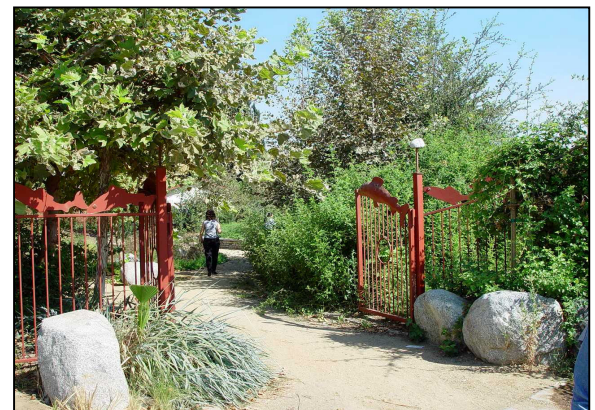
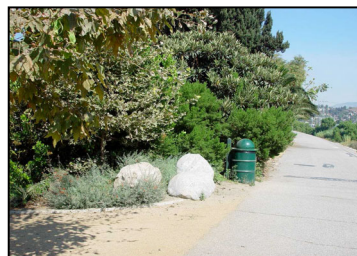
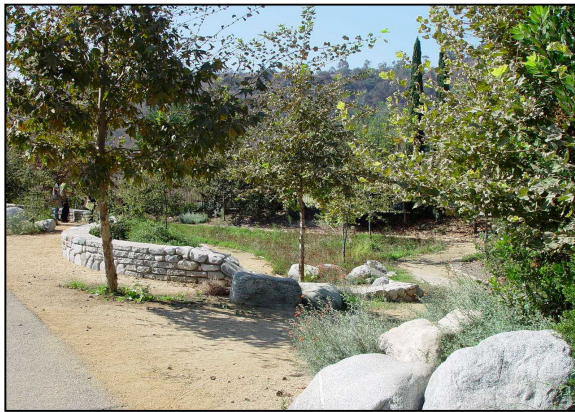


Los Angeles River Landscape Maintenance Manual



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EXECUTIVE SUMMARY

The Los Angeles River has been the subject of numerous discussions, planning sessions, and documents. In 1996, *The Los Angeles River Master Plan* was developed “...to create a document that identifies ways to revitalize the publically-owned rights-of-way along the Los Angeles River and Tujunga Wash into an urban treasure”. The document identifies and locates amenities along the river corridor. In 1999, *Landscaping Guidelines and Plant Palettes for the Los Angeles River and Tujunga Wash* was developed, building on the previous planning work. This second document provides guidelines for the design of amenities such as planting palettes, site furnishing selections, and some maintenance objectives. This maintenance manual builds on the previous work to include basis information on the care and replacement of existing facilities along the LA River corridor. The information is a brief overview for use by volunteers and professionals to establish basic standards of care. Information is presented on irrigation, weed management, tree and plant care, litter control, graffiti, hardscape, site furnishings, soil testing, fertilization, mulch, pest management, and green waste. This document is intended to be dynamic, changing as methods improve or maintenance goals and standards change.

BACKGROUND

It is the intent of this document is to provide “hands on” assistance to those interested in maintaining the Los Angeles River and Tujunga Wash areas for recreational and environmental enhancement. Those individuals looking for greater detail on the planning and process of the Los Angeles River are directed to *The Los Angeles River Master Plan*. Suffice it to say that there are 102.9 miles of riverfront winding through thirteen municipalities (Bell, Bell Gardens, Burbank, Compton, Cudahy, Glendale, Long Beach, Los Angeles, Lynwood, Maywood, Paramount, South Gate, and Vernon) and numerous agencies and private entities with interest and jurisdiction over various portions of the River. Fortunately, the Los Angeles County Department of Public Works, Watershed Management Division has been given the responsibility of coordinating all efforts relating to the use and care of the River. Questions, concerns, and requests for permission to access the river should be directed to Maria Lopez, at the Watershed Management Division, Los Angeles County Department of Public Works, 900 South Fremont Avenue, 11th Floor, Alhambra, CA 91803, (626) 458-4342, email: marlopez@dpw.co.la.ca.us. No projects or maintenance efforts should be conducted without first coordinating with the County.

Insert Regional Context Map from the LA River Master Plan

Six Reaches of the Los Angeles River

For planning purposes, the *Los Angeles County Master Plan* describes the LA River by dividing it into six sections called “reaches”. The six maps from the *Master Plan* are reproduced here for ease of description. Reach 1: Southern Cities includes areas found within the cities of Long Beach and Carson beginning at the Pacific Ocean and ending at Atlantic Avenue. Reach 2: Mid-Cities continues from Atlantic Avenue to Washington Boulevard. This Reach winds through the cities of Paramount, Compton, Lynwood, South Gate, Cudahy, Bell Gardens, Maywood, Commerce, Bell, and Vernon. Reach 3: is within the City of Los Angeles and spans the areas from Washington Boulevard to Barham Boulevard in the Arroyo Seco. Reach 4: Glendale Narrows begins at Barham Boulevard and concludes at the confluence of Bell Creek and Arroyo Calabasas. Los Angeles, Glendale and Burbank are included in this section of the River. Reach 5: San Fernando Valley continues at this confluence and ends at the Sepulveda Dam in the Sepulveda Basin Recreation Area.. The communities of Canoga Park, Winnetka, Reseda, Encino, West Van Nuys, Sherman Oaks, and Taluca Lake, all communities within the City of Los Angeles, line the River in this Reach. Finally, Reach 6: Tujunga Wash begins at the Hansen Dam

within Reach 5 and ends at the confluence of the Tujunga Wash. Included within the Reach are the City of Los Angeles communities of Lakeview Terrace, Sun Valley, Panorama City, Van Nuys, and North Hollywood.

Division of Responsibility for River Maintenance

The River itself is maintained by either the Los Angeles County Flood Control District, Department of Public Works or the Army Corps. Of Engineers. Section 1 is maintained by the County and includes portions of Reach 5 from the Confluence of Bell and Calabasas Creeks in Canoga Park to White Oak Avenue in Reseda. Section 2 is maintained by the Army Corps. and includes the Sepulveda Basin from White Oak Avenue to Sepulveda Boulevard within the Sepulveda Dam Recreation Area in Reach 5. Section 3 is County maintained from Sepulveda Boulevard in Reach 5 to Lankershim Boulevard in Reach 4. Section 4 includes a portion of Reach 4 from Lankershim Boulevard, all of Reach 3, and a portion of Reach 2 to Southern Avenue. The final section, section 5 includes a portion of Reach 2 beginning at Southern Avenue and finishes at the Pacific Ocean in Long Beach.

***Insert Exhibit(s) showing the Reaches and Sections.

County and Corps. Maintenance Duties

According to Section 20.94.020 of the County Code: "The owner of any natural watercourse, swale, or man-made drainage channel shall maintain the same free of any vegetation tin cans, rubbish, or other obstructions to the extent necessary so that the natural flow will not be impeded at any time." The area from the top of any channel facility to the centerline of the channel is maintained by the County or Army Corp. or by the County for the Army Corp. No landscape maintenance or access shall occur within the River as such.

***Insert matrix showing levels of maintenance by area.

Los Angeles County Flood Control District Maintenance Standards

The following standards are reprinted here from *The Landscape Design Guidelines and Plant Palettes for the Los Angeles River and Tujunga Wash*. While there are numerous exceptions to these standards, all future work should be in compliance unless there has been preapproval by the County and governing agency.

- \$ Service roads shall have a minimum twelve (12) foot width. In areas with no service road, a Caltrans standard class I bike path with a minimum twelve (12) foot width shall be used.
- \$ An eight (8) foot clear "sacrificial" area is to be maintained continuously behind service roads for emergency crane equipment.
- \$ A vegetation high management landscape zone is to be maintained at a low "sacrificial" height.
- \$ Trees are to be planted seven (7) to eight (8) feet from the edge of a service road with a thirty (30) foot maximum spread allowed in each cluster. Clusters of trees shall be spaced 100 feet on center.
- \$ Trees shall be pruned to allow a fourteen (14) foot minimum vertical clearance.

- \$ Clusters of three (3) trees maximum shall be placed behind expansion joints every 100 feet.
- \$ Planting pockets against channel walls may be located between expansion joints, but not directly behind one.
- \$ Planting pockets against the channel walls may be planted with low shrubs, groundcovers and grasses, but no trees or large woody shrubs.
- \$ All access points are to be gated.
- \$ A forty (40) foot centerline turning radius is to be maintained by truck ingress and egress from arterial streets.
- \$ Setback from sidewalk to all trees and tall shrubs adjacent to vehicular ingress/egress from arterial streets shall meet local jurisdictional codes. For projects within the City of Los Angeles, consult Municipal Code Section 62.200. In the absence of criteria from the local agency of jurisdiction, a minimum four (4) foot setback shall be used.
- \$ All maintenance vehicles must have ingress/egress clearance at all times.
- \$ Any alteration/design of service roads must meet with County approval.
- \$ Vehicular access gates are to be setback twenty (20) feet from the arterial street curb.

IRRIGATION SYSTEM MANAGEMENT

A functioning and efficient irrigation system is crucial to the overall success for a landscape project.

Irrigation systems for the purposes of the maintenance manual are broken down into three categories:

1. High level maintenance irrigation systems — Systems which need weekly irrigation checks. These systems include spray and rotor systems which operate twice a week or more. All drip irrigation using 1/4" to 1/8" tubing and emitters would also be considered within this group.
2. Medium level maintenance irrigation systems — Systems which run seasonally.
3. Temporary irrigation systems — Systems that are designed to be abandoned or removed within a limited time frame.

High Level Maintenance Irrigation Systems

Most traditional irrigation systems fall into this category. These systems should be tested on a weekly basis. Each station should be turned on from the controller manually or by using a test program incorporated into the controller's standard features. A test program will run each station on the controller for two minutes or some other defined amount of time. If the controller does not have a test cycle, but does have multiple start times, it is possible to create a two minute test program on one of the programs. See manufacturer's specifications for controller programming.

Each week, the stations should be run in sequence from the controller rather than turned on by opening the valve. This will insure that the controller is responding properly. While the stations are running, the inspector should check to insure that all spray heads and rotors are properly aimed without overspraying onto pathways or roadways. Each spray head or rotor should be spraying, without interruption, the distance to the next sprayhead or rotor as designed by the manufacturer.

Drip emitters should be checked weekly to insure that the tubing has not become loosened or that emitters are not clogged or missing. Drip emitters should be checked to be sure that the emitter is located next to the plant it is intended to irrigate. Filters for drip irrigation systems should be checked at least every two months.

Likewise, the irrigation controller should be checked weekly to insure that the irrigation program is current and functioning properly.

Medium Level Maintenance Systems

Landscape designs with plant materials native to the southern California region or similar climates receiving about 12" of precipitation per year would be classified as medium level systems. Supplemental irrigation will be needed only during the hotter summer months. During these months, the irrigation should be checked on a weekly basis prior to the scheduled irrigation cycle. These systems should be programmed to irrigate each station each week for about a minute. While it may be desirable to turn the system off during the months that irrigation is not needed, leaving the system shut down for extended periods of time can cause the rubber components in the valves to dry and crack causing leaks and failures when the system is re-energized. In an effort to reduce water waste from broken equipment during the times when the equipment is running in a maintenance mode, the equipment should be checked regularly, not less than monthly. In areas where vandalism is likely to occur, the irrigation should be checked weekly. Manually running the irrigation from the controller would take the place of running a one minute cycle to keep the irrigation system moist, especially the interior components of the control valves.

Temporary Irrigation

Mitigation sites which are designed to restore an area to a native or close to native state may be irrigated by temporary irrigation systems. These systems typically are placed on the ground rather than buried and usually utilize larger rotors to cover bigger areas. Vandalism, due to the exposed nature of the system, is of great concern. During the life of the system (usually three to five years), it is important to check for missing irrigation sprayheads, rotors, or emitters, and to check for animal damage, and leaks. As with the other systems, temporary systems should be checked at a minimum, just before the day that they are scheduled to irrigate. The system should be operated and checked on a monthly basis during the seasons that they are not needed rather than on a weekly basis; as the system was designed to be operable for five years or less. Most valves are warranted for five years and would be assumed to be less likely to suffer from drying and failing. At the end of the establishment period, all the equipment should be removed and returned to the County or disposed of in an approved manner, as determined by the County.

Temporary irrigation controllers may be connected to an electrical system or may be solar powered. In either case, they should be checked on a regular basis to insure that the program is functioning properly.

Irrigation Scheduling

Ideally, irrigation systems should be managed to apply the appropriate amount of water to the plants in order to maintain their optimal health without runoff or water waste. Most of the plants within the LA River area are drought tolerant or native plantings which require much less water than a typical urban, ornamental landscape. Unless higher water usage plants are being implemented, watering should be kept

to a minimum - allowing the landscape to adapt to the surrounding climate. Three seasons can be followed including winter (between November and January), early summer (between March and May), and the heat of summer and fall (June through October).

During the winter months, after the beginning of seasonal rains, irrigation can be reduced to once per week with continued monitoring. After the seasonal rains and prior to the full heat of summer, irrigation systems should be scheduled two or three times per week. A full schedule will begin once daytime temperatures are consistently in the 80 to 90 degree range. Individual schedules should be prepared by County staff or irrigation professionals and located in the irrigation control box for each site.

Refer to *Landscaping Standards and Plant Palette for the Los Angeles River and Tujunga Wash* for further information regarding typical plantings proposed and implemented in the LA River corridor. The California Sycamore Association and the Cottonwood/Willow Association are not considered drought tolerant. Depending on the proximity with seasonal available water, it may be necessary to provide supplemental irrigation beyond that for drought resistant plants. Any questions regarding the amount of water needed for plant success should be directed to a landscape professional or County landscape maintenance supervisor.

Newly planted landscapes require additional irrigation during the time of establishment. Even drought tolerant, native plantings may need daily watering for the first week or more after their initial planting. Irrigation should be monitored daily during plant establishment and adjusted as needed to insure that the rootballs of the new plants do not dry out. Newly planted trees will need to be watered deeply on a regular basis until fully established, but not necessarily on a daily basis. At no time should the roots of a new plant be allowed to completely dry out.

Backflow Preventors

Certification of backflow preventors is conducted on an annual basis by licensed professionals. This is beyond the expertise and capability of volunteer labor and should be the responsibility of the governing agency. During regularly scheduled irrigation maintenance inspections, the backflow device should be monitored for leaks or other obvious problems. These problems should be immediately reported to the County's coordinator for repair.

WEED MANAGEMENT

Weeds

A weed is considered to be any plant growing where it is not desired. This leaves room for broad interpretation. The following are plants considered to be typical landscape weeds. An outstanding reference on weeds with photographs is *Weeds of the West*, published by the University of Wyoming. Further information on this book can be obtained by contacting The Western Society of Weed Science, P.O. Box 963, Newark, CA 94560.

The follow is a selection of weeds commonly found in southern California landscapes. These photos

serve as a guide for volunteers to identify weeds that should be removed.

Thistles

A large weed with characteristic purple flowers. Left unattended, they become a fire hazard when dried and woody.



***Insert Photo

Sow Thistle

Can grow to 4'. Sow Thistle has a seed head that resembles the

Dandelion and can be profuse in spreading.



Dandelion

A common weed throughout the United States.



Mustard

A common sight during the spring on disturbed slopes.

Morning Glory

A vine that is difficult to eradicate once established.

***Insert Photo

Castorbean



Care should be taken when removing, as the seeds can be irritating when touched and are poisonous, if eaten.

***Insert Photo

Filaree

While attractive, it is a European forb that should be removed.



Mallow

Mallow is another common garden weed.

Clover

Also called creeping woodsorrel or Oxalis, it spreads both by seeds which can spread ten feet or by rooting at its nodes. It is difficult to eradicate.



Grasses

Bermuda, Quackgrass, Nutsedge, and Crab Grass are common to the urban environment. Care should be taken to properly identify these grasses in areas that have been planted with native grasses. Grasses are extremely difficult to remove effectively. Persistence is necessary to keep them from invading and taking over the landscape.



