STANDARD SPECIFICATIONS AND DETAIL PLATES

MARCH 2015

CITY OF SAVAGE, MINNESOTA
6000 MCCOLL DRIVE
SAVAGE, MN 55378-2464

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TABLE OF CONTENTS

STANDARD SPECIFICATIONS

DETAIL PLATES

Street, Walkways, and Curb

101 Concrete Curb & Gutter
102 Valley Gutter
103 Bituminous Curb & Bituminous Berm
104 B618 Curb to Casting or Radius Transition
105 Typical Driveways (Residential & Commercial)
106 Apron for Commercial Driveway and Alley
107 Typical Sidewalk & Bituminous Path
108 Typical Cul-De-Sac 28’ Min Face to Face of Curb/60’ ROW
109 Temporary Turnaround Alternate 1
110 Temporary Turnaround Alternate 2
111 Temporary Turnaround Alternate 3
112 Typical Section

Storm Sewer

201 Standard Manhole
202 Large Manhole
203 Drop Manhole
204 Drop & Sump Manhole
205 Catch Basin Manhole
206 Catch Basin Type A & Type B
207 R-3067-V or Approved Equal Vane Grate Casting
208 Perforated Drain Tile
209 Concrete Spillway
210 Pond Control Structure
211 Rip Rap at Outlets
212 Rip Rap Overflow
213 Bioretention (Rain garden) Section

Sanitary Sewer

301 Standard Manhole
302 Standard Drop Manhole
303 72” Diameter Manhole
304 84” Diameter & Larger Manhole
305 Manhole Joints
306 Service
307 Cleanouts
308 Non-Rigid Pipe Bedding
309 Non-Rigid Pipe Bedding in Rock

Watermain

401 Typical Gate Valve
402 Typical Gate Valve on Stub
403 Typical Hydrant & Gate Valve
404 Watermain Thrust Blocking
405 Typical Water Service
406 Watermain Service Lowering and Insulation
407 Watermain & Sewer Crossing

Erosion & Sediment Control

501 Silt Fence
502 Silt Curtain, Type Still Water
503 Vehicle Tracking Pad

504 Rock Ditch Check

Signs & Misc.

601 Type III Barricades (Temporary & Permanent)
602 Stop & Street Identification Sign
603 Street Sign
604 Park Sign
605 Retaining wall with Split Rail Fence
606 Ornamental Metal Rail

SECTION 1200

GENERAL CONDITIONS

Table of Contents

GENERAL CONDITIONS

1.00 DEFINITIONS

Wherever used in the contract documents, the following terms shall have the meanings indicated, which shall be applicable to both the singular and plural thereof.

1.01 ADDENDA: Written or graphic instruments issued prior to the execution of the agreement which modify or interpret the contract documents, drawings and specifications, by additions, deletions, clarifications or corrections.

1.02 BID: The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the work to be performed.

1.03 BIDDER: Any person, firm or corporation submitting a bid for the work.

1.04 BONDS: Bid, performance, and payment bonds and other instruments of security, furnished by the Contractor and his surety in accordance with the contract documents.

1.05 CALENDAR DAY: Every day shown on the calendar.

1.06 CHANGE ORDER: A written order to the Contractor authorizing an addition, deletion or revision in the work within the general scope of the contract documents, or authorizing an adjustment in the contract price or contract time.

1.07 CONTRACT DOCUMENTS: The contract, including advertisement for bids, information for bidders, bid, bid bond, contract, performance bond, payment bond, notice of award, notice to proceed, change order, drawings, specifications, and addenda.

1.08 CONTRACT PRICE: The total monies payable to the Contractor under the terms and conditions of the contract documents.

1.09 CONTRACT TIME: The number of working days or calendar days stated in the contract documents for completion of the work.

1.10 CONTRACTOR: The person, firm or corporation with whom the Owner has executed the agreement.

1.11 DRAWINGS: The part of the contract documents that show the characteristics and scope of work to be performed and which have been prepared or approved by the Engineer.

1.12 ENGINEER: The person, firm or corporation named as such in the contract documents.

1.13 FIELD ORDER: A written order affecting a change in the work not involving an adjustment in the contract price or an extension of the contract time, issued by the Engineer to the Contractor during construction.

1.14 HOLIDAYS: The days of each year set aside by legal authority for public commemoration of special events, and on which no public business shall be transacted except as specifically provided in cases of necessity. Unless otherwise noted, the following days shall be established as holidays:

New Year's Day	January 1
Martin Luther King Day	3rd Monday of January
Presidents Day	3rd Monday of February
Memorial Day	last Monday in May
Independence Day	July 4
Labor Day	1st Monday in September
Veterans Day	November 11
Thanksgiving Day	4th Thursday in November
Day after Thanksgiving Day	Friday after Thanksgiving Day
Christmas Eve	December 24
Christmas Day	December 25

All work will cease at 3:30 p.m. the day before the holiday and resume the working day after no earlier than 7:00 a.m. If the holiday falls on a Friday, work will resume no earlier than 7:00 a.m. on Monday.

1.15 NOTICE OF AWARD: The written notice of the award of the contract from the Owner to the successful bidder.

1.16 NOTICE TO PROCEED: Written communication issued by the Owner to the Contractor authorizing the Contractor to proceed with the work and establishing the date of commencement of the work.

1.17 OWNER: A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the work is to be performed.

1.18 PROJECT: The undertaking to be performed as provided in the contract documents.

1.19 RESIDENT PROJECT REPRESENTATIVE: The authorized representative of the Owner who is assigned to the project site or any part thereof.

1.20 SHOP DRAWINGS: All drawings, diagrams, illustrations, brochures, schedules and other data, which are prepared by the Contractor, subcontractor, manufacturer, supplier or distributor that illustrate how specific portions of the work shall be fabricated or installed.

1.21 SPECIFICATIONS: A part of the contract documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship. Reference made to the Minnesota Department of Transportation Standard Specifications for Construction 2014 Edition and all subsequent revisions/addenda.

1.22 SUBCONTRACTOR: An individual, firm or corporation having a direct contract with the Contractor or with any other subcontractor for the performance of a part of the work at the site.

1.23 SUBSTANTIAL COMPLETION: An interim completion date pertaining to specific portions of the construction.

1.24 SUPPLEMENTAL GENERAL CONDITIONS: Modifications to general conditions required by a Federal agency for participation in the project and approved by the agency in writing prior to inclusions in the contract documents.

1.25 SUPPLIERS: Any person, supplier or organization that supplies materials or equipment for the work, including that fabricated to a special design, but does not perform labor at the site.

1.26 WORK: All labor necessary to produce the construction required by the contract documents and all materials and equipment incorporated or to be incorporated in the project.

1.27 WORKING DAY: A calendar day, exclusive of Saturdays, Sundays, and State recognized legal holidays, on which weather and other conditions not under the control of the Contractor will permit construction operations to proceed for at least four (4) hours of the day with the normal working force engaged in performing the controlling item or items of work that would be in progress at the time.

1.28 WRITTEN NOTICE: Any notice to any party to the agreement relative to any part of this agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at their last given address or delivered in person to said party or an authorized representative on the project.

2.00 PREVAILING WAGES

Pursuant to City of Savage Resolution No. R-90-74 adopted July 12, 1990, prior to the award of any contract for the City of Savage, the cost of which is estimated to exceed fifteen thousand dollars ($15,000), the Contractor shall agree that the Contractor's employees and any subcontractor's employees who fall within any job classification established and published by the Minnesota Department of Labor and Industry, shall be paid, at a minimum, the prevailing wage rates, defined in Minn. Stat. Sec. 177.42, as certified by the Minnesota Department of Labor and Industry.

A. Governing Specifications: The Mn/DOT Standard Specifications for Construction, 2014 Edition shall apply on this contract except as modified or altered in the following special provisions.

B. Labor Provisions: The Contractor shall have copies of these Labor Provisions on file at his/her job headquarters, and shall post a notice, approved by the Engineer, in a conspicuous place at the site of the work, informing his/her employees that these provisions are available for their inspection. Copies of these provisions can be secured from the State without charge.

1. EMPLOYMENT CLASSIFICATIONS
   All employees on the project shall be classified in one of the following four categories, according to the definitions given.
   a **Executive or Administrative:** Employees in this category shall be classified according to the definitions for Executive and Administrative employees as adopted by the Secretary of Labor and in effect at the time of invitation for bids.
   b **Skilled:** Skilled labor shall include the operators of complex, heavy power equipment and skilled craftsmen at the journeyman grade.
   c **Intermediate Grade:** Intermediate grade labor shall include: 1) operators of power equipment except complex, heavy power equipment, trucks of 1½ tons or less (manufacturer's rated capacity), tractors of less than twenty horsepower

(manufacturer's rated capacity), and passenger cars; and 2) persons doing any other labor that requires considerable training and experience.

d **Unskilled:** Unskilled labor shall include: 1) operators of trucks of 1½ tons or less (manufacturer's rated capacity), operators of tractors of less than twenty horsepower (manufacturer's rated capacity), and operators of passenger cars; and 2) helpers of journeyman craftsmen and all other labor that requires no special skill or experience or the exercise of discretion or judgment.

2. LABOR INFORMATION

In the selection of labor, the Contractor may avail himself/herself of the services of the Minnesota State Employment Service.

3. MINIMUM WAGE RATES

The minimum hourly rates of wages required to be paid to the various laborers and mechanics employed by the Contractor and the subcontractors in the construction work on the contract shall be an amount equal to the sum of the basic hourly wage rate plus applicable fringe benefits as certified by the Minnesota Department of Labor and Industry for State funded construction projects for the appropriate contract area. These rates have been determined by the Minnesota Department of Labor and Industry, pursuant to the provisions set forth in Minnesota Statutes, Section 177.44. If no wage schedule is contained in the contract, it is the responsibility of the Contractor to obtain a copy from the Minnesota Department of Labor and Industry prior to bidding.

From the time an hourly employee is required to report for duty at the site of the work until he/she is released or allowed to leave the site of the work, no deduction shall be made from his/her time for any delays of less than thirty consecutive minutes.

In the event the Contractor or subcontractor employs apprentice workers under the occupational training program of the State of Minnesota, Department of Education, or under the Division of Voluntary Apprenticeship of the State of Minnesota, Department of Labor and Industry, or under the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, he/she may pay wages to such apprentice workers at hourly rates approved by the appropriate agency despite the hourly rates specified in the schedule of wage rates to be paid to any classification of labor. The ratio of apprentices to journeyman level employees on the job site must not be greater than the ratio permitted for the Contractor's entire work force under the registered program.

A Contractor or subcontractor may discharge his/her minimum hourly rate obligation as defined above by: 1) making cash payments to the employee plus payments to a bona fide employee's fringe benefit program, funded or unfunded, the sum of which is equal to the minimum hourly rate; or 2) making payments in cash to the employee in the amount equal to the minimum hourly rate.

While the rates shown are the minimum hourly rates required for the life of this contract, this is not a representation that labor can be obtained at these rates. It is the responsibility of bidders to inform themselves as to local labor conditions and prospective changes or adjustments of wage rates. No increase in the contract price shall be allowed or authorized due to payment or rates more than those listed.

All cash payments due to mechanics and laborers employed or working upon the site of the work shall be paid unconditionally, not less often than once a week, and without subsequent deductions or rebate on any account despite any contractual relationship that may be alleged to exist between the Contractor or subcontractor and such labors and mechanics.

The schedule shall be kept posted by the Contractor at the site of the work in a conspicuous place where the workers can easily see it. The City of Savage may withhold, or cause to be withheld from the Contractor, part of the amount due to the Contractor as may be considered necessary to ensure payment to laborers and mechanics employed by the Contractor or subcontractor.

4. PREVAILING HOURS OF LABOR
The Prevailing Wages for State Funded Construction Contracts issued by the Minnesota Department of Labor and Industry set forth the prevailing hours of labor. According to Minnesota Statutes Section 177.44, Subdivision 1, employees may not be allowed or required to work longer than the prevailing hours of labor unless the employee is paid for all hours more than the prevailing hours at a rate of at least 1½ times his/her hourly basic rate of pay.

The laborer or mechanic must be paid at least the prevailing wage rate in the same or most similar trade or occupation in the area.

C. Required Contract Provisions:
These Contract Provisions shall apply to all work done on the contract by the Contractor with his/her own organization, and with the assistance of employees under his/her immediate superintendence and to all work done on the contract by piecework, station work or by subcontract.

The Contractor shall insert in each of his/her written subcontracts or purchase orders all stipulations contained in these Required Contract Provisions, and a clause requiring his/her subcontractors to include these Required Contract Provisions in any lower tier subcontracts that they may enter, with a clause requiring the inclusion of these provisions in any further subcontracts that may in turn be made. The Required Contract Provisions shall in no instance be incorporated by reference.

A breach of any of the stipulations contained in these Required Contract Provisions may be grounds for termination of the contract.

1. **Statements and Payrolls – Payrolls and Payroll Records:**
   a Payrolls and basic records relating thereto will be maintained during the work and preserved for three years after that for all laborers, mechanics, apprentices, trainees, watchpersons and guards working at the site of the work.
   b The payroll records shall contain name, social security number and address of each such employee, his/her correct classification, rates of pay, daily and weekly number of hours worked, deductions made and actual wages paid. Whenever it is found that the wages of any laborer or mechanic include the amount of any costs anticipated in providing benefits under a plan or program, the Contractor shall maintain records that show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been expressed in

writing to the laborers or mechanics affected and records that show the costs anticipated or the actual cost incurred in providing such benefits.

c The payrolls shall contain the following information:
   1) The employee's full name, address and social security number. The employee's full name and social security number need only appear on the first payroll on which his/her name appears. The employee's address need only be shown on the first submitted payroll on which the employee's name appears, unless a change of address requires a submittal to reflect the new address.
   2) The employee's classification.
   3) Entries showing the employee's basic hourly wage rate and where applicable, the overtime hourly rate. The payroll should show separately the amounts of employee and employer contributions to fringe benefit funds and/or programs. Any fringe benefits paid to the employee in cash must be shown. There is no prescribed or mandatory form for showing the above information on payrolls.
   4) The employee's daily and weekly hours worked in each classification, including actual overtime hours worked (not adjusted).
   5) The itemized deductions made.
   6) The net wages paid.
   7) The Contractor shall submit weekly all weekly payrolls to the City. The copy shall be accompanied by a statement signed by the employer or his/her agent showing that the wage rates contained therein are not less than those determined by the Department of Labor and Industry, and that the classification set forth for each laborer or mechanic conform with the work he/she performed, i.e. Form Mn/DOT 21658.

d The Contractor shall make the records required under the labor standards clauses of the contract available for inspection by authorized representatives of the City of Savage and the Department of Labor and Industry and shall allow such representatives to interview employees during working hours on the job.

e The wages of labor shall be paid in legal tender of the United States, except that this will be considered satisfied if payment is made by negotiable check, on a solvent bank, which may be cashed readily by the employee in the local community for the full amount, without discount or collection charges of any kind. Where checks are used for payment, the Contractor shall arrange for them to be cashed and shall give information regarding such arrangements.

f No fee of any kind shall be asked or accepted by the Contractor or any of his/her agents from any person as a condition of employment on the project.

g No laborers shall be charged for any tools in doing their respective duties except avoidable loss or damage thereto.

h Every employee on the work covered by this contract shall be allowed to lodge, board and trade where and with whom he/she elects, and neither the Contractor nor his/her agents, nor his/her employees shall, directly or indirectly, require as a condition of employment that an employee shall lodge, board or trade at a particular place or with a particular person.

i No charge shall be made for any transportation furnished by the Contractor or his/her agents, to any person employed on the work.

j No individual shall be employed as a laborer or mechanic on this contract except on a wage basis, but this shall not be construed to prohibit the rental of teams, trucks or other equipment from an individual.

3.00 OWNERSHIP OF EXISTING MATERIAL

3.01 All materials existing on the site and removed during the construction are the property of the Owner. The Contractor, at his expense, shall stockpile or dispose of all materials that the Owner does not want to retain as directed by the Engineer. All materials that the Owner wants to retain shall be delivered to a location in the City as directed by the Engineer at the expense of the Contractor.

4.00 ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

4.01 The Contractor may be furnished additional instructions and detail drawings to carry out the work required by the contract documents when determined necessary by the Engineer.

4.02 The additional drawings and instructions thus supplied will become a part of the contract documents. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions.

5.00 SCHEDULES, REPORTS AND RECORDS

5.01 The Contractor shall submit to the Owner such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed.

5.02 Prior to the first partial payment estimate, the Contractor shall submit schedules showing the order in which he/she proposes to carry on the work, including dates at which various parts of the work will start, estimated date of completion of each part and as applicable.

A. The dates at which special detail drawings will be required; and
B. Respective dates for submission of shop drawings, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

5.03 The Contractor shall also submit a schedule of payments that he/she anticipates he/she will earn during the course of work.

5.04 The Contractor shall submit a copy of their Company Safety Program to the City prior to beginning work.

6.00 COMMUNICATION WITH RESIDENTS

6.01 Communication with homeowners is essential for a successful project. Arguing with residents, bad language or inappropriate behavior **will not** be tolerated. In the event of complaints, the offender may be banned from the work site. This will be at the discretion of the City Engineer.

6.02 Every effort will be made to accommodate requests of the residents. This includes, but is not limited to, temporary fencing to contain dogs or protect plantings and scheduling construction around planned events such as weddings or graduations.

7.00 LOCAL ACCESS DURING CONSTRUCTION

7.01 The Contractor shall perform his work in such a manner as to cause the least interference with local residences. The Contractor shall maintain local access to properties throughout the project.

7.02 All trenches shall be filled and access to properties/driveways restored at the end of each work day. Access routes shall be maintained in a drivable condition for private vehicles of all sizes. In the event of a question regarding the drivability of the access routes, the City Engineer will make the final determination.

7.03 Access routes shall be constructed of material from on-site and shall be considered incidental to the project.

7.04 A contact name and 24-hour number shall be submitted to the City's Police Department in case of access problems at night or on weekends. The contact person must be available to be on-site within two hours of any call.

8.00 WORK ZONE LIMITS

8.01 All work associated with the project shall be restricted to the City right-of-way and easements. No work or other construction related activities shall occur outside the work zone limits without a signed right of entry agreement from the property owner.

8.02 The Contractor will be solely responsible for all fines/penalties/damages and the restoration or other items required by the various regulatory agencies and/or property owners as a result of any encroachments beyond the staked work zone limits. The City may charge the Contractor a fine of $5,000 for each occurrence of encroachment beyond the work zone limits.

9.00 MAINTENANCE OF THE JOB SITE

9.01 Care shall be taken to keep the job site free of debris. All garbage including but not limited to cans, bottles, and wrappers will be removed by the end of each day and not buried or left where it could blow into the adjacent properties.

10.00 GARBAGE PICK-UP

10.01 During construction, if access is limited and garbage trucks cannot pick up at the driveways, the Contractor is required to collect the garbage and recycling containers from the curbs of the existing homes and place them in a designated location for pick-up by the garbage hauler. Containers should be marked with the corresponding address to ensure the return of the container to the proper location. The Contractor will return the garbage and recycling containers to the curb of the existing homes at the end of the day.

The Contractor shall coordinate the designated pick-up location with the various garbage and recycling haulers prior to the start of construction.

This item shall be considered incidental to the project cost.

11.00 NEIGHBORHOOD MEETINGS

11.01 The City intends to have at least one neighborhood meeting with the property owners/residents who are affected by this project. This meeting will be held prior to the beginning of construction. Other meetings may be held during construction if the Engineer deems it necessary or desirable. The Contractor is required to have a representative in attendance at these meetings to address questions.

12.00 CONSTRUCTION MEETINGS

12.01 If deemed necessary, the Contractor shall be responsible for organizing weekly construction meetings. The construction meetings will be held at an agreed upon location. The Contractor will be responsible for taking all meeting notes and minutes and returning copies at the following meeting. The Contractor must coordinate an appropriate time for the meetings.

13.00 EXISTING UTILITIES

13.01 Project information will be submitted to the respective utility companies for review and consideration with regard to relocation and/or reconstruction of gas, telephone, cable, power lines, etc., in this area. Utility lines shown on plan sheets are for general information only. It is the responsibility of the Contractor to call "Gopher State One Call" for locates on all utilities before excavation.

13.02 The Contractor shall schedule and coordinate their construction activities with the construction activities of the utility companies who may be relocating or reconstructing their utility lines. The City shall not be held responsible for any scheduling conflicts or delays.

14.00 DRAWINGS AND SPECIFICATIONS

14.01 The intent of the drawings and specifications is that the Contractor shall furnish all labor, materials, methods, tools, equipment and transportation necessary for the proper execution of the work in accordance with the contract documents and all incidental work necessary to complete the project in an acceptable manner, ready for use, occupancy or operation by the Owner.

14.02 In the case of a conflict of meaning between any of the terms of the Contract Documents, the provisions of the document listed first below shall take precedence over those of a document listed later:

A. Written direction from the City Engineer.
B. Contract
C. Special Provisions
D. Proposal Form
E. Plans
F. Specifications
G. General Conditions

Special provisions and detail plans are intended to modify and prevail over standard plans and specifications. Figure dimensions on drawings shall govern over scale dimensions.

14.03 Any discrepancies found between the drawings and specifications and site conditions or any inconsistencies or ambiguities in the drawings or specifications shall be immediately reported in writing to the Owner and Engineer, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after the discovery of such discrepancies, inconsistencies or ambiguities shall be done at the Contractor's risk.

14.04 All Contractors on-site, including subcontractors, shall have a current copy of the City's Standard Specifications and Detail Plates, dated March 2015, and . All Contractors and subcontractors are expected to be able to produce the standard specifications upon demand and are required to adhere to same.

Copies of these specifications can be obtained through the City Engineering division.

15.00 SHOP DRAWINGS

15.01 Prior to performance of the work, the Contractor shall prepare and submit to the Engineer, schedules, documents and shop drawings necessary to complete this work. The Contractor shall allow sufficient time for the Engineer to review and comment on the submittals and for the Contractor to respond to the comments, prior to performance of the work involved -- normally two to three weeks. The Engineer may require additional information including permits, detail drawings, and calculations as needed to complete the review. The Contractor shall furnish as many copies of the submittals as the Engineer requires for review and subsequent inspection of the work. The Contractor shall not change the submittals without the Engineer's written consent. Upon completion of the work, reproducible copies suitable for scanning shall be furnished to the Engineer if requested. The price bid for the contract items includes the cost of preparing and furnishing the submittals.

The Engineer's review of the submittals does not relieve the Contractor of responsibility for:

A. Accuracy of dimensions and details.
B. Agreement and conformity with the contract.
C. Successful completion of the work.
D. Proper and safe design done by the Contractor.
E. Proper and safe construction of the work.

15.02 The approval of any shop drawings that substantially deviates from the requirement of the contract documents shall be evidenced by a change order.

15.03 When submitting for the Engineer's review, shop drawings shall bear the Contractor's certification that the Contractor has reviewed, checked and approved the shop drawings and that they are in conformance with the requirements of the contract documents.

15.04 Portions of the work requiring a shop drawing or sample submission shall not begin until the shop drawing or submission has been approved by the Engineer. Prior to the Engineer's approval of the shop drawings or other submissions, fabrication and installation will be done at the Contractor's risk. The Contractor will not receive any additional compensation to bring the completed work into compliance with the approved shop drawings or submissions. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.

16.00 MATERIALS, SERVICES AND FACILITIES

16.01 It is understood that, except as otherwise specifically stated in the contract documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature necessary to execute, complete and deliver the work within the specified time.

16.02 Materials and equipment shall be stored as to ensure the preservation of their quality and fitness for the work. Stored materials and equipment to be incorporated in the work shall be located to facilitate prompt inspection.

16.03 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

16.04 Materials, supplies and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.

16.05 Materials, supplies or equipment to be incorporated into the work shall not be purchased by the Contractor or the subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

17.00 INSPECTION AND TESTING

17.01 All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with generally accepted standards.

17.02 The Owner shall provide at his/her expense the necessary testing and inspection services required by the contract documents.

17.03 The Owner shall provide all other inspection and testing services not required by the contract documents.

17.04 If the contract documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any work to specifically be inspected, tested, or approved by someone other than the Contractor, the Contractor will give the Engineer timely notice of readiness. The Contractor will then furnish the Engineer the required certificates of inspection, testing or approval.

17.05 Neither observations by the Engineer nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the work in accordance with the requirements of the contract documents.

17.06 The Engineer and any representatives will at all times have access to the work. In addition, authorized representatives and agents of any participating Federal and State agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials and other relevant data and records. The Contractor will provide proper facilities for such access and observation of the work and also for any inspections or testing thereof.

17.07 If any work is covered contrary to the request of the Engineer, it must, if requested by the Engineer, be uncovered for his/her observation and replaced at the Contractor's expense.

17.08 If any work has been covered that the Engineer has not specifically requested to observe prior to its being covered, or if the Engineer considered it necessary or advisable that covered work be inspected or tested by others, the Contractor at the Engineer's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the work in question, at the Contractor's expense, furnishing all necessary labor, materials, tools and equipment. If it is found that such work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection, testing and of satisfactory reconstruction. If, however, such work is not found to be defective, an extension of the Contract time will be given, and the Owner will bear all the expense directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate change order shall be issued.

18.00 SUBSTITUTIONS

18.01 Whenever a material, article or piece of equipment is identified on the drawings or specifications by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function will be considered by the Engineer, if submitted by the Contractor. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the contract documents by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may approve its substitution and use by the Contractor.

18.02 The Contractor shall allow sufficient time for the Engineer to review and comment on the substitution and for the Contractor to respond to the comments, prior to the performance of the work; normally two to three weeks. Any cost differential shall be deducted from the contract price, and the contract documents shall be appropriately modified by change order. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the project will result. Incidental changes or extra component parts required to accommodate the substitution will be made by the Contractor without a change in the contract price or contract time.

19.00 PATENTS

19.01 The Contractor shall pay all applicable royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for any such loss when a particular process, design, or the project of a particular manufacturer(s) is specified. However, if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent; the Contractor shall be responsible for such loss unless he/she promptly gives such information to the Engineer.

20.00 SURVEYS, PERMITS, REGULATIONS

20.01 The Owner shall furnish all land surveys and will set construction stakes establishing lines, slopes, elevations and grades for utility and street construction as the Engineer deems necessary for proper

control of the work as shown in the contract documents within the two (2) working days after notification by the Contractor of the need for these items. From the information provided by the Owner, unless otherwise specified in the contract documents, the Contractor shall develop and establish other necessary control, detail dimensions, slope stakes and measurements required for proper layout and performance of the work. The Contractor shall assume full responsibility for all measurements made from the stakes and marks so established.

20.02 The Contractor shall carefully preserve benchmarks, reference points and stakes, and in case of willful or careless destruction, he/she shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss of disturbance.

20.03 Permits and licenses of a temporary nature necessary for the prosecution of the work which cannot be issued to the Owner shall be secured and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the contract documents are at variance therewith, the Contractor shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in Section 24, Changes in Work.

21.00 PROTECTION OF WORK, PROPERTY AND PERSONS

21.01 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work as deemed necessary by the Engineer and in accordance with the contract documents and Minnesota Manual on Uniform Traffic Control Devices. The Contractor shall take all necessary precautions for the safety of, and will provide the necessary protection as deemed necessary by the Engineer to prevent damage, injury or loss to the traveling public, employees on the job and other persons who may be affected thereby, all the work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto. The Contractor shall be responsible for the protections of adjoining property which may include, but not be limited to, mailboxes, landscaping ornaments, irrigation systems, trees, shrubs, lawns, walks, pavements roadways, structures and utilities, etc., not designated for removal, relocation or replacement in the course of construction. The Contractor is responsible to field verify with the Engineer items within their work zone that are to be removed or relocated before commencing work in the area. Unless a specified bid item is provided, this work shall be considered incidental to the project.

21.02 The locations of existing utilities are based solely on available records and no responsibility is assumed by the Owner or the Engineer for the accuracy of those utilities indicated on the plans. The Contractor will assume all responsibility to the utility companies for expense incurred by them to protect or maintain their operation, including temporary relocations during the time work is in progress.

21.03 The Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body jurisdiction. The Contractor will erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. The Contractor will notify Owners of adjacent utilities when prosecution of the work may affect them. The Contractor will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them are liable, except damage or loss attributable to the

fault of the contract documents or to the acts or omissions of the Owner or the Engineer or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contractor.

21.04 In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. The Contractor will promptly give the Engineer written notice of any significant changes in the work or deviations from the contract documents caused thereby, and a change order shall thereupon be issued covering the changes and deviations involved.

22.00 SUPERVISION BY CONTRACTOR

22.01 The Contractor shall supervise and direct the work. He/she will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor will employ and maintain on the work site a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site. The supervisor shall have full authority to act on behalf of the Contractor, and all communications given to the supervisor shall be as binding as if given to the Contractor.

22.02 The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the work. At the time when the supervisor is not present on the site, the Contractor shall have a representative on the site to receive communications from the Engineer and Owner. If the representative does not have the power to act on the Contractor's behalf, the representative shall report all communications back to the Contractor in a timely fashion. No additional compensation or time will be given to the Contractor for delays or redoing of work that may be necessary that is caused by untimely communications between the Contractor and his representative.

22.03 Except where the Contractor is an individual and gives personal supervision to the work, the Contractor shall have a competent superintendent on the work site at all times during working hours with full authority to act on the Contractor's behalf. Competency shall be determined by the Engineer. The Contractor shall also provide an adequate staff, as determined by the City Engineer, for the proper coordination and expedition of work under the contract agreement.

23.00 CHANGES IN THE WORK

23.01 The Engineer may at any time, by issuing a written field order, make changes in the details of the work. The Contractor shall proceed with the performance of any changes in the work ordered by the Engineer unless the Contractor believes that such field order entitles him/her to a change in contract price or time, or both. In which event, he/she shall give the Engineer written notice thereof within fifteen (15) days after the receipt of the ordered change, and the Contractor shall not execute such changes pending the receipt of an executed change order or further instruction from the Owner. Failure by the Contractor to provide written notice of an intended change order within fifteen (15) days after the work is performed will result in denial of the change order request by the Owner for the work performed and submitted at a later date.

24.00 CHANGES IN CONTRACT PRICE

24.01 The contract price may be changed only by a change order. The value of any work covered by a change order or of any claim for increase or decrease in the contract price shall be determined by one or more of the following methods in the order of precedence listed below:

A. Unit prices previously approved.
B. An agreed unit price for each extra work item performed.
C. An agreed lump sum.
D. Force account basis pursuant to Mn/DOT Specification 1904 except as modified or altered below:
   - An additional 10% may be added for overhead and profit. The additional 10% will be based on the initial cost alone and will not be calculated as a cumulative total.

25.00 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

25.01 The date of beginning and the time for completion of the work are essential conditions of the contract documents, and the work embraced shall be commenced on a date specified in the Notice to Proceed.

25.02 The Contractor will proceed with the work at such rate of progress to ensure full completion within the contract time. It is expressly understood and agreed by and between the Contractor and the Owner that the contract time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.

25.03 If the Contractor shall fail to complete the work within the contract time, or extension of time granted by the Owner, the Contractor will pay to the Owner the amount for liquidated damages as specified in the schedule below for each calendar day that the Contractor shall be in default after the time stipulated in the contract documents.

SCHEDULE OF LIQUIDATED DAMAGES		
Original Contract Amount		**Charge Per Calendar Day ($)**
From More Than ($)	**Up to and Including ($)**	
0	25,000	100
25,000	50,000	200
50,000	100,000	300
100,000	500,000	750
500,000	1,000,000	1,000
1,000,000	2,000,000	2,000
2,000,000	5,000,000	3,000
5,000,000	10,000,000	5,000
10,000,000		7,000

25.04 The Contractor shall not be charged with liquidated damages or any excess cost if the Contractor has promptly given written notice of such delay to the Owner or Engineer and the delay in completion of the work is due to one of the following:

A. Any preference, priority or allocation order duly issued by the Owner.
B. Unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God or of a public enemy, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and abnormal and unforeseeable weather.
C. Any delays of subcontractors occasioned by any of the causes specified in paragraph 26.04A and 26.04B of this article.

26.00 CORRECTION OF WORK

26.01 The Contractor shall promptly correct all work rejected by the Engineer for failure to comply with the contract documents, whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the work in accordance with the contract documents and without expense to the Owner and shall bear the expense of making good all work of other Contractors destroyed or damaged by such removal or replacement. All methods of correction must be approved by the Engineer prior to implementation.

26.02 The Contractor shall promptly remove from the work area all materials rejected by the Engineer for failure to comply with the contract documents, whether incorporated in the construction or not. The Contractor shall keep the materials rejected by the Engineer segregated from the acceptable materials until properly disposed of. The Contractor shall bear all expense in the removal and replacement of the rejected materials.

26.03 All removal and replacement of work and materials rejected by the Engineer shall be done at the Contractor's expense. If the Contractor does not take action to remove such rejected work and/or material within ten (10) days after receipt of written notice, the Owner may cause to have such work and/or materials removed and replaced at the expense of the Contractor.

27.00 SUBSURFACE CONDITIONS

27.01 The Contractor shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the Owner by written notice of:

A. Subsurface or latent physical conditions at the site differing materially from those indicated in the contract documents; or
B. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered as provided for under the contract documents for type of work being performed.

27.02 The Owner shall promptly investigate the conditions, and if the Owner finds that such conditions materially differ and cause an increase or decrease in the cost of or in the time required for performance of the work, an equitable adjustment shall be made and the contract documents shall be modified by a change order. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he/she has given the required written notice, provided that the Owner may, if he/she determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

28.00 SUSPENSION OF WORK, TERMINATION AND DELAY

28.01 The Owner may, at any time and without cause, suspend the work or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the Contractor, by written notice to the Contractor and the Engineer, which notice shall fix the date on which work shall be resumed. The Contractor will resume that work on the date so fixed. The Contractor will be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to any suspension.

28.02 If the Contractor is adjudged as bankrupt or insolvent; makes a general assignment for the benefit of any creditors; or if a trustee or receiver is appointed for the Contractor or for any of his/her property; or if he/she files a petition to take advantage of any debtor's act; or to reorganize under the bankruptcy or applicable laws; or repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment; or disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the work; or disregards the authority of the Engineer; or otherwise violates any provision of the contract documents, then the Owner may, without prejudice to any other right or remedy and after giving the Contractor and his surety a minimum of ten (10) days from delivery of a written notice, terminate the services of the Contractor and take possession of the project and all materials, equipment, tools, construction equipment and

machinery thereon owned by the Contractor and finish the work by whatever method he/she may deem expedient.

In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price exceeds the direct and indirect costs of completing the project, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor will pay the difference to the Owner. Such costs incurred by the Owner will be determined by the Engineer and incorporated in a change order.

28.03 Where the Contractor's services have been so terminated by the Owner, said termination shall not affect any right of the Owner against the Contractor that existed or which may thereafter accrue. Any retention or payment of monies by the Owner due the Contractor will not release the Contractor from compliance with the contract documents.

28.04 After ten (10) days from delivery of a written notice to the Contractor and the Engineer, the Owner may, without cause and without prejudice to any other right or remedy, elect to abandon the project and terminate the contract. In such case, the Contractor shall be paid for all work executed and any expense sustained plus reasonable profit.

28.05 If, through no act or fault of the Contractor, the work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days after it is submitted, or the Owner fails to pay the Contractor substantially the sum approved by the Engineer or awarded by arbitrators within sixty (60) days after it is submitted, or the Owner fails to pay the Contractor substantially the sum approved by the Engineer or awarded by arbitrators within sixty (60) days of its approval and presentation, the Contractor may after ten (10) days from delivery of written notice to the Owner and the Engineer, terminate the contract and recover from the Owner payment for all work executed and all expenses sustained. In addition and in lieu of terminating the contract, if the Engineer has failed to act on a request for payment, or if the Owner has failed to make any payment as aforesaid, the Contractor may upon ten (10) days notice to the Owner and the Engineer stop the work until he/she has paid all amounts then due. In which event and upon resumption of the work, change orders shall be issued for adjusting the contract price or extending the contract time or both to compensate for the costs and delays attributable to the stoppage of the work.

28.06 If the performance of all or any portion of the work is suspended, delayed or interrupted as a result of a failure of the Owner or Engineer to act within the time specified in the contract documents, or if no time is specified, within a reasonable time, an adjustment in the contract price or an extension of the contract time, or both, shall be made by change order to compensate the Contractor for the costs and delays necessarily caused by the failure of the Owner or Engineer.

29.00 PAYMENTS TO CONTRACTOR

29.01 At least ten (10) days before each progress payment falls due (but not more often than once a month), the Contractor will submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the work performed during the period covered by the partial payment estimate and supported by such data as the Engineer may reasonably require. This payment information shall include the quantities and unit bid price of each item requested. If payment is requested on the basis of materials and equipment not incorporated in the work but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such

supporting data, satisfactory to the Owner, as will establish the interest therein, including applicable insurance. The Engineer will, within thirty (30) days after receipt of each partial payment estimate, either indicate in writing approval of payment and present the partial payment estimate to the Owner, or return the partial payment estimate to the Contractor indicating in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate. The Owner will, within thirty (30) days of presentation of an approved partial payment estimate, pay the Contractor a progress payment on the basis of the approved partial payment estimate. The Owner shall retain five percent (5%) of the amount of each payment until final completion of and acceptance of all the work covered by the contract documents. On completion and acceptance of a part of the work on which the price is stated separately in the contract documents, payment may be made in full, including retained percentages, less authorized deductions.

29.02 The request for payment may also include an allowance for the cost of such major materials and equipment, which are suitably stored either at or near the site.

29.03 All work covered by partial payment made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all terms of the contract documents.

29.04 Upon final acceptance of the work, the Owner shall issue a certificate that he/she has accepted the work. The entire balance found to be due the Contractor, including the retained percentages, but except such sums as may be lawfully retained by the Owner, shall be paid to the Contractor within sixty (60) days of completion and acceptance of the work.

29.05 The Contractor will indemnify and save the Owner or the Owner's agents harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, tools, and all suppliers, incurred in the furtherance of the performance of the work. The Contractor shall, at the Owner's request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged or waived. If the Contractor fails to do so the Owner may, after having notified the Contractor, either pay unpaid bills or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of the contract documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor, his/her surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Owner shall be considered as a payment made under the contract documents by the Owner to the Contractor, and the Owner shall not be liable to the Contractor for any such payment made in good faith.

29.06 If the Owner fails to make payments sixty (60) days after approval by the Engineer, in addition to other remedies available to the Contractor, there shall be added to each such payment interest on the unpaid amount of the Request for Payment at the rate pursuant to Minnesota State Statutes Section 429.041, Subdivision 6.

29.07 FINAL PAYMENT SECTION: The Owner will make final payment to the Contractor after the Contractor has submitted the following items:

A. State of Minnesota Department of Revenue certification that the contractor and any subcontractor have fulfilled the requirements of Minnesota withholding tax laws.
B. Letter of Consent of Surety.
C. Appropriate Lien Waiver(s).

30.00 ACCEPTANCE OF FINAL PAYMENT AS RELEASE

30.01 The acceptance by the Contractor of final payment shall be and shall operate as a release to the Owner of all claims and all liability to the Contractor other than claims in stated amounts as may be specifically excepted by the Contractor for all things done or furnished in connection with this work and for every act and neglect of the Owner and others relating to or arising out of this work. Any payment, however, final or otherwise, shall not release the Contractor or the Contractor's sureties from any obligations under the contract documents or the performance bond.

31.00 INSURANCE

31.01 The Contractor shall purchase and maintain such insurance as will protect him/her from claims set forth below, which may arise out of or result from the Contractor's execution of the work, whether such execution be by himself/herself or by any subcontractor or anyone directly or indirectly employed by them, or by anyone for whose acts they may be liable for:

A. Claims under worker's compensation, disability benefit and other similar employee benefit acts;
B. Claims for damages because of bodily injury, occupational sickness or disease, or death of his/her employees;
C. Claims for damages because of bodily injury, sickness or disease or death of any person other than the Contractor's employees;
D. Claims for damages insured by usual personal injury liability coverage which are sustained:
    1. By any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, and
    2. By any other person; and
E. Claims for damages because of injury to or destruction of tangible property, including loss of use resulting there from.

31.02 Certificates of insurance acceptable to the Owner shall be filed with Owner within ten (10) days after the receipt of the Notice of Award. These certificates shall name the City of Savage as an additional insured and shall contain a provision that coverages afforded under the policies will not be canceled unless at least fifteen (15) days prior written notice has been given to the Owner.

31.03 The Contractor shall procure and maintain, at his own expense, during contract time, liability insurance as hereinafter specified:

A. Contractor general public liability and property damage insurance including vehicle coverage issued to the Contractor and protecting him/her and the Owner from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the contract documents, whether such operations be by himself/herself or by any subcontractor under him/her, or anyone directly or indirectly employed by the Contractor or by a subcontractor under him/her. Insurance shall be written

with a limit of liability of not less than $1,000,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than $2,000,000 for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than $1,000,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than $2,000,000 for any such damage sustained by two or more persons in any one accident. An overall umbrella coverage of $2,000,000 shall be required.

B. The Contractor shall acquire and maintain during the life of the contract, automobile liability insurance for all self-propelled vehicles used in connection with the contract, whether owned, not owned, or hired; public liability limits of not less than $1,000,000 for one person and $2,000,000 for each accident and property damage limit of $1,000,000 for each accident with a $2,000,000 umbrella coverage.

C. The Contractor shall acquire and maintain, if applicable, fire and extended coverage insurance upon the project to the full insurable value thereof for the benefit of the Owner, the Contractor, and subcontractors as their interest may appear. This provision shall in no way release the Contractor or Contractor's surety from obligations under the contract documents to fully complete the project.

31.04 The Contractor shall procure and maintain, at his own expense, during the contract time, in accordance with the provisions of the laws of the State in which the work is performed, Workers' Compensation Insurance, including occupational disease provisions, for all of the Contractor's employees at the site of the project and in case any work is sublet, the Contractor shall require each subcontractor similarly to provide Workers' Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this contract at the site of project is not protected under Workers" Compensation Act, the Contractor shall provide, and shall cause each subcontractor to provide, adequate and suitable insurance for the protection of his employees not otherwise protected. The Contractor shall provide the Owner with proof of Workers' Compensation Insurance covering all the employees of the Contractors and all subcontractors.

31.05 The Contractor shall secure, if applicable, "All Risk" type Builders Risk Insurance for work to be performed. Unless specifically authorized by the Owner, the amount of such insurance shall not be less than the contract price totaled in the bid. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft and smoke during the contract time and until the work is accepted by the Owner. The policy shall name as the insured the Contractor, the Engineer and the Owner.

32.00 CONTRACT SECURITY

32.01 PERFORMANCE BOND: The Contractor shall within ten (10) days after the receipt of the Notice of Award furnish the Owner with a Performance Bond in penal sum equal to the amount of the contract price, conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the contract documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the work provided by the contract documents. Such bond shall be executed by the Contractor, and a corporate bonding company licensed to transact such business in the State in which the work is to be performed. The expense of this bond shall be borne by the Contractor. If at anytime, a surety on any such bond is declared bankrupt or loses its right to do business in the state in which the

work is to be performed, the Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The Contractor shall pay the premiums on such bond. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

32.02 PAYMENT BOND: The Contractor shall within ten (10) days after the receipt of the Notice of Award furnish the Owner with a Payment Bond in penal sum equal to the amount of the contract price, conditioned upon the prompt payment by the contract documents. Such bond shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the state in which the work is to be performed. The expense of this bond shall be borne by the Contractor. If at any time a surety on any such bond is declared a bankrupt or loses its right to do business in the state in which the work is to be performed, the Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The Contractor shall pay the premiums on such bond. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

33.00 ASSIGNMENTS

33.01 Neither the Contractor nor the Owner shall sell, transfer, assign or otherwise dispose of the contract or any portion thereof, or of his/her rights, title or interest therein, or their obligations hereunder, without written consent of the other party.

34.00 INDEMNIFICATION

34.01 The Contractor will indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the work, provided that any such claims, damage, loss and expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom and is caused in whole or in part by any negligent or willful act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable.

34.02 In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employee of the Contractor, any subcontractor, anyone directly, or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under any Workers' Compensation acts, disability benefit act or other employee benefits acts.

34.03 The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, the Engineer's agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications.

35.00 SEPARATE CONTRACTS

35.01 The Owner reserves the right to let other contracts in connection with this project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with

theirs. If the proper execution of results of any part of the Contractor's work depends upon the work of any other contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results.

35.02 The Contractor shall be responsible for the coordination of this construction schedule and work areas with other contractors (public or private) in the area of the construction. This coordination of construction with other contracts shall be done in accordance with Section 1505 of Mn/DOT Standard Specifications. The coordination of construction on this contract and other contracts shall be done such that all project completion dates are met on all contracts.

35.03 The Owner may perform additional work related to the project by him/her, or let other contracts containing provisions similar to these. The Contractor will afford the other contractors who are parties to such contracts (or the Owner, if he/she is performing the additional work), reasonable opportunity for the introduction and storage of materials and equipment and the execution of work and shall properly connect and coordinate his/her work with theirs.

36.00 SUBCONTRACTING

36.01 The Contractor may utilize the services of specialty subcontractors on those parts of the work, which under normal contracting practices are performed by specialty subcontractors.

36.02 The Contractor shall not award work to subcontractor(s) in excess of fifty percent (50%) of the contract price without prior written approval of the Owner.

36.03 The Contractor shall be fully responsible to the Owner for the acts and omissions of his/her subcontractors and of persons directly or indirectly employed by them as he/she is for the acts and omissions of persons directly employed by him/her.

36.04 The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the contract documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the contract documents.

36.05 Nothing contained in this contract shall create any contractual relation between any subcontractor and the Owner.

36.06 The Contractor shall be responsible for all communications necessary between the Owner and the Contractor's subcontractors. The Owner will only determine those claims submitted by the Contractor on behalf of his/her subcontractors.

36.07 *Minnesota State Statute* 471.425, Subd. 4a requires contracts of a municipality to require that the prime Contractor pay any subcontractor within ten (10) days of the prime Contractor's receipt of payment. The contract must also require that the prime Contractor pay interest of 1.5% per month or any part of a month to the subcontractor for any undisputed amount not paid to the subcontractor within the ten (10) days.

37.00 ENGINEER'S AUTHORITY

37.01 The Engineer shall act as the Owner's representative during the construction period. He/she shall decide questions, which may arise as to quality and acceptability of materials furnished and work performed. He/she shall interpret the intent of the contract documents in a fair and unbiased manner. The Engineer will make visits to the site and determine if the work is proceeding in accordance with the contract documents.

37.02 The Contractor will be held strictly to the intent of the contract documents in regard to the quality of materials, workmanship, and execution of the work. Inspections may be made at the factory or fabrication plant of the source of material supply.

37.03 The Engineer will not be responsible for the construction means, controls, techniques, sequences, procedures or construction safety.

37.04 The Engineer shall promptly make decisions relative to interpretation of the contract documents.

38.00 COMPENSATION FOR INCREASED OR DECREASED QUANTITIES

38.01 The Owner reserves the right to increase, reduce or delete any bid items after award of the contract. No adjustment will be made to the unit prices bid on the contract for any items because of any increase, reduction or deletion.

39.00 LAND AND RIGHT-OF-WAY

39.01 Prior to issuance of the Notice to Proceed, the Owner shall endeavor to obtain all land and rights-of-way necessary for carrying out and for the completion of the work to be performed pursuant to the contract documents, unless otherwise mutually agreed.

39.02 The Owner shall provide to the Contractor information, which delineates and describes the lands owned and rights-of-way acquired.

39.03 The Contractor shall provide at his/her expense and without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities or for storage of materials. The Contractor, at his expense, shall restore these said temporary construction facilities to the satisfactions of the property owner. The Contractor shall provide written documentation for the use of said property.

40.00 GUARANTY

40.01 The Contractor shall guarantee all materials and equipment furnished and work performed for a period of one (1) year from the date of substantial completion. The Contractor warrants and guarantees for a period of one (1) year from the date of substantial completion of the system that the completed system is free from all defects due to faulty materials or workmanship, and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to the parts of the system resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby

incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

Substantial completion referred to above is deemed by the Owner to be when the project is finally accepted by the Savage City Council. However, in the case of a project, which includes both utility and street improvements, the City will consider acceptance of the utility portion of the project upon written request by the Contractor and recommendation of the Engineer after the utility portion has been substantially completed and is capable of being put into service by the City of Savage.

41.00 ARBITRATION

41.01 All claims, disputes and other matters in question arising out of, or relating to, the contract documents or the breach thereof, except for claims which have been waived by the making and acceptance of final payment as provided by Section 22, may be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association provided that the Owner and the Contractor mutually agree by separate instrument to arbitrate such claims, disputes and matters in question. This agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it is any court having jurisdiction thereof.

41.02 Notice of the demand for arbitration shall be filed in writing with the other party to the contract documents and with the American Arbitration Association, and a copy shall be filed with the Engineer. Demand for arbitration shall in no event be made after institution of legal proceedings based on claim, dispute or other matter in question, which would be barred by the applicable statute of limitations nor prior to the complete execution of a separate instrument of agreement to arbitrate.

41.03 The Contractor will carry on the work and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

42.00 TAXES

42.01 The Contractor will pay all sales, consumer, use and other similar taxes required by the law of the place where the work is performed.

43.00 AIR, WATER AND LAND POLLUTION

43.01 GENERAL: Pollution of natural resources of air, water and land by operation under this contract shall be prevented, controlled and abated in accordance with the rules, regulations and standards adopted and established by the Minnesota Pollution Control Agency and in accordance with the provisions of Section 1717 of the current Mn/DOT Standard Specifications for Construction as modified below.

The Contractor shall furnish material, labor and equipment for the temporary control measures as shown on the plans or ordered by the Engineer and shall provide for the acceptable maintenance therefore during the life of the contract to effectively prevent water pollution through the use of berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains and other erosion and sediment control devices or methods.

The temporary pollution control provisions contained herein shall be coordinated with the permanent erosion and sediment control features specified elsewhere in the contract to the extent practical to assure economical, efficient and continuous erosion and sediment control throughout the construction and post construction period. At the preconstruction conference or prior to the start of the applicable construction, the Contractor shall submit for acceptance his/her proposed schedules for accomplishment of temporary and permanent erosion and sediment control work as are applicable for clearing and grubbing, grading, utility and street construction, and miscellaneous construction. He/she shall also submit for acceptance his/her proposed method of erosion and sediment control on all roads and at borrow pits and his/her plans for disposal for waste of materials. No work shall be started until the applicable erosion and sediment control schedules and methods of operations have been accepted by the Engineer.

43.02 MATERIALS FOR TEMPORARY CONTROL

A. Mulches may be hay, straw, fiber mats, netting, wood cellulose, corn or tobacco stalks, bark, corn cobs, wood chips or other suitable materials acceptable to the Engineer and shall be reasonably free of noxious weeds and other harmful matter.
B. Slope drains may be constructed of pipe, fiber mats, rubble, Portland cement concrete, bituminous concrete plastic sheets or other suitable material acceptable to the Engineer.
C. Grass shall be quick growing species (such as rye or cereal grasses) suitable to the area that will provide a temporary cover, which will not later compete with the grasses sown for permanent cover.
D. Fertilizers and soil conditions shall be free of phosphorous and be a standard commercial grade acceptable to the Engineer.
E. Other materials as approved for use by the Engineer.

The Engineer shall have the authority to limit the surface area of erodible material exposed by clearing and grubbing, excavation, borrow and fill operations and to direct the Contractor to provide immediate, permanent or temporary control measures to prevent contamination of adjacent streams or other water courses, lakes, ponds and areas of water impoundment. Such slopes shall be seeded and mulched as the excavation proceeds to the extent considered desirable and practical.

The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practical time as outlined in his/her acceptable schedule. Temporary pollution control measures will be used to correct conditions that develop during the construction that were not foreseen during the design and that are needed prior to the installation of permanent control features or that are needed temporarily to control erosion that develops during the normal construction practices but are not associated with permanent control features of the project.

The Engineer will limit the area of excavation, borrow and embankment operations in progress, commensurate with the Contractor's capability and progress of keeping the finish grading, mulching, seeding and other permanent erosion control measures current in accordance with the accepted schedules. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

In the event of conflict between these requirements and any pollution control laws, rules or regulations of any other Federal, State or local agencies, the more restrictive requirements shall apply.

All temporary and permanent erosion and pollution control measures necessitated by the Contractor's operations outside the right-of-way, and all temporary erosion and pollution control measures necessitated by the Contractor's negligence, carelessness or failure to properly coordinate the installation of permanent controls as part of the work scheduled within the right-of-way shall be performed as ordered by the Engineer at the Contractor's own expense.

In the case of failure on the part of the Contractor to control erosion, pollution and siltation as ordered, the Owner reserves the right to employ outside assistance or to use its own forces to provide the necessary corrective measures. All expenses so incurred by the Owner, including its engineering costs that are chargeable to the Contractor as his/her obligation and expense will be deducted from any monies due or coming to the Contractor.

Where the Engineer orders installation of either temporary or additional permanent erosion control measures or pollution control measures in the absence of any negligence, carelessness or failure on the Contractor's part to properly schedule and carry out the measures provided for in the contract and except for such work which is necessitated by the operations outside the right-of-way, the work shall be performed at the Owner's expense and payment will be made therefore at appropriate Contractor's prices for like work or as extra work if there is no comparable item of work in the contract.

Payment for silt fence, hay bales and flotation silt curtain erosion measures as detailed shall be on a linear foot basis for the length of silt fence and flotation silt curtain furnished and installed and on a per each basis for bales. Payment shall include the removal of the silt fence, hay bales and flotation silt curtain. Removal will be at such time as determined by the Engineer. Payment for necessary holding areas, settling basins and street sweeping, as determined by the Engineer, shall not be made directly but shall be considered incidental to the project.

Silt fence, hay bales and flotation silt curtain erosion control measures shall be paid as follows: sixty percent (60%) upon installation, twenty percent (20%) when project is completed, and the remaining twenty percent (20%) upon removal.

44.00 NOISE POLLUTION

44.01 City Ordinance No. 95.05 PUBLIC NOISE NUISANCES states:

"General Prohibition: No person shall make or cause to be made any noise that unreasonably annoys, disturbs, injures or endangers the comfort, repose, health, peace, safety or welfare of any persons, or precludes their enjoyment of property, or affects their property's value. This general prohibition includes, but is not limited to, the following:

The collection or removal of garbage or refuse in any residential district, or construction activity involving the use of any kind of electric, diesel or gas-powered machine or other power equipment, except between the hours of 7:00 a.m. and 7:00 p.m. on any weekday or between the hours of 9:00 a.m. and 7:00 p.m. on any Saturday or holiday, and between the hours of 9:00 a.m. and 5:00 p.m. on any Sunday. The City Engineer has the authority to grant contractors an extension to 10 p.m. on any day. An extension beyond 10 p.m. may be granted for an extenuating circumstance."

44.02 NORMAL PERIOD FOR WORKING HOURS: The normal working hours within the City of Savage are as follows:

Weekdays	7:00 a.m. to 7:00 p.m.
Saturdays	9:00 a.m. to 5:00 p.m.

The Contractor shall notify the Owner and Engineer of any work planned on Saturday, or **any legal holiday at least 48 hours prior to such work.**

Work may only be performed during the above-mentioned timeframes unless the City Engineer authorizes an extension in writing.

44.03 REQUEST FOR WORKING HOURS EXTENSION: The Contractor may make a written request for an extension to the working hours in Section 45.02. The request should contain the reasons and justification for the time extension that the Contractor feels is necessary. Upon reviewing the request, the City Engineer will either grant or deny the time extension request. The Contractor will not be entitled to additional compensation whether the request is granted or denied.

The City Engineer may waive the requirement for a written request in case of extenuating circumstances.

44.04 CONSTRUCTION NOISE ORDINANCE VIOLATION: The City may without notice to the Contractor, deduct the amount of $1,000 per day from the Contractor's pay request for each violation of the Construction Noise Ordinance or without notice to the Developer, draw down the Developer's cash escrow or irrevocable letter of credit in the amount of $1,000 for each violation of the Construction Noise Ordinance. The City, at its sole discretion, shall determine whether the Contractor or Developer is in violation of the ordinance subject to the provisions in the Construction Noise Ordinance. This determination may be made without notice to the Contractor or Developer.

It is stipulated that the violation of any term will result in damage to the City in an amount, which will be impractical and extremely difficult to ascertain. It is agreed that the per day sum stipulated is a reasonable amount to compensate the City for its damages. This does not apply to activities that are required on a 24-hour basis, such as dewatering, etc. Any deviations from the hours specified in the Construction Noise Ordinance are subject to the approval of the City Engineer.

44.05 NOTIFICATION OF THE ENGINEER: Any Developer, Contractor and his/her employees and agents **MUST** provide a minimum of 48 hours notice to the Engineer prior to any construction operation. Failure to provide this notice may result in a fine of $5,000 for each infraction.

The fine will be deducted from the Contractor's pay request or drawn down from the Developer's cash escrow or irrevocable letter of credit.

The City, at its sole discretion, shall determine whether the Developer or Contractor shall be fined. This determination may be made without notice to the Developer or Contractor.

It is stipulated that neglecting to notify the Engineer will result in damages to the City in an amount, which will be impractical and extremely difficult to ascertain. It is agreed that the per day sum stipulated is a reasonable amount to compensate the City for its damages.

SECTION 1505

COORDINATION

PART 1 - GENERAL

1.01 SCOPE: The Contractor shall be responsible for coordinating the construction schedule and work areas with other contractors and other government agencies in the area. The coordination of construction on this contract and other contracts shall be done such that all project completion dates are met on all contracts.

The Contractor shall perform his/her work in such a manner as to cause the least interference with local residents/property owners. The Contractor shall maintain local access to properties throughout the project.

1.02 COORDINATION BY GENERAL CONTRACTOR shall include scheduling, submittals, and work of the various specification sections to assure the efficient and orderly sequence of installation.

The Contractor shall be responsible for coordinating the work of various specification sections having independent responsibilities, the completion and clean up of work and all private utility work.

1.03 ADMINISTRATIVE/SUPERVISORY PERSONNEL: The General Contractor shall supervise and direct all work. The Contractor shall employ and maintain a full-time, qualified supervisor or superintendent who shall act as the Contractor's representative at all times on the job site.

The Contractor shall provide to the Owner, a listing of names, mobile and home telephone numbers for emergency contact for use during non-construction hours.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS: The Contractor shall be required to inspect conditions under which work is to be performed to determine if any unsatisfactory conditions exist. The Contractor will be responsible to correct all unsatisfactory conditions.

Each material item shall be inspected prior to installation. Any defective or damaged items shall be rejected at no additional cost to the Owner.

Contractor shall check and recheck grades, measurements and dimensions of the work. All staking requests shall be made a minimum of twenty-four (24) hours in advance.

The Contractor shall be responsible for monitoring weather conditions and project status to ensure proper coordination of the work and prevent deterioration of the work site and unsuitable workmanship.

Coordination of work with inspections and testing shall be required so as to minimize the necessity of uncovering, repairing or redoing work for those purposes.

3.02 CLEANING AND PROTECTION: During handling and installation, the Contractor shall clean and protect all work in progress and adjoining work. Cleaning and maintenance shall be performed as necessary throughout the construction period.

SECTION 1518

TEMPORARY WATER

PART 1 - GENERAL

1.01 SCOPE: The Contractor shall maintain the availability of water including, but not limited to, furnishing and installing temporary water services to each home or business affected by the replacement of the existing watermains as noted on the plans.

1.02 DESCRIPTION: The Contractor shall install, disinfect, test and maintain a temporary water system for all streets designated for watermain replacement. The temporary water system shall be tested and accepted a minimum of twenty-four (24) hours prior to being placed into service. Water samples shall be tested by a State of Minnesota certified laboratory.

Where possible, the system shall be connected to multiple hydrants.

1.03 PAYMENT: Payment for temporary water services shall be made on a lump sum basis and shall be compensation in full for the materials and labor necessary for complete placement, operation and removal of all temporary water services required by this project.

The Contractor shall receive twenty-five percent (25%) of the amount bid for "Temporary Water" when the system plan has been submitted and approved by the City Engineer. When the temporary water system is installed (or the first phase is installed if the watermain replacement is phased), an additional fifty percent (50%) will be paid. When the system is removed, the remaining twenty-five percent (25%) will be released.

Payment Schedule	Total Percentage of Item Paid
Plan submitted and approved	25%
System Installed	75%
System Removed	100%

PART 2 - PRODUCTS

2.01 MATERIALS: The following materials or approved equals shall be utilized in the construction of the temporary water system.

- Main line hose shall be Sun-Flow Inc., Torrance, CA SF-40, 2½" 150 psi.
- Fittings shall be quick disconnecting as manufactured by the PT Coupling Co, Inc. Enid, OK.
- Lateral house services shall be Goodyear Horizon 1", 200 psi with brass connections.
- Dual hose bib connections shall be Sherman/Thompson LA-63C, solid brass hose "Y" with shut offs

Each house service connection at the main line must have a ball valve. Hose clamps on the service connection from the main to the houses will not be allowed.

Pipe joints shall be welded, fused or joined in other methods approved by the local building code.

Hydrant connections shall be equipped to handle a 2½" removable handle valve for single connection or a wye with individual 2½" removable handle valves for dual connections at the hydrant.

The Contractor shall have one main line ball valve per block or as specified by the Engineer.

A minimum of one 2½" hydrant connection shall be available for fire protection at each temporary water source.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS: Prior to beginning work, the Contractor shall submit a plan for temporary water to the City Engineer for review and approval.

All main line temporary water shall be trenched under streets, driveways, and sidewalks. Each existing service shall be served by an individual temporary service to the outside spigot.

The Contractor shall keep a minimum of six (6) outside spigot wyes, four (4) fifty foot (50') lengths of service hose, one (1) twenty-five foot (25') length and one (1) fifty foot (50') length of main line hose on site for emergency repairs.

If any part of the temporary water system deteriorates and/or is deemed unsatisfactory by the Engineer, new material will be supplied to correct the situation at no additional cost to the Owner. The Engineer's decision will be final.

Prior to the installation of any temporary water service, the Contractor shall submit to the Engineer for review and approval, a plan showing details of connections, operations and other details that will meet this specification.

Each service connection must also include a vacuum break and back flow preventor, installed at the house connection, unless other means are proposed by the Contractor. Any other provisions of the local building code must also be adhered to. Minimum pressure at the house connection for any temporary service is sixty pounds per square inch (60 p.s.i.). If needed, a pressure reducing valve shall be installed at each house connection. The temporary water service pipes must be disinfected in accordance with the Section 2665 Watermain Construction prior to the connection to the houses. Temporary water services shall be maintained by the Contractor for the time they are required, and promptly removed when the new watermain is approved for operation.

If the location of the proposed temporary service connection has an existing backflow preventor, the Contractor shall work with the property owner to establish a service connection. Any damage done to private property due to the improper removal of a back flow preventor or the bypassing of such shall be the responsibility of the Contractor to correct.

SECTION 1603

MATERIALS: SPECIFICATIONS, SAMPLES, TESTS, AND ACCEPTANCE (QUALITY CONTROL)

PART 1 - GENERAL

1.01 SCOPE: This section includes, but is not limited to, the overseeing and inclusion of general quality control, workmanship, manufacturer's instructions, manufacturer's certificates, manufacturer's field services, and testing laboratory services.

PART 2 - PRODUCT – Not used

PART 3 - EXECUTION

3.01 QUALITY CONTROL – GENERAL CONTRACTOR: The Contractor shall maintain quality control over suppliers, manufacturers, products, services, site conditions and workmanship to produce work of the specified quality.

3.02 WORKMANSHIP: All work on this project shall comply with industry standards, except when more restrictive requirements are specified in the contract documents, and shall be performed by persons qualified to produce workmanship of the specified quality.

3.03 MANUFACTURER'S INSTRUCTIONS, CERTIFICATES & FIELD SERVICES: The Contractor shall comply with all manufacturers' instructions in full detail, including each step in sequence. Should instructions conflict with contract documents, clarification shall be requested from the Engineer before proceeding.

When required by individual Specification Sections, the Contractor shall submit the manufacturer's certificate, stating that products meet or exceed specified requirements.

When specified, the supplier or manufacturer shall be required to provide qualified personnel to observe field conditions, installation, quality of workmanship, start up of equipment, test, adjust and balance of equipment as applicable and to make appropriate recommendations at no additional cost to the Owner.

3.04 TESTING LABORATORY SERVICES: Unless otherwise specified, the Owner will employ and pay for services of an Independent Testing Laboratory (ITL) to perform inspections, tests and other services required by the specifications.

All repairs, replacement, and retesting necessary shall be paid by the Contractor directly or deducted from the Contractor's next payment.

Services will be performed in accordance with all requirements of the governing authorities and specified standards.

Reports, observations and test results indicating compliance or noncompliance with specified standards and with the contract documents shall be submitted to the Engineer.

3.05 CONTRACTOR'S RESPONSIBILITIES:

A. MATERIAL FURNISHED BY CONTRACTOR: The Contractor shall be responsible for all material furnished by him/her, and he/she shall replace at his/her expense all such material that is found to be defective in manufacturing or that has become damaged in handling after delivery by the manufacturer. This shall include the furnishing of all material and labor required for the replacement of installed material discovered defective prior to the final acceptance of the work, or during the warranty period of work.

B. MATERIAL FURNISHED BY THE OWNER: The Contractor's responsibility for material furnished by the Owner shall begin at the point of delivery by the manufacturer or Owner and upon acceptance of the material by the Contractor. The Contractor shall examine all material furnished by the Owner at the time and place of delivery and shall reject all defective material.

C. REPLACEMENT OF DAMAGED MATERIAL: Any material furnished by the Owner that becomes damaged after acceptance by the Contractor shall be replaced by the Contractor at his/her expense.

D. RESPONSIBILITY FOR SAFE STORAGE: The Contractor shall be responsible for the safe storage of material furnished by or to him/her, and accepted by him/her, and intended for the work, until it has been incorporated in the completed project. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage and freezing.

E. WATERMAIN TESTING: The Contractor shall be responsible for the cost of all testing associated with the disinfection and flushing of the new watermain. This includes, but is not limited to, bacterial and pressure testing.

F. LEVEL, ROD AND TRIPOD: Each crew that enters a City project site shall have a surveyor's level, rod and tripod on-site.

G. DENSITY TESTS: All density tests must be ordered by the Owner. The Contractor may not contact the testing company. Any costs associated with tests ordered by the Contractor shall be the sole responsibility of the Contractor.

H. SURVEYING: All surveying shall be ordered by the Owner. The Contractor may not contact the surveying company directly at any time.

The Contractor shall give the Engineer a minimum of forty-eight (48) hours' notice of his/her need for the establishment of line and grade so that the Engineer may have time to provide same. After lines and grades for any part of the work have been given by the Engineer, the Contractor will be held responsible for the proper execution of the work to be protected and preserved by him/her until authorized to remove them by the inspector. The Contractor shall at his/her expense correct any mistakes that may be caused by unauthorized disturbances or removal. The Engineer may require that work be suspended at any time when for any reason such marks cannot be properly followed.

No additional compensation shall be allowed the Contractor for any claims of crews being held up because of lack of line and grade stakes.

The Contractor shall remove all survey stakes and lath from the job site upon verification with the field inspector that stakes are no longer needed.

I. TICKETS

All material tickets including, but not limited to, bituminous, aggregate, tack coat, and calcium chloride, must be submitted within twenty-four (24) hours of the placement of the material. Any tickets submitted after twenty-four (24) hours without prior approval of the Resident Project Representative may not be accepted for payment.

