Design & Construction Standards Manual

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INTRODUCTION

Public parks are a reflection of a community's values and quality of life. Successfully designed parks build connections between residents of all social, economic, and cultural backgrounds. They can help promote healthy lifestyles, encourage positive social interaction, and promote economic growth. In short, great parks make great communities.

Since 1958, the Cordova Recreation and Park District has been working to protect and maintain a park system that connects people and neighborhoods throughout the District. This Design Standards & Construction Manual is intended for Designers, Developers, Contractors, and Consultants as they work on District Projects. The manual is not intended to limit creativity or innovation, but rather to ensure a certain level of quality is maintained throughout District sites.

During the design process, reference should also be made to the District's Master Plan, Preliminary District-Wide Facilities Distribution Plan, the County of Sacramento Standard Construction Specifications (most recent edition), and the City of Rancho Cordova Design and Construction Standards.

These standards do not replace other applicable codes or publications, such as the latest editions of the State of California Department of Transportation (Cal Trans) Standard Specifications, California Building Code, 2010 ADA Standards for Accessible Design, or other regulatory agency requirements.

The protection of public health, safety, and welfare shall be the overriding factor in the application of required standards. In the case of conflict between these standards and the codes described above, the stricter of the two shall apply.

The District shall retain approval authority for all design, engineering, and construction projects. Designers and builders will enter into an agreement with the Cordova Recreation and Park District before any planning, design, or construction work commences.

TABLE OF CONTENTS

DRAWING DETAIL INDEX

1. CONTACT INFORMATION

Cordova Recreation and Park District
Park Planning and Design Development Department
2729 Prospect Park Drive – Suite 230, Rancho Cordova, CA 95670
Telephone: (916) 842-3300
www.crpd.com

Contact the Cordova Recreation & Park District for questions, reviews, approvals, or inspections.

Division	Phone Number	Email
CORDOVA RECREATION & PARK DISTRICT		
Main Office	Office: (916) 842-3300	customerservice@crpd.com
General Manager, Patrick Larkin	Office: (916) 842-3300	plarkin@crpd.com
Director of Parks & Recreation, Jill Nunes	Office: (916) 842-3316	jnunes@crpd.com
Park Planning Manager, Laura Taylor	Office: (916) 842-3319	ltaylor@crpd.com
Construction Inspector, John Biundo	Office: (916) 769-9776 (Call 48 prior to request an inspection)	jbiundo@crpd.com
Landscape Architect, Cristina James	Office: (916) 842-3312	cjames@crpd.com
Planning Administrative Assistant, Andrew Saltmarsh	Office: (916) 842-3317	asaltmarsh@crpd.com
Parks Superintendent, Jim Morales	Office: (916) 363-0350	jmorales@crpd.com
CITY OF RANCHO CORDOVA		
Planning Department	Office: (916) 851-8700	esparkman@cityofranchocordova.org
Public Works	Office: (916) 851-8700	astricker@cityofranchocordova.org
COUNTY OF SACRAMENTO		
Municipal Services Agency (Public Works)	Office: (916) 874-5833	
Transportation Department	Office: (916) 874-6291	
Sewer – CSD-I	Office: (916) 876-6013	
Drainage	Office: (916) 874-6851	
REGIONAL WATER		
County of Sacramento	Office: (916) 874-6851	kernj@saccounty.net
Cal American Water	Office: (916) 568-4251	infoca@amwater.com
Golden State Water	Office: (800) 999-4033	customerservice@gswater.com
SACRAMENTO METRO FIRE	Office: (916) 859-4300	communityservices@metrofire.ca.gov
Underground Service Alert (U.S.A.)	Office: (800) 227-2600	
SMUD	Office: (916)732-5066	

2. PROCESS FOR DEVELOPER TURN-KEY PARK PROJECTS

Step	The Developer shall…	The District shall…
1	Contact Park Planning & Development Manager to set up a meeting to review project and process. Include the proposed construction budget, schedule for design, construction document preparation, and project construction. These items will be reviewed for compliance with the project's Park Development Agreement (PDA).	Meet with the Developer to review the project including process, construction budget, and schedule. District shall generate a project file for copies of the plans, specifications, permits, change orders, and all other project documentation both electronically and hard copy.
2	Generate a construction and/or reimbursement agreement between the District and the Developer(s). This may already be covered in PDA.	Provide input and assistance toward the creation of the construction and/or reimbursement agreement. Submit to District Board for approval.
3	Hire a qualified Landscape Architect.	Review the proposed Landscape Architect for approval.
4	Obtain a copy of the District Design Standards & Construction Manual for use by the Consultant, and Standard Construction Specifications from the County of Sacramento or Design and Construction Standards from the City of Rancho Cordova.	Provide a copy of the District Design & Construction Standards Manual to the Developer and Developer's Representative.
5	Submit to the District a Conceptual Master Plan and an estimate of probable costs based on the approved specific plan concept, for review and input by the District.	Review and provide input on the Conceptual Master Plan.
6	Revise the submitted plan based on District input for completion of the Final Master Plan. Submit a colored and laminated 24" x 36" rendering, a high resolution .pdf copy, and a revised estimate of probable costs in Excel (Windows format) compatible version.	Upon receipt of the Final Master Plan, submit proposed plan to District Board for approval in concept.
7	Based on the Final Master Plan, developer will provide required permits and environmental clearances for the project.	
8	Submit Final Master Plan with approved environmental documentation and Final Cost Estimate to District for final approval by District Board of Directors.	Submit the Final Master Plan, Final Cost Estimate and environmental documentation to the District Board for approval.
9	Provide construction documentation based on the Park Design Standards, applicable Standard Details, and applicable Standard Construction Specifications. Submit to the District at 30%, 50%, 95% and 100% completion.	Review the construction documents at 30%, 50%, 95%, and 100% completion. Coordinate and forward all review comments to the Developer's Landscape Architect for final incorporation into documents.

10	Revise and resubmit the construction documents to address District comments. Provide 100% completed construction documents to the District. Provide written responses to each District comment indicating where in the documents the response to the comment is located. Submit a Final Cost Estimate. Contractor shall submit to the District an electronic file of the approved construction document package in .dwg 2007 - 2010 compatible and .pdf.	Provide approval signatures for the final bid documents.
11	Obtain all applicable permits, including, but not limited to, grading, drainage, encroachment, irrigation, splash pad areas, ADA, tree permits, and all other permits as required by the County, City of Rancho Cordova, or other regulatory agencies. Submit copies of permits to District.	Retain permit copies in project file.
12	Upon receipt of a fully executed cover sheet and set of approved plans, obtain bids for the construction of the project, and provide the District with the results of the bid. Make recommendations for selection of the Contractor. Contractor must have an appropriate valid California A General Contractor's License for the work and have experience building parks. Contractor shall provide portfolio of at least three projects that are similar in scope and size to the proposed project.	Provide a list of acceptable Contractors from which the Developer can choose the project Contractor. The Developer may submit alternative recommendations for District consideration. A representative of the District shall attend the bid opening and pre-bid meetings.
13	Upon District approval, proceed with the construction of the project. Notify the District's Construction Manager of the pre-construction meeting and submit a preliminary construction schedule at that time.	Participate in the pre-construction meeting and ongoing inspections as required. District shall make inspections per the Construction Inspection Checklist.
14	Provide a qualified professional liaison (i.e. Landscape Architect). The liaison shall be actively engaged throughout the entire progress of the project to monitor and communicate with the District during the progress of construction and any changes which may need to be considered. This shall include the review of any submittals or other changes. The Developer shall ensure the District receives a copy of all submittals for review and approval. Developer will organize and attend weekly meetings at the construction site to review any changes or modifications to the project. The meeting shall include the liaison, Primary contractor, and District Construction Manager at a minimum.	Participate in the on-site review, submittal reviews, and inspection of construction progress. Attend routine construction meetings. The Developer shall provide testing results to the District.

15	Verify punch list completion. Obtain and submit certification by Landscape Architect and District Construction Manager that park is built according to plans and specifications. Contractor shall meet or exceed all pre-arranged timelines established in the preconstruction meeting and as documented in the project scheduling.	Participate in the intermittent and Final inspections.
16	Submit the appropriate documentation for the deeding of the improved park property to the District for recordation. Provide as-built documents, all account information for relevant utilities, and maintenance plan.	Transfer utility accounts and accept the project upon completion of all items. The formal dedication by the developer is dependent upon the satisfactory completion of the project including the maintenance period, receipt of as-builts, warranties, equipment manuals, and manufacturer instructions, and maintenance plan.
17	The maintenance period shall commence in conjunction with the substantial completion walk-through. The Developer shall complete the maintenance period (typically 90 days). After maintenance period is complete, the Developer shall provide all deeds and preliminary title report to the District. The Developer shall provide proof of all utility bills paid.	Upon completion of the maintenance period and receipt of all clean title documents, the District will bring the property before the Board for approval. Upon Board approval, all documents are brought to the County Recorder's Office by the District to file. On the day that the documents are recorded the property belongs to the District and the District's insurance activates. The District shall inform appropriate utility providers of the change in ownership. The public may occupy the site after the property is recorded.

3. EXAMPLE PROJECT SCHEDULE

The District shall be provided with a project schedule. The schedule shall be critical path method format and produced in Excel, Project, or other scheduling software. Schedules may vary from the template below depending on the project. This is intended for use by Consultants as a guideline only.

TASK	TIMEFRAME
Conceptual Design Phase	
Site Survey	(Varies, 2 weeks typ.)
Geotechnical Report	(Varies, 2 weeks typ.)
Consultant Prepares Conceptual Plans	(Varies)
District Reviews Conceptual Plans	(Varies)
For Projects within the City of Rancho Cordova:	
Consultant Presents Project at Development Services Team (DST)	1 day
Design Development Phase	
Consultant Prepares Design Development Drawings	Varies
District Reviews Design Development Drawings	2 weeks min.
Construction Document Phase (30%, 50%, 90%)	
Consultant Prepares Construction Documents	Varies
Consultant Submits Plans to District	1 day
District Reviews Construction Documents	4 weeks min.
Consultant Prepares 90% Construction Documents	Varies
Consultant Submits Plans to District and Land Authority	1 day
Consultant Prepares 100% Construction Documents	Varies
Consultant Submits Plans to District and Land Authority	1 day
Consultant Prepares Bid Set	Varies
Project Bidding	6 weeks min.
Construction Administration	Varies

Community Meetings and Outreach

This phase varies widely in scope and schedule depending on the project and existing community. It is more applicable to community park design projects rather than turn-key park development.

4. CONSTRUCTION INSPECTION CHECKLIST

Pre-construction Meeting
Verify approved plans
Verify submittals
Coordinate inspection process

Grading
Verify staking is consistent with elevations on plans

Sleeving
Verify sleeving location, depth, type, and size
Verify permanent marking system in place

Hardscape Site Amenities
Play equipment
Play equipment certification
Fencing, type, height, material
Flatwork, curbs, mow strips

Mainline
Mainline depth, type, marking, and size
Mainline connections, thrust blocks
Hydrostatic test (150 psi for 24 hours)
Verify manifold; meter, BF, MV, FS,

Backflow Preventer
Verify backflow Certification by others
Verify type, size, and location
Verify thrust blocks, hot rock cover, and pad

Booster Pump (as needed)
Location, enclosure
Installation, power connected, certification

Irrigation (Open Trench)
Verify lateral line depth, size, type
Lateral line pressure test
Verify head type, spacing, Swing joints
Wiring for size, depth, color (min 14 gage)

Irrigation (General)
Verify box supports, markings, valve I.D. tags
Wire connections, Reclaimed I.D.

Controller, type, stations, location, enclosure
installation, power, certification
Water Audit

Planting
Review & approve planting soil and agronomics soil test
Verify finish grade
Verify soil preparation and amendments
Verify plant species, size, quality, quantities, location
Planting layout, plant depth, tree staking
Final raking
Mulch installation
Turf installation
Hydro seed germination

Hardscape Site Amenities
Site furnishings
Signage installed

Final Acceptance
Turn over items, guarantees, warrantees
Warranty Letter
Letter of Substantial Completion
Certificate of Occupancy

Maintenance
Compliance to begin maintenance
Turn over controller charts, as-builts
30-day walk-through
60-day walk-through
90-day final walk-through

The District Inspector shall be notified 48 hours prior to backfilling of any utility or irrigation trenches.

The District Inspector shall be notified 48 hours prior to any concrete pour for inspection and approval of rebar placement.

SPECIAL TESTING AND INSPECTION IS REQUIRED FOR:

- Structural Concrete (high-strength)
- Structural Bolts (high-strength)
- Structural Steel Welding
- Any other building or development permit required STI

SECTION 1 - DESIGN STANDARDS

1.01 Purpose of the Standards

The purpose of these standards is to ensure that parks are designed to fit their context, to be unique, and to function effectively in connecting community members to one another and their environment. These standards are to be used by consultants, both in-house as well as those hired by others, during design development. These specific standards also contain conceptual guidance for improved park design. The proposed park improvements shall include the program elements outlined in the District Board approved Master Plan. As this section only provides general design criteria, the Landscape Architect shall refer to other sections to determine acceptable products, materials, the construction standards by which they shall be installed, and maintenance requirements.

1.02 Design Adjacent to Streets

These standards serve to strengthen aspects of the physical layout, function, and overall character of the District's streetscapes as they are experienced by residents and visitors who use the park system. The standards encourage the expression of functional land use distinctions through changes in the visual character of street components. For example, formal street tree planting should be used in residential areas whereas the planting of open spaces and riparian corridors should enhance and respect adjacent natural features.

The following design concepts are intended to promote these goals:

A. Foster a recognizable character for communities.

B. Emphasize entries and exits, including those that are gated.

C. Respond to the natural and cultural structure of the community.

D. Transitions between the park and road shall be well-designed and have a welcoming expression.

E. Plant native oaks where appropriate.

F. Use street trees to create a sense of spatial enclosure at the street edge.

G. Encourage visibility of public areas.

H. Use natural-looking elements, such as stone or split face CMU wall and on hillside retaining walls, etc.

I. Utilize a plant palette that conserves water per the approved plant list in Section 12 (pg. 72) or as approved by District Park Planning & Development Manager.

1.03 Additional Design Standards

All designs for District facilities shall comply with any and all applicable Local, State, and Federal laws and building codes.

1.04 Submittal Requirements

All plans shall be prepared by the appropriate licensed professional.

Construction Documents:

A. Submit two (2) sets of paper plans, one (1) set of digital plans (.pdfs), and any additional sets requested by the District.

B. Plans shall include the signature and license or certification number of the design professional that prepared the plans.

C. Plans shall be submitted on uniform size sheets, 24"x 36" overall dimension.

D. The scales for various portions of the drawings and the north point, where applicable, shall be shown on all sheets.

E. All printing or lettering on the plans shall be of 1/8" minimum height and be readily legible on prints and microfilm reproductions.

1.05 Submittal of Park Plans

If District Planning Department approval is required for a project (i.e., design review, use permit, or planned development), a construction drawing package submittal is required.

For Development Reviews of turnkey parks, landscape corridors, or other Developer projects related to District lands, an application and initial drawing review fee is required from the developer. For internal projects where the District is the property owner and has retained a Consultant, no application is required for drawing review.

