Standard Construction Notes

Appendix B

Notes:
1) The developer's engineers can request the standard construction notes in digital format from the City Engineer.
2) Per PWDS 1.10.d.1.f, all applicable City standard notes are to be included on construction drawings submitted for City review and approval. Supplemental notes may be added at the discretion of the design engineer.

GENERAL NOTES:

1. Contractor shall procure and conform to all construction permits required by the City of Aumsville and Marion County, and conform to all conditions and requirements of said permits. Issuance of a City Public Works street/site/utility construction permit does not relieve the contractor from obtaining any and all reviews and permits required under building, plumbing or electrical codes that any portions of the work may be subject to (including a site plumbing permit if required), or from any requirements under permits which may be required for the project by other agencies with jurisdiction.

2. Contractor shall procure a right-of-entry permit from ODOT State Highway Division for all work within the State right-of-way and conform to all conditions of the permit.

3. Contractor shall procure a right-of-entry permit from affected railroads for all work within the railroad right-of-way and conform to all conditions of the permit.

4. A copy of final approved construction drawings and any required permits shall be kept on-site at all times, for review by inspectors upon request.

5. Contractor shall provide all bonds and insurance required by public and/or private agencies having jurisdiction.

6. All grading, rocking, paving, utility and related work shall conform to Oregon Standard Specifications for Construction - OSSC (ODOT/APWA), 2021 edition, or local jurisdiction standards, whichever is more stringent.

7. All materials and workmanship for facilities in street right-of-way or easements shall conform to approving agencies' construction specifications wherein each has jurisdiction, including but not limited to the City, County, Oregon Health Authority – Drinking Water Services (OHA-DWS) and the Oregon Department of Environmental Quality (DEQ).

8. Unless otherwise approved by the Public Works Director, construction of all public facilities shall be done between 7:00 a.m. and 6:00 p.m., Monday through Friday, and between 9:00 a.m. and 6:00 p.m. Saturday.

9. The Contractor shall perform all work necessary to complete the project in accordance with the approved construction drawings including such incidentals as may be necessary to meet applicable agency requirements and provide a completed project.

10. Contractor to notify City, County, ODOT and all utility companies a minimum of 48 business hours (2 business days) prior to start of construction, and comply with all other requirements of ORS 757.541 to 757.571.

11. Any inspection by the City, County or other agencies shall not, in any way, relieve the Contractor from any obligation to perform the work in strict compliance with the applicable codes and agency requirements.

12. All traffic control plans & measures shall be approved by the agency with jurisdiction and in place prior to any construction activity. Contractor shall erect and maintain barricades, warning signs, traffic cones (and all other traffic control devices required) per City, County and ODOT requirements in accordance with the current MUTCD (including Oregon amendments). Access to driveways shall be maintained at all times.

13. Unless authorized in writing by the City prior to the start of the work, no work within any existing public roadway shall disrupt traffic flow for more than 14 consecutive days (timeframe applies independently and separately to each block or intersection where traffic control work is required).

14. **Record Drawings**. The Contractor shall maintain one complete set of approved drawings on the construction site at all times whereon he will record any approved deviations in construction from the approved drawings, as well as the station locations and depths of all existing utilities encountered (whether or not existing utilities are shown on the construction drawings). These field record drawings shall be kept up to date at all times and shall be available for inspection by the City upon request. Information on the field record drawings shall include reference measurements and materials type.

15. Upon completion of construction of public facilities, Contractor shall submit a clean set of field record drawings containing all as-built information to the Design Engineer for use in the preparation of As-Built drawings which must be submitted to the City prior to the first final walkthrough inspection.

16. The Contractor shall submit a suitable maintenance bond prior to final payment or final approval where required by public and/or private agencies having jurisdiction.

17. Contractor shall procure and conform to DEQ stormwater permit No. 1200C for construction activities where 1 acre or more are disturbed.

18. Elevations shown on the drawings are based from _____(City; OSHD, etc) Bench Mark ____, Elevation _____(adjusted 19__), consisting of a ____(brass cap; monument, etc.) Located at _____, *which is based on the NAVD 1988 datum corresponding to the FEMA flood map elevations*.

19. Address Numbers. Per OFC 505.1, all new and existing buildings shall have approved address numbers (4" minimum number height, color to contrast with background) placed in a position that is plainly legible and visible from the fronting street. For flaglots or other situations where the structure is not visible from the public street, an address sign shall be installed near the entrance to the driveway or private road. Temporary address signs shall be mounted in a visible location prior to and during any construction, and the permanent numbers mounted prior to occupancy, in a position that is plainly legible and visible from the street fronting the property.

20. Contractor is solely responsible for assuring that any site, street or utility work within the

jurisdiction of the City, meets or exceeds any and all legal requirements and any and all industry best practices in the design, construction and/or performance of such site, street or utility work. Contractor is solely responsible for payment of any assessment, fine, penalty, claim, damages or costs that result from Contractor's (1) performing site, street or utility work or (2) failing to perform site, street or utility work that meets or exceeds any and all legal requirements and industry best practices. The City may require and Contractor shall provide the City with confined space entry plans conforming with the requirements of OR-OSHA, traffic control plans, or other plans or performance descriptions necessary or desirable for the Public Works Director to assure that these requirements can be met in performing the work. The City's acceptance, review, or comments on or about the adequacy of any such plan shall not remove or reduce Contractor's sole responsibility to meet any and all legal requirements, administrative requirements, or industry best practices, and Contractor specially assumes, will defend, and will indemnify the City against any claims, liability, damages, fines, fees or assessments related in any manner to Contractor's site, street or utility work.

21. All construction water must be obtained through an approved hydrant meter or bulk water meter, at a location approved by Public Works Director.

22. The Contractor shall provide the City and the project engineer with the names and 24 hour telephone numbers of at least two persons associated with the project who can be contacted outside of regular work hours in case of emergencies.

23. Notice to Property Owners, Contractor Responsibility. When work performed by Contractor will impact or interrupt water/sewer/storm drainage utility service or interrupt vehicular or pedestrian access to any public or private property, Contractor shall notify all the affected parties prior to the anticipated impact a minimum of 48 hours in advance. In addition, Contractor shall provide door hangers or equivalent a minimum of 24 hours (and a maximum of 48 hours) before such interruption of utility service (or vehicular/pedestrian access) to all residences, structures or businesses impacted by the work (Contractor is responsible to coordinate with the City staff a minimum of 1 week prior in order to verify area of impact or interruption). In addition to the written notice, a representative of the Contractor shall knock on the front door of all affected residences or businesses on the morning that the work will commence, and attempt to notify the residents or businesses regarding the start of the work.

24. Fire, Police, Transit, School Bus Notification. Contractor shall provide a minimum of 48 hours (2 work days) notice to police, fire department and Post Office prior to any work that will impact vehicular traffic, and ensure that alternate emergency access is available. Provide a minimum 1 week (5 work days) notice to any transit district or school district of any traffic impacts on streets which are on bus routes *(Contractor to verify routes)*, and verify that arrangements are made for alternate routes.

25. Garbage/Recycle Notification. Contractor shall provide a minimum 1 week advance notice for the garbage/recycle collector, and make arrangements for the garbage and/or recycle receptacles at all properties to be placed at a location where they can be collected on the appropriate day(s).

EXISTING UTILITIES & FACILITIES:

26. ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is (503) 232-1987).

27. The location and descriptions of existing utilities shown on the drawings are compiled from available records and/or field surveys. The engineer or utility companies do not guarantee the accuracy or the completeness of such records. Contractor shall field verify sizes and locations of all existing utilities prior to construction.

28. The Contractor or developer shall retain a surveyor to research, locate and mark all existing property and street monuments within or adjacent to the work areas prior to construction. Any survey monuments that will be disturbed during construction of the project shall be referenced (prior to construction) and replaced (following construction) by a Registered Land Surveyor at the Contractor's expense. The monuments shall be replaced within a maximum of 90 days, and the County Surveyor shall be notified in writing and/or a survey document recorded as required by ORS 209 140, ORS 209.150 and/or ORS 209.155 as applicable.