***Insert Photo

Purslane

Familiar from the spongy succulent quality of the small leaves.

Puncture Vine

These nasty plants produce sharp burs during the summer which are painful if stepped on and readily carried off when stuck on clothing or socks.

***Insert photo

Palm

A common weed carried by birds is the Mexican Fan Palm. Because it is also considered a landscape plant, oftentimes it is left in the landscape which, in turn, allows it to propagate and spread.



Eucalyptus

Sometimes considered “native” due to its ability to acclimated itself to the southern California environment, the Eucalyptus can invade the natural environment and take hold to become a problem. The Eucalyptus secretes a natural substance that eliminates competition. Leaf litter from the Eucalyptus does not allow other species to germinate and grow. The Eucalyptus should be removed from the LA River landscape when it appears.

Weed Control Methods

It is the County’s desire that no weeds be allowed to grow beyond a height of 4". This would indicate that weeds should be removed not less than every two weeks during the height of the growing season.

The most effective and the most labor intensive method of weed control is to pull all weeds by hand. Usually, weeds are allowed to grow to a size of at least 2" so that there is enough area to grab hold of. Over time, properly hand weeded landscapes will have reduced weed infestation because they are not

allowed to go to seed. If weeds are left to go to seed, however, hand weeding can become unmanageable.

Hoeing of weeds is effective as a deterrent to weed growth when the weeds are cut as seedlings (less than 2"). Larger weeds may be able to regenerate from the cut roots, making this method less desirable for their eradication.

Chemical treatment for weed reduction may be less desirable from an ecological standpoint, as any time chemicals are added to planting areas, there is a change in the chemical balance. Also, overuse or misuse of chemicals can cause point source pollution of aquifers and storm runoff systems. Permission from the governing agency needs to be obtained prior to the use of chemicals for weed eradication.

Chemical options for weed control include pre-emergents, post-emergents, and non-selective herbicides. Pre-emergents are applied to weed-free areas creating a barrier in the soil to inhibit the germination of new seedlings. Pre-emergents should not be used in areas where wildflowers or other annual herbaceous plants are desired. Pre-emergents include brands such as Ronstar (granular) and Surflan (liquid). Post-emergents are applied to weeds after germination. Poast (for grasses) and Trimec (for broadleaf weeds) are brands of post-emergent weed controls. Non-selective herbicides such as Round-Up and Finale kill all plants and should be used with care because they will kill or damage desired plants as well as weeds. Non-Selective herbicides can be used in a process called "wicking" to selectively killing weeds while maintaining adjacent ornamental plants. The herbicide is painted or sponged onto the weed only, rather than spraying a large area. The herbicide is then taken up into the plant or "wicked". This process, when completed successfully, will kill the weed.

All manufacturer's recommendations for proper use and application should be followed at all times. Restricted chemicals may only be applied by a licensed professional (Qualified Applicator's Certificate) under the advise of a licensed Pest Control Advisor.

High Level of Weed Control

In areas of high use, it is important to keep areas weed free. Weeds should be monitored weekly and removed no less than every two weeks. Use of chemicals for weed control and suppression needs to be approved by the County.

Medium Level of Weed Control

Areas which use a combination of hand pulling and weed whipping can be considered medium level of weed control areas. These areas may have some planter beds which need to be hand weeded and also areas of Yarrow that need to be weed whipped.

Low Level of Weed Control

Wildflower areas and large slope plantings with woody groundcovers need only seasonal and occasional weed control. These areas are to be weed whipped at least twice per year, once in the spring and then again in the fall for weed control. These areas may need additional treatment to keep weeds from becoming a problem.

Plant Palette

Refer to *Landscaping Guidelines and Plant Palettes for the Los Angeles River and Tujunga Wash* for detailed information regarding approved plant materials. Photographs of selected plant material from the approved plant palette are included as Appendix B.

ARBORICULTURE

Maintenance of the trees is an important aspect of landscape care. Whether the area is monitored on a weekly or monthly basis, at each visit, the trees should be examined for potential problems.

Tree Hazard Evaluation

Any tree that poses a concern to public safety should be immediately barricaded and evaluated by a Certified Arborist. Issues of immediate concern would be trees or branches that are leaning or broken that may fall onto an area of pedestrian or vehicular activity. For further information, an excellent reference is *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas* by Nelda P. Matheny and James R. Clark, published by the International Society of Arboriculture.

Tree Selection

The following are guidelines for selecting trees to augment or replace existing tree stock.

Trees should be healthy with no obvious signs of disease, insects, or physical damage. The trees should be well-rooted in their containers and moist. At no time should trees be allowed to dry out prior to or during planting.

Trees with a broad-leaved, rounded crown (decurent) trees should have a single, straight main trunk and should not have been topped or pruned in a way to encourage a second main trunk. The branching should be evenly balanced around the trunk. There should be no included bark (bark embeded between the truck and a lateral branch). There should be at least 12" of growth from the previous season for smaller growing trees and at least 18" of new growth for trees that will ultimately be large trees. More growth is preferable. Trees should be able to stand upright when the nursery stake is removed. Trees should be rejected that touch the top of the planting container when untied from the nursery stake.

It is preferable to have smaller temporary branches (less than 1/4" of the diameter of the trunk) below the main scaffold branches. These should not be removed during planting.

Broad-leaved or coniferous, central trunked (excurrent) trees should have a single, straight trunk with no double leaders (codominant stems). The trees should not have been pruned to encourage second trunk. The branches, again should be evenly distributed around the main trunk. Do not plant evergreen,

coniferous trees that have been topped or otherwise obviously pruned.

All trees should be attractive and should not have been pruned or need to be pruned more than 25% of the total canopy of the tree for it to be attractive and well balanced.

Check the planting container to insure that there are no visible roots showing above the soil. The planting pot should not have had the soil removed from the initial soil level nor should the tree truck have been buried deeper than it was originally grown.

Trees should be rooted in the container, but should not have been left in the container so long that the roots completely fill the container. Roots should not be circling the tree or kinked within the container. The tree may be acceptable if the circling roots are not too large and can be straightened out during planting.

Trees should be of sufficient height and caliper for the container size and plant type specified. Typically, 15-Gallon trees should be 6'-8' in height, 24" box trees should be 8'-10' in height, and 36" box trees should be 10' -12' in height. These sizes are guidelines only, as slower growing trees can differ greatly from larger trees.

Fifteen gallon trees (and larger) should be staked or guy wired according to the tree staking details within this manual.

Tree Pruning

The following information is based on the International Society of Arboriculture standards.

Trees along the LA River are intended to appear as "natural" as possible. Trees should be pruned for safety and tree health reasons such as removing dead branches, removing rubbing branches, or reducing hazard potential. Trees should not be topped for any reason.

Pruning to remove dead, weak, or diseased branches can be done at any time of the year. Branches should be cut back to the main trunk at the branch collar (thickened area adjacent to the truck) or back to a branch lateral (the edge of a large branch). Do not cut branches flush to the trunk or leave stubs.

Crown cleaning, thinning, or raising is best left to professionals. A Certified Arborist should be consulted prior to any tree work being done.

Under no circumstances should more than 25% of a tree be pruned in one season. Trees should not be pruned at time of planting.

Wound dressing are no longer believed to prevent insects or disease and are not recommended for use.

The best time to prune trees is when they are dormant, typically in the winter time after leaf drop, but before the first leaf budding in spring. However, safety pruning should be done as needed and is not dependant upon the season. The least desirable time to prune is in the springtime after the spring growth flush. Several species, including Eucalyptus and Oaks are susceptible to insects and disease that are readily spread during certain times of the year. These trees should only be pruned between October and

March when conditions are correct. A Certified Arborist should be consulted prior to pruning these trees, especially if they are of historical value or large specimens.

Tree Replacement

Trees that are diseased or damaged should be replaced as soon as possible. Ideally, trees should be replaced with a tree of equal size. Should this not be possible, a fifteen gallon tree should be the minimum size planted. Planting in the fall is the most favorable for root establishment; however, a container plant can be safely planted most any time of the year. Trees as well as other landscape plants should not be installed during unusual or extreme conditions such as at a time when frost is eminent or when the soils are overly saturated. Trees should not be pruned at the time of planting.

Pruning Schedule

Unless there are broken branches, trees should not be pruned for the first season after planting. For the first five years (approximately), young trees should be inspected during the area's regular maintenance inspection for broken branches or safety concerns. Annually, these young trees should be inspected and pruned to correct defects such as poor structure, crossing branches, suckers, watersprouts, and weak branches.

The temporary branches under the structural scaffold branches can be removed anytime after the first year or left for an additional year or two depending on the species. These branches encourage trunk girth and strengthen the tree for its lifetime. These temporary branches should not be left too long that they grow of a size that will leave a large scar (1" -2") when removed. As soon as these branches become a hazard to pedestrians, they should be removed.

Diseased branches should be removed and the trees should be carefully monitored to watch for decline. Should the tree continue to exhibit signs of disease, it should be removed and disposed of in an appropriate manner. Trees with insect infestation should be completely removed from the site and chipped for disposal. Wood that is cut and suitable for firewood should be covered in plastic for a minimum of six months to insure that the insects have not been allowed to escape and infest other trees. When trees are removed, the stumps should be removed or grinded to 12" below the finish surface. Chippings from grinded stumps should be removed and replaced with clean top soil.

After the initial five years of planting, trees need less pruning. Trees should not be pruned unless there is a compelling reason such as rubbing branches, weak branches, or branches that interfere with pedestrian safety or block safety lighting. It is typical to place trees on a three year pruning cycle; however, many trees will not need more than occasional pruning to reduce structural problems and breakage. The trees along the LA River are intended to appear as natural as possible. Pruning should be minimal.

Tree clearance should be seven feet in pedestrian areas and 14 feet for vehicular areas insuring vertical clearance within ADA guidelines and adequate headroom and for safety.

Tree Staking

All newly planted trees should be staked in accordance with the tree staking detail provided in this manual. Tree stakes should be checked during each maintenance inspection. Loose ties should be

repaired. Each spring, after the windy season, tree ties should be examined and removed, if possible. Tree stakes should be removed by the third year after planting unless the tree is not able to support itself. Tree ties should be loosened, as needed during the year to prevent the tie from being embedded in the bark and damaging the tree.

SHRUB, GROUNDCOVER, AND VINE MAINTENANCE

Shrub Management

As with trees, all shrubs should be allowed to grow in as natural a state as possible. Shrubs should not be hedged, balled, or sheered, but rather, “selective” pruning techniques should be utilized. Selective pruning entails cutting branches back to the main stem or large branch rather than trimming the ends of a branch and leaving a stub. No more than 30% of a shrub should be trimmed out in a growing season.

Shrubs may be cut back more severely when adjacent to roads, walkways, or driveways or where they may obscure visibility for safety purposes. A shrub that has grown too large for the area in which it was planted should be replaced with a shrub of like character that will not grow as large.

Shrubs should be pruned at any time of the year to remove dead plants, broken branches, repair damage, or remove an obstruction. General maintenance including thinning should be conducted in the early fall (typically September/October) and after the first growth has hardened off (typically March/April). Dead shrubs should be replaced upon removal. It should be anticipated that up to 10% of a landscape may need to be replaced each year due to pests, irrigation problems, and natural attrition. This on-going plant replacement and upgrading should be considered a natural part of the maintenance of an area.

Shrubs should be planted in accordance with the planting details in this manual. It is imperative that plants are not allowed to dry out prior to or after planting. Even native shrubs that use less water need to have an adequate and consistent water supply during establishment. Shrubs should be watered daily for at least the first week, especially in hot weather. Daily watering may need to be extended based on the plant species and time of year. Regular watering should continue on at least a weekly basis until established (30 days or more). After the shrubs are established, they can be placed on the regular, seasonal watering schedule.

Woody Groundcover Management

Woody groundcovers should be maintained similarly to shrubs as described above. Woody groundcovers do not need to be pruned unless they encroach upon roads, walkways, or driveways. Should the ground covers become overly dense, it may be necessary to remove some of the initial planting to allow the remaining plants to grow and spread. Groundcovers that become unattractively thick should be replaced over time. Refer to planting details for appropriate planting techniques and the proper groundcover spacing method.

Herbaceous Groundcover and Wildflower Management

It is important that herbaceous groundcovers and wildflowers be able to reseed themselves annually. These areas should not be cut until after the flowers have set seed in the spring. This usually occurs

between March and May. Wildflower areas should then be weed whipped to a height of 4" between May 1 and June 30 each year. Weeds that flower during the growing season should be hand cleared prior to weed whipping so that they do not spread become a problem. After the initial weed whipping in May, the areas should be weed whipped, as needed, on a periodic basis throughout the year to discourage weed growth. Cuttings should be removed from the site after weed whipping; however, seed pods of desired plants may be left to encourage the next season's growth.

Chemical eradication should not be used in wildflower areas.

Depending on the mix of wildflowers used, it may be necessary to augment existing areas, expand areas or overseed new areas. Refer to *Landscaping Standards and Plant Palette for the Los Angeles River and Tujunga Wash* for acceptable wildflower seed mixes.

After soil preparation, the areas to be seeded should be brought to a finish grade. The soil should be free from rocks, sticks, debris, clumps, clods, or anything that will impede the germination of the seed or leave less than a smooth and even surface for the hydroseed. The finished surface should be approximately ½ inch below the surface of all walks, curbs and paved areas without abrupt grade changes.

Seed mixes can be spread by hand or hydroseeded. Hand seeding can be done with or without a "topper" of topsoil. A light sprinkling of topsoil helps to hold the seeds in place and reduces the amount of seed eaten by birds.

All areas to be hydroseeded should be irrigated to provide a moist seed bed. The areas should receive several consecutive watering cycles the day of the hydroseeding, in order to thoroughly saturate the soil without puddling or ponding.

Hydraulic equipment used for the application of slurry should have a built-in agitation system with an operating capacity sufficient to agitate, suspend and mix enough to prevent stoppage and to provide an even distribution of slurry. The pump should have a minimum pressure of 150 psi and sufficient additional pressure to insure adequate coverage. Nozzles and hoses should be of sufficient size and length to provide uniform coverage without waste. All equipment needs to be clean and free of seed species that are not shown on the plans. When seeding in small areas, slurry can be mixed and spread by hand.

It is important to spray with a uniform, visible coat by using the green color of the wood pulp as a guide.

Any slurry mixture that has not been applied to the areas within four hours after mixing should be removed and disposed of in a lawful manner.

It is important to maintain the area with proper irrigation to insure germination, especially when using more ornamental, herbaceous ground covers such as Gazanias. At no time, should the new seeds be allowed to dry out until they are completely germinated and have begun to grow stronger. Areas which do not germinate will need to be reseeded. Wildflower seeds can be broadcast through an area in the fall and left to germinate with the natural rainfall, if so desired, and do not need to have extra or continued irrigation.

Grass, Sedge, and Yarrow Management

Ornamental grasses, native grasses, and sedges should be cut back once per year in the fall to remove excess growth, dead flowers, or other unattractive growth. This encourages new grow in the spring. September or October are appropriate for this type of clean up, after the heat of summer, but prior to the winter rains.

Achillea milifolia (Yarrow) can be used as a turf substitute. The plants should be allowed to bloom in the spring and the late summer. After this bloom period, the Yarrow should be weed whipped to between 4" and 6" to knock down the seed heads. Periodically through the year, the Yarrow should be weed whipped to discourage weed growth and provide a consistent "lawn-like" appearance.

Vine Management

Each September, all vines should be trimmed so that they hang no more than two feet below the top of any wall or parapet. Vines that are self-adhering should be monitored on a monthly basis to insure that they are affixing themselves to the walls and not growing on the ground or otherwise falling over. Epoxy vine supports should be used to adhere all other vines to the desired wall surface. See the vine planting/attachment detail in this manual.

LITTER CONTROL

All trash, debris, and other unsightly material should be removed from the LA River area on a regular basis. Frequency of litter control is described based on a high, medium, or low level of service. As irrigation should be checked on a weekly basis, so should each site be monitored for excessive litter. Litter problems should be corrected as soon as they are noticed whether it is during the time regularly scheduled for litter removal or not.

