

Appendix

The appendix contains several elements:

- The Lakeside Road and Street Inventory table;
- A summary of the Transportation Workshop;
- Adopted street standards from the 1986 Street Improvement Program; and
- Construction specifications from the 1986 Street Improvement Program.

Table A-1. City of Lakeside Road and Street Inventory

Street or Road	From/To	Approximate Length, Ft.	Width		Surface Type ¹	Existing Condition ²
			Road Width	Surface		
Railroad Avenue	9th - 10th	295'	30'	18'	Gravel	
Railroad Avenue	10th - 12th	590'	30'	22'	Gravel	
Railroad Avenue	12th - 13th	295'	30'	6'	Dirt	
8th Avenue	South End - Railroad	1,455'	80'	36'	Paved	Fair
8th Avenue	Railroad - Bowron	310'	80'	24'	Paved	Poor
8th Avenue	Bowron - Hwy 101	5,220'	60'	24'	Paved	Good
Wildwood Drive	City Limits - Airport Way	2,300'	60'	18'	Paved	Poor
Airport Way	Hwy 101 - 8th	3,180'	60'	22'	Paved	Good/Very Good
Sarah Lane	Airport Way - North End	460'	pvt.	22'	Gravel	
Bowron Road	8th Ave - W. Trailer Ct. Rd.	1,960'	25'	18'	Paved	Very Good
Bowron Road	W. Trailer Ct. Rd. - E. End	160'/600'	25'	18'/10'	Paved	Very Good
Rainbow Lane	Bowron - Jacobson	320'	pvt.	10'	Dirt	
Rainbow Lane	Jacobson - Rainbow Drive	240'	50'	15'	Gravel	
Stanley Lane	Bowron - North End	990'	25'	10'	Gravel	
West Trailer Court Road	Bowron - North End	1,140'	pvt.	22'		
West Trailer Court Road	Bowron - North End	680'	pvt.	22'		
Rainbow Drive	Rainbow Lane - Stanley	600'	50'	18'	Gravel	
Rough Lane	Rainbow Drive - North End	655'	50'	15'	Gravel	
Hall Lane	West End - 8th Ave	290'	pvt.	10'	Gravel	
Jacobson Way	8th Ave - Forrest Ave	810'	60'	18'	Paved	Good
Forrest Avenue	Jacobson Way - Rainbow Ln.	370'	60'	18'		
Forrest Avenue	Jacobson Way - Nye Ct.	330'	50'	15'	Gravel	
Nye Court	West End - East End	550'	50'	15'	Gravel	
Miller Avenue	West End - 8th Ave	240'	20'	10'	Gravel	
Hill Top	South End - Devore Arm	1,740'	60'	15'	Paved	Good
Hill Top	Devore Arm - 8th Ave	2,100'	60'	15'	Paved	Good

Devore Arm	1,200	Devore Arm - End	pvt.	12'	Dirt	
Falling Tree	1,100'	Devore Arm - End	pvt.	12'	Dirt	
Park Avenue	320'	Wend - 3rd Ave	80'	15'	Gravel	Very Good
Park Avenue	320'	3rd Ave - 4th Ave	80'	15'	Gravel	Very Good
Park Avenue	320'	4th Ave - 5th Ave	80'	15'	Paved	Very Good
Park Avenue	320'	5th Ave - 6th Ave	80'	15'	Paved	Very Good
Park Avenue	295'	6th Ave - 7th Ave	80'	25'	Paved	Very Good
Park Avenue	295'	7th Ave - 8th Ave	80'	25'	Paved	Very Good
Park Avenue	285'	8th Ave - 9th Ave	80'	24'	Paved	Good
3rd Avenue	420'	9th Ave - 11th Ave	80'	24'	Paved	Good
4th Avenue	950'	Park Ave - North End	80'	6'	Dirt	
5th Avenue	1,000'	Park Ave - North End	80'	12'	Gravel	
5th Avenue	450'	Park Ave - North Lake	80'	15'	Gravel	
6th Avenue	450'	North Lake - North End	80'	20'	Gravel	
6th Avenue	340'	Park Ave - North Lake	80'	30'	Paved/Gravel	Good
7th Avenue	490'	North Lake - Railroad	80'	15'	Gravel	
7th Avenue	330'	Park Ave - North Lake	80'	25'	Paved/Gravel	Poor
9th Avenue	510'	North Lake - Railroad	80'	15'	Gravel	
9th Avenue	530'	Park Ave - North Lake	80'	15'	Gravel	
10th Avenue	180'/320'	North Lake - Railroad	80'	30'	Paved/Gravel	Fair
11th Avenue	500'	North Lake - Railroad	80'	21'	Gravel	
11th Avenue	535'	Park Ave - North Lake	80'	24'	Paved	Good
12th Avenue	280'	North Lake - North End	80'	15'	Gravel	
12th Avenue	395'	South End - North Lake	80'	22'	Gravel	
13th Avenue	590'	North Lake - Railroad	80'	10'	Paved	Fair
13th Avenue	395'	South End - North Lake	80'	15'	Gravel	
14th Avenue	590'	North Lake - Railroad	80'	15'	Gravel	
14th Avenue	360'	South End - North Lake	80'	12'	Dirt	
15th Avenue	550'	North Lake - Railroad	80'	15'	Gravel	
North Lake Avenue	450'	North Lake - North End	80'	18'	Gravel	
	300'	West End - 3rd Ave	80'	10'	Dirt	

