

SECTION 1000 PARKS AND RECREATION

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SECTION 1000 PARKS AND RECREATION

1000.00 SITE WORK AND EARTHWORK

1010.00 SITE PREPARATION

1011.00 General

Site preparation shall be completed in accordance with Section 1000.00, Site Work and Earthwork, of these STANDARDS AND SPECIFICATIONS.

Contractor will identify, verify and protect control point. Control point to be identified on all plans and as- builts. Contractor will verify location of control point weekly. Original condition of control point pin must be maintained through out entire project.

1012.00 Protection of Existing Vegetation

1012.01 Protection of Existing Vegetation on Town Owned Properties.

Prior to commencement of any site work, the Contractor, in conjunction with the Director of Parks & Recreation and Parks Superintendent or his designee, shall identify all designated vegetation (or remnant native areas) suitable for preservation located on Town owned properties. Vegetation that is to be preserved on the site shall be protected by creating adequate Vegetation and Tree Protection Zones. Protective fencing and signage shall be placed along the perimeter of designated Vegetation and Tree Protection Zones.

1012.02 Existing and Native Vegetation Representation

All significant existing and native vegetation shall be depicted on the design plans prior to adopting any “approved” plans.

1012.03 Protective Fencing

Vegetation and Tree Protection Zones shall be protected by orange vinyl construction fencing, chain link fencing, or snow fencing at least (4) feet high and supported at (10) foot intervals by metal T-posts. Wooden stakes and rebar posts shall not be used as supports. Fencing shall be maintained upright and in place. All fencing shall be in place prior to commencement of any site work and remain in place until all work has been completed.

1012.04 Signage

All protective fencing shall have a waterproof vegetation protection sign affixed to the fence every (20) feet in such a manner to be clearly visible to workers on the site. Signage shall be maintained

visible and legible. Signage shall be written in both Spanish and English and read as follows: “Protected Vegetation: NO traffic, vehicles, or material storage in this area.”

1012.05 Prohibited Practices in Vegetation and Tree Protection Zones

Prohibited practices within Vegetation and Tree Protection Zone(s) shall include, but not limited to the following: removal, relocation, or trimming of vegetation without permission of Parks Superintendent or his designee; breaking of branches or scraping of the bark; changes to existing grade by excavating, filling, trenching, or use of augers; nailing, bolting, or using vegetation as a temporary support in any way; parking or storing equipment or building materials; dumping of construction waste or materials, disposing of liquids or contaminants; driving equipment through; or removal of protective fencing until all work has been completed.

1012.06 Vegetation Protection Zones

All vegetation types that have been deemed suitable for preservation, with the exception of trees, shall be adequately preserved in Vegetation Protection Zones. Protective fencing shall be placed a minimum of five (5) feet away from the edge of the vegetations canopy and encompass the entire plant species/community.

1012.07 Tree Protection Zones

The Contractor, in conjunction with the Parks Superintendent or his designee and Town Engineer, shall identify the critical root zone area by all of the trees that are to be preserved on the site and create adequate Tree Protection Zone(s). The critical root zone shall be determined by whichever encompasses the greatest area: (1) the irregular shape formed around a tree by a series or vertical lines that run through the outermost portion of the canopy of the tree and extend to the ground, often referred to as the drip line; or (2) one and a half (1 1/2) feet of space from the trunk for each inch of trunk diameter in every direction. The critical root zone dimensions will serve as the required dimensions of the Tree Protection Zone.

1012.08 Tunneling and Boring

There shall be no trenching permitted within a Vegetation or Tree Protection Zone. Utilities shall be bored under the Vegetation or Tree Protection Zone in circumstances where it is not possible to trench around the protected area(s). When required, the length of the bore shall be the width of the critical root zone at a minimum depth of forty-eight (48) inches.

1012.09 Soil Protection

Under special circumstances, where vehicle and equipment access is needed through a Vegetation or Tree Protection Zone, permission must be obtained from the Parks Superintendent or his designee. Any access roads through a Vegetation or Tree Protection Zone shall be created using six (6) inches of wood mulch to reduce soil compaction in areas subject to repeated construction traffic. The mulch

shall be replenished as necessary to maintain a six (6) inch depth. Upon completion of all site work, the mulch shall be removed with care taken not to change existing grade.

1012.10 Penalties

Contractor shall be held responsible for any damage to vegetation that was designated to be preserved within designated Vegetation and Tree Protection Zones.

Failure to comply with Protection of Existing Vegetation specifications may result in penalties. If the violation results in damage to a tree or other woody plant, there shall be, in addition to any other applicable penalty, a penalty of three (3) times the damage caused to the tree or other woody plant, or \$500, whichever is greater. In the event a tree or other woody plant is removed in violation of any of the provisions of this section, the additional penalty shall be three (3) times the value of the tree. For purposes of calculating the damage to the tree, the most recent edition of the "Guide for Establishing Values of Trees and Other Plants" by the Council of Tree and Landscape Appraisers shall be presumed to provide the appropriate basis for determining damages.

1012.11 Maintenance of Retained Trees

All vegetation that was designated to be preserved within designated Vegetation and Tree Protection Zones shall be maintained by contractor including watering and pruning until final acceptance has been granted.

1020.00 TOPSOIL PREPARATION

1021.00 General

The Contractor will provide all labor, equipment and materials necessary to complete the topsoil preparation for seeding and/or sodding as required by the accepted plans and these STANDARDS AND SPECIFICATIONS.

Areas to be developed or otherwise re-seeded (including native seeding areas which are currently weed dominated) which are infested with annual, biennial or perennial weeds, such as bindweed, Canadian thistle, Scotch thistle, Russian thistle, Kochia, Diffuse knapweed, or annual ryegrass , and not bearing significant remnant native species, shall be treated with Round-up or another generic Glyphosate based broad spectrum herbicide at a rate recommended on the chemical's label for controlling all existing vegetation. Do not treat remnant native grasses, shrubs or trees in designated open space areas. Do not reseed or plant herbicide treated areas for at least 10 days following treatment. More time may be needed to neutralize the herbicide in cold weather or on sandy soils. All applicable portions of Section 1032.01, Topsoil, of these STANDARDS AND SPECIFICATIONS shall apply.

Landscape plans must show amount of organic amendments needed at a rate of five (5) cu. yards per thousand (1000) feet for all landscaped areas. Native areas soil amendments will be shown at a rate of three (3) cu. yards per thousand (1000) feet. Plans will provide detailed square feet/acreage measurements for all landscaped areas.

1022.00 Materials

1022.01 Organic Materials

Organic amendments shall consist of an organic product containing a mixture of well rotted/composted cow or sheep manure and or composted aspen humus or wood residue or approved equal (sphagnum or native mountain peat is not acceptable). Organic product shall have been aerobically and naturally processed in such a manner as to maintain a consistent temperature of 140 degrees Fahrenheit 30 degrees Celsius or greater for 70 to 90 days. The pH after composting shall be between 5.0 and 7.5, with organic matter content of not less than 30% and soluble salts not greater than 3mmhos/cm. Certification must be provided to prove the product has gone through this process.

1022.02 Fertilizer for Parks or Conventional Landscape Areas

Fertilizer will be a complete starter fertilizer having the chemical analysis of Nitrogen-18, Phosphorous-46, Potash-0. Fertilizer will be delivered to the site in new, unopened bags bearing the manufacturer's name and the chemical analysis. Fertilizer will conform to all Colorado Department of Agriculture fertilizer laws.

1022.03 Fertilizer for Open Space and Native Seeded Areas

Biosol, a slow release organic fertilizer shall be applied to all native seeded areas. Biosol shall be applied following seeding a before mulch application.

1023.00 Process (Seedbed preparation)

1023.01 Seedbed Prep Process for Parks or Other Conventional Landscape Areas

The Contractor will cultivate the area to be seeded / sodded to a depth of six (6) inches so as to free the site of weeds and other plants that may interfere with turf establishment. All stones, sticks, and debris brought to the surface over two (2) inches in diameter will be removed from the site. Prior to seeding / sodding, the Contractor will uniformly apply the specified organic material at the rate of five (5) cubic yards per one thousand (1,000) square feet along with a complete starter fertilizer having the chemical analysis of Nitrogen-18, Phosphorous-46, Potash-0, at the rate of five (5) pounds per one thousand (1,000) square feet and incorporate both materials into the soil to a depth of six (6) inches with a disc, rototiller, or other suitable tilling equipment. Organic materials shall be applied when the surface is within two (2) percent of final grade. No organic material containing manure

shall be stockpiled on the site for more than eight (8) hours before it is incorporated into the soil. After tilling, the areas to be seeded or sodded will be raked, graded, and rolled to the desired finished grades according to the grading plan within a tolerance of one-tenth (0.1) foot, with gently sloping surfaces to adequately drain all surface water run-off. The finished surface will be even and uniform, and no dirt clumps or other debris larger than two (2) inches in diameter will appear on the surface. The finished surface will be on an even plane with all sidewalks, curbs, or borders. Slopes will not be greater than four horizontal to one vertical (4:1) for all seeded or sodded areas. All property pins will be set and clearly marked before construction begins and will be preserved until final acceptance by the Town. On sloping ground, the final harrowing or disking operation will be on the general contour.

1023.02 Seedbed Preparation Process for Open Space and Native Seeded Areas

1023.03 Annual Weed Removal Procedure

Open space areas, which are covered by weedy plant communities dominated by such species as: Kochia, Cheatgrass, Russian thistle, Blue mustard, annual ryegrass, diffuse knapweed, Scotch, Bull or Musk thistles, Puncture vine, must be prepared for seeding by moldboard plowing in order to turn over and bury the weed seeds well below the seed bed surface prior to seeding. These areas should first be rotary mowed, moldboard plowed, spread with required organic amendments (below), and then disked to prepare the seedbed for planting. This treatment does not substitute for the requirement to pre treat weedy areas with broad spectrum herbicides (Section 1021, above).

1023.04 Organic Matter for Native Seeded Areas

Native seeded areas in open space will receive the specified organic material at the rate of three (3) cubic yards per one thousand (1000) square feet. Native areas shall be amended with Biosol at a minimum rate of eight hundred (800) pounds per acre. Organic materials shall be applied when the surface is within two (2) percent of final grade. No organic material containing manure shall be stockpiled on the site for more than eight (8) hours before it is incorporated into the soil. After tilling, the areas to be seeded or sodded will be raked, graded, and rolled to the desired finished grades according to the grading plan within a tolerance of one-tenth (0.1) foot, with gently sloping surfaces to adequately drain all surface water run-off. The finished surface will be even and uniform, and no dirt clumps or other debris larger than two (2) inches in diameter will appear on the surface. The finished surface will be on an even plane with all sidewalks, curbs, or borders. Slopes will not be greater than four horizontal to one vertical (4:1) for all seeded or sodded areas. All property pins will be set and clearly marked before construction begins and will be preserved until final acceptance by the Town. On sloping ground, the final harrowing or disking operation will be on the general contour.

1024.00 Inspections

When the Contractor is prepared for one (1) of the required inspections, he will give the Town forty-eight (48) hours notice to visit the site and perform the inspection. This does not preclude the right of the Town to make informal inspections at any time during the work of this Section. The Contractor must notify the Town for inspections of materials and soil preparation.

Written confirmation shall be provided to the Town of Erie Parks Division that all punch list items are fully completed prior to any punch walk being scheduled.

1024.01 Materials Inspection

The Town will inspect all manure, organic materials, seed and seed tags, mulch, and fertilizer upon delivery to the site. Any unsatisfactory materials will be removed and replaced with materials conforming to these STANDARDS AND SPECIFICATIONS. Weight tickets for all materials must be submitted to the Town. The Town Inspector will confirm receipt of the order before materials are spread.

1024.02 Soil Preparation Inspection

The Town will inspect the soil preparation for conformance to the accepted plans and these STANDARDS AND SPECIFICATIONS during or immediately following the completion of each segment of the project. Any workmanship deemed by the Town to be faulty or not in accordance with the accepted plans and these STANDARDS AND SPECIFICATIONS will be corrected at this time. The following is a list of the required inspections in their order:

- A. Prior to the commencement of any landscape or irrigation, Contractor must certify that the grade is within plus or minus 0.1 feet of final grading elevation.
- B. During or after first cultivation
- C. After application of specified organic materials
- D. During or after second cultivation
- E. After final grade is completed.

1030.00 SEEDING SPECIFICATIONS

1031.00 General

The Contractor will provide all labor, equipment and materials necessary to furnish and install seed as required by the accepted plans and these STANDARDS AND SPECIFICATIONS.

1032.00 Materials

1032.01 Topsoil

Topsoil shall have an **acidic reaction of 6.0 to 7.5 pH** and shall not include any minerals or elements detrimental to plant growth. Soluble salts measured in saturation extract shall be less than 3 mmhos/cm.

Topsoil preparation will be as described in Section 1020.00, Topsoil Preparation, of these STANDARDS AND SPECIFICATIONS.

1032.02 Booster Fertilizer

All fertilizer requirements will meet the requirements of Section 1020.00, Topsoil Preparation, of these STANDARDS AND SPECIFICATIONS.

In conventional landscape and park areas a booster fertilizer with the chemical analysis of Nitrogen-18, Phosphorous-46, Potash-0, with four (4) percent iron and eight (8) percent sulfur will be applied on the prepared soil at the rate of five (5) pounds per one thousand (1,000) square feet immediately prior to seeding.

Native seeded areas shall receive an application of 800 pounds per acre of Biosol following seeding and before mulching.

1032.03 Bluegrass Seed

Seed will be furnished in sealed, unopened, standard containers and labeled in accordance with the USDA Rules and Regulations and the Federal Seed Act. Seed will be fresh, clean, pure live seed equal in quality to the standards for "Certified Seed". It will be capable of passing the USDA test for germination of eighty-five (85) percent and for purity of ninety (90) percent. Seed will be free of *Poa annua* and all noxious or objectionable weed and shall have a maximum weed crop of one-tenth (0.1) percent. Seed shall have been prepared for seeding during the year of installation and shall have been stored away from high heat (over 100 degrees F). The Town at the Contractor's expense may require tests of seed verification.

1032.04 Native Seed

Seed shall have been prepared for seeding during the year of installation and shall have been stored away from high heat (over 100 degrees F). Seed will be furnished in sealed, unopened, standard containers and labeled in accordance with the USDA Rules and Regulations and the Federal Seed Act. Seed will be fresh, clean, pure live seed equal in quality to the standards for "Certified Seed".

Seed tags must be supplied to the Town of Erie Parks Division for all seed mixtures, showing overall quantities and species. The Town at the Contractor's expense may require tests of seed verification.

1032.05 Top-dressing/Mulch

Hydro-mulch: Hydro-mulch shall be a wood cellulose fiber type and shall be applied at the minimum rate of two thousand five hundred (2,500) pounds per acre with a minimum rate of one hundred and fifty (150) pounds per acre tackifier and shall be applied immediately after seed application. Hydromulch may be required in native seeded areas close to occupied buildings.

Straw: Straw consisting of 75% straws longer than 10 inches may be used on native seeding. It shall be applied evenly over the seeded surface at the minimum rate of two tons per acre and partially embedded into the soil using a crimper or similar implement.

1033.00 Seeding Process

1033.01 Bluegrass Seeding

1033.01.01 Seeding dates

All seeding will be done between March 15 and September 15 unless otherwise authorized in writing by the Town Engineer. No seeding shall be done when the soil is frozen, snow covered or excessively wet.

1033.01.02 Drill Seeding

Whenever possible, the seed will be applied using a Brillion seeder or equal equipment to drill the seed into a properly prepared seedbed. The seeder will be equipped with a satisfactory feeding mechanism, an agitator, double disc furrow openers, depth bands and packer wheels. Seed will be sown to a depth of one-quarter (1/4) inch into a properly prepared seedbed. Seed drilling will be done in two (2) separate applications crossing the area at right angles to one another to guarantee proper coverage. On sloping land, the final seeding operation will follow the general contour. All seeded areas will be top-dressed with hydro-mulch after the seeding is completed.

