



# City of Henderson Public Works, Parks and Recreation Department Standardized Design Guidelines



**City of Henderson, Nevada**  
**Public Works, Parks and Recreation Department**  
**Standardized Design Guidelines**  
**City Council approved July 2016**



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# City of Henderson

## Public Works, Parks and Recreation Department

### **Vision Statement**

To be America's premier community.

### **Purpose Statement**

To provide premium services and sustainable infrastructure to meet the existing and future needs of our community.

### **Accreditation**

The City of Henderson Public Works, Parks and Recreation Department is accredited through the Commission for Accreditation of Park and Recreation Agencies (CAPRA).

To achieve accreditation, the department was required to meet over 140 standards covering all operations contained in leisure services. These professional standards serve as an aid for improving performance and maintaining quality. They provide park and recreation agencies with an ability to evaluate their operation, while achieving and maintaining a level of efficiency and effectiveness. The department achieved accreditation in 2001, 2006 and 2011. Reaccreditation will occur in 2016.



In keeping with the standards and in endeavoring to achieve the vision of the City of Henderson's leadership and citizens, the Public Works, Parks and Recreation Department provides landscape and design guidelines.

### **Introduction**

The design guidelines are prepared in compliance with Henderson Municipal Code 19.7.10.H. They are based on past experiences, practices, and industry standards that have proven successful during design, construction, operation, and maintenance of the city's park and recreation facilities.

The City of Henderson Public Works, Parks and Recreation Department Standardized Design Guidelines are provided as a resource to the development community and design professionals to aid in the design and construction of public spaces within the City of Henderson. The city may, at its sole discretion, alter or amend these guidelines at any time. Deviations from the guidelines may be acceptable provided they are approved prior to implementation.

### **Intent**

The intent of this document is to provide the designer with a "look and feel" guideline. References to specific products or amenities are for the purpose of example and are not intended to be sole sources or endorsements of any product, manufacturer, or supplier.

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## II Trails

The City of Henderson trail system provides opportunities for recreation, education and alternate transportation. Trails provide access to recreation areas, recreation centers, schools, commercial districts, employment centers, and open spaces.

Generally trail corridors provide connectivity for pedestrians, bicyclists, equestrian riders and other users and are located adjacent to streets and highways; along utility, drainage, and transportation corridors; or as standalone corridors. Trails may be improved or unimproved corridors and consist of concrete, asphalt, soft or natural surfaces, or stabilized decomposed granite.

Along with this document there are several plans, manuals and guidelines that should be used to assist with the implementation of trails.

- Master Bicycle and Trails Plan
- Open Space and Trails Plan
- Lake Mead Parkway Trail and Wetlands Trail Phase II Master Plan
- St. Rose Parkway Trail Design Guidelines
- Boulder Highway Landscape Design Manual
- Union Pacific Railroad (UPRR) Trail Master Plan
- City of Henderson Municipal Code and Development Code

Refer to Section X Landscape, Section XI Irrigation, Section XII Complete Streets, Section XIII Lighting, Section XIV Parking Lots, Section XV Signage, Section XVI Site Furnishings, and Section XVIII Accessibility for more information.

### Agency Coordination

Many trails in Henderson shall require coordination with other agencies and entities for review and approval. Please review trail locations carefully as some require coordination and/or approvals from adjacent jurisdictions as well as utility companies and transportation authorities.

### DESIGN NOTE

Accessibility to City of Henderson facilities must be a consideration for the designer. Although there are cases where accessibility may not be feasible, the design should include access for as many users as possible.

### Crossings and Intersections

When an existing or proposed trail alignment crosses a street, driveway or intersection, the trail shall be designed to minimize conflicts and encourage safe passage. Work with Park Planning on the appropriate design options.

- Bridges

- Undercrossings
- Trail intersection and driveway crossings
- Mid-block crossings

### **Easements and Permitting**

Trails shall be constructed entirely within the right-of-way or completely outside of the right-of-way. If trails are constructed outside of the right-of-way, a public access easement shall be required. Revocable permits, vacations, and right-of-way dedication may be required. Contact the Public Works, Parks and Recreation Department's Right-of-Way Division to determine the appropriate actions required.

### **Equestrian Trails**

Equestrian trails shall be soft or natural surface and separated from other uses. Equestrian trails should be a minimum of eight feet wide to accommodate the passing of two riders. The composition of the trail is generally scarified native earth or a minimum of three inches of stabilized quarter-inch minus decomposed granite. In cases where soil stabilization or drainage is a consideration, the makeup of the trail surface should be engineered fill. In general, equestrian trails should be unobstructed, and free from objects larger than one-inch in diameter, including stones, roots or other material.

### **Gateways and Access Points**

When trails cross major roads, gateways shall be designed to identify the trail at a distance. Each trail shall have a unique design that showcases that trail. Trail gateways shall include monuments, signage, public art, unique pavement design and lighting. Where trails cross minor roads and at access points, the trail shall, at a minimum, have identifying signage.

### **Maintenance**

Trail facilities for each project will require the construction documents to call out if the trail will be publicly or privately maintained. Contact Park Planning to determine the appropriate designation.

### **Public Art**

Art along trails is encouraged and may be required. Contact Park Planning to discuss.

### **Signage**

Signage is required for all trails and shall include, but not be limited to, mile markers, trail identifiers, emergency locators, wayfinding, regulatory, warning, kiosks, trail maps, and interpretive. Trails signs are to be placed so that the bottom of the sign is a minimum of four feet and a maximum of five feet above the nearest paved edge.

### **Site Furnishings**

- Trash receptacles and dog waste stations shall be placed at the beginning and end of the trail and at access points.
- Benches shall be placed approximately 1,200-foot intervals and shall be shaded by a shade structure or trees.

- Recycling waste receptacles shall be placed at all trailheads.

### **Striping and Pavement Markings**

Striping and pavement markings shall be per AASHTO standards. Refer to the *Manual on Uniform Traffic Control Devices* (MUTCD) for size and color requirements unless otherwise stated in city trail specific master plans and guidelines.

- All trails shall have centerline striping, stop bars, and no passing striping.
- Trail specific markings may also include:
  - Striping for non-standard trail conditions (e.g., reduced trail width and objects within the clear zone)
  - Preformed words and symbols
  - Warnings
- The Nevada Department of Transportation (NDOT) requires clear zones be maintained in NDOT right-of-ways. The clear zone shall be a traversable and unobstructed roadside area approximately 30 feet beyond the edge of the outside travel lane. The clear zone width is determined by the roadway design, traffic volume, speed, and curvature.

### **Surfacing**

Paved trails shall be constructed of asphalt, concrete, or porous pavement.

- Asphaltic concrete trails shall be a minimum of 12 feet wide and constructed of two inches of asphalt over four inches of compacted type II aggregate base.
- Concrete trails shall be a minimum of ten feet wide and constructed of four inches of Portland cement concrete with a rough broom finish. The base material shall be four inches of compacted type II aggregate base. Half-inch expansion joints shall be provided at a maximum of 30 feet on center. Score joints shall be provided at a maximum of ten feet on center or as determined by the width of the trail.
- Porous pavement trails shall be ten feet wide. The trail shall be designed and constructed per industry standard porous pavement requirements.

Soft surface trails shall be constructed of compacted decomposed granite (dg), stabilized dg, or graded native earth.

- Soft surface trails shall be relatively smooth with no vegetation, roots, or other materials larger than one-inch diameter.
- Multi-use trails shall be 12 feet wide and single track trails shall be two feet wide.
- Stabilized decomposed granite trails shall receive soil stabilizer.

### **Trailheads**

Trailheads are the start and end point for many trail users. They provide connections to other trail systems and include, but are not limited to, parking, restrooms, shade structures, drinking fountains, signage, waste receptacles, seating, and bike repair stations. Each trailhead shall be designed per the individual trail corridor unless otherwise noted in trail specific guidelines and master plans.

**Visibility and Clear Zones**

All sight visibility and clear zones shall meet current City of Henderson and county requirements and codes. See Section X Landscape for more information.

- Provide a three-foot minimum horizontal clear zone between any vertical object and the edge of a trail.
- The bottom of signs shall be placed between four and five feet above the nearest paved edge.

**Utilities**

Separate utility meters must be provided for both water and electrical power, and shall be located in the public right-of-way. The exact location of the meters will be determined by the utility providing service. Connections to all utilities shall be shown on the civil plans. The plans shall state the developer is responsible for acquiring utility connection and the related costs. Once the facilities are approved and accepted by the City of Henderson, the utility responsibilities will be transferred to the city if the trail will be maintained and owned by the city.

## DESIGN NOTE

Crime prevention through environmental design (CPTED) shall be part of every trail and park design in the City of Henderson.

"CPTED is the proper design and effective use of the built environment which may lead to a reduction in the fear and incidence of crime, and an improvement of the quality of life." - National Crime Prevention Institute

The Four Strategies of CPTED

**1. Natural Surveillance** - A design concept directed at keeping intruders easily observable. Promoted by features that maximize visibility of people, parking areas and building entrances: doors and windows that look out on to streets and parking areas; pedestrian-friendly sidewalks and streets; front porches; adequate nighttime lighting.

**2. Territorial Reinforcement** - Physical design can create or extend a sphere of influence. Users can develop a sense of territorial control while potential offenders perceiving this as discouraging. This can be achieved by defining property lines and distinguishing private from public spaces using landscape plantings, pavement designs, gateway treatments, and CPTED fences.

**3. Natural Access Control** - A design concept directed primarily at decreasing crime opportunity by denying access to crime targets and creating an offenders perception of risk is gained by designing streets, sidewalks, building entrances, and neighborhood gateways that clearly indicate public routes and discourage access to private areas with structural elements.

**4. Target Hardening** - Accomplished by features that prohibit entry or access: window locks, door dead bolts, and interior door hinges.

# III Parks

## General Information

It is the intent of the City of Henderson Public Works, Parks and Recreation Department to design and construct state-of-the-art parks. Amenities provided will vary from park to park.

## Park Types

The City of Henderson has classified its parks into the following categories:

- **Pocket Parks**  
Generally less than five acres, these facilities are used to address limited activities or recreational needs. Generally landscaped areas, picnic shelters, and small play structures are included. Access to these sites is generally by interconnected trails, sidewalks, or low volume residential streets, and off-street parking is usually not available.
- **Neighborhood Parks**  
Generally five to ten acres, the facilities are designed to accommodate residents within a one-half to one-mile radius. Neighborhood parks are the basic unit of the park system and serve as the recreational and social focus of the neighborhood.
- **Community Parks**  
Generally ten to 25 acres, the facilities are gathering spots for multiple neighborhoods, and are designed to accommodate residents within a 1.5- to 2.5-mile radius. They offer both active and passive recreation and often include programmable facilities such as ball fields and/or multi-use fields.
- **Regional Parks**  
Generally large areas that provide numerous destination facilities such as ballfields, these facilities may also include play areas, water features, trails, and trailheads. These facilities provide amenities to host large events and may be as large as 100 acres. Generally large areas that provide numerous destination facilities, they serve a broader purpose than community parks and are used when community and neighborhood parks are not adequate to serve the needs of the community. Regional parks may also have unique elements and may include sports complexes, plazas, water features, and other specific site furnishings.

It is desirable for each park to have a unique element and identity. The use of plantings, plazas, water features, trails, site furnishings, and public art can enhance the park identity. The use of site-specific topography is also encouraged to add to elements of individuality to each park.

## Trailheads

An area or location having an information kiosk for a trail, the facilities may be stand-alone or may be located inside a park and may have other amenities.

**Trails**

Multi-purpose trails located within greenways, parks, and nature areas or along transportation or utility corridors, trails provide connectivity to neighborhoods and other parks and facilities and may be constructed of various materials including asphalt, decomposed granite, or native soil.

**Open Space**

Open space is defined as “an interconnected system of protected lands that are conserved in their natural state, restored or improved with appropriate native landscaping to retain a natural or natural-appearing condition.” Open space areas provide resource conservation; visual, wildlife, and recreational benefits; and relief from urban development. Allowed uses vary depending upon resource sensitivity and management objectives, but some areas can accommodate passive recreational uses and facilities such as trails, trailheads, overlooks, rest areas, and interpretive signage.

**General Requirements**

City of Henderson parks are designed and amenitized according to level of service (LOS) methodologies. These methods suggest that communities determine level of service through research, including surveys of park usage and residents’ interests, combined with insight into social and economic characteristics. City of Henderson levels of service are determined in its Parks and Recreation Master Plan.

Materials used in parks shall be new and without flaws or defects of any type, and shall be the best of their class and kind. Certain manufacturers and part numbers may be referenced in this document. Alternative bid proposals that propose complete pre-fabricated packaged mechanical and electrical components may be submitted for consideration by the owner. Alternative proposals must be fully supported by the manufacturer's catalog data, tables and/or calculations showing compatibility/comparability with the specified material, and will be entertained following the selection of the contractor.

**Manufacturers**

If all of the parameters, specifications, and design intent of the drawings are met, manufacturers with acceptable equipment model/series designation(s) would be acceptable for use. “Or Approved Equal” substitutions are acceptable, but must be submitted for approval to the Public Works, Parks and Recreation Department.

**Restroom Buildings**

Refer to Section IX Restroom Buildings for detailed information.

### **DESIGN NOTE**

The design of each restroom facility in City of Henderson parks must consider preventing access to the roof of the structure. Features such as drinking fountains, privacy walls, electrical boxes, and gates should be designed to prevent climbing to access the roof of the building.

#### **Parking and Circulation Requirements**

The use of decorative pavement areas in plazas and entries is encouraged. Vehicle access to these areas is required. The use of removable bollards to hinder public access may be required. Refer to Section XIV Parking Lots for more information. All parking lots shall be lighted. Refer to the Section XIII Lighting for more information.

#### **Playgrounds**

All parks shall be designed to provide a play area for children. The play areas (two separate) shall accommodate ages 2-5 and ages 5-12. Refer to the Section IV Playgrounds for more detailed information. All tot lot and playground facilities must be lighted. See Section XIII Lighting for more information.

#### **Open Space and Play Areas**

Open turf and passive play areas shall be three acres minimum, unless otherwise noted. See Section X Landscape for more information.

#### **Site Furnishings**

The following site furnishings are typical amenities found within parks. Quantities will vary based on the park size and need. Refer to the Section XVI Site Furnishings for more detailed information.

- Barbecue grills
- Picnic ramadas
- Drinking fountains
- Dog waste receptacles
- Picnic tables
- Trash receptacles
- Benches
- Signage
- Dog parks

Trash enclosures are required for parks. The design shall complement the park as well as comply with standards for Republic Services and Community Development. Refer to Section VIII Trash Enclosures for more information.



### **DESIGN NOTE**

The City of Henderson has a goal to provide a park within a half-mile of every resident.

#### **Required Amenities**

The City of Henderson Parks and Recreation Master Plan should be referenced in all park planning and design efforts.

#### **Circulation**

Paths within parks shall be designed to provide the most efficient flow possible. The design shall also consider maintenance and its pattern during the design of a park. The following are minimum requirements to meet for paths located within parks:

- Paths shall be a minimum of eight feet wide
- Constructed of 4-inch thick concrete
- All circulation paths within a park must be lighted per Section XIII Lighting and be ADA compliant

Paved access roads to sewer and storm drain facilities shall be a minimum of 12-feet wide. Access roads must be engineered to meet site conditions and recommendations of the soils report. Refer to Section II Trails for more information.

#### **Lighting**

Lighting shall be incorporated into the design of parks and shall follow CPTED guidelines. This applies to all aspects of a park including but not limited to: parking lots, plaza areas, playground areas, shade structures, rest rooms, and along all walking paths. Refer to the Section XIII Lighting for more detailed information.

#### **Irrigation**

All parks within the City of Henderson shall be designed to feature the most efficient irrigation design possible. See Section XI Irrigation for more detailed information such as the design of the system, acceptable manufacturers, and audit requirements.

# IV Playgrounds

## Safety

All playground equipment and surfacing shall meet or exceed the safety provisions and requirements specified in the latest versions of:

- Consumer Product Safety Council (CPSC) Handbook for Public Playground Safety
- ASTM F1487, Standard Consumer Safety Performance Specification for Playground Equipment for Public Use
- ADA Final Accessibility Guidelines for Play Areas as published by the Architectural and Transportation Barriers Compliance Board
- ASTM F1292, Standard Specification for Impact Attenuation of Surfacing Material
- ASTM F355, Standard Test Method for Impact Attenuation of Playing Surface Systems and Materials
- ASTM F2049, Standard Safety Performance Specification for Fences/Barriers

The play area shall have cushioned flooring in conformance with NRPA playground safety and ADA requirements, and shall bear the IPEMA certification seal.

## General Requirements

Crime Prevention Through Environmental Design (CPTED) is a part of every trail and park design in the City of Henderson. CPTED is a multi-disciplinary approach to deterring criminal behavior through environmental design. CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts.

Fabric shade structures with lighting over the playground are recommended to the greatest extent possible in compliance with City of Henderson CPTED standards and ASTM F1487, latest edition. Shade is not required over swing sets. If a shade structure is provided, roofs on playground equipment should not be included. Refer to Section XIII Lighting and Section XVI Site Furnishings for additional information.

The grade across a playground is to be less than two percent.

Provide a one-foot buffer of playground surfacing around all playground fall zones to allow for adjustment of playground equipment during construction, where applicable.

Wrought iron security fencing is to be provided when playgrounds are near streets or as otherwise directed by the Public Works, Parks and Recreation Department. If fencing is required, provide a non-climbable fence with a self-closing gate and ADA latch that latches to the outside around the playground to meet ASTM F2049, latest edition. Refer to Section XVI Site Furnishings for more information.

Separate water features from playgrounds.

If turf is installed near the playground there shall be a three-foot minimum buffer from playground surfacing.

### **Playground equipment**

Provide separate toddler (2-5 years old) and children's (5-12 years old) tot lot structures with play surfacing.

Provide separate toddler and children's swing areas with play surfacing.

Design equipment to have multiple play elements accessible to all users.

Provide 3-D drawings of the playground equipment layout, including swings.

Age appropriate signage shall be installed so that it is readily visible and be freestanding out of the use zone. Playground manufacturer signs shall be used for each age group and shall meet ASTM requirements. Include detail in construction documents for review during design phase. Signage shall include, but is not limited to:

- intended age range for product
- supervision recommended
- warning message regarding removal of helmets, drawstrings, or accessories around the neck
- hot play surfaces/surfacing warning
- manufacturer's identification

Recommended manufacturers:

- Miracle
- Kompan
- Approved equal

### **Playground Surfacing**

Playground surfacing thickness must meet fall heights requirements per ASTM and as determined by the playground surfacing manufacturer.

All playground surfacing shall have a sub base consisting of a four-inch-thick 95 percent minimum compacted type II base material with two-inch-thick concrete slurry, 2,500 psi minimum.

#### **Poured in Place**

Poured in place playground surfacing shall be a two-layer system consisting of a cushioned base and a wearing course or a one - layer system. Specify colors and patterns on plan sheets.

Provide a top coat as a sealer

- Flex grout
- Playground pavement

- Approved equal

Two-layer system: The wearing (color) course shall be ½-inch thick minimum EPDM rubber granules bonded with an aliphatic binder. The cushion layer should be a mixture of black recycled SBR rubber buffing mix to meet CPSC and ASTM standards.

- Recommended products
  - Tot Turf
  - FlexGround
  - Approved equal

One- layer system: bonded wood chips comprised of wire-free, cleaned recycled rubber and polyurethane binder to meet CPSC and ASTM standards.

- Recommended products
  - GT Imact
  - Tot Turf bonded rubber
  - Approved equal

### **Artificial Turf**

Artificial turf playground surfacing shall have a grass height of 1.5 inches, minimum face weight of 60 ounces and a minimum total weight of 90 ounces. A shock pad of at least ¾ inches shall be used on all installations with no infill material (sand or rubberized pellets) added. Material to be lead free.

Recommended products:

- SYNlawn
- FlexGround FlexGrass
- Approved equal

For high use/trample zones: High use or trample zones include the area under swings, at the bottom of slides, and other areas subject to excessive or concentrated wear.

- Synlawn SYNBermuda Premium 200/220
- Flexground Flexturf
- Approved equal

For all other (non- high use/ trample zone) play areas:

- Synlawn SYNTipede 322/351 Platinum
- Flexground Flexgrass
- Approved equal

### **Notes:**

The following information shall be included in the plans/specifications:

- A playground audit will be required by a NRPA certified playground safety inspector (CPSI)
- Only manufacturer-certified installers shall be used for playground installations
- Allergen free
- Provide documentation that all materials are free from lead or other heavy metals
- Warranty all materials per manufacturer recommendations from date of substantial completion
- Warranty installation for a minimum of one year from date of substantial completion
- Playground surfacing thickness to meet fall heights requirements per ASTM and as determined by the playground surfacing manufacturer
- Installation company must be licensed in the state of Nevada and Clark County
- Provide physical samples of surfacing

# V Spray Pads and Water Features

## General

- The inclusion of spray (splash) pads and other water features is on a limited case-by-case basis and must be approved by the City of Henderson Public Works, Parks and Recreation Department.
- All vertical concrete or masonry surfaces within 100 feet of the play features shall be treated with a non-slip waterproof sealer prior to startup.
- All materials must meet NSF Standard 50 for swimming pool locations.
- All fittings, bolts, nuts, washers and miscellaneous hardware shall be stainless steel, silicone bronze, brass, or plastic.
- Hanger strut material will be a plastic composite or corrosion resistant material.
- Play surface material is to be approved by the City of Henderson Public Works, Parks and Recreation Department.
- A dedicated water meter or totalizer shall be provided at each water feature for water consumption tracking.
- 1-inch quick coupler valve with swivel and key is to be installed in-ground with a lockable cover near the water feature for garden hose connections.
- Fencing is required around a spray pad in accordance to NAC 444.136. A variance may be obtained for a four-foot-high barrier in lieu of a six-foot-high barrier. The barrier is measured from the top of the bottom stringer to the top of the top stringer. All materials used must be corrosion resistant, aluminum, stainless steel or plastic. All gates shall be self-closing and self-latching with provisions for key or padlock locking. All hinges shall be of ball-bearing type with grease fittings.

### DESIGN NOTE

All structural items such as concrete slabs, footings, etc. to be constructed must be designed to meet site conditions. It is the responsibility of the design professional to review the related information and provide facilities that are suitable for the intended use.

## Design Criteria

### Concrete Surfaces

- The concrete play area pad shall be a minimum of four-inch thick, 4,500 psi concrete with #5 rebar four feet on center with a light broom finish to receive play surface material.
- Bare concrete surfaces shall have no peaks and valleys, to prevent

- ponding.
- Any new concrete surfaces for EPDM applications must have a brushed (rough) finish and be allowed to cure in accordance with EPDM manufacturer recommendations.
  - A key or V-groove must be installed into the concrete at all perimeters, around drains, nozzles and any other structures. All such V-grooves must be caulked with a polyurethane rubberized caulk for expansion, to prevent water seepage through cracks.
  - All nozzles and structures penetrating the concrete must have a “cup” allowance to be caulked and/or sealed, about one-inch deep, below the rest of the concrete surface.
  - The concrete surfaces must be prepared in accordance with manufacturers’ recommendations.
  - The concrete surfaces must be pre-sealed with a roller upon rubber installation, for advanced adhesion.
  - A concrete collar shall extend five to ten feet beyond the wet area, beyond perimeter drains, as determined by the city. It is preferred that a trench drain separate the concrete from the play surface material.

#### **Resilient Surface**

- Resilient surface shall be angular EPDM, a mixture of various sizes and colors, such as Rubaroc, Flexground, or approved equal.
- EPDM rubber surfaces color mixture(s) – 60 percent predominant color (such as blue, red, green, etc. – “bright colors”) with four other contrasting colors (such as brown, tan, eggshell white and black – “desert colors”), 10 percent each and two of the 10 percent colors to have small rubber granules (unless all colors are already a mixture of various sizes), unless otherwise approved.
- Contractor must provide, upon completion of a new installation, five gallons of the EPDM material premixed colors for future repairs (of each color combination used).
- All new EPDM surfaces shall be allowed to fully cure for five days, prior to the application of a finish coat of aliphatic sealer, at a spread rate of 80 square feet per gallon or per manufacturer’s recommendations.
- The rubber surface must extend a minimum of five feet, beyond any nozzles, to allow for water over-spillage, before reaching the perimeter gutter drains, unless designed with a semi-wall, directional nozzles or other obstacles that would prevent such water migration to adjacent surfaces.

#### **Electric and Controls**

- Electronic controls and valves are to be located in a separate pump equipment facility.
- The proximity switches or bollards for interactive starting of the water play features shall be of low voltage, not to exceed 24 VAC or VDC nominal.

- Wires connecting the process logic control (PLC) to the feature valves are to be continuous (no splices or junction boxes).
- Electrical equipment for all pumps is to be incorporated in a single motor control center (MCC) type cabinet for power distribution. Include adjustable ampere rating for each overload for individual pump starter controls, as well as three-phase protection for each pump motor (for voltage imbalance, phase reversal, phase loss, etc.)
- A separate ground fault circuit interrupter (GFCI) control shall be provided, to be wired in conjunction with a flood switch for flood protection of pumps and controls, if applicable.
- A cellular Ethernet data modem shall be installed adjacent to the designated installation of the chemical controller.
- The activator or proximity sensor must be installed on a bollard or on a wall, at the standard three-feet high. Unless part of a design, a push-button momentary switch shall be installed. No foot or “in-ground” activators are allowed.
- The PLC or controller shall ignore all subsequent activations until the water feature cycle is complete (it shall not restart the cycle sequence with every push of the button when the water feature is in the middle of the cycle).

### **Spray Heads**

- Spray head/nozzle shall be manufactured from stainless steel, brass, or of a high-impact UV resistant, non-corrosive material tamper and vandal proof.
- A pressure reducing valve shall be used on the water feature discharge side when required. The pressure reducing valve shall be epoxy coated with a stainless steel trim kit.

### **Piping and nozzles**

- Piping connections from the water feature to the supply valve shall be a continuous run of HDPE SDR11 piping with stainless steel transition fittings.
- Piping shall be uniformly placed in a sanded trench and grouped without crossing.
- All piping is subject to inspection and approval by the City of Henderson prior to placement of the top layer of sand.
- A manufactured in-place or OEM manifold must be provided for the distribution valves and be located in the pump room area. A three-inch bypass with a true union ball valve returning water back to the wet well underground water storage must be provided for recirculated systems.
- An accumulator, expansion tank(s) and/or a hammer arrestor(s) sized for the flow rate shall be installed at each distribution manifold around the back flow preventer and auto-fill line.
- Valves for water features shall be approved by the City of Henderson



Public Works, Parks and Recreation Department.

- High volume water flow installations must use scrubber valves with an additional pressure flow regulator.
- The in-floor nozzles and jets shall be above finished concrete grade by no less than 3/8-inch and no more than a half-inch to accept the finish material.
- All anchor bolts shall be stainless steel.
- Select water-saving nozzles that are OEM supplied such as Vortex, Water Play, Water Odyssey or similar. Such nozzles shall be selected based on the lowest water usage available.
- Convenience activator switch is to be incorporated at controller, to test operation.
- Controllers must include programming of master valves, so that the water is shut off at night and/or outside programming schedule.
- Every solenoid valve must have true union ball valves before and after such valves, to allow for isolation, quick removal and replacement.
- All valves to be designed with full port and Viton with Teflon seals, schedule 80 PVC.
- All gaskets and O-rings shall be Viton, whenever available.
- All transition points between metal and plastic must be done with companion flanges or PVC schedule 80 fittings with reinforced stainless steel rings, if threaded.
- Manifold installations must be symmetrical, for dynamically even water distribution.
- Garden hose provisions must be provided at distribution manifolds.

### **Drains and Drainage**

- The slope to the drain must be greater than 1.5 percent. No ponding areas allowed.
- Drains shall be trench type unless noted otherwise. A perimeter trench drain is preferred. Grates are to be non-metallic.
- All drains must be frameless, or the frame edge must be lower than the top of the concrete. A perimeter trench drain is preferred. Grates are to be non-metallic.
- Additional channel drains shall be installed through the center of the water play surface area. The concrete below such drains shall have V-grooves that are caulked and sealed to allow for concrete expansion, as well as to serve as alternate mini drains, preventing ponding.
- Drain grates must allow water penetration from the sides.
- Perimeter frameless channel/gutter drain grates shall be sectional/modular, interlocking and secured to the gutters every 12 inches, alternatively in one direction, for removal and reinstallation in one direction without the need to remove all anchor clips. Unless otherwise noted, the color of such grates shall be tan, captain tan, desert tan, or similar. Any hardware to secure drain grates shall be stainless steel with plastic

anchors.

### **Pumps**

- A booster pump system will be provided where necessary to maintain water feature manufacturers' recommended flow rates.
- All pumps (circulation and water feature) will be flood suction type, with designated pump pits below the normal water level of the storage tank.
- All pump pits shall have a gutter-type drainage system within three feet of each pump strainer to prevent runoff from reaching the strainer baskets. If gravity drainage cannot be installed, a sump pump system shall be installed with redundant pumps.
- The length of piping for the pumps must be a minimum of ten times the diameter of the pipe before the pump and five times diameter of the pipe after the pump. No fittings or valves are to be located within these dimensions to facilitate laminar flow of the water.
- An approved lint/hair strainer shall be installed on the suction side of each pre-filtered water pump. This strainer shall be installed away from the pump and not bolted to the pump. One additional strainer basket shall be provided for each strainer unit. The strainer must be isolated by placing a butterfly valve, sized to match the suction piping, on the suction side of each strainer. Strainer baskets shall be made of stainless steel, commercial grade, whenever available.
- The pump and filter will be sized to meet the guidelines of NAC444.
- A separate pump and filter system shall be installed to supply water to the water feature valves through the manifolds. Filters are required to be high rate sand type (such as EPD, Siemens, Pentair Commercial or approved equal).
- All pump installations shall have a Schedule 80 stainless steel or PVC butterfly check valve installed at the discharge of the pump.
- Pumps should be Variable Frequency Drive (VFD) compatible, capable of constant flow frequency modulation and include full flow bypass loops for maintenance.

### **Connections**

- A rubber vibration eliminator consisting of companion flanges (stainless steel or PVC Schedule 80) with stainless steel bolt kits and a butterfly valve shall be installed on the discharge of each pump.
- All reducing-type couplings on the suction side of the pumps shall be concentric, for a symmetrical distribution of laminated water to the eye of the pump impeller. All such reducing couplings shall be installed by means of companion flanges with stainless steel bolt kits with gaskets approved by the City of Henderson.
- Pressure gauges shall be installed at the suction and discharge of each pump, as well as one pressure gauge after the throttling valve on the discharge of each pump. All pressure gauges shall be stainless steel and

liquid filled unless the gauge is part of a pressure differential panel for backwash or other system.

### **Wet Well or Underground Water Storage and Chemical Treatment**

- The water storage “wet well” must be of sufficient size to maintain pool quality water for the water feature per current turnover rate for water features standards set by NAC444.
- A separate recirculation pump and filter system must be provided to filter and chemically treat the water within the water storage containment.
- Wet well trap door shall be corrosion resistant aluminum with stainless steel hinge and hardware kit.
- Automatic mechanical ventilation shall be provided to remove trapped chloramines or chemical fumes from underground storage tanks.
- The auto-fill for the wet well shall be located in the pool equipment room with a dead level pipe to the wet well.
- The fill line shall be provided a minimum of a two-inch air gap, with dedicated piping into the wet well, in lieu of a back flow prevention device for the dedicated domestic water supply.
- A mechanical/analog flow meter and a digital signet flow meter and monitor shall be provided either as a stand-alone items or part of the backwash system.

### **Chemicals**

- Becsys7 chemical controller with backwash and true ppm sensor or approved equal will be used with systems in the City of Henderson
- Chemical feed system shall be through vacuum induction type with dedicated two-inch water line loop for chemical monitoring and treatment through dedicated dosage feeders or the current chemical pumps being used by City of Henderson aquatic maintenance and approved by the City of Henderson Public Works, Parks and Recreation Department.
- Chemical storage tank rooms shall be accessible by delivery trucks within 50 feet. The delivery hose connection to fill chlorine tanks shall have two-inch ABS male cam lock fitting, while all acid tanks shall be equipped with one-inch male cam-lock fittings to prevent cross-contamination of chemicals upon delivery.
- All bulk chemical storage rooms shall have concrete floors equipped with trench-type sewer drains.
- There will be separate rooms/areas for bulk chlorine and acid tanks. All bulk storage tanks shall be of the double containment type, heavy-duty type, translucent white color and the ability to read the fill level from the inside of the tank, appropriately sized.
- Eyewash station with shower shall be installed at the bulk chemicals storage rooms.
- A hose bib with vacuum breaker shall be installed in each chemical tank room and equipment room.

- A GFCI receptacle with liquid tight or bubble cover shall be installed in each chemical tank room.
- An ultra violet (UV) lamp treatment system capable of receiving the full required water flow should be provided. UV unit to be NSF 50 approved.
- Aqua-Rex Physical Water Conditioner or approved equal provided for all splash pads that contain exposed water feature structures (other than in-ground nozzles), such as M# WK3C. This will mitigate scale formation at structures otherwise subject to water soaking.

### **Fittings**

- Clear schedule 80 PVC pipe must be provided for a minimum length of ten times the pipe diameter before a flow sensor and five times the pipe diameter after the flow sensor, for visual inspection.
- Unions must be provided on the upstream and downstream side of all valves. Use full port type ball valve for pipes up to two inches in diameter. For pipe size exceeding two inches in diameter, use flanged butterfly valves with a stainless steel bolt kit.

### **Flow Calculations**

- The calculations must identify specifically where and at what point during construction the downstream flow and pressure are to be determined.
- All flow calculations and pressure requirements for the splash pad elements must be reviewed and approved by the Public Works, Parks and Recreation Department to ensure that flows and pressures can be met.

### **Filters**

- The drain pit shall be sized to meet the capacity of the largest filter backwash flow rate and volume. All backwash drain lines shall have a minimum of two-inch air gap above the flood level of the drain pit (no direct connection to sewer lines). Each backwash drain line shall have a minimum two-foot section of clear PVC Schedule 80 close to each filter for visual inspection of the water and debris being backwashed.
- All filters shall be equipped with an automatic venting system such as ARI auto-vents with rolling seals or approved equal.
- If the filters are in negative pressure when off, the air vents will be pressure relief/vacuum type.

### **Recirculated (over 40 gallons per minute flow demand)**

1. All of the actual flow calculations and pressure requirements for the splash pad elements must be called out on the plan to ensure that flows and pressures can be met.
2. Valves for the water features shall be ASCO-type valves when instantaneous action is required. For high volume water flow, slow opening/closing Rain Bird Scrubber valves with additional pressure flow/regulator, whenever a short delay is acceptable.

3. All materials shall meet NSF approval Standard 50 prior to installation.
4. An accumulator, expansion tank and/or a Sioux Chief-style hammer arrestor sized for the flow rate shall be installed at each distribution manifold and auto-fill line.
5. Wires connecting the PLC to the feature valves are to be continuous and in conduit (no splices or junction boxes).
6. Electrical equipment for all pumps are to be incorporated in a single cabinet MCC type for power distribution, inclusive of adjustable ampere rating for each overload for individual pump starter controls, as well as three-phase protection for each pump motor (for voltage imbalance, phase reversal, phase loss, etc.).
7. A separate GFCI control shall be provided, to be wired in conjunction with a flood switch for flood protection of the pumps and controls, for flooded pump pits.
8. All reducing-type couplings on the suction side of the pumps shall be concentric, for a symmetrical distribution of laminar water flow to the eye of the pump impeller. All such reducing couplings shall be installed by means of companion flanges with stainless steel bolt kits and Viton-type gaskets.
9. A phone line receptacle shall be installed adjacent to the designated installation of the chemical controller, in addition to a cellular Ethernet modem.
10. A sign submittal is required, must be approved, and must be erected as per drawings and sign specifications.
11. Showers must be provided in accordance with NAC444.

**Non-Recirculated (less than 40 gallons per minute flow demand)**

1. Water feature electronic controls and valves are to be in a separate CMU-type building or within the plumbing chase at the park location (in a dry location and not within a vault).
2. A dedicated water meter shall be provided for water consumption tracking.
3. A back flow prevention RPPA-type device is required on the water supply.
4. Expansion tanks may be required to mitigate water hammer and pressure fluctuations. Often, the domestic water supply is shared with restroom facilities.
5. If needed, a pump system will be provided in order to maintain water feature manufacturer recommended flow rates.
6. A master valve/pressure reducing valve Clay-Val or approved equal type shall be used when necessary on water feature supply side when required. The pressure-reducing valve shall be companion flanged brass or bronze with a stainless steel trim kit and reaction speed adjustments.
7. A sand separator is required on the waste line of the water play feature before it is dumped into the sewer.
8. An accumulator, expansion tank and/or a Sioux Chief or approved equal style hammer arrestor must be sized for the flow rate.
9. Wires connecting the PLC to the feature valves are to be continuous (no splices or junction boxes).

10. A dedicated two-inch domestic water mainline with backflow preventer is not to be shared with other park amenities.
11. Mechanical area must have a solid concrete floor with a pitched metal roof. Working area of the room shall be a minimum of seven feet in height.

### **Warranty**

- A minimum one year on all electric, electronic, plumbing, walls, and structures.
- Resilient rubber surface or EPDM must include a five-year replacement warranty
- Minimal maintenance: the rubber surface should only require annual light pressure and chemical washing for removal of scale, dirt and grime.

### **Signage**

Refer to the Section XV Signage for information on necessary signage for splash pads.

### **Regulations**

The definition of a spray pad is found under NAC444.070.

Regulations for spray pools are found under NAC444.200.

NAC444.200 references NAC444.136 as the regulation requirements for the barrier of a spray pool.

Additional barrier requirements for a spray pool are found under NAC444.204.

A written contingency plan must be submitted to and approved by the health district in order to receive exemptions from the barrier requirements.

## VI Sports and Outdoor Recreation

The City of Henderson strives to create exceptional outdoor recreation and sports opportunities for different user groups. Numerous considerations need to be determined when designing new fields or facilities. Each project shall have established design requirements based on the facility's use, user group(s), open and/or league play, and surfacing. This section shall provide information on field, court, and facility requirements based on the sport and outdoor recreation use. Please note that not all activities have been included in this section. Other field and court types may be designed at parks and along trails with approval from the city. The additional uses are subject to supplementary requirements as determined by the Public Works, Parks and Recreation Department.

### General Design Considerations

- All facilities shall have positive drainage on and away from the field/court/facility and shall be one percent minimum to 1.8 percent maximum slope, unless otherwise noted.
- See Section XIII Lighting for sports lighting requirements.
- All fencing areas shall be designed to have at least one maintenance gate that provides access for large vehicles for light pole maintenance.
- One accessible route shall be provided to each type of sports field/court/facility. However, it is preferred to have accessible routes to all. See Section XVIII Accessibility.
- Provide an eight-foot minimum decomposed granite landscape strip between all court surfacing and turf areas.
- See Section X Landscape for turf and landscape requirements.
- See Section XX Appendix for details.
- Sports rules and wayfinding signage shall be designed and placed at all field and court entrance gates. See Section XV Signage for more information.

### Baseball and Softball Fields

- Infield and warning track mix shall be two millimeter, four-inch depth when compacted
  - Acceptable manufacturers:
    - Sports Parks
    - Gail Materials Pro Gold
    - Approved equal
- A trajectory study shall be required prior to design in order to determine the fencing and/or ball netting heights and requirements,
- Bases include one home plate base plus three bases, and one pitching rubber,
- All fields shall be designed to include an area for the scorer's table behind each backstop as well as each dugout. This area shall include lockable electrical outlets and USB ports,

- All fields shall be designed for electronic scoreboards located in the outfield, which includes underground power supply

### Field Layout

Base Field Distance	Minimum Outfield Fencing Distance	Pitching Mound Distance	Infield Type	Outfield Type	Additional Information
60'	300'	35' to 46'	Grass or artificial turf; and skinned	Grass	Little league fields shall use approved breakaway bases
70'-80'	300'	50' to 54'	Grass or artificial turf; and skinned	Grass	Rectangular-shaped pitching cutout; double first base; jock boxes installed at home plate batter's box, right and left of the plate
90'	375'	60'-6"	Grass or artificial turf	Grass	Minimum 320-foot foul line fencing distance

- Pitcher's warmup areas shall be designed at all fields adjacent to each dugout.
  - Warmup areas shall be 15 feet wide. Length shall be a minimum of 55 feet long for 60-foot fields, 65 feet for 70- to 80-foot fields, and 70- to 90-foot fields.
  - The warmup area shall be fenced and will have direct access to the adjacent dugout through a gate.
- One team warmup area shall be designed at four-field and above complexes.
- When possible, back of home plate shall face north-northeast with the first baseline running west to east.
  - When two fields are required, it is recommended to orient the fields north-northeast and north-northwest.
  - When four fields are required, it is recommended to orient the fields north-northeast, north-northwest, south-southeast, and south-southwest.
- Fields shall have a minimum 60-foot separation distance (first and third base fencing line) from other baseball fields.
  - All fields shall have a ten-foot-wide outfield warning track.

### Fencing

- The following information shall be used in addition to fencing requirements in Section XVI Site Furnishings:



- All fields shall be fenced and lockable.
- Foul line fencing shall be a minimum ten feet tall; 11 gauge galvanized chain link; and shall have a 12-foot-wide vehicular access with six-foot swing gates.
- Outfield fencing shall be minimum six feet tall; 11 gauge galvanized chain link with yellow poly-cap fencing guard on the top rail.
- Grind all bolts to within 1/8-inch of nut.
- Wind screens shall be on outfield fencing. Provide a darkened batter's-eye on the center fencing.
- Backstop fencing dimensions shall be 25-foot high by 21-foot wide at the center; 25-foot high by 27-foot wide adjacent to center; followed by 20-foot high by 27-foot wide on the outside of the backstop.
  - Nine gauge galvanized chain link, two inch square shall be located at the 27-foot wide fencing and above ten feet on the 21-foot wide fencing
  - Six gauge vinyl-coated chain link, one inch square shall be located at the 21-foot wide fencing from the ground to ten feet high
  - Two extra horizontal rails shall be located at the one-foot height and two-foot height on the 21-foot wide fencing and 25-foot high by 27-foot wide fencing
- Foul poles shall be bright yellow.
- All dugouts shall be surrounded by fencing.
  - 11 gauge galvanized chain link, eight-foot minimum height with plastic fencing slats
  - Three-foot minimum pedestrian gate on one of the sides and a four-foot opening to field
- Eight-inch wide by six-inch deep mow curb shall be required under all fencing that is not located on concrete.

### **Dugouts**

- Dugouts shall be located on both sides of the backstop and be a minimum of eight feet wide by 36 feet long.
- Overhead foul ball protection and shade shall be provided over the dugout,
- A batter's rack shall be located in each dugout.

### **Safety Netting**

If a trajectory study requires safety netting, the design shall meet the study's requirements.

- The netting shall be nylon
- All utility boxes located on safety netting poles shall be facing away from the outfield and provide easy maintenance access

### **Seating**

- All seating shall be located on concrete with paved access
- A 21-foot aluminum bench shall be located in each dugout
- Each ball field shall have two 21-foot, five-row aluminum bleachers with picket barriers along the back and upper third portion of the sides.
  - All bleachers shall be located under a shade structure. The lowest height of the structure's roof shall be a minimum of eight feet above the tallest bleacher height.
- Acceptable manufacturers:
  - L.A. Steelcraft
  - Miracle
  - Approved equal

### **Basketball Courts**

The quantity of courts and their colors shall be determined by the city.

#### **Layout**

- Each court shall be 84 feet long by 50 feet wide on a six-inch thick post tension slab.
- A ten-foot minimum perimeter paved buffer shall surround the entire court and separate adjacent courts.
- All courts shall have six goals:
  - The full court shall have two goals at ten-foot heights
  - Each half-court shall have two goals of the same height. One of the half courts shall be eight-foot heights and the other shall be nine-foot heights.
  - Goal posts shall be gooseneck support posts; four and one- half inch outside diameter minimum galvanized steel pipe; and one continuous piece
- Provide at least one bench and one trash receptacle per court. See Section XVI Site Furnishings for more information.
- Acceptable manufacturers for goal posts, web nylon netting, steel backboards, and double rimmed goal rings:
  - L.A. Steelcraft
  - Approved equal

#### **Fencing**

The following information shall be used in addition to fencing requirements in Section XVI Site Furnishings. Fencing shall be required on a case-by-case basis dependent on adjacent uses. If required, at a minimum fencing shall meet the following:

- Ten-foot high, nine gauge galvanized chain link
- Grind all bolts to within 1/8-inch of nut
- Eight-inch wide by six-inch deep mow curb shall be required under all

fencing that is not located on concrete

### **Surfacing and Striping**

- All courts shall be designed to have acrylic, non-skid sport court surfacing.
  - Colors to be determined by the city
- Basketball court striping shall be two inches wide and shall include three point lines
- Acceptable manufacturers:
  - Plexipave Systems
  - Approved equal

### **Multi-use Fields**

The quantity of fields and surface type shall be determined by the city. Goals, netting, and other equipment shall be determined by field use and approved by the city.

### **Layout**

- Fields shall have a north to south orientation. Approval is required by the city prior to alternative configurations.
- Fields shall be 360 feet long by 225 feet wide with an additional 15-foot buffer zone.
- Fields shall be constructed of grass or artificial turf. See Section X Landscape for more information.
  - If artificial turf is designed, no permanent field lines shall be constructed. Only design for temporary painted fields
- Each field shall be designed to include an area for the scorer's table. This area shall include a concrete pad, and lockable electrical outlets and USB ports.

### **Fencing**

The following information shall be used in addition to fencing requirements in Section XVI Site Furnishings. Fencing shall be required on a case by case basis dependent on adjacent uses. If required, at a minimum fencing shall meet the following:

- Fencing shall be minimum eight-foot tall, 11 gauge chain link
- Goal line fencing shall be a minimum 15 feet tall, nine gauge galvanized chain link. Additional requirements may apply.
- Grind all bolts to within 1/8 inches of nut
- Eight-inch wide by six-inch deep mow curb shall be required under all fencing that is not located on concrete.
- If the entire field requires fencing:
  - All fields shall have two, 4-foot wide minimum pedestrian access gates, and at least one 12-foot access with two 6-foot gates for vehicular maintenance. All gates shall be lockable.

- Adjacent fields may share perimeter fencing and reduce fencing in between each field as determined by the city.

### **Seating**

Spectator seating areas shall be located outside of the use zone and inside the fencing. Seating requirements shall be determined by the city and may include but not limited to bleachers, benches, and grass.

### **Horseshoe Courts**

When horseshoe courts are part of a design, a minimum of two courts shall be required. At least one court shall meet current accessibility standards, which may require alternate designs, dimensions, and amenities.

- Typical court dimensions shall be 46 feet length from front of rubber backboard to front of rubber backboard. See Section XX Appendix for detail information.
  - Minimum six-foot clear zone shall be provided between each court and a minimum ten-foot buffer shall be designed around the entire court area
  - Ten-foot extended platforms may be required at each throwing area to accommodate users at all skill levels
  - Provide a three-foot high concrete backstop with one-inch thick rubber backing at each pit
  - The one-inch diameter, 3'-6" solid steel horseshoe stake shall be reinforced in the ground by a minimum eight-inch wide by 16-inch deep concrete footer
  - Pit area shall have ten-inch plaster sand
- Shade through shade structures and/or trees shall be a part of the design. At least one bench shall be located at each end of the court.

### **Tennis Courts**

The quantity of courts and their colors shall be determined by the city. When tennis courts are part of a design, a minimum of two courts shall be required.

#### **Layout**

- Courts shall be oriented north to south with a spectator area on the east or west sides.
- Each single court and use zone shall be 120 feet long by 60 feet (120 feet by 120 feet for two courts) on a six-inch thick post tension slab.
- Spectator area shall be a minimum of 20 feet wide.
- Acceptable post and net manufacturers:
  - Douglas
  - Midwest Sports
  - Approved equal

#### **Surfacing and Striping**

- All courts shall be designed to have acrylic, non-skid sport court surfacing

- Colors to be determined by the city
- Acceptable manufacturers:
  - Plexipave Systems
  - Approved equal

### **Fencing**

The following information shall be used in addition to fencing requirements in Section XVI Site Furnishings. Fencing is required around all tennis courts and shall meet the following:

- Ten-foot high perimeter, nine gauge galvanized chain link
- Four-foot fencing separating adjacent courts
  - Court fencing next to spectator area shall be reduced to four feet. The spectator area shall have ten-foot high perimeter fencing.
- Provide 8-foot windscreen with slits or wind windows along all ten-foot fencing.
- Each court and each spectator area shall have a minimum of one lockable four-foot wide pedestrian gate.
- Provide multiple lockable 12-foot wide, double gates for court groupings to provide maintenance vehicles access to the courts without having to turn around or back up. Single access entry is not allowed.
- Grind all bolts to within 1/8 inches of nut.
- Eight-inch wide by six-inch deep mow curb shall be required under all fencing that is not located on concrete.

### **Seating, Shade, and Trash Receptacles**

- Court seating shall have a minimum of two benches located between adjoining courts that are covered by a metal shade structure.
- Spectator seating shall have a minimum of one backless bench and one picnic table for every two courts. Tables and benches shall be located under a metal shade structure and shall have one trash receptacle.

### **Pickleball Courts**

The quantity of courts and their colors shall be determined by the city. When pickleball courts are part of a design, a minimum of four courts shall be required.

### **Layout**

- Courts shall be oriented north to south with a spectator area on the east or west sides.
- Each single court shall be 64 feet long by 34 feet wide.
- Courts shall be constructed on a six-inch thick post-tension slab.
- Spectator area shall be a minimum of 20 feet wide.
- Acceptable post and net manufacturers:
  - Douglas
  - Midwest Sports
  - Approved equal

### **Surfacing and Striping**

- All courts shall be designed to have acrylic, non-skid sport court surfacing
  - Colors to be determined by the city
- Acceptable manufacturers:
  - Plexipave Systems
  - Approved equal

### **Fencing**

The following information shall be used in addition to fencing requirements in Section XVI Site Furnishings. Fencing is required around all pickleball courts and shall meet the following:

- Eight-foot high perimeter, nine gauge galvanized chain link
- Four-foot fencing separating adjacent courts
  - Court fencing next to spectator area shall be reduced to four feet. The spectator area shall have ten-foot high perimeter fencing.
- Provide windscreens with slits or wind windows along all eight-foot fencing
- Provide multiple lockable 12-foot wide, double gates for court groupings to provide maintenance vehicles access to the courts without having to turn around or back up. Single access entry/exit is not allowed.
- Grind all bolts to within 1/8 inches of nut
- Eight-inch wide by six-inch deep mow curb shall be required under all fencing that is not located on concrete

### **Seating, Shade and Trash Receptacles**

- Court seating shall have a minimum of two benches located between adjoining courts that are covered by a metal shade structure
- Spectator seating shall have a minimum of two backless benches and one picnic table for every four courts. Tables and benches shall be located under a metal shade structure and shall have one trash receptacle.

### **Volleyball Courts**

The quantity of courts and their colors shall be determined by the city. When volleyball courts are part of a design, a minimum of two courts shall be required.

### **Layout**

- Court dimensions shall be 30 feet wide by 60 feet long with an additional ten-foot buffer surrounding the court.
  - A 36-foot wide net shall be centered with three-foot overhang
- Shading in the form of prefabricated shade structures and/or trees should be a part of the design near all volleyball courts.
- Posts shall be galvanized steel pole with caps and galvanized eye bolts and washers.
  - Post shall be powder coat finished

### **Turf Courts**

- Turf courts shall be either grass or artificial turf.
  - Surround the court buffer with an eight-inch wide by six-inch deep mow curb if turf is not adjacent to the courts

### **Sand Courts**

- Sand courts shall be two feet deep, double washed volleyball sand.
  - No silica sand allowed
  - Surround the court and buffer with an 18-inch high by 13-inch wide concrete curb for sand containment
  - Sand courts shall be incorporated into the irrigation system through a dedicated control valve

### **Bocce Ball Courts**

The quantity of courts and their colors shall be determined by the city. When bocce ball courts are part of a design, a minimum of two courts shall be required.

- Inside court dimensions shall be 13 feet wide by 90 feet long
- At the edge of the court there shall a nine and one-quarter inch tall concrete pavement edge or curb with anchored two-inch thick by ten-inch tall wood boards
- Courts shall be surrounded by ten-foot minimum concrete sidewalk buffer.
  - Adjacent courts may reduce buffers to five feet
- Shading in the form of prefabricated shade structures or trees shall be located at each end of the court
- One bench shall be located at each end of each court

### **Skate Parks and BMX Tracks**

The inclusion of skate parks or other related amenities shall be determined by the city.

- Shall be located away from playgrounds and homes.
- Shall be located in a prominent location and accessible by police and other emergency vehicles.
- Park elements shall be designed to minimize noise when in use.
- Ten-foot high powder coated, shepherd's hook fencing shall be required to surround the entire area with a four-foot wide lockable pedestrian gate and 12-foot wide access with two lockable six-foot gates for maintenance.
- The pedestrian gate shall be auto closing.
- Spectator seating may be required and shall be provided outside of the fencing.
- Shading in the form of prefabricated shade structures or trees shall be located adjacent to the facility.

### **Outdoor Fitness Equipment**

Outdoor fitness equipment may be required along trails and at parks. Fitness equipment shall meet or exceed the safety provisions and requirements specified in the latest version of ASTM F3101 for the equipment, the spacing of equipment, and surfacing

requirements.

- All equipment shall be approved by the city.
- The equipment shall be signed to state it is for ages 13 years old and above.
- The equipment stations shall be located in stabilized decomposed granite or safety surfacing with and mow curb separating station use zone with adjacent surfaces.

### **Bounce House Pads**

Every park shall provide areas for temporary bounce houses. The area shall be located adjacent to open turf and large shade structures. The bounce house areas shall be located on 50-foot by 100-foot concrete pads with recessed built-in tie-downs a minimum of every 20 feet. Tie downs shall be designed to have caps.



## VII Dog Parks

Each dog area provided should be a minimum of one acre. Two or three separate areas should be provided to allow for rotation of use and maintenance. The City of Henderson reserves the right to determine if a different option exists.

