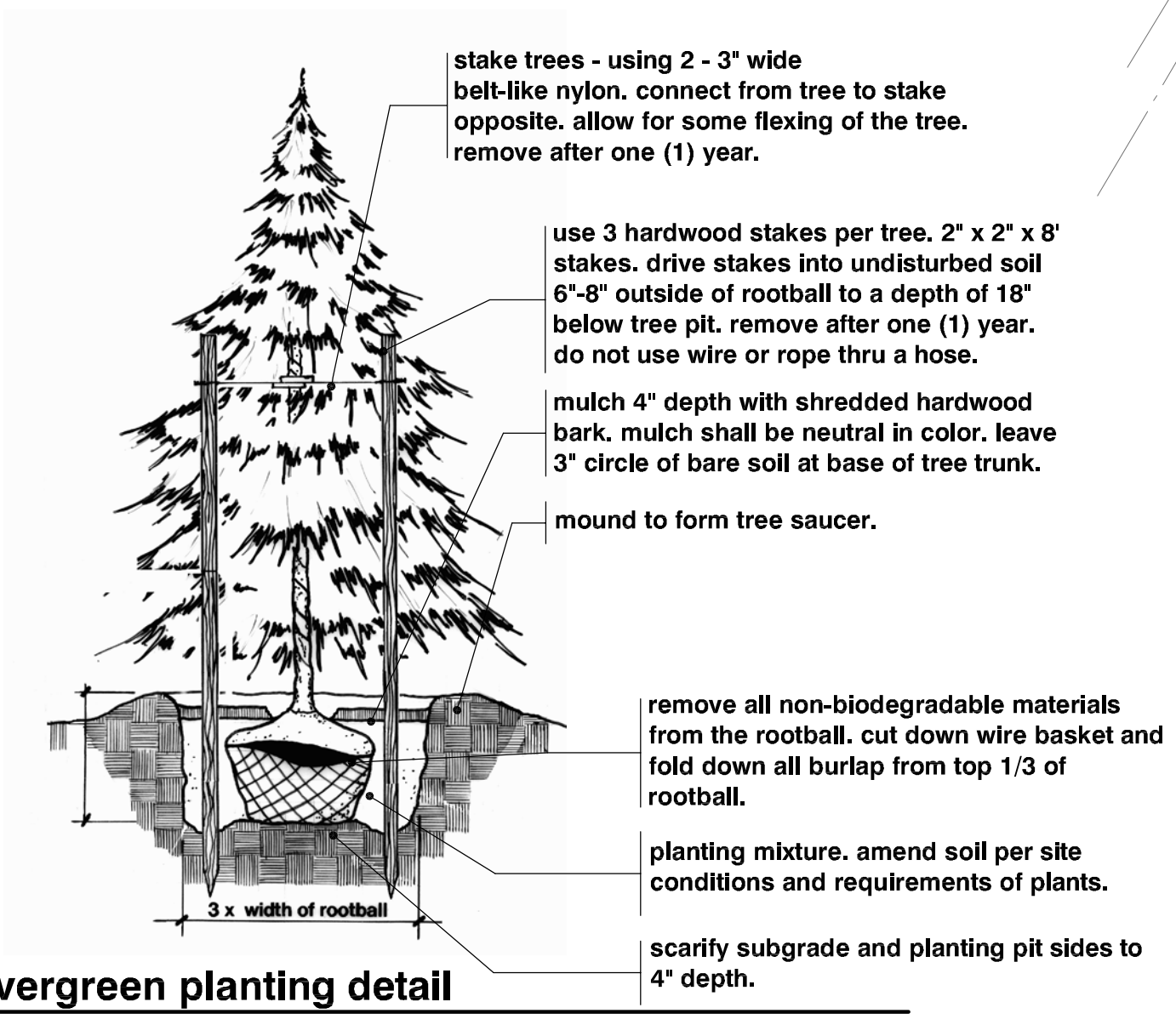
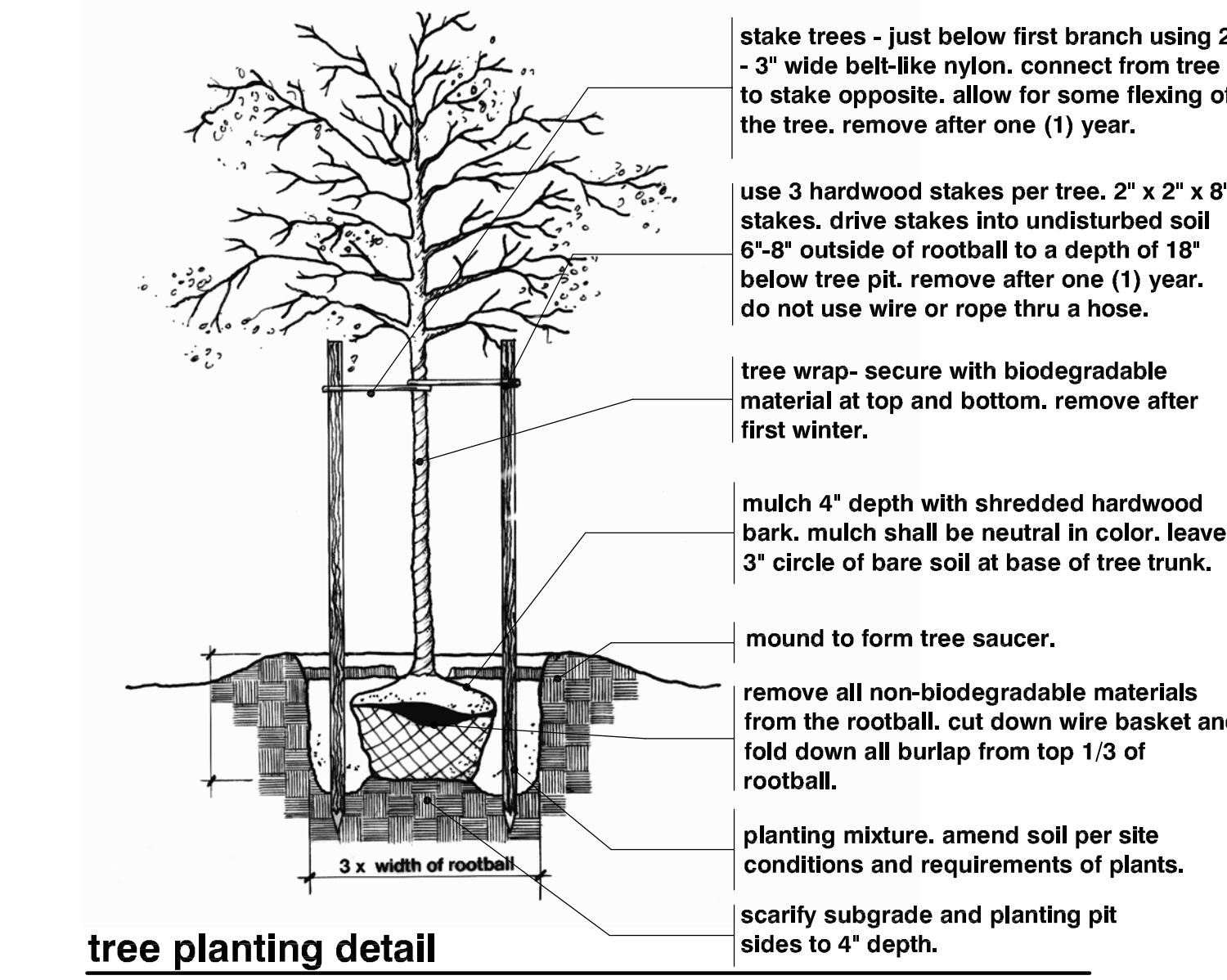
TOTAL ESTIMATED PLANT MATERIALS COST	\$12,000.00
TOTAL ESTIMATED IRRIGATION COST	\$3,500.00
TOTAL ESTIMATED SOD COST	\$4,000.00
TOTAL MISC. ITEM COST (MULCH, EDGING, FABRIC, ETC.)	\$1,200.00
TOTAL ESTIMATED LANDSCAPE COST	\$21,700.00

ALL PROPOSED LANDSCAPE PLANTINGS LOCATED WITHIN ROAD R.O.W TO OBTAIN AND RECEIVED CITY OF NOVI AND OAKLAND COUNTY PERMITS PRIOR TO INSTALLATION



plant material list

key	SHT.L-1	botanical name	common name	size	cost	totals
AR	3	ACER R. 'FRANKSRED'	RED SUNSET RED MAPLE	3" BB	\$400	\$1,200
TC	7	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LINDEN	3" BB	\$400	\$2,800
GB	2	QUERCUS 'BICOLOR'	SWAMP WHITE OAK	3" BB	\$400	\$,800
GT	5	GLEDTISIA TRI. 'NERMIS 'SKYCOLE'	SKYLINE LOGSJT	3" BB	\$400	\$,2000
CC	2	CERCIS CANADENSIS	REDBUD	2" BB	\$250	\$,500
M&G	4	MALUS SARGENTII	SARGENT CRAB	2" BB	\$250	\$,1000
MF	5	MALUS FLORIBUNDA	JAPANESE FLOWERING CRABAPPLE	2" BB	\$250	\$,1250
MS	4	MALUS 'SNOWDRIFT'	SNOWDRIFT CRABAPPLE	2" BB	\$250	\$,1000
PS	1	PINUS STROBUS	EASTERN WHITE PINE	10' BB	\$400	\$,400
PBL	1	PICEA STROBUS	EASTERN WHITE PINE	12' BB	\$450	\$,450
PP	2	PICEA FUNGENS	COLORADO SPRUCE	10' BB	\$400	\$,800
PPL	1	PICEA FUNGENS	COLORADO SPRUCE	12' BB	\$450	\$,450
JT	11	JUNIPERUS S. 'TAMARISCIFOLIA'	TAM'S JUNIPER	24" BB	\$50	\$,550
TD	24	TAXUS XM. 'DENSIFORMIS'	JAPANESE DENSE YEW	36" BB	\$50	\$,1200
LV	22	LIGUSTRUM X. 'VICARYI'	GOLDEN VICARY	3" BB	\$50	\$,1100
SG	8	SPIRAEA X.B. 'GOLDFLAME'	GOLDFLAME SPIREA	#3 CONT.	\$50	\$400
RK	10	ROSA 'RADTKO'	DOUBLE KNOCKOUT ROSE	#3 CONT.	\$50	\$,500
RAG	5	RHUS AROMATIC 'GRO-Low'	GRO-LOW FRAGRANT SUMAC	#3 CONT.	\$50	\$,250
PAH	24	HEMEROCALLIS 'STRAWBERRY CANDY'	STRAWBERRY CANDY DAYLILY	#3 CONT.	\$15	\$,360
MBM	2	MISCANTHUS SINENSIS 'MORNING LIGHT'	MORNING LIGHT JAPANESE SILVER GRASS	#3 CONT.	\$20	\$,40
TOTAL						\$11,010.00



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Community Land Planner and registered Landscape Architect
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seal:
FELINO A. PASCUAL
LANDSCAPE ARCHITECT
No. 1433
MICHIGAN

client:
TROWBRIDGE COMPANIES
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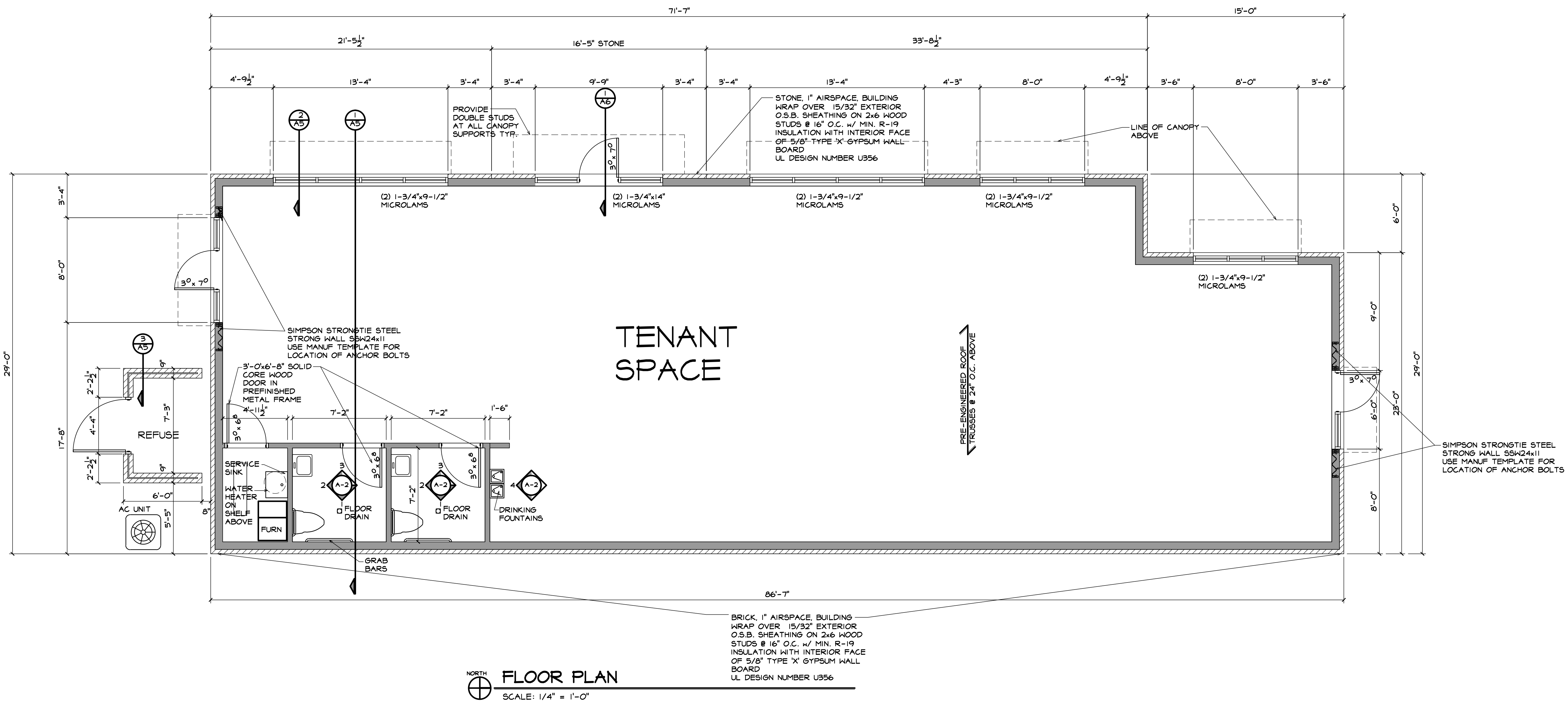
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project location:
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City of Novi, Michigan
sheet title:
Landscape Plan

issue/revision date:
SPA 6-25-2013

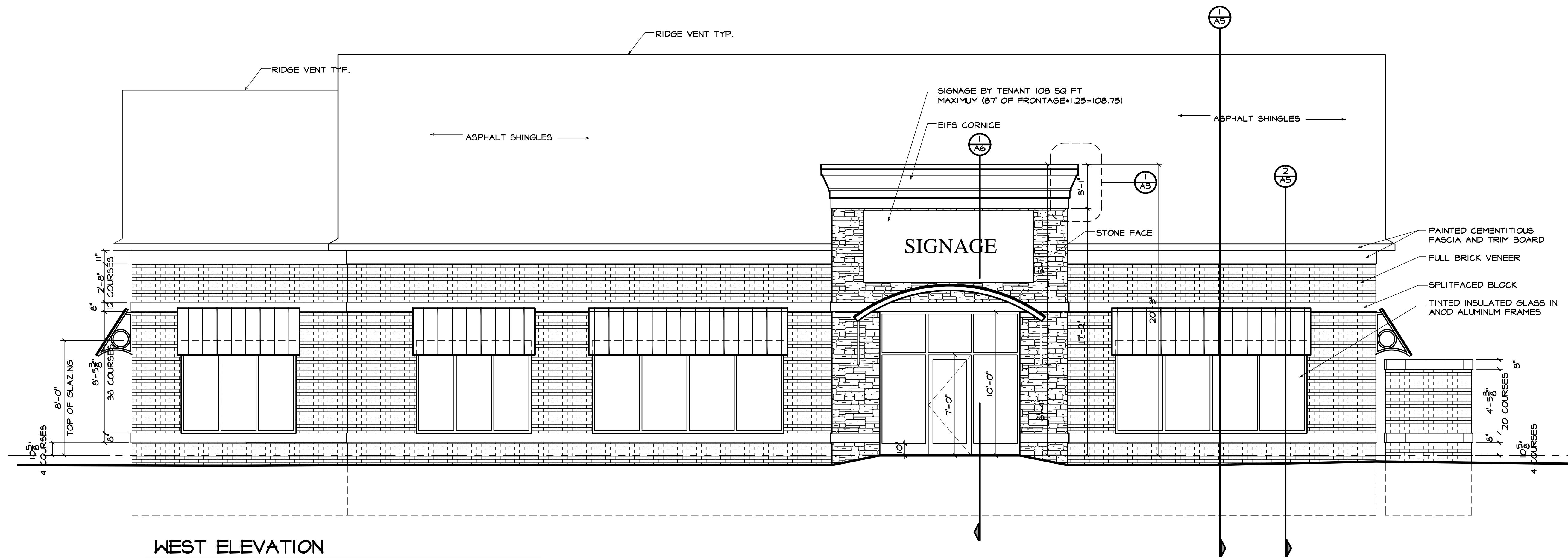
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JP
checked by:
FP
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notice:
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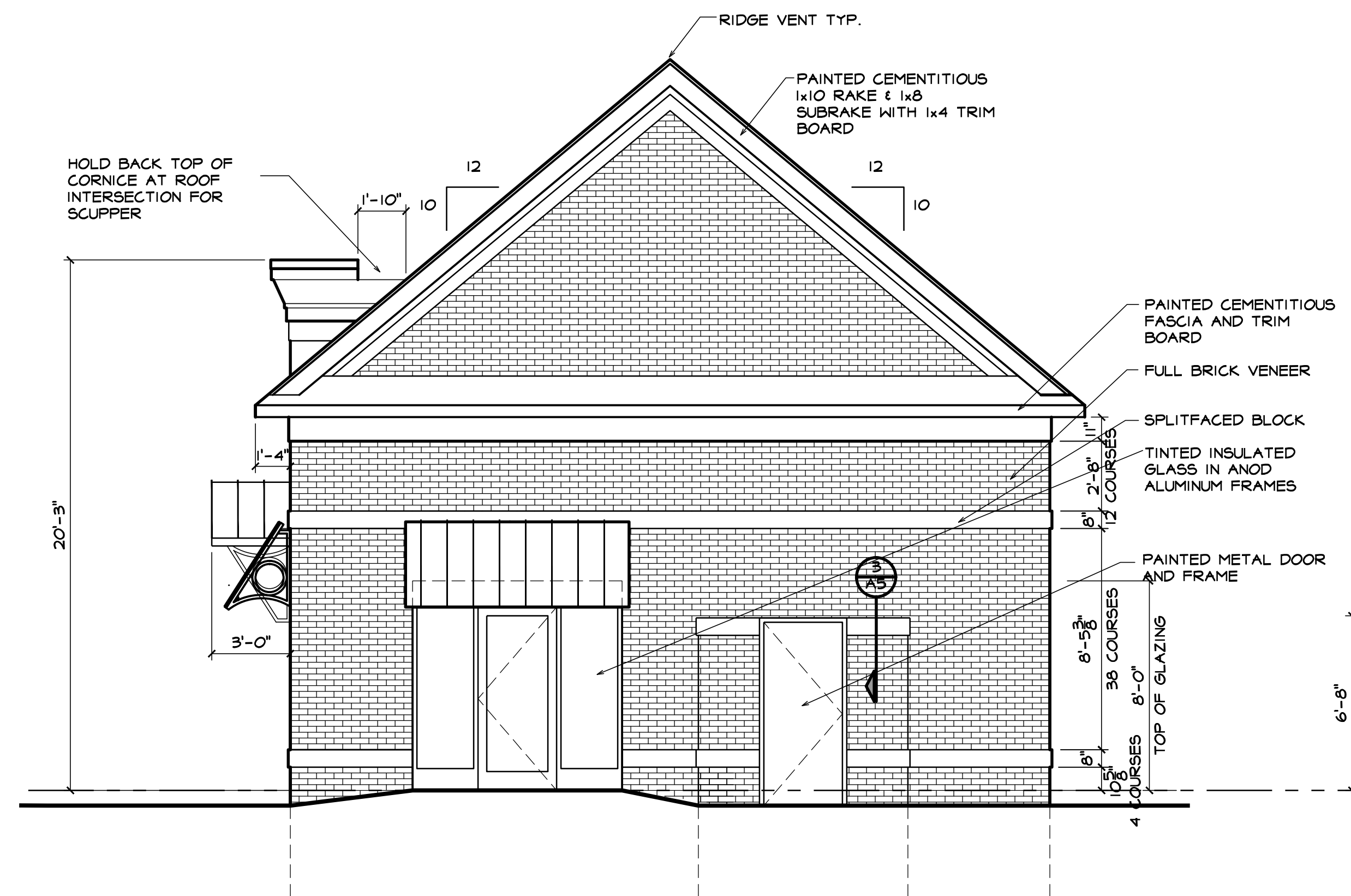
FLOOR PLAN
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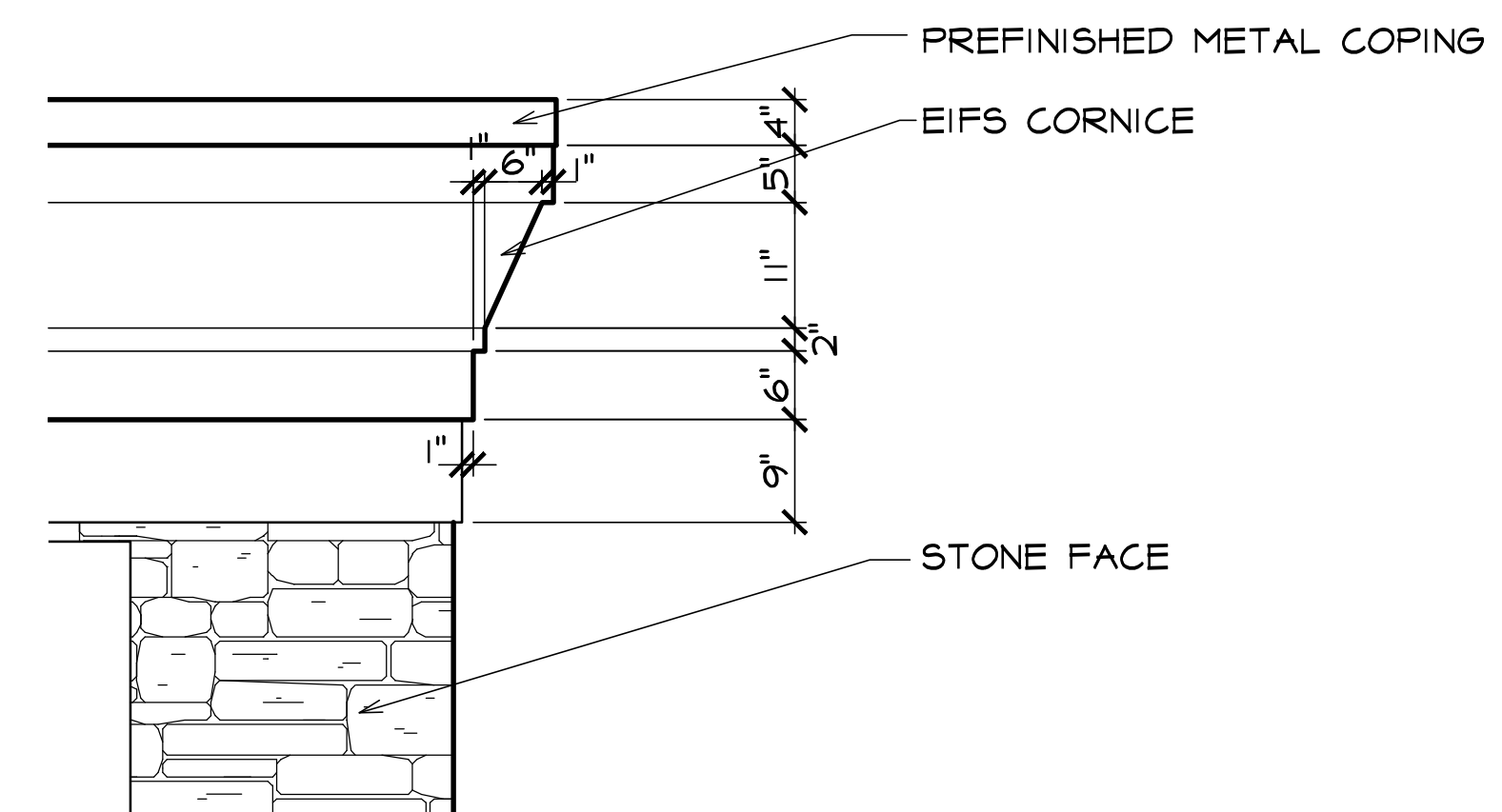
WEST ELEVATION

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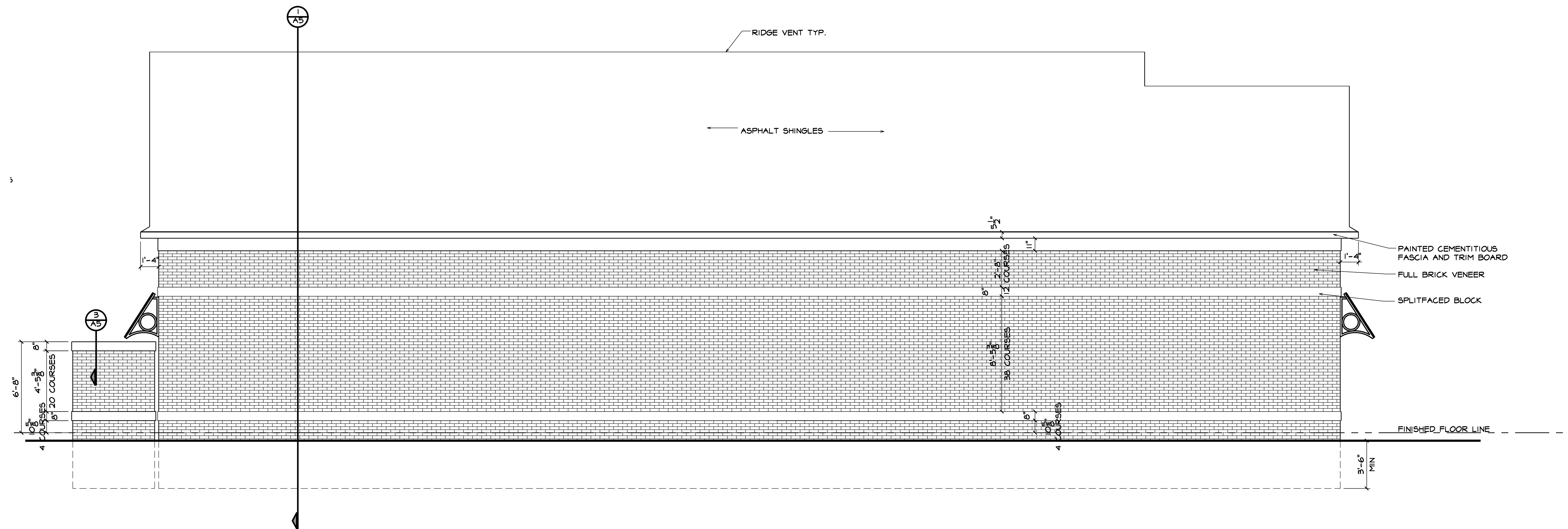