3.05 QUALITY CONTROL REQUIREMENTS:

OWNER/ CONTRACTOR	PRODUCT	REFERENCE	TEST REQUIREMENTS	FREQUENCY
OWNER	Aggregate	Section 2211 - Aggregate Base	Mn/DOT Gradation Specification	1/500 T per source
CONTRACTOR	Air Pressure Test Method	Section 2731 - Sanitary Sewer Construction CEAM Standard 2621 - Sanitary Sewer Specifications	4.0 psi	All new pipe
CONTRACTOR	Bituminous Streets and Trials	Section 2360 - Plant Mixed Asphalt Pavement	Maximum Density Compaction	Table 2360.6-32a
CONTRACTOR	Concrete Mix	Section 2521 - Walks & Pathways Section 2531 - Concrete Curb & Gutter and Driveways	See Section 2531 & 2521	All Concrete work
OWNER	Concrete Test	Section 2521 - Walks & Pathways Section 2531 - Concrete Curb & Gutter and Driveways	ACI Concrete Field Testing Requirements	Min. 1 set for each 100 cy (3 Cylinders)
CONTRACTOR	Infiltration/ Exfiltration test	Section 2731 - Sanitary Sewer Construction	See Section 2731	All Concrete Sanitary Sewer
CONTRACTOR	Deflection Test	Section 2731 - Sanitary Sewer Construction CEAM Standard 2621 - Sanitary Sewer	5% Maximum	All new PVC pipe
OWNER	Density Tests	Section 2451 - Trench Excavation, Bedding, & Backfill Section 2105, - Excavation & Embankment Section 2112 - Subgrade Preparation	95% of Specified Density from Pipe Zone to Upper 3 feet and 100% of Specified Density in Upper 3 feet	1 test every 500ft Horizonal/2' Vertical Depth zone. Failed tests are retested and frequency doubles.

OWNER/ CONTRACTOR	PRODUCT	REFERENCE	TEST REQUIREMENTS	FREQUENCY
CONTRACTOR	Disinfection, Chlorine Residual, Bacteriological	Section 2665 - Watermain Construction CEAM Standard 2611 - Watermain	See Section 2265	All Watermain
CONTRACTOR	Electrical Conductivity	Section 2665 - Watermain Construction CEAM Standard 2611 - Watermain	350 Amps ± 10% for 5 min.	All new pipe
CONTRACTOR	Fire Sprinkler Pressure Test	Section 2665 - Watermain Construction CEAM Standard 2611 - Watermain	200 psi for 120 min.	All Watermain
CONTRACTOR	Pressure Test and Leakage Test	Section 2665 - Watermain Construction CEAM Standard 2611 - Watermain	150 psi for 2 hours	All new pipe, services & valves
OWNER & CONTRACTOR	Subgrade Compaction	Section 2105, - Excavation & Embankment Section 2112 - Subgrade Preparation Section 2111 - Test Rolling	100% Standard Proctor Density in the Upper 3 feet Test Roll – maximum ¾" yielding when driven over with fully loaded aggregate truck	1 test every 500 ft Horizontal /2' Vertical Prior to placement of aggregate base
CONTRACTOR	Televising	Section 2731 - Sanitary Sewer Construction CEAM Standard 2621 - Sanitary Sewer Specifications	All new main	All Sanitary Sewer Mains
CONTRACTOR	Test Roll	Section 2111 - Test Rolling	Max. yield ¾" on subgrade. 0" on aggregate base.	All Streets

SECTION 1711

ROCK BLASTING
and
VIBRATION MONITORING REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE: For use if this construction project will result in transmission of vibrations from blasting and other construction activities including pavement removal or structure demolition.

1.02 METHOD OF MEASUREMENT: Work described in this section will be measured for payment and shall be performed on a lump sum basis according to the Bid Proposal for "Construction Vibration Monitoring" and/or Rock Blasting.

1.03 PAYMENT: Payment shall be full compensation for all work specified in this section including, but not limited to, conducting tests, maintaining logs, contact with affected residents and businesses providing and maintaining equipment and vibration monitoring. Payment prorating shall be on a quantity complete basis.

PART 2 - PRODUCTS –Not Used

PART 3 - EXECUTION

3.01 BLASTING PROCEDURE: The hours of blasting will be fixed by the Engineer. The Contractor's methods of procedure relative to blasting shall conform to local and state laws as well as municipal ordinances.

3.02 GENERAL BLASTING PROVISIONS: The regulatory requirements of OSHA Safety and Health Standards 29 CRF, Part 1926, Subpart U "Blasting and Use of Explosives" shall apply. The use of blasting mats is required. The mats shall be in good condition and be so employed as to prohibit flyrock.

The Contractor shall maintain a blast log report. These reports shall include, as a minimum, the location, time of each blast, distance to the nearest structure, depth and spacing of the drilled holes, minimum burden to free face, number of blast holes, types of blasting caps and explosives, distribution of delays and delay intervals, maximum amount of explosives in pounds per delay, total amount of explosives, and the name of the blaster who is responsible for the loading and detonation. The Contractor shall also maintain a log of all vibration related complaints, contracts, and actions. If practical, the blasting Contractor should blast on a regular schedule or at specified times (such as on the hour) in order to minimize the surprise factor for adjacent property owners.

The Contractor shall conduct a test blast program prior to construction blasting, including presplitting. The intent of this program is to estimate attenuation characteristics, or how the vibration intensities decrease with increasing distances from the blast site and variation in charge weights.

3.03 BLASTING: The Contractor will retain an independent testing laboratory (ITL) to perform monitoring of ground vibrations and air blast, which result from the rock blasting operations.

During the test blasting phase and, as needed, during the first two or three days during subsequent production blasting, all blasts should be monitored by the ITL by utilization of two or three engineering seismographs. At least one recording unit should be three-component particle velocity seismograph and should have the capability of monitoring airblast. An example of such equipment would be the Spregnether Model VS-1600 Engineering Seismograph.

The second or third seismographs can be velocity recorders such as the Spregnether VS-1100 or VS-1200 (no airblast recording).

The Contractor will provide full cooperation with respect to the ITL vibration monitoring activities.

After the test blasting and subsequent two to three days of production blasting and full-time monitoring of ground vibration and airblast, the frequency of monitoring can be reduced if approved by Engineer, providing the Contractor does not increase blast loads or modify the blast design to significantly increase the transmitted vibration to surrounding structures. For example, if the maximum weight of explosives per delay is increased without significantly increasing distance to the nearest structure, then the shot should be monitored by the ITL.

If it is established that vibration sensitive equipment (such as data processing equipment) is operating within the adjacent structures, consideration should be given to monitoring vibrations transmitted to the floor adjacent to such machines. The purpose of such work would be to:

- Establish whether blasting results in an increase above existing or background vibration in the equipment room; and
- Determine whether blasting vibration results in vibration intensity levels exceeding vibration tolerance levels for the equipment, if such criteria are available from the user or manufacturer.

If available criteria are stated in terms of acceleration or displacement, a seismograph should be used, which provides data in terms of acceleration displacement (e.g., Spregnether Mode VS-1200).

3.04 BLASTING VIBRATION MONITORING: The seismograph should be placed to measure vibration at external ground locations adjacent to the affected buildings or structures. Unless designated otherwise, this vibration should be measured in peak particle velocity. No controls are established for existing utilities, and the Contractor must conduct his operations to prevent damage to the utilities.

For blasts with ground path distances greater than 70 feet, the maximum single component peak particle velocity resulting from construction activity shall not exceed 0.75 inches per second.

For blasts with ground path distances less than 70 feet, the maximum single component peak velocity resulting from construction activity shall not exceed 0.75 inches per second with vibration intensities equal to or less than 40 hertz. If the frequency associated with the peak particle velocity of any of the three components is greater than 40 hertz, the applicable particle velocity related to different frequencies are shown on the following table. This alternate control limit does not relieve that Contractor from the 0.75 ips limit at other buildings equal to or greater than 70 feet during the vibration event in question.

Frequency of Peak Particle Velocity	Allowable Peak Particle Velocity
40 or less (Hz)	0.75 (ips)
50-60 (Hz)	1.25 (ips)
70-90 (Hz)	1.75 (ips)

If vibration sensitive equipment is monitored within adjacent building (2), the data generated should be compared to vibration tolerance levels provided by the equipment supplier, if such criteria exist.

Alternatively, the vibration level could be compared to background levels on the floor adjacent to the equipment.

3.05 AIRBLAST CONTROL LIMIT: The maximum measured airblast resulting from construction activities shall not exceed the values given in the table below.

Frequency Range of Instrumentation	Max. (Db)	Airblast (psi)
0.1 – 200 Hz, flat response	134	0.015 peak
2.0 – 200 Hz, flat response	133	0.013 peak
6.0 – 200 Hz, flat response	129	0.008 peak

3.06 VIBRATION CONTROL FOR GREEN CONCRETE: The Contractor may prefer or need to blast proximate to freshly poured concrete, during the course of the work. The following maximum vibration levels for fresh concrete shall apply:

Concrete Age (Hrs)	Max. Peak Particle Velocity (ips)
0-1	No limit
1-10	0.8
10-24	1.2
24-48	2.0
48+	4.0

SECTION 1712

PROTECTION OF PROPERTY

PART 1 - GENERAL

1.01 SCOPE: The Contractor is responsible for the preservation of all public and private property in conducting the work.

1.02 PAYMENT: Protection of property is the responsibility of the Contractor and shall be considered incidental to the project.

PART 2 - PRODUCT – Not Used

PART 3 - EXECUTION

3.01 PROTECTION AND RESTORATION OF PROPERTY: The Contractor's operations shall be confined to the areas covered in the right-of-way and easements granted to the City. Any work done by the Contractor, beyond the limits indicated, without written permission from the property owner, shall be the sole responsibility of the Contractor, who shall hold the City harmless from any claim for damages due to trespassing. It is the intent of the City to have all easements secured prior to the commencement of the work; however, if the easements have not been finally secured, the Contractor shall amend the construction sequence accordingly until such time as it is possible to secure such easements.

3.02 TREE MOVING AND PROTECTION: Trees not designated for removal shall be protected and saved from damage during construction. Trees designated to be saved shall be protected by placing brightly colored, high-density polyethylene, safety fence at the drip line of the tree.

The Contractor is required to move trees per Mn/DOT Specification 2571 and protect trees per Mn/DOT Specification 2572.

Should any damage be inflicted upon the trunks or branches of the trees in the project area, the damage shall be treated in accordance with nursery-approved methods or as directed by the City's Natural Resource Coordinator. Any broken branches shall be trimmed as per Engineer's direction. All bruise and cut wounds shall be treated with asphalt base tree paint.

The Contractor will be responsible for any damage to existing trees caused by work on this project, by the Contractor's workers or subcontractors. Damages may result in replacement trees or monetary damages as determined by the City's Natural Resource Coordinator or a licensed arborist.

Contractors shall be especially careful of existing oak trees. Any damage to these trees between April 1st and August 15th could cause oak wilt resulting in serious damage or death to the tree.

3.03 WALKS, STREETS, AND PRIVATE PROPERTY: If the project requires sawcutting a sidewalk, trailway, street or private property, the Contractor will be required to restore these areas within five (5) days after completion of the utility installation.

Sawcutting shall be straight and clean. Any damage done to adjacent property/panels due to carelessness shall be repaired or replaced by the Contractor at no additional cost to the City. What may be repair or replacement shall be determined by the Engineer in the field.

All sawcutting shall be full depth and be considered incidental to the removal unless a specific item is included in the bid proposal. No additional compensation shall be considered for re-cutting due to crooked/jagged cuts, cuts not full depth or pavement that chips off along the straight edge.

SECTION 1717

AIR, LAND AND WATER POLLUTION

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include the general requirements for the control of pollution from construction sites and related activities.

1.02 BASIS OF PAYMENT: All activities required by or relating to this section shall be considered incidental to the project.

No compensation or time extension will be granted due to actions brought against the Contractor for failure to comply with pollution control requirements.

1.03 REFERENCES AND RELATED SECTIONS:

A. Section 2573 - Temporary Erosion Minimization and Sediment Control
B. Section 2105.3 - Dewatering
C. Section 1060 - Regulatory Requirements

1.04 QUALITY ASSURANCE: All operations shall be conducted in a manner so as to prevent, control and abate the pollution of air, land and water in accordance with the ordinances, rules, regulations and standards adopted and established by the following:

- City of Savage
- Minnesota Pollution Control Agency (MPCA)
- Minnesota Department of Natural Resources (DNR)
- Watershed District (Lower Minnesota and Prior Lake-Spring Lake)

1.05 SCHEDULING: All operations shall be scheduled to minimize soil erosion and prevent siltation and the resultant turbidity of public waters.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.01 PREPARATION: The Contractor shall review all local conditions, ordinances, rules and regulations pertaining to air, land and water pollution prior to commencing operations.

3.02 PROTECTION OF WATERS: The Contractor shall take all measures necessary to:

A. Prevent pollution of waters of the State from particulate or liquid matter that may be harmful to fish and wildlife or detrimental to public use, or in violation of local, state or federal requirements.
B. Remove sediment from aggregate wash operations by filtration or settlement prior to discharge into waters of the State.
C. Prevent the discharge of wash water or waste from concrete mixing operations into waters of the State.

3.03 EROSION MINIMIZATION AND SEDIMENT CONTROL: The Contractor shall comply with all applicable laws, ordinances, regulations, orders pertaining to erosion minimization, sediment

control, and storm water management affecting the conduct of the work. When required, the Contractor shall apply for and obtain coverage under the National Pollution Discharge Elimination System (NPDES) Construction Stormwater Permit prior to starting work. No work shall be initiated until the Minnesota Pollution Control Agency's (MPCA) letter of coverage has been applied for by registered mail to the MPCA a minimum of seven (7) days before starting soil disturbing activities.

A. General Requirements: The Contractor shall schedule and conduct construction activities in a manner that will minimize soil erosion and the resulting siltation and turbidity of waters of the State. The Contractor shall comply with the requirements herein whether or not NPDES permit coverage for the work is required.

B. Before Construction: The Contractor shall install temporary sediment control measures in areas tributary to waters of the State before construction begins in a drainage area. Waters of the State include pond side slopes, curb and gutter systems, storm sewer inlets, temporary or permanent drainage ditches, creeks, rivers or other storm water conveyance or storage systems.

C. During Construction: The Contractor shall implement the Project's Storm Water Pollution Prevention Plan (SWPPP) and the City of Savage approved Erosion Minimization and Sediment Control Plan. The Contractor shall schedule and install temporary and permanent sediment and erosion control measures, construct ponds and drainage facilities, finish earthwork operations, place topsoil, establish turf and conduct other Contract work in a timely manner to minimize erosion and sedimentation.

All exposed soil areas with a positive slope within 200 feet of Waters of the State (defined above) shall have temporary erosion protection or permanent cover for the exposed soil areas within the following time frames (for the purposes of this provision, exposed soil areas do not include stockpiles or surcharge areas of sand, gravel, aggregate, concrete or bituminous):

Type of Slope	Time *
Steeper than 1 vertical: 3 horizontal	1 day
Flatter than 1:3	14 days

* the maximum time an areas can remain unaltered by the Contractor without temporary or permanent erosion control measures implemented.

For all exposed soil slopes in drainage areas contributing to Special Waters, temporary erosion protection or permanent erosion protection must be installed within seven (7) days of the soil no longer actively being worked. Special Waters are defined as those listed and referenced in the NPDES permit. The bottom of temporary or permanent drainage ditches constructed to drain water from a construction site must be stabilized with erosion control measures within 200 feet from the property edge or from the point of discharge to any surface water. Stabilization shall be completed within twenty-four (24) hours of connecting the drainage ditch to surface water, existing gutter, storm sewer inlet, drainage ditch or other stormwater conveyance system that discharges to surface waters.

Pipe outlets shall be provided with temporary or permanent energy dissipation within twenty-four (24) hours of connecting the pipe to surface water.

The Contractor shall limit the surface area of erodible soil that can be exposed to possible erosion at any one time when the permanent erosion control features are not completed and operative.

D. Vehicle Tracking: The Contractor shall minimize vehicle tracking of sediment or soil off site at locations where vehicles exit the construction site onto paved surfaces. Tracked sediment shall be removed from paved surfaces, which do not drain back into the construction site, within 24 hours of discovery.

If at any time the Contractor fails to comply with this requirement, the Engineer may notify the Contractor. This notification may be verbal or written (U.S. mail or fax). If the Contractor fails to clean the affected paved surface within 24 hours of notification, the Engineer may make arrangement for the paved surfaces to be cleaned by the City and bill the Contractor $500.00 per occurrence. The $500.00 fee for street sweeping will be deducted from payments to the Contractor or deducted from Developer's Escrow.

E. Street Sweeping: The street sweeper utilized will be a "pick-up" sweeper only. Street sweeping will be paid on an hourly basis. The Contractor is required to sweep the streets in the entire project area when needed or as requested by the Engineer. The use of a skidloader or any other equipment needed in addition to the sweeper is incidental. The Contractor has twenty-four (24) hours to sweep the streets after being notified by the Engineer. If the Contractor does not sweep within twenty-four (24) hours of being notified, the City will hire an independent company to sweep the street, and the Contractor will be responsible for all associated costs. This cost will be deducted from the next payment submitted to the City Council.

F. INLET PROTECTION: Catch basins in the area are of varying sizes and shapes. This should be taken into account when installing inlet protection. No additional compensation shall be considered for unusually sized/shaped catch basins. Inlet protection must adhere to the City's standards as well as all State guidelines and standards. All inlet protection shall be removed prior to winter suspension. Inlet protection that was installed and removed in 2015 that requires reinstallation in 2016 will be paid for at the contract unit price in each year that the installation was completed.

G. Sediment Removal: The Contractor is responsible for preventing or minimizing the potential for erosion or siltation after temporary erosion or sediment control work has been performed. The Contractor shall retrieve all sediment that has left the Construction Site, to the fullest extent possible. The Contractor shall remove all deltas and sediment deposited in drainage ways or catch basins and re-stabilize the areas where sediment removal results in exposed soil. The removal and stabilization shall take place within 7 calendar days of discovery unless precluded by legal, regulatory, or physical access restraints. If precluded, removal and stabilization must take place within 7 calendar days of obtaining access. The Contractor is responsible for contacting all local, regional, state, and Federal authorities before working in surface waters and obtaining applicable permits.

3.04 Suspension of Grading: The Contractor shall shape exposed soil and incorporate temporary and permanent erosion control measures to the satisfaction of the Engineer before suspension of grading operations for any appreciable length of time. Prior to shut down and ceasing grading activities for the winter, exposed soils and discharge points shall have temporary or permanent cover installed.

3.05 RELATED WORK: The Contractor shall control drainage and erosion on the work related to the Project including: haul roads, temporary construction, waste disposal sites, plant and storage locations, and borrow pits other than commercially operated sources. The Contractor shall

maintain the area, shape the area to allow storm runoff with minimum erosion, replace topsoil, and establish vegetative cover on areas where the potential for pollution has been increased due to the Contractor's operations. The Contractor's waste disposal sites, borrow pit areas or other related work that disturbs 43,560 square feet (1 acre) or more of total land area and located outside of the Construction Site will require the Contractor's own NPDES permit coverage.

3.06 QUALITY CONTROL: The Contractor shall be responsible for maintaining a quality control program to ensure that erosion is controlled, that sedimentation is prevented and that provisions of permits are adhered to. The quality control program shall consist of:

A. Ensuring that permit requirements related to the Contractor's construction activities are adhered to.
B. Conducting the inspections required in the NPDES permit.
C. Maintaining the NPDES inspection log.
D. Ensuring that erosion control is incorporated into the work in a timely manner and that disturbed areas are stabilized with mulch/seed or vegetative cover on a section by section basis.
E. Ensuring in accordance with section 2573.3 that temporary erosion control devices are maintained.
F. Ensuring in accordance with section 2573.3 that temporary erosion control devices are removed when they are no longer necessary.

In accordance with MnDOT 1506 the Contractor shall have a competent individual available to the Project to conduct the quality control program. The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. NPDES inspection records shall be maintained by the Contractor at the Project site and made available at all times for verification by the Engineer.

3.07 EROSION CONTROL SCHEDULE: The Contractor shall prepare and submit a weekly schedule of proposed erosion control activities for the Engineer's approval. The Engineer may require schedules to be submitted orally or in writing. The schedule shall provide a discussion of:

A. Proposed erosion control installations and when they will be installed.
B. Areas ready for permanent turf establishment and when it will be accomplished.
C. Grading operations and how erosion control will be incorporated into the work.
D. Repair or maintenance required on erosion control installations and when it will be accomplished.
E. Proposed erosion control measures during periods of suspension of work.

3.08 SITE PLANS: The Engineer may require the Contractor to submit a site plan detailing proposed erosion control and sediment control measures and a schedule indicating starting and completion times for construction operations working in water bodies and/or in direct proximity to waters of the state. Contractor shall not start work in the affected areas until the schedule and site plan have been accepted by the Engineer.

3.09 COMPENSATION: The Contractor will receive compensation for erosion and sediment control as provided for in the Contract. All other expenses incurred in complying with these provisions and section 1717 shall be borne by the Contractor. The Contractor will not receive compensation for erosion or sediment control off of the Construction Site unless so specified in the Contract. Temporary and permanent erosion minimization or pollution control measures ordered by the

Engineer, which are necessitated by additional Contract work or by unforeseen failure of the original erosion or sediment control work provided for in the Contract, will be paid for at the appropriate Contract prices for like work or as Extra Work in the absence of comparable items of work.

3.10 WITHHOLDING OF PAYMENT—NONCOMPLIANCE: If the Contractor fails to install erosion or sediment control measures ordered by the Engineer, the Engineer may withhold payment from related work until the control measures are undertaken by the Contractor. When the Contractor fails to conduct the quality control program, doesn't conduct the inspections required in the NPDES permit, or fails to take action ordered by the Engineer to remedy erosion or sediment control problems: The Engineer will issue a written order (by fax or by U.S. mail) to the Contractor. The Contractor shall respond within 24 hours with sufficient personnel, equipment and/or materials and conduct the required work or **be subject to a $500.00 per calendar day deduction for noncompliance**.

3.11 SPECIAL REQUIREMENTS: The Contractor shall provide temporary bridging where drainage crossings are necessary and remove such bridging as soon as crossings are no longer necessary.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

Pollution of natural resources of air, land and water by ordinances under this Contract shall be prevented, controlled, and abated in accordance with the rules, regulations, and standards adopted and established by the City of Savage, Minnesota Pollution Control Agency (MPCA), and in accordance with the provisions of MnDOT 1717, 1803.5 and the following:

By signing the Proposal and completing the NPDES permit application, the Contractor is a co-permittee with the Owner to ensure compliance with the terms and conditions of the General Storm Water Permit (MN R100001) hereafter referred to as General Permit and is responsible for those portions of the permit where the operator is referenced. This Permit establishes conditions for discharging storm water to waters of the State from construction activities that disturb 43,560 square feet (1 acre) or more of total land area. A copy of the "General Permit Authorization to Discharge Storm Water Associated with a Construction Activity Under the National Pollutant Discharge Elimination System (NPDES)/State Disposal System Permit Program" is available at http://www.pca.state.mn.us/water/stormwater/stormwater-c.html or by calling 651-296-3890.

The Contractor shall apply for and pay for the NPDES Permit coverage on this Project. Payment for the application shall be incidental to the Contract and no direct compensation will be made. The Contractor shall complete the application process, and post the Permit and MPCA's letter of coverage onsite.

No work which disturbs soil and/or work in Waters of the State will be allowed on this Project until the NPDES Permit is in effect and the City has received the required documentation.

The Contractor shall be solely responsible for complying with the requirements listed in Part II.B and Part IV of the General Permit.

The Contractor shall be responsible for providing all inspections, documentation, record keeping, maintenance, remedial actions, and repairs required by the permit. All inspections, maintenance, and records required in the General Permit Paragraphs IV.E, shall be the sole responsibility of the Contractor. The word "Permittee" in these referenced paragraphs shall mean "Contractor". Standard forms for logging all required inspection and maintenance activities shall be used by the Contractor. All inspection and maintenance forms used on this Project shall be turned over to the Engineer every two weeks for retention in accordance with the permit.

The Contractor shall have all logs, documentation, inspection reports on site for the Engineer's review and shall post the permit and MPCA's letter of coverage on site. The Contractor shall immediately rectify any shortcomings noted by the Engineer. All meetings with the MPCA, Watershed District, WMO, or any local authority shall be attended by both the Engineer and the Contractor or their representatives. No work required by said entities, and for which the Contractor would request additional compensation from the Owner, shall be started without approval from the Engineer. No work required by said entities and for which the changes will impact the design or requirements of the Contract documents or impact traffic shall be started without approval from the Engineer.

Emergency Best Management Practices must be enacted to help minimize turbidity of Waters of the State and relieve runoff from extreme weather events. It is required to notify the MPCA Regional Contact Person within 2 days of an uncontrolled storm water release. The names and phone numbers of the MPCA Regional Contract personnel can be found at:

http://www.pca.state.mn.us/water/stormwater/stormwater-c.html. The Contractor is reminded that during emergency situations involving uncontrolled storm water releases that the State Duty Officer must be contacted immediately at 1-800-422-0798 or 1-651-649-5451.

The Contractor shall review and abide by the instructions contained in the permit package. The Contractor shall hold The City harmless for any fines or sanctions caused by the Contractor's actions or inactions regarding compliance with the permit or erosion control provisions of the Contract Documents.

The Contractor is advised that Section 1 of the NPDES application form makes reference to a Storm Water Pollution Prevention Plan (SWPPP). This Projects' SWPPP is addressed throughout MnDOT's Standard Specifications for Construction, as well as this Project's Plan and these Special Provisions.

SECTION 2015

PRECONDITION SURVEY

PART 1 - GENERAL

1.01 SCOPE: This section covers development of a vibration monitoring and condition surveys program in conjunction with general construction disturbances.

The Contractor is charged with protecting adjacent structures from damage, and the purpose of this program is to assist the Contractor. The program outlined below identifies monitoring necessary to document the impact of construction activities on existing structures.

1.02 PAYMENT: The work of this section shall be performed on a lump sum basis and will not be measured for payment. Complete payment shall be full compensation for all work specified above including, but not limited to, conducting tests, maintaining logs, contacts with affected residents and businesses, providing and maintaining equipment and a precondition survey report.

The Contractor shall receive twenty-five percent (25%) of the amount bid for "Precondition Survey" on the first payment. When fifty percent (50%) of the original contract amount has been earned, an additional fifty percent (50%) will be paid. After seventy-five percent (75%) of the original contract amount has been earned, the remaining twenty-five percent (25%) will be released.

Payment Schedule	Total Percentage of Item Paid
1st Payment	25%
50% Project Complete	75%
75% Project Complete	100%

PART 2 - PRODUCT – Not Used

PART 3 - EXECUTION

3.01 PRECONDITION SURVEY: The survey will include a documentation of interior subgrade and above-grade accessible walls, ceilings, floors, roof, and visible exterior as viewed from the grade level. The survey will detail (by engineering sketches, DVD, photographs, and/or notes) the existing structural, cosmetic, plumbing, and electrical damage but will not necessarily be limited to areas in buildings showing existing damage.

Crack displacement monitoring gages will be installed as deemed appropriate in buildings within a radius of one hundred feet (100') of the construction work to help verify distress if any should develop.

The survey should include documentation of visible cracks and separations or other defects to walls, ceilings, floors and/or windows.

It is the intent of this inspection to document the existing structural condition to determine any potential damages due to settlement of the ground surface from dewatering operations, blasting operation and/or general construction operations.

Three copies of the preconstruction building condition surveys shall be submitted to the Owner for review prior to the start of any construction or demolition activity. Duplicate copies of all photos and DVDs shall be clearly identified and submitted with the building surveys. A DVD of the pre-construction building condition survey of each property shall be delivered to each respective property owner.

This specification does not anticipate the need to conduct a second building survey. If the Owner deems a second survey, or portion thereof, is necessary to document post-construction condition, the Contractor will perform the work on a time and materials basis through a formal Supplemental Agreement.

SECTION 2021

MOBILIZATION

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include, but is not limited to, preparatory work and operations, the movement of personnel, equipment, supplies and incidentals to the project site and the establishment of Contractor offices and facilities.

The Contractor shall install a sign(s) at all entrances to the construction site or as directed by the Engineer in the field. The sign may not impede sight distance for traffic. The sign shall contain the following information:

A. Contractor's Name
B. Business Address
C. Business Phone Number
D. Business Fax Number
E. Business E-mail Address

In addition, the sign shall be freestanding and wind resistant. It must be a minimum of two feet high by three feet wide (2' x 3'). The letters shall be large enough so as to be clearly readable from a distance of 200 feet with a contrasting background.

1.02 PAYMENT: The Contractor shall receive twenty-five percent (25%) of the amount bid for "Mobilization" on the first payment. When fifty percent (50%) of the original contract amount has been earned, an additional fifty percent (50%) will be paid. After seventy-five percent (75%) of the original contract amount has been earned the remaining twenty-five percent (25%) will be released.

Payment Schedule	Total Percentage of Item Paid
1st Payment	25%
50% Project Complete	75%
75% Project Complete	100%

1.03 PERFORMANCE REQUIREMENTS: The following shall be included as part of the Contract bid item "Mobilization":

A. Submittals
   1. Approved Project Schedule
   2. Shop Drawing Schedule
   3. List of subcontractors with addresses and phone numbers
   4. List of Suppliers
   5. Material and Procedural Submittals as required.
B. Temporary Sanitary Facilities - The Contractor shall provide temporary sanitary facilities on site. The facilities shall be cleaned and maintained each week throughout the duration of the project and shall be removed immediately upon completion of the project.
C. Commencement of work.
D. Remobilizations due to failure of Contractor to properly schedule and coordinate workers, subcontractors, and/or private utility work.

PART 2 - PRODUCTS

2.01 MATERIALS: The Contractor's sign shall be constructed of wood or metal intended for weather exposure.

PART 3 - EXECUTION

3.01 INSTALLATION: The sign(s) shall be installed prior to the start of construction and removed promptly upon completion of the project.

SECTION 2101

CLEARING and GRUBBING

PART 1 - GENERAL

1.01 SCOPE: Clearing and grubbing shall consist of, but is not limited to, all trees, shrubs, brush, stumps, roots, windfalls, unsound branches and other plant life noted on the plans for removal or marked by the Engineer.

The City's Natural Resources Coordinator or Engineer in the field must approve all trimming of trees and shrubs. All trees damaged during construction shall be trimmed and repaired.

1.02 METHOD OF MEASUREMENT: Clearing and grubbing shall be measured as specified on the bid proposal by either the tree or acre as defined below.

A. All multi-stemmed or single trees shall be considered as one (1) unit/tree when measured at the ground.

B. When the acre is the unit of measurement, quantities will be determined by measuring to the nearest 0.05 acre all areas cleared and all areas grubbed, within the limits shown on the plans or staked by the Engineer.

All measurements will be made horizontally to points ten feet (10') outside the trunks of qualifying trees or stumps on the perimeter of the area being measured. Separate areas smaller than 0.05 acre will be considered 0.05 acre.

1.03 PAYMENT: Payment for acceptable quantities of clearing and grubbing shall be at the contract unit price as listed on the Bid Proposal. All pruning and associated work shall be considered incidental.

The City's Natural Resources Coordinator shall mark trees or areas of clearing and grubbing to preserve established trees. Additional clearing and grubbing may be required during construction and will be paid at the unit price. No remobilization shall be paid for return trips.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.01 PROTECTION: The Contractor shall clear and grub the areas as shown on the plans or directed by the Engineer in the field. All trees shown to be removed shall be marked in the field by the Contractor with ribbon seven (7) days prior to removal. The City will meet with the residents to obtain final approval to remove trees. Any trees that are determined to remain in place as a result of discussions with the residents shall be protected. Extreme care shall be exercised by the Contractor to remove only those trees that are designated by the Engineer for removal. No trees shall be removed until the Engineer has identified and confirmed the removal limits.

All operations shall be conducted in a manner that will not damage or injure surrounding plant life and property.

Any trees deemed not savable by the Engineer shall be marked in the field for removal. All other trees shall be protected by the Contractor during construction. The Contractor will be responsible for any damage to existing trees caused by work done by the Contractor or subcontractors. Damages may result in replacement trees or monetary damages as determined by the City's Natural Resource Coordinator.

The Contractor shall avoid wounding any oak trees not marked for removal during the time period from April 1st to August 1st to prevent the spread of oak wilt. If the Engineer determines that work must take place near oak trees during those months, resulting wounds shall immediately be treated with a wound dressing material consisting of latex paint or shellac. Paint colors shall blend with the bark color. The Contractor shall have an approved wound dressing on the project at all times during this period. Any costs that are associated with tree repair that were caused by the Contractor or subcontractor shall be incidental to the project. If the tree dies or significantly declines within a year, due to wounding, the Contractor shall be responsible for the replacement and/or replacement cost of the tree as determined by a licensed arborist chosen by the City.

The Contractor shall provide services, as deemed necessary by the City's Natural Resources Coordinator and/or Engineer, to maintain health and integrity of trees to be saved during street and utility construction. This may include the installation of tree protection devices (fencing, wood mulch, etc.), mechanical root pruning, restoration of exposed roots, and watering. These services shall be incidental to project costs. All tree protection devices shall remain in place during construction and removed prior to final inspection.

All multi-stemmed or single trees shall be considered as one unit when measured at the ground surface, for purposes of bidding, clearing and grubbing. The Engineer will only measure trees/shrubs for payment that have a diameter of more than six inches (6") at the ground surface. Removal and disposal of brush, stumps and trees shall be an incidental item to the contract. The Contractor shall protect the trees designated to remain, place temporary fence, and conduct all clearing and grubbing operations in a manner that will not damage or jeopardize the surrounding plant life and property.

3.02 CLEARING OPERATIONS: Clearing shall include, but not be limited to, cutting and removing all designated trees, shrubs, bushes, windfalls and other vegetation. The Contractor shall also be responsible for pruning and removing any low hanging or unsound branches as directed by the Engineer.

3.03 TREE TRIMMING

All trimming of mature trees (4" diameter at breast height "dbh" or greater) shall be completed by ISA Certified Arborists and according to the ISA Standards for *Pruning Mature Trees.*

Tree Trimming and Root Pruning shall be paid for under the corresponding bid items "Tree Trimming (Certified Arborist)" and "Root Pruning (Certified Arborist)" by the Unit Hour and shall be compensation in full for all labor, materials and equipment required to perform the work. Payment will be made to the nearest ½ hour by the time spent performing the work on-site.

Within fifteen feet (15') of the construction limits outside of structures, the Engineer will designate and require the proper trimming of trees to complete and maintain the improvements. The Contractor shall properly dispose of all branches and brush related to the trimming operations.

3.04 GRUBBING OPERATIONS: Grubbing shall consist of removing and disposing of designated stumps, roots and other remains. All stumps shall be removed completely. All material produced by mulching/grinding the trees and/or stumps shall become the property of the Contractor and removed from the site for disposal.

3.05 ROOT PRUNING

All trees designated for root pruning per plan shall be pruned at a minimum depth of thirty-six inches (36") with vibratory plow or trenching knife. No chain type trenchers or exposed tree roots will be allowed. Root pruning shall occur at a maximum distance away from the tree trunk wherever possible and as indicated per plan by the Engineer. The Contractor shall be responsible for locating and maintaining all underground utilities associated with the root pruning operations.

3.06 DISPOSAL OPERATIONS: All disposal of debris shall be off-site and shall be the responsibility of the Contractor.

All removal, stump grinding, and debris removal, including rocks, twigs, branches, leaves and excess soil and grindings shall occur as one phase prior to road and utility construction. Turf areas and sidewalks shall be kept clear of debris associated with tree removal, and lawn areas must be restored to a mowable condition following removal of trees and stumps. The Contractor shall fill all depressions resulting from grubbing operations with suitable material and compact the material to the satisfaction of the Engineer.

The disposal of Elm and Red Oak shall be in accordance with Minnesota Rules 1505.

3.07 EMERALD ASH BORER (EAB)

The Emerald Ash Borer has become a concern in recent years and decreasing or avoiding the spread of the insect is very important. The Minnesota Department of Agriculture Guidelines are as follows and will be adhered to during construction.

EAB Active Period – May 1 – August 31st:

1. Avoid removal of ash branches, trees, and/or stumps.
2. If removal is necessary, due to a hazardous condition, then
   a. Chip at least one inch (1") of bark/wood on site and transport **to the nearest facility** that can process the material or
   b. Transport at least outer one inch (1") of bark/wood in a vehicle where it is **100% enclosed to the nearest facility** than can quickly process the material.

Material should remain enclosed until it can be at a minimum chipped.

EAB Dormant Period – September 1 – April 30:

1. Conduct pruning, removal of ash as desired.
2. Transport at least outer one inch (1") of bark/wood to a facility where it can be processed prior to May.

Active vs. Dormant Period

By postponing pruning until fall the risk of EAB spreading can be reduced. If the tree is left intact during the EAB Active Period, it can provide habitat for EAB adults to lay eggs. However, since the adults will not emerge until the following year, the tree or branch may be cut and properly disposed of during the EAB Dormant Period. Any EAB that may exist in the ash material will be

destroyed when the wood is destroyed. Material moved during the EAB Active Period may release adults at any time during transportation into a previously un-infested area.

SECTION 2103

MAILBOXES

PART 1 - GENERAL

1.01 SCOPE: This section includes, but is not limited to, salvaging and reinstalling existing mailboxes, maintaining existing mail service and other delivery during construction and installing new mailboxes when requested and provided by the Owner.

1.02 REFERENCES AND RELATED SECTIONS:
A. Section 2563 – Traffic Maintenance and Control
B. United States Postal Service Regulations

1.03 PAYMENT: Removal and reinstallation of mailboxes shall be considered incidental to the project unless a specific bid item is included in the bid proposal.

All work, equipment, materials and labor needed to furnish, install, maintain and remove temporary mailboxes shall be considered incidental to the project. No compensation shall be made for the maintenance of existing mail, delivery, garbage or recycling services.

PART 2 - PRODUCTS

2.01 MATERIALS: If a new mailbox is required, it shall be constructed of wood or metal intended for weather exposure. The size of the mailbox and any identification on the box shall conform to current postal standards and the owner of the box. The minimum identification required shall include the address.

PART 3 - EXECUTION

3.01 GENERAL: As designated by the Engineer and the U.S. Postal Service, prior to any work, the Contractor shall move temporary mail and delivery boxes within the construction area to a location which will allow delivery during construction. All temporary mailboxes shall be placed at a location determined by the Post Office and shall be accessible to the U.S. Postal Service, as well as the postal recipient, at all times. Several mailbox banks may be utilized to minimize the distance from the postal recipient.

Notification of the change in delivery location shall be made to the postal recipient a minimum of 48 hours prior to the actual change. Any problems with postal delivery shall immediately be addressed by the Contractor.

All salvaged mailboxes shall be delivered to the property owner for storage during construction. The existing condition of each mailbox should be noted and any problems brought to the attention of the Engineer and/or property owner. Any damage not reported prior to removal may be considered the responsibility of the Contractor.

The temporary mailboxes cannot be removed until the permanent mailboxes have been reinstalled along the curb according to Post Office standards. The property owners shall be notified a minimum of forty-eight (48) hours prior to the re-installation of mailboxes.

SECTION 2104

REMOVING PAVEMENT AND MISCELLANEOUS STRUCTURES

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include, but is not limited to, the removal and disposal of pavements, sewers (all types and sizes), watermain (all types and sizes), storm sewer and culverts (all types and sizes), abandoned structures, concrete curb & gutter, sidewalk, and pathways.

Also included are the salvaging of designated materials such as delivery boxes, signs and other structures designated in the plans and specifications.

The backfilling and compaction of any depression, hole or trench created by removal shall be considered incidental to the project.

1.02 REFERENCES AND RELATED SECTIONS:

1.03 METHOD OF MEASUREMENT: Only materials and items designated for removal or salvage will be measured. Removal and salvaged items will be measured separately as identified on the Bid Proposal. Measurements shall be made as follows:

A. Pavement and walks of any thickness shall be measured by area in square yards.
B. Length measurements shall be taken along the longitudinal centerline.
C. Pipe measurements will be taken to the center of structures to the center of structure.
D. Sawcutting will be considered incidental.

1.04 PAYMENT: The basis of payment shall be as follows:

A. Removal of abandoned fences will be paid at the unit price as indicated on the Bid Proposal.
B. Removal of hydrant includes valve, valve box, hydrant, and lead will be paid at the unit item price as indicated on the Bid Proposal.
C. Removal of culverts will be paid at the unit price as indicated on the Bid Proposal.
D. Removal of sanitary sewer pipe and manhole will be paid at the unit price as indicated on the Bid Proposal.
E. Hydrants and valves, which are removed, shall become the property of the Contractor unless directed otherwise by the Engineer.
F. Only items removed in acceptable condition, as determined by the Engineer, will be measured as salvage.
G. Items proposed for salvage, which are damaged by the Contractor's negligence, shall be replaced at the Contractor's expense.
H. The backfilling and compaction of depressions resulting from removals shall be considered incidental to the project.
I. Service lines are considered incidental to the mainline removal.
J. Removal of concrete curb and gutter will be paid for at the unit price as indicated in the Bid Proposal.
K. Removal of bituminous curb will be paid for at the unit price for bituminous pavement removal.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.01 PREPARATION: The Contractor shall sawcut pavement (all types) along removal lines through the entire pavement thickness to produce a neat square edge. All inplace structures and facilities not designated for removal shall be protected. The Contractor shall mill/sawcut the layers of bituminous.

All sawcutting shall be full depth and be considered incidental to the removal. No additional compensation shall be considered for recutting due to crooked cuts, cuts not full depth or pavement that chips off along the straight edge.

3.02 REMOVAL OPERATIONS: Only structures and facilities that have been marked by the Engineer shall be removed. Removals designated for salvage shall be done in a manner that will not result in damage.

All structures marked for removal shall be removed completely. Pipes should be removed unless otherwise indicated on the plans or approved by the Engineer. Abandoned pipes shall be filled with sand or approved like material and capped at the ends of the removal section unless otherwise directed by the Engineer. Concrete shall be removed at a joint and a slip-in plug installed, and PVC pipes shall have a cap glued on at the factory unless otherwise directed by the Engineer.

The Contractor shall remove only structures and facilities that have been marked for removal by the Engineer. Removals designated for salvage shall be done in a manner that will not result in damage.

Any existing damage to a structure shall be brought to the attention of the Engineer prior to removal. Any damage not reported will be the responsibility of the Contractor to repair or replace as deemed necessary by the Engineer at no cost to the Owner.

3.03 REMOVE CONCRETE PAVEMENT (All Types): Remove Concrete Pavement shall include, but is not limited to, the removal of aprons, sidewalk, curb and gutter, and pedestrian ramps. Concrete shall be removed cleanly at joints or sawcuts. Sawcutting concrete is incidental to the unit cost of this bid item. No additional compensation will be made for jagged joints requiring additional removal to create a clean, straight joint.

3.04 REMOVE BITUMINOUS PAVEMENT (All Types): Remove Bituminous Pavement shall include, but is not limited to, the removal of pathways, parking lots, bituminous curb, and roadways. Sawcutting full depth is incidental to the unit cost of this bid item. No additional compensation will be made for jagged joints requiring additional removal to create a clean, straight joint.

3.05 REMOVE WOOD FENCE & RETAINING WALL: The Property Owner shall be given the option to keep the wood fence or retaining wall material if they want it. If the Property Owner wants the material, the Contractor shall salvage and place the material at a location specified by the Property Owner with no additional compensation being made. If the Property Owner does not want the material it should become the property of the Contractor with no additional compensation being given for disposal. Payment for removal of both items will be by the Linear Foot as measured along the base of the fence or wall that is being removed. The Contractor shall remove only the amount of material that is necessary to complete construction and grading operations. If it is determined in the field that grading and construction operations can be completed without

impacting the fencing or walls designated for removal, those portions of the fencing and walls should remain in place and be protected.

3.06 SALVAGE SIGNS AND POST: All salvaged signs and posts shall be delivered to the City of Savage Public Works at 13770 Dakota Avenue. Care shall be taken not to break or damage signs and posts during removal or delivery.

3.07 DISPOSAL OF MATERIALS AND DEBRIS: All material designated for salvage shall be stockpiled at a predesignated site approved by the Engineer.

All material not designated for salvage shall become the property of the Contractor and shall be disposed of off-site at no cost to the Owner. Material shall be disposed of in accordance with all applicable laws and ordinances.

The Contractor shall reinstall all salvaged material as shown on the plans or directed by the Engineer in the field.

SECTION 2105

EXCAVATION AND EMBANKMENT

PART 1 - GENERAL

1.01 SCOPE: This work shall consist of constructing the project's excavations and embankments within the designated construction limits.

1.02 REFERENCES AND RELATED SECTIONS:

A. Section 2573 – Storm Water Management Temporary Erosion Control
B. Section 2112 - Subgrade Preparation
C. Section 2211 - Aggregate Base
D. CEAM Specifications 2600 - Trench Excavation and Backfill/Surface Restoration

1.03 METHOD OF MEASUREMENT:

A. Excavation Material shall be measured by volume of material in its original position. Unless otherwise indicated, volumes are calculated in cubic yards by the average end area method determined from the existing and proposed cross sections.

B. Borrow Material shall be measured by volume in cubic yards, or as specified in the bid proposal. Only materials which are accepted for use and have been imported from offsite shall be measured.

C. Salvage Material shall be measured by compacted volume in cubic yards (CV). The salvaging, processing, stockpiling and placing shall be considered a single operation.

Only material salvaged from the project site may be used in the construction of the project and only if the material is approved by the Engineer prior to placement. Salvaged material from other locations may not be used.

D. Stabilizing Aggregate shall be measured by weight in tons of material acceptably placed. A computer generated ticket must be provided to verify weight or no payment will be made. Stabilizing Aggregate shall be 3" Minus unless otherwise specified by the Engineer.

1.04 PAYMENT: Payment for acceptable quantities of excavation and embankment shall be at the Contract unit price as listed on the Bid Proposal. All associated work items shall be considered incidental.

Payment of Common Excavation will be made for the proposed quantity unless dimensional changes are authorized. Common excavation will include all excavation from existing ground to the bottom of the proposed street section (top of the subgrade).

Payment for Stabilizing aggregate shall include, but is not limited to, all labor, equipment and materials needed for removal of existing material, placement, grading, compaction, test rolling, and tolerancing as specified. The excavation shall be defined as the removal of material below the subgrade, as directed by the engineer in the field, which is necessary to provide a stable foundation for the roadway. Recycled concrete material may be used if the material meets the gradation. A gradation test report must be submitted for review and approval prior to placement.

The Contractor shall compact and shape the material to its full width as may be necessary to produce the required density and stability in the typical section and the required grade and cross section.

Tickets must be provided with weight shown for payment of material.

Excess material on the project shall become the property of the Contractor for disposal off site, unless directed otherwise by the Engineer.

1.05 DEFINITIONS: Excavated materials will be classified in accordance with Mn/DOT 2105.2

PART 2 - PRODUCTS

2.01 MATERIALS: Borrow material shall be in accordance with the following:

A. Topsoil Borrow – 3877.2A
B. Stabilizing Aggregate shall be of the class specified on the bid proposal.
   3" Minus Gradation averages are as follows:

Sieve	% Passing
3"	100.0
2"	89.7
1"	63.1
¾"	52.2
3/8"	33.6
#4	22.9
#10	17.5
#40	12.9
#200	6.8

PART 3 - EXECUTION

3.01 EXCAVATION: The Contractor shall grade the project site using the following guidelines:

A. If present, remove frozen soils, ice and snow prior to grading operations.
B. All grading shall conform to the planned grades, cross-sections and stakes.
C. All topsoil and organic material shall be removed below the typical section.
D. Confine operations to established limits.
E. Maintain site in a well-drained condition at all times.
   1. Install planned drainage facilities concurrent with embankment operations.
   2. Provide temporary drainage facilities to maintain existing drainage courses until permanent facilities are operative.
   3. Seepage trenches shall be provided for granular backfill replacement of unstable areas.
F. The Contractor will be solely responsible for the safety of all trenches and will indemnify and hold harmless the City or the City's agents from all claims incurred due to unsafe trench conditions.

3.02 PREPARATION OF EMBANKMENT FOUNDATION: The Contractor shall remove topsoil, organic and unstable material from the roadbed prior to placing embankment.

3.03 SUBGRADE PREPARATION: The Contractor shall excavate, compact and shape the subgrade to provide a smooth, stable surface for the placement of the aggregate base. The material shall be compacted to 100% of Standard Proctor Density. The necessary moisture content in the material shall be produced and maintained by scarification or application of water as directed by the Engineer.

Operations shall continue until no rutting or displacement occurs under the test rolling or construction traffic. A finished surface shall be provided within 0.05 feet of the prescribed elevation at all locations.

3.04 DISPOSAL OF EXCAVATED MATERIAL: Only suitable excavated materials may be used for embankment construction. The Contractor shall excavate and stockpile all suitable topsoil material separately for later use.

Embankments shall be constructed in layers of uniform materials.

Non-uniform soils shall be mechanically mixed to produce uniform moisture content and density. Stone, ice or frozen lumps exceeding six inches (6") shall not be placed in the roadbed embankment. No stone, concrete or bituminous fragments shall be placed in the upper six inches (6") of the roadbed embankment or within eighteen inches (18") of any structure.

All surplus or unsuitable excavated materials shall become the property of the Contractor for disposal offsite at no cost to the Owner.

3.05 PLACING EMBANKMENTS: The Contractor shall not place embankment material on ground that is frozen. The material shall be deposited and spread in uniform layers. The upper three feet (3') of the roadbed shall be constructed in layers of no more than six inches (6"). The remainder of the roadbed shall be constructed in layers of no more than twelve inches (12").

3.06 COMPACTING EMBANKMENTS: Embankments shall be constructed from approved excess excavation material with proper moisture content maintained during placement and compaction. Compaction shall be as follows:

A. Compact upper three feet (3') of embankment to not less than one hundred percent (100%) of Standard Proctor Density.
B. Compact remainder of embankment to not less than ninety-five percent (95%) of Standard Proctor Density.
C. In pavement areas, any settlements which interfere with normal use and maintenance [defined as settlement greater than one inch (1") as measured with a ten feet (10') straight edge] within the warranty period of this contract shall be considered failure of the mechanical compaction and shall be repaired by the Contractor at no cost to the Owner.

   Any settlements in boulevard, yard and ditch areas including service trench areas which interfere with normal use and maintenance as determined by the City Engineer within the warranty period of this contract shall be considered failure of mechanical compaction and shall be repaired by the Contractor at no cost to the Owner.

3.07 FINISHING OPERATIONS: The Contractor shall finish all earthwork to within a 0.05 of a foot of the staked grade and conduct finishing and topsoiling operations concurrently with the grading operations to avoid erosion.

SECTION 2111

TEST ROLLING

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications includes, but is not limited to, testing the stability of the subgrade prior to base construction of the streets and pathways and a second test on the aggregate base prior to the street and pathway paving by driving a dump truck over the subgrade.

1.02 PAYMENT: Test rolling shall be considered incidental to the project and no direct compensation will be made.

The reconstruction and retesting of sections found to be unstable will be considered incidental to the project.

1.03 SCHEDULING AND SEQUENCING: The first roll test shall be performed after the subgrade is established to the proposed width and is within five hundredth of a foot (0.05') of the staked grades at all locations.

The second test shall be performed after the placement and tolerancing of the aggregate base has been completed.

No test rolling shall be executed until both the Contractor and the Engineer agree that the subgrade is acceptable.

PART 2 - PRODUCTS

2.01 EQUIPMENT: All roll tests shall be performed using a loaded dump truck, which will deliver a gross weight of at least twenty-seven (27) tons. A computer generated ticket shall be provided to verify the weight.

PART 3 - EXECUTION

3.01 PROTECTION: The Contractor shall protect all culverts and other structures during the test rolling. Additional cover shall be provided as required over inplace structures as protections during the test rolling. This additional cover shall be considered incidental to the project.

Structures damaged during the test rolling shall be replaced at no additional cost to the City.

3.02 APPLICATION: The test roll shall take place under the following conditions:

A. The entire width of the proposed pavement structure shall be tested.
B. The test roll shall be operated at a speed between one to four miles per hour (1-4 mph)
C. The truck shall make a minimum of three (3) passes over the entire street.
D. Tested areas between tire paths shall not exceed two feet (2').

3.03 FIELD QUALITY CONTROL: The Engineer and Contractor shall be present for all test rolling and shall agree to the following conditions:

A. The roadbed will be considered unstable at any location where the surface shows yielding or rutting of more than three quarters of an inch (¾") during test rolling of the subgrade. No deflection will be allowed in the aggregate base.

B. All unstable areas shall be reconstructed in accordance with Section 2211.

SECTION 2131

DUST CONTROL/APPLICATION OF CALCIUM CHLORIDE

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include, but is not limited to, furnishing and applying water and/or the application of calcium chloride as a roadbed surface treatment or as an admixture with aggregate materials for dust control.

1.02 PAYMENT:
Payment for the application of calcium chloride will be made at the contract unit price bid in gallons at 60˚F (weight may be converted to gallons based on 11.6 pounds per gallon for a 38% concentration) or by area of application in square yards (SY) as specified on the Bid Proposal. Tickets must be submitted prior to payment.

All associated work items shall be considered incidental to the bid item.

Application of water as dust control shall be considered incidental to the project cost.

1.03 SUBMITTALS: The Contractor shall submit the source and analysis of the calcium chloride proposed for use prior to the start of construction.

PART 2 - PRODUCTS

2.01 MATERIALS: All calcium chloride used on the construction site shall be in accordance with Mn/DOT 3911. All water shall be clear and free from contaminants.

Water for dust control may be obtained from Public Works (13770 Dakota Avenue). The Contractor may pick up a key from the staff at the Public Works Building for access to water on site.

2.02 EQUIPMENT: The distributor used to apply calcium chloride shall be in accordance with Mn/DOT 2131.3.

The distributor shall be a self-propelled, pressure type, mounted on pneumatic wheels. The water supply tank shall have distributing bars to ensure uniform application with a pump capacity to provide any rate up to 250 gallons per minute.

PART 3 - EXECUTION

3.01 SURFACE APPLICATION: The Contractor shall apply the calcium chloride solution, using a distributor, uniformly in the locations and at the rate of 0.30 gallons per square yard or as directed by the Engineer in the field.

3.02 ADMIXTURE APPLICATION: The Contractor may apply calcium chloride, as an admixture, directly on the road surface and then mechanically mix it with the aggregate only if previously approved by the Engineer in the field.

3.03 APPLICATION: The Contractor shall within eight (8) hours of the Engineer's request apply dust control in the locations and at the rates or amounts directed.

The Contractor shall be responsible for reapplication of water or calcium chloride as dust control as needed or directed by the Engineer. If the Contractor's response to controlling dust is determined to be inadequate, the City will sublet the work and deduct the cost plus ten percent (10%) from a future payment.

SECTION 2211

AGGREGATE BASE

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include, but is not limited to, all labor, materials and equipment necessary to construct the aggregate base specified.

1.02 REFERENCES AND RELATED SECTIONS:
A. Section 2232 – Mill Pavement Surface
B. Section 2105 - Excavation and Embankment
C. Section 2111 - Test Rolling

1.03 METHOD OF MEASUREMENT: Aggregate Base shall be measured by weight in tons of material acceptably placed or as shown on the Bid Proposal.

All water used for wetting the Class 5, to achieve the density and dust control, will be incidental to the price of the Class 5 as indicated on the Bid Proposal.

1.04 PAYMENT: Payment for acceptable quantities of aggregate base shall be at the contract unit price as listed on the Bid Proposal. All associated work items shall be considered incidental. All Class 5 tickets shall be turned into the project inspector at the end of each day. Any tickets turned in the following day or later will not be accepted by the Owner for payment.

All water used for wetting the Class 5 to achieve the density and dust control will be incidental to the price of the Class 5 as indicated on the Bid Proposal.

1.05 SUBMITTALS: The name and location of the source, as well as a sample gradation shall be provided for each aggregate material.

1.06 HANDLING AND DELIVERY: The Contractor shall stockpile and drain all aggregate removed from below water for a minimum of twenty-four (24) hours prior to delivery.

1.07 SEQUENCING AND SCHEDULING: After the utilities are completed, the Contractor shall grade the roadway to the proper width and depth of the subgrade. The tolerance of the subgrade shall be within ±0.05’ as specified. A City representative shall inspect the subgrade with the Contractor.

The City representative and the Contractor shall be present while a roll test is performed. If correction is needed, it shall be done at this time. The Contractor shall then place the Class 5 on the subgrade.

1.08 SITE CONDITIONS: Aggregate shall be deposited only on dry, compacted, approved subgrade so that no rutting or displacement will occur under construction traffic.

PART 2 - PRODUCTS

2.01 MATERIALS: Aggregate Base material shall be in accordance with Mn/DOT 3138, Class 5. Limestone from the Platteville formation is not acceptable.

If the Contractor proposes to use salvaged material in lieu of Class 5 aggregate base, the decision must be approved by the Engineer prior to placement. A gradation test will be required prior to approval. Failure to gain permission to substitute salvaged material could result in the removal of the material at no additional cost to the Owner.

2.02 3" MINUS STABILIZING AGGREGATE: Stabilizing aggregate shall include all labor, equipment and materials needed for removal of existing material, placement, grading, compaction, test rolling, and tolerancing as specified. The excavation shall be defined as the removal of material below the subgrade, shown on typical section and as directed by the engineer in the field, that will be necessary to provide a stable foundation for the roadway. Recycled concrete material may be used if the material meets the gradation. A gradation test report must be submitted for review and approval prior to placement.

The Contractor shall compact and shape the material to its full width as may be necessary to produce the required density and stability in the typical section and the required grade and cross section.

Tickets must be provided with weight shown for payment of material.

3" Minus Gradation averages are as follows:

Sieve	% Passing
3"	75-95
2"	50-80
1"	25-75
¾"	25-65
3/8"	15-50
#4	15-45
#10	5-40
#40	0-15
#200	0-15

2.03 AGGREGATE SURFACING: The Contractor shall install Aggregate Surfacing, Class 2 that meets the gradation requirements outlined in Mn/DOT Specification 3138. When connecting into an existing aggregate surface that is not Class 2, the Contractor shall match the existing aggregate surfacing material with no adjustment in unit price compensation being made.

2.04 SALVAGE AGGREGATE AND BITUMINOUS MATERIAL: "Salvaged Aggregate and Bituminous Material" shall include the removal or milling, processing, hauling, stockpiling on site, placement, grading, and compaction of existing bituminous pavement and aggregate base course. During bituminous material excavation, the Contractor shall monitor the material being mixed to ascertain that proper quantities and qualities of materials are being used within the salvaging process. The Contractor shall adjust the depth of the mixing/processing as necessary to insure that a proper material gradation is being maintained. Excess salvaged aggregate and bituminous material shall become the property of the Contractor and shall be disposed of offsite at no cost to the City.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS: With vibratory compaction, Aggregate Base material shall be placed in layers not-to-exceed a maximum of six inches (6") compacted thickness.

The Contractor shall deposit only the amount of aggregate that can be spread and compacted during the same day. Water may be added during mixing to produce proper compaction.

All aggregate shall be mixed uniformly to maintain gradation requirements. Each layer shall be spread and compacted to the required cross section and density before placing the next layer. Layers shall be compacted to 100% of Standard Proctor Density.

Each course shall be constructed to within 0.05 feet of the planned grades and staked elevations at all locations. Any material that becomes contaminated after placement shall be removed and replaced at no additional cost to the Owner.

The Contractor shall place the initial bituminous base course or otherwise protect the inplace aggregate base within seven (7) days after placement, unless previously approved by the Engineer.

3.02 TICKET REQUIREMENTS: Tickets must be a minimum size of four inches by six inches (4" x 6") and include the following information:

1. Name of Supplier and name of Buyer
2. Truck Number, ticket number, and number of Truck axles.
3. Weight of Truck with material (gross weight), weight of Truck empty, and Difference between gross weight and truck empty weight
4. Total tons and running total of material to job site
5. Date & Time
6. Job number and Project Name
7. Directions to job site and signature line for driver

SECTION 2232

MILL PAVEMENT SURFACE

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include, but is not limited to, the milling and/or reclaiming of on-site existing bituminous pavement by utilizing a machine process to provide a blended aggregate mixture of existing bituminous and aggregate base material.

1.02 METHOD OF MEASUREMENT: Pavement milling will be measured by the area of the surface removed in square yards, based upon actual finished dimensions of work measured in the field. Pavement surface shall include all integrant bituminous curb, and areas of removal regardless of type and depth. If bituminous is overlaid on concrete or vice versa, there will be no additional cost to the Owner for the removal of the underlying pavement.

1.03 PAYMENT: Payment will be made on the actual area milled as measured in the field. All associated work items, including but not limited to, traffic safety, cleanup and disposal operations, shall be considered incidental to the bid item.

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION

3.01 RECLAMATION OPERATION: The roadway material being reclaimed by the operation shall be used within the project area or delivered to the Owner according to the contract documents.

The reclaimed surface may be compacted to provide a temporary driving surface as directed by the Engineer.

Prior to the milling or reclamation process, all structures, including valve boxes, shall be located and marked to avoid damage. Requests to lower structures prior to reclamation should be made to the Engineer before construction begins. The Contractor shall inspect all structures prior to construction and report any dirt, debris or damage to the Engineer. Any damaged or disturbed structures not reported prior to the reclamation process shall be, replaced or cleaned by the Contractor at no additional cost to the Owner.

3.02 MILLING OPERATION: The Contractor shall mill the existing bituminous pavement to an average depth as shown on plans or directed by the Engineer in the field. The Contractor shall monitor the operations so that milling of the bituminous surface is such that the existing wear course layer is effectively removed. Variations of 0.5 inches, either positive or negative, to the planned depth of removal should be anticipated by the Contractor and considered without additional compensation.

The removed surface material shall become the property of the Contractor, except as specified within these specifications, and shall be disposed of offsite and at no cost to the Owner. Disposal shall be incidental to the Mill Bituminous Surface.

SECTION 2357

BITUMINOUS TACK COAT

PART 1 - GENERAL

1.01 SUMMARY: This section includes treating a prepared base with bituminous material prior to placing a bituminous course thereon.

1.02 REFERENCES AND RELATED SECTIONS:
A. Mn/DOT Section 2360 – Plant Mixed Asphalt Pavement
B. Section 2531 – Concrete Curb and Gutter and Driveways

1.03 MEASUREMENT: Measure by volume in gallons at 60º F of material acceptably placed. The basis for quantity is 0.05 gallons per square yard.

1.04 PAYMENT: Payment for bituminous tack coat shall be at the contract unit price as listed on the Bid Proposal.

1.05 SITE CONDITIONS: Tack coat shall not be applied to any wet surfaces or prior to imminent precipitation.

1.06 SEQUENCING AND SCHEDULING: The Contractor shall coordinate application to allow traffic movement in at least one direction without pick-up or tracking tack oil.

The Contractor shall provide traffic control to avoid or limit vehicles on applied areas. Any damage to private vehicles due to insufficient traffic control shall be the sole responsibility of the Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS: Bituminous Tack Coat shall be in accordance with Mn/DOT 2357.2 A.

PART 3 - EXECUTION

3.01 PREPARATION: The Contractor shall make all repairs to the roadway, mill any temporary ramps, remove all foreign matter from the roadbed and verify that the surface is clean and dry prior to application. No compensation will be made for this work.

Adjacent curb and gutter, sidewalk and other exposed surfaces shall be protected from overspray.

3.02 EQUIPMENT: Material shall be applied with a distributor meeting the requirements of Mn/DOT 2360.3.B.2.d.

3.03 APPLICATION: Bituminous tack coat shall be applied in a uniform coating on the contact surface of all fixed structures and the edge of in place courses at the transverse and longitudinal joints. The application rate shall not exceed 0.05 gallons per square yard with the temperature of the material at application in accordance with Mn/DOT 2357.3 D.

SECTION 2411

RETAINING WALLS

PART 1 - GENERAL

1.01 SCOPE: This section includes construction of retaining walls. The work includes furnishing and installing retaining walls to the lines and grades designated on the construction drawings prepared by others, or as directed by the Engineer and furnishing and installation of appurtenant materials required for construction of the retaining walls as shown on the construction drawings, or as directed by the Engineer.

1.02 RELATED SECTIONS:

A. Mn/DOT 3149 – Granular Material
B. Mn/DOT 3138 – Aggregate for Surface and Base Courses
C. ASTM C 33 – Specification for Concrete Aggregates
D. ASTM C 1372- Specification for Dry-Cast Segmental Retaining Wall Units
E. ASTM C 140 – Methods for Sampling and Testing Concrete Masonry Units and Related Units
F. ASTM C 150 – Specification for Portland Cement
G. ASTM C 331 – Specification for Lightweight Aggregates for Concrete Masonry Units
H. ASTM C 595 – Specification for Blended Hydraulic Cements
I. ASTM C 618 – Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use Concrete
J. ASTM C 920 – Specification for Elastomeric Joint Sealants
K. ASTM C 989 – Specification Slag Cement for Use in Concrete and Mortars
L. ASTM D 698 – Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
M. ASTM D 2487 – Classification of Soils for Engineering Purposes

1.03 METHOD OF MEASUREMENT: Retaining walls shall be measured as total square yards of retaining wall, including any below grade. The Contractor shall dig out each step below grade to allow for accurate measurement.

1.04 PAYMENT: Payment for retaining wall shall include the furnishing and installation of wall units along with backfill, geogrid, foundation drain aggregate, drain tile, and other appurtenant and incidental materials required for construction of the retaining walls as shown on the construction drawings. It shall include all compensation for labor, materials, supplies, equipment and permits associated with constructing the retaining walls.

The quantity of the retaining walls as shown on the plans may be increased or decreased at the direction of the Engineer based on construction procedures and actual site conditions. No change in unit cost shall be considered based on any change in quantity.

Payment for acceptable quantities of retaining wall shall be at the contract unit price as listed on the Bid Form. All associated work items shall be considered incidental.

1.05 SUBMITTALS: The Contractor shall submit one (1) sample of each proposed type of retaining wall unit a minimum of ten (10) days prior to construction for approval. The sample shall be typical of the size, texture, color and finish proposed for installation.

Shop drawings shall be submitted for approval and shall include footing and top of wall profiles, footing details, other miscellaneous details and proposed detailed procedures for construction of retaining wall systems and the aggregate drain. An engineered design is not necessary if the height of the wall is less than forty-eight inches (48"). In that case, only shop drawings showing the Contractor's understanding of the design in the construction drawings are required.

If the wall is forty-eight inches (48") or higher, a design signed by an engineer is required. Railings must be installed to city's standards, if the wall is along a pedestrian route or the City deems it a safety requirement.

The Contractor shall submit, prior to construction, to the Engineer the following documentation:

A. Descriptive technical data, provided by the manufacturer, on the modular block.
B. Certificates of Compliance stating that the materials provided meet the requirements specified.
C. Density Test Reports shall be submitted immediately for review and acceptance or direction on corrective action required.
D. Results of three (3) strength tests and three (3) absorption tests from an independent laboratory taken on six cap blocks provided by the Contractor.

1.06 QUALITY ASSURANCE: The retaining wall subcontractor shall submit references for three jobs of similar magnitude and detail completed within the past two years.

1.07 DELIVERY, STORAGE AND HANDLING: Upon delivery, all materials shall be checked by the Contractor upon delivery to ensure that the proper material has been received.

The Contractor shall protect the materials from excessive mud, wet cement, epoxy and like substances until the completed wall is accepted.

PART 2 - PRODUCTS

2.01 MATERIALS: The Contractor shall construct retaining walls as shown on the plans and as directed by the Engineer. The retaining walls shall be solid core "Versa-Lok – Weathered Mosaic, color – Chestnut Blend, as manufactured by Versa-Lok Midwest, Oakdale, MN 55128, Keystone – Country Manor Tumbled, Color – Tan/No. 591, Recon "Big Block" or approved equal.

The Contractor shall place Construction Adhesive between the top two layers of the retaining wall block. Payment for the adhesive shall be incidental to the retaining wall construction.

2.02 PHYSICAL REQUIREMENTS:

A. Retaining wall units shall have a minimum 28-day compressive strength of 3,000 psi in accordance with ASTM C 90, and the concrete masonry shall have adequate freeze-thaw protection with a maximum moisture absorption rate of eight percent (8%). Exterior dimensions of the block may vary. The units shall be solid and split to present a stone texture. The block color shall consist of a shade, subject to approval by the City. The units shall be positively interlocked by means of clips, pins or lip extensions from the block.
B. Wall Caps shall be precast concrete units and shall be placed on top of all retaining walls. The units shall have a minimum of 3⅝" height, a ten inch (10") depth and a color and texture on exposed faces to match that of the modular block units. The cap units shall meet the physical requirements for the modular block units in the paragraph above.