1.06 Level of Service Standards

Consultants shall refer to the approved Master Plan which describes District Level of Service Standards.

SECTION 2 – GRADING

2.00 General Standards

A. Consider functional effectiveness, ease and cost of long-term maintenance, aesthetics, and traffic safety when grading.

B. Accommodate proposed and existing utility vaults. In cases where walls around vaults are unavoidable, walls shall be masonry or concrete.

C. Meet existing elevations at property lines while providing proper drainage.

D. Minimum slope of turf areas is 2%. Maximum slope is 6:1 (17%), unless otherwise approved by District.

E. Maximum slope of shrub areas shall be 3:1 (33%).

F. Crown playing fields such as baseball and softball at 1.5%. Informal playing fields shall be sloped at 2%.

G. Soccer fields shall be graded with a level crown down the centerline and a slope to the touch line of 1.5%.

H. Provide adequate level areas for spectator seating on at least two sides of playing field and/or behind backstops.

I. All native grass and planting areas shall provide positive storm water drainage.

J. Drainage on all asphalt and concrete surfaces shall be directed to catch basins, the storm drain system, bioswales, or detention facilities.

K. Cross slope on all walkways shall not exceed 2%.

L. Minimum slope on paved surfaces shall be .5% (i.e., under pavilions).

M. Longitudinal grades on pathways shall be less than 5% maximum.

N. Ensure compliance with the most current update of the Americans with Disabilities Act (ADA) and the California Building Code (most current edition).

O. Minimize the need for handrails whenever possible.

P. Hard court surfaces shall be graded at minimum of 1% perpendicular to the long axis.

Q. Comply with County of Sacramento and City of Rancho Cordova Oak & Heritage Tree Ordinance – as applicable.

R. Trails and bikeways inside park properties shall be constructed per District standards (see CRPD Design Details).

2.01 Park Site Criteria

For all Developer owned future park land, the Developer shall deliver to the District a site suitable for park development. The park site must meet **all** the following criteria to be deemed "suitable":

A. All utilities must be stubbed out at boundary of property (electrical, water, storm drainage, sewer).

B. Improvements of street frontage (curb, gutter, sidewalk, and landscaping within ROW) must be provided.

C. Site shall not have been used as a staging area, to stock pile material or as a disposal site during construction unless approved in writing by the District.

D. Site shall be generally level and free of erosion or drainage issues.

E. Geotechnical Engineering Report prepared for site development of parks shall include borings/test pits on park sites and discussion/recommendations relative to park development.

1. A minimum of two (2) borings/test pits shall be performed for each park. The final number of borings/test pits will depend on the size of the park, but there shall be at least one boring/test pit for every two acres of park, or portion thereof.
2. Borings/test pits shall extend to a minimum depth of five (5') feet for sites with five (5') or less of topographic relief and up to ten (10') for sites with greater than five (5') of topographic relief.
3. Soil samples shall be collected and tested for gradation (grain-size), and expansive characteristics. Results of the laboratory testing shall be included in the Geotechnical Engineering Report.

F. At the completion of rough grading, each park site shall contain a volume of landscape soil sufficient to provide at least twelve (12") inches of soil over the entire park acreage (approximately 1600 cubic yards per acre). Soil may consist of natural undisturbed native soils, stockpiled soil from other areas of the development, or approved import.

G. Suitable landscape soils are defined as meeting the following physical characteristics:

1. Soils shall be relatively uniform in texture (uniformly graded) and meet the following gradation requirements:
   ---maximum rock size of three (3") inches;
   ---at least ninety percent (90%) shall pass a ¾" sieve;
   ---at least eighty percent (80%) shall pass a No. 4 sieve; and
   ---at least forty percent (40%) shall pass a No. 200 sieve.
2. The Expansion Index (EI) of the soil shall be fifty (50) or less
3. Native or import soils shall not contain any significant rubble and debris and be free of any known contaminants.

H. The fully developed park site soil shall meet the following minimum standards within the first 12" or as modified by soil test and fertility recommendations determined by testing:

CHEMISTRY

Reaction (pH) saturated paste	**6.0-7.6**
Salinity (ECe dS/m) saturation extract	**<3.0**
Sodium adsorption ratio (SAR)	**<6.0**
Boron in saturation extract, ppm	**<1.0**

TEXTURE

Particle Size Passing	**USDA Sieve Size (mm)**	**Objective – Percent**
Gravel	**No. ¾" Sieve**	**>100%**
Coarse sands	**No. 4**	**>80%**
Silt plus clay	**No. 200**	**<40%**

***Use Hydrometer method**

Verification for conformance with topsoil parameters shall be provided via a fertility, agricultural suitability, and partial size soil test.

2.02 Definition of Contractor

The term "Contractor" is used in its broadest sense within this section. The Contractor may be a Developer/Contractor installing public improvements to be turned over to the District for maintenance, the District Park Services Department, or Construction Contractors hired on contract by the District.

2.03 Scope of Work

A. The Contractor shall perform all soil preparation work including, but not limited to:

1. Topsoil placement.
2. Organic amendment.
3. Fertilizer placement.
4. Finish grading.

B. The work shall include the provision of all labor, materials, equipment and apparatus not specifically mentioned herein or noted on the Reviewed Plans, but which are incidental and necessary to complete the work specified.

2.04 Quality Control

A. CODES AND STANDARDS:

All construction shall comply with any applicable standards and current and applicable Local, State, and Federal ordinances and Building Codes.

B. SAFETY:

1. All work shall be performed in a safe manner and shall meet or exceed the safety standards established under the Federal Occupational Safety and Health Act (OSHA) and its most current amendments.

2. Barricades, guards, warning signs, and lights shall be erected and maintained as required by OSHA regulations, the Property Owner, or by the District for the protection of the public and workers.

3. Where work infringes upon the public right-of-way, traffic control plans shall be submitted and encroachment permits obtained from the local land authority.

C. PERSONNEL:

1. The Contractor shall possess all proper and current licenses, certificates, permits, and/or registrations required to perform the scope of services.

2. The Contractor shall employ at least one qualified supervisor familiar with the products and requirements of this section. The supervisor shall always be present at the project when work is being performed. The supervisor shall have full authority to act on behalf of the Contractor.

3. The Contractor shall employ workers familiar with the products and requirements of this section.

D. SITE PROTECTION:

1. The Contractor shall incur all expenses to repair or replace any damage to existing improvements such as buildings, equipment, irrigation systems,

piping, sewers, sidewalks, or landscaping caused during activities related to the scope of work in this section. Repairs and replacements must be done in a manner and to a quality level satisfactory to the Owner and District within a reasonable timeframe as determined by the District.

2. The Contractor shall exercise extreme care when excavating and working near existing utilities. The Contractor is responsible for correcting any damage to existing utilities for which the Contractor's operation is either the direct or indirect cause. The Contractor is required to call **Underground Service Alert (USA) at (800) 227-2600** for marking of underground utilities prior to excavating.

2.05 Submittals

The Contractor shall provide the soil analysis report and written certificates stating quantity, type, composition, weight, and origin for all amendments. Chemicals shall be approved by the District before the material is used on the site.

2.06 Soil Testing (see Section 2.01 for more information)

A. The Contractor shall provide two (2) one-quart samples to a District-recognized testing laboratory, for testing for conformance to this specification.

   1. Sample one shall be from the proposed import topsoil
   2. Sample two shall be from the proposed planting area.

B. For areas larger than 100,000 square feet, one additional sample shall be analyzed for each additional 50,000 square feet of landscaped area.

C. If the total length of the landscaped area, measured longitudinally, exceeds 2,500 linear feet (i.e. for median island strips or backing lot treatments), one representative composite sample shall be analyzed for each 2,500 linear feet segment.

D. For multiple, discontinuous landscaped areas within one project, one representative composite shall be analyzed for each distinct area, if the areas are separated by more than 2,500 feet.

E. If different soil textures or colors are discovered while sampling, a representative sample from each distinct soil type shall be analyzed.

F. One representative soil for every 3,000 cubic yards of import soil shall be analyzed.

G. Each composite sample shall be a mixture of 10 or more sub-samples taken from the rooting depths of the proposed plantings. Typical rooting depths are as follows:

1. Turf and herbaceous groundcovers: 0 to 6 inches
2. Shrubs and Trees: 0 to 12 inches

H. Each soil sample shall be analyzed to determine its soil chemistry for the following:

1. Alkalinity or acidity (pH)
2. Fertility
3. Landscape compatibility
4. Soil classification and particle size
5. Percolation or infiltration rate
6. Boron content
7. Salinity; including Electrical Conductivity (ECE) and Sodium Absorption Ratio (SAR)
8. Any calcareous or chlorotic conditions
9. Any other condition deemed important by the horticulturalist or requested by the District.

I. No material shall be delivered to the site until the District approves the material.

J. All testing costs shall be paid by the Contractor, including initial samples and any additional samples required due to non-compliance by the contractor.

K. The results of the horticultural analysis shall be presented in a report that shall include recommendations for soil amendments, fertilization, drainage, Ph, depth of the water table (if known), and other necessary measures to assure a successful landscape design and plant life sustainability.

L. The Contractor shall provide a one-quart sample of each proposed amendment to the testing laboratory for testing for conformance to this specification and recommendations for incorporation. No material shall be delivered to the site until the District approves the material. Amendment testing costs shall be paid by the Contractor. Acceptable labs include:

Sunland Analytical --- (916) 852-8557

Soil & Plant Laboratory, Inc. --- (408) 727-0330

Waypoint Analytical --- (714) 282-0330

M. For landscaped and hard-surfacing areas, the Contractor shall submit the pre-emergent herbicide information for approval by the District before any application.

2.07 Materials

A. Imported Topsoil for Contained Planter Areas:

1. A minimum 12-inch layer of clean topsoil shall be provided in all planting areas.

2. The planting soil shall meet the recommendations of the horticultural analysis report.

3. The planting soil shall be free of any refuse, heavy or stiff clay, hard dirt clods, stones larger than ¾ -inch, roots larger than ¾ inch in diameter, litter, and other deleterious materials.

4. The planting soil shall be free of noxious weeds, Bermuda grass, nut grass, all invasive wild-land pest plant material, toxic amounts of boron, acid or alkaline chemicals, and shall be capable of sustaining healthy plant life.

5. Site strippings may be stockpiled and then used as planting soil, provided the material conforms to all applicable criteria.

6. Topsoil shall be a homogeneous mineral soil classified as sandy loam, or fine sand and meet the following requirements:

    a. Particle size data shall be based upon standard USDA methodology.
    b. Soil shall be 5% Organic Matter
    c. Provisions shall be made to add required materials to the soil, as recommended by the testing laboratory to support normal plant growth.
    d. The soil shall be free of organic herbicides or other growth restricting chemicals.
    e. Contamination may be tested by greenhouse trials using rye grass and radish as test crops using the existing import soil as substrate. These trials require four to five weeks for completion.
    f. Submit samples/test results for approval prior to install.

B. Fertilizer:

1. All fertilizers shall be commercially processed and shall conform to the requirements of the agricultural laws and regulations applicable in the State of California.

2. Unless otherwise specified, the fertilizer shall be a long-term, slow-release, water insoluble, nitrogen-based product.

3. The fertilizer shall be pellet, granular, or tablet form and have the chemical composition clearly marked on the packaging material for inspection by the District. The packaging must list the relative amounts of the three major macro-nutrients – Nitrogen (N), phosphorous (P), and potassium (K) – as percentages of the total weight. If other macro-nutrients (e.g. magnesium, sulfur, calcium) or micro-nutrients (e.g. chlorine, iron, boron, manganese) are included in a fertilizer, these must also be listed on the packaging. The

fertilizer packaging must also indicate whether the product is “fast-release” or “slow-release”.

4. Fertilizer shall be determined from soil analysis results, which shall be provided to the District.

2.08 Execution

A. Clearing and Grading:

1. The Contractor shall complete the rough grading as necessary to round the top and toe of all slopes, providing naturalized contouring to integrate newly graded areas with the natural topography. Finish grading shall be completed in accordance with the information shown on the District Approved Landscape Plans.

2. In all areas to be planted, remove and properly dispose of all rocks and paving materials over 3/4 inch in any dimension, all weeds, debris, and other deleterious or noxious material as described above.

B. Topsoil Preparation:

1. If in-place soils are to be amended to create the topsoil layer, the in-place soils within the areas to be planted shall be cross-ripped and scarified to a minimum depth of 12 inches (six inches in turf areas) and compacted to 85% before import is brought in and prior to the addition of amendments and fertilizers.

2. If import soil is used for topsoil, the underlying sub-soil shall be cross-ripped and scarified to a minimum depth of 12 inches before topsoil is placed. The import soil shall then be incorporated and mixed with the sub-soil so that there is a gradual change from sub-soil to topsoil, rather than a sharp distinction.

3. Following the ripping and scarifying operation, all areas to be planted shall be tilled to break down clods, to expose deleterious material to be removed, and to incorporate soil amendments and/or commercial fertilizer. Amendments and fertilizers shall be evenly distributed and incorporated throughout the topsoil layer.

4. The tilling operation shall be performed until the ripped and scarified soil is in a loose condition and the amendments and fertilizers are thoroughly mixed.

5. The outer limits of the areas to be cultivated shall extend a minimum of 12 inches beyond the outer row of plants requiring cultivation, unless otherwise stated on the plans.

6. The use of rubber-tired equipment will be permitted for cultivating operations provided that the equipment used completely eradicates any compaction caused by the tires. Rubber-tired equipment will not be allowed on cultivated areas after cultivation.

7. Fine grading work shall not be performed when the moisture content of the soil is such that excessive compaction will occur, or when the soil is so dry that clods will not break readily or dust will form in the air. Apply water as required to prevent the formation of an airborne dust nuisance and to provide ideal soil moisture content for tilling.

C. Pre-emergent Herbicide:

1. Pre-emergent herbicide shall be applied in accordance with the manufacturer's recommendations for all tree ring, ground cover, and shrub bed areas. The Contractor shall adhere to all agricultural laws and regulations applicable in the State of California and the manufacturer's safety recommendations when using agricultural chemicals.

2. The pre-emergent herbicide shall be applied before mulch is placed.

3. The Contractor shall use care in applying pre-emergent herbicide to avoid damaging any existing trees or other landscape features scheduled to remain. Herbicide shall not be applied during windy conditions to avoid spray drift.

4. All employees using chemicals shall be trained in the proper use of these chemicals and shall be licensed or certified as required by state and local agencies.

D. Finish Grading:

1. The Contractor shall finish grade all irrigated planting areas, unless otherwise noted, and shall remove all rocks and clods over 3/4 inch.

2. All areas shall be smooth and uniformly graded.

3. The Contractor shall repair all erosion damage during the construction period.

4. Unless otherwise noted on the Reviewed Landscape Plans, all soil finish grades shall be 1 inch below finish grade of walks, pavements, and curbs.

SECTION 3 - DRAINAGE

3.01 General Standards

A. Landscape designs shall meet requirements of all applicable Sacramento County Codes, the Sacramento County Stormwater Quality Design Manual, and reflect Best Management Practices for control of stormwater.

