

# **CITY OF GRASS VALLEY**



**PUBLIC WORKS DEPARTMENT - ENGINEERING DIVISION**

## **DESIGN STANDARDS**

**Revision: May 2016**

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## SECTION 1

### PURPOSE AND DEFINITIONS (PD)

- 1-1 PURPOSE** - The purpose of these Design Standards is to provide direction in the application of improvements which are to be dedicated to the public and accepted by the City for maintenance or operation, and to provide for coordinated development of those facilities to be used by and for the protection of the public. This includes certain private works, as well as improvements to be installed within existing City right-of-way and easements. Whereas it is the intent of these Standards to govern all new construction, City staff shall interpret and apply the Standards in a manner which achieves their intent, while encouraging and enabling the redevelopment of infill and vacant parcels.

These Standards shall apply to, regulate, and guide preparation of traffic impact studies and the design and preparation of plans for construction of streets, highways, alleys, drainage, sewerage, traffic signals, site access, water supply facilities and related public improvements, and shall set guidelines for all private works which involve drainage, grading, trees, and related improvements.

- 1-2 DESIGN PRACTICE** - Because it is virtually impossible to anticipate all situations that may arise or to prescribe specifications applicable to every situation, any items or situations not included in these Design Standards shall be designed in accordance with accepted engineering practices, the City of Grass Valley "Construction Standards", the Caltrans "Highway Design Manual," and the "California Manual on Uniform Traffic Control Devices," and as specified by the City Engineer.

The City Engineer may require additional standards and/or regulations not inconsistent herewith when deemed necessary to protect the health, safety, and welfare of the public. Questions regarding the Design Standards should be directed to the engineering staff of the Public Works Department. The City Engineer shall make all interpretations of the Standards. Appeals to the direction of the City Engineer shall be made to the City Council.

- 1-3 DEFINITIONS** - Whenever the following terms or titles are used in these standards or in any document or instrument where these standards govern, the intent and meaning shall be as herein defined:

- A. Applicant** - The Developer or his Consulting Engineer working on his behalf.
- B. Building Division** - The Building Division of the City of Grass Valley.
- C. CMUTCD** - The "California Manual on Uniform Traffic Control Devices" as adopted by the California Department of Transportation, latest edition.
- D. CBC** - California Building Code, latest edition.
- E. City** - The City of Grass Valley and its applicable Departments.
- F. City Engineer** - The Public Works Director/City Engineer of the City of Grass Valley, acting either directly or through the staff of the appropriate Divisions of the Public Works Department, or their authorized representatives.
- G. Construction Standards** - The latest edition of the "Construction Standards" adopted by the Grass Valley City Council and any amendments thereto governing the construction of roads, streets, sanitary sewers, storm drainage, concrete structures, water supply, traffic signals, street lighting and other facilities within the City of Grass Valley.

- H. Consulting Engineer** - Any person or persons, firm, partnerships or corporation legally authorized to practice civil, mechanical, or electrical engineering in the State of California who prepares or submits improvement plans and specifications to the Public Works Department of the City of Grass Valley for approval.
- I. Contractor** - Any person or persons, firm, partnership, corporation, or combination thereof, licensed to perform the type of work involved, who has entered into a contract with any person, corporation or company, or his or their legal representatives, for the construction of any improvement or portions of any improvement within the City of Grass Valley.
- J. Developer** - Any persons, firm, partnership, corporation, or combination thereof, financially responsible for the work involved.
- K. Development** - The act or process of any construction on properties as well as subdivision improvement.
- L. Development Code** - The latest edition of the “Development Code” adopted by the Grass Valley City Council, as may be supplemented by Design Guidelines for a given Specific Plan Area.
- M. Engineering Division** - The Engineering Division of the City of Grass Valley, Public Works Department.
- N. Fee Schedule** - The current fee schedule as adopted by City Council resolution.
- O. FEMA** - The Federal Emergency Management Agency charged with building and supporting the emergency management system, including advising communities on building codes and flood plain management.
- P. Fire Apparatus Access Roads** - Roads, either public or private, which serve to provide direct access to buildings or portions of buildings hereafter constructed. Said roads shall be designed to the minimum requirements of Grass Valley Fire Codes and these Standards.
- Q. Fire Department** - The Fire Department of the City of Grass Valley.
- R. Fire Flow** - The required flow rate of a water supply, measured at 20-pounds per square inch residual pressure that is available for firefighting. The procedure determining fire flow requirements for buildings or portions of buildings hereafter constructed shall be in accordance with Grass Valley Fire Codes.
- S. Fire Prevention Standards** - The latest edition of the “Fire Prevention Standards” enforced by the Fire Department in accordance with the Grass Valley Fire Codes.
- T. Grading Permit** - An official permit issued by the Engineering Division for excavation, fill, clearing and grubbing, and/or stockpiling activity, within the City limits, as specified on the approved grading or improvement plans.
- U. Improvements** - Street work, sidewalk, curb, gutter, driveways, water mains, sanitary sewer, storm drainage, street lighting, traffic signals, public utilities, landscaping, irrigation, parks, fences and other facilities to be constructed or installed by the Developer within an existing or future public right-of-way or easement and other improvements for which the Public Works Department is responsible for performing a plan-check or inspection.

- V. **Laboratory** - Any testing agency or testing firm which has been approved by the Public Works Department.
  - W. **Public Works Department** - The Public Works Department of the City of Grass Valley.
  - X. **Soils Report** - A report as prepared by any person or persons, firm, partnership, or corporation legally licensed to prepare “Soils Reports” in the State of California.
  - Y. **Standard Drawings** - The standard drawings as set forth in the Design Standards and Construction Standards as included herein, approved by the City Engineer and as amended.
  - Z. **State** - As used in the State Specifications, shall mean the City of Grass Valley
  - AA. **State Highway Design Manual** - “Highway Design Manual” of the State of California, Department of Transportation (Caltrans), latest edition.
  - BB. **State Standard Plans** - The “Standard Plans” of the State of California, Department of Transportation (Caltrans), latest edition.
  - CC. **State Standard Specifications** - The “Standard Specifications” of the State of California, Department of Transportation (Caltrans), latest edition.
- 1-4 **UPDATES** - These Design Standards shall be updated as necessary to reflect the changing technology and thinking of the engineering profession, the construction industry and the City of Grass Valley. All updates will be as directed by the City Engineer and as approved by the City Council. Users of this document shall be responsible for obtaining updates from the City of Grass Valley, Engineering Division.

## SECTION 2

### PERMIT AND SUBMITTAL REQUIREMENTS (PR)

- 2-1 GENERAL** - No work of any type shall be performed within the City right-of-way and easements without approved plans and an encroachment permit. No grading shall be performed within the City limit without approved plans and a grading permit. The certificate of insurance and all necessary securities shall be approved prior to approval of the plans and the issuance of any permits. This section contains the City's requirements for each of these permits.
- 2-2 GRADING PERMITS** - The City Development Code and the CBC requires that a grading permit be obtained from the City prior to beginning any grading, unless otherwise exempted as specified in the Development Code Chapter 17.60 Grading Permit Requirements and Procedures and the CBC.
- A. Fees** - A deposit for plan review and inspection fees is required with all grading permit applications. The final grading permit fees will be the actual cost of services provided. The latest adopted fee schedule shall be used to determine grading permit fees.
- B. Security** - An Improvement Performance Security shall be submitted for all activities requiring a grading permit (if a subdivision improvement agreement is not in place). The amount of the security shall be based on an approved Engineer's cost estimate for the project. The cost estimate shall be provided to the Engineering Division for review and approval as a part of plan submittal. All costs shall include a ten (10) percent contingency. The security amount shall be for the sum of the following: 1) 100% of the cost of public improvements necessary to restore the public right of way back to existing conditions or the cost of the proposed public improvements, whichever is less; 2) 10% of the cost of erosion and sedimentation control necessary to stabilize the site; 3) 10% of the cost of tree replacement; and 4) 100% of the cost to address any features which could cause a hazard to the public or neighboring property owners if left in an incomplete state. The minimum security amount shall be \$500.00.
- C. Insurance** - Insurance is not required where the proposed grading is not within existing City right-of-way and easements. Where grading is proposed within City right-of-way and easements an encroachment permit shall be applied for and issued prior to any work being performed in City right-of-way or easements.
- D. Release of Security** - The amount of the security may be reduced, but not less than \$500.00 or the Warranty and Guarantee Security for the public improvements, whichever is greater, by the Engineering Division as potential hazards are removed and/or the nature of the project does not justify the full amount. The Improvement Performance Security shall be released following completion of all conditions of the permit, receipt of written request for release by developer, submittal of a Warranty and Guarantee Security (if required) and approval by City Council (if required).
- 2-3 ENCROACHMENT PERMITS** - An encroachment permit is required for any work performed within the City's right-of-way and easements.
- A. Fees** - Plan review and inspection fees for encroachment permits will be the actual cost of services provided, subject to minimum amounts based on the project scope. The latest adopted fee schedule shall be used to determine encroachment permit fees.

Where grading is proposed in conjunction with the improvements, a grading permit shall be issued

prior to or concurrently with the encroachment permit.

Trench Cut Recovery Fees as specified in the Municipal Code will be collected for all utility cuts into existing streets as specified in the Ordinance. Trench Cut Recovery Fees are based upon the extent of trenching proposed and present condition of the street's pavement prior to trenching. Fees will be calculated prior to issuance of an encroachment permit by the Engineering Division.

- B. Security** - An Improvement Performance Security shall be submitted prior to the issuance of an encroachment permit, if required (as determined by the City Engineer). The security amount shall be for 100% of the cost of public improvements necessary to restore the public right of way back to existing conditions or the cost of the proposed public improvements, whichever is less. The estimate shall include the cost of erosion and sedimentation control and all improvements in the existing City right-of-way and easements. The minimum security amount shall be \$500.00. The cost estimate shall be provided to the Engineering Division for review and approval as a part of plan submittal. All costs shall include a ten (10) percent contingency.
- C. Insurance** - A Certificate of Insurance evidencing certain insurance coverage is required for all work within City right-of-way and easements. Contact the Engineering Division for information regarding minimum insurance coverage requirements.
- D. Release of Security** - The amount of the security may be reduced, but not less than \$500.00 or the Warranty and Guarantee Security for the public improvements, whichever is greater, by the Engineering Division as potential hazards are removed and/or the nature of the project does not justify the full amount. The Improvement Performance Security shall be released following completion of all conditions of the permit, receipt of written request for release by developer, submittal of a Warranty and Guarantee Security (if required) and approval by City Council (if required).

**2-4 ACCEPTED PLANS** - Complete plans and specifications for all proposed streets, bikeways, grading, drainage facilities, sewerage, utilities, traffic signals, water distribution systems, storage, wells, PRV stations, industrial developments, commercial developments, and subdivisions, including any necessary dedications, easements, and rights of entry, shall be submitted to the Public Works Department for acceptance. This acceptance shall be substantiated by the signature of the City Engineer, the responsible charge Consulting Engineer, appropriately licensed by the State of California, and the Geotechnical Engineer (if required by the City Engineer) prior to the beginning of construction of any such improvements.

**2-5 SUBMISSION OF IMPROVEMENT (GRADING) PLANS** - The following are the procedures and requirements when submitting improvement plans to the City of Grass Valley for review. Incomplete submittals will not be accepted.

The Public Works Department acts as the lead agency in the submittal process for improvement plans. The submittal package should be submitted directly to the Public Works Department for routing to the other City Departments as applicable.

**A. Submittal Requirements** - The following are the submittal requirements for improvement plans:

1. Completed application form - available online.
2. One (1) full size (24" X 36") paper set of improvement plans (unless otherwise requested by City staff). Initial submittals for review may be on bond paper, whereas the final copy submitted for

- acceptance and all record drawings shall be plotted on “Mylar” film (or equivalent).
3. One (1) set of improvement plans in electronic format (.pdf). If unavailable, a total of five (5) full size paper sets shall be required to comply with item 2.
  4. Two (2) copies or a pdf of the soils and/or geotechnical reports for the site.
  5. Two (2) sets or a pdf of landscaping and irrigation plans, if required by condition of approval.
  6. Two (2) copies or a pdf of the 10, 25 and 100 year storm drain calculations based on this manual and City of Grass Valley’s Storm Drainage Master Plan, including two (2) copies of the drainage shed map.
  7. Two (2) copies or a pdf of any necessary hydraulic studies and any necessary HEC analysis. These analyses, when required by the Public Works Department, shall include the following:
    - a. Program printouts for both the before and after conditions.
    - b. A plan showing contours, stream centerlines, limits of proposed construction, floodplain and floodway boundaries as calculated by the analysis, and boundaries as established by the best available information, if applicable.
    - c. Cross section plots of before and after conditions for all sections affected by the development.
  8. Two (2) copies or a pdf of water and sewer calculations in accordance with this manual, if required by the Public Works Department.
  9. Two (2) copies or pdf’s of all reports, approvals, and permits required per the conditions of approval for the project (if applicable).
  10. An itemized engineer's estimate of construction cost based upon reasonable and current unit costs. All cost estimates shall include a ten (10) percent contingency. The cost estimate shall include, but not be limited to, all public landscaping improvements, grading proposed within public right-of-way and easements, construction staking, all private improvements separately described and estimated (not including the cost of any buildings). The Engineer may be requested to substantiate unit costs used through recent bids, contractor prices, etc.
  11. Payment (100%) of the plan check deposit in accordance with the adopted fee schedule. The City reserves the right to collect additional plan check and inspection fees based on actual cost incurred.
- B. Record Drawings** - The following are the submittal requirements for improvement plan record drawings:
1. Obtain original Mylars from City Engineering Division, modify as required, stamp drawings “Record Drawing” and have engineer of record sign and date.
  2. The grading contractor shall sign a statement on the plans that the improvements were constructed as shown on the record drawings.

3. Submit record drawings to City for acceptance and record retention.

**2-6 SUBMISSION OF FINAL AND PARCEL MAPS** - Final and Parcel maps may be submitted only after approval of the tentative map by the City Council and after the Conditions of Approval are available from the Planning Department.

**A. Submittal Requirements** - The following are the submittal requirements for final maps or parcel maps:

1. Completed application form - available online.
2. Three (3) sets of the final or parcel map. Initial submittals for review may be on bond paper, whereas the final copy submitted for acceptance and all record drawings shall be plotted on "Mylar" film (or equivalent).
3. One (1) copy of the final or parcel map in electronic format (.pdf) on compact disc.
4. Payment of map check fee deposit in accordance with the adopted fee schedule.
5. Two copies of boundary and parcel closure calculations.
6. Two copies of the Preliminary Title Report dated within six months and if map approval extends beyond six months, a new report is required.

**2-7 SUBDIVISION IMPROVEMENT AGREEMENT** - Per the Development Code, the City may allow the filing of a parcel or final map prior to the completion of all required improvements. The subdivider must post a deposit in accordance with the adopted fee schedule for the City to prepare a Subdivision Improvement Agreement and obtain City Council approval. Security for the Subdivision Improvement Agreement shall amount to 50% for faithful performance, 50% for payment security, 10% for guarantee and warranty security and 100% of the costs for survey monuments for a total security not less than 110% of the total costs of the required improvements.

**2-8 SUBMISSION OF LOT LINE ADJUSTMENTS** - Lot line adjustments can include adjusting lot lines between up to four parcels, the recordation of a Certificate of Compliance, parcel mergers, or reversions to acreage.

**A. Submittal Requirements** - Lot line adjustments and reversions to acreage require prior approval from the Planning Division. The following are the submittal requirements for lot line adjustments, Certificates of Compliance, parcel mergers, and reversions to acreage for Public Works approval:

1. Completed application, available online, signed by all affected property owners attesting to their approval of the lot line adjustment.
2. Three (3) copies of the resultant property boundary descriptions with three (3) copies of exhibit maps (8.5" x 11" sheet) stamped and signed by a California Licensed Land Surveyor or Registered Civil Engineer authorized to practice land surveying.
3. Three (3) copies of the boundary closure calculations for the resulting lots.
4. Application signed by all affected property owners attesting to their approval of the lot line adjustment.



5. Three (3) copies of the deed(s) to convey interest in the affected properties.
6. Two (2) copies of a preliminary title report no older than six (6) months for all properties involved.
7. Evidence that the current year's property taxes have been paid, prior to City acceptance of the lot line adjustment.
8. Payment of Certificate of Compliance or parcel merger fee (if applicable). Payments for lot line adjustments and reversions to acreage are paid as part of the planning approval process.

**2-9 SUBMISSION OF DEDICATION BY SEPARATE INSTRUMENT** - Dedications for public right-of-way or public easements shall be submitted to the Public Works Department for review and processing.

**A. Submittal Requirements** - The following are the submittal requirements for dedications:

1. Completed application form.
2. Three (3) copies of the grant document on an 8.5" x 11" sheet(s) containing notarized signature(s) of the owners(s) and affected property(ies). The grant document shall contain a legal description sufficient to retrace property boundaries in metes and bounds format of the area being granted. The purpose(s) for which the area is being granted shall be included. Legal descriptions shall be prepared stamped and signed by a licensed Land Surveyor or Registered Civil Engineer authorized to practice land surveying and written in accordance with accepted practice.
3. Three (3) copies of an exhibit map on 8.5" x 11" sheet. The map shall show the physical location of the area being granted as described in the legal description. The map shall contain the following information:
  - a. North arrow.
  - b. Scale of map.
  - c. Point of beginning of the description.
  - d. Bearings and distances of the description.
  - e. Easement width and type.
  - f. Reference to other supporting documents.
4. Three (3) copies of lot closure calculations and supporting documents used to verify that legal lines are in their proper locations.
5. Two (2) copies of the Preliminary Title Report dated within six months. If approval extends beyond six months, a new report is required. If Deeds of Trust or Mechanic (or other) liens on the property appear in the Title Report for the property, subordination agreements shall be submitted. The agreement shall be signed and notarized by all property owners and beneficiaries.

**2-10 RESUBMITTAL REQUIREMENTS** - All resubmittals shall be sent directly to the Public Works Department for routing to other City Departments as needed. All resubmittals shall include the previous

check prints. The number of plans required shall be as requested by the City in the returned comments. All comments shall be either addressed on the plans or, if a comment is not specifically addressed on the plans, a written explanation shall be provided stating why the comment was not addressed.

Plans being resubmitted that contain alterations or revisions other than those required by the City shall require the consulting engineer to bring those revisions or alterations to the attention of the City.

**2-11 EXPIRATION OF PLANS** - Every permit issued under the requirements of this manual shall, at the discretion of the City Engineer, become null and void if the construction of work authorized by such permit is not commenced within one (1) year from the date of such permit, or if the construction of work authorized by such permit is suspended or abandoned at any time after the work is commenced for a period of six (6) months. At such time, the plans shall be subject to review by City staff to determine conformance with current City standards.

**2-12 IMPROVEMENT PLAN REVISIONS DURING CONSTRUCTION** - Should changes to improvement plans become necessary during construction, such changes shall be subject to approval of the City Engineer.

**A. Approval Process** - The procedure for obtaining approval shall be as follows:

1. The Consulting Engineer shall submit two (2) copies of the proposed changes shown in red. The Public Works Department shall route the proposed revision to all applicable City Departments for review.
2. Following review and approval by the Public Works Department and all other City Departments of the proposed change, the Consulting Engineer shall submit the current approved plan, stamped and signed by the Engineer, in reproducible form showing the proposed change.
3. If determined acceptable, the City Engineer will indicate approval for the change by initialing the plans in the revision box.

**B. Plan Revision** - After receiving approval, actual revisions shall be made in accordance with the following:

1. Unless approved by the City Engineer, the original design shall not be eradicated from the plans but shall be lined out.
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.

**2-13 STRUCTURAL ITEMS** - The following is the City's procedure for plan checking and construction inspecting of structural items such as bridges, retaining walls, non-standard culverts, etc.

**A. Private Improvements** - Where structural items are to be constructed on private property which is intended to remain privately owned, the design engineer shall submit a letter along with the plan submittal which certifies that the item has been designed in accordance with accepted engineering practice. Said letter shall be wet stamped with the design engineer's RCE stamp and wet signed by the design engineer. The City will not plan check the design of the item as related to structural integrity.

The responsibility for ensuring said integrity rests with the design engineer.

For inspection of private structural items, the design engineer shall submit a letter to the Engineering Division certifying that the item has been constructed in accordance with accepted test methods. Said letter shall be wet stamped with the design engineer's RCE stamp and wet signed by the design engineer. It shall be the Developer's responsibility to make arrangements, as necessary, with the design engineer to enable said engineer to provide said letter as described above. The City will not inspect the construction of the item as related to structural integrity. The responsibility for ensuring said integrity rests with the design engineer.

**NOTE:** The above is not to be confused with private on-site retaining walls, buildings, etc., as these items require a building permit and therefore are plan checked and inspected by the Building Division. The structural items addressed in this section primarily pertain to improvements associated with private roadways.

- B. Public Improvements** - Where structural roadway items are to be constructed on public property, public right-of-way, or on private property which is intended to become public property or right-of-way, improvement plans shall be submitted to the Engineering Division for plan check along with the roadway improvement plans.

For inspection of public structural roadway items, the Engineering Division will provide inspection services similar to typical public roadway inspection which may include retaining a consultant for inspection services.

**2-14 DEVIATION FROM STANDARDS** - All requests for approval of exceptions from the design requirements contained within these Design Standards shall be submitted in writing to the Engineering Division. Approval for exceptions shall be sought as early as possible in the project development process, particularly where the project concept and/or cost estimate depend on the proposed design exceptions.

- A. Design Exceptions** - Requests for design exceptions shall include the following:

1. A statement of the specific standard for which a design exception is requested.
2. A thorough but brief description of the reason for the request for the design exception.
3. A description of any non-standard safety enhancements to be provided such as median barriers, guardrail upgrades, etc.
4. An estimate of the additional cost required to conform to these Design Standards.

- B. Approval** - The approval of all deviations from these standards shall be by the City Engineer, or by motion of the Planning Commission or City Council, as applicable.

## SECTION 3

### PLAN AND MAP REQUIREMENTS (PM)

- 3-1 GENERAL** - Improvement (Grading) Plans shall be prepared for all private improvements requiring a grading permit, and public improvements required of subdivisions and all other work performed within City right-of-way or easements that is in excess of minor work, as determined by the City Engineer. For the purposes of this section, minor work shall consist generally of the construction, or the removal and replacement of curbs, gutters, sidewalks or driveways; minor street widening; connections to existing water, sewer or storm drainage facilities adjacent to site development; and utility related work. Minor work in City right-of-way or easements requires an encroachment permit and a plan may be required as part of that.
- 3-2 SHEET INFORMATION** - All improvement plans shall be clearly and legibly drawn in ink on 24-inch by 36-inch paper ("D" size). Initial submittals for review may be on bond paper, whereas the final copy submitted for acceptance and all record drawings shall be plotted on "Mylar" film (or equivalent). Sheets shall have a 1½-inch wide clear margin at the left edge and a 1-inch wide margin on all other edges, or as otherwise approved by the City Engineer.
- A. Drafting Standards** - All line work shall be neat, clearly legible, and opaque to light. Letters and numerals shall have a minimum height of 0.075-inch and be well formed and sharp. Numerals showing profile elevations shall not be bisected by station grid lines. Dimension lines shall be terminated by sharp, solid arrowheads.
- B. Scale** - Horizontal scale shall be 1-inch = 20, 30, 40, or 50 feet. Vertical scale shall be 1-inch = 2, 3, 4, or 5 feet.
- C. Title Block** - A title block must be shown on each sheet within the set of plans and shall show the grading permit number, subdivision or project name, sheet title, sheet number, date, scale, and the Consulting Engineer's name, signature, and license number. The title block shall be placed along the lower edge or right side of the sheet.
- D. Orientation** -All plan sets shall be oriented with the north arrow pointing either to the top or the right edge of the plan sheet, unless otherwise restricted by the centerline stationing requirements.
- E. Order of Plan Sheets** - Plan sheets shall be in the following order (not all sheets listed below will apply to every project):
1. Title Sheet
  2. Standard Notes
  3. Typical Sections and Details
  4. Retaining Wall Details
  5. Utility Overview Plan
  6. Grading Plans

7. Street Plan and Profile Sheets
8. Street Light /Signal Plans
9. Signing and Striping Sheets
10. Erosion and Sediment Control Plans
11. Landscaping and Irrigation Plans

**3-3 PLAN SHEETS** - Each set of Improvement Plans shall include the following sheets and information in the following order.

- A. Title Sheet** - The Title Sheet shall be sheet one of the plans and shall include the following (refer to the detailed drawing for additional information):
  1. A vicinity map drawn to a convenient scale, not less than 1 inch = 2,000 feet.
  2. A North arrow and scale. The North arrow must point to the top of the sheet.
  3. Index of sheets.
  4. A signature block for the City Engineer.
  5. Utility contact information.
  6. Key map showing the entire subdivision or parcel drawn to a scale not less than 1-inch = 200--feet, or as approved by the City Engineer. The map shall provide the following:
    - a. Streets and street names of all streets within or contiguous to the project.
    - b. Adjacent subdivisions or parcels properly identified including names, lot lines and lot numbers.
    - c. All property lines and City limit lines (if applicable).
  7. Legend of all symbols and abbreviations used in the improvement plans (May be included on Standard Notes sheet if space is inadequate).
  8. Temporary and permanent benchmarks with descriptions.
  9. A note stating that Nevada Irrigation District (NID) facilities must be approved by NID (if applicable).
  10. Earthwork quantities.
  11. Soils/Geology report information including:
    - a. Title.
    - b. Date.
    - c. Contact information

**12. Engineer's Declaration exactly as follows:**

**"DECLARATION OF ENGINEER OF WORK"**

I hereby declare that the design of the improvements as shown on these plans complies with professional engineering standards and practices. As the engineer in responsible charge of the design of these improvements, I assume full responsible charge for such design. I understand and acknowledge that the plan check of these plans by the City of Grass Valley is a review for the limited purpose of ensuring the plans comply with City procedures and other applicable policies and ordinances. The plan check is not a determination of the technical adequacy of the design of the improvements. Such plan check does not relieve me of my responsibility for the design of these improvements.

As Engineer of Work, I agree to indemnify and save the City of Grass Valley, its officers, agents, and employees harmless from any and all liability, claims, damages or injuries to any person or property which might arise from the negligent acts, errors or omissions of the Engineer of Work, my employees, agents, or consultants.

\_\_\_\_\_  
Engineer

\_\_\_\_\_  
License No.

\_\_\_\_\_  
Date

**B. Standard Notes** -The Public Works Department Standard Notes (PS-1, PS-2, PS-3) shall be clearly referred to on the project plans or included in their complete form. All Standard Notes and other Engineer's notes shall be provided on either the first or second sheet of the plans.

**C. Detail Sheets** - Detail sheets, if necessary, shall delineate special details, structural designs, etc., for which no Public Works Department Standard Drawing exists, and when space is not available on the plan and profile sheets.

Plan views of the structure, for which details of design are to be provided, shall be shown on the detail sheet depicting the location of said structure in relation to street centerlines, stations, bearings, skews, grades, etc. Structural details shall be delineated at a scale that will clearly define all facets of the design. Public Works Department Standard Drawings shall not be delineated on detail sheets or any other sheet unless included in their complete form.

NID detail sheets shall be included, as required, but shall not have a City Engineer's signature block as the City will not approve NID facilities

**D. Utility Plan Overview** - All existing and proposed utilities shall be shown including storm drainage, sewer, water, electrical and gas utility trenches.

**E. Grading and Improvement Sheets** - Grading plans shall conform to the requirements of these Design Standards.

**F. Street Plan and Profile Sheets** - The following requirements are for all plans submitted to the City of Grass Valley for review and approval:

1. **Plan View** - The plan view of each street to be improved shall be shown on separate sheets and shall include existing improvements and contours/elevations within the project vicinity (generally 100 feet of the project boundary), proposed improvements and future improvements if known. Proposed improvements shall include sidewalks, curbs, gutters, driveways, sewer mains, water mains, sewer lateral locations, storm drains, manholes, valves, fire hydrants, fencing, barricades, monuments, survey stationing, signal pull boxes, signal poles, hardscape features, curve data for all curves along centerline and curb returns and distinct elevations along the face of curb at all beginning and ends of curves and at all curb returns. In addition, right-of-way lines, easement lines, and City limit lines (if applicable) shall be shown. Callouts on the plans to City Standard Improvements (“Type C D.I.”, “Type 2 curb”, etc.) shall reference the Standard Drawings where these are shown. Callouts for non-standard improvements shall reference the detail, including sheet number, which provides the construction specifics. Other data may be required as specified by the City Engineer. The survey stationing shall normally read from left to right with the North arrow pointing either to the top or right edge of the sheet. All stationing shall be a continuation of that used for the design of existing improvements where possible.
2. **Profile View** - The profile view of each street shall be shown immediately below its plan view. The profile shall include existing and proposed street centerlines, sewer mains, storm drains, water mains, public utility mains, all utility crossings, and gutter flow lines. Distinct stations and elevations shall be shown for the street centerline and gutter flow line at 25-foot intervals and at all, beginning, middle and end of curves, grade break points, manhole and catch basins, and water main crossings with other utilities. Rates of grade shall be shown on all profile lines. Elevations of the hydraulic grade line for the 25-year and 100-year frequency storms shall be shown at all storm drain manholes, catch basins and drain inlets.

**G. Signing and Striping Plans** - All existing and proposed traffic signing and striping shall be shown on a plan view and on separate sheets from all other improvements. The scale shall be a minimum of 1-inch = 40 feet, or as otherwise approved by the City Engineer. Signing and striping to be shown shall include all existing and proposed traffic striping, pavement markings, pavement markers, regulatory signs and warning signs. All existing signing and striping within at least 200-feet of the project limits shall be shown.

**H. Signal Plans** - Signal plans, if required, shall conform to the requirements of these Design Standards

**I. Erosion and Sediment Control Plans** – An erosion and sediment control plan and/or SWPPP developed pursuant to the State Water Board’s Construction General Permit (CGP) is required for every Grading Permit project and must include site-specific construction site Best Management Practices (BMP’s) consistent with the latest edition of the California Storm Water Quality Association (CASQA) BMP Handbook or equivalent. Rationale may need to be supplied regarding the selection of BMP’s including soil loss calculations, if not obvious. All erosion and sediment control plans must list applicable permits directly associated with the grading activity, including but not limited to the State Water Board’s CGP, State Water Board 401 Water Quality Certification, U.S. Army Corps 404 permit and California Department of Fish and Game 1600 Agreement.

**J. Other Plans** - Other plans that shall be incorporated in the Improvement Plans include, but are not limited to, landscaping, irrigation, tree removal and protection, and photometric plans. All other plans shall conform to the requirements of these Design Standards.

