

2002
CITY OF GOLD BAR

DESIGN AND CONSTRUCTION
STANDARDS AND SPECIFICATIONS

CITY OF GOLD BAR

Design and Construction
Standards and Specifications for Development

Prepared and Approved by
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Distributed By

Public Works Department
107 Fifth Street
Gold Bar, Washington 98251

FORWARD

The February 2002 Updates of the Design and Construction Standards and Specifications for Development have been prepared by the Public Works Department of the City of Gold Bar in accordance with 15.04.095 of the Municipal Code. This document is intended to be used in conjunction with the 2000 Standard Specifications for Road, Bridge and Municipal Construction , the Stormwater Management Manual for Puget Sound and current city policies and procedures.

This edition and updates apply to all new construction, public works projects, projects on private and/or public property, reconstruction, land use or zoning applications and whenever any public or private work is performed within the street rights of way or public easement of the City of Gold Bar including work performed by private parties at their own expense under authority granted by ordinance of the City Council or permit process of the Public Works Department.

A document such as this is constantly being updated due to new technology, changes in policy or procedures and methods of design and construction. To request any updates to this manual please contact City Hall.

Despite all efforts to make this an error-proof document, some typos will have slipped through the cracks. Should you find errors in this document, please bring them to our attention at the following address:

City of Gold Bar
Public Works Department
P.O. Box 107
107 Fifth Street
Gold Bar, Washington 98251
(360) 793- 1101

Additional copies of this document may be obtained at the above address for \$25.00 per copy (\$35.00 if mailed).

Sincerely,

John Light
Public Works Director

CONSTRUCTION AND DEVELOPMENT STANDARDS

Pursuant to Title 15 Chapter 15.04.095 of the Gold Bar Municipal Code the following Construction and Development Standards are hereby administratively adopted:

1. Recommended Guidelines for Subdivision Streets, published by the Institute of Traffic Engineers.
2. Stormwater management Manual for the Puget Sound Basin, published by the Washington State Department of Ecology.
3. Washington State Department of Transportation Design Manual.
4. Washington State Department of Transportation Standard Specifications for Road, Bridge, and Municipal Construction.
5. American Public Works Association Standard Specifications for Municipal Public Works Construction.
6. AWWA Standards, published by the American Water Works Association.
7. 2002 City of Gold Bar Design and Construction Standards.
8. Department of Transportation Manual on Uniform Traffic Control Devices

John Light

Date:

Public Works Director

CITY OF GOLD BAR

PUBLIC NOTICE

ADMINISTRATIVE ADOPTION OF DESIGN AND CONSTRUCTION STANDARDS

Under authority granted pursuant to GBMC 15.04.095, the Gold Bar City Public Works Director does hereby repeal the 10/20/99 version of The City of Gold Bar Design and Construction Standards and adopt new Standards dated, February 2002, hereafter referred to as The City of Gold Bar Design and Construction Standards and Specifications.

These standards have been compiled through review and modification utilizing existing standards from various other cities and government jurisdictions, primarily the City of Everett and previous City of Gold Bar Standards.

These standards shall apply to all new construction, public works projects, projects on private and/or public property, reconstruction, land use or zoning applications.

A copy of this document is on file at Gold Bar City Hall and is available for public viewing.

**John Light
Public Works Director**

Date:

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DESIGN & CONSTRUCTION STANDARDS AND SPECIFICATIONS

SECTION 1

GENERAL CONSIDERATIONS

1-1 STANDARDS

These City of Gold Bar Design and Construction Standards and Specifications, hereinafter referred to as the "Standards", shall apply whenever any public or private work is performed within the street rights-of-way of the City of Gold Bar including work performed by private parties at their own expense under authority granted by ordinance of the City Council or permit process. Except where these Standards provide otherwise, design, construction and materials shall conform to the appropriate standards of the current edition of the following publications produced separately by the Washington State Department of Transportation (WSDOT) or jointly by WSDOT and the Washington State Chapter of the American Public Workers Association (APWA).

- A. WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction, hereinafter referred to as the "WSDOT/APWA Standard Specifications".
- B. WSDOT/APWA Standard Plans for Road, Bridge and Municipal Construction, hereinafter referred to as "WSDOT/APWA Standard Plans".

When there is a conflict between two or more standards, the most stringent standard shall apply to all development and construction activities within the jurisdiction of the city.

1-2 REFERENCES

These Standards are intended to be consistent with the most currently adopted provisions of the following:

- A. Gold Bar City Codes
- B. State of Washington Shoreline Management Act
- C. State and National Environmental Policy Acts
- D. City Design Standards
- E. Uniform Building Code
- F. Uniform Electrical Code
- G. Uniform Plumbing Code
- H. Uniform Mechanical Code
- I. Uniform Fire Code
- J. WSDOT Design Manual
- K. WSDOT Traffic Manual
- L. WSDOT Utilities Manual
- M. WSDOT Construction Manual
- N. AWWA Standards
- O. Manual on Uniform Traffic Control Devices (MUTCD)
- P. Gold Bar Shoreline Master Program
- Q. Puget Sound Basin Stormwater Management Manual

1-3 AS-BUILT DRAWINGS

GENERAL CONSIDERATIONS

Prior to the acceptance of the work, the developer/contractor shall furnish the public works director one neatly and legibly marked set of reproducible mylar drawings of significant permanent items showing any and all changes in the final locations of all items of work including, but not limited to curb and gutter, storm drain lines, water lines, sewer lines, catch basins, manholes, fire hydrants, valves, new and existing utilities and all other miscellaneous items included in the work. Marking of the drawings shall represent all changes, vertical and horizontal, and be done at the time the material and equipment is installed.

As-built drawings shall be required whether for private or public construction in accordance with the following:

Private Development

- A. Plats - Final plat approval shall be withheld until after the as-builts have been submitted and approved.
- B. Commercial - Final approval and installation of water meters will be withheld until the as-builts have been submitted and approved.

Public Construction

As-built drawings shall be considered an item on the contractor's punch list. Until all items on the punch list are completed, the project will not be sent to the City Council for approval. Final acceptance will be withheld until the as-built drawings are submitted and approved.

1-4 CITY PERFORMED WORK

When work is to be performed by the city, the city will provide all the material required for the said work. The cost for the material and the work performed shall be at the developer's expense. Any requests for city work should be scheduled at least one week in advance.

1-5 CONTROL OF NOISE

Under the City's Noise Ordinance, 8.16.050, construction related noise has limitations during the hours before 7 a.m. and after 9 p.m. on weekdays, and 8 a.m. to 9 p.m. on weekends and state recognized holidays. Due to citizen concerns about construction noise in neighborhoods, and given the city's intent to limit the occurrence of public disturbance noise, construction sites will be monitored and violators are subject to fines.

Construction contractors are responsible for notifying subcontractors of the city's noise regulations.

1-6 GUARANTEES

Performance and warranty guarantees will be required for all public works improvements or work within the public right-of-way. Work to be performed by any state agency or unit of local government shall be exempt from providing guarantees based on Chapter 35A.21.250 R.C.W.

Acceptable methods of guarantees will be as follows:

GENERAL CONSIDERATIONS

- A. Bond
- B. Cash Deposit
- C. Letter of Credit

Standard documents as approved by the city for the above items are available from the Clerk Treasurers Department.

1-6.1 PERFORMANCE

Performance guarantees for deferred improvements will be required for all improvements located in the public rights-of-way and as required by city ordinance as detailed on the approved plans and as noted in the following summary:

<u>Street/Alley</u>	<u>Drainage (private)</u>	<u>Utilities (public)</u>
125% of estimated cost; construct improvements prior to building permit issuance; for a plat construct all improvements prior to final plat approval.	For properties one acre or more with drainage abatement facilities, 125% of estimated cost.	125% of estimated cost; construct improvements prior to occupancy; for a plat construct prior to final plat approval.

The initial guarantee and subsequent extensions as approved will be limited to one year increments. If time extensions are approved, the guarantee amount shall be revised to reflect inflation and/or other cost impacts.

The developer shall provide an estimate, prepared by a licensed engineer, of the improvements based on the approved plans. The estimate shall be itemized by description, quantities and costs. The submitted data will be reviewed by public works for adequacy of quantities and comprehensiveness of estimates. The estimate shall be reviewed to reflect the city's cost to complete the improvements.

1-6.2 WARRANTY

Warranty guarantees will be required at the time of final acceptance of the public improvements and/or improvements required by city ordinance. The guarantee amount will be 25% of the documented final cost of the improvements. The warranty guarantee is required prior to release of the performance guarantee. Methods of posting warranty guarantee shall be the same as for performance guarantee and shall be for the lengths of time as listed below:

<u>Street/Alley</u>	<u>Drainage (private)</u>	<u>Utilities (public)</u>
One Year	Two Years (will be extended for 1 year if city elects to assume maintenance.)	One Year

1-7 PERMITS

A public works permit is required for all work within the public right-of-way and city utility easements, and for all sewer, water, and drainage improvements, including clearing, fill and excavation (as defined in Section 2), parking lot construction and/or paving on private property.

GENERAL CONSIDERATIONS

The approved applicants copy of the public works permit, together with a set of plans approved by the Public Works Department shall be available on the job site whenever work is being done on any portion of the project.

Any questions regarding information about permits and the approved prices should be directed to the customer service counter located at 107 5th Street, Gold Bar (360) 793-1101.

1-8 LEGAL RELATIONS AND RESPONSIBILITIES

The contractor at all times shall comply with all Federal and State laws, local laws and ordinances, and any regulations which in any manner affect the project.

The contractor shall release, indemnify and promise to defend and hold harmless the city, its officers, employees and agents from and against any and all liability, loss, damage, expense, actions and claims, including costs and reasonable attorneys fees incurred by the city in defense thereof, asserting or arising directly or indirectly on account of any violation of laws, ordinances or regulations whether such violations are by the contractor, his subcontractors, his employees, or his agents.

1-9 MODIFICATIONS OF STANDARDS

Modifications from these Standards may be granted by the public works director upon evidence that such modifications are in the public interest, that they are based upon sound engineering judgment, and that requirements for safety, function, appearance, and maintainability are fully met. Desired modifications must be approved prior to construction.

1-10 PLAN REVIEW

The Public Works Department has established basic standards for improvement plans so plan checking can be processed efficiently. See each section for specific requirements over and above the following standards. Plans must meet these standards before they will be accepted. Requirements for plans will be divided into two general categories.

- A. Minor Projects: Work not requiring public right-of-way improvements. For example, small site projects such as a new house or duplex, garage addition, house addition or remodel.
- B. Major Projects: Work involving street improvements, drainage, water and sewer improvements. Plans for major projects must be drawn by a registered civil engineer licensed by the State of Washington.

1-10.1 FORMAT AND REQUIRED DATA

- A. All public works plans for street improvements and utility systems shall be prepared in a mylar plan/profile format either with sheets printed in half plan and half profile or with separate sheets for plan view and profile views. Sheets shall be standard size 36"X24"
- B. Plans shall be prepared with all utilities, connections, extensions, both new and existing, shown in plan/profile detail. For example, on the sanitary sewer sets, the water and storm drains shall be shown with the sanitary sewer portions being heavily highlighted. Other utilities are also to be shown in plan/profile views where connections/crossings occur.

GENERAL CONSIDERATIONS

- C. Whenever possible, use notes detailing and specifying city standard numbers for common items such as catch basins, restrictors, fire hydrant assemblies, water meters, etc.
- D. Show the existing channelization of all streets that front the proposed development. Show all curb cuts on both the adjacent properties and the properties across the streets that front on the proposed development.
- E. Show complete data for curb radii, utility locations (new and existing), curb elevations, street stationing, street widths, existing adjacent improvements, elevations of existing street improvements, and utilities, etc.
- F. All elevations and grades on public works plans shall be to the 1988 N.A.V.D. (North American Vertical Datum).
- G. A summary of quantities for all work within the public right-of-way or in easements granted to the city shall be listed on the title sheet or on the first sheet of all plans or sets of plans. The following list can be used as a guideline for the items to be listed but is to be supplemented as necessary for a particular project:

1. Asphalt Concrete Pavement (Roadway)	S.Y.
2. Cement Concrete Pavement (Roadway)	S.Y.
3. Asphalt Concrete Pavement (Alley)	S.Y.
4. Cement Concrete Pavement (Alley)	S.Y.
5. Cement Concrete Curb & Gutter-Type "A-1"	L.F.
6. Cement Concrete Sidewalk	S.F.
7. Cement Concrete Driveway Approaches	S.F.
8. Ductile Iron Water Main (Size)	L.F.
9. Gate Valves (Size)	EA.
10. Butterfly Valves (Size)	EA.
11. Concrete or PVC Sewer Main (Size)	L.F.
12. Concrete or PVC Side Sewer (Size)	L.F.
13. Sewer Manholes (Type)	EA.
14. Concrete or PVC Storm Drain Pipe (Size)	L.F.
15. Catch Basins (Type)	EA.
16. Traffic Regulatory Signs (Type)	EA.
17. Street Name Signs	EA.
18. Fire Hydrant Assemblies	EA.
19. Water Main Blow-Offs	EA.
20. Water Services	EA.

- H. A "Driveway Schedule" which lists all of the driveways, both residential and commercial, being constructed and shall include the following information pertaining to each driveway, in tabular form:
 - 1. Location of driveway
 - 2. Surface type
 - 3. Width
 - 4. Profile grade (may require separate sketch)
 - 5. Length

1-10.2 REQUIRED DRAWINGS

The following plans for public works improvements and utilities shall be prepared:

- A. Erosion Control & Grading Plan.
- B. Street Improvements.*
- C. Storm Drain or Drainage Plan (Drainage & Street Plans may be combined together).*
- D. Sanitary Sewer Plan.*

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- E. Water System Plan.*
- F. Landscaping Plan.
- G. Parking Plan

* A separate cross section plan sheet is required for all new street construction and utility installation.

For most minor projects, all the above required sheets may be condensed into one plan sheet. If an extension or either a sewer main, water main, or storm drain main is required, a separate sheet will be required for that work.

1-10.3 SCALE OF DRAWINGS

All plans are to be drawn utilizing an engineer's scale.

The acceptable scale for public works improvement plans shall be 1"=50' for plan view (horizontal) and 1"=5' for profile view (vertical.)

1-10.4 SIZE OF DRAWINGS

- A. Minor Projects: Plans must be drawn or printed on paper that is relatively heavy, such as blueprint quality or standard drafting paper. Plans drawn on tissue paper, poster board or cardboard will not be accepted. The minimum acceptable size is to be 8-1/2"x14", with the maximum acceptable size being 24"x36".
- B. Major Projects: Plans must be 24"X36" in size with mylars.

1-11 PROTECTION OF PROPERTY AND UTILITIES

1-11.1 PROPERTY

The contractor shall protect and preserve from damage, interference and destruction all private and public property on or in the vicinity of the work. If such property is damaged or destroyed or its use interfered with by the contractor or his agents, it shall be restored immediately to its former condition by the contractor at his expense and such interference terminated. The use of adjacent or alternate property requires written permission from the property owner.

1-11.2 UTILITIES

The contractor shall protect from damage private and public utilities, including telephone and telegraph lines, power lines, sewer and water lines, railroad tracks and appurtenances, highway lighting and signal systems, and similar facilities. Before beginning any excavation, the contractor shall provide notice of commencement to all owners of underground facilities through the one number locator service, phone number 1-800-424-5555, if available; if not the contractor shall give notice to all individual utility owners. Such notice shall not be less than 2 nor more than 10 business days before the scheduled date of excavation.

1-12 SITE MAINTENANCE

GENERAL CONSIDERATIONS

The developer and contractor shall schedule and control the work so as to prevent all hazards to public safety, health and welfare.

Streets shall be kept free of dirt and debris on a continuous basis.

Pedestrian facilities shall be kept free of obstruction, and continuity shall be maintained at all times unless otherwise approved by the Public Works Department.

On existing streets, two way traffic shall be maintained at all times unless detour plans have been approved in advance by the public works director.

Pedestrian and vehicular access to occupied buildings shall be maintained at all times except where approval from the building owner and public works department has been obtained.

1-13 TRAFFIC CONTROL

1-13.1 GENERAL

Traffic control for all projects shall comply with Chapter 6 of MUTCD. The contractor shall be responsible to furnish and maintain all required labor and materials as needed to the satisfaction of the public works director.

The contractor shall conduct his or her operations as to offer the least possible obstruction and inconvenience to the public, and the contractor shall have under construction no greater length or amount of work than can be prosecuted properly with regard to the rights of the public. The contractor shall not open up sections of the work and leave them unfinished, but he shall finish the work as he goes insofar as practicable.

Unless otherwise approved in writing by the public works director, all public traffic shall be permitted to pass through the work with as little inconvenience and delay as possible. The contractor shall keep existing roads and streets adjacent to or within the limits of the project open to and maintained in a good and safe condition for traffic at all times. The contractor shall remove any deposits or debris and shall repair any damage resulting from his operations. Construction shall be conducted so as to cause as little inconvenience as possible to abutting property owners. Convenient access to driveways, houses and buildings along the line of work shall be maintained. Alternate access utilizing private property requires written approval by the property owner. It shall be the responsibility of the contractor to obtain the access approval.

1-13.2 DETOURS AND ROAD CLOSURES

Approval must be received from the public works director for all detours and road closures. A formal traffic control plan complying with the MUTCD manual shall be submitted to public works for review and approval by the traffic engineer prior to any work proceeding.

The contractor shall be responsible in notifying all affected parties of detours and road closures. Notification shall include police, fire, post office, public transit, school / transportation and public works.

Roadways shall be posted of at least 48 hours prior to the time of closures.

1-13.3 FLAGGERS, BARRICADES AND SIGNS

GENERAL CONSIDERATIONS

Flagger(s), barricades, signs shall conform to the Standards established in the latest edition of the "Manual on Uniform Traffic Control Devices" (MUTCD). Should the contractor deviate from these Standard Plans, he or she should prepare a signing plan showing the necessary construction signing, barricades and flagger(s) required for the project and submit the plan(s) to the public works for approval by the public works director in advance of the time the signing and barricades will be required. All equipment and materials required for traffic control shall be furnished, installed and maintained by the contractor to the satisfaction of the public works director.

1-14 CONTROL AND INSPECTION

1-14.1 GENERAL

Work performed in construction or improvements within the city, whether by a private developer, a city contractor or city forces, shall be done in accordance with the approved plans and specifications and to the satisfaction of the public works director.

No work may be started until such plans are approved. Any revision to such plans shall be approved by the public works director prior to performing the work.

The public works director will have authority to enforce these Standards as well as other referenced or pertinent specifications and will appoint project engineers, assistants and inspectors as necessary to inspect the work for compliance.

1-14.2 MATERIALS SAMPLING & TESTING

1-14.2(1) DEVELOPMENTS

It shall be the responsibility of the developer to provide test reports certified by a professional engineer licensed in the State of Washington to verify compliance of materials used in the project. Sampling and/or testing shall be at a frequency and magnitude determined by the public works director or designated representative. Copies of all test reports shall be furnished to the public works director. All costs incurred for testing or sampling, as required, shall be the responsibility of the developer.

1-14.2(2) CITY FORCES & CITY CONTRACTORS

Construction work performed by city forces and city contractors shall be inspected by city inspectors. Sampling and testing shall be performed by city inspectors or by a professional laboratory unless otherwise specified in the contract document.

1-14.2(3) NOTIFICATION OF INSPECTION

The developer shall notify the city of inspection needs in a timely manner. In general, a minimum of 24 hours advance notice will be required. Failure to notify in time may oblige the city to arrange appropriate sampling and testing after-the-fact, with certification by a qualified private testing laboratory. Costs of such testing and certification shall be borne by the developer.

1-15 ASBESTOS CONTROL

GENERAL CONSIDERATIONS

Asbestos containing material (ACM) may be encountered during a construction project in the form of asbestos cement pipe, pipe insulation, or as insulation in a structure that is being demolished. It can be found in pipe for water and sewer mains, electrical conduits, drainage pipe, and vent pipes, etc. Normal breakage and crushing of the material can cause an asbestos fiber release which presents a serious respiratory hazard. It is imperative that asbestos fiber release be controlled. Citations, by regulatory agencies, for an asbestos fiber release carry substantial fines.

Only employees certified by the State of Washington as a Certified Asbestos Worker may work on ACM during construction, demolition, repair, maintenance, renovation, salvage, or disposal of ACM.

The contractor shall have all asbestos removed from the site and property disposed of by a State licensed asbestos contractor in accordance with the practices specified by the State of Washington Department of Ecology, the Snohomish County Solid Waste Division and all other pertinent State and Federal Regulations. See WAC 296-62-077.

1-16 LANDSCAPING

The development of landscaping and erosion control is to conform to the basic concepts and principles set forth in the City of Gold Bar Zoning Code. Landscaping shall be required on all projects to provide visual orientation for traffic safety; to create physical delineation of parking areas and to furnish definition and scale of the entire complex by interval plantings and to insure the preservation of land values by creating an environmental quality which compliments the objectives of the respective land uses in any zone. A copy of the Zoning Code is available for review at Gold Bar City Hall, 416 Orchard Ave..

1-17 FENCING

All fences permanently or temporarily installed upon public and/or private property shall comply with these standards, the Uniform Building Code, and GBMC 15.06 (Fence Regulations). See STD No. 335 and STD No. 336 for vision and setback requirements.

**DESIGN AND CONSTRUCTION STANDARDS
AND
SPECIFICATIONS**

SECTION 2

**SMALL PARCEL EROSION, SEDIMENT CONTROL
AND LAND ALTERATIONS**

2-1 GENERAL

This section of the Standards covers erosion and sediment control for small parcels, where land alteration activities will disturb less than one acre of land. Projects which will disturb one acre of land or more must refer to the Puget Sound Basin Stormwater Management Manual for large parcel erosion and sediment control requirements.

Land alteration activities are those activities which are commonly referred to as clearing (the act of vegetation removal from the land surface, often referred to as land clearing); grubbing (the act of root vegetation removal from beneath the surface of the earth, usually in conjunction with clearing); excavation (the mechanical removal of earth material); filling (deposition of earth material placed by artificial means); grading (excavation of filling or combination thereof); and stockpiling (temporary deposition of earth material placed by artificial means).

2-1.1 PERMIT REQUIREMENTS

Land alteration activities which exceed the exempt limits set forth in following table shall be required to obtain a Clearing/Grading Permit from the City of Gold Bar prior to construction activities;

<u>Activity</u>	<u>Maximum Exempt Limits</u>
Clearing/Grubbing *	2,500 square feet *
Excavation/Grading **	12 inches of depth **
Filling/Stockpiling **	50 cubic yards **
Tree Removal	6 trees over 6" in diameter

* Note: All land alteration activities adjacent to a sensitive area are subject to a permit.

** Note: Excavation and/or stockpiling of soils related to septic soil & site review such as percolation test pits are exempt from a grading/clearing permit, but may require SEPA review based upon threshold exempt levels.

2-2 SMALL PARCEL EROSION AND SEDIMENT CONTROL

2-2.1 SMALL PARCEL EROSION AND SEDIMENT CONTROL PLANS (SPESCP)

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

A SPESCP illustrates the Best Management Practices (BMPs) and strategies for controlling erosion and sediment on a small parcel during construction. The applicant developing a small parcel shall submit two copies of a site improvement and drainage plan on 8 1/2" by 14" paper showing the following:

- Name, address, and phone number of owner or contact person.
- North arrow, lot number and plat, address, date, and street name fronting structure.
- Footprint of all proposed structures, any existing structures on the site, location and quantities of fill material to be used and type of material.
- Location of any environmentally sensitive areas (as identified in the City of Gold Bar's Sensitive Areas Ordinance) on or immediately adjacent to the site, including streams, wetlands, steep slopes, and their required buffers.
- Arrows or topographical contours showing the slope of the site.
- Methods to convey runoff away from the proposed structures and construction activity.
- Proposed location and erosion protection of excavated basement soil stockpiles (if applicable).
- Methods to stabilize disturbed areas of the site and to protect adjacent properties and/or streets from sediment and stormwater runoff (these methods may include plastic covering, mulching, seeding, planting, sodding, vegetative buffer strips, vegetative and/or bark mulch berms, sediment barriers or filter fences, and dikes).
- A construction vehicle access (limited to one route, whenever possible) using 2"-4" rock applied to the driveway area, with truck traffic restricted to this one route.
- A proposal for maintenance or reconstruction of the vehicle access.
- A note calling for periodic street cleaning to remove any sediment tracked off the site.
- A note calling for routine inspection and maintenance of all installed erosion and sediment control BMPs, especially after storms.
- A note indicating that bare and/or disturbed soils shall remain uncovered and/or unstabilized for no more than 2 days from October 1 through April 30, and for no more than 7 days from May 1 through September 30.

2-2.2 SMALL PARCEL BMPs

2-2.2(1) BMP ES.10 Planned Clearing and Grading

Clearing and grading of the site should be planned properly. It is important to clear only the areas needed, thus keeping exposed areas to a minimum. Clearing should be phased so that only those areas that are actively being worked are uncovered. Clearing limits shall be flagged in the lot or area prior to the initiation of clearing.

Sensitive and/or critical areas shall be clearly delineated and marked prior to any clearing or grading activities being conducted.

2-2.2(2) BMP ES.20 Excavated Basement Soil

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

Excavated basement soil should be located a reasonable distance behind the curb, right-of-way, easements, adjacent property, or utility structures. This practice will prevent erosion from infiltrating into utilities or adjacent property. Soil piles shall be covered until the soil is either used or removed. Piles shall be situated and/or protected so that sediment does not erode into the street or adjoining yards.

2-2.2(3) BMP ES.30 Backfilling

Basement walls should be backfilled as soon as possible and the lot rough graded. This practice will eliminate large soil mounds which are highly erodible and prepares the lot for temporary cover, which will further reduce erosion potential.

2-2.2(4) BMP ES.40 Removal of Excess Soil

Excess soil should be removed from the site as soon as possible after backfilling. This practice will eliminate any sediment loss from surplus fill.

2-2.2(5) BMP ES.50 Management of Soil Banks

If a lot has a soil bank higher than the curb, the bank should be located several feet behind the curb and a shallow trench should be excavated between the bank and the curb. This practice will help prevent any eroded sediment from entering the street.