1033.01.03 Broadcast Seeding

In areas where the drill method of seeding cannot be used, a broadcast method may be substituted. If the broadcast method is used, the seeding rate must be doubled, and the area must be dragged after seeding followed by a suitable top dressing.

1033.02 Native Seeding

1033.02.01 Seeding dates:

Native seeding must occur between October 15th and March 15th. Permission for exceptions to this seeding time must be obtained prior to seeding from the Town of Erie Parks Division. No seeding shall be done when the soil is frozen, snow covered or excessively wet.

1033.02.02 Drill seeding

Native seed shall be applied using a native grass drill seeder equipped with a seed box agitator and depth bands. Seed will be sown to a depth of one-quarter ($\frac{1}{4}$) to one-half ($\frac{1}{2}$) inch into a properly prepared seedbed. On sloping land, the seed shall be applied following the general contour.

1033.02.03 Broadcast seeding:

In areas where drill seeding is not possible such as corners, near fences, along walkways, or around posts or boxes associated with electric, gas, irrigation installations or other similar situations, broadcast seeding may be substituted. No hydro seeding shall be permitted, except in wetland seeding areas. When using the broadcast method, the seeding area must be decompacted and harrowed after seeding, followed by mulching.

1033.02.04 Mulch application:

Seeded areas will be mulched with twenty-five hundred (2,500) pounds per acre hydromulch of immediately following seeding. Hydromulch must include one hundred and fifty (150) pounds per acre organic tackifier. At this rate soil coverage is 100%. Any thin areas in the mulch, where soil is visible, will be cause for a request to reapply mulch until the coverage is satisfactory, at the contractor's expense. If weather conditions deteriorate, contractor will delay work until conditions improve. Mulch must be applied in a separate operation on the same day as seeding.

No hay will be permitted on the construction site for any purpose.

1033.02.05 Cleanup:

Remove all hydromulch from all plant materials, fences, concrete and other areas except for seed bed. Overly dense applications of straw mulch, or windrows of loose straw mulch which may smother seedling grasses, must be collected and removed. Straw mulch blown onto adjacent residential areas must be removed.

1034.00 Seeding Rates and Mixtures

1034.01 Bluegrass Seed Rate

All bluegrass seed will be drilled at the rate of one hundred fifty (150) pounds per acre and the seed mixture will consist of a blend of at least four (4) varieties of bluegrass. The specific varieties and percentages of each variety will be determined by the Director of Parks & Recreation.

1034.02 Native Seed Rates

The following seed mixtures may be used for native seeded areas. Substitution of other mixtures may b3 made only with prior approval.

Table 1. Mixed Grass Prairie Native Seed Mixture: For use in open space native seeding at least 10 feet away from road and trail edges. This mixture is for general usage, is dominated by short to mid sized native prairie grasses (6-18 inches in height), but includes a few taller species (up to 36 inches) and a limited amount of native wildflowers (identified with the *, below). Best for use in larger open space areas. Be sure to over seed any swales or moist areas within this seeding type with the Moist Swale Seed Mixture (Table 3).

COMMON NAME	SCIENTIFIC NAME	VARIETY	OZ/ACRE	PLS LBS/ACRE
Buffalo grass	<i>Buchloe dactyloides</i>	Native		3
Sideoats grama	<i>Bouteloua curtipendula</i>	Butte		5
Prairie sandreed	<i>Calamovilfa longifolia</i>	Goshen		1
Blue grama	<i>Chondrosom gracile</i>	Lovington		3
Western wheatgrass	<i>Pascopyrum smithii</i>	Arriba		5
Little bluestem	<i>Schizachryium scoparium</i>	Pastura		4
Alkali sacaton	<i>Sporobolus airoides</i>	Common		1
Sand dropseed	<i>Sporobolus cryptandrus</i>	Common		1
Switchgrass	<i>Panicum virgatum</i>	Blackwell		5
Fringed sage*	<i>Artemisia frigida</i>	Common	1	
Purple prairie clover*	<i>Dalea purpurea</i>	Common	6	
Blanketflower*	<i>Gaillardia aristata</i>	Common	6	
Gayfeather*	<i>Liatris punctata</i>	Common	4	
COMMON NAME	SCIENTIFIC NAME	VARIETY	OZ/ACRE	PLS LBS/ACRE
Blue flax*	<i>Linum perenne</i>	Common	3	
Tansy aster*	<i>Machaeranthera tanacetifolia</i>	Common	3	
Prairie coneflower*	<i>Ratibida columnifera</i>	Common	3	
OUNCES			26	1.625
SEEDING RATE POUNDS PLS/ACRE				29.625

Table 2. Shortgrass Prairie Native Seed Mixture. For use in open space native seeding less than 10 feet from road and trail edges. This mixture is for specific usage near trails or where shorter grasses are desired (such as smaller park sites). It is dominated by short to mid sized native prairie grasses (6-18 inches in height), but includes a few native wildflowers (identified with the *, below). Best for use along roads and trails and in smaller native seeded park areas. Be sure to over seed any swales or moist areas within this seeding type with the moist swale seed mixture (Table 3).

COMMON NAME	SCIENTIFIC NAME	VARIETY	OZ/ACRE	PLS LBS/ACRE
Buffalograss	<i>Buchloe dactyloides</i>	Native		14
Blue grama	<i>Chondrosom gracile</i>	Lovington		12
Sand dropseed	<i>Sporobolus cryptandrus</i>	Common		4
Fringed sage*	<i>Artemisia frigida</i>	Common	1	
Purple prairie clover*	<i>Dalea purpurea</i>	Common	4	
Gayfeather*	<i>Liatris punctata</i>	Common	4	
Tansy aster*	<i>Machaeranthera tanacetifolia</i>	Common	3	
OUNCES			12	0.75
SEEDING RATE POUNDS PLS/ACRE				30.75

Table 3. Moist Swale Seed mixture. This mixture is intended to be seeded over the top of either Table 1 or Table 2 seed mixtures in locations which may be moist at least some of the year (such as pond edges, small or larger swales or ditches within the open space areas or along roads, in detention or retention basins, or along the inner banks of irrigation ditches. Be sure to seed one of the other seed mixtures first and then add this mixture to provide adequate species adapted to moist conditions.

COMMON NAME	SCIENTIFIC NAME	VARIETY	PLS LBS/ACRE
Woolly sedge	<i>Carex lanuginosa</i>	Native	0.5
Nebraska sedge	<i>Carex nebrascensis</i>	Native	0.1
Blue grama	<i>Chondrosium gracile</i>	Lovington	1.5
Buffalograss	<i>Buchloe dactyloides</i>	Native	0.5
Inland saltgrass	<i>Distichlis stricta</i>	Native	0.5
Baltic rush	<i>Juncus balticus</i>	Native	0.1
Prairie cordgrass	<i>Spartina pectinata</i>	Native	1
Alkali sacaton	<i>Sporobolus airoides</i>	Native	3
Switchgrass	<i>Panicum virgatum</i>	Blackwell	3
Western wheatgrass	<i>Pascopyrum smithii</i>	Ariba	5
Aster	<i>Aster laevis</i>		0.05
Yarrow	<i>Achillea millefolium</i>		0.05
Prairie coneflower	<i>Ratibida columnifera</i>		0.05
			15.35

Table 4. Roadside Native Seed mixture. This mixture is intended for use for seeding of Public Works roadside re-vegetation projects. It is an adaptable mix of short to mid-size native and introduced warm and cool season grasses. Use for Public Works roadside and right-of-way seeding projects only.

COMMON NAME	SCIENTIFIC NAME	VARIETY	PLS LBS/ACRE
Western wheatgrass	<i>Pascopyrum smithii</i>	Ariba	8.0
Crested wheatgrass	<i>Agropyron cristatum</i>	Ephriam	5.0
Streambank wheatgrass	<i>Elymus lanceolatus</i>	Sodar	5.0
Sideoats grama	<i>Bouteloua gracilis</i>	Butte	2.0
Blue grama	<i>Bouteloua gracilis</i>	Hachita	5.0
Buffalograss	<i>Buchloe dactyloides</i>	Bison	3.0
Sand dropseed	<i>Sporobolus cryptandrus</i>	Common	1.0
SEEDING RATE POUNDS PLS/ACRE			29.0

1035.00 Maintenance Procedures

1035.01 Maintenance Procedures for Bluegrass

1035.01.01 Warranty

The Contractor will warranty the life and good health of the seed installed until the entire project has been accepted by Town Council. Any areas deemed by the Town to be thin, weak, or dead will be reseeded according to these STANDARDS AND SPECIFICATIONS and germinated prior to the beginning of the two year warranty period.

1035.01.02 Signage

The Contractor will erect suitable signs at strategic points notifying the public to keep off the seeded areas until the lawn is well established. Any traffic damage that may occur prior to final acceptance of the work will be repaired and reseeded at the Contractor's expense.

1035.01.03 Mowing

During the maintenance period, after a suitable stand of grass has been established, the Contractor will begin mowing all lawn areas on a routine basis using a mowing height of three inches (3"). Frequency of mowing will be determined by the growth rate of the grass but at no time should the clippings exceed two inches (2") in length.

Only turf-type mowers will be used for this operation.

1035.01.04 Additional Fertilizing

At the time of the first mowing, the Contractor will apply a commercial fertilizer with the chemical analysis of Nitrogen-20, Phosphorous-10, Potash-5, plus two percent (2%) iron at the rate of five (5) pounds per one thousand (1,000) square feet. Care should be taken to prevent burning. Any areas disturbed or damaged by the Contractor during fertilizing operations will be repaired in accordance with these STANDARDS AND SPECIFICATIONS at the Contractor's expense.

1035.01.05 Watering

The Contractor will be responsible for watering the seeded area(s) a minimum of two (2) times per day (mid-morning and late afternoon) and for keeping the areas moist until the lawn is established. The Contractor will be responsible for water usage until such time as the project is accepted by the Town Council.

1035.02 Maintenance Procedures for Native and Open Space Areas

1035.02.01 Maintenance period

Contractor maintenance period minimum shall be the two (2) year warranty period or until Town acceptance of the site (Final Acceptance). Extended warranty period may be required as determined by the Town's representative. Seeded areas must be maintained in a weed free manner. Weed infestations must be mowed, or spot treated with approved herbicides starting during construction phase and during two year post installation warranty period. It is recommended maintenance activities be reported regularly to the Town of Erie Parks Superintendent, to assure a complete record of activities is on file in support of the Final Acceptance Inspection (at the closure of the two year warranty period).

1035.02.02 Signage

The contractor is responsible for providing and installing barriers as required to protect seeded areas from pedestrian and vehicular damage. Provide signage and barricades as needed.

1035.02.03 Litter removal

All litter or trash from construction sites or other sources which may blow onto Open Space must be collected and removed from the area weekly, in order to prevent smothering of establishing vegetation. Placement of an orange construction fence between construction areas and Open Space may facilitate litter collection.

1035.02.04 Access

Vehicular traffic is not permitted on Open Space areas, except for approved maintenance vehicles on established trails and sidewalks. Mowing, re-seeding, and spray equipment are allowed off trails,

but must avoid all access immediately following precipitation or irrigation events which may lead to rutting. All damage to irrigation installations, to prevent rutting of seeded or planted areas. Damage must be repaired at the contractor's expense, according to the original specifications.

1035.02.05 Mowing for annual weed control

Annual weeds must be mowed when they exceed 10 inches in height. Rotary mowers must be used for mowing operations. Dense accumulations of mowed weeds must be collected to prevent smothering of desirable vegetation. At a minimum, this will require mowing at least twice (late May and late August) during normal years; and could require mowing more frequently in wet years or if the site is heavily irrigated.

1035.02.06 Noxious biennial and perennial weed control

State listed noxious weeds or other problematic weedy species of concern* (listed below) shall be spot treated with approved herbicides with approved application methods at approved times for

effective control, at least twice each year. For acceptable results, most of these species should be planned to be sprayed during late May/early June and again in late August t/September. *Other non-native weedy species of concern in the Erie area include, but may not be limited to: Common (or great) mullein (*Verbascum thapsus*) and Curly dock (*Rumex crispus*).

Herbicide selection, concentration, and timing of application must be approved by the Town’s representative prior to application. Broadcast application of herbicides with boom sprayers will not be allowed unless approved by the Town’s representative in writing. Spot treatment of weeds with spray guns on 4 wheelers or back packs is acceptable. Permission must be obtained from a Parks Department representative for exception to this regulation.

1035.02.07 Irrigation

The contractor will be responsible for temporary irrigation on all native seed areas and for water usage until such time as the seeding is established and accepted. The contractor will be responsible for initial watering the native seeded area and for keeping the area adequately moist until seed is established. Over watering can be detrimental to the success of native seeding. Failed seedling establishment due to over or under watering must be reseeded and re-mulched. Assistance in preparation of site specific irrigation schedule for native seeded areas is available from the Parks Division upon request.

General recommended watering schedule for native seeded areas. Watering is generally unnecessary until May or June following winter or early spring seeding.

WEEKS AFTER SEEDING	FREQUENCY	DURATION	TIMING
first month, or until initial germination (May or June)	2 times per day	15 minutes or until soil is moist to 1 inch depth	10 AM, 10 PM (to provide extended period of soil moisture at night)
4-6 weeks	2 times per week	20 minutes or until soil is moist to 2 inch depth	10 PM (after evening winds subside)
7-10 weeks	1 time week	30 minutes or until soil is moist to 3 inch depth.	10 PM (after evening winds subside)
11 weeks to mid September	every other week	30 minutes or until soil is moist to 3 inch depth	10 PM (after evening winds subside)

1035.02.08 Standard of acceptable establishment for native seeding:

Warrant seeded areas for consistency and completion of coverage. The standard of acceptable establishment shall be at least six (6) desirable seeded plant seedlings per square foot. All bare areas over 10 square feet in size shall be re-seeded and re-mulched.

TWO YEAR WARRANTY PERIOD SEEDING MAINTENANCE REQUIREMENTS

ACTIVITIES	SEASONAL FREQUENCY	APPROXIMATE DATES	COMMENTS
Installation protection	Keep initial installation repaired	As required	Place fencing and signage to prevent unauthorized vehicle access and disturbance to seeded and planted areas. Maintain fencing and signage on preserved remnant areas and trees.
Collect wind drift of straw mulch	After initial installation and before germination	As required before germination	Incompletely crimped straw mulch may blow into dense drifts which can smother seeded areas. Check for these and remove excess straw prior to germination.
Litter collection	Collect litter to prevent smothering	As required	Collect construction or other litter which blows onto open space to prevent smothered vegetation and repairs. Placing an orange fence between construction site and the edge of open space may help concentrate litter off the vegetation and reduce clean up time.
Repair seeded or planted areas damaged by irrigation malfunction, tire ruts, erosion		As required	Construction damage to open space vegetation should be repaired immediately.
Annual weed control	Two or more times per growing season	Late May to early June and again in late August to early September	Annual weeds, including Annual ryegrass, Russian thistle, and Kochia should be mowed when they exceed 10 inches in height. Generally mowing is necessary twice a year for a couple years. More frequent mowing could be needed in wet years. Do not mow when the site is muddy to prevent ruts and repairs.
Noxious weed control	Two or more times per growing season	Late May to early June and again in late August to early September	Several species of noxious weeds occur in the Erie area: Canada thistle*, Musk thistle, Scotch thistle, Diffuse knapweed*, Blue mustard. All noxious species (if they occur on the development site) must be treated (*treat twice a year) with the proper concentration of effective chemicals, with the proper equipment, at the correct times in order to receive full credit for the warranty period. Consult a certified weed control specialist for best results.
Irrigation	See irrigation table in Standards and Specifications (Section 1035.27)	May through September of first year following winter to early spring seeding	Temporary irrigation during establishment is required for native seeding in Erie Open Space.
Reporting activities	Regularly	As completed	To assure full credit for proper warranty period activities, it is recommended that regular reports for all required two year warranty maintenance activities be filed with the Town of Erie Parks Superintendent to provide a complete record for consultation during the Final Acceptance Inspection. (Regularly submitted reports help prove due diligence.)