**3-4 PARCEL AND FINAL MAPS** - The parcel or final map shall be prepared by or under the direction of a registered Civil Engineer authorized to practice land surveying or licensed land surveyor in the manner required by the State Subdivision Map Act, the City of Grass Valley Municipal Code, and these Design

Standards.

**A. Preparation and Form** – All maps shall be clearly and legibly drawn in ink on 18-inch by 24-inch paper. Initial submittals for review may be on bond paper, whereas the final copy submitted for acceptance shall be plotted on “Mylar” film (or equivalent). The general form and layout of maps, including size and type of lettering, drafting and location acknowledgements, etc., shall be as approved by the City Engineer. Parcel and final maps shall conform to the following:

1. Survey information shall normally read from left to right orientated perpendicular or parallel with the northerly direction. North shall be oriented to either top or right edge of the sheet.
2. Large lot final maps or large lot parcel maps shall not be more than one inch equals 100-feet, unless otherwise permitted by the City Engineer. The scale of residential final maps shall not be more than one inch equals 50-feet. All maps shall clearly show all details of the subdivision.
3. All dimensions shall be shown in feet and hundredths of a foot. No ditto marks shall be used.
4. If more than two sheets are necessary to show the entire subdivision, a graphical index shall be included.
5. The subdivision designation, tract number, other numbers assigned by the City Engineer, scale and north arrow shall be shown on each sheet.
6. A title sheet, designated as page number one of the final map, shall be provided. Where the size of the subdivision permits, in lieu of a separate title sheet, the information required may be shown on the same sheet as the map of the subdivision.
7. The final map shall be legibly drawn in accordance with the requirements of the Subdivision Map Act, and as directed by the City Engineer. The parcel or final map, when filed, must be in such condition that legible prints and negatives can be made there from.

**B. Certificate Sheet** - The Certificate Sheet shall contain the following information:

1. The title followed by the words, “Final Map/Parcel Map No. (insert Planning Department’s file number).” “City of Grass Valley, Nevada County, California.”
2. Below the title shall be a subtitle, consisting of a description of all property being subdivided with reference to such map or maps of property shown thereon as shall have been last previously recorded or filed in the County Recorder’s Office, or shall have been previously filed with the County Clerk pursuant to a final judgment in any action in partition, or shall have been previously filed in the office of the County Recorder under authority of the Subdivision Map Act or by reference to the plat of any United States survey.
3. The subtitle of maps filed for the purpose of reverting subdivided land to acreage shall consist of the words, “A reversion to acreage of . . . .” (insert description as required herein).
4. Reference to tracts and subdivisions in the description must be worded identically with original records. References to book and page of record must be complete.
5. Affidavits, certificates, acknowledgements, endorsements, acceptances, dedications and notarial seals as required by law including, but not limited to, the Subdivision Map Act and City



Ordinance.

- C. Information** - The Parcel or Final Map shall substantially conform to the City approved or conditionally approved tentative map including all approved modifications, and shall contain the following information:
1. All areas shown on the map which do not constitute a part of the subdivision shall be labeled “Not a part of this subdivision,” or, “N.A.P.O.T.S.” All lines delineating such areas shall be dashed.
  2. The following survey data and information shall be shown on the Final Map:
    - a. Stakes, monuments (together with their precise position) or other evidence found on the ground, to determine the boundary of the subdivision.
    - b. Corners of all adjoining properties identified by lot and block numbers, subdivision names, numbers and pages of record, or by section, township and range, or other proper designation.
    - c. All information and data necessary to locate and retrace any point or line without reasonable difficulty.
    - d. The location and description of any required monuments to be set after recording of the parcel map, and the statement that they are “to be set.”
    - e. Bearings and lengths of each lot line, block line and boundary line. The bearings and lengths of centerlines describing a road or easement shall be shown unless otherwise depicted by the lot boundaries. All line annotation shall be located adjacent to the described line. Curve and line tables can be used to avoid crowding and conflicts with line work or other information shown on the map; however, the use of annotation tables shall be kept to a minimum.
    - f. Chord length, chord bearing, radius, and central angle of each curve, as required to retrace curve.
    - g. The survey center lines of any street or alley in or adjacent to the parcel together with reference to a field book or map showing such center line and the monuments which determine its position. If the monuments are determined by ties, that fact shall be so stated.
    - h. Sheet numbering shall be located in the lower right hand corner of each sheet.
    - i. Such other survey data or information as may be required to be shown by the City.
  3. All resulting lots or parcels being subdivided for the purpose of sale, lease, or financing, excluding those exempted by law, and all parcels offered for dedication to the City or any other public agency, for any purpose, with all dimensions, boundaries and courses clearly shown and defined. Dimensions of lots shall be as total dimensions corner to corner, in addition to point to point dimensions.
  4. All lots shall be numbered consecutively, without omissions or duplication, throughout the subdivision, starting with the number one, except units of a total development which shall be numbered consecutively throughout the development. Lot numbering shall be consistent with that of the approved or conditionally approved tentative map or as approved by the City Engineer.

- Only parcels offered for dedication other than for streets or easements shall be designated by letters. However, in single family divisions, the parcels intended for other than single family use may be designated by letters. Each numbered lot shall be shown entirely on one sheet.
5. The square footage (to the nearest foot) shall be shown on the map directly under the lot number. Lots one (1) acre or greater shall be shown with the net acreage (to the nearest one hundredth of an acre).
  6. The location and total width of all public streets, alleys, pedestrian ways, equestrian and hiking trails and biking paths, and rail road right-of-ways; the names of public streets, and the width on each side of the center line of each public street; the width of the portion of the street, alley, pedestrian way, equestrian and hiking trail and bike path being dedicated, and the width of the existing dedication, public or private, if any, within the subdivision.
  7. All necessary data including width and sidelines of all proposed and existing public utility easements to which the lots of the subdivision are subject. Each easement shall be clearly labeled as to nature and purpose and, if already of record, its recorded reference given. Easements shall be denoted by fine dashed lines.
  8. All limitations on rights of access to and from streets and lots and other parcels of land.
  9. The lines of any natural watercourse, channel, stream, creek or body of water in or adjacent to the subdivision and/or officially adopted floodplain lines, which constitute parcel boundary lines or easement lines.
  10. Any City boundary crossing or adjoining the subdivision clearly designated and tied in.
  11. Total acreage within the subdivision.
  12. The basis of bearings used in the field survey, making reference to some recorded subdivision map or other source acceptable to the City Engineer.
- D. Additional Data Required** - The following statements, documents and other data, and as many additional copies thereof as may be required, shall be filed with the parcel or final map:
1. On the application form, the names, addresses, and telephone numbers of the record owners and sub-divider and persons preparing the Parcel or Final Map.
  2. A guarantee of title or letter from a title company, certifying that the signatures of all persons whose consent is necessary to pass a clear title to the land being subdivided and all acknowledgements thereto, appear and are correctly shown on the proper certificates, and are correctly shown on the final map; both as to consents for the making thereof and the affidavit of dedication.
  3. A traverse computations sheet in a computerized form approved by the City Engineer, giving bearings, distances and coordinates, and showing the mathematical closure. No manual computations will be accepted. All lots must close to within 0.02-feet or as specified by the City Engineer.
  4. All protective covenants, restrictions, or affirmative action obligations in the form in which the same are to be recorded when approval thereof by an officer of the City has been required as a

condition of approval of the Tentative Map.

5. All offers of dedication by separate instrument shall conform to these Design Standards; and any offer of dedication by separate instrument for fee title shall conform to the City of Grass Valley Municipal Code.

Whenever an offer of dedication by a separate instrument accompanies a Parcel or Final Map, the Parcel or Final Map shall not be accepted for filing by the City Engineer until he first approves the instrument of recordation.

6. All other data required by law as a condition of approval of the Tentative Map, including plans, reports, agreements, permits, fees, security or other requirements.

7. Refer to standard details for standard statements.

**3-5 PROPERTY OF CITY** - All plans, maps, reports and any other items submitted to the City shall become the property of the City. The City shall not be responsible for the return of these items once they are submitted.

**3-6 STANDARD DETAILS** - Standard details PS-1 through PS-5 are attached on the following pages.

GENERAL:

1. ALL WORK SHALL CONFORM TO THE LATEST EDITIONS OF THE CITY OF GRASS VALLEY CONSTRUCTION STANDARDS, DESIGN STANDARDS, CALTRANS STANDARD SPECIFICATIONS AND PLANS AND THE CALIFORNIA MUTCD.
2. THE CONTRACTOR AGREES THAT, IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD OWNER AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXEMPTING LIABILITY ARISING FROM THE NEGLIGENCE OF ENGINEER.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN PERMITS, LICENSES AND CERTIFICATES FROM THE APPROPRIATE AGENCIES NECESSARY TO PERFORM THE WORK SHOWN ON THESE PLANS.
4. THE CONTRACTOR SHALL NOT BEGIN ANY WORK SHOWN ON THESE PLANS UNTIL THE CITY ENGINEER'S SIGNATURE OF APPROVAL IS AFFIXED HEREON. THERE SHALL BE AN APPROVED SET OF PLANS ON THE JOB DURING ANY CONSTRUCTION.
5. THE CONTRACTOR SHALL CONTACT THE CITY OF GRASS VALLEY ENGINEERING DIVISION TO SCHEDULE A PRE-CONSTRUCTION MEETING ONE-WEEK PRIOR TO STARTING WORK. THE ENGINEERING DIVISION SHALL NOTIFY THE APPROPRIATE CITY DEPARTMENTS OF THE MEETING. ALL OTHER APPROPRIATE UTILITY REPRESENTATIVES AND SUBCONTRACTORS SHALL BE NOTIFIED BY THE CONTRACTOR AS TO THE DATE AND LOCATION OF THE MEETING.



UTILITY LOCATION:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL EXISTING UNDERGROUND UTILITIES, WHETHER OR NOT THEY ARE SHOWN ON THESE PLANS. A REASONABLE EFFORT HAS BEEN MADE TO LOCATE AND DELINEATE ALL UNDERGROUND FACILITIES, HOWEVER, THE DESIGN ENGINEER ASSUMES NO LIABILITY FOR THE ACCURACY OR COMPLETENESS OF THE EXISTING FACILITIES SHOWN HEREON OR FOR THE EXISTENCE OF OTHER UNDERGROUND UTILITIES NOT SHOWN ON THESE PLANS.
2. THE CONTRACTOR SHALL CONTACT U.S.A. AND HAVE UTILITIES MARKED AT LEAST 72 HOURS BEFORE BEGINNING WORK. THE CONTRACTOR IS SOLELY RESPONSIBLE TO PROVIDE ALL LABOR AND EQUIPMENT NECESSARY TO LOCATE EXISTING UNDERGROUND FACILITIES BEYOND THE INFORMATION PROVIDED BY U.S.A. MARKING. WHERE MARKINGS ARE NEAR PROPOSED FOUNDATIONS THE CONTRACTOR SHALL LOCATE UNDERGROUND UTILITIES BY POT HOLING PRIOR TO EXCAVATING.

**48 HOURS BEFORE EXCAVATING  
CALL U.S.A.  
UNDERGROUND SERVICE ALERT  
811 OR 1-800-227-2600**

TRAFFIC CONTROL PLANS:

1. TRAFFIC CONTROL SHALL BE PER THE CALIFORNIA MUTCD. AT LEAST ONE LANE IN EACH DIRECTION SHALL REMAIN OPEN TO TRAFFIC UNLESS OTHERWISE SHOWN ON THE PLANS. TRAFFIC CONTROL HOURS ARE SUBJECT TO LIMITATION BY THE CITY. TRAFFIC CONTROL WITH LANE CLOSURES THAT AFFECT TRAFFIC FLOW MAY REQUIRE NIGHT WORK. IF, AS A PART OF TRAFFIC CONTROL MEASURES, A ROADWAY CLOSURE HAS BEEN APPROVED, THE CONTRACTOR SHALL NOTIFY THE ENGINEERING DIVISION 72 HOURS IN ADVANCE OF SETTING UP THIS CLOSURE.
2. THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT A WRITTEN TRAFFIC CONTROL PLAN FOR ANY PROPOSED LANE CLOSURES OR DISTURBANCES TO TRAFFIC WITHIN THE CITY RIGHT OF WAY. THE PLAN SHALL INCLUDE THE DATE AND TIME, DESCRIPTION OF WORK, CONTACT PERSON AND ESTIMATED DATE OF COMPLETION. THE CONTRACTOR SHALL NOTIFY THE ENGINEERING DIVISION 72 HOURS IN ADVANCE OF SETTING UP THE TRAFFIC CONTROL.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING ALL CONSTRUCTION SIGNING AS REQUIRED BY THE CALIFORNIA MUTCD TO DELINEATE CONSTRUCTION HAZARDS AT HIS OWN EXPENSE. THE CONTRACTOR SHALL PROVIDE ALL LIGHTS, CONES, SIGNS, BARRICADES, FLAGGERS OR OTHER DEVICES NECESSARY TO PROVIDE SAFETY.



	PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION		
	<b>STANDARD NOTES (1 OF 3)</b>		
APPROVED BY: 	PUBLIC WORKS DIRECTOR / CITY ENGINEER		
SCALE: NONE	DRAWN BY: BPJ	DATE: MAR 3, 2009	<b>PS - 1</b>

RESTORATION:

1. ALL EXISTING UTILITIES, LANDSCAPING, IRRIGATION SYSTEMS AND IMPROVEMENTS THAT ARE DAMAGED BY THE CONTRACTOR, WHICH ARE NOT DESIGNATED BY THE PLANS OR SPECIFICATIONS TO BE DISTURBED, SHALL BE RESTORED OR REPAIRED TO THE SATISFACTION OF THE CITY ENGINEER AT THE CONTRACTOR'S EXPENSE.
2. THE CONTRACTOR SHALL TAKE EXTREME CARE TO PROTECT EXISTING SITE AND ADJACENT IMPROVEMENTS FROM DAMAGE. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR OR REPLACE ALL CRACKED AND OTHERWISE PRE-EXISTING DAMAGED PUBLIC IMPROVEMENTS ALONG THE FRONTAGE OF THE PROJECT SITE AND ANY DAMAGE RESULTING FROM CONSTRUCTION TO CURRENT CITY STANDARDS AND AT THEIR OWN EXPENSE. THE EXTENT OF THE REPAIRS SHALL BE DETERMINED BY THE PUBLIC WORKS INSPECTOR AND SHALL BE COMPLETED PRIOR TO THE CITY ACCEPTANCE OF THE IMPROVEMENTS.

EROSION AND DUST CONTROL:

1. EXCAVATIONS SHALL BE ADEQUATELY SHORED, BRACED AND SHEETED SO THAT THE EARTH WILL NOT SLIDE OR SETTLE AND SO THAT ALL EXISTING IMPROVEMENTS WILL BE FULLY PROTECTED FROM DAMAGE.
2. CONSTRUCTION ACTIVITIES OCCURRING BETWEEN OCTOBER 15 AND APRIL 15 SHALL HAVE EROSION AND SEDIMENT CONTROL MEASURES IN PLACE. THE CONTRACTOR SHALL ENSURE THAT THE CONSTRUCTION SITE IS PREPARED PRIOR TO THE ONSET OF ANY STORM. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN WINTERIZATION FACILITIES AT ALL TIMES OR UNTIL THE IMPROVEMENTS ARE FINAL.
3. EROSION CONTROL SEEDING SHALL BE APPLIED TO ALL GRADED AND DISTURBED SOILS WITHIN THE WORK AREA PRIOR TO OCTOBER 15 OF ANY GIVEN YEAR WHETHER THE PROJECT IS COMPLETE OR NOT (CONTRACTOR IS TO NOTIFY THE ENGINEERING DIVISION IMMEDIATELY AFTER APPLICATIONS FOR INSPECTION PURPOSES).
4. ADJACENT STREET FRONTAGES SHALL BE SWEEPED DAILY OR AS NEEDED TO REMOVE SILT WHICH IS EVIDENT FROM CONSTRUCTION ACTIVITIES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TIMELY DUST CONTROL OF DISTURBED AREAS AT ALL TIMES, TO THE SATISFACTION OF THE CITY ENGINEER. ALL MATERIAL EXCAVATED, STOCKPILED, GRADED, OR TRANSPORTED OFF-SITE SHALL BE SUFFICIENTLY WATERED, TREATED OR COVERED TO PREVENT DUST FROM CAUSING A PUBLIC NUISANCE OR A VIOLATION OF AN AMBIENT AIR STANDARD.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING CONSTRUCTION VEHICLES LEAVING THE SITE TO PREVENT DUST, SILT AND DIRT FROM BEING RELEASED OR TRACKED OFFSITE.
7. ALL AREAS WITH VEHICLE TRAFFIC SHALL BE WATERED OR HAVE A DUST PALLIATIVE APPLIED AS NECESSARY FOR REGULAR STABILIZATION OF DUST EMISSIONS.
8. ALL INACTIVE PORTIONS OF THE DEVELOPMENT SITE (PREVIOUSLY GRADED AREAS WHICH REMAIN INACTIVE FOR 96 HOURS) SHALL BE COVERED, SEEDED OR WATERED UNTIL A SUITABLE COVER IS ESTABLISHED. ALTERNATIVELY, THE APPLICANT SHALL BE RESPONSIBLE FOR APPLYING NON-TOXIC SOIL STABILIZERS TO ALL INACTIVE CONSTRUCTION AREAS.
9. ALL LAND CLEARING, GRADING EARTH MOVING OR EXCAVATION ACTIVITIES SHALL BE SUSPENDED AS NECESSARY TO PREVENT WINDBLOWN DUST WHEN WINDS ARE EXPECTED TO EXCEED 20 MPH.
10. THE CITY SHALL HAVE THE AUTHORITY TO STOP ALL GRADING OPERATIONS, IF, IN OPINION OF THE CITY ENGINEER, INADEQUATE DUST CONTROL MEASURES ARE BEING PRACTICED OR EXCESSIVE WIND CONDITIONS CONTRIBUTE TO FUGITIVE DUST EMISSIONS.
11. NO BURNING OF WASTE MATERIAL OR VEGETATION SHALL TAKE PLACE ON SITE.
12. THE CONTRACTOR SHALL MEET AND FOLLOW ALL NPDES REQUIREMENTS IN EFFECT AT THE TIME OF CONSTRUCTION.
13. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED AS SPECIFIED IN THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR THIS PROJECT (IF APPLICABLE) OR AS DETERMINED BY THE CITY INSPECTOR. THE SWPPP IS CONSIDERED A DYNAMIC DOCUMENT AND WILL CHANGE AS CONDITIONS WARRANT. PERMANENT EROSION AND SEDIMENT CONTROL MEASURES WILL BE CONSTRUCTED AS SHOWN ON THE SWPPP PLAN.

	PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION		
	<b>STANDARD NOTES (2 OF 3)</b>		
APPROVED BY: 			
PUBLIC WORKS DIRECTOR / CITY ENGINEER			
SCALE: NONE	DRAWN BY: BPJ	DATE: MAR 3, 2009	<b>PS - 2</b>

EARTHWORK:


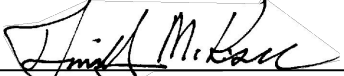
1. THE CONTRACTOR SHALL RETAIN THE SERVICES OF A QUALIFIED GEOTECHNICAL ENGINEER TO EVALUATE GEOLOGIC AND SOILS CONDITIONS ON THE SITE, PROVIDE CONSTRUCTION AND COMPACTION RECOMMENDATIONS SUBJECT TO CITY APPROVAL, INSPECT THE CONTRACTOR'S GRADING OPERATION AND CERTIFY THE CONTRACTOR'S COMPLIANCE WITH THE APPROVED RECOMMENDATIONS.
2. ALL UNDERGROUND UTILITIES WITHIN EXISTING OR PROPOSED CITY OF GRASS VALLEY EASEMENTS SHALL COMPLY WITH THE CITY STANDARD DETAIL. TRENCH BACKFILL SHALL BE SLURRY CEMENT OR AGGREGATE BASE PROCESSED TO 95% RELATIVE COMPACTION WITH CERTIFIED TESTING IN ACCORDANCE WITH CITY STANDARDS.
3. PRIOR TO EXCAVATION OF TRENCHES 5 FEET OR DEEPER, THE CONTRACTOR SHALL SUBMIT TO THE PUBLIC WORKS INSPECTOR A COPY OF THE COMPANY'S CALOSHA PERMIT AND A COPY OF THE COMPANY'S LETTER INFORMING CALOSHA OF THE TIME THE TRENCHING IS COMMENCING AND THE LOCATION OF THE WORK.
4. IF GRADING OR OTHER CONSTRUCTION OPERATIONS UNEARTH ARCHAEOLOGICAL OR HISTORIC ARTIFACTS OR RESOURCES, CONSTRUCTION ACTIVITIES SHALL CEASE AND THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CITY OF GRASS VALLEY PLANNING DEPARTMENT.
5. SHOULD GRADING OPERATIONS UNCOVER HAZARDOUS MATERIALS, OR WHAT APPEARS TO BE HAZARDOUS MATERIALS, THE FIRE DEPARTMENT SHALL BE CONTACTED IMMEDIATELY AT 911. THE AREA, WHICH CONTAINS THE HAZARDOUS MATERIALS, SHALL BE MARKED OFF UNTIL AN INVESTIGATION BY A MEMBER OF THE FIRE DEPARTMENT IS CONDUCTED.




TREE PRESERVATION:

1. THE GRADING PLAN FOR THE PROJECT HAS BEEN DESIGNED FOR NO GRADING TO OCCUR WITHIN THE DRIPLINE OF ANY TREE TO BE PRESERVED UNLESS SPECIFICALLY APPROVED BY THE PLANNING DEPARTMENT AND SHOWN ON THESE PLANS. NO GRADES SHALL BE MODIFIED WITHOUT THE APPROVAL OF THE CIVIL ENGINEER AND THE CITY OF GRASS VALLEY.
2. EACH TREE OR GROUP OF TREES TO BE SAVED SHALL BE FENCED IN ACCORDANCE WITH THE "TREE PROTECTION" DETAIL PRIOR TO ANY GRADING OR MOVEMENT OF HEAVY EQUIPMENT.
3. NO TRENCHING SHALL OCCUR BENEATH THE DRIPLINE OF ANY TREE TO BE SAVED UNLESS STATED ON THESE PLANS "TRENCHING UNDER THIS TREE IS APPROVED". NO MECHANICAL TRENCHING WHATSOEVER SHALL BE ALLOWED WITHIN THE DRIPLINE OF TREES TO BE PRESERVED.
4. THE CONTRACTOR SHALL NOT ALLOW STACKING OF CONSTRUCTION MATERIALS, PARKING OF CONSTRUCTION EQUIPMENT AND VEHICLES, GRADING, TRENCHING, CUTTING OR FILLING WITHIN A TREE DRIPLINE UNLESS OTHERWISE SHOWN ON THESE PLANS.

MISCELLANEOUS:

1. SHOULD IT APPEAR THAT THE WORK TO BE DONE OR ANY MATTER RELATIVE THERETO IS NOT SUFFICIENTLY DETAILED OR EXPLAINED ON THESE PLANS, THE CONTRACTOR SHALL REQUEST IN WRITING FROM THE ENGINEER SUCH FURTHER EXPLANATION AS MAY BE NECESSARY.
2. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING MONUMENTS AND OTHER SURVEY MARKERS DURING CONSTRUCTION. ALL SUCH MONUMENTS OR MARKERS DESTROYED DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
3. THE CITY REQUIRES A COMPLETE SET OF AS-BUILT PLANS. THE CONTRACTOR SHALL PROVIDE ANY AS-BUILT CHANGES TO THE DESIGN ENGINEER, ON A CLEAN SET OF PLANS AT JOB COMPLETION.



	PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION		
	<b>STANDARD NOTES (3 OF 3)</b>		
APPROVED BY:	 PUBLIC WORKS DIRECTOR / CITY ENGINEER		
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③	ENGINEERING DIVISION		1" 2"
④	<b>CITY OF GRASS VALLEY</b>		
③	GRADING AND IMPROVEMENT PLANS FOR		1"
⑤	<b>PROJECT NAME</b> 		
④	<b>SHEET TITLE</b>		3 1/4"
③	PROJECT ENGINEER:		
②	ACCEPTED BY:		1/4"
①	_____	_____	3/4"
	PUBLIC WORKS DIRECTOR/CITY ENGINEER	RCE NUMBER      DATE	
③	PROJECT NUMBER: 		1/4"
③	SHEET ____ OF ____	DRAWING NUMBER: 	1/2"
			2"
			4"

LETTER SIZES:


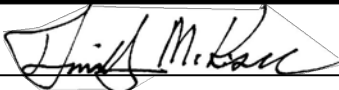
- ① 0.075" REGULAR
- ② 0.10" REGULAR
- ③ 0.12" REGULAR
- ④ 0.18" BOLD
- ⑤ 0.25" BOLD ITALIC

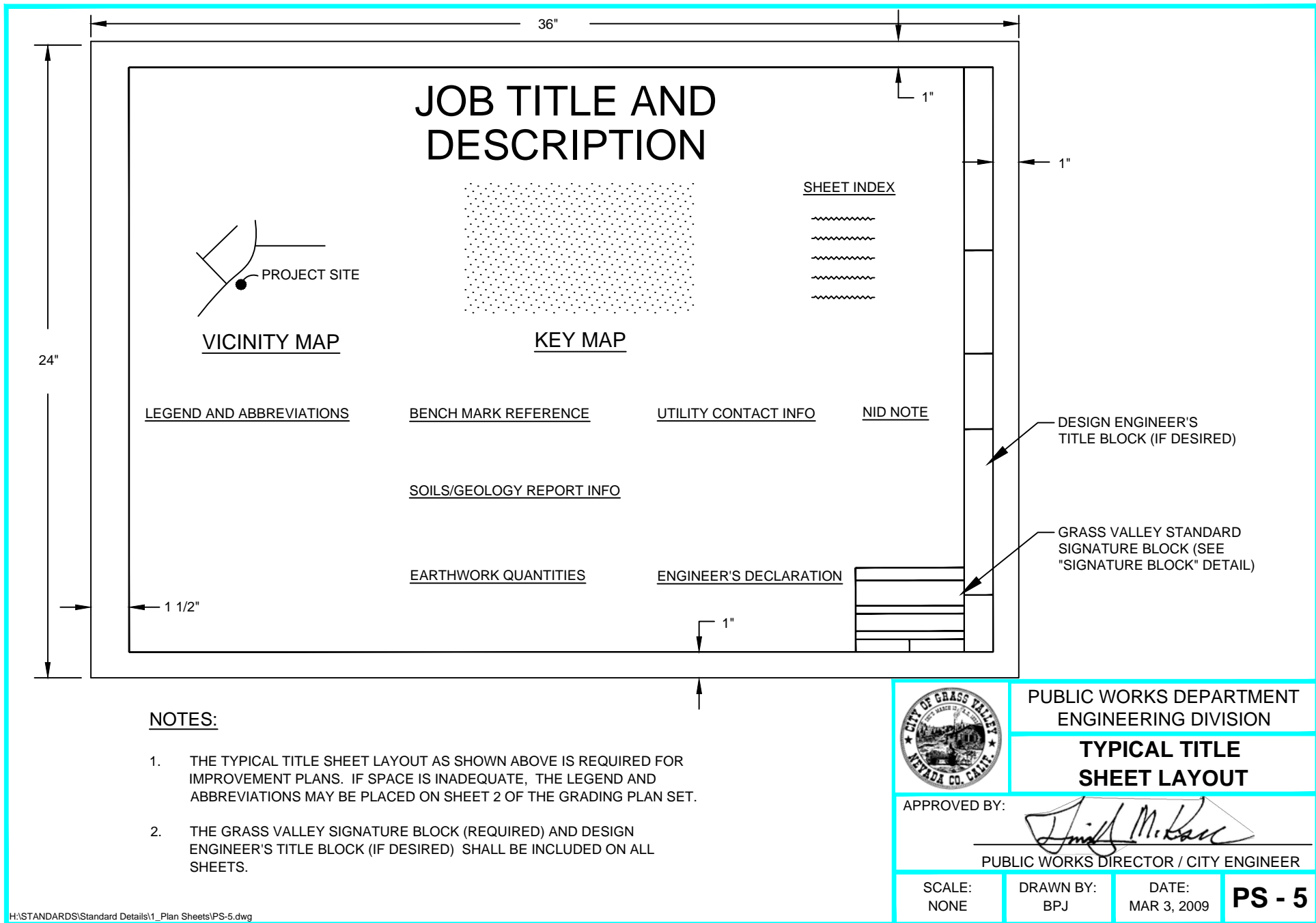
LEGEND:

-  CITY ASSIGNED
-  TO BE COMPLETED BY CITY

NOTES:

1. THE CITY ENGINEER'S SIGNATURE BOX SHALL BE OMITTED FROM NID DETAIL SHEETS.

	PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION		
	<b>SIGNATURE BLOCK</b>		
APPROVED BY: 			
PUBLIC WORKS DIRECTOR / CITY ENGINEER			
SCALE: NONE	DRAWN BY: BPJ	DATE: MAR 3, 2009	<b>PS - 4</b>



**NOTES:**

1. THE TYPICAL TITLE SHEET LAYOUT AS SHOWN ABOVE IS REQUIRED FOR IMPROVEMENT PLANS. IF SPACE IS INADEQUATE, THE LEGEND AND ABBREVIATIONS MAY BE PLACED ON SHEET 2 OF THE GRADING PLAN SET.
2. THE GRASS VALLEY SIGNATURE BLOCK (REQUIRED) AND DESIGN ENGINEER'S TITLE BLOCK (IF DESIRED) SHALL BE INCLUDED ON ALL SHEETS.



PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION

**TYPICAL TITLE SHEET LAYOUT**

APPROVED BY:

*Jim McRae*

PUBLIC WORKS DIRECTOR / CITY ENGINEER

SCALE:  
NONE

DRAWN BY:  
BPJ

DATE:  
MAR 3, 2009

**PS - 5**



## SECTION 4

### TRAFFIC STUDIES (TS)

- 4-1 GENERAL** - The City has established the following guidelines to aid in the determination of the need for, and the preparation of traffic studies. These guidelines are intended to ensure consistency of analyses and adequacy of information to aid City staff and decision makers in the consideration of project approval with regard to impacts to the City's transportation system.

Development projects that have the potential to substantially affect the City of Grass Valley's transportation system may be required to prepare a traffic study. The City will consider the requirement for a traffic study on a case-by-case basis as development projects are brought forward for consideration.