B. Rim and invert elevations on all drainage facilities and pipes shall be located on plans.

C. All drainage pipes shall be PVC pipe, SDR-35, with a minimum diameter size of 8-inch diameter and a minimum slope of 0.5%.

D. Do not locate drains within, or directly adjacent to, a play field. Maintain a minimum separation of 20 feet from play fields.

E. Sheet drain basketball courts to a pre-sloped trench drain system.

F. Catch basins shall be a minimum of eighteen inches (18”). Catch Basins shall be concrete with bolt-down and bicycle proof grates.

G. Drainage for swales in landscape or turf areas shall be a minimum slope of 2%.

H. Do not sheet drain from planted or landscaped areas across hardscape.

I. Avoid sheet draining across long distances.

J. For storm drain and other utility stubs in future phases of work, cap and locate with a marker at grade.

K. Do not place drains within any existing native Oak or Heritage Tree root zones.

L. Storm Water Pollution Prevention Plan (SWPPP) is required on all projects. Storm water treatment shall comply with all SWPPP regulations and requirements.

M. Where possible designers should look for ways to reduce hardscape and increase site permeability to reduce stormwater runoff (i.e. through the use of detention basins, permeable paving, and swales).

3.02 Stormwater Pollution Prevention Plan (SWPPP)

A. Stormwater Pollution Prevention Plan (SWPPP) is designed to comply with California’s General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities.

B. A Storm Water Permit is issued by the State Water Resources Control Board (State Water Board). A Storm Water Pollution Prevention Plan (SWPPP) must be prepared following the California Stormwater Quality Association Stormwater Best Management Practice Handbook Portal: Construction (CASQA, 2010). A SWPPP is designed to address the following:

    1. Pollutants and their sources, including sources of sediment associated with construction, construction site erosion, and other activities associated with construction activity are controlled

    2. All non-stormwater discharges are identified and either eliminated, controlled, or treated

    3. Site Best Management Practices (BMPs) are designed to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard.

SECTION 4 - HARDSCAPE

4.01 General Standards

A. Non-vehicular-rated concrete walks shall be a 4" depth of concrete with 2.9"x2.9"x6" welded wire mesh reinforcing with "dobies/chairs" on 4" depth of compacted Class II aggregate base material (per District standard details) or per the recommendations contained in a site geotechnical study, whichever depth is greater. 12" dowels shall placed in new concrete sections that are constructed adjacent to existing concrete sections. Felt material shall be placed in sidewalk expansion joints and capped with a Sealtight Expansion Joint Snap-Cap. Joints shall then be sealed with Sikaflex sealant or approved equal. Sand granules shall be adhered to the tooled sealant.

B. District sidewalks shall be a minimum 6 feet wide. 8 feet At least one main route shall allow for maintenance vehicle access at minimum 8' wide.

C. Vehicular-rated concrete walks shall be designed and constructed per the recommendations contained in a site geotechnical study.

D. In general, sport courts shall be asphalt paving over a compacted Class II aggregate base material (per District standard details) or per the recommendations contained in a site geotechnical study, whichever depth is greater. Acrylic sports court surfacing with the appropriate playing lines shall be applied as the top course.

E. The use of decomposed granite shall be limited to areas where growing and maintaining vegetation is difficult (such as around utilities). Decomposed granite may be used as material for associated sports, such as bocce ball.

F. Acceptable manufacturers include: Plexipave, Surface America, or equal.

G. All manufacturer's recommendations should be followed.

4.02 Bike Trails (see also details in this guide)
These three trail standards are District preferences unless dictated otherwise by the land authority:

A. **Regional Bike Trail in CRPD Park** shall be paved with asphalt. Trail shall be 10'/12' in width. Refer to City of Rancho Cordova standards or County of Sacramento Standards for pavement section. The shoulders shall be 2' of compacted decomposed granite. A 12'' concrete curb shall be placed between the decomposed granite shoulder any sections of park turf. No concrete curb is required between a decomposed granite shoulder and a shrub area.

B. **Regional Bike Trail adjacent to CRPD Park** shall be paved with asphalt. Trail shall be 12' in width. Refer to City of Rancho Cordova Standards or County of Sacramento Standards for pavement section. The shoulders shall be 2' of compacted

decomposed granite. A 12'' concrete curb will separate the decomposed granite shoulder any sections of park turf. When close to a major traffic artery, a 6' planter shall be placed next to the decomposed granite shoulder with a 6" raised curb separating the planter and the major arterial area unless otherwise specified by the land authority.

C. **Local Bike Sidewalk Trail adjacent to CRPD Park** shall be paved with concrete. Trail shall be 10' in width. Refer to CRPD standards (listed in this document) for paving section. No decomposed granite shoulders are required. Concrete paved trail can be placed adjacent to CRPD park turf. A 6" curb shall be installed between the concrete bike path and a 7' parking lane adjacent to the roadway.

SECTION 5 - FENCING

5.01 General Standards

A. **Chain link**

1. Where fencing is related to a specific facility (tennis courts, backstops, etc.) install black, blue, or green (per District direction) vinyl coated chain link fabric, with posts and fittings primed and painted to match.

2. Minimum fabric wire size shall be (9)-nine gauge.

B. **Ornamental Fencing**

1. Ornamental steel fencing shall be 14-gauge steel minimum and manufactured by Ameristar Fence Systems or approved equal.

C. **Post and Cable Fencing**

1. At certain park sites where a physical barrier is needed, but a visual barrier is not desired, the use of post and cable fencing may be preferred to other fencing types (i.e. between park site and adjacent City-owned open space, preserve area, or bike trail).

D. **District Policy**

1. District Park Planning policy sections 1.30 and 1.31 provide additional information regarding fences on or near District property.

SECTION 6 - LIGHTING

6.01 General Standards

A. All lighting design shall be compliant with Title 24 Energy Efficiency standards set by the California Energy Commission.

B. Security lighting shall be provided in all park settings. This includes lighting for park picnic shelters, restroom building exteriors, and pathway lighting (when budget allows).

C. Activity nodes such as playgrounds and picnic areas shall be lit at an average of 1/4 foot-candle.

D. City and County requirements for parking lot lighting shall prevail.

E. The District prefers 14’ light standards to low bollards to minimize vandalism.

F. Penetration of unwanted light into adjacent neighborhoods shall be mitigated as much as possible.

G. Parking lot lighting shall comply with all applicable codes including the California Energy Commission Standards.

H. When possible, lighting standards shall comply with the Model Lighting Ordinance (MLO).

SECTION 7 - PLAY AREAS

7.01 General Standards

A. All play areas shall comply with applicable codes including Americans with Disabilities Act (ADA), Consumer Product Safety Commission Guidelines (CPSC), and National Playground Safety Institute Guidelines (NPSI).

B. At least one play area should be included in a neighborhood park. Community parks may have more than one. Equipment should promote muscle development, motor coordination, social interaction, fantasy, creativity, and dramatic play.

C. A toddler-scale play area should be provided for younger children (under 5 years) in all parks. In larger parks, larger play apparatus may be provided in a separate area for older children, adjacent to school uses if applicable.

D. All play areas shall have adjacent seating for adult supervision.

E. Play areas shall be made up of high quality and innovative play structures and/or play/exploration elements.

F. Colors of the play components shall be approved by the District.

G. Play equipment selected shall be reviewed and approved by the District.

H. Site the play area for safe play and easy viewing from the street or parking lot. Play areas within fifty feet (50') of roads shall have three to four foot (3'-4') tall protective decorative fencing.

I. Chain link fencing shall not be used in any play area.

J. Wood play equipment is not acceptable.

K. "Age Appropriate" signs should be posted within the play areas. The sign language should describe the intended age range of the user and the requirement for adult supervision.

L. Provide for an accessible path of travel to every major play component (the transfer deck of an active play structure and one belt swing). The path of travel must be constructed of non-friable materials. This path shall be indicated on the plan.

M. Fall zones shall be compliant with accepted standards and requirements.

N. The same surfacing material shall be used throughout the swing area (including fall zone).

O. Provide a perforated pipe drainage system within engineered wood fibar play areas per District standard details. Provide drainage system under poured-in-place resilient surfacing play areas as recommended by manufacturer. Locate all drainage system catch basins, drain inlets, or clean outs outside of fibar play areas with adjacent landscape or turf areas. Filter fabric shall be installed between subgrade and playground fibar per CRPD standard detail.

P. Trees shall be planted immediately adjacent to play lots to provide 50% shade over the play area within 5 years.

Q. Sports fields/courts shall be oriented with a North-South axis, unless otherwise approved by the District.

R. The District encourages the use of commercial grade play equipment such as climbing rocks, netting, etc. and the use of innovative and interactive play equipment.

S. Play area elements include but are not limited to:
    1. Required Elements (in order of priority and as space permits)
        a. Play Equipment for children under 5 years
        b. Seating Area for adult supervision
        c. Apparatus play area for 5-12-year olds
        d. Planting to provide shade for seating areas
        e. Trash Receptacles (per District standard)
        f. Drinking Fountain (per District standard)
        g. Shade Shelters
    2. Optional Elements:
        a. Sand Play Area
        b. Tricycle Course

T. Acceptable playground manufacturers:
    1. Landscape Structures
    2. Berlinger
    3. Little Tykes
    4. Miracle
    5. (Or Approved Equal)

7.02 Splash Pads

A. Splash pad areas shall comply with the California Conference of Directors of Environmental Health Recreational Health Technical Advisory Committee Standards for Construction & Operation of Spray Grounds.

B. Spray ground plans must be reviewed and approved by the County of Sacramento Environmental Management Department.

C. Use EFB-CP Series Brass Valves.

D. Splash pad surface must be broom finish concrete.

E. Controls should be enclosed in a mechanical room typically as part of a larger restroom chase room. No underground or above-ground vaults permitted.

F. Sand play areas shall not be located near splash pad area.

SECTION 8 - SITE FURNISHINGS

8.01 General Standards

A. Site furnishings shall be sturdy, commercial-grade, and made of vandal resistant materials.

B. Site furnishings shall not be made of wood, unless otherwise approved by the District.

C. Site furnishings and amenities shall comply with the Americans with Disabilities Act (ADA).

D. Elements such as play areas and sports fields shall have associated seating.

E. Site furnishing and finishes colors shall be approved by the District.

F. Trash receptacles shall be placed near all seating areas, play lots, picnic areas, sports fields, tennis courts, parking lots, and all other high use areas as directed by the District.

G. A minimum of 5% of total picnic tables within the park must be accessible.

H. When feasible, picnic tables shall be shaded with trees or a structure and located in groups or placed individually. There shall be one picnic table per acre minimum.

I. Neighborhood parks should aim for one picnic area that can accommodate up to 25 people. Community parks should aim for a reservable picnic area that can accommodate up to 50 people.

J. A 3’ minimum clearance shall be provided between picnic tables and other obstructions per ADA requirements.

K. Use surface mount site furnishings except with prior written approval.

L. Amenities shall be designed and installed in a manner that prevents inappropriate skateboarding. Provide District approved skate stoppers or similar devices.

M. All benches and tables shall be placed on a concrete pad. Provide a three foot (3’) minimum concrete clearance on front, left, and right sides of all site furnishings.

N. The use of recycled content equipment, surfacing, and site furnishings is encouraged.

O. Site furnishings quantities shall be consistent with the District’s Basic Park Improvements for Neighborhood and Community Parks

P. Drinking fountains must be located in areas where they will not protrude into the pedestrian access route.

Site Furnishing Standards

8.02 Approved Site Furnishings

Description	Manufacturer & Model Number	Comments
Sport Backstop with Hood (Permanent Install)	Patterson Williams Athletic Manufacturing Company: 1240-03 with 3 planks, black PC frame and vinyl coated mesh	Or approved equal
Sport Backstop (Portable)	Patterson Williams Athletic Manufacturing Company: 1240-12 with Vinyl Coated Mesh	Or approved equal
Ball Field Mix	50/50 Red lava and clay loam	Or approved equal
Basketball Goals		4" Galvanized Steel Posts or approved equal
Softball Bases and Pitching Rubber	Hollywood Home Plate (10350 Step down pitching rubber, Saf-T-Slider Base) Double First. Base (10390) Anchor Ground Spikes (10053, 10050) (10225)	One (1) per Field Two (2) per Field One (1) set per Field Nine (9) total per Field
Barbeque Grills	Little Tykes (200-X, 210-X or 220-X) Outdoor Creations Model# 300A Family BBQ Unit Iron Mountain Forge (198-x stationary grill, 210-x group grill)	Finishes to be approved by District
Bike Racks	LA Steelcraft (WB-700) Dumor (125, 130) FairWeather (BR-1.5) Belson Orion Bike Rack (Round Tubing)	Loop style, powder coated
Drinking Fountains	Most Dependable Fountain (440SM, Hi-Lo)	Dual bowl with jug filler and doggie bowl
Park Lighting	Carmanah (SE-20, Solar LED) American Electric Lighting	Consult with District, use pending District approval.
Pathway Lighting	Hadco Fixture: #CL32-M-H-K-A-1-A-W-H-W-A-2-SP1 Pole: Whatley #TR34-16-AB-BLK-TXT-30	
Shelter Lighting	Brownlee Lighting #7156-BL-B12LED-30K	
Park Name Signs	Outdoor Creations District Standard	Concrete sign for placement in planting area
Park Rule Sign	Aluminum .083 thickness	Color and logo per District Standard and design. Sign to be located in planting area

		on posts with other signs, or light pole when possible. Mount out of the path of travel.
Picnic Tables	Outdoor Creations Wabash Valley (D-Series) FairWeather (F-8)	Wabash Valley S series replaced with D series
Picnic Table and Chairs	Wabash Valley (CA-300R, Chair) Wabash Valley (CA-101, CA-101R Tables) FairWeather (F-7)	For use at Golf Course or Plaza settings, surface mounted, or approved equal
Park Bench with Backrest	Dumor (58, 119, 160) Wabash Valley (HR305, ES 420) Sitescapes (Westport Series Horizontal Strap) Sitescapes (CityView Series Vertical Strap) Victor Stanley (R-28, CR-138) FairWeather (PL-5,	
Park Bench with arms	Cityview backed bench metal (CV1-1001)	
Park Bench without Backrest	Dumor (92, 120, 164) Wabash Valley (ES-425) Victor Stanley (Custom Arching Benches) Sitescapes (Westport Series Horizontal Strap) FairWeather (PL-1.5,	
Trash Receptacles	Outdoor Creations Dumor (84) Victor Stanley (SD-42 Surface Mount, NSDC-36, RB-36) FairWeather (TR-1224, TR-12)	All proposed trash receptacles to be reviewed and approved by District on a project-by-project basis.
Tennis Court Post and Net	Patterson Williams (2205)	3” Square posts, black powder coated, removable brass tension handle, heavy duty net.
Dog Clean up	Dogipot	
Decorative Steel Tube Fencing	Ameristar or approved equal	Color shall be black, unless otherwise directed
Vinyl Coated Chain Link Fencing	Dog Park Applications: 5’-6’ tall, black	
Permanent Bollards	FairWeather (42” B-3, 42” B-3-L)	Black, powder coated
Removable Bollard	FairWeather Site Furnishings (42” B-3-R)	District approval required prior to specified use of any removable bollards
Volleyball Posts and Nets	Patterson Williams (2216-00)	3-1/2” O.D. posts, 10-1/2 ft. long with fixed eyelets, or approved equal.
Volleyball Sand	Patterson sand and Gravel, Sheridan, CA (No. 2, fine white)	Or approved equal
Tree Grates	Sitescapes (TerraFirma Series)	

	South Bay Foundry (CNK D04 Series) South Bay Foundry (STBM D22 Series) South Bay Foundry (STB D11 Series) Urban Accessories (KVIA-SQ, Viper) Ironsmith (A.D.A, Market Street Series)	
Skateboard Racks	Madrax (Skateboard Rack System, SRS-SNG-6-P)	
Skateboard Stoppers	Skate Stoppers (HR and FR series)	
Tree Guards	South Bay Foundry (GD-B Style) South Bay Foundry (GD-C Style)	
Trench Drain Covers	Ironsmith (A.D.A, Conquistador, Market Street Series) FairWeather (CNK Series	

SECTION 9 - RESTROOMS

9.01 General Standards

A. A proposed restroom location must be shown on approved plans for any Community Park site. Proposed restroom locations shall be stubbed out for sewer, potable water, and electrical services.