2-2.2(6) BMP ES.60 Construction Road Access

2" to 4" rock shall be applied to the driveway area and vehicle traffic restricted to this one route. Driveway paving can be installed directly over the gravel. This measure will help prevent soil from adhering to tires and stop soil from washing into the street. This construction access requires periodic inspection and maintenance including washing, top-dressing with additional stone, reworking and compaction.

2-2.2(7) BMP ES.70 Soil Stabilization

Soil stabilization measures protect soil from the erosive forces of raindrop impact and flowing water. Acceptable measures include establishing vegetation by sodding or seeding, mulching with two tons of straw per acre or approved equal, plastic or other impervious covering staked to the ground or anchored with rocks or sandbags, and the early application of gravel base on areas to be paved. Horizontal tracking is a successful method when used in conjunction with one of the above measures.

2-2.2(8) BMP ES.80 Street Cleaning

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

Periodic street cleaning shall be provided to remove any sediment that may have been tracked out. Sediment should be removed by shoveling or sweeping and carefully removed to a suitable disposal area where it will not be re-eroded.

2-3 GENERAL

Types of Land Alteration: Land alteration activities are those activities which are commonly referred to as clearing (the act of vegetation removal from the land surface, often referred to as land clearing); grubbing (the act of root vegetation removal from beneath the surface of the earth, usually in conjunction with clearing); excavation (the mechanical removal of earth material, including test pits); filling (disposition of earth material placed by artificial means); grading (excavation or filling or combination thereof) and stockpiling (temporary disposition of earth material placed by artificial means).

All land alteration activities within the City of Gold Bar shall conform to the requirements of the Gold Bar City Codes, Sensitive Areas Ordinance, Puget Sound Basin Stormwater Management Manual, City of Gold Bar Shorelines Master Program, State and Federal guidelines and these standards.

The Public Works Director shall determine whether or not erosion and sedimentation control measures are to be constructed and operational prior to initiation of clearing and grubbing operations. Conditions to be used in making this determination will include but not be limited to time of year, topography, erosion potential, proximity to sensitive areas, seasonal conditions, etc. Erosion and sedimentation control materials must be available on-site at all times and must be able to be installed immediately upon notification from the City.

Clearing permits will not be issued for projects that are in SEPA review.

2-4 EROSION/SEDIMENTATION CONTROL REQUIREMENTS

2-4.1 GUIDELINES

For sites not located in a critical drainage area, but are areas that are highly susceptible to erosion, adequate erosion control during clearing and grading operations can normally be obtained by providing a temporary siltation/sedimentation pond with interceptor ditches and reseeding the disturbed soils. Such areas are identified as: steep slopes or bare slopes, potential slides, flood plains, stream banks, waterways and areas adjacent to waterways, silt bars, wetlands, bogs, marches, poorly drained areas and which are less than one acre in size. After clearing and grading operations are completed and the storm drainage system installed, the sedimentation pond and interceptor ditches may be abandoned provided sediment traps are provided around all storm drain inlets and there is not a possibility of sediment laden water crossing property lines.

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

For sites not located in critical drainage area, but larger than one acre, erosion control requirements may also include sedimentation ponds, check dams, filter fabric fence, jute matting or plastic sheeting, and a temporary construction entrance.

Developments located on steep slopes (25% or greater) shall require, in addition to the normal requirements for a comparably sized development on a slope less than 25%, the following: gradient terraces, immediate hydroseeding and mulching, phasing of construction so as to minimize the amount of exposed soils at any given time and seasonal limitation restrictions. See Section 2-2.3 for additional requirements. Depending upon soil and slope conditions, the proximity to a waterway and the size of the site, additional requirements may include flexible down drains, filter fabric fences, jute matting or other approved means to secure seed and mulch in place, temporary level spreaders and stabilized channels to convey off-site runoff through or around site.

Development adjacent to waterways shall require, in addition to the normal requirements for a comparable sized development not adjacent to a waterway: a vegetative buffer between the waterway and the development and seasonal limitation restrictions. See Section 2-2.3 for additional requirements. Any work within the waterway will require a hydraulics permit from the Department of Fisheries and/or Game. The city may make additional requirements, including but not limited to temporary bypass culverts or channels.

The exact combination of required erosion control measures will be clarified during the SEPA review process.

The following table generally summarizes erosion control requirements:

	<u>Small Sites</u>	<u>Large Sites</u>	<u>Steep Slopes</u>	<u>Adj. to Waterway</u>	<u>In Waterway</u>
Silt Fence	*	*	*	*	*
Sedimentation Pond	*	*	*	*	*
Interceptor Swale	*	*	*	*	*
Check Dam		*	*	*	*
Gradient Terrace			*		
Catch Basin Sock	*	*			

See Section 2-4.2 for details on the above requirements

2-4.2 METHODS OF CONTROL

The types of controls as noted in this section and the related Standard Plans for Erosion and Sedimentation Facilities are a minimum requirement and, in certain conditions, may require much more extensive facilities. Erosion control facilities shall be periodically inspected and maintained by the developer or contractor to ensure continued intended operation.

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

2-4.2(1) CHECK DAMS AND BERMS

Check dams and/or berms shall be incorporated into erosion control facilities as required.

Straw bales (staked in place) may be used as energy dissipating drop structures, flow direction control structures and/or dams to create ponding. See Standard Plan No. 203 or 206.

Rock berms can be used for all uses stated for straw bales and may be used as filtering devices. Earth berms may be used to control flow direction and prevent silt-laden water from discharging into adjacent properties and/or the public rights-of-way.

2-4.2(2) CUT-OFF TRENCHES

Cut-off trenches are recommended to dissipate drainage into the natural on-site vegetation.

2-4.2(3) FILTERING DEVICES

Filtering devices, such as filter fabric fences, shall be used to filter runoff prior to discharge from site. See Standard Plan Nos. 205A and 205B. Approved filter fabrics are Celanese fiber, polyvinyl chloride woven cloth, reinforced chlorosulfinated polyethylene cloth, chlorinated polyethylene woven cloth, such as Mirafi 100X, Typar 3401, Stablenka 100, or approved equal. Catch basin socks shall be installed on all existing or new catch basins during all construction.

2-4.2(4) FLEXIBLE DOWN DRAINS

Flexible down drains may be utilized as temporary structures to protect open slopes and shall be constructed of flared end sections connected by plastic sheet tubing, heavy duty fabric, or non-perforated corrugated plastic pipe. See Standard Plan No. 209. Appropriate sediment control devices shall be utilized at all down drain outlets.

2-4.2(5) GRADIENT TERRACE

A gradient terrace is an earth embankment or ridge designed so that the top of the constructed ridge is lower at any point than the design elevation of the water surface at the outlet under design flow and is installed so as to intercept surface runoff and convey it to a stable outlet at a non-erosive velocity. Gradient terraces may be useful both as a temporary and/or a permanent erosion control measure. See Standard Plan No. 210A.

2-4.2(6) INTERCEPTOR DITCHES

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Interceptor ditches are constructed to channel water away from unprotected slopes or erodible soils, or convey silt laden water to sedimentation facilities.

If the location of the ditch may result in erosion of the ditch itself, stabilization of the ditch may be required. Rip rap, temporary sodding, or a combination of filter fabric and rip rap are methods of ditch stabilization that may be required to prevent erosion. See Standard Plan No. 210B.

2-4.2(7) ROADWAY AND PARKING LOT CONSTRUCTION CONTROL

In addition to those erosion control methods above, the additional erosion control measures below may be necessary to protect the installed storm drainage system and/or downstream systems and shall be utilized in such combination as is necessary to achieve the requirements of these Standards. Erosion control facilities shall be periodically inspected and maintenance performed in order to ensure their proper functioning.

2-4.2(7)(A) SEDIMENT TRAPS

Sediment traps are structures of limited capacity designed to create a temporary siltation pond filter around storm drain inlets or at points where silt laden stormwater is discharged. Periodic maintenance by the contractor or developer is crucial to the proper functioning of sediment traps. Examples of typical sediment trap installations are found in Standard Plan Nos. 211, 212 and 213. Placement of filter fabric under the grate of a catch basin is not an acceptable method of inlet protection.

2-4.2(7)(B) INTERCEPTOR DIKES

Interceptor dikes are temporary berms of compacted soil or gravel constructed across disturbed construction areas. Interceptor dikes shall be designed and constructed so as to reduce erosion by intercepting stormwater and diverting it to stabilized outlets such as siltation/sedimentation ponds or areas of well established vegetation.

2-4.2(8) TEMPORARY CONSTRUCTION ENTRANCE

A temporary construction entrance is a rock stabilized temporary entrance pad and shall be constructed at points where traffic will be entering or leaving a construction site from or onto public right-of-way. The pad shall be of sufficient length and width to eliminate transportation of mud and sediment from the construction area onto the public right-of-way by motor vehicles or by runoff, but under no circumstance shall it be less wide than the ingress/egress at the right-of-way nor less than 50 feet long. The stabilized construction entrance shall be a minimum thickness of 8 inches and constructed of material approved by the public works director, such as 4"X8" quarry rock. The entrance shall be maintained to the satisfaction of the public works inspector. See Standard Plan No. 208. When site conditions are such that the temporary entrance pad fails to perform as required, all vehicles exiting the site shall have their tires and wheels cleaned by sweeping, brushing, or washing prior to entering public right-of-way. All

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

washing shall be done on an area draining to an approved erosion control facility. The contractor is responsible to ensure proper working conditions of the temporary construction entrance.

2-4.2(9) TEMPORARY SOIL STABILIZATION MEASURES

Soil stabilization measures protect soil from the erosive forces of raindrop impact and flowing water. Acceptable measures include establishing vegetation by sodding or seeding, mulching with 2 tons of straw per acre or approved equal, plastic or other impervious covering staked to the ground or anchored with rocks or sandbags, and the early application of gravel base on areas to be paved.

The most appropriate measure should be chosen given the time of the year and the site conditions. Seeding alone is acceptable only on flat areas and slopes less than 25%, and only during the periods from March 1 to May 15 and August 15 to October 1 or as otherwise required or approved. Mulch may need to be held in place by utility mesh or netting.

2-4.2(10) TEMPORARY SILTATION/SEDIMENTATION PONDS

Temporary siltation/sedimentation ponds shall be required of all land alteration operations in order to detain runoff waters and trap sediment from erodible areas thus protecting properties, drainage ways and streams below the installation from damage by excessive sedimentation and debris disposition. The dam or barrier forming the pond shall be located to provide for maximum volume capacity for trapping sediment behind the structure as well as for greatest ease of clean out. The temporary pond requirement may be waived, at the discretion of the city engineer, for small areas of land disturbance where potential damage is minimal and pond construction impractical as long as runoff from all such areas is filtered prior to discharge from the site.

Temporary siltation/sedimentation ponds are basins created by construction of a barrier or by excavation or by a combination of both.

Interior surfaces of the sedimentation pond shall be stabilized where required to prevent erosion of the pond bottom and/or sides.

Interior sides of the pond shall be no steeper than 3 feet horizontal to 1 foot vertical.

Siltation/sedimentation ponds shall provide a minimum of 2 feet of dead storage below the outflow elevation and will be sized to provide a minimum of 1 cubic foot of live storage per 100 square feet of channel area.

A stabilized access will be provided to the siltation/sedimentation pond for sediment removal and other maintenance.

2-4.3 SEASONAL LIMITATIONS

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

Land alteration operations are restricted to seasonal limitations. The restrictions are site specific and are based on, but not limited to, steepness of slopes on site, distance from sediment/erosion sensitive areas, soil type, etc. Contact the city's public works director for site specific seasonal limitations.

In addition, these operations shall be governed by the following seasonal limitations:

- A. No fill material shall be placed, spread, or rolled while either the fill material or the site surface is frozen or thawing, or during other unfavorable conditions.
- B. All land alteration work is subject to stoppage by the Public Works Director or his designee due to heavy rain.
- C. When land alteration activities are interrupted by heavy rain, operations shall not be resumed until the Public Works Department determines that erosion control facilities are operating satisfactorily.
- D. Underground utilities and foundation installation are allowed with seasonal limitations under the following conditions:
 - 1. All trenches shall be covered or filled by the end of the day.
 - 2. If unavoidable circumstances result in the inability to close a trench, all open areas and side spoils are covered with plastic sheeting that is staked in place and anchored by rocks, sand bags, tires, or by other approved methods at the end of the day.
 - 3. Discharge from de-watering of utility trenches or foundation areas is directed to the nearest sedimentation pond, or to a specially created sump area, in a non-erosive fashion. Large quantities of silt in the discharge water may result in the de-watering activity being stopped by the city inspector until the source of the sediment is identified and attempts made to minimize the quantity in the discharge.
 - 4. Utility corridors are re-stabilized by temporary soil stabilization measure immediately following the completion of utility work or if earth is to be left exposed for 7 days or more on flat ground or 3 days or more on slopes greater than 25%.
 - 5. Water is prevented from entering foundation work areas from surface runoff by creating small compacted earth berms around the perimeter of the building site to divert runoff away from the working area. The berms shall be covered to prevent erosion.
- E. In general, removal of existing vegetation within the buffer zone of any wetland or perennial stream will not be allowed. If allowed, disturbed area shall be revegetated within 7 days of completion of project or 30 days from beginning work within the stream area, whichever results in restoration of the area within the shortest time frame.
- F. Permits from agencies other than the city may be required for work within or adjacent to environmentally sensitive areas. It is the responsibility of those ordering such work to ensure that all required permits are secured prior to beginning operations and to see that all regulations are complied with during operations.

2-4.4 TEMPORARY EROSION/SEDIMENT CONTROL PLANS

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

A temporary erosion/sedimentation plan is required for the following land alteration activities:

- A. Disturbances to areas greater than 2,500 square feet.
- B. On slopes 25% or greater.
- C. Where cut and/or fill slopes 25% or greater will be created by the proposed work.
- D. Where work done may impact on environmentally sensitive areas (stream, wetland, etc.).

The plan shall clearly indicate the construction sequence for establishment of all erosion control work both temporary and permanent and shall be on a separate sheet.

Emergency management plans are to be submitted for all clearing and grading permit applications. To include at a minimum:

- A. Name, address, and 24 hour telephone number(s) for the person(s) responsible for regular observation and repair or replacement of all erosion and sedimentation control measure.
- B. Schedule for regular inspection, maintenance and replacement of erosion and sedimentation control measures.
- C. Location and inventory of materials required to be stockpiled on the site for emergency repair of the approved erosion and sedimentation control system.
- D. Contingency plans in case of failure of the erosion and sedimentation control system, including how individual erosion control measures would be accessed during undesirable site conditions.

2-4.4(1) REQUIRED NOTES ON PLANS

The following are the minimum notes required on all Temporary Erosion/Sedimentation Control Plans:

- A. The temporary erosion control system shall be installed and inspected by the Public Works Inspector prior to all other construction.
- B. Where possible natural vegetation will be maintained for silt control.
- C. As construction progresses and seasonal conditions dictate, the erosion control facilities shall be maintained and/or altered as required by the Public Work Director to ensure continuing erosion/sedimentation control.
- D. Temporary siltation ponds and all temporary siltation controls shall be maintained in a satisfactory condition until such time that clearing and/or construction is completed, permanent drainage facilities are operational, and the potential for erosion has passed.
- E. All disturbed land areas that will be left for 30 days or more during the periods of March 1 to May 15 and August 15 to October 1 shall be immediately seeded with a mix and by a method approved by the Public Works Department and maintained until seed germination is assured.

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

In addition to seeding, slopes of 25% or greater will be mulched with 2 tons of straw per acre, or with an approved equal. During the rest of the year, temporary soil stabilization must be applied immediately to disturbed areas that will be left exposed for 7 days or more, and immediately to slopes greater than 25% that will be left exposed for 3 days or more.

- F. Approval of this plan does not constitute an approval of design, size, nor location of pipes, restrictors, or detention facilities; but is an approval of grading and sedimentation control plan only.
- G. The public right-of-way shall be kept clean. Tracking of mud and debris from the site will not be allowed. Failure to comply with this condition will result in all work on the site being stopped.

2-5 VEGETATION

2-5.1 PRESERVATION OF EXISTING VEGETATION

Preservation of existing vegetation in order to control erosion and to preserve an area's character and quality of the environment shall be considered during the Land Alteration design review process. All excavation in the proximity of trees and shrubs shall be kept outside the drip line of said trees and shrubs, unless otherwise approved by the public works director. The following vegetation must be preserved:

- A. Healthy trees over 60 feet in height, which can remain healthy in the proposed surrounding environment.
- B. The overstory, vegetation over 10 feet in height, particularly where it forms a continuous canopy.
- C. All vegetation, particularly brush from 1 to 4 feet in height, understory 4 feet to 10 feet in height and overstory within any erosion prone area. Vegetative restoration may be substituted for preservation where preservation is not practical and where such restoration can be achieved without significant detrimental effect on the environment.
- D. Vegetation on the site perimeter, which may serve as a screen to or from adjoining property or roadways. Enhancement of such screening vegetation should also be considered.
- E. Vegetation providing shade for and protecting against silt disposition in streams and watercourses, particularly where those streams and watercourses are known to support fish life or are directly tributary to known fish streams.

2-5.2 RESTORATION

Areas disturbed by construction activity, which are not to be covered by permanent impervious surfaces shall be landscaped or reseeded at the earliest possible time, not to exceed 15 days after final grade is

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reached during the allowable construction period. During the rest of the year, landscaping or reseeding is required within 7 days of reaching final grade.

If wet weather prohibits reseeding or landscaping during the given period, temporary soil stabilization measures must be used until conditions are suitable for permanent measures.

When the area to be seeded is hard, compacted, or crusted, the top layer of soil shall be loosened by disking, raking, or other acceptable means before seeding.

Although the specifications for seed, fertilizer and mulch will depend upon the slope, soil conditions, and the planned use of the site, the following is an example which will usually be considered adequate:

SEED MIXTURE

The seed mixtures and rate of application shall be as follows:

<u>Seed Mix #1 (Highway Mix)</u>		<u>Seed Mix #2 (Lawn Seed Mix) (Beds & Planting Strips)</u>	
<u>Kind and Variety of Seed in Mixture</u>	<u>Percent by Weight</u>	<u>Kind and Variety of Seed in Mixture</u>	<u>Percent by Weight</u>
Colonial Bentgrass (Highlands or Astoria)	10%	Red Creeping Fescue	45%
Red Fescue (Illahee Rainier or Pennlawn)	40%	Chewings Fescue	30%
Perennial Rye	40%	Kentucky Bluegrass	15%
White Dutch Clover	10%	Highland Colonial Bentgrass	10%

The rate of application shall be 4 pounds per 1,000 square feet. No noxious weeds will be permitted. The seed mixture shall be no less than 98% pure, and shall have a minimum germination rate of 90%. All seed shall be protected to insure germination. Reseeding shall be required upon request by the Public Works Director.

FERTILIZER

Fertilizer shall be a standard commercial grade of organic or inorganic fertilizer of the kind of quality specified herein. It may be separate or in a mixture containing the percentage of total nitrogen, available phosphoric acid and water-soluble potash in the amount specified. All fertilizers shall be furnished in standard unopened containers with weight, name of plant nutrients and manufacturer's guaranteed statement of analysis clearly marked, all in accordance with State and Federal laws.

SMALL PARCEL EROSION, SEDIMENT CONTROL AND LAND ALTERATIONS

Acceptable commercial fertilizer may be supplied in one of the following forms:

- A. A dry free-flowing granular fertilizer suitable for application by agricultural fertilizer spreader.
- B. A soluble fertilizer ground to a fineness that will permit complete suspension of insoluble particles in water, suitable for application by power sprayer.
- C. Granular or pellet fertilizer, suitable for application by blower equipment.
- D. A non-volatile liquid fertilizer.

Fertilizer shall be standard commercial grade of formulation. Fifty percent of the nitrogen shall be derived from 38% ureaformaldehyde and applied at the rate of 12 pounds per 1,000 square feet.

MULCH

Wood cellulose fiber mulch shall be specially processed wood fiber containing no growth or germination inhibiting factors and shall be dyed a suitable color to facilitate inspection of the placement of the material. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material will become uniformly suspended to form a homogenous slurry. When hydraulically sprayed on the ground, the material shall allow the absorption and percolation of moisture.

Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content.

Wood cellulose fiber shall be applied at the rate of 60 pounds per 1,000 square feet.

**DESIGN AND CONSTRUCTION STANDARDS
AND
SPECIFICATIONS**

SECTION 3

STREETS AND RELATED WORK

3-1 GENERAL REQUIREMENTS

All work performed in the design, preparation of plans and in the construction or improvement of city streets and all appurtenances, whether public or private shall be the responsibility of the developer or contractor and done to the satisfaction of the Public Works Director and in accordance with the plans and specifications approved by the city for the work.

It is emphasized that no permits will be issued to start work until plans for that work are approved, any revisions to the plans shall be approved by the public works director before being implemented. A set of "as-built" drawings (mylars) will be required at the completion of the project and prior to final acceptance of the work. See individual utility sections for more specific "as-built" requirements.

City Ordinances and Standards establish policy for the installation of street improvements. Specific application will be determined at the time of permit application and or issuance.

3-2 ROADWAY TYPES AND GEOMETRICS

3-2.1 GENERAL

City of Gold Bar roadways are classified functionally as indicated in Standard Plan No. 300. Criteria for minimum right-of-way and roadway widths, and other geometrics shall be as listed for given classifications.

Structural sections and roadway appurtenances shall be as shown on Standard Plan Nos. 301 and 302.

The Public Works Director may require the second lift of asphalt to be bonded and delayed for up to one year.

Typical utility locations for design purposes are shown on Standard Plan No. 322.

3-2.2 HORIZONTAL ALIGNMENT

3-2.2(1) CURB RETURN RADII

Radii of 40 feet or more, should be three centered compound curves or simple curves with tapers to fit the paths of appropriate design vehicles.

STREETS AND RELATED WORK

3-2.2(2) LOCAL STREETS

For the intersection of two local streets, the minimum allowable curb radius shall be 20 feet, which is to be measured from the radius point to the face of curb.

For the intersection of a local street with any collector or arterial, the minimum radius shall be 25 feet.

3-2.2(3) OTHER STREETS

On all other street intersections, the minimum allowable radii shall be 25 feet.

3-2.2(4) TRUCKS AND BUSES

Radii of 40 feet or more should be provided where large truck combinations and buses turn frequently. Larger radii are also desirable where speed reductions would cause problems.

3-2.3 INTERSECTIONS

	<u>Intersections</u>
Angle of Intersection	80° to 90°
Minimum Centerline Radius	N/A
Minimum Curb Radius	20 feet (see sections 3-2.2; 2, 3 & 4)

3-2.4 STREET ENDS

Cul-de-sacs are permitted provided it can be demonstrated that development of a through street is not practical given the constraints of natural features.

Cul-de-sacs shall be provided at all permanent street ends, and on any temporary dead end location when the length of the street is more than 75 feet in length. Cul-de-sacs shall be per Standard Plan No. 304. Cul-de-sacs shall be limited in length to those listed within GBMC 16.14.090 (M).

3-3 EASEMENTS

A nonexclusive easement shall be reserved for and granted to all utilities serving subject plat and their respective successors and assigns, over, under and upon the exterior 10 feet parallel with and adjoining the street frontage of all lots and common areas in which to install, lay, construct, renew, operate and maintain underground conduits, cables, pipes, and wires; together with other necessary facilities and equipment, for the purpose of serving this subdivision and other property with utility service, together with the right to enter upon the lots at all times for the purposes herein stated.

3-4 FIRE DEPARTMENT ACCESS

As required by the fire chief, every building constructed shall be accessible to the Fire Department, both during and after construction, by way of access roadways approved by the Fire Department. The

STREETS AND RELATED WORK

roadway shall have at least 20 feet of unobstructed width, shall have adequate roadway turning radius, and be capable of supporting the imposed loads of fire apparatus. The minimum allowable vertical clearance shall be 13 feet 6 inches. All required fire access roads must be in service prior to commencement of construction.

When access roads cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief is authorized to require additional fire protection as specified in Section 901 & 902 of the Uniform Fire Code. Such devices or appliances may consist of automatic fire alarm systems, automatic sprinkler or water spray systems, standpipe and hose, fixed or portable fire extinguishers, suitable fire blankets, breathing apparatus, manual or automatic covers, carbon dioxide, foam, halogenated or dry chemical or other special fire-extinguishing systems. Where such systems are provided, they shall be designed and installed in accordance with the applicable Uniform Fire Code Standards.

The following definitions shall apply:

- A. **Fire Lane:** That portion of the Fire Department access to areas or structures which is required by the provisions of 15.04.081 of the Gold Bar Municipal Code. Generally, this access is in larger complexes and constitute continuous loops around buildings or complexes.
- B. **Fire Access Road:** That portion of the Fire Department access to areas or structures which is required by the provisions of Section 901 & 902 of the Uniform Fire Code, 1997 edition or subsequent revision. This type of access may be provided to almost any type of property.
- C. **Access Easement:** That portion of a "fire access road" as defined above which is provided by the granting of a permanent easement over one or more properties in order to provide permanent access to other properties.
- D. **Short Plat Access:** That portion of Fire Department access into short plats. The overall width of required Fire Department access may not be less than 20 unobstructed feet.

The required 20 feet of access shall consist of a minimum of 16 foot of a suitable native or fill material topped with 4 inches of Crushed Surfacing Top Course, compacted to 95% of maximum density on both surfaces. It shall be provided with an approved all season driving surface.

A permanent short plat fire access roadway shall have a minimum of 20 feet of 2 inches Class B Asphalt paving. The remaining portion of the required 20 feet of access shall consist of a suitable native or fill material topped with 4 inches of Crushed Surfacing Top Course, compacted to 95% of maximum density on both subgrade and rock surfaces. The maximum grade differential between the paved portion and the nonpaved portion shall not exceed 5%.

Temporary access roads in use during building construction, shall be constructed for all weather driving conditions. At no time during the construction of the project should the roadway surface consist primarily of dirt, mud, sand, or other material that, in the opinion of the Fire Chief, may impair fire fighting or rescue operations. The required 20 foot width must be maintained so that the driving surface is recognizable day or night.

The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times. The required cul-de-sac turnaround for fire apparatus shall be per Standard Drawing No. 304.