North Lake Avenue	3rd Ave - 4th Ave	295'	80'	10'	Dirt	
North Lake Avenue	4th Ave - 5th Ave	295'	80'	12'	Dirt	
North Lake Avenue	5th Ave - 6th Ave	295'	80'	18'	Gravel	
North Lake Avenue	6th Ave - 7th Ave	295'	80'	25'	Paved	Good
North Lake Avenue	7th Ave - 8th Ave	295'	80'	25'	Paved	Good
North Lake Avenue	8th Ave - 12th Ave	1,180'	80'	24'	Paved	Good
North Lake Avenue	12th Ave - 15th Ave	880'	80'	24'	Paved	Good
North Lake Avenue	15th - Tenmile Canal	1,680'	60'	24'	Paved	Good
North Lake Avenue	Tenmile Canal - City Limits	1,500'	60'-140'	22'	Paved	Very Good
Maple Street	North Lake - End	2,500'	pvt. - 20'	10'		
No Name #1	North Lake - City Limits	700'	pvt.	10'		
Railroad Avenue	6th Ave - 7th Ave	295'	30'	12'	Gravel	
Railroad Avenue	7th Ave - 8th Ave	295'	30'	15'	Gravel	
Railroad Avenue	8th Ave - 9th Ave	295'	30'	18'	Gravel	
Rachel Road	8th Ave - East End	560'	50'	15'	Gravel	
Woodland Street	8th Ave - Tiara Street	320'	60'	18'	Paved	Very Good
Woodland Street	Tiara Street -	540'	60'	12'	Dirt	
	Woodland - N. End	240'	60'	12'		
	Woodland - S. End	160'	60'	12'		
Tiara Street	Queens Ave - Woodland	940'	60'	15'	Gravel	
Tiara Street	Woodland - S. End	750'	60'	15'	Gravel	
Tiara Court	W. End - Tiara St.	180'	50'	15'	Gravel	
Royal Avenue	Tiara St - S. End	320'	60'	10'	Gravel	
Queens Avenue	8th Ave - Tiara St	360'/300'	50'	18'	Paved	Good
Alley	Queens Ave - E. End	300'	40'	12'	Gravel	
Sherwood Street	S. End - Robinhood	855'	40'	15'	Gravel	
Robinhood Avenue	Sherwood - 8th Ave	200'	40'	15'	Gravel	
Robinhood Avenue	8th Ave - Kings Ave	1,080'	50'	15'	Gravel	
Kings Avenue	W. End - 8th Ave	200'	30'	10'	Gravel	
Kings Avenue	8th Ave - Robinhood	715'	30'	12'	Paved	Very Good
Kings Avenue	Robinhood - City Limits	2,120'	50'	12'	Gravel	

APPENDIX B

CONSTRUCTION SPECIFICATIONS

2.1 Clearing and Grubbing

a. General

- (01) This item shall include the clearing and grubbing of all construction areas to an extent necessary for the Contractor to perform his work, and all incidental work shown on the plans or required to complete the project.
- (02) Clearing and grubbing shall include but not be limited to, the following work described under Workmanship.

b. Workmanship

- (01) Remove all trees, stumps, brush, vegetation, and debris within all construction areas.
- (02) Dispose of all cleared materials by burning or hauling away from project site.
- (03) All holes resulting from grubbing shall be filled with suitable material and compacted.
- (04) Contractor shall comply with all applicable local, State, and Federal laws and regulations pertaining to fire permits, burning, and disposal.
- (05) Remove and replace all improvements and/or facilities damaged or destroyed by Contractor's operations.
- (06) Remove and dispose of existing curb and other structures or obstructions where necessary to construct new work.
- (07) Adjust existing sanitary sewer and storm drain manhole covers, and waterline valve boxes to match new pavement grades.
- (08) Construct all other miscellaneous work which is not otherwise specified but which is required to complete the project.

a. General

- (01) This item shall include all labor, equipment, and materials for the excavation for street, sidewalk, and bicycle path construction.
- (02) Work included within this item includes, but is not limited to, the following:
 - a. Excavation of any material encountered regardless of nature, character, or condition, to the limits shown on the plans.
 - b. Hauling and disposal of unsuitable excavated materials on sites arranged by the Contractor unless otherwise designated on the plans.
 - c. Roadside ditching where required to facilitate drainage into existing culverts or drainage ways.
 - d. Removal of existing asphaltic pavement or other facilities.
 - e. Locating and protecting existing utilities and facilities.
 - f. Furnishing and installing safety devices and procedures.
 - g. Placement and compaction of any required embankment.
 - h. Reshaping of grade.
 - i. Compaction of subgrade.
 - j. Final cleanup.

b. Workmanship

- (01) All areas containing water shall be drained prior to commencement of construction.
- (02) Subgrade shall be free of ruts, depressions and irregularities.
- (03) Any soft areas shall be removed and replaced with suitable material approved by the Engineer.
- (04) Excavation shall be carried to line and grades shown on the plans, and as required to accommodate specified surfacing finish grades. Any overexcavation due to faulty workmanship will be brought to grade by the Contractor at his expense.

