

DIVISION 3. STREETS AND RELATED WORK

3-10 GENERAL: Design, preparation of plans, and construction of all street improvements and/or appurtenances shall be the responsibility of the developer. All improvements shall be in accordance with current City of Bremerton Design and Construction Standards. All plans shall be approved by the City Engineer prior to issuance of any permits for construction.

3-20 DESIGN:

3-20.1 Roadway Types and Geometrics:

3-20.1(1) City of Bremerton roadways are classified functionally as indicated in Standard Detail No. 3001. Criteria for minimum right-of-way and roadway widths and other geometrics shall be as listed for given classifications.

3-20.1(2) Structural sections and roadway appurtenances shall be as shown on Standard Details Nos... 3002, 3004, 3005, 3006. Where unusual site and use conditions occur the City Engineer may require the designer to perform an engineering analysis on parameters such as soil conditions, ADT and vehicle classifications of traffic proposed on the street.

3-20.1(3) Typical Utility Locations: Typical utility locations for design purposes are shown on Standard Detail No. 3009.

3-20.1(4) Curb and Gutter: Type "A-1" curb and gutter per Standard Detail No. 3131 shall be used on both sides of all roadways.

3-20.1(5) Concrete Sidewalks: Concrete sidewalks shall be required as noted in Standard Detail No. 3101 and shall be constructed per Section 8-14 of the Standard Specifications.

3-20.1(6) Driveways: Driveways shall be per Standard Details Nos. 3121, 3122 as applicable.

3-20.1(6)A General Criteria:

3-20.1(6)A1 New driveways installed in areas where curb and gutter improvements are not existing, and not required, 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.

3-20.1(6)A2 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 falling on the private property side. Provided however, storm runoff shall be maintained off the street.

3-20.1(6)A3 Commercial driveways located closer than 100 feet from the approach to an arterial intersection shall be signed and marked "Right Turn Only" for ingress and egress unless otherwise approved by the City Engineer. Private "Intersection Type" driveway openings may be approved in lieu of conventional driveways in commercial areas where the following criteria are met:

3-20.1(6)A3a Projected driveway usage is greater than 1000 vehicles per day.

3-20.1(6)A3b The opening is at least 200 feet from any other intersection.

3-20.1(6)A3c The opening is at least 200 feet from any other driveway on the property frontage under control of the applicant.

3-20.1(6)A3d A minimum 100-foot storage area is provided between the curb line on the street and any turning or parking maneuvers within the development.

3-20.2 Local Street Design:

The following elements should be incorporated in the design of the local residential street system to discourage and minimize both the volume and impact of through traffic within residential neighborhoods or subdivisions:

1. Use of T-intersections
2. Use of Cul-de-sacs
3. Use of loop streets
4. Use of curvilinear street pattern

Employment of the above design elements will provide some degree of travel discontinuity, thus discouraging the use of residential street system and through routes.

In addition excessive speed within the neighborhoods may also be minimized. Care should be taken in street design to ensure that connections to collector and arterial streets are adequate, as determined by the City Engineer.

3-20.3 Street Ends:

3-20.3(1) 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 200 feet. Cul-de-sacs shall be per Standard Detail No. 3005.

3-20.3(2) On temporary dead ends, when the length of the street is less than 200 feet, the required turn-around area may be a hammerhead type of design per Standard Detail No. 3011.

3-20.4 Sight Distance and Stopping Sight Distance:

The designer shall use WSDOT “ Design Manual and AASHTO “ A Policy on Geometric Design of Highways and Streets for determining sight distances.

3-20.5 Intersections:

3-20.5(1) Criteria:

	Intersections	Low Speed Curves
Angle of Intersection	80° to 90°	Up to 80°
Minimum centerline radius	N.A.	100 feet
Minimum curb radius	25 feet	N.A.

3-20.5(2) Minimum Centerline Offset of Adjacent Streets

3-20.5(2)A Local access and collector streets, any combination 160 feet

3-20.5(2)B Local access or collector streets, crossing or connecting to any arterial; or arterials intersecting arterials 300 feet

3-20.5(3) The design engineer shall field locate and verify the alignment of all existing utilities including depths and manhole inverts.

