



CITY OF DIXON

**ENGINEERING STANDARDS
&
SPECIFICATIONS**

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PREFACE TO
CITY OF DIXON
ENGINEERING STANDARDS & SPECIFICATIONS

This document is prepared by the City of Dixon for use in connection with the design, bidding, and construction of various types of public works projects by or for the City. The City of Dixon Engineering Standards & Specifications consist of the following sections:

- Section 1: Engineering Design Standards
- Section 2: Construction Specifications
- Section 3: Construction Details
- Section 4: General Provisions

The Engineering Standards & Specifications shall apply to all materials and construction methods for all construction work both under the direct inspection of the City of Dixon for contracts awarded by public entities and administered and inspected by the City of Dixon, and for those contracts under indirect inspection awarded by other parties for future dedication or incorporation into the City's facilities, and for construction of private improvements within public rights-of-way or easements.

The General Provisions are intended to be used by the City in connection with solicitation of bids for, the award of, and the administration by the City of public works contracts which are subject to the provisions of Section 20160 of the Public Contract Code. The individual sections and paragraphs of the General Provisions shall not apply to any other form of agreement to which the City is a party unless said section or paragraph is expressly incorporated into and made a part of that agreement.

The Construction Specifications, Construction Details, and all portions of the General Provisions which place any duty or responsibility upon personnel or agencies of the City of Dixon or other public entity, are also intended for use in those contracts entered into by public entities and administered by the City of Dixon.

Any use of the City of Dixon Engineering Standards & Specifications by any other person, persons, or entity shall not create or imply the assumption of any liability or responsibility by the City of Dixon or any public entity authorized to use these General Provisions.

Copies of the City of Dixon Engineering Standards & Specifications may be obtained at the following location:

City of Dixon City Engineer/ Public Works Department
171 South Fifth Street
Dixon, CA 95620
(707) 678-7030

PRICE: \$35.00

There is an additional charge of \$7.00 per copy for mail orders to cover postage and mailing material.

Approved and Adopted by the City Council of the City of Dixon on June 13, 2000 by
Resolution No. 00-87

Amended on February 27, 2001 by Resolution No. 01-40
Amended on March 25, 2003 by Resolution No. 03-55
Amended on November 23, 2004 by Resolution No. 04-248
Amended on February 8, 2005 by Resolution No. 05-027
Amended on April 24, 2007 by Resolution No. 07-064
Amended on November 24, 2009 by Resolution No. 09-191
Amended on August 26, 2014 by Resolution No. 14-120
Amended on March 15, 2022 by Resolution No. 22-052

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ENGINEERING DESIGN STANDARDS

SECTION 1 – GENERAL

DSI-01. PURPOSE: These design standards are a guide for development of public facilities with the City of Dixon. They are intended to assure equitable appreciation of ordinances, rules, and regulations.

These are minimum standards and may be modified by the City at any time these criteria or methods do not appear to be applicable or as new techniques are developed. Minor modifications may be allowed for sound engineering reasons, but the burden of proof will be on the Design Engineer. The decision of the City Engineer shall be final in all cases.

Any situations not included in these standards shall be designed in accordance with acceptable engineering practice and as approved by the City Engineer. Specifically, the following design manuals shall be used, in order of precedence:

1. Caltrans Highway Design Manual, 2018 edition
2. Manual on Uniform Traffic Control Devices, MUTCD, with California Supplement, latest edition
3. State of California Standard Plans for construction of local streets and roads, latest edition
4. State of California Standards Specifications for construction of local street and roads, latest edition
5. A policy on geometric design of highways and streets, AASHTO, latest edition

These design standards are necessary in order to provide for coordinated development of required public facilities to be used by and for the protection of the public.

DSI-02. DEFINITIONS: In these standards, the intent and meaning of the terms that are used shall be as defined in Section G-1 of the City General Provisions.

DSI-03. PLAN APPROVAL: No plans will be approved nor construction authorized until such time as the City Engineer signifies approval by signing the set of improvement plans or dimension sketch. The City Engineer will sign the tracings in the space provided, after the Design Engineer has signed the plans, all the appropriate City fees have been paid, and all required bonds posted. The City Engineer's approval is valid for a period of 12 months. Should work not commence within the 12-month period, the plans shall be resubmitted for reapproval.

DSI-04. CONFLICTS, ERRORS, AND OMISSIONS: Excepted from approval are any features of the plans that are contrary to, in conflict with, or do not conform to any Federal Law, California State Law, City Code, conditions of approval, or generally accepted good engineering practice, in keeping with the standards of the profession, even though such errors, omissions or conflicts may have been overlooked in the City Engineer review of the plans.

DSI-05. EXISTING UTILITIES: All existing utilities are to be shown on the plans. In addition, the Design Engineer shall submit prints of the preliminary and approved plans to the utility companies involved. This is necessary for the utility companies to properly plan their relocation projects and needed additional facilities. Copies of the transmittal letters to the utility companies shall be provided to the City Engineer. The transmittal letters shall indicate all conflicts which require relocation.

If there are required alterations or revisions to the improvement plans as submitted that may affect the utility design, the Design Engineer shall resubmit the preliminary plans to each of the utility companies.

The Design Engineer is responsible for obtaining written approval of the plans from the utilities and for delivering the approval letters to the City of Dixon.

In addition, the following note shall appear on the street light plan if no approval letters are received from the utilities before the City Engineer signs the improvement plans:

“No approval of street subgrade until all the utility letters are received by the City of Dixon.”

DSI-06. OTHER AGENCY NOTIFICATIONS: The Design Engineer is responsible for obtaining the approval and necessary permits of governmental or municipal agencies when their facilities are involved.

ENGINEERING DESIGN STANDARDS

SECTION 2 – CONSTRUCTION PLANS PREPARATION, SUBMITTAL, AND PROCESSING

DS2-01. GENERAL: Complete plans and specifications for all proposed improvements including proposed streets, bikeways, grading, erosion control, drainage facilities, sewerage, street lighting, water distribution systems, landscaping and any necessary dedications and easements shall be submitted to the City of Dixon City Engineer and must receive the required approval by the City Engineer prior to the beginning of construction of any portion of such improvements within the public right-of-way. Such plans shall be prepared by a California Registered Civil Engineer in accordance with the provisions of "Civil Engineer's Act" Chapter 7, Division 3 of the Business and Professions Code, relating to the practice of Civil Engineering.

DS2-02. PREPARATION OF MAPS: Final Maps and Parcel Maps shall be prepared in conformance with the current Subdivision Map Act, the City of Dixon Subdivision Ordinance, and as follows:

- A. DIMENSIONS:** Maps shall be clearly and legibly drawn on 26 inch by 18 inch sheets with a 1-inch margin on all sides.
- B. SCALE:** The scale of the map shall be 1 inch equals 50 feet or 100 feet and enough sheets shall be used to accomplish this end. A graphical scale not less than 3 inches in length shall be shown in addition to numerical scale.
- C. FORM:** The statement sheet shall be drafted so that the statements (See Figures 2-1A thru 2-1C as applicable) will appear in the form and location as shown in Figure 2-2. The statements shall be appropriately completed and signed in the following order:
 - 1. Owner
 - 2. Notary Public
 - 3. Trustee (if applicable)
 - 4. Trustee's Notary
 - 5. Engineer (or surveyor)
 - a. Community Development Director
 - b. City Engineer
 - c. Solano Irrigation District (if applicable)
 - d. City Clerk
 - 6. Tax Collector
 - 7. County Recorder

DS2-03. PREPARATION OF IMPROVEMENT PLANS:

- A. DIMENSIONS:** Construction plans shall be clearly and legibly drawn on 36 inch by 24 inch sheets with a 1-1/2 inch clear margin on the left edge and 1/2 inch margins on all other edges.

B. **SCALE:** Horizontal scale shall be 1" = 40'; vertical scale shall be 1" = 4' or as approved. Numeric and graphic scale shall appear on each sheet.

C. **FORM:**

1. Title Sheet (See Figure 2-3)
 - a. Name and number of subdivision or, for CIP projects, the project name and location.
 - b. Plan view showing the entire street right-of-way layout (Scale: 1" = 100'), proposed water and sewer mains, storm drainage system, lot numbers and other miscellaneous improvements to be installed.
 - c. Index of Sheets.
 - d. Complete Legend. (See Figures 2-4A and 2-4B)
 - e. Vicinity Map with North Arrow.
 - f. Title Block - shall conform to engineering standards located across the bottom edge of the sheet with the sheet number located in the lower right hand corner. This is typical of each and every sheet.
 - g. Temporary and permanent bench marks including their descriptions.
2. General Notes - A list of City-required general notes shall be shown for all development plans (See Pages DS2.15 thru 2.24).
3. Detail Sheet - Project specific construction details shall be shown including typical street sections.
4. Street Plan and Profile Sheets
 - a. Plan view of each street to be improved shall be shown on separate sheets indicating existing improvements, proposed improvements and future improvements, if known. Improvement plans shall include the following items where applicable:

Streets & Sidewalks	Sewer Mains	Water mains & valves	Streetlights
Curb & Gutter	Storm drain lines	Water service laterals	Pull boxes & conduit
Driveways	Service laterals	Fire hydrants	Existing signs, trees, etc.
Street signs	Sampling stations	Survey stationing	Proposed lot numbers
Monuments	Manholes	Joint trenches	SID Irrigation lines
Fences & barricades	Drainage inlets	PG&E service points	

Survey stationing shall read from left to right with the north arrow pointing either to the top or right edge of the sheet. Stationing shall be a continuation of existing improvements where possible.

- b. Profile view of each street shall be shown immediately below its plan view. The profile shall include existing grade lines, sewer mains, storm drains, water mains, public utility mains, all utility crossings, and top of curb. Elevations shall be shown at top of curb at grade break points, manhole and catch basin inverts, and water main crossings with other utilities.
- c. Draftsmanship: All line work must be clean, sharp and heavy. Letters and numerals must be 1/8" minimum height, well formed and sharp. Numerals showing profile elevations shall not be bisected by station grid lines. Mechanically generated lettering may be 1/10" minimum height.
- d. Right-of-way: Right-of-way lines, the boundaries of lots fronting on the street, drainage easements, utility easements, landscape easements, section lines and corners, land grant lines and temporary construction easements,

both existing and proposed, shall be shown on the plans. All right-of-way and easement lines shall be properly dimensioned.

- e. Topography: All pertinent topographic features shall be shown, such as street lines, medians, driveways (on both sides of the street when within 40 feet of the median ending), curbs, sidewalks, shoulders, location and size of storm and sanitary sewer lines, high water and frequent inundation levels, water lines, gas lines, telephone conduits, other underground utilities, existing structures, houses, trees (6" diameter and larger) and other foliage, traffic signals, streetlights and pullboxes, underground electrical conduits, drainage ditches, utility poles, fire hydrants, retaining walls, masonry structures, and all other features of the area which may affect the design requirements for the area. When a potential utility conflict exists, "as built" elevations of the utilities shall be verified by the Design Engineer.
 - f. Contours and Elevations: Existing contours or supporting elevations shall be shown on all plans.
 - g. Profiles: The plans shall show the existing profile of all roadway centerline, edges of pavement, curb and gutter flow lines, drainage ditches, storm and sanitary sewers. All profiles of proposed improvements shall state centerline elevations at 50 foot intervals and rate of grades, vertical curves and other vertical alignment data, and shall show all existing utilities. Any vertical curve shall set elevations at 25 foot intervals.
The plans shall show the existing ground profile for a minimum distance of 200 feet beyond temporary street endings to facilitate setting proper vertical alignment within the proposed improvement limits. The 200-foot minimum shall be increased when requested by the City Engineer.
 - h. Stationing and Orientation: All plan and profiles shall be coordinated with City stationing. The Design Engineer shall contact the City for such stationing.
The stationing on plan and profile shall read from left to right. Stationing shall increase from south to north or from west to east. Plans shall be so arranged that the north arrow points toward the top right edge of the sheet unless approved otherwise by the City Engineer.
 - i. Bench Marks: The bench marks and datum shall be clearly delineated on the plans both as to location, description and elevations. If the proposed improvements are over 1,000' from any existing bench mark, a new bench mark shall be established and tied into the City system.
 - j. Typical Sections: A typical section for each type of facility within the improvement, setting out the structural features, shall be a part of the plans.
 - k. Cross Sections: Cross sections shall be required where an existing street is being widened and on all City projects. Cross sections shall be included for all changes in street right-of-way dimensions. The cross sections shall show all existing and proposed elevations, points of conform, and all dimensions and slopes. The sections shall be drawn at a scale that will allow a detailed review of the design.
5. Water Plan: See Section DS5 for requirements.
 6. Grading Plan: Grading plan shall include building pad elevations, individual lot drainage pattern, adjacent land drainage, driveway locations, fencing, existing contours at 1-foot intervals, or spot shots at 50-foot intervals and existing trees, wells, ditches and other landmarks important in the construction of the improvements. In addition, adjacent lot gradings shall be shown. The site development plans shall conform to F.H.A. Standards. See Section DS12, "Subdivision Grading Plan," for requirements.
 7. Erosion Control Plan: Erosion Control Plan shall follow the guidelines of the Stormwater Pollution Prevention Plan (SWPPP). The plan shall include site

- maps(s), and identification of construction/contractor activities describing measures for providing erosion and sediment control. The SWPPP shall be submitted with the first improvement plan submittal.
8. Streetlight Plan: See Section DS7, “Street Light Design,” for requirements.
 9. Signing and Striping Plan: The proposed Public Improvement Plans shall include a plan sheet which will show the existing and proposed signing and striping of streets within the project area. This plan can be incorporated into the Street Light Plan and shall be titled “Street Light and Striping Plan.” See Section DS9, “Signing and Striping of Streets,” for requirements.
 10. Detour Plan: When the City Engineer requires a detour plan, all signs, striping, flag persons, and traffic control devices shall conform to the latest California Department of Transportation standards.

DS2-04. PROCEDURE FOR IMPROVEMENT PLANS:

A. IMPROVEMENT PLAN SUBMITTAL

NOTE: Improvement Plans shall be completed and approved prior to acceptance of a Final or Parcel map for processing as per the City of Dixon Subdivision Ordinance. A Final or Parcel map shall not be deemed to be submitted for approval until the approval of the Improvement Plans by the City Engineer.

No work shall be commenced by the Contractor on any public improvement until the City Engineer has approved the Improvement Plans.

Upon submittal of Improvement Plans, the City Engineer will determine the adequacy of the support data, and will notify the Design Engineer if additional information is required prior to beginning the Improvement Plan check. If the Plans submitted are not prepared in accordance with these Engineering Design Standards and Construction Specifications or not in accordance with acceptable standards of the profession, the City Engineer may return them unmarked and unapproved.

In the event any of the required items are not submitted, or if a significant number of the items are incomplete, the City Engineer may determine that the project is not suitable for review.

The initial submittal of improvement plans to the Engineering shall consist of the following items:

1. Electronic set of plans, complete and in accordance with these Engineering
2. Design Standards and Construction Specifications, along with any required specifications.
3. Electronic set of landscaping plans, if applicable.
4. Submittals required for Storm Drain Design: (Two copies of each)
 - a. Tributary Area Map
 - b. Runoff Calculations
 - c. Grading Plan
 - d. Storage Volume Calculations for Street and Detention Basin Storage (if applicable)
 - e. Hydraulic Grade Line Elevations for 5-year, 10-year 100-year storms at each inlet.
5. Stormwater Pollution Prevention Plan (SWPPP)
6. Sewer Analysis and Map. See Section DS6-03(F) for additional information.

7. Electronic copy of the soils report which includes establishment of the soils "R" value and recommendations for street section design based on traffic index shown in Section 3, Street Design.
8. Electronic copy of approved tentative map and/or conditions of approval.
9. Electronic copy of the approved environmental document, including environmental impact report mitigation requirements if applicable.
10. Electronic copy of legal description of proposed easements and diagram showing location (if not covered by a map).
11. Cost estimate for public improvements.
12. Payment of fees
13. Plan check deposit
14. The name, address, and telephone number of the developer.
15. Preliminary utility letters.
16. Joint Trench Plan (if applicable).

Should there be required revisions to the plans as submitted, the City Engineer will return comments with necessary revisions to be made and/or one copy with the corrections marked or indicated thereon for the Design Engineer to resubmit.

- B. IMPROVEMENT PLAN RESUBMITTAL:** Plans being resubmitted shall consist of 7 complete sets of plans along with original redlined plan check set. Additional sets may be required by the City Engineer.

At the discretion of the City Engineer, plan check resubmittal may be submitted electronically along with an electronic copy of the redlined plan check set. Plans being resubmitted that contain revisions or alterations other than those required by the City Engineer on previously corrected plans shall require the Design Engineer to bring those revisions or alterations to the attention of the City Engineer.

If the Design Engineer has not made all the corrections, a list shall be submitted of uncorrected items, stating why the corrections have not been made. This process will continue until the plans are ready for approval.

NOTE: In special circumstances, and with approval by the City Engineer, a grading permit may be issued prior to improvement plan final approval and signing. Developer is proceeding at their own risk and is responsible for any changes required by the signed improvement plans.

- C. IMPROVEMENT PLAN APPROVAL:** When the plans are deemed ready for approval, the developer shall enter into an improvement agreement, pay the appropriate fees and post required bonds. At that point, a mylar or sepia set of plans will be forwarded to the City Engineer for signature. Plans will not be considered approved until signed by the City Engineer or his representative. After approval by the City Engineer, the Design Engineer will furnish the City three sets of plans prior to starting construction.

When the Improvement Plans are accepted and signed by the City, the final utility letter shall be sent to each of the utility companies.

If no approval letters have been received from the utilities before the Improvement Plans are signed by the City Engineer, the following note shall appear on the streetlight plans:

“No approval of street subgrade until all the utility letters are received by the City of Dixon.”

Signed Improvement Plans are released to the developer and construction may begin.

A pre-construction meeting may be scheduled if required by the City Engineer.

D. IMPROVEMENT PLAN REVISIONS: Should changes become necessary during construction, the Design Engineer shall first obtain the consent of the City

Engineer and shall then resubmit the title sheet and the plan sheets affected for approval. The changes on the plans shall be made in the following manner:

1. The original proposal shall not be eradicated from the plans but shall be lined out. In the event that eradicating the original proposal is necessary to maintain clarity of the plans, approval must first be obtained from the City Engineer.
2. The changes shall be clearly shown on the plans with the changes and approval noted on a revision signature block.
3. The changes shall be identified by the revision number in a triangle delineated on the plans adjacent to the change and on the revision signature block. Very minor changes which do not affect the basic design or contract may be made upon the authorization of the City Engineer. The City Engineer may order changes in the plans in order to complete the necessary facilities. Changes in the plans ordered by the City Engineer shall conform to all of the above.
4. For City projects, the Design Engineer must submit the design change in writing via a City Change Order to the City Engineer for approval.

E. IMPROVEMENT PLAN RECORD DRAWINGS: Upon completion of the improvements and prior to acceptance or sign-off by the City as applicable, the Design Engineer is to prepare and submit one set of as-built record drawing mylars (double matte, 3 mil, sepia toned), two sets of blue line as-built record drawing prints, and disk copies of plan computer files in AutoCAD, Adobe Acrobat PDF and TIFF image files at 300 DPI format to the City. Contact the City regarding AutoCAD release format required for the plan file.

DS2-05. REVIEW AND APPROVAL PROCEDURE FOR FINAL MAPS, PARCEL MAPS:

A. Prior to preparation of the Final Map or Parcel Map, Improvement Plans shall be approved by the City Engineer as per the City of Dixon Subdivision Ordinance. A Final Map or Parcel Map shall not be deemed to be submitted for approval until the approval of the Improvement Plans by the City Engineer. If the Map submitted is not prepared in accordance with these Design Standards or not in accordance with acceptable Standards of the profession, the City Engineer may return them unmarked or unapproved. In the event any of the required items are not submitted, or if a significant number of the required items are incomplete, the City Engineer may determine that the Map is not acceptable for review.

B. The Design Engineer prepares and submits Final Map or Parcel Map, to the City Engineer.

- C. The following items must be presented with the original submittal:
1. All information required by California Subdivision Map Act, City Subdivision Ordinance, and Engineering Design Standards and Construction Specifications.
 2. Final Map or Parcel Map Application including:
 - a. Electronic copy of the Final or Parcel Map.
 - b. One (1) 8-1/2"x11" reproducible copy of map.
 - c. Electronic copy of the Vesting Deed, Preliminary Title Report (current within last 30 days), copies of deeds referenced.
 - d. Electronic copy of the closure calculations with parcel acreage.
 - e. Electronic copy of Tentative Maps with conditions of approval.
 3. Payment of fees.
- D. City checks data in Step B and returns to Design Engineer for changes and/or corrections. Improvement Agreement is prepared and sent to Developer for review. Developer submits to City a copy of the developer's insurance policy for approval.
- E. Design Engineer makes all changes and/or corrections and submits corrected Final Map. Developer returns Agreement with any comments or with a letter stating the Agreement is acceptable as is.
- F. Steps "C" and "D" are repeated until Map and Agreement are acceptable to the City.
- G. Developer delivers executed agreement, and all items required by said agreement (i.e., fees, deeds, etc.) to the City Engineer. For Final Maps, this submittal shall be at least fourteen (14) days prior to desired date for City Council action on the Final Map and Improvement Agreement.
- H. Upon request by the City, Design Engineer submits signed originals and necessary copies of the Map for City Council approval and electronic copy of Map files in AutoCAD, Adobe Acrobat PDF and TIFF image files at 300 DPI format. Contact the City regarding the AutoCAD release format required for the Map files.
- I. City Engineer signs the Map, then submits the Map to the City Clerk for signature.
- J. City Clerk and City Manager sign the Improvement Agreements and City Clerk may record Map and Agreement. Developer's title company may be required to pick up the Map and Improvement Agreement and have them recorded at the County Recorder's Office.

TYPICAL MAP STATEMENTS

(Standard forms for Construction Plans-Preparation, Submittal and Processing)

OWNER'S TRUSTEE STATEMENT

[I]WE, THE UNDERSIGNED, DO HEREBY CONSENT TO THE PREPARATION AND FILING OF THIS MAP AND WE DO HEREBY CERTIFY THAT IN ORDER TO PASS CLEAR TITLE TO THE LAND DELINEATED WITHIN THE EXTERIOR BOUNDARY OF THIS _____ MAP THE CONSENT OF NO OTHER PERSONS ARE NECESSARY.

[I]WE DO HEREBY IRREVOCABLY OFFER FOR DEDICATION _____ TO THE PUBLIC AS AND FOR PUBLIC THOROUGHFARES, ALL STREETS, DRIVES, COURTS AND WAYS, AS SHOWN THEREON; AND WE ALSO HEREBY IRREVOCABLY OFFER FOR DEDICATION FOR SPECIFIC PURPOSES THE FOLLOWING RIGHTS-OF-WAY AND EASEMENTS FOR DRAINAGE, LANDSCAPING, WATER, SEWER, GAS PIPES, POWER, LIGHTS, TELEVISION CABLES AND TELEPHONE CABLES; AND ANY AND ALL OTHER UTILITY SERVICES TOGETHER WITH ANY AND ALL NECESSARY APPURTENANCES IN EACH CASE, IN, OVER AND ACROSS THOSE STRIPS OF LAND SHOWN OR DESIGNATED AS PUBLIC SERVICE EASEMENTS (P.S.E.)]

[I]WE DO HEREBY RELINQUISH ALL ABUTTERS RIGHTS TO INGRESS AND EGRESS AS DELINEATED HEREON (//////) AS NON-ACCESS EASEMENTS.]

[I][WE ALSO HEREBY GRANT EXCLUSIVE RIGHT OF VEHICULAR INGRESS AND/OR EGRESS TO THE CITY OF DIXON ACROSS LOT LINES SHOWN HEREON AND DESIGNATED "NO INGRESS, EGRESS RIGHTS LINE."]
[LOT ____ IN FEE TO THE CITY OF DIXON FOR LANDSCAPING PURPOSES.]

BY: _____
(NAME OF ENTITY) (TITLE)

NOTARY'S STATEMENT

STATE OF CALIFORNIA
COUNTY OF SOLANO

ON THIS _____ DAY OF _____, 20 __, BEFORE ME, _____, A NOTARY PUBLIC IN AND FOR THE STATE OF CALIFORNIA, PERSONALLY APPEARED _____, PERSONALLY KNOWN TO ME AS TO BE THE PERSON[S] WHOSE NAME[S] IS[ARE] SUBSCRIBED TO THE WITHIN INSTRUMENT, AND ACKNOWLEDGED TO ME THAT HE[SHE][THEY] EXECUTED THE SAME IN HIS[HER][THEIR] AUTHORIZED CAPACITY, AND THAT BY HIS[HER][THEIR] SIGNATURE ON THE INSTRUMENT THE PERSON[S], OR ENTITY UPON BEHALF OF WHICH THE PERSON[S] ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL THE DAY AND YEAR FIRST ABOVE WRITTEN.

NOTARY PUBLIC
DATE: _____

COUNTY TAX COLLECTORS STATEMENT

I, _____, TAX COLLECTOR OF SOLANO COUNTY, CALIFORNIA, DO HEREBY CERTIFY THAT ACCORDING TO THE RECORDS OF THIS OFFICE THERE ARE NO LIENS AGAINST THIS SUBDIVISION OR ANY PART THEREOF FOR UNPAID STATE, COUNTY, MUNICIPAL OR LOCAL TAXES OR SPECIAL ASSESSMENTS COLLECTED AS TAXES, EXCEPT TAXES OR SPECIAL ASSESSMENTS NOT YET PAYABLE.

I ALSO CERTIFY THAT A GOOD AND SUFFICIENT BOND, TO THE BENEFIT OF THE COUNTY OF SOLANO, HAS BEEN FILED WITH THIS OFFICE IN THE SUM OF \$ _____, WHICH IS THE AMOUNT ESTIMATED BY THE ASSESSOR OF THE COUNTY OF SOLANO AS BEING A LIEN BUT NOT YET PAYABLE FOR TAXES AND SPECIAL ASSESSMENTS AGAINST THE LAND CONSTITUTING THIS SUBDIVISION; AND THAT ALL CERTIFICATIONS REQUIRED UNDER THE PROVISIONS OF SECTION 66492 AND 66493 OF THE GOVERNMENT CODE HAVE BEEN FILED. THIS CERTIFICATE VOID AFTER _____ FILE NO. _____.

DATED _____

COUNTY TAX COLLECTOR
COUNTY OF SOLANO, CALIFORNIA
BY: _____
DEPUTY

COUNTY RECORDER'S STATEMENT

FILED AT THE REQUEST OF _____ AT _____: _____ M ON THE _____ OF _____
_____, 20____, IN THE OFFICE OF THE COUNTY RECORDER OF SOLANO COUNTY IN BOOK _____ OF [PARCEL]
[SUBDIVISION] MAPS AT PAGE _____, AS INSTRUMENT NUMBER _____.

COUNTY RECORDER
BY: _____, DEPUTY RECORDER

CITY CLERK'S STATEMENT

I, THE UNDERSIGNED, CLERK OF THE CITY COUNCIL OF THE CITY OF DIXON, HEREBY STATE THAT THE CITY COUNCIL DID ON THE _____ DAY OF _____, 20____, APPROVE THIS _____ MAP ENTITLED _____ AND AT THAT TIME REJECTED, ON BEHALF OF THE PUBLIC, ANY REAL PROPERTY OFFERED FOR DEDICATION AS PUBLIC RIGHTS-OF-WAY OR PUBLIC SERVICE EASEMENTS IN CONFORMITY WITH THE TERMS OF THE IRREVOCABLE OFFER OF DEDICATION.

IN WITNESS WHEREOF, I HAVE HEREUNTO SET MY HAND ON THIS _____ DAY OF _____
20____.

CITY CLERK, CITY OF DIXON

SURVEYOR'S STATEMENT (FINAL MAPS ONLY)

I HEREBY STATE THAT THIS MAP OF " _____ " WAS PREPARED BY ME OR UNDER MY DIRECTION AND IS BASED UPON A FIELD SURVEY IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCE AT THE REQUEST OF _____ IN _____ 20__ AND IS TRUE AND COMPLETE AS SHOWN. I HEREBY STATE THAT THIS MAP SUBSTANTIALLY CONFORMS TO THE CONDITIONALLY APPROVED TENTATIVE MAP; THAT THE MONUMENTS (WILL BE OF THE CHARACTER AND WILL OCCUPY THE POSITIONS INDICATED) (WILL BE SET UPON THE COMPLETION OF THE REQUIRED SUBDIVISION IMPROVEMENTS ON OR BEFORE _____ 20__.) AND THAT SAID MONUMENTS WILL BE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

DATED _____ (NAME) _____ (RCE [LS] NUMBER)
EXPIRES: _____

(NOTE: SURVEYOR SHALL POST A BOND IF INTERIOR MONUMENTS ARE TO BE SET AT A LATER DATE.)

SURVEYOR'S STATEMENT (PARCEL MAPS ONLY)

THIS MAP WAS PREPARED BY ME OR UNDER MY DIRECTION [AND WAS COMPILED FROM RECORD DATA] [AND IS BASED UPON A FIELD SURVEY] IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCE AT THE REQUEST OF _____ ON _____. I HEREBY STATE THAT THIS PARCEL MAP SUBSTANTIALLY CONFORMS TO THE APPROVED OR CONDITIONALLY APPROVED TENTATIVE MAP, THAT THE MONUMENTS (WILL BE OF THE CHARACTER AND WILL OCCUPY THE POSITIONS INDICATED) (WILL BE SET UPON COMPLETION OF THE REQUIRED SUBDIVISION IMPROVEMENTS ON OR BEFORE _____ 20__), IF ANY, AND THAT ALL MONUMENTS ARE, OR WILL BE, SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

DATED _____ (NAME) _____ (RCE [LS] NUMBER)
EXPIRES: _____

(NOTE: SURVEYOR SHALL POST A BOND IF INTERIOR MONUMENTS ARE TO BE SET AT A LATER DATE.)

CITY ENGINEER'S STATEMENT (FINAL MAPS ONLY)

I, _____, DO HEREBY CERTIFY THAT I HAVE EXAMINED THIS FINAL MAP ENTITLED " _____ " AND HAVE FOUND IT TO BE SUBSTANTIALLY THE SAME AS IT APPEARED ON THE TENTATIVE MAP AND ANY APPROVED ALTERATION THEREOF. I AM SATISFIED THAT THE MAP IS TECHNICALLY CORRECT AND THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT AND OF THE ORDINANCES OF THE CITY OF DIXON HAVE BEEN COMPLIED WITH.

DATED _____ CITY ENGINEER, CITY OF DIXON
LICENSE : R.C.E. [L.S.]# _____
EXPIRES: _____

NOTE: REQUIRES R.C.E. PRIOR TO JANUARY 1, 1982 OR LICENSED SURVEYOR TO EXECUTED THIS STATEMENT.

CITY ENGINEER'S STATEMENT (PARCEL MAPS ONLY)

I, _____, DO HEREBY CERTIFY THAT I HAVE EXAMINED THIS PARCEL MAP AND FOUND IT TO BE SUBSTANTIALLY THE SAME AS THE TENTATIVE MAP AND ANY APPROVED ALTERATION THEREOF SUBMITTED TO THE PLANNING COMMISSION OF THE CITY OF DIXON; THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT AND ALL CITY ORDINANCES APPLICABLE AT THE TIME OF APPROVAL OF THE TENTATIVE MAP HAVE BEEN COMPLIED WITH; AND THAT SAID MAP IS TECHNICALLY CORRECT.

DATED _____

CITY ENGINEER, CITY OF DIXON
LICENSE : R.C.E. [L.S.]# _____
EXPIRES: _____

NOTE: REQUIRES R.C.E. PRIOR TO JANUARY 1, 1982 OR LICENSED SURVEYOR TO EXECUTED THIS STATEMENT.

COMMUNITY DEVELOPMENT DIRECTOR'S STATEMENT

I HEREBY CERTIFY THAT I HAVE EXAMINED THIS MAP AND HAVE FOUND IT TO BE SUBSTANTIALLY THE SAME AS IT APPEARED ON THE TENTATIVE MAP AND ANY APPROVED ALTERATION THEREOF AND COMPLIES WITH ALL APPLICABLE CITY ORDINANCES.

DATED _____

COMMUNITY DEVELOPMENT DIRECTOR
CITY OF DIXON

SOLANO IRRIGATION DISTRICT STATEMENT

THE SOLANO IRRIGATION DISTRICT HEREBY CONSENTS TO THE PREPARATION AND RECORDATION OF THE FINAL [PARCEL] MAP OF _____. THE CERTIFICATION DOES NOT, UNLESS OTHERWISE INDICATED IN WRITING, CONSTITUTE A STIPULATION OR AGREEMENT AS TO AN AGREED BOUNDARY, AS TO THE CORRECTNESS OF THE SURVEY DATA INVOLVED ON THIS MAP, OR PERMISSION TO OCUPY OR UTILIZE ANY INTEREST IN REAL PROPERTY POSSESSED BY THE DISTRICT. SEPARATE WRITTEN AGREEMENTS MUST BE ENTERED INTO IN REGARD TO USE OF SUCH INTERESTS IN REAL PROPERTY.

DATED _____

SECRETARY-MANAGER OR DIRECTOR
OF ENGINEERING
LICENSE: R.C.E.# _____
EXPIRES: _____

[PARCEL] [SUBDIVISION] [DEVELOPMENT] IMPROVEMENT AGREEMENT

THE [PARCEL] [SUBDIVISION] [DEVELOPMENT] IMPROVEMENT AGREEMENT WAS RECORDED ON _____, 20__, IN INSTRUMENT NO. _____, OFFICIAL RECORDS OF SOLANO COUNTY.

General Notes:

1. Approval by the City Engineer, or an authorized representative, is required prior to: (A) placing any concrete; (B) placing any aggregate base; (C) placing any asphalt concrete; and (D) backfilling trenches for pipe. Work done without such approval shall be at the Contractor's risk. Such approval shall not relieve the contractor from the responsibility of performing the work in an acceptable manner.
2. The types, locations, sizes and/or depths of existing underground utilities as shown on the improvement plans are obtained from sources of varying reliability. The Contractor is cautioned that only actual excavation will reveal the types, sizes, locations and depths of such underground utilities. The Project Engineer assumes no responsibility for the completeness or accuracy of the delineation of such underground utilities nor for the existence of other buried objects or utilities which are not shown on these plans. The Contractor is hereby notified that, prior to commencing construction, he/she is responsible for contacting the utility companies involved and requesting visual verification of the locations of their underground facilities shown on these improvement plans. The Project Engineer shall be notified by the Contractor of the scheduled time and place of such visual verification to enable said firm to have a representative present. Should a conflict become apparent, the Project Engineer will contact the parties responsible for relocation of the conflicting facility.
3. The contractor shall remove all obstructions, both above ground and underground, except as noted in Item 2 above, as necessary for the construction of the proposed improvements.
4. Where the Project Engineer, or his said representative, is to provide construction stakes, said firm will assume no responsibility whatsoever for improvements constructed therefrom unless the following procedure is observed by the Contractor: (A) the Contractor shall, through the office of the Project Engineer, request construction stakes for any particular phase of the work at least 48 hours prior to the planned use of said stakes. No request for stakes received from a contractor will be recognized unless a work order or authorization is received from that subcontractor; (B) where construction stakes are intended for use in setting concrete forms, the Contractor shall, upon completion of form setting, contact the Project Engineer to request a form check. If the grade and alignment of the forms are not approved, certain corrections will be requested prior to permitting concrete to be placed. A representative of the contractor must be present at the form check. No authorization will be given to a subcontractor.
5. Certain control points will be set by the Project Engineer, or a representative, which are critical to the construction staking of the project. These points will be designated at a pre-construction conference between representatives of the Project Engineer and the Contractor. The control points will be permanent monuments (rebar) set and clearly marked on the job site. The contractor shall not disturb the control points in any manner. If it becomes necessary to remove said control points during construction, the Contractor shall notify the engineer 48 hours in advance of said removal to allow for referencing said control points and their eventual replacement. If control points are removed or destroyed without said notification, the cost of replacement shall be deducted from the Contractor's payment and payment shall be made by owner to the Project Engineer.
6. The Contractor shall be responsible to prepare both pre and post construction corner records as required by Section 8700 (et seq.), of the State of California Professional Land Surveyor's Act for the preservation and protection of all existing survey monuments and other survey markers during construction. All such monuments or markers destroyed during construction shall be re-established at the Contractor's expense.

7. The site map is shown for general information only and is not intended to replace the detailed sheets elsewhere in this set of plans.
8. The City of Dixon is a member of the Underground Service Alert (U.S.A.) One-call program. The Contractor or any subcontractor for this contract shall notify members of
9. U.S.A. 2 working days in advance of performing any excavation work by calling the toll free number (800) 227-2600.
10. The Contractor shall expose existing sewer and drain lines for the Project Engineer to verify location and elevation prior to placement of pipe, where noted on the drawings. All costs of such excavation and backfill shall be included in the prices paid for various items of work.
11. The Contractor shall adjust all existing manholes and valve boxes within the work area to grade unless noted otherwise.
12. All materials and construction of public improvements shall conform to the latest edition of the City of Dixon Standard Specifications, unless otherwise shown on these plans or noted in the special provisions. All work shall conform to the Caltrans Standard Specifications, latest edition, except as modified herein.
13. The Contractor shall obtain the necessary encroachment permits from the City of Dixon or any other agencies having jurisdiction prior to commencing any work. Contractor shall be responsible for all Caltrans encroachment permits.
14. The Contractor shall notify the City of Dixon 48 hours prior to commencing work.
15. Contractor agrees that the Contractor shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property. This requirement shall apply continuously and not be limited to normal and City working hours. The Contractor shall defend, indemnify and hold the owner and the Project Engineer harmless from any and all liability, real or alleged, in connection with the performance of work on this project, excepting for liability arising from the sole negligence of the owner or Project Engineer.
16. Stationing is taken from centerline distances, except as noted.
17. All gravity flow pipelines to be laid uphill from the lowest point starting at the end of existing improvements.
18. Prior to requesting a final acceptance of improvements, the engineer shall set survey monuments as shown in the Construction Details.
19. Underground facilities shall be installed prior to installation of curb, gutter, sidewalk, and aggregate base.
20. Castings collars for underground utilities shall be adjusted to 3/8 inch below finish grade by the underground Contractor (after completion of paving).
21. The Contractor shall provide the Project Engineer with a record of all field changes from these plans and the Project Engineer shall supply the City with mylar "as-built" and electronic plans upon completion of the project.
22. If unusual amounts of bone, stone or artifacts are uncovered, work within 50 meters of the area shall cease immediately and a qualified archaeologist shall be consulted to develop, if necessary, mitigation measures to reduce any archaeological impact to a less than significant effect before construction resumes in the area.
23. The Contractor is to verify depth and location of all existing utility stubs prior to installation of any pipe.
24. The Contractor shall be responsible for all excavation and shoring procedures and shall conform to the latest O.S.H.A. requirements.

25. The Contractor shall maintain an ongoing dust control program, including watering of open areas and/or placing soil stabilizer, in order to conform with the latest State and County air pollution regulations.
26. The Contractor shall maintain an ongoing process of removal of all spillage and tracking of excavation material on all paved streets.
27. The Contractor shall pursue the work in a continuous and diligent manner, conforming to all pertinent safety regulations, to ensure a timely completion of the project.
28. All dimensions and distances are to face of curb, curb return, face of building, face of wall, flow line, property line, center of striping, centerline of pipe or limits of improvements.
29. The Contractor shall, at all times during construction, protect from damage existing improvements on and around the site, including, but not limited to, pavement, curb and gutter, sidewalk, landscaping, signage, storm and sanitary sewer and all utilities. The Contractor shall assume sole responsibility for the repair of any improvements (existing or proposed) damaged throughout the course of construction.
30. All quantities shown herein are approximate and used for permit and bond purposes only. They shall not be used in any way for bidding or construction. It shall be the Contractor's responsibility to conduct quantity take-offs for bidding and construction purposes.
31. Ground profile is shown along centerline unless otherwise noted.
32. Prior to work on drawings that tie into existing facilities, the Contractor shall verify elevations shown. If elevations differ from that shown on the plans, adjustments to conform will be made by the Project Engineer.
33. When a utility pole is located in the proposed pavement section, this note shall be placed near the pole to be relocated: "No excavation work will occur within the street right-of-way prior to completion of utility pole relocation."
34. Contractor shall be responsible for conducting his/her operation entirely outside of any floodplain boundaries or "no grading areas." Floodplain boundaries shall be clearly delineated in the field prior to construction.
35. Where work is being done in an off-site easement, the Contractor shall notify the property owner 48 hours prior to commencing work.

Sewer Notes Vitrified Clay Pipe (V.C.P.):

1. It shall be the Contractor's responsibility to verify all sewer lateral locations with the Project Engineer prior to construction.
2. Contractor to expose end of existing sewer lines for surveyors to verify location and elevation prior to placement of pipe.
3. All sewer services shall have 5'-0" to 5'-6" of cover at the property line and 4'-0" cover at storm drain crossings. Water tight plugs shall be installed at the end of laterals and mains to be extended in the future. Installation shall be approved by the City prior to backfill.
4. Any sewer pipe having less than 20" of cover measured at the bell within the street before the addition of rock base shall be ductile iron pipe. All other pipe shall be V.C.P. conforming to A.S.T.M. C-700.
5. Cleanouts shall be installed 18" to 24" from the back edge of walk for all sewer service laterals. Services shall be extended 10 feet beyond the back of sidewalk. The cleanout shall have a screw tight plug with a box and lid.
6. The Contractor shall place an "S" in the wet concrete curb top at sewer lateral locations.
7. Use V.C.P. channel sections in all sewer transition manholes.
8. All sewer services to manholes shall match invert of the inlet pipe to crown of the outlet pipe, unless otherwise noted.

9. All sewer services to manholes shall be air tested to the satisfaction of the City Engineer after aggregate base and sidewalk placement and prior to placement of asphalt concrete. Services shall be ball and flushed and TV tested. Also, not less than 11 months after acceptance and prior to expiration of the one year warranty period, sewer mains and laterals shall be ball and flushed and TV retested. Contractor shall submit DVD disk and logs to the City after implementing any repairs required of retest.
10. Any water entering the sanitary sewer system to be constructed under these plans shall not be discharged into the existing system. Plugs must be installed in existing manholes as necessary to permit pumping the new system clear of water and debris prior to acceptance. Care shall be exercised in locating plugs to avoid interrupting service connections. Mortar or bricks must be used, inflatable devices are not satisfactory.
11. All manhole risers shall be sealed between rings with "Ramneck" or similar sealing material. Joints shall be grouted inside and out.
12. During installation and backfilling, all trenches shall be free of water. All dewatering shall be the responsibility of the Contractor or owner.
13. Sewer pipe shall be extra-strength, bell and spigot, unglazed vitrified clay pipe conforming to ASTM C-700.

Sewer Notes- (SDR 26) Poly Vinyl Chloride (P.V.C.) PVC Sewer Pipe shall not be installed without written approval by the City Engineer)

1. It shall be the Contractor's responsibility to verify all sewer lateral locations with the Project Engineer prior to construction.
2. Contractor to expose end of existing sewer lines for surveyors to verify location and elevation prior to placement of pipe.
3. Any sewer pipe having less than 20" of cover measured at the bell within the street before the addition of rock base shall be ductile iron pipe. All other pipe shall be V.C.P. conforming to A.S.T.M. D3034.
4. The Contractor shall place an "S" in the wet concrete curb top at sewer lateral locations.
5. All sewer services to manholes shall match invert of the inlet pipe to crown of the outlet pipe, unless otherwise noted.
6. All sewer services to manholes shall be air tested to the satisfaction of the City Engineer after aggregate base and sidewalk placement. Services shall be TV tested. Prior to expiration of the 1 year warranty period. Sewer mains and laterals shall be TV tested.
7. Any water entering the sanitary sewer system to be constructed under these plans shall not be discharged into the existing system. Temporary plugs must be installed in existing manholes as necessary to permit pumping the new system clear of water and debris prior to acceptance. Care shall be exercised in locating plugs to avoid interrupting service connections.
8. All sewer services to manholes shall match invert of the inlet pipe to crown of the outlet pipe, unless otherwise noted.
9. For all sanitary sewer systems, at the contractor's discretion, contractor may preform preliminary low pressure air testing from SSMH to SSMH. Exceptance low air pressure testing to the satisfaction of the City Engineer and in the presence of a City Public Works Inspector shall be performed after aggregate base, curb, gutter and sidewalk placement and prior to placement of Hot Mix asphalt. Services shall be ball and flushed and TV tested. Also, not less than 11 months after acceptance and prior to expiration of the one year warranty period, sewer mains and laterals shall be ball and flushed and TV retested. Contractor shall submit electronic copy and logs to the City after implementing any repairs required of retest.

10. Any water entering the sanitary sewer system to be constructed under these plans shall not be discharged into the existing system. Plugs must be installed in existing manholes as necessary to permit pumping the new system clear of water and debris prior to acceptance. Care shall be exercised in locating plugs to avoid interrupting service connections. Mortar or bricks must be used, inflatable devices are not satisfactory.
11. All manhole risers shall be sealed between rings with “Ramneck” or similar sealing material. Joints shall be grouted inside and out.
12. During installation and backfilling, all trenches shall be free of water. All dewatering shall be the responsibility of the Contractor or owner.
13. All leakage tests shall be completed and approved after backfilling and prior to placing of permanent surfacing.
14. All sewer mains and laterals shall be cleaned and flushed, deflection tested and air tested according to City of Dixon Standard Specifications.
15. The complete job site is ready for television inspection when the following work is completed:
 - a. All sewer pipelines are installed and backfilled.
 - b. All structures are in place, all channeling is complete and pipelines are accessible from structures.
 - c. All other underground facilities, utility piping and conduits are installed.
 - d. Final street subgrading is complete and ready for asphalt concrete surfacing. Pipelines to be inspected have been preliminarily balled and flushed or cleaned with a high pressure cleaner.
 - e. Final air tests have been completed and approved. When the above items are complete, the Contractor shall notify the City in writing as to the scheduled date of the television inspection and the inspection shall be completed per the City of Dixon Standard Specifications.
16. All sewer laterals are to use ABS cleanouts.
17. All laterals and mains are to be video taped to the service cleanout.

Storm Drain Notes:

1. The Contractor shall maintain all existing drainage facilities and provide necessary erosion control measures within the construction area until the drainage improvements are in place and functioning. If requested by the City Engineer, the Contractor shall provide an erosion control plan to the City for approval.
2. Unless otherwise noted on the plans, all reinforced concrete pipe (RCP) shall be A.S.T.M. C76 Class III. Cast-in-place non-reinforced concrete pipe (CIPP) shall conform with Caltrans Standard Specifications Section 63 with the following additional requirements: (1) concrete shall be 3,500 psi. minimum 28 day compressive strength; (2) portland cement shall be Caltrans Type II modified; and (3) backfill shall comply with the project specifications.
3. Install weak concrete plug at all storm drain stubs.
4. Manhole barrel sections to be grouted inside and outside.

Water System Notes:

1. All materials and installation of the City of Dixon water distribution system shall be in accordance with the City’s Engineering Standards and Specifications, latest revisions.
2. The Contractor shall be responsible for locating and verifying all existing utilities.
3. Water mains shall be PVC C-900 Class 150 and shall be laid in separate trenches with a minimum horizontal separation of 10 feet and a minimum vertical separation of 1 foot.

4. All sectionalizing valves shall be butterfly valves and conform to the applicable provisions of AWWA C-504. All butterfly valves shall be flanged (short body) and not of the wafer type, with a pressure rating equivalent to that of the pipeline. Refer to City standards for coating requirements.
5. Contractor shall use PVC pipe for valve box depth extensions.
6. The Contractor shall place a "W" in the wet concrete curb top for water service locations.
7. Contractor shall notify the City of Dixon at (707)678-7030, 48 hours prior to the inspection of the water system.
8. Provide five copies of shop and fabrication drawings to the City of Dixon for review and approval.

Grading Notes:

1. Grading shall include all labor, materials and equipment necessary to construct grades as shown on the grading plan. No additional compensation will be allowed for the disposal of excess excavation placed at the direction of the Project Engineer in advance of any changes deemed necessary to obtain a balanced grading program to meet minimum standards. Minimum compaction outside the street right-of-way shall be 90 percent.
2. All grading shall be completed in accordance with the recommendations of the preliminary soils report.

Erosion and Sedimentation Control Notes: Notes shall be on the Erosion Control Plan (or on the Grading Plan if no separate Erosion Control Plan), addressing the following. All plans shall be in compliance with the City of Dixon's approved NPDES permit and annual Best Management Practice (BMP) listing. For additional information contact the City Engineer.

1. Erosion and sediment control measures shall be effective for the duration of control activity.
2. No storm runoff water shall be allowed to drain directly into the existing underground storm system before the on-site storm drain system is installed.
3. As soon as practical after the new on-site system is installed, the catch basins shall be installed and straw bales or approved screens shall be placed around the catch basins, as shown on City Standard Details. The Contractor shall have an option to install prefabricated frames with filter fabric attached to the front of the drain inlet and extended 12 inches on each side of the drain inlet opening. Frame shall be approved by the City Engineer and shall fit the opening with less than one-quarter inch gap at any one point.
4. Should the proposed on-site storm system not be installed by October 15, temporary sediment basins shall be constructed around the opening of any existing storm pipes that drain the site, per City Standard Details or per a special detail shown on the plan.
5. The name, address and 24-hour telephone number of the responsible person for implementation of erosion and sedimentation control plan shall be provided.
6. A minimum of 50 linear feet by 12 feet width of drain rock, 1-1/2" diameter or larger at a minimum depth of 6", shall be installed at each site ingress/egress. This does not need be done at ingress/egress locations, which will be closed by immovable barricades during construction.
7. All erosion and sedimentation control measures shall be maintained until disturbed areas are stabilized. Changes to the Erosion and Sedimentation Control Plan shall be made to meet field conditions, but only with the approval of or at the direction of the City Engineer.
8. During the rainy season as specified in Note # 1, all sidewalk and paved areas shall be kept clear of earth material and debris. The site shall be maintained so as to minimize sediment laden runoff from entering any storm drainage system.

9. The Erosion and Sedimentation Control Plan covers only the first winter during which construction is to take place. Plans are to be resubmitted prior to September 1 of each subsequent year until the City accepts the site improvements.
10. The Contractor shall be responsible to inspect and repair all erosion control facilities at the end of each workday during the rainy season.
11. The Contractor shall be responsible to clean out sediment basins whenever the level of sediment reaches the sediment clean out level indicated on the plans.
12. The Contractor shall be responsible to protect borrow areas and/or stockpiles with appropriate erosion control measures satisfactory to the City Engineer.
13. The cleaning of paved streets, during and at the completion of construction, shall be performed with mechanical sweepers. The use of water trucks to “wash down” the street is prohibited.
14. The Erosion and Sedimentation Control Plan, details, notes and calculation if required, must be a part of the plan check submittal package for either Grading Permit only or Final Site Approval. The Design Engineer prior to plan preparation should consult the City Engineer if the need for a separate plan is in doubt.

Street Lighting Notes:

1. Street lighting luminaires shall be 120 volt high pressure sodium with semi-cutoff Type III light distribution.
2. Street lighting Contractor shall be responsible for contacting all utilities companies and/or utility districts as to location of underground facilities.
3. Street light foundation cap shall be installed square to sidewalk with 2 percent slope toward the street.

Street Notes:

1. Public safety and traffic control shall be provided in accordance with the Standard Specifications and as directed by the City Engineer. Safe vehicular and pedestrian access shall be provided at all times during construction.
2. When street work or trenching is done that would interfere with emergency response traffic, the Contractor shall obtain an Encroachment Permit from the City of Dixon, submit a traffic control plan, and notify the Fire and Police Departments 24-hours in advance of the time and location of such closures. The Contractor shall again contact these departments as soon as the street is reopened.
3. Unless specifically set forth in the Special Provisions, all marked lanes of traffic shall be open on all major streets in each direction during the peak traffic hours of 7:00 am to 8:00 am and 3:00 pm to 5:00 pm. A traffic lane shall be considered open if it is surfaced with asphalt and is at least 10 feet wide.
4. Whenever a work zone is within 10 feet of a traffic lane and there is a pavement cut, ditch or trench greater than 2 inches deep, the Contractor shall maintain continuous barricades spaced at approximately 50 foot intervals. If the cut, ditch or trench is more than 10 feet from a travel lane, the spacing may be greater, but not to exceed 200 feet.
5. Prior to ordering street name signs, the Contractor shall verify street names and street sign specifications with the City Engineer.
6. The Contractor shall remove, temporarily relocate and reinstall all public signs, private signs and mailboxes in conflict with the construction. Mail box locations shall be as approved by the United States Postal Department. Public sign relocation shall be coordinated with the sign owners and the City of Dixon.

SUBDIVISION NO., XXXX
PROJECT NAME
ENGINEER
DATE

ENGINEER'S STATEMENT
(OR)
SURVEYOR'S STATEMENT

CITY ENGINEER'S STATEMENT

SOLANO IRRIGATION DISTRICT
STATEMENT

CITY CLERK'S STATEMENT

COMMUNITY DEVELOPMENT DIRECTOR'S
STATEMENT

COUNTY TAX COLLECTOR'S STATEMENT

COUNTY RECORDER'S STATEMENT

OWNER'S STATEMENT

NOTARY PUBLIC

TRUSTEES STATEMENT

NOTARY PUBLIC



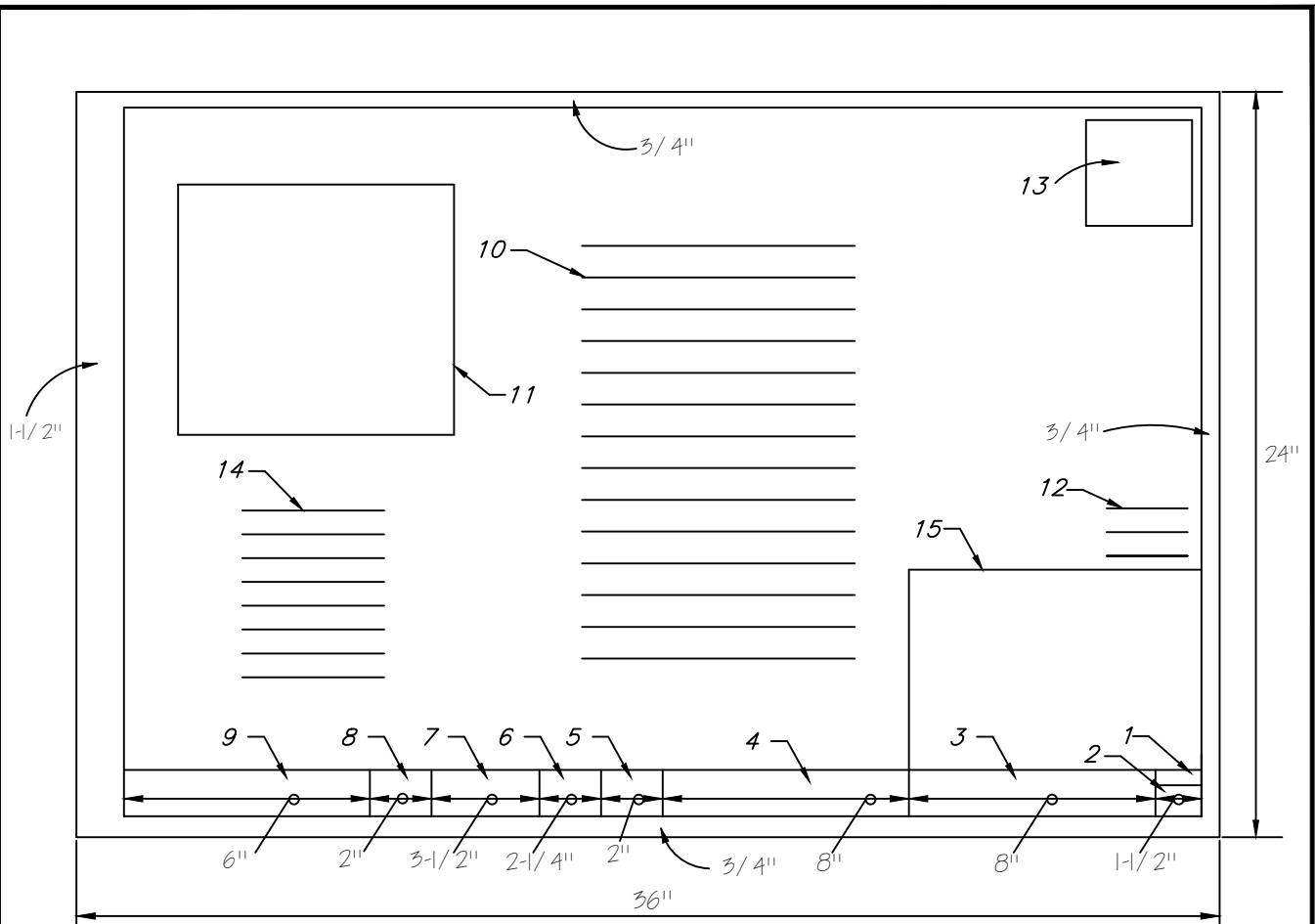
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DESIGN STANDARD



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TYPICAL STATEMENT
SHEET LAYOUT

FIG.
2-1



1. Date: Month & Year
2. Sheet No. X of X.
3. Project title and sheet description.
4. Private engineers title block including company name and emblem, address, phone no., fax no. and email address if applicable.
5. Registered civil engineer stamp with license no. and expiration date.
6. Drawing initials: computed by:, drawn by:, designed by: and proj. eng.:
7. Bench mark.
8. Drawing scale.
9. Revision block.
10. Construction notes, if space exists.
11. 100 scale index map with:

A. Tract boundaries	E. Existing improvements to be joined.
B. Lot lines	F. Index of sheets
C. All streets with names	G. North arrow and scale
D. All improvements	
12. Soils engineers name, address, date of report.
13. Location map.
14. Legend and abbreviations.
15. Approval block with signature blocks for City Engineer
 City Engineer block shall state: "Reviewed and accepted for public improvements in public rights-of-way and in public easements on private property. The City Engineer has not reviewed and is not responsible for any on-site improvements."

FIG.
2-2

TYPICAL TITLE SHEET
FOR
IMPROVEMENT PLANS




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STREET LEGEND	EXISTING	PROPOSED
SIDEWALK, VERTICAL CURB & GUTTER WITH DRIVEWAY		
SIDEWALK, LOW PROFILE CURB & GUTTER		
BACK EDGE OF WALK ELEVATION		
GRADE ELEVATION		
PROPERTY LINE		
RIGHT-OF-WAY		
EASEMENT		
STREET CENTERLINE		
SURVEY MONUMENT		
NO ACCESS		
FENCE		
TREE		
STREET LIGHT		
POLE TOP STREET LIGHT		
UTILITY POLE		
TRAFFIC SIGNAL HEAD		
PEDESTRIAN HEAD		
SERVICE PEDESTAL		
CONTROLLER		
PULL BOX		



CITY OF DIXON
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TYPICAL LEGEND

FIG.
2-3A

SEWER LEGEND	EXISTING	PROPOSED
SEWER MAIN LINE (SHOW SIZE AND DIRECTION OF FLOW)		
SERVICE WYE AND LATERAL		
MANHOLE		

WATER LEGEND		
WATER MAIN (SHOW SIZE)		
VALVE		
FIRE HYDRANT		
BLOW OFF		
CHECK VALVE		

STORM DRAIN LEGEND		
STORM DRAIN MAIN LINE (SHOW SIZE AND DIRECTION OF FLOW)		
GRATE INLET/ Type A		
CURB INLET/ Type B		
FIELD INLET		

MISCELLANEOUS		
REMOVE EXISTING IMPROVEMENTS		
PAVEMENT OVERLAY		
NEW PAVEMENT		

FIG. 2-3B	TYPICAL LEGEND		CITY OF DIXON ENGINEERING DESIGN STANDARD
		Approved: March 2022	

ENGINEERING DESIGN STANDARDS

SECTION 3 – STREET DESIGN

DS3-01. STREET CLASSIFICATIONS: For the purposes of geometric and structural design, streets shall be classified according to the following requirements. Street classifications shall be based on land use frontage and proposed cumulative traffic volumes to maintain an acceptable Level of Service.

Alleys are not permitted unless specifically approved by the City Council.

New Alley – A 23’ wide travel way/ right-of-way and 6’ Public Service Easement (PSE) each side, depressed in the center with concrete valley gutter.

Existing Alley- A 20’ wide travel way/ right-of-way, depressed in the center.

Cul-De-Sac – A street terminated with a bulb with only one public entrance/exit. See DS3-07 for additional details.

Local Street – A street servicing 100 or fewer residential lots between beginning and ending points and providing access from the residential lots to minor collectors.

Minor Collector – A residential or local commercial street servicing more than 100 residential lots, a school, a park, or a street providing access to a major collector servicing local commercial development.

Major Collector – A street servicing a commercial subdivision or a residential entrance providing access from minor collectors and arterials to other arterials. No residential frontage (driveways) will be permitted along major collector streets.

Industrial Collector - A street servicing a development of primarily industrial land uses.

Arterial – A street leading to and from an Interstate Freeway (I-80) interchange or State Highway (SR113/ North First Street) to major traffic attractions, such as the downtown business district; major residential, commercial or other industrial areas; or traversing the entire city limits.

DS3-02. STRUCTURAL SECTIONS:

The design of the pavement structural section for all streets shall be based on the Traffic Index (T.I.) as shown in Table 3-1, and the “R” Value (Resistance Value) as determined by Test Method No. California 301. If soils tests are not available, a minimum R-Value of 5 shall be used. T.I. values listed in Table 3-1 may be raised by the City Engineer if actual/projected traffic volumes and/or percentage of trucks warrant higher values.

**TABLE 3-1
TRAFFIC INDEX VALUES**

Arterial		Collector		Local	Industrial
SR-113	City	Major	Minor		
*	10 *	8 *	7	6	10 *

*A classification count shall be conducted and 20-year T.I calculated and approved by the City Engineer.

The thickness of the various structural components will be determined by the tables, charts, formulas and procedures contained in the “Caltrans Highway Design Manual,” or as directed by the City Engineer. The safety factor, as shown in the Design Manual, shall be used when designing pavement section(s) for Traffic Indices of 8 and above. The structural section for local streets shall be a minimum of 3 ½ inches of asphalt concrete and 10 inches of aggregate base over engineering fabric per Section 88 of the State Standard Specifications. A pavement structural section design based on a soils report is required for arterial, collector and industrial streets. For collectors the minimum asphalt section shall be 4 ½ inches and for arterials and industrial streets the minimum asphalt section shall be 6 inches.

The soils report shall include a map of the subject area showing proposed and existing streets, contours, locations of the test samples, “R” value results and the proposed structural pavement sections. The report shall be signed by a registered civil or geotechnical engineer and shall be bound in an 8-1/2” x 11” format.

DS3-03. PROFILE STANDARDS:

The minimum longitudinal gutter slopes on all new streets shall be 0.35 percent. The minimum longitudinal gutter slopes through all curb returns and cul-de-sac bulbs shall be 0.50 percent. The maximum longitudinal grade on new streets shall not exceed 5.0 percent unless approved by the City Engineer.

Standard cross slope on new streets shall be 2.0 percent.

When an existing street is widened, the minimum cross slope shall be 1.5 percent and the maximum cross slope shall be 4.0 percent. The cross slope of the widening shall not be less than the cross slope of the existing pavement.

When two streets intersect, neither street shall have a grade greater than 3.0 percent for a minimum distance of 40 feet measured from the curb line of the intersecting street.

Vertical Curves – The minimum vertical curve length allowable at the intersection of two grades shall be 50 feet. Vertical curves on local and collector streets may be omitted where the algebraic difference in grades does not exceed 2.0 percent. The minimum vertical curve data to be computed and shown on the plans shall consist of the point of intersection elevation, the tangent gradients, the middle ordinate and the length of curve.

Design Speed – The typical design speed shall be 30 mph for local streets, and 35 mph for minor collector streets, and 45 miles per hour for major collector streets. The City Engineer shall be consulted for design speeds of arterial streets.

DS3-04. STREET GEOMETRICS: Table 3-2 summarizes the street widths, intersection radii, and horizontal curvature radii associated with the different street classifications.

DS3-05. PARTIAL STREETS: Partial streets may be permitted by the City Engineer along the boundary of a subdivision or property of the development where the ultimate right-of-way cannot be obtained or where the entire street width cannot be constructed.

The minimum right-of-way width shall be one-half of the ultimate right-of-way, or additional width to provide a minimum of 32 feet of pavement. When partial streets are constructed, parking will be considered only adjacent to curb, gutter. All other areas shall be posted “NO PARKING.”

When only a portion of a street is constructed, the edges of the new pavement not adjacent to curb and gutter shall be protected by the use of 2”x6” redwood headers, construction grade, and 24” redwood stakes at 4 feet centers. Asphalt concrete dikes, extruded concrete curbs or 2-foot-wide compacted aggregate base shoulders shall be placed at the edge of pavement.

DS3-06. INTERSECTION SPACING: Table 3-3 summarizes minimum acceptable intersection spacing between local, collector and arterial streets.

DS3-07. CUL-DE-SAC: Local (residential) cul-de-sac streets shall be terminated with a bulb which shall have right-of-way and curb radius dimensions conforming to Figure 3-1. Commercial and industrial cul-de-sacs shall have a minimum curb radius of 50 feet. No cul-de-sac shall exceed 600 feet in length measured from the centerline of the connecting street to the radius point of the cul-de-sac.

DS3-08. ELBOW INTERSECTION: Right angle elbow intersections shall be avoided. Upon approval of the City Engineer, they may be permitted and designed in accordance with Figure 3-1.

TABLE 3-2 STREET GEOMETRICS
(REFER TO FIG. 3-4A – 3-4I)

Classification	Street Width		Intersection Radii ¹		Horizontal Curve Radii
	Curb Face to Curb Face	Right-of-Way	Curb Face	Right-of-Way ²	Centerline (Minimum)
Local & Local w/Cul-de-Sac	36 Feet ³	37-48 Feet	30.5 Feet	24 Feet	300 Feet
Collector					
Minor ⁶	40 Feet	53 Feet	35 Feet	Varies	500 Feet
Major	53-67 Feet	54-116 Feet ⁴	40 Feet	Varies	500 Feet
Industrial ⁵	48 Feet	49 Feet	50 Feet	Varies	350 Feet
Arterial					
City	80 Feet	81-133 Feet	50 Feet	Varies	800 Feet
SR113	80 Feet	81-133 Feet	50 Feet	Varies	

¹ Where streets of differing classification intersect, the greater radius requirement shall prevail.

² Right-of-way radii at intersections with arterial and/or collector streets shall be designed with a 45 degree chord at the back edge of walk to provide for a 4-foot-wide sidewalk platform behind the curb ramps.

³ Low-profile and rolled curb, gutter and sidewalk, 1 foot from back of sidewalk (approx. flowline).

⁴ Width dependent on residential backing and/or landscape strip designations.

⁵ Typically, sidewalk on industrial streets will be installed on one side of street.

⁶ When bike lanes are mandated, an additional 10' right-of-way and pavement shall be required.

DS3-09. CENTERLINE RADIUS: Street centerlines shall intersect one another at an angle as near to the right angle as possible by tangents not less than 100 feet in length, unless otherwise approved by the City Engineer. Minimum centerline curve radii for the various street classifications are shown in Table 3-2. Sight distances shall be designed for the design speed of the street per Section DS3-03 (G), DS3-10 and Figures 3-3A, 3-3B and 3-3C. The curve data (delta angle, length, tangent, radius, chord distance and chord bearing) for all centerline curves shall be computed and shown on the plans. Special consideration will be given to unusually difficult alignment problems

TABLE 3-3

Intersection Roadway Classifications	Minimum Acceptable Intersection Spacing From Adjacent Intersections
Local with Local	150 Feet
Local or Minor Collector with Minor Collector	200 Feet
Minor Collector or Major Collector with Major Collector	660 Feet
Major Collector with Arterial	1,000 Feet*
Arterial with Arterial	1,000 Feet*

*- This condition does not apply where a raised median is provided on arterial streets to separate conflicting movements. Blocks must be a minimum of 500 feet in length.

DS3-10. SIGHT DISTANCE AT INTERSECTIONS: Streets shall not be designed with intersections on the inside of curves or at any location in general where sight distance will be inadequate for drivers, bicyclists, or pedestrians to determine if they can safely enter the traffic flow or cross the street. Street alignments may require individual designs based on State of California, Department of Transportation standards.

The minimum required sight distance at stop sign locations is calculated by locating a point 15 feet back from the through street’s curb line and 3 feet to the right of the centerline of the cross street (where a driver’s eyes would typically be following a legal stop behind the stop bar) and extending a “line of sight” to the most dangerous position of an approaching vehicle. This distance, which varies with the design speed of the through street, is shown on Figure 3-3A. Refer to Figures 3-3B and 3-3C for specific sight distance requirements.

DS3-11. INTERSECTION WIDENING: Street right-of-way widths are to be increased in accordance with Figure 3-2 at the following intersections: (1) any two arterial streets; (2) an arterial street and a major collector street; and (3) any two major collector streets, as directed by the City Engineer.

DS3-12. SIDEWALKS: Sidewalk widths are measured from the back of curb to the back of walk. All sidewalks adjacent to arterial, major collector streets and in commercial areas shall be a minimum of 8 feet wide. Sidewalks on minor and industrial collectors shall be 6 feet in width. Sidewalks on local streets shall be 5 feet. The typical width for meandering sidewalks shall be a minimum of 8 feet and if sidewalk serves as a bike path, sidewalk shall be a minimum of 10 feet. When a sidewalk is adjacent to a fence, soundwall, building, or vertical landscaping, an additional 2 feet of width shall be added.

DS3-13. CURB AND GUTTER: Low-profile curb and gutter shall be installed on local streets in accordance with Construction Detail 3010. Vertical curb and gutter shall be installed on collector, arterial, and industrial streets in accordance with Construction Detail 3000. The transition from low-profile curb to vertical curb shall be in accordance with Construction Detail 3050.

DS3-14. CURB RAMPS: Accessible curb ramps shall be constructed at all street intersections in accordance with the appropriate Construction Details 3140, 3150, 3160, 3170, and 3180 and at other locations where required by the City Engineer. Ramps shall be located at the midpoint of the curb return at intersections. Type II accessible curb ramps Standard Detail 3150 shall be constructed at all residential intersections unless otherwise approved by the City Engineer.

DS3-15. DRIVEWAYS:

All driveways shall intersect streets perpendicular to the centerline of the street. Driveways on cul-de-sacs shall intersect radially to the center point.

Driveways are not permitted within the curb returns of an intersection.

Driveways intended for single-family residential usage shall be designed in accordance with either Residential Driveway Detail 3070 when vertical curb is used or Residential Driveway Separated Sidewalk Detail 3090 when separated sidewalk is used. All other driveways shall be designed according to the Commercial Driveway Detail 3100 or the Industrial Driveway Detail 3120. The City Engineer may require/allow greater widths for developments with high traffic generation.

When on-site driveways are abandoned or relocated, the concrete driveway sections in the public right-of-way shall be removed and replaced with curb, gutter and sidewalk to match existing improvements.

Where possible, driveways shall not be located on the inside of curve. Accessible curb ramps shall not be utilized as driveway approach.

DS3-16. EASEMENTS: A Public Service Easement (PSE) used for utility company improvements, streetlights, fire hydrants, and street signs shall be dedicated to the City and shall be located adjacent to the right-of-way as shown in Figures 3-4A through 3-4I.

DS3-17. VALLEY GUTTERS: Valley gutters at driveways are allowed in special circumstances and require the written approval of the City Engineer (See Construction Detail 3060).

DS3-18A. NEW ALLEY WAY: A new alley shall be no less than 23 feet in width with a minimum slope of 2 percent from the outside edge to the center with a 3' wide concrete valley gutter constructed at its center similar to Construction Detail 3060. The typical alley (Type 1) structural section shall be 3 ½ inches of asphalt concrete and 10 inches of Class II aggregate base(See Construction Detail 3190).

DS3-18B. EXISTING ALLEY WAY: An alley shall be no less than 20 feet in pavement width with a minimum slope of 2 percent from the outside edge to the center. The typical alley (Type 1) structural section shall be 3 ½ inches of asphalt concrete and 10 inches of Class II aggregate base. An alternative (Type 2) section of 8 inches concrete over 6 inches Class II aggregate base may be utilized (See Construction Detail 3190). A City standard alley apron shall be provided at the street entrance (See Construction Detail 3200). Parking shall not be allowed in the alley unless adequate additional width is provided.

DS3-19. MAINTENANCE ROADS: Roads designed for maintenance access to storm drainage ponds, remote facilities, or for fire apparatus access shall have a typical right-of-way width of 24 feet and a minimum roadway width of 12 feet. The typical structural section shall be 8 inches of Class II aggregate base on geotextile fabric. When required by the City Engineer, 3" of asphalt concrete over 8 inches Class II aggregate base shall be placed. As required by the Fire Marshall, maintenance roads shall be constructed with 60 feet by 20 feet wide turnouts, including shoulders, at 300 feet intervals.

DS3-20. STREET NAMES: New streets shall be named in accordance with the City of Dixon Subdivision Ordinance. Streets shall be named with an appropriate suffix designation such as "Avenue,"

“Drive,” “Way,” “Street,” or “Lane.” Cul-de-sac streets shall be named with “Court” or “Place” as the only acceptable suffixes.

DS3-21. STREET NAME SIGN LOCATIONS: Two street name sign installations with two sign plates on each pole are required at each four-way intersection. The installations shall be located on both far right-hand corners of the intersection relative to the street having the greater right-of-way width or relative to the more important street if right-of-way widths are equal. Street name signs can usually be installed above stop signs on the same post (See Construction Detail 3240). Additional street name signs may be required where a street changes names at the intersection.

At “Tee” intersections, the street name sign shall be mounted on the streetlight standard located at the prolongation of the intersecting street’s centerline, when possible. For situations where a streetlight cannot be utilized, signs shall be placed at the far right-hand corner of the intersection relative to the through street. At elbow intersections, the sign installation shall be located behind the sidewalk at the midpoint of the inside curb return.

Street names and street name sign size and locations shall be shown on the improvement plans and meet the following standards:

General:

- Street name signs will be 9” wide by 30”, or 36” long (Depending on the length of the street name).
- The sign will be Green with white lettering with a white boarder.
- No arrows, block numbers, or pictographs will be allowed on the sign.
- The sign will be made of DG3 (diamond grade) reflective sheeting.
- The sign will be .125 aluminum.

Lettering:

- Lettering shall be composed of a combination of lower-case letters with initial upper-case letters.
- Lettering of initial upper-case letters at least 6 inches in height and lower-case letters at least 4.5 inches in height.
- The City Standard Font is HWY GOTIDC MOD C.
- North, South, East, and West streets will be abbreviated with an upper-case corresponding abbreviation followed by a period (i.e., N. S. E.W.)
- Streets that are named after a letter of the alphabet will have the direction spelled out using the criteria above, and no period will be placed following the letter of the street (i.e., West B St compared to W. Walnut St or East D St. compared to N. Second St).
- Abbreviations for type of street are listed in the table below (first letter upper-case and the following letters lower-case):

TABLE 3-4

Avenue	Ave
Boulevard	Blvd
Circle	Cir
Court	Ct
Drive	Dr
Lane	Ln
Parkway	Pkwy

Place	Pl
Road	Rd

Examples:

- N. Almond St
- Parkway Blvd
- Diane Pl
- Pitt School Rd
- N. Second St
- Marvin Way
- MacDonald Ct
- Gateway Dr
- Market Ln
- E. Creekside Cir
- Stratford Ave
- West A St

Intersections with arterial and major collector streets will require advance street name signs. Signplacement for these locations shall be at the direction of the City Engineer.

DS3-22. TYPICAL TRAFFIC SIGNS: The following is a summary of the installation requirements of signs typically associated with development projects. Additional signs may be required by the City Engineer.

“Stop”: Locations shall be established in accordance with the City of Dixon “Policy and Warrants for Stop and Yield Signs.” All stop signs shall be installed as directed by the City Engineer contingent upon an authorizing City Council resolution. Stop signs shall be 30” octagonal shaped where approach speeds are less than 45 mph and shall be 36” octagonal where approach speeds are 45 mph or greater.

“Dead-End” and “No Outlet”: All single roads or streets that terminate in a dead-end or cul-de sac where it is not immediately apparent to the driver that no other streets can be accessed from road shall be posted with a standard code W14-1 (“Dead-End”) sign. The standard location for the W14-1 sign is on the right-hand side at the curb return or at the first property line. The “No Outlet” signs shall be posted at the entrance to a road or road network from which there is no other exit.

“No Parking”: All restricted parking signs and markings shall be installed as directed by the City Engineer upon authorization by City Council resolution.

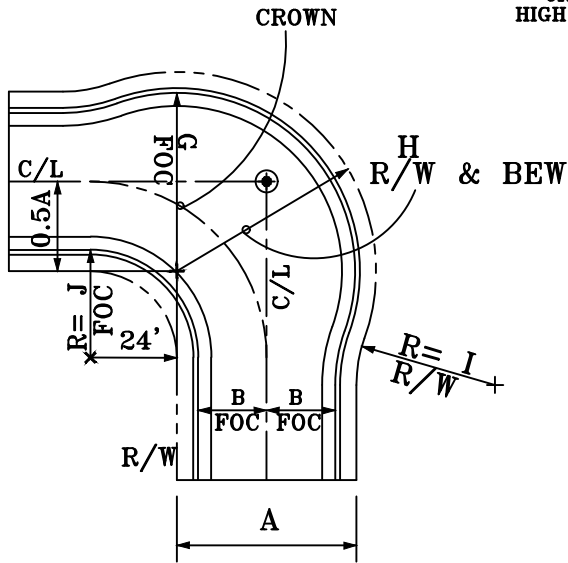
DS3-23. SIGNING AND STRIPING: Signing and striping shall conform to the California Department of Transportation and City of Dixon requirements. Bikeways shall be delineated according to the City of Dixon Bikeway Plan on file at the City of Dixon Engineering Department. A signing and striping plan shall be submitted as part of the improvement plans for City Engineer’s approval. This plan may be combined with the street lighting plan when clarity can be maintained.

DS3-24. PERMANENT BARRICADES: A standard end of street barricade shall be constructed where improvements are temporarily terminated but are proposed for extension in the future. The barricade shall extend completely across the right-of-way and be constructed in accordance with Construction Detail 3260.

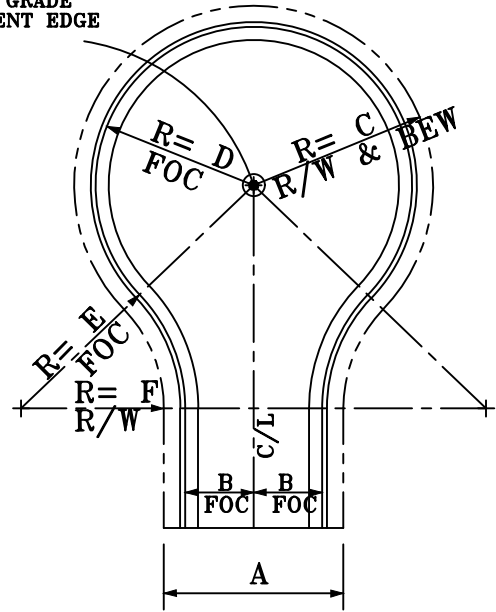
A standard sidewalk barricade shall be constructed across the end of a sidewalk where pedestrians cannot safely continue beyond the end of the sidewalk. Sidewalk barricades are not required when a standard street barricade will be installed across the entire right-of-way block the sidewalk. Sidewalk barricades shall conform to Construction Detail 3250.

Signs and barricades, in accordance with Construction Detail 3270, are required where partial street widening occurs.

CROWN TO HAVE 2% GRADE
HIGH POINT OF PAVEMENT EDGE



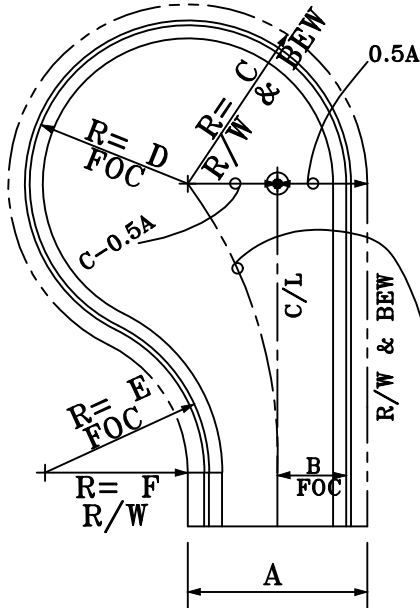
EXPANDED CORNER



CUL-DE-SAC

		Street R/W A	Street C/L to FOC B	BULB R/W Radius C	BULB FOC Radius D	Reverse Curvature FOC Radius E	Reverse Curvature R/W Radius F
CUL-DE-SAC	Residential	48'	18'	50'	44'	36'	30'
	Commercial	Varies*	25'	60'	54'	50'	44'
	Industrial	Varies*	25'	60'	54'	50'	44'
OFFSET CUL-DE-SAC	Residential	47'	17.5'	50'	44'	30'	24'
	Commercial	Varies*	25'	60'	54'	50'	44'
	Industrial	Varies*	25'	60'	54'	50'	44'

Varies* - Depends on sidewalk width of 0', 6' or 8'.



OFFSET CUL-DE-SAC

		Street R/W A	Street C/L to FOC B	Expanded Corner FOC Radius G	Expanded Corner R/W Radius H	Expanded Corner R/W Radius I	FOC J
EXPANDED CORNER	Residential	48'	18'	46'	52'	30'	30'
	Commercial	Varies*	25'	70'	76'	44'	50'
	Industrial	Varies*	25'	70'	76'	44'	50'

Varies* - Depends on sidewalk width of 0', 6' or 8'.

CROWN TO HAVE 2% GRADE. HIGH POINT TO PAVEMENT EDGE.

- ⊙ - MONUMENT
- FOC - FACE OF CURB/ FLOW LINE
- BEW - BACK EDGE OF WALK
- R/W - RIGHT-OF-WAY
- C/L - CENTERLINE
- R - RADIUS
- NA - NOT APPLICABLE

NOTE: LOW-PROFILE CURB & GUTTER TYPICAL FOR RESIDENTIAL STREETS.



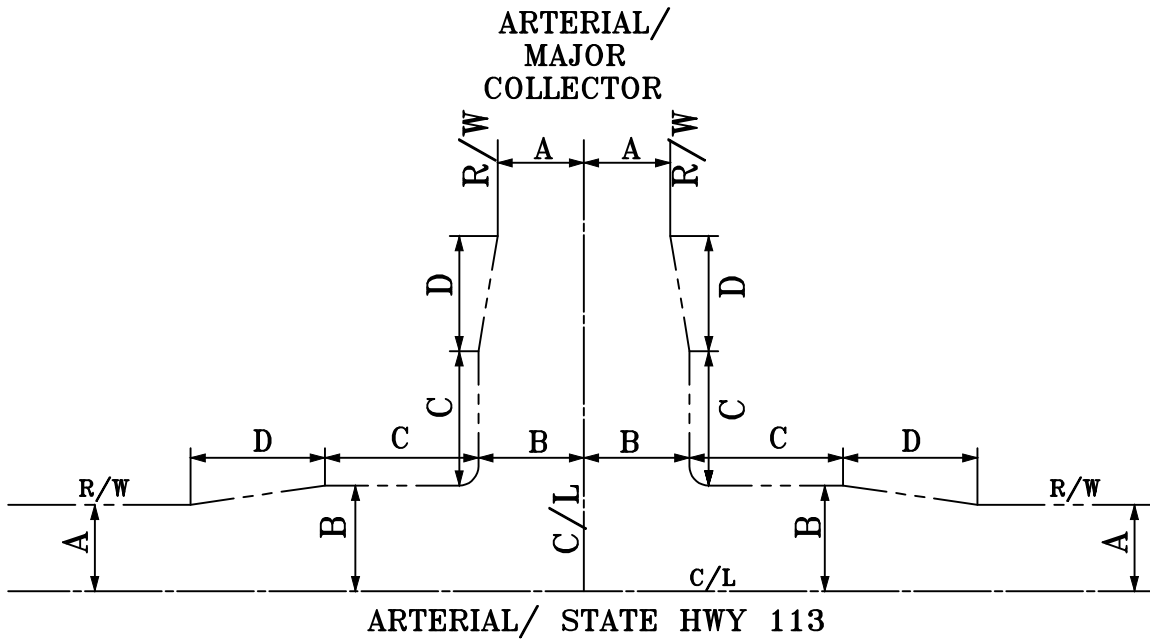
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CUL-DE-SAC
EXPANDED CORNER

FIG.
3-1



DIMENSIONS

	A	B	C	D
MAJOR COLLECTOR	*	A+12'	175'	120'
ARTERIAL (CITY)	*	A+12'	175'	120'
STATE HWY **	50'	A+12'	175'	120'

* REFER TO TABLE 3-2 OF THESE STANDARDS.
 ** REQUIRES CALTRANS APPROVAL.

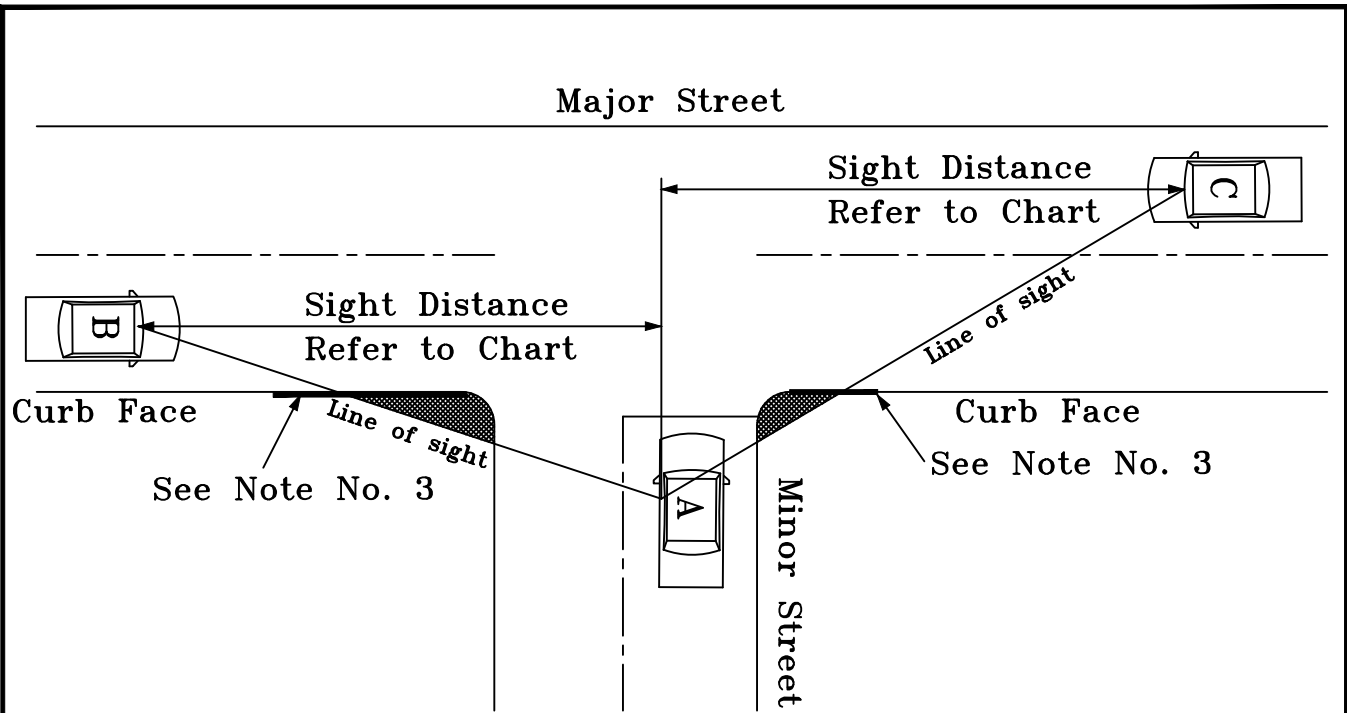
FIG.
3-2

WIDENING DETAILS
AT MAJOR STREET
INTERSECTION



CITY OF DIXON
ENGINEERING
DESIGN STANDARD





DESIGN SPEED (MPH)	25	30	35	40	45	50	55
SIGHT DISTANCE (FEET)	150	200	250	300	495	550	605

SPECIAL NOTE:

This design Standard shall be utilized at intersections and driveways where street speed limit is 35 miles per hour or more. All other streets shall conform with Fig. 3-3B.

NOTES:

- No mounds, fences, landscaping or monuments will be permitted within the shaded area more than 1 foot above the top of curb.
- Trees restriction within the shaded zone shall comply with the minimum standards:
 - Shall not exceed 6" in trunk girth.
 - Branches and canopy shall be maintained at 10 feet above the top of curb elevation.
- Parking shall be removed, as necessary, to provide adequate sight distance. Red curb shall be installed.
- Sight distance shall be measured with Vehicle A located 15 feet from the traveled way, as determined by the City Engineer. On streets with more than one lane in each direction, Vehicles A & B shall be in the lane with the greatest conflict.



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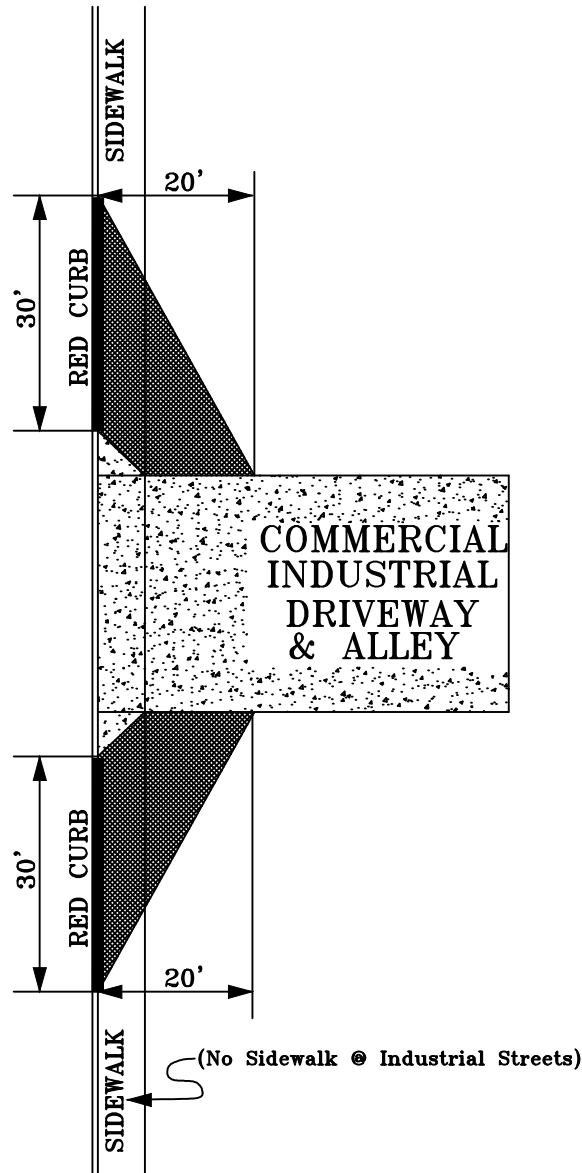


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SIGHT DISTANCE
TYPICAL INTERSECTION
AND DRIVEWAYS
(35 MPH AND MORE)

FIG.
3-3A

PUBLIC STREET



SPECIAL NOTE:

This design Standard shall be utilized at driveways where street speed limit are 30 miles per hour and less.

NOTES:

1. No buildings within the shaded area.
2. Fences, signs, walls, monuments and shrubbery may not exceed 3 feet in height, measured from top of curb, within the shaded area.
3. Trees restriction within the shaded zone shall comply with the minimum standards:
 - A. Shall not exceed 6" in trunk girth.
 - B. Branches and canopy shall be maintained at 10 feet above the top of curb elevation.
4. For speed limits of 30 MPH or less or else Fig. 3-3A shall apply.

FIG.
3-3B

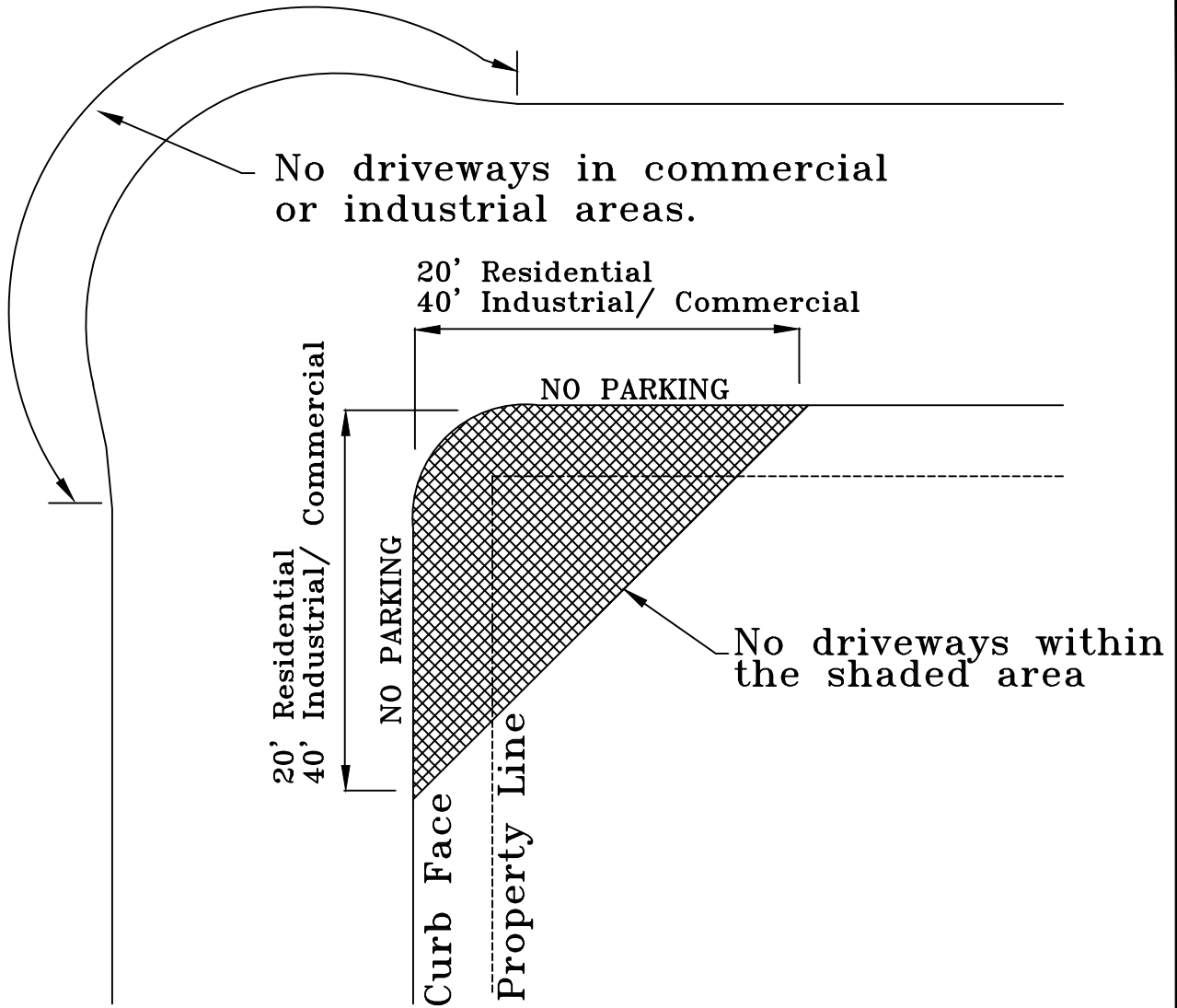
**SIGHT DISTANCE
TYPICAL DRIVEWAYS**



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Notes:

1. No fences, trees or shrubs within the shaded areas.
2. No mounds over 1 foot above top of curb within the shaded area.
3. Trees restriction within the shaded zone shall comply with the minimum standards:
 - A. Shall not exceed 6" in trunk girth.
 - B. Branches and canopy shall be maintained at 10 feet above the top of curb elevation.



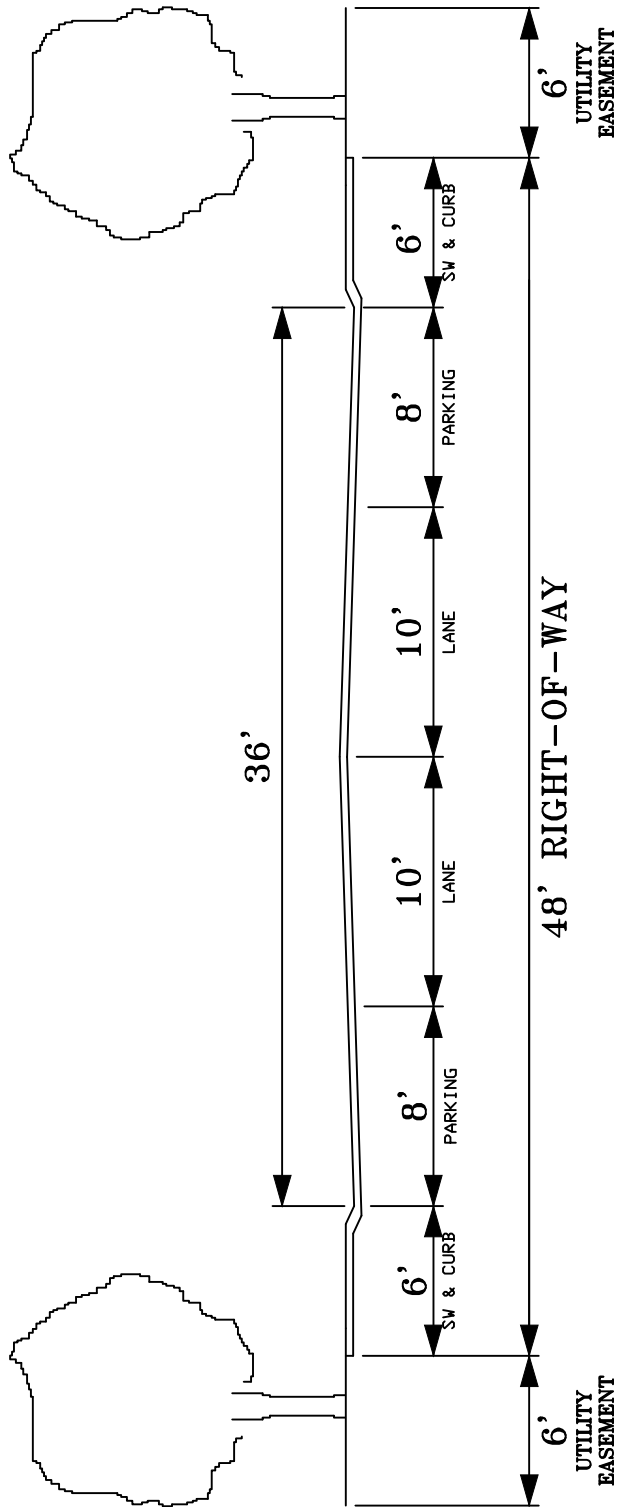
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SIGHT DISTANCE
EXPANDED CORNER

FIG.
3-3C



* INCLUDING LOCAL STREET WITH CUL-DE-SAC

LEGEND

SW = Sidewalk

FIG. 3-4A

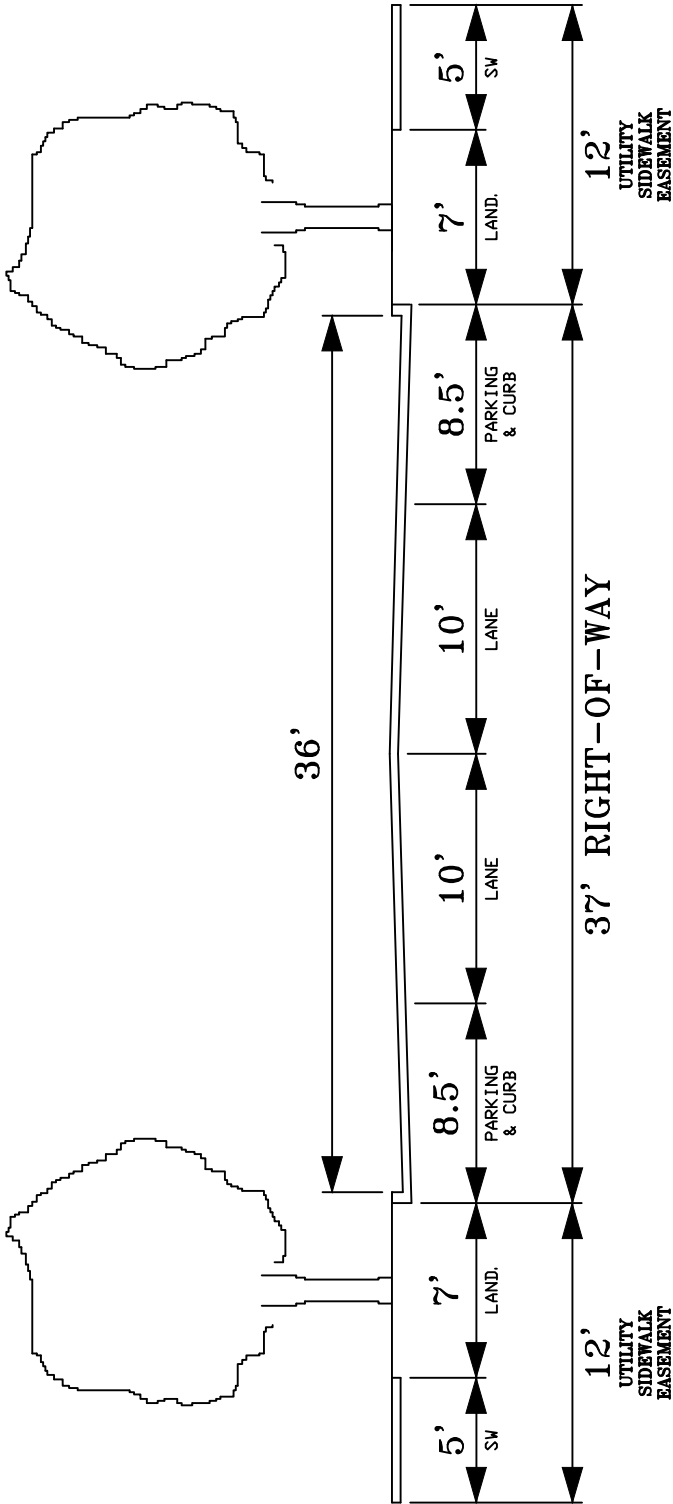
LOCAL STREET STREET SECTION



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ENGINEERING
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LOCAL STREET WITH SEPARATED SIDEWALKS

LEGEND
 LAND. = Landscape Area
 SW = Sidewalk



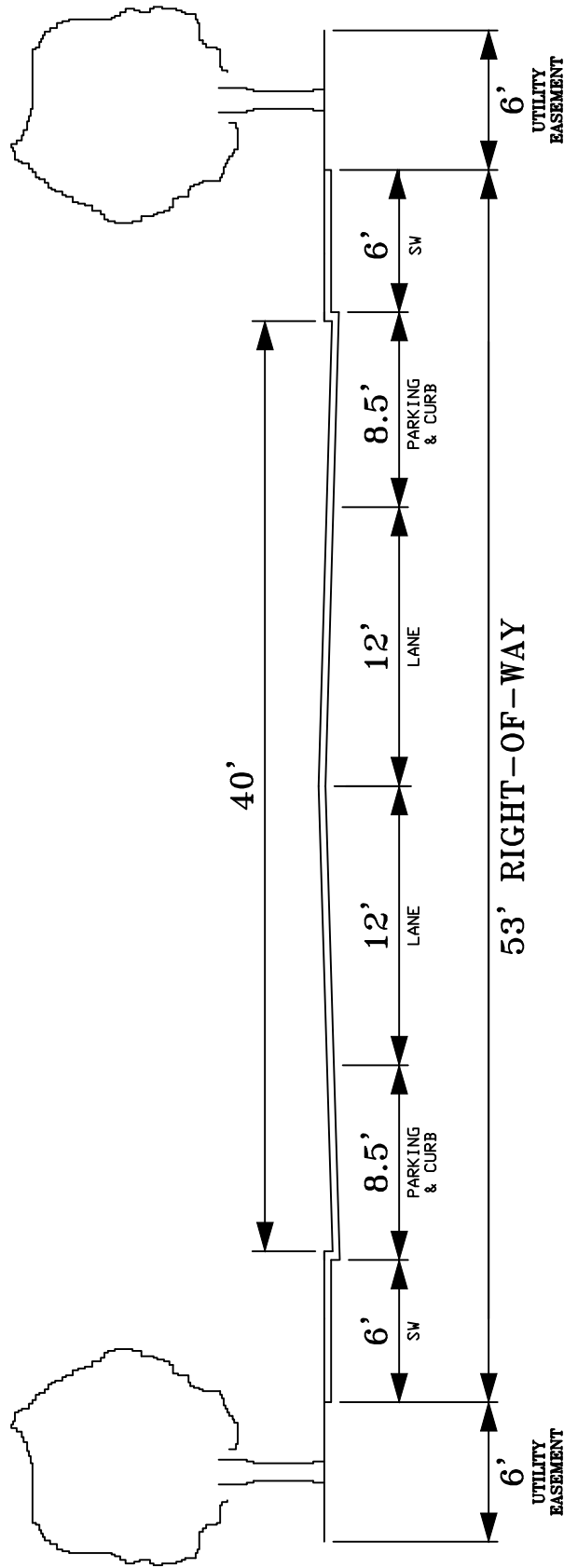
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LOCAL STREET
 SEPARATED SIDEWALK
 STREET SECTION

FIG.
 3-4B



MINOR COLLECTOR

LEGEND
 SW = Sidewalk

FIG.
 3-4C

MINOR COLLECTOR
 STREET SECTION

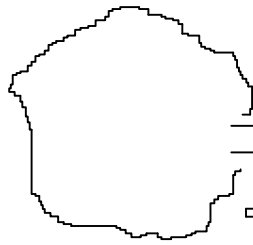


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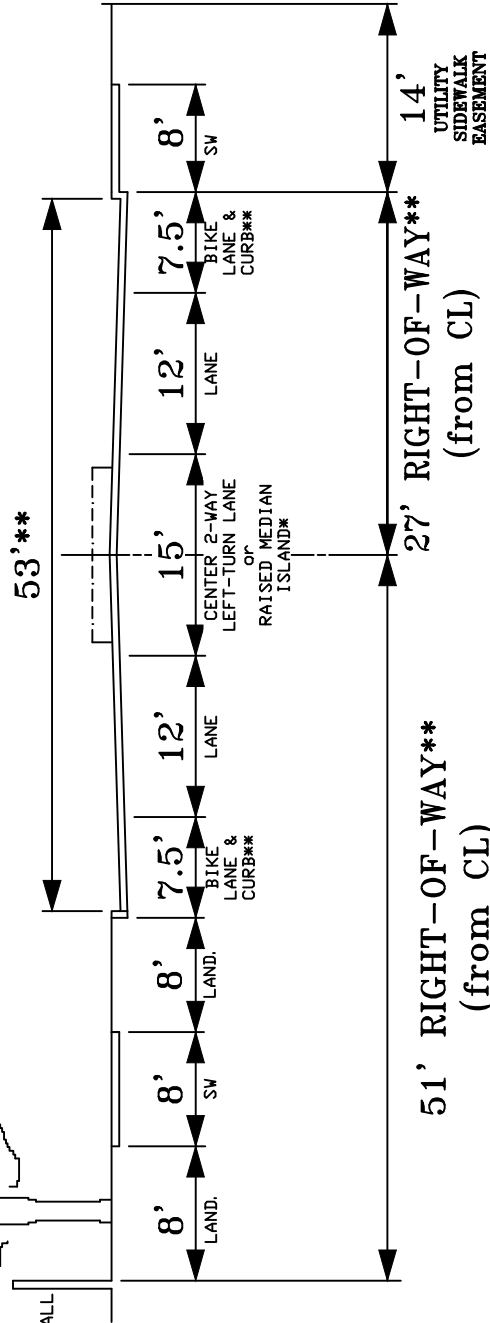


RESIDENTIAL



SOUNDWALL

COMMERCIAL,
OFFICE, OR
INDUSTRIAL



MAJOR COLLECTOR

LEGEND

LAND. = Landscape Area

SW = Sidewalk

CL = Center Line

- * 13' WIDE MEDIAN ISLAND AND 13' LANES ADJACENT
- ** WHERE PARKING IS PROVIDED ON ONE SIDE OF THE STREET, USE FIGURE 3-4D FOR THE SIDE WITH NO PARKING AND FIGURE 3-4E FOR THE SIDE WITH PARKING.



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DESIGN STANDARD



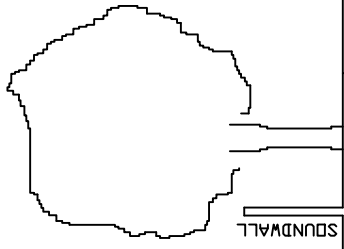
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MAJOR COLLECTOR
NO PARKING
STREET SECTION

FIG.
3-4D

RESIDENTIAL

COMMERCIAL,
OFFICE, OR
INDUSTRIAL



67'**

58' RIGHT-OF-WAY**
(from CL)

34' RIGHT-OF-WAY**
(from CL)

14'
UTILITY
SIDEWALK
EASEMENT

MAJOR COLLECTOR

LEGEND

- LAND. = Landscape Area
- SW = Sidewalk
- CL = Center Line

- * 13' WIDE MEDIAN ISLAND AND 13' LANES ADJACENT
- ** WHERE PARKING IS PROVIDED ON ONE SIDE OF THE STREET, USE FIGURE 3-4D FOR THE SIDE WITH NO PARKING AND FIGURE 3-4E FOR THE SIDE WITH PARKING.

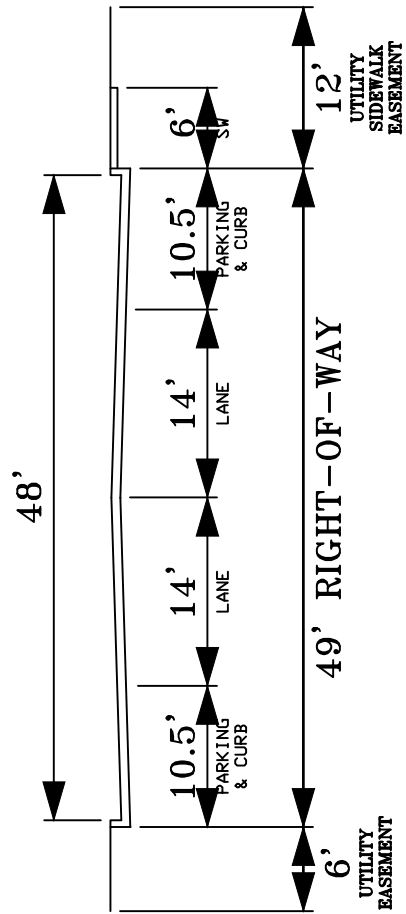
FIG.
3-4E

MAJOR COLLECTOR
WITH PARKING
STREET SECTION

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INDUSTRIAL COLLECTOR

LEGEND
 SW = Sidewalk



CITY OF DIXON
 ENGINEERING
 DESIGN STANDARD



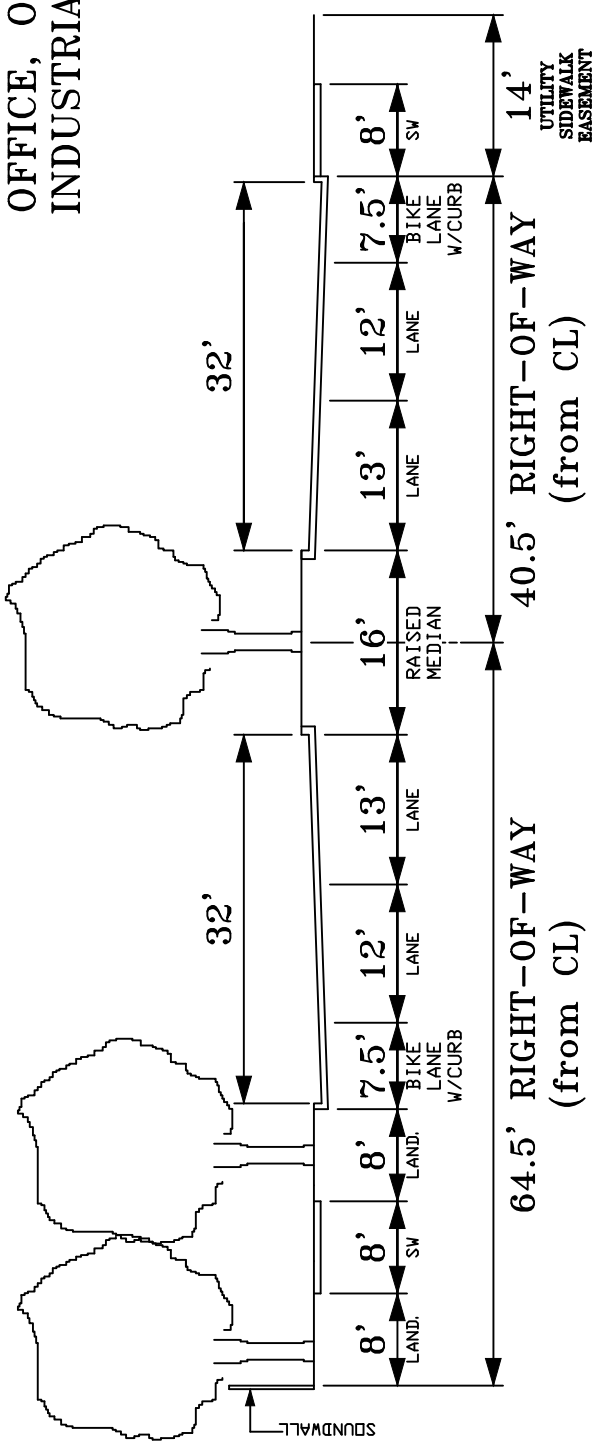
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INDUSTRIAL COLLECTOR
 STREET SECTION

FIG.
 3-4F

COMMERCIAL,
OFFICE, OR
INDUSTRIAL

RESIDENTIAL



ARTERIAL

LEGEND

- LAND. = Landscape Area
- SW = Sidewalk
- CL = Center Line

FIG.
3-4G

ARTERIAL
STREET SECTION



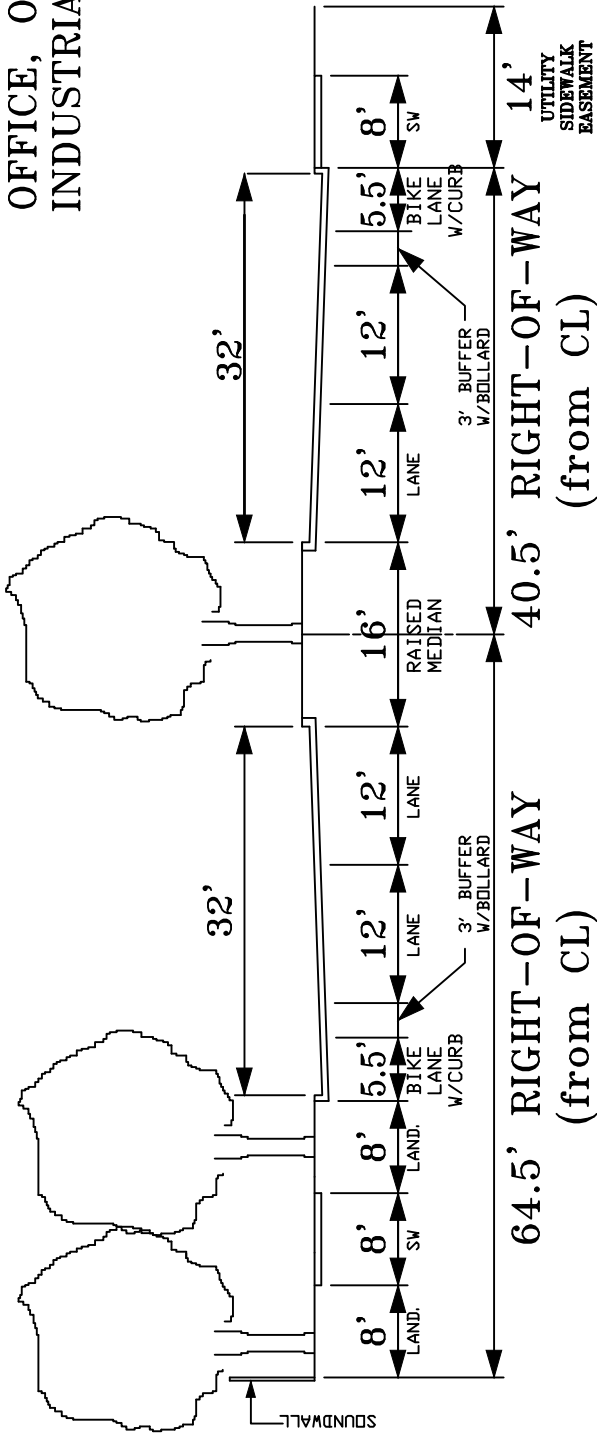
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ENGINEERING
DESIGN STANDARD



RESIDENTIAL

COMMERCIAL,
OFFICE, OR
INDUSTRIAL



ARTERIAL WITH CLASS IV BIKEWAY

LEGEND

- LAND. = Landscape Area
- SW = Sidewalk
- CL = Center Line



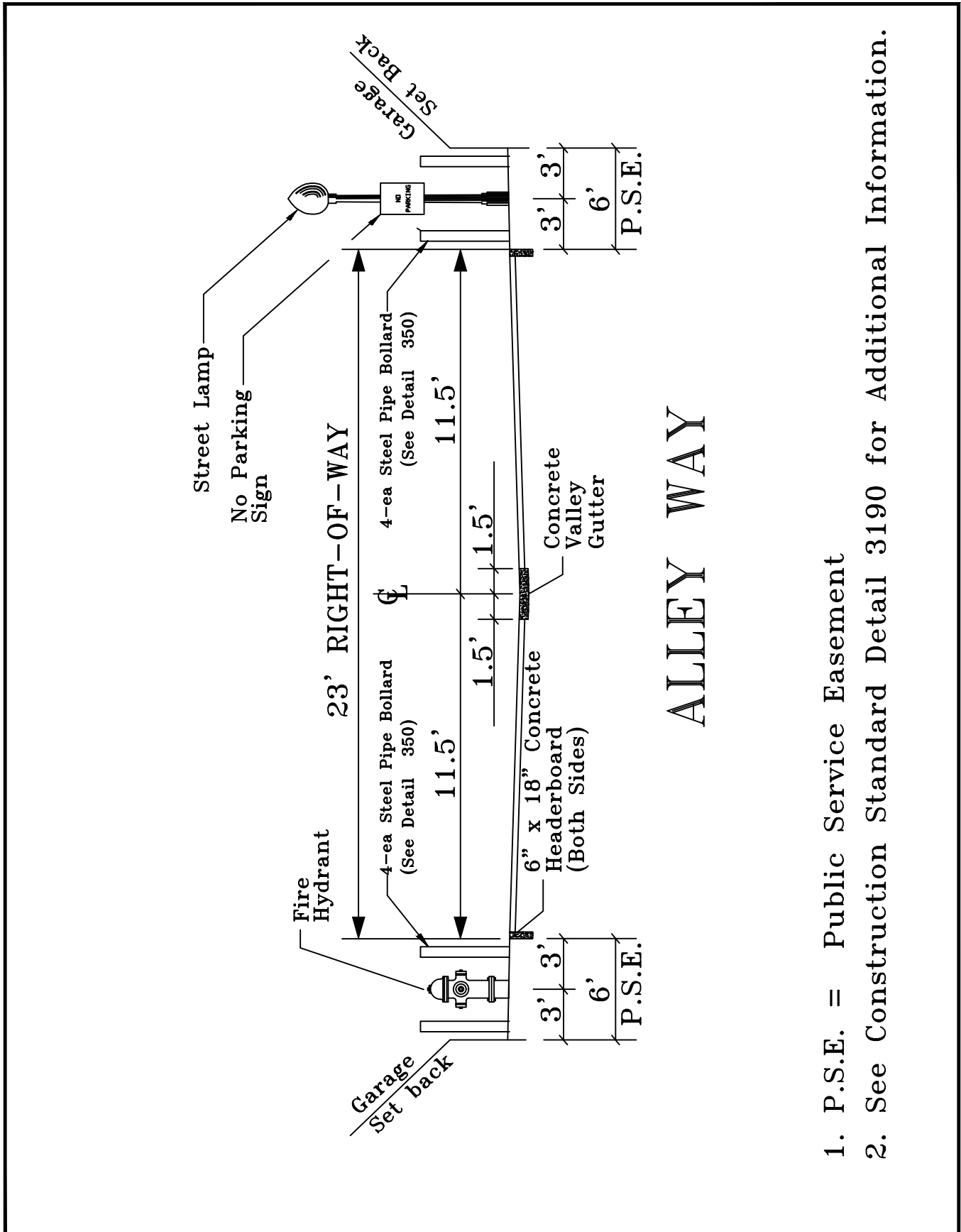
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DESIGN STANDARD



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ARTERIAL
WITH CLASS IV
BIKEWAY
STREET SECTION

FIG.
3-4H



1. P.S.E. = Public Service Easement
2. See Construction Standard Detail 3190 for Additional Information.

FIG.
3-4I

ALLEY
STREET SECTION

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CITY OF DIXON
ENGINEERING
DESIGN STANDARD

ENGINEERING DESIGN STANDARDS

SECTION 4 – DRAINAGE DESIGN

DS4-01. GENERAL:

A. Submittals.

The Design Engineer shall submit a storm drain report (design information and calculations) for approval prior to the initial submittal of Improvement Plans. The design report shall include, but not be limited to, the following:

1. Topographic map showing existing & proposed ground elevations and total shed and sub-shed areas in acres.
2. Tributary area, land use and design flow at each structure.
3. Design flow in each pipe, channel, or pond.
4. Hydraulic grade line (HGL) at each structure and slope of the HGL between structures shall be shown on the storm drain profile.
5. Gutter flow line, pipe crown and invert elevations at each structure.
6. Pipe size, material, class, length, and slope.
7. Typical cross-sections of open channels.
8. Overland release points of drainage system and estimate of maximum water surface elevation of the 100-year storm.
9. Adjacent building pad elevations.

B. Acceptable Storm Discharges

The City Storm Drainage System is designed to convey clean stormwater runoff. All runoff containing any toxic substances or any human wastes shall not be discharged into the storm system, onto public streets or onto any lands tributary to the City maintained drainage system. All such wastes shall be appropriately pre-treated, as required, and discharged to the City Sewer System.

C. Design Storm Requirements (These design storm data include an 18 percent increase from historic data to account for climate change to 2050 to 2099).

1. Storm drains – 10-year storm. (See Figure 4-1)
2. Open channels – 100-year storm. (See Figure 4-1)
3. Detention Ponds – 100-year, 4-day storm. (See Figure 4-1)
4. Retention Ponds – 100-year, annual rainfall. (See Figure 4-2)
5. Overland Release – 100-year storm. The development grading shall be designed to achieve the building pad freeboard criteria even if the drain inlets and storm drain system are clogged.

D. Other Requirements

1. Infrastructure that will be owned, operated, and maintained by the City should be designed to minimize future operations and maintenance (O&M) labor and costs (versus minimizing initial construction and capital costs).
2. The stormwater system O&M costs shall be estimated, and an O&M funding mechanism must be established.

3. All engineering planning and design work shall use the North American Vertical Datum of 1988 (NAVD88).
4. The City Engineer may allow deviations from these standards. Requests for deviations should 1) be submitted in writing, 2) clearly state the deviation requested, 3) explain why the standard cannot be achieved and why the deviation is needed, 4) provide an approval or denial signature block for each requested deviation. The deviations are not authorized until they have been approved in writing by the City Engineer.
5. All storm drainage facilities shall comply with the current NPDES permit, trash capture requirements, low impact development requirements, hydro-modification requirements, and applicable state and federal requirements.

DS4-02. DESIGN RUNOFF:

- A. For areas up to 100 acres: Use Figures 4-3 through 4-6 at the end of this section. The Rational Method may be used, but it should reproduce the peak runoff rates from these figures. If the Rational Method is used for a storm drain that flows into a detention basin, the basin should be assumed to be half full (by volume) to establish the starting water surface elevation for the Rational Method.
- B. For areas larger than 100 acres and for any area where detention storage is proposed: Use a computer model with the model parameters adjusted to produce runoff rates consistent with runoff curves in Figure 4-3 through 4-6. The SacCalc model and XPSWMM using the Sacramento Method are two models that can be used and will directly reproduce the peak runoff rates in Figures 4-3 to 4-6 for developed land (see notes on the figures).
- C. Impervious Percentages for various land uses are presented in Figure 4-7.
- D. For areas that drain into existing storm drain facilities that were sized using previous standards, the City Engineer may approve use of other runoff rates.

DS4-03. HYDRAULIC GRADE LINE: The design of the storm drain system shall satisfy the following criteria regarding hydraulic grade line (HGL):

- A. 10-year HGL shall be at least 1.0 foot below gutter flow line.
- B. 100-year HGL shall be at least 1.0 foot below pad elevations.
- C. For drains that discharge into existing storm drains that were sized using other standards, the City Engineer may allow deviation these HGL standards.

DS4-04. INLETS, GUTTERS, AND STREETS:

- A. Drain Inlet spacing – maximum gutter flow length shall be 400 feet from summit to inlet.
- B. Longitudinal gutter slope – minimum longitudinal gutter slope shall be 0.35 percent and 0.5 percent through all curb returns and cul-de-sac bulbs.
- C. Street conveyance – streets shall be designed to store or transport the difference between storm drain capacity and the 100-year storm runoff. The Design Engineer shall provide written evidence that the project can safely withstand the effects of a 100-year storm event.

- D. The maximum area allowed to drain into any one drain inlet is 2 acres.
- E. Location- inlets are to be located at property lines whenever possible. At curb returns, inlets are to be located on the local street side of the curb return (street with lesser traffic).
- F. Intersection drainage – no crossflow valley gutters at intersections are permitted without prior written approval of City Engineer.
- G. Drain inlets shall conform to Construction Details 4510 through 4570, or an approved equal with written approval of City Engineer. Type A (grate drain inlet) over Type B (hooded drain inlet) shall be utilized at street curb & gutter locations unless Type B is approved by the City Engineer.
- H. Minimum drop from invert of inlet to invert of connection at storm drain shall be 0.25 feet.
- I. Vertical curb and gutter required at all inlets (see Construction Details 4550, 4560 & 4570).
- J. Trash racks may be required when, in the opinion of the City Engineer, they are necessary to prevent clogging of the storm line or to restrict access.

DS4-05. STORM DRAINS:

- A. HGL Design – Pipe drainage systems shall pass the peak runoff from the 10- year storm with the design HGL at least 1.0 feet below the gutter flow line.
- B. Materials – Allowable pipe material include reinforced concrete pipe (RCP). Other materials such as cast-in-place concrete pipe (CIPCP), non-reinforced concrete, corrugated steel, corrugated aluminum, ductile iron, and plastic (PVC, ABS, HDPE) may be used only with prior approval of the City Engineer. If metal pipe is used, it must be certified to have a service life of no less than 50 years, in accordance with Section 7-851.3 of Caltrans Highway Design Manual. If CIPCP is used, a detailed soils report addressing the placement of CIPCP shall be submitted and approved by the City prior to approval of any Improvement Plans. Pipe material shall be specified on plans (RCP, CIPCP, etc.).
- C. Manning’s formula shall be used to determine design parameters such as capacity, slopes, hydraulic grade lines and velocity. Computation shall be based on the following Manning’s “n” roughness coefficients:

Roughness Coefficients	
Material	Manning’s “n”
Reinforced Concrete	0.013
Corrugated Metal	0.024
Ductile Iron	0.013
Plastic (PVC, ABS, HDPE)	0.011
Open Channel- Fully Lined	0.018
Open Channel- Lined Bottom	0.030
Open Channel- Earthen	0.035
Open Channel- Natural	0.060

- D. Size – The minimum diameter for storm drain mains shall be 18 inches. The minimum diameter of a lateral from a street drainage inlet to a manhole shall be 12 inches.

- E. Minimum velocity – The minimum design velocity in pipes shall be 2 feet per second flowing full.
- F. Minimum cover – The minimum cover shall be 18 inches from subgrade unless otherwise approved by the City Engineer.
- G. Horizontal Alignment – The storm drains shall typically be located underneath gutter flow line. Storm drains shall have at least 5 feet of horizontal clearance with any parallel underground utility.
- H. A vertical alignment of not less than 12 inches shall be maintained between all storm drains and all crossing utilities, and a vertical clearance not less than 6 inches shall be maintained between all private storm services and all private crossing utilities.
- I. Easement – The minimum easement for any storm drain not within public rights-of-way shall be 15 feet. Additional easement width for storm drains larger than 36 inches in diameter and/or for depths of storm drain greater than 8 feet will be required, as determined by the City Engineer.
- J. Horizontal curves may be allowed with prior written authorization by the City Engineer provided the joint deflection is no more than 80 percent of the manufacturer’s recommendation.
- K. Inverted siphons are not permitted.
- L. Private Connections – The maximum area which will be allowed to drain across the sidewalk or driveway into the public street right-of-way shall not exceed 10,000 SF in residential areas and 5,000 SF in office, commercial or industrial areas. Any drainage exceeding these limitations shall be collected via an underground pipe system and connected to a defined drainage system, whether public or private. The minimum size of private service shall be 12 inches in diameter and shall connect to the system at an inlet or manhole. A clean-out box (2’ diameter) shall be installed at the right-of-way for all other connections. All private service connections shall be sized and designed to convey the peak 10-year flows as calculated in accordance with this standard.
- M. Small drains through the curb and under the sidewalk will be acceptable with approval by the City Engineer. The Design Engineer shall prepare and show details of this type of drain on the plans. The drain shall be capable of passing the 10-year storm flows without overtopping the sidewalk. Provisions shall be made to prevent leaves and debris from interrupting the function of the drain.

DS4-06. MANHOLES:

- A. Manholes – Manholes shall be located at the following points:
 - 1. Storm drains 42" in diameter and smaller – 400 feet maximum spacing
 - 2. Storm drains 48" in diameter and larger- 500 feet maximum spacing
 - 3. At changes in pipe size, direction and/or grade
 - 4. At intersections of all main lines
 - 5. Beginning and end of curved alignment

See Construction Details 4000 through 4050, and 4500.
- B. A drop of 0.10 feet through a manhole is required when the deflection angle between the inlet and outlet pipe(s) exceeds 45°. The deflection angle through a manhole shall not exceed 90

degrees. The invert of an incoming line shall not be higher than 12 inches above the crown of the largest pipe. In general, when the incoming line is smaller than the outgoing line, the crown of the incoming line shall match the crown of the outgoing line.

- C. Drain Inlet Substitution for Manhole – A standard City Drain Inlet with a manhole cover may be substituted for a manhole. Access for maintenance of pipe shall be provided.
- D. Manhole Access Roads – Roads designed for maintenance access shall be provided to all manholes not within a public right-of-way. The access road shall be a minimum width of 12 feet. The structural section shall be 8 inches of Class II aggregate base on geotextile fabric, and when required by the City Engineer, 3" of asphalt concrete.

DS4-07. OPEN CHANNELS: Open channels are not allowed except in special circumstances and requires prior review and written approval of the City Engineer.

If approved by the City Engineer, the minimum criteria for open channels includes the following provisions:

- A. Roads designed for maintenance access shall be provided to all channels. The access road shall be a minimum width of 12 feet with 4-foot shoulders on each side. As required by the Fire Marshall, maintenance roads shall be constructed with 60 feet by 20 feet wide turnouts, including shoulders, at 300 feet intervals. The structural section shall be 8 inches of Class II aggregate base on geotextile fabric, and when required by the City Engineer, 3" of asphalt concrete.
- B. The channel shall be designed to convey the 100-year storm. Minimum freeboard shall be 1 foot if the design water level is below the surrounding ground surface and shall be 3 feet if the design water level is above the surrounding ground surface.
- C. A small diameter pipe may be required by the City Engineer to be installed in conjunction with the linear pond/open channel to convey low flows through the channel.
- D. Erosion control shall typically include riprap and/or hydroseeding pending the City Engineer's approval in all impacted areas. Additional erosion control, subject to the review and approval of the City Engineer, may be required at bends, culverts, and inflow areas.
- E. Maximum design velocity shall be 3 feet per second unless additional erosion protection is included.
- F. Side slopes shall be no steeper than 4 horizontal to 1 vertical. Steeper slopes may be allowed if concrete lined, or with approval of the City Engineer.
- G. Fencing shall be installed unless otherwise approved by the City Engineer. Fencing to be typical 6 feet high screened-type, such as chain-link with slats.

DS4-08. DETENTION POND CRITERIA:

- A. Capacity – Detention storage facilities shall be designed to safely store the flow from the critical 100-year storm event using the analysis methods described in Section DS4-02. Minimum freeboard during the 100-year design storm shall be one foot if the design water level is below the surrounding ground surface. Minimum freeboard during the 100-year design storm shall be 3 feet if the design water level is above the surrounding ground surface. To

account for potential preceding storms, the basin should be assumed to be 25 percent full (by volume) at the start of the 100-year, 4-day design storm.

- B. Configuration – Maximum depth shall not exceed 10 feet and the pond bottom shall be at least 2 feet above historic groundwater levels based on groundwater investigations approved by the City Engineer. If supported by the groundwater investigation the City Engineer may allow basins to be deeper than 10 feet. The slope of all banks or levees subject to inundation shall be no steeper than 4 horizontal to 1 vertical. All slopes shall be protected by hydroseeding or the equivalent. In addition, slopes within public access areas such as parks and green belts shall be no steeper than slope of 6:1 unless otherwise approved by the City Engineer.
- C. Access – Roads designed for maintenance access shall be provided around the perimeter of all storage facilities. The top of the levee shall be 12 feet wide and 4 feet wide shoulders with an access road width of 12 feet. As required by the Fire Marshall, maintenance roads shall be constructed with 60 feet by 20 feet wide turnouts, including shoulders, at 300 feet intervals. The structural section shall be 8 inches of Class II aggregate base on geotextile fabric, and when required by the City Engineer, 3" of asphalt concrete. A 12 feet wide and 4 feet wide shoulders access road shall also be provided to the floor of the storage facility with a maximum slope of 10 percent.
- D. Perimeter Fencing – Fencing shall be installed 6 inches inside the property line of the storage facility with adequate access including vehicle and walk gates. Fencing shall be 6 feet in height, chain-link with slats or otherwise approved by the City Engineer.
- E. Multiple Use – Storm drainage detention basins may include additional uses such as parks/play areas/sports facilities, wetlands, wildlife areas or groundwater recharge. Additional requirements for such facilities may include irrigation systems, landscaping, bike or walking paths, flatter slopes, and plantings for wildlife enhancement. The City Engineer will specify what multiple uses shall be included in detention basins.
- F. Detention – Outlet facilities for detention storage shall be designed to discharge the maximum allowable flow based on project conditions. Discharge capacity shall be determined on a case-by-case basis and subject to review and approval of the City Engineer. Design Engineer shall provide an emergency spillway or overflow provisions for extreme conditions. Suitable backup systems and/or redundant pumping capability shall be provided subject to approval of the City Engineer.
- G. Retention – Shall be designed in accordance with Section DS4-9, “Retention Pond Design Criteria.”

DS4-9. RETENTION POND CRITERIA: Retention ponds may be used with prior written authorization by the City Engineer. If authorized, they will be sized using criteria provided below.

- A. Determine the pervious and impervious tributary areas. For the purpose of estimating runoff volumes, be sure to include the retention basin area as an impervious surface.
- B. Set up a spreadsheet analysis as shown in Figure 4-2 or obtain an electronic copy of the spreadsheet from the Public Works Department.
- C. Using the 100-year monthly design rainfall (provided in attachment Figure 4-2) calculate the monthly runoff from the impervious area (the design rainfall times the impervious area).

- D. Using the 100-year monthly effective rainfall (provided in Figure 4-2) calculate the monthly runoff from the pervious areas (the effective rainfall times the pervious area).
- E. Determine the total retention basin inflows by adding the pervious and impervious monthly runoff.
- F. Develop a relationship between the retention basin volume and the water surface area and water depth. In the sample (provided in Figure 4-2), the basin was assumed to be square to simplify development of these relationship. However, this assumption may not be applicable for a specific site.
- G. Assume the retention basin is empty on October 1. This assumption is based on the City of Dixon Engineering Standard DS4-08B, which requires the basin bottom to be at least 2 feet above historic groundwater levels. Since the maximum depth for basins is 10 feet, this assumption is likely to be correct, but should be verified for a specific site.
- H. Determine the potential unit evaporation rate from the retention basin. Reasonable evaporation rates for Dixon are provided in Figure 4-2.
- I. Determine the potential evaporation loss by multiplying the potential unit evaporation rate by the water surface area.
- J. Estimate the potential percolation loss from the pond to the groundwater. If rates higher than the rates shown in the sample spreadsheet are to be used, a geotechnical evaluation of the specific site is required to accurately quantify the long term (for life of the pond) percolation rate. The geotechnical evaluation shall be submitted to the City Engineer as part of the sizing/design of the retention basin.
- K. Determine the total basin loss by adding the potential evaporation loss to the potential percolation loss. The total loss cannot be more than the start-of-month volume of stored water.
- L. Determine the end-of-month volume of stored water by adding the total runoff and subtracting the total loss from the start-of-month volume of stored water.
- M. Define the next month's start-of-month volume of stored water as being equal to the previous month's end-of-moth volume of stored water.
- N. Perform the water balance throughout the year, ending with September.
- O. Adjust the retention basin size (area and depth) until the minimum allowed freeboard exists at the time of maximum storage. Minimum freeboard shall be one foot if the design water level is below the surrounding ground surface. Minimum freeboard shall be 3 feet if the design water level is above the surrounding ground surface. At the end of the water balance (September, see Figure 4-2) the retention pond must be no more than 25 percent full. At least 1 foot of freeboard exists at the time of maximum storage (design standard DS4-08A), and at the end of the water balance (September, see Fig. 4-2) the retention pond is no more than 25 percent full.
- P. Retention Ponds shall be designed to criteria in DS4-08, item no. B through D.
- Q. DS4-08 (B), (C), (D) & (E) also apply to retention ponds.

DS4-10. PUMP STATION CRITERIA:

- A. Design Process – The pump station design process shall be a cooperative process between the designers and the City Engineer and shall include at least an initial meeting with the City Engineer, submittal and written approval of a predesign report (representing a 30 percent design), and submittal and comments on 50 percent design and the 90 percent design, and submittal and approval of the final construction plans and specifications. The design shall be consistent with and integrated with the City’s SCADA system.
- B. Firm Capacity – The firm capacity (with the largest pump out of service) of pump stations must be approved in writing by the City Engineer. The firm capacity must be coordinated with the detention or retention basin sizing and configuration. The pump station firm capacity will need to comply with downstream storm drain and open channel capacity limitations.
- C. Total Capacity – The pump station must include a backup pump equal to the capacity of the largest firm capacity pump.
- D. Wet Well – The wet well shall be designed American National Standards Institute/Hydraulic Institute Standards. A means to isolate the wet well shall be provided.
- E. Site – The site shall be configured to provide truck access to all equipment without backing up and at least two parking spaces.
- F. Debris Removal – The pump station shall include a trash rack and automatic rake that discharge into a dumpster. This debris removal system must comply with the state’s Trash Amendment requirements.
- G. Standby Generator – The pump station shall include a standby generator capable of operating all the firm capacity pumps simultaneously and a fuel tank that will provide 24 hours of firm capacity pump operation. The generator shall be enclosed in a sound attenuation structure.
- H. Crane – The pump station shall include a built-in crane that can remove all pump motors, pumps, and associated valves and equipment.
- I. Operations Building – The pump station shall include an operations building that contains the pump controls and electrical equipment, an equipment/parts storage room, an office, and a restroom.
- J. Fencing and Security – The pump station shall be enclosed in a block wall fence with razor topper. The fence shall include two 20-foot automatic gates that do not block traffic when open. The primary gate should have a Knox Box (see www.knox.com) for emergency access. The site shall surveillance cameras connected to and integrated with the City’s security system.
- K. Final Grade – The pump station final grade shall be at least 2 feet above the nearby 100-year water surface elevation.

DS4-11. ADDITIONAL DESIGN CRITERIA:

- A. Subdrainage facilities shall be provided when required by the City Engineer.
- B. Headwalls, wingwalls, culverts and outfalls shall be individually designed by the Design Engineer in accordance with the California State Standard Plans and Specifications unless otherwise approved by the City Engineer. Erosion protection shall be included as part of the design.

- C. Connections to existing systems shall be at locations approved by the City Engineer. The Design Engineer shall verify the downstream capacity of the existing system. Tapping into an existing system shall be detailed on the Improvement Plans.
- D. When off-site drainage enters the project area, the design of the drainage improvements shall include capacity to convey the off-site drainage at a rate consistent with ultimate buildout of the property, as approved by the City Engineer.
- E. Storm drain stubs shall be provided for future development on adjacent properties. Water-tight plugs shall be used.

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Approved: March 2022

DESIGN STORM
RAINFALL DATA

FIG.
4-1

Figure 4-1. 10-Year and 100-Year Design Storm Rainfall Depths

	Time Duration												
	5 Min	10 Min	15 Min	30 Min	1 Hour	2 Hour	3 Hour	6 Hour	12 Hour	1 Day	2 Day	3 Day	4 Day
10-Year Rainfall Depth (inches)	0.34	0.46	0.55	0.74	1.00	1.36	1.60	2.16	2.90	3.92	5.25	5.72	6.38
100-Year Rainfall Depth (inches)	0.48	0.66	0.79	1.05	1.42	1.91	2.27	3.06	4.12	5.55	7.72	8.50	9.39

Note:

These design storm data include an 18 percent increase from historic data to account for climate change to 2050 to 2099. The increase is based on the 100-year return period, 1-day duration Representative Concentration Pathways (RCP) 4.5 for the Sacramento Area from Appendix B of Projected Changes in California's Precipitation Intensity-Duration-Frequency Curves, prepared for California's Fourth Climate Change Assessment, August 2018.

Rainfall-Runoff Analysis		Retention Basin Water Balance Analysis	
Impervious Average:	64.2	Retention Pond Area (acres):	28.4
Pervious Average:	35.8	Retention Pond Depth (ft)	10.0
Total Average	100.0	Retention Pond Side Slope (H:V)	4
			25% of Maximum Volume (ac-ft): 58.7

Table 2. Rainfall-Runoff and Retention Basin Water Balance Analysis

Date	Design Rainfall (in)	Impervious Area Runoff(ac-ft)	Effective Rainfall (in)	Pervious Runoff(ac-in)	Total Runoff(ac-ft)	Start-of-Month Volume of Stored Water (ac-ft)	Water Surface Area (ac)	Water Depth (ft)	Potential Unit Evaporation Rate (in)	Potential Evaporation Loss (ac-ft)	Potential Unit Percolation Loss (in)	Potential Percolation Loss (ac-ft)	Total Loss (ac-ft)	End-of-Month Volume of Stored Water (ac-ft)
October	0.33	1.77	0.00	0.00	1.77	0.00	0.00	0.01	4.03	0.00	9.80	0.00	0.00	1.77
November	4.21	22.54	1.83	5.46	27.99	1.77	24.50	0.10	2.10	4.29	9.30	18.99	1.77	27.99
December	2.86	15.28	0.90	2.68	17.95	27.99	24.88	1.10	1.55	3.21	9.60	19.90	23.12	22.83
January	12.86	68.81	6.52	19.75	88.56	22.83	24.80	0.90	1.55	3.20	5.60	11.58	14.78	96.61
February	8.61	46.08	7.79	23.23	69.32	96.61	25.92	3.80	2.24	4.84	1.40	3.02	7.86	158.07
March	9.62	51.45	5.58	16.65	68.10	158.07	26.87	6.20	3.72	8.33	1.60	3.58	11.91	214.26
April	1.43	7.64	0.07	0.21	7.85	214.26	27.67	8.20	5.10	11.76	2.40	5.53	17.29	204.81
May	0.67	3.60	0.00	0.00	3.60	204.81	27.55	7.90	6.82	15.66	3.70	8.49	24.15	184.26
June	0.71	3.79	0.00	0.00	3.79	184.26	27.23	7.10	7.80	17.70	5.10	11.57	29.27	158.78
July	0.35	1.89	0.00	0.00	1.89	158.78	26.87	6.20	8.68	19.44	6.80	15.23	34.66	126.01
August	0.00	0.00	0.00	0.00	0.00	126.01	26.39	5.00	7.75	17.05	8.40	18.48	35.52	90.49
September	0.00	0.00	0.00	0.00	0.00	90.49	25.85	3.60	5.70	12.28	9.30	20.03	32.31	58.18
Total	41.65	222.85	22.79	67.98	290.83				57.04	117.75	73.00	136.40	232.64	
Maximum	12.86	68.81	7.79	23.23	88.56	214.26	27.67	8.20	8.68	19.44	9.80	20.03	35.52	214.26

Note:
 These design storm rainfall data include an 18 percent increase from historic data to account for climate change to 2050 to 2099. The increase is based on the 100-year return period, 1-day duration Representative Concentration Pathways (RCP) 4.5 for the Sacramento Area from Appendix B of Projected Changes in California's Precipitation Intensity-Duration-Frequency Curves, prepared for California's Fourth Climate Change Assessment, August 2018.
 These percolation rates are from the planning of the Dixon wastewater treatment plant percolation/evaporation basins. Different percolation rates may be appropriate for other sites. Site-specific percolation testing shall be performed to document use of other rates. The study shall be stamped and signed by a civil or geotechnical engineer.

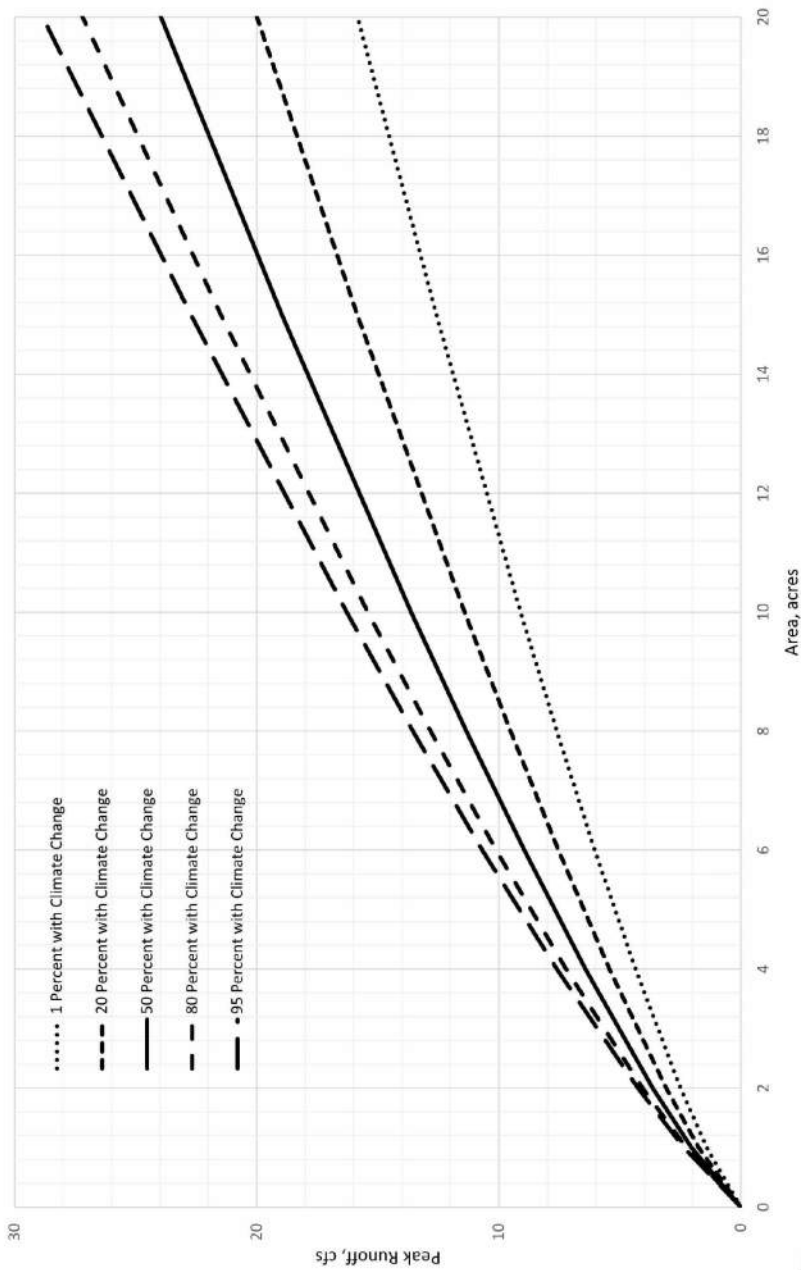
FIG. 4-2

RETENTION BASIN WATER BALANCE

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Notes:
 These runoff curves for developed land were generated with the Sacramento Method in XPSWMM, as follows:
 - Hydrologic soil group (HSG) D was used (for the high clay content and for compaction during construction activities).
 - The watershed is fully developed (for the channelization data).
 - An average ground slope of 0.001 was used.
 - The lag time parameters were calculated as length of watershed, $L = 737.9 * A^{0.5}$ where A = area (in acres), and $L_c = 0.5 * L$.



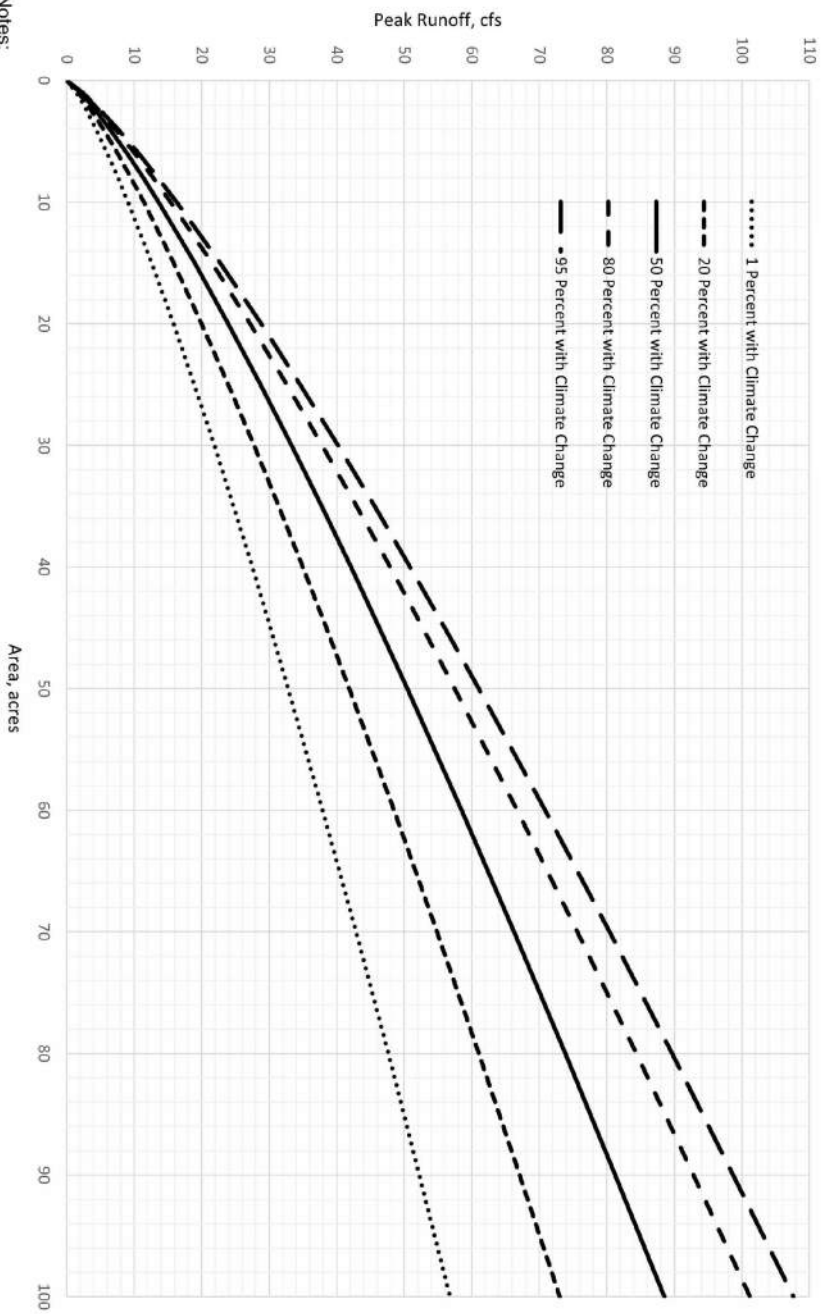
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10-YEAR PEAK FLOW
 0 - 80 ACRES

FIG.
 4-3



Notes:
 These runoff curves for developed land were generated with the Sacramento Method in XPSWMM, as follows:
 - Hydrologic soil group (HSG) D was used (for the high clay content and for compaction during construction activities).
 - The watershed is fully developed (for the channelization data).
 - An average ground slope of 0.001 was used.
 - The lag time parameters were calculated as length of watershed, $L = 737.9 \cdot A^{0.5}$ where A = area (in acres), and $L_c = 0.5 \cdot L$.

FIG. 4-4

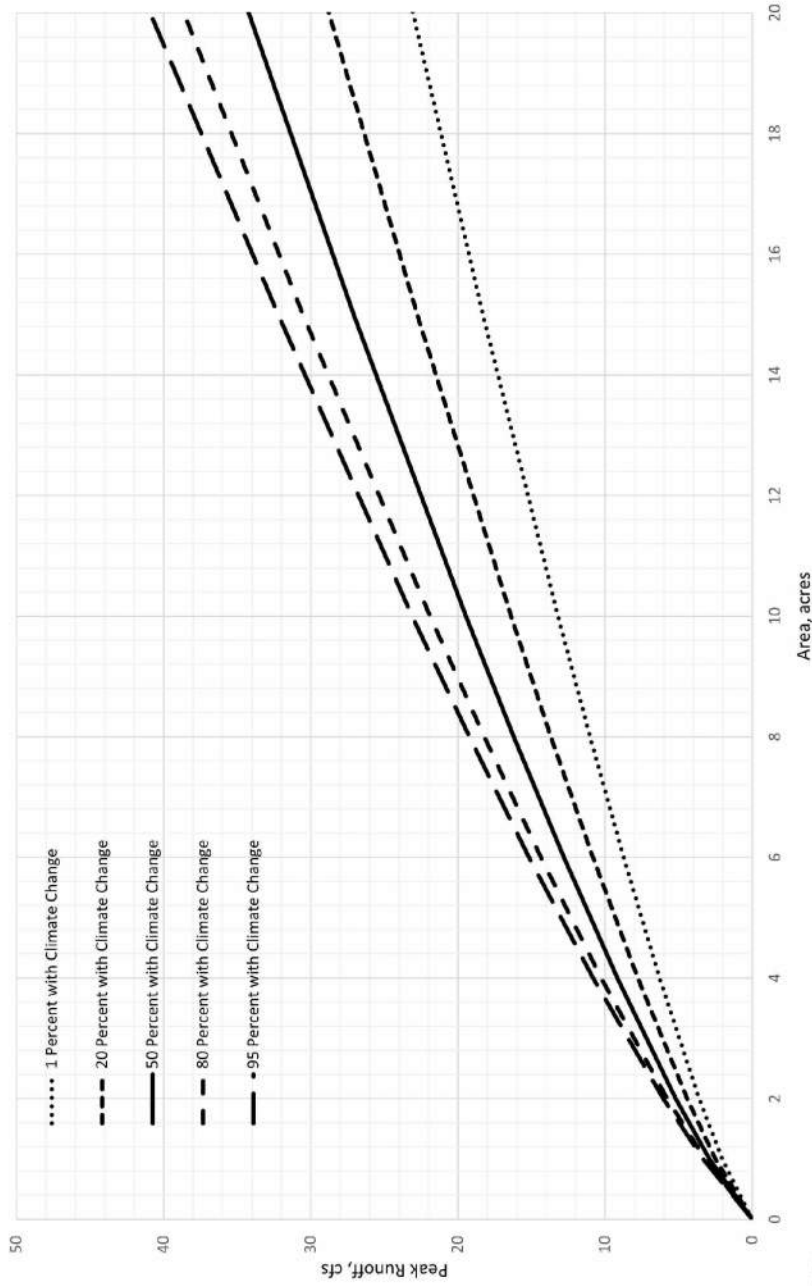
10-YEAR PEAK FLOW
 80 - 640 ACRES



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Notes:
 - These runoff curves for developed land were generated with the Sacramento Method in XPSWMM, as follows:
 - Hydrologic soil group (HSG) D was used (for the high clay content and for compaction during construction activities).
 - The watershed is fully developed (for the channelization data).
 - An average ground slope of 0.001 was used.
 - The lag time parameters were calculated as length of watershed, $L = 737.9 \cdot A^{0.5}$ where A = area (in acres), and $L_c = 0.5 \cdot L$.



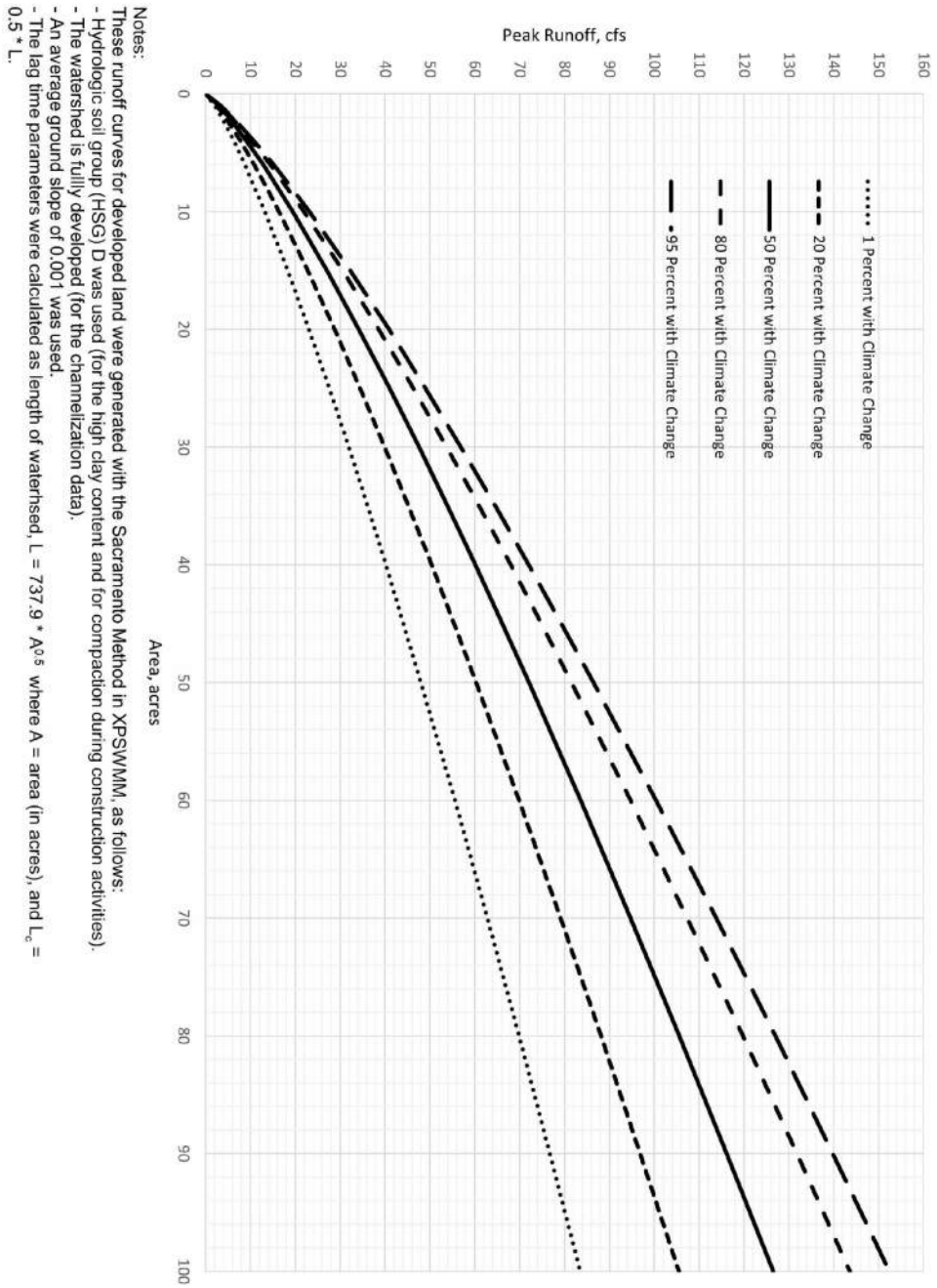
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100-YEAR PEAK FLOW
 0 - 80 ACRES

4-5



Notes:
 - These runoff curves for developed land were generated with the Sacramento Method in XPSWMM, as follows:
 - Hydrologic soil group (HSG) D was used (for the high clay content and for compaction during construction activities).
 - The watershed is fully developed (for the channelization data).
 - An average ground slope of 0.001 was used.
 - The lag time parameters were calculated as length of watershed, $L = 737.9 \cdot A^{0.5}$ where A = area (in acres), and $L_c = 0.5 \cdot L$.

