

900 – CONSTRUCTION MATERIALS

900.00.00 – Scope

This section describes and specifies the materials commonly used in all City of Central Point, Department of public works projects. Materials specific only to particular phase of construction, such as paving, water or storm sewer shall be included in that materials section.

900.01.00 – Materials Testing and Quality Assurance

The standard materials test methods for the materials contained in these standards and specifications shall be conducted by a materials testing laboratory certified to perform the tests as required by the qualifying agency or institution. The tests shall include all tests requested by the City, or a consulting engineer acting in agency for the City to determine the initial design elements as well as quality assurance testing in the field.

City, state, county or a combination of such funding may fund City projects. Public Works facilities may also be constructed in conjunction with private development and accepted by the City of Central Point. In these cases specific or specialized materials may be approved by the Public Works Department on a particular project. These materials and conditions will be specified on the approved drawings.

910.00.00 – Aggregate

Aggregate shall include all classes of crushed rock to be used in construction of Public Works facilities that has been mechanically plant produced by a certified source described and specified as follows.

910.00.01 – Aggregate Source Certification

All aggregate sources must have a current certification from ODOT. Copies of aggregate source certification shall be supplied to the City of Central Point at time of preconstruction meeting. The certification shall identify the source by its state designated source number and situs.

910.10.00 – Crushed Rock

910.10.02 – Base Aggregate

Certifications required for sieve sizes $\frac{3}{4}$ "-0 through 2- $\frac{1}{2}$ " - 0 crushed rock base materials shall conform to all the requirements as set forth in Oregon Standard Specifications for Construction, **latest edition**, Section 02630, Base Aggregate.

Crushed aggregate base and sub-base shall meet the following gradation and quality specifications:

Table 910-1 Base Aggregate Sieve

Separated Sizes	2-½"-0	2"-0	1-½"-0	1"-0	¾"-0
<u>Sieve Size</u>			<u>Percentages Passing (by weight)</u>		
3"	100				
2-½"	95 – 100	100			
2"	-	95 – 100	100		
1 ½"	-	-	95 – 100	100	
1-¼"	55 – 75	-	-	-	
1"	-	55 – 75	-	90 – 100	100
¾"	-	-	55 – 75	-	90 – 100
½"	-	-	-	55 – 75	-
3/8"	-	-	-	-	55 – 75
¼"	30 – 45	30 – 45	35 – 50	40 – 55	40 – 60
No. 10	(1)	(1)	(1)	(1)	(1)

(1) Of the fraction passing the ¼" sieve, 40% to 60% shall pass the No. 10 sieve.

910.10.03 – Sub-base Aggregate

This term is used to describe durable, natural pit-run shale, coarse gravel, cobbles, and boulders mixed with natural fractions of sand, and cemented sand and gravel that has been reduced to a 4" minus size by processing through a crusher, that would not be acceptable as a crushed rock base course material because of contamination by cementitious materials or poor gradation. The material shall be certified to meet the following requirements:

Gradation	Screen/Sieve Size	Percent Passing
4"	4"	100
	3"	-
	2"	55 - 75
	1"	-
	½ "	25 - 45

910.10.04 – Clean Drain Rock

This material shall be clean washed 1" drain rock produced from screened creek gravels. The primary use of this rock will be for bedding under storm sewer pipes to allow the flow of ground water beneath the pipe. Clean Drain Rock shall only be used in

situations where there is excessive ground water and the City Engineer directs its use. The Public Works inspector at the project site shall visually accept the material.

910.11.00 – Trench Backfill and Bedding Aggregate

910.11.01 – Requirements

Trench backfill and bedding shall conform to the following requirements:

- a) *Bedding for Water Mains* – Material for bedding shall consist of ¾"-0 minus crushed rock meeting the grading requirements in Section 910.10.02, Base Aggregate above, unless otherwise directed by the Public Works Department.
- b) *Bedding for Storm Sewers* - Material for bedding shall consist of ¾"-0 crushed rock meeting the grading requirements in Section 910.10.02, Base Aggregate above, unless otherwise directed by the Public Works Department.
- c) *Bedding for Water Service lines and Utilities* – This bedding material shall consist of clean uniformly graded coarse sand produced from crushed gravels with a maximum particle size of 1/4". At least 90 to 100 percent shall pass the No. 4 sieve and not more than 5 percent shall pass the No. 200 sieve. **Sand bedding, within the paved section of the street, shall be compacted by mechanical means using a vibraplate, jumping jack, or similar device. Decomposed Granite and Pea Gravel are not approved.**
- d) *Pipe Zone* – Pipe zone material shall consist of ¾"-0 crushed rock meeting the grading requirements in Section 910.10.02, Base Aggregate unless otherwise directed by the Public Works Department.

In certain cases where the depth of trench exceeds 8' in depth, is a safety hazard, and where the pipe diameter is too large to adequately compact material beneath the haunches of the pipe, the Public Works Department may authorize the use of clean washed and screened 1" clean drain rock conforming to Section 910.10.04, Clean Drain Rock from the bedding to the spring line of the pipe. The quality of the clean rock shall be visually determined and approved by the Public Works Department.

- e) *Variable Zone Trench Backfill* - Backfill, from 6" above the pipe to the top of newly compacted sub-grade (varying depth), within the City street section right-of-way the material shall consist of ¾"-0 crushed rock meeting the grading requirements in Section 910.10.02, Base Aggregate **or**:

Under existing pavement, a 1 sack mix, cement and sand slurry otherwise meeting the requirements of Section 945.00.00, Cement-Sand Slurry may be substituted for ¾"-0 crushed rock noted above.

- f) *Upper Zone Trench Backfill* - Under existing pavement, backfill from the bottom of the pavement section to 36" below finished grade (top of the variable zone), a 1 sack

cement and sand slurry mix meeting the requirements of described in Section 945.00.00, Cement-Sand Slurry shall be installed.

In newly constructed streets, within the City street section right-of-way, from the top of sub-grade to the top of the pipe zone (or top of the variable zone), the backfill material shall consist of ¾"-0 crushed rock meeting the grading requirements in Section 910.10.02, Base Aggregate.

g) *Trench Backfill Outside of Street R/W* - Backfill over natural ground, outside the City street section Right-of-Way, from a minimum of 6" above the pipe (top of pipe zone) to finished grade. Unless other wise specified, material consisting of 4" crushed rock conforming to Section 910.10.03; or of ¾"-0 crushed rock meeting the grading requirements in Section 910.10.02, Base Aggregate; or decomposed granite or selected material approved by the Public Works Department may be used.

911.00.00 – Aggregate Material Tests

Aggregate material tests shall be performed in accordance with the requirements of source certification per ODOT.

915.00.00 – Sub-grade and Trench Reinforcement Rock

This section describes rock material that is acceptable for reinforcing soft areas of trench or street sub-grades. These areas are typically over excavated and then are brought to the designed sub-grade elevation with reinforcement material. These materials may be also incorporated into the approved design where the cost of additional crushed sub-base above the minimum required thickness is required to meet equivalent pavement thickness design criteria.

915.01.01 – Material Requirements

The material shall meet all of the requirements for grading as follows:

Pit – Run basalt shale material shall be selected from the quarry site that is fractured, of durable quality, and that can be further broken down to individual pieces by towed, self-propelled grid or vibratory grid rollers.

Decomposed Granite and un-fractured Creek Run Gravels are not approved!

Gradation - The grading shall be such that the maximum size shall not exceed 75% of the compacted thickness of the layer, in which, it is to be incorporated. The aggregate fraction passing a ¼" sieve shall constitute not less than 10% or more than 50% of the whole, by weight. Not more than 8% of the total aggregate shall pass a No. 200 sieve. Within the above limits, the aggregate shall be uniformly graded so that the materials will be dense and firm when watered and compacted.

Abrasion - The source material from which aggregate materials are obtained, Produced or manufactured when tested in accordance with AASHTO T 96, shall have a percentage of wear of not more than 45.

Sand Equivalent – Aggregates to be incorporated in the work shall have a Sand Equivalent value of not less than 30.