1036.00 Inspections

Inspections shall be completed in accordance with Section 1024.00, Inspections, of these STANDARDS AND SPECIFICATIONS. The Contractor must notify the Town for inspections of seed certification and germination.

1036.01 Inspection of Seed Certifications

Seed certification tags shall be delivered to the Town to verify compliance with these STANDARDS AND SPECIFICATIONS.

1036.02 Germination Inspection

When germination is complete and plants are visible, the Contractor will notify the Town and request an initial germination inspection for approval in order to begin the guarantee period (warranty period, two year maintenance period). Any areas deemed by the Town to be thin, weak or dead will be replaced at this time. All washouts will be reseeded immediately after the germination inspection. No partial acceptance will be made.

1040.00 SODDING SPECIFICATIONS**1041.00 General**

The Contractor will provide all labor, equipment and materials necessary to furnish and install all sod as required by the accepted plans and these STANDARDS AND SPECIFICATIONS.

1042.00 Materials**1042.01 Topsoil**

Topsoil preparation will be as described in Section 1020.00, Topsoil Preparation, of these STANDARDS AND SPECIFICATIONS.

1042.02 Booster Fertilizer

All fertilizer will meet the requirements of Section 1020.00, Topsoil Preparation, of these STANDARDS AND SPECIFICATIONS. A booster fertilizer with a chemical analysis of Nitrogen-12, Phosphorous-12, Potash-4, with four percent (4%) iron and eight percent (8%) sulfur will be applied at a rate of five (5) pounds per one thousand (1,000) square feet immediately prior to sodding.

1042.03 Sod

The sod will consist of a blend of at least four (4) varieties of bluegrass. This blend is to be approved by the Director of Parks & Recreation prior to installation.

Sod will be strongly rooted and free of noxious weeds, undesirable plants, roots, stones, and other foreign materials that will be detrimental or will hinder the proper development of the sod. The sod will be procured from areas where the soil is reasonably fertile and contains a high percentage of loamy topsoil. The sod will be cut from living, thickly matted turf. The sod will be mowed to a height not to exceed two inches (2") and thoroughly watered before the sod is cut. All sod will be cut to provide a minimum thickness of three-fourths inch (3/4") of soil adhering to the roots. The Contractor will furnish written proof of sod variety to the Town. Sod must be tested by the Colorado State University laboratory or a certified laboratory at the Contractor's expense if requested by the Town.

1043.00 Sodding Process**1043.01 Care and Handling**

Care will be exercised at all times to retain the native soil on the sod roots during transportation, handling and planting. Dumping sod from vehicles will not be permitted. The sod will be transported to the site within twenty-four (24) hours from the time it is cut, unless it can be stored to the satisfaction of the Town. During delivery and while in stacks, all sod will be kept moist and protected from exposure to the wind, sun and freezing. All damaged or dry sod will be rejected.

1043.02 Transporting Sod On-Site

Sod can be transported on or across the site on pallets by forklift. Damage to the sod bed by the vehicles will be kept to a minimum and will be re-graded before sodding of the area. Damage caused to paving, curbs, fence, plants or other objects during sodding, will be repaired or replaced by the Contractor at his expense as directed by the Town.

1043.03 Sodding

The sod bed will be lightly sprinkled just prior to laying the sod. Do not create muddy soil. All sod strips will be placed tightly against each other so no open joints are apparent. Joints between ends of strips will be staggered at least one foot (1') between adjacent rows. At the end of walks and drives, the sod will have the same finish grade as the abutting surfaces. At curbs the sod will have the same finish grade as the top of the curb. Sod placed on slopes equal to four horizontal to one vertical (4:1) will be staked with wire pins not less than six inches (6") long and spaced not more than thirty inches (30") apart. The pins shall be driven into the ground at an angle against the flow of the water until the top of the stake is three inches (3") above the sod. Sod laying will begin at the bottom of the slope and progress upward with strips laid transverse to the slopes. Immediately after the sod has been laid, it should be tamped or rolled as needed with approved equipment to eliminate

all air pockets and to provide a smooth, even surface. Immediately after rolling or tamping the sod, sufficient water will be applied to completely saturate the sod. The sod will be watered as often as required to prevent it from drying out. Settled sod areas will be pulled up, re-graded, relayed, and retamped.

1044.00 Cleanup

Any remaining peat, soil, sand, rock, or similar material which has been brought onto the site by work operations or otherwise, will be removed, and all other remaining debris will be disposed of. All ground area disturbed as a result of the sodding operations will be renovated to its original condition or to the required new condition.

1045.00 Maintenance

The proper care and maintenance of the sodded areas will be the responsibility of the Contractor until the work has been completed and accepted by Town Council. The maintenance operations will begin as soon as each portion of the area is sodded. Maintenance will consist of repair and replacement of eroded areas, watering, mowing (when the sod is established), weeding, fertilizing, and re-sodding as necessary to provide an even, consistent stand of grass. All replacement sodding deemed necessary by the Town will be done by the Contractor at his own expense.

1045.01 Mowing

During the maintenance period, after the sod is established, the Contractor will begin mowing all lawn areas on a routine basis using a mowing height of three inches (3"). Frequency of mowing will be determined by the growth rate of the grass but at no time should the clippings exceed two inches (2") in length.

Only turf-type mowers will be used for this operation.

1045.02 Additional Fertilizing

Thirty (30) days after sod is laid, an application of fertilizer with the chemical analysis of Nitrogen-12, Phosphorous-12, Potash-4, with four percent (4%) iron and eight percent (8%) sulfur will be applied at the rate of six (6) pounds per one thousand (1,000) square feet. When applied, the fertilizer must be dry and free flowing. All damage caused to the sod during fertilizer application will be repaired by the Contractor at his expense.

1045.03 Watering

The Contractor will be responsible for watering the sodded area(s) a minimum of two (2) times per day (mid-morning and late afternoon) and for keeping the areas moist until the sod is established. The Contractor will be responsible for water usage until such time as the project is accepted by the Town Council.

1046.00 Inspections

Inspections shall be completed in accordance with Section 1024.00, Inspections, of these STANDARDS AND SPECIFICATIONS. The Contractor must notify the Town for inspection of sodding .

When sodding operations are complete, the Contractor will notify the Town and request a sodding inspection. Any areas deemed by the Town to be thin, weak or dead will be replaced at this time. Sod must be installed a minimum of three weeks before contractor calls for a landscape or sod inspection. No partial acceptance will be made.

1050.00 SPRINKLER SYSTEMS**1051.00 General**

All irrigation design plans and specifications will be submitted to the Town in accordance with Section 160.00, Plans and Specifications, and Section 161.00, Construction Plan Requirements, of these STANDARDS AND SPECIFICATIONS. The Director of Parks & Recreation must review and accept the design plans prior to the commencement of any work. Three (3) sets of plans and specifications will be provided to the Town for this purpose. This review and acceptance process normally will take fourteen (14) calendar days from the time the plans and specifications are submitted to the Town.

The work will be performed in accordance with the best standards of practice relating to the various trades and under the continuous supervision of a competent foreman capable of interpreting drawings and specifications. The Contractor will notify the Town as soon as any discrepancies between plans and specifications are discovered. The work will include all labor, materials, equipment and appliances and obtaining of all permits required by governing codes to complete the work as indicated on the accepted plans and as herein specified. All work will comply with the building codes adopted by the Town of Erie. During progress of the work, the Contractor will keep the site as clean and free of rubbish as possible. All surplus and useless material resulting from this work will be removed from the site by the Contractor.

The Contractor will guarantee all material and workmanship for a minimum period of one (1) year from the date of acceptance of the work.

The Contractor will furnish the Town with:

- A. quick coupler key with hose swivel (1)
- B. drain key (1)
- C. turn-off key (1)
- D. control clock keys (2)
- E. valve box key

- F. head wrench (1 for each type of head)
- G. sprinkler heads (2 of each type)
- H. maintenance manuals for all components
- I. as built drawings
- J. controller charts at each field controller
- K. sample program

The location of all utilities will be completed by contractor before any excavation work is started.

System must be designed to provide head to head coverage with matched precipitation rates. Shrub and perennial beds are to be zoned separately. Heads shall not overspray walkways, pavements or other hard surfaces. Spray radius of heads will be limited to water only areas intended to be watered.

1052.00 Materials

1052.01 Water License and Tap Fee

The Contractor will purchase a water license and pay all applicable tap and meter fees prior to connecting into the Town’s water system. The size of the water tap will be determined and approved by the Town Building Official and/or the Town Engineer.

1052.02 Water Tap

All taps into Town water mains shall comply with the requirements of Section 643.00, Tapping the Main, of these STANDARDS AND SPECIFICATIONS.

1052.03 Water Service Line

The Contractor will be responsible for installing the water service line from the corporation stop valve to the meter pit. This will include a curb stop valve installed just behind the curb, between the curb and the meter pit and all plumbing inside the meter pit. Reference Section 640.00, Water Service Line Construction, of these STANDARDS AND SPECIFICATIONS. Also refer to the Standard Drawings.

1052.04 Meter Pit

Refer to Section 632.124, Vaults, of these STANDARDS AND SPECIFICATIONS.

1052.05 Water Meter

The water meter will be provided by the Town. The fee is covered in Section 1052.01, Water License and Tap Fee, of these STANDARDS AND SPECIFICATIONS.

All water meters for irrigation systems will be turbo type and shall comply with all applicable portions of Section 642.00, Equipment and Materials, of these STANDARDS AND SPECIFICATIONS.

1052.06 Electrical Service

All service lines shall be run underground and in electrical PVC conduit. All wire shall be copper and shall be properly sized. If a booster pump is required, a sixty (60) amp (minimum) metered service shall be required. If the irrigation controller is the only electrical demand, an unmetered flat rate service can be installed. All electrical service lines shall have electrical warning tape in the trench six (6) inches above the conduit pipe. An electrical disconnect shall be mounted on the irrigation controller. Electrical box will be weather proof, vandal resistant. Box will be securely mounted and lockable. Electrical box will be grounded and installed according to local codes. All electrical buried within Parks and Open Space boundaries need to have a minimum of 36 inches of cover.

1052.07 Backflow Preventer

The backflow prevention device for water taps two (2) inches and smaller will be a Feb-Co 825-YA Series reduced pressure backflow preventer or approved equal.

Each backflow preventer shall be enclosed in a locked, stainless steel strong box with the following features:

- A. Marine grade aluminum alloy construction
- B. 100% stainless steel hardware
- C. Flush, mounted, locking mechanism for security
- D. Full-release locking mechanism for service and repair access
- E. Pre-punched viewing ports

Strongboxes shall be sized in accordance with manufacturer's recommendations, and must be approved by the Director of Public Works.

For taps 3" and larger, the backflow prevention device will be a Febco 880 Series or approved equal. It will be sized in accordance with manufacturer's recommended velocities, but no velocities shall exceed the normal industrial practice of seven and a half (7.5) feet per second through the backflow device. The device will meet the requirements of ASSE Standard 1013; AWWA Standard Code C 506-78; and USC Foundation for Cross Connection Control and Hydraulic Research, latest edition.

Backflow preventer(s) shall be installed in accordance with the applicable sections of the UBC and in accordance with the Standard Drawings. It shall have either a brass union or a bolted flange connection on both the inlet and discharge side of the device.

All backflow prevention devices will be tested and certified before acceptance.

A Rain Bird 44QC quick coupler or approved equal will be installed adjacent to backflow prevention device for winterization blow out connection.

1052.08 Booster Pump

The requirement for a booster pump will be determined by the Town water main static pressure and the design requirements of the irrigation system. When a booster pump is needed, it will be a Peerless-type P.E. or approved equal, with magnetic starter and heater and a time delay circuit. The heater, starter, and time delay will be approved by the Town prior to installation.

1052.09 Pump House

When a booster pump is needed, it will be enclosed in a concrete pump house similar to that manufactured by ADPC, Inc. The pump house will have an exposed aggregate finish; heavy duty hollow steel door and door jamb; non-locking door knob with latch; and secured with a heavy duty commercial deadbolt. The pump house will enclose all above ground plumbing, such as piping fittings, backflow preventer, and booster pump; all electrical equipment, such as breaker panels, switches, overhead light and outlets; and irrigation controllers. It shall have a minimum ceiling height of seven (7) feet.

All electrical equipment will be Square D, Cuttler Hammer, or G.E., and a waterproof type. All wire will be copper conductor and run in conduit.

1052.10 Controllers

The controller will be Rain Bird ESP MC or approved equal electrical type, compatible with operating 24-volt electric solenoid zone valves. It will feature a pump start, manual advance switch, lightning protection, manual operating mode and weatherproof turf cabinet. Each controller will have a minimum of four (4) extra stations, and will not exceed forty-eight (48) stations. Controllers will be properly grounded with an eight (8) foot ground rod. When the controller is not installed in a pump house, it will be mounted on a turf pedestal and enclosed in a strong box or similar type enclosure if needed. All installation shall be in accordance with the Standard Drawings

1052.11 Zone Valves

The zone valves will be direct burial, diaphragm type with a contamination-proof filter, a flow control and a manual bleed screw, such as the Rainbird PEB series, for “dirty water” applications PES-B valves shall be used. They will be operated with a twenty-four (24) volt solenoid and will be capable of allowing compressed air to flow through them. All zone valves will be placed in a locking Rain Bird or equal valve box approved by the Director of Parks & Recreation. Install valve at proper depth so that the top of the flow control handle is three (3) inches from the bottom of the valve box lid. All valves will be installed with a plastic ball valve in valve box over three (3) inches depth of three-quarter ($\frac{3}{4}$) inch gravel. Install only one valve per valve box. Install all valve boxes a minimum of twelve (12) inches apart, and at least twelve (12) inches from and aligned with all adjacent walls or pavement edges. Stamp all valve box lids with corresponding controller station number.

All valve boxes must be installed plumb and level with finish grade and in accordance with the Standard Drawings.

1052.12 Heads

In turf areas, Rain Bird Talon, Falcon SS, 8005, 7005 SS, and 5004-PL-PC(FC)-SAM-R-NP-SS, or approved equal gear driven rotary pop-up heads will be used. Each head will be installed on a swing joint consisting of schedule forty (40) PVC fittings and schedule eighty (80) PVC nipples. Swing pipe is not permitted on any gear driven rotors. Heads must have stainless steel riser. Heads must be installed plumb and level with finish grade and in accordance with the Standard Drawings.

In small turf areas where pop-up spray heads are needed, Rain Bird 1800 SAM-PRS series or approved equal will be used. No VAN adjustable nozzles unless in approved locations. Heads must be installed plumb and level with finish grade.

In shrub and flower beds, Rainbird 1800 SAM-PRS or equivalent heads will be used. They will have a minimum pop-up height of twelve (12) inches, and will be installed using the bottom inlet. In some cases, bubblers may be permitted with approval of the Director of Parks & Recreation.

All threaded joints will be assembled using two (2) wraps of Teflon tape. No Marlex type fittings will be allowed. The type of heads used in any particular area shall be approved by the Parks Superintendent.

Swing pipe may be used only on Rain Bird 1800 series pop up spray heads. Use Rain Bird spiral barb fittings.