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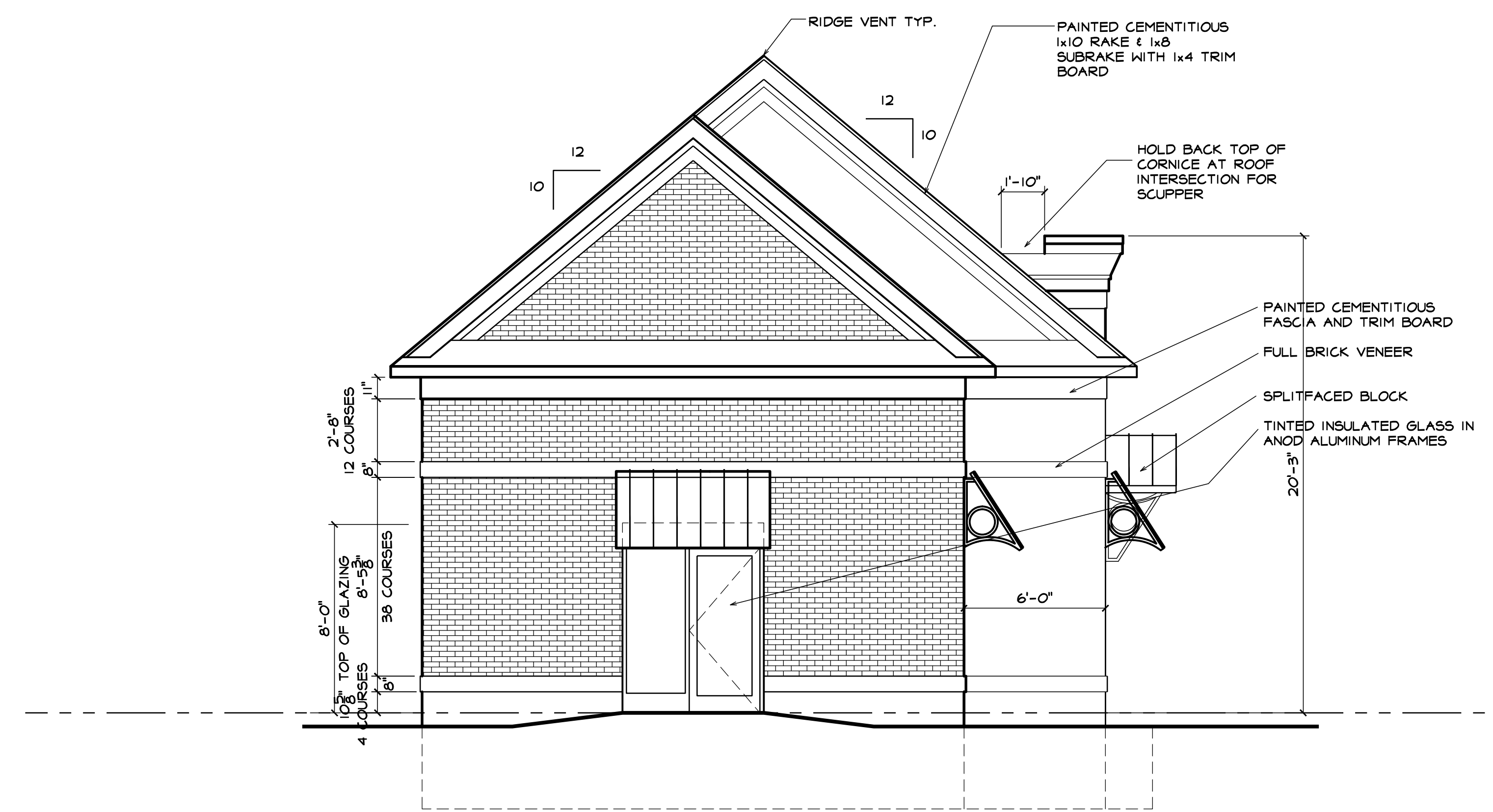


EIFS CORNICE
SCALE: 3/4" = 1'-0"



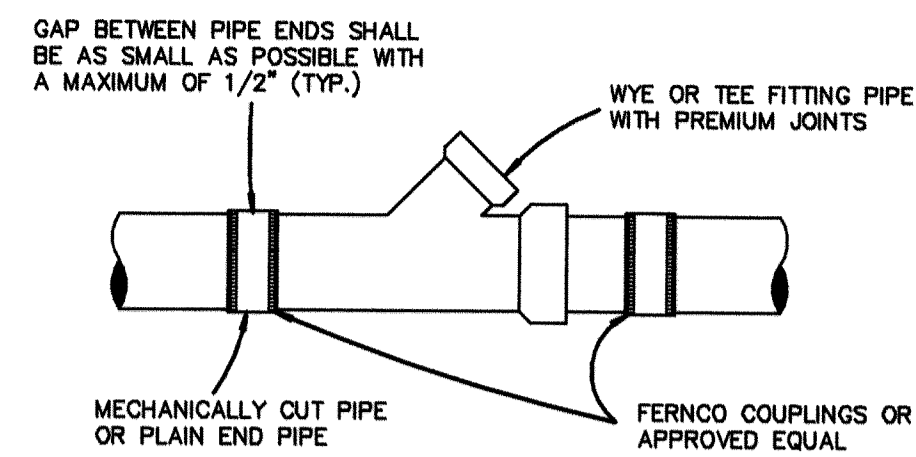
EAST ELEVATION

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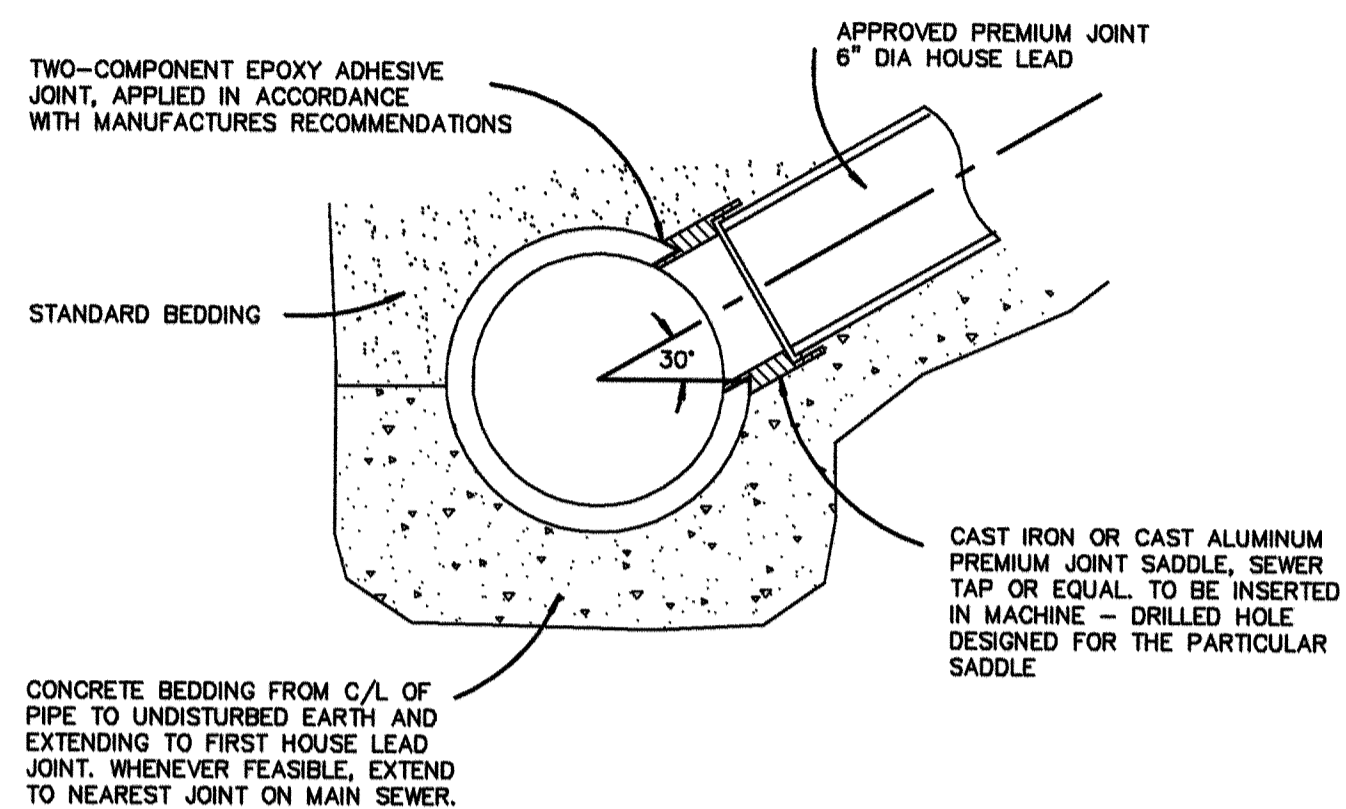


NORTH ELEVATION

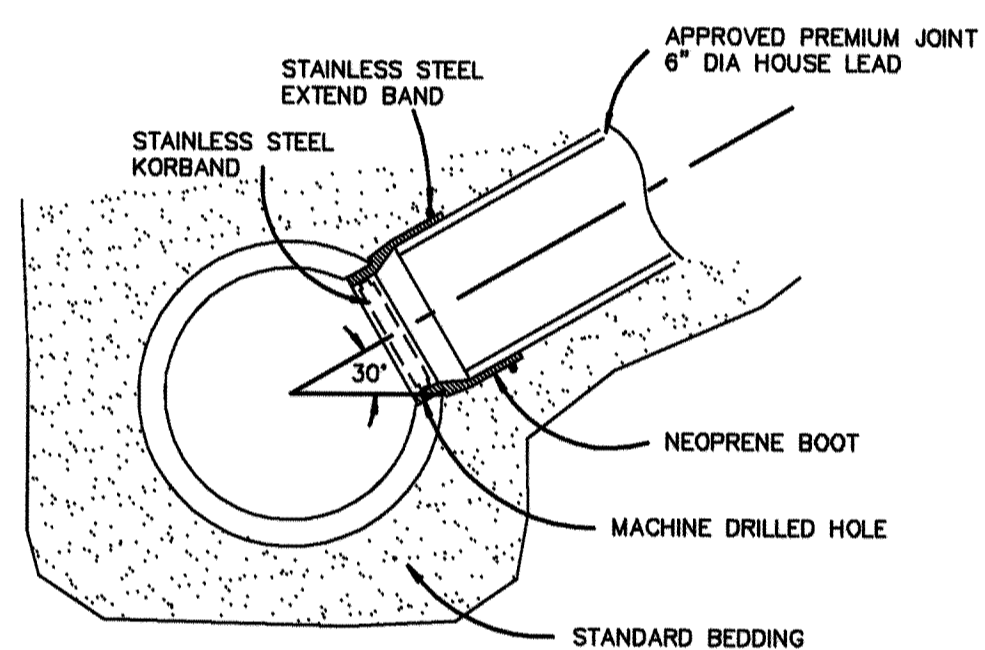
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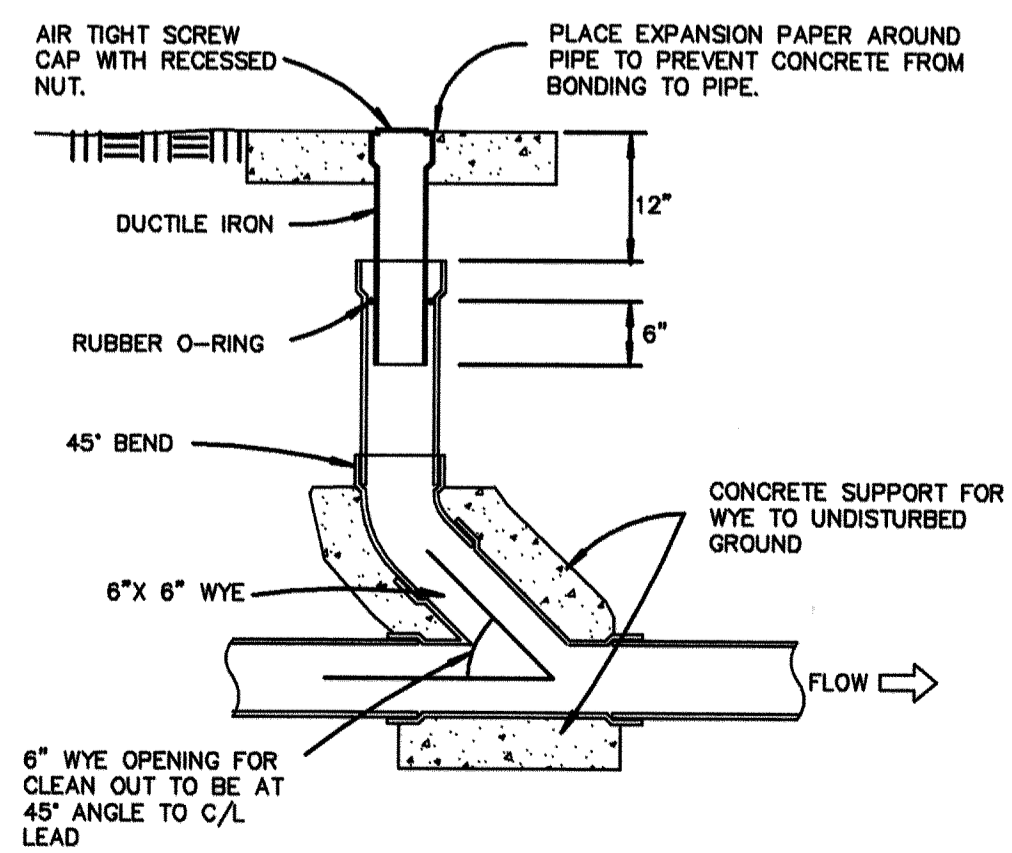
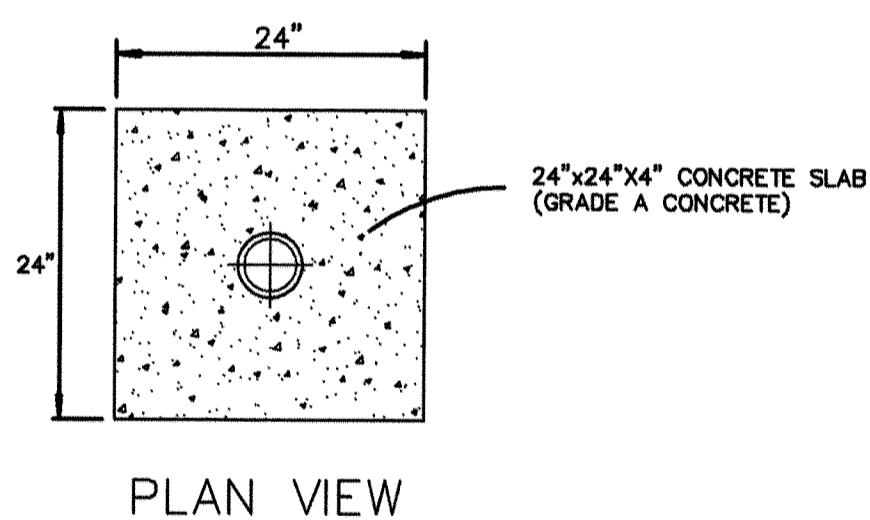
METHOD A
WYE PIPE INSERTION WITH FLEXIBLE COUPLINGS
SEE NOTE #8



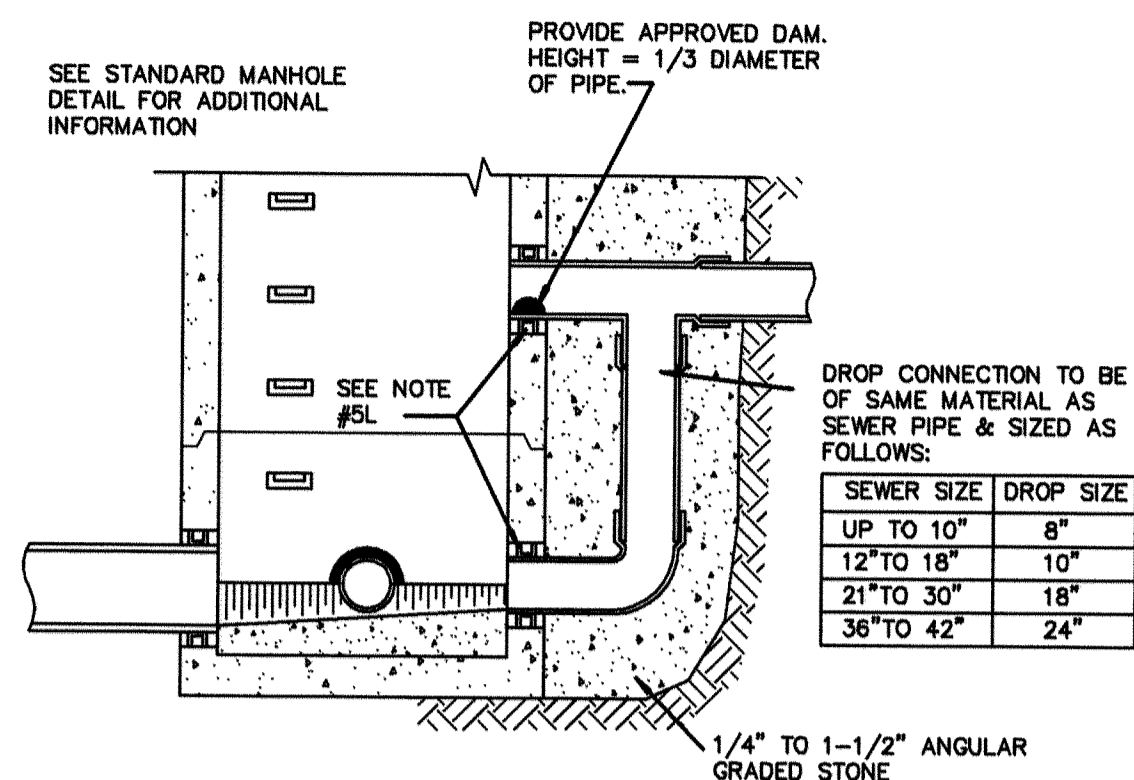
METHOD B
SADDLE TAP - ALL SIZE OF MAIN SEWER
SEE NOTE #9 & #10



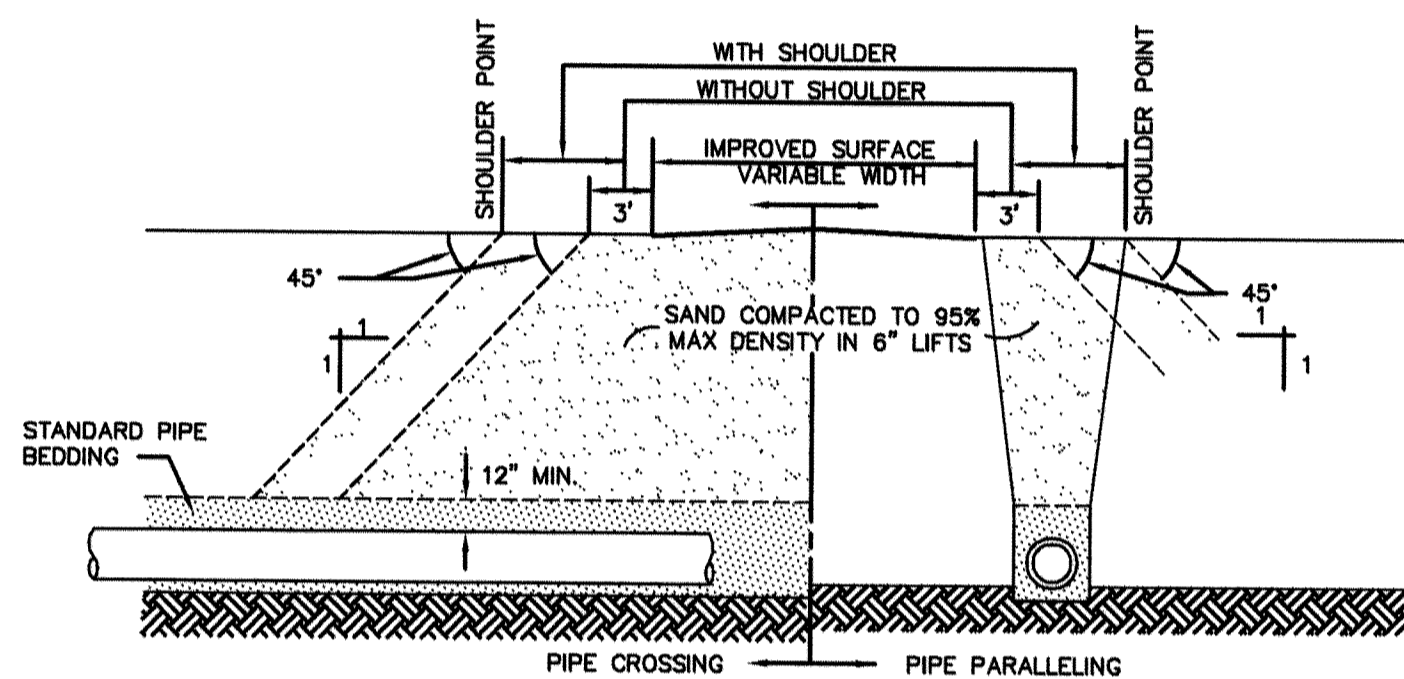
METHOD C
KOR-N-TEE TAP FOR CONCRETE PIPE