2.03 PERMISSIBLE VARIATIONS IN DIMENSIONS: Overall dimension (width, height, length) as defined by the manufacturer shall not vary more than ±⅛ inch in the depth or length of the units and not more than ⅛ inch in height from the specified dimension.

2.04 FINISH AND APPEARANCE: All units shall be sound and free of cracks and other defects that would interfere with the proper placing of the units or significantly impair the strength or performance of the construction. Minor cracks incidental to the usual method of manufacture, or minor chipping resulting from shipment and delivery are not grounds for rejection. Units showing cracks larger than ½" when measured along their length shall not be used within the wall.

The face of units that are to be exposed shall be free of chips, cracks or other imperfections when viewed from a distance of thirty feet (30'). Five (5) percent of a shipment may contain slight cracks or small chips not larger than one inch (1").

2.05 SAMPLING AND TESTING: The purchaser or authorized representative shall be accorded proper facilities to inspect and sample units from lots ready for delivery. The Contractor shall notify the authorized representative in writing a minimum of five (5) calendar days prior to shipment of materials.

Sample and test units for compressive strength and absorption shall be in accordance with ASTM C 90.

The expense of inspection and testing shall be borne by the Contractor except as specified in paragraph "PERMISSIBLE VARIATIONS IN DIMENSIONS" and unless otherwise agreed.

PART 3 - EXECUTION

3.01 EXCAVATION: The Contractor shall excavate only within limits necessary for construction of the retaining wall.

3.02 FOUNDATION SOIL PREPARATION: Foundation soil shall be excavated as required for footing dimensions as shown or as directed by the Engineer. Unsatisfactory material encountered below the grades shown shall be removed as directed and replaced with suitable common excavation material, at no additional expense to the Owner. Where the foundation becomes unstable due to the Contractor's lack of control of groundwater or surface water, the unstable material shall be removed as directed and replaced with satisfactory material at no additional expense to the Owner. Over excavation will not be paid for, and replacement with same and/or wall system components to the indicated excavation grade as selected by the Engineer will be required at the Contractor's expense. Backfill shall be placed and compacted as specified in Section 2105. Backfilling and compaction shall be incidental to the cost of the wall construction. Required density is ninety-five percent (95%) of maximum density, ASTM D 698.

The ground surface shall be broken up to a minimum depth of twelve inches (12"), pulverized and compacted to the specified density. Subgrade preparation shall be to the depths and widths shown. The subgrade soil shall be tested to ensure that the density meets or exceeds ninety-eight percent (98%) of Standard Proctor Density. One test shall be conducted in the area to receive the aggregate base course.

3.03 AGGREGATE BASE AND FOUNDATION DRAIN: Aggregate base materials shall be installed upon the upgrade as shown. The aggregate base shall be placed in one lift and compacted to

ninety-eight percent (98%) of maximum density. Aggregate base shall be to depths and widths as shown and shall be of consistent gradation and materials throughout the length of the wall.

After placement of aggregate base, the Contractor shall perform excavation for wall base drain to the dimensions shown on the drawing and compact. Base filler aggregate shall be placed as shown on the drawing. The filler aggregate shall be compacted to obtain ninety-eight percent (98%) maximum density.

3.04 RETAINING WALL INSTALLATION: The retaining wall shall be constructed as follows:

A. First course of concrete wall units shall be placed on the prepared base. The units shall be checked for level and alignment. The first course is the most important to ensure accurate and acceptable results.
B. Ensure that blocks are in full contact with the prepared base.
C. Blocks shall be placed end-to-end at constant elevations for full length of wall alignment where possible. Alignment shall be done by using a string line or offset from a base line.
D. Construction for retaining wall shall begin at lowest base elevation and progress towards the highest base elevation.
E. Lay each course ensuring a positive connection between adjacent courses is achieved following the manufacturer's instructions. Blocks shall have no gap between units at the facing of the wall. Backfill and compact in accordance with Section 2105.
F. Sweep all excess material from the top of the blocks and install next course.
G. Alignment Tolerances
    1. Horizontal: ± one inch (1") from the alignment shown in the plans.
    2. Vertical: The top of footing elevations shall be within one inch (1") from elevations shown in the plans.
    3. Plumbness:
        a. Batter – shall fall within the maximum and minimum shown in the plans.
        b. Level – blocks shall be placed level within 1.25" in 50' perpendicular and parallel to the wall alignment.
H. Apply water sealer and/or stain(s).
I. Drain tile needs to be added to all retaining walls, regardless of size.

3.05 QUALITY CONTROL: The Contractor shall establish and maintain quality control for the work under this section to assure compliance with contract requirements and maintain records of its quality control for all construction operations including, but not limited to, the following:

A. Foundation Preparation and Backfill Density
B. Alignment tolerances
    1. Horizontal
    2. Vertical
    3. Plumbness
    4. Gaps between wall units
C. Test Results. A copy of the records of inspection and tests, as well as the records of corrective action taken, shall be furnished to the Engineer.

SECTION 2450

DEWATERING

PART 1 - GENERAL

1.01 SCOPE: This section shall include providing and maintaining an adequate dewatering system to remove and dispose of all precipitation, surface and groundwater entering the excavation, trenches, and other area of work.

1.02 REFERENCES AND RELATED SECTIONS:
2451.301B Trench Excavation

1.03 MEASUREMENT AND PAYMENT: No direct compensation shall be made for the dewatering of trenches, excavation for structures or removal of surface water. Such dewatering shall be considered incidental to the project unless a specific bid item is provided in the Bid Proposal.

1.04 PERMITS AND LICENSES: The Contractor shall be responsible for obtaining all necessary permits as related to dewatering and to comply with all stipulations of such permits.

A permit is required from the Minnesota Department of Natural Resources (DNR) for any dewatering of groundwater. The Contractor shall provide specific information to the DNR, obtain the permit, and be responsible for any pumping, and/or additional fees, as required.

Discharging of water off site is regulated by the NPDES Construction Stormwater Permit. All discharging must be performed in compliance with this permit.

The Contractor is responsible for a performance escrow in the amount determined by the City Engineer and all special conditions of all permits.

PART 2 - PRODUCTS

2.01 MATERIALS: Dandy Dewatering bag, Flocculent bags, Watering Dumpsters, sediment traps or approved equal.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS: Each excavation shall be kept dry during the course of all work herein, including, but not limited to, subgrade correction, pipe installation, structure construction and backfilling, to the extent that no damage from hydrostatic pressure, flotation or other water damage results. All excavations shall be dewatered to a depth of at least six inches (6") below the bottom of the concrete slab or pipe invert to be installed therein.

The Contractor may use any method or combination of methods for dewatering he/she chooses. However, all dewatering methods and equipment, which in the opinion of the Engineer are ineffective or noncompliant with relevant ordinances, rules, regulations and/or standards, shall be abandoned, improved, replaced or otherwise altered to obtain effective and compliant dewatering at no additional cost to the City.

The Contractor shall provide all power, pumps, materials and apparatus necessary and shall be responsible for disposing of the water pumped from the excavation in a manner that will not interfere with other work within the area, will not damage public or private property and is compliant with relevant ordinances rule or regulations. The Contractor shall be responsible for the condition of any pipe, conduit, ditch, channel or natural watercourse utilized for drainage purposes, and all erosion, sediment or other adverse results of their use shall be repaired at no additional cost to the City.

Buildings located in the area where dewatering may be required could have shallow wells. If, during the dewatering operations, the residential wells are dried up or the water level lowered, the Contractor will be required to provide those buildings an approved temporary water supply, as required in Section 1518 during the operation of the project. The cost to provide the water supply shall be considered incidental.

3.02 WATER QUALITY CONTROL: All points of concentrated dewatering discharge shall be monitored to determine that no eroded materials from the construction site are being deposited in any natural drainage ways or Waters of the State. No sediment-laden water may be discharged off site.

SECTION 2451

TRENCH EXCAVATION, BEDDING, AND BACKFILLING

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include, but is not limited to, the excavation, trenching and backfill required for underground utility systems.

1.02 REFERENCES AND RELATED SECTIONS:
A. Section 2105 – Excavation and Embankment
B. Section 2557 - Fencing
C. CEAM Specifications - 2600 Trench Excavation and Backfill/Surface Restoration

1.03 PAYMENT: Payment for quantities measured in this section shall be at the contract unit price as listed in the Bid Proposal. All associated work items shall be considered incidental unless specified in the Bid Proposal.

Granular or crushed rock bedding material, dewatering, trenching, sheeting and backfilling, testing, restoring of the surface, necessary permits and all material or work necessary to install the pipe complete in place and the depth specified shall be incidental to the cost.

Foundation Material, placed in the six inches (6") below the pipe, shall be paid for at the unit price in the bid proposal and include all labor, equipment and material necessary to provide a stable pipe foundation.

1.04 SUBMITTALS: The Contractor shall submit to the Engineer prior to any delivery or placement the Name and location of each source of bedding material and a sample gradation.

1.05 WARRANTY: The Contractor shall repair all trench settlements and resulting damage or displacement of surface facilities that occurs within the contract warranty period.

PART 2 - PRODUCTS

2.01 MATERIALS:
A. Crushed Rock Pipe Foundation material shall be in accordance with Mn/DOT 3149.2H.
B. Granular Pipe Foundation material shall be in accordance with Mn/DOT 3149.2F.
C. Aggregate Pipe Foundation material shall be in accordance with Mn/DOT 3149.2G.
D. Replacement Backfill material shall be in accordance with Mn/DOT 3149.2A.
E. Foundation material shall be ¾" clear rock.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS:

A. Pipe Foundation: The trench shall be dug so that the pipe can be laid to the alignment and depth required and shall be excavated only so far in advance of pipe laying as can be placed and restored within twenty-four (24) hours. The trench shall be braced and drained so that the workmen may work therein safely and efficiently. All trenches shall be sheeted and braced to a safe angle of repose. Such angle of repose shall be no less than the repose required by the

Accident Prevention Division of the Minnesota State Industrial Commission or the requirements of the Occupational Safety and Health Act (OSHA) whichever is more restrictive. The Contractor will be solely responsible for the safety of all trenches and will indemnify and save the City or the City's agents harmless from all claims incurred due to unsafe trench conditions.

No trench shall remain open when the Contractor is not present without approval of the Engineer. If any trench remains open, safety fence will be installed at the direction of the Engineer at no additional cost to the Owner.

In rocky or boulder conditions the watermain and storm sewer pipes shall be **bedded in granular materials** which shall be included in the contract price per linear foot of the pipe.

The Engineer will determine the stability of the trench bottom. If the bottom is found to be stable, the Contractor shall shape the trench bottom to conform to the bottom half of the pipe and excavate bell holes to permit proper joining. Bedding may also be required at the direction of the Engineer. Bedding material shall be incidental to the pipe cost unless specified in the bid proposal. For PVC sanitary sewer, granular bedding as shown in is always required.

If the bottom is deemed unstable, the Contractor shall excavate below the pipe grade to a specified depth that is agreed upon by the Contractor and Engineer. Then refill the hole with foundation material in accordance with the detail plate or as directed by the Engineer and compact the material to bed the pipe.

B. Excavation and Embankment: After underground utility construction has been completed within the roadway and shoulders, the Contractor shall proceed with final sub base grading and compaction. Compaction shall be by the Specified Density Method. Standard Proctor tests indicating 100% in the upper three feet (3') of the roadway and ninety-five percent (95%) in the upper three feet (3') of the shoulder will be required. One test for each 500 feet is required.

C. Backfilling: Backfilling consists of placing suitable materials excavated from the trench in successive twelve-inch (12") thick layers from a point twelve inches (12") from the top of the pipe. Each twelve-inch (12") lift shall be compacted before additional material is placed in the excavation.

The top twelve inches (12") of the backfill shall be compacted with the use of a sheep's foot roller or approved similar compaction equipment. Only approved mechanical tamping or compacting will be allowed. Use of bucket compaction or wheel rolling is not permitted.

The density of the backfilled material after compaction shall be ninety-five percent (95%) of Standard Proctor Density from the encasement zone to three feet (3') below the surface and 100% of Standard Proctor Density in the upper three feet (3').

Suitable backfill material may contain any mixture of loam, clay, sand or coarse gravel but shall be free of stones, boulders, chunks, or lumps with any dimension greater than eight inches (8") and shall contain no ashes, refuse, rubbish, roots, frozen material or vegetation or organic material that would cause settlement. In any case, where rocks are present in the backfill material, adequate sand shall also be present and mixed to fill in all voids.

Pipe bedding meeting the Granular Material Gradation shall be spread in six-inch (6") layers and hand tamped and compacted by approved mechanical methods to a density of ninety-five percent (95%) of Standard Proctor Density by the Mn/DOT "Specified Density Method." Care shall be taken to deposit the material simultaneously on both sides of the pipe for the full width of the trench. At the top of the encasement zone, the backfill shall be well compacted by using mechanical tamping equipment in such a manner as not to damage the pipe joints or shift the pipe alignment. The Contractor may not use water to obtain compaction at the pipe zone.

Backfilling shall not be done in freezing weather except by permission of the Engineer, and shall not be done with frozen material or be performed where the material already in the trench is frozen. After backfilling has been accomplished, the Contractor shall be responsible for furnishing backfill or surfacing material as necessary and filling settlement depressions resulting from inadequate compaction or any other construction defect until the acceptance of the work.

In pavement areas, any settlements which interfere with normal use and maintenance (generally a settlement greater than one inch (1") as measured with a ten feet (10') straight edge) within the warranty period of this contract shall be considered failure of the mechanical compaction and shall be repaired by the Contractor at no cost to the Owner.

Any settlements in boulevard, yard and ditch areas, including but not limited to service trench areas, which interfere with normal use and maintenance as determined by the City Engineer within the warranty period of this contract shall be considered failure of mechanical compaction and shall be repaired by the Contractor at no cost to the Owner.

3.02 FIELD QUALITY CONTROL: Density tests shall be taken on backfilled material as directed by the Engineer. Any areas represented by failed density tests shall be recompacted by the Contractor.

The Owner will provide for any initial tests. However any tests that fail or retests will be deducted from any monies owed the Contractor.

3.03 PIPE CLEARANCES AND CONFLICTS: The Contractor shall provide a minimum clearance between sewers and watermain as follows:

A. Maintain ten feet (10') of horizontal clearance between pipes.
B. Maintain eighteen inches (18") of vertical clearance between pipes.
C. When the required vertical clearance cannot be maintained, the Contractor shall provide special pipe crossing as follows:
    1. Construct sewer using pipe material and joints equal to watermain at the crossing point.
    2. Center the pipe lengths at the crossing point.
    3. Provide special foundation material for both pipes.
    4. Place insulation as directed.

3.04 SOLID ROCK EXCAVATION DEFINED: Solid rock excavation shall include such rocks as are not decomposed, weathered or shattered and which require extraordinary construction activities, as determined by the Engineer, including, but not limited to, blasting, barring, wedging, hammering or the use of air tools for removal. Included in this classification shall be the removal of any concrete or masonry structure exceeding two cubic yards (2 CY) in volume, with the exception of concrete pavement, curb, gutter and sidewalk, which may be encountered in the work.

SECTION 2501

CASING PIPE JACKING

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include, but is not limited to, construction of the jacking pit, furnishing and installing the casing pipe and carrier pipe, sand fill, end seal, and all the appurtenances as shown on the drawings.

1.02 METHOD OF MEASUREMENT: Measurement of the casing shall be per linear foot (LF) of casing installed.

1.03 PAYMENT: The casing will be paid for at the unit price as shown on the bid proposal. The payment of the casing pipe will be on a linear foot (LF), and will include the construction of the jacking and receiving pits, furnishing and installing the casing pipe and carrier pipe, sand fill, sealing up both ends of the casing, riser pipes for filling the casing, dewatering, and any other materials that may be needed to install the casing as well as equipment and labor.

1.04 SUBMITALS: The Contractor shall supply, to the City for review and approval, a list of materials and manufacturers of the supplies that will be used in the casing operation.

1.05 PERMITS, BONDS AND INSURANCE: It shall be the responsibility of the Contractor to obtain and provide to the Owner any required permits, bonds, and insurance before beginning construction of the crossing. The Contractor shall contact the permitting agency prior to bidding to ascertain the amount required for the bond.

The Owner will submit the application for the permit unless the issuing agency requires the application to be made by the Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS: Casing pipe shall be welded or seamless steel pipe. Steel pipe shall be minimum 35,000 psi yield strength and shall have a wall thickness as listed below:

Nominal Pipe Diameter (Inches)	Minimum Wall Thickness (Inches)
Under 14	0.250
14 and 16	0.282
18	0.312
20	0.344
22	0.375
24	0.406
26	0.438
28 and 30	0.469
32	0.500
34 and 36	0.531
38 to 42	0.563

PART 3 - EXECUTION

3.01 GENERAL: The casing pipe shall be placed as shown on the plan sheets and as staked by the Engineer. The Engineer and the agency issuing the permit shall approve the method of jacking or auguring prior to the work being done.

All crossing of roadbeds or railroads shall be made by boring inside a casing pipe jacking or augering.

The auger shall not lead the casing pipe by more than one inch (1"). Open trenching shall be restricted to the area from five (5') feet beyond the shoulder to the right of way line; 10 feet for interstate crossings; thirty feet (30') from railroad right of way; and forty feet (40') from the center of the nearest track or as directed by the Engineer.

All voids caused by jacking or boring shall be filled by grouting. A simultaneous grouting and jacking or boring procedure shall be used. The jacking system shall be provided with an integral grouting and casing tube with positive piston pressure on the grout throughout the jacking operations. The grout material shall consist of a sand-cement slurry of at least two sacks of cement per cubic yard and a minimum of water to assure satisfactory placement.

The annular space between the casing pipe and the carried pipe shall be filled with sand and the end sealed with cement grout. The sand filler pipes shall be cut off below grade and capped with a watertight cap.

It shall be the Contractor's responsibility to maintain the proper grade and elevation of the carrier pipe.

Elevations of the casings and ties to the each end shall be provided to the City prior to backfilling.

Any and all lost or damaged equipment shall be the sole responsibility of the Contractor.

3.02 SPACING IN CASING PIPE: The carrier pipe shall be supported within the casing pipe to the proper grade by means of commercially available spacers or treated lumber with metal bands. The spacing of such supports should be in accordance with the pipe manufacturer's recommendations. Special care should be taken to ensure that spacers are correctly assembled and evenly tightened.

3.03 CASING SIZE: The size of the casing pipe shown on the plan sheets or described in the specifications shall be a minimum. The Contractor shall determine the best means required to complete the jacking-boring. If the Contractor chooses to increase the size of the casing, all additional costs associated with the increase will be incidental to the bid item.

3.04 LOCAL CONDITIONS: The soil history in the City of Savage has shown boulders may be found in all areas and at all depths. The Contractor will be required to investigate the site, make a determination and take appropriate measures to complete the casing pipe jacking without additional cost to the Owner. Failure to complete an investigation may result in the denial of additional costs.

SECTION 2503

STORM SEWER CONSTRUCTION

PART 1 - GENERAL

1.01 SCOPE: This section shall be included the complete construction of a storm sewer extension within the street right-of-way or easement. The sewer extension shall be laid as shown on the plans, including manholes and shall include all necessary excavation and backfilling.

1.02 REFERENCES AND RELATED SECTIONS:
A. Section 2451 - Trench Excavation
B. CEAM Specifications - 2621 Sanitary Sewer and Storm Sewer Installation

1.03 METHOD OF MEASUREMENT: All items shall be measured separately according to the design designation as indicated in the plans, specifications, detail plates, and pay item as it is indicated on the Bid Proposal.

1.04 PAYMENT: No extra depth will be paid on storm sewer structures. Payment shall include all component parts thereof as described or required to complete the item, but excluding any item covered by a separate pay item in the Bid Proposal.

All material, labor and equipment necessary to install tied RCP, as required for steep slopes, shall be considered incidental to the cost of the pipe.

Adjust existing storm manhole castings shall be paid when casting is adjusted to the wear course elevation. New concrete rings shall be placed as part of the initial adjustment.

Adjust frame and ring casting will be considered incidental to reconstruct and/or new manholes when the frame and ring casting is adjusted to the base course elevation and/or when the frame and ring casting is adjusted to the wear course elevation when the wear course is placed in the same year as the base course. Adjust frame and ring casting will be paid once for reconstruct and/or new manholes when the frame and ring casting is adjusted to the wear course elevation.

1.05 SUBMITTALS: Prior to ordering precast manhole or catch basin components, Contractor shall submit for review manhole and catch basin shop drawings in order that verification can be made that the materials to be supplied are in conformance with the design concept of the Project and in compliance with the information given in the Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS: The Contractor shall furnish all materials required for the complete construction of the specified work, and all materials shall be new, of first grade and shall be products reputable manufacturers known to the trade.

2.02 MANHOLE AND CATCH BASIN STRUCTURES: The Contractor shall use precast sections unless approved by the Engineer

If the Contractor must construct the manholes and catch basins using segmental block, the following shall apply:

Block work shall be laid up in good workmanlike manner to the dimensions shown. All block shall be wetted thoroughly with water just before laying, and headers and vertical joints shall be broken from course to course. Each horizontal course shall be completed before starting the next course above. Horizontal joints shall be not more than one-half inch (½") thick and vertical joints on inside face not more than three-eighths inch (⅜") thick. All joints shall be complete filled with mortar. All joints on inside shall be plastered smooth with mortar, thickness to be not less then one- fourth inch (¼") at any point.

All work shall be covered when not being worked upon. Masonry shall be kept at a temperature above freezing until mortar has attained sufficient strength and set so that it will not be damaged by freezing. In freezing weather, all materials shall be heated before laying and shall be protected as necessary to prevent damage after laying. No work shall be done in unsuitable weather, unless suitable protection is provided.

The blocks shall be radial blocks and shall conform to the radius of the manhole as detailed. The blocks shall have a vertical groove with one-inch (1") radius on both ends. The batter blocks for the tapered tops shall be a minimum of five inches in thickness and the blocks used in the four-foot diameter manhole section shall be a minimum of six inches in thickness.

The manhole depth to which the six-inch thickness blocks may be used shall not exceed twelve feet (12'). Below this point, the block thickness shall be increased to ten inches (10") for manholes up to twenty feet (20') in depth, and for manholes deeper than twenty feet (20'), the block thickness shall be not less than twelve inches (12"). A flat slab top may be required instead of a tapered top. Precast adjusting rings shall be used to form the upper eight inches (8") of the structure.

2.03 MANHOLE/CATCH BASIN STEPS: Manholes and catch basins deeper than four feet (4') measured from the top of the casting shall have steps spaced sixteen inches (16") on center, on the downstream face of the manhole, unless otherwise specified.

Manhole steps shall be steel reinforced plastic and shall be constructed in accordance with Mn/Dot Standard Plate No. 4180J and subsequent revisions.

2.04 MANHOLE CASTINGS: Manhole casting shall be Neenah Catalog No. R-1642 Type "B" solid cover with two concealed pick holes or equal. The minimum allowable weight for a manhole casting and cover 360 lbs.

Storm sewer manholes shall have lids furnished with "STORM SEWER" cast in two-inch (2") high letters. Full bearing surfaces of frame and cover shall be machined to provide true bearing surface.

For casting adjustments the existing castings shall be reused unless damaged and deemed unusable by the Engineer in the field. If a damaged casting is found, the Contractor must notify the Engineer in the field immediately to verify that the damage was not caused by the Contractor. Any castings damaged beyond use by the Contractor shall be replaced at no cost to the City.

2.05 CATCH BASIN CASTINGS: Catch basin casting and grate shall be as follows:

A. Surmountable or B618 Concrete Curb and Gutter - Neenah Catalog No. R-3067 Casting with Type V Grate or approved equal
B. Ditch or Yard Area Inlet - Neenah Catalog No. R-4342 or approved equal.

C. Valley Gutter - Neenah Catalog No. R-3382 or approved equal.
D. Driveway - Neenah Catalog No. R-3290-A or approved equal.

2.06 OUTLET CONTROL STRUCTURES:
Outlet control structures shall be constructed according to the City's standard detail and the approved design shown on the plans.

2.07 FLARED END SECTIONS WITH RIPRAP:
Flared end sections (FES) shall include trash guards and riprap as shown on the City's standard detail. The last three (3) pipe joints shall be tied according to the detail.

2.08 6" PVC PERFORATED PIPE SEWER W/ WASHED ROCK & FABRIC: The item for 6" PVC Perforated Pipe Sewer W/ Washed Rock & Fabric shall include all labor, equipment, materials and excavation necessary to construct the drain tile line per the detail in the plans. No payment will be made for bends, fittings, cleanouts and non-perforated PVC pipe necessary to connect the perforated pipe section to the drainage structure.

PART 3 - EXECUTION

3.01 ALIGNMENT AND GRADE: All pipes shall be laid and maintained to the required lines and grades, with manholes, catch basins and special structures at the required locations. No deviation from line or grade shall be made without the written consent of the Engineer.

3.02 PIPE LAYING: The alignment of pipe between manholes shall be such as to permit the entire inside circumference to be seen from any manhole to the next adjacent manhole. Piping that does not conform to line and grade shall be relaid at the Contractor's expense.

Pipe shall be laid against the grade of the sewer. The spigot end of the pipe shall be inserted full depth into the bell, and when completed, each line of pipe shall have a uniform and smooth invert. Joints for all sewers shall be made watertight. As soon as the joint is made, the bell depression shall be filled with granular bedding material, which shall be pressured under and around the joint by hand, in such a way as to protect it from sagging or being disturbed. The pipe shall be laid so the bell end is upstream.

The Contractor shall assume total responsibility for assuring that segments of the pipe shall be installed to match the line and grade as shown on the plans.

Joint ties shall be installed on the last three joints at all flared end section locations. The interior of all pipe shall, as the work progresses, be cleaned of all dirt and superfluous materials. The exposed end of the pipe shall be protected with suitable temporary covers until installation is underway. Pipe laid in place shall be protected from damage and disturbance.

3.03 MANHOLE AND CATCH BASIN INSTALLATION: Manholes and catch basins shall be constructed as detailed and set plumb with a maximum deviation of ± 0.05 feet from vertical. All rows of steps shall be set vertical through the height of the manholes.

Channels for the flow through the manholes shall be formed in the floor and grouted smooth to conform to the inverts of the sewers as shown. All lift holes, and any manhole joints, which indicate infiltrations, shall be filled with expanding grout.

The Contractor shall be responsible for keeping all new and existing manholes clean and free of dirt at all times.

The adjusting rings for the catch basin castings shall be set in a bed of mortar, and the exterior of the adjusting rings shall be given a one-half inch (½") mortar covering. The joints of the adjusting rings shall be completely filled with mortar and the interior joints struck smooth.

The storm sewer manhole casting adjustments shall include precast concrete adjusting rings as required with a minimum of two (2) rings and a maximum of six (6) rings.

Precast manholes shall have a one-foot (1') or one-foot four-inch (1'- 4") manhole section installed under the cone section or top slab to allow for height adjustment.

3.04 ADJUST MANHOLE CASTING: Adjust existing manhole castings shall be paid when the casting is adjusted to the wear course elevation. New concrete rings and an I/I barrier shall be placed as part of the adjustment and shall be incidental to the price of the adjustment.

Existing castings shall be reused unless damaged and deemed unusable by the Engineer in the field. If a damaged casting is found, the Contractor must notify the Engineer in the field immediately to verify that the damage was not caused by the Contractor. Any castings damaged beyond use by the Contractor shall be replaced at no cost to the City.

All manholes shall be adjusted to a final elevation of three-eighths inch to one-half inch (⅜" to ½") below the grade of the roadway. If a wear course is to be place the following year, the manhole shall be adjusted for the base course and again for the wear course. Any structure not meeting the required tolerance shall be adjusted to the appropriate elevation at no cost to the owner.

All labor, equipment and material necessary to patch the areas around manhole adjustments including, but not limited to, sawcutting, aggregate base and bituminous material shall be considered incidental to the price of the manhole adjustment.

3.05 LASER BEAM CONTROL: The Contractor shall maintain the line and grade of the pipe in the trench by means of a laser machine. The laser apparatus shall be in good working order when being used. When directed by the Engineer, the Contractor shall set the laser machine above the ground and assist the Engineer in verifying the working order of the laser machine. The Contractor shall periodically check the line and grade of the pipe being laid by other means. The Contractor shall check the grade of each structure placed by means of an automatic level and rod or by other means approved by the Engineer.

3.06 CONNECT TO EXISTING DRAIN TILE: The bid item for Connect to Existing Drain Tile shall include all labor, equipment, and materials necessary to reconnect the existing drain tile lines currently connected into the storm sewer structures and pipe on 129th and Ottawa. Drain tile pipe that is currently connected to the storm sewer structure shall be reconnected to the new structure. Drain tile pipe that is currently connected to the storm sewer pipe at the main shall be reconnected at the main with payment for the connection being made in addition to payment by the Each for the PVC Wye under item '8"x6" Wye (SDR 26)'.

SECTION 2506

MANHOLE, CATCH BASIN AND VALVE BOX ADJUSTMENT

PART 1 - GENERAL

1.01 SCOPE: This section includes, but is not limited to, the adjustment of frame and ring castings and valve boxes to the surface elevation.

1.02 REFERENCES AND RELATED SECTIONS:
Section 2360- Plant-Mixed Asphalt Pavement

1.03 METHOD OF MEASUREMENT:

A. Valve Box Adjustments:
Each valve box adjustment shall be measured as an individual unit as listed in the Bid Proposal. Valve box adjustments in green areas are considered incidental to the installation of valve.

B. Catch basin Casting Adjustments:
Casting adjustments for new curb catch basins shall be incidental to the installation of catch basins in new curb or green areas.

1.04 PAYMENT:

A. Frame and Ring Casting Adjustments:
Manhole casting adjustments include precast concrete adjusting rings and I & I Barrier as required. Casting adjustments for existing curb catch basins shall be paid for under the bid item for adjust frame and ring casting.

All manholes, existing or new, shall be adjusted to a final elevation of three eighths inch ($^3/_8$") to one-half inch (⅜" - ½") below the grade of the roadway. If the wear course is to be placed the following year, the manhole shall be adjusted for the base/binder course and again for the wear course. Any structure not meeting the required tolerance shall be adjusted to the appropriate elevation at no cost to the Owner.

B. Valve Box Adjustments:
Adjustment of water valve box assemblies, including extensions if required, shall be paid for at the contract unit price bid per each. All gate valves, existing or new, and gate valve manholes shall be adjusted to a final elevation of three-eighths inch to one-half inch (⅜" - ½") below the grade of the roadway. If a wear course is to be placed the following year, the gate valve shall be adjusted for the base/binder course and again for the wear course. Any structure not meeting the required tolerance shall be adjusted to the appropriate elevation at no cost to the Owner.

C. Catch Basins:
Payment for adjustment of existing catch basin frames will be made only when the adjustment necessitates the addition or removal of concrete adjustment rings or masonry or when the adjustment rings of a catch basin must be shifted laterally to meet a proposed curb. No compensation will be allowed for removal of castings when such removal is for the convenience of the contractor. Two foot (2') by three foot (3') catch basin rings shall be

sealed with Ess Brother's Flex-Seal, or approved equal. Sealing shall be considered incidental to the installation or adjustment.

D. Payment schedule:
Payment for acceptable quantities of casting and valve box adjustments shall be at the contract unit price as listed in the Bid Proposal. All associated work items, including but not limited to aggregate and bituminous patching, shall be considered incidental. **Payment for adjustment shall be paid once, with 50% at placement of base/binder and the remaining 50% at placement of wear.** Any additional adjustments shall be considered incidental.

Manholes and/or valves constructed as part of the project will be paid as "construct" or "furnish and install" to the base/binder course and as an adjustment to the wear course.

Catch Basins constructed as part of the project will be paid only as "construct" or "furnish and install" to the concrete curb elevation. Any additional adjustments shall be considered incidental.

PART 2 - PRODUCTS – not used

PART 3 - EXECUTION

3.01 UTILITY ADJUSTMENT: Adjustments may not be made more than seventy-two (72) hours ahead of the paving operations. Adjustments shall be marked with signs and barricades as directed by the Engineer until paving operations are completed. This work will be done at the Contractor's expense.

3.02 CASTING ADJUSTMENT: The Contractor shall adjust castings within the roadway surface prior to the placement of bituminous material and shall keep excavated areas to a minimum. All excavated areas shall be replaced with bituminous or similar materials as removed.

Adjusting rings shall be provided in accordance with plan detail to establish the required casting elevation. The infiltration and inflow (I/I) barrier for the sanitary manholes shall be installed at the time of the first adjustment (base/binder) of the casting and extend inside the casting one-half inch (½") plus the wear course thickness.

The Contractor shall provide not less than two (2) rings/four inches (4") or more than six (2) rings/twelve inches (12") of precast concrete adjusting rings on the bottom of the cast iron frame and the top of the concrete manhole section.

3.03 VALVE BOX ADJUSTMENT: The Contractor shall adjust valve boxes within the roadway surface prior to or after the placement of bituminous base/binder course. The final adjustment of the valve box shall be done prior to the placement of the wear course. All excavated areas shall be replaced with bituminous or similar materials.

The top of the valve box shall be set three-eighths inch to one-half inch (⅜" - ½") below the proposed roadway surface. Blistering is not acceptable.

3.04 CATCH BASINS: The Contractor shall adjust all catch basin castings which require adjustment (no wood shims allowed). Payment for such adjustment shall be at the contract unit price, which price shall be compensation in full for all costs incidental to the adjustment.

The curb and gutter shall be built to fit around any drainage structures, which may be encountered. Normally, final adjustment of structures shall be made at the time the forms are set. The transitions from the regular curb and gutter sections shall be constructed as directed by the Engineer. The exposed surface shall be finished in the same manner as the regular curb and gutter.

3.05 WOODEN PAVING PLATES: The Contractor is required to use no thicker than one-half inch (½") wooden plates on the manhole castings and gate valve boxes when placing the base course, binder course and wear course of bituminous to ensure the casting or gate valve box is ½" lower than the pre-compacted bituminous material. Use of wooden plates are considered incidental to the project.

The manhole casting shall be adjusted three-eighths inch to one-half inch (⅜" - ½") below the bituminous wear course. Castings that measure outside of this tolerance shall be readjusted at no additional cost to the Owner.

3.06 MISCELLANEOUS ITEMS: The cost of any additional labor, materials, tools and supplies not covered in the specification but required to complete the project per the plan and specifications shall be considered incidental to the project.

Saw cutting will be considered incidental to adjustments, where applicable. No additional compensation will be made for jagged joints requiring additional removal to create a clean, straight joint. Saw cuts around manholes in the roadway shall be configured in a diamond pattern with opposite corners parallel to the centerline of the road.

SECTION 2511

RIPRAP

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include, but is not limited to, all labor, material and equipment necessary to furnish and install all stone riprap specified for the project.

1.02 REFERENCES AND RELATED SECTIONS:
A. Section 2503 - Storm Sewer Construction

1.03 METHOD OF MEASUREMENT: Riprap shall be measured by volume in cubic yards (CY) based on the staked surface dimensions and specified thickness. Each class and type of riprap will be measured separately as specified in the Bid Proposal.

1.04 PAYMENT: Payment for riprap shall be at the contract unit price listed in the Bid Proposal. The bid price also includes, but is not limited to, all excavation and foundation preparation. Filter blanket and all other associated work shall be considered incidental.

PART 2 - PRODUCTS

2.01 MATERIALS: All materials, including natural stone, shall be in accordance with the following specifications:
A. Mn/DOT 3601 - Riprap Materials
B. Mn/DOT 3733 - Geotextiles

PART 3 - EXECUTION

3.01 FOUNDATION PREPARATION: The Contractor shall excavate and shape foundation areas at the location and to the cross section staked by the Engineer. All loose foundation material shall be compacted and the surface made smooth, free of sticks, stones and other debris prior to geotextile placement.

3.02 GEOTEXTILE MATERIAL: The Contractor shall place multiple fabric widths with the longest dimension perpendicular to the direction of water flow. The fabric shall be placed with a minimum of eighteen inches (18") overlapping. The overlap will be increased to thirty-six inches (36") under water. Joints shall be overlapped in a shingle arrangement to shed water.

Under no circumstances shall equipment be operated on the fabric.

3.03 RIPRAP STONE: A level surface shall be provided to facilitate uniform thickness and appearance of the riprap. The Contractor shall begin placement of the riprap at the lowest elevation and work upgrade and position stones to provide uniform size distribution and minimize void space.

Contractor shall not drop stones from a greater than twelve inch (12") height. Smaller stones should be seated between larger stones to produce a uniform surface and the space between stones shall be minimized.

Fabric and riprap shall be installed prior to the installation of the Flared End Section (FES) and shall be placed under the FES to insure proper drainage and prevent erosion. Fabric shall be anchored to prevent movement during riprap placement and upgrade edges of the fabric shall be buried to prevent undermining.

The Contractor shall define the edges of the riprap area using selected stones to set to line and grade. Joints shall be staggered up the slope.

Riprap shall be Class III, IV, and V unless otherwise specified on the plans or Bid Proposal. Natural stone may be used if approved prior to the installation.

3.04 THICKNESS REQUIREMENTS: As shown on detail or as directed by the Engineer.

SECTION 2521

WALKS AND PATHWAYS

PART 1 - PART 1 - GENERAL

1.01 SCOPE: This section includes all labor, equipment and materials necessary for the complete construction of bituminous pathways and concrete walks.

1.02 REFERENCES AND RELATED SECTIONS: The following sections are related to the installation of walks and pathways.
A. Section 2105 – Excavation and Embankment
B. Section 2211 – Aggregate Base
C. Section 2531 – Concrete Curb and Gutter and Driveways

1.03 METHOD OF MEASUREMENT: Concrete walk shall be measured in square feet (SF) for each specified thickness and type.

Concrete pedestrian ramp panels shall be six inches (6") thick and measured and paid for per square foot.

Pedestrian Ramp shall include the installation of truncated dome castings at no additional cost to the City.

Pathways shall be measured in square feet for each specified thickness and type or as shown on the Bid Proposal.

1.04 PAYMENT: Payment for walk and pathway construction shall be at the Contract Unit Price as listed on the Bid Proposal and shall include, but not limited to, all grading, common excavation, subgrade preparation, aggregate base and concrete or bituminous placement. No separate compensation will be made for any of the labor, materials or equipment required for the complete construction of the walk/pathway.

Surface treatment and truncated domes for pedestrian ramps shall be considered incidental to the bid item. All equipment, materials and labor necessary to install a pedestrian ramp shall be considered incidental to the bid item. This includes, but is not limited to, aggregate base and bituminous patching.

1.05 SUBMITTALS: The Contractor shall submit a job mix formula using the proposed aggregate source for each bituminous mixture.

PART 2 - PRODUCTS

2.01 MATERIALS: All materials shall be in accordance with the respective Mn/DOT specifications as follows:
A. Concrete – Mn/DOT 2461
B. Preformed Joint Filler – Mn/DOT 3702
C. Bituminous Mixture – Mn/DOT 2360 Mix No. SPWEB240C
D. Granular Materials – Mn/DOT 3149.

2.02 CONCRETE WALKS: Concrete walks shall be in accordance with the requirements of Mn/DOT specification 2521.

The concrete mix to be used shall conform to Mn/DOT Mix No. 3A32 for manually placed concrete and Mix No. 3A22 for machine placed concrete. Fifty percent (50%) of the coarse aggregate shall be Class A (crushed quarry granite) material as specified in Mn/Dot Specification 3137.

Where a concrete sidewalk crosses a driveway, the sidewalk going through the driveway and one panel on either side of the driveway shall be six inches (6") thick.

2.03 ACCESSORIES: All materials shall be in accordance with the respective Mn/DOT specifications as follows:

A. Concrete Treating Oil – Mn/DOT 3917
B. Curing Materials
    1. Plastic Curing Blankets – Mn/DOT 3756
    2. Membrane Curing Compound – Mn/DOT 3754
    3. Membrane Curing Compound – Mn/DOT 3755
C. Forms
    1. Forms shall be of wood or metal with a smooth contact face.
    2. Form height shall be that of the proposed concrete thickness.

2.04 MIXTURE PROPORTIONS: The concrete mix to be used shall conform to Mn/DOT Mix. No. 3A32 for manually placed concrete. Fifty percent (50%) of the coarse aggregate shall be Class A material as specified in Mn/DOT Specification 3137.

Bituminous Mixture shall be in accordance with Mn/DOT 2360 (SPWEB240C) unless otherwise specified in the Bid Proposal.

2.05 EQUIPMENT: Bituminous Paver shall be a self-contained power propelled unit.

PART 3 - EXECUTION

3.01 NOTIFICATION: The Contractor shall notify the Engineer in the field a minimum of twenty-four (24) hours prior to any concrete placement or string line installation.

Any properties that will be impacted by driveway closures or detours, the Contractor shall notify a minimum of twenty-four (24) hours in advance.

Failure to notify the Engineer or residents/businesses could result in a delay of placement until proper notification can be made or personnel are available to check string lines. **Any placement without notification will be considered incidental to the project.**

3.02 PREPARATION: The Contractor shall excavate, shape and compact all subgrade soils to ninety-five percent (95%) of Standard Proctor Density, as shown on the plans or directed by the Engineer.

All unsuitable subgrade material shall be removed as directed by the Engineer. This material shall become the property of the Contractor to dispose of offsite. Foundation preparation shall be considered incidental to the placement of the concrete.

The contact face of all forms shall be coated with form treating material prior to the placement of concrete.

3.03 CONCRETE INSTALLATION: Prior to concrete placement, the Contractor shall wet the foundation and forms. The concrete shall be placed promptly after mixing and in a manner, which will prevent any segregation of the mix. It shall be tamped and spaded and sufficiently to bring some mortar to the surface and until all voids are filled inside the concrete and no honeycombs will be evident upon removal of the forms.

Concrete shall be struck off to the required grade, and the Contractor shall float the surface smooth and edge all joints. The surface shall be brushed to a uniform texture.

Forms should be maintained in place for a minimum of twelve (12) hours after the concrete placement. If honeycombs appear when forms are removed, it will be the decision of the Engineer if the concrete must be removed and replaced. Such removal and replacement will be at the Contractor's expense.

All concrete with a slump of over four inches (4") will be rejected. Finished surfaces must be within ¼" from a ten-foot (10') straight edge.

3.04 JOINT CONSTRUCTION: Concrete walk should be divided into uniformly sized panels and outlined with contraction or expansion joints. Panels should be square (5' x 5') with twenty-five square feet (25 sf) of area unless otherwise shown on the plans or directed by the Engineer.

Joints shall be vertical and straight, parallel to or at right angles to the edge of the walk and aligned with like joints in adjacent work. All joints shall be rounded using a one-half inch (½") round-over edging tool.

Contraction joints shall be one-eighth inch (1/8") wide and shall be extended to at least one-third (⅓) of the thickness of the walk.

Expansion joints shall be one-half inch (½") wide and shall be the full thickness of the walk. One-half inch (½") preformed joint filler shall be installed adjacent to all fixed objects or as directed by the Engineer.

There shall be a maximum of sixty feet (60') between felt joints in sidewalks.

3.05 CURING AND PROTECTION: Curing media shall be applied within thirty (30) minutes after finishing the concrete placement and shall be provided for a minimum of seventy-two (72) hours after finishing.

Membrane curing compounds shall be type 2 white pigmented and shall conform to ASTM C309 or clear as directed by the Engineer. **Clear curing compound shall be WR Meadows 1100 Clear or approved equal and shall be used when replacing panels in existing sidewalks** or as directed by the Engineer in the field.

The Contractor shall protect the concrete from damage caused by inclement weather, vandalism or freezing and shall follow ACI Standard Specification for cold weather concreting.

3.06 BITUMINOUS INSTALLATION: The Contractor shall spread each mixture to the required cross section in one pass using an approved paver. The speed of the paver shall be coordinated with the rate of delivery of the mix to provide a uniform placement rate. Only areas not accessible to a paver shall be spread manually.

The Contractor is required to construct the pathway utilizing a controlled grade method.

After compaction, each course shall be within one-fourth inch (¼") of the required thickness. The Contractor shall remove and replace any areas that are not within tolerance at no additional cost to the Owner. After rolling, each surface shall be free of open and torn sections. The surface shall be smooth and true to the planned grade and cross section and shall not vary more than one-eighth inch (⅛") from the edge of a ten-foot (10') straightedge placed parallel or perpendicular to the centerline.

3.07 COMPACTING OPERATIONS: Compaction, using a steel-wheeled and a pneumatic-tired roller, shall take place as soon as possible after the mixture has been spread and can be accomplished without causing undue displacement of the mixture.

Rollers shall be operated continuously until all areas are compacted to the required density and all roller marks are eliminated. Each course shall be compacted uniformly using the Ordinary Compaction Method until there is no further evidence of consolidation.

3.08 BACKFILLING: Areas adjacent to the walk shall be backfilled with excavated materials. Grade and finish adjacent areas in accordance with the proposed typical section.

Backfilling shall take place no earlier than three (3) days but no later than seven (7) days after installation.

3.09 PEDESTRIAN RAMPS: Pedestrian ramps will be constructed in accordance with current Mn/DOT recommendations, standard plate and the Americans with Disabilities Act (ADA) guidelines. The exception that the **flat area at the curb shall be five feet (5') wide** rather than the four feet (4') shown on the detail. Ramps shall be aligned to allow for the proper flow of pedestrian traffic. **Forms shall be approved prior to pouring.**

Pedestrian ramps item shall include all labor, materials and equipment necessary for the installation of the ramp.

3.10 READY-MIX TRUCK AND CONCRETE CLEANUP AREA: The Contractor is responsible for providing a signed specific area to wash out ready-mix trucks and concrete wash. The Contractor shall also be responsible for the maintenance, removal of the concrete washings, and all associated work shall be considered incidental to the project.

3.11 CONCRETE STEPS: Concrete steps shall match the width of the existing walk or steps. Payment shall be by the each and shall include all labor, materials and equipment necessary for the installation of the steps. This includes, but is not limited to, foundation preparation, aggregate base, concrete placement, and any necessary formwork. The Contractor shall submit a detail to the Public Works Director/City Engineer for review and approval prior to placement.

SECTION 2531

CONCRETE CURB AND GUTTER AND DRIVEWAYS

PART 1 - PART 1 - GENERAL

1.01 SCOPE: This section shall include, but is not limited to, the furnishing of all materials, equipment, labor necessary for the placing of concrete curb & gutter and driveways

1.02 REFERENCES AND RELATED SECTIONS:
A. Section 2521 Walk & Pathways
B. Section 2211 Aggregate Base

1.03 METHOD OF MEASUREMENT:
Curb and gutter shall be measured in linear feet along the face of the curb at the gutter line. Each design type shall be measured separately or as specified in the Bid Proposal. All curb cuts will be considered incidental to the project.

Driveway pavement shall be measured by area in square yards for each thickness. Class 5 Aggregate Base shall be considered incidental to the pavement.

1.04 PAYMENT: Payment of concrete construction shall be at the Contract Unit Price as listed in the Bid Proposal. All associated work items, including Aggregate Base material shall be considered incidental.

Curb and gutter through commercial driveways will be paid as indicated on the detail for "Typical Commercial Driveway Apron."

The unit bid price per lineal foot for Concrete Curb and Gutter shall include reinforcing bars and drilling the holes necessary for the bars as requested by the Engineer in the field for replacement of sections.

The bid item for 6" concrete pavement shall include driveways, driveway aprons, drainage flumes and sidewalk panels through driveway sections and one panel either side of driveways. Driveway aprons shall be poured from the back of curb to the sidewalk or if no sidewalk exists, the apron shall be four feet (4').

Concrete Apron and Commercial Driveway will be paid as follows:

1. The curb & gutter portion of the driveway/apron adjacent to the roadway shall be paid in linear feet (LF) of curb & gutter.
2. The radii on each side of the driveway shall be paid in linear feet (LF) of curb & gutter.
3. The remaining concrete area shall be paid in square yards (SY) of Concrete Pavement, Concrete Apron or Commercial Driveway as it appears on the bid proposal.

PART 2 - PRODUCTS

2.01 MATERIALS: All materials shall be in accordance with the respective Mn/DOT Specifications as follows:
A. Concrete - Mn/DOT 2461
B. Reinforcement Bars - Mn/DOT 3301

C. Steel Fabric - Mn/DOT 3303
D. Preformed Joint Fillers - Mn/DOT 3702
E. Aggregate Base - Mn/DOT 2211
F. Concrete Treating Oil - Mn/DOT 3917
G. Curing Materials
    1. Plastic Curing Blankets – Mn/DOT 3756
    2. Membrane Curing Compound – Mn/DOT 3754
    3. Membrane Curing Compound – Mn/DOT 3755

2.02 CONCRETE CURB & GUTTER shall be in accordance with the requirements of Mn/DOT Specification 2531. The concrete mix to be used shall conform to Mn/DOT Mix No. 3A32 for manually placed concrete and Mix. No. 3A22 for machine placed concrete.

2.03 CONCRETE DRIVEWAYS AND VALLEY GUTTERS: Concrete driveways and valley gutters shall be in accordance with the requirements of Mn/DOT Specification 2531.

The concrete mix to be used shall conform to Mn/DOT Mix. No. 3A32 for manually placed concrete and Mix No. 3A22 for machine placed concrete. Fifty percent (50%) of the coarse aggregate shall be Class A material as specified in Mn/DOT Specification 3137.

PART 3 - EXECUTION

3.01 NOTIFICATION: The Contractor shall notify the Engineer in the field a minimum of twenty-four (24) hours prior to any concrete placement or string line installation.

Any properties that will be impacted by driveway closures or detours, the Contractor shall notify them twenty-four (24) hours in advance.

Failure to notify the Engineer or residents/businesses could result in a delay of placement until proper notification can be made or personnel are available to check string lines. **Any placement without notification will be considered incidental to the project.**

3.02 FOUNDATION PREPARATION: The Contractor shall excavate, shape and compact the foundation of all concrete work to the planned section and grade. Class 5 material shall be provided and compacted to the required depth as shown on the plans or directed by the Engineer.

All unsuitable subgrade material shall be removed as directed by the Engineer. This material shall become the property of the Contractor to dispose of offsite. Foundation preparation shall be considered incidental to the placement of the concrete.

The foundation for concrete shall be constructed of a material as shown on the plans and shall be well drained and compacted with an approved compactor to a firm surface with a uniform bearing power. It shall be thoroughly dampened prior to pouring to provide a moist condition when the concrete is placed.

3.03 INSTALLATION: The Contractor will be responsible for the proper installation of concrete. Proper installation includes, but is not limited to, notification, phasing, placement, finishing, curing and backfilling as follows:

A. Phasing: All driveway aprons shall be poured within 24 hours of curb and gutter placement.

B. Forms: The Contractor shall provide forms, which are capable of sustaining the concrete in the proper line, grade and cross section until set. All contact surfaces of the forms shall be coated with form treating material conforming to Mn/DOT 3902 prior to the placement of concrete.

C. Joint Construction: All joints shall be constructed perpendicular to the subgrade. Similar joints shall be aligned in adjacent work. Transverse joints shall be placed a right angles to the alignment.

Transverse Expansion Joints shall be filled with ½ inch preformed joint filler material. Joints should be placed as follows:

1. Five feet (5') on each side of all catch basins.
2. At the beginning and end of the radii.
3. Where new construction surrounds or adjoins any existing fixed object.
4. Sixty foot (60') maximum spacing between felt construction joints.

Contraction joints shall be provided at eight-foot (8') intervals in curb or curb and gutter construction. The Contractor shall form or saw each joint to a minimum two-inch (2") depth from all exposed surfaces.

The concrete curb & gutter shall be removed and replaced to the nearest joint or in **sections of no less than 5 feet**. The actual length shall be determined by the Engineer in the field. Sawcutting shall be considered incidental to the price of the concrete curb & gutter removal. Cut of saw blade needs to be big enough to cut ALL the way through the material that is being cut. The quantity shown on the Bid Proposal is an estimate and the actual amount will be determined in the field.

D. Metal Reinforcement: The Contractor shall provide and place all metal reinforcement as shown on the plans or directed in the field by the Engineer. Epoxy coated rebar shall be used unless otherwise approved.

E. Placing and Finishing: Prior to concrete placement, the Contractor shall wet the foundation and forms. The concrete shall be placed promptly after mixing, and in a manner that will prevent any segregation of the mix. It shall be tamped, spaded and vibrated sufficiently to bring some mortar to the surface and until all voids are filled inside the concrete, and no honeycombs shall be evident upon removal of the forms. Vibrators shall not come in contact with any joints assembly, subgrade or side forms and shall never be operated longer then fifteen (15) seconds in one location.

After the initial placement, all voids shall be filled by hand tamping or internal vibration. The Contractor shall then strike off all excess material to the required grade and float the area smooth. The top surface of the curb face shall be hand floated. All joints and edges shall be rounded to half-inch (½") radii and all exposed surfaces lightly brushed to a uniform texture.

All cavities shall be filled with mortar when side forms are removed form hand placed curb.

F. Slip Form Placement: Placement by an extrusion type machine in lieu of fixed forms is permitted if the final product meets all standards for fixed-form placement. Hand finishing may be necessary to obtain the specified finish and texture.

G. Curing and Protection: Curing media shall be applied within thirty (30) minutes of finishing the concrete placement.

Membrane curing compounds shall be type 2 white pigmented and shall conform to ASTM C309 or clear as directed by the Engineer. Clear curing compound shall be WR Meadows 1100 Clear or approved equal. Clear curing compound shall be used on all replacement concrete to match the existing concrete.

Spot repaired concrete curb shall be cured using a **clear curing compound** to better match the existing curb color. Clear curing compound shall be WR Meadows 1100 Clear or approved equal.

The Contractor shall protect the concrete from damage caused by inclement weather, vandalism or freezing. Any concrete placement during cold weather conditions must be approved by the Engineer. During cold weather, the concrete shall be protected from frost damage. The Contractor shall follow the ACI Standard Specification for cold weather concreting.

H. Joint Sealing: Joint sealing is not required unless shown on the plans, included in the Special Provisions or directed by the Engineer in the field.

I. Backfill Construction: Backfilling shall take place no earlier than three (3) days but no later than seven (7) days after installation.

All backfill shall be to the top of curb. Under no circumstances shall garbage or debris be included as fill behind the curb. All curb backfill is considered incidental to the cost of curb and gutter. Six inches (6") of compacted topsoil will be provided where seed/sod is to be placed. This will be paid for at the unit bid price of seed/sod.

J. Removal and Replacement: The Contractor shall remove and replace all damaged or unacceptable work that was caused by their company or subcontractor. Curb and gutter removal and replacement shall be no less than one half (½) panel and remaining sections shall be no less than four feet (4') unless directed by the Engineer in the field.

The Contractor and a City representative shall walk the job site, inspect and mark the damaged curb and gutter before the snow falls and or first snowplowing. This is to determine the damage prior to snow plowing. If no walk through is done, then all damaged curb and gutter will be the responsibility of the Contractor at no additional cost to the Owner.

The Contractor shall be responsible for all damage done by private utility companies as well.

The Owner agrees to pay for any additional damage, after the final inspection, caused by snow plows over the winter. The payment for removal and replacement of this curb and gutter will at unit bid prices. No additional compensation will be considered.

3.04 CONCRETE PLACEMENT: Concrete shall be thoroughly consolidated against and along faces of all forms and along full length and both sides of all joint assemblies, by vibrating. Vibrators shall not come in contact with a joint assembly, the subgrade or side forms. Vibrators shall never be operated longer than 15 seconds in one location.

The vibrating may be accomplished by the use of a mechanical finish machine, vibratory screeds, vibrating units of the internal rotating type, or various combinations of these units to produce consolidation. The internal vibrating type shall be mechanically driven by electricity, compressed air or mechanical connection, to produce a speed in the unit of 6,000 revolutions per minute. The operations of depositing the concrete and compacting shall be so conducted that the concrete shall be smooth and dense, free from honeycomb and free from pockets of segregated aggregate. At the end of the day, or incase of an unavoidable interruption of more than 30 minutes, a transverse construction joint shall be placed at the point of stopping work, provided that the section of which the work was suspended is not less than eight feet (8') in length. Sections less than eight feet (8') in length shall be removed at no additional cost to the Owner. The joints shall conform to the requirements for construction joints described elsewhere in these specifications.

3.05 STREET GRADE MODIFICATIONS: The Engineer, at the time of the string line being set for the curb & gutter construction, may make modification to the proposed street elevations in order to more closely fit existing driveways, yards, etc. No additional compensation will be provided for any modification.

3.06 CONCRETE CURB & GUTTER: When surmountable curb is specified, the Contractor shall transition to B618 curb & gutter within eight feet (8') of the radii. An additional eight feet (8') of B618 curb will be transitioned beyond the radius point. At catch basin locations, the Contractor shall construct a five foot (5') section of B618 curb & gutter (including transition).

3.07 CONCRETE DRIVEWAYS: Driveway materials and construction will be as specified in Mn/DOT Specification 2531.

Contraction and expansion joints shall match existing construction.

Driveways shall be constructed as shown on the attached detail plates or as directed by the Engineer in the field.

Driveway slopes shall be at least two percent (2%) and no more than ten percent (10%).

Residents must be notified a minimum of 24-hours prior to removing curb in front of a driveway. No removal will be allowed without proper notification.

3.08 TOLERANCES: Gutter flow lines shall be finished to eliminate low spots and avoid water entrapment. Deviations greater than one-fourth inch ¼ inch from a ten-foot (10') straightedge on tangent lines or grades will be considered as unacceptable work.

All unacceptable work will be removed and replaced as directed at no additional cost to the Owner.

3.09 REMOVAL & REPLACEMENT: The Contractor shall remove and replace all damaged or unacceptable concrete work as directed at no additional cost to the Owner unless otherwise stipulated in these specifications.

3.10 STAMPING OF SERVICE LOCATIONS ON THE CURB & GUTTER
Immediately following the placement of the curb & gutter, a "S" and a "W" will be stamped on the face of the curb to mark the location of the sanitary sewer and water services for each property.

The letter shall be placed at the intersection of an imaginary line from the curb stop to a point perpendicular to the curb back.

The "S" and the "W" shall be one and one-half inches (1½") tall and one and three-quarter inches (1¾") wide. They shall be straight and placed with the top of the letters one inch (1") from the top of the curb.

3.11 READY-MIX TRUCK AND CONCRETE CLEANUP AREA: The Contractor is responsible for providing a signed specific area to wash out ready-mix trucks and concrete wash. The Contractor shall also be responsible for the maintenance, removal of the concrete washings, and all associated work shall be considered incidental to the project.

3.12 BITUMINOUS CURB: The bid item for bituminous curb is intended for any temporary curbing required to maintain drainage between areas of permanent construction and existing curb that will be replaced later as part of the project. A slip-form will not be required for the placement of bituminous curb, but the curb will be required to be as close to B618 curb as practical and shall match the flow lines of the two curbs. Payment for bituminous curb shall be by the LF and shall cover any costs associated with the placement of the curb in addition to the unit price payment made for the bituminous material under the item LVNW350030B Mn/DOT 2350 Base Course Mixture.

SECTION 2557

FENCING

PART 1 - GENERAL

1.01 SCOPE: This section includes, but is not limited to, all equipment, labor and materials necessary to salvage, furnish, install, replace or otherwise construct any temporary and/or permanent fence required in this project.

1.02 REFERENCES AND RELATED SECTIONS:
Section 1712 – Protection of Property

1.03 METHOD OF MEASUREMENT: Measurement of fencing shall be by length in linear feet from center to center of end post along the fence bottom

1.04 PAYMENT: Payment for temporary construction fence shall include installation maintenance and removal operations and shall be considered incidental to the project.

Payment for acceptable quantities of fencing shall be at the contract unit price as listed on the Bid Proposal. All associated work items shall be considered incidental to the project.

All safety fence and posts shall be five feet (5') in height, spaced at five foot (5') intervals and shall include installation and removal and shall be considered incidental to the project. The use of silt fence does not preclude the need for safety fencing. Safety fencing shall be placed anywhere the Engineer deems necessary for the safety of the public.

1.05 SUBMITTALS: Product Data – Provide manufacturer's information on all components.

PART 2 - PRODUCTS

2.01 MATERIALS: Temporary construction fence shall be readily available, nonconducting and subject to Engineer's approval.

Other fence materials shall be as shown on the plans or stated in the Bid Proposal.

PART 3 - EXECUTION

3.01 PREPARATION: Remove all brush, trees and debris along the proposed fence alignment and provide a smooth ground profile along the proposed alignment.

3.02 INSTALLATION:

A. Temporary construction fence placed around the open trench for the convenience of the Contractor shall be considered incidental.

B. Temporary construction fence shall be installed and inspected prior to the start of all construction operations, except approved clearing and grubbing. The Contractor shall maintain and repair the fence as necessary throughout the duration of the project. After all work is completed, temporary fencing shall be removed at the direction of the Engineer.

C. Permanent Fence: The Contractor will be required to replace any private fence or other private property previously removed from public property or within the construction limits. The fence, or property, shall be replaced at the property line or as directed by the Engineer.

D. Private fences should be inspected for damage prior to any salvage operations. Any existing damage should be reported to the Engineer prior to removal. The Contractor shall be responsible for any damage not reported to the Engineer and shall replace damage sections of fencing at no additional cost to the Owner.

3.03 INSTALL WOOD RETAINING WALL (MATCH EXISTING): The bid item for 'Install Wood Retaining Wall' shall cover all work associated with furnishing and installing new portions of a wood retaining wall where portions of the existing retaining wall had been removed as part of the Contract. The Contractor shall take note of existing wood type, style and size during removal so that the existing wood retaining wall can be matched when reconstructed. Final acceptance of the fence will be made by the Engineer.

SECTION 2563

TRAFFIC MAINTENANCE AND CONTROL

PART 1 - GENERAL

1.01 SCOPE: This section relates to the procedures and equipment for safely maintaining and controlling traffic within and near the project site during construction.

1.02 REFERENCES AND RELATED SECTIONS: The following references contain additional information related to this section:

A. Section 1404 - Maintenance of Traffic
B. Section 1710 - Traffic Control Devices
C. Minnesota Manual on Uniform Traffic Devices (MMUTCD) - Temporary Traffic Control Zone Layouts (Field Manual), January 2014 or latest edition and all supplements.
D. AASHTO - Guide for Selecting Locations and Designing Traffic Barriers
E. Mn/DOT Standard Signs Manual
F. Mn/DOT Standard Plate No. 8000 - Standard Barricades
G. Mn/DOT Standard Plate No. 8337- Temporary Portable Precast Concrete Barrier
H. Minnesota Traffic Engineering Manual

1.03 PAYMENT: Payment for traffic maintenance and control shall be at the contract unit bid price as listed on the Bid Proposal. All associated work items and equipment used shall be considered incidental to the bid item.

The Contractor shall receive twenty-five percent (25%) of the amount bid for "Traffic Control" on the first payment. When fifty percent (50%) of the original contract amount has been earned, an additional fifty percent (50%) will be paid. After ninety-five percent (95%) of the original contract amount has been earned, the remaining twenty-five percent (25%) will be released.

Payment Schedule	Total Percentage of Item Paid
1st Payment	25%
50% Project Complete	75%
95% Project Complete	100%

1.04 DEFINITIONS: Wherever used in the contract documents, the following terms shall have the meanings indicated, which shall be applicable to both the singular and plural thereof:

A. Long Term Restriction: A traffic restriction or lane closure, which is in effect during construction without regard to the time restrictions stated in the contract documents or 1.08B of this section.
B. Short Term Restriction: A traffic restriction or lane closure, which is in effect only during the Contractor's work hours and is consistent with the time restrictions stated in 1.08B of this section.

1.05 SUBMITTALS: The following submittals shall be made to the appropriate agencies and the City of Savage:

A. A Traffic Control Plan as detailed in 1.08C of this section.
B. Names, addresses and phone numbers of a minimum of two (2) local persons who will respond to requests for maintenance as detailed in 1.09 of this section. These names shall also be

submitted to the Savage Police Department, the Savage Public Works Department and Scott County Department of Public Works.

C. Any and all permits required by Mn/DOT and/or the County to allow for signing, barricading and work within the Mn/DOT or Scott County right-of-way as necessary to complete the project.

1.06 QUALITY ASSURANCE: All operations shall be conducted in accordance with the Minnesota Temporary Traffic Control Zone Layouts (Field Manual), January 2014 or current edition.

The Contractor shall, whenever deemed necessary by the Engineer, provide qualified certified flaggers familiar with applicable traffic laws and regulations and properly trained in the responsibilities of traffic control, including provisions spelled out in the Field Manual and Flagging Handbook.

Flaggers shall be properly deputized to direct and control traffic around or through a traffic control device.

Flaggers shall be properly clothed and equipped, including shirt or blouse, pants, sturdy shoes, fluorescent green hard hat, fluorescent green vest (reflectorized), a 2-way radio, and an approved "Stop-Slow" paddle or standard.

Uniformed off-duty police or patrol officers using hand signals may be used as flaggers. They shall be equipped with a fluorescent green hardhat and fluorescent green vest (reflectorized) during flagging operations.

Flaggers must be provided when any work is being done within thirty feet (30') of any Railroad right-of-way. Contact railroad personnel prior to any operations or flagging done in the right-of-way.

1.07 PARKING: Contractor and worker vehicles may not park in any manner or location, which interferes with traffic flow, conflicts with residential or consumer parking or obstructs any traffic control device or sight distance unless so approved by the Engineer. If damage is caused by the workers vehicles, the Contractor is responsible for all restoration.

1.08 SEQUENCING AND DETOUR REQUESTS: This section includes all procedures that must be followed when diverting or detouring traffic.

A. Closure and Detour Requests:
All requests for short-term lane closures shall be submitted to the Engineer at least forty-eight (48) hours prior to the time of closure and be consistent with all traffic regulations and recommendations in this section.

All requests for street closures and traffic diversions or detours shall be submitted to the Engineer at least twenty-one (21) days prior to the proposed time of closure with a detour/traffic plan.

The authority to divert traffic or close roadways shall be subject to the Engineer's approval. If approval is given, the Contractor shall provide notice of closures and detours as stated in 3.01A of this section.

B. Restrictions:
Work that may interfere with traffic operations described in this section shall not be allowed from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. Monday through Friday inclusive.

Lane closures will not be permitted during inclement weather or when the Engineer deems that such a closure would be a hazard to traffic.

The Engineer shall approve any work to be done after dusk in advance. Adequate lighting shall be provided as necessary during nighttime construction (supplementing or replacing existing street lighting) so that the work, personnel, equipment, traffic control devices and flaggers are visible to motorists. All workers shall wear reflectorized fluorescent green jumpsuits during nighttime construction.

The Contractor shall maintain all in-place railroad tracks, crossings and signals at all times unless otherwise permitted by the railroad agency and the Engineer.

The proper railroad agency shall be notified prior to beginning any work on or adjacent to railroad property. A flagger must be provided anytime work is conducted within or adjacent to the railroad right-of-way.

Temporary lane widths shall be a minimum of eleven feet (11'). Lanes shall be continuous throughout the project and may be adjacent to each other or separated.

Traffic shall be maintained on in place, temporary or permanent roadways or any combination of these.

Flag persons shall be utilized on any roadway that is restricted to one (1) lane for traffic, except as approved by the Engineer.

The Contractor shall furnish, install and maintain all proper signing, flag persons and warning devices, as appropriate, in order to close or restrict traffic on a roadway, provide adequate detour information, protect the work, the workers and the motorists, to inform the motorists of dates of pending construction and direct the motorist through the work zone.

Access to individual residences and businesses shall be maintained at all times unless otherwise approved by the Engineer.

Traffic may be restricted on any street requiring milling, miscellaneous roadwork and/or surfacing subject to the following:

1. Milling, miscellaneous roadwork and surfacing operations shall be coordinated with street reconstruction to afford local residents and business clientele access to the vicinity of homes and businesses. Access signs may be required and will be incidental to the traffic control.
2. Any drop-off where traffic may cross from or to the in place surface to the milled surface shall be tapered and/or chamfered to provide safe passage of traffic.
3. "ROUGH ROAD AHEAD" or "BUMP" signs shall be placed at locations determined by the Engineer after milling operations have been completed.
4. The Contractor shall not mill notches for surfacing tapers until immediately prior to paving unless a temporary bituminous taper is installed and maintained until the surfacing taper is installed.