All other sprinkler heads are to be mounted on swing joints using schedule forty (40) PVC fittings and schedule eighty (80) nipples. Swing pipe is not permitted on any gear driven rotors.

Pre-made swing joints may only be used with prior approval upon inspection before installation.

1052.13 Field Wiring

Lead wire: For runs less than seven thousand seven hundred (7,700) feet, the lead wire connecting the valves to the controller shall be #14 UF single strand, direct burial, PVC jacketed, copper wire with the insulation being red in color throughout the entire jacket. For runs in excess of seven thousand seven hundred (7,700) feet, the lead wires shall be #12 UF. A minimum of four (4) spare wires will be pulled and will be of a different color (yellow).

Common wire: All common wire shall be #12 UF single strand, direct burial, PVC jacketed, copper wire with the insulation being white in color throughout the entire jacket. One spare common wire will be pulled and shall be of a different color (black). Where multiple controllers are used, a separate common wire will be installed for each controller.

Connectors: Only Blazing Pro Series Blue Wire Connectors water resistant connectors will be used in making wire connections, including connections in valve boxes.

All wire shall be taped every 10 feet and coiled with a 36 inch coil every 100 feet and at every change in direction of main line.

1052.14 Pipe

All pipe will be continuously and permanently marked showing the manufacturer's name, the size, and the class of the pipe. All PVC pipe will conform to the requirements of the United States Department of Commerce commercial standard Type 1-ASTM-D-2241 and in accordance with the Standard Drawings.

The velocity of the water through PVC pipe shall not exceed five (5) feet per second. The velocity of the water through copper pipe shall not exceed nine (9) feet per second. Irrigation system piping shall be as follows:

- A. Primary water service line (from Town water main to water meter) shall be as described in Section 642.02, Service Lines, of these STANDARDS AND SPECIFICATIONS.
- B. Secondary water service line (from water meter to backflow preventer) shall be either ductile iron as specified in Section 632.02, Pipe, of these STANDARDS AND SPECIFICATIONS, or type "K" rigid copper. All copper fittings shall be soldered together using silver solder (brazing) using solder consisting of 45% silver, 15% copper, 16% zinc, and 24% cadmium and solids at 1125~F and liquids at 1145~F.

- C. The irrigation main pipe shall be SDR21-200 PVC pipe. It will be assembled using ASTM F-656 purple primer followed with heavy bodied ASTM D-2564 glue. All PVC main line from one (1) inch through three (3) inches diameter shall be solvent weld type. All PVC main larger than three (3) inches diameter shall be “O” ring type pipe. When “O” ring type pipe is used, it shall be provided with proper thrust blocks or restraints as recommended by the manufacturer and as may be required by Section 633.06, Thrust Blocks, Restrained Joints and Fittings, of these STANDARDS AND SPECIFICATIONS.
- D. The lateral lines shall be Class 200 PVC pipe. It will be assembled using the same primer and glue noted in “C” above.

No main line pipe shall be smaller than one inch (1”).

Use solvent weld joints in all connections in sleeves regardless of pipe size.

Do not stack lateral lines or run in a common trench with other piping.

1052.15 Quick Coupler Valves

Each system will have a minimum of one quick coupler valve located near the backflow preventer. This valve will be a Rainbird No.44QC. It will be installed in a ten (10) inch diameter round locking valve box as manufactured by Rain Bird over 3” of ¾” gravel. All quick couplers will be installed with a swing joint. All quick couplers will be staked with re-bar secured to the quick coupler with two (2) stainless steel screw clamps to prevent turning or twisting during use. Installation shall be in accordance with the Standard Drawings

1052.16 Stop and Waste Valve

All main lines will have a stop and waste valve installed on the upstream side of the backflow preventer. Recommend stop and waste valve be installed with compression type S&W (Mac - Pac).

1052.17 Isolation Valves

Isolation valves shall be installed at locations noted on the accepted plans or as required by the Town Engineer and in accordance with the Standard Drawings. Isolation valves two (2) inches and larger shall be Matco or acceptable substitute, and conform to the requirements of Section 632.05, Gate Valves, and Section 642.11, Valves For Use With Meter, of these STANDARDS AND SPECIFICATIONS. Isolation valves will have a square operating nut and resilient seat.

Install isolation valve in a separate 10” Rain Bird round locking box with stand pipe over a three (3) inch depth of three-quarter (¾) inch gravel for each assembly.

1052.18 Pressure Reducing Valves

When the Town main line static pressure exceeds one hundred ten (110) psi, a Watts pressure reducing valve shall be installed downstream from the reduced pressure backflow preventer and in accordance with the Standard Drawings. All applicable portions of Section 632.07, Pressure Reducing Valves, of these STANDARDS AND SPECIFICATIONS, shall apply.

1052.19 Sleeving

All piping shall be sleeved under sidewalks, curbs, roadways, or similar structures. Sleeves shall be placed in an excavated trench that provides the proper alignment for the pipe. Trenches shall be excavated and compacted in accordance with Section 660.00, Trenching, Backfilling and Compacting, of these STANDARDS AND SPECIFICATIONS, prior to the installation of any sidewalks, curbs, roadways or similar structures.

Sleeves shall be PVC SDR-26 or heavier pipe and shall be a minimum of one (1) inch larger inside diameter than the maximum outside diameter (bell) of the pipe to be installed through it. Sleeves shall extend a minimum of twelve (12) inches beyond the edge of the sidewalk, curb, roadway or similar structure.

1052.20 Drip Irrigation

Rain Bird Xerigation drip irrigation components will be used. Xeribug emitters and pressure compensating nozzles, Xeri tube distribution line, and Rainbird one-quarter ($\frac{1}{4}$) inch distribution tubing will be used. Bug caps shall be installed in distribution tubing. Valve assemblies will consist of a PVC ball valve, inline Basket filter and Rainbird PEB Valve assembly model X CZ-100-B-COM a pressure regulating device must be installed down stream of valve and in accordance with the Standard Drawings.

Drip lateral lines to shrub beds will consist of 160 1" class PVC solvent weld pipe or eighty (80) psi 1" Commercial Poly pipe. PVC insert fittings for poly pipe or Rain bird compression fittings will be used at distribution line connections.

All clamps shall be stainless steel screw clamps, no pinch clamps.

All drip lateral lines will be minimum of $\frac{3}{4}$ " . (No 1.2" drip lines is allowed in the Town of Erie.)

A flush cap will be installed at the end of each distribution line. Install flush cap in appropriate round box over three (3) inches of three-quarter ($\frac{3}{4}$) inch gravel.

Use manufacturer's guidelines to determine flow rate, number of emitters and water application rate for each plant. Place emitters so that they are evenly spaced around the plant. Distribution

lines will not exceed two hundred and fifty (250) feet in length. System must be designed to provide at least a minimum of 15PSI available at the end of each tubing run to flush the system. Place emitters halfway between the main trunk of the plant and the edge of its canopy. Design approach of drip irrigation installation will be specific to soil type, the type of plants used, their water requirements and the suitability of the components in the landscape.

Drip laterals minimum of 12” deep in paved, sodded, seeded areas.

Where drip laterals enter shrub beds from turf areas, elbow up to finish grade. All drip irrigation components will be installed below finish grade of beds. Where mulch or rock are used with landscape fabric, place distribution lines under the fabric with a minimum of 4” of rock or mulch. Secure distribution tube with galvanized tie down stakes.

Do not use risers, bubblers, or any drip components that extend above finish grade of beds.

1053.00 Site Conditions

The Contractor will coordinate his work with that of other trades whenever possible to prevent conflicts. Before starting work, the Contractor will inspect the site and check all grades to ensure that he may safely proceed. All scaled dimensions are approximate. Before proceeding with any work, the Contractor will carefully check and verify all dimensions.

Changes or alterations in the system to meet site conditions will be subject to the approval of the Town Engineer and will be made at the Contractor’s expense. If any work requires that it be installed in locations other than shown in the accepted plans, the Contractor will prepare a set of “as built” drawings in accordance with Section 161.00, Construction Plan Requirements, of these STANDARDS AND SPECIFICATIONS, noting the exact locations of those changes. Exact measurements of buried valves and wire locations will be shown. The Contractor will supply the “as built” Mylar to the Town prior to receiving final acceptance. “As-built” drawings will be completed daily and kept on site for review and inspection during construction.

The Contractor will be responsible for all costs incurred for supplying the electrical needs required for the job. Xcel Energy or United Power should be contacted for information on possible electrical sources. All electrical work, except twenty-four (24) volt, will require a separate inspection from the Town Building Official.

All applicable portions of Section 1000.00, Site Work and Earthwork, of these STANDARDS AND SPECIFICATIONS, shall apply.

1054.00 Excavation

All applicable portions of Section 660.00, Trenching, Backfilling and Compacting, of these STANDARDS AND SPECIFICATIONS, shall apply. When approved by the Director of Public Works, trench excavation and backfill for irrigation systems in excess of the limits noted in Section 660.00 may be allowed.

1055.00 Process

Staking: Prior to excavating or trenching, the Contractor will stake all proposed and existing utilities and all sprinkler head and line locations. Stakes will be suitable wooden stakes color coded for materials and maintained throughout the sprinkler installation process.

Pump house: When a pump house is used, the secondary water service line shall be extended a minimum of twenty-four (24) inches below grade on the discharge side of the pump house and a minimum of twenty-four (24) inches beyond the pump house slab or footing.

Pipe assembly: The adaptation from copper to PVC will be made by using a female copper adapter receiving a male PVC adapter.

PVC pipe shall be assembled in accordance with Section 1052.14, Pipe, of these STANDARDS AND SPECIFICATIONS. All excess glue will be wiped from the joint with a cloth rag or similar material after assembly.

All threaded PVC fittings and nipples shall receive a double wrap of Teflon tape prior to assembly.

Trenching: All pipe will be installed in an excavated trench. Trenches will be dug true to the alignments shown on the accepted plans. Excavation of the trenches will be done in a workman-like manner, providing a trench that is straight and true with a flat bottom containing no rocks or other deleterious material that may damage the pipe.

Separate trenches will be dug for each line. No doubling up of lines in a single trench will be allowed. Trenches will be dug deep enough to allow the following cover over the top of the pipe:

Main Line Size	Minimum Cover	Maximum Cover
1" - 1-1/2"	24"	24"
2" - 3"	24"	36"
Greater than 3"	36"	48"

Lateral Line Size	Minimum Cover	Maximum Cover
1"- 3" (where rotors are used)	18"	24"
1"- 3" (where spray heads 4" - 8" pop up height are used)	12"	24"
1"- 3" (where spray heads 12" or over pop-up heights are used)	18"	24"

No trench will be left open overnight without specific prior approval by the Town Engineer or his designee and without sufficient barricades to protect the public. Barricades shall meet the requirements of Section 141.08, Traffic Control, Barricades and Warning Sign, of these STANDARDS AND SPECIFICATIONS and in accordance with the Standard Drawings.

Control valves: Control valves will be installed in valve boxes with the top of the flow control stem three (3) inches below the bottom of the valve box lid. Whenever possible, electric valve control wires will be buried under and to one side of the main line. All wire will be buried deep enough to maintain a minimum cover of thirty-six (36) when not buried with the mainline, and a minimum of twelve (12) inches of slack for both the lead wire and the common wire will be provided within each valve box. Multiple valves on a single control wire are prohibited. Warning tape will be installed over wiring at any location where wiring is not installed adjacent to mainline.

Backfill: All backfill material will be free of rocks one (1) inch in diameter and larger. Backfill shall be completed in accordance with Section 660.00, Trenching, Backfilling and Compacting, of these STANDARDS AND SPECIFICATIONS.

Turn on and winterization: The Contractor shall winterize the system in the fall, put it into operation in the spring, and perform all other necessary service work needed to insure proper operation of the system.

1056.00 Inspections

Inspections shall be completed in accordance with Section 1024.00, Inspections, of these STANDARDS AND SPECIFICATIONS. The Contractor must notify the Town for inspections of sprinkler location staking, main line installation, wiring installation and coverage test.

1056.01 Sprinkler Location Staking

The Town will inspect the staked locations of all lines and heads for conformance to the accepted plans and these STANDARDS AND SPECIFICATIONS. The Town reserves the right to move, shift and adjust any of the stakes to better achieve the design intentions as shown on the accepted plans. No trenching will be done until the inspection is complete and the staked locations accepted by the Town.

1056.02 Main Line Inspection

The Town will inspect the depth of pipe, manual drain valves, sumps and control valves for conformance to the accepted plans and these STANDARDS AND SPECIFICATIONS prior to covering the pipe. All main lines will be pressure tested in accordance with Section 633.14, Leakage, of these STANDARDS AND SPECIFICATIONS.

1056.03 Wiring Inspection

When the wiring installation has been completed, the Town will inspect it for conformance to the accepted plans and these STANDARDS AND SPECIFICATIONS.

1056.04 Coverage Test

After the sprinkler heads have been installed and backfilling operations are complete and prior to ordering any sod or seed, the Contractor, in the presence of the Town, will perform a coverage test to determine the conformance to the accepted plans and these STANDARDS AND SPECIFICATIONS. No partial acceptance will be made.

1056.05 Pressure Test

Sprinkler mains will be pressure tested for two (2) hours at one hundred and twenty (120) psi, and shall be observed by the Town Inspector. No leakage or pressures losses shall be accepted. Leakage will be detected by hydrostatic testing and visual inspection. Cement or caulking to repair leaks is prohibited. Repeat test until all leaks are corrected.

1057.00 Warranty Period

The Contractor shall be responsible for the entire sprinkler system for a period of two (2) years from the date of acceptance of the entire project. If any trouble should develop within this time period due to faulty workmanship or material, the defect will be corrected in a timely fashion by the Contractor without expense to the Town. The Contractor will not be responsible for repair of the sprinkler system due to vandalism or due to erosion after the work has been accepted by the Town.

Repair damages to the premises caused by defective items within a maximum of five (5) days of notification from the owner.

Make adjustments, repairs and replacements at no additional cost to the contract price.

System must provide head to head coverage. Contractor will guarantee head to head coverage and make any adjustments or field changes to ensure proper coverage during construction or during the warranty period at no additional cost to the contract price.

Any settling of backfilled trenches, which may occur during the guarantee period, will be repaired without expense to the Town, including the complete restoration of all damaged property.

Turn on and winterization: The Contractor shall winterize the system in the fall, put it into operation in the spring, and perform all other necessary service work needed to insure proper operation of the system.

Approved construction drawings shall be on site daily and updated weekly with As Built markups. Contractor will make As Builts available for review and inspection to Town staff on site at all times on request. Record all changes which are made from the contract drawings. Irrigation As Builts will identify and record dimensioned locations for all components installed in valve boxes and locate all dimensions from two permanent reference points. Record all required information on as built drawings. Do not use these prints for any other purpose.

1060.00 PLANTING SPECIFICATIONS

1061.00 General

The scope of work involves furnishing all plants, equipment, materials, labor and supervision necessary for the installation of plant materials as indicated on the accepted plans and in these STANDARDS AND SPECIFICATIONS.

1062.00 Materials

1062.01 Mulch

Wood chip mulch shall be of a high quality fibrous nature, such as shredded wood chips or shavings, which are between one (1) inches and four (4) inches in length. Mulch shall be clean and free of soil or man-made debris.

Rock mulch shall be clean, three-quarter (3/4) to three (3) inch rounded, washed river rock. Rock Cobble shall be 2 – 4 inch or 3 – 6 inch washed cobble. Rock Mulch and Cobble shall be clean and free of soil or man-made debris and shall be of good quality. All Rock mulch or Cobble samples shall have the size, product name and supplier listed with the sample provided.

Different mulch types shall be separated by three-sixteenths (3/16) inch wide by six (6) inches deep green painted steel.