STREETS AND RELATED WORK

3-5 PARKING LOTS

3-5.1 GENERAL

Off street parking lots shall be constructed in conformance with the requirements for number of stalls and landscaping as noted in the City of Gold Bar Zoning Code. Additionally, if all of the following are met, a maximum of 25% of the required number of stalls may be sized for compact cars, as shown on Standard Plan Nos. 334A and 334B. Aisle widths may be required to be widened if multiple utility lines are located within the aisle corridor. Note the compact stalls should not be intermixed with standard stalls.

- A. The parking lot contains 8 or more parking spaces.
- B. The parking area is defined as long term parking, i.e., more than 3-4 hours and does not involve packages. For example, a shopping center could not meet this criterion, but an apartment complex could.

3-5.2 CONSTRUCTION

All parking lot construction shall be inspected by the Public Works Department for conformance to plans for size, layout, drainage control and structural section. The minimum acceptable structural section for parking lots shall be 2 inches of Class "B" Asphalt placed over 4 inches of Crushed Surfacing Top Course, unless otherwise approved by the Public Works Director. Prior to placing any surfacing material on the roadway, it will be the responsibility of the developer/contractor to provide density test reports certified by a professional engineer registered in the State of Washington.

Crushed Surfacing Top Course shall be compacted to 95% maximum density. Density testing for asphalt pavement including the necessity and frequency of core samples will be determined by the engineer on a case by case basis.

3-5.3 HANDICAP REQUIREMENTS

Handicap parking stalls shall meet the requirements of Washington State Regulations for Barrier Free Facilities (WAC 51-20).

Safe, convenient handicap access is required from the street to all buildings on site. This is in addition to safe, convenient handicap access between buildings. See Section 3-5.5.

3-5.4 ILLUMINATION

Parking lot illumination shall be provided for all parking lots containing more than eight (8) parking spaces, and shall be designed and constructed so as to:

- A. Provide security lighting to all parking spaces.
- B. Be shielded in a manner that does not disturb residential uses.

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3-5.5 PEDESTRIAN CONCERNS

Pedestrian walkways shall be required for those activities listed within GBMC 16.14.120 & 17.30.030 (10). Pedestrian walkways may be required within commercial parking lots as determined by the public works director.

Internal vehicle and pedestrian circulation for parking lots shall be approved by the public works director. Parking lot circulation shall allow for access so pedestrians and wheelchairs can easily gain access from public sidewalks and bus stops to building entrances through the use of pedestrian paths which are physically separated from vehicle traffic and maneuvering areas. In shopping center parking lots containing more than 100 spaces, such pedestrian/wheelchair paths shall be a minimum of 5 feet wide and constructed in a manner that they cannot be used as a holding area for shopping carts.

Access driveways for parking areas shall be located so as to cause the least possible conflict with vehicular and pedestrian traffic on public rights-of-way.

The Public Works Director may require joint use of driveways by more than one property.

3-6 THROAT LENGTH REQUIREMENTS

The throat length is the unobstructed storage length requirement measured from the inside face of curb to the first driveway or parking stall. Distances may be reduced for multiple driveways as approved by the Public Works Director. Minimum throat lengths for each particular land use are as shown on the following table:

Land Use	Size	<u>MINIMUM THROAT LENGTHS</u>	
		Min Throat Length Collector (ft)	Min Throat Length Arterial (ft)
Light Industrial	< 100,000 sq. ft.	25	50
	100,001-500,000 sq. ft.	50	100
	> 500,000 sq. ft.	50	200
Discount Store	< 30,000 sq. ft.	25	50
	> 30,000 sq. ft.	25	75
Shopping Center	< 250,000 sq. ft.	25	50
	250,001-500,000 sq. ft.	50	75
	500,001-750,000 sq. ft.	75	200
	> 750,000 sq. ft.	125	250
Supermarket	< 20,000 sq. ft.	50	75
	> 20,000 sq. ft.	75	125
Apartments	< 50 units	25	25
	50-100 units	25	50
	100-200 units	50	75
	> 200 units	75	125
Quality Restaurant	< 15,000 sq. ft.	25	50
	> 15,000 sq. ft.	25	75

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Drive-in Restaurant	<	2,000 sq. ft.	25	75
	>	2,000 sq. ft.	50	100
General Office	<	50,000 sq. ft.	25	50
		50,001-100,000 sq. ft.	25	75
		100,001-200,000 sq. ft.	50	100
		200,001-500,000 sq. ft.	100	150
	>	500,000 sq. ft.	125	250
Motel	<	150 rooms	25	75
	>	150 rooms	25	100

3-7 TRAFFIC CONTROL SIGNING AND STRIPING

All traffic control devices, signing, striping and other pavement delineation shall conform to the Manual on Uniform Traffic Control Devices (MUTCD). It shall be the developer's responsibility to furnish all materials and labor as required to install all traffic control as required by the Public Works Director. All required signing (traffic control and street name signs), striping, and other delineation as required, shall be shown on the street improvement plans prior to plan approval.

3-8 TRAFFIC STUDIES

All residential, commercial and/or industrial development which generates more than 10 trips/ day, as defined by the Federal Trip Generation Manual, or will result in more than eight (8) parking stalls may be required to perform and submit a formal Traffic Study. Those residential, commercial and/or industrial developments which generate more than the above trips and/or parking stalls and have direct access to a principal arterial shall perform and submit a formal Traffic Study as part of the development application.

3-9 UNDERGROUND UTILITIES

3-9.1 GENERAL

1. The WSDOT/APWA Standard Specifications shall apply unless otherwise stated below.
2. When trenching through existing pavement, the open cut shall be a neat line made by either saw cutting or jackhammering a continuous line. Saw cutting will be required unless the cut is made prior to reconstruction or an overlay.
3. Temporary pavement patch shall be accomplished by using cold mix (MC 250), ATB or steel plates.
4. Permanent pavement patch shall be as specified on Standard Drawing No. 316.

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5. Where trench excavation equals or exceeds a depth of 4 feet, the developer/contractor shall provide, construct, maintain and remove, as required, safety systems that meet the requirements of the Washington Industrial Safety and Health Act, RCW 49.17, including WAC 296-155. The trench safety systems shall be designed by a qualified person, and meet accepted engineering requirements (see WAC 296-155-660).
6. The developer/contractor shall furnish, install, and operate all necessary equipment to keep excavations above the foundation level free from water during construction, and shall dewater and dispose of the water so as not to cause injury to the environment, public or private property or nuisance to the public. Sufficient pumping equipment in good working condition shall be available at all times for all emergencies, including power outage, and shall have available at all times competent workmen for the operation of the pumping equipment.
7. Compaction tests will be required to ensure adequate compaction on all lifts. All compaction tests shall be conducted by a licensed testing laboratory at the expense of the developer/contractor.
8. Water settling of backfill in trenches is not permitted.

3-9.2 TRENCH EXCAVATION

The length of trench excavation in advance of pipe laying shall be kept to a minimum and in no case shall exceed 150 feet unless specifically authorized by the Public Works Director. The maximum permissible trench width between the foundation level to the top of the pipe shall be 40 inches for pipe 15 inches or smaller inside diameter; or 1 ½ x I.D. plus 18 inches for pipe 18 inches or larger. If the maximum trench width is exceeded without written authorization of the Public Works Director, the developer/contractor will be required to provide pipe of higher strength classification or to provide a higher class of bedding, as required by the Public Works Director.

3-9.3 TRENCH BACKFILL

Suitable native material excavated during trenching shall be used for trench backfill unless notified by the Public Works Director that the native material is unsuitable. The Public Works Director or his representative will examine excavated native material at the time of excavation to determine its suitability for use as backfill. Native material will be considered suitable for trench backfill if it is:

- a) Capable of attaining the degree of compaction specified in Section 3-9.4 Compaction.
- b) Within reasonable tolerance of optimum moisture content.
- c) Reasonably free of organic material, clay, frozen lumps, rocks under 4" or other deleterious matter.

Unsuitable backfill material shall be removed from the site and hauled to an approved disposal site. The Public Works Director shall be provided with the location of all disposal sites to be used and also copies of the permits and approvals for such disposal sites.

Imported material shall meet the requirements of Gravel Borrow as specified in Section 3-20.2 of these Standards or Crushed Surfacing Top Course as specified in Section 9-03.9(3) of the WSDOT/APWA Standard Specifications and Section 3-20.5 of these Standards.

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3-9.4 COMPACTION

Trench backfill shall be spread in layers and compacted by mechanical tampers of the impact type approved by the Public Works Director. Compaction measures shall pay appropriate attention to the sensitivity of all adjacent utilities. The backfill material shall be placed in successive layers with the first layer not to exceed 2 feet above the pipe, and the following layers not exceeding 12 inches in loose thickness with each layer being compacted to the density specified below:

- a) Improved areas such as street and sidewalks shall be compacted to 90% of maximum dry density to within 3 feet of subgrade. The last 3 feet shall be compacted to 95% of maximum dry density.
- b) Unimproved area or landscape areas shall be compacted to 90% of maximum dry density.

3-9.5 TRENCHING LONGITUDINAL TO ROADWAY

Sewer, water and storm lines that are within the roadway section and longitudinal to the roadway shall be backfilled with native material or Gravel Borrow whichever is approved by the Public Works Director to the pavement patch level or subgrade whichever applies. All other utility cuts such as gas, telephone, power, and cable TV shall be backfilled with controlled density fill, crushed rock or and/or washed sand.

3-9.6 TRENCHING TRANSVERSE TO ROADWAY

Utility trenching that crosses transversely to the roadway alignment will generally not be permitted unless it can be shown that alternatives such as jacking, auguring or tunneling are not feasible or unless the utility can be installed just prior to reconstruction or an overlay of the road. Should an open cut be approved, controlled density fill may be required as backfill. When high ground water levels are encountered, relief drains shall be installed at 15 feet intervals to prevent damming. The relief drains shall be 3 inch PVC and placed at a minimum 3 feet from finished grade or as otherwise approved by the Public Works Director.

3-9.7 JACKING, AUGERING, MOLEING OR TUNNELING

Tunneling, moleing or pushing may be required by the Public Works Director under pavements, buildings, railroad tracks, etc. The developer/contractor shall install the pipe by jacking, auguring, moleing or tunneling, or installing the pipe in a casing pipe by a combination of these methods.

When use of a casing pipe is required, the developer/contractor shall be responsible to select the gauge and size required, unless otherwise indicated on the drawings, and consistent with the jacking or auguring operation, and shall be set to line and grade. During jacking or auguring operations, particular care shall be exercised to prevent caving ahead of the pipe which will cause voids outside the pipe. When the carrier pipe is installed within a casing pipe, the carrier pipe shall be skidded into position in an acceptable manner and to the line and grade as designated. The annular space between the casing and the pipe shall be filled with controlled density fill or as otherwise approved.

After existing utilities are located faces of the jacking pit shall be constructed by driving steel sheets, or installing timber lagging as the excavation proceeds. The sheets, or lagging, shall extend a minimum of 5 feet below the bottom of the pit except at the entrance of the utility. Prior to jacking or auguring activities, shop drawings describing these activities, including dimensioning of pit length and size of

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underground borings and complete description of shoring, shall be submitted to the Public Works Director for approval.

3-10 SURVEYING AND MONUMENTATION

3-10.1 DESCRIPTION

This work shall consist of all the surveying and monumentation required to construct the project as described in the plans and these Specifications.

It shall be the responsibility of the developer/contractor to furnish materials and install monuments and castings in accordance with the drawings and where directed by the Public Works Director. All survey work shall be performed by or under the direct supervision, of a Professional Land Surveyor (PLS) licensed in the State of Washington. Monument and monument case and cover shall be supplied and installed per Standard Plan No. 313.

Surveying, as required to construct a given project per the approved plans, shall be furnished by the developer at no expense to the city. It is required that survey stakes be set for new curb and gutter construction, for both horizontal and vertical control. Additionally, any water, storm drain, or sanitary sewer mains which are to be constructed in easements are to have survey offset stakes set prior to starting that work, and any deviation from that staked line must be left uncovered and resurveyed to realign easement as required and for corrected as-built information.

3-10.2 MATERIALS

Materials for monumentation shall be Class 3000 concrete or commercial concrete per Section 6-02 of the WSDOT/APWA Standard Specifications and the monument case and covers shall be gray iron castings conforming to the requirements of AASHTO M 105, Class 30B. The cover and seat shall be machined so as to have perfect contact around the entire circumference and full width of bearing surface.

3-10.3 CONSTRUCTION REQUIREMENTS

Monuments shall be located at all centerline intersections of intersecting streets. Curved streets shall be monumented at centerline PI's (point of intersection), if it falls within the street pavement, otherwise the PC (point of curvature) and PT (point of tangency) of the curve shall be monumented.

It shall be the developer's/contractor's responsibility to provide the surveying required to establish or perpetuate land corner monumentation as may be required on the project.

All land corner surveying shall conform to the requirements of RCW 58.09. If the developer's or contractor's surveyor replaces or restores an existing or obliterated "General Land Office" (GLO) corner(s), it shall be their responsibility to file "Land Corner Records" for these monuments with the Snohomish County Auditor's Office.

When all land corners have been established, replaced or restored and monumented as described herein, the surveyor shall certify this information with a letter to the Public Works Director. This certification letter shall include the location of the monumented corner(s) and that all land corner(s) have been monumented as described herein.

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The city reserves the right to check survey points and/or the correct locations and elevations of new construction. These spot-checks will not change the requirements for normal checking and testing as described elsewhere, and do not relieve the contractor of the responsibility of producing a finished product that is in accordance with the contract. If unacceptable errors are found due to errors or omissions by the contractor's survey activities, then the contractor shall correct these errors including removing and replacing improvements and pay all expenses incurred by the city including the re-survey.

3-11 STREET ILLUMINATION

Street lights shall be provided in all residential subdivisions, short plats, public facilities and commercial developments. Street light poles and luminaries shall be according to Snohomish County P.U.D. standards. The luminaries are supplied and maintained by the Snohomish County PUD. Special luminaries, which are not supplied by the PUD, must be approved by the Public Works Director. All street light wiring, conduit and service connections shall be located underground.

Street light locations shall be established by the P.U.D. Engineering Department and is subject to review and approval by the Public Works Director. Snohomish County P.U.D. and City of Gold Bar standards require that lighting be installed at approximately 150 ft. intervals.

The Public Works Director shall coordinate the installation of PUD luminaries on the street light poles. The installation of special luminaries, not provided by the PUD, shall be the responsibility of the developer.

3-12 GUARDRAILS

Unenclosed floor and roof openings, open and glazed sides of stairways, landings and ramps, balconies or porches, which are more than 30 inches above grade or floor below, and roofs used for other than service of the building shall be protected by a guardrail. See Sections 1712 and 3306 of the latest edition of the Uniform Building Code for specific requirements.

For Safety Rail see Section 3-16 of these Standards and Standard Drawing Nos. 325, 325A and 326.

Roadway guardrail installations shall conform to WSDOT/APWA Standard Plan C-1, Beam Guardrail Type 1. End anchors shall conform to WSDOT/APWA Standard Plan C-6, Beam Guardrail Anchor Type 1.

3-13 MAILBOXES

New residential developments shall have mailboxes installed similar to Standard Plan Nos. 320 and 320A, or gang box supplied by the U.S. Postal Service similar to Standard Plan No. 321.

- A. When mailboxes are located adjacent to the sidewalk, the sidewalk shall be widened to provide a clear of not less than the required width of sidewalk, from back of curb to any portion of the mailbox structure, per Standard Plan No. 321.
- B. In the case of new road construction or reconstruction requiring mailboxes to be moved back or rearranged, the builder shall coordinate with the U.S. Postal Service through the Gold Bar

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Postmaster in the Post Office in Gold Bar, for acceptable box locations and to ensure uninterrupted mail service. Approved locations for mailboxes shall be shown on street construction plans.

3-14 PAVEMENT PATCHING

3-14.1 DESCRIPTION

This work shall consist of the patching of various types of pavement cuts, the performances of which shall be in accordance with these Specifications, the WSDOT/APWA Standard Specifications and Standard Plan No. 316.

3-14.2 MATERIALS

All materials shall conform to the requirements specified for material in other sections of the WSDOT/APWA Standard Specifications as follows:

- A. Asphalt concrete pavement patch shall be Class B meeting the requirements of Section 5-04.
- B. Asphalt for temporary patch shall be MC 250 meeting the requirements of Section 9-02.
- C. Cement concrete pavement patch shall be Class 4000 HES meeting the requirements of Section 6-02.
- D. Crushed Surfacing Top Course shall meet the requirements of Section 9-03.9.(3).

3-14.3 CEMENT CONCRETE PAVEMENT RESURFACED WITH ASPHALT CONCRETE

Streets which have cement concrete pavements surfaced with asphalt concrete shall be patched as shown on Standard Drawing No. 316.

The cement concrete portion of the patch shall be Class 4000, HES. The thickness shall be 1 inch thicker than the existing concrete base or 6 inches whichever is greater. The top surface of the concrete patch shall match the top surface of the existing concrete base; in no case shall the top of the concrete be higher than the top of the existing concrete base. Brush finishing will not be required. Joints shall be placed to match existing or as directed by the Public Works Director.

Asphalt concrete plant mix shall not be placed until 3 days after the cement concrete base has been placed or otherwise permitted by the Public Works Director. The asphalt concrete plant mix shall not be placed until the concrete base has received a tack coat of CRS-2 at a rate of 0.12 to 0.20 gallons per square yard. The edges of the existing asphalt and castings shall also be painted with the tack coat. The asphalt concrete pavement shall then be placed, leveled, and compacted to conform to the surface of the existing asphalt pavement. Immediately, thereafter, all joints between the new and original asphalt pavement shall be painted with CSS-1 asphalt emulsion and covered with dry sand before the asphalt solidifies.

Asphalt shall be compacted to 92% of maximum density as determined by WSDOT Test Method 705.

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3-14.4 ASPHALT CONCRETE ON GRANULAR BASE

After the Crushed Surfacing Top Course subgrade has been leveled and compacted, Asphalt Concrete Pavement Class B shall be placed to a thickness of 1 inch greater than the existing asphalt pavement depth or to a minimum of 3 inches, whichever is greater. Asphalt shall be compacted to 92% of maximum density as determined by WSDOT Test Method 705.

3-14.5 UNTREATED ROADWAY SURFACES AND SHOULDERS

Existing crushed rock, gravel, and oil mat streets shall be restored with Crushed Surfacing Top Course to a compacted depth of not less than 6 inches within the neat lines of the trench. Crushed surfacing shall be mixed, placed, spread and shaped in accordance with the requirements of Section 4-04 of WSDOT/APWA Standard Specifications. Compaction shall be as specified by one of the methods shown in Section 3-14.7(1) of these Specifications.

3-14.6 TEMPORARY PAVEMENT PATCHING

The contractor shall furnish, place and maintain temporary pavement patching, at locations as directed by the Public Works Director, until such time as a permanent patch of permanent paving can be made.

Temporary pavement patch shall consist of a 2 inch thick course of cold mix asphalt (MC 250) over a 4 inch course of Crushed Surfacing Top Course. The crushed surfacing shall be compacted to 95% maximum density as determined by one of the methods described in Section 3-14.7(1) of these Specifications. Asphalt shall be compacted to 90 % of maximum density as determined by WSDOT Test Method 705. Temporary asphalt patching shall be required where roadway or walk is needed for vehicular or pedestrian traffic, during the construction period, until permanent pavement and sidewalks can be constructed.

In the event that the temporary surface subsides after the initial placement, additional MC 250 and Crushed Surfacing shall be applied to maintain the surface.

3-14.7 CONSTRUCTION REQUIREMENTS

3-14.7(1) GENERAL

Pavement patching shall be scheduled to accommodate the demands of traffic and shall be performed as rapidly as possible to provide maximum safety and convenience to public traffic.

The placing and compaction of the trench backfill and the preparation and compaction of the subgrade shall be in accordance with the various applicable sections of the WSDOT/APWA Standard Specifications except as modified by these Specifications.

Before the pavement patch is to be constructed the pavement shall be saw cut so that the marginal edges of the patch will form a rectangular shape with straight edges and vertical faces.

Signs, barricades, lights and other warning devices shall be installed per the requirements of the "Manual on Uniform Traffic Control Devices" and they shall be maintained 24 hours a day until the patching work is completed and ready for traffic.

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Compaction of the subgrade shall be completed prior to the required patching. Subgrade compaction shall be to 95% as determined by one of the following methods:

ASTM D1556	(sand cone method)
ASTM D2167	(rubber balloon method)
ASTM D2922	(nuclear method)

3-14.7(2) CEMENT CONCRETE PAVEMENT

After the Crushed Surfacing Top Course subgrade for the pavement has been constructed and compacted to line and grade, the cement concrete pavement patch shall be placed and struck off to a thickness of 1 inch greater than the existing pavement or 8 inch minimum, whichever is greater. All work shall be in accordance with Section 5-05 of the WSDOT/APWA Standard Specifications, except as modified by these Specifications and Standard Drawing No. 316.

Through joints and dummy joints shall be placed to match existing or as directed by the Public Works Director. The surface of the concrete patch shall be finished and brushed with a fiber brush. Approved curing compound shall be placed on the finished concrete immediately after finishing.

3-15 ROCKERIES AND ROCKWALLS

3-15.1 DESCRIPTION

This work shall consist of constructing rockeries with rock facing height of 8' or less used for erosion control or the containment of cuts and embankments. Work shall be performed in accordance with these Specifications and Standard Plan No. 324. Rockeries over 8' in height must be designed by a civil engineer licensed in the State of Washington.

3-15.2 MATERIALS

All rock shall be sound, angular ledge rock that is resistant to weathering. The longest dimension of any individual rock should not exceed three times its shortest dimension. Acceptability of rock will be determined by laboratory tests as hereinafter specified, geologic examination and historical usage records.

All rock delivered to and incorporated in the project shall meet the following minimum specifications:

- | | |
|---|---|
| a. Absorption
ASTM C127
AASHTO T-85 | <i>Not more than 2.0% for igneous and metamorphic rock types and 3.0% for sedimentary rock types.</i> |
| b. Accelerated Expansion (15 days)
CRD-C-148*1, *2 | <i>Not more than 15% breakdown.</i> |
| c. Soundness (MgSO ₄ at 5 cycles)
ASTM C88 or CRD-C-137 | <i>Not greater than 5% loss.</i> |
| d. Unconfined Compressive Strength
ASTM D 2938 | <i>Intact strength of 6,000 psi, or greater.</i> |
| e. Bulk Specific Gravity (155pcf)
ASTM C127 or AASHTO T-85 | <i>Greater than 2.48.</i> |

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- *1. The test sample will be prepared and tested in accordance with Corps of Engineers Testing Procedure CRD-C-148, "Method of Testing Stone for Expansive Breakdown on Soaking in Ethylene Glycol."
- *2. Accelerated expansion tests should also include analyses of the fractures and veins found in the rock.

The density of the rock shall be equal to, or greater than, one hundred fifty-five (155) pcf. Typically rocks used for rock wall construction shall be sized approximately as shown on Standard Plan 324.

Rockery caps will be required on all rockeries higher than four (4) feet in the public right-of-way and optional on private property. The cement concrete cap shall be a minimum of two (2) inches thick. Concrete for Rockery Cap shall be Class 3000 or Commercial. Lamp black coloring agent to match the color of the rockery shall be added to the cement concrete during mixing in an amount not to exceed 1½ pounds per cubic yard of concrete. Where a pedestrian or ornamental handrail is required, the rockery cap shall be deepened to a minimum of twelve (12) inches for a section six (6) inches either side of each pipe sleeve. Dummy joints shall be constructed at twelve (12) foot intervals. The depth of the dummy joint shall be one-third the depth of the cap.

3-15.3 GENERAL

Surfaces reasonably accessible to pedestrians above and adjacent to rockeries over 30" in height shall be protected by a guardrail conforming to Section 1712 of the Uniform Building Code and to Section 3-16 of these Specifications.

A Public Works permit is required for all rock walls within the public right-of-way and for all those exceeding 4 feet in height on private property.

3-15.4 CONSTRUCTION REQUIREMENTS

The first step in rock wall construction, after general excavation, is to construct a keyway of at least twelve (12) inches in depth, extending for the full length of the rock wall. The keyway shall be slightly inclined back towards the face being protected. Once the competency of the keyway subgrade to support the rock wall is verified, a shallow ditch or trench, approximately twelve (12) inches wide and deep, shall be dug along the read edge of the keyway. For those walls over thirty (30) inches in height a four-inch diameter perforated or slotted high-density polyethylene (HDPE), smooth interior pipe shall be placed in the trench. This drain pipe shall be installed with sufficient slope to initiate flow and the outfall connected to a positive and permanent discharge.

The contractor shall have sufficient space available so that he can select from among a number of stockpiled rocks for each space in the rock wall to be filled. Rocks which have shapes which do not match the spaces offered by the previous course of rock should be placed elsewhere to obtain a better fit. Rocks shall be of a generally cubical, tubular or rectangular shape. Any rocks of basically rounded or tetrahedral form shall be rejected or used for filling large void spaces.

The first course of rock shall be placed on firm unyielding soil. There shall be full contact between the rock and soil, which may require shaping of the ground surface or slamming or dropping the rocks into place so that the soil foundation conforms to the rock face bearing on it. The bottom of the first course of rock shall be a minimum of twelve (12) inches below the lowest adjacent site grade.

As the rock wall is constructed, the rocks shall be placed so that there are no continuous joint planes in either the vertical or lateral direction. Whenever possible, each rock shall bear on at least two rocks below it. Rocks should be placed so that there is some bearing between flat rock faces rather than on joints. Joints between courses (the top surface of rock) shall slope back towards the cutface and away from the rock wall.

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Because of the nature of the product used to construct a rock wall, it is virtually impossible to avoid creating void spaces between individual rocks. Where voids of greater than six inches in dimension exist in the face of a rock wall, they shall be visually examined to determine if contact between the rocks exists within the thickness of the rock wall. If there is no rock contact within the rock wall thickness, the void shall be chinked with a smaller piece of rock.

A rock drainage filter shall be installed between the rear face of the rock wall and the soil face being protected. This drain rock layer shall be at least twelve (12) inches thick. For rock walls eight(8) feet in height or higher, it shall be at least eighteen (18) inches thick. The material for the drainage filter shall be Quarry Rock, as specified in Section 3-20.7 of these Specifications.

3-16 METAL HAND RAILINGS

3-16.1 DESCRIPTION

This section applies to providing and building metal hand railings that meet the requirements of the Plans, these Specifications and the public works director.