The Contractor shall provide for the protection of traffic from open excavations as described in 3.02 of this section.

Operations shall be conducted to allow continual emergency access to all areas within the project.

The above restrictions may be modified by the Engineer to ensure safe traffic operations.

C. Traffic Control Plan:
The Contractor shall submit an overall traffic control plan for review a minimum of twenty-one (21) days prior to initiating any construction. Approval is required prior to any work being done.

As construction progresses, the Contractor shall provide a schedule to the Engineer on a weekly basis for approval and/or suggested modifications. An updated two-week traffic control plan shall be submitted to the Engineer (on a weekly basis) for approval.

Traffic control plans shall include, but are not limited to, the planned sequence of construction operations, proposed street closures or restrictions and estimated dates, proposed detour routes and signs and devices to be used.

Each traffic control plan is subject to acceptance, rejection or suggested revision by the Engineer. After a plan is revised, it must be resubmitted for approval. No construction operations may begin without the complete approval of a traffic control plan.

D. Winter Suspension:
Delete the last paragraph of Mn/DOT 1404.7 "Winter Suspension" and substitute the following:

> "When work is resumed after winter suspension, the Contractor shall replace or renew any work lost or damaged during the suspension and shall remove, to the extent directed by the Engineer, any temporary construction or materials used in the maintenance thereof.
>
> When winter suspension results from an extension of the contract time due to a fault or negligence on the part of the Contractor, the Contractor shall not suspend operations until roads or temporary facilities, which are being used by traffic, are in such condition that only routine maintenance will be required to adequately accommodate all traffic during the anticipated period of suspension. In this instance, all maintenance of roads, temporary facilities, as well as traffic control devices, will be the responsibility of the Contractor and shall be considered incidental to the project."

1.09 MAINTENANCE: It shall be the Contractor's responsibility to maintain all traffic control devices on a 24-hour basis, including weekends and holidays, throughout the duration of the project, including work suspensions.

The Contractor shall be required to repair or replace, as deemed necessary by the Engineer, any devices that are damaged or moved, lights that have ceased to function properly, and any barricade weights that are damaged or fail to stabilize the barricade.

If any traffic control device requested by the Engineer is not installed, repaired, or replaced as requested within two (2) hours of the request, the City may do the work and deduct an amount equal to the cost from the Contractor's next payment or the Developer's escrow.

All traffic control devices shall be checked twice daily, including once at the end of the workday and one night per week after work hours. The Contractor will immediately correct all deficiencies in alignment, visibility and reflectivity.

A traffic control checklist contained in this section must be completed each day that traffic control devices are being used on the project. The Contractor shall submit the completed checklist to the Engineer each day at a mutually agreeable time. Failure to submit the checklist by the agreed upon time will be considered "noncompliance" in maintaining traffic control devices and may be subject to the daily charge set forth under Mn/DOT 1807 - Failure to Complete the Work on Time.

The Contractor shall provide a means of receiving maintenance requests on a 24-hour basis. All maintenance requests must be responded to within two (2) hours. Failure to respond to maintenance requests will result in the work being completed by the City with three times the cost thereof being deducted from any monies due the Contractor or Developer. This cost may include the hourly rate of the Engineer with a minimum charge of one (1) hour.

PART 2 - PRODUCTS

2.01 EQUIPMENT: The following equipment and/or traffic devices may be used on the project as stated in the Bid Proposal, as proposed in the traffic control plan or as requested by the Engineer.

The Contractor shall furnish all signs in accordance with the MMUTCD, Mn/DOT Standard Signs Manual, Minnesota Traffic Engineering Manual, the Field Manual, and the Plans and as approve by the Engineer. All signs shall be fabricated of either steel or aluminum.

Where required the Contractor shall provide eight foot (8') Type III barricades in accordance with the current Mn/DOT Standard plate 8000. Flashers shall be installed on all barricades.

Temporary portable precast concrete barriers in accordance with the current Mn/DOT Standard Plate 8337 shall be installed by the Contractor where specified in the plans or deemed necessary by the Engineer.

The Contractor shall provide drum-like channelizers in accordance with the MMUTCD, Appendix B, and the Minnesota Traffic Engineering Manual 8-8.03.02 where specified in the plans or deemed necessary by the Engineer.

PART 3 - EXECUTION

3.01 PREPARATION: Prior to any work proceeding, the following items shall be addressed:

A. The Contractor shall provide a minimum of seven (7) days' notice for all closures and detours to the following:
   1. City Engineer
   2. Public Works Superintendent-Streets
   3. Savage Police Department
   4. Savage Fire Department

5. Local Ambulance Dispatcher
6. Scott County Department of Public Works
7. Local School District Transportation Director
8. MTC, MVTA and any other local transit operation
9. Postal Service
10. Garbage Services

B. The Contractor must provide a minimum of seven (7) days notice of all closures and detours to all effected residences and businesses. The proposed closure or detour dates (beginning and ending) shall be included. The Contractor must meet with a representative of each business affected by each restriction of access and coordinate work to allow for deliveries, client access, etc.

C. Existing signs may not be removed until authorized by the Engineer. If it is necessary to remove an existing sign, the Contractor shall carefully remove it and deliver signs and posts to the appropriate agency (Mn/DOT, Scott County, or the City of Savage). The Contractor shall replace all signs and/or posts damaged or lost during removal or construction at no additional cost to the City or Developer.

D. The Contractor shall relocate or temporarily mount all required signs along streets, which remain open to traffic. If "STOP" or other prohibitive signs are removed the Contractor may be required to provide flaggers until temporary signs can be installed.

3.02 OPERATIONS: The Contractor shall be responsible for the installation of all traffic control devices, traffic protection, maintenance of pedestrian and traffic access and the removal of devices after the project is completed.

The Contractor shall provide, locate and maintain all traffic control devices in accordance with the contract documents and the approved traffic control plan. Minor modifications and field adjustments may be required to accommodate special conditions or situations that may occur as directed by the Engineer at no additional cost to the Owner.

Signs shall be mounted on posts driven into the ground at the proper height and lateral offset as detailed in the MMUTCD, or maintained on portable supports or barricades. No sign shall be mounted on metal drums.

The placement of signs shall follow the direction of the flow of traffic. All signs or traffic control devices, which may be inconsistent with proposed traffic patterns, shall be covered so as to avoid confusion.

The Contractor shall not deposit or store materials or park equipment on or adjacent to any roadway open to traffic that may interfere with the safe flow of traffic. Roadways, which are kept open, shall be kept free from earth materials and debris.

Traffic barriers will be provided for any obstruction placed within the "clear zone" as defined by the AASHTO Guide for Selecting Locations and Designing Traffic Barriers. During the construction process, the Contractor may be required to install additional devices to protect traffic and pedestrians from drop-offs, open excavations, falling objects, splatter or other hazards.

Where work is required adjacent to the traveled roadway, the Contractor shall schedule operations so as to minimize traffic exposure to uneven lanes, milled edges and edge drop-offs. When construction causes a drop-off greater than four inches (4") adjacent to a land or shoulder, the Contractor shall close or restrict the adjacent lane unless adequately protected by traffic barriers. Any drop-offs less than four inches (4") shall be delineated and signed as shown in the Field Manual.

When excavations on roadways open to existing traffic exceed one foot (1') in depth, the Contractor shall provide continuous portable barriers for the entire length of the excavation. Barrier installation shall include suitable end treatment consisting of tapered barrier sections, impact attenuators or a combination thereof. Warning lights shall be placed along the length of the barriers at a minimum of fifty-foot (50') intervals.

Portable concrete barriers shall be placed with end treatments as per Mn/DOT's "Guidelines for Portable Concrete Barrier Placement and End Treatments in Work Zones".

In lieu of precast concrete barriers, barrels and barricades may be used during construction, as approved by the Engineer, provided that:

A. Construction work is actively done in or directly adjacent to the excavation.
B. Workers are present.
C. It is daylight hours, or if nighttime hours, there is additional lighting of the open excavation.
D. Traffic is in a single lane (alternating) or a single lane in each direction with parking removed.
E. The barrels or barricades can be set outside the minimum widths required for traffic and at intervals as directed by the Engineer.

The Contractor shall provide continuous access to all adjacent residences and businesses. Signs, barricades, flashers, safety fence or other devices may be required to protect pedestrians adjacent to the work.

When existing or temporary signs are removed, signposts shall be removed at the same time or as soon after as possible. Removal of signs and barricades shall begin at the end of construction areas and proceed toward oncoming traffic, unless otherwise directed by the Engineer.

The Contractor shall be held fully responsible for preventing and minimizing any dust nuisance caused by and during construction, until the project has been completed and accepted. Dust control measures may include sweeping, water sprinkling, calcium chloride applications, treatment with bituminous materials or any other methods, as directed by the Engineer, which will provide and maintain dust-free conditions on the project.

All such dust control work shall be considered incidental to the project unless specific bid items have been provided in the Bid Proposal form.

3.03 FIELD QUALITY CONTROL: The Contractor shall be responsible for monitoring all traffic control devices for location, visibility and effectiveness for the duration of the project.

At least 24 hours prior to construction and upon request, the Contractor shall present all traffic control devices intended for use on the project to the Engineer to ensure conformance with the MMUTCD and Mn/DOT Standard Signs Manual.

Any device that is found to be defective shall be replaced immediately.

The Contractor shall replace any reflective material (on both new and used traffic control devices) whose effectiveness, in the Engineer's opinion, has been substantially reduced from traffic or other causes.

All traffic control signs and devices shall be kept in a legible condition, including removing grime deposited on devices by traffic, natural causes or by the nature of the work being performed.

The Contractor shall be responsible for relocating any traffic control device that has been misplaced due to construction operations, traffic or any other reason.

3.04 SCHEDULES: The Contractor shall present a schedule of work and a traffic control plan to the Engineer at the preconstruction and each progress meeting.

A separate plan for traffic control may be required for the installation of bituminous base, binder and wear courses. Each plan shall be prepared in detail and submitted to the Engineer for approval. The Engineer will determine the viability of the planned sequence and may accept, reject or suggest alterations to the plan.

The Contractor may not begin installation of the bituminous base, binder, and wear course, crosswalks, or pavement markings without complete approval of this plan by the Engineer.

TRAFFIC CONTROL INSPECTION CHECKLIST
CITY PROJECT NO._____

****

Are any traffic control devices missing? _____ Yes _____ No How Many?_____
Type _____

Do any traffic control devices need repair? _____ Yes _____ No How Many?_____
Type _____

Were any traffic control devices replaced/repaired? _____ Yes _____ No How Many?_____
Type _____

****

Are any flashers/lights not functioning? _____ Yes _____ No How Many?_____

Were any flashers/lights replaced/repaired? _____ Yes _____ No How Many?_____

****

Are any traffic control devices improperly placed? _____ Yes _____ No How Many?_____

Were all traffic control devices positions corrected? _____ Yes _____ No

****

Do any traffic control devices need cleaning? _____ Yes _____ No How Many?_____

Were all traffic control devices cleaned? _____ Yes _____ No How Many?_____

Are any traffic control devices missing? _____ Yes _____ No

****

THIS TRAFFIC CONTROL INSPECTION WAS PERFORMED BY:

_____ _____ of _____
Name Title Contractor

_____ / _____ / _____ at _____ a.m./p.m.

ADDITIONAL COMMENTS: _____

_____

_____

_____

_____

SECTION 2564

TRAFFIC SIGNS AND DEVICES

PART 1 - GENERAL

1.01 SCOPE: This section includes, but is not limited to, providing sign panels, posts and other devices for traffic control and street identification; relocating inplace sign panels and posts; and removing inplace sign panels, posts and mounting hardware.

1.02 REFERENCES AND RELATED SECTIONS:

A. Mn/DOT Section 2564 – Traffic Signs and Devices
B. Mn/DOT Section 3352 – Signs, Delineators and Markers
C. Mn/DOT Section 3401 – Flanged Channel Sign Posts
D. Mn/DOT Standard Signs Manual
E. Minnesota Traffic Engineering Manual
F. City of Savage Sign Policy
G. Minnesota Manual on Uniform Traffic Control Devices (MMUTCD)

1.03 METHOD OF MEASUREMENT: Sign panels shall be measured by area in square feet based on the nominal panel dimensions for each sign type.

Street name signs shall be measured as a unit at each installation, including post, bracket, mounting hardware and all sign panels.

1.04 PAYMENT: Payment for acceptable quantities of traffic signs and devices shall be at the Contract unit price as listed on the Bid Form. All associated work items, including but not limited to hardware, posts and fabrication stickers, shall be considered incidental to the bid item.

Delivery of removed/salvaged signs to the City of Savage Public Works building, or other designated location, shall be considered incidental to the bid item.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Sign Panels
   1. Provide in accordance with the latest Mn/DOT Standard Signs Manual, the Minnesota Traffic Engineering Manual, the MMUTCD, the Plans, and Mn/DOT 2564.
   2. Fabricate in accordance with the following:
      a. Sign base material shall be sheet aluminum conforming to material requirements of Mn/DOT 3352.2A1b.
      b. Sign face material shall be reflective sheeting conforming to Mn/DOT 3352.2A2b.
      c. Sign legend material shall be "Direct Applied" conforming to the requirements of Mn/DOT 3352.2A5b, 3352.2A5c or 3352.2A5d.
   3. Provide sign panels (legends, sizes, and quantities) as shown in the Plans.
   4. Package, deliver, store and install sign panels in accordance with the retroflective sheeting manufacturer's recommendations.

2.02 TRAFFIC SIGN POSTS: All posts shall be 3 lb/ft flanged channel signposts conforming to Mn/DOT 3401.

The Contractor shall provide the quantity of sign posts required for installation at each location as shown on the plans or in the Bid Proposal. All structural components required for mounting sign panels (including posts, knee braces, etc.) shall be in accordance with the applicable provision of the plans, the Minnesota Traffic Engineering Manual and the details in these specifications.

The length of the signposts shall be in accordance with the following sign panel mounting height guidelines provided in these specifications.

2.03 FABRICATION STICKERS: The Contractor shall silkscreen a fabrication sticker and affix it to backside of each new sign panel in the lower right-hand corner (when facing the back of the sign). A full-sized mock-up (minimum 1½" x 1") of sticker shall be submitted to the Engineer for written approval prior to producing any stickers for the project. The fabrication sticker shall be produced in accordance with the following:

A. Colors shall be black legend on white reflectorized background.
B. Month and year of fabrication of the sign panel shall be punched out prior to installation of sticker on sign panel.
C. Fabrication sticker shall be similar to example shown below, unless otherwise approved by Engineer.

City of Savage, 6000 McColl Drive, Savage, MN 55378

Month: 1, 2, 3, etc.

Year: 03, 04, 05 etc.

2.04 STREET NAME SIGNS:

A. Posts
   1. Provide round galvanized steel pipe as follows:
      a. 2 ½" outside diameter
      b. 2 lb/ft minimum wall thickness.
B. Mounting Hardware
   1. Provide galvanized steel assembly units as follows:
      a. Post cap with Allen set screws or lock screws.
      b. Bracket assembly shall be green Lyle E-450 or E/An approved equal.
      c. Ornamental top nut.
C. Sign Panels
   1. Fabricate from sheet aluminum conforming to material requirements of Mn/DOT 3352.2A1b.
   2. Sign face material shall be reflective sheeting conforming to requirements of Mn/DOT 3352.2A2a.
   3. Panels shall be reflectorized nine inches (9") wide (Standard Sign Green Color) with screened five-inch (5") upper and lower case Type "C" white letters, and one and one-half (1½") radii.
   4. Legends shall refer to appropriate street name and shall be approved by Engineer before fabrication.
   5. Sign assembly shall consist of four (4) single face sign plates, sign bracket assembly, signpost and any additional hardware necessary to provide a complete unit.
   6. Wording of street name signs shall be verified with Public Works.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. TRAFFIC SIGN PANELS shall be mounted on flanged channel signposts or as otherwise shown on the plans. Posts shall be installed at the locations shown on the plans and checked for plumb. Exact locations will be determined in the field by the Engineer prior to installation.

Each sign panel shall be installed to meet the following mounting height requirements:
1. The minimum mounting height specified in the MMUTCD.
2. Mount at least seven feet (7') above the adjacent sidewalk or ground line.
3. The edge of the sign panel shall be mounted a minimum of three feet (3') from the curb face.

Sign faces shall be installed vertically. To avoid specular glare, sign faces shall be mounted at approximately ninety-three degrees (93°) from the traveled roadway.

Mounting holes in sign panels shall be punched in accordance with the details and the Plans. However, the number of posts shown on the signing charts in the Plans shall govern the punch code used for each sign panel.

If difficulty is encountered in driving a stub post to the embedment depth required, the post shall be removed and a hole drilled to the required embedment depth. Any post bent or damaged during such post driving operations shall be removed from the site and replaced at no expense to the City.

After installation of the signpost in the drilled hole, void areas shall be filled with backfill material, which shall be selected earth or sand and free from rocks and excessive organic material. Upon placement, backfill material shall be moistened and thoroughly compacted.

B. PUBLIC STREET NAME SIGNS shall be top mounted with a bracket assembly (green Lyle E-450 or approved equal). Posts shall be installed at the locations shown on the plans and checked for plumb. Exact locations will be determined in the field by the Engineer prior to installation.

Each sign shall be installed to meet the following mounting requirements:
1. Posts shall be installed a minimum of three feet (3') below ground level in concrete footings
2. Provide seven feet (7') clearance between ground level and lowest sign panel.

3.02 REMOVE SIGN PANELS: The Contractor shall remove existing sign panels, posts (including the stub post), mounting hardware and delineator posts, without damaging any component as indicated on the plans or as directed by the Engineer.

Existing nuts, bolts and washers shall be removed in such a manner as not to damage the sign panels. If a sign panel is damaged, a deduction of the salvage value will be made. Any existing damage to a sign panel shall be brought to the attention of the Engineer prior to removal. Any damage not reported will be the responsibility of the Contractor to repair or replace as deemed necessary by the Engineer at no cost to the Owner.

The Contractor shall deliver salvaged items to the proper agencies/locations as directed by the Engineer with a minimum of three (3) working days notice prior to delivery.

Any sign panel not identified for removal may not be removed unless deemed necessary by the Engineer.

Should signs and posts need to be removed prior to their final removal from the site, the Contractor shall relocate and mount the necessary signs temporarily as directed by the Engineer.

Where it is necessary to remove "Stop" or prohibition signs on roads open to traffic prior to installation of new signs, the Contractor shall provide either qualified flag persons or relocate or remount temporary signs as necessary, prior to leaving the area.

A visual inspection shall be made, at the job site, prior to salvage operations and again at the storage site by the Engineer. Any damage to the salvaged materials during the salvage and hauling operations shall be repaired or replaced at no cost to the Owner.

3.03 MAINTAIN SIGNS IN PLACE: The Contractor shall maintain in place the existing stop and street signs unless otherwise noted on the plans or directed by the Engineer. Any signs removed or damaged due to the construction operation without prior approval of the Engineer shall be repaired and/or replaced by the Contractor at no additional cost to the Owner.

SECTION 2573

TEMPORARY EROSION MINIMIZATION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications includes the furnishing, installing, maintenance and removal of all temporary measures and devices needed to control soil erosion and sedimentation.

1.02 REFERENCES AND RELATED SECTIONS:
A. Mn/DOT Section 2575 – Establishing Turf and Controlling Erosion

1.03 METHOD OF MEASUREMENT: Items shall be measured as follows or as described in the Bid Proposal.

A. Machine sliced silt fence with steel posts shall be measured by the linear foot furnished and acceptably installed and maintained throughout the duration of the project. The measurement shall be taken along the base of the fence from outside to outside ends of the posts.
B. Rock Construction Entrance shall be measured on a per unit basis for each entrance installed and maintained throughout the duration of the project.
C. Fiber log shall be measured by the linear foot, furnished, acceptably installed and maintained throughout the project.

1.04 PAYMENT: Payment for acceptable quantities of erosion control items shall be at the contract unit price as listed on the Bid Proposal. All associated work items shall be considered incidental.

Payment shall be limited to **fifty percent (50%)** of the actual quantity installed. The remainder will be paid once all temporary erosion control measures have been removed from the project site.

1.05 REGULATORY REQUIREMENTS: The Contractor shall be required to meet the requirements of the City of Savage approved Erosion Minimization and Sediment Control Plan and the Minnesota Pollution Control Agency (MPCA) National Pollutant Discharge Elimination System (NPDES) General Storm Water Permit program.

1.06 EROSION CONTROL SUPERVISOR: The Contractor shall provide a certified Erosion Control Supervisor, whose training and duties shall conform to Mn/DOT Specification 2573.3 and the requirements of the MPCA, NPDES Permit and City of Savage erosion minimization and sediment control requirements. He/she shall administer the Contractor's erosion minimization and sediment control quality control program. In addition, the Erosion Control Supervisor shall be available weekly and be on the project within twenty-four (24) hours of a one-half inch (½") or greater rainfall to conduct inspections, supervise corrective actions that are required to regain compliance and fill out weekly inspection logs. The Owner shall furnish the blank weekly inspection log sheets to the Contractor's representative.

If the Contractor fails to provide a certified Erosion Control Supervisor for the project, the Engineer shall issue a written order to the Contractor. The Contractor shall respond within twenty-four (24) hours and provide the required Erosion Control Supervisor or be subject to a $500.00 per calendar day deduction for noncompliance.

The Erosion Control Supervisor shall be considered incidental to the project.

PART 2 - PRODUCTS

2.01 MATERIALS: Materials will conform to Mn/DOT specifications or as directed by the Engineer.

A. Silt fence shall be in accordance with Mn/DOT 3886, machine sliced, steel posts and the fabric shall be orange in color.
B. Temporary Construction Exit Controls shall be in accordance with Mn/DOT 3149H as modified according to the plan detail.
C. Fiber log shall be in accordance with Mn/DOT 3895.

2.02 EROSION MINIMIZATION AND SEDIMENT CONTROL APPROVED PRODUCTS LIST: The contractor shall refer to Mn/DOT website www.dot.state.mn.us/products/landscaping/inlet.html for choosing appropriate products before installation.

PART 3 - EXECUTION

3.01 GENERAL: Erosion minimization and sediment control measures should be coordinated with earthwork and vegetation and pavement establishment operations.

The Contractor shall be responsible for grading, finishing, erosion minimization and sediment control and vegetation establishment for the entire drainage area to prevent excessive soil erosion.

3.02 PLACING TEMPORARY EROSION MINIMIZATION AND SEDIMENT CONTROL ITEMS: All temporary erosion minimization and sediment control shall be constructed in accordance with typical sections, elevation controls and details shown on the plans.

Sediment control devices shall be installed and inspected prior to the start of construction. It shall be maintained throughout the duration of the project as stated in the erosion minimization and sediment control plan. Prior to the final payment, the Contractor shall remove and dispose of all Sediment control devices on the project.

Construction Exit Controls shall be installed prior to the start of construction and shall be maintained until potential for off-site tracking no longer exists or the removal has been approved by the Engineer.

Erosion minimization and sediment control items shall be placed in locations as shown on the plans or as directed by the Engineer. If the Contractor believes additional or alternative measures are necessary, the Contractor shall immediately inform the Engineer.

Accumulated sediment shall be spread and shaped to permit natural drainage and provide for turf establishment.

3.03 ACCEPTANCE OF WORK: The Contractor shall maintain and repair all erosion minimization and sediment control items to insure proper function throughout the project duration. Erosion minimization and sediment control measures shall be repaired, replaced, or supplemented as set forth in the City of Savage approved Erosion Minimization and Sediment Control Plan.

If the Contractor fails to provide maintenance of the temporary erosion minimization and sediment control measures within twenty four (24) hours, the Engineer shall have the authority, under the

terms of this contract, to have the work done and deduct the costs incurred from any monies due the Contractor.

The Contractor shall be assessed liquidated damages of $200 per day for each specified area for which the Contractor has not installed or repaired erosion minimization and sediment control devices (including sod) within 48 hours after receiving written notice.

SECTION 2575

**VEGETATION ESTABLISHMENT,
PLANT INSTALLATION
AND RESTORATION OF PROPERTY**

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include, but is not limited to, the general clean-up of street right-of-way, grading areas disturbed by construction, turf establishment, tree and plant protection, removal and installation.

1.02 REFERENCES AND RELATED SECTIONS: The following sections are related to the protection and restoration of property:

A. Section 2101 - Clearing and Grubbing
B. Section 2105 - Excavation and Embankment
C. Section 2573 - Temporary Erosion Control
D. Section 2575 - Turf Establishment and Restoration of Property
E. Mn/DOT Section 3877 - Topsoil Material
F. Mn/DOT 3880 - Peat Moss
G. Mn/DOT Section 3881 - Fertilizer (Savage is zero phosphorous community)
H. Mn/DOT Section 3882 - Mulch Material

1.03 METHOD OF MEASUREMENT: Sod shall be measured in square yards by area covered including six inches (6") of compacted topsoil. Seeding shall be measured in acres by areas seeded including six inches (6") of topsoil. Water for turf establishment, sod or seed, shall be considered incidental to the placement except as stipulated in these specifications.

Transplanting or planting shrubs shall be measured by the linear foot of shrubbery acceptably transplanted measured horizontally along the base of the hedge or as specified in the Bid Proposal.

Transplanting or planting trees shall be measured as a unit for each size and variety acceptably planted.

1.04 PAYMENT: Payment for quantities of accepted turf establishment shall be at the contract unit price as listed on the Bid Proposal and all associated costs are incidental to the price of the bid item.

All associated work including, but not limited to placement of six inches (6") of compacted topsoil, fertilizer, mulch, erosion control mats, and disc anchoring, shall be considered incidental to the placement of seed and/or sod.

The cost of replacing any sod disturbed outside of the approved construction limits by the Contractor in his/her negligence shall be considered incidental to the project.

If the Engineer requests water beyond the thirty (30) day maintenance period, it shall be paid at the unit price bid and shall include all equipment and labor to apply as required. This includes on weekends and holidays.

The Contractor will be responsible for protecting all existing trees and shrubs. All work, including labor, materials and equipment, associated with the protection shall be considered incidental to the project.

Payment for acceptable quantities of furnished and planted and transplanted trees and shrubs shall be at the contract unit price listed on the Bid Proposal and includes:

A. Furnishing and planting the materials as specified.
B. Furnishing and installing planting soil, mulch, materials, protective materials and other specified materials.
C. Plant replacement and maintenance until acceptable.
D. Disposal of all excess excavated material.
E. Staking of trees.
F. Restoration in kind of all areas disturbed by Contractor's operations.

All associated work items not otherwise compensated shall be considered incidental. All costs of plant establishment work shall be at the Contractor's expense, including the costs of any replacement materials required.

1.05 CONTRACTOR QUALIFICATIONS: Installation and maintenance of native seed shall comply with Mn/DOT specifications and be completed by a Contractor specializing in native seed installation and has a minimum of five (5) years' experience with native seed installation and maintenance.

1.06 SUBMITTALS: The Contractor shall submit a certified test report for each seed mixture and/or a certification from the grower stating the grass varieties contained in the sod.

1.07 ACCEPTANCE OF WORK: Turf establishment will be accepted on a total project basis. All erosion control items must be in place and properly maintained prior to acceptance.

The Engineer will inspect the project at the end of the plant establishment period and notify the Contractor of any defects. The Contractor will replace all defective work immediately on or at the beginning of the next planting season if directed by the Engineer.

No payment will be made for unacceptable plantings.

1.08 DELIVERY, STORAGE AND HANDLING: Sod shall be delivered to the site within twenty-four (24) hours of cutting and shall be placed and rolled the same day as delivery. Seed shall be stored in a cool, dry place prior to use.

1.09 SCHEDULE OF WORK: The placement of sod/seed shall be coordinated to minimize the lag time after the placement of topsoil. The Contractor shall schedule turf establishment operations during the optimum time periods (below) or as close as possible.

Operation	Optimum Time
Seeding	July 20th to September 20th
Sodding	May 5th to June 10th August 10th to October 10th

1.10 MAINTENANCE: The Contractor shall maintain and repair all areas throughout the project duration and the warranty period. Washouts caused by improperly functioning erosion control measures during this time shall be repaired or replaced at the Contractor's expense.

The warranty period shall be thirty (30) days within the optimum time periods established above. The Contractor shall call for a final inspection prior to the expiration of the warranty. The warranty will not expire until and unless the final inspection has taken place.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Plant Stock - In accordance with Mn/DOT 3861.
B. Transplant Stock - As detailed in the plans and directed by the Engineer.
C. Growing Medium Materials
   1. Topsoil Material - In accordance with Mn/DOT 3877.
   2. Peat Moss - In accordance with Mn/DOT 3880.
   3. Mulch, Type 6 - In accordance with Mn/DOT 3882.
   4. Water - Shall be suitable for human consumption.
D. Wound Dressing
   1. Shellac
   2. Asphalt - Base tree paint.
E. Tree Wrapping - Corrugated white plastic tubing.

2.02 FERTILIZER: Commercial fertilizer, analysis 10-0-10, Mn/DOT Specification 3881, shall be spread at the rate of 450 pounds per acre. Fertilizer shall be applied uniformly over the designated area using a mechanical spreading device.

2.03 SEED: The grass seed mixture "Lawn Type" shall be:

SUNNY LAWN MIX

25% Shamrock Kentucky Bluegrass
25% Park Kentucky Bluegrass
30% Secretariat Perennial Ryegrass
20% Creeping Red Fescue

SHADY LAWN MIX

40% Creeping Red Fescue
20% Baron Kentucky Bluegrass
20% Secretariat Perennial Ryegrass
20% Magic Chewings Fescue

SUN-SHADE LAWN MIX

20% Secretariat Perennial Ryegrass
40% Baron Kentucky Bluegrass
20% Magic Chewings Fescue
20% Boreal Creeping Red Fescue

NATIVE GRASS SEED:

Mixture #22-111	Purpose: 1-2 year soil stabilization with non-native species. (Mn/DOT bulk rate)
Mixture #22-112	Purpose: 2-5 year roadside stabilization with non-native species. (Mn/DOT bulk rate)
Mixture #25-121	Purpose: General non-native roadside for dry or sandy soils. (Mn/DOT bulk rate)
Mixture #25-141	Purpose: General non-native mix for roadsides with mesic soils. (Mn/DOT bulk rate)
Mixture #25-142	Purpose: General non-native roadside for areas that will be cut for hay. (Mn/DOT bulk rate)
Mixture #33-261	Purpose: Stormwater pond edges, temporarily flooded dry ponds, and temporarily flooded ditch bottoms. (Mn/DOT bulk rate)
Mixture #34-262	Purpose: Wet prairie reconstruction for wetland mitigation or ecological restoration.
Mixture #35-221	Purpose: General dry prairie mix for native roadsides, ecological restoration, or conservation program plantings.
Mixture #35-241	Purpose: General mesic prairie mix for native roadsides, ecological restoration, or conservation program plantings.

Seed mixture shall be as stated in the Bid Proposal and at locations as directed by the Engineer.

2.04 STABILIZATION: Mulch or erosion control blanket shall be applied as erosion control as specified on the plans or as directed by the Engineer. The following stabilization materials are suggested:

A. Type 3 mulch, meeting the requirements of Mn/DOT Specification 3882, shall be applied to seeded areas at the rate of two (2) tons per acre, and anchored by dicing, except where plastic netting for stabilization is specified. The mulch will not be disked for yard seeding unless directed by the Engineer.
B. Erosion Control Blanket meeting the requirements of Mn/DOT Specification 3885 shall be used to cover seeded areas and shall be anchored with staples of a six-inch (6") minimum length.

2.05 SOD: The sod shall meet the requirements of Mn/DOT Specification 3878 and the following types:

Sod Type	Application
Lawn & Boulevard (Lawn Sod)	Premium quality sod for use in highly maintained areas, such as lawns
Lawn & Boulevard (Salt Tolerant Sod)	Premium quality sod for use in areas adjacent to roadways, such as boulevards
Erosion Control	An average to high-density sod for areas with low maintenance Requirements such as ditch bottoms and pipe inlets or outlets.

PART 3 - EXECUTION

3.01 INSTALLATION (TREES AND SHRUBS): The Contractor shall transplant and plant trees/shrubs in areas as shown on the plans or directed by the Engineer. Plants shall be installed

and maintained only by an experienced crew under the direct supervision of a qualified nurseryman or landscape specialist.

Planting shall only occur under favorable weather and soil conditions as approved by the Engineer or City's Natural Resources Coordinator.

Plant holes shall be dug as detailed in the plans and these specifications and centered at staked locations. Drain tile shall be installed as shown on the plans and in these specifications or in heavy clay or impervious soil as directed by the Engineer.

The Contractor shall rototill or aerate any planting soil compacted by construction operations.

Planting soil shall be prepared in the following proportions:

1. Four parts select topsoil borrow by volume.
2. One part peat moss by volume.
3. Three pounds per cubic yard of 10-0-10 analysis fertilizer.

Mix soil until thoroughly blended.

The Contractor shall observe the following when installing plants:

4. Install plants plumb. Main order root shall be no greater than one inch (1") below finished grade.
5. Protect root system while placing and compacting backfill.
6. Remove all burlap and wire from upper portion of root ball.
7. Plant bare root plants on compacted soil and backfill leaving no air voids around roots.
8. Install plants from containers immediately after removing from container and spreading roots in a natural position.
9. Stake trees as directed by the Engineer with minimum two stakes per tree, with stakes being metal fence posts, and guys having flexibility components.
10. Transplant using the same procedure used for nursery stock plants.

3.02 EXISTING TREES AND SHRUBS: The Contractor shall take all necessary measures, including temporary fencing, and minimizing construction activity around existing trees and shrubs to ensure survival.

Existing roots shall be cut only with sharp an appropriate tools and as directed by the City's Natural Resources Coordinator. All existing growth shall be pruned back in proportion to the amount of roots removed. Pruning shall be accomplished under the direct supervision of a qualified nurseryman or landscape specialist and as detailed in the plans and these specifications. All wounds shall be dressed immediately.

Trees not designated for removal shall be protected and saved from damage during construction. Temporary easements shall be used only for the storage of material and equipment or the maneuvering of equipment, and all trees shall be protected by placing brightly colored, high-density polyethylene safety fence around or along the trees.

Should any damage be inflicted upon the trunks or branches of the trees in the project area, the damage shall be treated in accordance with nursery-approved methods or as directed by the City's

Natural Resources Specialist. Any broken branches shall be trimmed as per the Engineer's direction. All bruise and cut wounds shall be treated with asphalt base tree paint.

The Contractor is required to move trees per Mn/DOT Specification 2571 and protect trees per Mn/DOT Specification 2572.

The Contractor will be responsible for any damage to existing trees caused by work on this project by the Contractor's workers or subcontractors. Damages may result in replacement trees or monetary damages as determined by a qualified Forester or Arborist.

Contractors shall be especially careful of existing oak trees. Any damage to these trees between April 1st and August 15th could cause oak wilt resulting in serious damage or death to the tree.

3.03 DELIVERY AND STORAGE OF PLANTS: Plants shall be installed on the day of delivery to the project site. The Contractor shall cover all plant roots until planting with a moisture holding material such as straw, sawdust, moss or soil.

New plantings shall be balled and burlapped, container or bare root as specified in the plans.

3.04 PRUNING AND WRAPPING: The Contractor shall abide by the following guidelines:

A. Prune all bare roots.
B. Remove all dead, rubbing, damaged or diseased branches.
C. Prune trees to give them a uniform and symmetrical shape.
D. Leave leaders in tact while removing all stubs.
E. All pruning shall be done immediately prior to planting as directed by the Engineer.
F. Wrap all trees from the ground to the first major branch.
G. Apply wrap at the end of the growing season and remove it prior to the following growing season.

3.05 WATERING AND MULCHING: Each plant shall be watered to thoroughly saturate all planting soil within two (2) hours of planting. Planting soil shall be brought to specified level within five (5) days of initial watering and additional soil shall also be saturated.

Mulch shall be placed within forty-eight (48) hours of second watering and as detailed in the plans and these specifications or as directed by the Engineer.

3.06 PLANT ESTABLISHMENT PERIOD: The Contractor shall maintain the work and care for all plants installed, as necessary, for the duration of the plant establishment period, which shall be two (2) calendar years from the date of final job acceptance. Maintenance includes the following:

A. Keeping all plants in healthy growing condition.
B. Maintaining adequate, but not excessive, soil moisture at all times
C. Repairing or replacing as necessary tree wrapping, staking and guying, mulch material and planting soil.
D. Removing all weed growth in and three and a half feet (3½') around all mulched areas.
E. Applying insecticide spray as necessary.
F. Furnishing and installing replacement plants as needed, including new mulch and planting soil.
G. Keeping all plants upright.
H. The Contractor will be held responsible for all plants lost due to acts of vandalism, theft and rodent damage.

3.07 VEGETATION ESTABLISHMENT:

A. GRASS (Type Lawn): The requirement for sod, seed and fertilizer and the placing or applying thereof shall be in accordance with Mn/DOT Specification 2575 as modified below.

The Contractor shall carry on his operation in such fashion that only the minimum amount of sod is disturbed or removed. The Engineer shall determine if the disturbed area should be replaced with seed or sod. It is anticipated that the only areas requiring sodding will be those work areas which are presently established lawns, and for erosion control.

1. SOIL PREPARATION:
   a. The area shall be raked smooth and free of all undesirable weeds and vegetation, as well as all stones, debris and clods larger than two inches (2").
   b. Topsoil shall be loosened in all areas with 2:1 slopes or flatter prior to seeding and/or sodding.
   c. Cultivate soil to a depth of six inches (6") using discs or other suitable equipment.
   d. Operate equipment at right angles (perpendicular) to the direction of drainage.
   e. Fill all washouts prior to cultivation.
   f. Finish all areas to provide a smooth, moist, even-textured foundation of uniform density.

2. SODDING:
   a. The Contractor shall place, roll and care for sod in accordance with Mn/DOT Specification 2575.
   b. The Contractor shall furnish and install sod and six inches (6") of topsoil to the area designated by the Engineer. Imported topsoil may be required at the direction of the Engineer.
   c. The Contractor shall use a sod cutter to make a straight-line cut at full sod widths to match existing sod areas. Waste material shall then be removed, and the area prepared to allow a minimum depth of six inches (6") for topsoil placement.
   d. The Contractor shall roll/compact the sod after placement and before watering.
   e. Watering of the sod shall be the responsibility of the Contractor. If obtaining water from the City, the Contractor must have a filling system that has the proper backflow preventor or air gap within it. The filling system is subject to the Utility Superintendent's approval.

      The Contractor shall not take water from the hydrants in the City of Savage.

      The Contractor shall water all sod areas as directed by the Engineer.

      After the sod is placed, and until it is accepted, the Contractor shall water a minimum of three (3) times a week and maintain the sod in a condition satisfactory to the Engineer. The sod shall be cared for on a timely day-to-day basis. Watering and replacement shall be accomplished as the need arises and without the Engineer having to so order. Areas replaced with new sod shall be maintained by the Contractor for at least thirty (30) growing days after placement.
   f. Starter fertilizer, analysis 10-0-10, shall be applied to all sod areas at the rate of 200 lbs/acre.
   g. The Contractor shall maintain the sod for thirty (30) days. Watering during the thirty (30) day maintenance period shall be considered incidental to the unit price bid for sod

with six inches (6") topsoil. The Engineer will then make the final inspection and consider acceptance of the sod.

The 30-day warranty period is suspended from June 10th to August 10th, during which time the Owner will pay for watering the sod per the contract unit price. After August 10th, the warranty will resume. The water used on dates other than between June 10th and August 10th shall be considered incidental to the unit price bid for sod with six inches (6") topsoil.

The Contractor is responsible for the sod for thirty (30) days regardless of the weather conditions. There will be no exceptions to the thirty (30) day maintenance period.

The Contractor shall call for a final inspection prior to the expiration of the warranty. The warranty will not expire until and unless the final inspection has taken place. If replacement is required after the warranty period expires and an inspection has not taken place, the Contractor will be responsible for replacement without additional compensation.

h. Sod shall have an additional twenty (20) day warranty extension after replacement.

3. SEEDING:
   a. The Contractor shall furnish and install seed at a minimum depth of six inches (6") of topsoil to the areas designated by the Engineer. Imported topsoil may be required as directed by the Engineer. The Contractor will be responsible for stripping and storing the existing topsoil. After completion of construction, the Contractor will spread the existing topsoil. If it is determined that there is not sufficient topsoil on-site to meet project specifications, the Contractor will be required to import additional topsoil. The imported topsoil will be considered incidental to the price of the seed, a specific item for the material has been included in the Bid Proposal.
   b. The seeding shall not be placed until the Engineer has inspected the area and approved the subgrade preparation and topsoil.
   c. If directed by the Engineer, the Contractor shall reseed, at his/her expense, any area on which the original seed has failed to grow, using the type of seed directed by the Engineer.
   d. Fertilizer, analysis 10-0-10, shall be applied to all seed areas at a rate of 450 lbs/acre.
   e. Type 3 mulch shall be applied in accordance with Mn/DOT Specification 2575.3 and anchored with one-sided rapid biodegradable blanket.
   f. The seed type lawn shall be planted with a "Turfmaker Seeders" such as a Brillion seeder. All other seed types can be seeded with a broad caster.
   g. Seed shall be inspected thirty (30) days after planting. If the growth is less than 25% of the area, the topsoil shall be redressed and the area reseeded. After the growth is 80% of the area, a thirty (30) day warranty period shall begin.

      The Contractor shall call for a final inspection prior to the expiration of the warranty. The warranty will not expire until and unless the final inspection has taken place. If replacement is required after the warranty period expires and an inspection has not taken place, the Contractor will be responsible for replacement without additional compensation.

B. NATIVE VEGETATION: This requirement includes, but is not limited to, the preparation of site, furnishing, installation, establishment and maintenance of native vegetation as specified per contract.

1. SITE MANAGEMENT: to ensure successful establishment of vegetation, the following maintenance procedures shall be implemented as directed by the Engineer.

   Refer to Tables 2575-1 *Season of Planting* in Mn/DOT Standard Specifications for Construction - 2014 Edition and Table 1 *Recommended Seed Mixtures* in the Mn/DOT Seeding Manual - 2014 Edition for application rates.

   a. Native grass requirements, Native Forbs Species, Acceptable Varieties per Mn/DOT Seed Specifications - Section 3876
   b. If directed by the Engineer, the Contractor shall reseed, at his/her expense, any area on which original seed has failed to grow, using the type of seed directed by the Engineer.
   c. Fertilizer, analysis 10-0-10, shall be applied to all seed areas at a rate of 450 lbs/acre.
   d. Type 3 mulch shall be applied in accordance with Mn/DOT Specification 2575.3. Areas to be mulched shall be as shown on the plans or as directed by the Engineer in the field.
   e. The seed type lawn shall be planted with a "Turfmaker Seeders" such as a Brillion seeder, or approved equal. All other seed types may be seeded with a broad caster.

C. TOPSOIL: The Contractor will be responsible for stripping and storing the existing topsoil. After completion of construction, the Contractor will spread the existing topsoil. If it is determined that there is not sufficient topsoil on-site to meet project specifications, the Contractor will be required to import additional topsoil. The imported topsoil will be considered incidental to the price of the sod unless a specific item for the material has been included in the Bid Proposal.

The topsoil shall not be placed until the Engineer has inspected the area and approved the subgrade preparation and topsoil materials. The Contractor shall be required to remove topsoil placed on unapproved areas or topsoil, which does not meet Mn/DOT Specification 3877, at no additional cost to the Owner.

The Contractor shall not unload or stockpile the topsoil on the street unless specifically approved by the Engineer in the field. Topsoil placed on the street shall not be allowed to remain overnight unless approved by the Engineer in the field and proper safety flashers and erosion control are installed. If the Engineer allows the topsoil to be placed on City streets, the Contractor will be required to sweep the streets within twenty-four (24) hours of completion of the day's work at no additional cost to the Owner.

It shall be the Contractor's responsibility to make sure all catch basins in the construction area are kept clean at all times during the grading, preparation and sod laying. Gutters shall be cleaned and be free of dirt and other materials at the end of each working day to ensure proper drainage.

The Contractor shall prepare the sod/seed area prior to placement. The area shall be raked smooth and be free of all stones, debris, and clods larger than two inches (2").

All topsoil proposed for use, whether available from the site or imported, shall meet the requirements of Mn/DOT Spec. 3877.2. Topsoil shall be pulverized before placement and compacted after placement.

Sod/seed shall be placed within five (5) days of topsoil placement. If the sod/seed is not placed within this time, the next day, the Contractor will bring in new topsoil and redress all areas directed by the Engineer. This shall be done at no additional cost to the City.

Seed shall be placed with six inches (6") topsoil, 10-0-10 fertilizer, seed (Type lawn), and anchored with one-sided rapid biodegradable blanket.

Contractor shall place, roll and care for sod in accordance with Mn/DOT Spec. 2575 and the City's standard specifications.

Growing days for both seed and sod shall be as listed in the City's "Standard Specifications and Detail Plates," dated May 2008.

Seed shall be inspected thirty (30) days after planting. If the growth is less than 25% of the area, the topsoil shall be redressed and the area reseeded. After the growth is 80% of the area, a thirty (30) day warranty period shall begin.

Sod shall have an additional twenty (20) day warranty extension after replacement.

The Contractor shall call for a final inspection prior to the expiration of the warranty. The warranty will not expire until and unless the final inspection has taken place. If replacement is required after the warranty period expires and an inspection has not taken place, the Contractor will be responsible for replacement without additional compensation.

Topsoil furnished under this Specification shall be obtained from the soil horizons normally designated as "A" or "B" as defined by the Soil Science Society of America, or shall be obtained from alluvial deposits. The material shall meet the requirements given herein for the several classifications defined.

1. Topsoil Borrow for general use as a turf growing medium shall meet the requirements below:

TOPSOIL BORROW REQUIREMENTS

	Minimum	Maximum
Material Passing 2.00 mm Sieve	85%	- -
Clay	5%	30%
Sand and Gravel	10%	70%
Organic Matter	3%	20%
pH	6.1	7.8

2. Select Topsoil Borrow, for use as a plant growing medium in designated areas such as landscape beds, shall meet the requirements below:

SELECT TOPSOIL BORROW REQUIREMENTS

	Minimum	Maximum
Material Passing 2.00 mm Sieve	90%	- -
Clay	5%	30%
Silt	10%	70%
Sand and Gravel	20%	70%
Organic Matter	3%	20%
pH	6.1	7.5
Extractible Phosphorous	30 kg per hectare	- -
Exchangeable Potassium	150 kg per hectare	- -
Soluble Salts	- -	0.15 siemens per meter

The Contractor shall submit to the Engineer a list of prospective sources for topsoil borrow at least one (1) month prior to the time of use to allow adequate time for inspecting, testing and approving the sources.

Texture of the topsoil shall be classified according to the Engineering definition of particle size. Texture shall be determined by the method described in AASHTO T-88.

The current standard testing procedure of the University of Minnesota, Soil Science Department, Soils Testing Laboratory shall be used for determining pH, percent of organic matter, extractible phosphorous, exchangeable potassium, and soluble salts.

3.08 CLEANUP AND RESTORATION: The Contractor shall sweep the street following the completion of the sodding and seeding operations. All sweeping shall be completed within twenty four (24) hours after the completion. This sweeping shall be with a pick-up power sweeper and shall continue until all loose material is completely cleaned up to the satisfaction of the Engineer.

All catch basins shall be cleaned to the Engineer's satisfaction within the same time requirements stated above.

The Contractor shall collect and dispose of all excess materials, including but not limited to, excess excavated material, packaging and containers, off site at no additional cost to the Owner.

All turf, property and other facilities damaged by the Contractor's operations shall be restored or replaced, in kind, at no additional cost to the Owner.

3.09 PROTECTION AND RESTORATION OF PROPERTY: The Contractor's operations shall be confined to the areas covered in the right-of-way and easements granted to the City. Any procedures by the Contractor of any sort beyond the limits indicated without written permission from the property owner shall be the sole responsibility of the Contractor, who shall hold the City harmless from any claim for damages due to trespassing

A. FENCES, MAILBOXES, ETC.: All property owners whose fences, mailboxes, or similar private property extend into the area where construction work occurs shall be notified one week in advance of the commencement of the Contractor's construction work. Notification shall be made by the Contractor.

The Contractor may be required to remove mailboxes and relocate them temporarily to a location agreed to by the Engineer and the U.S. Postal Service. The mailboxes shall be replaced in their original locations by the Contractor as soon as deemed practical by the Engineer.

The Contractor will be required to reinstall or replace any private fence or other private property previously removed from public property. The fence, or property, shall be replaced at the property line or as directed by the Engineer. Any removal, relocation and/or replacement shall be considered incidental to the project unless a specific item for the work has been included in the Bid Proposal.

B. WALKS, STREETS, AND PRIVATE PROPERTY: If the project requires cutting through a sidewalk, trail, street or private property, the Contractor will be required to restore these areas within five (5) days after completion of the utility installation.

3.10 LANDSCAPE ROCK: The Contractor shall be required to furnish the decorative landscape rock that matches the existing landscape on the project. The edging and plastic weed barrier in the landscape area shall be considered incidental to the bid item. Payment shall be at the contract unit price bid and shall include all labor and materials necessary to complete the work to the satisfaction of the Engineer in the field.

SECTION 2582

PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 SCOPE: This work shall consist of all labor, equipment and supplies needed for furnishing and applying pavement markings for control and guidance of traffic in accordance with these specifications and at all locations shown in the plans or as directed by the Engineer.

1.02 REFERENCES AND RELATED SECTIONS

A. Minnesota Manual on Uniform Traffic Control Devices (MMUTCD)
B. Minnesota Traffic Engineering Manual
C. Mn/DOT Specification for Three-Minute Dry Alkyd Traffic Paints
D. Mn/DOT Specification for Epoxy Resin Pavement Markings (3590)
E. Mn/DOT Specification for Drop-on Glass Beads (3592)
F. Mn/DOT Sign Details for Striper Train

1.03 METHOD OF MEASUREMENT:

A. Measure solid lines (single and double) by distance in linear feet of applied material and measure each color and line width separately.
B. Measure broken lines by distance in linear feet (LF) of *applied* material; do not measure spacing between line segments; measure each color and line width separately.
C. Measure pavement messages individually as a unit for each message type.
D. Measure block crosswalks by area in square feet (SF) of applied material.

1.04 PAYMENT: Removal of the existing pavement striping and the placement of the temporary reflectorized pavement marking tape shall be installed as detailed on the plans, measured by the lump sum and included in the unit price for traffic control quoted in the Bid Proposal.

Replacement of the permanent paint striping shall be paid for by the linear foot, as stated in the Bid Proposal and paid at the unit price quoted in the Bid Proposal.

PART 2 - PRODUCTS

2.01 PAINT: Paint for pavement markings shall meet the requirements of Mn/DOT "Specifications for White and Yellow, Three-Minute Dry, Alkyd Traffic Paints".

2.02 EPOXY RESIN: Epoxy Resin for pavement markings shall meet the requirements of Mn/DOT "Resin Pavement Markings".

2.03 REFLECTIVE MEDIA: Glass beads shall meet the requirements of Mn/DOT "Specifications for Glass Beads, Drop-on type for Reflectorizing Traffic Paint".

PART 3 - EXECUTION

3.01 PROTECTION OF TRAFFIC AND MARKINGS:

A. Furnish and install all necessary warning and directional signs and devices in order to maintain traffic whenever pavement markings are applied in the presence of traffic and to protect uncured markings as needed until traffic can cross markings without damaging them.

B. When necessary, a pilot car and flaggers shall be used to provide adequate control and direction of traffic.

C. Warning signs and barricades shall be placed only where marking operations are in progress, be relocated as often as necessary and shall not be left in place overnight.

D. Traffic shall be allowed to keep moving at all times and the striping equipment shall be operated in a manner that will not make it necessary for traffic to cross uncured markings.

E. Protective devices such as "cones" shall be of an approved type that will not cause damage to the vehicle when accidentally struck.

F. Any damage to private property due to insufficient traffic control, as determined by the Engineer in the field, shall be the sole responsibility of the Contractor.

3.02 SURFACE PREPARATION: All surfaces to be marked shall be thoroughly cleaned before application of the paint/epoxy. Dust, dirt and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water or a combination of these methods as required. Rubber deposits, surface laitance, existing paint markings and other coatings adhering to the pavement shall be completely removed with scrapers, wire brushes, sandblasting, approved chemicals or mechanical abrasion as directed. Where oil or grease is present on pavements to be marked, affected areas shall be scrubbed with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinsed thoroughly after each application. After cleaning, oil soaked areas shall be sealed with cut shellac to prevent bleeding through the new paint. Pavement surfaces shall be allowed to dry, when water is used for cleaning, prior to striping or marking. Surfaces shall be recleaned when work has been stopped due to rain.

Apply epoxy pavement marking to bituminous surface not less than twenty-four (24) hours after placement of bituminous surface.

A. Cleaning Existing Pavement Markings: In general, markings shall not be placed over existing pavement marking patterns. Existing pavement markings that are in good condition that interfere with or conflict with the newly applied marking patterns shall be removed.

Deteriorated or obscured markings that are not misleading or confusing or interfere with the adhesion of the new marking material do not require removal. New preformed and thermoplastic pavement markings shall not be applied over existing preformed or thermoplastic markings. Whenever grinding, scraping, sandblasting or other operations are performed, the work must be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that is misleading or confusing. When these operations are completed, the pavement surface shall be blown off with compressed air to remove residue resulting from the cleaning work.

B. Cleaning Concrete Curing Compounds: On new Portland cement concrete pavements, cleaning operations shall not begin until a minimum of thirty (30) days after the placement of concrete. All new concrete pavements shall be cleaned by either sandblasting or water

blasting. When water blasting is performed, thermoplastic and preformed markings shall be applied not sooner than twenty-four (24) hours after the blasting has been completed. The extent of the blasting work shall be to clean and prepare the concrete surface as follows:

1. There is no visible evidence of curing compound on the peaks of textured concrete surface.
2. There are no heavy puddled deposits of curing compound in the valleys of the textured concrete surface.
3. All remaining curing compound is intact and all loose and flaking material is removed.
4. The peaks of textured pavement surface are rounded in profile and free of sharp edges and irregularities.
5. The surface to be marked is dry.

3.03 APPLICATION: All pavement markings and patterns shall be placed as shown on the plans or as shown in "Minnesota Manual on Uniform Traffic Control Devices" (MMUTCD) and as directed by the Engineer.

A. Paint: As per Mn/Dot Specification for Three-Minute Dry Alkyd Traffic Paint.

B. Epoxy: As per Mn/Dot Specification for Epoxy Pavement Markings.

3.04 CLEANING: Waste materials shall be removed or destroyed at the end of each workday. Upon completion of the work, all containers and debris shall be removed from the site. Paint spots upon adjacent surfaces shall be carefully removed by approved procedures, which will not damage the surfaces, and the entire job shall be left clean and acceptable to the City. Excess reflective media shall be swept up and removed from the site at no additional cost to the City.

SECTION 2665

WATERMAIN CONSTRUCTION

PART 1 - GENERAL

1.01 SCOPE: This section shall include all labor, material and equipment necessary to completely construct all watermain within street right-of-way and easements. The watermain shall be laid as shown on the plans, including all necessary excavation and backfilling.

1.02 RELATED SECTIONS AND REFERENCES:
A. CEAM Specifications - 2611 Water Main and Service Line Installation

1.03 METHOD OF MEASUREMENT:
Watermain pipe and services shall be measured per linear foot (LF) of pipe installed.
Gate Valves, curb stops, and corporations shall be paid on a per unit (EA) basis or as shown on the Bid Proposal.

1.04 PAYMENT: All materials, equipment and labor necessary to install the watermain shall be considered incidental unless a specific bid item is included in the Bid Proposal.

A. Watermain Extra Depth
Watermain shall be installed with a minimum of 7.5 feet of cover over the pipe. Any required extra depth will be considered incidental to watermain installation and no direct compensation will be made.

B. Ductile Iron Fittings
Ductile iron fittings and specials will be paid for at the contract unit price per pound as listed for C153 fitting unless otherwise approved by the Engineer. Payment shall not be made for mega-lugs or approved equal gaskets, bolts or other accessories.

PART 2 - PRODUCTS

2.01 MATERIALS: All of the Standard Specifications of the American Society for Testing and Materials (ASTM), the American National Standard Institute (ANSI) and all other similar societies and associations for testing, materials, dimensions, methods of construction, etc, are intended, in all cases, to refer to and should be understood to mean the latest edition/revisions thereto at the time the work is bid unless definitely specified otherwise in the Special Provisions.

All pipe shall be American, US Pipe or approved equal.

2.02 WATERMAIN: Watermain pipe shall be Class 52, or other specified class, ductile iron of the size shown on the plans. Ductile iron pipe shall be made in accordance with ASA Specification A21.52 (AWWA Cl. 52).

Joints shall be push-on type except that mechanical joints shall be used at all valves, fittings and hydrants. Fittings shall be ductile iron. Gray Iron pipe and fittings will not be accepted.

The push-on joints will be electrically bonded with an external copper jumper or specially designed gaskets, which are capable of meeting these specifications and approved by the Engineer.

Wedge type connectors will not be allowed. Conductivity through the mechanical joints may be accomplished with armor-tip gaskets in place of an external jumper if approved by the Engineer.

2.03 FITTINGS: All ductile iron fittings shall be epoxy coated.

2.04 HYDRANTS: All hydrants shall be Waterous Pacer WB-67-250, or approved equal and shall be in accordance with AWWA Specification C-502, for hydrants except as otherwise provided herein to suit local requirements.

Hydrants shall have the following extra components not found on a standard W-67: epoxy coated base; lower valve washer; and stainless steel hardware. Hydrants shall be supplied with a sixteen-inch (16") break-off/traffic section twenty-four inches (24") from ground line to centerline of nozzle. The hydrants shall not have a weather cap on the top nut.

Hydrants are to have a five-inch (5") minimum valve opening. They shall be equipped with two (2) two and one-half inch (2 ½") hose connections and one (1) five-inch (5") Storz hose coupling or approved equal. The two and one-half inch (2 ½") connections shall have National Standard threads. "O" ring seals shall be provided to prevent water from reaching the operating mechanism. The operating mechanism shall be lubricated through a hole in the operating nut.

The hydrant pumper nozzle shall be of one-piece design, compatible with five-inch (5") Storz hose coupling. The nozzle shall be an integral part of the fire hydrant and must be furnished by American Flow Control, an authorized distributor of American Flow Control Waterous WB67-250 Fire Hydrants, or approved equal. Storz adapters will not be accepted. Steel cables or chairs must be provided for all caps as shown on detail.

All moving parts are to be bronze or a non-corrodible metal. Hydrant lengths shall be suitable for seven and a half feet (7.5') depth of cover over the centerline of the ductile iron lead pipes and a distance of twenty-three inches to twenty-five inches (23"-25") from the grade of sidewalk line to the center of the outlet nozzles.

Each hydrant shall have a safety stem coupling and safety flange so constructed that if hit, the stem will not bend and the hydrant barrel will not break, unless otherwise specified. It shall also permit rotation for the upper barrel of addition of extension sections.

The hydrant main valve shall be of the compression type and shall open against the pressure. The valve shall be faced with a resilient material, which resists damage by rocks and other foreign matter and shall be so designed that together with the seat, it is removable for repairs and replacement without digging up the hydrant.

The gasket shall be inset so that it will remain attached to the seat rings and will not be injured when raised or lowered. A non-corrodible drain valve shall be provided and arranged so that it will automatically drain the hydrant barrel when the main valve is closed and prevent any leakage when the main valve is open. The drain valve shall be faced with high-grade leather, or approved equal material, or have a tapered plug and seat for positive closure. The entire drain mechanism shall be lubricated with waterproof graphite grease. The hydrant drains shall not be plugged even in areas where the water table is above the drain. The City shall be responsible for plugging drains as required.

Hydrants shall have satisfactory self-lubricating features for the stem threads. Where the stem (valve rod) or operating nut comes in contact with the packing, it shall be bushed with bronze or non-corrodible metal and no leakage shall be permitted under the bushed surface. All movable parts within the hydrant shall be bronze or non-corrodible metal.

Outlet nipples shall be of bronze or suitable non-corrodible metal securely pinned or locked in and caulked in place.

Hose caps shall be provided for all outlets and must be securely attached to the barrel with a chain of constructed material not less than one-eighth inch (⅛") in diameter. A leather, rubber or lead washer shall be provided in each cap and set in a groove to prevent it from falling out when the cap is removed. The hose cap nut shall be of the same size and shape as the top operating nut. All caps shall be lubricated with waterproof graphite grease. The size and shape of the operating nut shall be the National Standard pentagon nut, measuring one and one-half inch (1 ½") from point to flat. Hydrants shall open to the left (counterclockwise) and shall be marked with an arrow to show the direction of opening.

The hydrant shall be marked with the name of the manufacturer. The bidder shall state the weight of each hydrant complete and shall furnish detailed working drawings, specifications and description of hydrants to be furnished. All hydrants shall have a six-inch (6") mechanical joint inlet for connecting to a six-inch (6") ductile iron lead from the main. There shall be a gate valve between each hydrant and the watermain or lateral.

Hydrants shall be painted one (1) coat of red primer paint and two (2) finish coats of an approved red paint. Hydrants shall be touched up at the end of construction.

Each hydrant shall be supplied with a Hydra Finder Flag or an approved equal. Hydra Finder Flag shall be installed per detail and the manufacturer's recommendations.

2.05 HYDRANT BAGGING PROCEDURE: Until the watermain has been tested and accepted, all hydrants installed shall be covered with a four mil (4 mm) plastic bag with appropriate ties. The bags shall be furnished by the Contractor and shall be considered incidental to the price of the hydrant. After being accepted, the watermain shall become part of the existing system. Upon being connected to the existing system and accepted for operation by the Engineer, bags shall be removed by the Contractor.

2.06 HYDRANT EXTENSIONS: Hydrant extensions, as required to bring a hydrant up to the proper elevation as directed by the Engineer, shall be one continuous piece as supplied by American Flow Control or approved equal. Hydrant extensions two feet (2') or less shall be achieved by adding an extension to the top of the standpipe as per manufacturer's recommendation. Hydrant extensions greater than two feet (2') shall be accomplished by utilizing the K-444 Bottom Extension kit as supplied by American Flow Control or an approved equal. Payment for all materials and labor necessary to complete this item shall be per the unit bid price. No after market extension kits will be accepted.

The Contractor shall provide a minimum of twenty-four (24) hours notice prior to the installation of hydrant extension. Any extension installed without a representative of the City present shall be removed and reinstalled at no additional cost to the Owner.

2.07 VALVES: All gate valves shall be American Flow Control or approved equal. Gate valves two inches (2") to forty-eight inches (48") shall be resilient wedge type, rated for 250 p.s.i.g. cold water working pressure. All ferrous components shall be ductile iron. All valve sizes shall be in full compliance with AWWA C515. The words "D.I." or "Ductile Iron" shall be cast on the valve or stamped on a permanently attached corrosion resistant metal tag. The wedge shall be ductile iron encapsulated with EPDM rubber and shall be symmetrical and seal equally well with flow in either direction.

Valves shall be NSF Standard 61 certified.

Bolting material shall be class 304 stainless steel, Cor-Blue or approved equal bolts and nuts meeting the physical requirements of ASTM F593 and ASTM F594. The heads must be hexagon conforming to ANSI B18.2.1. Therefore, metric size, socket head cap screws are not allowed.

The operating nut shall be constructed of ductile iron and shall have four flats at the stem connection to assure even input torque to the stem.

All gaskets shall be pressure-energized o-rings.

The stem shall be sealed by three O-rings. The top two O-rings shall be replaceable with valve fully open and subject to full rated working pressure. O-rings set in a cartridge shall not be allowed.

All internal and external surfaces of the valve body and bonnet shall have fusion-bonded epoxy coating, complying with ANSI/AWWA C550, applied electrostatically prior to assembly.

Detailed drawings, catalog information and maintenance data shall be furnished as requested by the Engineer.

Gate valves shall be resilient seat American Flow, or approved equal, with mechanical joints meeting AWWA Specification C515. All gate valves shall be provided with a two-inch (2") square operating nut and shall open in a counterclockwise direction.

Valves shall have "O-Ring" construction and be designed for 250 psi working pressure. Valves fourteen inches (14") and larger shall be gear driven gate valves as supplied by American Flow Control Series 2500 Resilient Wedge Valve with stainless steel hardware or approved equal.

Wall Indicator Valves (WIV) shall be installed for all indicator valves required on a project. If it is not feasible to install a WIV, and with the City Engineer's approval, a post indicator valve (PIV) may be installed. Post Indicator Valves (PIV) shall be installed at a minimum of thirty six inches (36") above final grade.

2.08 VALVE BOXES: Valve boxes shall be ductile iron of the three (3) piece type suitable for a depth of seven and one-half feet (7 ½') of cover over the top of the pipe or to a depth as shown on the plans or directed in the field. Shafts shall be five and one-fourth inch (5¼") diameter, bases may be round or oval and the length of adjustment shall be screw type. Valve boxes shall be power seal ductile iron valve box Model 8860 DI or approved equal.

Drop covers on valve boxes shall bear the word "WATER" on the top and shall be approved by the City's Utility Superintendent. All valves shall be supplied with "Valve Bonnet and Valve

Adapters" as manufactured by Adapter Inc. or approved equal. Valve bonnet and adapters shall be considered incidental to the valves.

In case of either greater depth or less depth than seven and one-half feet (7½'), the valve boxes supplied shall allow a minimum of six inches (6") of adjustment both ways.

Valves in excess of eight feet (8') shall have operator extensions installed to a point no less than seven feet (7') below proposed grade. The extensions shall be as supplied by Water Products Company or approved equal. The extension items shall be anchored with a set bolt to the valve nut and shall have a centering plate at the top of the stem. The stem shall have a universal joint to allow free movement.

2.09 CORPORATION STOPS: Corporation stops shall be Ford No. FB600-x style or approved equal for one inch (1") and two inch (2") diameter copper tubing.

2.10 SERVICE CLAMPS: Service clamps shall be used with two inch (2") or larger corporation stops on eight-inch (8") watermain. Clamps shall be ductile iron with double straps equal to Smith-Blair Type #313.

2.11 CURB STOPS: Curb stops shall be Ford No.B22-xxxm Style, or approved equal, with Minneapolis thread pattern, with inlet and outlet each one-inch (1") or two-inch (2") in diameter for flared connections.

Immediately following the placement of the curb & gutter, a "W" shall be stamped on the face of the curb to mark the location of the curb stop for each property. The letter shall be placed at the intersection of an imaginary line from the curb stop to a point perpendicular to the curb back.

The "W" shall be a Kraft Tools Company CF405 Water Utility Stamp (three inch (3") letter) or an approved equal. It shall be straight and centered on the face of the curb.

If the Contractor neglects to stamp the curb he/she shall be responsible for grinding the letter into the hardened concrete. If the ground letter is not neat, clean and to the specified dimensions or if the location of the letter does not correspond to the service location, the Contractor shall remove the entire panel and replace it with a minimum of two (2) epoxy rebar dowels in each joint and stamp the new concrete as specified above.

2.12 CURB BOXES: Curb boxes shall be Mueller No. H-10300, or approved equal, with stationary rods and with Minneapolis top for one-inch (1") and two-inch (2") size. Boxes shall be seven feet (7') to eight feet (8') adjustable.

2.13 WET TAP EXISTING WATERMAIN: All wet taps shall be Waterous Resilient Seal Tapping Valve, or an approved equal, meeting AWWA Series C509 requirements. The tapping valve shall be supplied with the appropriate size stainless steel sleeve. The stainless steel sleeve shall be Ford Fast, Ford FPS, Rockwell 662, Rockwell 622, or approved equal. The tapping sleeve should be able to withstand a working pressure of 300 psi. Valve boxes shall be per Section 2.07 of these Watermain Specifications.

The Contractor will be required to submit a list of tapping materials and subcontractors performing the work, for the Engineer's approval.