High Level of Litter Control

Areas defined as receiving a high level of control include bicycle rest stops and other areas which receive a higher level of patronage. These areas typically have trash receptacles. Trash receptacles should be checked every week and should be emptied no less than every two weeks. All other debris should be removed at this time. Pathways, bike trails, and access roads should be cleared of rocks, branches, or any other debris.

Medium Level of Litter Control

Litter control in areas of a medium level of service should be monitored and cleared a minimum of once per month. All trash receptacles, if any, should be emptied and all trash and debris removed. Rocks, branches, and other debris should be removed from pathways, trails, and access roads.

Low Level of Litter Control

All other areas that are not open to the public or not readily accessible and are not receiving a higher level of services should be monitored and all litter and debris removed on a semi-annual basis.

GRAFFITI, HARDSCAPE, AND SITE FURNISHINGS

Graffiti

The best deterrent to graffiti is immediate removal. If graffiti is removed within 24 hours of its first appearance it is unlikely to be painted. Graffiti should be reported to _____. Minor occurrences can be removed with a cloth and graffiti removal product such as “Goof-Off”. Care should be taken not to also remove the underlying paint, if any. Graffiti should not be painted over without prior County approval.

Graffiti coatings can be instrumental in combating graffiti. There are two types of graffiti coatings: permanent and sacrificial. Permanent coatings seal the undersurface and make it impervious to paint, tar, markers, etc. These coatings have gone out of favor because graffiti removal involves the use of solvents and intensive scrubbing. Sacrificial coatings are intended to be removed along with the graffiti. Some of these products have a waxy, polymer base that is removed with a hot water pressure sprayer. After cleaning graffiti in this manner, the coating needs to be immediately replaced in order to be effective.

Hardscape

Hardscape elements include asphalt access roads, bike trails, and pathways, concrete walkways, pavers, decomposed granite and other “softer” paving materials, as well as, boulders, cobble, and walls.

Refer to *Landscaping Guidelines and Plant Palettes for The Los Angeles River and Tujunga Wash* for specific types of approved site amenities.

Asphalt surfaces need to be monitored for excessive cracking. These areas should be reported to the County for repair. Dirt, rock, mulch, and other dry materials should be swept from the path or road surfaces. Due to environmental and/or noise concerns, gas powered blowers or water should not be used for surface cleaning.

Walls, cobble, boulders, and concrete surfaces should be monitored for graffiti and damage on a regular basis. Any area that appears to be unsafe should be immediately barricaded until it can be repaired.

Benches

Benches and trash receptacles should be monitored monthly for foreign substances, such as gum, bird droppings, graffiti, etc. These items should be cleaned immediately. Each should be monitored on a monthly basis for safety concerns such as structural failure or sharp edges. Should the safety of any site amenity be in question, the item should be immediately removed or barricaded. And the concern should be reported to the County.

Drinking Fountains

Drinking fountains have numerous bearings and other moving parts that break down or become “stuck”. Drinking fountains run the risk of leaking or running excessively causing water waste, slippery surfaces and a general nuisance. Drinking fountains are typically located in bicycle trailhead areas, rest stops, and

small park settings. These areas should already be receiving a high level of irrigation and litter control inspection. Each week during summer months when irrigation is being monitored weekly and certainly every other week when litter is being picked up, the drinking fountains should be checked for leaks, excessive run off, and to insure that they are functioning correctly and the water pressure is appropriate for use. Each drinking fountain should be turned on and visually checked. If the fountain is not working properly, it should be shut off at the water source until it can be repaired. Drinking fountains should be repaired within one week of determination that there is problem.

Signage and Public Art

Some of the public areas within the LA River corridor include signage, decorative fencing, or public art. In addition to graffiti which has already been discussed, etching or carving can damage site amenities and public art. Many of the signs are covered with a heavy plastic such as Lexan. Periodically this covering needs to be replaced when it becomes too scratched to be able to read the exhibit. The plastic coverings are affixed with fasteners that can be removed and replaced. Care should be taken in removing graffiti or other damage from pieces of public art and signage. Work of this type should be approved by the County prior to the start of such clean-up efforts.

SOILS TESTING AND FERTILIZATION

Soils Testing

Prior to installation of new planting areas and periodically throughout the life of a landscape, agronomic soils testing should be conducted to insure that the soils are properly balanced for the optimal health of the landscape.

During the initial installation of new plantings, after the completion of rough grading and prior to soil preparation, testing of planting soils and composted materials should be completed by an independent agronomic soils testing laboratory (member of the California Association of Agricultural labs). Representative soil samples shall be taken in the field and a written report shall be prepared by the soil scientist and shall include recommendations for applications, pre-plant fertilization, hydromulch slurry, and post-maintenance fertilization. A second soils report shall be performed after soil preparation to confirm that soil preparation was performed in compliance with the pre-plant soils report and specifications.

Soils for cultivated crops are typically tested every three years, but may be tested annually depending on the type of crop, its economic value and rotation methods. It is not unusual for a landscape area to never be tested again after installation. Unless there is a compelling reason to question the soil content of fertility, a soils test conducted every five years should be able to indicate the content and health of the soil and to determine an appropriate fertilization program for an established landscape.

Some soils testing labs will come to the site and collect the samples. Many firms will be able to test and report on a sample that is sent to them. Should the site manager choose to use the latter method, be sure to first contact the lab to get the instructions for taking the sample, soil test kit (if appropriate), and forms necessary to process the work.

A typical method of collection might be to take samples from several areas within the site at a depth of not less than six inches, twelve being preferred to be sure to avoid any random substance that may have been spilled on the surface, but is not indicative of the area's overall soil character. Mix the samplings in a container taking care to break up lumps or clods. Allow the soil to air dry under natural conditions (not under a heat source or other artificial drying system that may change the soil character. A pint of soil is then placed in an appropriate container for transport and sent off following the laboratory's instructions. It usually takes about two weeks to receive the results of the soils testing. The lab should provide information on the balance of nutrients and PH, comparing it with what should be expected for landscape growing conditions. A prescription will be included for corrective action, as necessary, or a balanced program to meet the needs of the plants.

Fertilization

There is an ongoing debate regarding the fertilizer needs of ornamental landscape plantings, especially landscapes using southern California native plants. One point of view is that native plants should not be fertilized while the other opinion leans toward the use of natural or artificial fertilizers. For the purposes of this manual, fertilizers will be discussed. The decision on where and whether fertilizers should be used should be determined by the County as appropriate to each individual site and area.

The best method of determining an appropriate fertilizer mix is to conduct soils testing and have a fertility program developed by a Certified Pest Control Advisor. The following information is useful only as a guide of what might be a typical fertility program for an ornamental landscape. Fertilizer should be a long-lasting, slow release fertilizer compound having a N-P-K ratio of 16-6-8. Fertilizer should be applied at the rate recommended by the manufacturer two times per year. Ammonium sulfate fertilizers should not be used during the heat of summer.

Planting Tablets

Planting tablets may be used when installing new or replacement plants. They should be seven gram, slow-released type with potential acidity of not more than 5% by weight containing the following percentages of nutrients by weight:

20% nitrogen

10% phosphoric acid

5% potash

2.6% combined calcium

1.6% combined sulfur

.35% iron (elemental) from ferrous sulfate

One tablet should be used for each one-gallon container plant, two for a five-gallon container plant, three for a fifteen gallon container plant, four for a 24" box tree, six for a 36" box tree, and eight for a 48" box

tree or greater. These are guidelines; however, and manufacturer's recommendations should supercede when available.

MULCH

Mulch should be used in all planting areas to allow the soil to retain its moisture, reduce competition for weeds, and maintain a tidy appearance. Mulch should consist of recycled chippings from an approved source that do not contain Pine, Eucalyptus, trash, or debris. If recycled materials are not available, a premium grade shredded cedar bark can be used. Mulch can be delivered to the site in a bulk form or be purchased in 3 cubic yard bags. All planting areas should receive a 3" depth layer of mulch. Slopes can be mulched; however, large particles (2" on up) will need to be used so that it is not blown on windy days. A typical mulch size for all areas is a blend of 2" to 4" particles.

Chippings from annual tree pruning can be used as a good source of mulch. Diseased or insect infested trees should not be used as mulch.

Mulch should be replenished in all planter beds not less than every two years.

PEST MANAGEMENT

Landscape pests are typically classified as either vertebrate (having a backbone) or invertebrate (usually insects). Some, like squirrels and rabbits, may be considered attractive or appealing in the landscape. Nevertheless, their damage can be a problem. Slope areas heavily infested with ground squirrels and/or meadow mice can be undermined, lose their integrity, and be subject to slope failure. *Wildlife Pest Control Around Homes and Gardens*, published by the University of California Cooperative Extension is a good resource for more information regarding animal and birds and the damage that they can cause.

Trapping is a method of vertebrate pest control and can be a solution in most of the cases discussed below. Traps are placed in areas where it is likely the animal will cross. After the trap has been sprung, the animal is removed from the site. This method has the advantage of not introducing additional chemicals into the planting area. However, trapping can be more time consuming and less effective than the use of pesticides.

Ground Squirrels

Ground squirrels are a burrowing animal that seems to inhabit slopes and rocky areas. Areas that have fruit or nut trees are a preferred habitat. They dig underground burrows that may be fairly large causing holes and dirt mounds. Squirrel control is conducted mainly by introducing a small feeder often built from 4" PVC pipe. The feeder is filled with a product containing an anticoagulant that over time causes the demise of the squirrels. While these chemicals are not restricted, squirrel control should be conducted only with County approval by a licensed (Qualified Applicator's Certificate) professional.

Gophers

Gopher damage is readily seen, especially in turf areas. A small circle (3" in diameter) is located in an area. Usually, there is associated mounding after extended use. The circle may be open or be filled in with what appears to be a granular pile of soil. Gophers are solitary creatures, so even though there may be numerous gopher mounds in an area, they are most likely from the same gopher. One gopher may occupy a 50 foot radius. Gophers can cause extensive damage to groundcovers and grasses. They can

also girdle shrubs and trees, killing them.

Gopher control (other than trapping) is primarily through the use of gopher baits. The most effective gopher bait is Fumitoxin, a restricted chemical, and must be used under the guidance of a Pest Control Advisor by a certified technician.

Rabbits

It is important when conducting a control program for rabbits to understand that many people find rabbits to be a welcome addition to the natural environment and are opposed to rabbit control programs. Rabbit control should be conducted by a professional pest control service with extensive experience in rabbit abatement.

Meadow Mice (Voles)

In many parts of the urban environment, especially as it interfaces with large open areas, a habitat has been created that promotes that insurgence of meadow mice. These rodents do not climb and are not usually found in or near dwellings, as they prefer open fields and rolling hills.

Areas with dense, irrigated herbaceous groundcovers are particularly attractive to these small rodents. Meadow mice create small burrows that are not very deep, but they also cut trails through vegetation that can over time become unsightly. Habitat modification can be very effective in reducing the number of meadow mice to a manageable level. Replacing lush, herbaceous groundcovers with drought tolerant, woody groundcovers can be an effective step in population reduction.

Chemical deterrents include using the same feeders that are placed for squirrel control. They are not very effective, though, because with an abundant, preferred food supply there is not compelling reason to use the feeders. A more effective control method is to “salt” all the burrow entries with a palatable, but effective bait. This is time consuming and may leave residual granules that are also harmful to other desired animals.

Rats and House Mice

Rats and mice are not typically considered a landscape problem, as they prefer the environment of and around habitable structures. Vegetation thinning, litter removal, and removal of wood scraps or debris that might create a habitat for them is usually sufficient to reducing their populations to manageable numbers.

Invertebrate Pests

There are numerous chewing, boring, and sucking insect pests that inhabit a landscape. It is only when the populations become out of balance that these creatures become a problem. The use of chemicals for the reduction of insect populations may reduce the pest for a time, but may not create a balance that is sustainable and may reduce or eliminate populations of beneficial insects, causing more harm than good in the long run.

When an insect infestation is suspected and causing a problem, it is important to get an evaluation for a licensed Pest Control Advisor to prescribe a program of treatment. Integrated Pest Management (IPM) is an effective method of pest management.. IPM looks at the landscape as a holistic system and looks to find methods to balance that system rather than treat only one aspect of it.

Some pests of concern are borers that are infecting Oaks and Eucalyptus (different species) and also the Oleander blight.

Coast Live Oak (*Quercus agrifolia*) is currently being monitored in urban areas for Sudden Oak Death which as its name indicates, is killing many heritage Oaks. Indicators of concern include, a black sap on the trunk at approximately a three foot height, exit holes from a variety of insect borers, and sawdust trails on the trunk, also at about a three foot height. Should these indicators be noticed, a certified Arborist with knowledge of Oaks be contacted for an evaluation.

Many Eucalyptus species are susceptible to infestation by the Eucalyptus Long Horn Beetle. Borer damage is evident from the exit holes left on branches or trunks. There is often dieback of new growth at the tips of branches that also indicates that the tree is under attack. Reducing the possibility of drought stress by providing supplemental irrigation seems to be the most effective method of insuring the continued success of these Eucalyptus trees. The borers prefer dead and dying material and will usually only attack trees that are under stress. The trees can coexist with some borer activity and even fend off attack if their environment is of a quality to promote tree health.

It is important to note that both the Oaks and the Eucalyptus should be pruned only between October and March when conditions are favorable and the insects are inactive. A certified Arborist should be contacted and supervise the pruning. Wood taken from the trees should either be chipped and disposed of in a lawful manner. If it is to be used for firewood, it should be covered and sealed with plastic for a period of not less than six months to destroy any insects that may be present in the wood.

Oleander Blight is also of recent concern. Research indicates that the blight is a virus spread by insects. It also appears that the virus is spread through the use of pruning equipment that has not been cleaned with bleach between uses. It is not recommended that Oleanders continue to be planted, as there is not a method of treatment for the blight at this time. Existing Oleanders should be carefully maintained so as not to spread the disease.

GREEN WASTE MANAGEMENT

Green waste refers to the trimmings, clippings, and cuttings of landscape plants. Because the landscape areas within the LA River corridor are dependant on mulch to reduce weeds and promote water retention, it is necessary to look for available sources of mulch.

Residual material from annual and occasional tree pruning should be utilized on site whenever possible. Material that cannot be reused on site and other green waste that is not suitable for mulch should either be stock piled for use as compost or removed to an approved green waste facility.