In those circumstances where metal handrails are required, a Type 1 or Type 6, vinyl coated, chain link fence, meeting the requirements of Standard Plan Nos. 327 and 327A, may be substituted with the approval of the public works director.

3-16.2 MATERIALS

Materials shall meet the requirements of the following:

Ornamental Handrail

Ornamental handrail shall be constructed in accordance with Standard Plan No. 326 and these Specifications. Horizontal rails and vertical support posts shall be 1½ inches by 1½ inches by 1/8 inch tubular steel conforming to ASTM A120. Balusters shall be 1/2 inch by 1/2 inch and the horizontal bottom rail 1-1/2 inches by 1/2 inch by 1/8 inch channel steel (ASTM A120). Vertical support posts shall be a maximum 8 feet on center and balusters a maximum 4 inches clear space. The center of the bottom rail shall be a maximum 4 inches above finished grade. Finished height of the railing shall be 42 inches above the pedestrian walking surface. Provide slip joints at stairway expansion joints and at 24 feet on center maximum.

Pedestrian Handrail (Galvanized Steel and Aluminum)

Galvanized Steel and Aluminum pedestrian handrail shall be constructed in accordance with Standard Plan Nos. 325 and 325A and these Specifications. Horizontal rails and vertical support posts shall be 1-1/2 inch diameter Schedule 40 Standard pipe and balusters shall be 3/4 inch diameter Schedule 40 Standard Pipe. Vertical support posts shall be on 8 foot centers and balusters on 4 inches clear space. Finished height of the railing shall be 42 inches above the pedestrian walking surface. Provide slip joints at stairway expansion joints and at 24 feet on center maximum.

3-16.3 FABRICATION

Before fabricating the railing, the contractor shall submit 6 copies of the shop plans for the Public Works Directors approval. The contractor may substitute other rail connection details for those shown in the

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plans if details of these changes show in the shop plans and if the engineer approves. In approving shop plans, the director indicates only that they are adequate and complete enough. Approval does not indicate a check on dimensions.

Welding shall conform to the requirements of the "Structural Welding Code" AWS D1.1 for steel, and to the requirements of the "Specifications for Aluminum Structures" of the Aluminum Association, for aluminum alloys. All exposed welds shall be ground flush with adjacent surfaces.

Railing panels shall be straight and true to dimensions. Adjacent railing panels shall align with each other with a variation not to exceed 1/16 inch. Joints shall be matchmarked.

For structures on curves, either horizontal or vertical, the railing shall conform closely to the curvature of the structure by means of series of short chords. The lengths of the chords shall be the distance center to center of rail posts.

Steel railing units shall be galvanized after fabrication. Zinc used for galvanizing shall be grade Prime Western conforming to ASTM B6 with a minimum 2 ounces per square foot.

Completed aluminum railing units shall be anodized after fabrication conforming to the requirements of the Aluminum Class 1 Anodic Coating, AA-C22-A41.

Ornamental railing shall be painted with a rust proof metal primer and one coat of black ornamental iron metal paint. Alternative colors may be considered subject to approval by the public works director.

3-16.4 INSTALLATION

The railing shall be erected in accordance with the plans on anchor bolts, or in holes formed by inserts provided in the concrete railing base to receive the railing posts. Sheet metal inserts shall be removed before the erection of the railing.

No railing shall be erected on the structure until the sidewalk to which it is to be attached is completed and all falsework supporting the system is released.

The railing shall be carefully erected, true to line and grade. Railing is required on both the top and bottom of the structure. Posts and balusters shall be vertical with the direction from the vertical for the full height of the panel not exceeding 1/8 inch.

Slip joints shall be as shown on Standard Drawing Nos. 325, 325A and 326. Railing installed without slip joints will be rejected and the contractor shall install new railing at his own expense.

3-17 CEMENT CONCRETE SIDEWALKS

3-17.1 DESCRIPTION

This work shall consist of constructing cement concrete sidewalks, thickened edge for sidewalks, curb ramps, and bus shelter pads, including excavation for the depth of the sidewalk and subgrade preparation, in accordance with these Specifications, the WSDOT/APWA Standard Specifications and Standard Drawings Nos. 306, 306A, 310A through 310D and 311.

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3-17.2 MATERIALS

Materials shall meet the requirements of the following section of the WSDOT/APWA Standard Specifications:

Cement Concrete Class 3000	6-02
Portland Cement	9-01
Aggregates	9-03
Premolded Joint Filler	9-04
Concrete Curing Materials and Admixtures	9-23

Slump of the concrete mix shall not exceed 3-1/2 inches. Lamp black coloring agent for matching the color of newly constructed cement concrete sidewalks to the color of adjacent existing cement concrete sidewalks shall be added to the concrete during mixing in an amount not to exceed 1-1/2 pounds per cubic yard of concrete. No lamp black shall be used in curb ramps.

The use of Calcium Chloride as an admixture must be pre-approved by the Public Works Inspector.

3-17.3 CONSTRUCTION REQUIREMENTS

3-17.3(1) GENERAL

The curb and gutter section shall be placed prior to the placement of the sidewalk section unless otherwise directed by the Public Works Director.

Subgrade shall be approved by the Public Works Inspector prior to concrete being placed. Generally, 1/4 inch V-grooves deep are to be placed on 5 feet centers, but at the discretion of the inspector this may be changed to make for a better match with the surrounding area. Expansion joints shall be placed to match those placed in curbs if new sidewalk is poured adjacent a curb and gutter, in all other cases the maximum spacing on expansion joints shall be 30 feet center to center. Dummy joints shall be 1/2 inch by 1-1/2 inch on 15 foot centers. Through joints shall be 1/2 inch by 4 inches.

A minimum distance of not less than the required sidewalk width is required from the back of curb to any obstruction on or within the sidewalk unless otherwise noted.

It is expected there will be sufficient suitable native material excavated from various portions of the improvement to fill low areas in the sidewalk subgrade.

Where there is insufficient suitable native material on the project site, the contractor shall furnish, place and compact Gravel Borrow. All sidewalks shall be constructed over a minimum 2 inches of Crushed Surfacing Top Course meeting the requirements of Section 3-20.5 of these Specifications and Section 9-03.9(3) of the WSDOT/APWA Standard Specifications compacted to 95% of maximum density.

Fill requirements for planting strips associated with sidewalk construction should refer to GBMC 17.60 for specific requirements.

Knockouts or soil strips are required around hydrants to allow for maintenance to the hydrants.

3-17.3(2) FORMS AND FINE GRADING

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Wood forms shall be 2"x4" (nominal) in lengths of not less than 10 feet. Steel forms may be used upon approval of the Public Works Director. Forms shall be staked to a true line and grade. A subgrade template shall then be set upon the forms and the fine grading completed so that the subgrade will be a minimum of 3-5/8 inches below the top of the forms. Forms shall be provided around all street name sign posts and traffic sign posts that are placed in concrete areas. Forms used for this purpose shall be 1 foot square or 1 foot minimum diameter cutout, as approved by the Public Works Director.

3-17.3(3) PLACING AND FINISHING CONCRETE

The concrete shall be spread uniformly between the forms and thoroughly compacted with a steel shod strikeboard. Through joints and dummy joints shall be located and constructed in accordance with the Standard Plans. In construction of through joints, the premolded joint filler shall be adequately supported until the concrete is placed on both sides of the joint.

Whenever castings are located in the sidewalk area, joints shall be installed at the casting location to control cracking of the sidewalk. If spacing of joints or scoring is such that installation of joint material would be unsuitable, the contractor shall install rebar to strengthen the sidewalk section.

Dummy joints shall be formed by first cutting a groove in the concrete with a tee bar of a depth equal to, but not greater than the joint filler material, and then working the premolded joint filler into the groove. Premolded joint filler for both through and dummy joints shall be positioned in true alignment at right angles to the line of the sidewalk and be normal to and flush with the surface. Where the sidewalk will be contiguous with the curb, it shall be constructed with a thickened edge as shown on Standard Plan No. 306A.

After the concrete has been thoroughly compacted and leveled, it shall be floated with wood floats and finished at the proper time with a metal float.

The surface shall be brushed with a fiber hair brush of an approved type in a transverse direction except that at driveway and alley crossings it shall be brushed longitudinally. The placing and finishing of all sidewalk shall be performed under the control of the Public Works Director, and the tools used shall meet with his approval. After brush finish, the edges of the sidewalk and all joints shall be lightly edged again with an edging tool to give it a finished appearance.

The surface finish and joint pattern may vary at the direction of the Public Works Director in order to match existing sidewalk.

3-17.3(4) CURING AND PROTECTION

The curing materials and procedures specified in Section 5-05.3(13) of the WSDOT/APWA Standard Specifications shall prevail, except that white pigment curing compounds shall not be used on sidewalks.

The contractor shall have readily available sufficient protective covering, such as waterproof paper or plastic membrane, to cover the pour of an entire day in event of rain or other unsuitable weather.

The sidewalk shall be protected against damage or defacement of any kind until it has been accepted by the Public Works Director. Sidewalk which is not acceptable to the Public Works Director because of damage or defacement, shall be removed and replaced by the contractor.

Prior to final acceptance exposed soil areas directly abutting the sidewalk must be brought to finish grade. Finish grade shall be considered complete when appropriate topsoil has been placed, compacted

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to 90% and raked smooth. Topsoil shall not be less than ½ inch from top of sidewalk for those applications, which are to be seeded and not less than 1 inch for those that are to receive sod. . New seeding and sod shall be protected from eroding away.

3-17.3(5) CURING AND HOT WEATHER

In periods of low humidity, drying winds, or high temperatures, a fog spray shall be applied to concrete as soon after placement as conditions warrant in order to prevent the formation of shrinkage cracks. The spray shall be continued until conditions permit the application of a liquid curing membrane or other curing media. The Public Works Director shall make the decision when the use of a fog spray is necessary.

3-17.3(6) COLD WEATHER WORK

When the air temperature is expected to reach the freezing point during the day or night, the concrete shall be protected from freezing. The contractor shall provide a sufficient supply of straw, hay, grass, earth, blankets, or other suitable blanketing material and spread it over the pavement to a sufficient depth to prevent freezing of the concrete. The contractor shall be responsible for the quality and strength of the concrete thus cured. Any concrete injured by frost action or freezing shall be removed and replaced at the contractor's expense in accordance with these Specifications.

3-17.3(7) THROUGH AND CONTRACTION JOINTS

Standard locations for through joints for sidewalks are:

- a) At street margins produced and at 30 foot intervals.
- b) To separate concrete driveways, stairways, curb ramps and their landings from sidewalks.
- c) Around the vertical barrel of fire hydrants, around utility poles and large diameter underground utility cover castings when located in the sidewalk area.
- d) Longitudinally between concrete walks, curbs, paved planting strips and solid masonry or concrete walls where they abut.
- e) To match as nearly as possible, the through joints in the adjacent pavement and curb when sidewalk abuts curb.

Transverse contraction joints (dummy joints) shall be constructed with premolded material 1/2 inch wide by 2 inches depth, and set at 15 foot intervals, or as decided by the Public Works Director. At no time will dummy joint spacing exceed 15 feet.

Transverse and longitudinal through joints as shown on Standard Plan No. 307 shall be 1/2 inch thickness premolded non-extruding joint material, cut to a width equal to the full depth of the concrete where located, plus 1/2 inch. When installed, they shall be placed with top edge 1/8 inch below the finished surface of the concrete, in a perpendicular plane to the surface and with the bottom edge

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embedded in the subgrade. All joints shall be in straight alignment, except where placed in curved locations.

Construction joints for sidewalks shall conform to the applicable requirements for through joints. The top edge shall be 1/8 inch below the finished surface of the sidewalk. At no time will joint spacing exceed 15 feet.

3-17.3(8) CURB RAMPS

In accordance with State law, curb ramps shall be provided at all pedestrian crossings with curb sections. It is required that when a ramp is constructed giving handicap access to the roadway area, the corresponding ramp at the opposite side of the roadway will also be required. Exact locations at each curb return will be approved in the field during construction.

Curb ramps shall be constructed in accordance with the Standard Plan Nos. 310A thru 310D and 311. Curb ramps shall be constructed where shown on the plans or as directed by the Public Works Director. This work shall include curb ramps installed in new sidewalks and curb ramps to be installed in existing sidewalks. Existing sidewalks shall be neatly saw-cut full depth prior to construction of curb ramps.

Curb ramps shall be constructed separately from the sidewalk to produce a definite break line between the ramp and the sidewalk. A 1/2 inch non-extruded through joint material shall be installed between the curb ramp and the sidewalk with edging.

Ramp texturing is to be done with an expanded metal grate placed and removed from wet concrete to leave a diamond pattern as shown. The long axis of the diamond pattern shall be perpendicular to the curb. Grooves shall be 1/8 inch deep and 1/4 inch wide.

Curb ramps will not be poured integral with sidewalk and shall be isolated by expansion joint material on all sides, but not at end of ramp adjacent to the roadway.

3-18 CURB AND GUTTER

3-18.1 DESCRIPTION

The standard curb and gutter section used in Gold Bar shall be Type A-1 per Standard Plan No. 305A. Rolled curbs illustrated in Standard Plan No. 305B may be used for residential applications for local access streets and cul-de-sacs with approval by the public works director when it can be demonstrated that traffic speeds and roadway design provide adequate safety provisions for pedestrian traffic. No new curb and gutter is to be placed until forms have been checked and approved for line, grade and compaction by the Public Works Inspector.

3-18.2 MATERIALS

Materials shall meet the requirements of the following Sections of the WSDOT/APWA Standard Specifications:

Portland Cement	9-01
Concrete Aggregate	9-03
Reinforcing Steel	9-07

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Premolded Joint Filler	9-04
Curing Compounds	9-23

The Portland Cement Concrete shall meet the requirements of Section 5-05 of the WSDOT/APWA Standard Specifications. Concrete mix for curbs shall be Class 3000. Slump of the concrete shall not exceed 3 1/2 inches.

All new curb and gutter shall be placed over not less than 2 inches of Crushed Surfacing Top Course compacted to 95% maximum density.

Forms may be of wood or metal at the option of the contractor, provided that the forms as set will result in a curb, or curb and gutter of the specified thickness, cross section, grade and alignment shown on the drawings and Standard Plan No. 305A.

3-18.3 PLACING CONCRETE

The subgrade shall be properly compacted and brought to specified grade before placing concrete. The subgrade shall be thoroughly dampened immediately prior to the placement of concrete. Concrete shall be spaded and tamped thoroughly into the forms to provide a dense, compacted concrete free of rock pockets. The exposed surfaces shall be floated, finished and brushed longitudinally with a fiber hair brush approved by the Public Works Director.

The rate of concrete placement shall not exceed the rate at which the various placing and finishing operations can be performed in accordance with these Specifications.

If concrete is to be placed by the extruded method, the contractor shall demonstrate to the satisfaction of the Public Works Director that the machine is capable of placing a dense, uniformly compacted concrete to exact section, line and grade.

3-18.4 CURING

Transparent curing compounds shall be applied to all exposed surfaces immediately after finishing. Transparent curing compounds shall contain a color dye of sufficient strength to render the film distinctly visible on the concrete for a minimum period of 4 hours after application.

The contractor shall have readily available sufficient protective covering, such as waterproof paper or plastic membrane, to cover the pour of an entire day in event of rain or other unsuitable weather.

Additional requirements for curing in hot weather shall be as specified in Section 3-17.8 of these Specifications. Additional requirements for curing in cold weather may be found in Section 3-17.9 of these Specifications.

3-19 CEMENT CONCRETE DRIVEWAY

3-19.1 DESCRIPTION

This work shall consist of cement concrete driveway and alley returns constructed at the locations shown on the drawings and where directed by the Public Works Director, and shall be in accordance

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with these Specifications, the WSDOT/APWA Standard Specifications and Standard Plan Nos. 307, 308 and 309.

Type 1 driveways should only be used where there is likely to be limited stormwater runoff in the gutter line or adequate drainage facilities exist to prevent street stormwater from flowing onto adjacent properties.

3-19.2 MATERIALS

Materials shall meet the requirements of the following sections of WSDOT/APWA Standard Specifications:

Portland Cement	9-01
Fine Aggregate	9-03
Coarse Aggregate	9-03
Joint Materials	9-04
Curing and Admixtures	9-23

The concrete mix shall be as specified for Class 3000 and the slump of the concrete shall not exceed 3 inches.

A minimum of 2 inches of Crushed Surfacing Top Course shall be compacted to 95% maximum density prior to any placement of concrete.

3-19.3 CONSTRUCTION REQUIREMENTS

3-19.3(1) GENERAL

No driveway approach shall project beyond the extension of the side property line to the curb, unless the owner of the adjacent property is a co-signer of the driveway permit.

There must be at least 20 feet of full height curb between driveways serving any one property frontage. Neither residential nor commercial driveways shall be located less than thirty (30) feet from the tangent radius of the nearest intersection.

The Public Works Director shall have the authority to restrict the number, size and location of access driveways. A right of way use permit shall be obtained from the City prior to construction.

There must be at least 6 feet of full height curb between driveways on adjacent lots.

In critical on-street parking areas, additional off-street parking space(s) are required for the on-street spaces eliminated by any driveway(s).

Driveway aprons shall be constructed per Standard Plan Nos. 307, 308, or 309 as applicable. The minimum thickness of the driveway apron shall be 6 inches, placed over a minimum of 2 inches of Crushed Surfacing Top Course compacted to 95% maximum density over a compacted subgrade. In all cases, subgrade and rock grade shall be approved by the Public Works Inspector prior to concrete being placed. Driveway aprons over 15 feet wide shall have an expansion joint placed in the center of the apron.

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In locations where a new driveway is to be constructed and sidewalk and curb and gutter is already existing, it must be totally removed and replaced to driveway standards. It is not permissible to "knock-off" existing curb and install driveway apron, the total curb and gutter section must be removed, either by sawcutting or to the nearest expansion joint, and replaced to driveway standards.

New driveways installed in areas where curb and gutter improvements are not existing, and not required to be installed, shall be paved from the existing edge of pavement to the property line regardless of whether the remainder of the driveway on the private property is paved. Existing pavement shall be saw cut and the new pavement shall match the existing pavement elevation. All joints shall be sealed.

In areas not fully improved with curbs and sidewalks, the elevation of the driveway at the point where it crosses the property line shall not be more than 3 inches higher than the elevation of the centerline of the existing paved street if the driveway is rising on the private property side and no lower than level with the elevation of the centerline of the existing street if the driveway is going down on the private property side.

3-19.3(2) COMMERCIAL DRIVEWAYS

When allowed, driveways located closer than 100 feet from the approach to an arterial intersection shall be signed and marked "Right Turn Only" unless otherwise approved by the Public Works Director.

A. Commercial Driveway Width:

B.

Street Posted Speed <u>MPH</u>	Driveway Max Width* <u>feet</u>
25	30
26-45	35
Over 45	40

*Dimension "1" on Standard Plan Nos., 307, 308 and 309.

The minimum width of a commercial driveway will be 20 feet.

B. Grade:

The maximum recommended grade is 8%. Vertical curves should be used for smooth transitions at significant grade differentials.

3-19.3(3) RESIDENTIAL DRIVEWAYS

A. **Width:** The maximum width shall be 20 feet at dimension "1" on Standard Plan Nos., 307, 308 and 309.

B. **Grade:** The maximum recommended grade is 15%. Grade changes that exceed 16% shall require vertical curves to connect tangents.

3-19.3(4) INTERSECTION TYPE CRITERIA

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Private intersection type driveway openings will be considered in lieu of conventional driveways in commercial areas where the criteria A through D below are met. Meeting the criteria is not a guarantee that an intersection type driveway will be allowed.

- A. Projected driveway usage is greater than 1,000 vehicles per day.
- B. The opening is at least 160 feet from any other intersection.
- C. The opening is at least 160 feet from any other driveway on the property frontage under control of the applicant.
- D. A minimum 100 feet storage area is provided between the curb line on the street and any turning or parking maneuvers within the development.

3-19.3(5) EXCAVATION AND SUBGRADE

Where directed by the Public Works Director, unsuitable material in the subgrade shall be removed to a specific depth and backfilled with select material such as Gravel Borrow conforming to Section 3-20.2 of these Specifications.

Before any concrete is placed, the contractor shall bring the subgrade to the required line, grade and cross-section. The contractor shall maintain the subgrade in the required condition until the concrete is placed. Compaction shall be to 95% standard density.

3-19.3(6) FORMS AND FINE GRADING

Forms for the straight sections of the driveway or alley return shall have a minimum thickness of 2 inches and be equal to the nominal depth of the concrete. Plywood or 1 inch lumber may be used on radii. All forms shall be securely staked and blocked to true line and grade.

A template shall be set upon the forms and the subgrade shall be fine graded to conform to the required section. The subgrade shall then be compacted to the approval of the Public Works Director. Prior to placement of the concrete, the subgrade shall be thoroughly dampened.

3-19.3(7) PLACING AND FINISHING

The concrete shall be spread uniformly between the forms and thoroughly compacted with an approved type of strikeboard. Through joints and contraction joints shall be located and constructed in accordance with the Standard Plans. In the construction of through joints, the premolded joint filler shall be adequately supported until the concrete is placed on both sides of the joint.

Contraction joints (dummy joints) shall be formed with a tee bar by first cutting a groove in the concrete to a depth equal to, but not greater than the joint filler material and then working the premolded joint filler into the groove. Premolded joint filler for both through and dummy joints shall be positioned in true alignment and at right angles to the centerline of the driveway or alley return.

After the concrete has been thoroughly compacted and leveled, it shall be floated with wood floats and finished at the proper time with a metal float. Joints shall be edged with 1/4 inch radius edger and the driveway or alley return edges shall be tooled with 1/2 inch radius edger.

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The surface shall be brushed in a transverse direction in relation to the center line of the driveway or alley return with a fiber hair brush of approved type.

3-19.3(8) CURING AND PROTECTION

The curing materials and procedures specified in Sections 5-05 and 9-23 of the WSDOT/APWA Standard Specifications and Section 3-17.7 of these Specifications shall be used. The driveway and the alley return shall be protected against damage or defacement of any kind until acceptance by the Owner. Any driveway or alley return not acceptable, in the opinion of the Public Works Director, because of damage or defacement, shall be removed and be replaced by the contractor.

Before placing any concrete, the contractor shall have on the job site enough protective paper to cover the pour of an entire day, in event of rain or other unsuitable weather conditions.

Prior to final acceptance exposed soil areas directly abutting the driveway must be brought to finish grade. Finish grade shall be considered complete when appropriate topsoil has been placed and raked smooth. Topsoil shall not be less than ½ inch from top of concrete for those applications, which are to be seeded and not less than 1 inch for those that are to receive sod.

3-20 PROPORTIONING OF MATERIALS

3-20.1 CONTROLLED DENSITY FILL (CDF)

CDF shall conform to the following specifications:

1. Portland Cement: Type I-II ASSHTO M85.
2. Mineral Filler Admixtures: pozzolana or fly ash (ASTM C-618, Class F).
3. Aggregate: Washed Coarse Sand No. 2.

CDF shall be used in the following proportions for 1 cubic yard. Batch weights may vary depending on specific weights of aggregates.

Portland Cement	50 lbs/yd ³
Fly Ash	250 lbs/yd ³
No. 2 Washed Coarse Sand(SSD)	3,200 lbs/yd ³
Water	50 gals/yd ³ (Max)

Add sufficient water to provide a 6 inch to 8 inch slump delivered in place at the job site.

3-20.2 GRAVEL BORROW

The gradation for Gravel Borrow in Section 9-03.14 of the WSDOT/APWA Standard Specifications is superseded by the following:

U.S. Standard	Percent Passing
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<u>Sieve Size</u>	<u>By Dry Weight</u>
3 inch	100
1-1/4 inch	80-100
No. 4	20-70
No. 40	0-25
No. 200	0-5
Sand Equivalent	50 Min.

3-20.3 NO. 2 WASHED COARSE SAND

No. 2 Washed Coarse Sand shall be a clean mixture free from organic matter and conforming to the following gradation:

<u>U.S. Standard Sieve Size</u>	<u>Percent Passing By Weight</u>
1/2 inch	100
#4	65-100
#50	0-10
#200	0-3

All percentages are by weight

3-20.4 SPAWNING GRAVEL

Spawning Gravel shall be clean, well-rounded, uniformly graded and shall conform to the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
4" Square	100
3" Square	85 - 95
1-1/2" Square	65 - 75
1/2" Square	0 - 50
1/4" Square	2 Max.

All percentages are by weight.

3-20.5 CRUSHED SURFACING

Crushed Surfacing Top Course and Crushed Surfacing Base Course shall meet the requirements of Section 9-03.9(3) of the WSDOT/APWA Standard Specifications including the grading and quality shown.

<u>Sieve Size</u>	<u>Percent Passing Base Course</u>	<u>Top Course</u>
1-1/4" Square	100	
5/8" Square	50 - 80	100
1/4" Square	30 - 50	55 - 75
U.S. No. 40	3 - 18	8 - 24
U.S. No. 200	7.5 Max.	10.0 Max.
% Fracture	75 Min.	75 Min.

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Sand Equivalent

40 Min.

40 Min.

All percentages are by weight.

The fracture requirements shall be at least one fractured face and will apply to material retained on each sieve size U.S. No. 10 and above if that sieve retains more than 5% of the total sample.

The portion of Crushed Surfacing retained on a 1/4 inch square sieve shall not contain more than 0.15% wood waste.

3-20.6 FOUNDATION MATERIAL CLASS A

Foundation Material Class A shall meet the requirements of Section 9-03.7 of the WSDOT/APWA Standard Specifications as shown herein:

<u>Sieve Size</u>	<u>Percent Passing</u>
2-1/2" Square	98 - 100
2" Square	92 - 100
1-1/2" Square	72 - 87
1-1/4" Square	58 - 75
3/4" Square	27 - 47
3/8" Square	3 - 14
U.S. No. 4	0 - 1

All percentages are by weight.

3-20.7 QUARRY ROCK

Quarry Rock shall meet the following requirements:

<u>U.S. Standard Sieve Size</u>	<u>Percent Passing By Weight</u>
4"	100
2"	40 maximum
3/4"	10 maximum

All percentages are by weight.

3-20.8 NON-SHRINK CEMENT SAND GROUT

Non-shrink cement sand grout shall be proportioned as follows:

- 1 part high early strength (H.E.S.) cement.
- 2 parts clean fine-grained sand by weight and well-mixed with sufficient water to obtain a stiff consistency.