Separate entrances for each area including a single gate for patrons and a dual gate for maintenance.

Each dog area is to include:

- Lighting per Section XIII Lighting
- A separate gated area must be provided for patrons to leash/unleash their dogs before entering either side of a dog area.
- Refer to Section XVI Site Furnishings:
  - A potable water drinking fountain with dog fountain
  - Shade structures
  - Fencing
  - Pet waste stations
  - Benches
  - Trash receptacles
- Refer to Section XV Signage:
  - Dog run signage
  - Rules signage
- 12-foot wide access with two 6-foot wide gates for maintenance
- Curbing is to be provided at the bottom of the fence with a maximum half inch clearance between the curb and the bottom of the fence.
- Provide a quick coupler box in transition area for cleanup.
- Refer to Landscape section:
  - Decomposed granite
  - Turf
  - Landscaping

# VIII Trash Enclosures

## General Information

Trash enclosures must be concrete masonry construction with graffiti resistant coating and shall meet Republic Services requirements. Design team is responsible for Republic Services approval for location. Contact Republic Services customer service at (702) 735-5151 for location approval. Refer to Appendix A, Trash Enclosures details. The number, location, and colors are to be approved by the City of Henderson Public Works, Parks and Recreation Department. Aesthetics must be approved through the Community Development and Services Department.

Trash enclosures shall be designed based on the following:

- One trash enclosure is to be provided for approximately every ten acres
- Trash enclosures shall have positive drainage
- Trash enclosure locations must allow for Fire Department access
- Recycle receptacles may be preferred and should be coordinated with the Public Works, Parks and Recreation Department
- Gates shall be metal and perforated
- Regulatory signage – include a “no public dumping” sign in a visible location. Sign shall be white/red and include the current HMC code and city logo.
- Slide bolts shall be used for single gate. The slide bolt shall be lockable and minimum 3/4” diameter. Deadbolt lock will not be accepted.
- Hinges – gate hinges shall be designed to withstand the weight of the gate. Warranty for hinges shall be a minimum of five years.

## Graffiti Resistant Coating

Apply paint coating(s) as specified. Paint application(s) must be inspected and approved by the owner’s representative before any further work is initiated. A minimum of two coats of paint shall be applied, as specified per the manufacturer.

Acceptable manufacturers:

- Dunn-Edwards: Ultrashield, Aliphatic Polyurethane Enamel Clear IP631 702-873-1649
- US Coating Systems (800) 925-1840, Tnemec Industrial Coatings (800) 863-6321
- Approved equal

# IX Restroom Buildings

## General Requirements

Restroom floorplan or type shall be approved by the City of Henderson Public Works, Parks and Recreation Department and varies depending on the park size and amenities. One of three restroom floor plans is typical: trailhead, neighborhood park, or concession. Sample floor plans are available from the City of Henderson Public Works, Parks and Recreation Department.

Restroom buildings shall have vehicular access for maintenance staff, as required by city staff. However, removable bollards shall be provided to hinder public vehicular access, if applicable.

Colors are to be approved by the City of Henderson Public Works, Parks and Recreation Department.

Provide concrete access around perimeter of building.

## Restroom Building Standards

- Standard buildings should have both men's and women's facilities.
- All vertical concrete surfaces shall be coated with non-sacrificial graffiti resistant coating. Refer to Graffiti Resistant Coating Section.
- All interior restroom walls are to be epoxy paint coated white.
- Provide a slip resistant gray epoxy coating on restroom floors to comply with building code.
- Any architectural features that may promote climbing, footholds, handholds, etc. are discouraged. Example: An eight-foot screen wall would be preferred over a five-foot screen wall due to climb ability.
- Electrical gear shall be housed in an enclosure.
- Masonry partitions are to be installed in restroom facilities between stalls.
- Where applicable, plumbing chase to have eight-foot wide clearance to allow for a maintenance bay with a combination maintenance/plumbing area.
- Provide signage, address, fire extinguishers, Knox-Box, etc. per City of Henderson Building and Fire Safety code.
- Restroom signs: recessed, cast aluminum, and shall meet ADA requirements.
- Restroom windows: provide high open screened/mesh windows with powder-coated decorative metal grating to provide ventilation and light during daylight hours.
- Restroom doors: to be made of a solid phenolic material with breakaway hinges. Ensure ADA compliance is met.
- Restroom gates: Powder-coated tube steel restroom gates shall be used in lieu of doors on the men's and women's restroom entries. Tube steel is to be 3/16-inch minimum and gates shall have the ability to be locked in both the

- open and closed positions using a heavy duty slide bolt that accepts a padlock.
- The joint where floor/wall/ceiling come together shall have a joint sealant over the joint.
  - Comply with Southern Nevada Health District standards for concession layout.
  - Best brand locks shall be used on all lockable doors and gates.

### **Prefabricated restroom**

A prefabricated restroom needs must to be approved through the State of Nevada Manufactured Housing Division, ICC, or be on the approved Clark County fabricator list.

Recommended products:

- Public restroom company
- CXT concrete buildings
- Approved equal

### **Custom-built restroom**

CMU block building, split face, with fluted or decorative block accents required, unless otherwise specified.

Roof is to be corrugated metal over a weather resistant barrier. All interior ceiling must be smooth and painted. Sheetrock is not permitted. Access to the maintenance bay from the restrooms shall be restricted.

### **Maintenance Bay**

Maintenance bay is to have 16-foot minimum width x 20-foot depth with a 10-foot clearance (all access to high voltage switch gears inside chase). If a roll-up door is required it shall be a 10-foot commercial coiling roll-up door (electric with a keyed switch on the exterior of the building), with a manual chain override including metal jambs, and vandal resistant lock. Provide a tube steel gate with slide bolt lock and padlock latch at exterior threshold that protects the roll-up door. Tube steel thickness shall be a minimum of 3/16-inch and powder coated.

Maintenance bay shall also have a hollow metal man door, with Best brand locks. Man door shall also have a powder coated 3/16-inch minimum thick tube steel gate protecting it.

If there is a roll-up door, a man door is required. If there is no roll-up door or man door, then double doors 8 feet wide are required (with a powder-coated 3/16-inch minimum thick tube steel gate protecting them).

Maintenance bay is to include a commercial grade mop sink and an eye wash station.

Provide sufficient sleeves and pull strings for irrigation controllers, electrical and electrical controls, Musco controls, and phone lines. Provide sufficient electrical service for irrigation controllers per park maintenance requirements.

Provide conduit as required (usually two inch) with pull string for telephone line. The conduit shall stub up into maintenance bay. Provide all telephone board and equipment required by service provider.

Provide access for Musco control link interior to the maintenance bay.

Provide lighting in maintenance bay with occupancy sensors/switches.

### **Electrical**

Refer to the restroom lighting sub-section in Section XIII Lighting for detailed information on restroom lighting requirements.

### **Fixtures**

All fixtures are to be stainless steel with push buttons (when applicable). Fixture counts will be reviewed when the restroom is for larger sport facilities. Fixtures to include: drinking fountains, sinks, urinals, toilets, mirrors, toilet paper dispensers, hand dryers, and soap dispensers. One hose bib shall be located within equal distance to the men's and women's restrooms and shall be recessed with a locking door. Detention grade fixtures shall be used. All fixtures are to be wall-mounted, except hand dryers, which are recessed.

Toilet paper dispensers to be heavy duty double roll with bar and padlock.

Recommended products:

- Acorn
- Willoughby
- Approved equal

Drinking fountains, outdoor wall-mount brass. Airtrol valves on the fountains only; no plastic valves:

- Acorn
- Willoughby
- Approved equal

Wall-hung lavatories- vandal proof with brass Airtrol valve bodies on all brands; no plastic:

- Acorn
- Willoughby
- Approved equal

Lavatory faucets- public areas:

- Moen
- Willoughby
- Approved equal

Showers- public area, vandal proof, to be brass Airtrol valves only; no plastic:

- Acorn Airtrol
- Symmons Showeroff
- Approved equal

Toilets- vandal proof, wall hung only with integral seat:

- Acorn
- Willoughby
- Approved equal

Urinals- vandal proof:

- Acorn
- Willoughby
- Approved equal

Hand dryer- vandal proof, heavy duty, mounting through wall:

- Fastaire
- World Dryer
- Approved equal

### **Plumbing**

Provide water pressure regulator.

Provide cleanouts.

Water heaters to be installed in maintenance bay, if required. Water heaters are required if it is a concession layout.

All plumbing to be installed in maintenance bay.

Hand dryer to be recessed in the wall with motor mounted in maintenance bay.

Provide two floor drains on each side and ensure drainage in each facility for wash down capability. Floor drains shall have passive trap primers with concrete slope toward the drain.

Wall hydrants:

- JR Smith
- Woodford
- Approved equal

Flushometers, concealed:

- Sloan Royal
- Zurn Aquaflush
- Approved equal

Tempering/mixing valves:

- Symmons TempControl series
- Leonard FM150
- Approved equal

Backflow prevention devices shall be the same size as the piping they serve:

- Wilkens
- Watts
- Approved equal

### **Graffiti Resistant Coating**

Graffiti resistant coating shall be non-sacrificial. Apply paint coating(s) as specified. Paint application(s) must be inspected and approved by the owner's representative before any further work is initiated. A minimum of two coats of paint shall be applied, as specified.

Recommended products:

- Dunn-Edwards: Ultrashield, Aliphatic Polyurethane Enamel Clear IP631
- Sherwin Williams anti-graffiti coating
- Approved equal

### **Notes:**

The following information shall be included in the plans/specifications:

- Apply paint coating(s) as specified. Paint application(s) must be inspected and approved by the owner's representative, before any further work is initiated. A minimum of two coats of paint shall be applied, as specified.
- A minimum of two coats of clear graffiti resistant coating shall be applied.
- A minimum of a five-gallon bucket for each color and graffiti resistant coating at each building shall be provided at turnover.

# X Landscape

Landscaping is an integral city asset that increases in value and appeal over time. Design and maintenance are important factors in determining a landscape's success. This section is intended to assist with designing landscapes that promote aesthetics while supporting maintenance requirements. When developing parks, trails, and other facilities, it is important to design landscapes that adapt to surrounding environments and provide longevity. Conservation through landscape materials selection and design is also a key component to providing exceptional, long-lasting facilities while sustaining maintenance costs.

## General Design Considerations

- Minimize the disturbed footprint adjacent to native areas and revegetate all disturbed conditions.
- Slope protection is to be taken into consideration. Any disturbed slopes should be revegetated with erosion protective plantings and surfacing.
- All plant material must be placed so as not to conflict with above and below ground utilities, lighting, and easements. Designers shall coordinate with other disciplines to reduce conflicts.
- Plant material and placement shall be designed to follow Crime Prevention Through Environmental Design (CPTED) strategies, which includes, but is not limited to:
  - Selecting plant material that provides visibility and does not create hiding places.
  - Locating plants to define walking spaces, control access and define property lines.
- Landscaping shall meet city municipal and Development Code requirements unless otherwise stated in this document.
- See Section XIV Parking Lots for further information.
- Landscaping designed within utility corridors and easements will require approval from the owner and/or utility agency.
- Landscape medians and landscape strips/buffers adjacent to roads shall be six-foot minimum width.
- When designing adjacent to a roadway or parking lot:
  - Select plants that tolerate radiant heat and winds
  - Provide a minimum six-foot- wide landscape zone free of hardscape
  - Provide a swale that does not impede tree trunks
  - Only use tree grates in high pedestrian traffic locations
  - Abide by required site visibility zones. Do not plant shrubs that will grow past 24- inch mature height. At a minimum, plant tree trunks outside the visibility limit by 12 inches.
- Special considerations shall be made when designing landscapes adjacent to playgrounds and dog parks. Noxious and thorny plants shall not be located near playgrounds, splash pads, and dog parks.



## **Plant Material**

Plant material shall be desert adaptive and drought tolerant. Designs are encouraged to follow the approved Southern Nevada Regional Planning Coalition's [Regional Plant List](#) and all plant material shall be subject to review by Park Planning staff for approval.

When selecting plant material, consider the following:

- Adaptability and relationship to the Henderson environment and time of year
- Color, form and pattern
- Ability to provide shade
- Soil type, slope, and retention
- Hardiness
- Resistance to fire and pathogens
- Invasive and illegally harvested plants shall not be used

## **Trees - General**

- Unless otherwise noted, all trees shall be 24- inch box minimum, spacing to be typical mature width of tree on center. Groupings are encouraged.
- Large, deciduous, standard trunk trees are recommended around shaded picnic areas, dog parks, near benches, at entry points, and spectator seating areas around active sport areas such as baseball fields, volleyball courts, basketball courts, skate parks, multi-purpose fields, water parks, playground areas, trails, etc.
- A six-foot mowing berth shall be provided between trees and vertical surfaces to allow for maintenance machinery.
- Except at dog parks, provide a six- foot diameter, four-inch deep bark mulch ring around trees in turf areas with mulch two inches away from the trunk.
- Minimum tree quantity requirements shall be determined by:
  - Parks: 25 trees per every acre unless otherwise directed in park specific master plans and guidelines.
  - Trails and streets: one tree for every 25 linear feet of trail unless otherwise directed in city Development Code, trail-specific master plans, and guidelines.
- Selection and placement of trees shall be placed for optimal shading of buildings, trails, and impervious surfaces.
- Plantings with thorns, seed pods, excessive fruit, etc. shall not be planted in close proximity to trails, hardscapes, play areas, water play areas, turf, and other areas with increased pedestrian traffic.
- All tree trunks located within ten feet of a sidewalk or hardscape shall be protected with root guards. Install root guards adjacent to the edge of a hardscape or sidewalk surface at a vertical depth of 48 inches and width of five feet each side of the trunk center (for a total of ten feet). If structural soils are installed, root guards are not required.
- Multi-trunk trees shall be a minimum of ten feet from the sidewalks and trail edges. Standard tree trunks shall be a minimum of six feet from the sidewalk and trail edges.

- All trees shall be placed to not impair required lighting and utilities.
  - No trees, based on mature canopy spread, shall be placed within ten feet of light poles.
  - No trees, based on mature canopy spread, shall be designed or constructed on top of underground utilities or below overhead utilities without written approval of utility owner(s).
    - Small mature height trees may be allowed under overhead utilities if approved by the utility company.
- Trees shall be located in the center line of medians.
  - If the median is less than 15 feet wide, trees shall be standard trunk.
  - Trees shall not be located within nine feet from the end of the median
  - Trees shall be placed according to mature canopy spread
- Provide a minimum eight-foot clear zone from all tree trunks adjacent to accessible parking.
- Provide a minimum six- foot clear zone from tree trunks to adjacent bus shelters.

### **Trees - Protection**

Tree protection is required on all plans that contain existing trees. The tree protection design and/or notes on plans/specifications shall include:

- Within the Tree Protection Zone, the following shall not occur:
  - Construction
  - Disturbance/alterations of existing grades
  - Storage of materials or equipment
  - No vehicles, equipment or persons shall travel or park within the tree protection limits
- If a vehicular route cannot be avoided near or adjacent to existing trees, a minimum of 12 inches of bark mulch at 15 feet wide shall be provided.
- All trees adjacent to and within the limits of construction, access, and staging areas shall be protected by placing ten feet outside of the tree's drip line, a four-foot-high orange "snow" fencing with steel "T" posts around the entire tree. Trees shall be grouped where possible.
- At the end of the work, any damage to the park including trees, turf, irrigation, or other facilities must be repaired to match the existing condition of the park at the contractor's expense.
- A steel traffic plate or two layers of double thickness plywood shall be placed over any irrigation or utility valve boxes in the vicinity of the access route.
- Trees that have been designated as preserved trees within their protective barriers shall receive vertical mulching in accordance to techniques as described in the [Nevada Cooperative Extension Publication](#).

### **Shrubs**

- All shrubs shall be a minimum five gallon size and shall be provided at one shrub per 80 square feet of landscape area.
- Shrubs shall not be located within a three-foot clear zone from edge of adjacent paving, hardscapes, trails, and turf areas so that plants do not overhang onto the adjacent areas by the plants' mature plant width.
- Shrub spacing shall be designed to mature species width. Groupings are recommended.
- Cactus and other thorny shrubs shall maintain a six-foot clear zone from edge of adjacent paving, hardscapes, trails, and turf areas.
- Shrubs shall not be located on slopes exceeding 4:1 (25 percent).
- The following shrubs are discouraged for city-maintained projects
  - *Acacia redolens*
  - *Baccharis* varieties

### **Ground Cover**

- All ground cover is to be a minimum of one gallon size. Groupings are encouraged. Quantity shall be one ground cover minimum per 80 square feet of landscape area.
- Ground cover shall be located with a three-foot clear zone from edge of mature plant size to adjacent paving, hardscapes, trails, and turf areas so that plants do not overhang onto adjacent areas.
- Ground cover spacing shall be designed to mature species width.
- Ground cover shall not be located on slopes exceeding 3:1 (33 percent).

### **Turf**

- Turf shall be minimally used and located in areas that require turf to function (e.g., sports fields, dog parks and passive play adjacent to playgrounds).
- All irrigated turf areas shall not exceed a slope of 3:1 (33 percent).
- Following an approved irrigation audit certification, sod or hydroseeding may be installed.
- The turf establishment period is a minimum of 90 days for sod and 120 days for hydroseeding.
- Open space play areas shall be fescue.
- Sports fields and dog parks shall be hybrid Bermuda.
- All turf that is installed during dormant season shall be overseeded with perennial rye.
- All turf areas adjacent to hardscapes shall have a two-foot minimum decomposed granite strip or landscape strip with eight inches wide by six inches deep reinforced mow curb separating the turf from the landscape area in order to minimize irrigation overspray onto impervious surfaces.
- Turf shall be located a minimum of three feet away from all playground and splash pad safety surfacing.

## **Mulch, Rock, and Boulders**

- All planting areas and non-paved areas shall receive decomposed granite (dg) mulch or rock restoration unless stated in this document, project requirements, or project specific master plans.
- Finish grades of decomposed granite shall be one inch below adjacent hardscape and paved surface.
- Decomposed granite mulch shall be gold color or match existing color, 1/4-inch minus size, two minimum depth, and have a one-inch recess adjacent to hardscape unless otherwise directed by the project location and associated manuals/master plans.
  - Red colors shall not be used, especially in dog parks.
- Boulders shall be designed in all projects. Size, quantity, and color shall be determined the city's project design group. Boulders shall be placed in groupings with plant material intermixed.

## **Desert Revegetation and Restoration**

### **Description**

Desert revegetation is a landscaping method that uses a combination of native soil, seeds, salvaged plants, rock mulch and/or the application of desert varnish to restore disturbed areas to resemble the natural desert environment.

Revegetation may consist of any combination of rock restoration, desert varnish, plant salvaging, and seeding.

### **Revegetation**

The Mojave Desert plant palette consists of plant material such as Joshua trees, Mojave yucca, creosote bush, white bursage and various cacti species depending on location and elevation. Each plant adapts to its specific elevation and soil type as it develops. For this reason, it is critical for the native revegetation contractor to salvage native plants from the project site or secure alternative salvage sites with similar elevation and soil type as the project site. The finished native revegetation project results in a self-sustaining, non-irrigated environment.

Critical to the long-term success of a revegetation project is proper execution of the maintenance program after installation. Proper watering schedules and overall growth monitoring during the maintenance period is imperative for successful transition of the plant into its ultimate non-irrigated native environment.

- Salvaged plants should be located in an onsite or designated nursery during construction.
- The revegetation contractor shall guarantee survival for each species installed with a designated percentage at the end of a one- year maintenance period.
- Contractors should be able to demonstrate experience in Mojave Desert plant palette revegetation.

### **Planting/Salvage of Native Plant Material**

Prior to any work or salvage, one transect shall be completed to determine accurate plant counts to guide revegetation. The transect shall be up to 10,000 square feet separate, non-continuous areas as determined by the nature of the project. The average of those areas will be used to determine the quantity of plant material per acre that will best complement the natural environment.

Salvage of native plant materials to an onsite nursery or designated off-site location shall occur prior to clearing and grubbing of the site. Existing plant material shall be salvaged from all areas within the disturbance limits and as directed by the owner's representative including, but not limited to:

- *Larrea tridentata*/ creosote bush
- *Ambrosia dumosa*/ white bursage
- *Opuntia basilaris*/ beavertail cactus
- *Opuntia erinacea*/ old man cactus
- *Echinocereus triglochidiatus*/ hedgehog cactus
- *Yucca brevifolia*/ Joshua tree
- *Yucca schidigera*/ Mojave yucca
- *Ferocactus wislizenii*/ barrel cactus

The north orientation of each plant shall be marked prior to salvage. Proper orientation shall be maintained when stored onsite or in the nursery. As much of the root ball as possible shall be included and protected. The root ball shall be kept moist and protected at all times during transportation. Plants shall be reinstalled in their original orientation to reduce sunburn.

If applicable, the revegetation contractor shall provide the owner's representative with alternate salvage locations of similar elevation and soil conditions as the project site.

### **Nursery Construction and Maintenance**

The nursery area shall be constructed onsite or at an agreed upon location by the owner's representative and revegetation contractor to host salvaged plant material. Proper soil preparation shall include scarifying as necessary to provide adequate planting conditions. Salvaged shrubs shall be immediately treated according to their species and then transplanted to the nursery. Salvaged plant material shall be properly transported, hosted and maintained until replanted.

### **Transplanting of Salvaged Native Plant Material**

Upon final contouring and distribution of rock mulch, the area shall be revegetated with the salvaged native plant material. Configuration of the planting shall be consistent with the surrounding environment.

### **Plantings**

- The densities and diversity of revegetation species will be consistent with natural, undisturbed areas adjacent to the project site.

- Watering will begin based on the maintenance program provided by the revegetation contractor.
- Revegetation contractor shall coordinate with landscape contractor on the use of the irrigation system.

**Native Seeding**

The revegetation contractor shall apply a native seed mix within the native revegetation zones that is consistent in density and type with the surrounding environment or as directed by the owner’s representative.

Seed mix shall be applied via minimum 3,000 gallon capacity hydro-mulcher, unless otherwise approved by the City of Henderson.

The list below is representative of plant species included in revegetation areas. Species and density may vary depending on project location.

- *Sphaeralcea ambigua* (globe mallow) 1.05 PLS/lbs./acre
- *Baileya multiradiata* (desert marigold) 0.20 PLS/lbs./acre
- *Ambrosia dumosa* (white bursage) 1.00 PLS/lbs./acre
- *Larrea tridentata* (creostoe bush) 1.25 PLS/lbs./acre
- *Ambrosia deltoidea* (triangle bursage) 1.00 PLS/lbs./acre
- *Eriogonum inflatum* (desert trumpet) 0.20 PLS/lbs./acre
- *Verbena 'Homestead Purple'* (purple verbena) 1.50 PLS/lbs./acre
- *Encelia farinosa* (brittlebush) 0.50 PLS/lbs./acre

**Salvage of Rock Mulch**

Rock mulch and boulders are to be salvaged from the site or from a similar site approved by the owner’s representative. Color shall be selected to emulate the character of the surrounding environment.

**Soils**

It will be the revegetation contractor’s responsibility to ensure soil compatibility with the proposed revegetation process. Testing including, but not limited to, composite soil sampling, fertility testing, chemical analysis, and soluble salts analysis. Tests shall determine the quantities and type of soil amendments required to meet local growing conditions for the plant material specified.

**Contouring and Shaping**

If required, contouring and shaping shall be performed prior to redistribution of rock mulch. The contractor shall conduct minor contouring activities where applicable to visually integrate disturbed area with the native grades. Contouring and scarifying may include the recreation of natural swells, native surface wrinkles and washes or as indicated on the plans.

**Rock Mulch and Boulder Salvage and Replacement**

Rock mulch shall consist of materials native to Southern Nevada as follows:

3/4-inch minus	55%
Two-inch – three-inch rock	15%
Four-inch – eight-inch rock	15%
12-inch – 18-inch rock	15%

- Contractor shall provide a minimum ten foot by ten foot mock up area for owner's approval
- No rock mulch larger than three inches shall be placed within the three-foot clear zone adjacent to walks, paths, and trails.
- Rock mulch coverage shall be a minimum of three inches thick unless noted otherwise on plans. Caliche shall be removed.
- Place salvaged rock mulch and boulders in a fashion that resembles the surrounding environment in appearance and texture.
- Imported rock mulch and boulders will resemble the material of the surrounding environment.
- Rock mulch is to be applied at a coverage rate of 60 percent after contouring and shaping.

#### **Site Preparation**

- Do not disturb natural areas or newly planted trees, shrubs, or turf areas
- The topsoil shall be placed prior to the plant materials, rock mulch, and boulders.
- Contour the surface to match the surrounding topography. This work will not adversely affect the site drainage patterns. All formed channels and swales are to be maintained. All contouring should be by mechanical means where possible.
- Loosen topsoil to relieve compaction and facilitate water penetration and plant establishment to a minimum depth of six inches.
- Rough harrow to break up hardened masses of soil.
- All heavy equipment tracks and marks shall be raked and blended into the terrain leaving a natural appearance.

## DESIGN NOTE

All wildflower and grass seeding rates are specified in terms of "pounds, pure live seed." The total weight of a seed bag is not the pounds of pure live seed because the contents will not be 100 percent pure nor will every seed germinate. This is not a reflection of poor business practices by the seed industry, but rather the nature of the seeds, which cannot be changed.

### Calculating Pounds of Pure Live Seed

To determine the amount of Pure Live Seed (PLS) in a seed bag, use the following formula: percent purity x percent germination = percent PLS.

For example, a one- pound bag of Bermuda grass seed might contain the following information: purity equals 85 percent; germination equals 75 percent.

The PLS formula for this bag of Bermuda grass seed would be:  $0.85 \times 0.75 = 0.64$  PLS.

In other words, the one-pound bag of Bermuda grass seed actually contains 64 percent (or 0.64 pounds), of pure, live seed. It also means that 36 percent or 0.36 pounds is unneeded material.

In order to get one pound of pure live seed, it's best to set up a basic proportion equation that says "0.64 pounds pure live seed is to one pound, as one pound is to x pounds pure live seed." The equation would look like this:  $0.64:1 = 1:x$

Solving the equation you would find  $0.64x = 1$  and then,  $x = 1/.64 = 1.56$  (lbs. bulk). Therefore, in our example, you would need to purchase 1.56 pounds of bulk seed in order to get one pound of pure live seed.

### Soil Stabilizer

The seed mixture specified above shall be mixed in soil stabilizer specifically made for hydro-seeding applications to ensure slope stability, germination, and minimize nuisance erosion. The soil stabilizer shall be mixed and applied per the manufacturer's recommendation. Mineral dye shall be added to the slurry to provide immediate color integration to the desert floor. Color shall be approved by the owner's representative.

### Desert Varnish

#### General

The rock coloring material shall be applied only by licensed applicators approved by the manufacturer. Variegated patinas that develop shall be controlled by a custom blending of the rock coloring material and/or application techniques. The rock coloring material shall be clear when applied and full color development shall occur within two to four weeks. A listing of equipment to be used for the application of simulated desert varnish shall be submitted prior to beginning of operation.



When the contractor provides samples of the desert varnish, the following should be included:

- Material Safety Data Sheets (MSDS);
- Product information showing the following:
  - Product chemical composition;
  - Product does not to have a pH of seven or greater;
  - Product will produce permanent, stable, oxidized colors;
- Desert varnish color to be determined by the city;
- Written statement of patent compliance;
- Written statement of indemnification whereby the contractor indemnifies all parties from any legal implications as a result of the use of the product;
- List of equipment to be used for application of desert varnish.

### **Color Varnish**

The desert varnish shall be Permeon, Natina, or an approved equal. The coloring material shall be a single step application process, desert varnish material that will develop natural, aged earth tones or desert varnish colors on the surface to which it is applied. The rock coloring material shall be able to match the color of the surrounding environment. The desert varnish material shall be applied directly to clean surfaces by an applicator certified by the manufacturer. Dilution shall be approved by the owner's representative. The material shall produce stable oxidized colors with a projected life of 100 years.

### **Sample Area**

The contractor shall apply the rock coloring to a minimum ten foot by ten foot test section to be reviewed by the owner's representative prior to treating the entire site. Test sections shall be applied at various dilutions to match existing natural desert patina colors at the project.

### **Application of Desert Varnish**

The soil and rock surfaces to be treated shall be uniformly stained to blend with the surrounding colors in the environment. The owner's representative shall approve the stain coverage of all treated areas.

- Protect all surfaces not scheduled for finishing including sidewalks, landscaping, amenities, etc.
- Clean and prepare all surfaces to receive application of desert varnish according to manufacturer's recommendations
- Clean concrete surfaces, natural stone, and ground planes of dirt, debris, efflorescence, encrustations and other foreign matter. Surface shall be dry prior to application of desert varnish.
- Field conditions will dictate the amount of desert varnish required beyond that specified or recommended to provide uniform complete coverage based on the samples provided and approved. Completion and performance will be based on the final result as opposed to a unit price. Contractor shall thoroughly inspect the site and use his best judgment and

experience regarding quantities of materials required. No change in contract sum will be approved for any claimed additional costs to ensure adequate coverage.

- Product shall be applied by an applicator certified by the product manufacturer. Apply material evenly, free from sags, runs, crawls or defects of any kind. Apply each coat at proper consistency with material uniformly flowed on. Product shall be applied when daytime temperatures reach a minimum of 65 degrees Fahrenheit. Do not apply finishes on surfaces that are not sufficiently dry.
- After distribution of rock mulch, spot applications of Permeon, Natina, or an approved equal will be used to visually mitigate coverage to all scarred areas, boulders, and rock mulch.

### **Warranty/Guaranty/Maintenance Period**

The revegetation contractor shall warranty the yucca, cacti, and shrubs for a period of one year, from date of substantial completion.

The revegetation contractor shall maintain survival rates of 80 percent for each plant species and must replace any dead or dying plant materials that are not in a vigorous, thriving condition, weather permitting, upon notification of the owner's representative in order to achieve this rate. The contractor shall replace plant materials, which in the opinion of the owner's representative have partially died, thereby damaging shape, size, or symmetry.

The revegetation contractor shall replace plant material with the same species, variety, color, and size as originally installed at no cost to owner. Remove dead or dying trees as directed by the owner's representative. Protect irrigation system and other plantings during replacement operations.

Plants that have died will be stomped down and left for seed germination. Replacement plants will be located near the dead plants.

The revegetation contractor shall be responsible for providing and performing routine watering and maintenance of all plant material installed. The revegetation contractor shall be responsible for, but not limited to the following tasks:

- Cultivation and weeding plant beds and tree pits.
- The revegetation contractor shall determine routine watering schedules, including the watering of the plant materials, as necessary, to saturate the root system.
- Maintaining wrapping, guys, and stakes. Repair or replace accessories when required.
- Provide a copy of warranty form on company letterhead, prior to substantial completion.

### **Invasive Species and Noxious Weeds**

- Invasive species removal shall be designed for every project and shall follow

the specific recommendations including, but not limited to, use of approved chemicals and mechanical removal, for each species type in order to ensure 100 percent removal rate.

- Pre-emergent herbicide shall be a non-selective, pre-emergent herbicide appropriate for the season and for use around shrubs, ground cover, and trees in decorative rock areas. The pre-emergent shall have colorant for inspection purposes.
- Product submittals are required for approval by Park Planning or Park Operations prior to application. Inspections require 48-hour notification to the city.
  - Use Surflan, Snapshot, or approved equal.
  - Two applications shall be applied.
  - Apply pre-emergent herbicide before and after installation of decorative rock.
  - Products must be able to control Russian thistle.
  - After application, area shall be controlled to eliminate use on the application areas.

### **Soils**

- Structural soils shall be required for all tree wells as well as trees located in landscape strips less than eight feet wide adjacent to hardscapes.
- Soils analysis information shall be included in the specifications:
  - Agricultural soils analysis shall be obtained of both the proposed import and onsite soils from a lab specializing in agricultural soil analysis. The analysis shall recommend specific soil amendments and fertilizer applications. Submit the results to the city for review and approval.
  - Analysis shall show testing results and provide recommendations for the contractor to abide.
  - Testing shall include, but not be limited to, Organic Matter (OM), Sodium Adsorption Ration (SAR), Electrical Conductivity (EC), pH, Nitrogen, Potassium, Calcium, Magnesium, Copper, Iron, Zinc, Manganese, Boron, Sulfate, Cation Exchange Capacity (CEC)

### **Fertilizers, Agricultural Minerals, and Additives**

- All specific soil amendments, additives, minerals and fertilizers to be added to all onsite and import soils for landscaping shall follow the recommendations of the approved agricultural soils analysis and manufacturers recommendations.
- All fertilizers and shall be granular.
- Pre-plant fertilizer shall be mixed by commercial fertilizer supplier, consisting of the following ratio by weight: 3:3:1 (N-P-K). Follow soils analysis recommendations.
- Sod fertilizer shall be mixed by commercial fertilizer supplier, consisting of the following ratio by weight: 16:20:20 (N-P-K) after sod is laid. Follow soils analysis recommendations.
- Fertilizer tablets are prohibited.

### **General Landscape Plan Notes**

The following items are additional landscape information to be included, but not limited to, in the general note section of the landscape plans. Designers shall also follow these items in layout/design of the landscape plans and specifications.

- A minimum 48 hours' notice prior to delivery is required. Upon delivery to the site and prior to planting, all trees and plant material shall be inspected and approved by the designated Park Planning or Park Operations project representative of the Public Works, Parks and Recreation Department.
- All planting material shall be warranted for a period of one year from the date of substantial completion letter.
- Plants shall be packed for shipment according to standard practice for the type of plant being shipped. The root system of plants shall not be permitted to dry out at any time.
- Plants shall be protected against heat and freezing temperatures, sun, wind, climatic, or seasonal conditions during transit.
- Plant material shall be furnished in containers unless otherwise specified. Plants specified balled and burlapped (B&B) shall be handled by the ball of earth and not the plant. Broken or "made" balls will not be acceptable. Container-grown plants shall be well developed with sufficient root development to hold the earth intact after removal from the container without being root bound, circled or girdled.
- Contractor is responsible for verifying all plant quantities. The plant schedule is intended as a reference only.
- Plant material shall have identification tags on ten percent of total quantity of each species, showing genus, species, variety, etc.
- Contractor shall provide positive drainage away from all structures, walls, and on all surfaces according to all codes, regulations, and requirements.
- Trees sizes and specifications shall be compliant with the standards set forth by the [Arizona Nursery Association](#).
- Tree trunk and root crown and large roots shall be free of circling and/or girdling roots.

# **XI Irrigation**

This document has been created to assist in the design and installation of an efficient irrigation system. The City of Henderson promotes and supports water conservation through the use of technology and modern design and installation practices. The information used to create this document was gathered from standards and guidelines as set forth by the industry and accepted by cities and states across the Southwest. Review this section in its entirety prior to beginning design of irrigation systems.

## **Irrigation Design**

The irrigation system shall be designed to provide an efficient irrigation system.

The design of the system shall keep over-spray areas to a minimum.

The design shall comply with the adopted City of Henderson building, electrical, and plumbing codes.

Calculation for irrigation flow requirements and window for the entire system should take into account Distribution Uniformity (DU), Precipitation Rate (PR), six days per week, six hours per day including necessary cycle/soak requirements to prevent runoff and the application of 2.8 inches per week over the given acreage.

The system is to be designed using the lowest static water pressure available minus 20 percent to allow for pressure fluctuations.

Pressure regulation valves are to be provided as necessary so the irrigation system can operate at optimum pressures. Locations may include the point of connection, remote control valves, individual sprinkler head, and low volume drip systems. Zone plant material appropriately. Refer to Zoning section.

## **System Characteristics**

The irrigation system shall be a fully automatic system. Irrigation plans shall indicate location and size of irrigation meters, points of connection, backflow devices, valves, pumps, master valves, flow sensors, controllers, sprinklers, emitters, mainline, and lateral pipe. An irrigation legend shall provide the sizes and models of equipment specified.

The following shall be placed next to the irrigation legend on all plans

- Name and department from which design pressures were obtained
- Water meter size, type and manufacturer
- Size of tap and service line for meter
- Static pressure
- Design water pressure
- Designed highest gpm/gph flow
- Worst-case pressure loss calculations

### **General Criteria**

- Pressure polyethylene pipe other than lateral and drip tubing shall be ASTM D2239 rated.
- All crossings under paving, structures, etc. shall be sleeved. Sleeve depth to match nominal depth of mainline/lateral line.
- All valves, quick couplers, and splices to be within valve boxes and identified with pre-numbered, manufactured Christy ID tags.
- All reuse water valve and quick coupler boxes shall be purple.
- All clocks, CCU, flow meter, sensors, phone line, and power to be located in the restroom chase when available. For trail installations, provide a Maxicom compatible irrigation controller located in a vandal resistant locking cabinet.

### **Thrust Blocking**

Thrust blocking shall be installed per City of Henderson Department of Utility Services guidelines.

Provide mainline thrust blocks at all changes in direction on all mainlines three inches in diameter and larger. Tape for all main lines shall be used. On gasketed pipe, a joint restraint system is required. Joint restraint systems will be resolved during the design process.

### **Flushing and Testing**

All testing shall take place in the presence of the designated city representative. All main supply lines shall be flushed completely of foreign particles before placing section control valves, quick-coupler valves and hose bibs. After flushing and when valves are in place, system shall be pressure tested at 150 psi with valves closed. Pressure shall be maintained for a period of two consecutive hours. All joints showing leaks shall be cleaned, remade, and retested.

After installation of section lines, the piping shall be completely flushed of foreign particles before attaching sprinkler heads and drain valves. After flushing, section lines shall be tested with risers capped and drain valves closed. The test shall be made at maximum operating pressure for a period of one hour. Any pipe, fittings or joints showing leaks will not be accepted.

All joints showing leaks shall be cleaned, remade, and retested. Control tubing shall be tested in the manner specified herein for the main supply lines.

Automatic controllers shall be tested by actual operation for a period of two weeks under normal operating conditions. Should adjustments be required, the contractor shall do so according to manufacturer's direction and test until operation is satisfactory.

Integrity of system shall not be compromised after testing. If the system is compromised, it will have to be repressurized and tested.

**Backflow**

Backflow preventers shall meet the requirements of the City of Henderson Department of Utility Services. Each backflow preventer shall be equipped with a gate valve at each end of the backflow prevention unit.

All backflow devices shall be in a weather and vandal resistant locking box with master valves and flow control and meet the requirements of approved City of Henderson Department of Utility Services backflow and enclosure requirements.

Provide backflow prevention assemblies at all connections with potable water supplies according to all applicable codes. It is the responsibility of the designer to specify the assembly according to all applicable regulations. It is the responsibility of the contractor to see that the assembly is installed properly and that it passes inspection.

**Controllers**

All controllers shall be connected and working with City of Henderson central control system at time of turnover to the City of Henderson.

Each valve in the circuit shall be adjustable for setting to remain open for any desired period of time from one minute or less to at least 60 minutes.

The controller shall operate on 110-117 volts and shall be equipped with a circuit breaker or fusible connection to protect the controller from overloads.

The controller shall have a master on/off switch to turn all stations off without disturbing the clock settings or automatic timing sequences.

Controllers shall allow any station to be operated manually both on or off whenever desired.

Controls shall provide for resetting the start of the irrigation cycle at any time and advancing from one position to another.

CCU/Site-SAT as required with TRC commander receiver card. Twenty-four minimum stations unless otherwise specified. Roadways, trails, and paths are typically a 12 station minimum. Controllers shall be designed to have a minimum of two empty stations per controller.

Control wire UF direct burial solid copper 12 AWG. Common, or for runs over 500 feet, 14 AWG pilot. Include two extra wires per run, snake wire in trenches, and provide a 30-inch loop at splices or points of connection. Tape and bundle at 20-foot intervals.

All controllers shall be installed in a maintenance bay where available. Where a maintenance bay is available, install stainless steel pedestal mounted locking

controllers. All locks or locking devices shall be master keyed and three sets of keys provided to city staff. In maintenance bays provide conduit as required (usually two inch) with pull string for telephone line. Provide all telephone board and equipment required by service provider.

All controllers must be Maxicom compatible. Provide one TRC Commander Remote transmitter for every three controllers at site (e.g., one transmitter for one to three controllers; two transmitters for four to six controllers; three transmitters for seven to nine controllers). Provide one TRC Commander receiver for each controller at the site. Provide the best antenna option for the site, located on the nearest light pole to the controller. Refer to Appendix A, Irrigation Details. Show conduit on electrical drawings for TRC wire to nearest light pole.

Recommended products:

- Rainbird
- Approved equal

### **Mainline**

- Mainline shall be run in its own trench, separate from other utilities.
- Mainline depth shall be 24 inches minimum and tracer wire shall be installed with it.
- Pipe under three inches shall be Schedule 40 minimum. Pipe three inches and over shall be ring tight or gasketed and a minimum of class 315.

### **Lateral line**

- Lateral line shall be run perpendicular to grade whenever possible to prevent low head drainage.
- Inline check valves shall be used whenever low head drainage is possible.
- Fittings at grade or above should be black or color matched to finish grade cover.
- Lateral line shall be Schedule 40, with a depth of 18 inches minimum.

### **Piping/Sleeving**

All PVC pipe shall be rated ASTM D 1784 or 1785.

Minimum recommended standards for PVC pipe: Schedule 40 for sizes ¾ inch through three inches, Class 315 for sizes four inches and up. Half-inch PVC pipe is not allowed.

All pipe or wire under hardscape shall be contained in sleeving. Sleeving shall be a minimum of two times the diameter of the pipe or wire to be sleeved, or a minimum of two-inch sleeve.

### **Turf irrigation Heads**

Provide double swing joints on each head and quick coupler.



Rotors are to be three inches minimum and six inches maximum from paving edge. Rotors shall be 12 inches from walls or buildings.

Pop-up turf heads are to be one inch minimum from paving surfaces. See Appendix A, Irrigation Details.

### **Head Spacing**

Systems shall be designed to provide minimum Precipitation Rates (PR) and Distribution Uniformity (DU)

- Spray type heads: 1.5–inch PR at 70 percent DU
- Full circle rotor-type heads: .40 inches PR at 75 percent DU
- Part circle rotor-type heads: .75 inches PR at 75 percent DU
- Full circle rotor-type heads (sports fields): .40 inches PR at 80 percent DU
- Part circle rotor-type heads(sports fields): .75 inches PR at 80 percent DU

Use a maximum of 90 percent of manufacturer's listed range for square spacing.

Use a maximum of 85 percent of manufacturer's listed range for triangular spacing.

Use triangular spacing where areas are exposed to prevailing wind conditions.

Trim open areas with a minimum of a double row of 1800 PRS (with SAM if possible low head drainage) using square spacing to prevent overspray onto walk ways, hardscape or other areas that may promote runoff or slip hazards.

All sprinkler heads shall be spaced at a maximum of 45 percent of design performance diameter of the sprinkler.

### **Large Rotor--- Stainless Steel**

- Single row applications are not permitted.
- PSI at head shall be per manufacturer's optimum pressure.

Recommended products:

- Rainbird
- Approved equal

### **Mid-Size Rotor--- Stainless Steel PRS with SAM.**

- Use Matched Precipitation Rate (MPR) nozzles whenever possible.
- Use four inches for Bermuda and six inches for fescue and blends.

Recommended products:

- Rainbird
- Approved equal

### **Rotary Nozzles**

- Use manufacturer's recommended pressure regulating bodies.
- Use four inches for Bermuda and six inches for fescue and blends.
- Single row applications are not permitted.

Recommended products:

- Hunter MP Rotator
- Rainbird Rotary
- Approved equal

### **Fixed Spray With SAM-PRS**

- Use four inches for Bermuda and six inches for fescue and blends.
- PSI at head should be a maximum of 30 psi.
- Single row applications are not permitted.

Recommended products:

- Rainbird
- Hunter
- Approved equal

## **Drip irrigation**

### **Drip Emitters**

Emitters shall have a plastic threaded body with single outlet and be pressure compensating. The drip tubing from the drip line header to the emitters shall be half-inch flexible thick-walled PVC tube. Use with half-inch PVC fittings and 795 glue.

Emitters shall be no more than one inch above grade.

Refer to Appendix A, Irrigation Details.

Recommended products:

- GPH emitters
- Salco prospec pressure compensating threaded emitters
- Approved equal

### **Netafim**

Netafim shall be considered in in areas where there are trees but few to no shrubs, due to lack of supplemental water from shrubs. Also, Netafim shall be used in turf conversion projects where existing trees will no longer have supplemental irrigation from turf. The system shall be designed to encompass the mature size of the tree drip line. Typical spacing of system will be project specific.

**Flexible tubing**

Flexible tubing shall be half-inch IPS with a maximum length of eight feet.

Recommended products:

- Rainbird
- Salco
- Approved equal

**Valves**

- Provide unions for all valves (up and down stream), except gate valves and master valves.
- Provide ball valves prior to all irrigation control valves. Refer to Appendix A, Irrigation Details.
- Remote control valves shall be sized according to the zone demand requirement, lateral piping downstream and manufacturer's specifications.
- All remote control valves shall have flow control adjustment.
- All remote control valves shall have ability to be manually operated.
- Non-potable systems shall use compatible remote control valves.
- Control valves will be installed in a standard or larger, manufactured, valve/meter box, capable of being bolted closed after installation.
- Remote control valve in valve box shall have ample space for service of entire assembly.

**Isolation (Gate) Valves**

Isolation valves are to be placed at strategic locations throughout the system to facilitate maintenance. For example, at one inch or larger points of connection and for irrigated areas over 2,500 square feet.

Valves two and 1/2 inches and smaller shall be of the same size as the pipes on which they are placed unless otherwise indicated on the plans. Service rating for non-shock cold water shall be 200 psi. Valves shall be all bronze, split wedge type, with rising stem and union bonnet. Packing shall be Teflon impregnated asbestos and the valve shall be capable of being repacked under pressure. Hand wheels shall be malleable iron.

Valves three inches and larger shall be iron body bronze, mounted, double disc, parallel seat type with "O" ring seal and shall comply with AWWA Standards. Valves shall have a working pressure of 200 psi and a test pressure of 400 psi. A shut-off rod, six feet in length (per City of Henderson Department of Utility Services) that will fit a two-inch wrench nut, shall be furnished by the contractor.

Valves shall meet or exceed AWWA C-509.

Epoxy shall meet or exceed AWWA C-550.

Valves shall be repairable from above without removing valve body from system.

Isolation gate valves shall be provided at strategic locations.

Recommended products:

- Nibco
- Clow
- Approved equal

### **Master Valve Assembly**

Electric master control valves shall be of the diaphragm type, normally open or closed 24-volt. The valve solenoids shall operate with 18-30 volts of power.

Depth shall be a maximum of two feet below finish grade.

Solenoids shall be completely encapsulated for positive waterproofing. The valve body and bonnet shall be of cast bronze, flanged or threaded type, and epoxy coated.

Valve box shall provide minimum eight inches clear around all sides of valve.

Master control valves shall be capable of withstanding a non-shock cold water working pressure of 200 psi.

Recommended products:

- Griswold
- Cla-Val
- Approved equal

### **Remote Control Valve Assembly**

Valves shall have pressure regulation module to ensure optimum performance (PRS-D).

Valve bonnet shall have a bleed screw for manual operation and a manual flow control adjustment.

Recommended products:

- Rainbird
- Approved equal

### **Drip Valves**

The electric remote control valve shall be a normally closed 24 VAC 50/60 Hz (cycles/sec) solenoid actuated globe pattern design. The valve pressure rating shall not be less than 200 psi (13,80 bar). Basket filter with a minimum of 150 mesh screen. Pressure regulating basket filter and y-strainer for less than 4 gpm.

Pressure regulators include plastic housing, ¾-inch size, with corrosion resistant internal parts, flow control and manually operated, and capable of controlling outlet pressure to approximately 30 psi. Strainer/filter units include plastic housing with corrosion resistant internal parts and 200 mesh screens.

Pressure regulating valves in excess of 75 psi need to have a PRS-D installed.

Valve bonnet shall have a bleed screw for manual operation and a manual flow control adjustment.

Drip valve: size to be determined by designer or one-inch minimum

Refer to Appendix A, Irrigation Details.

Recommended products:

- Rainbird
- Approved equal

### **Quick-Coupler Valves**

The quick-coupler valve shall be of brass or bronze construction with one inch FIP bottom connection. The valve shall be of two-piece construction with removable upper body. The valve body shall be designed with a single slot to receive a single slot coupler. The one inch male and ¾-inch female IPS coupler for the quick-coupler valve shall be single slot of bronze construction.

Along trails, quick-coupler valves shall be located a maximum of 100 feet from plant material. In parks, quick couplers shall be located to maximize availability to plant material, picnic areas, sports fields or courts, etc. They shall be located a maximum of 150 feet from amenities.

### **Air Relief Valves**

The air relief valve shall be designed to release air entrapped in a pipeline until liquid reaches the float, which will rise to the seat and close the valve. The float shall be stainless steel resting within a stainless steel or bronze cup.

The valve shall be sized per design requirements, and shall be capable of withstanding pressures up to 300 psi. The valve shall be fitted with a galvanized steel return elbow.

Recommended products:

- Netafim TRAVRV (only to be used on Netafim system)
- Waterman
- Approved equal

### **Valve Boxes**

Valve boxes shall be commercial grade and of the general dimensions shown on the plans. Lids shall be overlay type instead of inset. Valve boxes shall have extensions as necessary to reach the depth indicated.

All valve boxes shall be located outside of turf areas where possible. No boxes are to be placed in sports fields. Place valve boxes no more than 12 inches from paving surfaces.

Minimum clearance to bottom of valve box lid for irrigation control valves is a minimum of three inches and a maximum of 12 inches as measured from the highest point of the valve assembly.

Valve box color shall be green in turf areas, sand in decomposed granite/rock areas, and purple for reuse areas.

Branding shall be included on all valve box covers.

Recommended products:

- NDS
- Carson
- Approved equal

### **Zoning**

- Ball field outfields shall be separate from infield.
- Palms trees must be on a separate system.
- Provide separate zones for turf, shrubs, groundcover beds, and trees.
- Provide separate zones for different exposures. (e.g., north side of building vs. south side).
- Match appropriate zones for plant material to irrigation.
- Provide separate zones for sloped areas.
- When irrigating slopes, take runoff at slope bottom into consideration. Run lateral lines perpendicular to grade.
- Systems shall contain air relief valves to prevent low point drainage where applicable.
- Provide separate zones for variations in site soil types.
- Design and/or install with reduced head spacing and/or low angle nozzles for windy conditions.
- Irrigation design should minimize overspray onto non turf areas.
- Each zone shall have its own station on the controller.
- No single zone shall be designed or installed with sprinklers of differing pressure requirements or precipitation rates (rotors, spray heads, drip emitters may not be mixed within a zone).
- The use of non-potable color indicators (equipment) for heads, valves, valve

boxes, quick couplers, piping, etc., are required when irrigation systems are supplied by non-potable water sources.

### **Other components**

#### **Dri-Splice connectors**

Dri-Splice connectors shall be prefilled with non-hardening silicone.

Inside splice boxes, valve wires are to have a minimum of 30 inches long extra coiled, and station ID shall be identified on both sides of the splice.

Connectors shall be located within valve boxes and identified with a Christy ID tag.

Two-wire decoder based system shall have voltage rated 3M DBY.

Recommended products:

- Spears DS-400
- Approved equal

#### **Irrigation saddles**

If the valve location is within four feet of the mainline, saddles attached to the irrigation mainline shall be installed in an upright (vertical) position. The section of pipe after the saddle shall be no less than 15 inches below finish grade for a vertical saddle. At valve location, appropriate fittings should be used to ensure the inlet piping to the valve is no less than 15 inches and no more than 18 inches below finish grade.

If the valve location is farther than four feet, saddles attached to the irrigation mainline shall be installed on the side of the mainline (in a horizontal position). If the saddle is installed in the horizontal position, the mainline after the saddle shall be installed at nominal mainline depth until reaching valve location. Appropriate fittings should be used at the valve location to ensure the inlet piping to the valve is no less than 12 inches and no more than 18 inches below finish grade.

Provide stainless steel straps and bolts. Saddles made of stainless steel or bronze.

Products used shall be City of Henderson Department of Utility Services approved.

#### **Communication wire**

- Communication wire for flow sensors shall be a minimum of three pair approved for direct burial.
- Each controller shall have its own color wire. Spare wire is typically green while common wire is typically white with a stripe of the color of the valve

wire.

- Provide a spare wire for each grouping of valves.
- Provide two separate conduits, one for TRC wire and one for electrical wire, from controller to nearest light.
- Label spare wires with Christy ID tags and identify on as-builts.
- Provide minimum of two spare wires for all irrigation systems. Provide a minimum of one spare wire for every eight remote control valves in system. Spare wire shall be available at all valve manifolds or clusters. All spare wires shall be “home run” to the respective controller.
- Provide minimum of one spare 12 AWG common wire from controller to last valve in system.

### **Booster Pump Stations**

Booster pumps shall be installed on systems where supply pressure does not meet optimum recommended pressures of sprinkler manufacturers.

Pumps shall be Variable Frequency Drive (VFD) with flow and pressure controls, full flow bypass loops for maintenance, remote access via telephone or internet, and a minimum of low flow, low pressure and electrical safeties. Pump shall be able to record and display time/date of fault and parameters at time of fault.

Pump size to be designed based on the pressure at flow (dynamic pressure).

Recommended products:

- Watertronics
- Munro
- Approved equal

### **Landscape Irrigation Audit Requirements**

All overhead irrigated landscape areas shall have a landscape irrigation audit performed by a certified landscape irrigation auditor, certified in good standing with the Irrigation Association (IA). The auditor shall be independent of the property owner and of all contractors associated with the property. The audits will be conducted in accordance with the current edition of the IA’s Landscape Irrigation Auditor’s Handbook.

Flow requirements and watering window shall be based on post-established landscapes and shall consider the following:

- Projected PR
- Projected DU
- Operation of a maximum of six days per week
- Weekly ET rates of 2.8 inches
- Maximum of six-hour watering window, including all projected cycle and soak adjustments

The minimum efficiency requirements to meet in the audit are 70 percent DU for all fixed



spray heads and 80 percent DU for all rotor systems.