APPENDICES

A: Plant lists from the *Landscaping Standards and Plant Palette for the Los Angeles River and Tujunga Wash*

B: Photographs of selected plant materials from the approved plant list

C: Planting and Irrigation Details

D: Water consumption calculations and sample irrigation schedule

E: Maintenance Monitoring Checklist

F: Capital Improvement Project Schedule and Agency Contact List

**Photographs of Selected Plant Material
from the Approved Plant List**



Platanus racemosa - California Sycamore



Populus fremontii - Western Cottonwood



Muhlenbergia rigens - Deergrass



Elymus glaucus - Wild Blue Rye



Cercis occidentalis - Western Redbud



Quercus agrifolia - Coast Live Oak



Rhamnus californica - Coffeeberry



Rhus integrifolia - Lemonadeberry



Heteromeles arbutifolia - Toyon



Encelia californica - California Encelia



Yucca whipplei - Our Lord's Candle



Baccharis pilularis - Coyote Bush



Artemisia californica - California Sagebrush



Epilobium canum ssp. *latifolium* (*Zauschneria californica*) - California Fuchsia

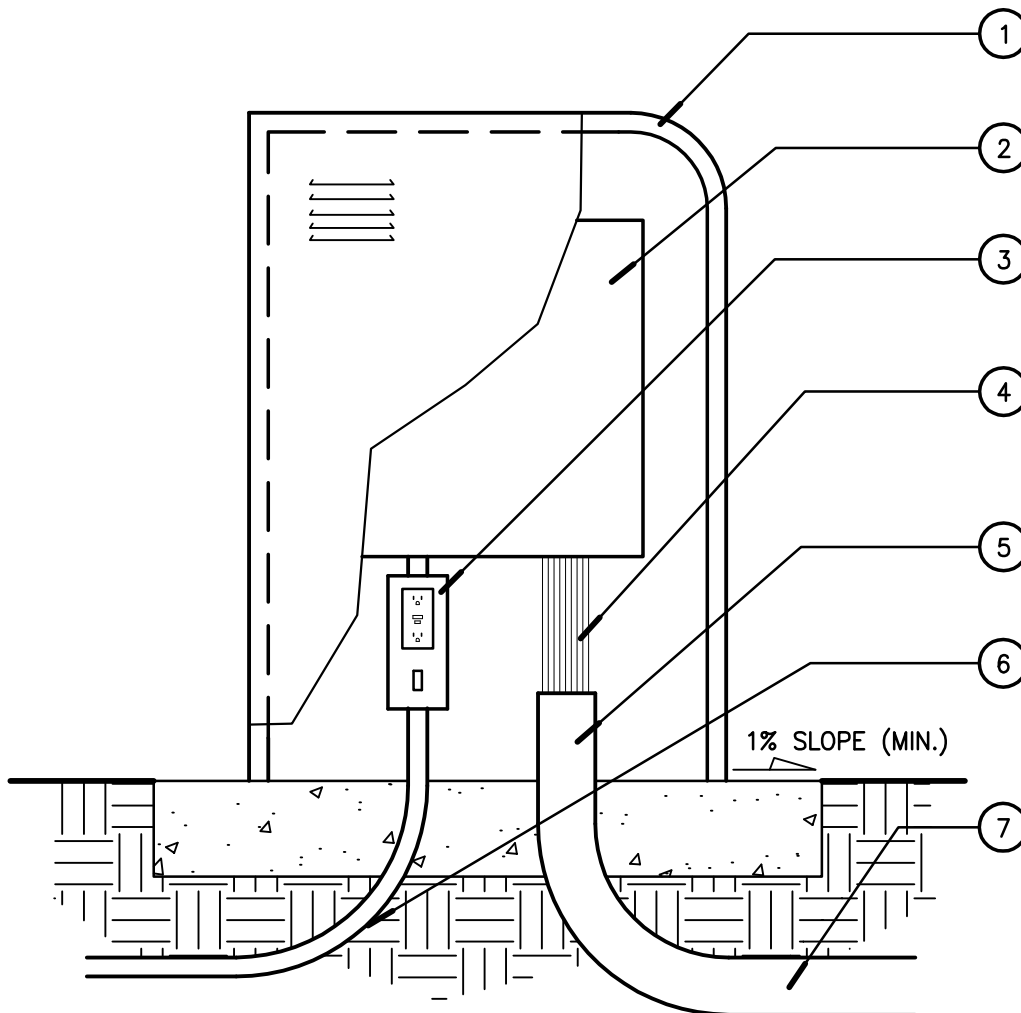


Eschscholzia californica - California Poppy



Sisyrinchium bellum - Blue-Eyed Grass

Planting and Irrigation Details



1. IRRIGATION CONTROLLER ENCLOSURE (STAINLESS STEEL UNLESS OTHERWISE NOTED)
2. AUTOMATIC CONTROLLER – INSTALL PER MANUFACTURER’S RECOMMENDATION
3. ELECTRICAL OUTLET AND ON/OFF SWITCH
4. DIRECT BURIAL WIRES TO AUTOMATIC VALVES IN FIELD
5. LONG SWEEP PVC ELL – SIZE AS REQUIRED

6. 110 V POWER SUPPLY
7. EXTEND PVC SLEEVE AS REQUIRED TO CLEAR SLAB, FOOTING, ETC.

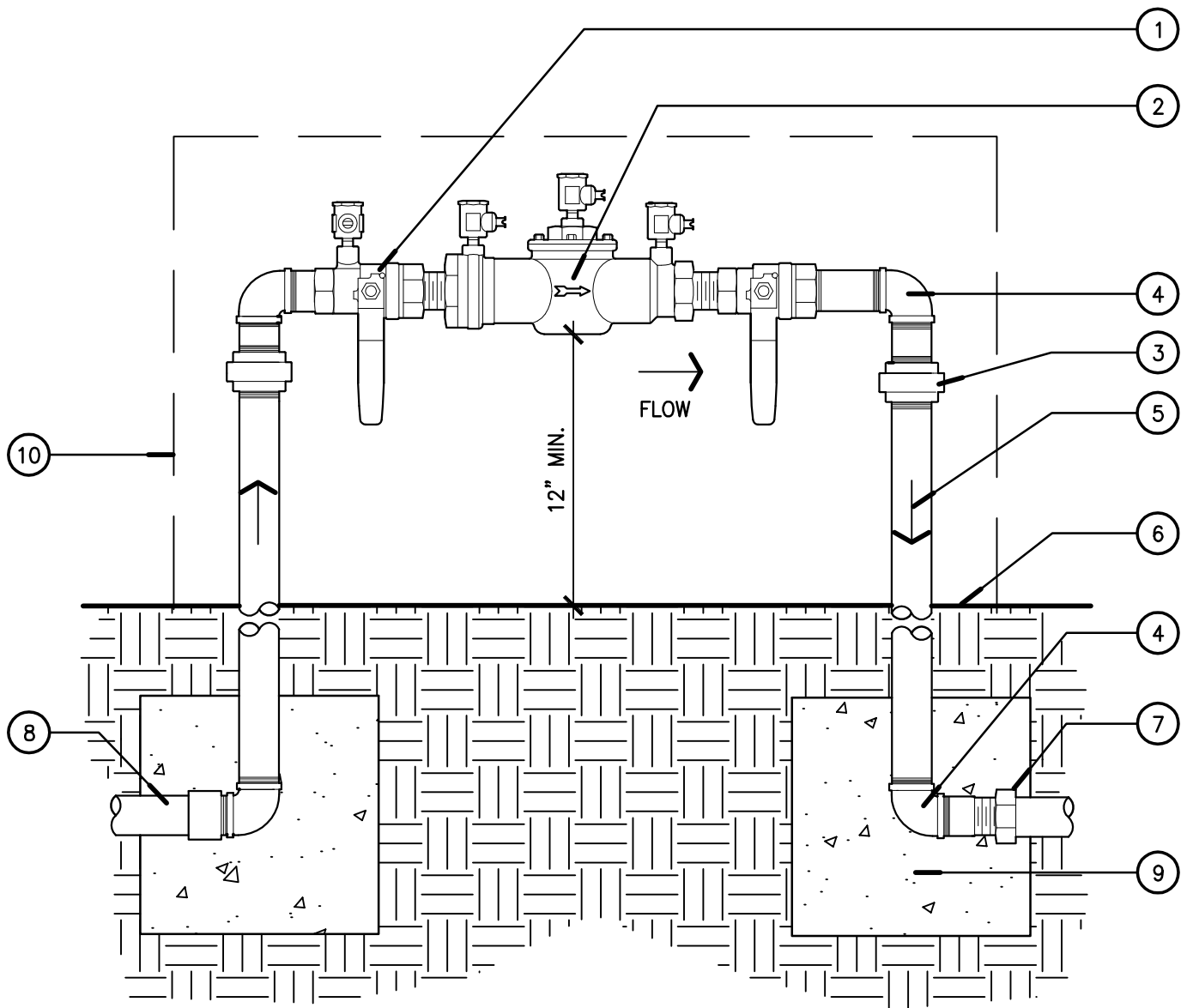
NOTE:

CONSTRUCT 6" THICK CONCRETE SLAB FOR CONTROLLER. ALLOW 6" LIP ALL SIDES. CONNECT ENCLOSURE TO SLAB PER MFG.’S RECOMMENDATION.

INSTALL CONTROLLER PER ALL GOVERNING CODES, LAWS, AND REGULATIONS.

CONTROLLER

SCALE :
NOT TO SCALE



1. SHUT-OFF VALVE (TYP.)
2. REDUCED PRESSURE ASSEMBLY
3. BRASS UNION (TYP.)
4. BRASS 90 ELL (TYP.)
5. FLOW DIRECTION
6. FINISH GRADE
7. SCH. 80 PVC MALE ADAPTER (TO SPRINKLERS)
8. TO POINT OF CONNECTION – ADAPT AS REQUIRED
8. 1 CU. FT. CONCRETE THRUST BLOCK (TYP.)

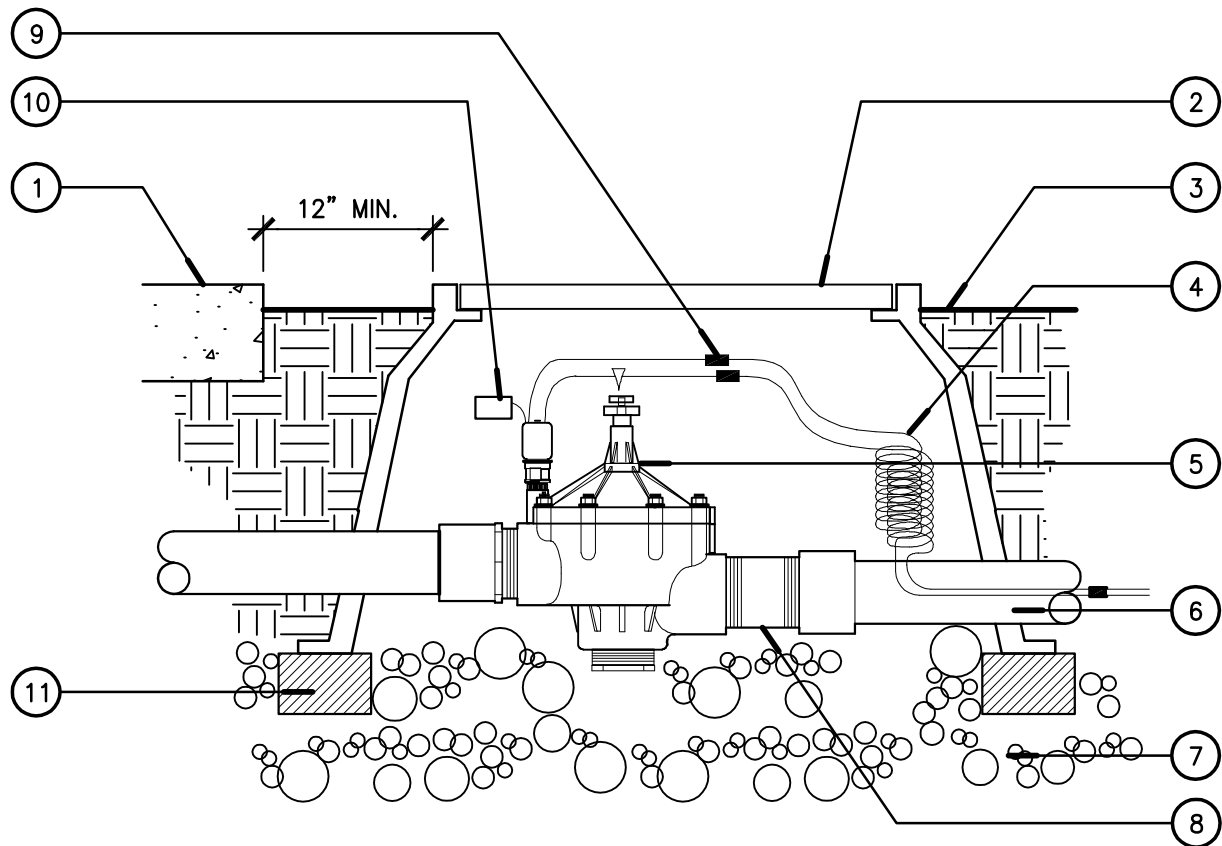
10. STAINLESS STEEL ENCLOSURE – VANDAL RESISTANT

NOTES:

- LOCATE INSIDE STAINLESS STEEL ENCLOSURE, IF NOTED ON PLAN
- MAINTAIN MIN. 12" CLEARANCE ON ALL SIDES FROM BUILDINGS, WALLS, ETC.
- INSTALL BACKFLOW PREVENTER PER ALL GOVERNING CODES, LAWS, AND REGULATIONS.

BACKFLOW PREVENTION DEVICE

SCALE :
NOT TO SCALE

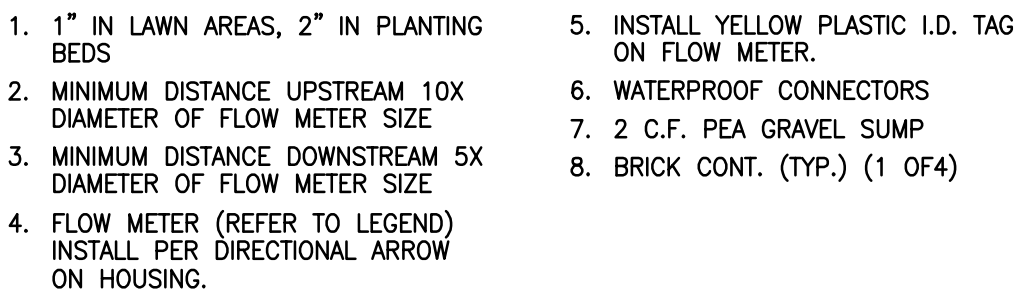


- | | |
|---|---|
| 1. CURB, SIDEWALK, ETC. | 6. PVC MAINLINE |
| 2. ROUND PLASTIC VALVE BOX
W/HINGED, LOCKING TOP
(LABELED MASTER VALVE
W/CONTROLLER # IN 2"
LETTERS W/HOT IRON)
SET 1" ABOVE FINISH GRADE
IN PLANTING AREAS ONLY. | 7. 2 C.F. PEA GRAVEL SUMP |
| 3. FINISH GRADE | 8. SCH. 80 PVC UNION |
| 4. COMMON AND CONTROL WIRES
TO CONTROLLER LOCATION
PROVIDE 2' EXPANSION LOOP
FOR EACH WIRE. | 9. WATERPROOF CONNECTORS |
| 5. MASTER VALVE (REFER TO
LEGEND) | 10. INSTALL YELLOW PLASTIC I.D. TAG
ON M.V. - INDICATE CONTROLLER #. |
| | 11. BRICK CONT. (TYP.) (1 OF 4) |

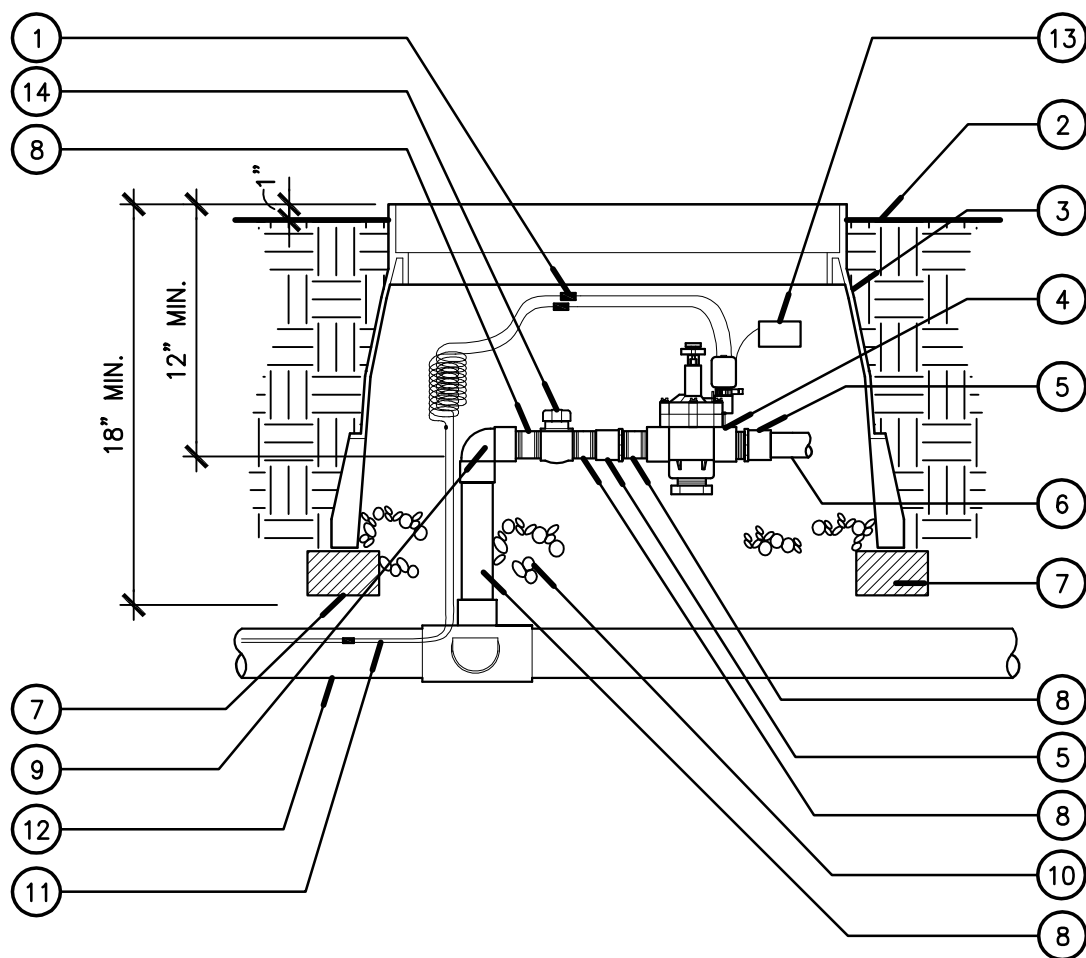
NOTE: CONCRETE VALVE BOXES SHALL BE USED IN AREAS
SUBJECT TO POTENTIAL CONTACT WITH MOTORIZED VEHICLES.