3-20.6 Radii on Curb Returns:

3-20.6(1) The minimum allowable curb radius shall be 25 feet, which is to be measured from the radius point to the face of curb. The 25-foot radius curb return may only be used at the intersection of two local access residential streets.

3-20.6(2) On all other street intersections, the minimum allowable radii shall be 30 feet, which shall also be used at the intersection of local access residential street with any collector or arterial.

3-20.6(3) Radii of 40 feet or more, and preferably three-centered compound curves or simple curves with tapers to fit the paths of appropriate design vehicles, should be provided where large truck combinations and buses turn frequently. Larger radii are also desirable where speed reductions would cause traffic problems.

3-20.7 Curb Ramps (Wheelchair Ramps): In accordance with State Law, curb ramps shall be provided at all pedestrian crossings with curb sections. See Standard Details No. 3111 and 3112 for details. 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.

3-20.8 Monumentation: It shall be the developer's responsibility to monument the boundaries of all plats, major street intersections, and street centerline control points.

3-20.8(1) Monuments shall be located at all centerline intersections of intersecting streets. Curve streets shall be monumented at centerline P.I.'s (point of intersection), if it falls within the street driving surface, otherwise both P.C. (point of curvature) and P.T. (point of tangency) of the curve shall be monumented.

3-20.8(2) Monument and monument case and cover shall be supplied and installed per Standard Details No. 3401. Monuments shall be set by a Professional Land Surveyor, licensed in the State of Washington.

3-20.8(3) It shall be the responsibility of the developer to provide longitude and latitude coordinate information of all newly installed monuments to the City Engineer.

3-20.9 Street Illumination:

3-20.9(1) Street lights shall be provided in construction drawings for plats and for commercial developments in accordance with City street light standards. All luminaires maintained by the Puget Sound Energy shall be subject to their approval. All street light wiring, conduit and service connections shall be located underground.

3-20.9(2) Street light locations must be approved by the City Engineer.

3-20.9(3) Coordination for the installation of the street lighting system by Puget Sound Energy (if applicable), shall be the responsibility of the developer.

3-20.10 Traffic Control Signing and Striping:

3-20.10(1) All traffic control devices shall conform to "Manual on Uniform Traffic Control Devices" (MUTCD) as applicable. It shall be the developer's responsibility to pay for all materials and labor as required to install all traffic control devices. All required signing (traffic control and street name signs), striping, and other delineation as required, shall be as shown on the street improvement plans prior to plan approval and shall be installed by City forces. Developer shall reimburse City for installation of traffic control devices.

3-20.10(2) See Section 9.2.1, "Lane Markers", Standard Specifications for Road, Bridge

and Municipal Construction.

3-20.11 Guardrails: Where required, guardrails shall conform to standards published in Standard Specifications WSDOT and APWD, most recent revision. Type selected shall be approved by the City Engineer.

3-20.12 Safety Railing:

3-20.12(1) Sidewalk Safety Rail: When a sidewalk is to be constructed above a slope, adjacent to a rock wall or retaining wall where, in the opinion of the City Engineer a hazardous condition will exist, a safety rail will be required.

3-20.12(2) Design: Safety railings shall be constructed of 2" galvanized steel pipe with vertical supports at 10 feet on center and horizontal railings 9 inches on center. All joints except expansion joints, shall be welded and the entire safety railing coated to assure corrosion protection. Railings shall be erected to assure a continuous line and grade. Finish height to be 42 inches above pedestrian area.

See Standard Detail No. 3301 and 3302

3-20.13 Rock Walls and Retaining Walls:

3-20.13(1) Public Works Permit is required for ALL rock walls/retaining walls within the public right-of-way. Structural calculations and design drawings stamped by a Licensed Engineer are required for all retaining walls greater than 4 feet in height measured from undisturbed grade to top of wall.

3-20.13(2) Removed.

3-20.13(3) Rock Wall Usage:

3-20.13(3)A Rock walls may be used for the containment of cut or fill embankments up to a maximum height of 4 feet in stable soil conditions which will result in no significant foundation settlement or outward thrust upon the walls.