1062.02 Organic Amendments

Organic material will be dry, well-rotted, minimum one (1) year old poultry, horse, sheep or dairy cow manure. Manure will be free of sawdust, wood chips, and excessive salt and chemical additives

1062.03 Landscape Fabric

All landscape fabric shall be Typar 3401 or Mirafi Mirascape geo-textile polypropylene fabric or an approved equivalent or greater material.

1062.04 Edging

All edging shall be three-sixteenths (3/16) inch wide by six (6) inches deep green painted steel.

1062.05 Tree Wrap

All tree wrap shall be new, four (4) inch wide corrugated or crepe paper.

1062.06 Staking and Guying

All trees shall be staked and guyed using the following material:

- A. Stakes: Six (6) foot steel tee posts for deciduous trees
Two (2) foot steel tee posts for coniferous trees
- B. Wires: A double strand of number twelve (12) gauge galvanized wire
- C. Nylon straps: One and one-half inch (1½) wide nylon strap with eyelets at each end.

1062.07 Submittals

Contractor shall furnish material samples (mulch, amendments, etc.) on request by the Town.

1062.08 Plant Materials

The Contractor will furnish and install all plants shown on the accepted plans. All plant material shall conform to the measurements as noted in the size requirements and on the accepted plans. Nursery stock shall meet the minimum dimensions for height and/or caliper. All plant material shall comply with the American Standard for Nursery Stock ANSI Z60.1-2004.

Distribution of Tree Species

Tree diversity shall follow the 10/20/30 rule: No more than ten (10) percent of a single species, twenty (20) percent of a single genus, or thirty (30) percent of a single family are to be used in landscape design unless approved by Parks Superintendent or his designee. All landscape designs shall be reviewed by the Parks Superintendent or his designee, prior to adopting the landscape plans, for species diversity and distribution.

Size Requirements

All deciduous trees shall be two (2) inch caliper or larger. All ornamental trees will be one and a half (1.5) inch caliper or larger. Caliper measurement shall be taken six (6) inches above the root flare if four (4) inches or less and twelve (12) inches above the root flare for larger tree sizes.

All evergreen trees shall be a minimum of six (6) feet tall or larger. Height dimensions refer to the main body of the tree, from the root collar and above.

Shrubs shall be number five (5) size containers or larger. Smaller containerized stock or dormant bare root shrubs and trees may be planted at the edge of drainages in native areas.

Perennials and groundcovers shall be number one (1) size container or larger

Quality

Trees shall be typical of their species and/or variety. Plant materials shall be live, healthy, vigorous, structurally sound, and free of disease and insect infestations.

Trees shall have a symmetrical form as typical for the species/cultivar. Trees must be self-supporting and shall have a single, relatively straight central leader and tapered trunk, free of co-dominant stems and vigorous, upright branches that compete with the central leader. The tip of the dominant leader shall be the tallest part of the tree.

Branches shall be distributed radially around and vertically along the trunk, forming a symmetrical crown typical for the species. Branches shall be no larger than two-thirds (2/3) the diameter of the trunk. The attachment of scaffold branches shall be free of included bark. Evergreens shall have branches that extend to the ground. Trees shall be free of twig and/or branch dieback

Plants shall exhibit good annual growth and buds shall be plump and well fitted for the species. Foliage shall be full and display a healthy and consistent color when in leaf. Evergreen foliage will be good intense color.

Trees shall be free of wounds (except properly-made pruning cuts), disfiguring knots, sunscald injury, evidence of previous or current disease or insect infestations, fungal fruiting-bodies, wood cracks, and bleeding areas.

Plant tags stating the correct plant name and size will be securely attached to all plant materials. Plants shall be true to their name as specified.

Balled and Burlapped trees shall have a solid ball of earth of minimum or greater specified size firmly wrapped with burlap or similar materials and held in place securely bound with twine or rope. No balled plant will be planted if the ball is broken, either before or during the planting process. Any plant that is loose in the ball will be removed from the site and replaced.

The minimum ball size for B & B trees is as follows:

Tree Size	Ball Depth Minimum	Ball Diameter Minimum
1½" - 2" caliper	18"	22"
2" - 2½" caliper	20"	24"
2½" - 3" caliper	22"	28"
3½" - 4" caliper	30"	38"
5' - 6' height	14"	16"

Container grown trees shall be well rooted and established in the container in which they are growing. They shall be grown in the container for a sufficient length of time for the root system to hold the earth when taken from the container, but not long enough to become pot bound. They should have few, if any, roots on the outside surface of the media. The root collar and large roots shall be free of circling and/or kinked roots. The upper-most roots or root collar shall be within one (1) inch above or below the soil surface. The soil level should be within two (2) inches of the top of the container. Containers shall be stable and not deteriorated to a degree that will cause breaking up of the root ball during the planting operations.

Bare-root trees shall have a heavy fibrous root system that has been developed by proper cultural treatment, transplanting and root pruning. The spread of the root system shall be twelve (12) times the trunk diameter (caliper) in inches, plus an additional six (6) inches. Any damaged, injured, or broken roots shall be cut with sharp, clean pruning shears, leaving no damaged, frayed, or splintered cut surfaces.

Plant materials not meeting these standards are subject to rejection

Town of Erie Approved Tree List

Thoroughly research all trees before ultimately choosing a tree to assure that the species you select is suitable for the desired site in regards to mature sizes and growing conditions. All height and branch spread figures are estimates and can be highly variable depending on the variety or cultivar chosen. All of the listed trees are suitable for planting on private properties (i.e. lawns/yards) and in public access areas (i.e. parks/tot lots), with the exception of thorn bearing species denoted below by a *. Only thornless varieties of thorn bearing species shall be planted in any public access areas.

Soil Moisture Needs: L = Low (Drought Tolerant), M = Moderate, H = High
 Moisture needs refer to their requirements after establishment.

Evergreen Trees

Common Name/ Botanical Name	Height (in feet)	Spread (in feet)	Shape/ Form	Hardiness Zone	Soil Moisture Needs
Arborvitae <i>Thuja occidentalis</i>	25-50	10-15	Pyramidal	3	M
Cypress, Arizona <i>Cupressus arizonica</i>	30-40	15-25	Pyramidal	5	L-M
Fir, Concolor (White) <i>Abies concolor</i>	40-60	20-30	Pyramidal	3	M
Juniper <i>Juniperus spp.</i> (chinenses, scopulorum, virginiana)	12-30 Highly Variabl e	4-25 Highly Variabl e	Pyramidal, Irregular, Columnar	3-5	L
Pine, Austrian <i>Pinus nigra</i>	40-60	30-40	Pyramidal	4	M
Pine, Bosnian <i>Pinus heldreichii</i>	15-25	6-8	Pyramidal	4	M
Pine, Bristlecone <i>Pinus aristata</i>	20-40	10-30	Irregular	2	L
Pine, Lacebark <i>Pinus bungeana</i>	30-40	25-30	Pyramidal	5	M
Pine, Limber <i>Pinus flexilis</i>	30-50	15-30	Irregular, Pyramidal	4	L
Pine, Mugo <i>Pinus mugo</i>	5-20	5-20	Oval to Rounded	3-4	L
Pine, Pinyon <i>Pinus edulis</i>	20-30	10-20	Rounded, Irregular	4	L
Pine, Ponderosa <i>Pinus ponderosa</i>	60-90	25-35	Rounded, Pyramidal	3	L
Pine, Scots <i>Pinus sylvestris</i>	30-50	20-35	Pyramidal to Rounded	2	M
Pine, Southwestern White <i>Pinus strobiformus</i>	40-50	20-30	Pyramidal to Rounded	5	L-M
Spruce, Colorado <i>Picea pungens</i>	40-60	20-30	Pyramidal	2	M
Spruce, Norway <i>Picea abies</i>	20-60	15-25	Pyramidal	2	M
Spruce, Serbian <i>Picea omorika</i>	50-60	20-25	Pyramidal	4	M

Deciduous Ornamental/Small Trees

The following list includes trees that typically do not exceed 30 feet in height when fully grown.

Common Name/ Botanical Name	Height (in feet)	Spread (in feet)	Shape/ Form	Hardiness Zone	Soil Moisture Needs
Alder, Thinleaf <i>Alnus tenuifolia</i>	20-25	15-20	Oval to Rounded, Often Multi-stemmed	2	M
Amur Maackia <i>Maackia amurensis</i>	20-30	25-35	Rounded	4	L-M
Crabapple/Apple <i>Malus spp.</i>	15-25	15-25	Rounded, Upright, Pendulous	3-5	M
Dogwood <i>Cornus spp.</i>	15-30	20-30	Rounded, Vase shaped, Upright Spreading	4-5	S-M
Hawthorn* <i>Crataegus spp.</i>	15-30	20-30	Rounded, Upright Spreading	3-4	L-M
Hoptree/ Wafer Ash <i>Ptelea trifoliata</i>	15-20	15-20	Rounded	3	M
Lilac, Japanese Tree <i>Syringa reticulata</i>	15-25	10-20	Oval to Rounded	4	L-M
Lilac, Peking Tree <i>Syringa pekinensis</i>	15-25	10-20	Oval to Rounded	4	L-M
Magnolia (tree form) <i>Magnolia spp.</i>	15-30	10-30	Upright, Spreading	4-5	M
Maple, Bigtooth/ Wasatch <i>Acer grandidentatum</i>	25-35	20-30	Broadly Spreading	3-4	L-M
Maple, Ginnala <i>Acer ginnala</i>	15-25	15-25	Rounded, Often Multi-stemmed	3-4	L
Maple, Hedge <i>Acer campestre</i>	25-35	25-35	Rounded, Often Multi-stemmed	5	M
Maple, Paperbark <i>Acer griseum</i>	20-30	15-25	Oval to Rounded, Upright	4	M
Maple, Tatarian <i>Acer tataricum</i>	15-25	15-25	Oval to Rounded, Often Multi-stemmed	3	L
Maple, Rocky Mountain <i>Acer glabrum</i>	15-25	10-20	Irregular, Often Multi-stemmed	4-5	M
Maple, Shantung <i>Acer truncatum</i>	20-30	20-30	Rounded	4	M
Maple, Three-Flowered <i>Acer triflorum</i>	15-25	15-25	Rounded	5	M
Maple, Trident <i>Acer buergerianum</i>	25-35	20-30	Oval to Rounded	5	M
Oak, Gambel <i>Quercus gambelii</i>	15-20	10-20	Rounded, Often Multi-stemmed	3-4	L
Pear <i>Pyrus spp.</i>	15-35	15-30	Vase Shaped, Upright, Pyramidal	3-5	L-M
Prunus <i>Prunus spp.</i> (Cherries, Peaches, Plums, Almonds)	15-30	15-30	Vase shaped, Upright Spreading, Often Multi-stemmed	2-5	L-M
Serviceberry <i>Amelanchier spp.</i>	15-30	15-20	Upright Spreading, Often Multi-stemmed	3-5	L-M
Smoketree <i>Cotinus obovatus</i>	20-30	20-30	Upright, Oval	4	M

Deciduous Medium/Large Shade Trees

The following list includes trees that will exceed 30 feet in height when fully grown.

Common Name/ Botanical Name	Height (in feet)	Spread (in feet)	Shape/ Form	Hardines s Zone	Soil Moisture Needs
Alder <i>Alnus glutinosa</i>	40-50	25-35	Narrowly Pyramidal	4	M-H
Amur Corktree <i>Phellodendron amurense</i>	35-45	30-45	Broadly Spreading, Rounded	3-4	L-M
Ash <i>Fraxinus spp.</i>	40-65	20-45	Oval, Rounded	3-4	M
Bald Cypress <i>Taxodium distichum</i>	50-60	25-35	Pyramidal	4	M-H
Catalpa <i>Catalpa spp.</i>	40-60	20-40	Irregular Oval Crown	4	L-M
Dawn Redwood <i>Metasequoia glyptostroboides</i>	50-80	20-30	Pyramidal	5	M-H
Elm <i>Ulmus species</i> (use only Dutch Elm Disease resistant hybrids)	35-70	40-50	Vase Shaped, Broadly Rounded	3-5	M
Filbert, Turkish <i>Corylus colurna</i>	35-45	25-30	Broadly Pyramidal	4 -5	L-M
Ginkgo <i>Ginkgo biloba</i>	35-50	25-40	Broadly Pyramidal	3-4	M
Goldenrain Tree <i>Koelreuteria paniculata</i>	30-35	30-35	Rounded	5	L-M
Hackberry <i>Celtis occidentalis</i>	50-60	35-45	Rounded to Vase Shaped	3-5	L
Hardy Rubber Tree <i>Eucommia ulmoides</i>	40-50	40-50	Rounded	5	M
Honeylocust * <i>Gleditsia tricanthos inermis</i>	40-60	30-40	Rounded, Broadly Spreading	4	M
Hornbeam, European <i>Carpinus betulus</i>	30-40	20-30	Oval, Columnar	5	M-H
Horsechestnut <i>Aesculus spp.</i>	45-60	35-50	Oval, Rounded	4	M
Ironwood/Hop-hornbeam <i>Ostrya virginiana</i>	25-35	20-30	Pyramidal to Oval	4	M
Japanese Pagoda Tree <i>Sophora japonica</i>	40-55	35-50	Rounded	4	M
Kentucky Coffeetree <i>Gymnocladus dioicus</i>	55-65	35-50	Oval	4	L
Katsura Tree <i>Cerdidiphyllum japonicum</i>	40-55	20-35	Pyramidal, Spreading	5	M

Larch, European <i>Larix decidua</i>	70-90	25-40	Broad Pyramidal	2	M
Linden <i>Tilia spp.</i>	35-60	20-45	Pyramidal, Rounded	3-4	M
Common Name/ Botanical Name	Height (in feet)	Spread (in feet)	Shape/ Form	Hardines s Zone	Soil Moisture Needs
London Planetree <i>Platanus acerifolia</i>	65-80	65-80	Rounded, Spreading	5	M
Magnolia, Cucumber <i>Magnolia acuminata</i>	50-80	40	Pyramidal	4	M
Maple, Freeman <i>Acer x freemanii</i>	35-55	30-45	Broadly Oval to Rounded, Columnar	3-4	M
Maple, Miyabe <i>Acer miyabe</i>	30-40	25-45	Upright Oval, Rounded	4	M
Maple, Norway <i>Acer platanoides</i>	35-55	20-50	Broadly Oval, Rounded, Columnar	3-4	M-H
Maple, Sugar <i>Acer saccharum</i>	35-60	25-55	Upright Oval, Rounded	3-5	M-H
Oak, Bur <i>Quercus macrocarpa</i>	50-70	40-65	Broadly Oval, Irregular	3	L
Oak, Chinkapin <i>Quercus muehlenbergi</i>	45-55	40-50	Rounded	5	M
Oak, English <i>Quercus robur</i>	45-65	15-45	Broadly Rounded, Columnar	5	M
Oak, Red <i>Quercus rubra</i>	50-70	40-50	Rounded	4	M
Oak, Shumard <i>Quercus shumardii</i>	45-70	40-50	Broadly Oval	5	M
Oak, Swamp White <i>Quercus bicolor</i>	40-60	40-60	Rounded, Upright Spreading	4	L-M
Ohio Buckeye <i>Aesculus glabra</i>	30-40	30-40	Oval, Rounded	3	M
Sweetgum <i>Liquidambar styraciflua</i>	45-65	30-50	Oval	5	M
Sycamore <i>Platanus occidentalis</i>	60-80	50-60	Rounded, Spreading	4	M
Tuliptree <i>Liriodendron tulipifera</i>	50-75	30-40	Oval, Rounded	4	M
Tupelo <i>Nyssa sylvatica</i>	30-45	20-30	Irregular, Rounded	5	M
Yellowwood <i>Cladrastis kentuckea</i>	30-45	35-50	Rounded	5	M
Zelkova <i>Zelkova serrata</i>	40-50	25-45	Vase Shaped, Upright Spreading	5	M