- (05) Subgrade and embankment areas shall be compacted to 95% maximum density as determined by AASHTO T-99, Method C.

2.3 Aggregate Subbase and Aggregate Base

a. General

- (01) This item shall include all materials, labor and equipment required for the construction of the new aggregate subbase and aggregate base as shown on the plans.

- (02) APWA Standard Specifications, 1980, Section 207, and OSHD Standard Specifications, 1984, Section 304, shall apply to this section.

b. Materials

- (01) Aggregate subbase material shall be 1½"-0 crushed rock.
(02) Aggregate base material shall be ¾"-0 crushed rock.
(03) Materials shall conform to the requirements of Section 703.07 of the OSHD Standard Specifications, 1984.

c. Workmanship

- (01) A separate trip ticket shall accompany each load delivered to the job site and shall be received by the owner's representative prior to dumping.
(02) A factor for converting the load weight to yards shall be supplied to the Engineer and verified by tests made by the contractor at the quarry site prior to the start of the work.
(03) Placement - Gravel surfacing shall be placed in such a manner and to such depth that when compacted it will conform to the grades shown on the plans.
(04) Compaction - Gravel shall be compacted to achieve 95% density when tested in accordance with AASHTO T-99. Add water as required.

a. General

- (01) This item shall include furnishing all materials, labor, and equipment required to construct asphalt concrete pavement, complete, as shown on the plans and herein specified.
- (02) Any temporary construction required to maintain roadways, including cold patching, shall be at the expense of the Contractor and without additional expense to the Owner.

b. Materials

- (01) Asphalt concrete shall be a mixture of asphalt cement, aggregate, mineral filler, and additives as required, heated and plant mixed into a uniformly coated mass.
- (02) Asphalt concrete shall be Class B mix conforming to Section 403 of the Oregon State Highway Division, Standard Specifications, 1984.

c. Workmanship

- (01) Mix, process, place, and compact in strict compliance with the Oregon State Highway Division, Standard Specifications, 1984.
- (02) Minimum temperature at time of placement shall be 250 degrees F. and shall not be placed when the ambient temperature is below 35° F.
- (03) Contact surfaces of manholes, catch basins and existing pavements shall be treated with a layer of tack coat asphalt. Do not place on wet surfaces.
- (04) Care shall be taken at all times to prevent segregation in the mixture.
- (05) Deficiencies or damages in surfacing shall be immediately repaired by the Contractor upon request of and in a manner approved by the Engineer.
- (06) Compaction shall be at least 92% as determined by AASHTO T230.
- (07) Compacted depth - as shown on the plans.
- (08) Surface of the asphaltic concrete after compaction shall be smooth and true to established cross section and grade. Any mixture that becomes loose or broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture, which when compacted shall conform to the surrounding area. There shall be no sign of roller marks. All costs in correcting defective surfaces shall be borne by the Contractor.

- (09) No traffic shall come in contact with any newly paved surface until surface has cooled and set sufficiently to prevent marking. The Contractor is responsible for this traffic control.
- (10) A separate trip ticket shall accompany each load delivered to the job site and shall be received by the Owner's representative prior to dumping.
- (11) After completion of paving the Contractor shall remove all debris from the site resulting from his operation.
- (12) Contractor shall maintain all surfaced areas and shall furnish all required materials and workmanship at no additional cost to Owner for a period of one (1) year following the Owner's final acceptance of the complete project.
- (13) Deficiencies or damages in surfacing shall be immediately repaired by the Contractor upon request of, and in a manner approved by, the Engineer.
- (14) All costs incurred in the repair of deficiencies or damages shall be borne by the Contractor and no additional compensation will be due the Contractor.

2.5 Seal Coat

a. General

- (01) This item shall include furnishing all materials, labor, and equipment required to construct aggregate seal coat.

b. Materials

- (01) Asphalt shall be emulsified or cut-back asphalt as specified from Section 210.205A of the APWA Standard Specifications, 1980.
- (02) Aggregate shall conform to the requirements of section 210.2.02B of the APWA Standard Specifications, 1980.

c. Workmanship

- (01) Spreading of asphalt and aggregate shall be in strict compliance with the APWA Standard Specifications, 1980.
- (02) Asphalt shall not be placed on any wet surface, or when the ambient temperature is below 60° F.
- (03) Irregularities in surface smoothness, segregation of materials, pockets of dirt, and other deficiencies and defects shall be removed and replaced as approved by the Engineer.
- (04) Traffic shall be permitted to travel over any spread of aggregate after it has been shaped and compacted.

2.6 Portland Cement Concrete Pavement

a. Scope

- (01) This item shall include furnishing all labor, equipment, and materials for concrete pavement construction.
- (02) Work includes, but is not limited to, furnishing, mixing, forming, placing, finishing, and curing all concrete.
- (03) Finished concrete shall conform to the lines, grades, and dimensions shown on the plans.

b. Materials

- (01) Type I Portland Cement conforming with ASTM C150 shall be used.
- (02) Concrete Aggregates shall conform to ASTM C33. Maximum coarse aggregate size shall be 1/4 the slab thickness.
- (03) All mixing water shall be clean and free from deleterious amounts of acids, alkalies, or organic materials.
- (04) Expansion joint material where required shall be ½-inch thick asphalt impregnated premolded fiber.
- (05) Poured joint sealer where required shall conform to AASHTO M173 or ASTM D1190, grey color.