- 4-2 PURPOSE OF TRAFFIC STUDIES** - Traffic studies are an important tool for the City in the overall development planning process for all types of projects (residential, commercial, industrial, institutional, etc.). These studies provide the necessary information to allow an assessment of the potential traffic impacts associated with proposed projects as they relate to transportation policies established by the City. Traffic studies are also used to identify appropriate mitigation and/or recommendations where practicable to offset project specific impacts, specifically as it relates to the California Environmental Quality Act.

- 4-3 REQUIREMENT FOR TRAFFIC STUDY** - A traffic study may be required for any proposed development project for which at least one of the following criterion is met:

- A.** Project will substantially change the off-site transportation system or connections to it or may create a hazard to public safety as identified by the City or the California Department of Transportation (Caltrans).
- B.** Project is inconsistent with the current General Plan land use, current NCTC 2027 traffic model land use, or current City-wide traffic model land use and project generates more traffic than the current General Plan/modeled land uses.
- C.** Project generates 63<sup>1</sup> or more new PM peak hour vehicle trip ends. The City may evaluate and apply other non-PM peak periods, such as the noon hour, based on the location of the site or a unique traffic demand of the development.

If a traffic study has been previously prepared for a project, a new study or updated study may be required by the City if the traffic study is more than two years old and/or the proposed project changed and the PM peak hour trip generation increases by more than 10%.

- 4-4 SCOPING** – In order to determine if a traffic study is required, the type of traffic study needed, and to facilitate the traffic study process, the project applicant shall first prepare and submit a completed "Scoping Agreement for Traffic Study" form (the "Scoping Agreement") to the Engineering Division. This form will be used to determine and document if a traffic study is required and, if so, the specific nature of the study. The Engineering Division will complete the City portion of the form. Certain sections of the City portion of the form may not be able to be completed until a traffic consultant is selected by the City. The Scoping Agreement provides for documentation and agreement of key points including but not limited to:

- A.** Approximation of project trip generation, distribution and assignment.

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<sup>1</sup> Based on the lowest PM Peak Hour Trip count of projects requiring mitigation as detailed in a Traffic Study Comparison of actual traffic studies of projects in the City of Grass Valley.

- B. Determination of potentially affected transportation facilities.
- C. Identification of approved projects for background traffic, traffic growth assumptions, and integration with the City's traffic model.
- D. Determination of the type of traffic study, if required.
- E. Proposed special assumptions and/or quantifiable improvements or changes to the circulation system which are not consistent with the City's *General Plan Circulation Element*.

For projects within one (1) mile of a state highway, or any project that may create a significant impact on a state highway, coordination with Caltrans may be necessary. For projects adjacent to the City/Nevada County limits and with anticipated project trip distribution into the County, coordination with Nevada County may be necessary. A summary of the outcome of these coordination efforts is required to be provided to the City.

If a traffic study is required, the City will obtain three quotes from those traffic engineering consultants under Professional Service Agreements with the City. The City and applicant will select a traffic consultant. An agreement and deposit will then be required between the applicant and City prior to preparation of a traffic study. These steps generally take four weeks to complete. The applicant will be responsible for the cost of the preparation and review by City staff of the traffic study.

**4-5 TRAFFIC STUDY CONTENT**– Based on the Scoping Agreement, the City will accept one of the following types of traffic studies. All traffic studies shall be prepared and stamped by a Registered Traffic Engineer or a Registered Civil Engineer with demonstrated competence and adequate experience in the field of Traffic Engineering.

- A. **Traffic Impact Assessment (TIA)** - This type of traffic study is required for development projects which are determined (through the Scoping Agreement) to not have a significant impact on the overall transportation system, rather it may have impacts at the immediate site access points and/or a localized impact on an adjacent intersection. The scope of the TIA varies and is determined on a case by case basis but generally will include evaluation of existing year plus proposed project traffic at the project access points and adjacent impacted intersections and roadway segments. The TIA, depending on site specific factors, may include other components as described in this section.
- B. **Traffic Impact Study (TIS)** - This type of traffic study is required for development projects which are determined (through the Scoping Agreement) to have a significant impact on the transportation system. Generally, studies of this nature are required for development projects that are not consistent with current planning documents or projects that generate a high number of PM Peak Hour Trips. The following is the recommended outline and content for a typical TIS:
  - 1. **Executive Summary** - Presents factual and concise pertinent information relative to the traffic issues including a brief overview of the project, a short discussion of the project's traffic generation potential, the expected impacts of the project, and a summary of measures necessary to mitigate resultant project impacts.
  - 2. **Introduction** – Includes a general overview of the proposed project site and study area boundaries, existing and proposed site uses, and existing and proposed transportation facilities located within the study area. Also includes a regional map showing the project vicinity and a site layout map.

3. **Project Setting** – Includes: 1) a generalized geometric description of transportation (vehicular, bicycle, pedestrian and transit) facilities anticipated to be effected by project traffic including existing traffic volumes that use the vehicular facilities (include the source and count year of the traffic data). Consistent with the Scoping Agreement project trip assignment, these facilities include all major access routes to the site with descriptions of the most likely routes to be utilized; 2) a description of existing and proposed land uses surrounding the proposed project site. If the land uses differ from the general plan designation for a particular parcel, it needs to be indicated in this section; 3) an exhibit showing the various transportation facilities in the study area with existing PM and/or other peak hour traffic count information; 4) a table showing daily (24-hour) volumes, if appropriate; and 5) a discussion of planned (by the City or other agency) transportation facilities.

Traffic counts are only valid for two (2) years. When required to be collected, all traffic counts shall be conducted between 4:00 p.m. to 6:00 p.m. on a Tuesday, Wednesday or Thursday during the normal public school period (i.e. September to May) unless otherwise defined in the Scoping Agreement. The City will provide copies of current traffic count information, if available. Based on the location of the site or a unique traffic demand, the City may require evaluation of other peak demand periods of the day (i.e. AM peak period, mid-day peak period, or weekends). Please note that Caltrans and/or Nevada County may require additional traffic analyses if the projected traffic impacts a State and/or County facility.

4. **Project Description and Location** - Expands on information presented in the Introduction giving a detailed development description and specific project location. Exhibits in this section shall include at a minimum a clear illustration of the project (i.e. site plan) in which density, adjacent transportation facilities, on-site parking and circulation, gross square footage, number of rooms/units, phasing and other descriptions as appropriate are clearly depicted. Any changes in these descriptors during the permitting and construction processes may require an amendment to the study.
5. **Traffic Generation Forecast** - Includes trip generation estimates for the project based on industry standard trip generation values or other methods approved by the Engineering Division such as local trip generation rates. Typically, these values will be derived from the current edition of *Trip Generation*, published by the Institute of Transportation Engineers (ITE). Adjustments to these values may be appropriate assuming the applicant proposes acceptable specific and permanent measures that will reduce the traffic generation potential of the project. The engineer must submit the proper documentation to sufficiently support the proposed reduction. Locally valid trip generation rates may also be applied for unique project types.

Includes a summary table listing each specific project use, the size contemplated, the trip generation rates used (total daily traffic and peak hours), appropriate trip reductions and the resultant total trips generated for the project site. In general, the peak hour trip generation shall be that of a typical weekday and shall coincide with the peak hour of the roadway system (not the peak hour of the generator); however, there may be instances where a unique project use requires an analysis during different time frames, such as a weekend.

Includes a discussion on how the project's trip generation rate compares with typical trip generation rates for the site's existing *General Plan* land use category. If the proposed project represents only a portion of a larger overall site, such as a phased project, then the study shall discuss the degree to which both the initial phase and the ultimate development impacts the transportation network.

- 6. Traffic Distribution and Assignment** – Includes: 1) traffic distribution and assignment consistent with current traffic distribution patterns; 2) a description of the utilization of study area transportation facilities by site-generated traffic; 3) an exhibit in which the projected daily link volumes between intersections, as well as peak hour turning movement volumes at intersections, are clearly depicted. All of this information is usually presented on two exhibits: one presenting daily link volumes between intersections and the second illustrating peak hour turning movement volumes within the study area.
- 7. Traffic Impact Analysis** - Unless otherwise noted in the Scoping Agreement, includes evaluation of intersection operation as well as midblock roadway segment operation.
  - a. Analysis Methodologies** -
    - i.** Highway Capacity Manual (HCM) methodology must be used. Default HCM values must be used unless noted otherwise below.
    - ii.** Current signal timing schedules for signalized intersections must be used in the analysis.
    - iii.** For roundabouts, micro simulation (SimTraffic for single lane roundabouts and Vissim for multi-lane roundabouts) or SIDRA software must be used.
    - iv.** For the Brunswick Road Corridor (including Brunswick/E. Main, Brunswick/SR20/49 on and off ramps, and Brunswick/Sutton intersections) and the McKnight Way corridor (McKnight and SR49 on and off ramp intersections), Synchro/SimTraffic Version 7 software (or approved equal) micro-simulation software using *HCM 2000* methodology must be used to evaluate the corridor as a whole due to the coordinated operation of the closely spaced signalized intersections.
    - v.** Intersections with non-standard traffic control (i.e. McKnight and South Auburn) should be analyzed using the engineer’s best judgment (such as micro-simulation) with review and approval of methodology by the Engineering Division.
    - vi.** Standard lane utilization may not occur at all intersections. This operational aspect is particularly true at SR 20/49 interchanges. The assumed lane utilizations should reflect actual conditions, which may require counts for each lane.
  - b. Study Intersections and Roadway Segments** – LOS A, B, C, and D are considered acceptable LOS’s for City intersections and roadway segments except where LOS E is considered acceptable for the following downtown intersections: Mill/Neal, W. Main/Mill, W. Main/Church, W. Main/School, Bank/S. Auburn, SR 20/49 SB Ramp/Bennett. Where project traffic is distributed, the following intersections and roadway segments must be analyzed if they: 1) are currently operating at LOS A, B, and C (D for downtown intersections identified above) where project traffic contributes 10 or more peak hour trips; 2) are currently operating at LOS D (E for downtown intersections identified above) or worse; and/or 3) are high accident locations (defined as intersections or roadway segments having five or more reported accidents within the most recent 3 year period).

If the project traffic causes an intersection or roadway segment to worsen from an acceptable LOS to LOS E or worse or is distributed to an intersection or roadway segment currently operating at an unacceptable LOS, the project is determined to cause a significant impact which must be mitigated. It is acceptable to mitigate an intersection or roadway segment

from an unacceptable LOS to an acceptable LOS. In the event of a significant impact, cumulative year analyses are required.

**c. Conditions and Timeframes** – In all cases, the analysis of transportation facility operations must be performed and documented for the following conditions and timeframes:

- i.** Existing Year
- ii.** Existing plus Proposed Project (completion year or one for each completed phase for a multi-phase project)

In those cases where the results of the existing year analyses determine that the project's traffic causes a significant impact, the following cumulative year analyses must be performed:

- iii.** Cumulative (Year 2030) - including approved but not yet built development project traffic which exceeds the traffic generation assumptions of the General Plan/ Grass Valley Travel Demand Model land uses.
- iv.** Cumulative plus Proposed Project (Year 2030) - including approved development project traffic which exceeds the traffic generation assumptions of the General Plan/ Grass Valley Travel Demand Model land uses.

The City's Engineering Division will provide information pertaining to the latest approved but not yet constructed project list for inclusion in the cumulative analysis scenarios as part of the Scoping Agreement. Approved but not yet built development projects within the City which contribute 25 or more peak hour trips are included in said list.

Additional time frames may be required for large multi-phased developments.

**d. Additional Documentation Requirements-**

- i.** Include a table in which the forecast LOS for each transportation facility within the defined study area is identified. This summary table shall present LOS for all scenarios.
- ii.** Identify transportation facility improvements within the study area that are planned to be constructed by the City as part of the Grass Valley Transportation Impact Fee Program or the Regional Transportation Mitigation Fee program.
- iii.** The need for new traffic signal control at unsignalized study intersections shall be evaluated based on applicable warrants contained in the latest edition of the California Manual on Uniform Traffic Control Devices (MUTCD) or other approved source. If a new traffic signal is being proposed and the signal installation would be located close to an adjacent signalized intersection, the study shall include a micro-simulation analysis. The roadway segment to be analyzed for signal progression must include all existing and planned signalized intersections. Those intersections that would reduce the optimum corridor bandwidth if a traffic signal were installed may be required to remain unsignalized and have turning movements restricted by access design or median islands.

**8. Project Site Access** – Includes discussion and/or depiction of: number of driveways serving a parcel or site, right turn deceleration lane or right turn curb flares for driveways, left turn deceleration lane for driveways, storage requirements for turn lanes, minimum offset for opposing driveways, restricted turning movements for driveways, sight distance, existing and proposed transit

stop locations, and probable delivery/service truck routes to the site. Each site access point shall be discussed separately. If the proposed site access does not satisfy the City's Design Standards, identify what modifications would be necessary to meet City standards or provide justification for use of a non-standard driveway configuration.

- 9. On-Site Circulation** - Includes a discussion of on-site circulation complete with descriptions of the proposed access points, turn prohibitions, number of lanes proposed, on-site transit stop locations, driveway throat depth, parking supply/demand/parking aisle circulation, on-site pedestrian circulation, bicycle parking, on/off-site delivery truck circulation and any other applicable circulation issues.
- 10. Construction Period Impacts** - Includes a discussion of any unusual circumstances anticipated during construction. Proposed transportation facility closures, construction signage, safety features, and detours shall be included. At no time will any street capacity be reduced or closed without written permission from the Engineering Division.
- 11. Conclusions / Mitigation Measures** - Includes all measures required to mitigate intersection, roadway segment, or other transportation facility significant impacts. A table presenting resultant levels of service for conditions with and without mitigation shall be included. Appropriate text along with sketches (either in this section, the appendix, or accompanying the report) must be provided detailing each mitigation measure assumed in the study and method(s) of implementation. These sketches shall include, as a minimum, the existing intersection geometrics, striping, right-of-way and building locations (as applicable) and the proposed modifications.

Traffic improvements necessary as a result of project related impacts could become conditions of approval for the subject development. Improvement of the transportation facilities adjacent to the project, to at least half-width configuration, could also be a condition of approval. Additional off-site traffic related improvements may be required on a project by project basis.

For each significant impact, one of the following must be proposed by the engineer:

- a. Mitigation to a level of insignificance.** The following describes acceptable determinations of mitigation:
  - i. Proposed Mitigation** Identifies and evaluates any proposed mitigation and documents how the impact will be mitigated to a level of insignificance. Signal phasing/timing modifications may be sufficient mitigation measures in some cases. The following mitigation methods may be applicable:
    - 1.** If an intersection improvement project is identified and programmed as a priority project as part of the Grass Valley Transportation Impact Fee (GVTIF) program or the Regional Transportation Mitigation Fee (RTMF) program, is fully funded with a secured funding source, and has a schedule for completion, then payment of the GVTIF program and/or RTMF program fees is sufficient mitigation.
    - 2.** If an intersection improvement project is included in the GVTIF program or the RTMF program but is not fully funded and not a priority project, the applicant will be 100% responsible for funding the improvements. The applicant may be eligible for reimbursement, minus their fair share of the costs, which will require the applicant to enter into a reimbursement agreement with the City and/or the Nevada

County Transportation Commission (NCTC).

3. If an intersection improvement is not identified in the GVTIF program or RTMF program, then the applicant will be 100% responsible for constructing and funding the necessary improvements. At the option of the applicant and with approval of the City, the applicant may create, at their own expense, a Benefit Assessment District and/or Area of Benefit and Reimbursement Agreement or other funding mechanism to seek reimbursement for the improvements minus their fair share.

- b. **Mitigation not identified and/or feasible.** May result in the preparation of an Environmental Impact Report (EIR) in accordance with the provisions of the California Environmental Quality Act (CEQA) which may determine that an overriding consideration is applicable.

**12. Appendices** - Detailed appendix material is to be supplied as part of the report. If the main report is too large to include an appendix, such material shall be provided under a separate and identifiable cover. Typical material includes traffic counts, HCM analysis worksheets, level of service reports/worksheets, micro-simulation input and output reports, signal timing information, fully completed signal warrants, accident diagrams at high accident locations, sketches of proposed mitigation measures, and other information necessary for the City's review of the report.

**4-6 TRAFFIC STUDY UPDATE** - All previous traffic studies that are more than two (2) years old and where the improvements have not been constructed, or the project has not been approved, will generally be required to be updated unless the Engineering Division determines that conditions have not changed significantly.

**4-7 SUBMITTAL PROCEDURE** – All traffic studies for projects in the City of Grass Valley must be reviewed and accepted by the Engineering Division. The City requires that all traffic studies for projects in the City be prepared by one of the Traffic Engineering consultants under contract with the City. The following procedure for submittal shall be followed:

- A. Selection of Consultant** – The City will request three quotes for preparation of a study, based on the Scoping Agreement, from an approved list of traffic consultants under contract with the City. The City in coordination with the applicant will select a consultant. The consultant will be directed by the City to proceed after the applicant has entered into a reimbursement agreement with the City and posted funds to pay for the cost of the study and staff's review time of the study.
- B. Prior to Preparation of a Draft Traffic Study** – The consultant will complete and/or revise the City portion of the Scoping Agreement and submit it to the Engineering Division for review and acceptance. Once the form is returned with the City's signature accepting the agreement, the draft traffic study preparation may begin.
- C. Submit Draft Traffic Study** – Submit two (2) 8-1/2" x 11" paper copies of the draft traffic study and one electronic copy of the study in PDF format. Comments will be electronically returned to the consultant.
- D. Submit Final Traffic Study** – Submit four (4) 8-1/2" x 11" paper copies of the draft traffic study and one electronic copy of the study in PDF format. If all previous comments have been addressed and the traffic study meets all City requirements as outlined, one paper copy of the traffic study with

an acceptance stamp will be sent to: the consultant; the applicant; the Planning Division; and, one will be maintained by the Engineering Division.



## SECTION 5

### SITE ACCESS (SA)

- 5-1 GENERAL** - Driveways shall meet sight distance, width, type and design requirements as discussed in these Design Standards for both ingress and egress movements.

Vehicles backing out of driveways onto the roadway shall only be permitted for single family residential or duplex land use on residential streets where speeds are at or below 25 MPH and sight distance is not an issue. Other land uses shall be designed so both ingress and egress vehicles are traveling forward.

Driveways shall be located to provide at least five (5) feet between the driveway's traveled way and appurtenances such as fire hydrants, poles, drop inlets, etc. No portion of an access will be permitted within curb returns. Driveways must intersect public and private streets at a ninety degree angle whenever possible, and never less than a 75 degree angle.

The City recognizes that infill projects (projects with 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 contained herein to the extent practicable.

#### **5-2 DRIVEWAY LOCATIONS**

**A. MINOR AND PRIMARY RESIDENTIAL STREETS** - For single family residential or duplex, the following shall apply:

1. Driveways shall be at least ten (10) feet apart as measured edge to edge, except in cul-de-sac bulbs and the outside portion of elbows, where the minimum shall be five (5) feet. For corner parcels, the driveway shall front whichever street is projected to have a lower traffic volume, and the driveway shall be located at least thirty-five (35) feet from the curb return unless otherwise approved by the City Engineer.
2. Where residential streets intersect collector or arterial streets there shall be no driveways on the residential street within 100 feet of said intersection unless otherwise approved by the City Engineer.

**B. COLLECTOR OR ARTERIAL STREETS** - Where parcel size permits, driveways shall be at least 200 feet apart on collector and arterial streets. Driveways shall be at least 150 feet from an intersection on collector streets.

- 5-3 NUMBER OF DRIVEWAYS SERVING A PARCEL OR SITE** - For single family residential or duplex land uses, only one driveway per parcel will be permitted, except where circular drives are proposed and 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 that the only access to that parcel be achieved via cross access over an adjacent parcel.

Where land uses other than single family residential or duplex are adjacent, the City requires cross access to minimize motorists having to use the street to get from one development to another whenever possible.

For projects requiring a Traffic Study, 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 is minimized, while still providing a sufficient number of access points to minimize congestion and delay.

**5-4 RIGHT TURN DECELERATION LANES FOR DRIVEWAYS** - A right turn deceleration lane shall be provided for a driveway if all of the following conditions are met:

**A. Conditions -**

1. The driveway is located on an arterial.
2. Right turn ingress volume is expected to exceed fifty (50) vehicles during peak hour flows on the roadway. For right turn ingress volumes between ten (10) vehicles and fifty (50) vehicles, a right turn curb taper shall be constructed.
3. There is ample room and frontage to fit a deceleration lane as determined by the City Engineer.
4. The travel speed of the roadway, as determined by the City Engineer, equals or exceeds 30 mph.

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

**5-5 LEFT TURN DECELERATION/ACCELERATION LANES FOR DRIVEWAYS** - Left turn deceleration lanes (left turn pockets) are not required on residential streets.

On collectors and arterials, and where left turns in will be permitted, a left turn deceleration lane shall be provided. This may be in the form of a separate left turn pocket or a continuous two (2)-way-left-turn-lane. The minimum left turn pocket length shall be 200 feet plus a 120 foot entry taper. Longer left turn pockets may be required if a Traffic Study demonstrates the need.

Separate left turn acceleration lanes are not typically required.

**5-6 MINIMUM OFFSET FOR 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. MINOR AND PRIMARY RESIDENTIAL STREETS** - For driveways on minor and primary residential streets, the minimum offset shall be 100 feet where lot size permits.

**B. COLLECTOR OR ARTERIAL STREETS** - For driveways on collectors and arterials, the minimum offset shall be 200 feet where lot size permits.

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.

**5-7 SIGNALIZED DRIVEWAYS** - The need for signalized driveways shall be based on warrants contained in the latest edition of the California MUTCD. Any such evaluation shall be performed by the Consultant as part of the Traffic Study for the project.

- 5-8 GROOVED CONCRETE DRIVEWAY** - Any driveway with a grade of ten (10) percent or greater, will be required to provide a grooved concrete surface, unless the requirement is waived by the Fire Department.
- 5-9 VEHICLE STORAGE** - Parking facilities must allow for full internal vehicle circulation, delivery/maintenance/business related truck loading/unloading space, sufficient storage capacity for inbound and outbound vehicles, and sufficient storage capacity for drive through facilities.
- 5-10 FIRE APPARATUS ACCESS ROADS** - Fire apparatus access roads are required for project sites where fire apparatus access is not provided by an acceptable publicly maintained street. Every facility, building, or addition to a building must be accessible by an approved fire apparatus access road. Fire apparatus access roads must meet the following requirements:
  - A. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS** - For driveways on minor and primary residential streets, the minimum offset shall be 100 feet where lot size permits. Buildings exceeding three stories, 30 feet in height, or 62,000 square feet in area are required to have at least two means of fire apparatus access for each structure. However, if projects have a gross building area of up to 124,000 square feet equipped with an approved automatic sprinkler system, a single fire apparatus access road will be acceptable.
  - B. SINGLE AND DUPLEX RESIDENTIAL DEVELOPMENTS** - Projects having more than 30 dwelling units shall be equipped with two separate and approved fire apparatus access roads unless all dwelling units are equipped throughout with an approved automatic sprinkler system. All driveways over 150 feet must meet the requirements for dead-end fire apparatus access roads.
  - C. MULTIPLE-FAMILY RESIDENTIAL DEVELOPMENTS** - Projects having more than 100 dwelling units shall be equipped with two separate and approved fire apparatus access roads. However, if projects have up to 200 dwelling units with approved automatic sprinkler systems throughout all buildings, a single approved fire apparatus access road will be acceptable. All driveways over 150 feet must meet the requirements for dead-end fire apparatus access roads.
  - D. ROAD SECTIONS** - Fire apparatus access roads must: 1) meet the Structural Section requirements identified in the Streets section of the Design Standards; 2) have a grade of less than 10 percent, unless approved otherwise by the Fire Chief; 3) have a minimum turning radius of 200 feet; 4) have a minimum road width of 26 feet, exclusive of shoulders, on both sides of fire hydrants and in the immediate vicinity of buildings and facilities over 30 feet in height; 5) not contain any overhead utility and power lines within the roadway to buildings and facilities over 30 feet in height; and 6) meet the requirements in Table 5-1 for dead-ends.

**TABLE 5-1  
REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS ROADS**

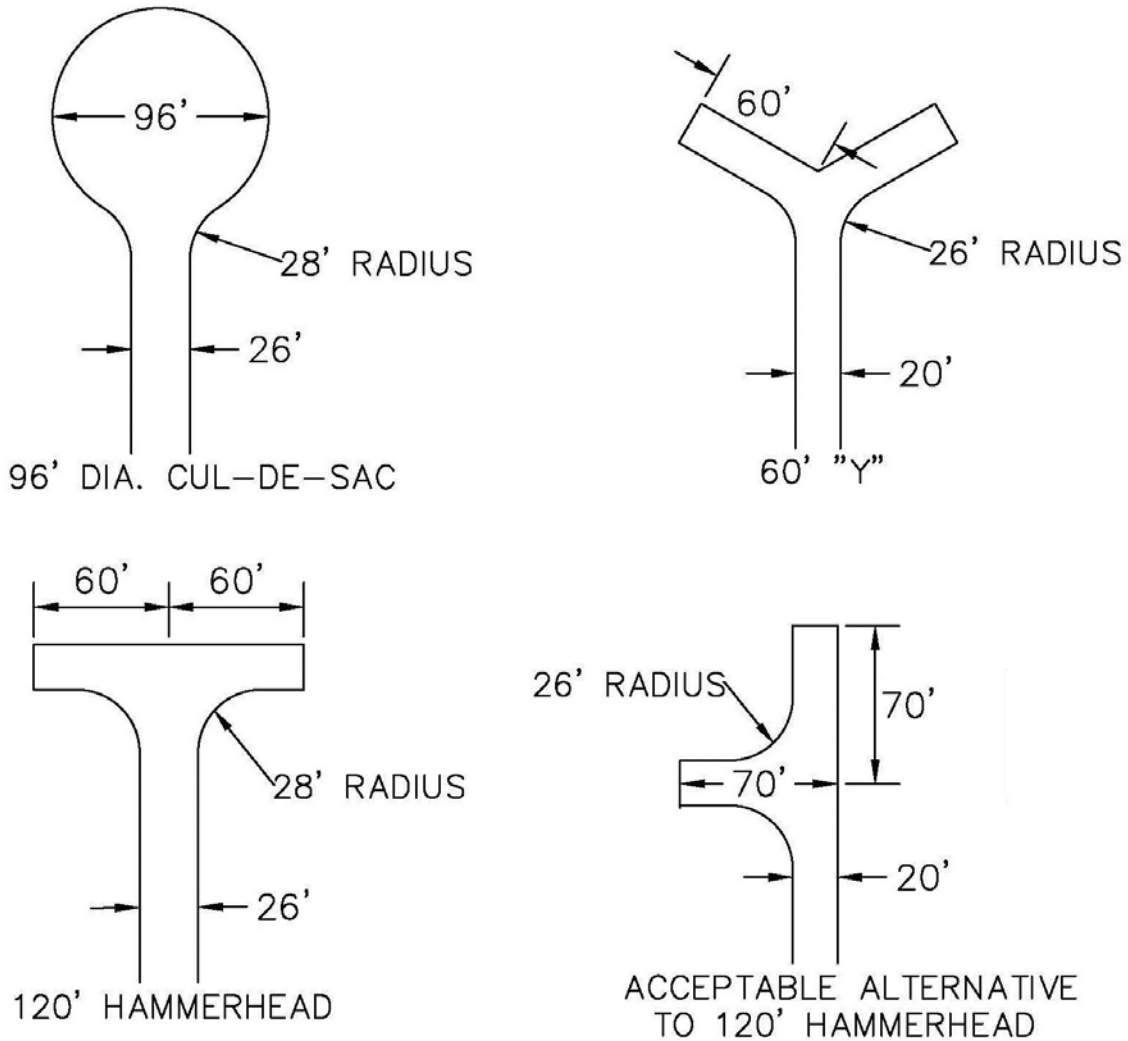
<b>LENGTH (feet)</b>	<b>WIDTH (feet)</b>	<b>TURNAROUNDS REQUIRED</b>
0-150	20	None required.
151-500	20	Refer to Figure 5-1.
501-750	26	Refer to Figure 5-1.
Over 750	Special approval required.	

- E. ROAD LOCATIONS** - Where two fire apparatus access roads are required, they must be placed a distance apart equal to not less than one half the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses. At least one fire

apparatus access road to a building 30 feet in height or more must be located within a minimum of 15 feet and a maximum of 30 feet from the building and must be positioned parallel to one entire side of the building.

- F. **GATES** - Gates must: 1) be a minimum of 20 feet in width; 2) be of the swinging or sliding type; 3) be operable manually by a single person; 4) maintained in an operative condition at or times and replaced/repared when defective; 5) be equipped with a means of opening the gate by the Fire Department for emergency access if electric (emergency opening devices must be approved by the Fire Code Official and be in accordance with UL 325) or be openable by forcible entry tools or a key (when a box containing the key is installed at the gate location) if manual; 6) have all locking device specifications approved by the Fire Code Official; and 7) if intended for automatic operation, be designed, constructed and installed to comply with the requirements of ASTM F 2200.
- G. **SIGNS** - Fire apparatus access roads shall be posted on both sides as a fire lane for roads 20 to 26 feet in width and on one side for roads more than 26 feet in width. Signs must meet CA MUTCD requirements. Signs may also be required by the fire code official in additional locations.

**FIGURE 5-1  
REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS ROADS**



## SECTION 6

# STREETS (ST)

**6-1 STREET CLASSES AND GEOMETRIC REQUIREMENTS** - For purposes of geometric and structural design of all new public streets, streets shall be classified according to the following requirements, the appropriate Standard Details, and details below. Changes to the standards can only be made at the discretion of the City Engineer.

- A. Alley** - A street depressed in the center with a right-of-way and surface width of 20 feet. Alleys are allowed for servicing up to ten (10) residential lots with no expected cut through traffic. If an alley is used to provide Fire Department access, refer to Section 5 of the Design Standards for additional information. A minimum separation of five (5) feet is required between the 20-foot for the alley and any structure, 20-feet if parking in front of garages is allowed.
- B. Residential Streets** - The following standards shall apply to minor and primary residential streets:
  - 1. Minor Residential** - A residential street servicing 100 or fewer lots shall be classified as a minor residential street.
  - 2. Primary Residential** - A residential street servicing more than 100 lots, or along which schools or parks are proposed to front, shall be classified as a primary residential street. Primary residential streets shall have a right-of-way width of 50 feet, and back of curb to back of curb width of 40 feet.
- C. Collector/Industrial** - A street serving an industrial/commercial subdivision, or a residential subdivision along which no home frontage is allowed, shall be classified as a collector/industrial street. Additional right-of-way and pavement shall be provided at intersections for deceleration lanes, bus turnouts, and turn lanes.
- D. Arterial** - Those roads specified in the City's Street System Master Plan as arterials and main thoroughfares as determined by the City Engineer. Additional right-of-way and/or pavement may be required for bus turnouts and at intersections and driveways for acceleration lanes, deceleration lanes, and multiple left turn lanes. Additional right-of-way shall also be provided if sidewalks are not part of a landscape/pedestrian corridor adjacent to the back of curb.
- E. Cul-de-Sac** - The length of cul-de-sac streets as measured from the centerline of the intersecting street to the center of the bulb, shall not exceed 750 feet, unless a secondary emergency vehicle access is provided to the rear of the cul-de-sac bulb area, in which case the length of the cul-de-sac may be increased with the approval of the Fire Chief and the City Engineer. Cul-de-sacs longer than 150 feet shall have increased bulb radii per the standard drawing.