MASTER VALVE

SCALE :
NOT TO SCALE



SCALE :
NOT TO SCALE

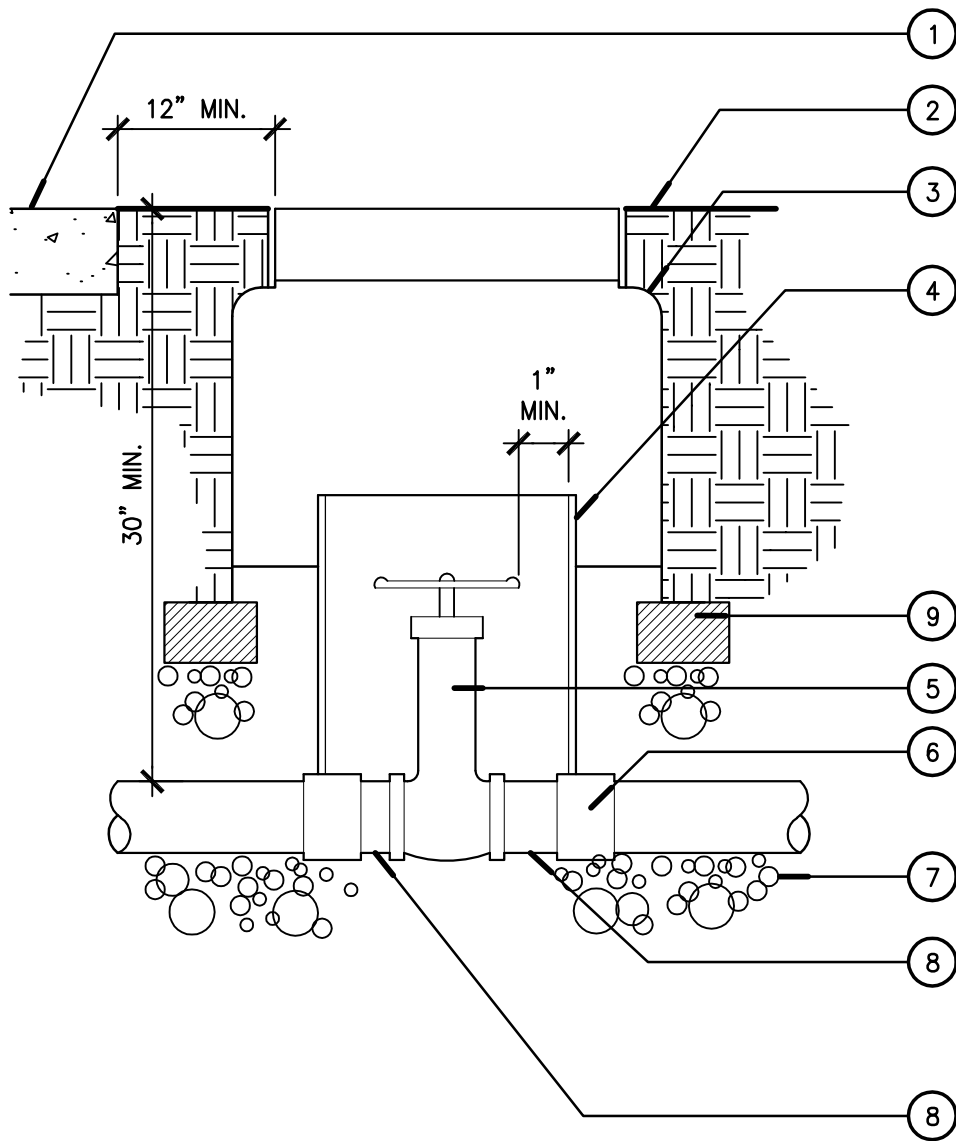


- | | |
|--|---|
| 1. WATERPROOF WIRE CONNECTORS | 8. PVC SCH. 80 NIPPLE (NOT CLOSED) |
| 2. FINISH GRADE | 9. PVC SCH. 80 S X T ELL |
| 3. RECTANGULAR PLASTIC VALVE BOX WITH HINGED, LOCKING COVER (MARKED IRRIGATION CONTROL VALVE W/CONTROLLER # & STATION # IN 2" LETTERS W/HOT IRON) SET 1" ABOVE FINISH GRADE IN SHRUB AREAS ONLY. | 10. 2 C.F. PEA GRAVEL SUMP |
| 4. ELECTRIC CONTROL VALVE (REFER TO LEGEND) | 11. COMMON AND CONTROL WIRES TO CONTROLLER LOCATION. PROVIDE 2' EXPANSION LOOP FOR EACH WIRE. |
| 5. SCH. 80 PVC UNION | 12. PVC MAINLINE PER PLAN |
| 6. PVC LATERAL LINE — ANGLE TO PROPER DEPTH WITH 45° ELLS | 13. INSTALL YELLOW PLASTIC I.D. TAG ON M.V. — INDICATE CONTROLLER #. |
| 7. COMMON RED BRICK (4 REQUIRED) | 14. BALL VALVE (REFER TO LEGEND) |

NOTE: CONCRETE VALVE BOXES SHALL BE USED IN AREAS SUBJECT TO POTENTIAL CONTACT WITH MOTORIZED VEHICLES.

REMOTE CONTROL VALVE

SCALE :
NOT TO SCALE



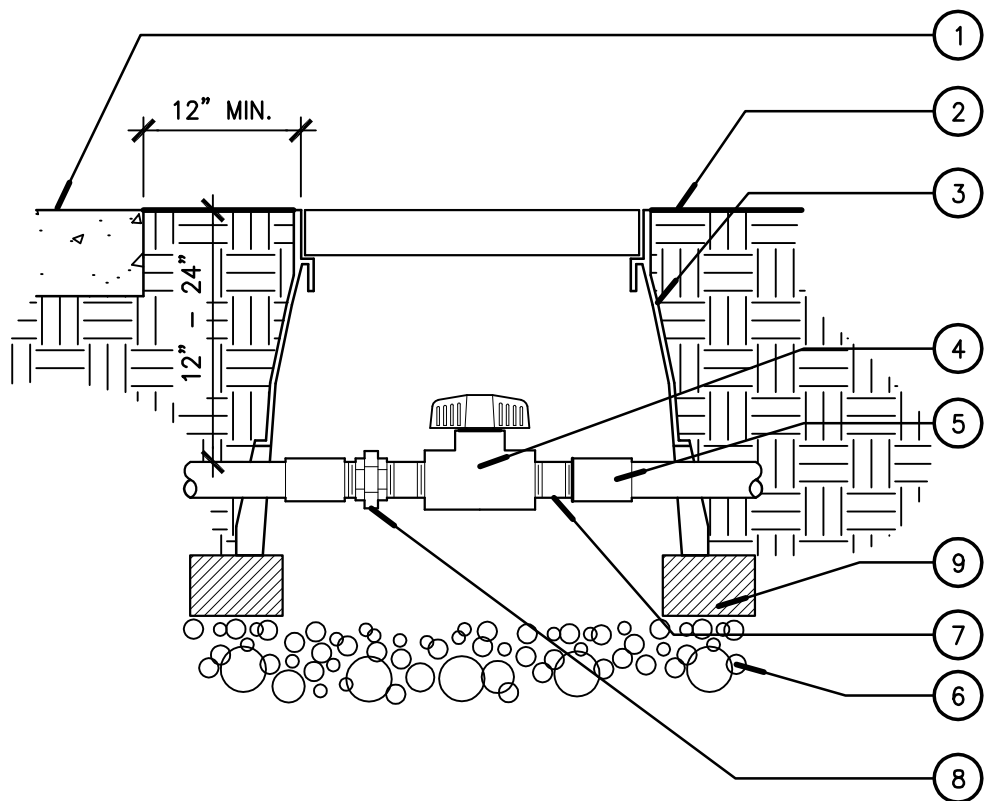
1. CURB, SIDEWALK, ETC.
2. FINISH GRADE
3. ROUND PLASTIC VALVE BOX
W/ LOCKING TOP (HEAT BRAND
'GV' IN 2" LETTERS ON LID)
4. PLASTIC PIPE SLEEVE (MIN.
4" DIA.)
5. GATE VALVE (REFER TO
LEGEND)

6. SxT MAINLINE FITTING (TYP.)
7. 2 C.F. PEA GRAVEL SUMP
8. SCH. 80 PVC NIPPLE
9. BRICK CONT. (TYP.) (1 OF 4)

NOTE: ALL VALVES TO BE
INSTALLED IN PLANTED AREAS.

GATE VALVE

SCALE :
NOT TO SCALE



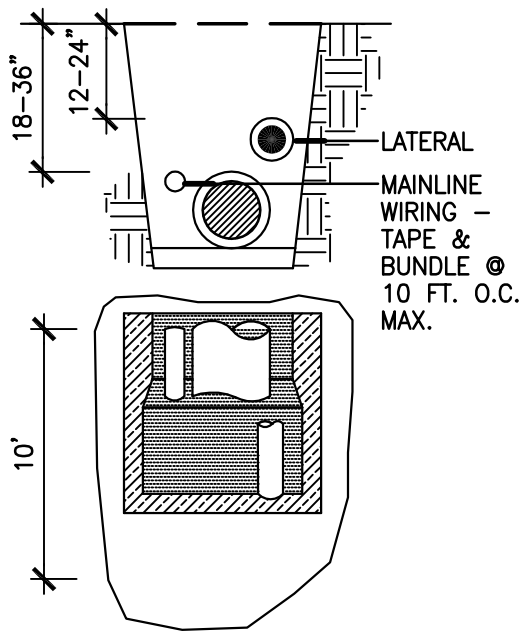
1. CURB, SIDEWALK, ETC.
2. FINISH GRADE
3. ROUND PLASTIC VALVE BOX
W/ LOCKING TOP (HEAT
BRANDED 'BV' IN 2" LETTERS)
4. BALL VALVE (REFER TO
LEGEND)
5. SxT SCH. 80 FITTING (TYP.)

6. 2 C.F. PEA GRAVEL SUMP
7. SCH. 80 PVC NIPPLE
8. SCH. 80 PVC UNION (IF PART
OF VALVE/INSTALLATION)
9. BRICK CONT. (TYP.)(1 OF 4)

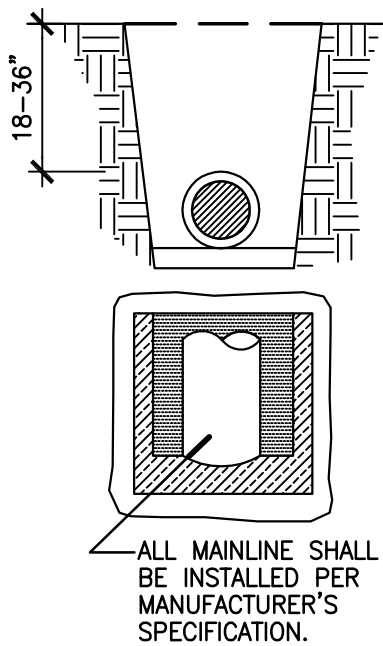
NOTE: ALL VALVES TO BE
INSTALLED IN SHRUB AREAS.

BALL VALVE

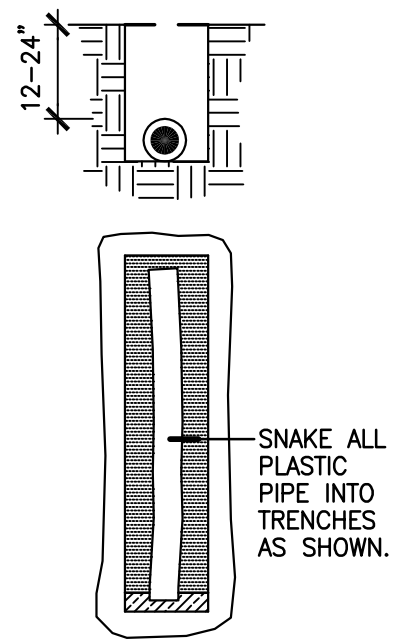
SCALE :
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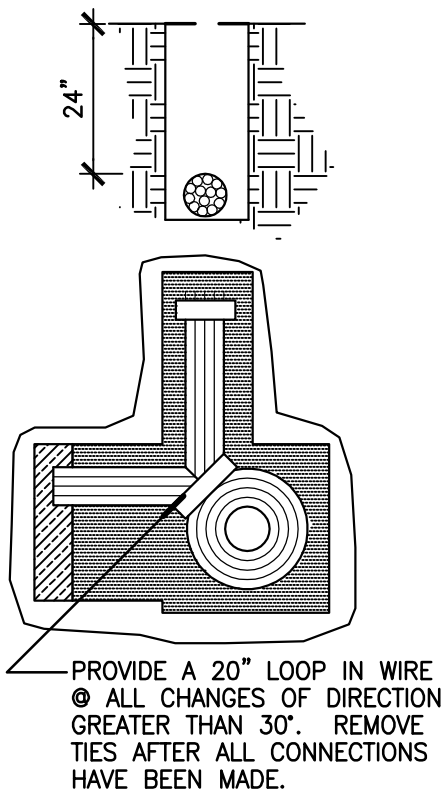
MAIN SUPPLY, LATERAL, & WIRING