FIG. 4-6

100-YEAR PEAK FLOW
 80 - 640 ACRES



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Land Use	Percent Impervious
Highways, Parking Lots	95
Commercial, Office	90
Industrial	85
Apartments, High Density Residential	80
Mobile Home Park	75
Condominiums, Medium Density Residential	70
Residential (8-10 du/acre)	60-70
Residential (6-8 du/acre), Low Density Residential, Schools	50-60
Residential (4-6 du/acre)	40-50
Residential (3-4 du/acre)	30-40
Residential (2-3 du/acre)	25-30
Residential (1-2 du/acre)	20-25
Residential (0.5-1 du/acre)	15-20
Residential (0.2-0.5 du/acre)	10-15
Residential (<0.2 du/acre)	5-10
Open Space, Agricultural	2 - 5



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LAND USES
AND
IMPERVIOUS PERCENTAGES

FIG.
4-7

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ENGINEERING DESIGN STANDARDS

SECTION 5 – WATER SUPPLY SYSTEM DESIGN

DS5-01. GENERAL:

Design of the domestic water system in the service area of the City of Dixon shall, unless otherwise noted, conform to the standards and references set forth below, and standard acceptable engineering practices. Water improvements shall be designed to serve the ultimate level of development as defined in the General Plan and the Water System Master Plan.

All improvements shall conform to the requirements with, but not limited to, the California Safe Drinking Water Act and Related Laws, the State Water Resources Control Board Department of Drinking Water, the California Plumbing Code, the National Board of Fire Underwriters, the California Fire Code, the California Building Code, and these Design Standards.

1.1 Abbreviations and Definitions

ARV: Air Release Valve

BFPs: Backflow Prevention Assemblies

Contractor: Any person or persons, firm, partnership, subdivider, company, or corporation supplying the materials or doing the work of installing water facilities

City Engineer: As used herein means the City of Dixon City Engineer

City Standards: The City of Dixon Engineering Standards and Specifications, latest revision

DCDA: Double Check Detector Assembly

DI: Ductile iron

Engineer: The Project Engineer or his authorized representative

fps: feet per second

gpm: gallons per minute

Hydrant branch: The pipeline connecting a fire hydrant to a water main

Inspector: All persons employed by the City of Dixon responsible for inspection of City of Dixon improvements

Multi-family residence: Dwelling structures with two or more units

NEQ: North East Quadrant

psi: pounds per square inch

PVC: Poly Vinyl-Chloride

RP: Reduced Pressure Backflow Preventer

RPDA: Reduced Pressure Detector Assembly

Service Connection: The pipe extending from the main to the meter, including all of the pipe, fittings, valves and appurtenances, except the meter, necessary to make the installation

SID: Solano Irrigation District

USA: Underground Service Alert

Water Master Plan: The latest revision of the City of Dixon Water System Master Plan

1.2 References

- A. City of Dixon Engineering Standards and Specifications
- B. City of Dixon Construction Details
- C. City of Dixon Water Master Plan
- D. The City of Dixon Municipal Code for Water, being Chapter 14.02, Water, of the Dixon Municipal Code.
- E. American Water Works Association (AWWA) Standards.
- F. California Code of Regulations, Title 22, Division 4, Chapter 16, California Waterworks Standards.
- G. State Water Resources Control Board Division of Drinking Water (DDW).
- H. The Uniform Plumbing Code.
- I. Occupational Safety and Health Administration (OSHA)
- J. The California Building Code.
- K. Solano County Resource Management Department Well Standards
- L. State of California, Water Code Section 13750 thru 13755
- M. State of California, Department of Water Resources (DWR) Bulletin 74-81: Water Well Standards, State of California, December 1981 and Bulletin 74-90: California Well Standards, June 1991
- N. American Standard Testing Materials (ASTM)
- O. NSF/ANSI 60 Drinking Water Treatment Chemicals
- P. NSF/ANSI 61 Drinking Water System Components
- Q. California Air Resources Board and Air Quality Management District Standards
- R. American National Standard Institute/Hydraulic Institute (ANSI/HI)
- S. American Bearing Manufacturers Association (ABMA)

T. International Organization of Standardization (ISO)

1.3 Improvement Plan Requirements

Improvement Plans are to include plans, profiles and details. A signature block, as shown in Figure 2-2 shall be provided for the City Engineer to approve the plans. A note shall be made on the plans to direct the Contractor to contact U.S.A. prior to any excavation, giving 48 hours' notice, as required by U.S.A., and include the U.S.A. phone number. The plans must show existing and proposed rights-of-way. Show existing and proposed main sizes and types, valves, air valves, hydrants, blow offs and other related facilities in both plan and profile views, except valves do not have to be shown in the profiles. Services shall be shown in the plan views, but need not be shown in the profiles. Show top of pipe elevation at all grade changes. Show and note points of connection to existing mains. Show clearance to all crossing utilities. Provide details where conflicts may occur to show how they are avoided.

1.4 Modifications

These Design Standards may be modified on a case-by-case basis by the City Engineer.

DS5-02. DISTRIBUTION FACILITIES:

2.1 Main Lines

2.1.1 Sizing

- A. Typical minimum size of main pipelines shall be 8 inches. A 6 inch pipeline may be used on dead-end lines having no fire hydrants, if it can supply the necessary flowrate and pressure.
- B. In all cases, water mains shall be large enough to meet the fire flow requirements established by the Insurance Services Office, the City of Dixon Fire Department, and those listed below.

2.12 Pipe Type

Allowable materials for public water distribution shall be DI or PVC.

2.1.3 Pressure and Flow Requirements

- A. Mains shall be sized to maintain 50 psi to 80 psi throughout the system under normal conditions. (Note that the system is set to operate between 55 psi and 65 psi.) Pipes shall be rated for a minimum 150 psi service unless a higher pressure rating is necessary.
- B. Peak hour pressures may drop to 45 psi.
- C. Fire flow demand must be provided simultaneously with the maximum daily demand on the system. The minimum fire flow rates shall be provided at a minimum of 20 psi for a minimum 3 hour period. The City of Dixon Water Master Plan, latest revision, presents the latest Fire Flow requirements.

<u>Zoning</u>	<u>Flowrate</u>
Single Family	1,500 gpm
Multi-Family	2,500 gpm
Commercial	3,500 gpm typical, 4,000 gpm North East Quadrant (NEQ)
Industrial	3,500 gpm typical, 4,000 gpm NEQ and future industrial areas east of the

railroad tracks

- D. Pipeline design velocities shall be limited to 6 fps. A maximum water velocity of twelve (12) fps will be utilized when designing for fire flows and/or other emergency conditions.

2.1.4 Location and Clearance Requirements

- A. Mains shall be located within public rights-of-way or easements for public utilities. Easements shall conform to section DS5-05.4. Minimum width of 30 feet for 8 inch and smaller pipes and 40 feet for 12 inch and larger pipes.
- B. Mains within street rights-of-way shall generally be located 6 feet south or east of street centerlines.
- C. Main lines shall be laid straight, with direction changes made with fittings. Gradual curves of not less than manufacturer-recommended minimum radii may be used in curved streets and where approved by the City Engineer.
- D. Minimum cover over main pipelines shall be as follows:
Within paved areas: 30 inches from top of pipe to bottom of subgrade.
Outside of paved areas: 36 inches from top of pipe to finish grade.
Refer to Standard Detail Sheet 5000.
- E. Mains shall be looped in a gridiron pattern to eliminate dead-end pipes.

EXCEPTIONS:

- 1. Mains in cul-de-sacs may be dead-ended if any hydrant located at the start of the cul-de-sac is connected to a loop in the system, not the dead-end branch in the cul-de-sac.
- 2. Mains may be dead-ended if they are to be extended in the near future and the planned extension will eliminate the dead-end conditions.
- F. Maximum spacing between parallel supply mains (12 inch pipes) shall be one-half mile (2,640 feet).
- G. Mains adjacent to sanitary sewers and other non-potable pipelines shall be located in accordance with the California Waterworks Standards Title 22 CCR §64572 Refer to Standard Detail Sheets 5010, and 5210.
- H. Water mains in streets planned to be extended in the future shall be extended past the edge of pavement and through public service easements.
- I. Water services and sewer laterals may be run in the same trench, but ONLY if the requirements of the Uniform Plumbing Code, Section 1108, are met. Designers are responsible to make themselves aware of the exact wording of that section. The basic requirements are:
 - 1. The bottom of the water pipe shall at all points be at least 12 inches above the top of the sewer lateral pipe.
 - 2. The water service pipe shall be placed on a solid shelf excavated at one side of the common trench, with a minimum clear horizontal distance between the sewer and water pipes of 24 inches.

2.2 Main Pipeline Appurtenances

2.2.1 Valves

- A. Valves shall be located so that any section of main line may be isolated, and so that no more than two fire hydrants are removed from service.
- B. Valves shall be installed in main lines at the boundary of development if the main pipeline is to be extended in the future.
- C. Maximum spacing of valves shall be 600 feet in commercial and industrial areas, and 1000 feet in all other areas.
- D. Valves located between street intersections shall be located at fire hydrant branches. Only one in-line valve is required at branch fittings where needed to comply with the maximum spacing requirement of Item 2.2.1 C.
- E. Install four valves at cross fittings. Refer to Standard Detail Sheet 5050.
- F. Install three valves at tee fittings except at hydrant branches (see 2.2.1 D).
- G. Install valves on each side of services to allow for isolation, 3 inches in size and larger, to schools, hospitals and major industrial sites.
- H. Note on the plans all existing valve boxes to be adjusted to grade.
 - 1. Resilient seat gate valves are preferred.
- I. Refer to Standard Detail 5090 for the approved method of installation.

2.2.2 Fittings

- A. All joints shall safely withstand the same working pressures for which the water main is designed.
- B. All fittings shall be thrust blocked as follows:
 - 1. Concrete thrust blocks must be of adequate size. Refer to Standard Detail Sheets 5020, 5030 & 5040.
 - 2. At vertical bends where the thrust is upward, tie rods shall be used and designed to take the full theoretical tension developed under the test pressure.
 - 3. Alternate joint restraints may be used if approved by the City Engineer. (e.g., mechanical joints with constraints)
- C. Fittings shall be used for all bends of $11\frac{1}{4}^\circ$ and larger.

2.2.3 Hydrants

- A. Hydrant locations:
 - 1. Maximum spacing shall be 300 feet as measured along the face of curb.
 - 2. Locate on property lines when practical;
 - 3. Provide minimum 3 feet clearance from street light poles;
 - 4. Provide minimum 10 feet clearance from existing and proposed street trees;

5. When located near intersections, place 5 feet beyond the curb return.
 6. In cul-de-sacs, locate the hydrant at the start of the return to the cul-de-sac bulb. See Design Detail DF-2, "Standard Fire Hydrant Location on Cul-de-Sac Streets," for the preferred location.
 7. All locations are subject to the approval of the City of Dixon Fire Marshal and the City Engineer.
- B. The minimum pipeline size to serve a fire hydrant is 6 inches. A dead-end 8-inch main may serve two hydrant branches.
 - C. All fire hydrants which are privately owned need to conform to CFC and as approved by City of Dixon Fire Marshal and the City Engineer. A public easement shall be provided to the City for privately owned hydrants.
 - D. Hydrants shall be independently valved at the service main.
 - E. Blue reflective pavement markers shall be located 8 inches from the street centerline, perpendicular to and towards each hydrant. The markers shall be shown on the striping plan sheet if such a plan is required.
 - F. Refer to Standard Details 5060, 5070, 5080 & 5220 for the approved method of installation.

2.2.4 Air Relief Valves

- A. Air relief valves (ARV) shall be located:
 1. At the end of main lines, both permanent and temporary, if the pipeline rises to the termination point.
 2. At high points in main pipelines. A high point is considered to exist when the pipe slopes downwards in both directions away from the pipe and the difference in elevation, between changes in grade 500 or more feet apart, exceeds one diameter of the pipeline.
- B. Existing temporary ARVs to be removed or relocated, and new ARVs to be installed, shall be clearly shown and noted on the plans.
- C. Temporary ARVs shall be located 5 feet past the end of the roadway pavement.
- D. See Standard Detail 5150 for the approved method of installation.
- E. For pipe segments spanning 1,000 feet, air release and blow off should be placed on either side of the isolation valve.

2.2.5 Combination Air and Vacuum Valves

- A. Combination air and vacuum valves exhaust air during filling of pipe and admit air during shutdown and draining of pipe. These valves release air continuously during normal operation of pipe and prevent any surges. Use these types of air valves in all pipelines 12 inches and larger.

2.2.6 Blowoffs

- A. Blowoffs shall be located:
 - 1. At dead-end of main lines, both permanent and temporary if the pipeline descends to the termination point, and where no fire hydrant exists. A fire hydrant may be considered as a blowoff if located where a blowoff is required.
 - 2. At significant low points in main lines where directed by the City Engineer.
 - 3. Where stagnant conditions are likely to develop in pipelines isolated by normally closed valves from water flowing through the distribution system.
 - 4. At the ends of water service pipes without meter stops installed in grade boxes.
- B. Existing blowoffs to be removed or relocated, and new blowoffs to be installed, shall be clearly shown and noted on the plans.
- C. Temporary blowoffs shall be located outside of roadway pavement.
- D. See Standard Detail 5140 for the approved method of installation.

2.2.7 Sampling Stations

Locations for state-required sampling stations shall be provided by the City Engineer and noted on Improvement Plans submitted for review. The number of stations required in the City of Dixon Service Area depends upon the population being served, or the number of service connections, and is determined by City staff.

2.2.8 Main Taps

- A. "Hot taps" to be approved by City Engineer.

DS5-03. SERVICE CONNECTIONS:

3.1 Services

- A. Every developable parcel shall be provided a service connection. A single service connection shall not serve more than one dwelling unit except:
 - 1. In multi-family dwellings, where an adequately sized service line may feed multiple meters, and
- B. The minimum service pipe size shall be 1 inch to be HDPE material (iron pipe size).
- C. Services larger than 1 inch in size shall be justified by submission of the water demand on the service. 1 ½ to 2 inch HDPE material (Copper tube size) larger than 2-inch ductile iron or C-900. Installation of larger services shall be approved by the City Engineer.
- D. The location of all service lines shall be shown on the plans. Services shall be located:
 - 1. A minimum of 3 feet from the projection of the side lot line;
 - 2. A minimum of 2 feet clearance from sewer laterals;
 - 3. On the wide frontage of corner lots, or on the lesser-traveled way at intersections with arterial or collector streets;
 - 4. Not within driveway approaches. This includes service lateral pipelines from the main to the meter.
 - 5. Services shall not be connected to fire hydrant branch mains downstream of the shutoff valve.

- E. Easements for services shall extend 5 feet or more beyond the point of connection and be 10 feet wide. Services shall be located in the center of their easements.

3.2 Meters

- A. All services shall be metered. Meter sizes shall be determined in accordance with the Uniform Plumbing Code, latest edition, except as noted below.
- B. Each lot in a new residential subdivision shall be provided with a one inch meter to meet required fire sprinkler needs per the California Building Code, and as required by the City of Dixon. A ¾ inch meter may be provided at the discretion of the City. In all cases, calculations supporting the new service size shall be submitted to the City for review and acceptance prior to approval of any building or Improvement Plans.

In the event that a residential addition or remodel triggers the need for fire sprinklers, per California Building Code and as required by the City of Dixon, calculations supporting the service size shall be submitted to the City for review and acceptance prior to approval of any building or Improvement Plans.

Utilize Standard Detail 5200 for the installation of the metered service with residential fire sprinkler system.

- C. Commercial Meter Location: Meters shall be located within 5 feet of the service stub unless otherwise approved by the City Engineer.
- D. Refer to Standard Details 5100, 5120, & 5200 for the approved method of installation

3.3 Cross-Connection Control (Backflow Prevention)

- A. Cross-connection requirements are specified in the Article XI, Protection of Drinking Water, of the City of Dixon Municipal Code for Water.
- B. In general, backflow prevention assemblies are required on all services except single family residential services, including:
 - 1. Commercial and industrial services;
 - 2. Fire protection systems (both sprinkler and distribution systems);
 - 3. Landscaping irrigation systems.
 - 4. Multi-Family Residences (Apartment complexes, triplex, etc.)

Refer to Article XI, Protection of Drinking Water, of the City of Dixon Municipal Code for Water, Section 14.02.1130.B.4.f for a list of recommended minimum types of backflow protection devices. These recommendations shall be followed.

- C. All assemblies are to be:
 - 1. Designed in accordance with Article XI, Protection of Drinking Water, of the City of Dixon Municipal Code for Water.
 - 2. Listed as approved by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research.
 - 3. Installed in accordance with Standard Details 5160, 5170, 5180, 5190 & 5191.

- D. Backflow prevention assemblies are owned by the landowner, and all maintenance and repair of them is at the landowner's expense.
- E. Backflow prevention assemblies shall generally be located as follows:
 - 1. To protect the water system, locate BFPs immediately after (downstream of), and as close as practical to, the water meter.
 - 2. To protect them from physical damage, locate BFPs:
 - a. Immediately behind the back of the sidewalk for 2 inches and smaller BFPs;
 - b. Ten feet behind sidewalks in landscaping areas, and 5 to 6 feet from driveways for 3 inch and larger BFPs.
 - 3. Locate BFPs at the center of their easements.
- F. The proposed location of Reduced Pressure Detector Assemblies (RPDA) and Double Check Detector Assemblies (DCDA) shall be approved by the City Engineer.
 - 1. To protect the RPDA/DCDA from physical damage, locate it 10 feet behind sidewalks in landscaping areas, and 5 to 6 feet from driveways.
 - 2. Locate RPDAs/DCDAs at the center of their easements and as near as practical to the service stub.
- G. Access to all backflow prevention assemblies must be provided so that annual testing may be safely and easily accomplished by an American Water Works Association certified cross-connection backflow tester.

DS5-04. WATER SUPPLY FACILITIES:

4.1 General

Water supply facilities include municipal supply wells, storage and hydropneumatic tanks, booster pump stations, and associated equipment for their use and operation. The City of Dixon water system uses these facilities to extract and pump groundwater into the distribution system.

The criteria listed below are for designing City of Dixon water supply facilities. All water supply facilities shall be built to current state and City specifications, which are provided in the City of Dixon Construction Standards. Additional specifications will be provided by the City Engineer as necessary for inclusion in construction documents.

Construction will be inspected by the City of Dixon for compliance with its specifications. Design review, inspection and other oversight of supply facility design and construction shall be at the developer's expense.

4.2 Site Requirements

A. Site Area and Dimensions

1. Well, Tanks and Booster Facilities:

The site layout is to be rectangular and shall meet, the minimum dimensions shown on Drawings DF-4, DF-5, and DF-6. Single tank sites shall be sized to allow for a future second tank. See Design Details DF-4 and DF-5 for typical layouts and minimum dimensions. Provide a minimum of two driveways into the site and access through the site so well rigs can be positioned around the well

and all equipment can be accessed and maintained. Actual design shall be on a site by site basis and must be approved by the City Engineer in writing.

2. High Pressure Municipal Supply Well Facilities:

Provide an open area of at least 20 feet wide by 50 feet long on each side of the well casing. These are needed for location of cranes and trailers used in well maintenance. The open areas should be in-line and opposite each other. Provide a minimum of two driveways into the site so well rigs can be positioned around the well. The total site area shall be 0.3 to 0.4 acre. Typical dimensions are 100' x 110'. See Design Detail DF-6 for a typical layout. Municipal supply well sites shall be adequately sized to accommodate wellhead treatment.

3. Requirements for Additional Area

If some of the site will be unusable (such as areas containing creeks), the site area must be increased to offset the unusable area. Passage of other public utilities through the site in their own easements, and setback requirements on the site that prevent some of it from being fenced or used, add additional area and separation requirements. A more detailed review can be made on alternative dimensions, but a tentative site layout will be required, at the developer's expense.

B. Site Locations

Each water supply facility shall be sited based on consideration of applicable regulations and requirements and defined facility-specific siting needs. Municipal supply wells shall be sited in accordance with the State of California Code of Regulations Title 22, Division 4, Chapter 16, Article 3, Section 64560, "New Well Siting, Construction, and Permit Application", State Water Resources Control Board Division of Drinking Water (DDW) requirements and Solano County Resource Management Department Well Standards. Site locations are subject to review and approval by DDW.

C. Site Access Requirements

Each facility shall be provided dual access from adjacent public rights-of-way, which shall conform to applicable City standards in all respects, including alignments, dimensions, clearances and surfacing. Adequate space must be provided for vehicular drive through access to facilities. Access for trailer-mounted drilling and pump column-removal equipment shall be provided at municipal supply well sites.

D. Grading and Drainage

Before the final site elevation is set, the drainage patterns of flood flows in the area should be determined, and the lowest site elevation set one foot above the probable high-water elevation. The site should be sloped upwards from this elevation to provide proper on-site drainage. The water supply equipment should be located at or near the high point.

E. Clearances between Structures and Equipment

At least 42 inches clearance around all equipment is required. Manufacturer-required clear zones for maintenance are in addition to the minimum 42 inches.

F. Lighting

Provide lights at the well, the electrical building door, and the chlorinator.

G. Sound Control

If the well is located in a residential area, a sound enclosure will be required. Noise levels are established by the City of Dixon Community Development Department.

H. Fencing

Fence shall be 8 feet tall block wall with razor topper. Use of chain link fencing must be approved by City Engineer. Gates shall be single panels, 20 feet wide roller gates (preferred) or alternatively 20 foot swing gates opening into the compound. Dual access required for circulation.

I. Landscaping

Landscaping shall be designed to blend with existing landscaping as much as possible, and shall be planted outside of the fenced compound. Non-deciduous and water conserving plants are preferred. Automatic irrigation systems shall be included. Landscaping shall be maintained by the City of Dixon City Engineer.

J. Typical Facilities

Design Details DF-4 and DF-5 show typical Well, Tanks and Booster Facilities. Actual facilities may be designed differently as long as they meet City requirements. Site design shall be subject to the approval of the City Engineer.

4.3 Equipment Requirements

A. Municipal Supply Wells

1. Municipal supply wells shall be drilled, constructed, developed and tested in accordance with the State of California Waterworks and Well Standards, applicable sections of the California Code of Regulations, Solano County Resource Management Department Well Standards, City of Dixon Municipal Code for Water requirements, and applicable AWWA, ASTM, NSF/ANSI 60, and NSF/ANSI 61 standards. Municipal supply wells shall have sanitary seals with a minimum 50-foot depth, around their casings per state and county standards. Deeper sanitary seals with a depth potentially greater than 400 feet (due to agricultural contaminants of the shallow groundwater) shall be required when needed to protect municipal supply wells from shallower groundwater with degraded quality. Wells shall be gravel packed using appropriately size-graded material conforming to AWWA standards. Casing and screen shall meet applicable ASTM standards. Well screens shall be factory-fabricated louvered or wire wrapped.
2. The use of mud pits during well drilling shall not be allowed.
3. The minimum design production capacity for a municipal well in the City system is 1,500 gallons per minute. If pumping into a storage tank, well pumps must develop sufficient pressure to fill the tank at its site. Well pumps that pump directly into the distribution system must generate the maximum current system pressure and must be confirmed before finalizing the well design.
4. Municipal supply wells shall be designed and constructed to include pump to waste capability to support operation and maintenance requirements.
5. Municipal supply well design shall be based on a test boring or multiple completion monitoring well to a depth of at least 1,500 feet below ground surface. Information from the test boring or multiple completion monitoring well will be used to identify productive zones that meet

drinking water standards and achieve a yield of 1,500 gpm. The preference is to design the well to meet all drinking water standards without treatment. If required, the information shall be sufficient to design the required treatment system.

6. Pump controls.
 - a. Reservoir – As the water level in the reservoir drops or rises, sensors signal the pump control box to start or stop.
 - b. Distribution System Pressure – Must generate the maximum current system pressure and must be confirmed with City Operations before finalizing the pump control design.
 - c. SCADA – A programmable logic controller (PLC) interface between the storage tank instruments and the central control system. The storage tank remote terminal units (RTU) is programmed in accordance with the storage tank's control strategy which should be prepared by the design consultant.
 - d. Well pumps – Well pumps shall be centrifugal pumps, with solid shaft, rotor with impeller keyed or press-fit on it. The casing, shaft and impeller are made from alloy steel forging.
 - e. Diesel generator – Diesel generator should be capable of running 72 hours continuously. The generator should have sound barrier arrangement to meet the noise ordinance requirements at project property line. It also needs automatic transfer switch.
 - f. Municipal supply wells pumping directly into the system shall be provided with variable frequency drives. Those pumping into storage tanks shall be provided with constant speed motors. The suction line should extend at least 5 feet below the pumping water level and be about 10 feet above the well bottom.
 - g. Pumps shall be housed in a building adjacent to the municipal supply well.

B. Hydropneumatic /Surge Tank

1. Each well directly connected to distribution system shall be equipped with a hydropneumatic tank, check valve/meter manifold, liquid/tablet chlorinator, electrical control building, PG&E transformer, and a diesel-powered emergency electrical generator.
2. A hydropneumatic tank shall be installed on the outlet of each pumping plant. The hydropneumatic tank or surge protection tank must include all controls and appurtenances, including air volume control system and air charging system, supplied by a single vendor as unit responsibility.

C. Water Storage Tanks

1. Water storage tanks shall be welded steel and shall be designed and constructed in accordance with AWWA D-100 (Welded Carbon Steel Tanks for Water Storage), ASCE 10 (Minimum Design Loads and Associated Criteria for Buildings and Other Structures), and the California Code of Regulations Title 22 Chapter 16, Article 6 (Distribution Reservoirs).
2. Tanks shall have separate inlet and outlet piping as required by CCR Title 22 §64585(b)(4). Piping shall be placed through the bottom of the tank. Recirculation piping and pumps shall be provided to afford additional circulation in the storage tank. The pumping system shall be designed to recirculate the entire volume of the storage tank in 3 days.
3. The tank foundation shall consist of a reinforced concrete ring. The top of the ring wall footing shall be a minimum of 6 inches above finished grade. The minimum depth of the ring wall footing below the bottom of the tank is not less than 2 feet. A geotechnical investigation shall be conducted at the site of the tank structure with at least one boring located at the center of the proposed tank and to a depth of 75 percent of the tank radius or a minimum depth of 60 feet.

- The number of borings and associated depth shall be approved by the City Engineer prior the beginning of the geotechnical field investigation.
4. An emergency fill connection to the distribution system shall be provided within the facility compound and immediately adjacent to the tank. The emergency fill connection shall be valved and controlled automatically with a supervisory control and data acquisition (SCADA) system.
 5. Accessories shall include a secured roof access, stairs, overflow pipe and drains.
 6. Access to antennas and related equipment should comply with Occupational Health and Safety Administration (OSHA) regulations. This may require a safety rail around the installation, anchor points on the tank roof for personnel tie-off, ladders, or other fall-prevention devices.
 - a. Roof Vent shall be provided and located near center of the tank.
 - b. Vent capacity shall be equal to the maximum flow rate of water entering or exiting the tank without developing excess pressure.
 - c. Vent shall be screened with a stainless-steel mesh.
 7. Vent shall be pressure-vacuum vent or a separate pressure-vacuum relief mechanism shall be provided.
 8. Tank drain at bottom of tank (not the manway) and where it discharges (storm drain). Discharge should be dechlorinated prior to release into the storm drain system.
 9. Seismic anchor – Anchor bolts are used to resist safely the seismic force and the uplift resulting from the overturning moment about the axis of the base of the tank. Anchor bolt nuts are torqued after filling the storage facility. Anchor bolts shall be included in accordance with AWWA D100.
 10. Interior/exterior coating shall be in accordance with AWWA D102.
 11. Water Quality – A disinfection system shall be included and chlorine residual level shall be monitored continuously.
 - a. Disinfection Type: Sodium Hypochlorite.
 - b. The disinfection system shall be housed in separate room within the pump station building. The design should include chlorine analyzers, sampling ports and a flanged connection for chlorine injection.
 12. Tank sampling ports for water quality – Four (4), $\frac{3}{4}$ -inch sample taps shall be provided at the following levels.
 - a. Three points protrude one foot into the tank and separated vertically to represent water quality from the bottom to the top of the tank.
 - b. A fourth sample point located at the bottom, flush with the inside face of the tank.
 13. Signed and stamped calculations from design engineer registered in the State of California.
 14. Cathodic protection - at a minimum the corrosivity study should be performed to determine if cathodic protection is required. Study shall be performed by NACE certified.
 15. Provide visual level indicator on exterior of tank.
 16. SCADA – Water storage tank level, sodium hypochlorite storage tank levels, chlorine feed pump status/fail, and chlorine residual levels.

D. Pumping Stations

1. The discharge manifold of each pumping station (both wells and booster pumps) will be metered and teed directly into the 12" distribution pipe grid so as to provide two 12" flow paths into the grid. In other words, such facilities will not be located at the end of a 12" branch line or discharge into one 12" and one 10" pipe, etc.

2. Pumps and electrical equipment shall be housed in weatherproof buildings. The prevailing architectural style of buildings includes split-face block walls, metal doors, and wood truss-framed roofs with tile roofing.
3. Each pumping station shall be equipped with a PG&E service (which typically requires an on-site transformer) and a diesel-powered emergency electrical generator. All electrical equipment shall conform to the National Electrical Code (NEC).
4. Pumps, valves and pipings shall be designed, selected, constructed and tested in accordance with the American National Standard Institute/Hydraulic Institute (ANSI/HI), American Bearing Manufacturers Association (ABMA) and International Organization of Standardization (ISO).

4.4. Well Abandonment

Abandon and destroy water wells in accordance with the provisions of DDW and County Public Health Department Standards. Provide a Water Well destruction plan prepared by a registered engineer or certified hydrogeologist. The primary purpose of the plan shall be to prevent groundwater movement, utilizing the existing well structure, between the various underground aquifers as well as prevent the direct movement of surface water into the underlying aquifer. The well destruction plan will be reviewed and approved by the City Engineer prior to commencement of work.

DS5-05. SPECIAL CONSIDERATIONS:

5.1 Landscape Irrigation Services

Services shall be located near a 110 VAC power source for the irrigation controller. RP assemblies shall be provided for each landscaping irrigation service.

5.2 Fire Protection Services

Calculations of water service requirements shall be submitted for review by City's Fire Marshal.

5.3 SID Irrigation Facilities

Existing facilities of the Solano Irrigation District (SID) shall be protected, relocated, taken out of service or removed as directed by SID in review comments. All work done on SID facilities shall be in conformance with the SID Standard Specifications and Details. No work can be done on water systems to be maintained by SID without the approval of the plans and details by the SID Engineering Department.

5.4 Rights-of-way

Proof of existing rights-of-way shall be submitted to the City of Dixon for review and approval a minimum of 60 days prior to commencement of construction. Easements for water system facilities shall be a minimum of 30 feet wide for 8 inch pipes and 40 feet wide for 12 inch and larger (except for services and BFPs as noted above), with the main or appurtenance offset 6 feet from the centerline of the easement. On-site interior water lines outside the public right-of-way and not protected by backflow prevention devices shall be owned and maintained by the City, and shall require an easement dedicated to the City of Dixon.

DS5-06. DESIGN SUBMITTAL REQUIREMENTS:

6.1 Special Designs

- A. Water demand for services larger than one inch in size.
- B. Locations of RPDA/DCDA assemblies for fire protection systems.
- C. Fire protection system calculations, stating the following supply requirements: pipe size, design supply pressure, design flowrate, booster pump size, inlet head requirements, and curves.
- D. Pipe supports.
- E. Railroad crossings (bored casings) and similar measures.

6.2 Approvals

No work can be performed on City water systems without an approved set of plans.

6.3 Typical Review Process

- A. Three (3) copies of Improvement Plans shall be submitted to the City of Dixon City Engineer, with accompanying calculations, tentative or final subdivision maps, and other data necessary for review of the proposed design.
- B. When the complete plans are acceptable, an original set shall be submitted to the City of Dixon for signature. Four (4) sets of prints and a reproducible set of the approved plans shall be submitted to the City of Dixon City Engineer prior to commencement of work. Additionally, electronic plan set files shall be submitted, including AutoCAD files (or other design software) and pdf files.

6.4 Addresses

- A. City of Dixon City Engineer

Mail:

600 East A Street

Dixon, CA 95620

(707) 678-7030

FAX (707) 678-7039

Physical Address:

171 South Fifth Street

Dixon, CA 95620

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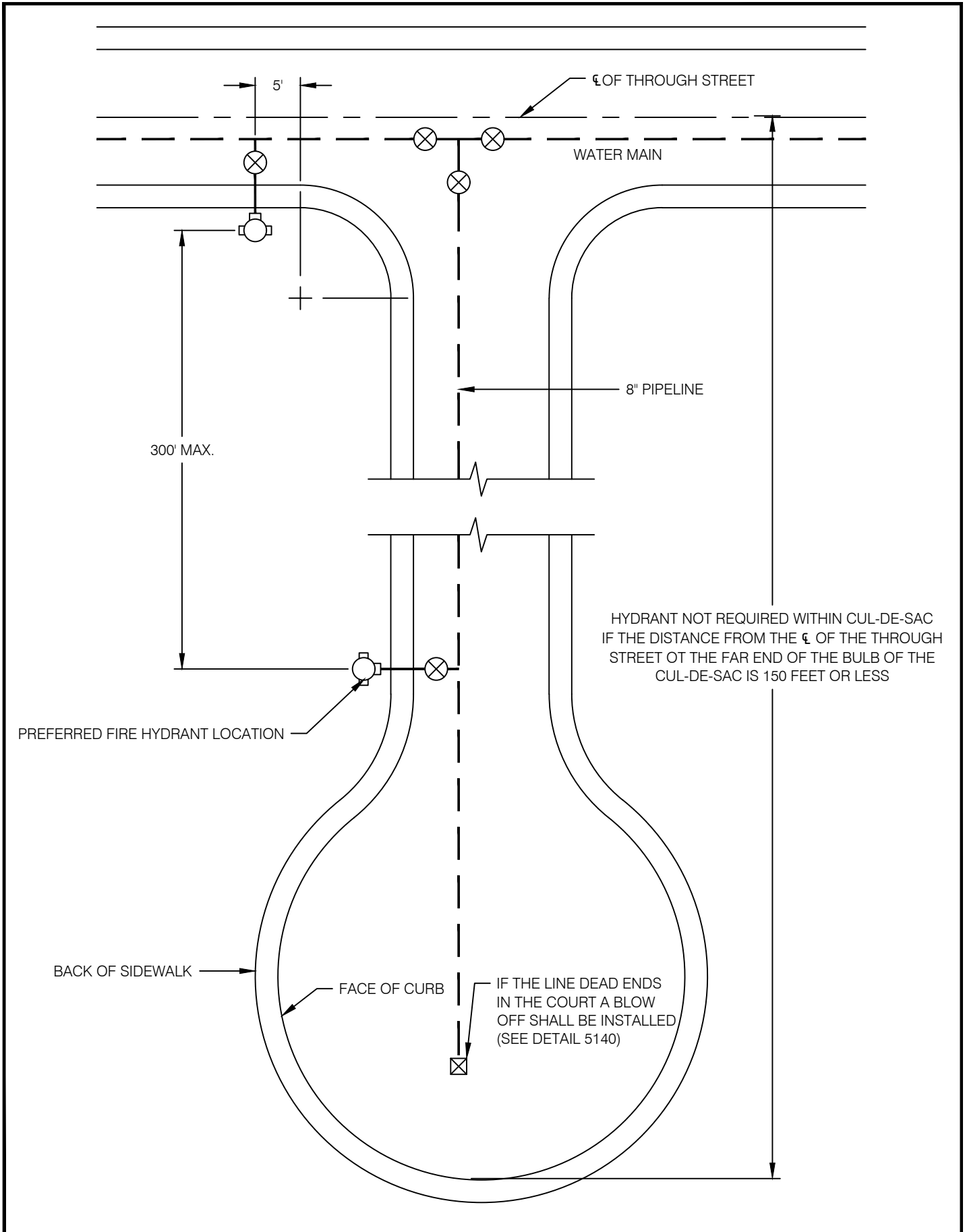
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

TYPICAL SIGNATURE
BLOCK

DF-1



DF-2

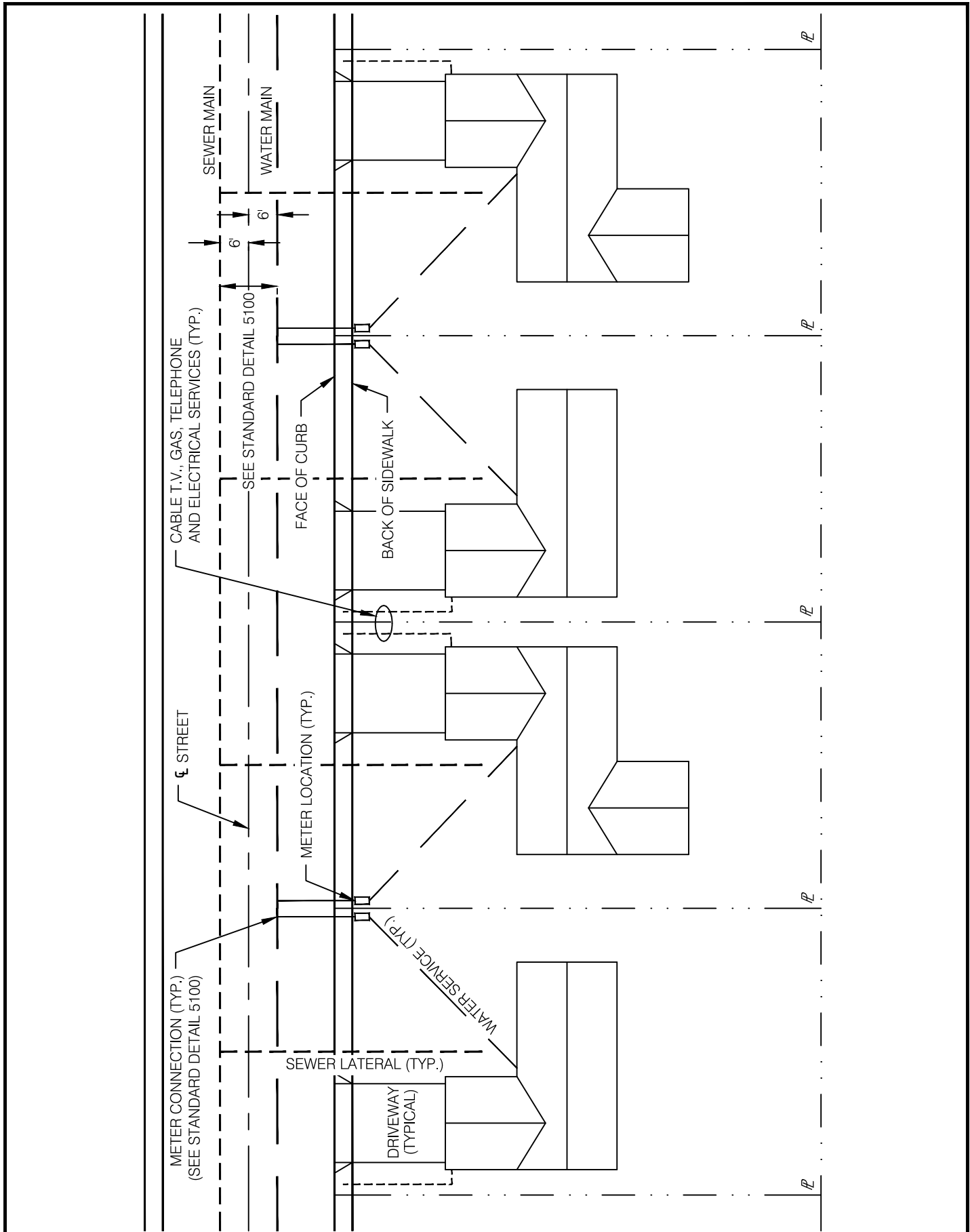
STANDARD FIRE
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APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





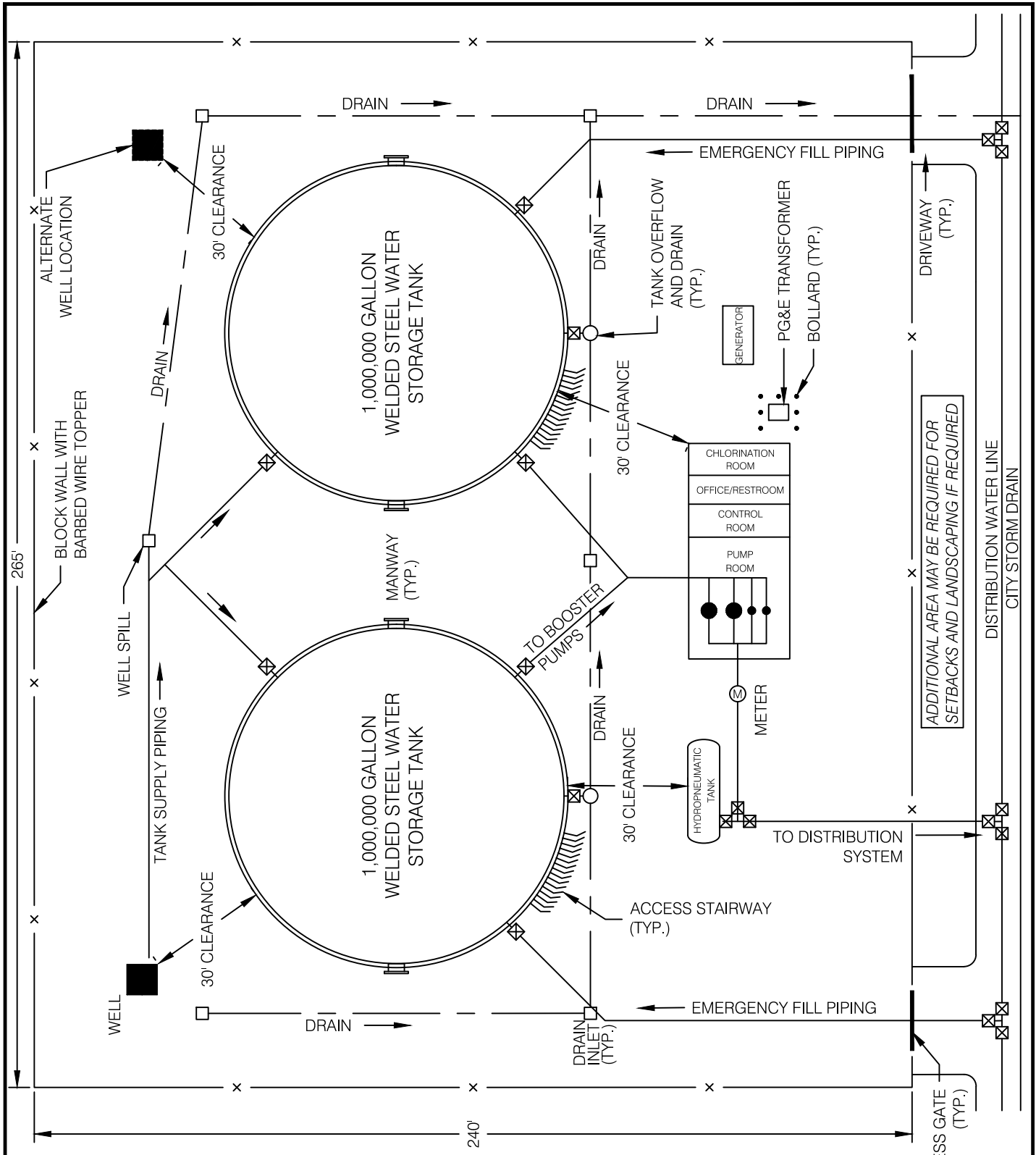
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APPROVED: MARCH 2022



**TYPICAL LOCATION
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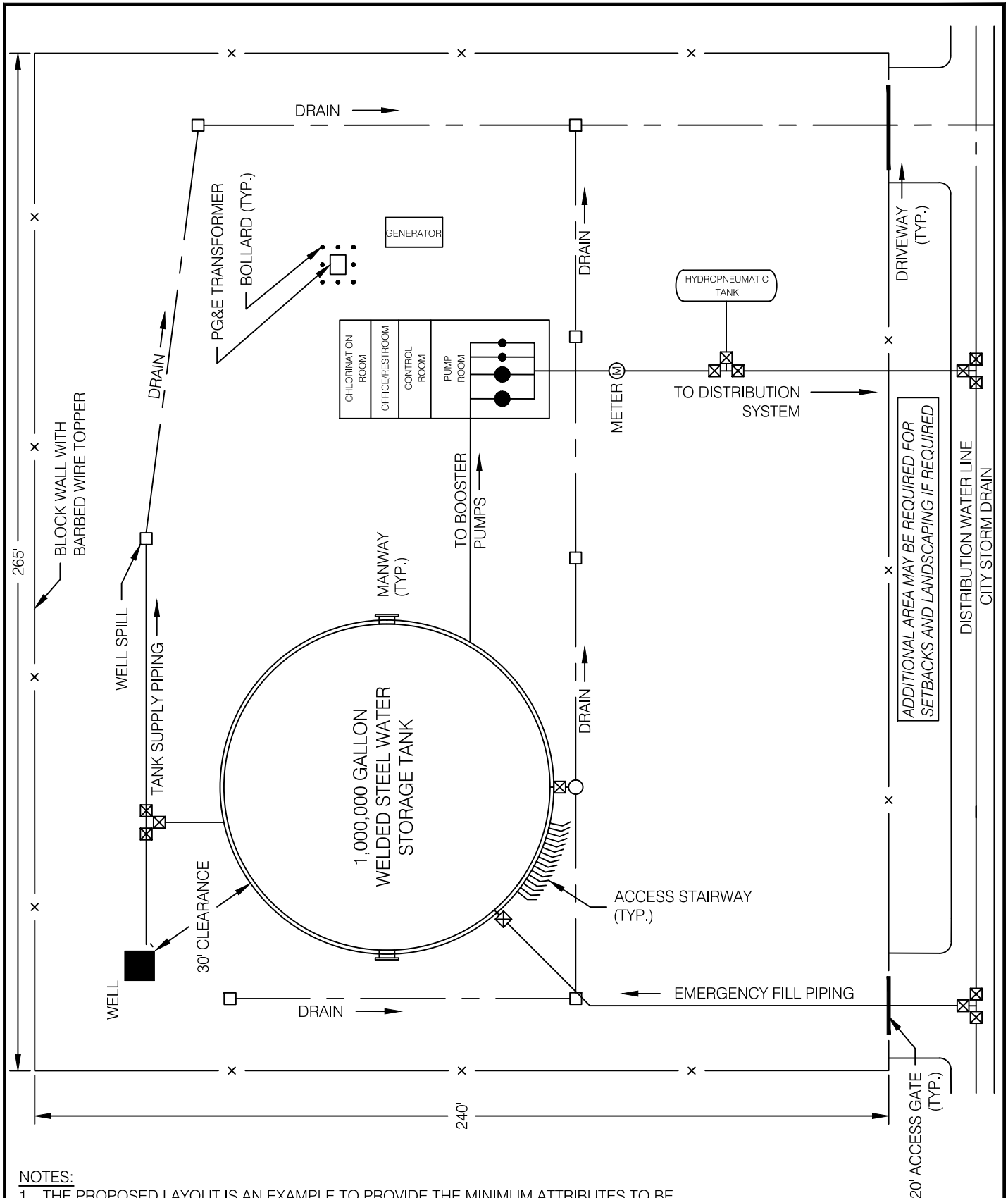
DF-3



NOTES:

1. THE PROPOSED LAYOUT IS AN EXAMPLE TO PROVIDE THE MINIMUM ATTRIBUTES TO BE INCLUDED AT A WATER TANK FACILITY. THE ACTUAL DESIGN SHALL BE DESIGNED ON SITE BY SITE BASIS AND APPROVED BY THE CITY ENGINEER.
2. DUEL ACCESS REQUIRED TO THE FACILITY W/ INTERNAL TRUCK ACCESS/CIRCULATION.
3. UTILITY CONNECTIONS TO MEET WATER, SEWER, STORM REQUIREMENTS.

DF-4	TYPICAL TWIN 1,000,000 GALLON TANK SITE		CITY OF DIXON ENGINEERING STANDARD DETAIL	
		APPROVED: MARCH 2022		



ADDITIONAL AREA MAY BE REQUIRED FOR SETBACKS AND LANDSCAPING IF REQUIRED

NOTES:

1. THE PROPOSED LAYOUT IS AN EXAMPLE TO PROVIDE THE MINIMUM ATTRIBUTES TO BE INCLUDED AT A WATER TANK FACILITY. THE ACTUAL DESIGN SHALL BE DESIGNED ON SITE BY SITE BASIS AND APPROVED BY THE CITY ENGINEER.
2. DUEL ACCESS REQUIRED TO THE FACILITY W/ INTERNAL TRUCK ACCESS/CIRCULATION.
3. UTILITY CONNECTIONS TO MEET WATER, SEWER, STORM REQUIREMENTS.



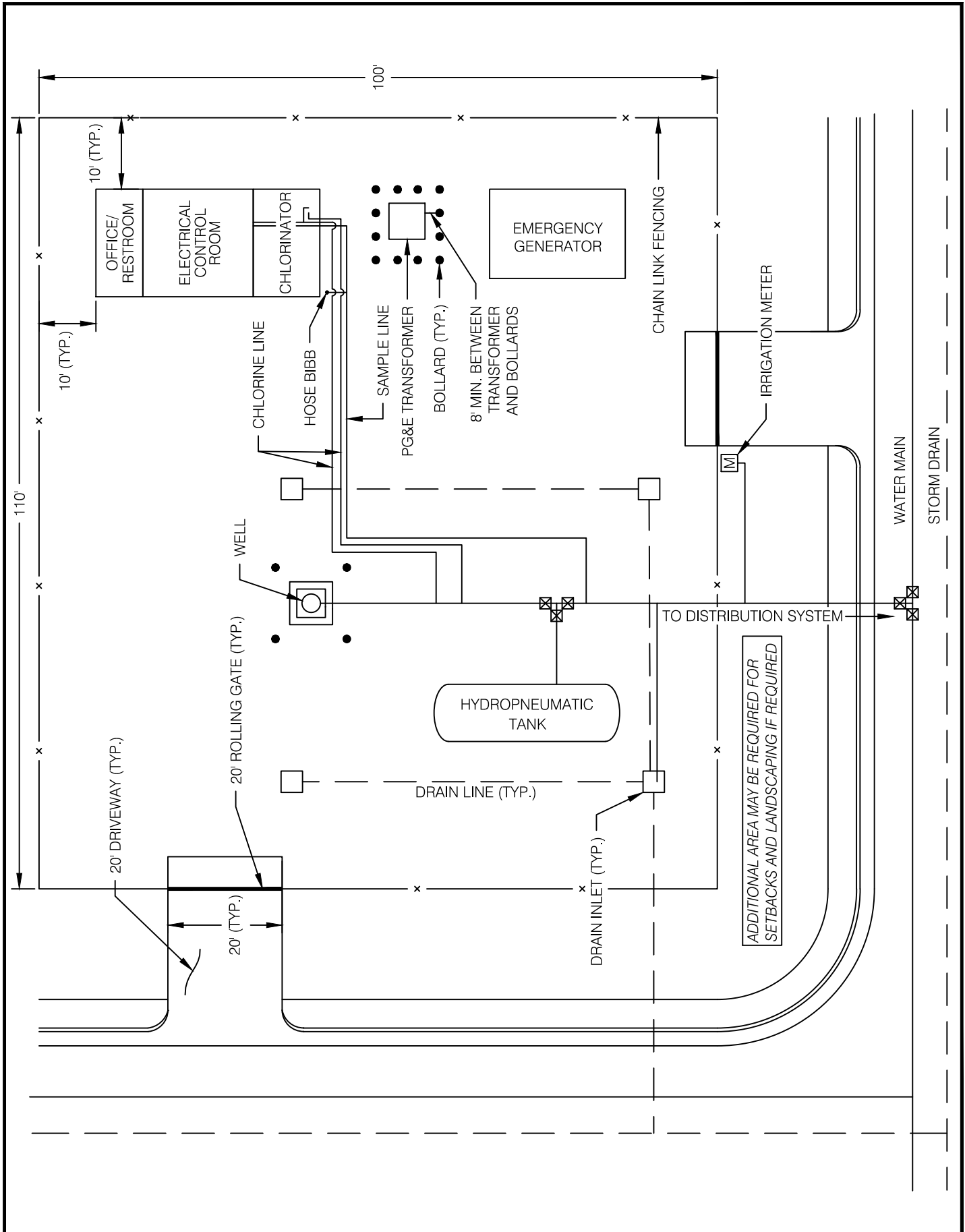
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

**TYPICAL 1,000,000
GALLON TANK SITE**

DF-5



DF-6

**TYPICAL DIRECT
FEED WELL
FACILITY**

APPROVED: MARCH 2022

CITY OF DIXON

ENGINEERING
STANDARD DETAIL

ENGINEERING DESIGN STANDARDS

SECTION 6 – SANITARY SEWER DESIGN

DS6-01. GENERAL: Sanitary sewer improvements shall be designed to serve the ultimate level of development as defined in the City General Plan. All improvements shall conform to the requirements of the Solano County Health Department, the Uniform Plumbing Code, and the City of Dixon Engineering Design Standards and Construction Specifications.

DS6-02. PLAN REQUIREMENTS: Sanitary sewer improvement plans shall show geometric designs in both plan and profile views. Required information shall be main and lateral sizes and slopes, utility crossings, manholes, cleanouts, invert elevations, and any calculation used in the design of the system.

DS6-03. DESIGN:

- A. Flow - The design sanitary sewer flow in gallons per day (gpd) shall be calculated using the following formula:

$Q_d = Q_p + I + I$, where

Q_d = Design flow

Q_p = Peak flow = Average Daily Flow x Peaking Factor

$I + I$ = Infiltration & Inflow Factor

The average daily flow rates and the I+I (Infiltration & Inflow) factors for various land uses are shown in the following table:

DESIGN FLOWS		
LAND USE	AVERAGE DAILY FLOW	I+I FACTOR
Single-Family	250 gpd per unit	500 gpd per gross acre
Multi-Family	3,600 gpd per net acre	500 gpd per gross acre
Commercial/Public	1,100 gpd per net acre	500 gpd per gross acre
Industrial	1,400 gpd per net acre	500 gpd per gross acre
Schools	3,600 gpd per net acre	500 gpd per gross acre

*Note: Net Acres is assumed as 80 percent of Gross Acres.

The peaking factors to be used to calculate the peak flow are shown in the following table:

PEAKING FACTORS	
SHED AREA	PEAKING FACTOR
Shed area less than 500 acres	2.5
500 acres □ Shed Area □ 1,500 acres	2.2
Shed area greater than 1,500 acres	2.1

- B. Pipe Capacity - Typically sewer mains shall be sized based upon the sewer flowing at 70 percent of pipe capacity using the following formula:

Manning's Formula: $Q = A(1.49/n)(R^{2/3})(S^{1/2})$, where

Q = Flow, in cubic feet per second (cfs)

A = Area of Pipe in square feet (sf)

R = Hydraulic Radius (Area/ Wetted Perimeter)

S = Slope of Pipe

n = Roughness of 0.013 or as recommended by the pipe manufacturer, whichever is greater

Pipe capacity, in all cases, shall be adequate to carry the design flow from the entire tributary area, even though said tributary area is not located within the project boundaries. Sewer trunk line design criteria shall be done on a case by case basis, as approved by the City Engineer.

- C. Velocity - Sewer velocity shall be equal to or greater than 2 feet per second for all sewers when flowing full with a maximum velocity of 10 feet per second. Sewers which will exceed 50 percent capacity at ultimate development shall have their minimum design slope determined using a minimum velocity flowing full of 2 feet per second. Sewers which will not exceed 50 percent capacity at full development shall have a minimum design velocity flowing full of 2.5 feet per second.
- D. Main Size - Minimum size sewer main shall be 8 inches with a minimum slope of 0.0052 percent.
- E. Sewer Pipe Type - Typical sanitary sewers shall be constructed of extra-strength vitrified clay pipe (ESVCP). SDR35 polyvinyl chloride pipe (PVC) material may be used in residential areas, on a case by case basis, upon approval by the City Engineer. PVC pipe consideration will require a design and construction analysis using ASTM Specifications for the pipe material. A report will be submitted identifying all design and construction criteria per ASTM Specifications.
- F. STUDY MAP - A study map may be required prior to review of the sewer design if there is a possibility that upstream or adjacent areas might require service through the subject property. The map should show the entire service area including upstream tributary and adjacent areas, and all other data necessary to determine anticipated service area, including pipe sizes and slopes, shall be shown to the extent necessary to determine the requirements within the subject property. Any required study map shall be paid for by the project developer; however, said study map may be waived by the City Engineer if previously performed.

DS6-04. VERTICAL ALIGNMENT:

- A. At all manholes where a change of direction of more than 20 degrees occurs, the flow line of the upstream main shall be 0.20 ft. above the flow line of the downstream main.
- B. Where a change in size of mains occurs, the crowns shall be matched.

- C. No vertical curves shall be allowed.
- D. Where minor mains connect to trunk mains, the crowns shall match if feasible. Under no circumstances shall the invert of the minor main enter the trunk main below springline.

DS6-05. HORIZONTAL ALIGNMENT:

- A. All sanitary sewers shall be installed in the pavement area of the street. Generally the location should be 6 feet from the center line of the street, on the opposite side of the centerline from the water line.
- B. Under special circumstances, if approved in advance of plan submittal, exception may be granted by the City Engineer which will allow a sanitary sewer line to be placed in an easement. In such cases, a minimum 15 foot wide easement shall be given, and the easement shall cross not more than one lot. Deeper lines shall require a wider easement to the satisfaction of the City Engineer.
- C. Location in existing streets - The following shall be considered: location of curbs, gutters, and sidewalks; traffic lane configurations; future street improvement plans; and existing utilities.

DS6-06. SEWER MAIN CLEARANCES: Clearances between sanitary sewer mains and other facilities shall conform to state law, but shall not be less than:

- Horizontal: 10 feet minimum from any water line
5 feet minimum from all other facilities
- Vertical: 1 foot minimum from all facilities for main lines
6" minimum from all facilities for service laterals

DS6-07. APPURTENANCES:

- A. Manholes - Normal maximum spacing for manholes shall be 400 feet. Where the location of two manholes is determined by intersecting lines, the distances between intervening manholes shall be approximately equal. Sewers on curved alignments with a radius of less than 400 feet shall have manholes spaced at a maximum of 300 feet on the beginning and ending of the curve and adjusted to fit the individual case. The spacing of manholes on trunk sewer lines 12 inches and larger in diameter shall be proposed for each individual case and shall be approved by the City Engineer. All manhole connections of trunk lines 12-inch and larger shall be epoxy-coated to reduce inflow & infiltration. Manholes shall also be located at all change in pipe sizes and slopes, and at angles of 20° or more in alignment. Manholes shall also be placed at the termination of all sewer mains including those lines which may be extended in the future and cul-de-sacs. Services to adjacent properties within the cul-de-sac should be connected to this manhole.
- B. Drop manholes will be allowed upon approval of the City Engineer. Change in sewer pipe invert through a manhole is not to exceed 2 feet on an 8 or 10 inch sewer main.
- C. Cleanouts - Cleanouts on sewer main lines shall not be used. Cleanout spacing on sewer laterals shall not exceed 100 feet within the City right-of-way. Cleanouts shall be placed at all changes of size, slope, or angle points greater than 20 degrees; at intersections of mains; and at service connections where service lines are 6-inch and larger.

DS6-08. SERVICE LATERAL:

- A. GRADIENT: Four inch (4") sewer services shall have a minimum slope of 2 percent.
- B. LOCATION AND ALIGNMENT: Sewer services shall be at right angles or radial to street right-of-way. The location shall be stationed on the plans. Services shall be located near the center of each parcel, however not located within driveways, and shall be not less than 10 feet from water services, fire hydrants, street lights, etc. In cul-de-sac bulbs services should enter manholes.
- C. SIZE: Minimum size for single-family dwellings is 4-inch. Minimum size for commercial, apartments and industrial developments shall be 6 inches.
- D. DEPTH: Sewer services shall have 5-foot to 5-foot, 6-inches of cover at the right-of-way line, and 12 inches at any buildable location within the properties to be served.
- E. CLEANOUTS: Cleanouts shall be installed on the service lateral at the back of sidewalk as shown on the Construction Details.
- F. IDENTIFICATION: Sewer laterals shall be identified with an "S" stamped or etched on the top of curb.
- G. CONNECTIONS TO LARGE MAINS: Sewer service may be directly connected to sewer mains smaller than 12 inches in diameter. For trunk sewer lines 12 inches and larger in diameter, or more than 15 feet in depth, the service sewer may be directly connected only with the approval of the City Engineer.
- H. TYPE OF PIPE: Same as sewer mains. Cleanout assemblies and service to site from the cleanout may be ABS per Construction Detail 6020.
- I. ON-SITE CONNECTIONS: Storm runoff shall not be designed to enter the sanitary sewer system.
- J. Each parcel within commercial and industrial districts, including multi-family development service laterals, shall connect to a sewer main manhole unless approved otherwise by the City Engineer.

DS6-09. TRENCH LOADING: For sanitary sewer lines over 10 feet deep, Marston's formula shall be used to determine the load placed on the pipe by backfill. The procedure for rigid pipe is described in the ASCE Manual of Engineering Practice No. 60, the Clay Pipe Engineering Manual, and in similar handbooks. The Design Engineer shall determine the factor of safety. Only the three edge bearing strength of the pipe shall be used in the computations for rigid pipe. The minimum trench width shall be O.D. plus 12 inches.

DS6-10. BEDDING AND INITIAL BACKFILL: Bedding types and factors for V.C.P. shall be as per Construction Details 3280 and 3290. For other materials, the trench width, bedding, and initial backfill shall be consistent with the pipe manufacturer's requirements. Bedding and initial backfill type shall be as necessitated by depth of cover over the pipe, trench width, pipe strength, and other factors used to determine safe pipe loading. Any special backfill requirements shall be noted on the plans.

DS6-11. LIFT STATIONS: Lift stations shall not be permitted unless specifically approved by the City Engineer in advance of plan submittal.

DS6-12. UNUSUAL DESIGN: Special designs of sanitary sewer facilities or other unusual features or structures will require individual study and approval by the City Engineer.

ENGINEERING DESIGN STANDARDS

SECTION 7 – STREET LIGHT DESIGN

DS7-01. DESIGN STANDARDS: The Design Engineer shall show the proposed street lighting system on improvement plans which meet the City of Dixon standards for public improvement plans. Unless an exception is granted by the City Engineer, the street lighting plan shall be shown on a separate plan sheet. Proposed street light locations shall also be shown on the overall site plan.

The Street Lighting Plan Sheet shall show the following:

1. Location of electroliers
2. Location of service points
3. Location of conduit and pull boxes
4. Luminaire wattage, distribution type number, and pole numbers
5. Mounting height and arm lengths
6. Wire sizes
7. Right-of-way lines and easements

All lighting systems shall be designed in accordance with accepted engineering principles, P.G.& E. drawing number 025455, Guide for Design of Street Lighting, etc., Sheets 1-7, the National Electric Code, and these standards.

For all projects which will include the construction of street lighting, the developer should contact the City Engineer early in the design process and start coordination with P.G.&E. regarding providing service to the expanded street light system. Street light identification numbers are to be assigned by P.G. & E. and should be shown on the Plan Sheet.

All street lights and the lighting systems shall be dedicated to the City upon satisfactory installation by the developer.

DS7-02. DESIGN CRITERIA: Design and placement for single arm street lights shall be in accordance with the following: Refer to Detail 7030 for double arm street lights.

Type	Street Classification	Spacing	Wattage	Nom. Mounting Height	Lumens
A	Residential	200'-250'*	70	28'	6300
B	Collector	200'-250'*	100	28'	9000
C	Arterial	150'-200'*	200	28'	18000
D	Industrial	200'-250'*	70	28'	6300
E	State Highway	150'-200'*	200	28'	18000

* See Figure 7-1A, 7-1B, & 7-1C.

All intersections shall be lighted. In the case of two different classifications of streets intersecting, the higher wattage requirement of the two streets shall prevail. All electroliers shall be controlled by a photoelectric cell.

DS7-03. LOCATIONS: The maximum spacing as listed above shall correspond to spacing for lights along the roadway. Typical street light locations are shown in Figures 7-1A through 7-1C. Additional placement criteria are given below.

For "Tee" intersections, an electrolier should be located on the through street, at or near the projected centerline of the intersecting street. For cul-de-sacs, an electrolier should be located within the bulb. (See Figure 7-1A).

Electroliers shall be located at property lines and/or curb returns. The electrolier shall be centered 30 inches behind the back edge of sidewalk when sidewalk (see Construction Detail 7010). Normally, the electroliers will be staggered on opposite sides of the street.

Any adjacent tree planting shall be coordinated such that a minimum 25' clearance shall be achieved at full canopy of planting.

DS7-04. INFORMATION FROM P.G. & E.: Once the electrolier locations have been established and approved by the City, an electronic set of plans showing the locations should be sent to P.G. & E. by the Design Engineer. The following data should be requested:

1. Service Point (Service Box or Pole/Transformer Location)
2. Electrolier Numbers

(When this information is received from P.G. & E., it shall be placed on the plans by the Engineer.)

DS7-05. CONDUIT: Electrolier conduit shall be shown on the plans in plan view and in the typical section for the street. The street light conduit may be in the "joint utility" trench or a separate trench at 6 inches from B.E.W. Conflicts with water services should be avoided but when necessary to cross a water service location, the conduit may be tucked just under the back edge of walk. Conduit shall be a minimum 1-1/2 inches Schedule 40 PVC.

DS7-06. PULL BOXES: Pull boxes shall be installed where splices are to be made between light standards and where service from a PG&E service point must be split. Pull boxes are required for each electrolier. Additional pull boxes are required for conduit runs over 300 feet.

DS7-07. CIRCUIT: Circuit locations and service points shall be shown on the Street Light Plan. Each circuit shall have no more than seven lights. Lights on opposite sides of the street shall be on separate circuits to maintain sufficient lighting in the case of a tripped circuit breaker.

DS7-08. POLES AND ARMS: Pole heights shall be specified on the plans based on the final mounting height required for the roadway classification. (See DS7-02)

Arm lengths shall be specified on the plans such that the luminaire is mounted approximately over the gutter flow line. Generally a six foot arm should be used when the pole is 7 feet to 8 feet from the flow line. Pole locations shall also be shown on the Site Plan Sheet to ensure that other improvements do not interfere with proposed street light locations.

DS7-09. WIRE: Service conductors shall be minimum No. 8 AWG. Larger sizes may be required for longer circuits with more lights. All street light standards shall be wired with copper wire, moisture and heat resistant thermoplastic insulation (THW) or equal, minimum No. 12 AWG. Where larger wire sizes

are required due to heavy electrical loads, they shall be sized in conformance with the National Electrical Code requirements.

DS7-10. SERVICE: A 120-volt underground electrical service shall be provided for each street lighting system through a Caltrans standard Type III AF unmetered service pedestal. Refer to the latest edition of the State of California Standard Plans' Detail for Type III-A Series for further detail. Separate circuit breakers shall be provided for each circuit. A maximum of seven (7) street lights shall be designed on any given circuit. Other voltage circuits (i.e.; 208 volt) may be approved by the City Engineer in unusual situations. Service pedestals shall be provided within a utility easement and shall be easily accessible from the street frontage.

DS7-11. LIGHTING. All lights shall be LED.

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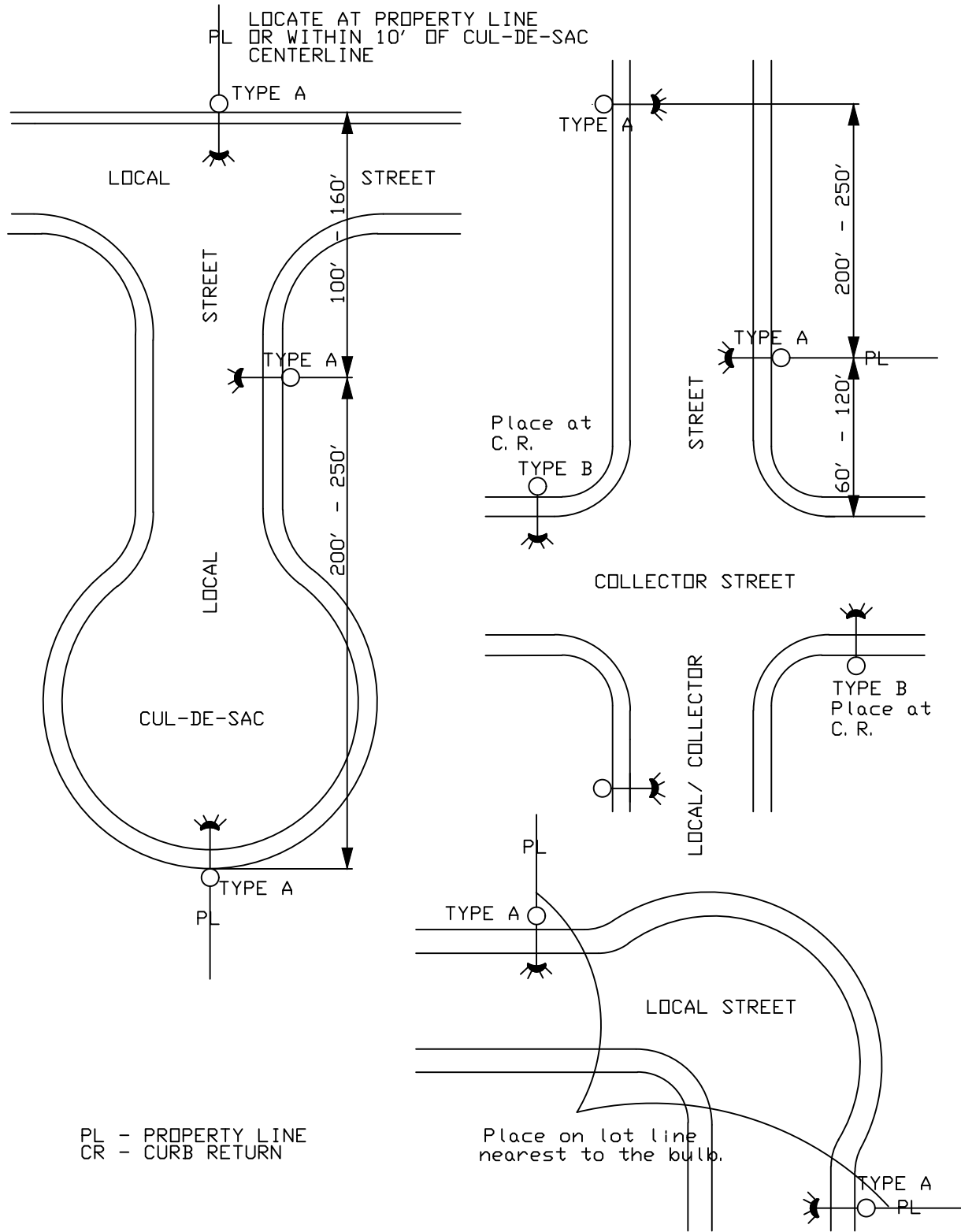


FIG.
7-1A

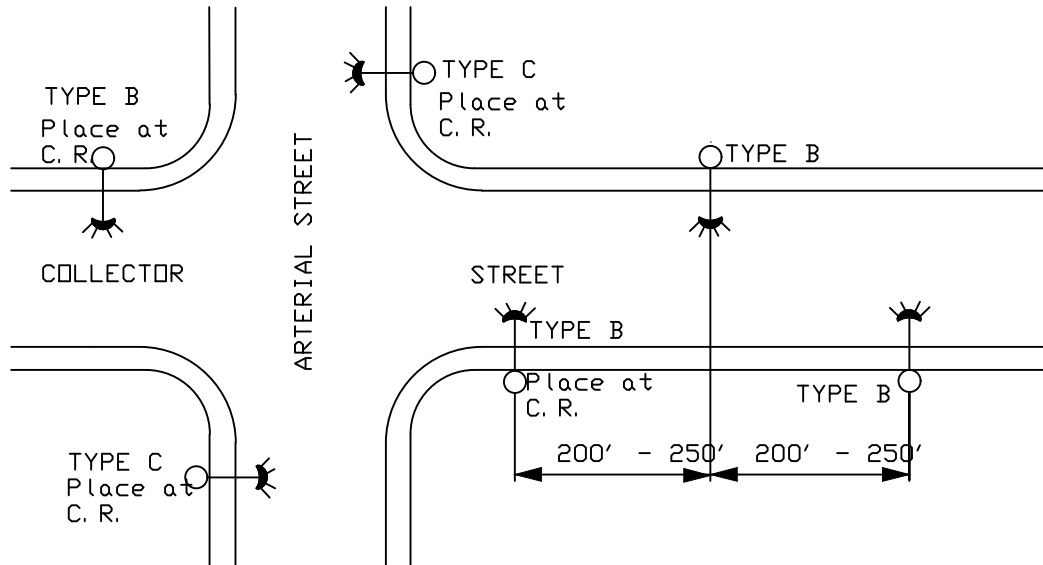
**STREET LIGHT LOCATIONS
LOCAL STREETS**



Approved: March 2022

CITY OF DIXON
ENGINEERING
DESIGN STANDARD





CR - CURB RETURN

NOTE:

1. Locate street lights on traffic signal poles at signalized intersections.



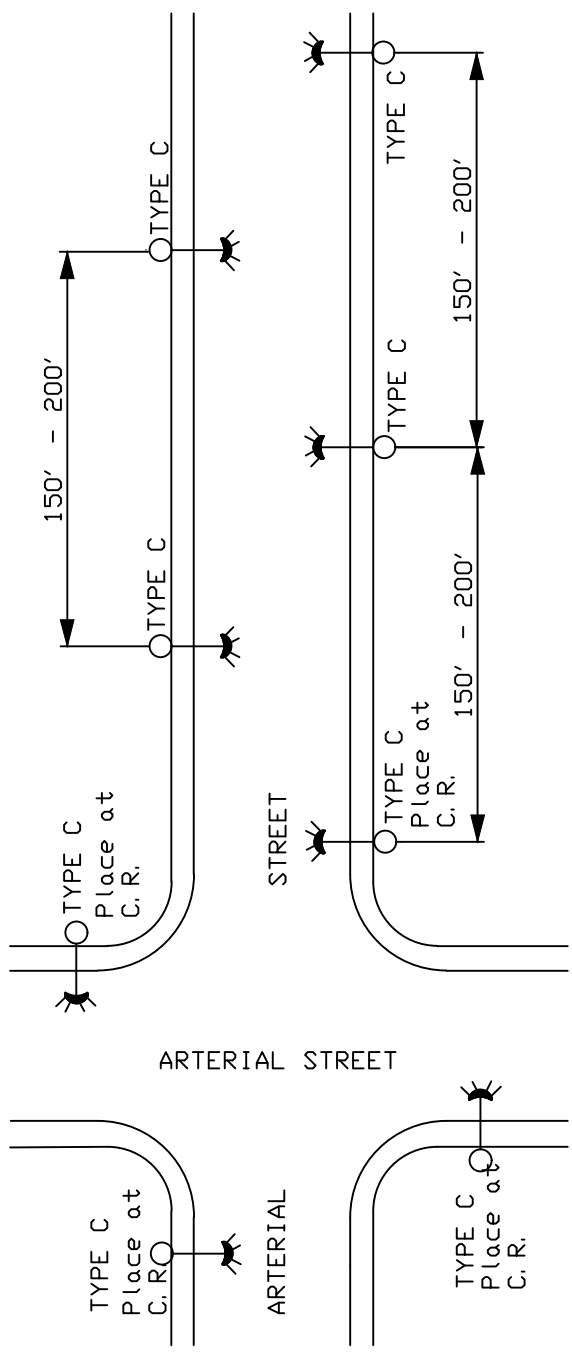
CITY OF DIXON
ENGINEERING
DESIGN STANDARD



Approved: March 2022

STREET LIGHT LOCATIONS
COLLECTOR STREETS

FIG.
7-1B



CR - CURB RETURN

- NOTE:
1. Locate street lights on traffic signal poles at signalized intersections.

FIG.
7-1C

STREET LIGHT LOCATIONS
ARTERIAL STREETS



CITY OF DIXON
ENGINEERING
DESIGN STANDARD

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ENGINEERING DESIGN STANDARDS

SECTION 8 – TRAFFIC SIGNAL DESIGN

DS8-01. GENERAL: The need for traffic signals shall be based on warrants contained in the Caltrans Traffic Manual. For a more detailed needs assessment, refer to DS15-07 “Study Methods and Techniques,” of these design standards.

Traffic signals shall be designed in accordance with these Standard Specifications and the latest editions of the following:

- Caltrans Standard Specifications and Standard Plans, including all standard symbols contained therein; and
- Manual on Uniform Traffic Control Devices with California Supplement.

DS8-02. SIGNAL STANDARDS: Traffic signal standards, posts and mast arms shall be of the types listed in the most recent edition of the State Standard Plans.

DS8-03. VEHICLE AND PEDESTRIAN SIGNALS:

All vehicle signals and pedestrian signals shall have terminal block components and be of the types listed in the most recent edition of the State Standard Plans.

All mast arm mounted vehicle signals shall be 12” in diameter and mast arm side-mounted (MAS).

Protected left turn signals shall be red, yellow and green all ways. All vehicle and pedestrian signals shall be LED type.

Programmed visibility vehicle signals shall not be used without prior approval of the City Engineer.

DS8-04. VEHICLE SIGNAL ALIGNMENT: Typical vehicle signal alignments are listed below. Case-by-case variations may occur.

1. For single lane left turns with protected left turn movement, the left turn signal shall line up with the center of the left turn lane as close as possible.
2. For two-lane left turns which shall have a protected movement, the left turn signal shall line up with the extension of the line between the two left turn lanes as close as possible.
3. When a protected left turn signal is used, the signal for the thru movement shall line up with the center of the thru lane group as close as possible, regardless of the number of thru lanes.
When 50 foot or 55 foot mast arms are used, only one MAS signal shall be used for the thru movement instead of two signals as shown in the State Standard Plans.
4. For one thru lane with permissive left turn without a left turn pocket, the MAS signal shall line up with the center of the left half (upon approach) of the thru lane, as close as possible. If a left turn pocket is provided, the MAS signal shall line up with the stripe between the thru and left turn lanes.

5. For two thru lanes with permissive left turn without a left turn pocket, the MAS signal shall line up with the center of the #1 thru lane (i.e., the lane adjacent to the left turn lane), as close as possible.
6. When a 4 section MAS signal is used, it shall line up with the center of the left half (upon approach) of the #1 thru lane, as close as possible.

DS8-05. NUMBER AND SIZE OF SIGNAL INDICATIONS: Typical indications are as follows:

1. Protected Left Turn Movements: One 3-section all arrow mast arm top-mounted (MAT) and one 3-section all arrow far left side pole mounted signal.
2. Thru Movements (with protected left turns): One 3-section MAS, one 3-section far right side pole mounted signal, and one 3 section near right side pole mounted signal.
3. Permissive Left Turn Movements: One 3-section MAS, one 3-section far left side pole mounted signal, one 3-section far right side pole mounted signal, and one 3-section near right side pole mounted signal.
4. Split Phasing: One 4-section MAS (w/green arrow), one 4-section far left side pole mounted signal (w/green arrow), one 3-section far right side pole mounted signal, and one 3-section near right side pole mounted signal.
5. Right Turn Overlap: Same as above except the far right side and near right side pole mounted signals shall be 5-section with green and yellow arrows. Overlaps require prohibited U-turn on associated protected left movements. Right turn arrow overlaps shall not be provided without prior approval of the City Engineer.

DS8-06. VEHICLE DETECTION FOR A MODULAR (MULTI OR SINGLE CAMERA) VIDEO DETECTION SYSTEM WITH OPTIONAL HIGH SPEED APPROACH RADAR/VIDEO FUSION TECHNOLOGY.

1. General: This specification sets forth the minimum requirements for a system that detects vehicles on a roadway using only video images of vehicle traffic.
2. System Hardware: The video detection system (VDS) shall consist of up to four video cameras, a video detection processor (VDP) capable of processing from one to four video sources, output extension modules, video surge suppressors and an industry standard 3-button USB mouse.
3. System Software: The system shall include software that detects vehicles in multiple lanes using only the video image. Detection zones shall be defined using only an on-board video menu and a pointing device to place the zones on a video image. Up to 24 detection zones per camera view shall be available. A separate computer shall not be required to program detection zones.

DS8-07. CONDUIT: Conduit requirements shall conform to the following (unless restricted by push button post size):

1. Service run conduit shall be 2-1/2 inch minimum diameter.
2. Conduit from the main pull box to the controller shall be two 3-inch diameter conduits minimum.

3. All signal runs and interconnect conduit shall be 2-inch minimum diameter.
4. All street crossing conduit runs shall be a minimum of 3 inches.

DS8-08. CONDUCTORS: All conductor runs for each signal phase to each terminal block on a pole shall be direct from the controller home run pull box. The conductor schedule shall not allow for splicing at intermediate pull box location.

DS8-09. PULL BOXES: Refer to Caltrans Standard Plans No. ES-8.

1. The minimum size for pull boxes shall be #5. However, #6 boxes shall be used at the ends of street crossings and when four or more conduits enter the box. Covers shall be concrete and marked “Traffic Signal.”
2. Larger pull boxes shall be required as follows:

Condition	Size
Any pull box with 12 or more cross section inches of conduit entering.	A pull box extension or 20” x 42” dual lid pull box.
Home run pull box for a 2, 3 or 5 phase signal.	20” x 42” dual lid pull box.
Home run pull box for an 8 phase signal.	30” x 48” dual lid pull box.

3. Traffic signal interconnect conduit shall be installed in separate concrete pull boxes and their covers shall be marked “Interconnect.”
4. Pull boxes subjected to vehicular traffic shall be installed with 1/4” steel plate traffic rated covers (galvanized after fabrication) with a diamond-plate type surface in accordance with ES-8 of the State Standard Plans.
5. Maximum spacing between pull boxes shall be 175 feet.

DS8-10. CONTROLLER CABINET LOCATION: Controller cabinet locations shall be approved by the City. Typical location should be on the minor street adjacent to the service pedestal. Both controller and service pedestal should be located such that the conduit from the service point to the service pedestal does not require trenching across a street. The controller cabinet door should be oriented so that the technician can view the entire intersection when standing at the front door.

DS8-11. PROTECTED VS. PERMISSIVE LEFT TURN PHASING: Protected left turn phasing should be provided under any of the following conditions:

1. For an intersection with one thru lane and a left turn pocket, a protected left turn may be required at the discretion of the City Engineer if the product of the left turn volume and conflicting volume exceeds 30,000 for any 1 hour.
2. Where any of the guidelines for protected left turns are met as outlined in the Manual on Uniform Traffic Control Devices with California Supplement.
3. Where there are two or more opposing thru lanes and the left turning vehicle occupies a dedicated left turn pocket, or where two-lane left turns are provided.
4. Where the travel distance through the intersection for left turn vehicles is more than 100 feet, and the 85th percentile speed of opposing traffic is 45 mph or more.

5. Where there are three or more opposing thru lanes.
6. Where the left turn queue recurrently occupies the #1 thru lane, and where two-lane left turn lanes cannot be provided, and where the left turn lane cannot be extended.

DS8-12. TRAFFIC SIGNAL INTERCONNECT: Traffic signal interconnect shall be provided for new signal installations, and for modification of existing signals, which currently do not have interconnect. The interconnect cable shall not share conduit with service conductors, but may share conduit with signal conductors and detector lead-in cables.

Interconnect conduit shall be installed half the distance to the next proposed signalized intersection, as determined by the City Engineer, and shall connect to existing interconnect conduit. If the installation of interconnect conduit completes the link between two signal, the interconnect cable shall be installed, wired to the terminal blocks and the signals shall be coordinated, as directed by the City Engineer.

Where interconnect conduit is installed and interconnect cable is not provided or required, a pull rope shall be installed in the conduit.

DS8-13. TRAFFIC CONTROL SIGNS: Pertinent traffic signs shall be specified with the signal design. Typical signs include mast arm mounted street name signs, R-73 mast arm mounted signs, R34-2 mast arm mounted signs, R49 signs (where crossing the street is permitted at only one location via crosswalk), R96 signs (where crossing the street is completely prohibited), W41 roadside signs (and pavement markings) where visibility of the signal is limited or where the signal may be unexpected by motorists, and R6 1 roadside signs on the geometric minor leg approach of a “tee” intersection.

In the case of R73 mast arm mounted signs, U-turns will only be permitted where there is at least 36 feet between the right side of the left turning vehicle and the curb to the far left of the vehicle.

Mast arm mounted street name signs shall be required for all approaches. These signs shall have a minimum lettering size of 8” U.C. and 6” L.C. with Type D stroke. Other lettering sizes shall require approval of the City Engineer. The signs shall be double sided. The signs shall have a visual reflectivity equal to V.I.P. diamond grade. Signs shall be installed using illuminated street name sign brackets in accordance with State Standard Plan ES-70. Street name signs shall be illuminated when directed by the City Engineer.

DS8-14. EMERGENCY VEHICLE PREEMPTION (EVP): All new traffic signals shall have EVP for all directions of approach on public streets. Each direction shall have a separate detector. Detectors shall be optical in nature and 3M Opticom equipment or approved equal.

DS8-15. SIGNAL PHASING: The phases shall be assigned with Phase 2 for northbound and Phase 8 for westbound.

DS8-16. ADVANCE FLASHING BEACONS: Advance flashing beacons shall be included at the discretion of the City Engineer. Typically they are located on roadways with speed limits 45 m.p.h. or greater when there are no controlled intersections within 1 mile.

DS8-17. MISCELLANEOUS APPURTENANCES:

1. Bicycle loops shall be installed for all approaches with bike lanes.
2. Audible pedestrian signals shall be required in all commercial areas and other areas as directed by the City Engineer.
3. Walking man (international symbol) type plate shall be used for all pedestrian push buttons and shall have black lettering on yellow background. Additionally pedestrian push button assembly shall be ADA compliant when constructed.
4. Additional pedestrian push buttons on medians of four or more lane roads may be considered where the center median/ pedestrian refuge area is a minimum of 10 feet in width with approval of City Engineer.
5. Push buttons shall be large button Americans with Disabilities Act (ADA) type and shall be submitted to City for approval.

DS8-18. PREPARATION OF PLANS: Traffic signal plan sheets shall conform to the provisions of Section 2, "Construction Plans Preparation, Submittal, and Processing," of these design standards, including submittal requirements, AutoCAD files, etc. Traffic signal plans shall have a title sheet followed by a signal and lighting sheet for each intersection. Signing, striping, and interconnect information may be included on the signal and lighting sheet, or may be included on separate sheets, depending on ease of readability.

1. Title Sheet: The title sheet shall include the following:
 - Title of project, which shall include location.
 - Vicinity map with north arrow, scale not required.
 - Pertinent signature blocks, and revision block.
 - Legend.
 - Service equipment schedule and wiring diagram with legend.
 - General Notes and the following Traffic Signal Notes
 1. All work shall conform to City of Dixon and Caltrans standards and specifications.
 2. No lane closures are permitted between the hours of 3:30 pm. and 9:00 am. Traffic control shall be per Caltrans Traffic Manual of Traffic Controls for Construction and Maintenance Work Zones.
 3. The Contractor shall be responsible for verification of all existing underground utilities, whether or not they are shown on these plans. The Contractor shall contact U.S.A. and have utilities marked at least 48 hours prior to beginning work. Where markings are near proposed foundations, the Contractor shall locate underground utilities by pot holing prior to excavating.
 4. Locations of signal standards, controller, and service pedestal as shown on these plans are approximate. Actual location shall be performed by the City Engineer in the field.
 5. The Contractor shall provide and install all equipment and materials necessary for the signal to operate as shown in the phase diagram.

2. Signals and Lighting Sheet: The signals and lighting sheet shall be drawn at a scale of 1 inch equals 20 feet, and shall include the following:
 - North arrow.
 - Existing and proposed field conditions such as: underground and overhead utilities; driveways; fire hydrants; poles; signs; fences; street lights; edge of pavement; curb, gutter and sidewalk; right-of-way; easements; striping; medians; pull boxes; curb ramps; trees; adjacent topography; etc. Existing conditions and appurtenances shall be dashed and screened. Proposed shall be solid and bold.
 - Pole and equipment schedule.
 - Conductor and conduit schedule. The schedule shall include percent fill conduit quantity and size.
 - Signalization appurtenances such as: conduit runs; detector loops with input designations; detector handholes; vehicle and pedestrian signals with phase designation; luminaries; pedestrian pushbuttons with phase designation; controller; service pedestal; service point; emergency vehicle detectors; signing; striping; and interconnect.
 - Phasing diagram.
 - Phasing for emergency vehicle preemption. Protected left turns shall be combined with the concurrent thru movement during EV preemption.
 - Conduit shall not pass through detector loops.
3. Utility Relocation Plan (as required): Show all existing and proposed underground and overhead utilities.
4. Striping and Signing Plan (20 or 40 scale): Shall include all existing signs, curb and pavement markings, and shall show disposition of each (removal, relocate, or remain). Shall show all necessary parking removal signs and curb markings.
5. Signal Interconnect Plan (as required.).
6. Civil Plan (20 or 40 scale): To include all paving, structural section, concrete, drainage, sanitary sewer, and earthwork items.
7. Signal Hardware:

Draft special provisions shall be submitted to the City for approval.

Service Pedestal: Type III-AF.

Cabinet: Type 332 Anodized aluminum, with 210 conflict monitor.

Controller: Type 1 70E with 68HC11 Chip with Comm port on front panel.

Prom Board: 412-F System Memory module with 27C1001 EPROM and full complement of RAM.

Software: Bitrans Systems program #233.

Detector Cards: Model 222 Caltrans approved.

Modem: Model 400.

LED Signal Heads: LED signal heads required for all new vehicular and pedestrian signal indications.

ENGINEERING DESIGN STANDARDS

SECTION 9 – SIGNING AND STRIPING DESIGN

DS9-01. SIGNING AND STRIPING: Existing and proposed signing and striping shall be designed in accordance with the latest edition of Manual on Uniform Traffic Control Devices with California Supplement, and this section of the City Standards. The Design Engineer shall be responsible for evaluating the adequacy and design of the existing signing and striping within and adjoining the project area as it relates to the proposed improvements.

The signing and striping shall be shown on a separate plan sheet and shall include the following notes and requirements:

1. All striping, pavement marking, and signing shall conform to the Design and Construction Standards of the City of Dixon as well as latest edition of Manual on Uniform Traffic Control Devices with California Supplement.
2. The Contractor shall notify the City Engineer a minimum of 2 working days to the day of layout of the proposed signing and striping.
3. The Contractor shall be responsible for layout and cat-tracking of all proposed striping and markings. Cat-tracking shall be done a minimum of 2 working days prior to proposed striping and marking to allow the City time for review and approval. No pavement striping and/or markings will be permitted until the cat-tracking has been approved.
4. All existing striping and pavement marking in conflict with proposed striping and markings shall be removed by grinding by the Contractor. Grinding methods shall be approved by the City Engineer. All legends where grinding is approved shall be ground into block shapes and sealed with one coat of asphalt sealer. All thermoplastic grindings shall be disposed at approved class waste disposal site.
5. Proposed striping and marking shall be installed the same day as the removal of the conflicting striping and marking.
6. All striping to include: pavement legends, crosswalks; and solid white lines; centerlines; and dashed lines shall be thermoplastic materials with reflectorized pavement markers, as needed per Caltrans standards.
7. All signing (warning, stop, etc.) shall be installed on two-inch galvanized metal poles per detail 3220, 3230 and 3240. If signs are installed on a street light pole, do not cover pole numbers.
8. Signs shall typically be installed behind the sidewalk area and on light poles wherever possible. The City Engineer may require signs to be placed in the sidewalk.
9. All signing shall be high-intensity with graffiti film (See Construction Detail 3220).
10. The plans shall show the Caltrans sign designation code and the location of installation with adequate dimensions.
11. Construction signs shall be installed per Caltrans standards.

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ENGINEERING DESIGN STANDARDS

SECTION 10 – MASONRY WALL DESIGN

DSI0-01. LOCATION REQUIREMENTS: When a masonry wall is required by the conditions of development for a project, the wall shall be placed on private property, with the face of the wall on the right-of-way line. Consideration shall be given in the placement of the masonry wall to the following:

- A. Masonry walls shall be placed so as to maintain appropriate sight distances from intersections. Wall heights may be stepped down to maintain sight distances. All masonry walls within 150 feet of an intersection shall require the approval of the City Engineer.
- B. Appropriate clearances must be maintained between the wall and all utilities.

DSI0-02. TYPE: The color and architectural treatment of the wall shall be approved by the Planning Commission and shown on the plans.

DSI0-03. DESIGN: All calculations for the wall shall be submitted to the Chief Building Official for approval.

All design details for the walls shall be shown on the improvement plans. Construction details shall include, at a minimum, the height, depth, spacing, footings, steel sizes and quantities for the wall.

DSI0-04. DETAILS: All pertinent details of the masonry wall design shall be shown on the plans. Such details shall include, but shall not be limited to, footing or pier depth and spacing, post spacing, wall height, amount and location of reinforcing steel, etc. When the City of Dixon is to maintain any part of a masonry wall, plans shall include the following note:

“The Contractor shall provide the City of Dixon City Engineer with the appropriate paint code or other information that may be necessary to maintain the masonry wall.”

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ENGINEERING DESIGN STANDARDS

SECTION 11 – SURVEY MONUMENTS

DS11-01. SUBDIVISION BOUNDARY: The boundary survey and final map shall be prepared by a licensed land surveyor or a registered civil engineer who is authorized to practice land surveying, who shall find or set a durable monument at each corner, angle point, or point of tangent of-curve, in the exterior boundary of the tract. The exterior boundary of the tract shall be monumented before the final map may be recorded.

"Durable monument" shall be one of the following:

1. An iron pipe not less than 2 inches in outside diameter, not less than 24 inches in length, set not less than 24 inches in the ground, and with a concrete (mortar) plug not less than 6 inches in length poured and tamped in the top of the pipe. A galvanized metal nail shall be set in top of the plug.
2. A lead plug not less than 3/4 inch in length and not less than 1/4 inch in diameter, set in a hole drilled in Portland cement concrete. A metal (galvanized) tack shall be set in top of the plug. Brass caps set in a concrete base will be acceptable.

The registered license number of the engineer or surveyor shall be permanently indicated on the monument.

DS11-02. INTERIOR PROPERTY LINES: All lot corners and angle points within the boundary of the subdivision shall be marked by 5/8 inch rebar, 24 inches long or by other approved methods. Crosses or ramset nails shall be set in the concrete on a 24" projection of each lot line.

DS11-03. STREET MONUMENTS: In general, street monuments shall be located at each angle point; at each point of beginning and end of a curve or at the point of intersection of the semi-tangents of curves (if accessible); at each point of intersection with the centerline of an existing boundary line, street, or alley; and at the point of intersection with the centerline of another street or alley. Unless conflicts occur with existing utilities, street monuments shall be set on centerline. All monuments shall conform to Construction Detail 3210 and be located at all points shown on the final map.

DS11-04. MONUMENT PROTECTION: The Design Engineer shall place a note on all construction plans stating that:

1. The Contractor is responsible for the protection of all existing monuments and other survey markers.
2. No final acceptance of the construction shall be issued until the survey monuments are in place.

DS11-05. VERTICAL CONTROL BENCHMARK: NAVD (North America Vertical Datum (1988)) shall be incorporated into each subdivision boundary survey monuments. The location and quantity of NAVD (North America Vertical Datum (1988)) benchmarks shall be proposed by the Design Engineer and approved by the City Engineer.

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ENGINEERING DESIGN STANDARDS

SECTION 12 – SUBDIVISION & DEVELOPMENT GRADING PLANS

DS12-01. GRADING PLAN: A Grading Plan shall be included in the improvement plans for subdivisions and other developments, when necessary. Guidelines for the preparation of the Grading Plan are as follows:

1. Grading plans shall be prepared by a registered Civil Engineer or licensed Architect in accordance with Appendix Chapter 33 of the California Build Code (CBC) and the Project Soils Report. The Grading Plan must comply with the City's Flood Ordinance.
2. Grading plans may require the signature of the Soils Engineer at the discretion of the City Engineer.
3. The Grading Plan will be on sheets of the same quality and size as the improvement plans.
4. The Grading Plan shall be the same scale as the improvement plans.
5. The plan shall clearly show each lot number, how each lot drains, and the pad elevation of each lot.
6. With the exception of hillside areas, each lot must drain to the street, without crossing the property line of any other lot.
7. There shall be no slopes steeper than 5:1 between the back of walk and the right-of-way line. Level areas having a minimum width of 2 feet shall be required at the toe and top of said slope. Maximum residential lot grades shall not exceed 8 percent (+/-8 percent) at the back edge of walk. See construction detail 3000, 3010, 3020 and 3030.
8. Drainage from hillside areas must be picked up in a ditch or swale at the right-of-way line of adjacent properties or in an easement from the adjacent property owner, rather than spilling over the sidewalk.
9. Grading plans shall include an Engineer's/Architect's Certification signature block confirming lot pads are graded within 0.2 feet plus or minus of the elevations shown on the approved plans. A separate Engineer's Certification signature block shall be included, as necessary, confirming lot pads compaction in accordance with Soils Engineer's recommendations; however, both certifications shall be required with record drawings.
10. Every part of the subdivision must be designed with a drainage release. The drainage release will be such that if any portion of the storm drain system fails, water will stand in the street no more than 1 foot deep and no less than 1 foot below the pad elevation of any house.
11. The plan shall clearly show (by contours, elevations, typical cross sections, etc.) the relationship of the Grading Plan to the existing ground and drainage pattern of adjacent properties.
12. Existing drainage patterns on adjacent properties must remain the same (or be improved) by the Grading Plan for the subdivision.
13. If retaining walls are needed, they shall be constructed of concrete or reinforced masonry block.
14. The plan shall show all drainage facilities being installed, clearly labeling high and low points and curb elevations.

DS12-02. GRADING AT TREES: Grading under trees with aesthetic value (oak trees and trees with a 9-inch diameter or larger, measured 4-1/2 feet above the ground, in healthy condition) shall be given special attention. Every reasonable effort shall be made to avoid removing trees or creating conditions adverse to the tree's health. The natural ground within the dripline of trees, especially oak

trees, shall remain as undisturbed as possible. Grading within the dripline of oak trees will not be permitted without adequate justification and approval by the City Engineer.

Cross sections may be required where trees are located adjacent to roadways, new slopes or critical areas. In addition, a dimension from the face of a tree to some critical point or line may be required.

The following comments regarding oak trees shall be included on all improvement plans where oak trees are to be saved:

1. Only those oak trees marked with an "X" are to be removed during construction.
2. During construction there shall be no grading, trenching, earth removal or addition, building pad formation or earth alteration of any kind within the dripline of any oak tree not marked with an "X."
3. During the construction phase of the project, a physical barricade shall be erected and maintained coincidental to the driplines of all oak trees not marked with an "X." Within this barrier no construction related activities shall be allowed including but not limited to vehicular parking or material storage.
4. The physical barricade shall be T-bars and 4 foot high hogwire fencing.

DS12-03. CONFIRMING PAD ELEVATIONS: Upon completion of the grading and prior to acceptance of the subdivision improvements by the City, the Design Engineer shall verify the final pad elevations. The elevations shall be verified at the center and the corners of each pad. Elevation deviations or more than 0.20 feet shall be noted on the tracings.

A signature block, confirming that final graded elevations in the field are the same as those shown on the plans, shall be included on the mylars of the subdivision grading plans. The Project Designer shall sign the signature block, confirming the pad elevation. The Design Engineer shall provide one set of signed as-built record grading plans in accordance with section DS2-04(E) of these standards.

DS12-04. GRADING PERMIT: A grading permit may be obtained to permit the Contractor to begin rough grading prior to approval of the improvement plans upon approval of the Grading Plan. No underground utility work can begin until the improvement plans are approved by the City Engineer.

DS12-05. EROSION AND SEDIMENTATION CONTROL PLANS:

1. **PLAN:** An erosion control and sedimentation control plan must be done for all projects. The plan shall follow the guidelines of the Stormwater Pollution Prevention Plan (SWPPP). The plan shall include site maps(s), and identification of construction/contractor activities describing measures for providing erosion and sediment control. The SWPPP shall be submitted with the first improvement plan submittal and implemented before construction start.
If the erosion control measures can be adequately described by reference to City Standard Details, a separate plan sheet need not be done. Reference to these Standard Details and Erosion Control Notes can be placed on the Grading Plan. If, however, in the opinion of the City Engineer, locations or details of erosion control appurtenances cannot be adequately described in notes, a separate Erosion Control Plan must be prepared. The Design Engineer shall consult the City Engineer regarding the need for a separate Erosion Control Plan prior to commencing preparation of project plans.
2. **EROSION CONTROL NOTES:** Notes shall be placed on the Erosion Control Plan (or on the Grading Plan if no separate Erosion Control Plan). See Erosion and Sedimentation Control Plan Notes page DS2.21 for additional information.

ENGINEERING DESIGN STANDARDS

SECTION 13 – IRRIGATION AND LANDSCAPING DESIGN

DS13-01. GENERAL: Design of all Public Landscaping Improvements within the City of Dixon shall be performed by a Licensed California Professional Landscape Architect or other Licensed Professional in accordance with these standards and criteria. Landscape improvement plans shall be prepared and submitted to the City for approval on plan sheets per City design standards DS2-03, “Preparation of Improvement Plans.” Prepared plans shall consist of title sheet, Irrigation plan sheet(s), Planting/grading plan sheet(s), construction details and notes. At conclusion of the project and prior to acceptance, the Landscape Architect shall provide the City as-built mylar plans of the completed project.

DS13-02. TITLE SHEET: The title sheet shall be prepared according to Figure 2-3 with the addition of a Designers Substantial Completion Block with the following statement:

“I hereby state that all improvements have been substantially constructed as represented on these plans.”

DS13-03. CONSTRUCTION PLANTING & GRADING PLANS: It is the intent of these design standards to permit the Landscape Architect when designing Public Landscape Improvements to incorporate individual expression with a desired theme, from park to park and subdivision streetscape to subdivision streetscape. It shall be the Landscape Architect’s task to apply City standard specifications, applicable City Ordinances including the Landscape Ordinance and industry standards into consideration as appropriate for his/her respective project assignment. Upon designing improvement plans, site features such as adjacent streets, curbs, walks lights, benches etc. shall be clearly shown on the construction planting plan and when incorporated into the project shall follow City of Dixon Standard Details and Specifications. Site drainage features shall be clearly incorporated into all Landscape planting plan(s). Additionally known underground utilities shall be noted on the irrigation plan(s). Upon completion of improvement plans, the City shall plan check and return comments to the Architect for revisions as outlined in DS2-05. The designer’s attention is directed to DS12-01 (7) regarding grade leveling minimum slope requirements in areas adjacent to sidewalk.

DS13-04. CONSTRUCTION NOTES: The following construction notes shall be incorporated into and utilized in all Public Landscaping Improvement plans.

GENERAL NOTES

1. Unless otherwise shown on these plans or noted in the special provisions, all work, materials and construction of Public Improvements shall conform to the City of Dixon Construction Specifications, Design Standards and/or latest edition of Caltrans Standard Plans and Specifications.
2. Approval of the City Engineer, or his authorized Representative, is required on completed work prior to (A) placing of concrete; (B) placing of aggregate base; (C) placing of asphalt concrete; (D) backfilling trenches. Work done without such approval shall be at the Contractor’s risk and subject to rejection by the City. Such approval shall not relieve the Contractor from the responsibility of performing the work in an acceptable manner.
3. The Contractor shall coordinate City inspections and submit required samples prior to commencing work for approval.

Required inspections shall include but are not necessarily limited to:

- a. Pre-Construction Meeting- grading, site conditions etc.
- b. Soil Preparation including application of weed killer, required amendments and pre-emergent herbicide
- c. Irrigation trenching layout
- d. Open trench hydrostatic pressure test for main line & lateral lines before backfilling trenches (Contractor shall center load piping providing all pipe joints and connections are exposed for the test):
 - i) Irrigation Mainline- The section(s) of the mainline shall be flushed of air, capped at ends and tested under full static line pressure for a minimum of 4 hours. Any leaks noted shall be repaired, defective materials replaced and re-tested. (At the Contractor's option a one hour pressure test at 100 PSI may be substituted for the above test, however the Contractor shall be responsible to provide pump and misc. equipment as may be necessary).
 - ii) Irrigation Laterals- All lateral lines shall be tested as specified above except that the test period shall be a minimum one (1) hour. Lateral pipes shall be plugged or capped at sprinklers, bubbler or drip connections and other locations necessary to perform the test.
- e. Irrigation operation and coverage
- f. Plant material
- g. Planting layout
- h. Pre-ninety day maintenance period final inspection
- i. Post-ninety day maintenance period final inspection

The following samples shall be submitted for approval prior to installation:

- a. Shredded bark mulch
 - b. Masonry block
 - c. Soil amendments, herbicides & weed killer
 - d. Other specialty item as determined by the City Engineer
4. Contractor shall be responsible for making him/herself familiar with construction site including all underground utilities, pipes and structures and shall take sole responsibility for all cost due to damages caused by his construction operations and subsequent replacement of said utilities and structures.
 5. Contractor shall not willfully proceed with construction as designed when it is obvious that unknown obstructions, area discrepancies and/or grade differences exist that may not have been known during design. Such conditions shall be immediately brought to the attention of the City Representative. The Contractor shall assume full responsibility for all necessary revisions due to failure to give such notification.
 6. Contractor shall be responsible for any coordination with subcontractors or utility agency as required to complete all construction items of work. All piping, conduit, sleeves, etc., shall be set in prior to installation of other construction items such as concrete or asphalt concrete pavement.
 7. All dimensions are from face of paving, walls, etc. unless otherwise noted.
 8. All property lines and lot lines shall be verified prior to commencing work.

9. Contractor is responsible to refer to coordinate grading with all improvement plans when such plans pertain to any aspect of his work items (e.g., grading, drainage structures, walls, footings, and other structures).
10. See Civil Engineer's Improvement plans, if applicable, for layout and construction of streets, drainage structures, parking lots, curbs and sidewalks and other civil improvements.
11. All gradients between spot elevations are assumed to be straight gradients.
12. Verify all station point locations in field, and report any discrepancies between station number shown and actual location of item to City Representative before proceeding with work.
13. All existing improvements, materials and plant material to remain within the new construction area shall be properly and adequately protected from damage. It shall be the responsibility of the Contractor to restore to original condition any existing item that is damaged or disturbed in any way.
14. All materials to be used or salvaged shall be stored in an area designated by the City or developer/owner for that purpose. All salvaged materials shall remain the property of the City or developer/owner.
15. All streets, sidewalks and adjacent properties shall be protected throughout construction operations.
16. Landscape maintenance period shall commence after acceptance of improvements by the Dixon City Council and shall continue for 90 calendar days. Maintenance items shall include watering, weeding, fertilizing, mowing, spraying, and pruning necessary to keep the plants in a healthy growing condition. At the end of the maintenance period, all plant materials shall be in healthy growing condition and landscape areas weed free and cleaned of all debris. At the direction of the City Engineer during the maintenance period, any plant exhibiting weakness, vandalized or displaying the probability of dying, shall be replaced immediately by the Contractor at his own expense.
17. Should any plant materials be diseased or other installed material prove defective or should the installation as a whole prove defective, due to faulty workmanship, materials furnished or methods of installation, or should the said improvement or any part thereof fail to live or function properly, as planned, due to any of the above causes, all within one year after acceptance of landscape improvements by the Dixon City Council, the Contractor agrees that repairs shall be made within fifteen (15) calendar days after receipt of written notice from the City.
18. The Contractor shall take appropriate measures to protect the public from all hazards created by his operations. All excavations & trenches over 12" in depth adjacent to public walkways, within parks etc. shall be barricaded from the public or as directed by the City Engineer.
19. The Contractor or any subcontractor shall notify members of USA 2 working days in advance of performing excavation work by calling the toll-free number 1-800-227-2600. Excavation is defined as being 18" or more in depth below the existing grade surface.

GRADING NOTES

1. All proposed grades shall be constructed to properly drain in accordance with approved grading plans. Grades are to meet or blend in with existing grading at project limits and existing walkways and sidewalks. Precise elevations indicated on plans to be verified in field to as-built condition.
2. The location of features to be constructed not specifically dimensioned may be determined by scale. If conflicts arise in field, contact City Representative for resolution.

3. If in the field, scaled dimensions conflict with stated grades, and/or elevations, the stated design elevations shall take precedence.
4. Contractor shall be responsible for "Rounding Off" all sharp ridges existing on site whether or not such conditions are indicated on plans.
5. Grade tolerances shall conform to the following approved schedule unless otherwise noted on the plans or in the special provisions:
 - a. Rough Grading - +/- 0.2 ft
 - b. Finish Grading - +/- 0.1 ft
 - c. All Paving +/- 0.1 ft
 - d. All 85 & SD Pipe - +/- 0.1 ft
 - e. All Structures - +/- 0.1 ft

LANDSCAPING NOTES

1. Contractor shall field verify and accept existing site grading prior to commencement of work. Said work shall consist of installation of irrigation systems, soil preparation, planting, fertilizing and maintaining landscape plantings throughout construction activities and 90 day maintenance period. All planter beds shall receive a 3 inch thick layer of shredded bark mulch.
2. No planting shall occur during weather conditions which will adversely affect materials or when soil is in a muddy condition as determined by the Landscape Architect. Contractor shall not plant at the end of the day, on Fridays or before holidays unless a special crew has been assigned to care for plants on the next calendar day, and on weekends and holidays.
3. SOIL PREPARATION
 - a. In accordance with the Landscape Architect's recommendations, all imported soils shall be tested by a City approved soils laboratory.
 - b. The Contractor shall prepare all landscape areas by removing all weeds, debris, rubbish and 1" diameter or larger stones.
 - c. Planting areas shall be completely till cultivated with soilamendments recommended by the Landscape Architect, to a minimum depth of 12 inches. See planting details for additional information.
 - d. Subsequent to installation of irrigation system(s) and prior to installation of plant materials, the Contractor shall:
 - i) Restore plan grades by floating turf areas and planter beds to a smooth uniform grade and slope.
 - ii) Thoroughly water down beds, turf areas etc. and allow 7 days to pass before applying Ron-Star, Round-Up or other approved weed killing agent in accordance with manufacturer's recommendations.
 - e. Applied fertilizer shall be commercial grade inorganic in granular or pellet form. The Contractor shall follow Landscape Architect's recommendations for required fertilizer application. See planting details for additional information.
4. Prior to installation of mulch, a pre-emergent herbicide shall be applied to all planter beds in accordance to manufacturer's recommendations after plantings have been installed. As required by Landscape Architect, chemicals used are to be in written chemical weed control program prepared by a licensed pest control advisor and approved by the City. The

Contractor is responsible to possess and maintain all local agency permits or licenses necessary for application of herbicide chemicals.

5. PLANTING NOTES- Plant materials shall be planted in accordance with the following provisions and as directed by the City Engineer or his authorized Representative. Plant substitutions shall not be permitted unless previously recommended by the Landscape Architect and approved by the City Engineer. In all cases, the City shall give final approval of all substitutions.
 - a. Plants shall be delivered to site healthy, shapely, and well-rooted. Roots shall show no evidence of having been root bound, girdled, restricted or deformed. Plants shall have straight trunks with the leader intact, undamaged and uncut. All old abrasions and cuts shall be completely calloused over. All plants shall be measured when their branches are in their normal position. Height of plant is measured from the root crown to the top of the plant. Width of plant is measured at branching at the widest point. Indicated sizes shown are before pruning. Plants shall not be pruned prior to delivery except upon approval of the City Engineer.
 - b. Trees shall be shapely and well tapered from trunk base so that when the nursery stake is removed, the tree supports itself upright without further staking. Trees shall have a main leader, and the main branches shall be spaced vertically and alternately along the trunk. Branching shall not be concentrated in one location nor shall there be severe crossing of branches. Branches shall be smaller in diameter than the trunk, and at least one-half of the foliage on the branches shall be located along the lower two-thirds of the trunk.
 - c. Plant material shall be removed from the containers in such a manner that the root ball is not broken, and they shall be planted and watered as hereinafter specified immediately after their removal. Containers shall not be cut prior to delivery of plants to planting area. Root balls of plants temporarily removed from containers prior to planting shall be kept moist and covered at all times, and shall not be exposed to the air except while actually being placed in the ground.
 - d. No planting will be allowed until soil preparations have been completed and required amendments, herbicides and other quantities used have been inspected and verified by the City Representative. The City Representative may also inspect all plants prior to planting. Plants displaying root bound or girdled root characteristics shall be rejected and the Contractor shall remove such plants from work site at the end of the workday.
 - e. Shredded bark mulch shall not be installed until the City has verified application of pre-emergent herbicide and has approved of shredded bark mulch sample.
6. IRRIGATION NOTES- All irrigation parts and materials utilized throughout the system(s) shall be new and in perfect condition. Contractor should reference irrigation equipment parts except for piping, offsets & sleeves on the plan construction detail sheet of the construction plans. Irrigation design is diagrammatic unless otherwise noted; therefore piping shown within paved areas is for design clarification only. Such piping shall be installed in planting areas unless installed in pipe sleeves. Generally, irrigation mainline and laterals shall be installed adjacent to walkways, walls or other existing features as appropriate. Additionally, piping shall not be installed beneath trees or shrubbery. Under no circumstance shall irrigation piping be installed so that pipes come in contact with one another. All piping shall be installed so as to maintain a minimum 6 inch separation. The Contractor shall keep detailed notes of approximate locations of piping and incorporate into as-built construction plans.

- a. Generally due to scale of drawing, it is not possible to indicate all irrigation offsets, fittings, sleeves, etc. which may be required. Therefore, the Contractor shall be responsible to investigate site conditions affecting his work and plan accordingly.
- b. A licensed electrical Contractor shall supply power to controller, and irrigation Contractor shall be responsible to make final electrical connection when installing controller and valve wiring.
 - i) Each controller shall have its own independent groundwire.
 - ii) Splicing of 24 volt wires shall not be permitted except in valve boxes where there are 24 inch wire coils of excess wiring at each splice and 100 feet on-center along wire run. Tape excess wire in bundles 10 feet on-center except inside sleeves.
 - iii) Install a spare control wire (different color) along entire wiring run, and loop the same in 36 inch excess coil inside each single remote valve box and inside one of each group of valve boxes.
 - iv) Contractor shall install identification tag inside each remote valve box noting controller & remote valve number.
- c. The irrigation Contractor shall flush, clean and adjust irrigation heads for optimum performance and to prevent overspray onto walkways, roads, buildings etc. as necessary. This shall include selecting the best degree of arc to fit the existing site conditions and to throttle the flow control at each remote valve to obtain optimum operating pressure for each system. Additionally Contractor shall make minor adjustments to the system as may be necessary and shall report any required major adjustments to the City. The City shall either direct the Contractor as to corrective measures required or shall consult the irrigation designer regarding the deficiency.
- d. Irrigation boxes shall be installed approximately 12 inch from and perpendicular to walks, curbs etc. and a minimum of 12 inch separation shall be maintained between other remote valve boxes when grouped. Unless specified the short end of valve box shall be installed adjacent to walks, curbs etc. Each irrigation remote valve box shall house a single remote control valve.
- e. All existing surface and underground facilities damaged or cut as a result of the Contractor's operations shall be restored to original condition. Except as specified herein, excavating and trenching, backfill and compaction shall conform to City of Dixon Construction Details and Specifications for piping larger than 4 inches in diameter. Within landscaped areas, backfill and compaction of trenches housing piping 4 inches in diameter and less shall be as follows:
 - i) Backfill material shall be clean native fill free of stones, debris or other foreign materials.
 - ii) Trench compaction shall be maintained at 90 percent relative compaction (applies to all pipe sizes). Jetting of irrigation trenches may be approved by the City Inspector in landscaped areas which are not beneath sidewalks or other structures.
- f. Pipe, fittings and other irrigation components shall be assembled according to manufacturer's recommendations. Pipe, fittings etc. shall be thoroughly cleaned before applying primer and solvent. Connections between PVC pipe and metal valves or steel pipe with threaded fittings shall be made using plastic male adapters, and a non-hardening pipe dope (rector seal or Teflon tape) shall be applied to male threads. Unless otherwise specified, brass unions shall be installed on each side of all irrigation valves, backflow prevention equipment, filters and ball controlled shut off valves shall be installed upstream of all remote control valves.

The irrigation central control system shall be the Rain Master Irrigation Systems, Inc. When 6 or more remote valves are required, the controller shall be Evolution DX2 including flow sensor device (FSAY), Evolution communication hardware including radio and dome RDM and Promax remote control (PMR-CAC) receiver.

For systems requiring less than 6 remote valves, the controller shall be Rainmaster Eagle Controller including flow sensor & master valve (ESMV) and Promax receiver (PMR-CAC). There is no known equal to Rainmaster controller systems, submittals shall be required.

PLANTING LEGEND

The plans shall depict various planter beds and areas with plant material and landscape features in accordance with industry standard practices. The Landscape Architect (designer) shall responsible for landscape plant material conforming to the City of Dixon “Water Efficient Landscape Ordinance,” Ordinance No. 9212, adopted December 8, 1992, or the most currently adopted ordinance. All plans shall include as a minimum the following reference criteria:

Plant Symbol	Spacing	Quantity	Common Name	Botanical Name
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WATER USAGE CONSUMPTION CHART

	Evapotransporation Rates (inches)	Evapotransporation Rates (feet)	Landscape Area (Sq.Ft.)	Total (Cu. Ft.)	Total (Gal.)
January	X	Y	Z	A	B
February	-----	-----	-----	-----	-----
March	-----	-----	-----	-----	-----
April	-----	-----	-----	-----	-----
May	-----	-----	-----	-----	-----
June	-----	-----	-----	-----	-----
July	-----	-----	-----	-----	-----
August	-----	-----	-----	-----	-----
September	-----	-----	-----	-----	-----
October	-----	-----	-----	-----	-----
November	-----	-----	-----	-----	-----
December	-----	-----	-----	-----	-----

Plans of planter beds and landscape areas shall clearly identify, depict, and quantify all plant materials. Areas to receive shredded bark mulch shall also be noted. Architect shall use City Landscaping Notes but may modify and/or append specifications as may be required.

DS13-05. IRRIGATION DESIGN: Irrigation systems shall be designed to include all appurtenances, incidentals and accessories required for proper installation and operation of the system(s). The Landscape Architect shall apply City of Dixon and as necessary industry standards when designing and depicting Public Improvement Irrigation Plans.

Architect shall clearly identify and detail required components of the system(s) including any specialty items such as booster pumps, drip irrigation components, fenced enclosures etc. Plans should show supply

water main line point of connection, water meters, back flow prevention, controllers, irrigation mains and laterals, irrigation heads, remote control valves, drip units, bubblers, filters, pumps etc., on the plans.

DS13-06. SPECIALTY SITE FEATURES: All specialty site features to be incorporated into the Landscape Improvement Plans shall be designed and depicted clearly on the plans. As with any specialty feature, lighting improvements, drainage items or other items specified within City Specifications shall be designed in accordance with City of Dixon Design and Construction Standards as applicable, unless otherwise directed by the City Engineer. Items such as block walls, misc. fencing, children's play equipment or other shall be designed according to industry standards and/or as directed by authorized City Engineer.

DS13-07. MEDIAN ISLAND LANDSCAPING: Median island landscaping design shall include installation of storm drainage systems consisting of area drain inlets and necessary piping along with landscape erosion protection measures. Maintenance turn-out may be required as determined by the City Engineer. See Standard Detail 3340.

ENGINEERING DESIGN STANDARDS

SECTION 14 – DEVELOPMENT SITE ACCESS

DS14-01. GENERAL: Driveways shall meet sight distance requirements as discussed in DS3-10 of these design standards for both ingressing and egressing movements. Driveway width, type, and design shall conform to DS3-15 of these design standards.

Backing of vehicles out of driveways onto the roadway shall only be permitted for single-family residential or duplex land uses. All other land uses shall be designed such that both ingressing and egressing vehicles are facing forward.

Driveways shall be oriented to provide at least 5 feet between the driveways traveled way and appurtenances such as fire hydrants, poles, and drop inlets.

The City recognizes that infill projects (projects within older, previously developed areas) may have certain constraints such as lot size, existing driveways near the property line on adjacent parcels, etc. which may deem it impractical to achieve the requirements contained in these design standards for site access. Infill projects such as these will be evaluated on a case-by-case basis by the City. However, the goal will be to achieve the requirements herein to the extent practical.

DS14-02. DRIVEWAY LOCATIONS AND SPACING:

Driveway Locations on Local Streets and Minor Collector Streets

- A. For single-family residential or duplex, the following standards shall apply:

Driveways shall be a minimum of 10 feet apart, measured from edge to edge, except in cul-de-sac bulbs and the outside portion of knuckles, where the minimum shall be 5 feet.

Where a local street intersects a local street or cul-de-sac, driveways shall be located at least 50 feet from the face of curb of the intersecting street.

Where a local street or minor collector street intersects a minor collector street, driveways shall be located at least 75 feet from the face of curb of the intersecting collector street to the centerline of the driveway and front the local street at local street corner lots. This may be accomplished by designing a local street parallel to the minor collector street providing access to the lots. Special consideration will be made in unusual circumstances.

- B. For land uses other than single-family residential or duplex fronting local streets or minor collector streets, the following standards shall apply:

Driveways shall be a minimum of 100 feet apart, measured between driveway centerlines, except on cul-de-sacs and knuckles where driveways shall be shared or otherwise designed to minimize the number of driveways to the extent possible. For corner parcels, driveways shall be located at least 100 feet from the face of curb of the intersecting street, measured from the centerline of the driveway. Where the local street or minor collector street

intersects a minor collector street, driveways shall be located at least 150 feet from the face of curb of the intersecting street, measure from the driveway centerline, and shall front the local street at local street corner lots.

Driveway Locations on Major Collector or Arterial Streets

There shall be no driveways along major collector or arterial streets serving single-family residential or duplex land uses. Driveways on the same side of the street shall be at least 200 feet apart, measured between driveway centerlines, on major collector streets and at least 250 feet apart, measured between driveway centerlines, on arterial streets. For major collector streets, driveways shall be at least 150 feet from the face of curb of the intersecting street. For minimum driveway distances from intersections on arterial streets, see Figure 14-1. For driveway spacing on opposite sides of the street (offset spacing), see Minimum Offset of Opposing Driveways.

Minimum Offset of Opposing Driveways

For land uses other than single-family residential or residential duplex, the centerline of driveways on opposite sides of the street shall either be in direct line, or have a minimum offset distance as listed below (measured from the centerline of the driveways):

- A. For driveways on local streets, the minimum centerline offset shall be 100 feet.
- B. For driveways on collectors, the minimum centerline offset shall be 200 feet.
- C. For driveways on arterials, offsets shall be considered on a case-by-case basis.

Where a raised median is provided along the center of the street separating conflicting turning movements, the offset requirements as stated above will not apply.

Number of Driveways Serving a Parcel or Site

For single-family residential or duplex land uses, only one driveway per parcel will be permitted. Where circular drives are proposed on a property, there shall be a minimum frontage of 150 feet and the circular drive must be approved by the City Engineer.

For other land uses, the number of driveways shall be minimized, but not to a point that could cause local congestion within the public right-of-way. Consolidation of driveways with adjacent parcels shall occur whenever possible. Where driveway location standards cannot be met for a parcel, the City may require the only access to that parcel be achieved via cross access over an adjacent parcel. This shall satisfy legal requirements for access to a parcel, and the City therefore shall not be required to permit direct access to any parcel via a driveway along the parcel's frontage.

Where land uses other than single-family residential or duplex are adjacent, the City typically requires cross access to minimize use of the public streets to travel between adjacent developments.

For projects requiring a traffic study (see Figure 15-1), the study shall evaluate the proposed site access for the project. The study shall discuss balancing the number of driveways for the project so the number of driveways and required throat depths are minimized, while providing a sufficient number of access points to minimize congestion and delay.

Right-Turn Deceleration/Acceleration Lanes for Driveways

A right-turn deceleration lane shall be provided for a driveway if all of the following conditions are met:

- A. The driveway is located on an arterial.
- B. Right-turn ingress volume is expected to exceed 50 peak hour vehicles on the arterial.
- C. There is ample right-of-way and frontage to provide a deceleration lane as determined by the City Engineer. Right-of-way dedication may be required.
- D. The 85th percentile travel speed of the roadway, as determined by the City Engineer, equals or exceeds 40 mph.

There may be cases where some of the above criteria are not met, but City Engineer may require a deceleration lane in the interest of safety.

There may be cases where it will be necessary to merge a deceleration lane with an existing acceleration lane. Where the beginning of a deceleration taper will be within 100 feet of the end of an acceleration taper, then the deceleration and acceleration shall be merged to form a continuous auxiliary lane.

There may be cases where it is desirable to provide room for right-turn deceleration, but an entirely separate deceleration lane is either too difficult to install, due to design constraints, or is not reasonable. In these cases, a right-turn curb taper shall be provided in accordance with Figure 14- 2.

Right-turn acceleration lanes for driveways shall not be provided.

Left-Turn Deceleration/Acceleration Lanes for Driveways

Left-turn deceleration lanes (left-turn pockets) are not typically required on minor collector or residential streets unless required by the City Engineer as a traffic calming measure.

On major collectors or arterials where left-turn ingress will be permitted, a left-turn deceleration lane shall be considered at the time of tentative map submittal or street improvements of existing intersections/mid-block locations if one or more of the following conditions are met:

1. Twenty-five or more vehicles make or are projected to make a left-turn and are in conflict with 100 or more vehicles on the through road during the peak hour and the 85th percentile speeds on the through road, as determined by the City Engineer, equals or exceeds 40 mph.
2. Four or more reported accidents which are susceptible for correction by a left-turn pocket installation have occurred during a 12-month period. Accident types include rear end and same direction sideswipes involving left-turning vehicles.
3. The visibility of approaching traffic is less than the safe stopping sight distance for the 85th percentile speed as listed in Table 201.1 of the California Department of Transportation Highway Design Manual.

Left-turn lanes may be in the form of a separate left-turn pocket or a continuous two-way, left-turn-lane. The minimum left-turn pocket length shall be 150 feet with a 90 foot entry taper. Longer left-turn pockets may be required if a traffic study demonstrates the need.

If a raised curb median island exists, all of the policy warrants for median openings must be met in accordance with DS14-05 "Median Openings," along with any one of the warrants for left-turn pockets.

The satisfaction of these warrants is not a guarantee that the left-turn pocket will be permitted. The warrants are strictly for consideration purposes only. The installation of the left-turn pocket must be compatible with the traffic safety and circulation of the area.

Separate left-turn acceleration lanes are not typically required.

Restricted Turning Movements for Driveways on Arterial Streets

Turning movement restrictions shall apply to unsignalized driveways on arterial streets per Figure 14-1.

DS14-03. DRIVEWAY MINIMUM REQUIRED THROAT DEPTHS: Driveways shall meet the minimum required throat depth (MRTD) requirements as discussed in DS15, "Traffic Impact Analysis." In the case of "drive-thru" facilities, attention is directed to the minimum on-site storage distances for ingressing vehicles.

On-site parking shall not be permitted within the MRTD area. The MRTD requirement does not apply to single-family residential or duplex land uses.

In cases where a traffic study is not required, or in cases where there is insufficient data available to calculate the MRTD in accordance with DS15, "Traffic Impact Analysis," Table 14-1 shall be used to determine minimum required throat depth for access points for a site. In cases where a traffic study will be provided, but the access points have not yet been determined for a site, Table 14-1 shall be used to estimate the MRTD during the site design process. In these cases, the final MRTD requirements shall be determined by the traffic study via the methodology in DS15. The distances shown in Table 14-1 chart represent vehicle storage equivalents, which means the total required distance may be achieved by summing the throat depths for several access points if more than one access point is to serve the site. In these cases, the distance shown in Table 14-1 shall be prorated to each access point to the nearest 25 feet based on the estimated relative percent usage of each access point.

DS14-04. SIGNALIZED DRIVEWAYS: The need for signalized driveways shall be based on warrants contained in the latest edition of the Caltrans Traffic Manual. Any such evaluation shall be performed by the consultant as part of the traffic study for the project in accordance with DS15, "Traffic Impact Analysis."

Attention is also directed to DS15, "Traffic Impact Analysis" for minimum required throat depth (MRTD) for signalized access locations.

The City does not share in the cost of design and construction of traffic signals at driveways required as a mitigation of development. The developer shall bear all costs of providing signalization at the private access point, including design and construction. This obligation is in addition to required Traffic Mitigation Fees. Maintenance and operation of these traffic signals shall be accepted by the City.

DS14-05. MID-BLOCK MEDIAN OPENINGS: Mid-block median openings to permit turns to and from adjacent property will not normally be considered unless all of the following conditions are met:

1. The property to be served has continuous frontage of 200 feet or more along the street.
2. The median opening is not less than 500 feet from an intersection, measured between the centerlines.
3. The median opening is not less than 500 feet from any other existing or proposed mid-block median opening, measured between the centerlines.

Those openings which are proposed with left-turn pockets must also satisfy one or more of the warrants listed in DS14-03. The satisfaction of these warrants is not a guarantee that the median opening will be allowed. These warrants are strictly for consideration purposes only. The opening must conform to the traffic safety and circulation of the area.

TABLE 14-1
MINIMUM THROAT DEPTH

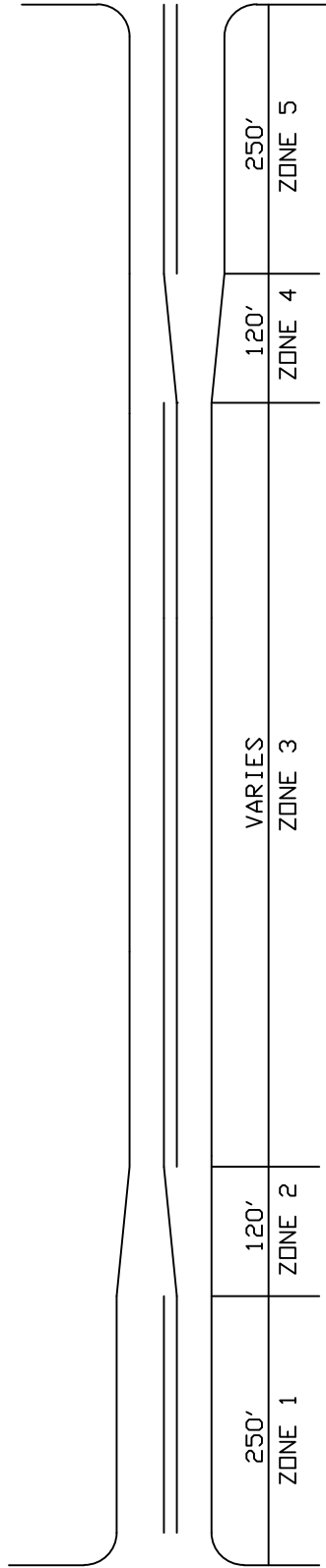
Land Use	Size	Street Type		
		Local	Collector	Arterial
Apartments, Condos, Mobile Homes, Planned Unit Development	0 - 80 units	25'	50'	50'
	81 - 160 units	50'	50'	50'
	> 160 units	50'	50'	100'
Quality/ Sit Down Restaurant	0 - 15,000 SF	25'	25'	25'
	> 15,000 SF	25'	25'	50'
Drive-Thru Restaurant	0- 2000 SF	25'	25'	50'
	2001 - 3000 SF	25'	50'	100'
	3001 - 5000 SF	50'	75'	150'
	>5000 SF	75'	100'	225'
Motel]	0 - 150 rooms	25'	25'	50'
	151 - 400 rooms	25'	75'	100'
	>400 rooms	25'	125'	150'
Convention Hotel	0 - 150 rooms	50'	50'	100'
	151 - 400 rooms	50'	150'	250'
	>400rooms	50'	250'	350'
Office Park	0 - 20,000 SF	25'	25'	25'
	20,001 - 50,000 SF	25'	50'	75'
	50,001 - 100,000 SF	50'	75'	175'
	100,001 - 150,000 SF	75'	125'	250'
	150,001 - 300,000 SF	125'	250'	500'
	> 300,000 SF	150'	400'	825'
General Office	0 - 50,000 SF	25'	25'	50'
	50,001 - 100,000 SF	25'	50'	100'
	100,001 - 150,000 SF	50'	75'	175'
	150,001 - 200,000 SF	50'	100'	225'
	200,001 - 300,000 SF	75'	175'	350'
	300,001 - 400,000 SF	125'	225'	450'
	> 400,000 SF	150'	275'	575'
Light Industrial	0 - 100,000 SF	25'	25'	50'
	100,001 - 200,000 SF	25'	50'	100'
	200,001 - 300,000 SF	50'	75'	150'
	300,001 - 400,000 SF	50'	100'	200'
	> 400,000 SF	75'	12'	250'
Industrial Park	0 - 500,000 SF	25'	25'	50'
Discount Store	0 - 30,000 SF	25'	25'	25'
	30,001 - 50,000 SF	25'	50'	75'
	50,001 - 75,000 SF	25'	50'	125'
	>75 000 SF	50'	75'	175'

TABLE 14-1 (cont.)
MINIMUM THROAT DEPTH

Land Use	Size	Street Type		
		Local	Collector	Arterial
Shopping Center	0 - 10,000 SF	25'	25'	50'
	10,001 - 20,000 SF	25'	50'	125'
	20,001 - 30,000 SF	50'	100'	175'
	30,001 - 40,000 SF	75'	125'	225'
	40,001 - 100,000 SF	75'	150'	250'
	100,001 - 150,000 SF	100'	175'	375'
	150,001 - 200,000 SF	125'	250'	500'
	200,001 - 250,000 SF	150'	300'	625'
	250,001 - 600,000 SF	175'	375'	750'
	600,001 - 700,000 SF	200'	375'	750'
	700,001 - 800,000 SF	225'	425'	875'
	800,001 - 900,000 SF	250'	500'	975'
	900,001 - 1,000,000 SF	275'	550'	1075'
> 1,000,000 SF	425'	825'	1275'	
Drive-In Bank	0 - 10,000 SF	25'	25'	50'
	10,001 - 20,000 SF	50'	50'	150'
	20,001 - 30,000 SF	75'	150'	250'
	30,001 - 40,000 SF	100'	200'	350'
	>40,000 SF	150'	250'	450'
Supermarket	0 - 20,000 SF	25'	25'	50'
	20,001 - 30,000 SF	25'	50'	75'
	30,001 - 40,000 SF	25'	50'	100'
	>40,000 SF	25'	75'	150'
Medical Clinic	0 - 100 employees	25'	25'	50'

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FIGURE 14-1 PERMITTED DRIVEWAYS/ STREETS ON ARTERIALS



- ZONE 1- NO DRIVEWAYS OR STREETS ALLOWED.
- ZONE 2- DRIVEWAYS AND STREETS ALLOWED. LEFT-TURNS OUT PROHIBITED.
- ZONE 3- DRIVEWAYS AND STREETS ALLOWED. ALL TURNING MOVEMENTS PERMITTED.
- ZONE 4- DRIVEWAYS AND STREETS ALLOWED. LEFT-TURN IN AND OUT PROHIBITED.
- ZONE 5- NO DRIVEWAYS OR STREETS ALLOWED.

NOTE:

All spacing shall be measured from center of driveway to face of curb of intersecting street.



CITY OF DIXON
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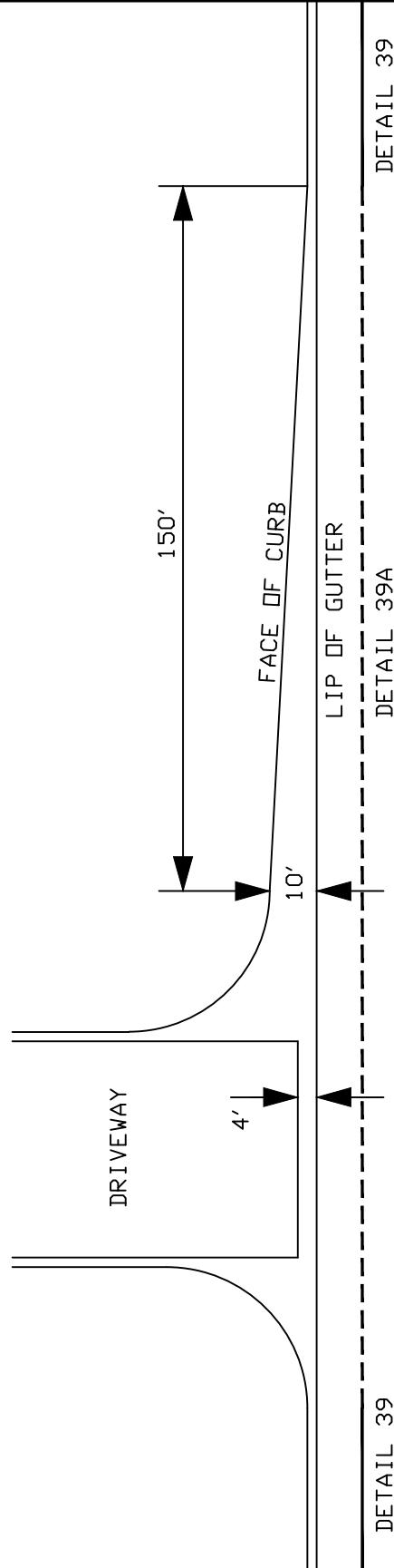


Approved: March 2022

PERMITTED DRIVEWAYS/
STREETS ON ARTERIALS

FIG.
14-1

FIGURE 14-2 RIGHT-TURN CURB FLARE



NOTES:

1. WHERE A CURB FLARE IS PROVIDED AT A DRIVEWAY, THE GUTTER FLOWLINE SHALL REMAIN PARALLEL WITH THE STREET CENTERLINE AND THE CURB FLARE TRANSITION SHALL BE CONSTRUCTED OF CONCRETE.
2. WHERE A CURB FLARE IS PROVIDED AT A STREET INTERSECTION, THE GUTTER FLOWLINE SHALL BE CONSTRUCTED PARALLEL TO THE CURB RETURN AND THE PAVEMENT SECTION WITHIN THE TRANSITION SHALL MATCH THE PAVEMENT SECTION OF THE MINOR STREET. NO CROSS GUTTERS SHALL BE ALLOWED.

FIG.
14-2

RIGHT-TURN
CURB FLARE



Approved: March 2022

CITY OF DIXON
ENGINEERING
DESIGN STANDARD



ENGINEERING DESIGN STANDARDS

SECTION 15 – TRANSPORTATION IMPACT ANALYSIS

DS-15-01. GENERAL: It is the policy of the City of Dixon that improvements be made to the City’s transportation network to provide adequate multimodal transportation facilities, as growth and development occur. To implement the policies of the Dixon General Plan and comply with the provisions of the California Environmental Quality Act (CEQA), the City of Dixon requires transportation impact analysis for significant development projects. The intent of this local transportation analysis is to determine a project’s traffic effects, to ascertain if the area transportation network is adequate to comply with the policies of the Dixon General Plan and to assist in the design and construction of sufficient infrastructure. In addition, all development projects must be analyzed for potential Vehicle Miles Traveled (VMT) impacts per the CEQA guidelines. The primary responsibility for assessing the transportation effects associated with a proposed development shall rest with the applicant, not the City. All local transportation and CEQA impact analyses shall be subject to review and approval by the City.

DS-15-02. DEFINITIONS:

1. “City Engineer” shall mean the City Engineer of the City of Dixon or his/ her appointed representative.
2. “Level of Service” (LOS) shall mean a scale which ranks intersection operations based on the amount of delay at an intersection. A complete description of the system is included in the Highway Capacity Manual published by the Transportation Research Board. Briefly the level of service ranking system is a scale with a range Level A (represents free-flow conditions) to Level F (represents severely congested or capacity conditions).
3. “A.M. Peak Hour” shall be the peak consecutive hour with the highest traffic volume during the 7–9 A.M. peak period.
4. “P.M. Peak Hour” shall be the peak consecutive hour with the highest traffic volume during the 4–6 P.M. peak period.
5. “Project” shall mean the entire plan as submitted for approval, including all phases within the plan boundaries and all proposed off-site improvements.
6. “Peak Hour” shall mean the greater of either the A.M. peak hour or the P.M. peak hour.
7. “Trip Generation Letter” shall mean a memorandum describing the trip generation characteristics of a project.
8. “Focused Local Transportation Analysis” shall mean a short report addressing project trip generation and selected local transportation topics.
9. “Full Local Transportation Analysis” shall mean a transportation report addressing trip generation, local transportation topics, and intersection capacity analysis.

DS-15-03. LOCAL TRANSPORTATION ANALYSIS (LTA) THRESHOLDS: A Trip Generation Letter, focused Local Transportation Analysis (LTA), or full LTA report may be required to determine the general adequacy of the area transportation network to accommodate a particular development project. Figure 15-1 and the following text describes the need for various analyses. Note that adjoining projects which are being processed concurrently by the same applicant that would cumulatively meet the criteria listed below, shall be considered as one project for the provisions of this policy.

TRIP GENERATION LETTER THRESHOLDS

At a minimum, all projects will require a trip generation letter stating the number of peak hour and daily trips expected to be generated. Projects expected to generate less than 50 peak hour trips will generally not require additional local transportation analysis. However, additional local transportation analysis may also be required if a project is expected to affect an intersection currently not meeting LOS standards, or if there is a specific site concern, as determined by the City Engineer. Table 15-1 lists some common land use quantities that would fall under the threshold at which a trip generation letter would generally suffice.

THRESHOLDS FOR FOCUSED LTA

Projects expected to generate at least 50 and less than 100 peak hour trips will generally require a trip generation letter that also addresses a subset of local transportation analysis topics (focused LTA). Additional local transportation analysis may also be required if a project is expected to affect an intersection currently not meeting LOS standards, or if there is a specific site concern, as determined by the City Engineer.

DS-15-04. TRIP GENERATION LETTER REQUIREMENTS: If the proposed project meets the above criteria for a trip generation letter, trip generation should be estimated for the proposed project using the latest version of the Institute of Transportation Engineers (ITE) Trip Generation Manual and/or trip generation surveys conducted at similar facilities¹. Trip generation calculations using the ITE Manual should apply either the average or fitted curve rate, as appropriate or directed by the City Engineer. If the estimated trip generation for the proposed project is fewer than 50 peak hour trips, a simple memorandum is necessary to document the weekday A.M. and P.M. peak hour and daily trip generation estimates and note the project does not trigger any additional LTA requirements.

**TABLE 15-1
COMMON DEVELOPMENT PROJECT TRIP GENERATION**

Land Use	ITE Land Use Code	Size Threshold	A.M. Peak Hour Trips	P.M. Peak Hour Trips
Single Family Residential	210	53 units	38	50
		106	74	100
Multifamily Residential - Low Rise	220	98 units	40	50
		196	78	100
General Office Building	712	23,300 sq. ft.	39	50
		46,500 sq. ft.	78	100
Hotel	310	85 rooms	39	50
		170 rooms	78	100
Sit-Down Restaurant	932	5,250 sq. ft.	50	48
		10,500 sq. ft.	100	95

Source: ITE Trip Generation 11th Edition (<https://itetripgen.org/>)

¹ Use of trip generation surveys collected independently from ITE should be verified with the City Engineer prior to use.

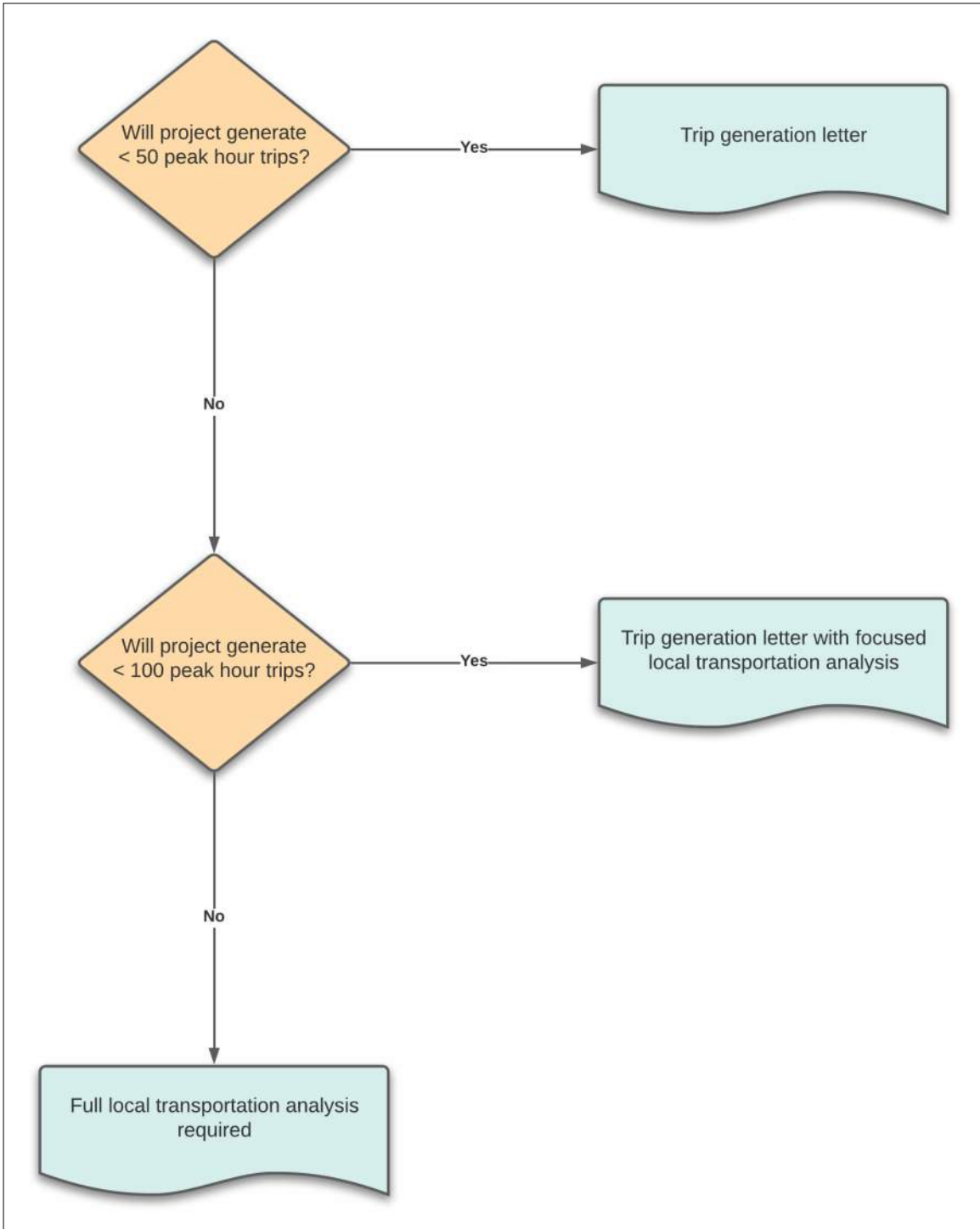


Figure 15-1 Local Transportation Analysis Requirements

DS-15-05. FOCUSED LOCAL TRANSPORTATION ANALYSIS

REQUIREMENTS: If the proposed project meets the above criteria for a focused LTA, trip generation should be estimated for the proposed project using the latest version of the Institute of Transportation Engineers (ITE) Trip Generation Manual and/or trip generation surveys conducted at similar facilities¹. Trip generation calculations using the ITE Manual should apply either the average or fitted curve rate, as appropriate or directed by the City Engineer. If the estimated peak hour trip generation for the proposed project at least 50 but fewer than 100 peak hour trips, a ~~two to three page~~² letter report would be required, including a discussion of the following items:

1. Weekday A.M. and P.M. peak hour and daily trip generation estimate for peak hour of adjacent street traffic.
2. Sight distance at project access point(s).
3. Safety evaluation within ¼ mile of project frontage (i.e., horizontal/vertical curves, sight distance, high collision locations, access spacing, street lighting/visibility, etc.).
4. Discussion/evaluation of onsite circulation and connectivity to adjacent parcels.
5. Bicycle and pedestrian issues shall be discussed, and planned facilities shall be compared with the City of Dixon General Plan to make sure any facilities proposed in the General Plan on the proposed project site are included as part of the proposed project. Potential path connections to adjacent parcels and streets shall be determined and discussed. For residential developments within ½ mile of a school, include a description of the walking route to school. Identify any unsafe walking conditions such as sidewalk gaps. A description of the nearest transit routes and stops should be included, if applicable.
6. Any additional topics as identified by the City Engineer.

At the City Engineer's discretion, additional analysis may be required once this initial information is collected. In general, addressing the items listed above would be sufficient.

DS-15-06. SCOPE FOR FULL LOCAL TRANSPORTATION ANALYSIS

REPORT: Local Transportation Analysis (LTA) reports shall be prepared by a qualified traffic engineer or transportation planner approved by the City Engineer. Prior to initiating an LTA, the City Engineer should be contacted to help establish the project study area, intersections for analysis, scenarios to be evaluated and any other pertinent information concerning the study. All LTA reports shall include the information described in the sections below.

EXECUTIVE SUMMARY AND INTRODUCTION

This section should include a brief description of the project and summary of project impacts. Any recommended improvements and/or operational issues shall be discussed.

EXISTING CONDITIONS

This section shall include the following elements:

1. Description of roadways in the study area, including roadway classification, number of lanes, average daily traffic volume, roadway width, presence or absence of sidewalks

² Deleted October 3, 2023

- and/or bicycle facilities, nearest transit route, posted speed, presence or absence of on-street parking.
2. Existing intersection geometry, traffic control and geometric deficiencies at study intersections.
 3. Existing turning movement counts at the study intersections measured within the previous 12 months. Weekday traffic counts should be conducted on Tuesdays, Wednesdays, or Thursdays (excluding weeks with a holiday). If possible, the counts should be conducted on days when schools are in session. Traffic counts should include motor vehicles, pedestrians, and bicyclists.
 4. Crash data at study intersections and within the project vicinity for the most recent three-year period available.
 5. Other pertinent features such as adjacent at grade railroad crossings.

Study area intersections shall be determined based on the following criteria (and subsequently verified by the City Engineer):

- All intersections of regional significance (arterials and collectors) where the traffic generated by the proposed project exceeds 10 percent of existing A.M. or P.M. peak hour total intersection traffic volumes within the City of Dixon city limits.
- All freeway ramps and sections that may be substantially affected by the project.
- All project access points onto the public roadway system.

The determination of study time periods should be made separately for each project based upon the peaking characteristics of the project traffic and surrounding street system. Office, industrial and residential projects should generally include weekday A.M. and P.M. peak hours. Retail projects may study only P.M. peak hour weekday time periods. Special circumstances may require mid-day or weekend analysis. Intersection operational analysis shall be conducted using the most recent version of the Highway Capacity Manual.

SITE CONDITIONS

The following conditions at and in the vicinity of the project site shall be discussed:

1. A brief description of the site plan, including a site plan layout shall be provided, including the number of driveways serving a parcel or site.
2. A review of the site conformance with the City's access standards Section 14, "Development Site Access," of these design standards. Each site access point shall be discussed separately. If the proposed site access does not meet City Standards, then the traffic study shall identify what modifications to the proposed site access would be necessary to meet City Standards and explain why these modifications are not proposed.
3. Sight distance at project access point(s) (verified by a registered engineer).
4. On site circulation, truck circulation, parking layout, and discussion/evaluation of connectivity to adjacent parcels.
5. Bicycle and pedestrian issues shall be discussed, and planned facilities shall be compared with the City of Dixon General Plan to make sure any facilities proposed in the General Plan on the proposed project site are included as part of the proposed project. Potential path connections to adjacent parcels and streets shall be determined and discussed. For residential developments within ½ mile of a school, include a description of the walking route to school. Identify any unsafe walking conditions such as sidewalk gaps. A description of the nearest transit routes and stops should be included, if applicable.

TRIP GENERATION AND DISTRIBUTION

A detailed description of the proposed project shall be provided including the intended land use and intensity of use. A summary table listing each specific use, the size involved, the trip generation rates used (total daily traffic and A.M./P.M. peak hours), and the resultant total trips generated shall be provided for the project site. The peak hours shall be that of the roadway network, not the proposed project. Trip generation shall be estimated using the most recent version of the ITE Trip Generation Manual or other sources previously agreed upon with the City Engineer. For industrial/surface mining projects, identify the number of truck trips that will be generated and design accommodations necessary to support these trucks.

Professional transportation sources are acceptable as sources for pass-by trip percentages. All pass-by trip percentages shall be verified by the City. Pass-by trips cannot be subtracted from driveways to the proposed project.

The assumed trip distribution and assignment shall represent the most logically traveled route for drivers accessing the proposed development. Trip distribution patterns for a project can use existing traffic counts, the City's travel demand model or a regional transportation model (project assignment only) or local knowledge. Trip distribution assumptions shall be reviewed by the City Engineer prior to their use.

The volume of site-generated traffic on the area's street system shall be shown on a map. The technical analysis steps, basic methods, and assumptions used in this work shall be clearly stated. These routes can be determined by observation of travel patterns to existing land uses in the study area.

INTERSECTION CAPACITY ANALYSIS

Intersection analysis (and freeway merge/diverge/weaving analysis, if needed) shall be conducted for the following scenarios:

1. Existing Conditions
2. Year of Opening Background Conditions (includes approved project trips)
3. Year of Opening Background Conditions plus Project Condition
4. Cumulative Year Conditions
5. Cumulative Year plus Project Conditions

*City Engineer may waive requirements for Cumulative Year scenarios if propose development generates equal to or fewer peak hour trips than are forecasted by the City's travel demand model.

The analysis shall include level of service, average delay and 95th percentile queuing. The intersection analysis for each scenario shall be summarized in a table with the calculation sheets provided in an appendix to the report.

The queuing analysis shall include consideration of the minimum required throat depth (MRTD) at the site public access points. The MRTD is to provide enough stacking distance for egressing vehicles, so the first drive aisle is not blocked and is measured from the back of the sidewalk to the edge of the first drive aisle. The MRTD shall be measured in car length increments of 25 feet and should be a minimum of 25 feet. The MRTD requirement does not apply to single family residential or duplex land uses. Listed in Table 15-2 are various types of "drive-thru" facilities and their respective storage

requirements. The distance is measured from the back of sidewalk at the street driveway to the service point. One space is equal to 25 feet. If the calculated MRTD is physically or unreasonable too long for the proposed development, then the study shall suggest ways to reduce the MRTD by either reducing the egressing demand volume, or by increasing the movement capacity.

**TABLE 15-2
VEHICLE STORAGE REQUIREMENTS**

TYPE OF FACILITY	VEHICLE STORAGE ¹
Drive-thru bank window	10 spaces
Drive-thru restaurant	10 spaces
Automatic car wash	10 spaces
Self-service car wash	3 spaces
Drive-in theater	15% of parking capacity
Hospital	1% of parking capacity
Service Station	4 spaces
Drive-thru dry cleaners	3 spaces
Self-storage mini warehouse	2 spaces

¹ The distance is measured from the back of sidewalk at the street driveway to the service point.

SIGNIFICANT TRANSPORTATION EFFECTS

The following thresholds should be used to determine if an effect is significant and requires improvements to address adverse effects.

Signalized Intersections: A project is considered to have a significant effect if it would:

- Result in a signalized intersection operating at an acceptable LOS (LOS D or better) to deteriorate to an unacceptable LOS; or
- Increase the average delay by more than 2 seconds at a signalized intersection that is operating at an unacceptable LOS without the project.

Unsignalized Intersections: A project is considered to have a significant effect if it would:

- Result in an unsignalized intersection movement/approach operating at an acceptable LOS to deteriorate to an unacceptable LOS, or
- Result in an increase in average delay of more than 2 seconds, at a movement/approach that is operating at an unacceptable LOS without the project, or
- Result in an unsignalized intersection meeting a traffic signal warrant.

Freeway Ramps: A project is considered to have a significant effect if it would:

In addition to the effects of significance noted in Signalized and Unsignalized Intersections,³

- Result in or ramp queues exceeding storage capacity; or result in a decrease in safety.

Bicycle and Pedestrian Facilities: A project is considered to have a significant effect if it would:

- Eliminate or adversely affect an existing bikeway or pedestrian facility in a way that would discourage its use;
- Interfere with the implementation of a planned bikeway as shown in the General Plan or

³ Added October 3, 2022

- Fail to provide adequate access for bicyclists and pedestrians, resulting in unsafe conditions, including unsafe bicycle/pedestrian, bicycle/motor vehicle, or pedestrian/motor vehicle conflicts.

Safety: A project is considered to have a significant effect if it would:

- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses

IMPROVEMENTS TO ADDRESS SIGNIFICANT ADVERSE EFFECTS

If a project is found to cause significant adverse transportation effects, a recommended improvement to address these should be identified. If a project causes a level of service deficiency, potential intersection improvements shall be proposed. At a minimum, the study shall consider improvements identified in the City of Dixon Capital Improvement Program (CIP). If an unsignalized study area intersection is proposed to be signalized, a signal warrant analysis based on the California Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) shall be conducted.

If a project causes a LOS deficiency to a facility that is operating satisfactorily under the existing condition, the project is generally 100% responsible for implementing the improvement. If a project is found to cause a significant transportation effect at a facility that is already operating below the standard under existing conditions, a fair share project contribution should be calculated based on the project’s share of traffic in excess of the acceptable standard. Similarly, project fair share contributions should be calculated for any improvements needed under background or cumulative conditions without the project.

If the local transportation analysis indicates the project will result in a level of service deficiency or other adverse transportation effects, the project shall be modified by the applicant to include the funding and construction of the recommended improvements to alleviate these effects, or be either:

1. Withdrawn by the applicant until improvements have been installed to improve the identified LOS deficiencies or adverse transportation effects, or
2. Denied by the City Council due to its negative impact on the transportation network.

As an alternative to the provisions above, the City Council may grant an exception to permit a project to cause or worsen a level of service in the peak hour for one or more intersections. The Planning Commission shall hold a public hearing to consider the requested exception and make a recommendation to the City Council related to the request. The City Council shall then hold a public hearing on the exception request and consider the recommendation of the Planning Commission prior to the approval of any such exception. An exception may be granted if the City Council makes one of the following alternative findings:

Finding 1

- a. That the affected transportation facilities in question are within an infill area where existing development limits the acquisition of right-of-way for mitigation or an isolated area where the subject facility serves a limited area as opposed to a large portion of the City, and
- b. There is no practical and feasible way to mitigate the adverse transportation effects, and
- c. The project resulting in the adverse transportation effects is of clear, overall public benefit.

Finding 2

- a. That a capital improvement project is reasonably scheduled to be completed within 3 years of the project which will improve the projected level of service to LOS “D” or better, and

- b. That the interim impact of the projected traffic congestion is offset by the public benefits of the project.

Finding 3

- a. The City has entered into a binding development agreement that commits the City to approve the proposed project or precludes the addition of improvement measures necessary to alleviate the adverse effects.

If improvements are funded and/or installed as part of the project to achieve level of service LOS “D” or better or otherwise address adverse transportation effects as specified above or, reimbursement may be provided through the following mechanisms as appropriate:

3. A benefit district established in accordance with the Municipal Code to collect revenues from other benefitting properties as they develop if the improvements are not specifically included in the Capital Improvement Program.
4. An assessment, community facilities district or other financing district established in accordance with State law.
5. A combination of the methods above as approved by the City Council.

APPENDIX

The following items shall be in the appendix, at a minimum:

- Existing traffic counts
- Level of service calculations
- Current site plan

DS-15-07. CEQA VMT ANALYSIS: Since July 2020, measures of automobile delay are no longer considered transportation impacts for the purposes of the California Environmental Quality Act (CEQA). In place of delay measures, Vehicle Miles Traveled (VMT) is now assessed as the primary measure of transportation impact under CEQA. Other potential CEQA impacts include conflicts with a plan or policy addressing the circulation system, creation of hazardous features, or inadequate emergency access (see the most current CEQA Guidelines for more information).

Measurement methodology, baseline VMT rates, thresholds of significance, screening criteria, and mitigation measures are presented in more detail in the *Dixon Senate Bill 743 Implementation Procedures Report*. The following sections summarize the screening criteria and VMT baselines as well as the required documentation.

VMT ANALYSIS THRESHOLDS

If a project meets any of the VMT screening criteria listed below (also summarized in Figure 15-2), the project can be assumed to have less than significant VMT impacts, no further VMT analysis is required, and the finding should be documented in a VMT screening letter. Projects not qualifying for any of the screening criteria will need to prepare a CEQA VMT impact analysis.