The Contractor shall notify the Engineer at least forty-eight hours (48 hrs) before the wet tap is to be performed. No backfilling shall take place until visual testing for leaks, by the Engineer in the field, has taken place.

2.14 WATERMAIN POLYETHYLENE ENCASEMENT: The Contractor shall use 4-mil high-density cross-laminated (HDCL) polyethylene as per ANSI/AWWA C105/A21.5 installation methods. Method A will be used on the watermains, gate valve boxes, hydrants, etc. When the watermain is required to be taped for a service, the Contractor shall wrap the watermain with polyethylene adhesive tape. The adhesive should be wrapped around the watermain two or three times where the tapping machine and chain will be mounted.

The polyethylene adhesive tape is incidental to the price of the polyethylene encasement.

The polyethylene encasement will be paid for by the linear foot on the watermain. The polyethylene encasement used on the gate valve boxes and hydrants is incidental to the price of polyethylene encasements.

2.15 COPPER TUBING: Copper tubing shall comply with the following and shall be manufactured in the United States of America:

Federal Specification	WW-T-799 Type K
ASTM Specification	B-88-62 Type K

A minimum one inch (1") copper service line is required for all water service.

2.16 SERVICE SADDLES: Service saddles shall be provided for all services larger than those specified below. Service saddles shall be Smith-Blair type #313 or approved equal with double straps, zinc plated.

Watermain Size	Maximum Corp. Size without Saddle
6"	1"
8"	1¼"
10"	½"
12"	2"
14" or larger	2"

2.17 RETAINER GLANDS: All retainer glands shall be ductile iron with set screws similar to Mega Lug mechanical joint retainer glands or approved equal and shall be suitable for 150 psi working pressure. Set screws shall be capable of withstanding torque of not less than 80 foot pounds. All retainer glands shall be rodded to the one full pipe joint on either side of the joint being restrained.

2.18 ELECTRICAL CONDUCTIVITY MATERIALS: All joints on pipe and fittings shall be connected with an electrical conducting copper strap, clips or cable designed and tested to withstand 400 amps.

PART 3 - EXECUTION

3.01 REMOVE EXISTING WATERMAIN: All removed watermain shall become the property of the Contractor to dispose of off-site at no additional cost to the City.

3.02 DISPOSE LEAD WATER SERVICE: Work for this item shall include the cost of **disposal only** of any and all lead water services that are encountered during construction of the proposed improvements. Removal of the service pipe will be paid under item "Remove Watermain Service Pipe". Payment for this item will be made under Dispose Lead Water Service and shall be measured per each and shall be considered full compensation to furnish all labor, materials, equipment and tools to complete the work as specified.

3.03 DEPTH: Watermain shall be laid to such a depth as indicated on the plans. The depth shall be measured from the top of the pipe vertically to the finished grade of the street or ditch line. The minimum depth shall be seven and one-half feet (7 ½') for all watermain.

Mechanical bends may not be used to lower or raise the watermain. Pipe shall be deflected according to the manufacturer's recommendations.

3.04 REACTION BLOCKING: Reaction blocking shall be provided at all watermain fittings and hydrants in accordance with the typical blocking detail. In any instance where the Engineer determines that solid backing against undisturbed earth is not obtainable for fittings or hydrants, the Contractor shall use steel tie rods, mega lugs, or mechanical joint retainer glands as directed by the Engineer.

Valves on branch lines or on hydrant leads shall, in all cases, be tied to an adjacent tee or cross fitting or back one full length of pipe.

3.05 ALIGNING AND FITTING OF PIPE: Alignment and fitting of the pipe shall conform to the following AWWA table:

Pipe Size	Pipe Length	Allowable Deflection Mechanical Joint	Allowable Deflection Push-on Joint
4"	18'	31"	21"
6"	18'	27"	21"
8"	18'	20"	21"
12"	20'	22"	21"
16"	20'	15"	12"
18"	20'	12"	12"
20"	20'	12"	12"
24"	20'	10"	12"
30"	20'	10"	8"
36"	20'	9"	8"
42"	20'	8"	8"
48"	20'	8"	8"

3.06 TRENCH PREPARATION: The watermain excavation and trench preparation shall be in accordance with CEAM specification 2600.3B, "Excavation and the Preparation of Trench" in the Standard Utilities Specifications. The Foundation Bedding Method as shown in the details shall be used for all pipe installation where ground water or unstable material does not create a problem. Where, in the opinion of the Engineer, unstable material prevents use of this bedding method, the Contractor shall install Granular bedding or Trench Stabilization Material as shown in the details.

The cost of the granular material required, furnished and placed in the pipe zone, shall be included in the price per foot of watermain complete in place, unless a bid item is included in the Bid Proposal for this material.

3.07 UTILITY SERVICES

The exact location of existing water and sanitary services are not known. Approximate locations are shown on the plans. **Each set of services will need to be field located prior to installation**. No additional compensation will be considered for time spent locating services.

3.08 CONNECTIONS TO EXISTING UTILITIES: Any connections between existing and new watermains shall be as directed by the Engineer. All costs associated with making the connection, including cutting into the existing watermain, mechanical joint sleeves, adapters, short pieces of pipe, and labor, shall be included in the bid price to "Connect to Existing Watermain." All pipe and fittings for the new runs of watermain shall be paid for under the appropriate bid item.

3.09 INTERRUPTION OF WATER SERVICE: No interruption of water service (public or private) will be allowed unless approved by the Engineer. The Contractor will be required to provide temporary water service whenever possible or if deemed necessary by the Engineer.

The Contractor shall submit a plan showing the proposed method of temporary water service for the Engineer's approval. Temporary water service as required shall be at the expense of the Contractor unless a bid item is included in the Bid Proposal.

If an interruption of water service is approved, all consumers affected by the operation shall be notified by the Contractor at least forty-eight hours (48 hrs) before the operation and be advised of the probable time service will be restored.

All valves that need to be opened or closed shall be operated ONLY by the Savage Public Works Department or Engineering Division.

3.10 VALVES, FITTINGS AND HYDRANTS: All bends, tees, plugs and hydrants shall be securely braced against undisturbed soil using precast concrete blocks or poured in place concrete thrust blocks. In addition, retaining glands or mega lugs shall be installed on all valves, fittings and hydrants.

Hydrant leads, stubs, all pipe, fittings, valves and hydrants shall be tied with rods or bolts and retaining glands, or mega lugs back to the main. If tie rods are used they need to have coal tar applied after installation.

All nuts and bolts used in the assembly on ductile iron pipe shall be stainless steel or Cor-Blue. Each gland shall include two 6-ounce large zinc anode caps as manufactured by Trumball Industries or Engineer-approved alternate.

3.11 BUILDING SERVICES: Curb stops and boxes shall be installed as shown on the Standard Plates. The curb stop and box shall be located on the property line, unless specified otherwise.

Corporation stops shall be tapped into the main only when full of water and under pressure. No taps shall be made into a dry pipe. Corporation stops shall be turned into the pipe until tight and shall not be turned back to position the operating nut at the top.

The copper service lines as placed between the watermain and the curb boxes shall have a minimum of seven and one-half feet (7 ½') of cover as shown on the detail.

Service lines must be placed, at no additional cost to the Owner, beneath any obstruction which would prohibit the required cover if the service were placed over the obstruction. The method of tunneling under an obstruction shall be approved by the Engineer prior to work.

One continuous copper line without any joints shall be installed from the corporation to the curb stop unless approved by the Engineer. Each curb box shall be marked with a two-inch by two-inch (2" x 2") wooden post extending from the bottom of the curb box to a point two feet (2') above the ground's surface, along with a six-foot (6') steel fence post attached to the 2"x2".

3.12 WATERMAIN STUBS: The end of any watermain stub shall be marked with a treated four-inch by four-inch (4" x 4") wooden post. The post should be placed in the ground deep enough to withstand normal construction traffic, but extend one to two feet (1'-2') above the ground. The exposed portion of the post may be painted to differentiate the watermain stub from other watermain or sanitary sewer stubs. A six-foot (6') steel fence post shall be tied to the post and extend four feet (4') above the ground.

3.13 PRESSURE TESTING: All watermain, including fittings, valves, services and hydrants, shall be tested in accordance with and shall meet the requirements set forth in AWWA Specifications C-600.

The Contractor shall have the option of using an alternative testing procedure as identified below:

1. After the pipe has been laid, including fittings, valves, hydrants and services, and the line has been backfilled in accordance with these specifications; it will be subjected to a hydrostatic pressure of 150 psi, unless otherwise directed by the Engineer. The duration of each test shall be two (2) hours. Commercial and Multi-family installations with sprinkler system shall be tested at 200 psi for two (2) hours.

2. Each valved section of pipe shall be slowly filled with water and the specified test pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, gauges and all necessary apparatus shall be furnished by the Contractor at no additional cost to the Owner. Gauges and measuring devices must meet with the approval of the Engineer and the necessary pipe taps made as directed. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary at the point of highest elevation and afterward, tightly plugged.

The pressure testing procedure shall be set up in such a manner that will allow pressure testing of each main line valve. Upon completion of the watermain test, the Contractor shall proceed to test each main line valve by subjecting it to a pressure of one hundred and fifty (150) psi for five (5) minutes.

Any cracked or defective pipes, fittings, valves or hydrants discovered in consequence of the pressure test shall be removed and replaced by the Contractor with sound material in the manner provided and the test shall be repeated until satisfactory to the Engineer.

The pressure gauge for the tests shall be an Ashcroft Model 1082 with a four and one-half inch (4 ½") dial face with one (1) psi or approved equal.

3.14 DISINFECTING MAINS: After the completion of installation and testing, the Contractor shall disinfect the new pipe, valves and fittings as described in AWWA Specification No. C651-92 by use of the Tablet Method or may use the Continuous Feed Method during construction. The Tablet Method is generally described as follows:

1. The Contractor shall place hypochlorite tablets in each section of pipe and also in hydrants, hydrant leads and other appurtenances during construction. The tablets shall be attached to the top of the pipe with a food grade adhesive such as Poly Grip or approved equal. There shall be no adhesive on the tablet except on the broad side attached to the surface of the pipe. Attach all the tablets inside and at the top of the main. If the tablets are attached before the pipe section is placed in the trench, their position shall be marked on the section so it can be readily determined that the pipes installed with the tablets at the top.

2. When installation has been completed, the main shall be filled with water at a rate such that water within the main will flow at a velocity no greater than one-foot per second (1 fps). Precautions shall be taken to assure that air pockets are eliminated. This water shall remain in the pipe for at least twenty-four hours (24 hrs). If the water temperature is less than 41˚F (5˚C), the water shall remain in the pipe for at least forty-eight hours (48 hrs). Valves shall be positioned so that the strong chlorine solution in the treated main will not flow into watermains in active service. After the required retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is less than one (1) ppm.

The number of tablets required per eighteen feet (18') of pipe based on 3.25 grains available per chlorine per tablet is as follows:

Diameter	No. of Tablets
4"	1
6"	1
8"	2
10"	3
12"	4
16"	6
18"	8
20"	10
24"	14

Only fresh disinfectants shall be used and the main filled with water and flushed not later than one (1) week after the disinfectant has been added. The water (containing chlorine) shall be left in the pipe for a minimum of twenty-four hours (24 hrs).

3.15 FLUSHING AND BACTERIAL TESTING: The Contractor shall furnish all necessary materials, tools and labor to flush the entire main with a velocity of no less than two and one-half feet per second (2.5 fps).

Contractor is to flush all hydrants thoroughly until chlorine smell is gone, or two minutes, whichever is greater.

Twenty-four hours (24 hrs) after the final flushing, and before the new watermain is connected to the existing distribution system, water samples shall be collected from the new main. One (1) sample for every twelve-hundred (1,200) linear feet plus one (1) sample from each end of the line and one (1) sample from each branch shall be collected for testing. All samples shall be tested for bacteriological quality. A State of Minnesota Certified Laboratory shall test all samples.

All valves that are required to be opened or closed to collect samples shall be operated ONLY by the Savage Public Works Department or Engineering Division.

Testing shall be considered incidental to the price of the watermain.

SECTION 2731

SANITARY SEWER CONSTRUCTION

PART 1 - GENERAL

1.01 SCOPE: This section of the specifications shall include the complete construction of sanitary sewer extensions within street right-of-way and easements. The sewers are to be laid and bedded as shown on the plans, including but not limited to, manholes, all necessary excavation, backfilling, dewatering of the trench and trench shoring as required.

1.02 RELATED SECTIONS AND REFERENCES:
A. CEAM Specifications - 2621 Sanitary Sewer and Storm Sewer Installation

1.03 METHOD OF MEASUREMENT:
Sanitary sewer pipe shall be measured per linear foot (LF) of pipe from center of structure to center of structure. Sanitary sewer services shall be measured per linear foot (LF) of pipe installed. Manholes shall be measured from the invert to the top of casting. Extra depth shall be measured from fifteen feet (15') and deeper.

1.04 PAYMENT: Manholes will be paid for at the contract unit price, completely installed, including base and casting.

For the purpose of calculating the depth of the sanitary sewer lines, it shall be measured from the invert of the pipe to the finished grade of the centerline.

Sanitary sewer pipe shall be paid per linear foot (LF) of pipe installed.

Wyes and tees will be paid for at the contract price for each unit furnished of the size and classification specified in the Bid Proposal. Fittings shall be considered incidental.

Service pipe, including riser sections, will be paid for at the contract unit price. Fittings shall be considered incidental.

Pipe bedding material shall be considered incidental to the price of the pipe and no other compensation shall be made.

Adjust existing sanitary manhole castings shall be paid when the casting is adjusted to the wear course elevation. New concrete rings and I/I barrier shall be placed as part of the adjustment and shall be incidental to the price of the adjustment.

Adjust frame and ring casting will be considered incidental to reconstruct and/or new manholes when the frame and ring casting is adjusted to the base course elevation and/or when the frame and ring casting is adjusted to the wear course elevation when the wear course is placed in the same year as the base course. Adjust frame and ring casting will be paid once for reconstruct and/or new manholes when the frame and ring casting is adjusted to the wear course elevation.

1.05 SUBMITTALS: Prior to ordering precast manhole components, the Contractor shall submit for review shop drawings in order to verify that the materials to be supplied are in conformance with the design concept of the Project and in compliance with the information given in the Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS: The Contractor shall furnish all materials required for the complete construction of the specified work, and all materials shall be new, of first grade and shall be products of reputable manufacturers known to the trade.

A. PVC SDR 35U: shall conform to ASTM D3034 for 4" to 15" sizes and ASTM F679 for 18" to 27" sizes with gasketed joint and the following:

Nominal Size (inches)	Outside Diameter (inches)	Min. Wall Thickness (inches)
8	8.400	0.240
10	10.500	0.300
12	12.500	0.360
15	15.300	0.437
18	18.701	0.536
21	22.047	0.632
24	24.803	0.711
27	27.953	0.801

B. PVC SDR 26: shall conform to ASTM D3034 with gasketed joints and the following:

Nominal Size (inches)	Outside Diameter (inches)	Min. Wall Thickness (inches)
4	4.215	0.162
6	6.275	0.241
8	8.400	0.323
10	10.500	0.404
12	12.500	0.481
15	15.300	0.588

C. PVC SEWER SERVICES, RISERS & ALL RELATED FITTINGS: shall be PVC SDR 26 or other approved pipe.

D. DUCTILE IRON PIPE AND FITTINGS (DIP): The class of ductile iron pipe shall be as shown on the plans or specified by the Engineer. Gray Iron Pipe will not be allowed.

E. FIBERGLASS REINFORCED PIPE (FRP): Shall conform to ASTM D3236 and meet the CEAM Specification 2621.A10.

F. REINFORCED CONCRETE PIPE joints shall be Type R-4 or equal with molded Tylox super seal gaskets or approved equal meeting the requirements of ASTM C361.

1. Joint Coating and Sealing: All joints shall be inspected by the manufacturer, repaired, smoothed and cleaned in preparation for coating. The entire joint surface (pipe ends and mating surfaces) of both the bell and spigot shall be coated with an epoxy ester equal or exceeding the specifications of single-package epoxy as manufactured by Perfection Paint and Color Company of Indianapolis, Indiana. Application shall be in accordance with the

manufacturer's recommendations to produce a smooth, continuously coated joint mating surface and cover pipe ends.

2. Plant Testing: Pipe manufactured for this project will be vacuum tested to a minimum of 3.6 psi pressure differential and a leakage rate not to exceed 0.0017 cfm per square foot of internal pipe surface.

2.02 MANHOLES: shall be constructed of precast concrete sections with Tylox Super Seal or approved equal gasket material, meeting the requirements of ASTM C-443, with butyl rubber on top lip of all manhole section joints. A one foot (1') or one foot four inch (1'-4") section shall be installed under the cone section of all manholes to allow for future height adjustment.

All manholes shall have a cone no less than three feet (3') and no more than four feet (4') in height.

Pipes shall be connected to manholes by being precast in rubber boots. Manholes and pipe connections must be watertight. Connections that are not watertight shall be made watertight in a manner determined by the Engineer at no additional cost to the Owner.

2.03 MANHOLE STEPS: shall be spaced sixteen inches (16") on center, on the downstream face of the manhole, unless otherwise specified.

Manholes steps shall be steel reinforced plastic and shall be constructed in accordance with Mn/DOT Standard Plate No. 4180H and subsequent revisions.

2.04 I/I BARRIER & ADJUSTING RINGS: Manhole casting adjustments includes precast concrete adjusting rings, I/I Barrier as required and Neenah or approved casting.

2.05 MANHOLE CASTINGS: Manhole casting shall be Neenah Catalog No. R-1642 Type "B" solid cover with two concealed pick holes or approved equal. The minimum allowable weight for a manhole casting and cover is 360 lbs.

Sanitary sewer manholes shall have lids furnished with "SANITARY SEWER" cast in two-inch (2") high letters.

Full bearing surfaces of frame and cover shall be machined to provide true bearing surfaces.

2.06 PIPE INSULATION: Insulation shall be 2 two inch (2") thick boards of expanded polystyrene, specifically designed for use in highway construction, equal to "Styrofoam Hi 35" as manufactured by Dow Chemical Company. Special note is to be taken that this type is different than the type used in ordinary building construction. The insulation shall comply with Mn/DOT Specification 3760.

PART 3 - EXECUTION

3.01 ALIGNMENT AND GRADE: All pipe shall be laid and maintained to the required lines and grades, with manholes and fittings at the required locations. The Owner will furnish one set of line and grade stakes necessary for the work. It shall be the Contractor's responsibility to preserve these stakes from loss or displacement. The Engineer may order any stakes replaced as he/she deems necessary for the proper execution of the work. Any replacements shall be at the

Contractor's expense. All pipes shall be laid to the grade shown on the plans and/or cut sheets as supplied by the Engineer.

No deviation from line or grade shall be made without the consent of the Engineer.

3.02 LASER BEAM CONTROL: The Contractor shall maintain the line and grade of the pipe in the trench by means of a laser machine. The laser apparatus shall be in good working order when being used. When directed by the Engineer, the Contractor shall set the laser machine above ground and assist the Engineer in verifying the working order of the laser machine. The Contractor shall periodically check the line and grade of the pipe being laid by other means. The Contractor shall check the grade of each structure placed by means of an automatic level and rod or other means approved by the Engineer.

3.03 PIPE LAYING: The alignment of pipe between manholes shall be such as to permit the entire inside circumference to be seen from any manhole to the next adjacent manhole. Pipe that does not conform to line and grade shall be re-laid at the Contractor's expense.

Pipe shall be laid against the grade of the sewer. The spigot end of the pipe shall be inserted full depth into the bell and, when completed, each line of pipe shall have a uniform and smooth invert. Joints for all sewers shall be made watertight. As soon as the joint is made, the bell depression shall be filled with granular bedding material, which shall be pressed under and around the joint, by hand, in such a way as to protect it from sagging or being disturbed. The bell end of the pipe must be on the high side or end of the pipe.

Fiberglass pipe shall be handled with textile slings, or other suitable materials or a forklift. Use of chains or cables is not permitted. Bedding for fiberglass pipe shall be according to manufacture recommendation.

The Contractor shall assume total responsibility for assuring that segments of the pipe, which have been bypassed during construction, shall be installed to match the line and grade as shown on the plans.

The interior of the pipe shall, as the work progresses, be cleaned of all dirt and superfluous material. The exposed end of the pipes shall be protected with suitable temporary covers until installation is underway. Pipe laid in place shall be protected from damage and disturbance.

If deemed necessary by the Engineer, at the completion of the work, pipe shall be thoroughly flushed in a manner approved and directed by the Engineer and at the expense of the Contractor. All water used in the flushing must be pumped out of the sanitary sewer system after flushing.

3.04 MANHOLE INSTALLATION: Manholes shall be constructed as detailed and set plumb with a maximum deviation of ± 0.05 feet from vertical. All rows of steps shall be set vertical through the height of the manholes.

Channels for the flow of sewage through the manholes shall be formed in the floor and grouted smooth to conform to the inverts of the sewers as shown. All lift holes, and any manhole joints, which indicate infiltrations, shall be filled with expanding grout.

The Contractor shall be responsible for keeping all new and existing manholes clean and free of dirt at all times.

The manhole casting adjustments shall include precast concrete adjusting rings as required with a minimum of two (2) rings and a maximum of six (6) rings.

Precast manholes shall have a one-foot (1') or one-foot four-inch (1'- 4") manhole section installed under the cone section or top slab to allow for height adjustment.

3.05 MANHOLE DROP SECTIONS: shall be constructed where shown on the plans according to the details. No inside drops will be allowed.

3.06 ADJUST MANHOLE CASTING: Adjust existing manhole castings shall be paid when the casting is adjusted to the wear course elevation. New concrete rings and an I/I barrier shall be placed as part of the adjustment and shall be incidental to the price of the adjustment.

Existing castings shall be reused unless damaged and deemed unusable by the Engineer in the field. If a damaged casting is found, the Contractor must notify the Engineer in the field immediately to verify that the damage was not caused by the Contractor. Any castings damaged beyond use by the Contractor shall be replaced at no cost to the City.

All manholes shall be adjusted to a final elevation of three-eighths inch to one-half inch (⅜" to ½") below the grade of the roadway. If a wear course is to be place the following year, the manhole shall be adjusted for the base course and again for the wear course. Any structure not meeting the required tolerance shall be adjusted to the appropriate elevation at no cost to the owner.

All labor, equipment and material necessary to patch the areas around manhole adjustments including, but not limited to, sawcutting, aggregate base and bituminous material shall be considered incidental to the price of the manhole adjustment.

3.07 UTILITY SERVICES: The exact location of existing water and sanitary services are not known. Approximate locations are shown on the plans. **Each set of services will need to be field located prior to installation**. No additional compensation will be considered for time spent locating services.

Tracer wire shall be installed on all sanitary services and shall be considered incidental to the unit bid cost of the service pipe.

3.08 SERVICE LINES: Sewer service lines may be constructed in a common trench with water service lines. If the new sewer service elevation, as staked by the Engineer in the field, has an eighteen inch (18") vertical clearance between pipes with the top of the sewer laid eighteen inches (18") below the bottom of the water service, the sewer service shall be PVC SDR-26 and all pipes shall have gaskets. If the sewer service cannot be laid below the water service with a minimum of eighteen inches (18") clearance between pipes, then a ten-foot (10') horizontal separation must be maintained or the sewer service shall be constructed of watermain type materials.

Each new service shall be laid from the wye branch to the property line at a minimum of two percent (2%) slope. Each service shall be inspected, and the invert elevation at the end of the service shall be determined and recorded by the Engineer prior to backfill. A vertical riser shall be installed at the end of the service as shown in the detail plate. Fittings at the end of the service shall be solvent weld.

The Contractor shall connect a No. 10 solid trace wire to the sanitary sewer main and secure the wire along the service pipe to the end of the service line. The end of the trace wire shall be connected to the curb stop.

The end of each service shall be marked with a two inch by two inch (2" x 2") wooden post and a standard weight, painted steel fence post as shown on the detail plate.

Immediately following the placement of the curb & gutter, an "S" shall be stamped on the face of the curb to mark the location of the sanitary sewer service for each property. The letter shall be placed at the intersection of an imaginary line from the curb stop to a point perpendicular to the curb back.

The "S" shall be one and one-half inches (1½") tall and one and three-quarter inches (1¾") wide. It shall be straight and placed with the top of the letter one inch (1") from the top of the curb.

3.09 SANITARY SEWER STUBS: The end of any sanitary sewer stub shall be marked with a treated four-inch by four-inch (4" x 4") wooden post. The post should be placed in the ground deep enough to withstand normal construction traffic but extend one to two inches (1' – 2') above the ground with a metal fence post to extend four feet (4') out of the ground.

3.10 SEWER LINE TEST: Leakage tests and PVC deflection tests for sanitary sewer pipelines are detailed in the Standard Utilities Specifications bound with these documents. A rigid ball for deflection testing will not be accepted. Televising is required.

3.11 INFILTRATION AND EXFILTRATION TESTS: The Contractor shall furnish the weirs and other material and labor for placing the weirs in the sewers and shall assist the Engineer in making leakage tests and corrective work. No additional compensation will be given to the Contractor for his/her labor and materials necessary to assist in the testing and/or to reduce leakage to allowable values.

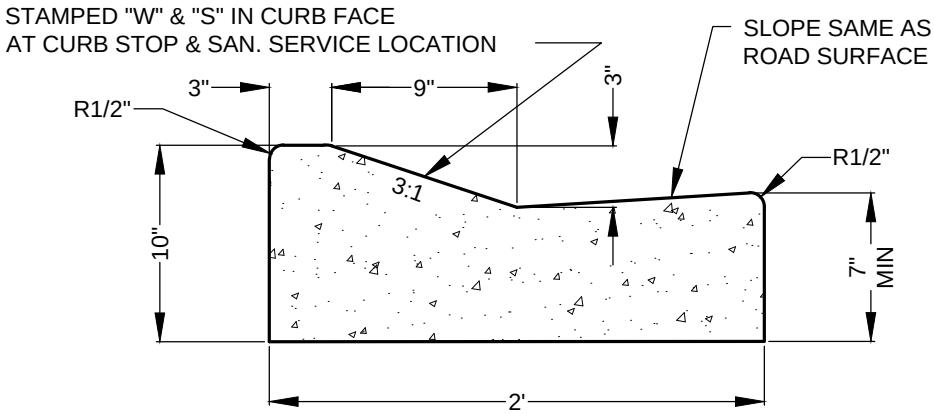
If measurements indicate leakage greater than the maximum allowed, additional measurements shall be taken and continued until all leaks are located and the necessary repairs and/or permanent corrective work to reduce the amount of leakage to below the maximum allowed by these specifications are completed.

Each section of the project, maximum length of 350 feet or the distance between two (2) manholes, shall be required to comply with the below allowable rates of infiltration and exfiltration. The quantity of pipe used in these calculations includes mains and street laterals only and does not include house service laterals.

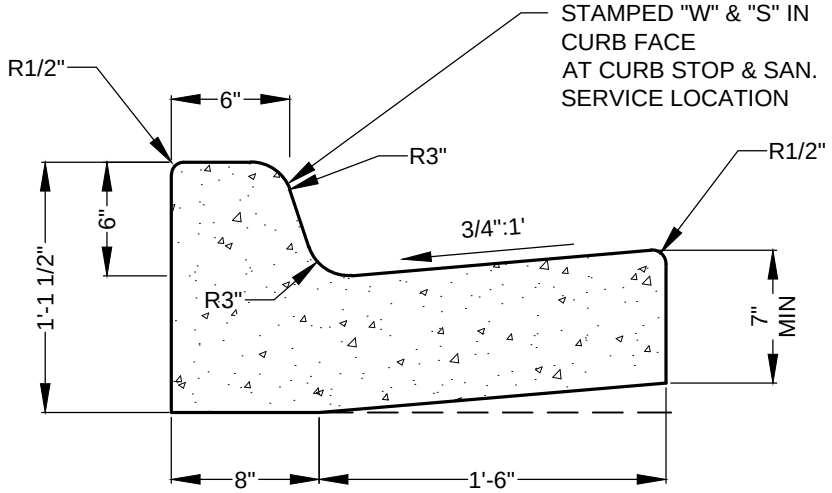
An infiltration test and/or exfiltration test, where applicable, and a low-pressure air test will be required on all sanitary sewer construction. Other tests shall be as specified in the Special Provisions. The cost of testing shall be considered incidental to the contract.

A. INFILTRATION TEST: Upon completion of the sewer and before any house services are connected, leakage tests shall be made to determine the amount of ground water infiltration into the sewers. Measurements shall be made by means of 90˚V-notch weirs placed in the manholes. Measurements shall be taken at all points where, in the opinion of the Engineer, the flow of water in the sewers is greater than the maximum allowable leakage. The maximum allowable rate of leakage shall be one hundred (100) gallons per inch of diameter of pipe per mile for twenty-four hours (24 hrs).

B. EXFILTRATION TEST: Upon completion of the sewer and before any house services are connected, exfiltration tests shall be made to determine the amount of exfiltration from the sewer line. The section of the sewer to be tested shall be sealed, and the manholes and pipeline to be tested shall be filled with water to a level or elevation specified by the Engineer. Measurements of the drop in water level shall be taken and recorded and rate of leakage shall be thereby calculated. The maximum allowable rate of leakage shall be two hundred (200) gallons per inch of diameter of pipe per mile for twenty-four hours (24 hrs) where the maximum hydrostatic head at the centerline of the pipe does not exceed twenty feet (20').



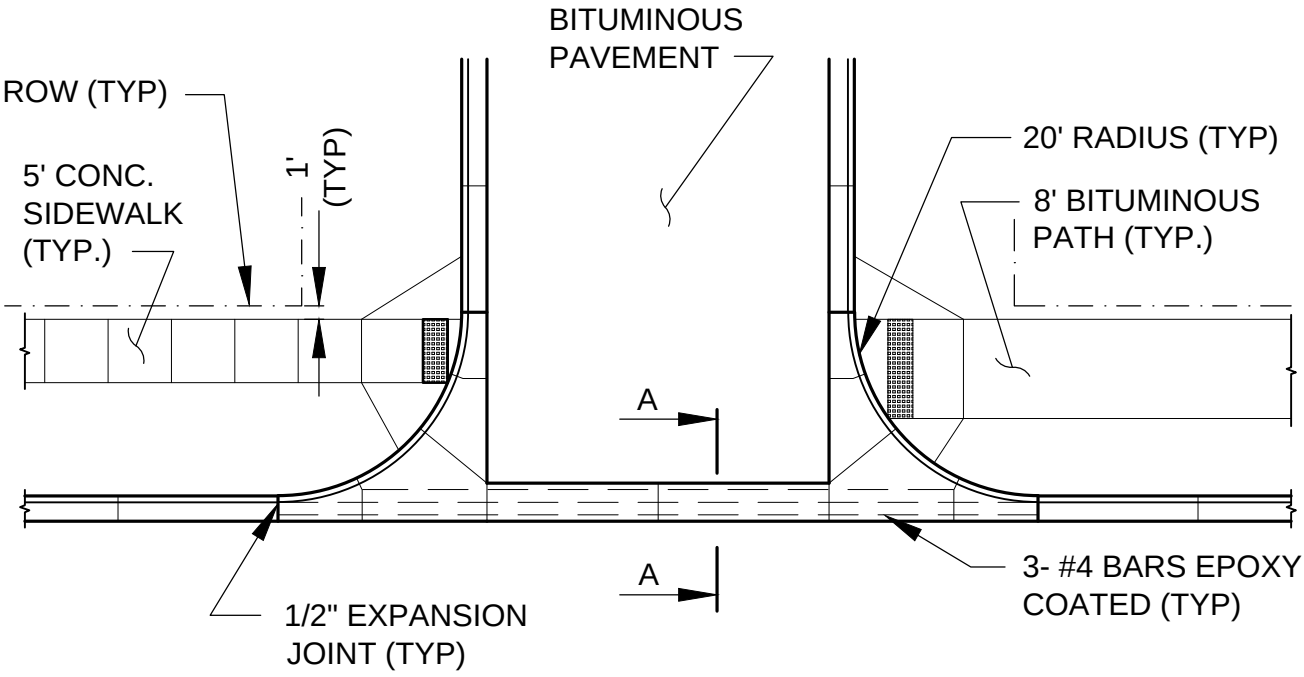
MODIFIED DESIGN "D"
CONCRETE CURB & GUTTER

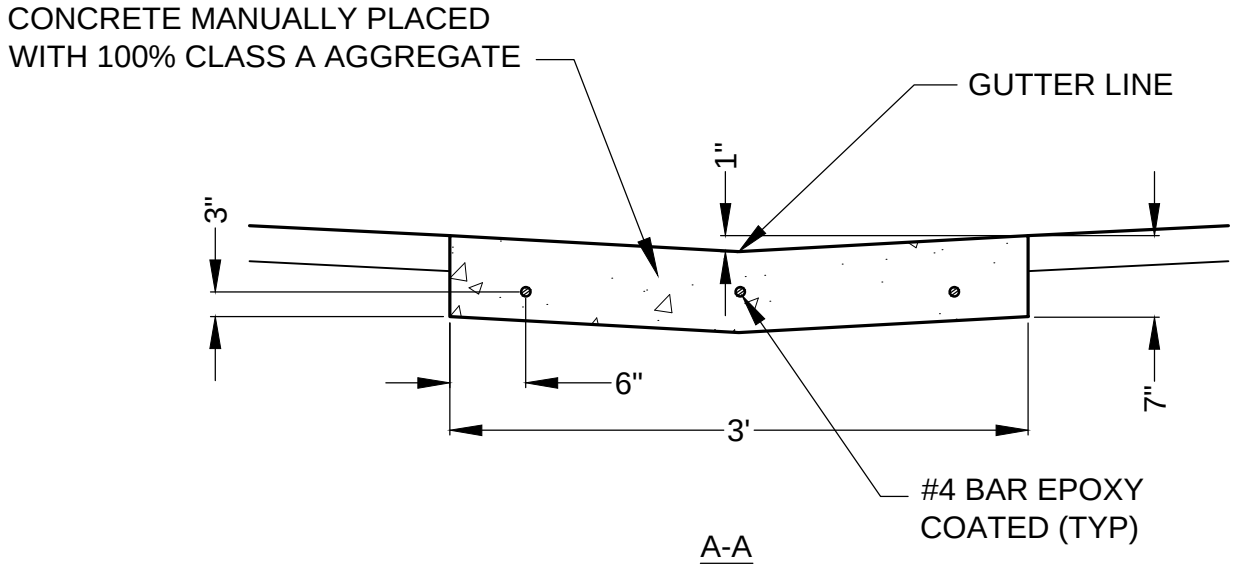


THE BOTTOM OF THE CURB AND GUTTER MAY BE CONSTRUCTED PARALLEL TO THE SLOPE OF SUBSURFACE COURSES PROVIDED A MINIMUM THICKNESS OF 7" IS MAINTAINED.

B618 CURB AND GUTTER

	CONCRETE CURB AND GUTTER	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 101





A-A

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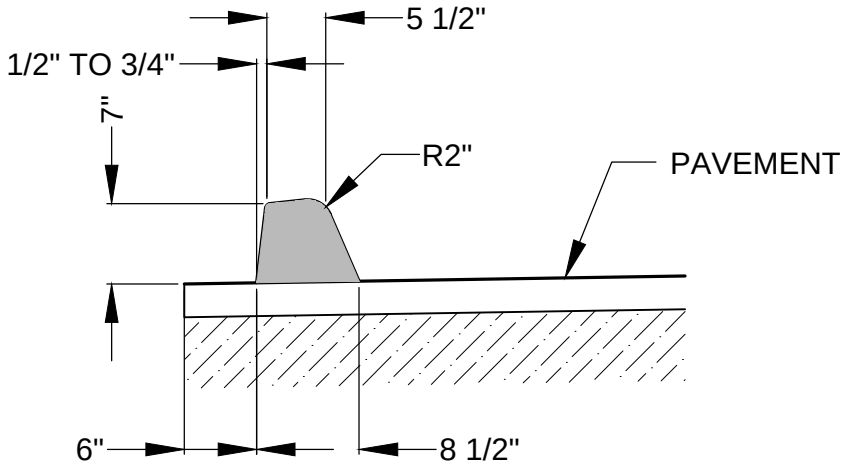
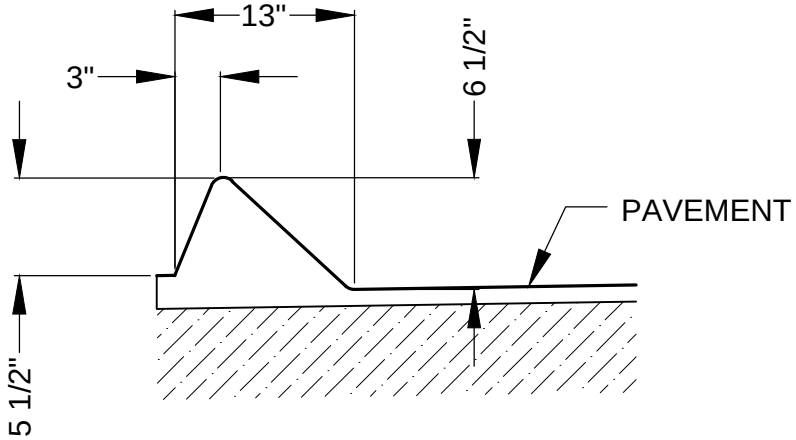
Savage	VALLEY GUTTER	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 102



CURB IS INSTALLED AS A
SEPARATE OPERATION

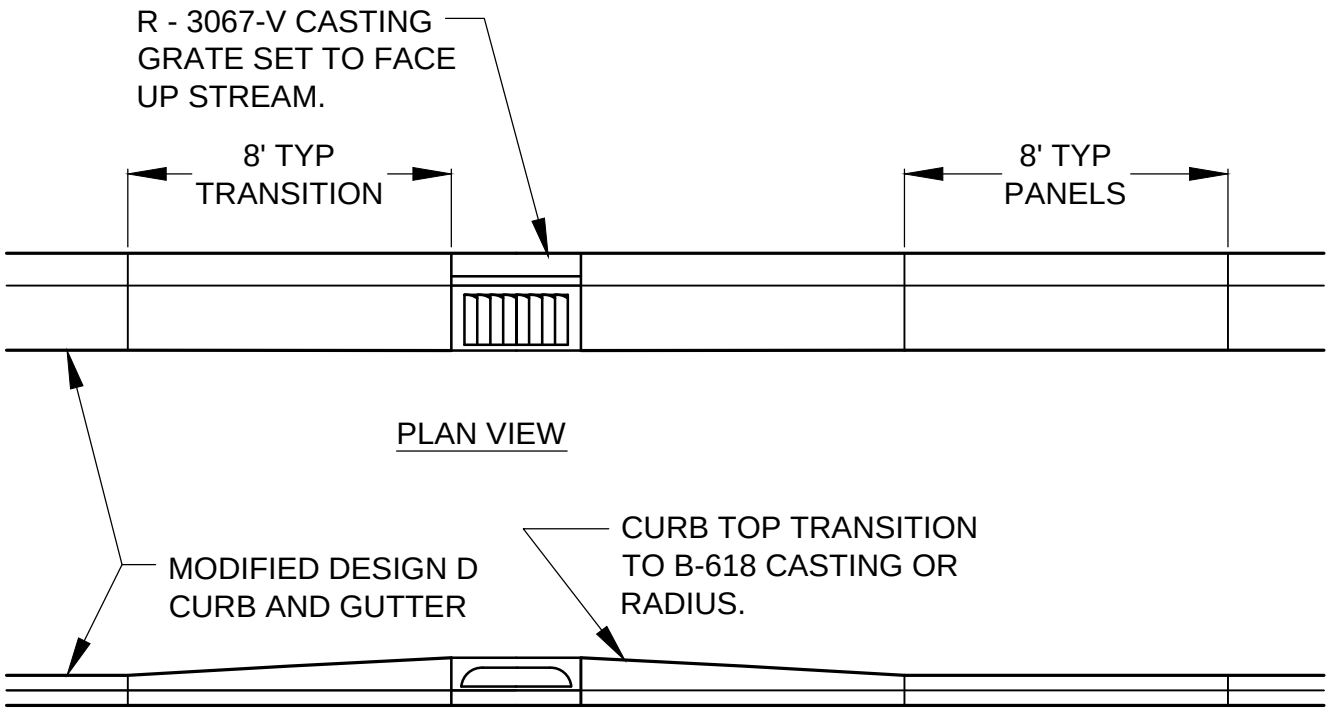
BITUMINOUS CURB



FORMED BY A SHOE ATTACHED TO THE
PAVER, THEREBY BEING AN INTEGRAL
PART OF THE BITUMINOUS SURFACE.

BITUMINOUS BERM

	BITUMINOUS CURB & BITUMINOUS BERM	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 103



PLAN VIEW

ELEVATION

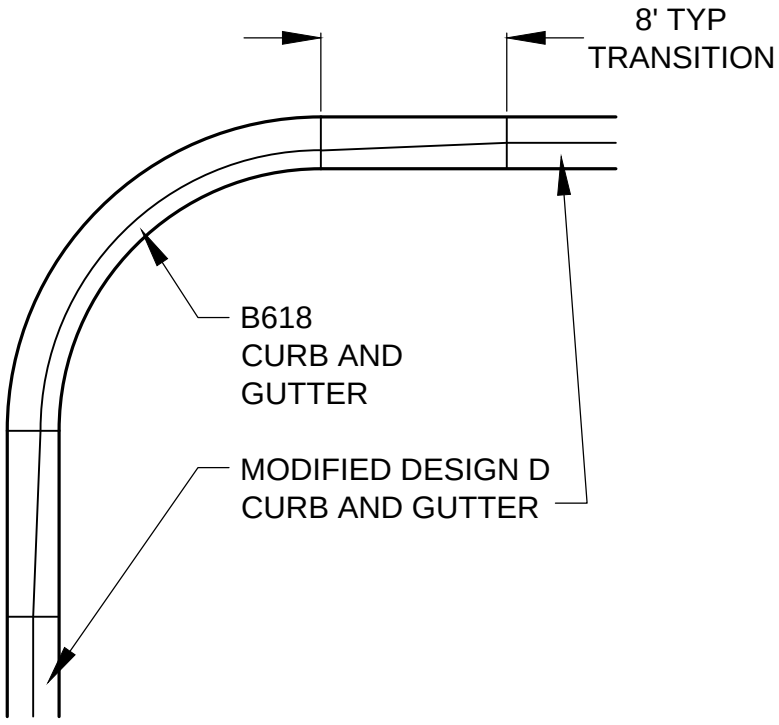
NOTES:

1. B618 CURB AND GUTTER THRU EACH STREET RADIUS WITH 8' SECTION EACH SIDE TO TAPER TO MATCH SURMOUNTABLE CURB AND GUTTER

2. ALL CURB AND GUTTER TO BE PAID FOR AT SURMOUNTABLE CURB AND GUTTER PRICE.

3. FOR VALLEYS USE R-3067-VB CASTING.

4. FOR DRIVEWAYS USE R-3067-C WITH TYPE "L" GRATE



RADIUS PLAN VIEW

	B618 CURB TO CASTING OR RADIUS TRANSITION	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 104

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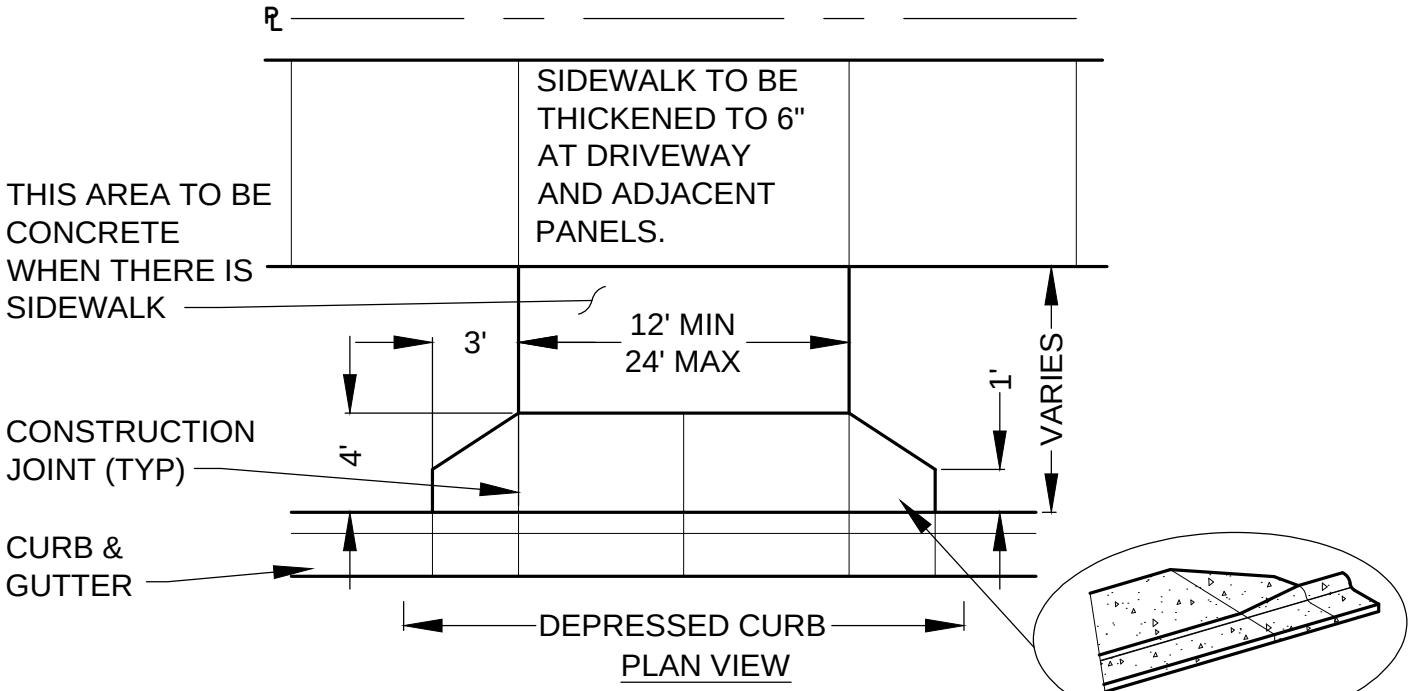
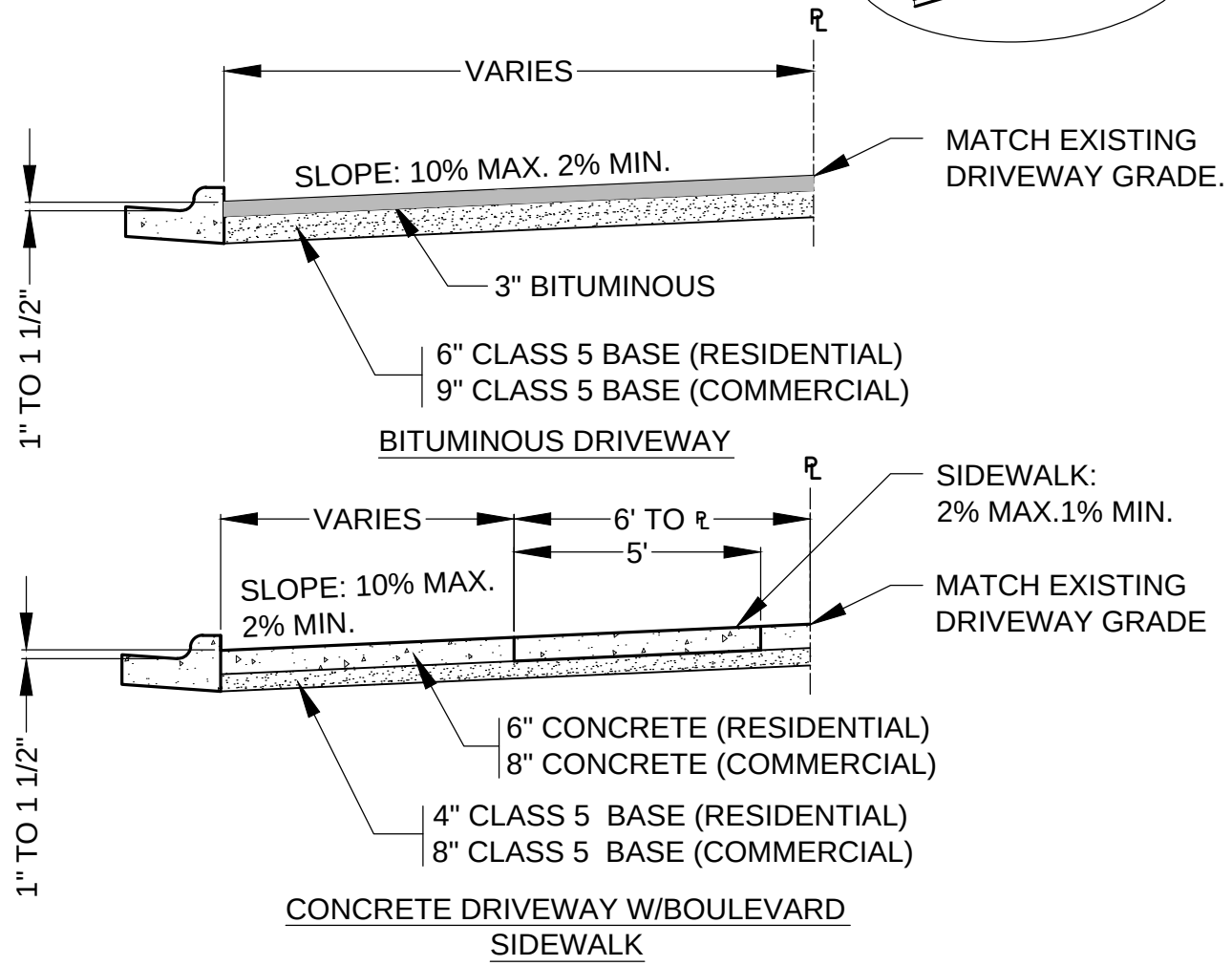


PLAN VIEW



BITUMINOUS DRIVEWAY

CONCRETE DRIVEWAY W/BOULEVARD SIDEWALK

Savage	TYPICAL DRIVEWAYS (RESIDENTIAL AND COMMERCIAL)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 105

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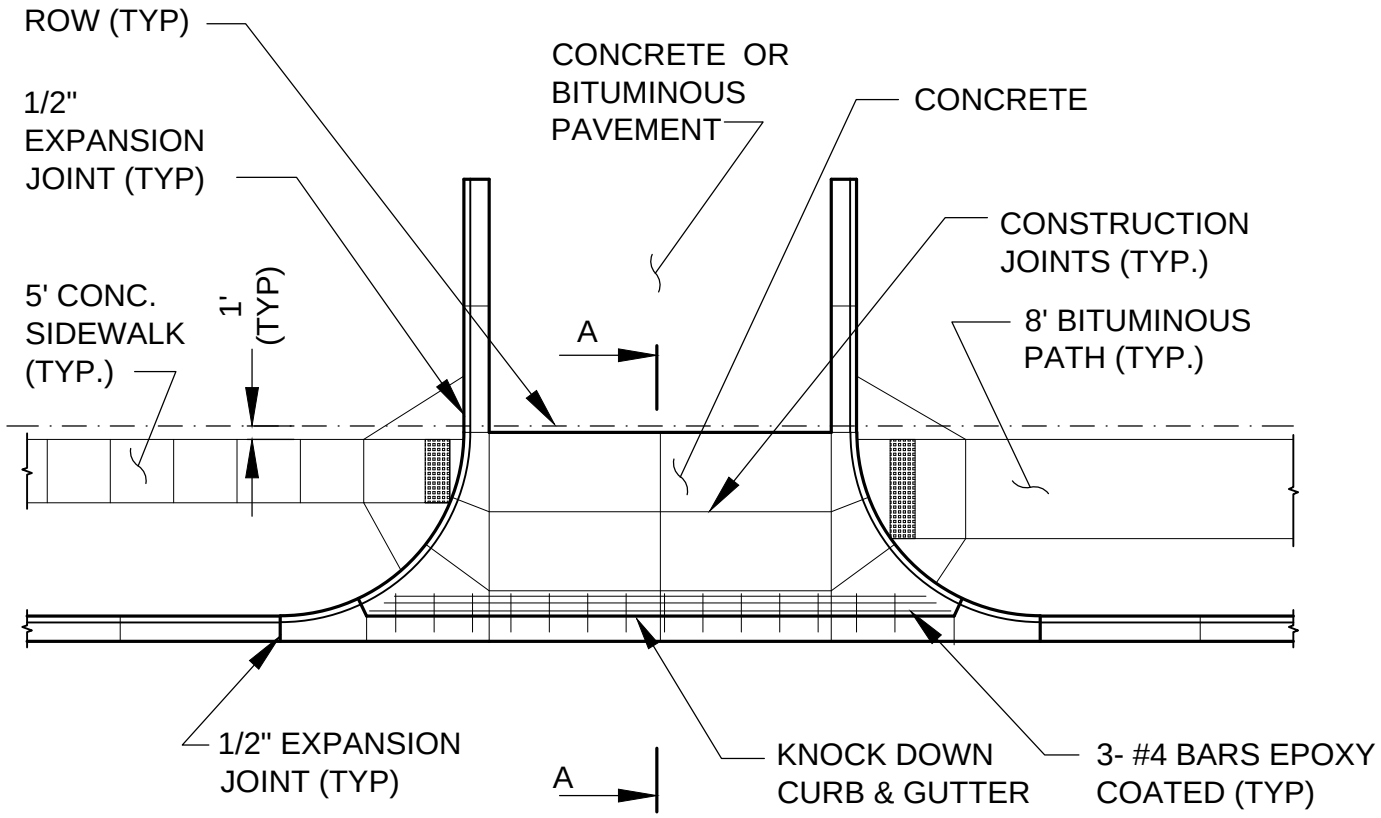

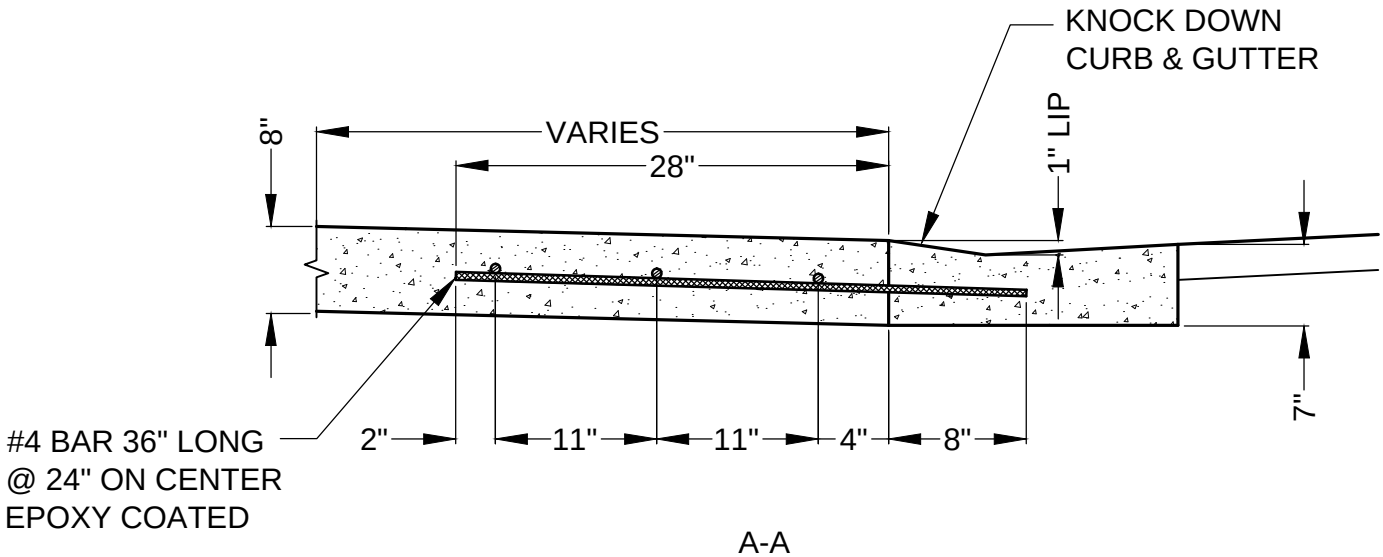

A-A

	APRON FOR COMMERCIAL DRIVEWAY AND ALLEY	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 106

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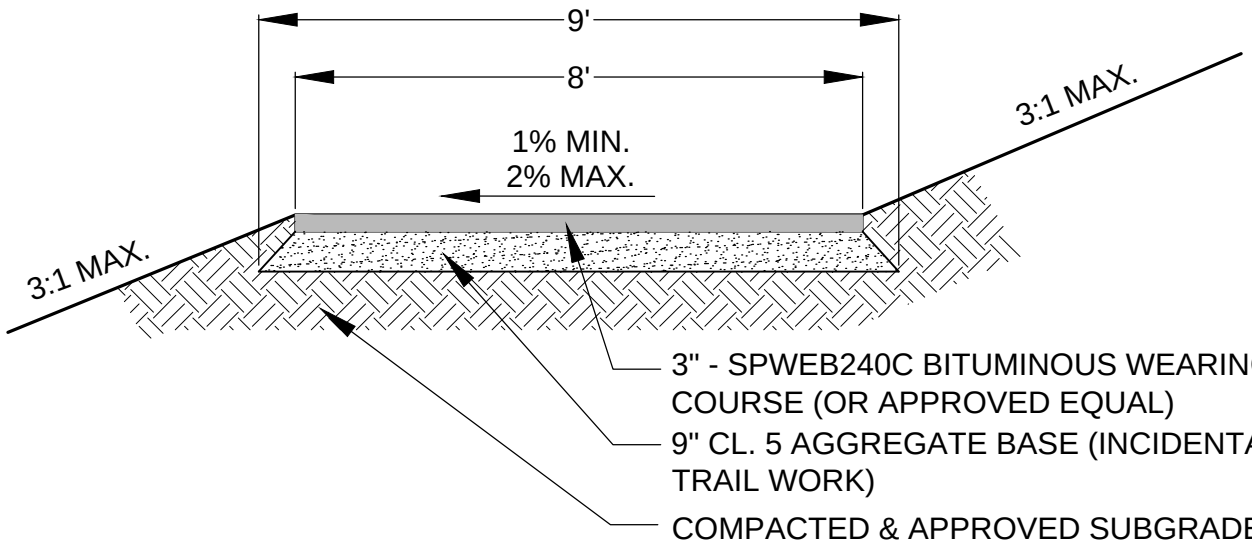
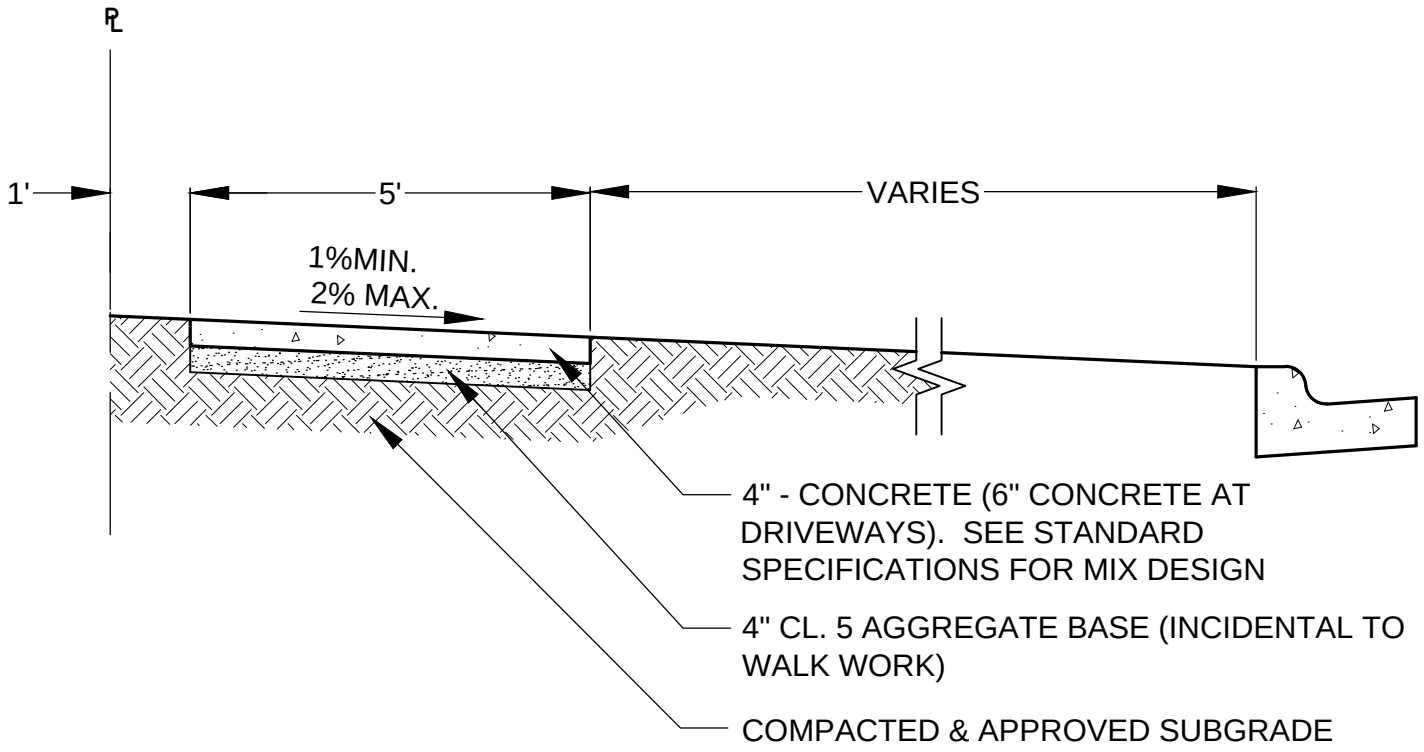


TYPICAL BITUMINOUS PATH



TYPICAL CONCRETE SIDEWALK

Savage	TYPICAL SIDEWALK AND BITUMINOUS PATH	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 107

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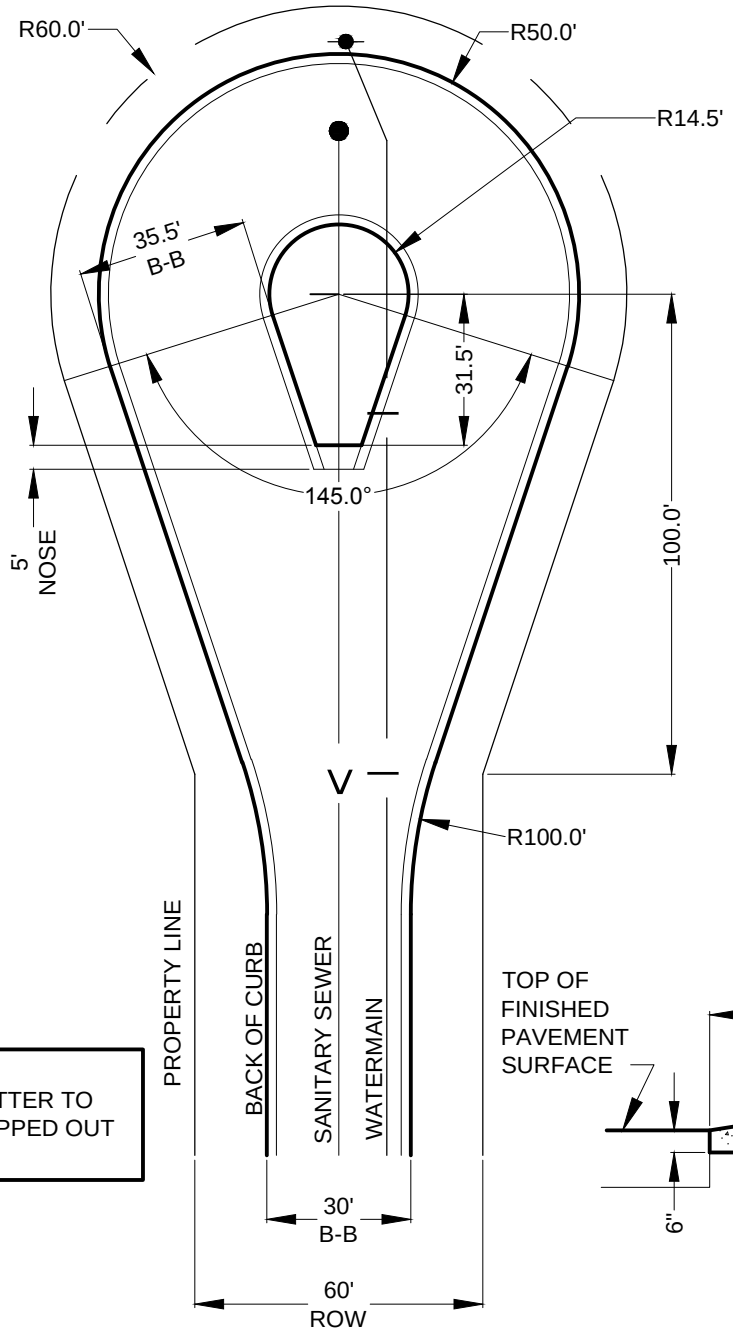
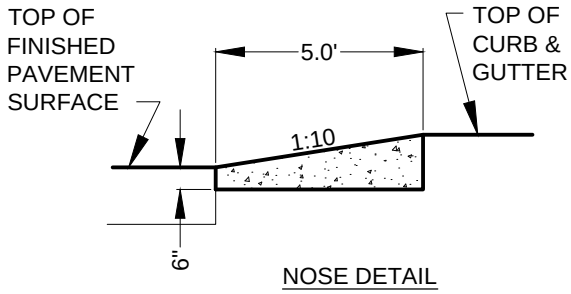


NOTE:
ISLAND CURB AND GUTTER TO BE B618 ONLY WITH TIPPED OUT GUTTER AT 1.5% MIN.