29. Contractor shall field verify location and depth of all existing utilities where new facilities cross or are closely parallel to the existing facilities. All utility crossings marked or shown on the drawings shall be potholed using hand tools or other non-invasive methods prior to excavating or boring. Contractor shall be responsible for exposing potential utility and other conflicts far enough ahead of construction to determine necessary grade, alignment or depth modifications without delaying the work or requiring otherwise unnecessary materials, fittings or structures. If grade, alignment or depth modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer shall obtain approval from the City Engineer prior to construction. .

30. All existing facilities shall be maintained in-place by the Contractor unless otherwise shown or directed. Contractor shall take all precautions necessary to support, maintain, or otherwise protect existing utilities and other facilities at all times during construction. Contractor to leave existing facilities in an equal or better-than-original condition and to the satisfaction of the City Engineer.

31. Except where otherwise shown on the drawings and explicitly approved in writing by the City, existing City utilities crossed, intercepted by or in the vicinity of new utility lines or facilities (of the same system) shall be connected to the new City utility system at locations as required by the City Engineer and Public Works Director. Existing City utility lines which are parallel with, or which are replaced or superseded by the new utility lines (as determined by the City), shall be abandoned or removed as part of the project (and existing facilities or structures served by the abandoned lines shall be connected to the new system as applicable), as required by the City Engineer and Public Works Director.

32. Utilities that are abandoned in place, or interfering portions of utilities, shall be removed by the

Contractor to the extent necessary to accomplish the work. The Contractor shall plug the remaining exposed ends of abandoned utilities (grout or concrete plugs, if used, shall be installed to fill the full pipe diameter for a distance of two times the pipe diameter back from the pipe end).

33. Contractor shall remove all existing signs, mailboxes, fences, landscaping, etc., as required to avoid damage during construction and replace them to existing or better condition.

34. Unless otherwise approved by the City, all springs, field tiles or drain lines intercepted or exposed during construction shall be connected to catch basins or new storm lines, except for field tiles or drain lines which are removed completely during construction, or are located and plugged at 50 foot maximum intervals uphill of the location intercepted (grout plugs, if used, shall have a length of two times the pipe diameter). Any abandoned drain tiles downstream of the intercepting trenches shall be plugged with grout for a distance of two times the pipe diameter back from the pipe end.

35. Any septic tanks encountered during construction shall be pumped out. Contractor shall break bottom of tank out and backfill with pea gravel unless otherwise required by public agencies having jurisdiction. Septic tank removal to be in accordance with County Sanitarian requirements.

36. Any wells encountered shall be abandoned per the Oregon Water Resources Department (WRD) requirements, and notice provided to the Public Works Director and the City Engineer. Locations of abandoned wells shall be noted and clearly shown on the as-built drawings.

37. Any fuel tanks encountered shall be removed and disposed of per State of Oregon DEQ requirements, and notice provided to the Public Works Director and the City Engineer. Locations of abandoned fuel tanks shall be noted and clearly shown on the as-built drawings. Backfill with compacted granular material.

GRADING, PAVING & DRAINAGE:

38. Contractor to review soils/geotechnical report prepared by _____ (dated __/20__), and conform to all recommendations listed in the report or requirements shown on these plans, whichever is more stringent.

39. The Contractor shall be responsible for managing construction activities to insure that public streets and right-of-ways are kept clean of mud, dust or debris. Dust abatement shall be maintained by adequate watering of the site by the Contractor.

40. Unless otherwise noted, all grading, rocking and paving to conform to OSSC (ODOT/APWA) Specifications, 2021 edition.

41. Clear and grub within work limits all surface vegetation, trees, stumps, brush, roots, etc. Do not damage or remove trees except as approved by the engineer or as shown on the drawings. Protect all roots two inches in diameter or larger on trees which are not scheduled for removal.

42. Strip work limits, removing all organic matter which cannot be compacted into a stable mass. All trees, brush and debris associated with clearing, stripping or grading shall be removed and disposed of off-site. Fills are not to be placed prior to approval of stripping limits and depths and concurrence of such approval by the City.

43. Clearing & stripping areas near water bodies or on sloped terrain shall follow best management practices to prevent erosion or runoff at any time.

44. Immediately following fine grading operations, compact subgrade to 95% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Subgrade must be inspected and approved by the City prior to placing embankments or base rock.

45. Engineered fills shall be constructed and compacted in 6" lifts over approved subgrade. All fills within public right-of-ways and easements shall be engineered, with each lift compacted to 95% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).

46. All fills outside of public right-of-ways which are within potential building envelopes shall be engineered and comply with the Oregon Structural Specialty Code, with each lift compacted to 90% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Fills outside of building envelopes which are over 12-inches in depth shall also be engineered and compacted.

47. Unless otherwise shown on the drawings, straight grades shall be run between all finish grade elevations and/or finish contour lines shown. Finish pavement grades at transition to existing pavement shall match existing pavement grades or be feathered past joints with existing pavement as required to provide a smooth, free draining surface.

48. Contractor is responsible for coordinating with the City for the following proof-rolls (witnessed by the City, with a fully loaded rock truck). Performance of proof-rolls summarized below are required for all public street, fire lane or common use driveway improvements. Performance of a proof-roll does not replace the requirement for density testing where specified or where required by City standards.
--Subgrade proof-roll: prior to fabric or baserock placement.
--Curbline proof-roll: prior to placement of curb & gutter.
--Finished rock proof-roll: prior to paving.
If the subgrade is disturbed after the subgrade proofroll, or if inclement weather (ie. significant rain) occurs between the time any proof roll is performed and baserock placement, curb placement or paving, another proof roll may be required by the City.

49. Crushed granular baserock shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve, and shall be approved by the City prior to placement.

50. Granular Baserock Compaction. Compact granular baserock to 95% of the maximum dry

density per AASHTO T-180 test method (Modified Proctor). Prior to placing AC pavement, written compaction test results for baserock and trench backfill must be received by the City, and a finished rock grade proof-roll (witnessed by the City) must be performed.

51. Paving of streets shall not be allowed until after completion of all of the following as a minimum, including submittal of acceptable written test results to the City where applicable:
--all required testing, inspection and proofroll of baserock;
--installation and testing of new water, sewer and storm drain lines under paved areas (including trench compaction testing and submittal of test results to the City);
--review and approval of the franchise and/or private utility plans by the City Engineer; and
--installation of all franchise utilities or sleeves located under or crossing paved areas, curbs or sidewalks.

52. A.C. Pavement shall conform to OSSC (ODOT/APWA) 00744 (hot mixed Asphalt Concrete Pavements (ACP)) for standard duty mix, and shall be approved by the City prior to placement. Unless otherwise approved in writing by the City (prior to paving), base course paving shall be 3/4 inch dense graded mix and wearing/leveling course paving shall be 1/2 inch dense graded mix (Level 2 JMF for local streets/parking lots/fires lanes, and Level 3 JMF for collector/arterial streets). AC Pavement shall be compacted to a minimum of 91% of maximum density (at all locations) as determined by the Rice standard method, based on nuclear density testing.

53. Pavement Joint Locations & Offsets. Per OSSC 744.44, place ACP in panel widths to minimize the number of transverse and longitudinal joints to a minimum. For multi-lift paving, offset the longitudinal joints and transverse (end) joints in one panel by at least 6-inches from the joints in the panel immediately below (OSSC 744.44.a). Longitudinal pavement panel joints/seams shall be at or within 6 inches of the centerline of the street unless otherwise approved by Public Works Director and agency with jurisdiction. Where approved, joints offset from centerline shall be installed at or within 6 inches of lane lines or fog lines. In no case shall longitudinal pavement joints be allowed in travel lanes or adjacent to travel lane wheel paths.

54. Where offsets between pavement lifts cannot be provided, or where new paving abuts existing pavement *(extension or widening)*, a bench grind along the joint shall be provided per City standard details, with a strip of pre-tacked paving fabric centered over the joint between the first and second lift.