1. **Small Projects-** Projects generating fewer than 110 trips per day
2. **Affordable Housing-** Projects consisting of 100 percent affordable housing units

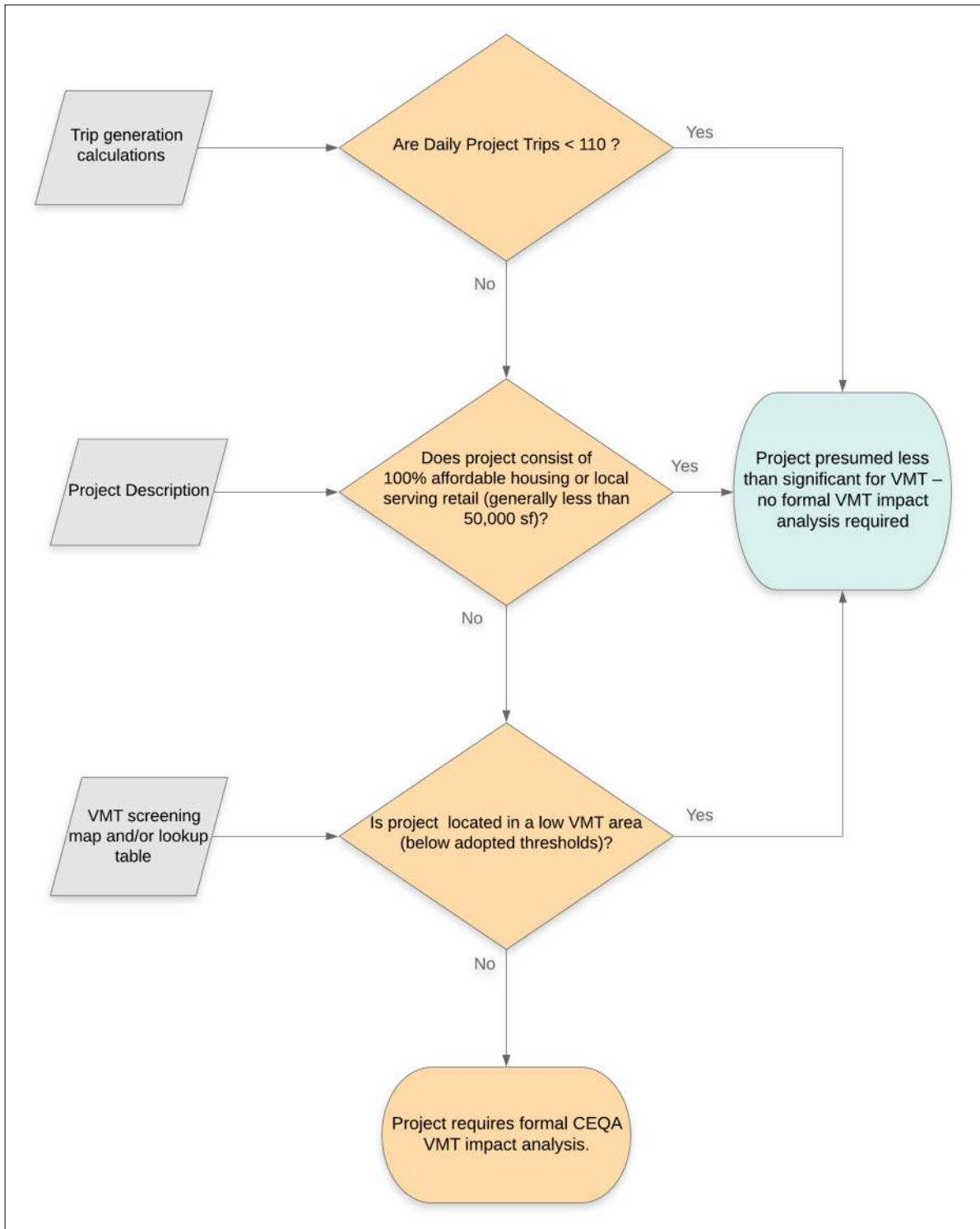


Figure 15-2 VMT Screening Process

3. **Local Serving Retail** - generally less than 50,000 square feet per individual establishment
4. **Transit Proximity** – Projects located within ½ mile of high-quality transit (as defined in Public Resources Code § 21064.3 – not currently applicable in Dixon)
5. **Project Location** – Projects located in a low VMT area as shown in Figures 15-3 and 15-4

For more information on the VMT screening criteria, please refer to the *Dixon Senate Bill 743 Implementation Procedures Report*.

VMT SCREENING LETTER

If a project qualifies for any of the VMT screening criteria listed above, the project can be assumed to have less than significant VMT impacts and no further VMT analysis is required. A brief memorandum documenting a statement regarding the presumption of less than significant VMT impacts should be submitted to the City Engineer for review.

CEQA VMT IMPACT ANALYSIS DOCUMENTATION

If a project does not qualify for VMT screening, a discussion of VMT impacts and mitigation should be documented in a formal CEQA analysis. Project associated VMT may be measured with the City of Dixon Travel Demand Model or alternative method to be approved by the City Engineer and should be compared to the thresholds of significance summarized below.

- *Residential projects* – should be compared to a threshold of significance of **18.5 VMT per capita**.
- *Employment projects* – should be compared to a threshold of significance of **14.1 VMT per employee**.
- *Retail or commercial projects* – any net increase in overall VMT would constitute an impact.
- *Medical uses* – may be analyzed using a similar approach to retail (net VMT impact). Medical facility employee VMT may also be considered for larger projects.
- *Industrial projects* – Determine whether there is significant light-duty vehicle VMT associated with the project, such as significant employee commute VMT. If so, compare the project VMT per employee to the appropriate threshold.
- *Mixed use projects* – Analyze each component land use separate or focus on predominant use (for example, analysis of a largely residential project with a small retail component could focus on the residential use).
- *Redevelopment projects* – consider the VMT of the previously existing use to account for the net impact.

For more details on analytical approaches and mitigation options, see the *Dixon Senate Bill 743 Implementation Procedures Report*. CEQA VMT reports should include the following sections:

- Project description to include quantities of each land use, assumed population for residential projects and employees.
- Description of analytical approach and resulting findings with respect to significant impacts and proposed mitigation.

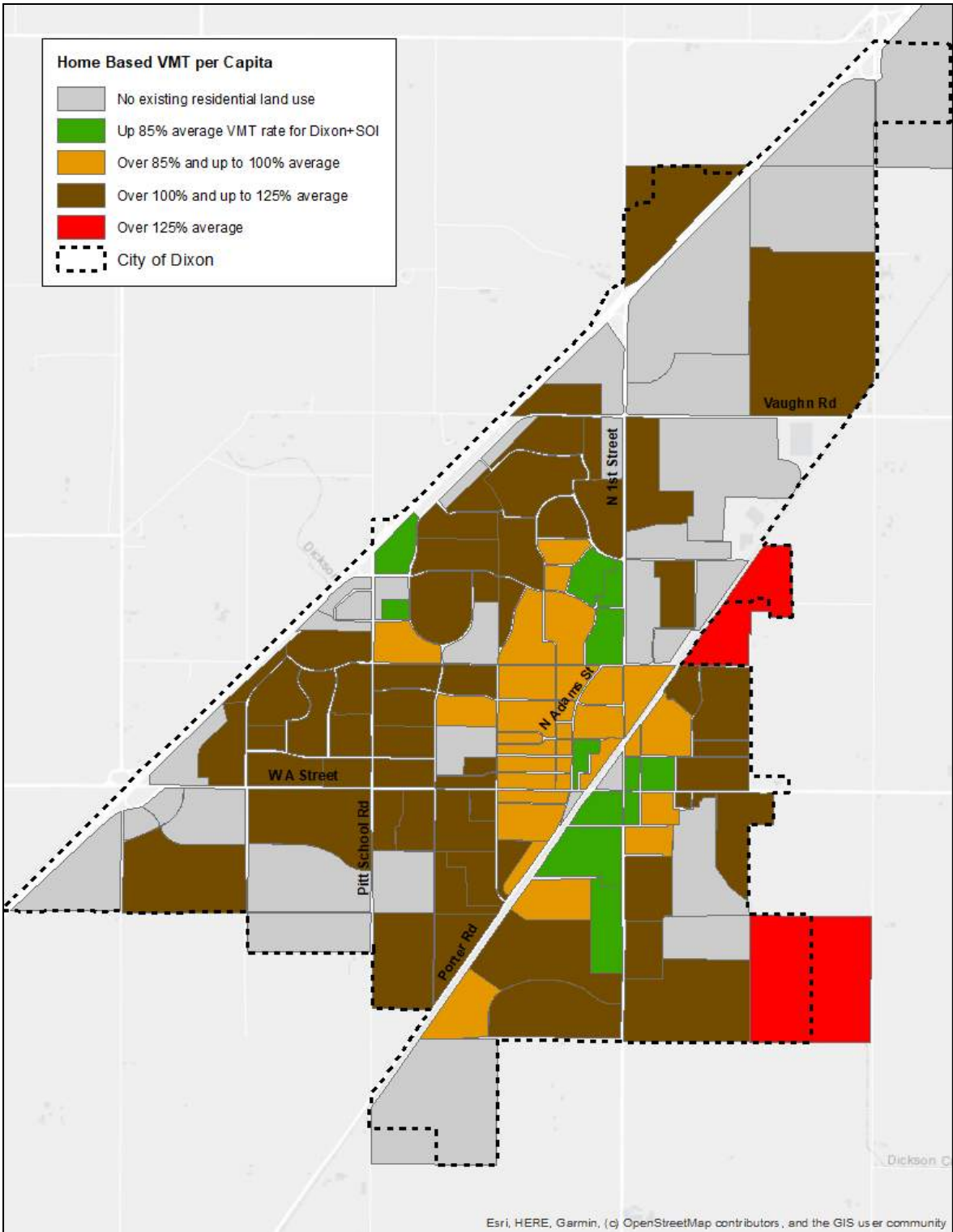


Figure 15-3 VMT Per Capita by TAZ

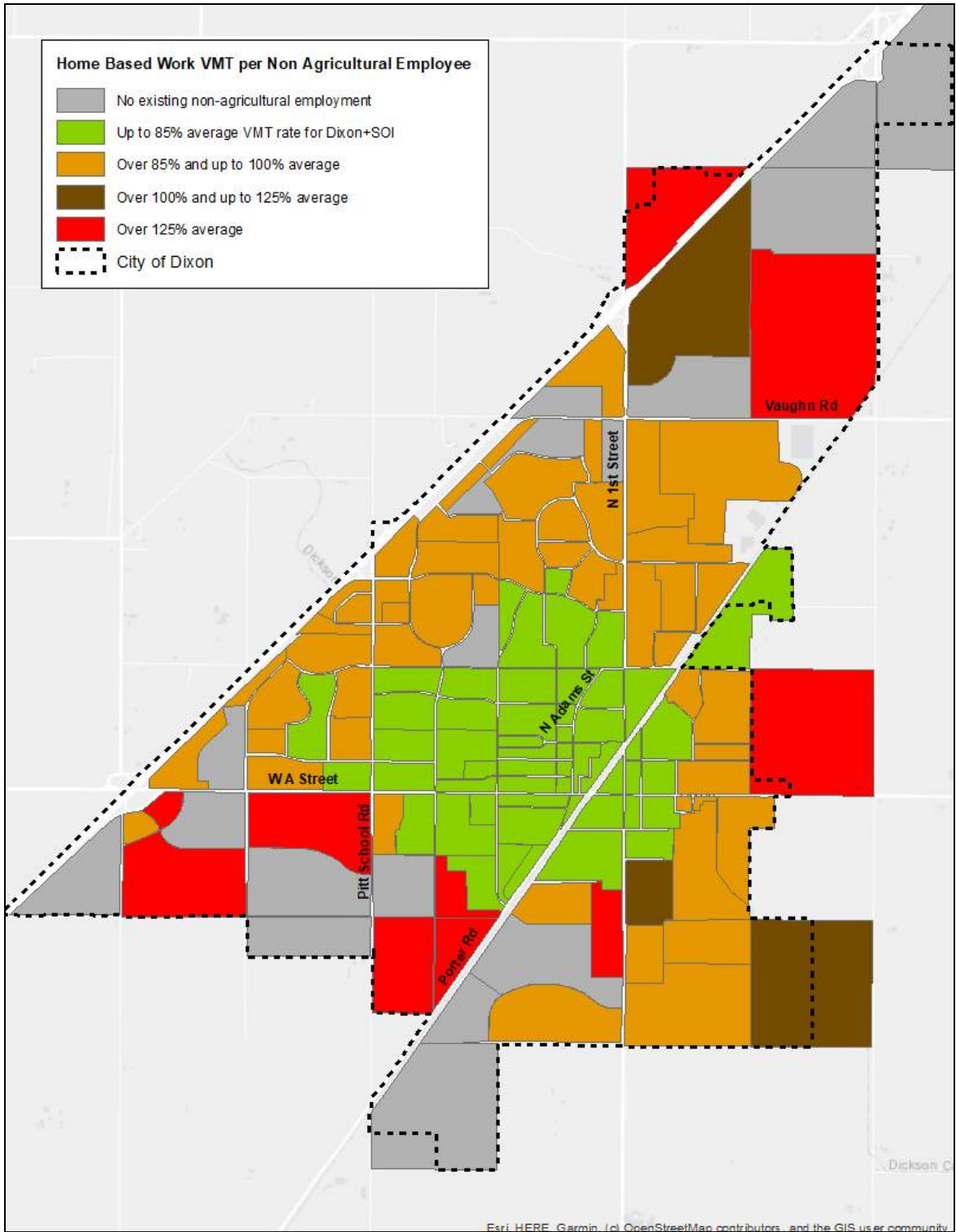


Figure 15-4 VMT per Employee by TAZ

DS-15-08.REPORT SUBMITTALS: The cover page of all Local Transportation Analysis reports shall be stamped and signed by a Transportation Professional. CEQA VMT screening letters and reports should be prepared by a qualified transportation planning professional. Transportation impact analysis should be performed as follows:

1. The analysis may be under contract to the City or the applicant if the analysis is not part of an environmental document. The analysis shall be under contract to the City or a City contractor if the analysis is part of an environmental document.
2. The analysis shall be prepared to the specification and scope of the City Engineer. If the analysis is part of an environmental document, the scope shall also be reviewed by the planner assigned as project manager for the environmental document.
3. The City reserves the right to require a peer review of analysis that is prepared under contract to the developer. Such peer review shall be prepared by or under contract to the City and funded by the applicant.
4. An electronic copy of the report shall be submitted to the Planning Department. Traffic studies that are not in compliance with the requirements set forth in these guidelines will be considered incomplete and may result in the application being deemed incomplete.
5. The Planning Department will forward one (1) copy of the report to the Department of Public Works. The Planning and Public Works Departments will then review the study data sources, methods and findings. Written comments from the Public Works Department will be provided to the Planning Department which will forward the comments to the applicant. The applicant and the transportation consultant will then have an opportunity to incorporate necessary revisions or responses as part of the final report.
6. Hard copies of the final report may be required for submittal to the Planning Department for Planning Commission Meetings or City Council Meetings. All copies of the study submitted shall become the property of the City.

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CONSTRUCTION SPECIFICATIONS

SECTION 1 - GENERAL

CS1-01. INSPECTION REQUIREMENTS: Any improvement constructed to the Standard Construction Specifications for which it is intended that the City will assume maintenance responsibility, shall be inspected during construction by the City Engineer or his designated representative. Each phase of construction shall be inspected and approved prior to proceeding to subsequent phases.

Any improvements constructed without inspection as provided above or constructed contrary to the order or instructions of the City Engineer will be deemed as not complying with Standard Construction Specifications and will not be accepted by the City of Dixon for maintenance purposes. It is the responsibility of the contractor to arrange the needed inspections, and to give 48 hours minimum notice for the inspections.

CS1-02. IMPROVEMENT ACCEPTANCE BY THE CITY: When all work called for on the improvement plans is complete, the Contractor may request a final inspection. If the City Engineer agrees that the project is substantially complete (95%), an inspection shall be performed and a punch list prepared. The punch list will identify the deficiencies in the work that must be corrected prior to acceptance. Every effort will be made to have the punch list address all deficiencies, however, if additional deficiencies are found after the punch list is made, the Contractor shall also correct these additional items. After all deficiencies have been corrected and the City Engineer approves the work, the Contractor, Design Engineer, and Developer will be notified by the City Engineer in writing within five (5) working days as to the date of the final approval and acceptance.

CS1-03. DUST CONTROL: Dust control shall conform to Sections 10, "Dust Control", 17, "Watering", and 18, "Dust Palliative", of the State Specifications. Additional dust control measures may be required, either by the Special Provisions, the plans, or by direction of the City Engineer. It is intended that the dust control measures specified in the State Specifications will be a minimum requirement for dust control in the City of Dixon. Additional dust control measures required shall not constitute an additional cost item.

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CONSTRUCTION SPECIFICATIONS

SECTION 2 - CLEARING AND GRUBBING

CS2-01. ITEM: This work shall consist of removing all natural and artificial objectionable material from the right-of-way, construction areas, road approaches and material sites within the work area. Clearing and grubbing shall be performed in advance of grading operations and in accordance with the requirements herein specified, subject to erosion control requirements. Demolition of buildings and structures, other than foundations or slabs, shall be as specified in the Special Provisions or on the plans.

CS2-02. CLEARING AND GRUBBING OPERATIONS: Unless otherwise specified, the entire area of the project to the widths specified below shall be cleared and grubbed.

The area above the natural ground surface shall be cleared of all vegetative growth, such as trees, logs, upturned stumps, roots of downed trees, brush, grass, weeds, and all other objectionable material, within the following limits:

- A. For streets, road and highway construction areas, including structures, frontage roads, or streets, ramps, approaches, ditches and channels and all other accessory roads and connections to be constructed, such grubbing shall extend to a width of 5 feet outside structures, excavation and embankment slope lines, except that where slopes are to be rounded, the areas shall extend to the outside limits of slope rounding.
- B. Within the limits of clearing, the areas below the natural ground surface, except in embankment areas where the grading plane is 2 feet or more above the natural ground, shall be grubbed to a depth necessary to remove all stumps, roots, buried logs, and all other objectionable material. Such objectionable material shall not be left in or under embankments or dikes. All trees, existing stumps and roots within embankment areas where the grading plane is 2 feet or more above the natural ground shall be cut off not more than one foot above the natural ground at any point, or completely removed where other items of work are to be placed and the unsuitable material is to be removed.

Trees and plants that are not to be removed shall be fully protected from injury by the contractor at his expense. Trees shall be removed in such a manner as not to injure standing trees, plants, and improvements which are to be preserved.

Destruction of abandoned wells shall be accomplished in conformance with "Bulletin 74 Water Well Standards: State of California".

CS2-03. REMOVAL AND DISPOSAL OF MATERIALS: All removed materials shall be disposed of by Contractor at Contractor's expense. The roadway and adjacent areas shall

be left with a neat and finished appearance.

The Removal of existing improvements shall conform to the following requirements:

- A. Bituminous Pavement--shall be removed to clean straight lines. Saw cutting shall be made to the depth required to prevent damage to existing pavement, but in no case shall be less than 1-1/2 inches deep. A neat line cut is acceptable if the existing pavement is being overlaid.
- B. Concrete Pavement--shall be removed to neatly sawed edges. Saw cutting shall be made to the depth required to prevent damage to existing concrete, but in no case shall be less than 1-1/2 inches deep.

CS2-04. TRAFFIC SIGNS: The protection and maintenance of existing signs and the removal, protection, storage, and resetting of City traffic signs that are effected by the work shall be the responsibility of the Contractor, as directed by the City Engineer, or as specified in the Special Provisions. The Contractor shall inventory all existing City signs prior to the start of work and provide a copy of the inventory to the City Engineer. The City Engineer shall confirm the inventory in writing prior to the start of work. Traffic signs and traffic control facilities existing within the limits of the project shall not be moved except as necessary to prevent them from being damaged by construction operations. When a sign needs to be removed because it interferes with the Contractor's work, it shall be done in one of the following described manners:

- A. Stop signs shall be maintained in their existing positions as noted in the inventory. Any stop sign which must be moved from its existing position and reinstalled in a new position, must be approved by the City Engineer before said stop sign is moved.
- B. Traffic signs and traffic control facilities, other than stop signs, necessary for the control of traffic during the project shall be maintained in place in an upright position and located so as to properly control traffic. Whenever it is necessary to remove them from their permanent location due to construction work, they shall be reinstalled in their permanent location at the earliest possible time. Control of traffic during the time which the signs are temporarily removed shall be the contractor's responsibility.
- C. Traffic signs and traffic control facilities not necessary for the control of traffic during the project shall be removed and salvaged by the Contractor. When signs are removed and salvaged as provided herein, they shall be stockpiled in an upright position and reinstalled by the Contractor at the conclusion of the project.

The project sign inventory shall indicate which of the above categories applies to each sign, subject to approval of the City Engineer.

CS2-05. MAILBOXES: Mailboxes and newspaper tubes, which are effected by the construction shall be removed and reset. All mailboxes shall be maintained in an upright position

adjacent to the construction area between the time the mailbox is removed and reset in its final location. Mailboxes shall be reset on 4" X 4" Douglas fir or redwood posts surfaced on four sides, unless otherwise noted on plans. They shall be set in a minimum of two feet of concrete. Mailboxes which can be salvaged intact, including ornamental or iron supports, shall be salvaged and reset. The bottom of mailboxes shall be set at a height of 3'6" above the back of curb or edge of shoulder. The face of the box shall be set one foot behind the back of sidewalk. Individual property owners and occupants will be notified of the action.

CS2-06. SURVEY MONUMENTS: The preservation of survey monuments and markers shown on the plans or encountered along the line of the work shall be the responsibility of the Contractor. The Contractor shall notify the City Engineer of monuments encountered, and shall not remove or damage said monument until the monument can be cross referenced and tied out by the survey party. When notified by the City Engineer that the ties have been completed, the monument or marker can then be removed. The Contractor is not responsible for the replacement of any monument or marker, the removal of which is necessitated by the work to be performed and which has been referenced and tied as set forth herein. If, through negligence or carelessness on the part of the Contractor, notification is not made as provided above or markers are removed which are not in direct conflict with the construction, the Contractor shall be responsible for the cost of referencing, resurvey, and replacement of the monument or marker. Such sums for the replacement shall be deducted from the final contract payment.

CS2-07. DRAINAGE FACILITIES: The Contractor shall be responsible for maintaining all existing drainage and irrigation facilities and to re-establish the drainage and irrigation ditches and facilities to their original location and condition as soon as possible after completion of the work in the area, to the complete satisfaction of the City Engineer, except when such realignment or modification of the existing facilities are set forth on the plans and in other items of work.

CS2-08. SPRINKLERS AND LIGHTS: Sprinkler system pipes, heads, hose bibs, and yard lighting systems which interfere with the clearing and grubbing or excavation for roadway or drainage projects within roadway rights-of-way or drainage easements for channels shall be cut and capped at the right-of-way line or easement line unless otherwise set forth on the plans and in the Special Provisions. These facilities shall be replaced and reconstructed to their original location and condition, unless otherwise set forth in the Special Provisions. Individual property owners and occupants will be notified of the action.

CS2-09. FENCING: The Contractor shall be responsible for the placing, maintenance, and removal of any temporary fencing that may be necessary along the line of work to confine or protect livestock that may be pastured in areas through which the work is to proceed. All existing fences that intersect a fenced channel easement line or a right-of-way line at an angle shall be cut and a new end post equal to or better than the existing shall be set at the right-of-way line and the existing fence attached thereto. Any fences removed for the Contractor's convenience during construction shall be replaced in accordance with the General Provisions or the Special Provisions.

CS2-10. SILT CONTROL: During Construction, provisions shall be made to prevent

siltation of the downstream drainage system, both from winter runoff or from any dry season flow passing through the construction site. Such provision may include silt basins, silt fences, or other physical means. If the Contractor's methods fail to prevent siltation, or fails to provide a protection against siltation, the Contractor shall clean the downstream drainage system to the satisfaction of the City Engineer, and he shall be responsible for any damage which might result.

CS2-11. DISPOSAL AND SALVAGE: All materials removed as provided herein shall become the property of the Contractor and shall be disposed of off the rights-of-way or easement unless otherwise set forth on the plans or in the Special Provisions. Existing public or private improvements which are designated on the plans or in the Special Provisions to be salvaged shall be carefully removed and stockpiled in the right-of-way or easement for later removal as specified in the Special Provisions.

CS2-12. RECLAMATION OF MATERIALS: The City of Dixon participates in various State reclamation and recycling programs which require minimum yearly quantities of recyclable materials be reused. Reclamation District 2068, (707) 678-5412 and B & J Landfill, (707) 451-3276 typically accept broken concrete, providing the materials are received without wire, bar or other embedded contaminates. As a part of this project, the Contractor will be required to recycle the maximum quantity of concrete material possible. Estimated quantities reclaimed shall be reported to the City in the form of certificates of acceptance or property owner permission slips, with original signatures.

CS2-13. PAYMENT: Under this item of the Proposal, the Contractor shall bid a lump sum price for clearing and grubbing. If no item for clearing and grubbing is included in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be included in the prices bid for other items of work, and that no additional compensation for clearing and grubbing shall be made.

Full payment for protecting existing facilities shall be considered as included in the lump sum price or the price paid for the various contract items of work and no additional compensation will be allowed therefore.

CONSTRUCTION SPECIFICATIONS

SECTION 3 - ROADWAY EXCAVATION

CS3-01. ITEM: The work for this section shall be as set forth in Section 19 of the State Specifications. This work shall consist of performing all operations necessary to excavate all materials, regardless of character and subsurface conditions, from the roadway prism or adjacent thereto; to excavate drainage ditches; to excavate selected material from the roadway and borrow material for use as specified; to construct embankments, including the placing of selected material in connection therewith as specified; to backfill trenches and depressions resulting from the removal of obstructions; to backfill holes, pits and other depressions within the roadway area; to apply water; to remove and replace unsuitable material; to excavate and grade road approaches, driveways, and connections; to construct protection dikes; to remove unstable material outside the roadway prism; to prepare basement material for the placing of other material thereon; all as shown on the plans and as specified in these specifications and the special provisions, and as directed by the Engineer; and furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work that may be required to construct and maintain the roadway facilities.

CS3-02. SUBGRADE PREPARATION: When the roadbed has been constructed to the required grade and cross section and is in a smooth and even condition, it will be ready for preparation of subgrade.

The roadbed shall then be scarified to a depth of at least 8 inches. The loosened material shall then be worked to a finely divided condition. The moisture content shall be brought to optimum as specified by the soils engineer. The material shall then be compacted by approved equipment to the specified relative compaction.

CS3-03. COMPACTION: Upon completion of the subgrade compaction tests shall be taken. The top 8 inches of subgrade material shall be compacted to a relative density of 95% as determined by Test Method California #216 or ASTM 1557-D (Nuclear Method). In addition to compaction test the City Engineer shall require a roller test to insure that no pumping occurs in the completed subgrade. The roller test shall be accomplished by the three-wheeled roller weighing at least 12 tons or a 3 axle 10-wheeled water truck carrying a minimum of 3,000 gallons of water. No appreciable indentation shall be made by the roller tires and no "pumping" shall occur in the completed subgrade. Any spots in the subgrade which show appreciable settlement or "pumping" under the roller wheels shall be removed, dried out, re-compacted and retested until satisfactory. If the existing material cannot be made to pass the above described inspection, it shall be removed and suitable material replaced, compacted and tested.

CS3-04. GRADE TOLERANCES: The finished subgrade shall not vary more than 0.05 foot above or below grade. Subgrade that does not conform to the above requirements shall be reshaped to conform to the specified tolerances and watered and re-compacted, all at the Contractor's expense.

The City Engineer will inspect all compacted subgrade and must approve it prior to placing aggregate subbase or aggregate base. Aggregate subbase or aggregate base placed upon sections of subgrade not approved shall be removed and the subgrade compacted and approved.

CS3-05. SOIL TREATMENT: Soil treatment to increase the "R" value of subgrade soils may be used with the approval of the City Engineer. A soils report by a Registered Geotechnical Engineer will be required. Permissible soil treatment shall be as follows:

- A. Lime Treatment: Lime treatment shall conform to Section 24 of the State Specifications.
- B. Cement Treatment: Cement Treatment shall conform to Section 27 of the State Specifications.

CS3-06. UNSUITABLE ROADWAY EXCAVATION AND BACKFILL: Any unsuitable material encountered within two feet below the subgrade or two feet below original ground, whichever is lower shall be brought to the attention of and removed at the direction of the City Engineer. The additional excavation greater than that required for preparation of original ground or subgrade shall be computed and paid for at the contract unit price per cubic yard of roadway excavations. Unsuitable material excavated more than two feet below subgrade shall be paid for as extra work if no item for "unsuitable material excavation" appears in the proposal.

The Contractor shall use extra care in excavating unsuitable material so as not to aggravate the condition. If, in the opinion of the City Engineer and the Geotechnical Engineer, the Contractor's methods for excavating are increasing the amount of unsuitable material required to be excavated, the City Engineer will require the Contractor to take the necessary steps to correct the condition.

Geotextile fabric, as approved by the City Engineer, shall be required between the subgrade and the base rock to prevent "pumping" when the subgrade is considered "unstable" by the City Engineer and/or the Geotechnical/Design Engineer.

CS3-07. UNSUITABLE MATERIAL IN EMBANKMENTS: Unsuitable material excavated as roadway excavation, which, in the opinion of the City Engineer, cannot be worked into the roadway embankment, shall be removed from the job site or wasted within the right of way as directed by the City Engineer. No additional compensation will be allowed for removing unsuitable material from the job site. Unsuitable material excavated as roadway excavation, which in the opinion of the City Engineer can be used for roadway embankment, shall be placed in embankment below a plane 30 inches below the finished grade and compacted to a minimum relative compaction of 90 percent. No additional compensation will be allowed for placing unsuitable material in the roadway embankment.

CS3-08. SURPLUS MATERIAL DISPOSAL: The Contractor's attention is directed to Section 8 "Surplus Material Disposal" of these construction specifications for disposal of excess excavation materials outside of easements or right of way.

CS3-9. **PAYMENT:** Under this item of the proposal, the Contractor shall bid the contract unit price per cubic yard for roadway excavation which shall include full compensation for compacting natural and original ground, for subgrade preparation, for all haul and overhaul, for excavation, for placing earth embankment and any proposed soil treatment as shown on the plans and as directed by the City Engineer, and for furnishing all water necessary for the compaction of the material and subgrade preparation. The bid price shall also include shaping and trimming slopes to solid material and to the lines and elevations shown on the plans.

Ditches and channels in the median area, between roadway and frontage roads and side ditches contiguous to the roadway and other locations as shown on the plans will be paid for as roadway excavation as specified herein, unless specifically indicated as ditch and channel excavation in the Special Provisions and the Proposal.

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CONSTRUCTION SPECIFICATIONS

SECTION 4 - IMPORTED BORROW

CS4-01. ITEM: Imported borrow shall consist of material required for the construction of embankments; as determined by the City Engineer; or as specified in the Special Provisions and shall be obtained from sources listed in the Special Provisions, or if no sources are listed, from sources the Contractor may elect. The Contractor's optional sources shall be approved in advance by the City Engineer. Imported borrow shall be free of roots, vegetative matter, and other unsatisfactory material, and be of such character that it will readily bind to form a firm and stable embankment when compacted.

CS4-02. AGREEMENTS: The Contractor shall enter into an agreement with the owner of any privately owned material site to hold said owner harmless from any claims for injury to persons or damage to property resulting from the Contractor's operations on said property. The agreement shall contain provisions to relieve the City of any obligation to the owner or claims for injury or damage of persons or property. Before commencing operations at the material site, the Contractor shall deliver satisfactory written evidence of said agreement to the City Engineer. The Contractor's attention is directed to Section 6.2 of the State Specifications in regard to local materials and their sources.

CS4-03. PLACEMENT: The imported borrow material shall have a sand equivalent of not less than the average sand equivalent of the native material that is adjacent to the existing roadbed, or as otherwise set forth in the Special Provisions, and shall be placed and compacted as herein specified for roadway embankment.

CS4-04. COMPACTION: Upon completion of the subgrade, compaction tests shall be taken. The top 6 inches of subgrade material shall be compacted to a relative density of 95% as determined by Test Method California #216. In addition to compaction test the City Engineer shall require a roller test to insure that no pumping occurs in the completed subgrade. The roller test shall be accomplished by the three-wheeled roller weighing at least 12 tons or a 3 axle 10-wheeled water truck carrying a minimum of 3,000 gallons of water. No appreciable indentation shall be made by the roller tires and no "pumping" shall occur in the completed subgrade. Any spots in the subgrade which show appreciable settlement or "pumping" under the roller wheels shall be removed, dried out, recompact and retested until satisfactory. If the existing material cannot be made to pass the above described inspection, it shall be removed and suitable material replaced, compacted and tested.

CS4-05. PAYMENT: Under this item of the Proposal, the Contractor shall bid a unit price per cubic yard for imported borrow compacted in place.

If no item for imported borrow appears in the Proposal, and the City Engineer deems it necessary to place imported borrow, the material shall be furnished and placed as extra work in accordance with Section GP4-06 of these specifications.

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CONSTRUCTION SPECIFICATIONS

SECTION 5 - STRUCTURE EXCAVATION AND BACKFILL

CS5-01. ITEM: Structure excavation shall conform to Section 19-3 of the State Specifications, except as herein modified. Structure backfill shall consist of furnishing, placing and compacting backfill material around structures to the lines designated on the plans or specified or directed by the Design Engineer.

CS5-02. JETTING: Jetting of structure backfill will not be allowed except when specifically set forth in the Special Provisions.

CS5-03. EXISTING STRUCTURES: When removing an existing structure which is to be replaced with a new structure, no payment will be made under this item for the area occupied by the existing structure.

CS5-04. PIPES AND MISCELLANEOUS STRUCTURES: Payment for and method of excavation and backfill for all pipes, manholes, inlets and miscellaneous facilities shall be as set forth elsewhere in these specifications.

CS5-05. UNSUITABLE MATERIALS: Unsuitable materials encountered at the grade elevation of the structural excavation which are directed by the City Engineer to be removed and backfilled shall conform to Section 3 of these specifications.

CS5-06. FINAL QUANTITY: The quantity of structural excavation shown on the plans and in the proposal shall be the final quantity for which payment will be made as provided in Section 9-1.015 of the State Specifications.

CS5-07. PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per cubic yard for structure excavation.

The contract unit price per cubic yard for structure excavation shall include full compensation for all necessary excavation, structure backfill, and previous backfill within the limits set forth on the plans, Construction Details, and in the Special Provisions. Structure and previous backfill shall conform to Section 19-3.06 of the State Specifications.

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CONSTRUCTION SPECIFICATIONS

SECTION 6 - TRENCH EXCAVATION

CS6-01. ITEM: Trench excavation shall include the removal of all materials or obstructions of any nature, and the control of water necessary to construct the work as shown. Unless otherwise indicated on the drawings or permitted by the City Engineer, excavation shall be by open cut.

The City of Dixon is a member of the Underground Service Alert (USA), one call program. The Contractor or any subcontractor shall notify members of USA two working days in advance of performing excavation work by calling the toll-free number 1- 800-227-2600. Excavation is defined as being 18" or more in depth below the existing grade surface.

During any of the trench excavation phases of work which may interfere with the normal traffic controls, Police, Fire and Solano County Dispatch shall be notified 48 hours in advance of the street closure. The type of obstruction expected shall be provided. These offices shall also be notified immediately upon the reopening of the street.

CS6-02. TRENCH WIDTH: Minimum trench width shall be the outside diameter of the pipe plus 24 inches as shown in Construction Details 3280 and 3290. Maximum trench widths at the top of the pipe shall be as shown on the plans for the designated type of bedding. If no maximum is shown, the Contractor shall conduct his operation to limit trench widths at top of the pipe to pipe outside diameter plus 24 inches for pipe 36 inches and larger, except with the specific approval of the City Engineer. If trench widths at the top of the pipe as shown on the plans or as specified herein are exceeded by any amount, for any reason, the Contractor shall provide, at his own expense, stronger pipe or improved bedding and backfill based on a design from the Design Engineer. This requirement shall be a consideration for pipe at manhole excavations and at boring and jacking excavations.

CS6-03. SHORING AND BRACING: The Contractor attention is directed to City of Dixon General Provisions section 7-7, "Trench Safety Plans" for additional requirements. The Contractor shall install sufficient shoring and bracing to insure the safety of workmen, protect the work, and protect adjacent improvements. Shoring and bracing shall comply with the rules, orders, and regulations of the California Division of Industrial Safety, latest revisions.

It shall be the duty of the Contractor to comply with Section 6500 of the Labor Code of the State of California and the California Division of Occupational Safety.

The Contractor shall submit a detailed plan to the City Engineer showing the design of shoring, bracing, sloping and other provisions to be made for worker protection from the hazards of cave-in during excavation or trenching. The Contractor shall contact the City a minimum of 24 hours prior to actual placement of shoring.

CS6-04. CUTTING OF PAVEMENT: When the trench is in an existing paved area, the pavement shall be sawed or scored on neat lines parallel and equidistant from the trench centerline. Pavement between the lines shall be broken and removed immediately ahead of the trenching operations. The width of pavement removed shall be sufficient that the trenching operation does not damage the edges of the pavement left in place. Asphalt concrete and concrete surfacing concrete shall be sawed to a neat line 6 inches wider on each side than the actual trench width.

Due to the uncertainty of the location of underground utilities, the pavement shall not be cut until the respective utility companies have marked the location of their facilities and the City Engineer has given final approval of the trench alignment.

CS6-05. MAXIMUM LENGTH OF OPEN TRENCH: At the end of each working day, there shall be a maximum of 300 feet of open trench in unimproved areas, excluding manhole excavations, for each operation unless the entire construction site is fenced off from public access and authorized by the City Engineer. The remainder of the trench shall be backfilled and compacted, and when in streets, opened to traffic as soon as possible. If set forth in the Special Provisions for the interest of public safety and convenience, the entire trench and all excavations shall be backfilled and equipment relocated as directed at the end of each working day. The maximum length of open trench at the end of each working day for cast-in-place concrete pipe shall be for placing pipe the next working day, plus the trench in which pipe was placed during the previous 24 hours, unless otherwise permitted by the Engineer or set forth in the Special Provisions. The remainder of the trench shall be backfilled and compacted, and when in streets or highways, opened to traffic as soon as possible.

Open trenches in excess of 3 feet deep must be covered or fenced. Uncovered open trenches must be protected with barricades and flashers every 25 feet, and connected with reflective tape at the top and bottom of the barricade.

CS6-06. TRENCH PLATES: Trench plates are steel plates used for temporary cover of trenches and other excavations. All trench plates used in the City right-of-way shall have a skid resistance surface treatment. When backfilling trenches and excavations within a paved street section or within the concrete curb, gutter and sidewalk area, whether transverse or longitudinal, and the work cannot be properly completed within the same working day, trench plates with non-skid surface treatment will be required to maintain traffic flow. The following conditions shall apply:

1. All steel trench plates shall extend beyond the edges of the trench wall a minimum of twelve (12") inches.
2. All steel trench plates shall be fully supported around the perimeter to prevent tipping.
3. Trenches and excavations shall be adequately shored or braced to withstand highway traffic loads.

4. All trench plates shall be tack welded together at the end of each day.
5. All trench plates shall be pinned in each corner to prevent movement.
6. Temporary paving or cold-mix asphalt concrete (cut-back) shall be placed around all edges of the trench plates.
7. A maximum of fifty (50) lineal feet of trench plating shall be allowed unless otherwise approved in writing by the City Engineer.

The following table shows a minimum required thickness for trench plates:

TRENCH WIDTH	MINIMUM PLATE THICKNESS
1.0 feet (0.3 meter)	1/2 inch (13 millimeter)
1.5 feet (0.45 meter)	3/4 inch (19 millimeter)
2.0 feet (0.6 meter)	1 inch (22 millimeter)
3.0 feet (0.9 meter)	1 inch (25 millimeter)
4.0 feet (1.2 meter)	1 1/4 inch (32 millimeter)

For trenches and excavations with spans greater than four feet (4'), a structural design shall be prepared by a registered civil engineer and approved by the City.

8. All trench plating shall be designed for HS20-44 Truck loading per the Caltrans Bridge Design Manual.
9. Trench plates shall maintain a skid resistant surface having a minimum coefficient of friction equivalent to 0.35 per California Test Method 342. A Rough Road Sign (W33) shall be used in advance of all trench plates.
10. Steel trench plate deformation may occur during loading, but if a steel plate is deformed without loading to at least 1/2 inch (1.2 cm) per 8 feet (2.4 meter) length, the plate shall be removed and replaced.

CS6-07. CONTROL OF WATER: When either ground water or surface run-off is encountered, the contractor shall furnish, install, maintain, and operate all necessary machinery, materials and equipment to keep excavation reasonably free from water until the placing of the bedding material, laying and jointing of the pipe, pouring of concrete, and placing of the shading material has been completed, inspected, and approved, and all danger of flotation and other damage is removed. Water pumped from the trench shall be disposed of in a manner subject to the approval of the City Engineer.

CS6-08. SPECIAL FOUNDATION TREATMENT: Whenever the bottom of the trench is soft or rocky, or, in the opinion of the City Engineer, otherwise unsuitable as a foundation for the pipe, the unsuitable material shall be removed and replaced with crushed rock, gravel, or sand as directed by the City Engineer, so as to provide a stable and satisfactory base. On City contracts, if material more than 12 inches below the normal trench bottom as required for proper bedding of the pipe is ordered to be removed by the City Engineer, the excavation below that point and the imported material required to backfill the trench to that elevation shall be paid for as extra work.

If the necessity for such additional bedding material has been caused by an act or failure to act on the part of the contractor, or is required for the control of ground water, the contractor shall bear the expense of the additional excavation and bedding.

CS6-09. EXCAVATION METHOD: Methods used in excavation shall be such as not to cause damage to surrounding property or to unnecessarily damage pavement. Street pads for backhoe outriders and other equipment to prevent unnecessary damage shall be utilized. When excavation is in existing pavement, Contractor shall sawcut existing pavement 6 inches on each side of the trench after backfilling is completed, and shall remove excess asphalt prior to repaving.

CS6-10. PAYMENT: Full compensation for trench excavation as herein specified, including all equipment, labor, materials, de-watering, special trench foundation, special traffic considerations, sawcutting, and safety measures required, shall be included in the price bid per lineal foot of the respective sizes, grades, and types of pipes and conduits listed in the Proposal, and no additional compensation will be allowed therefore.

CONSTRUCTION SPECIFICATIONS

SECTION 7 - TRENCH BEDDING AND BACKFILL

CS7-01. ITEM: Trench bedding and backfill shall consist of furnishing, placing, compacting, dewatering and shaping backfill material around pipes and structures to the lines designated on the contract plans or specified or directed by the City Engineer and as shown on Construction Details 3280, 3290 and 3300.

CS7-02. BEDDING: Bedding shall be defined as that granular material supporting, surrounding and extending to 12 inches above the top of pipe and twelve inches below the pipe barrel for all pipe diameters 24 inches and less in diameter or as defined by the design on the approved plans.

For pipes larger than 24 inches in diameter, imported bedding material, as specified herein, shall extend to twelve inches below and be placed to the spring line of the pipe. Bedding material above the spring line of the pipe shall be either the herein specified imported bedding material, or selected job excavated material as approved.

Unless otherwise indicated on the drawings and in the Special Provisions, the pipe shall be placed on a firm, prepared bed of imported granular materials. All loose material shall be removed from the new trench bottom before placing the bedding material.

Bedding material shall first be placed so that the pipe is supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of 0.4 times the outside diameter of the barrel.

The remainder of the bedding material shall be placed immediately after pipe joints have been completed, inspected, and passed by the City Engineer. The material shall be carefully placed so as not to disturb or damage the pipe, and shall be brought up evenly on both sides.

Pipe shall not bear on bells or joints. The trench shall be excavated at the pipe joints as necessary to provide at least 3 inches of bedding material below the bell. No wedging or blocking of the pipe will be permitted. Bell holes shall be cut out of the bedding such that the pipe bears evenly on the material.

Pipe bedding for all pipes shall be as provided below or shall be directed by the City Engineer if trench conditions vary from that shown on the contract plans as provided in Section CS6-02 of these specifications.

Where pipe is to be installed in new embankment, the embankment shall first be constructed to a height of 12 inches above the top of pipe and for a distance on each side of the pipe location of not less than 5 times the diameter of the pipe, after which the trench shall be excavated with sides nearly vertical and the pipe installed.

When water is encountered, the trench shall be kept dry until laying and jointing of the pipe and placing of the bedding material has been completed, inspected, and approved. The contractor shall place a minimum of 6 inches of pervious material or de-water the trench in a manner which has received prior approval of the Engineer.

Bedding material shall be 3/4 crushed stone in accordance with Section 72 of the California Standard Specifications and these specifications:

	Cal-Test	Requirement
Apparent Specific Gravity	No. 206	2.5 Min
Absorption	No. 206	4.2 Max
Durability Index	No. 229	52 Min

Crushed stone shall have a minimum cleanliness of 50% per Cal-Test No. 227.

Job excavated material may be used in lieu of the specified imported bedding material provided the job excavated material meets the requirements for bedding material as specified herein and is approved by the City Engineer. Should the contractor elect to use job excavated material in lieu of imported bedding material as specified, he shall furnish the City Engineer with certified copies of laboratory reports showing the material meets the requirements of these specifications.

CS7-03 INTERMEDIATE BACKFILL: Trench backfill above the bedding material shall be Class II aggregate base mechanically compacted to 95% of relative compaction in street rights-of-way or travel areas. Trench backfill above bedding material to 18 inches below the top of the trench in areas of horticulture may be job-excavated material mechanically compacted to 90% of relative compaction in maximum 2 foot lifts. The remaining 18 inches of backfill in areas of horticulture shall be mechanically compacted to 95% of relative compaction.

Backfill, for cast-in-place structures such as, but not limited to, manholes, transition structures, junction structures, vaults, valve boxes and reinforced concrete box conduits shall start at the surface upon which the base of the structure rests.

The City Engineer may designate the use of "Imported Select Backfill" in lieu of job-excavated material. If imported select backfill is required, the material and methods of payment shall be as specified in the Special Provisions.

CS7-04. OTHER BACKFILL REQUIREMENTS: Where cribbing is used in the trench, the fill shall be carried to a height sufficient to prevent the surrounding ground from cracking or caving into the trench before the cribbing is removed. Backfill around manholes and the pit excavated for boring operations shall be made in the same manner as above specified for trenches. However, whenever the excavated space between the outer wall of the manhole and the undisturbed earth is 12 inches or less, the backfill shall be bedding material, compacted to a relative compaction of 90 percent.

If, at any time during a period of one year from the date of final acceptance of the project, there is any settlement of the trenches requiring repairs to be made, the City Engineer shall notify the Contractor to immediately make such repairs at the Contractor's expense.

CS7-05. PAVEMENT REPLACEMENT IN EXISTING STREETS: In existing streets, trenches shall be paved with temporary or permanent paving on the same day after backfilling has been completed, no trench shall be left unpaved over a weekend or holiday. Temporary paving shall be maintained until permanent paving is placed and shall be replaced with permanent pavement no later than 30 days following backfill operations. Material for temporary paving shall consist of not less than 2 inches of premixed bituminous treated aggregate ("cut-back"). Permanent asphalt paving shall be 1 inch greater in thickness than adjacent existing pavement except that in no event shall the section be less than 4-1/2 inches of Asphalt Concrete and 8 inches of Aggregate Base. The finish grade of the replaced pavement shall be 1/8" above the adjacent pavement grade. Prior to placing permanent paving, the area shall be thoroughly cleaned and the opening saw-cut to a neat edge (See Construction Detail 3280). The subbase and base courses shall be thoroughly compacted and the edges shall be primed with an asphaltic emulsion (AR-4000) prior to placing the asphalt surface.

CS7-06. PAYMENT: Full compensation for trench bedding and intermediate and top backfill as herein specified, including all equipment, labor, materials, temporary cold patches, compaction, backfill materials, shaping and repairing trenches as required, shall be included in the price bid per lineal foot for the respective sizes, grades, and types of pipes and conduits listed in the Proposal, and no additional compensation will be allowed therefore.

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CONSTRUCTION SPECIFICATIONS

SECTION 8 - SURPLUS MATERIAL DISPOSAL

CS8-01. ITEM: Surplus materials, resulting from excavations or trenching operations that are not required for backfill or embankment construction or to satisfy right-of-way agreements as set forth on the plans and in the Special Provisions, shall become the property of the Contractor, who shall dispose of the surplus materials off the rights-of-way or easements unless permitted by the City Engineer to be disposed of otherwise.

CS8-02. DISPOSAL OF MATERIALS PERMIT: When any materials are to be disposed of outside the rights-of-way or easements, the Contractor shall obtain a written permit from the property owner upon whose property the disposal is to be made before any materials are deposited thereon. Excess materials shall not be deposited in any location which will block or restrict a natural or artificial drain or within the dripline of any trees.

CS8-03. PAYMENT: No separate payment will be made for disposal of surplus material unless otherwise noted on the proposal form and all compensation therefore is to be included in other contract items.

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CONSTRUCTION SPECIFICATIONS

SECTION 9 - AGGREGATE SUBBASE

CS9-01. ITEM: Under this item of the Proposal, the Contractor shall furnish Class 2 aggregate subbase material per section 25-1.02 A, 1/2 inch maximum grading, of the State Specifications complete in place as shown on the plans and as specified herein.

CS9-02. SPREADING: After subgrade has been approved, aggregate subbase shall be spread on the prepared subgrade to such depth that when thoroughly compacted, it will conform to the grades and dimensions shown on the plans. Where the required thickness is 6 inches or less, the aggregate subbase may be spread and compacted in one layer. Where the required thickness is more than 6 inches, the aggregate subbase shall be spread and compacted in two or more layers of approximately equal thickness, the maximum compacted thickness of any one layer not to exceed 6 inches. Aggregate subbase material shall be delivered to the roadbed as uniform mixtures and shall be spread in layers or windrows without segregation. Segregated materials shall be remixed until uniform.

CS9-03. COMPACTION: Each layer of aggregate subbase shall be inspected and approved by the City Engineer prior to the placing of the next layer. The relative compaction of each layer of compacted subbase material shall not be less than 95% as determined by the Test Method California #216. The final aggregate subbase layer must be inspected and approved by the City Engineer before placing any aggregate base.

CS9-04. TOLERANCES: The finished aggregate subbase shall not vary more than 0.05 foot above and below theoretical grade.

CS9-05. PAYMENT: Payment for laying aggregate subbase shall be either at the contract price bid per ton or at the contract price bid per square foot. The method used on any work will be shown by the list of quantities on the proposal and by the type of unit price requested in the proposal.

Payment shall include full compensation for furnishing the material, placing it on the roadway, applying water, finishing the surface, and performing all work and finishing all labor and equipment necessary to perform the work.

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CONSTRUCTION SPECIFICATIONS

SECTION 10 - AGGREGATE BASE

CS10-01. ITEM: Under this item of the Proposal, the Contractor shall furnish 3/4 inch Class 2 aggregate base material in place as shown on the plans and as specified herein.

CS10-02. MATERIAL AND PLACEMENT: Aggregate base material and method of placing shall conform to Section 26 of the State Specifications excepting modification as herein specified. The aggregate base shall conform to the grading provided for Class 2, 3/4 inch maximum as shown in the State Specifications.

CS10-03. SPREADING: After subgrade has been approved, aggregate base shall be spread on the prepared subgrade to such depth that when thoroughly compacted, it will conform to the grades and dimensions shown on the plans. Where the required thickness is 6 inches or less, the aggregate base may be spread and compacted in one layer. Where the required thickness is more than 6 inches, the aggregate base shall be spread and compacted in 2 or more layers of approximately equal thickness, the maximum compacted thickness of any one layer not to exceed 6 inches. Aggregate base material shall be delivered to the roadbed as uniform mixtures and shall be spread in layers or windrows without segregation. Segregated materials shall be remixed until uniform.

CS10-04. COMPACTION: The relative compaction of each layer of compacted base material shall not be less than 95% as determined by Test Method California #216.

CS10-05. TOLERANCES: The completed aggregate base shall not vary more than 0.05 foot above or below the theoretical grade.

CS10-06. GRADE AND INSPECTION: The final aggregate base layer shall be inspected and approved by the City Engineer before placing any asphalt concrete. The City Engineer may notify the Design Engineer, if deemed necessary, that a problem may exist and require verification of the finish grades prior to pouring of concrete and placing of pavement.

CS10-07. PROTECTION OF AGGREGATE BASE: Untreated base, once inspected and approved, must be protected from raveling and segregation by traffic. Areas once approved, but which are disturbed by traffic, must be re-compacted and retested prior to surfacing.

The Contractor may apply a penetration treatment approved by the City Engineer at his own expense to protect the untreated base.

CS10-08. PAYMENT: Payment for laying aggregate base shall be either at the contract price bid per ton or at the contract price bid per square foot. The method used on any work will be shown by the list of quantities on the proposal and by the type of unit price requested in the

proposal.

Payment shall include full compensation for furnishing the material, placing it on the roadway, applying water, finishing the surface, and performing all work and finishing all labor and equipment necessary to perform the work.

CONSTRUCTION SPECIFICATIONS

SECTION 11 - ASPHALT CONCRETE

CS11-01. ITEM: Under this item of the proposal, the contractor shall furnish asphalt concrete, Type “A” complete-in-place as shown on the plans and as specified herein.

CS11-02. MATERIAL AND PLACEMENT: Asphalt Concrete shall be a Type A (Modified) and shall conform to the Project Plans and provisions in Section 39 “Asphalt Concrete” of the Standard Specifications as amended by these Special Provisions.

Aggregate used in Asphalt Concrete shall conform to the ½” or ¾” Maximum, Medium grading requirements of section 39-2.02, and “Aggregate” of the Special Provisions as modified herein. The aggregate for Asphalt Concrete, Type A (Modified) shall be a minimum of 85% machined aggregate with a minimum of two fractured faces.

Asphalt Binder shall be a PG 64-16 grade. Steam refined paving asphalt conforming to Section 92, “Asphalt”, of the Standard Specifications. Asphalt binder shall be mixed with the aggregate at a ratio of 4 to 7 percent of the dry weight of aggregate. The percentage of air voids in the mix design at optimum bitumen content shall be between three (3) and five (5) percent.

“Asphalt concrete shall be spread and compacted in the number of layers and thickness indicated in the following table. All thicknesses shown are in the hundredths of a foot.”

Total Design Thickness	Number of Layers	Top Layer Thickness ½” Maximum Medium Grading		Next Lower Layer Thickness ¾” Maximum Medium Grading		All Other Layers Thickness ¾” Maximum Medium Grading	
		MIN	MAX	MIN	MAX	MIN	MAX
20 or less	1	-----	-----	-----	-----	-----	-----
25	2	12	13	12	13	-----	-----
30 through 40	2	15	20	15	25	-----	-----
45 or more	*	15	20	15	25	15	40

* - At least 3 layers if total thickness is more than 0.45 foot and less than 0.90 foot
 - At least 4 layers if total thickness is 0.90 foot or more

The Contractor shall provide to the Engineer for review and approval, an Asphalt Concrete mix design showing complete aggregate grading, void content, maximum density, unit weight, and Haveem Stability for each percentage binder used in the mix design determination. The mix design shall be submitted prior to commencement of work in accordance with “submittals” of these Special Provisions.

The amount of asphalt binder to be mixed with the aggregate for Type A (Modified) asphalt concrete will be determined by the Engineer based on data from California Test 367 provided by the contractor. The maximum tolerance for binder content shall be plus or minus 0.3% from the target binder content designated by the Engineer

As per Section 39-6.01, "General Requirements", of the Standard Specifications, asphalt Concrete shall be placed only when the atmospheric temperature is above 50 degrees F. All mixtures shall be spread at a temperature of not less than 260 degrees F and not greater than 300 degrees F. The initial rolling, or breakdown compaction, shall be performed immediately after placement.

When placing asphalt concrete, large aggregate that migrates to the surface during any handwork shall be returned to the paver box rather than scattered over the surface of the mat.

The first paragraph of section 39-5.01, "Spreading Equipment", of the Standard Specifications is amended to read:

"Asphalt Concrete shall be spread with a self-propelled asphalt paving machine."

Asphalt Concrete placed in layers less than 0.15-foot in compaction thickness or widths of less than 5-feet shall be spread and compacted with the equipment and by methods specified in said Section 39. All other asphalt concrete shall be compacted and finished in conformance with said Section 39, amended as follows:

CS11-03. COMPACTING EQUIPMENT: The Contractor shall furnish a sufficient number of rollers to obtain the specified compaction and surface finish required by these specifications.

Each roller shall have a separate operator; all rolling equipment shall be self-propelled and reversible. The minimum number, weight, and type of rollers required by be reduced or modified in accordance with provisions of section 39-6.03, "Compacting," for low rates of production or when alternative is approved by the Engineer.

All rollers shall be equipped with pads and water systems, which prevent sticking of asphalt mixtures to the pneumatic or steel, tire wheels. A Parting agent, which will not damage the asphalt mixture, as determined by the Engineer. may be used to aid in preventing sticking of mixture to the wheels.

CS11-04. ACCEPTANCE TESTING: Section 39-6.03, "Compacting", of the Standard Specifications, is amended by deleting the fourth, fifth, and seventh through the tenth paragraphs and adding the following before the eleventh paragraph:

Asphalt Concrete and Asphalt Concrete Base shall be compacted to a relative compaction of not less than 95% and shall be finished to the lines, grades, and cross sections shown on the Project Plans. The Engineer shall determine when the asphalt concrete has obtained adequate

compaction to allow the asphalt concrete pavement to be open to public traffic.

Finish rolling or final compaction shall be completed while the temperature of the mixture is above (150) degrees F. A vibratory roller may be used as a finish roller provided that it meets the requirement for a finish roller and it is operated with the vibratory turned off.

In-place-Density testing of the asphalt concrete will be based on Relative Compaction that will be determined by Cal-Trans Test Method #375. Lots will be established by the Engineer for asphalt concrete areas to be tested. If the density test results indicate that the relative compaction is less than 95.0 percent, the asphalt concrete represented by the lot shall be removed, except as otherwise provided below.

Asphalt concrete spreading operations shall not continue until contractor makes significant adjustments to his/her materials or procedures, or both, in order to meet the required compaction. The Engineer shall agree to the adjustments. However, if requested by the contractor and approved by the Engineer, asphalt concrete with a relative compaction of 90.0 percent or greater may remain in place and the contractor shall pay to the City an amount of reduced compensation for such lot(s) with low compaction. The City may deduct the amount of reduced compensation from any monies due, or that may become due, the contractor under the contract. The amount of reduced compensation the contractor shall pay to the City will be calculated using the total tons represented in the lot with low compaction values times the following reduced compensation factors:

Relative Compaction (Percent)	Reduced Compensation Factor
95.0 and above	0.00
94.0-94.9	0.02
93.0-93.9	0.04
92.0-92.9	0.06
91.0-91.9	0.08
90.0-90.9	0.10
89.9 and below	remove and replace as directed by the Engineer.

If the Contractor selects the batch mixing method, asphalt concrete shall be produced by the automatic batch mixing method as provided in Section 39-3.03 A (2), "Automatic Proportioning" of the Standard Specifications.

If the finished surface of the concrete does not meet required surface tolerances, as specified in Section 39-6.03, the Contractor shall, at his/her own expense, bring pavement surface within tolerance by the following method:

The Contractor shall apply tack coat and place an overlay of asphalt concrete in accordance with this Section of these Special Provisions. Said corrective work shall be at the Contractors expense

and no additional compensation shall be allowed.

The area to which the paint binder has been applied shall be closed to public traffic. Care shall be taken to avoid tracking binder material onto existing pavement surfaces beyond the limits of construction.

A drop off of more than 0.15- foot will not be allowed at any time between adjacent lanes open to public traffic. The Contractor shall schedule paving operations such that each layer of asphalt concrete is placed on all contiguous lanes of a traveled way each work shift. At the end of each work shift, the distance between the ends of the layers of asphalt concrete on adjacent lanes shall not be greater than 10 feet nor less than 5 feet. Additional asphalt concrete shall be placed along the transverse edge at the end of each lane and along the exposed longitudinal edges between adjacent lanes, hand raked and compacted to form temporary conforms. Kraft paper, or other approved bond breaker, may be placed under tapers to facilitate the removal of the taper when paving operations resume.

CS11-05. DESIGN MIX: For all paving projects, a proposed design mix shall be furnished to the City Engineer at least 48 hours in advance of any placement of asphaltic concrete. A Certificate of Compliance shall be furnished by the Contractor, if required by the City Engineer, at the Contractor's expense.

CS11-06. EXISTING PAVEMENT: Cut lines made on the existing pavement, both longitudinally and transversely, for the placing of new structural section, shall be straight and smooth and cut immediately prior to placing asphaltic emulsion. Edges shall be clean and free of dirt and dust prior to placing tack coat. Asphaltic emulsion shall be used as a tack coat or paint binder on existing pavement that is to receive an asphalt concrete overlay and also along the exposed edges of abutting pavement and concrete curbs and gutters. Its use may also be required between subsequent layers of asphalt concrete placed by the Contractor when ordered by the City Engineer. Asphalt emulsion shall conform to Section 94 of the State Specifications. If no item is included in the Proposal for asphaltic emulsion, payment shall be included in the price bid for asphalt concrete.

CS11-07. ADJUSTMENT OF IRON: Existing manholes, valve boxes, monument boxes, etc., shall be adjusted below grade before for grinding asphalt concrete as necessary and raised to 3/8 inch below finished grade, in accordance with City of Dixon Construction Details, after final pavement lift has been placed.

CS11-08. PAYMENT: Payment for asphaltic concrete pavement shall be at a price per ton of delivered and placed material or at a price per square foot for finished pavement. The method used on any work will be shown by the list of quantities on the Proposal and by the type of unit price requested in the Proposal.

Payment for asphaltic concrete pavement by either of the above two methods, as may be specified by the Proposal on that particular work, shall include full compensation for furnishing all the materials, loading, hauling, placing, compacting, marking existing items to be raised, adjusting iron below grade for grinding operations and above grade after placement of final

paving, traffic control, notifying agencies as required, and incidentals necessary for doing all the work involved in constructing asphalt concrete pavement.

CS11-09. PAVEMENT REINFORCING FABRIC: Pavement reinforcing fabric shall be placed as an interlayer between asphalt concrete and base material. The fabric to be used shall be a needle-punched, thermally bonded on one side, 100% polypropylene staple fiber fabric, which conforms to the following properties:

Tensile Strength, either direction (ASTM D4632)	101 lbs., minimum 450N
Elongation at Break, either direction (ASTM D4632)	50 (%), minimum
Mullen Burst Strength, (ASTM D3786)	200 psi, minimum, 1370 kPa
Weight, (ASTM D3776)	4.1 oz/y ² , minimum 140 gm/m ²
Asphalt Retention by Fabric, (ASTM D6140)	0.2 gal/y ² or 0.9 L/m ² , 26.9 oz/y ² residual minimum*, 914 gm/m ²

* - Binder requirements increase as weight of fabric increases. This value must be provided by the manufacturer.

The fabric shall have a demonstrated field performance of compatibility with recycling methods and construction reliability.

Prior to placing the fabric, the existing material to be covered shall be compacted to the design requirements and be free of loose material. Placing of the fabric shall be made only under the following conditions:

1. The ambient air temperature is above 50 degrees F.
2. The pavement is dry and pavement temperature is 40 degrees F.

The fabric shall be placed into an asphaltic binder tack coat, per these specifications, with a minimum of wrinkles that lap. Large wrinkles that overlap by more than ½" shall be slit and lapped in the direction of the paving. Burning and torching of wrinkles will not be allowed. All fabric shall be broomed in order to maximize pavement contact and remove air bubbles. All streets receiving fabric shall receive full coverage of the fabric, and the width of asphalt application will be the fabric width plus four inches. The fabric shall overlap with not more than two to six inches at the longitudinal joints and no more than two inches at the traverse joints. No joints shall be lapped with more than two layers of fabric. Traverse joints shall be shingled in the direction of the paving.

Fabric shall not be embedded in the asphaltic binder until the in-place binder has cooled to 180 degrees F or below as determined by non-contact thermometer. The equipment for placing the fabric shall be mechanized and capable of handling full rolls of fabric. The equipment used to place the fabric is subject to approval of the Engineer.

Turning of the paving machine or other vehicles on the fabric shall be gradual and shall be kept

to a minimum to avoid damage of the membrane. Should equipment tires begin sticking to the fabric during pavement operations, small quantities of asphalt concrete shall be broadcast ahead to prevent pick-up of the fabric. The Contractor shall not decrease tack coat application rate in order to minimize pick-up of the fabric.

CS11-10. ASPHALT BINDER TACK COAT: The surface to receive the fabric shall be first cleaned of debris, dirt and rocks, then sprayed with paving asphalt to be used as a binder. The original asphalt shall have a minimum absolute viscosity of 2200 Poise at 140 degrees F. unless otherwise directed by the City Engineer. Binder shall be applied at approximately 33.6 oz/y² (1.14 kg/m² +/- 1.14 kg/m²). Rate to be verified by scale tags. The Contractor's attention is directed to Section 92.1.04 "Applying Asphalt," of the State Standard Specifications. Good practice dictates that the asphalt binder to be spread in the range of 290 to 325 degrees F.

The asphalt binder tack coat application truck shall be equipped with a calibrated measuring rod and external truck mounted gauge which shows gallons used from the distributor truck. Tack rate in gallons is calculated using asphalt cement weight of 238 gallons per ton.

CS11-11. PAYMENT: Payment for furnishing all labor, materials, tools, equipment, and incidentals, and for completing all work involved in "Pavement Reinforcement Fabric" and "Asphalt Binder Tack Coat" including furnishing and placing of asphalt binder tack coat and pavement reinforcing fabric complete in place, sweeping the entire surface to be laid with fabric, as specified shall be paid at the contract unit price bid and no additional compensation will be allowed.

CS11-12. ASPHALT CONCRETE GRINDING: Grinding of existing asphalt concrete pavement shall conform to the provisions of Section 42-2, "Grinding," of the State Standard Specifications.

Asphalt grindings shall be disposed of as specified below:

1. Grindings shall be the property of the City of Dixon and shall be transported to locations specified within the City of Dixon, or
2. Grindings shall be the property of the Contractor who shall dispose of the same at approved locations outside of the City street right-of-way.

As grinding operations proceed, prior to allowing traffic onto streets, the Contractor shall immediately install and maintain cut-back ramp tapers or other approved transitions at all drop-off edges along intersecting streets and thoroughfares and as directed by the City Engineer until the asphalt concrete overlay pavement is installed.

Wedge Grinds - All streets to be overlaid shall receive 20 foot wide conform wedge grinds at the longitudinal paving limits and 6 foot wide wedge grinds along street edge before placement of asphalt concrete pavement overlay. Prior to all grinding operations, the Contractor shall adjust utility covers within the grinding areas before grinding plane. Wedge grind depths shall be at the

design overlay depth less 1/4 inch along gutter pans and at overlay depth at all other locations.

CS11-13. PAYMENT: Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in “Asphalt Concrete Grinding” including installation of temporary cut-back ramp tapers and delivery of asphalt concrete grindings to locations within the city limits, complete in place, as specified in the Special Provisions, as shown on the plans and as directed by the City Engineer shall be paid for at the contract price bid per each item of work and no additional compensation will be allowed thereof.

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CONSTRUCTION SPECIFICATIONS

SECTION 12 - ASPHALT CONCRETE SURFACE TREATMENT

CS12-01. ITEM: Under this item of the proposal, the contractor shall furnish and make an application or applications of asphaltic emulsion and screenings (chip seal); of a mixture of asphaltic emulsion, dry aggregates and added water (slurry seal); and of asphalt rejuvenating agent and sand (oil treatment) in accordance with the provisions of Section 37 of the State Standard Specifications.

CS12-02. GENERAL: Any surface to receive a surface treatment must be thoroughly cleaned of all dust and dirt and any loose materials. All sunken areas must first be patched and leveled up as directed by the City Engineer. All traffic striping to include paint, thermoplastic, buttons and reflectors shall be removed prior to any surface treatment.

CS12-03. CHIP SEAL: Chip seals shall only be permitted at the discretion of the City Engineer. Chip seal shall conform to the requirements of Section 37-1 of the Standard Specifications, except as modified below.

A. MATERIALS:

1. **Latex Asphalt Emulsions:** The asphalt emulsion used for the single seal coat shall be CRS-2h type meeting all of the requirements for such materials as specified in Caltrans Standard Specification Section 94, Table 2 - Requirements for Cationic Asphaltic Emulsion. The latex shall be SBR rubber and shall be 2 percent of the asphaltic residual content. Samples and certificates of compliance from the latex supplier shall be provided. The latex asphalt emulsion shall be applied to a 40-90 pen base.

The Contractor will furnish a one-quart sample of asphaltic emulsion drawn from each tank load of material to be used on the project. Samples will be obtained in accordance with ASTM Method D140 or such other methods as are approved by the City Engineer. A certificate of compliance shall be furnished by the Contractor in accordance with Section 6-1.07 of Caltrans Standard Specifications for all asphaltic emulsion used under these specifications. Section 94 of the Caltrans Standard Specifications. Additional information relevant to the specifications shall be furnished if requested by the City Engineer.

2. **Aggregate:** (seal coat, chips or screenings) Aggregate for the chips or screenings for the seal coat shall comply in all respects to requirements in Section 37-1 of the Caltrans Standard Specifications for medium size (3/8" X No. 6). The aggregates for seal coat shall be surface damp at the time of application but excess water on the aggregate surface will not be

permitted. Wetting of the aggregate stockpiles on the day or days prior to application will be permitted; wetting of the aggregates on the day of application will only be permitted if approved by the City Engineer.

A certificate of compliance in accordance with Section 6-1.07 of Caltrans Standard Specifications shall be furnished by the Contractor for all aggregate used under this specification. The certificate of compliance shall include results of laboratory tests indicating the average gradation, maximum values for L.A. rattler loss and minimum cleanness value, all in accordance with Section 37-1.02 of the Caltrans Standard Specifications.

B. PLACEMENT:

The following sections of this specification describe requirements for the preparation, materials application and finishing of streets for the chip seal coat as part of a cape seal.

1. Preparation: Immediately before commencing the chip seal operations, all surface metal utility covers and frames (including survey monuments) shall to be protected from the chip seal. Covers and frames shall be uncovered and cleaned of chip seal material by the end of the same work day.
2. Applying Latex Asphaltic Emulsion: Latex Asphaltic emulsion for chip seal shall be applied in accordance with Section 37-1.05 of Caltrans Standard Specifications and all provisions thereof. The initial application rate shall be 0.27 gallons per square yard. The rate of application can be changed within a range of 0.20 to 0.35 gallons per square yard as directed by the City Engineer.

The temperature of the latex asphaltic emulsion at the time of application shall range between 110 degrees Fahrenheit and 160 degrees Fahrenheit in accordance with Section 94 of the Caltrans Standard Specifications.

3. Spreading Aggregate: (Screenings) Immediately following the application of asphaltic emulsion, it shall be covered with screenings in accordance with Section 37-1.06 of Caltrans Standard Specifications. The initial spread rate shall be 22 pounds per square yard. The rate of application can be changed within a range of 20 to 30 pounds per square yard as directed by the City Engineer.

If required by the City Engineer, a 300 ft. long test section shall be covered with each self-propelled spreader in order to check spread rate and to determine that the spreader is in good operating condition. A 20

- percent tolerance rate will be permitted in spreading the aggregate.
4. Finishing: Rolling and sweeping shall be in accordance with provisions of Section 37-1.07 in the Caltrans Standard Specifications.

Initial rolling shall begin immediately behind the chip spreader. Rollers shall be kept in continuous operation on the chip seal coat until the roadway is open to public traffic with a minimum of two (2) complete coverages. Chip spreading will not be allowed with less than two (2) operating rollers on the job. Rolling shall be discontinued as required by the City Engineer.

Residential streets shall be swept within 24 hours after placing the chip seal. The sweeper shall be self-propelled with vacuum or reagentive air pickup and spray bar(s) to reduce dust. Residential areas shall be swept a second time or more if necessary in the same manner as the first sweeping as directed by the City Engineer. Completion of sweeping shall be evidenced by the absence of loose chips in the street, gutters and driveways. Special attention shall be required in sweeping driveways clear of loose chips. The Contractor shall provide a sufficient number of sweepers to sweep all streets within 24 hours after spreading screenings (chips) for chip seal coat. Should the Contractor be required to sweep the street a second or more times, compensation for these additional sweepings will be provided on a force account basis.

5. Placing: The chip seal shall be allowed to age and cure under traffic for at least one week before placing the slurry mixture. A longer curing period shall be required if, in the opinion of the Engineer, the asphaltic emulsion used for the chip seal has not achieved a reasonable set which could result in damage to the cape seal if prematurely covered by the slurry mix.

CS12-04. POLYMER MODIFIED BLACK AGGREGATE SLURRY SEAL: Slurry Seal shall consist of mixing asphalt emulsion, aggregate, and water and spreading the mixture on a surface or pavement where shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

A. MATERIALS

The materials for slurry seal immediately prior to mixing shall conform to the following requirements:

POLYMER MODIFIED ASPHALT EMULSION

Polymer emulsified asphalt shall be a quick traffic, quick cure (QT-QC) type, shall be a homogeneous brown color throughout and show no separation after thorough mixing, shall break and set on the aggregate within five (5) minutes and shall be ready for cross-traffic within fifteen

(15) to forty five (45) minutes. The polymer asphalt emulsion, upon standing undisturbed for a period of twenty-four (24) hours, shall show no white or milky colored substance on its surface and conform to the requirements in Table I.

TABLE I

Test on Emulsion	Test Method	Requirement
Viscosity, SSF, @ 77 degrees F, sec	ASTM D244	15-90
pH		1 to 3
Distillation Residue %, Minimum		60
Test on Residue from Distillation Test		
Penetration, 77 degrees F., 100g, 5s	ASTM D5	40-80
Softening Point (Ring & Ball), degrees F	ASTM	130 +
Ductility, 77 degrees. F,(25C, 5 cm/Min., Minimum	ASTM D113	25
Fraass-Breaking Point (degrees C.) min.	DIN 52012	-18

WATER

Water shall be potable, free of harmful soluble salts and shall be of such quality that the asphalt will not separate from the emulsion before the slurry seal is in place in the work.

AGGREGATE

Aggregate shall consist of sound, durable, crushed stone or crushed gravel and approved mineral filler. The material shall be free from vegetable matter and other deleterious substances. Aggregates shall be 100% crushed with no rounded particles, volcanic in origin and black in color, as supplied by George Reed, Table Mountain Plant, Sonora, CA., or equal. The use of gray or light-colored aggregate will not be allowed. The percentage composition by weight of the aggregate shall conform to the following grading:

Type II	
Sieve Sizes	Percentage Passing
3/8"(9.5- mm)	100
No. 4(4.75- mm)	90-100
No. 8(2.36- mm)	65-90

No. 16(1.18- mm)	40-70
No. 30(600- um)	25-50
No. 200 (75- um)	5-15
Theoretical asphalt content, % based on dry aggregate	7.5-13.5
Approximate application rate (Pounds/Square Yard)	14-18

The aggregate shall also conform to the following quality requirements:

Test	Test Method	Requirement
Sand Equivalent or ASTM D2419	California Method 217	60 Min.
Durability Index	California Method 229	55 Min.

Type III: The percentage composition by mass of the aggregate shall meet the following grading requirements when tested in conformance with California Test 202:

Type III	
Sieve Sizes	Percentage Passing
9.5-mm	100
4.75-mm	70 - 90
2.36-mm	45 - 70
1.18-mm	28 - 50
600-um	19 - 34
75-um	5 - 13

The Type III aggregate shall conform to the following additional quality requirements:

Test	Test Method	Requirement
Sand Equivalent	ASTM D2419	65 Min.
Durability Index	California Test 229	55 Min.
Abrasion Resistance*	ASTM C131	30% maximum after 500

		revolutions
* Abrasion Resistance is to be performed on the parent aggregate before crushing.		
If the results of the aggregate grading do not meet the gradation specified, the microsurfacing represented by the test shall be removed. However, if requested in writing by the Contractor and approved by the Engineer, the microsurfacing may remain in place and the Contractor shall pay to the State \$2.00 per tonne for the aggregate represented by the test and left in place.		

POLYMER

Styrene Butadiene Rubber latex polymer shall be added to the water/soap phase by injection prior to the mill manufacture of the asphalt emulsion by the emulsion producer. The polymer shall be BASF NX 1118 or approved equal. The amount of polymer solids shall be between 3 and 4 percent of the asphalt residual content and shall be certified by the emulsion producer on each load of emulsion delivered to the job site. No post or field addition of polymer will be allowed. Samples of polymer shall be provided and shall conform to the following requirements.

Test	Requirement
Total Solids, min %	60
Bound Styrene %	24 - 60
pH at 25 Degrees C	4.2 - 5.2
Brookfield Viscosity RVT	1000 - 4000
Residual Monomer %	0.08 max.

MINERAL FILLER

The mineral filler shall be either Portland cement or other approved mineral fillers, if required. Portland cement if used, shall be commercially available Type I-II and shall be free of lumps and clods.

B. MIX DESIGN

At least 7 working day before slurry seal placement commences, the Contractor shall submit to the Engineer for approval a laboratory report of tests and proposed mix design covering the specific materials to be used on the project. The percentage of asphalt emulsion proposed in the mix design shall be within the percentage range specified in Section 2.04 "Proportioning".

The tests and mix design shall be performed by a laboratory capable of performing the applicable International Slurry Seal Association (ISSA) tests. The proposed slurry seal mixture shall

conform to the requirements specified when tested in accordance with the following tests:

Test	ISSA Test Method	Test Requirement
Slurry Seal Consistency, cm	T106	3 max.
Wet Stripping	T114	Pass
Compatibility	T115	Pass (a)
Cohesion Test, kg - cm within 1 hour	T139	20 min. (b)
Wet Track Abrasion, g/sq. ft.	T100	75 max.
(a). Mixing test must pass at the maximum expected air temperature at the project site during application.		
(b). Using project source aggregate asphalt emulsion and set-control agents if used.		

The laboratory report shall be signed by the laboratory that performed the tests and mix design and shall show the results of the tests on individual materials, comparing the test results to those required by the specifications. The report shall clearly show the proportions of aggregate, filler (as determined from the tests, minimum and maximum), water (minimum and maximum), asphalt solids content based on the dry weight of aggregate and set-control agent usage. Previous laboratory reports covering the same materials may be accepted provided they are made during the same calendar year.

PROPORTIONING

Asphalt emulsion shall be added at a rate determined by the mix design and in the range of the table above. A job mix design shall be submitted by the Contractor for approval by the Engineer that conforms to the specification limits, and that is suitable for the traffic, climate conditions, curing conditions and final use. This will include recommended application rate of slurry to suit the job conditions.

The Slurry Seal mixture shall be proportioned by the operation of a single start/stop switch or lever which automatically sequences the introduction of aggregate, emulsified asphalt,

admixtures, if used, and water to the pug mill.

Calibrated flow meters shall be provided to measure both the addition of water and liquid additives to the pug mill. If necessary for workability, a retarding agent, that will not adversely affect the seal, may be used.

Water, and retarder if used, shall be added to ensure proper workability and (a) permit uncontrolled traffic on the slurry seal no more than three (3) hours after placement without the occurrence of bleeding, raveling, separation or other distress; and (b) prevent development of bleeding, raveling, separation or other distress within fifteen (15) days after placing the slurry seal.

C. MIXING AND SPREADING EQUIPMENT

The Slurry Seal shall be mixed in a self-propelled mixing machine equipped with a continuous flow pug mill capable of accurately delivering and automatically proportioning the aggregate, emulsified asphalt, water and additives to a double shafted, multi-blade pug mill mixer capable of minimum speeds of 200 revolutions per minute.

A minimum of two operational mixing machines of 12 cubic yard capacity, or larger, shall be maintained on the project. The mixed slurry seal retention time in the pug mill shall be less than three seconds. No retention of mixed slurry seal shall be allowed within the pug mill by gate shut-off or other mechanical means. Any machines with pugmill retention or shut-off gates shall have them removed prior to being used on this project. The mixing machine shall have sufficient storage capacity of aggregate, emulsified asphalt, and water to maintain an adequate supply to the proportioning controls.

The mixing machine shall be equipped with hydraulic controls for proportioning the material by volume to the mix. Each material control device shall be calibrated, properly marked, preset and lockable at the direction of the Engineer. The mixing machine shall be equipped with a water pressure system and nozzle type spray bars to provide a water spray immediately ahead of the spreader box.

The mixing machine shall be equipped with an approved fines feeder that provides a uniform, positive, accurately metered, pre-determined amount of a mineral filler, if used, at the same time and location that the aggregate is fed.

The slurry mixture shall be uniformly spread by means of a controlled spreader box conforming to the following requirements:

The spreader shall be capable of spreading a traffic lane width and shall have strips of flexible rubber belting or similar material on each side of the spreader box and in contact with the pavement to prevent loss of slurry from the box. The box shall have baffles, or other suitable devices, to insure uniform application on super-elevated sections and shoulder slopes. Spreader boxes shall be maintained in such a manner as to prevent chatter (wash boarding) or other surface defects that will affect the esthetic value of the finished slurry seal mat.

The rear flexible strike-off blade shall make close contact with the pavement and shall be capable of being adjusted to the various crown shapes so as to apply a uniform slurry seal.

Slurry mixture, to be spread in areas inaccessible to the controlled spreader box, may be spread by other approved methods.

D. PLACEMENT

The slurry seal shall not be placed if either the pavement or the air temperature is below 55 degrees F (13C) and falling, but may be applied when both the air and pavement temperature is 45 degrees F (7C) or above and rising. The mixture shall not be applied if high relative humidity prolongs the curing beyond a reasonable time.

Before placing the slurry seal, the pavement surface shall be cleaned by sweeping, flushing or other means necessary to remove all loose particles of paving, all dirt and all other extraneous material.

48 hours prior to the slurry seal operations, the contractor shall notify all residents, businesses and agencies with an approved written notice detailing the streets and limits of work to be done along, with the hours of work. The contractor shall also post all streets with temporary "No Parking - Tow Away" signs at 75 foot staggered intervals. These signs shall also state the day of the week and hours of no parking.

Immediately before commencing the slurry seal operations, all surface metal utility covers (including survey monuments) shall be protected by thoroughly covering the surface with an appropriate adhesive and paper or plastic. No adhesive material shall be permitted to cover, seal or fill the joint between the frame and cover of the structure. Covers are to be uncovered and cleaned of slurry material by the end of the same work day.

Hand tools shall be available in order to remove spillage. Ridges or bumps in the finished surface will not be permitted. The mixture shall be uniform and homogeneous after spreading on the existing surface and shall not show separation of the emulsion and aggregate after setting.

Adequate means shall be provided to protect the slurry seal from damage from traffic until such time that the mixture has cured sufficiently so that the slurry seal will not adhere to and be picked up by the tires of the vehicles.

For the purpose of this project, the construction zone is defined to include all stockpile staging areas and travel routes to/from streets where the slurry seal is to be applied.

The Contractor shall abide, at all times, to the State of California, Department of Transportation's "Manual of Traffic Controls for Construction and Maintenance Work Zones" as applicable to this project.

Any deviations shall not be made without prior written approval from the project engineer.

CS12-05. OIL TREATMENT: Oil treatment shall only be permitted at the discretion of the City Engineer. Oil treatment shall consist of application of asphalt rejuvenating agent to designated street pavements, application of sand, and subsequent sweeping of residual sand.

The mixture to be placed by the Contractor shall be two parts of the asphalt rejuvenating agent concentrate mixed with one part water. The water shall be potable and uncontaminated with any materials which may affect the performance of the asphalt rejuvenating agent mixture. Asphalt rejuvenating agent shall comply with the requirements of Section SS12-05 - Recycling Agent, of these Standard Specifications.

The application rate shall be as directed by the City Engineer but shall nominally be 0.080 gallons of asphalt rejuvenating agent mixture per square yard. The City Engineer reserves the right to vary the application rate without limitation to minimize excess unabsorbed mixture. No additional compensation shall be allowed the Contractor for complying with these requirements.

The Contractor shall apply the asphalt rejuvenating agent mixture in an acceptable, to City Engineer, workmanlike manner. Operators of the distribution truck shall be experienced, safe and capable in all aspects of the vehicle operations and placing of this mixture.

The distribution trucks shall be serviceable and properly equipped with distribution equipment to apply the mixture evenly and uniformly. Any vehicles having equipment which results in puddling, skips, bare spots or uneven application shall be removed from the work until properly repaired. Contractor to provide a 300 ft. long test run to verify proper working condition of distribution equipment.

Actions or performance of vehicles and/or operators, which results in material being deposited in any location, except upon the asphalt concrete of the scheduled street, shall result in the Contractor being required to clean up the unacceptable work at no additional cost to the City and perform the work in an acceptable manner.

Sand used for oil treatment shall be fine granular material naturally produced by the disintegration of rock and shall be sufficiently free of organic material, mica, loam, clay and other deleterious substances. Sand shall be thoroughly suitable for absorbing excess asphalt rejuvenating agent and provide adequate traction for traffic.

The Contractor shall apply sand to the rejuvenated asphalt surface 45 minutes to one and one-half hours after the application of the asphalt rejuvenating agent, or as directed by the City Engineer. The sand shall be spread evenly and uniformly over the entire rejuvenated area with equipment and methods approved by the City Engineer.

The application rate shall be one to two pounds per square yard. The exact rate is to be determined in the field by the City Engineer.

The Contractor shall return to the job site two to five days after the application of the sand and

shall remove all loose sand by power brooms and hand brooms, as directed by the City Engineer.

CS12-06. REJUVENATING AGENT: Asphalt rejuvenating agent conforming to the following specifications shall be applied diluted 2 parts agent to 1 part water before the processed pavement is opened to traffic, preferably within 30 minutes, but in no event more than 8 hours after compaction. The exact rate of application will be determined by the City Engineer, in the range of 0.10 to 0.20 gallons per square yard. Determination based upon tests provided by contractor. Spreading equipment shall conform to Section SS12-04 of these Specifications.

Asphalt recycling or rejuvenating agent shall be "Reclaimite" as formulated and marketed by Witco Chemical, or equal. The asphalt rejuvenating agent shall be a petroleum resin-oil base emulsified with water for the purpose of rejuvenating asphalt concrete and shall conform to the following physical and chemical requirements.

Specification Designation	Test Method	Requirements
Viscosity, S.F., at 77 F.	ASTM D244-60	15-40 Sec.
Residue (1)	ASTM D244-60 (Mod)	60-65% Min.
Miscibility Test (2)	ASTM D244-60 (Mod)	No Coagulation
Sieve Test (3)	ASTM D244-60 (Mod)	0.10% Max.
Particle Charge Test	ASTM D244-60	Positive
Tests on Residue from	ASTM D244-60 (Mod):	
Viscosity, cs., 140 F.	ASTM D445	100-200 Sec.
Asphaltenes	ASTM D2006-65-T	100-200 Sec.
Maltenes Dist. Ratio	ASTM D2006-65-T	0.3-0.5

PC + A (4)

S + A

- 1) STM D244 Modified Evaporation Test for percent of residue is made by heating a 50 gram sample to 300 F until foaming ceases, then cool immediately and calculate results.

- 2) Test procedure identical with ASTM D244-60 except that .02 Normal Calcium Chloride solution shall be used in place of distilled water.
- 3) Test procedure identical with ASTM D244 except that distilled water shall be used in place of 2% sodium oleate solution.
- 4) In the Maltenes Distribution Ratio Test by ASTM Method D2006-65-T:

PC	=	Polar Compounds	A	=	First Acidaffins
A	=	Second Acidaffins	S	=	Saturates

The materials shall have a record of satisfactory service as an asphalt rejuvenating agent; such satisfactory service being based on the capability of the material to increase the ductility and penetration of the asphalt binder in the pavement surface.

Certified weighmaster certificates shall be submitted showing weight of rejuvenating agent concentrate, the diluted mixture and any unused material to be returned.

CS12-07. SAND SEAL:

- A. Description: This work shall consist of application of asphalt emulsion and screening in accordance with Section 37 and Section 94 of the State Standard Specifications.
- B. Condition of Surface: Before any surface receives a seal coat, it shall be thoroughly cleaned of all dust and dirt and any loose material. The variation of the existing surface from the testing edge of a straightedge between any two contacts with the surface shall not exceed 3/16 inch. All depressed areas shall first be repaired. Method of repair shall be submitted and approved by the City Engineer prior to start of work.
- C. Weather Conditions: Sealing shall not be attempted when surface temperature of pavement or ambient temperature is below 50 degrees F. or when rain is forecast.
- D. Asphalt Binder: Asphalt Emulsion shall not be CRS-1h conforming to requirements for CRS-1 in Section 94 of the State Standards except that the Penetration at 75 degrees F. on the Residue from Distillation Test shall be between 40 and 90. The emulsion shall be delivered and applied at a temperature between 75 degrees F. and 130 degrees F.
- E. Aggregate: Sand shall be free from clay or organic material, suitable for the purpose of sand seals, and shall be of such size that twenty (20) percent shall pass a No. 30 sieve and not more than one (1) percent shall pass a No. 200 sieve. The sand shall have a minimum Fineness Modulus (FM) of 3.5.

- G. Application of Sand Seal Emulsion: The spray truck shall be capable of spraying the oil consistently at rates in the range of 0.12 to 0.25 gallons per square yard and shall be maintained in good working order. The typical spray rate shall be 0.15 gallons per square yard. Each distributor truck shall be equipped, at all times, with its proper measuring stick and calibration card. On-site calibration of distributor trucks, for determining actual spread rate of asphalt emulsion, shall be performed when directed by the City Engineer. A two-axle, short wheel base, distributor truck is required for all cul-de-sac and radii.

NOTE: Computer controlled distributor trucks with spread rate and quantity printouts are required for asphalt emulsion application.

- H. Temporary Traffic Striping and Markings: All permanent striping and markings shall not be applied to a sand seal surface until a minimum of 14 calendar days has passed. The Contractor shall be responsible for maintaining all temporary striping, markings, and construction signs. The Contractor shall review the temporary traffic control on a daily basis. All costs associated with maintaining the temporary traffic striping, and markings shall be paid for by the Contractor.

CS12-08. SEAL COATS:

- A. Description: The work covered by this specification includes the design, testing and quality control for this proper production of the asphalt seal coat product and all materials, equipment and workmanship required for the application of seal coat to an existing asphalt concrete pavement.

- B. Materials: The materials for Asphalt Seal coat immediately prior to mixing shall conform to the following requirements:

1. Asphaltic Emulsion: Asphaltic Emulsion shall be SS1h, conforming to the requirements in Section 94 of the California State Standards Specifications, "Asphalt Emulsions". Table 1 or 2 of Section 94, with the exceptions of the penetration on residue from distillation which shall conform to the value of 20 to 60, or Clay stabilized emulsion, with a pH not greater than 7.0 and solids content of not less than 45 percent (45%). Two percent (2%) latex shall be added into the seal coat. The properties of the SS1h shall be determined in accordance with AASHTO designation T59 "Testing Emulsified Asphalt".

NOTE: Coat tar emulsion and Gilsonite products are not acceptable products.

2. Mineral Aggregate: Mineral Aggregate shall be one hundred percent (100%) passing a #16 mesh sieve and be clean of all decomposed materials or organic materials. The sieve analysis of the Mineral

Aggregate shall be determined in accordance with A.S.T.M. test Method C136 or Cal Test 202.

- C. Mix Design: A mix design shall be submitted to the City a minimum of ten (10) working days prior to placement of the seal coat. The Contractor shall submit lab and test results and Manufacturer Certificate of Compliance covering proposed material.

Asphalt seal coats, as manufactured and tested by the Asphalt Seal Coat Manufacturers Association, shall be undiluted and conform to the following:

	MINIMUM	MAXIMUM	METHOD
Weight (per gallon)	9.0 pounds		A.S.T.M. D244
Con Penetration at 77 degrees F. dmm	340 mm	700	A.S.T.M. D217
% Non-Volatile	50		A.S.T.M. A-1*
Loss on ignition of insoluble residue %		16	
% Non-Volatile soluble in Trichlorethylene	10	35	A.S.T.M. D2042
Solubility of residue in C ₂ H ₂ CL	15	20	
Wet track Abrasion		35 gram loss	A.S.T.M. D3910
Mineral Aggregate Components	#16 Sieve 100% passing		A.S.T.M. C136
Dried Film Color	Black		
Dehydration, 96 hours at 100 degrees F.	0.6 min.		

Viscosity	75 KREB		A.S.T.M. D562
Accelerated Weathering (2 yr. Exposure)	No Deterioration		Fed Spec TT-C 555B

** Weigh 10 grams of homogenous product into a previously tarred, small ointment container. Place in a constant temperature oven at 325 degrees F. for 90 minutes. Cool, re-weigh and calculate the non-volatile components.*

The following mix design shall be incorporated in a two-step seal coat application process:

FIRST APPLICATION

- ◆ 100 gallons seal coat material
- ◆ 200 pounds silica sand (30 mesh)
- ◆ 2 gallons latex copolymers
- ◆ Appropriate gallons of potable water for dilution

SECOND APPLICATION

- ◆ 100 gallons seal coat material
- ◆ 2 gallons latex copolymers
- ◆ Appropriate gallons of potable water for dilutions

D. Surface Preparation: The surface preparation to receive the asphalt seal coat must be free of all foreign material and completely dry prior to seal coat application. Cleaning of the surface may be made by air, vacuum, mechanical sweeping, washing or any other method approved by the City Engineer. All oil and grease deposits shall be removed prior to applying the seal coat. The application of an oil seal may be required prior to placement of the seal coat. The seal coat must not be applied without first obtaining the City Engineer's approval.

Cracks in excess of on-quarter inch (1/4") and less than one inch (1") in width must be sealed with an approved method prior to placement of the seal coat. The crack cleaned by routing or compressed air. Crack sealer shall be latex modified sealer compatible with the asphalt seal coat. Cracks wider than one inch (1") in width shall be patched with asphalt concrete per Section CS-11, "Asphalt Concrete" of these Standard Specifications.

On weathered surfaces or areas such that cleaning operations has left a film of dust, a tack coat of SS1h conforming to Section 94 of the State Standards Specifications shall consist of one (1) part SS1h and four (4) parts water or two (2) parts asphalt seal coat with one (1) part water and applied at a rate of 0.10 gal/sq. yd. The tack coat shall be completely dry prior to the placement of the asphalt seal coat. On new asphalt surfaces, asphalt seal coats shall not be placed on a new asphalt surface until after a sixty (60) day cure period or as directed by the City Engineer.

E. Application: Seal coats shall be applied in a two-step application process. Application of the seal coat shall be by mechanical means using a rubber faced

squeegee with the curved portion of the squeegee spreading the seal coat. The asphalt seal coat shall be applied in a uniform free flowing method, free of lumps and other solids. Potable water may be added per the manufacturer's recommendation not exceeding ten percent (10%) by volume. If the seal coat is unsuitable after the addition of the water, the seal coat shall be rejected and removed from the project. Application rates will vary depending on the texture of the existing asphalt surface receiving the seal coat. The surface may require a second seal coat over the first seal coat if the surface is rough. The following application rates are to be used as a guideline. The City Engineer will make the final determination as far as the application rates to be used.

Asphalt seal coats shall be applied when ambient temperature and surface temperature is fifty degrees (50°) and rising. Seal coats shall not be applied when ambient temperatures are in excess of eighty degrees (80°) without the possibility of a pretreatment per the manufacturer's recommendation. Seal coat shall not be applied within twenty-four (24) hours of rain or inclement weather. Traffic shall not be allowed on the seal coat for twenty-four (24) hours after the last application of the seal coat. All striping and markings shall not be applied to a seal coat surface until a minimum of 14 calendar days have passed. All asphalt seal coats shall be measured by the gallon before the addition of extra sand, binder, or water.

SURFACE TYPE	MINIMUM APPLICATION RATES
Smooth dense Surface	20 Gals. Per 1000 Sq. Ft.
Medium Surface with loss of fines	30 Gals. Per 1000 Sq. Ft.
Rough Aged Surface without cracks	40 Gals. Per 1000 Sq. Ft.*
Excessively Rough Surface	50 Gals. Per 1000 Sq. Ft.*

** The addition of #30 mesh sand with additional binder is recommended for the first coat. The addition of sand shall not exceed three (30 pounds per gallon with an approval of the City Engineer. Additional binder shall not consist of 1/10 gallon of SS1h.*

CS12-09. FOG SEAL:

- A. Description: An application of a liquid asphalt to seal small cracks and surface voids and as a curing seal for Cement Stabilized Base Course.
- B. Materials: The Contractor shall supply the asphalt material SS-1 in accordance with State Standard Specification Section 94, "Asphaltic Emulsions".
- C. Preparation: The City Engineer may request calibration certification of

Contractor's equipment before being used on the work. Prior to application of the Fog Seal, loose dirt or other objectionable material shall be removed from the prepared surface by brooming or by other methods acceptable by the City Engineer.

- D. Construction: Fog Seal shall be applied only when the surface to be treated is dry, when the weather is not foggy or rainy, and when the surface temperature is above thirty two degrees (32^o) F. for application of cutback asphalts and shall be fifty degrees (50^o) F. for emulsions, or as otherwise approved by the City Engineer.

The asphalt material shall be applied by means of a self-powered pressure distributor equipped with the following control devices.

1. Tachometer.
2. Pressure gauge.
3. Adjustable length spray bar.
4. Positive displacement asphalt pump with separate power unit.
5. Heating coils and burner capable of applying even heat to the asphalt material.
6. Thermometer well and accurate thermometer.

Before applying asphalt material, the Contractor shall ensure that the application equipment meets the following adjustments and requirements:

1. The distributor vehicle will maintain a constant height of the spray bar as the tank is unloaded.
2. All spray bar nozzles are of the same manufacture, type, and size.
3. Clogged nozzles have been removed and cleaned with solvent.
4. All nozzles have been set in the spray bar so that the nozzle slots make the same angle (15^o to 30^o) with the longitudinal axis of the spray bar.
5. The spray bar has been adjusted to the correct height to ensure uniform application without streaking.
6. The spray bar has been provided with a positive shut-off to prevent dribbling.
7. The distributor is capable of maintaining a uniform speed.

The asphalt emulsion shall be uniformly applied without streaking. Joints and seams shall not be excessively overlapped. Structures, wheel guards, guardrail, and other roadway appurtenances shall not be spattered by the asphalt material. The Contractor shall remove, at his own expense, any spattering caused by his operation.

CS12-10. PAYMENT: Under this item of the Proposal, the Contractor shall bid a price per square yard for seal coats over asphalt pavement.

1. Chip Seal -- The contract price paid per square yard of chip seal shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in constructing the chip seal, complete in place, including cleaning the surface, spreading and mixing materials as required, protecting the chip seal until it has set and is ready for traffic, traffic control, and clean-up, all as shown on the plans, and as specified in these special provisions and any referenced standard specifications or manuals.
2. Slurry Seal -- The contract price paid per square yard of slurry seal shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in constructing the slurry seal, complete in place, including cleaning the surface, spreading and mixing materials as required, protecting the slurry seal until it has set and is ready for traffic, traffic control, and clean-up, all as shown on the plans, and as specified in these special provisions and any referenced standard specifications or manuals.
3. Oil Treatment -- Asphalt recycling (rejuvenating) agent will be paid for at the contract unit price per ton by certified weight. All other tasks under this item, including cleaning the surface, traffic control, sanding and clean-up will be paid for on a square yard basis.
4. Recycling Agent Concentrate -- Recycling agent concentrate will be paid for at the contract unit price per ton by certified weight. The certified weight shall be determined by weighing on sealed scales regularly inspected by the State Bureau of Weights and Measures. The unit price shall include full compensation for cleaning the surface, furnishing, applying the recycling agent, traffic control and clean-up.
5. Sand Seal, Seal Coat or Fog Seal -- The contract price paid per square yard of Sand Seal or Seal Coat shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in constructing the sand seal, complete in place, including cleaning the surface, spreading and mixing materials as required, protecting the fog seal until it has set and is ready for traffic, traffic control, and clean-up, all as shown on the plans, and as specified in these special provisions and any referenced standard specifications or manuals.

CONSTRUCTION SPECIFICATIONS

SECTION 13 - PORTLAND CEMENT CONCRETE CURB, GUTTER, & SIDEWALK

CS13-01. ITEM: The Contractor shall furnish Portland cement concrete median or planter curb; curb and gutter (vertical or rolled); sidewalk, driveway or alley; and any specialty item in place as shown on the contract plans and as specified herein. The materials and methods of placing concrete shall conform to Sections 73 & 90 of the State Specifications. Design and construction shall conform to City of Dixon Construction Specifications and Details.

CS13-02. AGGREGATE BASE MATERIAL: Aggregate base material when required as subgrade for concrete shall be Class 2, aggregate base as specified in Section CS10-02. of these specifications.

CS13-03. DESIGN MIX: For all concrete projects the design mix shall be Class 1 (6 sack), per the State Standard Specifications. If the special provisions require submittal of a design mix, the Contractor shall furnish copies of the mix design to the City Engineer at least 48 hours in advance to the placement of any Portland cement concrete. A Certificate of Compliance shall be furnished by the Contractor to the City Engineer after the completion of the project.

CS13-04. CONCRETE PLACEMENT: Concrete shall be placed within ninety (90) minutes after it has been mixed unless otherwise authorized by the City Engineer. It shall be placed on clean, thoroughly dampened surfaces free from mud, debris, frost, excess water or objectionable coatings. Concrete shall be worked into the corners of the forms and around all reinforcement and embedded items without permitting the materials to segregate. Concrete shall not be placed under adverse weather conditions such as rain, high wind or extreme temperatures. All concrete placing equipment and methods shall be subject to approval.

Slump shall not exceed 4" for all formed work, and 2" for extrusion machine use. Slump testing and test cylinders may be required at the discretion of the City Engineer at the Contractor's expense.

CS13-05. EXPANSION JOINTS, WEAKENED PLANE JOINTS: Expansion joints, weakened plane joints and score marks shall be placed in accordance with City of Dixon Construction Details unless otherwise shown on the contract plans. Score marks, grooves and other required impressions shall be carefully aligned to produce a final product of uniform size and shape.

CS13-06. FINISHING CURB AND GUTTER: Prior to removal of any forms, the surface shall be finished true to grade by means of a straightedge float.

In the construction of the perpendicular curb, and immediately after removing the front curb forms, the face of the curb shall be worked with a trowel to present a smooth even surface, followed with a final fine brush finish with brush strokes parallel with the top of the curb.

The face of the finished curb shall be true and straight, and the top surface of the curbs and gutters shall be of uniform width, free from humps, sags or other irregularities. Surface shall be fine brush finished in accordance with City of Dixon Construction Details.

It is further required that as soon as the surface of the gutter has set sufficiently to permit the introduction of a shallow stream of water without causing damage to the gutter surface, same shall be applied and all flow line irregularities shall be corrected before the concrete surface has taken initial set.

The letter "S" shall be stamped over each sanitary sewer service and the letter "W" shall similarly be stamped over each water service. Said letter size and letter style to be approved by the City Engineer. The letter shall be placed at top of curb on vertical curb, gutter and sidewalk and top of roll on roll curb, gutter and sidewalk.

CS13-07. FINISHING SIDEWALK: After the concrete for the sidewalk has been placed, the concrete shall be struck off to proper section. The surface shall then be wood floated in a longitudinal direction so that the final finished surface shall not vary more than one-eighth (1/8") from a ten (10') foot straightedge except at grade changes. The final finish shall be accomplished with a fine hair broom made with light continuous straight strokes perpendicular to the direction of the sidewalk. The City Engineer may modify the method of finish to fit the requirements of the job. All exposed surface edges shall be neatly rounded with an edging trowel. Surface markings and lines shall be made when specified by the City Engineer and in a manner specified by the City Engineer.

CS13-08. DAMAGE AND REPAIRS: All damage done or openings cut in concrete walks, curbs or gutters during the progress of the work shall be repaired by the Contractor to the satisfaction of the City Engineer. Any necessary patching due to faulty construction or failure of concrete to properly set shall be done to the satisfaction of the City Engineer without additional cost to the City.

Any damage done to A.C. pavement shall be repaired by saw cutting A.C. and replacing damaged section in accordance with Section CS11 of these specifications. The area to be replaced shall extend at least two feet out from the lip of gutter or as determined by the City Engineer. See Construction Detail 3130.

CS13-09. RECONSTRUCTION OF DRIVEWAYS: Driveways to be widened or reconstructed shall be removed to the edge of pavement. If adjacent A.C. is damaged it shall be replaced as described in CS13-08 and Construction Detail 3130. Existing curb, gutter and sidewalk shall be sawed to a minimum depth of one and one-half (1-1/2") inches at the limits indicated and the concrete between the sawed joints shall be removed cleanly with no spalling of the sawed edge. A minimum 5 foot of sidewalk shall be left between new driveway and existing joints or section must be removed to the joint.

CS13-10. GRADE AND INSPECTION: No alteration, repair or construction will be undertaken without having grade approval by the City Engineer. No concrete pouring will be undertaken until the forms and subgrade have been approved by the City Engineer. Should the

City Engineer deem necessary, the Design Engineer shall verify forms and subgrade prior to concrete pouring. The City Engineer may notify the Design Engineer, if deemed necessary, that a problem may exist and require verification of the finish grades prior to pouring of concrete and placing of pavement.

CS13-11. PAYMENT: Payment for placing concrete items shall be either at the contract price bid per lineal foot, at the contract price bid per square foot for curb, gutter and sidewalk and at the contract price per item for driveways and curb ramps. The method used on any work will be shown by the list of quantities on the proposal and by the type of unit price requested in the proposal.

The price bid on each of the concrete items shall include full compensation for preparing the subgrade; dampening the subgrade (furnishing the water); furnishing, placing and later removing necessary forms and form work; furnishing the concrete; finishing the concrete; curing the concrete; furnishing and placing expansion joint material; furnishing and placing dowels and reinforcement; and doing such other work as may be necessary to construct each of the concrete items as shown by the contract plans.

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CONSTRUCTION SPECIFICATIONS

SECTION 14 - BAR REINFORCING STEEL

CS14-01. ITEM: Under this item of the Proposal, the Contractor shall furnish and place the type and grades of bar reinforcing steel as indicated in the plans and specifications and as directed by the City Engineer.

CS14-02. MATERIAL AND PLACEMENT: Bar reinforcing steel and method of placing shall conform to Section 52 of the State Specifications.

CS14-03. PAYMENT: Payment for placing reinforcing steel shall be either at the contract price bid per ton or shall be included in the prices bid for other items of work and that no additional compensation will be allowed therefore. The method used on any work will be shown by the list of quantities on the proposal.

The quantity of bar reinforcing steel shown on the plans and Proposal shall be the final quantity for which payment will be made, as provided in Section 9-1.015 of the State Specifications. Payment for reinforcing steel shall include full compensation for furnishing all steel, for cutting and bending, for placing, for furnishing all wire, stirrups, hangers, and placement devices, for cleaning the reinforcement, and for insuring the proper placement of the steel reinforcement in the finished structure.

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CONSTRUCTION SPECIFICATIONS

SECTION 15 - PORTLAND CEMENT CONCRETE CURB RAMPS

CS15-01. ITEM: Under this item of the proposal, the Contractor shall construct handicap ramps for the physically handicapped in existing curb, gutter, and sidewalk as indicated in the plans and specifications. Design and construction shall conform to Construction Details 3140, 3150, 3160, 3170 and 3180.

CS15-02. DETECTABLE WARNING SURFACE: Detectable warning surfacing shall be installed on curb ramps as noted on the Construction Details. Where applicable, the surfacing shall extend across the full width and depth of the ramp landing. Detectable warning surfaces shall be Armor-Tile surface applied for existing curb ramp installations and Armor-Tile cast-in-place applied for new curb ramps, or City approved equal. All truncated domes shall be in-line configuration.

CS15-03. PAYMENT: Payment for constructing handicap ramps shall be at the contract price bid per each. The price bid for handicap ramps shall include full compensation for preparing the subgrade; dampening the subgrade (furnishing the water); furnishing, placing and later removing necessary forms and form work; furnishing the concrete; finishing the concrete; curing the concrete; furnishing and placing expansion joint material; furnishing and placing detectable warning surfaces (either surface applied or cast-in-place); furnishing and placing dowels and reinforcement; and doing such other work as may be necessary to construct the handicap ramps as shown by the contract plans.

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CONSTRUCTION SPECIFICATIONS

SECTION 16 - WATER SYSTEM

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PART 1 - GENERAL

CS16-01 ABBREVIATIONS & DEFINITIONS:

ARV: Air-and-vacuum relief valve

AWWA: American Water Works Association, 6666 Quincy Ave., Denver CO, 80235

Contractor: the entity performing the construction work described herein.

City Engineer: the City of Dixon City Engineer, as used herein means the Engineering Manager of the City of Dixon.

DCDA: Double Check Detector Assembly

Fabricated: refers to components to be installed in the water system that are made or assembled by the Contractor or its subcontractors.

fps: feet per second

gpm: gallons per minute

HDPE: high-density polyethylene pipe

Improvement Plans: plans prepared for the Owner detailing specific project improvements.

Inspector: all persons employed by the City of Dixon responsible for inspection of City improvements.

Manufactured: refers to components to be installed in the water system that are purchased pre-fabricated by the Contractor.

Owner: the entity sponsoring a project.

PE: polyethylene

psi: pounds per square inch

PVCP: polyvinyl chloride pipe

RP: reduced pressure backflow preventer

RPDA: reduced pressure detector assembly

Standard Detail Sheets: the City of Dixon Standard Details included in the Construction Specifications.

Construction Specifications: a section of the City of Dixon Engineering Design Standards and Construction Specifications, including this Section.

USA: Underground Service Alert

CS16-02 INTENT OF THE SPECIFICATIONS AND DETAILS: The size and configuration of the various components of the water system shall be as indicated herein, in the Standard Details, and in the approved Improvement Plans, if any. The work shall be completed in a competent manner to insure an operable and watertight condition.

CS16-03 RELATED WORK: Refer to the following sections of the Construction Specifications for additional requirements.

Section 4	Imported Borrow
Section 6	Trench Excavation
Section 7	Trench Bedding and Backfill
Section 8	Surplus Material Disposal
Section 9	Aggregate Subbase
Section 10	Aggregate Base
Section 11	Asphalt Concrete
Section 14	Bar Reinforcing Steel

CS16-04 STANDARDS: All construction of the water system shall conform to the AWWA Standards and the City of Dixon Engineering Standard Specifications and Details unless otherwise noted in this Section. The California Regulations Related to Drinking Water, CCR Title 17 and CCR Title 22 apply as well.

CS16-05 SUBMITTALS: The Contractor shall submit the following:

- A. Paint color charts for selection by the City of Dixon.
- B. Five (5) copies of shop and fabrication drawings for approval.
- C. Certificates of compliance with specified standards for PVC pipe and elastomeric gaskets (see Section CS16-08.3.1).

CS16-06 INSPECTION:

6.1 Reference:

Refer to General Provisions Section G6-4, Inspection.

6.2 Designated Inspector:

The inspector for a project will be employed by the City of Dixon. Notification will be

made to the Contractor, either verbally or in writing, of who will be inspecting the project.

6.3 Access:

The State Department of Health Services, the City Engineer, and their authorized agents and inspectors shall at all times have access to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection.

6.4 Notification:

If the Specifications, the City Engineer instructions, laws, ordinances or any public authority require any work to be specially tested or approved, the Contractor shall give the City Engineer timely notice of readiness for inspection. If the inspection is by an authority other than the City Engineer, said notice shall include the time set for said inspection.

6.5 Exposure of Unauthorized Work:

If any work is performed without the approval or consent of the City Engineer, it must, if required by the City Engineer, be exposed for examination at the Contractor's expense, irrespective of whether the work exposed is found to be defective or not.

6.6 Exposure of Questionable Work:

Re-examination of questionable work may be ordered by the City Engineer, and if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the Specifications and Improvement Plans, if any, the City will pay the cost of re-examination and replacement. If such work is found to not be in accordance with the Specifications and Improvement Plans, if any, the Contractor shall pay such cost, unless it can be shown that the defect in the work was caused by another contractor, and in that event the City shall pay such cost.

6.7 Obligations Not Relieved:

The inspection of the work shall not relieve the Contractor of any obligations to comply with the requirements of the Specifications and Improvement Plans, if any. Defective work shall be made good, and unsuitable materials may be rejected, notwithstanding that such work and materials have been previously overlooked by the City Engineer and accepted. If the work, or any part thereof, shall be found defective at any time before the final acceptance of the whole work, the Contractor shall within ten (10) calendar days make good such defect without compensation, in a manner satisfactory to the City Engineer. If the Contractor shall fail or neglect to make ordered repairs of defective work or to remove condemned materials from the work within ten (10) calendar days after direction by the City Engineer in writing to do such work or remove such materials, the City may make the ordered repairs or remove the condemned materials, by its own forces or by the use of others, and charge the cost thereof to the Contractor.

CS16-07 GUARANTEES AND WARRANTIES: Refer to General Provisions Section G4-11, Guarantee. Contractor also guarantees pipelines against leakage for the one-year guarantee period, which begins when the pipeline is accepted by the City. The Contractor shall repair all leaks and maintain the pipeline in a satisfactory operating condition during the guarantee period. Upon notice to the Contractor by the City of needed repairs, the Contractor shall undertake such repairs, including necessary dewatering, within forty eight (48) hours. Neither the guarantee nor the maintenance requirements shall apply to damage to the pipelines caused by an Act of God, negligence in the operation of the system, or acts of third parties.

-- End of Part 1 - General --

PART 2 - MATERIALS

CS16-08 PIPE AND PIPE FITTINGS:

8.1 Steel Pipe & Fittings:

8.1.1 Pipe & Fittings:

Steel pipe and fittings shall conform to AWWA C200 and be of the various wall thicknesses indicated in the Details, and Improvement Plans if any, but not less than one-quarter inch ($\frac{1}{4}$ ") wall thickness. Welded steel pipe and fittings shall be electrically welded and fabricated from steel plate conforming to ASTM A283, Grade C or D, or ASTM A570, Grade 30 or 33. Seamless steel pipe and fittings shall conform to ASTM A53, and shall be Schedule 40, minimum. Fabrications shall conform to the configurations shown in the Details, and Improvement Plans if any.

8.1.2 Flanges for Steel Pipe & Fittings:

Flanges to be fitted onto steel pipe and fittings shall conform to AWWA C207, Class D, and may be ring or hub type. Blind flanges shall be flat faced. Nuts & bolts shall be ASTM A307, Grade B, and conform to AWWA C207. Gaskets shall be rubber, flat-faced, $\frac{1}{8}$ " thick, suitable for potable water service and conforming to AWWA C207.

8.2 Ductile Iron Pipe & Fittings:

8.2.1 Ductile Iron Pipe:

Ductile iron pipe shall conform to AWWA C151. Joints shall be flanged type per AWWA C110 or C115. Provide standard thickness interior cement-mortar lining per AWWA C104. Provide standard thickness exterior coal tar coating per AWWA C151.

8.2.2 Ductile Iron Fittings:

Main pipeline fittings (including end caps, ells, tees and crosses) shall be ductile iron, conform to the requirements of AWWA C110 or C153, have flanged or mechanical joints, and be compatible with AWWA C900 (PVC). Nuts & bolts shall be ASTM A307, Grade B, and conform to AWWA C110, Appendix A. Gaskets for flanged joints shall be rubber, flat-faced, $\frac{1}{8}$ " thick, suitable for potable water service and conforming to AWWA C110. The interior of ductile iron fittings shall be coated with a cement mortar lining in accordance with AWWA C104. The exterior shall be coated with a petroleum asphaltic (coal tar) coating per AWWA C110 or C153, as applicable.

8.3 Polyvinyl Chloride Pipe (PVC):

8.3.1 Water Main Pipe C900 and C905:

Water mains shall be PVC pressure pipe conforming to AWWA C900, Class 150, DR18, and AWWA C905, Class 165, DR25, unless otherwise noted. Where called for, C900 Class 200, DR14 or C905 Class 235, SDR 18 shall be installed. PVC shall be made of polyvinyl chloride compound 12454-B per ASTM D1784. PVC pipe outside diameters shall be iron pipe size. PVC shall be supplied in standard 20-foot lengths. Pipe joints shall be the bell-and-spigot type, self-centering, with O-ring elastomeric gaskets, conforming to ASTM D3139 and F477. The Contractor shall furnish certificates of compliance with the specified standards for the PVC pipe and elastomeric gaskets. Pipes used for distribution purposes must have a safety factor of 2.5, per AWWA C900

8.4 Polyethylene (HDPE) Pipe:

8.4.1 Up to and Including 1" Diameter:

PE pipe shall conform to AWWA C901, ASTM Designation D2239, PE 3408, SDR 7, and shall have a pressure rating of not less than 200 psi at 23°C. PE pipes up to and including one inch (1") in diameter shall be iron pipe size (IPS).

8.4.2 Over 1" Diameter:

PE pipe shall conform to ASTM Designation D2737, PE 3408, SDR 9, and shall have a pressure rating of not less than 200 psi at 23°C. PE pipes over one inch (1") in diameter shall be copper tubing size (CTS). PE pipe shall not be used for pipelines larger than three inches (2") in diameter.

8.4.3 Packaging of Polyethylene Pipe:

The pipe shall be coiled and packaged for protection against dirt and damage during shipment, handling and storage.

8.5 Brass Pipe:

Where called for, provide seamless red brass pipe suitable for use in water service lines and plumbing. Brass pipe shall conform to ASTM B43.

8.6 Pipe Couplings:

8.6.1 Mechanical Joint and Flanged Coupling Adapters:

Adapter bodies and end rings installed underground shall be ductile iron. Adapter bodies and end rings installed above ground may be fusion bonded epoxy-lined and coated steel or ductile iron. Bolts and nuts shall conform to AWWA C111, Appendix B. Gaskets shall be suitable for use with potable water and shall be suitable for the type of pipe being coupled. Anchor studs are not allowed when coupling to PVC pipe. All mechanical joints shall use restraints.

8.6.2 Compression Couplings:

Compression couplings (including straight, transition, reducing and end cap types) shall be ductile iron. Gaskets shall be suitable for use with potable water and shall be suitable for the type of pipe being coupled. Bolts and nuts shall conform to AWWA C111, Appendix B. All compression couplings shall use restraints.

8.6.3 Insulated Flanges and Couplings:

8.6.3.1 Insulation Points:

Install an approved, electrically insulating connection at the following locations:

1. At all pipe connections where dissimilar coating or lining materials occur.
2. At connections to other appurtenances where shown in the Details or Improvement Plans.

8.6.3.2 Flange Insulation Kits:

Kits shall consist of a central gasket, bolt sleeves, insulated washers and steel washers. The central gasket shall be reinforced. Insulating materials shall have sufficient strength to operate at the pressure rating of the pipe to which they will be coupled, and shall be suitable for direct burial. Flange insulating kits shall be submitted for use and approved by the City Engineer prior to use.

8.6.3.3 Insulated Mechanical Couplings:

Couplings shall be supplied with insulating boots. Insulating materials shall have sufficient strength to operate at the pressure rating of the pipe to which they will be coupled, and shall be suitable for direct burial. Insulated couplings shall be submitted for use and approved by the City Engineer prior to use.

CS16-09 VALVES:

9.1 General:

All sectionalizing valves four (3) inches and larger shall be flanged resilient wedge gate valves and conform to AWWA C509 or AWWA C515. Valve installations shall be complete with all gaskets, bolts and all else required to complete the valve in an operating, watertight condition. Valves shall have all ferrous interior surfaces fusion epoxy coated in conformance with the provisions of AWWA C550. Valves located underground shall have a coal tar coating in accordance with applicable provisions of AWWA C203, and all ferrous surfaces shall have a fusion bonded epoxy coating conforming to AWWA C550. All belowground valves shall be

provided with two inch (2") square operating nuts and have two (2) O-ring stem seals. Operating nuts shall be installed on the side of the valve closest to the curb. If the operating nut on belowground valves is deeper than 60", then a valve nut extension shall be installed (See Standard Detail 5190). Valves shall open when turned counterclockwise (left), and close when turned clockwise (right).

9.2 Gate Valves:

9.3.1 Below-Ground Gate Valves:

All below ground gate valves shall be of a resilient wedge design. They shall have a non-rising stem, and a cold water rated work pressure of 250 psi. Gate valves shall conform to the manufacturing standards set in AWWA C509 or AWWA C515. All below ground valves shall have a coal tar coating in accordance with applicable provisions of AWWA C203, and all ferrous surfaces shall have a fusion bonded epoxy coating conforming to AWWA C550

9.3.2 Above-Ground Gate Valves:

Shall have bronze body and shall be provided with a removable hand wheel.

9.3 Check Valves:

All check valves shall conform to the applicable provisions of AWWA C508, have the valve body and disc so proportioned that they will provide a passage fully equal in area of the nominal pipe size of the valve, when the valve is in the wide-open position, and shall have a pressure rating equivalent to that of the pipeline of which they are to become a part, or 150 psi, whichever is greater. Check valves shall be iron body, swing type, flanged, bronze fitted, have a bronze disc seating ring, and be furnished with an external lever and single weight or spring. Check valves shall be as manufactured by Eddy-Iowa, Bailey, or approved equal.

9.4 Air Release Valves (ARV):

All air release valves shall have the same pressure rating as the pipeline at the point of installation, and shall be Bermad Model 4415 or approved equal.

9.5 Butterfly Valves:

All butterfly valves shall conform to the applicable provisions of AWWA C504 and be the flanged (short body) type. Wafer-type valves shall be unacceptable. Valves shall be Class 150 pressure rating, show no leakage under 200-psi pressure. The use of butterfly valves is not permitted for underground use unless approved by the City Engineer.

CS16-10 FIRE HYDRANTS AND APPURTENANCES:

Hydrants shall be the wet-barrel type and have two 2½" outlets and one 4½" outlet. All outlets shall have National Standard threads and cast iron caps with bleed ports and chains. Hydrants shall be supplied with a factory-applied coat of "bright white" epoxy coating. Hydrant assemblies shall include break-off risers, break-off check valves and hub-end hydrant burys. Hydrants shall be Clow Valve Company, Model 960 three-way fire hydrant.

CS16-11 SERVICE LINE FITTINGS:

11.1 Service Saddles:

Saddles shall be sized for use on cast iron pipe size AWWA C900 PVC mains. Saddle bodies shall be the bronze, double-strap type. Saddles shall be provided with female iron pipe thread outlets per AWWA C800. Assembly hardware shall be silicon bronze or stainless steel. The gasket shall be of material suitable for use with potable water.

11.2 Curb Stops:

All curb stops shall be a lockable angle meter stop conforming to AWWA C800. See Details 5100, 5120, and 5200 for installation requirements.

11.3 Brass Fittings and Stops:

Brass tees, elbows, reducers, nipples, corporation stops, curb stops, and all other miscellaneous parts shall conform to the requirements of AWWA C800. All ¾-inch and 1" fittings for connecting to IPS PE pipe shall be Ford "Pack Joint" compression, Mueller "Insta-Tite" or approved equal. Fittings larger than 1" in size for connecting to CTS PE pipe shall be Ford "Pack Joint" or approved equal.

CS16-12 WATER METERS:

Water meters shall be brass and conform to AWWA C700. Water meters sized ¾" and 1" shall be Sensus Model SR-II. Water meters 1.5" and larger shall be Sensus Model OMNI C2. All meters shall have a 520 M smart point terminal. Meters are to read in cubic feet, and are to be furnished and installed by the City at the Owner's expense.

CS16-13 BACKFLOW PREVENTION ASSEMBLIES:

All backflow preventers shall be from the approved list of the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California. Only reduced pressure principal and reduced pressure detector assemblies are acceptable for the required backflow protection as described in the City of Dixon Cross Connection Control and Backflow Prevention Ordinance (14.02.1550).

CS16-14 SAMPLING STATION:

Sampling stations shall be Steel Source Construction, Model SDMX-H FBE, powder coated RAL 6028 (Pine Green) and have the City logo etched on the back of the unit. Sample station shall be installed per Detail 5130.

CS16-15 COATINGS, LININGS & PAINT SYSTEMS:

15.1 Fusion Bonded Epoxy Lining and Coating Systems:

Fusion bonded epoxy systems shall conform to AWWA C213. The minimum thickness shall be 20 mils.

15.2 Epoxy Lining Systems:

Epoxy lining systems shall conform to AWWA D102, Section 3.2, "Inside Paint System No. 1 (Epoxy)." All storage tank coatings shall be submitted to and approved by the City Engineer prior to application.

15.3 Tape Coating:

Tape coatings are unacceptable for aboveground piping. Continuation of belowground tape coating to a minimum distance above the ground line as specified is acceptable.

15.3.1 Field-Applied Tape Coating:

Field-applied tape coatings shall conform to AWWA C209. The minimum thickness shall be 20 mils, and the minimum overlap shall be ½ inch.

15.3.2 Factory-Applied Tape Coating:

Factory-applied tape coatings shall conform to AWWA C214. The minimum tape thickness shall be 50 mils.

15.4 Above-Ground Painting:

15.4.1 Piping:

Aboveground epoxy painting shall conform to AWWA D102, Section 2.1, Outside Paint System No. 1, special color, and shall have three coats except the prime coat shall be a 3.0 mil self-priming epoxy. The total dry film thickness shall be seven (7) mils. Color shall be as specified herein, in the Standard Details, or in the Improvement Plans, if any. Intermediate paint coats shall be tinted to provide discernable contrast in the subsequent coat.

15.4.2 Miscellaneous Metal:

Unless otherwise specified herein, in the Standard Details, or in the Improvement Plans, if any, piping and exposed metal called to be painted shall be painted with industrial grade primer and enamel.

CS16-16 TRENCH BACKFILL AND SURFACING MATERIALS:

16.1 Pipe Bedding Material:

Sand for pipe bedding shall conform to the following specifications: imported granular material of which 100% shall pass the 3/8 inch sieve, 70-100 % shall pass the No. 4 sieve, 20-100 % shall pass the No. 30 sieve, and not more than 15% will pass the No. 200 sieve. The granular material shall have a minimum equivalent of 30 as determined by the Test Method No. Calif-217.

16.2 Native and Imported Backfill Material:

Refer to Construction Specifications Section CS7-03, Intermediate Backfill. All waterline trench backfill is classified as Intermediate backfill. Imported backfill shall be granular in nature, free of organic material and stones larger than one inch (1") in maximum dimension.

CS16-17 MISCELLANEOUS MATERIALS:

17.1 Polyethylene (PE) Film:

Polyethylene film for encasing (wrapping) ductile iron fittings, details, and miscellaneous metals shall conform to the requirements of AWWA C105. Minimum film thickness is 20 mils.

17.2 Tracer Wire:

All water lines, including mains, laterals, service lines, blow-offs, ARV, etc. shall have tracer wire. Tracer wire shall be #12 AWG copper clad steel, high strength with a minimum 450 lb. break load, with minimum 30-mil HDPE insulation thickness. Tracer wire for water line shall be coated shall be blue. Tracer wire shall be taped to the water line in five (5) foot intervals, and spooled neatly in water/valve boxes, and at termination points.

17.3 Warning Tape:

Warning tape shall be blue, 12" wide, 4-mil thick polyethylene backed with metal foil. Tape shall be labeled with black lettering to say "CAUTION - WATER LINE BURIED BELOW".

17.4 Hydrant Pavement Markers:

Reflective markers used to mark locations of fire hydrants shall conform to the requirements of Section 85, "Pavement Markers," of the State of California, Department of Transportation Standard Specifications. Color shall be blue.

17.5 Reinforcing Bars:

Reinforcing steel shall conform to ASTM Designation A615 Grade 40 for deformed and plain billet steel bars for concrete reinforcement.

17.6 Concrete:

Concrete shall use Portland cement conforming to ASTM C150, Type II, and have a minimum cement content of five (5) sacks per cubic yard. Minimum compressive strength shall be 3,000 psi after 28 days.

17.7 Concrete Grade Boxes:

17.7.1 Air Release Valve (ARV) Boxes:

Provide lightweight fiberglass reinforced plastic meter box with nominal dimensions 17"x 30", or approved equal with extensions as necessary to provide the required depth. Air vent enclosure and lid shall be Placer Waterworks Model PW/AE 3618-MN or

approval equal per Detail 5150.

17.7.2 Water Meter Boxes:

Provide lightweight fiberglass reinforced plastic meter box with nominal dimensions 13 x 24" or 17"x 30", per referenced detail, or approved equal, with extensions as necessary to provide the required depth. Provide lightweight fiberglass reinforced plastic lid with round opening for Sensus "Smart Point" box lid-mounted meter sensor, per Detail 5100, 5120, and 5200

17.7.3 Water Valve Box:

Christy Model G-5 utility box with traffic cover marked "WATER" for isolation valves and "FIRE" for hydrant laterals, per Detail 5090.

17.7.4 Blow off Box:

Christy Model G-12 utility box with traffic cover marked "WATER", per Detail 5140.

17.8 Block or Brick Blocking:

Provide Utility-grade block or brick for blocks under grade boxes.

-- End of Part 2 - Materials --

PART 3 - EXECUTION

CS16-18 WATER-SEWER AND NON-POTABLE SEPARATION REQUIREMENTS:

The contractor shall follow the California Waterworks Standards, Title 22 CCR, 64572 for the separation requirements between water mains and sanitary sewer guidelines prepared by the State of California Department of Health Services. When installing water and sewer laterals in the same trench, do so in accordance with Section 1108 of the Uniform Plumbing Code.

CS16-19 TRENCH EXCAVATION AND BEDDING:

19.1 General:

Comply with Construction Specifications Section 6, Trench Excavation, and Construction Specifications Section 7, Trench Bedding and Backfill. Refer to Standard Detail Sheet 5000.

19.2 Trench Safety Requirements:

Refer to General Provisions Section G7-7, Trench Safety Requirements.

19.3 Grade & Alignment:

Comply with General Provisions Section G5-5, Surveying. Trenches shall be excavated true to line and grade.

19.4 Trench Preparation:

The bottom shall be smooth and free of all loose and objectionable material. Comply with Construction Specifications Section CS6-08, Special Foundation Treatment, *except* that excavation below the design pipe grade shall be the full width of the trench, backfilled with sand or aggregate base rock, and compacted to the in-place (in situ) density.

CS16-20 TRENCHLESS PIPE INSTALLATION:

Pipelines may be installed using trenchless technology only with the approval of the City Engineer. The Contractor shall confirm the location and depth of all utilities to be crossed by pipelines installed using trenchless techniques. Said utilities, if damaged, shall be repaired to the satisfaction of the utility owner at the Contractor's expense, and no additional payment will be allowed for such repairs.

CS16-21 PIPELINE INSTALLATION:

21.1 General:

Contractor shall provide all labor, material, and equipment to install all pipe and other appurtenant apparatus required to complete the potable water pipeline in an operating, watertight condition. Contractor shall furnish all supports, bracing, other materials and all work required for hauling, unloading, distributing, trenching, protecting, dewatering, placing, backfilling, disinfecting, cleaning and testing of the pipeline and appurtenances, and for resurfacing of roads and jobsite cleanup.

21.2 Handling of Materials:

During handling, loading, transportation and unloading, every precaution shall be taken to prevent injury to the pipe, fittings, valves and appurtenances. Coatings, linings and finishes shall be protected from damage. The manufacturer's recommendations for handling materials shall be followed. During transportation, storing and stringing, each joint of pipe shall rest upon suitable pads, strips, or blocks as recommended by the manufacturer and shall be securely wedged into place. Materials shall be carefully lowered into the trench. Any materials damaged beyond repair, in the opinion of the City Engineer or Inspector shall be replaced by, and at the expense of, the Contractor.

21.3 Cleanliness and Cleaning During Construction:

21.3.1 All materials shall be thoroughly clean before installation. The pipelines shall be kept clean and dry during construction. The Contractor shall follow the procedure set in most recent version of AWWA C651 during the installation of new water mains. The Contractors shall take precautions to prevent contamination of the interior of pipes, fittings valves and appurtenances by dirt, debris, animals, etc. entering the pipe. Any contamination shall be addressed in accordance with AWWA C651. After construction is completed, the main shall be disinfected using the continuous-feed method, per AWWA C651.

21.3.2 At the close of each workday and when pipe installation is not in progress, exposed ends of the pipeline shall be protected with approved temporary bulkheads furnished and installed by the Contractor. Temporary bulkheads shall not be removed until the trench is dry. Before work is stopped for the day, all joints shall be completed with the exception of joints adjoining structures.

21.4 Connections to Existing Mains:

21.4.1 Main-line connections shall be made with mechanical joint or compression couplings, with restraints. AWWA C651 procedures for flushing, disinfecting, and final connections to existing mains shall be followed. "Hot tap" connections are permitted for service connections up to two inches (2") in diameter, larger "Hot Tap" connections may be allowed at the approval of the City Engineer.

21.4.2 The Contractor shall coordinate the sequence and method of connection with the City Engineer and the Water Operations Division prior to making the connection. No exceptions shall be granted, and Contractors shall be held liable and prosecuted for any

damages and/or public health complaints for connecting to a Public Water System without knowledge or permission from the Water Purveyor.

21.4.3 The Contractor shall notify all affected users in writing at least 48 hours in advance of service interruption. The Contractor shall notify the City of Dixon at 707-678-7030, at least 96 hours in advance to schedule valve closures for service interruptions. Only City employed certified Operators are to operate existing valves.

21.4.4 Disinfection of materials and equipment used for connections to existing mains shall conform to AWWA C651. Newly installed extensions of the water system are to remain physically isolated from the system, or shall be metered and backflow protected with a certified Reduced Pressure Principal assembly. Final connection is only permitted after the extension has been hydrostatic pressure tested, analyzed for bacteriological contamination, and required flushing has been performed. All testing must be documented and observed by the City Inspector and/or designated Certified Water Operator. All bacteriological analysis must be recorded as absent before a connection to the Public Water System will be allowed.

21.4.5 Existing mains to be abandoned in place shall be plugged with concrete.

21.5 Pipe Laying:

The pipe shall be placed firmly in the center of the trench and true to line and grade with no visible change in alignment at any joint, unless the alignment is shown to be curved in the Improvement Plans. Joint deflection for curved alignments shall not exceed the manufacturer's recommended maximum. On slopes, greater than ten percent (10%) the pipe bells shall be pointed up-grade and laying shall proceed up-grade. The pipe joints shall be assembled according to the manufacturer's recommendations, these Specifications, and as directed by the City Engineer or Inspector, but regardless of the method used the joints shall be watertight. Joint deflection shall not exceed 80% of the manufacturer's recommended values. If it is necessary that a pipe be moved or that the alignment be adjusted after it has been installed, it shall be removed and rejoined as was accomplished in the original installation. Except as required for backfilling, the Contractor shall prohibit walking or working upon the pipe until backfilling of the trench has been completed. The Contractor shall provide temporary bridging over pipe trenches where it is necessary to provide crossings for workers and equipment, or access roads. The Contractor shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source, shall assume full responsibility for any damage and shall, at his own expense, restore and replace the pipe to its specified condition and grade if it is displaced for any reason.

21.6 Pipe Bedding:

Comply with Construction Specifications Section CS7-02. Bedding material shall comply with Construction Specifications Section CS16-16.1. Bedding shall extend twelve (12) inches over the top of the pipe. Jetting of water pipe bedding is not permitted, See Standard

Detail 5000.

21.7 Steel Pipe:

21.7.1 Field Welding Steel Pipe:

Field welding of pipe joints and attachments shall conform to AWWA C206. If previously coated and/or lined, field welded joints shall be recoated and lined with approved coating and lining systems.

21.7.2 Below-Ground Coatings and Encasement:

Refer to Construction Specifications Section CS16-15, Coatings, Linings & Paint Systems, for acceptable materials. All buried steel piping, fittings and fabrications shall be coated. An electric holiday detector shall be passed about the entire circumference of tape-coated pipe to locate holidays and pinholes after coating and before installation. Any defective coating shall be repaired and retested. Fittings, piping and miscellaneous steel that will have concrete support pads or thrust blocks cast next to or around them shall be polyethylene encased per AWWA C105 using PE film per Section CS16-17.1. Fittings shall be clean of pipe bedding material, soil, etc., prior to PE encasement. Belowground nuts and bolts shall be stainless steel and PE film encased per Section CS16-17.1, or tape wrapped per Section CS16-15.3. Ends of the PE film shall be taped closed around the covered materials. Exposed bolt threads shall be stainless steel and coated with spray-on silicone sealant.

21.7.3 Above-Ground Painting:

Refer to Construction Specifications Section CS16-15, Coatings, Linings & Paint Systems, for acceptable materials. All above ground piping, fittings, and fabrications shall be painted with industrial primer and enamel unless otherwise noted. Color shall be as specified. Before painting, all piping shall be cleaned and free of mill scale. Paint shall be applied per the manufacturer's recommendations, and shall be checked for holidays and pinholes by an approved method.

21.7.4 Linings:

Refer to Construction Specifications Section CS16-15, Coatings, Linings & Paint Systems, for acceptable materials. All piping, couplings and fittings three inches (3") and larger shall be lined. All piping, couplings and fittings two and one-half inches (2½") and smaller shall be brass.

21.8 PVC Main Pipelines:

Elastomeric gaskets for PVC pipe joints, supplied loose, shall be stored in a cool, well-ventilated place, and shall not be exposed to the direct rays of the sun, until immediately before joint assembly. The joints shall be lubricated and assembled in accordance with the manufacturer's recommendations. There shall be no pulling of joints unless shown in the plans or approved by the City Engineer, and shall comply with the manufacturer's recommendations. Care shall be taken in fitting the pipe together to avoid twisting or otherwise displacing or damaging the gasket. After the joint has been assembled, the position of the gasket shall be verified by passing a feeler gauge around the complete circumference of the joint. If the gasket is displaced, the joint shall be disassembled, a new gasket installed, the pipe re-laid, and the position of the gasket rechecked. There shall be no service connections within two (2) feet of a pipe joint. No rubber-gasket joint shall be encased in concrete.

21.9 Main Fittings & Valves:

Fittings shall be supported independently of the pipe. Temporary supports under fittings or under pipe will not be permitted. Permanent supports under fittings may be precast concrete blocks or concrete foundations. Preassembling flanged fittings before installation in the trench will be permitted. Fittings shall be polyethylene encased per AWWA C105 using PE film. No rubber-gasket joint shall be encased in concrete. If necessary, the Contractor shall use long or special fittings to comply with this requirement. Fittings shall be clean of pipe bedding material, soil, etc., prior to PE encasement. Ends of the PE film shall be taped closed around the covered materials. Valves are to be set plumb. Provide a valve box at each valve per the Standard Detail 5190.

CS16-22 THRUST BLOCKS:

Concrete thrust blocks are required at all angle points, tees, terminal points of the line, and fire hydrants. Thrust block configurations shall be per Standard Details 5020, 5030, 5040, and 5050. Thrust blocks shall not cover joints.

CS16-23 BACKFILL:

23.1 Warning Tape:

Warning tape shall be placed in the same trench, directly over and not more than 12" above all main pipelines.

23.2 Tracer Wire:

All water lines, including mains, laterals, service lines, blow-offs, ARV, etc. shall have tracer wire. Tracer wire shall be taped to the water line in five (5) foot intervals, and spooled neatly in water/valve boxes, and at termination points.

23.3 Backfilling and Compaction:

Comply with Construction Specifications Sections CS7-03, Intermediate Backfill, and CS7-04, Other Backfill Requirements. Backfill shall be within 2% of the optimum moisture content per ASTM D-1557 for cohesive materials when compacted. Unless otherwise directed, pipe trenches shall be backfilled within 48 hours after the installation of the pipe. The Contractor shall backfill the trench prior to field-testing. Compaction of the backfill material shall be as shown in Standard Detail 5000. The Contractor shall use extreme care in compacting the backfill in the vicinity of the pipe to avoid damaging the pipeline. Jetting of trench backfill is not permitted in waterline trenches.

CS16-24 TRENCH RESURFACING:

Comply with Construction Specifications Section CS7-05, Pavement Replacement in Existing Streets, and Standard Detail Sheet 5000. Aggregate base construction shall conform to Standard Specification Section 10, Aggregate Base. Asphalt concrete construction shall conform to Standard Specification Section 11, Asphalt Concrete, except that asphalt surfacing shall be applied in two lifts. The first lift shall be to within 1½ inches of final grade and shall contain ¾-inch maximum aggregate. The second and final lift of asphalt paving shall contain ½-inch maximum aggregate. A fog seal coat may be required to be applied to the finished asphalt concrete in accordance with Section 37, "Bituminous Seals", of the Caltrans Standard Specifications.

CS16-25 APPURTENANCE INSTALLATION:

25.1 Backflow Prevention Assemblies:

Backflow preventers shall be installed per the following Standard Details:

- 5160 ¾" - 2" Reduced Pressure Backflow Preventer Installation
- 5170 Reduced Pressure Backflow Preventer Protective Enclosure
- 5180 3" - 10" Reduced Pressure Backflow Preventer Installation
- 5190 Reduced Pressure Detector Assembly Installation
- 5191 – Double Check Detector Assembly Installation

The City of Dixon requires all backflow to be Reduced Pressure Principal assemblies. A Double Check Detector Assembly (DCDA) may be used for a fire protection service if the services does not contain chemical additives, and the facility and services is free of any

hazard as defined by the Cross Connection Control Handbook. If the fire suppression system contains, or may contain chemical additives, or the facility manufactures hazardous materials, a Reduced Pressure Detector Assembly will be required. All backflow prevention assemblies shall be tested immediately after they are installed. A certified AWWA backflow tester, with a valid gauge calibration certificate at the Contractor expense, shall test and provide a passing certification to the City prior to activation. Back flow assemblies 2" smaller require a protective enclosure and freeze protection provided at the Contractors expense.

25.2 Fire Hydrants:

Hydrants and aboveground piping shall be painted per Section CS16-15.4.2 above. A blue reflective marker shall be installed six inches (6") from the street centerline toward each hydrant, on a line from the hydrant perpendicular to the centerline of the street. For corner hydrants at intersections, markers shall be placed in each street. Fire hydrants are shown in the following Standard Details:

5060 Fire Hydrant Detail

5070 Fire Hydrant Installation for Developed Areas

5080 Fire Hydrant Installation for Open Areas

25.3 Air Release Valve and Blow off Installation:

Install ARVs and blow offs where shown in the Improvement Plans, per Standard Details 5140 and 5150. Reinforcement of the connection point to the pipeline shall be installed if required.

25.4 Service Connections:

Install service connections as shown in the Standard Detail Sheets at the locations shown in the Improvement Plans. The minimum service pipe size is one inch (1"). Trenches for service pipes shall be excavated, backfilled and resurfaced per these Standard Specifications. Trenchless installation is preferred under existing paved surfaces, and may be used in any location. PE pipe shall be installed in accordance with applicable provisions of AWWA C901. Adjacent taps into the water main shall be separated by at least one foot (1') and connections shall not be closer than two feet (2') from pipe joints and the end of the main pipe.

25.5 Sampling Stations:

Locate sampling stations where shown in the Improvement Plans or as directed by the City Engineer and install per Standard Detail 5130.

CS16-26 DISINFECTION:

26.1 Chlorination and Flushing:

Disinfection shall be in accordance with most recent version of AWWA C-651, Disinfecting Water Mains, by use of the Continuous-Feed unless other methods are specified and approved by the City Engineer and Water Purveyor. Method. The water main shall be completely filled with water then flushed to remove any particulates, then refilling the main with potable water that has been chlorinated to a minimum of 25 mg/L After a 24-hr holding period in the main, there shall be a free chlorine residual of not less than 10 mg/L.

26.2 Final Flushing:

Final flushing shall be in accordance with AWWA C651. All super chlorinated water must be flushed from the main until a system representative residual is achieved. De-chlorination pads or tablets shall be used when flushing into a storm drain.

26.3 Bacteriological Tests:

After final flushing and before the water main is placed into service, water samples will be collected and tested per AWWA C651 by City Water Distribution Operators at the Contractor's expense. Satisfactory result must be submitted from a Certified Laboratory prior to the final connection to the Public Water System.

26.4 Re-disinfection:

Should the laboratory test results indicate a presence of coliform organisms, the disinfection procedure shall be repeated.

26.5 Final Connections:

All final connections shall be made in accordance with AWWA C651. Final connections shall be made with mechanical joint or compression couplings with restraints. All final connections shall be disinfected, flushed, and sampled as described in AWWA C651.

CS16-27 FIELD HYDROSTATIC TESTING:

27.1 Preparation for Testing:

The Contractor shall submit the proposed testing procedure, in writing, to the City Engineer for review. Installation of all valves, fittings, appurtenances and thrust blocks shall be complete. Bedding to 12 inches over the top of the pipe shall also be completed. Testing shall not take place sooner than five (5) days after the placement of any mortar or concrete that will be subject to hydrostatic pressure during a test. Temporary bulkheads furnished and installed by the Contractor may be used when approved. After testing, the bulkheads shall be removed by the Contractor. Contractor shall supply all labor, equipment, materials,

bulkheads and recently calibrated measuring apparatus required to make the tests. The pipeline to be tested shall be slowly filled with water and left under normal operating pressure for at least 24 hours prior to the start of testing. Air shall be expelled from and through all services, blow offs and hydrants as well as ARVs. Chlorination levels in the pipeline to be tested shall be confirmed and verified before pressure testing any section of main connected to an existing main. The City will not be responsible for any damage, including damage to pipelines and appurtenances, due to testing.

27.2 Test Sections:

The pipeline shall be tested once the entire water system as shown on the Improvement Plans has been installed. Partial system testing is not permitted unless otherwise directed by the City Engineer. The system to be tested shall have only a single physical connection to the Public Water System that shall be metered and backflow protected.

27.3 Test Pressure:

Test pressure shall be no less than 150 pounds per square inch measured at the low point in the test section.

27.4 Test Duration:

Once the water line is pressurized, and all gauges have settled, the hydrostatic pressure test shall be maintained for four (4) hours. A City Inspector or a system Water Operator shall witness all tests.

27.5 Acceptance and Repair of Pipelines:

All leaks shall be corrected and any damaged, cracked or defective pipes, fittings, valves, hydrants and miscellaneous appurtenances shall be replaced. Regardless of the actual leakage from the pipe, the Contractor shall repair all visible leaks. After repairs, the system shall be hydrostatic pressure tested for the full duration. Repairs and re-testing shall continue until there is no observed leakage during the four (4) hour test. Leaks shall be repaired by and at the expense of the Contractor.

CS16-28 BACKFLOW PREVENTER ASSEMBLY TESTING:

An AWWA certified backflow tester, with a valid gauge calibration certificate, at the expense of the Contractor, shall test all backflow preventers. A “passing” City of Dixon backflow test form shall be completed by the tester and submitted to the City prior to activation and acceptance.

End of Section 15: Water System

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CONSTRUCTION SPECIFICATIONS

SECTION 17 - SANITARY SEWER SYSTEM

CS17-01. ITEM: The Contractor shall furnish all labor, materials, tools and equipment to construct and complete in an efficient and workmanlike manner the installation of the sanitary sewer mains and laterals in accordance with the approved plans, construction details and these specifications.

CS17-02. MATERIALS: The source and supply of materials shall be approved by the City Engineer.

A. GRAVITY SEWER PIPE: Sewer pipe shall conform to the requirements listed below. Ductile iron pipe shall be used in locations where depth, separation from other facilities, or some other special constraint is present, and shall be used only with the City Engineer's approval. SDR 26 PVC pipe may be approved by the City Engineer. Extra-strength vitrified clay pipe (ESVCP) shall be used in all other locations. A certification of compliance with the requirements of these specifications must be furnished by the pipe manufacturer to City Engineer prior to the Contractor commencing construction.

1. VITRIFIED CLAY PIPE (VCP):

SPECIFICATION: Vitrified clay pipe and fittings shall conform to and meet all of the requirements of ASTM C700 latest revision, for unglazed vitrified clay sewer pipe, extra strength, and shall conform to all materials data contained in the current Clay Pipe Engineering Manual published by the National Clay Pipe Institute.

JOINTS FOR VITRIFIED CLAY PIPE: Joints in vitrified clay pipe shall be of factory applied resilient type plastic compression type joints which conform to ASTM C425, latest revision. Compression couplings for plain end pipe shall conform to ASTM C594, latest revision.

2. DUCTILE IRON PIPE (DIP):

SPECIFICATION: Ductile iron pipe shall conform to ANS1 A21.51 (AWWA C151, latest revision) unless otherwise specified. Casting grade for pipe shall be 60-42-10. Laying length shall be the manufacturer's standard length.

The interior surface of all ductile iron pipe shall be cement-mortar lined and seal coated in conformance with AWWA C104, latest revision, and the exterior surface shall polyethylene wrapped in accordance with AWWA C105, latest revision.

Fittings shall be push-on, mechanical, or flanged-type ductile iron or cast iron and shall conform to ANSI 21.10 (AWWA C110, latest revision) or ANSI 21.15 (AWWA C115, latest revision). Coating and lining requirements shall be the same as specified for pipe.

JOINTS FOR DUCTILE IRON PIPE: Joints shall be push-on or mechanical type and shall conform to ANSI 21.15 (AWWA C115, latest revision) with rubber gaskets unless otherwise specified. Coating and lining requirements shall be the same as specified for pipe.

3. **POLYVINYL CHLORIDE (PVC) PIPE:**

SPECIFICATION: Polyvinyl chloride pipe and fittings shall conform to the requirements of ASTM Designation D3034 as they apply to SDR 26 PVC sewer pipe using an elastomeric gasket joint in a bell and spigot assembly. The use of this pipe for sanitary sewer mains shall be restricted to 8- and 10-inch diameters and shall be used within residential areas only when approved by the City Engineer and where there is no possibility of commercial or industrial waste flowing through the pipe. Trench depths shall not exceed 15 feet and shall be a minimum of 6 feet.

JOINTS FOR PVC PIPE: Polyvinyl chloride joints shall be bell and spigot using an elastomeric gasket which meets the requirements of ASTM Designation D1869. No solvent weld joints will be allowed.

- B. PRESSURE SEWER PIPE:** Whenever the design of a sanitary sewer system includes the necessity of a sewage lift station and pressure mains, types of pipe shall be approved by the City Engineer on a case-by-case basis.
- C. TRANSITION JOINTS AND BANDED RUBBER COUPLINGS:** Transition joints between different pipe materials shall be made with an approved flexible coupling. Where necessary, proper adapters shall be used. Fittings shall be manufactured of the same materials as the pipe and installed in accordance with the Construction Details.
- D. LATERALS:** Pipe shall be of the same type and class as that used for the main. Joints and couplings for laterals shall be the same type and specifications as those used for the mains.
- E. MANHOLES:** Sanitary sewer manhole barrels, risers, cones, flat tops and grade rings shall be of precast reinforced concrete conforming to ASTM Designation C478 except that the Portland Cement shall be Type II modified cement. The manhole base, riser and cone shall have a minimum compressive strength of 4,000 psi at 28 days. Manholes shall be constructed in accordance with the Construction

Details.

Manhole frames and covers shall be Phoenix Iron works P-1090 or South Bay Foundry SBF-1900(Domestic) or equal and be installed in accordance with Construction Detail 4000.

Where a sewer manhole is constructed in a location to remain unpaved, the frame shall be constructed in accordance with Standard Detail 4050.

- F. CLEANOUTS:** Back of sidewalk cleanouts shall be constructed in accordance with Construction Detail 6020.
- G. CONDUCTOR PIPE:** Pipe used as a conductor pipe under a highway or railroad shall be welded steel pipe. Any protective lining and coating shall be as shown on the plans or specified in the Special Provisions.

Welded steel pipe shall be manufactured of steel meeting the requirements of ASTM Designation A245, Commercial Grade. The method by which the pipe is manufactured shall comply with one or more of ASTM Specifications: A-134, A-135, A-139 or A-211. The pipe shall be welded by either the electric-resistance or electric-fusion process, with either spiral seam welded joint or straight seam welded joint. All joints shall be butt welded.

- H.** When the conductor pipe is to be installed by boring and jacking, the wall thickness shall be 1/4 inch for sizes up to and including 24 inches in diameter, and 5/16 inch for sizes greater than 24 inches in diameter, unless otherwise specified.

CS17-03. INSTALLATION:

- A. SANITARY SEWER MAINS:** All sanitary sewer pipe installations shall be accomplished as specified herein except where modified by the requirements specific to the various types of pipeline materials as specified under Section CS17-02. PVC pipe shall be installed per manufacturer's recommendation and ASTM specifications or as otherwise directed by the City Engineer.

All sewer pipe shall be laid with a minimum of 12 inches vertical clearance from mainlines and 6 inches of clearance from all other improvements and utilities, unless otherwise approved by the City Engineer. Refer to the pipe cover requirements in Section 6 of the Design Standards for minimum cover requirements. Water and sewer lines shall meet minimum vertical and horizontal separation requirements as stipulated by the California State Department of Health Services under Section 64630, Title 22, of the California Administrative Code. Where the horizontal separation between sewer and water lines is less than 10 feet or where a sewer line crosses over the top of a water line, special requirements shall apply for the type of pipe used and the location of the joints.

All pipe shall be laid to conform to the prescribed line and grade as shown on the plans and each pipe length checked to the grade line which the Contractor establishes from the grade stakes.

The grade line shall be established before any pipe is laid in the trench. For pipes with slopes greater than 1%, the string line set for trenching purposes may be used as the grade line. For pipes with slope less than 1%, either: (1) a grade line shall be established in the bottom of the trench such that the top of each bell will touch the line when the pipe has been properly positioned or, (2) a grade line shall be established above the trench on firmly secured batter boards from which the grade of each pipe can be checked by using a grade pole.

Alternate use of commercial laser grade setting systems in lieu of string lines specified herein are acceptable when the following requirements and conditions are met:

1. The contractor shall have the responsibility of providing an instrument operator who is qualified and trained in the operation of the laser and said operator must adhere to the provisions of the State of California Construction Safety Orders issued by the Division of Industrial Safety. Attention is particularly directed to Sections 1516, 1800 and 1801 of said Orders for applicable requirements.
2. All laser control points shall be established bench marks or construction off-set stakes identified on cut sheets and set in the field for the work. Laser set up points shall be these control points or points directly from them by instrument.

Each length of pipe shall be laid “downstream” to “upstream” on compacted, approved bedding material as specified and shall have full bearing for its entire length between bell holes excavated in said bedding material to allow for unobstructed assembly of all bell and spigot joints. “Stabbing”, “Swinging In” or “Popping On” spigot ends of pipe into bell ends will not be permitted. After jointing is accomplished, all annular spaces between pipe and bell holes shall be packed with bedding material, taking care not to damage, move or lift the pipe from its bedding support.

Adjustments of pipe to line and grade shall be made by scraping away or filling in and tamping approved material under the body of the pipe. No wedging or blocking to support the pipe will be permitted.

A sewer line, unless otherwise approved by the City Engineer, shall be laid, without break, upgrade from point of connection to existing sewer and with the bell end forward or upgrade. Pipe shall not be laid when the City Engineer determines that the condition of the trench or the weather is unsuitable.

Sewer pipes, branches, stubs, or other open ends which are not to be immediately connected, shall be plugged or capped with a standard watertight plug or cap, as approved by the City Engineer for use in the particular installation. The plug or cap shall be placed on a standard end.

Pipe entering or leaving manholes or other structures shall have joints within 2-1/2 feet of the manhole base.

In all cases, flexibility of joints in or at the manhole base shall be preserved to prevent damage to the pipe by differential settlement.

All sewer line connections to manholes, trunk sewers, main sewers or side sewers shall be left uncovered until after the inspection has been made. After the approval of the connection, the trench shall be backfilled as specified. The City Engineer may require special pipe to be laid in areas that are potentially unstable or subject to settlement.

If the sewer is to be laid in an area that is to be filled, and the cover prior to filling is less than 5 feet, the pipe shall not be laid until the area has been filled to a level 5 feet above the proposed pipe and compacted to 90% relative compaction, unless otherwise authorized by the City Engineer.

- B. **LATERALS:**** Service sewers shall be installed as detailed on Construction Detail 6030 and at the locations shown on the contract plans. Unless otherwise specified, they shall be 4 inches in diameter, of the same material as the sewer to which they connect, and constructed to the property line or easement. A regularly manufactured “Y” fitting shall be used in the lateral sewer for each sewer and shall be inclined upwards at a minimum angle of 10 degrees from the horizontal. The ends of all service sewers shall be securely sealed by stoppers in such a manner that the stoppers can be removed for extending the line without damage to the pipe. All sewer service connections after capping shall have a 4" x 4" stake installed above the cap to at least one foot above finish grade behind the back of walk. The 4" x 4" stake shall be painted green to indicate a sewer service. Unless otherwise noted on the plans, the depth of cover of the sewer service at the easement or property line shall be 5 feet to 5 feet 6 inches below existing ground or edge of adjacent roadway, whichever is at the lower elevation.

Service sewers entering a manhole shall be set with the invert of the service sewer level with the crown of the outgoing pipe.

When a service sewer is to be connected to an existing lateral or trunk sewer, the Contractor shall make the tap into the existing sewer under the direct supervision of the City Engineer. Notice shall be given at least 48 hours in advance of the proposed time of the tap.

1. CONNECTIONS TO MAINS IN STREETS: All service sewers are to be constructed perpendicular to the street centerline, radially to manholes in cul-de-sacs and radially to the street centerline on curved sections of streets.
2. CONNECTIONS TO MAINS IN EASEMENTS: Service sewers are to be constructed perpendicular to the main to at least the easement line; a cleanout must be provided at the first point of deflection.

Unless otherwise noted on the plans, sewer service cleanouts shall be provided for all service sewers as per Construction Detail 6020. The cleanout will generally be within three feet of the back of the sidewalk or at the easement line if the service is located within a side or back of lot easement and shall not typically be located in the driveway. A concrete box shall be set to finish grade of the property. If the cleanout must be located in the driveway, a traffic rated box shall be placed. The cleanout and service shall be of like material and diameter.

In improved areas, the location of each service shall be permanently indicated by inscribing the letter "S" in the top of curb directly above the line when the service is perpendicular to the street centerline. The curb mark shall be placed at the same time the service is installed to ensure proper location.

Whenever lateral lines are to be installed as part of the contract for the construction of the sewer main, the use of saddles will not be permitted.

That portion of the lateral line to be placed under an existing curb and gutter and/or sidewalk shall be done by boring or cutting and replacing the existing curb and gutter and/or sidewalk. Sidewalk, curb and gutter shall be sawcut at the nearest score mark or deep joint.

C. MANHOLES:

1. MANHOLE CONSTRUCTION: All manholes shall be excavated and backfilled in conformance with the requirements of Section 19-3 of the State Specifications and installed as specified herein. All embedment materials under, around and at least 3 inches over all pipelines located within 5 feet of structure bases shall be compacted without jetting prior to barrel section placements. All manholes shall be constructed to subgrade prior to jetting adjoining sewer pipeline trench and/or structure backfill where such method of compaction is permitted and used.
2. All joint surfaces of precast barrel and cone sections and face of manhole base shall be thoroughly cleaned prior to setting precast sections. The various sections shall be set in preformed plastic sealing gaskets of

material conforming to the requirements of FEDERAL SPECIFICATION SS-S-00210.

3. **INSTALLATION OF GASKETS:** Apply one coat of primer to clean, dry joint surface (both tongue and groove) and allow to dry. Remove the paper wrapper from one side only of the two-piece wrapper on the gasket. The outside paper will protect the gasket and assure against stretching. Before setting the manhole section in the trench, attach the plastic gasket strips end-to-end to the tongue or groove of each joint, forming a continuous gasket around the entire circumference of the manhole joint.

Handling of barrel sections after the plastic gasket has been affixed shall be carefully controlled to avoid bumping the gasket and thus displacing it or contaminating it with dirt or other foreign material. Any gaskets so disturbed shall be removed and replaced if damaged and repositioned if displaced.

Care shall be taken to properly align the manhole section with the previously set section before it is lowered into position.

During cold or wet weather, pass direct heat over the concrete joint surface lightly until ice, frost and moisture are removed and surface to be primed is dry and warm immediately before application of primer. Direct heat shall also be passed over plastic gasket strips immediately prior to attaching them to joint surfaces and immediately prior to insertion of tongue and groove.

Precast concrete bases shall be required when SDR 26 PVC pipes are used. Cast-in-place concrete bases shall be 4,000 psi, 28 day concrete with 1-1/2" maximum size aggregate. It shall rest on firm, undisturbed soil and shall be of the dimensions shown on the Construction Details. The cast-in-place portion shall not be higher than 6 inches above the outside tops of the main incoming and outgoing pipes. Rebar, as required, shall be placed in the bottoms and sides of the cast portion, subject to inspection by the City Engineer. Minimum and maximum wall thickness for the cast-in-place sections shall conform to the following table:

Manhole Diameter	Minimum Wall Thickness	Maximum Wall Thickness
48 inches	5 inches	7 inches
60 inches	6 inches	8 inches
72 inches	7 inches	9 inches

Where the sewer lines pass through manholes, the pipe shall be laid continuously as a whole pipe. After the manhole base and precast sections have been placed and sufficient time has elapsed to allow all concrete and grout to set, the top half of the pipe within the manhole shall be carefully cut off and the sides mortared. All channels so formed shall be checked with a template and shall form a smooth flowing channel at all flow depths.