In the case of stub streets associated with phased development, the combined street lengths as measured from the dead-end to the nearest through street shall be in accordance with the requirements for cul-de-sacs. Stub streets shall be terminated with a temporary bulb or a hammerhead conforming to the Standard Details. A barricade conforming to the Standard Details shall be installed at the end of all streets that are proposed for future extension. For cul-de-sacs greater than 150 feet or where the end of the cul-de-sac is not visible from the centerline intersection of cross street, a "NOT A THROUGH STREET" sign shall be installed at the beginning of the cul-de-sac.

- F. Modified Collector Street** - The Grass Valley City Council has adopted modified collector street sections for designated streets within the city.
- 1. Ridge Road** - Refer to the Standard Details for the adopted street section for Ridge Road between Slate Creek Road and Hughes Road.
  - 2. Idaho-Maryland Road** - Refer to the Standard Details for the adopted street section for Idaho-Maryland Road between Highway 20/49 and Brunswick Road.

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**TABLE 6-1  
STREET GEOMETRIC REQUIREMENTS**

<b>CLASS</b>	<b>RIGHT OF WAY WIDTH</b>	<b>BACK TO BACK OF CURB WIDTH</b>	<b>RADIUS OF CURB RETURN @ RIGHT OF WAY / @ BACK OF CURB</b>		<b>NO. OF TRAVEL LANES</b>	<b>MINIMUM CENTERLINE RADIUS FOR HORIZONTAL CURVE</b>
Minor Residential Attached Sidewalk	42 feet	32 feet	21 feet	26 feet	2	200 feet
Minor Residential Detached Sidewalk	32 feet	32 feet	26 feet	26 feet	2	200 feet
Primary Residential Attached Sidewalk	50 feet	40 feet	21 feet	26 feet	2	200 feet
Primary Residential Detached Sidewalk	40 feet	40 feet	26 feet	26 feet	2	200 feet
Collector Attached Sidewalk	58/72 feet	48 feet	26 feet	31 feet	2	500 feet
Collector Detached Sidewalk	48/62 feet	48 feet	31 feet	31 feet	2	500 feet
Arterial Attached Sidewalk	82 feet	72 feet	Residential & Collector 26 feet / 31 feet  Arterial 45 feet / 50 feet		4/5	1000 feet
Arterial Detached Sidewalk	72 feet	72 feet	Residential & Collector 26 feet / 31 feet  Arterial 45 feet / 50 feet		4/5	1000 feet

**6-2 RIGHT-OF-WAY WIDTH** - Right-of-way widths shall be in accordance with these standards for the street classification under consideration or as determined by the City Engineer. No streets shall have a right-of-way width that is less than the street of which it is a continuation. Right-of-way requirements for widening at intersections shall be as specified by the City Engineer.

Building setbacks, landscaping requirements, and parking requirements shall be based on the ultimate right-of-way, regardless of the location of public street improvements.

A minimum 10-foot public utility easement (P.U.E.) shall be dedicated adjacent to all public and private streets and shall include traffic control appurtenances. Additional easement for sewer, water, storm drainage, landscaping, fencing, and all other public utilities shall be provided as required by the utility companies, these Design Standards, and as specified by the City Engineer.

Along the frontage of collector and arterial roadways, the right-of-way dedication shall include the landscape corridor adjacent to parcels zoned single-family residential (SFR).

**6-3 ROADWAY SIGNAGE AND STRIPING** - Signing and striping shall conform to the latest edition of the California Manual of Uniform Traffic Control Devices (CMUTCD), unless modified by these standards, the Construction Standards, or in writing by City Engineer.

**6-4 STRUCTURAL SECTION** - All roads, both public and private, to be constructed within the City of Grass Valley shall be asphalt concrete over aggregate base and, if necessary, aggregate sub-base.

All pavement sections shall be designed on the basis of the resistance R-value as determined in accordance with the State of California, Department of Transportation design method and appropriate traffic indices (TI). If the subgrade has an “R” value of 10 or less, a geotextile fabric or other approved product shall be installed on subgrade prior to placement of AB or ASB material. In addition, the City Engineer may require the installation of edge drains in soils where the “R” value of the subgrade is 10 or less.

Minimum TI values shall be as specified in Table 6-2 or as determined by the City Engineer.

**TABLE 6-2**

STREET CLASSIFICATION	MINIMUM TRAFFIC INDEX	MINIMUM STRUCTURAL SECTION (Assumes R=50)		
		AC	AB	AS
ALLEY-WAY	-	3"	6"	
MINOR RESIDENTIAL	6	3"	8"	
PRIMARY RESIDENTIAL	7	3"	9"	
COLLECTOR / NON-RESIDENTIAL COLLECTOR	8	4"	9"	
INDUSTRIAL	9	4"	7"	6"
ARTERIAL	10	5"	7"	6"

**A. Structural Street Sections at Signalized Intersections** - Pavement sections shall be designed by a Registered Engineer. Where traffic signal loops are anticipated or will be installed, the minimum structural section shall include 4" of AC on the minimum required AB for a length of 100-feet, from the curb return of the arterial street.



**6-5 CURB AND GUTTER REQUIREMENTS** - Curb and/or gutter are required adjacent to all public and private streets. All curb and gutter shall be Portland Cement Concrete, Class “A” mix and shall conform to the Standard Details.

- A. Type 1 Rolled Curb and Gutter** - Type 1 rolled curb and gutter shall be installed adjacent to residential areas or as directed by the City Engineer, poured monolithically with the sidewalk.
- B. Type 2 Vertical Curb and Gutter** -Type 2 vertical curb and gutter shall be installed adjacent to all multiple residential, industrial/commercial developments, school and park sites, poured monolithically with the sidewalk or as approved by City Engineer.
- C. Cross Gutters** - Cross gutters shall not be installed unless the intersection cannot be drained by an underground system. Installation of cross gutters shall be subject to the approval of the City Engineer.

**6-6 SIDEWALK REQUIREMENTS** - Sidewalks shall be constructed adjacent to all public streets. All sidewalks shall be Portland Cement Concrete, Class “A” mix conforming to the provisions of Section 90 of the Caltrans Specifications. All sidewalks shall have a minimum thickness of six inches, and shall meet the following requirements:

- A. Width** - The required width of sidewalks shall be 5-feet unless otherwise approved by the City Engineer. The width of the curb shall not be considered as included in the width of the sidewalk.
- B. Slopes** - Sidewalks shall have a maximum slope in the direction of travel of 5.0 percent unless otherwise approved by the City Engineer. If the longitudinal street grade is greater than 5.0 percent, the slope of the sidewalk shall not exceed the longitudinal slope of the street. Cross slope shall be a minimum of 1.0 percent and maximum of 2.0 percent sloped downwards towards the gutter.
- C. Pedestrian Curb Ramps** - Pedestrian curb ramps shall be provided at all intersections. All curb ramps shall conform to the requirements of these standards and the City’s Construction Standards for slope criteria and standard design. It is the design engineer’s responsibility to ensure that the intersection slopes designated on the improvement plans allow for the construction of pedestrian curb ramps that meet the above criteria. Curb ramps in the downtown area shall be constructed in accordance with the Grass Valley Downtown Streetscapes Standards Manual.
- D. Sidewalk Barricades** - Sidewalk barricades shall be required where satisfactory provisions cannot be made for pedestrians to safely continue beyond the terminus of the sidewalk. Where sidewalks end in fill areas, the fill shall be extended beyond the end of the sidewalk for a minimum distance of six (6) feet.

**6-7 PEDESTRIAN WALKS AND BIKE PATHS** - Pedestrian walks within a development shall have a minimum easement width of eight (8) feet and sidewalk width of five (5) feet. All walks shall conform to the requirements of Title 24. Walks shall be constructed with a minimum thickness of six-inches of Portland Cement Concrete, Class “A” mix.

Bike path design shall conform to “Bikeways” section of these Design Standards. Combined pedestrian/bike paths shall be a minimum of 10 feet wide and be constructed of either Portland Cement Concrete, Class “A” mix, having a minimum thickness of 4-inches or 2-inches of asphalt concrete over 4-inches of aggregate base. If the bikeway is intended or anticipated to support vehicle traffic the structural section shall be increased as determined by the City Engineer.

Pedestrian walks and Class 1A bike paths, if situated between lots, shall be fenced with chain link fencing or other material as approved by the Public Works Department and shall extend from the street right-of-way to the back lot line. These fences shall be 6-feet high from the building setback line to the back lot line and 3-feet high from the building setback line to the street right-of-way line. Collapsible bollards shall be placed at both ends of all these pedestrian walks/Class 1A bike paths.

**6-8 ROADWAY PROFILE STANDARDS** - Roadway profile design shall be based on the Caltrans Highway Design Manual and the following standards:

- A. Grades** - The minimum centerline (longitudinal) grades on new streets and gutter flow lines shall be 0.5 percent. The maximum street grade shall be 10 percent for all arterial and industrial streets and 15 percent for all collector and residential streets. Any deviation for unusually limiting terrain or existing topographical features will require specific approval by the City Engineer.
- B. Cross Slopes** - Standard cross slopes shall be 2.0 percent on all roadways. Certain roadways may require super elevations as directed by the City Engineer. Cross slopes on widened existing streets shall be a minimum of 1.5 percent and maximum of 3.5 percent. Where a street constructed with a super elevation is to be widened, the cross slope shall be as specified by the City Engineer.
- C. Vertical Curves** - The minimum allowable vertical curve length at the intersection of two grades shall be 50 feet; however, vertical curves may be omitted where the algebraic difference in grades does not exceed 2.0 percent. When vertical curves are required, they shall provide for adequate sight distance based on the minimum design speeds specified in Table 6-4. The vertical curve data shall be computed and shown on the plans and shall call out the tangent gradient length of curve, the elevations and stationing points of the beginning of vertical curve (BVC), end of vertical curve (EVC), PI, high and low points, and along 25 foot intervals.

**6-9 INTERSECTIONS** -. Refer to the Standard Details for required rights-of-way, pavement, taper lengths, etc. for intersections involving minor and major arterials.

- A. Grades** - The intersection and approach areas where vehicles are stored while waiting to enter the intersection should be designed where feasible: 1) with a minimum of 0.5 percent, a preferred slope of 2 percent and a maximum slope of 6 percent; and 2) with a maximum slope of 5 percent longitudinally and 2 percent perpendicularly for crosswalks. Stopping and decision sight distances shall be in conformance with AASHTO requirements. The intersection design must consider the needs of pedestrians, bicyclists and motorists.

Minimum approach areas must be at least 50 feet in length for unsignalized intersections and 200 feet in length for signalized intersections or as required for sight and stopping sight distances, measured from the curb line of the intersecting street. Any deviation for unusually limiting terrain or existing topographical features will require specific approval by the City Engineer. The centerline of the minor street shall meet the crown slope at the projected lip of gutter. Crown slope shall be reduced to 1.0 percent within the intersection if necessary.

- B. Angles** - Streets must intersect at 90 degree angles whenever possible by tangents not less than 100 feet in length. Where terrain necessitates a lesser angle, a deflection of up to 10 degrees is acceptable with deflection of up to 25% with the approval of the City Engineer.

**6-10 OFFSET INTERSECTIONS** - The following requirements apply to all offset intersections. Any variation to these requirements shall be subject to the approval of the City Engineer. **Distances are measured from centerline to centerline.**

- A. Residential Intersecting Residential** - Residential streets intersecting another residential street from opposite sides shall have their centerlines meet, or the offset between intersections shall be a minimum of 150 feet.
- B. Residential Intersecting Collector** - Minor and primary residential streets intersecting collector streets from opposite sides shall have their centerlines meet or the offset between the intersections shall be a minimum of 200 feet.
- C. Residential or Collector Intersecting Arterial** - Minor and primary residential streets and collector/industrial streets intersecting arterial streets from opposite sides shall have their centerlines meet or the offset between the intersections shall be a minimum of 500 feet. This condition shall not apply where a raised center median is provided on the major street separating conflicting turning movements.
- D. Arterial Intersecting Arterial** - Intersections between two arterials shall have their centerlines meet, or the offset between the intersections shall be a minimum of 1,320 feet.

**6-11 ELBOW INTERSECTIONS** - Use of expanded corners shall be limited to projected low volume residential, commercial and industrial streets and conditions where conformance to minimum horizontal length of centerline radius is not practical, and shall be subject to approval of the City Engineer.

#### **6-12 DESIGN SIGHT DISTANCES**

- A. Stopping Sight Distance** - The minimum sight stopping distance over any segment of roadway shall be designed for the vehicle speeds list in Table 6-4 unless specific approval for a lesser design speed is received from the City Engineer. Minimum stopping sight distance shall be consistent with that specified in the latest edition of Caltrans Highway Design Manual and the American Association of State Highway and Transportation Officials (AASHTO) Geometric Design of Highways and Streets.

The design stopping sight distance requirement for passenger cars is based on 3.5-foot height of eye, a 6-inch height of object. Adjustment factors, per AASHTO, must be used when calculating stopping sight distances for grades greater than 3 percent.

- B. Sight Distances at Intersections and Driveways** - The design of all public streets, private streets, and major non-residential driveways shall provide minimum sight distance in accordance with the following requirements. Design speeds shall be as specified in Table 6-4 or as specified by the City Engineer. Minimum design sight distances are specified in Table 6-5A through 6-5D. These requirements were extracted from the "Guidelines for Driveway Design", published by the Institute of Transportation Engineers. The safe sight distance requirements for passenger cars are based on a 3.5-foot height of eye and 2.0-foot height of object. The distances for semi-trailers are based on a 6-foot height of eye and 2.0-foot height of object, and shall apply to all streets intersecting arterial streets only. All measurements are from a vehicle located ten feet back of the traveled way as illustrated in the figure following Tables 6-5A and 6-5B. Adjustment factors, per AASHTO, must be used when calculating sight distances for grades greater than 3 percent. Special circumstances may preclude locations from meeting the requirements shown below, but in no case will the City allow the sight distance to be less than the minimum stopping sight distances per the State Highway Design Manual.

**TABLE 6-4  
ROADWAY DESIGN SPEEDS**

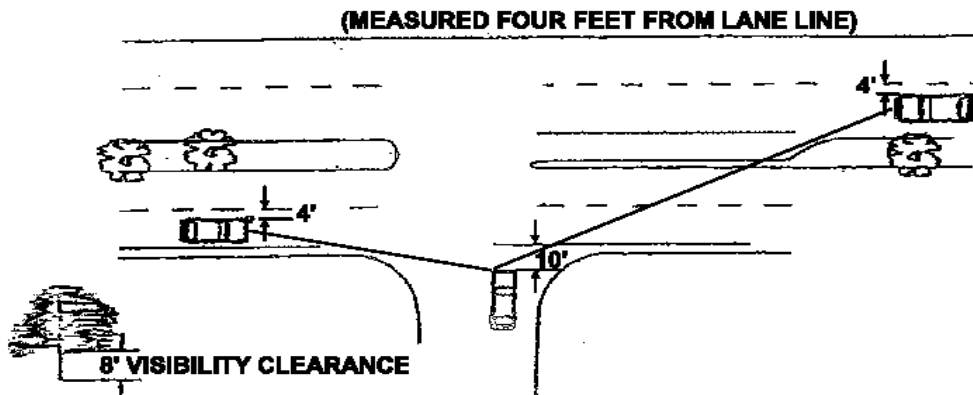
<b>STREET CLASSIFICATION</b>	<b>ROADWAY DESIGN SPEEDS</b>	<b>SIGHT DISTANCE DESIGN SPEED</b>
<b>Minor Residential</b>	<b>25 mph</b>	<b>30 mph</b>
<b>Primary Residential</b>	<b>25 mph</b>	<b>30 mph</b>
<b>Collector</b>	<b>35 mph</b>	<b>40 mph</b>
<b>Arterial</b>	<b>45 mph</b>	<b>50 mph</b>

**TABLE 6-5A**  
**DESIGN SIGHT DISTANCE FOR PASSENGER CARS**  
**EXITING A SIDE STREET ONTO TWO-LANE ROADS**

DESIGN SPEED (MPH)	DESIGN SIGHT DISTANCE - LEFT (FEET)	DESIGN SIGHT DISTANCE - RIGHT (FEET)
20	150	130
25	250	195
30	350	260
35	440	350
40	530	440
45	635	570
50	740	700
60	950	1050

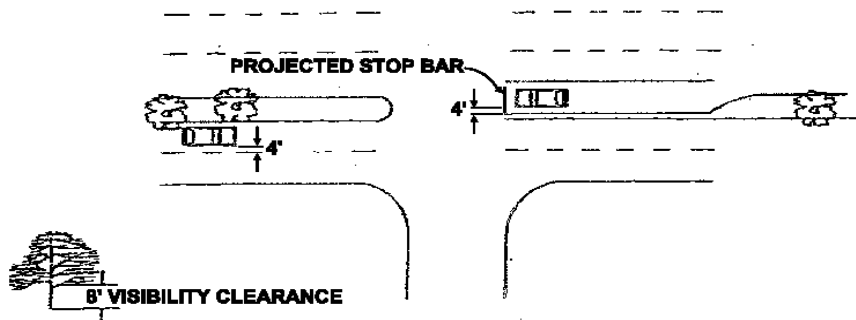
**TABLE 6-5B**  
**DESIGN SIGHT DISTANCE FOR PASSENGER CARS**  
**EXITING A SIDE STREET ONTO FOUR AND SIX-LANE ROADS**

DESIGN SPEED (MPH)	DESIGN SIGHT DISTANCE - LEFT (FEET)	DESIGN SIGHT DISTANCE - RIGHT (FEET)
20	130	130
25	175	195
30	220	260
35	300	350
40	380	440
45	500	570
50	620	700
60	950	1050



**TABLE 6-5C**  
**SIGHT DISTANCE FOR CARS ENTERING DRIVEWAYS/STREETS BY LEFT TURN**

Sight Distance in Feet			
OPERATING SPEED (MPH)	2-LANE (SINGLE LANE)	4-LANE (2 LANES)	6-LANE (3 LANES)
20	150	160	170
25	190	205	220
30	230	250	270
35	300	320	345
40	370	390	420
45	445	470	500
50	520	550	580
60	700	740	780



**TABLE 6-5D**  
**DESIGN SIGHT DISTANCE FOR SEMI-TRAILERS**  
**ENTERING ONTO FOUR AND SIX-LANE ROADS**

DESIGN SPEED (MPH)	DESIGN SIGHT DISTANCE - LEFT (FEET)	DESIGN SIGHT DISTANCE - RIGHT (FEET)
25	400	300
30	500	400
40	850	850
50	1600	1600
60	2500	2500

**6-13 CENTERLINE RADII** - The curve data (delta angle, length, tangent and radius) for all centerline curves shall be computed and shown on the plans. The minimum centerline curve radii shall be as specified in Table 6-1. Special consideration may be given by the City Engineer for unusually difficult alignment problems.

**6-14 DRIVEWAYS** - When driveways are abandoned or relocated, the driveway section shall be removed and replaced with curb, gutter, and sidewalk conforming to these standards. Parking is prohibited within any section of driveway. All new driveways shall conform to the following requirements:

**A. Types, Widths and Grades**

1. Single Family Residential and Duplex Driveways shall have a minimum width of 12-feet and maximum width of 20-feet.

Lot pads shall be graded to accommodate driveway slopes of 15 percent from back of right-of-way. Unusual terrain conditions may warrant a driveway slope up to a maximum of 20 percent subject to the approval of the City Engineer. Number of driveways accessing a single parcel is defined in Section 5 “Site Access” of these Design Standards.

2. Multi-Family/Office and Commercial/Industrial Driveway main entrances shall have a minimum width of 15-feet and a maximum width of 35-feet. If a raised median is provided in the driveway throat, the driveway width shall be widened as necessary to accommodate the number of ingress and egress lanes required, with a minimum ingress lane width of 15-feet. The minimum driveway median width shall be 4-feet and the maximum width shall be 10-feet. The nose of the median shall be no less than 7-feet and no more than 15-feet from the gutter flow line.

Driveways located on collector streets shall be standard commercial driveways per the Standard Details.

Driveway slopes shall have a maximum grade of 2 percent from the edge of pavement to a distance of 15-feet within the project. The remainder of the driveway shall have a maximum slope of 10-percent. Unusual terrain condition may warrant waiver of this requirement subject to the approval of the City Engineer. Driveway profile maximum grade changes without a vertical curve shall be 10% for a crest and 9% for a sag for a 10-foot distance on either side of the point of vertical intersection. The 10 foot distance with attached sidewalks shall begin at the back of the sidewalk.

- B. Location** - All aspects of site access (location of driveways, number of driveways allowed, spacing of driveways, etc.) are addressed in Site Access of these Design Standards.

**6-15 BUS TURNOUTS** - Bus turnouts and shelter pads shall be required at locations specified by the City Engineer. The size and location of bus turnouts and shelter pads, whether existing or proposed, shall be in conformance with the Standard Details and as approved by the City Engineer. Bus stop shelters in the downtown area shall be designed and constructed in accordance with the Grass Valley Downtown Streetscapes Standards Manual.

**6-16 DEVELOPER RESPONSIBILITY FOR IMPROVEMENTS TO STREETS** The following requirements apply to private development projects adjacent to existing and proposed streets.

- A.** The Developer shall be responsible for upgrading streets within, and adjacent to, the developer’s project where the pavement section of an existing street does not meet the structural section and/or the centerline grade and alignment requirements specified in these Design Standards for those streets.

Where the design centerline grade is to be higher than the existing, the Developer shall extend the overlay beyond the centerline of the street and shall neatly conform to the existing surface grade on

the other side. The Developer shall also be responsible for overlaying any low areas where the new pavement is proposed to meet the existing pavement to maintain a uniform cross slope.

- B. When making a connection to an existing stub street, the Developer shall be responsible for removing and reconstructing up to a maximum of twenty feet of the existing roadway to make a satisfactory connection as required by the City Engineer.
- C. When widening to complete an existing partial street along a development project, or when removing existing curb and gutter, the Developer shall be responsible for saw cutting and removing a narrow strip along the outside portion of the pavement to provide a clean and stable pavement section for constructing against. Grinding of existing pavement (1½-inch minimum) shall be made to the next nearest edge of lane line. The width to be removed shall be determined by the City Engineer. In the case of curb and gutter removal, a minimum width of pavement cut shall be 2-feet.
- D. All temporary approaches to existing roadways required as a result of the development shall be at the Developer's expense. The temporary approaches shall be paved with the structural section to be determined individually for each situation.
- E. The Developer shall be responsible for relocating existing traffic signals and streetlights, and installing new traffic signals and street lights as necessary for new street and driveway locations. The Developer shall also be responsible for relocating existing traffic signals and street lights as necessary for the installation of new curbs or new curbs and sidewalks at locations where there are no existing curbs or curbs and sidewalks. Traffic signals must remain operational during all construction within signalized intersections.
- F. The Developer shall be responsible for constructing or modifying median island curbs where required by these standards, or when required for traffic control as a result of the development, as determined by the City Engineer.
- G. The Developer is required to provide frontage improvements along existing and proposed roadways at the Developer's expense. Frontage improvements include, but are not limited to, sidewalk, curb and gutter, center median, street pavement (at a minimum to the right-of-way centerline), drainage system, landscaping, soundwalls, street lighting, roadway signing and striping, and all utilities (including traffic signal interconnect if applicable). For minor residential, primary residential, collector and industrial streets, the Developer shall provide the full right-of-way improvements.
- H. For development within the "infill" areas of the City, the level of improvements to public streets adjacent to the development site shall be determined on a project specific basis at the discretion of the City Engineer.
- I. The Developer shall be responsible for all drainage facilities (bridges, pipes, culverts, and appurtenances) crossing new streets within or adjacent to the project.
- J. The Developer shall be responsible for all necessary modifications within the public right-of-way and the project site to comply with state and federal standards for access for disabled, including but not limited to sidewalk ramps.

**6-17 TRENCHING IN EXISTING PAVED ROADWAYS** - All trenching in existing roadways shall conform to the Standard Details and the Construction Standards. The Developer may be required to coordinate trenching work schedules to avoid cutting pavement where repaving is planned by the City.



All installations on paved surfaces less than 5-years old shall be by boring and jacking only. If trenching is unavoidable, the entire lane width of the disturbed area shall be slurry sealed.

**6-18 STREET NAMES AND STREET NAME SIGNS** - Street names shall be chosen by the Developer from an approved list established by the City of Grass Valley and in accordance with the Street Naming Standards of the City of Grass Valley Municipal Code. No duplication of names already in use or previously proposed or sound alike names will be permitted.

**A. Sign Requirements** - Street name signs shall be furnished and installed by the Developer. The requirements for location of signs do not apply to signalized intersections since signals will have their own street name signs. Street name signs shall conform to City of Grass Valley Construction Standards. Street name signs in the downtown area shall be constructed in accordance with the Grass Valley Downtown Streetscapes Standards Manual. Type "C" letter shall be used until the number of characters and spacing exceeds the capacity of a 30" blank sign. Should more letters be required, all letters shall be type "B".

**B. Location and Number Required** - The required number of street name signs installed and location, depends upon the width of street right-of-way and shall conform to the following:

**1. Case 1** - Two street name sign installations (with four sign plates on each post) are required at each intersection where one or both of the intersecting streets are a collector or arterial street. At a four-way intersection, the installations shall be located on both far right hand corners of the intersection relative to the direction of travel on the street having the greater right-of-way width or on the major street if right-of-way widths are equal.

At a "T" intersection, one sign shall be installed on the far right hand corner of the intersection relative to the direction of travel on the through street and the other shall be installed along the left side of through street relative to the direction of travel at a point directly opposite the centerline of the "T" intersecting street. One sign plate should be omitted from the standard four-plate installation at the "T" intersection sign locations where an approach street does not exist.

Street name signs shall be located adjacent to the major street at the end of the curb return.

**2. Case 2** - One street name sign installation (with four sign plates on each post) is required at each intersection where both intersecting streets are residential streets. At a four-way intersection, the installation shall be located at one of the far right hand corners of the intersection relative to the direction of travel on the street having the greater right-of-way width or on the major street if the right-of-way widths are equal.

At a "T" intersection, the installation shall be located on the far right hand corner relative to the direction of travel on the through street.

Street name sign shall be located at the midpoint of the curb return.

**3. Case 3** - For arterials with frontage roads, the street name sign installations shall be located in the divider strip between the frontage road and the main traveled way of the highway at the near side of the intersection. All other requirements shall be as outlined above, except that only one sign will be required (in the divider strip in line with the centerline of the minor street) when there is no opening in the divider strip for access to a main highway.

**6-19 TRAFFIC SIGNS** - Signs shall be installed per the CMUTCD unless denoted otherwise.

1. Typical signs include the R-73 (CA) series mast arm mounted signs, R3-18 mast arm mounted signs, R9-3a and R9-3b signs (where crossing the street is restricted), W3-3 Signal Ahead roadside signs (pavement markings are only necessary where visibility of the signal is limited or where the signal may be unexpected by motorists), and R3 series roadside signs on the stem of a "tee" intersection.
2. U-turns shall be restricted where less than 36-feet exists between the left edge of the inside left turn lane to the face of curb for the opposing direction traffic lane, or as required by the City Engineer.

**6-20 STRIPING AND MARKINGS** - All painted traffic stripes, arrows, and pavement markings shall be constructed with thermoplastic material to the specifications set forth in Section 84 of the Caltrans Standard Specifications (latest edition) and shall conform to the CMUTCD.

**A. Fire Hydrant Markers** - At all fire hydrant locations, a blue reflective pavement marker shall be installed one foot off paved centerline or median on the hydrant side of the roadway, recessed into the pavement such that the top of the marker is flush with the pavement surface.

**B. Removal** - All existing traffic stripes and pavement markings shall be completely removed in accordance with the Construction Standards.

**C. Installation** - The following shall apply when installing traffic stripes and pavement markings:

1. In addition to locations shown on the plans, bike lane signs and pavement markings shall be installed at no more than one-half mile intervals and following every break in the bike lane striping. The BIKE LANE legend shall be centered in the lane to ensure the legend does not run into the lane striping.
2. A bicycle detector pavement marking shall be installed in conjunction with each bicycle detector per CMUTCD Figure 9C-7 and shall be placed starting 6-inches back of the crosswalk/stop bar.
3. Unless otherwise specified on the plans, crosswalks shall be ten (10) feet wide, measured from the centerline of the stripe. Longitudinal lines parallel with the direction of traffic may be required as shown on the plans or as directed by the City Engineer.
4. Traffic stripes and pavement markings shall not be placed over utility covers including, but not limited to, manhole covers, utility boxes, hand holes, or water valve covers.
5. STOP legend pavement markings and limit lines are required with stop signs. YIELD legend pavement markings are not required with yield signs. The yield limit line shall be per the CMUTCD (24" by 26" triangles).
6. At signalized intersections with left turn lanes longer than 150 feet the Type II or Type III arrows shall be placed 20-feet behind the limit line. Where there are dual left turn lanes with staggered limit lines, the arrows in the number 1 left turn lane (closest to the median) shall be placed 15-feet behind the limit line, and the arrow in the number 2 left turn lane shall be placed 20-feet behind the limit line. The intent is to have the two arrows line up side by side, even though the limit lines are staggered.
7. All turn lanes shall have a Type II or Type III arrow at the beginning of the turn lane such that the tail of the arrow lines up with the beginning of the Detail 38 striping. All turn lanes 150-feet or

longer shall have a minimum of two Type II or Type III arrows (one arrow for every 150-feet of turn lane).