55. Pavement surface shall be a smooth, well-sealed, tight mat without depressions or bird baths. Bony or open graded pavement surfaces shall be repaired to the satisfaction of the City, prior to final acceptance of the work.

56. ACP mixtures shall be placed only when the surface is dry and weather conditions are such that proper handling, finishing and compaction can be accomplished. In no case shall ACP mixtures be placed when the surface temperature is below the minimum established under 2021 OSSC (ODOT/APWA) 00744.40 (Season and Temperature Limitations) or the project specifications, whichever is more stringent.

57. Contractor shall protect new pavement against traffic as required, until it has cooled sufficiently to avoid tracking.

58. All existing or constructed manholes, cleanouts, monuments, gas valves, water valves and similar structures shall be adjusted by the Contractor to match finish grade of the pavement, sidewalk, landscaped area or median strip wherein they lie.

59. Street pavement widening cross slope shall be a minimum of 2% and a maximum of 5% except at intersections, where the street cross slopes shall not exceed 2% maximum (intersection defined from end of curb radius both directions) to comply with ADA and PROWAG standards. Prior to placing curbs, Contractor shall field verify pavement widening cross slope and contact City if the design pavement widening cross slope is not within the limits stated above.

60. All street signs, traffic control signs, curb & pavement painting or striping, and/or reflectors shall be installed (in conformance with City and MUTCD standards) prior to requesting final inspection by the City. Signs or barricades at the end of streets, sidewalks or bike lanes shall conform with City standards and be acceptable to the Public Works Director.

61. Pavement Markings. Stop bars shall be provided at all stop signs, located behind the pedestrian crossing at a location acceptable to Public Works Director. All stop bars, crosswalk striping and other roadway marking and emblems shall be 125 mil thick pre-formed skid resistant thermoplastic with intermix glass beads (Premark BD by Ennis-Flint, or OptaTrac by Geveko Markings). Installation shall be by methods and by a contractor approved by Public Works Director.

62. Unless otherwise shown on the drawings, no cut or fill slopes shall be constructed steeper than 2H:1V maximum.

63. All planter areas shall be backfilled with approved top soil minimum 8" thick. Stripping materials shall **not** be used for planter backfill.

64. Contractor shall seed and mulch all exposed slopes and disturbed areas which are not scheduled to be landscaped, including trench restoration areas. Mulch shall be either hydromulch or finely chopped fescue or rygrass mulch conforming with OSSC (ODOT/APWA) Section 01030.15

    As noted in the OSSC, CEREAL GRAIN STRAW (wheat or similar) IS NOT AN ACCEPTABLE SUBSTITUTE without specific written approval.

65. Grading shown on the drawings is critical to functioning of detention system and shall be strictly followed.

66. Contractor shall coordinate and ensure that detention volumes are inspected and approved by public agencies having jurisdiction prior to paving and landscaping.

- **Curbs & Sidewalks**

67. Unless otherwise shown or indicated on the drawings, 6-inches nominal curb exposure used for design of all parking lot and street grades.

68. Unless otherwise approved in writing by the City and any other agency with jurisdiction, monolithic curb & sidewalk shall not be placed in the public right-of-way (ie. curb concrete & sidewalk concrete shall be placed separately). Joint material shall be placed at spacing and locations as noted on the standard details.

69. Construction of all curbs & sidewalks shall conform to the applicable requirements of OSSC (ODOT/APWA) Section 00759, Miscellaneous Portland Cement Concrete Structures, including placement, curing, finishing and the repairing of minor defects. Major defects (as determined by the City) will require removal and replacement of the defective portions as directed.

70. Where new curbing connects to existing curbing or is installed along existing streets or pavement, the gutter grade shall match the existing street grades so as to allow drainage from the street to the gutter, as well as through any transitions or connections between old & new curbs. The Contractor shall notify the City in writing of any grade discrepancies or problems prior to curb placement. Curbs that are placed too high or too low shall be removed and replaced as directed by the City

71. Finish sidewalk grades at transition to existing sidewalks shall match existing sidewalk grades as required to form a continuous, smooth, free draining surface. The Contractor shall notify the City in writing of any grade discrepancies or problems prior to sidewalk placement.

72. Each lot shall be provided with a minimum two 3–inch diameter weep holes per lot in curbs on each frontage to provide for lot drainage. As a minimum, one weep hole shall be located 5 feet from the property line on the low point in the lot frontage at the time of curb construction. Weep holes shall also be provided as required for existing drainpipes whether or not shown on the drawings, for additional drainpipes shown on the drawings, as well as on both sides of driveway aprons. Contractor shall install drainpipe (smooth wall PVC or ABS) from each weep hole to the back of sidewalk location prior to acceptance of the curbing by the City *(drain pipe under sidewalks shall extend 12-inches behind back of sidewalk and be capped)*, and shall connect to existing drain piping where such piping exists within or adjacent to the right-of-way or easement. Where storm drain laterals for lots are constructed to curb weepholes in conjunction with subdivision or development improvements (ie. where storm drain laterals from storm mainline is not provided), the Contractor shall install 3" x 4" eccentric reducers just past the back of sidewalk to transition to 4-inch PVC rain drain lines as applicable.

73. Weep holes installed in existing curbs shall be core drilled and sealed as required by Public Works Director.

74. New or replacement curbs shall be stamped with an 'S', 'D' or a 'W' at the point where each sanitary sewer, storm drain or water service lateral crosses the curb, respectively. Letters shall be a minimum of 2-inches high. Existing curbs crossed by new services shall have letters routed or cut into the concrete, unless otherwise approved in writing by the City.

75. Contractor shall construct handicap access ramps at all intersections in accordance with current ADA and PROWAG requirements.

76. Concrete. All curbs, sidewalks and driveway approaches shall be constructed using batch plant concrete 3300 psi min @ 28 days, max 5" slump, 4.5% air (±1.5%), and shall be cured with Type 1 or Type 1D clear curing compound. All sidewalks shall fully comply with all ADA and PROWAG standards.
--Standard sidewalks shall be a minimum of 4-inches thick.
--All pedestrian ramps and standard residential driveways shall be a minimum of 6-inches thick.
--Commercial or industrial use driveways and alley approaches shall be minimum 8-inches thick.
--Multi-Use paths shall be a minimum of 6-inches thick *(any pathways used for maintenance vehicle access to utilities shall be reinforced with #4 bar at 12" OC EW, unless 8" concrete thickness is provided).*

77. Curb & sidewalk concrete shall be placed only during periods when it will not be damaged by rain (protect unhardened concrete from precipitation). Concrete shall not be placed on frozen baserock. Do not begin concrete placement until temperature in the shade is a minimum of 35°F and rising, and stop placement if air temperature falls below 35°F. Protect concrete from freezing for a minimum of 5 days after placement per OSSC (ODOT/APWA) 0000440.40.d & 00756.40 or the project specifications, whichever is more stringent.

78. Contraction joints shall be installed directly over any pipes that cross under the sidewalk, to control cracking. In general, cracks in new curbs or sidewalks (at locations other than contraction joints) are not acceptable, and cracked panels shall be removed & replaced unless otherwise approved by Public Works Director.

79. Contractor shall conduct a flood test of all new or replacement pedestrian ramps after concrete is cured to demonstrate that the ramp does not hold water. After water is poured into the ramp area, the inspector shall check the ramp 15 minutes later to determine if water is ponding in the ramp or gutter area. If water is ponding in the ramp or gutter area and the pond is more than 1-foot in length or ¼-inch in depth, the Contractor shall be required to make repairs in an approved manner at his sole expense.

80. Where trench excavation or other work requires removal of (or causes damage to) PCC curbs and/or sidewalks, the curbs and/or sidewalks shall be sawcut and removed at a tooled joint unless otherwise authorized in writing by the City. Any sawcut lines shown on the drawings are schematic and not intended to show the exact alignment of such cuts.

81. Unless otherwise approved in writing by Public Works Director, areas along curbs and

public sidewalks shall be backfilled with approved topsoil, as well as being seeded and mulched (or hydroseeded).