B. No porcelain or plastic fixtures shall be used. Use stainless steel commercial grade unless otherwise approved.

C. Hand dryer shall be recess mounted to comply with ADA standards for 4" protrusion limits.

D. Install at least one outdoor GFI Quadruple outlet with heavy duty, weather resistant, vandal proof lockable cover.

E. Lighting fixtures shall be rough service, vandal resistant fixtures, or approved equal.

F. A minimum 5-foot-wide chase is required.

G. Prefabricated restroom building manufacturers must meet all applicable California codes and requirements.

H. Prefabricated restroom building plans must be stamped by a California licensed engineer. Prefabricated restrooms must comply with all federal and state laws for accessibility. An accessible path of travel to the restroom must be provided and a compliant transition at the restroom entrance door is required.

I. Signage shall comply with California Building Code Requirements.

J. Restrooms shall have the capability to lock automatically.

Restroom Fixture Standards

Description	Model #	Manufacturer
Toilet Flush Valves	952-1.5-MBFW	Sloan
Urinal Flush Valves	995-MBFW	Sloan
Toilet	4110 back supply w/A611 access panel	Metcraft
Urinal	7630 back supply w/A610 access panel	Metcraft

Sink	5683 single hole w/A311 faucet & A775 braces	Metcraft
Partitions	Reinforced composite partition	Bobrick
Toilet Paper Dispenser	OFUX2	Vandalstop Products
Toilet Seat Cover Dispenser	SCD	Vandalstop Products
Electric Hand Dryer	XA5	World Hand Dryer
Interior Flourescent	VSL 2 40 120 ES, Enclosed Linear Flourescent	Lithonia

SECTION 10 - IRRIGATION SYSTEM

10.01 General Standards

A. Contractor shall coordinate with Rain Bird certified representative and CRPD supervisor to ensure flow sensors and master valves are properly installed and programmed in the controller to manage and watch flow.
B. Contractor shall coordinate with V-Power Equipment representative and CRPD supervisor to do start-up of the pump to ensure proper operation while using different zones.
C. Thrust blocks shall be installed on any fittings changing the direction of the main line.
D. Contractor shall mark or map two wire pads in the irrigation plans.
E. All utility equipment shall be mounted on concrete pads. Irrigation equipment and utility boxes shall be installed in planter areas.

F. Irrigation mainlines shall be designed as a looped system.

G. Irrigation valve boxes shall not be placed within the playing surface of sports fields or adjacent field safety zone.

H. Sprinkler head spacing shall be designed to accommodate head-to-head spacing, with no runoff or overspray onto non-irrigated areas.

I. Sprinkler head layout shall be designed to apply water at a precipitation rate that is compatible with the needs of the plant material irrigated and does not exceed the infiltration rate of the soil.

J. Any system utilizing recycled water shall be designed and installed in strict compliance with all applicable rules, regulations, and laws.

K. Do not place irrigation within the drip line of any Oak or Heritage Tree canopy.

L. Designers and Consultants shall comply with AB 1881 the Model Water Efficient Landscape Ordinance. All efforts shall be made to design a water efficient irrigation system.

10.02 Definition of Contractor

The term “Contractor” is used in its broadest sense within this section. The Contractor may be a Developer/Contractor installing public improvements to be turned over to the District for maintenance, the District General Services Department, or Construction Contractors hired on contract by the District.

10.03 Scope of Work

It is the responsibility of the Contractor to complete the installation of the landscape irrigation system as indicated on the Approved Landscape Plans. The Contractor is required to order and furnish all labor, materials, supplies, tools, and transportation, as well as perform all aspects of operations in connection with and reasonably incidental to the installation of the irrigation system. This work includes, but is not limited to, the following:

A. Automatic irrigation system; including piping, fittings, sprinkler heads, couplings, adapters, and accessories
B. Pumps (if indicated on the Approved Landscape Plans)
C. Remote control valves, gate valves, quick coupler valves
D. Backflow preventer with enclosure
E. Water meter (coordinate the installation to be done by others)
F. Flow sensors (if indicated on the Approved Landscape Plans)
G. Controller, controller wiring, mounting equipment and enclosure
H. Testing
I. System adjustments
J. Excavation and backfill
K. Sleeving
L. Record or As-Built Plans
M. Provide a one-year warranty
N. Backflow inspection and testing
O. Approval of local land use authority

Work related to the landscape irrigation system that is necessary to complete the project according to the Approved Landscape Plans, may include:

A. Earthwork and site grading/sculpting
B. Concrete/Bomanite installation
C. Planting
D. Electrical (power and data lines for the automatic irrigation controller)

10.04 Quality Control

A. CODES AND STANDARDS:

All work and materials shall be in full compliance with codes and standards, including, but not limited to:

1. The rules and regulations of the National Electric Code
2. The rules and regulations of the Uniform Plumbing Code, as published by the Western Plumbing Officials Association
3. All applicable State and local laws, codes, and regulations including the Model Water Efficient Landscape Ordinance (Assembly Bill 1881).

The above-mentioned codes and standards are the minimum level requirements. Nothing in the Approved Landscape Plans is to be construed to permit work not conforming to these codes and standards. If the Approved Landscape Plans call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, the provision in the Approved Landscape Plans shall take precedence. The Contractor is responsible for complying with all applicable rules and regulations, including those not mentioned here or shown on the Approved Landscape Plans. All materials and labor required for compliance shall be furnished by the Contractor, at no additional cost to the District.

B. SAFETY:

1. All work shall be performed in a safe manner and shall meet or exceed the safety standards established under the Federal Occupational Safety and Health Act and its most current amendments.

2. Barricades, guards, warning signs, and lights shall be erected and maintained as required by OSHA regulations, the Property Owner, or by the District for the protection of the public and workers.

3. Where work infringes upon the public right-of-way, traffic control plans shall be submitted, and encroachment permits obtained from the local land use authority.

C. PERSONNEL:

1. The Contractor shall possess all proper and current licenses, certificates, permits, and/or registrations required to perform the scope of services.

2. The Contractor shall employ at least one qualified supervisor familiar with the products and requirements of this section. The supervisor shall be present at the project at all times during construction. The supervisor shall have full authority to act on behalf of the Contractor.

3. The Contractor shall employ workers familiar with the products and requirements of this section.

D. SITE PROTECTION:

1. The Contractor shall incur all expenses to repair or replace any damage to existing improvements, such as buildings, equipment, irrigation systems, piping, sewers sidewalks, or landscaping caused during activities related to the scope of work in this section. Repairs and replacements must be done in a manner and to a quality level satisfactory to the Owner and District and within a reasonable timeframe as determined by the District.

2. The Contractor shall exercise extreme care when excavating and working near existing utilities. The Contractor is responsible for correcting any

damage to existing utilities for which the Contractor's operation is either the direct or indirect cause. The Contractor is required to call **Underground Service Alert (USA) at (800) 227-2600** for marking of underground utilities prior to excavating.

E. REVIEWS AND INSPECTIONS.

The Contractor shall specifically request the following District approvals at the appropriate times and prior to progressing work. The District will decide at the time of the request whether the specific inspection will be required.

1. Mainline Pressure Test: Upon proper installation of the mainline, the Developer/Contractor shall contact the District, a minimum of three days in advance, to schedule a mainline pressure test. The mainline pressure test is always required.

2. Layout Inspection: Prior to any installation, the exact locations of the major components of the landscape irrigation system shall be flagged and/or staked. This should include at a minimum the piping, sprinkler heads, valves, control wire, backflow prevention units, controllers, and weather stations. Once marked, the Contractor shall notify the District to schedule an inspection for approval of the layout of the project.

3. Lateral Line Pressure Test

4. Coverage Test

5. Substantial Completion Inspection

6. Final Acceptance and Warranty

10.05 Submittals

A. MATERIALS

A list with information and descriptions of any components and materials to be used that are not specified on the Reviewed Landscape Plans shall be submitted to the District for approval. All materials must be deemed acceptable by the District prior to any work being performed.

B. SUBSTITUTIONS:

The District must approve any substitutions to the specifications of the Approved Landscape Plans and to the accepted list of materials. All substitutions must be of equal or greater quality than that specified. Requests for substitution must be accompanied by a copy of catalogue information on the materials desired for substitution. No substitutions will be permitted without prior written consent from

the District. Unapproved substitutions shall be corrected for compliance at no cost to the District.

C. RECORD OR AS-BUILT DRAWINGS:

The Contractor shall maintain in the field office one complete set of the Approved Landscape Plans. Throughout installation of the landscape irrigation system, records shall be updated showing the exact locations of all the components of the system. If site conditions require modifications to the Approved Landscape Plans, the Contractor must first receive written authorization from the District. The Contractor shall then update the field-maintained Landscape Plans. Any work not installed as indicated on the Approved Landscape Plans and did not receive prior District approval constitutes an unauthorized change and shall be corrected by the Contractor at no cost to the District. The field-maintained Landscape Plans must also indicate the locations and dimensions of all underground electrical features, including stub-outs for future valves and connections. Locations on all As-Built Plans shall be made in reference to two permanent site features.

Included with the As-Built Irrigation Drawings shall be a water budget which includes estimated annual water use in gallons, the area in square feet to be irrigated, precipitation rates for each valve circuit, a monthly irrigation schedule for plant establishment, and an irrigation schedule for establishing plantings. Irrigation scheduling shall consider ETO rates and tied into a local weather station network.

Upon completion of the project, the Contractor shall obtain reproducible prints from the Landscape Architect and neatly correct the prints to show all as-built conditions. The Contractor shall submit the As-Built Plans to the District, which must be done before the District will accept the project.

D. OPERATION AND MAINTENANCE MANUALS:

Prior to the final inspection of the landscape irrigation system, the Contractor shall furnish two individually bound service manuals to the District. The manuals should contain the following:

1. An index sheet indicating the contact information of the Contractor. This includes at minimum the name, telephone number, professional license number, email address, and physical address.

2. A copy of the signed and completed Irrigation Warranty form.

3. A certificate of insurance verifying coverage for completed operations.

4. A list of equipment installed, with the manufacturer's contact information.

5. Copies of installed equipment warranties and certificates.

6. Complete operating and maintenance instructions of all installed equipment. This should include the name of the manufacturer, the model number, exploded drawings, and parts list.

7. The contractor shall also provide the District with instructions for operation of the landscape irrigation system as a whole.

E. HARDWARE ITEMS:

Provide the District with the following hardware items:

1. Two sets of matching quick coupler valve (QCV) keys and hose swivels.

2. Two keys to each controller box.

3. Two sets of any special tool required for the maintenance of any component of the landscape irrigation system.

10.06 Pipes and Fittings

A. PVC PIPE AND FITTINGS:

1. Main lines under constant pressure shall be polyvinyl chloride (PVC) 1120-315 psi for 2 ½" outside diameter and larger, and PVC 1120 Schedule 40 for 2" outside diameter and less in size.

2. At changes in direction or branch mains, use appropriate Schedule 40, Type I, Grade I PVC fittings as approved by the Uniform Plumbing Code.

3. Lateral lines not under constant pressure and protective sleeves shall be (PVC) 1120-315 psi for 2 ½" outside diameter and larger, and PVC 1120 Schedule 40 for 2" outside diameter and less in size, Type I, Grade I PVC solvent weld fittings.

4. Connections between main lines and remote-control valves (RCV's) shall be Schedule 80 PVC (threaded both ends) nipples and fittings.

5. Risers shall be Schedule 80 PVC threaded nipples and Schedule 80 PVC ells, as indicated on the District-Reviewed Landscape Plans.

B. COPPER PIPE AND FITTINGS:

1. Copper pipe shall be Type K, hard tempered ASTM B88 and fittings shall be wrought solder joint type in accordance with ANSI B16.22.

2. Joints shall be soldered with silver solder, conforming to ASTM B206.

C. BRASS PIPE AND FITTINGS:

1. Brass pipe shall be 85% red brass ANSI Schedule 40 screwed pipe.

2. Fittings shall be 125 pound class medium brass screw-type.

D. GALVANIZED STEEL PIPE AND FITTINGS:

Galvanized steel pipe and fittings are generally NOT allowed. Should the use of galvanized steel pipe and fittings be necessary, prior written approval must be received from the District. Underground galvanized pipe installations will not be permitted under any circumstances.

10.07 Reduced Pressure Backflow Preventer

A. Reduced Pressure Backflow Preventer shall be a Febco 860 or 880 Reduced Pressure Assembly, or approved equal. The units shall be equipped with ball valves and the manufacturer and model number shall be specified on the Landscape Plans. The District will review the specification when the Landscape Plans are submitted for review.

B. Backflow prevention units shall be contained within a steel vandal-resistant enclosure. Chain link is not approved by the District.

10.08 Booster Pumps

A. The Landscape Architect/Irrigation Designer shall submit all manufacturer supplied data on all pumps. The manufacturer and model number shall be specified on the Landscape Plans. Booster pump information will be reviewed when the Landscape Plans are submitted for review.

B. Booster pumps, points of connection, and all related irrigation system components shall be sized to complete an entire irrigation cycle within a 7-hour window whenever possible. The watering window should be from 10 pm to 5 am.

C. All pumps shall have a flow-switch activation assembly and the proper motor size to ensure efficient operation.

D. All pumps shall be protected by a low-pressure inlet-sensing device.

E. All pipe and fittings within the pump assembly shall be made of brass.

F. All pumps shall be contained within a chain link, steel, or masonry vandal-resistant enclosure. Enclosure shall safeguard against excessive sound attenuation.

G. Pump assemblies located adjacent to a wall shall be installed in a manner that provides clearance for servicing the assembly.

10.09 Master Valve and Flow Sensor

A. Master Valve shall be Superior Model # 3100-05 N-O.

B. Flow Sensor shall be Rainbird F-S-350 B (High Flow) or F-S-150 P (Low Flow).

10.10 Moisture Sensor

The District generally discourages the use of moisture sensors, in favor of other sensing devices such as a weather station linked to a central controlled system.

10.11 Remote Control Valves

A. Remote control valves shall be Rainbird PEB and PRS-D Series, or an equal approved by the District. Sizes of remote control valves shall be specified on the Landscape Plans and on the As-Built Plans.