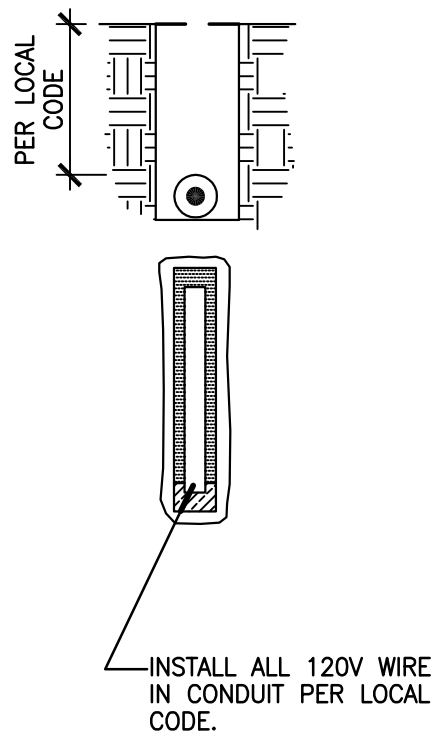
MAIN SUPPLY



LATERAL



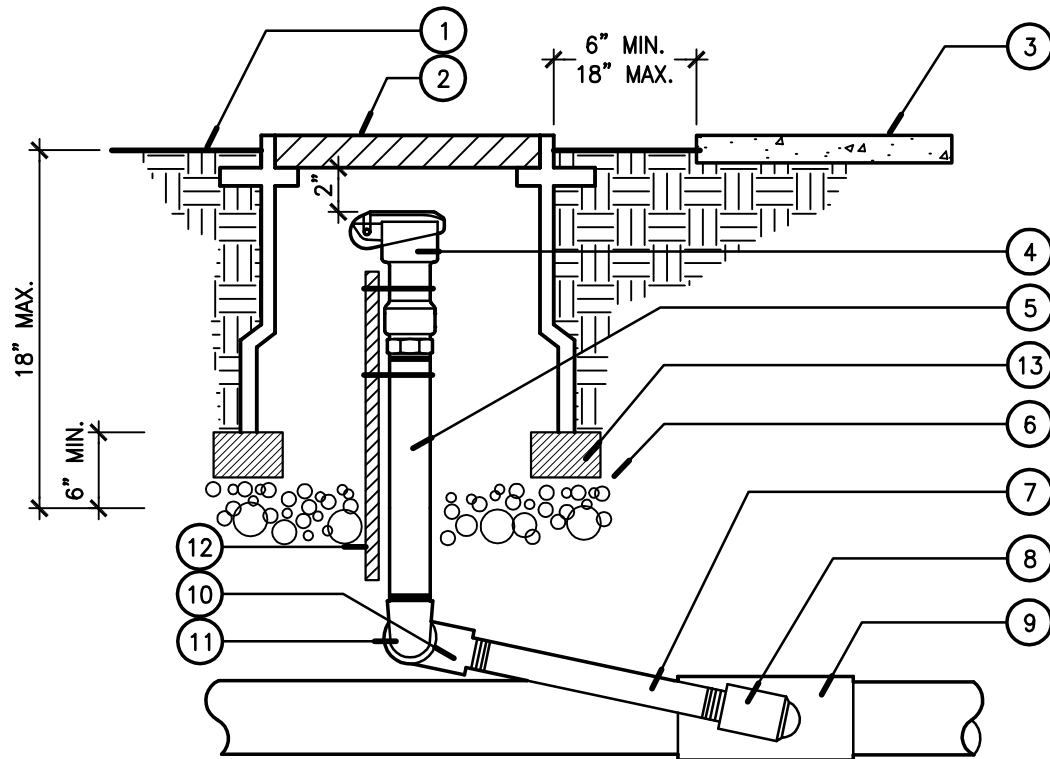
WIRING



120 VOLT

TRENCHING

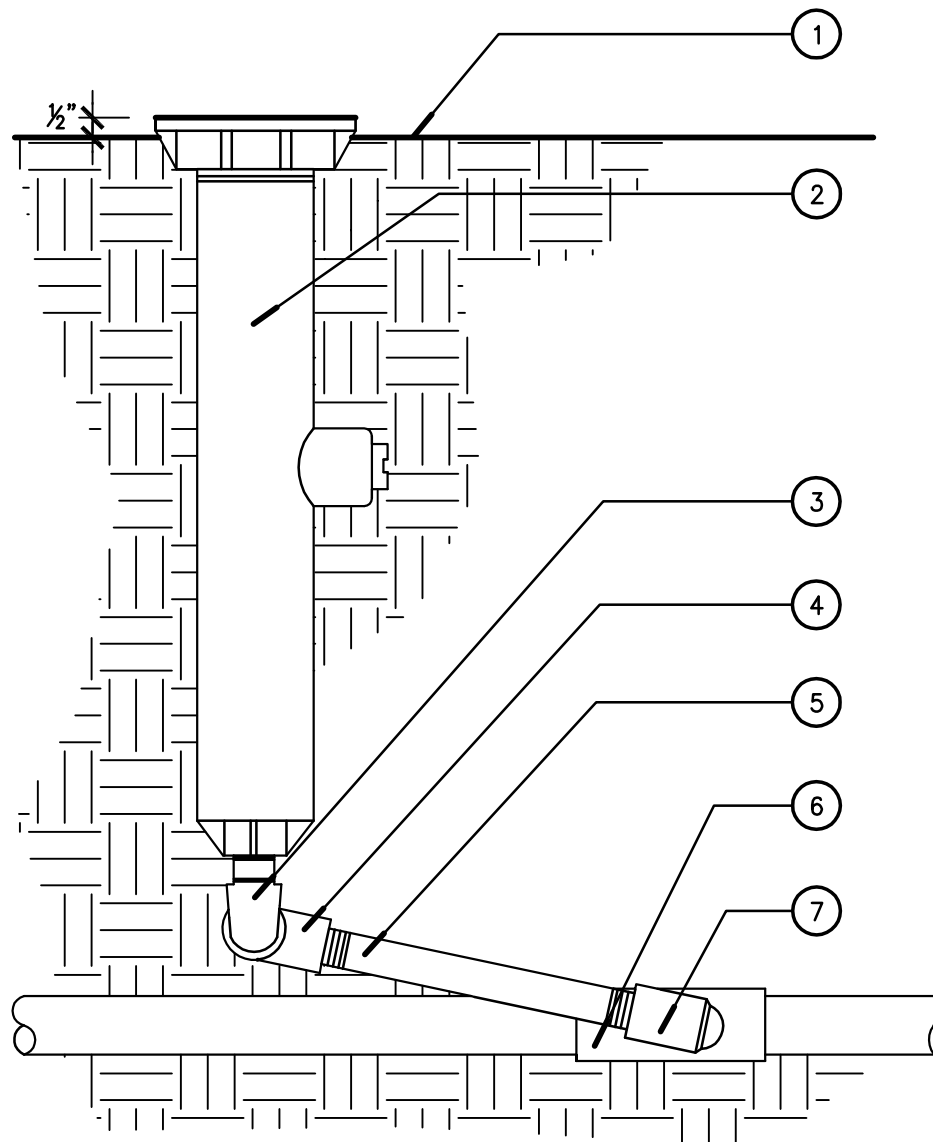
SCALE :
NOT TO SCALE



- | | |
|--|---|
| 1. FINISH GRADE. | 7. BRASS NIPPLE 6" LONG. |
| 2. ROUND PLASTIC VALVE BOX & COVER – HEAT BRAND 'QC' IN 2" LETTERS ON LID. | 8. BRASS 90° STREET ELL FITTING. |
| 3. STRUCTURE OR HARDSCAPE WHERE OCCURS. | 9. PRESSURE SUPPLY LINE. |
| 4. QUICK COUPLING VALVE. SET 1" ABOVE GRADE IN LAWN AREA, OR 2" ABOVE FINISH GRADE IN PLANTING AREA. | 10. BRASS 90° STREET ELL. |
| 5. BRASS NIPPLE 8" LONG. | 11. BRASS 90° ELL. |
| 6. 3/4" WASHED CRUSHED AGGREGATE BASE. | 12. #4 REBAR STAKE WITH 2 STRAP STAINLESS STEEL CLAMPS. |
| | 13. BRICK CONT. (TYP.)(1 OF 4) |

QUICK COUPLER

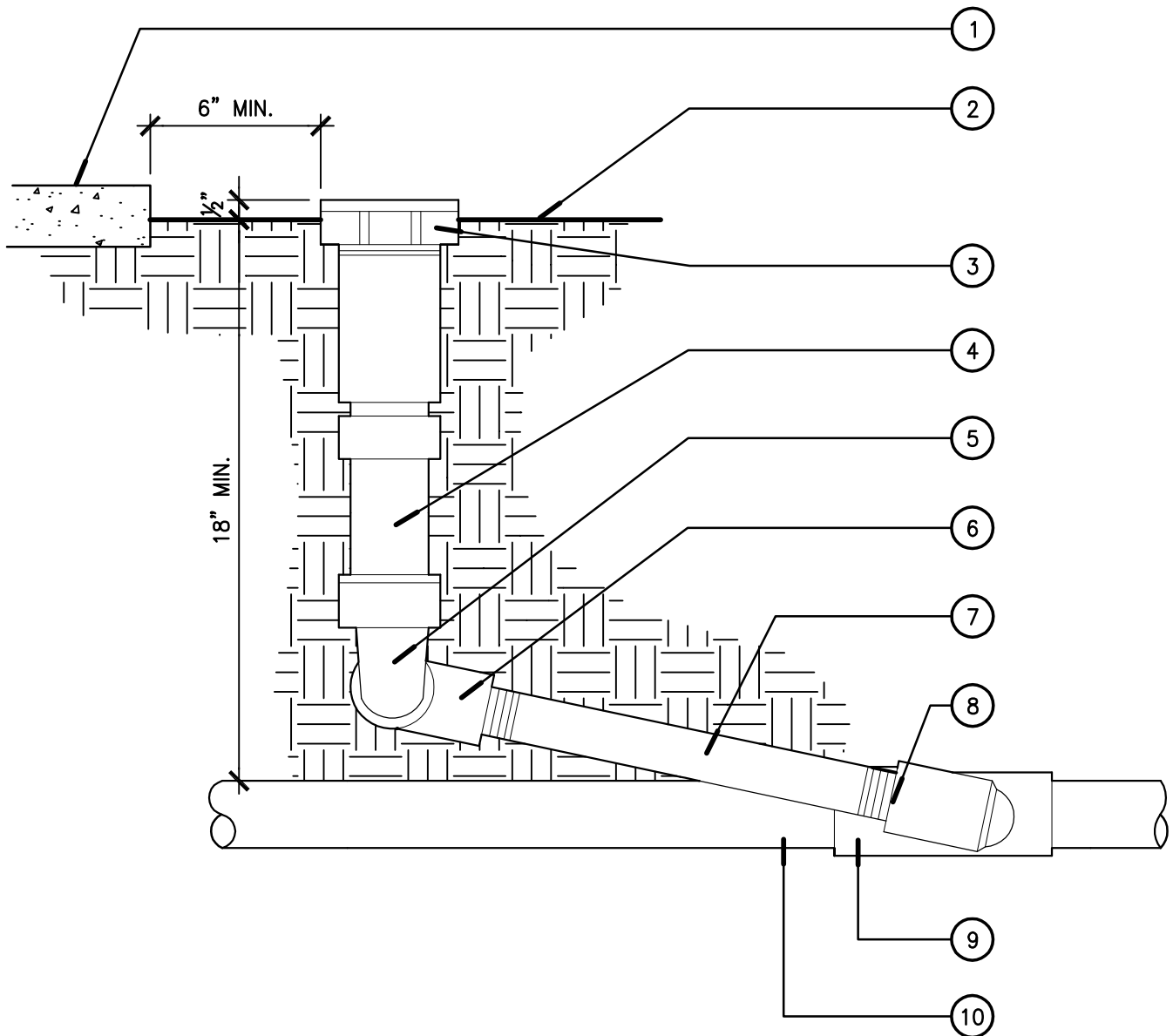
SCALE :
NOT TO SCALE



1. FINISH GRADE.
2. POP-UP SPRAY HEAD WITH ANTI-DRAIN VALVE. SET TOP OF HEAD 1/2" ABOVE GRADE.
3. SCH. 80 PVC T x T 90° ELL.
4. SCH. 80 PVC T x T 90° STREET ELL.
5. SCH. 80 PVC NIPPLE (TYP.).
6. LATERAL LINE PIPE AND FITTING.
7. SCH. 80 PVC T x T 90° STREET ELL.

POP-UP SPRAY HEAD

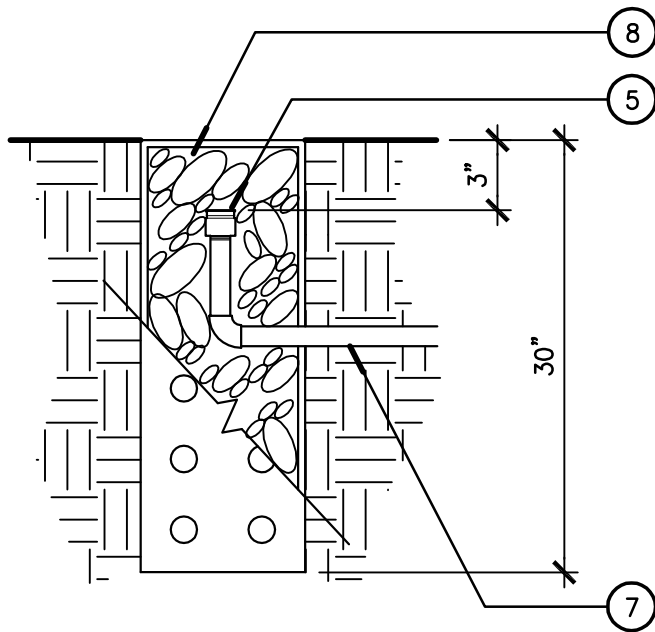
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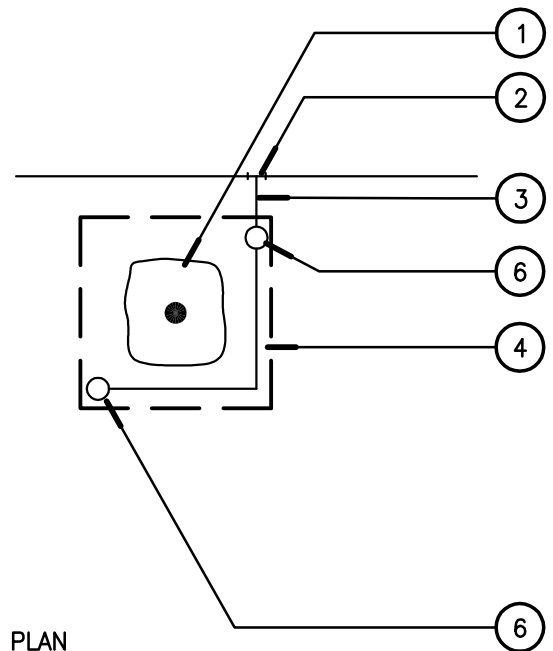
- | | |
|---|---|
| 1. CURB, SIDEWALK, ETC. | 6. PVC TxT MARLEX STREET ELL |
| 2. FINISH GRADE | 7. SCHEDULE 80 PVC NIPPLE.
MIN. 10" LONG |
| 3. POP-UP ROTOR HEAD WITH
ANTI-DRAIN VALVE. SET TOP
OF HEAD 1/2" ABOVE GRADE. | 8. SCH. 80 PVC TxT MARLEX
STREET ELL |
| 4. SCH. 80 PVC NIPPLE
LENGTH AS REQUIRED | 9. SCH. 80 PVC SxSxT TEE |
| 5. SCH. 80 PVC TxT ELL | 10. LATERAL LINE PIPE AND
FITTING |

POP-UP ROTOR

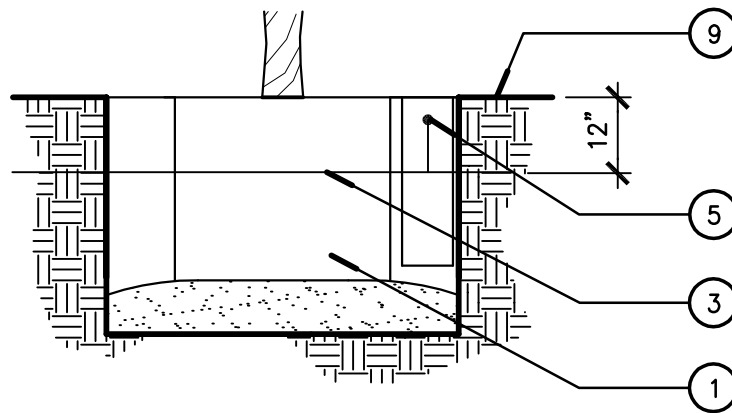
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SECTION