PIPED UTILITIES:

82. Contractor shall coordinate and pay all costs associated with connecting to existing water, sanitary sewer and storm sewer facilities.

83. Unless otherwise noted, materials and workmanship for water, sanitary sewer and storm sewer shall conform to OSSC (ODOT/APWA) Specifications, 2021 edition.

84. The Contractor shall have appropriate equipment on site to produce a firm, smooth, undisturbed subgrade at the trench bottom, true to grade. The bottom of the trench excavation shall be smooth, free of loose materials or tooth grooves for the entire width of the trench prior to placing the granular bedding material.

85. **Pipe Bedding and Trench Backfill**. All pipes shall be bedded with minimum 6-inches of 3/4" minus granular backfill (crushed rock) bedding and backfilled with compacted 3/4" minus granular backfill in the pipe zone *(granular backfill shall extend a minimum of 12-inches over the top of the pipe in all cases)*. Granular trench backfill shall be used under all improved areas, including sidewalks.

86. Granular backfill shall be ¾"-0 conforming to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.

87. Granular Trench Backfill Compaction. Granular trench bedding and granular backfill in the pipe zone shall be compacted to be firm and unyielding, even though compaction testing is not required in this zone. Granular trench backfill above the pipe zone shall be compacted to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor), and shall tested in lifts for deeper trenches.

88. **Trench Foundation Stabilization**. If trenches are over- excavated for any reason, over-excavation shall be filled to the design trench subgrade (ie. to the bottom of the 6" thick pipe bedding layer) with compacted, well-graded granular backfill as specified (the use of open graded rock for trench foundation stabilization is prohibited unless it is completely encapsulated in geotextile fabric & approved in writing by the City).

89. Temporary thrust restraint on pressure pipelines shall be provided at all locations where necessary due to construction sequencing shown on the drawings, required by City standards or chosen by the Contractor. The adequacy of the temporary thrust restraint shall be the Contractor's sole responsibility, but shall be acceptable to the City and any other agency with jurisdiction. Any movement of the pipe or fittings during pressurization of the pipeline or connection shall be considered evidence that the temporary thrust restraint is not adequate, and the pipeline or connection shall be depressurized and the thrust restraint increased as necessary. Re-pressure testing or re-chlorination, if deemed necessary at the

sole discretion of the City, shall be completed at the Contractor's expense.

90. Contractor shall arrange for and pay all costs to abandon existing sewer and water services not scheduled to remain in service.

91. All piped utilities abandoned in place shall have all openings closed with concrete plugs with a minimum length equal to 2 times the diameter of the abandoned pipe.

92. The end of all utility stubs shall be marked with a painted 2-x-4, extending 2 feet minimum above finish grade (painted white for sanitary sewer, green for storm), and wired to pipe stub. Tracer wire shall be extended (and attached) to the top of the 2-x-4 post. Type of utility (ie. sewer, storm, etc) and depth below grade to pipe invert shall be clearly & permanently labeled on the marker post.

93. Contractor shall provide all materials, equipment and facilities required for testing all utility piping in accordance with City construction specifications.

94. **Tracer (Toning) Wire**. All water, sanitary and storm sewer piping shall have an electrically conductive insulated 12 gauge solid core copper tracer wire the full length of the installed pipe using blue wire for water and green for storm and sanitary piping.
--Tracer wire shall be taped to the top of the pipe at 10 foot maximum intervals and shall be extended up into all valve boxes, and manholes and catch basins and accessible from the surface.
-- All tracer wire splices shall be made with corrosion resistant waterproof wire nuts (DBR direct bury splice kit by 3M Company, or equal).
--Tracer wire penetrations into manholes shall be within 18 inches of the rim elevation and adjacent to manhole steps. The tracer wire shall be tied to the top manhole step or otherwise supported to allow retrieval from the outside of the manhole or catch basin.

95. **Warning Tape.** Detectable or non-detectable acid and alkali resistant safety warning tape shall be provided along the full length of all water, sanitary sewer and storm drain service laterals and along the full length of all water, sanitary sewer and storm drain mainline segments not located under sidewalks or paved portions of public streets. Underground warning tape shall be continuous the entire length of service laterals installed from the mainline to the back of the PUE.

96. **Warning Tape**. All underground water, sanitary and storm sewer piping shall have a 6-inch wide warning tape installed in the upper reaches of the trench as shown on Detail 301 *(color & "Caution: Buried ___ Below" wording as required for water, sewer, storm drain, etc.).*

97. No trenches in roads or driveways shall be left in an open condition overnight. All such trenches shall be closed before the end of each work day and normal traffic flows restored.

98. Before mandrel testing, TV inspection or final acceptance of gravity sewer or storm pipelines, all trench compaction shall be completed and all sewers and storm drains flushed & cleaned to remove all mud, debris & foreign material from the pipelines, manholes and/or catch basins.

99. Where future extensions are shown upstream of new manholes (sewer or storm), catch basins or junction boxes, pipe stubs (with gasketed caps) shall be installed at design grades to a point 2' minimum outside of the structure.

100. Timing for Trench Work on Existing Public Streets. Unless authorized in writing by the City prior to the start of the work: trenching within existing paved streets shall be backfilled and repaved within 14 days of the start of excavation unless the trenches are completely plated or repaired with cold patch; trenches within each block or intersection shall be permanently repaved within 21 days of the start of excavation (including completion of all inspections, testing & corrective work required by City standards prior to paving). These timeframes apply independently and separately to each block or intersection where trenching work occurs.

- **Water**

101. City forces to operate all valves on existing public water mains, on the public side of water meters, or at the connection of fire service lines to public water mains.

102. No person other than Public Works staff shall operate or flow test fire hydrants without first obtaining written authorization from the Public Works Director. This hydrant use restriction shall not apply to fire department/fire district staff in the performance of their regular duties. All hydrant flow tests shall be performed with Public Works staff present unless otherwise approved by the Public Works Director. Opening or operating fire hydrants with any tool other than a standard hydrant wrench designed for that purpose is prohibited.

103. All water mains shall be C-900 PVC (DR 18) or Class 52 ductile iron. All fittings 4-inches through 24-inches in diameter shall be ductile iron fittings in conformance with AWWA C-153 or AWWA C-110. The minimum working pressure for all MJ cast iron or ductile iron fittings 4-inches through 24-inch in diameter shall be 350 psi for MJ fittings and 250 psi for flanged fittings.

104. All water mains to be installed with a minimum 36 inch cover to finish grade unless otherwise noted or directed. Service lines to be installed with a minimum 30 inches cover within the right-of-way. Deeper depths may be required as shown on the drawings or to avoid obstructions.

105. Unless otherwise approved by the City Engineer, all valves shall be flange connected to adjacent tees or crosses (where such fittings are installed adjacent to valves). In-line valves shall be MJ x MJ.

106. All buried valves shall be provided with new valve boxes, including new valves installed by the Contractor, or existing valves which are excavated around as part of the work, and existing valves which are located within newly paved, newly concreted or newly graveled surfaces. Valve boxes shall conform to Standard Details. Reuse of existing valve boxes will only be allowed is they fully conform with current standard details, are accurately centered on the valve nut, are clean of excess rock or debris around the valve nut, and are approved in writing by the

City on a case-by-case basis.

107. Permanent thrust restraint (concrete thrust blocks) shall be provided on all bends, tees and other direction changes per local jurisdiction requirements and as specified or shown on the drawings. All concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi min @ 28 days, max 5" slump, 4.5% air (±1.5%). Concrete mix design shall be submitted to the City for review and approval prior to use. If hand mixed sack-crete type concrete is proposed by the Contractor and approved by the Public Works Director, it shall be a 4000 psi minimum mix (approved by the City prior to use), mixed with the minimum amount of water necessary for workability (5" slump or stiffer). In no case will dry sack-crete mix (either in bags or as loose mix) be considered as an acceptable substitute for an approved mixed concrete.

108. It shall be the Contractor's responsibility to coordinate with the City for visual inspection and verification of all thrust restraint and thrust blocking prior to covering or backfilling.