Unpolished aluminum powder shall be added to the dry cement in the proportion of one heaping teaspoonful per sack of cement no more than 30 minutes before the grout mixture reaches its final in-place position.

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The required strength of the non-shrink concrete or grout shall be $f_c=4,000$ psi and be verified by the cube strength test. The strength shall be confirmed by schmidt hammering of the pads.

Prior to placing the grout, the contact surface shall be thoroughly cleaned, roughened and wetted with water. The grout shall be covered with burlap sacks after the initial concrete set and wetted at regular intervals until the required strength is obtained.

3-20.9 NO. 2 COARSE AGGREGATE

No. 2 Coarse Aggregate shall conform to the following grading [Section 9-3.1(3)C of the WSDOT/APWA Standard Specifications]:

<u>Sieve Size</u>	<u>Percent Passing</u>	
	<u>Minimum</u>	<u>Maximum</u>
1 1/2" Square	100	---
1 1/4" Square	95	100
1" Square	---	---
3/4" Square	40	70
1/2" Square	---	---
3/8" Square	5	20
U.S. No. 4	0	2
U.S. No. 200	0	0.5

**DESIGN AND CONSTRUCTION STANDARDS
AND
SPECIFICATIONS**

SECTION 4

STORM AND SURFACE WATER

4-1 GENERAL

Drainage control and stormwater quality enhancement shall be provided on all property improvements within the City of Gold Bar per these Standards, the Department of Ecology Stormwater Management Manual for Puget Sound Basin and/or Washington State and the City's Sensitive Areas Ordinance.

Construction equipment should only be cleaned at the contractor's yard where methods presented in the AGC Water Quality Manual can be followed.

Erosion control requirements covered under Section 2 shall also be required and should be considered in conjunction with this Section in designing drainage control.

Surface water entering the subject property shall be received at the naturally occurring location and surface water exiting the subject project property shall be discharged at the naturally occurring location with adequate energy dissipaters to prevent erosion. The discharge rate of flow after development shall not exceed the rate of flow prior to development for the design storm.

Surface water exiting the subject property shall be conveyed to the nearest established, stable drainage course by pipe or an approved swale in a manner that will not result in erosion or flooding. Sufficient downstream information and analysis shall be provided to enable the city to determine that this requirement is being met. Private easements will be required if conveyance must occur across private property.

In the absence and/or ability to drain surface water to an established drainage course, an on site system, separate from a rooftop drain system, must be designed and installed with the approval of the Public Works Department.

Drainage from parking lots or parking areas shall be collected and controlled on the site and discharged through a tightlined storm drainage system. The final catch basin in the system prior to discharge from the site shall be equipped with a floatable material separator per City Standard Nos. 410 and 411.

Rooftop drainage shall be addressed for all development projects. In all cases, the method selected will be subject to approval by the Public Works Department, with considerations given to site, soil types,

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slope conditions, and the nature of the development. The acceptable methods for disposal of rooftop drainage are:

1. Tightline discharge to a residential roof downspout system designed per Section 4-94 and Drawing No. 421.

4-2 DRAINAGE PLANS

4-2.1 CONDITIONS OF REQUIREMENTS

Drainage plans are required for the following proposals:

- A. Grading permits and/or Clearing Permits.
- B. Subdivision.
- C. Short Subdivisions.
- D. Rezones.
- E. Substantial Development Permit required under RCW 90.58 (Shoreline Management Act).
- F. Special Property Use Permits (except when there is no change in developmental coverage).
- G. Construction of Parking Lots
- H. Construction permits where the permit is related to 4,000 square feet or more of impervious surface coverage_or 5,000 square feet or more of developmental coverage within the subject property.
- I. All construction permits for development in critical flood, drainage, or erosion areas as determined by the Public Works Director.
- J. Planned residential developments.
- K. All projects that involve roadway construction.
- L. Those projects that are unable to drain to an established drainage course, to include single family residence.

4-2.2 REQUIREMENTS FOR SUBMITTALS AND PLANS

A topographical map shall be submitted by the developer, which will indicate the natural drainage patterns of the proposed land development along with the surrounding area. Sufficient adjoining areas shall be included on the map to determine the existing stormwater inflow into the proposed development as well as the areas downstream that will be impacted by the development. The map shall indicate direction of the flow, site acreage, tributary acreage, the outline of the development, the length of travel and grade of the drainage courses.

Construction plans shall be submitted for review and approval for all storm drain work proposed. All storm drain plans shall be on 24" x 36" sheets with a minimum scale of 1 inch equals 50 feet and may be

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combined on the plan sheet showing roadway or street improvements. Requests for alternate sizes may be considered by the Public Works Department. The following items shall be included or are required for all storm drain plans:

- A. Both plan and profile views of all storm drains.
- B. All other utilities existing, or to be constructed, must be shown on plans in a lighter tone.
- C. All utility crossings are to be indicated in profile views.
- D. Illustrative details must be shown on preliminary and final plans showing all connections, cross sections, tie-ins, catch basins (location and type), manholes, oil water separators (type and location), grates, restrictors, etc. Details must reference and conform to City Standards.
- E. Plans must indicate elevations for all flow lines, top of grates or lids, restrictor overflows, orifice sizes, etc.
- F. All easements must be shown on plans
- G. Existing and proposed flow lines.

4-2.2(1) GENERAL NOTES REQUIRED ON PLANS

The following maintenance statement and notes shall be included on site storm drainage plans.

- A. All work and materials shall conform to City of Gold Bar Standards and/or WSDOT/APWA Standard Specifications as applicable.
- B. No part of the drainage system shall be covered, concealed or put into use until it has been tested and accepted by the city.
- C. Approximate locations of existing utilities have been obtained from available records and are shown for convenience. The contractor shall be responsible for verification of locations and to avoid damage to any additional utilities not shown. If conflicts with existing utilities arise during construction, the contractor shall notify the Public Works Department and any changes related required shall be approved by the Public Works Director prior to commencement of construction on the project.
- D. All storm drain work must be staked by survey for line and grade prior to starting construction.

4-3 EASEMENTS

When a closed system is used to handle drainage within the subject property, all structures must be a minimum of 10 feet from the system.

STORM AND SURFACE WATER

There shall be a minimum drainage easement of 15 feet in width for publicly maintained open channel or closed system installations.

No structures shall be erected within any drainage easement. Construction of a fence across an easement is allowed provided a 10-foot wide access gate is provided.

All easements, except for special circumstances, shall be located to run within single lots rather than being split by a lot line.

The minimum width of an access way from an established city street to a drainage facility shall be 15 feet.

4-4 SITES CONTAINING OR ADJACENT TO ENVIRONMENTALLY SENSITIVE AREAS

Environmentally sensitive areas shall be protected in accordance with the Sensitive Areas Ordinance, these Standards, Gold Bar Shoreline Master Program, the conditions of final SEPA approval, and the following additional requirements:

1. Discharge of on-site stormwater into a sensitive area shall only be considered for approval by the public works department when it can be demonstrated that there is no reasonable on-site alternative. All on-site stormwater runoff shall be pre-treated by an approved method prior to discharging into a wetland, stream, river, lake or pond.
2. Surface drainage facilities, such as detention ponds, wetponds, vegetated swales, and infiltration basins, shall be located outside of the associated buffers of all wetlands, streams, rivers, lakes or ponds. Underground drainage facilities may be located within buffer areas under special circumstances with approval from the Public Works Department.
3. Naturally occurring or mitigation wetlands may not be used for detention of stormwater unless allowed under the City's Shoreline Master Program, Sensitive Area Regulations and approval by the Public Works Director. If allowed, such action shall be demonstrated by the applicant to have no significant effect on the functions and values of the wetlands. See No. 1 above.
4. Trees that have blown down within a buffer area of an environmentally sensitive area shall not be removed unless a Sensitive Areas Permit is obtained from the city.
5. Trees within the buffer area of an environmentally sensitive area may only be cut down if, in the opinion of the Public Works Director, the tree is in danger of falling and causing damage outside the buffer area and then a permit is obtained from the city.
6. Development of a site must not adversely effect the hydrology of wetlands located on or adjacent to the site. The quantity and rate of water entering wetlands must be determined for

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pre-development conditions. After the site is developed, a similar rate and quantity of roof drainage or treated runoff must continue to be discharged to the wetland(s). Prior to application for building permits and plan review by the Public Works Department, a characterization of the hydrology of the wetland(s) on or adjacent to this project that may be effected by the development of this site must be submitted to and approved by the Public Works Director.

7. Discharge of water to wetlands should mimic natural discharges as much as is feasible. Where point source discharges do not occur, this type of discharge should be avoided. Techniques that result in dispersed discharge, such as dispersion trenches or buried perforated pipe located at wetland buffer edges, can be used to mimic naturally occurring sheet flow into wetlands.

4-5 HIGH RISK LAND USES

4-5.1 GENERAL

In addition to the construction of stormwater quality enhancing facilities, high risk land uses, including but not limited to fueling sites, auto stores, maintenance shops, car washes, auto dealerships, vehicle storage lots, multi-family development, and businesses that soapy or contaminated wash water as a result of business activities, shall follow the following site management practices to prevent the contamination of storm water.

All high risk uses as indicated above shall be required to install a baffle type oil-water separator prior to discharging to the designed storm system.

All high risk uses that generate and/or store hazardous material and/or bulk petroleum products shall be required to construct, maintain and store these products in a spill containment area.

4-5.2 FUELING SITES

4-5.2(1) GENERAL REQUIREMENTS

A 55 gallon drum full of absorbent material shall be kept in a location convenient to the fueling island and tanker transfer areas. The absorbent material shall be used in the clean-up of any spills of gasoline or oil. In addition, an empty and separate, 55 gallon drum shall be kept on the site for disposal of used absorbent.

Instructions on responding to an accidental spill shall be made available to all employees and shall be posted in visible locations at the fueling site.

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The city shall be notified of any fuel or hazardous spills. The contractor shall also notify all other regulating agencies of the hazard or spill.

Signs must be posted noting the location of the pump shut-off switch(s).

All fueling sites shall meet the requirements of the Department of Ecology, Environmental Protection Agency, and all other regulating agencies.

The contractor shall be responsible for any site cleanup including disposal of contaminated materials.

4-5.2(2) HIGH VOLUME USE FUELING AREAS

High volume use fueling areas include, but are not limited to, commercial gas station fueling islands and fleet fueling islands.

High volume use fueling areas shall be covered to prevent the direct entry of precipitation and shall be graded or bermed to prevent the run-on of stormwater from adjacent areas.

High volume use fueling areas shall be paved using Portland cement concrete.

The pavement under covered areas shall be graded, or trench or valley drains shall be located at the covered area perimeter along the downhill side(s), to collect runoff or washwater from the fueling areas. All collected runoff shall be routed through a spill containment vault with a 50 gallon (minimum) live capacity prior to discharge into an approved on site infiltration or detention system.

An isolation valve shall be installed in the outlet piping from the spill containment vault. Whenever site configuration allows, the valve control shall be an above-ground hand-wheel and clearly marked. If only a below-ground valve control is feasible, the valve shall still be hand-operable and the lid of the valve control box shall be brightly colored to allow for easy identification. Signs indicating the location and purpose of the valve shall be posted at the fueling islands and at the attendant's station.

The vault lid shall be designed to vent vapors to the atmosphere and shall be constructed of non-sparking material. The pavement around the vault lid shall be graded or bermed to prevent the run-on of stormwater from adjacent areas.

Concrete-filled, steel pipe posts (see City Standard No. 510) shall be constructed and located where necessary to prevent vehicles entering the fueling area from striking the gasoline pumps.

4-5.2(3) TANKER TRANSFER AREAS

Either spill containment or underground storage tank overfill prevention, as detailed in the following Sections, shall be provided for areas where tanker transport to underground storage tanks occurs.

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4-5.2(3)(A) SPILL CONTAINMENT

The transfer area shall be graded to prevent the run-on of stormwater from adjacent areas.

Trench or valley drains shall be located at the perimeter of the tanker transfer area along the downhill side. The drains shall route any runoff or spills to a spill containment structure consisting of a vault or catch basin with 1000 gallons of live capacity. The spill containment structure shall be self contained. The containment structure shall be pumped out with materials disposed of as required by the regulating agencies.

The outlet of the spill containment structure shall be equipped with an AFL/Clark Oil Stop valve, or approved equal, that allows passage of water but not of the product being stored in the underground storage tanks.

The lid of the spill containment structure shall be designed to vent vapors to the atmosphere and shall be constructed of non-sparking material. The pavement around the lid shall be sloped or bermed to prevent the run-on of stormwater from adjacent areas.

An audible alarm system, triggered by a liquid level sensor, shall be designed and installed to alert an attendant if the tank fills to 90% capacity.

4-5.2(3)(B) UNDERGROUND STORAGE TANK OVERFILL PROTECTION

A spill catchment basin shall be provided which surrounds the underground storage tank's fill pipe, prevents the inflow of the stored substance into the subsurface environment, and drains minor overfills into the underground tank once volume becomes available.

An audible alarm system, triggered by a liquid level sensor, shall be designed and installed to alert the tanker operator when the tank has been filled to 90% capacity.

An automatic shut-off device shall be installed that stops the flow of product being delivered to the underground storage tank when the underground tank is full.

4-5.2(4) ABOVE-GROUND STORAGE TANKS

Single-wall above-ground storage tanks shall be placed in a bermed, impervious area. The bermed area shall be paved with Portland cement concrete for permanent installations. The bermed area shall be large enough, and the berms high enough, to contain 110% of the largest tank's total volume. An outlet shall be provided from the bermed area to allow drainage of accumulated non contaminated rain water. An oil/water separator shall be installed at the outlet of the berm area. The outlet shall be equipped with a manually operated valve that shall be kept in the closed position except when the area is being drained of accumulated non contaminated rain water. The valve shall be located downstream from the oil/water

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separator. Bypass of the oil/water is not permitted under any circumstances. Accumulated non contaminated rain water shall be released frequently during the wet season. Any contaminated rain water shall be disposed of as required by the regulating agencies. Multi-wall tanks need not provide bermed containment.

One of the following items shall be installed to prevent overflowing of the tank: an audible alarm system, triggered by a liquid level sensor, to alert the operator when the tank has been filled to 90% capacity; or an automatic shut-off device that stops the flow of product being delivered to the storage tank when the tank is 95% full.

4-5.3 AUTO REPAIR/MAINTENANCE SHOPS

No physical connection to the storm drainage system will be allowed for repair bays, fluid dispensing areas, or storage areas. Automotive oil, transmission fluids, antifreeze, etc., shall be stored undercover and shall be isolated from the storm drainage system. Outside dumpsters shall be placed under-cover, and shall have a containment berm placed around the dumpster. Oil absorbent material shall be kept within the containment berm and shall be replaced as the material becomes saturated.

Vehicle maintenance shops often steam clean vehicle engines and parts. Any waste water generated from steam cleaning on this site must not enter the storm drain system. A separate area must be provided for this type of activity which discharges into an approved on site infiltration or detention system. The area where steam cleaning will occur must be covered, paved with Portland cement concrete, and hydrologically isolated from the site's storm drain system. An oil/water separator will be required to treat the waste water before discharge to the drainage system. Design details for the oil/water separator will be available from the City's Public Works Department.

4-5.4 RETAIL AUTO PARTS STORES

One or more containers (such as garbage cans) with a minimum capacity of 30 gallons shall be placed in a convenient location for customers to dispose of empty motor oil containers. The containers shall be leakproof and shall be covered to protect against the entrance of rainwater. Containers shall be emptied regularly and before containers reach 90% of their full capacity. A sign shall be placed near the containers requesting customers to re-cap oil containers before disposal.

4-5.5 CAR WASHES

Process water from all car washes shall be discharged through an oil/water separator prior to discharging into an approved on site infiltration or detention system. All soaps, detergents, degreasers, etc., must be stored under cover and isolated from the storm drain system.

4-5.6 NEW AND USED AUTO DEALERSHIPS

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No physical connection to the storm drainage system will be allowed for repair bays, fluid dispensing areas, or storage areas. Oil, transmission fluids, etc., shall be stored undercover and be isolated from the storm drainage system. These storage areas shall be designated on the site plans. Outside dumpsters shall have containment berms placed around them and oil absorbent material within the containment berms.

Vehicles may be washed on the lot as long as water only is used. This restriction applies to mobile washing services. Washing cars or other equipment with soap in areas that can drain to the storm system is a violation of city ordinances. A designated wash area, meeting the requirements of Section 4-5.7 must be designed and shown on the plans.

4-5.7 BUSINESSES THAT GENERATE SOAPY OR CONTAMINATED WASH WATER

When soapy or contaminated wash water will be produced on a site due to business activities, a designated wash area shall be provided. Business that will typically require a designated wash area include, but are not limited to, auto detail shops, new and used vehicle dealerships, vehicle maintenance shops and tire sales/repair shops.

Acceptable locations for designated wash areas are within a building or in an outside area designated as a wash area. The following criteria shall be met:

1. The area shall be paved with Portland cement concrete.
2. The area shall be designed to collect only wash water, adjacent site area must drain away from the wash.
3. Wash water shall be discharged on site by infiltration or detention methods after passing through a baffle-type oil/water separator designed to meet City Standards. The design flow for the separator shall be the expected rate of wash water flow.
4. The area shall be covered. As an alternative, a discharge pipe with a positive control valve that is shut when washing is not occurring, with appropriate signs instructing the washer as to valve operating procedures, may be substituted if it is not feasible to provide a covered wash area.

4-5.8 MULTIPLE FAMILY DEVELOPMENT

A specially designated area shall be required for washing of vehicles by tenants/owners of the complex. The area must be hydrologically isolated from the rest of the site, be covered, and wash water from the area must drain to a separate approved on site system after being routed through a baffle-type oil/water separator designed to City Standards. The area must be a minimum of two standard parking stalls wide to allow for convenient use. Signs must be posted on the site, limiting car washing to the designated area only.

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A covenant shall be attached to the property, restricting vehicle washing to the designated area only. A note stating that car washing is only permissible in the designated area shall be included on the storm drainage plans. If units of the development will be rented, the tenant lease or rental agreement shall contain a clause prohibiting car washing on the site outside of the specially designated area. A covenant shall be recorded and signed by the owner stating that such a clause will be written into the tenant leases and/or rental agreements.

As an alternative to the specially designated car washing area, hose bibs can be eliminated from the site or tenant/owner access to them prevented. A note stating that car washing is prohibited on the site must be added to the storm drainage plans. If this option is exercised, a covenant shall be attached to the property, prohibiting vehicle washing on the site. If units will be rented, the tenant lease or rental agreement shall contain a clause prohibiting car washing on the site. A covenant shall be recorded and signed by the owner stating that such a clause will be written into the tenant leases and/or rental agreements.

A covenant attached to the property, or the tenant lease or rental agreement for the project, shall contain a clause prohibiting vehicle maintenance on the site. If units are to be rented, a covenant shall be recorded and signed by the owner stating that such a clause will be written into the tenant lease and/or rental agreements.

All storm drains in the complex shall be stenciled with substantially the following language: “Dump no waste, drains to (the appropriate surface water)”. This reminder is typically spray-painted on to the ground adjacent to the catch basin with the use of a stencil. The treatment needs to be repeated, approximately annually, when the paint wears off. The developer/owner may either perform the stenciling, or give permission for volunteer groups to enter onto the property to perform the stenciling.

4-6 DRAINAGE FACILITIES

Drainage facilities include those facilities designed to provide stormwater conveyance, quantity control, and/or water quality enhancement. These facilities can be surface facilities, or underground facilities.

4-6.1 GENERAL REQUIREMENTS

All surface drainage and stormwater quality enhancement facilities (including detention ponds, wetponds, vegetated swales, and infiltration basins) shall be landscaped so as to provide slope stability and a pleasant appearance by utilizing sodding, hydroseeding and/or seeding. Under no circumstances shall use of easily floatable or erodible materials (such as beauty bark) be permitted in surface ponds or basins, or vegetated swale interiors. Trees and/or shrubbery shall not be planted on detention or wetpond raised berms, but are acceptable for the upper slopes of excavated ponds (below ground level).

4-6.2 TOPSOIL REQUIREMENTS

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Topsoil used in constructing drainage facilities such as vegetated swales and wetponds shall meet the Standard for Topsoil Type A, as specified in Section 9-14.1(1) of the WSDOT/APWA Standard Specifications with the following modification: 100% of the topsoil shall pass through a 1/2 inch sieve.

The following are important excerpts from WSDOT/APWA Section 9-14.1(1), with city modification.

Topsoil shall be free from materials toxic to plant growth, noxious weeds, rhizomes, roots, subsoil, stones, and other debris.

Topsoil Type A shall consist of sandy clay loam, sandy loam, loam, clay loam, silty clay loam, or silt loam soil. The mix may not be more than 50% sand nor 20% clay. Total organic matter shall be 1% to 10%. A maximum of 20% of the mix volume may be retained on a 1/4" sieve.

4-6.3 ACCESS REQUIREMENTS

Appropriate access must be provided to all drainage facilities to allow for maintenance of these facilities, particularly for maintenance and repair of control structures and for removal of accumulated sediment from surface ponds and basins.

An access road shall be provided to all control structures, grit/sediment removal structures, and oil/water separators not accessible from surfaces paved for vehicle use. The following criteria apply for access roads:

- 1) Access roads shall be a minimum of 15 feet in width and have a maximum grade of 6H:1V.
- 2) Fence gates shall be provided for access roads at "straight" sections of the road.
- 3) A 40 foot minimum outside radius must be provided on access roads to control structures.
- 4) The surfacing of access roads must be an all-weather surface of crushed rock or better, but no less than 1 1/4 " minus or greater than 4" quarry spalls.
- 5) Where possible, manhole and catch basin lids to be accessed shall be on the right hand side of the vehicle accessing the structure.
- 6) Surface ponds or basins greater than 30 feet wide shall be designed and constructed with a sloped access road to that area of the pond or basin bottom where sediment would accumulate. Access road shall be surface with 2" quarry spalls.
- 7) Surface ponds or basins 15 feet wide or less shall be designed and constructed with a crushed gravel access road along one side of the pond, open water cell, or basin.

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8) Surface ponds or basins between 15 and 30 feet wide, shall be designed and constructed with an access road along both sides of the pond or basin or to the area of the pond or basin bottom where sediment would accumulate.

4-6.4 FENCING REQUIREMENTS

Surface ponds and infiltration basins with a maximum design water depth of 1 foot or less and does not exceed a maximum depth of 3 feet from top of slope to bottom of basin will not require fencing provided the maximum exterior or interior side slope of the pond does not exceed three horizontal to one vertical.

All ponds and basins with a maximum design water depth of greater than one (1) foot and/or a maximum depth, from top of slope to bottom of basin, greater than 3 feet will require a six foot high perimeter fence.

When fencing is required around a facility to be dedicated to and/or maintained by the city, the fence shall be a 6 feet high chain link fence with thermally bonded, not sprayed or dipped on, polyvinyl chloride (PVC) coating. The PVC coating shall not be subject to fading, cracking, peeling, or shrinkage and shall be brown, black, or some shade of natural green (such as pine, forest, or olive). The fence manufacturer shall provide a 15 year (minimum) warranty on the chainlink fence and the PVC coating.

Fencing slats will be allowed, subject to the same color restrictions as the PVC coating, if the slats proposed are non-brittle, crack-resistant, locked in place in a bottom retaining channel, and non-fading.

The chainlink fence shall meet all applicable specifications set forth in the WSDOT/APWA Standard Specifications and these Standards. See Drawing No. 327 & 327A.

4-6.5 BERM REQUIREMENTS

All berms or embankments constructed for surface ponds and basins shall be compacted to at least 95% of the maximum relative density in lifts not to exceed 6 inches in depth.

Berm soils shall consist of material conforming to the following gradation:

<u>Sieve Size</u>	<u>% Passing</u>
3"	100
#4	65-90
#200	12-20

4-6.6 MAINTENANCE

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The city will assume the operation and maintenance of drainage facilities constructed in connection with residential subdivision of land after the expiration of a one-year operation and maintenance period if:

- 1) All of the requirements of Title 16 of the Gold Bar Municipal Code have been fully complied with; and
- 2) The facilities have been inspected and accepted by the Public Works Department after 1 year of operation and maintenance in accordance with city maintenance standards; and
- 3) All necessary easements and dedications entitling the city to properly maintain the facilities have been conveyed to the city and recorded with Snohomish County Auditor; and
- 4) The warranty bond required in subsection B of Section 16.12.090 of the Gold Bar Municipal Code has been filed, covering the city's first two (2) years of operation and maintenance; and
- 5) The developer has supplied to the city an accounting of capital, construction operation and maintenance expenses, or other items, for the drainage facilities to the end of the two-year period.

The maintenance of all drainage facilities associated with commercial, industrial, and most multi-family development is the responsibility of the owner(s) of the development.

4-7 VACTOR TRUCK WASTE DISPOSAL

Vactor trucks (also called eductor or vacuum trucks) are often used by private contractors to clean out drainage facilities such as catch basins and oil/water separators. The cleaning operation results in the collection of water used to flush out the system, standing water that was in the facility, sediments, and possible other wastes such as oil. Waste water, collected sediments, and other wastes are considered contaminated and may not be discharged back into the drainage facility they were removed from, nor to any other component of the surface water system.

At this time, formalized procedures for the handling of vactor truck wastes does not exist in the Snohomish County area. A vactor truck waste disposal site may be designed and constructed in the future by either the City of Everett or Snohomish County.

Sediments and oil wastes must be transferred to a appropriate facility for disposal. Receipts and/or other documents must be sent to the City of Gold Bar Public Works Department.

Small quantities of vactor waste materials that are free of heavy metals and other toxic components may be land farmed at specific locations within the City if approved by the public works department and Department of Ecology.

Vactor/eductor truck wastes disposed of at a septic dump site may be randomly tested for concentration of heavy metals and other toxic components. If concentrations of pollutants in the loads exceed those

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levels expected from residential land uses, the contractor shall be barred from using the septic dump site. The contractor will remove all contaminated materials placed within the dump site by its firm.

4-8 STORM WATER QUALITY ENHANCEMENT REQUIREMENTS

4-8.1 GENERAL

Stormwater quality enhancement shall be required for all development in the City of Gold Bar that will create 2,500 square feet or more of impervious surface. High risk land uses, including but not limited to auto repair/maintenance shops, retail auto parts stores, gas stations, and car washes shall be required to design and construct stormwater quality enhancement facilities regardless of the amount of paved surface created by the project.