Tree Spacing Requirements & Recommendations

Small Deciduous Trees	Medium Deciduous Trees	Large Deciduous Trees
Under 25' Mature Height	30' – 45' Mature Height	Over 45' Mature Height
12' Minimum Spacing Between Trees, 20' Recommended	20' Minimum Spacing Between Trees, 30' Recommended	30' Minimum Spacing Between Trees, 40' Recommended

Small Evergreen Trees	Large Evergreen Trees
Under 30' Mature Height	Over 30' Mature Height
12' Minimum, 20' Recommended Spacing Between Trees	20' Minimum, 30' Recommended Spacing Between Trees
Do Not Use as a Street Tree	Do Not Use as a Street Tree

Approved Street Trees

Small/Ornamental Deciduous Trees

- Under 30' Mature Height
- 12' Minimum Spacing Between Trees, 20' Recommended
- Required 4' Minimum Planting Strip Width
- Tree Form Only
- No Multi-Stemmed/Clump Forms
- Thornless Varieties Only

Pruning may be required for clearance above sidewalks and streets

- Amur Chokecherry** *Prunus maackia*
- Amur Maackia** *Maackia amurensis*
- Chokecherry** *Prunus virginiana'shubert'*
- Dogwood** *Cornus spp.*
- Hawthorn** *Crataegus spp.*
- Lilac, Japanese Tree** *Syringa reticulata*
- Lilac, Peking Tree** *Syringa pekinensis*
- Maple, Bigtooth/Wasatch** *Acer grandidentatum*
- Maple, Ginnala** *Acer ginnala*

- Maple, Hedge** *Acer campestre*
- Maple, Paperbark** *Acer griseum*
- Maple, Rocky Mountain** *Acer glabrum*
- Maple, Shantung** *Acer truncatum*
- Maple, Tatarian** *Acer tataricum*
- Maple, Trident** *Acer buergeranum*
- Mayday Tree** *Prunus padus*
- Pear** *Pyrus spp.*
- Serviceberry** *Amelanchier spp.*
- Smoketree** *Cotinus obovatus*

Medium Deciduous Trees

- 30' – 45' Mature Height
- 20' Minimum Spacing Between Trees, 30' Recommended
- Required 6' Minimum Planting Strip Width

All Trees Listed Under Approved Small/Ornamental Street Tree Are Acceptable

- Amur Corktree** *Phellodendron amurense*
- Filbert, Turkish** *Corylus colurna*
- Ginkgo** *Ginkgo biloba*
- Goldenrain Tree** *Koelreuteria paniculata*
- Honeylocust** *Gleditsia tricanthos inermis*
- Hop Hornbeam** *Ostrya virginiana*
- Hornbeam, European** *Carpinus betulus*
- Katsura** *Cerdidiphyllum japonicum*

- Linden, Crimean** *Tilia x euchlora*
- Linden, Littleleaf** *Tilia cordata*
- Maple, Freeman** *Acer x freemanii*
- Maple, Miyabe** *Acer miyabe*
- Ohio Buckeye** *Aesculus glabra*
- Tupelo** *Nyssa sylvatica*
- Yellowwood** *Cladrastis kentuckea*

Large Deciduous Trees

Over 45' Mature Height

30' Minimum Spacing Between Trees, 40' Recommended

Required 8' Minimum Planting Strip Width

All Trees Listed Under Approved Small/Ornamental and Medium Street Trees Are Acceptable

Ash *Fraxinus spp.*

Catalpa *Catalpa spp.*

Elm *Ulmus spp.*

(use only Dutch Elm Disease resistant hybrids)

Hackberry *Celtis occidentalis*

Hardy Rubber Tree *Eucommia ulmoides*

Horsechestnut *Aesculus spp.*

Kentucky Coffeetree *Gymnocladus dioicus*

Linden *Tilia spp.*

London Planetree *Platanus acerifolia*

Maple, Norway *Acer platanoides*

Maple, Sugar *Acer saccharum*

Oak, Bur *Quercus macrocarpa*

Oak, Chinkapin *Quercus muehlenbergi*

Oak, English *Quercus robur*

Oak, Shumard *Quercus shumardii*

Oak, Swamp White *Quercus bicolor*

Oak, Red *Quercus rubra*

Sycamore *Platanus occidentalis*

Tuliptree *Liriodendron tulipifera*

Zelkova *Zelkova serrata*

Approved Shrub List

SHRUBS, ORNAMENTAL GRASSES AND PERENNIALS

Acceptable shrubs, ornamental grasses and perennials for landscaping in Erie are included in the following lists. Other plant materials may be submitted for review and approval by Erie. Preference shall be given to drought resistant species.

Evergreen Shrubs

Juniperus

Chinensis

Suggested: Armstrongii
Blue point
Holbert
Spearmint

Juniperus Horizontalis

Suggested: Bar harbour
Blue chip
Hughes
Prince of wales
Wiltoni
Youngstown

Juniperus x media

Suggested: Hetzi glauca
Old gold
Pfitzeriana
Ppfitzeriana auria
Sea green

Juniperus procumbens

Suggested: Greenmound
Nana

Juniperus sabina

Suggested: Arcadia
Broadmoor
Buffalo
Scandia
Seirra spreader
Tamariscifolia

Juniperus scopulorum

Suggested: Gray gleam
Wichita blue

Juniperus virginiana

Suggested: Skyrocket
Cupressifolia

Pinus Mugo

Suggested: Mops
Slowmound
White bud
Big tuna

Deciduous Shrubs

<i>Alnus tenuifolia</i> Alder Thinleaf	<i>Physocarpus opulifolius</i> 'Nanus' Dwarf Ninebark
<i>Amelanchier alnifolia</i> Serviceberry	<i>Potentilla fruticosa</i> 'Golden Drop' Golden Drop Potentilla
<i>Amphora canescens</i> Leadplant	<i>Potentilla fruticosa</i> 'Goldfinger' Goldfinger Potentilla
<i>Atriplex canescens</i> Fourwing Saltbush	<i>Potentilla fruticosa</i> 'Katherine Dyke' Katherine Dyke Potentilla
<i>Berberis</i> Barberry	<i>Potentilla fruticosa</i> 'McKay's White' McKay's White Potentilla
<i>Buddleia davidi</i> Butterfly Bush	<i>Potentilla fruticosa</i> 'Tangerine' Tangerine Potentilla
<i>Cargana arboresens</i> Siberian Pea Shrub	<i>Prunus besseyi</i> Western Sand Cherry
<i>Caryopteris x clandonensis</i> "Dark Knight" Dark Knight Spirea	<i>Prunus besseyi</i> 'Pawnee Buttes' Pawnee Buttes Sand Cherry
<i>Caryopteris x clandonensis</i> Blue Mist Spirea	<i>Prunus besseyi</i> Western Sand Cherry
<i>Cercocarpus montanus</i> Mountain Mahogany	<i>Prunus fruticosa</i> Flowering Almond
<i>Cercocarpus intricatus</i> Mahonia Littleleaf Mountain Mahogany	<i>Prunus tomentosa</i> Nanking Cherry
<i>Cercocarpus ledifolius</i> Curl Leaf Mountain Mahogany	<i>Prunus virginia</i> Choke cherry Native
<i>Chaenomeles japonica</i> Red Quince	<i>Prunus x cistena</i> Cistina Plum
<i>Chamaebatiara millefolium</i> Fernbush	<i>Prunus x cistena</i> Cistena plum
<i>Chrysothamnus nauseosus</i> Rabbit Brush	<i>Quercus gambelli</i> Gambel Oak
<i>Chrysothamnus nauseosus</i> Dwarf Rabbit Brush	<i>Quercus unulata</i> Wavyleaf Oak
<i>Cornus sericea</i> 'Isanti' Isante Dogwood	<i>Rhamnus frangula</i> 'Columnaris' Buckthorn
<i>Cornus alba</i> 'Argenteo-marginata' Variegated Dogwood	<i>Rhamnus frangula</i> 'Aspenifolia' Fernleaf Buckthorn
<i>Cornus sericea</i> 'Baileyi' Redtwig Dogwood	<i>Rhamnus frangula</i> 'Smithii' Smith Buckthorn
<i>Cornus sericea</i> 'flaviramea' Yellow twig Dogwood	<i>Rhus aromatica</i> Gro-low Sumac
<i>Cornus sericea</i> 'Kelseyi' Kelsey's Dogwood	<i>Rhus glabra</i> Dwarf Smooth Sumac
<i>Corylus avellana</i> 'Rote Zeller' Filbert - Red Leaf	<i>Rhus trilobata</i> Threeleaf Sumac
<i>Cotinus coggygia</i> Purple Smoke Tree	<i>Rhus typhina</i> 'lanciniata' Cutleaf Sumac
<i>Cotoneaster apiculatus</i> Cranberry Cotoneaster	<i>Ribes alpinum</i> Alpine Currant
<i>Cotoneaster dammeri</i> Coral Beauty Cotoneaster	<i>Ribes alpinum</i> 'Greenmound' Greenmound Current
<i>Cotoneaster horizontalis</i> Lowfast Cotoneaster	<i>Ribes aureum</i> Yellow Flowering Currant
<i>Cotoneaster lucidus</i> Peking Cotoneaster	<i>Ribes uva-crispa</i> 'Comanche' Gooseberry Comanche
<i>Cytisus purgan</i> 'Spanish gold' Spanish Gold Broom	<i>Rosa sp.</i> Roses Shrub
<i>Euonymus alatus compacta</i> Burning Bush – Compact	<i>Salix purpurea</i> Dwarf Artic Willow
<i>Euonymus alatus</i> Burning Bush	<i>Sambucus canadensis</i> Elder, Golden
<i>Euonymus fortunei</i> 'Emerald Gaiety' European Euonymus	<i>Spirea japonica</i> 'Goldflame' Goldflame Spirea
<i>Euonymus fortunei radicans</i> 'Harlequin' Euonymus Emerald Gaiety	<i>Spirea japonica</i> 'Little Princes' Little Princess Spirea
<i>Euonymus fortunei</i> 'Emerald and Gold' Emerald n'Gold	<i>Spirea japonica</i> 'Froebel' Froebel Spirea
<i>Euonymus</i>	<i>Spirea nipponica</i> Cheyenne Snowmound Spirea
<i>Euonymuskiautschovica</i> 'Manhattan' Manhattan Euonymus	<i>Spirea x bumalda</i> 'Gumball' Gumball Spirea
<i>Fallugia paridoxa</i> Apache Plume	<i>Spirea x bumalda</i> 'goldmound' Goldmound Spirea
<i>Forsythia Arnolds Dwarf</i> Arnolds Dwarf Forsythia	<i>Spirea x bumalda</i> Anthony Waterer Spirea
<i>Forsythia Arnolds Gold</i> Arnolds Gold Forsythia	<i>Symphoricarpos occidentalis</i> Western Snowberry
<i>Forsythia x intermedia</i> 'Spring Glory' Spring Glory Forsythia	<i>Symphoricarpus x chenault</i> 'Hancock' Hancock Coralberry
<i>Hippophae rhamnoides</i> Sea Buckthorn	<i>Symphoricarpus x orbiculatus</i> Indian Current/Red Snow Coralberry
<i>Kolkwitzia amabilis</i> Beauty Bush	<i>Syringa meyeri</i> , 'Palibin's Dwarf Korean Lilac
<i>Ligustrum vulgare</i> 'Cheyenne' Cheyenne Privet	<i>Syringa patula</i> 'Miss Kim' Miss Kim Lilac
<i>Ligustrum vulgare</i> 'Lodense' Lodense Privet	<i>Syringa vilgaris</i> French hybrids Lilac
<i>Lonicera korolkowii v. floribun</i> Honeysuckle Blue Velvet da' BlueVel'	<i>Syringa vulgaris alba</i> Common White Lilac
<i>Lonicera xylosteum compactum</i> Honeysuckle - Emerald Mound	

Mahonia aquifolium Mahonia
Mahonia aquilolium compacta Compact Mahonia
Perovskia atripiciflora Russian Sage
Philadelphus Virginalis Littleleaf Mockorange
Philadelphus lewisii 'Cheyanne' Cheyenne Mockorange
Philadelphus x Virginalis 'Minnesota snowflake' Minnesota Snowflake Mockorange
Philadelphus x. virginalis Mock orange Virginal
Physocarpus momogynus Mountain Ninebark
Physocarpus opulifolius 'Lutus' Golden Ninebark

Syringa vulgaris Common Purple Lilac
Syringa x chinensi Chinese Lilac
Viburnum opulus 'Nanum' Dwarf European Cranberry
Viburnum lantana Lantana Viburnum
Viburnum trilobum Highbush Cranberry

Viburnum trilobum 'Compactum' American Compact Cranberry
Viburnum x burkwoodii Burkwood Viburnum
Yucca baccata Banana Yucca
Yucca filamentosa Filamentosa Yucca

Shrub Roses

Adeleide Hoodless	Pink Grootendorst
Agnes	Pink Prairie
Austrian Copper	Rugosa
Cuthberg Grant	Sea Foam
F.J. Grootendorst	Sunblaze
Hansa	The Fairy
Meidiland Series (several var.)	Therese Bugnet
Morden Centennial	The Hunter
Nearly Wild	

Ornamental Grasses

<u>Scientific Name</u>	<u>Common Name</u>
<i>Andropogon gerardii</i>	Big Bluestem
<i>Calamagrostis arundinacea</i> 'Karl Forester	Feather Reed- Karl Forester
<i>Chasmanthium latifolium</i>	Northern Sea Oats
<i>Descampsia caespitosa</i>	Tufted Hair Grass
<i>Erianthus ravennace</i>	Pampas Grass
<i>Festuca glauca</i> 'Elijah Blue	Blue Fescue
<i>Helictotrichon sempervirens</i>	Blue Avena / Oat Grass
<i>Imperarata Cylindrica</i> 'rubra'	Blood Grass
<i>Miscanthus sinensis</i> 'Gracillimus'	Maiden Grasses
<i>Misicanthus sinensis</i> 'Zebrinus'	Zebra Grass
<i>Panicum virgatum</i> 'Heavy Metal'	Heavy Metal Switch Grass
<i>Pennistum alopecuroides</i> 'Hameln'	Hardy /Fountain Grass
<i>Phalaris arundinacea</i> 'Pieta'	Ribbon Grass
<i>Schizachyrium scoparium</i>	Little Bluestem