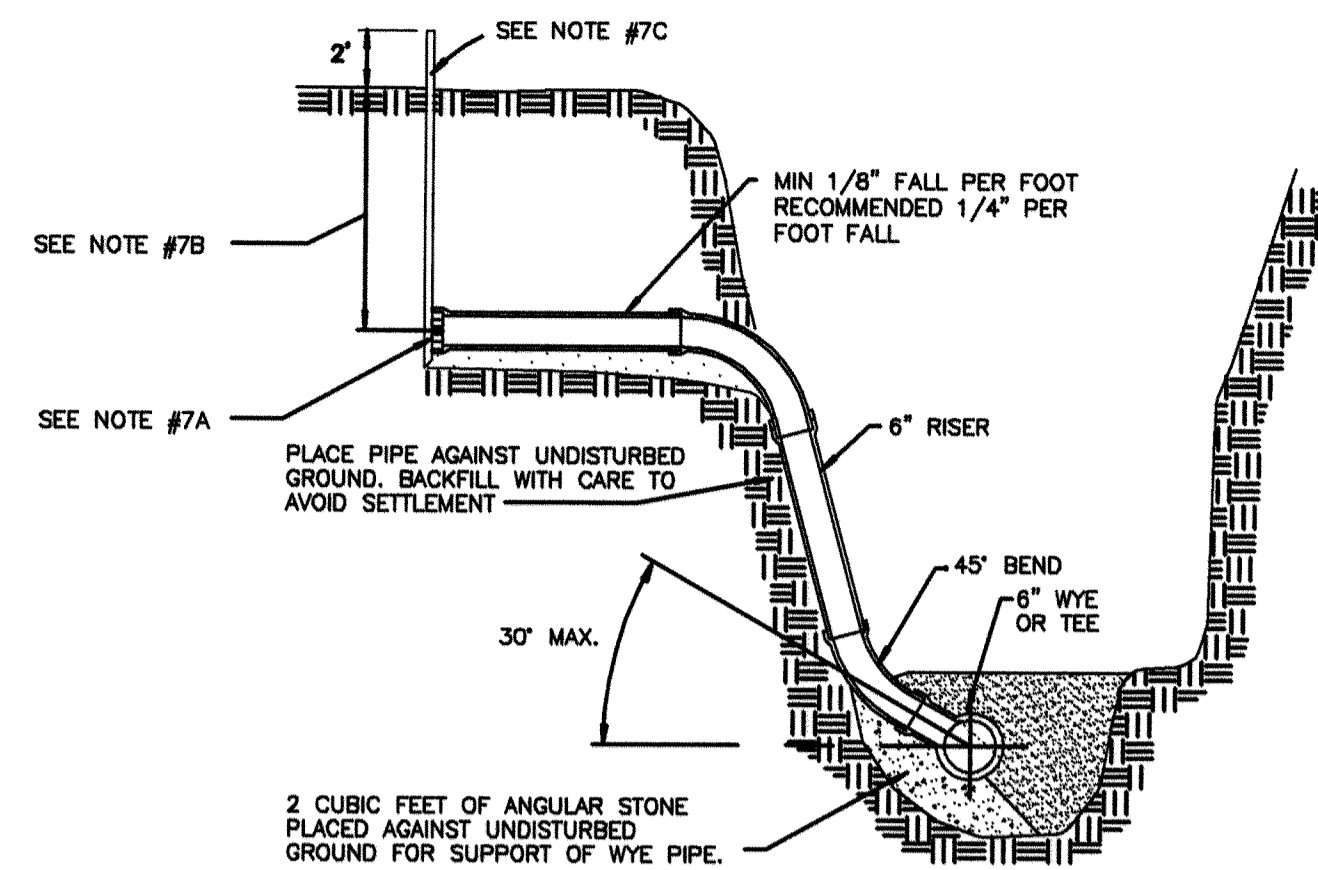
DETAIL OF SANITARY SEWER CLEANOUT



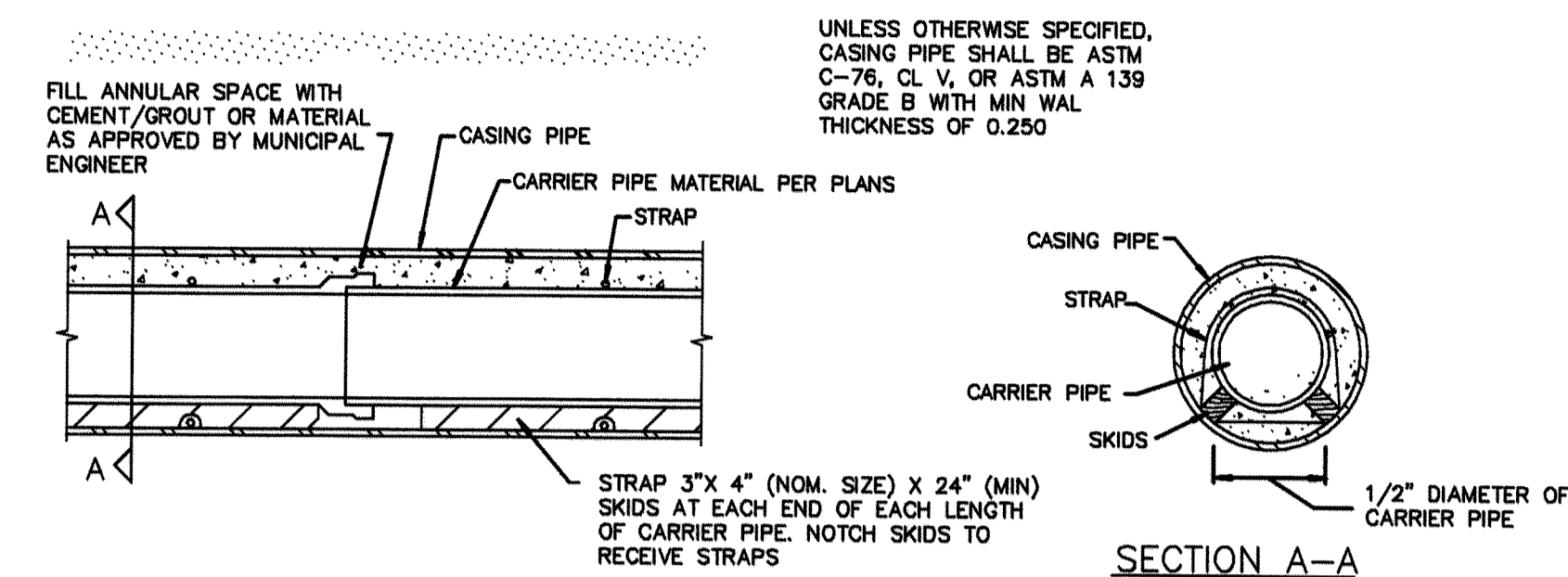
DROP MANHOLE CONNECTION
SEE NOTE #6



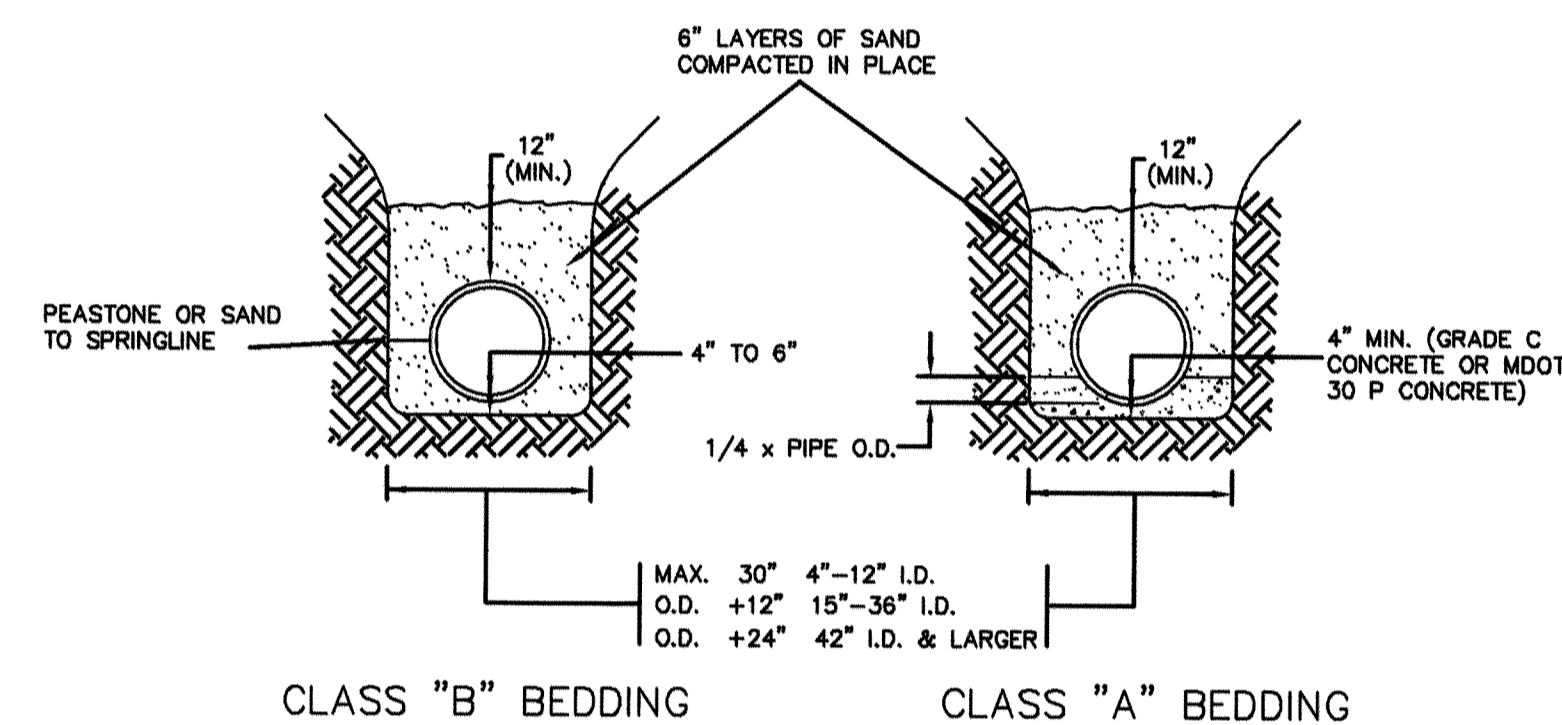
BACKFILLING IN THE AREAS OF STREETS, ALLEYS, SIDEWALKS, DRIVES & PARKING AREA



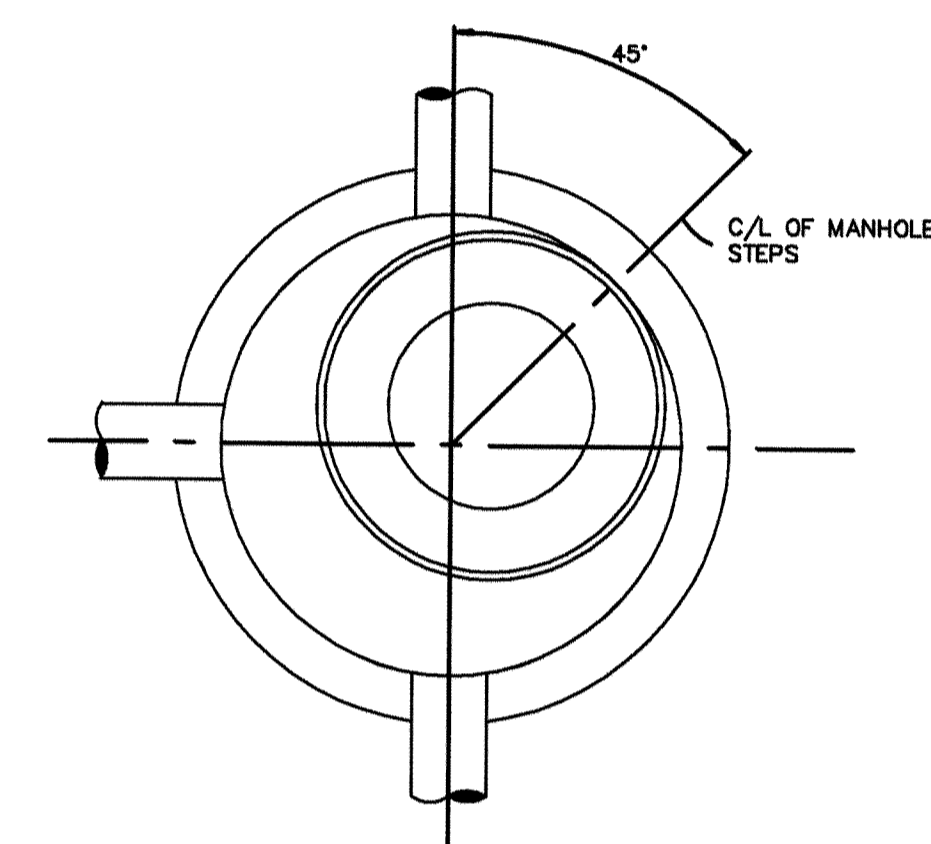
HOUSE LEAD DETAIL
SEE NOTE #7



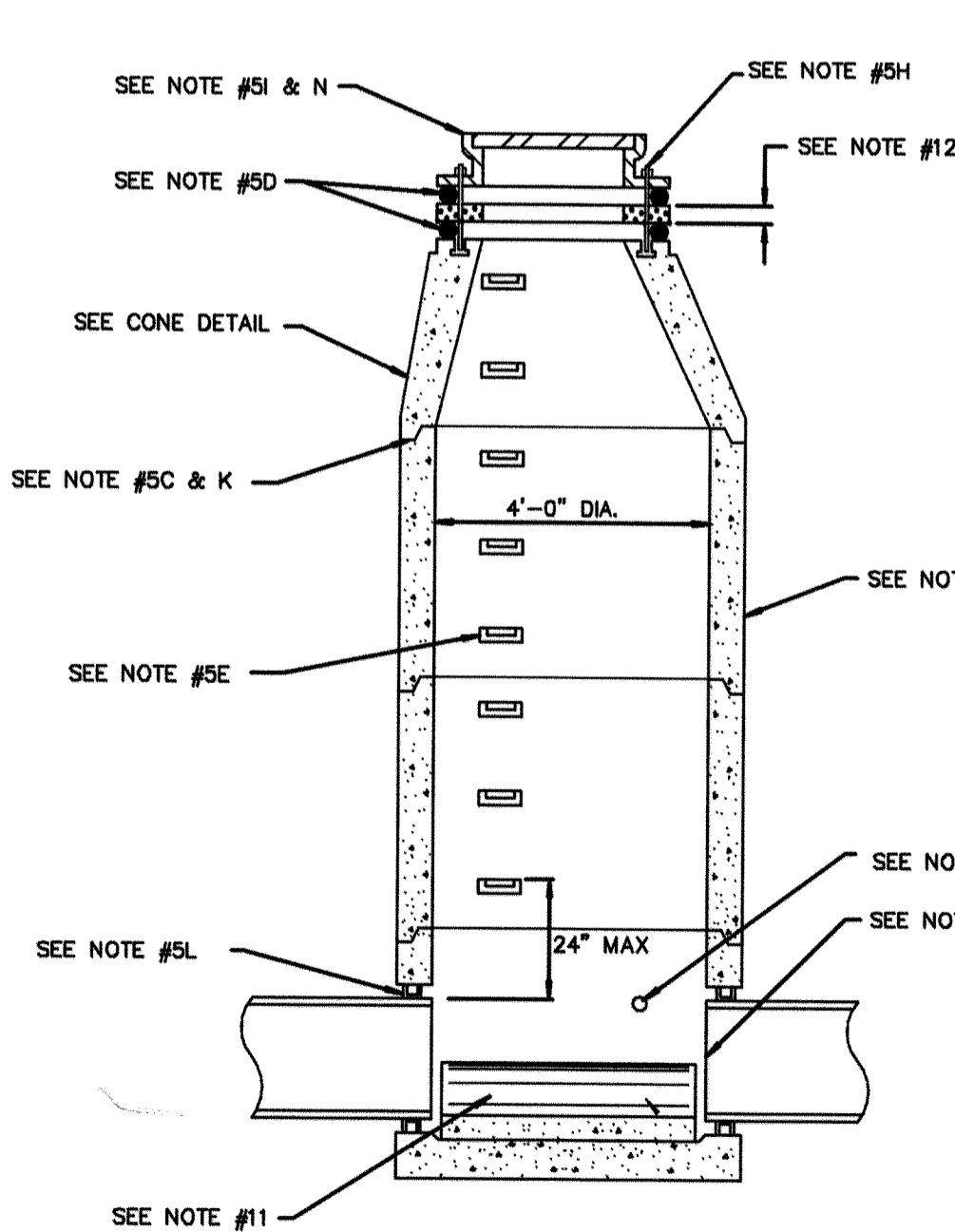
CARRIER PIPE WITH CASING PIPE
SEE NOTE #14