8. All traffic lane striping shall be discontinued through any four way public intersection from crosswalk to crosswalk, marked or unmarked. Striping shall be continuous through private intersections unless there is a striped left turn lane and/or traffic signal. For public "T" intersections, the through and bike lane striping shall be continuous for the non-intersection direction, i.e. "across the top of the T". However, there shall be no striping within the limits of the crosswalk.
9. At locations where bike lane striping is parallel to striping used to channelize traffic, right turn acceleration/deceleration lanes and bus turnouts, both stripes shall be Detail 38. Reflective pavement markers shall be placed to the outside of the bike lane.
10. Bike lane striping shall be continuous except at right turn bay tapers, intersections with City streets, and driveways where the centerline/median is broken. See the Design Standards Details for examples.
11. Lanes designated by the City Engineer as auxiliary shall be striped as directed by the City Engineer. Examples of typical auxiliary lane striping can be seen in the Design Standards Details. Bike lane striping along auxiliary lanes shall be a modified Detail 38 with 4-foot stripes at 10-feet on center.

**6-21 TRAFFIC CONTROL** - Construction area traffic control shall be installed in accordance with the City accepted project specific traffic control plan, the approved improvement plans and specifications, as directed by the City Engineer and as follows:

- A. Restrictions** - Construction that inhibits free flow traffic shall not occur between the hours of 7:00 a.m. and 9:00 a.m., and 4:00 p.m. to 6:00 p.m., Monday through Friday, without prior written approval of the City Engineer. Traffic control lasting more than one hour will be subject to additional time restrictions in order to minimize the impact to the public.
1. At least one lane in each direction shall remain open to traffic unless otherwise approved by the City Engineer.
  2. Turning movement restrictions require prior approval of the City. A changeable message sign (CMS) shall be posted in the direction of travel affected by the restriction a minimum of three (3) days prior to the implementation of the traffic control at the Contractor's expense. Wording and placement of the CMS shall be approved by the City Engineer prior to installation.
  3. Traffic control hours are subject to limitation by the City.
  4. Lane closures that affect traffic flow may require night work, changeable message signs, and/or certified flaggers at the Contractor's expense. The Contractor should consider traffic control included in their cost of work and may contact the City for requirements prior to bidding a job.
  5. Approved road closures require 72 hour advance notification to the City, the public and emergency services. CMS's shall be posted in the directions of travel affected by the closure a minimum of 1 week prior to the implementation of the traffic control at the Contractor's expense. Wording and placement of the CMS's shall be approved by the City prior to installation.

6. A request must be submitted to the Public Works Department 48 hours prior to the time the red flash is needed. Allowable hours of flashing operation will be set by the City and will require early morning, evening, or night work unless otherwise approved in writing by the City.

**B. Traffic Control Plans:** All traffic control plans (including signage) shall be per the CMUTCD.

1. The City Engineer shall determine the necessity of a formal Traffic Control Plan (TCP).
2. A TCP submittal will be required in the following situations:
  - a. If traffic control will be complicated (to be determined by the Public Works Inspector)
  - b. If it involves a signalized intersection
  - c. If it will be in effect for longer than 12 hours
  - d. If it's not detailed in the CMUTCD
  - e. If it involves road closures or detours
3. Traffic Control Plans require responsible party contact information, hours of operation (which may be restricted by the City), and duration of work.
4. TCP submittals require the following minimum review times per submittal:

<u>Type of TCP</u>	<u>Min. Review Time</u>
Lane closure	2 days
Intersection Signal Flash	2 days
One-way traffic control	2-4 days
Detour/Road Closure	1-2 weeks

Note that complicated TCP's may require more review time. TCP review time should be included in the contractor's work schedule.

5. The traffic control plan submittal process is as follows:
  - a. Three copies of the TCP must be submitted to the Public Works Inspector.
  - b. The TCP is reviewed by the City and corrections/modifications are made by the contractor as necessary.
  - c. If all corrections/modifications are made to the satisfaction of the City, the TCP will be approved.
  - d. One copy of the approved TCP will be returned to the contractor.
  - e. The contractor must have a copy of the approved TCP on site during the entire time the TCP is in place.
  - f. Any deviation from the TCP must be approved by the Public Works Inspector and may require re-submittal of the TCP for City review. It will be up to the Public Works Inspector to determine whether or not the modified TCP needs to be resubmitted to the City.
  - g. Failure to maintain the TCP may result in shutdown of the project, correction by the City at the Contractors expense, or any combination of the afore mentioned.

**6-22 SURVEY MONUMENTS – Survey monuments shall be placed in compliance with the California Land Surveyor’s Act and as described below.**

**A.** The Consulting Engineer shall place survey monuments at the following locations:

1. At the intersection of street centerlines.
2. At the center of all cul-de-sacs and elbow points.
3. On street centerlines located such that there will be sight distance between the two monuments within the street right-of-way.
4. At the subdivision boundary corners and at such other locations so as to enable any lot or portion of the improvement to be retraced or located, as directed by the City Engineer.
5. At front and rear lot corners.

**B.** The above-described monuments shall be as follows:

1. Subdivision monuments shall not be less than 3/4-inch galvanized iron pipe, a minimum of 18-inches in length, capped and tagged. Monuments in street pavement shall be set in monument wells conforming to the Standard Details.
2. Monument wells, conforming to the Standard Details, shall be placed at all street intersections and centers of street cul-de-sacs.
3. Lot corners shall have a 5/8-inch rebar at rear corners. Front corner and side lot lines shall be projected and marked on back of sidewalk with chisel mark in addition to nail and tag in the top of the curb with a typical distance offset provided to the front corner.
4. Permanent survey monuments shall be placed by the Consulting Engineer at all section and quarter corners within the development. The section corner monuments shall be Class “B” concrete, poured in place, with minimum dimensions of 6” diameter x 24” deep, with a brass cap in accordance with Bureau of Land Management Standards.

All such monuments shall be referenced to permanent objects located nearby and all ties shall be furnished to the City Engineer for general public use. Final acceptance of the public improvements will not be made until such ties have furnished to the City Engineer.

The Consulting Engineer shall also place a note on all construction plans stating that the Contractor is responsible for the protection of all existing monuments and other survey markers.

**6-23 BENCHMARKS -** In locations where a new benchmark will be required, as determined by the City Engineer, the Developer’s engineer will set in concrete a 3¼-inch brass cap and shall then run a second order, class two survey, from an approved City of Grass Valley benchmark to establish the U.S.G.S. elevation of the cap. The level notes will be submitted to the Engineering Division for approval. After approval of the notes, the Developer’s engineer will mark on the brass cap the City of Grass Valley benchmark number, the date, and R.C.E. or L.S. number of the person certifying the level notes.

Benchmarks shall be provided where specified by the City Engineer, at all culverts 60-inches or greater, bridge crossings passing a 100 year flow of 250 cfs or greater, and within subdivisions that are greater than 50 lots.

- 6-24 DRY UTILITIES** – For all construction required as part of a tentative map or parcel map necessitating the replacement, undergrounding, or permanently or temporarily relocating existing dry utilities (power, electrical, cable, etc.), the permanent dry utilities shall be placed underground.
- 6-25 DEVIATION FROM STANDARDS** - All new streets, public and private, must meet the City Standards as required by this section. Any revised standard or deviation from the standard must be approved in writing by the City Engineer, the Fire Marshall, and the City Council (if required).

## SECTION 7

# WATER (W)

- 7-1 INTRODUCTION** - These improvement standards shall govern the engineering design of all domestic water systems intended for operation and maintenance by the City of Grass Valley. Note: the area supplied with water by the City of Grass Valley is limited. Nevada Irrigation District supplies water to those areas in the City boundary but outside of the City's water supply limits. In these areas, the NID water system details and standards shall govern.
- 7-2 DESIGN CRITERIA** - These criteria shall apply to the engineering design of all water systems intended for operation and maintenance by the City of Grass Valley. The intent of these criteria is to provide a water system that will dependably and safely convey high quality water throughout the distribution system.
- 7-3 CURRENT STANDARDS** - Pertinent and current requirements of the following agencies or standards shall be complied with. In the case of conflicting design criteria, standards set forth by the City of Grass Valley, as established herein, shall govern:
- A.** United States Environmental Protection Agency (EPA) Drinking Water Regulations
  - B.** Laws and Standards of the State of California, Department of Public Health Services relating to Domestic Water Supply
  - C.** City of Grass Valley Construction Standards
  - D.** City of Grass Valley rules and regulations for installation of individual water services and taps to the water system
  - E.** City of Grass Valley Fire Codes
  - F.** Title 17, Chapter V, Sections 7583-7622, California Administrative Code regarding cross-connections and backflow prevention
  - G.** Latest Edition of the American Water Works Association (AWWA) standards
- 7-4 WATER SUPPLY QUALITY** - The quality of water supplied to the City's distribution system shall conform to the Environmental Protection Agency Drinking Water Act, and the State Department of Health Services Drinking Water Standards.
- 7-5 WATER SUPPLY PRESSURE** - Normal-operating pressures of not less than 50-psi nor more than 100-psi shall be maintained at service connections to the distribution system, except that during periods of peak domestic and fire demand, the pressure shall not be less than 20-psi.
- 7-6 PEAKING FACTORS** - The average day demand to maximum day demand peaking factor shall be 2.0. The maximum day demand to peak hour demand peaking factor shall be 1.7 (3.4 average day to peak hour).

- 7-7 REQUIRED FIRE FLOWS** - The California Fire Code shall be used as the standard for determining the required fire flows provided with the initial development. Consult with the City of Grass Valley Fire Department to confirm the fire flow, hydrant, and service size requirements.
- 7-8 LOCATION IN EXISTING STREETS** - Where water mains or services are to be located in an existing street, factors such as curbs, gutters, sidewalks, traffic conditions, traffic lane conditions, pavement conditions, future street improvement plans, and existing utilities shall be considered. The approval of the City Engineer shall be obtained in every instance.
- 7-9 LOCATION IN UNPAVED AREAS** - All mains in unpaved areas shall be marked every 150-feet with a blue 5-foot 6-inch composite utility marker. A decal shall be placed on the marker stating "CAUTION WATER MAIN." Utility markers shall be Carsonite or approved equal with anchor barb kit. The first utility marker shall be placed within 20-feet of the public roadway.
- 7-10 TRANSMISSION SYSTEM DESIGN** - Standard transmission main sizes are 6-, 8-, 10-, 12- and 14- inches in diameter. Technical specifications for water transmission mains shall be a requirement of the proposed improvement plans. Under no circumstances shall water services be directly connected to a transmission main.
- A. Transmission Mains** - All transmission mains shall be installed within public rights-of-way and easements.
1. Mains shall be located 3-feet from the curb and gutter on the northerly and westerly side of the street. If conflicts exist at this location, then the main may be installed within an easement immediately adjacent to and behind the property line fronting the public right-of-way, subject to approval of the City Engineer.
  2. Transmission mains shall maintain a minimum vertical clearance of 1-foot from all other utilities.
  3. Valves shall be spaced no more the 2,000 feet apart.
- 7-11 DISTRIBUTION SYSTEM DESIGN** - Standard distribution main sizes are 6-, 8-, and 12- inches in diameter. Sizes of mains shall be such that the stated normal pressures, as specified in Section 7-5, and the minimum requirements for main spacing, specified below, are maintained. The distribution system shall be designed in grid form to provide equalized pressures throughout the system equalized under varying rates and locations of demand. The minimum pressures and flows specified in these design standards shall govern the design. The following shall be considered during system design:
- A. Hydraulic Analysis** - A Hardy-Cross network hydraulic analysis shall be provided to the Engineering Division upon request.
1. The hydraulic analysis submitted shall include two copies of the following items:
    - a. The data input files, as well as the analysis results in electronic format;
      - i. Information on the proposed development (e.g. type of development, number of acres, number of units, fire flow requirements, etc.),
      - ii. Data sheets outlining all assumptions (e.g. method used to assign demands to corresponding junction nodes and source HGL's used),



- iii. Map identifying pipe and node numbers and their locations,
  - iv. Fire hydrant locations,
  - v. The name and version of software used for the analysis,
  - vi. Elevations of junction and source nodes. The elevations used in the network hydraulic analysis shall be based on a project grading plan or the anticipated final elevations. If the final grading plan deviates significantly from the elevations used in the analysis, a revised analysis will be required,
  - vii. Staging or phasing of the development,
  - viii. Appropriate off-site demands.
2. The Hazen-Williams formula shall be used in the analysis of the system. The roughness factor shall be as follows:
- a. C=130 for all new cement-line, PVC C-900, and ductile iron pipes
  - b. C=130 for all existing pipes greater or equal to 16-inches in diameter
  - c. C=120 for all existing pipes less than or equal to 12-inches in diameter
3. When identifying the fire flow available in a network analysis, use the hydrant located at the development's weakest point (highest point in the development and/or last hydrant on a dead-end main). Also verify the hydrant is located at a junction node. The maximum delivery from any hydrant of the type conforming to current City Standards shall be limited to 1,500 gallons per minute.
- B. Pipe Sizes** - The minimum pipe size for residential development shall be 6-inches in diameter. For commercial developments, the minimum pipe size shall be 8-inches in diameter.
- C. Stubs** - Stubs for future development shall be fully restrained with a valve originating from the water main.
- 7-12 WATER MAIN LOCATION** - Water mains shall be installed in public rights-of-way or easements granted to the City.

**A. Location** - The following horizontal and vertical criteria shall be used to locate water mains:

- 1. Mains shall be located 3 feet from the curb and gutter on the northerly or westerly side of the street. If conflicts exist, then the main may be installed immediately adjacent to and behind the property line fronting on the public right-of-way, subject to approval of the City Engineer. Arterial streets may require dual mains, one on each side of the street, as approved by the City Engineer.
- 2. If it is necessary to install a water main outside of the public right-of-way, an easement dedication to the City shall be required. Water mains shall be centered within their easement. Easements shall be located completely on one side of a property line or fence. Dedicated easements shall be clear of all permanent structures, building eaves, roof lines and the future trunks of large tree species. Temporary construction easements of adequate size shall also be provided. The easement width shall be the greater of the following:

- a. Minimum width of easement shall be 15-feet.
  - b. All easements shall have a minimum width equal to the required trench width according to the “Utility Trench Bedding, Backfill and Paving” detail for trench backfill plus two (2) additional feet of width for every foot of depth of the pipe as measured from the bottom of the pipe to finished grade. All water mains shall be centered within their easement.
  - c. Easements for City water mains located in private driveways or parking areas shall be width of pavement plus 1-foot.
3. Water mains located between lots at the end of cul-de-sacs shall require an access easement or pedestrian walkway as determined by the City Engineer.
  4. Water mains shall maintain a minimum horizontal separation of 10-feet between sanitary sewer mains. All other utilities shall maintain a minimum 5-foot separation sidewall of pipe to sidewall of pipe. The water main shall be a minimum of 12-inches higher than sewer systems. In cases where the water main must cross under a sanitary sewer main or service, and with the permission of the City Engineer, the water main shall be special pipe with no joints 10-feet on each side of the crossing. When crossing sanitary sewer force mains, the water main shall be installed a minimum of 3-feet above and be ductile iron a minimum of 5-feet on each side of the force main.
  5. Water mains shall maintain vertical separation of 12-inches between storm drains and other dry utilities. The vertical clearance may be reduced to 6-inches with the approval of the City Engineer.
  6. Water mains under large structures such as culverts and large diameter storm drains shall be ductile iron and installed within a casing per these standards. The casing shall extend beyond the structure a minimum of 5-feet or the depth of the water main on each side.
- B. Vertical Elevation Change** - Mains designed with a vertical elevation change using angle fittings shall use a segment of ductile iron pipe with an approved restraint system between the two angle fittings.
- C. Cover** - A minimum cover of 36-inches and a maximum cover of 60-inches shall be maintained as measured from the outside bell of the pipe to gutter flow-line for distribution mains. A minimum cover of 48-inches as measured above shall be maintained for transmission mains.
- D. Dead-End Mains** - Dead-end mains shall be eliminated wherever possible by looping the system. Blow-offs or hydrants conforming to the Standard Details shall be installed on all permanent or temporary dead-end mains. Removal of the blow-off at the end of cul-de-sacs and service connection to the end of the main is not permitted without prior approval by the City Engineer.
- E. Public Lines in Commercial Developments** - Water mains shall be located within drive aisles unless otherwise approved by the City Engineer. The Design Engineer shall minimize the length of publicly owned mains where an on-site water loop is required.
- 7-13 VALVES** - Sufficient valves shall be provided on water mains to minimize customer service interruptions and sanitary hazards during repairs and future development.

**A. Locations** - Valves shall be generally located as follows:

1. No single shutdown will result in shutting down a transmission main.
2. At minimum intervals of 500-feet in school, commercial, industrial, or multi-family residential developments.
3. In residential areas, valves shall be spaced such that no single shutdown will result in shutting off water to more than 20 services or 800-feet of water main, whichever occurs first.
4. Valves shall be located such that any section of main can be shut down without going to more than three (3) valves to shut down the section of main.
5. All tees shall have a minimum of three (3) valves. Commercial services 6-inches and greater shall have a valve on each leg of the tee for a total of three (3) valves.
6. All crosses shall have a minimum of four (4) valves.
7. Valves shall not be located in street gutters, valley gutters, or driveways.
8. A valve shall be installed on each side of a creek, bridge, major highway, or as required by the City Engineer.
9. At the end of all temporary dead end mains. The valve is to be located a minimum of ten (10) feet upstream of the blow off assembly.

**B. Valve Extension Stems** - Valve extension stems are required where the distance from the top of the valve box to the top of the operating nut exceeds 40-inches. The valve extension stem shall be a minimum of 24-inches long and shall be within 24-inches of the surface.

**C. Air Relief Valves** - In the absence of services to relieve air trapped in high points of the water main, air relief or air vacuum relief valves are required on pipeline high points and changes in grade.

**7-14 HYDRANTS AND BLOW-OFFS**

**A. Location** - Hydrants and blow-offs shall adhere to the following criteria:

1. Fire hydrants shall be placed at street intersections wherever possible. Hydrants located at intersections shall be installed at the curb return on the same side of the water main connection.
2. Fire hydrants and blow-offs not located at intersections shall be installed on property lines between lots.
3. The pipeline connecting the hydrant and the main shall be a minimum of 6-inches, with a gate valve flange connected to the main.
4. A blow-off assembly shall be installed on all permanent and temporary dead-end runs. A 2-inch blow-off shall be used on mains 12-inches and smaller. A 4-inch blow-off shall be used on mains 16-inches and larger. In no case shall the location be such that there is a possibility of back-siphonage into the distribution system.

5. Blow-off assemblies shall be located at low points along transmission mains.

**B. Spacing** - Fire hydrants and blow-offs shall have a maximum spacing of 500-feet measured along the street frontage in residential areas and a maximum spacing of 300-feet in all other areas. Where new water mains are extended along streets where hydrants are not needed for protection of buildings or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000-feet to provide for transportation hazards. Fire hydrants shall be installed at the end of all permanent dead end runs. Refer to the Grass Valley Fire Code for the number and distribution of fire hydrants served by private fire service water systems.

**C. Cul-de-sacs and Dead-end Streets** - Hydrants shall be required within a cul-de-sac or dead-end street measuring more than 250-feet as measured from the curb return of the intersecting street and the end of the bulb or street. A minimum 8-inch water main shall extend up to the hydrant tee.

**D. Valves** - Hydrant valves shall be placed with a minimum separation of 15-feet from the hydrant for straight runs. Hydrant valves will be placed at the tee for crossings.

**7-15 WATER SERVICES** - Water services shall be installed at the time the water main is constructed. Service stubs smaller than 2-inches or smaller shall be Polyethylene Pressure Pipe. Service stubs larger than 2-inches shall be fully restrained ductile iron pipe and meet the requirements of the Construction Standards for DIP water main . Services from mains installed in private roads shall be extended 1-foot beyond the edge of pavement. Water services shall also conform to the following requirements:

**A. Location** - Water services for residential subdivisions shall be located 42-inches from the property line per these Construction Standards. The building service shall be located to provide the most direct connection to the main. Every effort shall be made to pair services.

**B. Curb Stamp** - The curb shall be stamped with a “W” at all service locations.

**C. Sizing** - The standard size of a single-family residential service line shall be 1-inch in diameter. Single-family residences requiring fire sprinklers may require larger service lines. Schools, commercial, industrial, or multi-family residential developments shall be provided with a larger service subject to approval by the City Engineer.

**D. Spacing** - For service laterals 2-inches in diameter or smaller, service saddles shall be a minimum of 12-inches from the end of the main and 24-inches to any other service saddle or pipe joint.

**E. Service Taps** - The City will make all water service taps into existing mains after approval of an application for the service tap and payment by the applicant. Work by the City shall be performed on a time and materials basis. A note to this effect shall be placed on the plan sheet which shows a detail of the area that requires such tapping. The service tap application shall be made to the City of Grass Valley Water Division a minimum of two (2) weeks in advance of the time the tap is desired. All connection fees must be paid prior to the time of application. All excavation, backfill, and the installation of the remainder of the water service, shall be performed by the Contractor.

**F. Water Meters** - Water meters shall be installed on all water services. Meters shall be purchased through the City and installed by City forces upon plan approval and payment of the connection fees.

**7-16 RESTRAINT** - Joint restraint shall be achieved by means of a mechanical joint restraint device. Full pipe restraint shall be required within bridges, casings, dead end runs, temporary dead end runs, and as determined by the City Engineer. Restrained pipe within casings, bridges, and per the City Engineer shall

be fully extended. A note shall be placed on the plans. Thrust blocks shall not be used unless specifically called out on the plan set and approved by the City Engineer. In the case of hydrant runs and dead-ends, thrust blocks shall be used in addition to mechanical restraints as a redundant feature. Restraint calculations shall be submitted with the plan review.

- 7-17 WORK NEAR EXISTING WATER MAINS** - Existing transmission water mains shall be clearly shown on the plans. The plans shall have a caution note on the cover sheet, plan/profile sheets, and grading sheets where the transmission main is shown as existing. The notes shall read as follows:

*CAUTION EXISTING (main size) WATER MAIN.*

No construction shall be permitted within the water main easement without the presence of the Public Works Inspector. 48-hour notice shall be given prior to start of construction. Heavy equipment and vibratory equipment may cross designated segments of the water main with a minimum of 10-feet of cover or approved equivalent. The City shall inspect the condition of the existing main prior to paving. Request for inspection shall be made one (1) week in advance.

**A. Water Mains 16 Inches and Larger:**

1. The Public Works Inspector shall inspect the interior of the existing water transmission main prior to paving. If damage to the pipe resulting from construction activities is discovered, the Contractor shall be responsible to pay for all repairs. A minimum of one (1) week advance notice is required prior to inspection.
2. The Contractor shall provide the City with a construction schedule, and a list of equipment proposed to be used within the water main easement.
3. A plastic mesh fence shall be installed on both sides of the water main a minimum of 10 feet from the centerline prior to the start of construction and/or grading operations.

- 7-18 WATER SAMPLING STATION** – Water quality sampling stations on the distribution line may be required. See standard details.

- 7-19 WATER IMPROVEMENT PLAN REQUIREMENTS** - Plans for the construction of water infrastructure, whether in conjunction with other improvements or for a water project only, shall conform to these standards, the Construction Standards, and meet the following requirements.

**A. Water Study** - A water study or water master plan as determined by the City Engineer may be required prior to review of the water design if there is a possibility that adjacent areas might require service through the subject property.

**B. General Requirements** - Plans for water improvement projects shall include a layout sheet, plan and profile of each public water line, and necessary detail drawings. Reference to the Construction Standards shall be made for all Standard Details.

**C. Layout Sheet** - Improvement plans shall include an overall map which shows the project boundaries, water mains, valves, services, and other important items of the work.

1. A parcel which benefits from and financially participates in a water construction project, but is not included within the project boundaries, shall have a note to this effect placed on the layout map and on the plan and profile sheet if the parcel appears thereon. Parcels which make use of

those facilities may be subject to additional fees at the time of connection, if the participation has not been so noted.

**D. Plan and Profile Sheets** - Water lines to be maintained by the City of Grass Valley shall be shown on both plan and profile sheets. The following standards, with respect to drafting and the information to be included on the plan and profile sheets, generally apply to projects in developed areas.

1. Water lines to be constructed shall be indicated on profile by parallel lines spaced to show the pipe diameter to scale. The length, size, and type of pipe material shall be printed parallel to the horizontal grid lines or parallel to the pipe line if space permits. The profile shall note all proposed appurtenances. Existing facilities shown on the profile shall be dashed or distinguishable from proposed improvements. Manhole identification on the plan view may be oblique. Stationing shall appear at the lower edge of the profile grid directly under the appurtenance.
2. Proposed water services shall be indicated on the plans per the Standards Details.
3. Improvements or lots shown on a plan sheet but served to a line shown on another plan sheet shall have the direction of service shown by a small triangle and letter "W."
4. Both permanent and working easements shall be shown to scale on the plans, with the width noted.
5. Proposed water lines shall be adequately dimensioned from street centerline. If the water line is to be located in an easement, sufficient dimensions and bearings from physical features to locate the line in the field shall be shown on the plans.
6. Existing gas, sewer, storm drains, and all other utility lines above or below ground shall be shown on the plans.
7. Trees and other objects within the construction area shall be shown on the plans to scale, with the diameter of tree trunks noted. Removal of a tree or object, or other special handling shall be noted. Written documentation of any special arrangements regarding preservation of property shall be provided to the City Engineer if no easement document is involved. If an easement is negotiated, all special arrangements shall be included in the easement document. Tree removal must be approved by the Planning Department.
8. Culverts shall be shown on both plan and profile sheets when crossed by the construction or when parallel and within 20-feet of the construction line. Type, size, and invert elevations shall be called out.
9. No trees or permanent structures shall be placed within water easements without the approval of the City Engineer.

**E. Detail Drawings** - Details not covered by the Standard Details shall be shown on the plans.

**SECTION 8**

**SANITARY SEWER (SS)**

- 8-1 DESIGN CRITERIA** - These criteria shall apply to the engineering design of any sanitary sewer system to be maintained by the City of Grass Valley or, with those exceptions as noted, to that within private multiple ownership residential or multi-parcel commercial and industrial developments.
- 8-2 AVERAGE FLOW DETERMINATION** - The determination of average dry weather flows for design purposes shall be based upon the best available information concerning land use and density as determined by the City Engineer. This information may include approved land use and density in accordance with current zoning in the absence of more specific information pertaining to expected development. Average dry weather flow factors are listed in Table 8-1.

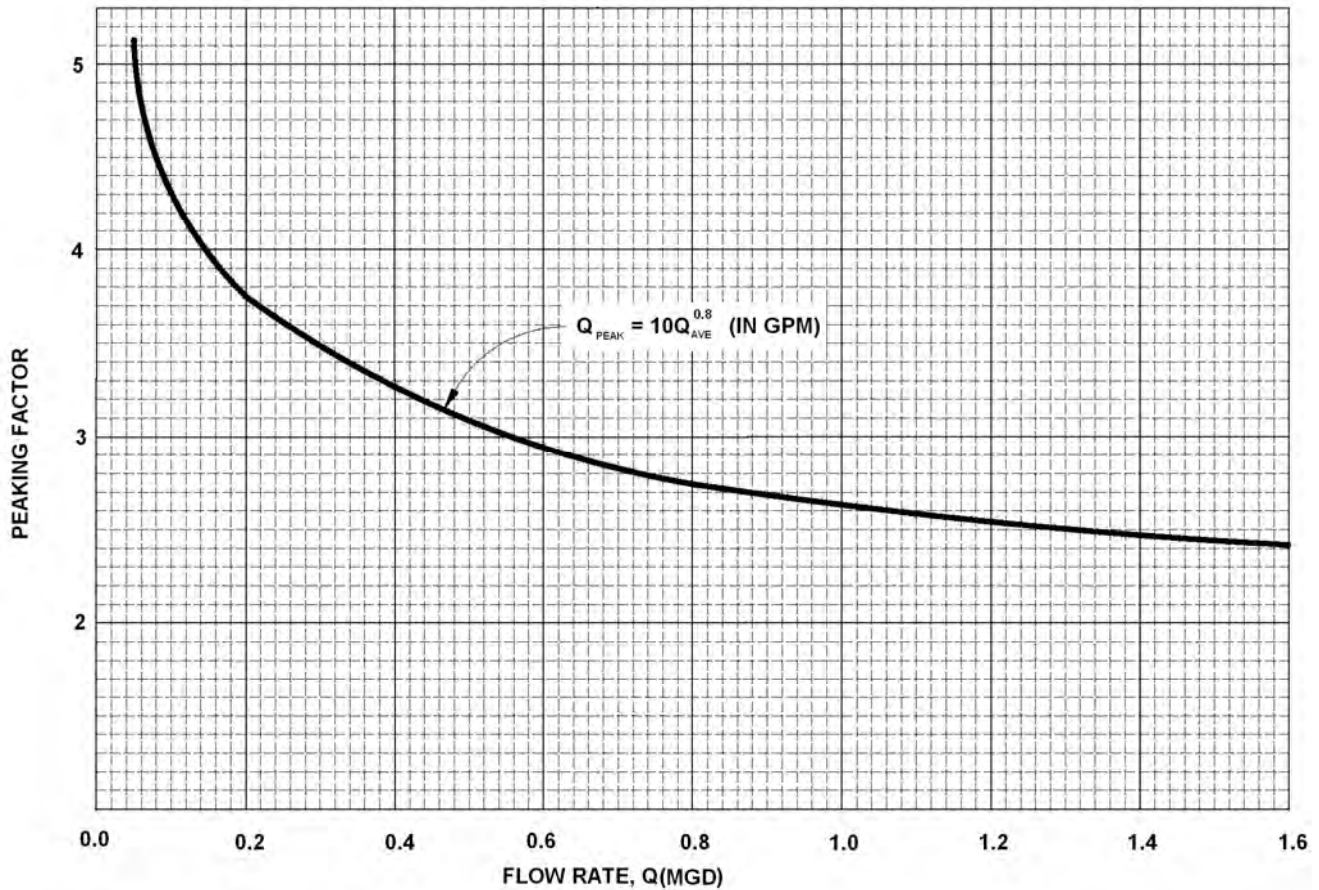
**Table 8-1 - Average Dry Weather Unit Flow Factors**

<b>Land Use Designation</b>	<b>Units</b>	<b>Wastewater Generation Factor (gpd/unit)</b>
Commercial/Industrial	Acre	850
Residential Single Family	Dwelling Unit	191
Residential Multiple Family	Dwelling Unit	135

Note: Flow factors for land use designations not listed, including Public lands, mixed use, and schools shall be determined on a case-by-case basis

- 8-3 DESIGN FLOW** - Design flow sizing of infrastructure 15-inches in diameter and smaller shall be calculated by using the average dry weather unit flow factor(s) listed in Table 8-1 for the upstream service area along with a safety factor of 2.0 and the appropriate peaking factor listed on Figure 1. For sizing trunk sewers 18-inches in diameter and larger, utilize the hydraulic model of the collection and conveyance system and consult with Engineering staff.