109. Where approved by the City prior to construction, temporary thrust restraint may be used at mainline connections where it is not possible (prior to pressurization of the connection and placing the waterline in service) to install permanent concrete thrust blocks, straddle blocks or other permanent thrust restraint as required or shown/noted on the drawings. Trenches at the temporary thrust restraint location shall be left open and not backfilled (but plated as necessary or required) until the permanent thrust restraint is installed and approved by the City. Unless otherwise approved in writing by the City, permanent thrust restraint shall be installed by the end of the next working day after installation of the temporary thrust restraint, but in no case later than the third calendar day following installation of the temporary thrust restraint.

110. Unless otherwise approved by the City, water service pipe on the public side of the meter shall be Munipex blue xl-PE tubing (CTS, SDR 9, 200 psi) conforming to AWWA C904 with 2-3/8"long style stiffner inserts (AY McDonald 6133T CTS insert stiffener or equal) and pack joint style fittings.

111. Unless otherwise noted, water service pipe on the private side of the meter shall be Schedule 40 PVC or as approved by the OPSC.

112. Domestic, irrigation and fire backflow prevention devices and vaults shall conform to requirements of public and/or private agencies having jurisdiction. It is the responsibility of the premise owner and/or water user to provide a thermal expansion tank or other means approved by the Oregon Plumbing Specialty Code (OPSC) to address thermal expansion concerns in the private water system piping downstream of any backflow device or pressure regulator where applicable (see PWDS 3.22.c & OPSC 608.2&3). The premise owner and water user is hereby notified of these thermal expansion concerns, and that it is the responsibility of the premise owner and/or water user to address these concerns.

113. The Contractor shall be responsible for having backflow devices tested and certified prior to final acceptance of the work.

114. The Contractor shall coordinate with the owner(s) of property being served for permits and installation of conduit(s) and wire as necessary to power required sump pumps in meter vaults and/or in backflow vaults, and any required freeze protection, or as necessary to monitor any tamper switches required in backflow vaults or enclosures. Installation and activation of any such power and/or signal wires is required prior to acceptance by the City.

115. The Contractor installing each vault or enclosure shall be responsible to install (or coordinate the installation of) the conduit and wires required to serve each such vault or enclosure.

116. The work shall be performed in a manner designated to maintain water service to buildings supplied from the existing waterlines. In no case shall service to any main line or building be interrupted for more than four (4) hours in any one day. Contractor shall notify the City and all affected residents and businesses a minimum of 24 business hours (1 business day) prior to any interruption of service.

117. Water Mainline Couplings. Where shown on the drawings or required by the City, restrained sleeve couplings shall be Krauz Hymax Grip Couplings or approved equal (Romac Alpha Coupling). Unrestrained mainline couplings shall be long-style epoxy coated DI sleeve couplings, or Hymax Wide Range Coupling (short body couplings not allowed).

118. **Sanitary Sewer & Waterline Crossings**. Where new waterlines cross below or within 18-inches vertical separation above a sewer main or sewer service lateral, center one full length of waterline pipe at point of crossing the sewer line or sewer lateral. Unless otherwise approved in writing by the Public Works Director, existing sewer mains and/or service laterals within this zone shall be replaced with a full 12 foot length of new pipe (D2241 PVC-DR 32.5, C-900 PVC-DR 18 or CL 50 ductile iron), centered at the crossing in accordance with OAR 333-061 and local jurisdiction requirements. Connect to existing sewer lines with approved flexible reinforced couplings (MaxAdaptor Coupling by Gripper Gasket LLC or approved equal). Example: For an 8-inch waterline with 36-inches cover, 4-inch service lateral inverts within 5.67-feet (68-inches) of finish grade must have this pipe centered at the crossing.

119. Contractor shall install temporary chlorination & sample taps, restrained caps/plugs and blowoffs as required on new waterlines for flushing, pressure testing, chlorination and bacteriological testing (configuration to be acceptable to the City or other agency with jurisdiction). Chlorination and sample taps shall be located within 18-inches of the end of each mainline segment to be chlorinated & tested, and configured to ensure that all portions of the pipelines are adequately disinfected.

120. Pressure Testing. All waterlines, services and appurtenances shall be pressure tested for leakage. All testing shall conform to requirements as outlined on City testing forms contained in the PWDS. The hydrostatic test shall be performed with all service line corporation stops open and meter stops closed, and with all hydrant line valves open. Prior to the start of each pressure test, the position of all mainline valves, hydrant line valves and service line corporation stops in the test segment shall verified.

121. Cleaning & Flushing. After the pressure test and prior to disinfecting, the water lines shall be thoroughly flushed through hydrants, blow offs or by other approved means.

122. Disinfection & Bacteriological Testing. All water mains and service lines shall be chlorine disinfected per local jurisdiction requirements, AWWA C-651 or OAR 333-061 (25 mg/L minimum chlorine solution, 24 hours contact time), whichever is more stringent. Unless otherwise approved by the Public Works Director, a City representative shall witness the application of the chlorine solution and the chlorine testing at the end of the 24 hour contact period. After the 24 hour chlorine contact period, the free chlorine concentration shall be checked, and if it is found to be 10 mg/L or more, the chlorine solution shall be drained (otherwise the line shall be rechlorinated), the waterline flushed with potable water, and a minimum of two consecutive samples taken at least 24 hours apart shall be collected from the waterline for microbiological analysis (ie. one sample immediately after flushing, and another sample a minimum of 16 hours later). Contractor to pay for laboratory analysis of water samples taken under the supervision of the City. If the results of both analyses indicate that the water is free of coliform organisms, the waterline may be placed in service. Should the initial treatment prove ineffective, the flushing & chlorination shall be repeated until confirmed tests show acceptable results. Contractor shall coordinate with Public Works Director to ensure that both a high level chlorine test kit and a chlorine residual test kit is available at the site during testing.

123. Disinfection of Connections. For connections which cannot be disinfected with the waterline mainlines as noted above, all fittings, valves and appurtenances, including tool surfaces which will come in contact with potable water, shall be thoroughly cleaned by washing with potable water and then swabbed or sprayed with a one percent (1%) hypochlorite solution (10,000 mg/L) in accordance with the requirements of AWWA C-651 and OAR 333-061.

124. Disposal of Chlorinated Water. The chlorine residual in water from testing, disinfection or flushing activities shall be neutralized in accordance with DEQ standards prior to discharge to the storm system or ditch discharging to surface waters. Care should be exercised to balance the amount of dechlorinating chemical against the chlorine present. Where required by Public Works Director, the Contractor shall provide a field chlorine residual test kit to verify adequate dechlorination of water being discharged.

125. Capping of Chlorination Taps, Pressure Test Taps, Temporary Sample Taps, etc. Unless otherwise approved or required by the City, all extra pipe and fittings attached to chlorination, pressure test or temporary sampling taps shall be removed and the corporation stop capped at the mainline tap or saddle after the new waterline is placed in service (to avoid depressurizing the mainline after disinfection). Wrap each capped corporation stop in plastic prior to backfilling. The location of all such capped corporation stops shall be shown on the Contractor's record drawings.

126. Unless otherwise shown on the drawings AND explicitly approved in writing by the City, any existing waterlines abandoned in place shall be physically disconnected from valves and other connection points to the existing water system. A blind flange or restrained MJ plug (as

applicable) shall be installed on the back side of all valves from which abandoned waterlines are disconnected. Remove valve boxes from abandoned valves prior to repaving or surface restoration.

- **Sewer & Storm Manholes**

127. All precast sanitary sewer manholes shall be provide with integral rubber boots. Lockdown lids shall be used on manholes outside of public right-of-way only where specifically required by Public Works Director.

128. All connections to existing manholes shall be made by core-drilling the existing manhole structure and installing a rubber boot. Connections to manholes shall be watertight and shall provide a smooth flow into and through the manhole. Small chipping hammers or similar light tools which will not damage or crack the manhole base may be used to shape channels. Use of large pneumatic jackhammers shall be prohibited.