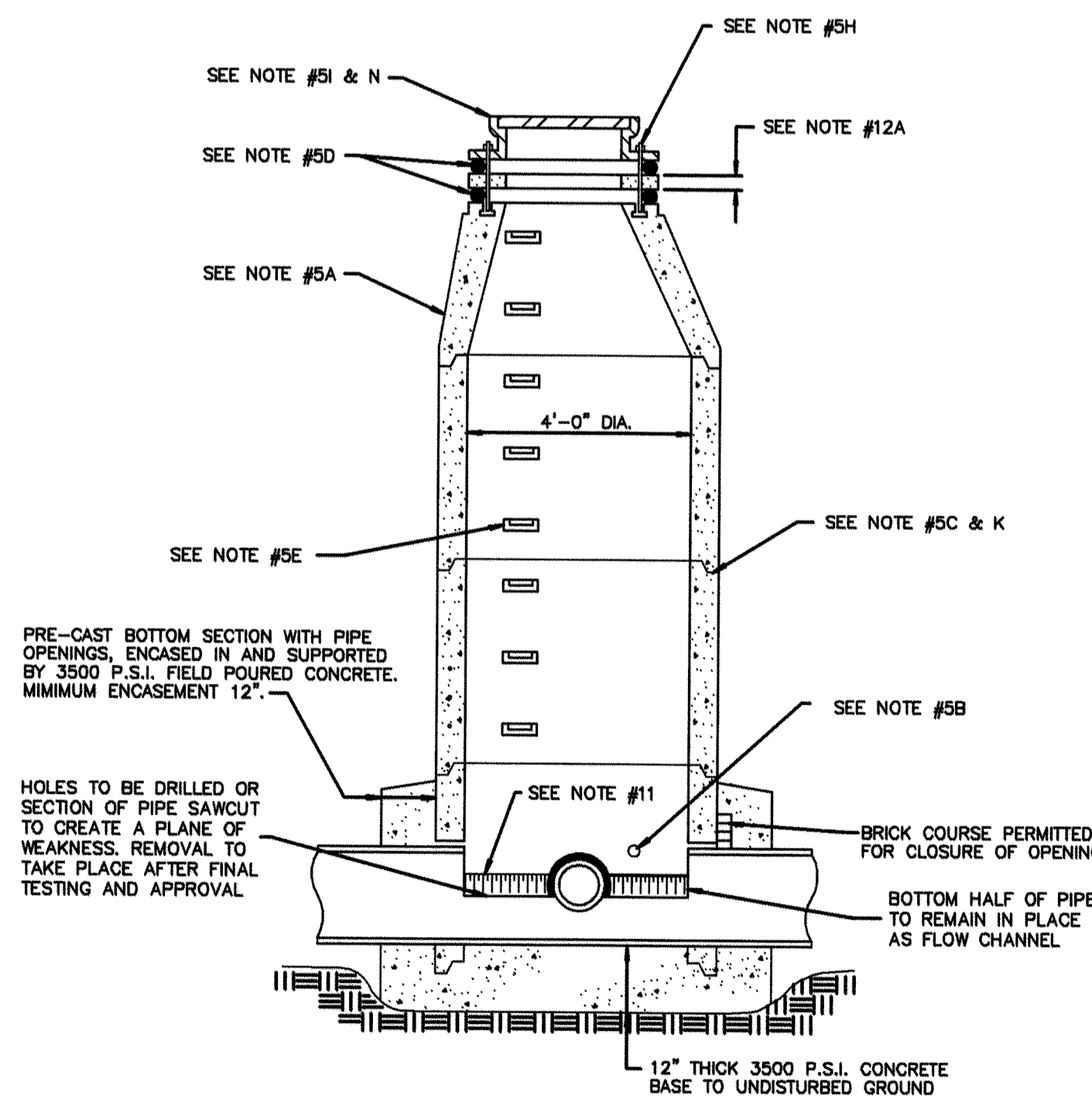
BEDDING & TRENCH WIDTH REQUIREMENT



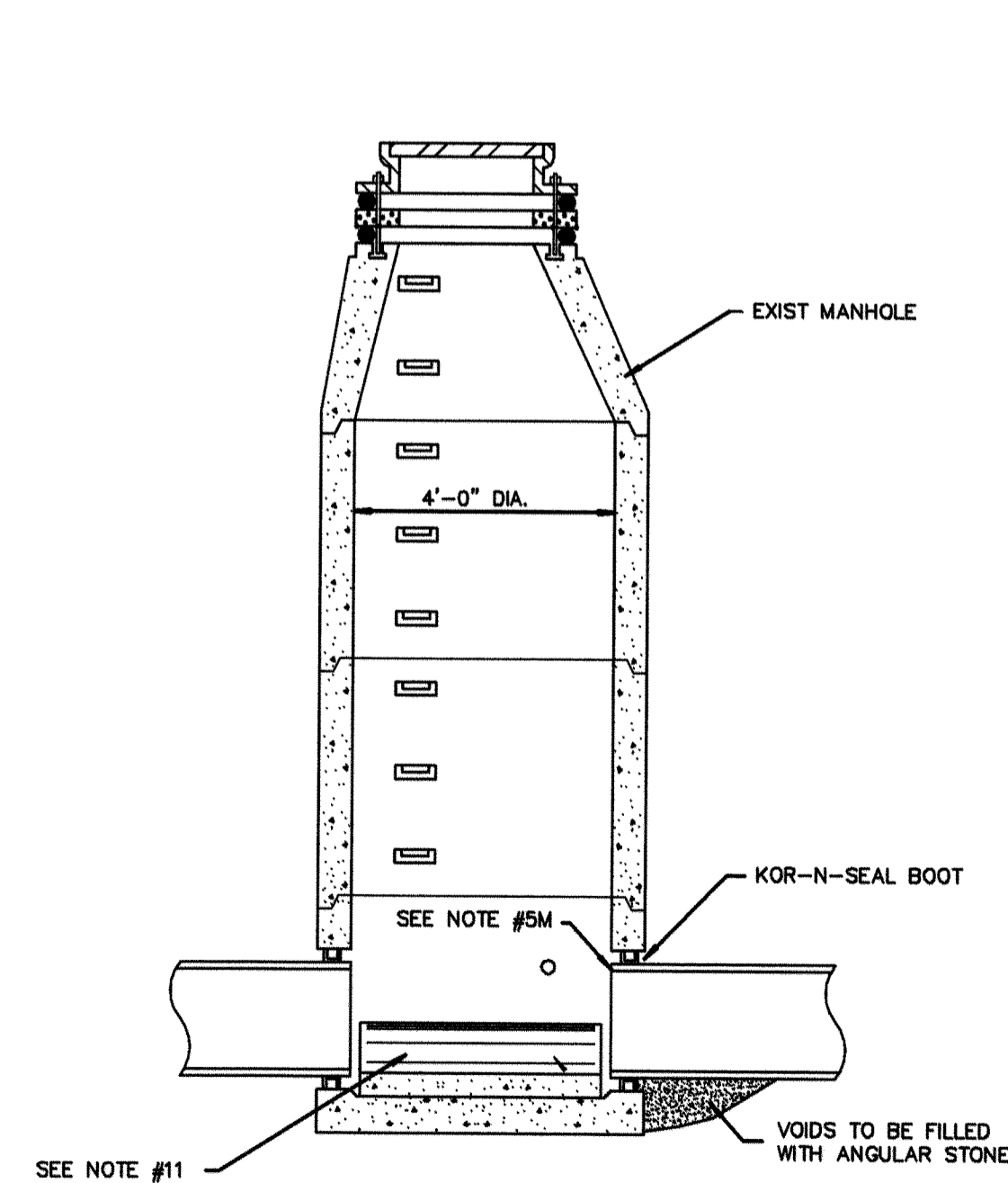
TOP VIEW OF MANHOLE



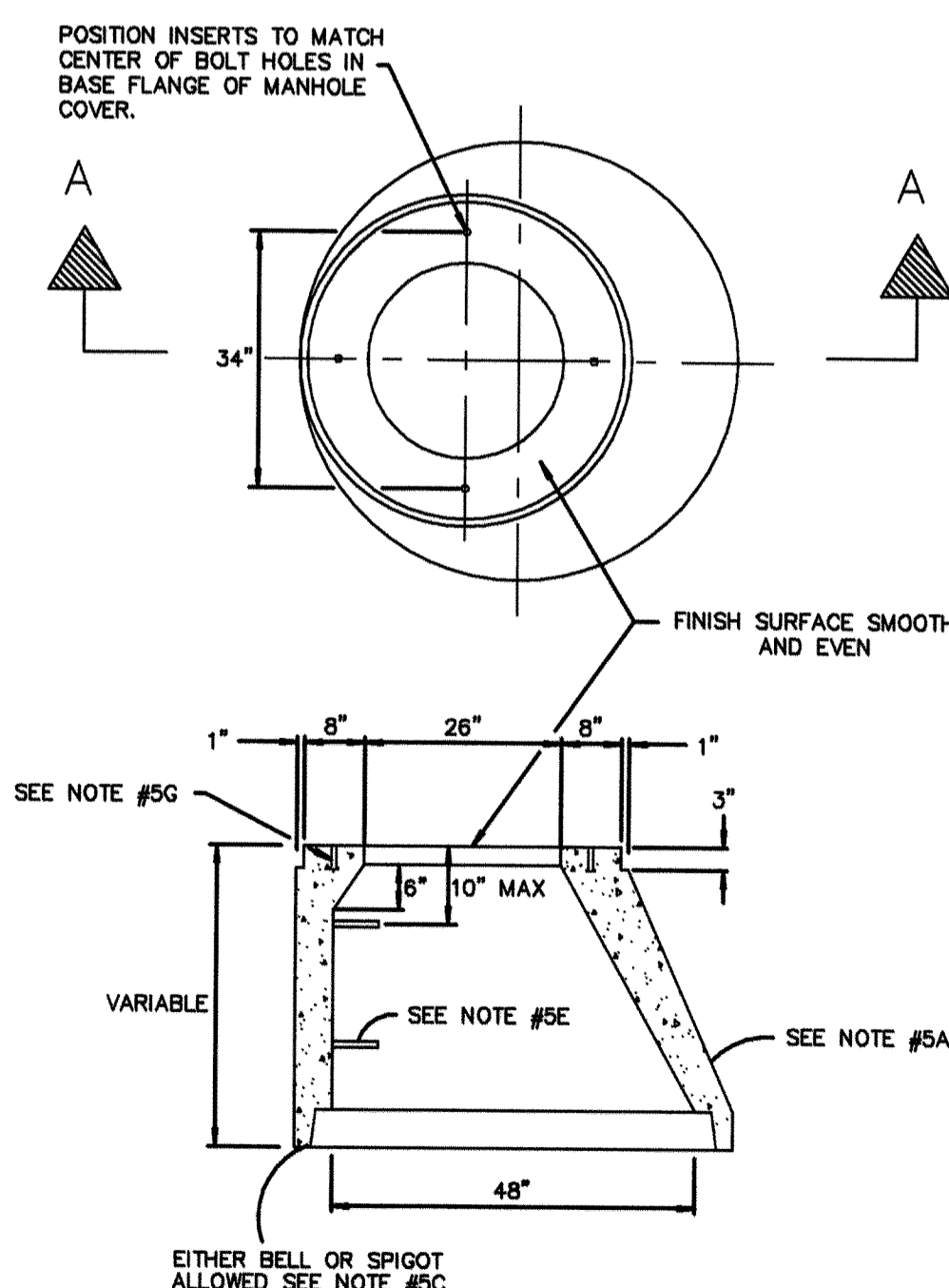
STANDARD MANHOLE FOR PIPE SIZES 24\"/>



MANHOLE OVER EXISTING SANITARY LINE



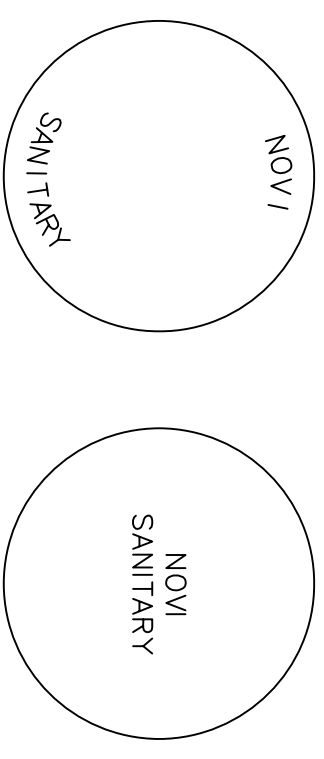
SEWER TAP TO EXISTING MANHOLE



CONE DETAIL

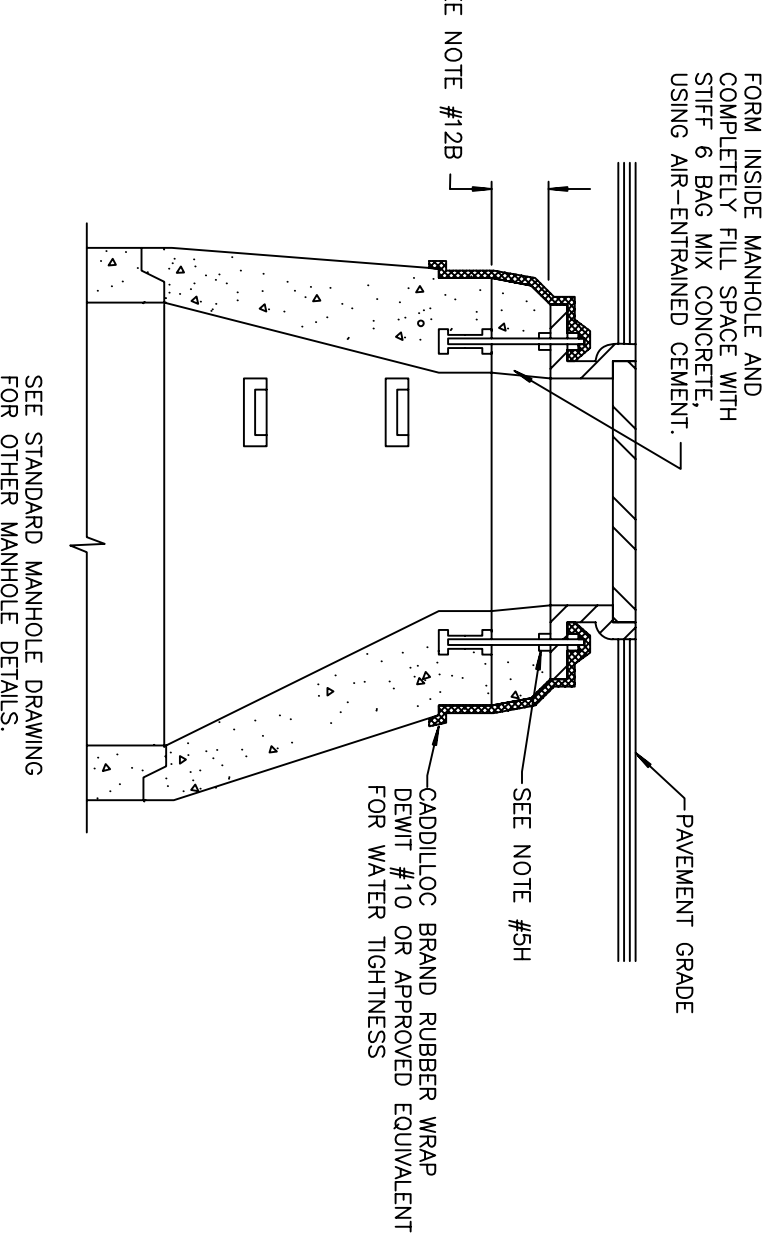
DETAILED CONSTRUCTION NOTES

1. PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL TELEPHONE MISS DUG 1-800-368-5888 TO DETERMINE THE LOCATION OF ALL UTILITIES AND SHALL NOTIFY REPRESENTATIVES OF OTHER UTILITIES LOCATED IN THE VICINITY OF THE WORK.
2. ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE LOCAL MUNICIPALITY AND THE OAKLAND COUNTY DRAIN COMMISSIONER (ODC). ALL CONSTRUCTION SHALL BE PERMITTED BY THE OAKLAND COUNTY DRAIN COMMISSIONER. THE CONTRACTOR SHALL NOTIFY THE LOCAL MUNICIPALITY FOR INSPECTION 48 HOURS PRIOR TO THE START OF CONSTRUCTION (248-348-9005).
3. AT ALL CONNECTIONS TO ODDC SEWERS OR EXTENSIONS, AND BEFORE START OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT TO THE ODC A PROPOSED SEWER BY ODC. GRANTY SEWER PERMIT CHARGES ARE \$250 FOR EACH CONNECTION PLUS \$25 FOR EACH MANHOLE CONSTRUCTED. PRESSURE SEWER PERMIT CHARGES ARE \$250 PER 2460 L.F. OF FORCE MAIN WITH A MINIMUM PERMIT FEE OF \$250. FAILURE TO PASS ANY TEST SEGMENT WILL RESULT IN AN ADDITIONAL CHARGE TO THE CONTRACTOR FOR EACH RETEST. IN ACCORDANCE WITH THE ABOVE PRICE SCHEDULE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF ALL TESTS AND REPAIRS TO THE EXISTING SYSTEM. THE CONTRACTOR SHALL NOTIFY THE LOCAL UNIT OF GOVERNMENT AND THE ODC 24 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION. FINAL AIR TESTS MUST BE WITNESSED BY COUNTY PERSONNEL AND MUST BE SCHEDULED IN ADVANCE.
4. NO SEWER INSTALLATION SHALL HAVE AN INFILTRATION EXCEEDING 100 GALLONS PER HOUR PER FOOT OF PIPE LENGTH AND NO INFILTRATION SHALL EXCEED 50 GALLONS PER HOUR BETWEEN MANHOLES SHALL EXCEED 250 GALLONS PER INCH DIAMETER PER MILE. AIR TESTS IN LEOU OF INFILTRATION TESTS SHALL BE AS SPECIFIED IN OCCPW "ACCEPTANCE TESTS", DATED SEPTEMBER 1972. ONLY MODIFIED GROOVE TONGUE, ASTM C-425, ASTM C-443, O-RING, UNILOC, AMVIT, NOBEL, RING-TITE, FLUID-TITE OR EQUAL, AS APPROVED BY THE OAKLAND COUNTY DEPARTMENT OF PUBLIC WORKS MAY BE USED FOR SEWER JOINTS. ALL JOINTS SHALL MEET REQUIREMENTS OF ASTM C-425 OR C-443.
5. CONSTRUCTION OF MANHOLES
 - A. PRECAST REINFORCED CONCRETE SECTIONS SHALL CONFORM TO ASTM C-478.
 - B. THE MANUFACTURER SHALL INSTALL 1/2" DIAMETER STEEL PIPE AND CAP AT ELEVATION EQUAL TO THE CROWN OF THE SEWER, FLUSH WITH OUTSIDE WALL, AND EXTENDING 3 INCHES INTO MANHOLE FOR TESTING PURPOSES. CONTRACTOR TO SEAL AFTER COMPLETION OF TESTS.
 - C. JOINTS BETWEEN PRECAST SECTIONS SHALL BE MODIFIED TONGUE AND GROOVE TYPE WITH RUBBER O-RING GASKET.
 - D. RUBBER O-RING GASKETS SHALL CONFORM TO THE REQUIREMENTS OF ANSI/ASTM C-443, EXCEPT THAT THE GASKETS SHALL BE SYNTHETIC RUBBER ONLY. NATURAL RUBBER GASKETS ARE NOT ACCEPTABLE.
 - E. MANHOLE STEPS SHALL BE STEEL ENCASED WITH POLYPROPYLENE PLASTIC, EQUIVALENT TO M.A. INDUSTRIAL, INC., PS-1 OR PS-1B, AS APPROPRIATE.
 - F. RESILIENT WATERTIGHT CONNECTORS BETWEEN MANHOLE AND PIPE SHALL CONFORM TO ASTM C-443 AND ASTM C-923, EXCEPT THAT ONLY SYNTHETIC RUBBER GASKETS SHALL BE PERMITTED. NATURAL RUBBER WILL NOT BE ACCEPTABLE.
 - G. ANCHOR BOLTS SHALL BE INSTALLED IN FOUR THREADED INSERTS AT 90 DEGREES (NO. F-5 5/8 INCH "SURE GRIP" OR EQUIVALENT) IN PRECAST SECTION. INSERT TO BE PLACED WHEN CASTING OF CONE SECTION, NOT DRILLED AND GROUTED IN PLACE AFTER CURING.
 - H. BOLTS SHALL BE FOUR GALVANIZED 5/8 INCH THREADED STUDS, EACH WITH 3/4" x 2" x 1/6" NEOPRENE FLAT WASHER, 3/4" x 2" x 1/8" STEEL FLAT WASHER AND NUT.
 - I. MANHOLE COVER SHALL BE A BOLTED, WATERTIGHT COVER AND EQUIVALENT TO EAST JOHNSON IRON WORKS 1040-403, WITH ANCHOR BASE FLANGE HOLES.
 - J. NEW MANHOLES CONSTRUCTED DIRECTLY ON OAKLAND COUNTY DEPARTMENT OF PUBLIC WORKS SEWERS SHALL BE PROVIDED WITH COVERS READING "OAKLAND COUNTY-SANITARY" IN RAISED LETTERS. NEW MANHOLES BUILT OVER AN EXISTING SANITARY SEWERS SHALL HAVE MONOLITHIC POURED BOTTOMS.
 - K. MORTAR FOR LAYING BRICK AND BLOCK, POINTING OF JOINTS, JET HOLES AND PLASTERING OUTSIDE AND INSIDE OF STRUCTURES SHALL BE COMPOSED OF 1 PART MASONRY CEMENT (TYPE II) AND 2 1/2 PARTS MASONRY SAND. NO LIME SHALL BE ADDED TO THE MORTAR.
 - L. MANHOLES FOR PIPE SIZES 16 INCH DIAMETER AND SMALLER SHALL BE MANUFACTURED AND CONSTRUCTED AS "PRECAST FLEXIBLE-JOINT SEWER MANHOLES", UNLESS OTHERWISE DIRECTED BY THE MUNICIPAL ENGINEER.
 - M. PIPE SHALL NOT EXTEND INTO A MANHOLE BEYOND THE INSIDE FACE OF THE MANHOLE WALL AS MEASURED AT THE SPRINGLINE OF THE PIPE. FIELD CUTTING SHALL BE PERMITTED BY THE MUNICIPAL ENGINEER. ALL CUTTING SHALL BE DONE USING METHODS APPROVED BY THE MUNICIPAL ENGINEER. EXPOSED ENDS OF REINFORCING STEEL SHALL BE CUT FLUSH WITH THE PIPE END.
 - N. MANHOLE STRUCTURES WHICH ARE TO BE LEFT OPEN OVERNIGHT SHALL BE SECURELY ENCLOSED WITH SUITABLE FENCING AND HAVE ADEQUATE LIGHTED BARRICADES, UNLESS OTHERWISE APPROVED BY THE MUNICIPAL ENGINEER.
 6. DROP MANHOLES & TAPPING EXISTING MANHOLES.
 - A. DROP MANHOLES SHALL BE OF THE SAME DESIGN AS STANDARD MANHOLES. DROP MANHOLES SHALL BE USED WHERE THERE IS AN 18 INCH DIFFERENCE IN PIPE SIZES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF ANY OTHERWISE DIRECTED "OMIT THE TEE AND USE AN APPROVED STOPPER IN THE RISER PIPE WHEN PLACING A BLIND DROP CONNECTION FOR FUTURE USE.
 - B. TAPS TO EXISTING MANHOLES SHALL BE MADE BY CORING. THE CONTRACTOR SHALL PLACE A KOR-N-SEAL BOOT OR APPROVED EQUAL AFTER THE CONING IS COMPLETED. BLIND DRILLING WILL NOT BE PERMITTED IN LEOU OF CORING.
 7. WYES, RISERS AND BUILDING LEADS
 - A. BUILDING LEAD RISERS SHALL BE INSTALLED ON DEEP SEWERS TO A DEPTH OF 10 FEET BELOW THE FINISHED SURFACE ELEVATION UNLESS OTHERWISE AUTHORIZED BY THE MUNICIPALITY. ALL RISERS THAT ARE INSTALLED WITHOUT BUILDING LEADS SHALL INCLUDE AN APPROVED STOPPER.
 - B. ALL BUILDING LEADS AND RISERS SHALL BE 6 INCH SPR. 23.5 ABS PIPE WITH CHEMICALLY FUSED JOINTS OR AN APPROVED STOPPER AT THE PROPERTY LINE OR EASEMENT LINE, UNLESS OTHERWISE NOTED. AT A NOMINAL DEPTH OF 10 FEET.
 - C. EACH RISER AND/OR BUILDING LEAD SHALL BE MARKED WITH A 2 INCH X 2 INCH PIPER MARKER. THE MARKER SHALL BE PLACED AT THE END OF THE PIPE AND PAINTED WITH FLOURESCENT-TYPE PAINT.
 - D. MONITORING MANHOLES ARE REQUIRED ON ALL NONRESIDENTIAL BUILDING LEADS IN EASEMENTS OR PUBLIC RIGHT-OF-WAY.
 8. REPAIR FOR RISERS, WYES AND MANHOLE
 - A. FERRO- FLEXIBLE COUPLING, WATER MAIN REPAIR CLAMPS, SMITH-BLAIR, BAKER, FORD (ALL STAINLESS STEEL) OR EQUIVALENT SHALL BE USED WHEN MAKING TIE-IN TO TEE OR WYE. THESE FITTINGS SHALL BE USED IF PIPE ADAPTERS OR SADDLE TAPS ARE NOT AVAILABLE.
 9. HOUSE LEAD CONNECTIONS TO MAIN SEWER
 - A. WYE OPENING TO BE MADE BY PLACING APPROPRIATE SADDLE TAP OPENING PER MANUFACTURER'S SPECIFICATIONS.
 10. CONNECTIONS
 - A. WHEN CONNECTIONS ARE MADE WITH SEWERS OR DRAINS CARRYING FLUIDS, SPECIAL CARE MUST BE TAKEN THAT NO PART OF THE WORK IS BUILT UNDER WATER. A FLUME OR DAM MUST BE INSTALLED AND PUMPING MAINTAINED IF NECESSARY, AND THE NEW WORK KEPT DRY UNTIL COMPLETED AND ANY CONCRETE OR MORTAR HAS SET UP.
 - B. THE CONTRACTOR SHALL INSTALL A SUITABLE BULKHEAD TO PREVENT CONSTRUCTION WATER, SAND, SILT, ETC. FROM ENTERING THE EXISTING SEWER SYSTEM. SUCH BULKHEAD SHALL BE LEFT IN PLACE UNTIL SUCH TIME AS THE OAKLAND COUNTY DEPARTMENT OF PUBLIC WORKS AUTHORIZES THE CONTRACTOR TO REMOVE IT.
 - C. NO GROUND WATER, STORM WATER, CONSTRUCTION WATER, DOWNSPOUT DRAINAGE OR WEEP TILE DRAINAGE SHALL BE ALLOWED TO ENTER ANY SANITARY SEWER INSTALLATION.
 11. CHANNELS
 - A. PROPER CHANNEL SHALL BE CONSTRUCTED WITHIN THE EXISTING MANHOLE OR OTHER STRUCTURE AT WHICH THE CONNECTION IS TO BE MADE TO DIRECT THE FLOW TO THE EXISTING OUTLET IN A MANNER WHICH WILL TEND TO CREATE THE LEAST AMOUNT OF TURBULENCE. ANY PORTION OF THE EXISTING STRUCTURE WHICH WOULD BE REMOVED OR DESTROYED SHALL BE REPAIRED. CONCRETE CHANNELS FORMED WITHIN PRECAST CONSTRUCTION SHALL BE REINFORCED WITH STEEL. THE REINFORCING SHALL BE TAKEN TO THE EXTERIOR OF THE STRUCTURE. THE CONCRETE HAS TAKEN ITS INITIAL SET AND IS RESISTANT TO DAMAGE OR OTHERWISE SPECIFIED BY THE MUNICIPAL ENGINEER.
 12. CASTING ADJUSTMENTS
 - A. ADJUSTMENT TO MANHOLE CASTING SHALL BE ACCOMPLISHED BY USING RUBBER O-RING AND PRECAST CONCRETE ADJUSTMENT RING BOLTED TO THE CONCRETE SECTION WITH A MAXIMUM ADJUSTMENT OF TWO ADJUSTMENT RINGS NOT EXCEEDING 15 INCHES.
 - B. MANHOLE CASTINGS LOCATED WITHIN PAVEMENT AREAS SHALL BE ADJUSTED A MAXIMUM OF 15 INCHES USING FOUR CADMIUM COATED 5/8 INCH DIAMETER THREADED STUDS WITH ADJUSTING SUPPORT NUTS FOR SETTING FRAME TO CORRECTED GRADE AS DETAILLED ON THE CONTRACT DRAWINGS. THE VOID BETWEEN CASTING AND TOP OF CONE SECTION SHALL BE COMPLETELY FILLED WITH STIFF MORTAR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER PLACEMENT OF WATERPROOFING SHALL BE TAKEN TO THE EXTERIOR OF THE STRUCTURE. THE CONCRETE HAS TAKEN ITS INITIAL SET AND IS RESISTANT TO DAMAGE OR OTHERWISE SPECIFIED BY THE MUNICIPAL ENGINEER.
 13. BORED AND JACKED CASING
 - A. INSIDE DIAMETER OF CASING SHALL BE EQUAL TO THE OUTSIDE DIAMETER OF THE PIPE BELL PLUS 8 INCHES, UNLESS OTHERWISE NOTED ON CONTRACT DRAWINGS.
 - B. UNLESS OTHERWISE SPECIFIED, CASING PIPE SHALL BE ASTM C-76 CLASS V R.C.P. OR ASTM A139 GRADE B WITH MINIMUM WALL THICKNESS OF 0.250 INCHES.
 - C. ALTERNATE METHODS OF SUPPORTING AND MAINTAINING THE POSITION OF THE CARRIER PIPE WITH RESPECT TO THE CASING PIPE (IN LEOU OF THE USE OF TIMBERS) WILL BE CONSIDERED. THE CONTRACTOR SHALL SUBMIT DETAILS OF SUCH ALTERNATE METHODS FOR APPROVAL BY THE MUNICIPAL ENGINEER.
 - D. THE ENDS OF THE CASING PIPE SHALL BE CLOSED WITH A MASONRY BULKHEAD.
 14. TESTING
 - A. ALL SANITARY SEWER SYSTEMS WILL HAVE PRELIMINARY AIR TESTS WITNESSED BY THE ENGINEER'S REPRESENTATIVE PRIOR TO A FINAL AIR TEST AND ACCEPTANCE BY THE MUNICIPALITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF ANY OTHERWISE DIRECTED "OMIT THE TEE AND USE AN APPROVED STOPPER IN THE RISER PIPE WHEN PLACING A BLIND DROP CONNECTION FOR FUTURE USE." ALL TESTING WILL BE IN ACCORDANCE WITH THE OAKLAND COUNTY DEPARTMENT OF PUBLIC WORKS STANDARDS AND SPECIFICATIONS. TELEVISION OF ALL SANITARY SEWER LINES WITH VIDEO TAPE WILL BE REQUIRED PRIOR TO SETTING UP THE FINAL AIR TEST. MANDRELLING MAY BE REQUIRED AT THE DISCRETION OF THE ENGINEER.
 - B. AT ALL CONNECTIONS TO AN EXISTING ODDC SEWER OR EXTENSION THERETO, A WATERTIGHT BULKHEAD WITH A CARPPED ONE INCH DIAMETER PIPE TO PERMIT MESSAGING INFILTRATION SHALL BE PROVIDED. A TEMPORARY 12-INCH DEEP SUMP SHALL ALSO BE PROVIDED IN THE FIRST MANHOLE ABOVE THE CONNECTION WHICH WILL BE FILLED IN AFTER SUCCESSFUL COMPLETION OF ANY ACCEPTANCE TEST UP TO THE STANDARD FILLET PROVIDED FOR THE FLOW CHANNEL.



ALTERNATE LETTERING LAYOUT FOR MANHOLE COVERS

SEE NOTE #5 I

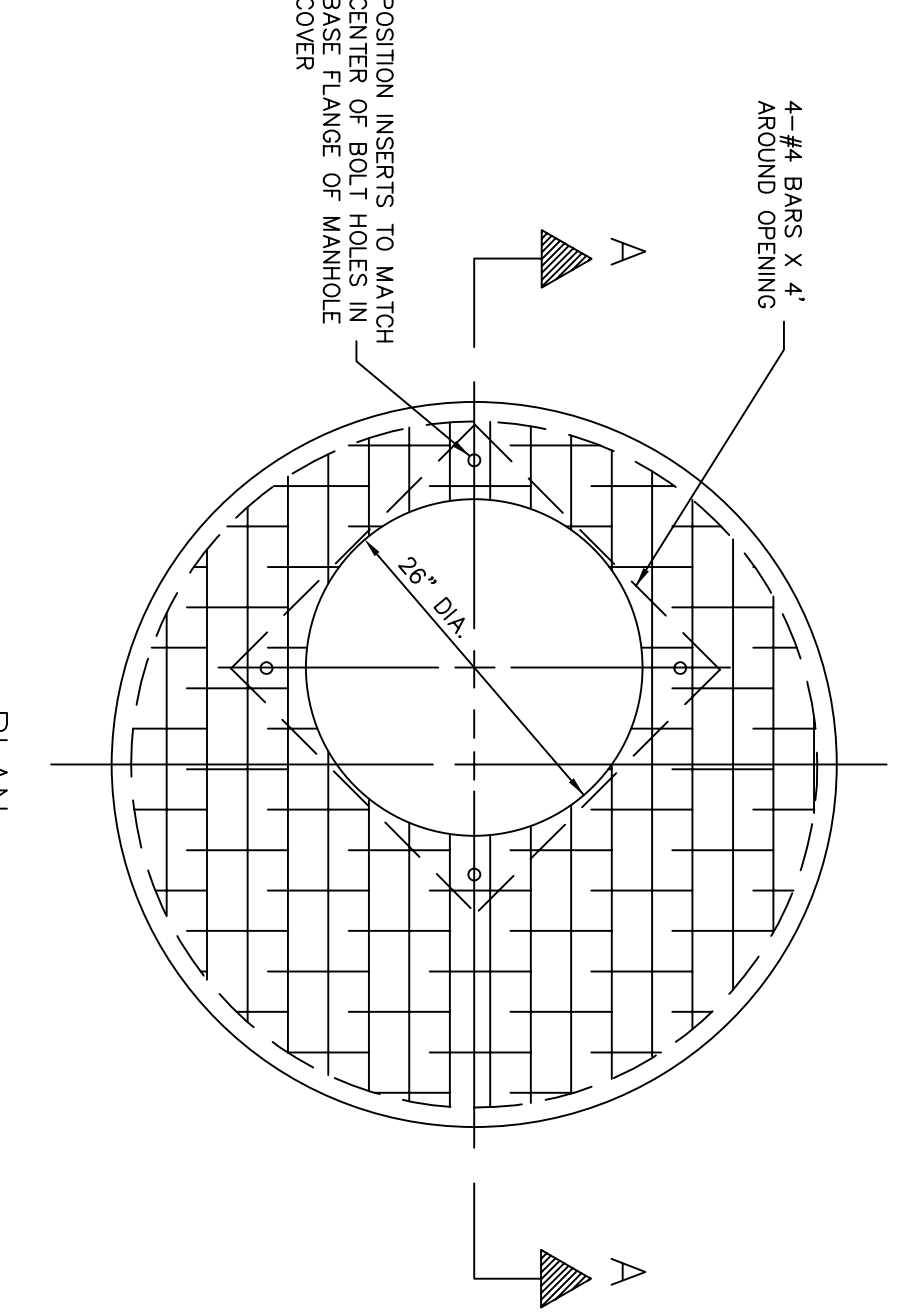
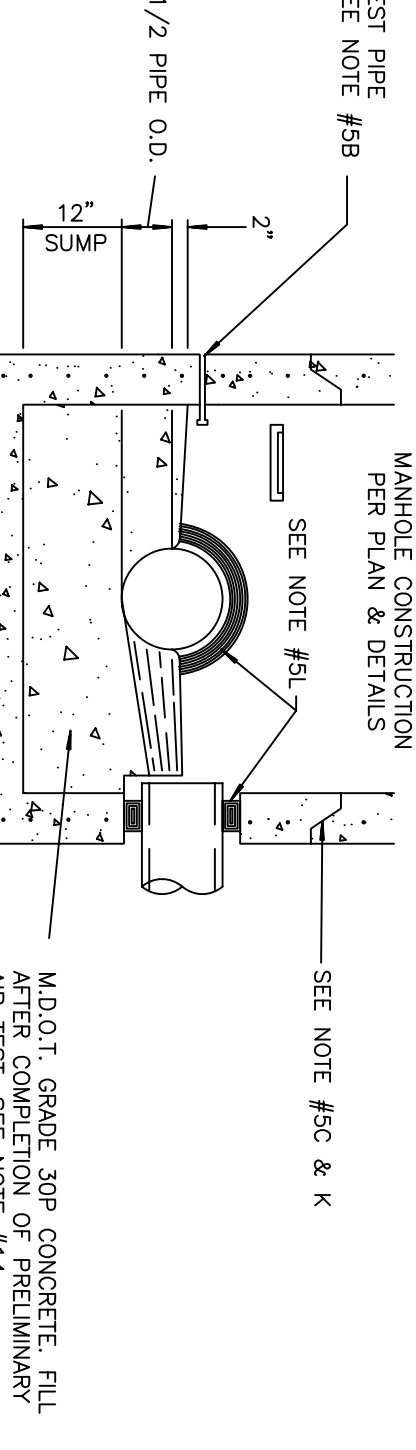


CONSTRUCTION DETAILS FOR SANITARY MANHOLE TOPS WITHIN PAVEMENT AREAS

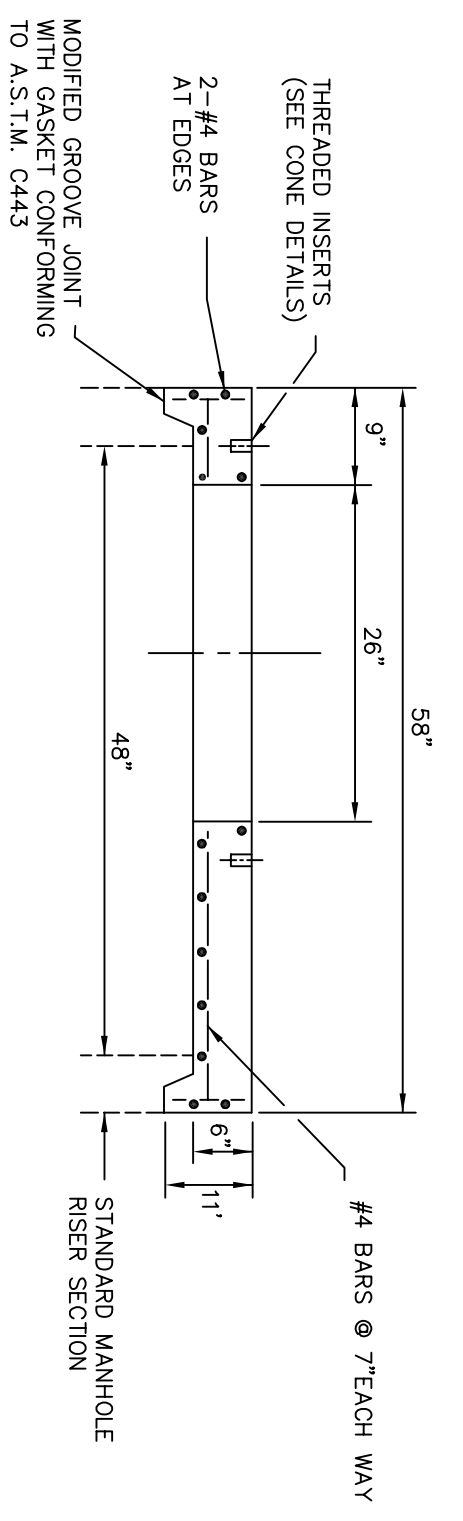
SEE STANDARD MANHOLE DETAILS FOR OTHER MANHOLE DETAILS.

STANDARD SANITARY MANHOLE CHANNEL W/SUMP DETAIL

SECTION C-C

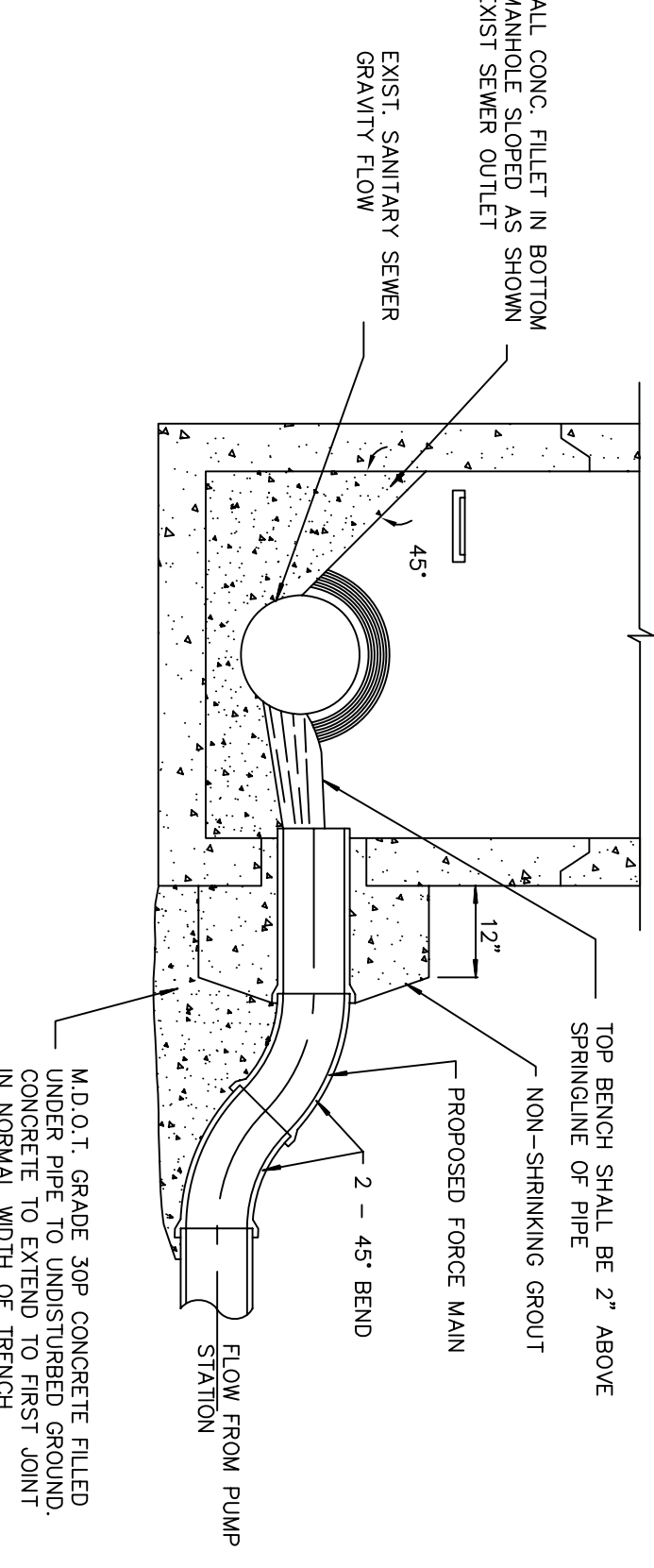


PLAN

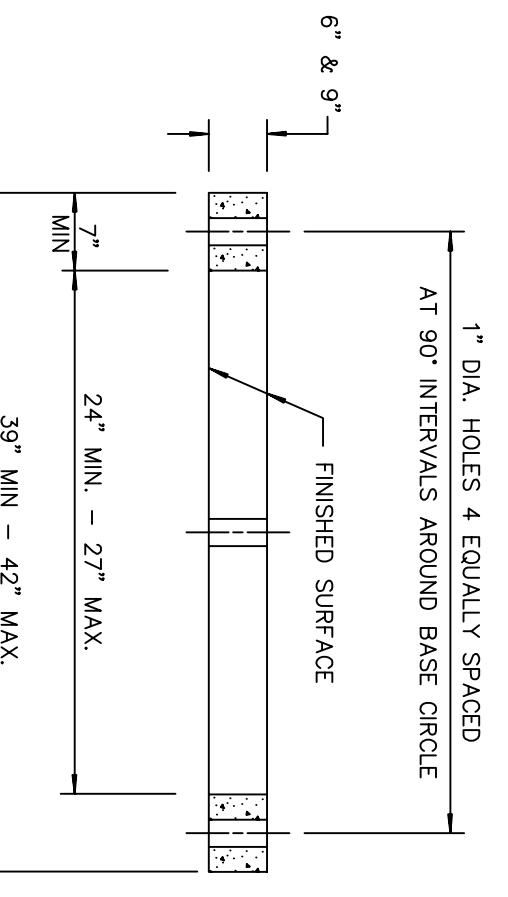


SECTION A-A

FLAT SLAB MANHOLE TOP



FORCE MAIN DISCHARGE TO EXISTING MANHOLE

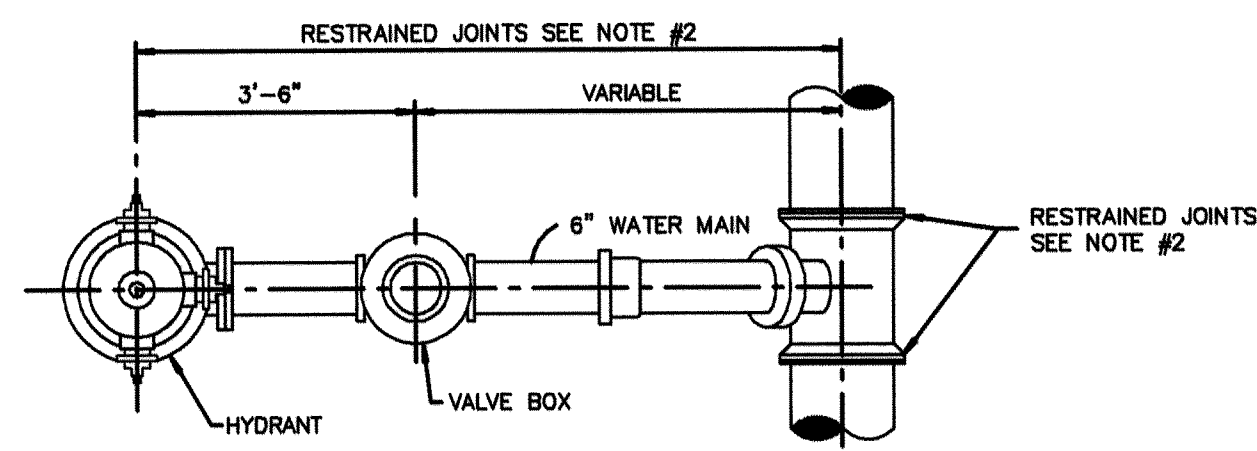


ADJUSTMENT RING DETAIL

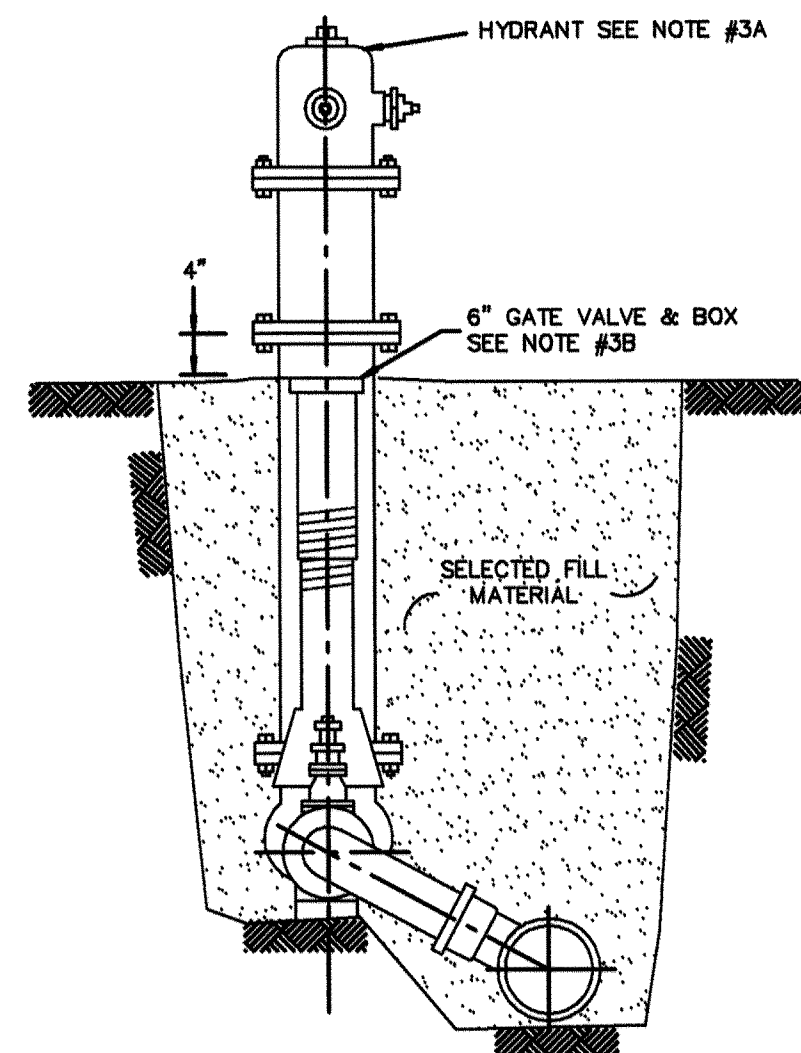
SEE NOTE #12A

Revisions	
5/20/99	REVISED MANHOLE COVER
4/24/06	REV INFILTRATION STD (ocdc)

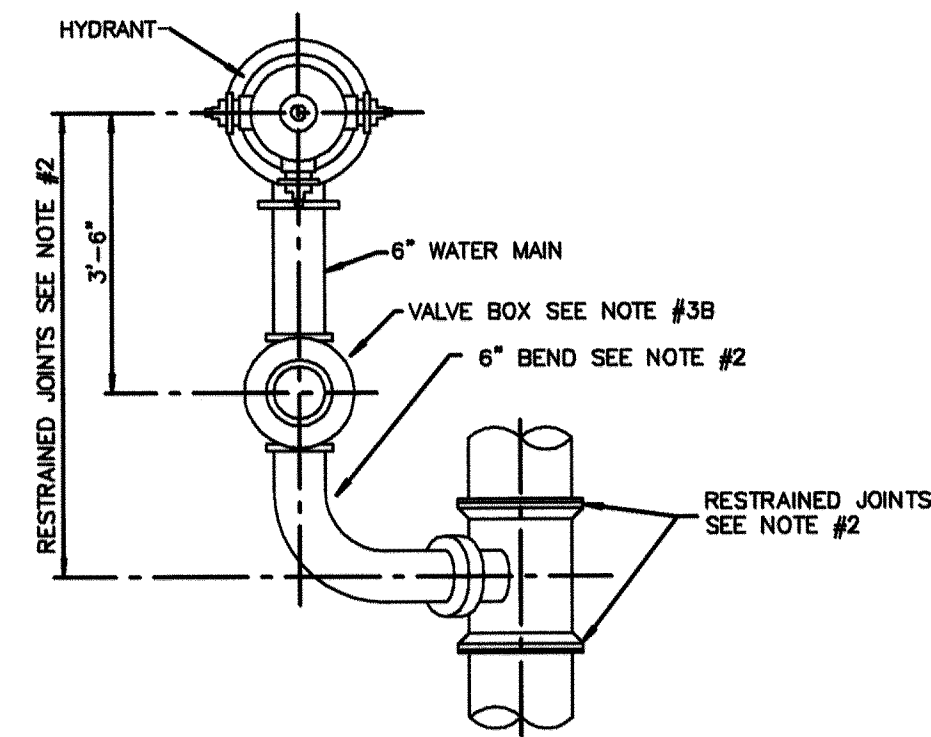
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Drawn	6/15/98
Designed	Job No.
Checked	Shek No.