NOSE DETAIL

28' MIN FACE TO FACE OF CURB
60' RIGHT OF WAY

ALL DIMENSIONS ARE SHOWN TO BACK OF CURB

	TYPICAL CUL-DE-SAC 28' MIN FACE TO FACE OF CURB/60 'ROW	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 108

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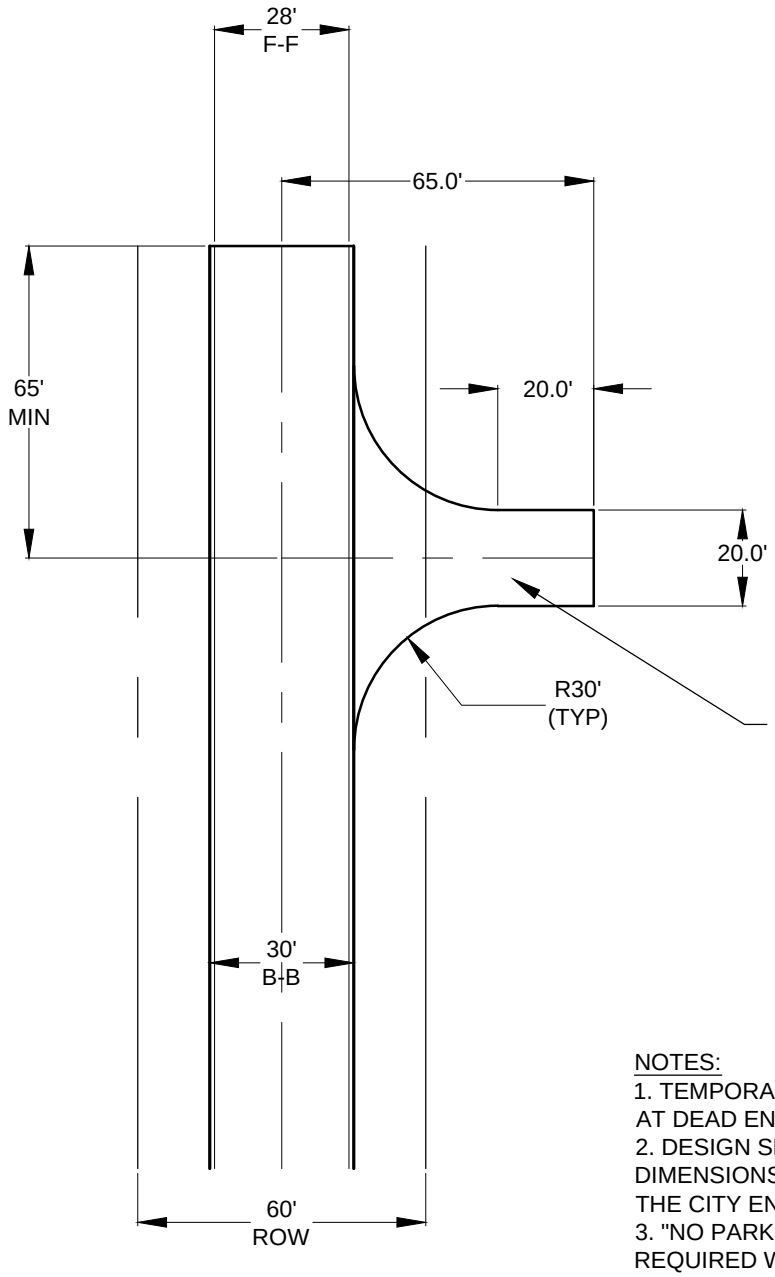
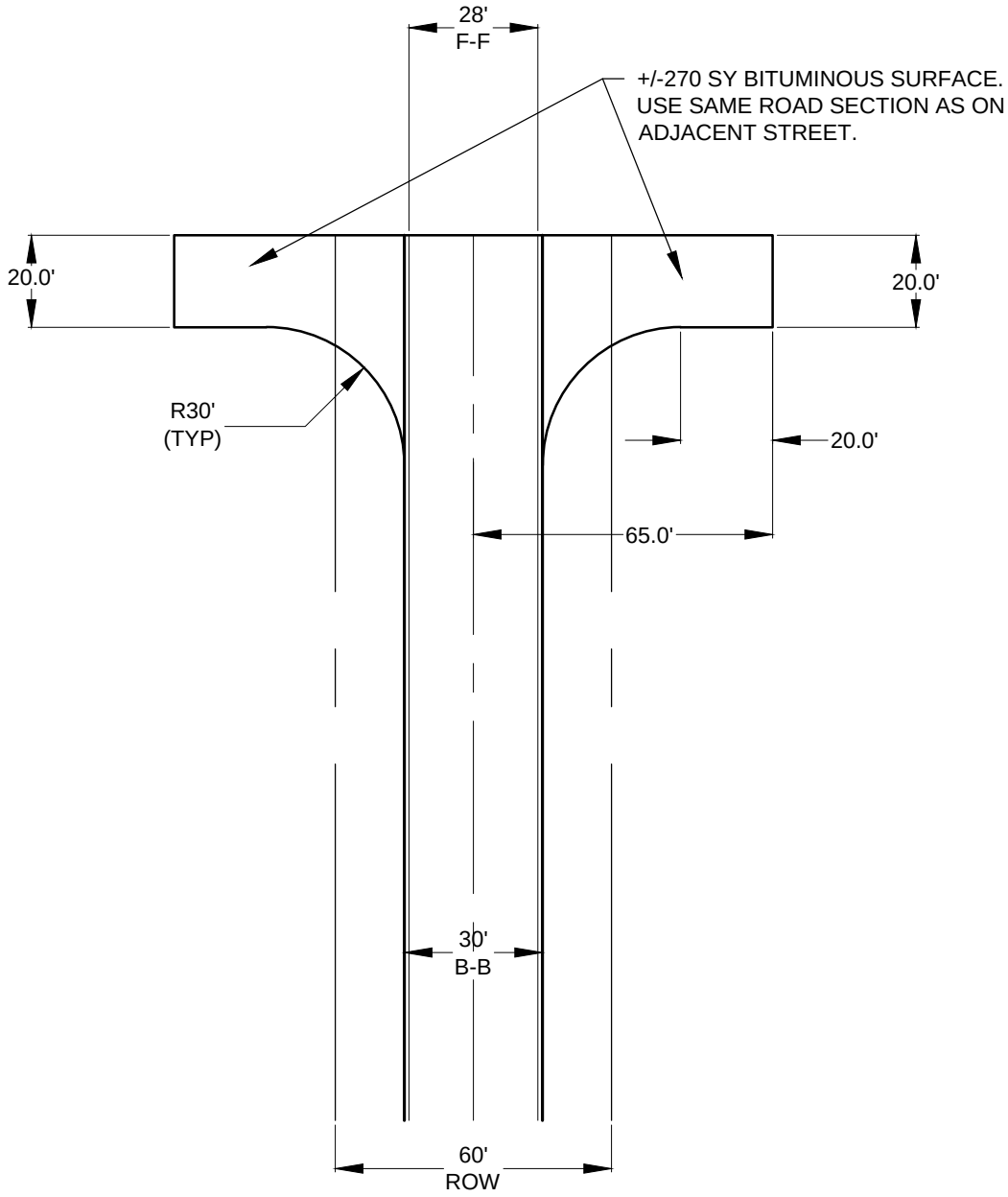


NOTES:

1. TEMPORARY TURNAROUNDS TYPICALLY REQUIRED AT DEAD END STREETS LONGER THAN 150 FEET.
2. DESIGN SHOWN IS TYPICAL MINIMUM DESIGN. ANY DIMENSIONS CHANGE SHALL MEET THE APPROVAL OF THE CITY ENGINEER.
3. "NO PARKING" AND "NO SNOW STORAGE" SIGNS ARE REQUIRED WITHIN TURNAROUND AREA.

Savage	TEMPORARY TURNAROUND ALTERNATE 1	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 109



NOTES:

1. TEMPORARY TURNAROUNDS TYPICALLY REQUIRED AT DEAD END STREETS LONGER THAN 150 FEET.
2. DESIGN SHOWN IS TYPICAL MINIMUM DESIGN. ANY DIMENSIONS CHANGE SHALL MEET THE APPROVAL OF THE CITY ENGINEER.
3. "NO PARKING" AND "NO SNOW STORAGE" SIGNS ARE REQUIRED WITHIN TURNAROUND AREA.

Savage	TEMPORARY TURNAROUND ALTERNATE 2	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 110

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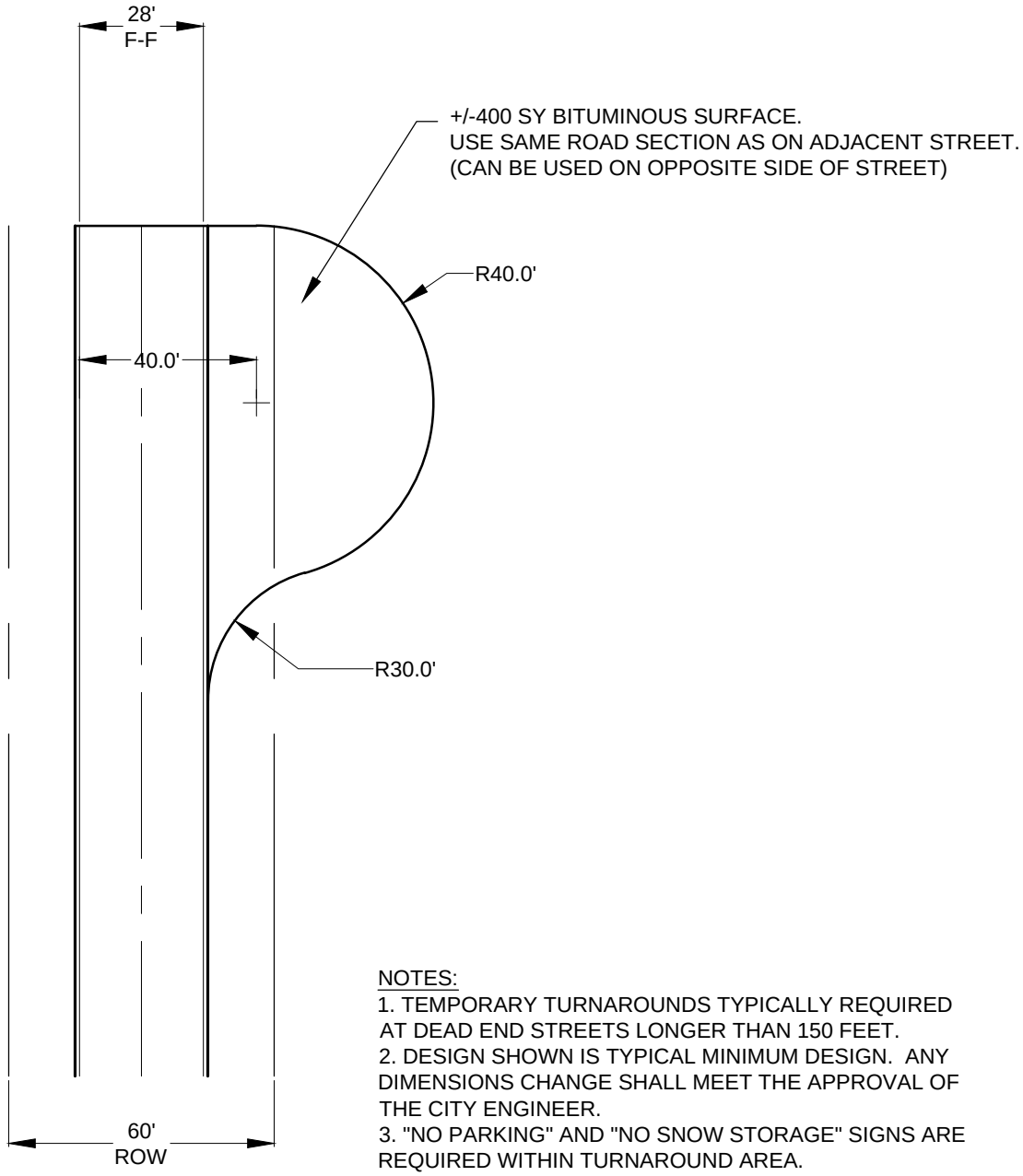

NOTES:
1. TEMPORARY TURNAROUNDS TYPICALLY REQUIRED AT DEAD END STREETS LONGER THAN 150 FEET.
2. DESIGN SHOWN IS TYPICAL MINIMUM DESIGN. ANY DIMENSIONS CHANGE SHALL MEET THE APPROVAL OF THE CITY ENGINEER.
3. "NO PARKING" AND "NO SNOW STORAGE" SIGNS ARE REQUIRED WITHIN TURNAROUND AREA.

Savage	TEMPORARY TURNAROUND ALTERNATE 3	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 111

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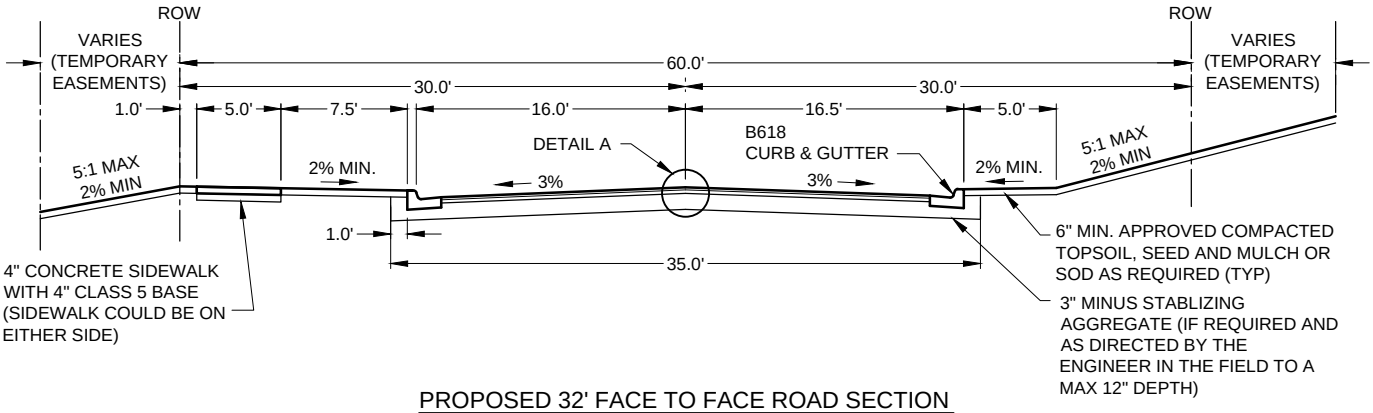
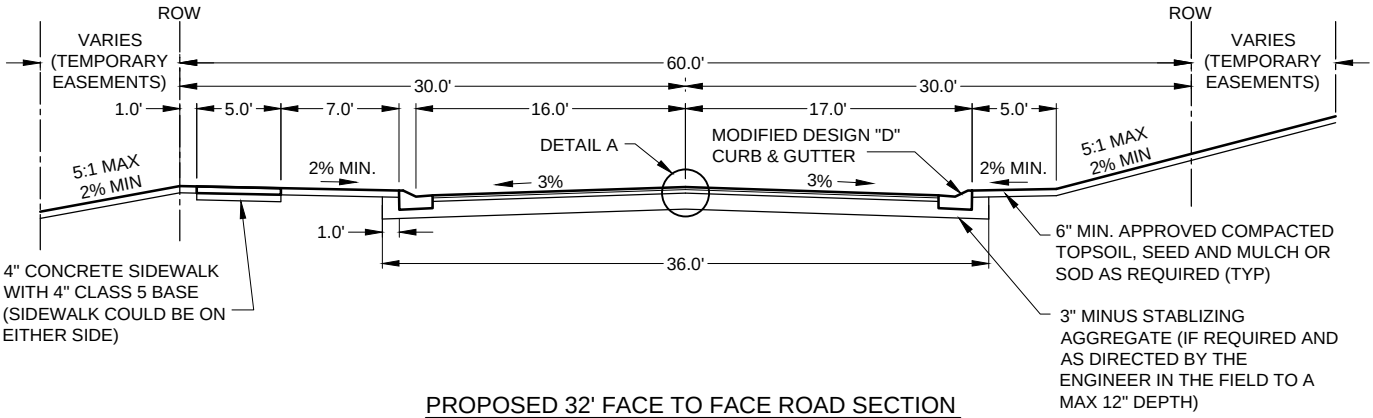
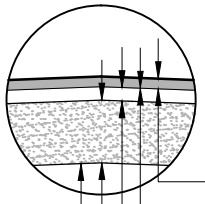


PROPOSED 32' FACE TO FACE ROAD SECTION
WITH BARRIER CURB



PROPOSED 32' FACE TO FACE ROAD SECTION
WITH SURMOUNTABLE CURB



DETAIL A

1.5" TYPE SP 12.5 BITUMINOUS WEAR COURSE MnDOT 2360 - MIX SPWEA240C

BITUMINOUS TACK COAT MnDOT SPEC. NO. 2357

2" TYPE SP 12.5 BITUMINOUS NON WEAR COURSE MnDOT 2360 - MIX SPNWB230C

9" CLASS 5 AGGREGATE BASE (MnDOT SPEC. NO. 3138)

COMPACTED AND APPROVED SUBGRADE

NOTE:
MINIMUM REQUIREMENTS SHOWN.
ALL ALTERNATIONS TO BE APPROVED BY CITY OF SAVAGE ENGINEERING DIVISION.

	TYPICAL SECTIONS	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 112

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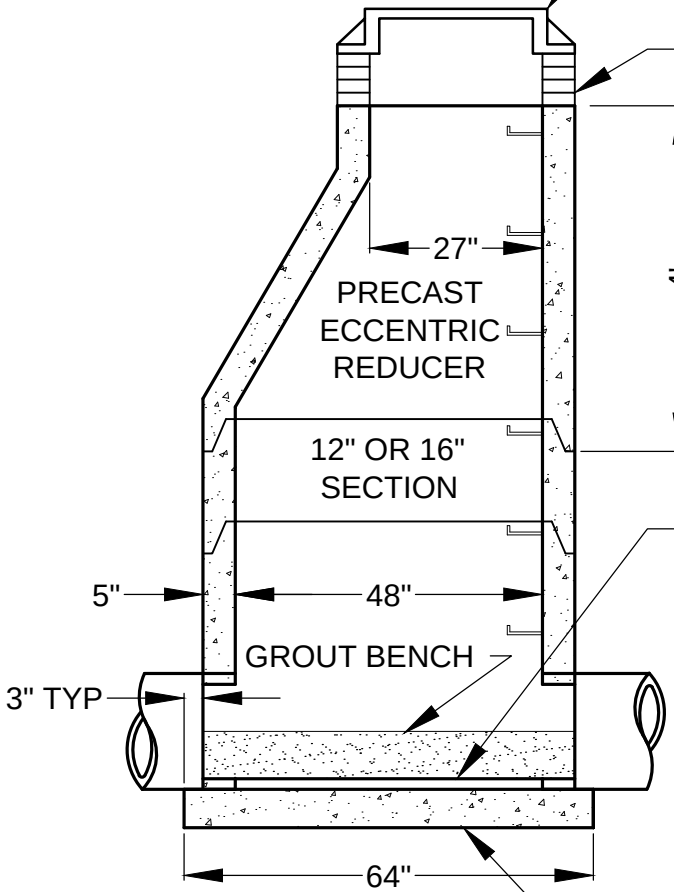

STANDARD CASTING, NEENAH R-1642 WITH TYPE "B" LID STAMPED "STORM SEWER"OR APPROVED EQUAL

CONCRETE ADJUSTING RINGS,
MIN 2, MAX 6 (12" MAX)

WHEN MANHOLE DEPTH IS LESS THAN 8' OR CASTING IS RECTANGULAR A SLAB TOP SHALL BE USED IN PLACE OF THE CONE. THE SLAB SHALL BE SUITABLE FOR AASHTO HS 20 HIGHWAY LOADING.

MANHOLE INVERT SHALL BE SLOPED TO PROVIDE SMOOTH FLOW FROM INLET TO OUTLET.

PRECAST BASE TO HAVE 6" MINIMUM SLAB THICKNESS FOR LESS THAN 14' MANHOLE DEPTH. INCREASE THICKNESS 1" FOR EACH 4' OF DEPTH GREATER THAN 14', AND REINFORCE WITH 6"x6" 10/10 MESH.

Savage	STANDARD MANHOLE (STORM SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 201

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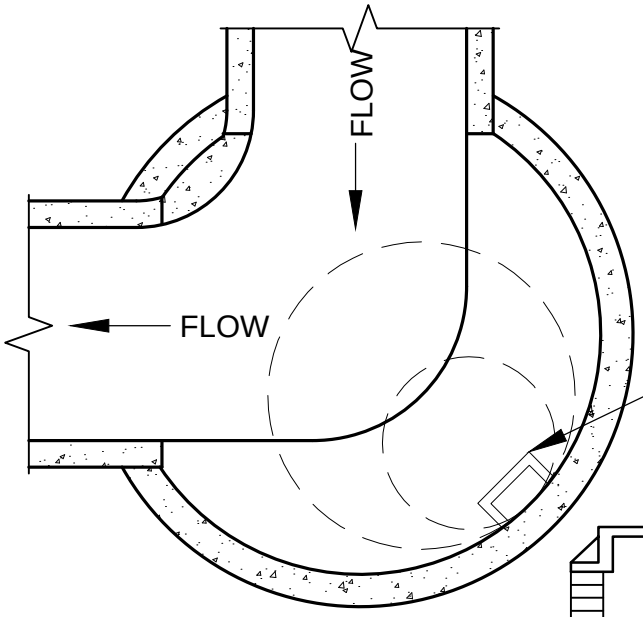


PLAN

A	B	C
5'	6"	78"
6'	7"	92"
7'	8"	106"
8'	9"	120"

LAY-OUT DIMENSIONS

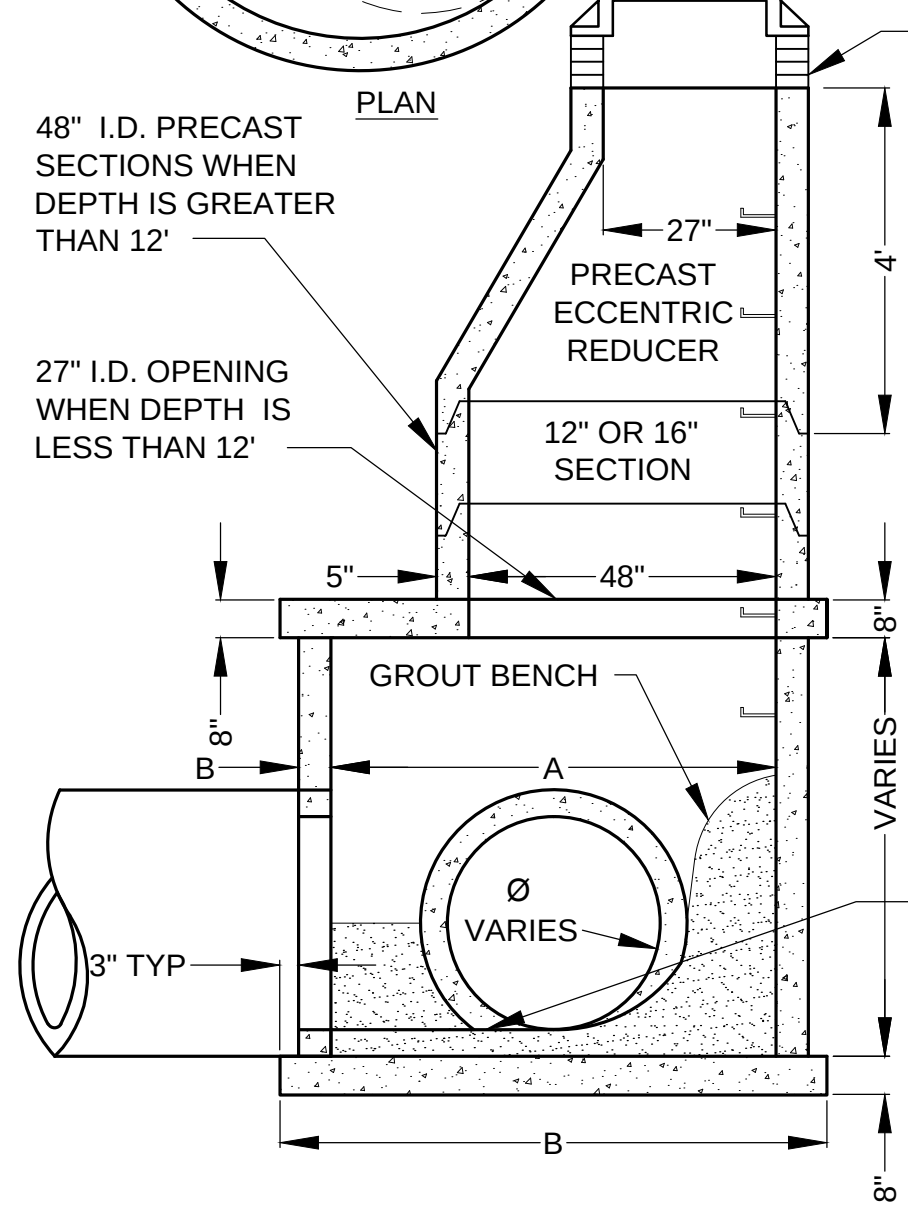
MANHOLE STEPS SHALL BE ON THE DOWNSTREAM SIDE OF MANHOLE.

STANDARD CASTING, NEENAH R-1642 WITH TYPE "B" LID STAMPED "STORM SEWER"OR APPROVED EQUAL

CONCRETE ADJUSTING RINGS,
MIN 2, MAX 6 (12" MAX)

WHEN MANHOLE DEPTH IS LESS THAN 8' OR CASTING IS RECTANGULAR A TOP SLAB SHALL BE USED IN PLACE OF THE CONE. MANHOLE SLAB(S) SHALL BE DESIGNED FOR AASHTO HS20 HIGHWAY LOADING PLUS DEAD LOAD.

MANHOLE INVERT SHALL BE SLOPED TO PROVIDE SMOOTH FLOW FROM INLET TO OUTLET.



Savage	LARGE MANHOLE (STORM SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 202

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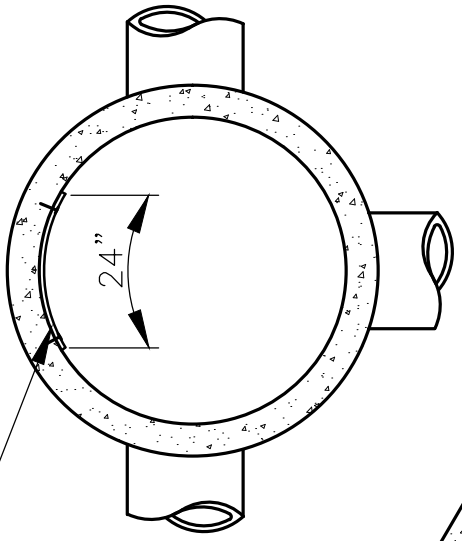


PLAN

SCOUR PLATE LOCATION ON OPPOSITE WALL FROM INLET PIPE. THE TOP OF PLATE TO BE 4" LOWER THAN THE TOP OF INLET PIPE.

24" WIDE BY $\frac{1}{16}$" THICK STAINLESS STEEL SCOUR PLATE INSTALLED w/ 4-½"x3" STAINLESS STEEL FLATHEAD SLEEVE ANCHOR 2" MIN FROM EDGES OF PLATE

SCOUR PLATE BENT TO FIT INSIDE STRUCTURE DIAMETER PRIOR TO INSTALLATION.

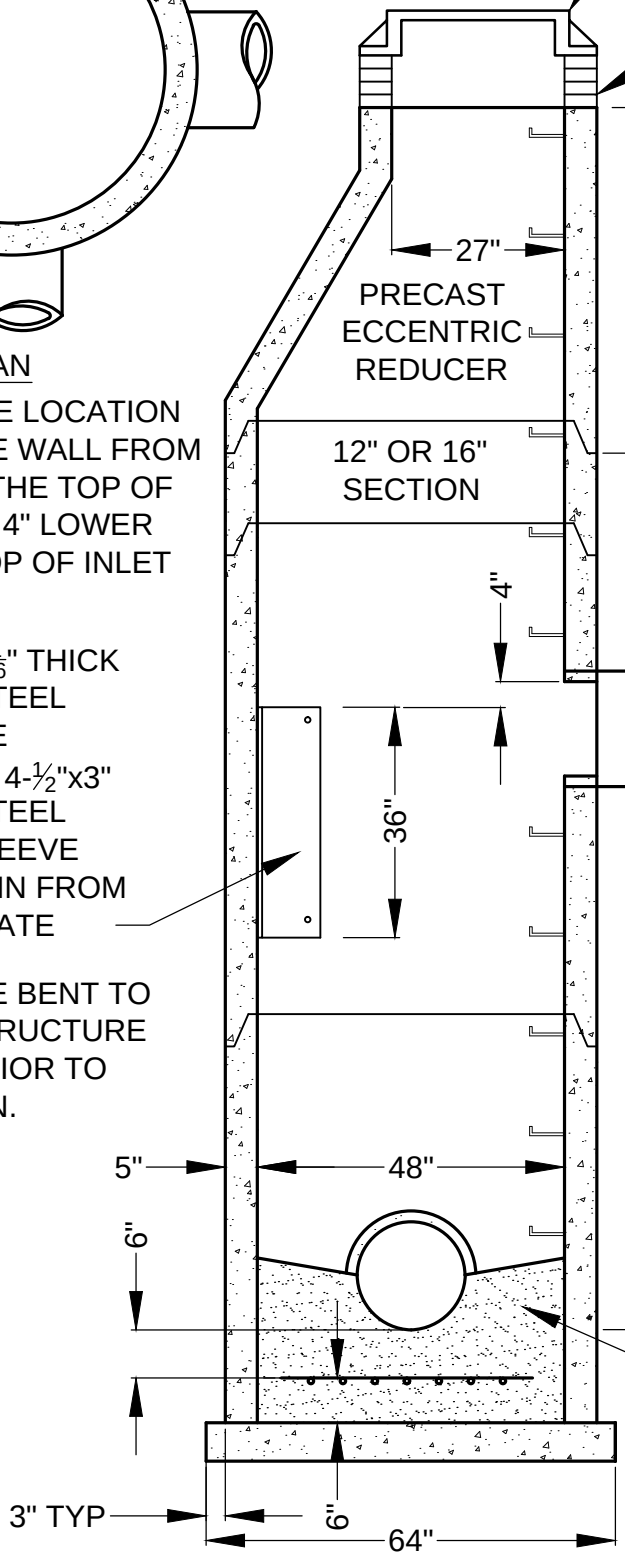
STANDARD CASTING, NEENAH R-1642 WITH TYPE "B" LID STAMPED "STORM SEWER"OR APPROVED EQUAL

CONCRETE ADJUSTING RINGS, MIN 2, MAX 6 (12" MAX)

WHEN MANHOLE DEPTH IS LESS THAN 8' OR CASTING IS RECTANGULAR A SLAB TOP SHALL BE USED IN PLACE OF THE CONE. THE SLAB SHALL BE SUITABLE FOR AASHTO HS 20 HIGHWAY LOADING.

PRECAST BASE TO HAVE 6" MINIMUM SLAB THICKNESS FOR LESS THAN 14' MANHOLE DEPTH. INCREASE THICKNESS 1" FOR EACH 4' OF DEPTH GREATER THAN 14', AND REINFORCE WITH 6"x6" 10/10 MESH.

FILL SUMP WITH 5,000 PSI CONCRETE w/ #5 BARS 8" O.C.



	DROP MANHOLE (STORM SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 203

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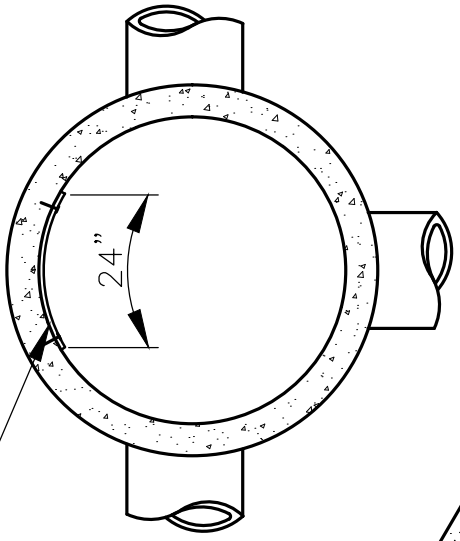


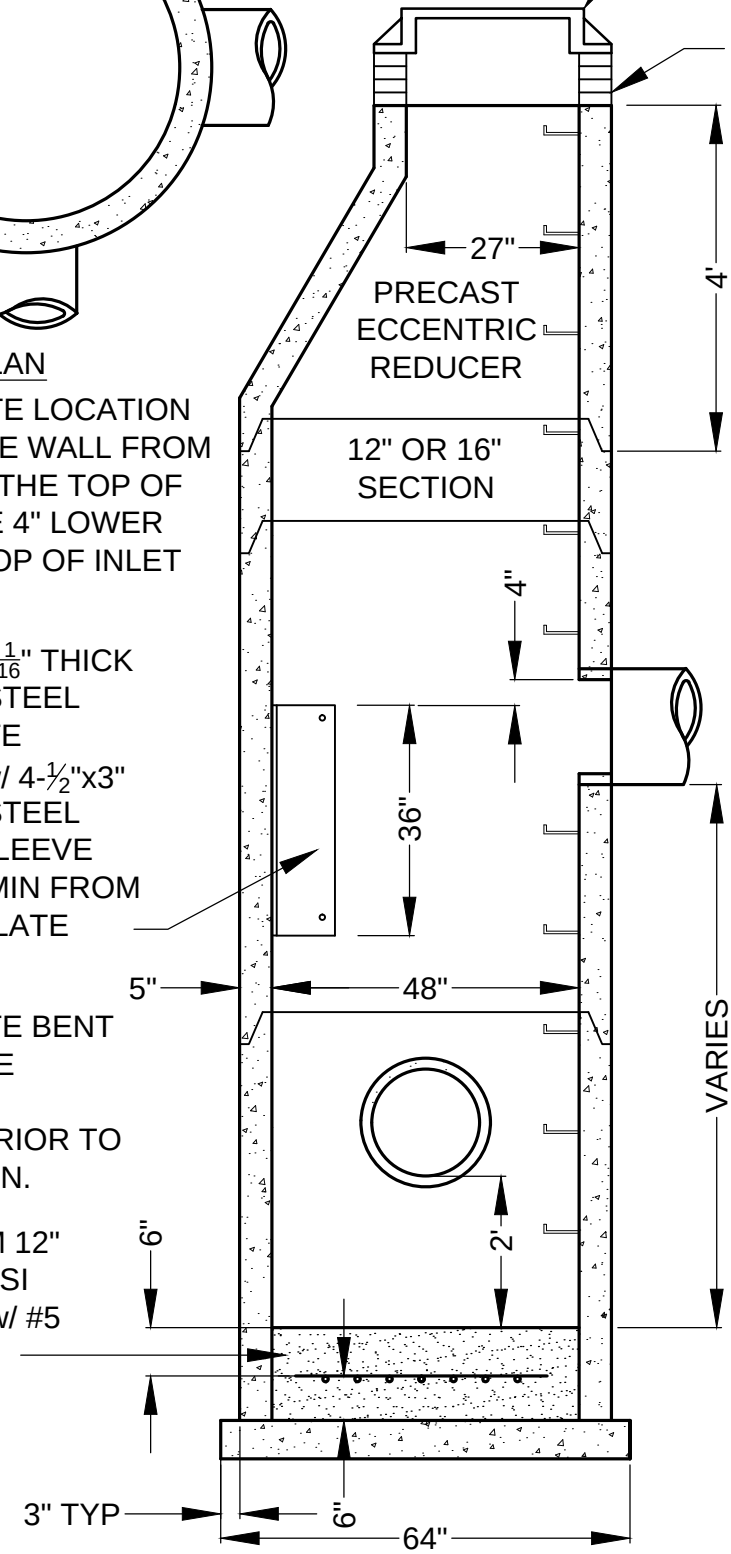
PLAN

SCOUR PLATE LOCATION ON OPPOSITE WALL FROM INLET PIPE. THE TOP OF PLATE TO BE 4" LOWER THAN THE TOP OF INLET PIPE.

24" WIDE BY $\frac{1}{16}$" THICK STAINLESS STEEL SCOUR PLATE INSTALLED w/ 4-½"x3" STAINLESS STEEL FLATHEAD SLEEVE ANCHOR 2" MIN FROM EDGES OF PLATE

SCOUR PLATE BENT TO FIT INSIDE STRUCTURE DIAMETER PRIOR TO INSTALLATION.

FILL BOTTOM 12" WITH 5,000 PSI CONCRETE w/ #5 BARS 8" O.C.



STANDARD CASTING, NEENAH R-1642 WITH TYPE "B" LID STAMPED "STORM SEWER"OR APPROVED EQUAL

CONCRETE ADJUSTING RINGS, MIN 2, MAX 6 (12" MAX)

WHEN MANHOLE DEPTH IS LESS THAN 8' OR CASTING IS RECTANGULAR A SLAB TOP SHALL BE USED IN PLACE OF THE CONE. THE SLAB SHALL BE SUITABLE FOR AASHTO HS 20 HIGHWAY LOADING.

PRECAST BASE TO HAVE 6" MINIMUM SLAB THICKNESS FOR LESS THAN 14' MANHOLE DEPTH. INCREASE THICKNESS 1" FOR EACH 4' OF DEPTH GREATER THAN 14', AND REINFORCE WITH 6"x6" 10/10 MESH.

Savage	DROP & SUMP MANHOLE (STORM SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 204

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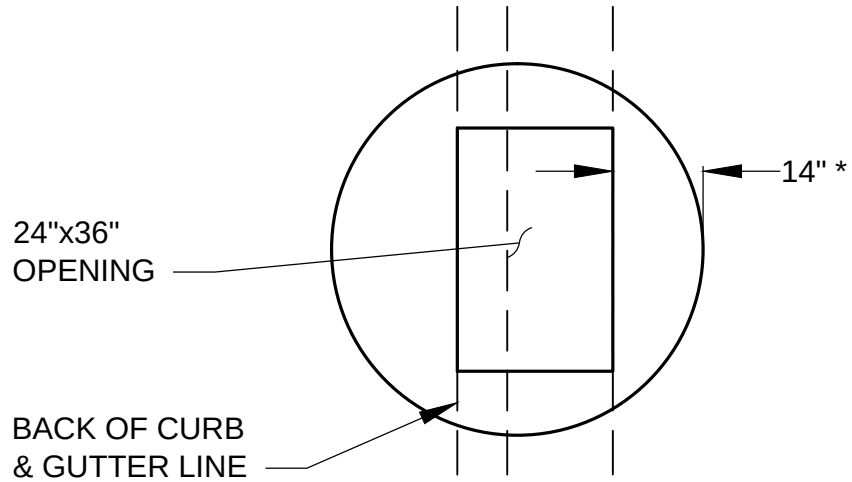
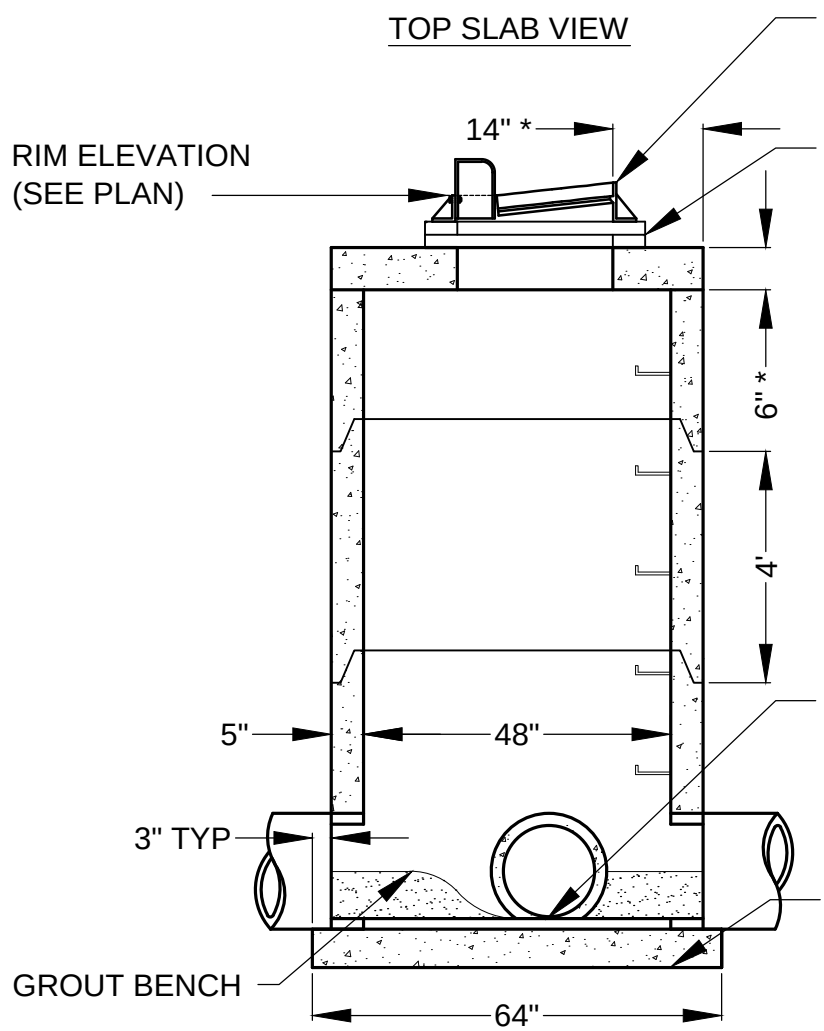


TOP SLAB VIEW



STANDARD CASTING, NEENAH R-3067-V (OR APPROVED EQUAL)

CONCRETE ADJUSTING RINGS, MIN 2, MAX 6 (12" MAX)

WHEN MANHOLE DEPTH IS LESS THAN 8' OR CASTING IS RECTANGULAR A SLAB TOP SHALL BE USED IN PLACE OF THE CONE. THE SLAB SHALL BE SUITABLE FOR AASHTO HS 20 HIGHWAY LOADING.

MANHOLE INVERT SHALL BE SLOPED TO PROVIDE SMOOTH FLOW FROM INLET TO OUTLET.

PRECAST BASE TO HAVE 6" MINIMUM SLAB THICKNESS FOR LESS THAN 14' MANHOLE DEPTH. INCREASE THICKNESS 1" FOR EACH 4' OF DEPTH GREATER THAN 14', AND REINFORCE WITH 6"x6" 10/10 MESH.

* NOTE: REFER TO MANUFACTURER SIZING CHART FOR CBMH OVER 48" INSIDE DIAMETER

Savage	CATCH BASIN MANHOLE	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 205

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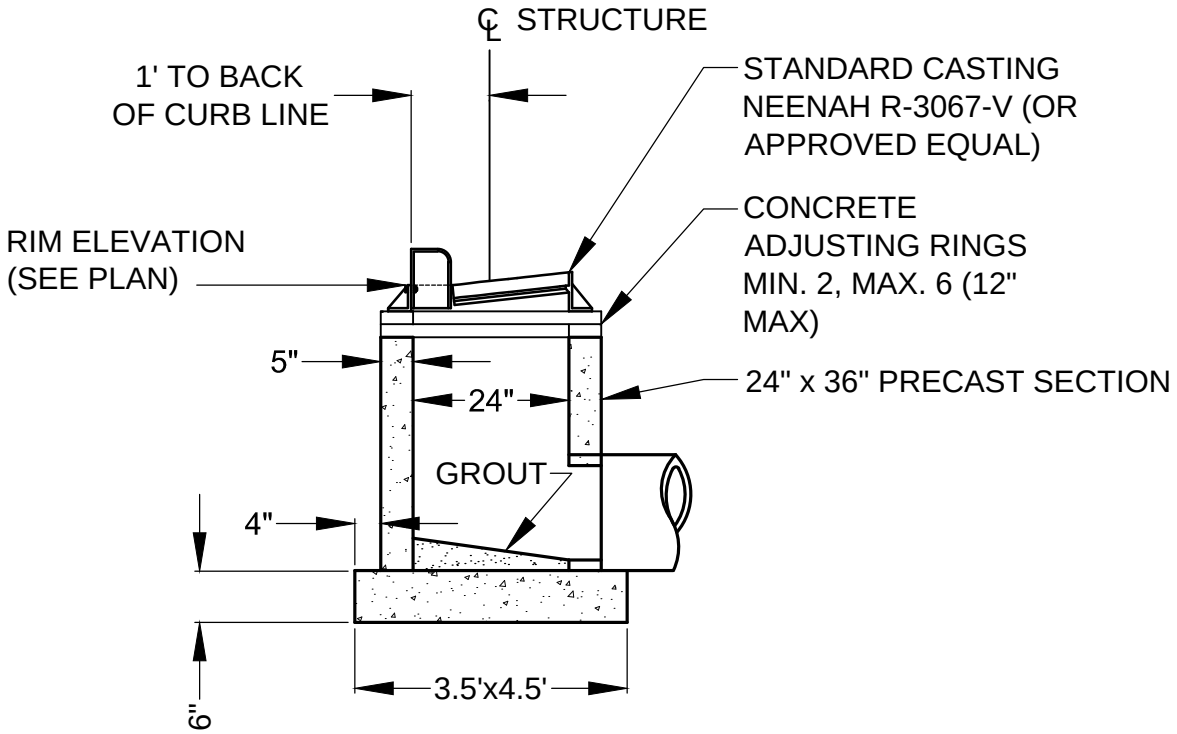
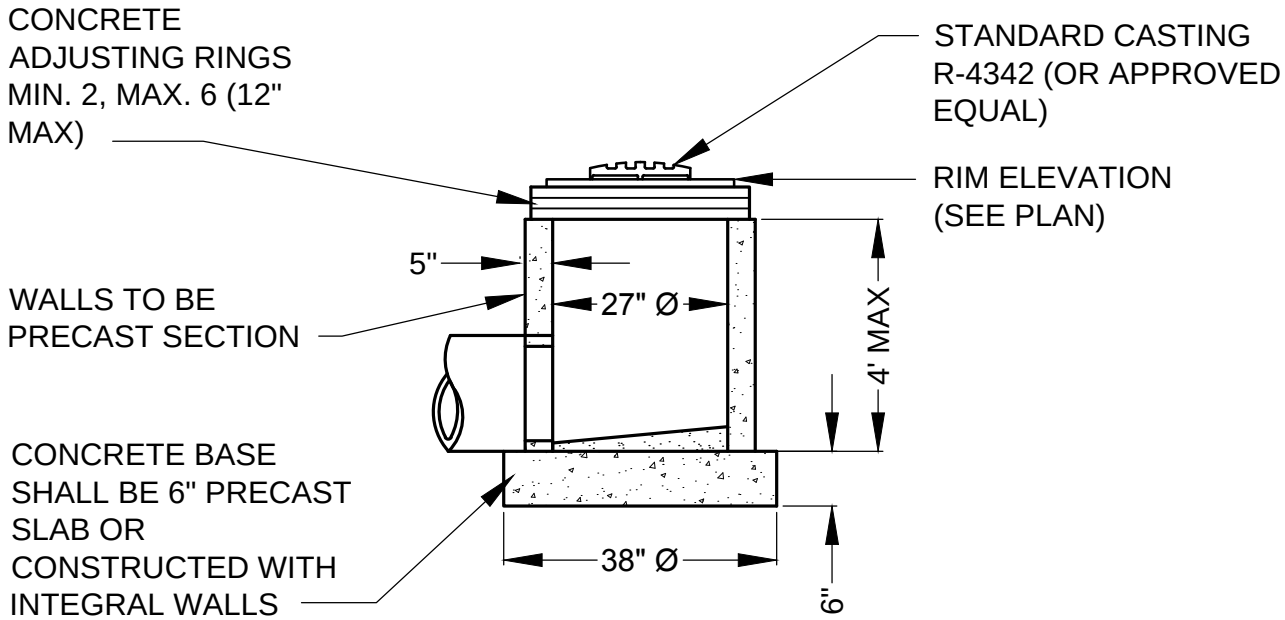


TYPE "A"
RECTANGULAR



TYPE "B" CIRCULAR
(FOR YARDS ONLY)

	CATCH BASIN TYPE A AND TYPE B	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 206

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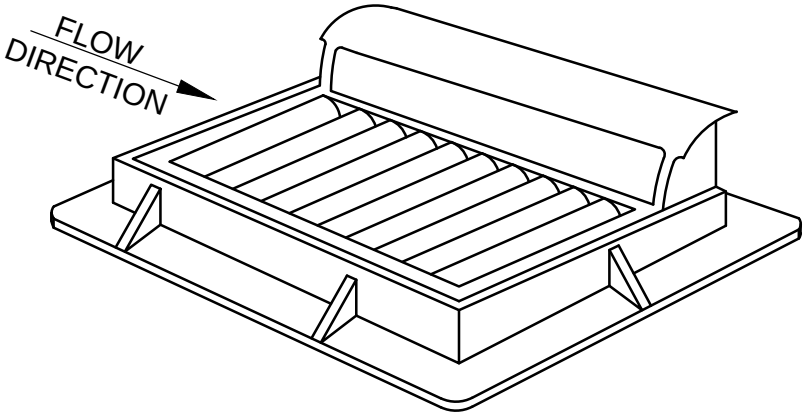
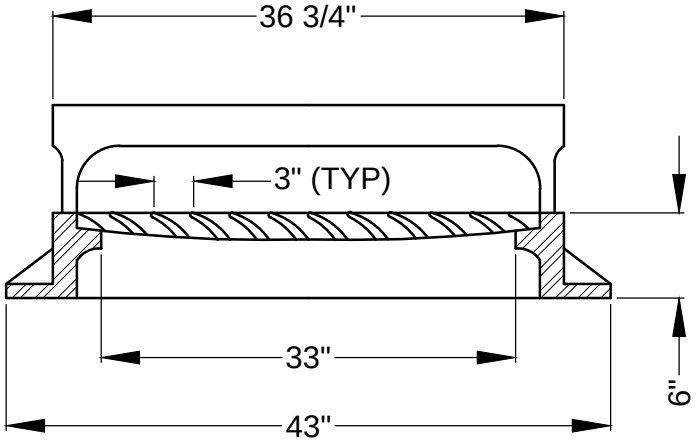
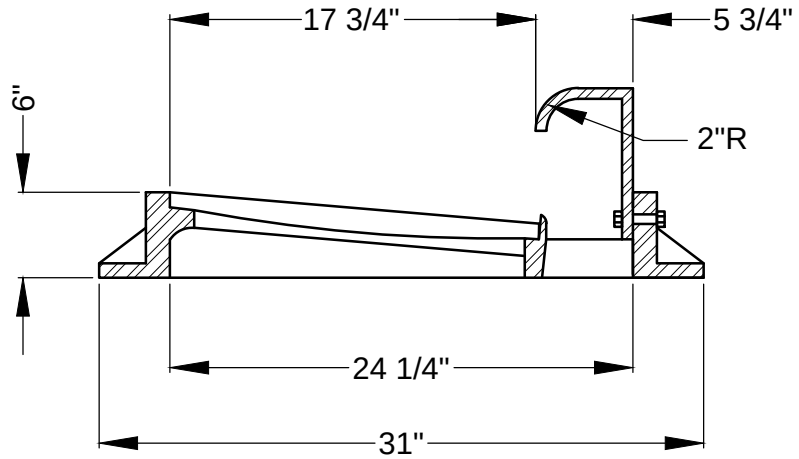




FRONT VIEW



SIDE VIEW

1. FOR VALLEYS USE R-3067-VB CASTING
2. FOR DRIVEWAYS USE R-3067-C CASTING WITH TYPE "L" GRATE

Savage	R-3067-V OR APPROVED EQUAL VANE GRATE CASTING	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 207

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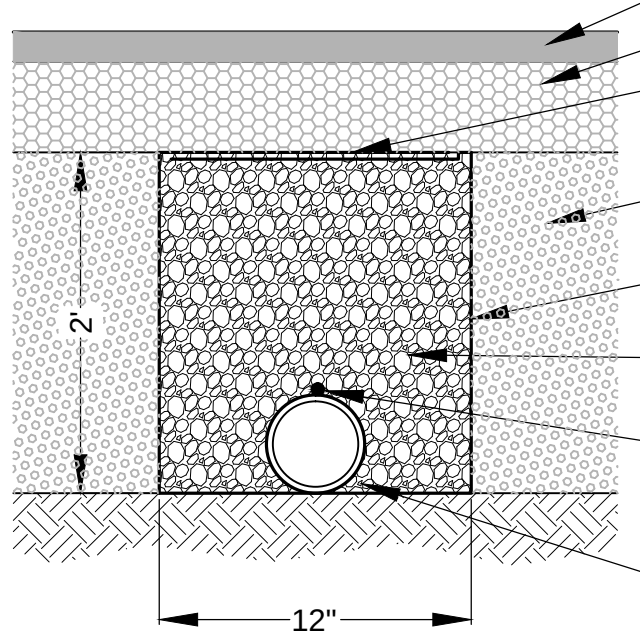


ASPHALT SECTION

AGGREGATE BASE

OVERLAP FABRIC 12" MIN ON TOP

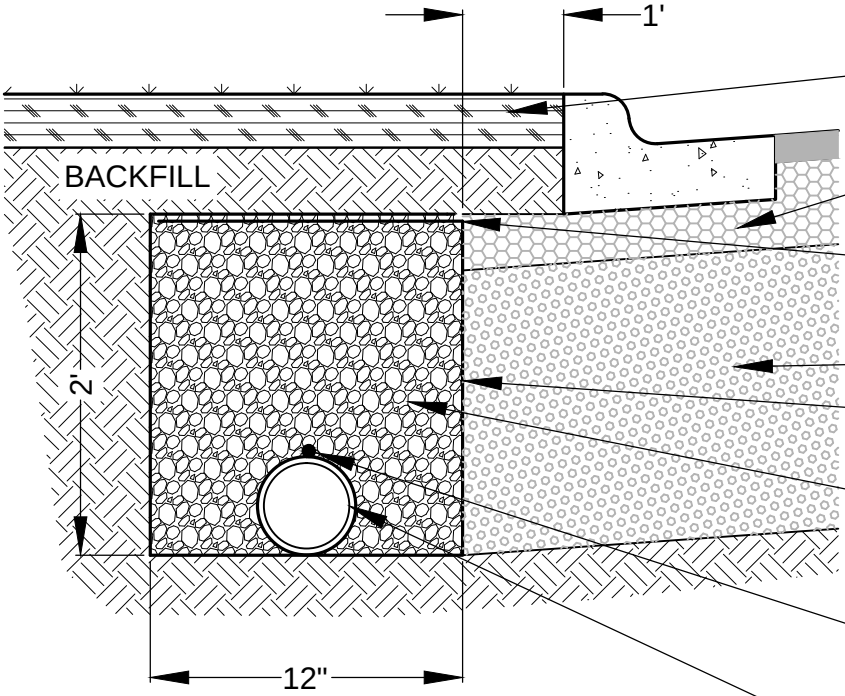
STABILIZING AGGREGATE

GEOTEXTILE WRAP (3733, TYPE 1)

PEA ROCK OR COURSE FILTER AGGREGATE MnDOT 3149.2H

TRACER WIRE NO. 10 SOLID COPPER WIRE (INCIDENTAL TO DRAIN TILE)

4" PVC OR PE PERFORATED DRAIN TILE CENTERED WITHIN PEA ROCK WITH GEOTEXTILE WRAP (3733, TYPE 1)



6" COMPACTED TOPSOIL

AGGREGATE BASE

OVERLAP FABRIC 12" MIN ON TOP

STABILIZING AGGREGATE

GEOTEXTILE WRAP (3733, TYPE 1)

PEA ROCK OR COURSE FILTER AGGREGATE MnDOT 3149.2H

TRACER WIRE NO. 10 SOLID COPPER WIRE (INCIDENTAL TO DRAIN TILE)

4" PVC OR PE PERFORATED DRAIN TILE CENTERED WITHIN PEA ROCK WITH GEOTEXTILE WRAP (3733, TYPE 1)

NOTE:
SLOPE 3/4" PER FOOT
UNLESS OTHERWISE SPECIFIED

Savage	PERFORATED DRAIN TILE	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 208

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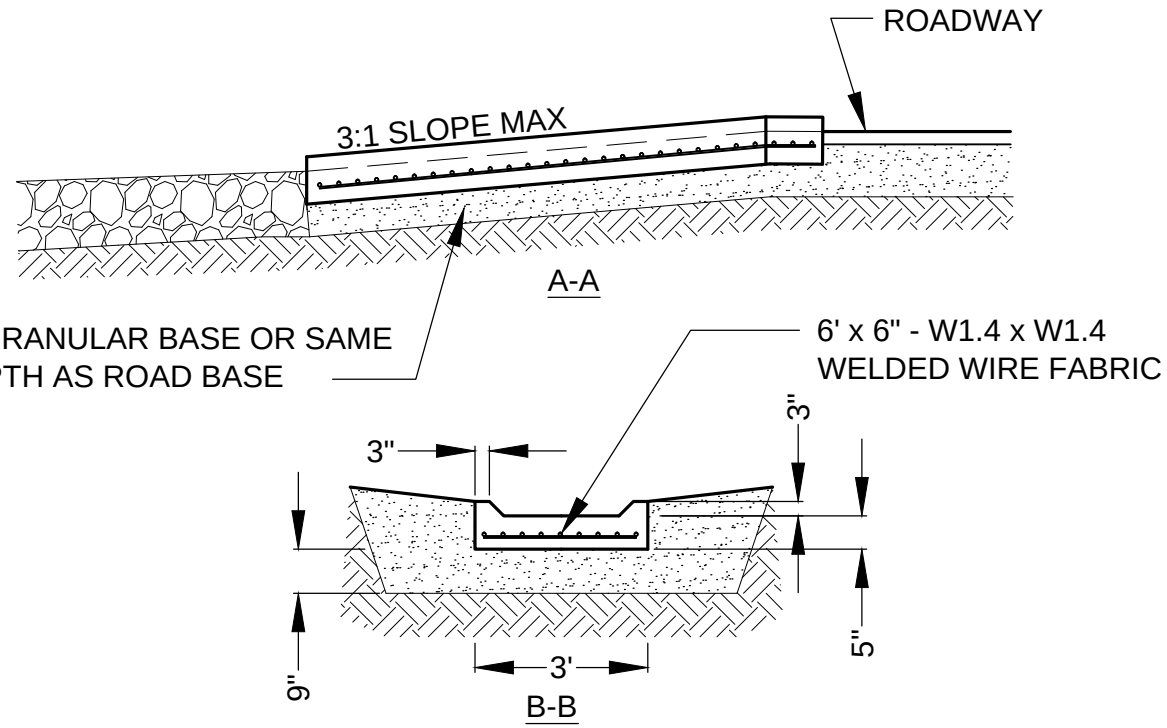

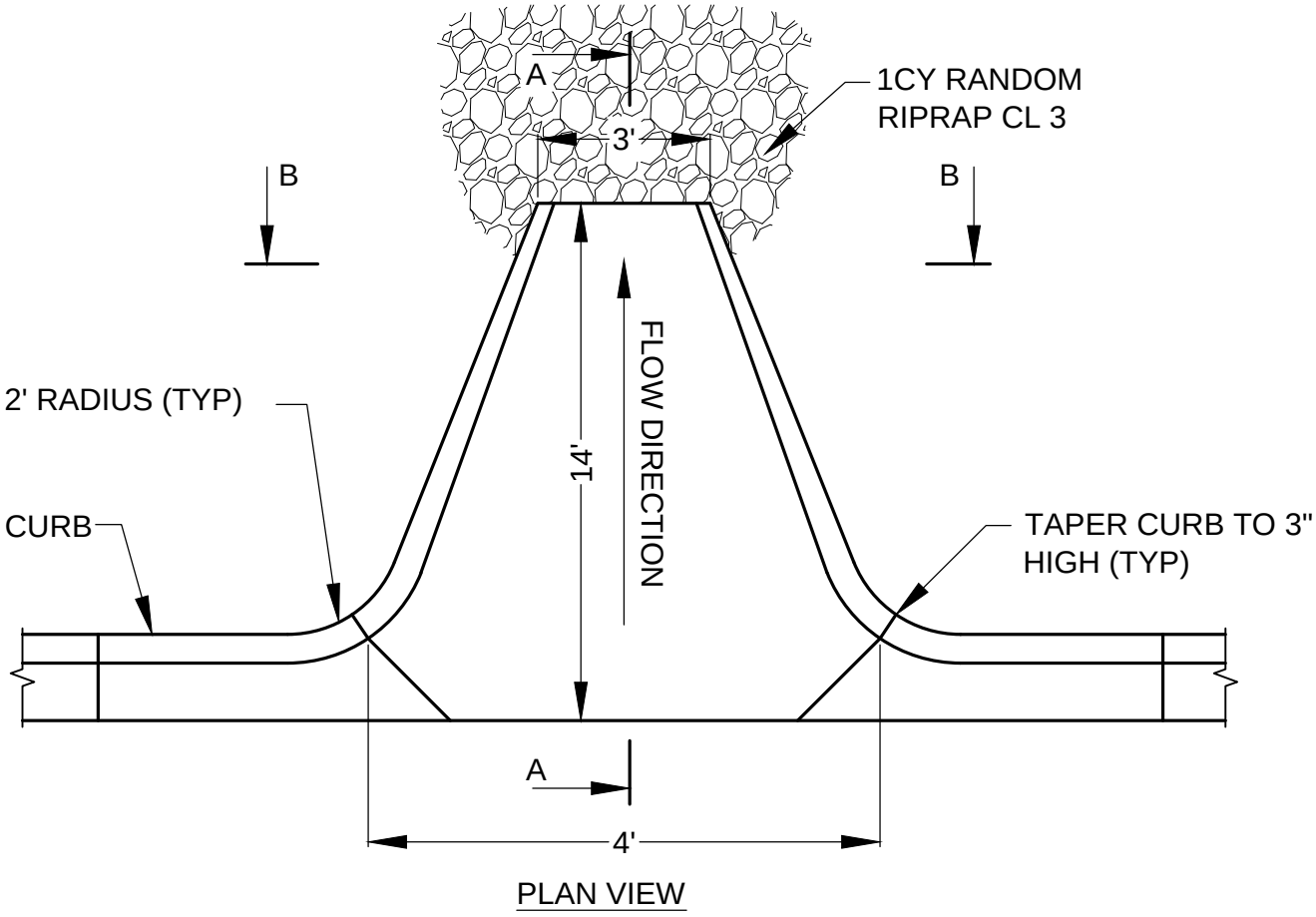

PLAN VIEW

Savage	CONCRETE SPILLWAY	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 209

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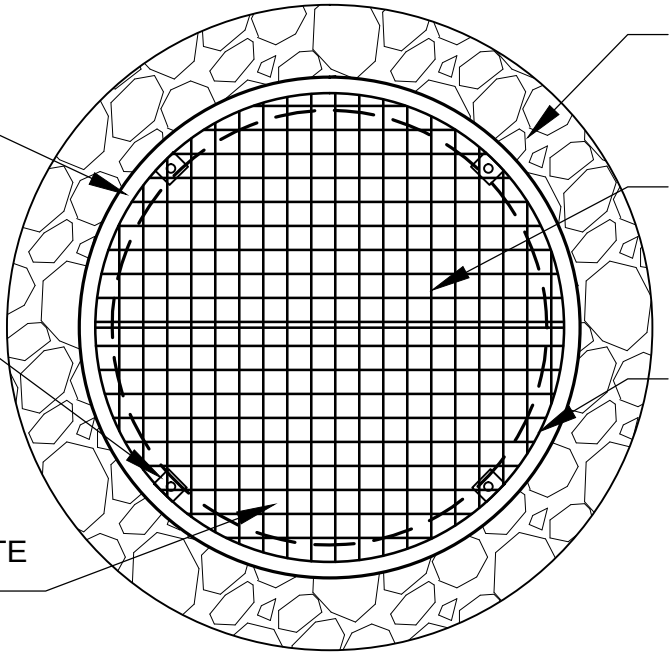
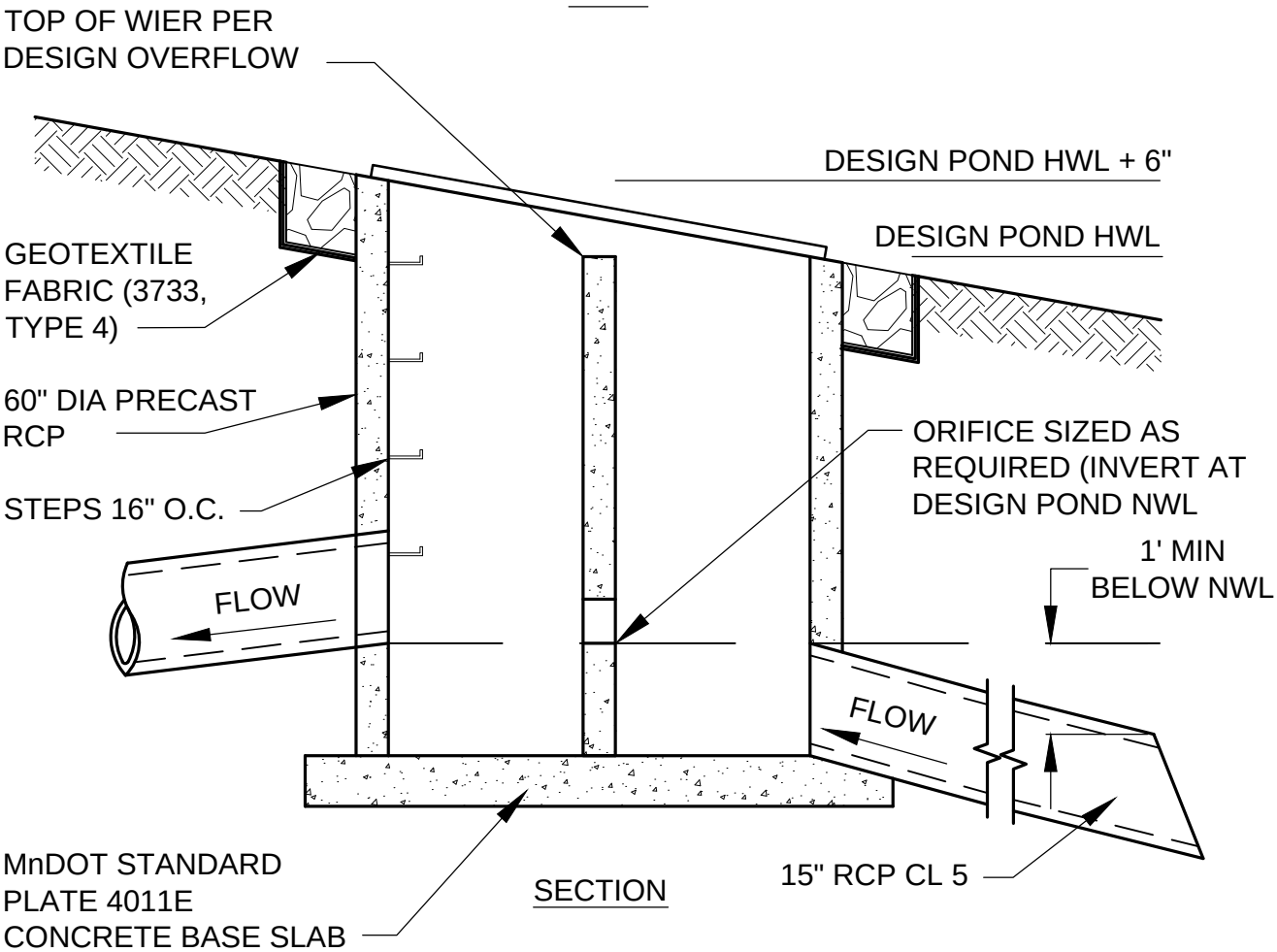


PLAN



SECTION

	POND CONTROL STRUCTURE	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 210

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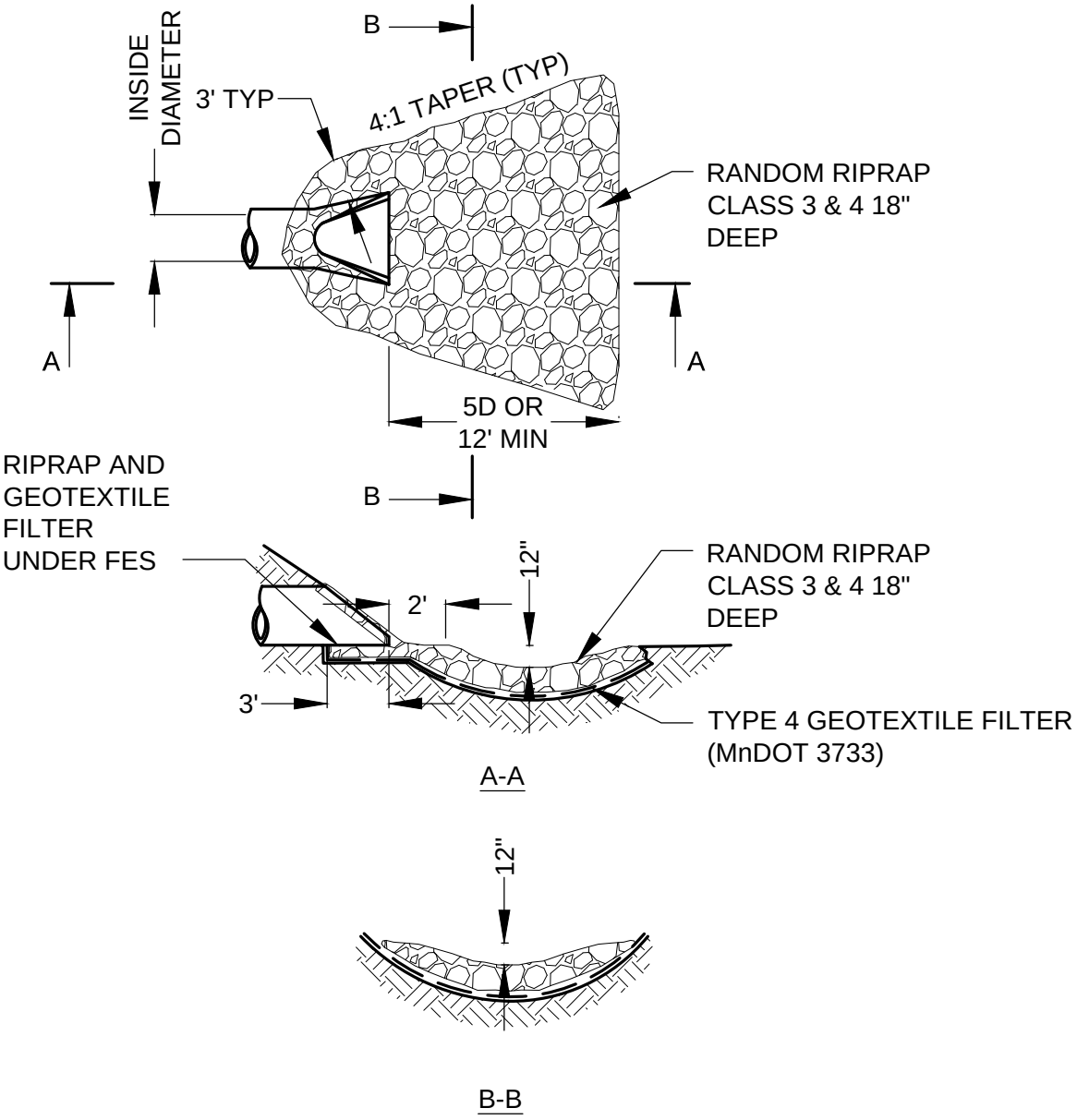