Temporary covers of 3/8 inch steel plate of sufficient size to adequately cover the opening shall be placed on the cone until the base is complete and the manhole casting shall then be installed. Suitably located ribs shall be welded to the underside of the cover to hold it in place during any grading operations.

The throat of the manhole shall be made of precast concrete rings of the proper inside diameter. The minimum depth of throat permitted shall be one 3 inch ring between the cone and the frame. The maximum depth permitted shall be 18 inches of rings between the cone and frame.

Connections to existing manholes shall be made by carefully breaking out an opening in the wall of the manhole, inserting the end of the pipe through the opening, and packing the opening around the pipe with a stiff mix of cement mortar thoroughly compacted. The mortar shall be composed of one part Type II Portland Cement and three parts clean sand. All connections shall be watertight.

Before any work is started on adjusting or repairing a manhole, the channels in the base shall be covered with strips of wood and the entire base covered with a heavy piece of canvas. This cover shall be kept in place during all work. Upon completion of the work, the wood strips and the canvas shall be removed from the manhole allowing no debris to fall or remain in the manhole.

- D. DROP CONNECTIONS EXISTING MANHOLES:** Drop sewer connections shall conform to Construction Details 6000 and 6010 of these specifications unless otherwise detailed on the plans.

- E. ADJUSTING MANHOLES TO GRADE:** The contractor shall adjust manholes and cleanouts to grade or elevation as indicated on the plans and as directed by the City Engineer. Adjustment may be made by utilization of precast grade rings or by a cast-in-place ring, in accordance with these specification.

When adjusting the manhole frame and cover to grade, the frame shall be wired to a 2"x4" piece of wood of sufficient length to span the excavation, and the throat

completed to the right level. Whenever the space between the bottom of the frame and the top of a ring is less than 3 inches, the void may be filled with concrete, poured against a suitable form on the side of the structure.

When adjusting an existing manhole to grade and the total depth of the throat from the top of the frame to the bottom of the throat exceeds 24 inch, the upper portion of the manhole shall be removed to the first full-size manhole section. The upper portion shall then be reconstructed as outlined above.

- F. CLEANOUTS:** Cleanouts shall be constructed as shown on Construction Detail 6020 of these specifications.

- G. INSPECTION:** The City Engineer shall at all times have access to the work during its construction, and the contractor shall provide proper and safe facilities for such access and inspection. The City Engineer shall be furnished with every reasonable facility for ascertaining that the materials and the workmanship are in accordance with the requirements and intentions of these specifications. All work done and all materials furnished shall be subject to his inspection and approval.

The work shall be done under the supervision and to the complete satisfaction of the City and in accordance with the laws of the State of California.

The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill his contract as prescribed, and defective work shall be made good and unsuitable materials may be rejected, notwithstanding that such defective work and materials have been previously overlooked by the City Engineer and accepted or estimated for payment. See the General Provisions for details.

The Contractor, shall, at any time when requested, submit to the City Engineer properly authenticated documents or other satisfactory proof as to his compliance with the requirements of these Specifications.

- H. TESTING OF SEWER LINES:** All leakage tests shall be completed and approved after backfilling and prior to placing of permanent surfacing. All tests shall be performed at the expense of the Contractor. A test may be performed which enables the Contractor to determine the acceptability of the line prior to backfill.
 - 1. **CLEANING AND FLUSHING:** Prior to performing a leakage test, the pipe installation shall be thoroughly cleaned. Cleaning shall be performed by the Contractor by means of an inflatable rubber ball. The ball shall be of a size that will fit snugly into the pipe to be flushed. The ball shall be placed in the last cleanout or manhole on the pipe to be cleaned, and water introduced behind it. The ball shall pass through the pipe with only the

pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole where its presence is noted. If any wedged debris or damaged pipe shall stop the ball, the Contractor shall remove the obstruction. When a new sewer is connected to an existing line, cleaning and flushing shall be carried out to the first existing manhole downstream from the point of connection.

2. PVC DEFLECTION TEST: PVC pipe shall be tested consistent with ASTM standards. After the PVC pipe is installed, cleaned and ready to be air tested, according to these specifications, the pipe deflection shall be checked by means of a deflection mandrel, in the presence of the City Engineer. A rigid mandrel, with a circular cross section having a diameter, as indicated by the following table, shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall be equal to the nominal inside diameter of the pipe.

Nominal Average Diameter (Inches)	Average Inside Diameter (Inches)	Base Inside Diameter (Inches)	7.% Deflection Mandrel Diameter (Inches)
8	7.891	7.665	7.09
10	9.864	9.563	8.84

From the Uni-bell Plastic Pipe Association Handbook of PVC Pipe, Third Printing - May 1979.

Any section of PVC pipe that does not permit passage of the deflection mandrel will not be accepted, and said section shall be properly repaired and replaced, and remandrelled, as directed by the City Engineer. All other testing shall be performed as required in these specifications for sanitary sewer pipe. If, because of the additional required testing, any section of PVC has to be repaired or replaced, that section shall be remandrelled again as directed by the City Engineer. The additional deflection test shall be performed not sooner than 30 days after completion of densification and backfill.

3. MANHOLE VACUUM AIR TEST: Low-Pressure Air Testing of sanitary sewer systems shall include the Contractor air testing manholes in accordance with provisions of A.S.T.M. C1244-02, "Standard Test Method for Concrete Sewer Manholes by Negative Air Pressure (Vacuum) Test Prior to Backfill."

LOW-PRESSURE AIR TEST: After completing backfill of a section of sewer line, the Contractor shall at his expense, conduct a Line Acceptance Test using low-pressure air. The test shall be performed using the equipment listed below, according to stated procedures and under the supervision of the City Engineer. All test results shall be logged and submitted to the City Engineer, prior to placement of permanent surfacing.

a. EQUIPMENT: Equipment used shall meet the following minimum requirements:

- i. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
- ii. Pneumatic plugs shall resist internal test pressures without requiring external bracing and blocking.
- iii. All air used shall pass through a single control panel.
- iv. Three individual hoses shall be used for the following connections.
 - a) From control panel to pneumatic plugs for inflation.
 - b) From control panel to sealed line for introducing the low pressure air.
 - c) From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

b. PROCEDURE: At least two minutes shall be allowed for the air pressure to stabilize.

After the stabilization period (3.5 psig minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed “acceptable” if the time required in minutes for the pressure to decrease from 3.5 to 2.5 9 pounds per square inch, gage (psig) is not less than the time shown for the given diameters in the following table:

Pipe Diameter in Inches	Seconds
4	122

6	184
8	245
110	306
12	367
15	460

For larger diameter pipe use the following formula:

$$\text{Min. time in seconds} = 30.6 \times \text{pipe diameter in inches}$$

When the prevailing groundwater is above the sewer being tested, air pressure shall be increased 0.43 psi for each foot the water table is above the flow line of the sewer.

If the time for the pressure to drop 0.5 psi is 125 percent or less of the time given in the table, the line shall immediately be repressurized to 3.0 psi and the test repeated.

For 6" and 8" pipe: If, during the 5 minute saturation period, pressure drops less than 0.5 psi after the initial pressurization and air is not added, the section undergoing test shall be "acceptable".

If the test is not passed, the leak shall be found and repaired to the satisfaction of the City Engineer and the length of repaired line retested.

House sewer laterals shall be considered part of the main to which they are connected and no adjustment of test time shall be allowed to compensate for the smaller diameter of the laterals.

The pressure gauge used shall be supplied by the contractor and certified to have been calibrated within six months of the test.

If the installation fails to meet this requirement, the Contractor shall, at his/her own expense, determine the source of leakage. He/she shall then repair or replace all defective materials and/or workmanship and perform the air test as many times as necessary to achieve an acceptable test.

- c. SAFETY: The air test may be dangerous if, because of ignorance or carelessness, a line is improperly prepared. It is extremely

important that the various plugs be installed and braced in such a way as to prevent blowouts. Since a force of 250 lbs. is exerted on an 8 inch plug by an internal pipe pressure of 5 psi, it should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous.

As a safety precaution, pressurizing equipment should include a regulator set at 10 psi to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the manholes during testing. If the test is not passed in two trials, the leak shall be located and repaired to the satisfaction of the City Engineer and the line shall be retested at the Contractor's expense.

The pressure gage used shall be supplied by the Contractor and shall have minimum divisions of 0.10 psi, and shall have an accuracy of 0.04 psi. Accuracy and calibration of the gauge shall be certified by a reliable testing firm.

4. T.V. INSPECTION: Prior to acceptance of any sanitary sewer line by the City, said line shall be inspected internally by television as outlined below at the contractor's expense. Also, not less than 11 months after acceptance, prior to expiration of the one year warranty period, and during periods of highest groundwater (usually February through April), sewer mains and laterals shall be ball and flushed and TV retested. Contractor shall submit DVD disk and logs to the City after implementing any repairs required of retest.

Defects such as high and low spots, joint separations, offset joints, chipped ends, cracked or damaged pipe, infiltration points and debris in lines shall be corrected by the contractor at his expense. For joint separations, low spots and chipped ends, the following maximum acceptable limits will apply for eight and ten inch pipes:

Joint separations -	1/2"
Low spots -	1" max. depth
Chipped ends -	1/4"

- a. The complete job is ready for television inspection when the following work has been completed:
 - i. All sewer pipelines are installed and backfilled.
 - ii. All structures are in place, all channeling is complete and pipelines are accessible from structures.

- iii. All other underground facilities, utility piping and conduits are installed.
 - iv. Final street subgrading is complete and ready for asphaltic concrete surfacing.
 - v. Pipelines to be inspected have been preliminarily balled and flushed or cleaned with a high pressure cleaner.
 - vi. All other tests have been performed and deficiencies remedied.
- b. When the above work is complete, the Contractor shall arrange for the television inspection.
 - c. The Contractor of the project will notify the City in writing as to the scheduled date of the television inspections.
 - d. After conditions i through vi as outlined above are met, the entire job will be initially televised and recorded. The DVD disk and reports shall be delivered to the City.
 - e. DVD disk video recording shall be color format and the audio and video portions shall be free of electrical interference and excessive background noise.
 - f. The audio report shall be recorded by the operating technician on the DVD disk as they are being produced and shall include the location of the sewer, the names or numbers of the manholes involved, the direction of travel and a description of all lateral locations and conditions in the sewerline as they are encountered and their locations.
 - g. In addition to the audio report, a written report shall be required listing all the information required in the audio report.
 - h. The Contractor will be notified in writing of any deficiencies revealed by the television inspection that will require repair. If corrective work is indicated and the Contractor wishes to view DVD disk recording, he shall contact the City to set a time for viewing with the City Engineer.
 - i. Corrective work shall be done. The cost shall be borne by the Contractor.

- j. Those portions of the pipeline system that have been corrected must be retelevised and recorded and the DVD disks and reports delivered to the City.
- k. The procedure outlined in conditions “A” through “G” above will be repeated until all deficiencies observed by television inspection have been corrected to the complete satisfaction of the City.
- l. All DVD disk recordings and reports become the property of the City to be used as “As-Built” for future reference.

CS17-04. PAYMENT:

- A. PIPE:** Payment for sanitary sewer pipe complete in place shall be per lineal foot measured from the center of manhole to center of manhole following a line parallel to the grade of the sewer. Payment shall include the furnishing of all labor, materials, water, tools and equipment required to construct and complete in an efficient and workmanlike manner the excavation, bedding, backfill, furnishing and laying of pipe, dewatering, testing and all other work necessary to construct the sewer system in accordance with the plans and these specifications.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

- B. STRUCTURES AND MANHOLES:** The unit of measure for payment shall be per each unit. Payment shall be made at the bid price per item for each structure complete in place and shall be the average price for manholes of all depths and types indicated on the plans and in the Proposal. Payment shall include the cost of excavation, backfill, frames, covers, plates or reinforcing steel where required.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

- C. DROP CONNECTIONS:** The Contractor shall bid a unit price per each for constructing inside drop connections at existing manholes, which shall include excavation and all labor and equipment necessary for completion of the drop connection in accordance with the plans.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

- D. MANHOLE ADJUSTMENT:** Payment for adjusting manholes shall conform to Section 15-2.05A of the State Specifications, except that the unit price bid shall include all necessary excavation and backfill and that the unit price shall be the average of all depths and limits of adjustment required.
- E. CLEANOUTS:** The unit bid price for cleanouts shall include excavation, pipe precast concrete items, cast iron frame and cover, concrete backfill, and all other labor, equipment and materials necessary for completion of the cleanout in accordance with the plans and these specifications.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

- F. SERVICE SEWERS:** The unit bid price for service sewers shall include the furnishing of materials necessary for construction of the services and all labor and materials necessary to excavate the trench, connect to existing manholes or lateral sewer, bed, place and joint the pipe and fitting, backfill the trench, inscribe the letter "S" on the curb, install the cleanout and all other work necessary to produce a complete installation in accordance with the Construction Details and specifications. The unit price bid shall be the average price for service sewers of all lengths as indicated on the plans and in the Proposal.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

CONSTRUCTION SPECIFICATIONS

SECTION 18 - STORM DRAIN SYSTEM

CS18-01. ITEM: The Contractor shall furnish all labor, materials, tools and equipment to construct and complete in an efficient and workmanlike manner the installation of the storm drainage system in accordance with the approved plans, these specifications and the Construction Details.

CS18-02. MATERIALS: The source and supply of materials shall be approved by the City Engineer. A certification of compliance with the requirements of these specifications must be furnished by the pipe manufacturer to the City Engineer prior to the Contractor commencing construction.

A. **STORM DRAIN PIPE:** Storm drainage pipe shall conform to the requirements listed below:

1. **REINFORCED CONCRETE PIPE (RCP):**

SPECIFICATION: Reinforced concrete pipe shall conform to the specification of ASTM Designation C76, per latest revision. The class of pipe will be specified on the contract plans. Reinforcing shall be as specified in ASTM Designation C76. Portland cement used in the manufacture of reinforced concrete pipe shall conform to the requirements of the specifications for Type II Portland Cement, ASTM Designation C150.

JOINTS FOR REINFORCED CONCRETE PIPE: Joints shall be tongue and groove, bell and spigot, or other approved type as shown on the contract plans or specified in the Special Provisions. Each joint shall be sealed to prevent leakage. Sealing materials shall consist of either cement mortar, rubber gasketed joints, or resilient materials as shown on the plans and shall conform to Section 65-1.06A, 65-1.06B, and 65-1.06C of the State Specifications. Joints sealed with cement mortar or resilient materials shall be sealed both inside and outside.

If cement mortar is used in sealing the joint, the sealed joint shall be constructed, protected and cured in a manner approved by the City Engineer.

2. **CAST-IN-PLACE CONCRETE PIPE:** (may only be used with prior approval of the City Engineer, and submittal/ approval of a detailed soils investigation prior to approval of any improvement plans):

SPECIFICATION: Cast-in-place concrete pipe shall conform to the applicable portions of Section 63 of the State Standards.

The pipe shall be constructed of Class A Concrete and shall conform to the requirements of Class A Concrete of Section 90, entitled "Portland Cement Concrete" of the State of California, Standard Specifications, except as herein modified.

Concrete mixes shall be designed on the basis of the concrete attaining a strength at 28 days of at least 4000 P.S.I. During pouring, the Contractor shall prepare 2 standard 6" X 12" test cylinders for each 75 cubic yards or portions thereof poured each day. Casting, handling and curing of all cylinders shall be in accordance with ASTM Designation C-31. One of the two cylinders shall be tested at the end of seven days and one at the end of 28 days in accordance with ASTM Designation C-31. Cylinders shall be tested for strength by a recognized testing laboratory at the Contractor's expense and the test results shall be submitted to the City Engineer. Aggregate size shall not be more than 1/3 of the minimum pipe wall thickness.

Slump shall not exceed 3 inches as determined by the slump cone method of ASTM Designation C-143 or an equivalent slump as determined by Test Method California #533, unless otherwise permitted by the City Engineer.

JOINTS: Construction joints may be formed by either of the two following methods:

- a. The joint shall be formed at about 45 degrees from the vertical. On all such joints, after cleaning, wetting, and freeing of all laitance, loose or defective concrete, coatings of foreign material shall be removed to assure a good bond.
- b. After squaring off the end of the pipe, an excavation shall be performed along the sides and bottom of the joint of such size as to permit the placing of a concrete collar around the outside of the joint. This collar shall have a minimum thickness at the joint of 1-1/4 times the wall thickness of the pipe and shall lap the joint by at least 2 times the wall thickness.

3. **CORRUGATED METAL PIPE:** (CMP - may only be used with prior approval by the City Engineer)

SPECIFICATION: Corrugated metal pipe shall conform to Section 66 of the Standard Specifications. Each specific installation of the Standard

Specifications must be approved by the City Engineer. CMP shall not be permitted in the street right-of-way.

JOINTS: Joints shall conform to the "positive" classification unless otherwise specified.

4. NON-REINFORCED CONCRETE PIPE (CP - may only be used with prior approval by the City Engineer):

SPECIFICATION: Non-reinforced concrete pipe shall conform to specifications of ASTM designation C-14 per latest revision. The class of pipe shall be Class III, unless otherwise specified on the contract plans. Non-reinforced concrete pipe shall not be allowed in street right-of-ways.

JOINTS FOR NON-REINFORCED CONCRETE PIPE (CP): Joints shall be as specified in Reinforced Concrete Pipe, Section SS18-02.A of these Specifications.

- B. MANHOLES: The Contractor shall construct the various sizes and types of concrete manholes as indicated on the plans and in accordance with the Standard Specifications.

1. CONCRETE MANHOLES:

SPECIFICATION: Manholes shall consist of cylindrical sections, all with joints and base construction as detailed on Construction Details 4010, 4020, 4030 and 4500. Precast manhole barrels, risers, cones, flat tops, and grade rings shall conform to ASTM Designation C478 with the additional requirement that the cement used shall be Type II. Manhole sections shall be manufactured without provision for steps. Manhole bases shall be cast-in-place. Stubs or couplings provided in precast bases shall be of the same material as the pipe to which they connect unless otherwise approved by the City Engineer.

CONES: Standard concentric cones conforming to ASTM Designation C478 shall be used on all manholes shown on the contract plans unless otherwise specified.

JOINTS: Joints in precast manhole barrels shall be made with mortar or with preformed plastic sealing gaskets conforming to Federal Specifications SS-S-00210 and installed as recommended by the manufacturer. All joint surfaces shall be thoroughly cleaned prior to placing the sealing compound or mortar. Interior of manhole shaft shall have all joints filled and mortared smooth.

FRAMES AND COVERS: Manhole frames and covers shall conform to Construction Detail 4000 unless otherwise stated on the plans or in the Special Provisions. Frames and covers shall be set 1/4" below the pavement finish grade unless otherwise herein specified or otherwise stated on the contract plans or in the Special Provisions.

2. SADDLE MANHOLES: Saddle manholes shall be constructed in accordance with Construction Detail 4030 and Section CS18-02 of these Specifications.
3. DRAIN INLET: Drain inlet types shall conform to Construction Details 4510 through 4570. The concrete box portion of the drain inlet shall be cast to the proper grade in a maximum of two placements of concrete. No provisions for steps shall be made in the drain inlet.
4. HEADWALLS, WINGWALLS, ENDWALLS, AND RAILINGS: All headwalls, wingwalls, and endwalls shall be of 4,000 psi reinforced Portland Cement Concrete constructed in accordance with the plans and Section 51 of the State Specifications. Temporary bank protection shall be provided by sack concrete rip-rap in accordance with Section 72 of the State Specifications.
5. DRAINAGE PUMP STATIONS: Drainage pump stations shall be allowed on a case-by-case basis with specific approval of the City Engineer.
6. GROUTING AND BANDING: All pipe installation and pipeline construction shall be in accordance with the manufacturer's specification for the particular pipe and fitting material.

CS18-03. INSTALLATION:

- A. CONCRETE PIPE: Concrete pipe shall be laid without break upgrade from structure to structure. The first pipe laid shall be bedded to establish line and grade. Where joints are tongue and groove, the groove should be carefully washed with a wet brush and buttered with mortar. The tongue of the second pipe is then fitted into the groove end of the first pipe until the mortar is squeezed out onto the inner and outer surfaces. The inner surface of the pipe at the joint is then brushed smooth with a long handled brush to present a contour matching the inner barrel of the pipe and then a band of mortar at least 4 inches in width and three-quarters 3/4 inch in depth at the joint line shall be placed around the entire outside circumference of the pipe.

The external band shall then be protected by covering with a water proof building paper securely held in place.

External banding and internal pointing up shall stay a sufficiently long distance behind the pipe laying so that mortar joints will not be disturbed by the laying of the pipe.

All pipe shall be laid on a firm, flat surface that is free of depressions or irregularities and that is true to line and grade. Allowable deviation in profile shall be 0.05 foot per foot lineal for all diameters of drainage pipe. Pipe shall not be laid when the condition of the trench or the weather is unsuitable, at the discretion of the City Engineer. The pipe shall have continuous bearing throughout its length and no blocking up or wedging shall be permitted.

Immediately after the laying of each joint of pipe, trench bedding and backfill material per Section 7, "Trench Bedding and Backfill" of these Specifications, shall be placed on each side of the middle of the length of pipe and firmly packed around the lower portion of the pipe to firmly block it from moving when the next length of pipe is laid.

- B. CAST-IN-PLACE CONCRETE PIPE (may only be used with prior approval by the City Engineer) : Cast-in-place concrete pipe (CIPCP) shall consist of Portland Cement Concrete placed in a prepared trench at the locations shown on the plans, as specified in these specifications and in accordance with any special provisions. The pipe shall be constructed with equipment specially designed for constructing cast-in-place concrete pipe. The Contractor may be required to furnish evidence of recent successful operation of the equipment proposed to be used. Equipment not acceptable to the City Engineer or not suitable to produce the quality of work as herein specified will not be permitted to operate on the work.
1. EXCAVATION: The trench shall be neatly excavated with vertical sides and semicircular bottom to the grades specified in the plans. Rate of departure from and return to established grade and the invert of the installed pipe shall not exceed 1 inch per 10 lineal feet with a maximum allowable departure of 1-1/2 inch. Rates for alignment shall not exceed 2 inches per 10 lineal feet with a maximum allowable alignment departure of 4 inches. The bottom of the trench, hereinafter known as the trench form, will be shaped to provide full, firm, and uniform support by undisturbed earth or compacted fill for at least the bottom 210 degrees of the pipe.

Excavated trench shall be checked for compliance with requirements for grade and alignment prior to placement of concrete. The Contractor shall

submit proposed method of grade and alignment control and checking of same for conformance with Specifications to the City Engineer, for approval prior to start of work. The Contractor shall supply manpower, equipment and materials, as are required to provide and confirm compliance with grade and alignment requirements.

2. **PLACEMENT:** The concrete shall be placed around the full circumference of the pipe in one operation by means of fixed forms and traveling forms. The internal fixed forms shall be of sufficient strength to withstand the vibrating or tamping of concrete. At the time of concrete placement, all soil in the trench will be adequately moistened so that water is not drawn from the freshly placed concrete. However, the trench form will be completely free of water, mud and debris. All forming devices, including the slipforms and hopper of the placement device, shall be thoroughly moistened. The trench shall be free from running water. Should water be encountered, proper dewatering procedures shall be utilized.

Concrete shall not be placed when temperature of the concrete exceeds 90 degrees F or is less than 50 degrees F. The soil adjacent to the trench shall be at a temperature above freezing.

The pipe shall be constructed in one placement, the entire cross section being placed monolithically. Inside forms shall be sufficiently rigid to withstand consolidation of the fresh concrete. Placement shall be such as to produce a homogeneous concrete mixture conforming to the test requirements of this specification. Effective consolidation means shall be applied to the fresh concrete over the entire circumference and from within the pipe shell. Consolidation means shall be capable of effectively placing and consolidating fresh concrete at production speeds. Methods of consolidating shall be capable of building up sufficient pressure to effectively bond the concrete to the surrounding earth and to keep loose sand, mud, and water out of the pipe shell.

Under no circumstance will the Contractor be allowed to continue the pipe installation if the vibrators of the cast-in-place machine are inoperable. Portable vibrators or "stingers" shall only be used to supplement internal vibrators on the machine and not as a sole source to consolidate and distribute the concrete mix.

The contractor shall make provisions for removing sloughed material, debris and any foreign objects from trench before and during placement of concrete such that buildup of material does not occur ahead of the machine.

3. **STOPPAGE JOINTS:** When pipe placement stops in excess of ninety (90) minutes, a construction joint shall be formed. The ends of the pipe that are to be in butt contact shall be left in rough condition. Number 4 reinforcing bars shall be embedded 12 inches minimum in the previous pour and 12 inches into the next pour and shall be placed 12 inches on center for pipe 42 inches in diameter or less and shall be placed 18 inches on center for pipe diameters in excess of 42 inches.

Immediately before resuming concrete placement, the surfaces to be bonded shall be cleaned of all laitance, coatings, foreign materials, and loose or defective concrete, and thoroughly wetted.

It is essential that concrete placement be done in a smooth and steady manner with as few starts and stops as possible. The contractor shall schedule materials and operate the pipe machine at speeds and in a manner that will achieve this.

The Contractor shall provide an anchoring system for pull of the machine in a manner which will provide the least probability of causing deviations in grade and/or alignment.

4. **PIPE DIMENSIONS AND TOLERANCES:**

- a. The internal diameter of the pipe at any point shall not be less than 95 percent of the nominal diameter, and the average of any four measurements of the internal diameter made at intervals equal to pipe diameter, shall not be less than the nominal diameter.
- b. The minimum wall thickness for the various sizes of pipe shall conform to the following table:

Internal Diameter (Inches)	Minimum Wall Thickness (Inches)
30 or less	3
36	3-1/2
42	4
48	5
54	5-1/2

60	6
66	6-1/2
72	7
78	7-1/2
84	8
96	9
120	12

- c. Offsets at form laps and horizontal edges shall not exceed the limits specified in the following table:

Internal Diameter (Inches)	Minimum Wall Thickness (Inches)
42 or less	1/2
48-66	5/8
72-84	7/8
96+	1

All form strut bearing plates shall be removed and any indentations exceeding 1/8 inch left in the concrete from such plates shall be cleaned, filled with mortar, and carefully troweled and cured.

5. CURING: Polyethylene film complying with ASTM C-171 shall be placed on the exposed top surface of the pipe immediately after the pipe is cast. The film should be immediately covered with a minimum of 3 inches of moist loose soil to hold the film in place and to protect the pipe. The trench backfill shall not commence until the pipe attains 2500 psi compressive strength. The pipe shall be checked for compliance with grade and alignment and thickness requirements prior to placement of backfill.

A humid atmosphere within the pipe, as evidenced by condensation on the interior surface, shall be maintained for at least seven (7) days following placement, except for a maximum period of 24 hours which is allowed for removing forms and making all repairs. To prevent air drafts which may

dry the pipe and to maintain a humid atmosphere inside the pipe, all openings (ends, manholes, connector pipes) shall be kept closed or securely covered at all times except when actual work on the inside of the pipe is in progress. The pipe shall also be partially filled with water during the curing period, to allow higher humidity, when actual work is not being performed on the inside of the pipe.

6. REPAIR: Immediately after removal of the forms, the inside of the pipeline will be inspected for required repairs and conformance with all dimensional requirements including alignment and grade.

The Contractor shall schedule his work force, by extended, staggered or multiple shifts, as required, to provide for dropping of forms within 2 to 6 hours of placement of concrete and start of repairing, patching and finishing of pipeline to conform with specification requirements. In no event shall work commence later than 24 hours from placement.

All rock pockets, cracks less than 0.01 inches or indentations shall be cleaned, moistened and filled with 1:2 cement grout, epoxy material, rubberized mastic or other material approved by the Engineer.

Cracks exceeding 0.01 inches in width may be cause for rejection and removal and replacement of that portion of the pipe. Subject to the approval of the Engineer, cracks exceeding these limits may be repaired using a pressure applied epoxy compound capable of providing structural correction to the area in addition to sealing the void.

7. FINISHING: Except for the form offsets, the interior surface of the pipe shall be equivalent to or better than a wood float finish. Form offsets shall be trimmed so as to provide a reasonable tapered slope from surface to surface. The bottom of the pipe below the metal forms shall be finished in a workmanlike manner and shall conform to the general circular circumference of the pipe without sags, dips and humps. All extraneous concrete shall be removed from the interior surface.
8. TESTS: Random tests shall be made of the wall thickness at the top, bottom and sides, approximately every 100 feet, on a daily basis by probes through fresh concrete or small holes drilled through the concrete. Holes shall be properly and permanently closed and sealed, flush with the inside surface of the pipe, after measurements are made.

Test cylinders shall be prepared and tested as per Section 90 of the State Standard Specifications. If the cylinder tests indicate that the concrete does not meet the specified strength requirements, cores shall be taken

from the same section of concrete represented by the faulty test cylinder under the supervision of the Engineer. The concrete should be at least 14 days old before the core specimens are taken. The diameter of the core specimens for the determination of compressive strength should be at least 3 times the maximum nominal size of the coarse aggregate used.

The length of the specimen, when capped, should be twice the core diameter. A core having a maximum height of less than 95 percent of its diameter before capping or a height less than its diameter after capping shall not be tested.

9. INSPECTION: An inspector of cast-in-place concrete pipe under the direct supervision of a Registered Civil Engineer experienced in the manufacture and placement of CIPCP shall be required at the expense of the Contractor for continuous inspection of the construction of the pipe. The inspection shall be certified in writing and signed by the Inspector and the Registered Civil Engineer. The certification to be done on a daily basis of operation shall include, as a minimum, the following:
 - a. Review of trench and adjacent soil conditions and test results.
 - b. Report on method of operation and compliance with these specifications.
 - c. Report on concrete mix design used, transit method and machinery, and slump as poured.
 - d. Report on visual appearance of the pipe as poured for smoothness, rock pockets, if any, and alignment and grade.
 - e. Report on curing method.
 - f. Report on method and timing of backfill.
 - g. Review of concrete test results and adequacy of the finished product.
10. CONNECTIONS: Pipe connections to drainage manholes shall be made so that the pipe is flush with the inside face of the manhole. Mortar shall be used to seal and smooth the joints.
11. CAST PORTION: The Contractor shall cast the lower portion of drainage manholes in place. Minimum and maximum wall thickness for the cast-in-place sections shall conform to the following table in accordance

with Section 90 of the State Standard Specifications.

Manhole Diameter (Inches)	Minimum Wall Thickness (Inches)	Maximum Wall Thickness (Inches)
48	5	7
60	6	8
72	7	9

Inside diameters of cast-in-place portions shall equal the diameter of the manhole specified. Standard precast manhole riser sections and/or cones shall be placed above the cast-in-place section to bring the manhole rim to grade.

12. **CAST-IN-PLACE GRADE ADJUSTMENT:** Grade adjustment may be made by utilization of precast grade rings or, in new subdivisions only, by a cast-in-place ring. The latter shall have a minimum horizontal thickness of 4 inches and a maximum of 15 inches. The concrete pour shall not extend above the top of the base flange of the manhole frame. The minimum height of the ring shall be 3 inches and the maximum 12 inches. The manhole frame is to be set 14 inches below pavement finish grade.

CS18-04. TESTING OF STORM DRAINS: Testing of storm drains, if required by the City Engineer, shall be conducted after backfilling has been completed. If the testing is required, the following test shall be performed:

1. The line shall be plugged at the lower manhole and the section to be tested shall be plugged at the upstream manhole on all lines coming onto the manhole. Water shall then be introduced into the lower manhole to a depth 3 feet above the top of the pipe. The water shall be introduced into the line at least 4 hours in advance of the test to allow the pipe to become saturated. The water shall then be brought to the 3 feet mark above the top of the pipe in the lower manhole and the amount of water measured that is lost in a 4-hour test period. The leakage shall not exceed 20 gallons per diameter inch per 1000 feet of pipe for the 4-hour test period.

Test sections showing leakage in excess of that allowed shall be repaired or reconstructed as necessary to reduce the leakage to that specified. Method of repair shall be at the discretion of the City Engineer.

2. **T.V. INSPECTION:** Prior to acceptance of any storm drain line by the City, said line shall be inspected internally by television as outlined below at the contractor's expense.

Contractor shall submit DVD disk and logs to the City after implementing any repairs required of retest.

Defects such as high and low spots, joint separations, offset joints, chipped ends, cracked or damaged pipe, infiltration points and debris in lines shall be corrected by the contractor at his expense.

- a. The complete job is ready for television inspection when the following work has been completed:
 - i. All storm drain pipelines are installed and backfilled.
 - ii. All structures are in place, all channeling is complete and pipelines are accessible from structures.
 - iii. Final street subgrading is complete and ready for asphaltic concrete surfacing.
 - iv. Pipelines to be inspected have been preliminarily flushed or cleaned with a high pressure cleaner.
 - v. All other tests have been performed and deficiencies remedied.
- b. When the above work is complete, the Contractor shall arrange for the television inspection.
- c. The Contractor of the project will notify the City in writing as to the scheduled date of the television inspections.
- d. After conditions i through v as outlined above are met, the entire job will be initially televised and recorded. The DVD disk and reports shall be delivered to the City.
- e. DVD disk video recording shall be color format and the audio and video portions shall be free of electrical interference and excessive background noise.
- f. The audio report shall be recorded by the operating technician on the DVD disk as they are being produced and shall include the location of the sewer, the names or numbers of the manholes involved, the direction of travel and a description of all lateral locations and conditions in the storm drains as they are encountered and their locations.

- g. In addition to the audio report, a written report shall be required listing all the information required in the audio report.
- h. The Contractor will be notified in writing of any deficiencies revealed by the television inspection that will require repair. If corrective work is indicated and the Contractor wishes to view DVD disk recording, he shall contact the City to set a time for viewing with the City Engineer.
- i. Corrective work shall be done. The cost shall be borne by the Contractor.
- j. Those portions of the pipeline system that have been corrected must be retelevised and recorded and the DVD disks and reports delivered to the City.
- k. The procedure outlined in conditions "A" through "G" above will be repeated until all deficiencies observed by television inspection have been corrected to the complete satisfaction of the City.
- l. All DVD disk recordings and reports become the property of the City to be used as "As-Builts" for future reference.

CS18-05. PAYMENT:

- A. PIPE: Payment for storm drain pipe shall be at a price per lineal foot from center of manhole to center of manhole or catch basin or from center of manhole to wall of outlet structure as the case may be. Measurement shall be along a line parallel to the grade of the storm drain.

Payment shall include full compensation for excavation, bedding, backfill, furnishing and laying of pipe, de-watering, testing, and all other work necessary to construct and complete in an efficient and workmanlike manner the installation of storm drain pipe in accordance with the contract plans and these specifications.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

- B. MANHOLES:

- 1. CONCRETE MANHOLES: The contract unit price paid for reinforced concrete manholes shall include excavation, backfill and all labor, equipment and material necessary for completion of the structure in

accordance with the contract drawings and specifications. The unit price bid shall be the average price for manholes of all depths and types indicated on the plans and in the Proposal.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

2. SADDLE MANHOLES: The contract unit price paid for saddle manholes shall include excavation and all labor, equipment and material necessary for completion of the structure in accordance with the drawings and the specifications. The unit price bid shall be the average price for manholes of all depths as indicated in the plans and in the Proposal.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

3. FRAMES AND COVERS: The cost of furnishing and placing manhole frames and covers shall be included in the contract unit price bid for manholes and/or other items of work.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

- C. DRAIN INLETS: Under the appropriate item(s) of the Proposal, the Contractor shall bid a price per each for constructing the respective types of drainage inlets as indicated in the plans and the Proposal. The price bid per drainage inlet shall include all excavation, materials and labor to place the complete unit as set forth on the plans and specifications. The unit price bid shall be the average price for drainage inlets of all depths for the type indicated in the Proposal.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

- D. INLET AND OUTLET STRUCTURES: Under the appropriate item(s) of the Proposal, the Contractor shall bid a price each for construction of inlet structures and outlet structures. The price bid each for construction of inlet and outlet structures with racks shall include full compensation for all materials, labor, and equipment, to place the unit, complete, as shown on the plans and in the specifications. The unit price bid shall be the average for all sizes and types of rack shown on the plans.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

CONSTRUCTION SPECIFICATIONS

SECTION 19 - TRAFFIC STRIPE REMOVAL

CS19-01. ITEM: Under this item of the Proposal, the Contractor shall remove traffic striping. Stripes of widths other than 4" shall be converted to an equivalent length of 4" stripe for determination of quantities. Traffic stripe shall be defined as paint, thermoplastic, buttons, reflectors or any other striping material.

CS19-02. SPECIFICATION: Traffic stripe removal shall conform to Section 15-2.02B of the State Specifications and the following requirements.

Traffic stripe shall be removed by sandblasting or approved grinding methods. Pavement legends shall be ground into blocks, removing no more than 1/4" of asphalt depth, leaving no trace of legend. The block shall then be sealed with one coat of seal coat material in the shape of the block with neat edges.

Where buttons or reflectors are removed, the divot left by the removal of asphalt shall be filled with bituminous material and leveled off with the top of pavement leaving no bump, divot or excess materials.

CS19-03. PAYMENT: The unit price bid shall be per lineal foot for linear stripes, square foot for legends and per button for buttons and reflectors. Price bid for removal shall include full compensation for all material, tools, labor, traffic control and equipment to remove the striping and treat the surface as specified herein.

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CONSTRUCTION SPECIFICATIONS

SECTION 20 - STREET NAME SIGNS

CS20-01. ITEM: The work shall consist of furnishing and installing street name signs at locations shown on the contract plans or where directed by the Engineer.

CS20-02. SPECIFICATION:

- A PANELS:** Panels shall be made of 0.125" thick aluminum with 1-1/4" rounded corners, DG3 (diamond grade) reflective sheeting, and green EC reverse cut foreground. Street name sign panels shall be 9" x 30" minimum with 6" upper-case and 4.5" lower-case HWY GOTHIC MOD C style with 1/2" stroke width. No block numbers, arrows, or pictographs shall be allowed on signs. North, South, East, and West streets shall be abbreviated with an upper-case corresponding abbreviation followed by a period. Streets that are named after a letter of the alphabet shall have the direction spelled out using the criteria above, and no period shall be placed following the letter of the street. Abbreviations for street type classifications shall conform to the following:

Avenue	Ave
Boulevard	Blvd
Circle	Cir
Court	Ct
Drive	Dr
Lane	Ln
Parkway	Pkwy
Place	Pl
Road	Rd
Street	St
Way	Way

- B MOUNTING HARDWARE:** Street name signs shall be mounted to the top of sign poles. Street name signs shall be attached to street light poles using arm bracket and crosspiece as needed. Assembly shall be mounted to the light pole using adjustable electrolier mounting bands. Mounting hardware shall be approved by City Engineer prior to installation.

Street name signs shall be mounted as shown on Construction Detail 3240.

CS20-03. PAYMENT: The unit price or lump sum bid for the installation of signs shall include full compensation for all material, tools, labor, and equipment to install the signs as specified herein.

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CONSTRUCTION SPECIFICATIONS

SECTION 21 - TRAFFIC SIGNS

CS21-01. ITEM: The protection and maintenance of existing signs and the removal, protection, storage, and resetting of City of Dixon traffic signs that are affected by the work shall be the responsibility of the Contractor, as directed by the City Engineer or as specified in the Special Provisions.

CS21-02. SPECIFICATION: Signs shall be erected pursuant to the provisions of Section 56-2 of the State Specifications, unless otherwise modified by the City Engineer or in the Special Provisions. The Contractor shall furnish and install signs as shown on the contract plans. All signs shall be in conformance with the Manual on Uniform Traffic Control Devices with California Supplement; size and materials must be approved by the City Engineer if not shown on the contract plans.

- A. METAL POLES:** All metal pipe poles shall be minimum 2" nominal size, galvanized iron, Schedule 40, conforming to the provisions of A.S.T.M. A120 (standard installation).
- B. WOOD POSTS:** All wood posts shall be minimum 4" x 4", nominal size, and shall be construction grade pressure treated redwood, all-heart (special approval required).
- C. SIGNS:** All street signs shall be high intensity fully reflective sheeting on .080" min. aluminum plates.
- D. MOUNTING HARDWARE:** Signs shall be attached to sign poles using single clamp-on u-brackets. Signs shall be attached to street light poles using adjustable electrolier mounting sets.
- E. BACK BRACING:** Back bracing is required for all signs larger than 18" x 24" or where identified by the City Engineer.

Signs shall be mounted as specified in Construction Detail 3220.

CS21-03. CONSTRUCTION SIGNS: The Contractor shall furnish and install construction signs in accordance with the contract plans and the Manual on Uniform Traffic Control Devices with California Supplement of Traffic Controls. If required by the City Engineer, a Traffic Control Plan (TCP) shall be provided to the City and approved by the City Engineer prior to installation of construction signs or beginning of construction work within the City street right-of-way.

CS21-04. PAYMENT: The unit price bid for the installation of signs shall include full

compensation for all material, tools, labor, and equipment to install the signs as specified herein. The cost of furnishing and installing construction signs and preparation of the Traffic Control Plan (TCP) shall be considered to be included in payment for other items of work, unless a specific pay item is included in the proposal.

CONSTRUCTION SPECIFICATIONS

SECTION 22 - GUIDE MARKERS

CS22-01. ITEM: This item shall consist of furnishing and installing markers and delineators at the locations shown on the contract plans or where directed by the City Engineer.

CS22-02. SPECIFICATION: Guide markers shall conform to the applicable portions of Section 82 of the State Standards for markers and delineators and the following:

Flexible posts shall be used. Flexible posts shall be made from a flexible white plastic which shall be resistant to impact, ultraviolet light, ozone and hydrocarbons. Flexible posts shall resist stiffening with age and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability.

Each marker shall have a reflector consisting of a 3" x 18" (minimum) strip of silver reflective sheeting.

Posts may be driven in place where soil conditions permit, provided the method of driving does not damage the posts. If ground conditions are such that the posts cannot be driven without damaging them, pilot holes may be drilled or the posts may be reinforced with a one foot minimum length of metal drive post attached at the bottom to facilitate driving. The standard length shall be 4 feet above ground with two feet in the ground.

CS22-03. PAYMENT: The unit price bid for the installation of signs shall include full compensation for all material, tools, labor, and equipment to install the sign as specified herein.

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CONSTRUCTION SPECIFICATIONS

SECTION 23 - ELECTRICAL

CS23-01. GENERAL: The electrical work to be done consists of furnishing all labor, materials, transportation, tools, equipment and appurtenances required for the complete installation of all electrical systems shown on the Plans, and as specified in these Specifications, the Special Provisions, Section 86 of the State Specifications, the National Electric Code (NEC) and the International Municipal Signal Association (IMSA).

All equipment, materials and supplies shall be new and of current manufacture unless otherwise specified. All equipment shall be complete and in operation to the satisfaction of the City Engineer at the time of acceptance of the work.

All incidental parts which are not shown on the Plans or specified herein and which are necessary to complete the traffic signal and street lighting systems shall be furnished and installed as though such parts were shown on the Plans or specified herein.

CS23-02. RULES AND REGULATIONS: Electrical equipment furnished shall conform to the standards of the National Electrical Manufacturers Association, the Underwriters' Laboratories, Inc., or the Electronic Industries Association, wherever applicable. All material and work shall conform, where applicable, to the requirements of the National Electrical Code; Title 8, California Administrative Code, Electrical Safety Orders; Rules for Over Head Electrical Line Construction, General Order No. 95 of the Public Utilities Commission; Standards of the American Society for Testing and Materials (ASTM); American National Standards Institute (ANSI); and City of Dixon ordinances governing such types of construction.

CS23-03. MAINTAINING EXISTING ELECTRICAL FACILITIES: All existing electroliers shall be maintained in operation until replacement electroliers are energized, as directed by the City Engineer.

All traffic signal heads and pedestrian signal heads installed but not operational shall be entirely covered with burlap and securely tied to prevent exposure of signal head face to vehicular or pedestrian traffic.

Where the modification of existing traffic signal intersections may require the temporary shutdown of traffic signals, the contractor shall take all steps necessary to keep traffic signal intersection downtime to a minimum. The work shall be scheduled so that the downtime of each intersection shall be four (4) hours maximum and shall occur between the hours of 9:00 a.m. and 3:00 p.m. The Contractor shall notify the City Engineer five (5) working days prior to any planned traffic signal intersection shutdowns.

CS23-04. FOUNDATIONS: Foundations for posts, standards, pedestals, and other appurtenances shall be Class 'A' Portland cement concrete conforming to Section 90 of the State Standard Specifications.

Foundations for standards shall be poured monolithically. The bottom of the standard shall be one to two inches above the top of the foundation. Grout shall be placed from the top of the foundation to the bottom of the standard. The exposed portion of the foundation shall be formed to present a neat appearance. Tops of foundations for posts and standards, except special foundation, shall be finished to curb or sidewalk grade as shown on the Plan or as directed by the City Engineer.

When a foundation is to be abandoned in place, the top of foundation, anchor bolts and conduits shall be removed to a depth of six inches (6") below the surface of sidewalk or unimproved ground. The resulting hole shall be backfilled with material equivalent to the surrounding material.

There shall be no greater than a 4:1 slope of native material within 5 feet of a signal controller/ service pad. A retaining curb or masonry block wall may be required by the City Engineer to achieve the required slope.

CS23-05. EXCAVATING AND BACKFILLING: The excavations required for the installation of conduit, foundations, and other appurtenances shall be performed in such a manner as to cause the least possible injury to the streets, sidewalks and other improvements. All lawns or improvements disturbed in excavating shall be replaced or reconstructed with the same kind of material as found on the work or with materials of equal quality. The trenches shall not be excavated wider than necessary for the proper installation of the electrical appurtenances and foundations. Excavating shall not be performed until immediately before installation of conduit and other appliances.

The material from the excavation shall be placed in a position that will not cause damage or obstruction to vehicular and pedestrian traffic nor interfere with surface drainage.

Permission to cut or disturb the pavement in any street must be obtained from the City Engineer. The removal of existing pavement and concrete walks or driveways shall be by sawing the edges of the areas to be removed to a minimum depth of one and one-half inches (1 1/2") and digging out the old pavement or concrete. Whenever a part of a square or slab of existing concrete sidewalk or driveway is broken or damaged, the entire square or slab shall be removed and replaced.

Backfill material shall be placed in six inch (6") layers. Each layer of backfill shall be moistened and thoroughly tamped, tolled or otherwise compacted until the relative compaction is not less than ninety-five percent (95%). Compacting of backfill material by pounding or jetting will not be permitted.

Immediately following the completion of backfill at each location where pavement was cut, the

Contractor shall place the necessary temporary surfacing and follow up with the permanent paving at the expense of the Contractor. The reconstruction of the concrete walks and driveways shall be as specified in these Specifications. The type of concrete used and its color shall match the adjacent concrete construction. The cost of said concrete work will be at the expense of the Contractor. Concrete sidewalks shall have a minimum thickness of four inches (4") and the minimum thickness of concrete driveways shall be six inches (6").

All surplus excavated material shall be removed and disposed of within forty-eight (48) hours by the Contractor. All sidewalks and gutters shall be swept clean.

CS23-06. CONDUITS: Conduits shall be either mild steel, rigid, hot dipped galvanized or Schedule 40 polyvinyl chloride (PVC). PVC conduit shall not be concrete encased.

A. Requirements for Mild Steel, Rigid Conduit: The rigid steel conduit shall be thoroughly cleaned and all burrs removed. The use of thin-wall conduit is specifically prohibited for underground installation.

Exterior and interior surfaces of all conduit and fittings shall be uniformly and adequately zinc coated by the hot-dipped galvanizing process. The interior and exterior of a six inch (6") sample cut from the center of a standard length of conduit when tested, shall not show a fixed deposit of copper after four, one-minute immersions in the standard copper sulfate solution.

The interior of the conduit shall have a continuous coating of lacquer or enamel. Each length shall bear the label of Underwriters' Laboratories, Inc. Installation shall conform to appropriate articles of the Code.

Rigid steel conduits shall be not less than one and one-half inches (1-1/2") in diameter. Contractors, at their own expense and discretion, may be allowed to use larger size conduit, upon request. Where larger size conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing couplings shall be permitted in any run. All conduit bends, except factory bends, shall have a radius of not less than six (6) times the inside diameter of the conduit. Where factory bends are not used, conduit shall be bent, with approved hydraulic bender, without crimping or flattening, using the longest radius practicable. All conduit ends shall be sealed with a slip on cap until wiring is started. When caps are removed, conduit ends shall be provided with approved conduit bushings.

Conduit stubs, caps, exposed threads and all standard screw joints shall be painted with zinc rich paint or an equal rust preventative paint.

All mild steel, rigid conduits, where exposed to a corrosive environment, must be OCAI. All conduit openings whether used or spare must be identified and sealed with duct seal.

- B. Requirements for Schedule 40 Polyvinyl Chloride Conduit: Polyvinyl Chloride conduit (PVC) shall be ninety degrees (90°) C rated and listed by Underwriters' Laboratories. Conduit shall conform to NEMA Standards and be in conformance with Article 347 of the National Electrical Code. Conduit, fittings and cement shall be produced by the same manufacturer, who shall have at least five (5) years experience manufacturing the product. Material shall have a minimum tensile strength of 7,000 psi at 73.4° F; flexural strength of at least 11,000 psi and a minimum compressive strength of 8,600 psi. All joints shall be solvent welded in accordance with the manufacturer's recommendations.

All PVC conduits shall be not less than one and one-half inches (1-1/2") in diameter. Contractors, at their own expense and discretion, may be allowed to use larger size conduit, upon request. Where larger size conduit is used, it shall be for the entire length of the run. All conduit ends shall be sealed with a slip on cap until wiring is started. The slip on cap shall have a slot large enough for a pull rope. Unless otherwise specified, all PVC conduits shall contain one No. 10 green ground conductor.

- C. Requirements for Conduit Installation: The installation of conduit in lawn areas shall be by approved boring method or by trenching. If trenching is used, Contractor shall first remove the sod prior to trenching. The removal of sod over jack holes or over trenches shall be done by a sod cutting machine. Removal of sod by other means shall not be accepted. Each strip of sod removed shall be rolled into a neat roll without damage. All sod removed shall be replaced within forty- eight (48) hours. The installation of conduits in paved streets shall be by approved jacking, drilling or trenching methods.

When installed under sidewalk, conduit shall be laid to a depth of not less than eighteen inches (18") below sidewalk grade. In all other areas, conduit shall be laid to a depth of not less than twenty-four inches (24") below the finished grade.

Conduit runs to be located under street pavement shall be installed within a minimum of twelve inches (12") and a maximum of eighteen inches (18") from and parallel to the lip of gutter, by using the "Trenching Installation of Conduit in Paved Streets" method. Installation of additional conduits at street intersections may be required, at the discretion of the City Engineer, to support known and potential future telecom requirements. All pull boxes shall be located behind sidewalks unless otherwise noted on the Plans.

When a conduit is shown on the Plans as lying in a straight line parallel to the curb line, sidewalk, or pavement edge, it shall not deviate more than six inches (6") to either side of that parallel line.

In order to verify that conduit is laid to the correct depth and in as straight a line as possible, the Contractor shall, as the minimum, leave conduit exposed at a spacing of not over seventy-five feet (75') and no such exposure shall be backfilled until approved by the City Engineer.

The bending of PVC conduit shall be by a hot box bender, and in lieu of jacking or boring, PVC conduit shall be installed by the drill rod method in which a drill rod is first installed and the PVC is pulled into the cavity made by the drilling rod as the rod is removed. At locations where conduit is not installed by the said trenching method, the conduit shall be installed by the drill rod method.

Before any wire is pulled in the conduit system, all conduit shall be swabbed out to remove any foreign material that is in the conduit. The removal of foreign material from the conduit with compressed air is acceptable.

Conduit entering controller or service cabinets shall be sealed to prevent the entrance of gases by the use of paraffin or other sealing compound approved by the City Engineer.

Five inch (5") conduit nipples shall be attached by use of a coupling to any conduit run which terminates inside signal standards. Top of nipple shall be two inches (2") above the finished grade of the signal standard foundation.

- D. Trenching Installation of Conduit in Paved Streets: Conduit shall be placed under existing pavement in a trench approximately two inches (2") wider than the outside diameter of the conduit to be installed. Trench shall not exceed six inches (6") in width. Conduit depth shall not generally exceed twelve inches (12") or conduit trade diameter plus ten inches (10"), whichever is greater, except that at pull boxes the trench may be hand dug to a required depth. The top of the installed conduit shall be a minimum of nine inches (9") below finish grade.

The outline of all areas of pavement to be removed shall be cut to a minimum depth of three inches (3") with an abrasive type saw or with a rock cutting excavator specifically designed for this purpose. Cuts shall be neat and true with no shatter outside the removal area.

The trenching machine shall be shielded to prevent loose material from being thrown away from the machine. Loose material deposited on the pavement behind the cutting machine shall be removed from the pavement immediately and the pavement cleared to allow the passage of traffic. Only those traffic lanes occupied by the cutting machine and the cleanup operation shall be closed and they shall be opened as soon as the work has moved sufficiently to clear them.

The conduit shall be placed in the bottom of the trench and the trench shall be backfilled with commercial quality concrete containing not less than 564 pounds of Portland cement per cubic yard to not less than 0.10 foot below the pavement surface. The concrete shall be tamped or vibrated to provide a dense material free from excessive voids and rock pockets.

The top 0.10 foot shall be backfilled with asphalt concrete produced from commercial

quality paving asphalt and aggregates, and approved by the City Engineer.

Spreading and compacting of asphalt concrete shall be performed by any method which will produce an asphalt concrete surfacing of uniform smoothness, texture, and density.

Excavation, installation of conduit and concrete backfill shall be completed within the same working day. Asphalt concrete backfill shall be completed within twenty-four (24) hours after excavation off trench.

Upon completion of all contract work, the trenches cut through existing pavement will be inspected and, if found necessary by the City Engineer, they will be brought to grade with an appropriate asphaltic concrete mix. In addition to bringing the trenches to grade, the City Engineer may require a twelve inch (12") wide seal coat centered over the trench pavement or between the trench pavement.

CS23-07. PULL BOXES: Pull boxes shall be installed behind the sidewalk at the locations shown on the Plans, or at locations designated by the City Engineer at site of work. As a minimum, pull boxes shall be located where two or more conduits intersect, at critical angle points, street crossings, and adjacent to the bases of all street lights poles. The distance between pull boxes shall not exceed 175 feet. Contractor may, at own expense, install such additional pull boxes as may be desired to facilitate the work.

For signal systems, or combined signal and low voltage lighting systems, reinforced concrete covers shall be inscribed 'Traffic Signals' and for lighting systems, reinforced concrete covers shall be inscribed 'Street Lighting'. ('High Voltage' where applicable). If pull boxes are set in an area subject to vehicle traffic load they shall have a steel cover of suitable design to withstand such loads. The lid inscriptions shall be in conformance with Caltrans Standard Plan ES-8.

The bottom of all concrete boxes shall be left open and at least twelve inches (12") of crushed rock shall be placed below the box for drainage as shown on Plans or as directed by the City Engineer. The crushed rock shall be installed prior to the installation of the conductors.

Unless otherwise noted on the plans, all pull boxes containing three or less street lighting conduits shall be Caltrans Standard No. 3-1/2 size. A Caltrans Standard No. 5 pull box shall be used for all pull boxes containing either traffic signal conduit or four or more conduits, unless otherwise noted on the plans.

Pull box extension shall be furnished and installed where called for on the Plan. Where a pull box extension is to be installed over the ends of existing conduits, the conduit ends shall be raised or lowered so they will be a minimum of five inches (5") and a maximum of seven inches (7") below the underside of the pull box cover.

Pull boxes shall not be placed in curb ramp areas unless directed by the City Engineer.

CS23-08. CONDUCTORS: Unless otherwise specified, conductors shall be single conductor, solid or stranded copper of the gauge shown on the Plans. Wire sizes shall be based on American Wire Gauge (AWG). Copper wire shall conform to the applicable portions of ASTM Designations B3 and B8. Contractor shall use color coded wires, using a different color for each circuit with continuous color maintained throughout each circuit. Color coding shall be as required by the City Engineer or as detailed on the Plans or Special Provisions. Where permitted by the City Engineer, conductor of the same color may be used on different circuits. These conductors shall be identified with approved tags.

Traffic signal and multiple circuit lighting conductors shall be rated for 600 volt operation. Unless otherwise specified, the insulation for the conductors shall be Type THW or Type THWN.

CS23-09. WIRING: Pulling wires shall be done with special care to preclude injury to the insulation. Hand power only shall be employed in pulling wire. A UL or ETL listed inert lubricant shall be used in placing conductors in conduit.

Wires shall not be drawn into underground conduit until standards have been delivered and ready for erection.

Ends of spare conductors shall be taped and water sealed with Scotch Kote or approved equivalent.

All splices shall be Method B.

Field fuses shall be installed in the handhole of the standard. All ungrounded conductors shall be fused.

CS23-10. BONDING AND GROUNDING: All metal conduit systems, standards, pedestals, ballast and transformer cases, service equipment, anchor bolts, etc., shall be made mechanically and electrically secure to form a continuous system and shall be effectively grounded. Grounding shall be in accordance with all applicable codes and regulations. Bonding and grounding jumpers shall be copper wire or copper strap with a minimum cross sectional area equivalent to a No. 8 AWG.

Splices in ground wires shall be made with UL or ETL approved compression connectors.

Bonding wire or strap shall be secured to the lower section of metal standard by brass or bronze bolts three-sixteenths inch (3/16") or larger.

In conduit systems where rigid steel conduit and PVC conduits are mixed, the following requirements apply.

1. The rigid steel conduit shall have an approved grounding bushing installed at the conduit end(s).

2. The grounding conductors in the PVC conduit shall be attached to a grounding bushing which shall be attached to the rigid steel conduit.

If there is no rigid steel conduit, the grounding conductors must be attached to the 5/8" x 8' cooper ground rod.

CS23-11. ELECTRIC SERVICE: The locations of service points shown on the Plans are approximate only. Contractor shall coordinate to determine the precise locations from PG&E. Service conduits, service conductors, service grounds, metering and transformer pads where required shall be installed in accordance with PG&E requirements. Service equipment and enclosure shall be furnished and installed as detailed on the Plans or specified in the Special Provisions.

The service enclosure shall be Type IIIAF per the latest edition of the State of California Standard Plans Detail for Type III-A Series. For street lighting, a separate breaker shall be supplied for each circuit plus one spare. An internal twist-lock type PEU shall be installed with a plexiglass window on the side of the enclosure. A test switch shall be installed. For Traffic signals a separate breaker shall be installed for internally illuminated street name signs.

CS23-12. PANELBOARDS: Panelboards shall be as called for on the Plans. Each circuit breaker shall be permanently marked with its trip rating. Multipole breakers shall be common trip with a single handle. Unless otherwise specified, each circuit breaker shall be equipped with a device for padlocking the breaker in the 'on' or 'off' position. Panelboards shall be equipped with copper bus bars with sizes based on a current carrying capacity of not over one thousand (1,000) amperes per square inch of cross section.

Unless otherwise specified, enclosures of panel board shall be Anodized Aluminum.

CS23-13. STANDARDS: The locations of standards for traffic signals and street lights shown on the Plan are approximate only. The exact location of each standard will be determined by the Engineer prior to installation.

Each standard shall be anchored to the concrete foundation by galvanized steel anchor bolts, nuts, leveling nuts and washers in accordance with the Plans and the standards shall be installed in a true vertical position.

CS23-14. FIELD TEST: Prior to acceptance of the work, the Contractor shall test the following:

- A. For continuity of each circuit.
- B. For grounds in each circuit.

- C. A megger test on each circuit. For traffic signal loops there must be a minimum of 200 meg. Ohms at 500 volts for one minute.
- D. A functional test.
- E. Unoccupied and occupied frequency of the loop must fall within the vehicle detectors maximum sensitivity range.

CS23-15. TRAFFIC SIGNAL TESTING AND ACTIVATION: Prior to the initial traffic signal activation, the Contractor shall perform the following functional tests in the presence of the City Engineer representative:

- A. All vehicular and pedestrian indications shall individually be turned on momentarily and proper operation and phasing shall be checked.
- B. The controller shall be turned on with the vehicle and pedestrian indications turned off, all pedestrian pushbuttons and inductive loop detectors shall be checked for proper operation and phasing.
- C. All vehicular and pedestrian signal heads shall be properly adjusted and covered.

If any system component or circuit does not operate properly, it shall be repaired and retested prior to traffic signal intersection turn on. After the successful completion of all tests, the Contractor shall request through the City Engineer, a time and date for turn on.

Traffic signal intersection turn on may occur only between the hours of 9:00 a.m. and 2:00 p.m. on Monday, Tuesday, Wednesday or Thursday on a week with no scheduled holidays. The Contractor shall give the Engineer at least five (5) working days notice prior to the traffic signal intersection turn on.

The intersection turn on date shall be subject to the approval of the City Engineer. Contractor shall arrange to have a signal technician qualified to work on the controller and employed by the controller manufacturer or authorized representative present at the time of traffic signal intersection turn on.

In addition, Contractor shall provide sufficient personnel and equipment for the timely completion of the traffic signal intersection turn on. If in the opinion of the City Engineer the Contractor has not provided sufficient personnel and equipment, the City Engineer, may postpone the traffic signal turn on until such time as sufficient personnel and equipment are provided.

CS23-16. TRAFFIC SIGNAL CONTROLLER FUNCTIONAL TEST: A functional test shall be made on the new controller after installation. Contractor shall schedule the test upon the approval of the City Engineer.

Prior to the functional test, Contractor shall first verify that all equipment as shown on the Plans or called for under these specifications are installed and operable.

The functional test shall not begin on a Friday or on the day preceding a legal holiday. The test shall be made between 9:00 a.m. and 2:00 p.m. by the Contractor in conjunction with the service engineer of the controller manufacturer in the presence of the City Engineer and Traffic Signal Maintenance Section representatives.

Included as part of the functional test is the continuous satisfactory operation of the signal system for a period of not less than five (5) working days. During the five (5) day test period, the Contractor and the authorized service engineer of the controller manufacturer shall be available at the job site within four (4) hours after notification to correct any malfunction which might develop in the signal system or the controller.

CS23-17. INSPECTION: In order to facilitate inspection by the City Engineer, Contractor must observe the following procedure:

- A. Prior to final electrical inspection, Contractor must ascertain that:
 - 1. All standards are tightly secured.
 - 2. All standards are true.
 - 3. All standards are grounded with copper ground wire or strap with brass bolts and washers.
 - 4. All conduit studs are bonded.
 - 5. All exposed threads are painted.
 - 6. All splices are taped and insulated in accordance with these Specifications.
 - 7. Circuits are tagged with metal tags where required.
- B. Concrete pull box covers shall be protected during construction. Damaged covers shall be replaced with new covers by the Contractor.

CS23-18. SALVAGE: All salvageable material and equipment removed from present installation which are not to be re-installed shall be delivered to the Municipal Service Center at 385 East Chestnut Street, Dixon, California.

The Contractor shall remove all signal heads, mounting brackets, luminaires, mast arms and appurtenances from all salvaged traffic signal and street lighting standards prior to delivery to the Municipal Service Center.

The Contractor shall provide for the safe transfer with no damage to the salvaged equipment. Any equipment broken or lost by the Contractor shall be replaced with equipment of equal quality at the expense of the Contractor.

CS23-19. LED SIGNAL INDICATIONS: Unless otherwise indicated, all new red, yellow, and green traffic signal indications and all pedestrian indications shall be the light emitting diode type and shall conform to the most recent specification of the State of California Department of Transportation. All purchases shall be from vendors and models listed on the Caltrans Qualified Product List, or approved equal.

CS23-20. EMERGENCY VEHICLE PREEMPTION (EVP): Emergency Vehicle Preemption equipment shall be 3M Opticom or approved equal.

Preemption cables shall be labeled in the following manner:

Phase 2&5	single gray band
Phase 4&7	double gray band
Phase 1&6	triple gray band
Phase 3&8	quadruple gray band

Labels shall consist of banded colored tape visible at the preemption detector, signal standard handhole, adjacent pull box and the controller cabinet. Cables in the controller cabinet shall have tie wrap labels with appropriate phasing descriptions.

CS23-21. VEHICLE SIGNAL FACES: All signal faces shall be aluminum, powder coated dark olive green with flat black door. Visors shall be 12" black aluminum tunnel type, powder coated black inside and out. Mountings for MAT and MAS signal sections shall be bronze metal, powder coated dark olive green.

CS23-22. SIGNAL SECTIONS: All signal sections shall be 12" mold-cast aluminum.

CS23-23. BACKPLATES: All vehicle signal sections shall have aluminum backplates with perforated louvers, flat black on both sides.

CS23-24. PEDESTRIAN SIGNAL FACES: Pedestrian signal faces shall be aluminum Type "A" with international symbols. Pedestrian head mounts shall be clam shell type with bronze mounting hardware, powder coated green/ black. All wiring shall be quick connect type (plug-in).

Pedestrian heads shall be mounted on the intersection side of the signal pole unless otherwise directed by the City Engineer.

Pedestrian signal mounts shall be made from galvanized steel pipe and fittings with bronze terminal compartment, powder coated dark olive green.

CS23-25. SIGNAL MOUNTING ASSEMBLIES: Terminal compartments (TV and SV) and mast arm slip fitters (MAS and MAT) shall be made from galvanized steel pipe and fittings with bronze terminal compartment, powder coated dark olive green.

CS23-26. PEDESTRIAN PUSH BUTTON: The pedestrian push button housing and signage shall meet ADA specifications for color and texture signage shall be black lettering on yellow background. The pedestrian push button shall meet ADA and Caltrans specifications. The push button housing shall be aluminum, adjustable to fit, and powder coated dark olive green. Pedestrian push buttons should be located no more than five feet (5') from the curb ramp.

CS23-27. VEHICLE DETECTOR MATERIALS: Loop wire shall be Type 1, RHW-USE, neoprene jacketed, cross-linked polyethylene insulated, #12 stranded copper.

Lead-in cable shall be Type B copper. Tinned copper shall not be permitted.

Vehicle detector handholes shall be Type A.

Front detector loops shall be Type D loops per State Standard Plan ES-5B.

CS23-28. VEHICLE DETECTOR INSTALLATION: All loop locations shall be verified by the City Engineer.

All loop wires shall be labeled with banded colored tape visible in the pull boxes.

Detector lead-in cables shall be clearly marked at both ends with input address by means of plastic tie-wrap labels.

Loop home run slots shall be double cut to accommodate the twisted pair (3-turns/foot), or as directed by the City Engineer. Sealant for filling slots shall be Hot Melt Rubberized Asphaltic Sealant or equivalent as approved by the City Engineer. All excess sealant shall be removed by squeegee after application

All loop wires shall terminate in the nearest pull box, not the handhole.

Detector Lead-in cables shall not be spliced between the termination point (the pull box adjacent to the loop detectors) and the controller cabinet terminals.

CS23-29. STREETLIGHT LUMINAIRES: Streetlight luminaires shall meet the following specifications unless otherwise approved:

1. Semi-cutoff, Type II or Type III lighting distribution.

2. Multi-voltage ballast (120/208/240/277) with lag type magnetic regulator.
3. Power door ballast assembly and plu-in starter.
4. Photocell receptacle (with shorting cap if applicable)
5. Glass lens.
6. Polyester fiber gasket breathing seal.
7. Voltage tap connection.

CS23-30. PHOTOELECTRIC CONTROLS: Photoelectric controls shall be twist-lock type, Type II, mounted either pole-top or in the electrical service pedestal as shown on the plans.

The Contractor shall supply all equipment, supplies, and material required for mounting the photoelectric cell.

A single photoelectric cell shall energize each circuit. If pole-mounted, the photoelectric cell shall be on top of the first pole in the circuit.

CS23-31. PAYMENT: The unit price bid for Electrical items of work shall include full compensation for all material, tools, labor, and equipment to install all Electrical work as specified herein.

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CONSTRUCTION SPECIFICATIONS

SECTION 24 - IRRIGATION AND LANDSCAPING

CS24-01. LANDSCAPING: Landscape planting shall consist of soil preparation, planting landscape materials and maintaining landscaping throughout a ninety day maintenance period unless otherwise specified, as specified on approved project plans and specifications, in these Specifications, Special Provisions and as directed by the City Engineer/ Public Works Director.

The Contractor shall be responsible to survey and become familiar with work site and all existing underground utilities, pipes and structures. Contractor shall take responsibility for all cost incurred due to damage of said utilities.

Contractor shall not willfully proceed with landscape construction as designed when it is obvious that unknown obstructions and/or rough grade differences exist that are beyond the scope of his responsibility. Upon acceptance of the site, the landscape contractor shall be responsible to complete improvements and install finish grades in accordance with project plans, specifications and special provisions.

CS24-02. CERTIFICATE OF COMPLIANCE: A Certificate of Compliance shall be furnished, upon request, to the City Engineer/ Public Works Director for each lot of material delivered to the work site and the lot so certified must be clearly identified in the certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time, and shall be inspected as determined by the City Engineer/ Public Works Director (see project notes for inspection requirements). The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the plans and specifications and any such material not conforming to such requirements or other specifications shall be rejected whether in place or not.

CS24-03. SOIL PREPARATION: Soil preparation shall consist of clearing and grubbing, removing debris, weeds and stones larger than 1 inch in diameter within landscape areas, thoroughly tilling areas with amendments as specified, completing finish grading activities so that landscape areas conform to finish grade per landscape notes and applying specified weed control measures.

SOILS ANALYSIS: Prior to commencement of work, the contractor shall perform and submit a soils analysis to the City for all landscape improvement areas recommending required soil amendments to meet the following requirements:

Soil Elements	Acceptable Range
pH	6.6 - 8.0
CEC (Cation Exchange Capacity)	12.12 - 35.12 meq/112 g
SAR (Sodium Absorption Ratio)	less than 5.12
ESP (Exchangeable Sodium Percentage)	less than 5.12
EC (Electronic Conductivity)	2.0 - 2.5 mmmho/cm
SP (Sodium Percentage)	less than 45%
Percentage Organic Matter	2% - 5%

The minimum soil amendments in lawn area or sod areas shall consist of Type 1 organic mulch, applied at a rate of 10 cubic yards per 1,120 square feet and Soil Preparation Fertilizer applied at a rate of 30 lbs per 1,120 square feet. Amendments shall be rototilled into the top 8 inches of the topsoil.

Fertilizer Requirements:

Use	Nitrogen	Phosphorus	Potassium
Soil Preparation	6	20	20
Plant Maintenance	16	6	8
Tablets (21g, 5% max acidity)	20	10	5

Seed shall be treated with a pre-emergent fungicide, such as □thiram□ or approved equivalent.

After installation of irrigation systems, planting of materials and finish grading activities are complete and before application of approved shredded bark mulch, all landscape areas shall have pre-emergent herbicide applied in accordance with manufacturer recommendations.

CS24-04. PLANT STOCK AND GROUND COVER: Plants shall be the variety, quantity and size indicated on the plans. When total quantities are shown tabulated on the drawings, they shall be considered approximate and are furnished for convenience only. Contractor is responsible for installing all the plants shown on landscape plans and for computing the quantity of ground cover required within the area specified and at the specified spacing. Quality and size shall conform to the State of California Grading Code of Nursery Stock, No.1 grade. Nursery grown stock only shall be used, and shall be free of insect pests and diseases.

Plants shall be healthy, shapely and well rooted. Roots shall show no evidence of having been root bound, restricted, deformed or girdled. Plants shall have straight trunks with leader intact, undamaged and uncut. All old abrasions and cuts shall be completely calloused over. All plants shall be measured when their branches are in normal position and height measured from root crown to the top of plant. Trees shall be well tapered in the trunk so that when the nursery stake is removed, the tree supports itself upright without further staking and shall have a main leader. Tree branches shall be spaced vertically and alternately along the trunk and shall not be concentrated at a single location nor shall display severe branch crossing. All plants declared unsuitable shall be removed from the work site immediately and shall be replaced with specimens which conform to plans and specifications.

CS24-05. MULCH: Unless otherwise specified, all planted landscaped areas shall have a 4" section of fibrous, medium course shredded bark mulch. A cedar or redwood mulch is preferred; however, the contractor shall submit a sample to the City and obtain prior approval before delivering mulch to the work site. Unless specified on the plans, it shall be the Contractors responsibility to estimate required mulch quantities and provide delivery tags to the City to verify in-place quantity.

CS24-06. NINETY CALENDAR DAY MAINTENANCE PERIOD: Unless otherwise specified, after installation of landscape improvements and final inspection and acceptance of improvements by the City, the City shall submit to the Contractor in writing the starting and ending date of the 90 calendar day maintenance period. Maintenance shall include, but is not limited to watering, weeding, fertilizing, cultivating, spraying and pruning as necessary to keep the plant material in a healthy growing condition and to keep the landscape areas neat, attractive and clean of debris or other foreign material. As a minimum the Contractor shall visit site weekly to clean site of papers or other debris. Prior to the end of the 90 calendar day maintenance, the City shall make a final inspection of the landscape improvements. Any discrepancies found during final inspection shall be reported to the Contractor immediately and shall be corrected prior to the end of the maintenance period. Until all corrections are complete and accepted by the City, the Contractor shall be responsible for maintenance activities.

All trees and other plant material shall be guaranteed to take root, grow, thrive and be disease free for a period of one year after final acceptance of work. Any tree or plant materials that die back and lose form and size originally specified shall be replaced, even though they have taken root and are growing after the die-back. The City shall notify the Contractor in writing within 15 calendar days of required replacements. The Contractor shall at his own expense remove and replace all guaranteed plant materials which for any reason, fail to meet requirements of the guaranty. Replacements shall be made to the same specifications as required of original materials and shall carry the same guaranty from the time they are replaced.

CS24-07. SPECIALTY ITEMS - HYDRO-SEEDING: Any specialty or hydro-seeding item of work specified in the Special Provisions or shown on the plans shall be completed as required. The Landscape Architect or other designer shall specify either on the plans or in the special provision recommendation and requirements for such work items. The Contractor shall be responsible to complete specialty items of work as specified and provide the City with any submittals requested to insure compliance with specifications or Manufacturer's recommendations.

CS24-08. IRRIGATION: Irrigation work items shall consist of furnishing all required materials, equipment and labor necessary to construct, complete-in-place, a turn-key, fully operational and efficient irrigation system in accordance with the plans, specifications and Special Provisions. All irrigation materials provided shall be new and in excellent condition unless otherwise specified.

Unless otherwise specified in the Special Provisions, all taps on water supply mainlines shall be performed by the governing water agency, either the City of Dixon or California Water Service, at the Contractor's expense. All irrigation points of connections shall begin at service-side of water meter which shall comply with respective water agency standard specifications.

All required irrigation component parts and equipment, lines, spray heads, controllers, valves, boxes etc. shall be clearly identified on project plans for size and type. Irrigation component and part details may be referenced on the plans for additional information.

Irrigation systems shall be constructed utilizing the following specified parts and equipment as applicable and in accordance City Standard irrigation details:

<u>Main line & Lateral lines piping-</u>	PVC schedule 40, unless otherwise noted
<u>Valves</u>	Gate Valves- 3 inch and smaller shall be bronze, class 125 or 150 with threaded ends, non-rising stem, O-ring stem or gasket or Teflon impregnated asbestos packing and handwheel operator.
Remote Valves-	Shall be specified as shown on City Standard detail.
Backflow & DCDA-	Shall be specified as shown on City Standard details.
<u>Solvent Cement and Primer-</u>	Shall be compatible with PVC pipe material and size and be proper consistency. No mixing of solvent with thinners will be allowed, and primers shall be used as recommended by solvent manufactures
<u>Control Wiring-</u>	Shall be 24 volt solid wire U.L. approved for direct underground burial. (White or red #14 UF direct lead and black #12 common ground.) 110 volt wiring shall be 2- #12, CU, THW, one black, one white. All wiring shall be identified with all weather tag as shown on City Standard details at all remote valves, and all other access points of connections. Buried control wiring shall be tied at minimum of 10 foot intervals, with one or more additional control wire which shall have a 24 inch coiled wrap in each remote valve box.
<u>Valve Boxes, Controller Couplers & Misc. Equipment-</u>	All other misc. equipment shall be identified on CS24.4

either plan detail sheet or City Standard details.

IRRIGATION CONTROLLER CHART(S): The Contractor shall submit to the City 2-sets of all-weather laminated record drawing irrigation controller chart(s) depicting as-built irrigation system, all remote valve stations, and sprinklers. The chart shall plot site features including plot plan, buildings, non-irrigated interior areas, sidewalks, benches and all significant site features. The chart may be reduced to 8-1/2" x 11" or 11' x 17" in legible detail.

CS24-09. PAYMENT: Irrigation items of work shall be measured and payment made at the contract Lump Sum or Contract Unit price and shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals and for doing all work involved in irrigation items of work including any specialty items, as shown on the plans and as specified in the Special Provisions or as directed by the City Engineer/ Public Works Director and no additional compensation will be made therefore.

Landscaping items of work shall be measured and payment made at the contract Lump Sum or Contract Unit price and shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals and for doing all work involved in Landscape items of work including any specialty items or hydro-seeding and maintenance work, as shown on the plans, as specified in the Special Provisions or as directed by the City Engineer/ Public Works Director and no additional compensation will be made therefor.

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-STREETS-

Detail #

3000	Vertical Curb, Gutter and Sidewalk
3010	Low-Profile Curb, Gutter and Sidewalk
3020	Rolled Curb, Gutter and Sidewalk
3030	Separated Sidewalk, Curb & Gutter
3040	Sidewalk Staged Construction
3050	Curb, Gutter, and Sidewalk Details
3060	Valley Gutters
3070	Residential Driveway, Vertical Curb
3080	Residential Driveway, Conventional Vertical Curb
3090	Residential Driveway, Separated Sidewalk
3100	Commercial Driveway
3110	Commercial Driveway With Restricted R/W
3120	Industrial Driveway
3130	Street Replacement at Driveway or Curb and Gutter
3140	Curb Ramp (Type 1), Residential Street
3150	Curb Ramp (Type 2), Residential and Collector Street
3160	Curb Ramp (Type 3), Arterial and Collector Street
3170	Curb Ramp (Type 4 and 5), Mid-block Ramp
3180	Separated Sidewalk Curb Ramp (Type 6), Residential and Collector Street
3190	Alley Sections, Type 1 and 2 New & Existing Right-of-Way
3200	Alley Apron
3210	Street Survey Monument
3220	Street Sign
3230	Median Signs With “Break-Away”
3240	Street Name Sign
3250	Sidewalk Barricade
3260	End of Street Barricade
3270	Street Transition Sign and Barricade
3280	Trench Backfill For City Utilities Within Paved Area
3290	Trench Backfill For City Utilities In Unpaved Areas
3300	Utility Trench For Non-City Utilities
3310	Pavement Digout Repair
3320	PVC & Concrete Filled Steel Pipe Bollard
3330	Access Gate
3340	Median Island

-MANHOLES-

Detail #

- 4000 Manhole Frame & Cover
- 4010 Manhole For Pipes Less Than 24"
- 4020 Manhole For Pipes 24" To 48" Diameter
- 4030 Saddle Manhole For Pipes Larger Than 48"
- 4040 Manhole Plug For Future Pipe
- 4050 Unimproved Area Manhole Frame & Bollards

-STORM DRAIN-

- 4500 Storm Drain Manhole Installation In Sidewalk
- 4510 Storm Drain Curb Inlet Type A, Pipes < 24"
- 4520 Storm Drain Curb Inlet Type A, Pipes \geq 24"
- 4530 Storm Drain Curb Inlet Type B, Pipes < 24"
- 4540 Storm Drain Curb Inlet Type B, Pipes \geq 24"
- 4550 "No Dumping" Curb Inlet Label
- 4560 Curb Inlet, Type A
- 4570 Curb Inlet, Type B
- 4580 Under Sidewalk Drain
- 4590 Field Inlets
- 4600 Field Inlet

-WATER-

Detail #

- 5000 Trench Details for Polyvinyl Chloride Pipe (PVC)
- 5010 Water-Sewer Separation Detail
- 5020 Fitting and Thrust Blocks for Horizontal Bends and Tees
- 5030 Fitting and Thrust Blocks for Vertical Downward Bends
- 5040 Fitting and Thrust Blocks for Vertical Upward Bends
- 5050 "Cut-In" Tee or Cross Detail for Lateral Connection
- 5060 Fire Hydrant Detail
- 5070 Fire Hydrant Installation for Developed Areas
- 5080 Fire Hydrant Installation for Undeveloped Areas
- 5090 Traffic Box and Valve Details
- 5100 3/4"-1" Meter Connection
- 5110 3/4"-1" Double Meter Connection
- 5120 1-1/2"-2" Meter Connection
- 5130 1" Connection With Sample Station
- 5140 Blow-Off Assemblies
- 5150 Air & Vacuum Valve Assembly
- 5160 3/4"-2" Reduced Pressure Backflow Preventer Installation
- 5170 Reduced Pressure Backflow Preventer Protective Enclosure
- 5180 3" - 10" Reduced Pressure Backflow Preventer Installation
- 5190 Reduced Pressure Detector Assembly (RPDA)
- 5191 Double Check Detector Assembly (DCDA)
- 5200 Residential Fire Sprinkler Service Installation
- 5210 Water and Non-Potable Pipeline Separation Detail
- 5220 4" Wharf Hydrant

-SANITARY SEWER-

- 6010 Inside Sanitary Sewer Drop Manhole
- 6020 Sewer Lateral Cleanout
- 6030 Sewer Service Lateral
- 6040 Sewer Main Tap

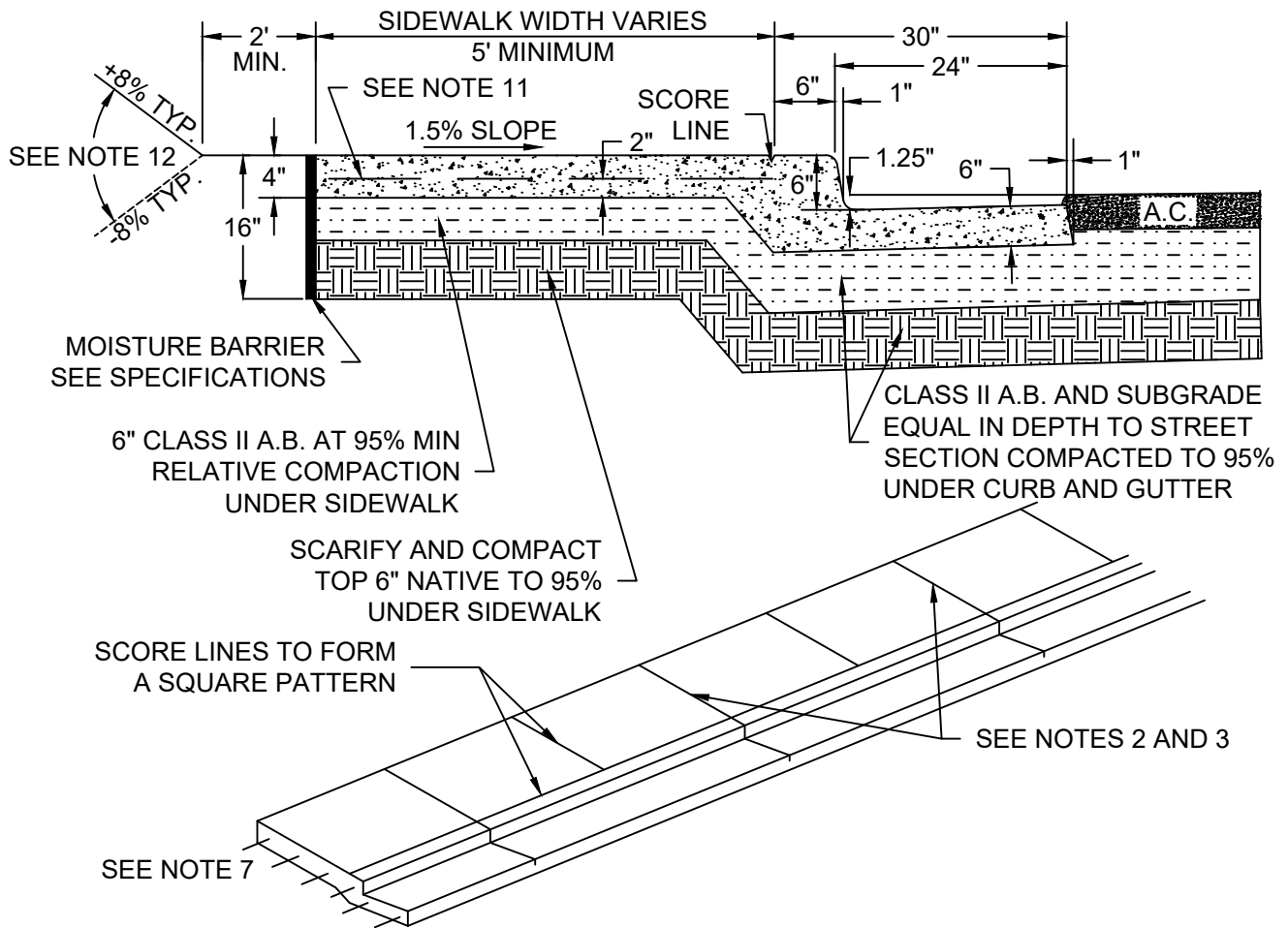
-STREET LIGHTING-

Detail #

- 7000 Street Light Pole Installation
- 7010 Street Light Foundation Cast-in-Place
- 7020 Street Light Pole-to-Base Attachment
- 7030 Street Light Pole Specifications
- 7040 Street Light Box and Conduit Installation
- 7050 Standard Street Light Numbering
- 7070 Fluted Pole Top Path Light
- 7080 Fluted Pole Top Path Light Base Detail

-IRRIGATION AND LANDSCAPING-

- 8000 Tree Planting
- 8010 Shrub Planting
- 8020 Irrigation Controller
- 8030 Remote Control And Ball Valve Combination
- 8040 Irrigation Drip Filtering System
- 8050 Quick Coupler
- 8060 Typical Spray Head
- 8070 Irrigation Box Arrangement
- 8080 Typical Bubbler
- 8090 Drip Irrigation Flush Plug
- 8100 Drip Emitter Arrangement
- 8110 Underground Wire Splice
- 8120 Drip Irrigation Multi-Outlet Emitter



NOTES:

1. USE CITY STANDARD CONCRETE.
2. SCORE LINES SHALL BE $\frac{1}{2}$ " DEEP AND FORM A SQUARE.
3. WEAKENED PLANE JOINTS SHALL BE $\frac{1}{4}$ " DEEP AND INSTALLED AT 12' MAX INTERVALS TO MATCH SCORE LINES.
4. PLACE EXPANSION JOINTS AT CURB RETURNS, TRANSITIONS TO DRAIN INLETS, AND DRIVEWAYS AND 60' INTERVALS.
5. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
6. NEW SIDEWALK, CURB AND GUTTER SHALL BE MONOLITHICALLY POURED.
7. EXISTING CONCRETE TO BE MATCHED SHALL BE DRILLED AND EPOXY DOWELED WITH 8" LONG, #4 REBAR AT 12" MAXIMUM ON CENTER.
8. ALL CORNERS SHALL HAVE $\frac{1}{2}$ " TOOLED RADIUS.
9. FOR CURB TYPE TRANSITION DETAILS AND WEAKENED PLANE JOINT DETAIL SEE DETAIL 3050.
10. FOR CURB AND GUTTER TRANSITION DETAILS AT CURB INLETS, SEE DETAIL 4090 AND 4100.
11. 6"x6"x10 GAUGE WIRE REINFORCEMENT REQUIRED FOR ALL SIDEWALKS.
12. A MAXIMUM SLOPE GRADE OF 5:1 WILL BE ALLOWED AT STREET LANDSCAPING APPLICATIONS WHERE APPROVED BY THE CITY ENGINEER.
13. SIDEWALK REPLACEMENT IN EXISTING NEIGHBORHOOD SHALL BE SCORED TO MATCH EXISTING, SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.
14. ALL UTILITY CROSSINGS SHALL BE MARKED ON CONCRETE DURING POUR.



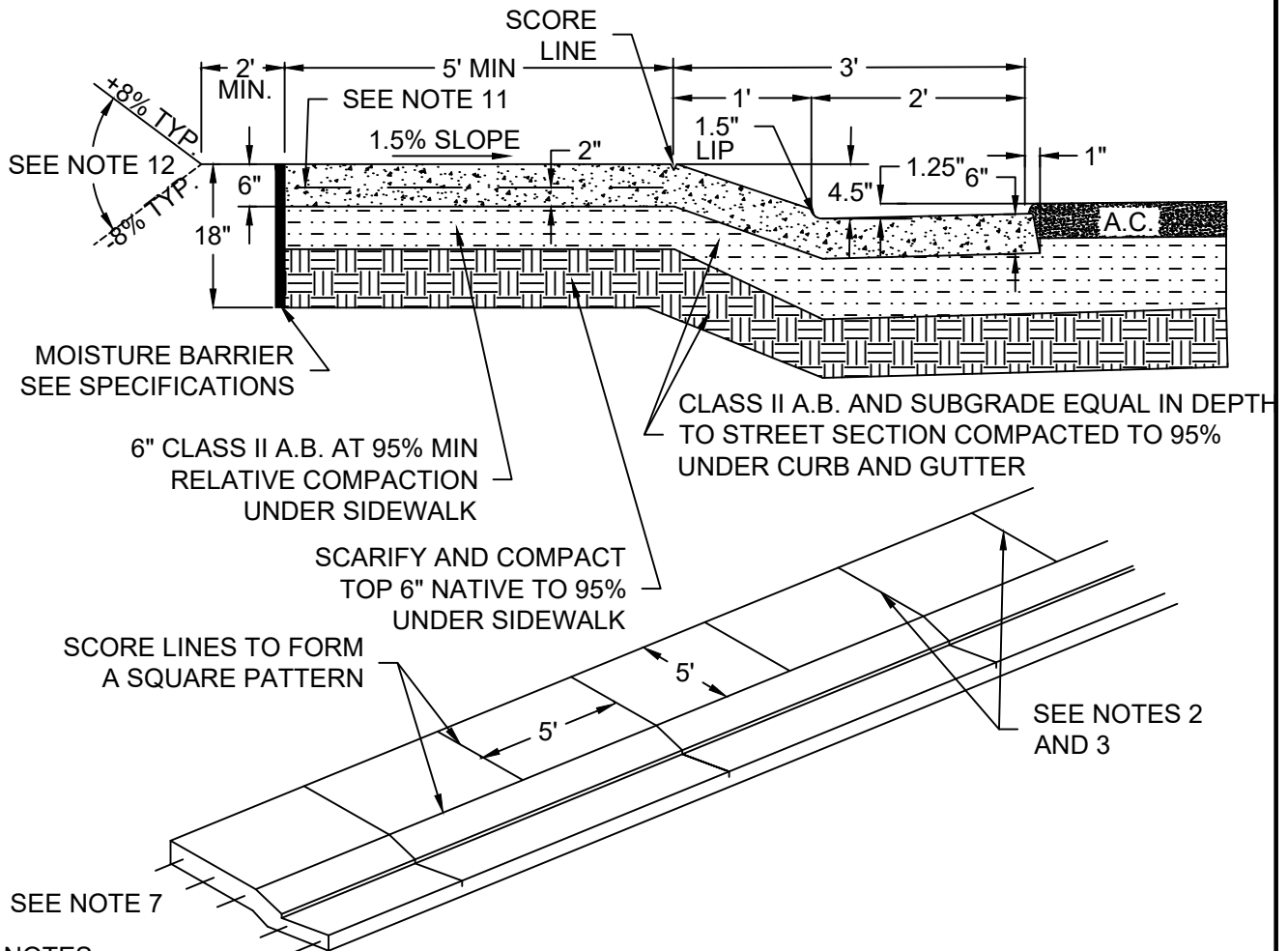
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

**VERTICAL CURB,
GUTTER & SIDEWALK**

3000



NOTES:

1. USE CITY STANDARD CONCRETE.
2. SCORE LINES SHALL BE $\frac{1}{2}$ " DEEP AND FORM A SQUARE.
3. WEAKENED PLANE JOINTS SHALL BE $1\frac{1}{4}$ " DEEP AND INSTALLED AT 12' MAX INTERVALS TO MATCH SCORE LINES.
4. PLACE EXPANSION JOINTS AT CURB RETURNS, TRANSITIONS TO DRAIN INLETS, AND DRIVEWAYS AND 60' INTERVALS.
5. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
6. NEW SIDEWALK, CURB AND GUTTER SHALL BE MONOLITHICALLY POURED.
7. EXISTING CONCRETE TO BE MATCHED SHALL BE DRILLED AND EPOXY DOWELED WITH 8" LONG, #4 REBAR AT 12" MAXIMUM ON CENTER.
8. ALL CORNERS SHALL HAVE $\frac{1}{2}$ " TOOLED RADIUS.
9. FOR CURB TYPE TRANSITION DETAILS AND WEAKENED PLANE JOINT DETAIL SEE DETAIL 3050.
10. FOR CURB AND GUTTER TRANSITION DETAILS AT CURB INLETS, SEE DETAIL 4090 AND 4100.
11. 6"x6"x10 GAUGE WIRE REINFORCEMENT REQUIRED FOR ALL SIDEWALKS.
12. A MAXIMUM SLOPE GRADE OF 5:1 WILL BE ALLOWED AT STREET LANDSCAPING APPLICATIONS WHERE APPROVED BY THE CITY ENGINEER.
13. SIDEWALK REPLACEMENT IN EXISTING NEIGHBORHOOD SHALL BE SCORED TO MATCH EXISTING, SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.
14. ALL UTILITY CROSSINGS SHALL BE MARKED ON CONCRETE DURING POUR.

3010

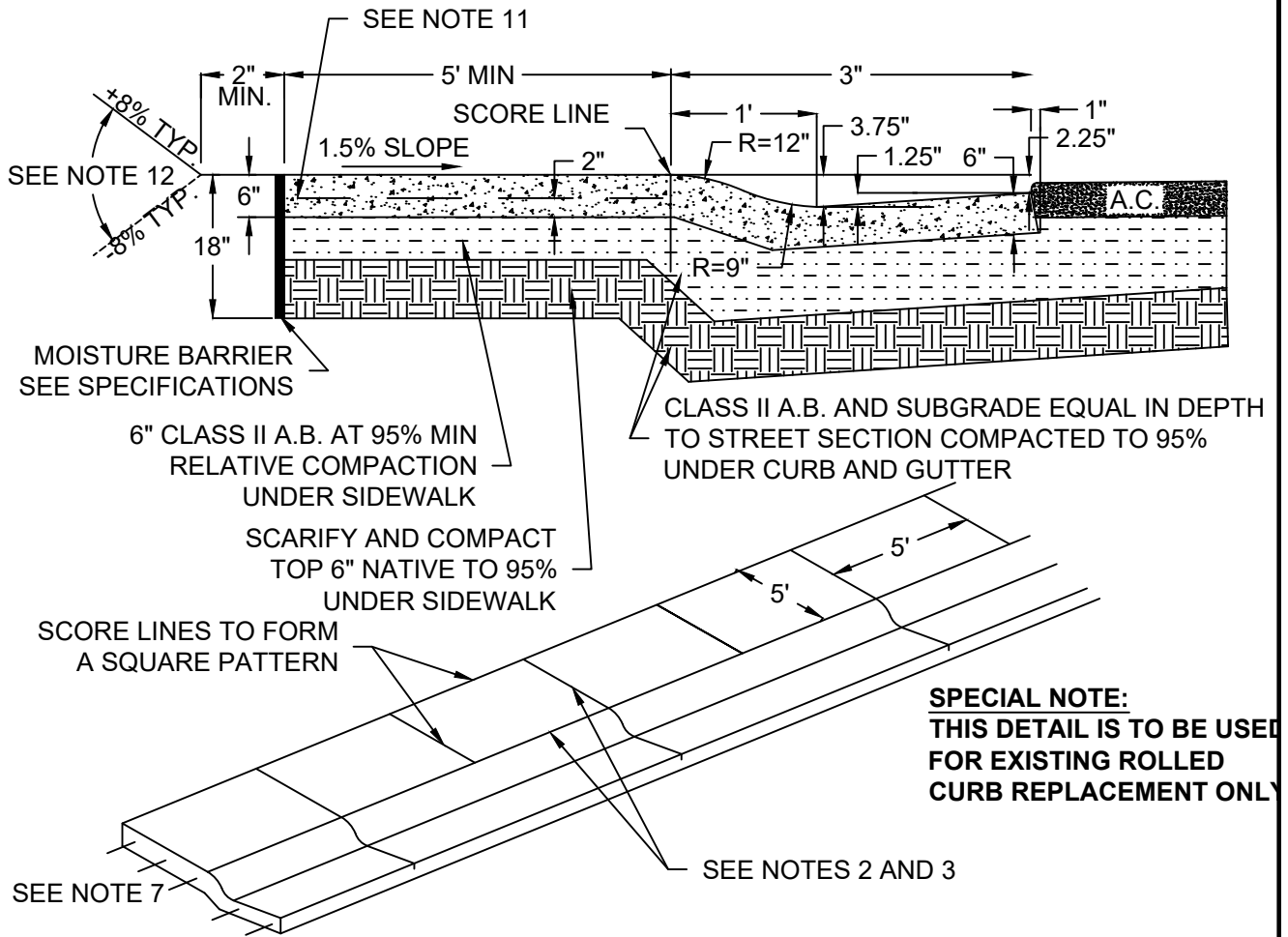
**LOW-PROFILE CURB
GUTTER & SIDEWALK**



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CITY OF DIXON
ENGINEERING
STANDARD DETAIL





SPECIAL NOTE:
THIS DETAIL IS TO BE USED
FOR EXISTING ROLLED
CURB REPLACEMENT ONLY

NOTES:

1. USE CITY STANDARD CONCRETE.
2. SCORE LINES SHALL BE $\frac{1}{2}$ " DEEP AND FORM A SQUARE.
3. WEAKENED PLANE JOINTS SHALL BE $1\frac{1}{4}$ " DEEP AND INSTALLED AT 12' MAX INTERVALS TO MATCH SCORE LINES.
4. PLACE EXPANSION JOINTS AT CURB RETURNS, TRANSITIONS TO DRAIN INLETS, AND DRIVEWAYS AND 60' INTERVALS.
5. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
6. NEW SIDEWALK, CURB AND GUTTER SHALL BE MONOLITHICALLY POURED.
7. EXISTING CONCRETE TO BE MATCHED SHALL BE DRILLED AND EPOXY DOWELED WITH 8" LONG, #4 REBAR AT 12" MAXIMUM ON CENTER.
8. ALL CORNERS SHALL HAVE $\frac{1}{2}$ " TOOLED RADIUS.
9. FOR CURB TYPE TRANSITION DETAILS AND WEAKENED PLANE JOINT DETAIL SEE DETAIL 3050.
10. FOR CURB AND GUTTER TRANSITION DETAILS AT CURB INLETS, SEE DETAIL 4090 AND 4100.
11. 6"x6"x10 GAUGE WIRE REINFORCEMENT REQUIRED FOR ALL SIDEWALKS.
12. A MAXIMUM SLOPE GRADE OF 5:1 WILL BE ALLOWED AT STREET LANDSCAPING APPLICATIONS WHERE APPROVED BY THE CITY ENGINEER.
13. SIDEWALK REPLACEMENT IN EXISTING NEIGHBORHOOD SHALL BE SCORED TO MATCH EXISTING, SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.
14. ALL UTILITY CROSSINGS SHALL BE MARKED ON CONCRETE DURING POUR.



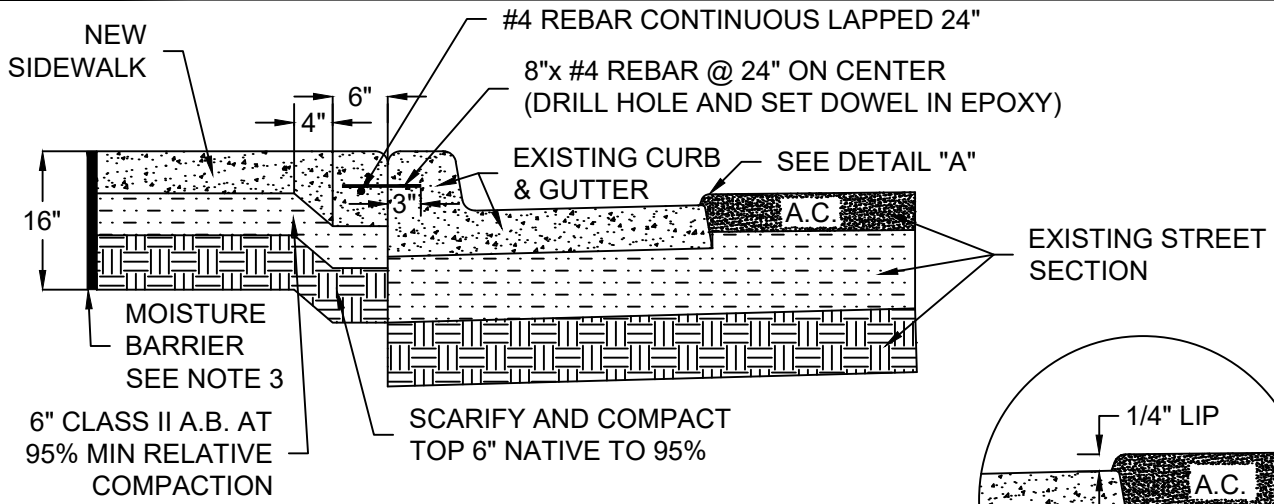
CITY OF DIXON
 ENGINEERING
 STANDARD DETAIL



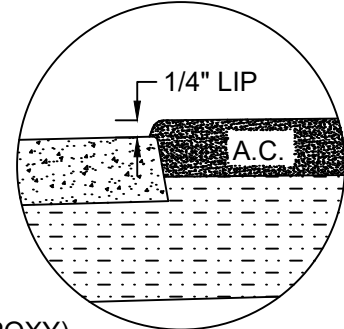
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**ROLLED CURB,
 GUTTER & SIDEWALK**

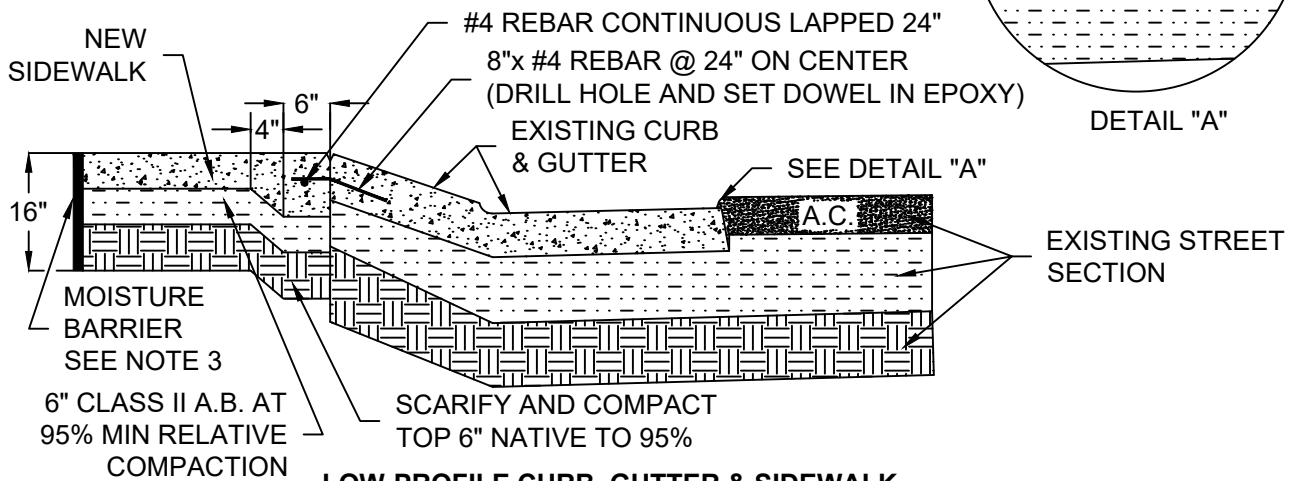
3020



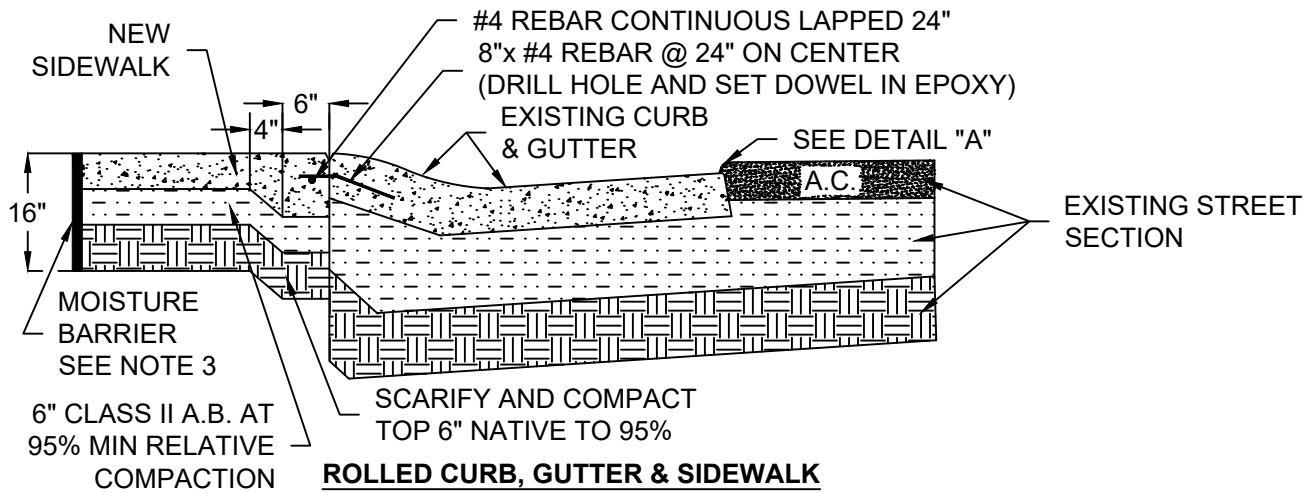
VERTICAL CURB, GUTTER & SIDEWALK



DETAIL "A"



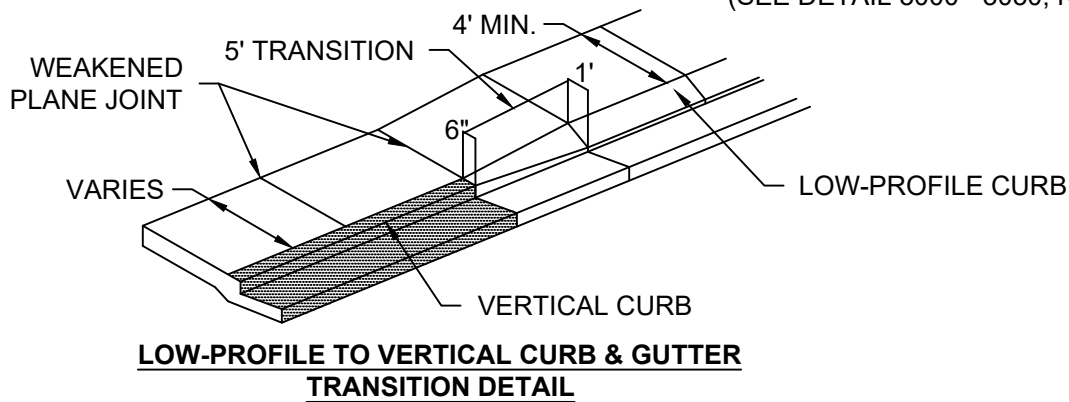
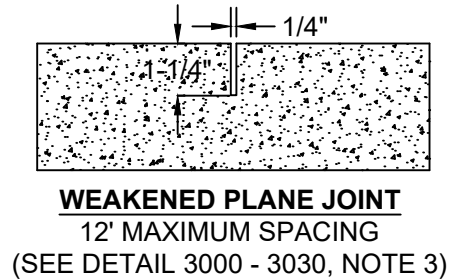
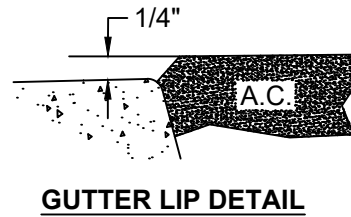
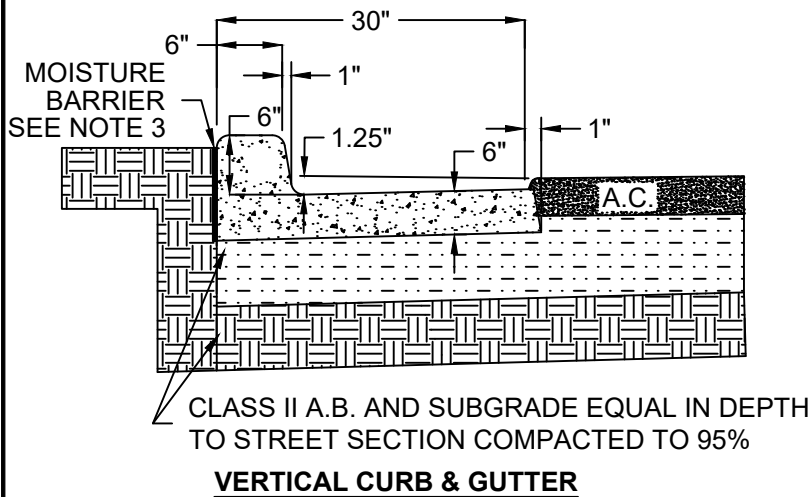
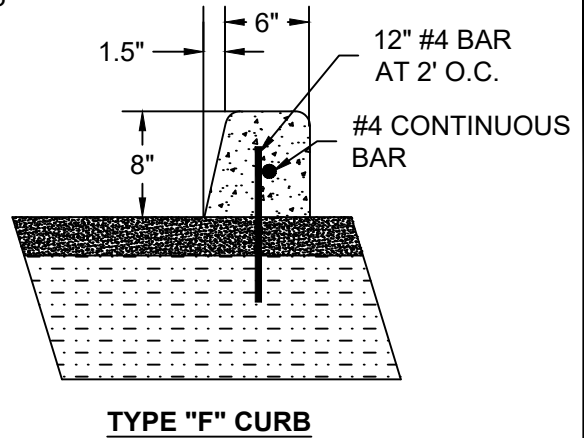
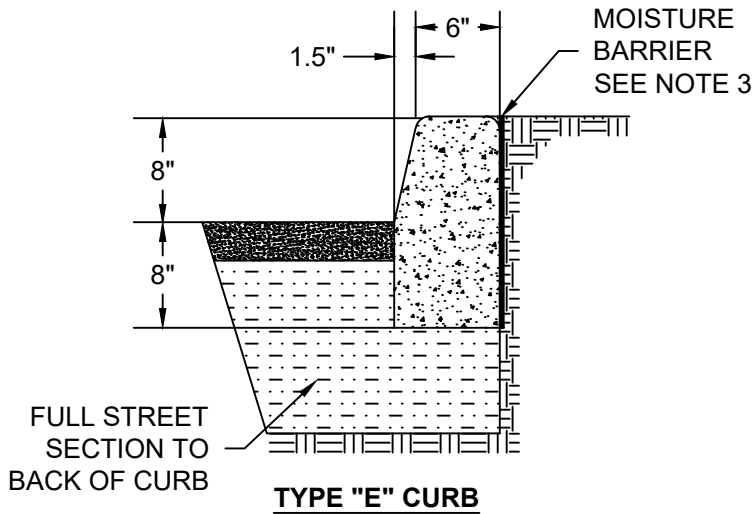
LOW-PROFILE CURB, GUTTER & SIDEWALK



ROLLED CURB, GUTTER & SIDEWALK

- NOTES:**
1. SEE DETAILS 3000, 3010 AND 3020 FOR SIDEWALK CONSTRUCTION DETAILS.
 2. ALL CORNERS SHALL HAVE $\frac{1}{2}$ " TOOLED RADIUS.
 3. FOR MORE INFORMATION SEE SPECIFICATIONS.

	<p>CITY OF DIXON ENGINEERING STANDARD DETAIL</p>	<p>APPROVED: MARCH 2022</p>	<p>SIDEWALK STAGED CONSTRUCTION</p>	<p>3040</p>
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NOTES:

1. SEE DETAILS 3000, 3010 AND 3020 FOR SIDEWALK CONSTRUCTION DETAILS.
2. ALL CORNERS SHALL HAVE $\frac{1}{2}$ " TOOLED RADIUS.
3. FOR MORE INFORMATION SEE SPECIFICATIONS.

3050

CURB, GUTTER &
SIDEWALK DETAILS

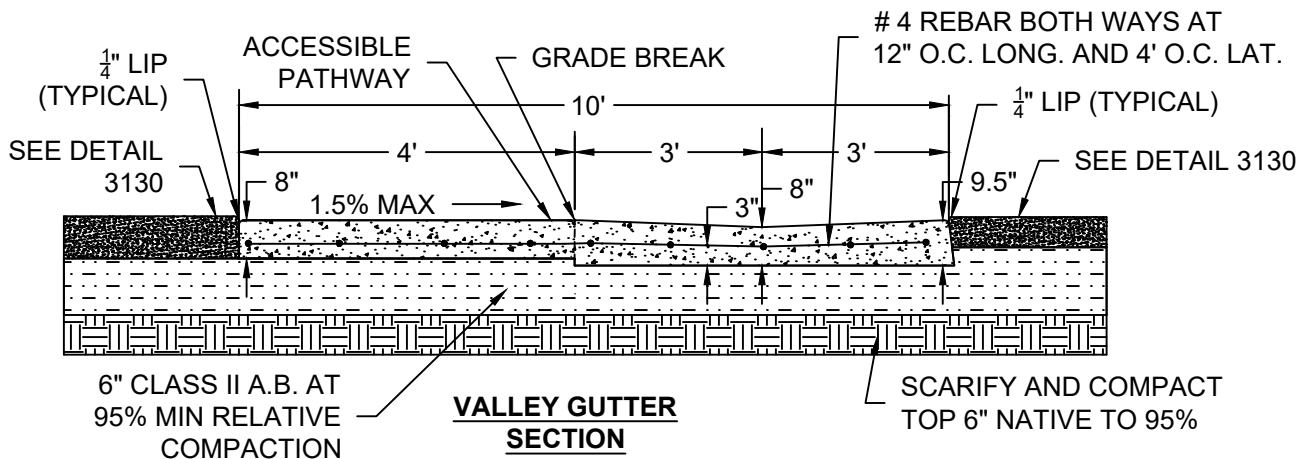
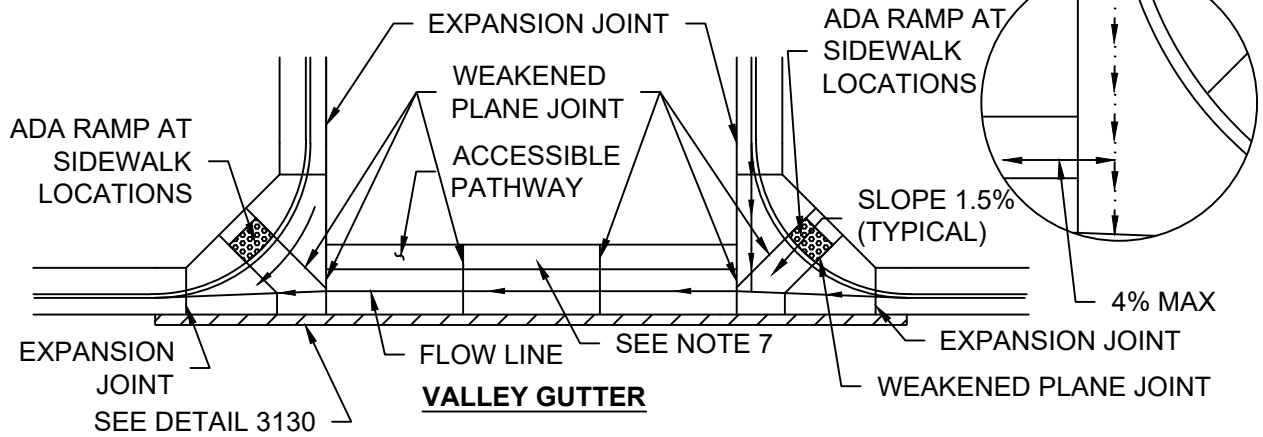
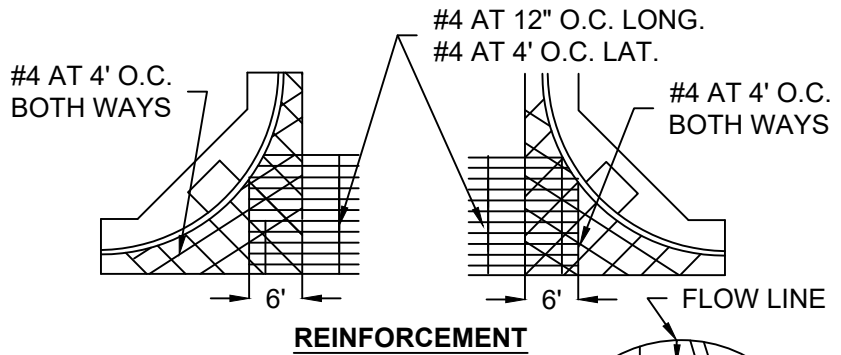


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CITY OF DIXON
ENGINEERING
STANDARD DETAIL



RADIUS TABLE	
TYPE	MINIMUM FACE OF CURB RADIUS
INDUSTRIAL	30' MIN
COMMERCIAL	20' MIN
RESIDENTIAL APARTMENTS	20' MIN



NOTES:

1. MINIMUM LONGITUDINAL SLOPE SHALL BE 0.5%.
2. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
3. ALL CORNERS SHALL HAVE A 1/2" TOOLED RADIUS.
4. FULL STREET SECTION OR 6", WHICHEVER IS GREATER.
5. USE CITY STANDARD CONCRETE.
6. MINIMUM CONCRETE GUTTER PAN APRON SECTION IS 8".
7. ACCESSIBLE PATHWAY SHALL BE 4' WIDE WITH A MAX. OF 1.5% CROSS SLOPE IN ALL DIRECTIONS AND WITHOUT ABRUPT GRADE CHANGE AT GUTTER FLOW LINE.



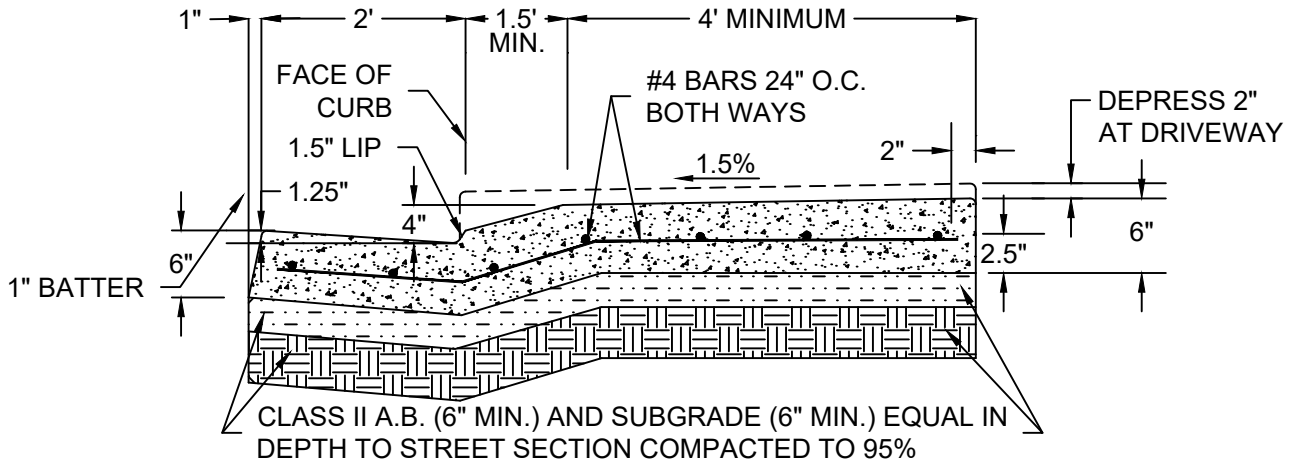
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



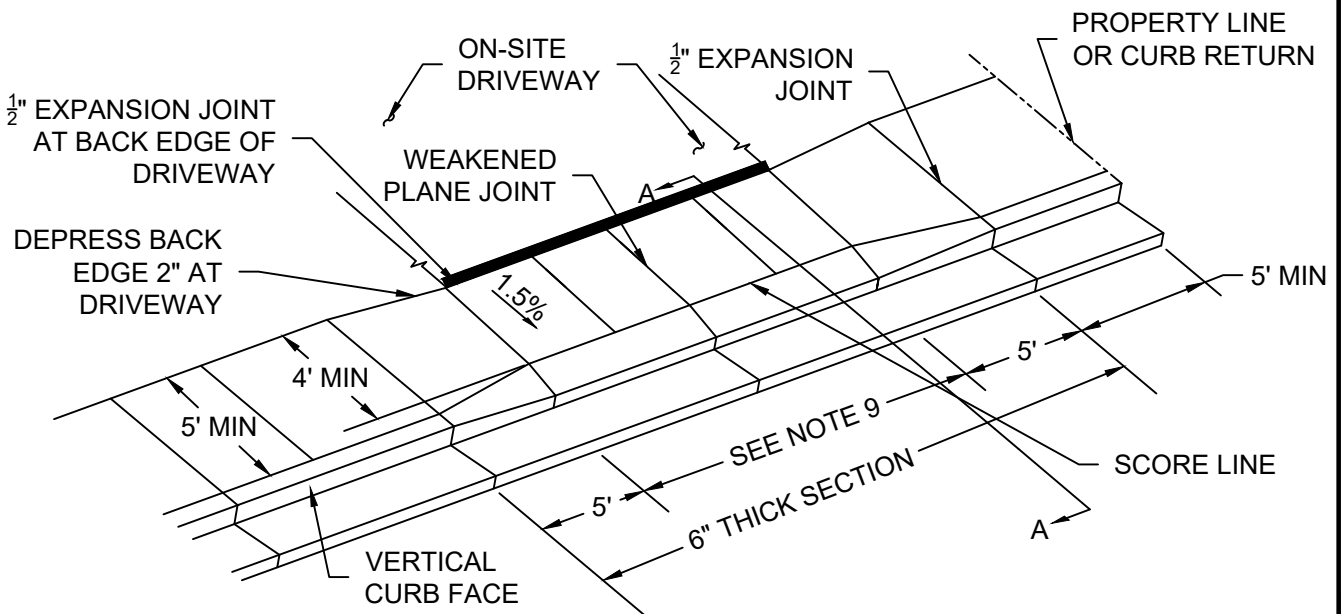
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VALLEY GUTTERS

3060



DRIVEWAY SECTION A-A
(SECTION BETWEEN EXPANSION JOINTS ON EACH SIDE OF DRIVEWAY)



NOTES:

1. USE CITY STANDARD CONCRETE.
2. SCORE LINES SHALL BE 1/2" DEEP AND FORM A SQUARE.
3. WEAKENED PLANE JOINTS SHALL BE 1/4" DEEP AND INSTALLED AT 12' MAX INTERVALS TO MATCH SCORE LINES.
4. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
5. NEW SIDEWALK, CURB AND GUTTER SHALL BE MONOLITHICALLY POURED.
6. EXISTING CONCRETE TO BE MATCHED SHALL BE DRILLED AND EPOXY DOWELED WITH 8" LONG, #4 REBAR AT 12" MAXIMUM ON CENTER.
7. ADJACENT ASPHALT MUST BE REPLACED PER DETAIL 3130.
8. BACK EDGE OF DRIVEWAY SHALL BE DEPRESSED 2.5" BELOW SIDEWALK.
9. MINIMUM RESIDENTIAL DRIVEWAY WIDTH SHALL BE A MINIMUM OF 16' AND MAXIMUM OF 30'.

3070

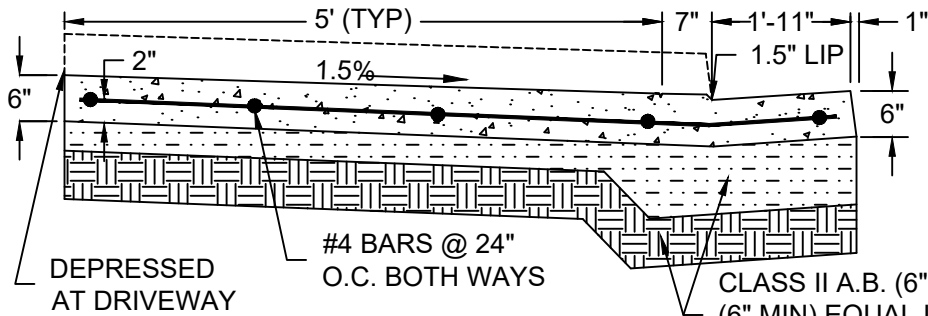
RESIDENTIAL
DRIVEWAY
VERTICAL CURB



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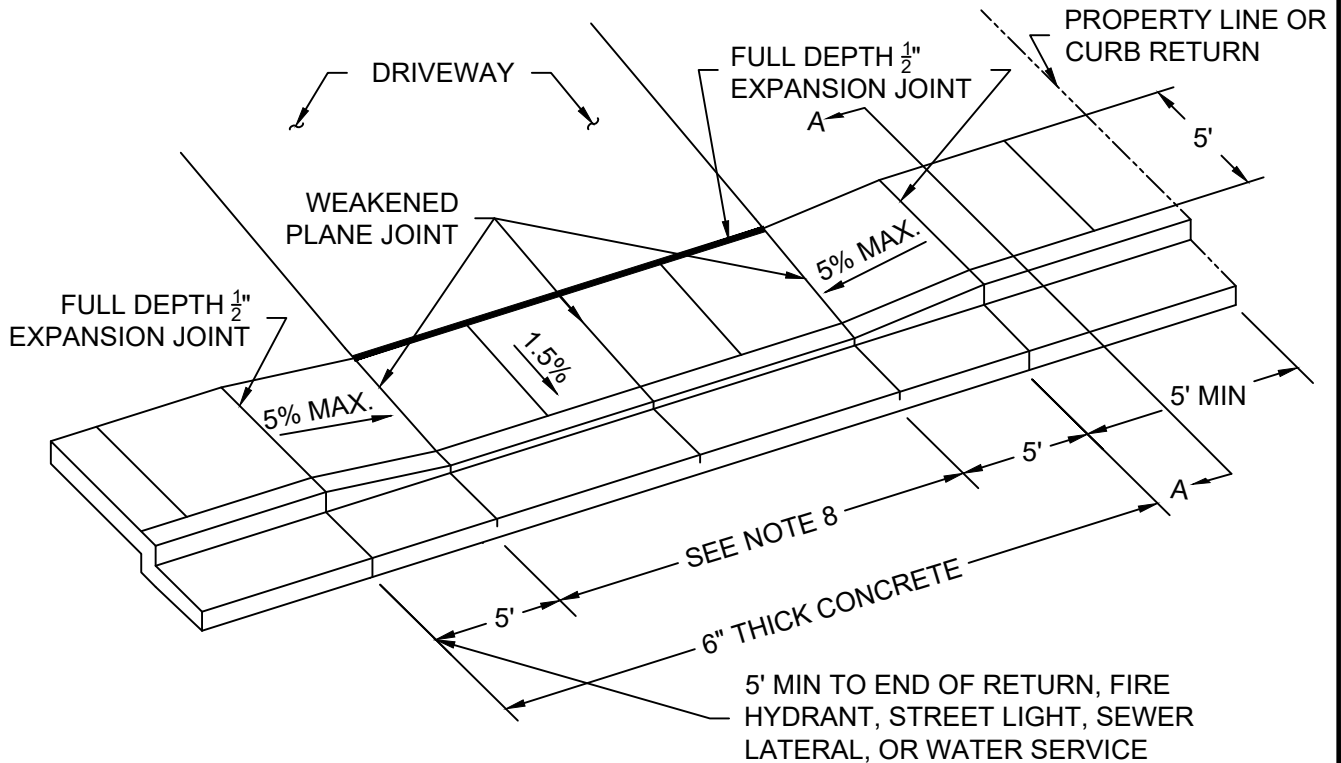
CITY OF DIXON
ENGINEERING
STANDARD DETAIL





**SPECIAL NOTE:
DRIVEWAY TO BE
USED ONLY BY
APPROVAL OF THE
CITY ENGINEER**

DRIVEWAY SECTION
(SECTION BETWEEN EXPANSION JOINTS ON EACH SIDE OF DRIVEWAY)



NOTES:

1. USE CITY STANDARD CONCRETE.
2. SCORE LINES SHALL BE $\frac{1}{2}$ " DEEP AND FORM A SQUARE.
3. WEAKENED PLANE JOINTS SHALL BE $\frac{1}{4}$ " DEEP AND INSTALLED AT 12' MAX INTERVALS TO MATCH SCORE LINES.
4. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
5. NEW SIDEWALK, CURB AND GUTTER SHALL BE MONOLITHICALLY POURED.
6. EXISTING CONCRETE TO BE MATCHED SHALL BE DRILLED AND EPOXY DOWELED WITH 8" LONG, #4 REBAR AT 12" MAXIMUM ON CENTER, PER DETAIL 3000.
7. ALL CORNERS SHALL HAVE $\frac{1}{2}$ " TOOLED RADIUS.
8. DRIVEWAY CUT SHALL ALIGN WITH AND BE OF EQUAL WIDTH AS THE APPROACH TO THE GARAGE OR OTHER APPROVED PARKING AREA. MINIMUM WIDTH OF 16' AND MAXIMUM OF 30'.
9. ADJACENT ASPHALT MUST BE REPLACED PER DETAIL 3130.



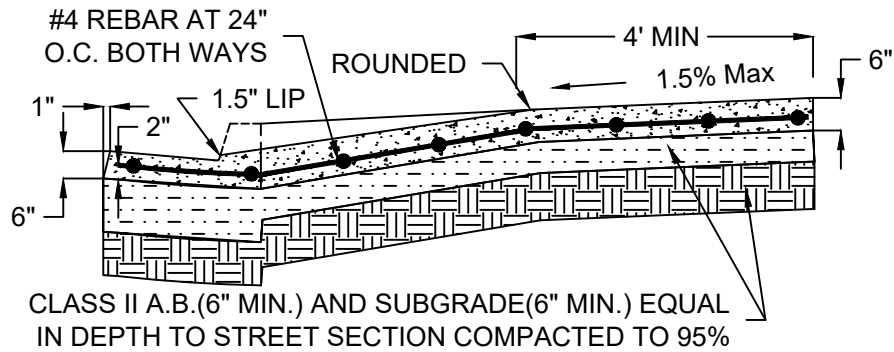
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



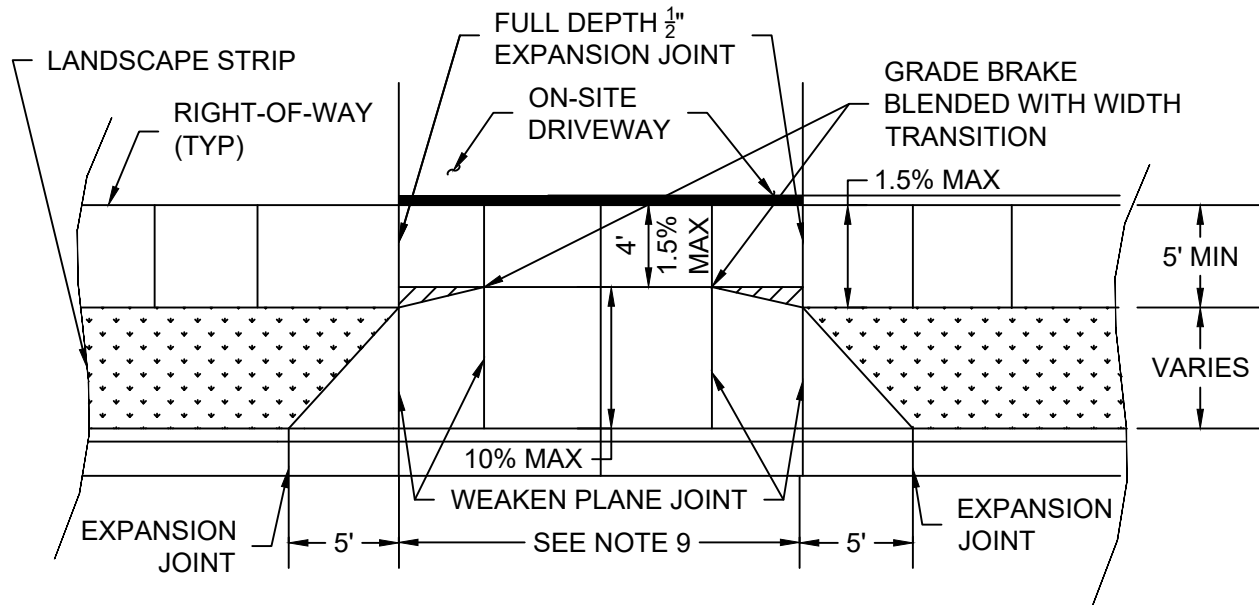
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**RESIDENTIAL
DRIVEWAY
CONVENTIONAL
VERTICAL CURB**

3080



DRIVEWAY SECTION



NOTES:

1. USE CITY STANDARD CONCRETE.
2. SCORE LINES SHALL BE $\frac{1}{2}$ " DEEP AND FORM A SQUARE.
3. WEAKENED PLANE JOINTS SHALL BE $1\frac{1}{4}$ " DEEP AND INSTALLED AT 12' MAX INTERVALS TO MATCH SCORE LINES.
4. PLACE EXPANSION JOINTS AT CURB RETURNS, TRANSITIONS TO DRAIN INLETS, AND DRIVEWAYS AND 60' INTERVALS.
5. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
6. NEW SIDEWALK, CURB AND GUTTER SHALL BE MONOLITHICALLY POURED.
7. EXISTING CONCRETE TO BE MATCHED SHALL BE DRILLED AND EPOXY DOWELED WITH 12" LONG, #4 REBAR AT 12" MAXIMUM ON CENTER, PER DETAIL 3000.
8. ALL CORNERS SHALL HAVE $\frac{1}{2}$ " TOOLED RADIUS.
9. DRIVEWAY CUT SHALL ALIGN WITH AND BE OF EQUAL WIDTH AS THE APPROACH TO THE GARAGE OR OTHER APPROVED PARKING AREA. MINIMUM WIDTH OF 16' AND MAXIMUM OF 30'.
10. ADJACENT ASPHALT MUST BE REPLACED PER DETAIL 3130.
11. PER ADA, GENERAL SIDEWALK WIDTH SHALL BE 5'. THE ADA PATH OF TRAVEL CAN BE REDUCED TO 4' AT THE DRIVEWAY.

3090

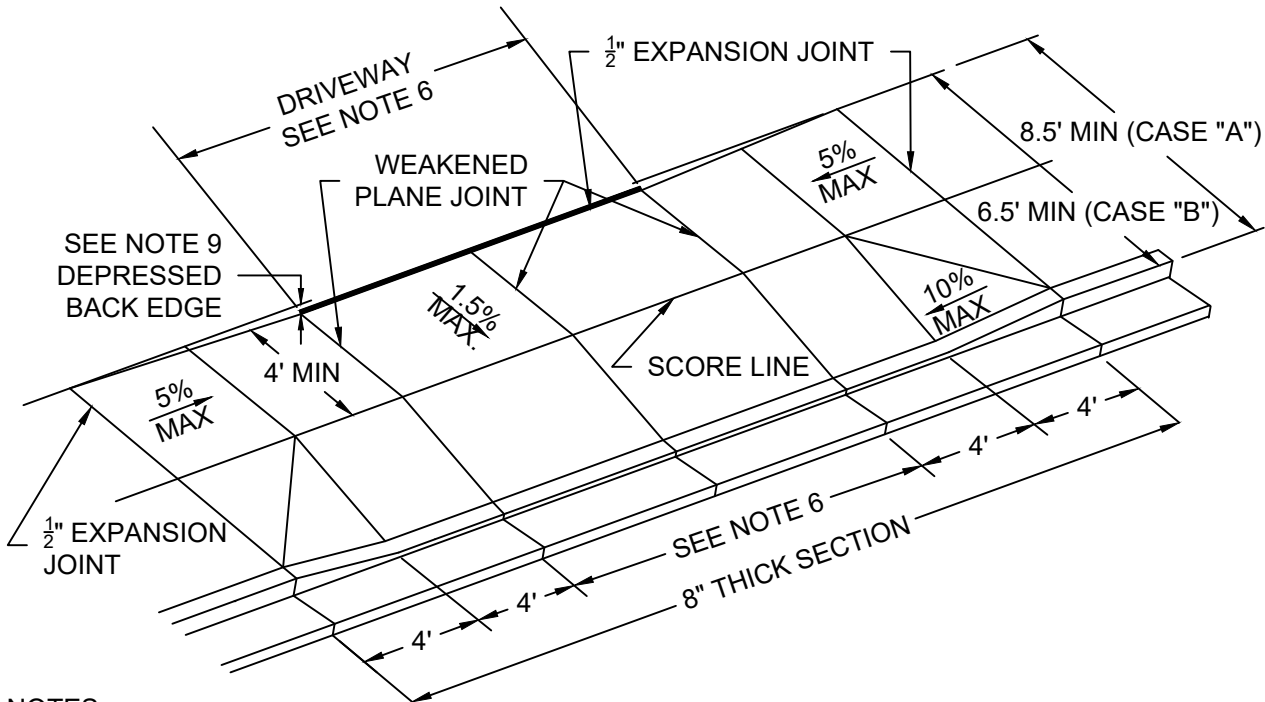
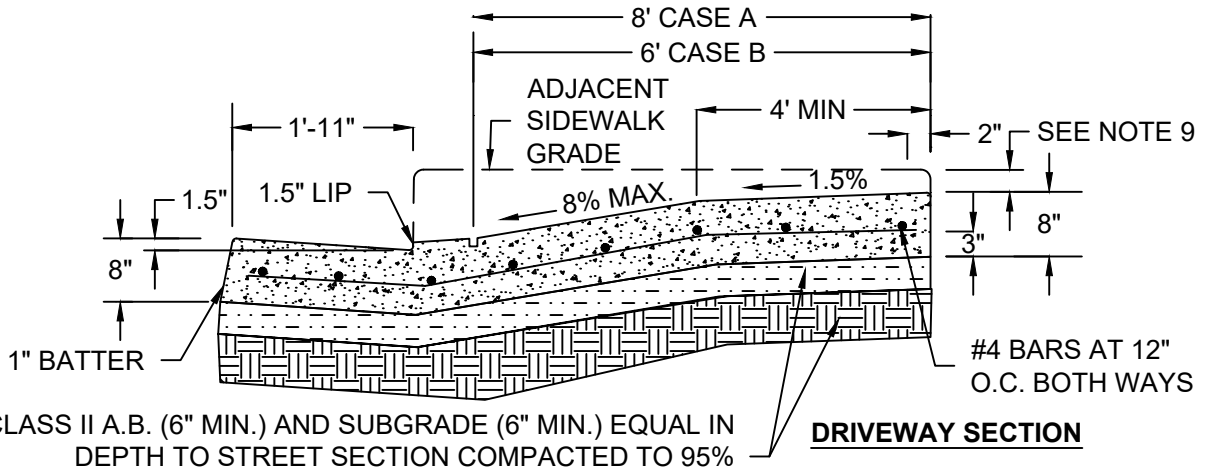
RESIDENTIAL
DRIVEWAY
SEPARATED
SIDEWALK



APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

1. USE CITY STANDARD CONCRETE.
2. SCORE LINES SHALL BE $\frac{1}{2}$ " DEEP AND FORM A SQUARE.
3. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
4. NEW SIDEWALK, CURB AND GUTTER SHALL BE MONOLITHICALLY POURED.
5. EXISTING CONCRETE TO BE MATCHED SHALL BE DRILLED AND EPOXY DOWELED WITH 12" LONG, #4 REBAR AT 12" MAXIMUM ON CENTER, PER DETAIL 3000.
6. DRIVEWAY CUT SHALL ALIGN WITH AND BE OF EQUAL WIDTH AS THE APPROACH TO THE GARAGE OR OTHER APPROVED PARKING AREA. ONE-WAY DRIVEWAYS SHALL BE BETWEEN 18' TO 24' AND TWO-WAY DRIVEWAYS SHALL BE BETWEEN 30' TO 36'.
7. ADJACENT ASPHALT MUST BE REPLACED PER DETAIL 3130.
8. THIS DETAIL IS TO BE USED AT ALL COMMERCIAL LOCATIONS WITH SIDEWALK. DETAIL 3120 SHALL BE USED AT INDUSTRIAL LOCATIONS WITHOUT SIDEWALK.
9. DEPRESSION AT BACK EDGE OF DRIVEWAY FOR CASE "A" IS 1.5" AND FOR CASE "B" IS 3".



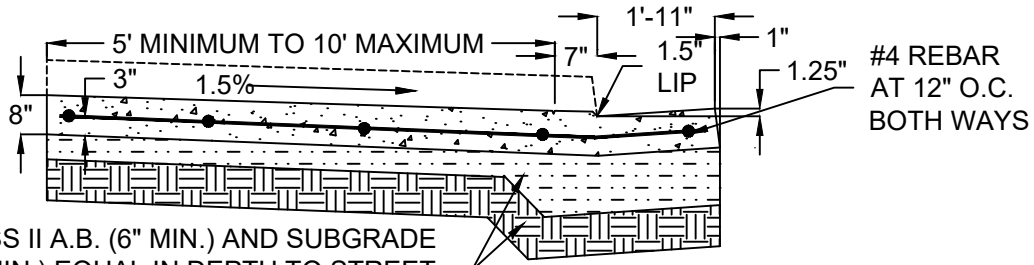
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



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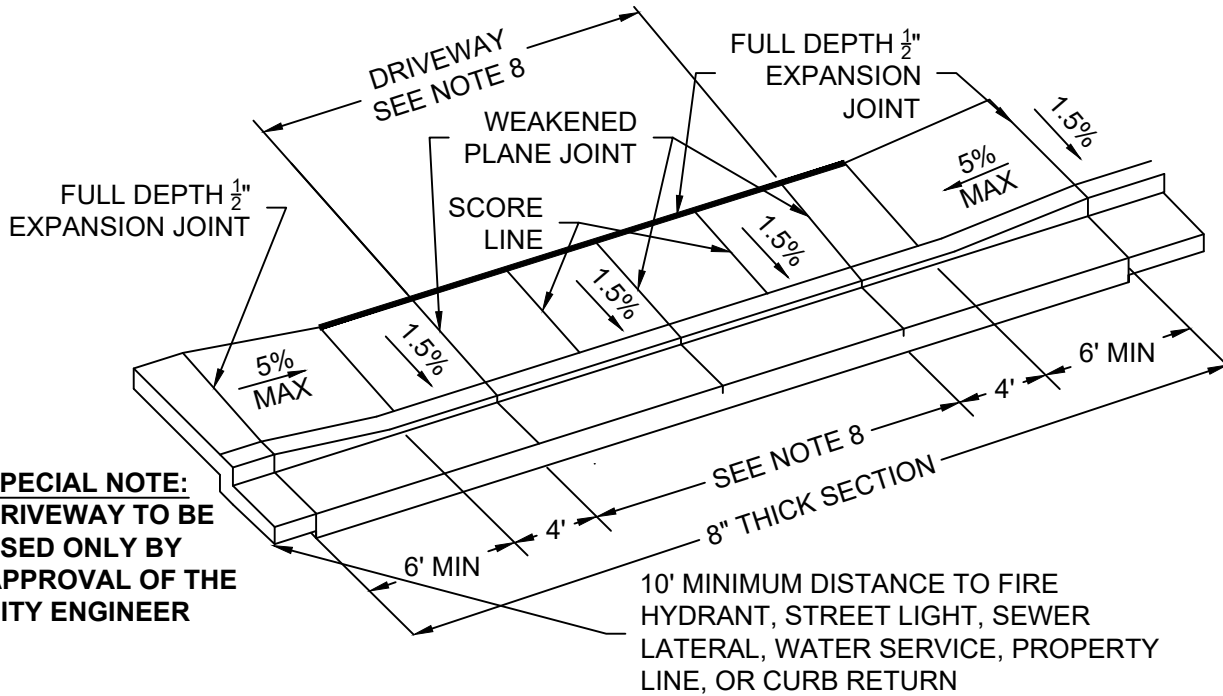
**COMMERCIAL
DRIVEWAY**

3100



CLASS II A.B. (6" MIN.) AND SUBGRADE (6" MIN.) EQUAL IN DEPTH TO STREET SECTION COMPACTED TO 95%

DRIVEWAY SECTION



SPECIAL NOTE:
DRIVEWAY TO BE USED ONLY BY APPROVAL OF THE CITY ENGINEER

10' MINIMUM DISTANCE TO FIRE HYDRANT, STREET LIGHT, SEWER LATERAL, WATER SERVICE, PROPERTY LINE, OR CURB RETURN

NOTES:

1. USE CITY STANDARD CONCRETE.
2. SCORE LINES SHALL BE 1/2" DEEP AND FORM A SQUARE.
3. WEAKENED PLANE JOINTS SHALL BE 1 1/4" DEEP AND INSTALLED AT 12' MAX INTERVALS TO MATCH SCORE LINES.
4. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
5. NEW DRIVEWAY, SIDEWALK, CURB AND GUTTER SHALL BE MONOLITHICALLY POURED.
6. EXISTING CONCRETE TO BE MATCHED SHALL BE DRILLED AND EPOXY DOWELED WITH 12" LONG, #4 REBAR AT 12" MAXIMUM ON CENTER, PER DETAIL 3000.
7. ALL CORNERS SHALL HAVE 1/2" TOOLED RADIUS.
8. DRIVEWAY CUT SHALL ALIGN WITH AND BE OF EQUAL WIDTH AS THE APPROACH TO THE GARAGE OR OTHER APPROVED PARKING AREA. ONE-WAY WIDTH SHALL BE 24' MINIMUM AND TWO WAY WIDTH SHALL BE 36' MINIMUM.
9. ADJACENT ASPHALT MUST BE REPLACED PER DETAIL 3130.
10. THIS DETAIL IS TO BE USED AT ALL COMMERCIAL LOCATIONS AND AT INDUSTRIAL LOCATIONS WITH SIDEWALK. DETAIL 3120 IS TO BE USED AT INDUSTRIAL LOCATIONS WITHOUT SIDEWALK.
11. BACK EDGE OF DRIVEWAY SHALL BE SET 4" ABOVE FLOW LINE.

3110

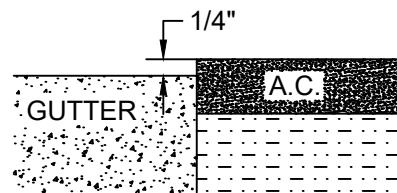
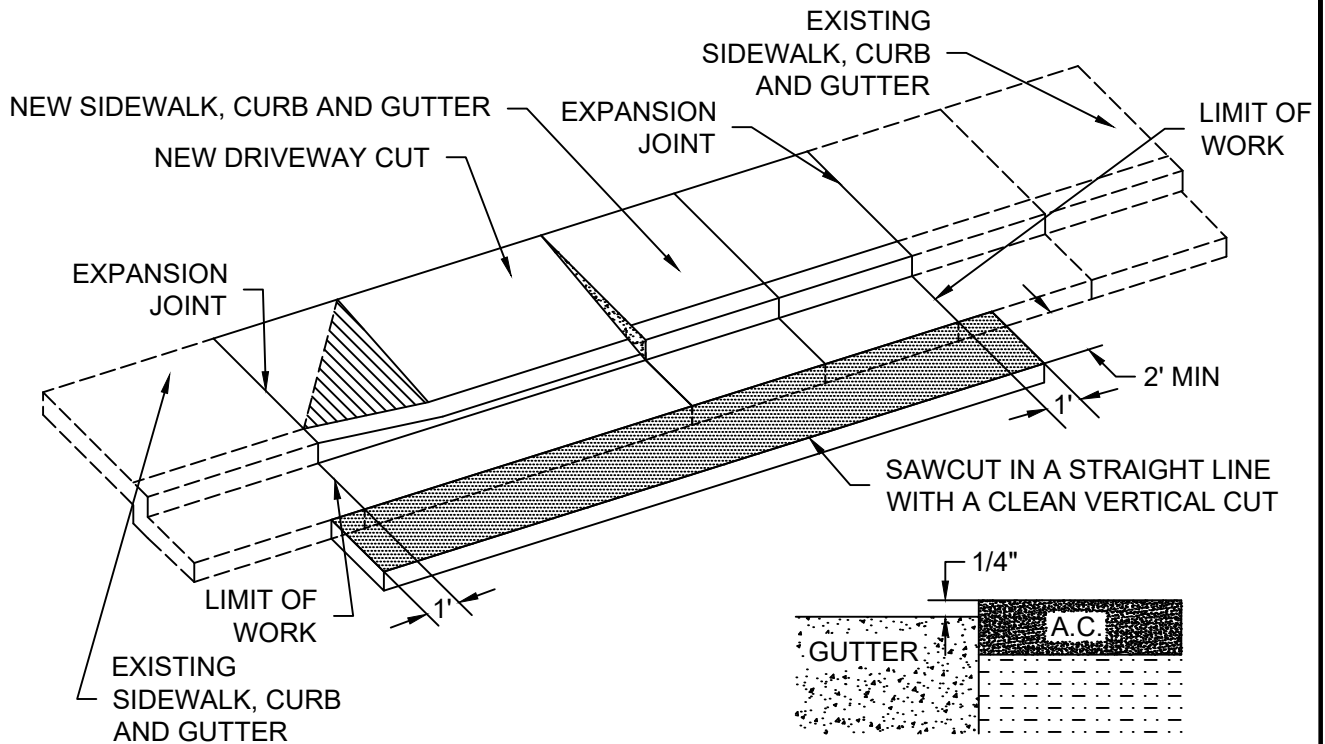
COMMERCIAL DRIVEWAY WITH RESTRICTED R/W



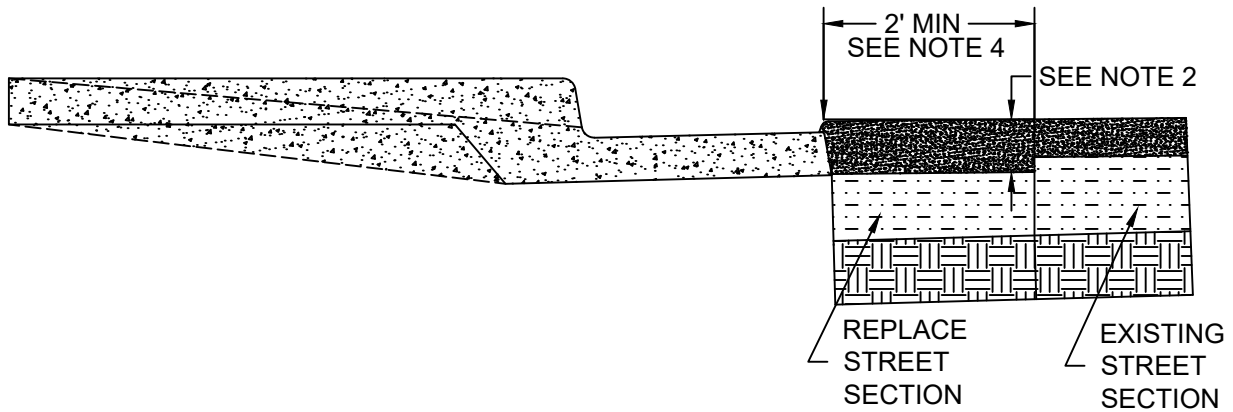
APPROVED: MARCH 2022

CITY OF DIXON
 ENGINEERING
 STANDARD DETAIL





LIP DETAIL



NOTES:

1. TEMPORARY CUTBACK SHALL BE PLACED IMMEDIATELY AFTER BACKFILL AND SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL PERMANENT PAVING IS INSTALLED. PRIOR TO PERMANENT PATCH, EXISTING A.C. SHALL BE SAWCUT TO A NEAT EDGE AND SHALL BE TACK COATED PRIOR TO PAVING.
2. PERMANENT A.C. PAVING SHALL BE 1" GREATER IN THICKNESS THAN EXISTING PAVING WITH A MINIMUM THICKNESS OF 4".
3. REMOVE TO EXISTING SCORE MARK, WEAKENED PLANE JOINT OR EXPANSION JOINT.
4. ADDITIONAL REPLACEMENT MAY BE REQUIRED DUE TO MORE EXTENSIVELY DAMAGED A.C.
5. EXISTING CONCRETE TO BE MATCHED SHALL BE DRILLED AND EPOXY DOWELED WITH 8" LONG, #4 REBAR AT 12" MAXIMUM ON CENTER.

3130

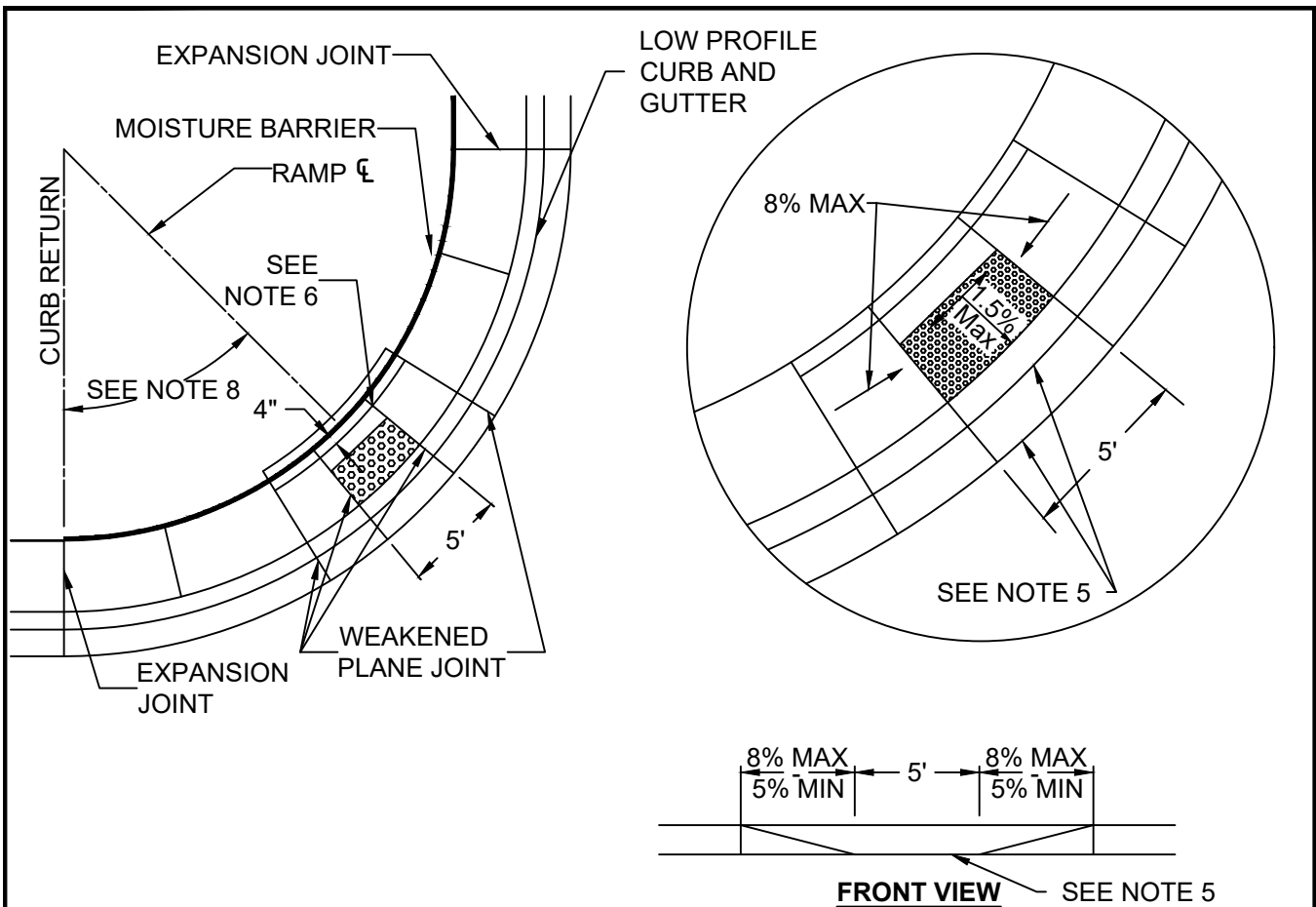
**STREET
REPLACEMENT AT
DRIVEWAY OR CURB
AND GUTTER**



APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

1. CURB RAMPS SHALL COMPLY WITH THE ADA AND TITLE 24 STANDARDS.
2. REFER TO APPLICABLE DETAIL 3000, 3010, OR 3020 FOR CURB, GUTTER AND SIDEWALK DETAILS AND NOTES.
3. REFER TO DS 3-14 FOR RAMP LOCATION.
4. THE SURFACE OF THE RAMP AND FLARES SHALL HAVE A TRANSVERSED BROOMED SURFACE ROUGHER THAN THE SURROUNDING SIDEWALK.
5. TRANSITION FROM RAMP TO GUTTER SHALL BE FLUSH. FROM GUTTER FLOWLINE TO 4' BEYOND LIP SHALL BE A MAXIMUM OF 5%.
6. RETAINING CURB SHALL BE INSTALLED BEHIND THE SIDEWALK, EXCEPT WHERE PROHIBITED BY RIGHT-OF-WAY OR GRADING RESTRAINTS.
7. CURB RAMPS SHALL HAVE DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH OF THE RAMP AND A DEPTH OF 3'. THE EDGE OF THE DETECTABLE WARNING SURFACE NEAREST THE STREET SHALL BE BETWEEN 6" AND 8" FROM THE GUTTER FLOWLINE; REFER TO CS 15-02.
8. CENTERLINE OF RAMP TO BE VERIFIED BY CITY PRIOR TO PLACEMENT OF FORMS.
9. USE CITY STANDARD CONCRETE.