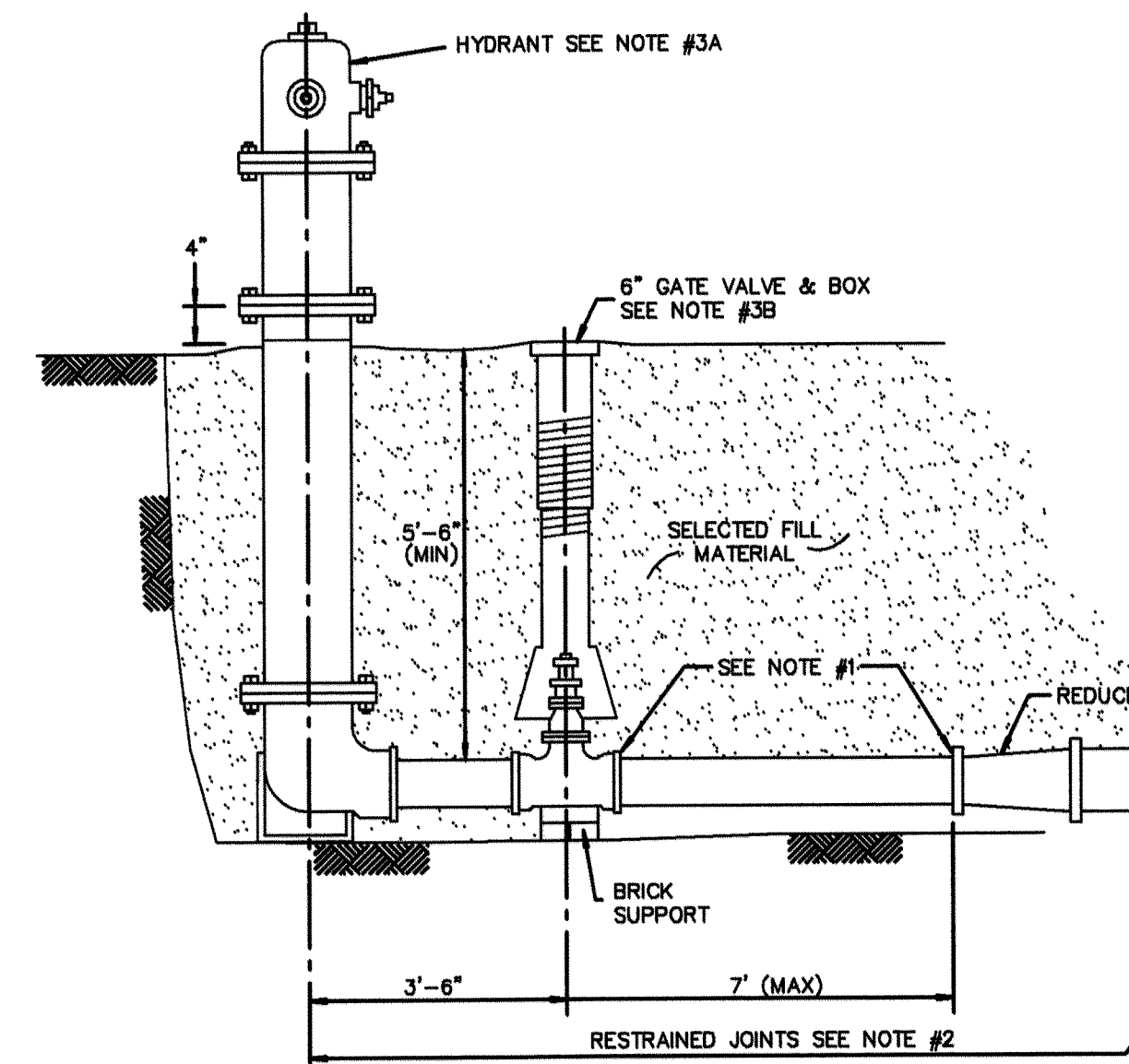
PLAN



SECTION

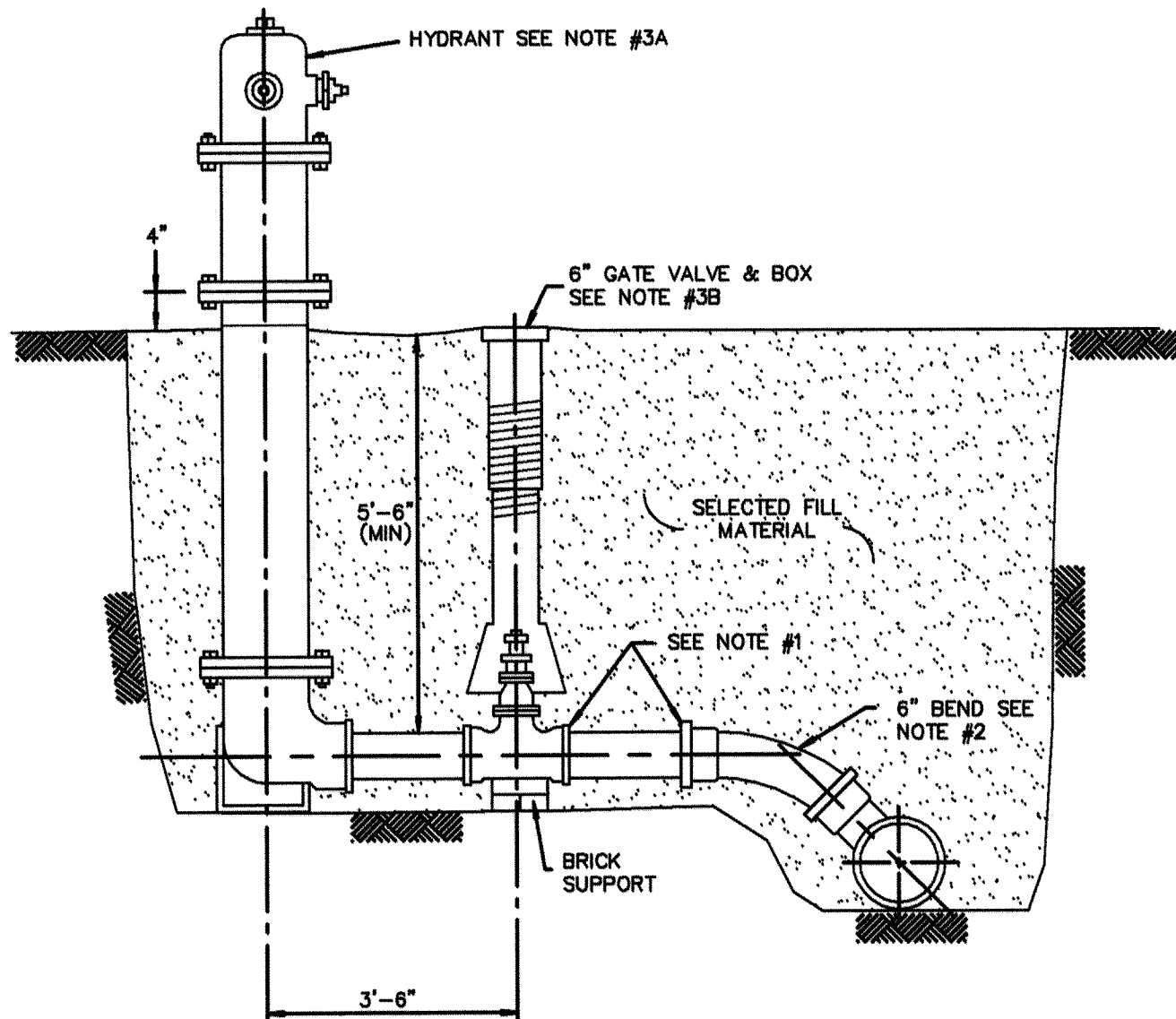


PLAN



TYPICAL HYDRANT VALVE & BOX CONNECTION AT END OF WATER MAIN

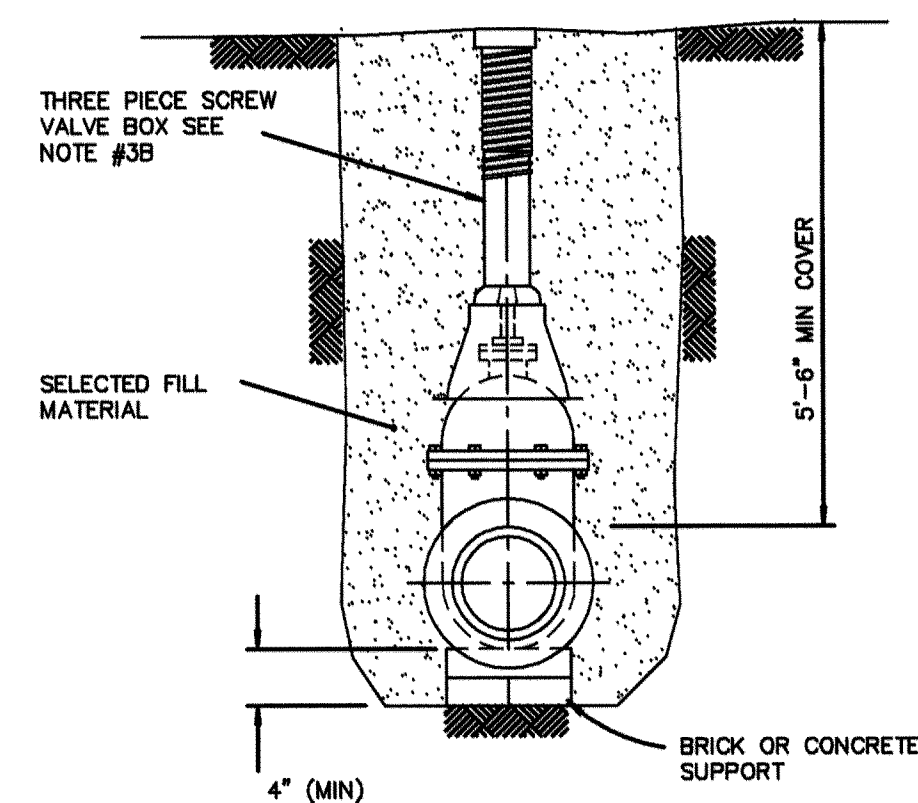
- TYPE OF JOINT SHALL BE APPROVED BY MUNICIPAL ENGINEER, (TYTON, SUPER BELL-TITE OR MECHANICAL, IN ACCORDANCE WITH ANSI A 21.11) OR APPROVED EQUIVALENT.
- RESTRAINED JOINTS ARE REQUIRED IN LIEU OF THRUST BLOCKS. RESTRAINED JOINTS FOR PIPE SIZES UP TO 16" SHALL BE FAST GRIP GASKETS, MEGA LUG OR APPROVED EQUAL. RESTRAINED JOINTS FOR PIPE SIZES OVER 16" SHALL BE AMERICAN DUCTILE IRON FLEX-RING JOINT PIPE OR APPROVED EQUAL BOLTLLESS SYSTEM.
THRUST RESTRAINT DESIGN SHALL BE PER THE DUCTILE IRON PIPE RESEARCH ASSOCIATION MANUAL; THRUST RESTRAINT DESIGN FOR DUCTILE PIPE, CURRENT EDITION.
- A. HYDRANTS SHALL BE EAST JORDAN MODEL TYPE 6BR.
B. VALVE BOXES SHALL BE EAST JORDAN E-3002, OR APPROVED EQUIVALENT.
- UNLESS OTHERWISE NOTED OR DIMENSIONED, HYDRANTS SHALL BE:
 - MAXIMUM 15', MINIMUM 7' BEHIND EXISTING CURB.
 - 30' ± 1' FROM R.O.W. CENTERLINE IN STREETS WITH DITCHES.
- HYDRANT DRAIN OPENING SHALL BE SECURELY PLUGGED.
- PRIOR TO ACCEPTANCE:
 - HYDRANT SHALL BE PLUMBED.
 - VALVE BOXES SHALL BE PLUMBED AND IN LINE WITH THE VALVE.
 - STEAMER CONNECTION OF THE HYDRANT SHALL FACE THE STREET CENTERLINE, OR AS DIRECTED BY THE FIRE MARSHALL.
 - HYDRANTS SHALL BE CLEANED AND PAINTED TO FIRE MARSHALL'S COLOR CODE. RUSTOLEUM FIRE HYDRANT RED, OR APPROVED EQUIVALENT.
 - HYDRANTS SHALL BE CHARGED TO BE TESTED FOR LEAKAGE AND ANY LEAKS ARE TO BE REPAIRED.
 - HYDRANTS AND VALVE BOXES SHALL BE SET TO FINAL FINISHED GRADES.
- EXTENSION STEMS AND STEM GUIDES AS MANUFACTURED BY TRAVERSE CITY IRON WORKS, OR APPROVED EQUIVALENT SHALL BE PROVIDED IN EACH GATE WELL WHERE THE VALVE OPERATING NUT IS FURTHER THAN 5' BELOW THE TOP OF THE GATE WELL COVER OR VALVE BOX COVER. EXTENSION STEM SHALL EXTEND TO WITHIN 5' OF THE TOP OF COVER FINAL ELEVATION. EXTENSION STEMS WILL BE SECURED IN PLACE WITH BRACKETS ATTACHED TO THE RISER SECTIONS.