B. Valves and circuits shall be installed independently based on hydro-zone watering requirements.

C. Remote control valves shall have Schedule 80 unions on either side of installation.

D. Irrigation valves shall be designated and zoned by function, example: soccer field, turf valved separately from open play area turf, etc.

10.12 Valve Boxes

A. Valve boxes shall be Rainbird VB-JBM (Jumbo Box) or an approved equal. A lid is required, and both the box and lid shall be plastic. The top of box rim and lid shall both be heat stamped with the controller designation and station number and be marked "IRRIGATION CONTROL VALVE" by the Contractor.

B. All valve boxes shall be placed in a geotextile fabric envelope per District standard.

10.13 Automatic Irrigation Controller

A. CENTRAL CONTROLLED IRRIGATION SYSTEMS:

District maintained areas that are required to install a central controlled irrigation system controller shall conform to the following general requirements:

1. Automatic irrigation controllers for District maintained irrigation systems shall be Rain Bird Maxicom ESP-LX-IVM or the IVM Pro (2 wire decoder for IQ Central Control System) Satellite (District Central Control System). A dedicated mainline with the appropriate master valve(s) and flow sensor(s) shall be provided by the Contractor as listed on the District-Reviewed Landscape Plans.

2. Additional conduit wiring shall be installed with Controller for centralized control system, per manufacturer's and communication company specifications.

10.14 Automatic Irrigation Controller Wiring

A. The wiring for the irrigation controller shall be copper with UL approval for direct ground burial. The wire size shall be #14-1.

B. The common ground wire shall have a white insulating jacket. The control wire shall have an insulating jacket of a color other than white.

C. Splices shall be made with a 3M DBY splice kit or an approved equal. A separate ground wire is required for each controller.

D. Control wires shall be connected to irrigation controller in a sequential arrangement according to the assigned identification number of each valve as shown on the Approved Landscape Plans.

10.15 Weather Station

The Landscape Architect/Irrigation Designer shall contact the District prior to submitting any plans for approval for information regarding new installation or connection to the existing District weather station at Hagan Park for use in conjunction with the Rainbird Maxi-com Central Control System.

10.16 Gate Valves

A. Gate valves 3” or smaller in size shall have bronze bodies and rising stems and brass cross handles. Gate valves of this size shall be threaded and be a Nibco F-619 Gate valve with Square Operating Nut or an approved equal.

B. Gate valves 4” or larger shall be AWWA approved and have flanged connections, a 2” square operating nut, cast iron bodies, and have an arrow cast in the metal

indicating the direction of the water flow. Gate valves of this size shall be Stockham G612 or approved equal.

C. Gate Valves shall be installed in Rainbird VB-JBM (Jumbo Box) with cover with locking lid. The top of box rim and lid shall both be heat stamped and marked "IRRIGATION GATE VALVE" by the Contractor.

10.17 Sprinkler Heads

A. GENERAL:

1. The District does not permit irrigation runoff or overspray into non-irrigated area.

2. Sprinkler system shall be designed to apply water at a precipitation rate that is compatible with the needs of the plant material irrigated and does not exceed the infiltration rate of the soil.

3. The GPM flow rate for the number of heads designated per valve shall not exceed 70% of the maximum flow rate of the Backflow Prevention Device as measured on the downstream side of the device.

B. LARGE TURF AND GROUNDCOVER SPRINKLER HEADS:

1. For large turf and groundcover areas, sprinkler heads shall be gear-driven and pop-up type with integral check valve. The body shall be constructed with ¾" or 1" N.P.T. bottom inlet. The sprinkler head shall have positive spring retraction and rise or pop-up a minimum of 6" for turf and 12" for groundcover. The District requires use of Rain Bird 5000, 5500 or 8005 Series, or District written-approved equal.

2. The District does not permit the use of impact drive pop-up type sprinklers in favor of the above detailed gear-driven pop-up style sprinkler heads for water conservation reasons. Sprinkler heads of this type in turf areas shall have a protective rubber cover.

3. All sprinklers must have head-to-head coverage with spacing no greater than 45' apart unless written approval is granted by the District.

4. Full and partial circle rotary sprinklers shall have separate valves unless rotary nozzles are designed for matched precipitation.

C. SMALL TURF AND GROUNDCOVER SPRINKLER HEADS:

1. For small turf and groundcover areas, sprinkler heads shall be Rain Bird 1800 Series with Hunter MP Rotary Nozzle or an approved equal.

2. All heads shall rise or pop-up a minimum of 6” in turf areas and 12” in groundcover areas where the plants specified on the Landscape Plans may mature to block the water spray.

3. All sprinklers must have head-to-head coverage.

4. Full and partial circle rotary sprinklers shall have matched precipitation rates.

10.18 Drip Irrigation

A. Per the Model Water Efficient Landscape Ordinance (AB 1881), drip irrigation shall be used for shrubs, groundcover, and turf in planter areas less than 10’ wide. Tree bubblers shall be used for trees. The Designer and Contractor shall make every attempt to minimize the use of planter areas that are less than 10’ wide (with exception to tree wells).

B. Drip irrigation shall be Rainbird XFS Series Subsurface Dripline or approved equal.

C. Filter shall be a Rainbird QKCHK Series and shall be installed inside a Rainbird VB-JBM (Jumbo Box).

D. Pressure regulator shall be a Rainbird PSI-M40X-100 or approved equal. Pressure regulator shall be located inside a Rainbird VB-JBM (Jumbo Box) or an approved equal.

E. Rainbird MDFCOUP Couplings and MDCFCAP Removable Flush Caps are required at all ends of long drip bubbler runs or as shown on irrigation drawings. Couplings and Removable Flush Caps shall be installed inside a Rainbird VB-10RND box or an approved equal.

F. All trees shall be irrigated by (2) Rainbird Root Watering System Bubblers RWS-B-C-1402 with filter fabric sock per tree and root watering system bubbles shall not exceed .75 gallons per minute.

10.19 Quick Coupler Valves

C. Quick Coupler Valves shall be Rainbird 44LRC or an approved equal.

D. Quick Coupler Valves shall be installed inside a Rainbird VB-10RND box or an approved equal.

10.20 Equipment Enclosures

All equipment enclosures for controllers, pumps, backflow preventers, and other miscellaneous equipment shall be CRPD approved Strong Box MPE Series. Stainless steel enclosures shall not be painted.

10.21 Miscellaneous Equipment

The Contractor shall provide and incur all costs for all equipment called for in the Approved Landscape Plans and as approved by the District.

10.22 Miscellaneous Installation Materials

The proper assembly of an irrigation system requires the use of other materials, including solvent cement, primer, joint sealer, Teflon tape, copper solder and flux, and wire connectors. All such products shall be used in strict accordance with the manufacturer's directions and recommendations.

A. Solvent cement and primer for solvent weld joints shall be of a make and type approved by the manufacturer of the pipe and fittings. The cement shall be maintained at the proper consistency throughout its use.

B. Lubricant for assembling rubber ring seal joints shall be of a make and type approved by the manufacturers of the pipe and fittings.

C. Pipe joint compound shall be non-hardening, non-toxic, and designed for use on threaded connections in water carrying pipe. The joint compound shall be Lasco Blue Pipe Thread Sealant or an approved equal.

10.23 Execution

The following section provides the standards the Contractor shall follow in the execution of the installation of the landscape irrigation system as set forth in the Approved Landscape Plans. The Contractor shall also refer to the DETAILS section and install all specified assemblies in accordance with the details shown therein.

10.24 General Installation

A. The landscape irrigation system shall be installed by a licensed landscape contractor and shall be in full accordance with all applicable state and local laws, codes, and standards.

B. The Contractor shall follow all manufacturer's directions and recommendations, unless otherwise indicated on the Approved Landscape Plans. In no instance, however, shall this be construed as permission to violate any state or local law,

code, or ordinance and nothing shall be done in a manner that nullifies a manufacturer's warranty.

10.25 Site Conditions

A. All scaled dimensions on the Approved Landscape Plans are to be considered approximate. The Contractor shall check the specifications list and verify all size dimensions prior to proceeding with any work.

B. Installation of all irrigation material and equipment, especially pipe, shall be coordinated in a manner that does not interfere with any utilities, future/other construction, or lead to difficulty in planting trees, shrubs, turf, or groundcover.

C. The Contractor shall avoid trenching within the dripline of trees whenever possible. When not possible, all damaged roots 1-1/2” and larger in diameter shall be cut leaving a clean face. Immediately after cutting the root, the face is to be treated with tree seal, the required irrigation components are to be installed, and the applicable trench section is to be back filled and soaked with water. No fittings, however, shall be covered by such backfill until after the District inspection. The Contractor shall follow these actions immediately in order to safeguard the health of the tree. Notify the District of any above-mentioned root damage and report procedure used to correct damage.

D. All grades are to be checked carefully to ensure safety in the installation of the landscape irrigation system.

E. The Contractor shall coordinate any work to be done by others that affects the landscape irrigation system, such as the location of pipe sleeves through walls or under any paving.

F. The Contractor shall verify the available water pressure and flow rate prior to construction. If deficiencies exist that will hinder the system's performance, the District is to be contacted immediately for direction.

G. The Drawing design is considered diagrammatic. All piping, valves, etc. shown within the paved areas are for design clarification only. All piping, valves, etc. are to be installed in planting areas only.

10.26 Project Coordination

A. SEQUENCING AND SCHEDULING:

The Contractor shall be aware of the full scope of the project. As such, the Contractor is responsible for coordinating the installation of the landscape irrigation system with other site improvements, existing utilities and utility installations, plant

materials installation, and any other work required for the completion of the project.

B. ENVIRONMENTAL CONDITIONS:

Site work such as trenching and backfilling shall not be performed during wet, muddy, or frozen conditions.

10.27 Protection of Improvements and Materials

A. The Contractor shall protect all work from damage for the duration of the contract. This includes work done by others. The Contractor shall also protect all materials as directed by the manufacturers. This includes protecting plastic pipe and fittings from direct sunlight, and from undue bending and external loading. The bed on which the pipe is stored is required to be the full length of the pipe. Any damaged pipe or fittings shall not be used under any circumstances.

B. The Contractor shall take all necessary precautions to protect all site conditions, improvements, and plant materials that are to remain. Should the Contractor cause any damage, the Contractor shall make repairs to restore to original conditions or furnish and install equal replacements.

C. All existing irrigation systems shall be maintained in operating condition at all times. The Contractor is responsible for immediate repair of any damage to existing irrigation systems. Should repairs be made, the Contractor shall remove all sprinkler heads on applicable zones and flush the system of any dirt or debris before re-installing the sprinkler heads.

10.28 Correction of Work

All discrepancies of work the District deems unsatisfactory shall be corrected by the Contractor at no additional cost to the District. The correction of such work shall be completed within a reasonable time frame as determined by the District.

10.29 Trenching

A. The trench shall be dug straight and in a manner that supports the pipe continuously on the bottom of the trench. The pipe shall be laid on an even grade. The trenching excavation shall follow the layout shown on the Approved Landscape Plans and which was field inspected and approved by the District.

B. Main lines shall have 4” of sand bed and 4” of sand cover. Total soil coverage shall be 24” over top of pipe.

C. Lateral lines to spray sprinkler heads shall be provided with a minimum of 18” of cover over top of pipe.

D. All control wiring shall be provided with a minimum of 24” of cover.

E. Any pipe and/or wiring located under asphalt or concrete pavement shall be provided with a minimum of 36” of cover from finished grade, or be 12” below sub-grade, whichever is lower.

F. Trenches shall not be backfilled until all required tests and inspections are performed.

10.30 Installation and Testing of Main Line and Lateral Lines

A. MAIN LINE:

The Contractor shall install the main line as indicated on the Approved Landscape Plans and in accordance with the manufacturer's directions and these Landscape Standards. Once installed, the Contractor shall adhere to the following steps required for testing before any further work is performed:

1. Install the main line, all fittings for connection to the lateral lines, and other components that join directly to the main line such as the backflow prevention unit, reduced pressure backflow preventer, remote control gate valves, quick coupler valves, and booster pumps.

2. Main lines shall have 4” of sand bed and 4” of sand cover. Total soil coverage shall be 24” over top of pipe.

3. Contact the District a minimum of three working days in advance to schedule an appointment for a main line pressure test.

4. Cap all openings in the line.

5. Place small sections of backfill over the line to prevent slipping, arching, or other movement when the line is under pressure. No fittings shall be covered by such backfill.

6. Testing of pressure main lines shall be done prior to the installation of electric control valves.

7. During District inspection and testing, the Contractor shall perform ASTM F-690 testing as follows:

    a. Solvent welded PVC joints shall have cured a minimum of four hours or longer if required by manufacturer's directions. The Contractor shall adhere to all other manufacturer's directions.

b. Slowly fill the pipe with water to avoid water hammer damage.

c. Bleed the line to remove all air from the pipe.

d. Using a hydraulic pump or other safe method (do not use an air compressor), pressurize the line to 125% of the designed operating pressure.

e. After two hours of maintaining the above pressure, the line will then be inspected for leaks or other problems while the system continues to hold the above pressure.

f. The Contractor shall be responsible for correcting any inadequacies, deviations from the Approved Landscape Plans, or any other problems found by the District. Corrections will be made at no cost to the District. Any faulty joint shall be completely rebuilt. The use of any cement or caulking to seal a leak is strictly prohibited. After all corrections are made, the Contractor shall again notify the District to schedule an appointment for a re-inspection.

g. The Contractor may proceed with installation of the lateral lines only after the main line passes inspection.

B. LATERAL LINES:

The lateral lines shall only be installed after the main line has passed inspection and testing:

1. Lateral lines shall be installed in a manner that will not damage the main line.

2. Lateral lines and irrigation heads shall be laid following grade contours.

3. Lateral lines shall have 4” of sand bed and 4” of sand cover. Total soil coverage shall be 18” over top of pipe.

4. The pipe shall be filled with water slowly to avoid water hammer damage.

5. The system shall be visually inspected for leaks at normal line pressure after installation is complete. Any faulty joint shall be completely rebuilt. The use of any cement or caulking to seal a leak is strictly prohibited. Make any needed corrections prior to scheduling the system inspection with the District.

10.31 PVC Pipe and Fitting Installation and Connections

A. Multiple assemblies shall not be installed on plastic lines or lateral lines. Each assembly shall be provided with its own outlet.

B. PVC pipe and fittings shall be thoroughly cleaned to remove any dirt, dust, moisture, or other foreign matter before installation.

C. SOLVENT WELDING PVC pipe and fittings are to be joined using solvent welding. This method is to be performed in accordance with the instructions supplied by the primer, solvent cement, pipe, and fitting manufacturers. Generally, the method is as follows:

1. The joint is to be made by first squaring and deburring the end of the pipe. The pipe is to then be cleaned again to remove any dirt, dust, moisture, or other foreign matter.

2. Dry fit the pipe to ensure it inserts 1/3 to 2/3 of the depth of the socket.

3. To join the pipe with the fitting, first coat both the outside (male end) of the pipe and the inside (female) part of the fitting socket with an approved primer, such as Weld-On P-70 Primer. Without delay, apply an approved solvent cement, such as Weld-On 711 Cement, liberally to the male end of the pipe. Also, apply a light coating of cement to the female part of the fitting socket, followed by a second coating to the male end of the pipe.

