

Draft Operation, Maintenance, and Monitoring Plan

325 Blake Road Restoration and Redevelopment

Regional Stormwater Improvements and Greenway Enhancement

Minnehaha Creek Watershed District
March 2023

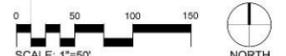




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1. Introduction

The 325 Blake Road Regional Stormwater and Greenway Project (the project) consists of the restoration and water-centric redevelopment of a site located adjacent to Minnehaha Creek, premised on a vision of Balanced Urban Ecology. The site is comprised of 4 parcels and one outlet that total 17.81 acres (see Figure 1.1: Site Parcels), with the primary parcel (A) being subdivided between the Developer (Alatus) and Minnehaha Creek Watershed District (the District), (see Figure 1.2: A Subdivision). The project is situated in the lower Minnehaha Creek watershed, approximately 7.3 river miles downstream of Gray's Bay dam on Lake Minnetonka where the headwaters of Minnehaha Creek are formed, and approximately 11.5 river miles upstream of Lake Hiawatha. Minnehaha Creek's confluence with the Mississippi River is located roughly 14 river miles downstream of the project site.

The project includes stormwater management BMPs and recreational facilities situated along Minnehaha Creek and the Cedar Lake LRT Regional Trail, within the Minnehaha Creek Greenway. Stormwater runoff from the Powell Road subwatershed (226 acres) and Lake Street subwatershed (30.3 acres) drains into the project through diversions of the mainline storm sewers. The diversions will fully divert small storms and the first flush of larger storms into the regional stormwater pond. When the diversions reach capacity, the remaining overflow discharges to existing offsite storm sewer outfalls.

This Operation, Maintenance, and Monitoring (OMM) plan outlines specific tasks recommended to maintain the District's regional stormwater treatment system and associated project features. These maintenance tasks are meant to be performed in perpetuity for the life of the project following construction and the completion of any feature-specific establishment period maintenance (i.e. establishment maintenance of plantings).

The OMM plan should be considered a 'living document', meaning that the District should continue to update it based on changes to site features, maintenance activities, and lessons learned.

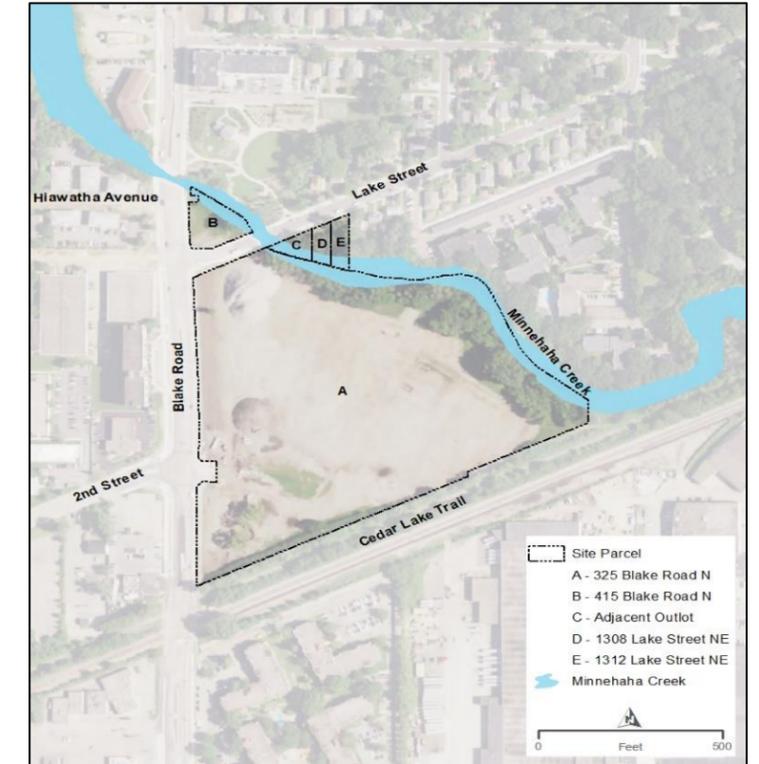


Figure 1.1: Site Parcels.