129. Grouting & Channels to be Smooth. All interior joints, penetrations & any exposed lifting holes shall be grouted following manhole assembly. The grouting and channels of all manholes shall be smooth and uniform, and shall not retain water or debris. Any grout or concrete splatters *(in channels, on channel benches, on walls or on steps)* shall be removed by the Contractor.

130. Unless otherwise approved in writing by the Public Works Director and the City Engineer, manhole steps shall be installed in any manhole which does not have existing steps, and which is connected to or otherwise altered in any way.

131. Manhole channel depths (sewer & storm) shall be to the heights shown on the drawings, but in no case shall be the channel depth be less than 2/3 of the pipe diameter. Flow channels in manholes shall be of such shape (semi-circular bottoms) and slope to provide smooth transition between inlet and outlet sewer size/ invert to minimize turbulence and to ensure that the manhole channels are self-cleaning. Channels, as well as shelves between the channels and the manhole walls, shall be sloped to drain per plan details.

132. For all sanitary sewer manholes, external mastic wrap joint seal *(9-inch minimum width)* shall be installed on all manhole barrel joints & pickholes after assembly, prior to backfilling *(Bidco External Joint Wrap BW-9T by Telleborg, or equal).* The exterior of the manhole barrels adjacent to each joint shall be clean *(under the mastic wrap)* to ensure a good seal *(use wire brush to clean the exterior surface under the mastic wrap to remove all dirt, loose particles or deleterious material).* The mastic wrap shall be held in place with plastic stretch wrap *(ie. pallet wrap plastic, 3 layers minimum)* during backfilling *(ie. to protect the external mastic wrap from displacement during backfill installation &/or compaction).* Plastic wrap shall be installed immediately after the mastic wrap is placed.

133. MH Rim Elevations. Contractor shall be responsible to verify manhole finish rim elevations match with finish grade or are set above finish grade as required to conform with City standard details. Manhole rim elevations shall be adjusted as required to conform with this requirement.

134. All sanitary sewer manholes in low areas which are subject to flooding or water ponding (including all lawn, landscape or gravel areas, or low areas of parking lots, or manholes closer than 4 feet clear of parking lot curblines or existing/future street curbs, adjacent to ditches, etc.) shall be provided with inflow protector lid inserts (whether or not such MH inserts are specifically noted on each applicable drawings sheet). Manhole inflow inserts shall be of ABS or HDPE plastic, and shall include integral lifting lugs on each side of the insert allowing removal with a manhole hook (lift straps are not an acceptable alternate), a factory installed closed cell neoprene rubber gasket bonded to the underside of the insert rim. Unless waived in writing by Public Works Director (case by case basis), a clog-free vent-valve valve (rubber check by Tideflex) shall be provided on each unit. Inserts shall be ManPan manhole inserts or approved equal.

135. Vacuum Testing (New MHs). All sanitary sewer manholes shall be vacuum tested following completion of paving or final surface restoration.

136. Vacuum Testing (Existing MHs). Existing sanitary sewer manholes to which new pipes are connected (or where existing pipe connections are modified) shall be sealed as required and pass a vacuum test prior to final approval.

137. Manhole Testing & Witness. All testing shall conform to requirements as outlined on City testing forms contained in the PWDS. Unless otherwise approved in writing by the Public Works Director, Public Works staff shall be present for all manhole testing. Visible groundwater infiltration or leakage constitutes a failed manhole test, whether or not the vacuum test is successful.

138. Manhole Cleaning. All manholes shall be thoroughly cleaned prior to being placed in service and/or accepted by the City, including removal of any debris, excess grout in manhole channels or on manhole steps, etc.

- **Sewer & Storm Warranty Inspections**

139. Re-inspection of the sanitary sewer systems by cleaning & TV inspection shall be performed during the last month of the warranty period, as well as visual inspection of all sanitary sewer manholes during the wet weather season (any visible groundwater infiltration or leakage constitutes a failed manhole test, and will require warranty correction). Based on the results of the TV inspections and/or the City's warranty inspections, additional warranty tests may include mandrel testing or low pressure air testing. The results of these test(s) will be used by Public Works Director to determine if final acceptance of the system is warranted and what corrective work is required prior to final acceptance. The cost of these re-inspections and any corrective work shall be the responsibility of the Developer. The warranty period will not be considered to be complete, and maintenance bonds will not be released until after all warranty inspections are finished and any resulting corrective work is completed.

- **Sanitary Sewer**

140. Unless otherwise shown, sanitary sewer pipe shall be PVC in conformance with ASTM D3034, SDR 35. All other appurtenances and installation to conform to the City specifications.

141. Sanitary sewer laterals for single family residential & each side of duplexes shall be a minimum of 4-inches in diameter (6-inch minimum for other laterals), and shall include toning wire and warning tape per standard details.

142. Gravity Sewer Couplings. Couplings for new PVC sewer pipe connecting to other PVC or solid wall HDPE pipe shall be gasketed solid sleeve PVC slip couplings. Couplings for connection of PVC to concrete pipe shall be MaxAdaptor Coupling (by Gripper Gasket LLC) for sizes up to and including 12-inch diameter.

143. **Sewer Cleaning.** After manhole channeling and prior to leakage testing, mandrel testing and/or TV inspection, flush and clean all sewers, and remove all foreign material from mainlines and manholes. Failure to clean all dirt, rock and debris from pipelines prior to TV inspection will result in the need to re-clean and re-TV the sewer lines.

144. **Sewer Leakage Testing.** Sanitary sewer pipe and appurtenances shall be tested for leakage. Leakage tests shall include an air test of all sewer mains and laterals prior to paving, and a separate air test of all sewer mains and laterals following excavation and backfilling of any franchise utility trenches or other utility work that crosses sanitary sewer laterals. All testing shall conform to requirements as outlined on City testing forms contained in the PWDS. Unless otherwise approved in writing by the Public Works Director, Public Works staff shall be present for all sewer leakage testing.

145. **Sewer Mandrel Testing.** Contractor shall conduct deflection test of flexible sanitary sewer pipes by pulling an approved mandrel through the completed pipe line following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted after the trench backfilling and compaction is completed and tested. Unless otherwise approved in writing by the Public Works Director, Public Works staff shall be present for all sewer mandrel testing.

146. **Sewer TV Inspection.** Upon completion of all sewer construction, testing and repair, the Contractor shall conduct a color TV acceptance inspection of all mainlines in accordance with OSSC (ODOT/APWA) 445.74 to determine compliance with grade requirements of OSSC (ODOT/APWA) 445.40.b (no deviation greater than 1/32-inch per inch of pipe diameter [1/2-inch max for pipes >16-inch diameter], & no reverse sloping pipe inverts) and to verify pipelines are adequately cleaned. The TV inspection shall be conducted by an approved technical service, using a track or wheel propelled self-leveling auto-focus pan-head camera which is equipped to make audio-visual recordings of the TV inspections on USB storage device. Unless otherwise required by the agency with jurisdiction, a standard 1-inch diameter ball shall be suspended in front of the camera during the inspection (with the ball in contact with the pipe invert) to determine the depth of any standing water. Sufficient water to reveal low areas or reverse grades shall be discharged into the pipe immediately prior to initiation of

the TV inspection. The USB storage device and written report (or download link and pdf report) shall be delivered to the City Engineer.

147. Prior to or concurrent with connection to a sanitary sewer lateral, it shall be demonstrated to the City that the sewer lateral is not obstructed. This shall be accomplished by "snaking" the service lateral downstream of the connection point to the mainline, or similar method acceptable to the City. City personnel or authorized agent shall be present during the "snaking" or other demonstration method.

148. Sewer service from upstream and affected properties shall be maintained during construction unless prior written City approval is granted. Bypass pumping or other methods used to maintain sewer flows shall be the Contractor's design, subject to approval by the City. The bypass system shall be capable of conveying flows when the sewers are flowing full. Normal unrestricted flows shall be restored at the end of each work day. Bypass systems left in place or operated outside normal working hours shall be monitored continuously by the Contractor personnel unless alternate arrangements proposed by the Contractor are acceptable to the City (ie. high level & pump fail alarm callouts, etc.). The Contractor shall provide for City review all submittal information required to demonstrate (to the satisfaction of the City) compliance with these requirements. Contractor shall be responsible for all costs related to cleanup, damages and fines resulting from any sewerage spill or overflow associated with any methods used to convey sewage flows during construction.