The irrigation schedule should include runtimes per station per cycle, cycles per day, total run time per cycle, and days per week for each station. Compliance with this provision is required prior to the City of Henderson issuing a letter of acceptance.

The results of the audit shall be provided to the City of Henderson in a report acceptable to the city and shall be signed by the auditor.

The report shall include:

- Controller number and location
- Station numbers and locations
- Sprinkler head locations and distance between sprinkler heads
- Pressure reading per station
- Catch device readings and locations
- Distribution uniformity for individual stations
- Precipitation rates per station and a twelve month irrigation schedule. (run times per cycle, cycles per day, and days per week for each station)
- Estimated soil infiltration rates, root zone soil type per station
- Completion of City of Henderson site data sheet

### **Irrigation As-Builts**

Provide a minimum of one bond copy and one electronic AutoCAD (CAD) version of all finished as-built drawings. Include the date the installation was completed. Contractor shall contact City of Henderson Public Works, Parks and Recreation Department's Quality Control Division for what version of CAD to use for as-builts.

Any items listed below that deviate from the construction documents shall be documented on the as-builts:

- Note all points of connection include tap size, line size and static water pressure (psi) of service.
- Locate with accurate measurements all of the following major components and their size, installed on the project.
  - Water meters
  - Backflow preventers
  - Pressure reducing valves (note pressure settings)
  - Filters
  - Master control valves
  - Isolation and gate valves
  - Flow sensors
  - Remote control valves (note station assignment, size, flow rate, pressure setting. D.U. and actual flow rates if available from water audit)
  - Drip system pressure regulators and filters
  - Quick couplers and hose bibs
  - Pressure main lines, sizes and depth

- Main line sleeves, sizes and depth
- Capped main lines, future POCs and depth
- Manual drain valves and sumps
- Remote control wire
- Controller location (s) (note manufacturer, model, size and number of stations used)
- Rain sensors
- Moisture sensors
- Note and identify location(s) of new and existing utility systems as encountered during installation, e.g., gas, phone, sewer etc.
- Additional components installed on the project:
  - All sprinkler heads
  - Lateral lines and sizes
  - Lateral line sleeves and sizes
  - Manual or automatic flush valves
  - Air release valves

Global Position System (GPS) location for the following components on the project

- Point of connection (POC)
- Master valve assembly
  - Isolation and gate valves
  - Irrigation valves
  - All major changes in direction of the main line
- Inline check valves
- Air relief valves

**Notes:**

The following information shall be included in the plans/specifications:

- Controller wire run within five feet of trees shall be run through PVC.
- All control wire shall be run in separate trench from other utilities.
- Valve bonnet shall have a bleed screw for manual operation and a manual flow control adjustment.
- All valve boxes shall be located outside of turf areas where possible. No boxes are to be placed in sports fields. Place valve boxes no more than 24 inches from paving surfaces. Color to match surrounding conditions.
- Minimum clearance to bottom of valve box lid for irrigation control valves is a minimum of 3 inches and a maximum of 12 inches as measured from the highest point of the valve assembly.
- Label spare wires with Christy ID tags and identify on as-builts.
- Contractor to verify pressure prior to ordering pump.
- It is the responsibility of the contractor to ensure the backflow assembly is installed properly and passes inspection.
- Emboss valve box cover with appropriate nomenclature per details, with two-inch high stencil letters using a stylus tip torch.

## **XII Complete Streets**

In 2013, the Regional Transportation Commission of Southern Nevada (RTC) finalized and approved the Complete Streets Design Guidelines for Livable Communities. The guidelines encourage designing a more comprehensive, welcoming, and safe travel environment for all user types. All park and trail projects within the city shall strive to incorporate complete streets design. Many of this document's sections already incorporate complete street design. However, this section shall be used as a supplement to City of Henderson and RTC complete street documents, codes, guidelines, and requirements. When the city's guidelines are stricter than RTC recommendations, designers should follow the city's requirements.

### **Age Considerations**

All projects shall accommodate for users of all ages and abilities. Special considerations need to include increased time for users to hear, see, judge distance, and react.

- Youth
  - Signage should use more symbols and less text.
  - Increase site visibility between pedestrians, cyclists, and vehicles adjacent to roads, trails, and parking lots. To encourage visibility of youth, designs shall incorporate appropriate amenity and plant height and sizes.
- Older Adults
  - Reduce sensitivities to light and glare.
  - Create designs to assist with reduced balance and strength.

### **Bike Parking**

Bike parking should be designed to encourage alternate modes of transportation.

- Locate bicycle parking at a closer proximity to an entrance than vehicular parking.
- Ensure bicycle parking has adequate lighting and provides protection from wind and sun.

### **Curb Extensions**

Design curb extensions at crosswalks to reduce pedestrian crossing distances, increase visibility, decrease vehicular speeds, and expand open space.

### **Intersections**

Intersections should be designed to:

- Encourage safe spaces for pedestrians. A median with a refuge island should be designed when intersections are greater than 40 feet. Refuge islands shall be a minimum of six feet wide.
- Minimize designated right turn only lanes. If a turn lane is needed, right turn channelization designs should be used.
- Decrease crosswalk distances. Crosswalk widths should be less than 12 feet wide.
- Reduce car speed by reducing intersection corners have 10–35-foot radii.

- Enhance bicycle visibility by increasing marked bike lane buffers.

### **On-Street Parking**

On-street parking should be designed within and around all parks.

- Parking should accommodate safe interaction between vehicles, bicycles, and pedestrians.
- Parking near intersections and corners should be placed a minimum of 30 feet behind the stop bar. This distance may be reduced if the design includes curb extensions.

### **Public Art**

All projects should incorporate public art. Art should be educational and can be integrated into any amenities, including but not limited to, site furnishings, play equipment, lights, signage, utilities, buildings, and fencing.

### **Roundabouts**

Roundabouts are encouraged for park and trail design.

- Include a minimum eight-foot refuge area at all intersection entrances and median refuge islands.
- All landscaping, signage, lighting, and site amenities shall not obstruct site visibility.
- Design a minimum 12-foot diameter center island that includes landscaping and/or public art as well as an elevated truck apron.

### **Sidewalks and Trails**

All sidewalks and trails adjacent to roadways and parking lots should be detached from the back of curb.

- Sidewalk and trail widths shall abide by Section II Trails requirements.

### **Traffic Calming**

Incorporate vehicular traffic calming measures into park and trail designs. This includes, but is not limited to, raised crosswalks, reduced lane widths, curb extension, speed humps, and pedestrian flashers.

### **Utilities**

Design parks and trails to reduce utility conflicts with hardscapes and landscapes.

- Above ground utility boxes and surface mounted utilities should be located within landscape areas and outside of all trails and sidewalks.
- Trails and sidewalks shall not reduce in width adjacent to utilities boxes.
- Underground utilities shall have a minimum five-foot cover when located within ten feet of trees and shrubs. See Section X Landscape for more information.
  - Utility laterals should be located outside of landscape areas and consolidated where possible.

## **Water Management**

Parks and trails should be designed to reduce and the limit impacts from storm events.

- Increase the use of pervious surfaces and limit impermeable paving.
- Along with conventional storm drain systems, design swales, raingardens and storm flows to reduce water runoff on streets.
  - Design swales and bioswales adjacent to roads and parking lots to capture and redirect runoff. The use of zero curbs and curb cuts are encouraged for this type of design.
  - Catch basins should be located upstream of crossings or crosswalks.

# XIII Lighting

## General Requirements

The City of Henderson has adopted a policy to utilize light emitting diode (LED) lighting wherever practicable.

### DESIGN NOTE

Lighting design is to include a ten-foot by ten-foot luminance grid (point-by-point) plot of maintained horizontal foot-candles overlaid on the site plan, plotted out to 0.0 foot-candles, which demonstrates compliance with the light trespass, luminance and uniformity requirements in these guidelines and approved by the City of Henderson Public Works, Parks and Recreation Department. When the scale of the plan, as judged by the Municipality, makes a ten feet x ten feet grid plot illegible, larger grid spacing may be permitted.

The maintenance (light-loss) factors, IES candela test-filename, initial lamp-lumen ratings and specific lamp manufacturer's lamp ordering nomenclature, used in calculating the presented luminance levels must be shown on the plan.

A third party field test will be required at the contractor's expense prior to final acceptance.

The following should be referenced regarding the specialized nature of each organization:

Crime Prevention Through Environmental Design (CPTED)

American Association of State Highway and Transportation Officials (AASHTO)

National Electric Code (NEC)

Illuminating Engineering Society of North America (IESNA)

All electrical must comply with NEC requirements and City of Henderson standards.

Arc Flash analysis including specific hazard category.

## IESNA Standards

Sports and Recreation Area Lighting – Classes of Play*		References
Class I	For competition play in large capacity arenas and stadiums	IESNA Manual
Class II	For competition play with fewer than 5,000 spectators	
Class III	For competition play primarily for players, with due consideration for spectators	
Class IV	For social and recreational play only, with secondary consideration for spectators	

Sports lighting Illumination Recommendations (Partial)*					References
Sport/Area Type	Lighted Area	Class of Play	Horizontal Fc avg.	Uniformity Max:Min	IESNA Manual
Baseball and Softball	Infield	I	150	1.7:1 or less	
	Outfield		100		
	Infield	II	100	1.5:1 or less	
	Outfield		70		
	Infield	III	50	3:1 or less	
	Outfield		30		
	Infield	IV	30	4:1 or less	
	Outfield		20		
Basketball		III	30	3:1 or less	
		IV	20		
Tennis		I	150	1.7:1 or less	
		II	100	2.5:1 or less	
		III	75	3:1 or less	
		IV	50	4:1 or less	
Volleyball		III	30	3:1 or less	
		IV	20	4:1 or less	
Soccer		II	150	2.5:1 or less	
		III	100	3:1 or less	
		IV	50	4:1 or less	

General Area Lighting – from IESNA

Area Type	Horizontal Min. Fc	Horizontal Avg. Fc	Max/Min	Avg/Min	References	Comments
Pedestrian Ways				See Comments	IESNA Manual	Avg/min where special pedestrian security is not essential should not exceed 4:1, except for residential sidewalks and roadside bikeways in residential areas where a 10:1 is acceptable. Where increased pedestrian security is desired, do not exceed 5:1 for any walkway or bikeway.
Commercial Areas		1.0		See Comments	IESNA Manual	Business areas with many pedestrians during night hours. Vert. = 2.2 fc avg. at 6ft AFG for special pedestrian security
Intermediate Areas				See Comments	IESNA Manual	Frequent moderately heavy nighttime pedestrian activity. Vert. = 1.1 fc avg at 6ft AFG for special pedestrian security
Residential Areas				See Comments	IESNA Manual	Residential or small commercial and residential mix. Few pedestrian at night. Vertical = 0.5 fc avg at 6ft AFG for special pedestrian security
Walkway/Bike Ways and Stairways				See Comments	IESNA Manual	Vert. = 0.5 fc at 6ft AFG for special pedestrian security
Pedestrian Tunnels				See Comments	IESNA Manual	Vert. = 5.4 fc at 6ft AFG for special pedestrian security
Parking Facility/Parking Lots					IESNA Manual	
Basic					IESNA Manual	Vert. = 0.1 fc at 5ft AFG

\*All information above has been summarized from the IESNA Lighting Handbook current edition.



## **Trail Lighting**

### **Luminaire**

Trail lighting in the City of Henderson is to be light emitting diode (LED) lighting wherever practicable.

Manufacturer shall be Cree Beta, Cooper Galean, or approved equal.

A warranty clause with a minimum five-year warranty shall be provided for the lighting.

Product is to be low profile modular design

Diecast, extruded-aluminum housing assembly

UL wet listed

Lighting level options shall include:

- Integral Backlight cutoff shield
- Integral dimming (80 percent high level and 15 percent low level – 2 minute duration)
- International dark sky association compliance
- IES BUG ratings available
- Energy calculations, max. per fixture, for full and dimmed conditions must be provided for approval.

Submittals must include a statement that fixtures provide illumination of an average of 0.5 maintainable foot candles at +/- 90-feet on center. Closer spacing will not be accepted.

All paved trails must be lighted where practicable. Lighting requirements for remote trails and trails in areas where lighting is not practicable will be determined by the Public Works, Parks and Recreation Department.

Lighting levels along trails is to be an average of 0.5 maintainable foot candles. A minimum of one foot candle is required at steep grades and at all traffic crossings.

Bollard-type lighting is not recommended or approved for park applications unless specifically authorized by the Public Works, Parks and Recreation Department.

### **Poles**

Poles must be a minimum of 16 feet in height unless otherwise specified. Five-inch x five-inch or larger square pole designed for area wind loads (100-mph). Poles to have a metal base plate to cover anchor bolts and a min/max four-inch x six-inch hand hole tack welded directly behind hand hole on back of pole at four

corners.

Poles to be either bronze or black and determined by the City of Henderson.

Anchor base (base plate) conforming to ASTM A36.

Pole shaft is to be fabricated from hot rolled commercial quality carbon steel of one-piece construction with a minimum yield strength of 55,000 psi.

Removable pole cap for poles receiving drilling patterns for side-mount luminaire arm assemblies. For top mount luminaire and/or bracket consult the manufacturer.

To prevent removable pole caps from coming off silicone will be added to pole caps. Install a vandal-proof screw on one side to prevent cap from popping off. Anchor bolts conforming to ASTM F1554 Grade 55, provided with two hex nuts and two flat washers, with "L" bend on one end and galvanized a minimum of 12" on the threaded end.

Galvanized high strength carbon steel structural fasteners

Galvanized or zinc-plated carbon steel or stainless steel non-structural fasteners  
Reference manufacturers' design criteria specification for all design conditions

The hand hole cover plate is to be secured by tack welding on four sides following acceptance or a locking mechanism where there is no turf.

Pole foundations must be placed a minimum three feet from the edge of a trail.

### **Electrical Pull Boxes**

Vandal-proof boxes must be provided as necessary. Pull boxes must be located to reduce access by others. In-ground junction boxes should be avoided where possible.

Supply box shall be provided. Grouting and adding slurry shall be provided when applicable.

Each underground conductor is to be fused with 10 amp/600v fuse and the fuse located in the hand hole in the pole.

AU conductor terminations must be done as stated in the UL listed methods and products.

Circuit: 240 volts with P.E. control and relay for entire circuit.

Underground box covers must be non-metallic.

Boxes in secured areas shall be covered with boulders where applicable.

Electrical equipment should have a three-foot concrete base pad above grade.

**Foundation**

NOTE: Light fixtures installed in Nevada Department of Transportation (NDOT) right-of-way must be provided with a breakaway base to comply with NDOT standards.

Foundation size must be matched with pole and wind loads. The top of foundation is to be four to six inches above grade and grounded per City of Henderson guidelines.

Poles placed within turf areas must provide a 12-inch radius full circle of concrete for turf maintenance. Concrete poles adjacent to hardscape areas must be provided with a 12-inch radius half circle of concrete for turf maintenance.

**Circuit**

The standard electrical circuit is to 240 volts with P.E. control and relays for the entire circuit. Each pole underground conductor is to be fused and the fuse located in the hand hole in the pole.

Each lighting system is to be controlled by a photo cell on time clock off with an override toggle switch mechanical time clock override.

All night light photocell with manual override switch.

**CAUTION:**

All lighting timers and any other “user” controls are to be installed outside of and independent of the electrical panel.

No electrical equipment controls to be installed to areas subject to any water source.

**DESIGN NOTE**

Crime prevention through environmental design (CPTED) is a part of every trail and park design in the City of Henderson

Crime prevention through environmental design is a multi-disciplinary approach to deterring criminal behavior through environmental design. CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts.

### **Sports Court Lighting**

Community-friendly facilities are a major concern when designing sports lighting in the City of Henderson. All lighting is to include "house side" shields or other measure to minimize the impact of lighting on neighboring residential areas.

Musco Lighting green systems or other systems that provide minimal light spill are preferred for all field lighting. Include Musco control-link system or approved equal.

Install electrical service, panels, and lighting controls outdoor to avoid non-compliance of the NEC working clearance. Article 110-26.

Underground box covers must be non-metallic.

Light pole hand hole ground stud is to be welded directly in the rear inside of the pole and include a #8 green pigtail approximately 12 inches long.

### **Sport Field Lighting**

Musco Lighting green systems or other systems that provide minimal light spill are preferred for all field lighting. Include Musco control-link system or approved equal. All courts shall be lighted with timing and warning device controllers that are accessible to the user inside each court.

All multi-use, baseball, and softball fields shall be designed to only be accessible to City of Henderson personnel. Timers and warning device controllers shall not be available for field users.

### **Restroom Lighting**

All lights to be LED.

Interior and exterior of restroom is to be lit with photocell, mechanical timer, and override. Interior and exterior lighting to be on a separate control system. All lighting is to be vandal resistant (detention grade with tamper proof screws), recessed when possible, and caged for vandal protection. Lighting and conduit is to be installed at height that would be out of easy reach. Conduit shall be contained within frame/structure whenever possible.

Interior lights are to be four-foot-long fixtures.

Exterior lighting to be located on each side of restroom, and at each ingress/egress minimum.

### **Miscellaneous Lighting**

Standard lighting for monument signs, restrooms buildings, etc. shall be vandal proof.

Well lights shall have a rock guard per the manufacturer.

**Maintenance Bays**

Lighting in maintenance bay is to include four 2-bulb fluorescent lights or approved equivalent LED.

Four duplex GFI outlets are to be provided.

# XIV Parking Lots

## **General information**

Refer to Chapter 19 of the Development Code for information regarding parking lots.

## **Parking Spaces Required**

Off-street parking shall comply with Chapter 19.7.

## **Parking Lot Landscaping**

Landscaping and screening for parking lots shall comply with Chapter 19.7.

## **Design Considerations**

When designing the parking lots, the following are encouraged:

- Flush (zero) curbs where appropriate for drainage
- Larger planter areas to encourage better growth for plant material
- Rain gardens

Note: Design considerations do not replace Development Code standards.

## DESIGN NOTE

### Park Parking Rules of Thumb

The City of Henderson General Development Standards are to be used to determine the number of parking spaces required. However, the following may give some guidance for determining the number of spaces needed. The number of spaces can vary greatly depending on whether every activity is busy at once and what events are programmed for the park.

Multi-Use Fields                      44 spaces per field

(11 per team x 2 teams + 2 teams warming up)

Baseball/Softball Fields      36 spaces per field

(18 per team x 2 teams + 2 teams warming up-- may be as low as 24 per field since baseball staging time is usually longer than soccer)

Tennis Courts                      4 per court

Basketball court                      10 per court

Bocce Courts                      4 per court

Horseshoe Court                      2 per court

Tot Lots/Water Feature      4-6 per structure

Dog Park                      1 per 1,000 s.f.

Maintenance                      1 per park up to five acres; one additional space for every additional five acres. Spaces to be distributed throughout the park per maintenance needs.

Shade Structures                      Design should take into consideration the size of the structure with the amount of spaces.

# XV Signage

## DESIGN NOTE

The City of Henderson Public Works, Parks and Recreation Department will review all park signs and propose standard designs and language for all park signage.

All park and trail signage must be approved by the Public Works, Parks and Recreation Department. Prior to installation.

### General

All signs shall utilize Class 6 retro-reflective sheeting for sign background, letters, numerals, symbols, borders and accessories. All letters, numerals, symbols, borders and accessories shall be directly applied to the sign background. All signage shall have graffiti resistant coating. Contractors shall provide shop drawings for approval for all signage.

### MUTCD

The current Manual on Uniform Traffic Control Devices (MUTCD) shall be followed where possible for all roads, parking lots and bicycle facilities.

### Materials

The panel sections shall be provided with suitable fastenings, as shown on the drawings, to permit easy attachment to supporting frames. These fastenings shall be so designed as to carry the full design load with a factor of safety of not less than 1.5. Panel sections shall be provided with closure strips at the joints.

Panel fastenings for use on sign panels covered with Class 4 or 6 reflective sheeting shall utilize nylon washers for contact between the reflective sheeting and the metal washer.

Closure strip shall be anchored by aluminum rivets as shown on the drawings. Rivets shall be the same color as the sign face. Closure strips are required only on aluminum sign panels.

Final determination of sign locations will be made in the field by the engineer.

Each sign face shall be thoroughly cleaned according to the reflective material manufacturer's recommendations, and all undesirable material that is visible on the face of the sign shall be removed. The use of abrasives or other cleaning material that will scratch or otherwise deface shall not be permitted.



Care shall be exercised at all times in the handling, storing, transporting, and erecting of the signs. Signs which are damaged shall be repaired or replaced at the contractor's expense.

### **Pipe sign posts**

Pipe sign posts may be field cut and drilled to adjust for local conditions when approved by the Engineer. Flame cutting will not be permitted. All field cuts and abraded areas on steel posts shall be thoroughly cleaned and given two coats of paint having a high-zinc dust content conforming to the requirements of Federal Specification MIL-P-21035. Extending the lengths of sign posts to adjust for local conditions by splicing or welding will not be permitted. It shall be the contractor's responsibility to ascertain that all required tests have been made by qualified testing laboratories as approved by the contracting agency. The contractor shall furnish the contracting agency with a written certification that all required tests have been satisfactorily completed and that materials and fabrication thereof comply with all the requirements.

### **Park Monument Sign**

- Park monument signs shall include the following:
- Park/Trail/Facility Name
- Lighting
- City of Henderson logo, Tree City USA logo and the Gold Medal Award logo
- All monument signs shall have anti-graffiti coating
- Affixed to a concrete base
- See Appendix A, Signage Details.

### **Park Rules sign**

See Appendix A, Signage Details

### **Spray Pad Signage**

See Appendix A, Signage Details

### **Dog Park Rules Signage**

See Appendix A, Signage Details

# XVI Site Furnishings

## General Information

The following provides information on site amenities typically found in parks and along trails within the City of Henderson. There will be amenities that are not included on this list that may be used in the parks and/or on the trails.

## Drinking fountain

In open areas, a minimum of two freestanding fountains for adult and child usable heights must be provided and must meet current ADA accessibility guidelines, unless otherwise approved by the City of Henderson Public Works, Parks and Recreation Department. Colors are to be approved by the City of Henderson Public Works, Parks and Recreation Department.

### DESIGN NOTE

The hydraulic design of the park must include a consideration for the turnover of the water supply to drinking fountains and drainage options.

Acceptable manufacturers are:

- Haws
- MDF
- Sunroc
- Acorn (outdoor wall mount)
- Metcraft (outdoor wall mount)
- Willoughby (outdoor wall mount)

Drinking fountains at restrooms are to be wall mounted to the building. See Appendix A, Site Furnishings details.

Doggie drinking fountains must be provided at dog parks and may be provided in other areas as approved by the Public Works, Parks and Recreation Department.

Drinking fountains shall drain to the public sewer. If an application arises where sewer connection is not available, draining through a French drain may be possible, but will need to be approved by the city's Public Works, Parks and Recreation Department and Department of Utility Services.

## Picnic table

- Smooth, integral concrete
- City of Henderson logo

- Skate resistant design
- Color shall be beige or as approved by the Public Works, Parks and Recreation Department
- Epoxy to surface in location(s) directed. Location to be approved by City of Henderson prior to epoxy.
- See Appendix A, Site Furnishings details

**Bench**

- Smooth, integral concrete
- City of Henderson logo
- Skate resistant design
- Color shall be beige or as approved by the Public Works, Parks and Recreation Department
- Epoxy to surface in location(s) directed. Location to be approved by City of Henderson prior to epoxy.
- See Appendix A, Site Furnishings details

**DESIGN NOTE**

Often site furnishings require specialized equipment for offloading. The designer should consider access to the site in the design. It is the contractor's responsibility to schedule deliveries, equipment, and progress of the work to avoid conflicts and to ensure equipment is properly offloaded and installed.

**Barbecue**

- Single or family
- Smooth, integral concrete
- City of Henderson logo
- Color shall be beige or as approved by the Public Works, Parks and Recreation Department
- Epoxy to surface in location(s) directed. Locations shall be approved prior to epoxy.
- See Appendix A, Site Furnishings details

**Trash Receptacle**

- Smooth, integral concrete
- City of Henderson logo
- Color shall be beige or as approved by Public Works, Parks and Recreation Department
- Epoxy to surface in location(s) directed. Locations shall be approved prior to epoxy.
- See Appendix A, Site Furnishings details

- Minimum quantities:
  - Ball fields and large ramadas      2 each
  - Tennis courts                              1 each
  - Basketball courts                        1 each
  - Restrooms                                    1 each
  - Tot lots                                        1 each
  - Parking lots                                 1 each
  - Dog parks                                    1 per area
  - Water play area                            1 each
  - Other sports amenities                 1 each

**Recycling Waste Receptacle**

- Smooth, integral concrete
- City of Henderson logo
- Recycling logo
- Color shall be beige or as approved by Public Works, Parks and Recreation Department
- Epoxy to surface in location(s) directed. Locations shall be approved prior to epoxy
- Standard top substituted with a recycling top
- Acceptable manufacturers:
  - Outdoor Creations
  - Wausau Tile
  - Approved equal
- See Appendix A, Site Furnishings details

**Pet waste station**

- Stainless steel
- Locking front access panel
- 400-bag capacity
- Signage
- Provide at intervals of 1,500 feet along paths or trails
- For parks, stations should be provided at a ratio of approximately two per five-acre area. For dog parks, a minimum of one at the entry and one for each area.

**Bike repair station**

- Minimum two-inch stainless steel frame
- One-bike capacity
- Powder coat finish, color determined based on project
- Provide the following vandal resistant tools:
  - Air pump
  - Phillips screwdriver
  - Flat-head screwdriver
  - Pedal wrench

- Torx wrench
- Headset wrench
- Tool tethers shall be a minimum 3/16-inch stainless steel cable

### **Complete Streets**

The City of Henderson encourages a comprehensive design that provides a safe travel environment for all users. Site furnishings for complete streets shall meet the following:

- Located in high pedestrian activity zones
- Use of sustainable materials is desirable

Refer to Section XII Complete Streets for more information.

### **Shade Structures**

Two types of shade structures are used for parks. Both fabric and metal structures are used whereas only metal is used for trails. The following describes the types of shade structures to be used.

The proposed structure(s) shall be modular and prefabricated, and include the structural steel frame, fabric/metal roof, steel cables, all fasteners, and installation of structure(s) including foundations. All shade structures shall be engineered and designed to meet a 90 mph wind load, 10 psf snow load, and 10 psf live load.

Installations of shade structures shall be performed by manufacturers licensed and bonded in the State of Nevada (Clark County) and comply with manufacturer's instructions for assembly, installation, and erection per approved drawings. Manufacturers not on the approved list will not be used.

Shade structures shall be lighted according to CPTED rules and regulations. Refer to Section XIII Lighting for detailed information.

The size of the shade structure will vary with each project. The minimum size for a metal shade structure is 12 feet x12 feet. Fabric shade structures are located over play areas. Size will depend on the equipment being covered.

Swings are not covered with shade structures. When a shade structure is located over a play structure, the roof of the play structure is not required.

Acceptable manufacturers for metal shade structures are:

- Polygon
- Classic Recreation Systems
- Approved equal

Acceptable manufacturers for fabric shade structures are:

- USA Shade
- Shade Systems
- Approved equal

## **Steel**

- Must be designed to meet requirements of the American Institute of Steel Construction (AISC) Specifications and the American Iron and Steel Institute (AISI) Specifications for Cold Formed Members.
- All connections shall have a maximum internal sleeving tolerance of .0625 inches using high tensile strength steel sections with a minimum sleeve length of six inches.
- All non-hollow structural steel members shall comply with ASTM A-36
- All hollow structural steel members shall be cold formed, high-strength steel and comply with ASTM A-500, Grade C.
- All steel plates shall comply with ASTM A-572, Grade 50.
- All galvanized steel tubing shall be triple coated for rust protection using an inline electro-plating coat process. All galvanized steel tubing shall be internally coated with zinc and organic coatings to prevent corrosion.
- Tension cable: Steel cable is determined based on calculated engineering load.
- For light and medium loads; ¼-inch (nominal) galvanized 7x19 strand cable is to be used.
- For heavy loads; 3/8-inch (nominal) galvanized 7x19 cable is to be used.
- There shall be no sharp edges.

## **Bolts**

- All structural field connections of the shade structure shall be designed and made with high strength bolted connections using ASTM A-354, Grade B or SAE J249, Grade 8.
- All stainless steel bolts shall comply with ASTM F-593, Alloy Group 1 or all bolt fittings shall include rubber washers for a water-tight seal at joints.
- All nuts shall comply with ASTM F-594, Alloy Group 1 or 2.
- Bolts shall be cut down after the nut so no sharp edges are exposed.

## **Welding**

- All shop welded connections shall be in strict accordance with the requirements of the American Welding Society (AWS) Specifications.
- Structural welds shall be in compliance with the requirements of the “prequalified” welded joints where applicable and by certified welders. No onsite or field welding shall be permitted.

## **Powder coating**

Shade structures shall receive powder coating. Powder used in the powder coat process shall have the following characteristics:

- Specific gravity: 1.68 +/- 0.05
- Theoretical coverage: 114 +/- 4 ft<sup>2</sup>/lb./mil
- Mass loss during cure: <1%
- Maximum storage temperature: 75<sup>0</sup> F at 50 percent relative humidity

### **Fabric Roof Systems & Properties**

- UV shade fabric is made of UV stabilized cloth and of a UV stabilized high-density polyethylene
- Mesh shall be raschel knitted with monofilament and tape yarn filler to ensure that material will not unravel if cut. The fabric knit is to be made using monofilament and tape filler that has weight of 195 grams per square meter.
- Fabric shall conform and pass the ASTM E84 testing standard for Fire Protection.
- Stretch stentored fabric weight (oz./m2) 6.9 fabric width 10 feet
- Roll length 164 feet, roll size 63 inches x 16.5 inches; weight 68 lbs.
- Life expectancy is ten years in sun with minimum fading after six years (three years for red).
- Temperature -22° F maximum temperature +176° F
- All sewing threads are to be double stitched. Thread shall be manufactured from 100 percent expanded PTFE, mildew-resistant exterior approved thread. Thread shall meet or exceed the following:
  - Flexible temperature range
  - Very low shrinkage factor
  - Extremely high strength; durable in outdoor climates
  - Resists flex and abrasion of fabric
  - Unaffected by cleaning agents, acid rain, mildew, and salt water; rot resistant and unaffected by most industrial pollutants
  - Treated for prolonged exposure to the sun
- Mechanical connections need to be safety cabled (clevises or turnbuckles)
- Reinforcement at corners to reduce tearing
- Separation of fabric and framework to reduce tearing
- There shall be a minimum seven feet of clearance from the highest designated play surface (platform) of a play structure and the shade structure.

### **Chain Link Fencing**

The following information provides general information for fencing located in parks and along trails. If fencing is located in another surface other than concrete, the fencing will need to be installed with a mow curb.

The use of used, light wall, rerolled, regalvanized, or open seams on any post or rail are not acceptable.

Acceptable manufacturers are:

- Anchor Fence Co.
- American Fence Corp.
- Tiberti Fence
- Approved equal

Fencing shall comply with the following standards:

- ASTM F669 Light Industrial Fence quality
- ASTM F1083
- ASTM F1234
- ASTM 525, G210
- ASTM A392

### **Components**

- Line post spacing: At intervals not exceeding 10 feet
- Line posts: 2.38-inch diameter. Gate posts: 3.5-inch diameter.
- Corner and terminal posts: 3.5-inch diameter
- Top, bottom and brace rail: 1.66-inch diameter, plain end, sleeve coupled
- Grind all bolts to within 1/8-inch of nut. A ½-inch gap is to be provided at the bottom of fencing between the fabric and concrete curbing or slab.
- Schedule 40 pipe shall be hot-dip galvanized inside and out.

### **Fabric**

- Fabric is to be double-knuckle chain link at top and bottom (9 gauge). Fabric wire (steel): Zinc coated wire fabric.
- Fabric for fencing under 16 feet in height: Two-inch diamond mesh interwoven wire, 9 gauge, top selvage knuckle end closed, bottom selvage knuckle end closed. Fabric for fencing over 16 feet in height refer to Section VI Sports and Outdoor Recreation.

### **Post Braces**

Post braces shall be provided for each gate, corner, pull, and end post for use with fabric, six feet or more in height, and shall consist of a round tubular brace extending to each adjacent line post at approximately mid height of the fabric, and a truss consisting of a rod not less than 5/16-inch nominal diameter from the line post back to the gate, corner, pull, or end post, with a turnbuckle or other equivalent provision for adjustment. Truss rods may be eliminated in any line of fence where there is a continuous center rail.

### **Post Tops**

Post tops shall consist of ornamental tops or combination tops with shepherd hook supporting arms, as required for security purposes. The top shall be provided with a hole suitable for the through passage of the top rail. The post tops shall fit over the outside of the posts and shall exclude moisture from posts.

### **Top Rails**

Top rails shall be in lengths of not less than 18 feet, and shall be fitted with couplings for connecting the lengths into a continuous run. "Swedged"-type connections are not acceptable. The couplings shall be not less than six inches in length with a wall thickness of .070 inches; and shall allow for expansion and contraction of the rail. Open seam outside sleeves are not acceptable.



### **Tension Bars**

Tension bars shall not be less than 3/16-inch x 3/4-inch and not less than two inches shorter than the normal height of the fabric with which they are to be used. One tension bar shall be provided for each end and gate post, and two for each corner post, pull post, top, and bottom rail. Tension bars shall be 0.078-inch thick steel.

### **Ties or Clips**

Ties or clips shall be 11 gauge galvanized steel ties and shall be provided in sufficient number for attaching the fabric to the line posts, top, mid, and bottom rails; at intervals not exceeding 15 inches.

### **Bands or Clips**

Bands and clips shall be 11 gauge galvanized steel, and shall be provided in sufficient number for attaching the fabric and stretcher bars to all terminal posts at intervals not exceeding 15 inches.

Tension bands shall be:

- Formed from flat or beveled steel
- Minimum thickness after galvanizing of 0.078 inches
- Minimum width of 3/4-inch for posts 4-inch O.D. or less and
- Minimum thickness of 0.108-inch by 7/8-inch for posts larger than 4-inch O.D.

Brace bands shall be:

- Formed from flat or beveled steel
- Minimum thickness of 0.108-inch after galvanizing
- Minimum width of 3/4-inch for posts 4-inch O.D.
- Attachment bolts shall be 5/16-inch x 1-1/4-inch galvanized carriage bolts with nuts

### **Gates**

Acceptable manufacturers are:

- Anchor Fence Co.
- American Fence Corp.
- Tiberti Fence
- Approved equal

Gates shall comply with the following standards:

- ASTM F900

### **Gate Hardware**

- Gate posts: 3.5-inch diameter
- Gate frame: 1.90-inch diameter for welded fittings and truss rod fabrication
- Horseshoe gate latch. Center gate stop and drop rod. Three ball and

- socket-type gate hinges per leaf and hardware for padlock.
- Gate frame shall be round or rectangular tubular members, welded at all corners or assembled with corner fittings.
  - Welded joints shall be top coated with aluminum paint to match the frame color. Gates assembled with corner fittings shall have adjustable truss rods 5/16-inch minimum diameter on panels five feet wide or wider. Truss rods shall be the same base material and finish as the gate frame. Gate leaves shall have vertical interior bracing at maximum intervals of eight feet and shall have a horizontal member if the fabric height is eight feet or more.
  - Gate fabric shall be the same type used in fence construction. The fabric shall be securely attached to the gate frame at intervals not exceeding 15 inches. Gate accessories shall be of the materials as specified for the fence.
  - Hinges shall be structurally capable of supporting the gate leaf and allow the gate to open and close without binding. The hinges shall be so designed to permit the gate to swing a full 180 degrees. 180-degree swing industrial-style hinges are not acceptable.
  - Single gate latch shall be capable of retaining the gate in a closed position and shall have provision for a padlock.
  - Double gate latch shall be a drop rod or plunger bar arranged to engage the gate stop. Locking devices shall be constructed so that the center drop rod or plunger cannot be raised when the gate is locked. The latching devices shall have provision for a padlock.
  - Gate stops shall be provided for all double swing gates.
  - Gate keepers shall be provided for each gate leaf over five feet wide.
  - Locking hardware shall consist of slide bolt and padlock.

### **Wrought Iron Fencing**

Wrought iron fencing shall be used at play areas and skate parks unless otherwise determined by the City of Henderson. If fencing is located in another surface other than concrete, the fencing will need to be installed with a mow curb.

- Durable, weather resistant, vandal resistant commercial grade galvanized steel. Six feet tall, eight feet wide panels, 5/8-inch pickets. Two-inch square posts. All connections shall be welded; no sharp edges. Three-inch maximum openings. Single and double gates to match powder coat finish, color to be determined by Public Works, Parks and Recreation Department.
- Locking hardware shall consist of slide bolt and padlock

# **XVII Design and Development Procedure**

The process of designing and constructing parks in the City of Henderson consists of three stages including pre-planning, construction document development, and construction.

## **City-Built Facilities**

### **Pre-Planning**

The pre-planning stage consists of site selection, site analysis, programming, concept development, and the development of a master plan for the park. The master plan is the conceptual design to be followed during the development of the construction documents. Meet with Park Planning to discuss the master-plan process and site amenities.

### **Master Plan**

Master plans shall include the following information as a minimum:

- Plan delineation showing the existing site conditions, adjacent roadways, rights-of-way, and easements per the current City of Henderson comprehensive plan.
- The surveyed boundaries of the property.
- Existing and proposed adjacent uses, rights-of way and easements.
- Existing vegetation with general species and size defined.
- Delineation of wetlands or other sensitive habitats with areas defined per a qualified ecological report. Jurisdictional waters of the United States per the U.S. Army Corps of Engineers shall be noted on the drawing.
- Proposed features such as ball fields, restrooms, parking areas, sport facilities, playground areas, ramadas, pathways and trails, maintenance facilities and related buildings, etc.
- Typical landscape design concepts must be shown including plant groupings, buffers, plant legends, and other features.
- Three full-size and three half-size sets for Park Planning review will be required for each submittal. Full-size plan scale is to be no smaller than one inch = 30 feet.
- One, 24-inch x 36-inch colored rendering mounted on a display board.
- Twenty-one 11-inch by 17-inch rendered exhibits, three-hole punched, for the City of Henderson Parks and Recreation Board review and acceptance.

A public meeting may be required prior to submitting the master plan for acceptance by the Parks and Recreation Board.

The Parks and Recreation Board shall review and accept a master plan. Once accepted, the master plan may proceed to the construction document phase. The plan will once again be presented to the Parks and Recreation Board at the 90 percent construction document stage.

### **Entitlements**

A meeting with the Community Development and Services Department will begin the entitlement process and determine what applications and permits will be required. Applications for conditional use permits and design reviews are to be made to the City of Henderson Planning Commission for approval. Once approved by the Planning Commission, the preparation of the construction documents can begin.

Each project may require a drainage study, traffic study, and a current soils report.

Contact the Community Development and Services Department Planning Division for in-depth information on entitlement requirements.

### **Construction Documents**

Once the master plan is accepted, development of construction documents may begin. Progress drawings will be submitted for review and approval by City of Henderson staff. The design drawings will be reviewed by the Park Planning Division at four intervals; 30 percent, 60 percent, 90 percent, and 100 percent (mylar). The City of Henderson submits a courtesy copy to the Development Services Center (DSC) at 60 percent construction documents and a detailed review is completed by the DSC at 90 percent construction documents. A letter from Park Planning to the consultant will be required prior to 90 percent DSC submittal.

See submittal process for an explanation of the minimum requirements of each phase of design.

All design drawings submitted to the City of Henderson for review must be sealed by a design professional registered in the State of Nevada as defined in the Nevada Revised Statutes covering Architecture, Registered Interior Design, Residential Design, Professional Engineering and Land Surveying, Landscape Architecture and Contractors

### **Permitting**

Projects will require coordination with the DSC for permit requirements.

### **Construction**

The construction process will be per the City of Henderson Public Works, Parks and Recreation Department's Quality Control Division standards.

### **Developer-Built Facilities**

#### **Developer-Built Parks**

A park and trails agreement may be required between the City of Henderson and the developer for large developments. This agreement will define the scope of

the park and the requirement for the timing of construction, bonding, etc.

Developer built or turnkey parks are designed and constructed by private developers as a condition of development and per the City of Henderson development code. The parks are dedicated to the City of Henderson upon acceptance. The City of Henderson is responsible for maintenance and operation of the park upon final acceptance.

### **Developer-Built Trails**

Construction of developer-built trails shall comply with the city's Master Bicycle and Trail Plan. At the beginning of the development process, the Park Planning Division shall be contacted to coordinate the design options.

A bond will be required as a part of the permitting process.

All aspects of developer-built trails will remain the responsibility of the owner until final acceptance of the construction by the City of Henderson Public Works, Parks and Recreation Department and a letter of final acceptance is issued. This includes maintenance, utility costs, etc.

### **Private Parks**

Contact Community Development and Services if a private park is required.

### **Submittal Process**

Plans typically have a graduated submittal process.

### **60 Percent Plans**

For the first review by the Public Works, Parks and Recreation Department, the following minimum information must be provided:

- Standard City of Henderson cover sheet, including a list of all consultants and contact information, vicinity map, location map
- 24-inch by 36-inch drawings with a scale of one inch = 40 feet or larger
- North arrows, bar scale, street names, and other standard plan notations to be shown on all sheets
- Title block
- Sheet index
- Sheet numbers
- Project number
- Project name
- Date
- Existing conditions identified on plans showing their location as surveyed
- Irrigation mainline layout and irrigation legend
- Landscape plans showing plant groupings, general plant type (deciduous, ornamental, evergreen, coniferous) trees, shrubs, ground cover and a plant palette with botanical name, common name, size, and quantity.

- All existing and proposed utility locations
- Site plan showing parking areas, ball fields, restrooms, walks, paths, drives and circulation, sports facilities, tot lot areas, trails, etc., and all other major elements.
- Lighting plan showing which fields, paths and other areas the will be lighted
- Building footprints and finish floor elevations
- Specification index
- General notes

The following general notes and information must be shown on the construction drawings:

Minimum design pressure assumptions.

Design watering window in hours and distribution uniformity for all fixed spray heads and rotor system. (See Section XI Irrigation).

Plant material shall have identification tags on 10 percent of total quantity of each species.

The City of Henderson municipal forester or other city representative shall approve all plant material prior to installation. The contractor shall provide a minimum of 48 hours' notice prior to plant material inspection.

Actual field conditions may necessitate adding, deleting, or making minor adjustments in spacing of irrigation heads to ensure uniform coverage and distribution. Do not proceed with the installation of the irrigation system when it is obvious in the field that obstruction or grade differences exist that might not have been considered in the engineering, or if discrepancies in construction details, legend, notes or specifications are discovered. Bring all such obstructions or discrepancies to the attention of the City of Henderson Public Works, Parks and Recreation Department.

It shall be the contractor's responsibility to install the irrigation system in accordance with these plans and the most current City of Henderson guidelines. Field changes to the plans must be approved by the City of Henderson Public Works, Parks and Recreation Department prior to installation.

Call Before You Dig

Call Before You Overhead

### **90 Percent Plans**

The second progress submittal will include the following items:

- Revisions outlined in the 60 percent review

- All of the items listed for the 60 percent submittal
- Completed and signed development agreement that clarifies the responsibility of the developer to install the project according to the most current standards in effect at the time of bid.
- Signature block for Public Works, Parks and Recreation Department Director
- Signature block for Public Works, Parks and Recreation Department Park Planning Park Project Manager
- Cost estimate and bid tabulation
- Complete civil improvement plans including site plans, grading plans, utility plans, horizontal control plans, details, signage and striping plans, and others as required.
- A copy of the soils report
- Building and architectural plans and details as needed
- Detailed planting plans
- Irrigation plan including the mainline layout, laterals, drip irrigation, head layout, etc.
- Irrigation plan to show zone and controller number, zone size, operating pressure, scheduled flow rates, pipe size for laterals and mainline.
- The following information will be shown in the irrigation legend:
  - Static pressure
  - Design water pressure
  - Designed highest gpm/gph flow
  - Worst-case pressure loss
- Park equipment located and specified
- All major elements and details including signs, play equipment, field layout and dimensions, landscape, irrigation details, tot lot details, retaining wall details, sports facility details, utility structures, etc.
- Submit complete civil improvement package to DSC and to Building and Fire Safety.
- Construction plans should include final irrigation plan information including piping, heads, valves, tap, controller, and other miscellaneous equipment layout. Provide gallons per minute, valve size, valve number for each remote control valve. Provide an irrigation schedule that shows a key for each piece of equipment shown on the plans and describes the manufacturer, model number and any other relevant information. Calculations must be provided per Irrigation section.

**100 Percent Plans (mylar)**

At the third progress submittal the following items must be included:

- All the items in the 60 percent and 90 percent submittals
- Revisions outlined in the 90 percent review
- Complete plans from all entities
- Complete specifications
- Schedule of alternatives, if applicable

## **XVIII Accessibility**

The City of Henderson is committed to providing exceptional outdoor experiences for everyone and, in doing so, requires compliance with all current accessible design guidelines. Parks, trails, and other facilities designed for the City of Henderson must adhere to all applicable laws, guidelines and standards.

Designers must consider inclusion of the entire population when designing parks, trails, and other facilities. Accessible features and amenities shall be considered where practicable during all phases of development from master planning through construction. The design professional has an obligation to be aware of current accessibility changes and to incorporate best practices into any design. Please refer to Section XIX References.

### **Existing Facilities**

Prior to a new design or improvement at an existing park, trail, building, or other facility, an accessibility assessment should occur. The audit is intended to evaluate the accessibility of existing facilities, identify barriers that do not meet present compliance standards, and provide recommendations to meet current requirements.

### **New Facilities**

As part of the master planning and design process, new parks, trails, and facilities will need to meet current accessibility standards. This shall also include any adjacent access to the facility that will be impacted by a new project. An accessibility assessment should take place to determine if the existing facilities will need to be redesigned to meet current accessibility standards.



# XIXReferences

- 2012 International Building Code (or latest adopted edition)
- American Association of State and Highway Transportation Officials (AASHTO) Manual Guide for the Development of Bicycle Facilities 2012
- American National Standards Institute ANSI A117.1
- Americans with Disabilities Act of 1990 (ADA), Title II, Paragraph 35.130
- [Arizona Nursery Standards](#); for a copy call 480-966-1610 or [www.azna.org](http://www.azna.org)
- ASTM F1083 - Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
- ASTM A392 zinc coated wire fabric
- ASTM F567 - Installation of Chain-Link Fence.
- ASTM F669 - Strength Requirements for Chain Link Posts and Rails.
- ASTM F1234 - Protective Coatings on Steel Framework for Fences.
- [Boulder Highway Landscape Design Manual](#)
- Chain Link Fence Manufacturers Institute (CLFMI) - Product Manual; [Chain Link Fence Manufacturers Institute Product Manual](#)
- City of Henderson Development Code, Title 19
- City of Henderson Master Bicycle and Trails Plan
- City of Henderson Master Streets and Highways Plan
- City of Henderson Municipal Code
- City of Henderson Open Space and Trails Plan
- [City of Henderson Parks and Recreation Master Plan](#)
- [City of Henderson Utility Services Code](#)
- CPTED – Crime Prevention through Environmental Design
- Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds, United States Department of Agriculture, Forest Service, Technology and Development Program, 2300 Recreation December 2007, 0723-2816-MTDC
- Illuminating Engineering Society of America (IESNA)
- [Lake Mead Parkway Trail Master Plan](#)
- Manual on Uniform Traffic Control Devices, (MUTCD); [MUTCD](#)
- National Electric Code NEC, current edition with Southern Nevada Amendments
- Nevada Administrative Code (NAC) Legislative Counsel Bureau 401 S. Carson St. Carson City, Nevada 89701 (775) 684-6830

<http://www.leg.state.nv.us/NAC/NAC-444.html>

Nevada Revised Statutes

NRPA: <http://www.nrpa.org/>

Public Right of Way Advisory Group (PROWAG)

Recreation Access Rights under the ADA, by John N. McGovern, JD

Republic Services: <http://www.republicservices.com/businesses>

[RTC Complete Streets Guidelines](#)

Southern Nevada Amendments to the 2009 International Building Code

Published: September 21, 2010

[Southern Nevada Health District](#)

[Southern Nevada Regional Plant List](#)

[St. Rose Parkway Trail Design Guidelines](#)

[The Irrigation Association](#)

Uniform Design and Construction Standards (UDACS) for Potable Water Distribution Systems.

Uniform Standard Drawings for Public Works Construction Off-Site Improvements Clark County Area Nevada, Volume II

Uniform Standard Specifications for Public Works' Construction Off-site Improvements Clark County Area Nevada

[Urban Foresters Ecosystems Institute](#)

United States Access Board

\*City of Henderson is not responsible for any broken links provided in this section

# **XX Appendix A**

**SP – Sports Details**

**EN – Enclosures Details**

**LA – Landscaping Details**

**IR – Irrigation Details**

**EL – Electrical Details**

**SI – Signage Details**

**SA – Site Furnishings Details**

# **XX Appendix A – Sports Details**

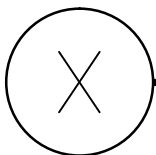
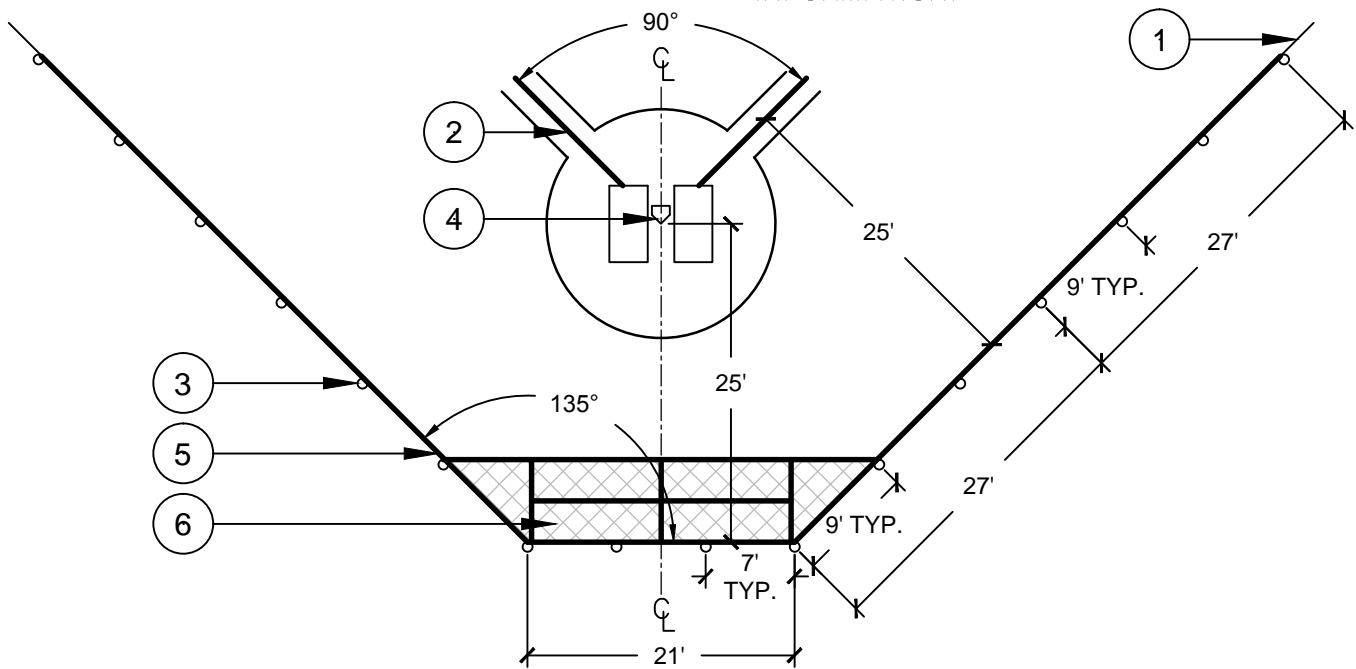


**LEGEND**

- 1. PERIMETER BALL FENCING
- 2. FOUL BALL LINE
- 3. 4" DIAMETER POSTS (TYP.)
- 4. HOME PLATE
- 5. BACKSTOP FENCING
- 6. ANGLED BACKSTOP COVER/HOOD

**NOTES**

- a. ALL POSTS SHALL BE LOCATED IN CONCRETE SIDEWALK OR MOW CURB
- b. ALL BACKSTOP POST DIMENSIONS SHALL BE CENTERED. ALL POSTS LOCATED IN THE 21' WIDE SECTION SHALL BE 29.5' HIGH
- c. SEE DETAILS 60' BACKSTOP SECTION, 60' BASEBALL FIELD, AND 60' HOME PLATE. SEE PLANS AND SPECIFICATIONS FOR MORE INFORMATION.