- (06) Curing compound shall be of the white liquid membrane forming type and conform to ASTM C309.
- (07) Air-entraining admixtures for concrete shall conform to ASTM C260.
- (08) All concrete shall have a minimum 28-day compressive strength of 4,000 psi. Concrete shall be manufactured and delivered in accordance with ASTM C94; Standard Specification for Ready-Mixed Concrete.
- (09) Minimum cement content - 6 sacks per cubic yard.
- (10) Maximum water content - 6 gallons per sack.
- (11) Maximum slump - 4 inches.

c. Workmanship

(01) Subgrade Preparation

- a. Concrete pavement shall be placed on the specified 3/4"-0 aggregate base course.
- b. Subgrade shall be in a moist condition when concrete is placed.
- c. Leveling course shall be uniformly compacted and smooth.

(02) Concrete Placement

- a. Ready-Mixed Concrete hauled in truck mixers or truck agitators shall be deposited in place within 90 minutes from the time the water is added to the mix. Retempering concrete by adding water shall be allowed as long as the maximum water-cement ratio will not be exceeded. Concrete that is unsuitable for placement as delivered shall be rejected.
- b. Before placing concrete, all water, hardened concrete, and foreign materials shall be removed from subgrade. All forms shall be thoroughly cleaned and secured in position and coated with a foam-release agent.
- c. The concrete shall be placed, struck off, and consolidated with a mechanical finishing machine, vibrating screed, or by hand-finishing methods when approved by the engineer. If a screed is used a depth of at least 2 inches of concrete should be carried in front of the screed for the full width of the pavement. In lieu of using fixed forms, the contractor may place concrete with a slipform paver designed to spread, consolidate,

screed, and float-finish the freshly placed concrete in one complete pass of the machine.

(03) Finishing

- a. After concrete has been struck off and consolidated, a bullfloat may be used to remove any high or low spots. Bullfloat use shall be confined to a minimum. A final skidresistant finish shall be made with a burlap drag or broom.

(04) Curing

- a. Concrete shall be cured by protecting it against loss of moisture, rapid temperature change, and mechanical injury for a least 3 days after placement. After all free water has disappeared from the surface, a liquid membrane-forming compound shall be uniformly sprayed on all exposed surfaces.
- b. When concrete has been placed in cold weather and the temperature may drop below 35 deg. F., straw, hay, insulated curing blankets, or other suitable material shall be provided along the line of work. Concrete injured by frost action shall be removed and replaced at the Contractor's expense.

(05) Joints

- a. Control (or contraction) joints, expansion joints, and all longitudinal joints shall be as shown on the plans. Traverse joints shall extend continuously through the pavement and curb and gutter.
- b. Control joints or contraction joints shall be formed by one of the following methods: sawed, hand formed, formed by premolded filler or full depth construction joints. Joint depth shall be equal to 1/4 of the slab thickness. Hand-formed joints shall have a maximum edge radius of 1/8 in. Sawing of joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive ravelling. All joints shall be continuous across the slab, unless interrupted by full-depth premolded joint filler. Joint openings shall be cleaned and sealed.

- c. Transverse construction joints of the type shown in the plans shall be placed whenever the placing of concrete is suspended for more than 30 minutes. A thickened-edge joint shall be used if the joint occurs at the location of a contraction joint.
- d. Expansion joints shall consist of vertical expansion joint filler placed in a butt-type joint as shown in the plans. The expansion joint filler shall be continuous from form to form, shaped to the subgrade and curb section. Preformed joint filler shall be furnished in lengths equal to the pavement width or equal to the width of one lane. Damaged or repaired joint filler shall not be used unless approved by the Engineer.

The expansion joint filler shall be held in a vertical position. An approved installing bar or other device shall be used if necessary to ensure proper grade and alignment during placing and finishing of the concrete. Finished joints shall not deviate in horizontal alignment more than 1/4 in. from a straight line. If joint fillers are assembled in sections, there shall be no offsets between adjacent units. No plugs of concrete shall be permitted anywhere within the expansion space.

- e. Isolation joints (expansion joints) shall be used to isolate fixed objects abutting or within the paved area. They shall contain premolded joint filler for the full depth of the slab.
- f. Sealing joints. Joints to be sealed shall be filled with joint-sealing material before the pavement is opened to traffic and as soon after completion of the curing period as is feasible. Just before sealing, each joint shall be thoroughly cleaned of all foreign material, including membrane curing compound, and joint faces shall be clean and surface-dry when seal is applied. Material for seal applied hot shall be stirred during heating to prevent localized overheating.

The sealing material shall be applied to each joint opening in accordance with the details shown in the plans or as directed by the engineer. The joint filling shall be done without spilling material on the exposed surfaces of the concrete. Any excess material on the surface of the concrete pavement shall be removed immediately and the pavement shall be removed immediately and the pavement cleaned. The use of sand or similar material to cover the seal shall not be permitted. Joint-sealing material shall not be placed when the air temperature in the shade is less than 50 deg. F., unless approved by the Engineer.