Determination – Determination of designated sizes and grading shall be by percentages of weight for each screen in conformance with AASHTO T 27.

Liquid Limit and Plasticity - Liquid limits of the material used shall not exceed 30 and plasticity index shall not exceed 5.

920.00.00 – Rip-rap

920.10.01 – General Requirements

Loose riprap of the required sizes or classes shall conform to the requirements of Oregon Standard Specifications for Construction, **latest edition**, Section 00390, Rip-Rap Protection.

925.00.00 – Hot Mix Asphalt Concrete Paving (HMAC)

925.10.01 – General Requirements

Plant produced HMAC shall be supplied by an approved company regularly engaged in the production of plant-mix asphaltic concrete for use in public works projects, using aggregates, asphaltic cement, plant, and equipment conforming to the standards of the Asphalt Institute. Asphalt and aggregate materials shall be subject to approval by the Public Works Department preceding mixing as stated below in Section 925.10.02, Mix Design.

Plant mixed HMAC shall be subject to final approval after blending and mixing at the plant or the place of delivery prior to final rolling. Approval will be based on periodic sampling of the materials at the plant or work site. Certified copies of the Suppliers plant test results shall be delivered upon request to the PWD to confirm field test results.

925.10.02 – Mix Design

Each local supplier of HMAC shall establish current mix design(s) with **ODOT**, as of January 1st of the year preceding construction for the standard classes of asphaltic concrete it intends to supply for public works projects or street construction to be dedicated to the City.

The mix design shall be prepared by an ODOT certified laboratory and shall conform to all of the requirements and standards of the Oregon Standard Specifications for

Construction, **latest edition**, for Level 3 and Level 4 duty pavements, **1" (Level II), ¾" (Level III), and ½" (Level IV)** dense graded mixes, as defined by Section 00745, unless otherwise approved by the Public Works Department.

Where a supplier has not supplied the annual mix design for asphaltic concrete to ODOT, or a special mix design is required, the supplier shall be required to submit the mix design prepared by an ODOT Certified laboratory, **meeting ODOT standards**, to the Public Works Department for approval by the at least 10 days prior to incorporation of the mix into the project.

The mix designs shall be prepared using the Suppliers aggregates, and shall include gradation, percentage of asphaltic cement, and maximum density, according to the ODOT method (RICE) or the Marshall method.

The asphaltic concrete mix shall conform as applicable to the requirements for mixing temperatures, hauling, and placing temperatures of the Oregon Standard Specifications for Construction, **latest edition**, Section 00745.

930.00.00 – Portland Cement Concrete (PCC)

930.10.01 – General

Plant mixed Portland Cement Concrete (PCC) for use in all Public Works facilities construction shall be produced by a company regularly engaged in the production of ready-mix concrete, using aggregates, cement, additives, plant and equipment that conforms to the applicable requirements of Oregon Standard Specifications for Construction, **latest edition**, Section **02001, Concrete**, and applicable requirements of the American Concrete Institute (ACI).

930.10.02 – Requirements

- a) Compressive Strength – Unless otherwise specified herein or shown on the plans or details, or as directed by the City Engineer, all PCC shall have a minimum compressive strength of **3000** psi after 28 days.
- b) Aggregate –
 1. Miscellaneous Concrete Structures - Unless otherwise specified, the maximum size aggregate shall be 3/4".
 2. Major Concrete Structures – The aggregate gradation shall be selected and designed in accordance with the type of structure and applicable sections of Oregon Standard Specifications for Construction, **latest edition**, Section 02001 Concrete and Section 02690, PCC Aggregates.
- c) Unless otherwise specified or approved, maximum slumps for concrete shall be required as follows:

1"- Machine-placed curbs, or curb and gutter

3" - Thrust blocking, concrete encasement for pipes, and manhole bases
3"- Formed and poured curbs, or curb and gutter

4"- Formed, reinforced concrete structures, sidewalks, driveway aprons, wheelchair ramps, catch basins and curb inlets

- d) Air Entrainment: Concrete which will be subject to freezing and thawing, Such as curb and gutter sections, sidewalks, driveway aprons, and wheelchair ramps, shall have **4% to 7%** entrained air, **per Oregon Standard Specifications for Construction, latest edition, Section 00440.12.**
- e) Certification: Upon request, the concrete supplier shall provide the Public Works Department with copies of the load ticket showing the batch date, type of material, quantity, delivery date and time; mix or yield design and any other reasonable information to substantiate the quality or type of material placed.