When stormwater quality enhancement is required on site, one of three treatment systems shall be provided prior to discharge of the site's stormwater to a creek or wetland or from the site. The least preferred treatment system will only be allowed if the first two treatment systems are infeasible in the opinion of the Public Works Department. The options for stormwater quality enhancement, in order of preference, are:

- 1) A baffle-type oil/water separator followed by infiltration trenches, both designed and approved by a licensed engineer to D.O.E. and City Standards.
- 2) A baffle-type oil/water separator followed by a vegetated swale, both designed and approved by a licensed engineer to D.O.E. and City Standards.
- 3) A wetpond designed and constructed to D.O.E. and City Standards.

Specific stormwater quality enhancement requirements will often be detailed in the project's State Environmental Policy Act (SEPA) determination.

4-8.2 REDEVELOPMENT

To the maximum extent practicable, all redevelopment projects will be required to install stormwater quality enhancing facilities to improve the quality of stormwater leaving the entire site. These facilities include, but are not limited to; infiltration basins, wetponds, infiltration trenches, baffle-type oil/water separators and/or vegetated swales.

Redevelopment is defined as physical alteration of existing development that affects the drainage (either quantity or quality), or would facilitate the installation of water quality improving devices.

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4-8.3 RESIDENTIAL PLAT, SHORT PLAT, AND PLANNED RESIDENTIAL DEVELOPMENTS

Stormwater facilities provided for quality enhancement or detention of runoff from residential plats, short plats, planned residential developments, or any other development where the city will undertake maintenance of the facilities, shall dedicate these facilities to the City of Gold Bar. The area dedicated shall include 15 feet around the facility, as measured from the high water mark and/or trench line, and shall include any required access roads or paths associated with the facilities. A twenty (20) foot setback shall be required from the top of slope of a drainage facility to any structure.

If other stormwater enhancement options are infeasible, and oil/water separators in combination with vegetated swales are the only option, the swale(s) shall be provided either in the public right-of-way, parallel to roadways, or in separate tracts of land dedicated to the city. For vegetated swales provided in the public right-of-way, parallel to a roadway, the following criteria shall apply in addition to other city vegetated swale standards:

- 1) The dedicated right-of-way shall be increased to include the top width of the vegetated swale at the required free-board elevation.
- 2) A covenant shall be recorded with the plat map stating that the swale area shall remain in its vegetated state. No alteration of swale areas may take place without permission from the City of Gold Bar Public Works Department and no alteration will be allowed that adversely affects the swale function.
- 3) The developer shall design and construct driveway accesses by installing culverts in the vegetated swale(s). The required design length of the swale may not include driveway crossings or other culverted sections.
- 4) The developer shall establish appropriate vegetation in the entire dedicated right-of-way.
- 5) Utilities, such as PUD pedestals, light poles, mailbox pads, etc., shall not encroach into vegetated swales, unless it can be determined that it does not interfere with the function or maintenance of the swale. Such placement of a utility requires approval from the Public Works Department.

4-9 INFILTRATION SYSTEMS

4-9.1 GENERAL

Infiltration shall be provided for stormwater runoff quantity and/or quality control per the recommendations of drainage basin plans and/or SEPA conditions. Generally infiltration is not acceptable as the sole method of disposing of stormwater, however Gold Bar is predominately

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characterized by the presence of highly permeable soils. It is an acceptable means of providing water quality enhancement when it has been demonstrated that the specific soil and site criteria are met.

Infiltration shall only be allowed as the major or sole method of stormwater disposal in areas of significant natural infiltration with soils classified as hydrologic Group A soils by the Soil Conservation Service. Designed infiltration systems shall include an approved pre-treatment method such as bio-swales or oil-water separators.

4-9.2 DESIGN CRITERIA

The bottom of all infiltration systems shall be located at least 5 feet above the seasonal high water mark, bedrock (or hardpan), and/or impermeable layer.

When an infiltration system will be used as the sole means of disposing of stormwater, the system shall be sized to completely infiltrate the 25 year, 24-hour storm within 24 hours after the end of the storm.

Infiltration facilities shall not be located within 150 feet of a water supply well and/or 20 feet from an NGPA.

Heavy equipment and traffic shall be restricted from traveling over infiltration areas to minimize compaction of the soil. The use of draglines and trackhoes are encouraged for the construction of these areas so that the work can be conducted from the side and/or end of the area versus impacting the infiltration area directly. The infiltration area shall be flagged or marked to keep equipment away.

Infiltration systems shall not be allowed in soils with 30% or greater clay content, 40% or greater silt/clay content, and or soils with an infiltration rate of less than 0.5 inches per hour.

If an infiltration system is proposed, soil logs shall be taken at a minimum of four locations within the development site. At least one soil log shall be taken at the location of each infiltration system and additional soil logs taken, at a frequency of one per 5,000 square feet of infiltration area, for large infiltration areas. Soil logs shall extend to a minimum depth of 5 feet below the proposed bottom elevation of the facility and the percent sand, silt, and clay in each distinct layer must be determined. At a minimum, the percent sand, silt, and clay of the soil shall be determined at two elevations; at the elevation of the proposed bottom of the infiltration basin and 5 feet below the proposed bottom of the infiltration basin.

The texture class of the soil in the first 5 feet below the infiltration basin bottom shall be classified using figure 4-9.1 of the U.S.D.A. Textural Triangle. The infiltration rate to be used in the system design shall be 50% of the value obtained from the following table, based on the soil texture class.

Texture Class	Infiltration Rate (inches/hr)	Hydrologic Soil Group
Coarse Sands	20.00	A

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or Cobbles		
Sand	8.27	A
Loamy Sand	2.41	A
Sandy Loam	1.02	B
Loam	0.52	B
Silt Loam	0.27	C
Sandy Clay Loam	0.17	C
Clay Loam	0.09	D
Silty Clay Loam	0.06	D
Sandy Clay	0.05	D
Silty Clay	0.04	D
Clay	0.02	D

If more than one texture type exists in the 5 feet below the infiltration basin bottom, 50% of the slowest infiltration rate shall be used in system design.

Any infiltration systems proposed near a slope greater than 20% will require an on-site soil investigation by a licensed geotechnical consultant. The consultant shall determine the maximum infiltration rate allowable and the slope setbacks necessary to maintain slope stability.

Final construction of infiltration facilities shall not be done until after other site construction has finished and the site has been stabilized with permanent erosion control practices, unless an alternate plan is submitted and approved, which can demonstrate that earlier construction shall not result in the impairment or loss of function of the original design.

4-9.3 INFILTRATION BASINS

An infiltration basin is a shallow surface pond provided to temporarily store stormwater until the water exits the pond by infiltrating through the soil. The following design criteria apply:

- 1) Infiltration basins shall be designed with a minimum of 1 foot of freeboard above the maximum design water level elevation.
- 2) An emergency overflow from the basin to the nearest established drainage course or system shall be provided. The elevation of the outlet shall be at the maximum design water level elevation.
- 3) A bypass system shall be designed and constructed to allow for vegetation establishment in the basin and for periodic maintenance.
- 4) Infiltration basins designed to treat stormwater runoff shall be sized to completely infiltrate the 10 year, 24-hour storm. Larger storms shall be bypassed around the facility, unless stormwater detention storage is also provided in the basin area.

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- 5) Stormwater detention may be provided in infiltration basins by providing a control structure with a primary orifice elevation above the infiltration storage elevation. However, if detention is provided in addition to infiltration in an infiltration basin, the system shall be designed to fully meet detention release and storage volume requirements in the event that the infiltration function of the basin fails. This requirement means that the storage below the primary orifice elevation is regarded as dead storage and that only discharge through the control structure is taken into account in the design analysis of the system's detention function.
- 6) When an infiltration system will be used as the sole means of disposing of stormwater, the system shall be sized to completely infiltrate the 25 year, 24-hour storm within 24 hours after the end of the storm.
- 7) Oil/water separation and grit removal, in accordance with City Standards, shall be provided upstream of all infiltration basins. Alternatively, a wetpond shall be used to remove oil and sediment upstream of the infiltration system.
- 8) Infiltration facilities shall be situated at least 20 feet downslope and 100 feet upslope from building foundations and property lines.
- 9) When the facility will be maintained by the city, such as for residential subdivision, the area of the infiltration basin up to and including the freeboard and the basin access road shall be included in a tract of land dedicated to the city.

4-9.3(1) CONSTRUCTION REQUIREMENTS

The infiltration system shall not be completed and/or put on-line until the project site has been stabilized and the potential for erosion has passed, unless approved by the Public Works Department.

In the case of residential development, all homes shall be constructed, including stabilization of front and rear yards with landscaping, prior to putting the infiltration system on-line. If the anticipated time period from final acceptance of the development to final completion of the homes is expected to exceed one year, the infiltration system shall be put on-line, but the bottom of the infiltration basin shall remain under-excavated by one foot until final completion of the homes.

In commercial, industrial, and multi-family development, the bottom of the infiltration basin shall remain under-excavated by 1 foot until all construction on the site has been completed, including the installation of all landscaping.

At the time that all home/site construction is completed and landscaping has been installed, the basin shall be taken off-line (utilizing the basin bypass system), and excavated to final grade, provided the time of the year is between April 1 and October 1. If construction is completed after October 1 of any year, the basin shall be excavated to final grade after April 1 of the following spring.

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Upon final excavation, all infiltration basins shall be rototilled and immediately hydroseeded with a water tolerant, turf-forming grass mix and maintained by the contractor as necessary to ensure seed germination and successful establishment of grass in the infiltration basin. Successful establishment of grass shall be defined to mean 80% cover or greater. Re-seeding shall occur promptly if initial seeding is unsuccessful. After grass has become established in the basin, the infiltration system may be put on-line.

4-9.3(2) MAINTENANCE OF INFILTRATION BASINS

The vegetation on the basin floor and side slopes shall be maintained by the contractor as necessary to promote a dense growth of healthy grass. Bare spots shall be immediately stabilized and re-vegetated. Any accumulated sediments shall be removed by hand, with a flat bottom shovel, and the area shall be re-seeded immediately.

4-9.4 INFILTRATION TRENCHES

An infiltration trench is a trench designed primarily to provide runoff treatment to small parcel areas. Trenches are generally 2 to 10 feet in depth, backfilled with a coarse washed stone aggregate, allowing for temporary storage of storm runoff in the voids between the aggregate material. Stored runoff then gradually infiltrates into the surrounding soils. The surface of the trench can be covered over with grating and/or consist of stone, gabion, sand or a grassed covered area with a surface inlet. The following design criteria shall apply;

- 1) Infiltration trenches designed to treat stormwater runoff shall be sized to completely infiltrate the 10year, 24-hour storm event.
- 2) Infiltration trenches shall not be used as the sole means of disposing of stormwater.
- 3) Baffle type oil/water separation and grit removal, in accordance with City Standards, shall be provided upstream of all infiltration trenches. Alternatively, a wetpond shall be used to remove oil and sediment upstream of the infiltration system.
- 4) Infiltration facilities shall be situated at least 20 feet downslope and 100 feet upslope from building foundations and property lines.
- 5) The base of all infiltration trenches shall be located at least 5 feet above the seasonal high water mark, bedrock (or hardpan), and/or impermeable layer.
- 5) The aggregate material for the infiltration trench shall consist of a clean washed stone, aggregate, with a maximum diameter of 3 inches and a minimum diameter of 1.5 inches.
- 6) The infiltration trench shall be lined with filter fabric that covers the top of the aggregate completely. The top of the aggregate shall be installed to level a minimum of 12"

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from the top of the trench. See Drawing No. 423.

- 7) An observation well shall be installed at each end of the infiltration trench to check for water levels, and conduct monitoring. See Drawing No. 425.

4-9.4(1) CONSTRUCTION REQUIREMENTS

The infiltration system shall not be completed and/or put on-line until the project site has been stabilized and the potential for erosion has passed, unless approved by the Public Works Department.

The trench shall be excavated to the designed dimensions. Excavated materials shall be placed away from the trench sides to enhance trench wall stability.

Intermixing of natural or fill materials with the stone aggregate shall be prevented.

Following aggregate placement, the filter fabric shall be folded over the stone aggregate to form a 12 inch minimum longitudinal overlap, totally covering the top surface of the aggregate. When overlaps are required between rolls, the upstream roll shall overlap a minimum of 2 feet over the downstream roll in order to provide a shingled effect.

Voids between the geotextile and excavation sides must be avoided. Removing boulders or other obstacles from the trench walls is one source of such voids.

4-9.4(2) MAINTENANCE OF INFILTRATION TRENCHES

Silt/sediment removal is suggested when the infiltration rate drops significantly below the design infiltration rate, or if there is water in the trench 72 hours after a design storm.

Accumulated paper, trash and debris should be removed every 6 months or as needed to prevent clogging.

Replace infiltrating medium as needed to obtain adequate infiltration rate and efficiency.

4-9.5 RESIDENTIAL ROOF DOWNSPOUT SYSTEMS

A residential roof downspout system is an underground infiltration trench system intended for infiltration of runoff from relatively small roof tops. Runoff from areas other than roofs shall not be allowed to enter the system. The following design criteria apply:

- 1) Roof downspout systems shall be located a minimum of 10 feet from any structure, property line, or NGPA, 30 feet from any septic tank or drainfield and a minimum of 50 feet from any steep slope.

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- 2) The roof downspout configuration shall allow for overflows onto concrete splash blocks if the capacity of the infiltration system is exceeded.
- 3) The aggregate material for the infiltration trench shall be 3/4 - 1 1/2 inch washed rock.
- 4) The infiltration trench shall be lined with filter fabric that covers the top of the aggregate completely. The top of the aggregate shall be installed to level a minimum of 12" from the top of the trench and then backfilled with approved fill material and compacted to 90% density.
- 5) A minimum of 6 inches of compacted backfill shall be provided over the top of the filter fabric covered aggregate.
- 6) Roof top runoff shall be delivered to the infiltration trench via a perforated pipe provided with a minimum cover of 2 feet.

4-9.5(1) CONSTRUCTION REQUIREMENTS

Requirements for the construction of roof downspout systems are the same as infiltration trenches except for the aggregate quantities. See STD 4-9.4(1) and Drawing No. 426.

4-9.5(2) MAINTENANCE REQUIREMENTS

Maintenance requirements for roof downspout systems are the same as for infiltration trenches. See STD 4.9.4(2).

4-9.6 APPROVAL OF INFILTRATION SYSTEM DESIGN CALCULATIONS

The following information shall be submitted for review and approval of infiltration system designs:

- 1) Soil log results
- 2) Depth to high water mark, bedrock or hardpan, and/or impermeable soil layer
- 3) Textural class of all soil samples taken
- 4) The design infiltration rate
- 5) Stage-storage relationship of basin
- 6) Results of routing the design storm through the facility
- 7) Bypass system sizing calculations
- 8) Sizing calculations for the oil/water separation and grit removal system
- 9) A site map showing the locations of soil logs, the proposed infiltration facility or facilities, and the required set-backs from buildings and property lines

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4-9.7 APPROVAL OF SITE PLANS WITH INFILTRATION SYSTEMS

When plans are submitted to the Public Works Department for review and approval, and an infiltration system is included on the site, the following information shall be included on the plans.

- 1) Construction requirements to include details and illustrations
- 2) Location of infiltration system
- 3) Location of property lines and building foundations
- 4) The maximum design water level in the infiltration system
- 5) Location and details of emergency overflow
- 6) Location and details of the bypass system (infiltration basins)

4-10 WETPONDS

4-10.1 GENERAL

Wetponds are surface ponds designed and constructed to improve the quality of stormwater runoff from a site. The term “wet” pond comes from the fact that the bottom of the pond is excavated below the elevation of the pond’s outlet. Therefore, there is always a pool of standing water in a wetpond. The pool provides pollutant removal from stormwater between storm events. In addition to this permanent storage volume in the wetpond, the outlet from the pond is typically restricted to provide additional live storage for shorter term treatment during storms.

Wetponds in the City of Gold Bar area are to be designed to have two separate cells. At the inlet to the wetpond, a deep water area, called the open water cell, is provided to encourage settling of sediments associated with stormwater. From the open water cell, the water flows to a shallow area planted with wetland vegetation called the wetland treatment cell. See Drawing No. 420 for illustration.

4-10.2 DESIGN CRITERIA

- 1) Wetponds are to be designed with the configuration shown in Drawing No. 420. As an alternative to providing an open water cell, an equivalent volume of water may be provided as dead storage in a wet vault. This alternative has the advantage of requiring less surface area, results in a more pleasing pond appearance, and often eliminates the need for fencing. Access for maintenance shall be required for all wetponds.
- 2) The wetpond design volume shall be calculated by one of two methods:
 - a) By multiplying the total precipitation associated with the design storm (3.40 inches for the 10 year, 24-hour event, or 2.40 inches for the 2 year, 24-hour event) by the amount of impervious surface contributing runoff to the wetpond; or

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- b) By generating the total volume of storm runoff from the design storm event using the Santa Barbara Urban Hydrograph (SBUH) method or comparable method prior approved by the Public Works Department.
- 3) If the wetpond design volume calculated by a method other than SBUH is significantly less than that calculated by method 2a, the city can require that the wetpond design volume be that resulting from method 2a.
- 4) The wetpond permanent storage volume shall be a minimum of 50% of the wetpond design volume.
- 5) A minimum of 30% of the wetpond permanent volume shall be associated with the wetland treatment cell (15% of the wetpond design volume).
- 6) The permanent storage depth in the wetland treatment cell shall range from 0-2 feet, with a maximum average depth of 1.33 feet. This maximum average depth requires at least 2/3 of the pond to have depths less than 2 feet.
- 7) The permanent storage depth in the open water cell shall range from 3-6 feet.
- 8) Live storage and a flow restricting device at the wetpond outlet shall be provided to cause the full wetpond design volume to be reached for the design storm. The design storm shall be routed through the pond to demonstrate that this requirement is being met.
- 9) At least one solid baffle shall be required across the width of the pond. The top of the baffle shall be at the dead storage elevation.
- 10) The length to width ratio of the pond shall be a minimum of 3:1. The use of baffles within the pond will be allowed to create an effective length to width ratio of 3:1. Baffles used for this purpose shall extend up to or above the elevation required for storage of the wetpond design volume.
- 11) Grit removal shall be provided upstream of the wetpond by a 72 inch diameter catch basin with a 48 inch deep sump. The pipe inlet into the wetpond shall have an invert elevation high enough to allow for a cleanout/catch at its outfall to prevent silting of the pie.
- 12) A planting schedule for the wetland treatment cell shall be provided for approval by the city. Plants suited to the depth of water in the treatment cell shall be used, such as hardstem bulrush, yellow iris, and/or cattails in the deeper areas of the pond, with rushes and/or sedges at the perimeter. Required density of plantings is a minimum of one per 2.25 square feet. Plants of the same type shall be planted in groups rather than in a completely random pattern.

4-10.3 WETPOND TREATMENT CELL CONSTRUCTION

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4-10.3(1) GENERAL

The wetland treatment cell should not be completed until the potential for construction related erosion on the site has passed. However, it will often be desirable to use the wetpond as a component of the temporary erosion control plan. In this situation, the wetpond can be excavated to final grade, and used as a sedimentation pond until land alteration activities on the site have been completed and the site has been paved. At that time, however, accumulated silt in both the wetland treatment cell and the open water cell shall be removed - without discharging turbid water downstream. Construction of the wetland treatment cell shall take place after the accumulated sediment has been removed.

4-10.3(2) CONSTRUCTION REQUIREMENTS

Over-excavate the wetland treatment cell by a minimum of 6 inches as compared to final grade. After the treatment cell area has been graded, roughen the bottom and sides of the treatment cell by raking and place topsoil (a minimum of 6 inches) to bring the bottom elevation to final design grade.

Sod the treatment cell immediately after the topsoil has been placed. Lay sod to a minimum of 1 foot of vertical depth above the bottom of the treatment cell. Lay the sod pieces with their long axis perpendicular to the direction of flow in the cell and stagger the pieces to avoid a continuous longitudinal seam in the bottom of the cell.

To plant the required wetland vegetation, punch holes in the sod with a bar or stake approximately equivalent to the diameter of the plants' root wads. Insert the plants in the holes and tamp the sod and earth down around the plants. Locate the plants in the bottom of the treatment cell only and in a staggered pattern - not a straight line.

4-10.4 APPROVAL OF WETPOND DESIGN CALCULATIONS

The following information shall be submitted for review and approval of wetpond design:

- 1) Wetpond sizing calculations, including calculation of wetpond design volume, wetpond permanent volume, and design volumes for the wetland treatment cell and open water cell.
- 2) Orifice sizing calculations
- 3) Stage-storage relationship of the pond
- 4) Results of routing the design storm through the pond, showing at a minimum the inflow hydrograph, outflow hydrograph, and the storage volume required
- 5) The wetland treatment cell planting schedule

4-10.5 APPROVAL OF SITE PLANS WITH WETPONDS

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When plans are submitted to the City of Gold Bar Public Works Department for review and approval, and a wetpond is included on the site, the following information shall be included on the plans:

- 1) The type of vegetation to be planted in the wetland treatment cell, the planting locations of different species, the density of the plantings, and the total number of plants needed.
- 2) The wetland treatment cell construction requirements found in Section 4-10.2(2).
- 3) Location of fence, if required, and gates for access to the pond.
- 4) Location and design detail of Maintenance Road.

4-11 OIL/WATER SEPARATION AND GRIT REMOVAL

4-11.1 GENERAL

Oil/water separators are required in a number of different situations in the City of Gold Bar. Alone, they are not considered adequate treatment for stormwater runoff being discharged to surface waters. They are used to provide coarse removal of oil and sediment from stormwater runoff prior to discharge to infiltration systems and vegetated swales. However, they are used alone for pre-treatment of wash water and runoff from high risk sites before discharge to individual approved on site systems.

The most common type of oil/water separator used in the city of Gold Bar is the baffle-type. However, coalescing plate separators may be provided instead of baffle-type oil/water separators to reduce the spatial requirements of the separator vault.

The contributing drainage area for the oil/water separator should be completely impervious and should consist only of those areas expected to contribute oil contaminated stormwater (i.e., paved vehicle access and parking areas). Non-source contributing areas only increase the size and cost of the separator and do not improve its effectiveness.

4-11.2 DESIGN CRITERIA

The oil/water separator design flow shall be determined by the use of the rational formula, $Q=CIA$, where Q is the design flow in cubic feet per second, C is the runoff coefficient for the area draining to the separator, I is the rainfall intensity in inches per hour, and A is the oil/water separator drainage area in acres. The rainfall intensity for use in the formula shall be 0.5 inch/hour.

Baffle-type oil/water separators shall provide a minimum of a 15 minute residence time for the separator design flow. If used instead, coalescing plate separators shall be designed to provide an equivalent treatment efficiency.

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The vault inlet shall be restricted to pass only the oil/water separator design flow. Bypass piping, or some other method, shall be used to route flows larger than the design flow around the separator. Overflow pipes should be equipped with a floatable material separator at the inlet, per City Standard No. 410, that extends a minimum of 6 inches below the invert elevation of the pipe to the separator.

In most cases, the separator inlet shall be sized to pass the design flow under the head present when water backs up to the bypass pipe invert elevation. However, a check shall be made using the head needed to pass the 25 year storm peak flow, to ensure that flows into the separator during large storm events will not cause accumulated oil to be flushed out of the separator.

The entire area contributing runoff to the separator shall be used in calculating the size of the oil/water separator although only runoff from paved surfaces is required to be routed through the separator.

Downstream conditions must not result in water being backed up into the oil/water separator. The maximum elevation of water downstream should be a minimum of 1 foot below the invert elevation of the outlet pipe.

A minimum of 2 feet shall be provided below the invert of the vault inlet and the bottom of the upstream catch basin.

Oil/water separators shall be equipped with a sampling tee at the outlet.

An access cover shall be provided above each compartment of the oil/water separator.

Plates provided for coalescing plate separators shall be no less than 3/4 inch apart, and the angle of the plates shall be from 45 degrees to 60 degrees.

4-11.3 MAINTENANCE REQUIREMENTS

Oil/water separators shall be checked frequently by the property owner or manager and cleaned whenever oil accumulations exceed 1 inch anywhere in the separator. In addition, the separator shall be cleaned at least once annually, in the fall-early winter, after the first significant rainfall (more than 0.5 inches in 24 hours). Documentation of cleaning shall be submitted to the city, annually, at the time of request for business license renewal.

Oil/water separators for high risk sites, or those discharging to sensitive surface waters, may require more frequent maintenance.

Oil accumulations from separators may be removed by the use of oil absorbing pads or pillows. Used pads may be squeezed out and re-used, or disposed of properly along with any collected waste oils or residuals. Collected waste oils and residuals may not be discharged to the sanitary sewer nor to any surface water system.

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Oil/water separators may also be pumped out by the use of a vactor truck to remove both accumulated oil and sediments. Water removed from the separator shall be disposed of properly as discussed in Section 4-7 of these Standards. Clean water will be used to replace any water removed from the separator.

4-11.4 APPROVAL OF OIL/WATER SEPARATOR DESIGN CALCULATIONS

The following information shall be submitted for review and approval of oil/water separator designs:

- 1) Design inlet capacity calculations
- 2) Oil/water separator sizing calculations
- 3) Bypass sizing calculations
- 4) Copy of site plan showing the contributing area
- 5) Design details and illustrations.

4-11.5 APPROVAL OF SITE PLANS WITH OIL/WATER SEPARATORS

When plans are submitted to the Public Works Department for review and approval, and an oil/water separator is included on the site, the following information shall be included on the plans:

- 1) A detail of the oil/water separator showing the inlet and outlet elevations of the separator, the sampling tee, the access covers, the elevation of the bottom of the separator, and the position and height of interior baffles
- 2) A detail of the bypass system, showing invert elevations of all pipes involved
- 3) The oil/water separator maintenance notes from Section 4-11.3.

4-12 VEGETATED SWALES

4-12.1 GENERAL

Two classes of vegetated swale shall be defined according to the slope of the swale. A swale with a slope of 2-4% is designated a grass swale. A swale with a slope of less than 2% is designated an emergent swale.

Vegetated swales shall not be located where they will be subject to heavy and prolonged shading.