(06) Protection

- a. The pavement shall not be opened to traffic until the field-cured concrete has attained a flexural strength of 550 psi, or a compressive strength of 3,500 psi. If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Before opening to traffic, the pavement shall be cleaned.
- b. The Contractor shall provide overnight protection from vandals. Any damage resulting from this occurrence shall be repaired in a manner approved by the Engineer at the Contractor's expense.

(07) Concrete Testing

- a. Concrete testing shall be performed by a certified testing laboratory, not a representative of the contractor or concrete supplier.
- b. Test cylinders shall be collected and tested for each day that concrete pavement is placed, or for each 100 cubic yards, whichever is the least frequent.
- c. Collect and cure specimens in accordance with ASTM C31.
- d. Test for required compressive strength in accordance with ASTM C39.
- e. Deliver test results to the Engineer.
- f. Contractor shall pay all cost associated with testing, including collection, curing, and transportation.

2.7 Curb and Gutter

a. General

(01) This item shall include furnishing all labor, equipment, and materials to construct concrete curb and gutter to the lines, grades, and sections shown on the plans.

b. Materials - Comply with 2.6.b.

c. Workmanship

- (01) Comply with applicable provisions of 2.6,c.
- (02) The subgrade shall be excavated or filled with suitable material to the required grades and lines. All soft, yielding, and otherwise unsuitable material shall be removed and replaced with suitable material. Filled sections shall be compacted and extend a minimum of 1 ft. outside the form lines. The subgrade shall be reasonably dense, firm, trimmed to a uniform smooth surface, and in a moist condition when the concrete is placed.

(03) Concrete Placement

- a. Machine Placement. The slipform/extrusion machine approved shall be so designed as to place, spread, consolidate, screed, and finish the concrete in one complete pass in such a manner that a minimum of hand finishing will be necessary to provide a dense and homogeneous concrete section. The machine shall shape, vibrate, and/or extrude the concrete for the full width and depth of the concrete section being placed. It shall be operated with as nearly a continuous forward movement as possible. All operations of mixing, delivery, and spreading concrete shall be so coordinated as to provide uniform progress, with stopping and starting of the machine held to a minimum.
- b. Formed Method. The forms shall be of wood, metal, or other suitable material that is straight and free from warp, having sufficient strength to resist the pressure of the concrete without displacement and sufficient tightness to prevent the leakage of mortar. Flexible or rigid forms of proper curvature may be used for curves having a radius of 100 ft. or less. Division plates shall be metal.

The front and back forms shall extend for the full depth of the concrete. All of the forms shall be braced and staked so that they remain in both horizontal and vertical alignment until their removal. They shall be cleaned and coated with an approved form-release agent before concrete is placed against them.

The concrete shall be deposited into the forms without segregation and then it shall be tamped and spaded or mechanically vibrated for thorough consolidation. Low roll or mountable curbs may be formed without the use of a face form by using a straightedge and templet to form the curb face. When used, face forms shall be removed as soon as possible to permit finishing. Front and back forms shall be removed without damage to the concrete after it has set.

(04) Finishing. The plastic concrete shall be finished smooth, if necessary, by means of wood float and then it shall be given a final surface texture using a light broom or burlap drag. Concrete that is adjacent to formed joints shall be edged with a suitable edging tool to the dimensions shown on the plans.

(05) Joints

- a. Contraction Joints. Transverse weakened-plane contraction joints shall be constructed at right angles to the curb line at intervals not exceeding 15 ft. Joint depth shall average at least one-fourth of the cross section of the concrete.

Contraction joints may be sawed, hand-formed, or made by 1/8-thick division plates in the formwork. Sawing shall be done early after the concrete has set to prevent the formation of uncontrolled cracking. The joints may be hand-formed either by (1) using a narrow or triangular jointing tool or a thin metal blade to impress a plane of weakness into the plastic concrete, or (2) inserting 1/8-in. thick steel strips into the plastic concrete temporarily. Steel strips shall be withdrawn before final finishing of the concrete. Where division plates are used to make contraction joints, the plates shall be removed after the concrete has set and while the forms are still in place.

- b. Expansion Joints. Expansion joints shall be constructed at right angles to the curb line at immovable structures and at points of curvature for short-radius curves. Filler material for expansion joints shall conform to requirements of ASTM D994, D1751, or D1752 and shall be furnished in a single 1/2-in. thick piece for the full depth and width of the joint.

Expansion joints in a slipformed curb and gutter shall be constructed with an appropriate hand tool by raking and sawing through partially set concrete for the full depth and width of the section. The cut shall be only wide enough to permit a snug fit for the joint filler. After the filler is placed, open areas adjacent to the filler shall be filled with concrete and then troweled and edged. Expansion joint spacing shall not exceed 45 feet.

- c. Construction Joints. May be either butt-type or expansion-type.

(06) Protection

- a. The contractor shall always have materials available to protect the surface of the plastic concrete against rain. These materials shall consist of waterproff paper or plastic sheeting. For slip-form construction, materials such as wood planks or forms to protect the edges shall also be required.
- b. When concrete is being placed in cold weather and the temperature may be expected to drop below 35 deg. F., suitable protection shall be provided to keep the concrete from freezing until it is at least 10 days old. Concrete injured by frost action shall be removed and replaced at the contractor's expense.