PLAN



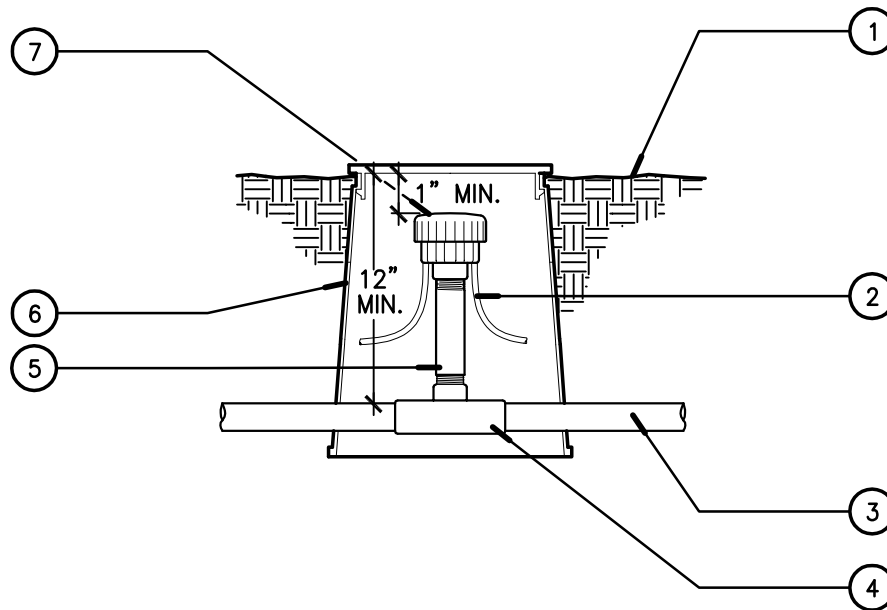
SECTION

1. ROOTBALL
2. PVC TEE
3. PVC LATERAL LINE
4. PLANT PIT
5. BUBBLER HEAD IN PIPE
6. FLOOD BUBBLER (2) PER TREE WELL
7. POLY PIPE W/ 1/2" MALE ADAPTER

8. 4" DIA. X 30" LONG PERFORATED DRAIN LINE FILLED WITH COARSE GRAVEL. SET AT GRADE W/ ROUND GRATE
9. FINISH GRADE

TREE BUBBLER

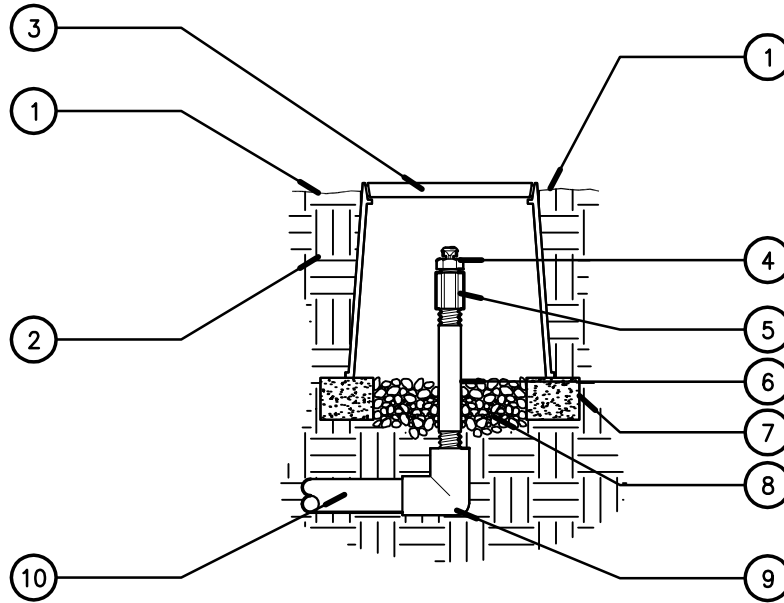
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1. FINISH GRADE
2. DISTRIBUTION TUBE
3. LATERAL LINE
4. PVC FITTING AS REQUIRED
5. 1/2" NPT MALE RISER
6. ACCESS BOX W/ LID - 6" ROUND
7. MULTI-OUTLET EMITTER

DRIP EMITTER

SCALE :
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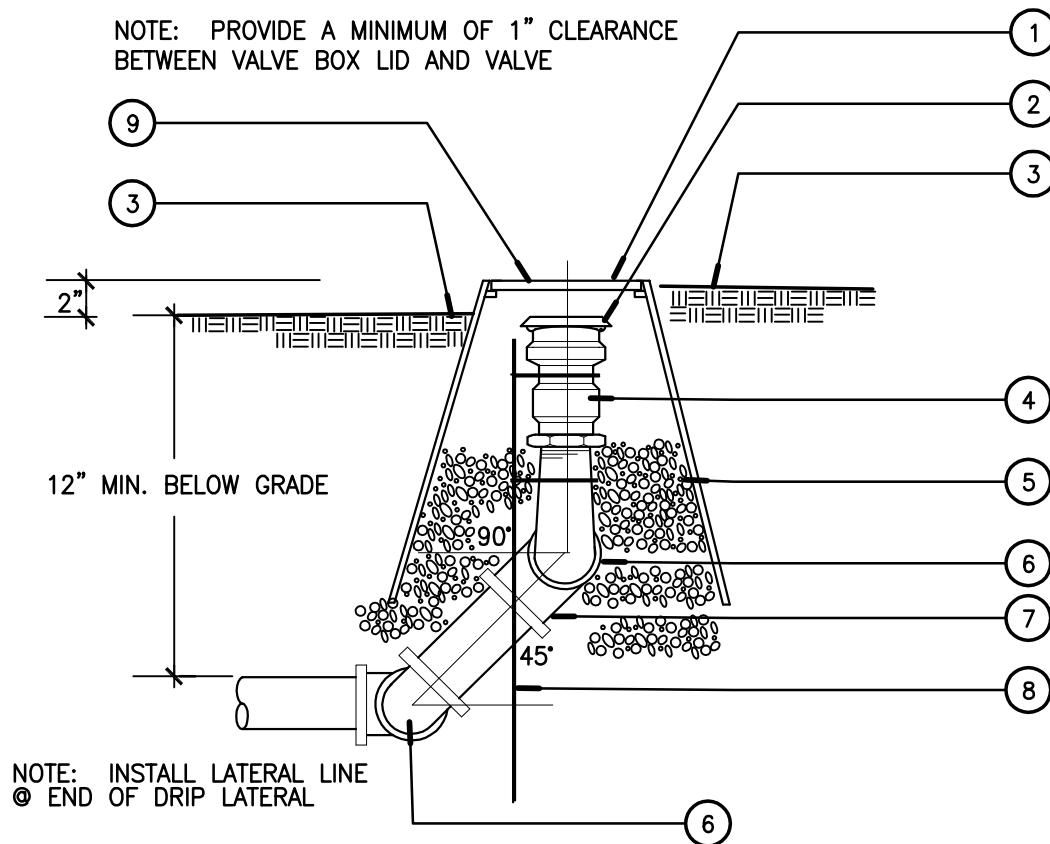
1. FINISH GRADE
2. NATIVE SOIL
3. 6" ROUND VALVE BOX
4. AIR/VACUUM RELIEF VALVE
5. 1/2" PVC COUPLING
6. 1/2" SCH 80 NIPPLE
(LENGTH AS REQUIRED)
7. BRICK (1 OF 3)
8. 3-INCH MIN. DEPTH OF
3/4 -INCH WASHED GRAVEL
9. SCH 40 PVC ELBOW
10. SCH 40 PVC PIPE

NOTES:

1. AIR/ VACUUM RELIEF VALVE CANNOT BE CONNECTED LOWER THAN DRIPLINE LATERALS.
2. USE FOR ZONES OF 7 GPM OR LESS ONLY (PLUMBED TO PVC).

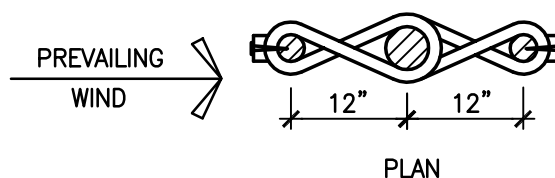
AIR RELIEF VALVE

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FLUSH VALVE

SCALE :
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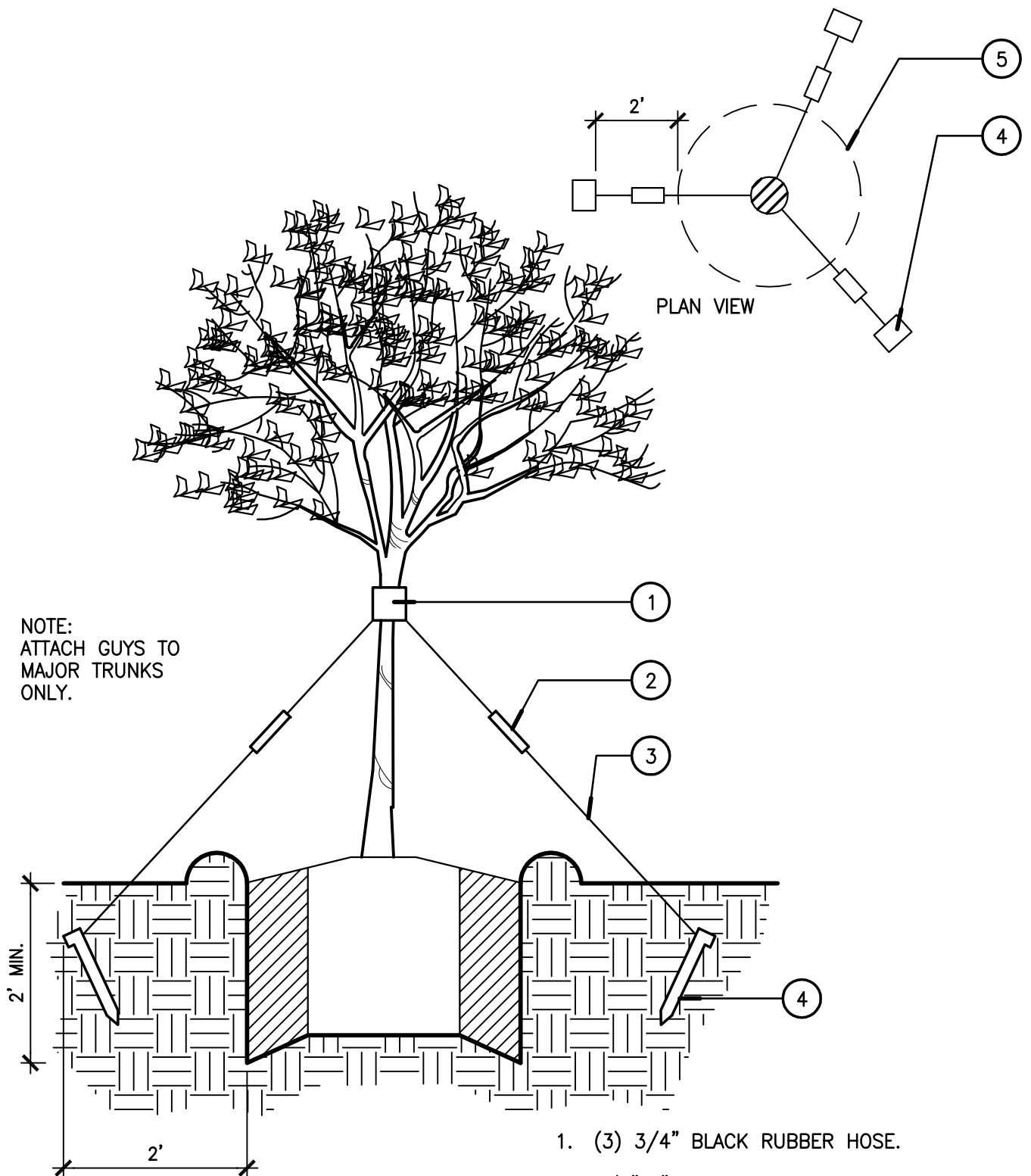


1. RUBBER CINCH-TIE
2. LODGEPOLE PINE STAKE COPPER
NAPHTHENATE IMPREGNATED. 2-1/2" DIA.
x12' LONG FOR 24" BOX AND SMALLER.
3. TOP OF ROOT BALL TO BE 1" ABOVE
FINISH GRADE.
4. 3" HIGH WATER BASIN
5. FINISH GRADE
6. PLANTING TABLETS
7. BACKFILL MIX
8. ROOTBALL
9. NATIVE SUBGRADE

MIN. TWO TIES (TOP & BOTTOM) REQUIRED.
USE THIRD TIE WHEN NECESSARY TO HOLD
TREE IN UPRIGHT POSITION. TIES TO BE
SECURED TO AVOID SLIPPAGE (WRAP STAKE TO
FORM FIGURE EIGHT). NAIL W/ (1) GALV. NAIL
THROUGH EACH TIE INTO POLE.

FOR PLANTING, REFER TO TREE PLANTING
DETAIL.

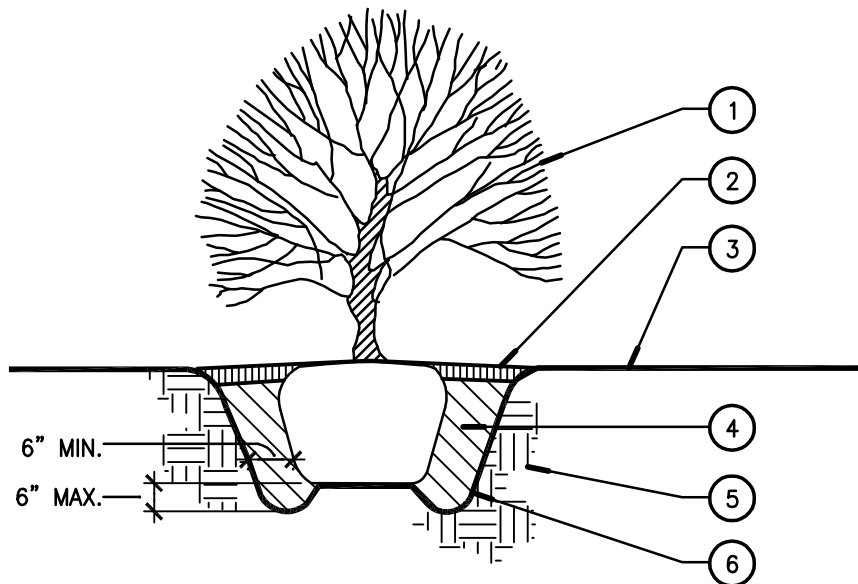
FOR 24" BOX TREES OR SMALLER



NOTE:
FOR PLANTING, REFER TO TREE PLANTING DETAIL.
FOR 36" BOX TREES AND LARGER

TREE GUYING

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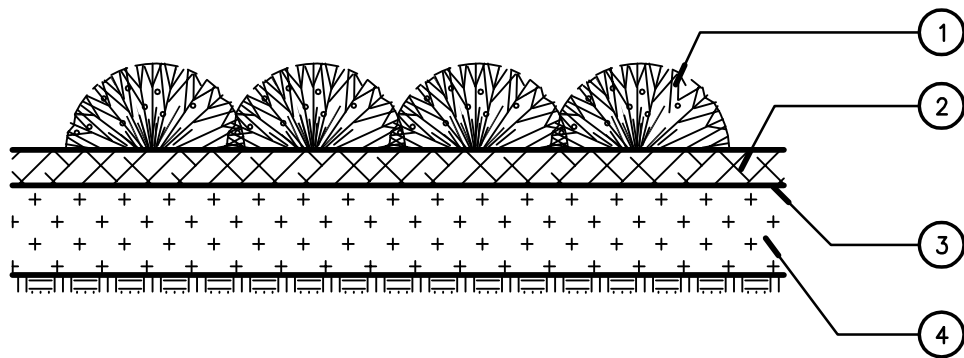


1. 1, 5 or 15 GALLON SHRUB
2. 2" THICK MULCH
3. FINISHED GRADE
4. PLANT SOIL AND FERTILIZER
5. EXISTING SUBGRADE
6. PIT SHALL BE 1-1/2 THE DIA. AND EQUAL THE DEPTH OF THE ROOT BALL.

NOTE:

PLACE 2 FERTILIZER TABLETS AT THE BOTTOM OF THE PLANTING PIT.