149. Thrust restraint shall be provided on all pressure pipelines meeting the same standards and requirements as for water mainlines.

- **Storm Drain**

150. Storm drain pipe materials shall conform to the construction drawings and City requirements. Contractor shall use uniform pipe material on each pipe run between structures unless otherwise directed or approved. Jointed HDPE pipe shall not be used for slopes exceeding ten percent (10%).

151. Catch basins and junction boxes shall be set square with buildings or with the edge of the parking lot or street wherein they lie. Storm drain inlet structures and paving shall be adjusted so water flows into the structure without ponding water.

152. Unless otherwise approved by the City Engineer, all storm drain connections shall be by manufactured tee or wye fittings.

153. Unless otherwise shown on the drawings, all storm pipe inlets & outfalls shall be beveled flush to match the slope wherein they lie.

154. Sweep (deflect) storm drain pipe into catch basins and manholes as required. Maximum joint deflection shall not exceed 5 degrees or manufacturers recommendations, whichever is less.

155. CB Grouting to be Smooth. All joints, penetrations & any exposed lifting holes shall be

grouted smooth, so as not to retain debris. Base/sump shall be smooth to facilitate cleaning.

156. Unless otherwise specified or directed, install storm drain pipe in accordance with manufacturer's installation guidelines.

157. Gravity Storm Couplings. Couplings for connection of PVC to concrete or other non-compatible pipe shall be MaxAdaptor Coupling (by Gripper Gasket LLC) for sizes up to and including 12-inch diameter.

158. **Storm Cleaning.** After manhole channeling and prior to mandrel testing or final acceptance, flush and clean all sewers, and remove all foreign material from the mainlines, manholes and catch basins.

159. **Storm Mandrel Testing.** Contractor shall conduct deflection test of flexible storm sewer pipes by pulling an approved mandrel through the completed pipe line following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted not more than 30 days after the trench backfilling and compaction has been completed.

160. Prior to acceptance, the City will typically lamp storm lines upstream & downstream of structures to verify that the pipes are clean and there is no grout or concrete in the mainlines, and that there are no observable bellies in the line. When necessary, sufficient water to reveal low areas shall be discharged into the pipe by the Contractor prior to any such inspection by the City.

STREET LIGHTS

161. Street lights shall be installed after all other earthwork and public utility installations are completed and after rough grading of the property is accomplished to prevent damage to the poles.

162. Public street light poles, conduit and junction boxes shall conform with the requirements of the City and the power company providing service. Junction boxes shall be H-20 rated and set to finish grade. Direct bury street light poles shall be set to a depth as specified by the manufacturer, but not less than 5 feet.

163. Street light poles shall be installed within one degree (1°) of plumb.

164. All public street lights shall be energized and fully operational prior to requesting final inspection by the City.

FRANCHISE & PRIVATE UTILITIES

165. Unless otherwise shown on the drawings and approved in writing by all jurisdictions having authority, new and relocated franchise utilities (power, cable TV, telephone & gas) shall be installed underground in conjunction with the development.

166. Franchise utility plans shall be submitted to Public Works Director and the City Engineer for review prior to installation. All franchise utility street crossings shall be installed at right angles to the street centerline, and all crossings of water, sewer or storm mainlines or laterals shall be as close to perpendicular as feasible.

167. Where franchise utilities are installed along new public or private streets, franchise utilities shall either be extended across the entire frontage of the property or to the end of the street improvements (whichever is further) or conduit shall be provided for extension of franchise utilities in the future without additional excavation along the new street frontage.

168. Developer and/or Contractor shall coordinate with gas, power, telephone, and cable TV company for installation/location of utilities and/or conduits in common trenches, as well as location of vaults, pedestals, etc., as required to serve all existing homes and new lots within the development. The Contractor shall be responsible for providing franchise utility companies adequate written notice of availability of the open trench (typically 10 days minimum), and reasonable access to the open trench for installation of franchise utilities as required to serve each lot within the development or along offsite improvements (even though how or whether the homes will connect to such franchise utility service lines will be up to the homebuilder or homeowner).

169. Unless otherwise approved in writing by the City, all above-grade facilities shall be located in PUEs (where PUEs exist or will be granted by the development), and otherwise shall be placed in a location outside the proposed sidewalk location. Contractor shall grade street frontage PUEs so that all franchise utility pedestals and vaults can be set to finished grade as measured from the back of the public sidewalk (whether the sidewalk is installed with street construction or deferred to a later time).

170. Installation of private utilities (including either franchise utilities or private water, sewer or storm services) in a common trench with public water, sanitary sewer or storm drains, or within 5 feet horizontally of (ie. clear separation) and paralleling public water, sanitary sewer or storm drains is prohibited.

171. Power, telephone and TV trenching and conduits shall be installed per utility company requirements with pull wire. Contractor shall verify with utility company for size, location and type of conduit prior to construction, and shall ensure that trenches are adequately prepared for installation per utility company requirements. All changes in direction of utility conduit runs shall have long radius steel bends.

172. Contractor shall notify and coordinate with franchise utilities for relocation of power poles, vaults, etc. to avoid conflict with City utility structures, fire hydrants, meters, sewer or storm laterals, etc.

STREET TREES, LANDSCAPING & IRRIGATION:

173. Street trees and landscaping shall not conflict with sight distance standards.

174. Landscape plantings shall maintain a minimum of three (3) feet clear from all fire hydrants. Maintenance of this clearance is an ongoing obligation of the property owner.

175. All irrigation systems shall be provided with backflow protection conforming to state and City standards. Backflow testing results shall be submitted to Public Works Director prior to requesting final inspection by the City.

TESTING AND INSPECTION:

176. The Contractor shall be responsible to ensure that all required or necessary inspections are completed by authorized inspectors prior to proceeding with subsequent work which covers or that is dependent on the work to be inspected. Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems and/or corrective measures arising from uninspected work.

177. Unless otherwise specified, the attached "Minimum Required Testing and Frequency" table outlines the minimum testing schedule for the project. This testing schedule is not complete, and does not relieve the Contractor of the responsibility of obtaining all necessary inspections or observations for all work performed, regardless of who is responsible for payment. Cost for retesting shall be borne by the Contractor. Copies of all test reports shall be submitted to the designated City representative.

MINIMUM REQUIRED TESTING AND FREQUENCY TABLE (see note 1)

Contractor to notify Public Works prior to all testing, to allow Public Works staff to be present if desired.

		Notes
Streets, Fire Lanes, Common Driveways, Parking Lots, etc.		
Subgrade	1 Test/4000 S.F./Lift (4 min), locations acceptable to Public Works (typically alternate sides of road or access aisles)	See note 2 & note 3
Engineered Fills	1 Test/4000 S.F./Lift (4 min), locations acceptable to Public Works	See note 2 & note 5
Baserock	1 Test/4000 S.F./Lift (4 min), locations acceptable to Public Works (typically alternate sides of road or access aisles)	See note 2 & note 3
Asphalt	1 Test/6000 S.F./Lift (4 min), locations acceptable to PW (typ. alternate as above)	See note 2
Piped Utilities, All		
Trench Backfill	1 Test/200 Foot Trench/Lift (4 min)	See note 2
Trench AC Restoration	1 Test/300 Foot Trench (4 min)	See note 2
Locate testing of each tracer wire system installed prior to paving (water, sewer & storm drainage mains & services)		See note 7
Water		
Pressure Test	(to be witnessed by City representative)	See note 4
Bacterial Water Test	Per Oregon Health Division	See note 2
Chlorine Residual Test	Per City Requirements	
Sanitary Sewer		
Air Test	Per City Requirements (see PWDS form)	See note 4
Mandrel	95% of actual inside diameter	See note 4
TV Inspection	All. Lines must be cleaned prior to TV work	
Manhole	(1) Vacuum test per manhole, witnessed by City representative.	See note 4
Pressure Test (force main)	Hydrostatic pressure test, witnessed by City representative.	See note 4

Storm		
Mandrel	95% of actual inside diameter	See note 4
TV Inspection	All. Lines must be cleaned prior to TV work	

Concrete, Block, etc.	
Slump, Air & Cylinders for all structures, reinforce concrete & PCC pavements. Unless otherwise specified, one set of cylinders per 100 cubic yards (or portion thereof) of concrete poured per day. Slump & air tests required on same load as cylinders.	See note 2
Building permit inspection & Special Inspection for structural concrete, reinforced masonry, epoxy anchors, etc. as required by current building codes.	See note 6

Retaining Walls	
Building permit inspection and Special Inspection, as well as compaction testing on backfill, all in conformance with all building code requirements	See note 5 & note 6

Note 1: The City considers the Contractor as responsible for scheduling any and all required testing. All testing must be completed prior to performing subsequent work. Additional or more frequent tests may be required by Building Official.