3-20.13(3)B Rock walls may be used for containment of cut or fill embankments greater than 4' high and up to a maximum height of 12 feet upon approval by the City Engineer of a rock wall design stamped by a Licensed Structural Engineer. In addition to construction monitoring by Public Works, rock walls greater than 8 feet in height require the owner to employ a licensed soils engineer for construction inspection and submit copies of his inspection reports to the City Engineer.

3-20.13(3)C Rock Wall Materials

3-20.13(3)C1 Size categories shall include:

Two-man rocks (300 to 800 pounds), 13" - 18" in least dimensions; and

Three-man rocks (800 to 1,500 pounds), 18" - 24" in least dimensions;
and

Four-man rocks (1,500 to 2,100 pounds), 24" - 32" in least dimension;
and

Five-man rocks (2,100 to 3,000 pounds), 30" - 38" in least dimension.

Five-man rocks shall be used for bottom course rock in all rock retaining walls over 7 feet in height.

3-20.13(3)C2 The rock material shall be fractured and as nearly rectangular as possible. No stone shall be used which does not extend through the wall. The rock material shall be hard, sound, durable and free from weathered portions, seams, cracks and other defects. For all walls higher than 4 feet or with a surcharge, rock density shall be a minimum of 160 pounds per cubic foot.

3-20.13(4) Trench Excavation: The rock wall shall be designed and constructed with an excavated trench having a minimum depth of one-half the base course or one foot (whichever is greater) below the ground level in embankment sections.

3-20.13(5) Rock Selection and Placement: Rock selection and placement shall be such that there will be minimum voids and, in the exposed face of the wall, no open voids over six inches across in any direction. The final course shall have a continuous appearance and be placed to minimize erosion of the backfill material. The larger rocks shall be placed at the base of the rockery so that the wall will be stable and have a stable appearance. The rocks shall be placed in a manner such that the longitudinal axis of the rock shall be at right angles to the rockery face. The rocks shall have all inclining faces sloping to the back of the rockery. Each course shall be seated tightly and evenly on the course beneath. After setting each course, all voids shall be filled from the back with quarry rock to eliminate any void sufficient to pass a 2-inch square probe.

3-20.13(6) Backfill: The wall backfill shall consist of quarry spalls with a maximum size of 2-1/2 inches and a minimum size of 3/4 inches or as specified by a Licensed Engineer. This material shall be placed to twelve-inch minimum thickness between the entire wall and the cut or fill material. The backfill material shall be placed in lifts to an elevation approximately six inches below the top of each course of rocks as they are placed, until the uppermost course is placed.

3-20.13(7) Filter Fabric: Fabric shall be as specified by a Licensed Engineer See Section 2-1.4.

3-20.13(8) Location: The location of rock or structural retaining walls shall not restrict drivers' sight distances.

3-20.14 Curb and Gutter: The standard curb and gutter section shall be Type "A" per Standard Detail No. 3131. All new curb and gutter shall be placed over not less than six inches of compacted crushed surfacing top coarse placed over a compacted sub-grade. The minimum acceptable compaction shall be 95% of maximum density. Steel forms shall be used for all tangent sections. Wood forms may be used on curved sections and on curb returns. No new curb and gutter is to be poured until forms have been checked and approved for line, grade and compaction by the City inspector.

3-20.15 Sidewalks: All sidewalks shall be placed over a minimum of three inches of crushed surfacing top coarse compacted to not less than 95% of maximum density placed on compacted sub- grade. In all cases, sub-grade and top of rock grade shall be approved by the City Engineer prior to concrete being placed. Sidewalks shall be a minimum of 4" thick. Generally, score marks are to be placed on five-foot centers, but at the discretion of the inspector this may be changed to make a better match with the surrounding area. Expansion joints shall be placed to match those placed in curbs if new sidewalk is poured adjacent to curb and gutter, in all other cases the maximum spacing on expansion joints shall be thirty feet.