- (07) Curing. Concrete shall be cured for at least 3 days after placement to protect it against loss of moisture, rapid temperature change, and mechanical injury. Moist burlap, waterproof paper, white polyethylene sheeting, white liquid membrane compound, or a combination thereof may be used as the curing material.

(08) Backfilling

- a. After concrete has achieved required strength, backfill with suitable materials, unless concrete has been placed against existing structures or original ground.
- b. Fill material shall be mechanically compacted in layers.

2.8 Gravel Pedestrian Walks

a. General

- (01) This item includes furnishing all labor, equipment, and materials to construct gravel pedestrian walks.

b. Materials

- (01) Gravel shall be 3/4"-0 crushed rock.

c. Workmanship

- (01) Comply with provisions of Section 2.3,c.

2.9 Asphalt Concrete Sidewalks and Bicycle Paths

a. General

- (01) This item includes furnishing all labor, equipment, and materials to construct asphalt concrete sidewalks and bicycle paths.

b. Materials

- (01) Aggregate base shall be 3/4"-0 crushed rock.
(02) Asphalt concrete shall comply with Section 2.4,b.

c. Workmanship - Comply with applicable provisions of Sections 2.3,c and 2.4,c.

2.10 Concrete Sidewalk and Bicycle Paths

a. General

- (01) This item shall include furnishing all labor, equipment, and materials to construct concrete sidewalk, and bicycle paths.

b. Materials

- (01) Aggregate base shall be 3/4"-0 crushed rock.
(02) Concrete shall comply with Section 2.6,b.

c. Workmanship

- (01) Comply with applicable provisions of Section 2.6,c.
(02) New sidewalk to be 4 inches thick except at driveway approaches where sidewalk shall be 6 inches thick. Bicycle paths to be 4 inches thick.

- (03) Subgrade preparation, comply with 2.7,c,02.
- (04) Forms shall be of wood, metal or other suitable material that is straight and free from warp, and has sufficient strength to resist the pressure of the concrete without excessive deflection.
- (05) Front and back forms shall extend for full depth of concrete being placed.
- (06) Forms shall be cleaned and coated with approved release agent prior to concrete placement.
- (07) Concrete shall be deposited in forms without segregation and tamped and spaded or mechanically vibrated for thorough consolidation.
- (08) Finishing
 - a. Trowel to smooth, hard, slick surface, free from trowel marks. Absorption of wet spots with neat cement not allowable.
 - b. Broom lightly at right angles to slab length. Provide scoring as specified.
- (09) Scored joints required on 5 foot centers.
- (10) Protection - Comply with 2.7,c.,06.
- (11) Curing - Comply with 2.7,c.,07.
- (12) Backfilling - Comply with 2.7,c.,08.

STREET IMPROVEMENTS

5.1.1 General

Developed in the following text are cost estimates for typical street improvements. In the case of both asphalt concrete streets and concrete streets a cost per lineal foot and a cost per square foot is estimated based on a typical 100 foot long section of roadway.

The estimates include 10% contingencies and 14% for engineering which includes complete design, contract administration, stakeout, and inspection.

The cost of street improvements will vary significantly dependent upon several factors. ~~It is emphasized~~ that the estimates are based on average, typical conditions, and should only be used for preliminary project planning. Detailed estimates should always be prepared based upon the actual design following the completion of plans and specifications. The actual costs may be higher than estimated due to soft subgrade conditions, rock formations, steep grades, the requirement to adjust manhole or valve covers, or drainage considerations. Similarly, the actual costs may be lower if the overall size of the improvement is quite large. If the improvement area has previously been cleared, or if existing in-place gravel can be utilized. Also, a complete street improvement project must include the cost of any sidewalk, bike path, or storm drain improvements as required.

5.1.2 Asphalt Concrete Streets

Table 5.1.1 list the items typically associated with the construction of a typical 100 ft. section of asphalt concrete roadway, and respective cost estimates for various street classifications.

5.1.3 Concrete Streets

Table 5.1.2 lists the items usually associated with the construction of a typical 100 ft. section of concrete roadway and the respective cost estimates for various street classifications.

5.1.4 Gravel Streets

It is not anticipated that the City will create any new gravel roadways. However, if they do, costs for the associated work can be obtained from Table 5.1.1. Included within projected costs should be: clearing and grubbing, excavation, aggregate subbase, engineering and contingencies. Total costs will be dependent upon type of street being developed. Costs for updating existing gravel streets will be covered in Section 5.4, Street Maintenance.