Perennials

<i>Achillea</i> spp. Yarrow	<i>Gypsophila paniculata</i> Baby's breath
<i>Agastache aurantiaca</i> Coronado Hyssop	<i>Hemerocallis</i> spp. Daylily
<i>Agastache cana</i> , <i>Sinning</i> Hyssop Sonoran Sunset	<i>Heuchera sanguinea</i> Coral Bells Snow Angel
<i>Agastache rupestris</i> Sunset Hyssop	<i>Hosta</i> spp. Hosta
<i>Armeria maritime</i> Thrift	<i>Iberis sempervirens</i> Candytuft
<i>Anchusa azurea</i> Anchusa (Italian bugloss)	<i>Iris</i> hybrids Bearded iris
<i>Aquilegia</i> spp. Columbine	<i>Lavandula angustifolia</i> Lavender
<i>Asclepias tuberosa</i> Butterfly weed	<i>Leucanthemum x superbum</i> Shasta daisy
<i>Aster novae-angliae</i> Aster (New England)	<i>Liatris scariosa</i> Gayfeather
<i>Aurinia saxatilis</i> Basket-of-gold	<i>Linum perenne</i> Blue flax
<i>Callirhoe involucrate</i> Winecups	<i>Lobelia cardinalis</i> Cardinal flower
<i>Campanula medium</i> Canterbury bells	<i>Lupinus polyphyllus</i> Lupine
<i>Campanula</i> spp. Harebell	<i>Monarda didyma</i> Beebalm
<i>Centaurea cyanus</i> Cornflower	<i>Oenothera macrocarpa subsp. incana</i> Silverblade, Evening Primrose
<i>Coreopsis lanceolata</i> Coreopsis	<i>Osteospermum barberia</i> var. <i>compactum</i> Purple Mountain Sun Daisy
<i>Crysanthemum morifolium</i> Hardy Mum	<i>Osteospermum</i> Lavender Mist
<i>Delosperma floribundum</i> Starburst Iceplant- Mesa Verde	<i>Paeonia</i> hybrids Peony
<i>Delphinium</i> hybrids Delphinium	<i>Papaver nudicaule</i> Iceland poppy
<i>Dendranthema coccineum</i> Painted daisy	* <i>P. orientale</i> Oriental poppy
<i>Dianthus barbatus</i> Sweet Shalliam	<i>Penstemon</i> spp. Penstemon
<i>Dianthus</i> First Love	<i>Penstemon grandiflorus</i> Prairie Jewel, Pikes Peak Purple, Red Rocks
<i>Diacia integerrim</i>	<i>Phlox paniculata</i> Garden phlox
<i>Dicentra spectabilis</i>	<i>Physostegia virginiana</i> Dragonhead (false)
<i>Coral Canyon Twin Spur</i> Bleeding heart	<i>Rudbeckia hirta</i> Black-eyed Susan
<i>Dictamnus albus</i> Gas plant	<i>Rudbeckia laciniata</i> 'Hortensiana' - Golden glow
<i>Echinacea purpurea</i> Purple coneflower	<i>Scabiosa caucasica</i> Pincushion flower
<i>Eriogonum umbellatum</i> Sulphur flower	<i>Sedum</i> spp. Sedum, stonecrop
<i>Gaillardia aristata</i> Gaillardia, blanket flower	<i>Thermopsis rhombifolia</i> Golden banner, false lupine
<i>Gazania linearism</i> Colorado Gold Gazania	<i>Veronica spicata</i> Veronica
<i>Gazania krebsiana</i> Tanager Gazania	<i>Viola corneta</i> Horned violet, viola
<i>Geranium magniflorum</i> Geranium, La Veta Lace	<i>Viola odorata</i> Sweet violet
<i>Geranium sanguineum</i> Bloody Cranesbill	<i>Zauschneria garrettii</i> Orange Carpet Hummingbird Trumpet

Approved Native Trees and Shrubs to be installed to provide erosion control, slope stability, and diversity along drainages in open space areas. Woody plants may be installed no closer than 25 feet from drainage inlets, outlets, or bridges. Native shrubs and trees must be installed along the toe of slope of drainages with adequate hydrologic conditions to support them. Do not plant across the floor of the drainage.

Common Name	Scientific Name	Variety	Mature Height (feet)	Location
Netleaf hackberry	<i>Celtis reticulata</i>	Native	15 – 35	Drainages, 2 - 4' above saturated soil
Rabbitbrush	<i>Chrysothamnus nauseosus</i>	Native	3 – 5	Drier areas
Dwarf rabbitbrush	<i>Chrysothamnus nauseosus var. naus.</i>	Native	2	Drier areas
Plains Cottonwood	<i>Populus sargentii</i>	Native	45 – 60	Drainages, 2 - 4' above saturated soil
Narrowleaf cottonwood	<i>Populus angustifolia</i>	Native	25 – 40	Drainages, 2 - 4' above saturated soil, plants will spread by root sprouts
Chokecherry	<i>Padus virginiana (aka Prunus)</i>	Native	10 – 12	Drainages, 1 - 5 above
Wild plum	<i>Prunus americana</i>	Native	6 – 8	Drainages 2 - 8' above saturated soil
Golden current	<i>Ribes aureum</i>	Native	3 – 4	Drainages, 2 - 10' above saturated soil
Three-leaf sumac	<i>Rhus trilobata</i>	Native	4 – 8	Drier prairie areas and drainages 2+ feet above saturated soils.
Peachleaf willow	<i>Salix amygdaloides</i>	Native	15 – 35	Drainages 1 - 4' above saturated soil.
Sandbar willow	<i>Salix exigua</i>	Native	5 – 6	Drainages, 0 - 3' above saturated soil
Snowberry	<i>Symphoricarpos occidentalis</i>	Native	2	Drainages, 2 - 10' above saturated soil,
Yucca	<i>Yucca glauca</i>	Native	2	Drier prairie sites (north facing slopes preferred).

1063.00 Handling, Transportation, and Storage Operations

All plants shall be packed, transported, and handled with utmost care to insure adequate protection against injury. Trees shall be protected from extreme temperatures, freezing or extreme heat. Trees shall be transported to the site in a covered vehicle that prevents wind and temperature extremes. Shade cloth shall be used to cover plant materials during transportation to protect the plant canopies and roots from drying winds in transit.

Trees shall be planted as soon as possible. If not planted on the day of delivery all plants shall be placed in a temporary nursery, irrigated daily, shaded and protected from sun or wind. Balled and Burlapped trees shall be heeled in within 24 hours of delivery in a compact group with a suitable mulch material placed around and between the balls so they are completely covered. No

plant shall remain on the job site in temporary storage for over a month unless otherwise approved by the Parks Superintendent or his designee.

Tree stock will be protected from excessive vibration; avoiding being thrown or bounced off mobile equipment to the ground. Trees shall not be dragged, lifted, or pulled by the trunk or foliage parts in a manner that will loosen the roots in the ball. To avoid damage when setting the tree in the hole, lift the tree with straps or rope around the root ball, not by the trunk.

1064.00 Planting

1064.01 Location Staking

The Contractor is responsible for arranging to have the locations of all utility lines (including but not limited to water, sewer, gas, electrical, phone and irrigation) marked prior to the inspection to assure safety and protection. The Contractor will be required to stake the proposed locations of all trees and shrubs on-site for approval by the Town prior to planting. The Town reserves the right to move, shift or adjust any or all of the stakes to better achieve the planting design intentions as shown on the accepted drawings.

1064.02 Placement

Trees shall be spaced to accommodate the full canopy of mature tree. Large deciduous trees shall have a minimum spacing of thirty (30) feet, mid-sized trees shall have a minimum spacing of twenty (20) feet, and small trees (ornamental) shall have a minimum spacing of twelve (12) feet. Coniferous trees shall have spacing of twenty (20) feet for large spreading varieties and ten (10) feet for columnar varieties. All trees shall be placed a minimum of ten (10) feet from all buildings. When space is limited or a special design effect or function is desired, closer spacing can be allowed upon permission of the Parks Superintendent or his designee. Coniferous trees shall be planted a minimum of six (6) feet away from hardscapes (sidewalks, trails, curbs, etc.). Thorn trees shall be placed a minimum of ten (10) feet away from sidewalks and trails. Refer to Approved Tree List for Species that are suitable for street trees.

1064.03 Placement of Native Trees and Shrubs in Native Areas.

Native trees and shrubs are to be added to the open space areas in order to help stabilize slopes, provide diversity for wildlife and natural aesthetic. One tree or one thicket consisting of 15 shrubs shall be planted along all drainages for each 50 feet of drainage. Trees and thickets may be grouped more closely than 50 feet, if desired for design purposes Woody riparian plants may be installed no closer than 25 feet from drainage inlets, outlets, or bridges. Native riparian shrubs and trees must be installed along the toe of slope of drainages with adequate hydrologic conditions to support them. Do not plant shrubs and trees across the floor of the drainage, blocking the flow... Town of Erie representative will assist with field locations, upon request. Please give at least 3 days notice prior to planting to obtain assistance with proper tree location in native drainages. If properly located, these native trees and shrubs may be exempted from drip irrigation requirements.

1064.04 Seasons of Planting

Planting may occur whenever the soil conditions are favorable or as authorized by the Parks Superintendent or his designee. Optimum planting periods are from March 15 to June 15 and from September 1 to October 26. Dormant bare root native shrubs and trees, for planting in open space areas, must be installed while still dormant, from March 1- April 15th.

1064.05 Planting Procedures**Tree Planting Procedures**

Tree pits shall be excavated a minimum of two (2) times greater than the diameter of the root ball and shall be saucer shaped. The root flare shall be identified to assure that the hole has been dug to the proper depth—and no more. The planting pit shall be deep enough to allow for the root flare to remain two (2) inches higher than the surrounding finish grade.

If tree pits are dug utilizing mechanical equipment, edges of planting hole shall be flared down to create a saucer shaped planting pit and the sides of the hole shall be scored to prevent glazing or compaction of planting hole and potential obstruction of lateral root growth. Care shall be taken to assure that the holes are the proper depth.

When planting on a sloping site, the root flare shall be even with the grade on the up-dill side of the tree. Site soil will need to be added on the downhill side to cover the sides of the root ball and to construct the soil berm to hold water.

All containers shall be removed prior to backfilling. This includes any organic manufactured containers. If the root system of a container grown plant has become container-bound, the entire outer and bottom one (1) inch of the root system shall be shaved prior to planting. Vertically slicing the root system shall not be utilized as a substitution for root shaving.

The root ball shall be placed on firm, undisturbed soil in the planting pit to prevent settling.

Remove wire baskets in their entirety. Remove the bottom of the wire basket first, prior to setting in hole. Adjust the root ball into the planting pit to check for desired depth. All plants shall be set plumb and straight and in the center of the pits and faced for best effect. After the tree has been correctly positioned in the planting pit, remove the sides of the wire basket. All wire, burlap, twine, string, etc. shall be removed from the

Planting pit backfill mixture shall consist of two (2) parts of excavated native soil and one (1) part organic soil amendment. Organic amendments shall be as specified in Section 1062.02. Backfill mixture shall be thoroughly blended to homogeneous condition in specific area away from plant excavations.

Backfill the hole 1/3 full to thoroughly stabilize the lower part of the root ball at planting to keep the root ball from shifting. Fill the remainder of the hole by adding the soil a few inches at a time and settle with water. Continue this process until the hole is filled and the tree is firmly planted. The tree will be thoroughly watered to fill any voids and eliminate air pockets. Do not backfill over crown of the root ball.

All plant tags, flagging tape, labels, string, etc. shall be removed from the trunk and canopy.

Shrub Planting Procedures

Prior to the planting of Perennial or Groundcover plants, the Contractor will cultivate the area to be planted to a depth of six (6) inches so as to free the site of weeds. All stones, sticks, and debris brought to the surface over two (2) inches in diameter will be removed from the site. Prior to planting, the Contractor will uniformly apply the specified organic material at the rate of five (5) cubic yards per one thousand (1,000) square feet. And then incorporate both materials into the soil to a depth of six (6) inches with a disc, rototiller, or other suitable tilling equipment.

All containers shall be removed prior to backfilling. This includes any organic manufactured containers. If the root system of a container grown plant has become container-bound, the roots shall be cut vertically on a minimum of two sides of the root mass prior to planting.

All plant tags, flagging tape, labels, string, etc. shall be removed.

The contractor shall install Perennial or Groundcover plants taking note of required on-center spacing and required distances from edges. Plants will be planted within the amended soil, 1” (inch) above finished grade. A layer of weed barrier fabric will be installed, and three (3) inches of specified mulch will be placed over it. All seams in the fabric will overlap a minimum of twelve (12) inches. All perennial or groundcover beds will have a continuous layer of weed barrier fabric installed under the mulch. Landscape fabrics shall be as specified in Section 1062.03

The contractor shall insure that all Perennial or Groundcover beds are watered as necessary until establishment is achieved.

The diameter of all shrub planting pits shall be twelve (12) inches greater in diameter than the diameter of the container. Shrub pits shall be excavated so that the top of the ball shall be one (1) inch above finish grade.

1064.06 Staking and Guying

All deciduous and coniferous trees will be staked and guyed immediately after they are planted. The position of the stakes shall be oriented with regards to prevailing winds. Staking for deciduous trees must be done using two (2) six (6) foot steel T-posts driven perpendicular to the tree at 180 Degrees. Staking for coniferous trees must be done using three (3) two (2) foot steel T-posts driven at 120 Degrees. All stakes shall be driven outside of the root ball and in undisturbed soil. All exposed ends of T-posts shall be capped with vinyl/plastic T-post caps. Three (3) stakes in a triangle formation shall be used for coniferous trees, and two (2) stakes shall be used for deciduous trees. The tree will be guyed using a one and one-half (1½) inch wide nylon strap with eyelets in each end. Nylon straps shall be long enough to accommodate one and one-half (1½) inch of growth and buffer all branches from wire. A double strand of twelve (12) gauge galvanized wire will be used to connect the nylon strap to the steel tee post. Proper tension on the guy wires will be obtained by twisting the double strands of wire and shall be only tightened enough to prevent straps from slipping. Half (½) inch PVC sleeving shall be installed over tree guy wires for visibility and safety with a maximum of two (2) inches of exposed wire on each side. Large trees may require additional tree posts and guying. Stakes shall remain on deciduous trees for one (1) year and on coniferous trees for two (2) years. Contractor is responsible for periodically re-tensioning and the removal of tree stakes. Staking materials shall be as specified in Section 1062.06.

1064.07 Mulching**1064.07.01 Trees**

Upon completion of the planting operations, the Contractor will prepare tree pits and planter beds for mulch. All deciduous trees shall have a sod-free base at least four (4) feet in diameter and evergreens shall have a sod-free base extending to the drip line. The plant pits will have a four (4) inch high earth berm built around the tree to form a saucer. The diameter of the saucer will be two (2) feet greater than the ball diameter for deciduous trees and at the drip line for Evergreen trees. The high earth berm saucer shall remain on trees planted in non-irrigated areas and shall be removed and graded out from irrigated turf areas following two (2) thorough waterings. Mulch will be placed evenly in the saucer to the depth of three (3) inches and a minimum of four (4) feet in diameter. Mulch shall be placed two (2) inches from and not make contact with tree trunks. In specific cases, when approved by the Parks Superintendent or his designee, rock mulch may be substituted for the fibrous mulch. Mulch shall be as specified in Section 1062.01.

1064.07.02 Shrub Beds

In areas where plants are grouped into beds, or in areas where gravel, rock or wood mulch is to be used as a ground cover, the entire bed will be excavated to a depth of three (3) inches, a layer of weed barrier fabric will be installed, and three (3) inches of suitable ground cover, such as wood mulch or rock, will be placed over it. Different mulch types shall be separated by three-sixteenths (3/16) inch wide by six (6) inches deep green painted steel. All seams in the fabric will overlap a minimum of twelve (12) inches. Landscape fabric pins will be used a minimum of every three feet along the edge of the fabric as well as a minimum of three feet on center throughout the fabric. All

shrub beds will have a continuous layer of weed barrier fabric installed under the mulch. Landscape fabrics shall be as specified in Section 1062.03.

1064.08 Tree Wrapping

All deciduous trees shall be wrapped using an approved tree wrap as specified in Section 1062.05 and remain wrapped between November 1 and April 1. No wrapping will be permitted until the trees have been inspected by the Town. The trunks of all trees will be wrapped spirally from bottom to top, overlapping the seams and entirely covering the trunk from the ground up to the second branch. The tree wrap will be neat, snug and secured with vinyl electric tape at twenty-four (24) inch intervals or tape approved by the Town. Only approved four (4) inches wide tree wrap will be used. The contractor shall be responsible for repairing torn, loose or damaged tree wrap; defective or weathered tape; and removal of tree wrapping materials.

1064.09 Pruning

All pruning shall comply with ANSI A300 standards shall only be performed by an I.S.A. Certified Tree Worker of Arborist and shall be done with clean, sharp, sterile tools. Pruning shall be limited to the removal of dead, diseased, broken, and damaged limbs or twigs at the time of planting.