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**Figure 1 - Peaking Factor**

**8-4 PIPE CAPACITY, SLOPE, VELOCITY, SIZE, DEPTH AND MATERIAL** - Design criteria for the pipe system are as follows:

- A. Main Sizes** - The minimum size sewer main within a residential development shall be 6-inches in diameter. The minimum size sewer main for commercial and industrial developments shall be 8-inches in diameter.
- B. Slope and Velocity** - Manning’s formula shall be used to determine the relation of slope, design flow, velocity, diameter, and "n" value. The "n" value shall not be less than 0.013 for all pipe materials.
  - 1. Table 8-2 provides minimum slopes and design flow capacities for various pipe diameters. Pipe slopes less than those listed in this table shall not be used without the approval of the City Engineer. The slopes indicated are based on a velocity of two (2) feet per second with the pipe flowing full.



**Table 8-2 - Minimum Slopes and Flow Capacities**

<b>PIPE DIAMETER (IN)</b>	<b>SLOPE (ft/ft)</b>	<b>CAPACITY AT 0.7 DEPTH</b>	<b>CAPACITY FLOWING FULL</b>
6	0.0050	0.22 MGD	
8	0.0035	0.38 MGD	
10	0.0025	0.58 MGD	
12	0.0020	0.85 MGD	1.00 MGD
15	0.0015	1.32 MGD	1.60 MGD
18	0.0012	1.95 MGD	2.35 MGD

2. The maximum depth of flow at design conditions in all laterals shall be 70 percent of pipe diameter.
3. All sanitary sewer pipe shall be designed for a minimum scour velocity of 2-feet per second at peak flows. The volume of wastewater within the pipe system as determined above shall be used when designing pipe slopes.
4. Maximum design velocity shall not exceed 10-feet per second.

**C. Capacity** - Pipe capacity in all cases, shall be adequate to carry the design flow from the entire tributary shed area even though said area may not be within the project boundaries.

**D. Hydraulic Grade Line** - The hydraulic grade line shall be determined from the design flows, based upon 100 percent development of the tributary area. Hydraulic grade line calculations must be submitted for the design of all lines 12-inches in diameter or larger.

**E. Depth** - Sewer mains with service laterals shall not exceed a depth of 15-feet. The system shall be designed to provide a minimum slope for sewer services of ¼-inch per foot with a minimum cover of 24-inches at any buildable location within the properties to be served. Proposed building floor pad elevations shall be a minimum 6-inches above the lowest upstream manhole rim. Where the pad elevation cannot be raised, a backwater valve for the building shall be required. The backwater valve shall be noted on the improvement plans and building plans. Installation shall be made during construction of the underground improvements. Deed restrictions shall be put in place which hold the City harmless for failure of the backwater valves on such lots.

**8-5 SEWER LOCATION AND ALIGNMENT REQUIREMENTS** - Location and alignment criteria are as follows:

- A. General** - All sanitary sewers shall be placed in rights-of-way dedicated for public streets or within easements approved by the City Engineer. Developments with deep sewer mains or with trunk mains may require dual sewer mains. There shall be a minimum horizontal clearance of 10-feet between parallel water and sanitary sewer mains. A minimum horizontal clearance of 5-feet shall be maintained between sewer mains, parallel storm drains, and other utilities. On crossings, water lines shall be a minimum of 12-inches above the sewer line, unless otherwise approved by the City Engineer. Attention is directed to Sewer and Water Separation of the Standard Details.
- B. Location in New Streets** - In new streets, sewers shall be located 5-feet south or east of street centerlines, or as approved by the City Engineer.
- C. Location in Existing Streets** - When sanitary sewers are to be installed in an existing street, factors such as curbs, gutters, sidewalks, traffic conditions, traffic lane conditions, pavement conditions, future street improvement plans, and existing utilities shall be considered. The approval of the City Engineer shall be obtained in every instance.
- D. Location in Unpaved Areas** - All mains in unpaved areas shall be marked every 100-feet maximum between manholes with a green 5-foot, 6-inch composite utility marker. A decal shall be placed on marker stating "CAUTION SEWER PIPE." Utility marker shall be Carsonite or approved equal with anchor barb kit.
- E. Easement Sewer Lines** - Easement sewer lines outside of the public right-of-way, or within a narrow right-of-way shall require an easement dedication to the City. Sewer lines shall be centered within their easement. Easements shall be completely on one side of the property line or fence. The easement shall be clear of permanent structures, building eaves, roof lines, and the future trunk of large tree species. Temporary construction easements of adequate size shall also be provided. The proposed easement shall be the greater of the following:
1. Minimum width of easement shall be 15-feet.
  2. All easements shall have a minimum width equal to the required trench width according to the standard detail for trench backfill, plus two (2) additional feet for every 1-foot of depth of the pipe as measured from the bottom of the pipe to finished grade. All sewer lines shall be centered within their easement.
- F. Water Well Clearance** - Sewer lines shall maintain a minimum 100-foot separation from all public or private wells. (Properly abandoned wells are not included.) If a clearance of less than 100-feet is approved, the pipe material shall be approved by the City Engineer. In no case shall a clearance of less than 50-feet be allowed.
- G. Lines in Drainage Swales** - Sewer lines, public or private, shall not be located within a drainage swale. The horizontal distance between the sewer line and the top of the bank shall be sufficient to maintain the integrity of the drainage swale and provide access for maintenance to the sewer line.
- H. Alignment** - Sewer lines and structures shall be designed to provide a minimum 12-inch vertical clearance from all utilities and/or improvements, unless otherwise approved by the City Engineer.
1. Horizontal alignment of sewer lines shall be parallel to the street centerline. The location shall be 5-feet south or east of street centerlines, as needed to maintain separation from water and storm drain lines, or as approved by the City Engineer. Minimum radius for sanitary sewers 6-inches through 12-inches in diameter shall be 200-feet. For pipe 27-inches in diameter or larger, mitered

joints, fittings, or other methods as specified in the Construction Standards may be utilized to accomplish alignment changes.

2. Vertical alignment shall provide a constant slope between manholes. If a change in grade is necessary, construction of a manhole shall be required unless the use of a vertical curve is approved by the City Engineer. In such case, elevations shall be shown at 10-foot intervals throughout the length of the vertical curve. The maximum deflection permitted shall be two percent for each 10-foot interval.

- I. **Sewer Main Stub** - Sewer main stubs for future development which are perpendicular to the sewer main shall originate from a manhole and terminate 5-feet into the future development.

**8-6 TRENCH BACKFILL** - The trench backfill requirements for sanitary sewer pipe are as follows:

- A. **Bedding and Initial Backfill** - Unless otherwise noted on the plans, bedding and initial backfill shall be per the Construction Standards. Special backfill requirements shall be noted on the plans.
- B. **Special Pipe Strength Requirements** - For sewer mains greater than 20-feet deep or mains requiring extra support strength, pipe material shall be approved by the City Engineer. Ductile iron pipe shall be used if cover is less than 3-feet or insufficient clearance exists between the sewer pipe and the rigid load transmitting structures. Such structures include large diameter storm drains and other structures subject to settlement. The ductile iron pipe shall extend 5-feet each side of the structure crossing.

**8-7 MANHOLE CRITERIA** - The design criteria for manholes are as follows:

- A. **General** - Manholes shall be placed at the intersection of all sanitary sewer lines, at the upstream end of a pipe run, and at the end of all sewer mains. No more than three (3) lines may enter a manhole with one (1) line exiting. Medium-density single-family subdivisions may enter a manhole with up to 4 services with one exiting main line upon approval of the City Engineer. Summit manholes are not permitted.
- B. **Spacing** - Maximum spacing of manholes shall be 500-feet for all straight lines of 10-inches in diameter or less. A line with a radius greater than 400-feet shall be considered as straight for purposes of this section. Manhole spacing on curved lines of 200-foot radius (minimum allowable) shall be 200-feet. Manhole spacing on curved lines of radii between 200- and 400-feet, or where only a portion of the line is curved, shall be adjusted proportionately. Reverse curves require a manhole at the point of tangency of the curves or as determined by the City Engineer. A manhole shall be required at any change in vertical alignment unless use of a vertical curve is approved by the City Engineer.
- C. **Invert Elevations** - The invert elevation for pipe of the same diameter entering a manhole shall have a 0.10-foot drop between the entering and exiting pipe. For pipes of different diameters the crown of the entering pipe shall be at the same elevation or higher than the exit pipe.
- D. **Special Construction Requirements** - Epoxy coating of manholes shall be required in areas determined to have a potential of generating excessive sulfide gases. Such manholes shall include, but are not limited to, the first manhole originating from a sewer trunk main 15-inches in diameter or larger, force main transition manholes, manholes designed with inside drops, or as determined by the City Engineer.

- E. Manhole Access** - Provisions must be made to prevent vegetation from overgrowing the manholes. An all weather 10-ton vehicular access road shall be provided to each manhole as required by the City Engineer. Turning radii of 30-feet inside and 45-feet outside, and a vertical clearance of 14-feet are required.
- F. Connection to City Mains** - Improvement plans which require a connection to an existing City of Grass Valley sewer main or structure, shall specify that such connection be performed by City forces on a time and materials basis.

**8-8 DROP CONNECTION CRITERIA** - Outside drop connections shall be the preferred drop connection, if required. If an elevation difference of less than 3-feet exists, the slope of the incoming line shall be increased to eliminate the need for the drop. Inside drops may be permitted under special conditions with the approval of the City Engineer.

**8-9 SEWER SERVICE DESIGN** - The design criteria for sewer services are as follows:

**A. General** - Services shall be designed and constructed perpendicular to the main or as approved by the City Engineer. The service shall extend from the main to the edge of the public right-of-way or easement. A cleanout shall be constructed at the property line per the Construction Standard Details. Services shall extend 2-feet beyond edge of pavement of private roads. Easements of adequate width to accommodate the service shall be obtained. A plan and profile of services shall be supplied to the City Engineer on request.

**1.** Cleanouts shall be designed and constructed to grade with subdivision improvements or at the time connection is made to the building sewer. Unless otherwise noted on the plans, construction of the cleanout to grade is the responsibility of the contractor for the subdivision improvements. If installation of the cleanout is deferred, the plans shall call for the placement of a 4-inch by 4-inch post at the end of the service sewer extending from the flow line to not less than 12-inches above ground surface.

**B. Sizing** - The minimum size service for single-family developments shall be 4 inches in diameter. Schools, commercial, industrial and multiple residential properties shall be served by a minimum 6-inch diameter service.

**1. Connection to Sewer Mains** - Residential services shall connect to the sewer main by means of a factory fitting. Properties with services located at the end of cul-de-sacs shall enter a manhole. Services 8-inches in diameter and larger shall be connected to the main by use of a manhole. Connection to trunk mains shall be approved by the City Engineer. In no case shall a service connection be made with the use of a tee.

**2. Connection to Existing Sewer Mains** - The Public Works Department will make all sewer service taps onto existing mains upon completion of an application for a permit and payment of the required connection fees. Proposed work by the City shall be performed by City forces and payment made to the City for such work will be on a time and materials basis. A note to this effect shall be placed on the plan sheet which shows a detail of the area that requires such tapping. Connection fees shall be paid prior to submittal of the application. All excavation, backfill, and the installation of the remainder of the sewer service or stub, shall be performed by the Contractor.

3. **Connection Limitations** - Sewer services shall connect to 12-inch diameter and larger pipe or to lines more than 15-feet in depth at a manhole. Direct connection to trunk mains shall only be with the approval of the City Engineer.
4. **Material** -Sewer pipe installation shall conform to section 5-6 of the Construction standards.
5. **Location** - A sewer service shall be constructed to each lot. In new subdivisions or developed areas, unless specifically requested otherwise in writing, sewer services shall be placed on the low side of any typical subdivision lot or similar parcel with 2 percent or greater slope across the front, or shall be placed in the center of lots of lesser slope. The sewer service for lots with lesser frontage cross-slope shall be placed at the center of the lot. Consideration shall be given to trees, improvements, etc., so as to minimize interference when the service sewer is extended to service the house.

If the property is located such that service is available both to a line located in an easement and also in a right-of-way, service shall be at the latter location unless otherwise approved by the City Engineer. No service sewer shall be located such that future on-site construction will result in the line being in such proximity to a water well or water main or service that applicable health standards will be violated.

- C. **Depth** - Adequate depth of sewer service at the edge of easement or right-of-way to service the intended parcel shall be verified. A depth of 4-feet to crown of pipe, measured from existing ground surface or edge of adjacent roadway, whichever is lower, shall be considered the standard for service sewer depth, except where the water main is to be installed at back of sidewalk as part of the subdivision improvements. In such cases, service shall have a minimum depth of cover of 4-feet at the property line and the service shall be extended to a minimum of 7-feet back of sidewalk with the cleanout to grade remaining within 2-feet of back of sidewalk. When greater depth is required, the invert elevation of the service sewer at the edge of the right-of-way or easement shall be noted on the improvement plans. If a joint trench is being utilized for other utilities, the plans shall indicate that a joint trench will exist and service elevations shall be adjusted accordingly. Sewer service connection to the main shall not exceed 15-feet.
- D. **Special Requirements in Developed Areas** - In developed areas, a sewer service shall be provided to each parcel participating in the project which contains a source of sewage less than 200-feet from a lateral. A property owner's request for service location shall be honored whenever practical. Parcels which have two or more sources of sewage must have an independent sewer service provided for each sewage source which can be separated from the rest of the parcel and sold. A service shall be provided to each lot. During the design period, each property owner affected by the proposed work shall be contacted in writing to determine the preferred sewer service location. In absence of a response, a sewer service shall be provided in accordance with these standards. In addition, upon staking the location of the proposed sewer services prior to construction, each property owner shall be given a final opportunity to approve the proposed sewer service location. Compilation of this information shall be furnished to the City Engineer.
- E. **Connection to Existing Sewer Stubs** - Connection to existing sewer stubs shall be made upon conducting a TV inspection and pressure test of the stub. The TV inspection shall be performed by City crews and payment made to the City for such work on a time and materials basis. If the stub is found damaged, repairs shall be made at the Developer's expense. A note to this effect shall be placed on the improvement plans.

**F. Abandoning Existing Sewer Stubs** - Existing sewer stubs to be abandoned shall be abandoned per Section 91 of the Construction Standards.

**G. Grease, Fats and Oil Removal System**- A grease, fats and oil removal system shall be required for any business having the potential of producing grease, such as food service establishments.

2. 1. General Commercial/Retail buildings shall require dedicated grease lines for future use. A location for the future grease interceptor shall be identified on the improvement plans. The grease, fats, and oil removal system must be situated on the user's premises and located so that landscaping or parked vehicles will not obstruct access to the device for inspection, cleaning and removal of grease. Such a device shall not at any time pose a hazard or obstruction to public use of the street or sidewalk area.
3. Waste discharge from fixtures and equipment in establishments which may contain grease or other objectionable materials including, but not limited to, scullery sinks, pot and pan sinks, dishwashers, food waste disposals, soup kettles, and floor drains located in areas where such objectionable materials may exist, must be drained into the sanitary waste through the grease, fats, and oil removal system when approved by the director provided, however, toilets, urinals, wash basins, and other fixtures containing fecal material shall not flow through the grease removal device.
4. No discharge to interceptor of  $\geq 140^{\circ}\text{F}$ .
5. All removal systems shall be of a capacity sufficient to provide 90 percent removal of FOG for non-gravity grease interceptors (GGI). Engineering calculations are required to be submitted to confirm the size.
6. Grease interceptors shall be required for all new food service establishment (FSE) buildings and when possible for any building converted to a FSE or where a FSE is added. Grease traps may be approved by the City Engineer where the installation of a grease interceptor is not feasible. Typically, grease interceptor sizing will be as follows:
  - a. Basic FSE (NAICS Code 722513): 1,000 gallon
  - b. Full Service FSE (NAICS Code 722511): 1,500 gallon
  - c. Large/specialty facilities (NAICS Codes 72212 (cafeterias), 7223 (special food services like contractors and mobile food vendors)): 2,000 gallons

**H. Backflow Prevention Device** - An approved backflow prevention device shall be required on the building side of the property line cleanout per the Construction Standard Details. The backflow preventer shall be a check valve type device installed inline with the sewer lateral.

**I. Pressure Relief Device** - An approved pressure relief device shall be installed in the cap of the cleanout located in an area least likely to cause damage to property or contamination if activated. Relief devices shall be gravity or spring loaded to closed position.

**8-10 CREEK CROSSING DESIGN** - Advance approval of the City Engineer, and other appropriate agencies, is necessary to initiate design. The criteria for creek crossings are as follows:

**A. General** - In all cases, the proposed future creek bed elevation shall be used for design purposes. Crossing details of pipe, piers, anchorage, transition couplings, etc., shall be shown on a detail sheet of the plans. The top of pipe shall have a minimum 3-foot of cover at the lowest point of the crossing.

**B. Construction and Material** - For line sizes 10-inches and smaller, ductile iron pipe shall be used under the full creek width plus 10-feet each side. For line sizes 12-inches and larger, pipe used shall

be as determined by the City Engineer. Steel I-beam piles may be necessary to support the pipe as recommended by the Design Engineer or as required by the City Engineer. All exposed surfaces shall be coated with coal tar epoxy. Upon verifying the slope, passing a pressure test and TV inspection, the entire crossing except for 5-feet at each end of the crossing shall be encased in concrete a minimum of 6-inches thick. A layer of 4-inch to 8-inch cobbles shall be placed and compacted on the top surface of the trench area for the full width of the creek. A trench plug shall be required at the top of the pipe at the downstream side of the crossing. The plug shall be a minimum of 4-feet in length, and shall extend 24-inches beyond the width and depth of the trench.

**C. Design** - Calculations shall be submitted which clearly indicate the design of the pipe and supports regarding impact, horizontal and vertical forces, overturning, pier and anchorage reactions, etc.

**8-11 BORING AND JACKING REQUIREMENTS** - The requirements outlined in the Construction Standards shall be followed.

**8-12 PUMP STATION AND FORCE MAIN REQUIREMENTS** - Every phase of pump station design, including force main design, shall be closely coordinated with, and shall be under the direction of, the City Engineer. The pump station and force main shall be designed and submitted concurrently.

**A. Design and Approval** - An Engineering Report is required for all wastewater lift stations. The report shall describe the contributory areas, basis of design and other essential features. In addition, detailed plans and specifications shall be submitted for approval showing the station size, construction details, system design, controls, valves, piping, access, station location, force main location and pertinent elevations.

**B. Location and Site Plan** - The sewer lift station layout shall conform to the Standard Sewer Lift Station Site Plan detail as closely as possible. Any deviations shall be approved by the City Engineer. A block wall and chain link fence with locking gate surrounding the facility shall be required. The pump station and facilities shall maintain a minimum 100-foot separation from existing and proposed residential and commercial structures. Adequate maintenance access shall be provided to the pump station. The access design shall consider requirements for the removal of pump station equipment.

**C. Capacity** - The pump station shall be designed to accommodate ultimate buildout flows as well as initial flows. Allowances for larger or additional pumping equipment must be made for future requirements. If the design capacity is in excess of anticipated initial flow, the effects of the minimum flow condition must be estimated to prevent excessive retention of sewage in the wet well so it will not create a nuisance and the pumping equipment will operate within the manufacturer's guidelines. Table 8-3 provides planning level criteria for sizing and configuration of pump station and force main facilities.

**Table 8-3 - Planning Level Criteria for Pump Stations and Force Mains**

<b>Pump Stations</b>	
Capacity	PWWF (hydraulic modeling required for pipes 18 inches and larger)
Storage	24 hours, or 8 hours with an emergency generator for ADWF
Operation	Lead/lag for duty pump(s), plus 1 standby pump
Maximum Pump Cycles	6 cycles/hour
<b>Force Mains</b>	
Headloss	Hazen-Williams roughness coefficient (C-factor) of 120
Maximum Velocity	10 feet per second
Minimum Velocity	3.0 feet per second

- D. System** - Sewer lift stations shall be complete, pre-engineered and pre-fabricated Flygt pump stations or equivalent. Stations shall come fully equipped with pumps, discharge connections and piping, a valve vault with check valves and isolation valves and a control panel. Two sources of power shall be provided for each lift station. If a generator is selected as a power source, it shall be a Generac Industrial Series with a fuel tank of sufficient size to operate the lift station for 72 hours.
- E. Station Piping** - Suction, discharge, and header piping within the station shall be sized to adequately handle flows. Piping less than 4-inches in diameter shall not be used for conveying sewage. Valves shall be located to allow proper equipment maintenance and operation. The design shall provide a bypass configuration back to the wet well.
- F. Odor Control** - If required, the station shall have equipment and/or space provided for the purpose of introducing odor control chemicals into the wet well, upstream gravity line, and/or force main. Adequate provisions shall be made for the safe handling and storage of chemical containers. The force main shall be designed to maintain a continuous uphill grade, or, as a minimum, be level. All force mains shall have provisions for introduction of either air or odor control chemicals.
- G. Force Mains** - Force mains shall be designed such that velocities normally fall within a range from 3- to 5-feet per second. If initial capacity of the station is considerably less than ultimate, consideration should be given to the undesirable effect of extensive detention time within the force main. The feasibility of installing dual force mains to accommodate initial and ultimate flows shall be investigated in such situations. The design shall also include facilities to eliminate or sufficiently dampen transient forces and/or surging, in the event of an immediate station shutdown. Details shall be included in the improvement plans.

**8-13 SEWER IMPROVEMENT PLAN REQUIREMENTS** - Plans for the construction of sanitary sewers, whether in conjunction with other improvements or for a sewer project only, shall conform to these standards, the Construction Standards, and meet the following requirements.

- A. Sewer Study** - A sewer study or sewer master plan as determined by the City Engineer 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 shall show the entire area including upstream tributary and adjacent areas, and all other data necessary to determine anticipated sewage flows. The method of providing service to the entire service area, including pipe sizes and slopes, shall be shown to the extent necessary to determine the requirements within the subject property.



- B. General Requirements** - Plans for sewer improvement projects shall include a layout sheet, plan and profile of each public sewer line, and necessary detail drawings. Reference to the Construction Standards shall be made for all standard details.
- C. Layout Sheet** - Improvement plans shall include an overall map which shows the project boundaries, sewer lines, manholes, backwater valves, and other important items of the work.
1. A parcel which benefits from and financially participates in a sewer construction project, but is not included within the project boundaries, shall have a note to this effect placed on the layout map and on the plan and profile sheet if the parcel appears thereon. Parcels which make use of those facilities may be subject to additional fees at the time of connection, if the participation has not been so noted.
- D. Plan and Profile Sheets** - Sewer lines to be owned and maintained by the City of Grass Valley shall be shown on both plan and profile. The following standards, with respect to drafting and the information to be included on the plan and profile sheets, generally apply to projects in developed areas.
1. Sewer lines to be constructed shall be indicated on profile by parallel lines spaced to show the pipe diameter to scale. Manholes shall also be indicated by parallel lines spaced according to scale. The slope, length, size, and type of pipe material between each manhole shall be printed parallel to the horizontal grid lines or parallel to the pipe lines. Pipe inverts, "IN and OUT," at manholes and other structures shall be indicated on the profile. The profile shall note all proposed manholes, special connections, and other appurtenances. Existing facilities shown on the profile shall be dashed or distinguishable from proposed improvements. Manhole identification on the plan view may be oblique. Stationing shall appear at the lower edge of the profile grid directly under the manhole. Each manhole shall be assigned a number that will appear in both plan and profile.
  2. Proposed sewer services shall be indicated on the plans by stationing, or an approved reference point such as a property line. The invert elevation of the service at its upstream end shall be shown on the plans whenever the standard depth is inadequate to serve the property. Standard depth shall conform to the conditions set forth in the Construction Standards.
  3. Improvements or lots shown on a plan sheet but served to a line shown on another plan sheet shall have the direction of service shown by a small triangle and letter "S." "Record drawings" shall also show the service sewer location measured from the nearest downstream manhole.
  4. Both permanent and working easements shall be shown to scale on the plans, with the width noted.
  5. Proposed sewer lines shall be adequately dimensioned from street centerline. If the sewer is to be located in an easement, sufficient dimensions and bearings from physical features to locate the line in the field shall be shown on the plans.
  6. Existing gas, water, storm drains, and all other utility lines above or below ground shall be shown on the plans.
  7. Trees and other objects within 10-feet of the limits of construction shall be dimensioned on the plans relative to the construction centerline. The diameter of tree trunks and interfering heavy tree branches shall be noted. Removal of a tree or object, or other special handling shall be noted.

Written documentation of any special arrangements regarding preservation of property shall be provided to the City Engineer if no easement document is involved. If an easement is negotiated, all special arrangements shall be included in the easement document. Tree removal must be approved by the Public Works Department.

8. Culverts shall be shown on both plan and profile when crossed by the construction or when parallel and within 20-feet of the construction line. Type, size, and invert elevations shall be called out.
9. No trees or permanent structures shall be placed within sewer easements without the approval of the City Engineer.

**E. Detail Drawings** - Details not covered by the Construction Standard Detail sheets shall be shown on the plans.

**F. Connection To Facilities Where Stoppage Of Existing Flow Will Be Required** - Upon approval of the application to connect to an existing sewer main by the Engineering Division, a coordination meeting to discuss the work plan shall be organized by the contractor a minimum of seven (7) days prior to the proposed connection or as permitted by the City's work schedule. Should the City Engineer determine that such work is to be performed by City forces, the work shall be performed on a time and material basis.

**8-14 MULTI-PARCEL COMMERCIAL AND INDUSTRIAL DEVELOPMENTS** - "On-site" sewer mains, to be accepted by the City, for new commercial and industrial developments containing more than one parcel, shall be designed in accordance with the requirements contained in these standards or as approved by the City Engineer. The sewer mains shall be installed within a dedicated public sewer easement in accordance with these standards. Each separate parcel within a multi-parcel commercial or industrial development shall have a separate connection to the public sewer line(s).

**8-15 EXAMPLE SEWER FLOW CALCULATIONS** - Example Design Flow Analysis for Sewers 15-Inches and Smaller

**Example calculation for application of safety factor and peaking factor curve for 400-unit single family subdivision:**

$$ADWF^a: \quad (400 \text{ DUs}) * (190 \text{ gpd/DU}) = 76,000 \text{ gpd} = ADWF$$

$$Factored \text{ Flow}: \quad (ADWF) * (2.0) = (76,000 \text{ gpd}) * (2.0) = 152,000 \text{ gpd} = \text{Factored Flow}$$

$$PWWF: \quad (\text{Factored flow}) * (3.95^b) = (152,000) * (3.95) = 600,400 \text{ gpd} = PWWF$$

Size sewer for this flow based on Section 8-4.

Per Section 8-4, a 12-inch sewer line at minimum slope is adequate for this PWWF.

<sup>a</sup> Based on ADWF unit flow factors shown in Table 8-1

<sup>b</sup> From Figure 1- Peaking Factor

## Section 9

# STORM DRAINAGE (SD)

**9-1 GENERAL** - This section is formulated to clearly define acceptable drainage analysis and design criteria for development in the City of Grass Valley.

**9-2 CITY REQUIREMENTS** - All residential lots shall have minimum pad elevations of 1-foot above the 100-year water surface elevation and all commercial sites shall have minimum finished floor elevations of 1-foot above the 100-year water surface elevation assuming failure of the drainage system. This requires the Design Engineer to provide an overland release for all projects or provide storage for the 100-year storm frequency.

The overland release path shall be constructed in a manner to transport the peak rate of runoff from the 100-year storm frequency through the site assuming all storm drains are inoperative, all upstream areas are fully developed, and that antecedent rainfall has saturated the tributary watershed. Streets, parking lots, playgrounds, pedestrian areas, pedestrian walkways, utility easements, and other open space areas may be considered compatible uses within the overland release path.

Except for single family or duplex residential lots, site drainage shall be collected on-site and conveyed via an underground storm drain system to an approved existing storm drainage system without flowing into existing street gutters or existing roadside ditches.

Unless regional storm water mitigation devices are available, specific mitigation shall be required for the project, shall be located on-site, and shall be maintained by the landowner.

**9-3 DEVELOPMENT IN A FLOODPLAIN** - Residential lots developed in a floodplain shall have pad elevations a minimum of 2-feet above the 100-year flood elevation. A Letter of Map Amendment (LOMA) or a Letter of Map Revision (LOMR) is required for any residential lot in or adjacent to the flood hazard area as shown on a Flood Insurance Rate Map. Non-residential projects shall have finished floor elevations a minimum of 2-feet above the City's 100-year flood elevation. Elevation Certificates are required for all such structures.

In the case of no-grade or contour grade lots located adjacent to the floodplain, and where a portion of the lot may become inundated with the 100-year storm event, a standard Guarantee letter shall be submitted to the Engineering Division prior to plan approval, or issuance of a building permit. The Guarantee letter shall be submitted by a Registered Civil Engineer or Land Surveyor and confirm that the lowest ground elevation adjacent to the building foundation meets the minimum requirements for pad elevations as described above.

If a tentative project is submitted which shows fill or other significant improvements within the floodplain, a hydraulic study shall be required to determine the effect of the encroachment. Encroachments shall not result in any off-site increase in water surface elevation. The Design Engineer should contact FEMA to ascertain what existing studies, if available should be used as a base model for the proposed development. The Design Engineer is responsible for assembling the necessary data and presenting the study to the City and FEMA for review. The study should reflect ultimate build out conditions of the watershed. When submitting plans that show improvements in the floodplain, the Design Engineer must submit a "Compliance Statement," stating that the proposed improvements shown in the plans are accurately reflected in the approved hydraulic study. A sample of the hydraulic study submittal requirements and sample Hydraulic Study Worksheets are provide in the attachments at the end of this section.

Parking lots and storage areas shall be no more than 1.5-feet below the 100-year water surface elevation.

When developing property inundated by a floodplain, the portion of the property that extends into the floodplain shall be dedicated to the City in fee or as a Flood Water Conservation Easement as determined by the Engineering Division. In areas where the floodplain has been dedicated as part of a Specific Plan but the 100-year flood levels are shown to extend slightly outside this dedicated floodplain area, the development shall fill the property located outside the dedicated floodplain to an elevation that is a minimum of 2-feet higher than the 100-year flood elevation, or incorporate that area into the floodplain.

**NOTE: Design requirements for bike paths within floodplains are provided in the section entitled “Bikeways” of these Improvement Standards.**

**9-4 FEDERAL FLOOD PROGRAM** - The City of Grass Valley is a participant in the National Flood Insurance Program (NFIP) and all development in the City shall comply with the regulations of the Federal Emergency Management Agency (FEMA) and the City’s Flood Damage Prevention Ordinance.