COST ESTIMATES FOR ASPHALT CONCRETE STREETS

Construction Item	Street Classification			
	Arterial	Collector	Local	
1. Clearing & Grubbing	L.S. = \$ 1,000	L.S. = \$ 800	L.S. = \$ 600	
2. Excavation	270 c.y. @ 3.60 = 972	200 c.y. @ \$ 3.60 = 720	155 c.y. @ \$ 3.60 = 558	
3. Aggregate subbase	195 c.y. @ \$ 12.00 = 2,340	115 c.y. @ \$ 12.00 = 1,380	67 c.y. @ \$ 12.00 = 804	
4. Aggregate base	40 c.y. @ \$ 12.00 = 480	30 c.y. @ \$ 12.00 = 360	22 c.y. @ \$ 12.00 = 264	
5. Curb & Gutter	200 L.F. @ \$ 5.50 = 1,100	200 L.F. @ \$ 5.50 = 1,100	200 L.F. @ \$ 5.50 = 1,100	
6. Asphalt Concrete	144 ton @ \$ 40.00 = 4,560	80 ton @ \$ 40.00 = 3,200	45 ton @ \$ 40.00 = 1,800	
Total Construction Cost	\$ 10,452	\$ 7,560	\$ 5,126	
Engineering & Contingencies	2,548	1,840	1,274	
TOTAL - 100 Lineal Feet	\$ 13,000	\$ 9,400	\$ 6,400	
Cost per lineal foot	\$ 130.00	\$ 94.00	\$ 64.00	
Cost per square foot	\$ 2.71	\$ 2.61	\$ 2.28	

TABLR 5.1.1.2

COST ESTIMATES FOR CONCRETE STREETS

Construction Item	Street Classification					
	Arterial		Collector		Local	
	L.S. =	\$ 1,000	L.S. =	\$ 800	L.S. =	\$ 600
1. Clearing & Grubbing						
2. Excavation	177 c.Y. @ \$ 3.60 =	640	133 c.Y. @ \$ 3.60 =	480	105 c.Y. @ \$ 3.60 =	380
3. Aggregate Base	40 c.Y. @ \$ 12.00 =	480	30 c.Y. @ \$ 12.00 =	360	22 c.Y. @ \$ 12.00 =	264
4. Curb & Gutter	200 L.F. @ \$ 5.50 =	1,100	200 L.F. @ \$ 5.50 =	1,100	200 L.F. @ \$ 5.50 =	1,100
5. Concrete pavement	534 s.Y. @ \$ 22.00 =	11,748	400 s.Y. @ \$ 20.00 =	8,000	315 s.Y. @ \$ 18.00 =	5,670
Total Construction Cost		\$ 14,968		\$ 10,740		\$ 8,014
Engineering & Contingencies		3,732		2,660		1,986
TOTAL - 100 Lineal Feet		\$ 18,700		\$ 13,400		\$ 10,000
Cost per lineal foot		\$ 187.00		\$ 134.00		\$ 100.00
Cost per square foot		\$ 3.90		\$ 3.72		\$ 3.57

5.2 BICYCLE PATHS

The cost estimates presented in this section are for a typical bicycle path section of asphalt concrete or concrete. Costs do not include any special construction nor any special bicycle path appurtenances. Tables 5.2.1 and 5.2.2 display cost estimates based upon a 100 ft. section of bikeway, 8 feet in width, for use by both pedestrians and bicyclists.

TABLE 5.2.1

COST ESTIMATES FOR ASPHALT CONCRETE BICYCLE PATHS

Construction Item	Cost
Clearing & Grubbing	\$ 200
Excavation	15 c.y. @ \$ 3.60 = 54
Aggregate Base	4" thick, 12 c.y. @ \$ 12.00 = 144
Asphalt Concrete	2" thick, 12 tons @ \$ 40.00 = 480
Total Construction	\$ 878
Engineering & Contingencies	222
TOTAL - 100 Lineal Feet	\$ 1,100
Price per lineal foot	\$ 11.00
Price per square foot	\$ 1.38

COST ESTIMATES FOR CONCRETE BICYCLE PATHS

<u>Construction Item</u>	<u>Cost</u>
Clearing & Grubbing	\$ 200
Excavation	15 c.y. @ \$ 3.60 = 54
Concrete	4" thick, 89 s.y. @ \$ 16.00 = 1,424
Aggregate Base	2" thick, 6 c.y. @ \$ 12.00 = 72
Total Construction	\$ 1,750
Engineering & Contingencies	450
TOTAL - 100 Lineal Feet	\$ 2,200
Cost per lineal foot	\$ 22.00
Cost per square foot	\$ 2.75

5.3 PEDESTRIAN WALKS

The majority of the preparation costs such as clearing and grubbing and excavation are usually covered under the street construction costs. Even if a pedestrian walk is constructed after the street, the costs are considered incidental and usually are not considered.

Table 5.3.1 below lists cost estimates for various sections of 5' wide pedestrian walks. The costs shown are for furnishing and installing materials only. Asphalt concrete pedestrian walks are not recommended in developed area.

TABLE 5.3.1

COST ESTIMATES FOR PEDESTRIAN WALKS

<u>Construction Item</u>	<u>Per sq. ft.</u>	<u>Per lin. ft.</u>
1. 4" Concrete walk	\$ 2.50	\$ 12.50
2. 4" Handicap Ramp	\$ 2.50	-
3. 6" Concrete driveway	\$ 3.25	\$ 16.25
4. 2" Asphalt concrete walk	\$ 1.50	\$ 7.50

5.4.1 General

General maintenance of the City's street system may include patching, grading of gravel sections, sweeping, overlays, clearing of storm drain systems, etc. A survey was made of the maintenance budgets of the surrounding communities, and these are compared in Table 5.4.1. The figures do not include any capital outlays for new street construction or extensive street rehabilitation.