All necessary corrective pruning shall be performed after a full season of growth in the new location by a trained professional. All plant materials will be pruned to preserve its natural form and character and in a manner appropriate to its particular requirements. Pruning shall be the responsibility of the Contractor. Contractor shall remove and replace excessively pruned or malformed stock resulting from improper pruning.

1064.10 Fertilizing

Trees and shrubs shall not be fertilized during installation or for the first twelve (12) months following installation.

1068.00 Inspections

Inspections shall be completed in accordance with Section 1024.00, Inspections, of these STANDARDS AND SPECIFICATIONS. The Contractor must notify the Town for inspections of plant location staking, plant materials, and planting operations.

1068.01 Plant Location Staking

The Town will inspect the plant location stakings prior to the installation of any plant materials as specified in Section 1064.01, Location Staking, of these STANDARDS AND SPECIFICATIONS.

1068.02 Quantity and Quality of Plant Material

The Town will inspect the plant material following their delivery to the site and prior to the planting on the site. The Town reserves the right to reject any plant not meeting the accepted design requirements for size, shape, form and conditions at that time..

All new and replacement plant materials require inspection and shall be tagged by the Parks Superintendent or his designee for all Town of Erie maintained areas prior to planting. Contact appropriate Town of Erie staff to arrange for materials to be tagged.

Substitutions – Any changes in species and plant locations shall be submitted to Town of Erie inspectors for review and approval. Overall quality and design concept to be consistent with approved landscape plan.

1068.03 Planting Operations

The Town will inspect the planting operations, including digging, planting, pruning, wrapping, fertilizing and mulching.

1069.00 Maintenance

1069.01 Pruning

All tree pruning shall comply with ANSI A300 standards and shall only be performed by an I.S.A. Certified Tree Worker or Arborist. Contractor shall remove and replace excessively pruned or malformed stock resulting from improper pruning. All necessary corrective pruning shall be performed after a full season of growth in the new location. All plant materials will be pruned to preserve its natural form and character and in a manner appropriate to its particular requirements. All plant material shall be kept maintained free of dead, diseased, broken and damaged limbs or wigs. Pruning shall be the responsibility of the contractor.

1069.02 Replacements

All replacement plant materials shall be the responsibility of the contractor until final acceptance has been granted. Refer to Quantity and Quality of Plant Material (sec. 1068.02)

Replacement of plant materials shall occur at the following rate:

Type	1 Year	2 Years
Deciduous Tree	Increase caliper by one (1) inch	Increase caliper by one and one-half (1 ½) Inch
Evergreen Tree	Increase height by one and one-half (1 ½) foot	Increase height by two(2) feet

1069.03 Tree Wrap

All deciduous trees shall be wrapped using an approved tree wrap with vinyl electric tape at twenty-four (24) inch intervals and shall remain wrapped between November 1 and April 1. The contractor shall be responsible for repairing torn, loose or damaged tree wrap; defective or weathered tape and removal of tree wrapping materials. Refer to Tree Wrap (sec. 1064.08)

1069.04 Fertilization

Trees and shrubs shall not be fertilized during installation or for the first twelve (12) months following installation.

1069.05 Watering

The contractor shall ensure that all plant materials are watered as necessary until final acceptance has been granted.

All plant materials shall be given supplemental water as required throughout the winter months.

1069.06 Staking

All deciduous trees shall be staked for twelve (12) months and evergreen trees for twenty –four (24) months. Contractor is responsible for periodically re-tensioning and the removal of tree stakes throughout this period. Refer to Staking and Guying (sec 1064.06)

1069.07 Weeding

All tree wells, shrub and perennial beds, and areas where gravel, rock or wood mulch is to be used as a ground cover shall be kept free of grass, weeds and other contaminates until final acceptance has been granted.

1070.00 RECREATION EQUIPMENT

1071.00 General

Selection of recreation equipment must be approved by the Director of Parks and Recreation prior to purchase by the Contractor. In selecting equipment, the brand, style, color, size and other criteria will be considered and jointly selected by the Contractor and the Town. All installations of equipment will be done by the Contractor.

1072.00 Ballfield Specifications

Adequate drainage must be taken into account in ballfield designs. Infield slopes will be between one and one half (1½) percent and two (2) percent. Outfield slopes will be between one and one half (1½) percent and two and one (2½) half percent.

Subsurface drainage will be required to provide adequate drainage as needed.

1072.01 Softball Infield

Infields will be cut on a seventy (70) foot arc from the back center of the pitching plate. Home plate will be twenty-five (25) feet from the backstop, and the foul line will be twenty-five (25) feet from wing fences. The pitching plate will be located fifty (50) feet from the back point of home plate.

1072.02 Baseball Infield

Infields will be cut on an eighty (80) foot arc from the back center of the pitching plate. Home plate will be thirty-five (35) feet from the backstop with foul lines thirty-five (35) feet from wing fences. The pitching plate will be located fifty (50) feet from the back point of home plate.

1072.03 Field Composition

The infield area will be excavated eight (8) inches below grade and eight (8) inches of suitable infield mixture (Golf & Sport Solutions infield mix), consisting of approximately eighty-five (85) percent sand and fifteen (15) percent clay, will be installed, leveled, and compacted to a firm, smooth surface. All mixtures will be approved by the -Director of Parks & Recreation prior to installation.

1073.00 Playground Equipment

1073.01 Proposal Submittals

The manufacturer’s representative shall provide the following items and information to the Town with each playground proposal:

- A. Complete three-dimensional drawings of equipment.
- B. Individual components specifications and schematic drawings of the play system.
- C. A minimum of three (3) references for similar work recently completed to the Town. Each reference shall include a brief summary of work completed, location, the owner’s representative name and phone number.
- D. A schedule of work that includes the time it will take to order and receive the play equipment and the time it will take to install once the play equipment is delivered.

- E.
 - E.1. Playground installer must provide documentation of current NPSI Certified Playground Safety Inspector (CPSI) certification.
 - E.2. Playground installer must provide documentation of current certification in playground construction by either a) NPCAI Playground Construction School and/or b) by the selected equipment manufacturer.
- F. A letter from the manufacturer stating that the playground equipment will meet or exceed the latest CPSC Guidelines and the ASTM F- 1487-07ae1 Standards. Letters from the manufacturers must reference the model number or drawing numbers of each unit.
- G. Copies of warranty information for play equipment to the Town. Warranties shall include minimum: ten (10) years on posts and decks; five (5) years on plastic; ten (10) years on clamps, and one (1) year on all other parts.

1073.02 Safety and ADA Requirements

The safety surface shall be an ADAAG approved surface for accessing the transfer point. Color of the surface to be approved by the Town.

All play equipment must meet or exceed the latest CPSC Handbook for public Playground Safety Guidelines. All play equipment and the protective ground space area around the equipment must meet or exceed ASTM F – 1951-99 Standard Specification for Determination of Accessibility of Surface Systems under and around Playground Equipment.

All play equipment must comply with the current ADAAG law using ASTM F- 1487 -07ae1 standards. This can be accomplished either by a safety surface or a ramp system as determined by the Town. The safety surface shall be an ADAAG approved surface for accessing the transfer point. Color of the surface to be approved by the Town.

1073.03 Protective Ground Space Area

The play system layout for each site shall include a safety surface area surrounded by a protective barrier. The Protective Surfacing within the use zone of each play structure in accordance with the Specification ASTM F – 1292 – 04 Appropriate for the Fall Height of each Structure and Specification ASTM F – 1951 – 99 where applicable. A sub-surface drainage system shall be installed under each protective surface area. The design of the drainage system to be approved by the Town Engineer.

The composition of the barrier for protective ground space area shall be approved by the Town.

1073.04 Component Requirements

All protective barriers, handrails, and guard rails shall meet requirements of ASTM F – 1487 – 07ae1.

Upper body equipment shall meet requirements of ASTM F – 1487 – 07ae1.

All equipment shall come with an structural integrity test results from the manufacturer.

Platforms, Landings, Walkways, Ramps, and similar Transitional Play surfaces shall meet requirements of ASTM F – 1487 – 07ae1.

The following requirements for equipment components apply:

- A. Slides must be double walled except for tube slides.
- B. Upper body equipment shall meet requirements of ASTM F – 1487 – 07ae1.
- C. Upper body climbers shall have end step ladders excluding overhead flyers. All equipment shall come with a structural integrity test results from the manufacturer.
- D. Components of the play system(s) for specific sites shall be approved by the Town. Each play system shall include and not be limited to: roofs, climbers, slides, bridges, ladders, arches, overheads, play panels, transfer points, decks, barriers, guard rails, protective barriers, and swings.
- E. Playground decks will be a minimum of forty-seven (47) inches square. The maximum opening of holes in the deck surface will be one-quarter ($\frac{1}{4}$) inches.
- F. Component colors must be approved by the Town.

1073.05 Materials

- A. No wooden structures will be considered by the Town of Erie.
- B. All Platforms, Landings, Walkways, Ramps, Protective Barriers, Guardrails, and Transitional Play surfaces shall be PVC coated.
- C. No metal slides will be accepted by the Town of Erie.
- D. All playground equipment shall be manufactured and constructed only of materials that have a demonstrated durability in the playground or similar outdoor setting. All plastics and other materials that experience ultraviolet (UV) degradation shall be protected against (UV). All paints or other similar finishes shall comply with 16 CFR Part 1303.
- E. No log rolls will be accepted by the Town of Erie.
- F. For applications of (poured in place) surfacing within the Town of Erie. The installer shall provide a 5 gallon bucket of Binder material, and a minimum of 25 pounds of color matching loose fill material for jobs of repair.

1073.06 Installation and Inspection

A company representative along with a Department of Parks & Recreation Designee, CPSI certified, is required to conduct a post installation inspection. Proper installation of play equipment, protective surfacing, and other structures as it relates to compliance will be verified during this process.

If any non-compliance issues are identified during this process these issues must be addressed and appropriate action taken, by the company, to bring items into compliance. Once these items are brought into compliance another inspection walk with a Department of Parks & Recreation designee must be requested by the company per Town Standards and Specifications, in order to verify compliance.

1080.00 TRAILS, WALKWAYS AND MAINTENANCE PATHS

1081.00 Concrete Trails, Walkways and Maintenance Paths

All sidewalks and maintenance paths within the parks, open space, or greenbelts, which could be utilized by the general public for conveyance, will be a minimum of eight (8) feet wide and six (6) inches thick concrete and shall have fiber mesh included in the mix. The concrete shall have minimum twenty-eight (28) day compression strength of four thousand (4,000) pounds and shall meet all applicable requirements of Section 400.00, Concrete Work, of these STANDARDS AND SPECIFICATIONS.

1082.00 Soft Trails

Soft trails will conform in accordance with the Standard Drawings unless otherwise approved by the Director of Parks & Recreation.

1083.00 Trail Specifications

1083.01 Location of Trails

To the extent possible, trails should be located, configured and set back from natural creeks or bodies of water so that recreation use will not significantly impact native plant and animal habitat.

1083.02 Alignment of Trails

Trails should be generally sinuous in nature, avoiding overlong and straight runs greater than 300 feet.

1083.03 Width of Trail Corridor

Spaces used to accommodate trails should be generally no less than three (3) times the width of the trail and shall accommodate development of Americans with Disabilities Act (ADA) compliant trails.

1084.00 Types of Trails

1084.01 Spine Trail

Spine trails consist of a wide concrete trail with an attached crusher fine trail.

- A. Concrete width - 8' to 10' wide section, 10' for regional transportation trails.
 - A.1. Shoulders maximum slope 1:6.
 - A.2. Slope across travel surface not to exceed 2%.
- B. Soft surface width – 4' crusher fines with geo textile fabric underlayment.
 - B.1. Shoulders minimum width 2', 6' preferred.
 - B.2. Slope along the direction of travel not to exceed 5%.
- C. All spine trails must meet ADA standards.
- D. Minimum trail corridor width 30 – 40' or greater preferred.
- E. Trails shall be designed to minimize crossings of streets and other hazards.
- F. On grade street crossings will be clearly marked with signage and cross-walks. Must conform to American Association of State Highway & Transportation Officials (AASHTO) Standards.
- G. Stop signs shall be installed at all street crossings.
- H. Prefer on grade street crossings at intersections rather than mid-block.
- I. Trails shall be located away from nuisance areas such as oil and gas facilities, dangerous ditches, steep slopes and mining areas that include tailings and shafts.
- J. Minimum overhead clearance shall be 12'.
- K. Spine trails shall be designed to accommodate maintenance vehicles such as pick up trucks and utility vehicles for routine all weather maintenance.
- L. Locate spine trails in open space areas whenever possible.
- M. Avoid locations which impact native plant and animal habitat.
- O. Where the path is located next to a steep drop off or embankment a 5' separation between the trail and top or bottom of embankment is required.
- P. Minimum turning radius for 20 mph trails shall be 100 ft, 25 mph trails 156 ft, 30 mph trails 225 ft. In cases where substandard curve radius are unavoidable curve warning signs and centerline striping shall be used.

- Q. Stormwater and drainage control shall be installed to prevent standing water, soil accumulation, moss and algae on trail surface.
- R. Adequate sight distance at curves and intersections must be maintained. Must conform to AASHTO Standards.
- S. General design speed of 20 mph should be used for all spine trails.
- T. Follow AASHTO Guide for the Development of Bicycle Facilities.

1084.02 Local Trails

- A. Local trail width equals the width of the spine trail to which it connects.
- B. At no time will the width of a local trail be less than 6'.
- C. Slope across trail not to exceed 2%.
- D. Slopes along direction of travel not to exceed 5%.
- E. Trails should be located away from nuisance areas.
- F. All local trails must meet ADA Standards.
- G. Whenever possible local trails shall be designed to accommodate maintenance vehicles.
- H. Adjacent slopes, grades and separations shall comply with those described under Spine Trails (section 1084.01).
- I. Minimum overhead clearance shall be 10-12'.

1084.03 Primitive Trails

- A. Primitive trails shall be located away from steep slopes, sensitive habitat and natural areas and nuisance areas.
- B. Minimum width shall be no less than 4'.
- C. Primitive trails shall consist of stabilized crusher fines with geo textile fabric underlayment.
- D. Erosion control components shall be installed at appropriate locations.
- E. Adjacent slopes, grades and separations shall comply with those described under Spine Trails (section 1084.01)
- F. Minimum overhead clearance shall be 10'.

- 1084.04 Trailheads
- A. Trailheads shall be provided where primary trail routes converge and where access from street to parking is convenient.
 - B. Adequate number of parking spaces is required based upon projected use of trailhead.
 - C. Adequate location and informational signage is required at trailhead, including trail name and map, ordinances. Signage must comply with Town of Erie sign specifications and include town logo.
 - D. Trash containers shall be provided, number based upon projected use. Containers must have hinged doors, be anchored, expanded metal, and covered to exclude animals.
 - E. Benches and tables shall be provided based on projected use. 6' expanded metal and surface mounted on concrete pad.
 - F. Amenities shall be selected for durability and vandal resistance, consistency of color, material and form.
 - G. Portable restrooms in a permanent enclosure may be install as appropriate. MZI enclosures or approved equivalent.
- 1084.05 Waysides
- A. Located every ½ mile.
 - B. Will include 6' benches or tables of expanded metal which shall be surface mounted on concrete pad. Tables should be ADA accessible.
 - C. Adequate number of seating elements based on projected trail use.
- 1084.06 Bridges
- A. Bridges shall be of steel construction.
 - B. Bridges shall have a minimum width of 8'.
 - C. Must accommodate load weight of maintenance vehicles to AASHTO Standards.
 - D. Concrete floors are preferred.