EROSION CONTROL MATERIALS

PIPE SIZE (IN)	MIN RIP RAP (CY)	GEOTEXTILE FILTER (SY)
54" & OVER	67	75
36" TO 48"	42	51
27" TO 33"	30	35
24" & LESS	12	15

RIPRAP
AT OUTLETS

CITY OF SAVAGE

REVISION DATE: 02/2015

STANDARD PLATE NO. 211

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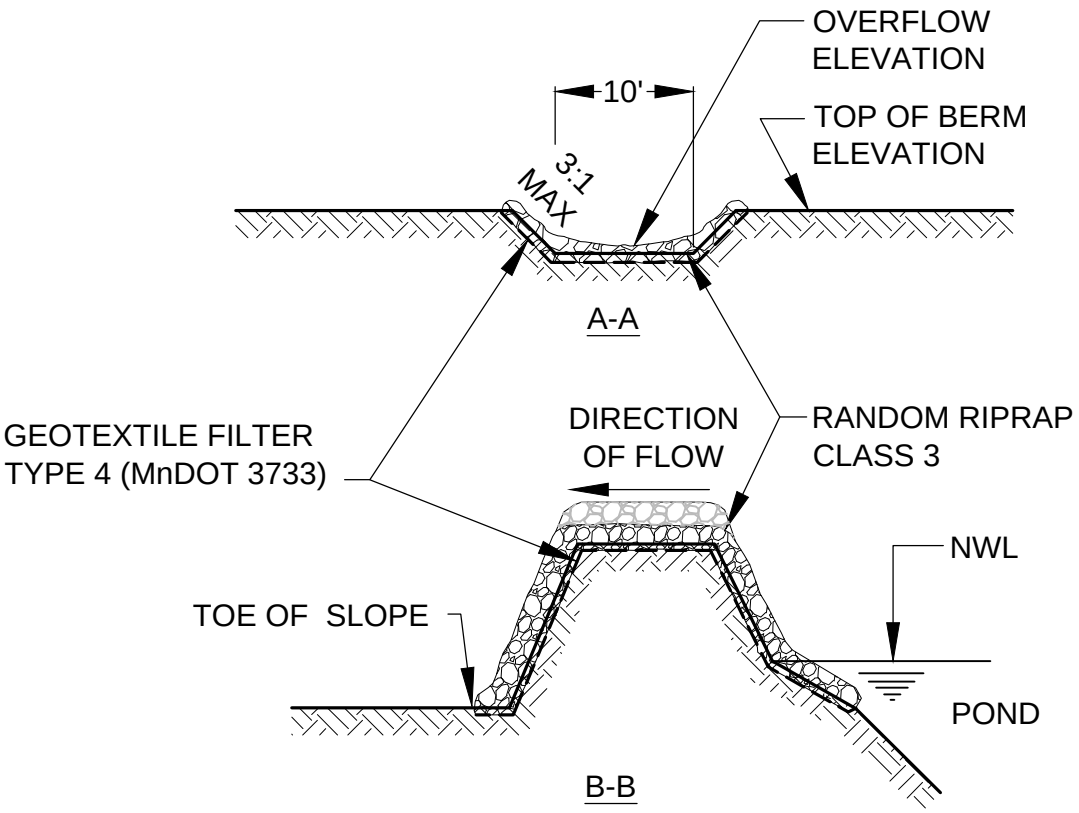

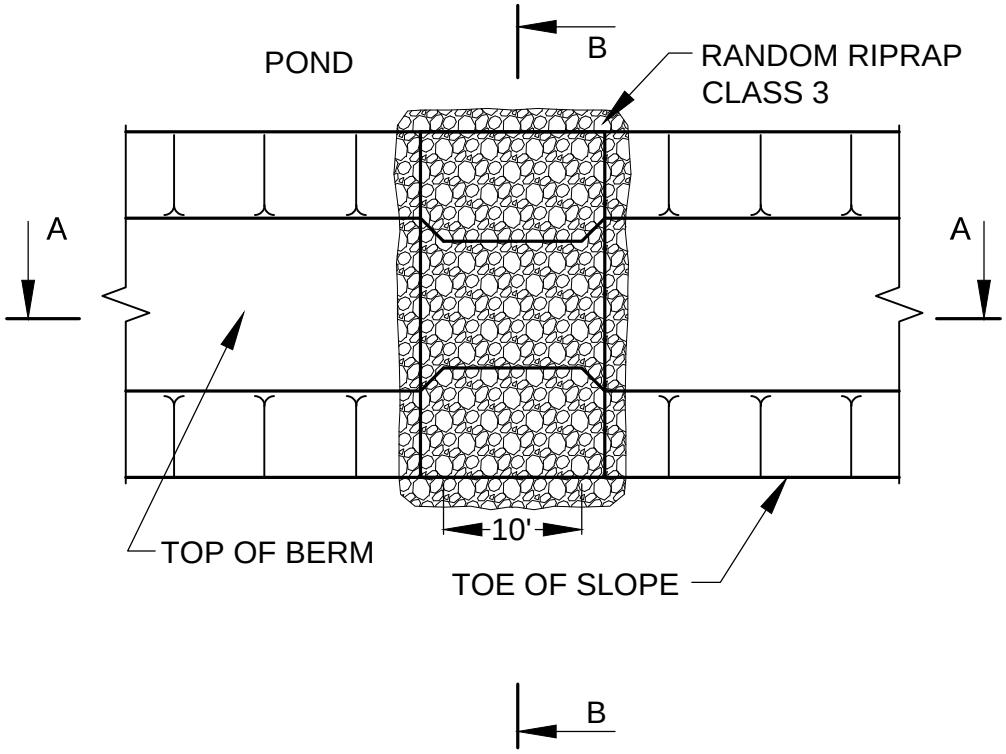

	RIPRAP OVERFLOW	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 212

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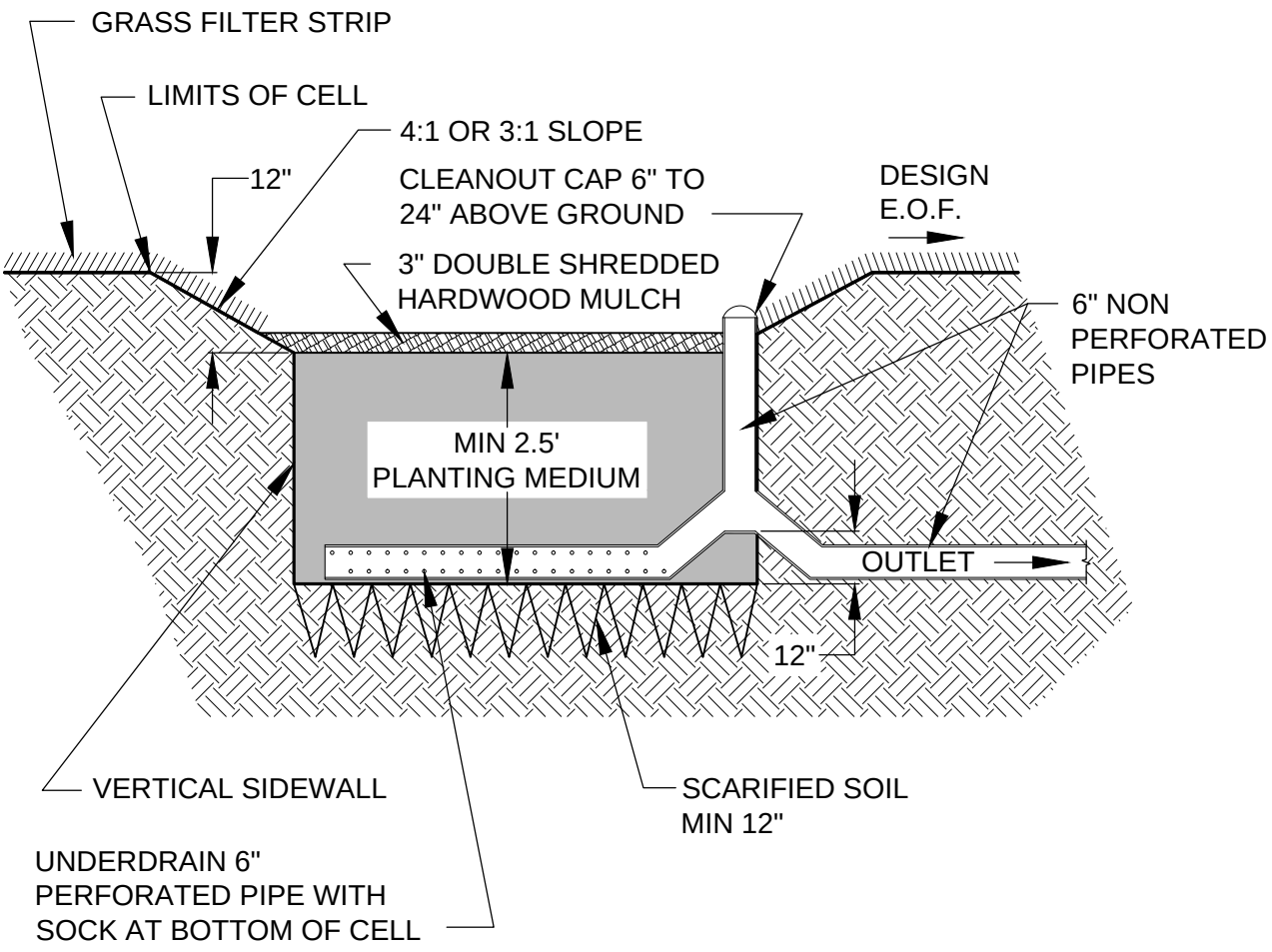

PLANTING MEDIUM

MAXIMUM 80% WASHED MEDIUM SAND (0.02 " TO 0.08") AND MINIMUM 20% GRADE 2 COMPOST MnDOT 3890.2B (NO TOPSOIL ALLOWED)

Savage	BIORETENTION (RAINGARDEN) SECTION	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 213

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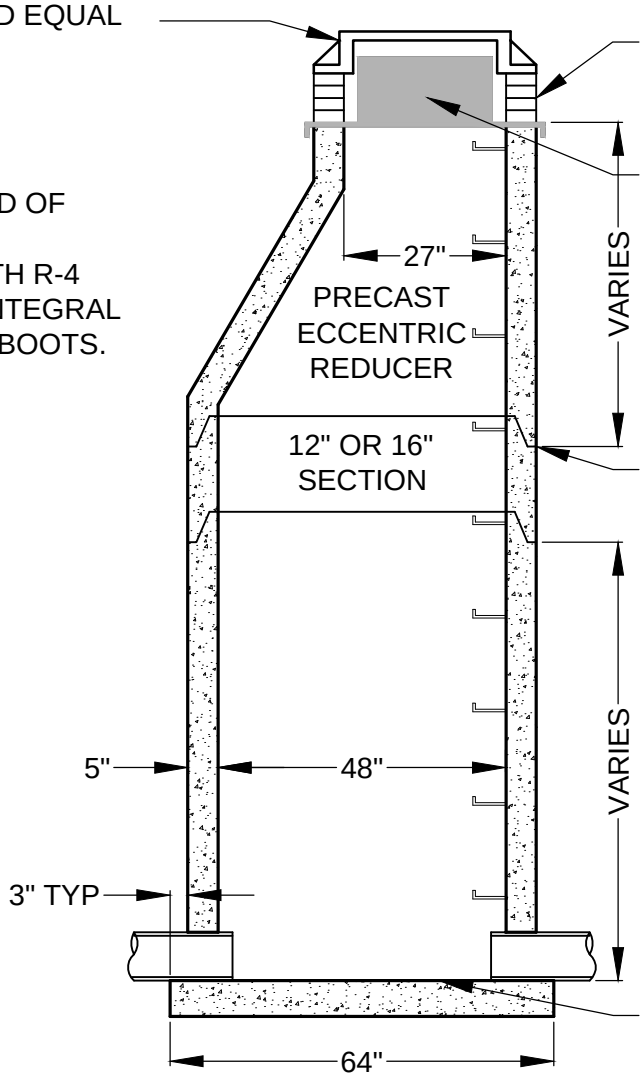
STANDARD CASTING, NEENAH R-1642 WITH TYPE "B" LID STAMPED "SANITARY SEWER" OR APPROVED EQUAL

WALLS TO BE CONSTRUCTED OF PRECAST SECTIONS WITH R-4 JOINTS AND INTEGRAL RUBBER PIPE BOOTS.



CONCRETE ADJUSTING RINGS MIN. 2, MAX. 6 (12" MAX)

INSTALL I&I BARRIER OR APPROVED EQUAL ON TOP OF THE CONE. INSTALL BUTYL RUBBER BETWEEN CONE AND I&I BARRIER.

INSTALL BUTYL RUBBER ON TOP LIP OF ALL MANHOLE SECTIONS. (TYP.)
ALL JOINTS BETWEEN SECTIONS SHALL HAVE TYLOX SUPER SEAL OR APPROVED EQUAL GASKET MATERIAL CONFORMING TO OR EXCEEDING A.S.T.M. C-443.

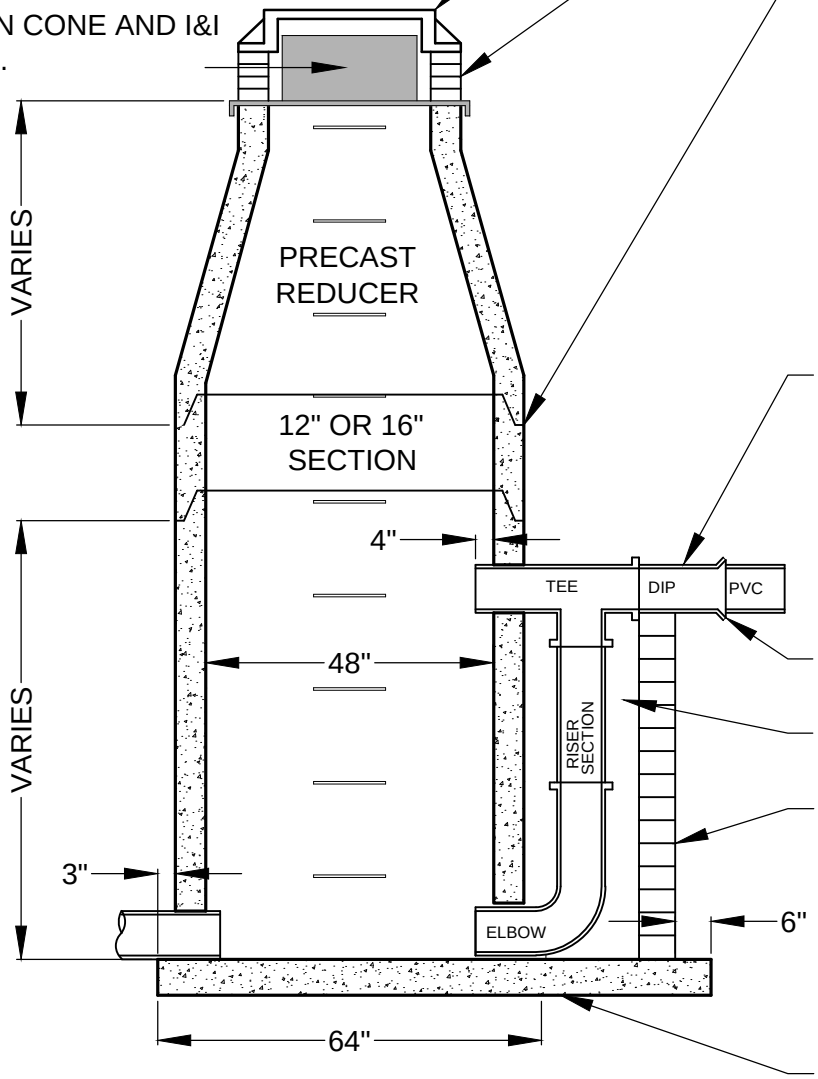
MANHOLE INVERT SHALL BE SLOPED TO PROVIDED SMOOTH FLOW FROM INLET TO OUTLET

5" PRECAST BASE FOR MANHOLES LESS THAN 14' DEEP. BASE SLAB TO BE CONSTRUCTED WITH INTEGRAL WALLS AND RUBBER PIPE BOOTS. INCREASE BASE 2" PER 6' OF DEPTH BEYOND 14'.

Savage	STANDARD MANHOLE (SANITARY SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 301

WALLS TO BE CONSTRUCTED OF PRECAST SECTIONS WITH R-4 JOINTS AND INTEGRAL RUBBER PIPE BOOTS.

INSTALL I&I BARRIER OR APPROVED EQUAL ON TOP OF THE CONE. INSTALL BUTYL RUBBER BETWEEN CONE AND I&I BARRIER.



STANDARD CASTING, NEENAH R-1642 WITH TYPE "B" LID STAMPED "SANITARY SEWER" OR APPROVED EQUAL

CONCRETE ADJUSTING RINGS. MIN. 2, MAX. 6 (12" MAX)

INSTALL BUTYL RUBBER ON TOP LIP OF ALL MANHOLE SECTIONS. (TYP.) ALL JOINTS BETWEEN SECTIONS SHALL HAVE TYLOX SUPER SEAL OR APPROVED EQUAL GASKET MATERIAL CONFORMING TO OR EXCEEDING A.S.T.M. C-443.

DUCTILE IRON PIPE SHALL BE USED FOR THIS SECTION AND SHALL BE INSTALLED TO UNDISTURBED SOIL OR A MIN. LENGTH OF 20'

DIP TO PVC TRANSITION

FILL ALL VOIDS WITH CONCRETE

HORSESHOES ON ALL SIDES

MANHOLE INVERT SHALL BE SLOPED TO PROVIDED SMOOTH FLOW FROM INLET TO OUTLET

8" PRECAST BASE FOR MANHOLES LESS THAN 14' DEEP. BASE SLAB TO BE CONSTRUCTED WITH INTEGRAL WALLS AND RUBBER PIPE BOOTS. INCREASE BASE 2" PER 6' OF DEPTH BEYOND 14' AND REINFORCE WITH 6" X 6" #10 MESH.

Savage	STANDARD DROP MANHOLE (SANITARY SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 302

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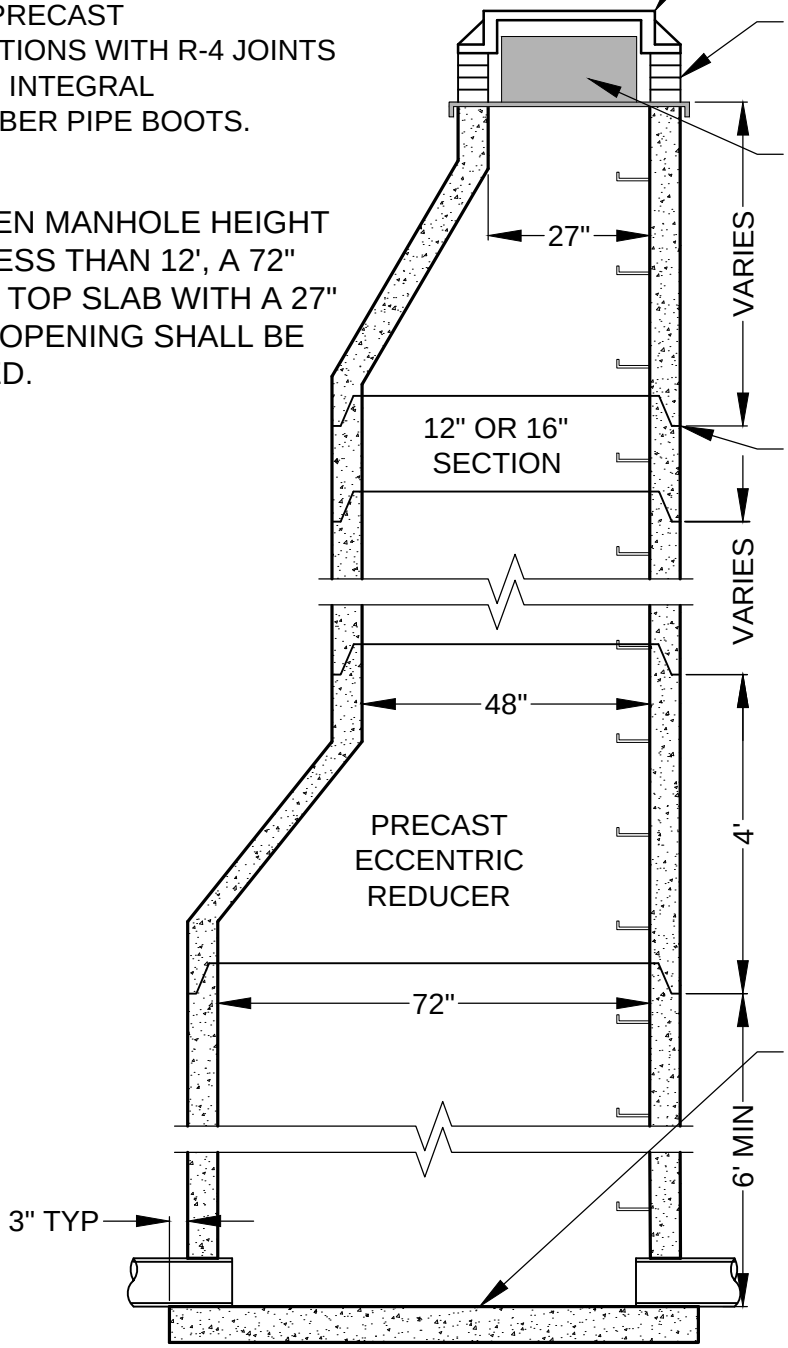
WALLS TO BE CONSTRUCTED OF PRECAST SECTIONS WITH R-4 JOINTS AND INTEGRAL RUBBER PIPE BOOTS.

WHEN MANHOLE HEIGHT IS LESS THAN 12', A 72" DIA. TOP SLAB WITH A 27" DIA OPENING SHALL BE USED.



STANDARD CASTING, NEENAH R-1642 WITH TYPE "B" LID STAMPED "SANITARY SEWER" OR APPROVED EQUAL

CONCRETE ADJUSTING RINGS MIN. 2, MAX. 6 (12" MAX)

INSTALL I&I BARRIER OR APPROVED EQUAL ON TOP OF THE CONE. INSTALL BUTYL RUBBER BETWEEN CONE AND I&I BARRIER.

INSTALL BUTYL RUBBER ON TOP LIP OF ALL MANHOLE SECTIONS. (TYP.)
ALL JOINTS BETWEEN SECTIONS SHALL HAVE TYLOX SUPER SEAL OR APPROVED
EQUAL GASKET MATERIAL CONFORMING TO OR EXCEEDING A.S.T.M. C-443.

MANHOLE INVERT SHALL BE SLOPED TO PROVIDED SMOOTH FLOW FROM INLET TO OUTLET

5" PRECAST BASE FOR MANHOLES LESS THAN 14' DEEP. BASE SLAB TO BE CONSTRUCTED WITH INTEGRAL WALLS AND RUBBER PIPE BOOTS. INCREASE BASE 2" PER 6' OF DEPTH BEYOND 14'.

Savage	72" DIAMETER MANHOLE (SANITARY SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 303

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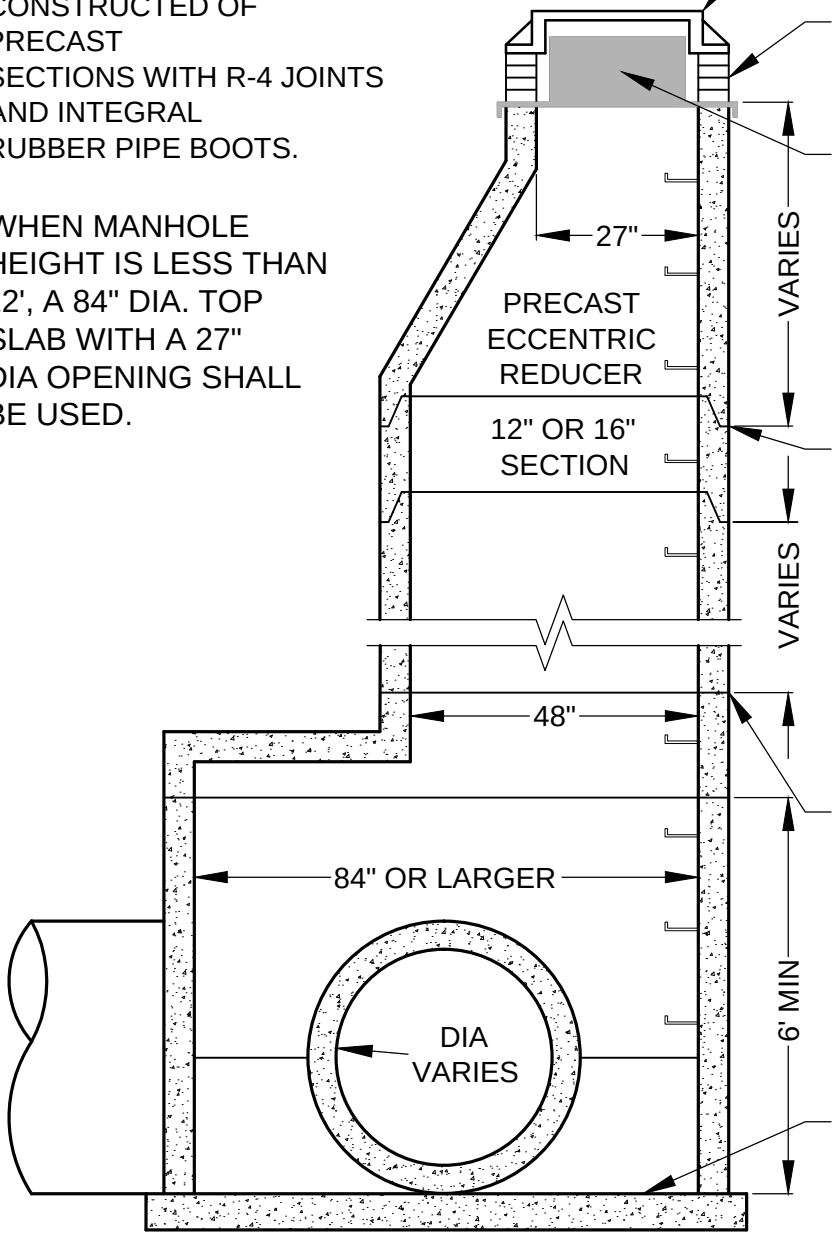
WALLS TO BE CONSTRUCTED OF PRECAST SECTIONS WITH R-4 JOINTS AND INTEGRAL RUBBER PIPE BOOTS.

WHEN MANHOLE HEIGHT IS LESS THAN 12', A 84" DIA. TOP SLAB WITH A 27" DIA OPENING SHALL BE USED.



STANDARD CASTING, NEENAH R-1642 WITH TYPE "B" LID STAMPED "SANITARY SEWER" OR APPROVED EQUAL

CONCRETE ADJUSTING RINGS MIN. 2, MAX. 6 (12" MAX)

INSTALL I&I BARRIER OR APPROVED EQUAL ON TOP OF THE CONE. INSTALL BUTYL RUBBER BETWEEN CONE AND I&I BARRIER.

INSTALL BUTYL RUBBER ON TOP LIP OF ALL MANHOLE SECTIONS. (TYP.)
ALL JOINTS BETWEEN SECTIONS SHALL HAVE TYLOX SUPER SEAL OR APPROVED
EQUAL GASKET MATERIAL CONFORMING TO OR EXCEEDING A.S.T.M. C-443.

GASKETED JOINTS

MANHOLE INVERT SHALL BE SLOPED TO PROVIDED SMOOTH FLOW FROM INLET TO OUTLET

6" PRECAST BASE FOR MANHOLES LESS THAN 14' DEEP. BASE SLAB TO BE CONSTRUCTED WITH INTEGRAL WALLS AND RUBBER PIPE BOOTS. INCREASE BASE 2" PER 6' OF DEPTH BEYOND 14'.

Savage	84" DIAMETER AND LARGER MANHOLE (SANITARY SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 304

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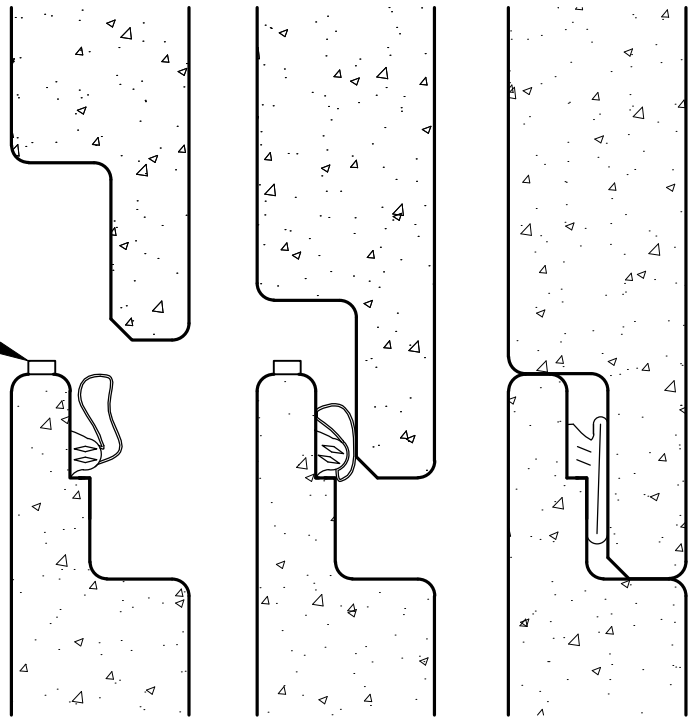
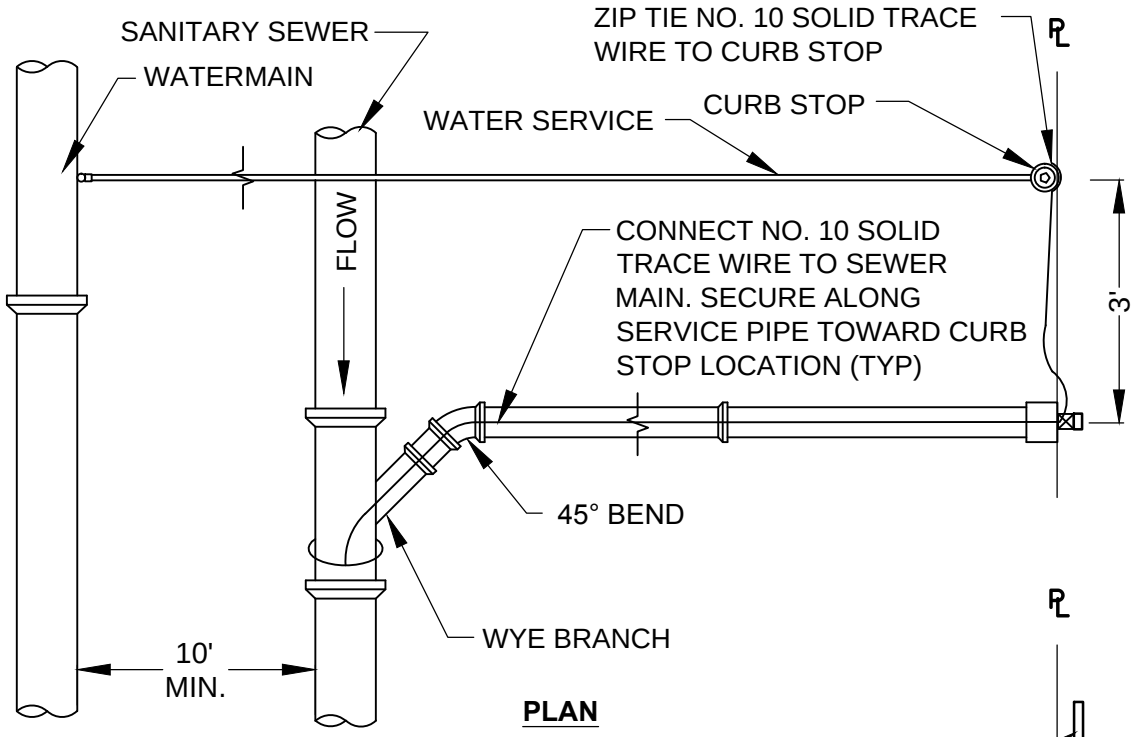
INSTALL BUTYL RUBBER ON TOP LIP OF ALL MANHOLE SECTIONS. (TYP.)

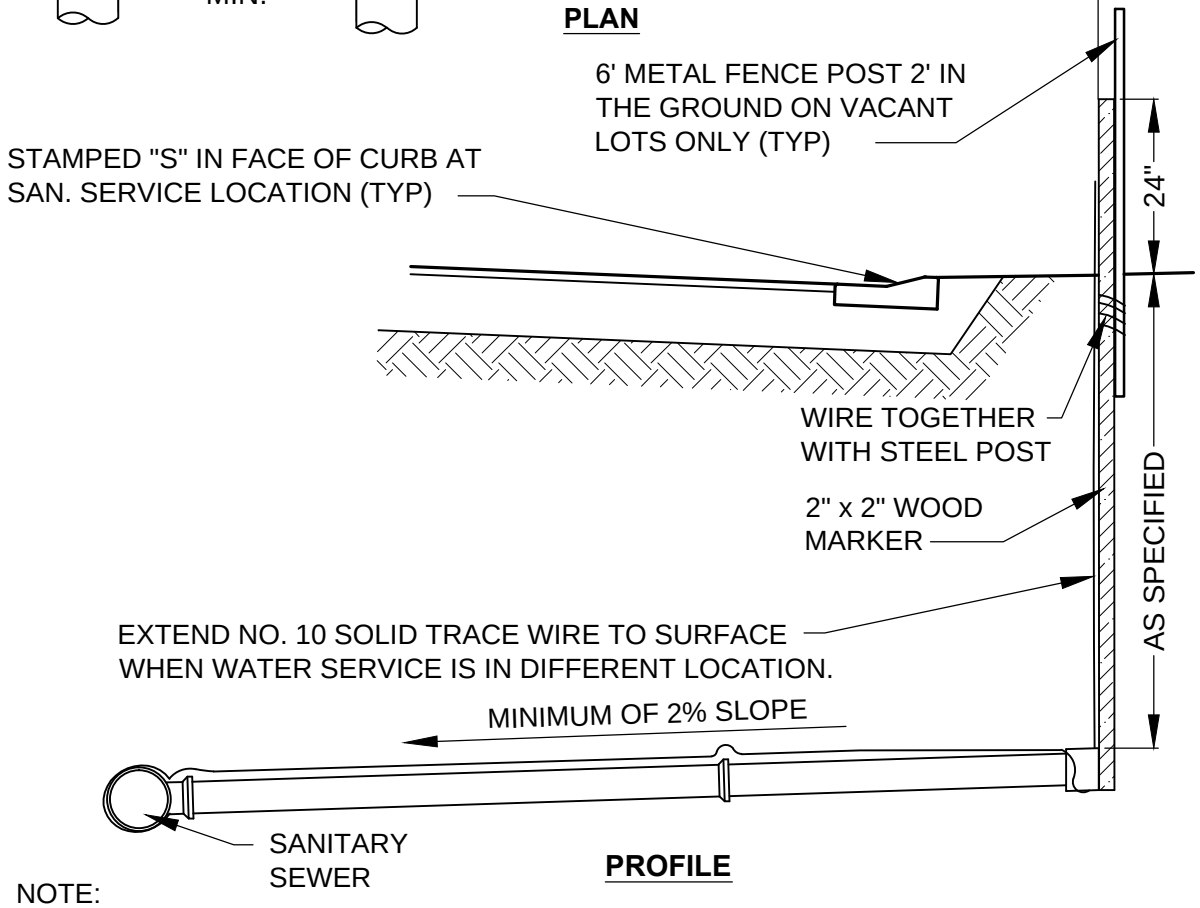
ALL JOINTS BETWEEN SECTIONS SHALL HAVE TYLOX SUPER SEAL OR APPROVED EQUAL GASKET MATERIAL CONFORMING TO OR EXCEEDING A.S.T.M. C-443.



	MANHOLE JOINTS (SANITARY SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 305



PLAN



PROFILE

NOTE:

1. ALL SERVICE PIPE SHALL BE S.D.R. 26 WITH GASKETS IN THE BELL OF THE PIPE. THE BELL END OF THE PIPE TO BE INSTALLED ON THE HIGH END.
2. THE PIPE SHALL EXTEND TO THE PROPERTY LINE OR BEYOND.
3. PLUG SHALL EXTEND ABOVE NATURAL WATER TABLE ELEVATION.

Savage	SERVICE (SANITARY SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 306

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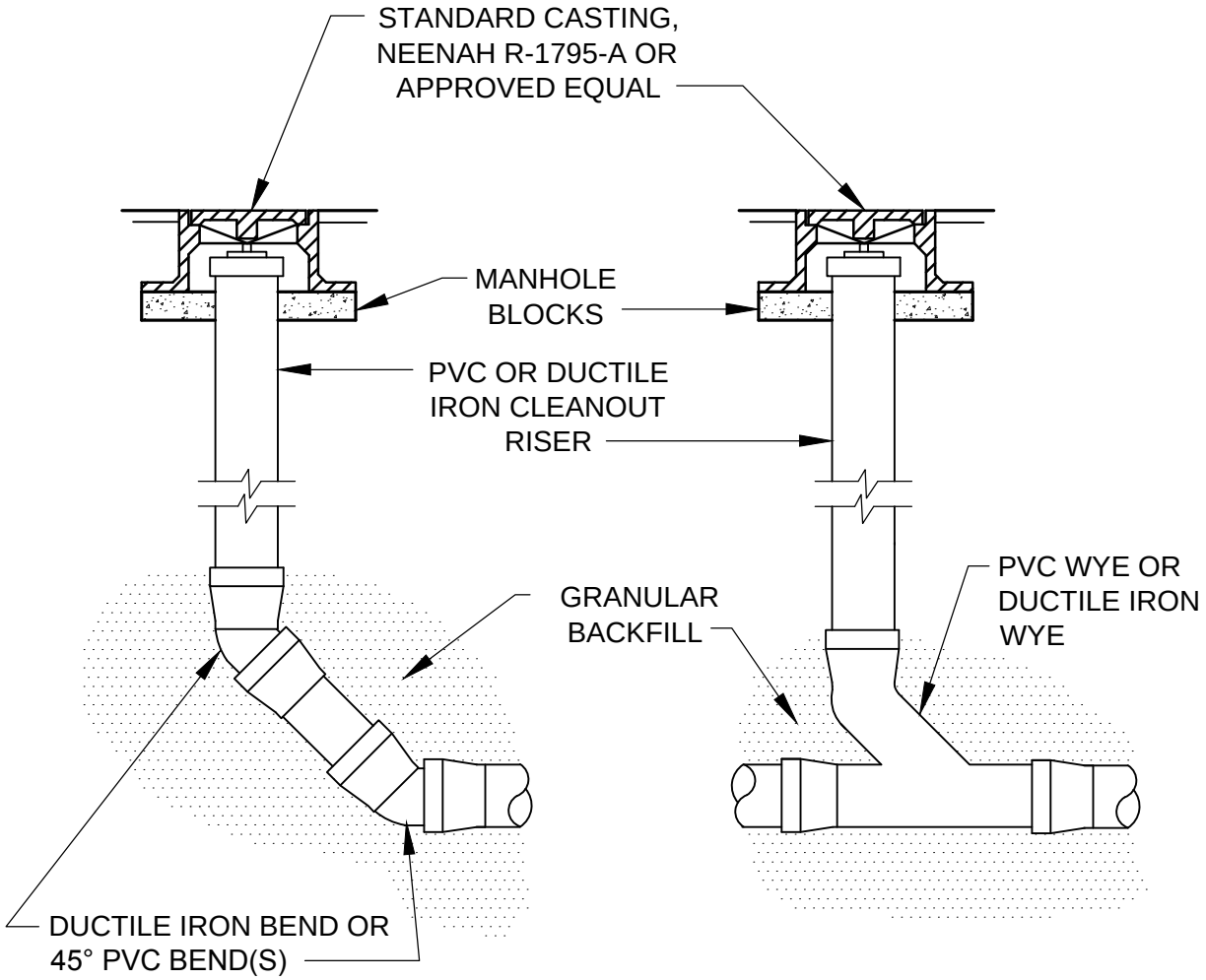

END OF LINE CLEANOUT

IN LINE CLEANOUT

NOTE:
THE RISER PIPE SHALL BE EXTENDED ABOVE GROUND LEVEL INITIALLY & THEN CUT BACK TO MATCH THE FINAL GRADE

	CLEANOUTS (SANITARY SEWER)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 307

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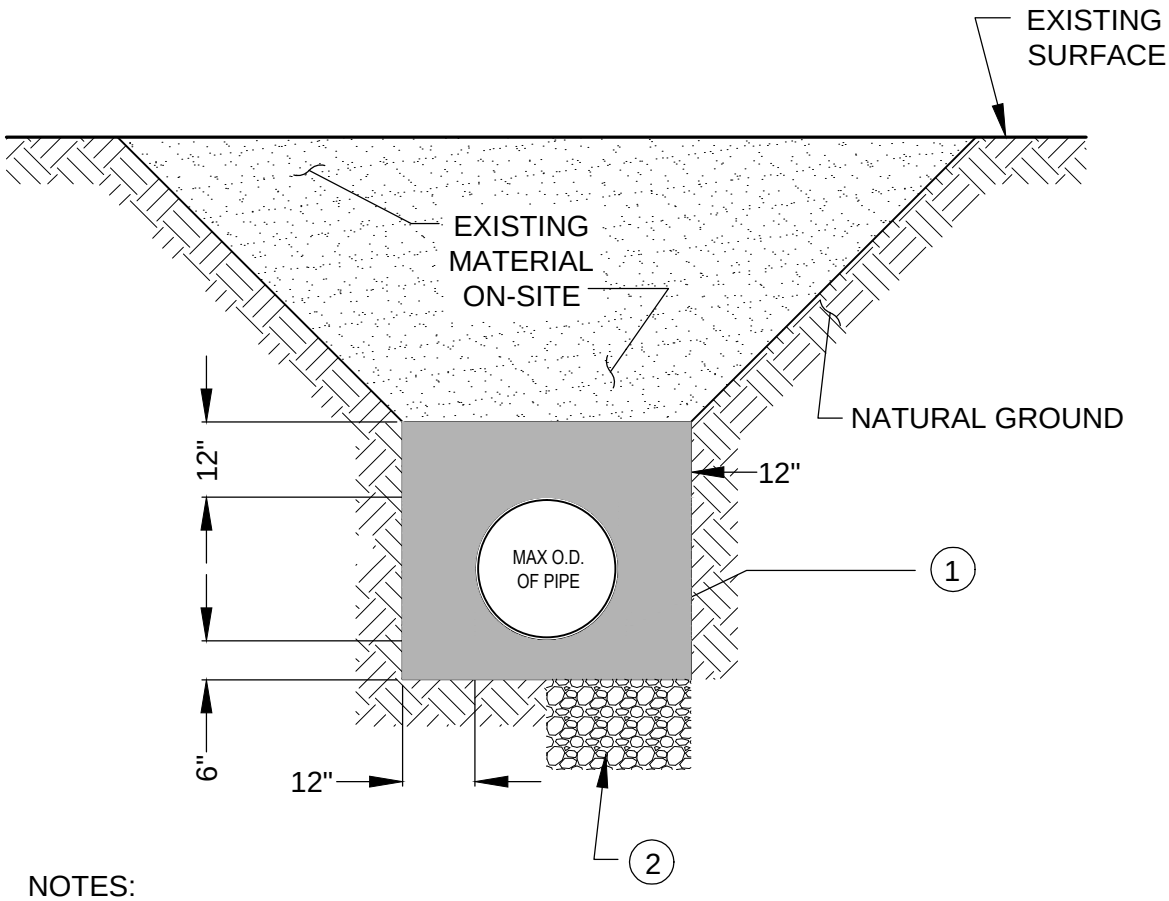

NOTES:

1. GRANULAR BEDDING SHALL BE IN ACCORDANCE WITH MN/DOT SPECIFICATIONS 3149.2F. IT SHALL NOT CONTAIN SOD, ROOTS, PLANTS, OTHER ORGANIC MATTER, OR ANY OTHER MATERIAL DEEMED OBJECTIONABLE BY THE ENGINEER IN THE FIELD. THIS MATERIAL SHALL BE INCIDENTAL TO PIPE INSTALLATION.
   CONTRACTOR SHALL SUBSTITUTE $\frac{3}{4}$" CLEAR ROCK (MN/DOT 3149.2H) WHEN CONTROLLING WATER IN BOTTOM OF TRENCH. THIS MATERIAL SHALL BE INCIDENTAL TO DEWATERING OPERATION.

2. FOUNDATION MATERIAL OR STABILIZING AGGREGATE SHALL BE IN ACCORDANCE WITH MN/DOT SPECIFICATIONS 3149.2C.
   IN ORGANIC SOILS, FOUNDATION MATERIAL SHALL BE WRAPPED WITH TYPE 2 GEOTEXTILE FILTER AS DIRECTED BY THE ENGINEER IN THE FIELD (GEOTEXTILE FILTER SHALL BE INCIDENTAL TO FOUNDATION MATERIAL).

Savage	NON-RIGID PIPE BEDDING	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 308

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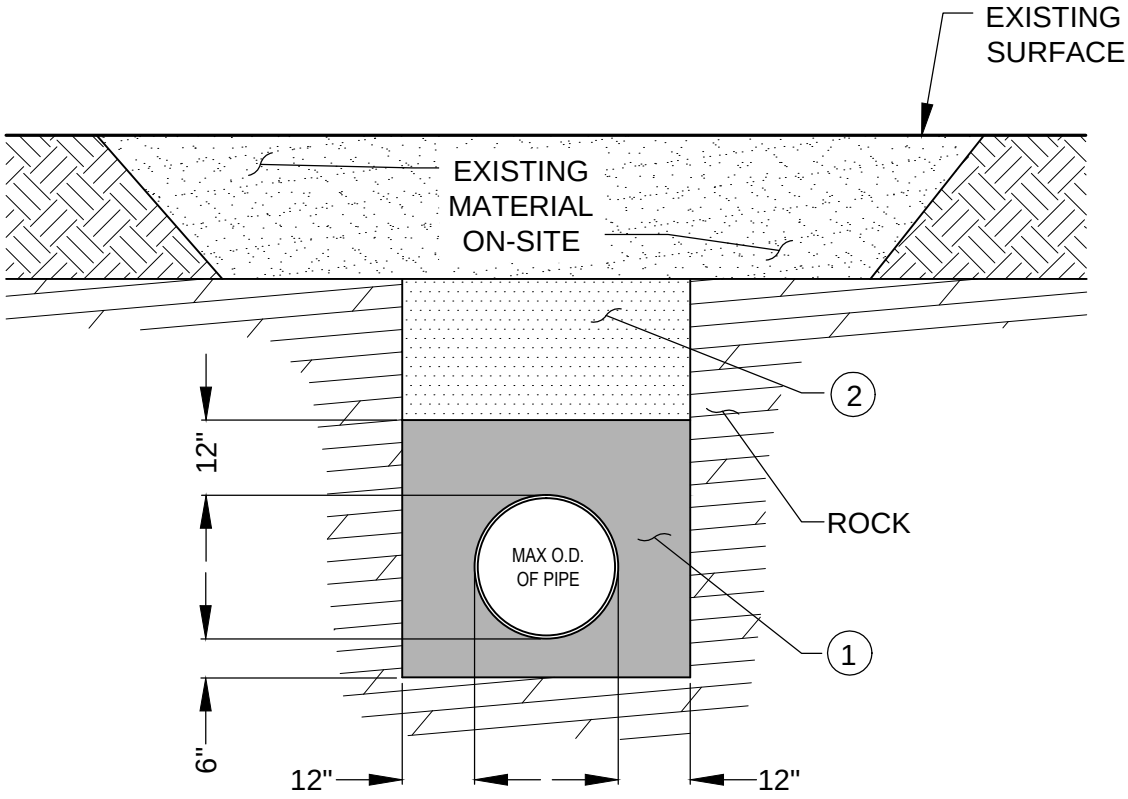


NOTES:

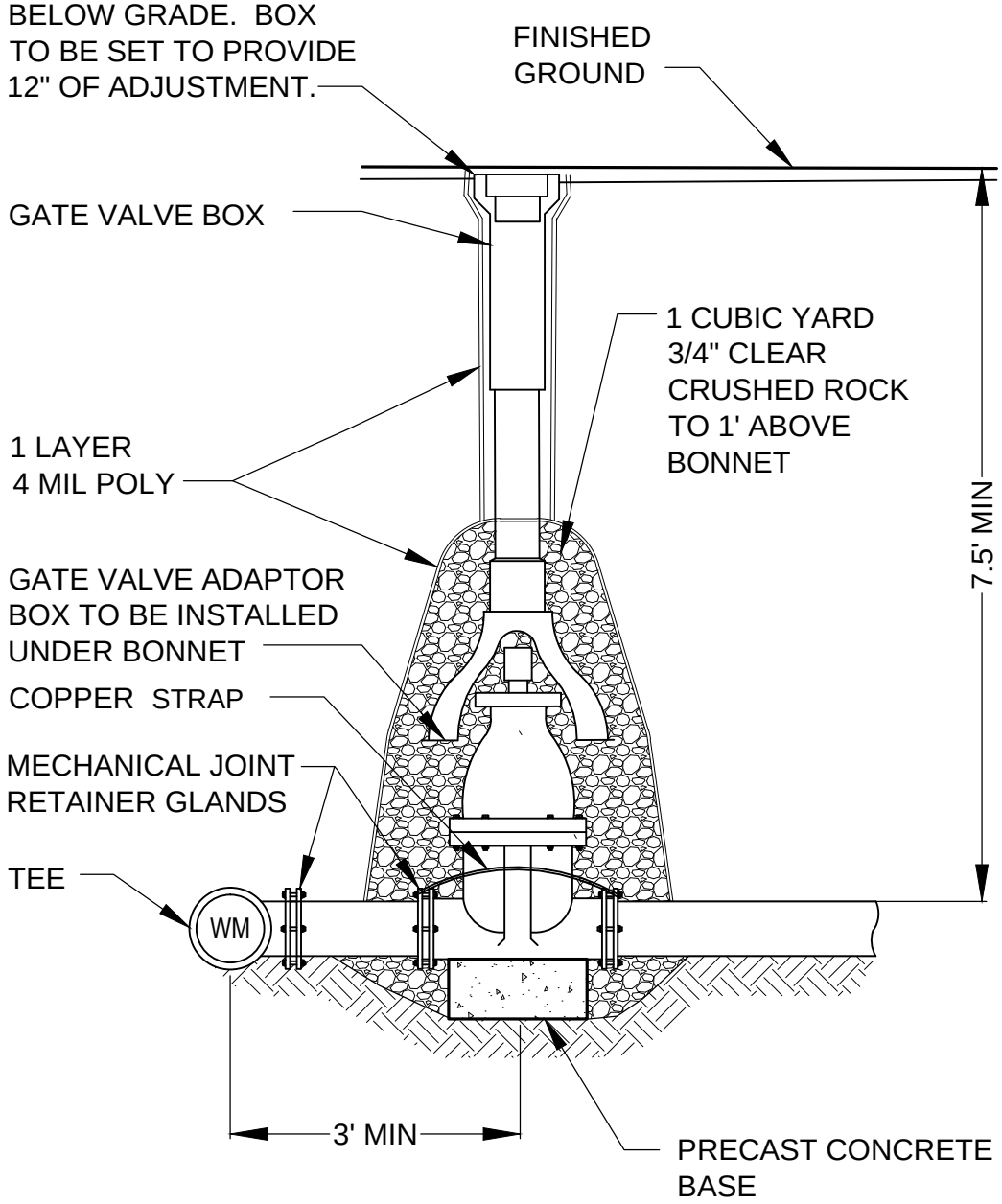
1. GRANULAR BEDDING SHALL BE IN ACCORDANCE WITH MnDOT SPECIFICATIONS 3149.2F. IT SHALL NOT CONTAIN SOD, ROOTS, PLANTS, OTHER ORGANIC MATTER, OR ANY OTHER MATERIAL DEEMED OBJECTIONABLE BY THE ENGINEER IN THE FIELD. THIS MATERIAL SHALL BE INCIDENTAL TO PIPE INSTALLATION.
   CONTRACTOR SHALL SUBSTITUTE ¾" CLEAR ROCK (MN/DOT 3149.2H) WHEN CONTROLLING WATER IN BOTTOM OF TRENCH. THIS MATERIAL SHALL BE INCIDENTAL TO DEWATERING OPERATION.

2. GRANULAR BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH MnDOT SPECIFICATION 3149.2D.1. IT SHALL NOT CONTAIN SOD, ROOTS, PLANTS, OTHER ORGANIC MATTER, OR ANY OTHER MATERIAL DEEMED OBJECTIONABLE BY THE ENGINEER IN THE FIELD.

Savage	NON-RIGID PIPE BEDDING IN ROCK	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 309

BOLTS 304 STAINLESS STEEL, COR-BLUE OR APPROVED EQUAL

GATE VALVE BOX SHALL BE POWER SEAL DUCTILE IRON VALVE BOX MODEL 8860 DI OR APPROVED EQUAL.



GATE VALVE BOX EDGE TO BE MIN 1' CLEAR OF CURB & GUTTER SECTION

Savage	TYPICAL GATE VALVE	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 401

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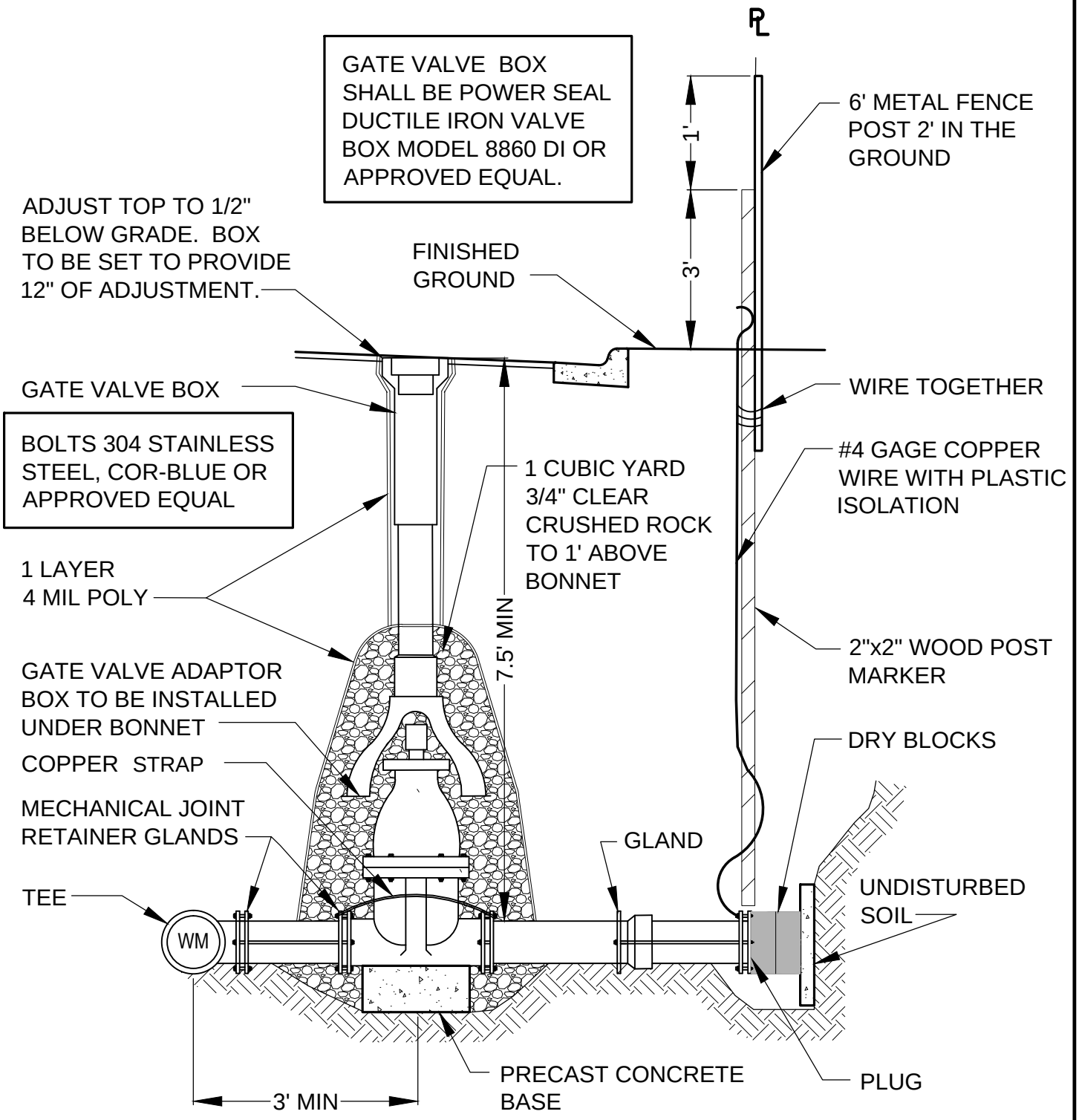

1. VALVE SHALL BE TIED TO TEE AT MAIN WITH RETAINER GLANDS PLUG SHALL BE TIED TO VALVE WITH RETAINER GLANDS OR 2-3/4" DIA. RODS. ALL TIE RODS TO BE COAL TAR COATED AFTER INSTALLATION.

2. GATE VALVE BOX EDGE TO BE MIN 1' CLEAR OF CURB & GUTTER SECTION

Savage	TYPICAL GATE VALVE ON STUB	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 402

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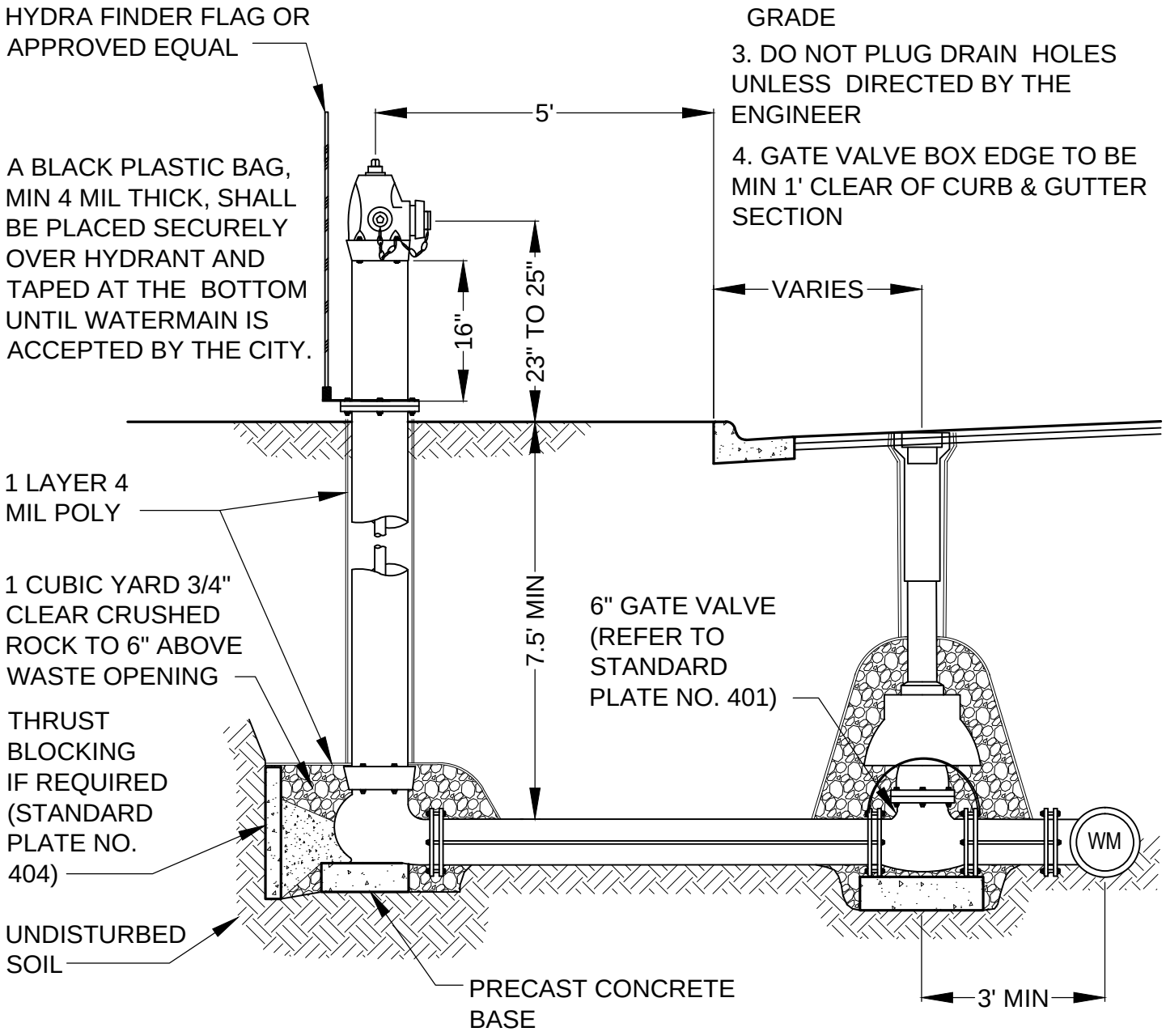
HYDRANT TO BE WATEROUS PACER WB-67-250

1. 5" STORZ NOZZLE W/CABLE (STORZ ADAPTERS WILL NOT BE ACCEPTED)
2. PAINT BARREL SECTION TO GRADE
3. DO NOT PLUG DRAIN HOLES UNLESS DIRECTED BY THE ENGINEER
4. GATE VALVE BOX EDGE TO BE MIN 1' CLEAR OF CURB & GUTTER SECTION



TIE HYDRANT TO VALVE AND VALVE TO TEE AT MAIN WITH RETAINER GLANDS OR 2-3/4" DIA TIE RODS. ALL TIE RODS TO BE COAL TAR COATED AFTER INSTALLATION.

Savage	TYPICAL HYDRANT & GATE VALVE	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 403

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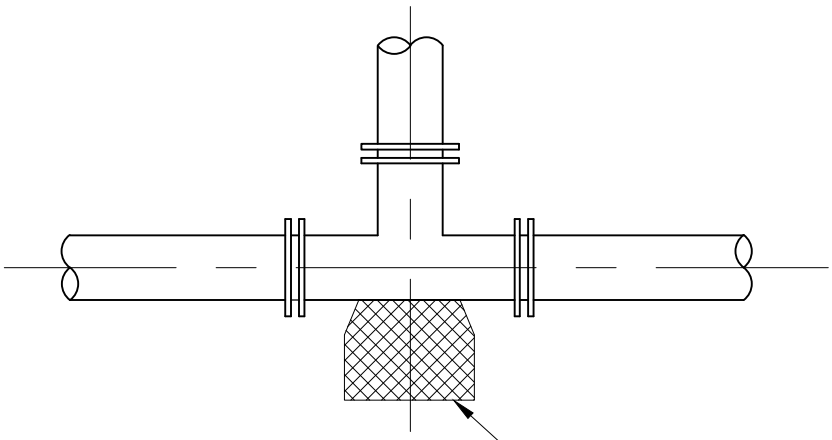
NOTES:

1. THRUST BLOCK TO BE USED FOR BENDS 22.5° AND OVER.
2. THRUST BLOCK SHALL ONLY BE USED WHERE WORKING PRESSURES ARE LESS THAN 150 LBS.
3. NO TIMBER WILL BE ALLOWED FOR THRUST BLOCKING.
4. WRAP FITTINGS WITH POLYETHYLENE.
5. POURED CONCRETE BLOCKING WILL BE REQUIRED ON ALL WATERMAIN PLUGS AND FITTINGS OVER 12" DIAMETER

PIPE SIZE	BEARING AREA
6"	4.0 SQ. FT.
8"	6.0 SQ. FT.
10" - 12"	12.0 SQ. FT.
16"	20.0 SQ. FT.
18"	24.0 SQ. FT.