TABLE 5.4.1

MAINTENANCE EXPENDITURES

<u>City</u>	<u>Miles of City Streets</u>	<u>Budgeted Maintenance Expenditures per year</u>	<u>Cost/Miles/Year</u>
Coos Bay	60	\$ 284,173	\$ 4,736
Lakeside	6	28,600	4,766
Coquille	16	71,391	4,462
Bandon	23	85,065	3,698

Lakeside's expenditures for street maintenance is comparable with other communities in Coos County. All of the cities surveyed expressed concern that existing budget amounts are not sufficient to cover all associated cost. It is also probable that as the City's transportation system expands, so will its maintenance cost.

5.4.2 Seal Coats

Seal coats are one type of surface treatment that can be applied to existing asphaltic concrete surfaces to extend the life of existing pavements. Table 5.4.2 lists the cost estimates for applying aggregate seal coats to various street classifications for a 100' typical section. Costs are based upon applying emulsified asphalt at 0.4 gallons per square yard and aggregate at 35 pounds per square yard.

COST ESTIMATE - SEAL COAT

Construction Item	Street Classification		
	Arterial	Collector	Local
Asphalt	.88 t. @ \$ 400 = \$ 352	.67 t. @ \$ 400 = \$ 268	.5 t. @ \$ 400 = \$ 200
Aggregate	9.3 t. @ \$ 50 = 465	7 t. @ \$ 50 = 350	5.4 t. @ \$ 50 = 270
Construction Cost	\$ 817	\$ 618	\$ 470
Engineering & Contingencies	183	182	130
TOTAL - 100 Lineal Feet	\$ 1,000	\$ 800	\$ 600
COST PER LINEAL FOOT =	\$ 10.00	\$ 8.00	\$ 6.00
COST PER SQUARE FOOT =	\$ 0.21	\$ 0.21	\$ 0.21

5.4.3 Overlays

Overlay construction is another method used to renovate existing paved surfaces, both asphaltic concrete and concrete. A 2 inch maximum lift is considered for all classifications of streets. The estimated cost for overlay construction is approximately \$ 0.6 per square foot.

5.4.4 Gravel Surfacing

The City should sometimes add gravel to existing gravel roadways to rejuvenate the driving surface. A two inch compacted depth is a recommended minimum. Before the new gravel is placed the existing roadway should be graded. Since roadway widths vary, the cost has been calculated on a square foot basis only. The estimated cost for gravel surfacing which includes grading and furnishing, placing, and compacting the gravel is approximately \$ 0.32 per square foot.

5.4.5 Dust Control

The roadway should be graded prior to dust control treatment. The estimated cost for dust control is as follows:

TABLE 5.4.3

COST ESTIMATE - DUST CONTROL
(Cost per square foot)

<u>Material Type</u>	<u>Grading</u>	<u>Material</u>	<u>Installation</u>	<u>Total</u>
Coherex	\$ 0.14	\$ 0.09	\$ 0.03	\$ 0.26
Lignin Sulfonate	0.14	0.03	0.03	0.20
Magnesium Chloride	0.14	0.02	0.03	0.19

5.5 COST UPDATING

Obviously, the City will not be able to afford all of the improvements recommended within this study. New street construction will have to be phased over a period of time, and as time passes the costs listed in this Section will become outdated.

The City has two methods by which to update these costs. One is to use the Engineering News-Record which is a weekly publication. This publication has monitored building costs since 1913. The increase or decrease in costs is examined each year. The other method is to verify construction cost with projects that have been recently constructed in the area.

COST ESTIMATES - SUMMARY

Type of Improvement	Street Classification					
	Arterial		Collector		Local	
	L.F.	S.F.	L.F.	S.F.	L.F.	S.F.
<u>A. NEW CONSTRUCTION</u>						
1. Asphalt Concrete Street	\$ 130.00	\$ 2.71	\$ 94.00	\$ 2.61	\$ 64.00	\$ 2.28
2. Concrete Street	187.00	3.90	134.00	3.72	100.00	3.57
<u>B. MAINTENANCE</u>						
1. Aggregate Seal-Coat	\$ 10.00	\$ 0.21	\$ 8.00	\$ 0.21	\$ 6.00	\$ 0.21
2. Asphalt Overlay	32.60	0.6	24.50	0.6	19.00	0.6

Type of Improvement	Arterial		Collector		Local	
	L.F.	S.F.	L.F.	S.F.	L.F.	S.F.
	<u>C. OTHER</u>					
1. Asphalt Concrete Bicycle Paths	\$ 11.00	\$ 1.38				
2. Concrete Bike Paths	22.00	2.75				
3. 4" Concrete Walk	12.50	2.50				
4. 4" Handicap Ramp		2.50				
5. 6" Concrete Driveway	16.25	3.25				
6. 2" Asphalt Concrete Walk	7.50	1.50				
7. Gravel Surfacing	-	0.32				
8. Dust Control	-	0.19 - 0.26				

Section 2. Repealer. Any prior Transportation Systems Improvement Plans are hereby repealed

ATTEST:

City Recorder

Passed by the council this _____ day of _____, 19____.

Approved by the Mayor this _____ day of _____, 19____.

Peter Schoonover, Mayor