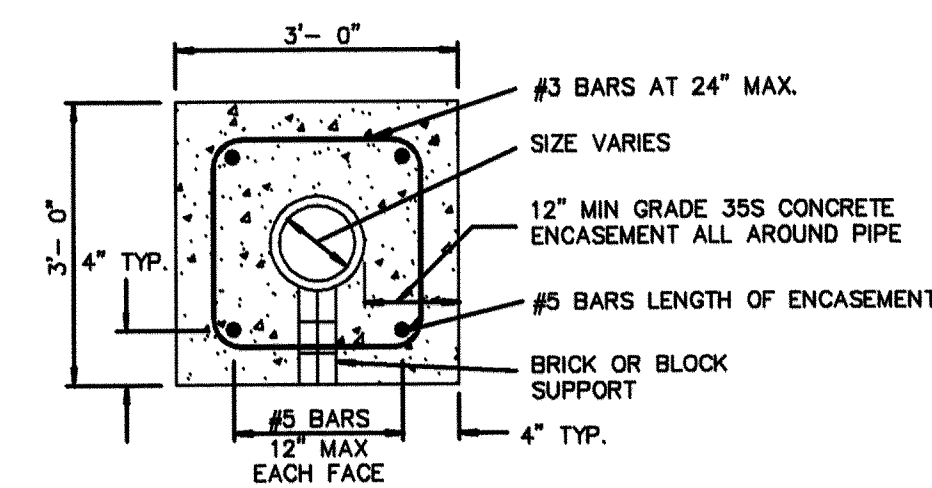
SECTION

TYPICAL HYDRANT SETTINGS

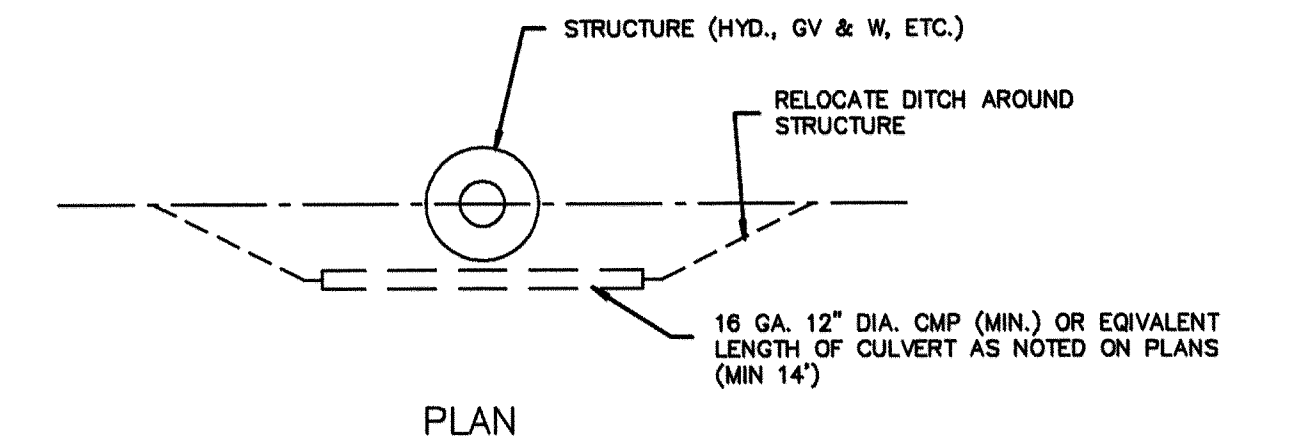
TYPICAL 90° HYDRANT SETTING



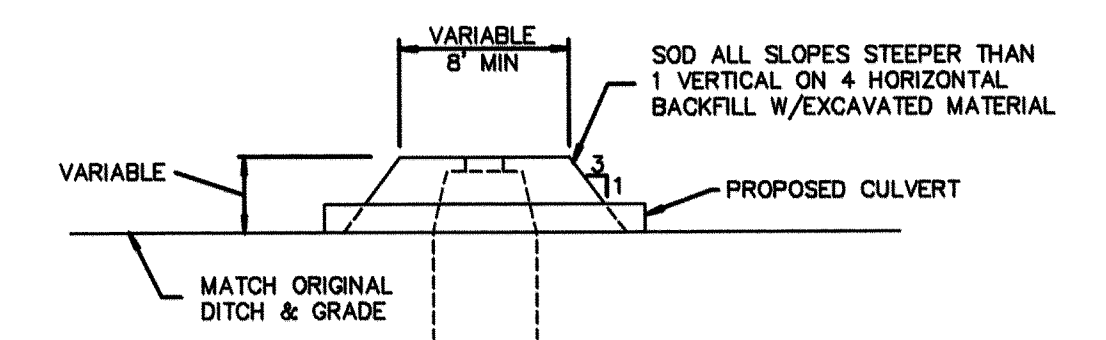
VALVE BOX DETAIL



STANDARD ENCASEMENT FOR 12" & SMALLER WATER MAIN

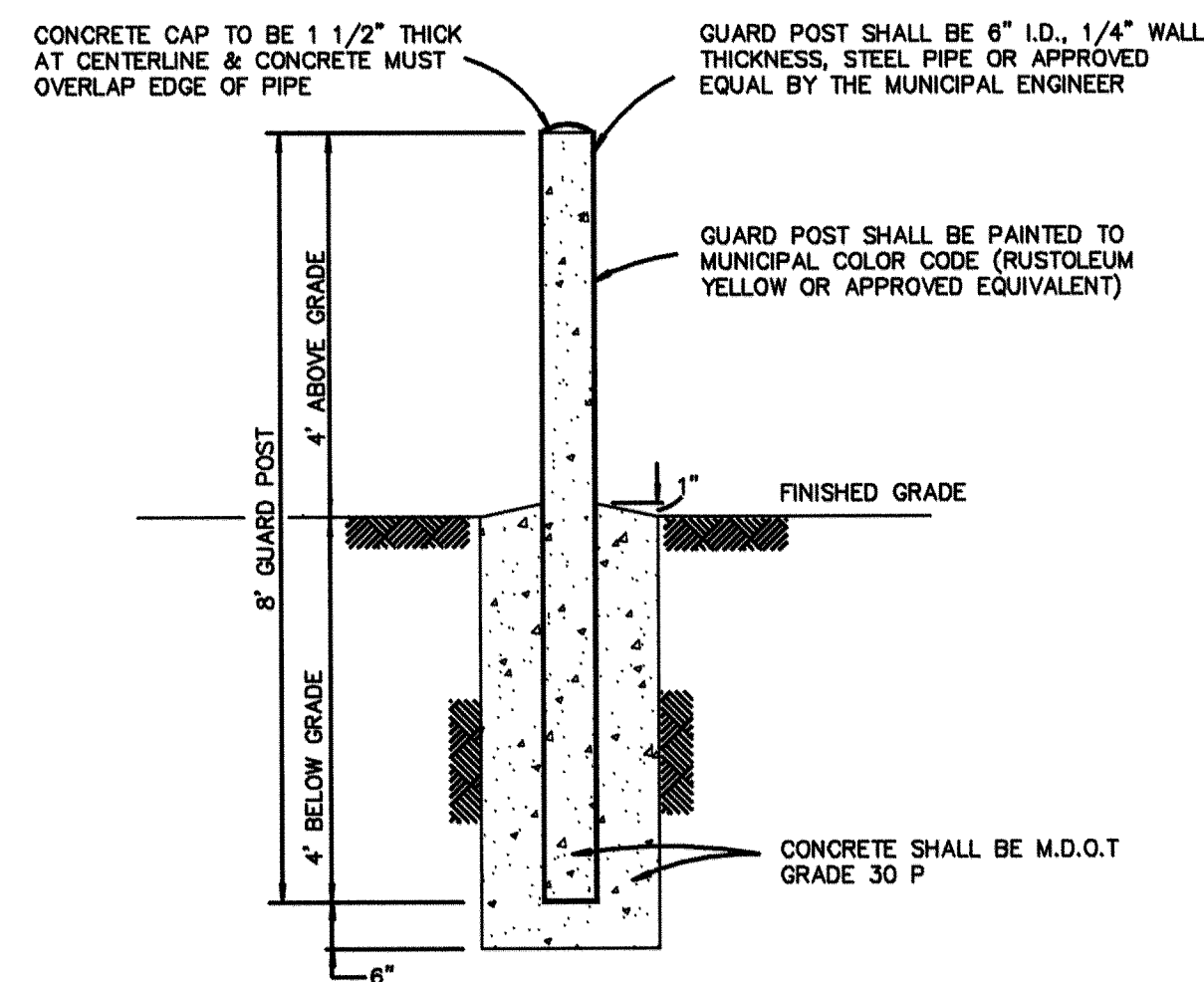


PLAN



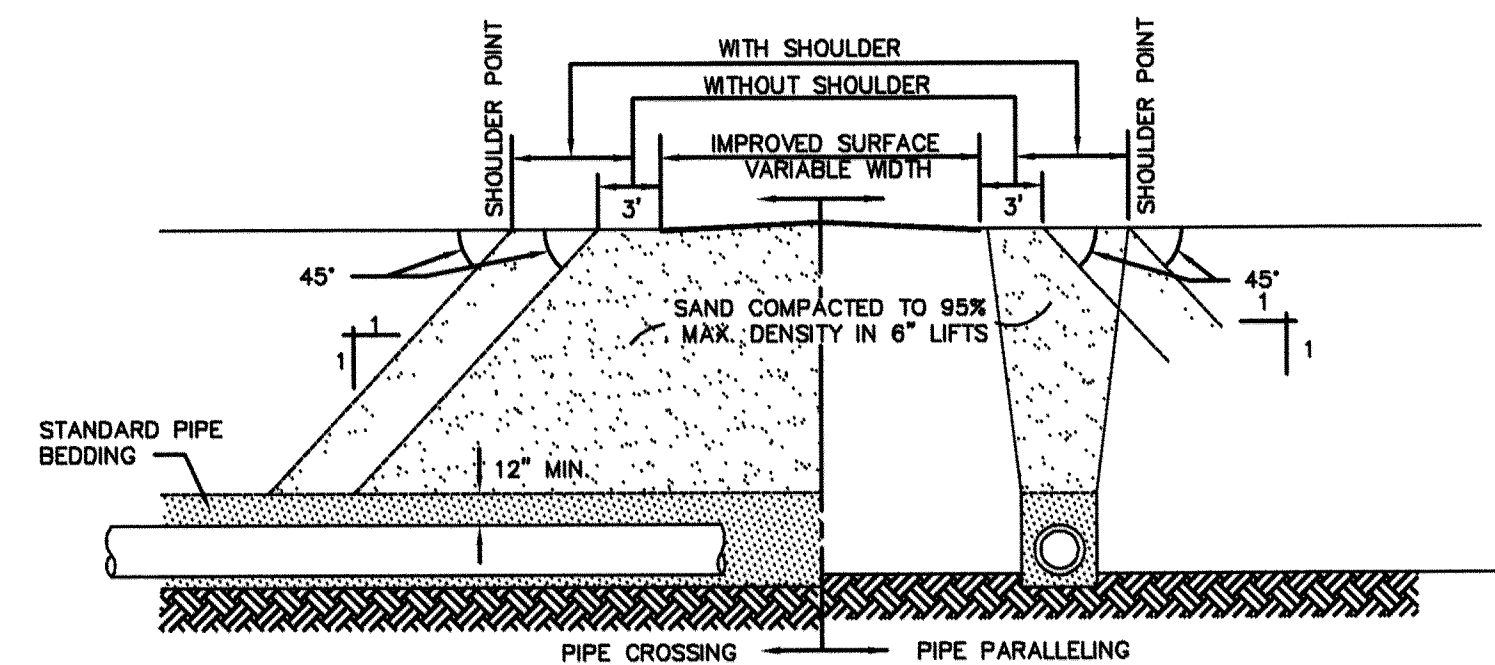
SECTION

DITCH RELOCATION & ENCLOSURE AROUND STRUCTURES



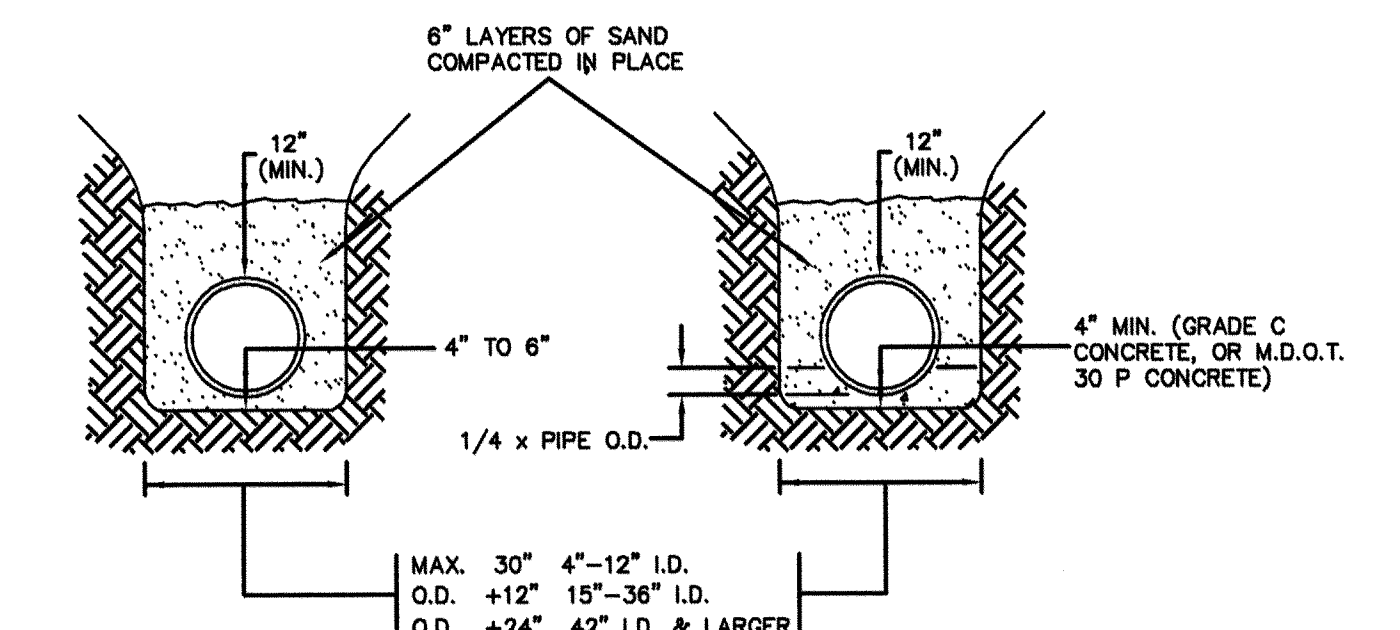
GUARD POST DETAIL

GUARD POST SHALL BE PLACED 4' FROM CENTERLINE OF HYDRANT OR AS PER PLAN



BACKFILLING IN THE AREAS OF STREETS, ALLEYS, SIDEWALKS, DRIVES & PARKING AREA

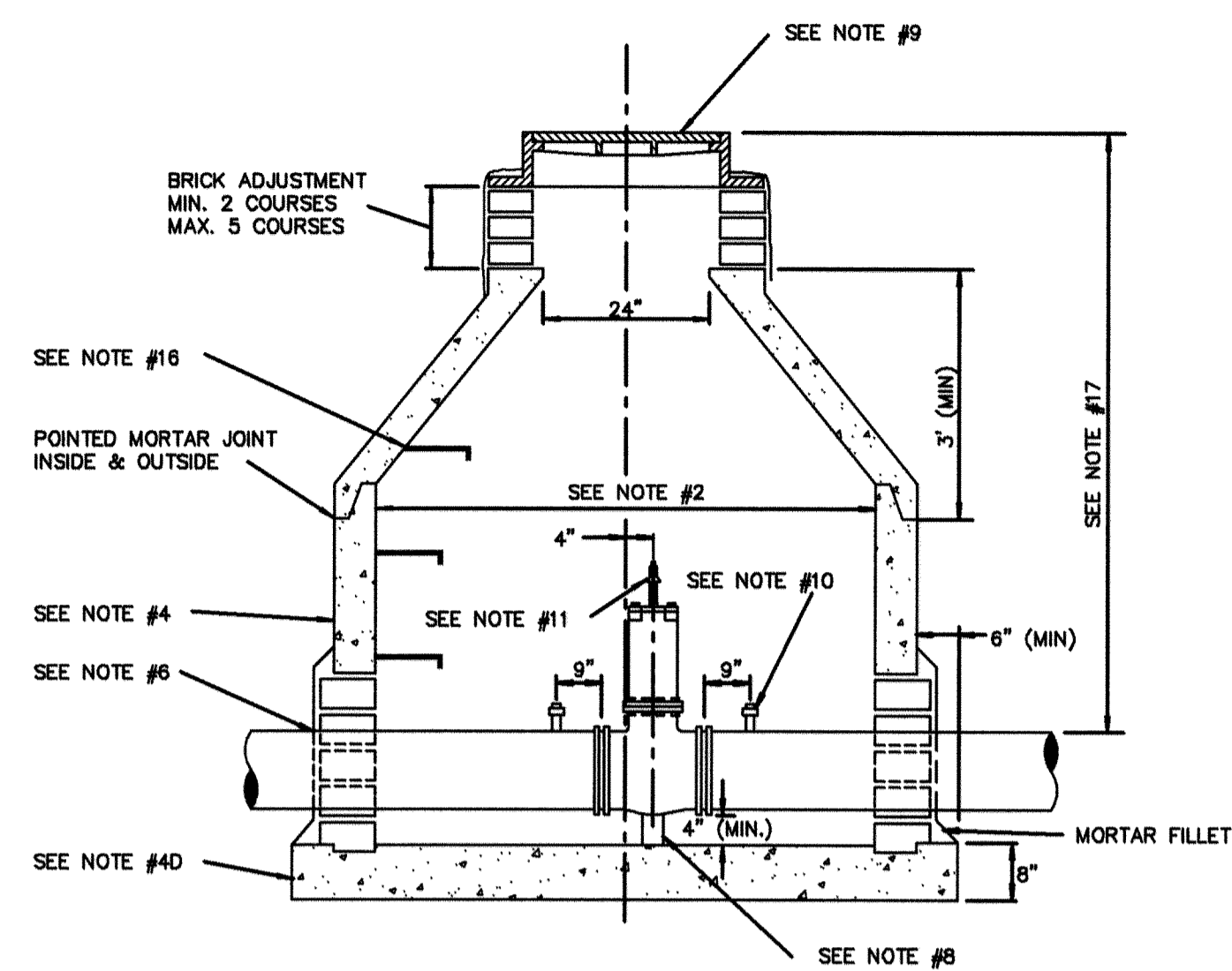
SEE NOTE # 2



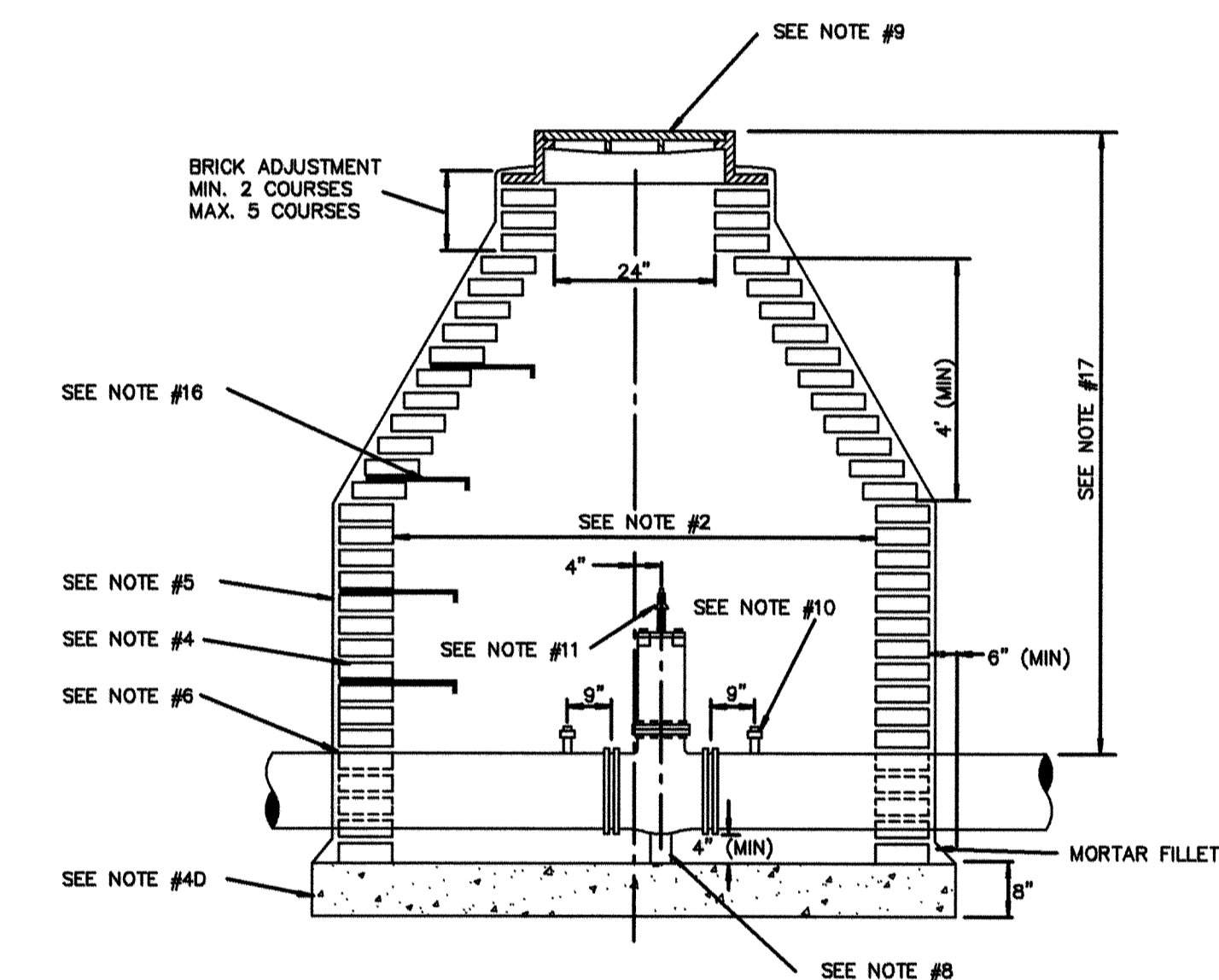
CLASS "B" BEDDING

CLASS "A" BEDDING

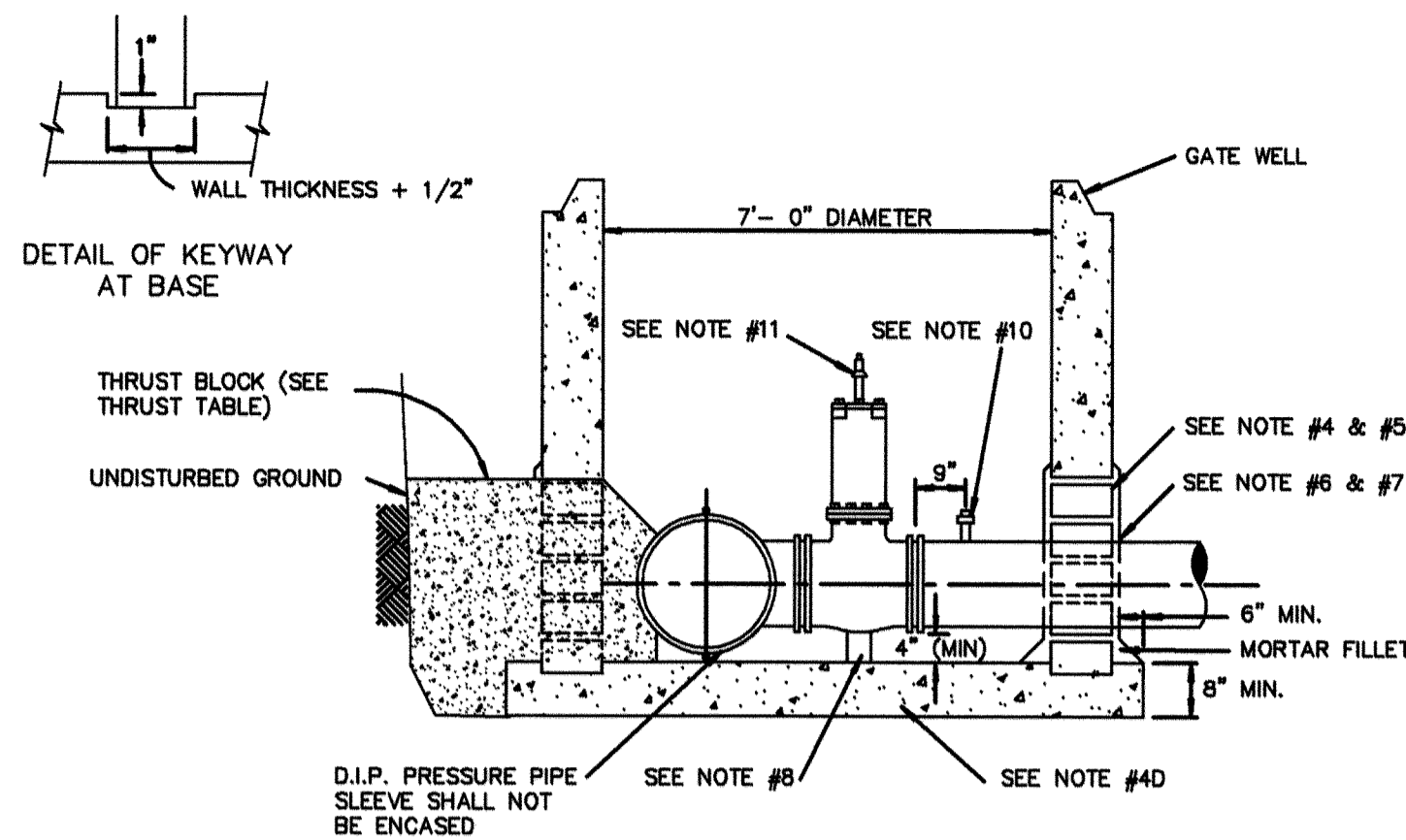
BEDDING & TRENCH WIDTH REQUIREMENT



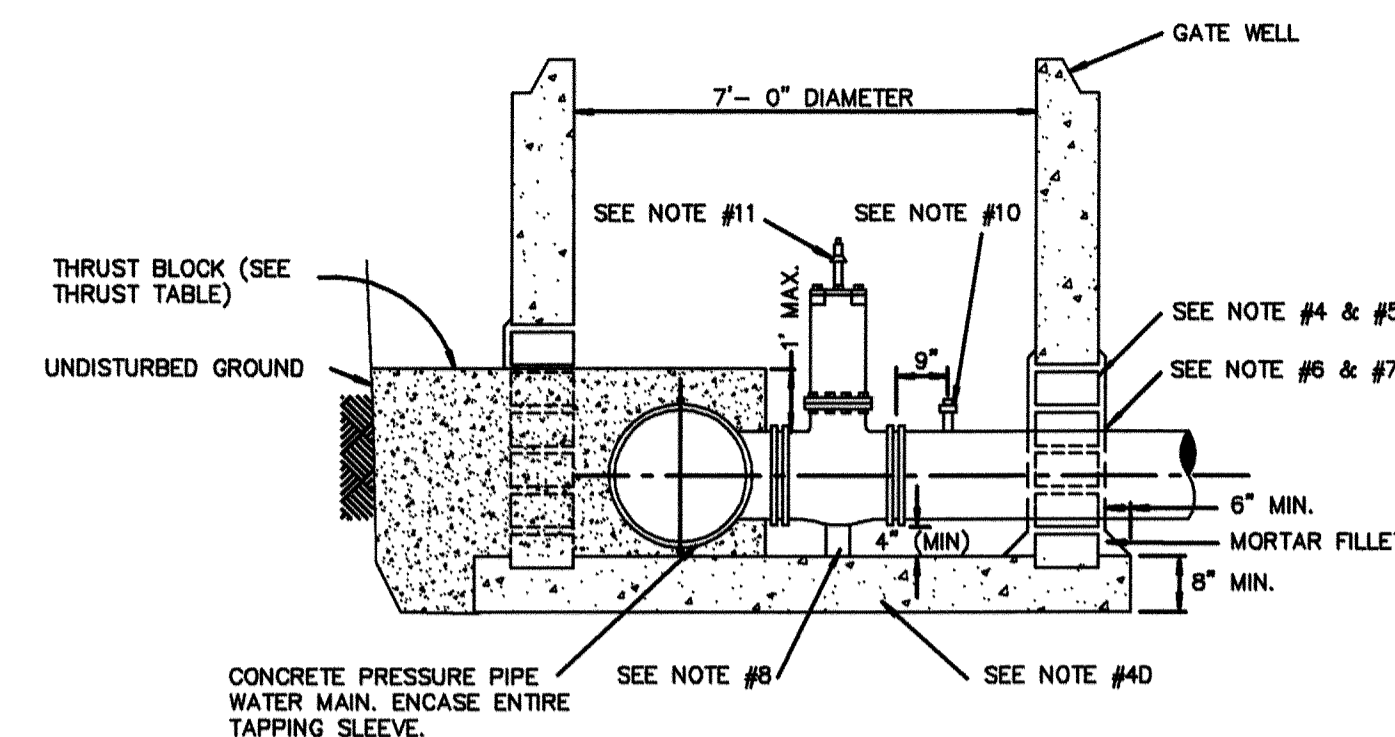
DETAIL OF PRECAST CONCRETE GATE WELL



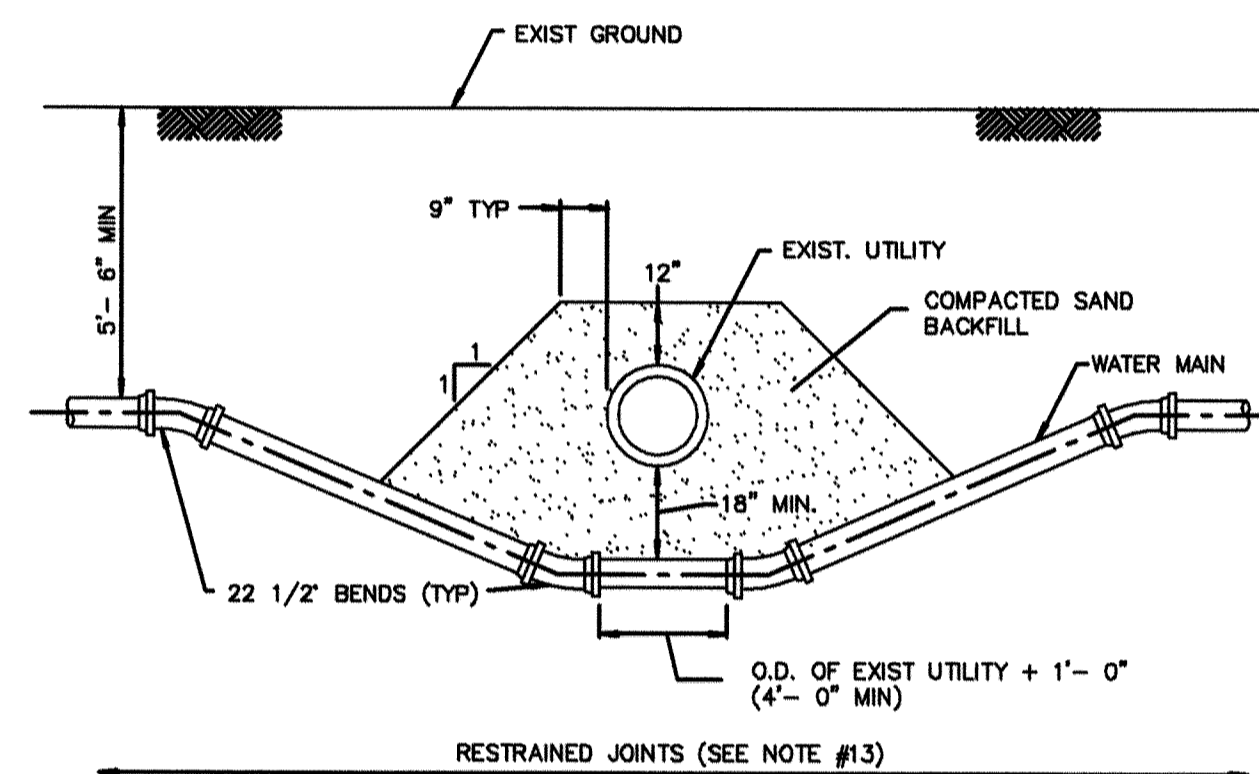
DETAIL OF BRICK GATE WELL



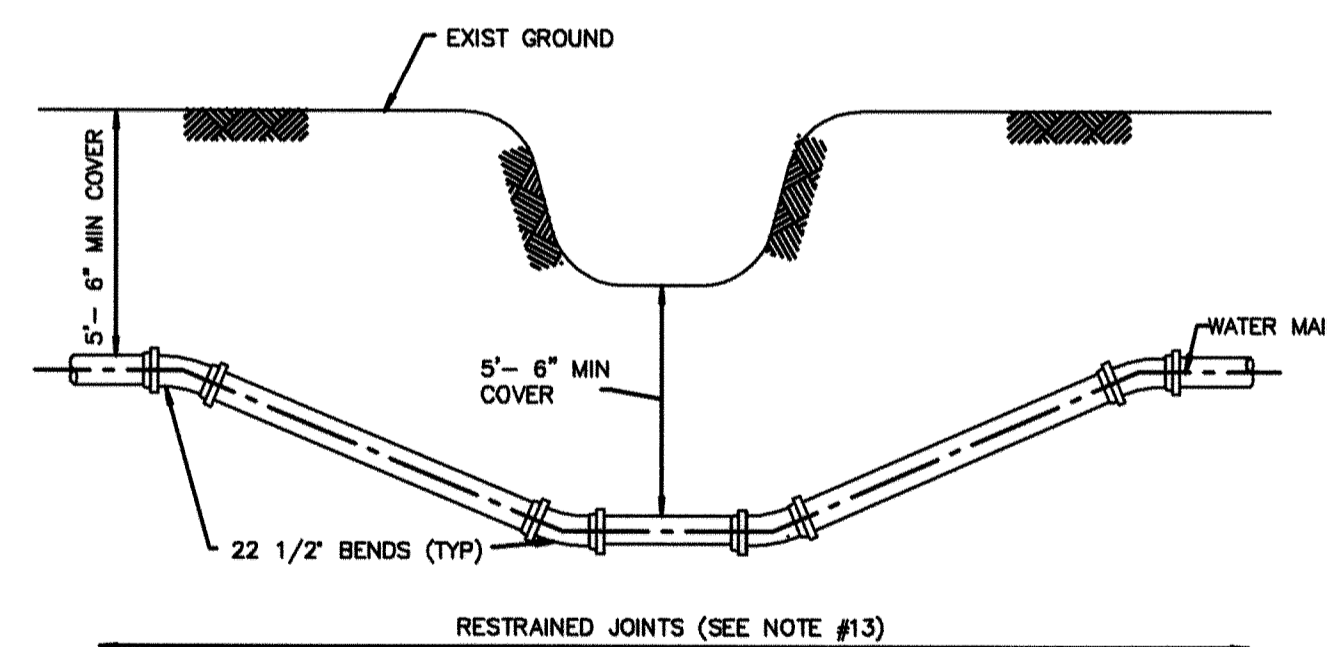
DETAIL FOR D.I.P. TAPPING SLEEVE VALVE & WELL



DETAIL FOR CONCRETE PIPE TAPPING SLEEVE VALVE & WELL



TYPICAL WATER MAIN UTILITY CROSSING



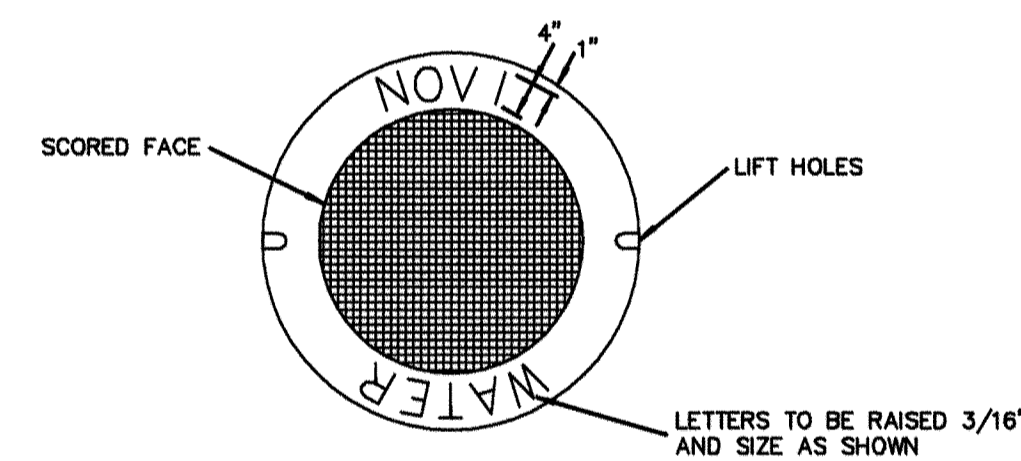
DITCH AND STREAM CROSSING

MAIN SIZE	TEES
6"	4,250
8"	7,540
12"	16,970
16"	30,160
20"	47,120
24"	67,860
36"	152,680

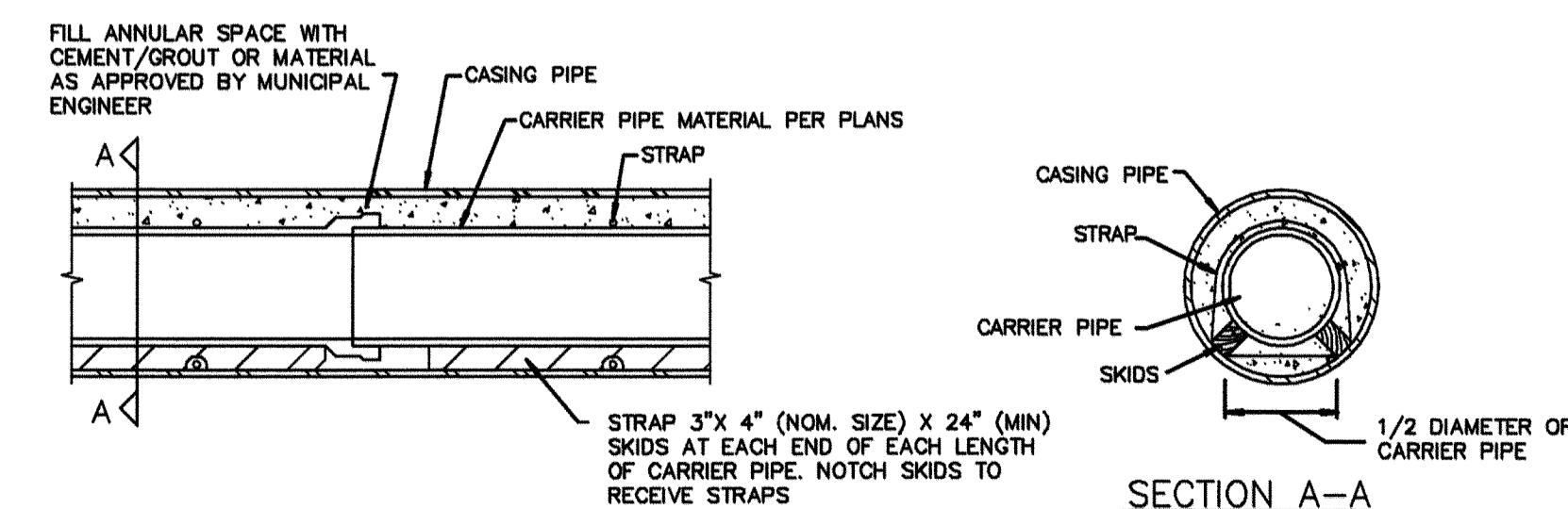
SOIL BEARING LOADS - HORIZONTAL THRUST	
TYPE OF SOIL	S.B.L. LBS./SQ. FT.
MUCK, PEAT, etc.	0
SOFT CLAY	1000
SAND	2000
SAND AND GRAVEL	3000
SAND AND GRAVEL CEMENTED W/CLAY	4000
HARD COMPACTED CLAY	5000

NOTE:
 1. ALL THRUST BLOCKS SHALL EXTEND TO UNDISTURBED GROUND
 2. CONCRETE SHALL BE M.D.O.T. GRADE 30P
 3. THRUST TABLE DIVIDED BY SOIL BEARING LOADS EQUALS THRUST BLOCK SQUARED.