Amendments of the FEMA flood maps will be required of all new developments located in a FEMA flood zone. Petitions for a Letter of Map Amendment, including any fee required by FEMA, shall be submitted to the Public Works Department prior to approval of improvement or site plans.

**9-5 DRAINAGE DIVERSIONS** - The diversion of natural drainage is allowable only within the limits of the proposed improvement. All drainage must enter and leave the improved area at its original horizontal and vertical alignment unless an agreement, approved by the City Engineer, has been executed with the affected property owners. Temporary drainage diversions during construction shall be approved by the City Engineer and shall be located and constructed in such a fashion as to permit their removal when necessary for the prevention of damage to adjoining properties.

**9-6 DRAINAGE EASEMENTS** - Publicly owned drainage conduits and channels will not be allowed on private property unless they lie within a dedicated public drainage easement. Where minor improvement of an existing channel falls on adjacent property (such as day lighting a ditch profile) a notarized right-of-entry from the property owner(s) for such construction shall be required. A copy of the document, which grants such approval, shall be submitted to the City Engineer prior to the approval of the improvement plans.

**A.** Easements for closed conduits shall meet the following width criteria:

1. All easements for closed conduits shall have a minimum width in feet equal to the required trench width according to the standard detail for unshored trenches and excavation backfill plus two (2) additional feet of width for every foot of depth as measured from the bottom of the pipe to finished grade. All conduits shall be centered within their easements.
2. Minimum width of any easement for closed conduit shall be 15-feet.
3. Easements adjacent to property lines shall be located entirely on one parcel.

**B.** Drainage easements for open channels shall have significant width to accommodate the following criteria:

1. Contain the channel and channel slopes.
2. Provide for fencing, where required.
3. Provide for a 10-foot wide service road and maintenance access ramps, where required by the City Engineer. A service road may not be required where the channel bottom is lined and a suitable

access ramp is provided. Dedication of easements shall be completed and submitted to the City Engineer with copies of deeds or title reports for the affected properties before improvement plans will be approved.

4. Open channels (natural or man-made) with a drainage area that exceeds 300 acres shall have the 100-year water surface elevation limits dedicated to the City in-fee or as a Flood Water Conservation Easement.

**9-7 DRAINAGE CAPACITY/DESIGN** - All drainage systems shall be designed to accommodate the ultimate development of the entire upstream watershed. The 10-year peak storm discharge shall be used in the design of local drainage systems. In addition, other facilities such as streets, bridges, open channels, and buildings have requirements that relate to the 25- and 100-year peak storm discharge. The Design Engineer shall calculate the 10-, 25-, & 100-year peak discharge and submit these calculations along with the plans for all proposed drainage systems.

**9-8 DESIGN PEAK DISCHARGE METHODS** - The acceptable methods for the determination of runoff quantities for the 10-, 25-, & 100-year peak discharge are specified in the most recent edition of the Caltrans Highway Design Manual and the City of Grass Valley Storm Drainage Master Plan. For Rational Method Runoff Coefficient 'c' and rainfall intensities 'i', refer to the City of Grass Valley Storm Drainage Master Plan.

**9-9 HYDRAULIC STANDARDS FOR DRAINAGE SYSTEMS**- All storm drain pipelines and open channels shall be designed to convey the design peak runoff calculated per Section 10-8 and shall conform to the following requirements:

**A. Hydraulic Grade Line** - The hydraulic grade line for the 25-year discharge shall be a minimum of 1-foot below all inlet grates, manhole covers, and all other drainage structures in the system.

**B. Manning's Formula** - The "n" value used in Manning's formula shall conform to the following:

1. Manning's formula shall be used to compute capacities of all open and closed conduits other than culverts.
2. Minimum velocity in closed conduits shall be 2-feet per second. Maximum velocity shall be 15-feet per second, unless otherwise approved by the City Engineer. Velocities shall be based on full flow conditions.

**9-10 STREET INUNDATION REQUIREMENTS** - City streets are allowed to convey runoff for storm events larger than the 10-year. The standards for street inundation are specified in Table 9-6. The Design Engineer shall provide calculations showing that these standards are met.

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**ALLOWABLE STREET INUNDATION: Table 9-6**

STREET	10-YEAR STORM	25-YEAR STORM	100-YEAR STORM
<p><b>RESIDENTIAL</b></p> <p>At continuous grade, uphill and downhill</p> <p>At Sag Points</p>	<p>Traveled lanes remain clear and do not carry storm water.</p> <p>Storm water elevation does not exceed top back of curb or sidewalk. Maximum depth in traveled way - 6". Centerline shall be dry.</p>	<p>Maximum depth at gutter flow line shall not exceed top-back-of-S/W (if no S/W, or S/W is offset) or a max. of 6". Centerline of street shall remain dry.</p> <p>Storm water elevation does not exceed 4" above the top back of curb. Maximum depth in traveled way - 6".</p>	<p>Maximum depth at gutter flow line shall not exceed 4" above the top-back-of-curb or a max. of 10". Max. depth at centerline is 4"</p> <p>Storm water is a minimum of one-foot below building pads. Ponding does not exceed more than 120' from inlet along any street segment.</p>
<p><b>COLLECTOR</b></p> <p>At continuous grade, uphill and downhill</p> <p>At Sag Points</p>	<p>Traveled way remains clear and does not carry storm water.</p> <p>Storm water elevation does not exceed top back of curb or sidewalk. Maximum depth in traveled way - 6". Centerline shall be dry</p>	<p>Maximum depth at gutter flow line shall not exceed top-back-of-curb or a max. of 6".</p> <p>Storm water elevation does not exceed 4" above the top back of curb. Maximum depth in traveled way - 6".</p>	<p>Storm water flow is contained within the right of way. The center 12 feet of roadway shall remain clear of storm water.</p> <p>Storm water flow is contained within the right-of-way. The center 12 feet of roadway shall remain clear of storm water.</p>
<p><b>ARTERIAL</b></p> <p>At continuous grade, uphill and downhill Or At Sag Points</p>			<p>All travel lanes are clear of storm water flow. Bike lanes are allowed to be inundated. Storm flow contained within the right-of-way.</p>

**9-11 CLOSED CONDUITS** - The specific type of pipe or alternate pipe to be used in any development shall be shown on the approved plans. If the Design Engineer proposes to use any type of pipe not shown on the approved plans, the plans shall be resubmitted to the City Engineer for approval.

**A. Size and Material** - Drainage systems to be maintained by the City shall have a minimum pipe diameter of 12-inches. The types of pipe materials that are allowed are stated in the City of Grass Valley Construction Standards.

**B. Cover Requirements** - See the City of Grass Valley Construction Standards, latest edition, for pipe cover requirements.

In fill areas, or in areas with poor soil conditions where it is anticipated that a good, firm, vertical-walled trench cannot be constructed, the Design Engineer shall design the pipe structural requirements in

accordance with good engineering practice. If trench conditions are uncertain, a note shall be placed on the plans making it the Contractor's responsibility to work with the Design Engineer to determine and place the proper strength pipe if poor trench conditions are encountered.

- C. Alignment** - Minimum radius of horizontal curvature shall be 200-feet. In no case shall the radius of curvature be less than the manufacturer's recommendations for the particular pipe size under consideration.

Drainage pipelines shall be located in the street whenever possible. The location of storm drainage pipelines in new streets shall be 5-feet north or west of, and parallel with, the street centerline. A minimum angle of 90 degrees shall be accommodated for downstream flow around bends, tees, and connection points.

When storm drainage lines are to be placed in existing streets, factors such as curbs, gutters, sidewalks, traffic conditions, pavement conditions, future street improvement plans, and existing utilities shall be considered. Where street width is not adequate, or the required separation between utilities limits placement of drainage lines in the street, pipelines may be placed directly under the curb and gutter with the approval of the City Engineer.

Open ditches, lined channels, swales, and floodplain areas shall be maintained as nearly as possible in their existing alignment. When an open ditch is to be constructed parallel to an existing roadway, the ditch shall be constructed outside the proposed right of way of the ultimate street development.

- D. Slope** - Pipelines for storm drainage shall have a constant slope between manholes, junction boxes, and/or catch basins. Minimum slope of storm drainage lines shall be 0.5%, unless otherwise approved.

**9-12 MANHOLES** - Standard precast concrete manholes shall be constructed as required. Where special manholes or junction boxes are required, the City Engineer must approve the design. In no case will junction boxes or manholes be allowed which are smaller than 48-inches inside diameter. Manholes shall be located at junction points, angle points, changes in gradient, changes in pipe size, end of curves and beginning of curves. Manholes or junction boxes will not be required for a reach of pipe less than 80-feet in length that is to be connected to a 36-inch or larger diameter pipe, subject to approval of the City Engineer. For straight alignment, the spacing of manholes shall not exceed 500-feet. The spacing of manholes shall be nearly equal whenever possible. On curved pipe, spacing of manholes shall be as specified in Table 9-7:

**MANHOLE SPACING: Table 9-7**

<b>RADIUS</b>	<b>PIPE DIAMETER</b>	<b>SPACING</b>
400' OR LESS	ALL	300'
GREATER THAN 400'	24" OR LESS	400'
GREATER THAN 400'	GREATER THAN 24"	500'

- A. Saddle Manholes** - Saddle manholes may be constructed on storm drain conduit 36-inches or greater in diameter provided that no junction exists with any other storm drain conduit as determined by the City Engineer.
- B. Covers** - All manholes and junction boxes, other than inlets, shall have standard manhole covers per the Standard Drawings. No pipe will be allowed to enter a manhole into the transition portion of the

manhole cone. Manholes will not be allowed in gutter flow line except where approved by the City Engineer. Slotted manhole covers may be used to pick up minor drainage in non-traffic areas.

**C. Manhole Access** - Manhole access shall be provided in accordance with the provisions of “Manhole Criteria” of the Sanitary Sewer section of these Design Standards.

**9-13 INLETS** - Drainage inlets in streets shall be located at property lines in residential subdivisions except at intersections, where they shall be placed at curb returns. Inlets shall be placed such that the length of flow in the gutter does not exceed 500-feet. The depth of flow in the gutter at the inlet shall not exceed 4.0-inches in a 10-year storm and shall not encroach into the traveled ways as specified in Table 9-6 for other design storms. The runoff volume shall include any flow that bypasses upstream inlets.

All inlets located within the City right-of-way or easements shall conform to the City of Grass Valley Construction Standards. Inlets may be modified for use without curb sections for on-site drainage. Where an inlet is proposed in public streets and sidewalk is not constructed adjacent to the back of curb, a concrete collar shall be placed behind the inlet.

Drainage inlets draining public streets may be connected directly to a trunk line, 36-inches in diameter or larger, by means of a lateral not exceeding 15-inches in diameter and 80-feet in length.

**9-14 JUNCTION BOXES** - Junction boxes shall be constructed of reinforced concrete or fabricated from reinforced concrete pipe section where size limitations permit. Structural calculations shall be provided for all junction boxes. Minimum wall thickness for reinforced concrete junction boxes shall be 6-inches.

The inside dimension of junction boxes shall be such as to provide a minimum of 3-inches clearance on the outside diameter of the largest pipe in each face. All junction boxes shall be rectangular in shape unless otherwise approved by the City Engineer. Junction boxes deeper than 4-feet shall have a minimum inside dimension of 48-inches.

**9-15 INLET AND OUTLET STRUCTURES** - The requirements for these facilities are as follows:

**A. Headwalls, Wingwalls, and Endwalls** - All headwalls, wingwalls, endwalls, preformed end sections, guard rails and bank protection shall be considered individually and shall be, in general, designed in accordance with the State Standard Specifications and Standard Plans and the City of Grass Valley Construction Standards.

Metal beam guardrails or chain link fencing may be required by the City Engineer at culverts, headwalls, box culverts, and on steep side-slopes.

**B. Trash Racks and Access Control Racks** - Trash racks will be provided where they are necessary to prevent clogging of culverts, storm drains, and to eliminate hazards. Access Control Racks shall be required on all pipes, 24-inches or larger in diameter.

**C. Flared End Sections** - Flared end sections shall conform to the provisions of the “Miscellaneous Facilities” section of the State Standard Specifications and the “Metal and Plastic Flared End Section” detail of the State Standard Plans.

**D. Culvert Outlet** - Culvert outlets shall be provided with a means of outlet protection or energy dissipation where outlet velocity cannot be reduced sufficiently to prevent downstream scour or erosion. Outlet protection shall conform to the provisions of the “Cross Drainage” section of the State Highway Design Manual.



**9-16 CROSS CULVERTS AND BRIDGES** - This section specifies criteria for relatively short circular or box culverts and bridges for transverse crossings (typically road or railroad embankments). Cross culverts shall be of the same material as allowed for closed conduits.

Cross culvert profiles will be determined on an examination of the channel for a minimum distance of 1000-feet on each side of the installation.

Driveway culverts will not be allowed unless the City has agreed to defer the construction of curb and gutter or the culvert is to allow for temporary construction access. Driveway culverts shall be approved by the City for size, grade, alignment and type.

**A. Design Storm** - Cross culvert size shall be determined on the basis of runoff as specified in the hydrology portion of this Section. Cross culverts, in general, shall be designed for a 25-year storm event with no head on the inlets. They shall also be sized such that no serious damage will be incurred due to ponding as a result of a 100-year event. A flood easement shall be provided for all areas impacted due to upstream ponding in the 100-year event. Culverts across arterials shall be sized for the 100-year storm with a minimum of one foot of freeboard below the lowest travel lane.

To account for debris collection, a clogging factor of 150 percent shall be applied to all storm frequencies in the design of bridges or culverts that cross a channel or stream with a drainage area that exceeds 300 acres.

**B. Computation of Flow** - Inlet or outlet conditions control flow in transverse culverts. In culverts operating under inlet control, the cross-sectional area of the culvert barrel, the inlet geometry, and the amount of headwater at the entrance, are of primary importance. Outlet control involves the additional consideration of the elevation of the tailwater in the outlet channel and the slope, roughness, and length of the culvert barrel.

Anticipated downstream flow depth and allowable headwater depth govern the available head on culverts. The type of flow under which a culvert will operate may be determined from a given set of conditions. This may be avoided by computing headwater depths from the charts in this section for both inlet and outlet control and then using the higher value to indicate the type of control and to determine the headwater depth. This method of determining the type of control is accurate except for a few cases where the headwater depth is approximately the same for both types of control. The monographs provided in this section shall be used for culvert design with uniform barrels. Where barrel sizes or entrance configurations differ between barrels, written calculations shall be provided to the satisfaction of the City Engineer.

The roughness coefficient, “n”, can be adjusted for the monographs by use of the following equation:

$$L_1 = L * \left[ \frac{n_1}{n} \right]^2$$



6. Green Roofs - a vegetative layer grown on a roof (rooftop garden);
7. Vegetated Swales - a vegetated, open-channel management practice designed specifically to treat and attenuate storm water runoff;
8. Rain Barrels and Cisterns - system that collects and stores storm water runoff from a roof or other impervious surface.

Project proponents must use the State Water Board SMARTS Post-Construction Calculator (at: <https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp>), or equivalent to quantify the runoff reduction resulting from implementation of site design measures.

This section is not applicable to: linear underground/overhead projects (LUP's).

- B. Regulated Projects:** All projects that create and/or replace 5,000 square feet or more of impervious surface are called Regulated Projects (per the State Water Board's Construction General Permit (CGP)). Regulated Projects must implement measures for site design, source control runoff reduction, storm water treatment and baseline hydromodification management. Regulated projects do not include: Detached single family home projects that are not part of a larger plan of development; Interior remodels; Routine maintenance or repair such as: exterior wall surface replacement and pavement resurfacing within the existing footprint; construction of new sidewalks, pedestrian ramps or bike lanes on existing roadways; and LUPs - Unless the LUP has a discrete location that has 5,000 square feet or more of newly constructed contiguous impervious surface. When the LUP has a discrete location that has 5,000 sq-ft or more of new contiguous impervious surface, only that specific discrete location is subject to this section.

Redevelopment: The following describe specific Regulated Project requirements for redevelopment (as defined by the CGP), road projects and LUP's:

- Where a redevelopment project results in an increase of more than 50 percent of the impervious surface of a previously existing development, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included to the extent feasible.
- Where a redevelopment project results in an increase of less than 50 percent of the impervious surface of a previously existing development, only runoff from the new and/or replaced impervious surface of the project must be included.
- Road Projects and LUPs - Any of the following types of road projects and LUPs that create 5,000 square feet or more of newly constructed contiguous impervious surface and that are public road projects and/or fall under the building and planning authority of a Permittee shall comply with the Low Impact Development Standards in these Standards except that treatment of runoff of the 85th percentile that cannot be infiltrated onsite shall follow U.S. EPA guidance regarding green infrastructure to the extent feasible. Types of projects include:
  - Construction of new streets or roads, including sidewalks and bicycle lanes built as part of the new streets or roads.
  - Widening of existing streets or roads with additional traffic lanes.
  - Where the addition of traffic lanes results in an alteration of more than 50 percent of the impervious surface of an existing street or road, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included in the treatment system design.
  - Where the addition of traffic lanes results in an alteration of less than 50 percent (but 5,000 square feet or more) of the impervious surface of an existing street or road, only the runoff from new and/or replaced impervious surface of the project must be included in the treatment system design.
  - Construction of linear underground/overhead projects (LUPs)
  - Specific exclusions are:
    - Sidewalks built as part of new streets or roads and built to direct storm water

- runoff to adjacent vegetated areas.
  - Bicycle lanes that are built as part of new streets or roads that direct storm water runoff to adjacent vegetated areas.
  - Impervious trails built to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas, preferably away from creeks or towards the outboard side of levees.
  - Sidewalks, bicycle lanes, or trails constructed with permeable surfaces.
  - Trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways and parking lots; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway.
- 1. Site Design Measures and Low Impact Development (LID) Design Standards:** All Regulated Projects must include site design measures as described above as well as LID Design Standards: All Regulated Projects must implement LID standards designed to reduce runoff, treat storm water, and provide baseline hydromodification management to the extent feasible and as described below.
- a. Drainage Management Areas (DMA's): Each Regulated Project must provide a map or diagram dividing the developed portions of the project site into discrete DMA's, and to manage runoff from each DMA using Site Design Measures, Source Controls and/or Storm Water Treatment and Baseline Hydromodification Measures.
  - b. Storm Water Detention, Retention and Treatment: Detention and/or retention and stormwater treatment devices are required for peak flow reduction and treatment of runoff from impervious DMA's. Drainage plans, hydrologic and hydraulic calculations prepared by a Registered Civil Engineer shall be submitted for approval by the City Engineer..
    - i. Hydrologic Criteria - Hydrology shall be in accordance with these Design Standards and the State Highway Design Manual. The effectiveness of the on-site storage shall be evaluated using basic hydrologic concepts and criteria for storage basins. The drainage plans and calculations shall indicate the following conditions before and after development:
      - 1. Quantities of water and water flow rates.
      - 2. Major watercourses, flood hazard areas, drainage areas and patterns and drainage courses.
      - 3. Diversions, collection systems and sumps.
    - ii. Design – Maintenance access shall be provided to facilities, passable under all weather conditions.
      - 1. Bio-Retention Facilities - Runoff from impervious DMA's must be directed to facilities designed to evapotranspire, infiltrate, harvest/use and/or biotreat/bioretain runoff per at least one of the following hydraulic sizing design criteria:
        - a. Volumetric Criteria:
          - ii.a. The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or
          - ii.b. The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of the

- CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.
- b. Flow-based Criteria:
    - ii.a.** The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or
    - ii.b.** The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records.
  - c. The following physical standards must be adhered to:
    - ii.a.** Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.
    - ii.b.** Minimum surface reservoir volume equal to surface area times a depth of 6 inches.
    - ii.c.** Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.
    - ii.d.** Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.
    - ii.e.** Underdrain with discharge elevation at top of gravel layer.
    - ii.f.** No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.
    - ii.g.** No liners or other barriers interfering with infiltration.
    - ii.h.** Appropriate plant palette for the specified soil mix and maximum available water use.
  - d. Alternative Designs — Facilities, or a combination of facilities, of a different design may be permitted if all of the following measures of equivalent effectiveness are demonstrated:
    - ii.a.** Equal or greater amount of runoff infiltrated or evapotranspired;
    - ii.b.** Equal or lower pollutant concentrations in runoff that is discharged after biotreatment;
    - ii.c.** Equal or greater protection against shock loadings and spills;
    - ii.d.** Equal or greater accessibility and ease of inspection and maintenance.
  - e. Allowed Variations for Special Site Conditions - The bioretention system design parameters above may be adjusted for the following special site conditions:
    - ii.a.** Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.
    - ii.b.** Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a “flow-through planter”).
    - ii.c.** Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.
    - ii.d.** Facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites may be required to provide additional

treatment to address pollutants of concern unless these high-risk areas are isolated from storm water runoff or bioretention areas with little chance of spill migration.

- f. Exceptions to Requirements for Bioretention Facilities - Contingent on a demonstration that use of bioretention or a facility of equivalent effectiveness is infeasible, other types of biotreatment or media filters (such as tree-box-type biofilters or in-vault media filters) may be used for the following categories of Regulated Projects:
  - ii.a. Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;
  - ii.b. Facilities receiving runoff solely from existing (pre-project) impervious areas;and
  - ii.c. Historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

## 2. Detention Basins

- ii.a. Elevation - The 100-year design pool elevation should be at or below natural ground. No more than 50 percent of the basin's storage depth shall be above existing ground.
- ii.b. Capacity - All detention basins shall be designed with adequate capacity to manage the 100-year storm event.
- ii.c. Emergency Overflow/Spillway - An emergency overflow is required for all storage basins, capable of passing a design flood equal to 125 percent of the 100-year storm event.
- ii.d. Freeboard - The basin shall be designed such that there is a minimum 2-foot freeboard height above the 100-year storm event water level. In addition the basin shall provide a minimum 1-foot freeboard height above the emergency spillway water level.
- ii.e. Energy Dissipater - Inlets and outlets of storage basins shall be provided with energy dissipaters and/or erosion protection as required by the City Engineer.
- ii.f. Outlet Control - A metered outlet structure is required for detention basins to provide the necessary flow attenuation to mimic the pre-development conditions for the 10-, 25- and 100-year storm events. Outlet structures include small gravity pipes, "V" shaped weirs, notched weirs and orifice plates, or as approved by the City Engineer.

3. Treatment Device Requirements - Stormwater treatment devices shall consist of a permanently installed system, capable of removing 80 percent of the average annual total suspended solids (TSS) load without scouring previously captured pollutants. The separator shall also be capable of removing 95 percent of the free floatable oil, while trapping fine sand, silt, clay and organic particles, in addition to larger sand, gravel particles, and small floatable. In order to use and alternate treatment system in lieu of the standard facility, the engineer or manufacturer would have to provide data showing that the alternate treatment meets these performance requirements.

2. **Hydromodification Management:** All Regulated Projects that create and/or replace one acre or more of impervious surface must comply with the following hydromodification management requirements. A project that does not increase impervious surface area over the pre-project condition does not have to comply with these hydromodification management requirements.

- a. Post project runoff must not exceed the estimated pre-project flow rate for the 2-year, 24-hour storm event.
- 3. Source Control Measures:** All Regulated Projects with pollutant generating activities and sources are required to implement standard permanent and/or operation source control measures as applicable. Measures for the following pollutant generating activities and sources must be designed consistent with recommendations from the CASQA BMP Handbook for New development and Redevelopment or equivalent manual:
- a. Accidental spills or leaks
  - b. Interior floor drains
  - c. Parking/storage areas and maintenance
  - d. Indoor and structural pest control
  - e. Landscape/outdoor pesticide use
  - f. Pools, spas, ponds, decorative fountains, and other water features
  - g. Restaurants, grocery stores, and other food service operations
  - h. Refuse areas
  - i. Industrial processes
  - j. Outdoor storage of equipment or materials
  - k. Vehicle and equipment cleaning
  - l. Vehicle and equipment repair and maintenance
  - m. Fuel dispensing areas
  - n. Loading docks
  - o. Fire sprinkler test water
  - p. Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources
  - q. Unauthorized non-storm water discharges
  - r. Building and grounds maintenance
- 9-18 ACCESS FOR MAINTENANCE-** Following the Engineering Division's initial review and conceptual approval of the grading and improvement plans, the plans shall be reviewed for maintenance access for drainage facilities. These facilities may include, but are not limited to bridges, culverts, headwalls, lined and unlined channels/ditches, sand/oil separators, manholes, retention basins and drain inlets. The access way shall be a minimum 12-foot wide and include 6-inches of ¾-inch aggregate base (95 percent relative compaction) over 6-inches of processed, native soil (95 percent RC). A cul-de-sac with a minimum diameter of 75-feet may also be required
- 9-19 SUBMITTAL REQUIREMENTS FOR ALL HEC - 1 STUDIES -** The following items listed under each category are required for each HEC-1 model run that is submitted.
- A. HEC-1 Print Out -** The following information shall be on the cover of the print out:
1. Name of engineering firm who performed the study.
  2. Name of project.
  3. Version of HEC-1 program.
  4. Date & time that the model was run.
  5. A statement if the model is pre-project or post-project.

**B. Computer Model CD –**

1. The CD must be clearly labeled.
2. If more than one model file is on the CD, a listing and description of all files shall be included with the CD, in an envelope.
3. HEC-1, HEC-2 or HEC-RAS files shall be submitted on separate CD's

**C. Watershed Map - showing the following:**

1. Outline of all subsheds used in the HEC-1 study,
2. The label of each subshed as modeled in the HEC-1 study,
3. The area of each subshed as used in the HEC-1 study,
4. The location where each subshed merges with the next clearly marked.

**D. Summary Sheets -** The City of Grass Valley's "Model Summary Worksheet" pages 1-3 must be completed for each HEC-1 run submitted and attached to the print out. If the study compares pre-project to post-project HEC-1 models, the City's summary sheets shall include a listing of all of the types and the locations of the changes made.

Remainder of page intentionally blank



**CITY OF GRASS VALLEY**  
**HEC-1 MODEL SUMMARY WORKSHEET**  
**PAGE 1 OF 3**  
**GENERAL INFORMATION**

Name of project: \_\_\_\_\_

Name of engineering firm performing the study: \_\_\_\_\_

Contact person \_\_\_\_\_ Phone # \_\_\_\_\_

If this replaces a previously submitted study, what is the name of that study? \_\_\_\_\_

This study reflects:  snoitidnoc tnempoleved-tsoP  snoitidnoc gnitsixE

If this HEC-1 study is used to compare pre-project to post-project runoff, what is the name of the study that you are comparing it with? \_\_\_\_\_ Run date \_\_\_\_\_

Has the pre-project study been approved by the City? \_\_\_\_\_ etaD **SEY**  **ON**

**BASIN INFORMATION**

Total area of the basin studied (sq. ml. ) \_\_\_\_\_ Number of sub-sheds \_\_\_\_\_

Elevation of shed: High point \_\_\_\_\_ Low point \_\_\_\_\_ Ave. \_\_\_\_\_ Used \_\_\_\_\_

The method used to determine the design storm used in the model:

mrots citehtnys 1-CEH launaM .tsiD doolF .C.P

atad eguag niaR margorp PDP .tsiD doolF .C.P

Duration of design storm: 1-hr 2-hrs 3-hrs 6-hrs 12-hrs 1-day other \_\_\_\_\_

Design storm frequency: 2-yr 5-yr 10-yr 25-yr 50-yr 100-yr other \_\_\_\_\_

Base flow (cfs/ sq mile): \_\_\_\_\_ Infiltration (in/ hour ) \_\_\_\_\_

Response time of entire basin \_\_\_\_\_

**Detention Basins** Give location and size of all detention basins that were modeled:

Provide topo or grading plans used to calculate storage volume for each detention basin.

Location in model	Amount of storage resulting from each design storm	Storm frequency	Max. Stage Height (ft)	Freeboard to Spill Point (ft)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**CITY OF GRASS VALLEY**  
**HEC-1 MODEL SUMMARY WORKSHEET**  
**PAGE 2 OF 3**  
**SUBSHED INFORMATION**

The total number of sub-sheds in the model \_\_\_\_\_

Provide assumed "n" factors used most often for the following surfaces:

Overland swales \_\_\_\_\_ Concrete gutters \_\_\_\_\_ Drainage Pipes \_\_\_\_\_

Earth-lined channels \_\_\_\_\_ Streams \_\_\_\_\_ Other \_\_\_\_\_

TITLE OF SUBSHED OR ROUTING LEG IN MODEL	PRIMARY LAND USES OF SUBSHED residential, open space, commercial, etc.	AREA OF SUBSHED (SQ ML)	METHOD USED IN ROUTING EXAMPLE: Kinematic wave, Muskingum	WAS DETENTION MODELED ( YES OR NO )

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## SECTION 10

# GRADING (GR)

**10-1 INTRODUCTION** - The City's authority to regulate grading on private property is provided by the CBC and the Development Code. The CBC and the Development Code requires that a Grading Permit be obtained from the City prior to beginning any grading work unless the work meets certain exemptions specified in the CBC and in the Development Code. This is necessary to ensure that on-site drainage is adequately accommodated, off-site drainage is conveyed through the project, the proposed grading is compatible with adjacent property topography and adequate erosion and sedimentation control measures are addressed.

This Section specifies design and plan submittal requirements of Grading Plans for private developments. It includes items pertinent for the City's review and reflects established professional engineering practice for preparation of Grading Plans. Grading Plans shall be submitted as part of the Improvement Plans for a project. Questions and clarifications regarding this Section should be directed to the Engineering Division of the Public Works Department.

The industry standard Best Management Practices (BMP's) shall be implemented to the extent possible.

**10-2 FEES AND SECURITY** - Plan review and permit fees for grading shall be in accordance with the latest adopted fee schedule. Public Improvements Performance Security shall be required as specified in the General Requirements section of these Standards.

**10-3 PREPARATION** - All Grading Plans shall be prepared by or under the direction of a Registered Civil Engineer. All sheets shall be stamped and signed by a Registered Civil Engineer.