For swales wider than 4 feet, some type of level spreader shall be designed and placed at regular intervals along the length of the swale to prevent the creation of a low-flow channel in the swale. A 4 inch by 6 inch or 8 inch board imbedded in the bottom of the swale (long dimension downwards) and

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into the banks (about 2 feet) has been a successful spreader. One board is set absolutely level at the height of the expected swale turf every 25-30 feet. Any preservative used to treat the board(s) must be environmentally non-toxic.

Introduction of runoff into swales via curb cuts or sheet flow is not a recommended practice in the City of Gold Bar, but may be allowed in certain situations.

4-12.2 DESIGN CRITERIA

- 1) Vegetated swales shall be designed to provide a minimum hydraulic residence time of 5 minutes for the peak runoff flow rate from the 2 year, 24-hour storm. Hydraulic residence time shall be calculated by dividing the length of the swale by the average velocity in the swale. If all of the stormwater to be treated does not enter the swale at the same location, the average hydraulic residence time in the swale shall be 5 minutes.
- 2) Flow rates larger than the peak flow rate from the 2 year, 24-hour storm shall be bypassed around the vegetated swale.
- 3) The minimum swale length shall be 100 feet.
- 4) Swale velocity calculations shall be determined using the Manning's equation with Manning's "n" equal to 0.20.
- 5) Swales shall be designed and constructed with a trapezoidal cross section. Bottom widths shall range from 1 to 8 feet, and the sides of the swale shall have a maximum slope of 3:1 (horizontal:vertical).
- 6) The maximum allowable velocity in vegetated swales shall be 0.9 feet per second.
- 7) The maximum allowable depth in vegetated swales shall be 2 inches for grass swales located in landscaped areas or in regularly mowed lawn areas, 4 inches for grass swales located in infrequently mowed areas, and 6 inches for emergent swales.
- 8) The maximum allowable longitudinal slope for vegetated swales shall be 4%.
- 9) The swale inlet shall be designed to provide energy dissipation and to uniformly distribute flow at the head of the swale.
- 10) Vegetated swales located in areas of high groundwater shall be designed as emergent swales. Vegetated swales located in areas of permeable soils shall be designed as grass swales unless an impermeable liner is used in the bottom of the swale.
- 11) Swales located in the public right-of-way, parallel to roadways, shall have a minimum bottom width of 2 feet and shall have side slopes no steeper than 4:1 (horizontal:vertical).

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- 12) Where a swale is located adjacent to a building, a minimum of 15 feet of essentially flat ground shall be provided between the building and the top of the swale.
- 13) Vegetated swales shall be designed and constructed with a minimum of 0.5 feet of free-board above the maximum design depth.
- 14) The entire associated side slope of the swale, from the bottom of the swale to the top of the adjacent bank, shall have a maximum slope of 3: 1 (horizontal:vertical) unless rockeries or retaining walls are used.
- 15) Neither rockeries nor retaining walls shall be designed to provide the required swale free-board depth. Therefore, for a swale with 3:1 side slopes, a retaining wall or the base of a rockery must be a minimum of 1.5 feet (horizontal distance) beyond the high water mark in the swale.
- 16) A 5-foot wide gravel path for maintenance access shall be provided along one side of the swale. The maximum lateral slope of the path shall be 5%.

4-12.3 PLANTING REQUIREMENTS FOR VEGETATED SWALES

Sod shall be established in both grass and emergent swales and shall be over-seeded with the seed mix detailed below. Ten pounds of seed shall be applied per every 1,000 square feet of swale bottom. Swale construction requirements, including sodding and seeding instructions, are located in Section 4-12.4.

In addition to sodding and seeding, emergent swales shall be planted with wetland vegetation. The species to be used are listed below. Four separate species shall be planted, at a frequency of 25 plants of each species per every 100 square feet of swale (for an overall density of one plant per square foot of swale bottom). The instructions found in Section 4-12.4 shall be followed when planting the emergent swale.

SEED MIX FOR GRASS AND EMERGENT SWALES:

<u>Grass Species</u>	<u>Percentage by Weight</u>
Meadow Foxtail (Alopecurus pratensis)	40%
Alta Fescue (Festuca pratensis)	25%
<u>Grass Species</u>	<u>Percentage by Weight</u>
Redtop Bent Grass	20%

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To prevent the swale from becoming a sediment source, it must be stabilized immediately after it has been graded. The recommended method for providing immediate swale stabilization and pollutant removal ability is to sod the swale per the construction requirements below.

Wetland vegetation planted after March 15 will require irrigation through the first summer to ensure plant viability. Wetland plants ideally should be planted between October 15 and March 15.

4-12.4(2) CONSTRUCTION REQUIREMENTS

Prepare the swale for sod immediately after it has been graded. Roughen the bottom and sides of the swale by raking, place 4 inches (minimum) of topsoil, and fertilize with an appropriate fertilizer at the rate of 7 pounds per 1,000 square feet before laying the sod. In general, use a 10-20-20 N-P-K fertilizer.

Sod the swale immediately after the sides and bottom of the swale have been prepared. Lay sod to a minimum of 1 foot of vertical depth above the bottom of the swale, with the long axis of the sod pieces perpendicular to the direction of flow in the swale. Stagger the pieces to avoid a continuous longitudinal seam in the bottom of the swale. Anchor the sod in place in the bottom of the swale and to 1 foot of vertical depth above the bottom of the swale with stakes, metal staples or other means.

Hand-seed or hydroseed the swale with the specified seed mix over the top of the sod. If the swale is completed between April 1 and September 1, hand-seed the swale immediately. If the swale is completed between September 1 and April 1, hand-seed after April 1, but before April 30, of the spring following completion. Disperse 5 pounds of seed per 1,000 square feet evenly over the sod and all bare side slope areas of the swale.

To plant wetland vegetation required for emergent swales, punch holes in the sod with a bar or stake approximately equivalent to the diameter of the plants' root wads. Insert the plants in the holes and tamp the sod and earth down around the plants. Locate the plants in the bottom of the swale only and in a staggered pattern - not in a straight line.

4-12.5 MAINTENANCE REQUIREMENTS

Vegetation in grass or emergent swales shall be cut at least once annually, in early fall, to a height of 6 inches. Cut vegetation will be removed immediately from the swale.

Swales may require irrigation during dry summer months and during establishment of vegetation, especially emergent swales.

Viable vegetation is important to the function of the swale and dead or unhealthy vegetation shall be replaced as necessary. Appropriate maintenance shall be performed to ensure healthy vegetation. Accumulations of sediment in the bottom of swales that cover vegetation or reduce the swale's capacity, shall be removed. Accumulated sediments shall be removed by hand, with a flat bottom shovel, during summer months. Bare areas shall be re-seeded immediately.

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4-12.6 APPROVAL OF VEGETATED SWALE DESIGN CALCULATIONS

The following information shall be submitted for review and approval of vegetated swale design calculations:

- 1) Design flow calculations
- 2) Velocity and flow depth calculations
- 3) The hydraulic residence time in each vegetated swale
- 4) Bypass sizing calculations
- 5) A copy of site plan showing the contributing area

4-12.7 APPROVAL OF SITE PLANS WITH VEGETATED SWALES

When plans are submitted to the City of Gold Bar Public Works Department for review and approval, and a vegetated swale is included on the site, the following information shall be included on the plans:

- 1) The vegetated swale maintenance requirements found in Section 4-12.5.
- 2) The seed mix and wetland plant list, as appropriate, found in Section 4-12.3.
- 3) The vegetated swale construction requirements found in Section 4-12.4(2).
- 4) Spot elevations in the bottom of the swale at the head of the swale, at the swale outlet, and at approximately 50-foot intervals along the length of the swale.
- 5) The height of any retaining wall associated with the swale.
- 6) The top and toe elevations of any rockery associated with the swale, as well as an accurate representation of the area that will be taken up by the rockery. A minimum of 4 horizontal feet is required for rockeries under 7 vertical feet constructed per City Standards.

4-13 STORMWATER QUANTITY CONTROL REQUIREMENTS

4-13.1 GENERAL

Stormwater quantity control is often required as mitigation for development. The conversion of natural areas to roads and rooftops during development increases the amount of water running off of land during rainstorms. These increases can cause flooding in downstream drainage systems, both natural and man-made, and can cause erosion and damage to natural stream systems.

Detention facilities are designed and constructed to provide quantity control of stormwater by limiting the increase in the peak storm flow rate caused by development of land. The typical approach is to determine the pre-development peak storm flow rate which results from a specified design storm, and to use this rate as the limit which must be met in controlling post-development stormwater runoff.

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When a detention facility is connected in-line with the conveyance system, all flows entering the system are metered through the outlet and backed up flows are temporarily stored within the detention system. When the volume of water exceeds the available storage volume the excess water is released via an emergency spillway or overflow.

4-13.2 RESTRICTOR DESIGN

Restrictors for detention systems shall be constructed and installed per Standard Nos. 412A, 412B, and/or 412C. Multiple orifice restrictors will be required where the detention system is designed based on a pre-development storm return frequency of 5 years or greater, or on large sites.

4-14 PARKING LOT PONDING SYSTEMS

4-14.1 GENERAL

The use of parking lot ponding as a way of providing stormwater detention is not an allowable use in the City of Gold Bar

4-14.2 DESIGN CRITERIA

Although parking lot ponding areas are not an allowable use in the city, underground systems may be designed under the parking area.

Underground systems shall be designed as to not compromise any parking lot area.

4-15 PIPING

4-15.1 GENERAL

All pipe joints shall be rubber gasketed. Culverts which flow under driveways from one open ditch to another, with a maximum length of 100 lineal feet may be mortar joint pipe.

The minimum velocity in any pipe or culvert carrying the design storm flow shall be 2 feet per second, except for pipe installed as equalizers or a direct part of a detention system.

The maximum allowable velocity in concrete pipe shall be 30 feet per second.

A catch basin or manhole will be required at all changes in storm drain diameters and changes in grade or alignment.

STORM AND SURFACE WATER

When required by the Public Works Department all storm sewer systems shall begin with and end with catch basins or manholes.

Storm drain pipes installed in easements shall be constructed as nearly as possible in the center of the easement, but in no case shall the pipe be within 5 feet of any structure or property line.

Any closed storm drain system collecting runoff from paved areas in the public right-of-way or private property shall provide for floatable material separation (see Standard Plan No. 410) prior to discharge to the main storm drain system in the public right-of-way unless otherwise approved by the Public Works Department.

4-15.2 PIPE MATERIALS

Pipe materials, joints and protective treatments shall conform to the requirements set forth in Section 9-05 of the WSDOT/APWA Standard Specifications. The pipe materials and specifications included below are for conveyance systems installed for development and construction in the City of Gold Bar. The use of other pipe materials or private property that are not part of the drainage system requirements are not excluded from use provided they are installed and maintained by the private property owner.

Pipe materials that are allowed for use in storm drainage systems in the City of Gold Bar are as follows:

- A. Plain concrete pipe (12 inches diameter only and used only for driveway culvert).
- B. Reinforced concrete pipe.
- C. Ductile iron pipe.
- D. Galvanized corrugated iron or steel pipe, treatment 1 through 6.
- E. PVC pipe (SDR35, ASTM D3034 with minimum 3 feet cover).
- F. Corrugated high density polyethylene pipe, with smooth interior.

Coupling bands shall be of the same material as the pipe. Gaskets will be required for all underground detention systems.

4-15.3 SIZING

No storm drain pipe between catch basins or manholes in the public right-of-way shall be less than 12 inch diameter, with the exception that an 8 inch culvert may be used between inlets and catch basins in runs of 50 feet or less. Storm drainage pipe in the public right-of-way will be sized for a 10 year storm. In areas of high potential for flooding on private property, a 25 year design storm shall be used.

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Debris barriers (trash racks) shall be required on culvert inlets, when in the opinion of the Public Works Director, circumstances warrant the elimination of miscellaneous flowing debris.

4-15.4 TESTING

Testing of storm drainage piping as specified under Section 6-17.14 of these Standards will not be required unless requested by the Public Works Director.

4-16 MANHOLES, INLETS, AND CATCH BASINS

4-16.1 DESCRIPTION

This work shall consist of constructing manholes, inlets and catch basins of the types and sizes designated in accordance with the plans, these Specifications, the Standard Plans, and Section 7-05 of the WSDOT/APWA Standard Specifications.

4-16.2 MATERIALS

Materials shall meet the requirements of the following sections of the WSDOT/APWA Standards Specifications:

<u>Item</u>	<u>Section</u>
Concrete	6-02
Rubber Gaskets	9-04.4
Metal Casings	9-05.15
Reinforcing Steel	9-07
Masonry Units	9-12

Non-shrink grout shall conform to Section 3-20.8 of these Standards.

Manholes, catch basins and inlets shall be constructed of pre-cast units in accordance with the following Standard Plans:

<u>Item</u>	<u>Standard Plan Nos.</u>
Manholes	605A through 605C
Catch Basins	402 through 404
Inlets	401
Steps and Ladders	606, 606A
Frames and Grates	405, 406A through 406C, 408 and 409

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4-16.3 CONSTRUCTION REQUIREMENTS

The cover or grating of a manhole or catch basin shall not be grouted to final grade until the final elevation of the pavement, gutter, ditch, or sidewalk in which it is to be placed has been established, and until permission thereafter is given by the Public Works Director to grout the cover or grating in place. Covers shall be seated properly to prevent rocking.

After installation all catch basins are required to have sediment socks installed, cleaned and maintained on a regular basis during construction. Socks are not to be permanently removed until the system has been approved and accepted by the Public Works Department.

The maximum spacing between catch basins shall not exceed 300 feet. For roadways wider than 48 feet, the spacing shall not exceed 200 feet. Catch basin spacing based on percent of roadway grade are as follows:

<u>Percent Grade</u>	<u>Maximum Spacing</u>
0.5 - 1.5	150 feet
1.5 - 3.0	200 feet
3.0 - 8.0	300 feet
8.0 - 12.0	200 feet
12.0 - 20.0	150 feet

Concrete inlets shall not be used where discharge pipe goes directly into main storm drain system. In cases where direct discharge into storm drain system is called for, a floatable material separator will be required per Standard Plan No. 410.

Except as otherwise required, all manholes, catch basins or inlets more than 5-1/2 feet in depth from the pipe invert to the grate shall be provided with a secured ladder as detailed in Standard Plan Nos. 427 or 427A.

Storm drain manholes and Type 2 Catch Basins functioning exclusively as access structures shall be equipped with round 24 inch covers and frames per Standard Plan No. 428. Round lids on all storm drain structures shall have "Drain" cast into the lid.

All catch basins and manholes not in a paved area shall be equipped with locking frames and lids or grates per Standard Plan Nos. 405 or 407.

All PVC connections to catch basins or manholes shall be made by grouting in an approved manhole adapter into which the PVC pipe is inserted.

Frame and grates under normal conditions shall be furnished and installed per Standard Plan Nos. 405 and 407. All required lockdown measures shall be designed and installed by the manufacturer. Unlock tools must be provided to the City by the contractor prior to final acceptance.

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In conditions when the effectiveness of a normal grate installation would be limited, an open grate face inlet frame and grate shall be furnished and installed per Standard Plan Nos. 408 and 409. These conditions usually occur due to high likelihood of clogging from leaf fall, especially in sag vertical curves; when the inlet is a surface drainage end point, such as a cul-de-sac and when the road grade is such that normal inlet grates are passed over during storms. The use of open curb face frame and grates must be approved by the Public Works Director.

All Type 2 Catch Basins and all manholes with catches shall be supplied with locking lids or grates per Standard Plan No. 405. Unlock tools must be provided to the City by the contractor prior to final acceptance.

At a minimum, a Type 2 Catch Basin shall be installed as the last collector in the public right-of-way prior to discharge in the stormwater system.

4-16.4 MAINTENANCE

Accumulated sediments shall be removed from manholes and catch basins when accumulated sediment reaches a depth of 6 inches or more.

4-17 OPEN CHANNELS

Open channels can be classified as either natural or artificial. The terminology natural channel refers to all channels which have been developed by natural processes and have not been significantly improved by humans. Within this category are creeks, rivers and tidal estuaries. The category of artificial channels includes all channels, which have been developed by human efforts. Within this category are navigation channels, power and irrigation canals, gutters, and drainage ditches.

Points of discharge from culverts or storm sewers into any open channel shall be protected from erosion by means of rip-rap, splash boards, stilling wells, and/or adequate vegetative cover.

Where open channels or ditches are used as a means for conveying stormwater runoff, the ditch or channel must be able to convey the design storm at a nonerosive velocity. The maximum nonerosive velocity will be dependent upon the vegetative cover within the channel. If the design storm will result in a velocity greater than the maximum nonerosive velocity, lining the channel with rip-rap underlain by filter fabric will be required. Soil Conservation Service and Washington State Highway Standards will be used as guidelines for determining the maximum nonerosive velocities for the vegetative cover under consideration, as well as the extent of the revegetation or rip-rap protection required. The extent of protection will also be dependent upon downstream flooding, water quality, and fisheries conditions.

Any work within the low flow channel of any creek, stream or its tributaries will require a hydraulics permit from the State Department of Fisheries and/or Wildlife.

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4-18 TRASH RACKS

4-18.1 GENERAL

Trash racks are provided on pipe inlets and outlets to and from surface drainage facilities to prevent plugging of the opening with debris and to provide safety to the public. In the City of Gold Bar, all such exposed pipes 8 inches in diameter or larger shall be equipped with a trash rack for public safety. Smaller pipes shall be equipped with trash racks when plugging with debris is perceived to be a potential problem.

4-18.2 DESIGN CRITERIA

A net area of trash rack not less than 20 to 40 times the area of the outlet shall be provided for outlets with a 6 inch or less diameter.

For outlets 24 inches in diameter or larger, a net area of trash rack not less than four times the area of the outlet shall be provided.

The spacing between the openings of the trash rack shall be 6 inches or less, or smaller than the smallest dimension of the outlet.

All trash racks shall be sloped at 30 to 50 degrees above the horizontal.

A 4 to 6 inch horizontal opening at the bottom of the trash rack may be provided on larger outlets to allow smaller debris to flush straight through.

DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS

SECTION 5

WATER DISTRIBUTION

5-1 GENERAL

All construction of water mains and related appurtenances shall conform to these Standards, the Gold Bar Municipal Code, applicable American Water Works Association (AWWA) Specifications and Section 7-11 of the WSDOT/APWA Standard Specifications. The general requirements of AWWA and the WSDOT/APWA Standard Specifications shall apply unless they are inconsistent with any of the provisions of this particular section. Should inconsistencies occur, these Standards shall have precedence.

Relocation, alteration and/or improvements to the water system that are necessitated due to construction of improvements by private developers, shall comply with all adopted standards, and be paid for by the local improvement district, utility, individual, firm or corporation initializing the improvements or alteration.

Any public water system, or any plumbing in a residential or nonresidential facility providing water for human consumption, which is connected to a public water system shall be lead free. With respect to solders and flux lead free shall mean no more than 0.2% lead, and with respect to pipes and pipe fittings no more than 8% lead.

Water main extensions will be required when the property does not front on a water main or when the existing water main is not adequate for the increased use proposed. At the time of connection, the property owner will be required to extend the main for the full public or private road frontage of the lot on which the structure to be connected is located. If the lot does not front on a public or private road for its full width, the main shall be extended to the boundary line of the nearest adjoining lot, which may be anticipated to require future connection to the main. The standard size shall be 8 inches in diameter with a minimum diameter of 6 inches if approved by the Gold Bar Public Works Department.

Water main extensions and/or new fire hydrant installations may also be required per the requirements of the Uniform Fire Code.

For single family homes and duplexes, a fire hydrant is required within 350 feet of any structure.

For all other buildings from triplexes to commercial uses, a fire hydrant is required within 200 feet, but not closer than 50 feet to any structure (measured distance to be along route to be traveled by fire equipment).

Unless finish grade information is provided to the water service construction crew prior to the installation, the property owner/applicant will be responsible for and may be charged for any necessary adjustments.

After the installation of any water service by the City of Gold Bar Public Works Department, the property owner/developer shall be held responsible for, and may be charged for, any and all damages to the service line, meter setter, meter and meter boxes/vault or any other appurtenances until completion of construction and/or the structure is approved for occupancy.

All water mains on private property that are looped back to the public right-of-way or are open to the general public system shall be installed in easements, granted to the city, and shall be maintained by the city.

The minimum water main easement width shall be 10 feet in width and shall be exclusive for the water main and appurtenances.

Due to the complexities of many water mains and their interface with other underground structures, all water main construction shall be staked to insure placement within designated easements. Any deviation from this requirement must be approved by the Public Works Director

WATER DISTRIBUTION

Upon completion of the installation of the water system, the original signed mylar of the water plan must be as-built by the developer/contractor, certified as such by the developer/contractor and turned in to the city. It is recommended that an as-built print be submitted for checking by the Public Works Department prior to submitting the originals. The water as-built is to be submitted and approved prior to city acceptance of the new installation.

The installation of all water mains and appurtenances shall be in accordance with the construction plans as approved by the Public Works Department for the project. Any deviation or changes are to be approved by utilities before the changes are incorporated into the work.

All materials shall be new and undamaged. Unless otherwise approved by the Public Works Department, the same manufacturer of each item shall be used throughout the work. Contractors shall furnish a water tight plug of the appropriate size which shall be installed in the end of the water main anytime work is delayed or stopped.

5-2 CONSTRUCTION PLANS

- A. The design and construction of water and sewer mains, which are to be connected to the city water system, shall be designed by a registered, professional engineer of the State of Washington, at the applicants expense.
- B. All plans must include the information listed within 1-10.1 thru 1-10.4 of these standards.
- C. Water plans to be separate from others but should have water mains highlighted and indicate locations of other utilities.
- D. Plans must show easements where mains are on private property and all hydrants, meters, and other appurtenances must be within the easements which must be a minimum of 10 feet wide with no other utilities within 3 feet of the water main.
- E. Easements must be executed at completion of construction and mains must be in the middle of easement as much as possible. Access to easements for maintenance must remain open. Structures, fences, and shrubs are not to be planted on easements.
- F. Show elevations of sewer mains, water mains and storm drains where they cross each other.
- G. A minimum of 10 feet horizontal clearance shall be maintained between a water main, sewer main and storm drains whenever possible.
- H. All hydrants when installed must be covered by a burlap bag or other suitable covering until accepted by the city and placed in service.
- I. An AWWA or D.O.H. approved backflow prevention assembly may be required for irrigation systems, commercial applications and/or residences which maintain an approved home occupation. Determination shall be made at the time of application by the Public Works Director and shall be based upon existing D.O.H. standards and/or those activities which may pose a potential cross connection risk to the public water system.

5-2.1 REQUIRED NOTES ON PLANS

- A. No connection to the existing mains will be allowed except by means of an approved backflow prevention device prior to satisfactory flushing, testing, disinfection, and receipt of satisfactory bacteriological test results. The city Public Works Department shall conduct the bacteriological testing.

WATER DISTRIBUTION

- B. All connections to existing water mains shall be made by the contractor/developer with prior approval of plans by the Public Works Director
- C. All work and materials must conform to City of Gold Bar Standards.
- D. The City of Gold Bar Public Works Department must be notified at least 24 hours prior to commencing construction.
- E. The owner or the owner's authorized agent shall notify The Public Works Department of a person who can be contacted regarding problems during construction on a 24 hour basis.

5-2 BACKFLOW PREVENTION

All backflow prevention devices connected to the city owned system shall be tested and shown to be in satisfactory working condition prior to being installed into the system. Documentation of annual testing indicating satisfactory results must be provided prior to the installation of that device.

To prevent contaminated water from the new main from entering the existing distribution system, two check valves or a double check valve assembly shall be used on the line supplying the water. Two check valves or a double check valve assembly is sufficient backflow protection only for filling and flushing of the new main. During the hydrostatic pressure test, the temporary connection between the new main and the existing distribution system shall be removed.

An AWWA or D.O.H. approved backflow prevention assembly shall be required for irrigation systems, commercial applications and/or residences which maintain an approved home occupation. Determination shall be made at the time of application by the Public Works Director and shall be based upon existing D.O.H. standards and/or those activities which may pose a potential cross connection risk to the public water system.

Cost, installation and maintenance of required backflow prevention assemblies are the sole responsibility of the applicant/owner. Services with backflow prevention shall be required to participate in an annual cross connection control inspection/maintenance program conducted by the City of Gold Bar at applicant/owners expense.

For fire and irrigation, the minimum level of backflow prevention required is a double check valve assembly. Air gaps and reduced pressure backflow assemblies are required wherever a potential health hazard exists. Minimum requirements are based on a risk assessment according to D.O.H standards. The risk assessment shall be conducted by the city or the city engineering consultants.

The City of Gold Bars backflow prevention program is based on WAC 248-54-285 and Gold Bar Municipal Code 13.04.

Plan approval does not constitute approval of a backflow prevention system. A separate backflow prevention or assembly must be obtained and installed prior to initiation of water service.

5-4 EXISTING UTILITIES

When utility services occupy the same space as the new water main, the contractor shall do all necessary excavation to fully expose such services. The contractor shall protect said services and work around them during excavating and pipe laying operations. The contractor shall be responsible for all damages to the services due to his operation and shall immediately notify the engineer and arrange for replacement of all damaged services.

WATER DISTRIBUTION

In the event of conflict, the contractor shall remove and restore existing catch basin connections, inlet connections, drains, side sewers, inlets, and other sewerage and drainage facilities. All restoration shall be constructed to city standards. Water main pipe shall be installed to clear mainline sewers and storm drains.

It is anticipated that the contractor will encounter private water service utilities (water service lines running between the City Water service meter and private residences) during work operations. Records of these utilities are not maintained by the city and will not be field located by the Public Works Department. It shall be the contractor's responsibility to ascertain the location of and protect these private utilities from damage. Damage to these services shall be repaired by the contractor performing the work. Repairs shall meet all requirements of these standards.

Ends of abandoned water main shall be plugged by filling with Class 3000 or Commercial Concrete for a minimum longitudinal length of twelve (12) inches.

5-5 FIRE FLOW

Fire Flow requirements shall be based upon adopted levels within the City of Gold Bar's most current approved and adopted Water System Plan, the City Comprehensive Plan and the Uniform Fire Code.

5-6 PIPE AND FITTINGS FOR WATER MAINS

5-6.1 DESCRIPTION

The work included in the following sections shall apply to the construction of water distribution and transmission mains and appurtenances for both temporary and permanent installation.