Note 2: Testing must be performed by an approved independent testing laboratory.

Note 3: In addition to in-place density testing, the subgrade and base rock shall be proof-rolled with a loaded 10 yard dump truck provided by the Contractor. Baserock proofroll shall take place immediately prior to (within 24 hours of) paving, and shall be witnessed by the an authorized Representative of approving agency. Location and pattern of testing and proofroll to be as approved or directed by said authorized Representative of approving agency.

Note 4: To be witnessed by City representative. The Contractor shall perform pretests prior to scheduling witnessed waterline or sanitary sewer pressure tests, or pipeline mandrel test.

Note 5: The approved independent laboratory retained by the Contractor shall provide a certification (stamped by an engineer licensed in the State of Oregon) that the subgrade was prepared and all engineered fills were placed in accordance with the provisions of the construction drawings and the contract documents.

Note 6: Regardless of who is responsible for payment, the Contractor is responsible for scheduling and coordinating any and all required inspections and Special Inspections as required by applicable building codes or jurisdictions having authority.

Note 7: Tracer wire testing will be conducted by City staff, employing methods & locate equipment acceptable to the City. Contractor responsible to pretest all tracer wire and verify (in writing) successful pretest prior to scheduling City locate test.

EROSION CONTROL NOTES

The erosion control notes and details contained in these PWDS also apply to work under separate building permits issued without the need for a Public Works Construction Permit. City Code requires that erosion control measures be provided for work under such building permits, to minimize runoff, siltation and pollution both during and after construction ().

General

1. Approval of an erosion/sedimentation control (ESC) plan does not constitute an approval of permanent road or drainage design (e.g. size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.)

2. The implementation of ESC plans and the construction, maintenance, replacement and upgrading of ESC facilities is the responsibility of the applicant/contractor until all construction is completed and approved and vegetation/landscaping is established as provided for on the construction drawings, or until 75% coverage without bare spots (ie. vegetation well established and not just showing).

3. The erosion control measures shown on the ESC plan are considered the minimum required for anticipated site conditions, and shall be supplemented and/or upgraded by the applicant/contractor as required to control erosion or sediment within the project boundaries and avoid impacts to adjacent property. Additional measures shall be installed as required to ensure that all paved areas are kept clean for the duration of the project.

4. The boundaries of the clearing limits shown on the plans shall be clearly flagged in the field prior to construction. During the construction period, no disturbance beyond the flagged clearing limits shall be permitted. The flagging shall be maintained by the applicant/contractor for the duration of construction. Sediment fence may be used as the flagging for the clearing limits at the discretion of the Contractor.

5. The ESC facilities must be installed and maintained in conjunction with all clearing, grading and construction activities, and in such a manner as to insure that sediment and sediment laden water do not enter the drainage system, roadways, or violate applicable water standards. The Contractor shall be financially responsible for all costs, violations, fines and/or penalties resulting from failure to adequately control erosion or sediment.

6. Erosion control facilities and sediment fences on active sites shall be inspected by the Contractor at least daily during any period with measurable precipitation. Any required repairs or maintenance shall be completed immediately. The erosion control facilities on inactive sites shall be inspected and maintained by the Contractor a minimum of once a month or within 24 hours following the start of a storm event, or within 24 hours of notification for failure of erosion control devices.

7. Sediment protection (silt sack inserts with biobags) for storm drain inlets, catch basin and area drains shall be installed and maintained for the duration of the project, and until permanent vegetation/landscaping is established.

8. At no time shall sediment accumulation within a trapped catch basin exceed 50% of the sediment capacity. All catch basins and conveyance lines shall be cleaned prior to paving, by the Contractor as their cost. The cleaning operation shall not flush sediment laden water into the downstream system. Contractor shall also verify that all catch basins and conveyance lines are clean, and all trash or sediment deposits are removed, prior to requesting final inspection of the project by the City.

9. In addition to hydroseeding, for slopes 2H:1V or steeper (or where slope protection matting *or erosion control blanket* is indicated on the drawings or required by Public Works Director), the erosion blanket/matting shall be a type that has a extended term functional longevity (ie. minimum 24 months degradability) and specifically designed for use of 2:1 or steeper slopes to ensure that the steep slopes are protected until they have adequate vegetation cover established before the matting biodegrades away. Erosion control blanket/matting shall be SC150 Erosion Control Blanket by North American Green, or approved equal (consisting of a full layer of 70% straw and 30% coconut fiber stitched with degradable thread between a heavyweight UV stabilized polypropylene top net and a lightweight photodegradable polypropylene bottom net).

10. The Contractor shall provide (at Contractor's expense) site watering as necessary to prevent wind erosion of fine-grained soils, and to support vegetation until it is established as specified herein, or as required by an erosion control permit or to comply with City/state/federal erosion control standards.

11. Soil or native fill stockpiles placed or left in place during wet weather periods shall be covered with UV resistant plastic or tarps anchored and weighted in place. Stockpile covering shall also include installation of sediment fences or other sediment barrier around the stockpile on all sides. Inactive stockpiles shall not be left uncovered for more than 7 days during dry weather periods.

Sediment Fences

12. Sediment fences shall consist of standard strength filter fabric fastened securely to stitched post loops, and shall be installed on the upslope side of the posts, with 6 inches of the fabric extended into a trench along the sediment fence alignment. The fabric shall not extend more than 30 inches above the original ground surface. Filter fabric shall not be stapled to existing trees.

13. The sediment fence (filter fabric barrier) shall be purchased in a continuous roll cut to the length of the barrier to minimize joints. When joints are necessary, the sediment fence shall be spliced together only at a support post. The support post ends of each sediment fence section shall be twisted together by at least 2 turns and both stakes installed into the ground together.

14. The filter fabric fence shall be installed to follow the contours where feasible. The fence posts shall be spaced a maximum of 6 feet apart and driven securely into the ground, and shall be provided with additional support as required to contain all silt and sediment capture. Filter fabric shall not be stapled to the existing trees.

15. Sediment fences shall be inspected by applicant/contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

16. Sediment fences shall be removed by the Contractor when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

Gravel Construction Entrances

17. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures, such as wheel wash basins, may be required to insure that all paved areas are kept clean for the duration of the project. Where provided or required by the City, wheel wash basins shall be periodically (or as directed by City inspector) drained, cleaned of sediment and refilled with clean water.

18. The area of the entrance shall be cleared of all vegetation, roots, and other objectionable material. The gravel shall be placed to the specified dimensions.

19. The entrance shall be maintained in a condition which will prevent tracking or flow of mud onto public right-of-way.

20. The entrance may require periodic top dressing with additional stone as conditions demand, and repair and/or cleanout of any structures used to trap sediment.

21. The Contractor shall verify that all trucks are well sealed when transporting saturated soils from the site. Water drippage from trucks transporting saturated soils must be reduced to less than 1 gallon per hour prior to leaving the site.

22. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately by the Contractor at their expense and to the satisfaction of the Public Works Director or his designee.