THRUST BLOCK TABLES
(FOR TAPPING SLEEVE VALVE & WELL ONLY)



COVER LETTERING DETAIL
(TYPICAL FOR ALL CASTINGS)
TYPE "A" COVER



CARRIER PIPE WITH CASING PIPE
SEE NOTE #14

- DETAILED CONSTRUCTION NOTES**
- ALL GATE WELL STRUCTURES SHALL BE CONCENTRIC CONE TYPE UNLESS OTHERWISE APPROVED BY THE MUNICIPAL ENGINEER.
 - GATEWELLS SHALL BE BRICK, BLOCK OR PRECAST REINFORCED CONCRETE SIZED AS FOLLOWS:
 - 6" THROUGH 10" PIPE SHALL BE 5' INSIDE DIAMETER.
 - OVER 10" PIPE SHALL BE 6' INSIDE DIAMETER.
 - TAPPING WELLS SHALL BE BRICK, BLOCK OR PRECAST REINFORCED CONCRETE.
 - BRICK SHALL BE GRADE U-1 CONFORMING TO ASTM C-55.
 - BLOCK SHALL BE GRADE N-1 CONFORMING TO ASTM C-139.
 - PRECAST REINFORCED CONCRETE SECTIONS SHALL CONFORM TO ASTM C-478. LIFT HOLES SHALL BE POINTED INSIDE AND OUTSIDE AT THE TIME STRUCTURE IS ASSEMBLED.
 - CONCRETE BASE SHALL BE MDT GRADE 30P (MINIMUM).
 - BRICK OR BLOCK SHALL PLASTERED ON THE OUTSIDE WITH A MINIMUM OF 1/2" OF MORTAR.
 - THE PIPE OPENINGS SHALL BE WRAPPED WITH CADILLAC WRAP, #30 MASTIC, OR APPROVED EQUIVALENT WITHIN THE WALL OF THE TAPPING SLEEVE AND VALVE WELL.
 - MORTAR FOR LAYING BRICK OR BLOCK, POINTING JOINTS AND PLASTERING OUTSIDE OF STRUCTURES SHALL BE COMPOSED OF 1 PART MASONRY CEMENT (TYPE I) AND 2 1/2 PARTS MASONRY SAND.
 - GATE VALVES SHALL BE E.J.I.W. IRON BODY, FULLY BRONZE-MOUNTED, DOUBLE DISC, PARALLEL SEAT TYPE, NONRISING STEM, OPENING COUNTERCLOCKWISE AND CONFORMING TO AWWA STANDARDS, OR RESILIENT SEATED GATE VALVES CONFORMING TO AWWA C-509. GATE VALVES AND FITTINGS SHALL BE SUPPORTED BY FORMED CONCRETE OR MORTARED BRICK BEARING ON THE FLOOR. (MINIMUM 4" CLEARANCE FROM FLOOR TO BOTTOM OF VALVE.)
 - EAST JORDON IRON WORKS #1040 AND TYPE A COVER (WITH LETTER AS PER DETAIL THIS SHEET) OR APPROVED EQUIVALENT PLACED ON A BED OF MORTAR. MORTAR SHALL EXTEND OVER BASE FLANGE.
 - CORPORATION STOPS
 - 1-INCH MUELLER #H-15000, CLOW F-1280 OR APPROVED BY THE MUNICIPAL ENGINEER.
 - ALL CORPORATION STOPS INSTALLED OUTSIDE OF GATEWELLS SHALL BE WITH BRONZE DOUBLE-STRAP TAPPING SADDLE (CLOW F-1280 OR APPROVED BY THE MUNICIPAL ENGINEER).
 - EXTENSION STEM AND STEM GUIDE AS MANUFACTURED BY TRAVERSE CITY IRON WORKS OR APPROVED EQUIVALENT, SHALL BE PROVIDED IN EACH GATE WELL OR VALVE BOX WHERE THE VALVE OPERATING NUT IS MORE THAN 5 FEET BELOW THE TOP OF THE GATE WELL COVER (FINAL ELEVATION). EXTENSION STEMS AND GUIDES SHALL EXTEND VALVE OPERATING NUT TO WITHIN 5 FEET OF THE TOP OF COVER (FINAL ELEVATION). EXTENSION STEMS SHALL BE SECURED IN PLACE WITH BRACKETS ATTACHED TO THE RISER SECTIONS.
 - WHENEVER A WATER MAIN IS INSTALLED UNDER ANY EXISTING UTILITY LINE, PROVISIONS SHALL BE MADE TO PROPERLY SUPPORT OR DISTRIBUTE ANY CONCENTRATED LOADS TO AVOID ANY SETTLEMENT AND ALL POSSIBLE FAILURE OF THE LOWER MAIN. A VERTICAL SEPARATION OF AT LEAST 18 INCHES BETWEEN THE SEWER AND THE WATER MAIN SHALL BE PROVIDED (MEASURED BARREL TO BARREL).
 - COMPACTED SAND BACKFILL SHALL EXTEND FOR 9 INCHES EACH SIDE OF EXISTING PIPE. AT 12 INCHES ABOVE EXISTING PIPE AND SHALL SLOPE AT A ONE ON ONE SLOPE TO THE BOTTOM OF THE TRENCH.
 - RESTRAINED JOINTS ARE REQUIRED IN LIEU OF THRUST BLOCKS. RESTRAINED JOINTS FOR PIPE SIZES UP TO 16" SHALL BE FAST GRIP GASKETS, MEGA LUG OR APPROVED EQUAL. RESTRAINED JOINTS FOR PIPE SIZES OVER 16" SHALL BE AMERICAN DUCTILE IRON FLEX JOINT PIPE OR APPROVED EQUAL BOLTLESS SYSTEM.

THRUST RESTRAINT DESIGN SHALL BE PER THE DUCTILE IRON PIPE RESEARCH ASSOCIATION MANUAL; THRUST RESTRAINT DESIGN FOR DUCTILE PIPE, CURRENT EDITION.
 - CARRIER PIPE WITH CASING PIPE
 - INSIDE DIAMETER OF CASING SHALL BE EQUAL TO THE OUTSIDE DIAMETER OF THE PIPE BELL PLUS 8 INCHES, UNLESS OTHERWISE NOTED ON CONTRACT DRAWINGS.
 - UNLESS OTHERWISE SPECIFIED, CASING PIPE SHALL BE ASTM C-76 CLASS V R.C.P OR ASTM A139 GRADE B WITH MINIMUM WALL THICKNESS OF 0.250 INCHES.
 - ALTERNATE METHODS OF SUPPORTING AND MAINTAINING THE POSITION OF THE CARRIER PIPE WITH RESPECT TO THE CASING PIPE (IN LIEU OF THE USE OF TIMBERS) WILL BE CONSIDERED. THE CONTRACTOR SHALL SUBMIT DETAILS OF SUCH ALTERNATE METHODS FOR APPROVAL BY THE MUNICIPAL ENGINEER.
 - THE ENDS OF THE CASING PIPE SHALL BE CLOSED WITH A MASONRY BULKHEAD.
 - WHERE A CONCRETE ENCASEMENT IS SPECIFIED, A 12 INCH MINIMUM LAYER OF MECHANICALLY COMPACTED SAND SHALL BE MAINTAINED BETWEEN EXISTING UTILITY AND TOP OF CONCRETE ENCASEMENT.
 - GATE WELL STEPS SHALL BE STEEL, ENCASED WITH POLYPROPYLENE PLASTIC, EQUIVALENT TO M.A. INDUSTRIES, INC., PS-1 FOR PRE-CAST WELLS OR PS-1B FOR BLOCK/BRICK WELLS OR APPROVED EQUIVALENT.
 - MINIMUM COVER
 - 5'- 6" INCLUDING CROSSINGS THROUGH DITCH SECTIONS. WHEN INSTALLED PARALLEL TO A DITCH, MAINS SHALL HAVE 5'- 6" OF COVER MINIMUM, AS MEASURED FROM THE NEAREST POINT IN THE DITCH CROSS SECTION.
 - 6'- 0" UNDER STREETS, ROADS, ALLEYS AND OTHER PAVED OR TRAVELED AREAS.
 - PRIOR TO ACCEPTANCE ALL WATER MAINS ARE TO BE PRESSURE TESTED AND AND DISINFECTED IN ACCORDANCE WITH ANS/AWWA C600-83 AND C651-92 STANDARDS.

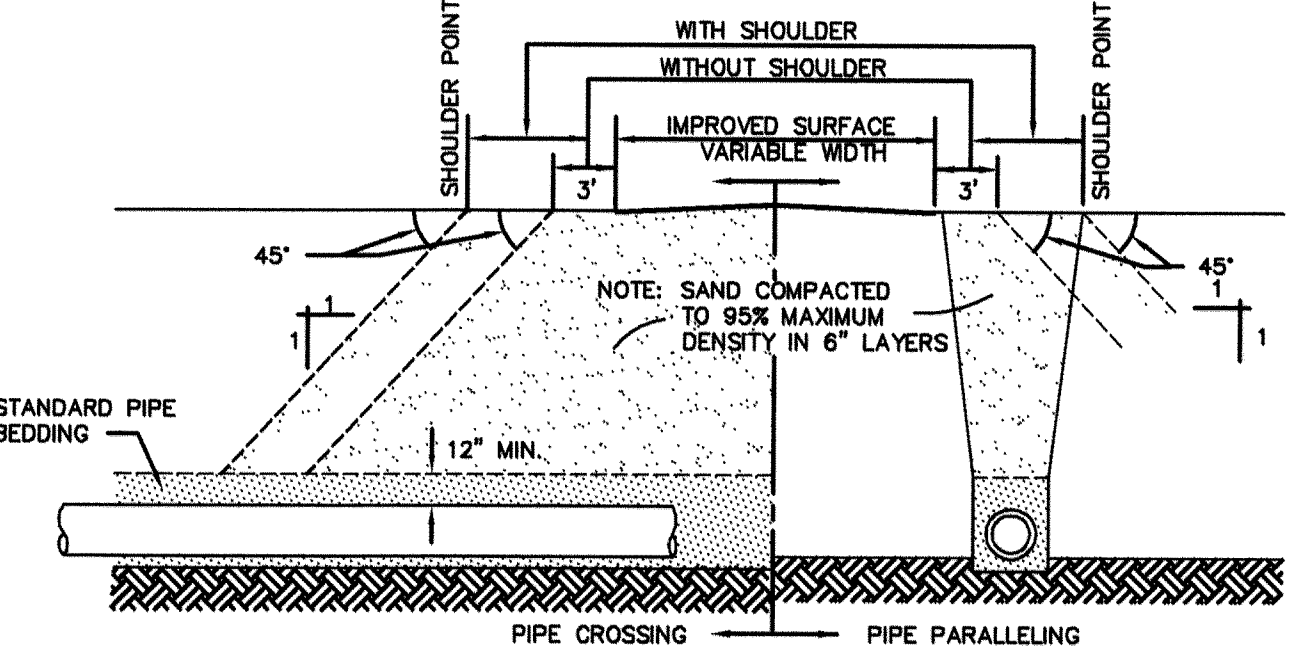
WATER MAIN DETAILS

CITY OF NOVATO

Revisions			
Drawn			
Designed			
Checked			
Scale	NO SCALE		
Date	6/15/98		
Job No.			
Sht. No.			

"STORM SEWER CONSTRUCTION NOTES"

- PIPE TYPES AND PIPE JOINTS:**
 - REINFORCED CONCRETE: PIPE SHALL CONFORM TO ASTM C-76. JOINTS SHALL CONFORM TO ASTM C-443.
 - ALL CATCH BASIN LINES AND INLET LINES SHALL CONFORM TO ASTM C-76, AND SHALL BE OF CLASS IV CONCRETE PIPE.
 - FOR SUMP MAIN(S) AND LEAD(S) A HEAVY WALL SCHEDULE 40 (CONFORM TO ASTM D3034) PREMIUM JOINTS PVC, ARMO TRUSS PIPE OR PVC CORRUGATED WITH SMOOTH INTERIOR, MEETING THE REQUIREMENTS OF ASTM F-949. ALL PIPE MATERIALS SHALL BE PLACED IN CLASS "B" BEDDING (OR APPROVED EQUIVALENT).
 - THE INSIDE JOINTS OF PIPE SIZES OVER 27" DIAMETER SHALL BE POINTED UP WITH MORTAR UPON COMPLETION OF BACKFILLING OPERATIONS.
- PIPE BEDDING AND BACKFILLING:**
 - BEDDING SHALL BE OF CLASS "B" MATERIAL UNLESS OTHERWISE NOTED ON CONSTRUCTION DRAWING AND SHALL BE A MINIMUM OF 4" BELOW PIPE TO CENTERLINE OF THE PIPE. BEDDING SHALL BE UNIFORM IN GRADE.
 - BACKFILL SHALL BE OF CLASS "B" MATERIAL COMPACTED TO 1" 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 LARGE ROCKS. BACKFILL SHALL BE RAMPED INTO TRENCH AND COMPACTED WITH A SMALL DOZER OR OTHER APPROVED METHODS. WHERE TRENCH IS WITHIN 3' OF STREET, ALLEYS, SIDEWALKS, DRIVEWAYS AND PARKING AREAS, BACKFILL SHALL BE GRANULAR MATERIAL, MDOT CLASS II COMPACTED IN 9" LAYERS 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. 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 MUNICIPAL ENGINEER.
 - TRENCH COMPACTION REQUIREMENTS FOR PVC CORRUGATED WITH SMOOTH INTERIOR (ASTM F-949) ARE PER MANUFACTURER SPECIFICATIONS AND MUST BE STRICTLY ADHERED TO.
- MANHOLE STEPS SHALL BE STEEL, ENCASED WITH POLYPROPYLENE PLASTIC OR APPROVED EQUIVALENT TO M.A. INDUSTRIES, INC., PS-1 FOR BRICK, OR PS-1B FOR BLOCK, EAST JORDAN IRON WORKS 8503 (OR APPROVED EQUAL).**
- CATCH BASIN AND INLET STEPS SHALL BE EQUAL TO EAST JORDAN IRON WORKS 8503 PLASTIC COATED (OR APPROVED EQUAL).**
- PIPE SHALL BE FLUSH WITH THE INSIDE WALL OF STRUCTURE AND NOT TO EXCEED 1" INSIDE THE STRUCTURE. PIPE SHALL BE POINTED UP WITH A SMOOTH FINISH.**
- MANHOLE FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS 1040, TYPE "B" COVER OR AS PER CONSTRUCTION DRAWINGS.**
 - EAST JORDAN IRON WORKS 7045, TYPE "K" COVER WITH STRAIGHT FACE AND GUTTER (OR AS APPROVED EQUAL).
 - EAST JORDAN IRON WORKS 7085 TYPE "C-4" COVER WITH MOUNTABLE CURB AND GUTTER AND INTEGRAL CURB AND GUTTER (OR AS APPROVED EQUAL).
 - EAST JORDAN IRON WORKS 1040, TYPE "02" COVER FOR 4' DIA. STRUCTURES AND EAST JORDAN IRON WORKS 1030, TYPE "01" COVER FOR 2' DIA. STRUCTURES TO BE USED ON OPEN DITCHES AND SWALES, REAR YARD CATCH BASINS (OR APPROVED EQUAL).
 - EAST JORDAN IRON WORKS 1030, TYPE "A" COVER TO BE USED ON ALL 2' DIA. CLEANOUT (OR APPROVED EQUAL).
 - COVERS FOR THE 2' DIA. SUMP PUMP CLEAN-OUT LINES SHALL BE EAST JORDAN IRON WORKS 1030 OR 1070, TYPE A COVER (OR APPROVED EQUAL).
- FRAMES SHALL BE SET IN FULL BED OF MORTAR AND THE SIDE SHALL BE OVERLAPPED TO PREVENT LEAKAGE.**
- A PROPER CHANNEL SHALL BE CONSTRUCTED WITHIN THE EXISTING MANHOLE OR OTHER STRUCTURE AT WHICH THE CONNECTION IS TO BE MADE 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 - 6", MAXIMUM - 18"**
- A. BLOCK USED FOR STANDARD CATCH BASIN, INLET, AND MANHOLE SHALL BE 8" AND BRICK SHALL BE 8", OR AS PER CONSTRUCTION DRAWINGS.**
- B. BLOCK SHALL BE GRADE U-1 CONFORMING TO ASTM C-139**
- C. BRICK SHALL BE GRADE N-1 CONFORMING TO ASTM C-55**
- D. PRECAST REINFORCED CONCRETE SECTION AS MINIMUM CONFORM TO ASTM C-478**
- E. CONCRETE BASE FOR MANHOLE, CATCH BASIN, AND INLET SHALL BE M.D.O.T. GRADE 30P (MIN.), 8" THICK, 3000 PSI.**
- PLASTER ALL OUTSIDE MASONRY SURFACES WITH 1:2 1/2 MASONRY CEMENT (TYPE 1) 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.**
- ALL PRECAST RISER(S) SHALL BE PLACED IN A FULL BED OF MORTAR. ALL JOINTS SHALL BE POINTED UP WITH MORTAR ON THE OUTSIDE AND INSIDE.**
- A. ALL STRUCTURE(S) SHALL BE 4' IN DIAMETER UNLESS INDICATED ON CONSTRUCTION DRAWINGS. 2' DIAMETER CATCH BASIN, AND INLET SHALL BE USED WHEN INDICATED ON CONSTRUCTION DRAWING.**
- B. A PERMANENT 4' DEEP SUMP IS REQUIRED FOR THE LAST STORM WATER STRUCTURE THAT IS MAINTENANCE ACCESSIBLE PRIOR TO RELEASE OFF-SITE TO A SEDIMENTATION OR STORM WATER HOLDING BASIN.**
- C. 4' DIA MANHOLES SHALL BE CONSTRUCTED WITH OIL AND GAS SEPARATORS AT THE LAST STRUCTURE PRIOR TO DISCHARGE INTO A DETENTION BASIN OR OPEN DRAINAGE COURSE AS DIRECTED BY THE MUNICIPAL ENGINEER.**
- INLET BAR SCREEN**
 - ALL BARS SHALL BE WELDED TO THE RING AND TO THE HORIZONTAL BARS.
 - THE BAR SCREEN SHALL BE GALVANIZED.
- END SECTION TREATMENT SHALL INCLUDE FIELD STONE OR BROKEN CONCRETE OF 4" MINIMUM THICKNESS AND A 9 SQUARE FOOT MINIMUM AREA AND SHALL BE MORTARED TO FORM A MONOLITHIC SLAB WITH A MINIMUM THICKNESS OF 6" AND SHALL BE PLACED ON GEOTEXTILE FABRIC.**



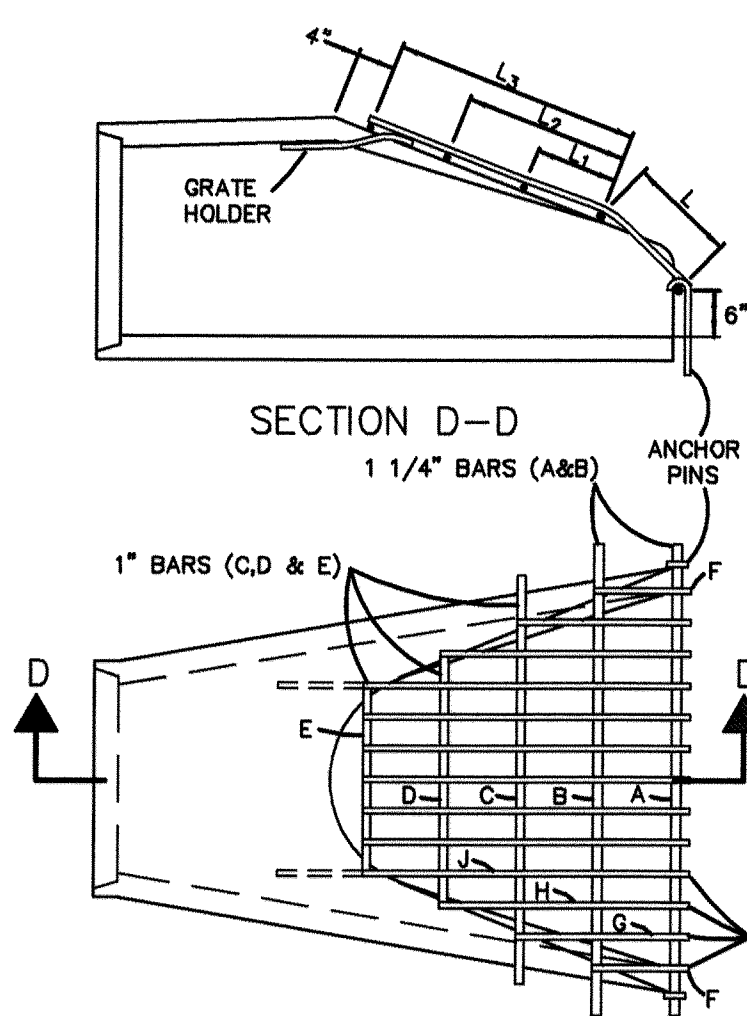
BACKFILLING IN THE AREAS OF STREETS, ALLEYS, SIDEWALKS, DRIVES & PARKING AREA

SEE NOTE # 2

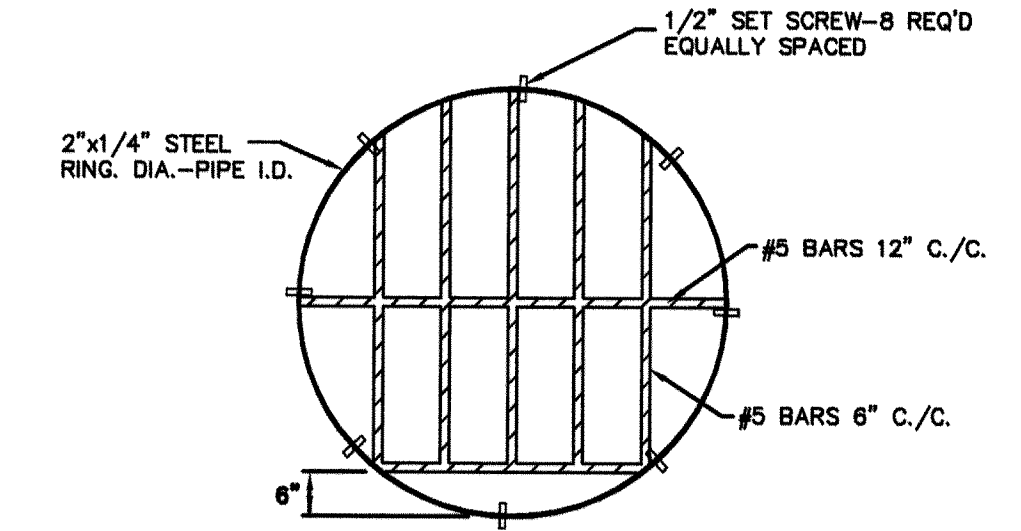


DIMENSIONS & ESTIMATED QUANTITIES FOR STEEL GRATE 12\"/>

END SEC DIA.	12"	15"	18"	21"	24"	27"	30"
L	10 1/2"	1-5/8"	11 1/2"	1-2"	1-2"	1-2 3/8"	1-6"
L ₁	10 1/2"	1-5/8"	11 1/2"	10 5/8"	10 1/2"	1-5/8"	1-1 1/4"
L ₂	-----	-----	1-9 1/4"	1-9"	2-1 1/4"	2-2 1/2"	-----
L ₃	-----	-----	2-7 1/2"	3-1 7/8"	3-3 3/4"	-----	-----
F-L ₁	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"
G-L+L ₁	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"
H-L+L ₂	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"
J-L+L ₃	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"
ANCHOR PINS	2 @ 3"	2 @ 3"	2 @ 3"	2 @ 3"	2 @ 3"	2 @ 3"	2 @ 3"
GRATE HOLDER	2 @ 3"	2 @ 3"	2 @ 3"	2 @ 3"	2 @ 3"	2 @ 3"	2 @ 3"
TOTAL LENGTH 3/4" DIA. BARS	18'	22'	25'	34'	45'	53'	58'
TOTAL LENGTH 1" BARS	1-6"	1-8"	2'-0"	4'-8"	8'-0"	8'-3"	9'-4"
TOTAL LENGTH 1" BARS	2'-10"	3'-4"	4'-0"	4'-8"	5'-0"	5'-4"	6'-0"
STEEL PER GRATE - LBS	58	68	78	103	133	150	163



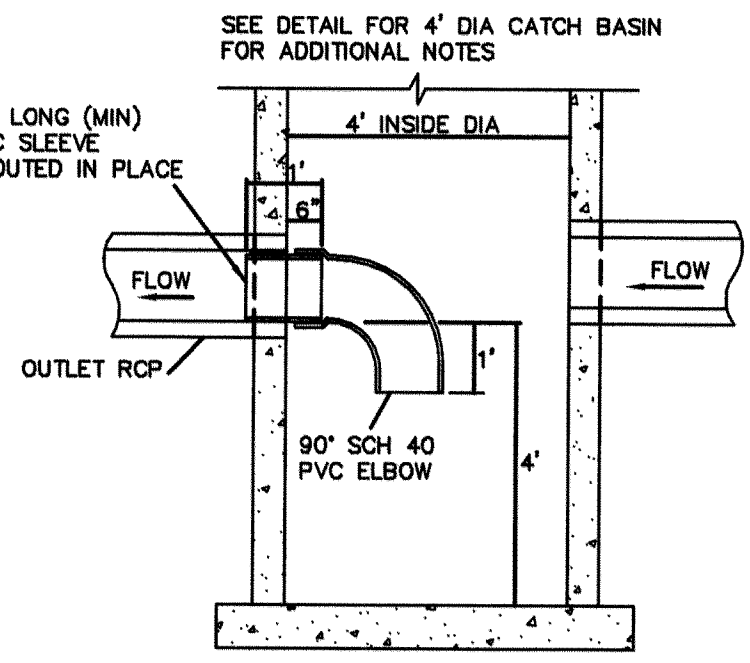
STEEL GRATE FOR PRECAST CONCRETE END SECTION



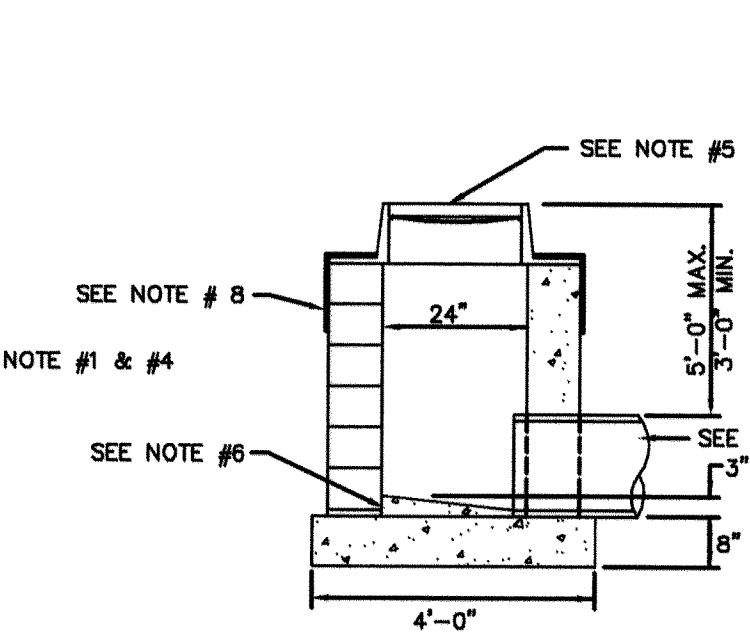
INLET BAR SCREEN DETAIL 18"-36"

M.D.O.T. GRADE OF CONCRETE	M.D.O.T. REFERENCE SECTION NUMBER (1990 VERSION)	CLASS OF CONCRETE AGGREGATE	CEMENT TYPE	CEMENT CONTENT		AIR ENTR.	COMPRESSIVE P.S.I.
				LBS. PER CU. YD.	SACKS (94 LB./CU. YD.)		
40 S	5.03	6A	1A,1S-A	611	6.5	6± 1	4000
35 S	5.03	6AA	1A 1S-A	564	6.0	6± 1	3500
	6.09						
	6.11						
30 P	4.25	6A	1A,1S-A	517	5.5	6± 1	3000
	4.50						
30 M	5.14	6A	1A 1S-A	517	5.5	6± 1	3000
	6.03						
	6.11						