5-6.2 MATERIALS

All water main distribution piping shall be ductile iron pipe, cement lined, standard thickness Class 52, unless otherwise specified and shall conform to the standards of USA Standard A-21.51 (AWWA C-151), and be installed in accordance with the manufacturer's recommendations. Any deviation from this policy must be approved by the Public Works Director on the plans for the project.

Polyethylene tubing shall conform to the requirements of AWWA C901. The pipe shall bear the seal of the National Sanitation Foundation for potable water pipe. Pipe joints shall be made in accordance with the manufacturer's recommendations. Solvent welded pipe joints will not be permitted. Minimum working pressure shall be 200 psi.

Cement lining thickness shall be in accordance with USA Standard A21.4 (AWWA) C-104).

5-6.3 JOINTS AND FITTINGS

Rubber gasket pipe joints shall be push-on-joint (Tyton) or mechanical joint (M.J.) in accordance with USA Standard A21.11 (AWWA C-111), unless otherwise specified. Flanged joints shall conform to USA Standard B16.1.

Bolts on mechanical joints and fittings shall be tightened uniformly with a torque wrench which measures the torque applied. The torque for mechanical joints shall be as follows:

Bolt size - inches

Range of Torque - ft/lbs

WATER DISTRIBUTION

5/8	40-60
3/4	60-90
1	70-100
1-1/4	90-120

Nuts spaced 180° apart shall be tightened alternately in order to produce equal pressure on all parts of the gland.

Set screws on retained glands shall be torqued to manufacturer's specifications.

Bolts for fittings and joints shall be cast or ductile iron, zinc or chromium plated or stainless steel.

Cast or ductile iron fittings shall be short body for pressure rating of 200 psi, unless otherwise noted. Metal thickness and manufacturing process shall conform to applicable portions USA Standards A21.20, A21.11, B16.2 and B16.4. All fittings shall be cement lined per USA Standard A21.4 (AWWA C-104).

5-7 TRENCH EXCAVATION, BEDDING AND BACKFILL FOR WATER MAINS

5-7.1 DESCRIPTION

This work shall consist of excavating, bedding, and backfilling for water mains and appurtenances, for both temporary and permanent installation under ordinary conditions.

5-7.2 GENERAL

Material excavated from trenches and piled adjacent to the trench, or in a roadway or public thoroughfare, shall be piled and maintained so that the toe of the slope of the material is at least 2 feet from the edge of the trench. It shall be piled in such a manner as will cause a minimum of inconvenience to public travel, and provisions shall be made for merging traffic where such is necessary. Restricting of driveway access shall be kept to a minimum. Free access shall be provided to fire hydrants, water valves, and meters, and clearance shall be left to enable free flow of storm water in gutters, other conduits, and natural watercourses.

Trenches that are left open overnight must be steel plated and clearly marked to offer protection to pedestrians and vehicular traffic. Steel plates shall be meet traffic barring rating approval and approved by the City Public Works Department.

Free access shall be maintained to all other utility control valves, meters and vaults.

5-7.3 GRADE AND ALIGNMENT

Prior to any pavement cutting or removal, or excavation for pipe laying, the contractor shall verify, in the presence of a Public Works Inspector, the locations and establish the depth of the existing water mains at the points where connections are to be made. The contractor shall verify the dimensions, type, and condition of the existing water main. The profile shall be adjusted so neither a high spot nor a low spot is created adjacent to the connection to the existing water mains.

The minimum cover for water mains 12 inches in diameter or smaller shall be 36 inches to the top of pipe. The minimum cover for water mains over 12 inches in diameter shall be 48 inches to the top of pipe. The maximum depth shall not be greater than 60 inches to the top of pipe.

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All depths both minimum and maximum shall be from finish grades and shall be adhered to unless approved by the Public Works Department in writing. The water line and hydrants shall be installed by line and grade information as supplied by a survey.

5-7.4 TRENCH EXCAVATION

5-7.4(1) GENERAL

The contractor shall perform all excavation of every description and of whatever materials encountered. All excavations shall be made by open cut unless otherwise provided for. The bottom of trenches shall be accurately graded to provide uniform bearing and support for each length of pipe on undisturbed or compacted soil at every point along its entire length, except at the joints.

Bell holes shall be excavated to the extent necessary to permit accurate work in making and inspecting the joints. The banks of the trenches shall be kept as nearly vertical as soil conditions will permit. Where determined necessary by the engineer to control trench width, to protect adjacent structures, or to provide safe working conditions, the trench shall be properly sheeted and braced.

See Section 3-9 of these Specifications for additional information on trench excavation.

5-7.4(2) TRENCH WIDTHS

The minimum and maximum trench widths for water main installation shall be as follows:

TRENCH WIDTHS (In Inches)

<u>Nominal Pipe Diameter</u>	<u>Minimum Earth</u>	<u>Minimum Rock</u>	<u>Maximum</u>
2	18	24	36
3	18	24	36
4	18	24	36
6	24	24	36
8	24	24	36
12	28	28	40
16	30	30	42
18	31	31	43
20	33	33	45
24	36	36	48
30	40	40	52
36	47	47	59
42	54	54	66
48	61	61	73
54	68	68	80
60	75	75	87

5-7.4(3) CRIBBING AND SHEETING-SHORING

The contractor shall adequately shore trenches to protect the work, existing property, utilities, pavement, etc., and to provide safe working conditions in the trench. The method of shoring shall be according to the

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contractor's design. The contractor may elect to use a combination of shoring and overbreak, tunneling, boring, sliding trench shields or other methods of accomplishing the work, provided the method meets all applicable local, state and federal safety codes. Damages resulting from improper cribbing or from failure to crib shall be the sole responsibility of the contractor.

See Section 3-9 Underground Utilities for additional requirements on shoring requirements.

5-7.4(4) UNSUITABLE MATERIAL

Whenever in excavating the trench for water mains and the bottom of the trench exposes peat, soft clay, quicksand, or other unsuitable material, such material shall be removed from the trench and replaced by Foundation Material Class A as specified in Section 3-20.6 of these Specifications. All unsuitable material shall be loaded directly into trucks and hauled to a waste site obtained by the contractor. Stockpiling of unsuitable material on the project site will not be allowed.

5-7.4(5) BEDDING THE PIPE

Bedding material, when specified or required by the Public Works Department shall be washed course sand No.2 as specified in Section 3-20.3 or 5/8" Crushed Surfacing as specified in Section 3-20.5 of these Specifications. Bedding is defined as 6 inches below the pipe, around the pipe, and 6 inches above the pipe. Native material may be used for bedding of ductile iron pipe unless judged unsuitable by the Public Works Department.

5-7.4(6) BACKFILLING TRENCHES

The contractor shall use suitable native excavated material for trench backfill unless notified by the Public Works that the native material is unsuitable. The inspector will examine excavated native material at the time of excavation to determine its suitability for use as backfill. Unsuitable backfill material shall be removed from the site, disposed of, and replaced by Washed Course Sand No. 2 as specified in Section 3-20.3 or 5/8" Crushed Surfacing as specified in Section 3-20.5 of these Specifications and as directed by the Public Works Director.

All water service lines and meter boxes shall be backfilled using Washed Course Sand or equivalent to within 6 inches of final grade.

In backfilling the trench, the contractor shall take all necessary precautions to protect the pipe from any damage or shifting. The contractor shall backfill from the side of the trench to a maximum uniform depth of 1 foot above the crown of the ductile iron pipe before starting mechanical compaction.

During all phases of the backfilling operations and testing as outlined herein, the contractor shall protect the pipe installation, provide for the maintenance of traffic as may be necessary, and provide for the safety of property and persons.

See Section 3-9 for additional requirements on backfilling.

5-7.4(7) COMPACTION OF BACKFILL

Trench backfill shall be spread in layers and be compacted by mechanical tampers of the impact type approved by Public Works. Water settling will not be permitted. After the initial backfill is placed the remaining backfill material shall be placed in successive layers not exceeding 1 foot in loose thickness, and each layer shall be compacted to the density specified below:

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- a) Improved areas such as street and sidewalk areas shall be compacted to 95% of maximum dry density.
- b) Unimproved areas or landscape areas shall be compacted to 90% of maximum dry density.

See Section 3-9 for additional requirements on compaction.

5-8 CONSTRUCTION REQUIREMENTS

5-8.1 DEWATERING OF TRENCH

Where water is encountered in the trench, it shall be removed during pipe-laying operations and the trench so maintained until the ends of the pipe are sealed and provisions are made to prevent floating of the pipe. Trench water or other deleterious materials shall not be allowed to enter the pipe at any time. Silty or dirty trench water shall be filtered prior to leaving the construction site or entering any water course.

5-8.2 HANDLING OF PIPE

All types of pipe shall be handled in a manner that will prevent damage to the pipe, pipe lining or coating. Pipe and fittings shall be loaded and unloaded using hoists and slings in a manner to avoid shock or damage, and under no circumstances shall they be dropped, skidded, or rolled against other pipe. Damaged pipe will be rejected, and the contractor shall immediately place all damaged pipe apart from the undamaged and shall remove the damaged pipe from the site within 24 hours.

Methods of pipe handling shall be corrected by the contractor if the inspector determines that these methods are damaging to the pipe.

Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations, and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned, and relaid. A clean whisk broom shall be used for this purpose and for brushing to remove foreign matter prior to joining of pipe ends. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or by other means approved by Public Works to ensure cleanliness inside the pipe.

Pipe shall be stacked in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. The bottom tiers of the stack shall be kept off the ground on timbers, rails or other similar supports. Pipe on succeeding tiers shall be alternated by bell and plain end. Timbers 4 inches by 4 inches in size shall be placed between tiers and chocks shall be placed at each end to prevent movement. For safety each size of pipe shall be stacked separately and clearly marked to protect pedestrians and vehicular traffic. If pipe is to be stored for a prolonged period of time, pipe ends shall be covered to protect the pipe against contamination.

PVC pipe shall not be stored in the sunlight for a time period not to exceed the manufactures recommendation.

5-8.3 CUTTING PIPE

Whenever it becomes necessary to cut a length of pipe, the cut shall be made by abrasive saw or by a special pipe cutter. All pipe ends shall be square with the longitudinal axis of the pipe and the outside shall be

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beveled and otherwise smoothed so that good connections can be made without damage to the gasket. Threads shall be cleanly cut. Oxyacetylene torch cutting of ductile iron pipe will not be allowed.

5-8.4 LAYING PIPE ON CURVES

Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflecting the joints. If the pipe is shown curved in the drawings and no special fittings are shown, the contractor can assume that the curves can be made by deflecting the joints with standard lengths of pipe. If shorter lengths are required, the drawings will indicate maximum lengths that can be used. The amount of deflection at each pipe joint when pipe is laid on a horizontal or vertical curve shall not exceed the manufacturer's printed recommended deflections.

Where field conditions require deflection or curves not anticipated in the drawings, the inspector will determine the methods to be used.

When rubber gasketed pipe is laid on a curve, the pipe shall be jointed in a straight alignment and then deflected to the curved alignment. Trenches shall be made wider on curves for this purpose.

Maximum deflections at pipe joints and laying radius for various pipe lengths are specified in the following table, or if not, shall conform to the manufacturer's and AWWA for the given type of pipe:

Maximum Permissible Deflection in Laying Mechanical-Joint Pipe

Size of Pipe Inches	Max. Permissible Deflections Per Length - In Inches				Approx. Radius of Curve Produced by Succession of Deflections			
	12-ft Length	16-ft Length	18-ft Length	20-ft Length	12-ft Length	16-ft Length	18-ft Length	20-ft Length
3	16	23	25	27	105	130	155	180
4	16	23	25	27	105	130	155	180
6	14	19	22	24	120	160	175	200
8	11	14	16	18	160	220	240	265
10	11	14	16	18	160	220	240	265
12	11	14	16	18	160	220	240	265
14	7	10	11	12	250	310	350	400
16	7	10	11	12	250	310	350	400
18	6	8	9	10	290	380	430	480
20	6	8	9	10	290	380	430	480
24	5	7	7	8	350	440	555	600
30	5	7	7	8	350	440	555	600
36	4	6	6	7	430	510	650	690

Maximum Permissible Deflection in Laying Push-In Joint Pipe

Size of Pipe	Max. Permissible Deflections Per Length - In Inches				Approx. Radius of Curve Produced by Succession of Deflections			
	12-ft	16-ft	18-ft	20-ft	12-ft	16-ft	18-ft	20-ft

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Inches	Length							
3	10	14	15	17	175	220	260	280
4	10	14	15	17	175	220	260	280
6	10	14	15	17	175	220	260	280
8	10	14	15	17	175	220	260	280
10	10	14	15	17	175	220	260	280
12	10	14	15	17	175	220	260	280
14	6	8	9	10	290	380	430	480
16	6	8	9	10	290	380	430	480
18	6	8	9	10	290	380	430	480
20	6	8	9	10	290	380	430	480
24	6	8	9	10	290	380	430	480
30	4	5	6	7	430	615	650	690
36	4	5	6	7	430	615	650	690

5-8.5 CONNECTIONS TO EXISTING MAINS

New taps and connections to the existing water system, over 1" in diameter, shall be installed by the developer, including the meter box, provided that it complies with all specifications of the city and state. In new subdivisions the developer shall install all water service connections. Installation of service connections shall coincide with the installation of the water main.

No water system valves on existing mains shall be operated by the contractor. City staff will operate all valves to accomplish shutdowns and subsequent reactivations. Draining of existing water mains will be conducted in the presence of city staff.

The owner/contractor will connect a double check valve assembly to the end of the water line at the designated point as shown on the approved plans. The approved double check valve assembly will be required during pressure, flushing and purity tests.

After receiving satisfactory purity tests, the owner/contractor will notify the public works inspector to schedule the removal of the double check assembly and to the final connection of the water main.

Water used for flushing and testing shall not be discharged into any waterways until the chlorine content is reduced to or falls below a reading of 1.2 parts per million.

Any party installing, repairing, extending or modifying water lines in the public right of way/ easement, which lines are connected to the city's water system will be required to provide insurance bonding and indemnification as per Gold Bar Municipal Code 13.04.240.

5-8.6 LOOPED MAINS

Unless otherwise approved by the city, dead ending of water main will not be permitted. All dead ends must be looped to existing water mains. In the event it is necessary for the developer to obtain an easement for the city through private property to accomplish looping of the dead end, the easement shall be a minimum of 10 feet wide. In those situations where the city has granted approval for a dead end main, a hydrant shall be required at the end of the main unless the city approves a blowoff assembly..

5-9 SERVICE LINES

WATER DISTRIBUTION

5-9.1 GENERAL

Service lines from the water main to the meter for all services 2 inches and smaller shall be polyethylene tubing. A number 10 copper trace wire is required for polyethylene pipe. All service lines 4 inches and larger shall be cement lined ductile iron pipe from the main to the meter.

Each single-family and duplex unit (side) shall be metered from their own individual connection. Commercial and/or multi-family applications may be served from a central master meter location as determined by the public works department.

Service lines from the water main to the meter for all services 2 inches and smaller shall be no shorter than 5 feet nor longer than 50 feet unless otherwise approved, in writing, from the city.

All service connection piping within the public right-of-way shall be a minimum of 30 inches below the finish grade surface. For further details on services and hook-ups, see Standard Nos. 502A and 502B.

On services installed in conjunction with new water mains, it is required that the services be installed from the main to the permanent curb stop and be subjected to purity and hydrostatic testing with the new water main as detailed in Sections 5-14 and 5-15.

5-9.2 MATERIALS

Polyethylene tubing shall conform to the requirements of AWWA C901. The pipe shall bear the seal of the National Sanitation Foundation for potable water pipe. Pipe joints shall be made in accordance with the manufacturer's recommendations. Solvent welded pipe joints will not be permitted. Minimum working pressure shall be 200 psi.

Ductile iron pipe shall conform to the requirements shown in Section 5-6.2 of these Standards.

5-9.3 CONNECTIONS

Service connections on all water mains or for any service 1 inch or larger shall be installed with Mueller, Rockwell, Romac or approved equal pipe saddles. The minimum acceptable tap size shall be 1 inch.

No service connections may be installed on fire service mains or on fire hydrant laterals between the hydrant valve and the fire hydrant.

5-10 VALVES FOR WATER MAINS

5-10.1 GENERAL

All valves shall be inspected upon delivery in the field to ensure proper working order before installation and shall be free of all rust and dirt. Valves shall be disinfected prior to being placed in any active system. They shall be set and jointed to the pipe in the manner as set forth in the AWWA Standards for the type of connecting ends furnished. The valves shall also be carefully inspected for injury to the outer protective coatings.

An Operating Nut Extension shall be installed when the ground surface is more than 24 inches above the valve operating nut. The Operating Nut Extension shall extend into the top section of the Standard Valve

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Box and shall clear the bottom of the lid by a minimum of 10 inches. When required, it shall be furnished and installed by the contractor.

At a minimum, valving shall be installed at all intersections, on each end of easements, and in line at maximum spacing of 600 feet, such that no more than 75 people would be out of service in any given shutdown. Additional valving may be required in high density areas.

5-10.2 AIR AND VACUUM RELEASE VALVES

If requested by the city, air and vacuum release valves shall be incorporated into the design of all new water system extensions or replacements. Air and vacuum release valves shall be installed per the manufactures requirements.

5-10.3 BUTTERFLY VALVES

Butterfly valves shall conform to AWWA C504, Class 150, with cast iron short body and "O" ring stem seal. Butterfly valves shall be used for all lines over 8 inches in diameter, except as noted in Section 5-10.5.

Butterfly valves in chambers shall have a mutual crank operation.

Buried butterfly valves will require valve operator extensions per Section 5-10.1 and as shown on Standard No. 504.

5-10.4 CHECK VALVES

Check valves for permanent installations other than cross connection control shall be rated the source pressure, unless otherwise specified, and shall have adjustable tension lever and spring to provide non-slamming action under all conditions unless otherwise specified. For backflow prevention see Section 5-3.

5-10.5 GATE VALVES

Buried gate valves shall be iron body, bronze mounted, resilient seal, nonrising stem suitable for installation with the type and class of pipe being installed. Ends to be equipped with standard 2 inch operation nut, and "O" ring stem seals. Valves must be of the type to have two "O" ring stem seals in the stuffing box of the valve to facilitate seal replacement without valve dismantling.

Gate valves shall only be used for lines 8 inches and smaller, all lines 12 inches or larger shall utilize butterfly valves, except as approved by Public Works. This is also a requirement for 12 inch tapping valves.

Valves not buried shall be specified on the plans.

Two inch gate valves shall be super heavy duty with resilient seat. Valves shall be Waterous Series 500, M&H 4067, or approved equal.

5-10.6 VALVE BOXES

Valve boxes in all areas shall be cast iron, two piece units designed with tabs (lugs) on cover, equal to a "Rich No. 940" as manufactured by Rich or Sather. Tabs on lid must be aligned to correspond with the direction of travel of the main. Fogtite or equal. See Standard Plan No. 504.

WATER DISTRIBUTION

The valve and valve box shall be set plumb with the valve box centered on the operator nut. Valve boxes shall be set flush in pavement and gravel roads. Asphalt or concrete is required in gravel roads 2 feet around the valve box. When the top of the valve operation nut is more than 3 feet below finished grade, a valve operator extension shall be installed per Standard No. 504. The minimum extension length shall be 12 inches.

5-10.7 VALVE MARKER POSTS

Marker posts per Standard No. 510 shall be installed for all valves located in unimproved or unpaved areas. Valve marker posts shall be set as directed by the public works inspector in a safe and reasonable conspicuous location. The distance to the valve is to be neatly stenciled on the post with 2 inch numerals. Valve markers shall be painted with traffic safety yellow paint and be installed in a minimum of 24" of compacted soil or crushed rock. Valve marker posts are not required for auxiliary hydrant valves.

5-11 HYDRANTS

5-11.1 GENERAL

Fire hydrants shall be installed in accordance with Standard Plan No. 507, at locations as shown on the approved plans. They shall be painted with 2 coats of high gloss Traffic Safety Yellow "Rust-Oleum" type paint.

Hydrants shall be the "Traffic Model" type with approved breakaway features. All hydrants shall be brass to brass subseat, minimum valve opening of 5-1/4 inches "O" ring stem seal, 6 inch mechanical or flange shoe connection, 1-1/4 inch pentagonal operating nut. Approved models are listed on Standard Drawing No. 507.

All hydrants shall have a minimum of (2) 2-1/2 inch National Standard Thread connection and (1) 4 1/2" National Standard Thread pumper connection (steamer port).

5-11.2 CAP REQUIREMENTS

- A. One seal to be nitrile/vinyl rubber, suction style for zero leakage, color to be gray.
- B. One-eighth inch vinyl covered aircraft cable, 18 inches minimum length to be attached to cap and adapter.
- C. Force to connect or disconnect to be a minimum of 18 ft/lbs, maximum of 30 ft/lbs.
- D. Outside diameter (not to exceed) 7-3/4 inches, overall length (not to exceed) 2 inches.

All hook-ups to fire hydrants for temporary water for whatever purpose shall be approved by the public works department and will require a hydrant use permit.

5-11.2 HYDRANT GUARD POSTS

Hydrant guard posts shall be required anywhere hydrants are exposed to any traffic or pedestrian hazards and have no other means of protection, as deemed necessary by the City Public Works Department.

WATER DISTRIBUTION

Hydrant guard posts, when required shall be either reinforced concrete posts 8" x 8" x 6' long, or 6" diameter x 6' long Schedule 40 steel pipe, concrete filled. All guard posts shall be painted with traffic safety yellow paint and be installed in a minimum of 42" of compacted soil or crushed rock. See Standard No. 510

5-12 PRESSURE REDUCING STATIONS

When pressure reducing stations are required or needed, all pipe, fittings, and equipment shall be supported and blocked against static and dynamic loading in accordance with the equipment manufacturers' recommendations and as approved by Utilities. Drain lines from pumps or other equipment shall be piped to a below grade drainage system connected to the station sump or drain. All drains shall utilize either an air gap or approved backflow prevention assembly to eliminate potential contamination.

5-13 CONCRETE THRUST BLOCKING

Concrete thrust blocking, as indicated on the Drawings and Standard Plans Nos. 505 and 506, shall be placed at bends, tees, dead ends, crosses and as designated by the engineer. Blocking shall be Class 3000 concrete mix poured in place.

Concrete thrust blocks shall be cast in place and have a minimum of 1/4 square feet of bearing against the fitting and 2 square feet of bearing against undisturbed soil and shall be clear of joints so as to permit taking up or dismantling the joint. All poured in place blocking shall have a minimum measurement of 12 inches between the pipe and the undisturbed bank. All blocking configurations and sizes shall be per Standard Nos. 505 and 506. All blocking as shown on the Standards are considered as minimums, and consideration should be given to unusual circumstances and topography.

Although, Standard Plan Nos. 505 and 506 will work quite adequately in many situations, they should not be used to substitute for professional engineering design, particularly in situations involving large diameter pipe lines (greater than 12 inches), high velocity situations (greater than 10 ft/sec), or soils where soil type or stability may be questionable. One of the more common cases of thrust block failure is the installation of thrust blocks in unstable soil, or in locations too close to trenches for other pipe lines.

5-14 HYDROSTATIC PRESSURE TEST

All water mains and appurtenances shall be hydrostatically tested as specified in Section 7-11.3(11) of the WSDOT/APWA Standard Specifications. A copy of this test procedure is included in the back of this Section.

The contractor shall provide all necessary equipment and shall perform all work connected with the tests. The contractor shall perform the test to assure that the equipment to be used for the test is adequate and in good operating condition and all air has been released prior to requesting the city inspector to witness the test.

5-15 DISINFECTION OF WATER MAINS

Before being placed in service, all newly installed pipe shall be flushed, chlorinated and a satisfactory bacteriological report obtained.

Disinfection by the Dry Calcium Hypochlorite Method shall not be allowed unless written approval has been obtained from the public works director.

WATER DISTRIBUTION

Disinfection of water mains shall be performed in accordance with AWWA Standard C651-86 and Section 7-11.3(12) of the Standard Specifications. A copy of this procedure is included in the back of this Section.

Flushing water must be disposed of in accordance with City of Gold Bar Water Management and Washington State Department of Ecology Standards. Flushing water may require dechlorination, site removal and/or disposal. Method of disposal shall be approved by the engineer.

5-15.1 CHLORINE DOSAGE

References in Section 7-11.3(12) of the WSDOT/APWA Standard Specifications to an initial chlorine content of the water of not less than 50mg/l is hereby changed to 25mg/l.

The amounts of chlorine (Cl₂) required to give 25mg/l for 100-foot lengths of various diameter of pipe are:

AMOUNTS OF CHLORINE REQUIRED FOR 25 MG/L DOSAGE

Pipe Size (inches)	Volume of Water Per 100 ft length (gallons)	Household Bleach 5-1/4% (gallons)	Commercial Bleach 12-1/2% (gallons)
4	65.3	.03	.13
6	146.5	.07	.03
8	261.0	.13	.053
10	408.0	.2	.08
12	588.7	.3	.12
14	799.6	.4	.16
16	1044.4	.5	.21
20	1631.9	.8	.33
24	2349.9	1.1	.47
30	3671.7	1.8	.75
36	5287.3	2.5	1.1
42	7196.6	3.5	1.44
48	9399.6	4.6	1.6

5-16 UNDERGROUND UTILITIES

Activities such a trench excavation, tunneling or boring, pipe embedment, backfilling, compaction, safety and pavement patching, whether for public or private utilities, shall conform to the requirements set forth in this Section and other Sections of these standards.

**DESIGN AND CONSTRUCTION STANDARDS
AND
SPECIFICATIONS**

SECTION 6

RECREATIONAL VEHICLE PARKS AND CAMPGROUNDS

6-1 GENERAL REQUIREMENTS

The following documents are adopted for the design, preparation of plans and the construction of recreational vehicle campgrounds and parks. All work performed in the design, preparation of plans and in the construction or improvements of RV parks or campgrounds, whether public or private shall be the responsibility of the developer or contractor and done to the satisfaction of the Public Works Director and in accordance with the following adopted standards and specifications.

1. ANSI A119.4 NFPA 1194 Standards on Recreational Vehicle Parks and Campgrounds 1999 Edition.
2. Designing RV Parks & Resorts for the 21st Century (5th Edition Oct. 2000)
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