60' BACKSTOP FENCING PLAN

DETAIL: SP-02

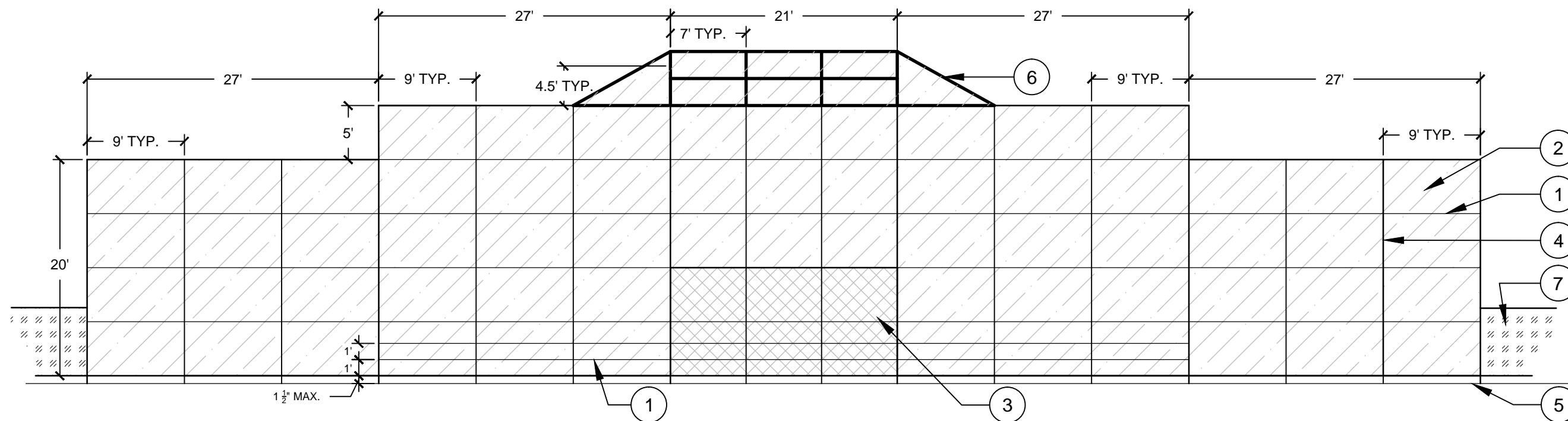
NOT TO SCALE

**LEGEND**

1. 1 5/8" DIAMETER HORIZONTAL RAILS (TYP.)
2. 9 GAUGE GALVANIZED CHAIN LINK FENCING, 2" MESH
3. 6 GAUGE GALVANIZED CHAIN LINK FENCING, VINYL COATED GREEN, 1" MESH
4. 4" DIAMETER POST WITH STANDARD CAP. 1/4"x3/4" FLAT STRETCHER BAR WITH STABILIZER BANDS ON ALL END AND CORNER POSTS (TYP.).
5. FINISH GRADE
6. ANGLED BACKSTOP COVER/HOOD
7. PERIMETER BALL FENCING

**NOTES**

- a. SEE STRUCTURAL PLANS
- b. ALL FENCING FABRIC SHALL BE PLACED ON FIELD SIDE OF POSTS
- c. ALL BOLTS SHALL BE GROUND TO 1/4" OF THE NUT AND FACE AWAY FROM FIELD
- d. INSTALL CHAIN LINK AND STRETCHER BARS TO POSTS AND RAILS AT 24" MAXIMUM SPACING
- e. 1 1/2" MAXIMUM GAP BETWEEN BOTTOM RAIL AND CONCRETE
- f. ALL POSTS LOCATED IN THE 21' WIDE SECTION SHALL BE 29.5' HIGH FOR BACKSTOP COVER
- g. SEE DETAILS 60' BACKSTOP PLAN, BACKSTOP COVER, AND 60' BALL FIELD. SEE PLANS AND SPECIFICATIONS FOR MORE INFORMATION.



60' BACKSTOP SECTION  
 DETAIL: SP-03

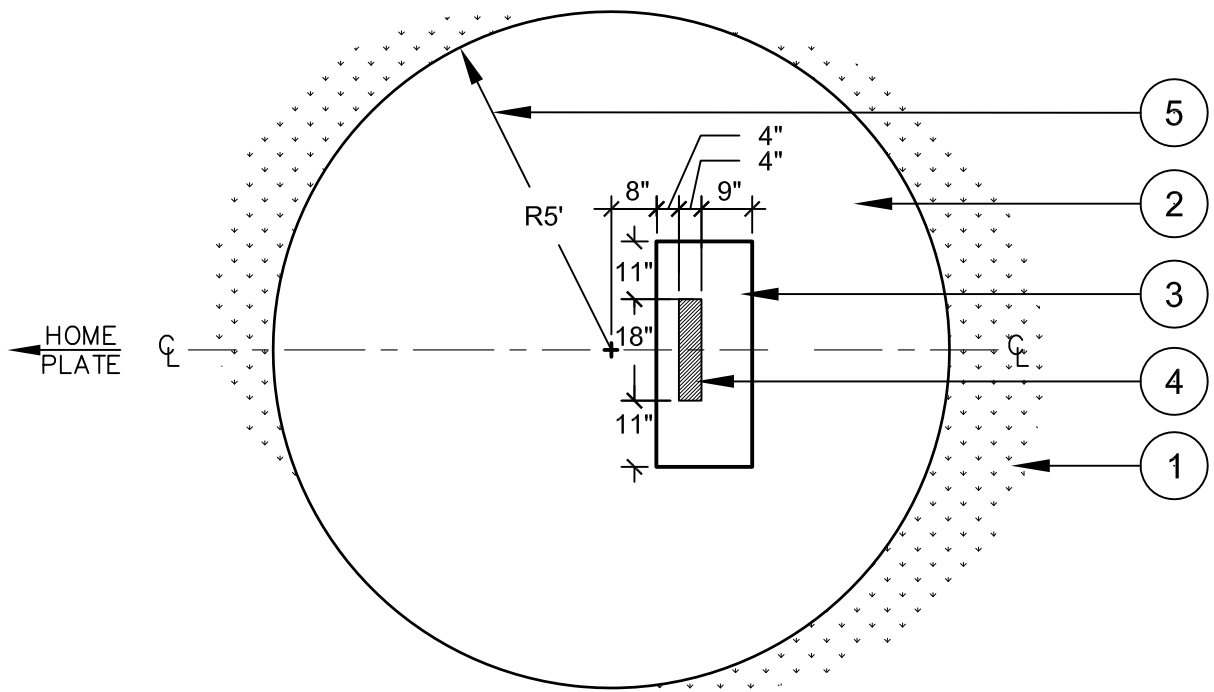
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## LEGEND

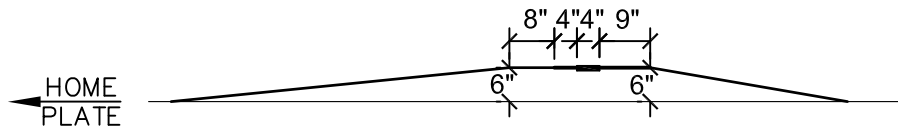
1. TURF
2. SKINNED AREA
3. LEVEL AREA
4. PITCHING PLATE
5. MOUND RADIUS

## NOTES

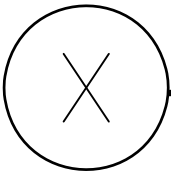
- a. SEE DETAILS 60' BALL FIELD AND 60' HOME PLATE. SEE PLANS AND SPECIFICATIONS FOR MORE INFORMATION.
- b. INSTALL PITCHING PLATE PER MANUFACTURER'S RECOMMENDATION



PLAN VIEW



SECTION



60' PITCHING MOUND

DETAIL: SP-04

NOT TO SCALE

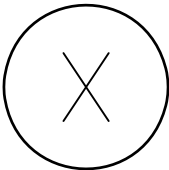
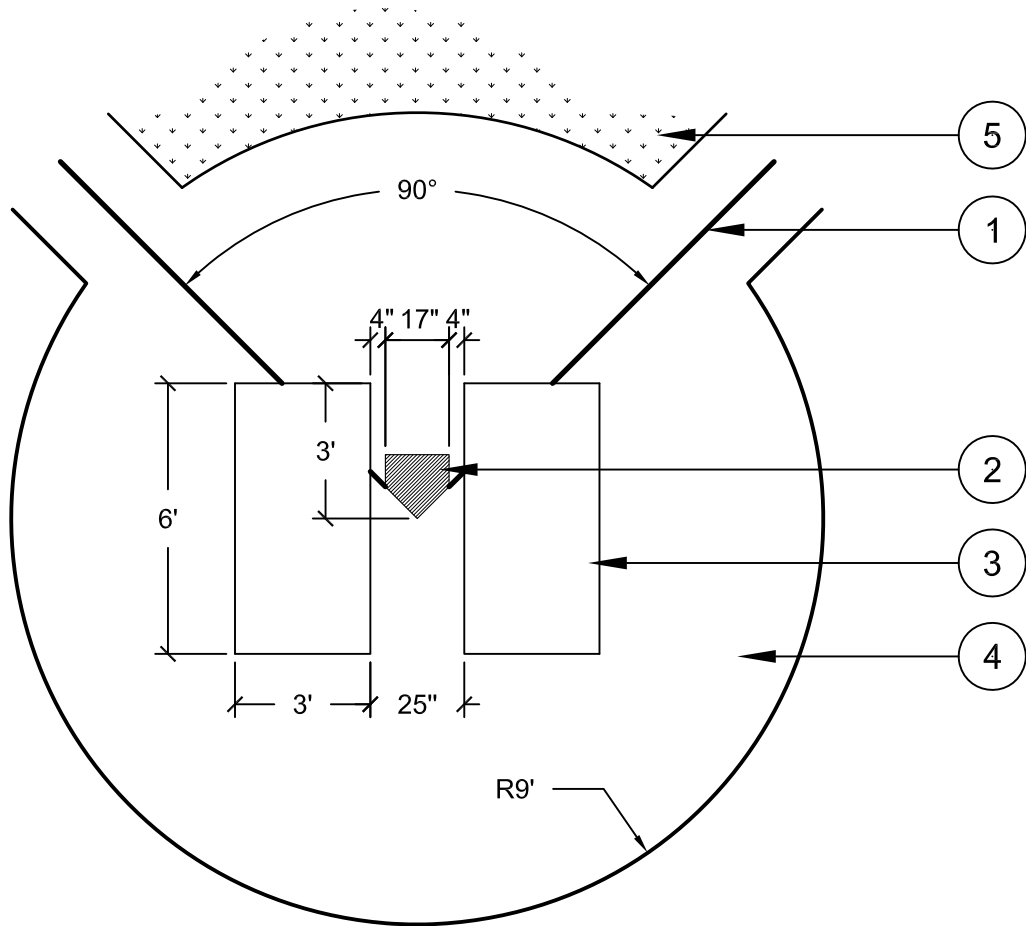


**LEGEND**

- 1. FOUL LINE
- 2. HOME PLATE
- 3. BATTER'S BOX
- 4. SKINNED AREA
- 5. TURF

**NOTES**

- a. SEE DETAILS 60' PITCHING MOUND AND 60' BALL FIELD. SEE PLANS AND SPECIFICATIONS FOR MORE INFORMATION.
- b. HOME PLATE SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS



60' HOME PLATE

DETAIL: SP-05

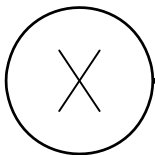
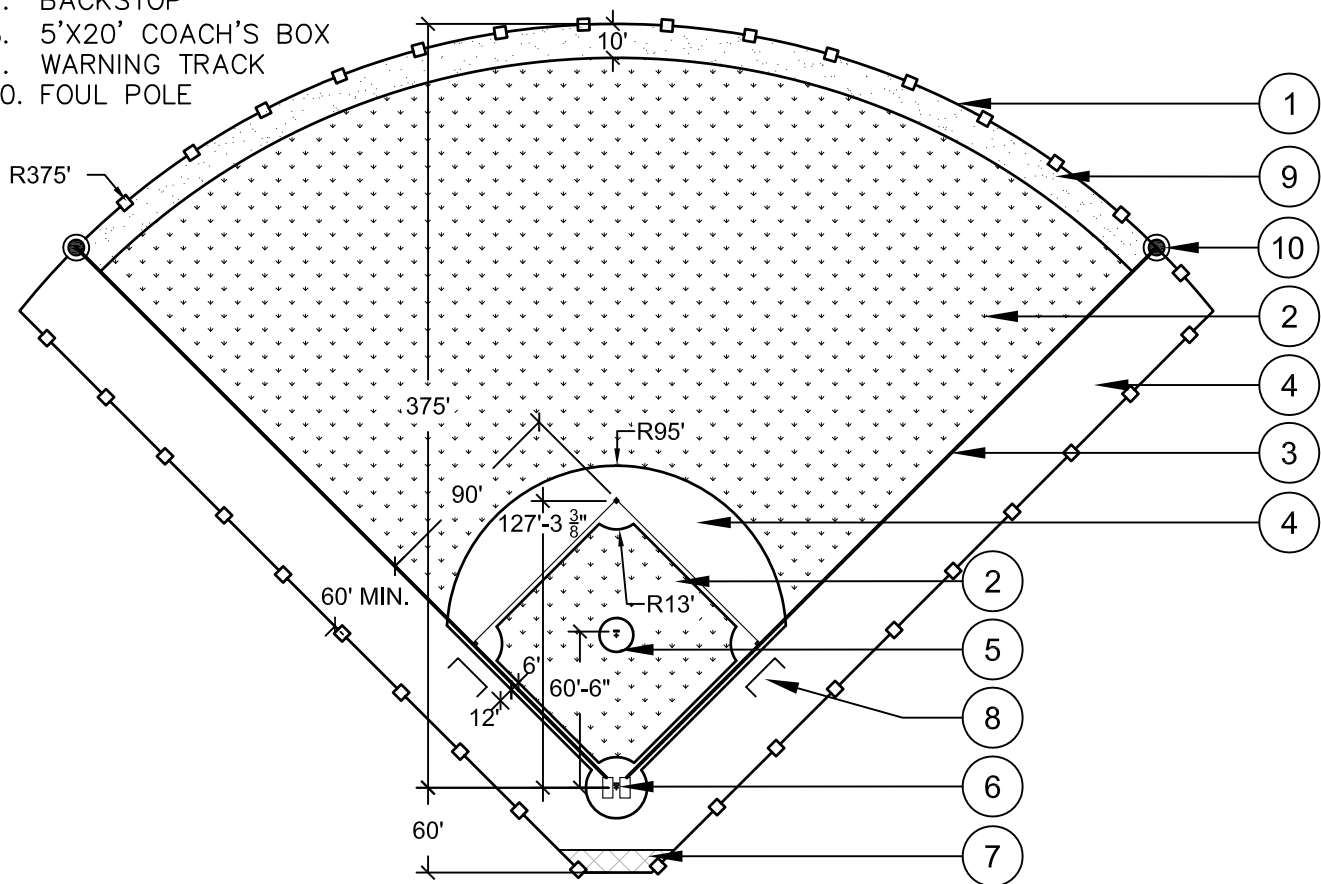
NOT TO SCALE

**LEGEND**

1. FENCING
2. TURF
3. FOUL LINE
4. SKINNED AREA
5. PITCHING MOUND
6. HOME PLATE
7. BACKSTOP
8. 5'X20' COACH'S BOX
9. WARNING TRACK
10. FOUL POLE

**NOTES**

- a. SEE DETAILS 90' PITCHING MOUND, 60' HOME PLATE, 90' BACKSTOP PLAN, AND 90' BACKSTOP SECTION. SEE PLANS AND SPECIFICATIONS FOR MORE INFORMATION.



90' BALL FIELD

DETAIL: SP-06

NOT TO SCALE

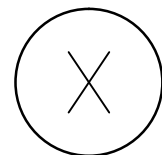
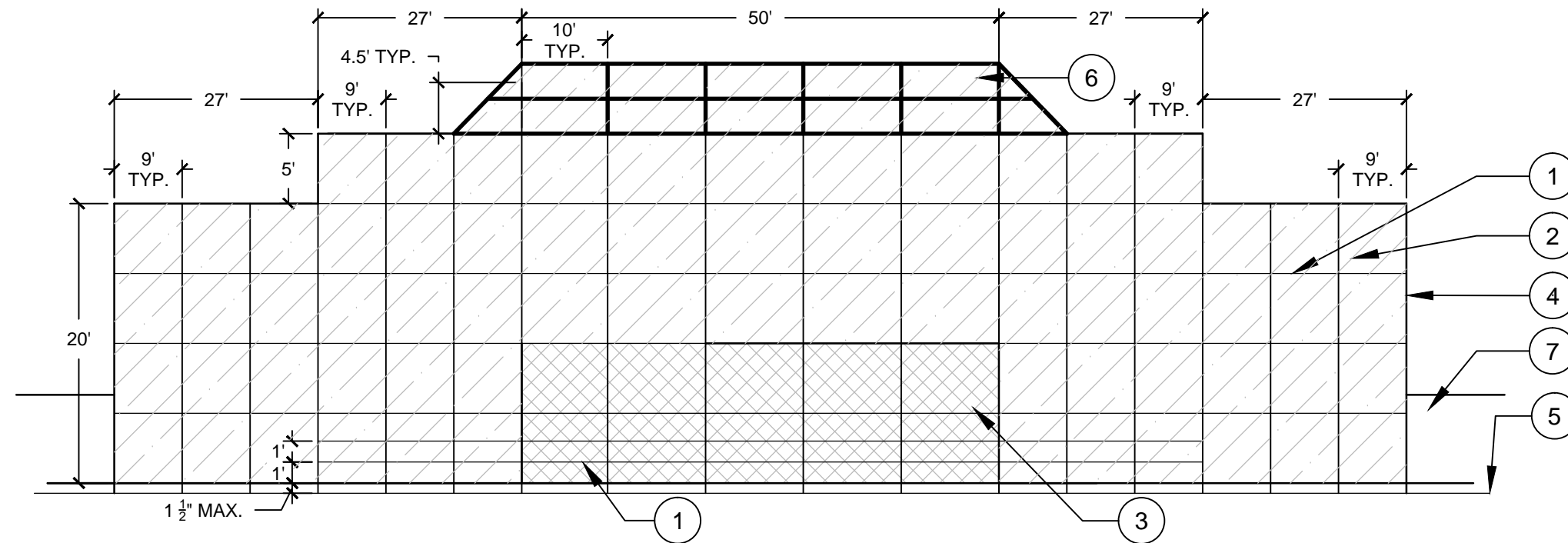


**LEGEND**

1. 1 5/8" DIAMETER HORIZONTAL RAILS (TYP.)
2. 9 GAUGE GALVANIZED CHAIN LINK FENCING, 2" MESH
3. 6 GAUGE GALVANIZED CHAIN LINK FENCING, VINYL COATED GREEN, 1" MESH
4. 4" DIAMETER POST WITH STANDARD CAP. 1/4"x3/4" FLAT STRETCHER BAR WITH STABILIZER BANDS ON ALL END AND CORNER POSTS (TYP.).
5. FINISH GRADE
6. ANGLED BACKSTOP COVER/HOOD
7. PERIMETER BALL FENCING

**NOTES**

- a. SEE STRUCTURAL PLANS
- b. ALL FENCING FABRIC SHALL BE PLACED ON FIELD SIDE OF POSTS
- c. ALL BOLTS SHALL BE GROUND TO 1/4" OF THE NUT AND FACE AWAY FROM FIELD
- d. INSTALL CHAIN LINK AND STRETCHER BARS TO POSTS AND RAILS AT 24" MAXIMUM SPACING
- e. 1 1/2" MAXIMUM GAP BETWEEN BOTTOM RAIL AND CONCRETE
- f. ALL POSTS LOCATED IN THE 21' WIDE SECTION SHALL BE 29.5' HIGH FOR BACKSTOP COVER
- g. SEE DETAILS 90' BACKSTOP PLAN AND 90' BALL FIELD. SEE PLANS AND SPECIFICATIONS FOR MORE INFORMATION.



90' BACKSTOP SECTION

DETAIL: SP-08

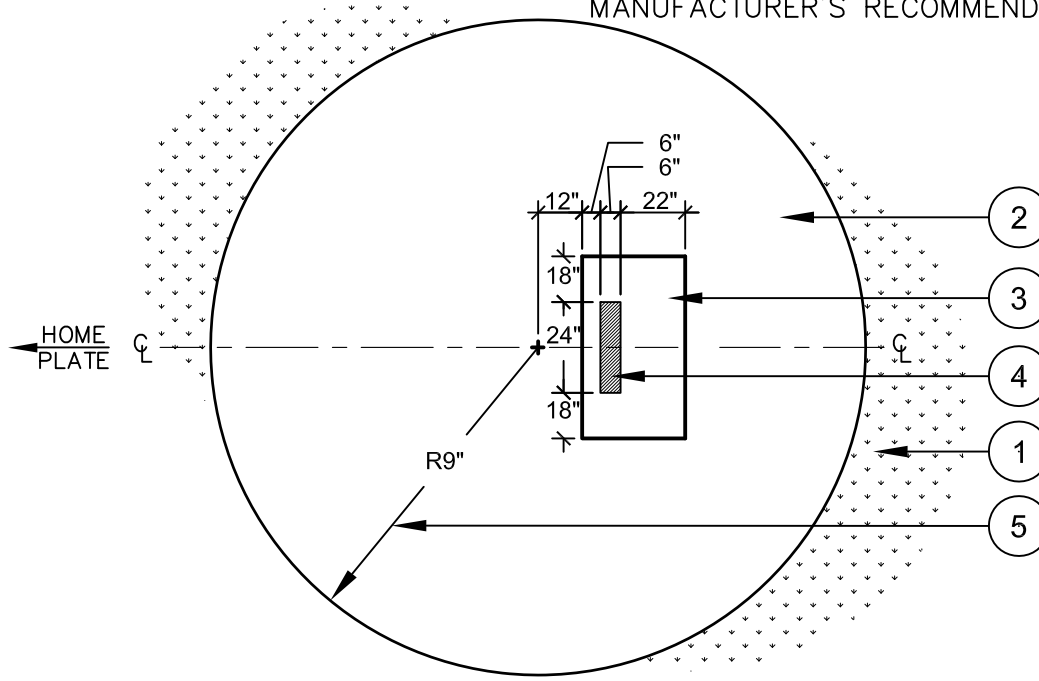
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**LEGEND**

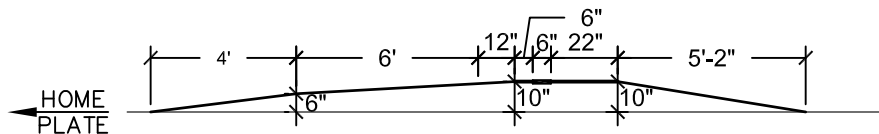
- 1. TURF
- 2. SKINNED AREA
- 3. LEVEL AREA
- 4. PITCHING PLATE
- 5. MOUND RADIUS

**NOTES**

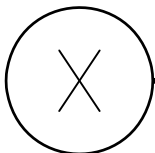
- a. SEE DETAILS 90' BALL FIELD AND 90' HOME PLATE. SEE PLANS AND SPECIFICATIONS FOR MORE INFORMATION.
- b. INSTALL PITCHING PLATE PER MANUFACTURER'S RECOMMENDATION



PLAN VIEW



SECTION



90' PITCHING MOUND

DETAIL: SP-09

NOT TO SCALE

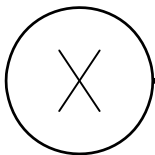
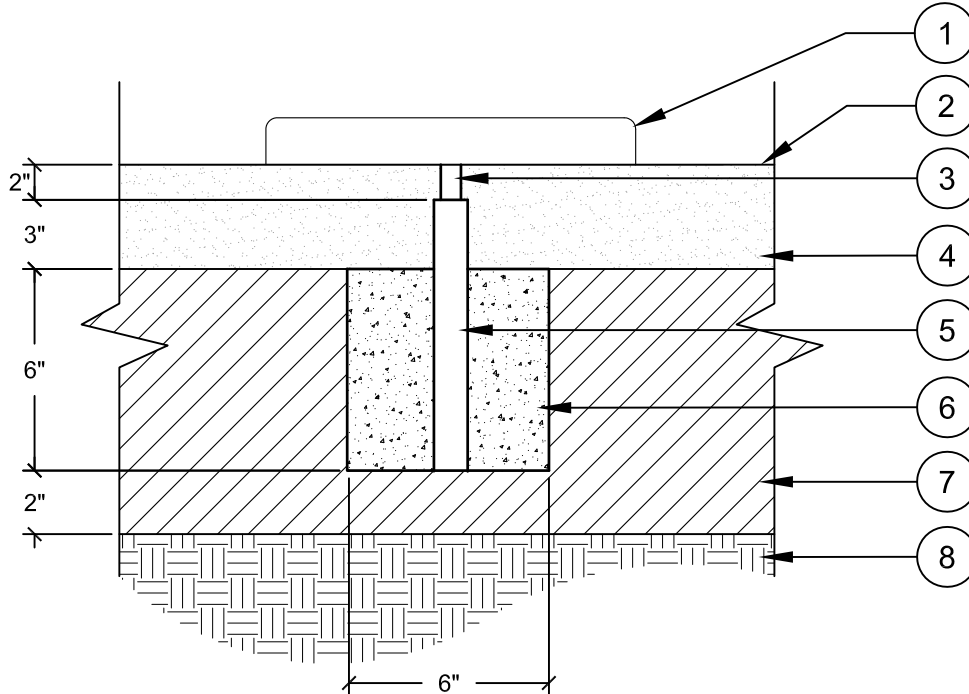


## LEGEND

1. SQUARE BASE
2. FINISH GRADE
3. MALE ADAPTOR ANCHOR; TOP PLATE BOLTED TO BASE
4. INFIELD MIX
5. FEMALE ADAPTER ANCHOR; GROUND STAKE
6. 6"x6"x6" CONCRETE FOOTING
7. WASHED MORTAR SAND
8. UNDISTURBED SUBGRADE

## NOTES

- a. SEE PLANS AND SPECIFICATIONS FOR MORE INFORMATION
- b. INSTALL PER MANUFACTURER'S RECOMMENDATIONS



BASE INSTALLATION

DETAIL: SP-11

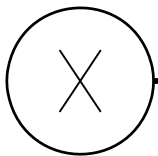
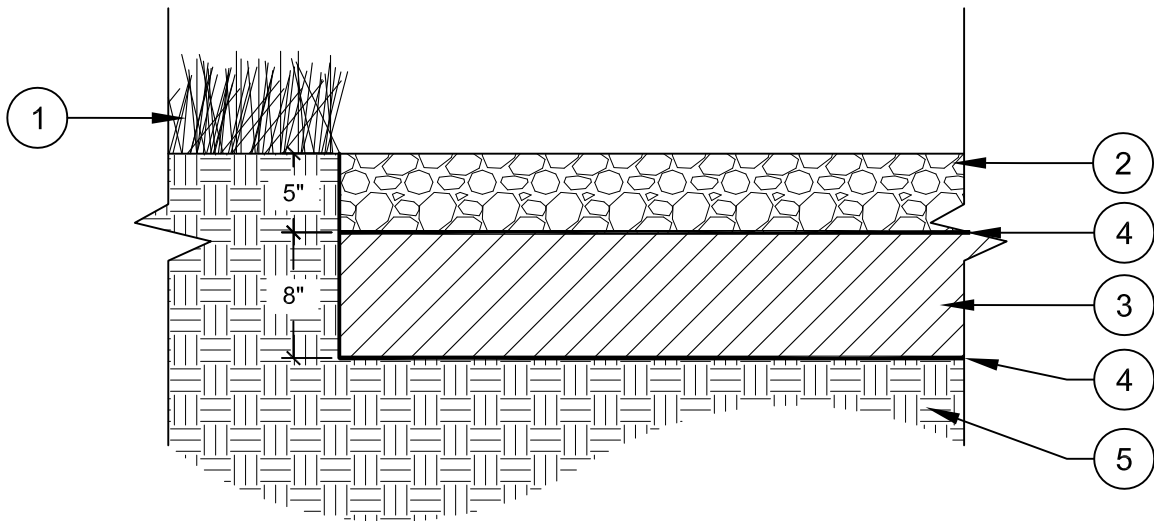
NOT TO SCALE

**LEGEND**

- 1. TURF GRASS
- 2. 2 MM INFIELD MIX
- 3. WASHED MORTAR SAND, HAND TAMPED
- 4. PRE-EMERGENT
- 5. UNDISTURBED SUBGRADE

**NOTES**

- a. SEE PLANS AND SPECIFICATIONS FOR DECOMPOSED GRANITE SIZE AND COLOR
- b. SEE SPECIFICATIONS FOR PRE-EMERGENT
- c. INSTALL PER MANUFACTURER'S RECOMMENDATIONS



INFIELD MIX  
DETAIL: SP-12

NOT TO SCALE

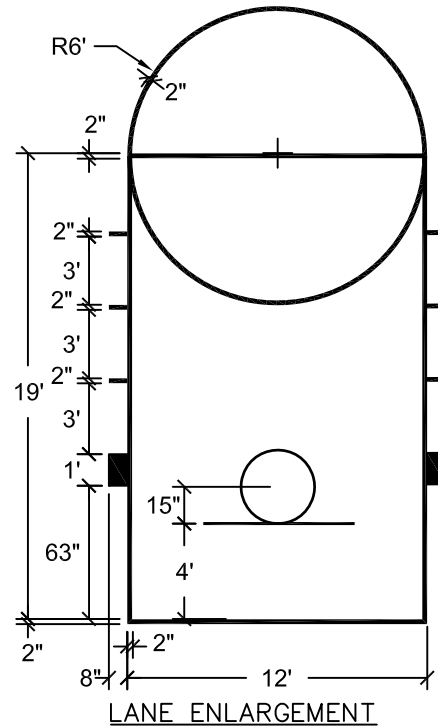
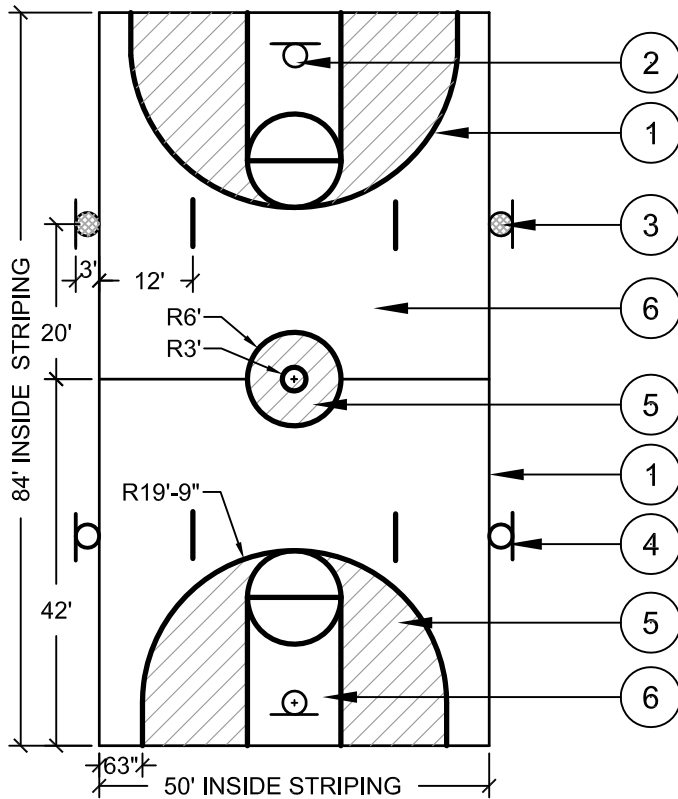


**LEGEND**

1. 2" WIDE STRIPING (TYP.)
2. 10' BASKETBALL GOAL
3. 9' BASKETBALL GOAL
4. 8' BASKETBALL GOAL
5. SPORTS COURT SURFACING COLOR 'A'
6. SPORTS COURT SURFACING COLOR 'B'

**NOTES**

- a. SEE SPECIFICATIONS FOR SPORTS COURT SURFACING.
- b. SEE STRUCTURAL FOR POST-TENSION SLAB AND ELECTRICAL FOR LIGHTING.
- c. ALL RADII SHALL BE MEASURED TO INCLUDE THE OUTSIDE OF THE 2" STRIPING.
- d. THE 50'X84' COURT SHALL BE A POST-TENSION SLAB. THE COURT SHALL BE SURROUNDED BY A 10' CONCRETE SLAB.




 BASKETBALL COURT  
 DETAIL: SP-13

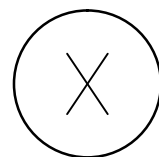
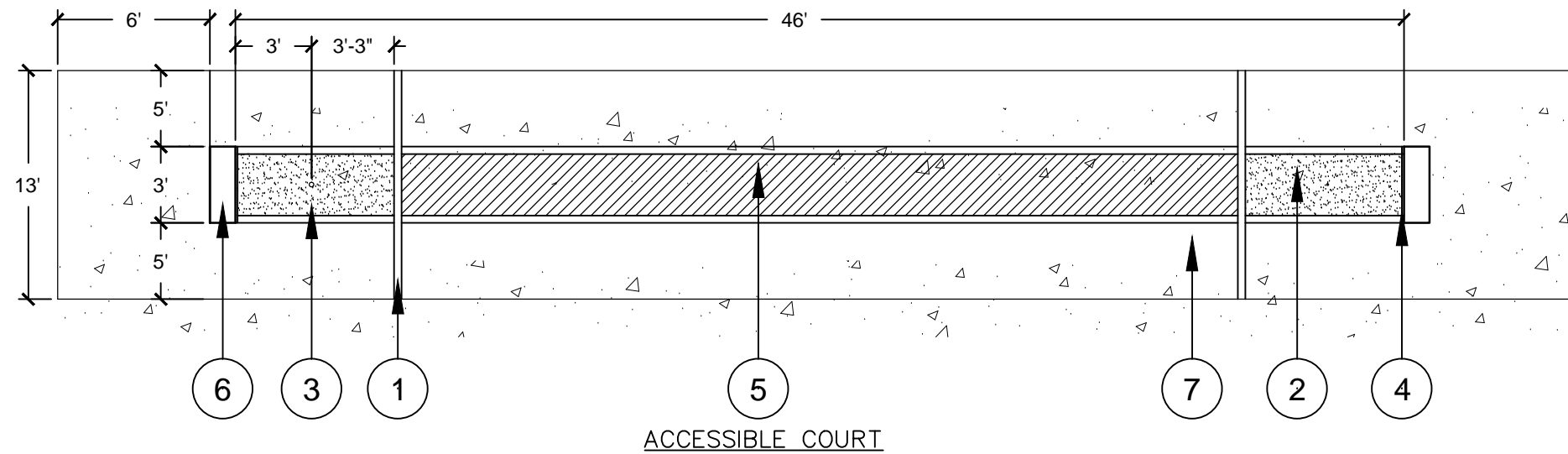
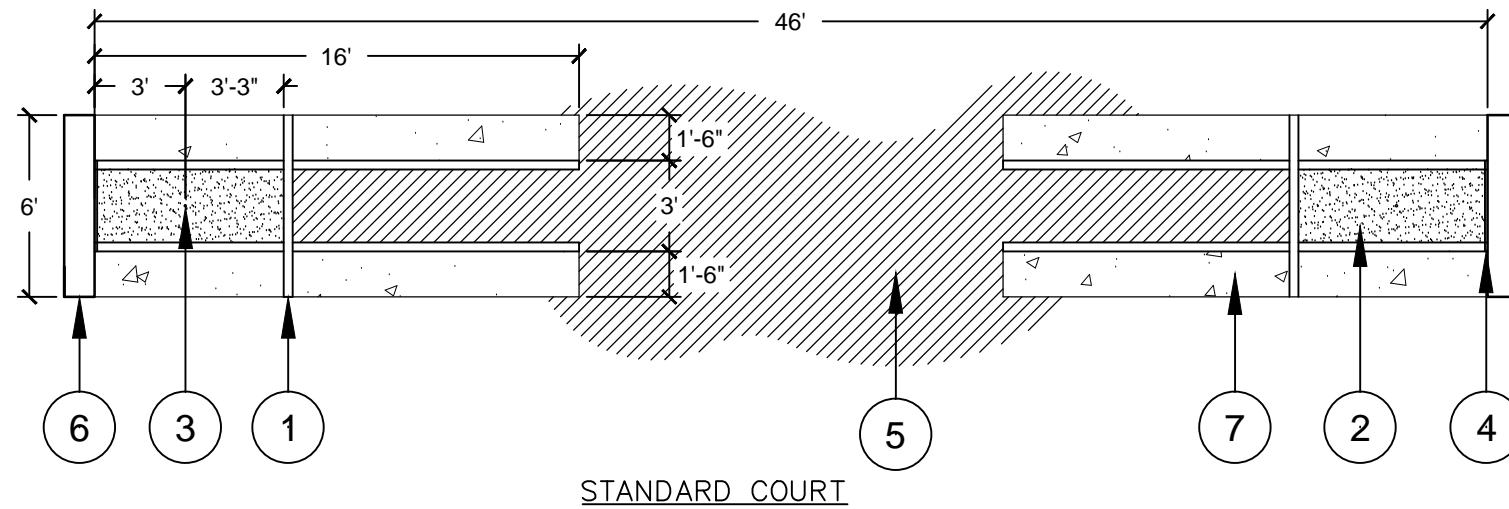
NOT TO SCALE

**LEGEND**

1. 2"x4" ENGINEERED WOOD
2. PLASTER SAND
3. 3'-6" STEEL STAKE, 1' DIAMETER
4. 1" THICK RUBBER BACKING
5. DECOMPOSED GRANITE
6. CONCRETE BACKSTOP
7. CONCRETE SIDEWALK

**NOTES**

- a. PROVIDE 3'-6" CLEAR AT ENDS OF STANDARD COURT AND 6' CLEAR AT ENDS OF ADA COURT
- b. PROVIDE 6' MINIMUM DISTANCE BETWEEN COURTS
- c. 1/4" MINUS DECOMPOSED GRANITE AT MINIMUM 2" DEPTH PER PLAN
- d. SEE DETAIL HORSESHOE PIT BACKSTOP, PLANS, AND SPECIFICATIONS FOR MORE INFORMATION



HORSESHOE COURTS

DETAIL: SP-14

NOT TO SCALE

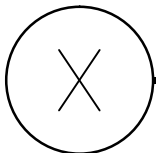
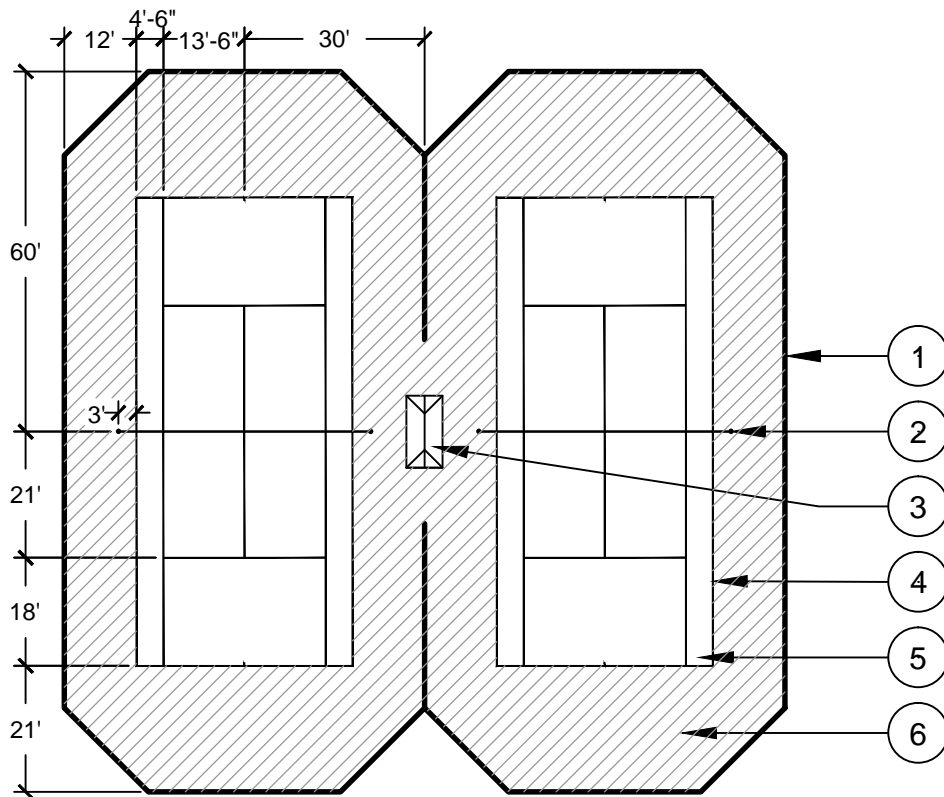


## LEGEND

1. FENCING
2. NET AND POSTS
3. SHADE STRUCTURE AND SEATING
4. 2" WIDE COURT STRIPING
5. SPORTS COURT SURFACING OVER POST-TENSION SLAB; COLOR A
6. SPORTS COURT SURFACING OVER POST-TENSION SLAB; COLOR B

## NOTES

- a. SEE STRUCTURAL AND ELECTRICAL PLANS
- b. SEE SPECIFICATIONS FOR SPORTS COURT SURFACING, STRIPING, AND COLORS
- c. SEE DETAIL TENNIS FENCING, PLANS, AND SPECIFICATIONS FOR MORE INFORMATION



TENNIS COURT

DETAIL: SP-16

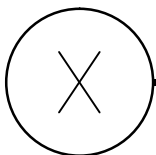
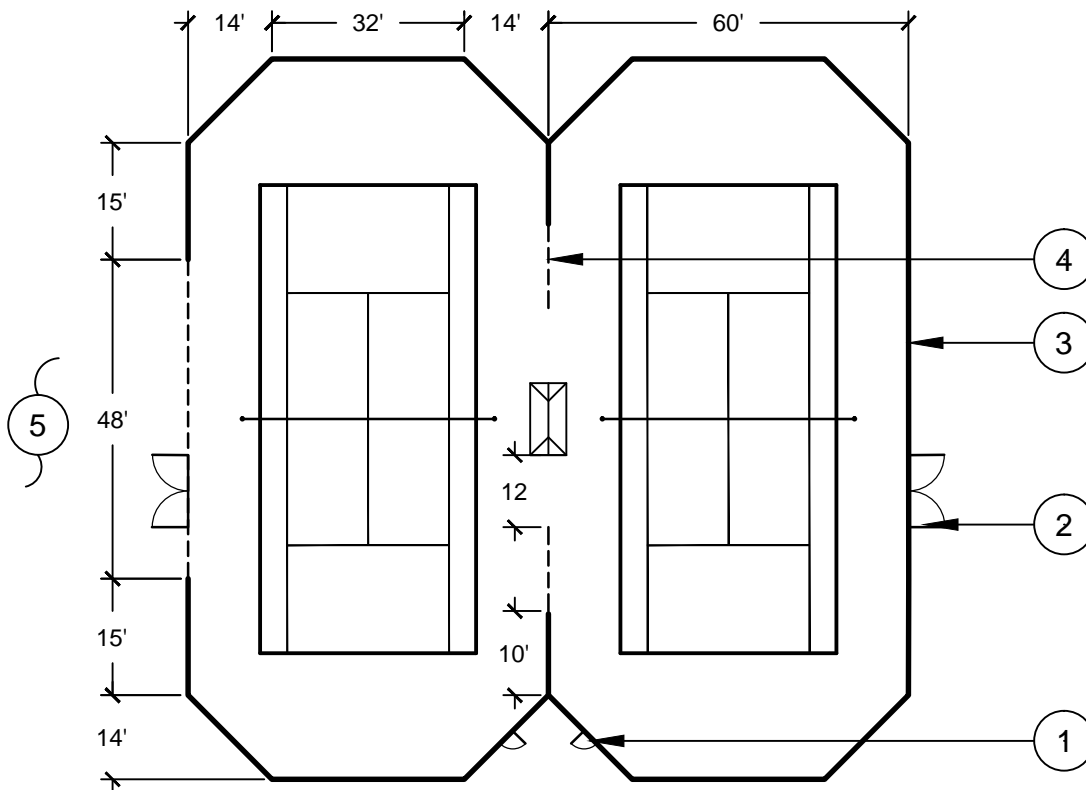
NOT TO SCALE

## LEGEND

1. 3' WIDE PEDESTRIAN GATE
2. 12' WIDE MAINTENANCE GATE
3. 10' HIGH FENCING WITH 8' HIGH WIND SCREEN
4. 4' HIGH FENCING
5. SPECTATOR AREA

## NOTES

- SEE DETAIL TENNIS COURT, PLANS, AND, SPECIFICATIONS FOR MORE INFORMATION
- WHEN ADJACENT TO SPECTATOR AREA, FENCING SHALL BE REDUCED TO 4' HIGH AS NOTED



TENNIS FENCING

DETAIL: SP-17

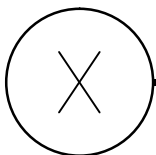
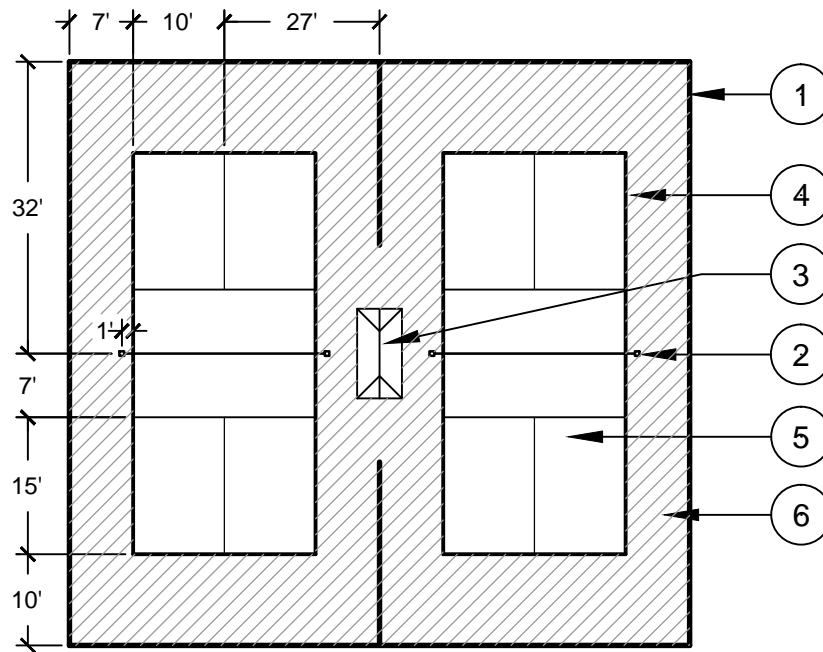
NOT TO SCALE

## LEGEND

1. FENCING
2. NET AND POSTS
3. SHADE STRUCTURE AND SEATING
4. 2" WIDE COURT STRIPING
5. SPORTS COURT SURFACING OVER POST-TENSION SLAB; COLOR A
6. SPORTS COURT SURFACING OVER POST-TENSION SLAB; COLOR B

## NOTES

- a. SEE STRUCTURAL AND ELECTRICAL PLANS
- b. SEE SPECIFICATIONS FOR SPORTS COURT SURFACING, STRIPING AND COLORS
- c. SEE DETAIL PICKLEBALL FENCING, PLANS, AND SPECIFICATIONS FOR MORE INFORMATION



PICKLEBALL COURT

DETAIL: SP-18

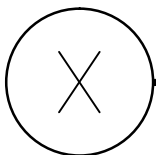
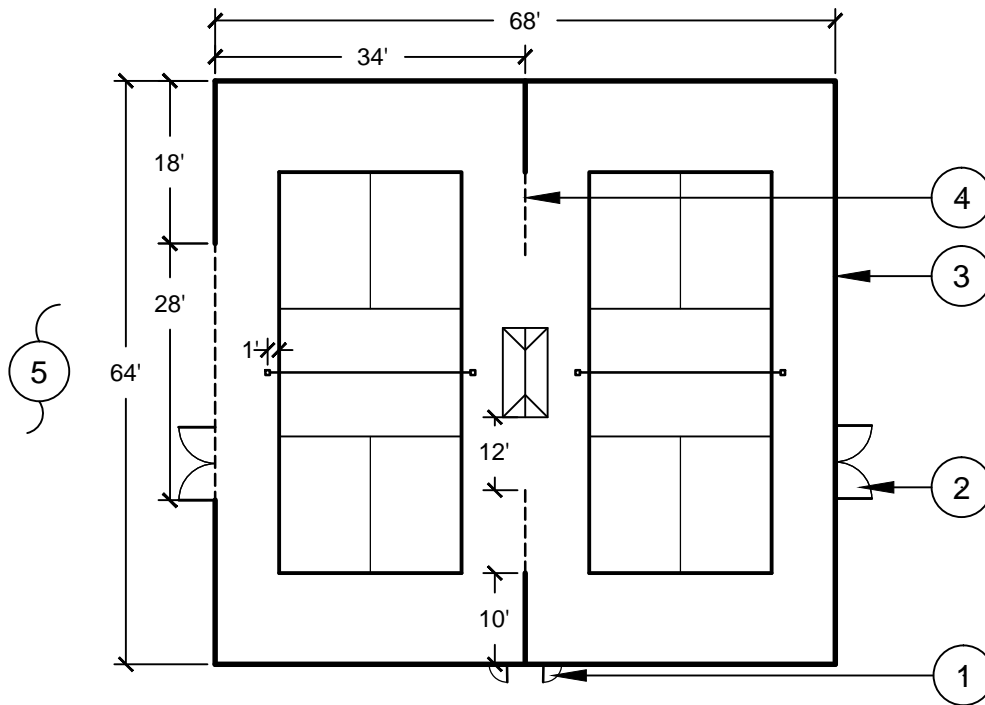
NOT TO SCALE

## LEGEND

1. 3' WIDE PEDESTRIAN GATE
2. 12' WIDE MAINTENANCE GATE
3. 8' HIGH FENCING WITH 7' HIGH WIND SCREENS
4. 4' HIGH FENCING
5. SPECTATOR AREA

## NOTES

- SEE DETAIL PICKLEBALL COURT, PLANS, AND SPECIFICATIONS FOR MORE INFORMATION
- WHEN ADJACENT TO SPECTATOR AREA, FENCING SHALL BE REDUCED TO 4' HIGH AS NOTED



PICKLEBALL FENCING

DETAIL: SP-19

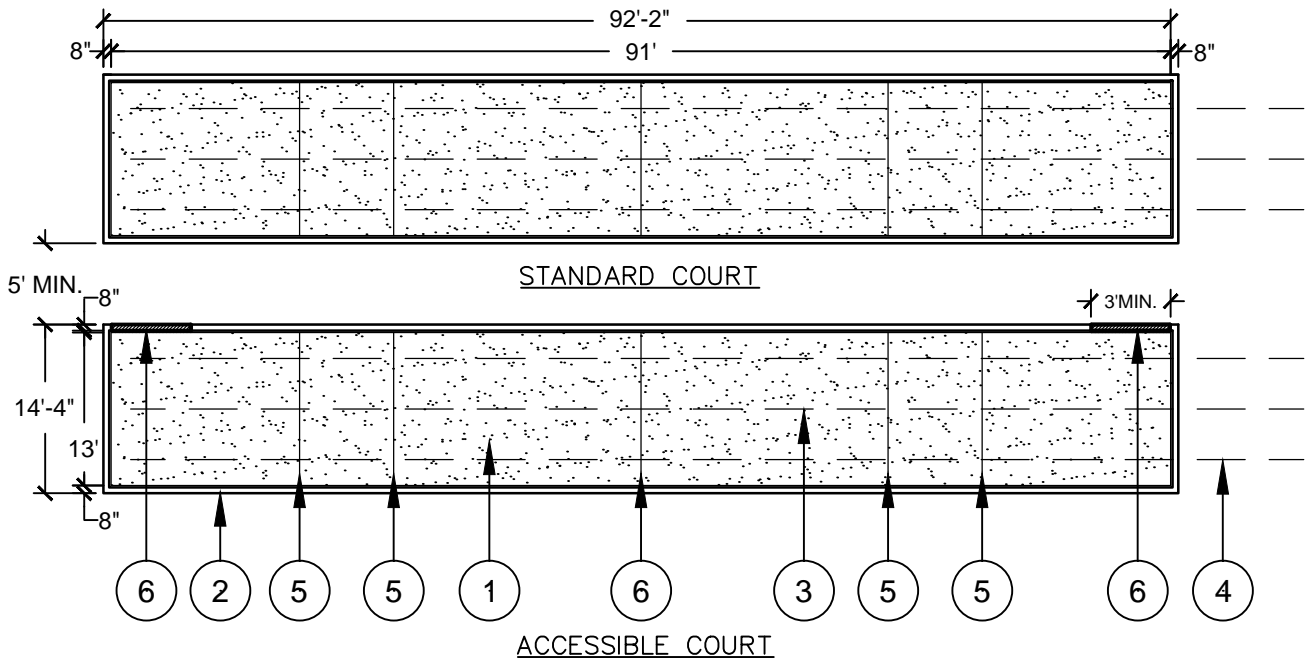
NOT TO SCALE

**LEGEND**

1. CLAY SURFACE
2. 6" WIDE CONCRETE CURB WITH 2"x10" PRESSURE TREATED DOUGLAS FIR BOARDS
3. 4" PERFORATED PLASTIC DRAIN PIPES
4. DRAINS TO OFF COURT SUMP
5. 2" WIDE STRIPING
6. ACCESSIBLE ENTRANCE

**NOTES**

- a. SEE DETAIL BOCCE SECTIONS AND ENLARGEMENTS, PLANS, AND SPECIFICATIONS FOR MORE INFORMATION
- b. 2" STRIPING SHALL BE OIL BASED PAINT LOCATED ON THE COURT AND SIDE WALLS. COLOR SHALL BE WHITE.
- c. 10' MINIMUM CONCRETE SIDEWALK SHALL SURROUND THE ENTIRE COURT. ADJACENT COURTS SHALL HAVE A 5' MINIMUM CONCRETE SIDEWALK SEPARATION.