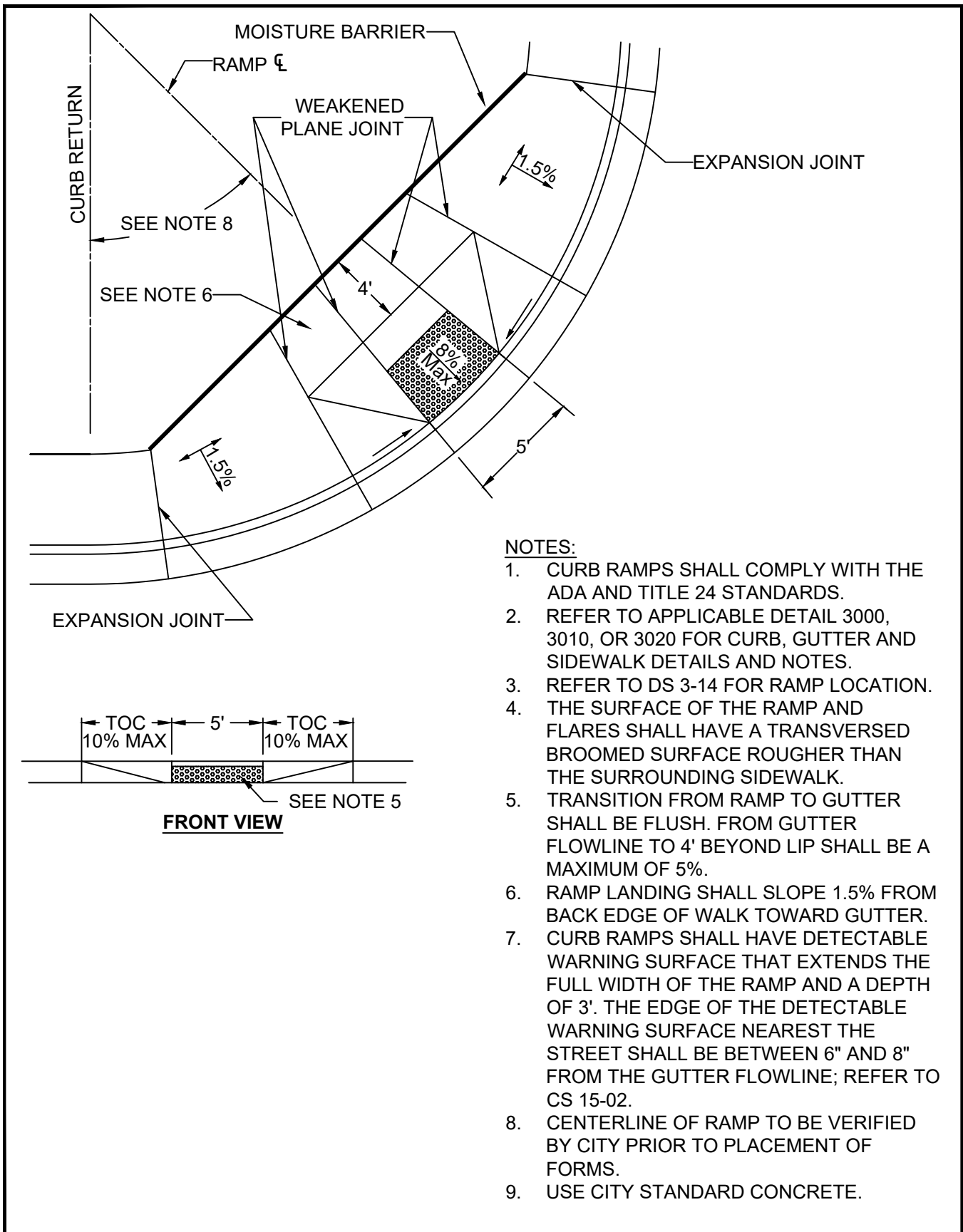
SPECIAL NOTE:
THIS RAMP TO BE USED ONLY BY APPROVAL OF THE CITY ENGINEER

DIXON CITY OF DIXON
 ENGINEERING
 STANDARD DETAIL

APPROVED: MARCH 2022

**CURB RAMP (TYPE 1)
 RESIDENTIAL STREET**

3140



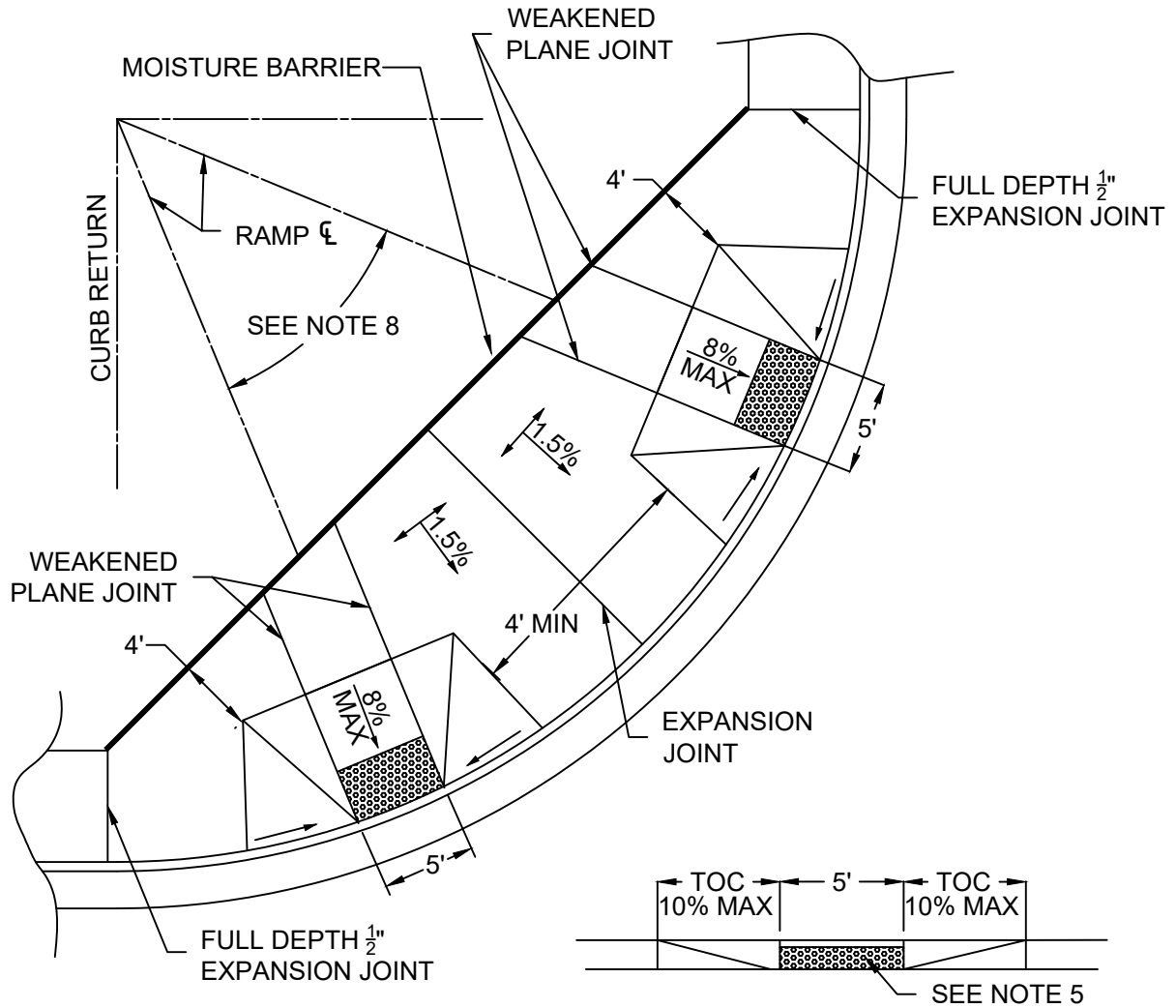
- NOTES:**
1. CURB RAMPS SHALL COMPLY WITH THE ADA AND TITLE 24 STANDARDS.
 2. REFER TO APPLICABLE DETAIL 3000, 3010, OR 3020 FOR CURB, GUTTER AND SIDEWALK DETAILS AND NOTES.
 3. REFER TO DS 3-14 FOR RAMP LOCATION.
 4. THE SURFACE OF THE RAMP AND FLARES SHALL HAVE A TRANSVERSED BROOMED SURFACE ROUGHER THAN THE SURROUNDING SIDEWALK.
 5. TRANSITION FROM RAMP TO GUTTER SHALL BE FLUSH. FROM GUTTER FLOWLINE TO 4' BEYOND LIP SHALL BE A MAXIMUM OF 5%.
 6. RAMP LANDING SHALL SLOPE 1.5% FROM BACK EDGE OF WALK TOWARD GUTTER.
 7. CURB RAMPS SHALL HAVE DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH OF THE RAMP AND A DEPTH OF 3'. THE EDGE OF THE DETECTABLE WARNING SURFACE NEAREST THE STREET SHALL BE BETWEEN 6" AND 8" FROM THE GUTTER FLOWLINE; REFER TO CS 15-02.
 8. CENTERLINE OF RAMP TO BE VERIFIED BY CITY PRIOR TO PLACEMENT OF FORMS.
 9. USE CITY STANDARD CONCRETE.

3150

**CURB RAMP (TYPE 2)
RESIDENTIAL AND
COLLECTOR STREET**

APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL



FRONT VIEW

NOTES:

1. CURB RAMPS SHALL COMPLY WITH THE ADA AND TITLE 24 STANDARDS.
2. REFER TO APPLICABLE DETAIL 3000, 3010, OR 3020 FOR CURB, GUTTER AND SIDEWALK DETAILS AND NOTES.
3. REFER TO DS 3-14 FOR RAMP LOCATION.
4. THE SURFACE OF THE RAMP AND FLARES SHALL HAVE A TRANSVERSED BROOMED SURFACE ROUGHER THAN THE SURROUNDING SIDEWALK.
5. TRANSITION FROM RAMP TO GUTTER SHALL BE FLUSH. FROM GUTTER FLOWLINE TO 4' BEYOND LIP SHALL BE A MAXIMUM OF 5%.
6. RAMP LANDING SHALL SLOPE 1.5% FROM BACK EDGE OF WALK TOWARD GUTTER.
7. CURB RAMPS SHALL HAVE DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH OF THE RAMP AND A DEPTH OF 3'. THE EDGE OF THE DETECTABLE WARNING SURFACE NEAREST THE STREET SHALL BE BETWEEN 6" AND 8" FROM THE GUTTER FLOWLINE; REFER TO CS 15-02.
8. CENTERLINE OF RAMP TO BE VERIFIED BY CITY PRIOR TO PLACEMENT OF FORMS.
9. USE CITY STANDARD CONCRETE.
10. THE MINIMUM INTERSECTION RADII AT THE CURB FACE OF A MAJOR COLLECTOR IS 40' AND 50' FOR AN ARTERIAL.



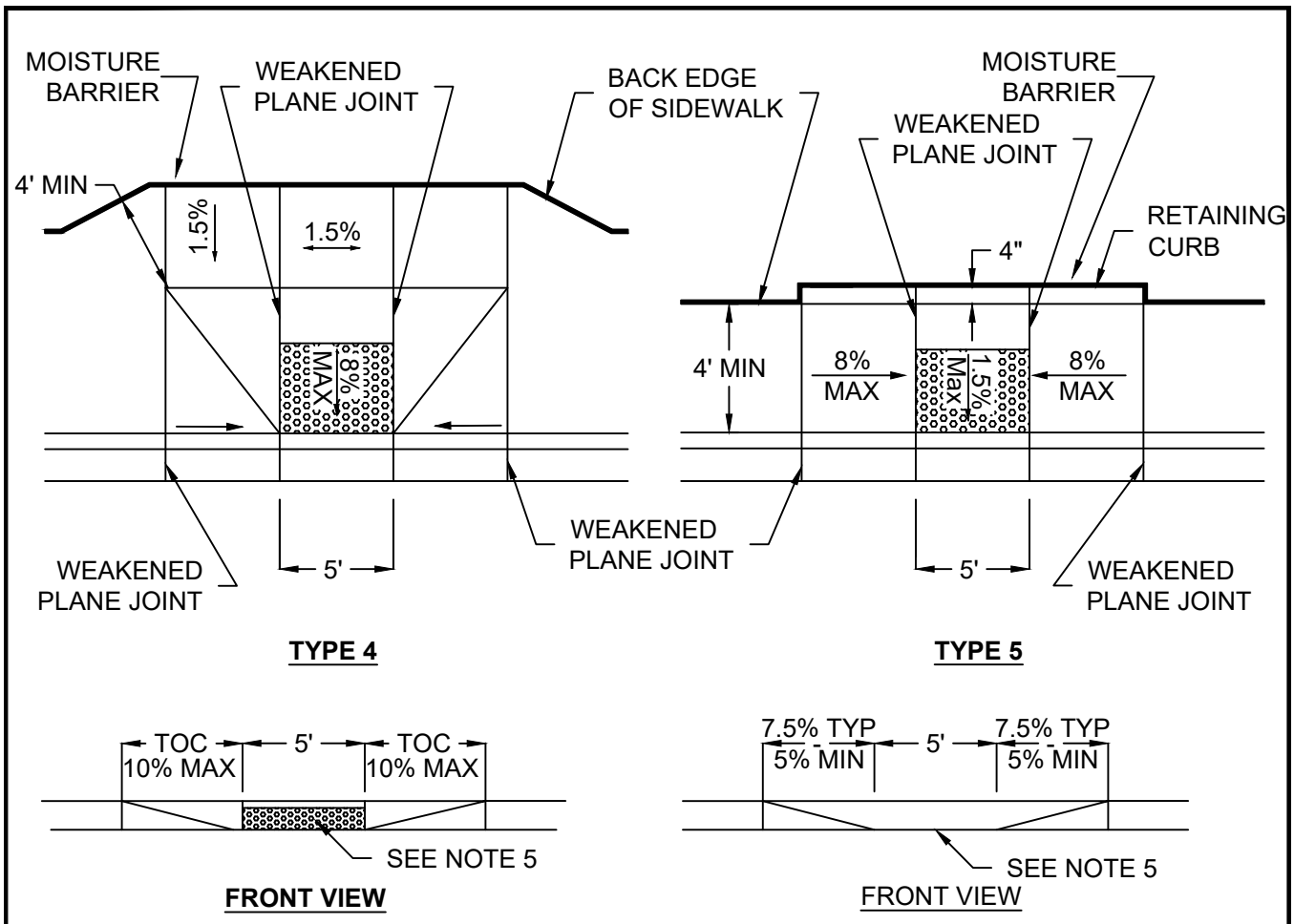
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

CURB RAMP (TYPE 3)
ARTERIAL AND
COLLECTOR STREET

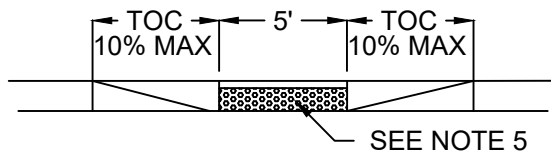
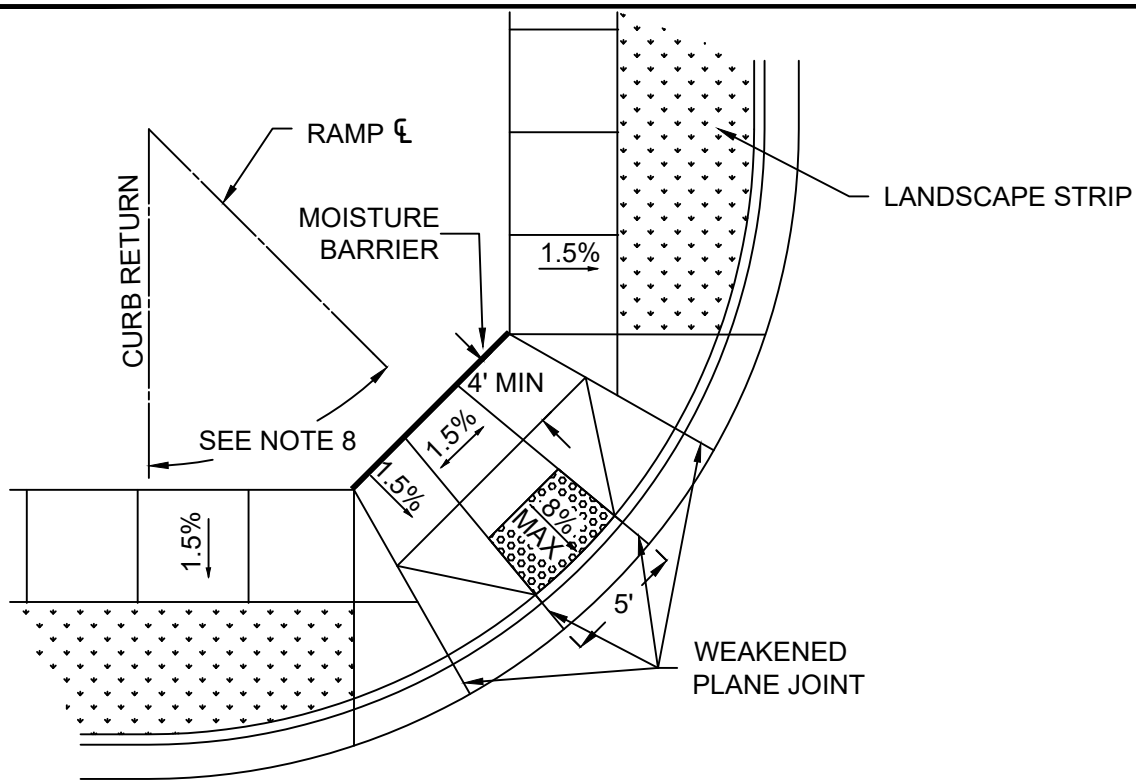
3160



NOTES:

1. CURB RAMPS SHALL COMPLY WITH THE ADA AND TITLE 24 STANDARDS.
2. REFER TO APPLICABLE DETAIL 3000, 3010, OR 3020 FOR CURB, GUTTER AND SIDEWALK DETAILS AND NOTES.
3. REFER TO DS 3-14 FOR RAMP LOCATION.
4. THE SURFACE OF THE RAMP AND FLARES SHALL HAVE A TRANSVERSED BROOMED SURFACE ROUGHER THAN THE SURROUNDING SIDEWALK.
5. TRANSITION FROM RAMP TO GUTTER SHALL BE FLUSH. FROM GUTTER FLOW LINE TO 4' BEYOND LIP SHALL BE A MAXIMUM OF 5%.
6. RAMP LANDING SHALL SLOPE 1.5% FROM BACK EDGE OF WALK TOWARD GUTTER.
7. CURB RAMPS SHALL HAVE DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH OF THE RAMP AND A DEPTH OF 3'. THE EDGE OF THE DETECTABLE WARNING SURFACE NEAREST THE STREET SHALL BE BETWEEN 6" AND 8" FROM THE GUTTER FLOWLINE; REFER TO CS 15-02.
8. USE CITY STANDARD CONCRETE.

3170	CURB RAMP (TYPE 4 & 5) MID-BLOCK RAMP	 <small>APPROVED: MARCH 2022</small>	CITY OF DIXON ENGINEERING STANDARD DETAIL 
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FRONT VIEW

NOTES:

1. CURB RAMPS SHALL COMPLY WITH THE ADA AND TITLE 24 STANDARDS.
2. REFER TO APPLICABLE DETAIL 3000, 3010, OR 3020 FOR CURB, GUTTER AND SIDEWALK DETAILS AND NOTES.
3. REFER TO DS 3-14 FOR RAMP LOCATION.
4. THE SURFACE OF THE RAMP AND FLARES SHALL HAVE A TRANSVERSED BROOMED SURFACE ROUGHER THAN THE SURROUNDING SIDEWALK.
5. TRANSITION FROM RAMP TO GUTTER SHALL BE FLUSH. FROM GUTTER FLOWLINE TO 4' BEYOND LIP SHALL BE A MAXIMUM OF 5%.
6. RAMP LANDING SHALL SLOPE 1.5% FROM BACK EDGE OF WALK TOWARD GUTTER.
7. CURB RAMPS SHALL HAVE DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH OF THE RAMP AND A DEPTH OF 3'. THE EDGE OF THE DETECTABLE WARNING SURFACE NEAREST THE STREET SHALL BE BETWEEN 6" AND 8" FROM THE GUTTER FLOWLINE; REFER TO CS 15-02.
8. CENTERLINE OF RAMP TO BE VERIFIED BY CITY PRIOR TO PLACEMENT OF FORMS.
9. USE CITY STANDARD CONCRETE.



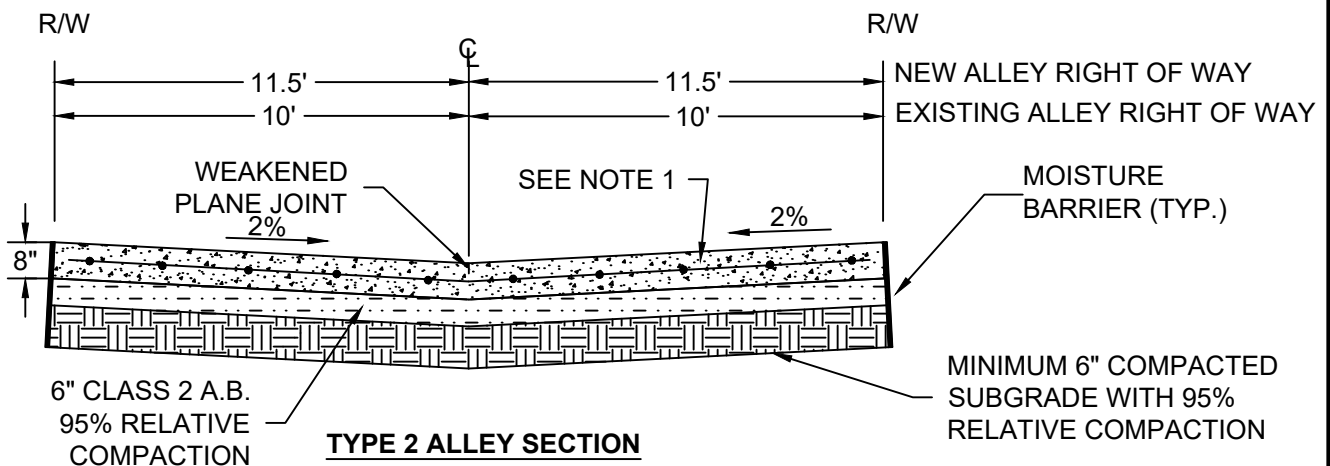
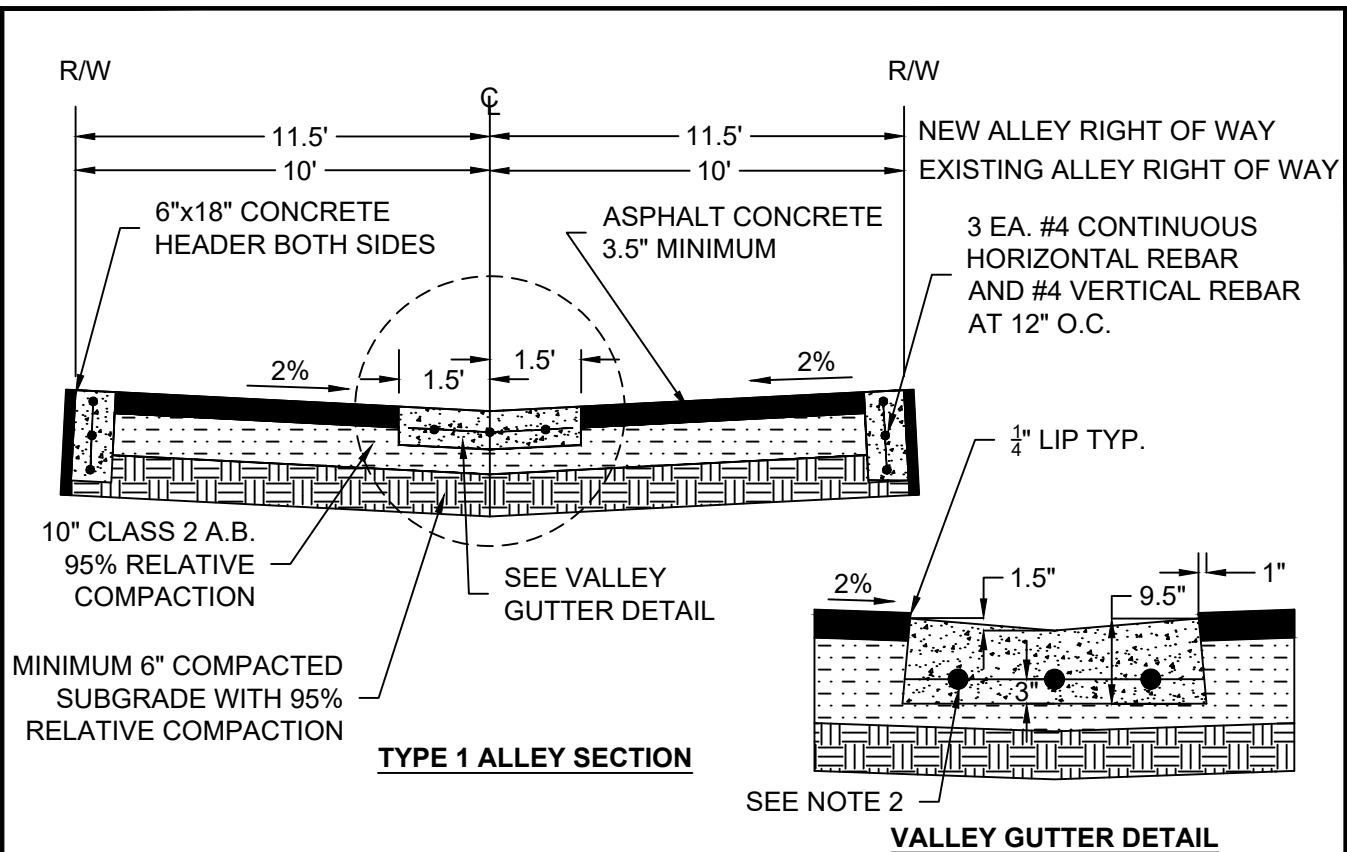
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022



**SEPARATED SIDEWALK
CURB RAMP (TYPE 6)
RESIDENTIAL AND
COLLECTOR STREET**

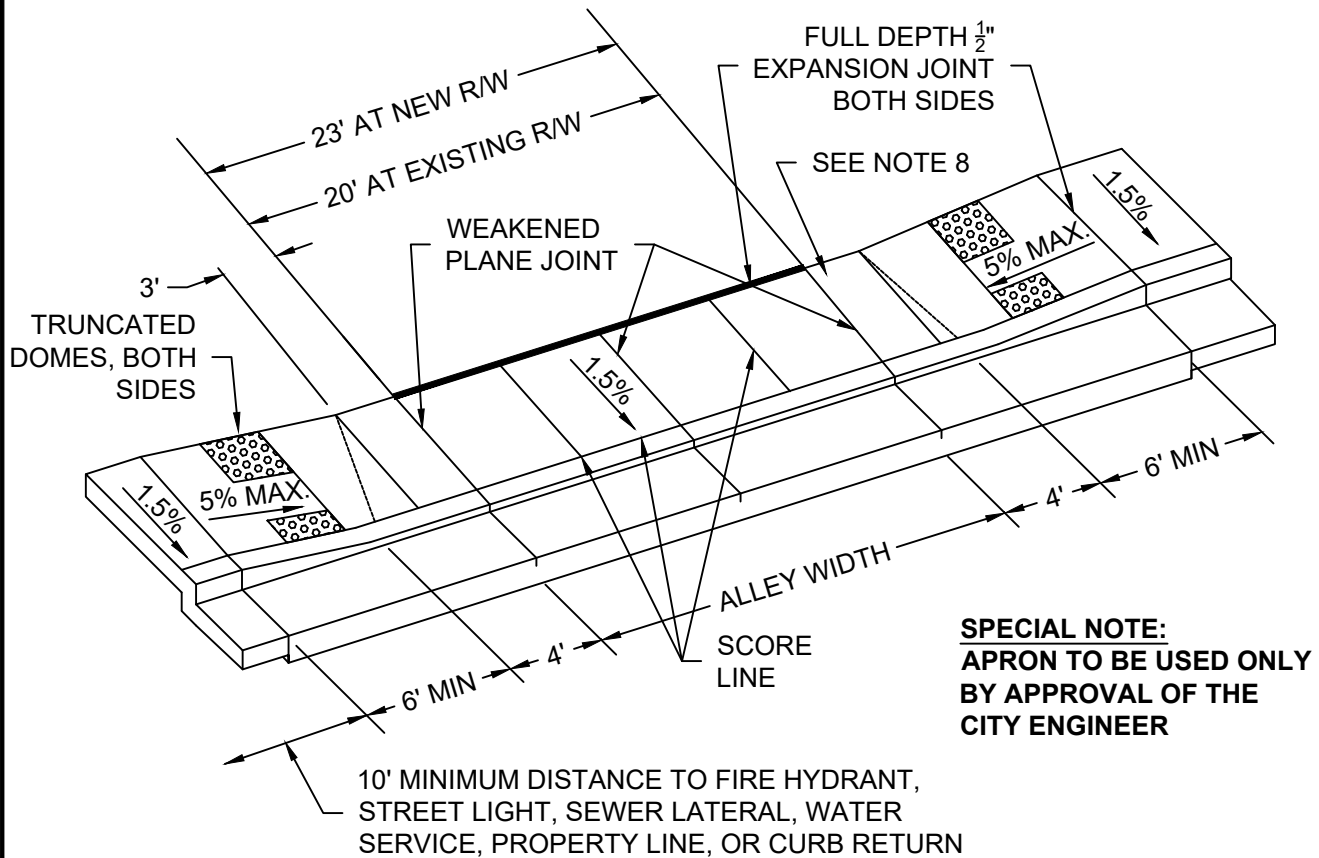
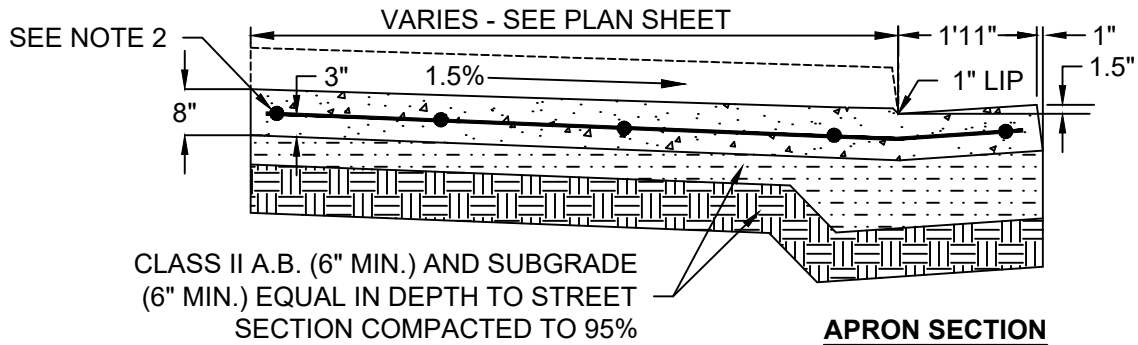
3180



NOTES:

1. CITY STANDARD CONCRETE WITH #4 REBAR AT 18" O.C. BOTH WAYS, 24" MINIMUM OVERLAP.
2. #4 REBAR BOTH WAYS AT 12" O.C. LONGITUDINALLY AND 4' O.C. LATERALLY.
3. APPLY "FINE BROOM" FINISH TO TYPE 2 ALLEY PARALLEL TO CENTERLINE.
4. MINIMUM CORNER RADIUS SHALL BE 1/2" RADIUS.
5. THE TRANSVERSE WEAKENED PLANE JOINT INTERVAL SHALL BE 10' FOR EXISTING ALLEYS AND 11.5' FOR NEW ALLEYS.
6. EXPANSION JOINT INTERVALS SHALL BE PLACED AT EVERY THIRD TRANSVERSE WEAKENED PLANE JOINT.
7. USE CITY STANDARD CONCRETE.

3190	ALLEY SECTIONS TYPE 1 AND 2 NEW AND EXISTING RIGHT-OF-WAY	 <small>APPROVED: MARCH 2022</small>	CITY OF DIXON ENGINEERING STANDARD DETAIL 
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NOTES:

1. CITY STANDARD CONCRETE WITH #4 REBAR AT 18" O.C. BOTH WAYS, 24" MINIMUM OVERLAP.
2. SCORE LINES SHALL BE $\frac{1}{2}$ " DEEP AND FORM A SQUARE.
3. APPLY "FINE BROOM" FINISH TO SIDEWALK PERPENDICULAR TO STREET; APPLY "FINE BROOM" FINISH TO CURB AND GUTTER PARALLEL TO STREET.
4. ALLEY APRON SHALL BE POURED MONOLITHICALLY.
5. WHEN TYING INTO EXISTING, DRILL AND DOWEL WITH 12" LONG, #4 REBAR AT A MAXIMUM 12" O.C.
6. MINIMUM CORNER RADIUS SHALL BE $\frac{1}{2}$ " RADIUS.
7. IF ADJACENT ASPHALT IS DAMAGED, REPLACE USING DETAIL 3130.
8. ALLEY WAY RIGHT OF WAY'S SHALL HAVE DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH OF THE SIDEWALK AT A DEPTH OF 3'. REFER TO CS 15-02.



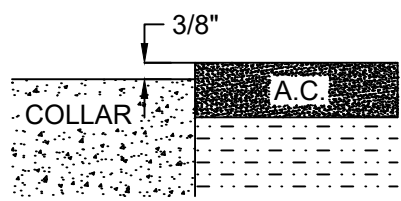
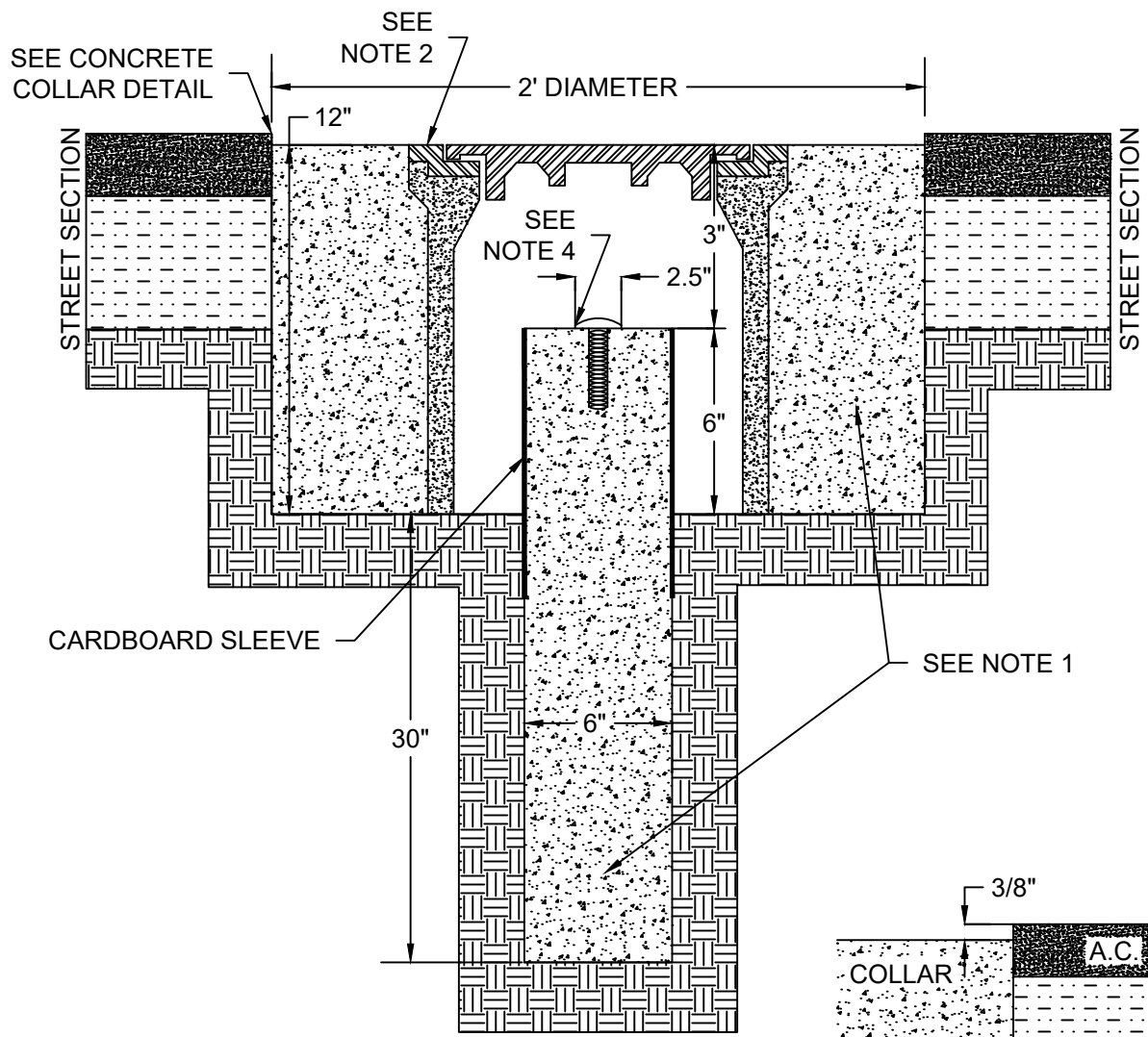
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

ALLEY APRON

3200

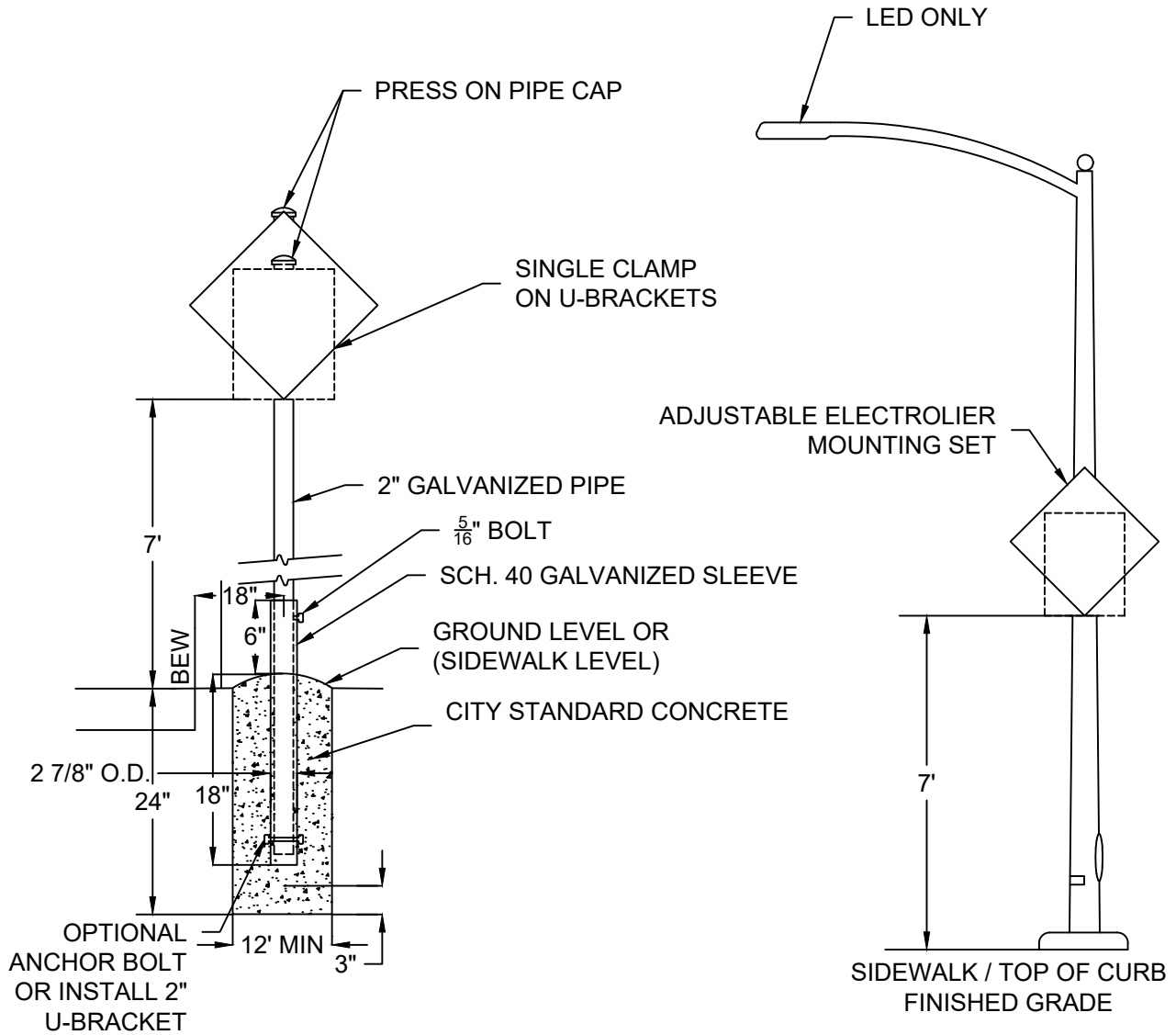


CONCRETE COLLAR DETAIL

NOTES:

1. USE CITY STANDARD CONCRETE.
2. COLLAR SHALL BE INTEGRALLY COLORED WITH PIGMENT #807 AS MANUFACTURED BY DAVIS COLORS.
3. MONUMENT FRAME AND COVER SHALL BE CHRISTY G5 TRAFFIC VALVE BOX OR APPROVED EQUAL. LID SHALL BE MARKED "MONUMENT".
4. SURVEY MARKER SHALL BE LEITZ 8134-16 OR SERVICE CO. 287-C.
5. THE R.E. OR L.S. NUMBER MUST APPEAR ON THE MONUMENT MARKER.
6. MARK REFERENCE POINT WITH A "+".

3210	STREET SURVEY MONUMENT		CITY OF DIXON ENGINEERING STANDARD DETAIL	
		APPROVED: MARCH 2022		



NOTES:

1. SIGN LOCATIONS TO BE DETERMINED BY THE CITY ENGINEER PRIOR TO PLACEMENT.
2. BACK BRACING REQUIRED FOR SIGNS LARGER THAN 18"x24" OR WHERE IDENTIFIED BY THE CITY ENGINEER.
3. ALL SIGNS SHALL BE HIGH-INTENSITY PRISMATIC WITH GRAFFITI FILM.
4. ALL MOUNTING HARDWARE SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.



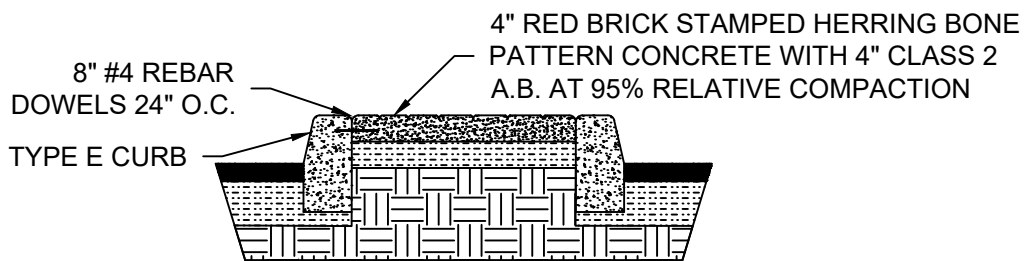
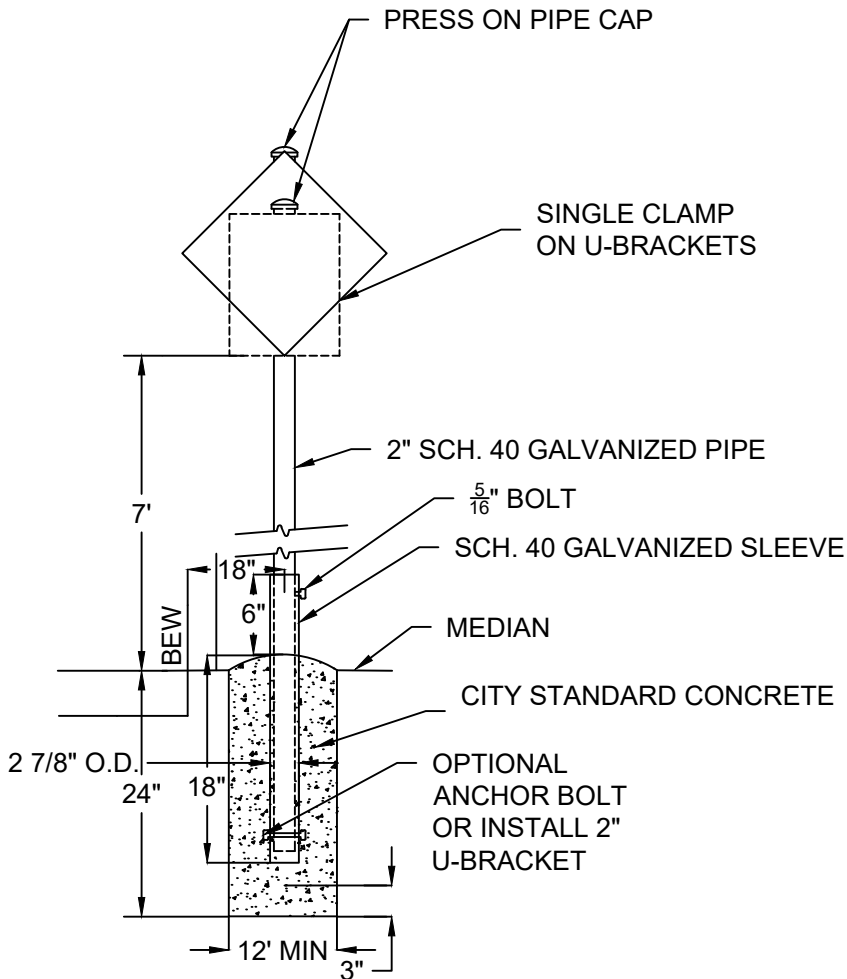
CITY OF DIXON
 ENGINEERING
 STANDARD DETAIL



APPROVED: MARCH 2022

STREET SIGN

3220



STREET SECTION PER IMPROVEMENT PLANS

NOTES:

1. SIGN LOCATIONS TO BE DETERMINED BY THE CITY ENGINEER PRIOR TO PLACEMENT.
2. BACK BRACING REQUIRED FOR SIGNS LARGER THAN 18"x24" OR WHERE IDENTIFIED BY THE CITY ENGINEER.
3. ALL SIGNS SHALL BE HIGH-INTENSITY PRISMATIC WITH GRAFFITI FILM.
4. ALL MOUNTING HARDWARE SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.

3230

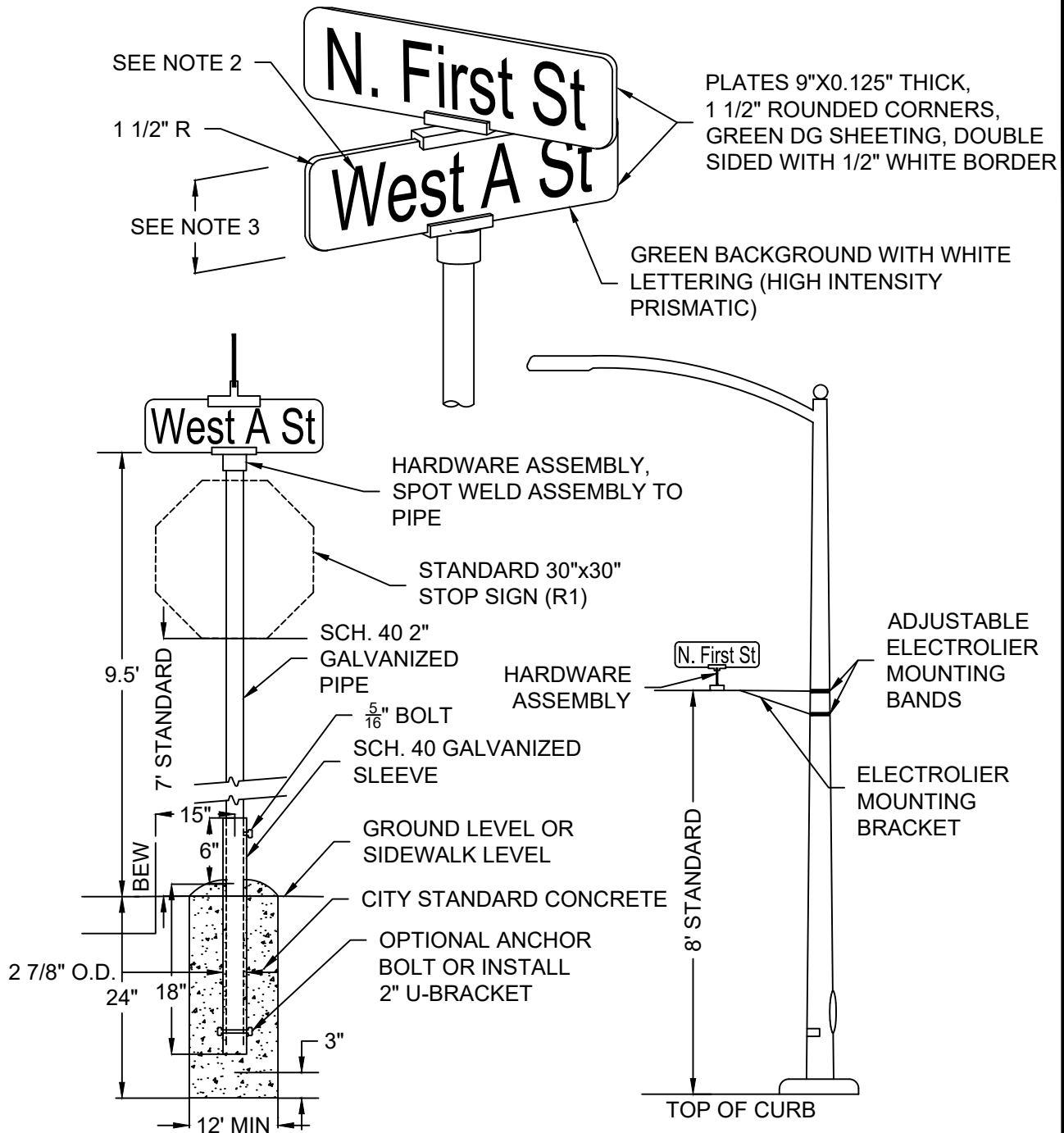
MEDIAN SIGNS WITH
"BREAK-AWAY"



APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

1. SIGN LOCATIONS TO BE DETERMINED BY THE CITY ENGINEER.
2. LETTERING SHALL BE HWY GOTHIC MOD C, WITH 1/2" STROKE WIDTH MINIMUM. INITIAL UPPER-CASE LETTER AT LEAST 6 INCHES AND LOWER-CASE LETTERS AT LEAST 4.5 INCHES IN HEIGHT.
3. SEE CS-20 "STREET NAME SIGNS" FOR DETAILS.
4. ALL MOUNTING HARDWARE SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.

SHEET 1 OF 2



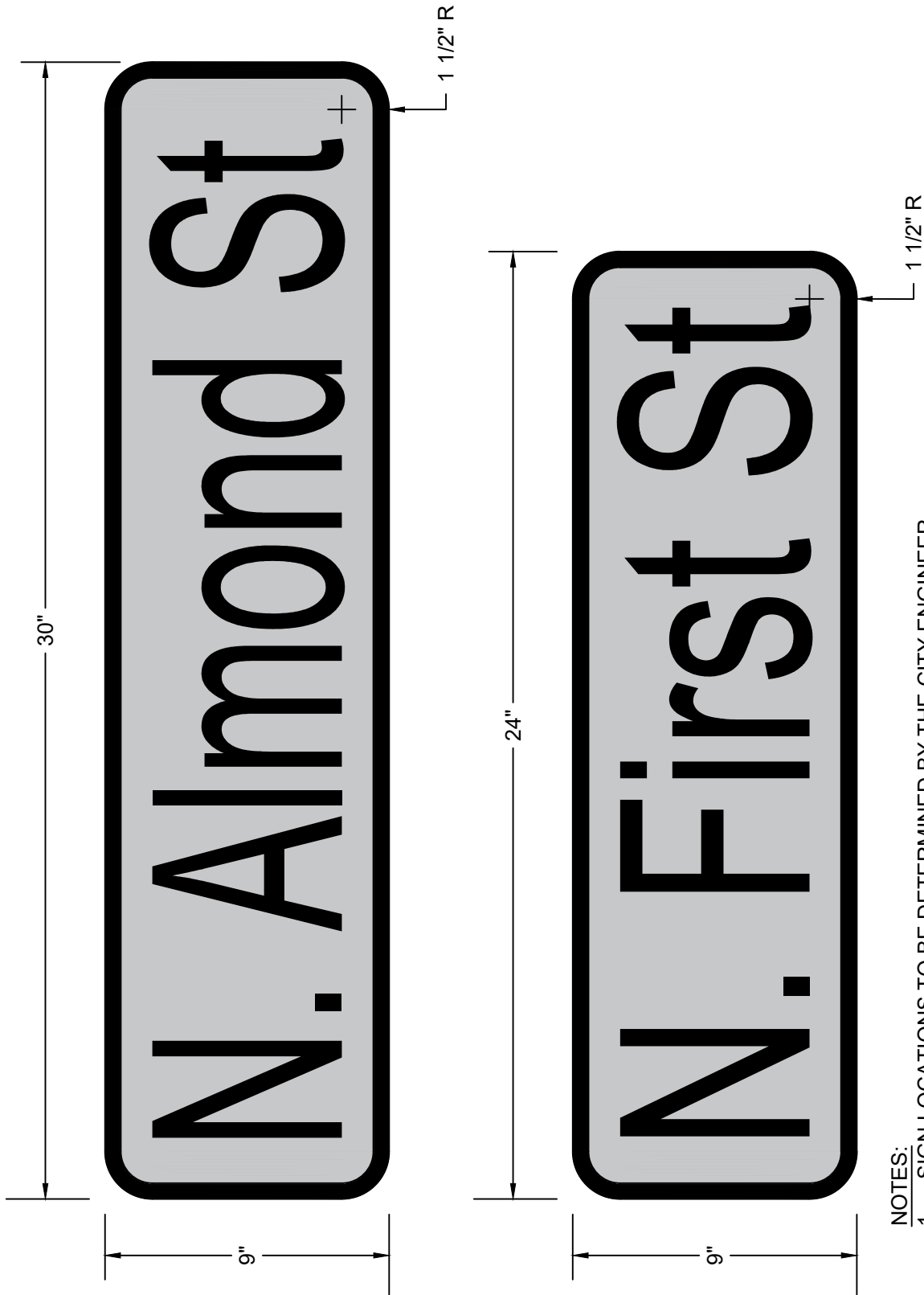
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

STREET NAME SIGN

3240



- NOTES:
1. SIGN LOCATIONS TO BE DETERMINED BY THE CITY ENGINEER.
 2. LETTERING SHALL BE HWY GOTHIC MOD C, WITH 1/2" STROKE WIDTH MINIMUM. INITIAL UPPER-CASE LETTER AT LEAST 6 INCHES AND LOWER-CASE LETTERS AT LEAST 4.5 INCHES IN HEIGHT.

SHEET 2 OF 2



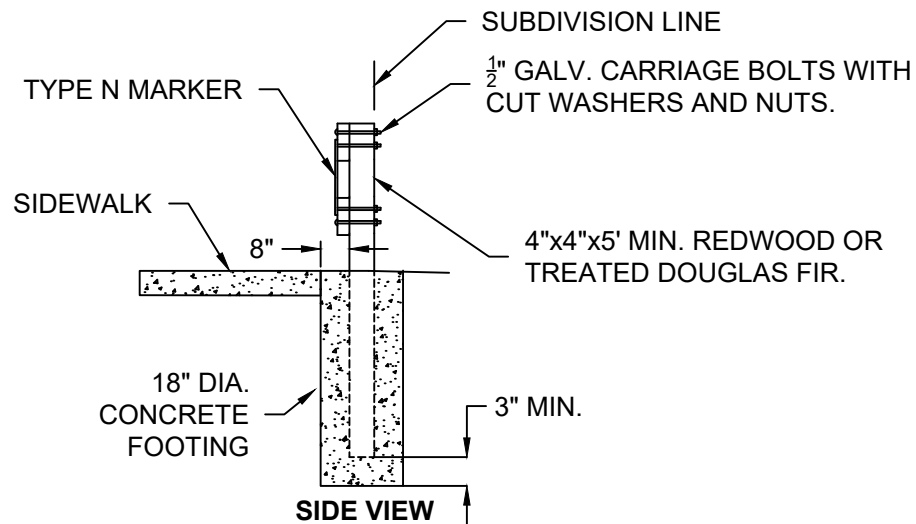
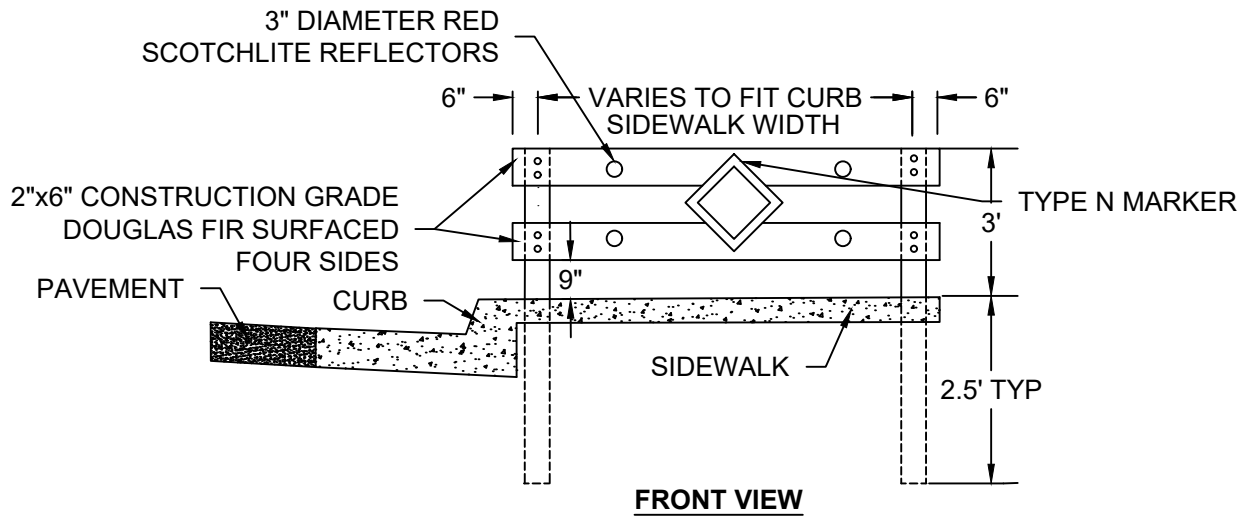
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

STREET NAME SIGN

3240



NOTES:

1. SIDEWALK BARRICADES TO BE ERECTED AT EACH LOCATION WHERE SATISFACTORY PROVISION CANNOT BE MADE FOR PEDESTRIANS TO CONTINUE BEYOND THE TERMINUS OF A SIDEWALK.
2. ALL EXPOSED WOOD SURFACES SHALL BE PAINTED WITH (2) COATS OF WHITE PAINT CONFORMING TO STATE STANDARD SPECIFICATION 91-3.02.

3250

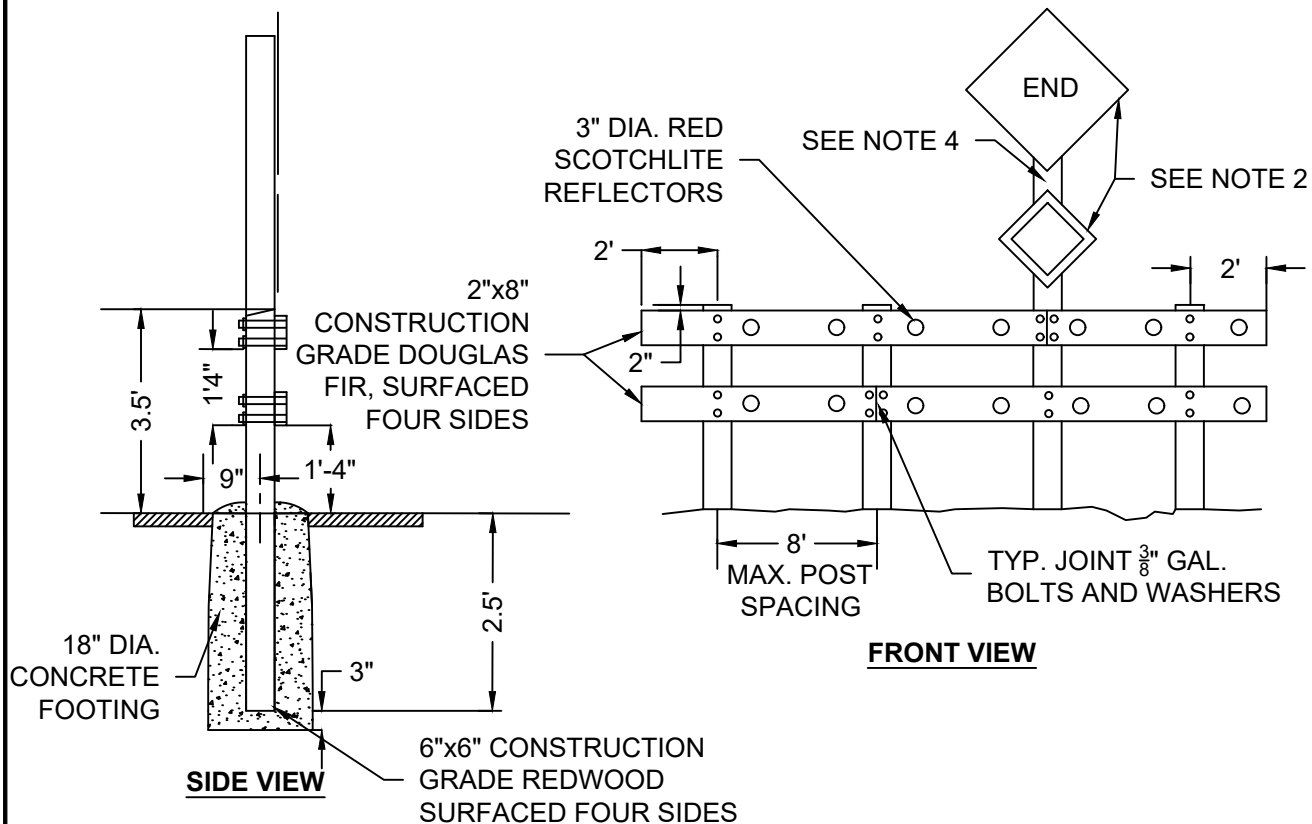
SIDEWALK
BARRICADE



APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





	NUMBER		SIZE		SIGN	
R/W	W31		TYPE N		C2 SIGN	
WIDTH	SIZE	NO.	SIZE	NO.	SIZE	NO.
≤ 50'	30"	1	18"	1	24"x36"	1
51'-75'	30"	2	18"	2	30"x48"	1
>75'	30"	2	18"	2	30"x48"	1

NOTES:

1. AT STREET TERMINATION LOCATIONS, AS APPROVED BY THE CITY ENGINEER, A C2 "ROAD CLOSED" SIGN WILL BE REQUIRED ON THE CENTERLINE OF THE ROAD IN ADDITION TO THE W31 "END" SIGNS.
2. 30"x30" W31 SIGNS AND 18"x18" RED TYPED N MARKERS ARE REQUIRED.
3. ALL EXPOSED SURFACES SHALL BE PAINTED WITH TWO COATS OF WHITE PAINT CONFORMING TO THE STATE STANDARD SPECIFICATION 91-3.02 PRIOR TO PLACEMENT OF REFLECTORS.
4. PLACE POST AT OR NEAREST TO CENTER. EXTEND RIGHT HAND SIDE TO PROVIDE MOUNTING FOR SIGNS.
5. USE CITY STANDARD CONCRETE.



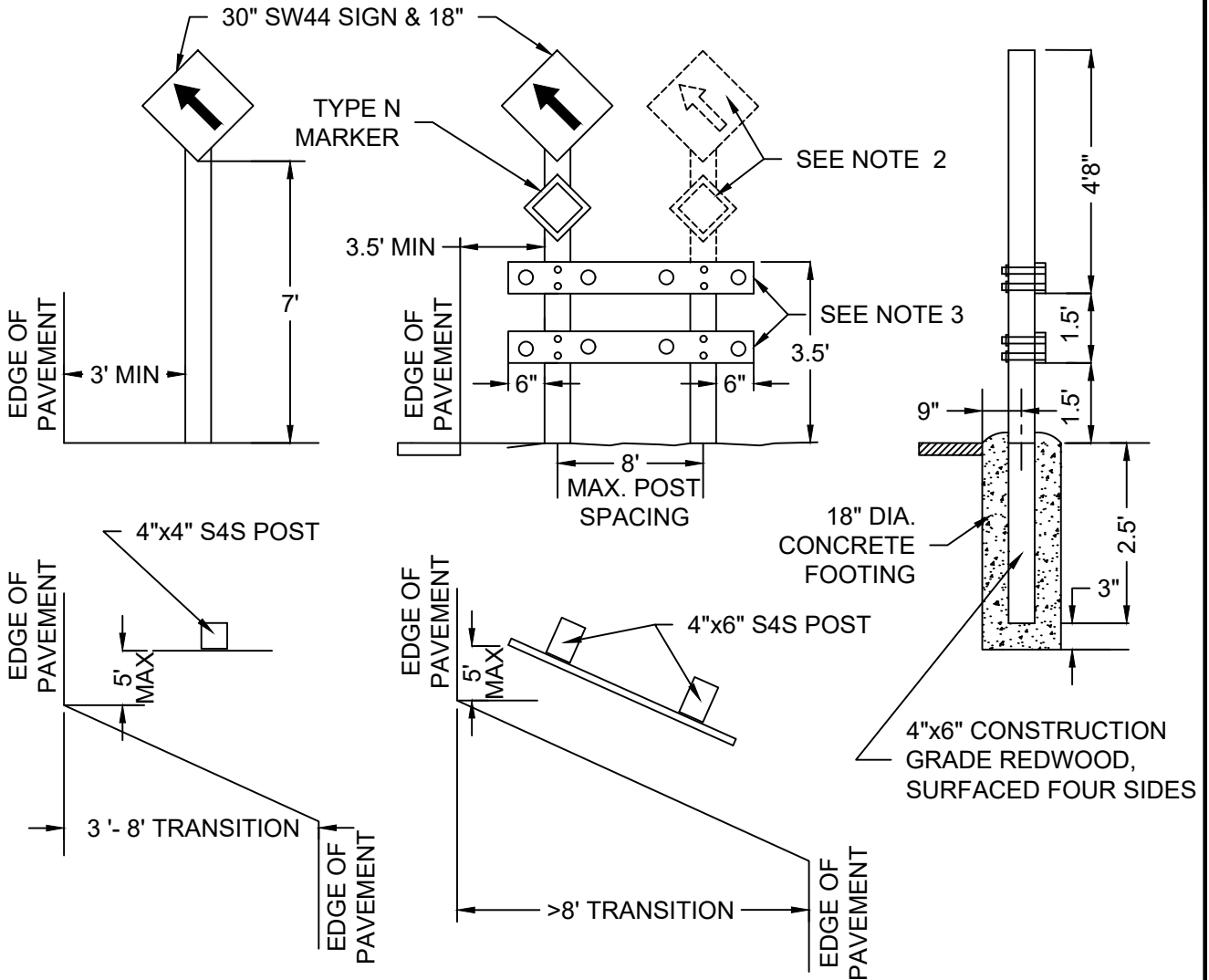
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

**END OF STREET
BARRICADE**

3260



NOTES:

1. ALL EXPOSED WOOD SURFACES SHALL BE PAINTED WITH (2) COATS OF WHITE PAINT CONFORMING TO STATE STANDARD SPECIFICATION 91-3.02.
2. FOR TRANSITION GREATER THAN 18', A SECOND SW44 AND TYPE N MARKER SHALL BE REQUIRED ON THE EXTENSION OF THE SECOND POST FROM THE EDGE OF PAVEMENT.
3. 2"x18" CONSTRUCTION GRADE REDWOOD SURFACED FOUR SIDES.
4. USE CITY STANDARD CONCRETE.

3270

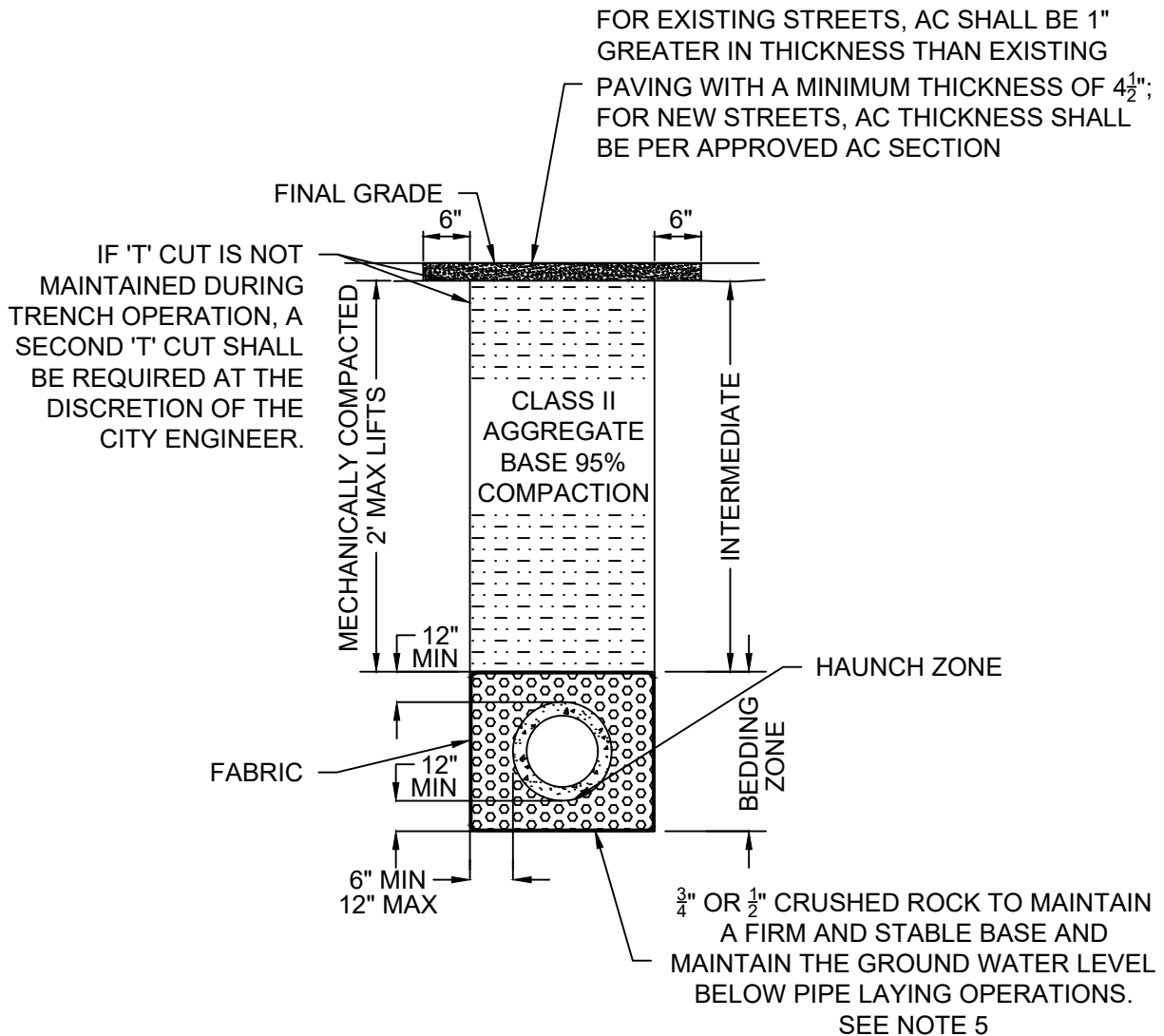
STREET TRANSITION
SIGN & BARRICADE



APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

1. TEMPORARY ASPHALT SURFACING SHALL HAVE A MINIMUM THICKNESS OF 2 INCHES AND SHALL BE PLACED IMMEDIATELY AFTER BACKFILL INSTEAD OF FINAL PAVING, TEMPORARY CUTBACK SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL PERMANENT PAVING IS INSTALLED. PERMANENT PAVING TO BE INSTALLED NO LATER THAN 30 DAYS FOLLOWING BACKFILL OPERATION.
2. PRIOR TO PERMANENT PAVING, EXISTING A.C. SHALL BE SAWCUT TO A NEAT EDGE 6" ON EITHER SIDE AND SHALL BE TACKED PRIOR TO REPAVING.
3. FINAL TRENCH DETAIL DEPENDENT UPON DESIGN, PIPE MATERIAL AND SOIL CONDITIONS.
4. FINAL A.C. PAVING SHALL BE PLACED $\frac{1}{8}$ " ABOVE ADJACENT A.C. GRADE
5. BEDDING ZONE SHALL CONSIST OF $\frac{3}{4}$ " OR $\frac{1}{2}$ " CRUSHED ROCK AS PER ASTM C-12. CRUSHED ROCK SHALL BE PLACED IN A MANNER SUCH AS SHOVEL-SLICING SPADE OR SHOVEL RODDING TO ENSURE CONSOLIDATION OF HAUNCH ZONE BELOW SPRINGLINE OF THE PIPE.
6. INTERMEDIATE BACKFILL REQUIREMENTS SHALL BE AS SPECIFIED BY THE SOILS ENGINEER, OR THE DESIGN ENGINEER IN ACCORDANCE WITH THE SOIL REPORT, AS APPROVED BY THE CITY ENGINEER.
7. A 2-SACK SAND SLURRY BACKFILL MAY BE UTILIZED IN THE INTERMEDIATE ZONE AS APPROVED BY THE CITY ENGINEER.



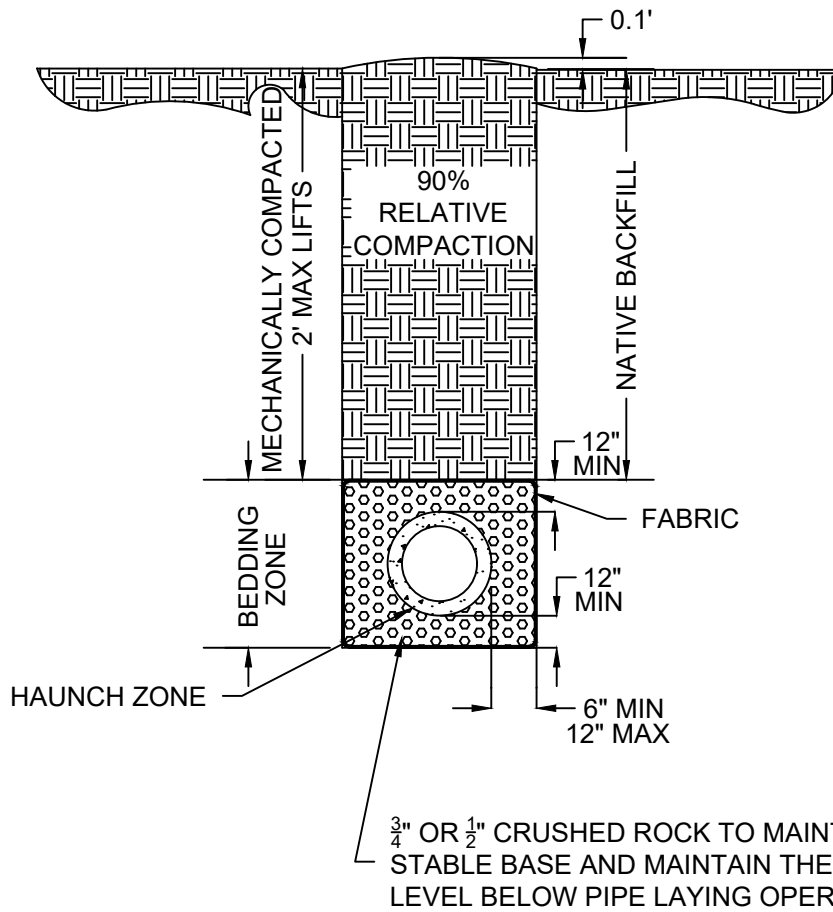
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

**TRENCH BACKFILL
FOR CITY UTILITIES
WITHIN PAVED AREA**

3280



NOTES:

1. FINAL TRENCH DETAIL DEPENDENT UPON DESIGN, PIPE MATERIAL, AND SOIL CONDITIONS.
2. BEDDING ZONE SHALL CONSIST OF $\frac{3}{4}$ " OR $\frac{1}{2}$ " CRUSHED ROCK AS PER ASTM-C-12. CRUSHED ROCK SHALL BE PLACED IN A MANNER SUCH AS SHOVEL-SLICING SPADE OR SHOVEL RODDING TO ENSURE CONSOLIDATION OF HAUNCH ZONE BELOW SPRINGLINE OF THE PIPE.

3290

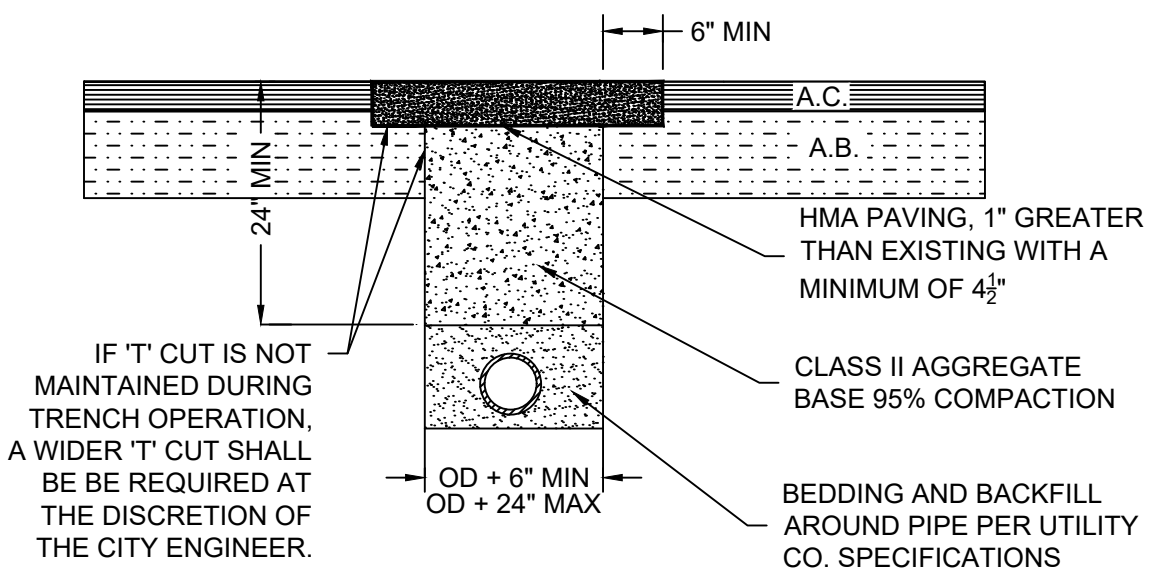
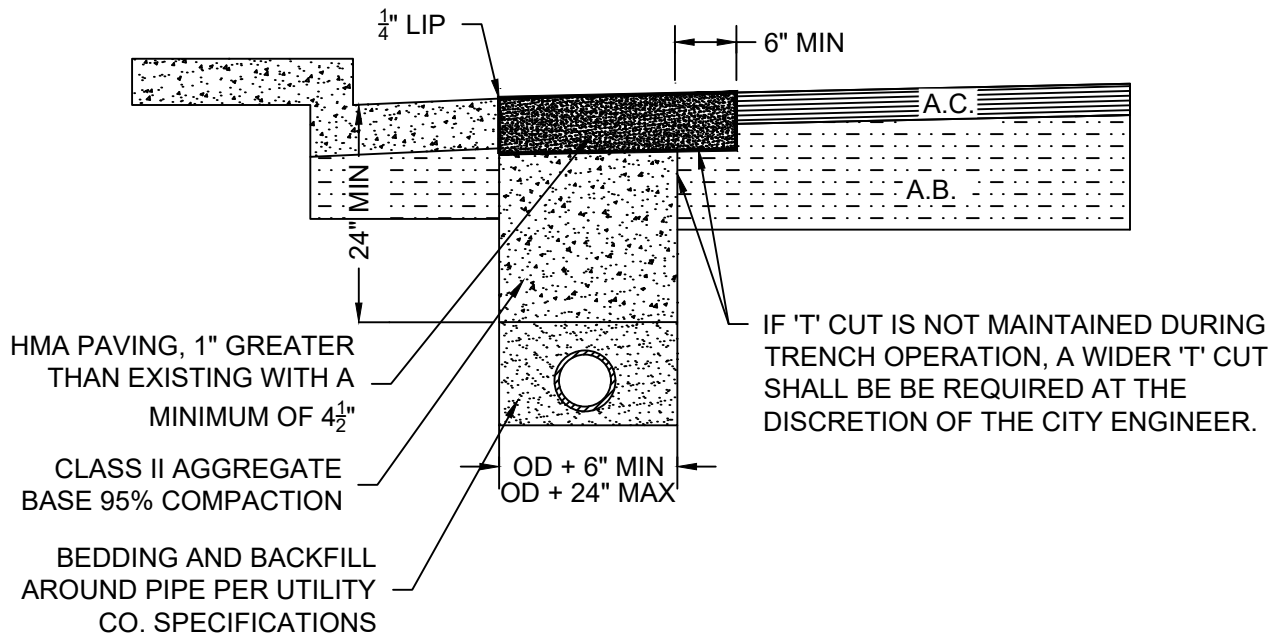
TRENCH BACKFILL
FOR CITY UTILITIES
IN UNPAVED AREAS



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CITY OF DIXON
ENGINEERING
STANDARD DETAIL



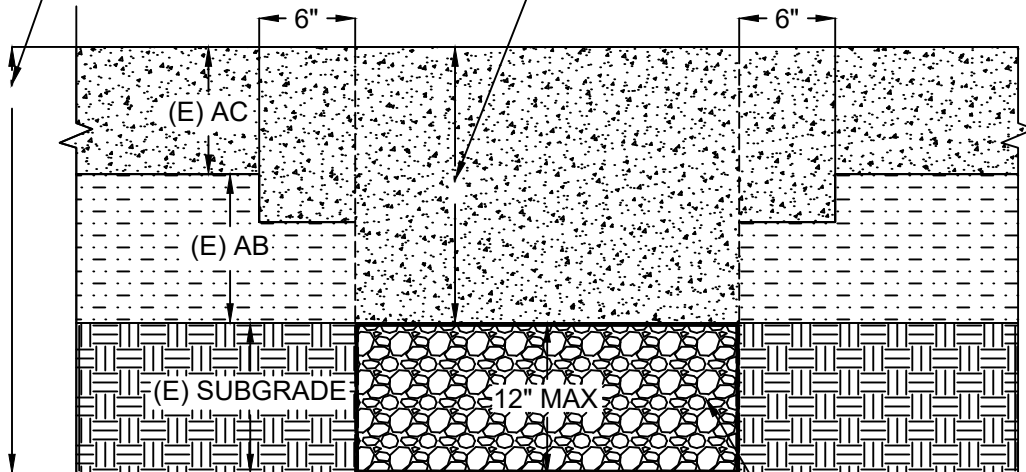


NOTES:

1. TEMPORARY ASPHALT SURFACING SHALL HAVE A MINIMUM THICKNESS OF 2 INCHES AND SHALL BE PLACED IMMEDIATELY AFTER BACKFILL INSTEAD OF FINAL PAVING, TEMPORARY CUTBACK SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL PERMANENT PAVING IS INSTALLED. PERMANENT PAVING TO BE INSTALLED NO LATER THAN 30 DAYS FOLLOWING BACKFILL OPERATION.
2. PRIOR TO PERMANENT PAVING, EXISTING A.C. SHALL BE SAWCUT TO A NEAT EDGE 6" ON EITHER SIDE AND SHALL BE TACKED PRIOR TO REPAVING.
3. FINAL R.M.A. PAVING SHALL BE PLACED $\frac{1}{8}$ " ABOVE ADJACENT A.C. GRADE.
4. FOR ADDITIONAL PAVEMENT REQUIREMENTS SEE STANDARD SPECIFICATIONS FOR SURFACE

REPAIR SHALL BE FULL A.C. AND A.B. EXISTING SECTION DEPTH PLUS 8" UNLESS OTHERWISE DETERMINED BY THE CITY ENGINEER.

SECTION SHALL BE REPAIRED WITH FULL DEPTH AC PAVING TO TOP OF SUBGRADE UNLESS OTHERWISE DETERMINED BY THE CITY ENGINEER



DIGOUT AREA
TO BE REPAIRED AS
SPECIFIED BY ENGINEER

12" MAX OF 2"
BALLAST ROCK
WRAPPED IN FABRIC
UNLESS OTHERWISE
DETERMINED BY
THE CITY ENGINEER

NOTES:

1. TEMPORARY CUTBACK SHALL BE PLACED IMMEDIATELY AFTER BACKFILL INSTEAD OF FINAL PAVING, TEMPORARY CUTBACK SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL PERMANENT PAVING IS INSTALLED. PERMANENT PAVING TO BE INSTALLED NO LATER THAN 30 DAYS FOLLOWING BACKFILL OPERATION.
2. PRIOR TO PERMANENT PAVING, EXISTING A.C. SHALL BE SAWCUT TO A NEAT EDGE 6" ON EITHER SIDE AND SHALL BE TACKED PRIOR TO REPAVING.
3. FINAL A.C. PAVING SHALL BE PLACED $\frac{1}{8}$ " ABOVE ADJACENT A.C. GRADE

3310

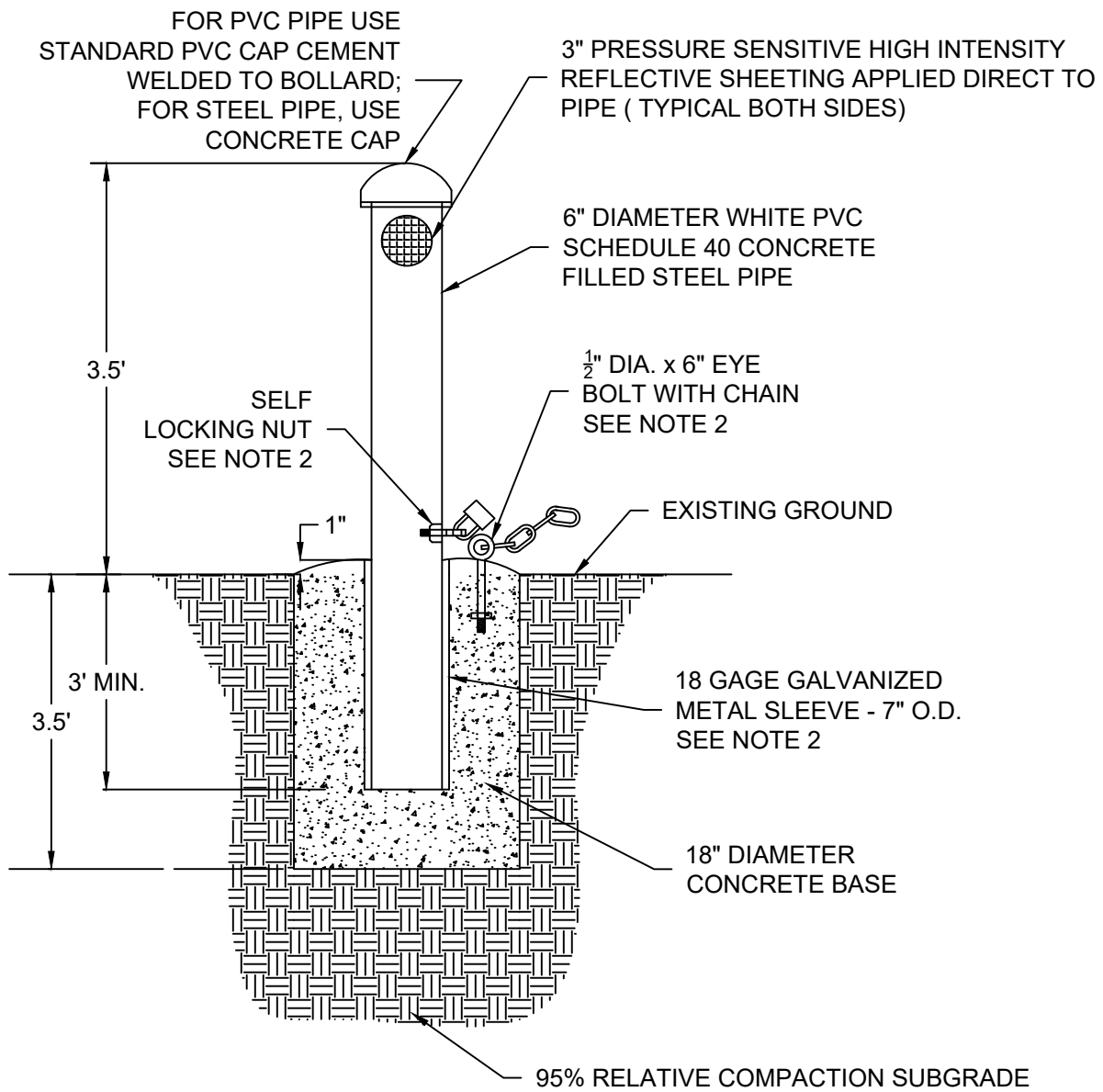
PAVEMENT DIGOUT
REPAIR



APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

1. USE CITY STANDARD CONCRETE.
2. OMIT CHAIN LOCKING DEVICE & FOOTING SLEEVE WHEN INSTALLING CONCRETE FILLED STEEL PIPE BOLLARD.
3. LOCATED NOT LESS THAN 3 FEET FROM PROTECTED OBJECT.



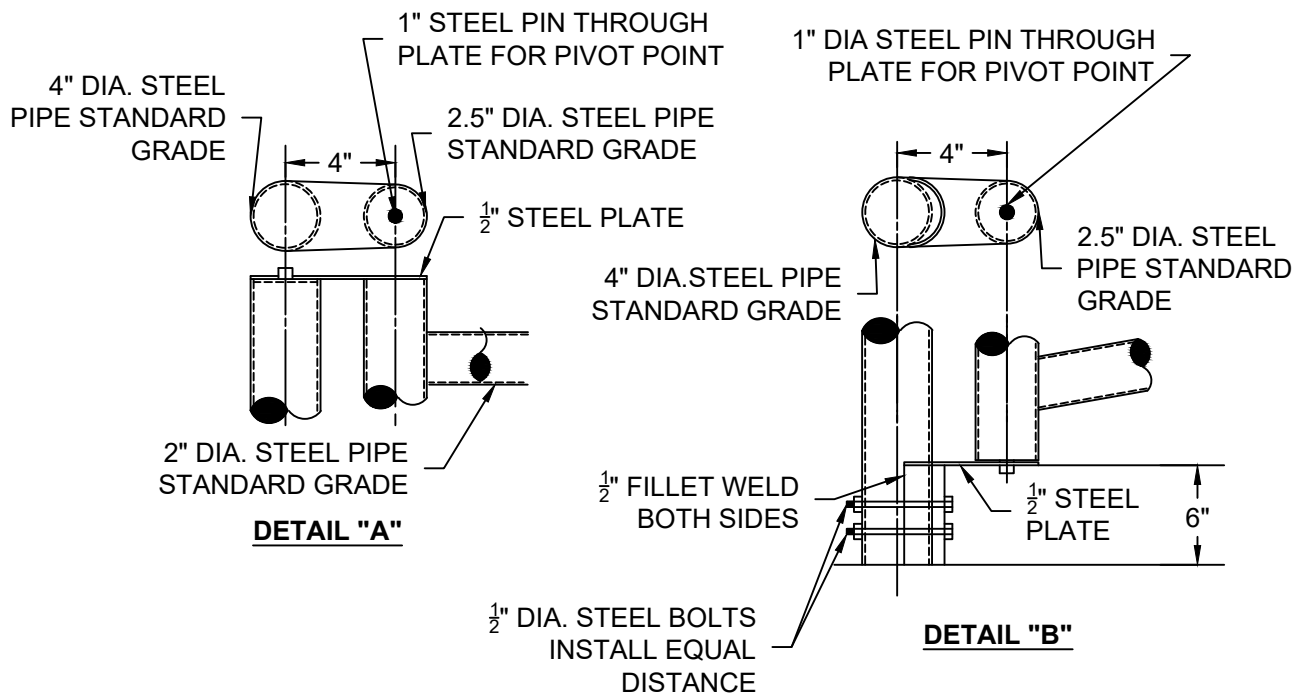
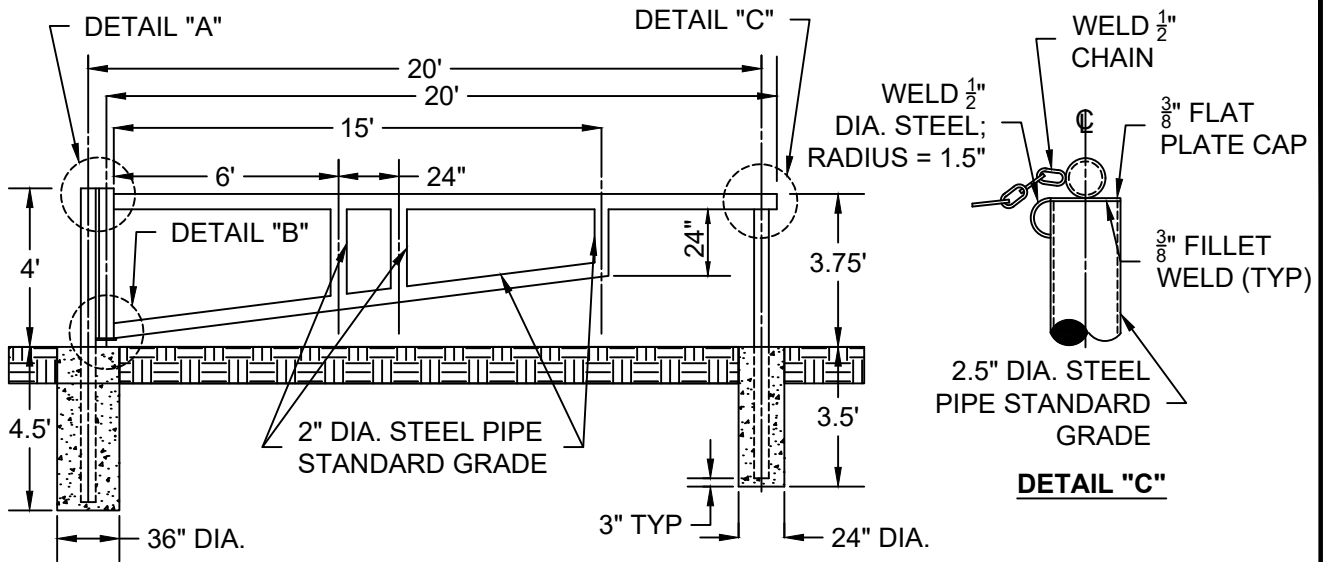
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

**PVC & CONCRETE
FILLED STEEL PIPE
BOLLARD**

3320



NOTES:

1. USE CITY STANDARD CONCRETE.
2. ALL STEEL PIPE AND PLATES SHALL COMPLY WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC).
3. ACCESS GATE SHALL BE HOT-DIP GALVANIZED.
4. ALL WELDS SHALL BE FULL PENETRATION UNLESS SPECIFIED OTHERWISE.

3330

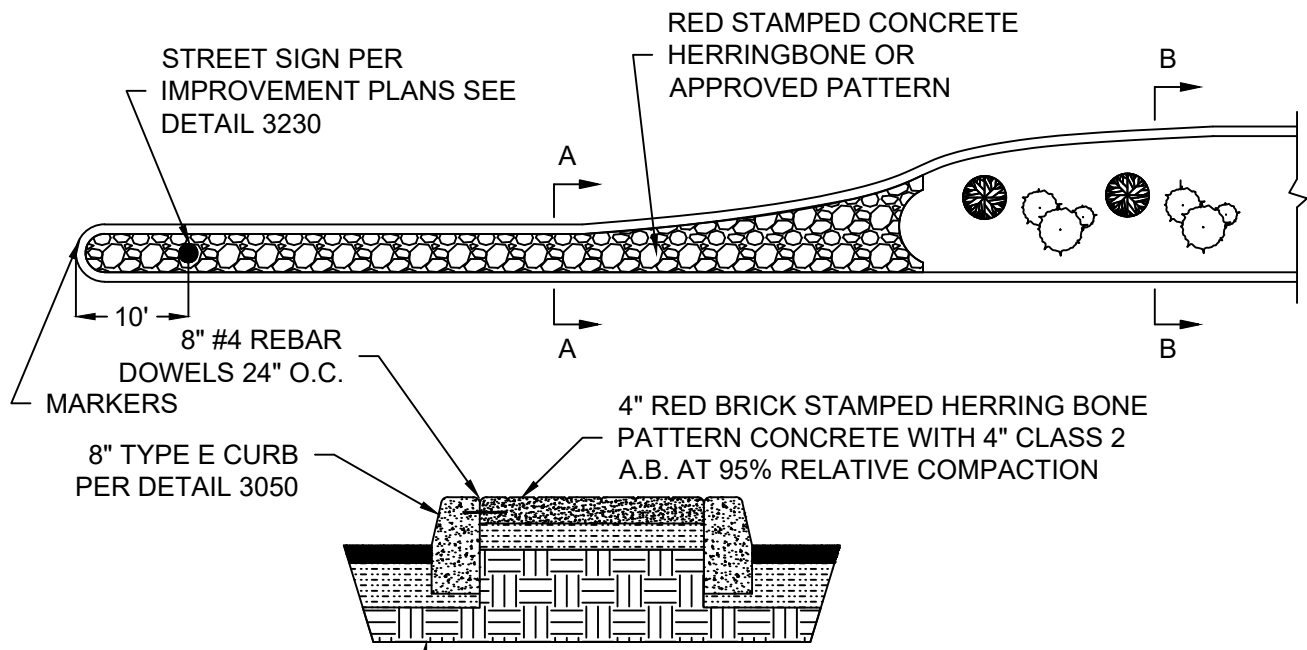
ACCESS GATE



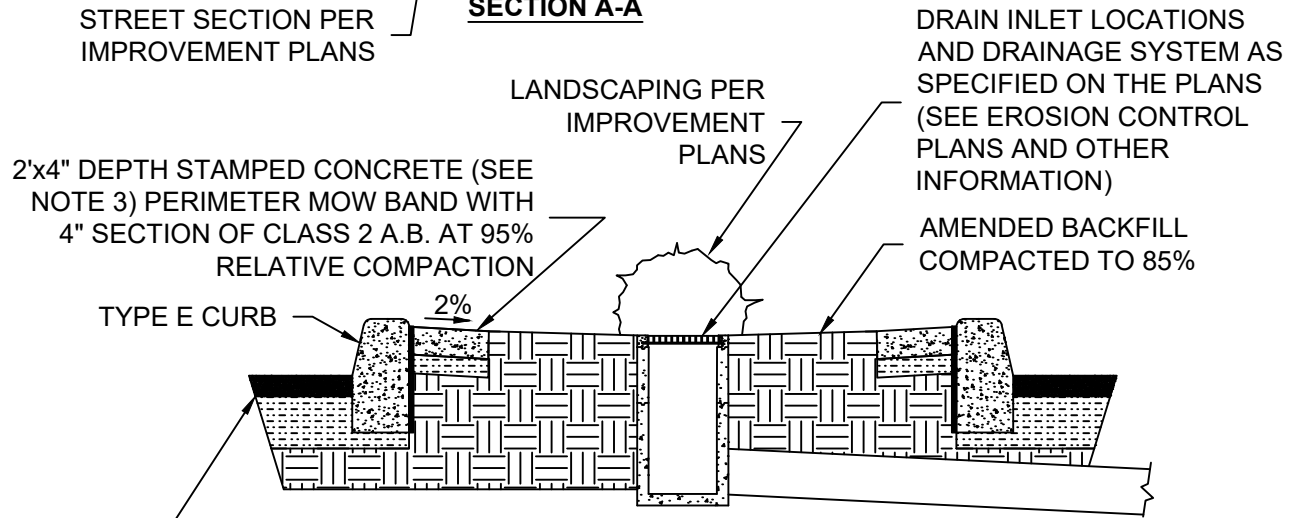
APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





SECTION A-A



SECTION B-B

NOTES:

1. USE CITY STANDARD CONCRETE.
2. 6"x 6"x 10 GAUGE WIRE REINFORCEMENT REQUIRED FOR STAMPED CONCRETE.
3. 40 MIL. WATER STOP SHEET "DEEP ROOT" #WB24 OR APPROVED EQUAL INSTALL WATER STOP BELOW MOW BAND BY APPLYING ADHESIVE BETWEEN CURB AND WATER STOP. WATER STOP SHALL BE MINIMUM 24" DEPTH UNLESS SPECIFIED IN THE PLANS OR SPECIAL PROVISIONS/ SPECIFICATIONS.



CITY OF DIXON
ENGINEERING
STANDARD DETAIL

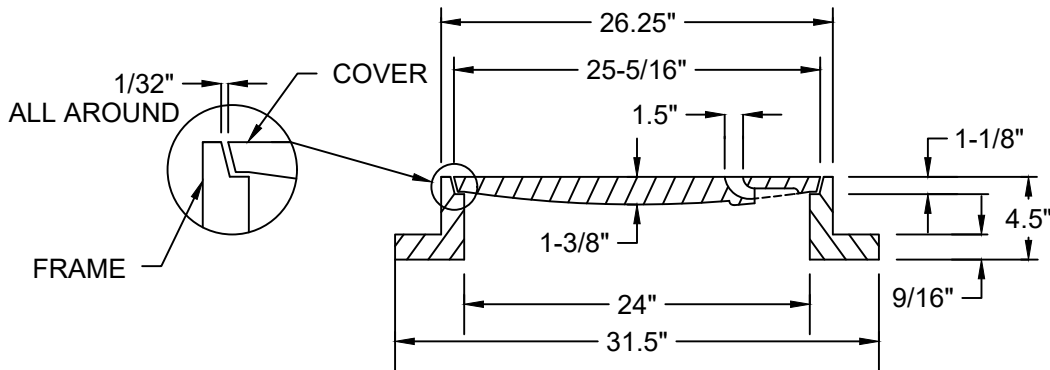
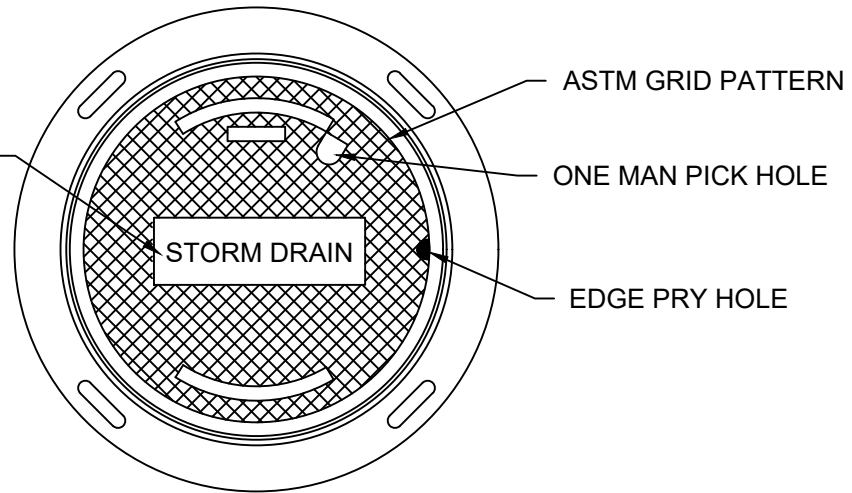


APPROVED: MARCH 2022

MEDIAN ISLAND

3340

LABEL AS EITHER
"STORM DRAIN" OR "SEWER"
AS APPROPRIATE



NOTES:

1. FRAME AND COVER FOR STORM DRAIN OR SEWER SHALL BE DESIGNED FOR H-20 HIGHWAY LOADING.
2. COVERS TO HAVE PICK HOLE AND EDGE PRY HOLE.
3. FRAME AND COVER TO BE SET 3/8" BELOW ROADWAY FINISH ELEVATION. SEE DETAIL 4010, 4020, 4030, 4040 OR 4500 FOR INSTALLATION DETAILS.
4. IN AREAS SUBJECT TO FLOODING, LOCKING/ BOLTED COVERS SHALL BE USED AT THE DISCRETION OF THE CITY ENGINEER.



CITY OF DIXON
ENGINEERING
STANDARD DETAIL



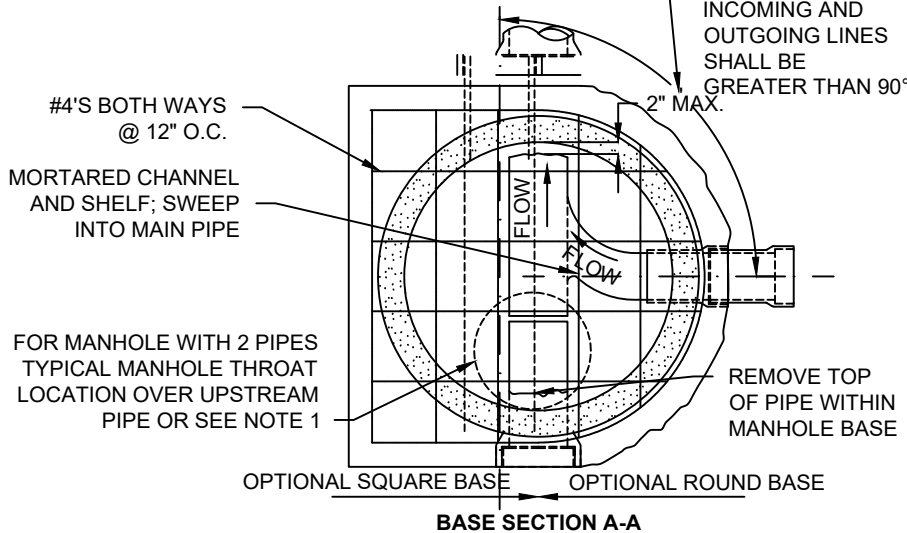
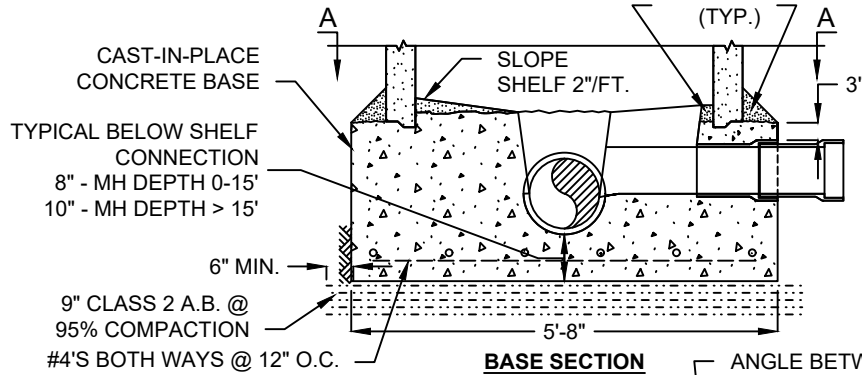
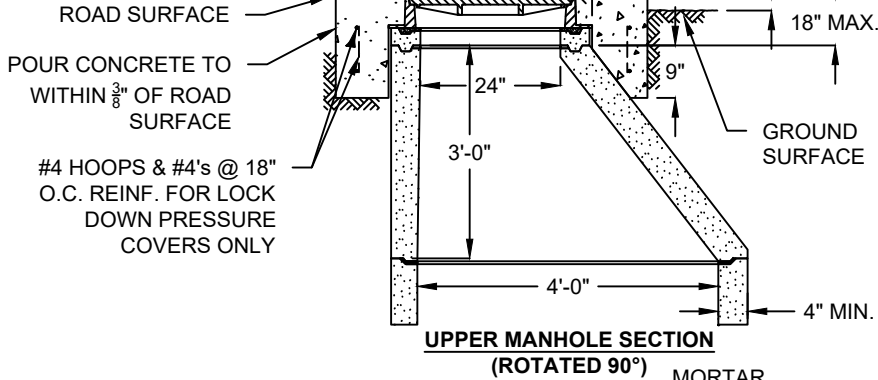
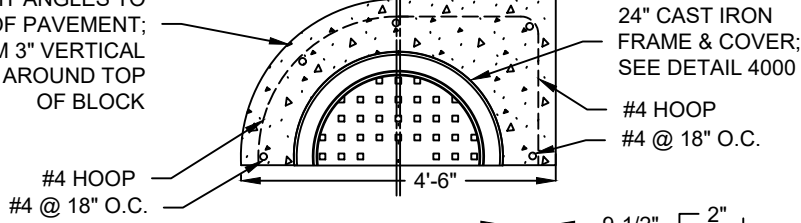
APPROVED: MARCH 2022

**MANHOLE
FRAME & COVER**

4000

CONCRETE BLOCK
PARALLEL TO OR AT
RIGHT ANGLES TO
EDGE OF PAVEMENT;
FORM 3" VERTICAL
EDGE AROUND TOP
OF BLOCK

ROUND BLOCK
(PAVED AREAS) SQUARE BLOCK
(UNPAVED AREAS)



NOTES:

1. MANHOLES WITH ONE OR MORE SIDE SEWER SHALL HAVE CONCENTRIC CONES
2. LAY PIPE THRU MANHOLE WHEN POSSIBLE OR FORM CHANNEL TO MAINTAIN PIPE SECTION. SEWER PIPES ENTERING OR LEAVING THE MANHOLE BASE SHALL HAVE A STANDARD JOINT LOCATED BETWEEN 12" AND 24" OF THE BASE.
3. ALL REINFORCEMENT STEEL SHALL BE 3" CLEAR.
4. BACKFILL SHALL BE PER DETAIL 3280 OR 3290.
5. IN AREAS SUBJECT TO FLOODING, LOCKING/ BOLTED COVERS SHALL BE USED.
6. COAT SANITARY SEWER MANHOLE WITH APPROVED H₂S PROTECTIVE COATING. WATERPROOFING TREATMENT (XYPEX OR EQUAL) MAY BE USED IN LIEU OF H₂S PROTECTION COATING AT THE DISCRETION OF THE CITY ENGINEER.
7. ALL JOINTS SHALL BE GROUTED BOTH INSIDE AND OUTSIDE.
8. PIPE JOINT SHALL BE LOCATED BETWEEN 1' TO 2' FROM MANHOLE.
9. NO WYE OR TEE FITTING SHALL BE INSTALLED WITHIN 12" OF THE STRUCTURE. AN APPROVED REPAIR COUPLING MAY BE USED BETWEEN THE STRUCTURE AND THE NEXT DOWNSTREAM PIPE WHEN WYE OR TEE FITTING IS BEING INSTALLED.
10. SLOPE BLOCK TO DRAIN AWAY FROM MANHOLE RIM (2% MAX.).
11. RISER SECTIONS, CONES AND ADJUSTING RINGS SHALL CONFORM TO ASTM C-479

4010

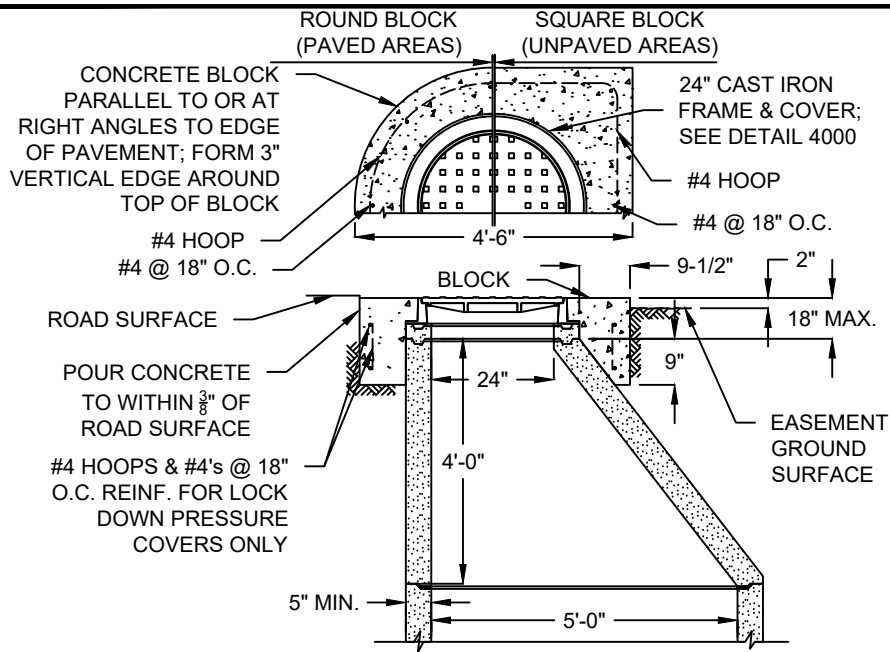
MANHOLE FOR PIPES
LESS THAN 24"



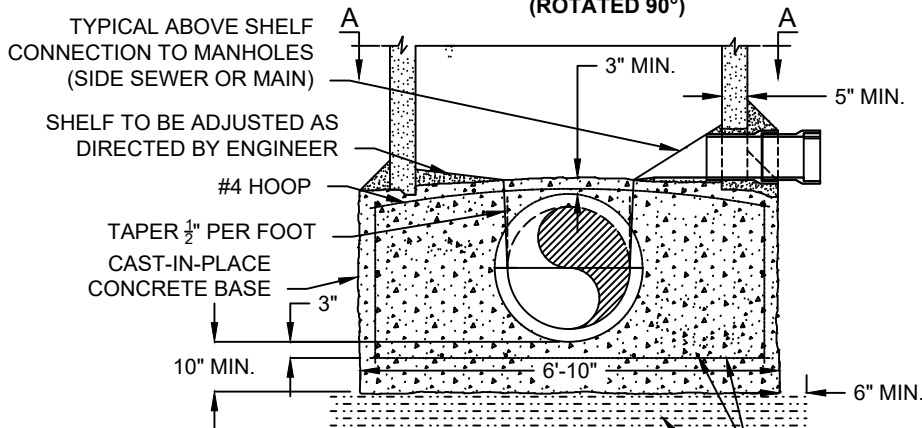
APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL

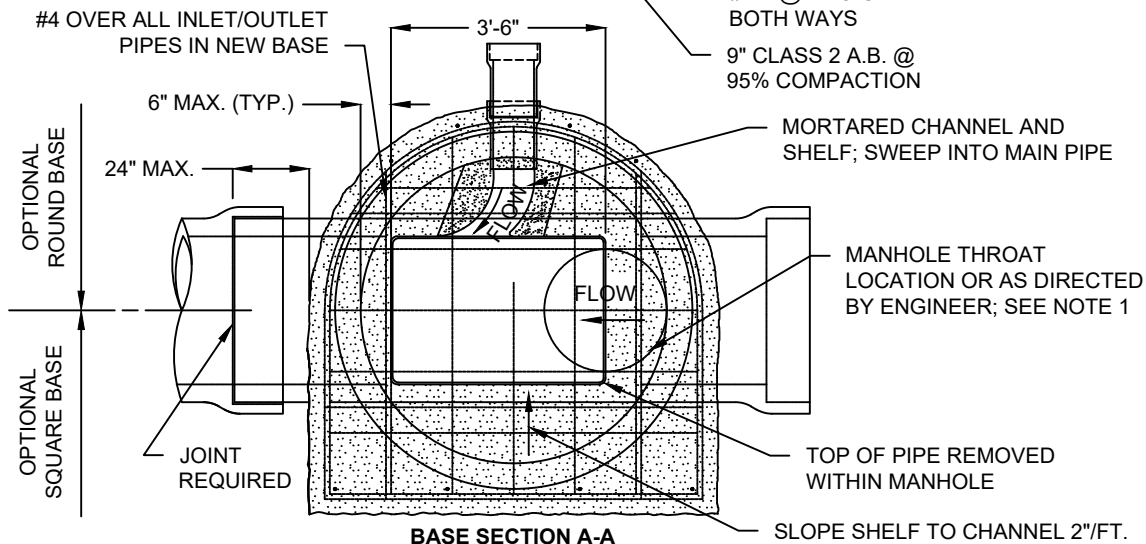




**UPPER SECTION
(ROTATED 90°)**



BASE SECTION



**BASE SECTION A-A
(ROTATED 90°)**

NOTES:

1. MANHOLES WITH ONE OR MORE SIDE SEWER SHALL HAVE CONCENTRIC CONES
2. LAY PIPE THRU MANHOLE WHEN POSSIBLE OR FORM CHANNEL TO MAINTAIN PIPE SECTION. SEWER PIPES ENTERING OR LEAVING THE MANHOLE BASE SHALL HAVE A STANDARD JOINT LOCATED WITHIN 24" OF THE BASE.
3. ALL REINFORCEMENT STEEL SHALL BE 3" CLEAR.
4. BACKFILL SHALL BE PER DETAIL 3280 OR 3290.
5. IN AREAS SUBJECT TO FLOODING, LOCKING/ BOLTED COVERS SHALL BE USED.
6. COAT SANITARY SEWER MANHOLE WITH APPROVED H2S PROTECTIVE COATING. WATERPROOFING TREATMENT (XYPEX OR EQUAL) MAY BE USED IN LIEU OF H2S PROTECTION COATING AT THE DISCRETION OF THE CITY ENGINEER.
7. ALL JOINTS SHALL BE GROUTED BOTH INSIDE AND OUTSIDE.
8. SLOPE BLOCK OR AC TO DRAIN AWAY FROM MANHOLE RIM (2% MAX.)
9. RISER SECTIONS, CONES AND ADJUSTING RINGS SHALL CONFORM TO ASTM C-479



CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

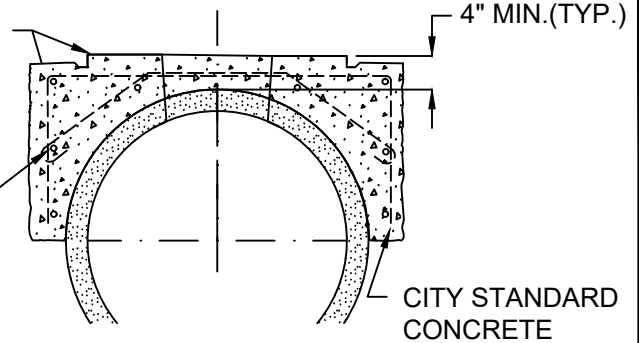
**MANHOLE FOR
PIPES 24" TO 48"
DIAMETER**

4020

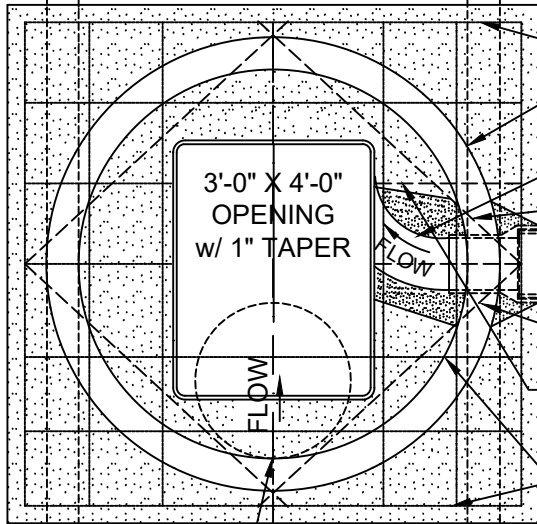
ALL SIDES OF BASE BLOCK
AND KEY FOR BARREL
SECTION TO BE FORMED

(5) #4 \square
& (2) #4 \triangle
@ EACH SIDE

24" MAX
JOINT REQUIRED



SECTION - BASE BLOCK



24" MAX
JOINT REQUIRED

MANHOLE CONE,
TOP BLOCK AND COVER
SEE DETAIL 4020

BASE SECTION A-A

(2) #4 \square
STANDARD 60" PRECAST MANHOLE
BARREL WITHOUT STEPS
MORTARED CHANNEL AND SHELF;
SWEEP INTO MAIN PIPE

#4 DIAGONALS

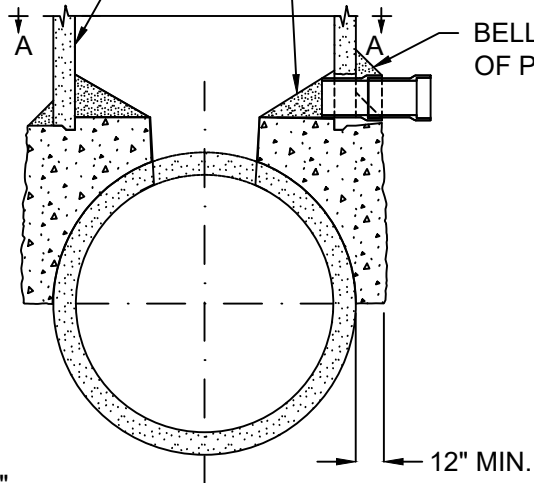
(2) #4 \times @
EACH SIDE

(3) #4 \square

STANDARD 60" PRECAST
MANHOLE BARREL
WITHOUT STEPS

TYPICAL ABOVE
SHELF CONNECTION
TO MANHOLES

BELL END
OF PIPE



SECTION - TYPICAL

NOTE:

1. ALL STEEL REINFORCING SHALL BE #4 WITH 2" CLEAR MINIMUM CONCRETE COVER.
2. BACKFILL SHALL BE PER DETAIL 3230 OR 3250.

4030

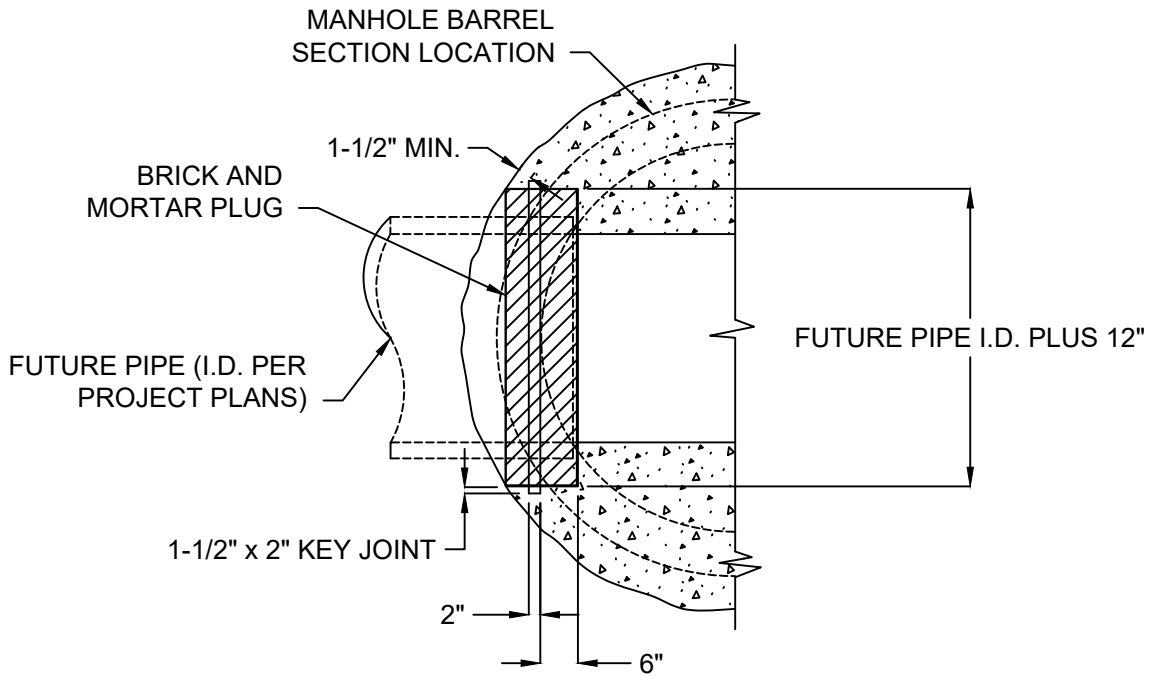
**SADDLE MANHOLE
FOR PIPES LARGER
THAN 48"**



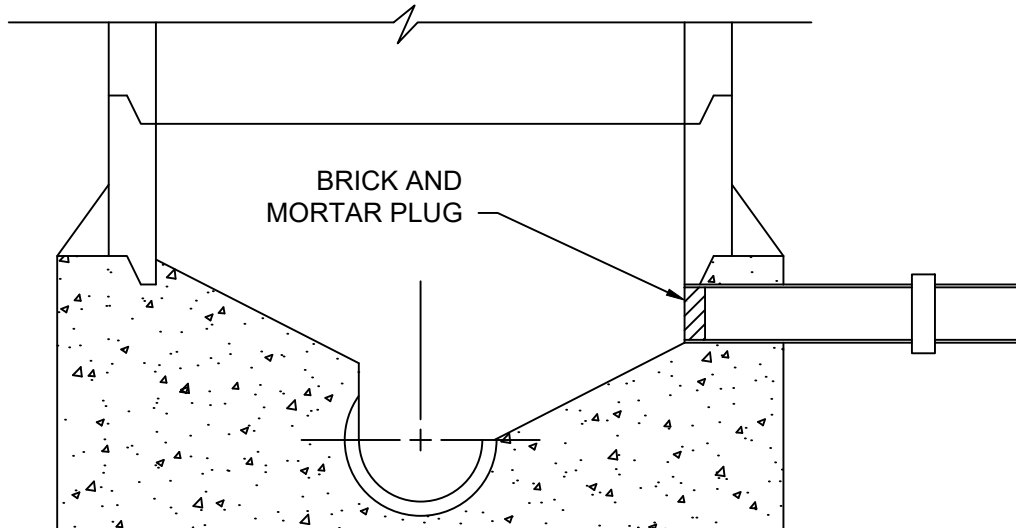
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CITY OF DIXON
ENGINEERING
STANDARD DETAIL





PLAN VIEW



PROFILE VIEW



CITY OF DIXON
 ENGINEERING
 STANDARD DETAIL

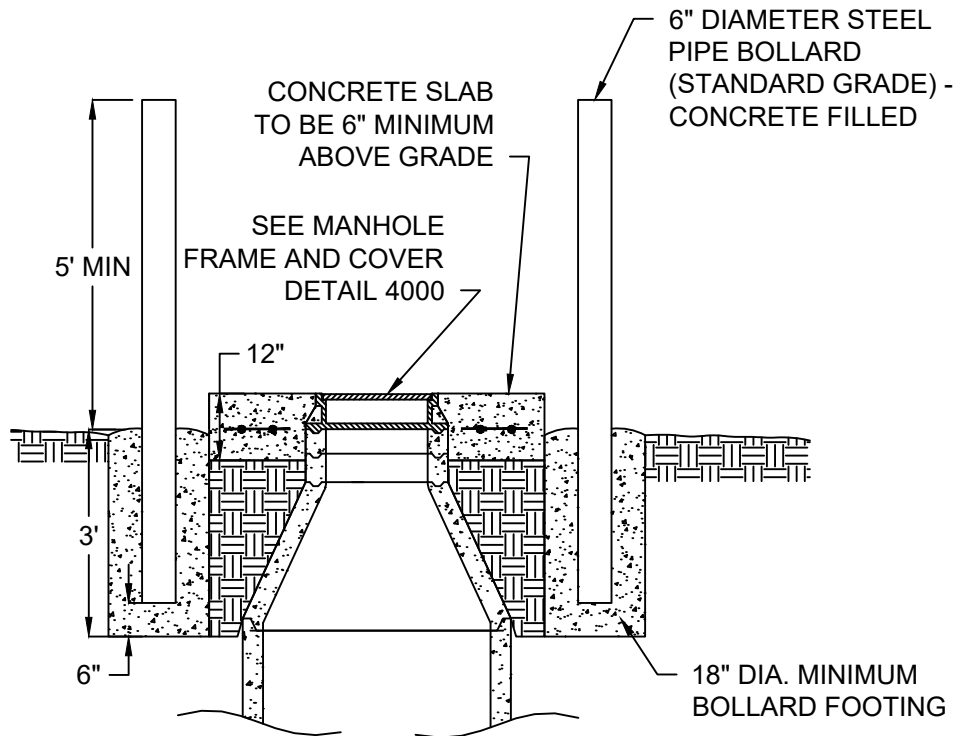
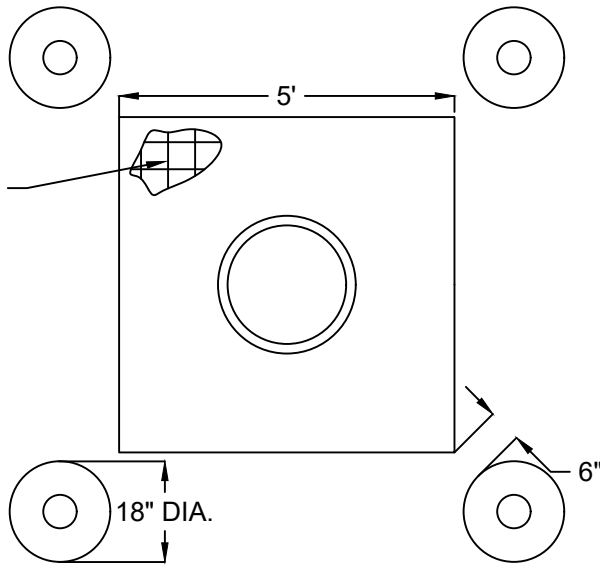


APPROVED: MARCH 2022

**MANHOLE
 PLUG FOR
 FUTURE PIPE**

4040

INSTALL #4 REBAR 12"
O.C. BOTH DIRECTIONS
AT MID-DEPTH



NOTES:

1. USE CITY STANDARD CONCRETE.
2. ALL STEEL PIPE AND PLATES SHALL COMPLY WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC).
3. STEEL PIPE SHALL HAVE TWO COATS OF CORROSION RESISTANT PAINT.

4050

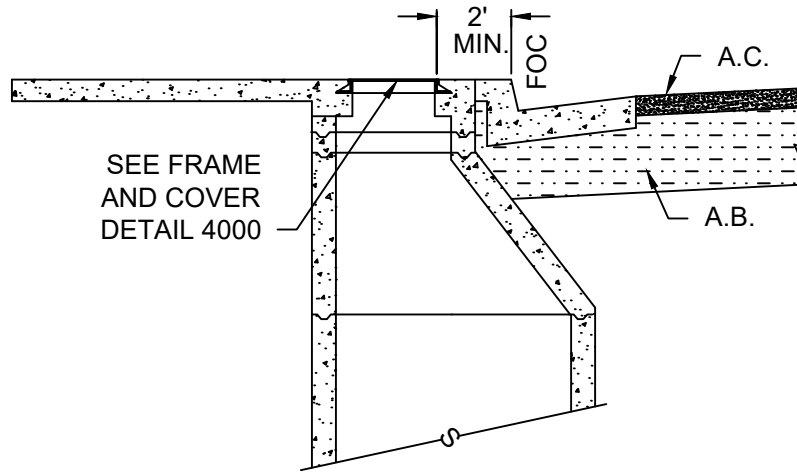
UNIMPROVED AREA
MANHOLE FRAME
& BOLLARDS



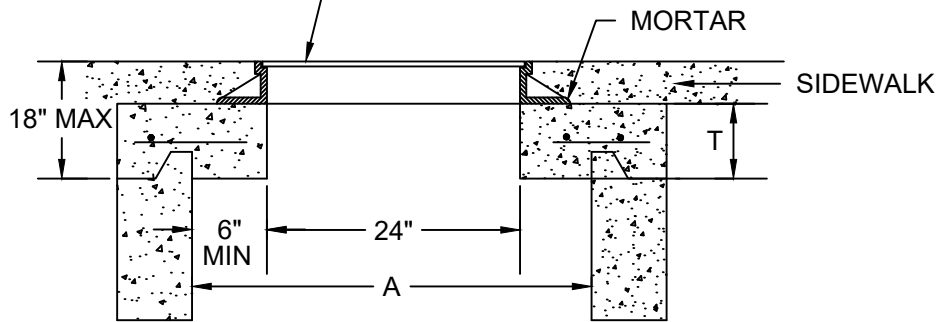
APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





SEE STD. FRAME AND COVER DETAIL 4000



FLAT SLAB SHALL BE USED WHEN DEPTH DOES NOT PERMIT USE OF TAPER UNIT

TABLE OF DIMENSIONS

M.H.	A	T MIN
48"	48"	6"
60"	60"	8"
72"	72"	8"

RISER SECTIONS, CONES AND ADJUSTING RINGS SHALL CONFORM TO ASTM DESIGNATION C-478

FRAME SHALL BE SECURED TO RISER OR FLAT SLAB TOP WITH CEMENT MORTAR



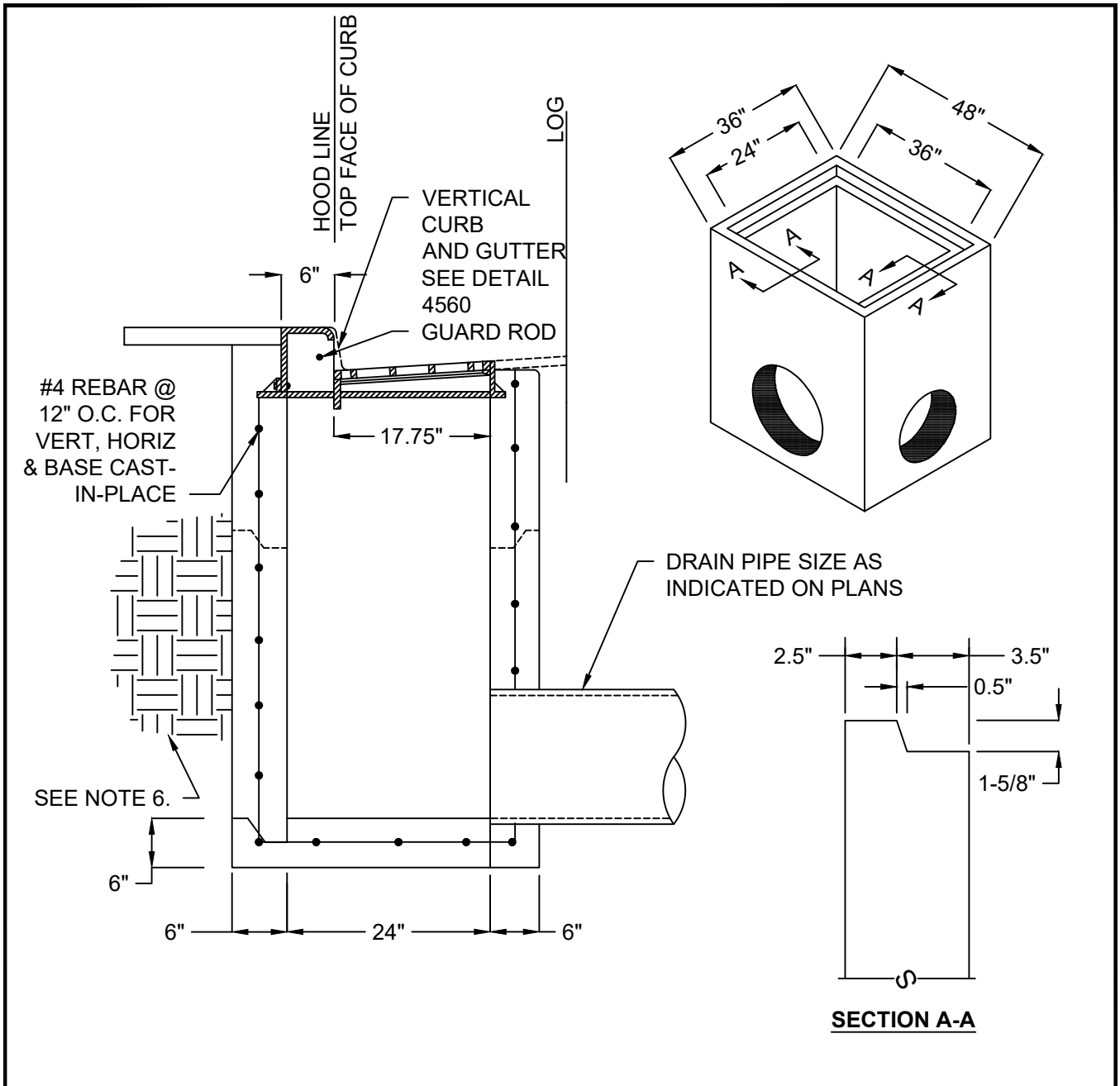
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



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STORM DRAIN
MANHOLE
INSTALLATION IN
SIDEWALK

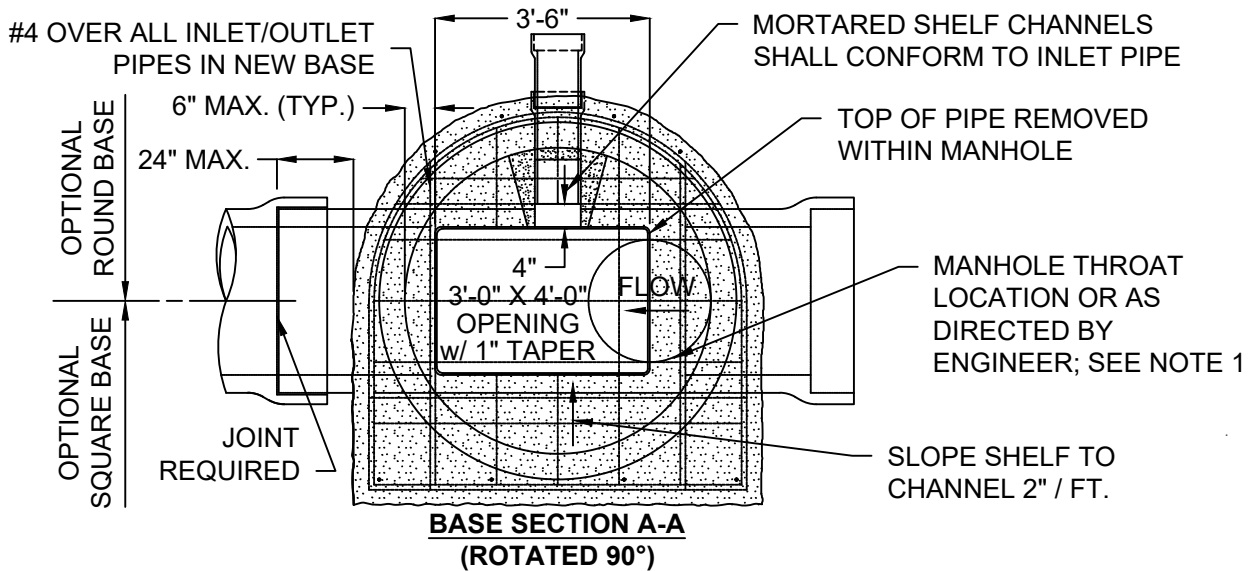
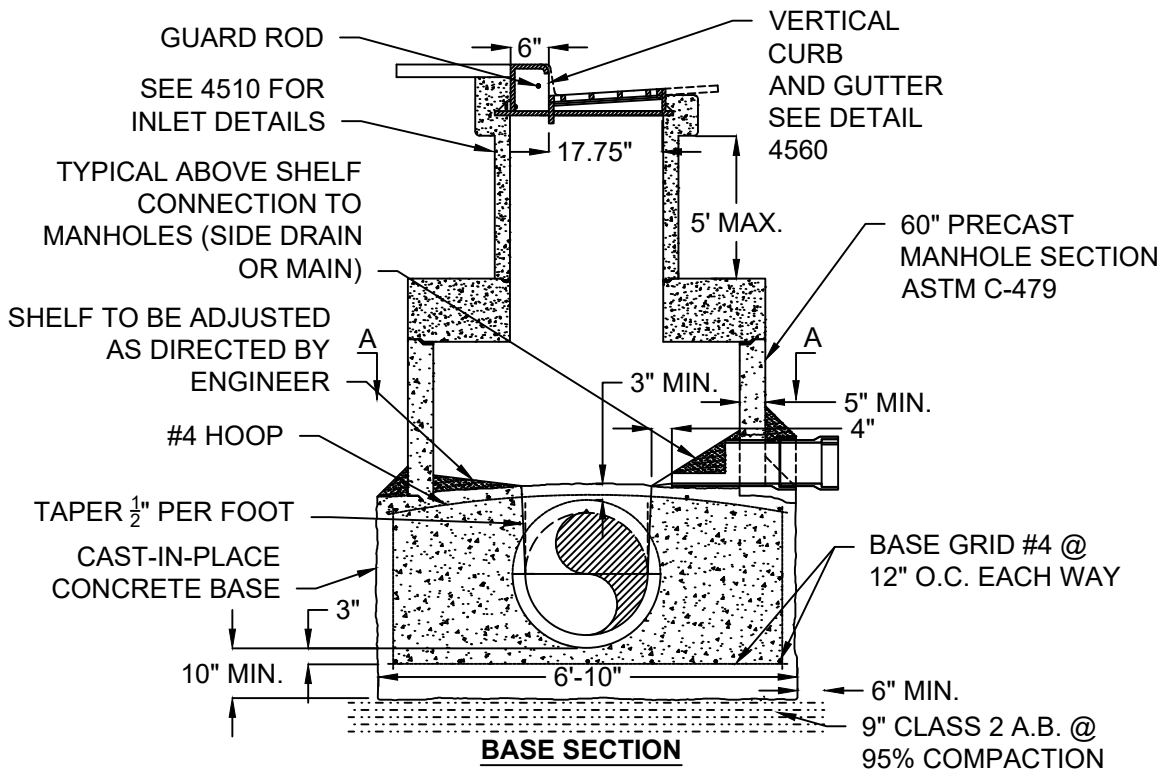
4500



NOTES:

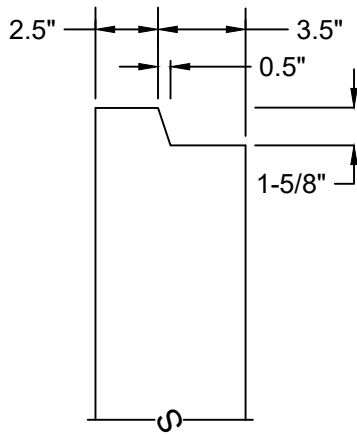
1. BASE MAY BE CAST-IN-PLACE OR PRECAST CONSTRUCTION.
2. PRECAST CATCH BASIN BASE SHALL BE JENSEN PRECAST MODEL #2436 OR APPROVED EQUAL
3. CAST-IN-PLACE WALLS AND BASE SHALL BE REINFORCED WITH #4 REBAR @ 12" O.C. WALLS SECTION SHALL IN NO CASE EXCEED 10" IN WIDTH.
4. CATCH BASINS SHALL HAVE A GUARD ROD AND THE INLET FRAME AND HOOD SHALL BE BOLTED TOGETHER ALLOWING FOR A ONE PIECE INSTALLATION.
5. GRATES SHALL BE CONSTRUCTED TO RECEIVE WATER EITHER FROM ONE OR TWO DIRECTIONS DEPENDING ON GUTTER FLOW LINE DIRECTION.
6. 95% RELATIVE COMPACTION FOR APPROVED BACKFILL SHALL BE INSTALLED AROUND PERIMETER OF BASIN WHEN PRECAST IS USED.

4510	STORM DRAIN CURB INLET TYPE A PIPES < 24"		CITY OF DIXON ENGINEERING STANDARD DETAIL
		APPROVED: MARCH 2022	

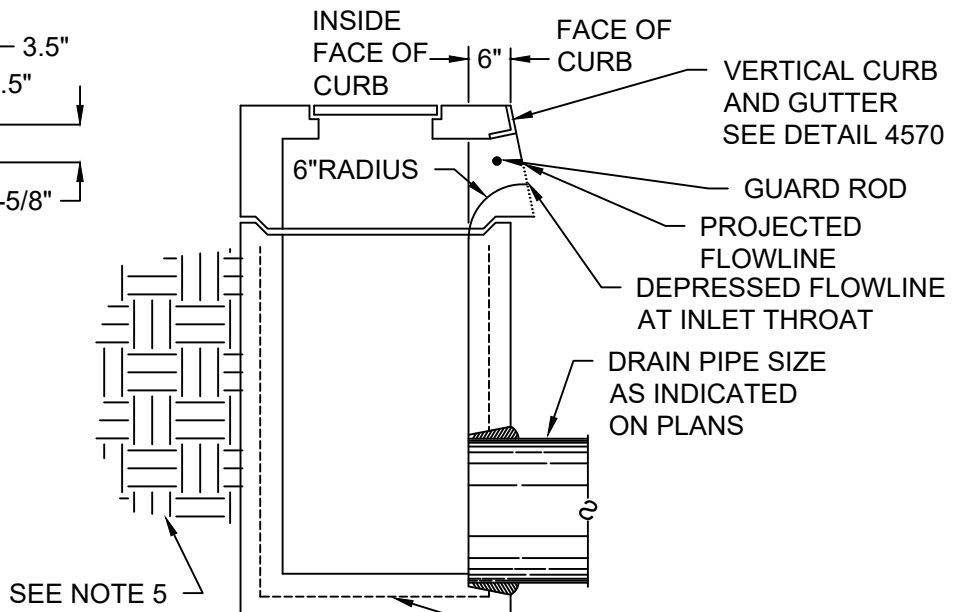


- NOTES:**
1. BASE SHALL BE CAST-IN-PLACE CONSTRUCTION.
 2. CATCH BASINS SHALL HAVE A GUARD ROD AND THE INLET FRAME AND HOOD SHALL BE BOLTED TOGETHER ALLOWING FOR A ONE PIECE INSTALLATION.
 3. GRATES SHALL BE CONSTRUCTED TO RECEIVE WATER EITHER FROM ONE OR TWO DIRECTIONS DEPENDING ON GUTTER FLOW LINE DIRECTION.

	<p>CITY OF DIXON ENGINEERING STANDARD DETAIL</p>	<p>APPROVED: MARCH 2022</p>	<p>STORM DRAIN CURB INLET TYPE A PIPES ≥ 24"</p>	<p>4520</p>
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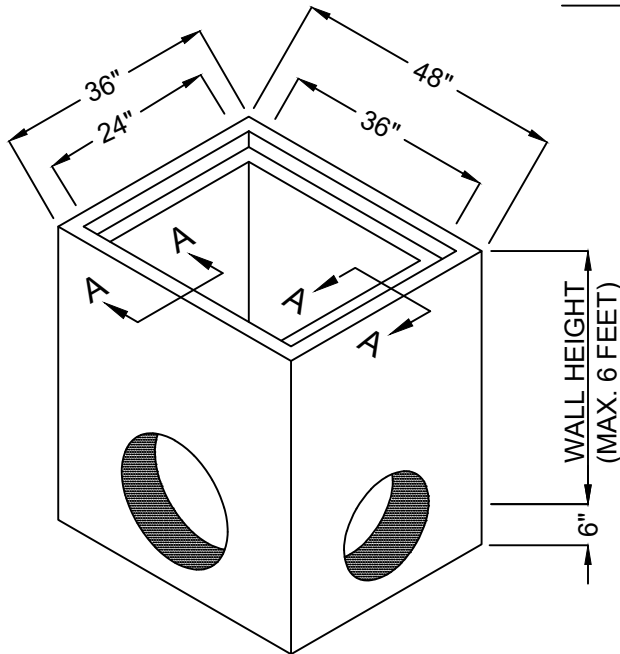


SECTION A-A



TYPICAL SECTION

#4 REBAR @ 12" O.C.
BOTH DIRECTION FOR
BASE AND VERTICAL
WALLS (CAST-IN-PLACE)



SPECIAL NOTE:
DRAIN INLET TYPE B
TO BE USED ONLY BY
APPROVAL OF THE
CITY ENGINEER.

NOTES:

1. BASE MAY BE CAST-IN-PLACE OR PRECAST CONSTRUCTION.
2. CAST-IN-PLACE SHALL INCLUDE #4 REBAR @ 12" ON CENTER BOTH DIRECTION FOR ALL VERTICAL WALLS AND BASE CONSTRUCTION. WALL SECTION SHALL NOT EXCEED 10" IN WIDTH.
3. 95% RELATIVE COMPACTION FOR APPROVED BACKFILL SHALL INSTALLED AROUND PERIMETER OF BASIN WHEN PRECAST IS USED.

4530

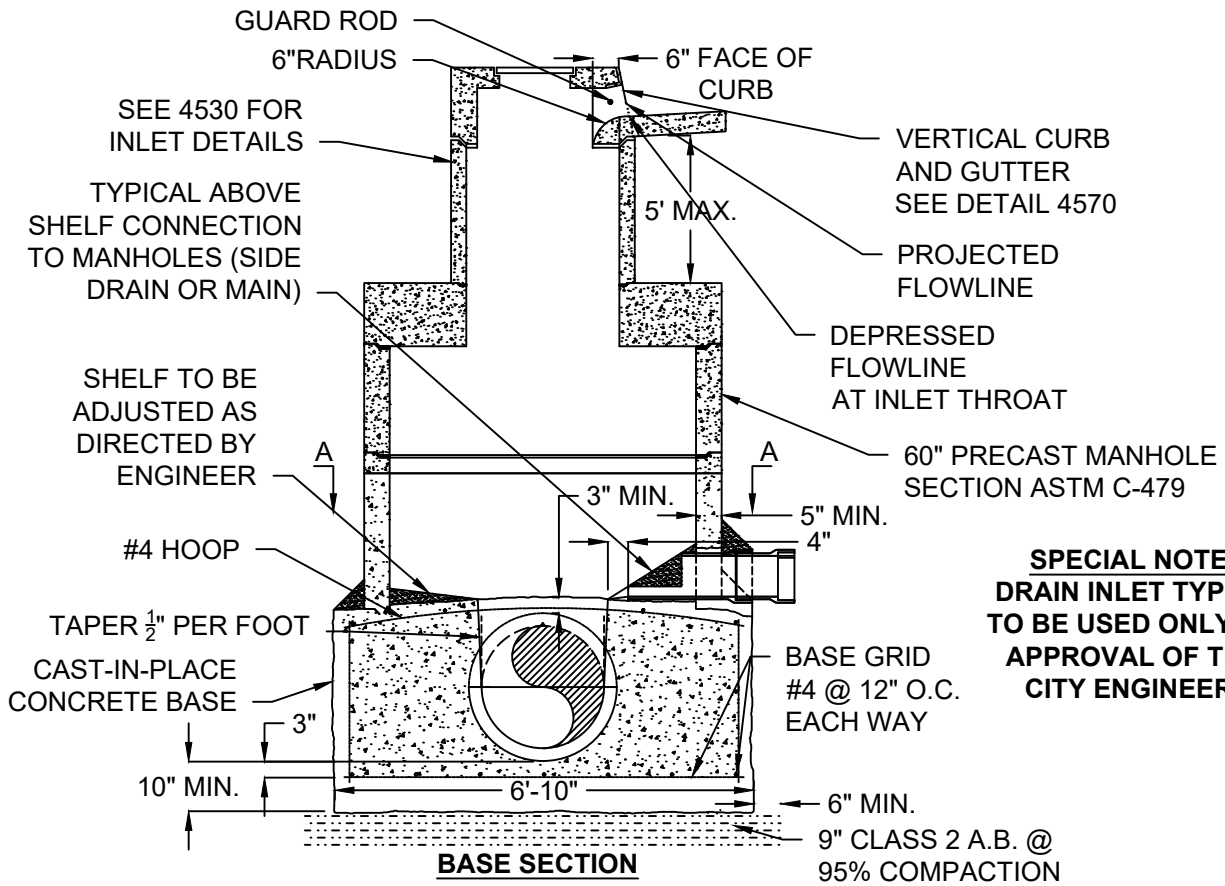
**STORM DRAIN CURB
INLET TYPE B
PIPES < 24"**



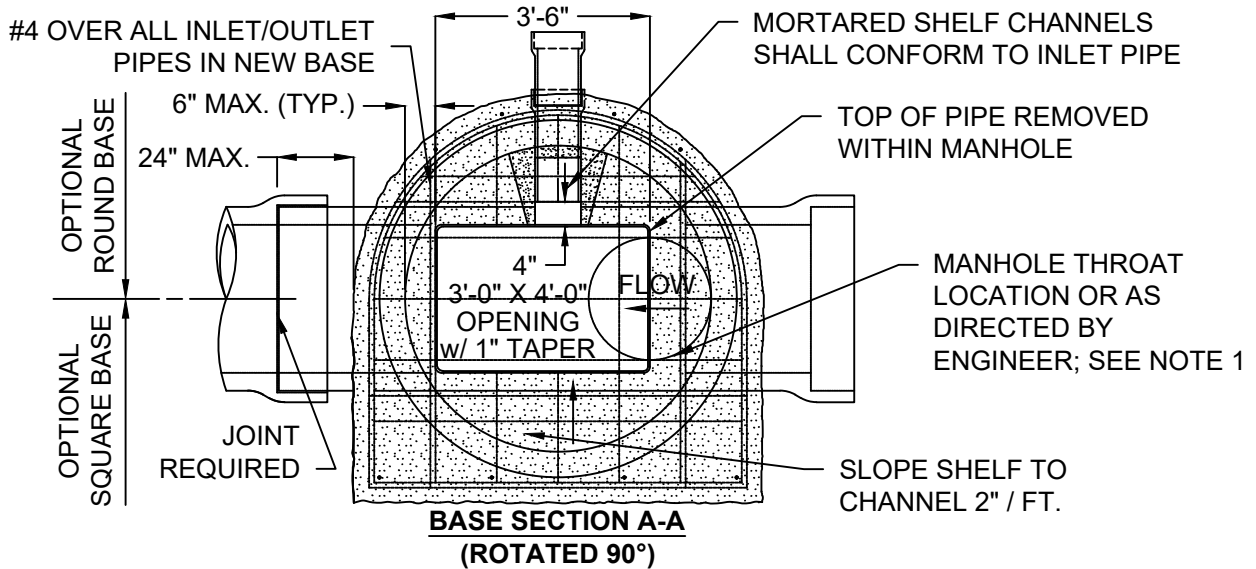
APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





**SPECIAL NOTE:
DRAIN INLET TYPE B
TO BE USED ONLY BY
APPROVAL OF THE
CITY ENGINEER.**



NOTES:

1. BASE SHALL BE CAST-IN-PLACE CONSTRUCTION.



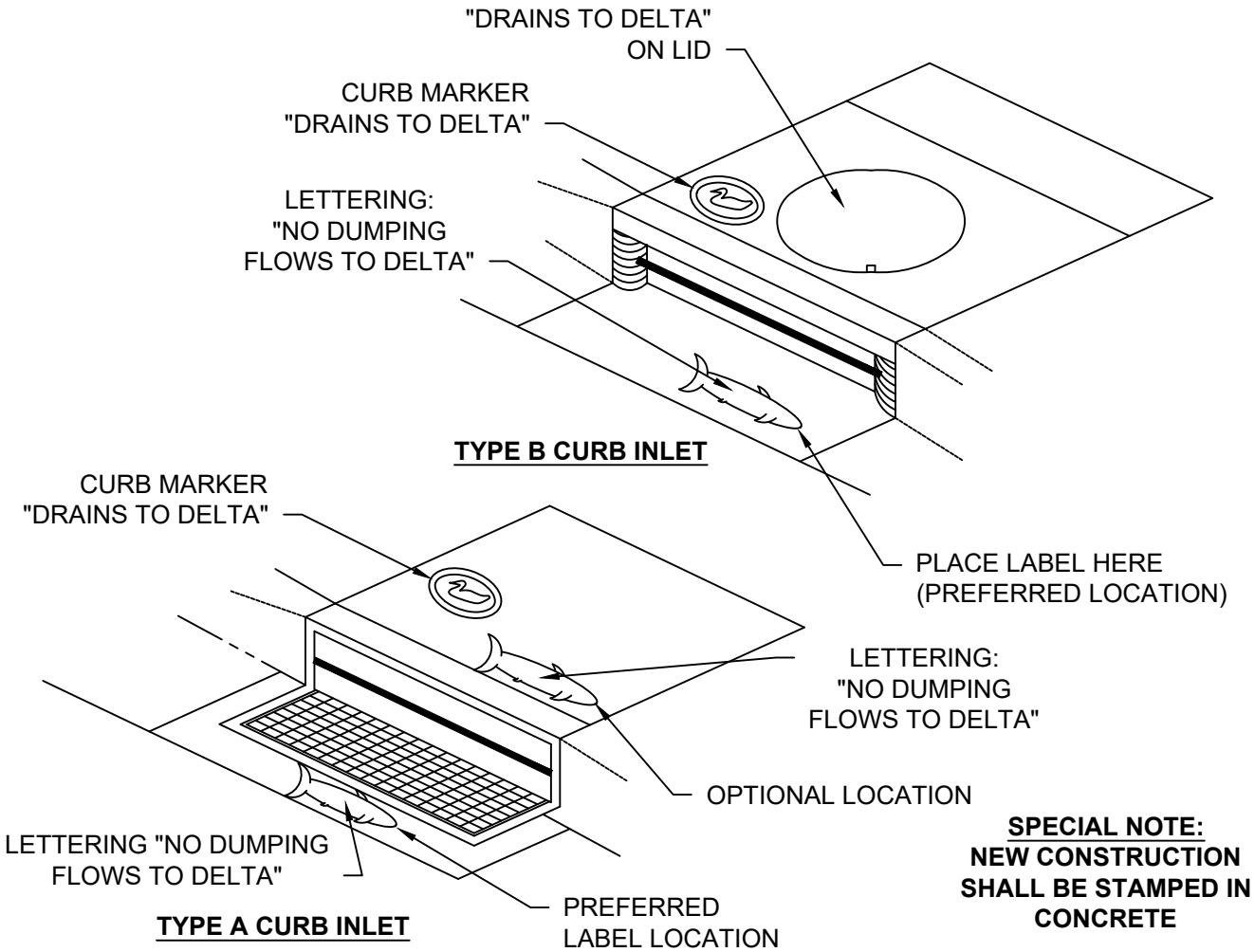
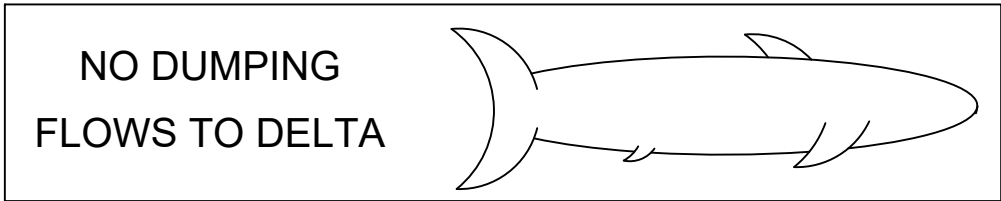
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

**STORM DRAIN CURB
INLET TYPE B
PIPES ≥ 24"**

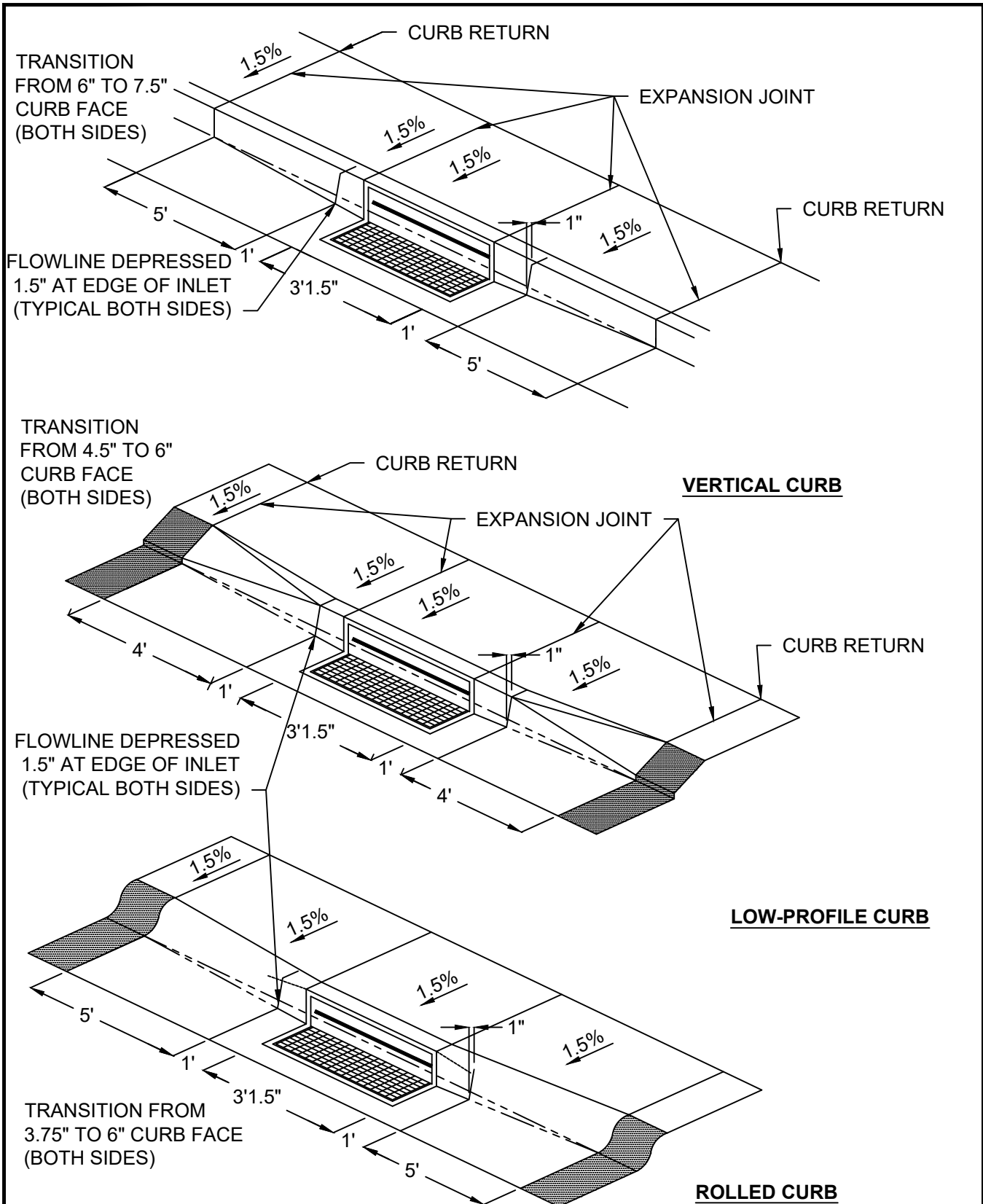
4540



NOTES:

1. LETTERING SHALL BE 1¼" TO 1½" IN HEIGHT. THE MESSAGE AND SYMBOL SHALL BE DEPRESSED 1/8" TO 1/4" INTO THE CONCRETE. THE FISH SYMBOL SHALL BE A MINIMUM OF 11" LONG AND 3½" HIGH.
2. THE LABEL SHALL BE APPROVED BY THE CITY INSPECTOR PRIOR TO PLACEMENT.
3. THIS DETAIL SHALL APPLY TO ALL DRAIN INLET DESIGNS. WHERE THE SIDEWALK DOES NOT ADJOIN THE BACK OF CURB, THE NOTICE SHALL BE STAMPED INTO THE CONCRETE BEHIND THE DRAIN INLET. WHERE THE DRAIN INLET IS PLACED IN A "V" GUTTER WITHOUT A CURB INLET, THE NOTICE SHALL BE STAMPED ON ONE SIDE, PARALLEL TO THE INLET.
4. THE MESSAGE SHALL BE BLEMISH FREE AND LEGIBLE.