**10-4 FINISHED GRADING PLAN REQUIREMENTS** - Grading Plans for subdivisions and all developments located within Planned Development zones shall be submitted as part of the Improvement Plans and shall detail the following:

- A. Slope symbols for all slopes 3:1 or steeper.
- B. Typical lot grading details.
- C. Proposed spot and/or pad elevations. All lot corner elevations shall be shown on the Grading Plan.
- D. Flow directional arrows, both on-site and off-site, and perimeter elevations at the property line.
- E. Existing spot elevations and or contour lines on-site and off-site around the perimeter of the development. Where the existing terrain is not relatively flat, contour lines shall be shown. Contour lines shall be in maximum increments of 2-feet. The spot elevations or contour lines shall be extended off-site for a minimum distance of 25-feet (flat terrain - 50-feet minimum).
- F. Existing trees (variety, size and elevation at base of all trees 8-inches in diameter or larger).
- G. A Certificate of Compliance of Grading with signature blocks for both the Registered Civil Engineer and the Geotechnical Engineer shall be provided stating the following:

**CERTIFICATE OF COMPLIANCE**

I hereby certify that the grades shown on these plans and accepted by the Engineering Division, have been constructed to within 1/10<sup>th</sup> of one (1) foot of their indicated elevation for all lot pads and improvements shown.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Project Engineer

PE Number

Date

I hereby certify that the pads for the following lots for this project have been tested for compaction in accordance with generally accepted test methods, and based upon the results of these tests, the compaction of said pads conforms to the recommendations of this projects' geotechnical report:

Lots: \_\_\_\_\_

I also state that our firm observed the grading operation to a sufficient extent to evaluate conformance with the project's geotechnical report as approved by the City, and further state that, based upon our observations, the grading for this subdivision conforms to the recommendations of said soil report.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Geotechnical Engineer

PE Number

Date

- H.** Back of sidewalk elevations at property lines, curb returns, high and low points, and other areas deemed necessary by the City Engineer.
- I.** All existing and proposed surface and subsurface drainage facilities including drain inlets, underground pipes, surface swales, and any other drainage improvement proposed to be constructed with, or as a part of, the proposed work.
- J.** Location of existing and proposed buildings or structures on the site, including proposed pad and/or finished floor elevation. Proposed residential plot plans should not be shown on the Grading Plans.
- K.** Location of existing and proposed buildings or structures on the land of adjacent owners which are within 15-feet of the property line and which may be impacted by the proposed grading operations.
- L.** Location of all existing and proposed retaining walls.
- M.** Typical sections across side yard property lines where the difference in finish pad elevations exceeds 1-foot.
- N.** Names of adjacent subdivisions.
- O.** Off-site intersecting property lines.
- P.** For all projects involving the export of soil material; the location of spoiled disposal. Spoil areas shall meet all the requirements of these standards.
- Q.** Silt retention and erosion control details as necessary and specified in these Improvement Standards.

- R. Location of temporary protective fencing for environmentally sensitive areas such as: creeks, wetlands, vernal pools, perennial streams, and preserve areas.

#### 10-5 DESIGN REQUIREMENTS -

A. **Rolling Terrain Grading** - Grading of rolling terrain shall be accomplished in a manner whereby the effect of the rolling terrain is maintained as close to that which exists, to the extent practicable. Every effort shall be made to keep grading of rolling terrain to an absolute minimum.

B. **Boundary Grading** - Special attention shall be given to grading adjacent to the exterior perimeter property line of a development. All adverse effects to off-site properties adjacent to new developments shall be kept to an absolute minimum. Fills and cuts adjacent to the exterior perimeter property line shall be designed in accordance with the following:

1. When grading along existing residential property, the grade should be, if at all possible, held equal to or lower than the existing property grades. When grades are to be raised higher than existing adjacent residential lots a retaining wall may be required. The wall shall be located as close to the property line as is feasible for construction. If permission can be obtained from the adjacent property owner(s), the wall should be placed on the property line or onto the lower lot and the fence relocated to the top of the wall.
2. If possible, all exterior slopes, fill or cut, shall be constructed off-site, with the property line being situated a minimum of 2-feet inside the higher elevation. If a slope easement cannot be obtained a retaining wall may be required at the property line.
3. A recorded notarized right of entry shall be required for all off-site fills and grading prior to plan approval.
4. Maximum slope shall be 2:1 or as specified by the Geotechnical Engineer.
5. All slopes steeper than 4:1 adjacent to the public right-of-way and private streets shall be protected with permanent erosion control measures.
6. All fill material shall achieve 90 percent relative compaction certified by a Registered Geotechnical Engineer.
7. When a drainage swale or ditch is proposed to run adjacent to the property line, a level area, minimum width of 5-feet is required between the property line and the top of the slope bank.
8. A specific haul route shall be approved by the City Engineer when a large quantity of imported or exported soil is required. Where a haul route has not been determined at the time of plan approval, the permit shall be conditioned stating that no grading activities shall occur until a haul route has been approved by the City Engineer.

C. **Interior Grading** - Differences in elevations across interior property lines within a development, such that slopes or retaining walls are required, shall conform to the following:

1. Cross lot drainage is not allowed unless specifically approved by the City Engineer for tree preservation. All single-family residential lots shall have grading per the Standard Drawings unless approved otherwise by the City Engineer. When a lot grading plan is proposed as part of a tentative map application for a single-family residential subdivision, the tentative grading plan

showing rear lot drains shall be supplemented with an alternative plan showing the effect on the subdivision if rear lot drains are not utilized.

2. Retaining walls shall be required whenever adjacent side lot elevations differ by more than ½-foot, unless otherwise approved by the City Engineer.
3. Property lines shall be situated inside of the top of any cut or fill slopes in accordance with the provisions in the latest edition of the California Building Code, but in no case less than a minimum of 1.0-foot.
4. The maximum earth slopes allowed shall be 2:1 (horizontal to vertical). Minimum asphalt concrete surface slopes shall be 1 percent and minimum concrete cement surface slopes shall be 0.25 percent. All proposed slopes that are 3:1 or steeper shall be shown on the plans by some type of slope symbol delineation.
5. Lots on the low side of streets at sag points shall have pad elevations a minimum of 1-foot above the 100-year water surface elevation assuming failure of all subsurface drainage systems.

**D. Retaining Walls** - Retaining walls, when required, shall be shown on the plans and shall include all necessary information and details for construction. All retaining walls adjacent to the public right-of-way or along the exterior boundary of the project shall be masonry. Other retaining walls less than or equal to 2-foot, 6-inches in height may be redwood. Walls higher than 2-foot, 6-inches shall be masonry. Stamped structural calculations by a Registered Civil Engineer and a Building Permit shall be obtained if any of the following conditions exist:

- a. Total wall height is in excess of 4 feet measured from bottom of footing to top of wall
- b. Earth slope is equal to or greater than 2 feet horizontal to 1 foot vertical (2:1 slope)
- c. Unique surcharge loading conditions exist (buildings, roads, and terraced or tiered slopes)
- d. Solid fences are attached (or directly adjacent) to the proposed retaining wall
- e. Unusual groundwater or drainage problems exist

**E. Stormwater Pollution Prevention Plan (SWPPP)** - A site specific SWPPP shall be submitted concurrently with the Improvement and/or Grading Plans when a project disturbs 1-acre or more of land. The preparation of a SWPPP is required by the State of California (General Permit for Storm Water Discharges Associated with Construction Activity, Order 99-08-DWQ).

SWPPPs are not required for projects under 1-acre, unless they are part of a larger development encompassing over 1-acre. For projects less than 1-acre, an erosion and sediment control plan shall be submitted with the improvement plans to the City for approval. This is generally part of the Grading Plan for the development. The Engineering Division will approve the erosion and sediment control plan upon review of the project. All erosion and sediment control devices shall be identified and implemented in the same fashion as projects with SWPPPs over 1-acre. Enforcement will be conducted similarly, with exception to SWPPP administrative requirements.

1. The purpose of the SWPPP is to ensure protection of the following:
  - a. Measures shall be provided to prevent siltation of streams, rivers, etc; avert instream degradation due to turbidity and pollutant load; and prevent toxic materials from leaving construction sites.
  - b. Methods shall be provided to prevent sediment from entering the storm drainage system.
  - c. Methods shall be employed to prevent any damage to adjacent properties.

2. SWPPP site plan(s) shall be submitted along with other SWPPP documents. The following information can be combined onto one plan if all facilities and measures can be shown without obscuring the clarity of the SWPPP site plan. The SWPPP site plan(s) shall contain the following:
  - a. SWPPP site plan(s) shall show the construction project in detail, including; the existing and planned paved areas and buildings, general topography both before and after construction, drainage patterns across the project area, and anticipated stormwater discharge locations (i.e. the receiving water, a conduit to receiving water, and/or drain inlets).
  - b. The location of all existing and proposed stormwater containment and/or conveyance systems shall be shown, which also includes proposed BMPs (Best Management Practices). Examples of such include diversion dikes, swales, grade stabilization structures (temporary pipe or slope drains), ditches, and sediment basins or traps. Sufficient calculations and supporting material to demonstrate the adequacy of such measures shall be provided.
  - c. The Engineering Division may require phasing of the SWPPP plan(s) to ensure that all necessary erosion control measures are taken during separate phases of construction. As an example, this may require the Developer to construct sediment traps and basins during the first phase of grading.
3. The following is a list of requirements for erosion and sediment general notes control measures, also referred to as BMPs (Best Management Practices) that shall be followed. The following erosion and sediment control requirements shall be part of the site specific SWPPP.
  - a. All erosion and sediment control measures shall be implemented by October 1, or as approved by the City Engineer. Grading during the wet season should be minimized.
  - b. All erosion and sediment control materials (fiber rolls, blankets, mats, straw bales, silt fencing, etc.) shall be delivered to the site by September 15<sup>th</sup>. Sufficient spare control materials shall be stockpiled on-site and available for maintenance and repair work.
  - c. Straw slopes greater than 10:1 shall be covered with broadcasted straw, or hand distributed, at a rate of 50 bales or 4,000 pounds per acre. For slopes 4:1 or steeper, Straw shall be anchored to soil surface by “punching”, “pressing”, pressing in place, or by tacking down using a tackifier
  - d. Slopes steeper than 4:1 and adjacent to the City right-of-way, flood plains, natural drainages, park land or designated open space shall be broadcast seeded and covered with straw matting. Alternative methods shall be approved by the Engineering Division.
  - e. All bare areas of disturbed soil, regardless of slope, within 50-feet of natural drainages shall be protected for erosion control.
  - f. Where required, broadcast seed shall be applied as follows:

Blando Brome	12 lbs/acre
Rose Clover	9 lbs/acre

Areas with sandy, dry soil shall be:

Zorro Annual Fescue	6 lbs/acre
---------------------	------------



Rose Clover                      9 lbs/acre

16-20-0 fertilizer or equivalent shall be applied at a rate of 500 pounds per acre. If hydro-seeding/mulching is used, seed quantities shall be increased by 30 percent.

- g.** No grading or trenching, except as required for erosion or sediment control, shall occur within 35-feet from the edge of perennial streams, creeks or environmentally sensitive areas between October 15 and April 15 unless approved by the Engineering Division.
  - h.** All erosion and sediment control measures shall be checked following all storms to ensure that all measures are functioning properly.
  - i.** Sediment and trash accumulated in drainages or detention basins shall be removed as soon as possible. In addition, oil and material floating on water surface must be skimmed weekly and the debris properly disposed of.
  - j.** Construction activities occurring between October 15 and April 15 shall have erosion and sediment control measures in place or capable of being placed within 24 hours. The Contractor shall ensure that the construction site is prepared prior to the onset of any storm.
  - k.** The Contractor shall establish a specific site within the development for maintenance and storage of equipment or any other activity that may adversely contribute to the water quality of the runoff. This area shall have a berm located around its perimeter. This area shall be restored to acceptable condition upon completion of project.
  - l.** Hydroseeding and hydromulching may be considered as alternatives to broadcast straw subject to the Engineering Division’s approval based on a review of the existing site conditions (location, slopes, proximity to streams) and time of year.
  - m.** SWPPP shall define erosion and sediment control measure objectives, and clearly identify control measure selections.
- F. Mitigation Monitoring Requirement** - All mitigation measures and mitigation monitoring measures as required to mitigate environmental impacts shall be complied with. The Developer is responsible for monitoring all mitigation measures and shall submit to the Planning Department a letter certifying compliance with such measures.
- G. Certifying Pad Elevations** - Upon completion of the grading and prior to acceptance of the subdivision improvements or issuance of building permits by the City, the Consulting Engineer shall verify the final pad elevations. The elevations shall be verified at the center and the corners of each pad. Pad grades shall be certified to an accuracy of 0.10-feet.
- A signature block, certifying that final graded elevations in the field are the same as those shown on the plans, shall be included on the drawings of the subdivision grading plans. The Consulting Engineer shall sign the signature block, certifying to the above, and shall provide one set of “record drawing” Grading Plans to the City Engineer.
- H. Maintenance of Access to Utility Facilities** - Continuous, suitable access shall be maintained during all stages of construction to any facility owned or operated by a utility/district providing essential services (i.e. sanitary sewer, water, drainage, electricity, gas, telephone, etc.).

## SECTION 11

# TRAFFIC SIGNALS AND LIGHTING (SG)

**11-1 DESIGN CRITERIA** - Traffic signals and street lights shall be designed and constructed in accordance with these Design Standards and the latest editions of the City of Grass Valley Construction Specifications and Standard Details, the State Standard Specifications, the State Standard Plans, and the CMUTCD.

All components of signals and street lights shall be powder coated black, where feasible, unless minor modifications are made to existing street lights, where any new components shall be made to match the existing signal or street light.

**11-2 TRAFFIC SIGNALS** - Traffic signals and appurtenances shall be designed in accordance with these Standards and the following requirements.

**A. Vehicle and Pedestrian Signal Types -**

1. Signal faces shall have LED displays, unless otherwise specified.
2. Protected left turn signals shall be all arrow.
3. Pedestrian signals shall include 16-inch countdown pedestrian heads with a walking person, upright hand, with countdown and auditory notification per the State Traffic Manual.
4. Accessible Pedestrian Signal (APS) push buttons shall be Campbell Company AGPS 915. The wiring must comply with section 13.02 of the ITE publication *Equipment and Materials Standards* chapter 2, "Vehicle Traffic Control Signal Heads," and be NEC rated for service at +105 degrees C. The conductor cable between the APS and the pedestrian signal head must be a no. 9, 20-conductor cable complying with MIL-W-16878D.

**B. Vehicle Signal Alignment** - The following vehicle signal alignments are typical. Variations may be required on a case by case basis.

1. For single left turn lanes 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 dual left turn lanes, the left turn signal shall line up with the line between the two left turn lanes as close as possible.
3. Through movement signal indications shall align as follows:
  - a. 1 travel lane - the center of the lane.
  - b. 2 travel lanes - the lane line in-between the two lanes
  - c. 3 or more travel lanes - one signal indication shall be provided on each lane line between through lanes.

**C. Signal Phasing** - Signal phasing shall start with phase 2 northbound and proceed in a clockwise direction unless directed otherwise due to coordinated corridor restrictions.

**D. Protected Left Turn Phasing** - Protected left turn phasing shall be provided under the following

conditions:

1. If any of the guidelines for protected left turn phases are met (or are expected to be met as a result of a development project) as outlined in the State Traffic Manual (e.g.; accidents, delay, volume, and misc.).
2. Where left turn lanes are provided.
3. 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.
4. Where there are three or more opposing through lanes.
5. Where the left turn queue recurrently occupies the #1 through lane, and where dual left turn lanes cannot be provided, and where the left turn lane cannot be extended.

**E. Vehicle Detection -**

1. Either thermal detection or video detection shall be provided for all new signals and signal modifications.
2. Loop detection may be required in conjunction with the video detection.
3. Existing loop detection may be replaced with the approval of the City Engineer.
4. Opticom emergency vehicle receivers are required for all new signals and signal modifications.

**F. Traffic Signal Interconnect -**

1. 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 have its own conduit and shall not share conduit with service conductors, signal conductors, or lead-in cables.
2. The interconnect shall connect the subject signal with at least one existing traffic signal. If the subject signal is between two existing signals, the interconnect shall connect all three signals.

**G. Right Turn Lanes -** Right turn lanes shall be provided at signalized intersections:

1. On all main street approaches.
2. On all minor street or driveway approaches with peak hour approach volumes of 60 vehicles or more.

**H. City Supplied Equipment -** City supplied equipment shall be picked up at an agreed upon location within ten (10) calendar days of notice to the City's Inspector. The Contractor is responsible to provide all labor and equipment necessary to load, transport, and install the equipment.

**I. Contractor Supplied Equipment -**

1. Attention is drawn to the following Contractor supplied and installed materials:

- a. Equipment grounding conductors shall be AWG #8 bare solid copper wire minimum.
  - b. Two (2) Category 5e and one (1) UL Type SOOW, CSA Type SO, 600 Volt 18/3 Power Cable Color Code 3/C to top of designated pole with 10-feet of slack for each wire at the top of the pole.
  - c. 16-inch countdown pedestrian heads.
  - d. Solid state, two tone audible, momentary LED pedestrian push buttons. Contact the City for approved vendors and models.
- J. Salvaged Equipment** - Salvaged equipment shall become property of the City and shall be delivered by the Contractor upon 24 hours notice. The Contractor shall deliver salvaged equipment to the location designated by the City.
1. Where signals are being modified or relocated, existing emergency preemption equipment shall be relocated to the new signal poles.
  2. Damaged conduits deemed to not be reusable shall be removed from existing pull boxes and ends plugged solid with grout. Existing conductors shall be removed from said conduits prior to plugging. Contractor shall properly dispose of said conductors.
  3. Abandoned conduits deemed reusable shall have the line blown out, existing conductors shall be removed, a number 10 green locate wire shall be installed, and the ends of the conduits shall be sealed.
- K. Signal Activation** - Functional testing per Caltrans Standard Specifications shall be performed for five (5) working days prior to signal activation. All systems shall be in place before functional testing can begin.
1. On the day of signal activation, the Contractor shall be required to have in his possession at the job site all tools, equipment and parts necessary to repair a signal malfunction. These items shall include, but not be limited to, a bucket truck, replacement LED's, wire, etc.
  2. Immediately prior to the activation of a new traffic signal, the Contractor shall install two (2) orange flags on the "Signal Ahead" signs. Flags shall remain in place for two (2) weeks.
  3. Prior to activation of a new traffic signal, the Contractor shall provide a minimum of two (2) flaggers per intersection to control traffic. The number of flaggers may be increased at the request of the Public Works Inspector for large intersections. Each flagger shall wear appropriate safety gear and carry a stop paddle for controlling traffic. The flaggers shall completely stop traffic prior to the signal changing from red flash to full operation.
- L. Trenching Within the Roadway** - The designer should be aware of the following requirements regarding civil improvements when working in the roadway:
1. The conduit trenches shall be a maximum of 6-inches wide and 2-inches wider than the outside diameter of the conduit to be installed. There shall be one inch minimum clearance between the conduit and the trench wall. The trench shall be crumbed clean prior to placement of conduit.

2. Aggregate material in concrete shall be pea gravel. Concrete shall be thoroughly consolidated around the conduit, filling all voids.
3. Rock wheel trenching shall be located along the centerline of the bike lane stripe or stop bar/crosswalk striping whenever possible so that the trench cut will be hidden by the stripe. Pre-existing improvements requiring deviation from the centerline of the stripe shall be accomplished within 20-feet from the beginning to the end of deviation. Deviations along bike lane lines shall be to the curb side of the stripe unless directed otherwise by the City Engineer. Deviations greater than 20-feet shall require asphalt concrete repair per Item #6 below.
4. Saw cutting in the street, other than rock wheel trenching, will require pavement repair per the Design Standards Details and/or grinding between lane lines per City Standards found elsewhere in this document and the Construction Standards.
5. Should the Contractor fail to install the conduits in new roadways prior to the bottom lift of asphalt concrete, the City will require the installation of a Glass Grid pavement reinforcing fabric, or approved equal, prior to the final lift of pavement.
6. The Contractor is solely responsible to provide all labor and equipment necessary to locate existing underground facilities beyond the information provided by the U.S.A. markings including, but not limited to, metal detectors, wire locating equipment, and potholing.
7. Where combinations of sidewalk or curb and gutter are poured contiguous to existing, all adjoining existing concrete vertical faces shall be doweled per the City Construction Standards.
8. Curb ramps conforming to the latest CBC, Title 24 requirements, and the City Construction Standards shall be installed at all pedestrian crossing locations within the project area. Existing ramps that do not meet these requirements shall be removed and replaced.

**11-3 STREET LIGHTING** - Street lights shall be required for all lots and parcels being developed or constructed upon unless exempted by the City Engineer. In addition, street lights may be required for lots and parcels containing existing structures which are being improved or altered, depending on the nature and extent of the work.

**A. Intersections** - Intersections shall have at least one street light.

**B. Cul-de-sacs** - All cul-de-sacs shall have a street light within the bulb.

**C. Spacing** - Street light spacing shall be determined using the isolux diagram to achieve desired illumination. In general, maximum spacing between luminaires is 300 feet.

**D. Illumination** - The minimum maintained horizontal illuminance should be as follows: On arterials, 1.6 horizontal lux on the area normally bounded by the crosswalks, and 6.5 horizontal lux at the intersection of centerlines of the entering streets. All other streets, 1.1 horizontal lux on the area normally bounded by the crosswalks, and 3.2 horizontal lux at the intersection of centerlines of the entering streets. To determine the position and number of luminaires needed to provide a desired lighting level or to determine the lighting level achieved by a given pattern of luminaires, the isolux diagram for the luminaire may be used. The lighting level at any point may be approximated by adding the values shown by the isolux curve passing through the point from each contributing luminaire.

- E. Location** - Street lights shall be located on property lines whenever possible and at least five-feet from driveways or any above ground facility. Street lights shall normally be staggered on opposite sides of the street and on outer edge of curves.
- F. Pull Boxes** - All pull boxes, including their size, shall be shown and identified on the plans. Pull boxes shall be installed at the locations where more than two (2) conduit runs intersect, where conduit runs are more than 200-feet long, where shown on the plans, at critical angel points, and at such locations ordered by the City Engineer. Normally, a No. 5 pull box will be used unless otherwise noted on the plans.
- G. Conductors** - All conductors, including quantity and size, shall be identified on the plans. Unless otherwise specified, conductors shall be single conductor with THW insulation, solid or stranded copper, sized in accordance with these standards and the National Electric Code.
- H. Conduit** - All conduit runs, including the size, shall be shown and identified on the plans. The conduit size shall be determined according to the National Electrical Code, with the minimum size being 1½-inch diameter conduit. Larger size conduits may be required at the discretion of the City Engineer.
- I. Electrical Equipment and Work** - Control and switching equipment and fusing of all circuits shall meet the requirements of the National Electrical Code, the Basic Electrical Regulations, Title 24, Part 3, of the California Administrative Code.
- J. City Parking Lots**- All city parking lots shall have lighting to provide a minimum 0.6 lux

**11-4 PREPARATION OF PLANS** - Traffic signal plan sheets shall conform to the provisions of these design standards, including submittal requirements, AutoCAD files, etc. Traffic signal plans shall have one (1) title sheet followed by separate signal and lighting, interconnect, and signing and striping sheets for each intersection. Signing and striping sheets shall be submitted concurrent with signal and lighting sheets for review. Signal and striping plan sheets must be stamped and signed by a licensed Civil Engineer.

- A. Title Sheet** - The title sheet shall include the following:
  - 1. Title of project, which shall include the location.
  - 2. A vicinity map, with north arrow showing the limits of work. The vicinity map is not required to be to scale.
  - 3. Pertinent signature blocks and revision block.
  - 4. A legend for symbols not found in the Standard Plans (e.g.; utility lines, etc.). Below the legend, place the following note: NOTE: SEE STATE STANDARD PLANS FOR EXPLANATION OF OTHER SYMBOLS.
  - 5. Controller/Service foundation detail, loop layout detail, and other special details. The service pedestal address shall be placed adjacent to these details in large, bold letters.
  - 6. Applicable City of Grass Valley General Notes.

- B. Signal and Lighting Sheet** - The signal and lighting sheet shall be drawn at a minimum scale of 1-inch equals 20-feet, and shall include the following:
1. A north arrow.
  2. Existing and proposed field conditions which include, but are not limited to, the following: underground and overhead utilities (including height of lines near signal poles), driveways, fire hydrants, poles, signs, fences, street lights, edge of pavement, curb and gutter, sidewalk, right-of-way line, P.U.E.s, roadway striping, medians, centerline, pull boxes, curb ramps, trees (particularly those needing trimming), adjacent topography, etc. Existing field conditions, appurtenances, etc., shall be dashed and screened. Proposed shall be solid and bold.
  3. Pole and equipment schedule.
  4. Conductor and conduit schedule. The schedule shall include rows showing "percent fill" values, and conduit quantity/size.
  5. Complete traffic signal design, including but not limited to, the following: conduit runs, detector loops (with input designations), detector handholes, vehicle and pedestrian signals (with phase designation), luminaires, pedestrian pushbuttons (with phase designation), controller, service pedestal, service point, emergency vehicle detectors, signing, striping, interconnect, CCTV Camera, and WiFi equipment.
  6. Phasing diagram. Designate type of flashing operation below the phasing diagram.
  7. Phasing for emergency vehicle preemption. Typically, protected left turn phases are combined with the concurrent through movement during EV preemption.
- C. Interconnect Sheet** - The interconnect sheet may be drawn at a scale of 1-inch equals 20-feet or 1-inch equals 40-feet and shall include a north arrow.
- D. Signing and Striping Sheet** - The signing and striping sheet shall be drawn at 1-inch equals 20-feet or 1-inch equals 40-feet, and shall include the following:
1. A north arrow.
  2. Existing signing and striping - dashed or screened.
  3. Proposed signing and striping where line types shall closely approximate striping proposed.
  4. Centerline stationing with either begin and end modification stationing or lineal feet of modification specified along with the detail.
- E. Photometric Sheet** - A photometric plan showing the horizontal illuminance of the site shall include a point by point foot-candle reading. Maximum grid spacing shall be 10-foot, zero-inches and 10-foot, zero-inches beyond the property line.

## SECTION 12

# BIKEWAYS

**12-1 GENERAL** - The City of Grass Valley bikeway standards are designed to insure that transportation and recreational bikeways are constructed in a manner that would provide a safe and comfortable use by both bicycles and pedestrians. Bikeways shall be designed to enhance safety and reduce maintenance.

**12-2 DESIGN CRITERIA** -

**A.** All bikeway design shall conform to the latest editions of the following documents:

1. The State Highway Design Manual, chapter “Bikeway Planning and Design”
2. The CMUTCD
3. The Construction Standards and these Design Standards

**B.** Bikeways are required on all collectors and arterials.

**12-3 PLAN APPROVAL** - Prior to construction of any bikeway related improvements, a complete set of bikeway improvement plans must be approved and four (4) sets of approved plans provided to the Engineering Division.

**12-4 BIKE PATHS IN FLOODPLAINS** - When a bike path is to be located in the floodplain, the path shall be designed to be no less than 1.0-foot below the 100-year storm event water surface elevation (100-WSE). Exceptions to this requirement may be allowed where the path goes under existing bridges to accommodate minimum vertical clearance. All segments of the path that are below the 100-WSE shall be Portland Cement Concrete, or other approved material, with toe protection to prevent the path from being undermined during flood events. All segments of the path that are more than 45 degrees to the directional flow of the water shall be Portland Cement Concrete, or other approved material, and shall have armored embankments with toe protection to prevent the path from being undermined during flood events.

**12-5 BIKE BRIDGES IN FLOODPLAINS** - When a bike or pedestrian bridge is to be placed in the floodplain, the minimum elevation of the bridge deck shall be no more than 1-foot below the 100-WSE. Bridge railings shall be designed to sustain the 100-year flood event without damage and without human intervention. Hydraulic and structural calculations shall be based on the assumption that the bridge (with railings) is solid, not assuming that water will pass through the rails.

Bridge railings shall be a minimum of 54-inches high, and shall have a toe board at the base of the guardrail.

All material used on the bridge shall be water resistant.

A Letter of Map Revision (LOMR) may need to be submitted to FEMA for approval, as determined by the Public Works Department.

Approach ramps to the bridge shall be armored to allow for cross flow around the bridge without damage to path. Where feasible, the approaches to the bridge shall contain a dip in the profile (lower than the bridge) to facilitate the water to flow around the bridge instead of directly over it. All portions of the path that are more than 45 degrees to the flow path, shall be Portland Cement Concrete, or other approved



material, and shall have armored embankments with toe protections to prevent the path from being undermined during flood events

## SECTION 13

### SOLID WASTE (SW)

- 13-1 INTRODUCTION** - These improvement standards shall govern the engineering design of all solid waste (trash) enclosures intended for service by the City of Grass Valley.
- 13-2 DESIGN CRITERIA** - The intent of these criteria is to provide for the serviceability of trash enclosures for commercial and multi-family areas.
- A. General** - A trash enclosure must be provided for each building or business. If a building is to have more than one solid waste customer, then a trash enclosure must be provided for each customer. Projects with more than one enclosure must number the enclosures and provide a map of the project showing the location of the enclosures. The type and number of the enclosures will be determined by their intended use (i.e., restaurant, office building, shopping center or small business).
  - B. Walls** - The trash enclosure shall have walls on three sides. Walls must be six-feet in height and shall be constructed as shown on the Standard Drawings. Enclosures in the downtown area shall be designed and constructed in accordance with the Grass Valley Downtown Streetscapes Standards Manual.
  - C. Gates** - Gates are required on any trash enclosure in line of sight of the public. Gates shall be constructed as shown on the Standard Drawings. Gates must be designed to open from the front of the enclosure and shall be equipped to be held in an open position with pins in the ground while the dumpster is being serviced. Bollards must be installed to prevent gates from opening into any parking spaces or adjacent structures.
  - D. Vehicle Approach and Floor** - The vehicle approach apron and the enclosure floor shall be reinforced concrete a minimum of 6-inches thick.
  - E. Signs and Striping** - “No Parking” signs shall be placed on the gates as well as painted on the approach area.
  - F. Location** - The enclosures shall be located within the most direct path of travel and access for refuse vehicles. Path of travel shall have minimal conflict with on-site vehicle and pedestrian circulation patterns. Consideration should also be made on increasing the structural section of the on-site pavement along the path of travel of refuse vehicles. The trash enclosure shall be located to allow refuse vehicles a straight approach to the enclosure. The enclosure and bin dumping areas must be free of overhead power lines and structures. The enclosure area shall be located away from service areas and “Loading” zones. Unobstructed access to the trash enclosure shall be provided. All trash enclosure locations shall be approved in writing by the appropriate waste collection agency (Waste Management).
  - G. Path of Travel** - The improvement plans shall provide a map showing the proposed path of travel for refuse vehicles to and from the trash enclosure, originating at the public roadway. The design inside turning radius of the refuse vehicle is 25-feet and the outside radius is 45-feet.
  - H. Back-Up Lengths** - Back-up lengths are limited to no more than 100-feet measured from the gate entry of the trash enclosure.