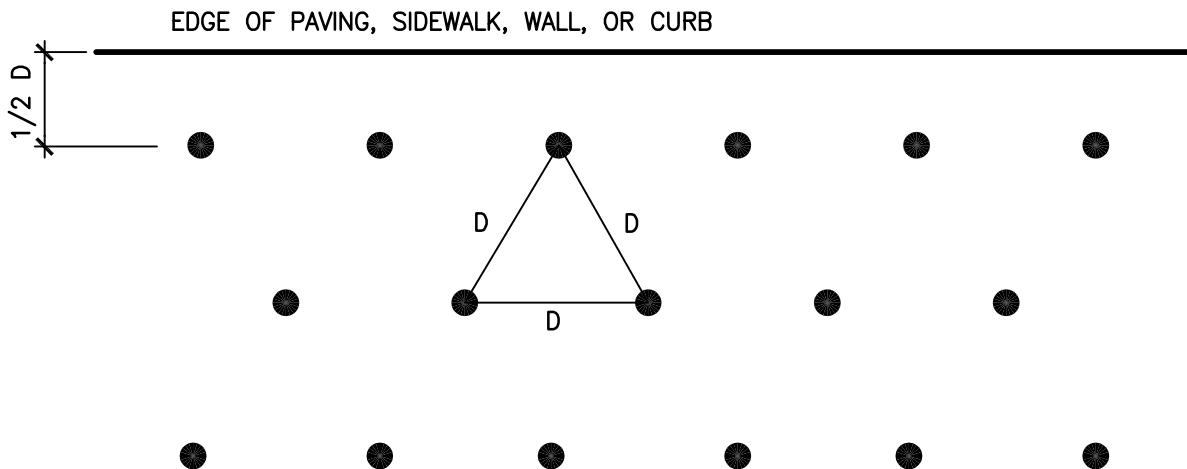
UNTANGLE MATTED ROOTS BY LOOSENING ALL ROOTS AT EDGE OF ROOT BALL W/ WATER FROM HOSE. DO NOT CRACK ROOT BALL.

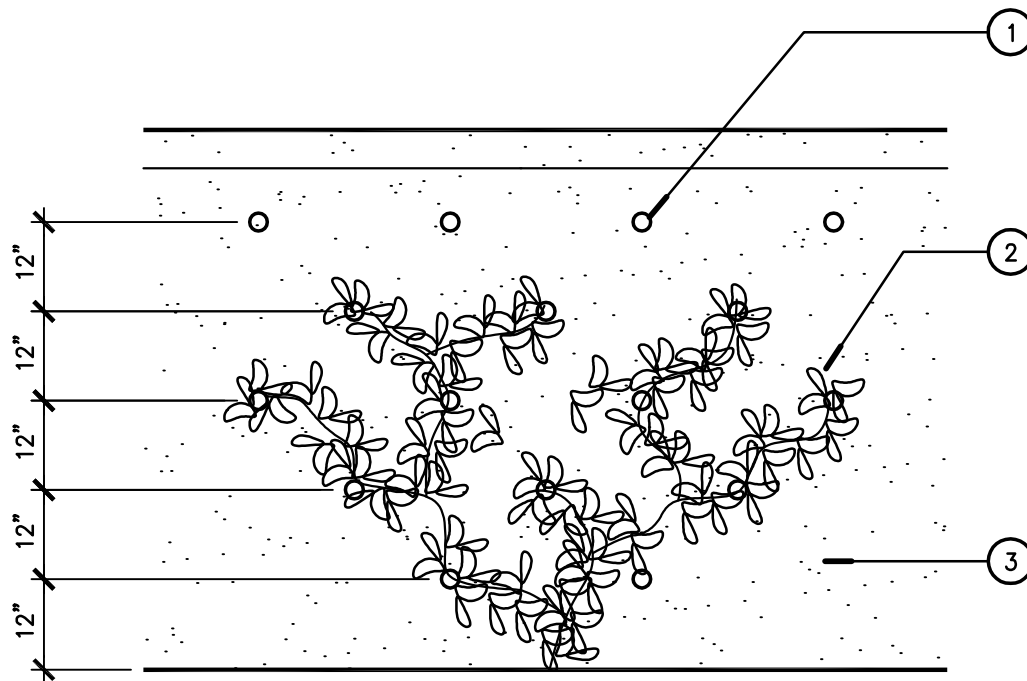


1. GROUND COVER PLANT FROM FLAT
2. 2" DEEP MULCH
3. FINISH GRADE
4. PREPARED BACKFILL (SEE SPECIFICATIONS FOR TYPE AND DEPTH.)

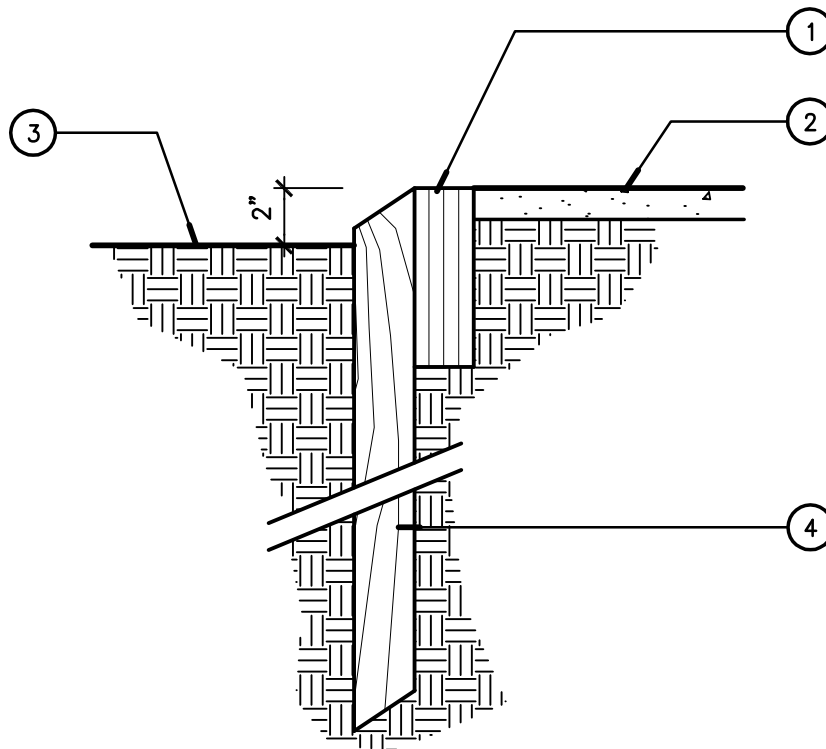
NOTE:

LOCATE PLANTS SPACED EQUAL DISTANCE (D) FROM EACH OTHER AS SHOWN. D – AS NOTED ON PLAN.





1. APPLY A ONE INCH (1") DIAMETER AMOUNT OF SILICON ADHESIVE WITH SIX INCH (6") LONG STAINLESS STEEL WIRE TO SURFACE (TRIANGULAR SPACED LOCATIONS).
2. ESPALIER OR VINE (SEE PLANTING PLAN FOR SIZE).
3. FENCE OR WALL.



1. (1) 2 x 4 OR
(2) 1 x 4 FOR STRAIGHT RUNS OR
(4) 1/2 x 4 FOR TIGHT CURVES
AS REQUIRED
2. FINISH GRADE – ROAD OR PATHWAY
3. FINISH GRADE – SHRUB AREA
4. 2 x 2 x 18 REDWOOD STAKE @
36" O.C. (ALTERNATE 2 x 4 x 18
REDWOOD STAKE @ 48" O.C.)

NOTES:

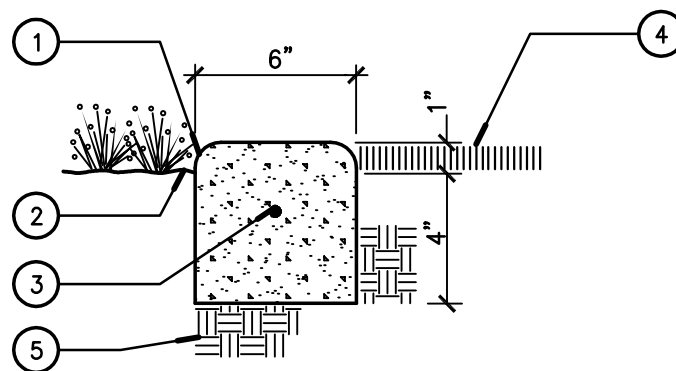
WOOD SHALL BE ROUGH
CONSTRUCTION HEART
REDWOOD.

NAILS AT STAKES SHALL
BE 16D GALV. COMMON (2)
PER STAKE MINIMUM.

NAILS AT SPLICES SHALL
BE 8D GALV. COMMON.

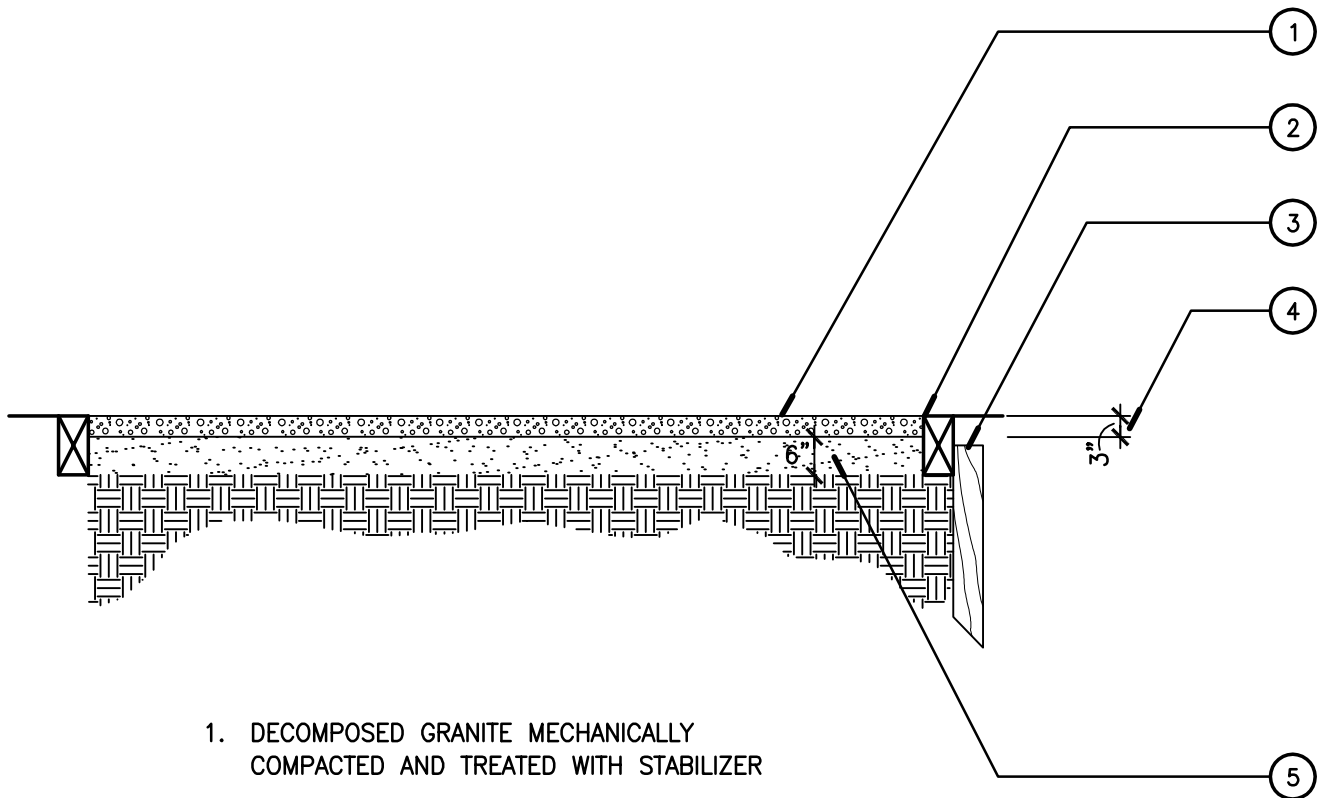
REDWOOD HEADER

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NOTE: INSTALL EXPANSION JOINTS AT 15' O.C.

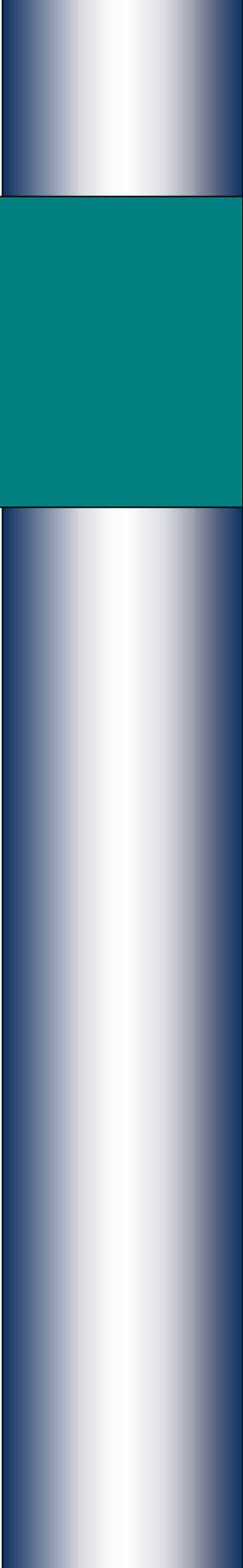
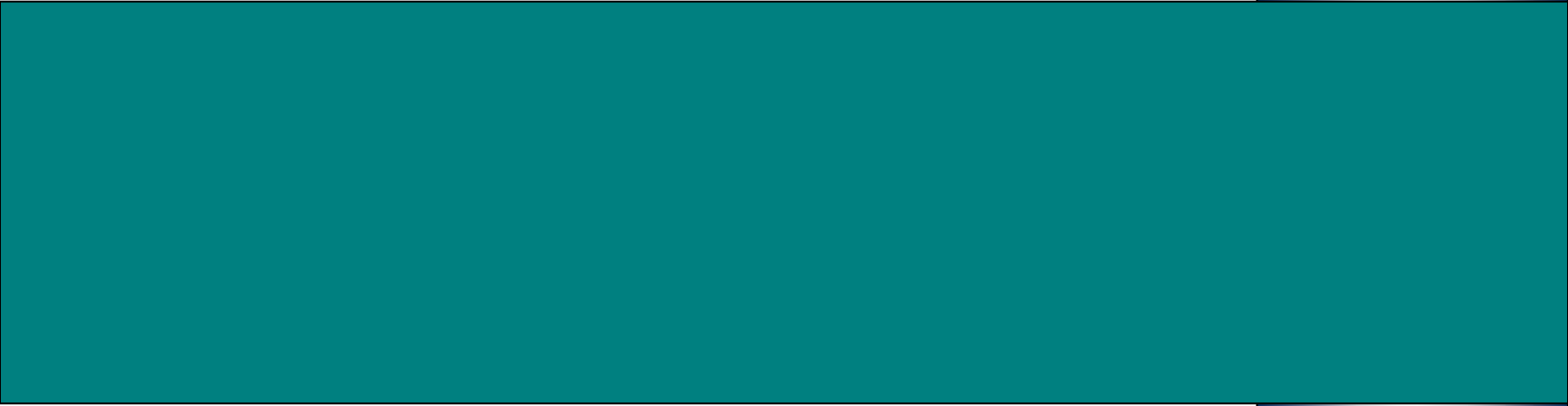
1. 3/4" RADIUS
2. SHRUB AREA/ FIN. GRADE
3. #4 REBAR CONT.
4. LAWN/ FIN. GRADE
5. 95% COMPACTED NATIVE SOIL



1. DECOMPOSED GRANITE MECHANICALLY
COMPACTED AND TREATED WITH STABILIZER
2. 2" X 4" NOMINAL HEADER
3. 2'-0" STAKE OR PIN TO ANCHOR HEADER
EVERY 24" O.C.
4. 3" MIN. DECOMPOSED GRANITE TO BE
1/4 MINUS FINES
5. 6" COMPACTED AGGREGATE FILL

DECOMPOSED GRANITE

SCALE :
NOT TO SCALE



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