 BOCCE COURT  
 DETAIL: SP-20

NOT TO SCALE

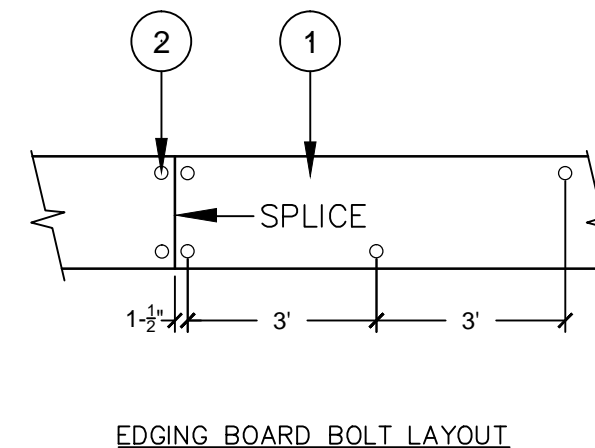
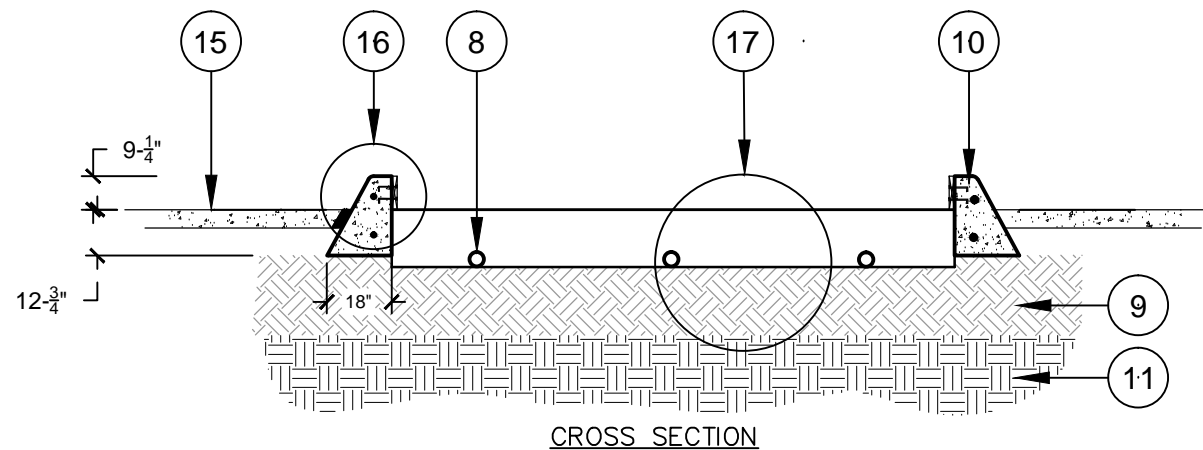
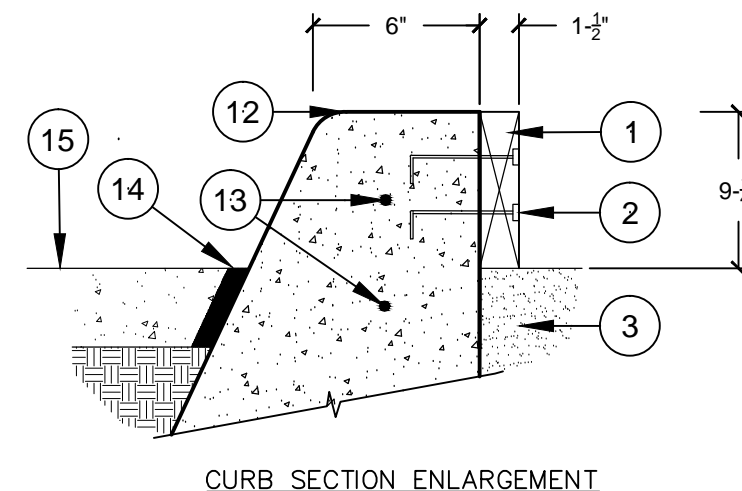
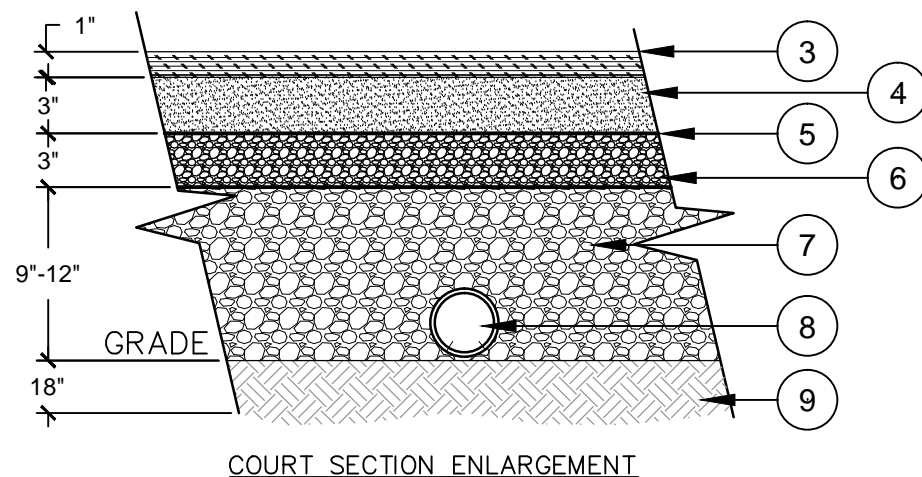


**LEGEND**

1. 2"x10" PRESSURE TREATED, DOUGLAS FIR BOARDS
2. 3/8"x5" COUNTERSINK ANCHOR BOLT
3. 1" CLAY SURFACE
4. 1/4" MINUS STABILIZED DECOMPOSED GRANITE
5. GEOTEXTILE FABRIC
6. GRAVEL COURSE
7. 3/4" SCREENED GRAVEL
8. 4" PERFORATED PIPE WITH FILTER FABRIC
9. COMPACTED TYPE II
10. CONCRETE CURB
11. UNDISTURBED SUBGRADE
12. 1/2" RADIUS
13. #4 REBAR, CONTINUOUS
14. 1/2" EXPANSION JOINT
15. SIDEWALK
16. SEE CURB SECTION ENLARGEMENT
17. SEE COURT SECTION ENLARGEMENT

**NOTES**

- a. SEE DETAIL BOCCÉ COURT, PLANS, AND SPECIFICATIONS FOR MORE INFORMATION



BOCCE SECTIONS  
 DETAIL: SP-21

NOT TO SCALE

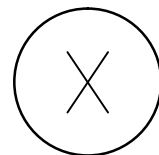
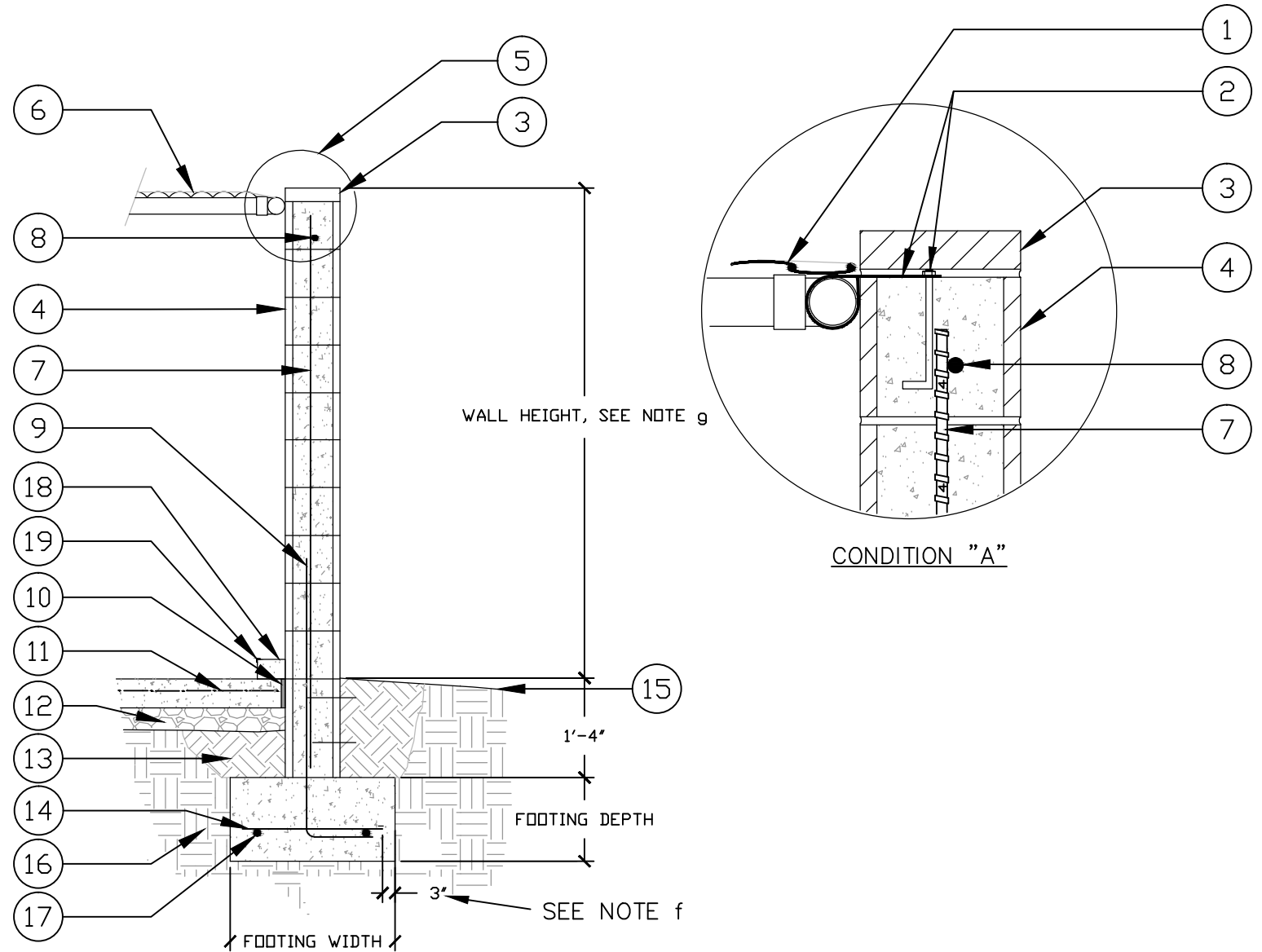
# **XX Appendix A – Enclosures Details**

**LEGEND**

1. 6 GA. CHAIN LINK ROOF ENCLOSURE (PUMP ENCLOSURE ONLY).
2.  $\frac{1}{8}$ " x 1" PRESSED STEEL BRACE BAND WITH  $\frac{3}{8}$ " DIAMETER ANCHOR BOLT SET IN CELL WITH MINIMUM 7" IMBED AT 48" O.C.
3. CAP BLOCK, 8"x2"x16"
4. 8" CMU WALL, PUMP OR TRASH ENCLOSURE (ROOF NOT PART OF TRASH ENCLOSURE).
5. CONDITION "A" (ONLY AT PUMP ENCLOSURE WITH CHAIN LINK TOP)
6. 2" MESH, 6 GA. CHAIN LINK ROOF
7. #6 REBAR AT 32" O.C. VERTICAL GROUT ALL CELLS SOLID
8. #4 CONTINUOUS BARS IN BOND BEAMS, GROUT SOLID
9. #6 REBAR AT 32" O.C. WITH 30" LAP, ALTERNATE BENDS IN FOOTING
10.  $\frac{1}{2}$ " PRE-MOLDED EXPANSION BOARD
11. 5" CONCRETE SLAB W/W6-6x6 MESH
12. 4" TYPE II AGGREGATE BASE UNDER CONCRETE SLAB, OR AS RECOMMENDED IN SOILS REPORT, WHICHEVER IS GREATER.
13. COMPACTED BACKFILL, 95% MINIMUM
14. #4 REBAR AT 32" O.C.
15. +/- FINISH GRADE, SLOPE AWAY FROM WALL
16. UNDISTURBED SUBGRADE
17. TWO, #4 REBAR, CONTINUOUS
18. 10"x6" CURB CONTINUOUS AROUND CMU AT TRASH ENCLOSURE
19. 3"x3"x $\frac{3}{8}$ " METAL ANGLE CONTINUOUS AT CURB AT TRASH ENCLOSURE

**NOTES**

- a. ALL MORTAR JOINTS TO BE TOOLED.
- b. ALL CMU TO BE SEALED AND GRAFFITI RESISTANT.
- c. GROUT ALL CELLS SOLID.
- d. CONCRETE TO ACHIEVE 4,500 PSI COMPRESSIVE STRENGTH AT 28 DAYS, W/C=.50.
- e. SUPPORT REBAR ON APPROVED CHAIRS OR DOBIES. DO NOT USE BROKEN BLOCK PIECES.
- f. MAINTAIN 3" CLEAR MINIMUM ON ALL SIDES, BOTTOM, AND ENDS FROM REBAR TO EARTH.
- g. WALL HEIGHT MINIMUM 7'-6" ABOVE GRADE FOR PUMP ENCLOSURE, 6'-0" ABOVE GRADE FOR TRASH ENCLOSURE.
- h. ENCLOSURE SHALL BE SIZED TO HOUSE RECYCLE DUMPSTER WITH STANDARD DUMPSTER.



PUMP/TRASH ENCLOSURE WALL SECTION

DETAIL: EN-01

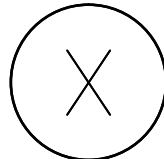
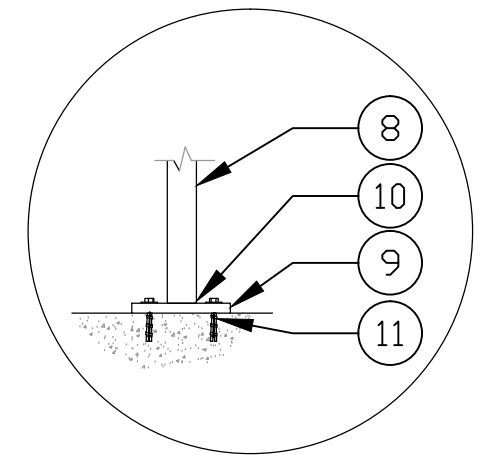
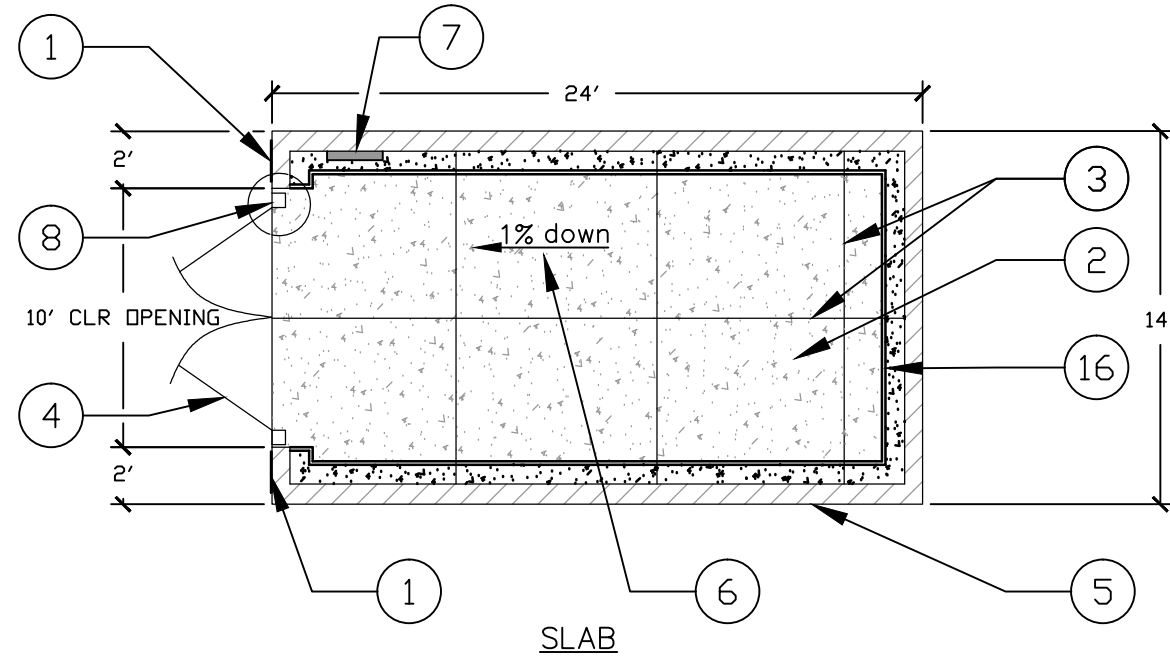
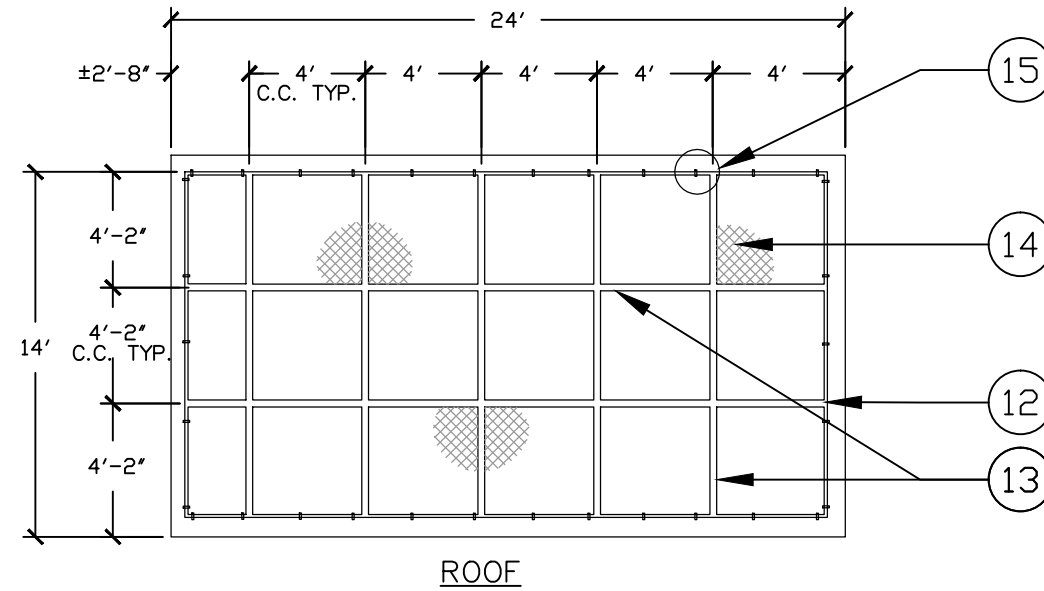
NOT TO SCALE

**LEGEND**

1. CITY TO INSTALL "HIGH VOLTAGE- KEEP OUT" SIGNS ON EACH SIDE OF ENTRANCE.
2. SEE PLANS FOR SLAB PENETRATION REQUIREMENTS.
3. SLAB CONTROL JOINT, TYPICAL
4. TUBE STEEL GATES
5. PUMP HOUSE CMU WALL
6. CONCRETE SLAB  $\frac{1}{8}$ " PER FOOT SLOPE. SEE GRADING PLANS.
7. SEE PLANS FOR IRRIGATION CONTROL LOCATION.
8. 6" SCH. 40 GALVANIZED POST WELDED TO GALVANIZED PLATE.
9. 10"x10"x $\frac{3}{8}$ " GALVANIZED STEEL BASE PLATE.
10. CONTINUOUS WELD
11. EXPANSION ANCHOR INTO CONCRETE SLAB.
12. 2" DIAMETER SUPPORT PIPE AROUND PERIMETER.
13. 3" DIAMETER SUPPORT PIPE.
14. 2" MESH, 6 GAUGE GALVANIZED CHAIN LINK FENCE WITH DARK GREEN CHAIN LINK.
15. SEE CONDITION "A" ON DETAIL EN-01.
16. 10"x6" CURB CONTINUOUS AROUND ENCLOSURE WITH 3"x3"x $\frac{3}{8}$ " METAL ANGLE ON EDGE. SEE DETAIL EN-01.

**NOTES**

- a. CONTRACTOR SHALL COORDINATE SLEEVING/CONDUIT FOR POWER AND TELEPHONE AT ENCLOSURE.
- b. ENCLOSURE SLAB CONTRACTOR SHALL COORDINATE WITH IRRIGATION CONTRACTOR AND PUMP MANUFACTURER FOR PUMP AND SKID DIMENSION. INSTALL THE CONCRETE UNDER THE SKID LEVEL.
- c. SEE DETAIL SHEET FOR LAYOUT OF EQUIPMENT WITHIN PUMP STATION.
- d. FINISH GRADE OF ENCLOSURE TO DRAIN TO GATES AT 1%, MINIMUM.
- e. ACTUAL POST LOCATION SHALL BE ADJUSTED IF NECESSARY SO IT DOES NOT CONFLICT WITH PUMP/CLEARANCES. COORDINATE WITH IRRIGATION CONTRACTOR.
- f. SEE DETAIL EN-01 FOR MORE INFORMATION.



PUMP STATION ROOF AND SLAB

DETAIL: EN-02

NOT TO SCALE

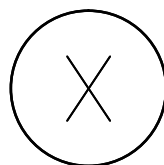
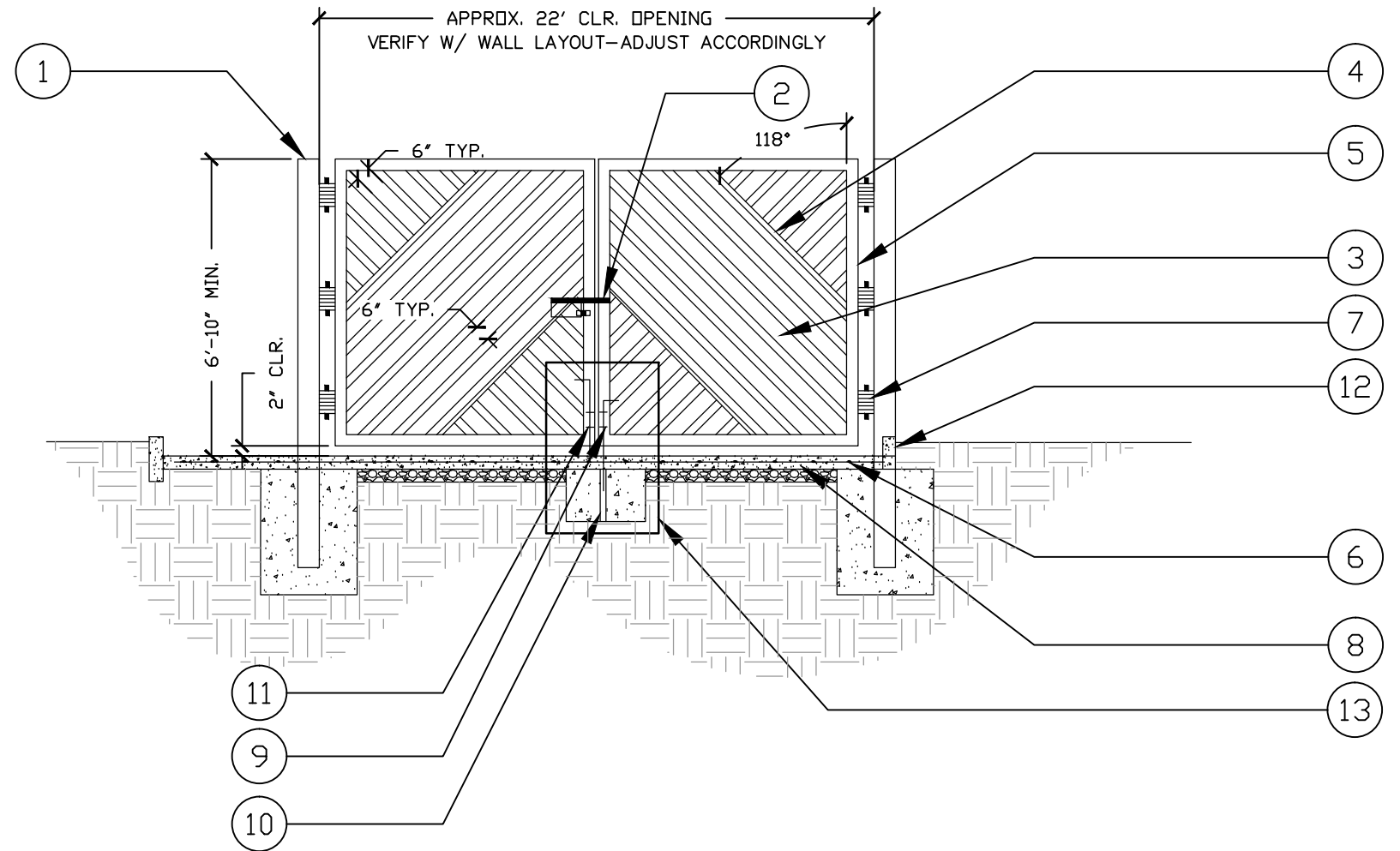


**LEGEND**

1. 8" STANDARD STEEL GATE POST
2. HEAVY DUTY LOCKABLE 3/4" DIA. SLIDE BOLT ASSEMBLY (CANE BOLTS).
3. 16 GA. STEEL PERFORATED SHEET W/1/4" HOLES STAGGERED.
4. 1-1/2" X 14 GA. TUBE STEEL
5. 2-1/2" X 12 GA. TUBE STEEL GATE FRAME TYP.
6. #5 REBAR AT 12" O.C. E.W.
7. HEAVY DUTY LUBRICATED STEEL GATE HINGE, 3 PER GATE LEAF.
8. 5" CONCRETE PAD W/W6-6XP 6 MESH AND APRON.
9. CANE BOLT ONE SIDE-EXTERIOR SIDE SEE DETAIL EN-07.
10. GALVANIZED PIPE SLEEVE IN CONCRETE THRU CONCRETE SLAB.
11. ROD SECURED IN UP POSITION
12. ADJACENT CURB, COORDINATE INSTALLATION W/GATE FOOTING.
13. ENLARGEMENT, SEE DETAIL EN-05.

**NOTES**

- a. ALL METAL SURFACE WELDS SHALL BE CLEAN AND FREE OF ALL FOREIGN MATTER PRIOR TO PRIMING AND PAINTING OF ALL SURFACES.
- b. ALL WELDS TO BE CONTINUOUS FOR TUBE STEEL CONNECTIONS.
- c. ALL WELDS SHALL BE GROUND SMOOTH INCLUDING ALL EXPOSED METAL EDGES.
- d. ENTIRE GATES HARDWARE & POSTS SHALL BE PRIMED AND PAINTED (2 COATS MIN.) WITH A HIGH GLOSS HEAVY DUTY INDUSTRIAL ENAMEL PAINT W/UV INHIBITORS.
- e. FOOTINGS PER STRUCTURAL CALCULATIONS.

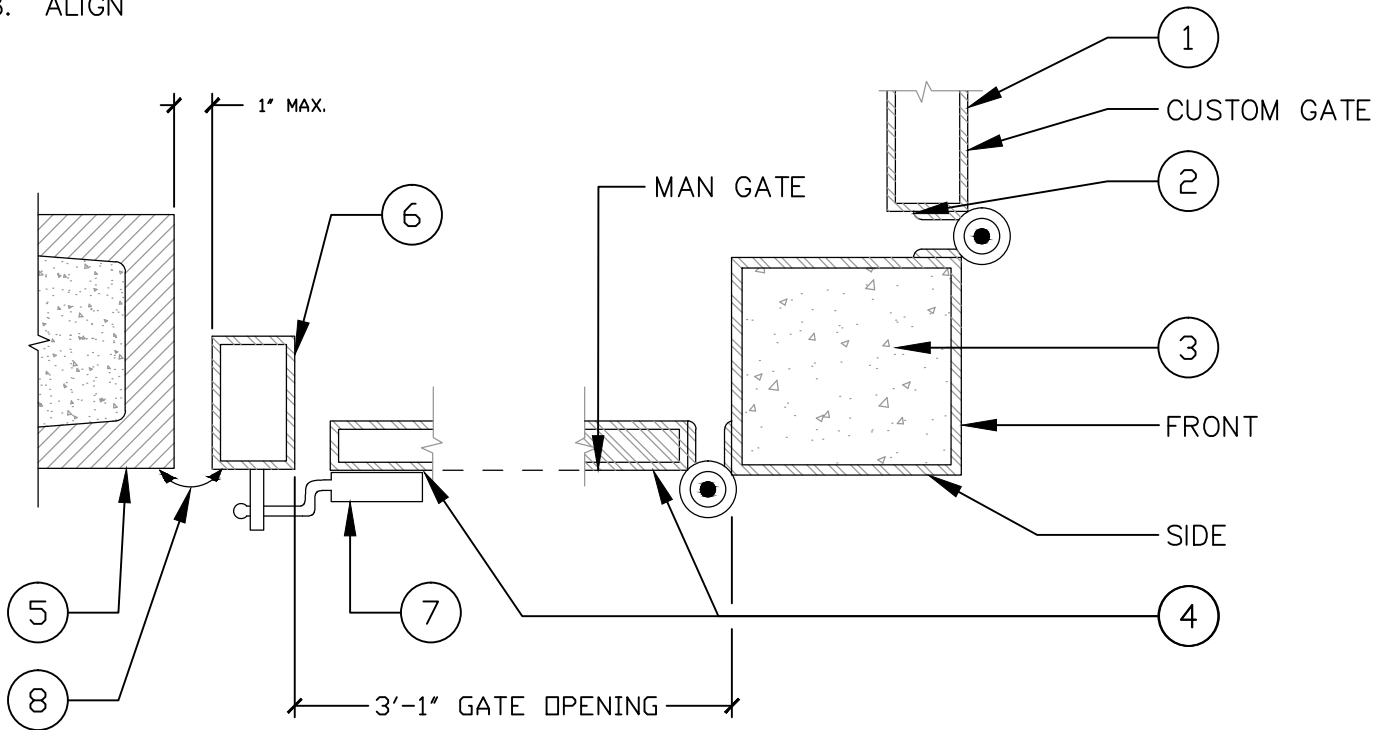


CUSTOM GATES AT TRASH ENCLOSURE  
 DETAIL: EN-04

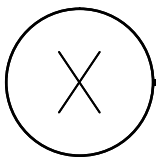
NOT TO SCALE

**LEGEND**

1. 2 1/2" WIDE TUBE STEEL GATE FRAME.
2. HINGE WELDED TO GATE AND POST.
3. 8" STANDARD TUBE STEEL SUPPORT POST FILLED WITH CONCRETE.
4. 1 1/2" ACCESS GATE FRAME
5. 8"x8"x16" CONCRETE MASONRY UNITS
6. 2"x4"x12 GA. TUBE STEEL POST W/WELDED CAP, GROUND SMOOTH.
7. HEAVY DUTY GATE LATCH ASSEMBLY
8. ALIGN



PLAN VIEW SECTION



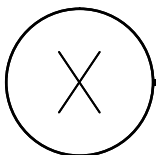
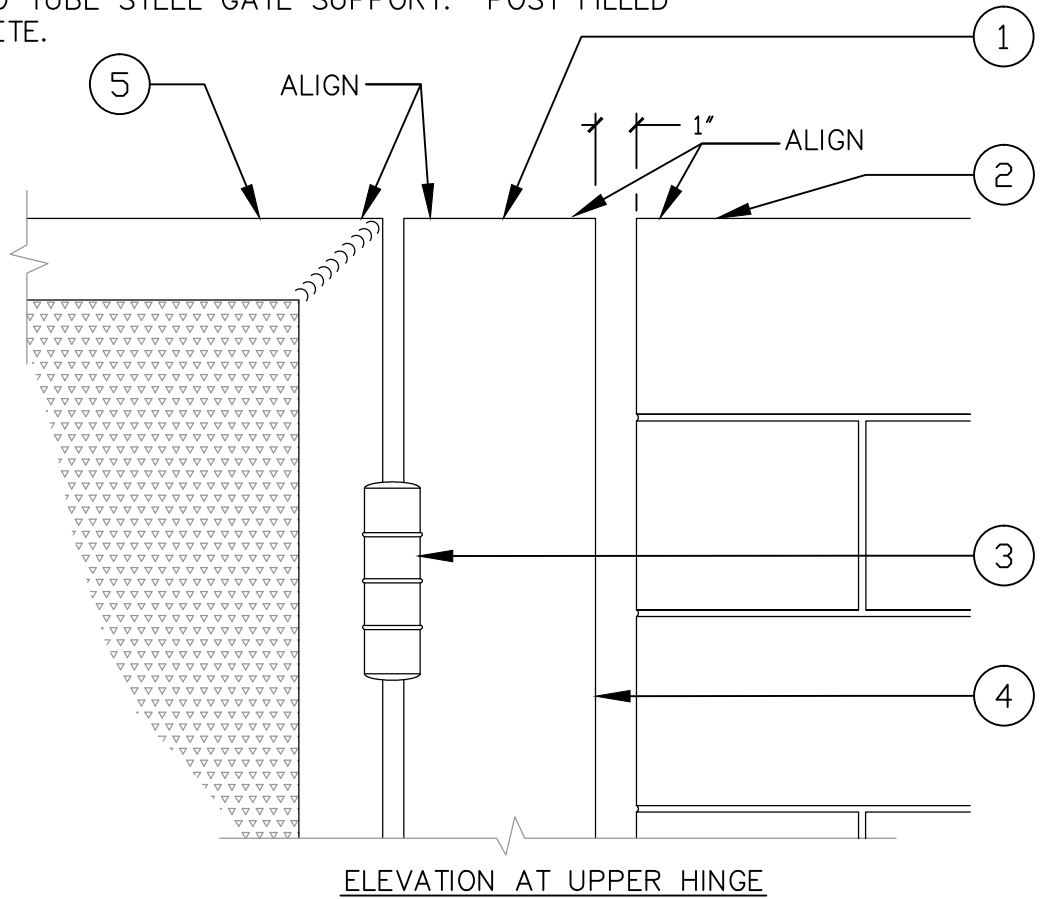
HINGE POST AT TRASH ENCLOSURE

DETAIL: EN-05

NOT TO SCALE

## LEGEND

1. FLAT TROWEL CONCRETE AT TOP OF POST.
2. MASONRY WALL NEXT TO POST.
3. EXTRA HEAVY DUTY EXTERIOR GRADE HINGE (GREASED). (2) PER GATE LEAF. WELD TO POST & GATE FRAME.
4. 6" STANDARD TUBE STEEL GATE SUPPORT. POST FILLED WITH CONCRETE.
5. GATE FRAME



POST TO WALL AT ENCLOSURE GATES

DETAIL: EN-06

NOT TO SCALE

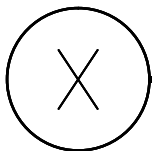
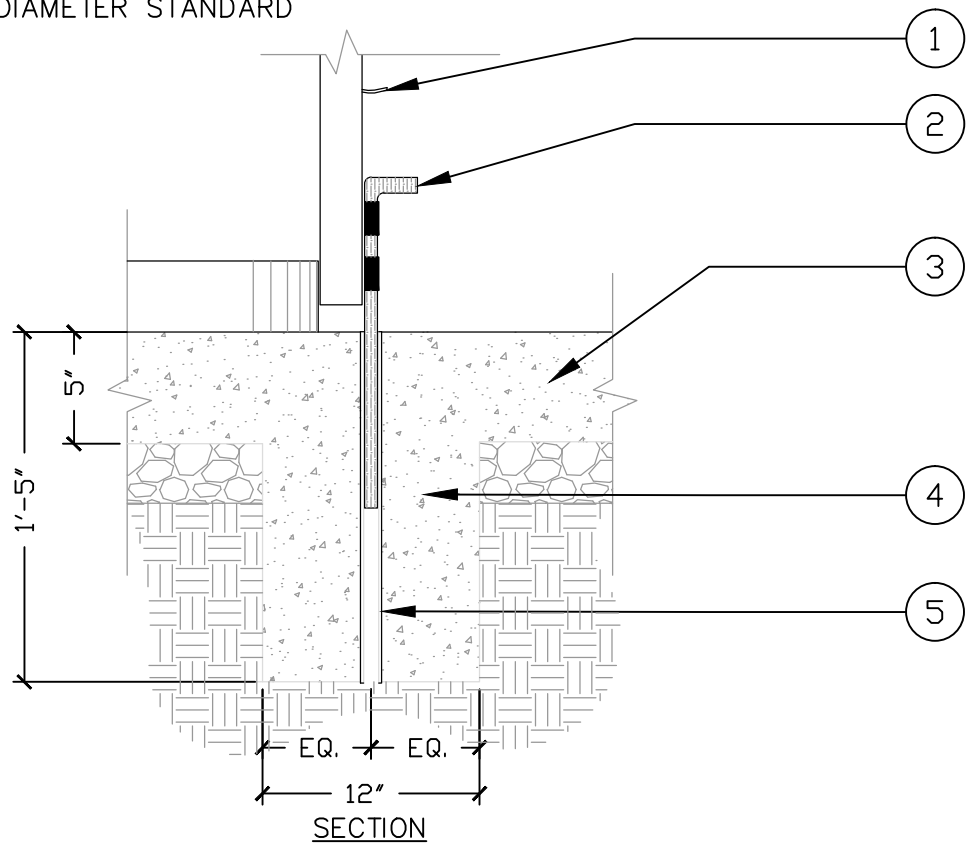


## LEGEND

1. HOOK FOR ROD IN UP POSITION.
2.  $\frac{3}{4}$ " DIAMETER ROD (CANE BOLT), MINIMUM 10" DROP BELOW GATE BODY.
3. CONCRETE SLAB
4. 12"X12" CONCRETE FOOTING FOR SLEEVE.
5. CONTINUOUS 1" DIAMETER STANDARD PIPE SLEEVE.

## NOTES

- SEE CUSTOM GATE DETAIL EN-04 FOR LOCATION OF DROP PINS ON GATE.



DROP PIN (CANE BOLT)

DETAIL: EN-07

NOT TO SCALE

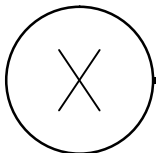
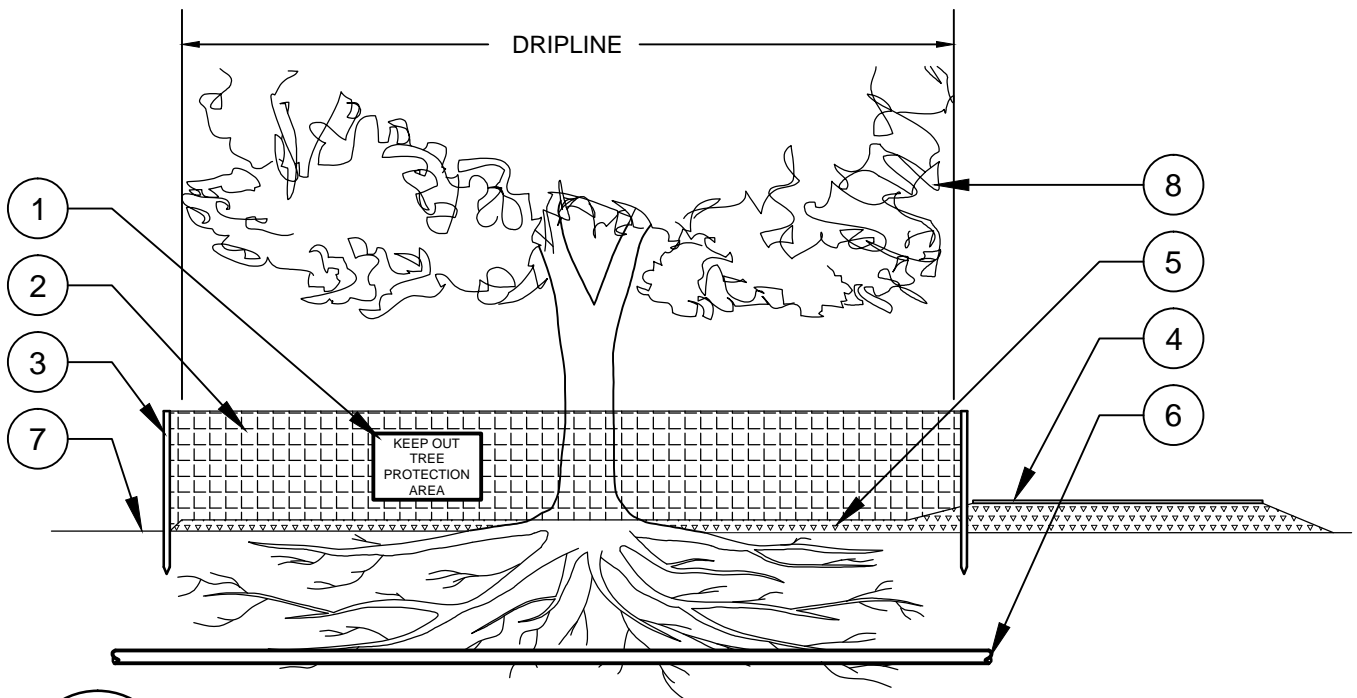
# **XX Appendix A – Landscaping Details**

**LEGEND**

- 1. KEEP OUT SIGN SPACED EVERY 50' ALONG FENCE
- 2. ORANGE POLYETHYLENE FENCING
- 3. 8' O.C. STEEL POSTS
- 4. 12' WIDE ACCESS ROAD WITH PLYWOOD OVER 12" DEEP MULCH (WHERE REQUIRED)
- 5. 5" DEEP MULCH INSIDE TREE PROTECTION AREA
- 6. PIPE (WHERE REQUIRED)
- 7. FINISH GRADE
- 8. EXISTING TREE

**NOTES**

- a. SEE SPECIFICATIONS FOR ADDITIONAL TREE PROTECTION REQUIREMENTS
- b. NO PRUNING SHALL BE PERFORMED UNLESS APPROVED BY CITY MUNICIPAL FORESTER
- c. NO EQUIPMENT SHALL OPERATE INSIDE THE PROTECTIVE FENCING AREA
- d. WHEN PIPING IS REQUIRED, CONTRACTOR SHALL OPEN TRENCH OUTSIDE THE DRIPLINE FOR BORING
- e. ALL FENCING SHALL BE LOCATED OUTSIDE OF THE DRIPLINE



TREE PROTECTION

DETAIL: LA-01

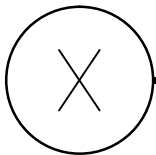
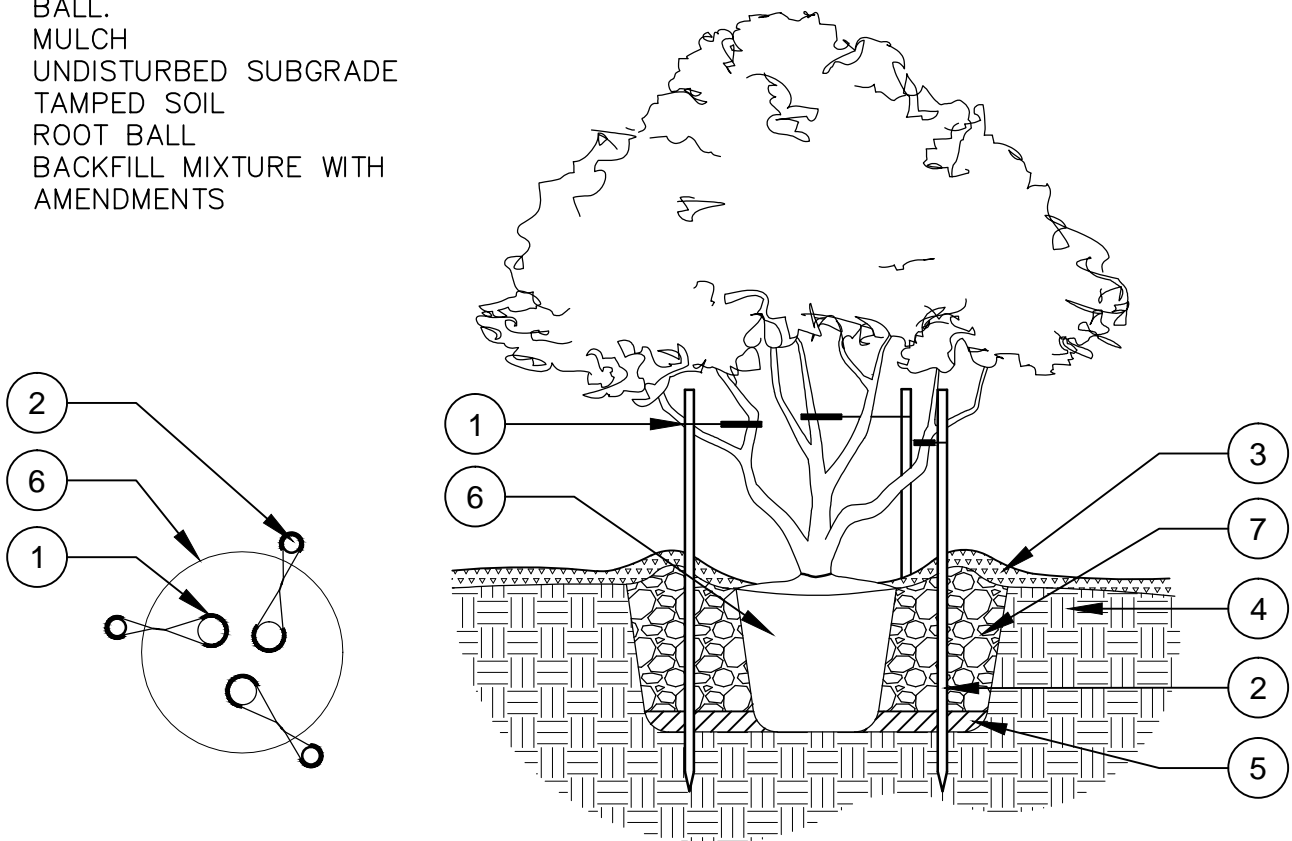
NOT TO SCALE

## LEGEND

1.  $\frac{1}{2}$ " RUBBER HOSE LOOPED, DOUBLE STRAND (OR NYLON STRAP) WITH 12 GAUGE WIRE. MAINTAIN 4"-6" LOOP FOR TREE GROWTH.
2. 2" DIAMETER, 10' TALL DOUGLAS FIR LODGE POLE. DRIVEN MINIMUM OF 4" BELOW BOTTOM OF ROOT BALL.
3. MULCH
4. UNDISTURBED SUBGRADE
5. TAMPED SOIL
6. ROOT BALL
7. BACKFILL MIXTURE WITH AMENDMENTS

## NOTES

- DO NOT STAKE IF THE TREE IS STRONG ENOUGH AS DETERMINED BY CITY MUNICIPAL FORESTER
- TRIM STAKES TO BE 6" BELOW BOTTOM BRANCHES
- STAPLE WIRE TO STAKES



MULTI-TRUNK PLANTING

DETAIL: LA-02

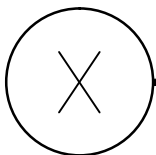
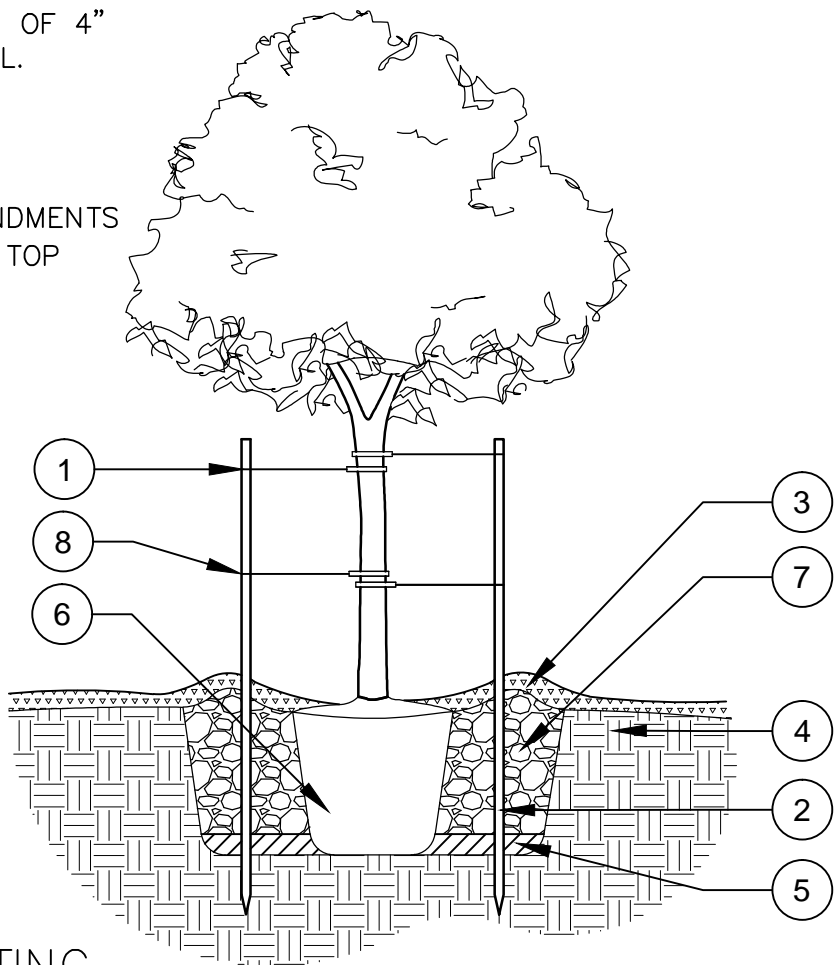
NOT TO SCALE

## LEGEND

1.  $\frac{1}{2}$ " RUBBER HOSE LOOPED, DOUBLE STRAND (OR NYLON STRAP) WITH 12 GAUGE WIRE. MAINTAIN 4"-6" LOOP FOR TREE GROWTH.
2. 2" DIAMETER, 10' TALL DOUGLAS FIR LODGE POLE. DRIVEN MINIMUM OF 4" BELOW BOTTOM OF ROOT BALL.
3. MULCH
4. UNDISTURBED SUBGRADE
5. TAMPED SOIL
6. ROOT BALL
7. BACKFILL MIXTURE WITH AMENDMENTS
8. MIDDLE TIES  $\frac{1}{2}$  WAY BETWEEN TOP TIES AND GROUND

## NOTES

- a. TOP TIE SUPPORT PLACED FOR MAX SUPPORT
- b. TRIM STAKES TO BE 6" BELOW BOTTOM BRANCHES
- c. STAPLE WIRE TO STAKES



TREE PLANTING

DETAIL: LA-03

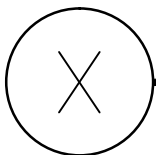
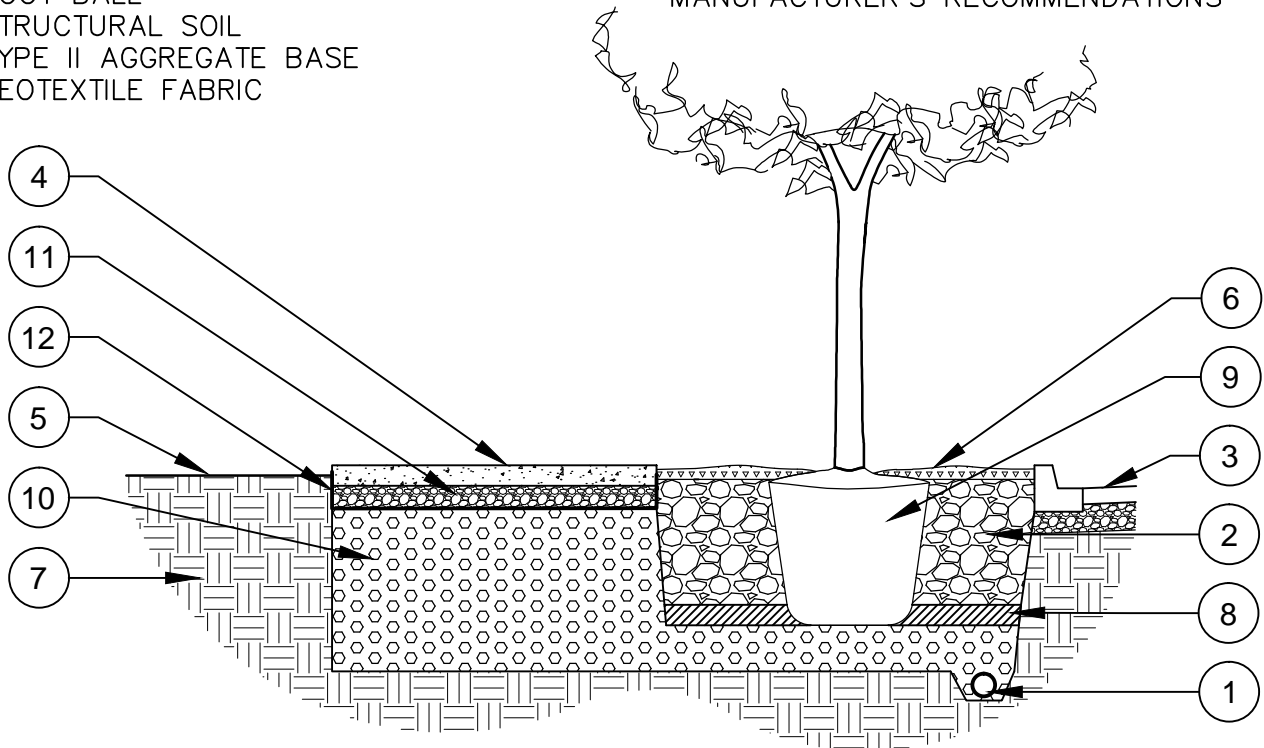
NOT TO SCALE

## LEGEND

1. 4" PERFORATED PIPE WRAPPED IN GEOTEXTILE FABRIC
2. BACKFILL MIXTURE WITH AMENDMENTS
3. ROAD
4. SIDEWALK OR TRAIL
5. LANDSCAPE AREA
6. MULCH
7. UNDISTURBED SUBGRADE
8. TAMPED SOIL
9. ROOT BALL
10. STRUCTURAL SOIL
11. TYPE II AGGREGATE BASE
12. GEOTEXTILE FABRIC

## NOTES

- a. PLANTING PIT TO BE CONTINUOUS ALONG CURB LINE
- b. LANDSCAPE STRIP AROUND TREE TO BE MINIMUM 5' WIDE
- c. REFER TO TREE PLANTING DETAIL FOR MORE INFORMATION
- d. REFER TO PLANS AND SPECIFICATIONS FOR SIDEWALK, CURB AND ROAD INFORMATION
- e. INSTALL STRUCTURAL SOILS PER MANUFACTURER'S RECOMMENDATIONS



STRUCTURAL SOIL DETAIL

DETAIL: LA-04

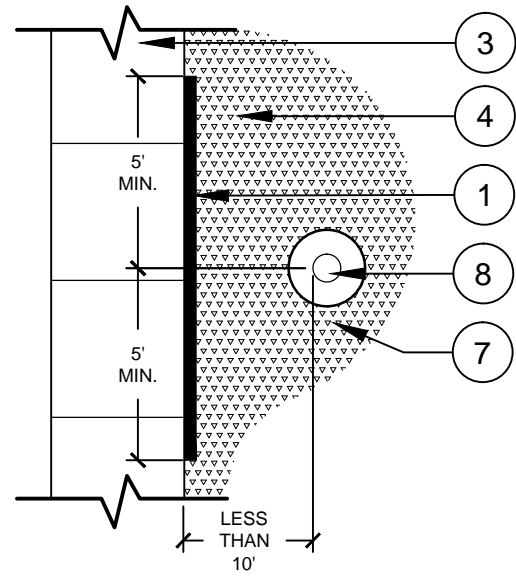
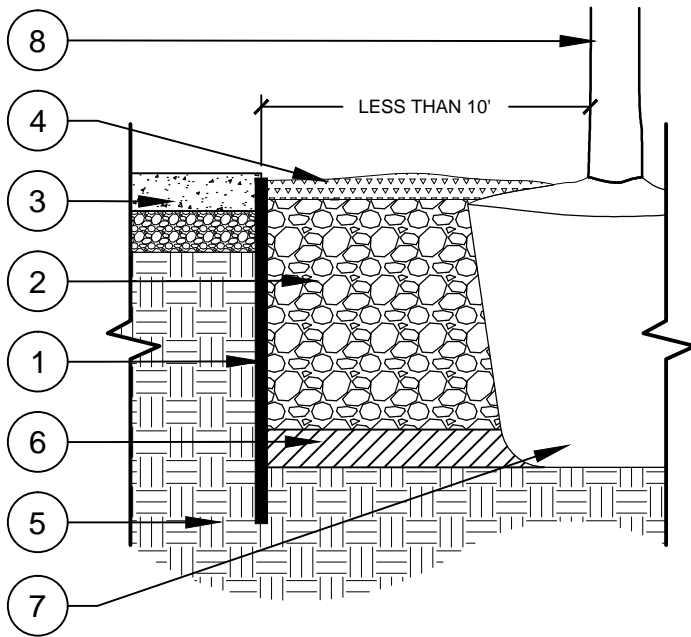
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**LEGEND**