<p>4550</p>	<p>"NO DUMPING" CURB INLET LABEL</p>	<p>APPROVED: MARCH 2022</p>	<p>CITY OF DIXON ENGINEERING STANDARD DETAIL</p>
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NOTES:

1. SEE DETAIL 3000, 3010, OR 3020 FOR SIDEWALK DETAILS.



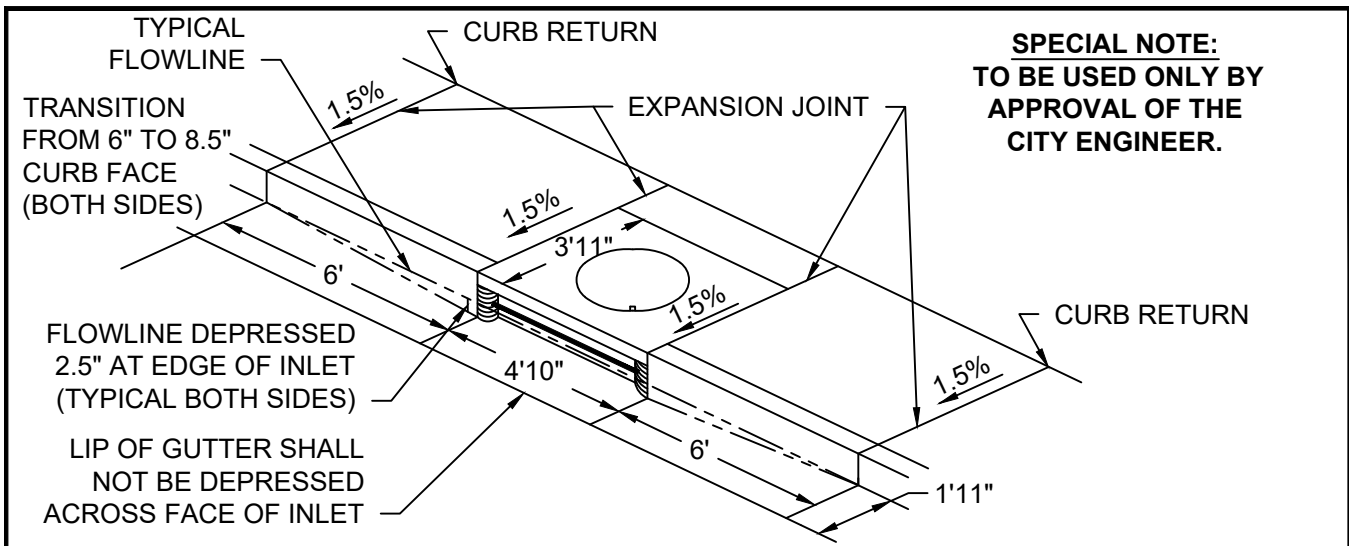
CITY OF DIXON
 ENGINEERING
 STANDARD DETAIL



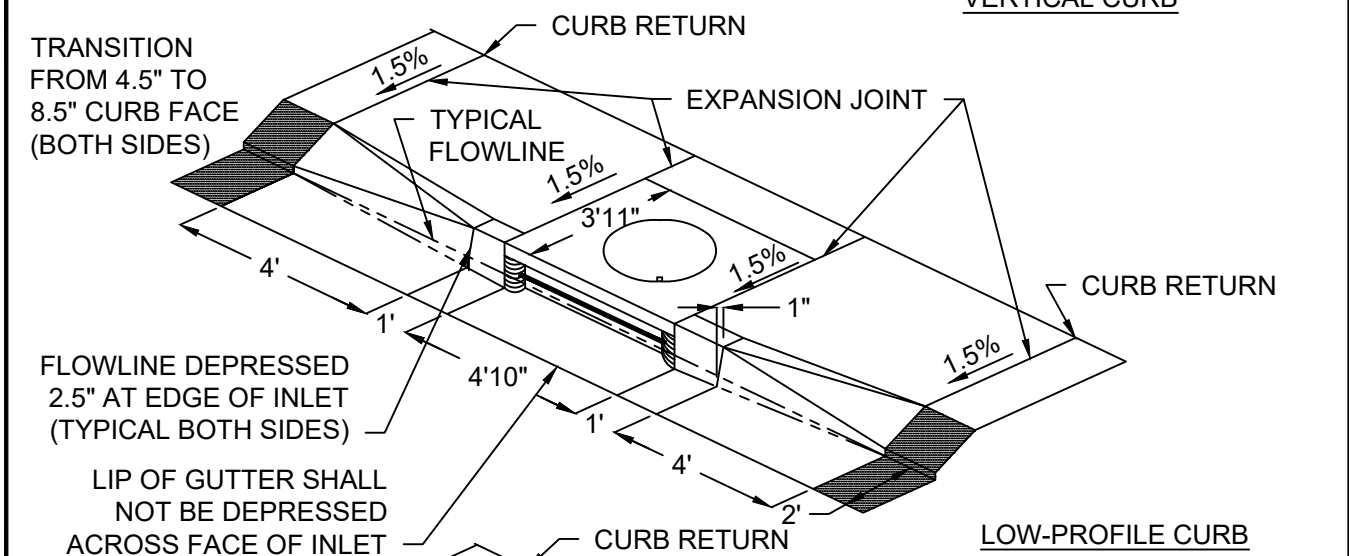
APPROVED: MARCH 2022

CURB INLET TYPE A

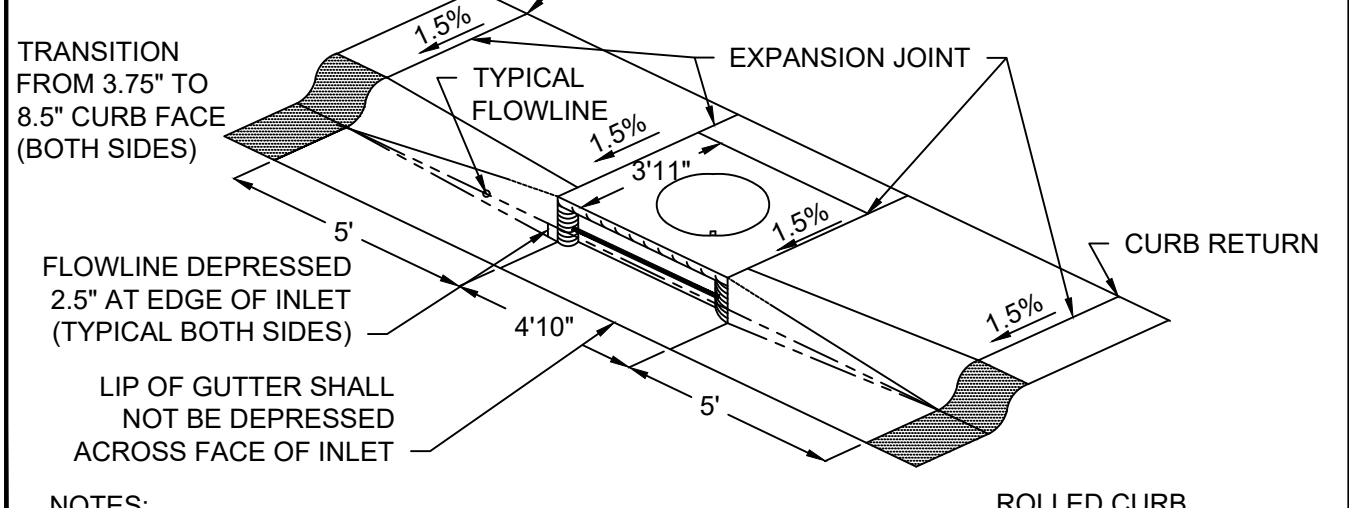
4560



VERTICAL CURB



LOW-PROFILE CURB



ROLLED CURB

NOTES:

1. TYPE B CURB INLET SHALL HAVE STANDARD ANGLE PLATE NOSE.
2. SEE DETAIL 3000, 3010, OR 3020 FOR SIDEWALK DETAILS.

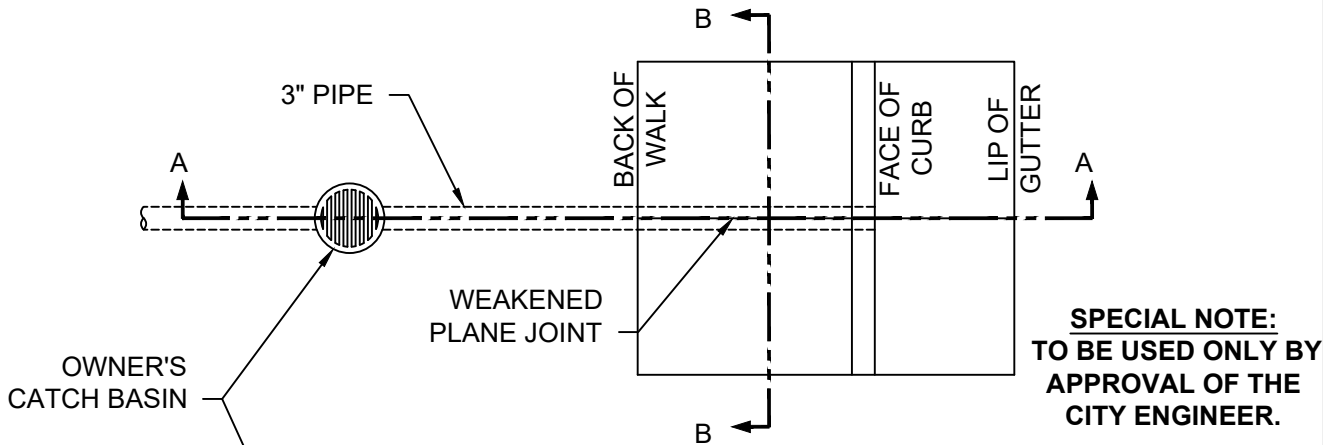
4570

CURB INLET TYPE B

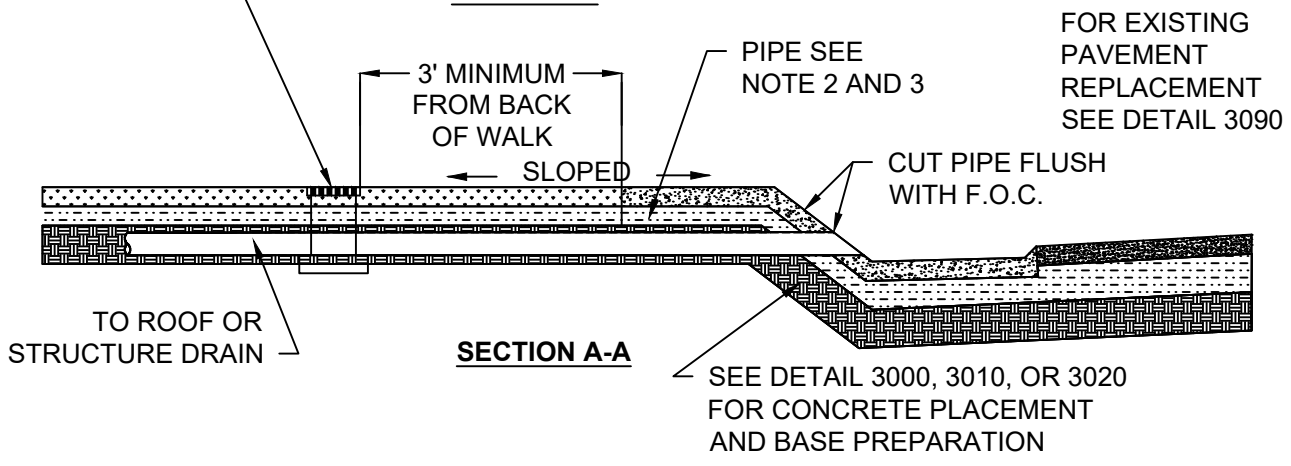
APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL

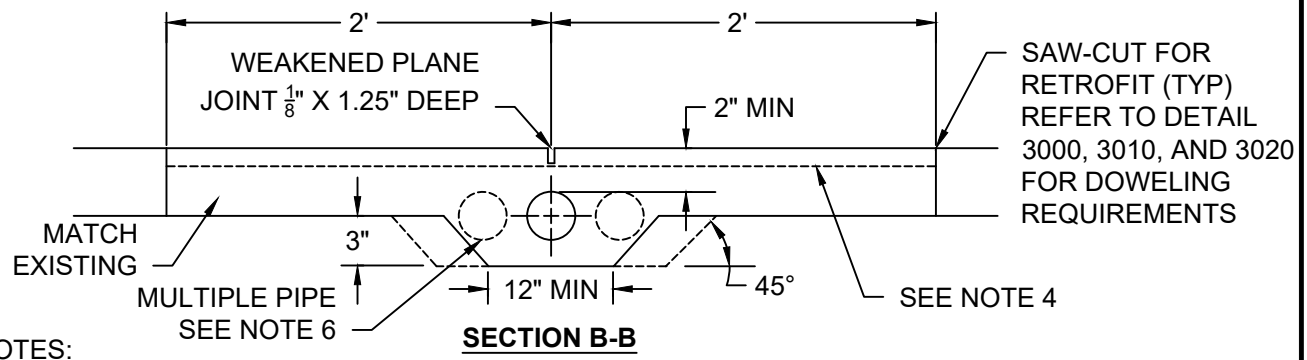




PLAN VIEW



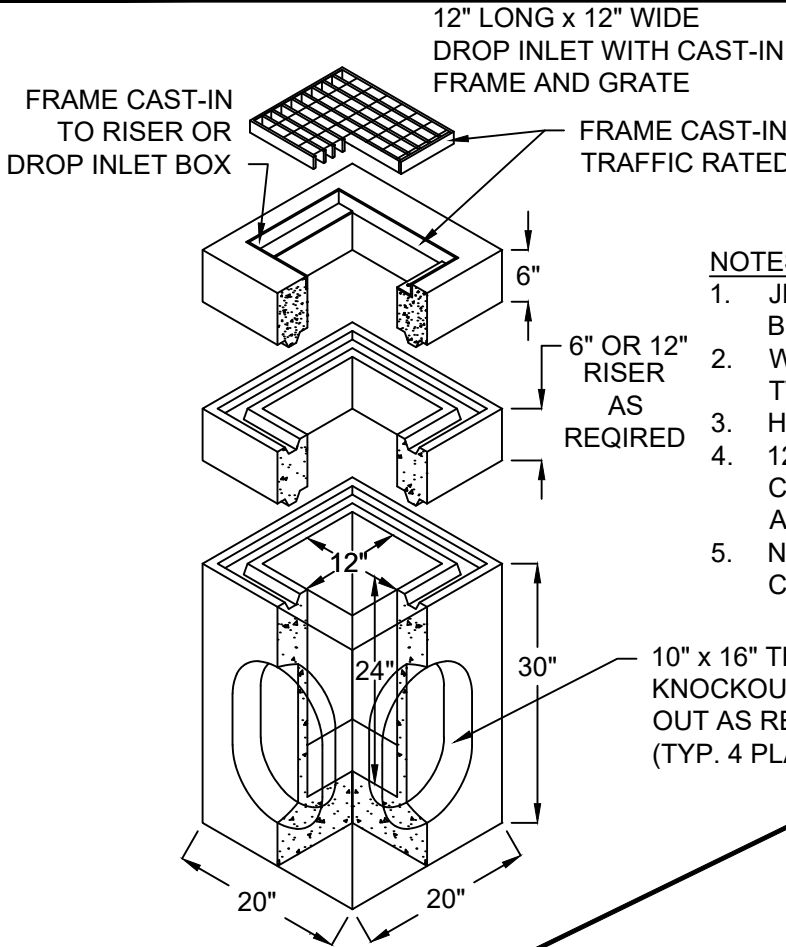
FOR EXISTING PAVEMENT REPLACEMENT SEE DETAIL 3090



NOTES:

1. PRIVATE PROPERTY OWNER SHALL BE RESPONSIBLE FOR CLEANING AND MAINTAINING ENTIRE PIPE.
2. PIPE SHALL BE 3" O.D. 12 STANDARD WEIGHT GALVANIZED STEEL OR NON-BELLCAST IRON PIPE IN TRAFFIC AREAS AND PVC IN NON-TRAFFIC AREAS.
3. PIPE SHALL BE PLACED WITH A MINIMUM 1% SLOPE.
4. PLACE 4x4 10 GAGE WIRE MESH FULL LENGTH 24" ON EACH SIDE OF PIPE.
5. UNDER SIDEWALK DRAINS WITHIN PUBLIC RIGHT-OF-WAY TO BE USED ONLY UPON APPROVAL OF CITY ENGINEER WHERE A STORM DRAIN DOES NOT EXIST, OR EXTENSION OF AN EXISTING STORM DRAIN IS IMPRACTICAL.
6. MULTIPLE PIPES MAY BE USED WHERE REQUIRED BY THE CONTRIBUTING AREA. IN THIS CASE, PIPES SHALL BE SPACED 7" APART ON CENTER.

	<p>CITY OF DIXON</p> <p>ENGINEERING STANDARD DETAIL</p>		<p>UNDER SIDEWALK DRAIN</p>	<p>4580</p>
		<p>APPROVED: MARCH 2022</p>		

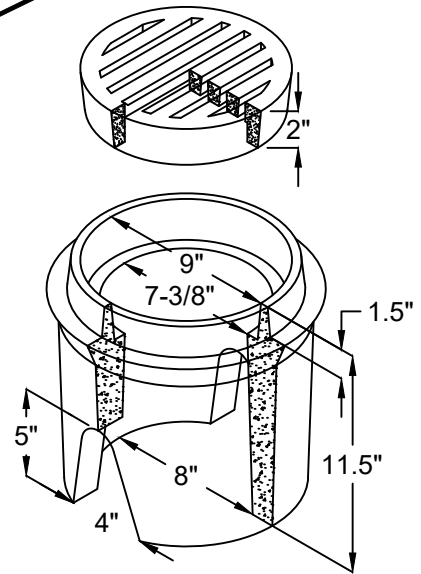


PARK AND TURF FIELD INLET

NOTES:

1. JENSEN 1212-HDI CHRISTY V12 DRAIN BOX OR APPROVED EQUAL.
2. WELDED STEEL BAR GRATE SHALL HAVE TWO HOLD DOWN BOLTS.
3. H-20 TRAFFIC LOADING.
4. 12" PERIMETER GROUTED COBBLE COLLAR FOR PLANTER BED APPLICATIONS.
5. NATIVE BACKFILL TO 90% RELATIVE COMPACTION.

PLANTER BED FIELD INLET



NOTES:

1. JENSEN F8 OR CHRISTY V05 OR APPROVED EQUAL.
2. 12" PERIMETER GROUTED COBBLE COLLAR.
3. NATIVE BACKFILL TO 90% RELATIVE COMPACTION.

SPECIAL NOTE:

CALTRANS TYPE OCP OR OCPI FIELD INLETS TO BE USED IN ALL OTHER FIELD APPLICATION WITH COBBLE STONE OR OTHER APPROVED EROSION CONTROL PROTECTION.

4590

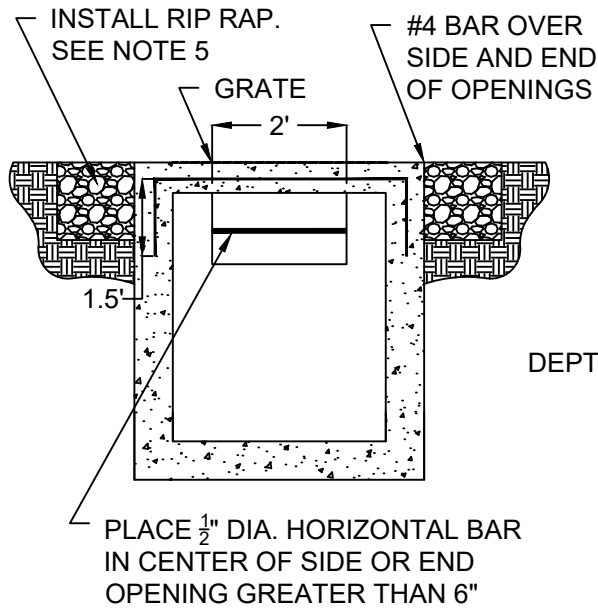
FIELD INLETS



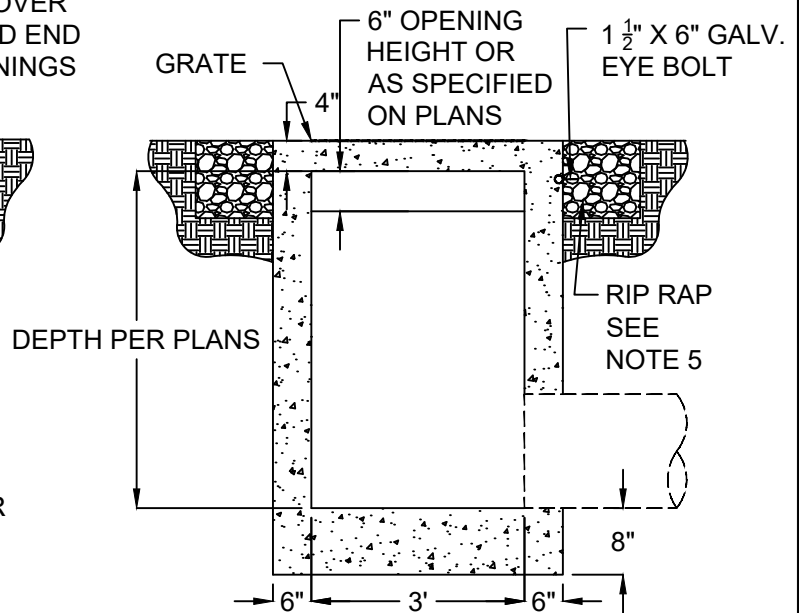
APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL

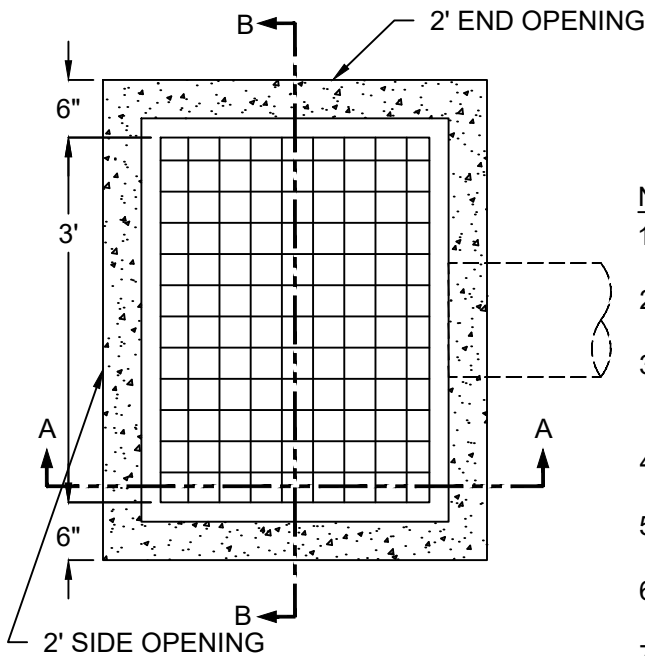




SECTION B-B



SECTION A-A



GRATE DETAIL

NOTES:

1. PROVIDE 1/4" X 18" GALV. CHAIN WELD TO COVER AND EYE BOLT.
2. PROVIDE END OR SIDE OPENINGS AS SHOWN ON PLAN OR CROSS SECTION.
3. TOP OF ALL WALLS TO BE FINISHED TO A FLAT PLANE TO PROVIDE EVEN BEARING FOR GRATE.
4. GRATE SHALL BE GALVANIZED WELDED STEEL GRATE SUITABLE FOR H20 WHEEL LOADING.
5. INSTALL 18" DEEP X 2' WIDE RIP RAP AROUND INLET.
6. NATIVE BACKFILL TO 90% RELATIVE COMPACTION.
7. WALL REINFORCING NOT REQUIRED WHEN DEPTH TO BOTTOM OF INLET. WALLS EXCEEDING THESE LIMITS SHALL BE REINFORCED WITH #4 BARS @ 18" O.C. PLACED 1 1/2" CLEAR TO INSIDE OF BOX UNLESS OTHERWISE SHOWN ON PLANS.



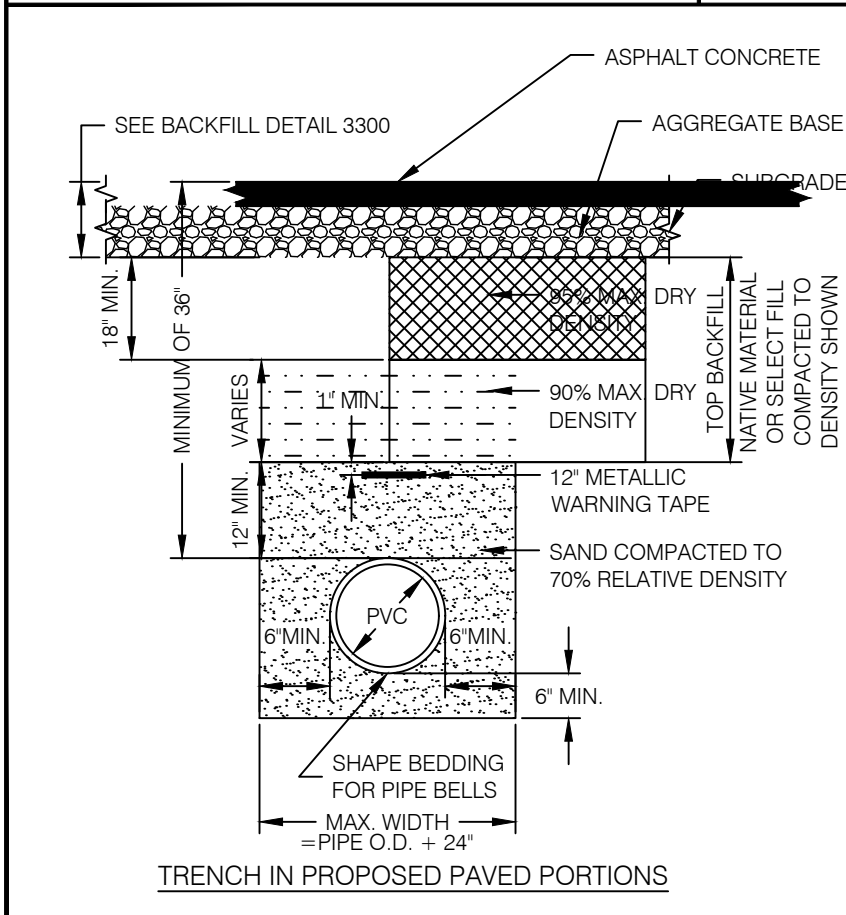
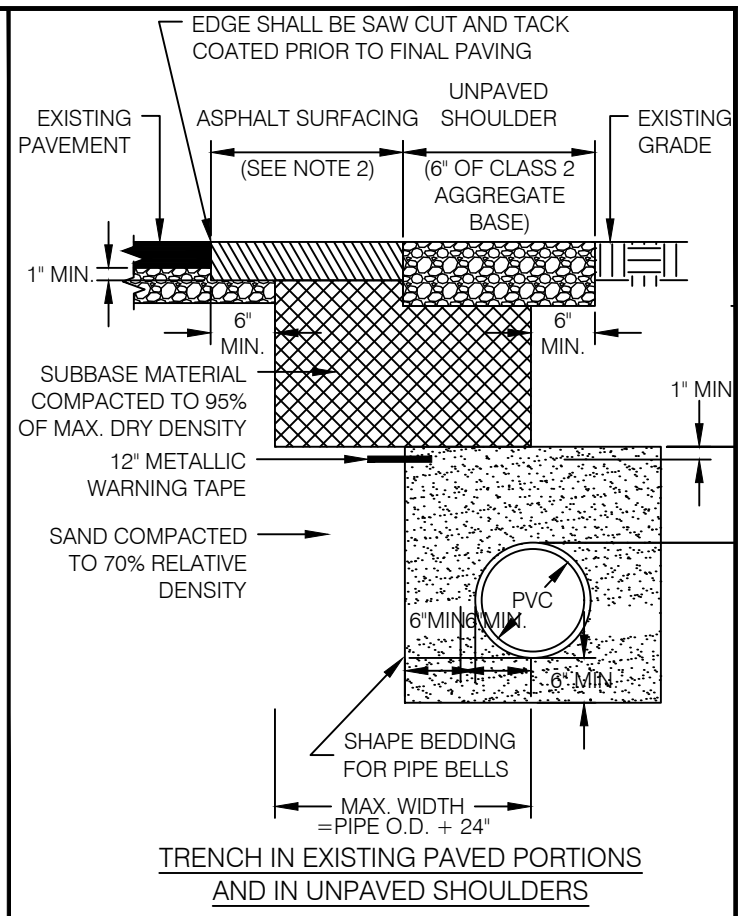
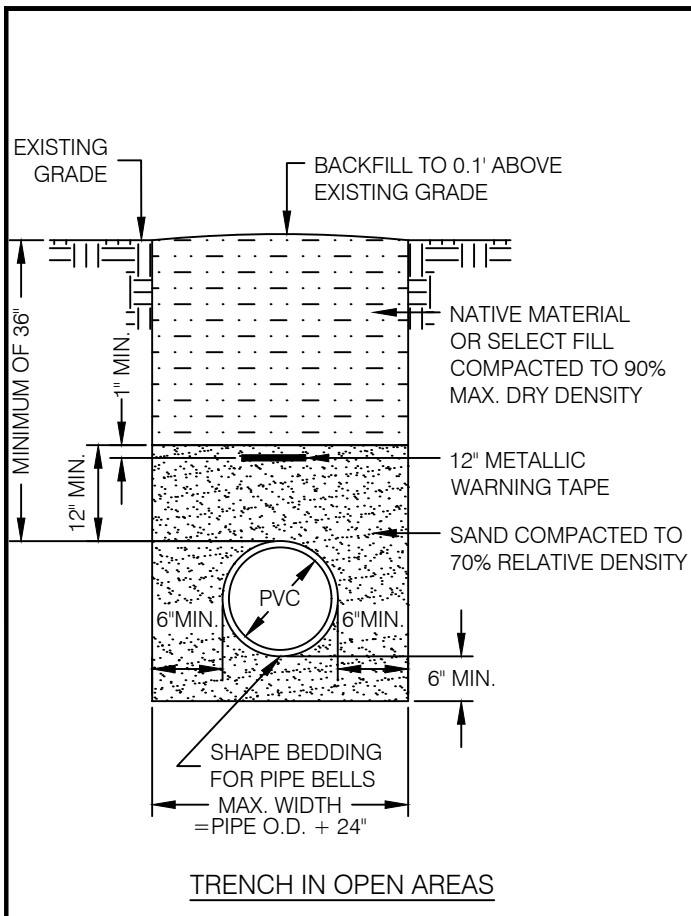
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

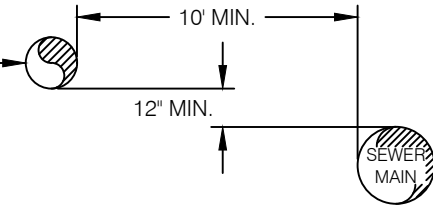
FIELD INLET

4600

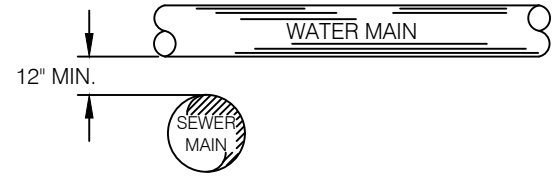


- NOTES:**
1. THE TEMPORARY ASPHALT SURFACING SHALL HAVE A MINIMUM THICKNESS OF 2 INCHES AND SHALL BE PLACED IMMEDIATELY AFTER BACKFILL AND MAINTAINED BY THE CONTRACTOR UNTIL PERMANENT SURFACING IS INSTALLED. THE PERMANENT ASPHALT SURFACING SHALL BE 1 INCH THICKER THAN THE EXISTING PAVEMENT, WITH A MINIMUM THICKNESS OF 4 INCHES. ASPHALT PAVING SHALL MEET THE REQUIREMENTS OF CALTRANS STANDARD SPECIFICATIONS WITH METHOD OF PLACEMENT AS REQUIRED BY THE CITY OF DIXON.
 2. THE SUBBASE MATERIAL SHALL BE CLASS 2 AGGREGATE BASE PER SECTION 26 OF CALTRANS STANDARD SPECIFICATIONS.
 3. MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-1557 FOR COHESIVE MATERIALS. RELATIVE DENSITY IN ACCORDANCE WITH ASTM D-4253 FOR NON-COHESIVE MATERIALS.
 4. EXISTING ASPHALT TO BE REMOVED FROM THE JOB SITE, NOT TO BE PLACED IN BACKFILL.
 5. JETTING OF TRENCH BACKFILL IS NOT PERMITTED.
 6. REFER TO THE STANDARD SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
 7. DIMENSIONS SHOWN ARE REQUIRED UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
 8. ALL OPEN TRENCH WATER LINES SHALL HAVE #12 AWG COPPER TRACER WIRE, SECURED TO THE PIPE WITH TAPE IN 5' INTERVALS.

WATER MAIN SHALL BE LOCATED ABOVE SEWER MAIN

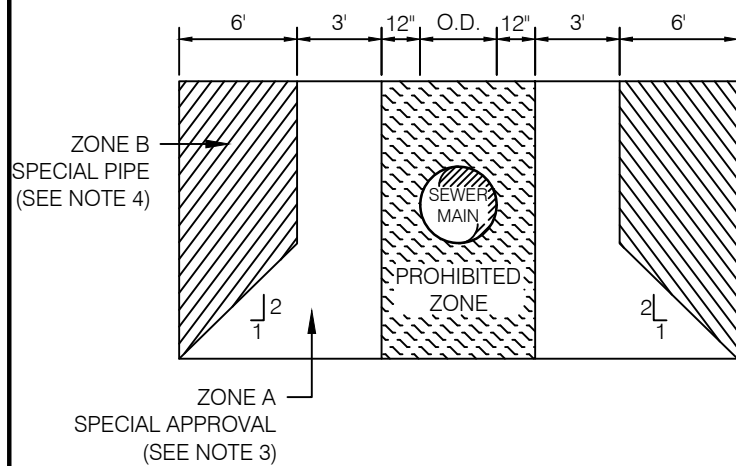


PARALLEL INSTALLATION

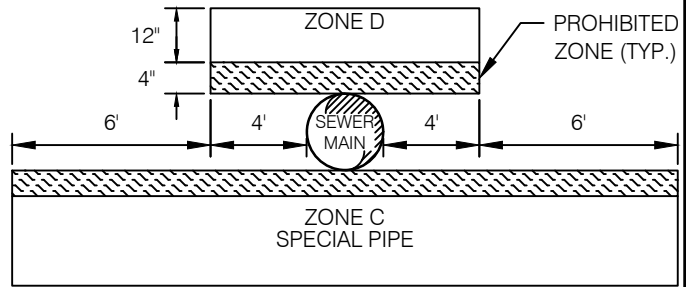


PERPENDICULAR CROSSING

BASIC SEPARATION REQUIREMENTS



PARALLEL INSTALLATION



PERPENDICULAR CROSSING

SPECIAL SEPARATION REQUIREMENTS

DIMENSIONS ARE FROM THE OUTSIDE OF THE SEWER MAIN TO THE OUTSIDE OF THE WATER MAIN

NOTES:

1. THE CONTRACTOR SHALL FOLLOW THE CALIFORNIA WATERWORKS STANDARD TITLE 22 CCR § 64572 FOR THE SEPARATION REQUIREMENTS BETWEEN WATER MAINS AND SANITARY SEWER GUIDELINES PREPARED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES.
2. WHEN THE BASIC SEPARATION REQUIREMENTS CANNOT BE MET, THE CONTRACTOR SHALL INSTALL WATER MAINS ACCORDING TO SPECIAL INSTALLATION REQUIREMENTS.
3. NO WATER MAINS PARALLEL TO SEWER MAINS SHALL BE INSTALLED WITHIN ZONE A WITHOUT SPECIAL APPROVAL FROM THE DEPARTMENT OF HEALTH SERVICES.
4. WHEN LOCATED IN ZONE B, THE WATER MAIN SHALL BE CLASS 305 PVC, DR 14 PER AWWA C900 OR EQUIVALENT.

5010

WATER - SEWER SEPARATION DETAIL

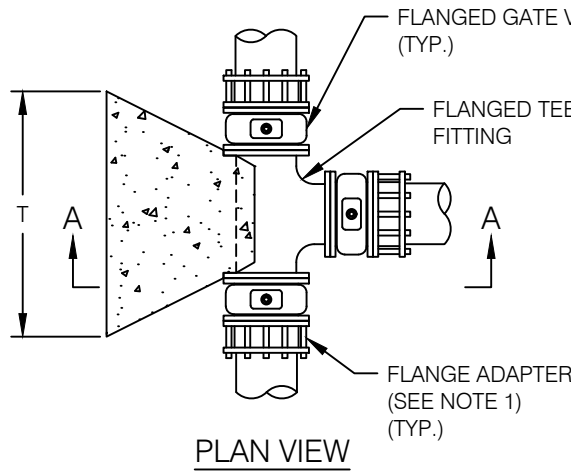


APPROVED: MARCH 2022

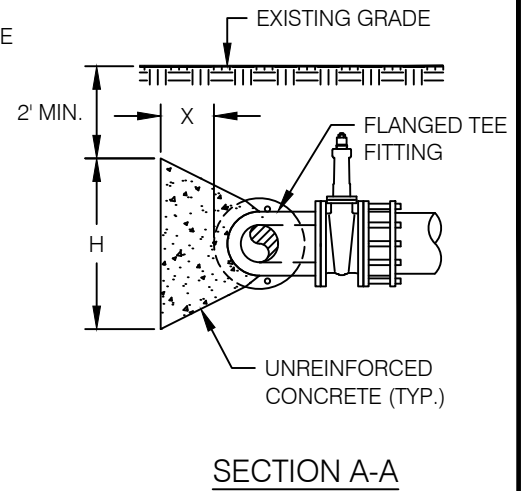
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



PIPE SIZE	TEES		
	H	T	X
4"	1.5'	1.5'	1'
6"	1.5'	3'	1'
8"	2.5'	3.5'	1.5'
10"	3'	4'	1.5'
12"	3'	6'	1.5'
14"	4'	5.5'	1.5'
16"	4.5'	5.5'	1.5'
18"	5'	5.5'	1.5'
20"	5'	6.5'	1.5'



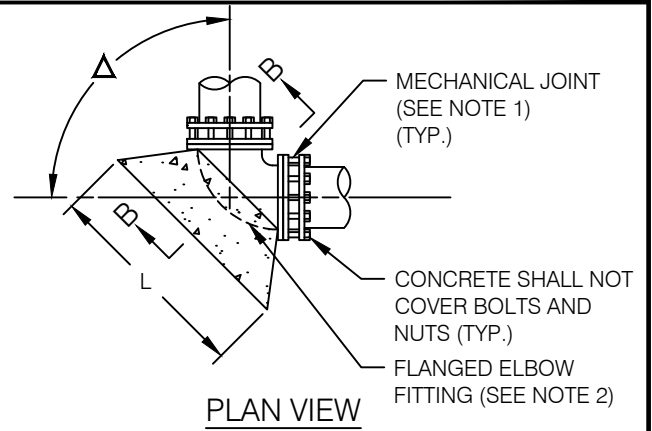
PLAN VIEW



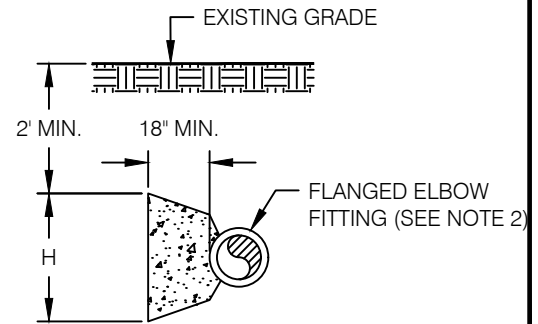
SECTION A-A

TEES

HORIZONTAL BENDS										
MINIMUM DIMENSIONS										
PIPE SIZE	BENDS (Δ)									
	3°-7°		>7°-22 1/2°		>22 1/2°-45°		>45°-60°		>60°-90°	
	H	L	H	L	H	L	H	L	H	L
4"	NO THRUST BLOCK REQUIRED		1.5'	1'	1.5'	1'	1.5'	1.5'	1.5'	2'
6"	NO THRUST BLOCK REQUIRED		1.5'	1.5'	1.5'	2.5'	1.5'	3'	1.5	4'
8"	NO THRUST BLOCK REQUIRED		2'	2'	2'	3'	2.5'	3.5'	2.5'	4.5'
10"	1.5'	1'	2'	2'	2.5'	3'	2.5'	4'	3'	4.5'
12"	2'	1'	2'	2'	3'	4'	3'	5.5'	3'	7.5'
14"	2'	1.5'	3'	3'	4'	4'	4'	5.5'	4'	7.5'
16"	2'	2'	3'	4'	4.5'	4.5'	5'	6'	5'	8'
18"	2.5'	2'	3.5'	4'	4.5'	5'	5'	6'	5'	8'
20"	3'	4'	3.5'	5'	4.5'	6'	5'	7'	5'	9.5'



PLAN VIEW



SECTION B-B

BENDS

NOTES:

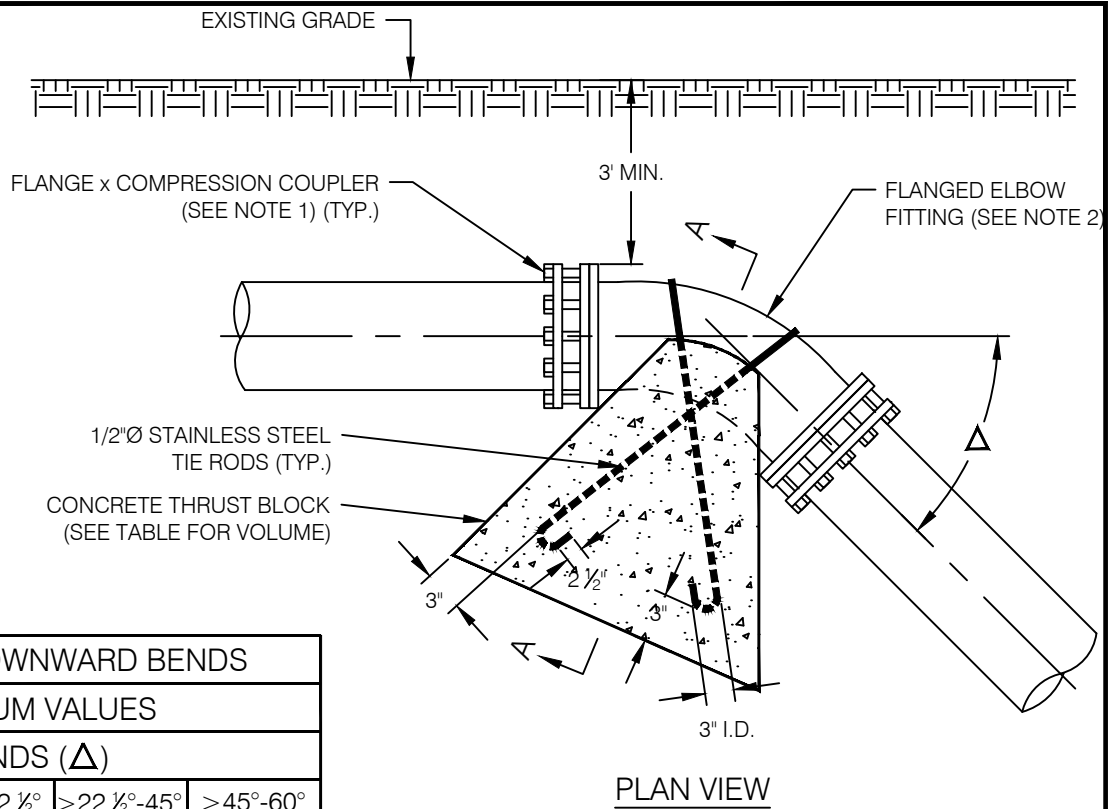
1. FLANGE ADAPTER MAY BE FLANGE BY MECHANICAL JOINT OR FLANGED COUPLING ADAPTER.
2. FITTINGS MAY BE FLANGED OR MECHANICAL JOINT TYPE.
3. ALL FLANGED OR MECHANICAL JOINT CROSSES, TEES AND BENDS SHALL BE DUCTILE IRON (AWWA C-110 OR C-153) CLASS 150. THE INTERIOR SURFACES SHALL BE CEMENT MORTAR LINED PER AWWA C-104 AND THE EXTERIOR SURFACES SHALL BE COAL TAR COATED AND BE POLYETHYLENE ENCASED PER AWWA C-105.
4. ALL BELOW GROUND NUTS, BOLTS AND MISCELLANEOUS STEEL SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES. STAINLESS STEEL MAY BE SUBSTITUTED.
5. ALL THRUST BLOCKS SHALL BE CAST AGAINST UNDISTURBED NATIVE MATERIAL. NO BACKFILL ALLOWED BETWEEN UNDISTURBED NATIVE MATERIAL AND THRUST BLOCK.
6. THE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CEMENT SHALL BE PORTLAND CEMENT, TYPE II, WITH A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
7. FOR DESIGN PRESSURES GREATER THAN 150 PSI, THRUST BLOCK DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.



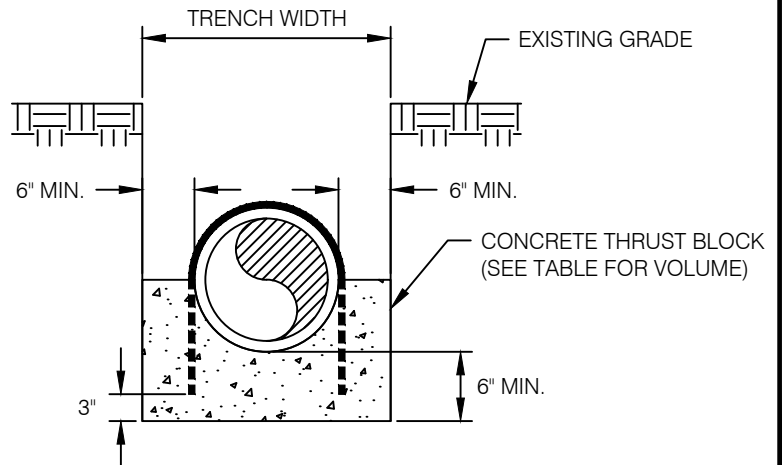
FITTINGS & THRUST
BLOCKS FOR
HORIZONTAL BENDS
AND TEES

5020

APPROVED: MARCH 2022



PLAN VIEW



SECTION A-A

VERTICAL DOWNWARD BENDS				
MINIMUM VALUES				
PIPE SIZE	BENDS (Δ)			
	3°-7°	>7°-22 1/2°	>22 1/2°-45°	>45°-60°
	CU YRD	CU YRD	CU YRD	CU YRD
4"	0.25	0.5	0.5	0.5
6"	0.25	0.5	1	1.5
8"	0.5	1.5	2.5	3
10"	0.5	1.5	3	3.5
12"	1	2.5	4	5
14"	1	3.5	6	8
16"	1.5	4	8	10
18"	2	5	9	11
20"	3	6	10	12

NOTES:

1. FLANGE ADAPTER MAY BE FLANGE BY MECHANICAL JOINT OR FLANGED COUPLING ADAPTER.
2. FITTINGS MAY BE FLANGED OR MECHANICAL JOINT TYPE.
3. ALL FLANGED OR MECHANICAL JOINT CROSSES, TEES AND BENDS SHALL BE DUCTILE IRON (AWWA C-110 OR C-153) CLASS 150. THE INTERIOR SURFACES SHALL BE CEMENT MORTAR LINED PER AWWA C-104 AND THE EXTERIOR SURFACES SHALL BE COAL TAR COATED PER AWWA C-203.
4. ALL BELOW GROUND NUTS, BOLTS AND MISCELLANEOUS STEEL SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES. STAINLESS STEEL MAY BE SUBSTITUTED.
5. ALL THRUST BLOCKS SHALL BE CAST AGAINST UNDISTURBED NATIVE MATERIAL. NO BACKFILL ALLOWED BETWEEN UNDISTURBED NATIVE MATERIAL AND THRUST BLOCK.
6. THE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CEMENT SHALL BE PORTLAND CEMENT, TYPE II, WITH A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
7. FOR DESIGN PRESSURES GREATER THAN 150 PSI, THRUST BLOCK DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.

5030

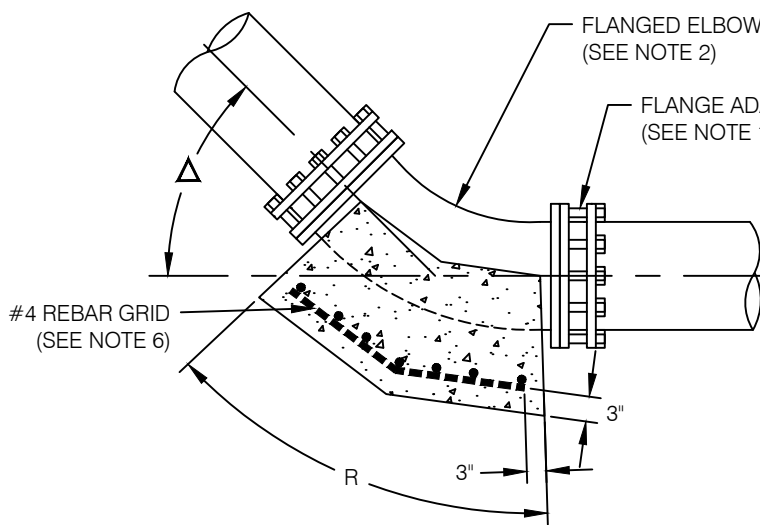
FITTINGS & THRUST
BLOCKS FOR
VERTICAL
DOWNWARD BENDS



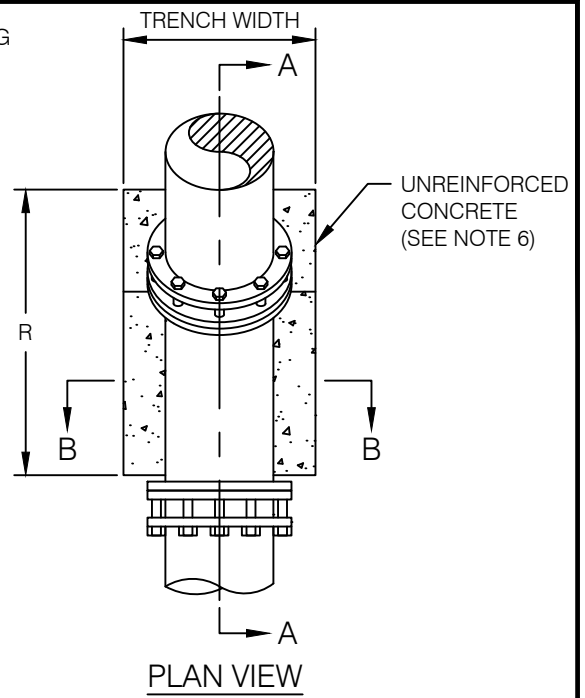
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CITY OF DIXON
ENGINEERING
STANDARD DETAIL



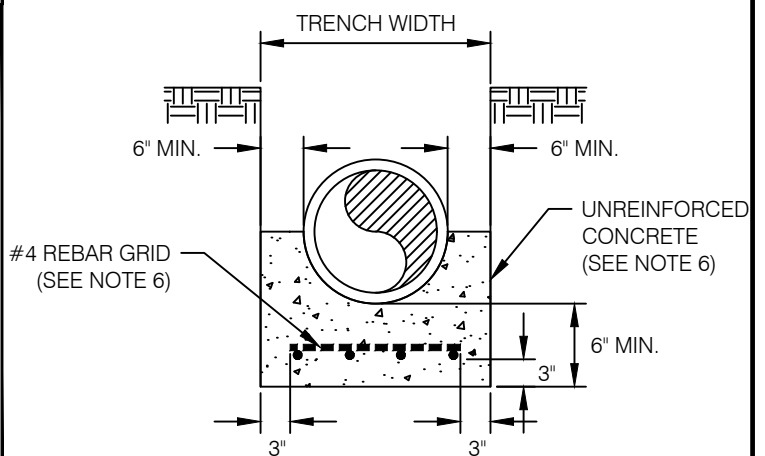


SECTION A-A



PLAN VIEW

VERTICAL UPWARD BENDS				
MINIMUM VALUES				
PIPE SIZE	BENDS (Δ)			
	3°-7°	>7°-22 1/2°	>22 1/2°-45°	>45°-60°
	R	R	R	R
4"	NA	1'	1'	1'
6"	NA	1'	1.5'	2'
8"	NA	1.5'	2.5'	3.5'
10"	1'	1.5'	3'	4'
12"	1'	2'	4.5'	5.5'
14"	1'	3'	6'	8'
16"	1'	3.5'	7'	9'
18"	1.5'	4'	8'	10'
20"	2'	5'	10'	12'



SECTION B-B

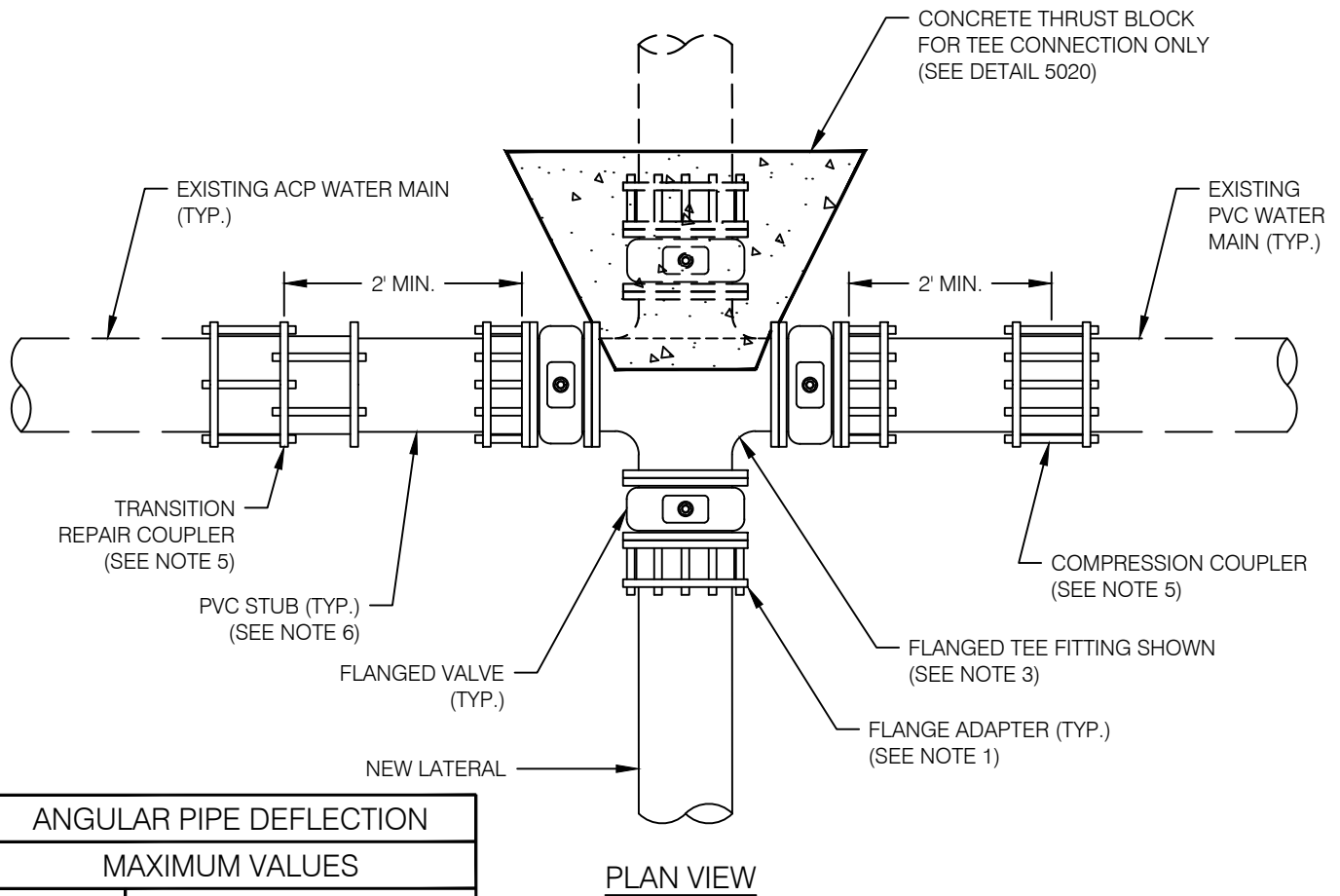
NOTES:

1. FLANGE ADAPTER MAY BE FLANGE BY MECHANICAL JOINT OR FLANGED COUPLING ADAPTER.
2. FITTINGS MAY BE FLANGED OR MECHANICAL JOINT TYPE.
3. ALL FLANGED OR MECHANICAL JOINT CROSSES, TEES AND BENDS SHALL BE DUCTILE IRON (AWWA C-110 OR C-153) CLASS 150 AND COMPATIBLE WITH CAST IRON PIPE SIZE PVC. THE INTERIOR SURFACES SHALL BE CEMENT MORTAR LINED PER AWWA C-104 AND THE EXTERIOR SURFACES SHALL BE COAL TAR COATED PER AWWA C-203.
4. ALL BELOW GROUND NUTS, BOLTS AND MISCELLANEOUS STEEL SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES. STAINLESS STEEL MAY BE SUBSTITUTED.
5. ALL THRUST BLOCKS SHALL BE CAST AGAINST UNDISTURBED NATIVE MATERIAL. NO BACKFILL ALLOWED BETWEEN UNDISTURBED NATIVE MATERIAL AND THRUST BLOCK.
6. IF THE MINIMUM DIMENSION "R" IS GREATER THAN THE TRENCH WIDTH, THE THRUST BLOCK SHALL BE REINFORCED WITH #4 REBAR GRID @ 12" O.C. EACH WAY AND LOCATED AS SHOWN.
7. THE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CEMENT SHALL BE PORTLAND CEMENT, TYPE II, WITH A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
8. FOR DESIGN PRESSURES GREATER THAN 150 PSI, THRUST BLOCK DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.



FITTINGS & THRUST
BLOCKS FOR
VERTICAL
UPWARD BENDS

5040



ANGULAR PIPE DEFLECTION			
MAXIMUM VALUES			
PIPE SIZE	SLEEVE LENGTH		
	5"	7"	10"
4" - 14"	4°	4 1/2°	4 1/2°
16" - 24"	2°	4°	4 1/2°
26" - 36"	1 1/2°	3 1/2°	3 1/2°

Note: Deflection (in degrees) is PER COUPLER

NOTES:

1. FLANGE ADAPTER MAY BE FLANGE BY MECHANICAL JOINT OR FLANGED COUPLING ADAPTER.
2. FITTINGS MAY BE FLANGED OR MECHANICAL JOINT TYPE.
3. ALL FLANGED OR MECHANICAL JOINT CROSSES AND TEES SHALL BE DUCTILE IRON (AWWA C-110 OR C-153) CLASS 150 AND COMPATIBLE WITH CAST IRON PIPE SIZE PVC. THE INTERIOR SURFACES SHALL BE CEMENT MORTAR LINED PER AWWA C-104 AND THE EXTERIOR SURFACES SHALL BE COAL TAR COATED PER AWWA C-203.
4. ALL BELOW GROUND NUTS, BOLTS AND MISCELLANEOUS STEEL SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES.
5. ALL COMPRESSION AND REPAIR COUPLERS SHALL BE RESTRAINED AND SHALL BE PER APPROVED MATERIALS LIST. FOR SEVERE ANGULAR PIPE DEFLECTIONS, REPAIR COUPLERS SHALL BE SUBMITTED TO AND APPROVED BY THE CITY ENGINEER.
6. PVC STUBS SHALL BE 2 FEET (2) MINIMUM IN LENGTH AND HAVE A CLASS AND PRESSURE RATING EQUAL TO, OR GREATER THAN, THE EXISTING WATER MAIN.
7. AT CONTRACTOR'S EXPENSE, ADDITIONAL FITTINGS AND PIPE SECTIONS MAY BE REQUIRED BY THE CITY ENGINEER TO ACCOMMODATE SEVERE MISALIGNMENTS IN THE PIPELINE AFTER IT HAS BEEN CUT.

5050

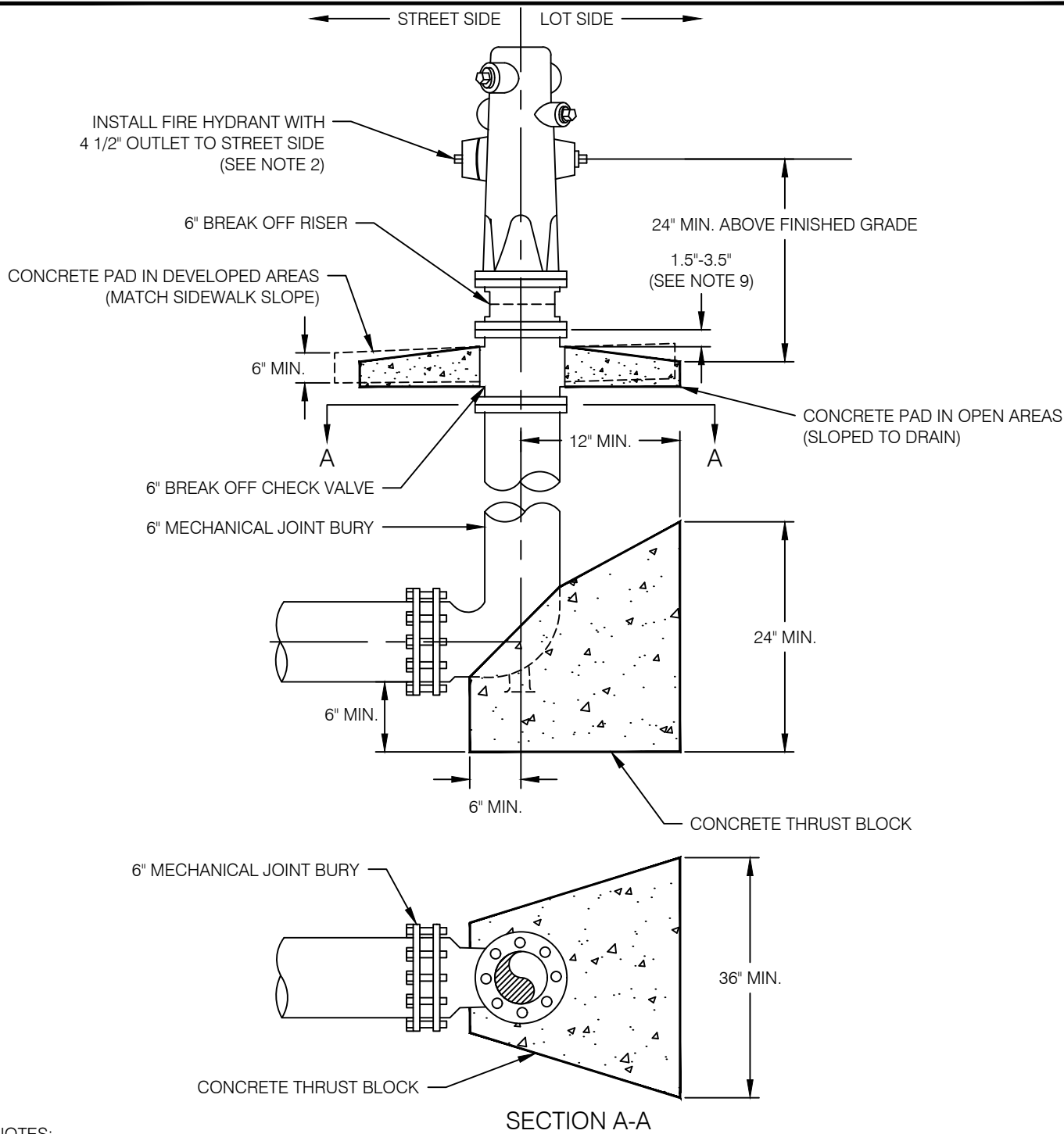
**"CUT-IN" TEE OR
CROSS DETAIL FOR
LATERAL
CONNECTION**



APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

1. FIRE HYDRANT SHALL BE CLOW 960.
2. 4 1/2" OUTLET CAP TO BE PAINTED ACCORDING TO NFPA STANDARDS BASED ON FLOW TEST RESULTS.
3. HYDRANT SHALL BE FURNISHED WITH FACTORY APPLIED "BRIGHT WHITE" EPOXY COATING. FIELD APPLIED TOUCH-UP MAY BE REQUIRED.
4. PRIVATE FIRE HYDRANTS SHALL BE FURNISHED WITH FACTORY APPLIED "RED" EPOXY COATING.
5. ALL EXPOSED METAL SHALL BE PROPERLY PREPARED AND PAINTED WITH BRIGHT WHITE INDUSTRIAL ENAMEL PAINT. FIELD APPLIED TOUCH-UP MAY BE REQUIRED.
6. ALL BELOW GROUND NUTS, BOLTS, AND MISCELLANEOUS STEEL SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED AS PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES.
7. THE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CONCRETE SHALL HAVE A MINIMUM OF 5 SACKS PORTLAND TYPE II CEMENT PER CUBIC YARD OF CONCRETE.
8. HYDRANT LATERAL SHALL BE INSTALLED AND BACKFILLED AS PER DETAIL 5000.
9. THE BOTTOM OF THE BREAKAWAY RISER SHALL BE 1.5"-3.5" FROM THE TOP OF THE CONCRETE SPLASH PAD.



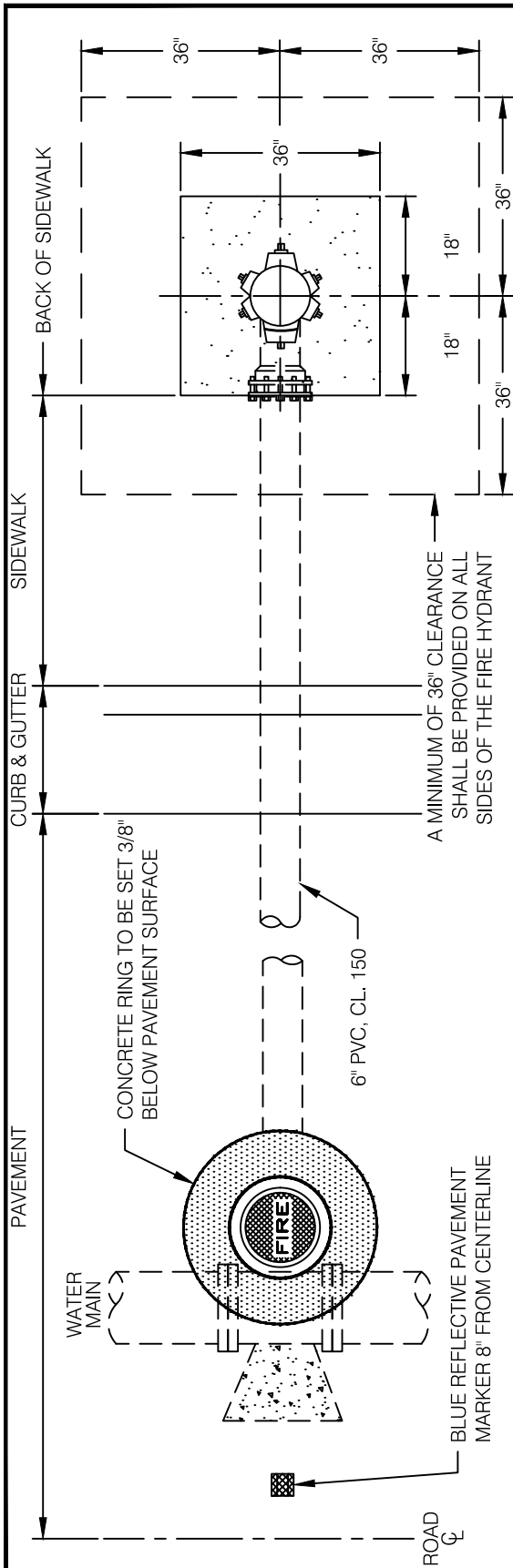
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



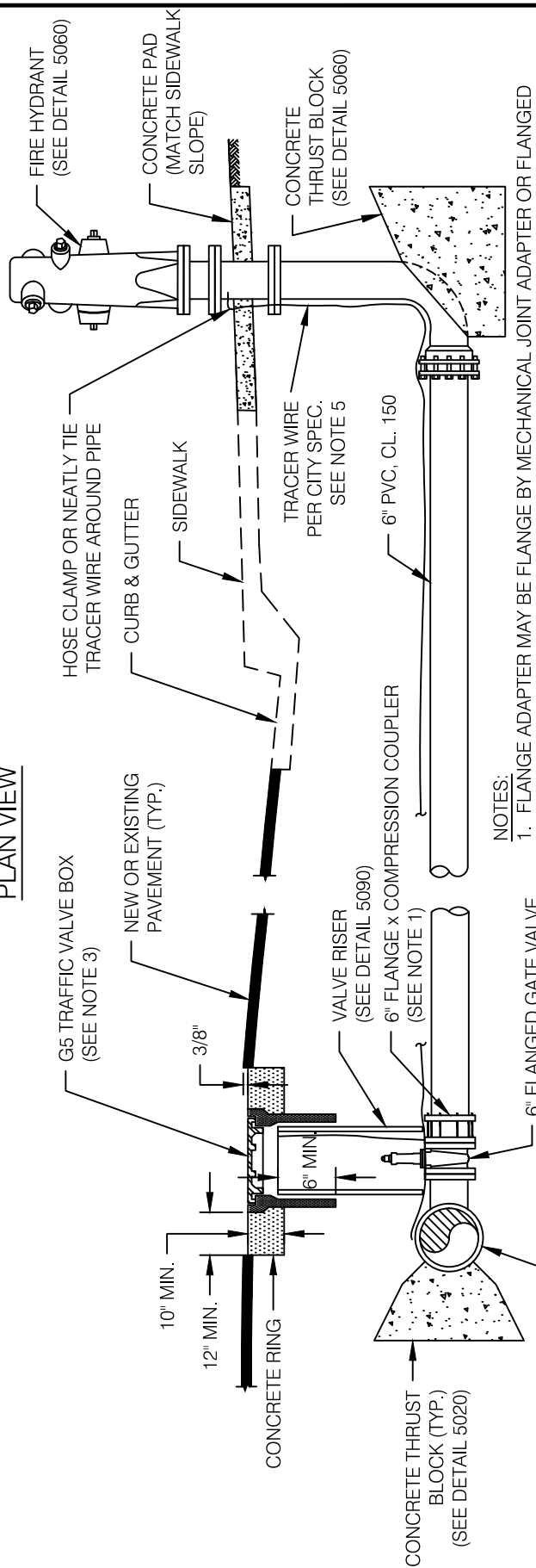
APPROVED: MARCH 2022

FIRE HYDRANT
DETAIL

5060



PLAN VIEW



PROFILE

- NOTES:**
1. FLANGE ADAPTER MAY BE FLANGE BY MECHANICAL JOINT ADAPTER OR FLANGED COUPLING ADAPTER.
 2. ALL BELOW GROUND NUTS, BOLTS, AND MISCELLANEOUS STEEL SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED AS PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES.
 3. TRAFFIC VALVE BOX WILL BE MODEL G-5 WITH CAST IRON CIRCULAR LID MARKED "FIRE".
 4. SEE DETAIL 5060 FOR OTHER NOTES AND DETAILS.
 5. TRACER WIRE SHALL BE ADDED TO THE HYDRANT LATERAL, FROM THE VALVE RISER TO THE SPLASH PAD. TRACER WIRE IS DESCRIBED IN DETAIL IN 5000.

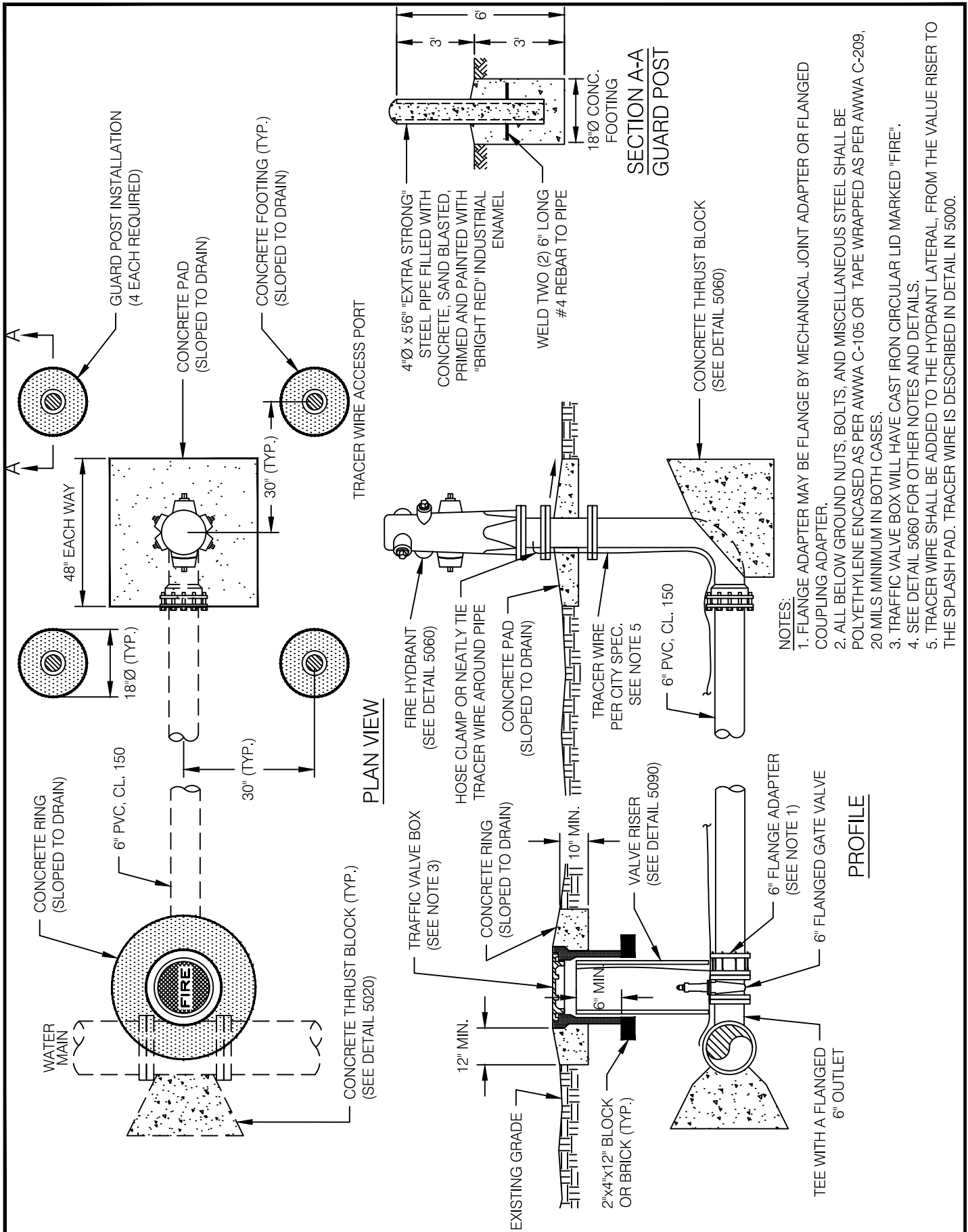
5070

**FIRE HYDRANT
INSTALLATION FOR
DEVELOPED AREAS**

APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

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2. ALL BELOW GROUND NUTS, BOLTS, AND MISCELLANEOUS STEEL SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED AS PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES.
3. TRAFFIC VALVE BOX WILL HAVE CAST IRON CIRCULAR LID MARKED "FIRE".
4. SEE DETAIL 5060 FOR OTHER NOTES AND DETAILS.
5. TRACER WIRE SHALL BE ADDED TO THE HYDRANT LATERAL, FROM THE VALVE RISER TO THE SPLASH PAD. TRACER WIRE IS DESCRIBED IN DETAIL IN 5000.



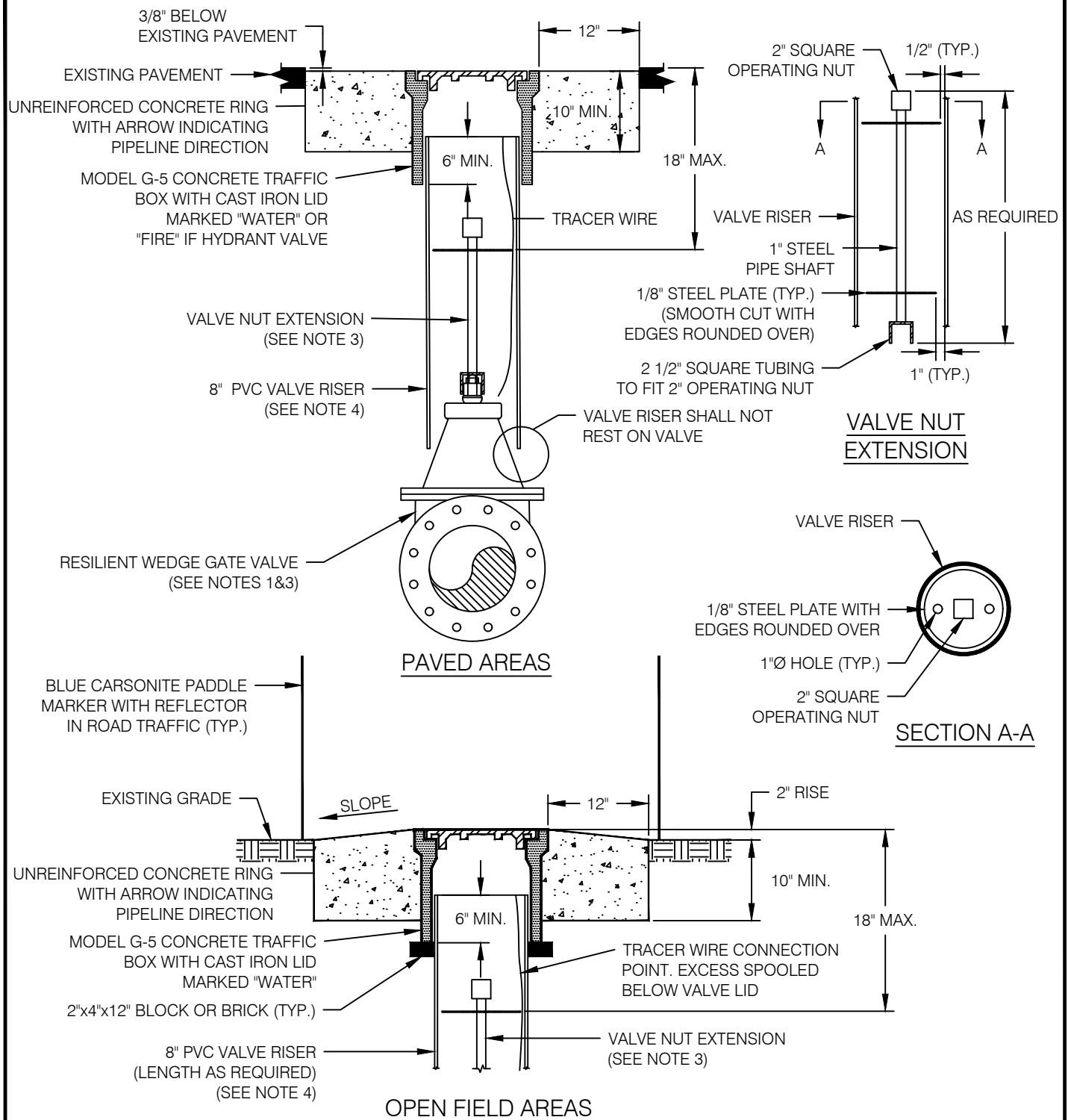
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

**FIRE HYDRANT
INSTALLATION FOR
UNDEVELOPED
AREAS**

5080



NOTES:

1. ALL RESILIENT WEDGE GATE VALVES SHALL BE PER APPROVED MATERIALS LIST AND CONFORM TO AWWA C509 OR AWWA C515. RESILIENT WEDGE GATE VALVES SHALL BE FURNISHED WITH A 2" SQUARE OPERATING NUT, CLOCKWISE TO CLOSE. ALL INTERIOR AND EXTERIOR SURFACES SHALL HAVE FUSION-BONDED EPOXY COATING AND CONFORM TO AWWA C550.
2. ALL BELOW GROUND NUTS, BOLTS AND MISCELLANEOUS STEEL SHALL BE STAINLESS STEEL OR POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED AS PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES.
3. IF TOP OF OPERATING NUT ON THE RESILIENT WEDGE GATE VALVE EXCEEDS 60" FROM EXISTING PAVEMENT OR GRADE, A VALVE NUT EXTENSION SHALL BE REQUIRED.
4. VALVE RISER MAY BE NOTCHED AROUND VALVE SHAFT WITH THE CITY ENGINEER'S APPROVAL. VALVE RISER SHALL NOT REST ON VALVE.

5090

TRAFFIC BOX AND VALVE DETAILS



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CITY OF DIXON
ENGINEERING
STANDARD DETAIL



DETAIL NOT USED

5110

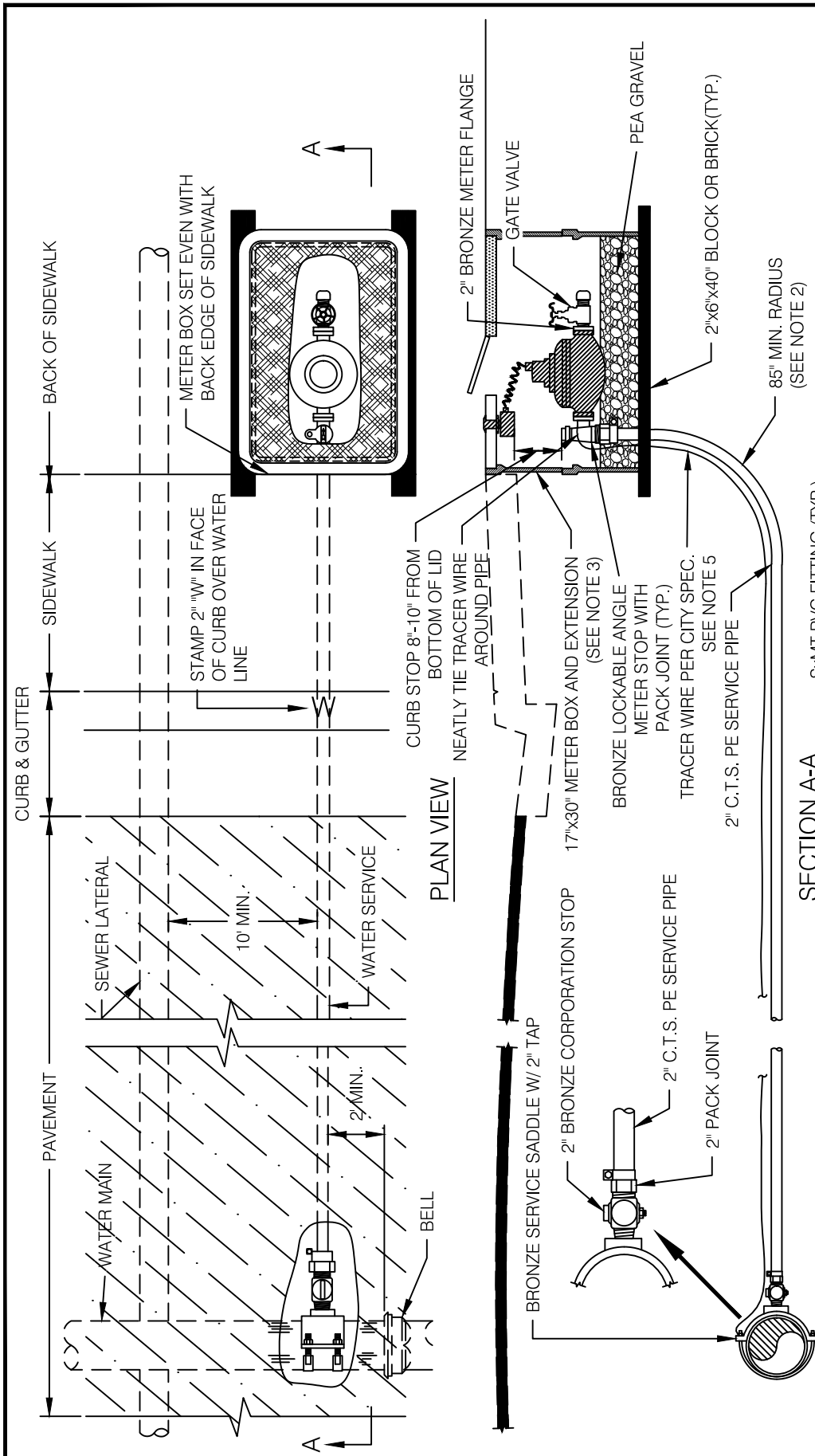
3/4" - 1" DOUBLE
METER
CONNECTION



APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

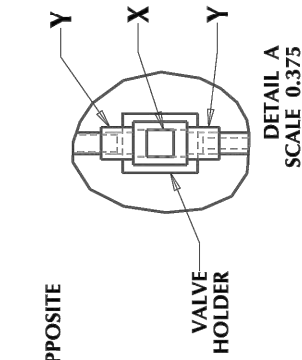
- METER SHALL BE SENSUS OMNI C2 WITH A 520 M SMART POINT. METER SHALL BE FURNISHED AND INSTALLED BY THE CITY AT THE CONTRACTORS EXPENSE. 1 1/2" AND 2" POLYETHYLENE PIPE SHALL BE COPPER TUBE SIZE (C.T.S) WITH A PRESSURE RATING OF 200 PSI. IF NOT IMMEDIATELY INSTALLED, THE CONTRACTOR SHALL FABRICATE AND INSTALL A JUMPER, EQUAL TO THE LENGTH OF THE METER TO BE INSTALLED (SEE DETAIL A).
- WHEN FIELD CONDITIONS WILL NOT ALLOW THE MINIMUM RADIUS, USE DETAIL B FOR REQUIRED INSTALLATION.
- METER BOX SHALL BE LIGHTWEIGHT FIBERGLASS REINFORCED PLASTIC OR APPROVED EQUAL.
- SUBMIT DETAILS TO THE CITY ENGINEER FOR APPROVAL ON SERVICES LARGER THAN 2" IN SIZE.
- TRACER WIRE SHALL BE ADDED TO PIPING FROM MAIN TO METER.

DIXON CITY OF DIXON
ENGINEERING
STANDARD DETAIL

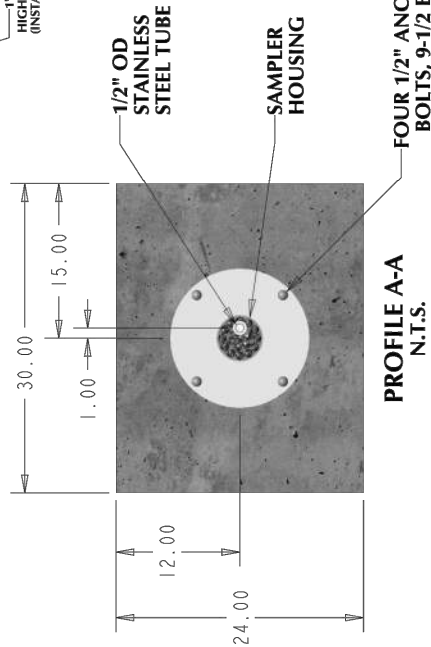
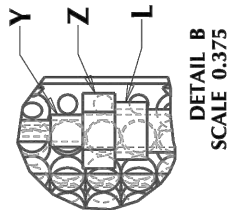
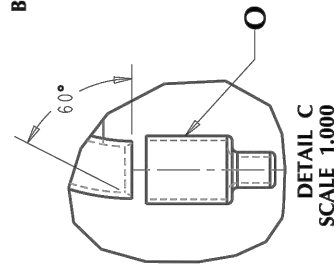
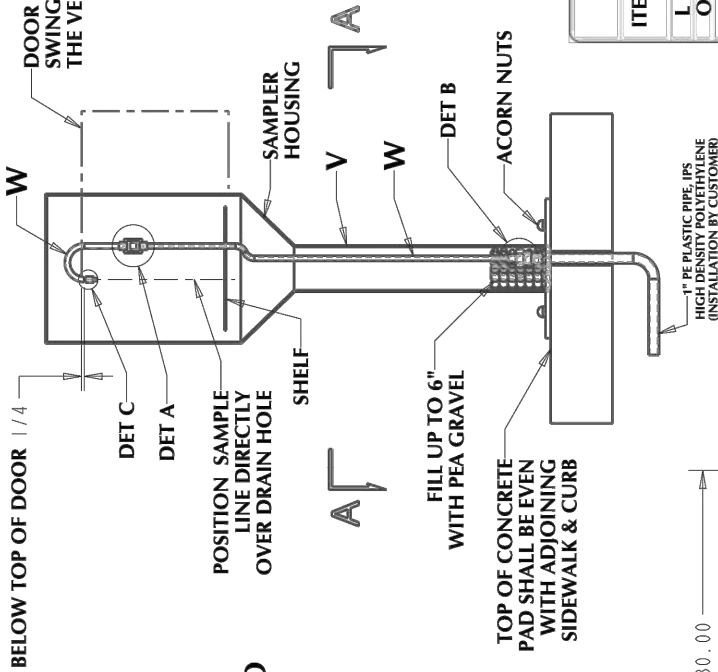
APPROVED: MARCH 2022

1 1/2" - 2" METER CONNECTION

5120



DOOR WHEN OPEN SHALL SWING OUT INTO SPACE OPPOSITE THE VEHICLE TRAVEL AREA



TYPICAL INSTALLATION FOR MX WATER QUALITY SAMPLING STATION TIE INTO EXISTING MAIN — N.T.S.

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PARTS LIST	
ITEM	DESCRIPTION
L	1 1" STRAIGHT COUPLING, FIP x PE-PS, LEAD FREE, (OPTIONAL)
O	1 VINYL CAP

MX WATER QUALITY SAMPLING STATION ASSEMBLY Model No. SDMX-H SUPPLIED BY STEEL SOURCE CONSTRUCTION	
ITEM	DESCRIPTION
V	1 S/S HOUSING, 1" DIA. x 46"; OPTIONS: 1. CYLINDER LOCK
W	2 1/2" OD 304 S/S TUBE
X	1 1/2" S/S BALL VALVE, FPT
Y	3 1/2" S/S COMPRESSION FITTING x NPT
Z	1 1" x 1/2" REDUCER, NPT x FPT

NOTE: ALL PIPE FITTINGS IN CONTACT WITH POTABLE WATER SHALL BE LEAD FREE AND COMPLIANT TO NSF-61/SECTION 8

- NOTES:
1. SAMPLE STATION SHALL BE POWDER COATED IN RAL 6028 (FOREST GREEN).
 2. SAMPLE STATION SHALL HAVE CITY LOGO ETCHED ON FLAT SIDE IN BACK.

5130

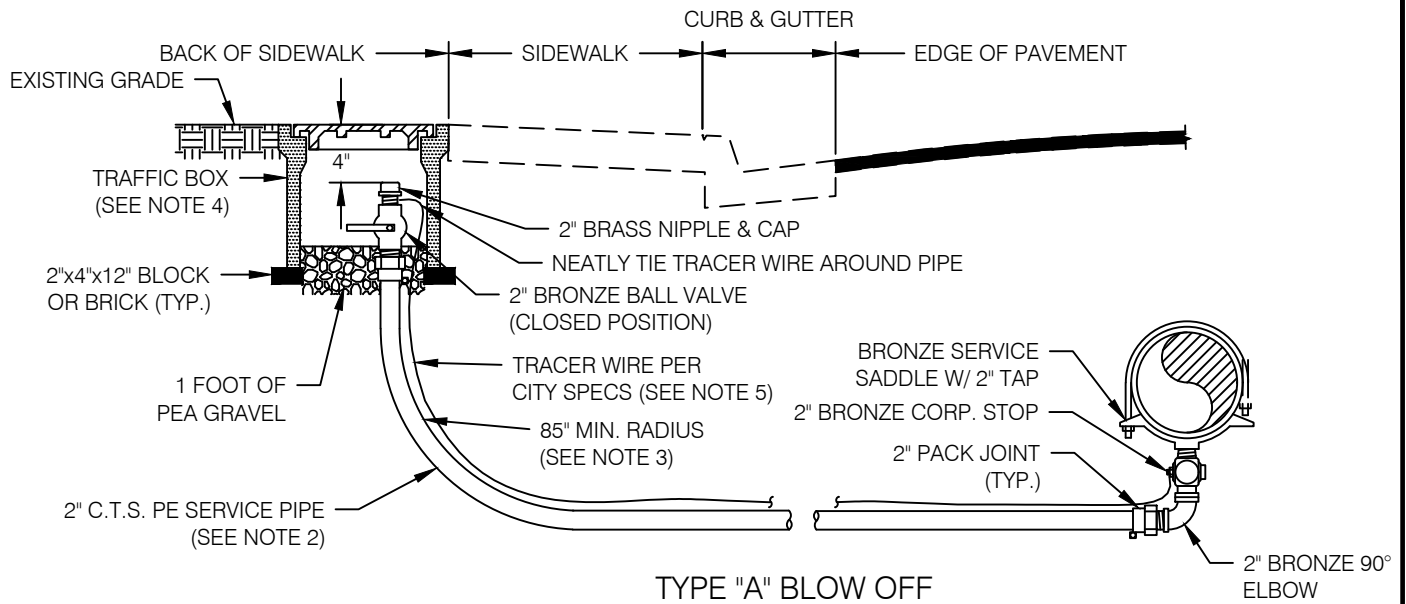
1" CONNECTION WITH
SAMPLE STATION



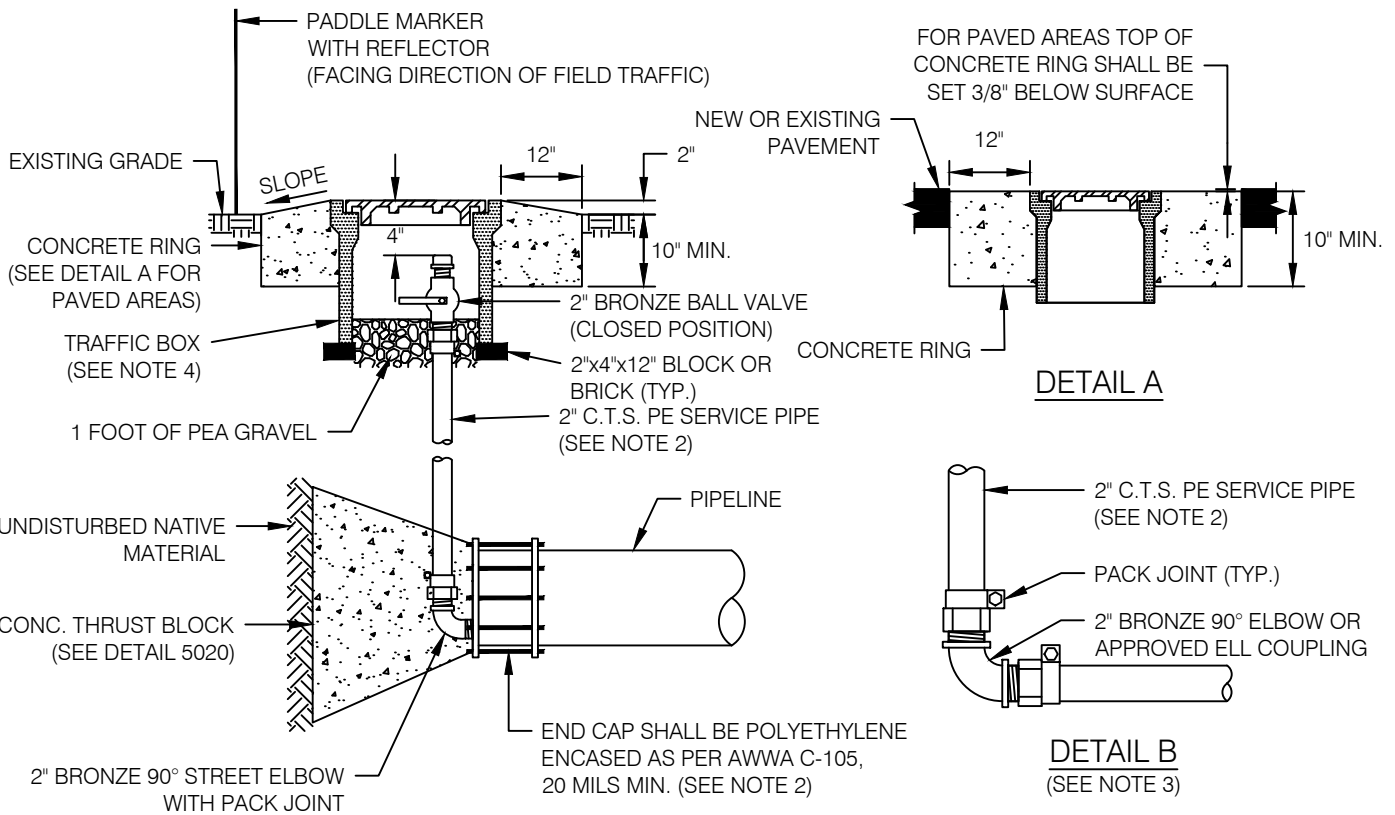
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CITY OF DIXON
ENGINEERING
STANDARD DETAIL





TYPE "A" BLOW OFF



TYPE "B" BLOW OFF

NOTES:

1. BLOW OFFS SHALL BE INSTALLED ON ALL END RUNS OF WATER MAINS WHETHER TEMPORARY OR PERMANENT.
2. POLYETHYLENE PIPE SHALL BE COPPER TUBE SIZE (C.T.S.) WITH A PRESSURE RATING OF 200 PSI.
3. WHEN FIELD CONDITIONS WILL NOT ALLOW THE MINIMUM RADIUS, USE DETAIL B FOR REQUIRED INSTALLATION.
4. TRAFFIC VALVE BOX SHALL BE CHRISTY MODEL G-12 WITH CAST IRON LID MARKED "WATER" OR APPROVED EQUAL.
5. TRACER WIRE SHALL BE ADDED TO PIPING FROM MAIN TO BLOWOFF.



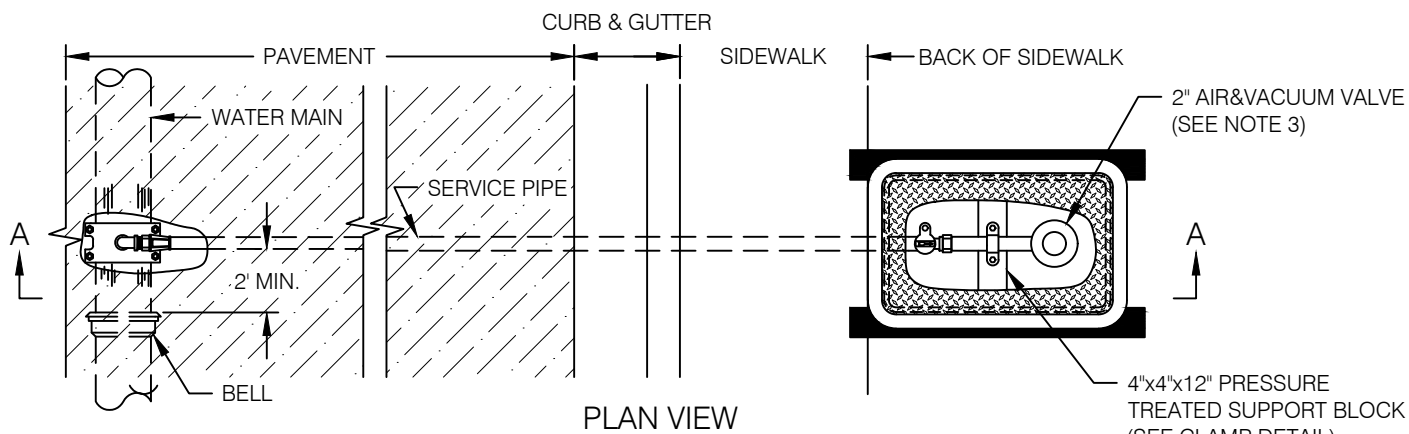
DIXON CITY OF DIXON
ENGINEERING
STANDARD DETAIL



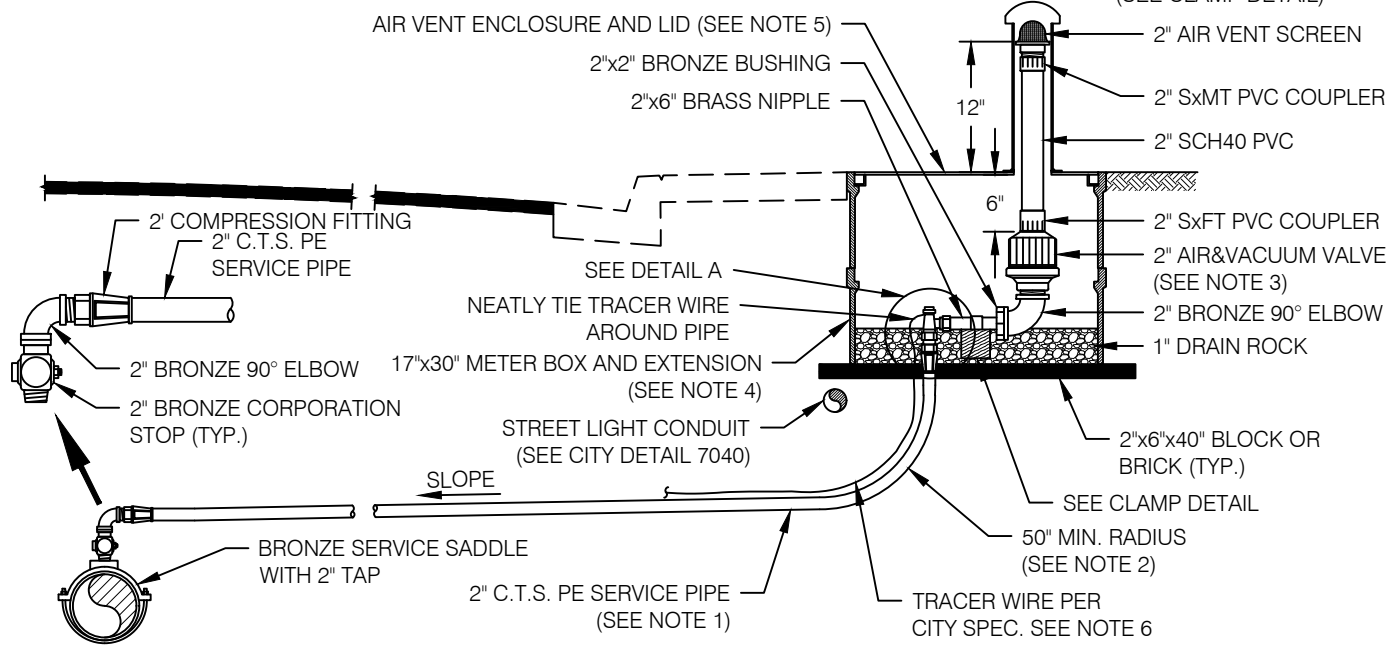
APPROVED: MARCH 2022

**BLOW OFF
ASSEMBLIES**

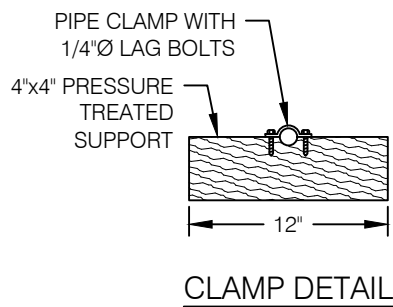
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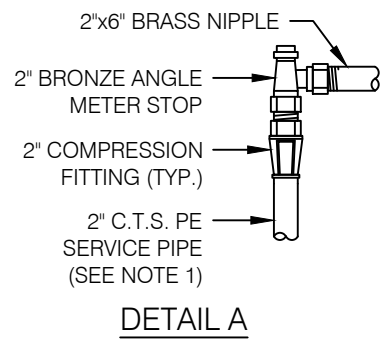
PLAN VIEW



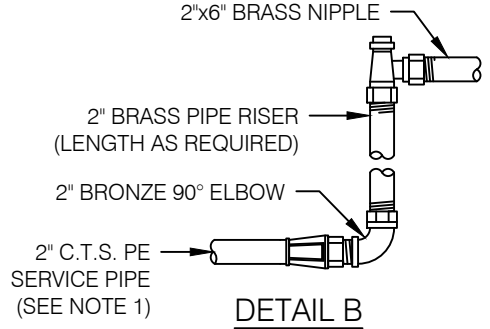
SECTION A-A



CLAMP DETAIL





DETAIL A

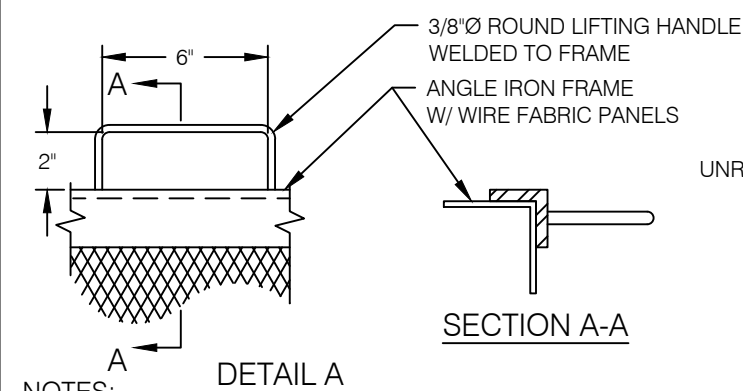
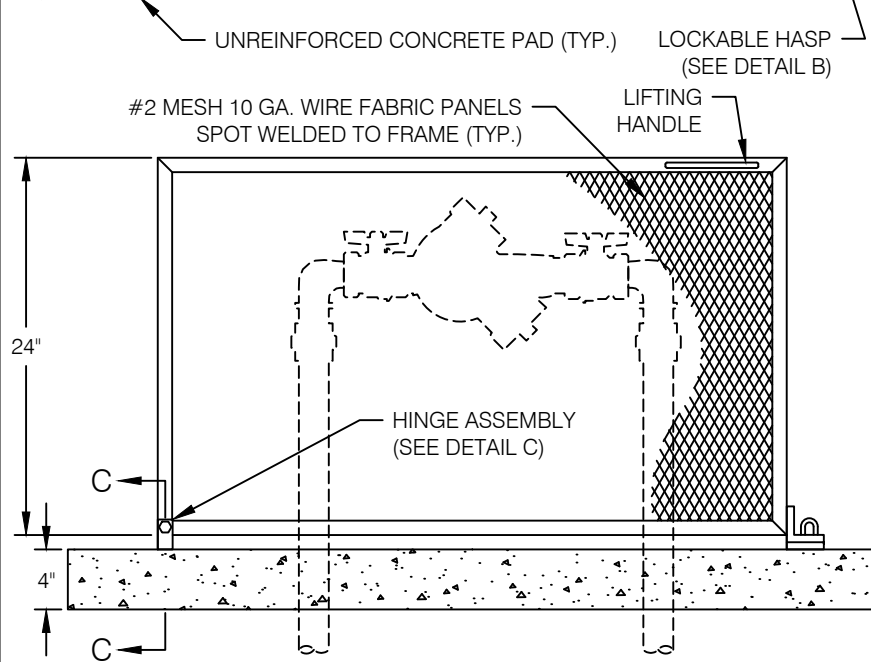
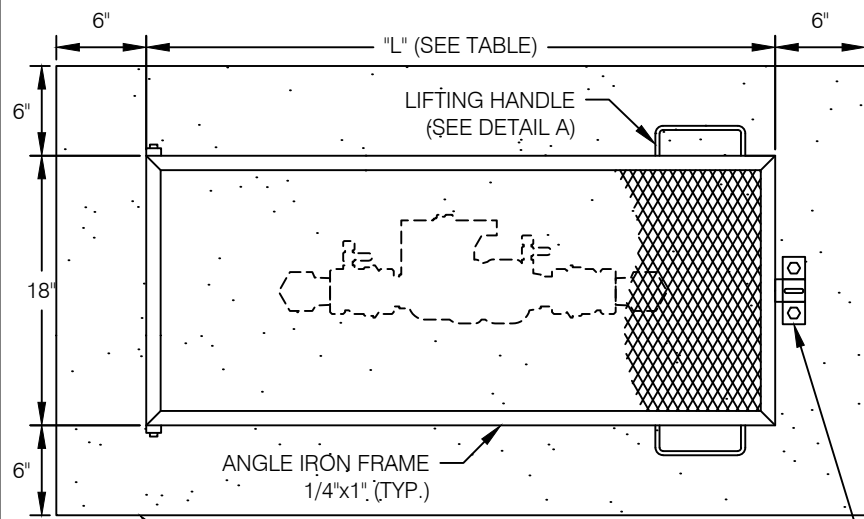


DETAIL B

NOTES:

1. 6"-14" WATER MAIN: 2" C.T.S. PE SERVICE PIPE SHALL BE USED (SHOWN). 16" AND GREATER: SHALL USE APPROPRIATE SIZE WITH APPROPRIATE FITTINGS AND COUPLERS, AS DIRECTED BY THE CITY ENGINEER.
2. WHEN THE FIELD CONDITIONS WILL NOT ALLOW THE MINIMUM RADIUS SHOWN, USE DETAIL B FOR THE REQUIRED INSTALLATION.
3. AIR & VACUUM VALVE SHALL BE BERMAID MODEL 4415 OR APPROVED EQUAL.
4. METER BOX SHALL BE LIGHTWEIGHT FIBERGLASS REINFORCED PLASTIC OR APPROVED EQUAL.
5. AIR VENT ENCLOSURE AND LID SHALL BE *PLACER WATERWORKS* MODEL: PW/AE3618-MN OR APPROVED EQUAL.
6. TRACER WIRE SHALL BE ADDED TO PIPING FROM MAIN TO AVV.

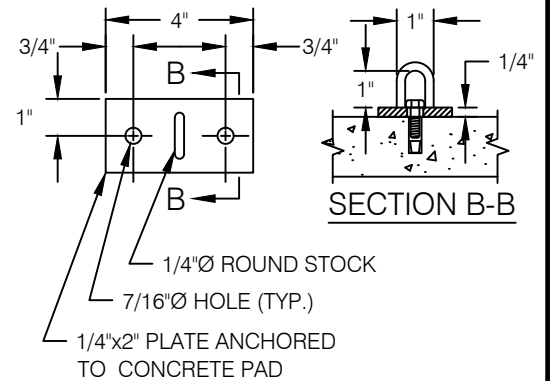
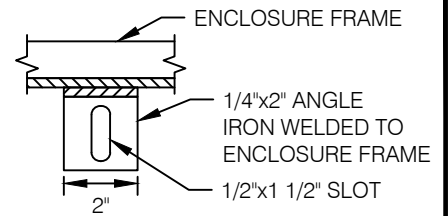
5150	AIR & VACUUM VALVE ASSEMBLY		CITY OF DIXON ENGINEERING STANDARD DETAIL 
		APPROVED: MARCH 2022	



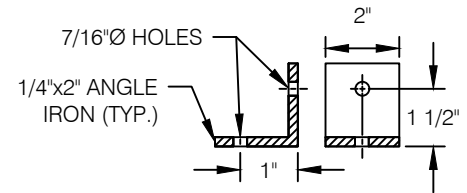
NOTES:

1. CONTRACTOR SHALL INSTALL A PREFABRICATED PROTECTIVE ENCLOSURE, TO THE SPECIFICATIONS SHOWN. ENCLOSURE DETAILS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.
2. THE BACKFLOW PREVENTER PROTECTIVE ENCLOSURE SHALL BE POWDER COATED "GREEN" AND MISCELLANEOUS STEEL SHALL BE GALVANIZED.
3. THE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CEMENT SHALL BE PORTLAND TYPE II WITH A MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
4. 3/4"-2" BACKFLOW PREVENTERS SHALL HAVE AN INSULATED CAGE, OR UNINSULATED CAGE WITH A FREEZE BAG. FREEZE BAGS ARE OPTIONAL FOR DEVICES LARGER THAN 2".

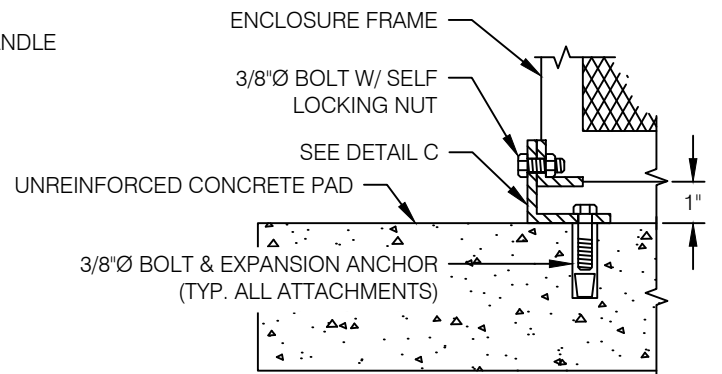
TABLE	
BFP SIZE	L
3/4" - 1"	30"
1-1/2" - 2"	42"



DETAIL B



DETAIL C



SECTION C-C

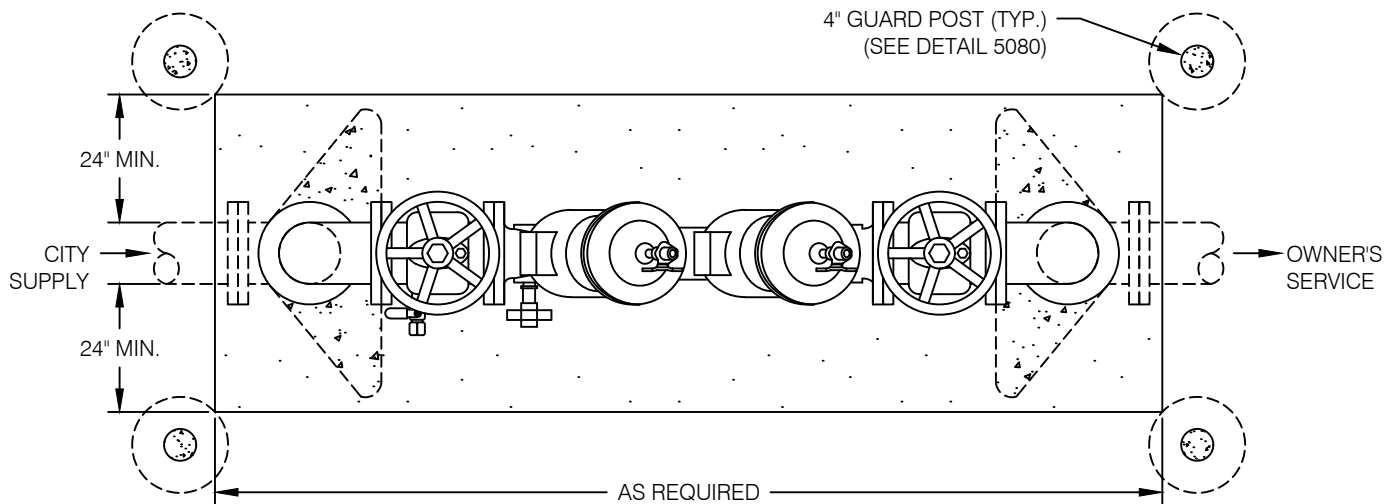
5170
**REDUCED PRESSURE
 BACKFLOW PREVENTER
 PROTECTIVE ENCLOSURE**



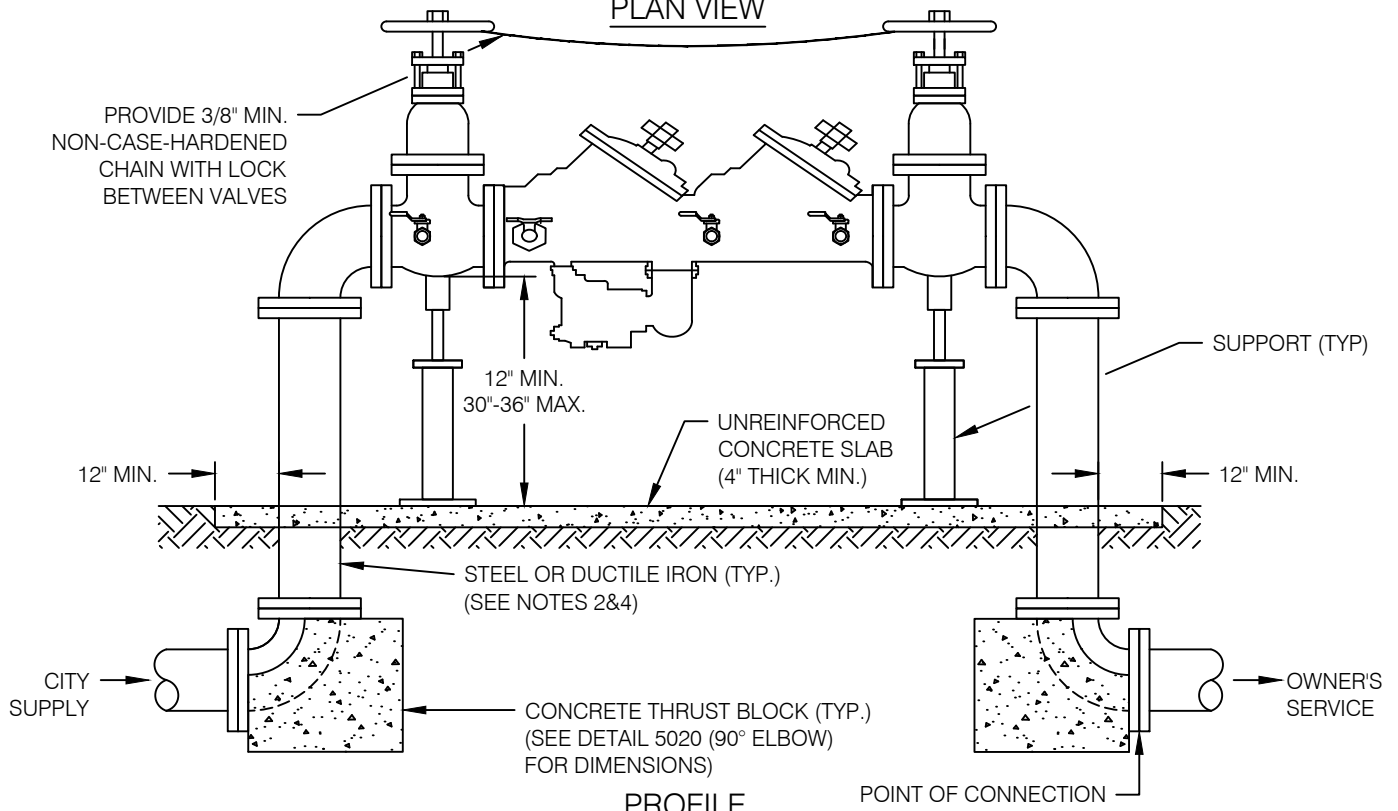
APPROVED: MARCH 2022

CITY OF DIXON
**ENGINEERING
 STANDARD DETAIL**





PLAN VIEW



PROFILE

(GUARD POSTS NOT SHOWN FOR CLARITY)

NOTES:

1. ALL BACKFLOW PREVENTERS SHALL BE FROM THE APPROVED LIST OF THE FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH AT THE UNIVERSITY OF SOUTHERN CALIFORNIA. THEY SHALL BE TESTED BY THE CONTRACTOR AND CERTIFICATION PROVIDED TO THE CITY PRIOR TO ACTIVATION.
2. ALL STEEL PIPE SHALL BE 1/4" WALL AS PER AWWA C-200; LINED AND COATED WITH FUSION BONDED EPOXY AS PER AWWA C-213, 20 MILS MINIMUM.
3. ALL STEEL FLANGES SHALL BE CLASS D AS PER AWWA C-207.
4. ALL DUCTILE IRON FITTINGS SHALL MEET AWWA C-110 & C-153, CLASS 150. THE INTERIOR SHALL BE MORTAR LINED AS PER AWWA C-104 AND THE EXTERIOR SHALL HAVE A COAL TAR COATING AS PER AWWA C-203, BELOW GRADE AND EPOXY COATING ABOVE GRADE PER AWWA C510
5. ALL NUTS AND BOLTS BELOW GROUND SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED AS PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES.



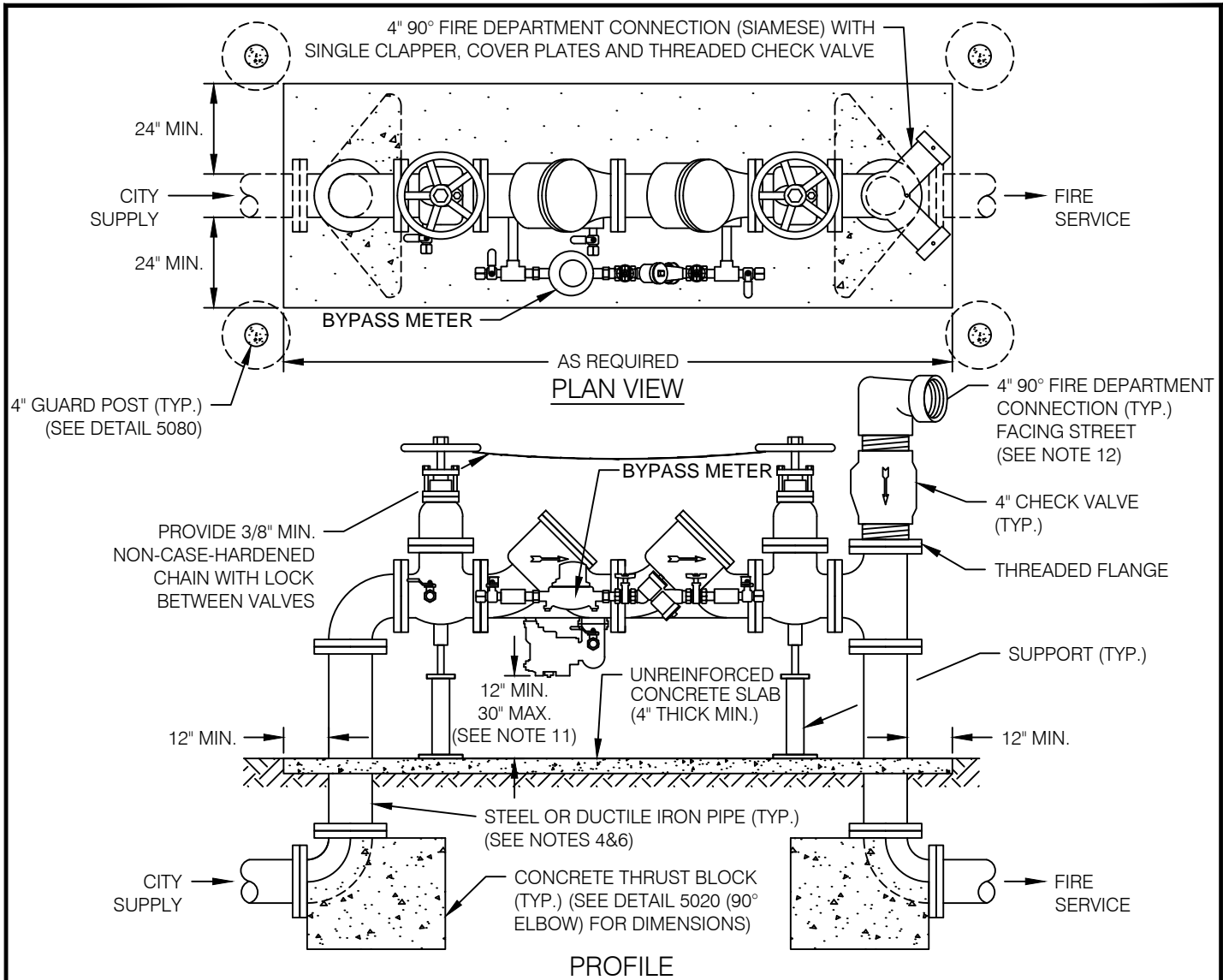
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: JAN 2023

**3" - 10" REDUCED
PRESSURE BACKFLOW
PREVENTER
INSTALLATION**

5180





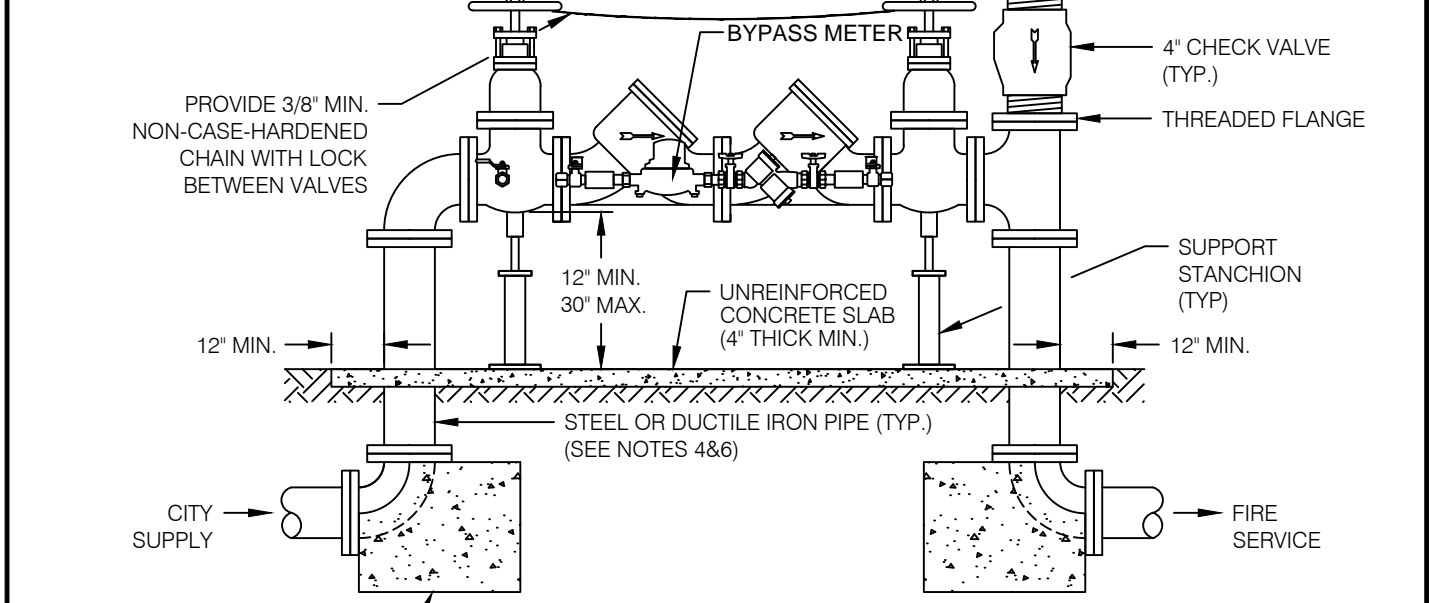
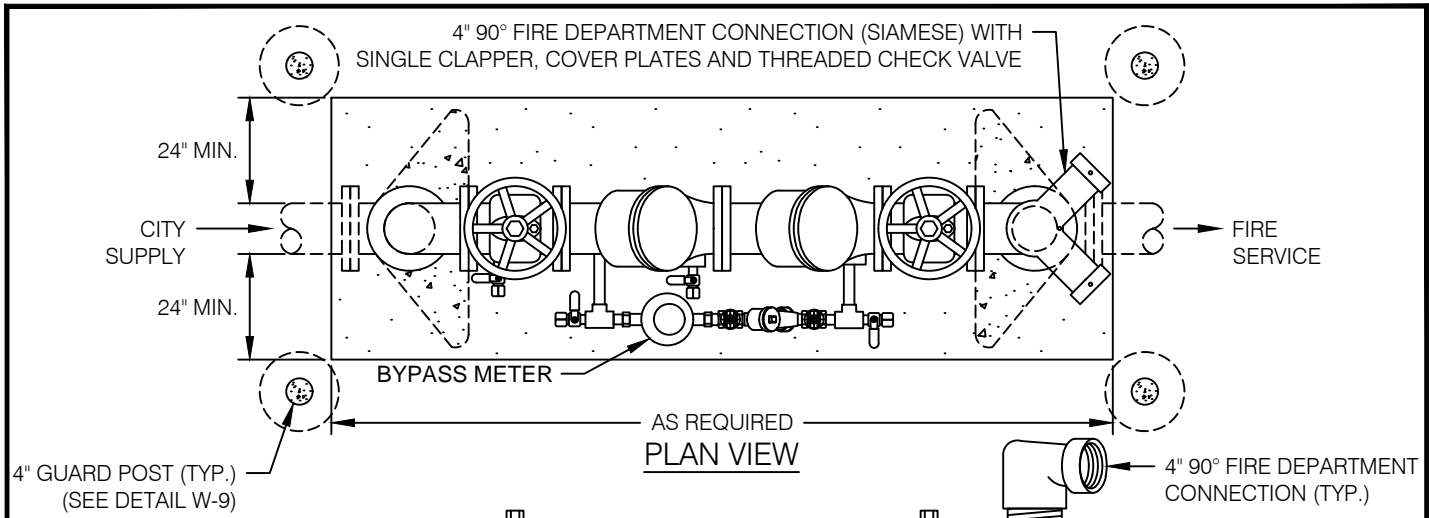
PROFILE

(GUARD POSTS NOT SHOWN FOR CLARITY)

NOTES:

1. ALL BACKFLOW PREVENTERS SHALL BE FROM THE APPROVED LIST OF THE FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH AT THE UNIVERSITY OF SOUTHERN CALIFORNIA. THE REDUCED PRESSURE ASSEMBLY AND THE BYPASS ASSEMBLY SHALL BE TESTED BY THE CONTRACTOR AND PROVIDED TO THE CITY PRIOR TO ACTIVATION.
2. BACKFLOW PREVENTER MUST BE CHAINED OPEN AND HAVE TAMPER SWITCHES INSTALLED FOR SPRINKLER SYSTEMS.
3. FIRE DEPARTMENT CONNECTION SHALL CONSIST OF TWO 2-1/2" FEMALE CONNECTIONS, UNLESS OTHERWISE SPECIFIED, WITH METAL COVER PLATES ONLY, AND MUST BE FM/UL APPROVED WITH STAMPED MARKINGS ON THE DEVICE.
4. ALL STEEL PIPE SHALL BE 1/4" WALL AS PER AWWA C-200; LINED AND COATED WITH FUSION BONDED EPOXY AS PER AWWA C-213, 20 MILS MINIMUM.
5. ALL STEEL FLANGES SHALL BE CLASS D AS PER AWWA C-207.
6. ALL DUCTILE IRON PIPE AND FITTINGS SHALL MEET AWWA C-110 & C-153, CLASS 150. THE INTERIOR SHALL BE MORTAR LINED AS PER AWWA C-104 AND EXTERIOR SHALL HAVE A COAL TAR COATING AS PER AWWA C-203.
7. ALL NUTS AND BOLTS BELOW GROUND SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED AS PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES. STAINLESS STEEL MAY BE SUBSTITUTED.
8. FIRE DEPARTMENT CONNECTION AND CHECK VALVE SHALL BE PROPERLY PREPARED AND PAINTED WITH "YELLOW" INDUSTRIAL ENAMEL PAINT.
9. THE RELIEF VALVE SHALL BE A MINIMUM OF 12" AND A MAXIMUM OF 30" FROM THE TOP OF THE FINISHED CONCRETE SPLASH PAD
10. THE FDC SHALL FACE THE STREET OR APPROVED FIRE ACCESS ROAD UNLESS APPROVED OTHER BY THE FIRE MARSHAL. FDC SHALL MEET CALIFORNIA FIRE CODE (CFC) SECTION 912 STANDARDS AND CFC CHAPTER 80. ALL FDC LOCATIONS MUST BE APPROVED BY THE FIRE DEPARTMENT

5190	REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)	 <small>APPROVED: JAN 2023</small>	CITY OF DIXON ENGINEERING STANDARD DETAIL 
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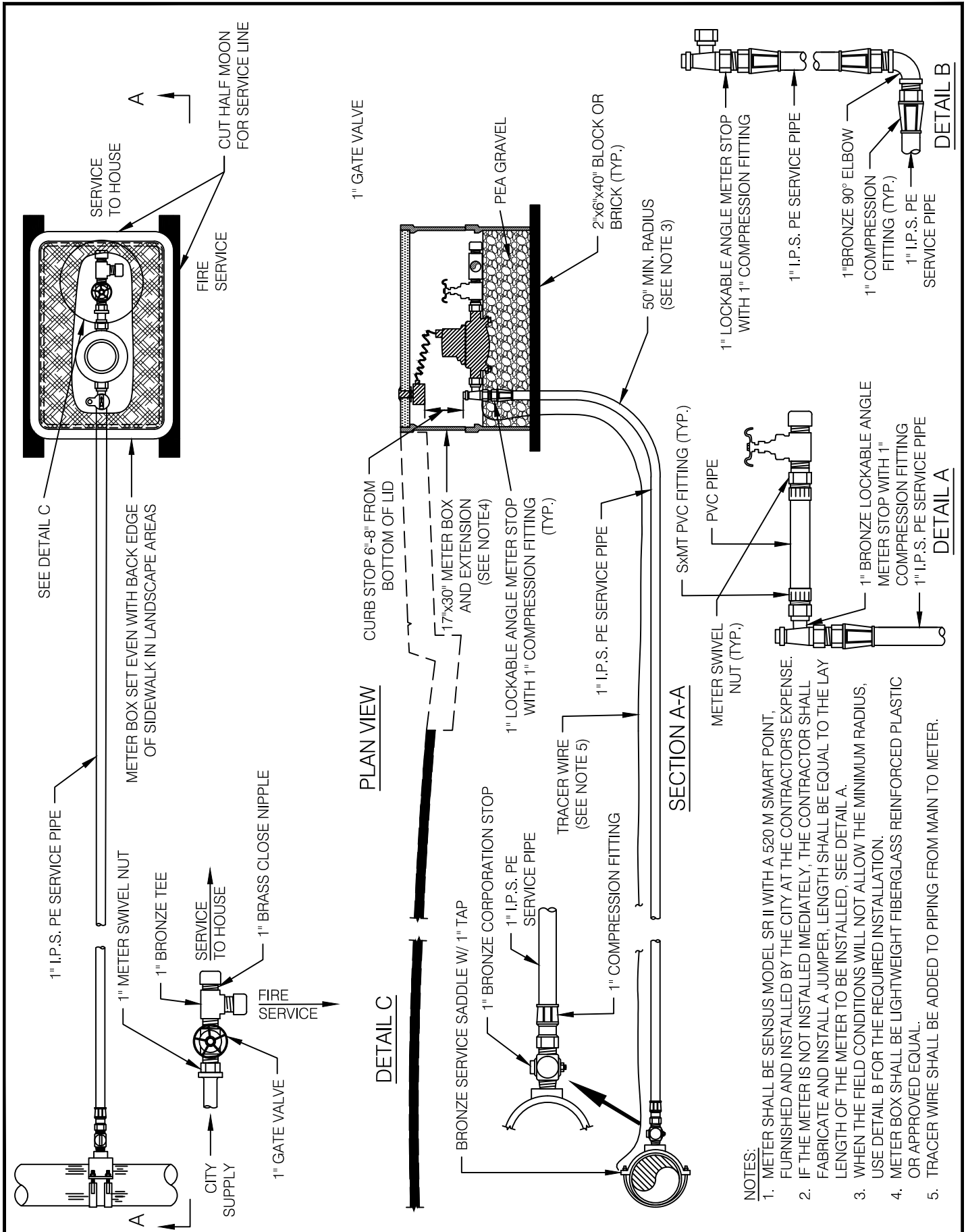


PROFILE
(GUARD POSTS NOT SHOWN FOR CLARITY)

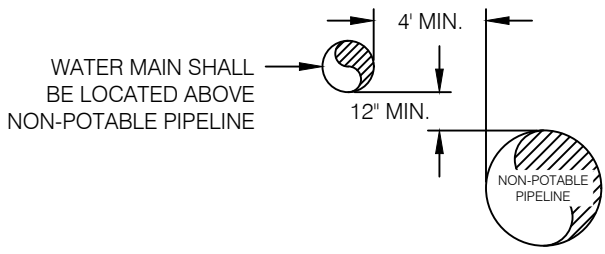
NOTES:

1. ALL BACKFLOW PREVENTERS SHALL BE FROM THE APPROVED LIST OF THE FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH AT THE UNIVERSITY OF SOUTHER CALIFORNIA. THE DOUBLE CHECK AND BYPASS ASSEMBLY SHALL BE TESTED BY THE CONTRACTOR AND PROVIDED TO THE CITY PRIOR TO ACTIVATION.
2. BACKFLOW PREVENTER MUST BE CHAINED OPEN AND HAVE TAMPER SWITCHES INSTALLED FOR SPRINKLER SYSTEMS.
3. FIRE DEPARTMENT CONNECTION SHALL CONSIST OF TWO 2-1/2" FEMALE CONNECTIONS, UNLESS OTHERWISE SPECIFIED, WITH METAL COVER PLATES ONLY, AND MUST BE FM/UL APPROVED WITH STAMPED MARKINGS ON THE DEVICE.
4. ALL STEEL PIPE SHALL BE 1/4" WALL AS PER AWWA C-200; LINED AND COATED WITH FUSION BONDED EPOXY AS PER AWWA C-213, 20 MILS MINIMUM.
5. ALL STEEL FLANGES SHALL BE CLASS D AS PER AWWA C-207.
6. ALL DUCTILE IRON PIPE AND FITTINGS SHALL MEET AWWA C-110 & C-153, CLASS 150. THE INTERIOR SHALL BE MORTAR LINED AS PER AWWA C-104 AND EXTERIOR SHALL HAVE A COAL TAR COATING AS PER AWWA C-203.
7. ALL NUTS AND BOLTS BELOW GROUND SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED AS PER AWWA C-209, 20 MILS MINIMUM IN BOTH CASES.
8. FIRE DEPARTMENT CONNECTION AND CHECK VALVE SHALL BE PROPERLY PREPARED AND PAINTED WITH "YELLOW" INDUSTRIAL ENAMEL PAINT
9. THE FDC SHALL FACE THE STREET OR APPROVED FIRE ACCESS ROAD UNLESS APPROVED OTHER BY THE FIRE MARSHAL. FDC SHALL MEET CALIFORNIA FIRE CODE (CFC) SECTION 912 STANDARDS AND CFC CHAPTER 80. ALL FDC LOCATIONS MUST BE APPROVED BY THE FIRE DEPARTMENT

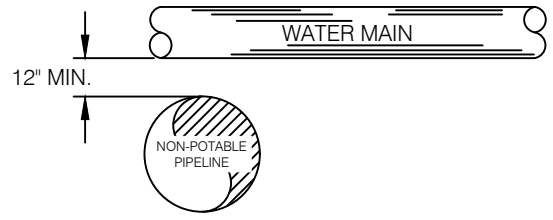
<h1>5191</h1>	<h2>DOUBLE CHECK DETECTOR ASSEMBLY</h2>		<p>CITY OF DIXON</p> <p>ENGINEERING STANDARD DETAIL</p>
		<small>APPROVED: JAN 2023</small>	



- NOTES:**
- METER SHALL BE SENSUS MODEL SR II WITH A 520 M SMART POINT, FURNISHED AND INSTALLED BY THE CITY AT THE CONTRACTOR'S EXPENSE.
 - IF THE METER IS NOT INSTALLED IMMEDIATELY, THE CONTRACTOR SHALL FABRICATE AND INSTALL A JUMPER, LENGTH SHALL BE EQUAL TO THE LAY LENGTH OF THE METER TO BE INSTALLED, SEE DETAIL A.
 - WHEN THE FIELD CONDITIONS WILL NOT ALLOW THE MINIMUM RADIUS, USE DETAIL B FOR THE REQUIRED INSTALLATION.
 - METER BOX SHALL BE LIGHTWEIGHT FIBERGLASS REINFORCED PLASTIC OR APPROVED EQUAL.
 - TRACER WIRE SHALL BE ADDED TO PIPING FROM MAIN TO METER.

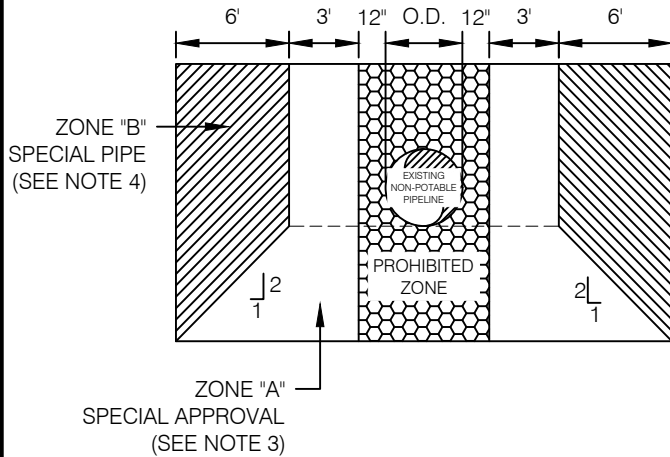


PARALLEL INSTALLATION

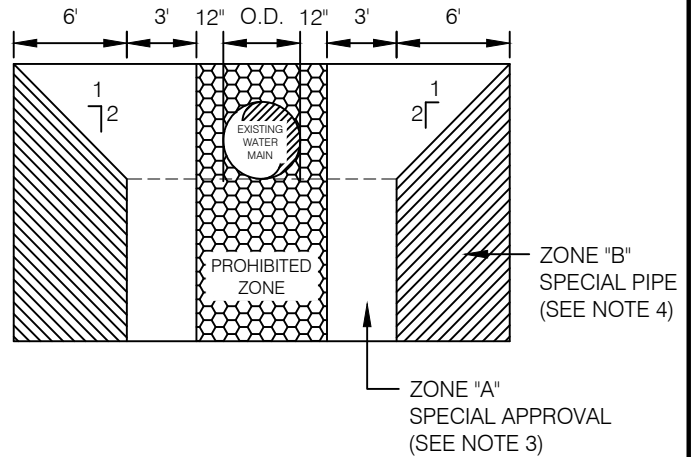


PERPENDICULAR CROSSING

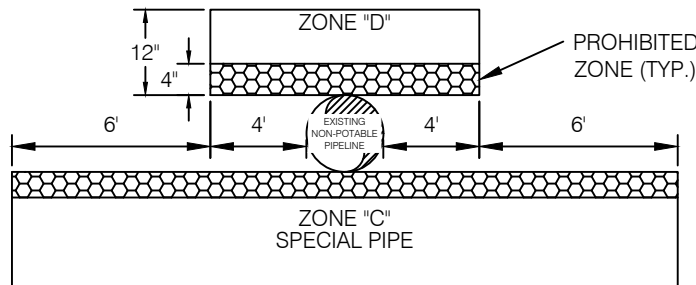
BASIC SEPARATION REQUIREMENTS



WATER MAIN PARALLEL INSTALLATION
(EXISTING NON-POTABLE PIPELINE)



NON-POTABLE PARALLEL INSTALLATION
(EXISTING WATER MAIN)



PERPENDICULAR CROSSING

SPECIAL SEPARATION REQUIREMENTS

DIMENSIONS ARE FROM THE OUTSIDE OF THE WATER MAIN TO THE OUTSIDE OF THE NON-POTABLE PIPELINE

NOTES:

1. THE CONTRACTOR SHALL FOLLOW THE CALIFORNIA WATERWORKS STANDARD TITLE 22 CCR § 64572 FOR THE SEPARATION REQUIREMENTS BETWEEN WATER MAINS AND SANITARY SEWER GUIDELINES PREPARED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES.
2. WHEN THE BASIC SEPARATION REQUIREMENTS CANNOT BE MET, THE CONTRACTOR SHALL INSTALL WATER MAINS ACCORDING TO SPECIAL INSTALLATION REQUIREMENTS.
3. NO WATER MAINS PARALLEL TO SEWER MAINS SHALL BE INSTALLED WITHIN ZONE A WITHOUT SPECIAL APPROVAL FROM THE DEPARTMENT OF HEALTH SERVICES.
4. WHEN LOCATED IN ZONE B, THE WATER MAIN SHALL BE CLASS 305 PVC, DR 14 PER AWWA C900 OR EQUIVALENT.

5210

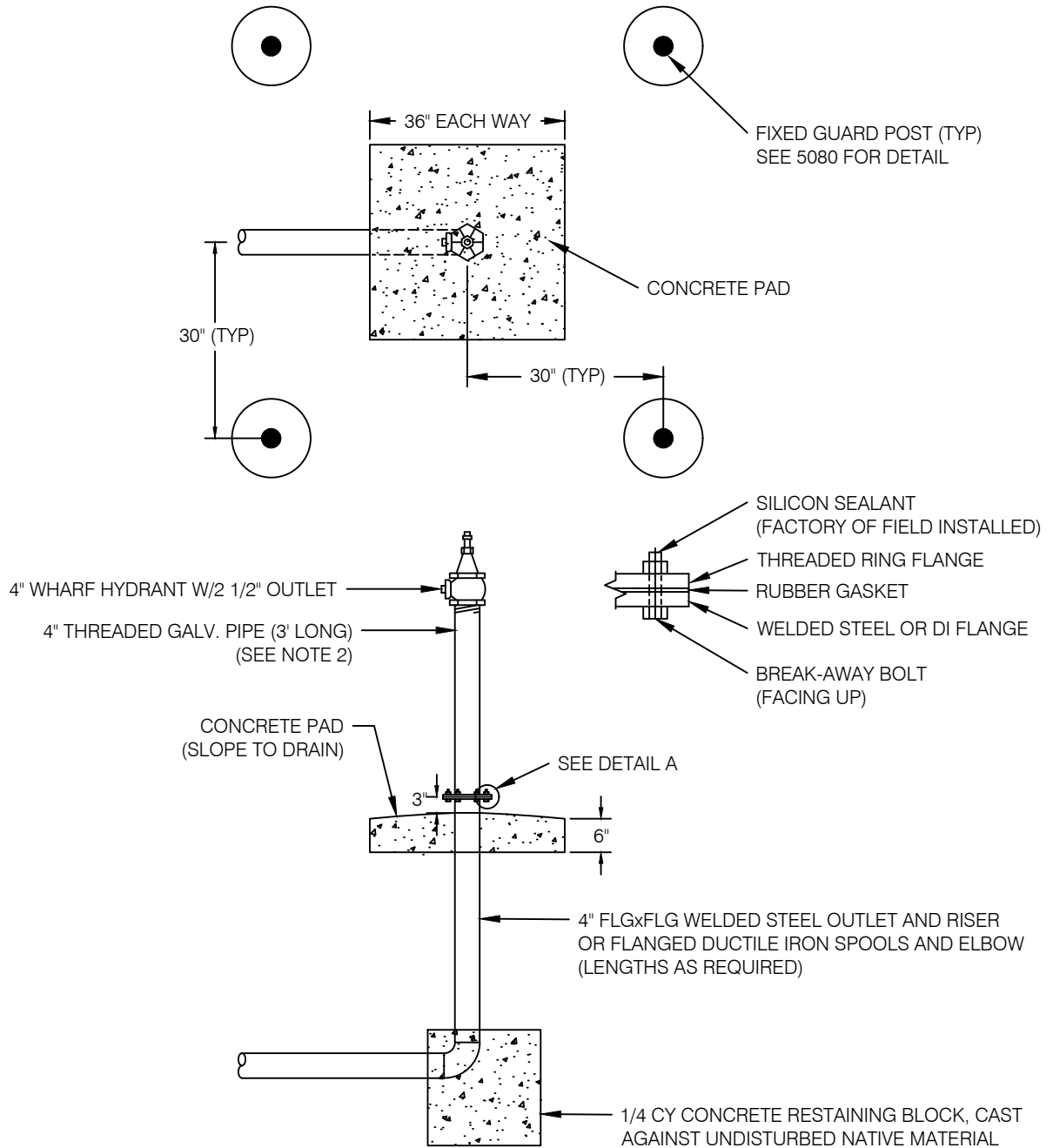
**WATER &
NON-POTABLE
PIPELINE SEPARATION
DETAIL**



APPROVED: MARCH 2022

CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

1. THE CITY INSPECTOR SHALL DETERMINE THE FINAL LOCATION OF THE 4" WHARF HYDRANT AND GUARD POSTS.
2. AFTER INSTALLATION THE THREADED HYDRANT RISER SHALL BE PROPERLY PREPARED, PRIMED AND PAINTED "BRIGHT RED" WITH INDUSTRIAL GRADE EPOXY PAINT.
3. ALL UNDERGROUND STEEL PIPE AND FITTINGS SHALL BE LINED AND COATED WITH MULTI-PURPOSE EPOXY OR APPROVED EQUAL, EXCEPT FLANGE FACES OR WHERE NOTED ELSEWHERE IN THE CITY'S STANDARD SPECIFICATIONS AND DETAILS.
4. ALL BELOW GROUND NUTS, BOLTS AND MISCELLANEOUS STEEL SHALL BE TAPE WRAPPED, 20 MILS MINIMUM.
5. THE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI. ALL CEMENT SHALL BE TYPE II PORTLAND, WITH A MINIMUM OF SACKS PER CUBIC YARD OF CONCRETE.
6. ANY CHANGES OR DEVIATIONS FROM THIS DETAIL SHALL BE APPROVED BY THE CITY INSPECTOR.
7. ALL PRIVATE WHARF HYDRANT SHALL BE BACKFLOW PROTECTED.



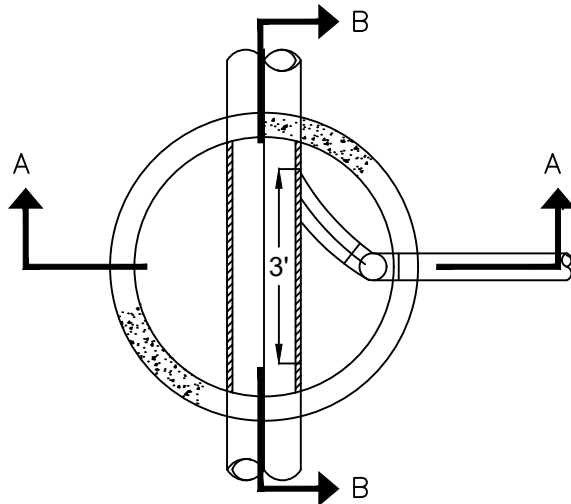
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



APPROVED: MARCH 2022

4" WHARF HYDRANT

5220

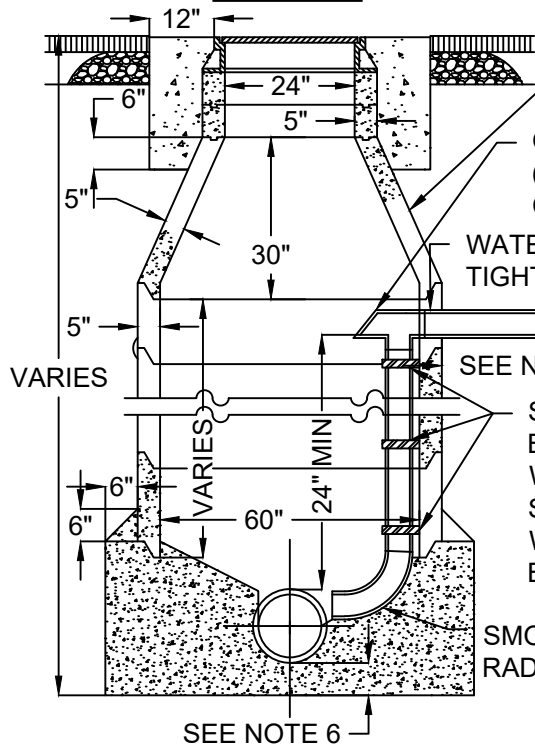


PLAN VIEW

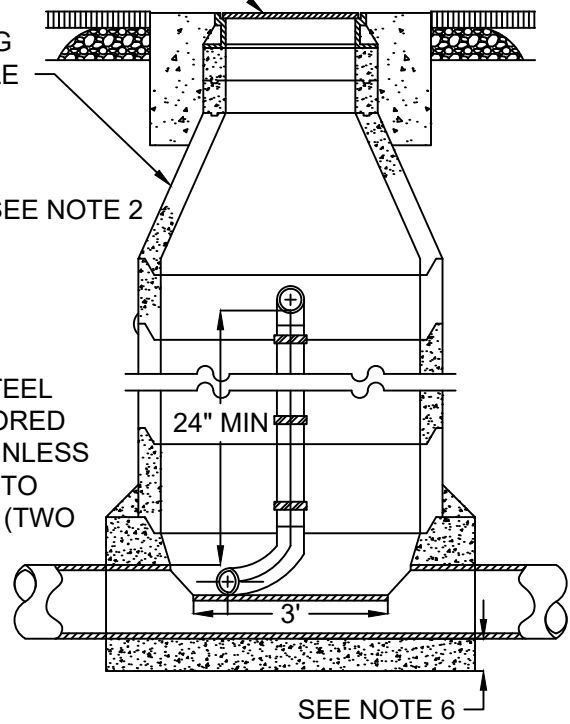
NOTES:

1. THIS INSTALLATION SHALL BE USED ON EXISTING MANHOLES ONLY WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE TOP OF THE OUTLET PIPE AND THE INVERT OF THE FEEDER OR COLLECTOR SEWER EXCEEDS 24".
2. BAND COUPLER PER APPROVED MATERIALS LIST. BAND SHALL HAVE A MINIMUM OF 3 LOCKING BAND STRAPS.

FRAME AND COVER
SEE DETAIL 4000



SECTION A-A



SECTION B-B

NOTES (CONTINUED):

3. 12" MAX FOR 8" TO 12" OR LARGER PIPE. 24" MAX. FOR PIPES LESS THAN 8".
4. THIS DETAIL SHALL ONLY BE USED FOR DROP PIPES 12" OR LESS. LARGER PIPES REQUIRE INDIVIDUAL DESIGN AND APPROVAL BY THE CITY ENGINEER.
5. ABS PIPE SHALL BE USED INSIDE MANHOLE.
6. MANHOLE BASES SHALL BE CAST IN PLACE PER DETAILS 4010, 4020 OR 4030 DEPENDENT UPON MAIN PIPE SIZE.
7. CAST IN PLACE MANHOLE BASES SHALL HAVE FULLY FORMED INTERIOR AND EXTERIOR WALLS. POURING THE WALLS OF THE BASE AGAINST THE WALL OF THE EXCAVATION SHALL NOT BE PERMITTED.



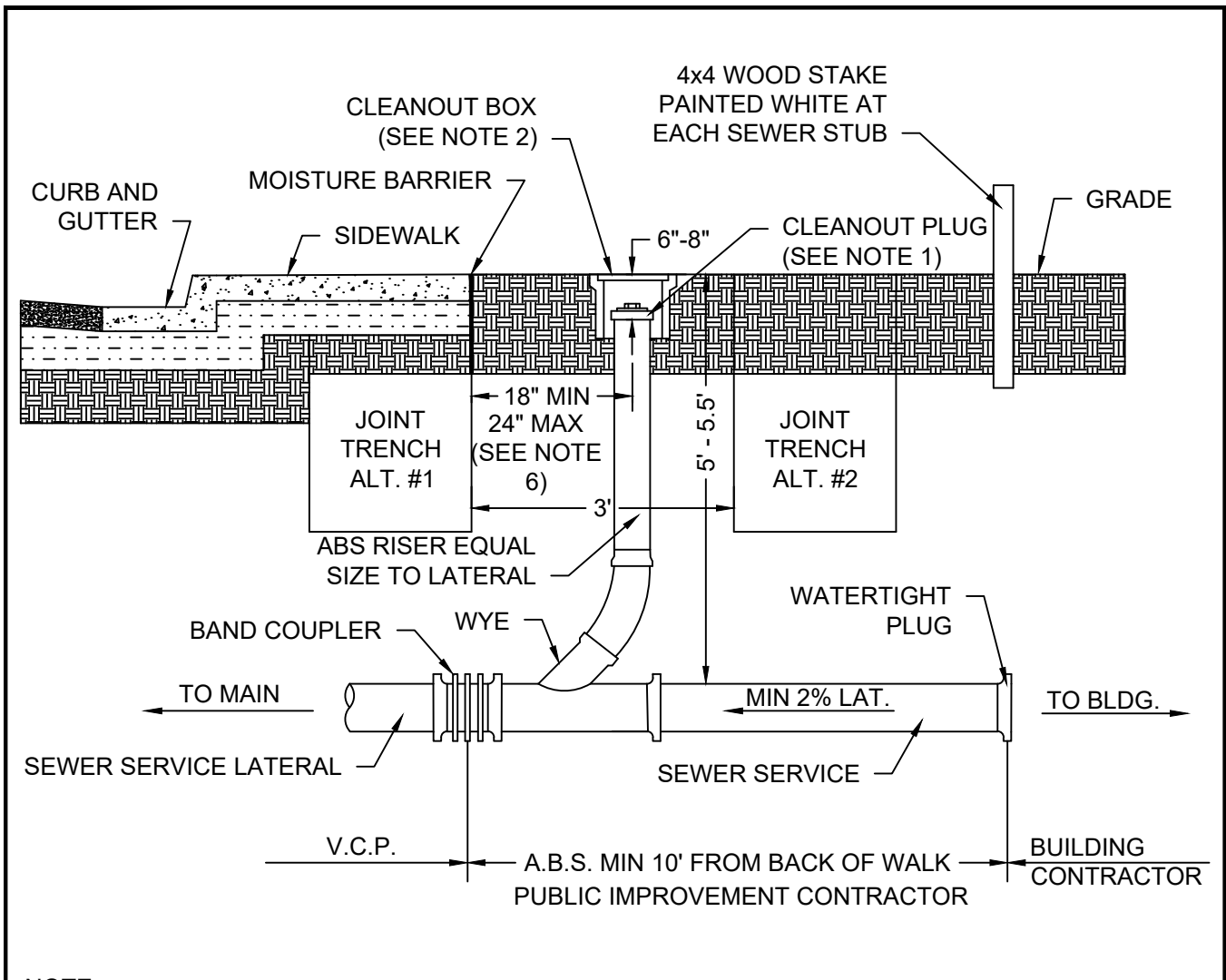
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



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**INSIDE SANITARY
SEWER DROP
MANHOLE**

6010



NOTE:

1. CLEANOUT PLUG TO CONSIST OF AN ABS THREADED CLEANOUT ADAPTER AND ABS CLEANOUT PLUG.
2. CLEANOUT BOX:
 - 2.1. IN LANDSCAPED AREAS USE CONCRETE LID MARKED "SEWER" SEE APPROVED MATERIALS LIST.
 - 2.2. IN CONCRETE DRIVEWAY OR PAVED AREAS, USE CAST IRON LID MARKED "SEWER" SEE APPROVED MATERIALS LIST.
 - 2.3. ALTERNATES TO BE USED UPON CITY ENGINEER APPROVAL ONLY.
3. UNDERGROUND CONTRACTOR TO LAY ABS LATERAL A MINIMUM OF 10 FEET BEYOND BACK OF WALK, PLUG AND INSTALL WOOD MARKER STAKE PAINTED WHITE.
4. BUILDING CONTRACTOR TO CONNECT TO STUB FOR SERVICE TO BUILDING.
5. LOCATION OF WATER LINES AND PUBLIC UTILITY LINES SHALL ACCOMMODATE GRAVITY FLOW OF SEWER SERVICES.
6. IN AREAS WHERE NO SIDEWALK EXISTS, THE CLEANOUT SHALL BE LOCATED WITHIN 18 INCHES OF THE BACK OF CURB AND THE BOX SET LEVEL WITH FINISH GRADE.
7. ALL PIPE AND FITTINGS FROM BAND COUPLER TO BUILDING SHALL BE ABS.
8. SERVICE LATERAL FROM THE MAIN TO THE BAND COUPLER SHALL BE V.C.P.