4. Immediately insert the pipe into the fitting and turn the pipe 1/4 turn to properly seat the pipe, distribute the cement evenly, and remove any air bubbles. The pipe must seat to the bottom of the socket and be aligned properly to avoid undue strain to either the pipe or the fitting.

5. The joint should be held still and in place for a minimum of 30 seconds.

6. Wipe any excess cement from the pipe and fitting.

7. Allow the joint to cure for a minimum of 30 minutes before handling and a minimum of 4 hours before allowing water into the pipe.

D. THREADED JOINTS:

Where threaded joints are to be used, such as the riser connector to the sprinkler head, the Contractor shall adhere to the following:

1. Only factory formed threads are permitted. Field threading of plastic pipe will not be permitted under any circumstance.

2. All threaded plastic joints shall be treated with threaded joint sealant compound. The compound must be approved by the District for use on plastic pipe. The compound should be applied to the male end of the pipe only. Adhere to all applicable manufacturers' directions.

3. Align and tighten the pipe and fittings to properly engage threads. Caution must be exercised to not strip the threads.

4. Final tightening of the threaded joint shall be done with a strap-type wrench. Under no circumstance shall wrenches with metal jaws be used on plastic pipes and fittings. Do not over-tighten and strip the threads. Wrench tightening shall not rotate the joint more than one full turn beyond that of hand tightening.

E. During assembly and installation of the pipe and fittings, all openings shall be capped to prevent dirt or other debris from entering the assembly creating an obstruction and reduced system performance. Caps and plugs shall only be removed when necessary to continue assembly.

F. PVC pipe shall be installed in the trench with moderate "snaking" from side to side to allow for expansion and contraction. The pipe shall not be installed when the air temperature is below 40° Fahrenheit.

10.32 Copper Pipe and Fitting Installation and Connections

A. SOLDERING:

Copper pipe and fittings shall be joined using silver solder conforming to ASTM B206. All directions by the pipe, fitting flux, and solder manufacturers shall be followed. Generally soldering is as follows:

1. Copper is a soft metal and caution shall be exercised to not pinch or crimp the pipe or the fittings.

2. The pipe end shall be cut square using a wheel-type cutter. Do not apply excessive pressure that may damage the pipe. Cutters of other types are not permitted.

3. The pipe and fittings should first be cleaned to remove dirt, dust, moisture, or other foreign matter before beginning.

4. The fresh cut on the male end shall have any burrs or other extraneous materials removed.

5. The male end of the pipe and the female fitting socket shall be cleaned/polished with an emery cloth to remove any oxidation or residuals that can hinder the soldering process.

6. Wipe the polished areas with a clean cloth and take care to not touch these areas with bare hands as the oils in the hand can also inhibit the soldering process.

7. Apply flux to the male end of the pipe and the female fitting socket. Be sure to follow the manufacturer's directions. Application of flux is required as it helps the solder to be drawn into and bond the joint properly.

8. The pipe should be firmly inserted into the fitting and given a 1/4 turn.

9. Using the appropriate type of torch, the joint should be heated uniformly. Proper temperature is achieved when the solder is put into contact with the joint and the solder melts and is drawn into the joint forming an even bead along the outer edge of the joint.

10. Once cooled the joint is to be wiped clean and inspected to ensure proper solder fill and bonding.

11. The joint shall be allowed to cool completely before being handled and permitted to have water in the line. Do not attempt to aid the cooling process as this will deteriorate the quality of the joint.

B. THREADED JOINTS:

Should the District grant permission for the use of threaded joints in copper pipe and fitting assemblies, the Contractor shall adhere to the following:

1. All connections to threaded fittings shall be done using factory produced adapters only. Copper pipe may be field threaded only when absolutely necessary. Field threading shall be done accurately on the proper axis and done utilizing a sharp die. Any adapters are to be soldered to the non-threaded end of the assemblies (refer to above section on soldering).

2. All threaded copper joints shall be treated with threaded joint sealant compound. The compound must be approved by the District for use on copper pipe. The compound should be applied to the male end of the pipe only. Adhere to all applicable manufacturers' directions.

3. Align and tighten the pipe and fittings to properly engage the threads. Caution must be exercised to not strip the threads.

4. Final tightening of the threaded joint shall be done with a strap-type wrench. Under no circumstance shall wrenches with metal jaws be used on copper pipe and fittings. Do not over-tighten and strip the threads. Wrench tightening shall not rotate the joint more than one full turn beyond that of hand tightening.

C. During assembly and installation of the pipe and fittings, all openings shall be capped to prevent dirt or other debris from entering the assembly creating an obstruction and reduced system performance. Caps and plugs shall only be removed when necessary to continue assembly.

10.33 Brass and Galvanized Steel Pipe and Fitting Installation and Connections

The District does not generally permit the use of galvanized steel pipe and fittings. When permitted for use, both brass and galvanized steel joints are to be connected using threaded screw joints. The method for connecting threaded joints is as follows:

A. Field threading should be done only when absolutely necessary. Field threading shall be done accurately on the proper axis and done utilizing a sharp die.

B. All threaded joints shall be treated with threaded joint sealant compound. The compound must be approved by the District for use on the appropriate pipe. The compound should be applied to the male end of the pipe only. Adhere to all applicable manufacturers' directions.

C. Align and tighten the pipe and fittings to properly engage the threads. Caution must be exercised to not strip the threads.

D. Final tightening of brass threaded joints shall be done with a strap-type wrench. Under no circumstance shall wrenches with metal jaws be used on brass pipe and fittings. Metal jaw wrenches are permitted for use on galvanized steel pipe and fittings only. Do not over-tighten and strip the threads. Wrench tightening shall not rotate the joint more than one full turn beyond that of hand tightening.

E. During assembly and installation of the pipe and fittings, all openings shall be capped to prevent dirt or other debris from entering the assembly creating an obstruction and reduced performance. Caps and plugs shall only be removed when necessary to continue assembly.

10.34 Rubber Ring Seal Joint

When approved for use by the District, rubber or gasket seal joints should be assembled according to the manufacturer's directions. Mechanical or Flange Restraints shall be provided with the use of rubber ring seal joints.

A. RUBBER RING SEAL JOINT:

1. Factory produced male ends should be used whenever possible. All male ends made in the field shall match exact factory specifications.

2. Carefully clean the bell or coupling to remove any dirt, dust, moisture, or other foreign matter. Proper cleaning is necessary to ensure a proper seal.

3. Carefully insert and position the ring seal or gasket without applying lubricant following the directions of the manufacturer.

4. Lubricate the male end according to manufacturer's directions. Insert the male end as specified to the required depth. When inserting PVC pipe, do so by hand only and not with the aid of any tools.

5. Complete the joint with the installation of the proper coupling.

B. MECHANICAL/ FLANGE RESTRAINTS:

1. Mechanical / Flange Restraints shall be provided at every change of direction in the main line pipe and at every in-line valve to resist system pressure force.

2. Mechanical / Flange Restraints with the size determined by a soil safe bearing of 700 pounds per square foot load and in accordance with the manufacturer's minimum recommendations to withstand the maximum surge pressure against the soil type in which it is installed.

10.35 Backflow Prevention Units

The backflow prevention unit shall be carefully installed according to the manufacturer's directions between the water source and the irrigation system main line. Placement of the backflow prevention unit shall leave adequate spacing for the installation of a lockable-insulated enclosure, to allow easy access for maintenance purposes, and lightly screened by landscape planting. The unit will be inspected by the District as part of the main line test and inspection.

10.36 Reduced Pressure Backflow Preventer Assembly

The pressure vacuum breaker assembly shall be installed according to the manufacturer's directions and will be inspected by the District as part of the main line test and inspection.

10.37 Booster Pump

A. Booster pumps installations are required at all District maintained parks to increase the existing pressure, the booster pump shall be installed on the main line according to the manufacturer's directions and will be inspected by the District as part of the main line test and inspection.

B. Irrigation systems shall be designed and installed to complete an entire irrigation cycle within 7-hours whenever possible. Watering shall be scheduled to take place between the hours of 10 PM and 5 AM.

10.38 Master Valve and Flow Sensor

Central controlled irrigation systems shall include the appropriate master valve(s) and flow sensor(s) or combination units. Units shall be installed in accordance with manufacturer's directions.

10.39 Remote Control Valves and Valve Boxes

A. Remote control valves shall be installed as indicated on the Approved Landscape Plans and grouped together whenever practical.

B. Remote control valves shall be properly placed and with adequate spacing as follows:

    1. Valve boxes shall be provided for all remote-control valves. Each valve box shall contain only one remote control valve, without exception.

2. Locate valve boxes 12” away from and perpendicular to walkway edges, buildings, and walls.

3. Locate grouped valve boxes 12” apart and align the sides parallel to each other.

4. All valve boxes located near turf areas shall be located outside of play areas.

5. Whenever possible, all valve boxes shall be located in shrub/groundcover areas.

6. All valve boxes shall be heat stamped with the controller and station designation and be marked "IRRIGATION CONTROL VALVE."

C. After passing the main line pressure test, thoroughly flush the main line before installing any valves.

10.40 Automatic Irrigation Controller Wiring

A. CENTRAL CONTROLLED IRRIGATION SYSTEMS:

1. System design shall include provision of telephone service to central control unit.

2. Irrigation equipment and utility boxes shall be installed in planter areas and, where possible, shall be lightly screened with plant materials.

Contractor shall conform to all applicable automatic irrigation controller wiring standards detailed for non-central controlled systems.

B. NON-CENTRAL CONTROLLED IRRIGATION SYSTEMS:

1. When possible, the automatic controller wiring shall follow the same route as the pressure supply or lateral lines and shall be located within the same trench. When not possible, the automatic controller wiring shall be housed in PVC Sleeves and Conduits.

2. If more than one wire is to occupy the same trench, the wires shall be taped together or tied with cable ties at 10-foot intervals.

3. Expansion coils shall be provided. Expansion coils shall be formed by wrapping the required length around a 2-inch diameter pipe and then withdrawing the pipe. Requirements for expansion coils are as follows:

a. Provide a 3 foot expansion coil at each point of wire connection.

b. For wire runs greater than 100 feet in length, a 3-foot expansion coil shall be provided at each interval of 100 feet.

4. Splicing is only permitted on runs exceeding 2,500 feet. All splices shall be placed inside junction boxes with their exact locations shown on the As-Built Plans.

5. Connections shall be made by crimping the bare wire over a brass connector and sealing the connection with an epoxy resin sealer pack.

6. One spare wire of a color other than white shall be installed along the entire length of the mainline, running from the valve boxes to the automatic controller, for every 12 remote control valves. A minimum of 1 spare wire shall be installed if the project has fewer than 12 valves.

7. At each valve and at the automatic irrigation controller, the automatic irrigation controller wiring shall be labeled with a 2 1/4-inch X 2 3/4-inch polyurethane identification tag. The identification tag shall indicate the controller number and that valve's station number. The identification tag shall be attached to the controller wire.

10.41 Sleeves and Conduits

A. Sleeves for Irrigation shall be twice the diameter of the irrigation line and shall be a minimum of schedule 40. A spare 3” sleeve, capped at both ends, shall also be provided adjacent.

B. Sleeves shall be marked with a ball marker.

C. Sleeves and conduits are required for all wiring and irrigation lines when under any of the following conditions:

1. For all flow sensor cables of a central controlled irrigation system.

2. When the automatic irrigation controller wiring is not located in the same trench and along the same route as a pressure supply or lateral line.

3. When the automatic irrigation controller wiring passes under hardscape such as an area that is to be paved with concrete, asphalt and/or brick pavers.

4. For any exposed automatic irrigation controller wiring that will not be sheltered by any other means.

D. All sleeves and conduits shall meet the following requirements:

1. All underground sleeves and conduits shall be Schedule 40 PVC pipe and sized to allow for ample room to maneuver inserts.

2. Flow sensor cables of a central controlled irrigation system shall be run in 1-inch Schedule 40 PVC from the flow sensor to the automatic irrigation controller enclosure.

3. Underground sleeves and conduits shall extend a minimum of 12 inches beyond the edge of paved areas and curbs. Mark the horizontal edge of pavement with blue paint to indicate sleeve location.

4. Sleeve and conduit openings shall be provided with removable, non-decaying plugs to prevent the entrance of earth and other debris.

10.42 Automatic Irrigation Controller

Automatic irrigation controllers shall be installed as indicated on the Approved Landscape Plans. The exact location for mounting the controller will be determined by the District at the site.

A. The Contractor shall provide and install any additional equipment, materials, and labor needed for the installation and connection of the automatic irrigation controller, which may include electrical outlets, wiring, conduits, and sleeves.

B. The automatic irrigation controller shall be connected to a 120-volt disconnect switch and outlet that is located reasonably nearby for ease of maintenance.

C. The control wires shall be connected to the automatic irrigation controller in a sequential arrangement according to the assigned identification number of each valve as shown on the Approved Landscape Plans.

D. A complete irrigation schedule outlining water timing per valve, by month, over a twelve-month period, shall be provided as part of the construction documents.

10.43 Gate Valves

Gate valves shall be installed as indicated on the Approved Landscape Plans. Gate valves shall be installed according to the manufacturer's directions.

10.44 Sprinkler Heads

A. Sprinkler heads shall be located as indicated on the Approved Landscape Plans.

B. The line shall be thoroughly flushed before installing any sprinkler heads or quick coupler valves.

C. All manufacturer directions for installation shall be followed.

10.45 Equipment Enclosures

All equipment enclosures shall be installed according to the manufacturer's directions.

10.46 Adjustments and Corrections to the Irrigation System

The following adjustments shall be made in preparation for testing and to ensure optimum performance of the landscape irrigation system:

A. All sprinkler heads shall be flushed and cleaned. Disassembly of the sprinkler head may be necessary.

B. Sprinkler heads shall be adjusted for proper distribution, direction, and trim to eliminate over-spray or runoff onto walkways, roadways, buildings, and other areas not intended for irrigation during normal operation. Repeat cycles shall be programmed if the problems cannot be corrected with other adjustments.

C. The Contractor shall determine if coverage is adequate and shall inspect the system and notify the District if any changes are required for proper coverage, such as changes in nozzle size or degrees of arc of sprinkler heads. All changes must be approved by the District and noted by the Contractor on the As-Built Plans.

D. With the system under pressure, all joints shall be visually inspected for leaks. Any faulty joint shall be completely rebuilt. The use of any cement or caulking to seal a leak is strictly prohibited.

E. Upon completion, the irrigation controller shall be adjusted to provide the minimal amount of water required to sustain healthy plant growth based on E.T. data supplied by a District weather station. At no time shall a valve be programmed so that the precipitation rate of the sprinklers exceeds the infiltration rate of the soil causing excessive ponding or run-off.

10.47 Backfilling

Backfilling shall not be done until all required tests are performed and the District grants approval to backfill. The following are the requirements for backfilling:

A. In sensitive areas such as at bends or in rocky terrain, pipe shall be surrounded with sand. Provide a 4-inch bed of sand and cover the pipe with 4 inches of sand followed by remaining backfill material to a depth mandated for each pipe type.