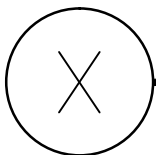
1. ROOT BARRIER
2. BACKFILL MIXTURE WITH AMENDMENTS
3. SIDEWALK OR HARDSCAPE
4. MULCH
5. UNDISTURBED SUBGRADE
6. TAMPED SOIL
7. ROOT BALL
8. TREE

**NOTES**

- a. ROOT BARRIER IS REQUIRED FOR FOR ALL TREE TRUNKS LOCATED WITHIN 10' OF HARDSCAPE
- b. INSTALL ROOT BARRIER PER MANUFACTURER'S RECOMMENDATIONS
- c. 10' LONG MINIMUM (24" DEEP MINIMUM) ROOT BARRIER SHALL BE LOCATED 5' ON EACH SIDE OF THE TREE ON CENTER.
- d. TOP OF ROOT BARRIER SHALL BE  $\frac{1}{2}$ " ABOVE LANDSCAPE FINISH GRADE AND BELOW ADJACENT HARDSCAPE



ROOT BARRIER PLAN



ROOT BARRIER DETAIL

DETAIL: LA-05

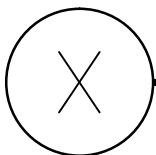
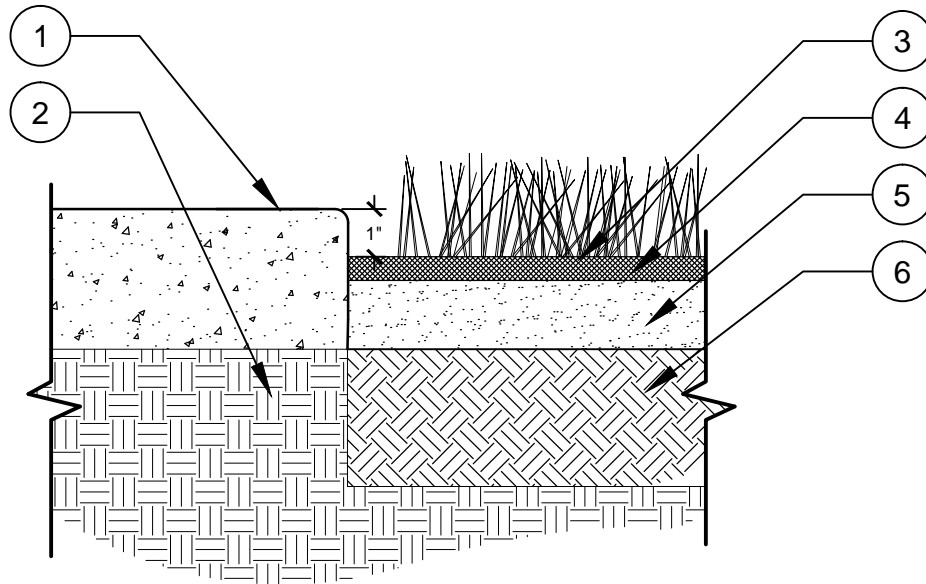
NOT TO SCALE

## LEGEND

1. PAVING OR HARDSCAPE
2. UNDISTURBED SUBGRADE
3.  $\frac{3}{4}$ " MINIMUM SOIL ON SOD
4. AMENDMENTS AND PLANTING MIX
5. CROSS RIP OR TILL SUBGRADE  
6" DEEP MINIMUM
6. COMPACTED SUBGRADE

## NOTES

- DO NOT INSTALL SOD THAT IS STRESSED, LOW QUALITY, OR IN DISREPAIR
- KEEP SEAMS  $\frac{1}{4}$ " OR LESS
- RECESS SOD 1" BELOW TOP OF PAVING OR HARDSCAPE



SOD PLANTING

DETAIL: LA-06

NOT TO SCALE

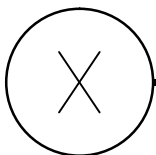
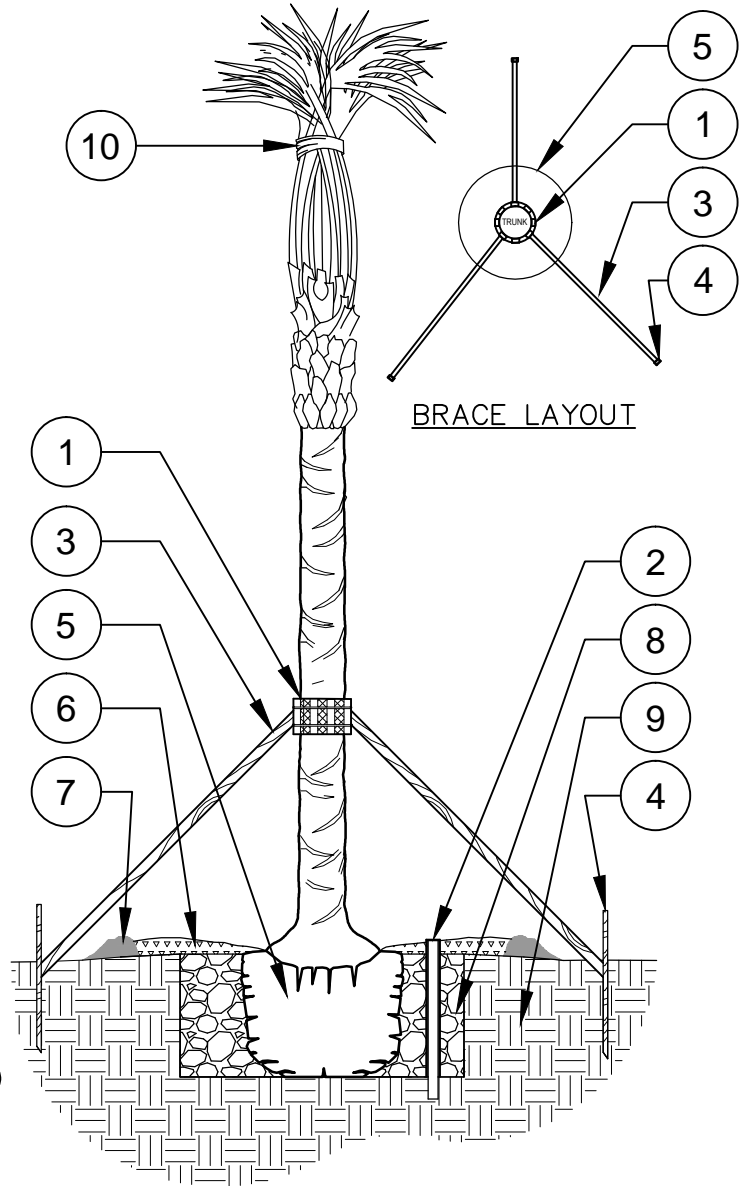


**LEGEND**

1. (8) BANDED 2"x4" WOODEN BATTENS OVER (5) LAYERS OF BURLAP CONNECTED WITH (2) 3/4" STEEL BANDS
2. 4" PERFORATED PIPE TO DEPTH OF ROOT BALL PLUS 6"
3. 2"x4" SUPPORT BRACES AT 45 DEGREES. (3) PER PALM WITH EQUAL SPACING. NAIL TO BATTENS AND STAKES.
4. 2"x4"x36" WOODEN STAKES ANCHORED INTO THE GROUND. STAKE MUST EXTEND A MINIMUM OF 24" INTO UNDISTURBED SUBGRADE.
5. ROOT BALL
6. MULCH
7. 6" WIDE AND TALL BERM
8. BACKFILL MATERIAL
9. UNDISTURBED SUBGRADE
10. TIED FRONDS

**NOTES**

- a. CHECK SOILS ANALYSIS PRIOR TO PLANTING
- b. PLANT AT DEPTH WHICH PLANT WAS GROWN. ADJUSTMENT OF ROOT BALL DEPTH TO ALIGN FINAL HEIGHT WILL NOT BE ALLOWED.
- c. TRUNK MUST BE STRAIGHT AND FREE OF CURVES, SCARS, BURN MARKS, AND BOOTS
- d. CONTRACTOR TO UNTIE FRONDS AT 90 DAYS OR UPON OBVIOUS NEW GROWTH



PALM PLANTING

DETAIL: LA-07

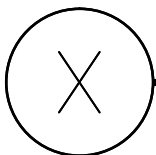
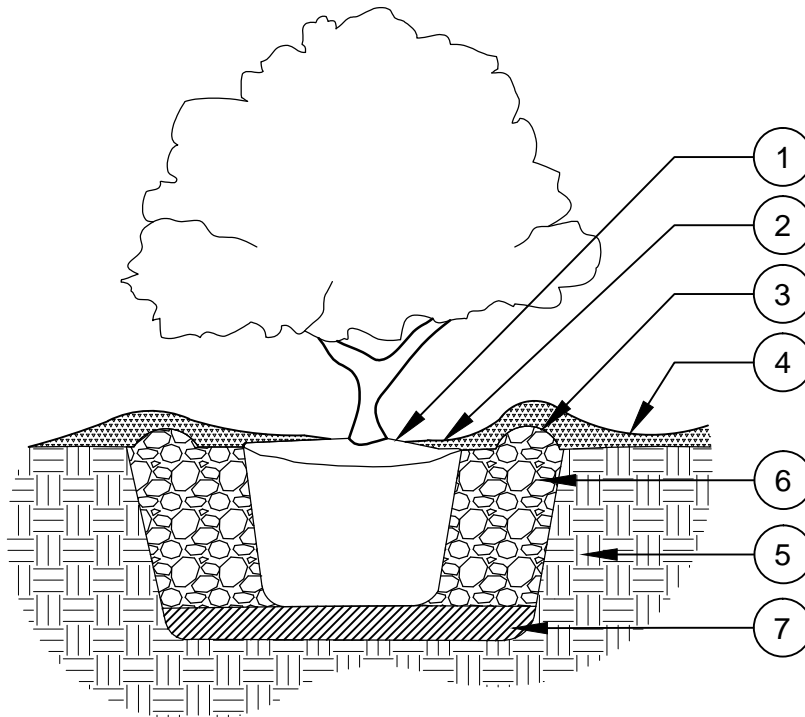
NOT TO SCALE

## LEGEND

1. PLANT CROWN OF ROOT BALL AT FINISH GRADE
2. TAPER MULCH TO  $\frac{1}{2}$ " THICK NEAR BASE OF SHRUB
3. TEMPORARY 3" HIGH BERM
4. FINISH GRADE
5. UNDISTURBED SUBGRADE
6. BACKFILL MIXTURE WITH AMENDMENTS
7. TAMPED SOIL

## NOTES

- a. WHEN SHRUB IS PLANTED ON A SLOPE, IRRIGATION EMITTERS SHALL BE INSTALLED ON THE UPHILL SIDE OF SHRUB
- b. SCARIFY SIDES OF HOLE PRIOR TO PLANTING
- c. REMOVE BERM WHEN IRRIGATION IS OPERATIONAL



SHRUB PLANTING

DETAIL: LA-08

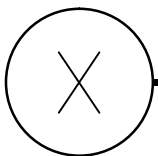
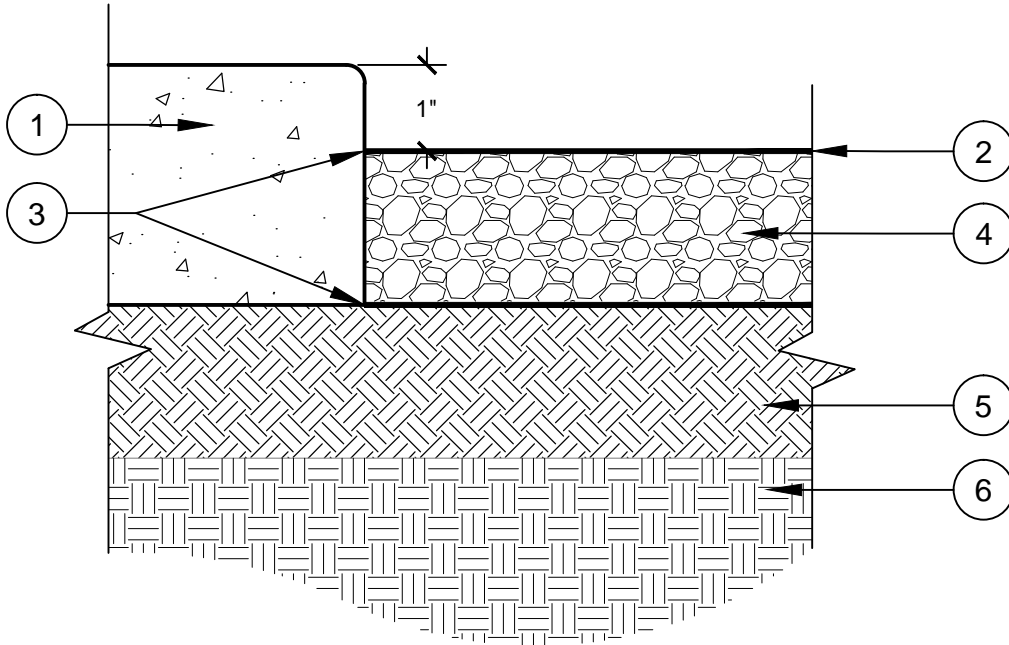
NOT TO SCALE

**LEGEND**

- 1. PAVING OR HARDSCAPE
- 2. FINISH GRADE
- 3. PRE-EMERGENT
- 4. DECOMPOSED GRANITE
- 5. COMPACTED SUBGRADE
- 6. UNDISTURBED SUBGRADE

**NOTES**

- a. REFER TO PLANS AND SPECIFICATIONS FOR DECOMPOSED GRANITE SIZE AND COLOR
- b. REFER TO SPECIFICATIONS FOR PRE-EMERGENT



DECOMPOSED GRANITE

DETAIL: LA-09

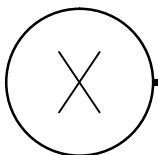
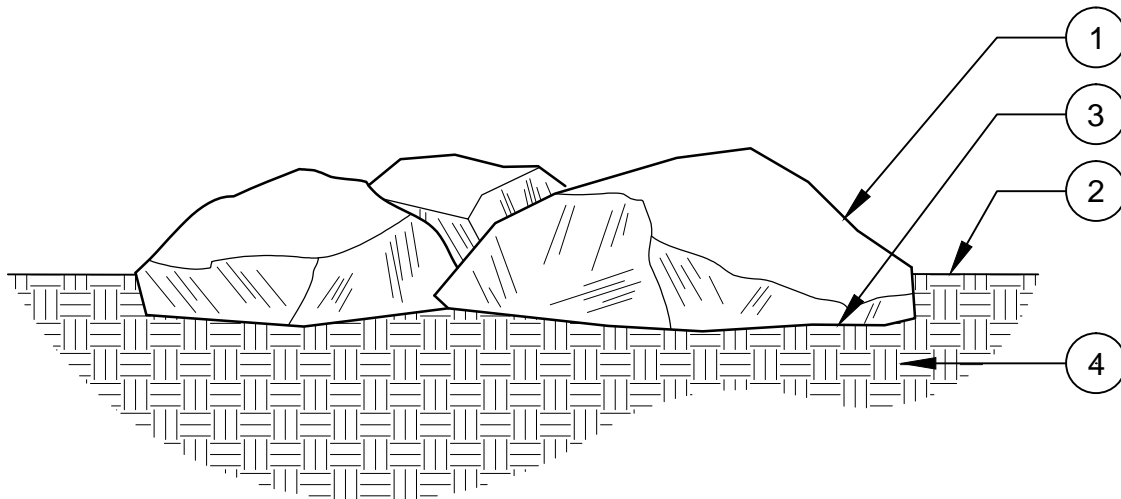
NOT TO SCALE

## LEGEND

1. BOULDER
2. FINISH GRADE
3. BOULDER SHALL BE PLACED WITH  $\frac{1}{3}$  ITS HEIGHT BELOW GRADE.
4. UNDISTURBED SUBGRADE

## NOTES

- a. BOULDERS SHALL BE FREE OF SCRAPES AND SCRATCHES
- b. REFER TO PLANS AND SPECIFICATIONS FOR SIZE AND COLOR
- c. BOULDERS SHALL BE PLACED TOGETHER IN A NATURAL CONFIGURATION



BOULDER PLACEMENT

DETAIL: LA-10

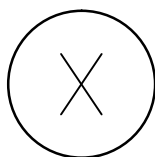
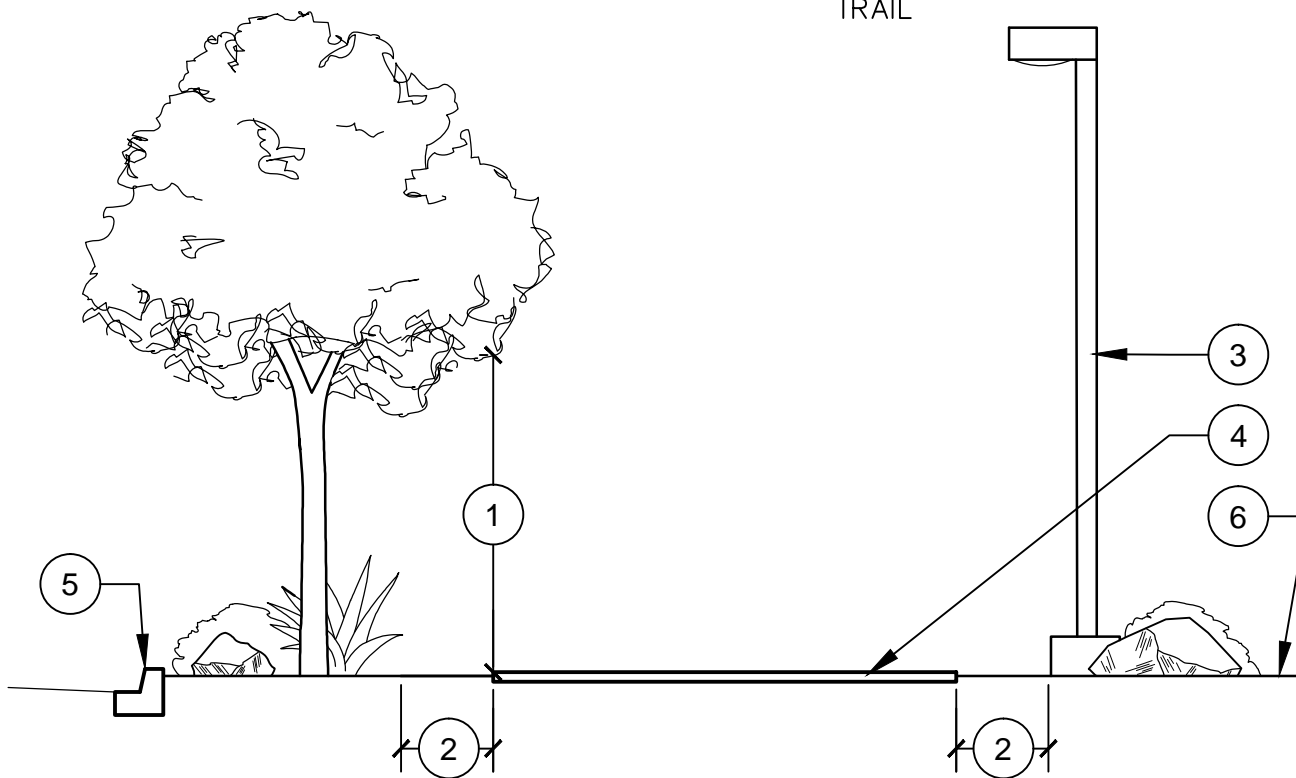
NOT TO SCALE

## LEGEND

1. 7' MINIMUM CLEAR ZONE FROM TREE TO FINISH GRADE.
2. 3' CLEAR ZONE
3. TRAIL LIGHT
4. TRAIL
5. CURB
6. FINISH GRADE

## NOTES

- a. LIGHT POLE BASES SHALL BE LOCATED ENTIRELY OUTSIDE OF THE CLEAR ZONE
- b. ONLY GROUND TREATMENT FINISH GRADE SHALL BE LOCATED IN 3' CLEAR ZONE
- c. 5' MINIMUM LANDSCAPE STRIP BETWEEN BACK OF CURB AND TRAIL



MULTI-USE TRAIL

DETAIL: LA-11

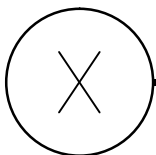
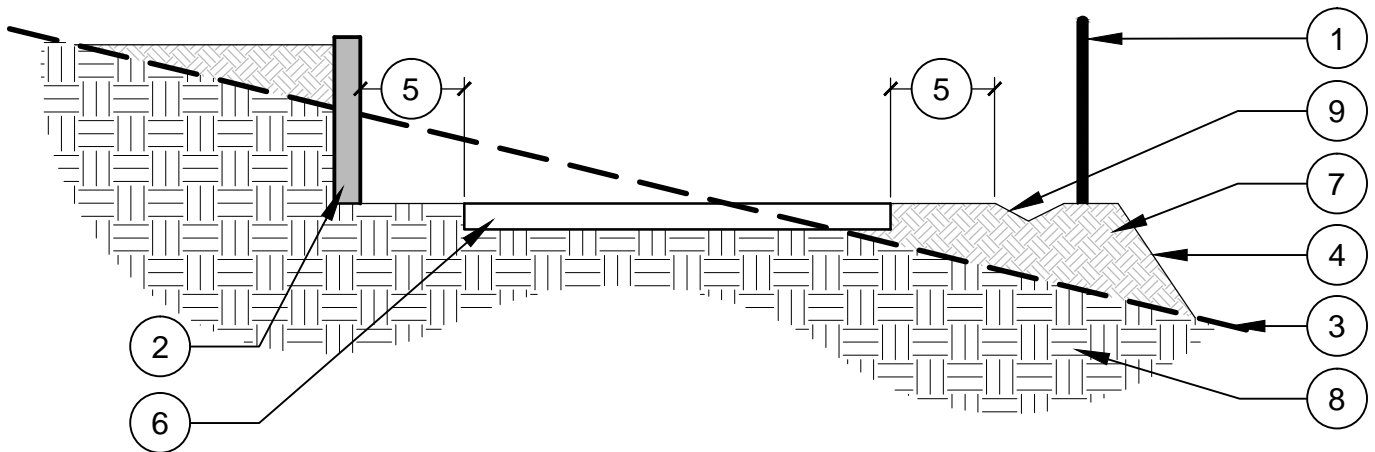
NOT TO SCALE

## LEGEND

1. RAILING (WHERE REQUIRED)
2. RETAINING WALL (WHERE REQUIRED)
3. EXISTING GRADE
4. FINISH GRADE
5. 3' CLEAR ZONE
6. TRAIL (PAVED OR SOFT SURFACE)
7. COMPACTED SUBGRADE (FILL)
8. UNDISTURBED SUBGRADE
9. SWALE

## NOTES

- a. REFER TO PLANS FOR GRADING, TRAIL, WALLS, AND RAILINGS



TRAIL SECTION ON SLOPE

DETAIL: LA-12

NOT TO SCALE

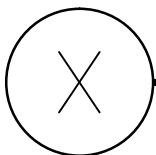
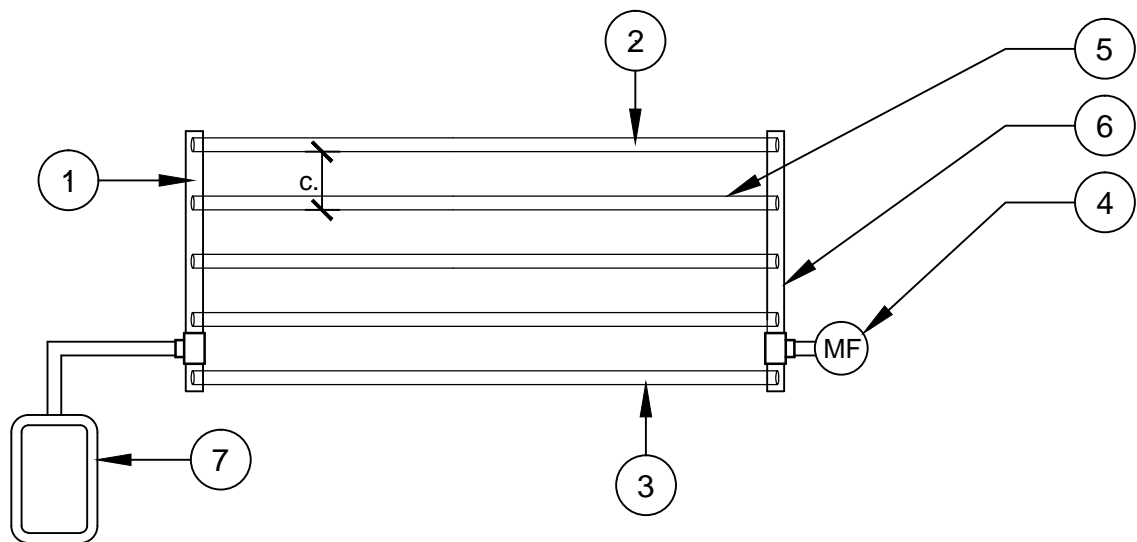
# **XX Appendix A – Irrigation Details**

## LEGEND

1. PVC SUPPLY HEADER
2. TOP OF SLOPE
3. TOE OF SLOPE
4. MANUAL LINE FLUSHING VALVE
5. CHECK VALVE DRIPLINE TUBING
6. PVC EXHAUST HEADER
7. REMOTE CONTROL VALVE ASSEMBLY WITH DISC FILTER AND PRV.

## NOTES

- ALIGN CHECK VALVE LATERALS PARALLEL TO THE CONTOURS OF THE SLOPE.
- SYSTEM TO BE DESIGNED TO MEET SITE AND MANUFACTURER'S RECOMMENDATIONS.
- SPACING OF DRIPLINE SHALL BE PROJECT SPECIFIC, TYP.



SUBSURFACE IRRIGATION LAYOUT

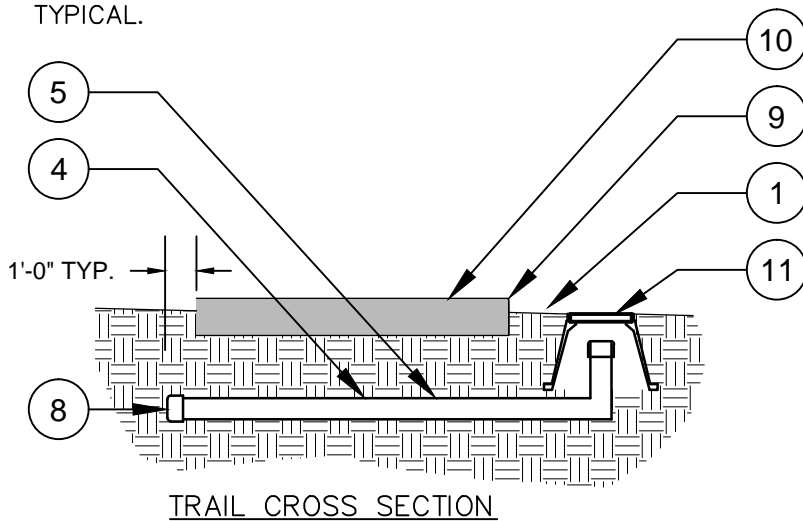
DETAIL: IR-01

NOT TO SCALE



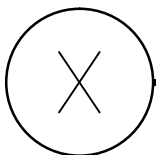
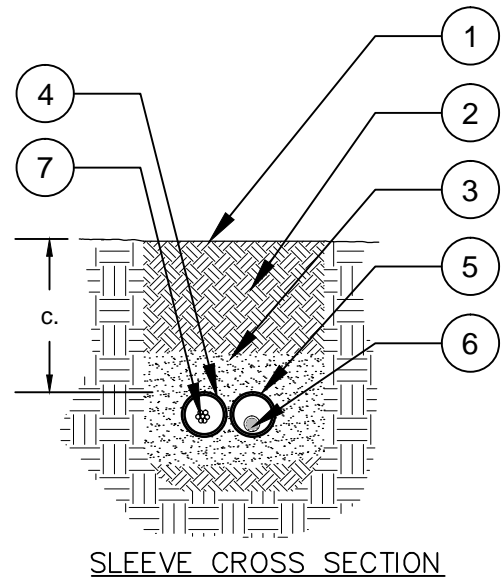
## LEGEND

1. FINISH GRADE
2. CLEAN BACKFILL, NO PARTICLE OVER  $\frac{1}{2}$ " DIAMETER, 95% COMPACTED.
3. BED AND SHADE WITH 2" OF SAND OR ROCK FREE SOIL AROUND ALL PIPE.
4. PVC SCHEDULE 40 WIRE CHASE, SLEEVE SIZE TO BE DETERMINED BY PIPE SIZE.
5. PVC SCHEDULE 40 PIPE SLEEVE, SLEEVE SIZE TO BE DETERMINED BY PIPE SIZE.
6. FUTURE IRRIGATION LINE
7. FUTURE CONTROL WIRE
8. PVC STANDARD CAP
9. MARK LOCATION WITH TYPE IV MONUMENT PER STD DWG. 242 BOTH SIDES. STAMP WITH "W" IN PUNCHMARK.
10. AC OR CONCRETE PAVING
11. STUB UP SLEEVE AND CAP IF FOR FUTURE USE AFTER INSTALLATION. LOCATE IN A 10" ROUND VALVE BOX, 18" BEYOND DGE OF PAVEMENT, TYPICAL.



## NOTES

- a. SLEEVE ALL PIPE AND WIRES UNDER WALKS, DRIVEWAYS, STRUCTURES, WALLS, ETC.
- b. LOCATE SLEEVES ALONG TRAIL AT APPROXIMATELY 300' MAXIMUM INTERVALS OR AS DETERMINED BY COH REPRESENTATIVE.
- c. NOMINAL DEPTH OF PIPE.
- d. SLEEVE SIZE TO BE TWICE THE DIAMETER OF THE PIPE.



SLEEVE INSTALLATION

DETAIL: IR-02

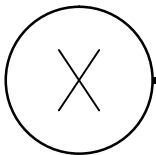
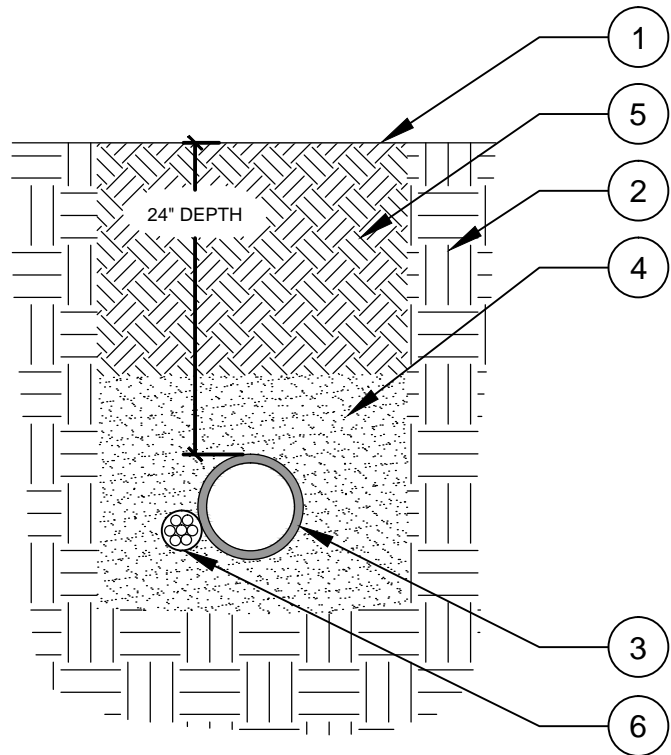
NOT TO SCALE

## LEGEND

1. FINISH GRADE
2. UNDISTURBED SUBGRADE
3. MAINLINE, PROVIDE THRUST BLOCKS AT ALL CHANGES IN DIRECTION ON ALL MAINLINE 3" AND LARGER. TRACER WIRE SHALL BE INSTALLED WITH MAINLINE.
4. BED AND SHADE WITH A MINIMUM 4" OF SAND ABOVE, BELOW, AND AROUND ALL PIPE.
5. COMPACTED FILL, NO PARTICLES OVER  $\frac{1}{2}$ " DIAMETER.
6. UF DIRECT BURIAL SOLID COPPER CONTROL WIRE, ROUTE WITH MAINLINE, TAPE AND BUNDLE AT 20' INTERVALS.

## NOTES

- SLEEVE ALL PIPE AND WIRES UNDER WALKS, DRIVEWAYS, STRUCTURES, WALLS, ETC.
- SLEEVE SIZE TO BE TWICE THE DIAMETER OF THE PIPE.
- SEE PLANS FOR MINIMUM PIPE COVER.
- TRENCH DEPTH TO BE BASED ON PIPE SIZE.



TRENCH SECTION—MAINLINE

DETAIL: IR-03

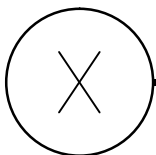
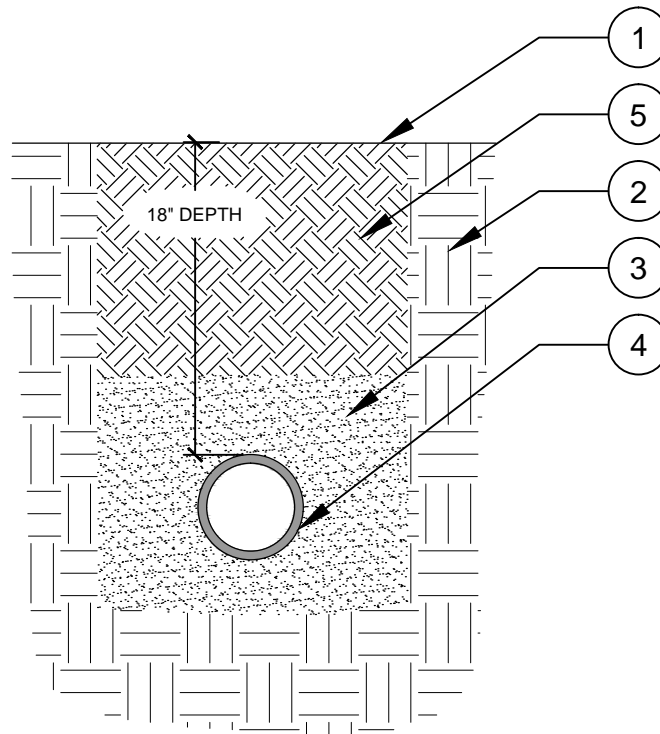
NOT TO SCALE

## LEGEND

1. FINISH GRADE
2. UNDISTURBED SUBGRADE
3. BED AND SHADE WITH A MINIMUM 4" OF SAND ABOVE, BELOW AND AROUND ALL PIPE.
4. LATERAL LINE
5. COMPACTED FILL, NO PARTICLES OVER  $\frac{1}{2}$ " DIAMETER.

## NOTES

- a. SLEEVE ALL PIPE AND WIRES UNDER WALKS, DRIVEWAYS, STRUCTURES, WALLS, ETC.
- b. SLEEVE SIZE TO BE TWICE THE DIAMETER OF THE PIPE.
- c. SEE PLANS FOR MINIMUM PIPE COVER.
- d. TRENCH DEPTH TO BE BASED ON PIPE SIZE.



TRENCH SECTION—LATERAL LINE

DETAIL: IR-04

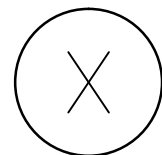
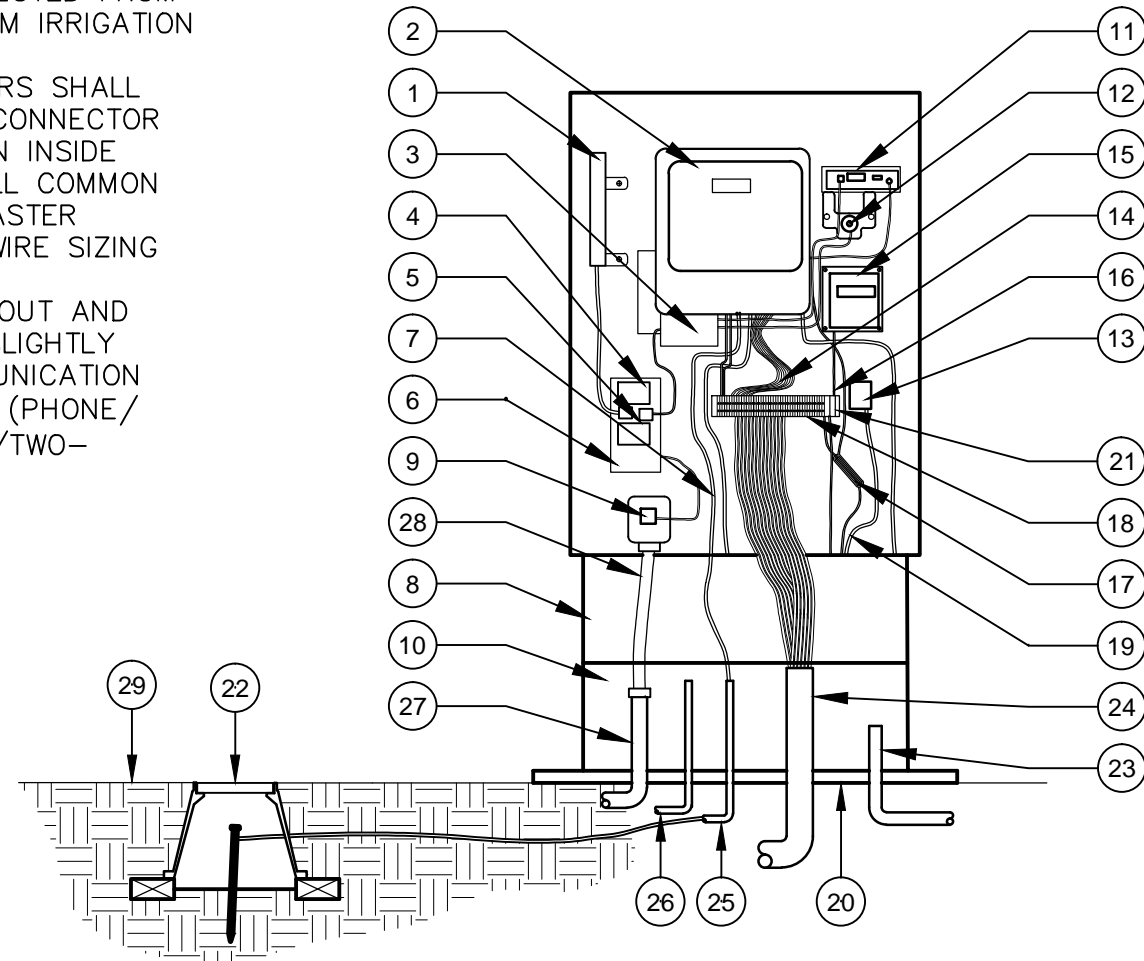
NOT TO SCALE

## LEGEND

1. 120V TEMPERATURE CONTROLLED EXHAUST FAN
2. MAXICOM IRRIGATION CONTROLLER
3. 120V CONTROLLER POWER SUPPLY
4. 12V FLOW MONITOR POWER SUPPLY
5. 12V CELLULAR ROUTER POWER SUPPLY
6. TRIPP-LITE ISOTEL 6 ULTRA SURGE PROTECTOR WITH TEL/FAX/MODEM.
7. GROUND WIRE FOR CONTROLLER COMPONENTS, MIN 10AWG, IN CONDUIT TO PROPER GROUNDING.
8. VIT STRONG BOX 24SS
9. 120V GFI OUTLET
10. VIT STRONG BOX 24SS PEDESTAL.
11. CELLULAR ROUTER (SEE NOTE c.)
12. CELLULAR ANTENNA (SEE NOTE c.)
13. TELEPHONE HARD LINE ACCESS (SEE NOTE c.)
14. CONNECTOR WIRES FROM CONTROLLER TO DIN RAIL, 18-22AWG
15. FLOW MONITOR (SEE NOTE c.)
16. FLOW SENSOR CONNECTIONS
17. 3 PAIR COMMUNICATION WIRE TO FLOW SENSOR
18. 35MM DIN RAIL CONNECTORS
19. DIRECT BURIAL IRRIGATION FIELD WIRES, 12-14AWG
20. VIT STRONG BOX 24SS QUICK PAD
21. SPACERS AND END CAPS
22. APPROVED GROUND ROD IN 10" ROUND VALVE BOX.
23. TELEPHONE CONDUIT (SEE NOTE c.)
24. CONDUIT FOR CONTROL WIRES, MINIMUM 2" DIA.
25. GROUND WIRE TO APPROVED GROUND STAKE.
26. TRC ANTENNAE TO NEAREST LIGHT POLE BASE.
27. 120V SERVICE
28.  $\frac{3}{4}$ " FLEX TUBING
29. FINISH GRADE

## NOTES

- a. ALL 120V LINES SHALL BE INSTALLED IN CONDUIT AND BE PROTECTED FROM ACCIDENTAL CONTACT FROM IRRIGATION PERSONNEL.
- b. 35MM DIN RAIL CONNECTORS SHALL INCLUDE A MINIMUM ONE CONNECTOR PER POINT OF CONNECTION INSIDE CONTROLLER INCLUDING ALL COMMON SENSOR, STATION, AND MASTER VALVES. SIZE TO MATCH WIRE SIZING OF INCOMING FIELD WIRES.
- c. CONTROLLER CABINET LAYOUT AND COMPONENTS WILL VARY SLIGHTLY DEPENDING ON THE COMMUNICATION TYPE USED AT EACH SITE (PHONE/SPREAD SPECTRUM RADIO/TWO-WIRE/CELL MODEM).



SINGLE PEDESTAL CONTROLLER

DETAIL: IR-05

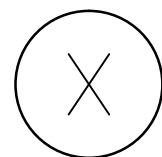
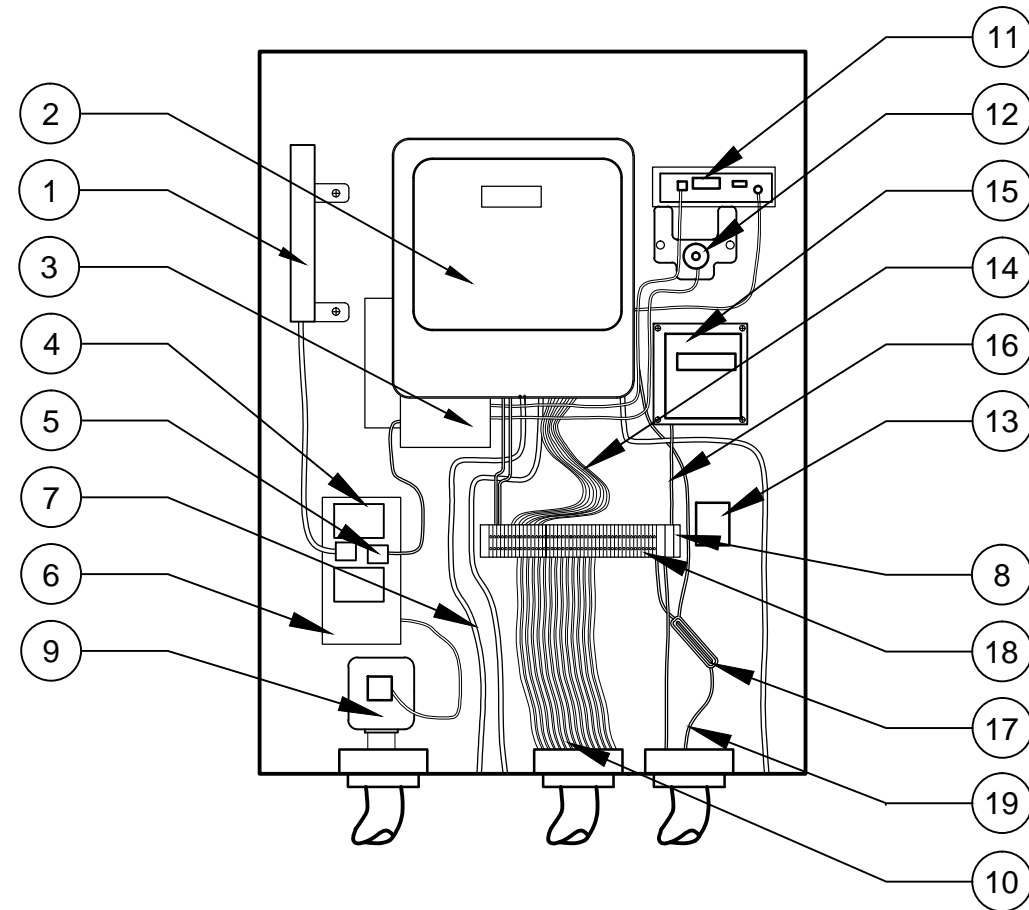
NOT TO SCALE

**LEGEND**

1. 120V TEMPERATURE CONTROLLED EXHAUST FAN
2. MAXICOM IRRIGATION CONTROLLER
3. 120V CONTROLLER POWER SUPPLY
4. 12V FLOW MONITOR POWER SUPPLY
5. 12V CELLULAR ROUTER POWER SUPPLY
6. TRIPP-LITE ISOTEL 6 ULTRA SURGE PROTECTOR WITH TEL/ FAX/ MODEM.
7. GROUND WIRE FOR CONTROLLER COMPONENTS, MIN 10AWG, IN CONDUIT TO PROPER GROUNDING.
8. SPACERS AND END CAPS
9. 120V GFI OUTLET
10. DIRECT BURIAL IRRIGATION FIELD WIRES, 12-14AWG
11. CELLULAR ROUTER (SEE NOTE c.)
12. CELLULAR ANTENNA (SEE NOTE c.)
13. TELEPHONE HARD LINE ACCESS (SEE NOTE c.)
14. CONNECTOR WIRES FROM CONTROLLER TO DIN RAIL, 18-22AWG.
15. FLOW MONITOR (SEE NOTE c.)
16. FLOW SENSOR CONNECTIONS
17. 3 PAIR COMMUNICATION WIRE TO FLOW SENSOR.
18. 35MM DIN RAIL CONNECTORS
19. TRC REMOTE ANTENNA WIRE

**NOTES**

- a. ALL 120V LINES SHALL BE INSTALLED IN CONDUIT AND BE PROTECTED FROM ACCIDENTAL CONTACT FROM IRRIGATION PERSONNEL.
- b. 35MM DIN RAIL CONNECTORS SHALL INCLUDE A MINIMUM ONE CONNECTOR PER POINT OF CONNECTION INSIDE CONTROLLER INCLUDING ALL COMMON SENSOR, STATION, AND MASTER VALVES. SIZE TO MATCH WIRE SIZING OF INCOMING FIELD WIRES.
- c. CONTROLLER CABINET LAYOUT AND COMPONENTS WILL VARY SLIGHTLY DEPENDING ON THE COMMUNICATION TYPE USED AT EACH SITE (PHONE/SPREAD SPECTRUM RADIO/TWO- WIRE/CELL MODEM).



SINGLE WALL MOUNT CONTROLLER

DETAIL: IR-06

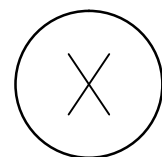
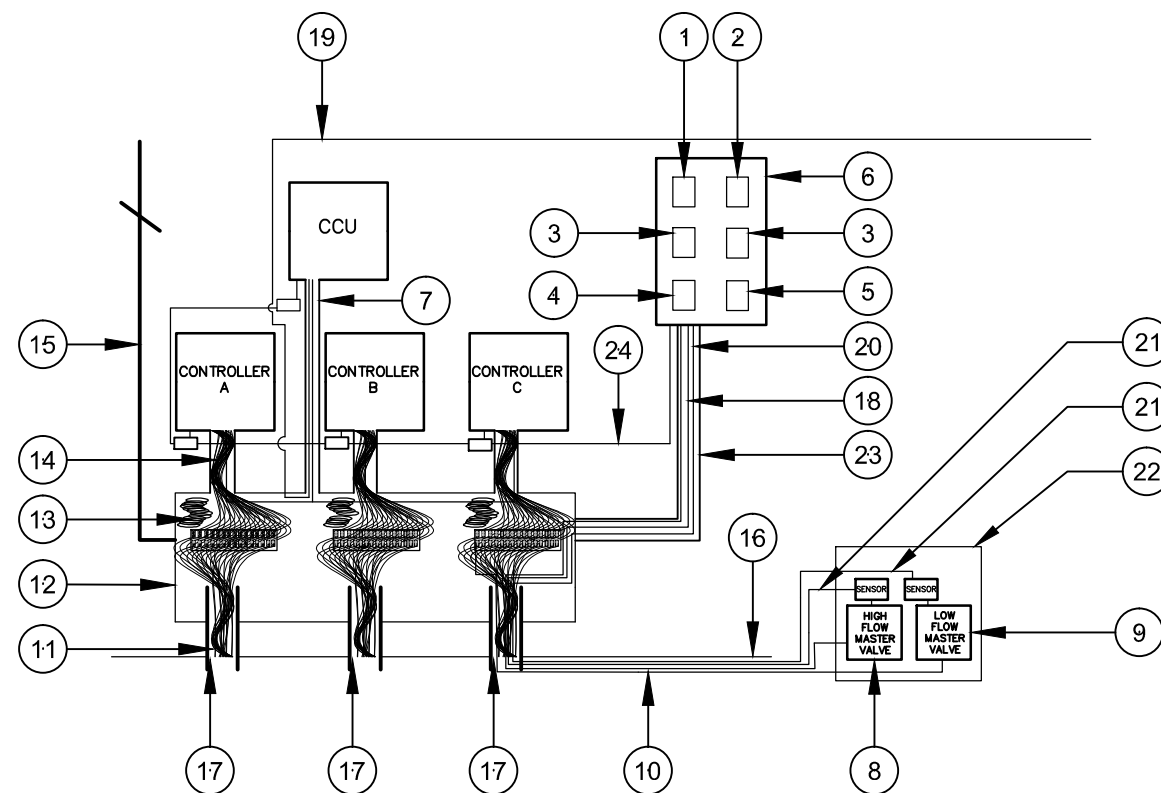
NOT TO SCALE

## LEGEND

1. HIGH FLOW METER
2. LOW FLOW METER
3. PULSE DECODER
4. GFCI PROTECTED, 4 GANG RECEPTACLE OUTLET
5. ONE, 24 VOLT TRANSFORMER WITH RELAYS (1 PER EACH CONTROLLER) FOR NORMALLY CLOSED HIGH FLOW MASTER VALVE.
6. PULSE TRANSMITTER CABINET
7. CONTRACTOR TO SUPPLY MAXI CABLE AND TELEPHONE CONNECTION IN CONDUIT FROM ELECTRICAL TROUGH TO CCU.
8. NORMALLY CLOSED HIGH FLOW MASTER VALVE
9. NORMALLY OPEN LOW FLOW MASTER VALVE
10. WIRE NORMALLY OPEN MASTER VALVE TO STATION #24 ON THE CONTROLLER WITH THE LOWEST CHANNEL NUMBER (I.E. "A" CONTROLLER) IN CONDUIT.
11. 14 AWG WIRE
12. WHEN MULTIPLE CONTROLLERS ARE INSTALLED INSIDE A SINGLE CHASE/ ROOM, THE FOLLOWING CABINET (E.G. WIEGMANN CABINETS) SIZE SHALL BE USED:
  - 2 CONTROLLER AND A CCU- 24"H X 30"W X 8"D
  - 3 CONTROLLER AND A CCU- 24"H X 42"W X 8"D
  - 4 CONTROLLER AND A CCU- 24"H X 48"W X 8"D
  - IF MORE THAN 4 CONTROLLERS, MULTIPLE CABINETS SHALL BE USED SPACING THE CONDUIT SLEEVES TO FIT PROPERLY UNDER EACH CABINET.
 EXAMPLE: 2 CONTROLLERS AND A CCU WOULD HAVE ONE 4-CONTROLLER CABINET AND ONE 3-CONTROLLER CABINET.
13. MINIMUM OF 3' RG-58 ANTENNA WIRE
14. 22 AWG CONDUCTORS WITH A MINIMUM 3' EXTRA ANTENNA WIRE IN 2" SECURED METAL CONDUIT.
15. ANTENNA COAX IN CONDUIT
16. FINISH FLOOR
17. VALVE WIRING SLEEVE TO BE TWICE THE DIAMETER OF CONTROL WIRE SLEEVE OR A MINIMUM OF 4" CONDUIT. ALL WIRE IN CONDUIT.
18. FLOW SENSOR WIRE MINIMUM OF PE-45
19. PHONE LINE IN CONDUIT FROM TELEPHONE BOARD TO ELECTRICAL TROUGH. TELEPHONE BOARD TO BE MOUNTED PER LOCAL SUPPLIER'S SPECS AND TELEPHONE WIRE TO BE IN CONDUIT FROM TELEPHONE BOARD TO ELECTRICAL TROUGH.
20. MAXI CABLE, FLOW SENSOR WIRE FROM MASTER VALVE, CONTROL WIRE TO RELAY FROM CONTROLLERS.
21. FLOW SENSOR WIRE FROM FLOW SENSORS
22. SEE MASTER VALVE CONFIGURATION DETAIL
23. 2" CONDUIT
24. 110 V. IN CONDUIT
25. FINISH FLOOR

## NOTES

- a. INSTALL WIRING, TELEPHONE COMMUNICATIONS, GROUNDING AND ALL OTHER REQUIRED COMPONENTS IN STRICT ACCORDANCE WITH LOCAL CODES AND MANUFACTURERS RECOMMENDATIONS.
- b. INSTALL IN MAINTENANCE YARD OR AS DIRECTED BY THE CONSTRUCTION PROJECT REPRESENTATIVE.
- c. CONDUIT AND SWEEP FITTINGS WILL BE INSTALLED UNDER ELECTRICAL CONTRACT (SEE ELECTRICAL ENGINEER'S DRAWINGS). WIRE AND CONNECTIONS WILL BE INSTALLED UNDER IRRIGATION CONTRACT.
- d. PROVIDE ANTENNA COMPONENTS AS REQUIRED FOR RADIO REMOTE OPERATION. CONFIRM SIGNAL INTEGRITY PRIOR TO FINAL ACCEPTANCE.
- e. 1 TRC COMMANDER RECEIVER CARD PER EACH ESP CONTROLLER.
- f. 1 TRC COMMANDER TRANSMITTER PER EVERY 3 CONTROLLERS.
- g. ALL MAXICOM CONNECTIONS TO BE MADE PER MANUFACTURER RECOMMENDATIONS.
- h. TRC REMOTE ANTENNAE SHALL BE LOCATED ON THE NEAREST LIGHT POLE LOCATED NOT MORE THAN 100' OF CABLE AWAY FROM THE CONTROLLER. CABLE SHALL RUN INSIDE CONDUIT INTO THE POLE AND SHALL BE COORDINATED WITH ELECTRICAL PLANS. COAX MUST BE IN CONDUIT WHERE EXPOSED TO ELEMENTS.
- i. LAYOUT SHALL ACCOMMODATE PLUMBING AND ELECTRICAL, AND MEET CODE.