3-20.16 Driveways:

3-20.16(1) The minimum thickness of the driveway apron shall be six inches in residential driveways and eight inches in commercial driveways. The adjacent sidewalk in the driveway area is to have a minimum thickness of six inches in residential areas and eight inches in commercial areas placed over a minimum of four inches of crushed surfacing top coarse compacted to 95% maximum density over a compacted sub-grade. In all cases, sub-grade and top of rock grade shall be approved by the City Engineer prior to concrete being placed. Driveway aprons over fifteen feet wide shall have an expansion joint placed in the center of the apron.

3-20.16(2) In location where a driveway is to be constructed and sidewalk and curb and gutter is already existing, it must be totally removed and replaced to driveway standards. The total curb and gutter section shall be removed, either by saw cutting or to the nearest expansion joint, and replaced to driveway standards.

3-20.16(2)A Abandoned Driveways: Where driveways are to be abandoned the driveway section shall be removed and replaced with a curb and gutter section.

3-20.17 Trench Excavation: Trench excavation under sidewalks or roadways shall comply with all sections of the Standard Specifications.

All service and utility lines shall be shored, supported and maintained during construction. In the event of damage, breakage or environmental contamination the contractor shall be responsible for all claims and fines which may arise. Open trenches shall be closed by the end of each working day. The City Engineer may require the trench to be plated or covered with cold mix asphalt.

3-20.18 Trench Backfill: Excavated material may be used as trench backfill only when approved by the City Engineer. Otherwise trench backfill shall be select material complying with Section 9-03.9 (3) of the Standard Specifications and shall be installed as per applicable sections of the Standard Specifications.

3-20.18(1) Compaction: Compaction shall be in compliance with applicable sections of Division 7 of the Standard Specifications.

3-20.19 Patching: The edges of all street cuts must be free from loose or broken pieces prior to patching. All existing pavement edges shall be sawcut. See Standard Plan No. 3153.

3-20.19(1) Cement Concrete Patches: Cement concrete patches shall be installed as shown on Standard Detail No. 3154 and shall be given a heavy broom finish. Expansion joints shall be placed as directed by the Engineer.

3-20.19(2) Asphalt Concrete Patches: Asphalt concrete patches shall be installed as shown on Standard Plan No. 3153 and edges sealed with SS-1 or AR 4000.

3-20.20 Earthwork: Earthwork shall comply with applicable sections of Division 2 of the Standard Specifications.

3-20.21 Crushed Rock: Crushed rock material shall comply with section 9-03.9(3) of the Standard Specifications and shall be installed as per applicable sections of Division 4 of the Standard Specifications.

Ballast	Standard Specification	9-03.9(1)
Shoulder Ballast (2 1/2"-0")	Standard Specification	9-03.9(2)
Crushed Surfacing (1 1/4"-0")	Standard Specification	9-03.9(3)
Maintenance Rock (1/2"-0")	Standard Specification	9-03.9(4)

3-20.22 Recycled Glass Aggregate: Aggregate composed solely of glass may be used as gravel backfill for walls, pipe bedding, and sand drains; sand drainage blanket; and gravel burrow.

One hundred percent of the glass shall pass a 3/4-inch square sieve and not more than 5 percent by weight shall pass a U.S. No. 200 sieve. Sieve analysis shall be conducted according to WAQTCFOP for AASHTOT27/11 on at least a quarterly basis by the product

supplier. All test results shall be kept on file by the product supplier.

The maximum debris level shall be 10 percent. Debris is defined as any deleterious material which impacts the performance of the engineered fill and includes all non-glass constituents of the glass feed stock. The percentage of debris in cullet shall be quantified using the following visual method. Approximately 200 grams of processed cullet shall be placed in a flat pan or plate. The percentage of debris shall be estimated using AGI Data Sheets 15.1 and 15.2 "Comparison Charts for Estimating Percentage Composition", by the American Geological Institute, 1982.

Total lead content testing shall be performed quarterly by the product supplier. Tests shall include a minimum of 5 samples. Sample collection shall be conducted according to WSDOT FOP for AASHTO T 2. The mean of these tests shall not exceed 80 ppm. Total lead content testing will be conducted according to the EPA Method 3010/6010. All test results shall be kept on file by the product supplier.

3.20.23 Pavement: Pavement materials and construction methods shall comply with applicable sections of Division 5 of the Standard Specifications.