B. Backfill in areas that are to be paved shall provide pipe with a 6-inch cover and a 4-inch bed of sand followed by remaining backfill material to a depth mandated for each pipe type.

C. The remaining backfill is to be of approved excavated material consisting of earth, loam, sandy clay, and sand. The backfill shall not contain any large clods, stones, or debris.

D. The backfill shall be mechanically compacted to a dry density equal to that of the surrounding undisturbed soil.

E. The backfill shall conform to the adjacent grades, without having any dips, humps, sunken areas, or other surface irregularities. The final grade shall be as specified on the Approved Landscape Plans.

10.48 Site Cleanup

A. The site shall be maintained in a clean condition as work progresses. Refuse and excess dirt shall be removed from the site and disposed of properly at the Contractor's expense. All walkways and other paved surfaces shall be swept and/or washed. The site shall be inspected for any damage caused either directly or indirectly by the Contractor. Any damage shall be restored to original condition.

B. After the installation of the landscape irrigation system, or otherwise directed by the District, the Contractor shall remove all trash, debris, surplus material, and unneeded equipment from the site. The site shall be maintained in an orderly fashion at all times.

SECTION 11 - PLANT SELECTION AND PLACEMENT

11.01 General Planting Concepts

A. All planting plans shall comply with applicable codes including AB 1881: the Model Water Efficient Landscape Ordinance.

B. Landscape design shall complement overall streetscape design, adjacent uses, and landscaping.

C. A minimum of one tree shall be provided for every 30 lineal feet of park/street frontage and in parking lot islands and edges. Trees shall be selected from the District tree list or shall be approved in writing by the District. Refer to SECTION 12 - PLANT LIST & USE STANDARDS.

D. Plant materials shall be selected so that they properly fit the allotted space and do not cause damage to surrounding pavement or other improvements. Design shall protect pavement from heaving upon tree maturation.

E. Parking, loading and service areas, utilities, solid building surfaces, soundwalls, and fences shall be screened with landscaping. However, clinging plant materials such as vines should not be placed in areas that will result in attachment to structures located outside of the District's right-of-way.

F. Parking areas shall be screened from streets with low shrubs, walls, and/or earth-berms at a 30-inch maximum height.

G. No shrubs shall be greater than 4 feet tall unless approved by District.

H. Landscape plants shall be selected from the District Approved Preferred Plant List unless otherwise approved by the District. These plants shall be low maintenance, drought tolerant or appropriate native species, and shall require little or no routine pruning. The District encourages plants that display variations in texture and form, with attention to flowering shrubs and seasonal color.

I. Plants shall be grouped by water requirements into hydro-zones.

J. Turf shall not be installed in areas less than 10 feet in width.

K. Turf shall not be installed on slopes exceeding 30%, or within 10 feet of existing Oak tree driplines.

L. Tree wells within hardscape must be a minimum of six feet in diameter or square.

M. Trees planted in natural areas shall be drought tolerant or appropriate native species.

N. Appropriate native hydroseed/seed drilling mix and native trees and shrubs shall be used on areas adjacent to open space, preserves, and waterways or drainage channels.

O. Select plant material that is appropriate and safe for parks.

11.02 Turf

A. Where turf is proposed, Tall Fescue or other approved drought-tolerant variety shall be specified.

B. Turf shall not be proposed on slopes exceeding 30%, or within 10 feet of existing oak tree drip lines.

C. Turf shall not be proposed in areas narrower than 6 feet wide. The square footage of turf shall be great enough to make turf maintenance cost effective.

D. Where mowed-turf abuts a different surface material, a concrete mow band shall be provided to facilitate maintenance (for example, at the base of fences and utility equipment in turf areas).

E. Turf shall only be used in areas where it serves a valuable recreational purpose and should not be used as general landscape area ground surfacing.

F. Turf is limited for use on no more than 2/3 of the available usable open space within any park site.

11.03 Planting near Utilities

A. The following are minimum setbacks that shall be adhered to in the planting of trees. All utility lines, vaults, overhead lines, and streetlights shall be indicated on the Landscape Plans to avoid conflicts.

1. Fire Hydrants: 10 feet
2. Driveways (top of wing): 10 feet
3. Stop Signs or Curb Returns: 15 feet
4. Electroliers: 15 feet
5. Storm Drain, Sanitary Sewer, Gas Lines: 10 feet
6. Water, Telephone, Electrical Main: 10 feet
7. Streetlights: 10 feet
8. Mail Boxes: 5 feet
9. Power Lines: 15 feet
10. Utility Poles: 20 feet

B. Above ground utilities and backflow prevention devices shall be lightly screened with landscaping.

C. Grading in the right-of-way shall accommodate proposed and existing utility vaults. In cases where walls around vaults are unavoidable, walls shall be masonry, concrete, or other permanent material.

D. Plant materials shall be selected so that they properly fit the allotted space and do not cause damage to underground utilities or other improvements.

E. Plant materials that require excessive regular pruning or shaping (weekly) shall not be used in any District maintained area.

F. Utilities trench shall not impact existing vegetation. Tree protection plans illustrating existing vegetation shall be provided where applicable.

11.04 Traffic Safety

A. Plants shall preserve sight distance at site entries and exits and internal circulation routes. Design of plant material within intersection view sheds must comply with all local codes.

B. Landscaping shall not obstruct building or parking lot light fixtures, address signs, street signs, building entrances, and windows.

C. All trees located less than 5 feet from the curb, sidewalk, or buildings shall have a root barrier. Root barrier does not wrap around the root ball but is installed along length of paving.

11.05 Water Conservation

A. The Estimated Total Water Use (ETWU) shall not exceed the Maximum Applied Water Allowance (MAWA).

B. Plant materials shall be grouped into appropriate hydrozones per estimated landscape water use.

C. Emphasis shall be placed on plants well suited to the microclimate and soil conditions at the given site and plants that require minimal water once established, are relatively free from pests and diseases, and are generally easy to maintain. Reference shall be made to Section 12 - PLANT LIST & USE GUIDE for recommended plant selections and grouping of like plant materials.

D. The Landscape Architect shall refer to the Sacramento County water ordinances and AB 1881 for additional requirements.

SECTION 12: PLANT LIST & USE GUIDE

12.00 Invasive Species

The planting of invasive species is prohibited anywhere in the Cordova Recreation & Park District. An invasive species is defined by the California Invasive Plant Council as a plant that "disrupts ecosystems by altering physical processes, displaces native plants, and degrades wildlife habitat". A full list of invasive species prohibited for use within the District can be found at: www.cal-ipc.org.

12.01 Approved Plant List

The provided plant material lists in this section outline the approved plants for use within the Cordova Recreation and Park District. Plant species listed are exact species and the Developer/Contractor may not specify or utilize alternative plant material without written approval from the District. Any requests from the Developer/Contractor to use alternative plant material must be made in writing with use of appropriate form and submitted to the District for approval.

12.02 Pollinators

The Cordova Recreation and Park District recommends the use of pollinators whenever possible. In the United States, pollinators include: butterflies, hummingbirds, the non-native European honeybee, and over 4,000 species of native bees.

Evidence of population declines of bees has prompted scientists to encourage changes in how we manage our public and private spaces. CRPD is committed to protect these important creatures. Providing wildflower-rich habitat is the most significant action that supports pollinators. Adult bees, butterflies, and other pollinators require nectar as their primary food source, and female bees collect pollen as food for their offspring. Native plants, which are adapted to local soils and climates, are usually the best sources of nectar and pollen for native pollinators. Incorporating native wildflowers, shrubs, and trees into any landscape promotes local biological diversity and provides shelter and food for a diversity of wildlife. Most natives require minimal irrigation, flourish without fertilizers, and are unlikely to become weedy.

12.02 Planting Zones

The Cordova Recreation and Park District is located within region two (2) as stated by the University of California Cooperative Extension, Water Use Classification of Landscape Species Guide.

Local Region: Region (2) Two

Central Valley (California Climate Zones 8, 9 and14), (CIMIS ETo Zones 12, 14, 15, and 16)

12.03 Area Type (AT)

The list below identifies zones to ensure 'Best Management Practices' when developing a landscape planting plan. The area types listed below correspond to the following plant list charts. Similar plants shall be grouped and placed in appropriate areas to ensure the greatest possible success of the plant material.

TYPE 1: Turf Area Planting:

TYPE 2: Non-Turf Area Planting:

TYPE 3: Accent / Specimen Planting Area:

TYPE 4: Wet / Storm-water Basin Planting Area:

TYPE 5: Adjacent to Streetscape Planting Area:

TYPE 6: Ecological Restoration / Natural Area Planting Area:

12.04 Water Use Area (WA)

The list below identifies water use areas to ensure 'Best Management Practices' when developing a landscape planting plan. The water use areas listed below correspond to the plant palette chart. Plants with 'like' water requirements shall be grouped and placed in similar water use area.

Zone H: High Water Use:

A landscape planting area designed where *applied water* is provided once-a week or more, commonly in or adjacent to turf areas and/or near aquatic features where overspray/splash will occur.

Zone M: Moderate Water Use:

A landscape planting area designed where *applied water* is provided two-three times per month during the warm seasons.

Zone L: Low Water Use:

A landscape planting area designed where little *applied water* is required.

Zone VL: Very Low Water Use:

A landscape planting area designed where minimal to no *applied water* will be provided, commonly referred to as *xeriscaping*.

Zone B: Variable Water Use / Street-side or Area Bioswale:

Typically refers to a Bioswale area where *applied water* is infrequent but heavy at times. Plants in this zone can accommodate periods of extended drought and periods of heavy precipitation provided by irrigation and/or street runoff. In most cases, plantings in this zone will be exposed to excessive soil pollutants. Plants selected must be compatible with these types of conditions.

Zone R: Temporary Supplemented Water Use:

A landscape planting area that would require no more than 3 years of *applied water* or a landscape planting area designed to have irrigation systems shut-off and/or removed after 3 years of use.

12.05 Key Legend

The list below corresponds to the following plant list charts. Review the charts and labeling, like plants shall be grouped and placed in appropriate Area Type (AT) and Water Use Areas (WA) to ensure the greatest possible success of the plant material.

Plant Type (PT):

T Tree
S Shrub
V Vine
Gc Groundcover
Tf Turf
P Perennial (includes: ferns, grasses, sedges and bulbs)
Bi Biennial

Other Characteristics (O):

E Evergreen Species
D Deciduous Species

Preferred Plants: Large Tree (T) List

Height and Spread 30’ to 100’

Botanical Name	Common Name	(O)	(PT): Size	(WA)	(AT)	Soil Type
Acer macrophyllum	Big Leaf Maple	D	T: 75x50	H	1, 2, 4	Most Soils
Acer negundo	Box Elder	D	T: 50x50	M	1, 2, 6	Not Defined
Acer rubrum	Red Maple	D	T: 60x40	H	1, 2, 4, 5	Most Soils
Alnus rhombifolia	White Alder	D	T: 90x40	H, B	1, 2, 4	Most Soils
Arbutus unedo	Strawberry Tree	E	T: 35x35	L	2, 3	Most Soils
Calocedrus decurrens	Incense Cedar	E	T: 75x20	M	1, 2	Most Soils
Cedrus deodara	Deodar Cedar	E	T: 80x40	M	2, 4	Well Drained
Cercidium fkiridum	Blue Palo Verde	D	T: 35x30	L	2	Good Drainage
Fagus sylvatica	European Beech	D	T: 85x55	H	1, 2, 5	Good Drainage
Ginkgo biloba	Maiden Hair Tree	D	T: 80x50	M	1, 2, 3, 5	Well Drained
Liriodendron tulipifera	Tulip Tree	D	T: 80x40	H	1, 2, 4	Well Drained
Nyssa sylvatica	Tupelo Tree	D	T: 50x25	M, B	1, 2, 4, 5	Most Soils
Pistacia chinensis	Chinese Pistache	D	T: 60x50	L	1, 2, 5	Good Drainage
Plantanus acerfolia	London Plane Tree	D	T: 80x40	M	1, 2, 4, 5	Most Soils
Plantanus racemosa	California Sycamore	D	T: 80x50	M	1, 2, 4, 5	Most Soils
Populus fremontii	Western Cottonwood	D	T: 60x30	M	6	
Quercus agrifolia	Coast Live Oak	D	T: 65x75	VL, R	2, 6	Good Drainage
Quercus douglasii	Blue Oak	D	T: 50x70	VL, R	2, 6	Good Drainage
Quercus kelloggii	Black Oak	D	T: 80x80	M	2, 6	Good Drainage
Quercus lobata	Valley Oak	D	T: 80x80	L, R	1, 2, 6	Good Drainage
Quercus palustris	Pine Oak	D	T: 80x40	M	1, 2, 4	Most Soils
Quercus rubra	Red Oak	D	T: 75x50	M	2	Good Drainage
Quercus wislizenii	Interior Live Oak	E	T: 75x85	VL, R	2, 6	Good Drainage
Sequoiadendron giganteum	Giant Sequoia	E	T: 100x50	M	1, 2, 4	Well Drained
Taxodium distichum	Bald Cypress	D	T: 70x30	M	1, 2, 4	Most Soils
Tilia cordata cvs.	Little Leaf Linden	D	T:50x25	M	1, 2, 5	Most Soils
Ulmus ‘Frontier’	Frontier Elm	D	T: 40x30	M	1, 2	Most Soils
Ulmus parvifolia	Chinese Elm	D	T: 60x70	M	1, 2	Most Soils
Zelkova serrata	Saw Leaf Zelkova	D	T: 60x60	M	1, 2, 5	Most Soils

Preferred Plants: Medium Tree (T) List

Height and Spread 15' to 30'

Botanical Name	Common Name	(O)	(PT): Size	(WA)	(AT)	Soil Type
Acer buergeranum	Trident Maple	D	T: 25x25	M	1, 2	Most Soils
Aesculus californica	California Buckeye	D	T: 25x25	L, R	2, 6	Most Soils
Cercis canadensis	'Oklahoma' Redbud	D	T: 30x30	M	1, 2, 3	Good Drainage
Cercis occidentalis	Western Redbud	D	T: 15x15	L, R	2, 6, 3	Good Drainage
Chionanthus retusus	Chinese Fridge Tree	D	T: 20x15	M	2, 3	Good Drainage
Cornus kousa	Kousa Dogwood	D	T: 20x20	H	2, 3	Most Soils
Cornus x 'Rutgan Aurora'	Aurora White Dogwood	D	T: 20x20	H	2, 3	Most Soils
Cornus x 'Rutgan Stellar Pink'	Stellar Pink Dogwood	D	T: 20x20	H	2, 3	Most Soils
Faijoa sellowiana	Pineapple Guava	E	T: 20x20	M	2, 3	Not Defined
Heteromeles arbutifolia	Toyon	E	T: 20x15	VL, R	2, 6	Most Soils
Lagerstroemia sp.	Crape Myrtle	D	T: Vary	M	1, 2, 3, 5	Good Drainage
Magnolia soulangiana	Saucer Magnolia	D	T: 25x30	M	2, 3	Most Soils
Malus floribunda	Japanese Flowering Crabapple	D	T: 25x20	M	2, 3	Most Soils
Olea europaea 'Monher'	'Majestic Beauty' Fruitless Olive	E	T: 30x25	VL	2, 3	Most Soils
Rhus lancea	African Sumac	E	T: 25x30	M	2	Good Drainage
Salix exigua	Sandbar Willow	D	T:	H	6	Good Drainage
Salix gooddingii	Gooding's Willow	D	T:	H	6	Good Drainage
Salix laevigata	Red Willow	D	T:	H	6	Good Drainage
Salix lasiolepis	Arroyo Willow	D	T:	H	6	Good Drainage
Styrax japonicus	Japanese Snowdrop Tree	D	S: 30x20	L	2, 3	Well Drained