MULTIPLE CONTROLLER INSTALLATION

DETAIL: IR-07

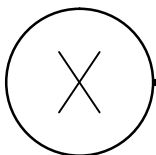
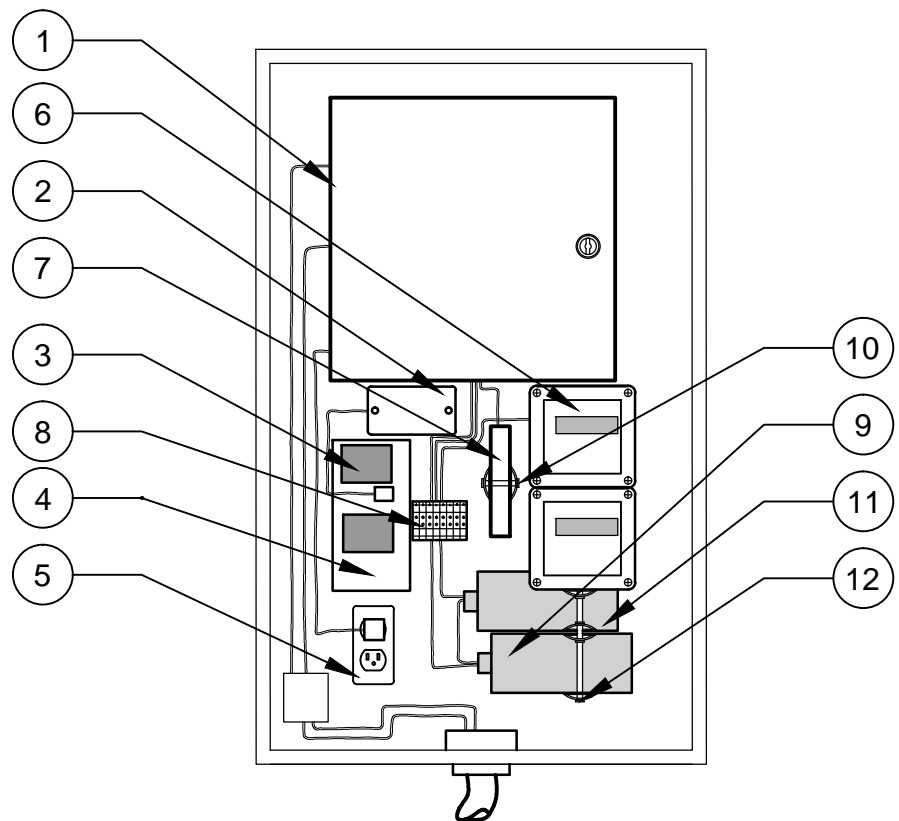
NOT TO SCALE

## LEGEND

1. CCU, SIZED TO HAVE A MINIMUM OF 1 FREE CHANNEL
2. 120V CONTROLLER POWER
3. 12V FLOW MONITOR POWER SUPPLY, 1 OF 2
4. TRIPP-LITE ISOTEL 6 ULTRA SURGE PROTECTION WITH TEL/FAX/MODEM
5. 120V GFI OUTLET
6. FLOW MONITOR, 1 OF 2
7. SURGE PIPE
8. 35MM DIN RAIL CONNECTORS WITH PROPER END CAPS AND BRACKETS, (1 OF 2), FLOW SENSOR AND MAXICOM TO HAVE TWO WIRE CONNECTIONS FROM FIELD
9. PULSE DECODER LOW FLOW MONITOR
10. 1" MOUNTING CLAMP
11. PULSE DECODER - HIGH FLOW MONITOR
12. 2" MOUNTING CLAMP

## NOTES

- a. ALL 120V FEED LINES SHALL BE INSTALLED IN CONDUIT AND BE PROTECTED FROM IRRIGATION PERSONNEL.
- b. LAYOUT SHALL ACCOMMODATE PLUMBING AND ELECTRIC, AND MEET CODE.



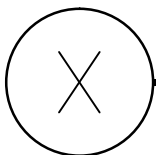
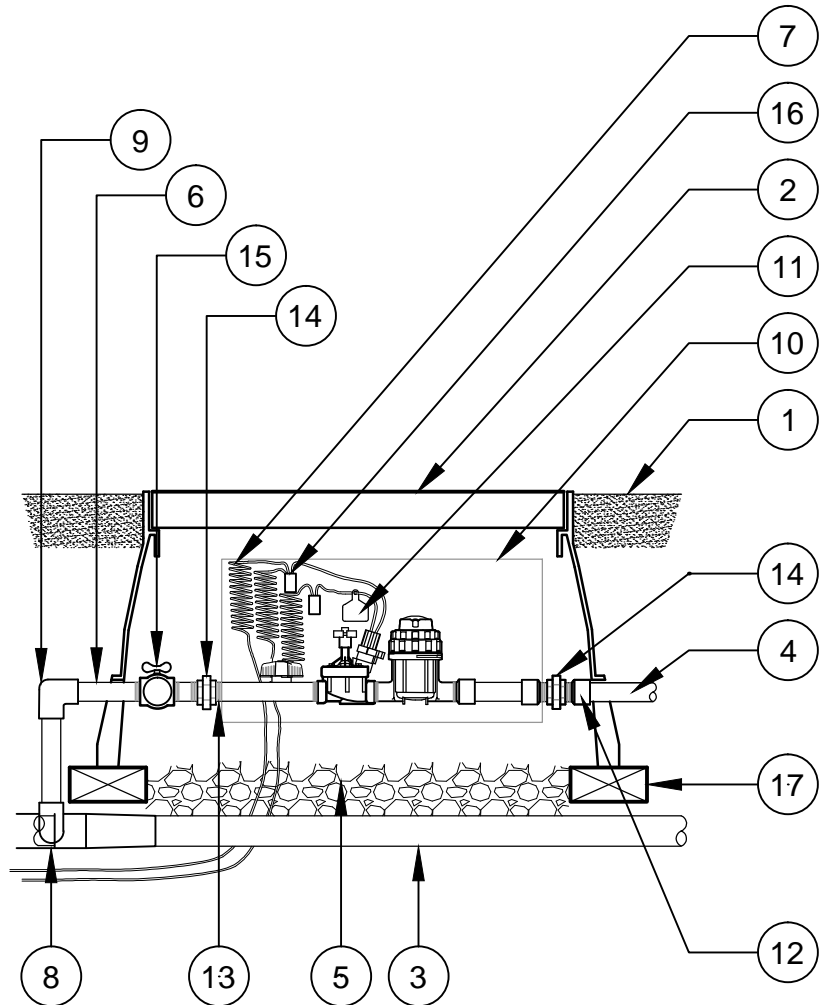
CCU CABINET FOR 2-WIRE INSTALLATION

DETAIL: IR-08

NOT TO SCALE

## LEGEND

1. FINISH GRADE
2. JUMBO LOCKABLE VALVE BOX WITH COVER. BRAND "xx" INTO VALVE BOX LID. SEE SPECIFICATIONS FOR FONT AND TEXT HEIGHT.
3. MAINLINE
4. LATERAL LINE
5. 3" MINIMUM DEPTH OF  $\frac{3}{4}$ " WASHED GRAVEL.
6. PVC SCH 40 NIPPLE UNLESS BALL VALVE IS THREADED, (TYPICAL, LENGTH AS REQUIRED).
7. 30" LINEAR LENGTH OF WIRE, COILED.
8. PVC SCH 40 TEE OR ELL
9. PVC SCH 40 ELL SXS.
10. REMOTE CONTROL VALVE (INCLUDES BALL VALVE, BASKET FILTER WITH PRESSURE REGULATOR). SIZED APPROPRIATELY.
11. ID TAG
12. PVC SCH 40 MALE ADAPTER, TYP.
13. PVC SCH 80 NIPPLE, TYP.
14. PVC SCH 80 UNION FOR SERVICING.
15. LINE SIZE COMMERCIAL SCHEDULE 80 BALL VALVE.
16. PREFILLED DRI-SPLICE CONNECTION.
17. BRICK (1 OF 4)



DRIP VALVE WITH BASKET FILTER

DETAIL: IR-09

NOT TO SCALE

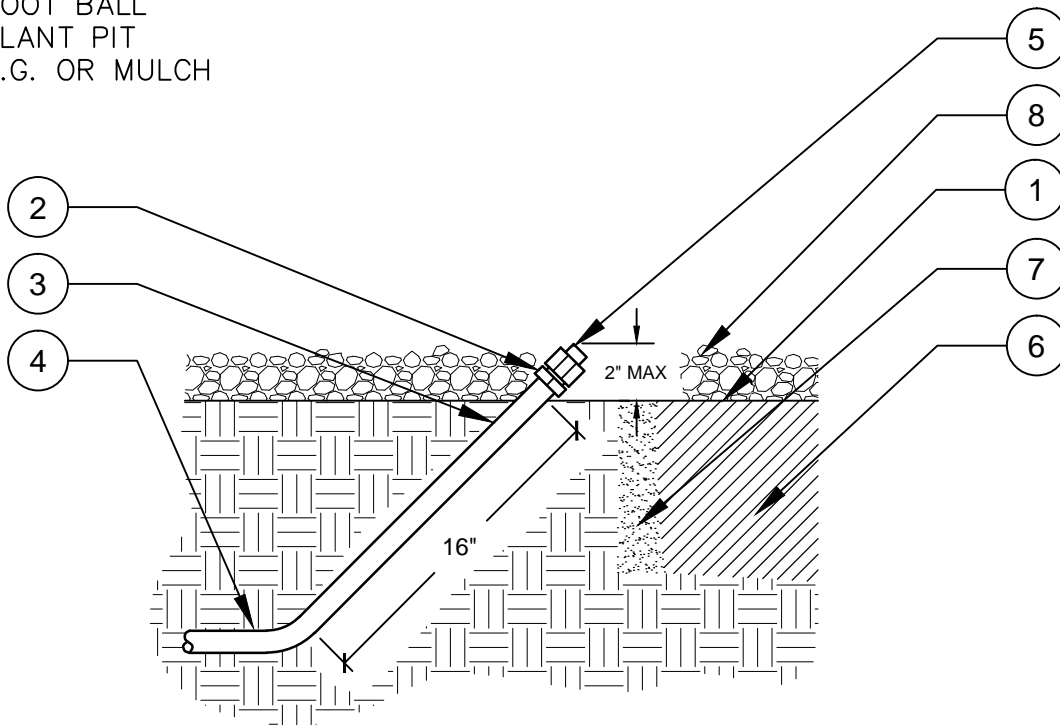


**LEGEND**

1. FINISH GRADE
2. 1/2" PVC SCHEDULE 40 MALE ADAPTER, BLACK IN COLOR.
3. 1/2" IPS FLEXIBLE, UVR & ALGAE RESISTANT PVC TUBING.
4. 1/2" FLEXIBLE PVC EMITTER LATERAL PIPE (8' LENGTH MAX.)
5. SINGLE-PORT EMITTER, SEE PLANT EMITTER SCHEDULE
6. ROOT BALL
7. PLANT PIT
8. D.G. OR MULCH

**NOTES**

- a. USE 795 PVC PIPE CEMENT TO BOND POLY-PIPE TO SCHEDULE 80 MALE ADAPTERS.
- b. USE 795 PVC PIPE CEMENT TO BOND TUBING TO PVC SCHEDULE 40 MALE ADAPTER.



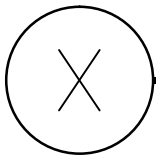
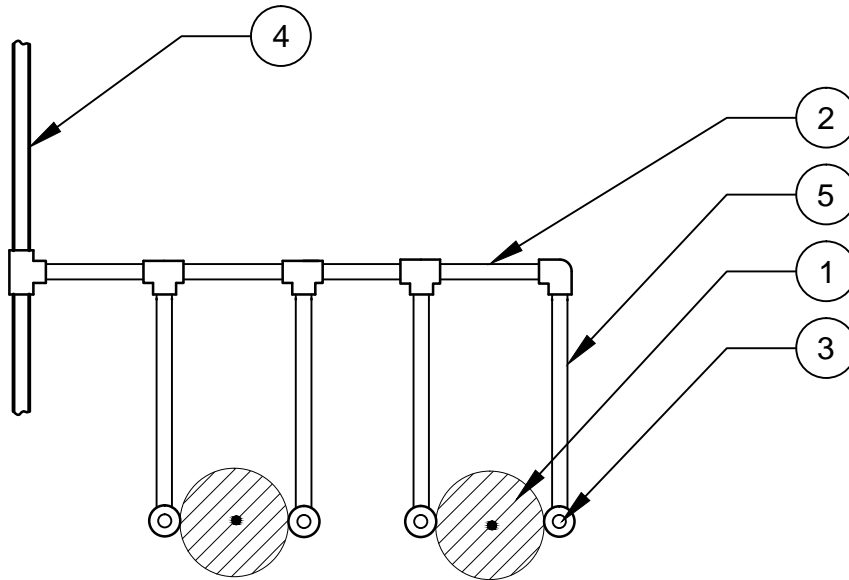
NOT TO SCALE

## LEGEND

1. SHRUB ROOT BALL
2. EMITTER SUB-LATERAL, (TYPE DEPENDING ON LENGTH OF RUN-OFF BASE LATERAL)  
TYPICAL,  $\frac{1}{2}$ " SCHEDULE 40 OR CLASS 200.
3. SINGLE-PORT EMITTER, SEE PLANT EMITTER SCHEDULE.
4. SHRUB EMITTER LATERAL PIPE. SIZE AS NOTED ON DRAWINGS.
5.  $\frac{1}{2}$ " FLEXIBLE UVR & ALGAE RESISTANT TUBING, 8'-0" MAXIMUM LENGTH.

## NOTES

- a. EMITTERS SHALL BE EQUALLY SPACED AND LOCATED TO DIRECT WATER FLOW TO THE PERIMETER OF THE PLANT ROOT BALL.
- b. NUMBER OF OPENINGS AND EMITTER TUBES REQUIRED IS BASED ON PLANT TYPE. (SEE PLANT EMITTER SCHEDULE).
- c. LOCATE EMITTERS ON UPHILL OF PLANT CENTER.
- d. SHRUBS AND GROUND COVER ONLY, SEE PLANT EMITTER SCHEDULE.



## SHRUB EMITTER LAYOUT

DETAIL: IR-11

NOT TO SCALE

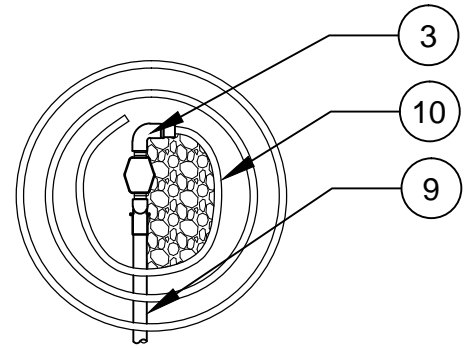


## LEGEND

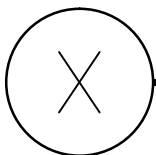
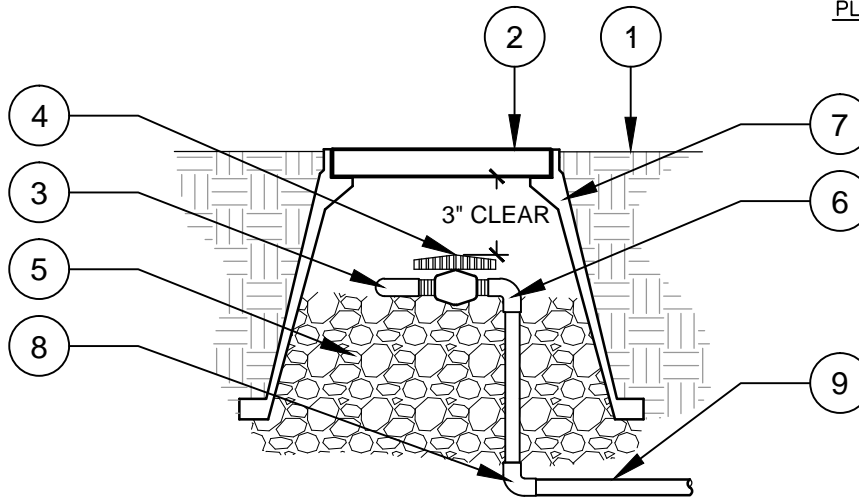
1. FINISH GRADE
2. 10" ROUND LOCKABLE VALVE BOX, BRAND "BLOW-OUT" INTO VALVE BOX LID. SEE SPECS. FOR FONT AND HEIGHT.
3. INSERT x MIP 90 ELL
4. 1/2" PVC BALL VALVE (F x F) TO REST ON GRAVEL SUMP.
5. 3/4" CRUSHED GRAVEL SUMP ( 1 CU. FT).
6. S x FIPT SCH 40 PVC 90 ELL.
7. 10" VALVE BOX TO REST ON GRAVEL SUMP.
8. FIP x FIP SCHEDULE 40 PVC 90 ELL.
9. PVC PIPE.
10. 24" x 1/2" I.D. 1/2" IPS FLEX PVC HOSE.

## NOTES

- a. PROVIDE A MINIMUM OF 3" CLEAR FROM BOTTOM OF VALVE BOX LID TO TOP OF BALL VALVE.



PLAN



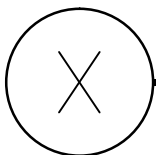
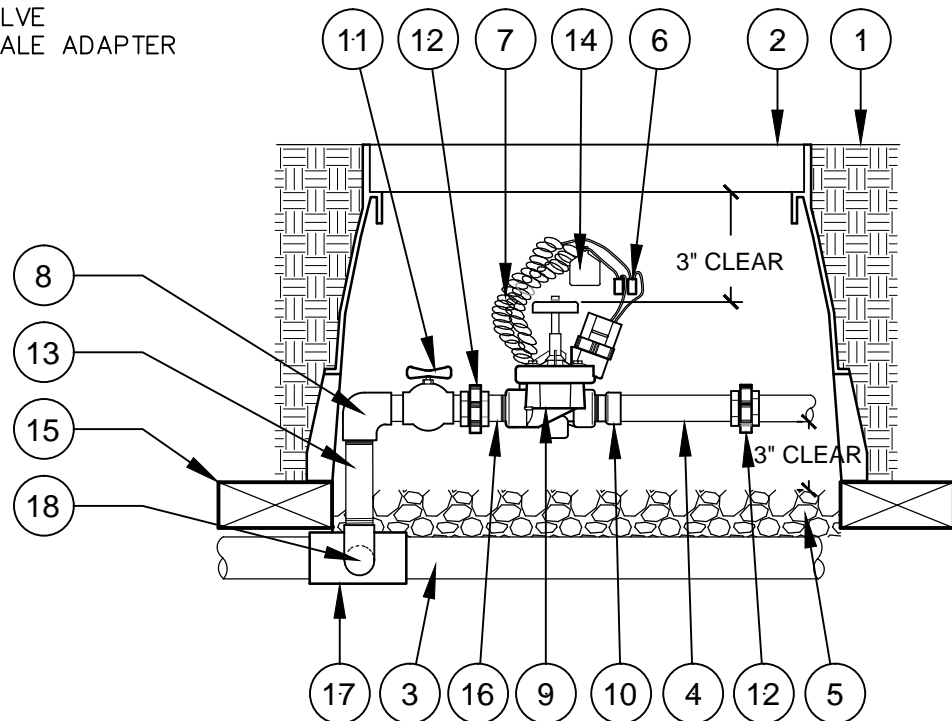
DRIPLINE BLOW-OUT

DETAIL: IR-13

NOT TO SCALE

## LEGEND

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. FINISH GRADE/TOP OF MULCH</li> <li>2. LOCKABLE VALVE BOX WITH COVER: 18" JUMBO SIZE. BRAND "xx" INTO VALVE BOX LID. SEE SPECIFICATIONS FOR FONT AND TEXT HEIGHT.</li> <li>3. PVC MAINLINE PIPE</li> <li>4. PVC LATERAL PIPE</li> <li>5. 3" MINIMUM DEPTH OF <math>\frac{3}{4}</math>" WASHED GRAVEL.</li> <li>6. PRE-FILLED, DRI-SPLICE CONNECTORS (1 OF 2).</li> <li>7. 30" LENGTH OF WIRE, COILED</li> <li>8. PVC SCHEDULE 40 ELL</li> <li>9. REMOTE CONTROL VALVE</li> <li>10. PVC SCHEDULE 40 MALE ADAPTER</li> </ol> | <ol style="list-style-type: none"> <li>11. BALL VALVE (GLUED)</li> <li>12. SCHEDULE 80 REINFORCED UNIONS (GLUED)</li> <li>13. PVC SCHEDULE 80 NIPPLE (LENGTH AS REQUIRED).</li> <li>14. I.D. TAG</li> <li>15. BRICK (1 OF 4) TYPICAL</li> <li>16. PVC SCHEDULE 80 NIPPLE (SIZE AS NEEDED).</li> <li>17. PVC SCHEDULE 40 TEE OR ELL</li> <li>18. SCHEDULE 80 NIPPLE, 2" LENGTH (HIDDEN) AND SCHEDULE 40 ELL.</li> </ol> |
|---|--|



CONTROL VALVE

DETAIL: IR-14

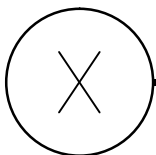
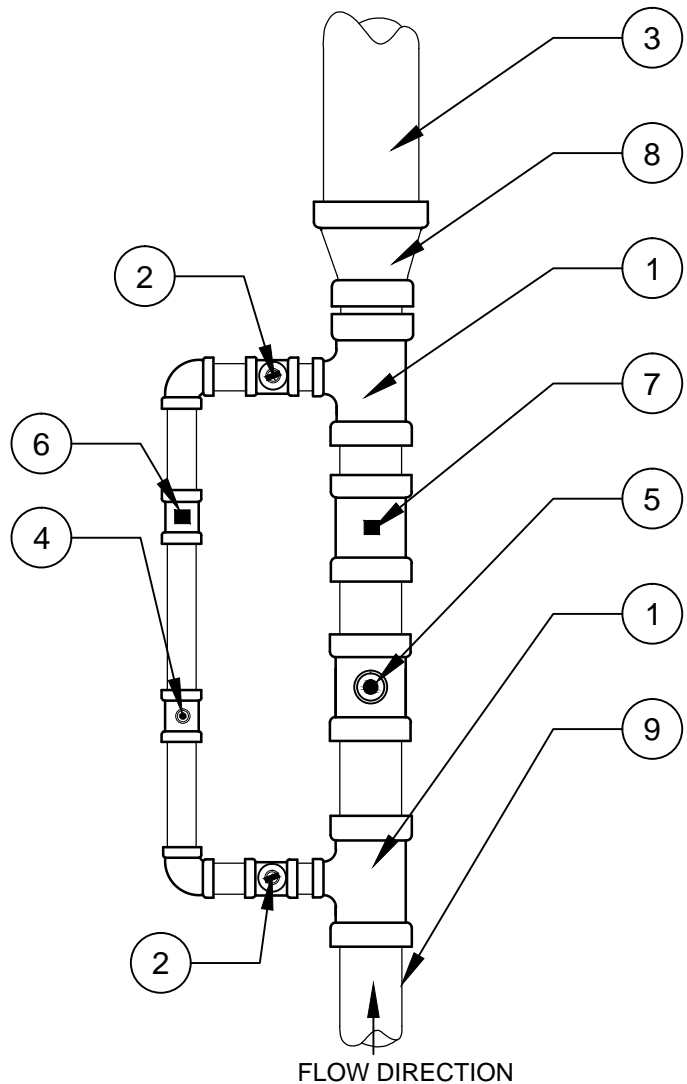
NOT TO SCALE

## LEGEND

1. TEE WITH PROPER RESTRAINTS, (SIZED PER PROJECT REQUIREMENTS.)
2. 1½" GATE VALVE WITH CROSS TOP HANDLE.
3. IRRIGATION MAIN LINE
4. 1½" NORMALLY OPEN MASTER VALVE (ENERGIZE TO CLOSE). CONNECT TO STATION 24 ON #1 CONTROLLER.
5. NORMALLY CLOSED MASTER VALVE (ENERGIZE TO OPEN).
6. FLOW SENSOR
7. FLOW SENSOR
8. REDUCER
9. IRRIGATION PIPE FROM PUMP STATION (20 FEET MAX).

## NOTES

- a. ALLOW STRAIGHT RUN OF PIPE 10 PIPE DIAMETERS UPSTREAM AND 5 PIPE DIAMETERS DOWNSTREAM OF EACH FLOW METER TO ACHIEVE PROPER FLOW REGIME.
- b. HIGH FLOW SENSOR AND MASTER VALVE TO BE PLACED IN SEPARATE BOX FROM LOW FLOW SENSOR AND MASTER VALVE, GATE VALVE SHALL ALSO BE IN INDIVIDUAL BOXES.
- c. FLOWS OVER 200 GPM.



## DUAL FLOW SENSOR & MASTER VALVE LAYOUT

DETAIL: IR-15

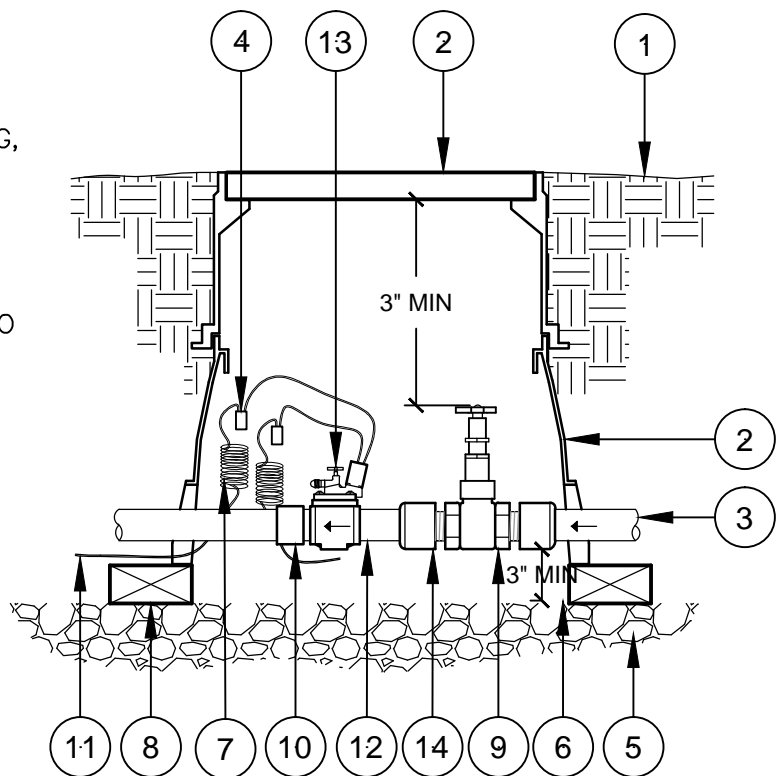
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## LEGEND

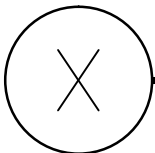
1. FINISH GRAD.
2. LOCKABLE VALVE BOX COVER, BRAND "MV" INTO COVER, SEE SPECIFICATIONS FOR FONT AND TEXT HEIGHT. (WITH EXTENSION AS NEEDED)
3. MAIN LINE
4. PRE-FILLED, DRI-SPLICE CONNECTION (1 OF 2).
5.  $\frac{3}{4}$ " WASHED GRAVEL, MINIMUM 3" DEPTH.
6. 3" CLEARANCE UNDER EQUIPMENT
7. 30" LENGTH OF COILED WIRE #14 AWG, DIRECT BURIAL.
8. BRICK (1 OF 4)
9. GATE VALVE WITH BRASS CROSS HANDLE.
10. MALE ADAPTER
11. WIRES TO CONNECT MASTER VALVE TO STATION #24 ON "A" CONTROLLER.
12. NIPPLE
13. NORMALLY OPEN (ENERGIZE TO CLOSE) MASTER VALVE.
14. MALE ADAPTER UP TO 2  $\frac{1}{2}$ " OR FLANGE IF 3", TYP. 2.

## NOTES

- a. REFER TO "DUAL FLOW SENSOR DIAGRAM", FOR ASSEMBLY CONFIGURATION.
- b. MAX DEPTH TO BE 2'-0".



## LOW FLOW MASTER VALVE ASSEMBLY (UP TO 3" AND LESS THAN 200 GPM)



DETAIL: IR-16

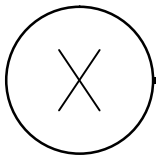
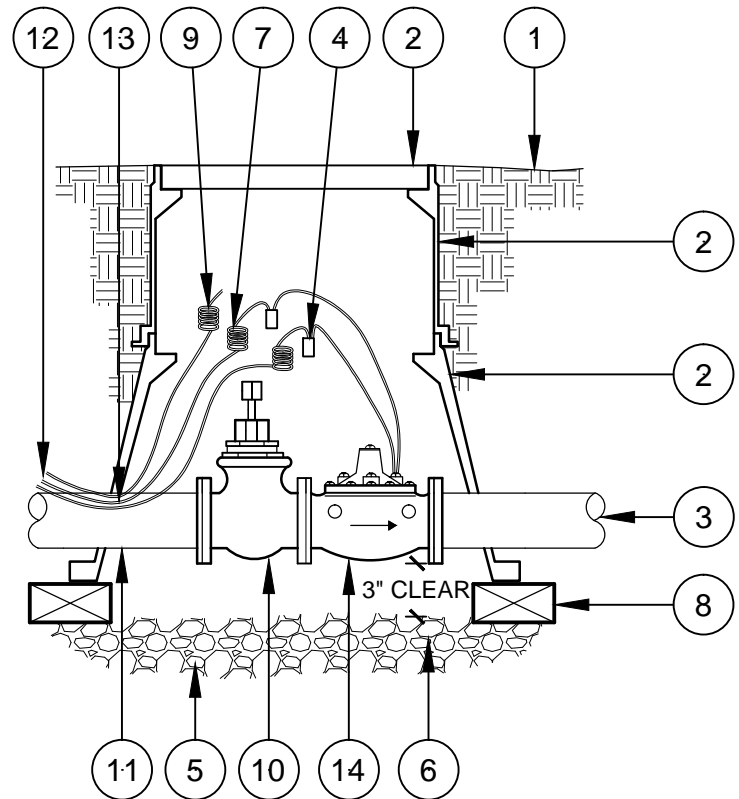
NOT TO SCALE

## LEGEND

1. FINISH GRADE
2. LOCKABLE VALVE BOX WITH COVER, (WITH EXTENSION AS NEEDED). BRAND "xx" INTO COVER. SEE SPECIFICATIONS FOR FONT AND TEXT HEIGHT.
3. MAINLINE PIPE TO FLOW SENSOR.
4. WATER PROOF CONNECTION
5. 3" MINIMUM DEPTH OF  $\frac{3}{4}$ " WASHED GRAVEL.
6. 3" MINIMUM CLEAR UNDER VALVES.
7. 30" LENGTH OF COILED WIRE.
8. BRICK (1 OF 4)
9. SPARE MASTER VALVE CONTROL WIRE.
10. GATE VALVE WITH FLANGED ENDS.
11. MAINLINE PIPE
12. WIRES CONNECT TO CONTROLLER.
13. 12-14 AWG DIRECT BURIAL WIRE.
14. SOLENOID VALVE. (SIZED PER PROJECT REQUIREMENT).

## NOTES

- a. REFER TO IR-15, "DUAL FLOW SENSOR AND MASTER VALVE LAYOUT" FOR ASSEMBLY CONFIGURATION.



MASTER VALVE ASSEMBLY

DETAIL: IR-17

NOT TO SCALE

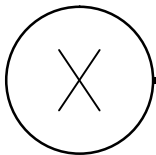
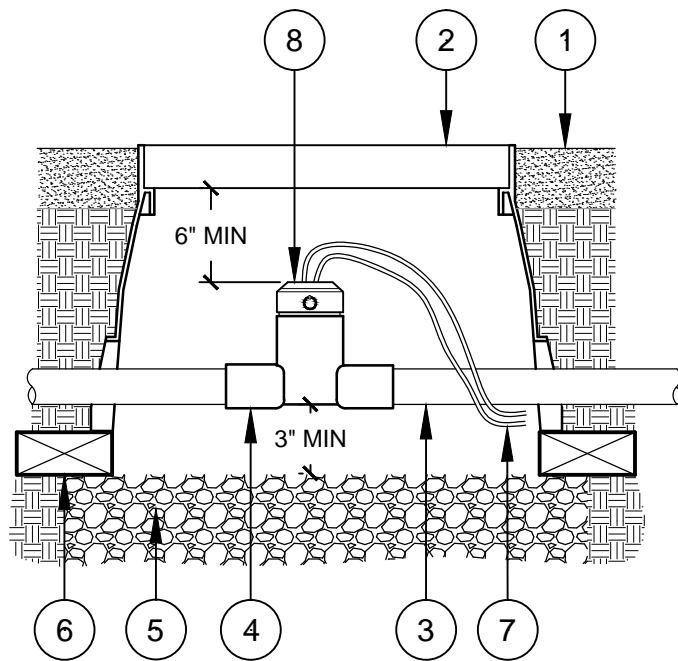


## LEGEND

1. FINISH GRADE
2. LOCKABLE VALVE BOX WITH COVER. BRAND "xx" INTO VALVE BOX LID. SEE SPECIFICATIONS FOR FONT AND TEXT HEIGHT.
3. MAINLINE PIPE— REFER TO IRRIGATION DRAWINGS FOR SIZE.
4. SOLVENT WELD SOCKET.
5. 3" MINIMUM DEPTH OF  $\frac{3}{4}$ " WASHED GRAVEL.
6. BRICK (1 OF 4)
7. SENSOR CABLE PER MANUFACTURER'S RECOMMENDATIONS. MULTI-STRAND, 3 PAIR, 20 AWG, SHIELDED, DIRECT BURIAL COMMUNICATION CABLE TO FLOW MONITOR/TRANSMITTER.
8. FLOW SENSOR, SIZE PER FLOW OF SITE/SEGMENT.

## NOTES

- a. VALVE BOX TO BE TAN IN XERISCAPE AND GREEN IN TURF (PURPLE FOR RECLAIMED WATER).
- b. THERE MUST BE FREE, UNRESTRICTED PIPE FOR AT LEAST 10 PIPE DIAMETERS UPSTREAM AND 5 PIPE DIAMETERS DOWNSTREAM OF THE TEE OR SADDLE.
- c. INSTALL VALVE BOX EXTENSIONS AS REQUIRED.



FLOW SENSOR ASSEMBLY

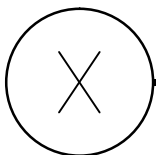
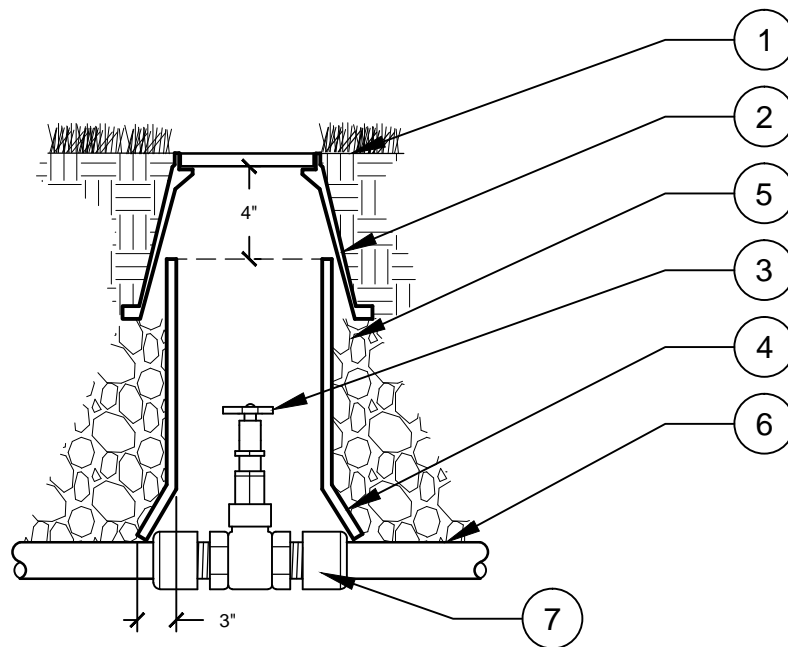
DETAIL: IR-18

NOT TO SCALE

## LEGEND

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1. FINISH GRADE
2. 10" ROUND LOCKABLE VALVE BOX. BRAND "GV" INTO VALVE BOX LID. VALVE BOX TO REST ON GRAVEL SUMP.
3. GATE VALVE WITH BRASS CROSS HANDLE.
4. 6" CLASS 16 PVC SLEEVE. BOTTOM TO BE FLARED AND CONTACT TOP OF PRESSURE SUPPLY LINE.
5.  $\frac{3}{4}$ " CRUSHED GRAVEL SUMP 1 CU. FT. MIN.
6. PVC PRESSURE SUPPLY LINE.
7. SLIP x MIPT SCHEDULE 40 PVC ADAPTER (2).



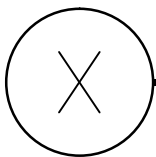
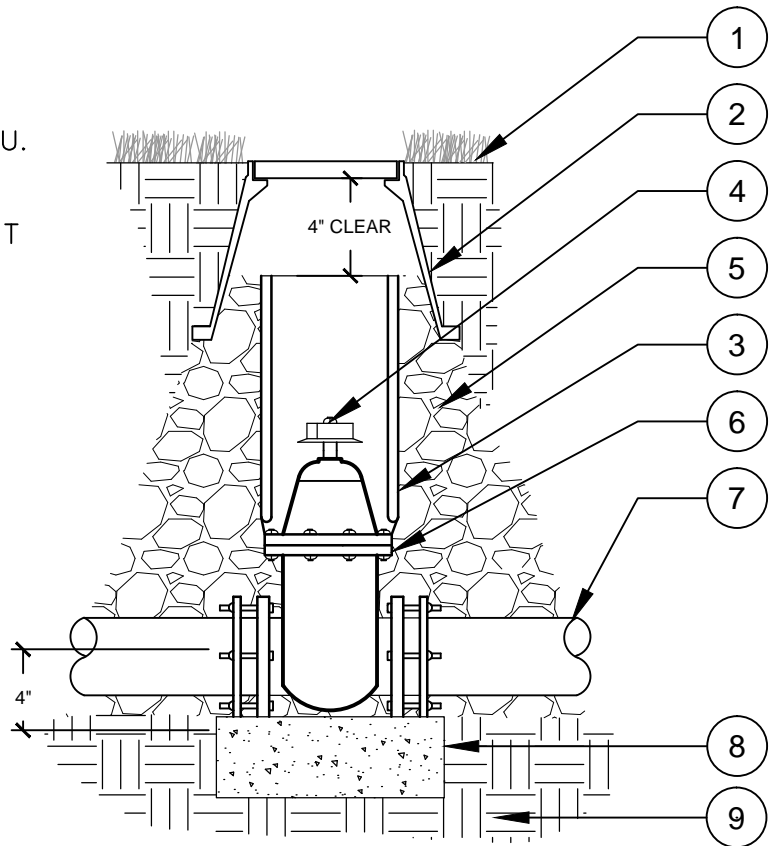
GATE VALVE, 1" TO 2 $\frac{1}{2}$ "

DETAIL: IR-19

NOT TO SCALE

**LEGEND**

1. FINISH GRADE
2. 12" ROUND LOCKABLE VALVE BOX.  
BRAND "GV" INTO COVER. SEE  
SPECIFICATIONS FOR FONT AND  
HEIGHT. VALVE BOX TO REST ON  
GRAVEL SUMP.
3. 6" CLASS 160 PVC SLEEVE,  
LENGTH AS REQUIRED.
4. STREET NUT
5. 3/4" CRUSHED GRAVEL SUMP, 1 CU.  
FT..
6. CAST IRON GATE VALVE  
MECHANICAL OR GASKETED JOINT  
WITH SQUARE OPERATING NUT.
7. PVC PRESSURE SUPPLY LINE.
8. CONCRETE THRUST BLOCK.
9. UNDISTURBED SUBGRADE



GATE VALVE, 3" AND LARGER

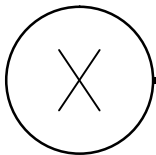
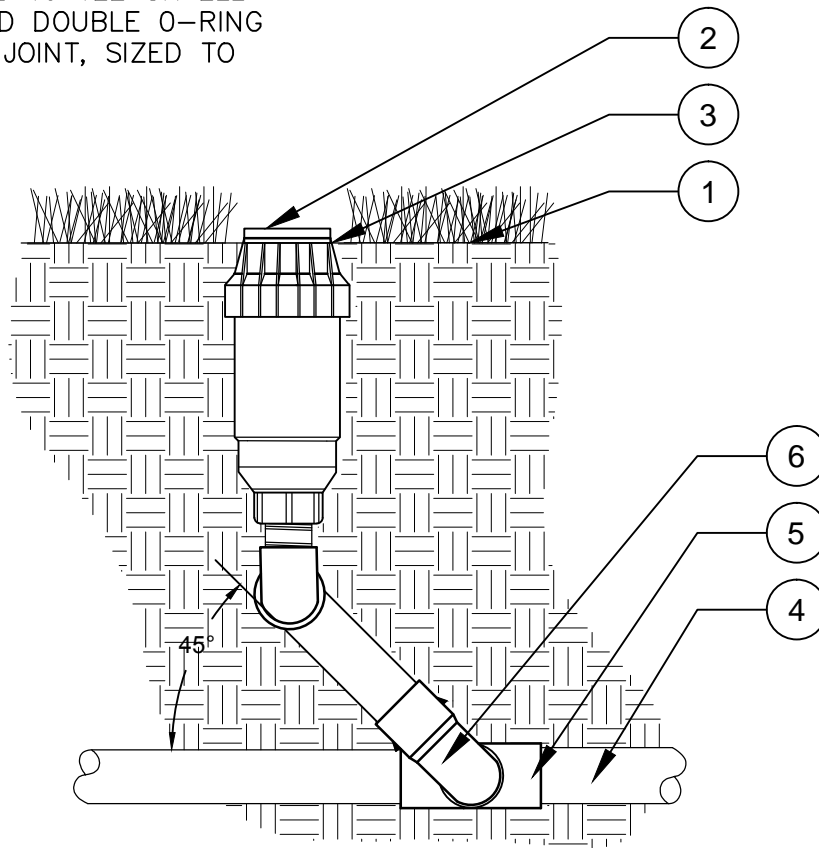
DETAIL: IR-20

NOT TO SCALE

## LEGEND

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1. FINISH GRADE
2. STAINLESS STEEL SHAFT
3. SET LIP AT FINISH GRADE SOIL LEVEL OF SOD.
4. PVC LATERAL PIPE
5. PVC SCHEDULE 40 TEE OR ELL
6. PREFABRICATED DOUBLE O-RING TRIPLE SWING JOINT, SIZED TO HEAD/DEVICE.



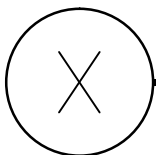
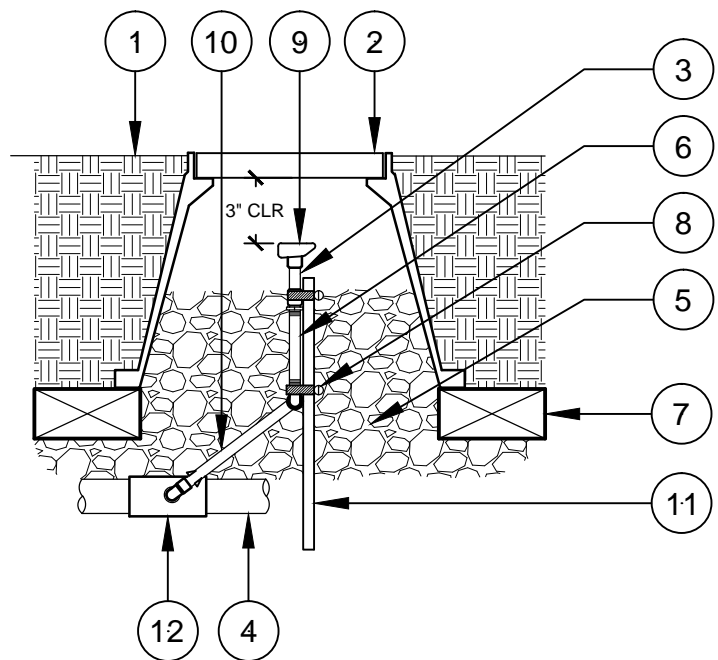
GEAR DRIVEN ROTOR

DETAIL: IR-21

NOT TO SCALE

## LEGEND

1. FINISH GRADE
2. 10" ROUND LOCKABLE VALVE BOX. BRAND "QC" INTO VALVE LID. SEE SPECIFICATIONS FOR FONT AND TEXT HEIGHT. VALVE BOX TO REST ON GRAVEL SUMP.
3. QUICK COUPLING VALVE
4. LATERAL PIPE
5.  $\frac{3}{4}$ " CRUSHED GRAVEL, SUMP 1 CU. FT.
6. SCH 80 NIPPLE LENGTH AS REQUIRED (SIZED PER PROJECT REQUIREMENTS).
7. BRICK (1 OF 2). EQUALLY SPACED.
8. STAINLESS STEEL CLAMP (2).
9. PURPLE NON-POTABLE CAP. (IF REUSE WATER).
10. PRE-FABRICATED PVC SWING JOINT,  $\frac{3}{4}$ " MALE NPT X  $\frac{3}{4}$ " MALE NPT, 12" LONG, SIZE TO MATCH QC VALVE.
11.  $\frac{1}{2}$ "x36" GALVANIZED STEEL SUPPORT PIPE OR #4 REBAR.
12. PVC SCH 40 TEE OR ELL



QUICK COUPLING VALVE

DETAIL: IR-22

NOT TO SCALE

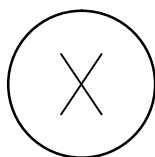
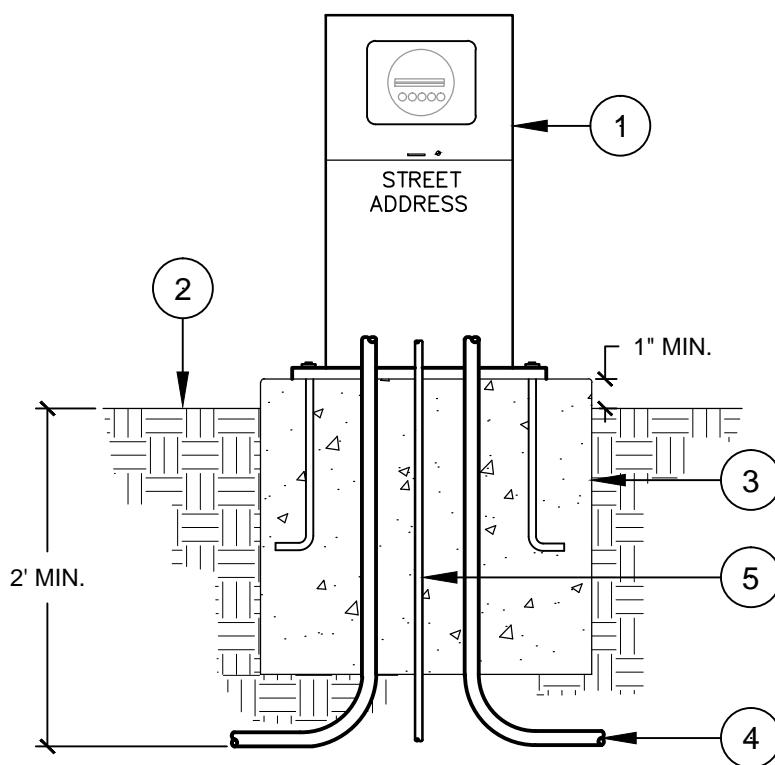
**XX Appendix A – Electrical Details**

## LEGEND

1. METER PEDESTAL PER CLARK COUNTY STD. DWG. #223.
2. FINISHED GRADE
3. FOUNDATION PER CLARK COUNTY STD. DWG. #224.
4. CONDUITS – SIZE PER PLAN.
5. 8-FOOT GROUNDING ROD

## NOTES

- a. PAINT PEDESTAL "WEIMAR GRAY"  
PITTSBURGH PAINTS #363
- b. ORIENT PEDESTAL SO PHOTOCELL IS  
FACING AWAY FROM TRAFFIC.
- c. STREET ADDRESS MUST BE AFFIXED  
TO EXTERIOR OF CABINET, FACING  
STREET.



ELECTRICAL SERVICE PEDESTAL

DETAIL: EL-01

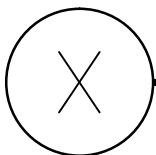
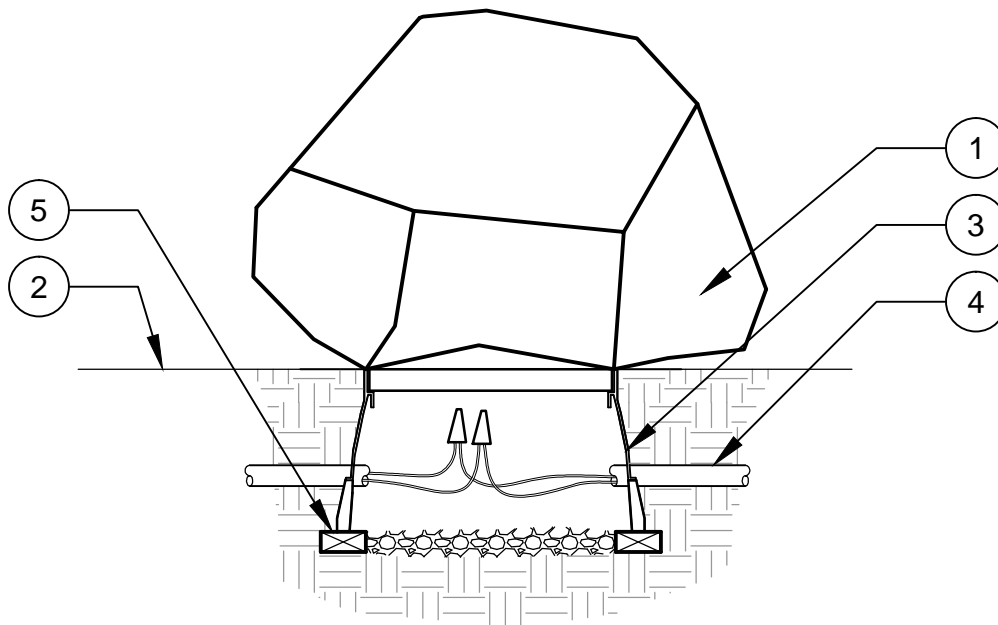
NOT TO SCALE

## LEGEND

1. BOULDER, 2'x3' MINIMUM.
2. FINISH GRADE
3. ELECTRICAL PULL BOX WITH LOCKING LID.
4. ELECTRICAL CONDUIT WITH WIRE.
5. SUPPORT BRICKS

## NOTES

- a. REFER TO PLANS FOR ADDITIONAL INFORMATION.