CONCRETE BLOCKING PLACE AGAINST UNDISTURBED SOIL. (BEARING AREA)

Savage	WATERMAIN THRUST BLOCKING	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 404

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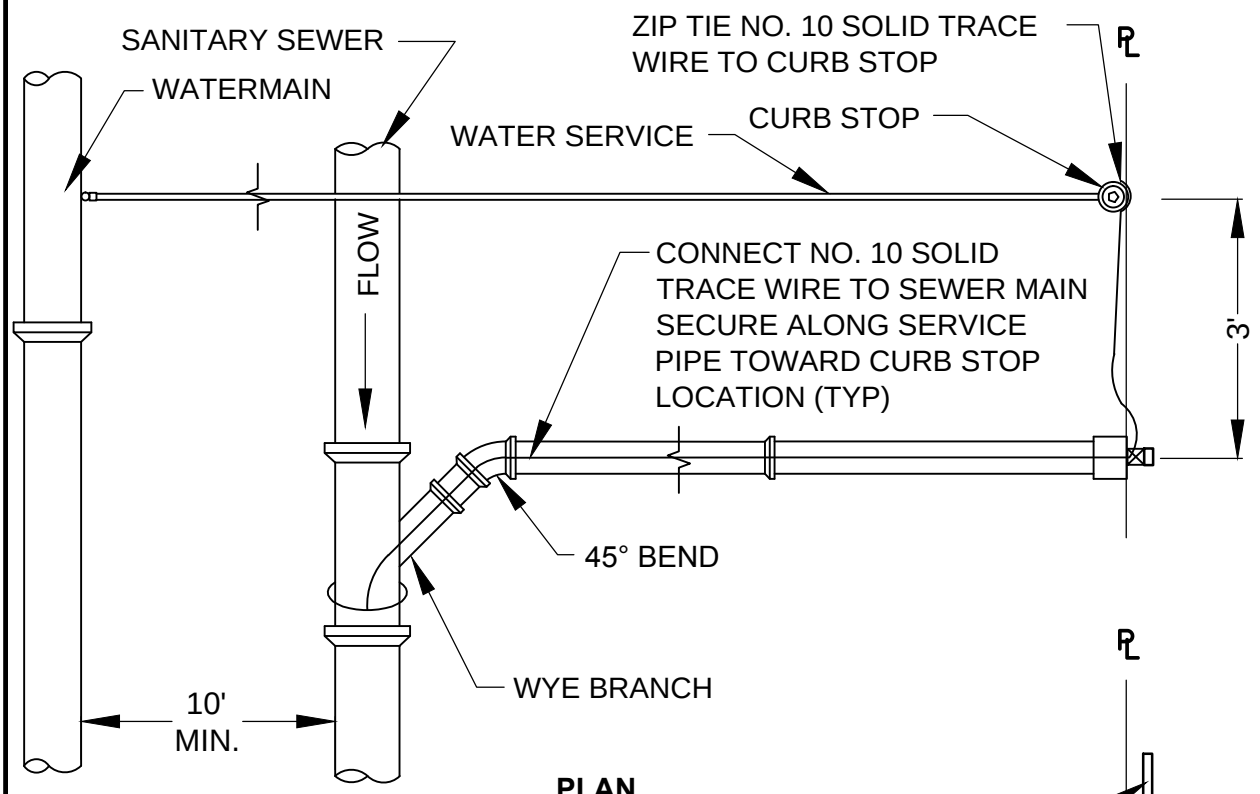
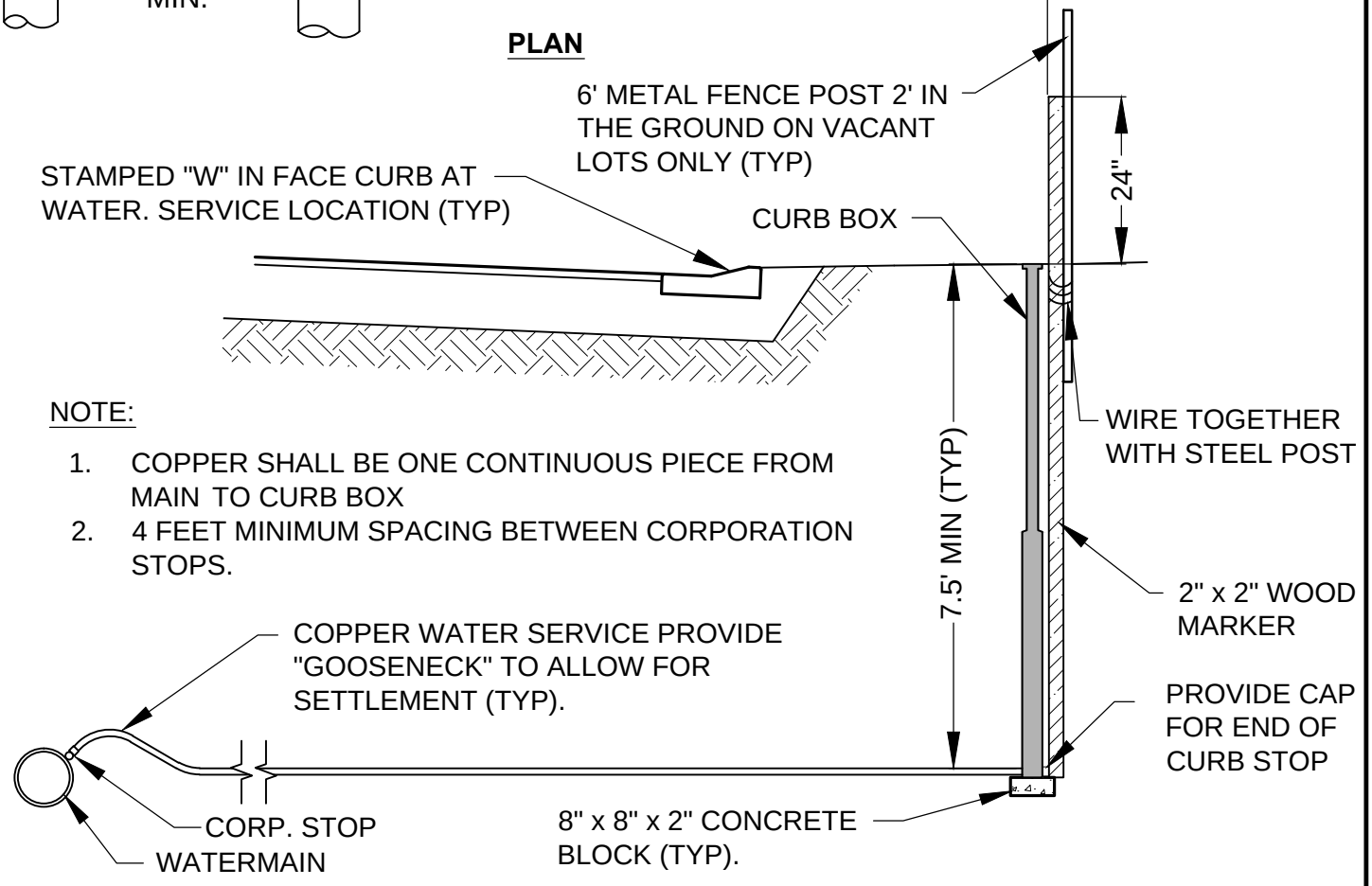


PLAN



NOTE:

1. COPPER SHALL BE ONE CONTINUOUS PIECE FROM MAIN TO CURB BOX
2. 4 FEET MINIMUM SPACING BETWEEN CORPORATION STOPS.

PROFILE

Savage	TYPICAL WATER SERVICE	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 405

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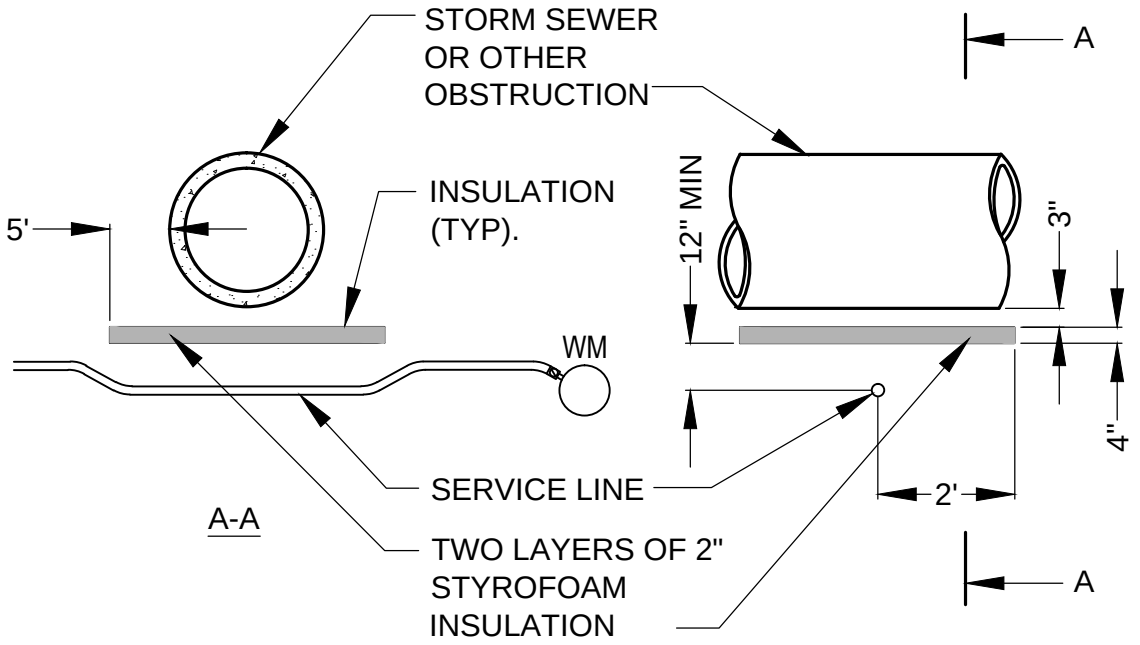
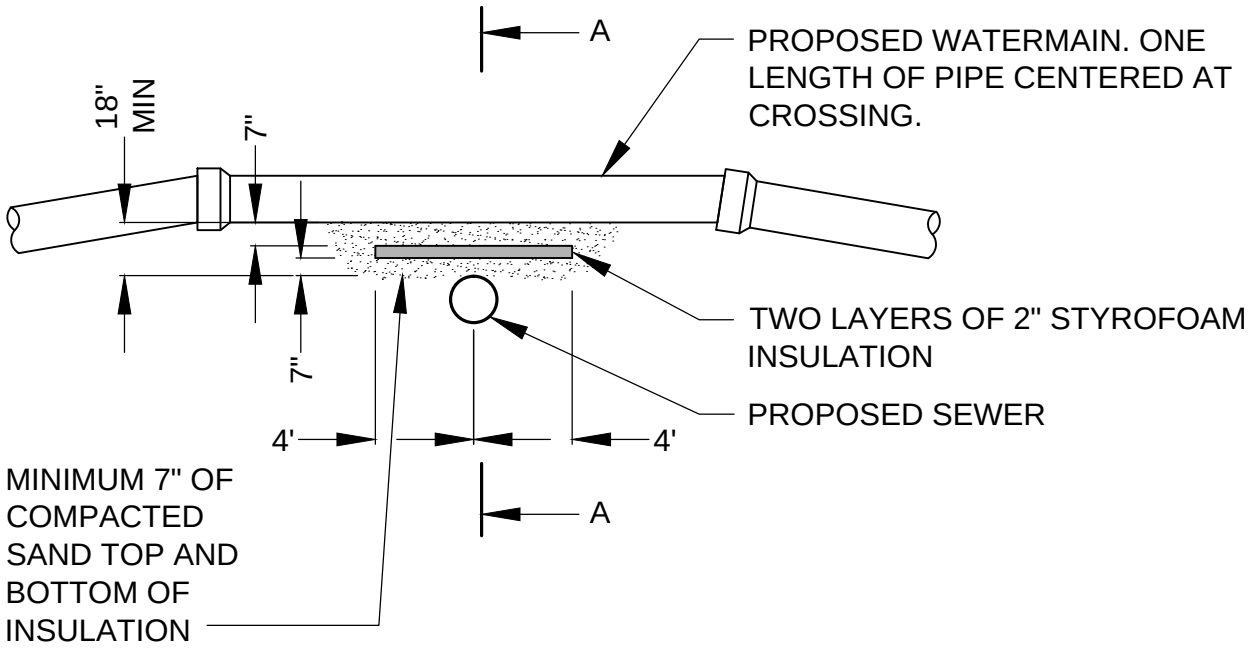
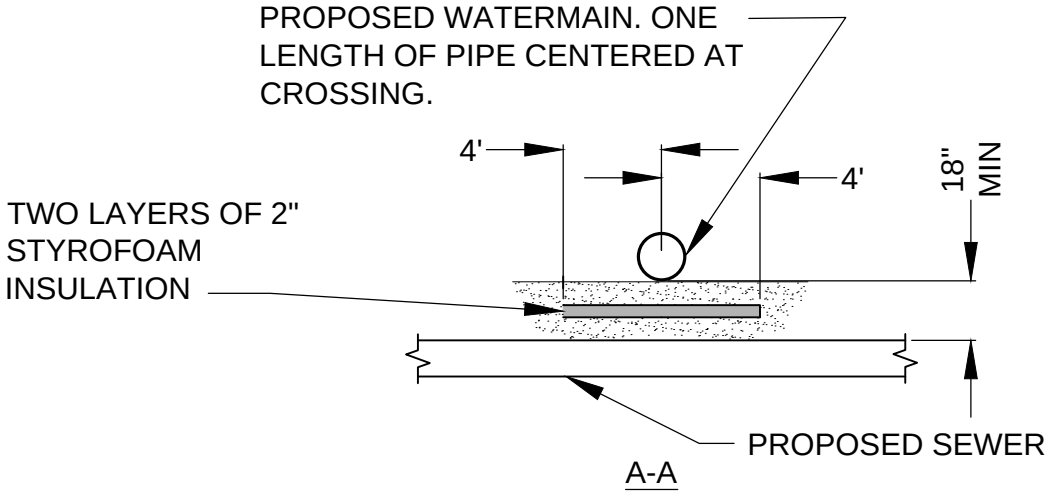


NOTE:

INSULATION SHALL BE EXTRUDED POLYSTYRENE (XEPS) INSULATION BOARD, "STYROFOAM SM" OR EQUIVALENT. IF LESS THAN 1.5' SEPARATION BETWEEN O.D. OF PIPES, THEN SERVICE MUST BE LOWERED TO 1.5' MINIMUM WITH THE INSULATION BEING INSTALLED AS SHOWN.

Savage	WATERMAIN SERVICE LOWERING AND INSULATION	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 406





NOTE:

TRANSITION WATERMAIN TO SPECIFIED DEPTH WITH NO LESS THAN 7.5' COVER. VERTICAL BENDS AND OTHER EXTRA FITTINGS ARE ALLOWED ONLY IN EXTREME CIRCUMSTANCES PER MANUFACTURER'S RECOMENDATIONS AND WITH ENGINEER'S PRIOR APPROVAL.

Savage	WATERMAIN AND SEWER CROSSING	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 407

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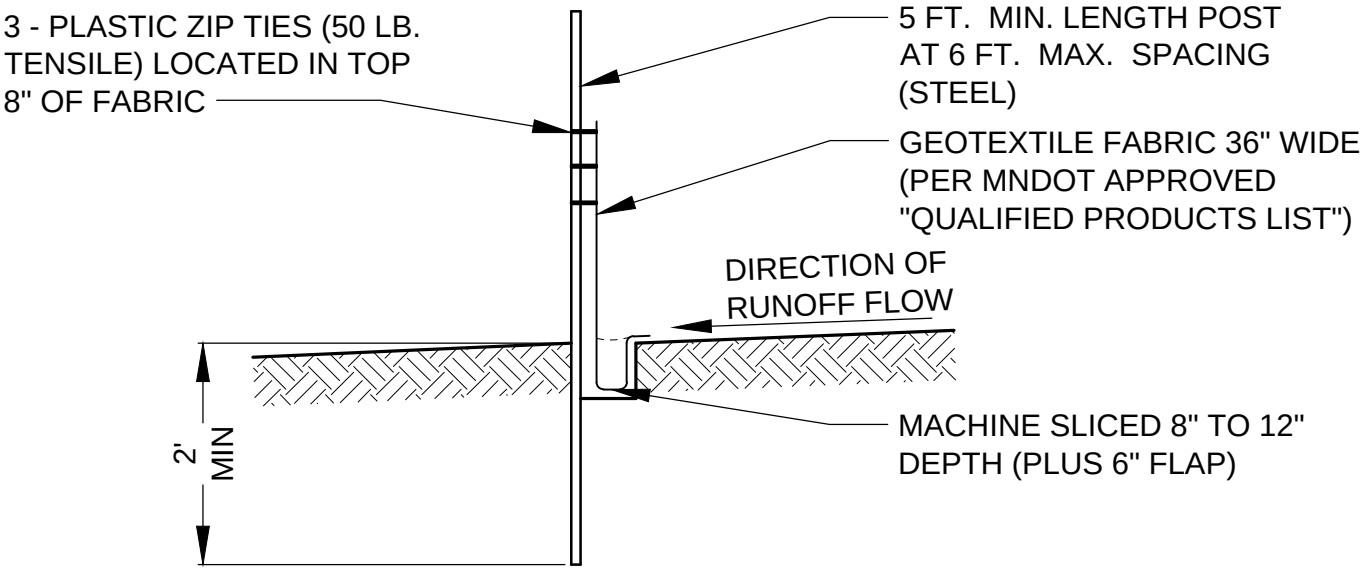
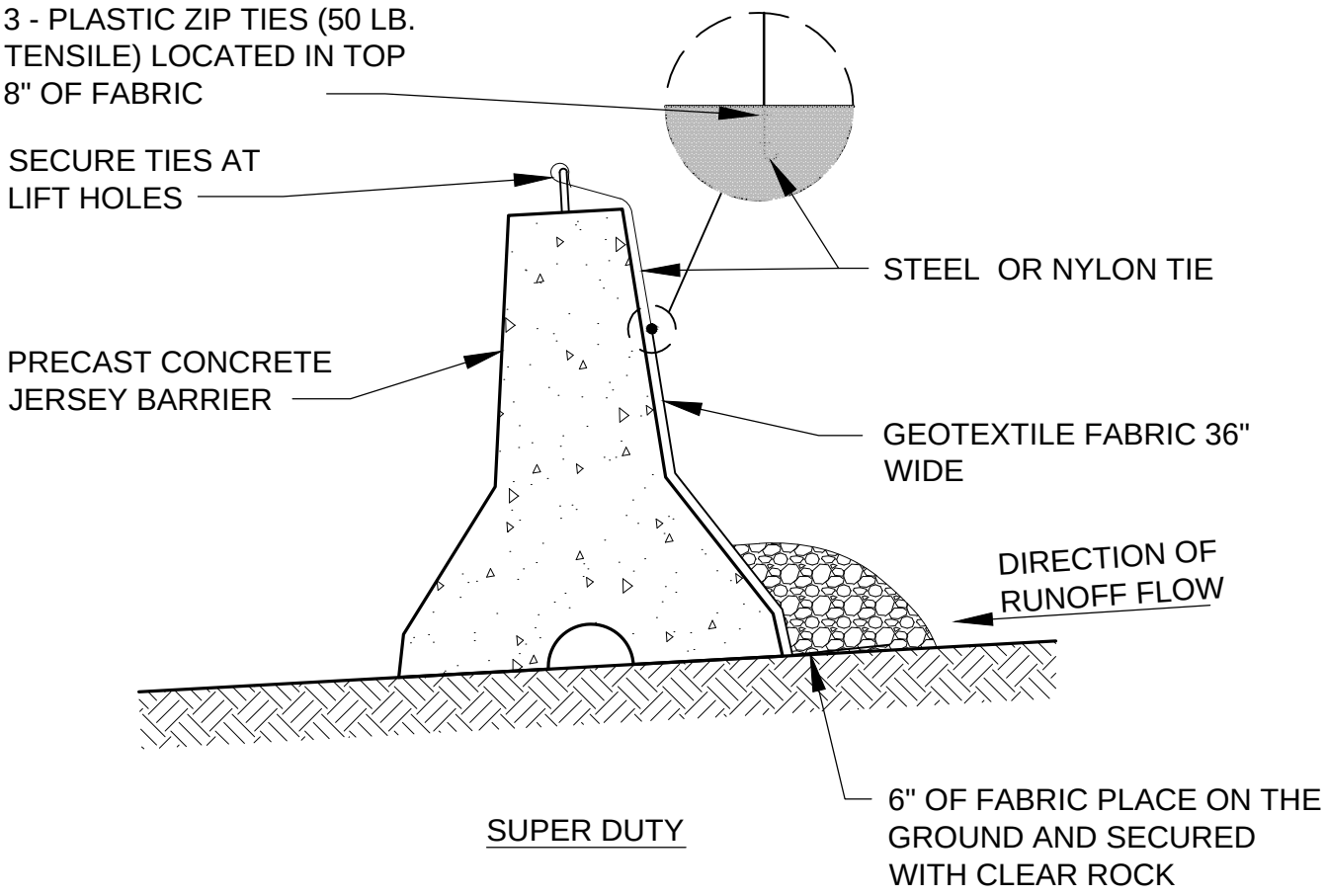


HEAVY DUTY MACHINE SLICED



SUPER DUTY

Savage	SILT FENCE	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 501

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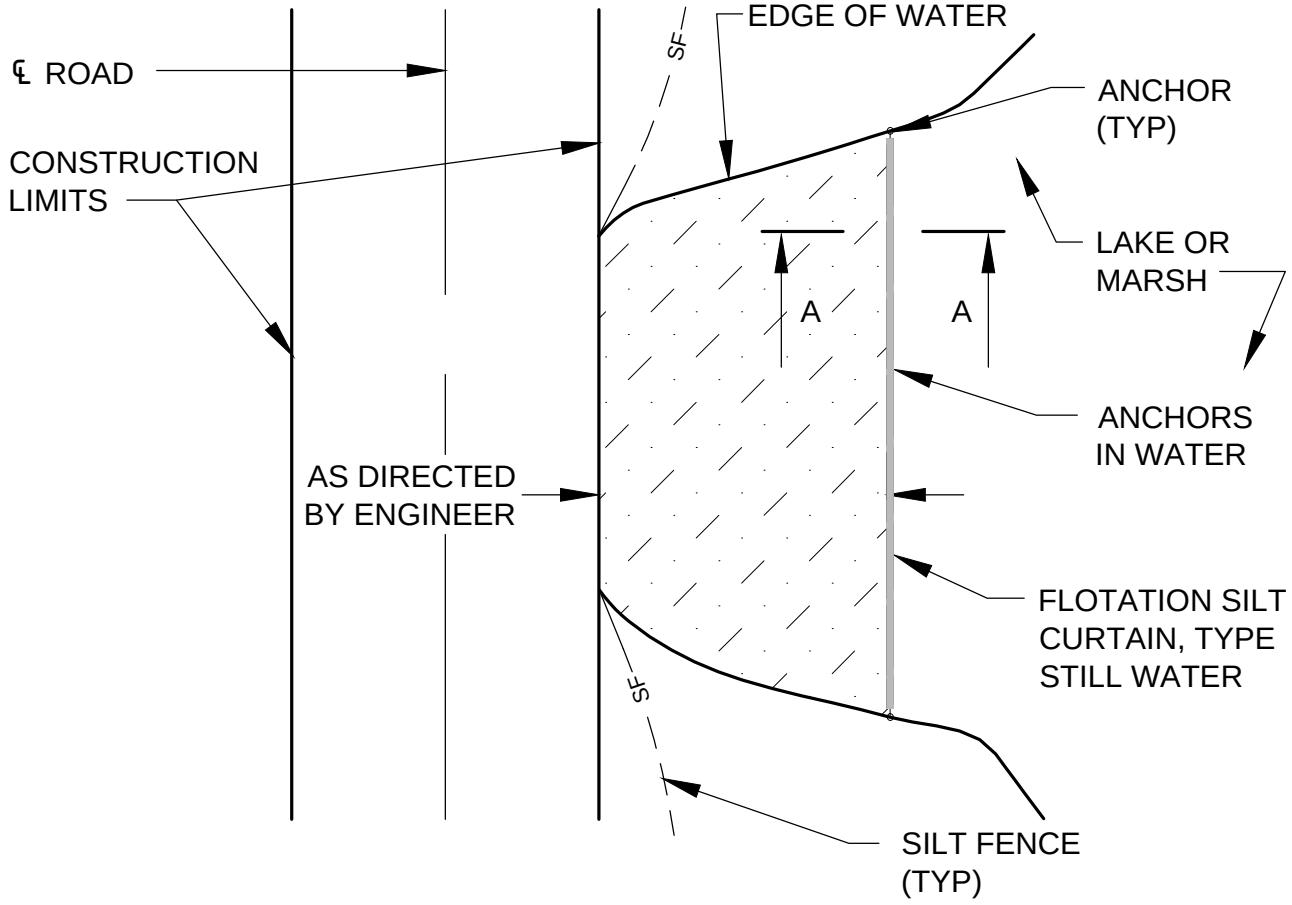
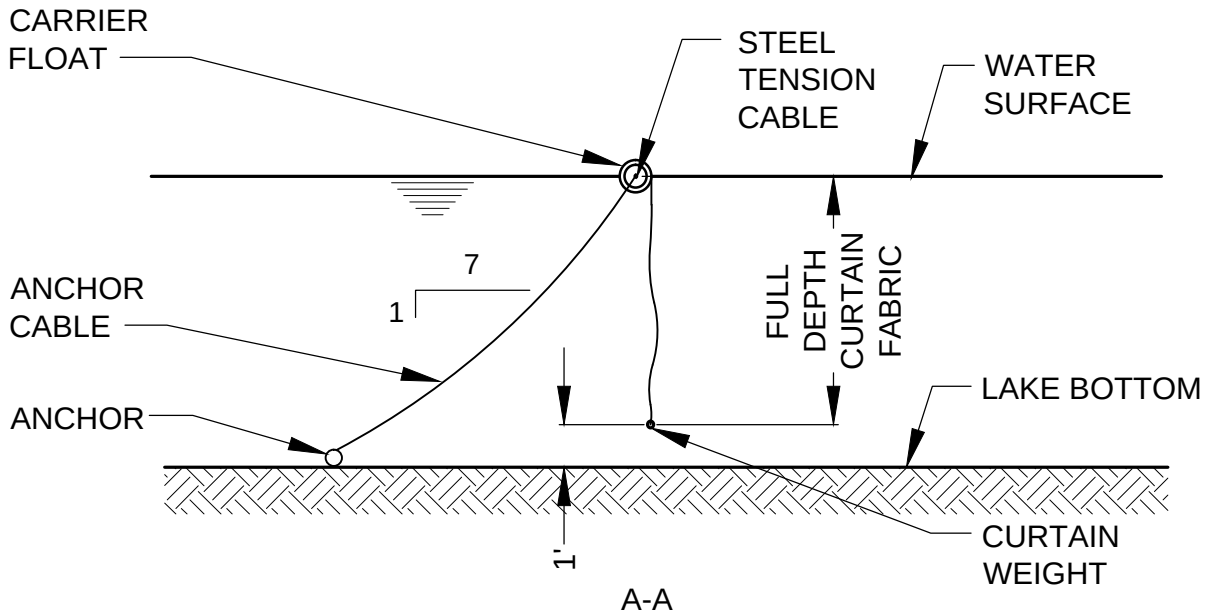


PLAN VIEW



A-A

NOTE:

FOR SITE CURTAIN IN MOVING WATER, CONTRACTOR TO SUBMIT PLAN FOR CITY APPROVAL.

Savage	SILT CURTAIN, TYPE STILL WATER	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 502

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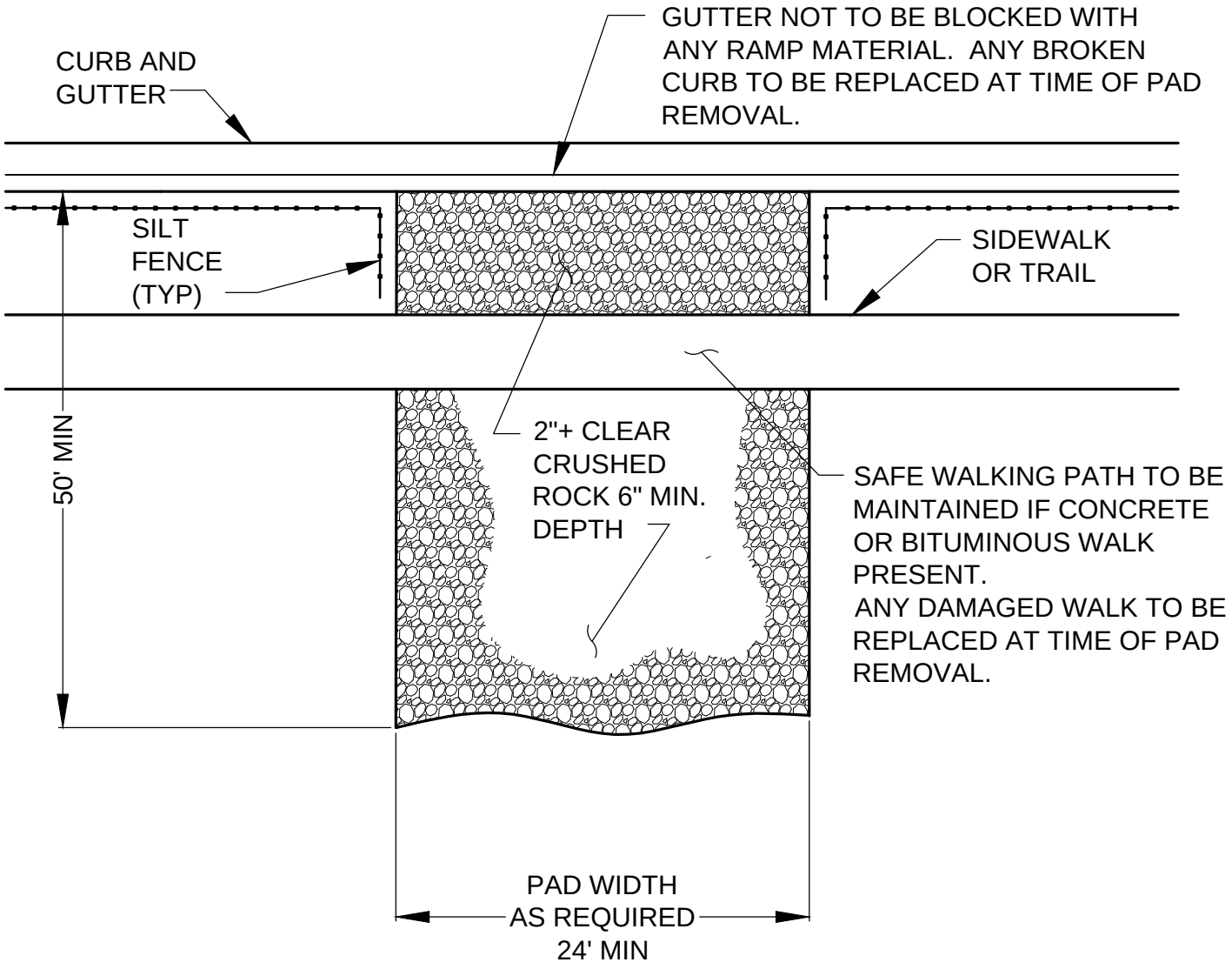
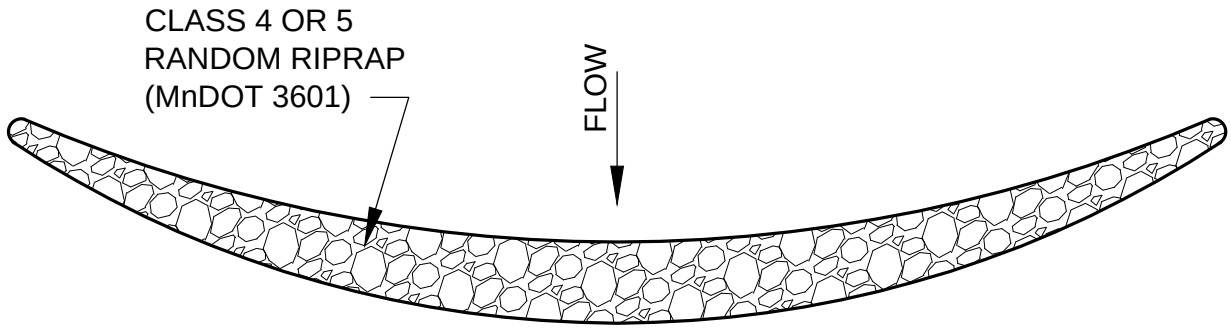


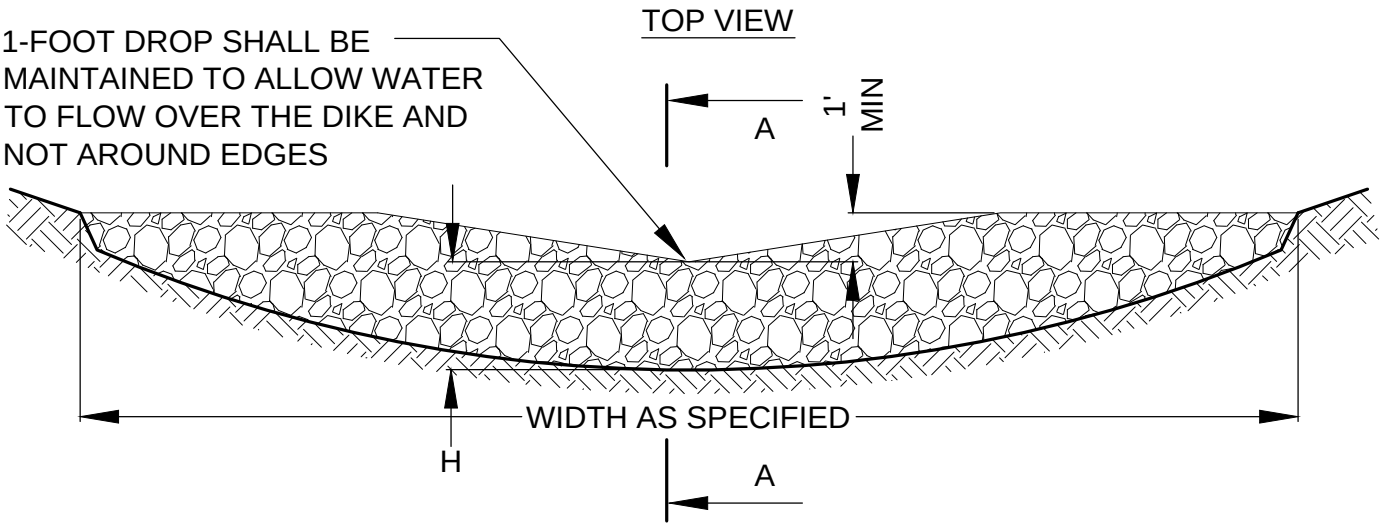
NOTE:

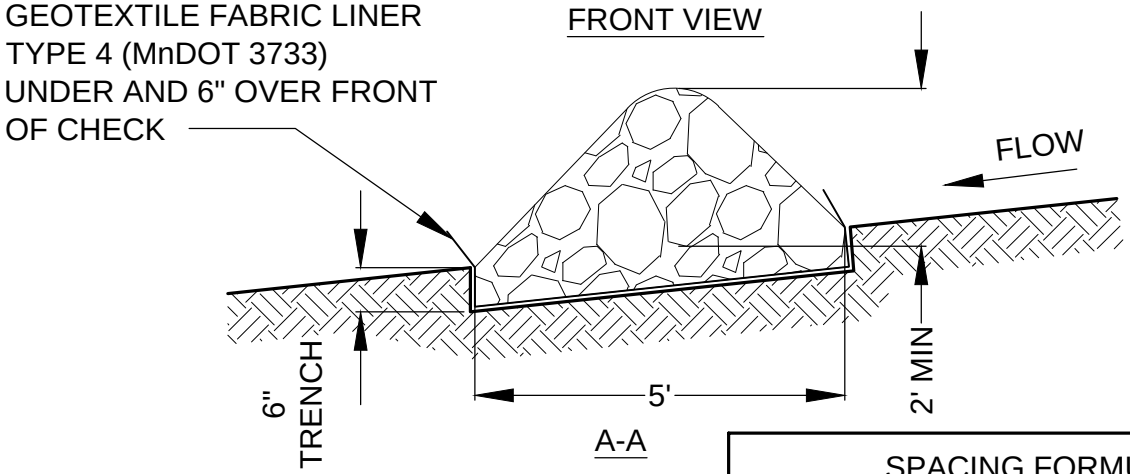
1. THE CONTRACTOR SHALL INSPECT PAD DAILY AND ENSURE VEHICLE TRACKING CONTROL EFFECTIVENESS BY MAINTAINING PAD AND CLEANING STREET. PAD MAINTENANCE INCLUDES BUT NOT LIMITED TO ADDING NEW ROCK MATERIAL.

2. THE CONTRACTOR MAY ELECT TO USE A METAL CONSTRUCTION PAD. THE METAL CONSTRUCTION PAD SHALL BE A "GRIZZLY TRACKOUT CONTROL DEVICE" OR APPROVED EQUAL BY THE ENGINEER.

Savage	VEHICLE TRACKING PAD	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 503







SPACING FORMULA

$$S=Hx100/P$$

S - DITCH CHECKS SPACING (FT)

H - DITCH CHECK HEIGHT (FT)

P - DITCH SLOPE (%)

NOTE:

PRIOR TO FINAL ACCEPTANCE OF PROJECT, TEMPORARY ROCK DITCH CHECK SHALL BE REMOVED FROM CLEAR ZONE, TRENCH SHALL BE RESTORED PER THE PROJECT PLAN.

Savage	ROCK DITCH CHECK	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 504

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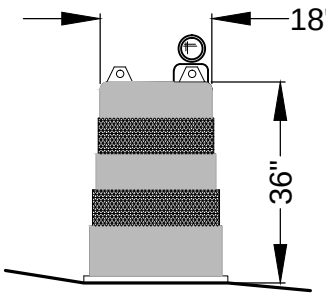
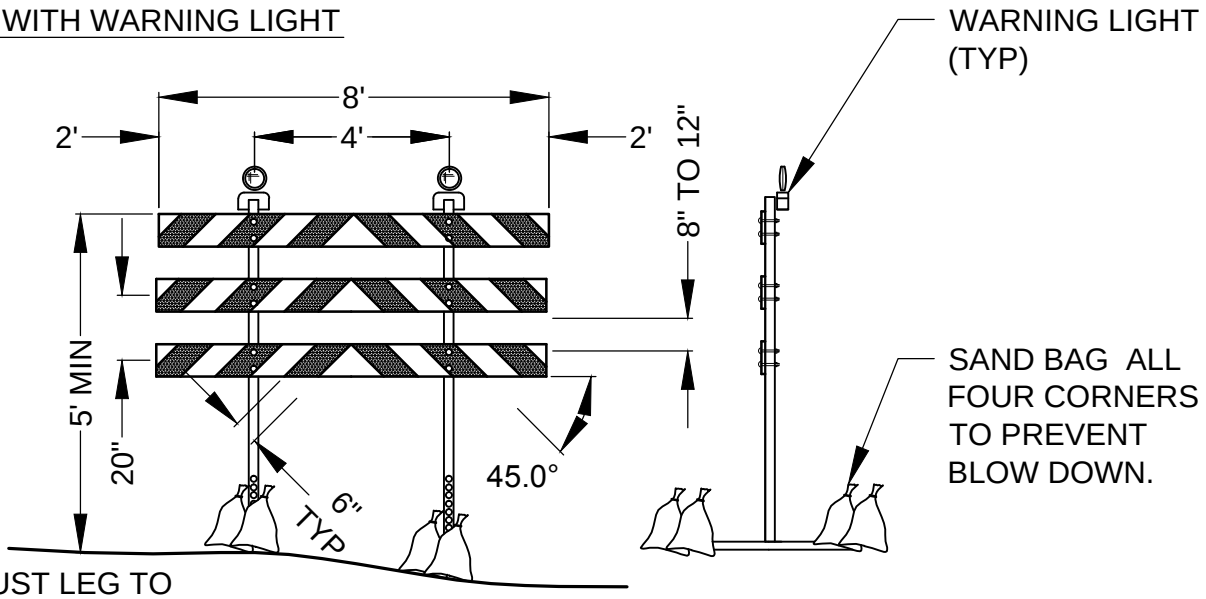
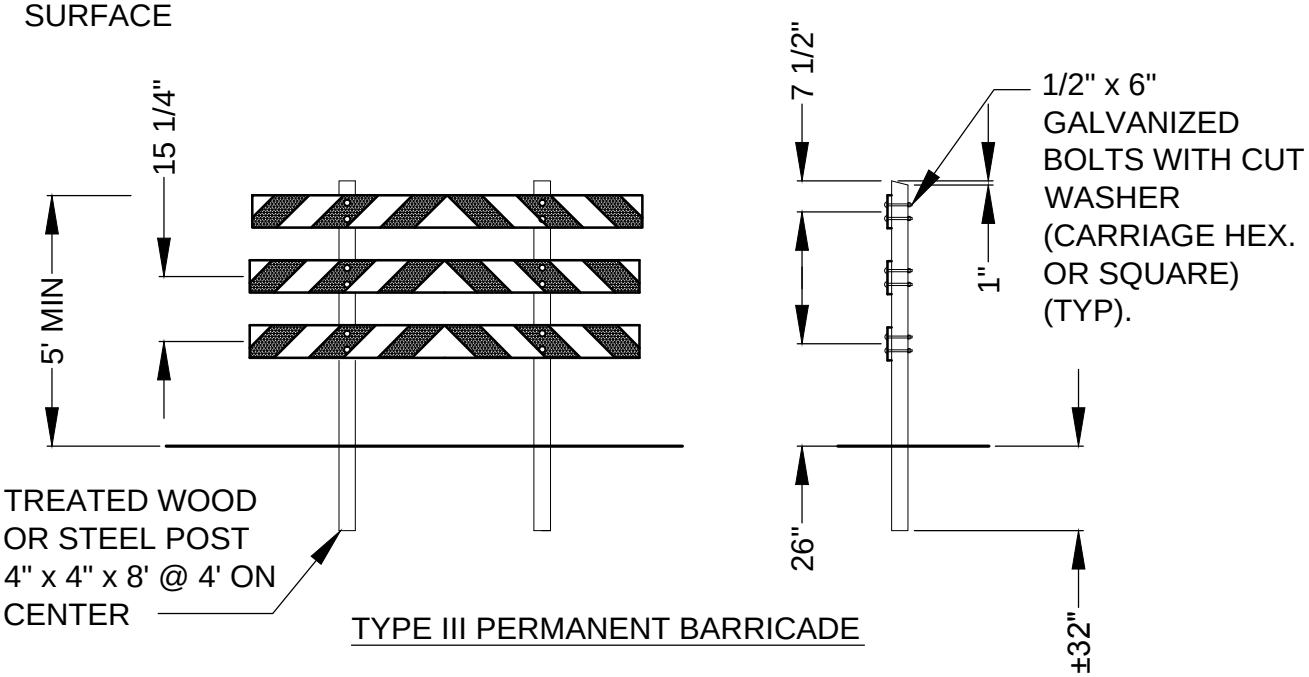


DRUM WITH WARNING LIGHT



ADJUST LEG TO MATCH UNEVEN SURFACE

TYPE III TEMPORARY BARRICADE WITH FLASHER



TYPE III PERMANENT BARRICADE

NOTE: TRAFFIC BARRICADES AND PLACEMENT MUST COMPLY WITH MMUTCD STANDARDS.

Savage	TYPE III BARRICADES (TEMPORARY AND PERMANENT)	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 601

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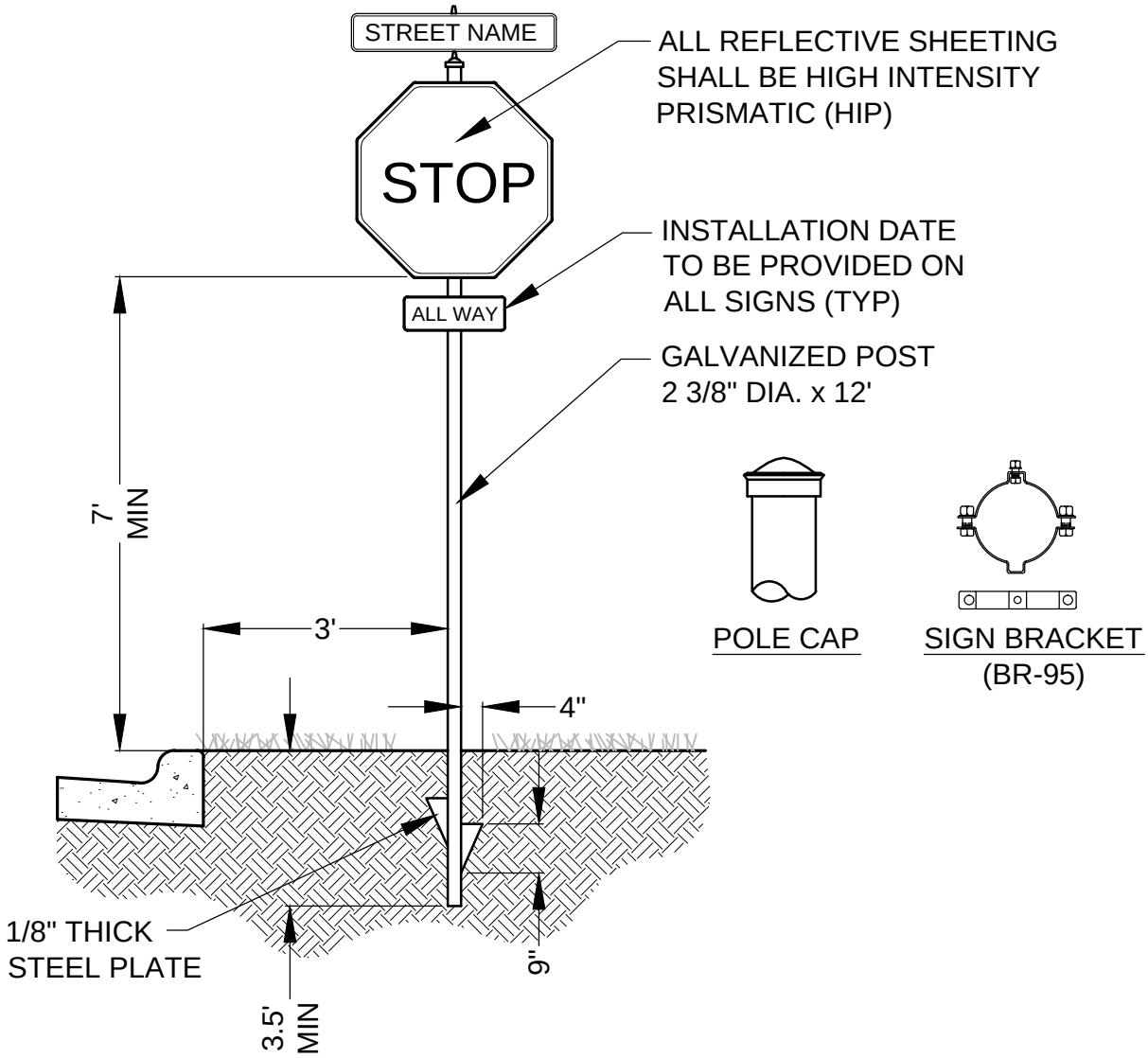

RESIDENTIAL STREET NAME SIGN SPECIFICATIONS:
SIZE: 9 INCHES WIDE x 36 INCHES MIN. LONG
TYPE: SINGLE FACE
REFLECTIVE SHEETING: HIGH INTENSITY PRISMATIC (HIP)
LETTER COLOR: WHITE
BACKGROUND COLOR: GREEN
BORDER: 3/8 INCHES SHALL MATCH LETTER COLOR
PUNCHING: E SERIES
LETTER SIZE: 5"
LETTER FORMAT: UPPER CASE
SIGN BRACKET: E450

PRIVATE STREET NAME SIGN SPECIFICATIONS:
SIZE: 9 INCHES WIDE x 36 INCHES MIN. LONG
TYPE: SINGLE FACE
REFLECTIVE SHEETING: HIGH INTENSITY PRISMATIC (HIP)
LETTER COLOR: BLACK
BACKGROUND COLOR: WHITE
BORDER: 3/8 INCHES SHALL MATCH LETTER COLOR
PUNCHING: E SERIES
LETTER SIZE: PRIVATE 2 INCHES
STREET NAME 4 INCHES
LETTER FORMAT: UPPER CASE
SIGN BRACKET: E450

STOP AND STREET IDENTIFICATION SIGN

CITY OF SAVAGE

REVISION DATE: 02/2015

STANDARD PLATE NO. 602

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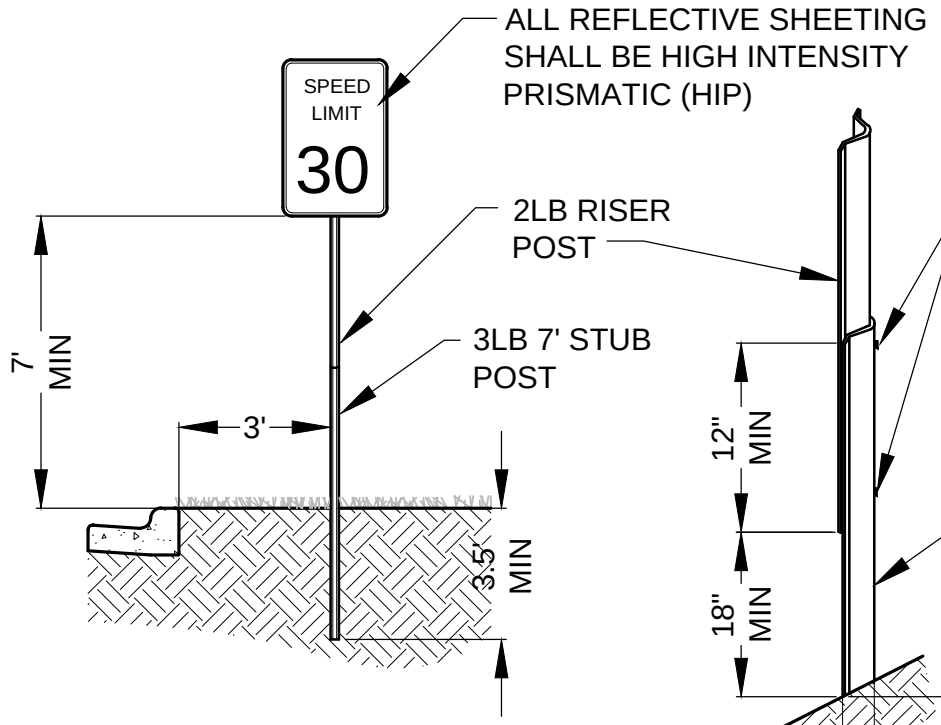
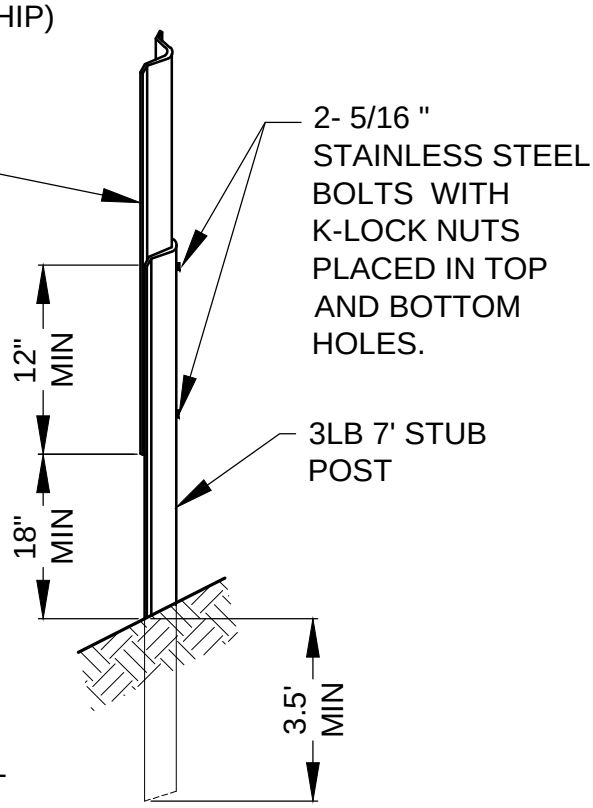
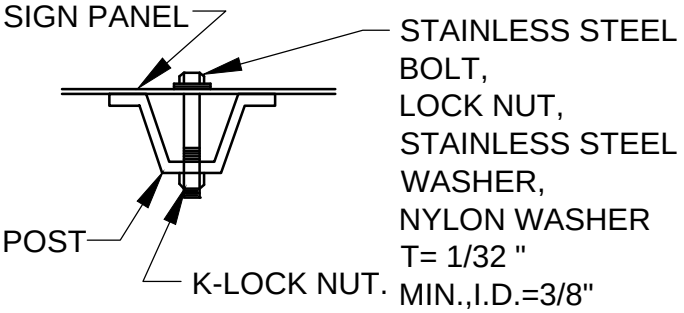


SIGN LOCATION WITH STEEL U-POST



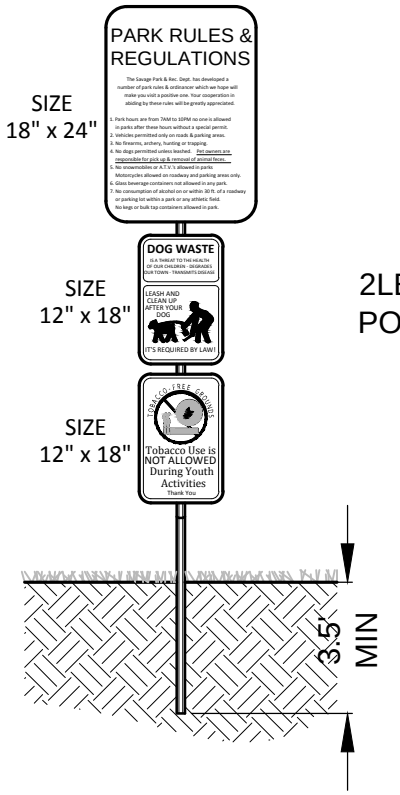
"U POST" SPLICE



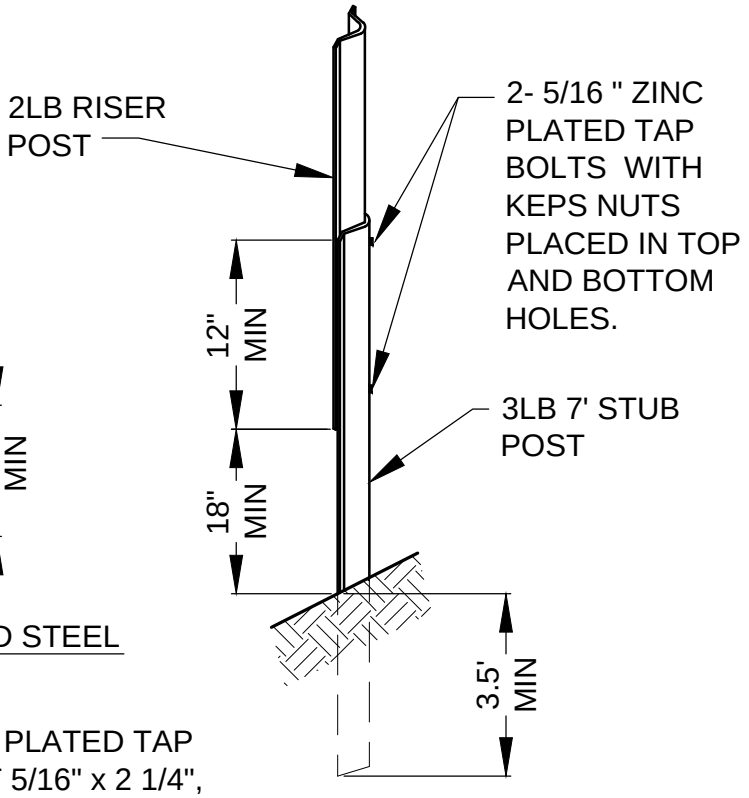
NOTES:

1. ALL STUB POSTS, RISER POSTS, STRINGERS, KNEE BRACES, AND LATERAL BRACES SHALL CONFORM TO MN/DOT 3401 AND SHALL HAVE A MINIMUM WEIGHT OF 3.0 POUNDS PER FOOT.
2. MOUNTING (PUNCHING CODE) FOR TYPE "C" SIGN PANELS SHALL BE AS INDICATED IN THE STANDARD SIGNS MANUAL UNLESS OTHERWISE SPECIFIED.
3. ALL RISER (VERTICAL) "U POSTS" SHALL BE SPLICED. DRIVEN STUB POSTS SHALL BE AT LEAST 7' LONG.
4. USE STAINLESS STEEL 5/16 " BOLTS, WASHERS AND K-LOCK NUTS AS SHOWN FOR ALL GROUND MOUNTED AND OVERHEAD MOUNTED SIGNS.
5. STAINLESS STEEL WASHER WITH SAME DIMENSIONS SHALL BE PROVIDED BETWEEN ALL NYLON WASHERS AND BOLT HEADS.
6. WHERE 2 OR MORE SINGLE POST SIGNS (TYPE "C") ARE MOUNTED SIDE BY SIDE, THEY SHALL BE REINFORCED LATERALLY BY AT LEAST 2 POST SECTIONS, BOLTED AT EACH POST AND LOCATED APPROXIMATELY AT THE QUARTER POINTS.
7. ALL POSTS SHALL BE GALVANIZED.
8. INSTALLATION DATE TO BE PROVIDED ON ALL SIGNS.

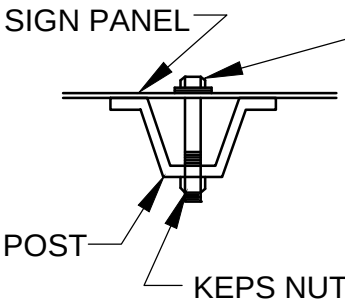
Savage	STREET SIGN	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 603



SIGN WITH GALVAINIZED STEEL U-POST



"U POST" SPLICE



ZINC PLATED TAP BOLT 5/16" x 2 1/4", KEPS NUT, STAINLESS STEEL WASHER
T= 1/32 "
MIN.,I.D.=3/8"
MAX.,O.D.=7/8".

SIZE
18" x 24"

PARK WATCH SIGN ONLY AT PARK WITH ACTIVE NEIGHBORHOOD WATCHES ADJOINING PARK

NOTES:

1. ALL STUB POSTS, RISER POSTS, STRINGERS, KNEE BRACES, AND LATERAL BRACES SHALL CONFORM TO MN/DOT 3401 AND SHALL HAVE A MINIMUM WEIGHT OF 3.0 POUNDS PER FOOT.
2. MOUNTING (PUNCHING CODE) FOR TYPE "C" SIGN PANELS SHALL BE AS INDICATED IN THE STANDARD SIGNS MANUAL UNLESS OTHERWISE SPECIFIED.
3. ALL RISER (VERTICAL) "U POSTS" SHALL BE SPLICED. DRIVEN STUB POSTS SHALL BE AT LEAST 7' LONG.
4. USE ZINC PLATED STEEL 5/16 " BOLTS, WASHERS AND KEPS NUTS AS SHOWN FOR ALL GROUND MOUNTED AND OVERHEAD MOUNTED SIGNS.
5. STAINLESS STEEL WASHER WITH SAME DIMENSIONS SHALL BE PROVIDED BETWEEN ALL BOLT HEADS.
6. ALL POSTS SHALL BE GALVANIZED.
7. INSTALLATION DATE TO BE PROVIDED ON ALL SIGNS.

Savage	PARK SIGN	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 604

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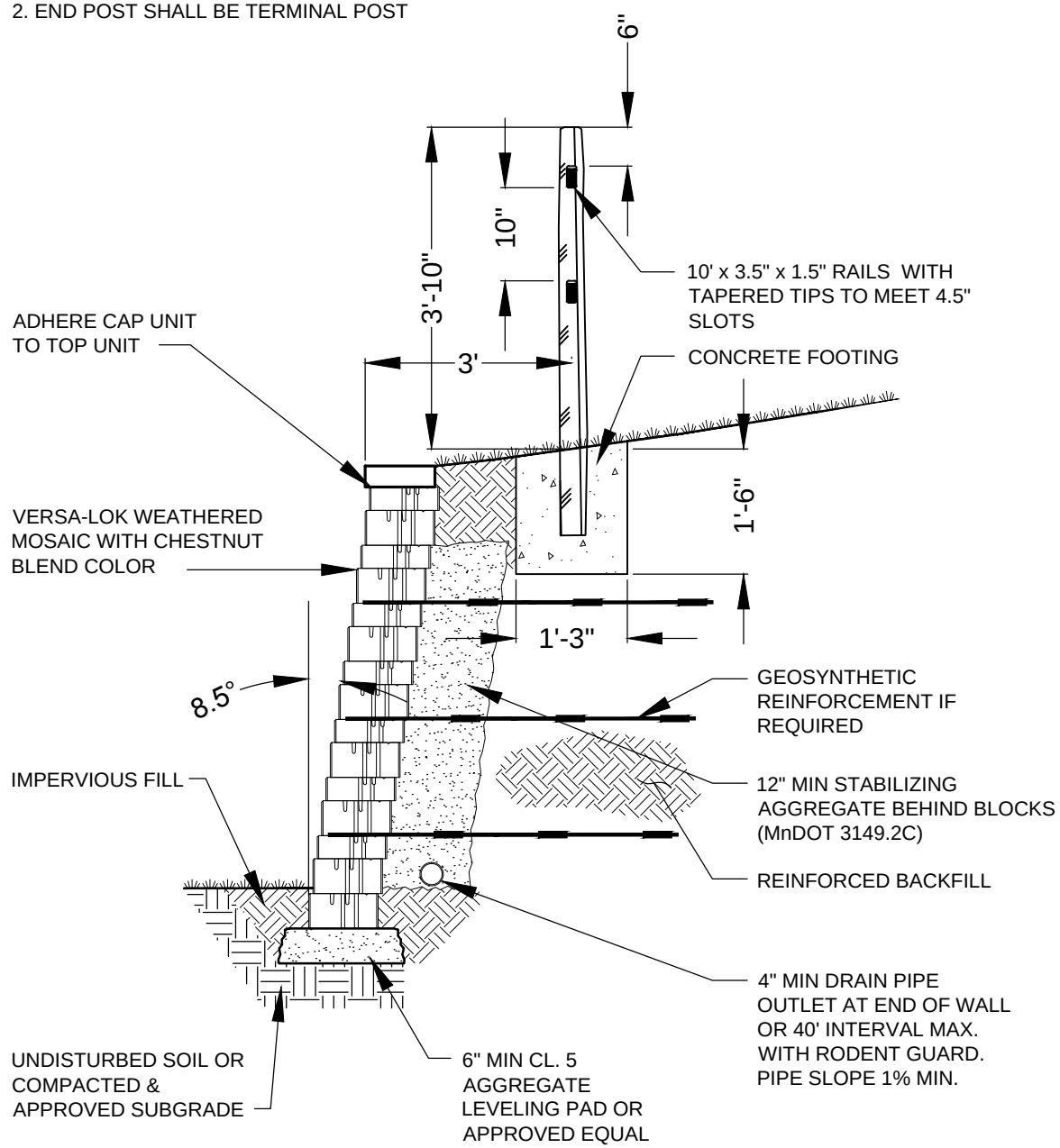
NOTES:
1. ALL WOOD FOR SPLIT RAIL FENCE TO BE CEDAR.
2. END POST SHALL BE TERMINAL POST



WALLS OVER 4' IN HEIGHT SHALL BE DESIGNED AND SIGNED BY AN ENGINEER. SPLIT RAIL FENCE OR APPROVED EQUAL SHALL BE INSTALLED ON TOP AS SHOWN

Savage	RETAINING WALL WITH SPLIT RAIL FENCE	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 605

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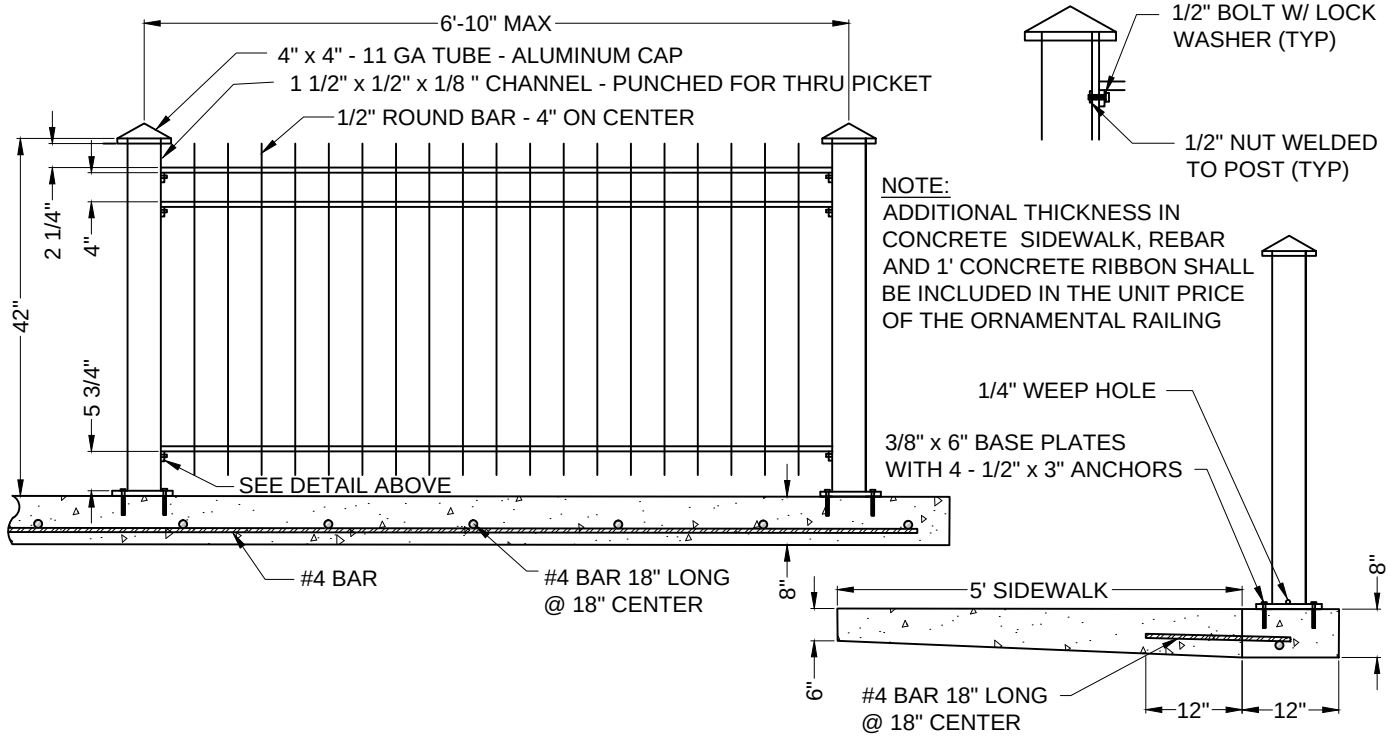
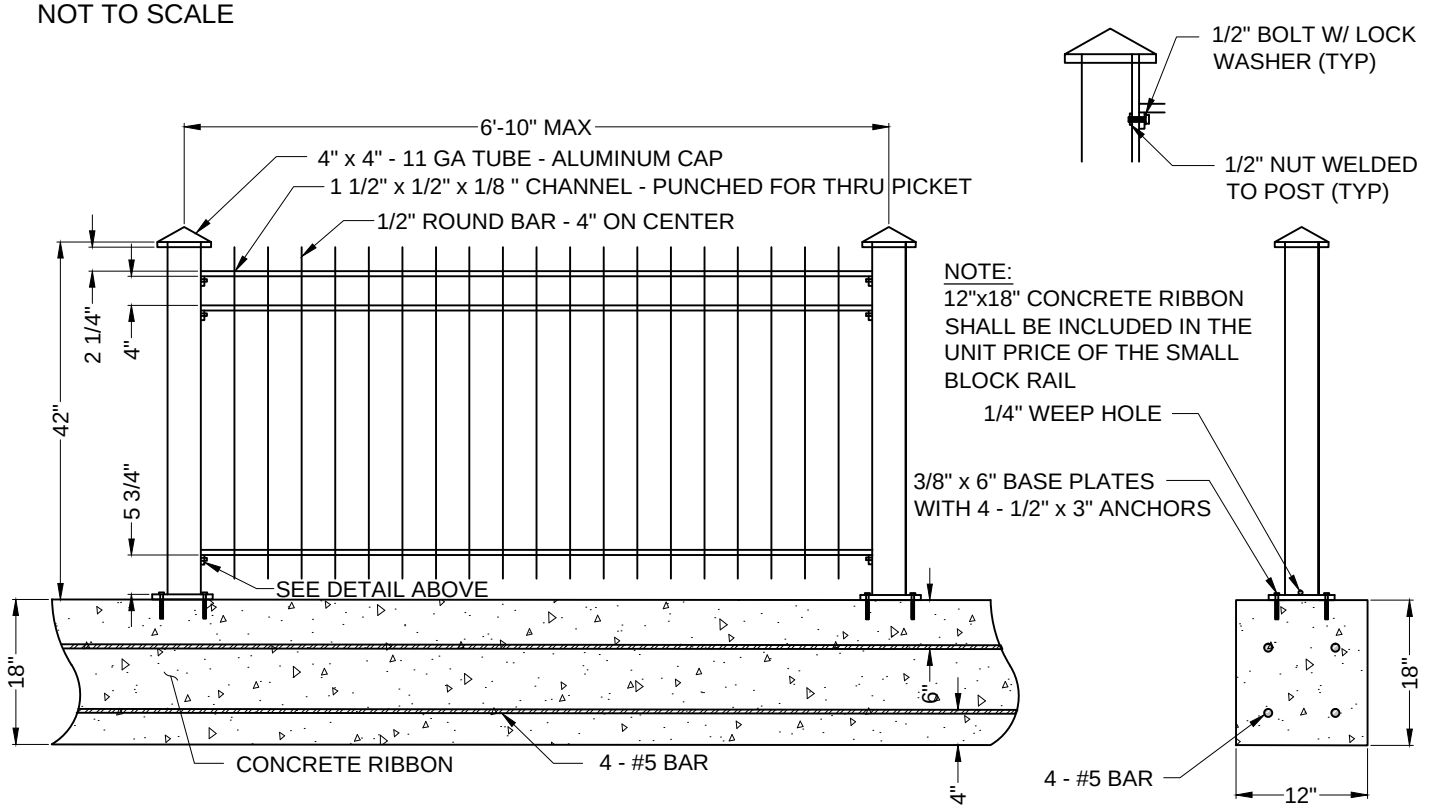


ORNAMENTAL METAL RAIL (SIDEWALK)

NOT TO SCALE



ORNAMENTAL METAL RAIL (CONCRETE RIBBON)

NOT TO SCALE

NOTE: ALL REINFORCEMENT BARS SHALL BE EPOXY COATED

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Savage	ORNAMENTAL METAL RAIL	CITY OF SAVAGE
	REVISION DATE: 02/2015	STANDARD PLATE NO. 606