Preferred Plants: Small Tree (T) List

Height and Spread 10’ to 20’

Botanical Name	Common Name	(O)	(PT): Size	(WA)	(AT)	Soil Type
Corylus ‘Contorta’	Harry Lauder’s Walking Stick	D	S: 10x10	M	2, 3	Most Soils
Fremontodendron	Flannel Bush	E	T: 15x12	L	2, 6	Good Drainage
Heteromeles arbutifolia	Toyon	E	T: 15x15	L	2, 6	Most Soils
Hibiscus syriacus ‘Aphrodite’	Aphrodite Rose of Sharon	D	S: 12x6	M	2	Most Soils
Hibiscus syriacus ‘Collie Mullens’	Collie Mullens Rose of Sharon	D	S: 12x6	M	2	Most Soils
Hibiscus syriacus ‘Diana’	Diana Rose of Sharron	D	S: 12x6	M	2	Most Soils
Laqerstroemia indica	Crepe Myrtle	D	T: Vary	M	2, 3, 5	Good Drainage
Leptospermum laevigatum	Australian Tea Tree	E	S: 15x15	L	2	Good Drainage
Leptospermum scoparium ‘Burgundy Queen’	Burgundy Queen New Zeland Tea Tree	E	S: 12x10	M	2	Good Drainage
Lindera obtusiloba	Japanese Spicebush	D	T: 15x15	M	2	Good Drainage
Magnolia stellata	Star Magnolia	D	T: 10x20	M	2, 3	Most Soils

Preferred Plants: Shrub/Perennial (S, P) List

Height and Spread Vary by Species

Botanical Name	Common Name	(O)	(PT): Size	(WA)	(AT)	Soil Type
Rosa x ‘Noatraum’	Pink Flower Carpet Rose	E	S: 2x3	M	2, 5	Good Drainage
Rosa x ‘Noare’	Red Flower Carpet Rose	E	S: 2x3	M	2, 5	Good Drainage
Rosa x ‘Noaschnee’	White Flower Carpet Rose	E	S: 2x3	M	2, 5	Good Drainage
Aloe vera	Medicinal Aloe	E	P: 1.5x4	L	2	Most Soils
Alyogyne huegelii	Blue Hibiscus	D	S: 7x7	L	2, 3	Most Soils
Artemisia douglasiana	Douglas Mugwort	E	P: 3xSPD	L, R	2, 6	Good Drainage
Baccharis pilularis	Dwarf Coyote Bush	E	P: 2x6	L	2	Most Soils
Ballota pseudodictamus	False Dittany	E	P: 1.5x2	VL	2	Good Drainage

Berberis thunbergii 'Aurea'	'Aurea' Barberry	D	S: 2.5x3	L	2, 5	Most Soils
Berberis thunbergii 'Crimson Pygmy'	'Crimson Pygmy' Barberry	D	S: 1.5x2.5	L	2, 5	Most Soils
Calamagostis x acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass	D	P: 2x2	M	2, 5	Most Soils
Callistemon viminalis 'Little Johns'	Little Johns' Bottle Brush	E	P: 3x3	L	2, 5	Most Soils
Camellia sasanqua 'Chansonette'	Chansonette Camellia	E	S: 3x8	M	2	Good Drainage
Carex albula 'Frosty Curls'	'Fosty Curls' Sedge	E	P: 2x2	M	2, 5	Most Soils
Carex buchanaii	'Fox Red' Leather Leaf Sedge	E	P: 3x2.5	M	2, 5	Most Soils
Carex divulsa	Berkeley Sedge	E	P: 1.5x2	M	2, 5	Most Soils
Carex elata 'Bowles Golden'	'Bowles Golden' Sedge	E	P: 2.5x1.5	M	2, 5	Most Soils
Carex morrowii 'Aurea Varigata'	Varigated Japanese Sedge	E	P: 1x1.5	M	2, 5	Most Soils
Ceanothus gloriosus 'Yankee Point'	'Yankee Point' Ceanothus	E	S: 3x10	L	2	Well Drained
Ceanothus maritimus	Maritime Ceanothus	E	S: 3x8	L	2	Well Drained
Cistus x pulverulentus 'Sunset'	'Sunset' Rock Rose	E	S: 2x7	L	2	Good Drainage
Coleonema pulchellum 'Sunset Gold'	'Sunset Gold' Pink Breath of Heaven	E	S: 1.5x4	M	2, 5	Fast Drainage
Cornus stolonifera 'Insanti Compact'	'Insanti' Compact Redtwig Dogwood	D	5x5	M	2, 3, 4	Not Defined
Cotoneaster apiculatus	Cranberry Cotoneaster	D	S: 3x6	L	2, 5	Most Soils
Cotoneaster dammeri 'Eichholz'	'Eichholz' Bearberry Cotoneaster	E	S: 1x6	L	2, 5	Most Soils
Cotoneaster horizontalis	Rock Cotoneaster	D	S: 3x15	L	2	Most Soils
Dianella revolute 'Little Becca'	Little Becca Blue Lily Flax	E	P: 2x2	M	2, 5	Good Drainage

Dianella revolute 'Little Rev'	Little Rev Blue Lily Flax	E	P: 2x2	M	2, 5	Good Drainage
Dietes bicolor	Fortnight Lily	E	P: 3x3	L	2, 5	Most Soils
Echeveria x imbricata	Hens and Chicks	E	P: .5x1	L	2	Most Soils
Echinacea purpurea	Purple Cone Flower	D	P: .5x2	M	2	Most Soils
Eriogonum umbellatum	Sulfer Flower	E	P: 2x4	L	2	Well Drained
Euonymus alatus 'Little Moses'	'Little Moses' Burning Bush	D	S: 3x3	M	2, 5	Most Soils
Euonymus fortunei 'Canadale Gold'	Canadale Gold Wintercreeper	E	S: 4x3	M	2	Most Soils
Festuca californica	California Fescue	E	P: 2x2	M	2, 6	Good Drainage
Festuca glauca	Common Blue Fescue	E	P: 1x1	L, R	2	Good Drainage
Festuca i. 'Siskiyou Blue'	Blue Idaho Fescue	E	P: 1x1	L, R	2	Good Drainage
Festuca idahoensis	Idaho Fescue	E	P: 1x1	L, R	2, 6	Good Drainage
Genista lydia	Prostrate Genista	D	P: 2x5	L	2	Good Drainage
Helictotrichon sempervirens	Blue Oat Grass	D	P: 3x3	L	2, 5	Well Drained
Hesperaloe parvifolia	Red Yucca	E	P: 3x3	L	2	Most Soils
Heuchera cv.	Coral Bells	E	P: 1.5x1.5	M	2	Well Drained
Iberis sempervirens	Evergreen Candytuft	E	P: 1x1	M	2	Well Drained
Juncus effusus	Rush	D	P: 2x2	H, B	2, 4, 6	Most Soils
Juncus patens	Gray Rush	D	P: 2x2	H, B	2, 4, 6	Most Soils
Kniphofia uvaria 'Flamenco'	'Flamenco' Red Hot Poker	E	P: 2x3	M	2	Most Soils
Lavandula angustifolia 'Hidcote'	'Hidcote' English Lavender	E	P: 2x2	L	2, 5	Well Drained
Lavandula dentata 'Goodwin Creek'	'Goodwin Creek' English Lavender	E	P: 3x4	L	2, 5	Well Drained
Lavandula x intermedia 'Grosso'	'Grosso' Hedge Lavender	E	P: 2.5x2.5	L	2, 5	Well Drained
Liriope mauscari	Big Blue Lilyturf	E	P: 1.5x2	M	2, 5	Good Drainage
Loropetalum chinense 'Suzanne'	'Suzanne' Fringe Flower	E	S: 3x3	M	2, 5	Well Drained
Lotus scoparis	Deerweed	E	P: 2x2	VL	2	Well Drained
Miscanthus sinensis 'Little Kitten'	Little Kitten Miaden Grass	D	P: 1.5x2	H	2	Most Soils
Muhlenbergia capillaries	Pink Muhly Deer Grass	D	P: 3x3	H	2	Good Drainage

Muhlenbergia capillaries 'Lenca'	'Regal Mist' Pink Muhly Grass	D	P: 2x3	H	2	Good Drainage
Muhlenbergia lindheimeri 'Autumn Glow'	Autumn Glow Muhly Grass	D	P: 3x3	H	2	Good Drainage
Muhlenburgia rigens	Deer Grass	D	P: 3x3	L	2, 5	Good Drainage
Myrtus communis 'Compacta'	Dwarf Myrtle	E	S: 3x3	L	2	Good Drainage
Osmanthus 'heterophyllus 'Goshiki'	'Goshiki' False Holly-leaf Osmanthus	E	S: 3.5x5	M	2	Most Soils
Pennisetum alopecuroides	Fountain Grass	D	P: 3x3	L	2	Most Soils
Penstemon 'Red Riding Hood'	'Red Riding Hood' Foothill Penstemon	E	P: 3x3	M	2	Well Drained
Penstemon heterophyllus	Foothill Penstemon	E	P: 3x3	M	2	Well Drained
Phormium hybrids 'Apricot Queen'	'Apricot Queen' New Zealand Flax	E	P: 3x5	L	2	Most Soils
Phormium hybrids 'Platt's Black'	'Platt's Black' New Zealand Flax	E	P: 3x4	L	2, 5	Most Soils
Phormium hybrids 'Sundowner'	'Sundowner' New Zealand Flax	E	P: 5x5	L	2	Most Soils
Phormium tenax 'Jack's Spratt'	'Jacks Spratt' New Zealand Flax	E	P: 1.5x1.5	L	2, 5	Most Soils
Phormium tenax 'Rainbow Warrior'	'Rainbow Maiden' New Zealand Flax	E	P: 3x3	L	2	Most Soils
Pittosporum tobira 'Crème de Mint'	'Crème de Mint' Pittosporum	E	S: 2x2.5	M	2, 5	Most Soils
Pittosporum tobira 'Wheeler's Dwarf'	'Wheeler's Dwarf' Pittosporum	E	S: 3x5	M	2	Most Soils
Rhamnus californica 'Seaview"	'Seaview' Coffeeberry	E	S: 1.5x8	L	2	Most Soils
Rhaphiolepis indica 'Ballerina'	'Ballerina' Indian Hawthorne	E	S: 2x4	M	2, 5	Most Soils
Rosmarinus officinalis 'Roman Beauty'	'Roman Beauty' Rosemary	E	S: 3x2	L	2	Most Soils

Salvia spathacea	Hummingbird Sage	E	S: 2x4	M	2	Good Drainage
Salvia x sylvestris	Meadow Sage	E	S: 2x2	M	2	Good Drainage
Santolina chamaecyparissus	Lavender Cotton	E	P: 2x3	L	2	Well Drained
Saponaria ocymoides	Soapwort	E	P: 1x3	L	2	Most Soils
Sedum x 'Autumn Joy'	'Autumn Joy' Sedum	E	P: 2x2	L	2, 5	Most Soils
Solidago	Goldenrod	E	P:2x2	M	2	Most Soils
Spiraea 'Goldflame'	'Goldflame' Spiraea	D	S: 2.5x2.5	M	2, 5	Most Soils
Spiraea 'Goldmound'	'Goldmound' Spirea	D	S: 3x4	M	2	Most Soils
Stipa gigantea	Giant Feather Grass	D	P: 3x3	L	2, 5	Most Soils
Teucrium f. 'Compactum'	Compact Blue Bush Germander	E	S: 3x3	L	2	Well Drained
Teucrium x lucidrys 'Nanum'	Dwarf Germander	E	P: 1x2	L	2	Well Drained
Tulbaghia violacea	Society Garlic	E	P: 1.5x1.5	M	2, 5	Well Drained
Tulbaghia violacea 'Silver Lace'	Silver Lace Society Garlic	E	P: 1.5x1.5	M	2, 5	Well Drained
Zauschneria californica	California Fuchsia	E	P: 3x3	L	2	Most Soils

Preferred Plants: Vine(V) List

Height and Spread Vary by Species

Botanical Name	**Common Name**	**(O)**	**(PT): Size**	**(WA)**	**(AT)**	**Soil Type**
Parthenocissus quinquefolia	Virginia Creeper	D	V: 40x40	M	2, 5	Most Soils
Ficus pumila	Creeping Fig	E	V: 25x30	M	2, 5	Most Soils
Hardenbergia violacia	Lilac Vine	E	V:10x10	M	2	Well Drained
Jasminum polyanthum	Pink Jasmine	E	V: 20x20	M	2	Most Soils
Parthenocissus tricuspidata	Boston Ivy	D	V: 30x30	M	2, 5	Most Soils
Solanum laxum	Potato Vine	E	V: 30x30	M	2	Most Soils

Preferred Plants: Groundcover (Gc) LIST

Height and Spread Vary by Species

Botanical Name	Common Name	(O)	(PT): Size	(WA)	(AT)	Soil Type
Arctostaphylos u. 'Green Supreme'	'Green Supreme' Bearberry Manzanita	E	Gc:.5x10	L	2, 5	Most Soils
Arctostaphylos u. 'Wood's Compact'	'Wood's Compact' Bearberry Manzanita	E	Gc: .5x10	L	2, 5	Most Soils
Arctostaphylosu. 'Point Reyes'	'Point Reyes' Bearberry Manzanita	E	Gc: .5x10	L	2, 5	Most Soils
Cerastium tomentosum	Snow in Summer	E	Gc: .8x3	M	2, 5	Good Drainage
Cercocarpus betuloides var. blancheae	Island Mountain Mahogany	E	Gc: .8x3	VL	2, 5	Good Drainage
Myoporum parvifolium	Myoporum	E	Gc: .5x9	M	2, 5	Most Soils

Preferred Plants: Turf (Tf) List

GENERAL PARK USE

80/20 Turf Mix (or approved equal): Full sun to light shade

80% Turf-type Tall Fescue
20% Kentucky Bluegrass
Minimum Purity 98% Maximum Crop 0.50% and Weed 0.05% Minimum Germination 85%

Seed: 8-10 pounds/1,000 square feet.
Emergence: 14-21 days
Establishment: 70 days

Sports Fields shall be 100% Bermuda

CALIFORNIA NATIVE LAWN SUBSTITUTE

Native Perennial Turf (or approved equal): Erosion and weed control, lawn substitute

90 % Molate Red Fescue
5 % San Diego Bent grass

5% Achellea millefolium

Note: Once established, low maintenance and no-irrigation required. Mow once or twice a year. Provides minimal color in the summer when grasses go dormant. The plants are active with winter rains. Plant before the first rains into a finely worked seedbed - may require supplemental irrigation and weed control during the first year to aid establishment.

Cordova Recreation & Park District

Construction Details