ELECTRICAL PULL BOX (TRAIL)

DETAIL: EL-02

NOT TO SCALE

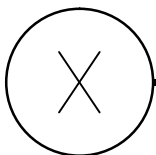
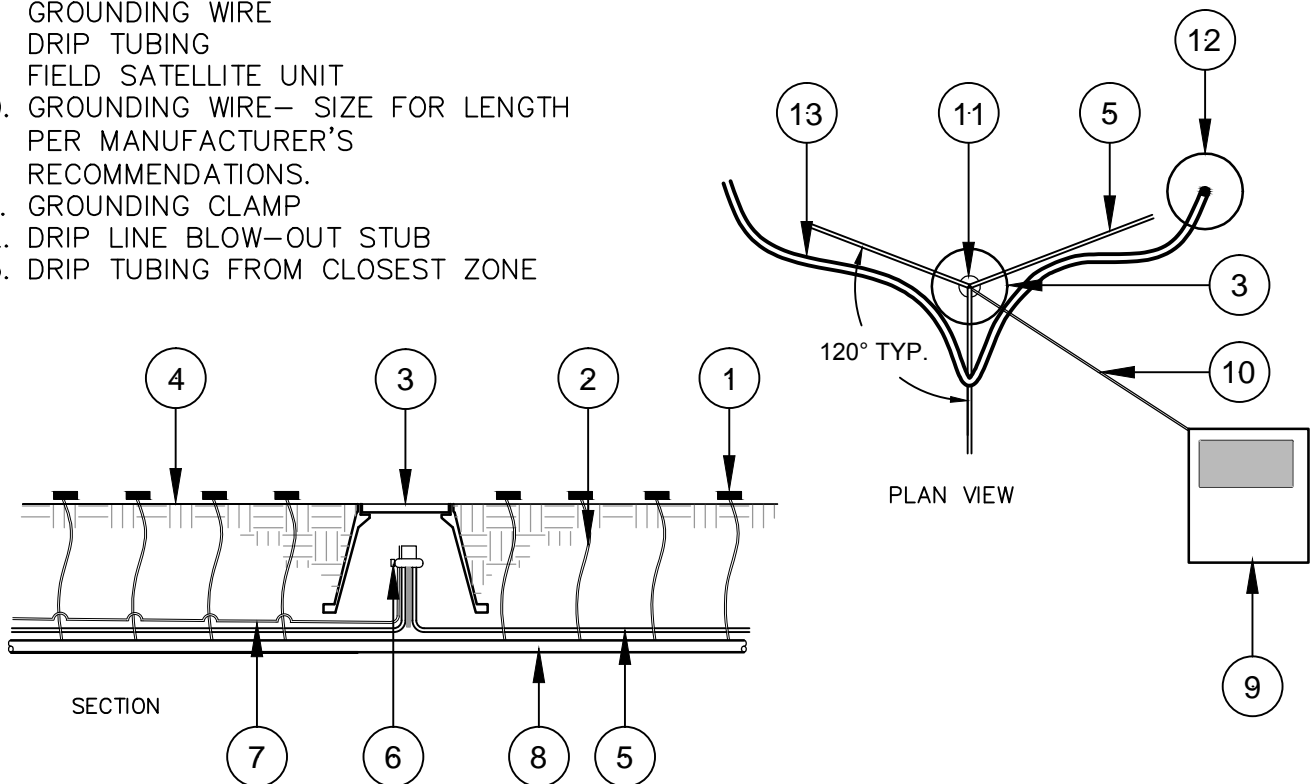


## LEGEND

1. 1 GPH EMITTER (4 PER ROD).
2. EMITTER TUBING
3. 10" ROUND VALVE BOX.
4. FINISH GRADE
5. 5/8" X 8' COPPER- CLAD GROUNDING ROD (TYPICAL).
6. GROUNDING CLAMP- ENCIRCLING AND ADJOINING ALL RODS.
7. GROUNDING WIRE
8. DRIP TUBING
9. FIELD SATELLITE UNIT
10. GROUNDING WIRE- SIZE FOR LENGTH PER MANUFACTURER'S RECOMMENDATIONS.
11. GROUNDING CLAMP
12. DRIP LINE BLOW-OUT STUB
13. DRIP TUBING FROM CLOSEST ZONE

## NOTES

- a. GROUNDING ROD DETAIL SHALL SUPPLEMENT MANUFACTURER'S FIELD UNIT GROUNDING RECOMMENDATIONS. THIS DETAIL APPLIES TO ALL CONTROLLER INSTALLATIONS WHICH DO NOT ALLOW GROUNDING RODS TO BE INSTALLED IN IRRIGATED TURF AREAS PER MANUFACTURER'S SPECIFICATIONS.



FIELD GROUNDING

DETAIL: EL-03

NOT TO SCALE

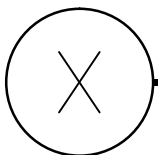
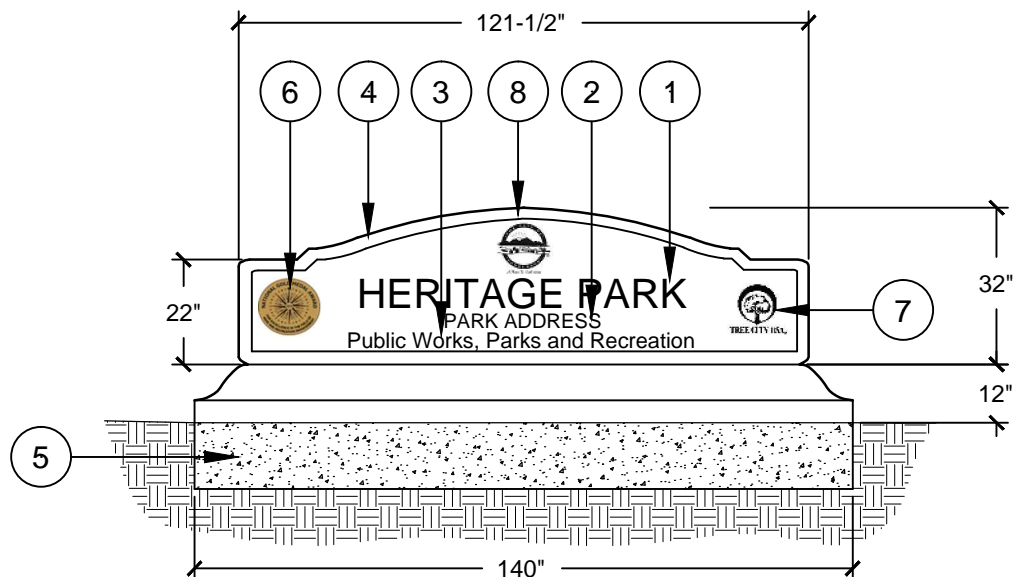
# **XX Appendix A – Signage Details**

## LEGEND

1. PARK NAME: 6"x73" GOUDY BOLD, PAINTED HUNTER GREEN.
2. PARK ADDRESS: 3.25"x28" GOUDY BOLD, PAINTED HUNTER GREEN.
3. PUBLIC WORKS, PARKS AND RECREATION ETC.: 3.25" HELVETICA, 80" LINE LENGTH, PAINTED BLACK.
4. DOUBLE SIDED SIGN, SAND COLOR CONCRETE FOR SIGN AND BASE.
5. SLAB FOOTING DESIGN SHALL BE SUBMITTED WITH DRAWINGS.
6. GOLD MEDAL LOGO
7. TREE CITY LOGO
8. CITY OF HENDERSON LOGO

## NOTES

- a. PARK SIGN IS TO BE EXTERNALLY ILLUMINATED WITH GROUND MOUNTED LIGHT FIXTURES ON BOTH SIDES.
- b. SIGN SHALL BE SUBMITTED FOR REVIEW BY COH FOR APPROVAL PRIOR TO FABRICATION.



PARK SIGN

DETAIL: SI-01

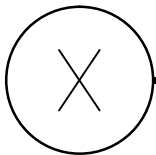
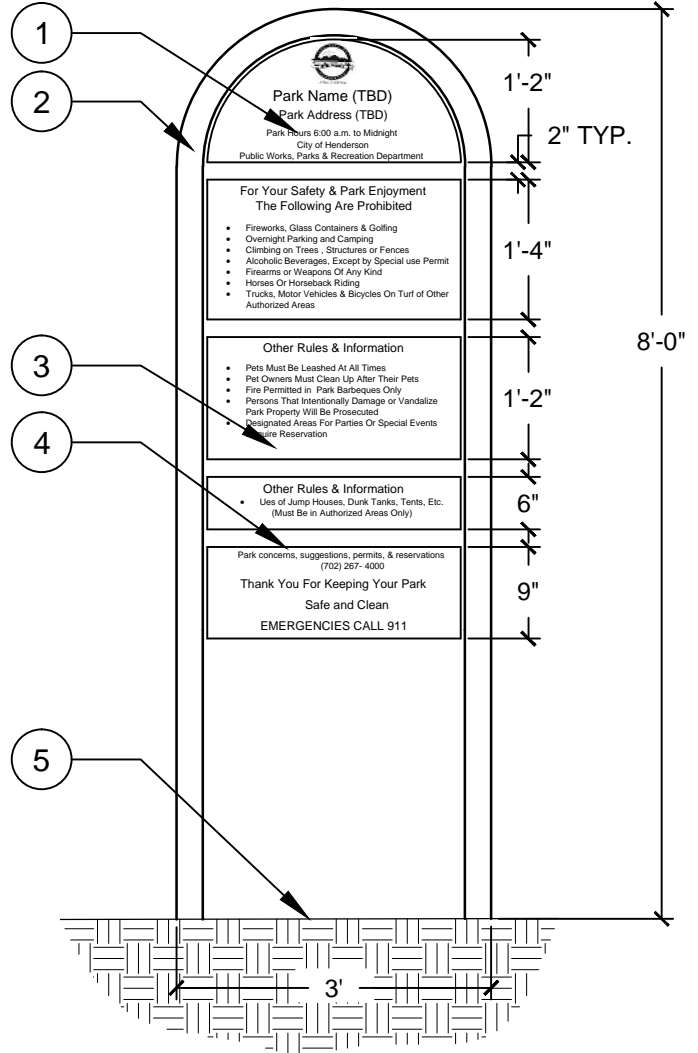
NOT TO SCALE

## LEGEND

1. COLOR COH LOGO
2. 3" DIAMETER TUBULAR STEEL FRAME.
3.  $\frac{1}{8}$ " THICK STEEL SHEET, BACKING TO BE CONTINUOUSLY WELDED INSIDE OF TUBULAR FRAME.
4.  $\frac{1}{8}$ " THICK STEEL SIGNS, BLACK LETTERING ON TAN BACKGROUND, TO BE BOLTED TO STEEL BACKING.
5. FINISH GRADE

## NOTES

- a. PAINT: 1 COAT PRIMER, 2 COATS PAINT, COLOR TAN.
- b. PROVIDE COLOR SAMPLE FOR APPROVAL BY CITY.
- c. ALL WELDS TO BE SMOOTH AND CONTINUOUS.
- d. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL REQUIRED SHOP DRAWINGS FOR APPROVAL BY CITY.
- e. CONTRACTOR TO PROVIDE STRUCTURAL DETAILS, FOOTING DESIGN AND OTHER NECESSARY CALCULATIONS PREPARED BY A NEVADA STATE LICENSED ENGINEER
- f. ALL TEXT, RULES AND REGULATIONS TO BE APPROVED BY CITY OF HENDERSON.
- g. CONTRACTOR TO SUBMIT TEXT FOR APPROVAL PRIOR TO FABRICATION.



COH RULES AND REGULATIONS

DETAIL: SI-02

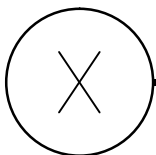
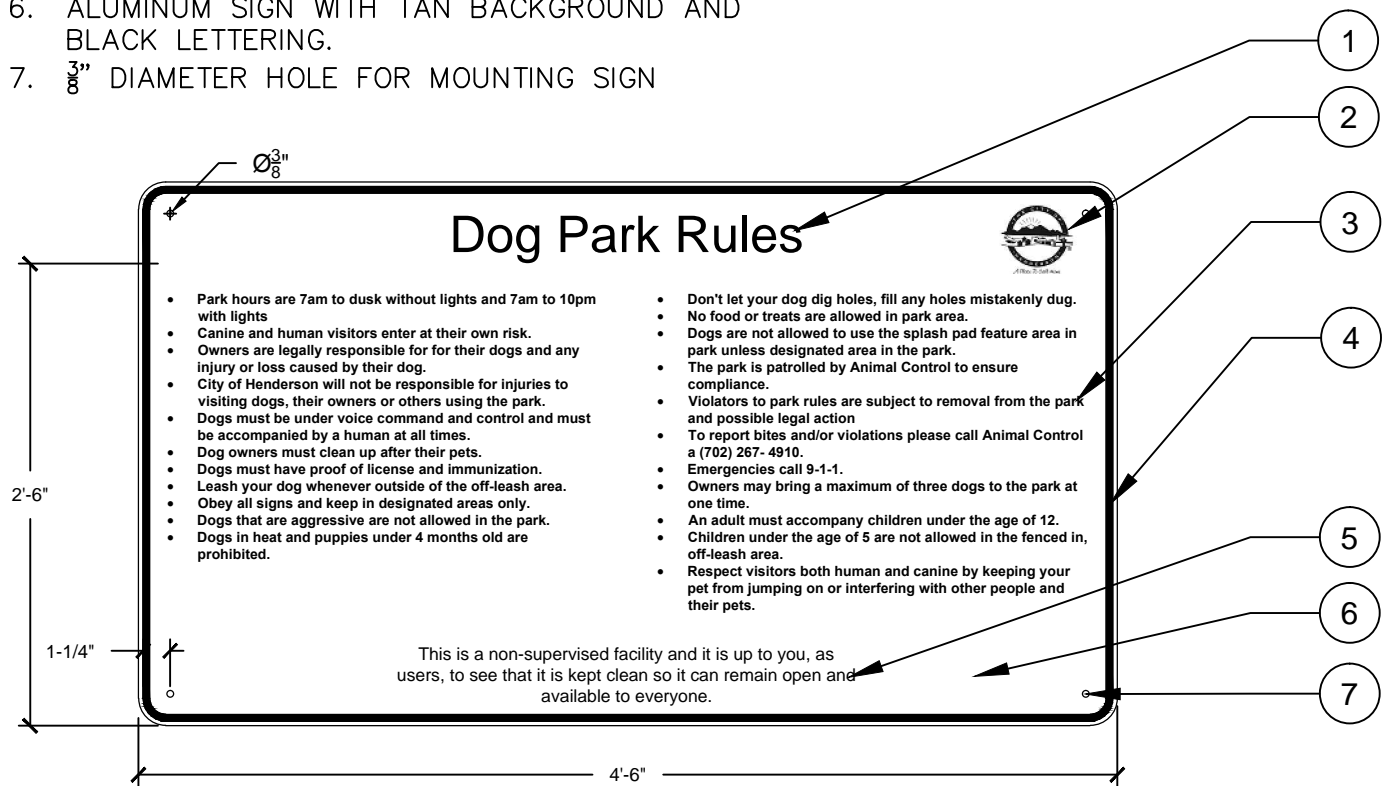
NOT TO SCALE

## LEGEND

1. 2" ARIAL BOLD TEXT—CENTER TEXT IN WIDTH OF SIGN. COLOR: BLACK
2. CITY OF HENDERSON LOGO
3. 9/16" ARIAL TEXT IN TWO COLUMNS. ADD AN ADITIONAL 1/16" VERTICAL LINE SPACING BETWEEN EACH SENTENCE.
4. 3/8" WIDE BLACK STRIPE
5. 5/8" ARIAL TEXT
6. ALUMINUM SIGN WITH TAN BACKGROUND AND BLACK LETTERING.
7. 3/8" DIAMETER HOLE FOR MOUNTING SIGN

## NOTES

- a. ATTACH SIGN TO FENCE, TYP.
- b. SIGN SHALL BE SUBMITTED FOR REVIEW BY COH FOR APPROVAL PRIOR TO FABRICATION.



DOG PARK RULES SIGN

DETAIL: SI-03

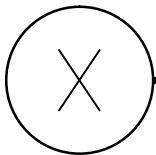
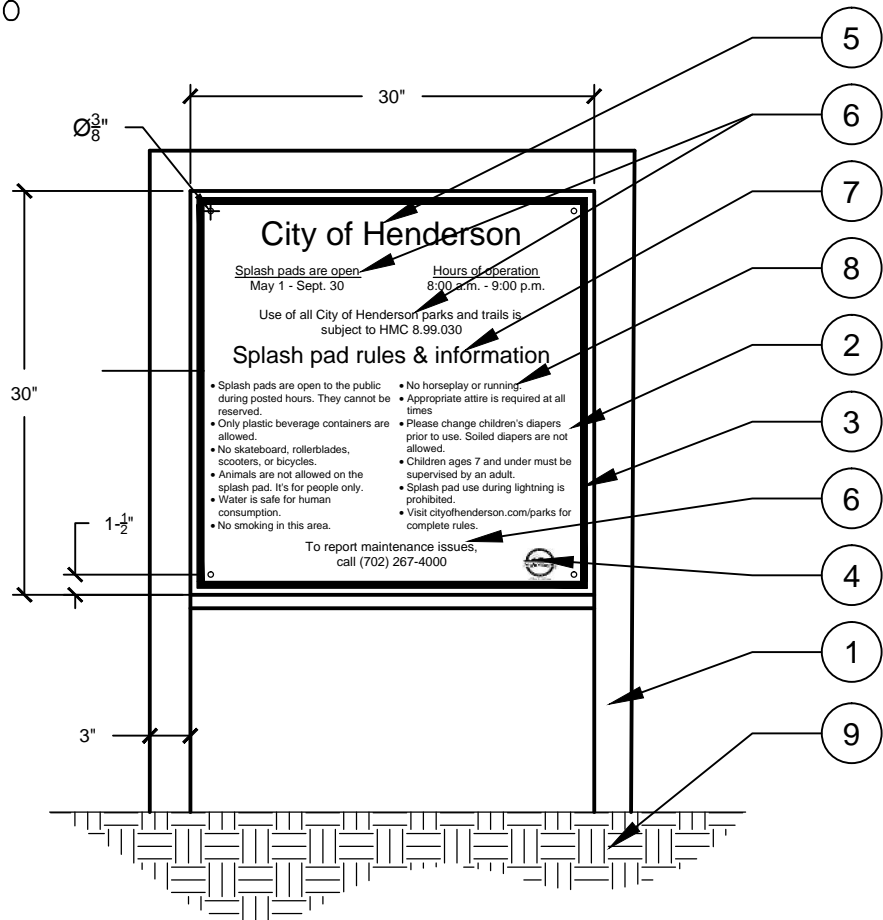
NOT TO SCALE

## LEGEND

1. 3" STEEL FRAME
2. ALUMINUM SIGN WITH BLACK TEXT, TO BE MOUNTED TO FRAME
3. 1/2" WIDE BLACK STRIPE
4. CITY OF HENDERSON LOGO
5. 1-3/4" ARIAL TEXT
6. 11/16" ARIAL TEXT
7. 1-1/4" ARIAL TEXT
8. 1/2" ARIAL TEXT
9. FINISH GRADE

## NOTES

- a. SIGN SHALL BE SUBMITTED FOR REVIEW BY COH FOR APPROVAL PRIOR TO FABRICATION.



SPLASH PAD SIGN

DETAIL: SI-04

NOT TO SCALE

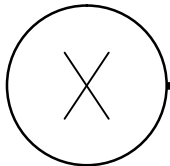
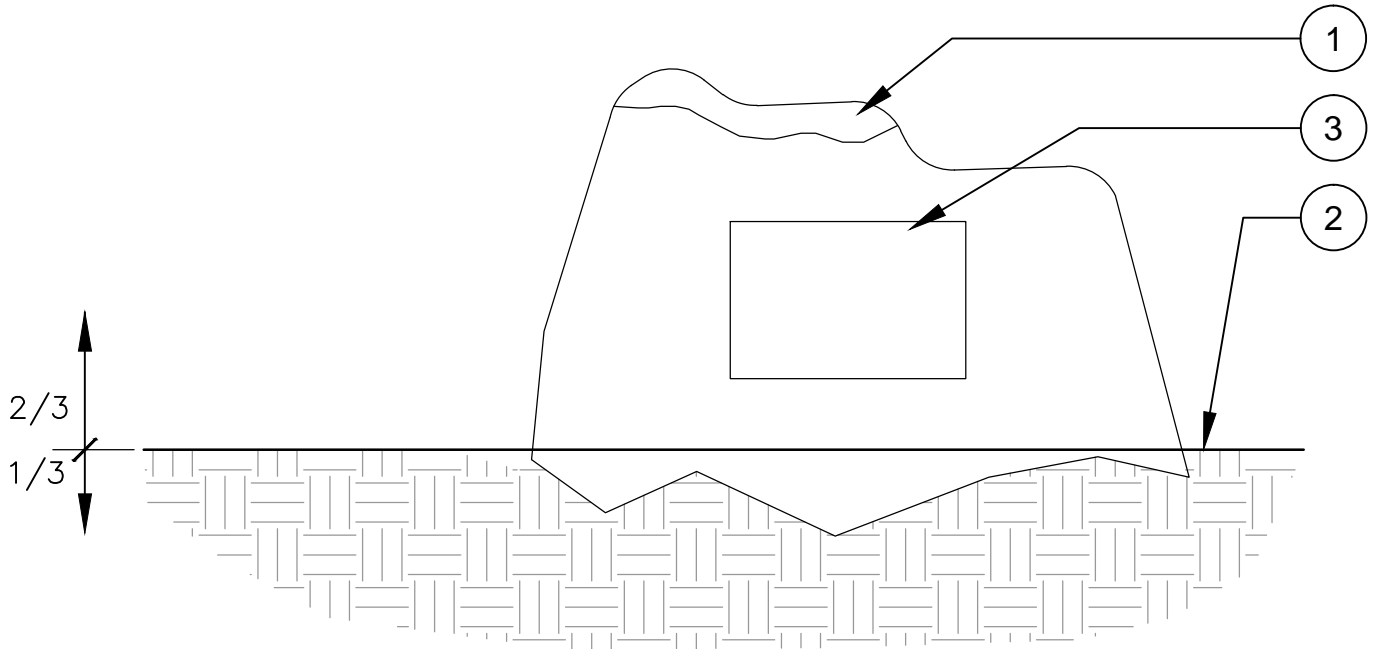
## LEGEND

1. BOULDER
2. FINISH GRADE
3. 12"X18" BLM BRONZE PLAQUE TO BE PLACED SECURELY TO FACE OF BOULDER. BOULDER FACE SHALL BE FLAT.



## NOTES

- PLACE ALL BOULDERS SUCH THAT  $\frac{1}{3}$  OF THE TOTAL MASS OF EACH BOULDER IS BELOW FINISH GRADE.
- PROTECT BOULDERS FROM SCRAPES AND SCRATCHES.
- TEXT FOR SIGNAGE. TEXT SHALL BE STANDARD BLOCK TEXT, SIZE DETERMINED TO FIT ALL TEXT ON PLAQUE. CONTRACTOR SHALL SUBMIT TEXT TO COH PRIOR TO FABRICATION.
- PLAQUE SHALL BE SECURELY SET IN BOULDER, INSET BY EITHER EPOXY OR BOLT INTO BOULDER. THE PLAQUE SHALL BE FLUSH WITH BOULDER FACE.



BLM PLAQUE

DETAIL: SI-05

NOT TO SCALE

# **XX Appendix A – Site Furnishings Details**

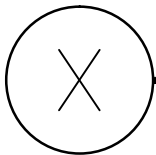
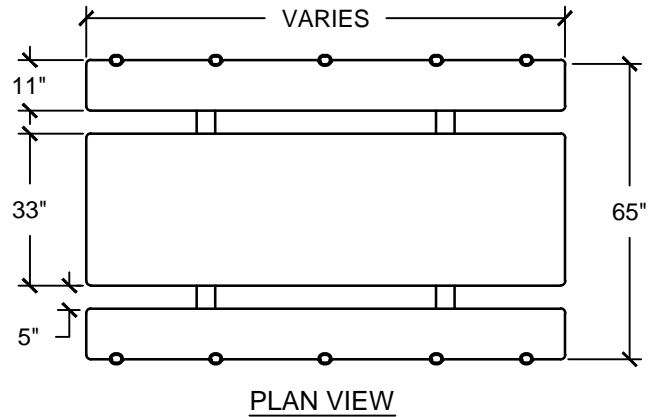
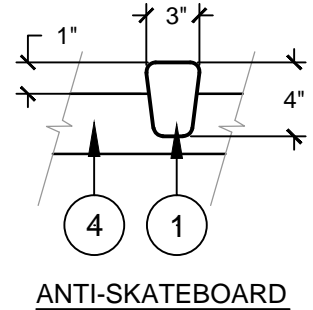
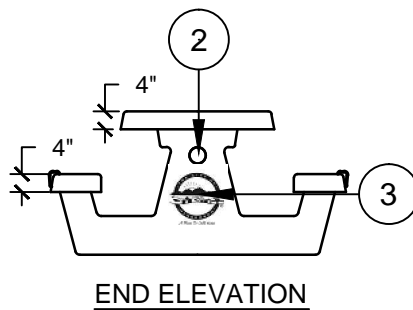
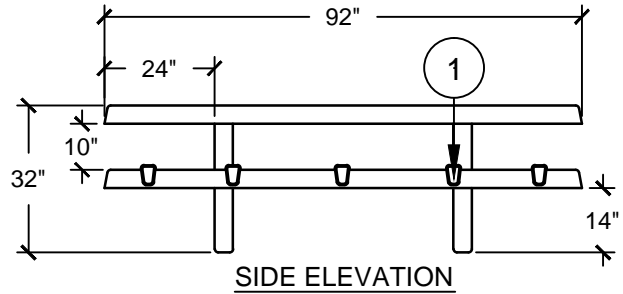


**LEGEND**

- 1. INTEGRALLY CAST ANTI-SKATEBOARD SYSTEM.
- 2. CITY OF HENDERSON LOGO
- 3. 4" DIAMETER THROUGH HOLE
- 4. SEAT
- 5. 1/2" MIN. RADIUS, TYPICAL

**NOTES**

- a. MINIMUM THICKNESS OF ALL AREAS TO BE 4".
- b. MINIMUM WEIGHT TO BE 2,450 LBS.
- c. PICNIC TABLE TOP, BENCHES AND SUPPORTS CAST IN ONE INTEGRAL PIECE (NO ASSEMBLY).
- d. COLORING AGENTS ARE TO BE PURE MINERAL OXIDES AND SHALL BE MIXED INTEGRALLY WITH CEMENT, COLOR "SAND".
- e. CONCRETE MIX DESIGN TO INCLUDE 8.5 SACKS PORTLAND CEMENT PER YARD W/MAXIMUM ROCK SIZE OF 3/4", REINFORCED W/#4 & #5 REBAR GRID. CURED CONCRETE TO BE A MINIMUM OF 7,000 PSI @ 28 DAYS.
- f. ALL FORMED SURFACES AND EDGES TO BE FULLY ROUNDED WITH SMOOTH FINISHES AND ANTI-GRAFFITI SEALER APPLIED.
- g. ANTI-SKATEBOARD PROTRUSIONS TO BE INTEGRALLY CAST WITH ONE-PIECE TABLE DESIGN.
- h. TABLE COLOR: "SAND"



PICNIC TABLE

DETAIL: SA-01

NOT TO SCALE

**LEGEND**

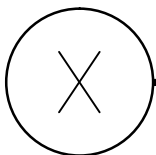
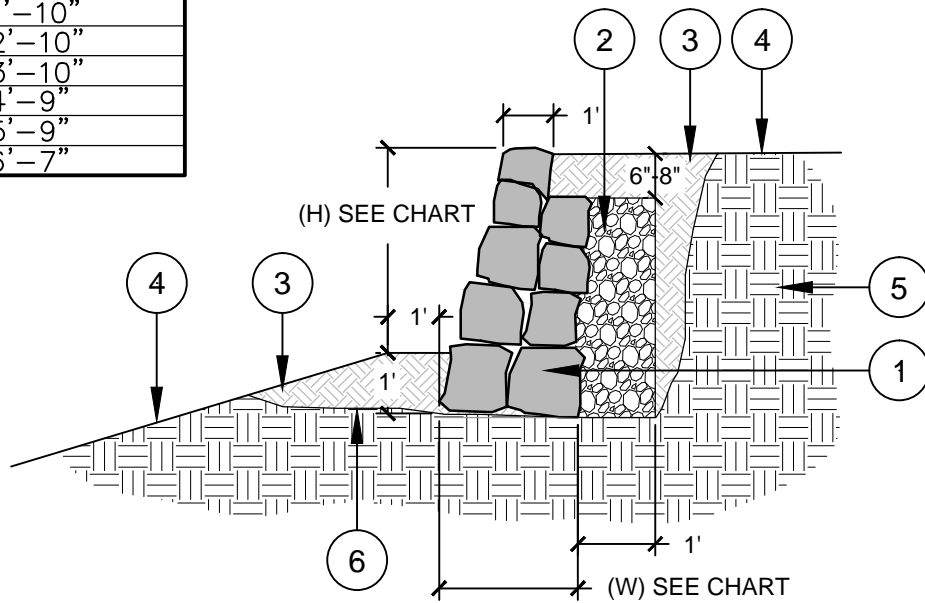
1. STACKED ROCK WALL
2. 1' OF DRAIN AGGREGATE
3. COMPACTED BACKFILL
4. FINISH GRADE
5. RETAINED SOIL (ENGINEERED FILL OR UNDISTURBED SOIL)
6. BASE OF WALL 1' BELOW FINISH GRADE.

**NOTES**

- a. FACE OF WALL MUST SLOPE BACK 1' FOR EACH 6' IN HEIGHT.

FOOTING SIZE CHART

HEIGHT	WIDTH AT BOTTOM
3'	1'-10"
5'	2'-10"
7'	3'-10"
9'	4'-9"
11'	5'-9"
13'	6'-7"



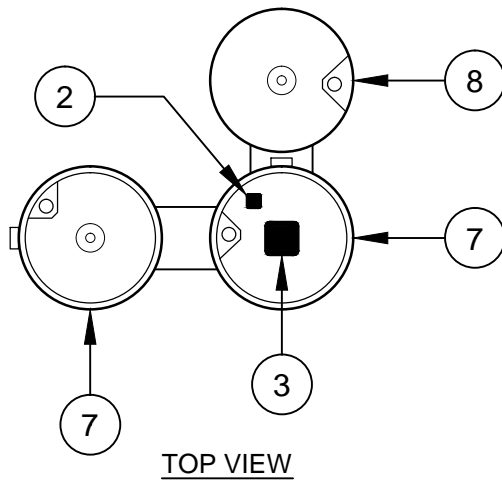
STACKED ROCK WALL

DETAIL: SA-02

NOT TO SCALE

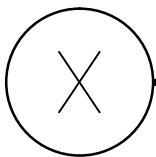
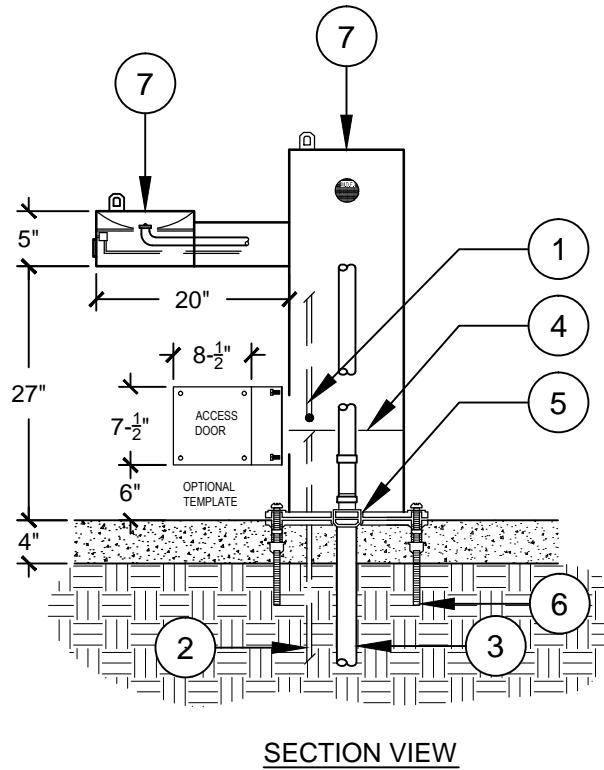
## LEGEND

1.  $\frac{3}{8}$ " NYLON REINFORCED NYLON BRAID TUBING WITH  $\frac{1}{2}$ " MIP.
2. WATER SUPPLY
3. 2", 3" OR 4" OPEN HUB DRAIN.
4. ATTACH PET FOUNTAIN ON OPPOSITE SIDE AS SHOWN ON TOP VIEW.
5. 2", 3" OR 4" OPEN DRAIN, IF POSSIBLE, OR RIGID CONNECTION.
6.  $\frac{1}{2}$ "x12" ZINC PLATED ROD
7. DRINKING FOUNTAIN
8. PET FOUNTAIN



## NOTES

- a. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
- b. SEE PLANS FOR DRAINAGE.
- c. PET FOUNTAIN SHALL BE LOCATED WHEN NECESSARY.



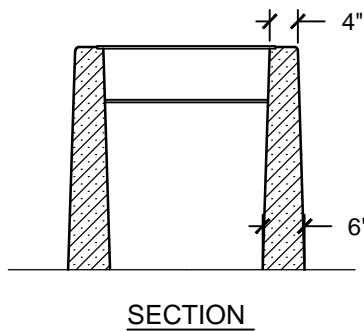
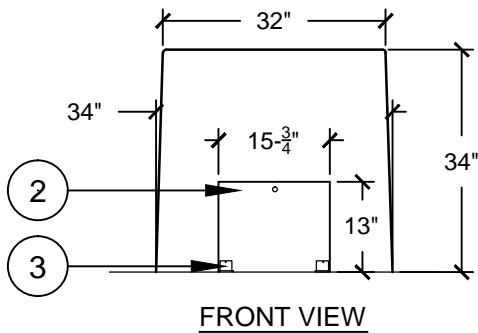
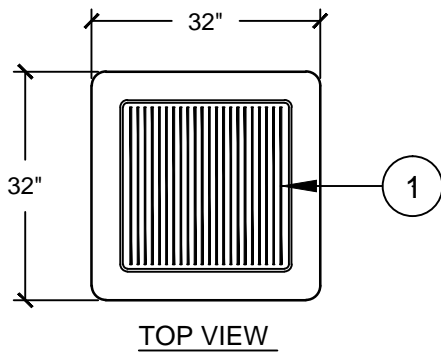
FREESTANDING DRINKING FOUNTAIN

DETAIL: SA-03

NOT TO SCALE

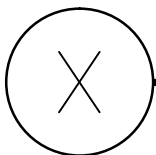
**LEGEND**

1. ONE PIECE, LASER-CUT, NON-WELDED GRILL SYSTEM.
2. CLEAN-OUT DOOR
3. CONCEALED HINGE ALLOWS DOOR TO LOWER FOR ASH REMOVAL.



**NOTES**

- a. MINIMUM THICKNESS OF ALL AREAS TO BE 4".
- b. MINIMUM WEIGHT TO BE 1800 LBS.
- c. COLORING AGENTS ARE TO BE PURE MINERAL OXIDES AND SHALL BE MIXED INTEGRALLY WITH CEMENT. COLOR TO BE "SAND".
- d. CONCRETE MIX DESIGN TO INCLUDE 8.5 SACKS PORTLAND CEMENT PER YARD WITH MAXIMUM ROCK SIZE <sup>3</sup>/<sub>4</sub>" REINFORCED WITH #4 & #5 REBAR GRID. CURED CONCRETE TO BE A MINIMUM 7,000 PSI IN 28 DAYS.
- e. ALL FORMED SURFACES AND EDGES TO BE FULLY ROUNDED WITH SMOOTH FINISHES AND ANTI-GRAFFITI SEALER APPLIED.
- f. GRILL TO BE LASER CUT, SINGLE STEEL SHEET DESIGN. NO WELDED ASSEMBLIES WILL BE APPROVED.
- g. EPOXY BOTTOM TO CONCRETE SLAB.



SINGLE BBQ GRILL

DETAIL: SA-04

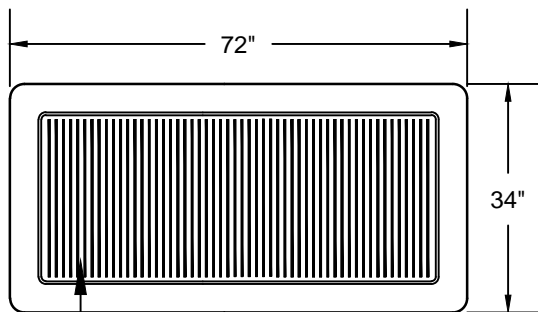
NOT TO SCALE

## LEGEND

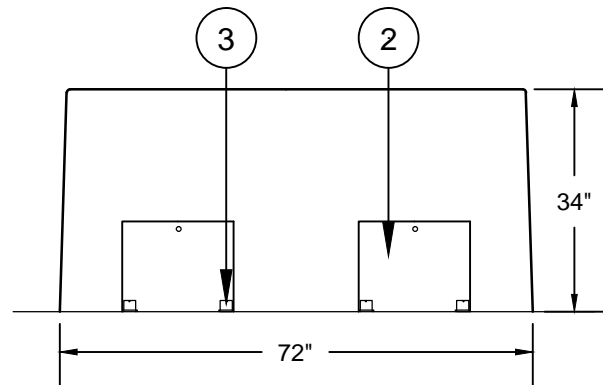
1. ONE PIECE, LASER-CUT, NON-WELDED GRILL SYSTEM.
2. CLEAN-OUT DOOR
3. CONCEALED HINGE ALLOWS DOOR TO LOWER FOR ASH REMOVAL.

## NOTES

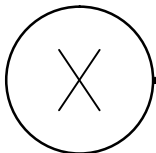
- MINIMUM THICKNESS OF ALL AREAS TO BE 4".
- MINIMUM WEIGHT TO BE 1,800 LBS.
- COLORING AGENTS ARE TO BE PURE MINERAL OXIDES AND SHALL BE MIXED INTEGRALLY WITH CEMENT. COLOR TO BE "SAND".
- CONCRETE MIX DESIGN TO INCLUDE 8.5 SACKS PORTLAND CEMENT PER YARD WITH MAXIMUM ROCK SIZE  $\frac{3}{4}$ " REINFORCED WITH #4 & #5 REBAR GRID. CURED CONCRETE TO BE A MINIMUM 7,000 PSI IN 28 DAYS.
- ALL FORMED SURFACES AND EDGES TO BE FULLY ROUNDED WITH SMOOTH FINISHES AND ANTI-GRAFFITI SEALER APPLIED.
- GRILL TO BE LASER CUT, SINGLE STEEL SHEET DESIGN. NO WELDED ASSEMBLIES WILL BE APPROVED.
- EPOXY BOTTOM TO CONCRETE SLAB.



TOP VIEW



FRONT VIEW



GROUP BBQ GRILL

DETAIL: SA-05

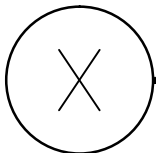
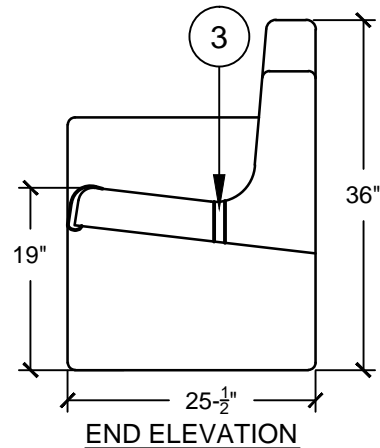
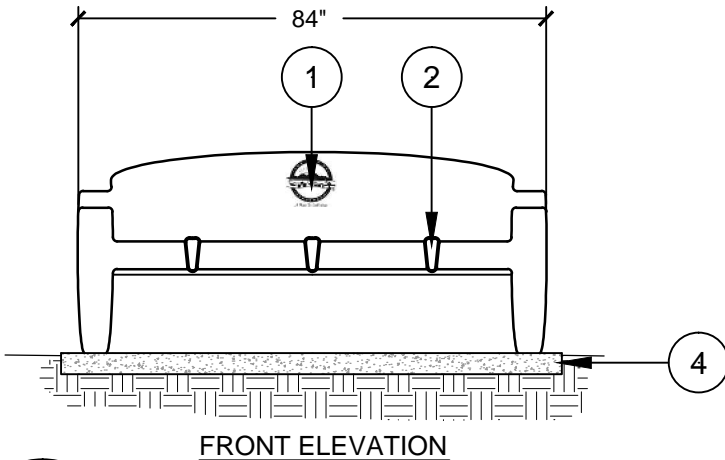
NOT TO SCALE

## LEGEND

1. CITY SEAL CAST IN CONCRETE.
2. INTEGRALLY CAST ANTI-SKATEBOARD SYSTEM.
3. CAST IN DRAIN HOLE
4. POURED-IN-PLACE CONCRETE PAD.

## NOTES

- a. MINIMUM THICKNESS OF ALL AREAS TO BE 4".
- b. MINIMUM WEIGHT TO BE 2,000 LBS.
- c. COLORING AGENTS TO BE PURE MINERAL OXIDES AND SHALL BE MIXED INTEGRALLY WITH CEMENT. COLOR SHALL BE "SAND".
- d. CONCRETE MIX DESIGN TO INCLUDE 8.5 SACKS PORTLAND CEMENT PER YARD WITH MAXIMUM ROCK SIZE OF  $\frac{3}{4}$ ", REINFORCED WITH #4 & #5 REBAR GRID. CURED CONCRETE TO BE A MINIMUM 7,000 PSI @ 28 DAYS.
- e. ALL FORMED SURFACES AND EDGES TO BE FULLY ROUNDED WITH SMOOTH FINISHES AND ANTI-GRAFFITI SEALER APPLIED.
- f. ANTI-SKATEBOARD PROTRUSIONS TO BE INTEGRALLY CAST WITH ONE PIECE BENCH CASTING (NO ASSEMBLY).
- g. BENCH TO BE SET ON CONCRETE PAD. EPOXY BENCH TO CONCRETE PAD.



BENCH

DETAIL: SA-06

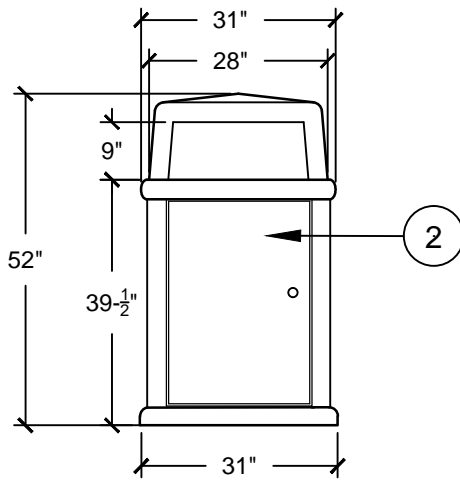
NOT TO SCALE

## LEGEND

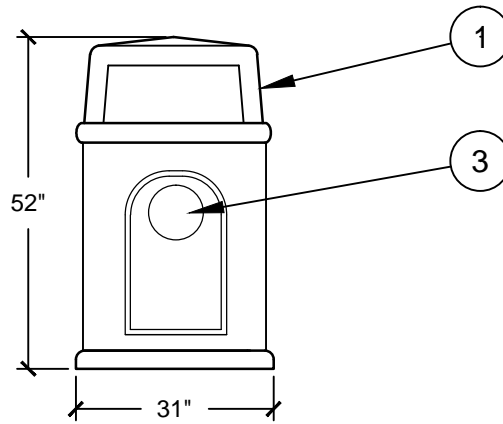
1. PRECAST CONCRETE TOP WITH (4) OPENINGS.
2. STEEL POWDER COATED DOOR WITH LOCKABLE  $\frac{1}{4}$  TURN LATCH.
3. CITY SEAL IN CONCRETE.

## NOTES

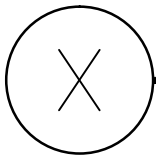
- MINIMUM THICKNESS OF ALL AREAS TO BE  $3\frac{1}{2}$  INCHES.
- MINIMUM WEIGHT 2,000 LBS.
- COLORING AGENTS ARE TO BE PURE OXIDES AND SHALL BE MIXED INTEGRALLY WITH CEMENT, COLOR "SAND".
- CONCRETE MIX DESIGN TO BE 8.5 SACK PORTLAND CEMENT PER YARD WITH A MINIMUM ROCK SIZE OF  $\frac{3}{4}$ " REINFORCED WITH #4 & #5 REBAR GRID. CURED CONCRETE TO BE 7,000 PSI IN 28 DAYS.
- ALL FORMED SURFACES AND EDGES SHALL BE FULLY ROUNDED AND SMOOTH WITH GRAFFITI-RESISTANT SEALER APPLIED.
- INTERIOR DIMENSIONS MUST ACCOMMODATE CONTAINER & 45 GALLON PLASTIC LINERS PROVIDED BY CONTRACTOR AS STANDARD EQUIPMENT.
- EPOXY TRASH RECEPTACLE TO CONCRETE SLAB.



REAR VIEW



SIDE VIEW



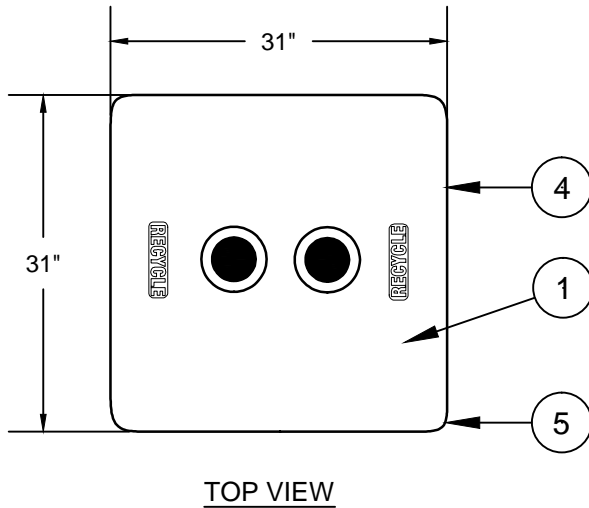
TRASH RECEPTACLE

DETAIL: SA-07

NOT TO SCALE

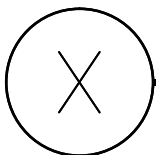
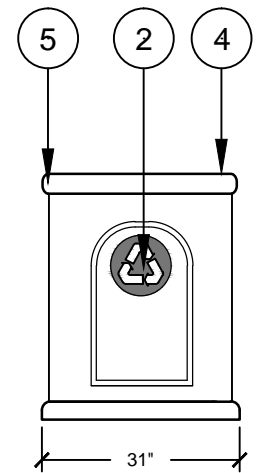
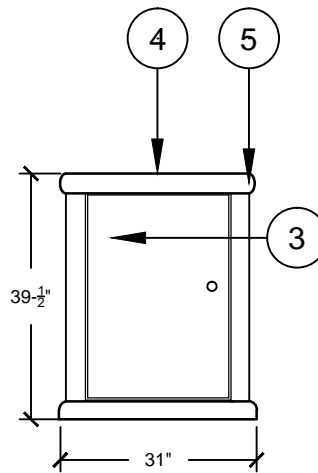
## LEGEND

1. PRECAST CONCRETE TOP WITH (2) RECYCLING HOLES.
2. RECYCLE LOGO CAST INTO CONCRETE AND PAINTED.
3. STEEL POWDER COATED DOOR WITH LOCKABLE  $\frac{1}{4}$  TURN LATCH.
4. TOP PORTION OF BIN TO BE PAINTED BLUE.
5. 2" RADIUS CORNERS



## NOTES

- a. MINIMUM THICKNESS OF ALL AREAS TO BE  $3\frac{1}{2}$  INCHES.
- b. MINIMUM WEIGHT 2,000 LBS.
- c. COLORING AGENTS ARE TO BE PURE OXIDES AND SHALL BE MIXED INTEGRALLY WITH CEMENT, COLOR "SAND", UNLESS OTHERWISE NOTED.
- d. CONCRETE MIX DESIGN TO BE 8.5 SACK PORTLAND CEMENT PER YARD WITH A MINIMUM ROCK SIZE OF  $\frac{3}{4}$ " REINFORCED WITH #4 & #5 REBAR GRID. CURED CONCRETE TO BE 7,000 PSI IN 28 DAYS.
- e. ALL FORMED SURFACES AND EDGES SHALL BE FULLY ROUNDED AND SMOOTH WITH GRAFFITI-RESISTANT SEALER APPLIED.
- f. INTERIOR DIMENSIONS MUST ACCOMMODATE CONTAINER & 45 GALLON PLASTIC LINERS PROVIDED BY CONTRACTOR AS STANDARD EQUIPMENT.
- g. RECYCLE LOGO AND TOP PAINTED BLUE.
- h. CITY LOGO CAST INTO REAR PANEL.
- i. EPOXY TRASH RECEPTACLE TO CONCRETE SLAB.



RECYCLE RECEPTACLE

DETAIL: SA-08

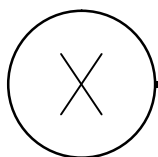
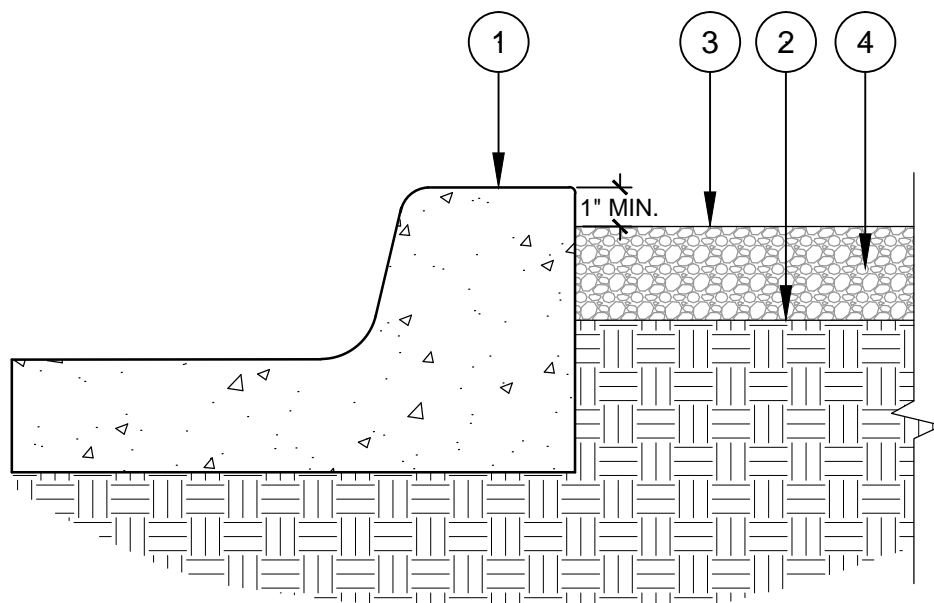
NOT TO SCALE



## LEGEND

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1. CONCRETE CURB OR CURB AND GUTTER.
2. UNDISTURBED SUBGRADE
3. FINISH GRADE
4. 2" DG, MULCH OR SPECIFIED FINISH MATERIAL.



FINISH GRADE AT CURB

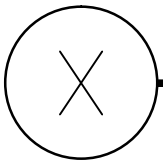
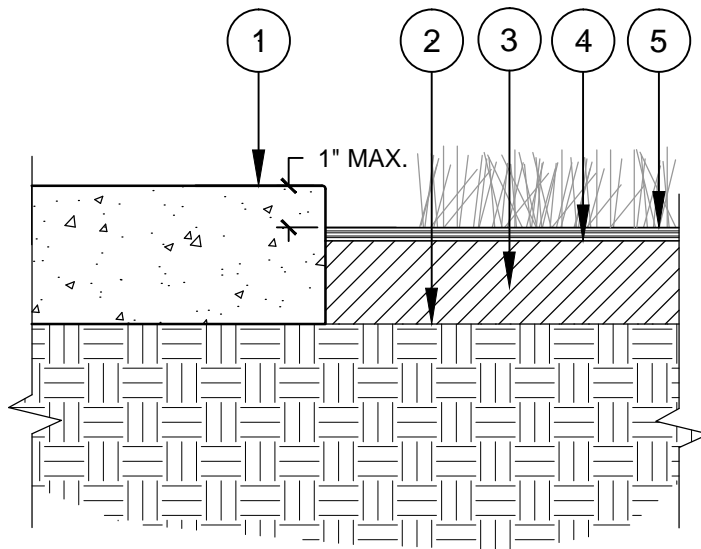
DETAIL: SA-09

NOT TO SCALE

## LEGEND

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1. SIDEWALK
2. UNDISTURBED SUBGRADE
3. TOPSOIL OR REJECT SAND WITH AMENDMENTS FOR PLANTING. (SEE SPECIFICATIONS)
4. FINISH GRADE OF TOPSOIL
5. SOD BASE OR ROOT AREA FROM TOP OF SIDEWALK.



FINISH GRADE AT SIDEWALK

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DETAIL: SA-10

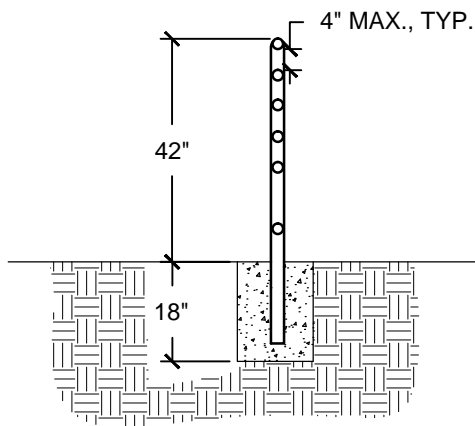
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## LEGEND

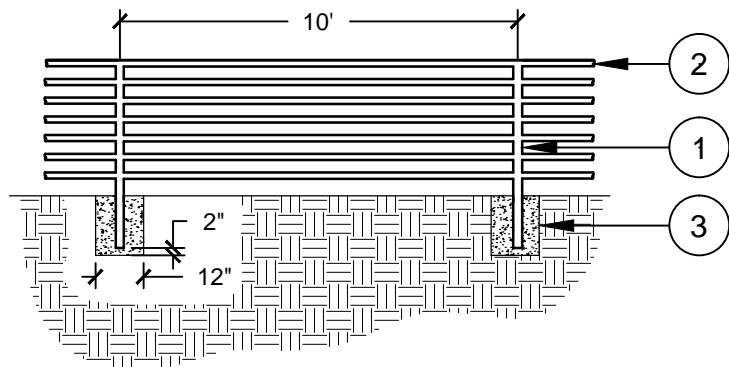
1. POSTS, 2" NOMINAL DIAMETER, SCHEDULE 40.
2. RAILS, 1½" NOMINAL DIAMETER, SCHEDULE 40.
3. FOOTING PER STRUCTURAL CALCULATIONS.

## NOTES

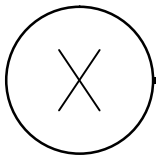
- a. PIPE SIZES SHOWN ARE FOR STANDARD WEIGHT STEEL PIPE, SCHEDULE 40.
- b. ALL WELDS SHALL BE CONTINUOUS.
- c. ALL WELDS SHALL BE GROUND SMOOTH INCLUDING ALL EXPOSED METAL EDGES.
- d. ALL SURFACES SHALL BE CLEAN AND FREE OF FOREIGN MATTER IF PAINT IS TO BE APPLIED.
- e. A MINIMUM 2" HIGH TOE KICK OR CURB IS REQUIRED IF THE TRAIL HAS A DROP OFF WHERE THE ADJACENT GRADE IS NOT EVEN WITH THE TRAIL GRADE.



END SECTION



SIDE ELEVATION



PIPE GUARD RAIL

DETAIL: SA-11

NOT TO SCALE