6020

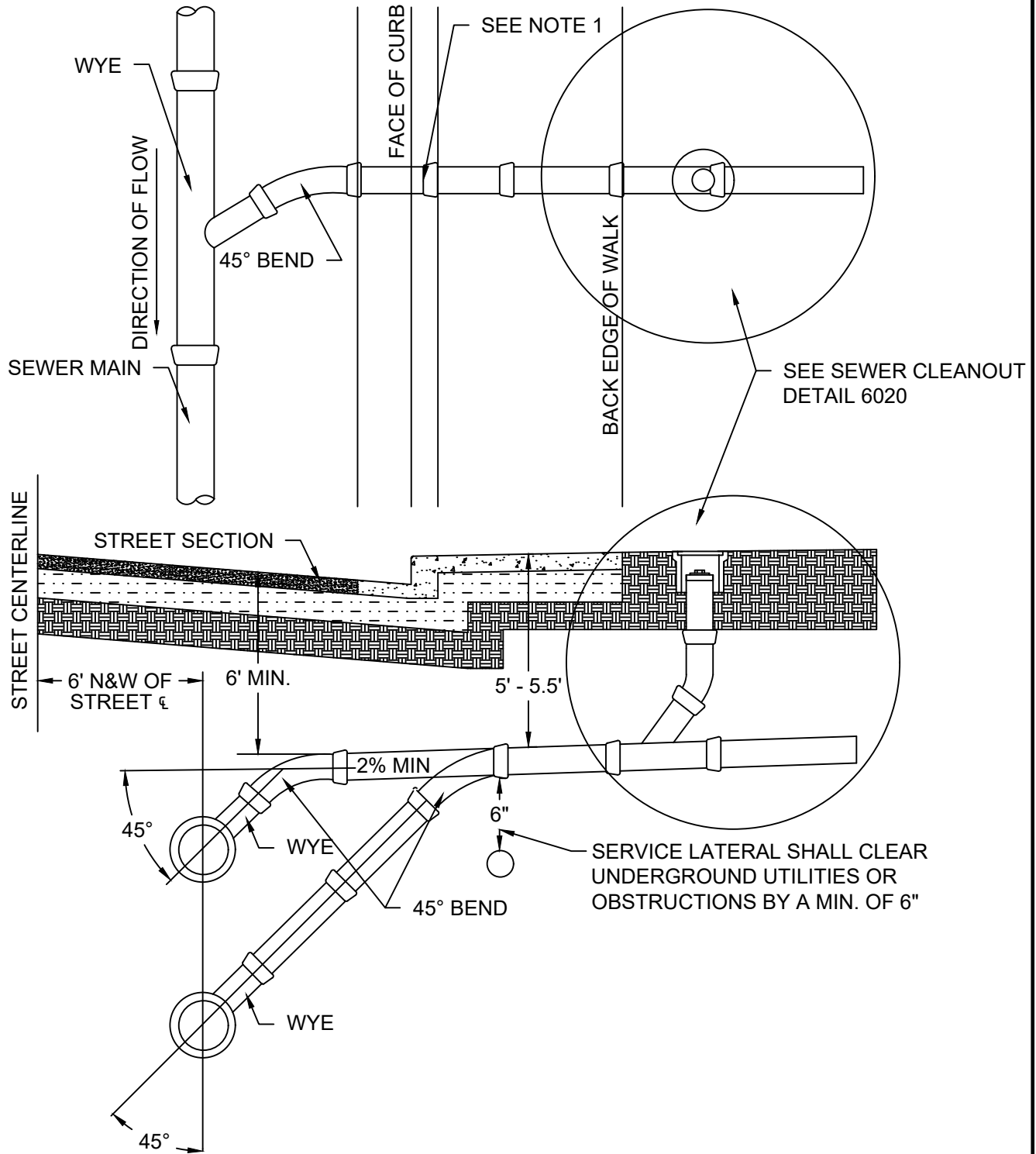
SEWER LATERAL
CLEANOUT



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CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTES:

1. STAMP "S" IN 2.5" LETTERS ON TOP OF CURB AT SERVICE CROSSING.



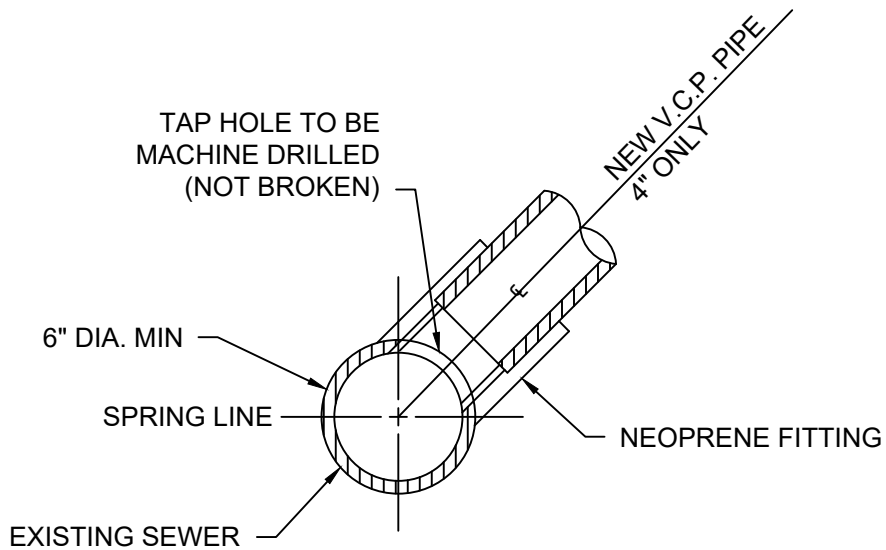
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



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SEWER SERVICE
LATERAL

6030



MAIN TAP

NOTES:

1. USE OF PREFABRICATED WYES AND TEES MUST BE APPROVED BY THE CITY ENGINEER.
2. TAPPING METHOD PER APPROVED MATERIALS LIST.
3. INVERT OF TAP SHALL BE ABOVE SPRING LINE OF MAIN.

6040

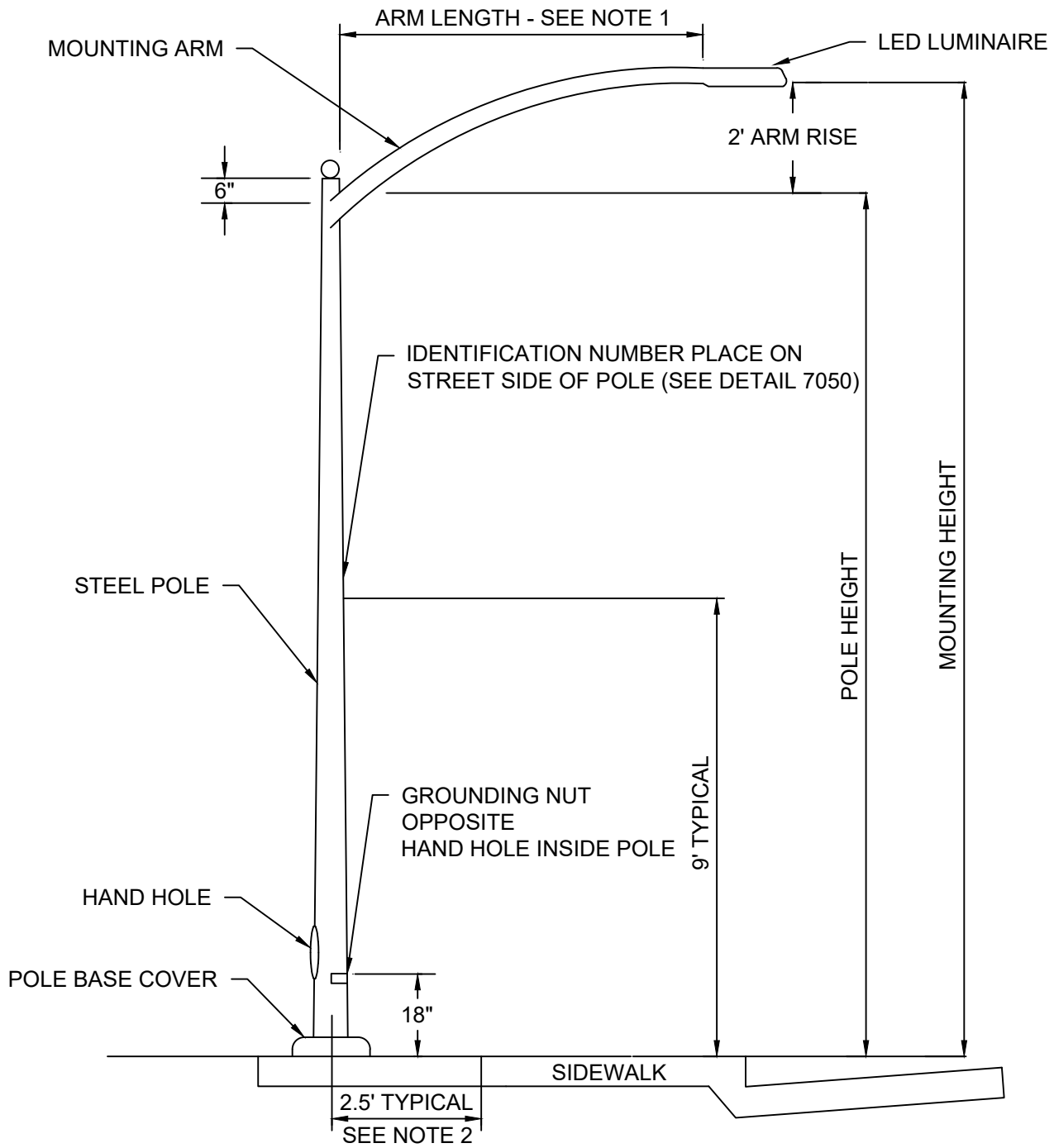
SEWER MAIN
TAP



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CITY OF DIXON
ENGINEERING
STANDARD DETAIL





TYPE	LUMINAIRE WATTAGE	NOM. MOUNTING HEIGHT	APPLICATION
A / D	23	28'	RESIDENTIAL / INDUSTRIAL
B	34	28'	COLLECTOR
C	73	28'	ARTERIAL

- NOTE:**
1. ARM LENGTH IS TO BE SELECTED SO THAT LUMINAIRE IS MOUNTED DIRECTLY ABOVE THE FACE OF CURB.
 2. WITH CURB AND GUTTER ONLY, USE 3' FROM FACE OF CURB.



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STANDARD DETAIL



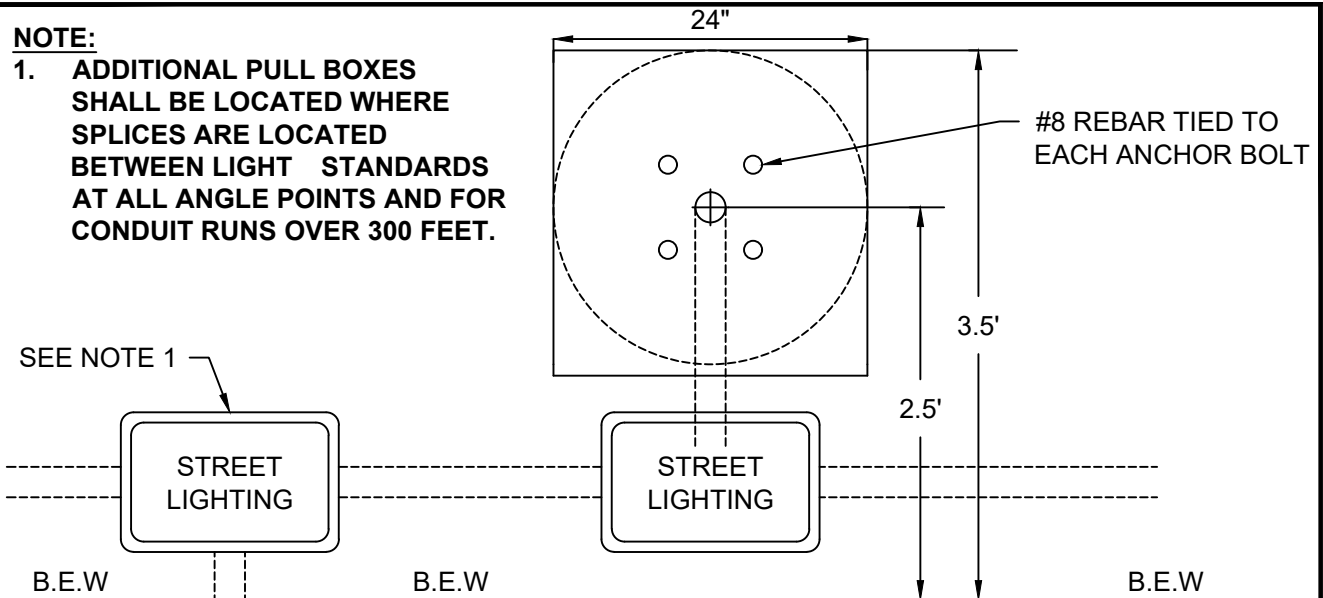
APPROVED: MARCH 2022

**STREET LIGHT POLE
INSTALLATION**

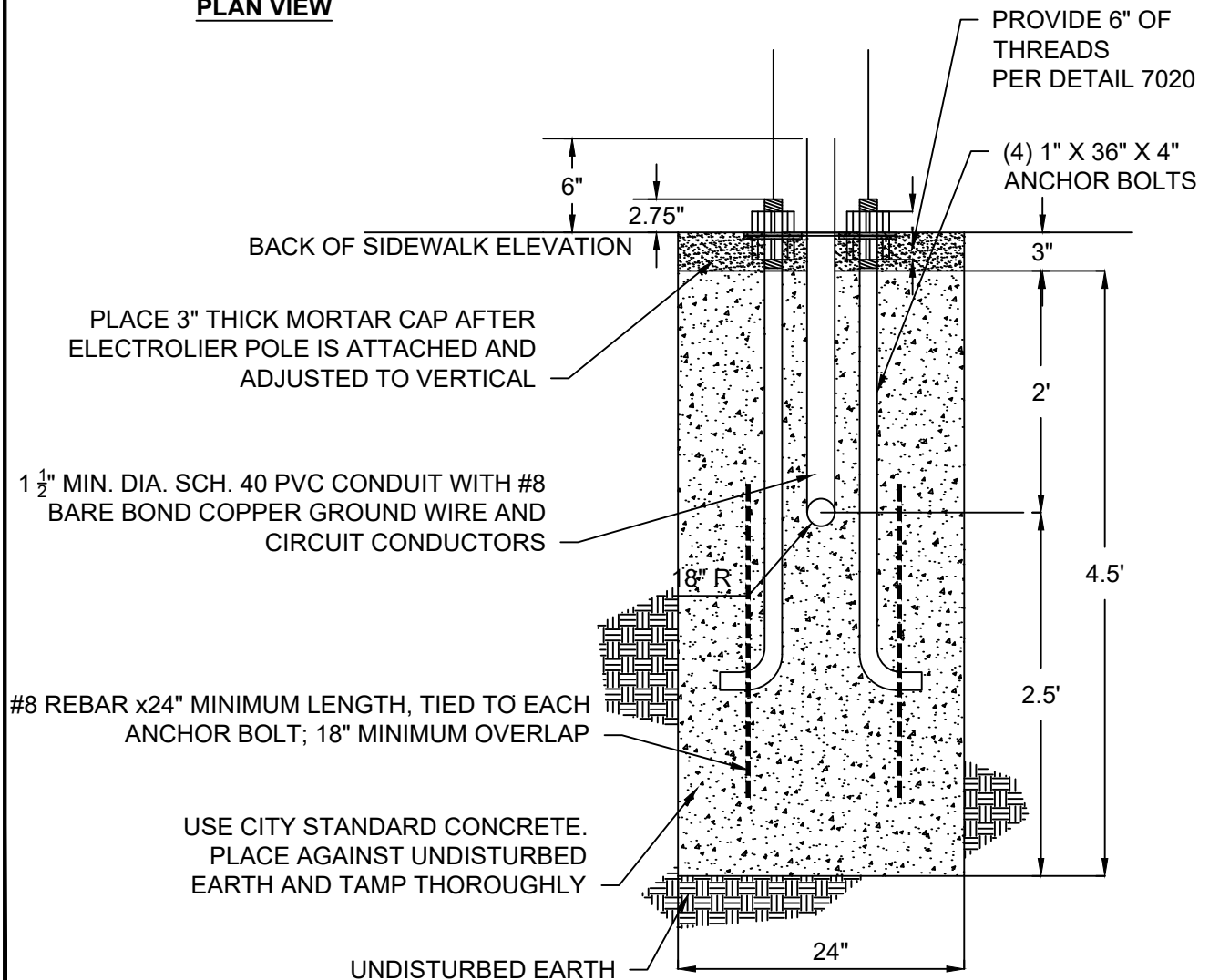
7000

NOTE:

- ADDITIONAL PULL BOXES SHALL BE LOCATED WHERE SPLICES ARE LOCATED BETWEEN LIGHT STANDARDS AT ALL ANGLE POINTS AND FOR CONDUIT RUNS OVER 300 FEET.**



PLAN VIEW



7010

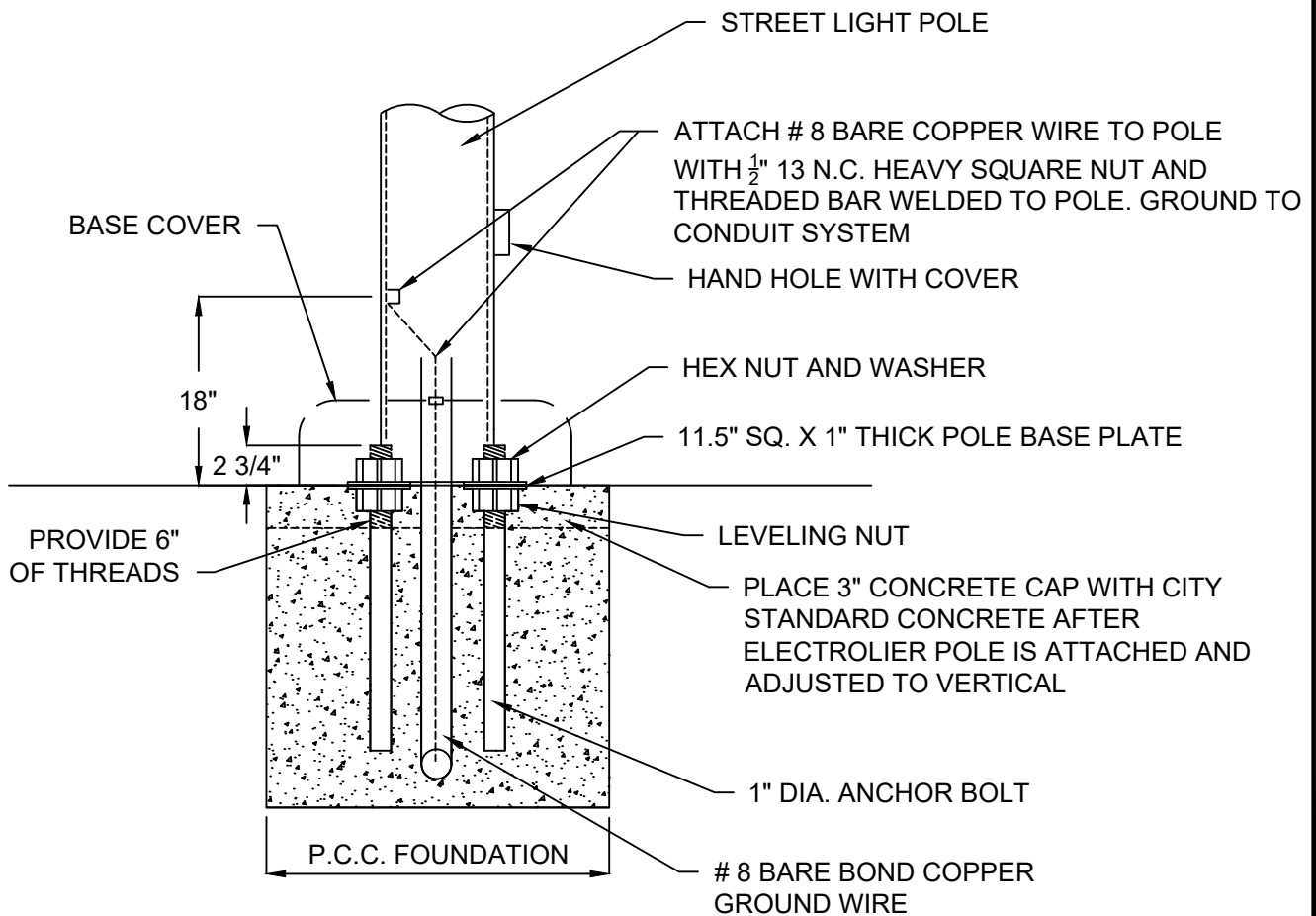
**STREETLIGHT
FOUNDATION
CAST-IN-PLACE**



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CITY OF DIXON
ENGINEERING
STANDARD DETAIL





NOTE:

1. USE CITY STANDARD CONCRETE PLACED AGAINST UNDISTURBED EARTH AND TAMP THOROUGHLY.



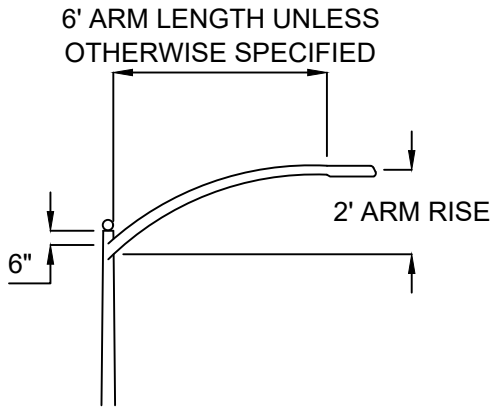
CITY OF DIXON
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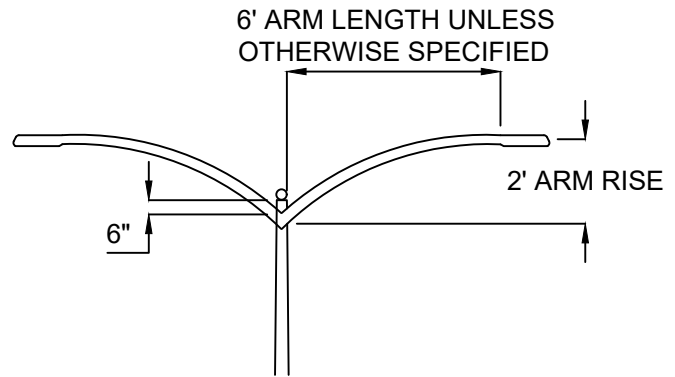
STREET LIGHT
POLE-TO-BASE
ATTACHMENT

7020



SINGLE ARM POLE

MOUNTING HEIGHT	ARM LENGTH	RISE	GAUGE
28'-0"	6'-0"	2'-0"	10
28'-0"	8'-0"	2'-0"	10



DOUBLE ARM POLE

MOUNTING HEIGHT	ARM LENGTH	RISE	GAUGE
32'-6"	6'-0"	2'-0"	11
32'-6"	8'-0"	2'-0"	11

NOTES:

1. POLES SHALL BE IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF EE1-NEMA STANDARDS FOR STREET LIGHTING POLES, EET PUBLICATION NO. TDJ 135.
2. ALL STEEL POLES TO HAVE $\frac{1}{2}$ " SQUARE GROUND OR NUT HOLDER IN THE POLE, DIRECTLY OPPOSITE THE HANDHOLE.
3. ALL STEEL POLES TO BE FURNISHED GALVANIZED . GALVANIZED STEEL POLES AND ANCHOR BOLTS TO BE HOT DIP GALVANIZED PER LATEST REVISIONS OF ASTM SPECIFICATION A153.
4. ALL STEEL PLATES TO BE FURNISHED WITH HANDHOLE AND HANDHOLE COVERS.
5. POLES TO BE FURNISHED WITH POLE BASE COVERS.
6. ALL LUMINAIRES SHALL BE LED.

7030

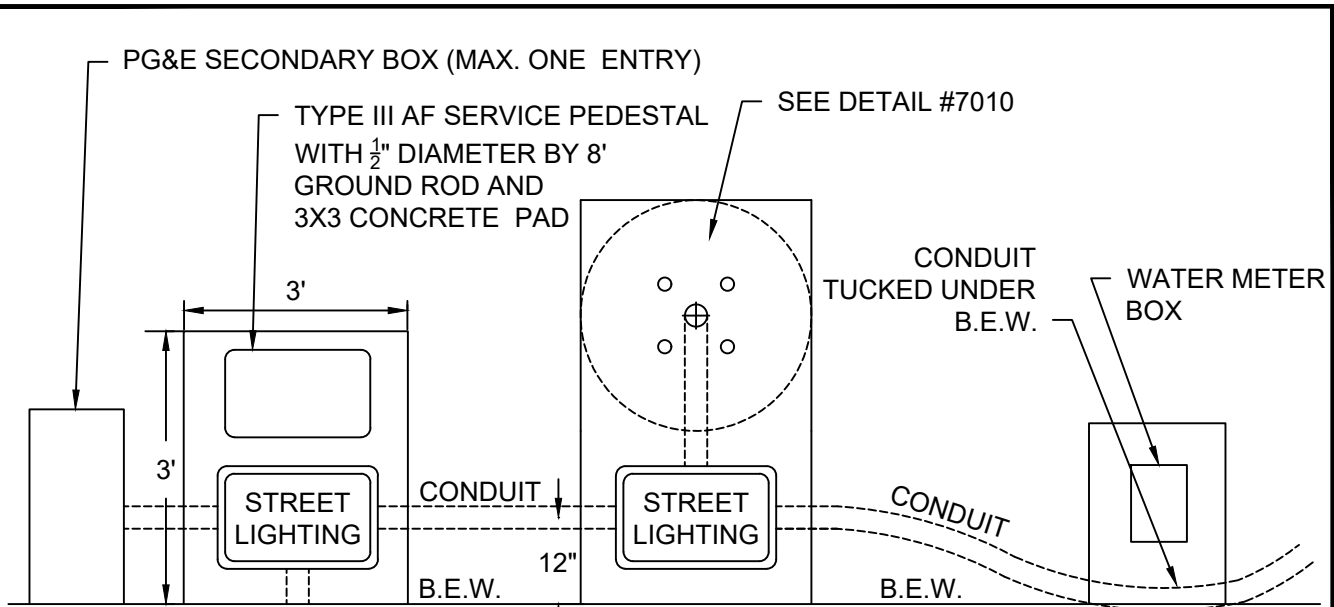
STREET LIGHT POLE SPECIFICATIONS



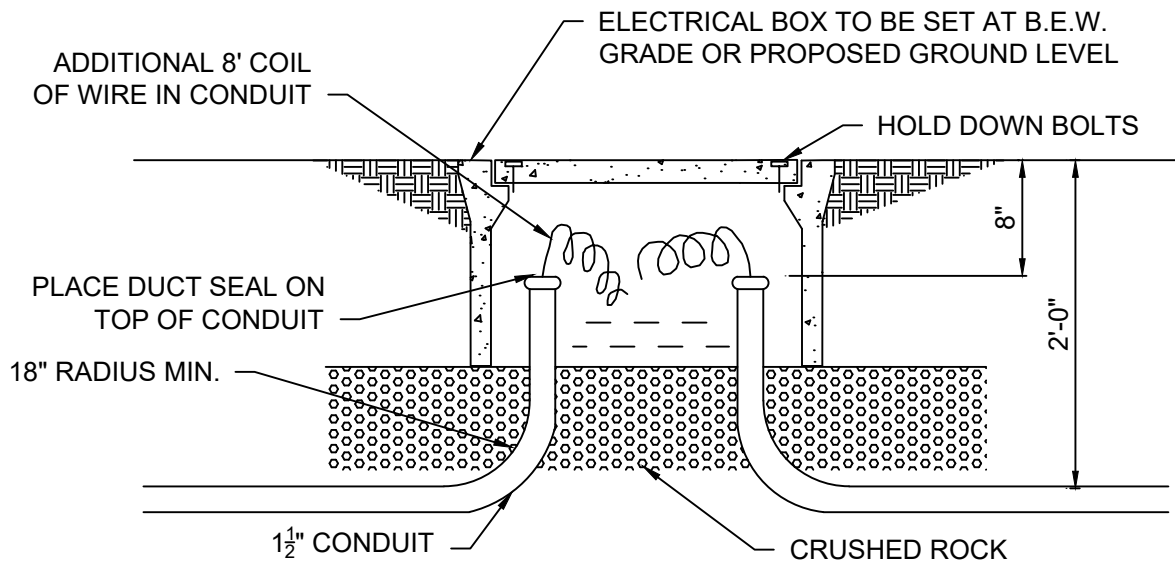
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CITY OF DIXON
ENGINEERING
STANDARD DETAIL





PLAN VIEW



NOTE:

1. ALL CONDUIT SHALL BE MIN. 1 1/2" SCHEDULE 40 PVC.
2. PULL BOXES SHOULD BE LOCATED AT EACH POLE, WHERE SPLICES ARE TO BE MADE BETWEEN LIGHT STANDARDS, WHERE A SERVICE FROM A PG&E SERVICE POINT MUST BE SPLIT, AND FOR ALL RUNS OVER 300 FEET.
3. BUSHINGS SHALL BE INSTALLED AT ALL CONDUITS ENDS.
4. PULL BOX SHALL BE PRECAST REINFORCED CONCRETE, # 3 1/2 STATE PULL BOX WITH HOLD DOWN BOLTS AND MARKED "STREET LIGHTING".
5. SERVICE PEDISTAL SHALL BE CALTRANS STANDARD TYPE III AF WITH SEPERATE BREAKERS FOR EACH CIRCUIT.
6. AN ADDITIONAL 8' OF ELECTRICAL WIRE SHALL BE COILED IN THE BOX.
7. TAPE AND SCOTCH GUARD SHALL BE PLACED AROUND EXPOSED WIRES.



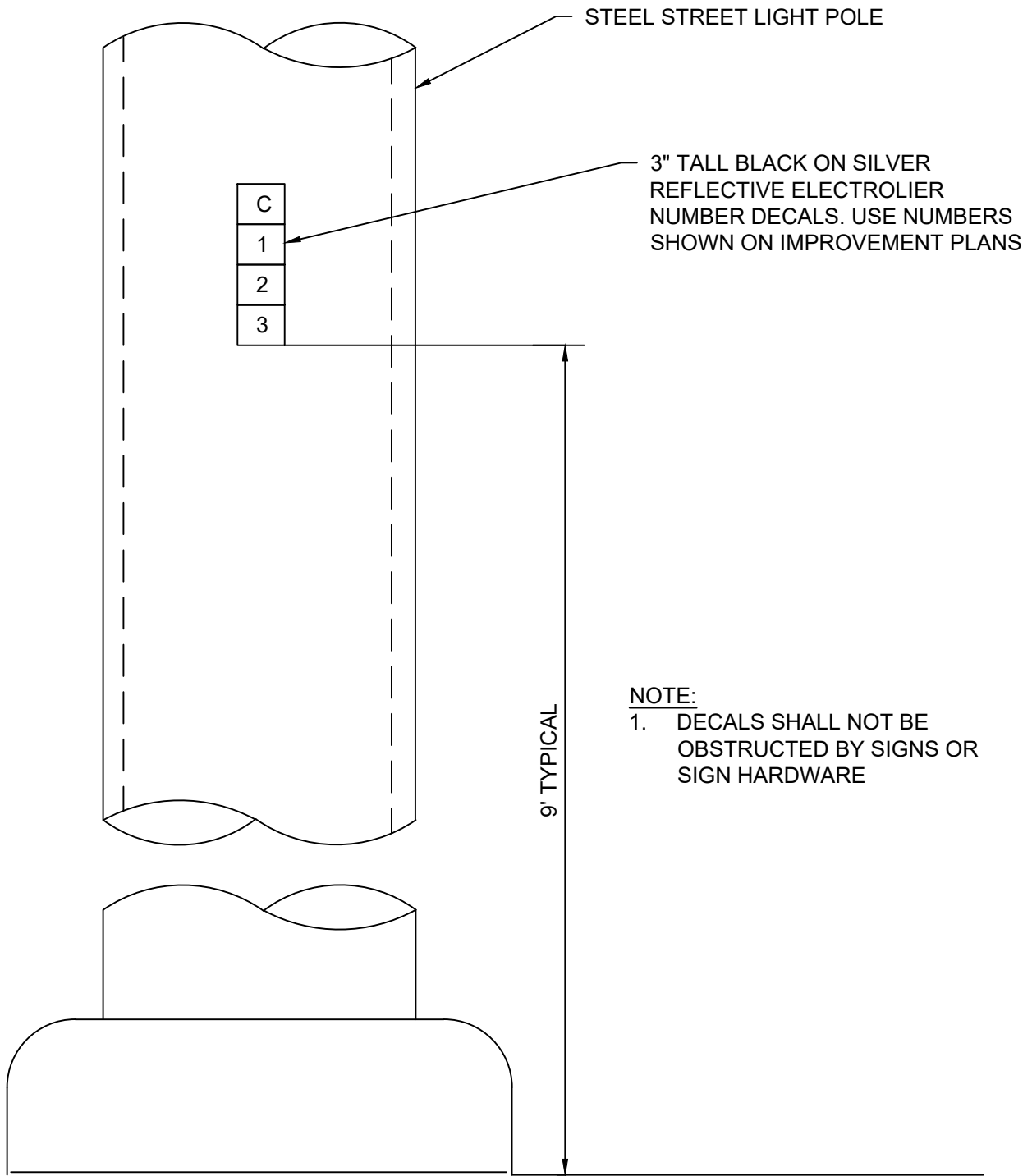
CITY OF DIXON
ENGINEERING
STANDARD DETAIL



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**STREET LIGHT BOX
& CONDUIT
INSTALLATION**

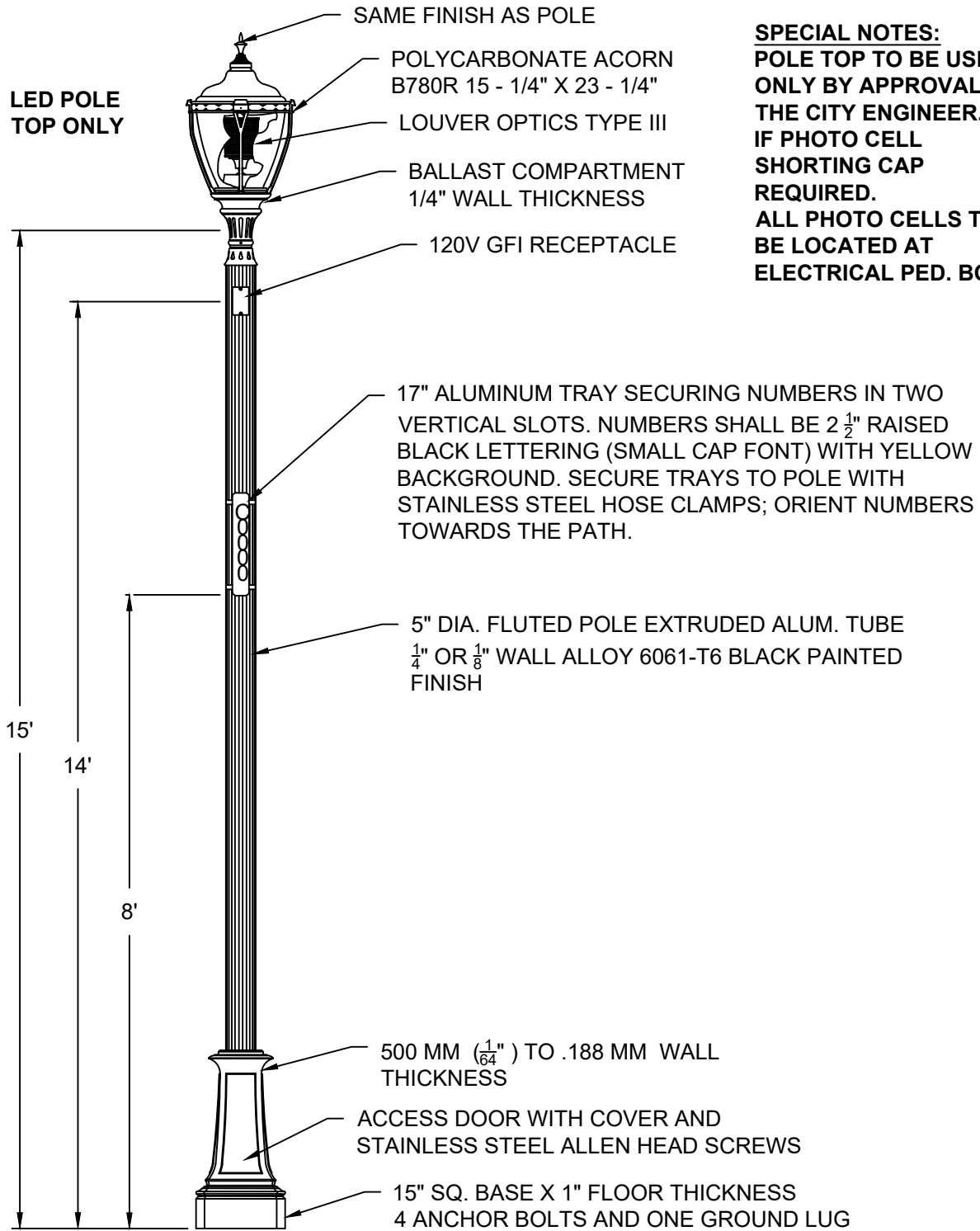
7040



BACK OF SIDEWALK GRADE / TOP OF CURB WHERE NO SIDEWALK EXISTS.

<p>7050</p>	<p>STANDARD STREET LIGHT NUMBERING</p>	 <p>APPROVED: MARCH 2022</p>	<p>CITY OF DIXON ENGINEERING STANDARD DETAIL</p> 
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**LED POLE
TOP ONLY**



SPECIAL NOTES:
**POLE TOP TO BE USED
 ONLY BY APPROVAL OF
 THE CITY ENGINEER.
 IF PHOTO CELL
 SHORTING CAP
 REQUIRED.
 ALL PHOTO CELLS TO
 BE LOCATED AT
 ELECTRICAL PED. BOX.**

NOTES:

1. HOUSE SIDE SHIELD SHALL BE INSTALLED AS SPECIFIED ON THE PLANS AND AS DIRECTED BY THE CITY ENGINEER.
2. POLE SHALL BE WELDED FOR SINGLE UNIT CONSTRUCTION.
3. ALL LUMINARIES SHALL BE LED.



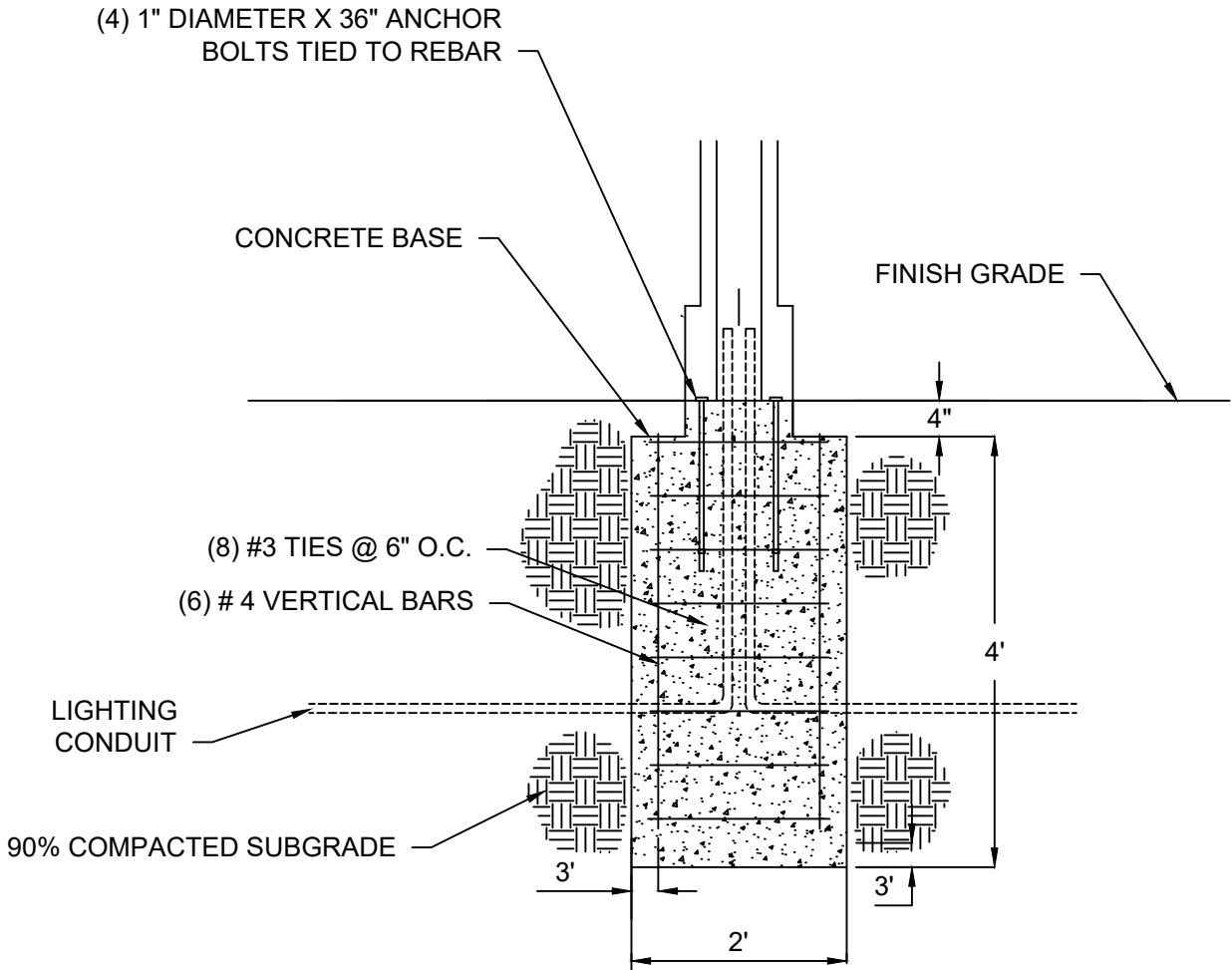
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**FLUTED
 POLE TOP TOP
 PATH LIGHT**

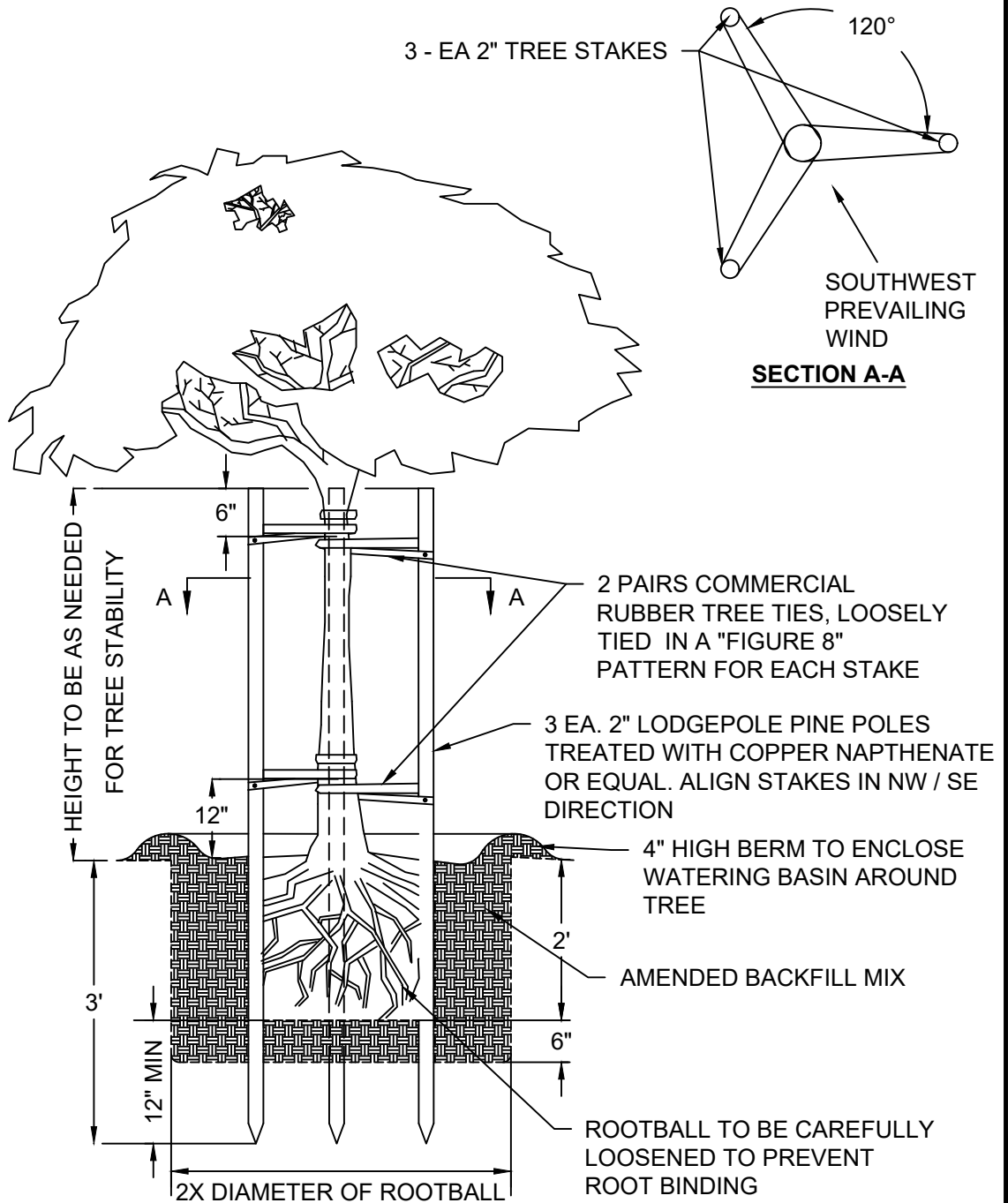
7070



NOTE:

1. USE CITY STANDARD CONCRETE, PLACE AGAINST UNDISTURBED EARTH AND TAMP THOROUGHLY.

<p>7080</p>	<p>FLUTED POLE TOP PATH LIGHT BASE DETAIL</p>	 <p>APPROVED: MARCH 2022</p>	<p>CITY OF DIXON ENGINEERING STANDARD DETAIL</p> 
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NOTES:

1. ROOT CONTROL PLANTER BOXES SHALL BE REQUIRED WHERE TREE IS 10 FEET OR LESS FROM EXISTING OR FUTURE SIDEWALK OR CURB. EWING STANDARD PLANTER, UNIVERSAL PLANTER OR CENTURY RC 24 OR EQUAL MAY BE USED. LENGTH OF BARRIER = 6' CENTERED ON TREE.
2. TREES SHALL BE PROVIDED WITH AUTOMATIC IRRIGATION SYSTEMS (INDIVIDUAL BUBBLERS WITH WATER BASIN).



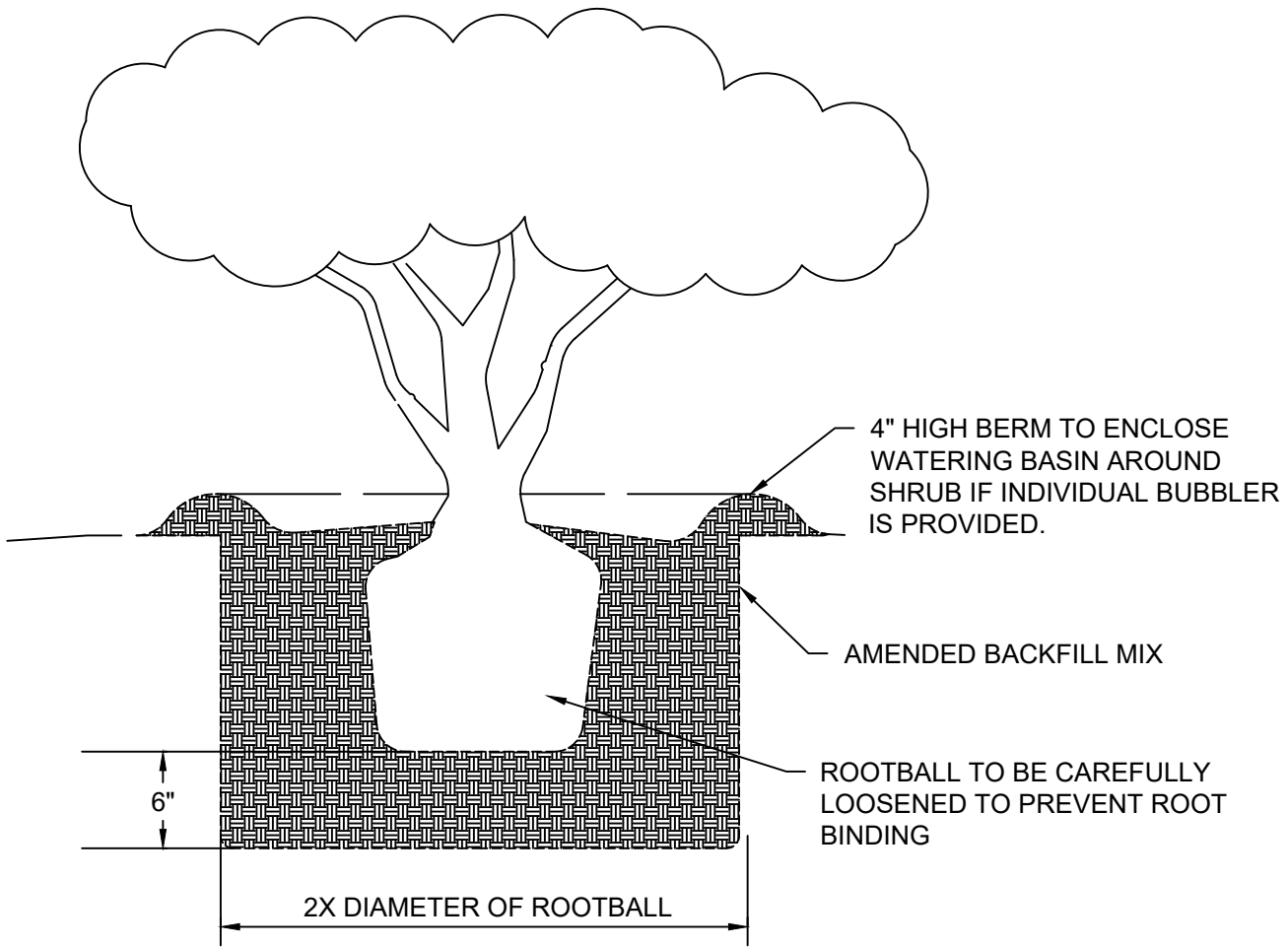
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TREE PLANTING

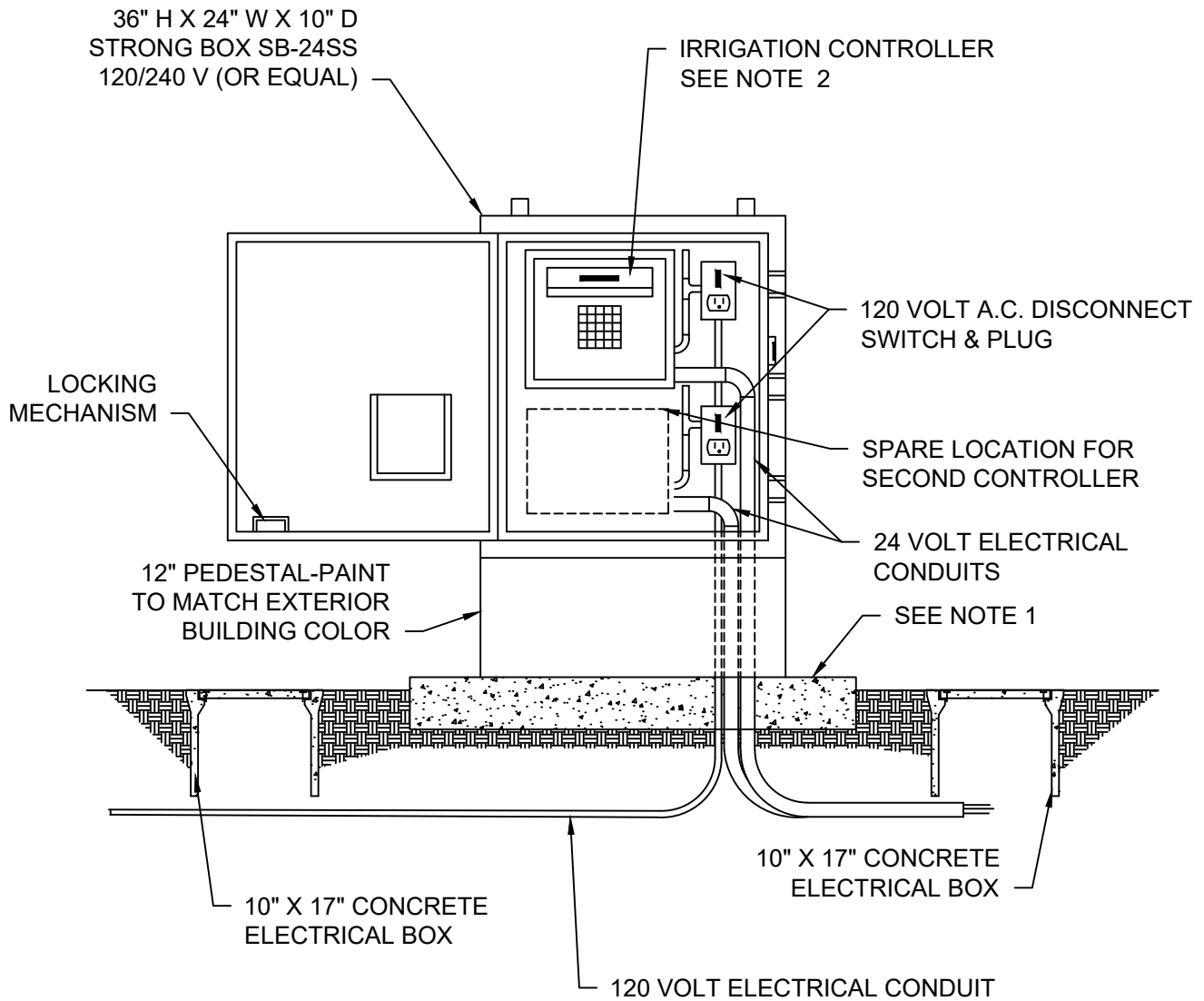
8000



NOTES:

1. ROOT CONTROL PLANTER BOXES OR BARRIER PANELS SHALL BE REQUIRED WHERE SHRUB IS 10 FEET OR LESS FROM EXISTING OR FUTURE SIDEWALK OR CURB. EWING STANDARD PLANTER, UNIVERSAL PLANTER OR CENTURY RC 24 OR EQUAL MAY BE USED. LENGTH OF BARRIER = 6' CENTERED ON SHRUB.
2. SHRUBS SHALL BE PROVIDED WITH AUTOMATIC IRRIGATION SYSTEMS (INDIVIDUAL BUBBLERS WITH WATERING BASIN).

<p>8010</p>	<p>SHRUB PLANTING</p>	<p>APPROVED: MARCH 2022</p>	<p>CITY OF DIXON ENGINEERING STANDARD DETAIL</p>
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NOTES:

1. 8" THICK CONCRETE SLAB EXTENDING 4" BEYOND SIDES AND BACK, AND 24" IN FRONT. SET TOP TO 2" ABOVE FINISH GRADE IN GROUND COVER AND 1" ABOVE FINISH GRADE IN TURF.
2. CONTROLLER TO BE SPECIFIED EVOLUTION OR EAGLE RAINMASTER. MAXIMUM (1) CONTROLLER PER BOX.
3. PROVIDE 2 COPIES OF LAMINATED SCHEMATIC MAP OF STATIONS IN CONTROLLER BOX.



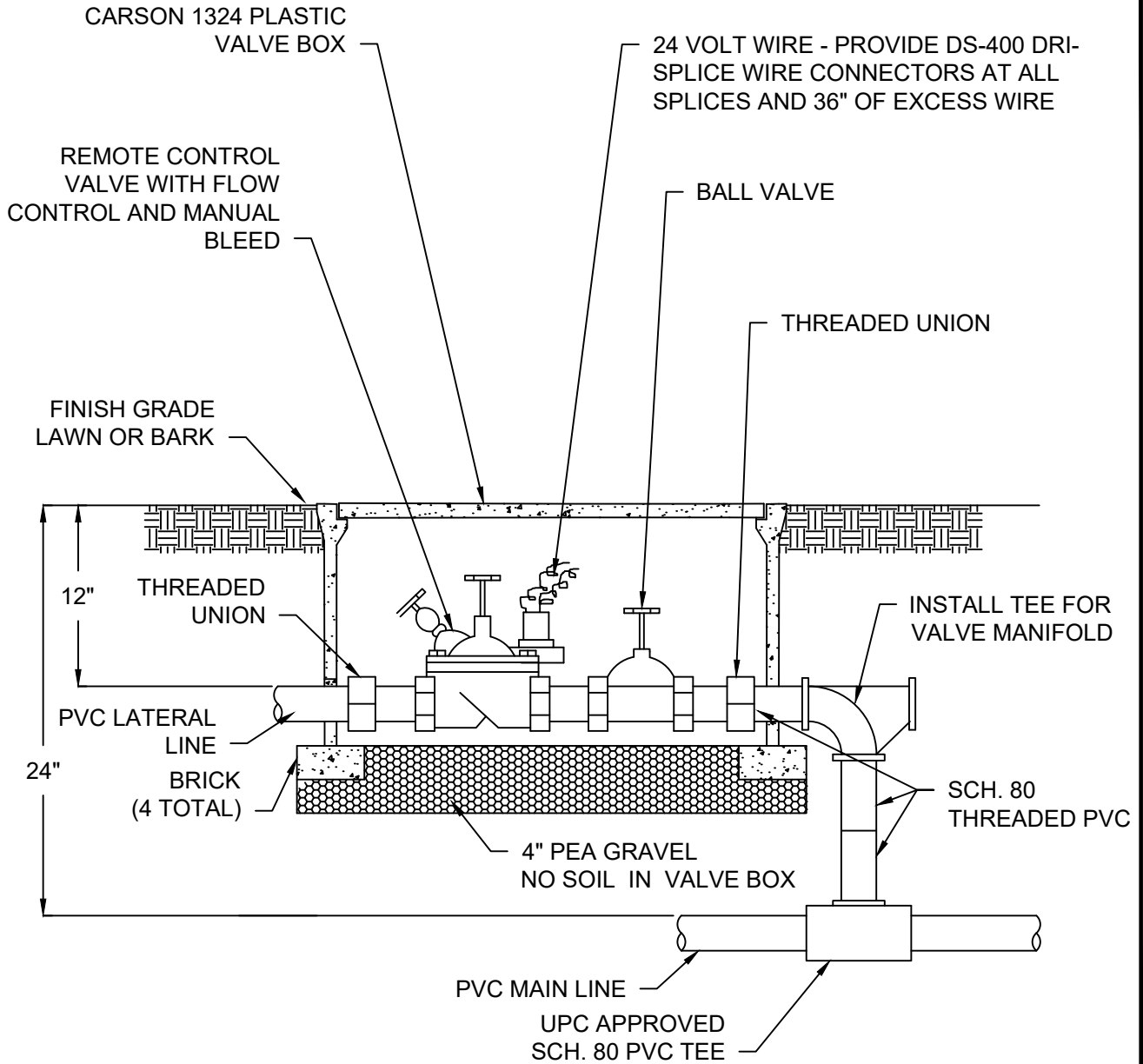
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**IRRIGATION
CONTROLLER**

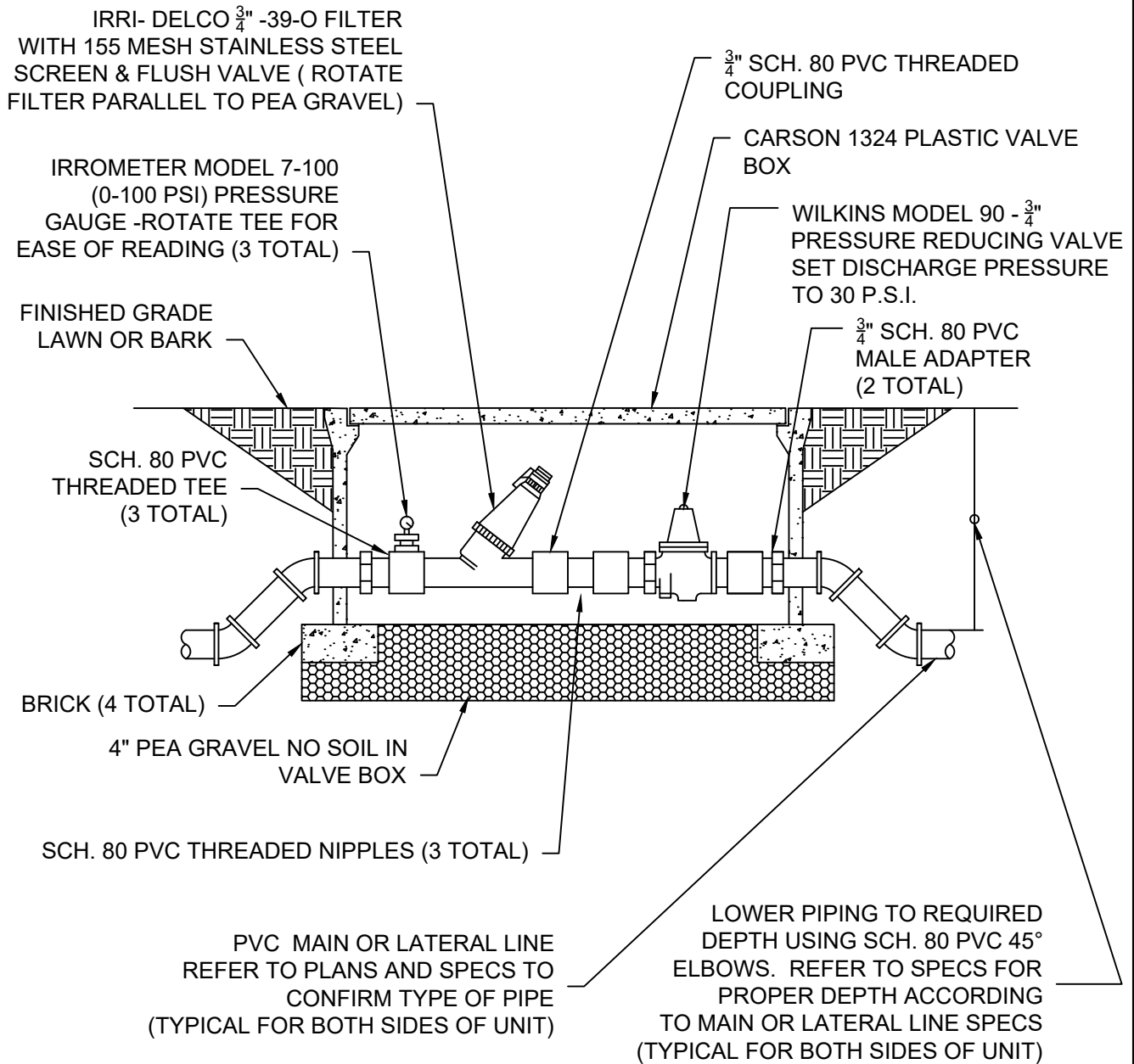
8020



NOTES:

1. WHEN PLASTIC VALVES ARE USED, THE CARSON VALVE BOX SHALL HAVE AN EMS DEVICE IN THE COVER TO FACILITATE DETECTION BY A METAL DETECTOR.
2. ONLY ONE (1) REMOTE CONTROL VALVE PER BOX - NO EXCEPTIONS.
3. PROVIDE DS-400 DRI-SPLICE WIRE CONNECTORS AT ALL SPLICES.
4. ALL WIRES SHALL BE LABELED OR TAGGED.
5. ALL MAINLINES SHALL HAVE LOCATING WIRE.

8030	REMOTE CONTROL AND BALL VALVE COMBINATION	 APPROVED: MARCH 2022	CITY OF DIXON  ENGINEERING STANDARD DETAIL
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NOTES:

1. PRESSURE GAUGES ON EITHER SIDE OF FILTER ARE TO INDICATE WHEN FILTER IS CLOGGED AND NEEDS CLEANING.
2. ONE MANIFOLD UNIT MAY BE USED UPSTREAM OF A GROUP OF DRIP VALVES, IF EQUIPMENT IS PRESSURE RATED.
3. PLACE MANIFOLD UNIT DOWNSTREAM OF SINGLE DRIP VALVE.
4. EMITTER MANIFOLD UNITS TO BE INSTALLED IN VALVE BOX AT GRADE FOR EASE OF FILTER CLEANING.



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ENGINEERING
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**IRRIGATION DRIP
FILTERING SYSTEM**

8040

CARSON 910 VALVE BOX WITH LOCK BOLTS

FINISHED GRADE
TOP OF LAWN
OR BOTTOM OF
3" MINIMUM BARK

QUICK COUPLING VALVE

BRICK (4 TOTAL)

$\frac{3}{4}$ " SCH. 80 PVC NIPPLE

4" PEA GRAVEL NO SOIL
IN VALVE BOX.

PVC MAIN LINE

SIDE VIEW

PVC MAIN LINE

$\frac{3}{4}$ " X 6" SCH. 80 PVC NIPPLE

$\frac{3}{4}$ " X 3" SCH. 80 PVC NIPPLE

$\frac{3}{4}$ " SCH. 80
PVC 90° ELBOW

TOP VIEW

NOTES:

1. ALL MAINLINES SHALL HAVE LOCATING WIRE.

8050

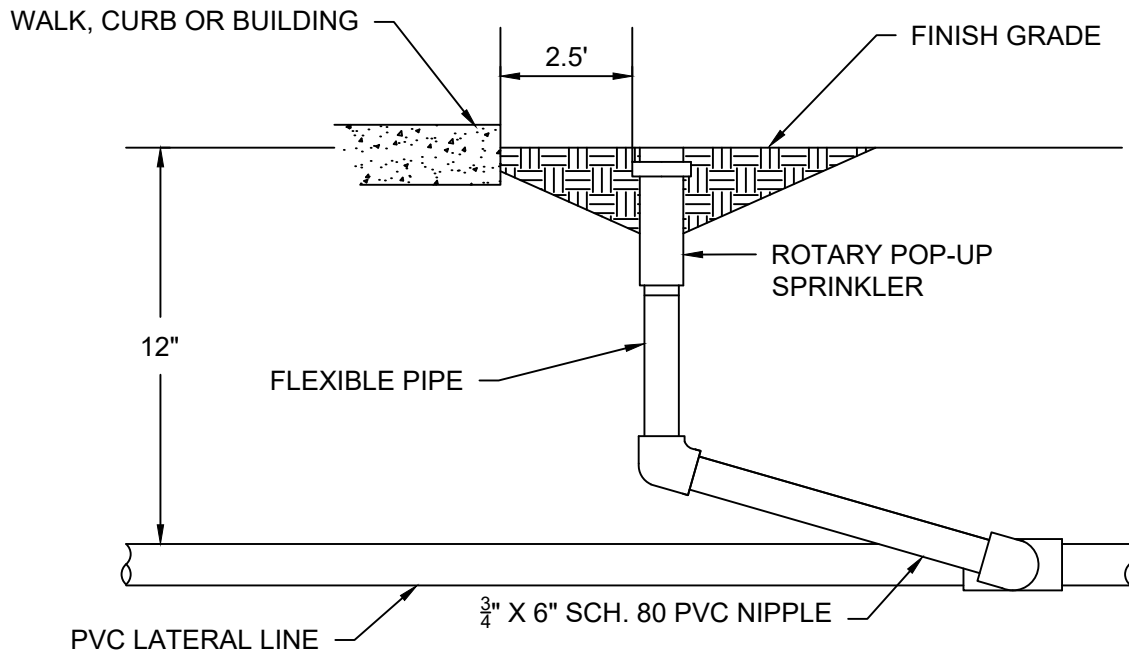
QUICK COUPLER



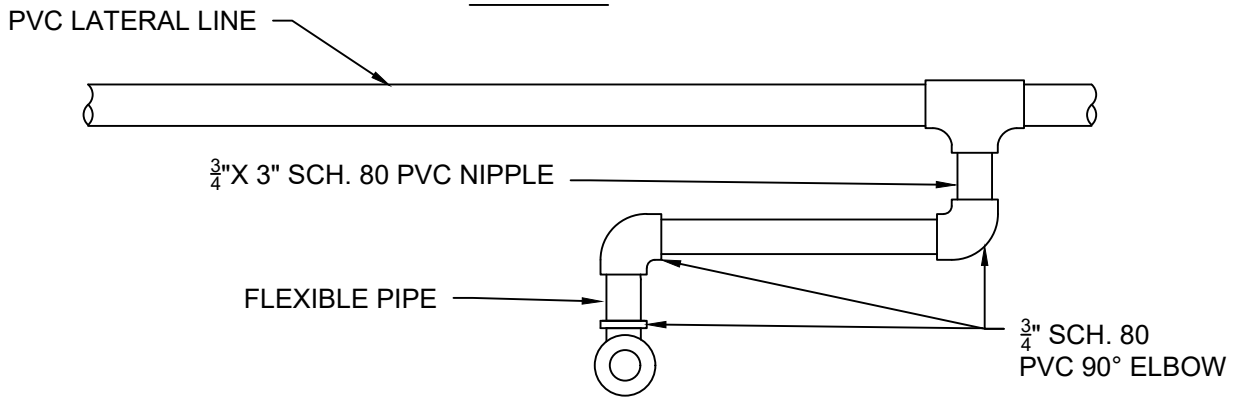
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ENGINEERING
STANDARD DETAIL





SIDE VIEW



TOP VIEW

NOTES:

1. SPRINKLER SHALL HAVE INTEGRAL CHECK VALVE TO PREVENT LOW HEAD DRAINAGE.
2. SET SPRINKLERS 2" ABOVE FINISH GRADE AT TIME OF INSTALLATION- LOWER TO FINISH GRADE WHEN TURF IS WELL ESTABLISHED.
3. ALL MAINLINES SHALL HAVE LOCATING WIRE.



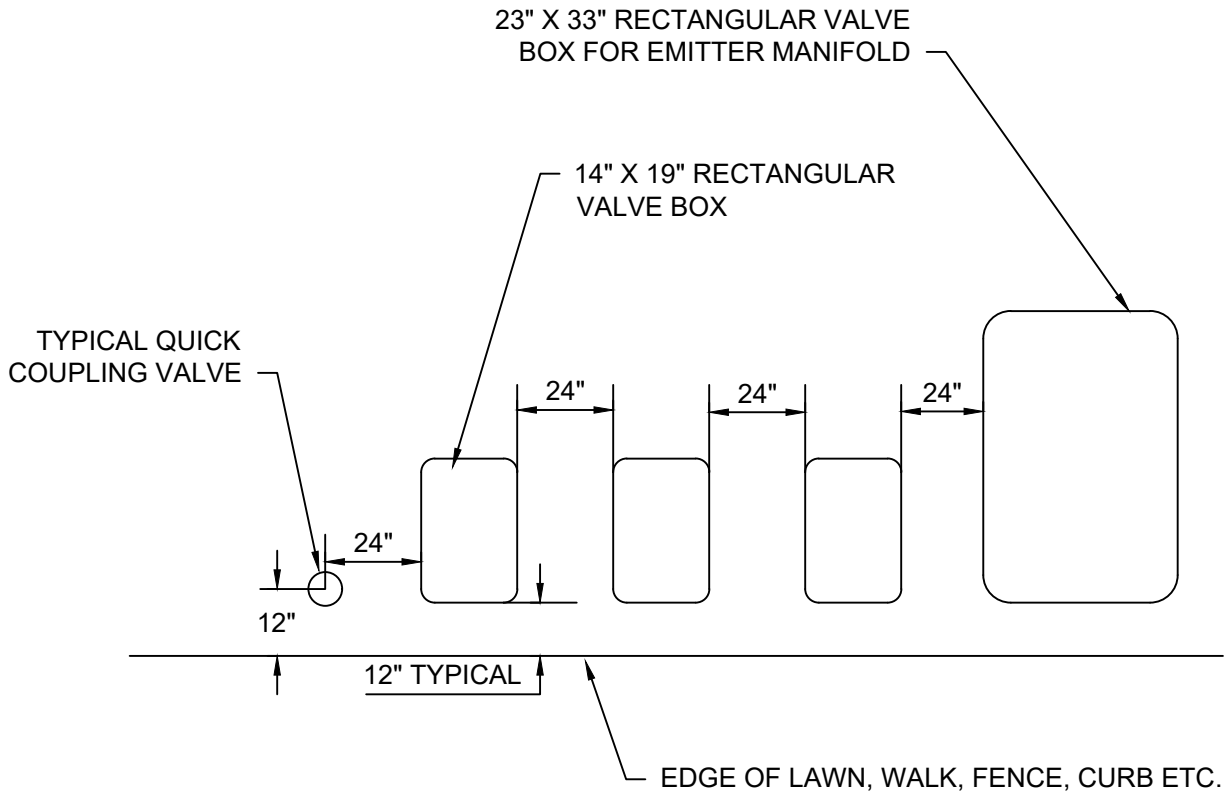
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TYPICAL SPRAY
HEAD

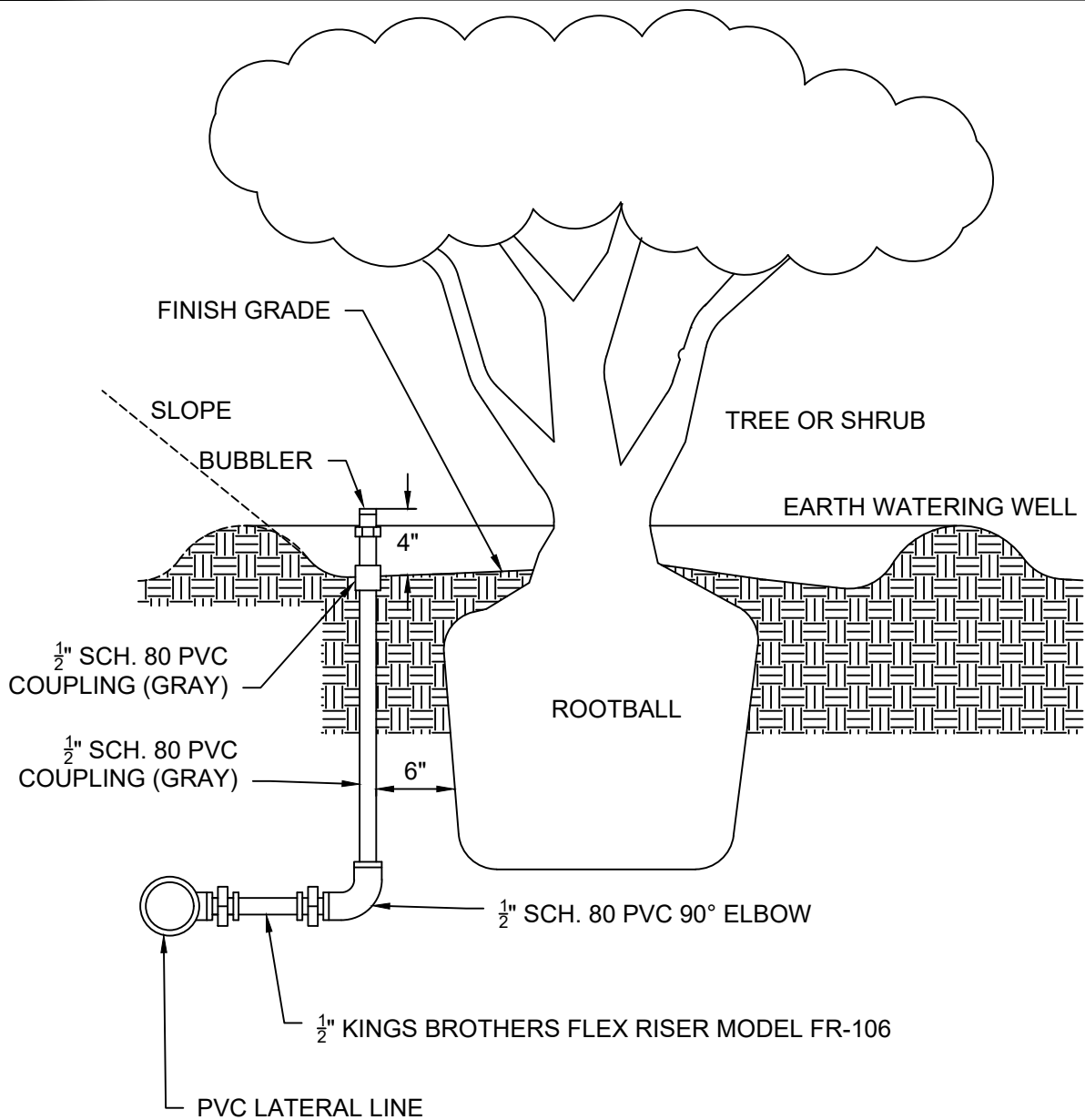
8060



NOTES:

1. CENTER VALVE BOX OVER REMOTE CONTROL VALVE TO FACILITATE SERVICING VALVE.
2. SET PCV AND VALVE BOX ASSEMBLY IN GROUND COVER / SHRUB AREA WHERE POSSIBLE. INSTALL IN LAWN ONLY IF GROUND COVER DOES NOT EXIST ADJACENT TO LAWN.
3. SET BOXES PARALLEL TO EACH OTHER AND PERPENDICULAR TO EDGE.
4. AVOID HEAVILY COMPACTED SOIL AROUND VALVE BOXES TO PREVENT COLLAPSE AND DEFORMATION OF VALVE BOX SIDES.
5. STAMP LIDS AND TAG VALVES.

<h1>8070</h1>	<h2>IRRIGATION BOX ARRANGEMENT</h2>	 <small>APPROVED: MARCH 2022</small>	<p>CITY OF DIXON ENGINEERING STANDARD DETAIL</p> 
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NOTES:

1. FOR BUBBLERS AT TREES OR SHRUBS IN GROUND COVER AREAS AND ON SLOPES.
2. INSTALL ONE OR TWO BUBBLERS, ON OPPOSITE SIDES OF THE ROOT BALL, AS PER IRRIGATION DESIGN.
3. INSTALL ALL BUBBLERS ON UPHILL SIDE OF PLANT.



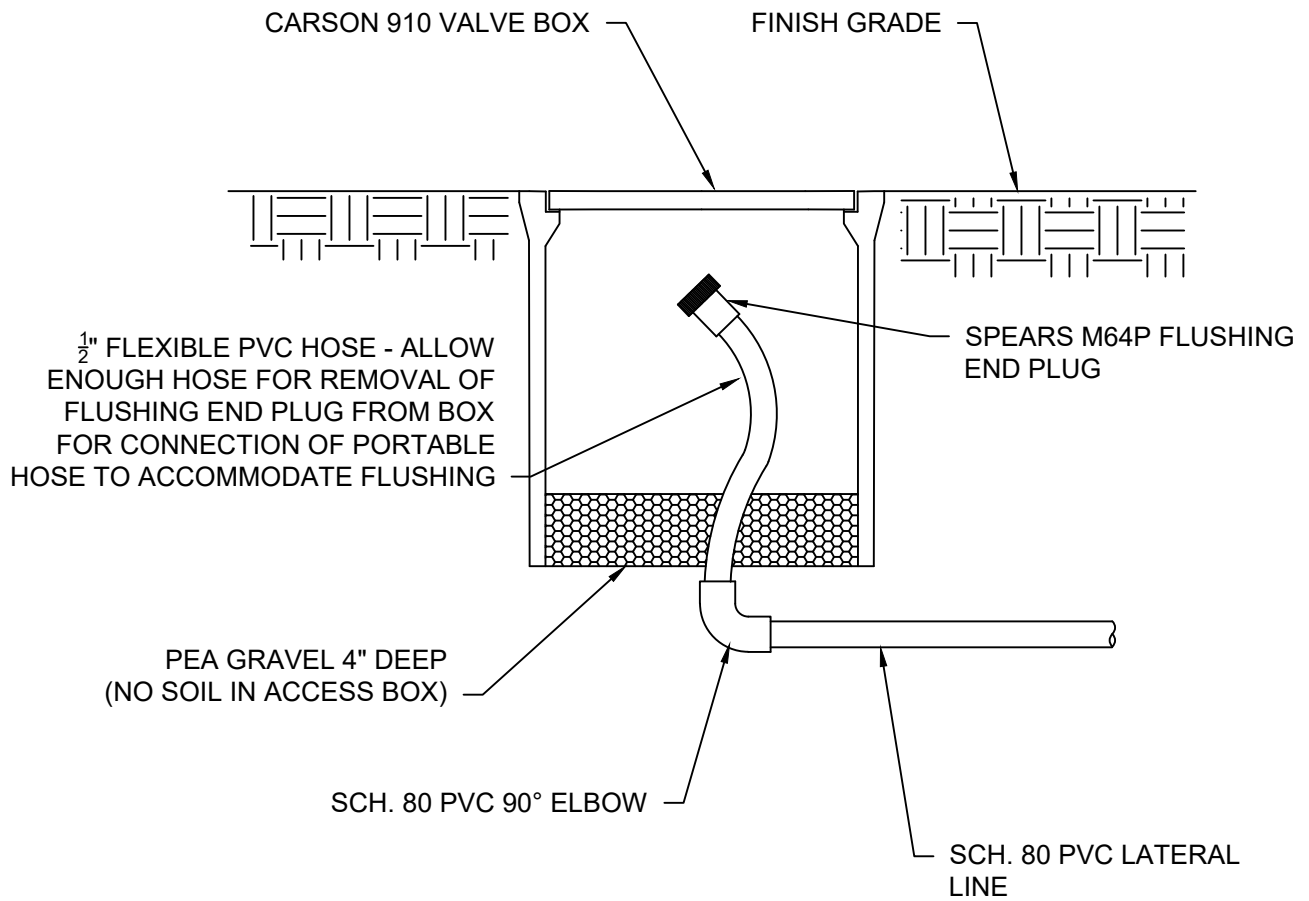
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TYPICAL BUBBLER

8080



NOTES:

1. THIS FLUSHING END PLUG IS TYPICAL OF ALL LATERAL ENDS IN DRIP SYSTEM.

8090

DRIP IRRIGATION
FLUSH PLUG



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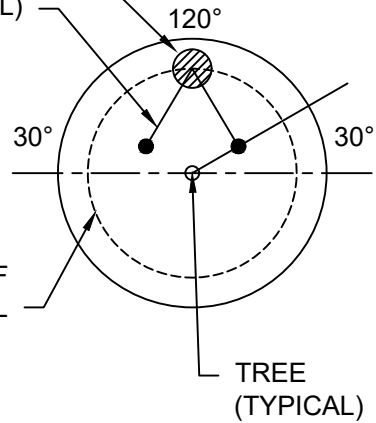
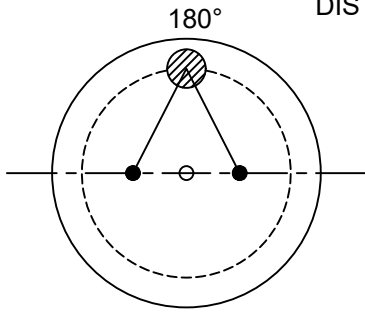


LEVEL GRADE

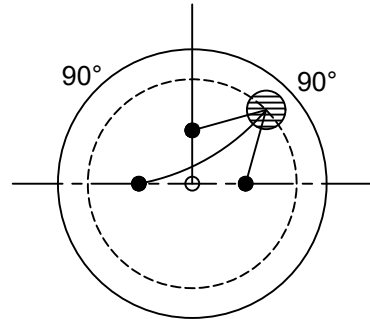
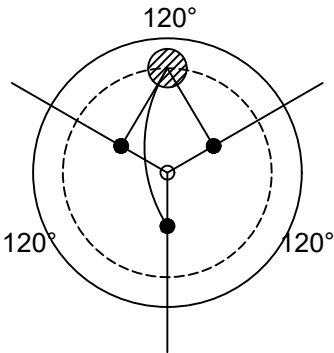
SLOPED GRADE

EMITTER ACCESS SLEEVE (TYP.)

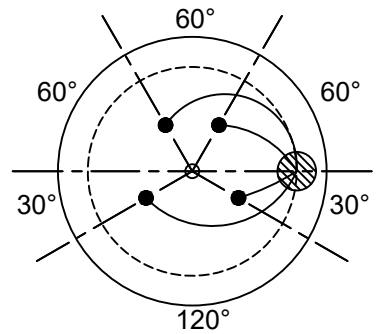
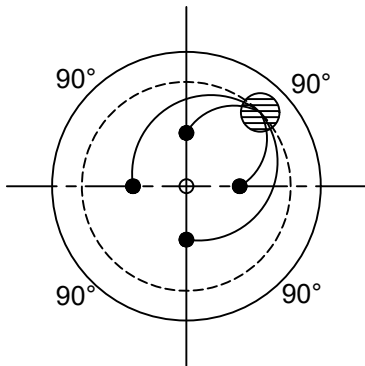
DISTRIBUTION TUBE (TYPICAL)



2 DISTRIBUTION TUBES



3 DISTRIBUTION TUBES



4 DISTRIBUTION TUBES

NOTES:

1. STAKING FOR EMISSION TUBES SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS.



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DRIP EMMITTER
ARRANGEMENT

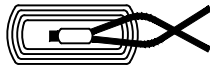
8100



STRIP WIRES APPROXIMATELY $\frac{5}{8}$ " FROM END



INSERT WIRES THROUGH HOLES IN BASE OF BODY



TWIST STRIPPED WIRES TOGETHER AND APPLY CRIMP SLEEVE WITH AN INDENT TYPE CRIMPING TOOL. PUSH WIRES BACK INTO BODY. INVERT BODY AND INSERT PLUG INTO BODY UNTIL IT SNAPS TIGHT.

NOTES:

1. ONE CONNECTOR HANDLES #10, #12 & #14 AWG WIRE.
2. WIRE CONNECTORS WILL ACCEPT THREE WIRE OR TWO WIRE CONNECTIONS.

8110

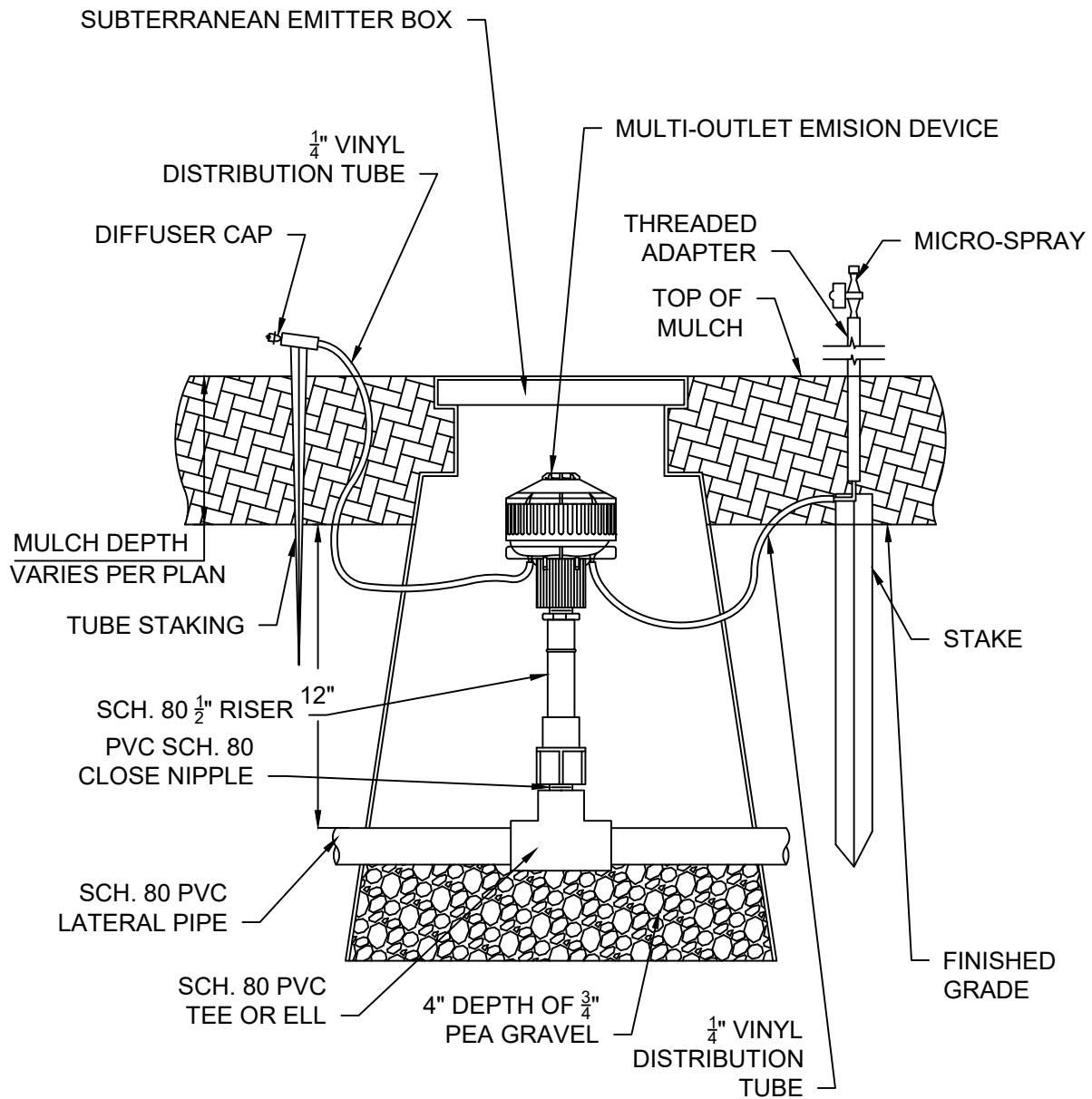
UNDERGROUND
WIRE SPLICE



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DRIP IRRIGATION
MULTI-OUTLET
EMITTER

8120

**CITY OF DIXON
GENERAL PROVISIONS**

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CITY OF DIXON
GENERAL PROVISIONS

SECTION 1: DEFINITIONS AND TERMS

1-1.01 GENERAL

Unless the context otherwise requires, wherever in the Specifications and other Contract Documents the following abbreviations and terms, or pronouns in place of them, are used, the intent and meaning shall be interpreted as provided in this section. Working titles having a masculine gender, such as "workman" and "journeyman" and the pronoun "he", are utilized in the Specifications for the sake of brevity, and are intended to refer to persons of either gender.

1-1.02A ABBREVIATIONS

AAN	American Association of Nurserymen.
AASHTO	American Association of State Highway and Transportation Officials.
ACI	American Concrete Institute.
AISC	American Institute of Steel Construction.
AISI	American Iron and Steel Institute.
ANSI	American National Standards Institute.
APHA	American Public Health Association.
API	American Petroleum Institute.
AREA	American Railway Engineering Association.
ASME	American Society of Mechanical Engineers.
ASTM	American Society for Testing and Materials.
AWG	American Wire Gage.

AWPA	American Wood-Preservers' Association
AWS	American Welding Society.
AWWA	American Water Works Association.
EIA	Electronic Industries Association.
IEEE	Institute of Electrical and Electronics Engineers.
NEMA	National Electrical Manufacturers Association.
UL	Underwriters' Laboratories Inc.

1-1.02A UNITS OF MEASUREMENT

The units of measurement used by the City of Dixon are the United States Standard Measures. The project Special Provisions shall designate a system of units different than the United States Standard Measures if another system will apply to contracts referencing these Specifications.

Some of the symbols for units of measurement used in the Specifications and in the Engineer's Estimate are defined as follows. The symbols for other units of measurement used in the Specifications are as defined in ASTM Designation: E-380, or in the various Specifications and text referenced in the Specifications.

Symbol Used	Definitions
amp	amperes
ea	each
lb	pound
acre or ac	acre
hr	hour

LNMI	lane mile
gal	gallon
LS	lump sum
LF	linear foot
mi	mile
MSYD	thousand station yard
sf	square foot
cf	cubic foot
sy	square yard
cy	cubic yard
	ohm
sec	second
sta	100 feet
TAB	tablet
ton	2,000 pounds
W	watt
V	volt
MFBM	thousand foot board measure

Some of the symbols for International System of Units (SI or “metric”) units of measurement possibly used in the Specifications and in the Engineer's Estimate are defined as follows.

Symbols used	Symbols as used in Engineer's Estimate	Definitions
A	—	amperes
—	EA	each
g	G	gram
kg	KG	kilogram
ha	HA	hectare (10 000 m ²)
h	H	hour
J	—	joule
—	LNKM	lane kilometer
L	L	liter
—	LS	lump sum
m	M	meter
km	KM	kilometer
mm	MM	millimeter
µm	—	micrometer
nm	—	nanometer
m ²	M ²	square meter
m ³	M ³	cubic meter

N	—	newton
N·m	—	newton meter
	—	ohm
Pa	—	pascal
kPa	—	kilopascal
MPa	—	megapascal
s	—	second
—	STA	station (100 m)
—	TAB	tablet
tonne	TONN	metric ton (1000 kg)
W	—	watt
V	—	volt

1-1.03 ACCEPTANCE

The formal written acceptance by the Dixon City Council of an entire contract which has been completed in all respects in accordance with the plans and Specifications and any modifications thereof previously authorized in writing.

1-1.04 (BLANK)

1-1.05 BASE

A layer of specified material of planned thickness placed immediately below the pavement or surfacing.

1-1.06 BASEMENT MATERIAL

The material in excavation or embankments underlying the lowest layer of subbase, base, pavement, surfacing or other specified layer which is to be placed.

1-1.07 BIDDER

Any individual, firm, partnership, corporation, or combination thereof, submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

1-1.08 BRIDGE

Any structure, with a bridge number, which carries a utility facility, or railroad, highway, pedestrian or other traffic, over a water course or over or under or around any obstruction.

1-1.085 CONDUIT

A pipe or tube in which smaller pipes, tubes or electrical conductors are inserted or are to be inserted.

1-1.09 CONTRACT

The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the work. The Contract shall include the Notice to Contractors, Instructions to Bidders, Proposal Forms, Plans, Technical Specifications, Special Provisions; Change Orders thereto; Standard Plans and Specifications of the State of California, Business and Transportation Agency, Department of Transportation, July 2002 edition, Sections 10 through 95, using English measurements and units, all as modified herein; and City of Dixon Engineering Standards & Specifications, April 2007 edition. All documents comprising the Contract may also be referred to as the "Contract Documents."

1-1.10 CONTRACTOR

The person or persons, firm, partnership, corporation, or combination thereof, private or municipal, who have entered into a Contract with the City of Dixon, as party or parties of the second part or their legal representatives.

1-1.11 CULVERT

Any structure, other than a bridge, which provides an opening under a roadway for drainage or other purposes.

1-1.12 DAYS

Unless otherwise designated, "days" as used in the Specifications will be understood to mean calendar days.

1-1.13 DEPARTMENT

The City of Dixon Engineering Department.

1-1.14 DETOUR

A temporary route for traffic around a closed portion of a road.

1-1.15 DIRECTOR

The City Engineer of the City of Dixon, or his/her authorized representative.

1-1.16 DIVIDED HIGHWAY

A highway with separated traveled ways for traffic, generally in opposite directions.

1-1.17 (BLANK)

1-1.18 ENGINEER

The City of Dixon, Engineering Department, Project Engineer, acting either directly or through properly authorized agents, the agents acting within the scope of the particular duties delegated to them.

1-1.19 ENGINEER'S ESTIMATE

The list of estimated quantities of work to be performed as contained in the "Proposal Form."

1-1.20 FEDERAL AGENCIES

Whenever, in the Specifications, reference is made to any Federal agency or officer, the reference shall be deemed made to any agency or officer succeeding in accordance with law to the powers, duties, jurisdiction and authority of the agency or officer mentioned.

1-1.21 FIXED COSTS

Any necessary labor, material and equipment costs directly expended on the item or items under consideration which remain constant regardless of the quantity of the work done.

1-1.22 FRONTAGE ROAD

A local street or road auxiliary to and located generally on the side of an arterial highway for service to abutting property and adjacent areas and for control of access.

1-1.23 GRADING PLANE

The surface of the basement material upon which the lowest layer of subbase, base, pavement, surfacing or other specified layer is placed.

1-1.24 HIGHWAY

The whole right of way or area which is reserved for and secured for use in constructing the roadway and its appurtenances.

1-1.25 LABORATORY

Any testing laboratory identified as such by the City of Dixon.

1-1.255 LEGAL HOLIDAYS

Those days designated as City holidays in the Engineering Standards & Specifications or Contract Documents.

1-1.26 LIQUIDATED DAMAGES

The amount prescribed in the Contract Documents, to be paid to the City of Dixon or to be deducted from any payments due or to become due the Contractor for each day's delay in completing the whole or any specified portion of the work beyond the time allowed in the Contract Documents.

1-1.265 MANUAL OF TRAFFIC CONTROLS

The State of California, Department of Transportation publication entitled "MANUAL OF TRAFFIC CONTROLS for Construction and Maintenance Work Zones."

1-1.27 MEDIAN

That portion of a divided highway separating the traveled ways for traffic in opposite directions including inside shoulders.

1-1.275 OFFICE OF STRUCTURE DESIGN

The State of California Office of Structure Design of the Department of Transportation. When the Specifications require working drawings to be submitted to the State Office of Structure Design, the drawings shall be submitted to: Office of Structure Design, Documents Unit, Mail Station 9, 4th Floor, 1801 30th Street, Sacramento, CA 95816, Telephone (916) 227-8252.

1-1.28 PAVEMENT

The uppermost layer of material placed on the traveled way or shoulders. This term is used interchangeably with surfacing.

1-1.29 PLANS

The official project plans and Standard Plans, profiles, typical cross sections, working drawings and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions and details of the work to be performed. These documents are to be considered as a part of the plans. In the above definition, the following terms are defined as follows:

STANDARD PLANS

The Standard Plans for Construction of Local Streets and Roads issued by the State of California, Department of Transportation.

PROJECT PLANS

The project plans are specific details and dimensions peculiar to the work and are supplemented by the Standard Plans insofar as the same may apply.

1-1.30 PROCESSING

Any operation or operations of whatever nature and extent required to produce a specified material.

1-1.31 PROPOSAL

The offer of the Bidder for the work when made out and submitted on the prescribed proposal form, properly signed and guaranteed.

1-1.32 PROPOSAL FORM

The approved form upon which the City of Dixon requires formal bids be prepared and submitted for the work.

1-1.33 PROPOSAL GUARANTY

The cash, cashier's check, certified check or bidder's bond accompanying the proposal submitted by the bidder, as a guaranty that the bidder will enter into a contract with the City of Dixon for the performance of the work if the Contract is awarded to the bidder.

1-1.34 ROADBED

The roadbed is that area between the intersection of the upper surface of the roadway and the side slopes or curb lines. The roadbed rises in elevation as each increment or layer of subbase, base, surfacing or pavement is placed. Where the medians are so wide as to include areas of undisturbed land, a divided highway is considered as including 2 separate roadbeds.

1-1.35 ROADWAY

That portion of the highway included between the outside lines of sidewalks, or curbs, slopes, ditches, channels, waterways, and including all the appertaining structures, and other features necessary to proper drainage and protection.

1-1.36 SHOULDERS

The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

1-1.37 SPECIAL PROVISIONS

The special provisions are specific clauses setting forth conditions or requirements peculiar to the work and supplementary to these Standard Specifications.

1-1.38 SPECIFICATIONS

The directions, provisions and requirements contained in the Contract Documents. Whenever the term "these Specifications" or "these Standard Specifications" is used in this Contract, it means the provisions set forth in this Contract. "State Specifications" or "State Standard Specifications" also means the State of California, Department of Transportation, Standard Specifications, 2002 edition, Sections 10 through 95 only.

1-1.39 STATE

The State of California.

1-1.40 (BLANK)

1-1.41 SUBBASE

A layer of specified material of planned thickness between a base and the basement material.

1-1.42 SUBGRADE

That portion of the roadbed on which pavement, surfacing, base, subbase, or a layer of any other material is placed.

1-1.43 SUBSTRUCTURE

All that part of the bridge below the bridge seats, tops of piers, haunches of rigid frames, or below the spring lines of arches. Backwalls and parapets of abutments and wingwalls of bridges shall be considered as parts of the substructure.

1-1.44 SUPERSTRUCTURE

All that part of the bridge except the bridge substructure.

1-1.45 SURFACING

The uppermost layer of material placed on the traveled way, or shoulders. This term is used interchangeably with pavement.

1-1.46 TRAFFIC LANE

That portion of a traveled way for the movement of a single line of vehicles.

1-1.47 TRAVELED WAY

That portion of the roadway for the movement of vehicles, exclusive of shoulders.

1-1.48 WORK

All the work specified, indicated, shown, contemplated or inferable from the Contract Documents to construct the improvement, including all alterations, amendments or extensions thereto made by Contract Change Order.

SECTION 2: PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 CONTENTS OF PROPOSAL FORMS

Prospective bidders must use City of Dixon proposal forms which will refer to the Special Provisions and Project Plans for the work to be done and will include a schedule of items for which bid prices are requested, showing the approximate estimate of the various quantities and kinds of work to be performed or materials to be furnished.

2-1.02 APPROXIMATE ESTIMATE

The quantities given in the proposal form and Contract are approximate only, being given as a basis for the comparison of bids. The City of Dixon does not, expressly or by implication, agree that the actual amount of work will correspond therewith, and reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work.

2-1.03 EXAMINATION OF PLANS, SPECIFICATIONS, CONTRACT, AND SITE OF WORK

All bidders shall carefully and completely examine the site of the work contemplated, the plans and Specifications, and the proposal and Contract forms therefor, and perform all tests and inspections necessary to inform bidder of all conditions that may be encountered, the character, quality and scope of work to be performed, and the quantities of materials to be furnished. The submission of a bid shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality and scope of work to be performed, the quantities of materials to be furnished and as to the requirements of the proposal, plans, Specifications and the Contract.

Where the City of Dixon has made investigations of site conditions, including subsurface conditions in areas where work is to be performed under the Contract, or in other areas, some of which may constitute possible local material sources, bidders and Contractor may, upon written request, inspect the records of the City of Dixon as to those investigations subject to and upon the conditions hereinafter set forth. The investigations are made only for the purpose of study and design.

The records of investigations, project records, log of test borings, record of geotechnical data, investigation of subsurface conditions, "Materials Information," cross-sections, contour maps, and any other investigations provided by City of Dixon, are not a part of the Contract and are available solely for the convenience of the bidder or Contractor. It is expressly understood and agreed that the City of Dixon assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the above described documents or of the interpretations set forth therein or made by the City of Dixon in its use thereof and there is no warranty or guaranty, either express or implied, as to the completeness or accuracy of the documents, that the conditions indicated by the documents are representative of those existing in or throughout those areas, or any part thereof, or that

unlooked-for developments may not occur, or that materials other than, or in proportions different from those indicated, may not be encountered.

The availability or use of information described in this section is not to be construed in any way as a waiver of the provisions of the first paragraph in this section and a bidder or Contractor shall make their own investigation and examination to be satisfied as to conditions to be encountered in the performance of the work.

No information derived from the inspection of investigations or compilation thereof made by the City of Dixon or from the Engineer, or their consultants, will in any way relieve the bidder or Contractor from any risk or from properly fulfilling the terms of the Contract.

2-1.04 ADDENDUM

If discrepancies or apparent errors are found in the Contract Documents prior to the date of bid opening, bidders shall submit a written request for clarification to City Engineer, which response to said request will be given in the form of addenda to all bidders, if time permits.

The correction of any discrepancies in, or omissions from the plans, Specifications, or other Contract Documents, or any interpretation thereof, during the bidding period will be made only by an addendum issued in writing by the City of Dixon. A copy of each such addendum issued by the City of Dixon will be mailed, faxed or delivered to each person receiving a set of the Contract Documents, and shall be made a part of the Contract. Any other interpretation or explanation of such documents will not be considered binding.

2-1.05 PROPOSAL FORMS

The City of Dixon will furnish to each bidder a standard proposal form, which, when filled out and executed shall be submitted as that bidder's bid. Bids not presented on forms so furnished, and copies or facsimiles of the bidder's completed and executed proposal forms submitted as a bid may be rejected.

2-1.06 (BLANK)

2-1.07 PROPOSAL GUARANTY

The proposal must be accompanied by cash, a bidder's bond, certified check, or cashier's check in an amount not less than ten percent (10%) of the amount bid. The bidder's bond must be signed in favor of the City of Dixon, and the certified check or cashier's check must be made payable to the City of Dixon.

2-1.01 WITHDRAWAL OF PROPOSALS

Any bid may be withdrawn at any time prior to the date and time fixed for the opening of bids only by written request for the withdrawal of the bid filed at the location at which the

bid was received by the City of Dixon. The request shall be executed by the bidder or the bidder's duly authorized representative. The withdrawal of a bid does not prejudice the right of the bidder to file a new bid. Whether or not bids are opened exactly at the time fixed for opening bids, a bid will not be received after that time, nor may any bid be withdrawn after the time fixed for the opening of bids.

2-1.09 PUBLIC OPENING OF PROPOSALS

Proposals will be opened and read publicly at the time and place indicated in the "Notice to Bidders." Bidders or their authorized agents are invited to be present.

2-1.095 RELIEF OF BIDDERS

Attention is directed to the provisions of Public Contract Code Sections 5100 to 5107, inclusive, concerning relief of bidders and in particular to the requirement therein, that if the bidder claims a mistake was made in the bid presented, the Bidder shall give the City of Dixon written notice within 5 days after the opening of the bids of the alleged mistake, specifying in the notice in detail how the mistake occurred.

2-1.10 DISQUALIFICATION OF BIDDERS

More than one proposal from an individual, firm, partnership, corporation, or combination thereof under the same or different names will not be considered. Reasonable grounds for believing that any individual, firm, partnership, corporation or combination thereof is interested in more than one proposal for the work contemplated may cause the rejection of all proposals in which that individual, firm, partnership, corporation or combination thereof is interested. If there is reason for believing that collusion exists among the Bidders any or all proposals may be rejected. Proposals in which the prices appear unbalanced may be rejected.

2-1.11 (BLANK)

2-1.12 (BLANK)

SECTION 3: AWARD AND EXECUTION OF CONTRACT

3-1.01 AWARD OF CONTRACT

The right is reserved to reject any and all proposals.

The award of the Contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. The award, if made, will be made within 60 days after the opening of the proposals. This period will be subject to extension for such further period as may be agreed upon in writing between the City of Dixon and the bidder concerned.

All bids will be compared on the basis of the Engineer's Estimate of the quantities of work to be done.

The low bid will be determined by adding the sum of the base bid and all alternates (if any). The City of Dixon reserves the right to include in the Contract, if a Contract is awarded, the base bid only, or the base bid plus any alternate bid or combinations of alternates bid.

3-1.02 BONDS

Within ten (10) days of Contractor's receipt of the Contract from the City of Dixon, the Contractor shall furnish corporate surety bonds to the benefit of the City of Dixon, issued by a surety company acceptable to the City of Dixon and authorized and admitted to do business in the State of California, as follows:

A. Faithful Performance Bond -- In a sum not less than one hundred percent (100%) of the total contract price as set forth in the Contract to guarantee the Contractor's faithful performance of all covenants and stipulations of the Contract. The bond shall contain a provision that the surety thereon waives the provisions of Sections 2819 and 2845 of the Civil Code of the State of California.

B. Payment (Labor and Materials) Bond -- In a sum not less than one hundred percent (100%) of the total contract price as set forth in the Contract to guarantee the payment of wage, and bills contracted for materials, supplies, or equipment used in the performance of the Contract. The bond shall be in accordance with the provisions of Sections 3225, 3226, and 3247 to 3252, inclusive, of the Civil Code of the State of California, and Section 13020 of the Unemployment Insurance Code of the State of California. Said bond shall also contain a provision that the surety thereon waives the provisions of Sections 2819 and 2845 of the Civil Code of the State of California.

Faithful Performance Bond and Payment Bond shall be on the forms provided by City of Dixon.

The surety companies shall familiarize themselves with all provisions and conditions of the Contract. It is understood and agreed that the surety or sureties waive the right of special notification of any modifications or alterations, omissions or reductions, extra or additional

work, extensions of time, or any other act or acts by the City of Dixon or its authorized agents under the terms of the Contract; and failure to so notify the surety companies of such changes shall in no way relieve the surety or sureties of their obligations under this Contract. The surety expressly waives the provisions of Sections 2819 and 2845 of the Civil Code of the State of California.

3-1.03 EXECUTION OF CONTRACT

The Contract shall be signed by the successful bidder and returned, together with the Contract bonds, within 10 days after the bidder has received the Contract for execution.

3-1.04 FAILURE TO EXECUTE CONTRACT

The Contractor shall pay to the City of Dixon such sums from said cash, bond, certified check, or cashier's check as necessary to reimburse the City of Dixon for costs incurred for failure of the successful bidder to complete, sign and return in strict compliance with these Contract Documents, if requested to do so, Bidder's Questionnaire, or enter into a Contract. The amount of said cash, bond, certified check, or cashier's check shall not be deemed to constitute a penalty or liquidated damages. The City of Dixon shall not be precluded by such cash, bond, certified check, or cashier's check from recovering from the defaulting bidder damages in excess of the amount of said cash, bond, certified check, or cashier's check incurred as a result of the failure of the successful bidder to complete, sign and return in strict compliance with these Contract Documents, if requested to do so, Bidder's Questionnaire, or enter into a Contract.

3-1.05 RETURN OF PROPOSAL GUARANTIES

The proposal guaranties accompanying the proposals of the first, second and third lowest bidders will be retained until the Contract has been finally executed, after which those proposal guaranties, may be returned to the respective bidders whose proposals they accompany. The proposal guaranties, other than bidder's bonds, submitted by all other unsuccessful bidders will be returned upon determination, by the City of Dixon, of the first, second and third lowest responsible Bidders.

SECTION 4: SCOPE OF WORK

4-1.01 INTENT OF PLANS AND SPECIFICATIONS

All work and materials shall be in full accordance with the latest adopted standards and regulations of the State Fire Marshal; the California Building Code; Title 24 of the California Code of Regulations; the California Electrical Code; the California Plumbing Code; Americans With Disabilities Act; and all other applicable codes, laws, rules or regulations. Nothing in these Contract Documents is to be construed to permit work not conforming to these requirements. The Contractor agrees that immediately upon signing of the Contract, Contractor will diligently review the Contract Documents and determine if any work described or inferred within the Contract Documents is not in conformance with these requirements. Should the Contractor discover work within the Contract Documents not in conformance with these requirements, the Contractor agrees to immediately notify the Engineer in writing of said nonconformance, and to not proceed with nonconforming work. When the work detailed in the Contract Documents differs from governing codes, it is understood and agreed that the Contract sum is based upon the more costly or expensive standard.

The intent of the plans and Specifications is to prescribe the details for the construction and completion of the work which the Contractor undertakes to perform in accordance with the terms of the Contract, and that the work performed under the Contract results in a complete operating system in satisfactory working condition with respect to the functional purposes of the installation, and no extra compensation will be allowed for anything omitted but fairly implied. The prices paid for the various items in the proposal shall include full compensation for furnishing all labor, materials, tools, equipment, overhead, profit, incidentals, and doing all work necessary to complete the finished product as provided in the Contract Documents. Where the plans or Specifications describe portions of the work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the finest quality are to be used. The Contractor shall furnish all labor, materials, tools, equipment, and incidentals, and do all the work involved in executing the Contract to the highest possible standard of workmanship.

Should it appear that the work to be done, or any of the matters relative thereto, are not sufficiently detailed or explained in the Contract Documents, or in the event of any doubt or question arising respecting the true meaning of the Contract Documents, the Contractor shall apply to the Engineer in writing for such further explanations as may be necessary, and the Engineer shall render his or her decisions thereon. The Contractor shall thoroughly review all Requests for Information (RFI's) submitted by subcontractors prior to submission to the Engineer to determine whether such RFI's is already answered in the Contract Documents. The Contractor represents to City of Dixon, that by submission of an RFI, the Contractor has thoroughly reviewed the RFI and thoroughly reviewed the Contract Documents, and determined that the RFI is not answered or reasonably inferable in the Contract Documents, and that the RFI pertains to an unforeseen condition or circumstance that is not described in the Contract Documents, that there is a conflict or discrepancy in

the Contract Documents, or there is an omission in the Contract Documents. In the event any RFI is answered or reasonably inferable from the Contract Documents, the Contractor agrees to pay the City of Dixon the reasonable cost, time and expenses associated with reviewing and responding to RFI's which are already answered or reasonably inferable from the Contract Documents. In the event of a disagreement over such compensation, the judgement of the Engineer shall be final.

4-1.02 FINAL CLEANING UP

Before final inspection of the work, the Contractor shall clean the highway, material sites and all ground occupied by the Contractor in connection with the work of all rubbish, excess materials, falsework, temporary structures and equipment. All parts of the work shall be left in a neat and presentable condition. Full compensation for final cleaning up will be considered as included in the prices paid for the various Contract items of work and no separate payment will be made therefor. Nothing herein, however, shall require the Contractor to remove warning, regulatory, and guide signs prior to formal acceptance by the Director.

4 -1.03 CHANGES

The City reserves the right without changing the scope of work, to make such alterations deviations, additions to or deletions from the plans and Specifications, including but not limited to, the right to add or delete any portion of the work to be done with no additional compensation or change in lump sum or unit bid prices. The City also reserves the right without changing the scope of work, to increase or decrease the quantity of any item or portion of the work, as may be deemed by the Engineer to be necessary or advisable and to require such extra work as may be determined by the Engineer to be required for the proper completion or construction of the whole work contemplated. Such increases or decreases in quantities shall not be a basis for change in character of the work.

The City of Dixon may request that the Contractor provide the City of Dixon with estimated costs for proposed changes to the work. The Contractor agrees to promptly provide the City of Dixon with detailed, itemized costs for proposed changes to the work and scheduling data demonstrating the impact, if any, of the proposed changes to the work and the time for completion. Adjustments, if any, in the amount to be paid the Contractor by reason of any modifications of the work as set forth in a Contract Change Order, Construction Change Directive, or arising from claims shall be determined by one or more of the following methods as elected by the City of Dixon:

- A. Lump Sum Price - By an acceptable lump sum price fixed in agreement between the City of Dixon and the Contractor.

- B. Unit Prices - By unit prices fixed by agreement between the City of Dixon and the Contractor.

C. Force Account - By directing the Contractor to proceed with the work and to keep and present in such form as the City of Dixon may direct, a correct account of the cost of the change, together with all vouchers therefor. The Contractor will be paid for labor, materials, equipment rental, etc. actually used on change order work performed under Force Account as per Section 9-1.03 of these specifications.

The amount of payment agreed upon or, in the absence of agreement, selected by the City of Dixon shall be set forth in the Contract Change Order or Construction Change Directive.

Upon receipt of a Contract Change Order authorized by the Engineer, the Contractor shall proceed with the ordered work. If ordered in writing by the Engineer, the Contractor shall proceed with the work so ordered prior to actual receipt of an authorized Contract Change Order therefor. In those cases, the Engineer will, as soon as practicable, issue a Contract Change Order for the ordered work and the provisions in Section 4-1.03A, "Procedure and Protest," shall be fully applicable to the subsequently issued Contract Change Order.

When the compensation for an item of work is subject to adjustment under the provisions of this Section 4-1.03, the Contractor shall, upon request, furnish the Engineer with adequate detailed cost data for that item of work. If the Contractor requests an adjustment in compensation for an item of work, the cost data shall be submitted with the request.

4-1.03A PROCEDURE AND PROTEST

A Contract Change Order authorized by the Engineer may be issued to the Contractor at any time. Should the Contractor disagree with any terms or conditions set forth in an authorized Contract Change Order not executed by the Contractor, the Contractor shall submit a written protest to the Engineer within 15 days after the receipt of the Contract Change Order. The protest shall state the points of disagreement, and the Contract specification references, quantities and costs involved. If a written protest is not submitted, payment will be made as set forth in the Contract Change Order, and Contractor agrees that payment shall constitute full compensation for all work included therein or required thereby. Unprotested Contract Change Orders will be considered as executed Contract Change Orders.

Where the protest concerning an authorized Contract Change Order relates to compensation, the compensation payable for all work specified or required by that Contract Change Order to which the protest relates will be determined as provided in Section 4-1.03D. The Contractor shall keep full and complete records of the cost of that work and shall permit the Engineer to have access thereto as may be necessary to assist in the determination of the compensation payable for that work.

Where the protest concerning an accepted Contract Change Order relates to the adjustment of Contract time for the completion of the work, the time to be allowed therefor will be determined as provided in Section 8-1.07, "Liquidated Damages."

Proposed Contract Change Orders may be presented to the Contractor for consideration prior to authorization by the Engineer. If the Contractor signifies acceptance of the terms and conditions of the proposed Contract Change Order by executing the document and if the Contract Change Order is accepted by the Engineer and issued to the Contractor, payment in accordance with the provisions as to compensation therein set forth shall constitute full compensation for all work included therein or required thereby. An accepted Contract Change Order shall supersede a proposed, but unaccepted, Contract Change Order covering the same work.

The Engineer may provide for an adjustment of compensation as to a Contract item of work included in a Contract Change Order determined as provided in Section 4-1.03D, if that item of work is eligible for an adjustment of compensation thereunder.

Contract Change Orders shall be in the form provided by City of Dixon in the Contract Documents.

4-1.03B NOT USED.

4-1.03C NOT USED.

4-1.03D EXTRA WORK

New and unforeseen work will be classed as extra work when determined by the Engineer that the work is not covered by any of the various items for which there is a bid price or by combinations of those items. In the event portions of this work are determined by the Engineer to be covered by some of the various items for which there is a bid price or combinations of those items, the remaining portion of the work will be classed as extra work. Extra work also includes work specifically designated as extra work in the plans or Specifications.

The Contractor shall do the extra work and furnish all labor, material and equipment therefor upon receipt of an accepted Contract Change Order or other written order of the Engineer, and in the absence of an accepted Contract Change Order or other written order of the Engineer the Contractor shall not be entitled to payment for the extra work.

Payment for extra work required to be performed pursuant to the provisions in this Section 4-1.03D, in the absence of an executed Contract Change Order, will be made by force account as provided in Section 9-1.03; or as agreed to by the Contractor and the Engineer.

4-1.04 DETOURS

The Contractor shall construct and remove detours and detour bridges for the use of public traffic as provided in the Contract Documents or as directed by the Engineer. Payment for this work will be made as set forth in the Contract Documents or at the Contract prices for the items of work involved if the work being performed is covered by Contract items of work

and no other method of payment therefor is provided in the special provisions, otherwise the work will be paid for as extra work as provided in Section 4-1.03D.

The cost of repairing damage to detours caused by public traffic will be paid for as extra work as provided in Section 4-1.03D.

When public traffic is routed through the work, provision for a passageway through construction operations will not be considered as detour construction or detour maintenance, and this work shall conform to and be paid for as provided in Section 7-1.08, "Public Convenience," unless otherwise specified in the special provisions.

Detours used exclusively by the Contractor for hauling materials and equipment shall be constructed and maintained by the Contractor at the Contractor's expense.

The failure or refusal of the Contractor to construct and maintain detours at the proper time shall be sufficient cause for closing down the work until the detours are in satisfactory condition for use by public traffic.

Where the Contractor's hauling is causing such damage to the detour that its maintenance in a condition satisfactory for public traffic is made difficult or costly, the Engineer shall have authority to regulate the Contractor's hauling over the detour.

4-1.05 USE OF MATERIALS FOUND ON THE WORK

Unless designated as selected material as provided in Section 19-2.07, "Selected Material," the Contractor, with the acceptance of the Engineer, may use in the proposed construction such stone, gravel, sand or other material suitable in the opinion of the Engineer as may be found in excavation. The Contractor will be paid for the excavation of those materials at the Contract price for the excavation, but the Contractor shall replace at the Contractor's expense with other suitable material all of that portion of the material so removed and used which was contemplated for use in the work, except that the Contractor need not replace, at the Contractor's expense, any material obtained from structure excavation used as structure backfill. No charge for materials so used will be made against the Contractor. The Contractor shall not excavate or remove any material from within the highway location that is not within the excavation, as indicated by the slope and grade lines, without written authorization from the Engineer.

SECTION 5: CONTROL OF WORK

5-1.01 AUTHORITY OF ENGINEER

The Engineer shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the work; all questions which may arise as to the interpretation of the plans and Specifications; all questions as to the acceptable fulfillment of the Contract on the part of the Contractor; and all questions as to compensation. The Engineer's decision shall be final, and the Engineer shall have authority to enforce and make effective those decisions and orders which the Contractor fails to carry out promptly.

5-1.02 PLANS AND WORKING DRAWINGS

The Contract plans furnished consist of general drawings and show such details as are necessary to give a comprehensive idea of the construction contemplated. All authorized alterations affecting the requirements and information given on the Contract plans shall be in writing.

The Contract plans shall be supplemented by such working drawings prepared by the Contractor as are necessary to adequately control the work. No change shall be made by the Contractor in any working drawing after it has been accepted by the Engineer.

Working drawings for any part of the permanent work shall include, but not be limited to stress sheets, anchor bolt layouts, shop details, erection plans, equipment lists and any other information specifically required elsewhere in the Specifications.

Working drawings for cribs, cofferdams, falsework, temporary support systems, haul bridges, centering and form work and for other temporary work and methods of construction the Contractor proposes to use, shall be submitted when required by the Contract Documents or ordered by the Engineer. Working drawings shall be subject to City of Dixon review insofar as the details affect the character of the finished work and for compliance with design requirements applicable to the construction when specified or called for, but details of design will be left to the Contractor who shall be responsible for the successful construction of the work.

Working drawings shall be reviewed by the Engineer before any work involving the drawings is performed. It is expressly understood that review of the Contractor's working drawings shall not relieve the Contractor of any responsibility under the Contract for the successful completion of the work in conformity with the requirements of the plans and Specifications. Review of working drawings shall not operate to waive any of the requirements of the plans and Specifications or relieve the Contractor of any obligation thereunder, and defective work, materials and equipment may be rejected notwithstanding the review.

Full compensation for furnishing all working drawings shall be considered as included in the prices paid for the Contract items of work to which the drawings relate and no additional compensation will be allowed therefor.

5-1.02A TRENCH EXCAVATION SAFETY PLANS

Attention is directed to Section 7-1.01E, "Trench Safety." Excavation for any trench 1.5 m {5 feet} or more in depth shall not begin until the Contractor has prepared detailed plans for worker protection from the hazards of caving ground during the excavation of that trench. The detailed plan shall show the details of the design of shoring, bracing, sloping or other provisions to be made for worker protection during the excavation. No plan shall allow the use of shoring, sloping or a protective system less effective than that required by the Construction Safety Orders of the Division of Occupational Safety and Health. If the plan complies with the shoring system standards established by the Construction Safety Orders, the plan shall be submitted at least 5 days before the Contractor intends to begin excavation for the trench. If the plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California, and the plan and design calculations shall be submitted at least 3 weeks before the Contractor intends to begin excavation for the trench.

5-1.03 CONFORMITY WITH CONTRACT DOCUMENTS AND ALLOWABLE DEVIATIONS

Contractor's work and materials shall strictly conform to the lines, grades, typical cross sections, dimensions and material requirements, including tolerances, required in the Contract Documents. Although measurement, sampling and testing may be considered evidence as to conformity, the Engineer shall be the sole judge as to whether the work or materials deviate from the plans and Specifications, and the Engineer's decision as to any allowable deviations therefrom shall be final.

5-1.04 COORDINATION AND INTERPRETATION OF PLANS, STANDARD SPECIFICATIONS, AND SPECIAL PROVISIONS

The City Standard Specifications, the State Standard Plans, project plans, Special Provisions, Contract Change Orders and all supplementary documents are essential parts of the Contract, and a requirement occurring in one Contract Document is as binding as though occurring in all. They are intended to be complementary, and to describe and provide for a complete work.

In the event of any discrepancy or inconsistency between the Contract Documents, the order of precedence of Contract Documents, from the highest to the lowest, shall be:

1. Construction Agreement
2. All approved Contract Change Orders to the Agreement
3. Notice to Bidders
4. Bid or Proposal accepted by the City of Dixon

5. Special Provisions
6. Plans, drawings and technical specifications prepared for this project
7. City of Dixon Construction Details
8. City of Dixon Construction Specifications
9. City of Dixon Engineering Design Standards
10. State Standards and Specifications
11. All bonds and insurance required by the Contract

Should it appear that the work to be done or any of the matters relative thereto are not sufficiently detailed or explained in the Contract Documents, the Contractor shall apply in writing to the Engineer for such further explanations as may be necessary and shall conform to them as part of the Contract. In the event of any doubt or question arising respecting the true meaning of the Contract Documents, reference in writing shall be made to the Engineer, whose decision thereon shall be final.

In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct. Indicated dimensions shall govern over scaled dimensions. Detailed drawings shall prevail over general drawings. All work shown on the drawings, the dimensions which are not indicated, shall be accurately followed to the scale to which the drawings are made. The specific shall control over the general.

5-1.05 ORDER OF WORK

When required by the Contract Documents, the Contractor shall follow the sequence of operations as set forth therein.

Full compensation for conforming to those requirements will be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

5-1.05A HOURS OF WORK

Regular working hours are 7:30 a.m. to 4:30 p.m., Monday through Friday, excluding holidays observed by the City. No work outside of the regular working hours shall be done unless previously requested by the Contractor in writing and approved by the Engineer in writing. Contractor is subject to reimbursing the City for the costs of providing inspection outside of regular working hours.

5-1.06 SUPERINTENDENCE

The Contractor shall designate in writing before starting work, an authorized representative who shall act as Superintendent and have the authority to represent and act for the Contractor. The Superintendent shall have responsibility for overall project operations and shall not be a "working foreman".

When the Contractor is comprised of two (2) or more persons, firms, partnerships or corporations functioning on a joint venture basis, the Contractor shall designate in writing before starting work, the name of one authorized representative who shall serve as the Superintendent, and shall have the authority to represent and act for the Contractor.

The Superintendent shall be present at the site of the work at all times while work is actually in progress on the Contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work which may be required.

Whenever the Contractor or the Contractor's Superintendent is not present on any particular part of the work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the foreman or other individual who may have charge of the particular work in reference to which the orders are given.

Any order given by the Engineer, not otherwise required by the Specifications to be in writing, will on request of the Contractor, be given or confirmed by the Engineer in writing.

5-1.07 LINES AND GRADES

Stakes or marks will be set by the Engineer as the Engineer determines to be necessary to establish the lines and grades required for the completion of the work specified in these Specifications, on the plans and in the special provisions.

When the Contractor requires the stakes or marks, the Contractor shall notify the Engineer of the requirements in writing a reasonable length of time in advance of starting operations that require the stakes or marks. In no event, shall a notice of less than two (2) working days be considered a reasonable length of time.

Stakes and marks set by the City, or representative of the City, shall be carefully preserved by the Contractor. In case the stakes and marks are destroyed or damaged, the Contractor will be charged for the cost of necessary replacement or restoration of stakes and marks. This charge will be deducted from any moneys due or to become due the Contractor.

5-1.08 INSPECTION

The Engineer shall, at all times, have safe access to the work during its construction, and shall be furnished with every reasonable facility for ascertaining that the materials and the workmanship are in accordance with the requirements and intentions of the Contract Documents. All work done and all materials furnished shall be subject to the Engineer's inspection.

Neither the inspection by the Engineer, a City inspector, or other representative of the City of Dixon, nor any measurement, approved or unapproved modification, Submittals, shop drawing, order, or certificate, nor acceptance of any part or whole of the work, or payment

of money, nor any possession or use by the City of Dixon or its agents, shall operate as a waiver of any provisions of the Contract or of any power or authority reserved therein, or of any right to damages thereunder; nor shall the waiver of any breach of this Contract be held to be a waiver of any subsequent or other breach.

Projects financed in whole or in part with State or Federal funds shall be subject to inspection at all times by the State or Federal agency involved, or their authorized representative.

5-1.09 REMOVAL OF REJECTED AND UNAUTHORIZED WORK

All work which has been rejected shall be remedied, or removed and replaced by the Contractor in a manner acceptable to the Engineer, and no compensation will be allowed to the Contractor for the removal, replacement or remedial work.

Any work done beyond the lines and grades shown on the plans or established by the Engineer, or any extra work done without written authority will be considered as unauthorized work and will not be paid for. Upon order of the Engineer unauthorized work shall be remedied, removed or replaced at the Contractor's expense.

Upon failure of the Contractor to comply promptly with any order of the Engineer made under this Section 5-1.09, the City of Dixon may cause rejected or unauthorized work to be remedied, removed or replaced, and to deduct the costs from any moneys due or to become due the Contractor.

5-1.10 EQUIPMENT AND PLANTS

Only equipment and plants suitable to produce the quality of work and materials required will be permitted to operate on the project.

Plants shall be designed and constructed in accordance with general practice for the equipment and shall be of sufficient capacity to ensure the production of sufficient material to carry the work to completion within the time limit.

The Contractor shall provide adequate and suitable equipment and plants to meet the above requirements, and when ordered by the Engineer shall remove unsuitable equipment from the work and discontinue the operation of unsatisfactory plants.

The Contractor shall identify each piece of equipment, other than hand tools, by means of an identifying number plainly stenciled or stamped on the equipment at a conspicuous location, and shall furnish to the Engineer a list giving the description of each piece of equipment and its identifying number. In addition, the make, model number and empty gross mass of each unit of compacting equipment shall be plainly stamped or stenciled in a conspicuous place on the unit. The gross mass shall be either the manufacturer's rated mass or the scale weight, expressed in metric units {United States Standard Measures}.

The make, model, serial number and manufacturer's rated capacity in metric units {United States Standard Measures} for each scale shall be clearly stamped or stenciled on the load receiving element and its indicator or indicators. All meters shall be similarly identified, rated and marked. Upon request of the Engineer, the Contractor shall furnish a statement by the manufacturer, designating sectional and weighbridge capacities of portable vehicle scales.

5-1.11 ALTERNATIVE EQUIPMENT

While certain of the Contract Documents may provide that equipment of a particular size and type is to be used to perform portions of the work, it is to be understood that the development and use of new or improved equipment is to be encouraged.

The Contractor may request, in writing, permission from the Engineer to use equipment of a different size or type in place of the equipment specified.

The Engineer, before considering or granting the request, may require the Contractor to furnish, at the Contractor's expense, evidence satisfactory to the Engineer that the equipment proposed for use by the Contractor is capable of producing work equal to, or better than, that which can be produced by the equipment specified.

If permission is granted by the Engineer, it shall be understood that the permission is granted for the purpose of testing the quality of work actually produced by the equipment and is subject to continuous attainment of results which, in the opinion of the Engineer, are equal to, or better than, that which can be obtained with the equipment specified. The Engineer shall have the right to withdraw permission at any time that the Engineer determines that the alternative equipment is not producing work that is equal, in all respects, to that which can be produced by the equipment specified. Upon withdrawal of permission by the Engineer, the Contractor will be required to use the equipment originally specified and shall, in accordance with the directions of the Engineer, remove and dispose of or otherwise remedy, at the Contractor's expense, any defective or unsatisfactory work produced with the alternative equipment.

The Contractor shall not have any claim against the City of Dixon for either the withholding or the granting of permission to use alternative equipment, or for the withdrawal of the permission.

Permission to use alternative equipment in place of equipment specified will only be granted where the equipment is new or improved and its use is deemed by the Engineer to be in furtherance of the purposes of this Section 5-1.11. The permission for use of particular equipment on any project shall in no way be considered as permission of the use of the equipment on any other project.

Nothing in this Section 5-1.11 shall relieve the Contractor of the responsibility for furnishing materials or producing finished work of the quality specified in the Contract Documents

5-1.11A ALTERNATIVE METHODS OF CONSTRUCTION

Whenever the plans or Specifications provide that more than one specified method of construction or more than one specified type of material or construction equipment may be used to perform portions of the work and leave the selection of the method of construction or the type of material or equipment to be used up to the Contractor, it is understood that the City of Dixon does not guarantee that every or any specified method of construction or type of material or equipment can be used successfully throughout all or any part of any project. It shall be the Contractor's responsibility to select and use the alternative or alternatives which will satisfactorily perform the work under the conditions encountered. In the event some of the alternatives are not feasible or it is necessary to use more than one of the alternatives on any project, full compensation for any additional cost involved shall be considered as included in the Contract price paid for the item of work involved and no additional compensation will be allowed therefor.

5-1.11B DIFFERING SITE CONDITIONS

During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the Contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the Contract, are encountered at the site, the Contractor shall promptly notify the Engineer in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

Upon written notification, the Engineer will investigate the conditions, and if the Engineer determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the Contract, an adjustment, excluding loss of anticipated profits, will be made and the Contract modified in writing accordingly. The Engineer will notify the Contractor of the Engineer's determination whether or not an adjustment of the Contract is warranted.

No Contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice. Contractor agrees that failure to provide written notice to Engineer as required herein, or failure to otherwise abide by this Section, shall be a waiver by Contractor of any claim, demand, compensation or adjustment in the Contract time or working days.

No Contract adjustment will be allowed under the provisions specified in this section for any effects caused on unchanged work.

Any Contract adjustment warranted due to differing site conditions will be made in conformance with the provisions in Section 4-1.03, "Changes," except as otherwise provided.

5-1.12 CHARACTER OF WORKERS

If any subcontractor or person employed by the Contractor shall appear to the Engineer to be incompetent or to act in a disorderly or improper manner, they shall be discharged immediately on the request of the Engineer, and that person shall not again be employed on the work.

5-1.13 FINAL INSPECTION

When the work has been completed, the Engineer will make the final inspection.

5-1.14 BLANK

5-1.15 MEANS AND METHODS

City of Dixon will not have control over, be in charge of, nor be responsible for construction means, methods, techniques, sequences, or procedures, or for the safety precautions and programs in connection with the work, since these are solely Contractor's responsibility.

The City of Dixon or adjacent property owner may perform other work adjacent to or within the project area, concurrent with the Contractor's operations. The Contractor shall cooperate fully with City of Dixon in all operations which coincide with other work being performed, and provide City of Dixon with such scheduling and other information as may be required by City of Dixon to perform such other work. The Contractor shall conduct operations to minimize interference with the work of other forces or contractors performing such work. This work performed by a second contractor may include work which is incomplete or in dispute with the Contractor.

Any disputes or conflicts which may arise between the Contractor and any other forces or contractors retained by the City of Dixon, causing delays or hindrance to each other, shall be referred to the Engineer for resolution.

The City of Dixon shall have the right at any time during the progress of this work to take over and place in service any completed or partially completed portion of the work, notwithstanding the time for completion of the entire work or such portions which may not have expired; but such taking possession thereof shall not be deemed an acceptance of any of the work, nor work on those portions not completed in accordance with the Contract Documents.

SECTION 6: CONTROL OF MATERIALS

6-1 GENERAL

6-1.01 SOURCE OF SUPPLY AND QUALITY OF MATERIALS

The Contractor shall furnish all materials required to complete the work, except materials that are designated in the Specifications to be furnished by the City of Dixon and materials furnished by the City of Dixon in conformance with the provisions in Section 9-1.03, "Force Account Payment."

Only materials conforming to the requirements of the Contract Documents shall be incorporated in the work.

The materials furnished and used shall be new, except as may be provided elsewhere in the Contract Documents. The materials shall be manufactured, handled and used in a workmanlike manner to ensure completed work in accordance with the plans and Specifications.

Materials to be used in the work will be subject to inspection and tests by the Engineer or the Engineer's designated representative. The Contractor shall furnish without charge such samples as may be required.

The Contractor shall furnish the Engineer a list of the Contractor's sources of materials and the locations at which those materials will be available for inspection. The list shall be furnished to the Engineer in sufficient time to permit inspecting and testing of materials to be furnished from the listed sources in advance of their use. The Engineer may inspect, sample or test materials at the source of supply or other locations, but the inspection, sampling or testing will not be undertaken until the Engineer is assured by the Contractor of the cooperation and assistance of both the Contractor and the supplier of the material. The Contractor shall assure that the Engineer or the Engineer's authorized representative has free access at all times to the material to be inspected, sampled or tested. It is understood that the inspections and tests if made at any point other than the point of incorporation in the work in no way shall be considered as a guaranty of acceptance of the material nor of continued acceptance of material presumed to be similar to that upon which inspections and tests have been made, and that inspection and testing performed by the City of Dixon shall not relieve the Contractor or the Contractor's suppliers of responsibility for quality control.

Manufacturers' warranties, guaranties, instruction sheets and parts lists, which are furnished with certain articles or materials incorporated in the work, shall be delivered to the Engineer before acceptance of the Contract.

Reports and records of inspections made and tests performed, when available at the site of the work, may be examined by the Contractor.

6-1.02 CITY FURNISHED MATERIALS

Materials which are listed as City of Dixon-furnished materials in the special provisions will be available to the Contractor free of charge.

The Contractor shall submit a written request to the Engineer for the delivery of City of Dixon-furnished material at least 15 days in advance of the date of its intended use, except that the written request for the delivery of City of Dixon-furnished sign panels for roadside signs and overhead sign structures shall be submitted at least 30 days in advance of their intended installation. The request shall state the quantity and the type of each material.

The City of Dixon-furnished materials will be available to the Contractor at a location designated in the special provisions. In those cases the materials shall be hauled to the site of the work by the Contractor at the Contractor's expense, including any necessary loading and unloading that may be involved. All costs of handling and placing City of Dixon-furnished material shall be considered as included in the price paid for the Contract item involving the City of Dixon-furnished material.

The Contractor shall be responsible for all City of Dixon-furnished materials furnished to the Contractor, and shall pay all demurrage and storage charges. City of Dixon-furnished materials lost or damaged from any cause whatsoever shall be replaced by the Contractor at the Contractor's expense. The Contractor shall be liable to the City of Dixon for the cost of replacing City of Dixon-furnished material, and those costs may be deducted from any moneys due or to become due the Contractor. All City of Dixon-furnished material that is not used on the work shall remain the property of the City of Dixon and shall be delivered to the location designated in the Special Provisions.

The Engineer may increase the number of sign panels in any shipment to provide economical use of the City of Dixon's transportation facilities.

The quantity of each type of City of Dixon-furnished paint required shall be determined by the Contractor subject to verification by the Engineer.

6-1.03 STORAGE OF MATERIALS

Articles or materials to be incorporated in the work shall be stored in such a manner as to ensure the preservation of their quality and fitness for the work, and to facilitate inspection.

6-1.04 DEFECTIVE MATERIALS

All materials which the Engineer has determined do not strictly conform to the requirements of the Contract Documents will be rejected whether in place or not. The rejected materials shall be removed immediately from the site of the work, unless otherwise permitted in writing by the Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used in the work, unless authorization in writing has been given by the Engineer. Upon failure of the Contractor to comply promptly with any order of the Engineer

made under the provisions in this section, the Engineer shall have authority to cause the removal and replacement of rejected material and to deduct the cost thereof from any moneys due or to become due the Contractor.

If nonconforming work, materials, or equipment not meeting the requirements and intent of the Contract Documents is discovered, and the Contractor fails to remedy the nonconforming work, materials, or equipment, or the City of Dixon agrees in writing to accept the nonconforming work, materials, or equipment, Contractor agrees to sign a Contract Change Order or otherwise reimburse City of Dixon in a sum equal to the cost to remedy the nonconforming work, materials, or equipment. It is expressly understood and agreed that the City of Dixon will be entitled to recover from Contractor the full cost of remedying nonconforming work, materials, or equipment, and that diminution in value will not be considered as a method for valuing the City of Dixon's damages for nonconforming work, materials, or equipment, and further that the doctrine of economic waste will not be a defense to the City of Dixon's recovery from Contractor of the full and complete cost and expense of remedying nonconforming work, materials, or equipment.

Re-examination of any work may be ordered by the Engineer, and such work must be uncovered by the Contractor. The Contractor shall pay the entire cost of such uncovering, re-examination, and replacement if the work does not conform to the Contract Documents.

6-1.05 TRADE NAMES AND ALTERNATIVES

For convenience in designation on the Contract Documents, certain articles or materials to be incorporated in the work may be designated under a trade name or the name of a manufacturer and the manufacturer's catalogue information. The use of an alternative article or material which is of equal or superior quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

The burden of proof as to the quality and suitability of alternatives shall be upon the Contractor, and the Contractor shall furnish all information necessary as required by the Engineer. The Engineer shall be the sole judge as to the quality and suitability of alternative articles or materials, and the Engineer's decision shall be final.

Whenever the Contract Documents permit the substitution of a similar or equivalent material or article, no tests or action relating to the acceptance of the substitute material will be made until the request for substitution is made in writing by the Contractor accompanied by complete data as to the equality of the material or article proposed. Request for such substitution shall be made in writing by the Contractor within thirty (30) days of the Notice to Proceed. Failure by the Contractor to request substitution within thirty (30) days of the Notice to Proceed constitutes an agreement by Contractor to furnish only the materials or equipment listed in the Contract Documents. Until and unless such substitutions are authorized in writing by the Engineer, no deviations from the specifications shall be allowed.

6-1.06 PLANT INSPECTION

The Engineer may inspect the production of material or the manufacture of products at the source of supply.

Plant inspection, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer. The Engineer or the Engineer's authorized representative shall have free entry at all times to those parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The City of Dixon assumes no obligation to inspect materials at the source of supply.

6-1.07 CERTIFICATES OF COMPLIANCE

A Certificate of Compliance shall be furnished prior to the use of any materials for which the Contract Documents require that a certificate be furnished. In addition, when so authorized in the Contract Documents, the Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the Contract Documents. A Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lot so certified shall be clearly identified in the certificate.

Materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the Contract Documents, and any material not conforming to the requirements will be subject to rejection whether in place or not.

The City of Dixon reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.

6-1.08 FOREIGN MATERIALS

Materials which are manufactured, produced or fabricated outside of the United States shall be delivered to a distribution point in California, unless otherwise required in the Contract Documents, where they shall be retained for a sufficient period of time to permit inspection, sampling and testing.

Attention is directed to the provisions in Section 8-1.07, "Liquidated Damages." The Contractor shall not be entitled to an extension of time for acts or events occurring outside of the United States, and it shall be the Contractor's responsibility to deliver materials

obtained from outside of the United States to the point of entry into the continental United States in sufficient time to permit timely delivery to the job site.

The Contractor, at no cost to the City of Dixon, shall supply the facilities and arrange for any testing required in California which the City of Dixon is not equipped to perform. All testing by the Contractor shall be subject to witnessing by the Engineer.

The manufacturer, producer or fabricator of foreign material shall furnish to the Engineer a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance." In addition, certified mill test reports clearly identifiable to the lot of material shall be furnished where required in the Contract Documents or otherwise requested by the Engineer.

If the welding of steel for structural steel members or the casting and prestressing of precast, prestressed concrete members is to be performed outside of the United States, the following requirements shall apply:

1. The fabrication shall be performed only within the plants and by fabricators who have previously established, to the satisfaction of the Engineer, that they have the experience, knowledge, trained manpower, quality controls, equipment and other facilities required to produce the quality and quantity of work required. At the option of the Engineer, prequalification of the plant and fabricator will be established either by the submission of detailed written proof thereof or through in-plant inspection by the Engineer or the Engineer's representative, or both.

2. The Contractor shall make written application to the Engineer for acceptance for the foreign fabrication at the earliest possible time and in no case later than 50 days in advance of the planned start of fabrication. The application shall list the specific units or portion of a work which will be fabricated outside of the United States.

3. The Contractor shall advise the Engineer, in writing, at least 20 days in advance of the actual start of any of the foreign fabrication.

4. All documents pertaining to the Contract, including but not limited to, correspondence, bid documents, working drawings and data shall be written in the English language and all numerical data shall use the International System of Units (SI) {United States Standard Measures} for measurement.

The use of steel manufactured outside of the United States as unidentified stock material, as provided in Section 55-2.07, "Unidentified Stock Material," will not be allowed.

6-1.09 STATE SPECIFICATION NUMBERS

The State Specification number of material furnished on the Contract shall conform to the number specified in these Specifications or the special provisions for the material involved, except that material conforming to a later specification issue will be acceptable.

6-2 LOCAL MATERIALS

6-2.01 GENERAL

Local material is rock, sand, gravel, earth or other mineral material, other than local borrow or selected material, obtained or produced from sources in the vicinity of the work specifically for use on the project. Local material does not include materials obtained from established commercial sources.

Local materials shall be furnished by the Contractor from any source the Contractor may elect, except that when mandatory local material sources of certain materials are designated in the Contract Documents, the Contractor shall furnish material from those designated mandatory sources.

The Contractor shall be responsible for making all arrangements necessary to obtain materials from any local material source other than a mandatory local material source. If the Contractor elects to obtain materials from a possible local material source, subject to the provisions in Section 6-2.02, "Possible Local Material Sources," the Contractor shall comply with the requirements of that section. If the Contractor elects to obtain material from any other non-mandatory source, the Contractor shall furnish the Engineer with satisfactory evidence that the Contractor has entered into an agreement with the property owner for obtaining material from that source and with copies of any necessary permits, licenses and environmental clearances before removing any material from those sources.

The furnishing of local materials from any source is subject to the provisions in Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," and in Section 6-2, "Local Materials."

Unless described in the Contract Documents as a mandatory local material source, or authorized in writing by the Engineer, material sources shall not be excavated at locations where the resulting scars will present an unsightly appearance from any highway. No payment will be made for material obtained in violation of this provision.

The Contractor shall, at the Contractor's expense, make any arrangements necessary for hauling over local public and private roads from any source.

When requested by the Contractor in writing, the City of Dixon will test materials from any local material source, which has not been previously tested, at Contractor's cost and expense.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in conforming to the provisions in this Section 6-2.01, for furnishing and producing materials from any source shall be considered as included in the price paid for the Contract item of work involving the material and no additional compensation will be allowed therefor.

6-2.02 POSSIBLE LOCAL MATERIAL SOURCES

Where the City of Dixon has made arrangements with owners of land in the vicinity of a project for the obtaining of material from an owner's property, the arrangements are made solely for the purpose of providing all Bidders an equal opportunity to obtain material from that property. Bidders or Contractors may, upon written request, inspect the documents evidencing those arrangements between property owners and the City of Dixon. The Contractor may, if the Contractor so elects, exercise any rights that have been obtained, which may be exercised by a Contractor under the arrangements, subject to and upon the conditions hereinafter set forth.

Arrangements made by the City of Dixon are not a part of the Contract, and it is expressly understood and agreed that the City of Dixon assumes no responsibility to the Bidder or Contractor whatsoever in respect to the arrangements made with the property owner to obtain materials therefrom and that the Contractor shall assume all risks in connection with the use of the property, the terms upon which the use shall be made, and there is no warranty or guaranty, either express or implied, as to the quality or quantity of materials that can be obtained or produced from the property or the type or extent of processing that may be required in order to produce material conforming to the requirements of the Contract Documents.

In those instances in which the City of Dixon has compiled "Materials Information" as referred to in Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," the compilation may include the documents setting forth the arrangement made with some of the property owners for the obtaining of material from those owners' properties. The inclusion of these documents therein shall not in any respect operate as a waiver of any of the provisions in this Section 6-2.02 concerning the documents.

All necessary permits, licenses and environmental clearances needed to enable the Contractor to use a possible local material source for which the "Materials Information" compilation for the project does not include permits, licenses and environmental clearances issued to the City of Dixon (whether or not the arrangement made by the City of Dixon with the owner of the property is included in the compilation) shall be obtained by the Contractor, and copies thereof shall be furnished the Engineer before any material is removed from the source.

The Bidder and Contractor shall make such independent investigation and examination as the Contractor deems necessary to be satisfied as to the quality and quantity of materials available from the property, the type and extent of processing that may be required in order to produce material conforming to the requirements of the Contract Documents and the rights, duties and obligations acquired or undertaken under the arrangement with the property owner.

Notwithstanding that the Contractor may elect to obtain materials from any such property owner's property, no material may be obtained from the property unless the Contractor has first either:

1. Executed a document that will guarantee to hold the owner harmless from all claims for injury to persons or damage to property resulting from the Contractor's operations on the property owner's premises and also agree to conform to all other provisions set forth in the arrangement made between the City of Dixon and the property owner, or
2. Entered into an agreement with the owner of the material source on any terms mutually agreeable to the owner and the Contractor, provided that the Contractor shall furnish to the Engineer a release, in a form satisfactory to the Engineer, executed by the owner, relieving the City of Dixon of any and all obligations under the City of Dixon's arrangement with the owner.

If the Contractor elects to obtain material under (1), the use of the site shall be subject to the terms, conditions and limitations of the arrangement made between the property owner and the City of Dixon, and the Contractor shall pay the charges as are provided for in the arrangement made by the City of Dixon with the property owner. Deductions will be made from any moneys due or that may become due the Contractor under the Contract sufficient to cover the charges for the material removed.

If the Contractor elects to obtain material under (2), the Contractor shall pay the charges as are provided for in the agreement between the owner and the Contractor, and deductions will not be made from any moneys due or that may become due the Contractor under the Contract to cover the charges.

Before acceptance of the Contract, the Engineer may require the Contractor to submit written evidence that the owner of the material source is satisfied that the Contractor has satisfactorily complied with the provisions of either— (1), the arrangement between the City of Dixon and the owner, or (2), the agreement between the owner and the Contractor, as the case may be.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and producing specified materials from possible local material sources, including the construction of any access roads or fences and any clearing, grubbing and stripping of material sources, and all processing of whatever nature and extent required, shall be considered as included in the price paid for the Contract item of work involving the material and no additional compensation will be allowed therefore.

6-2.03 MANDATORY LOCAL MATERIAL SOURCES

The Contractor shall perform all work required to obtain and produce acceptable materials from the mandatory local material sources designated in the Contract Documents and shall have no right to obtain the materials from any other source or sources. As part of the work in producing acceptable materials from the mandatory sources, it will be necessary for the Contractor to perform certain processing of the material as set forth in the Contract

Documents. Any processing of the material required in addition to that specified in the Contract Documents which, in the opinion of the Engineer, is necessary to produce acceptable material from the mandatory sources will be paid for as extra work as provided in Section 4-1.03D.

If the Engineer determines that the designated mandatory local material source or sources are no longer to be used because they are exhausted or for other reasons, the Engineer will designate an alternative mandatory local material source or sources from which the Contractor shall obtain the balance of the material required.

In this case the City of Dixon will pay the Contractor for the cost of moving the Contractor's plant to the new mandatory source and erecting the plant as extra work as provided in Section 4-1.03D. Construction of access roads, fences, clearing and grubbing or stripping of the new mandatory source, ordered by the Engineer to be performed, will be paid for as extra work as provided in Section 4-1.03D. The City of Dixon will also allow or deduct, as the case may be, the increase or decrease in haul cost due to an increase or decrease in the length of haul involved. Increased haul costs will be paid for as extra work as provided in Section 4-1.03D, and deductions for decreased haul will be determined in the same manner. No allowance or additional compensation will be made for lost time or for delay in completing the work due to moving the Contractor's plant from the designated mandatory source to the alternative mandatory source, other than an extension of time pursuant to the provisions in Section 8-1.07, "Liquidated Damages." Any processing of the material required in addition to that specified in the special provisions for the originally designated mandatory source which, in the opinion of the Engineer, is necessary to produce acceptable material from the alternative mandatory source will be paid for as extra work as provided in Section 4-1.03D. The Contractor will be charged the same royalty as provided in the special provisions for the original designated mandatory local material source.

The Contractor shall, prior to entering a mandatory local material source or an alternative mandatory local material source, execute a document that will guarantee to hold the owner of the property harmless from all claims for injury to persons or damage to property resulting from the Contractor's operations on the property owner's premises. The document will be prepared by the Engineer for execution by the Contractor.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in obtaining and producing specified materials from mandatory sources, including the construction of any access roads or fences and any clearing, grubbing and stripping of mandatory local material sources, except as otherwise provided for in this Section 6-2.03, shall be considered as included in the price paid for the Contract item of work involving the material and no additional compensation will be allowed therefor.

6-3 TESTING

6-3.01 GENERAL

All materials incorporated in the project shall meet the requirements of tests specified in the Standard Specifications and other minimum requirements specified herein or in the Contract documents.

The Contractor shall furnish written laboratory reports from a reputable testing or inspection agency, or written certification from the manufacturer as to compliance with the Specifications as to the composition, durability and performance of the all materials used in the project. Certain specification sections may require special items or materials to be included in the submittal. Reference is made to the Technical Specifications for specific instructions.

These reports on any material must be submitted to the Engineer in writing and approved by the Engineer before incorporating that material in the work. All materials shall be adequately identified by tags or other means as that material which has been tested and approved. Lack of proper identification shall be considered adequate cause for rejection of any material, which cannot be properly inspected on the job.

The City reserves the right to make such additional inspections or tests as it may require prior to acceptance of any materials, and also reserves the right to reject any material previously approved because of serious defects or damage discovered subsequent to such acceptance. Any material rejected by the City shall immediately be removed from the job site, and no payment will be allowed therefor.

The Contractor shall bear the expense for all unsatisfactory tests and deductions will be made from any moneys due or to become due the Contractor, sufficient to cover the cost of the tests.

Unless otherwise specified, all tests shall be performed in accordance with the methods used by the City of Dixon and shall be made by the Engineer or the Engineer's designated representative.

The State of California has developed methods for testing the quality of materials and work. These methods are identified by number and are referred to in the Specifications as California Test. Copies of individual California Tests are available at the Transportation Laboratory, Sacramento, California, and will be furnished to interested persons upon request.

Whenever the Specifications require compliance with specified values for the following properties, tests will be made by the California Test indicated unless otherwise specified:

Properties	California Test
Relative Compaction	216 or 231
Sand Equivalent	217
Resistance (R-value)	301
Grading (Sieve Analysis)	202
Durability Index	229

Whenever a reference is made in the Specifications to a California Test by number, it shall mean the California Test in effect on the day the Notice to Bidders for the work is dated.

Whenever the Specifications provide an option between two (2) or more tests, the Engineer will determine the test to be used.

Whenever a reference is made in the Specifications to a specification, manual or test designation either of the American Society for Testing and Materials, the American Association of State Highway and Transportation Officials, Federal Specifications or any other recognized national organization, and the number or other identification representing the year of adoption or latest revision is omitted, it shall mean the specification, manual or test designation in effect on the day the Notice to Bidders for the work is dated. Whenever the specification, manual or test designation provides for test reports (such as certified mill test reports) from the manufacturer, copies of those reports, identified as to the lot of material, shall be furnished to the Engineer. The manufacturer's test reports shall supplement the inspection, sampling and testing provisions in Section 6, "Control of Materials," and shall not constitute a waiver of the City of Dixon's right to inspect. When material which cannot be identified with specific test reports is proposed for use, the Engineer may, at the Engineer's discretion, select random samples from the lot for testing. Test specimens from the random samples, including those required for retest, shall be prepared in accordance with the referenced specification and furnished by the Contractor at the Contractor's expense. The number of the samples and test specimens shall be entirely at the discretion of the Engineer. Unidentified metal products, such as sheet, plate and hardware shall be subject to the requirements of Section 55-2.07, "Unidentified Stock Material."

When requested by the Engineer, the Contractor shall furnish, without charge, samples of all materials entering into the work, and no material shall be used prior to acceptance by

the Engineer, except as provided in Section 6-1.07, "Certificates of Compliance." Samples of material from local sources shall be taken by or in the presence of the Engineer; otherwise, the samples will not be considered for testing.

6-3.02 TESTING BY CONTRACTOR

The Contractor shall be responsible for controlling the quality of the material entering the work and of the work performed, and shall perform testing as necessary to ensure control. The test methods used for quality control testing shall be as determined by the Contractor.

The results of the testing shall be made available to the Engineer upon request. These tests are for the Contractor's use in controlling the work and will not be accepted for use as acceptance tests.

Full compensation for performing quality control tests and making the results available to the Engineer shall be considered as included in the Contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

SECTION 7: LEGAL RELATIONS AND RESPONSIBILITY

7-1.01 LAWS TO BE OBSERVED

The Contractor shall keep fully informed of all existing and future laws, ordinances and regulations which in any manner affect those engaged or employed in the work, or the materials used in the work, or which in any way affect the conduct of the work, and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. The Contractor shall at all times observe and comply with, and shall cause all the Contractor's agents and employees to observe and comply with all existing and future laws, ordinances, regulations, orders and decrees of bodies or tribunals having any jurisdiction or authority over the work; and shall protect and indemnify the City of Dixon, and all officers and employees thereof connected with the work, including but not limited to the Director and the Engineer, against any claim or liability arising from or based on the violation of any law, ordinance, regulation, order or decree, whether by the Contractor or the Contractor's employees. If any discrepancy or inconsistency is discovered in the Contract Documents for the work in relation to any law, ordinance, regulation, order or decree, each Bidder and the Contractor shall forthwith report the same to the Engineer in writing.

7-1.01A LABOR CODE REQUIREMENTS

Attention is directed to the following requirements of the Labor Code:

7-1.01A(1) HOURS OF LABOR

Eight hours labor constitutes a legal day's work. The Contractor or any subcontractor under the Contractor shall forfeit, as a penalty to the State of California, \$25 for each worker employed in the execution of the Contract by the respective Contractor or subcontractor for each calendar day during which that worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the requirements of the Labor Code, and in particular, Section 1810 to Section 1815, thereof, inclusive, except that work performed by employees of Contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than one and one-half times the basic rate of pay, as provided in Section 1815 thereof.

7-1.01A(2) PREVAILING WAGE

The Contractor and any subcontractor under the Contractor shall comply with Labor Code Sections 1774 and 1775. Pursuant to Section 1775, the Contractor and any subcontractor under the Contractor shall forfeit to the City of Dixon or political subdivision on whose behalf the Contract is made or awarded a penalty of not more than fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of Industrial Relations for the work or craft in which the worker is employed for any public work done under the Contract by the Contractor or by any subcontractor under the Contractor in violation of the requirements of the Labor Code and

in particular, Labor Code Sections 1770 to 1780, inclusive. The amount of this forfeiture shall be determined by the Labor Commissioner and shall be based on consideration of the mistake, inadvertence, or neglect of the Contractor or subcontractor in failing to pay the correct rate of prevailing wages, or the previous record of the Contractor or subcontractor in meeting their respective prevailing wage obligations, or the willful failure by the Contractor or subcontractor to pay the correct rates of prevailing wages. A mistake, inadvertence, or neglect in failing to pay the correct rate of prevailing wages is not excusable if the Contractor or subcontractor had knowledge of the obligations under the Labor Code. In addition to the penalty and pursuant to Labor Code Section 1775, the difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor or subcontractor. If a worker employed by a subcontractor on a public works project is not paid the general prevailing per diem wages by the subcontractor, the prime Contractor of the project is not liable for the penalties described above unless the prime Contractor had knowledge of that failure of the subcontractor to pay the specified prevailing rate of wages to those workers or unless the prime Contractor fails to comply with all of the following requirements:

1. The Contract executed between the Contractor and the subcontractor for the performance of work on the public works project shall include a copy of the requirements in Sections 1771, 1775, 1776, 1777.5, 1813 and 1815 of the Labor Code.
2. The Contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.
3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the Contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.
4. Prior to making final payment to the subcontractor for work performed on the public works project, the Contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to the subcontractor's employees on the public works project and any amounts due pursuant to Section 1813 of the Labor Code.

Pursuant to Section 1775 of the Labor Code, the Division of Labor Standards Enforcement shall notify the Contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages. If the Division of Labor Standards Enforcement determines that employees of a subcontractor were not paid the general prevailing rate of per diem wages and if the City of Dixon did not retain sufficient money under the Contract to pay those employees the balance of wages owed under the general prevailing rate of per diem wages, the Contractor shall withhold an amount of moneys due the subcontractor sufficient to pay those employees the general prevailing rate of per diem wages if requested by the Division

of Labor Standards Enforcement. The Contractor shall pay any money retained from and owed to a subcontractor upon receipt of notification by the Division of Labor Standards Enforcement that the wage complaint has been resolved. If notice of the resolution of the wage complaint has not been received by the Contractor within 180 days of the filing of a valid notice of completion or acceptance of the public works project, whichever occurs later, the Contractor shall pay all moneys retained from the subcontractor to the City of Dixon. These moneys shall be retained by the City of Dixon pending the final decision of an enforcement action.

Pursuant to the requirements in Section 1773 of the Labor Code, the City of Dixon has obtained the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation, travel time and subsistence pay as provided for in Section 1773.8 of the Labor Code, apprenticeship or other training programs authorized by Section 3093 of the Labor Code, and similar purposes) applicable to the work to be done, for straight time, overtime, Saturday, Sunday and holiday work. The holiday wage rate listed shall be applicable to all holidays recognized in the collective bargaining agreement of the particular craft, classification or type of workmen concerned.

The general prevailing wage rates and any applicable changes to these wage rates are available at the City of Dixon, Engineering Department. General prevailing wage rates are also available from the California State Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>.

The wage rates determined by the Director of Industrial Relations for the project refer to expiration dates. Prevailing wage determinations with a single asterisk after the expiration date are in effect on the date of advertisement for bids and are good for the life of the Contract. Prevailing wage determinations with double asterisks after the expiration date indicate that the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, the new rate shall be paid and incorporated in the Contract. The Contractor shall contact the Department of Industrial Relations as indicated in the wage rate determinations to obtain predetermined wage changes.

Pursuant to Section 1773.2 of the Labor Code, general prevailing wage rates shall be posted by the Contractor at a prominent place at the site of the work.

Changes in general prevailing wage determinations which conform to Labor Code Section 1773.6 and Title 8 California Code of Regulations Section 16204 shall apply to the project when issued by the Director of Industrial Relations at least 10 days prior to the date of the Notice to Bidders for the project.

The City of Dixon will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the Contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining the bid, and will not under any circumstances be considered as the basis of a claim against the City of Dixon on the Contract by Contractor.

7-1.01A(2)(A) TRAVEL AND SUBSISTENCE PAYMENTS

Attention is directed to the requirements in Section 1773.8 of the Labor Code. The Contractor shall make travel and subsistence payments to each workman, needed to execute the work, in conformance with the requirements in Labor Code Section 1773.8.

Full compensation for conforming to the requirement of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed, therefore.

7-1.01A(3) PAYROLL RECORDS

Attention is directed to the requirements in Labor Code Section 1776, a portion of which is quoted below. Regulations implementing Labor Code Section 1776 are located in Sections 16016 through 16019 and Sections 16207.10 through 16207.19 of Title 8, California Code of Regulations.

“(a) Each Contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

- (1) The information contained in the payroll record is true and correct.
- (2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.

(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

- (1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.
- (2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the Contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.
- (3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding

the Contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the Contractor.

(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

(d) A Contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

(e) Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in a manner so as to prevent disclosure of an individual's name, address and social security number. The name and address of the Contractor awarded the Contract or the subcontractor performing the Contract shall not be marked or obliterated.

(f) The Contractor shall inform the body awarding the Contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

(g) The Contractor or subcontractor shall have 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the Contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the Contract is made or awarded, forfeit twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A Contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section."