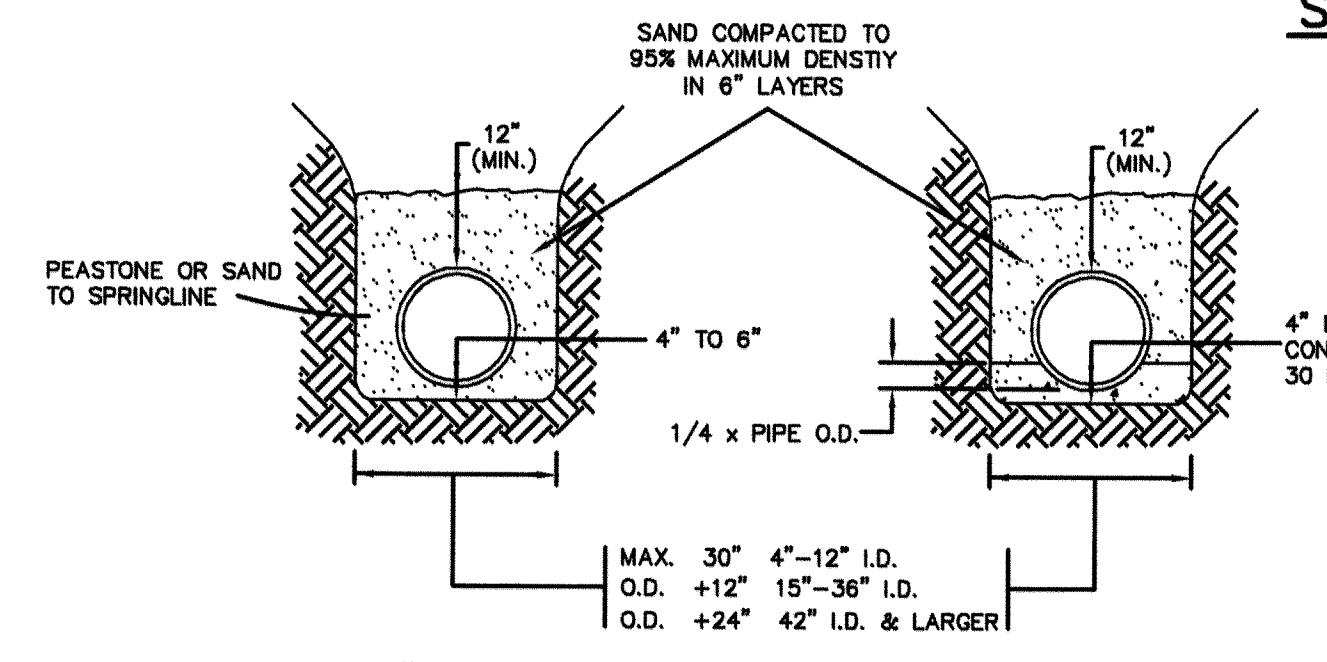
CONCRETE MIXTURES



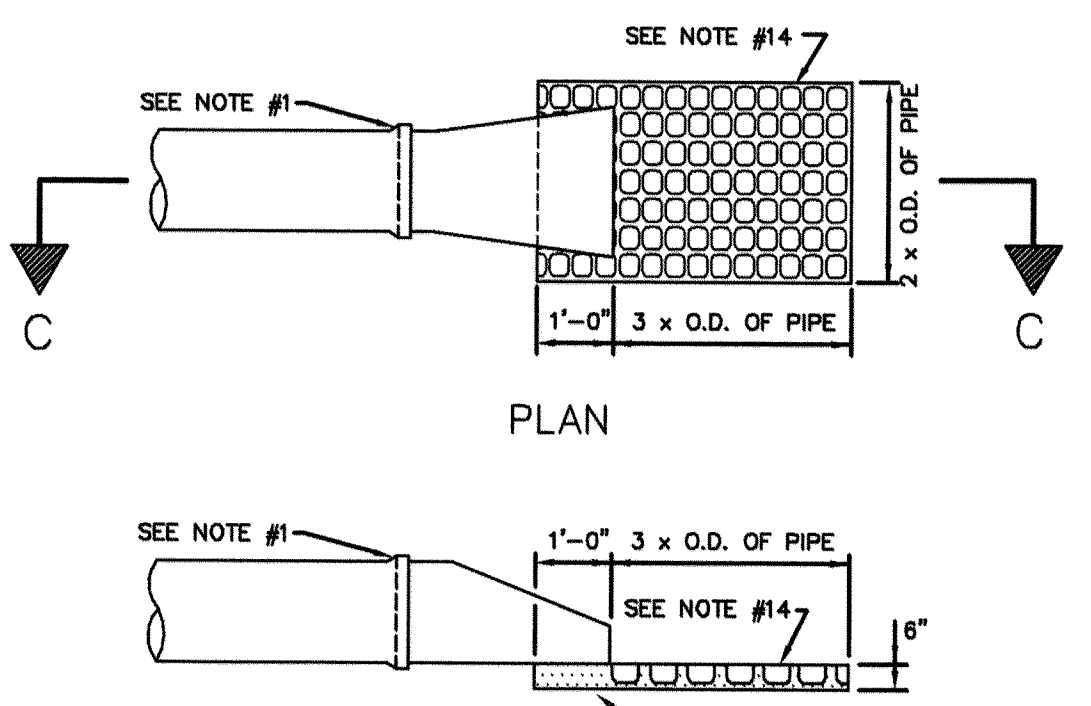
OIL/GAS SEPARATOR FOR OUTLET PIPE DIAMETERS SMALLER THAN 18"



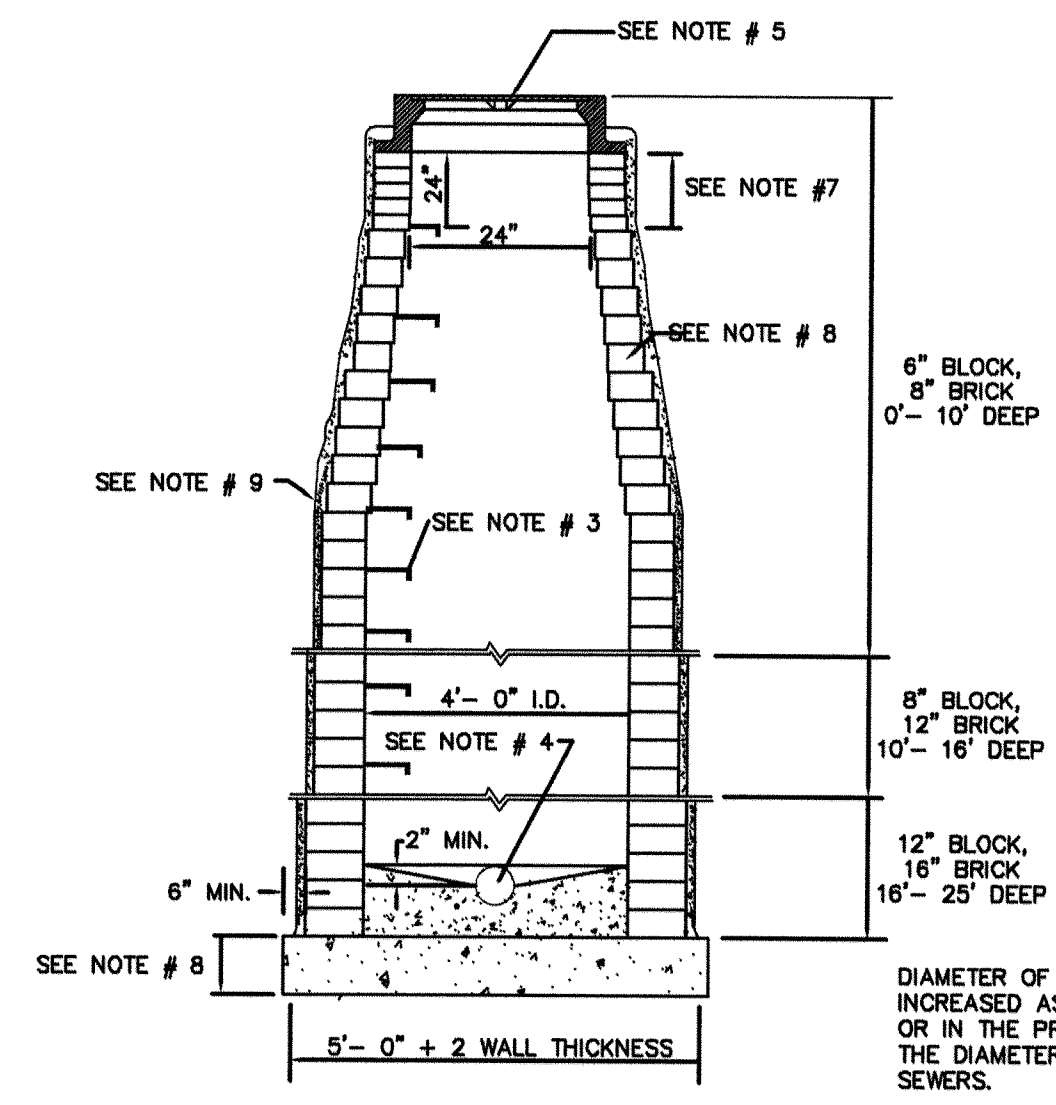
2' DIAMETER INLET



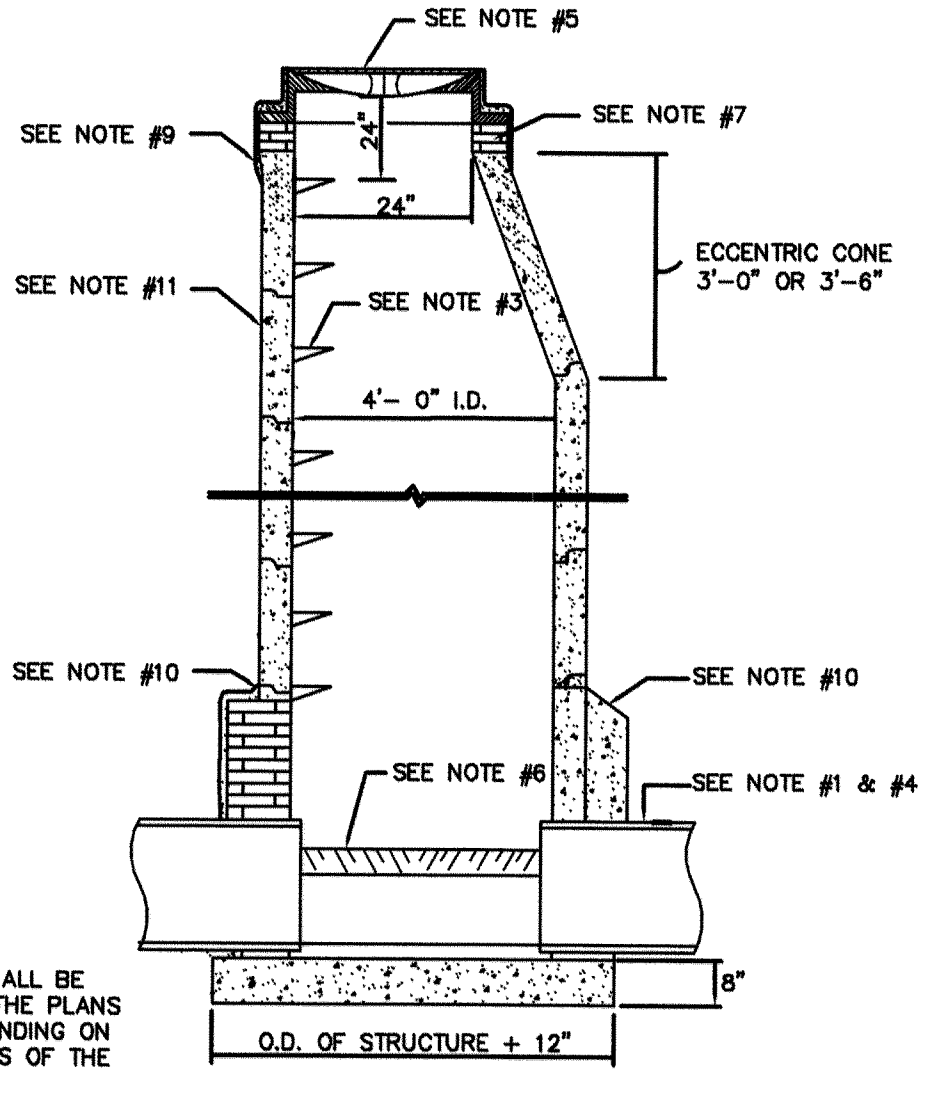
BEDDING & TRENCH WIDTH REQUIREMENT



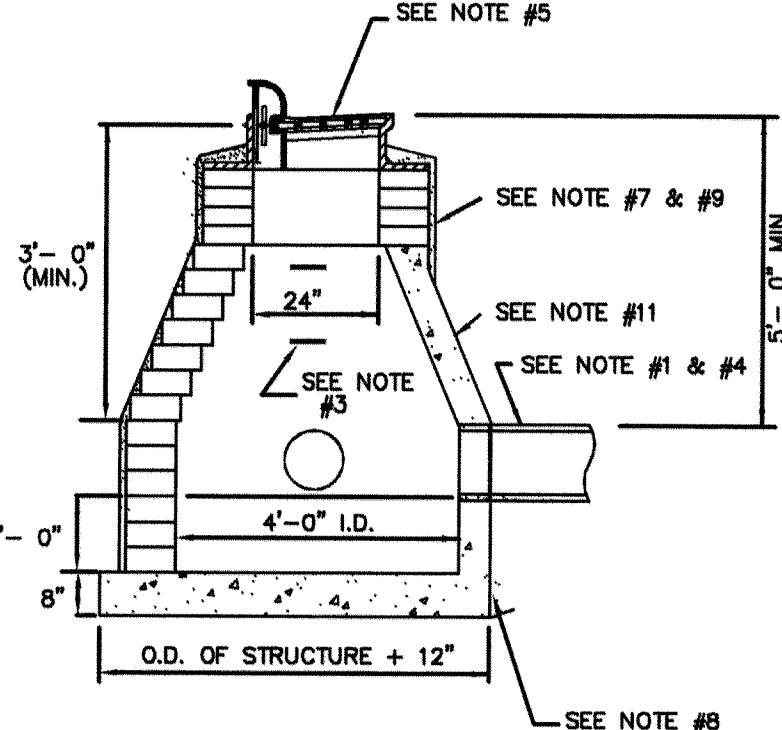
GRouted RIP-RAP



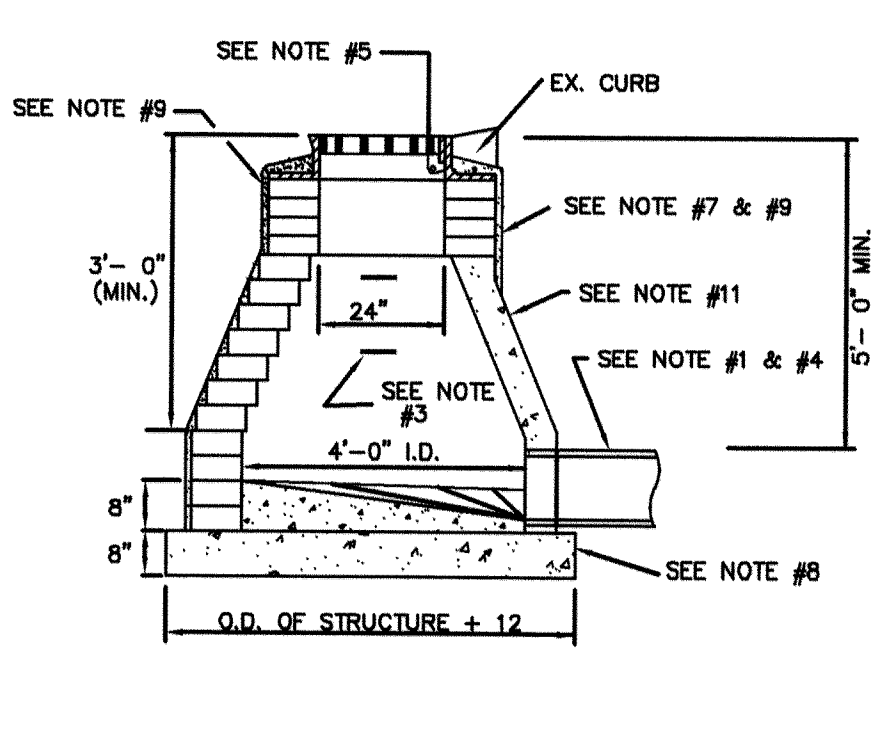
STANDARD MANHOLE BRICK OR BLOCK FOR PIPES 36" & SMALLER



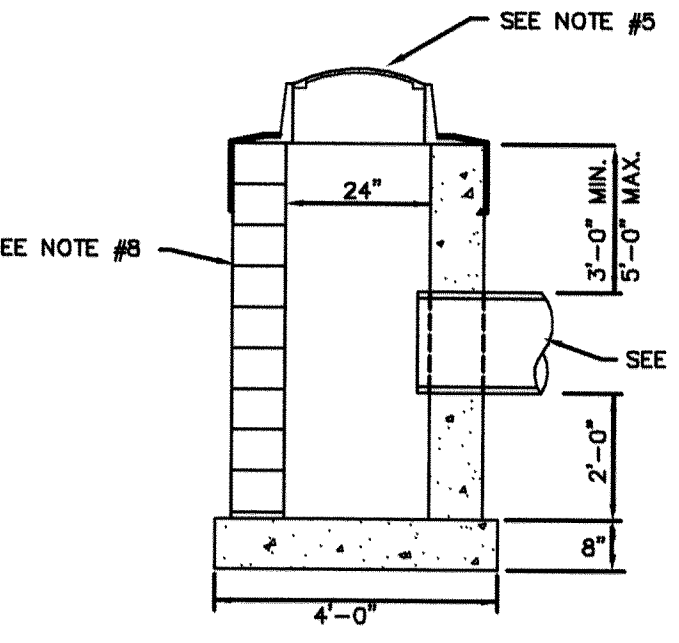
STANDARD MANHOLE PRECAST FOR PIPES 36" & SMALLER



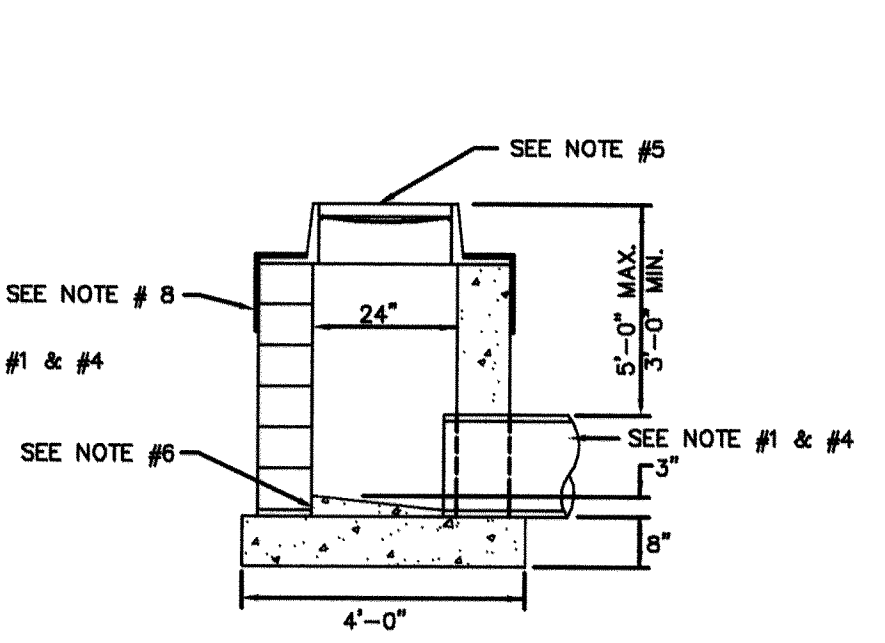
4' DIA. BRICK OR PRECAST CATCH BASIN



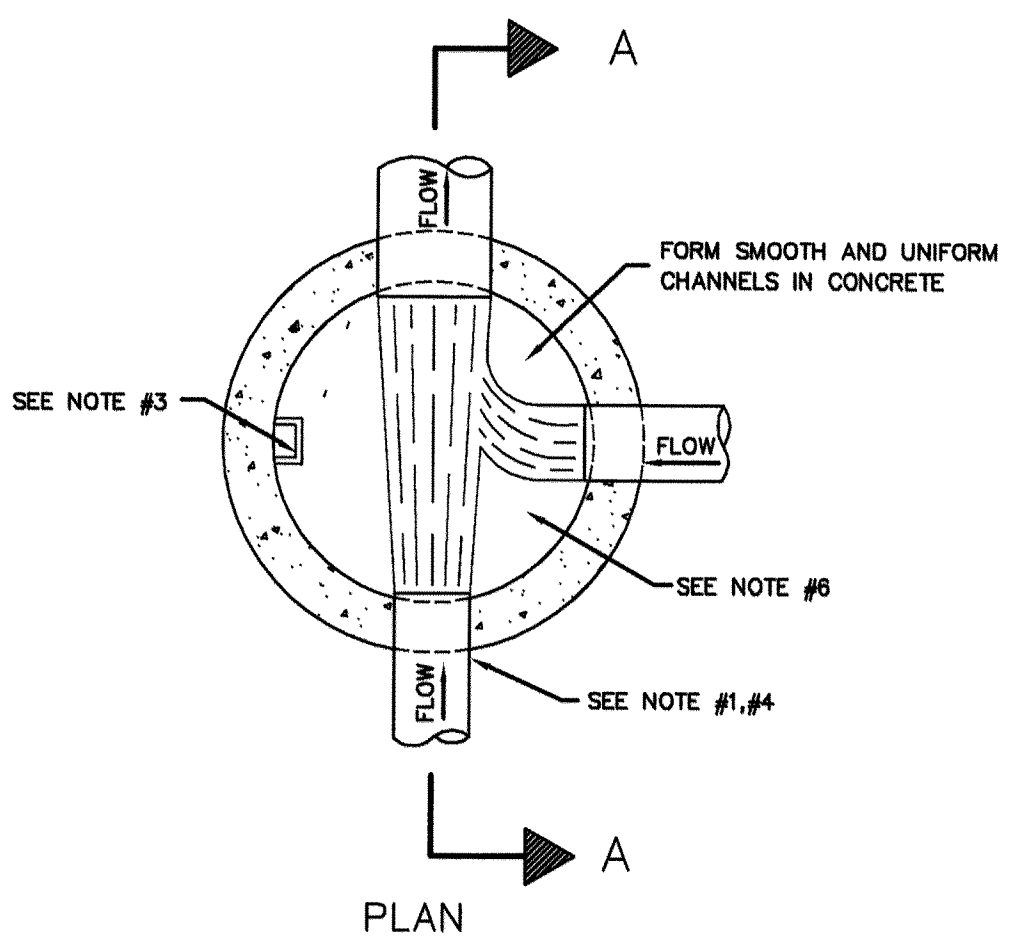
4' DIA. BRICK OR PRECAST INLET



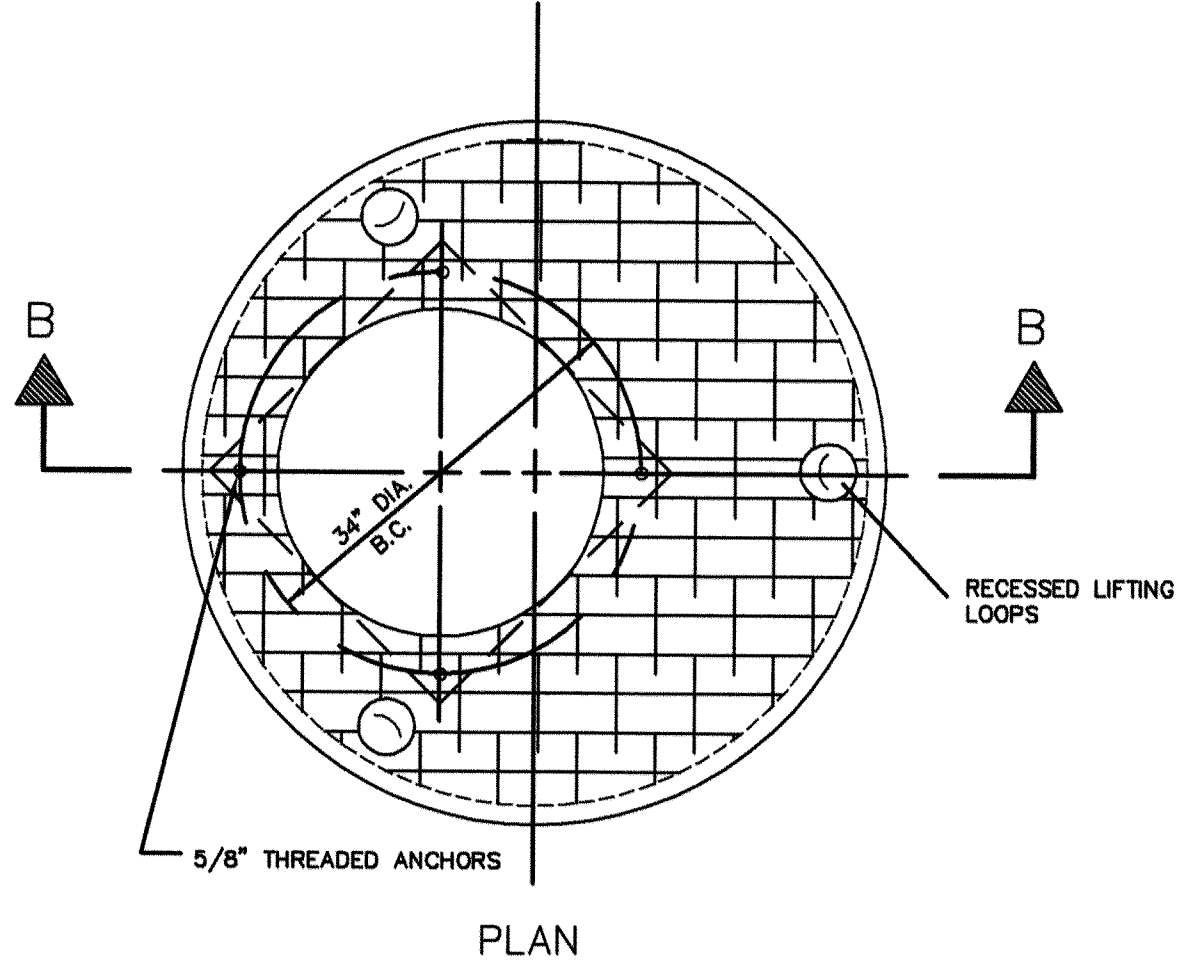
2' DIAMETER YARD BASIN & CATCH BASIN



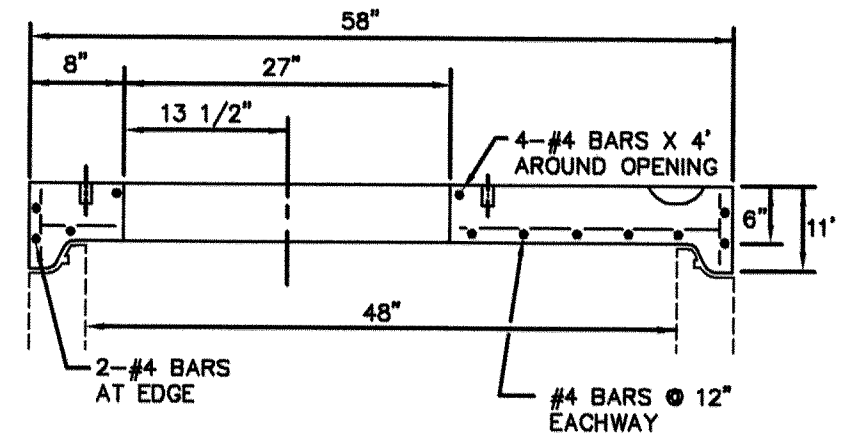
2' DIAMETER INLET



CHANNEL DETAIL



FLAT SLAB MANHOLE TOP



GRouted RIP-RAP

STORM SEWER DETAILS

CITY OF NOVI

Revisions
 Drawn
 Designed
 Checked
 Scale
 NO SCALE
 Date
 6/15/98
 Job No.
 Sht. No.