930.10.03 – Joint Materials

Generally, joint materials shall conform to Oregon Standard Specifications for Construction, **latest edition**, Section 02440, Joint Materials. Joint materials for residential sidewalks may be a high quality asphalt impregnated fiberboard.

935.00.00 – Topsoil

935.10.01 – General

Topsoil material(s) shall conform to the Oregon Standard Specifications for Construction, **latest edition**, Section 01040.14, Topsoil. Material shall be fertile, loamy, natural surface soil consisting of sands, silts, clays and organic matter in combination. Such topsoil material shall be free from substances toxic to plant growth and noxious weeds as defined by the Oregon Department of Agriculture as Type "A" or Type "B"; and from roots, refuse, sticks and lumps when tested according to AASHTO T 88.

Projects that include Low Impact Development in the design of stormwater control, shall refer to **ODOT Hydraulics Manual, Chapter 14.8**. For plantings in Low Impact Development projects, refer to Oregon Standard Specifications for Construction **latest edition**, Section 01040 – Planting.

935.10.02 – Quality Control of Source

Each source shall be well drained and, before stripping, shall have healthy crops of grass or other vegetative growth, free from noxious weeds as defined above including Canadian Thistle, Morning-Glory, Blackberry, Horsetail, Tansy Ragwort or other plants designated as a noxious weed by State or County officials.

940.00.00 – Geo-textile Construction Fabric

940.10.01 – General

Unless otherwise specified, all woven and non-woven geo-textile materials shall conform to the Oregon Standard Specifications for Construction, **latest edition**, Section 02320, Geosynthetics as applicable.

940.10.02 – Requirements

- a) Sub-grade Geo-textile – Only woven fabric is acceptable and shall meet the above requirements. Application and installation shall meet the requirements set forth in the requirements set forth in the plans or as described further herein and Oregon Standard Specifications for Construction, **latest edition**, Section 00350, Geosynthetic Installation.
- b) Pavement Overlay Geo-textile – **Contact the Public Works Department.**
- c) Embankment Geo-textile – Both woven and non-woven fabric is acceptable shall meet the above Materials requirements. Application and installation shall meet the requirements set forth in the plans or as described further herein and Oregon Standard Specifications for Construction, **latest edition**, Section 00350, Geosynthetic Installation.
- d) Drainage Geo-textile – Both woven and non-woven fabric is acceptable within the range of application and shall meet the above Materials requirements. Application and installation shall meet the requirements set forth in the plans or as described further herein and Oregon Standard Specifications for Construction, 2015, Section 00350, Geosynthetic Installation.

945.00.00 – Cement-Sand Slurry

945.10.01 – Requirements

As described in Oregon Standard Specifications for Construction, **latest edition**, Section 02010, except that the cement and sand slurry mix shall consist 1 standard sack Type II cement having a 7" slump, plus or minus 1-1/2" when tested according to AASHTO T 119. This mix shall be used in all applications requiring the use of cement-sand slurry unless otherwise specified or directed.

Sand shall meet the requirements Oregon Standard Specifications for Construction, **latest edition**, Section 02690.30, Fine Aggregates except that 100 percent shall pass the No. 4 (3/16") sieve.

960.00.00 – Miscellaneous Materials

960.10.01 – Locating Tape for Marking Discovered Utilities

Marking tape meeting ODOT or APWA requirements shall be minimum, 2” wide, heavy duty, non-fading, metallic/plastic material(s) that bear a repeated warning with the name or type of utility being marked, and shall be supplied in the following colors:

Example: “CAUTION: BURIED ELECTRIC LINE” (Red)

1. Water – Blue
2. Storm Drain – Green
3. Sanitary Sewer – Green
4. Gas – Yellow
5. Electrical – Red
6. TV Cable – Orange
7. Phone – Orange

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