The penalties specified in subdivision (g) of Labor Code Section 1776 for noncompliance with the requirements in Section 1776 may be deducted from any moneys due or which may become due to the Contractor.

A copy of all payrolls shall be submitted weekly to the Engineer unless otherwise specified by the Engineer in writing. Payrolls shall contain the full name, address and social security number of each employee, the employee's correct classification, rate of pay, daily and weekly number of hours worked, itemized deductions made and actual wages paid. They shall also indicate apprentices and ratio of apprentices to journeymen. The employee's

address and social security number need only appear on the first payroll on which that name appears. The payroll shall be accompanied by a "Statement of Compliance" signed by the employer or the employer's agent indicating that the payrolls are correct and complete and that the wage rates contained therein are not less than those required by the Contract. The "Statement of Compliance" shall be on a form approved by the Engineer. The Contractor shall be responsible for the submission of copies of payrolls of all subcontractors.

If by the 15th of the month, the Contractor has not submitted satisfactory payrolls for all work performed during the monthly period ending on or before the 1st of that month, the City of Dixon may retain an amount equal to 10 percent of the estimated value of the work performed (exclusive of Mobilization) during the month from the next monthly estimate, except that this retention shall not exceed \$10,000 nor be less than \$1,000. Retentions for failure to submit satisfactory payrolls shall be additional to all other retentions provided for in the Contract. The retention for failure to submit payrolls for any monthly period will be released for payment on the monthly estimate for partial payments next following the date that all the satisfactory payrolls for which the retention was made are submitted.

The Contractor and each subcontractor shall preserve their payroll records for a period of 3 years from the date of completion of the Contract.

7-1.01A(4) LABOR NONDISCRIMINATION

Attention is directed to Section 1735 of the Labor Code, which reads as follows:

"No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, or sex of such persons, except as provided in Section 12940 of the Government Code, and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter."

Attention is directed to the following "Nondiscrimination Clause" that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

NONDISCRIMINATION CLAUSE

1. During the performance of this Contract, Contractor and its SUBCONTRACTORS shall not unlawfully discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, medical condition, marital status, age (over 40) or sex. Contractors and SUBCONTRACTORS shall ensure that the evaluation and treatment of their employees and applicants for employment are free of such discrimination. Contractors and SUBCONTRACTORS shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code, Section 12990 et seq.) and the

applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285.0 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code, Section 12990, set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are incorporated into this Contract by reference and made a part hereof as if set forth in full. Contractor and its SUBCONTRACTORS shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

2. The Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the Contract.

7-1.01A(5) APPRENTICES

Attention is directed to Sections 1777.5, 1777.6 and 1777.7 of the California Labor Code and Title 8, California Code of Regulations Section 200 et seq. To ensure compliance and complete understanding of the law regarding apprentices, and specifically the required ratio thereunder, each Contractor or subcontractor should, where some question exists, contact the Division of Apprenticeship Standards, 455 Golden Gate Avenue, San Francisco, CA 94102, or one of its branch offices prior to commencement of work on the public works Contract. Responsibility for compliance with this section lies with the Contractor.

It is City of Dixon policy to encourage the employment and training of apprentices on public works Contracts as may be permitted under local apprenticeship standards.

A. Only registered apprentices within a written agreement in an approved apprentice-training program providing no less than 2,000 hours of continuous employment and education are eligible for employment on public works (in compliance with Labor Section 3077).

B. A contractor is no longer required to submit Form DAS-7, but must submit award information to the local applicable joint apprenticeship committee. The award information must include:

1. an estimate of the journeyman hours;
2. the number of apprentices to be employed; and
3. the approximate dates of apprentice employment.

C. The minimum statutory 1:5 hourly ratio of work stipulates that no less than one hour of apprentice work for every five hours of journeyman labor on any day of work. (Any journeyman work performed beyond 8 hours per day or 40 hours per week shall not be used to calculate the hourly ratio).

This section shall not apply to specialty contractors or general contractors whose contracts involve less than Thirty Thousand Dollars (\$30,000.00) or 20 working days.

The Division of Apprenticeship Standards may grant a certificate exempting the contractor from the minimum 1:5 hourly ratios under any one of the following:

1. Unemployment exceeds an average of 15% in the area for the previous 3-month period;
2. The number of apprentices in training in such area exceeds a ratio of 1:5;
3. The apprentice able craft or trade is replacing at least one-thirtieth of its journeymen annually through apprenticeship training, either locally or statewide;
4. The specific task would jeopardize the apprentice's life or public safety or no training can be provided to an apprentice by a journeyman for the specific task.

D. Apprentices employed on public works projects can only be assigned to perform work of the craft or trade to which the apprentice is registered.

E. All contractors with employees in any apprentice able occupation, regardless of the actual employment of journeymen or apprentices for the awarded public work, must either contribute to the local training trust fund or to the California Apprenticeship Council, P.O. Box 603, San Francisco, CA 94101 (as set forth in Section 227).

F. All violations of Section 1777.5 shall pay a civil penalty of Fifty Dollars (\$50.00) for each calendar day of noncompliance.

All willful violations of Section 1777.5 shall pay the \$50.00 fine for each calendar day of noncompliance and shall be denied the right to bid on, or to receive, any public works contract for a period of up to one year for the first violation and up to three years for any additional violations.

Compliance disputes arising under Section 177.5 shall be adjudicated under 8 California Code of Regulations, Article 1.

G. Within five (5) days of a public works contract award, the awarding agency must send a copy of the award to the Division of Apprenticeship Standards under Section 1773.3.

Within five (5) days of finding any discrepancy regarding the hourly ratio of apprentices to journeymen, the awarding agency shall notify the Division of Apprenticeship Standards.

H. The Contractor shall be responsible for compliance for all occupations within these sections where apprenticeships may apply.

7-1.01A(6) WORKERS' COMPENSATION

Pursuant to the requirements in Section 1860 of the Labor Code, the Contractor will be required to secure the payment of workers' compensation to the Contractor's employees in conformance with the requirements in Section 3700 of the Labor Code.

Prior to the commencement of work, the Contractor shall sign and file with the Engineer a certification in the following form:

"I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract."

This certification is incorporated in the Contract by reference, and signature and return of the Contract as provided in Section 3-1.03, "Execution of Contract," shall constitute signing and filing of the certificate.

7-1.01A(7) SUITS TO RECOVER PENALTIES AND FORFEITURES

Attention is directed to Sections 1730 to 1733, inclusive, of the Labor Code concerning suits to recover amounts withheld from payment for failure to comply with requirements of the Labor Code or Contract provisions based on those laws.

Those sections provide that a suit on the Contract for alleged breach thereof in not making the payment is the exclusive remedy of the Contractor or the Contractor's assignees with reference to amounts withheld for those penalties or forfeitures; and that the suit must be commenced and actual notice thereof received by the awarding authority prior to 90 days after completion of the Contract and the formal acceptance of the job.

7-1.01B FAIR LABOR STANDARDS ACT

The attention of Bidders is invited to the fact that the City of Dixon has been advised by the Wage and Hour Division, U.S. Department of Labor, that Contractors engaged in highway construction work are required to meet the provisions of the Fair Labor Standards Act of 1938 and as amended (52 Stat. 1060).

7-1.01C CONTRACTOR'S LICENSING LAWS

Attention is directed to the provisions of Chapter 9 of Division 3 of the Business and Professions Code concerning the licensing of Contractors. Contractor shall be properly licensed at all times during the performance of the work and performance of the Contract.

All Bidders and Contractors shall be licensed in accordance with the laws of this State and any bidder or Contractor not so licensed is subject to the penalties imposed by those laws.

Attention is also directed to the requirements in Public Contract Code Section 10164. In all projects where Federal funds are involved, the Contractor shall be properly licensed at the time the Contract is awarded.

7-1.01D VEHICLE CODE

Pursuant to the authority contained in Vehicle Code Section 591, the City of Dixon has determined that within those areas that are within the limits of the project and are open to public traffic, the Contractor shall comply with all the requirements set forth in Divisions 11, 12, 13, 14 and 15 of the Vehicle Code. The Contractor shall also comply with all requirements in the Dixon Traffic Ordinance, Chapter 12 of the Municipal Code.

Attention is directed to the statement in Vehicle Code Section 591 that this section shall not relieve the Contractor or any person from the duty of exercising due care. The Contractor shall take all necessary precautions for safe operation of the Contractor's equipment and the protection of the public from injury and damage from the Contractor's equipment.

7-1.01E TRENCH SAFETY

Attention is directed to the requirements in Section 6705 of the Labor Code concerning trench excavation safety plans.

The Contractor is warned that when the work involves existing sewers and appurtenances that have been exposed to sewage and industrial wastes, these facilities shall be considered contaminated with disease-causing organisms. Personnel in contact with contaminated facilities, debris, waste water, or similar items shall be advised by the Contractor of the necessary precautions that must be taken to avoid becoming diseased. It is the Contractor's responsibility to urge his/her personnel to observe a strict regimen of proper hygienic precautions, including any inoculations recommended by the local public health officer.

Because of the potential danger of solvents, gasoline, and other hazardous material in the existing sewers and storm drain pipes, these areas shall be considered hazardous. The Contractor shall be aware of these dangers and shall comply with Article 108, "Confined Spaces," of the General Industrial Safety Orders contained in Title 8 of the California Administrative Code.

In the event that this Contract requires the excavation of any trench or trenches in excess of five feet in depth, Contractor shall prepare a detailed design plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trenches. Said detailed design plan and subsequent excavating operations shall fully comply with all local, state and federal regulations including, but not limited to, the Construction Safety Orders, Section 1539, Permits and Section 1540 et seq., Excavation.

7-1.01F AIR POLLUTION CONTROL

The Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes which apply to any work performed pursuant to the Contract, including any air pollution control rules, regulations, ordinances and statutes, specified in Section 11017 of the Government Code.

Unless otherwise provided in the special provisions, material to be disposed of shall not be burned, either inside or outside the highway right of way.

7-1.01G WATER POLLUTION

The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, bays, and coastal waters from pollution with fuels, oils, bitumens, calcium chloride and other harmful materials and shall conduct and schedule operations so as to avoid or minimize muddying and silting of streams, lakes, reservoirs, bays and coastal waters. Care shall be exercised to preserve roadside vegetation beyond the limits of construction.

Water pollution control work is intended to provide prevention, control and abatement of water pollution to streams, waterways and other bodies of water, and shall consist of constructing those facilities which may be shown on the plans, specified herein or in the special provisions, or directed by the Engineer.

In order to provide effective and continuous control of water pollution it may be necessary for the Contractor to perform the Contract work in small or multiple units, on an out of phase schedule, and with modified construction procedures. The Contractor shall provide temporary water pollution control measures, including but not limited to, dikes, basins, ditches, and applying straw and seed, which become necessary as a result of the Contractor's operations. The Contractor shall coordinate water pollution control work with all other work done on the Contract.

Before starting any work on the project, the Contractor shall submit, for acceptance by the Engineer, a program to control water pollution effectively during construction of the project. The program shall show the schedule for the erosion control work included in the Contract and for all water pollution control measures which the Contractor proposes to take in connection with construction of the project to minimize the effects of the operations upon adjacent streams and other bodies of water. The Contractor shall not perform any clearing and grubbing or earthwork on the project, other than that specifically authorized in writing by the Engineer, until the program has been reviewed and accepted.

If the measures being taken by the Contractor are inadequate to control water pollution effectively, the Engineer may direct the Contractor to revise the operations and the water pollution control program. No further work shall be performed on those items until the

water pollution control measures are adequate and, if also required, a revised water pollution control program has been reviewed and accepted.

The Engineer will notify the Contractor of the acceptance or rejection of any submitted or revised water pollution control program.

The City of Dixon will not be liable to the Contractor for failure to accept all or any portion of an originally submitted or revised water pollution control program, nor for any delays to the work due to the Contractor's failure to submit an acceptable water pollution control program.

The Contractor may request the Engineer to waive the requirement for submission of a written program for control of water pollution when the nature of the Contractor's operation is such that erosion is not likely to occur. Waiver of this requirement will not relieve the Contractor from responsibility for compliance with the other provisions of this section. Waiver of the requirement for a written program for control of water pollution will not preclude requiring submittal of a written program at a later time if the Engineer deems it necessary because of the effect of the Contractor's operations.

Unless otherwise authorized by the Engineer in writing, the Contractor shall not expose a total area of erodible earth material, which may cause water pollution, exceeding 70 000 m² {750,000 square feet} for each separate location, operation or spread of equipment before either temporary or permanent erosion control measures are accomplished.

Where erosion which will cause water pollution is probable due to the nature of the material or the season of the year, the Contractor's operations shall be so scheduled that permanent erosion control features will be installed concurrently with or immediately following grading operations.

Nothing in the terms of the Contract Documents nor in the provisions in this Section 7-1.01G shall relieve the Contractor of the responsibility for compliance with Sections 5650 and 12015 of the Fish and Game Code, or other applicable statutes relating to prevention or abatement of water pollution.

When borrow material is obtained from other than commercially operated sources, erosion of the borrow site during and after completion of the work shall not result in water pollution. The material source shall be finished, where practicable, so that water will not collect or stand therein.

The requirements of this section shall apply to all work performed under the Contract and to all non-commercially operated borrow or disposal sites used for the project.

The Contractor shall also conform to the following provisions:

1. Where working areas encroach on live streams, barriers adequate to prevent the flow of muddy water into streams shall be constructed and maintained between working areas and

streams, and during construction of the barriers, muddying of streams shall be held to a minimum.

2. Removal of material from beneath a flowing stream shall not be commenced until adequate means, such as a bypass channel, are provided to carry the stream free from mud or silt around the removal operations.

3. Should the Contractor's operations require transportation of materials across live streams, the operations shall be conducted without muddying the stream. Mechanized equipment shall not be operated in the stream channels of the live streams except as may be necessary to construct crossings or barriers and fills at channel changes.

4. Water containing mud or silt from aggregate washing or other operations shall be treated by filtration, or retention in a settling pond, or ponds, adequate to prevent muddy water from entering live streams.

5. Oily or greasy substances originating from the Contractor's operations shall not be allowed to enter or be placed where they will later enter a live stream.

6. Portland cement or fresh Portland cement concrete shall not be allowed to enter flowing water of streams.

7. When operations are completed, the flow of streams shall be returned as nearly as possible to a meandering thread without creating possible future bank erosion, and settling pond sites shall be graded so they will drain and will blend in with the surrounding terrain.

8. Material derived from roadway work shall not be deposited in a live stream channel where it could be washed away by high stream flows.

9. Where there is possible migration of anadromous fish in streams affected by construction on the project, the Contractor shall conduct work operations so as to allow free passage of the migratory fish.

Compliance with the provisions in this section shall in no way relieve the Contractor from the responsibility to comply with the other provisions of the Contract, in particular the responsibility for damage and for preservation of property.

Full compensation for conforming to the provisions in this section shall be considered as included in the prices paid for the various items of work and no additional compensation will be allowed therefore.

7-1.01H USE OF PESTICIDES

The Contractor shall comply with all rules and regulations of the Department of Food and Agriculture, the Department of Health, the Department of Industrial Relations and all other agencies which govern the use of pesticides required in the performance of the work on the Contract.

Pesticides shall include but shall not be limited to herbicides, insecticides, fungicides, rodenticides, gerrnicides, nematocides, bactericides, inhibitors, fumigants, defoliants, desiccants, soil sterilants and repellents.

Any substance or mixture of substances intended for preventing, repelling, mitigating, or destroying weeds, insects, diseases, rodents, or nematodes and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant shall be considered a pesticide.

7-1.01I SOUND CONTROL REQUIREMENTS

The Contractor shall comply with all local sound control and noise level laws, rules, regulations and ordinances, which apply to any work performed pursuant to the Contract.

Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

The noise level from the Contractor's operations, between the hours of 9:00 p.m. and 7:00 a.m. shall not exceed 50 dBA and between the hours of 7:00 a.m. and 9:00 p.m. shall not exceed 80 dBA at a distance of 50 feet.

Said noise level requirement shall apply to all equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

7-1.01J ASSIGNMENT OF ANTITRUST ACTIONS

The Contractor's attention is directed to the following requirements in Public Contract Code 7103.5 and Government Code Sections 4553 and 4554, which shall be applicable to the Contractor and the Contractor's subcontractors:

"In entering into a public works Contract or a subcontract to supply goods, services, or materials pursuant to a public works Contract, the Contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works Contract or the subcontract. This assignment shall be made

and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties.

If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under this chapter, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under this part if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action."

7-1.02 LOAD LIMITATIONS

Unless expressly permitted in the special provisions, construction equipment or vehicles of any kind which, laden or unladen, exceed the maximum weight limitations set forth in Division 15 of the Vehicle Code, shall not be operated over completed or existing treated bases, surfacing, pavement or structures in any areas within the limits of the project, whether or not the area is subject to weight limitations under Section 7-1.01D, "Vehicle Code," except as hereinafter provided in this Section 7-1.02.

After application of the curing seal, no traffic or Contractor's equipment will be permitted on cement treated base or lean concrete base for a period of 72 hours. After 72 hours, traffic and equipment operated on the base shall be limited to that used in paving operations and placing additional layers of cement treated base. No traffic or Contractor's equipment will be permitted on treated permeable base except for that equipment required to place the permeable base and the subsequent layer of pavement. Trucks used to haul treated base, Portland cement concrete, or asphalt concrete shall enter onto the base to dump at the nearest practical entry point ahead of spreading equipment. Empty haul trucks shall exit from the base at the nearest practical exit point. Entry and exit points shall not be more than 300 m {1,000 feet} ahead of spreading equipment except in locations where Specifications prohibit operation of trucks outside the area occupied by the base or where steep slopes or other conditions preclude safe operation of hauling equipment. In those locations, entry and exit points shall be established at the nearest point ahead of spreading equipment permitted by Specifications and allowing safe operation of hauling equipment. Damage to curing seal or base shall be repaired promptly by the Contractor, at the Contractor's expense, as directed by the Engineer.

Within the limits of the project and subject to the control of the Engineer, and provided that the Contractor, at the Contractor's expense, shall provide such protective measures as are

deemed necessary by the Engineer and shall repair any damage caused by the operations, the Contractor will be permitted to:

1. Make transverse crossings of those portions of an existing public road or street that are within the highway right of way, with construction equipment which exceeds the size or weight limitations set forth in Division 15 of the Vehicle Code.
2. Make transverse crossings of treated bases, surfacing or pavement which are under construction or which have been completed, with construction equipment which exceeds the size or weight limitations set forth in Division 15 of the Vehicle Code.
3. Cross bridge structures that are not open to public traffic and which are designed for HS20-44 Live Loading (culverts and pipes excluded), with construction equipment which exceeds the size or weight limitations set forth in Division 15 of the Vehicle Code, but not exceeding the load limitations hereinafter specified, provided that the Contractor furnishes to the Engineer the dimensions and maximum axle loadings of equipment proposed for use on bridge structures:

(a) The maximum loading on bridge structures due to pneumatic-tired truck and trailer combinations shall not exceed (1) 12 700 kg {28,000 pounds} for single axles, (2) 21 700 kg {48,000 pounds} for tandem axles, nor (3) 27 200 kg {60,000 pounds} total gross load for single vehicles or 50 000 kg {110,000 pounds} total gross load for truck and trailer or semi-trailer combinations.

(b) The loading on bridge structures due to 2 and 3 axle pneumatic-tired earthmovers shall not exceed that shown in the following table.

Allowable Construction Loading On Bridges For 2 and 3 Axle Earthmovers	
Spacing of Bridge Girders (center to center in meters {feet})	Maximum Axle Loading (in kilograms {pounds})
1.2 {4}	12 700 {28,000}
1.5 {5}	13 100 {29,000}
1.8 {6}	13 600 {30,000}
2.1 {7}	14 500 {32,000}

2.4 {8}	15 400 {34,000}
2.7 {9}	16 700 {37,000}
3.0 {10} and over	18 000 {40,000}
Minimum axle spacing: For 3-axle earthmovers Axles 1 to 2 = 2.4 m {8 feet} Axles 2 to 3 = 6.1 m {20 feet} For 2-axle earthmovers Axles 1 to 2 = 6.1 m {20 feet}	

4. Move equipment within the limits of the project over completed or existing base, surfacing, pavement and structures, whether or not open to the public, in accordance with the limitations and conditions in the "Permit Policy" of the City of Dixon of Transportation.

Within the limits of the project and subject to the condition that the Contractor shall repair, at the Contractor's expense, any damage caused thereby, the Contractor will be permitted to cross culverts and pipes with construction equipment which exceeds the size or weight limitations set forth in Division 15 of the Vehicle Code in accordance with the conditions set forth on the plans. If the conditions are not set forth on the plans, the provisions in the first paragraph in this Section 7-1.02 will apply.

Should the Contractor desire to increase the load carrying capacity of a structure or structures which are to be constructed as a part of the Contract, in order to facilitate the Contractor's own operations, the Contractor may request the Engineer to consider redesigning the structure or structures. Proposals by the Contractor to increase the load carrying capacity of structures above 59 000 kg {130,000 pounds} per single axle or pair of axles less than 2.4 m {8 feet} apart, or above 149 000 kg {330,000 pounds} total gross vehicle weight, will not be approved. The request shall include a description of the structure or structures involved and a detailed description of the overloads to be carried, the date the revised plans would be required, and a statement that the Contractor agrees to pay all costs involved in the strengthening of the structure or structures, including the cost of revised plans, and further that the Contractor agrees that no extension of time will be allowed by reason of any delay to the work which may be due to the alteration of the structure or structures. If the Engineer determines that strengthening the structure or structures will be permitted, the Engineer will inform the Contractor of the estimated cost of the alterations, including engineering, and the date that revised plans could be furnished. If the cost and date are satisfactory to the Contractor, the Engineer will prepare a change order providing for the agreed upon alterations.

Pursuant to the authority contained in Section 591 of the Vehicle Code, the Department has determined that, within such areas as are within the limits of the project and are open to public traffic, the Contractor shall comply with all of the requirements set forth in Divisions 11, 12, 13, 14, and 15 of the Vehicle Code. Attention is directed to the statements in Section 591 that this section shall not relieve him or any person from the duty of exercising due care. The Contractor shall take all necessary precautions for safe operation of his/her equipment and the protection of the public from injury and damage from such equipment.

7-1.03 PAYMENT OF TAXES

The Contract prices paid for the work shall include full compensation for all taxes which the Contractor is required to pay, whether imposed by Federal, State or local government, including, without being limited to, Federal excise tax. No tax exemption certificate nor any document designed to exempt the Contractor from payment of any tax will be furnished to the Contractor by the City of Dixon, as to any tax on labor, services, materials, transportation, or any other items furnished pursuant to the Contract.

7-1.04 PERMITS AND LICENSES

The City will waive all required City of Dixon permit fees for this project.

Prior to award of the Contract, the Contractor and all subcontractors shall obtain and keep current for the duration of the project a City of Dixon Business License.

The Contractor shall give all notices required by and comply with all laws, codes, ordinances and regulations. Before installing any work, the Contractor shall carefully examine the Contract Documents for compliance with all laws, codes, ordinances and regulations and shall immediately report any discrepancy to the Engineer.

Should the Contractor proceed with the construction and/or install any utility variance, notwithstanding the fact that such installation is in compliance with the Contract Documents, or should the Contractor install any work not in compliance with all laws, codes, ordinances and regulations, the Contractor shall remove such work without cost to the City of Dixon.

The Contractor shall commit no trespass on any public or private property in any operation due to or connected with the improvements embraced in this contract.

The Environmental Quality Act (Public Resources Code, Sections 21000 to 21176, inclusive) may be applicable to permits, licenses and other authorizations which the Contractor must obtain from local agencies in connection with performing the work of the Contract. The Contractor shall comply with the provisions of those statutes in obtaining the permits, licenses and other authorizations and they shall be obtained in sufficient time to prevent delays to the work.

In the event that the City of Dixon has obtained permits, licenses or other authorizations, applicable to the work, in conformance with the requirements in the Environmental Quality Act or any other authority, the Contractor shall comply with the provisions of those permits, licenses and other authorizations.

7-1.05 PATENTS

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices or processes used on or incorporated in the work, and agrees to indemnify and save harmless the City of Dixon, the Director, the Engineer, and their duly authorized representatives, from all suits at law, or actions of every nature for, or on account of the use of any patented materials, equipment, devices or processes.

7-1.06 SAFETY AND HEALTH PROVISIONS

The Contractor shall conform to all applicable occupational safety and health standards, rules, regulations and orders established by the State of California.

Working areas utilized by the Contractor to perform work during the hours of darkness, shall be lighted to conform to the minimum illumination intensities established by California Division of Occupational Safety and Health Construction Safety Orders.

All lighting fixtures shall be mounted and directed in a manner precluding glare to approaching traffic, adjacent residences, and businesses.

Full compensation for conforming to the provisions in this section shall be considered as included in the Contract prices paid for the various items of work involved and no separate payment will be made therefor.

7-1.07 (BLANK)

7-1.08 PUBLIC CONVENIENCE

This Section 7-1.08 defines the Contractor's responsibility with regard to convenience of the public and public traffic in connection with the Contractor's operations.

Attention is directed to Section 4-1.04, "Detours," for provisions relating to the passage of traffic around the work over detours.

Attention is directed to Section 7-1.09, "Public Safety," for provisions relating to the Contractor's responsibility for the safety of the public. The provisions in Section 7-1.09 are in addition to the provisions in this Section 7-1.08, and the Contractor will not be relieved of the responsibilities as set forth in Section 7-1.09 by reason of conformance with any of the provisions in this Section 7-1.08.

Attention is directed to Section 12, "Construction Area Traffic Control Devices," for provisions concerning flagging and traffic-handling equipment and devices used in carrying out the provisions in this Section 7-1.08 and Section 7-1.09.

In the event of a suspension of the work, attention is directed to Section 8-1.05, "Temporary Suspension of Work."

The Contractor shall so conduct operations as to offer the least possible obstruction and inconvenience to the public and shall have under construction no greater length or amount of work than can be prosecuted properly with due regard to the rights of the public.

Unless otherwise provided in the special provisions, all public traffic shall be permitted to pass through the work with as little inconvenience and delay as possible. Where possible, public traffic shall be routed on new or existing paved surfaces.

Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor at the Contractor's expense.

Existing traffic signals and highway lighting shall be kept in operation for the benefit of the traveling public during progress of the work, and other forces will continue routine maintenance of existing systems.

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners.

Convenient access to driveways, houses, and buildings along the line of the work shall be maintained and temporary approaches to crossings or intersecting highways shall be provided and kept in good condition. When the abutting property owner's access across the right of way line is to be eliminated, or to be replaced under the Contract by other access facilities, the existing access shall not be closed until the replacement access facilities are usable.

The Contractor may be required to cover certain signs which regulate or direct public traffic to roadways that are not open to traffic. The Engineer will determine which signs shall be covered. Except as otherwise provided for construction area signs in Section 12, "Construction Area Traffic Control Devices," furnishing, installing and removing covers will be paid for as extra work as provided in Section 4-1.03D.

Roadway excavation and the construction of embankments shall be conducted in such a manner as to provide a reasonably smooth and even surface satisfactory for use by public traffic at all times; sufficient fill at culverts and bridges to permit traffic to cross shall be placed in advance of other grading operations; and if ordered by the Engineer roadway cuts shall be excavated in lifts and embankments constructed part width at a time, construction being alternated from one side to the other and traffic routed over the side opposite the one under construction. Culvert installation or culvert construction shall be conducted on but one-half the width of the traveled way at a time, and that portion of the

traveled way being used by public traffic shall be kept open and unobstructed until the opposite side of the traveled way is ready for use by traffic.

Upon completion of rough grading at the grading plane, or placing any subsequent layer thereon, the surface of the roadbed shall be brought to a smooth, even condition free of humps and depressions, satisfactory for the use of public traffic.

After the surface of the roadbed has been brought to a smooth and even condition for the passage of public traffic as above provided, any work ordered by the Engineer for the accommodation of public traffic prior to commencing subgrade operations will be paid for as extra work as provided in Section 4-1.03D. After subgrade preparation for a specified layer of material has been completed, the Contractor shall, at the Contractor's expense, repair any damage to the roadbed or completed subgrade, including damage caused by the Contractor's operations or use by public traffic.

While subgrade and paving operations are underway, public traffic shall be permitted to use the shoulders and, if half-width paving methods are used, shall also be permitted to use the side of the roadbed opposite the one under construction. When sufficient width is available, a passageway wide enough to accommodate at least 2 lanes of traffic shall be kept open at locations where subgrade and paving operations are in active progress. Any shaping of shoulders or reshaping of subgrade necessary for the accommodation of public traffic thereon during subgrade preparation and paving operations will be paid for as extra work as provided in Section 4-1.03D.

When ordered by the Engineer, the Contractor shall furnish a pilot car and driver and flaggers for the purpose of expediting the passage of public traffic through the work under one-way controls, and the cost thereof will be paid for as extra work as provided in Section 4-1.03D, except that the cost of flaggers furnished for this purpose will be paid for as provided in Section 12-2.02, "Flagging Costs." At locations where traffic is being routed through construction under one-way controls and when ordered by the Engineer, the movement of the Contractor's equipment from one portion of the work to another shall be governed in accordance with the one-way controls.

Water or dust palliative shall be applied if ordered by the Engineer for the alleviation or prevention of dust nuisance as provided in Section 10, "Dust Control."

In order to expedite the passage of public traffic through or around the work and where ordered by the Engineer, the Contractor shall install signs, lights, flares, temporary railing (Type K), barricades and other facilities for the sole convenience and direction of public traffic. Also where directed by the Engineer, the Contractor shall furnish competent flaggers whose sole duties shall consist of directing the movement of public traffic through or around the work. The cost of furnishing and installing the signs, lights, flares, temporary railing (Type K), barricades, and other facilities, not to be paid for as separate Contract items, will be paid for as extra work as provided in Section 4-1.03D.

The cost of furnishing flaggers for the sole convenience and direction of public traffic will be paid for as provided in Section 12-2.02, "Flagging Costs."

The Contractor will be required to pay the cost of replacing or repairing all facilities installed under extra work for the convenience or direction or warning of public traffic that are lost while in the Contractor's custody, or are damaged by reason of the Contractor's operations to such an extent as to require replacement or repair, and deductions from any moneys due or to become due the Contractor will be made to cover the cost.

Whenever a section of surfacing, pavement or the deck of a structure has been completed, the Contractor shall open it to use by public traffic if the Engineer so orders or may open it to use by public traffic if the Engineer so consents. In either case the Contractor will not be allowed any compensation due to any delay, hindrance or inconvenience to the Contractor's operations caused by public traffic, but will thereupon be relieved of responsibility for damage to completed permanent facilities caused by public traffic, within the limits of that use. The Contractor will not be relieved of any other responsibility under the Contract nor will the Contractor be relieved of cleanup and finishing operations.

Except as otherwise provided in this Section 7-1.08 or in the special provisions, full compensation for conforming to the provisions in this Section 7-1.08 shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

Contractor shall furnish, install and maintain all traffic warning and directional signs necessary to maintain the facility in a passable condition at all times. Traffic control shall meet the requirements of the latest State of California Department of Transportation Manual of Traffic Controls for Construction and Maintenance Work Zones. The contractor shall submit a Traffic Control Plan for review and acceptance by the Engineer at the pre-construction meeting.

The Contractor shall designate in writing the name, address and telephone number of the employee and the superintendent to contact after working hours for the proper maintenance of barriers and signs.

Barricades of the flashing beacon variety shall be placed at each excavation site and left until the Engineer deems there is no longer a hazard.

Full compensation for furnishing all flag persons necessary for the direction of public traffic either through or around the work shall be considered as included in the various contract items of work, and no additional compensation will be allowed therefor.

7-1.09 PUBLIC SAFETY

It is the Contractor's responsibility to provide for the safety of traffic and the public during construction.

Attention is directed to Section 7-1.12, "Indemnification and Insurance."

Attention is directed to Section 7-1.08, "Public Convenience," for provisions relating to the Contractor's responsibility for providing for the convenience of the public in connection with the Contractor's operations.

Attention is directed to Section 12, "Construction Area Traffic Control Devices," for provisions concerning flagging and traffic-handling equipment and devices used in carrying out the provisions of Section 7-1.08 and this Section 7-1.09.

Whenever the Contractor's operations create a condition hazardous to traffic or to the public, the Contractor shall, at the Contractor's expense and without cost to the City of Dixon, furnish, erect and maintain those fences, temporary railing (Type K), barricades, lights, signs and other devices and take such other protective measures that are necessary to prevent accidents or damage or injury to the public.

Fences, temporary railing (Type K), barricades, lights, signs, and other devices furnished, erected and maintained by the Contractor, at the Contractor's expense, are in addition to any construction area traffic control devices for which payment is provided for elsewhere in the Contract Documents.

The Contractor shall also furnish such flaggers as are necessary to give adequate warning to traffic or to the public of any dangerous conditions to be encountered, and payment therefor will be made as provided in Section 12-2.02, "Flagging Costs."

Signs, lights, flags, and other warning and safety devices and their use shall conform to the requirements set forth in the current Manual of Traffic Controls. Signs or other protective devices furnished and erected by the Contractor, at the Contractor's expense, as above provided, shall not obscure the visibility of, nor conflict in intent, meaning and function of either existing signs, lights and traffic control devices or any construction area signs and traffic control devices for which furnishing of, or payment for, is provided elsewhere in the Specifications. Signs furnished and erected by the Contractor, at the Contractor's expense, shall be approved by the Engineer as to size, wording and location.

The installation of general roadway illumination shall not relieve the Contractor of the responsibility for furnishing and maintaining any of the protective facilities herein before specified.

Construction equipment shall enter and leave the highway via existing ramps and crossovers and shall move in the direction of public traffic. All movements of workmen and construction equipment on or across lanes open to public traffic shall be performed in a manner that will not endanger public traffic.

The Contractor's trucks or other mobile equipment which leave a freeway lane, that is open to public traffic, to enter the construction area, shall slow down gradually in advance of the location of the turnoff to give following public traffic an opportunity to slow down.

When leaving a work area and entering a roadway carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic.

Lanes, ramps and shoulders shall be closed in accordance with the details shown on the plans, the provisions of Section 12, "Construction Area Traffic Control Devices," and as provided in the special provisions.

The Contractor shall notify the Engineer not less than 15 days before the anticipated start of each falsework and girder erection operation whenever the falsework or girders will reduce clearances available to public traffic.

Pedestrian openings through falsework shall be paved or provided with full width continuous wood walks and shall be kept clear. Pedestrians shall be protected from falling objects and curing water for concrete. Overhead protection for pedestrians shall extend not less than 1.2 m {4 feet} beyond the edge of the bridge deck. All pedestrian openings through falsework shall be illuminated in conformance with the provisions in Section 86-6.11, "Falsework Lighting."

Where the height of vehicular openings through falsework is less than 4.6 m {15 feet}, a W34B "Vertical Clearance" sign shall be provided above each opening facing approaching traffic. The signs shall have black letters and numbers on an orange reflectorized background and shall be illuminated so that the signs are clearly visible. The minimum height of the letters and numbers shall be 150 mm {6 inches} and 250 mm {10 inches}, respectively.

No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic, and at the end of each day's work and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from that portion of the roadway open for use by public traffic.

Temporary facilities which the Contractor uses to perform the work shall not be installed or placed where they will interfere with the free and safe passage of public traffic.

Temporary facilities which could be a hazard to public safety if improperly designed shall comply with design requirements specified in the Contract for those facilities or, if none are specified, with standard design criteria or codes appropriate for the facility involved. Working drawings and design calculations for the temporary facilities shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California and shall be submitted to the Engineer for review pursuant to Section 5-1.02, "Plans and Working Drawings." The submittals shall designate thereon the standard design criteria or codes used. Installation of the temporary facilities shall not start until the Engineer has reviewed and accepted the drawings.

Should the Contractor appear to be neglectful or negligent in furnishing warning devices and taking protective measures as above provided, the Engineer may direct attention to the existence of a hazard and the necessary warning devices shall be furnished and installed and protective measures taken by the Contractor at the Contractor's expense. Should the Engineer point out the inadequacy of warning devices and protective measures, that action

on the part of the Engineer shall not relieve the Contractor from responsibility for public safety or abrogate the obligation to furnish and pay for these devices and measures.

Provision for the payment for signs, lights, flares, temporary railing (Type K), barricades, and other facilities by extra work as provided in Section 7-1.08, "Public Convenience," or by Contract item as provided in Section 12, "Construction Area Traffic Control Devices," shall in nowise relieve the Contractor from the responsibility as provided in this Section 7-1.09.

Except as otherwise provided in this Section 7-1.09 or in the special provisions, full compensation for conforming to all of the provisions in this Section 7-1.09 shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

The Contractor shall note that the work may be performed on or in the vicinity of private property. The Contractor shall, at all times, remove all litter, debris, and construction waste, minimize noise, dust, standing water, vibrations, hazardous conditions and provide safe access to these properties. The Contractor is prohibited from using any and all privately owned utilities. The Contractor's materials and equipment shall not be stored upon private property without written approval from the resident and/or owner.

Construction on private property during overtime, weekend, holiday or any other irregular period shall be performed only when the Contractor has requested and received written approval from the adjacent residents and the City Engineer.

No separate payment shall be made for the above considerations. Full compensation for the above construction restrictions shall be considered as included in the price paid for the various items of work involved.

7-1.10 USE OF EXPLOSIVES

Explosives shall not be used unless explicitly required in the Contract documents.

When explosives are used, the Contractor shall exercise the utmost care not to endanger life or property.

In advance of doing any blasting work within 60 m {200 feet} of any railroad's tracks or structures, the Contractor shall notify the railroad of the location, date, time and approximate duration of the blasting operations.

7-1.11 PRESERVATION OF PROPERTY

Attention is directed to Section 7-1.12, "Indemnification and Insurance," and to Section 8-1.10, "Utility and Non-Highway Facilities." Due care shall be exercised to avoid injury to existing highway improvements or facilities, utility facilities, adjacent property, and roadside trees, shrubs and other plants that are not to be removed.

Roadside trees, shrubs and other plants that are not to be removed, and pole lines, fences, signs, markers and monuments, buildings and structures, conduits, pipelines under or above ground, sewer and water lines, all highway facilities and any other improvements or facilities within or adjacent to the highway shall be protected from injury or damage, and if ordered by the Engineer, the Contractor shall provide and install suitable safeguards, accepted by the Engineer, to protect the objects from injury or damage. If the objects are injured or damaged by reason of the Contractor's operations, the objects shall be replaced or restored at the Contractor's expense. The facilities shall be replaced or restored to a condition as good as when the Contractor entered upon the work, or as good as required by the Specifications accompanying the Contract, if any of the objects are a part of the work being performed under the Contract. The Engineer may make or cause to be made those temporary repairs that are necessary to restore to service any damaged highway facility. The cost of the repairs shall be borne by the Contractor and may be deducted from any moneys due or to become due to the Contractor under the Contract.

The fact that any underground facility is not shown upon the plans shall not relieve the Contractor of the responsibility under Section 8-1.10, "Utility and Non-Highway Facilities." It shall be the Contractor's responsibility, pursuant thereto, to ascertain the location of those underground improvements or facilities which may be subject to damage by reason of the Contractor's operations.

Any damage to private property caused by the Contractor and adjudged to be the responsibility of the Contractor by the Engineer shall be rectified to the satisfaction of the Engineer within a reasonable time, depending upon the extent of the damage. Said reasonable time shall be as determined by the Engineer, and if the condition is not rectified, the Engineer shall have the power and authority to rectify said damage and the cost thereof to be paid for by the Contractor, either by direct payment to the City of Dixon, or by deducting said amount from moneys due the Contractor.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in protecting or repairing property as specified in this Section 7-1.11, shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

7-1.12 INDEMNIFICATION AND INSURANCE

The Contractor's obligations regarding indemnification of the City of Dixon and the requirements for insurance shall conform to the provisions in Sections 7-1.12A, "Indemnification," and 7-1.12B, "Insurance," of this Section 7-1.12.

7-1.12A INDEMNIFICATION

Contractor shall defend, indemnify, and save harmless City of Dixon (including its inspectors, project managers, trustees, officers, agents, members, employees, affiliates, consultants, subconsultants, and representatives), and each of them, of and from any and all claims, demands, suits, causes of action, damages, costs, expenses, attorneys' fees,

losses, or liability, in law or in equity, of every kind and nature whatsoever arising out of, or in connection with, Contractor's operations to be performed under this Contract, including, but not limited to:

1. Personal injury (including, but not limited to, bodily injury, emotional injury or distress, sickness, or disease) or death to persons, including, but not limited to, any employees or agents of Contractor, City of Dixon, or any subcontractor, or damage to property of anyone including the work itself (including loss of use thereof), caused or alleged to be caused in whole or in part by any negligent act or omission of Contractor, City of Dixon, or anyone directly or indirectly employed by them, or anyone for whose acts they may be liable;
2. Penalties threatened, sought, or imposed on account of the violation of any law, order, citation, rule, regulation, standard, ordinance, or statute, caused by the action or inaction of Contractor;
3. Alleged infringement of any patent rights which may be brought arising out of Contractor's work;
4. Claims and liens for labor performed or materials used or furnished to be used on the job, including all incidental or consequential damages from such claims or liens;
5. Contractor's failure to fulfill any of the covenants set forth in these Contract Documents;
6. Failure of Contractor to comply with the provisions of the Contract Documents relating to insurance; and,
7. Any violation or infraction by Contractor of any law, order, citation, rule, regulation, standard, ordinance, or statute in any way relating to the occupational, health, or safety of employees.

The indemnities set forth in this section shall not be limited by the insurance requirements set forth in these Contract Documents.

Contractor's indemnification of City of Dixon will not include indemnification for claims which arise as the result of the active negligence of City of Dixon, or the sole negligence or willful misconduct of City, its agents, servants or independent contractors who are directly responsible to City, or for defects in design furnished by such persons.

7-1.12B INSURANCE

Insurance shall conform to the following requirements: The Contractor shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his/her agents, representatives, employees or SUBCONTRACTORS. Such insurance shall not be construed to relieve the Contractor of any liability in excess of such coverage. The cost of such insurance shall be included in the Contractor's bid.

1. Minimum Scope of Insurance Coverage shall be at least as broad as:

- a. Insurance Services Office form number GL 0002 (Ed. 1/73) covering Comprehensive General Liability and Insurance Services Office form number GL 0404 covering Broad Form Comprehensive General Liability; or Insurance Services Office Commercial General Liability coverage ("occurrence" form CG 0001).
- b. Insurance Services Office form number CA 0001 (Ed. 1/78) covering Automobile Liability, code 1 "any auto" and endorsement CA 0025.
- c. Workers' Compensation insurance as required by the Labor Code of the State of California and Employers Liability insurance.

2. Minimum Limits of Insurance

Contractor shall maintain limits no less than:

- a. General Liability: \$5,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
- b. Automobile Liability: \$1,000,000 combined single limit per accident for bodily injury and property damage.
- c. Workers' Compensation and Employers Liability: Workers' compensation limits as required by the Labor Code of the State of California and Employers Liability limits of \$1,000,000 per accident.

3. Deductibles and Self-Insured Retention

Any deductibles or self-insured retention must be declared to and accepted by the City. At the option of the City, either: the insurer shall reduce or eliminate such deductibles or self-insured retention as respects the City, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

4. Other Insurance Provisions

The policies are to contain, or be endorsed to contain the following provisions:

- a. General Liability and Automobile Liability Coverage

i. The City, its officers, officials, employees and volunteers are to be covered as insured as respects: liability arising out of activities performed by or on behalf of the Contractor, including the insured's general supervision of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the City, its officers, officials, employees or volunteers.

ii. The Contractor's insurance coverage shall be primary insurance as respects the City, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

iii. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the City, its officers, officials, employees or volunteers.

iv. The Contractor's coverage applies separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

b. Workers' Compensation and Employers Liability Coverage

The insurer shall agree to waive all rights of subrogation against the City, its officers, officials, employees and volunteers for losses arising from work performed by the Contractor for the City.

c. All Coverage

Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice has been given to the City.

5. Acceptability of Insurers

Insurance is to be placed with insurers with a Best's rating of no less than A:VII.

6. Verification of Coverage

Contractor shall furnish the City with certificates of insurance and with original endorsements effecting coverage required by this section. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates and endorsements are to be on forms approved by the City. All certificates and endorsements are to be received and accepted by the City before work commences. The City reserves the right to require complete, certified copies of all required insurance policies, at any time. All

certificates of insurance must include the City as an additional insured providing necessary endorsements and the cancellation clause shall be amended to read as follows:

“Should any of the policies described herein be cancelled before the expiration date thereof, the insurer affording coverage shall mail 30 days written notice to the certificate holder named herein.”

7. Subcontractors

Contractor shall include all subcontractors as insured under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverage for subcontractors shall be subject to all of the requirements stated herein.

Builder's Risk Insurance – Unless otherwise stated in the Special Provisions, the Contractor shall effect and maintain in the name of the Contractor and the City, "All Risk" Builders Risk Insurance upon the entire work of this contract to 100% of replacement cost valuation thereof, including items of labor and materials in place including surplus miscellaneous materials and supplies incident to the work, and such scaffolding, staging, towers, forms, and equipment as are not owned or rented by the Contractor, the cost of which is not included in the cost of the work.

Exclusions - This insurance does not cover tools owned by mechanics, any tools, equipment, scaffolding, staging, towers, and forms rented or owned by the Contractor, the capital value of which is not included in the cost of the work or any shanties or other structures erected for the sole convenience of the workers.

7-1.12B(4) ENFORCEMENT

The City of Dixon may take any steps as are necessary to assure Contractor's compliance with its obligations. Should any insurance policy lapse or be canceled during the Contract period the Contractor shall, within thirty (30) days prior to the effective expiration or cancellation date, furnish the City of Dixon with evidence of renewal or replacement of the policy. Failure to continuously maintain insurance coverage as herein provided is a material breach of Contract. In the event the Contractor fails to maintain any insurance coverage required, the City of Dixon may, but is not required to, maintain this coverage and charge the expense to the Contractor or terminate Contractor's control over the work. The required insurance shall be subject to the review and acceptance of City of Dixon, but any acceptance of insurance certificates by the City of Dixon shall in no way limit or relieve the Contractor of the Contractor's duties and responsibilities under the Contract to indemnify, defend and hold harmless the City of Dixon, its officers, agents, and employees. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve the Contractor for liability in excess of such coverage, nor shall it preclude the City of Dixon from taking other actions as is available to it under any other provision of the Contract or law. Failure of the City of Dixon to enforce in a timely manner any of the provisions of this section shall not act as a waiver to enforcement of any of these provisions at a later date.

7-1.12B(5) SELF-INSURANCE

Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and acceptance by the City of Dixon of evidence of the Contractor's financial capacity to respond. Additionally, self-insurance programs or retentions must provide the City of Dixon with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance.

7-1.12B(6) MISCELLANEOUS

Nothing contained in the Contract is intended to make the public or any member thereof a third party beneficiary of the Insurance or Indemnity provisions of these Standard Specifications, nor is any term, condition or other provision of the Contract intended to establish a standard of care owed to the public or any member thereof.

7-1.125 LEGAL ACTIONS AGAINST THE CITY OF DIXON

In the event litigation is brought against the City of Dixon concerning compliance by the City of Dixon with State or Federal laws, rules or regulations applicable to public works construction, the provisions of this Section 7-1.125 shall apply.

A. If, pursuant to court order, the City of Dixon prohibits the Contractor from performing all or any portion of the work, the delay will be considered a right of way delay within the meaning of Section 8-1.09, "Right of Way Delays," unless the Contract is terminated as hereinafter provided.

B. If, pursuant to court order (other than an order to show cause) the City of Dixon is prohibited from requiring the Contractor to perform all or any portion of the work, the City of Dixon may, if it so elects, eliminate the enjoined work pursuant to Section 4-1.03, "Changes," or terminate the Contract.

C. If the final judgment in the action prohibits the City of Dixon from requiring the Contractor to perform all or any portion of the work, the City of Dixon will either eliminate the enjoined work pursuant to Section 4-1.03, "Changes," or terminate the Contract.

D. If the Contract is to be terminated, the termination and the determination of the total compensation payable to the Contractor shall be governed by the provisions in Section 8-1.11, "Termination of Contract."

7-1.13 DISPOSAL OF MATERIAL OUTSIDE THE PUBLIC RIGHT OF WAY

If the Contractor elects to dispose of materials at locations other than those where arrangements have been made by the City of Dixon, or, if material is to be disposed of and the City of Dixon has not made arrangements for disposal of the material, the Contractor

shall make arrangements for disposing of the materials outside the public right of way and shall pay all costs involved. Arrangements shall include, but not be limited to, entering into agreements with property owners and obtaining necessary permits, licenses and environmental clearances. Before disposing of any material outside the public right of way, the Contractor shall furnish to the Engineer satisfactory evidence that the Contractor has entered into agreements with the property owners of the site(s) involved and has obtained the appropriate permits, licenses and clearances.

When any material is to be disposed of outside the public right of way, and the City of Dixon has not made arrangements for disposal of the material, the Contractor shall first obtain written authorization from the property owner on whose property the disposal is to be made and the Contractor shall file with the Engineer the authorization or a certified copy thereof together with a written release from the property owner absolving the City of Dixon from any and all responsibility in connection with the disposal of material on the property. Before any material is disposed of on the property, the Contractor shall obtain written permission from the Engineer to dispose of the material at the location designated in the authorization.

When material is disposed of as above provided and the disposal location is visible from public view, the Contractor shall dispose of the material in a neat and uniform manner to the satisfaction of the Engineer.

Where the City of Dixon has made arrangements with owners of land in the vicinity of a project for the disposal of materials on an owner's property, the arrangements are made solely for the purpose of providing all Bidders an equal opportunity to dispose of the materials on the property. Bidders or Contractors may, upon written request, inspect the documents evidencing the arrangements between property owners and the City of Dixon. The Contractor may, if the Contractor so elects, exercise any rights that have been obtained, which may be exercised by a Contractor under the arrangements, subject to and upon the conditions hereinafter set forth.

Such arrangements are not a part of the Contract and it is expressly understood and agreed that the City of Dixon assumes no responsibility to the Bidder or Contractor whatsoever in respect to the arrangements made with the property owner to dispose of materials thereon and that the Contractor shall assume all risks in connection with the use of the property, the terms upon which the use shall be made, and there is no warranty or guaranty, either express or implied, as to the quantity or types of materials that can be disposed of on the property, or that any material can be disposed of on the property.

In those instances in which the City of Dixon has compiled "Materials Information" as referred to in Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," the compilation will include the documents setting forth the arrangement made with some of the property owners for the disposal of material on those owners' properties. The inclusion of the documents therein shall not in any respect operate as a waiver of any of the provisions in this Section 7-1.13 concerning the documents.

The Bidder or Contractor shall make such independent investigation and examination as the Bidder or Contractor deems necessary to be satisfied as to the quantity and types of materials which may be disposed of on the property (if any) and the rights, duties and obligations acquired or undertaken under the arrangement with the property owner.

Notwithstanding that the Contractor may elect to dispose of materials on any such property owner's property, no material may be disposed of on that property unless the Contractor has first either:

1. Executed a document that will guarantee to hold the owner harmless from all claims for injury to persons or damage to property resulting from the Contractor's operations on the property owner's premises and also agree to conform to all other provisions set forth in the arrangement made between the City of Dixon and the property owner, or
2. Entered into an agreement with the owner of the disposal site on any terms mutually agreeable to the owner and the Contractor; provided that the Contractor shall furnish to the Engineer a release, in a form satisfactory to the Engineer, executed by the owner, relieving the City of Dixon of any and all obligations under the City of Dixon's arrangement with the owner.

If the Contractor elects to dispose of material under (1), the use of the site shall be subject to the terms, conditions and limitations of the arrangement made between the property owner and the City of Dixon and the Contractor shall pay those charges that are provided for in the arrangement made by the City of Dixon with the property owner, and deductions will be made from any moneys due or that may become due the Contractor under the Contract sufficient to cover the charges for the material disposed of.

If the Contractor elects to dispose of material under (2), the Contractor shall pay those charges that are provided for in the agreement between the owner and the Contractor and deductions will not be made from any moneys due or that may become due the Contractor under the Contract to cover the charges.

Before acceptance of the Contract, the Engineer may require the Contractor to submit written evidence that the owner of the disposal site is satisfied that the Contractor has satisfactorily complied with the provisions of either - (1), the arrangement between the City of Dixon and the owner, or (2), the agreement between the owner and the Contractor, as the case may be.

Full compensation for all costs involved in disposing of materials as specified in this Section 7-1.13, including all costs of hauling, shall be considered as included in the price paid for the Contract item of work involving the materials and no additional compensation will be allowed therefor.

7-1.14 COOPERATION

Should construction be under way by other forces or by other Contractors within or adjacent to the limits of the work specified or should work of any other nature be under way by other forces within or adjacent to those limits, the Contractor shall cooperate with all the other Contractors or other forces to the end that any delay or hindrance to their work will be avoided. The City reserves the right to perform, or to have performed, other or additional work at or near the site (including material sources) at any time, by the use of other forces, without changing the character of the work.

When 2 or more Contractors are employed on related or adjacent work, or obtain materials from the same material source, as provided in Section 6-2.02, "Possible Local Material Sources," or Section 6-2.03, "Mandatory Local Material Sources," each shall conduct their operations in such a manner as not to cause any unnecessary delay or hindrance to the other.

Each Contractor shall be responsible to the other for all damage to work, to persons or property caused to the other by their operations, and for loss caused the other due to unnecessary delays or failure to finish the work within the time specified for completion.

7-1.15 RELIEF FROM MAINTENANCE AND RESPONSIBILITY

Upon request of the Contractor, the Director, or the Director's designated representative, may relieve the Contractor of the duty of maintaining and protecting certain portions of the work as described below, which have been completed in all respects in accordance with the requirements of the Contract and to the satisfaction of the Engineer, and thereafter except with the Contractor's consent, the Contractor will not be required to do further work thereon. In addition, the action by the Director will relieve the Contractor of responsibility for injury or damage to those completed portions of the work resulting from use by public traffic or from the action of the elements or from any other cause but not from injury or damage resulting from the Contractor's own operations or from the Contractor's negligence.

Portions of the work for which the Contractor may be relieved of the duty of maintenance and protection as provided in the above paragraph include, but are not limited to, the following:

1. The completion of 0.5-km {0.3-mile} of roadway or 0.5-km {0.3-mile} of one roadway of a divided highway or a frontage road including the traveled way, shoulders, drainage control facilities, planned roadway protection work, lighting and any required traffic control and access facilities.
2. A bridge or other structure of major importance.
3. A complete unit of a traffic control signal system or of a highway lighting system.

4. Non-highway facilities constructed for other agencies.

However, nothing in this Section 7-1.15 providing for relief from maintenance and responsibility will be construed as relieving the Contractor of full responsibility for making good any defective work or materials found at any time before the formal written acceptance of the entire Contract by the Director. Furthermore, nothing in this section shall obligate the Director to relieve the Contractor for responsibility for any portion of the work and the Director may refuse to relieve the Contractor from responsibility for any reason, at the Director's (or his delagee's) sole discretion.

7-1.16 CONTRACTOR'S RESPONSIBILITY FOR THE WORK AND MATERIALS

The Contractor shall be completely responsible for the care and condition of the project improvements in their entirety until completion of the maintenance period and acceptance by the City. The Contractor shall provide all watchmen, guards, and security devices, as he/she deems necessary.

Until the acceptance of the Contract, the Contractor shall have the charge and care of the work and of the materials to be used therein (including materials for which the Contractor has received partial payment as provided in Section 9-1.06, "Partial Payments," or materials which have been furnished by the City of Dixon) and shall bear the risk of injury, loss or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work, except as provided in Sections 7-1.08, "Public Convenience," and 7-1.15, "Relief From Maintenance and Responsibility." The Contractor shall rebuild, repair, restore, and make good all injuries, losses or damages to any portion of the work or the materials occasioned by any cause before its completion and acceptance and shall bear the expense thereof, except as otherwise expressly provided in Section 7-1.165, "Damage by Storm, Flood, Tsunami or Earthquake," and in Section 19-2.04, "Slides and Slipouts," and except for those injuries, losses, or damages that are directly and proximately caused by acts of the Federal Government or the public enemy. Where necessary to protect the work or materials from damage, the Contractor shall, at the Contractor's expense, provide suitable drainage of the roadway and erect those temporary structures that are necessary to protect the work or materials from damage. The suspension of the work from any cause whatever shall not relieve the Contractor of the responsibility for the work and materials as herein specified. If ordered by the Engineer, the Contractor shall, at the Contractor's expense, properly store materials which have been partially paid for by the City of Dixon or which have been furnished by the City of Dixon. Storage by the Contractor shall be on behalf of the City of Dixon and the City of Dixon shall at all times be entitled to the possession of the materials, and the Contractor shall promptly return the materials to the site of the work when requested. The Contractor shall not dispose of any of the materials so stored except on written authorization from the Engineer.

7-1.16A DAMAGE BY STORM, FLOOD, TSUNAMI OR EARTHQUAKE

Attention is directed to Section 7-1.16, "Contractor's Responsibility for the Work and Materials." In the event damage to the work is caused by a storm, flood, tsunami, earthquake or other natural disaster which constitutes an "Occurrence," as hereinafter defined, the provisions in this Section 7-1.165 shall be applicable, and the Contractor may apply in writing to the Engineer for the City of Dixon to pay or participate in the cost of repairing damage to the work from that cause or, in lieu thereof, and at the sole discretion of the City of Dixon, terminate the Contract and relieve the Contractor of further obligation to perform the work, subject to the following:

A. Occurrence— "Occurrence" shall include tsunamis, earthquakes in excess of a magnitude of 3.5 on the Richter Scale, and storms, floods and other natural disasters as to which the Governor has proclaimed a state of emergency when the damaged work is located within the territorial limits to which the proclamation is applicable or, which were, in the opinion of the Engineer, of a magnitude at the site of the work sufficient to have caused such a proclamation had they occurred in a populated area or in an area in which such a proclamation was not already in effect.

B. Application by Contractor— The Contractor's written request for the City of Dixon to pay or to participate in the cost of rebuilding, repairing, restoring or otherwise remedying the damage to the work caused by the Occurrence shall be submitted to the Engineer before performing any work other than emergency work, including emergency work necessary to provide for passage of public traffic.

C. Protecting the Work from Damage— Nothing in this section shall be construed to relieve the Contractor of the responsibility to protect the work from damage. The Contractor shall bear the entire cost of repairing damage to the work caused by the Occurrence which the Engineer determines was due to the failure of the Contractor to comply with the requirements of the Contract Documents, take the best measures to protect the work or exercise the best engineering and construction practices in the conduct of the work, and those repair costs shall be excluded from consideration under the provisions of this section.

D. Repair Work— Repair of damaged work under the provisions of this section shall be pursuant to a Contract Change Order issued hereunder and specifying the repair work to be performed on the damaged facility. The repair work shall consist of restoring the in-place construction (for the purposes of this section erected falsework and formwork shall be considered in-place construction) to the same state of completion to which the work had advanced prior to the Occurrence. Emergency work which the Engineer determines would have been part of the repair work if it had not previously been performed, will be considered to be part of the repair work.

The City of Dixon reserves the right to make changes in the plans and Specifications applicable to the portions of the work to be repaired, and if those changes will increase the cost of repairing the damage over the Engineer's estimate of the cost of repair without the

changes, the Contractor will be paid for the increased costs in accordance with Subsection E and the increased cost amount shall not be considered in determining the cost of repair to be borne by the Contractor under Subsection F.

Nothing in this section shall be construed to relieve the Contractor of full responsibility for the risk of injury, loss or damage to materials not yet incorporated in the work and to materials, tools and equipment (except erected falsework and formwork) used to perform the work, or to relieve the Contractor of responsibility under Section 7-1.12, "Indemnification and Insurance." The provisions of this section shall not be applicable to the repair of damage caused by an Occurrence to any portion of the work as to which the Contractor has been granted relief from maintenance and responsibility pursuant to Section 7-1.15, "Relief From Maintenance and Responsibility," or to the removal of slides and slipouts or the repair and restoration of damage to the work resulting from slides and slipouts pursuant to Section 19-2.04, "Slides and Slipouts."

E. Determination of Costs— Unless otherwise agreed between the Engineer and the Contractor, the cost of the work performed pursuant to this Section 7-1.165 will be determined in conformance with the provisions in Section 9-1.03, "Force Account Payment," except there shall be no markup allowance pursuant to Section 9-1.03A, "Work Performed by Contractor," unless the Occurrence that caused the damage was a tsunami or earthquake. The cost of emergency work, which the Engineer determines would have been part of the repair work if it had not previously been performed, will be determined in the same manner as the authorized repair work. The cost of repairing damaged work which was not in compliance with the requirements of the plans and Specifications shall be borne solely by the Contractor, and those costs shall not be considered in determining the cost of repair under this Subsection E.

F. Payment for Repair Work— **Not Applicable**

G. Termination of Contract— If the City of Dixon elects to terminate the Contract, the termination and the determination of the total compensation payable to the Contractor shall be governed by the provisions of Section 8-1.11, "Termination of Contract."

7-1.17 ACCEPTANCE OF CONTRACT

When the Engineer has made the final inspection as provided in Section 5-1.13, "Final Inspection," and determines that the Contract work has been completed in all respects in accordance with the Contract Documents, the Engineer will recommend that the Director formally accept the Work as complete. Upon satisfactory completion of the Work and following the written acceptance of the Work as such by the Director or the Director's designated representative, the Engineer shall recommend the acceptance of the Contract to the City Council. Upon acceptance of the Contract as complete by the City Council, the said Council shall cause a Notice of Completion to be filed and recorded in the records of the Solano County Recorder's Office.

7-1.18 PROPERTY RIGHTS IN MATERIALS

Nothing in the Contract Documents shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or soil or after partial payment has been made as provided in Section 9-1.06, "Partial Payments," for material delivered on the ground or stored subject to or under the control of the City of Dixon and unused. All the material shall become the property of the City of Dixon upon being so attached or affixed or upon payment for materials delivered on the ground or stored subject to or under the control of the City of Dixon and unused, as provided in Section 9-1.06.

7-1.19 RIGHTS IN LAND AND IMPROVEMENTS

Nothing in the Contract Documents shall be construed as allowing the Contractor to make any arrangements with any person to permit occupancy or use of any land, structure, or building within the limits of the Contract for any purpose whatsoever, either with or without compensation, in conflict with any agreement between the City of Dixon and any owner, former owner, or tenant of the land, structure, or building.

The Contractor shall not occupy City of Dixon-owned property outside the right of way as shown on the plans or maps, unless the Contractor enters into a rental agreement with the City of Dixon. The agreement will be based on the fair rental values.

7-1.20 PERSONAL LIABILITY

Neither the Director, the Engineer nor any other officer or authorized employee of the City of Dixon, nor any officer or employee of any county, city or district shall be personally responsible for any liability arising under or by virtue of the Contract.

7-1.21 REPAIR OF EQUIPMENT

The work of installing, assembling, repairing or reconditioning, or other work of any nature on machinery, equipment or tools used in or upon the work shall be considered a part of the work to be performed under the Contract and any laborers, workers or mechanics working on the machinery, equipment or tools, unless employed by bona fide commercial repair shops, garages, blacksmith shops or machine shops, which have been established and operating on a commercial basis for a period of at least 2 months prior to the award of the Contract, shall be subject to all the requirements relating to labor set forth in these Contract Documents.

7-1.22 MATERIAL PLANTS

The construction, erection and operation of material production, proportioning or mixing plants from which material is used wholly on the Contract or on Contracts with the City of Dixon shall be considered a part of the work to be performed under the Contract and any

laborers, workers or mechanics working on those plants shall be subject to all of the requirements relating to labor set forth in these Contract Documents.

SECTION 8: PROSECUTION AND PROGRESS

8-1.01 SUBCONTRACTING

The Contractor shall give personal attention to the fulfillment of the Contract and shall keep the work under the Contractor's control.

No subcontractor will be recognized as such, and all persons engaged in the work of construction will be considered as employees of the Contractor and the Contractor will be held responsible for their work, which shall be subject to the provisions of the Contract Documents.

The Contractor shall perform, with the Contractor's own organization, Contract work amounting to not less than 30 percent of the original total Contract price, except that any designated "Specialty Items" may be performed by subcontract and the amount of any designated "Specialty Items" performed by subcontract may be deducted from the original total Contract price before computing the amount of work required to be performed by the Contractor with the Contractor's own organization. When items of work in the Engineer's Estimate are preceded by the letters (S) or (S-F), those items are designated as "Specialty Items." Where an entire item is subcontracted, the value of work subcontracted will be based on the Contract item bid price. When a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated percentage of the Contract item bid price, determined from information submitted by the Contractor, subject to acceptance by the Engineer.

Subcontracts shall include provisions that the Contract between the City of Dixon and the Contractor is part of the subcontract, and that all terms and provisions of the Contract are incorporated in the subcontract. Subcontracts shall also contain certification by the subcontractor that the subcontractor is experienced in and qualified to do, and knowledgeable about, the subcontracted work. Copies of subcontracts shall be available to the Engineer upon written request, and shall be provided to the Engineer within three (3) days of the Engineer's request.

Before work is started on a subcontract, the Contractor shall file with the Engineer a written statement showing the work to be subcontracted, the names of the subcontractors and the description of each portion of the work to be subcontracted.

Pursuant to the provisions of Section 6109 of the Public Contract Code, the Contractor shall not perform work on a public works project with a subcontractor who is ineligible to perform work on the public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.

When a portion of the work which has been subcontracted by the Contractor is not being prosecuted in a manner satisfactory to the City of Dixon, the subcontractor shall be removed immediately on the request of the Engineer and shall not again be employed on the work.

The roadside production of materials produced by other than the Contractor's forces shall be considered as subcontracted. Roadside production of materials shall be construed to be production of aggregates of all kinds with portable, semi-portable or temporary crushing or screening, proportioning and mixing plants established or reopened for the purpose of supplying aggregate or material for a particular project or projects. The erection, establishment or reopening of the plants and the operation thereof in the production of materials for use on the work shall conform to the requirements relating to labor set forth in these Specifications and in the special provisions.

In no case shall the use of subcontractors in any way alter the position of the Contractor or Contractor's sureties with relation to this Contract. When a subcontractor is used, the responsibility for every portion of the work shall still remain with the Contractor.

The Contractor shall pay, when due, all valid claims of subcontractors, suppliers, and workmen with respect to the project.

The mention herein of any specific duty or responsibility imposed upon the Contractor shall not be construed as a limitation or restriction of any other responsibility or duty imposed upon the Contractor by the Contract, said reference being made herein merely for the purpose of explaining the specific duty or responsibility.

8-1.02 ASSIGNMENT

The performance of the Contract may not be assigned, except upon the written consent of the Director. Consent will not be given to any proposed assignment which would relieve the original Contractor or the Contractor's surety of their responsibilities under the Contract nor will the Director consent to any assignment of a part of the work under the Contract.

The Contractor may assign moneys due or to become due the Contractor under the Contract and the assignment will be recognized by the City of Dixon, if given proper notice thereof, to the extent permitted by law, but any assignment of moneys shall be subject to all proper set-offs in favor of the City of Dixon and to all deductions provided for in the Contract and particularly all money withheld, whether assigned or not, shall be subject and subordinate to claims of the City of Dixon.

8-1.03 BEGINNING OF WORK

The Contractor shall begin work within 10 calendar days after receiving the Notice to Proceed, and shall diligently prosecute the same to completion within the time limit provided in the special provisions.

The Contractor shall notify the Engineer, in writing, of the Contractor's intent to begin work at least 72 hours before work is begun. The notice shall be delivered to the Engineer and shall specify the date the Contractor intends to start. If the project has more than one location of work, a separate notice shall be given for each location.

Should the Contractor begin work in advance of receiving written Notice to Proceed, any work performed by the Contractor in advance of the date of Notice to Proceed shall be considered as having been done by the Contractor at the Contractor's own risk and as a volunteer.

The Notice to Proceed shall constitute authority for the Contractor to enter upon the site of the work and to begin operations, upon condition that the Contractor has strictly complied with all requirements of these Contract Documents, including but not limited to, furnishing all required documentation and certificates of insurance. If Contractor has not provided City of Dixon with all documents required by these Contract Documents as of the date of the Notice to Proceed, Contractor shall not be allowed on the site of the work or allowed to start work on the Project, notwithstanding the issuance of a Notice to Proceed.

The counting of working days shall begin on the date of the Notice to Proceed, whether or not Contractor is allowed on the work site due to Contractor's failure to furnish City of Dixon with all documentation required by these Contract Documents. In no event shall there be a period of time greater than thirty (30) days, from the time the Contract forms are first received by the Contractor and the commencement of the contract time, regardless of the receipt or lack thereof by City of Dixon of all documents required by these Contract Documents. The Contractor shall, on commencing operations, take all precautions required for public safety and shall observe all the provisions in these Specifications and the special provisions.

8-1.04 PROGRESS SCHEDULE

The Contractor shall submit to the Engineer a practicable progress schedule within 20 working days of the execution of the Contract. The Contractor shall develop an initial Critical Path Method (CPM) construction schedule, and perform monthly updating of the schedule (Progress Schedules) to reflect the progress of the work and any changes or modifications of the work during construction.

The initial CPM construction schedule and subsequent Progress Schedules shall be prepared using Microsoft Project 2000, or another CPM software package approved in writing by the Engineer. The Contractor shall submit the initial CPM schedule, and each Progress Schedule, to the City in the form required in these specifications.

The Contractor shall employ experienced scheduling personnel qualified in Critical Path Method scheduling techniques, and the use of Microsoft Project 2000. Experience level required is set forth below. The Contractor may employ such personnel directly or may employ a services consultant for this purpose. After bid opening, the apparent successful low bidder shall provide the City with a written verification that the Contractor has the required personnel under its employ or that the Contractor will utilize a qualified CPM scheduling consultant. The written statement shall identify the individual who will perform CPM scheduling. The qualifications of the individual shall be verified by descriptions of construction projects on which the individual has successfully applied computerized CPM

scheduling. The required level of experience shall include at least two projects of a similar nature, scope, and value. The written statement shall provide contact persons for referenced projects with current telephone and address information.

The City reserves the right to reject the Contractor's scheduler, or consultant, at any time. The City also reserves the right to refuse replacement of the Contractor's scheduler or consultant, if it believes such replacement will negatively affect performance of the Contract Documents.

The CPM construction schedule shall consist of an orderly and realistic plan for completion of the work. The CPM schedule shall include a series of activities and milestones, linked by relationships, set forth in a time-scaled manner. The CPM schedule shall be based on and incorporate milestone and completion dates specified in the Contract Documents. The overall time of completion and time of completion for each milestone shown on the CPM schedule shall adhere to times in the Contract Documents, unless an earlier (advanced) time of completion is requested by the Contractor and agreed to by the City. Any such agreement shall be formalized in a written Change Order. The City is not required to accept an earlier (advanced) schedule, i.e., one that shows completion dates earlier than that required in the Contract Documents. The Contractor shall not be entitled to additional compensation for completing the work prior to the completion date set forth in the Contract Documents, even if an earlier (advanced) time of completion is accepted by the City.

Neither the City nor the Contractor own float time. The Project owns the float time. As such, liability for delay of the Project Completion Date rests with the party whose unexcused delay, last in time, actually causes a delay to the Project Completion Date. For example, if Party A incurs an unexcused delay and uses some, but not all, of the float, and Party B later incurs an unexcused delay which uses all of the remaining float as well as additional time beyond the remaining float, then Party B shall be liable for the delay that represents a delay to the Completion Date. Party A would not be responsible for the delay to the Completion Date since it did not consume all of the float with its unexcused delay, and additional float remained; therefore, the Completion Date was unaffected by Party A.

The Progress Schedule shall be the basis for evaluating project progress, payment requests, and time extension requests. Responsibility for developing all Contract CPM schedules and monitoring actual progress as compared to the Progress Schedule rests with the Contractor.

Failure of the initial CPM schedule or Progress Schedules to include any element of the work or any inaccuracy in Progress Schedules shall not relieve the Contractor from responsibility for accomplishing the work in accordance with the Contract Documents. The City's shall use the Contractor's schedule for monitoring and evaluating project progress, payment requests, and time extension requests, and the City's receipt of schedules shall not, in any manner, impose a duty of care upon the City, or act to relieve the Contractor of its responsibility for the means and methods of construction.

The Contractor shall submit the initial CPM schedule to the City for review within ten (10) working days after receipt of the Notice to Proceed. The initial CPM schedule shall consist

of a realistic, detailed proposal of how the Contractor will proceed with the orderly completion of the work, in conformance with the Contract Documents. By way of the Contractor assigning activity durations and proposing the sequence of the work, the Contractor agrees to utilize sufficient and necessary management of resources to perform the work in accordance with the schedule. Submission of the Contractor's schedule to the City shall not relieve the Contractor of total responsibility for scheduling, sequencing, and performing the work to comply with the Contract Documents, including dealing with adverse effects such as delays resulting from ill-timed work.

The initial CPM schedule shall be time-scaled. Each activity that requires actual labor to complete shall have a duration assigned, in working days. Milestones, or zero-duration activities, can be assigned to major task completion points, such as Sewer Installation Complete, or single-event activities, such as Submittal of Pump Cut-Sheets.

The initial CPM schedule shall include all major activities pertaining to the completion of the work. Each activity will have a discrete activity name and number. No activity on the schedule shall have a duration of longer than fifteen (15) working days, with the exception of submittal, review and approval, fabrication, and procurement activities, unless otherwise approved by the City in writing.

All dependencies, or relationships, between activities shall be included in the initial CPM schedule. Only relationships of the Finish-to-Start and Start-to-Start type shall be used in the schedule.

The first activity on the schedule shall be a milestone activity corresponding to the issuance of the Notice to Proceed. The last activity on the schedule shall be a milestone activity corresponding to the final acceptance of the project as complete by the Engineer (Project Acceptance). All intervening activities shall have their start date linked directly to the Notice to Proceed, or to another activity that can be traced back to the Notice to Proceed.

The completion of each activity in the CPM schedule shall be linked to a subsequent activity or series of activities that can ultimately be traced to Project Acceptance. All activities, including predecessor activities proceeding through a Start-to-Start relationship to a successor activity, shall have a relationship subsequent to the completion of the predecessor activity that ultimately leads to Project Acceptance.

The CPM schedule shall clearly identify the activities that constitute the controlling operations, or Critical Path. Only one Critical Path from the Notice to Proceed activity to the Project Acceptance activity shall exist in the schedule. No more than twenty-five percent (25%) of the activities in the schedule shall be critical or near critical. Near critical is defined as having float of less than or equal to five (5) days.

City furnished materials, equipment, or activities playing a defined role in the project, if any, shall be identified as separate, individual activities. City review and/or processing activities shall be identified as separate, individual activities. The CPM schedule shall include the appropriate amount of time for submittals, City review of submittals, revisions to submittals, and re-review. The Contractor shall be responsible for any additional review cycles as a

result of rejected submittals, without compensation for working days lost.

The CPM schedule shall include the procurement of major equipment or materials through receipt and inspection at the job site, including time for ordering, fabrication, delivery, and inspection. The CPM schedule shall show the dependencies (relationships) between procurement and construction.

The CPM schedule shall include a separate activity with a minimum of ten (10) working days for City to develop a punch list after project completion. Additionally, the CPM schedule shall include a separate activity with a minimum of ten (10) working days for the Contractor to complete punch list activities

The CPM schedule shall show separate activities which identify periods of interface with utilities and other agencies.

Within ten (10) working days of the submittal of the initial CPM schedule, the City and the Contractor shall meet to review and discuss the initial CPM schedule, after the City has completed a review of the initial submittal. The City's review and comment on the schedule will be limited to conformance with the Contract Documents and these specifications. The Contractor shall make the necessary corrections to the schedule to comply with the Contract Documents, and shall adjust the schedule to incorporate any missing information requested by the City. The Contractor shall resubmit the revised initial CPM schedule within five (5) working days of the meeting. The resubmitted, revised schedule shall be considered as the "Original CPM Schedule". The City may receive the Original CPM Schedule with no exceptions taken, or may require that the Contractor make additional revisions to the first updated CPM schedule (Progress Schedule).

The City reserves the right to require the Contractor to adjust, add to, or clarify any portion of the Original CPM Schedule which may later be discovered to be insufficient for monitoring the progress of the work or approval of partial payment requests. No additional compensation will be provided for such adjustments, additions, or clarifications.

Submittal of the Original CPM Schedule, and subsequent Progress Schedules, shall be understood to be the Contractor's representation that the schedule meets the requirements of the Contract Documents and that work shall be executed in the sequence indicated on the schedule.

The Contractor shall monitor progress of the work and shall update and adjust the schedule each month to reflect actual progress on schedule activities, any changes to activities, and the additional and/or subtraction of any activities due to change orders, additions, deletions, etc.

Each Progress Schedule submitted shall continue to show all activities, including those completed. Completed activities shall accurately reflect "as-built" information by showing when activities were actually started and actually completed.

Progress Schedules shall be submitted by the fifth working day of each month, with

progress updated through the last calendar day of the previous month.

Within ten (10) working days of the submittal of the Progress Schedule, the City will complete a review and provide comments on the schedule. The City may reject the Progress Schedule, receive it with no exceptions taken, or may require that the Contractor make additional revisions to the next Progress Schedule.

The Progress Schedule will be utilized as part of the basis for the Contractor's monthly application for payment. If the Progress Schedule is rejected, the Contractor's application for payment will not be processed until the Progress Schedule has been revised, resubmitted, and either received with no exceptions taken or received with revisions to be made the following month.

Updating the schedule to reflect actual progress shall not be considered revisions to the schedule. However, the CPM schedule is recognized as a dynamic tool which changes as new information is acquired. Therefore, it is anticipated that revisions to activity durations and sequences may be expected on a monthly basis as the project proceeds.

To reflect revisions to the schedule, the Contractor shall provide the City with a written revision request prior to incorporation into a Progress Schedule. The revision request shall consist of a narrative with an itemized, full description and reason for each revision to the schedule.

Schedule revisions shall not be incorporated into any Progress Schedule until the City has reviewed the revision request. The City may request additional information and justification for schedule revisions and the Contractor shall, within three (3) working days, provide the City with a complete written narrative response to the City's request.

If the Contractor's revision request is not accepted by the City, and the Contractor disagrees with the City's position, the Contractor has seven (7) calendar days from receipt of the City's letter rejecting the revision request, to provide a narrative providing full justification and explanation for the revision. The Contractor's failure to respond in writing within seven (7) calendar days of the City's letter rejecting the revision request shall be contractually interpreted as acceptance of the City's position, and the Contractor waives its rights to subsequently dispute or file of claims regarding the City's position.

If the Progress Schedule shows Project Completion, or any other specified milestone date, occurring after the date required in the Contract Documents, the Contractor shall submit to the City a proposed plan to recover the lost time. The proposed plan shall be in writing and shall include a written narrative of any activity revisions, sequence changes, and other revisions proposed. If the revisions include sequence changes, the Contractor shall submit a schedule diagram comparing the proposed revised sequence of work to the Original CPM Schedule.

The proposed revisions shall not be incorporated into the Progress Schedule until reviewed by the City. If the Contractor's proposed revisions are not accepted by the City, the Contractor shall follow the procedures in paragraph 3.04.C and 3.04.D above.

When the Contractor is directed to perform additional work under a Change Order, the Contractor shall prepare and submit to the City within ten (10) working days from the direction to proceed, a Schedule Impact Statement (SIS). The SIS shall include both a written narrative and a schedule diagram depicting any impacts the Contractor feels that the Change Order work will have on other project activities and on the Critical Path. The SIS schedule diagram shall show how the Contractor proposes to incorporate the changed work into the CPM schedule, and whether a time extension will be required. Time extensions will only be granted if the Contractor can show conclusively that the changed work impacts the Critical Path.

The City will review the Schedule Impact Statement to confirm that the Contractor's logic behind projected impacts to the schedule is appropriate. If the City concurs with the Contractor's projected impacts, the Contractor shall incorporate the revisions into the next Progress Schedule, and the Contract Time will be appropriately adjusted, if required. If the City does not concur with the Contractor's projected revisions, and they are not accepted by the City, the Contractor shall follow the procedures in paragraph 3.04.C and 3.04.D above.

The Contractor shall be responsible for all costs associated with the preparation of the Schedule Impact Statement, and the process of incorporating revisions into the Progress Schedule.

The Contractor is responsible for requesting time extensions for time impacts resultant from Change Orders that, in the opinion of the Contractor, impact the Critical Path of the current Progress Schedule. Failure of the Contractor to request time extensions; provide an SIS, or provide required Recovery Schedules will result in the Contractor waiving its right to a time extension and any costs to mitigate delays.

The City shall not be obligated to consider any time extension request unless requirements of the Contract Documents are complied with. Failure of the Contractor to perform in accordance with the current Progress Schedule shall not be excused by the submittal of SISs. If the Contractor does not submit an SIS within the required ten (10) working days for any Change Order, it is mutually agreed that the Change Order has no impact to the schedule and the Contractor does not require any time extensions for that Change Order.

The Contractor shall submit the initial CPM schedule to the City within ten (10) working days of receipt of the Notice to Proceed. Subsequent Progress Schedules shall be submitted by the fifth working day of each month, with progress updated through the last calendar day of the previous month.

All CPM schedules shall be submitted in Microsoft 2000, with a file copy submitted on a CD R/RW disk.

Copies of a summary report shall be included in each submittal on 8-1/2 x 11-inch bond paper. The Summary report shall be sorted by activity number in ascending order, and shall include activity number; activity name; original duration; remaining duration;

predecessor and successor activities for each activity, including relationship type; early and late start dates; early and late finish dates; and total float.

A network plot of the schedule shall also be included in each submittal on 30 x 42-inch bond paper, showing activity name, activity number, links between activities, and showing a single critical path from the first activity through the last activity in the schedule. The network plot shall be in color, with the Critical Path clearly shown in red.

The Contractor shall submit to the City four copies of all schedule submittals.

Full compensation for all costs involved in the preparation of the CPM schedule and supporting documents, such as Schedule Revisions, Recovery Schedules, and Schedule Impact Statements, including all labor, tools, equipment and incidentals, and for doing all work involved to revise, correct, and modify complete in place, as required in these specifications, and as directed by the Engineer, shall be considered as included in the prices paid for the various items of work, and no additional compensation shall be allowed therefore.

8-1.05 TEMPORARY SUSPENSION OF WORK

The Engineer shall have the authority to suspend the work wholly or in part, for any time period as the Engineer deems necessary, due to unsuitable weather, or to such other conditions considered unfavorable for the suitable prosecution of the work, or for any time period as the Engineer deems necessary due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the Contract, or for any other reason.

The Contractor shall immediately comply with the written order of the Engineer to suspend the work wholly or in part. The suspended work shall be resumed when conditions are favorable and methods are corrected, as ordered or accepted in writing by the Engineer, or as directed by the Engineer.

In the event that a suspension of work is ordered as provided above, and should that suspension be ordered by reason of the failure of the Contractor to carry out orders or to perform any provision of the Contract; or by reason of weather conditions being unsuitable for performing any item or items of work, which work, in the sole opinion of the Engineer, could have been performed prior to the occurrence of the unsuitable weather conditions had the Contractor diligently prosecuted the work when weather conditions were suitable; the Contractor, at the Contractor's expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic during the period of that suspension as provided in Sections 7-1.08, "Public Convenience," and 7-1.09, "Public Safety," and as specified in the special provisions for the work. In the event that the Contractor fails to perform the work above specified, the City of Dixon will perform that work and the cost thereof will be deducted from moneys due or to become due the Contractor.

In the event that a suspension of work is ordered by the Engineer due to unsuitable weather conditions, and in the sole opinion of the Engineer, the Contractor has prosecuted the work with energy and diligence prior to the time that operations were suspended, the

cost of providing a smooth and unobstructed passageway through the work will be paid for as extra work as provided in Section 4-1.03D or, at the option of the Engineer, that work will be performed by the City of Dixon at no cost to the Contractor.

If the Engineer orders a suspension of all of the work or a portion of the work which is the current controlling operation or operations, due to unsuitable weather or to other conditions considered unfavorable to the suitable prosecution of the work, the days on which the suspension is in effect shall not be considered working days as defined in Section 8-1.06, "Time of Completion." If a portion of work at the time of the suspension is not a current controlling operation or operations, but subsequently does become the current controlling operation or operations, the determination of working days will be made on the basis of the then current controlling operation or operations.

If a suspension of work is ordered by the Engineer, due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the Contract, the days on which the suspension order is in effect shall be considered working days if those days are working days within the meaning of the definition set forth in Section 8-1.06, "Time of Completion."

No Contract adjustment will be allowed under the provisions specified in this section to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any term or condition of this Contract.

Any Contract adjustment warranted due to suspension of work ordered by the Engineer will be made in the same manner as provided for right of way delays in Section 8-1.09, "Right of Way Delays."

In the event of a suspension of work under any of the conditions set forth in this Section 8-1.05, the suspension of work shall not relieve the Contractor of the responsibilities as set forth in Section 7, "Legal Relations and Responsibility."

8-1.06 TIME OF COMPLETION

The Contractor shall complete all or any designated portion of the work called for under the Contract Documents in all parts and requirements within the time set forth in the Contract Documents.

A working day is defined as any day, except as follows:

1. Saturdays, Sundays and legal holidays;
2. Days on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations, as determined by the Engineer, from proceeding with at least 75 percent of the normal labor

and equipment force engaged on that operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations; or

3. Days on which the Contractor is prevented, by reason of requirements in "Maintaining Traffic" of the special provisions, from working on the controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations.

Should the Contractor prepare to begin work at the regular starting time of any day on which inclement weather, or the conditions resulting from the weather, or the condition of the work, prevents the work from beginning at the usual starting time and the crew is dismissed as a result thereof and the Contractor does not proceed with at least 75 percent of the normal labor and equipment force engaged in the current controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations, the Contractor will not be charged for a working day whether or not conditions should change thereafter during that day and the major portion of the day could be considered to be suitable for those construction operations.

The current controlling operation or operations is to be construed to include any feature of the work (e.g., an operation or activity, or a settlement or curing period) considered at the time by the Engineer and the Contractor, which, if delayed or prolonged, will delay the time of completion of the Contract.

Determination that a day is a non-working day by reason of inclement weather or conditions resulting immediately therefrom, shall be made by the Engineer. The Contractor will be allowed 15 days from the issuance of the weekly statement of working days in which to file a written protest setting forth in what respects the Contractor differs from the Engineer; otherwise, the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The Engineer will furnish the Contractor a weekly statement showing the number of working days charged to the Contract for the preceding week, the number of working days of time extensions being considered or accepted, the number of working days originally specified for the completion of the Contract and the number of working days remaining to complete the Contract and the extended date for completion thereof, except when working days are not being charged in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work."

8-1.07 LIQUIDATED DAMAGES

It is agreed by the parties to the Contract that in case all the work called for under the Contract in all parts and requirements is not completed within the number of working days as set forth in the Contract Documents, damage will be sustained by the City of Dixon, and that it is and will be impracticable and extremely difficult to ascertain and determine the actual damage which the City of Dixon will sustain in the event of and by reason of the delay; and it is therefore agreed that the Contractor will pay to the City of Dixon, the sum set forth in the Contract Documents per day for each and every calendar day's delay in completing the work in excess of the number of working days prescribed; and the

Contractor agrees to pay the liquidated damages herein provided for, and further agrees that the City of Dixon may deduct the amount thereof from any moneys due or that may become due the Contractor under the Contract.

The Contractor will be granted an extension of time and will not be assessed with liquidated damages or the cost of engineering and inspection for any portion of the delay in completion of the work beyond the time named in the Contract Documents for the completion of the work caused by acts of God or of the public enemy, fire, floods, tsunamis, earthquakes, epidemics, quarantine restrictions, strikes, labor disputes, shortage of materials and freight embargoes, provided that the Contractor shall notify the Engineer in writing of the causes of delay within 3 days from the beginning of that delay. The Engineer shall ascertain the facts and the extent of the delay, and the Engineer's findings thereon shall be final and conclusive.

No extension of time will be granted for a delay caused by a shortage of materials unless the Contractor furnishes to the Engineer documentary proof that the Contractor has made every effort to obtain the materials from all known sources in a diligent and timely manner, and further proof in the form of supplementary progress schedules, as required in Section 8-1.04, "Progress Schedule," that the inability to obtain the materials when originally planned, did in fact cause a delay in final completion of the entire work which could not be compensated for by revising the sequence of the Contractor's operations. The term "shortage of materials," as used in this section, shall apply only to materials, articles, parts or equipment which are standard items and are to be incorporated in the work. The term "shortage of materials," shall not apply to materials, parts, articles or equipment which are processed, made, constructed, fabricated or manufactured to meet the specific requirements of the Contract. Only the physical shortage of material will be considered under these provisions as a cause for extension of time. Delays in obtaining materials due to priority in filling orders will not constitute a shortage of materials.

Except for the additional compensation provided for in Section 8-1.09, "Right of Way Delays," the Contractor shall have no claim for damage or compensation for any delay or hindrance.

It is the intention of the above provisions that the Contractor shall not be relieved of liability for liquidated damages or engineering and inspection charges for any period of delay in completion of the work in excess of that expressly provided for in this Section 8-1.07.

8-1.08 TERMINATION OF CONTROL

Whenever, in the opinion of the City of Dixon, the Contractor has failed to supply an adequate force of labor, equipment, or materials of proper quality, or has failed in any other respect to prosecute the work with the diligence specified in the Contract; or if Contractor should refuse or fail to comply with laws, ordinances, or directions of the Engineer; or if Contractor should fail to make prompt payments to subcontractors or for labor or materials; or otherwise be in breach of this Contract; the City of Dixon may give written notice of at least five (5) calendar days to the Contractor and Contractor's sureties that if the defaults

are not remedied within a time specified in such notice, the Contractor's control over the work will be terminated.

If the Contractor should be adjudged a bankrupt, or make an assignment for the benefit of Contractor's creditors, or if a receiver should be appointed on account of Contractor's insolvency, the City of Dixon may declare the Contractor's control over the work terminated, and so notify the Contractor and Contractor's sureties.

Upon such termination, the City of Dixon may take possession, and use all or any part, of the Contractor's materials, tools, equipment, and appliances upon the premises to complete the work; the City of Dixon assuming responsibility for the final relinquishment of such equipment at the conclusion of the work, or sooner, at its option, in as good condition as when it was taken over, reasonable wear and tear excepted; and the City of Dixon agrees to pay for such materials and the use of said equipment at a reasonable compensation.

Upon such termination or the City of Dixon's declaration that the Contractor is in default, the City of Dixon may direct the surety to complete, or cause to be completed, the Contract work, or the City of Dixon may direct that all or any part of the work be completed by day labor, or by employment of other contractors on informal contracts, or both. If the City of Dixon directs the surety to complete or cause to be completed, the Contract work, Contractor's performance bond surety agrees to immediately undertake to complete or cause to be completed, all Contract work. If surety fails or refuses to immediately complete or cause to be completed, all Contract work, surety agrees that damage will be sustained by the City of Dixon, and that it is and will be impracticable to determine the actual amount of damage by reason of such acts; and the Contractor and surety agree that in addition to any other damages City of Dixon may sustain and may be recovered pursuant to these Contract Documents, including but not limited to, other liquidated damages for delay, or actual damages, the sum of FIVE HUNDRED DOLLARS (\$500.00) is a reasonable amount to be charged as liquidated damages for each day surety fails or refuses to complete or cause to be completed, all Contract work, and it is therefore agreed that the Contractor and surety will pay to the City of Dixon this sum, for each and every calendar day surety fails or refuses to complete or cause to be completed, the Contract work; and the Contractor and surety further agree that the City of Dixon may deduct and retain the amount thereof from any monies due the Contractor under the Contract.

If the Contractor's control over the work is terminated as provided above, the Contractor is not entitled to receive any portion of the amount to be paid under the Contract until it is fully completed. After completion, if the unpaid balance exceeds the sum of the amount expended by the City of Dixon in finishing the work, plus all damages sustained, or to be sustained, by the City of Dixon, plus any unpaid claims on account of labor, materials, tools, equipment, or supplies contracted for by the Contractor for the work herein contemplated, the excess not otherwise required by these Contract Documents to be retained shall be paid the Contractor. If the sum so expended exceeds the unpaid balance, the Contractor and Contractor's surety are liable to the City of Dixon for the amount of such excess. If the surety completes the Contract work as provided above, such surety shall be subrogated to money due under the Contract, and to money which shall

become due in the course of completion by the surety. However, Contractor and surety agree that any subrogation rights of surety are subordinate to and inferior to rights of City of Dixon.

The City of Dixon reserves the right to terminate the work for its convenience upon written notice to Contractor. In such event, the Contractor shall be paid its reasonable costs for that portion of the work performed to the date of termination, reasonable costs associated with demobilization, plus fifteen percent (15%) of all such costs for overhead and profit.

8-1.09 RIGHT OF WAY DELAYS

If, through the failure of the City of Dixon to acquire or clear right of way, the Contractor sustains loss which could not have been avoided by the judicious handling of forces, equipment and plant, there shall be paid to the Contractor that amount that the Engineer may find to be a fair and reasonable compensation for that part of the Contractor's actual loss, that, in the opinion of the Engineer, was unavoidable, determined as follows:

Compensation for idle time of equipment will be determined in the same manner as determinations are made for equipment used in the performance of extra work paid for on a force account basis, as provided in Section 9-1.03A(3), "Equipment Rental," with the following exceptions:

- (1) The right of way delay factor for each classification of equipment shown in the State of California, Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is a part of the Contract Documents, will be applied to that equipment rental rate.
- (2) The time for which the compensation will be paid will be the actual normal working time during which the delay condition exists, but in no case will exceed 8 hours in any one day.
- (3) The days for which compensation will be paid will be the calendar days, excluding Saturdays, Sundays and legal holidays, during the existence of the delay, except that when rental of equipment is paid for under the provisions in Section 9-1.03A (3b), "Equipment not on the Work," no payment will be made for right of way delays in conformance with the provisions in this Section 8-1.09.

Actual loss shall be understood to include no items of expense other than idle time of equipment and necessary payments for idle time of workers, cost of extra moving of equipment and cost of longer hauls. Compensation for idle time of equipment will be determined as provided in this Section 8-1.09 and compensation for idle time of workers will be determined as provided in Section 9-1.03A(1), "Labor," and no markup will be added in either case for overhead and profit. The cost of extra moving of equipment and the cost of longer hauls will be paid for as extra work as provided in Section 4-1.03D.

If performance of the Contractor's work is delayed as the result of the failure of the City of Dixon to acquire or clear right of way, an extension of time determined pursuant to the provisions in Section 8-1.07, "Liquidated Damages," will be granted.

8-1.10 UTILITY AND NON-HIGHWAY FACILITIES

It is anticipated that some or all of the utility and other non-highway facilities, both above ground and below ground, that are required to be rearranged (as used herein, rearrangement includes installation, relocation, alteration or removal) as a part of the highway improvement will be rearranged in advance of construction operations. Where it is not anticipated that the rearrangement will be performed prior to construction, or where the rearrangement must be coordinated with the Contractor's construction operations, the existing facilities that are to be rearranged will be indicated on the plans or in the special provisions. Where a rearrangement is indicated on the plans or in the special provisions, the Contractor will have no liability for the costs of performing the work involved in the rearrangement.

The right is reserved to the City of Dixon and the owners of facilities, or their authorized agents, to enter upon the highway right of way for the purpose of making those changes that are necessary for the rearrangement of their facilities or for making necessary connections or repairs to their properties. The Contractor shall cooperate with forces engaged in this work and shall conduct operations in such a manner as to avoid any unnecessary delay or hindrance to the work being performed by the other forces. Wherever necessary, the work of the Contractor shall be coordinated with the rearrangement of utility or other non-highway facilities, and the Contractor shall make arrangements with the owner of those facilities for the coordination of the work.

Attention is directed to the possible existence of underground facilities and utilities not indicated in the Contract Documents and to the possibility that utilities may be in a location different from that which is indicated in the Contract Documents. The Contractor shall ascertain the exact location of all utilities, the location of their service laterals or other appurtenances, and of existing service lateral or appurtenances of any other underground facilities prior to doing work.

If the Contractor cannot locate an underground facility or utility whose presence is indicated in the Contract Documents after a diligent search and investigation, the Contractor shall immediately so notify the Engineer in writing. If the facility for which the notice is given is in a substantially different location from that indicated on the plans or in the special provisions, the additional cost of locating the facility will be paid for as extra work as provided in Section 4-1.03D.

If the Contractor discovers utilities not indicated in the Contract Documents, the Contractor shall immediately give the Engineer and the Utility Company written notification of the existence of those facilities. The utilities shall be located and protected from damage as directed by the Engineer, and the cost of that work will be paid for as extra work as provided in Section 4-1.03D. The Contractor shall, if directed by the Engineer, repair any damage which may occur to the utilities. The cost of that repair work, not due to the failure of the Contractor to exercise reasonable care or to comply with the terms of the Contract Documents, will be paid for as extra work as provided in Section 4-1.03D. Damage due to

the Contractor's failure to exercise reasonable care or comply with the Contract Documents shall be repaired at the Contractor's cost and expense.

Where it is determined by the Engineer that the rearrangement of an underground facility is essential in order to accommodate the highway improvement and the plans and Specifications do not provide that the facility is to be rearranged, the Engineer will provide for the rearrangement of the facility by other forces or the rearrangement shall be performed by the Contractor and will be paid for as extra work as provided in Section 4-1.03D.

When ordered by the Engineer in writing, the Contractor shall rearrange any utility or other non-highway facility necessary to be rearranged as a part of the highway improvement, and that work will be paid for as extra work as provided in Section 4-1.03D.

Should the Contractor desire to have any rearrangement made in any utility facility, or other improvement, for the Contractor's convenience in order to facilitate the Contractor's construction operations, which rearrangement is in addition to, or different from, the rearrangements indicated on the plans or in the special provisions, the Contractor shall make whatever arrangements are necessary with the owners of the utility or other non-highway facility for the rearrangement and bear all expenses in connection therewith.

The Contractor shall immediately notify the Engineer of any delays to the Contractor's operations as a direct result of underground main or trunk line facilities which were not indicated on the plans or in the special provisions or were located in a position substantially different from that indicated on the plans or in the special provisions, or as a direct result of utility or other non-highway facilities not being rearranged as herein provided (other than delays in connection with rearrangements made to facilitate the Contractor's construction operations or delays due to a strike or labor dispute). These delays will be considered right of way delays within the meaning of Section 8-1.09, "Right of Way Delays," and compensation for the delay will be determined in conformance with the provisions in Section 8-1.09. The Contractor shall be entitled to no other compensation for that delay.

Any delays to the Contractor's operations as a direct result of utility or other non-highway facilities not being rearranged as provided in this Section 8-1.10, due to a strike or labor dispute, will entitle the Contractor to an extension of time as provided in Section 8-1.07, "Liquidated Damages." The Contractor shall be entitled to no other compensation for that delay.

8-1.11 TERMINATION OF CONTRACT

The Contract may be terminated by the Director when termination is authorized by Section 7-1.125, "Legal Actions Against the City of Dixon," Section 7-1.165, "Damage by Storm, Flood, Tsunami or Earthquake," or by other provisions of the Contract which authorize termination. The City of Dixon also reserves the right to terminate the Contract at any time upon a determination by the Director that termination of the Contract is in the best interest of the City of Dixon.

If the Director elects to terminate the Contract, the termination of the Contract and the total compensation payable to the Contractor shall be governed by the following:

A. The Engineer will issue the Contractor a written notice signed by the Director, specifying that the Contract is to be terminated. Upon receipt of the written notice, the Contractor will be relieved of further responsibility for damage to the work (excluding materials) as specified in Section 7-1.16, "Contractor's Responsibility for the Work and Materials," and, except as otherwise directed in writing by the Engineer, the Contractor shall:

1. Stop all work under the Contract except that specifically directed to be completed prior to acceptance.
2. Perform work the Engineer deems necessary to secure the project for termination.
3. Remove equipment and plant from the site of the work.
4. Take action that is necessary to protect materials from damage.
5. Notify all subcontractors and suppliers that the Contract is being terminated and that their Contracts or orders are not to be further performed unless otherwise authorized in writing by the Engineer.
6. Provide the Engineer with an inventory list of all materials previously produced, purchased or ordered from suppliers for use in the work and not yet used in the work, including its storage location, and such other information as the Engineer may request.
7. Dispose of materials not yet used in the work as directed by the Engineer. It shall be the Contractor's responsibility to provide the City of Dixon with good title to all materials purchased by the City of Dixon hereunder, including materials for which partial payment has been made as provided in Section 9-1.06, "Partial Payments," and with bills of sale or other documents of title for those materials.
8. Subject to the prior written acceptance of the Engineer, settle all outstanding liabilities and all claims arising out of subcontracts or orders for materials terminated hereunder. To the extent directed by the Engineer, the Contractor shall assign to the City of Dixon all the right, title and interest of the Contractor under subcontracts or orders for materials terminated hereunder.
9. Furnish the Engineer with the documentation required to be furnished by the Contractor under the provisions of the Contract including, on projects as to which Federal funds are involved, all documentation required under the Federal requirements included in the Contract.

10. Take other actions directed by the Engineer.

B. Acceptance of the Contract as hereinafter specified shall not relieve the Contractor of responsibility for damage to materials. The Contractor shall continue to be responsible for damage to materials after issuance of the Notice of Termination, except as follows:

1. The Contractor's responsibility for damage to materials for which partial payment has been made as provided in Section 9-1.06, "Partial Payments," and for materials furnished by the City of Dixon for use in the work and unused shall terminate when the Engineer certifies that those materials have been stored in the manner and at the locations the Engineer has directed.

2. The Contractor's responsibility for damage to materials purchased by the City of Dixon subsequent to the issuance of the notice that the Contract is to be terminated shall terminate when title and delivery of those materials has been taken by the City of Dixon.

When the Engineer determines that the Contractor has completed the work under the Contract directed to be completed prior to termination and such other work as may have been ordered to secure the project for termination, the Engineer will recommend that the Director formally accept the Contract.

C. Termination of the Contract shall not relieve the Contractor or surety of their obligation for any claims arising out of the work performed.

D. The total compensation to be paid to the Contractor shall be determined by the Engineer on the basis of the following:

1. The reasonable cost to the Contractor, without profit, for all work performed under the Contract, including mobilization, demobilization and work done to secure the project for termination. In determining the reasonable cost, deductions will be made for the cost of materials to be retained by the Contractor, amounts realized by the sale of materials, and for other appropriate credits against the cost of the work. Deductions will also be made, when the Contract is terminated under the authority of Section 7-1.165, "Damage by Storm, Flood, Tsunami or Earthquake," for the cost of materials damaged by the "occurrence."

When, in the opinion of the Engineer, the cost of a Contract item of work is excessively high due to costs incurred to remedy or replace defective or rejected work, the reasonable cost to be allowed will be the estimated reasonable cost of performing that work in compliance with the requirements of the Contract Documents and the excessive actual cost shall be disallowed.

2. A reasonable allowance for profit on the cost of the work performed as determined under Subsection (1), provided the Contractor establishes to the satisfaction of the Engineer that it is reasonably probable that the Contractor would have made a profit

had the Contract been completed and provided further, that the profit allowed shall in no event exceed 4 percent of the cost.

3. The reasonable cost to the Contractor of handling material returned to the vendor, delivered to the City of Dixon or otherwise disposed of as directed by the Engineer.

4. A reasonable allowance for the Contractor's administrative costs in determining the amount payable due to termination of the Contract.

All records of the Contractor and the Contractor's subcontractors, necessary to determine compensation in conformance with the provisions in this Section 8-1.11, shall be open to inspection or audit by representatives of the City of Dixon at all times after issuance of the notice that the Contract is to be terminated and for a period of 3 years, thereafter, and those records shall be retained for that period.

After acceptance of the work by the Director, the Engineer may make payments on the basis of interim estimates pending issuance of the Final Estimate in conformance with the provisions in Section 9-1.07B, "Final Payment and Claims," when, in the Engineer's opinion, the amount thus paid, together with all amounts previously paid or allowed, will not result in total compensation in excess of that to which the Contractor will be entitled.

All payments, including payment upon the Final Estimate shall be subject to deduction for prior payments and amounts, if any, to be kept or retained under the provisions of the Contract.

SECTION 9: MEASUREMENT AND PAYMENT

9-1.01 MEASUREMENT OF QUANTITIES

All work to be paid for at a Contract price per unit of measurement will be measured by the Engineer in accordance with the United States Standard Measures, unless another system of units has been specified in writing by the Engineer. A ton shall consist of 2,000 pounds avoirdupois}.

Unless shipped by rail, material paid for by mass shall be weighed on scales furnished by and at the expense of the Contractor or on other sealed scales regularly inspected by the Division of Measurement Standards or its designated representative.

Weighing, measuring and metering devices used to measure the quantity of materials used in the work shall be suitable for the purpose intended and shall conform to the tolerances and Specifications as outlined in Title 4, Chapter 9 of the California Code of Regulations, the provisions of the California Business and Professions Code, Division 5, and these Specifications. Devices not Type-approved by the Division of Measurement Standards shall be Type-approved in conformance with the requirements in California Test 109.

Elements of the material plant controller which affect the accuracy or delivery of data shall be made available for the application of security seals. These devices will be inspected and adjusting elements sealed prior to the first production of materials for the Contract. The security seals will be furnished by the Engineer. Material production shall cease when alteration, disconnection or otherwise manipulation of the security seals occur, and production shall not resume until the device is inspected and resealed by the Engineer.

Weighing, measuring or metering devices used to determine the quantity of materials to be paid for will be considered to be "commercial devices" and shall be sealed by the Division of Measurement Standards or its authorized representative as often as the Engineer may deem necessary. The installation of all portable vehicle scales must be accepted by the Engineer prior to sealing.

Vehicle scales shall be of sufficient size to permit the entire vehicle or combination of vehicles to rest on the scale deck while being weighed. Combination vehicles may be weighed as separate units provided they are disconnected while being weighed. The maximum concentrated load shall not exceed the manufacturer's designed sectional capacity of the scale.

Weighing, measuring or metering devices required by these Specifications for the purpose of proportioning a material or product will be considered to be "non-commercial devices" and shall be tested and accepted in conformance with the requirements in California Test 109. This testing shall be done by one of the following, in the presence of the Engineer, as often as the Engineer deems necessary:

1. A County Sealer of Weights and Measures;

2. A Scale Service Agency; or
3. A Division of Measurement Standards Official.

The Contractor shall notify the Engineer at least 24 hours in advance of testing the device.

Undersupports for scale bearing points shall be constructed of Portland cement concrete produced from commercial quality aggregates and cement, which contains not less than 275 kg of cement per cubic meter {463 pounds of cement per cubic yard}. Undersupports shall be constructed in a manner to prevent any shifting or tilting of the support and shall have a minimum height of 350 mm {14 inches} above ground line. The footings shall have a minimum depth of 150 mm {6 inches} below the ground line. The bearing surface of the footings shall have a minimum width of 760 mm {30 inches} and shall be of sufficient area so the pressure does not exceed 200 kPa {4,000 pounds per square foot}. Adequate drainage shall be provided to prevent saturation of the ground under the scale. Scale bulkheads shall be of adequate material and strength to resist displacement. If timber bulkheads are used, the minimum cross section shall be 200 mm x 200 mm {8 inches x 8 inches}. Wedges shall not be used to shim the supports. If shimming is necessary, the shimming shall be done by securely attached metal shims, or by grouting. Shimming shall not exceed 75 mm {3 inches}. The approach ramps shall be level with the scale deck for a distance of not less than one-half the length of the scale deck. The mechanical indicating elements shall be installed level and plumb and shall be rigidly mounted upon a concrete foundation.

The lever system and mechanical indicating elements of hopper scales shall be rigidly attached to non-yielding supports in such a manner as to prevent any loss in weight due to bending and distortion of the supports.

When a multiple beam type scale is used in proportioning materials, an over and under indicator shall be provided which will give positive visible evidence of the amount of any over and under weight. The indicator shall be so designed that the indicator will operate during the addition of the last 90 kg {200 pounds} of any weighing. The over-travel of the indicator shall be at least one-third of the loading travel. Indicators shall be enclosed against moisture and dust.

Over and under dials, and other indicators for weighing and measuring systems used in proportioning materials shall be grouped so that the smallest increment for each indicator can be accurately read from the point at which the proportioning operation is controlled.

The Contractor shall bear the expense of all service fees for testing and approving of "non-commercial devices." The cost of the equipment, labor and materials furnished by the Contractor to assist in the testing of weighing, measuring or metering devices will be considered as included in the Contract prices paid for the various Contract items of work requiring the weighing, measuring or metering and no separate payment will be made therefor.

Whenever pay quantities of material are determined by weighing, the scales shall be operated by a weighmaster licensed in conformance with the requirements in the California Business and Professions Code, Division 5, Chapter 7. The Contractor shall furnish a Public weighmasters certificate or certified daily summary weigh sheets. A representative of the City of Dixon may, at the discretion of the Engineer, be present to witness the weighing and to check and compile the daily record of the scale weights.

When required by the Engineer, the operator of each vehicle weighed shall obtain a weight or load slip from the weigher and deliver that slip to the Engineer at the point of delivery of the material.

If material is shipped by rail, the car mass will be accepted provided that actual mass of material only will be paid for and not minimum car mass used for assessing freight tariff, and provided further that car mass will not be acceptable for material to be passed through mixing plants.

Vehicles used to haul material being paid for by mass shall be weighed empty daily and at additional times as the Engineer may direct. Each vehicle shall bear a plainly legible identification mark. Vehicles may from time to time be required by the Engineer to have the mass of the material to be paid for verified by weighing the empty and loaded vehicle on such other scales as the Engineer may designate.

Materials which are specified for measurement by volume, i.e. cubic yard, cubic foot, etc., shall be measured completed as-constructed. Whenever earthwork is to be measured by volume, it shall be measured "in-situ", unless otherwise specified in the Contract documents. Materials "measured in the vehicle" shall be hauled in vehicles of such type and size that the actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. Vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery. Loads hauled in vehicles not meeting the above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for that material.

When material is to be measured and paid for on a volume basis and it is impractical to determine the volume by the specified method of measurement, or when requested by the Contractor in writing and accepted by the Engineer in writing, the material will be weighed in accordance with the requirements specified for mass measurement and the mass will be converted to volume measurement for payment purposes. Factors for conversion from mass measurement to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before that method of measurement of pay quantities will be adopted.

Quantities of material wasted or disposed of in a manner not called for under the Contract; or rejected loads of material, including material rejected after it has been placed by reason of the failure of the Contractor to conform to the provisions of the Contract; or material not unloaded from the transporting vehicle; or material placed outside of the lines indicated on

the plans or established by the Engineer; or material remaining on hand after completion of the work will not be paid for, and those quantities will be deducted from the final total quantities. No compensation will be allowed for hauling and disposing of rejected material.

The mass of all aggregate or other roadway material which is to be paid for on a mass basis, except imported borrow, imported topsoil, straw, fiber, aggregate subbases, aggregate bases or aggregate for cement treated bases, will be determined by deducting from the mass of material, the mass of water in the material at the time of weighing in excess of 3 percent of the dry mass of the material. When imported borrow, imported topsoil or aggregate subbase is being paid for on a mass basis, the mass to be paid for will be determined by deducting from the mass of the material, the mass of water in the material at the time of weighing in excess of 6 percent of the dry mass of the material. When straw is being paid for on a mass basis, the mass to be paid for will be determined by deducting from the mass of straw, the mass of water in the straw at the time of weighing in excess of 15 percent of the dry mass of the straw. When fiber is being paid for on a mass basis, the mass of water in the fiber at the time of weighing shall not exceed 15 percent of the dry mass of the fiber. No deduction will be made for the mass of water in fiber. The percentage of water in the material shall be determined by California Test 226. The mass of aggregate base and aggregate for cement treated bases which are to be paid for on a mass basis, will be determined as provided in Section 26, "Aggregate Bases," and Section 27, "Cement Treated Bases," respectively.

The mass of water deducted as provided in this Section 9-1.01 will not be paid for.

Full compensation for all expense involved in conforming to the requirements specified in this Section 9-1.01 shall be considered as included in the unit prices paid for the materials being measured or weighed and no additional compensation will be allowed therefor.

9-1.01A FINAL PAY ITEMS

When an item of work is designated as (F) or (S-F) in the Engineer's Estimate, the estimated quantity for that item of work shall be the final pay quantity, unless the dimensions of any portion of that item are revised by the Engineer, or the item or any portion of the item is eliminated. If the dimensions of any portion of the item are revised, and the revisions result in an increase or decrease in the estimated quantity of that item of work, the final pay quantity for the item will be revised in the amount represented by the changes in the dimensions, except as otherwise provided for minor structures in Section 51-1.22, "Measurement." If a final pay item is eliminated, the estimated quantity for the item will be eliminated. If a portion of a final pay item is eliminated, the final pay quantity will be revised in the amount represented by the eliminated portion of the item of work.

The estimated quantity for each item of work designated as (F) or (S-F) in the Engineer's Estimate shall be considered as approximate only, and no guarantee is made that the quantity which can be determined by computations, based on the details and dimensions shown on the plans, will equal the estimated quantity. No allowance will be made in the event that the quantity based on computations does not equal the estimated quantity.

In case of discrepancy between the quantity shown in the Engineer's Estimate for a final pay item and the quantity or summation of quantities for the same item shown on the plans, payment will be based on the quantity shown in the Engineer's Estimate.

Under no circumstances will Contractor be entitled to payment for any final pay quantity that is greater than the unit quantity price for the final pay quantity item set forth in the proposal form.

9-1.02 SCOPE OF PAYMENT

The Contractor shall accept the compensation provided in the Contract as full payment for furnishing all labor, materials, tools, equipment, and incidentals necessary to the completed work and for performing all work required under the Contract; also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the acceptance by the Director and for all risks of every description connected with the prosecution of the work, also for all expenses incurred in consequence of the suspension or discontinuance of the work as provided in the Contract; and for completing the work according to the Contract Documents.

No compensation will be made in any case for loss of anticipated profits.

9-1.03 FORCE ACCOUNT PAYMENT

When extra work is to be paid for on a force account basis, the labor, materials and equipment used in the performance of that work shall be subject to the review and acceptance of the Engineer and compensation will be determined as follows:

9-1.03A WORK PERFORMED BY CONTRACTOR

The Contractor will be paid the direct costs for labor, materials and equipment used in performing the work determined as hereinafter provided in Sections 9-1.03A(1), "Labor," 9-1.03A(2), "Materials," and 9-1.03A(3), "Equipment Rental," except where agreement has been reached to pay in conformance with the provisions in Section 9-1.03B, "Work Performed by Special Forces or Other Special Services."

To the total of the direct costs computed as provided in Sections 9-1.03A(1), "Labor," 9-1.03A(2), "Materials," and 9-1.03A(3), "Equipment Rental," there will be added a markup of 33 percent to the cost of labor, 15 percent to the cost of materials and 15 percent to the equipment rental.

The above markups shall constitute full compensation for all overhead costs which shall be deemed to include all items of expense not specifically designated as cost or equipment rental in Sections 9-1.03A(1), "Labor," 9-1.03A(2), "Materials," and 9-1.03A(3), "Equipment Rental." The total payment made as provided above shall be deemed to be the actual cost of the work and shall constitute full compensation therefor.

When extra work to be paid for on a force account basis is performed by a subcontractor, approved in conformance with the provisions in Section 8-1.01, "Subcontracting," an additional markup of 5 percent will be added to the total cost of that extra work including all markups specified in this Section 9-1.03A. The additional 5 percent markup shall reimburse the Contractor for additional administrative costs, and no other additional payment will be made by reason of performance of the extra work by a subcontractor.

9-1.03A(1) LABOR

The Contractor will be paid the cost of labor for the workers (including foremen when authorized by the Engineer), used in the actual and direct performance of the work. The cost of labor, whether the employer is the Contractor, subcontractor or other forces, will be the sum of the following:

9-1.03A(1A) ACTUAL WAGES

The actual wages paid shall include any employer payments to or on behalf of the workers for health and welfare, pension, vacation and similar purposes.

9-1.03A(1B) LABOR SURCHARGE

To the actual wages, as defined in Section 9-1.03A(1a), will be added a labor surcharge set forth in the Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished. The labor surcharge shall constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to, or on behalf of, the workers, other than actual wages as defined in Section 9-1.03A(1a) and subsistence and travel allowance as specified in Section

9-1.03A(1c) SUBSISTENCE AND TRAVEL ALLOWANCE

The actual subsistence and travel allowance paid to the workers.

9-1.03A(2) MATERIALS

The City of Dixon reserves the right to furnish any materials it deems advisable, and the Contractor shall have no claims for costs and markup on those materials.

Only materials furnished by the Contractor and necessarily used in the performance of the work will be paid for. The cost of those materials will be the cost to the purchaser, whether Contractor, subcontractor or other forces, from the supplier thereof, except as the following are applicable:

9-1.03A(2A)

If a cash or trade discount by the actual supplier is offered or available to the purchaser, it shall be credited to the City of Dixon notwithstanding the fact that the discount may not have been taken.

9-1.03A(2B)

If materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier to the purchaser, the cost of those materials shall be deemed to be the price paid to the actual supplier as determined by the Engineer plus the actual costs, if any, incurred in the handling of the materials.

9-1.03A(2c)

If the materials are obtained from a supply or source owned wholly or in part by the purchaser, the cost of those materials shall not exceed the price paid by the purchaser for similar materials furnished from that source on Contract items or the current wholesale price for those materials delivered to the jobsite, whichever price is lower.

9-1.03A(2D)

If the cost of the materials is, in the opinion of the Engineer, excessive, then the cost of the material shall be deemed to be the lowest current wholesale price at which the materials were available in the quantities concerned delivered to the jobsite, less any discounts as provided in Section 9-1.03A(2a).

9-1.03A(2E)

If the Contractor does not furnish satisfactory evidence of the cost of the materials from the actual supplier thereof within 60 days after the date of delivery of the material or within 15 days after acceptance of the Contract, whichever occurs first, the City of Dixon reserves the right to establish the cost of the materials at the lowest current wholesale prices at which the materials were available in the quantities concerned delivered to the location of the work, less any discounts as provided in Section 9-1.03A(2a).

9-1.03A(3) EQUIPMENT

The Contractor will be paid for the use of equipment at the rental rates listed for that equipment in the Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a part of the Contract, regardless of ownership and any rental or other agreement, if they may exist, for the use of that equipment entered into by the Contractor, except that for those pieces of equipment with a rental rate of \$10.00 per hour or less as listed in the Labor Surcharge And Equipment Rental Rates publication and which

are rented from a local equipment agency, other than Contractor owned, the Contractor will be paid at the hourly or daily rate shown on the rental agency invoice or agreement for the time used on force account work as provided in Section 9-1.03A(3a), "Equipment on the Work." If a minimum equipment rental amount is required by the local equipment rental agency, the actual amount charged will be paid to the Contractor.

Equipment owned by the Contractor and already on the job site shall only be paid for actual hours of usage as documented on daily extra work reports. Equipment owned by the Contractor, required to perform force account work, and not already on the job site shall only be paid for actual hours of usage as documented on daily extra work reports and the cost of mobilization to bring to the job site. The Engineer shall determine if equipment not on the job site is required to be mobilized to perform extra work.

If it is deemed necessary by the Engineer to use equipment not listed in the Labor Surcharge And Equipment Rental Rates publication, a suitable rental rate for that equipment will be established by the Engineer. The Contractor shall furnish all cost data which might assist the Engineer in the establishment of the rental rate. If the rental rate established by the Engineer is \$10.00 per hour or less, the provisions above concerning rental of equipment from a local equipment agency shall apply.

The rental rates paid as above provided shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals.

Operators of rented equipment will be paid for as provided in Section 9-1.03A(1), "Labor."

All equipment shall, in the opinion of the Engineer, be in good working condition and suitable for the purpose for which the equipment is to be used.

Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

Individual pieces of equipment or tools not listed in the Labor Surcharge and Equipment Rental Rate publication and having a replacement value of \$500 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.

Rental time will not be allowed while equipment is inoperative due to breakdowns.

9-1.03A(3A) EQUIPMENT ON THE WORK

The rental time to be paid for equipment on the work shall be the time the equipment is in operation on the extra work being performed, and in addition, shall include the time required to move the equipment to the location of the extra work and return the equipment to the original location or to another location requiring no more time than that required to

return the equipment to its original location, except that moving time will not be paid for if the equipment is used at the site of the extra work on other than the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made if the equipment is used at the site of the extra work on other than the extra work.

The following shall be used in computing the rental time of equipment on the work:

1. When hourly rates are listed, less than 30 minutes of operation shall be considered to be 0.5-hour of operation.
2. When daily rates are listed, less than 4 hours of operation shall be considered to be 0.5-day of operation.

9-1.03A(3B) EQUIPMENT NOT ON THE WORK

When extra work, other than work specifically designated as extra work in the plans and specifications, is to be paid for on a Force Account basis and the Engineer determines that such extra work requires the Contractor to move on to the work equipment which could not reasonably have been expected to be needed in the performance of the contract, the Engineer may authorize payment for the use of such equipment at equipment rental rates in excess of those listed as applicable for the use of such equipment subject to the following additional conditions:

- A. The Engineer shall specifically approve the necessity for the use of particular equipment on such work.
- B. The Contractor shall establish to the satisfaction of the Engineer that such equipment cannot be obtained from his/her normal equipment source or sources and those of his/her subcontractors.
- C. The Contractor shall establish to the satisfaction of the Engineer that the proposed equipment rental rate for such equipment from his/her proposed source is reasonable and appropriate for the expected period of use.
- D. The Engineer shall approve the equipment source and the equipment rental rate to be paid by the City of Dixon before the Contractor begins work involving the use of said equipment.

For the use of equipment moved in on the work and used exclusively for extra work paid for on a force account basis, the Contractor will be paid the rental rates listed in the Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a part of the Contract, or determined as provided in Section 9-1.03A(3) and for the cost of transporting the equipment to the location of the work and its return to its original location, all in accordance with the following provisions:

1. The original location of the equipment to be hauled to the location of the work shall be agreed to by the Engineer in advance.
2. The City of Dixon will pay the costs of loading and unloading the equipment.
3. The cost of transporting equipment in low bed trailers shall not exceed the hourly rates charged by established haulers.
4. The rental period shall begin at the time the equipment is unloaded at the site of the extra work, shall include each hour that the equipment is actually used at the site of the extra work, excluding Saturdays, Sundays and legal holidays unless the equipment is used to perform the extra work on those days, and shall terminate at the end of the day on which the Engineer directs the Contractor to discontinue the use of the equipment. The rental time to be paid for equipment not on the work shall be the time the equipment is actually in operation on the extra work being performed and in accordance with the following:

The hours to be paid for equipment which is operated less than 8 hours due to breakdowns, shall not exceed 8 hours less the number of hours the equipment is inoperative due to breakdowns.

When hourly rates are listed, less than 30 minutes of operation shall be considered to be 0.5-hour of operation.

When daily rates are listed, less than 4 hours of operation shall be considered to be 4 hours of operation. No payment will be made if the equipment is not used. If the equipment is used more than 4 hours of operation, payment will be made for one day.

5. Should the Contractor desire the return of the equipment to a location other than its original location, the City of Dixon will pay the cost of transportation in accordance with the above provisions, provided the payment shall not exceed the cost of moving the equipment to the work.
6. Payment for transporting, and loading and unloading equipment, as above provided, will not be made if the equipment is used on the work in any other way than upon extra work paid for on a force account basis.

When extra work, other than work specifically designated as extra work in the Contract Documents, is to be paid for on a force account basis and the Engineer determines that the extra work requires the Contractor to move on to the work equipment which could not reasonably have been expected to be needed in the performance of the Contract, the Engineer may authorize payment for the use of the equipment at equipment rental rates in excess of those listed as applicable for the use of that equipment subject to the following additional conditions:

1. The Engineer shall specifically approve the necessity for the use of particular equipment on that work.
2. The Contractor shall establish to the satisfaction of the Engineer that the equipment cannot be obtained from the Contractor's normal equipment source or sources and those of the Contractor's subcontractors.
3. The Contractor shall establish to the satisfaction of the Engineer that the proposed equipment rental rate for the equipment from the proposed source is reasonable and appropriate for the expected period of use.
4. The Engineer shall approve the equipment source and the equipment rental rate to be paid by the City of Dixon before the Contractor begins work involving the use of that equipment.

9-1.03A(3c) OWNER-OPERATED EQUIPMENT

When owner-operated equipment is used to perform extra work to be paid for on a force account basis, the Contractor will be paid for the equipment and operator, as follows:

Payment for the equipment will be made in conformance with the provisions in Section 9-1.03A(3), "Equipment Rental."

Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the Contractor to other workers operating similar equipment already on the project or, in the absence of other workers operating similar equipment, at the rates for that labor established by collective bargaining agreements for the type of workers and location of the work, whether or not the owner-operator is actually covered by an agreement. A labor surcharge will be added to the cost of labor described herein, in conformance with the provisions in Section 9-1.03A(lb), "Labor Surcharge."

To the direct cost of equipment rental and labor, computed as provided herein, will be added the markups for equipment rental and labor as provided in Section 9-1.03A, "Work Performed by Contractor."

9-1.03A(3D) DUMP TRUCK RENTAL

Dump truck rental shall conform to the provisions in Sections 9-1.03A(3), "Equipment Rental," 9-1.03A(3a), "Equipment on the Work," and 9-1.03A(3b), "Equipment not on the Work," except as follows:

1. Fully maintained and operated rental dump trucks used in the performance of extra work paid for on a force account basis will be paid for at the same hourly rate paid by the Contractor for use of fully maintained and operated rental dump trucks in performing Contract item work.
2. In the absence of Contract item work requiring dump truck rental, the Engineer will

establish an hourly rental rate to be paid. The Contractor shall provide the Engineer with complete information on the hourly rental rates available for rental of fully maintained and operated dump trucks.

3. The provisions in Section 9-1.03A(1), "Labor," shall not apply to operators of rented dump trucks.

4. The rental rates listed for dump trucks in the Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates shall not apply.

5. To the total of the rental costs for fully maintained and operated dump trucks, including labor, there will be added a markup of 15 percent. An additional markup of 5 percent will be added by reason of performance of the work by a subcontractor. No separate markup will be made for labor.

The provisions in Section 9-1.03A(3c), "Owner-Operated Equipment," shall not apply to dump truck rentals.

9-1.03B WORK PERFORMED BY SPECIAL FORCES OR OTHER SPECIAL SERVICES

When the Engineer and the Contractor, by agreement, determine that a special service or an item of extra work cannot be performed by the forces of the Contractor or those of any of the Contractor's subcontractors, that service or extra work item may be performed by a specialist.

9-1.03C RECORDS

The Contractor and all subcontractors shall maintain records in such a manner as to provide a clear distinction between the direct costs of extra work paid and the costs of other operations.

From the above records, the Contractor shall furnish the Engineer completed daily extra work reports, on forms approved by the Engineer, for each day's extra work to be paid for on a force account basis. The daily extra work reports shall itemize the materials used, and shall state the direct cost of labor and the charges for equipment rental, whether furnished by the Contractor, subcontractor or other forces, except for charges described in Section 9-1.03B, "Work Performed by Special Forces or Other Special Services." The daily extra work reports shall provide names, identifications, and classifications of all workers, the hourly rate of pay and hours worked, and also the size, type and identification number of equipment, and hours operated.

Material charges shall be substantiated by valid copies of vendor's invoices. The invoices shall be submitted with the daily extra work reports, or if not available, the invoices shall be submitted within 30 days after the submittal of the daily extra work report or 30 days after the date of delivery of the material, whichever occurs first. Contractor waives payment for material charges not substantiated by valid copies of vendor's invoices submitted within the times provided.

Daily extra work reports shall be signed by the Contractor or the Contractor's authorized representative, and shall be submitted to the City on the day the work is performed, or within 24 hours if authorized by the Engineer. Daily extra work reports shall be signed by the designated representative of the City to acknowledge the labor hours, materials, and equipment used to perform the work. Signature by the City's representative does not constitute approval for payment. All daily extra work reports are subject to review and approval by the Engineer for conformance to the Contract Documents prior to payment. The City reserves the right to make adjustments to the amount to be paid for extra work based upon daily extra work reports at any time prior to project acceptance, even if payment has been made under a progress payment. Contractor waives payment for that portion of Force Account work in which a daily extra work report has not been signed by the City's designated representative and/or submitted to the City within the time specified above.

The Engineer will compare the Engineer's records with the completed daily extra work reports furnished by the Contractor and make any necessary adjustments. When these daily extra work reports are agreed upon and signed by both parties, the reports shall become the basis of payment for the work performed, but shall not preclude subsequent adjustment based on a later audit by the City of Dixon.

The Contractor's and all subcontractors' records pertaining to the Project shall be open to inspection or audit by representatives of the City of Dixon, during the life of the Contract and for a period of not less than 3 years after the date of acceptance thereof, and the Contractor and all subcontractors shall retain those records for that period. Where payment for materials or labor is based on the cost thereof to forces other than the Contractor, the Contractor shall make every reasonable effort to ensure that the cost records of those other forces will be open to inspection and audit by representatives of the City of Dixon on the same terms and conditions as the cost records of the Contractor. If an audit is to be commenced more than 60 days after the acceptance date of the Contract, the Contractor will be given a reasonable notice of the time when the audit is to begin.

9-1.03D PAYMENT

Payment as provided in Sections 9-1.03A, "Work Performed by Contractor," and 9-1.03B, "Work Performed by Special Forces or Other Special Services," shall constitute full compensation to the Contractor for performance of work paid for on a force account basis and no additional compensation will be allowed therefor. The payment will be made in conformance with the provisions in Section 9-1.06, "Partial Payments."

The Engineer's receipt of a proposed progress schedule and monthly updated progress schedules, all in strict compliance with these Contract Documents shall be conditions precedent to the Engineers acceptance of the Contractor's periodic pay requests and/or the City of Dixon's obligation to pay Contractor.

9-1.04 (BLANK)

9-1.05 STOP NOTICES

The City of Dixon, may at its option and at any time retain out of any amounts due the Contractor, sums sufficient to cover claims filed pursuant to Section 3179 et seq. of the Civil Code.

9-1.06 PARTIAL PAYMENTS

The City of Dixon, once in each month, shall cause an estimate in writing to be made by the Engineer. The estimate shall include the total amount of work done and acceptable materials furnished, provided the acceptable materials are listed as eligible for partial payment as materials in the special provisions and are furnished and delivered by the Contractor on the ground and not used or are furnished and stored for use on the Contract, if the storage is within the City of Dixon and the Contractor furnishes evidence satisfactory to the Engineer that the materials are stored subject to or under the control of the City of Dixon, to the time of the estimate, and the value thereof. The estimate shall also include any amounts payable for mobilization. Daily extra work reports furnished by the Contractor less than 5 calendar days, not including Saturdays, Sundays and legal holidays, prior to the preparation of the monthly progress estimate shall not be eligible for payment until the following month's estimate.

The amount of any material to be considered in making an estimate will in no case exceed the amount thereof which has been reported by the Contractor to the Engineer on City of Dixon approved forms, properly filled out and executed, including accompanying documentation as therein required, less the amount of the material incorporated in the work to the time of the estimate. Only materials to be incorporated in the work will be considered. The estimated value of the material established by the Engineer will in no case exceed the Contract price for the item of work for which the material is furnished.

Unless otherwise approved by the Engineer in writing, Contractor shall submit to Engineer on or before the tenth (10th) day of the month, an itemized application for payment for the cost of the work in permanent place, which has been completed in strict accordance with the Contract Documents as of the last day of the preceding month, less amounts previously paid. The application for payment shall be prepared in a form acceptable to Engineer, and shall contain itemized amounts in accordance with the Contract Documents. The applications for payment shall not include requests for payment on account of changes which have not been authorized by Change Orders, or for amounts Contractor does not intend to pay a subcontractor because of a dispute or other reason.

If requested by the City of Dixon, an application for payment shall be accompanied by a summary showing payment that will be made to subcontractors covered by such application, and unconditional waivers and releases of claims and stop notices, from each subcontractor listed in the preceding application for payment covering sums disbursed pursuant to that preceding application for payment.

Contractor warrants that upon submittal of an application for payment, all work has been performed in strict compliance with the Contract Documents, and all work for which certificates of payment have been previously issued and payment has been received from City of Dixon, shall be free and clear of all claims, stop notices, security interests, and encumbrances in favor of Contractor, subcontractors or other persons or firms entitled to make claims by reason of having provided labor, materials, or equipment related to the work.

Payment of all, or any part, of an application for payment may be withheld, a certificate of payment may be withheld, all or part of a previous certificate for payment may be nullified and that amount withheld from a current certificate for payment, or the City of Dixon may withhold from payment, on account of any of the following:

1. Defective work not remedied;
2. Third-party claims against Contractor or City of Dixon arising from the acts or omissions of Contractor or subcontractors;
3. Stop notices;
4. Failure of Contractor to make timely payments due to subcontractors for material or labor;
5. A reasonable doubt that the work can be completed for the balance of the Contract price then unpaid;
6. Damage to the City of Dixon or others for which Contractor is responsible;
7. Reasonable evidence that the work cannot be completed within the Contract time, and the unpaid balance of the Contract price would not be adequate to complete the work and cover City of Dixon's damages for the anticipated delay;
8. Failure of Contractor to maintain, update, and submit record documents;
9. Failure of Contractor to submit schedules or their updates as required by the Contract Documents;
10. Performance of the work by Contractor without properly processed shop drawings;
11. Liquidated damages assessed;
12. Any other failure of Contractor to perform its obligations under the Contract Documents.

By resolution of the City of Dixon's City Council, a fund has been established, money appropriated in the current budget, and assigned to the account(s) which is/are the sole source(s) of funds available for payment of the Contract price. Contractor understands and

agrees that Contractor will be paid only from this special fund and if for any reason this fund is not sufficient to pay Contractor, Contractor will not be entitled to payment. The availability of money in this fund, and City of Dixon's ability to draw from this fund, are conditions precedent to City of Dixon's obligation to make payments to Contractor.

Within thirty (30) days of receipt of an approved certificate for payment, properly executed by the Contractor, City of Dixon's Engineer and Director, City of Dixon agrees to pay Contractor, subject to all of the terms and conditions of these Contract Documents, an amount equal to ninety percent (90%) of the sum of the following (less any amounts withheld as permitted by the Contract Documents):

1. Cost of the work in permanent place as of the end of the preceding month as set forth and approved on the certificate for payment; and
2. Less amounts previously paid.

9-1.06A PAYMENT OF WITHHELD FUNDS

Upon the Contractor's request, the City of Dixon will make payment of funds withheld from progress payments to ensure performance of the Contract if the Contractor deposits in escrow with the City of Dixon, or with a bank acceptable to the City of Dixon, securities equivalent to the amount withheld. The Contractor shall be beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon. Upon satisfactory completion of the Contract, the securities shall be returned to the Contractor.

Alternatively, upon the Contractor's request, the City of Dixon will make payment of retentions earned directly to the escrow agent. The Contractor may direct the investment of the payments into securities, and the Contractor shall receive the interest earned on the investments upon the same terms provided for securities deposited by the Contractor. Upon satisfactory completion of the Contract, the Contractor shall receive from the escrow agent all securities, interest and payments received by the escrow agent from the City of Dixon.

Alternatively, and subject to the acceptance by the City of Dixon, the payment of retentions earned may be deposited directly with a person licensed under Division 6 (commencing with Section 17000) of the Financial Code as the escrow agent. Upon written request of an escrow agent that has not been approved by the City of Dixon under subdivision (c) of Section 10263 of the Public Contract Code, the City of Dixon will provide written notice to that escrow agent within 10 business days of receipt of the request indicating the reason or reasons for not approving that escrow agent. The payments will be deposited in a trust account with a Federally chartered bank or savings association within 24 hours of receipt by the escrow agent. The Contractor shall not place any retentions with the escrow agent in excess of the coverage provided to that escrow agent pursuant to subdivision (b) of Section 17314 of the Financial Code. In all respects not inconsistent with subdivision (c) of Section 10263 of the Public Contract Code, the remaining provisions of Section 10263 of the Public Contract Code shall apply to escrow agents acting pursuant to subdivision (c) of Section 10263 of the Public Contract Code.

Securities eligible for investment shall include those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit or any other security mutually agreed to by the Contractor and the City of Dixon.

The escrow agreement used pursuant to this Section 9-1.065 shall be substantially similar to the "Escrow Agreement for Security Deposits In Lieu of Retention" in Section 10263 of the Public Contract Code, deemed as incorporated herein by reference.

The Contractor shall obtain the written consent of the surety to the agreement.

9-1.07 PAYMENT AFTER ACCEPTANCE

After the work has been accepted in writing by the Director, as provided in Section 7-1.17, "Acceptance of Contract," payments will be made to the Contractor subject to the provisions in this Section 9-1.07.

9-1.07A PAYMENT PRIOR TO PROPOSED FINAL ESTIMATE

After acceptance of the work by the Director, the Engineer will make an estimate of the total amount of work done under the Contract and the City of Dixon will make a final monthly payment pending issuance of the Proposed Final Estimate. The City of Dixon will pay the balance thereon found to be due after deduction of all previous payments, all amounts to be kept or retained under the provisions of the Contract and those further amounts that the Engineer determines to be necessary pending issuance of the Proposed Final Estimate and payment thereon.

9-1.07B FINAL PAYMENT

After written acceptance of the Work as complete by the Director, or the Director's designated representative, the Engineer will prepare and issue to the Contractor a Proposed Final Estimate in writing of the total amount payable to the Contractor, including therein an itemization of the total amount, segregated as to Contract item quantities, extra work and any other basis for payment, and shall also show therein all deductions made or to be made for prior payments and amounts to be kept or retained under the provisions of the Contract. All prior estimates and payments shall be subject to correction in the Proposed Final Estimate.

The Contractor shall submit written approval of the Proposed Final Estimate or a written statement of all claims arising under or by virtue of the Contract so that the Engineer receives the written approval or statement of claims no later than close of business of the thirtieth day after receiving the Proposed Final Estimate. If the thirtieth day falls on a Saturday, Sunday or legal holiday, then receipt of the written approval or statement of claims by the Engineer shall not be later than close of business of the next business day. No claim will be considered that was not included in the written statement of claims, nor will any claim be allowed as to which a notice or protest is required unless the Contractor has

strictly complied with the notice or protest requirements of the Contract Documents.

On the Contractor's approval, or if the Contractor files no claim within the specified period of 30 days, the Engineer will issue a Final Estimate in writing in accordance with the Proposed Final Estimate submitted to the Contractor. The City of Dixon will pay any remaining moneys unpaid and found to be due in the Proposed Final Estimate 35 days after the recordation of the Notice of Completion in the records of the Solano County Recorder's Office as per Section 7-1.17, "Acceptance of Contract". That Final Estimate and payment thereon shall be conclusive and binding against Contractor on all questions relating to the amount of work done and the compensation payable therefor.

If the Contractor within the specified period of 30 days files claims, the Engineer will, issue a Semifinal Estimate in accordance with the Proposed Final Estimate submitted to the Contractor and within 30 days thereafter the City of Dixon will pay the sum so found to be due. The Semifinal Estimate and payment thereon shall be conclusive and binding against the Contractor on all questions relating to the amount of work done and the compensation payable therefor, except insofar as affected by the claims filed within the time and in the manner required hereunder.

9-1.07C CLAIMS

A. General. A "Claim" means a written demand or written assertion by Contractor to adjust, alter, modify, or otherwise change the Contract price or the Contract time, or both. All claims filed hereunder shall strictly comply with all requirements of the Contract Documents.

In order to qualify as a "Claim", the written demand must state that it is a claim submitted under Section 9-1.07C of the Contract Documents. A letter, voucher, invoice, payment application, or other routine or authorized form of request for payment is not a Claim under the Contract Documents. If such a request is disputed as to liability or amount, then the disputed portion of the submission may be converted to a Claim under the Contract Documents by submitting a separate claim in compliance with claim submission requirements.

A Claim must be stated with specificity, including identification of the event or occurrence giving rise to the Claim, the date of the event, and the asserted affect on the Contract price and the Contract time, if any. The Claim shall include adequate supporting data. Adequate supporting data for a Claim for an adjustment of the Contract time shall include scheduling data demonstrating the impact of the event on the controlling operation and completion of the Project. Adequate supporting data for a Claim for an adjustment in the Contract price shall include a detailed cost breakdown of items included within the Claim and documentation supporting each item of cost.

Notwithstanding and pending the resolution of any Claim, the Contractor shall diligently prosecute the disputed work to final completion of the work. Contractor shall impose the Claim notice and documentation requirements in this Contract on Contractor's subcontractors of all tiers, and require them to submit to the Contractor all Claims against

Contractor and/or City within the times and containing the documentation required by these provisions. The Claim notice and documentation procedure described in these provisions applies to all claims and disputes arising under the Contract Documents, whether or not specifically referred to in any specific portion of the Contract.

If additional information or details are required by the Engineer to determine the basis and amount of any Claims, the Contractor shall furnish additional information or details so that the additional information or details are received by the Engineer no later than the fifteenth day after receipt of the written request from the Engineer. If the fifteenth day falls on a Saturday, Sunday or legal holiday, then receipt of the information or details by the Engineer shall not be later than close of business of the next business day. Contractor understands and agrees that failure to submit the information and details to the Engineer within the time specified shall result in Contractor waiving that Claim.

The Contractor and all subcontractors shall keep full and complete records of the costs and additional time incurred for any work for which a Claim for additional compensation is made. The Engineer or any designated claim investigator or auditor shall have access to those records and any other records as may be required by the Engineer to determine the facts or contentions involved in the claims. Contractor agrees that failure to permit access to those records waives any Claim to which those records apply.

The City of Dixon, or its authorized representatives, shall have access, upon reasonable notice, during normal business hours, to Contractor and subcontractors' books, documents and accounting records, including but not limited to, bid worksheets, bids, subcontractor bids and proposals, estimates, cost accounting data, accounting records, payroll records, time sheets, canceled checks, profit and loss statements, balance sheets, project correspondence including but not limited to all correspondence between Contractor and its sureties and subcontractors/vendors, project files, scheduling information, and other records of the Contractor and all subcontractors directly or indirectly pertinent to the work, original as well as change and claimed extra work, to verify and evaluate the accuracy of cost and pricing data submitted with any change order, prospective or completed, or any claim for which additional compensation has been requested or claim has been tendered. Such access shall include the right to examine and audit such records, and make excerpts, transcriptions, and photocopies at City of Dixon's cost.

The parties agree that in the event Contractor or any subcontractor fails to comply with this section, it would be difficult for the City of Dixon to determine its actual damages; therefore, Contractor agrees to pay City of Dixon, as liquidated damages, the sum of Two hundred fifty dollars (\$250.00), which Contractor agrees is reasonable under the circumstances, for each and every calendar day which Contractor or a subcontractor fails or refuses to provide the City of Dixon, access to the materials specified in this section.

B. Disputes.

1. **Contract Interpretation Disputes:** Should it appear to the Contractor that the work to be performed or any of the matters relative to the Contract Documents are not satisfactorily detailed or explained therein, or should any questions arise as to the

meaning or intent of the Contract Documents, the Contractor shall give written notice to the City of Dixon. The Contractor shall bear all costs incurred in the giving of such notice.

All issues regarding the interpretation of the plans or specifications shall be referred to the City for interpretation. The City shall have the right but not the obligation to affirm or disaffirm any interpretation of the plans or specifications, which affirmation or disaffirmance shall be final. If the Contractor should disagree with the City's decision, the Contractor's sole and exclusive remedy is to file a Claim in accordance with these provisions.

2. Work Disputes: Should any dispute arise under the Contract Documents respecting the true value of any work performed, the implementation of the Work required by the Contract Documents, any Work omitted, any extra work which the Contractor may be required to perform or time extensions, respecting the size of any payment to the Contractor during the performance of the Contract Documents, or of compliance with Contract Documents procedures, the dispute shall be decided by the City of Dixon and its decision shall be final and conclusive. If the Contractor disagrees with the City's decision, the Contractor's sole and exclusive remedy is to file a claim in accordance with these provisions.

C. Delays. As used herein, the following terms shall have the following meanings:

"Excusable Delay" means any delay of the completion of the Project beyond the expiration of the Contract time caused by conditions beyond the control and without the fault or negligence of the Contractor such as strikes, embargoes, fire, unavoidable casualties, unusual delays in transportation, national emergency, and stormy and inclement weather conditions in which the work cannot continue. The financial inability of the Contractor or any subcontractor and default of any subcontractor, without limitation, shall not be deemed conditions beyond the Contractor's control. An Excusable Delay may entitle the Contractor to an adjustment in the Contract time.

"Compensable Delay" means any delay of the completion of the work beyond the expiration date of the Contract time caused by the gross negligence or willful acts of the City of Dixon, and which delay is unreasonable under the circumstances involved, and not within the contemplation of the parties. A Compensable Delay may entitle the Contractor to an extension of the Contract time and/or Contract price. Except as provided herein, the Contractor shall have no claim for damage or compensation for any delay, interruption, hindrance, or disruption.

"Unexcusable Delay" means any delay of the completion of the Project beyond the expiration of the Contract time resulting from causes other than those listed above. An Unexcusable Delay shall not entitle the Contractor to an extension of the Contract time or an adjustment of the Contract price.

The Contractor may make a Claim for an extension of the Contract time, for an Excusable Delay or a Compensable Delay, subject to the following:

1. If an Excusable Delay and a Compensable Delay occur concurrently, the maximum extension of the Contract time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last.
2. If an Unexcusable Delay occurs concurrently with either an Excusable Delay or a Compensable Delay, the maximum extension of the Contract time shall be the number of days, if any, by which the Excusable Delay or the Compensable Delay exceeds the Unexcusable Delay.
3. If an Unexcusable Delay occurs concurrently with both an Excusable Delay and a Compensable Delay, the maximum extension in the Contract time shall be the number of days, if any, by which the number of days determined pursuant to Subparagraph (a) exceeds the number of days of the Unexcusable Delay.
4. For a Compensable Delay, the Contractor shall only be entitled to an adjustment in the Contract price in an amount equal to the actual additional labor costs, material costs, and unavoidable equipment costs incurred by the Contractor as a result of the Compensable Delay, plus the actual additional wages or salaries and fringe benefits and payroll taxes of supervisory and administrative personnel necessary and directly employed at the Project site for the supervision of the work during the period of Compensable Delay. Except as provided herein, the Contractor shall have no claim for damage or compensation for any delay, interruption, hindrance, or disruption. There shall be no Compensable Delay unless the event or occurrence giving rise to the Compensable Delay extends the actual completion of the Project past the Contract time.

The parties agree that the City of Dixon's exercise of its right to order changes in the work, regardless of the extent and number of changes, or to suspend the work, is within the contemplation of the parties and shall not be the basis for any Claim for Compensable Delay. The rights of the Contractor to adjustments of the Contract time and the Contract sum, based on changes ordered in the work or suspension of the work, shall be governed by this provision.

Notwithstanding the making of any Claim or the existence of any dispute regarding any Claim, Contractor shall not cause any delay, cessation, or termination in or of Contractor's performance of the work, but shall diligently proceed with performance of the work in accordance with the Contract Documents.

Contractor agrees that the daily Contractor Delay Damages as set forth in the Proposal Form shall be full compensation to Contractor, all subcontractors and anyone for whom they may be legally responsible, for each day of delay that may be caused by City of Dixon or anyone for whom City of Dixon is legally responsible, including but not limited to, extended field costs, extended home overhead costs, impact, inefficiency, unabsorbed

home office overhead, underabsorbed home office overhead, hindrance, disruption or any other damage arising from delay, no matter how characterized and regardless of the cause, extent or duration of the delay. Inclusion of Contractor Delay Damages within the Proposal Form is solely for the purpose of determining the low bidder and establishing the City of Dixon's maximum daily liability as a result of City of Dixon delays to Contractor, if any, and City of Dixon has no obligation to pay any daily Contractor Delay Damages except as provided for in these Contract Documents for Compensable Delays. In the event that City of Dixon becomes liable to Contractor for compensable delays, City of Dixon agrees to pay Contractor the daily Contractor Delay Damages set forth in the Proposal Form or Contractor's actual daily delay damages, whichever is less, for each day of Compensable Delay as provided for by these Contract Documents.

D. Claim Procedures. Should any clarification, determination, action or inaction by the City, Work, or any event, in the opinion of the Contractor, exceed the requirements of or not comply with the Contract Documents, or otherwise result in the Contractor seeking additional compensation in time or money for any reason (collectively "Disputed Work"), then the Contractor and the City shall make good faith attempts to resolve informally any and all such issues and/or disputes. The Contractor must file a written Notice of Potential Claim with the City on the form provided in the Contract Documents before commencing the Disputed Work, or within seven (7) calendar days after Contractor's first knowledge of the Disputed Work, whichever is earlier, stating clearly and in detail its objection and reasons for contending the Work or interpretation is outside the requirements of the Contract Documents. If a written Notice of Potential Claim is not filed within this time period, or if the Contractor proceeds with the Disputed Work without first having filed the notice required by these provisions, the Contractor shall waive any rights to further claim on the specific issue.

The City will review the Contractor's timely Notice of Potential Claim and provide a decision. The City may require supplemental information from the Contractor to clarify that contained in the Notice of Potential Claim. If, after receiving the City's decision, the Contractor disagrees with the decision, the Contractor shall so notify the City, in writing, within seven (7) calendar days after receiving the decision, that a formal Claim will be filed. The Contractor shall submit the Claim in the form specified herein and all arguments, justification, costs or estimates, schedule analyses, and detailed documentation supporting the Contractor's position within thirty (30) calendar days after receiving the City's decision on the Notice of Potential Claim. The Contractor's failure to furnish notification within seven (7) calendar days and all justifying documentation within thirty (30) calendar days will result in the Contractor waiving all rights to the subject Claim.

If Disputed Work persists longer than thirty (30) calendar days after receiving the City's decision on the Notice of Potential Claim, then the Contractor shall, every thirty (30) calendar days until the Disputed Work ceases, submit to the City a document titled "Claim Update" which shall update and quantify all elements of the Claim as completely as possible. The Contractor's failure to submit a Claim Update or to quantify all costs and impacts every thirty (30) days shall result waiver of that portion of the Claim for that thirty (30) day period. Claims or Claim Updates stating that damages will be determined at a

later date shall not comply with the requirements of these provisions and shall result in the Contractor waiving such Claim(s) and/or Claim Updates.

All Claims must be submitted to Engineer before the issuance of the Final Estimate. Contractor hereby expressly waives all Claims not submitted, in complete and proper form, on or before the date of issuance of the Final Estimate.

Upon receipt of the Contractor's formal Claim including all arguments, justifications, costs or estimates, schedule analyses, and documentation supporting the Contractor's position as previously stipulated, the City or its designate will review the Claim and render a final determination. If the Contractor's Claims at project completion total less than \$375,000, then claims resolution shall proceed in the manner prescribed by Article 1.5, Chapter 1, Part 3 of Division 2 of the California Public Contract Code.

Claims shall be calculated in the same manner as extra work using the procedures set forth in Section 9-1.03 "Force Account Payment". This method applies in all cases of Claims, regardless of type, whether in negotiation, arbitration, litigation, and even applies in the event of fault, negligence, strict liability, or tort claims of all kinds, including strict liability or negligence. No other costs arising out of or connected to with the performance of Claims, of any nature, may be recovered by the Contractor. Except where provided by law, or elsewhere in these Contract Documents (if applicable), the City shall not be liable for special or consequential damages, and Claims shall not include special or consequential damages. Contractor shall be limited in its recovery on Claims to the calculations set forth in Section 9-1.03 of these provisions.

E. Claim Format. The Contractor shall submit the Claim justification in the following format:

1. Cover letter and certification of the accuracy of the contents of the Claim;
2. Summary of Claim including underlying facts, entitlement, quantum calculations and Contract Document provisions supporting relief;
3. List of documents relating to Claim including plans, specifications, clarifications/requests for information, schedules and others;
4. Chronology of events and correspondence;
5. Analysis of Claim merit;
6. Analysis of Claim costs;
7. Attached supporting documents referenced in Item 3 above.

F. Exclusive Remedy. The Contractors performance of its duties and obligations specified in these provisions and submission of a Claim as provided in these provisions is the

Contractor's sole and exclusive remedy for the payment of money, extension of time, adjustment or interpretation of Contract Documents terms or other contractual or tort relief arising from the Contract Documents. This exclusive remedy and the limitation of liability (expressed herein and elsewhere throughout the Contract Documents) apply notwithstanding the completion, termination, suspension, cancellation, breach or rescission of the Work or the Contract Documents, negligence or strict liability by the City of Dixon, its representatives, consultants or agents, or the transfer of the Work or the Project to the City for any reason whatsoever. The Contractor waives all claims of waiver, estoppel, release, bar, or any other type of excuse for non-compliance with the Claim submission requirements. Compliance with the notice and Claim submission procedures described in these provisions is a condition precedent to the right to commence litigation, file a Government Code Claim, or commence any other legal action. No Claim or issues not raised in a timely protest and timely Claim submitted under these provisions may be asserted in any Government Code Claim, subsequent litigation, or legal action. The City of Dixon shall not have deemed to waive any provision under this Section, if at the City's sole discretion; a Claim is accepted in a manner not in accord with this Section.

G. Mediation. All Claims not subject to the Claim resolution procedures set forth in these provisions shall, as a condition precedent to litigation thereon, first be mediated. Mediation shall be non-binding and utilize the services of a mediator mutually acceptable to the parties, and, if the parties cannot agree, a mediator selected by the American Arbitrator Association from its panel of approved mediators trained in construction industry mediation. All statutes of limitation shall be tolled from the date of the demand for mediation until a date two weeks following the mediation's conclusion. All unresolved claims shall be submitted to the same mediator. The cost of mediation shall be equally shared.

9-1.07C FALSE CLAIMS

California Penal Code section 72 provides that any person who presents for payment with intent to defraud any district board or officer, any false or fraudulent claim, bill, account, voucher, or writing, is punishable by fines not exceeding ten thousand dollars (\$10,000.00) and/or imprisonment in the state prison.

Government Code sections 12650, et seq., pertains to civil penalties that may be recovered from persons (including corporations, etc.) for presenting a false claim for payment or approval, presents a false record or statement to get a false claim paid or approved, or other acts, to any officer or employee of any political subdivision of the State of California. Any person or corporation violating the provisions of Government Code sections 12650, et seq., shall be liable for three times the amount of the damages of the political subdivision, plus a civil penalty, plus costs.

All Claims by Contractor, shall include the following certification, properly completed and executed by Contractor or an officer of Contractor:

I, _____, BEING THE _____ (MUST BE AN OFFICER) OF _____ (CONTRACTOR), DECLARE UNDER PENALTY OF PERJURY

UNDER THE LAWS OF THE STATE OF CALIFORNIA, AND DO PERSONALLY CERTIFY AND ATTEST THAT: I HAVE THOROUGHLY REVIEWED THE ATTACHED CLAIM FOR ADDITIONAL COMPENSATION AND/OR EXTENSION OF TIME, AND KNOW ITS CONTENTS, AND SAID CLAIM IS TRUTHFUL AND ACCURATE; THAT THE AMOUNT REQUESTED ACCURATELY REFLECTS THE CONTRACT ADJUSTMENT FOR WHICH THE OWNER IS LIABLE; AND, FURTHER, THAT I AM FAMILIAR WITH CALIFORNIA PENAL CODE SECTION 72 AND CALIFORNIA GOVERNMENT CODE SECTION 12650, ET SEQ, PERTAINING TO FALSE CLAIMS, AND FURTHER KNOW AND UNDERSTAND THAT SUBMISSION OR CERTIFICATION OF A FALSE CLAIM MAY LEAD TO FINES, IMPRISONMENT AND/OR OTHER SEVERE LEGAL CONSEQUENCES.

Contractor agrees that submission of a Claim, in strict conformance with all of the requirements of this Contract, and rejection of all or part of said Claim by City of Dixon, is a condition precedent to any action by Contractor against City of Dixon, including but not limited to, the submission of a claim pursuant to Government Code section 900, et seq., and the filing of a lawsuit.

Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of an independent Certified Public Accountant provided by Contractor with the claim.

Contractor agrees that any costs or expenses incurred by the City of Dixon in reviewing or auditing any claims that are not supported by the Contractor's cost accounting or other records, or the Contract, shall be deemed to be damages incurred by the City of Dixon within the meaning of the California False Claims Act.

Upon final determination of the claims, the Engineer will then make and issue the Engineer's Final Estimate in writing and within 30 days thereafter the City of Dixon will pay the entire sum, if any, found due thereon. That Final Estimate shall be conclusive and binding against Contractor on all questions relating to the amount of work done and the compensation payable therefor.

9-1.08 BLANK

9-1.09 CLERICAL ERRORS

Notwithstanding the provisions in Section 9-1.07, "Payment After Acceptance," for a period of 3 years after acceptance of the work, all estimates and payments made pursuant to Section 9-1.07, including the Final Estimate and payment, shall be subject to correction and adjustment for clerical errors in the calculations involved in the determination of quantities and payments. The Contractor and the City of Dixon agree to pay to the other any sum due under the provisions of this Section 9-1.09, provided, however, if the total sum to be paid is less than \$200, no payment shall be made.

9-1.10 BLANK

9-1.11 CONTRACTOR NOT AN AGENT FOR THE CITY

The right of general supervision shall not make the Contractor an agent of the City of Dixon, and the liability of the Contractor for all damages to persons or to public or private property arising from the performance of the work shall not be lessened because of such general supervision.

9-1.12 THIRD PARTY CLAIMS

The Contractor shall be responsible for all third-party claims, and for costs or injuries incurred by a third party which result from the operations of the Contractor, or its performance under the Contract.

9-1.13 GUARANTEE

Should any failure of the work occur within a period of one year after recordation of the notice of completion of the project or portions thereof, which can be attributed to faulty materials, poor workmanship, or defective equipment, the Contractor shall promptly make the needed repairs at Contractor's expense.

The City of Dixon is hereby authorized to make such repairs if the Contractor fails to make or undertake with due diligence the aforesaid repairs within ten (10) days after Contractor is given written notice of such failure and without notice to the surety provided, however, that in case of emergency where, in the opinion of the City of Dixon, delay would cause serious loss or damages, or a serious hazard to the public, the repairs may be made or lights, signs, and barricades erected, without prior notice to the Contractor or surety, and the Contractor shall pay the entire costs thereof.

9-1.14 MISCELLANEOUS PROVISIONS

This Contract shall bind and inure to the heirs, devisees, assignees, and successors in interest of Contractor, and to the successors in interest of City of Dixon, in the same manner as if such parties had been expressly named herein.

This Contract shall be governed by the laws of the State of California.

If any one or more of the provisions contained in the Contract should be invalid, illegal, or unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

This Contract constitutes the full and complete understanding of the parties, and supersedes any previous agreements or understandings, oral or written, with respect to the subject matter hereof. The Contract may only be modified by a written instrument signed by both parties.

Contractor hereby assigns to City of Dixon all its first-tier subcontracts now or hereafter entered into by Contractor for performance of any part of the work. The assignment will be

effective upon acceptance by City of Dixon in writing, and only as to those subcontracts which City of Dixon designates in writing. Such assignment is part of the consideration to City of Dixon for entering into the Contract with Contractor, and may not be withdrawn.

The provisions of the Contract Documents shall be included in all subcontracts.

9-1.15 PUBLIC CONTRACT CODE SECTION 20104, ET SEQ.

Public Contract Code section 20104, et seq., requires that the following language be set forth in the specifications:

§ 20104. Application of article; provisions included in plans and specifications

(i)(1) This article applies to all public works claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between a contractor and a local agency.

(2) This article shall not apply to any claims resulting from a contract between a contractor and a public agency when the public agency has elected to resolve any disputes pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2.

(ii)(1) "Public work" has the same meaning as in Sections 3100 and 3106 of the Civil Code, except that "public work" does not include any work or improvement contracted for by the state or the Regents of the University of California.

(2) "Claim" means a separate demand by the contractor for (A) a time extension, (B) payment of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (c) an amount the payment of which is disputed by the local agency.

(iii) The provisions of this article or a summary thereof shall be set forth in the plans or specification for any work which may give rise to a claim under this article.

(iv) This article applies only to contracts entered into on or after January 1, 1991.

§ 20104.2. Claims; requirements; tort claims excluded

For any claim subject to this article, the following requirements apply:

(v) The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.

(vi)(1) For claims of less than fifty thousand dollars (\$50,000), the local agency shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation

supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

(vii)(1) For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the local agency shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

(viii) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency's response or within 15 days of the local agency's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(ix) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

(x) This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

§ 20104.4. Civil action procedures; mediation and arbitration; trial de novo; witnesses

The following procedures are established for all civil actions filed to resolve claims subject to this article:

(i) Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

(ii)(1) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

(2) Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.

(3) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.

(3) The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.

§ 20104.6. Payment on undisputed portion of claim; interest on arbitration awards or judgments

(a) No local agency shall fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in the contract.

In any suit filed under Section 20104.4, the local agency shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