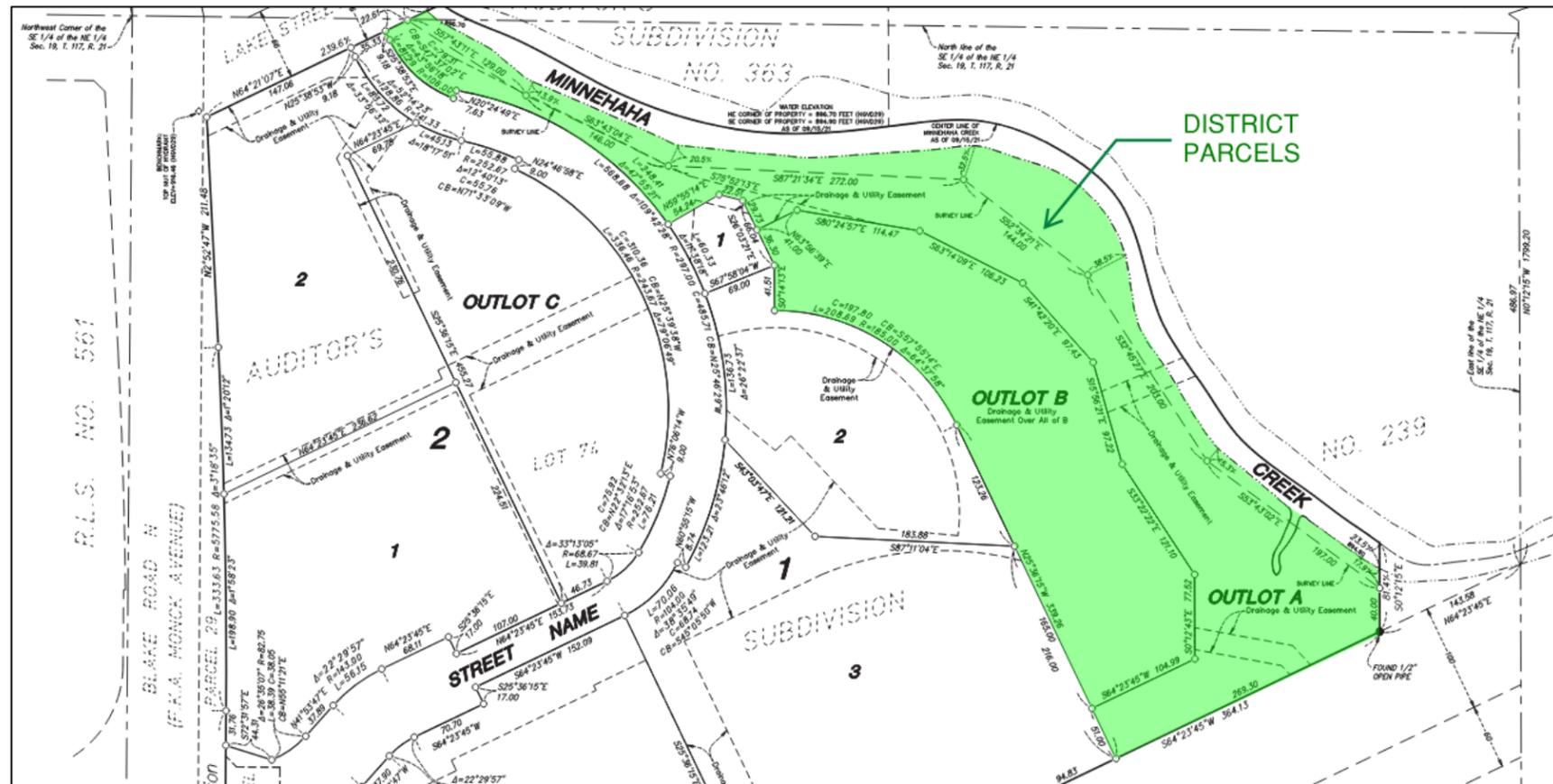


Figure 1.2: A Subdivision.



2. Project Components

The project features several site components that require routine operation, maintenance, and monitoring to achieve the goals set forth by the District. A brief description of site components to be considered for routine maintenance is as follows:

- Enhanced Vegetation Maintenance Zones (See Appendix B) – mulched beds, shrubs, trees
- Standard Vegetation Maintenance Zones (See Appendix B) – perennials, shrubs, trees, seeded areas
- Pond Areas – vegetation, drainage structures, slopes
- Nutrient Separating Baffle Boxes (NSBBs)*
- Outlet Structure – drainage structure*
- Rain Gardens – vegetated areas, drainage structures, subdrains
- Natural Stone Wall and Step Units – stone block seating*, stone step units*
- Site Furnishings – wooden benches*, picnic benches*, interpretive features, firepits, hammock poles, swing benches*, bike fixit station*, trail and site signage
- Play Equipment and Surfacing: engineered wood fiber, synthetic turf mounds, precast acorns, nature-based play features
- Pavements – permeable pavers*, crushed aggregate surfacing, decorative concrete, mulched natural surface trails
- Storm Sewers – pipes, drainage structures, maintenance & monitoring structures
- Structural Site Elements – pedestrian bridge, pergola, kayak storage rack
- Subdrainage – french drain, subdrains
- Utilities – light poles, lighting fixtures*, drinking water fountain*, irrigation system
- Weir Wall

Refer to most recent construction documents for construction information, placement, and a more detailed narrative description of project components. Project components (i.e. play equipment, NSBBs, etc.) where the manufacturer-recommended maintenance activities are included on cut-sheets have been marked with an asterisk in the bulleted list above. These manufacturer recommended maintenance activities should be followed in addition to any maintenance activities described below. A collection of these maintenance cut-sheets has been included as Appendix A. As new or updated maintenance cut-sheets become available they should be appended to this plan.

Table 2.1 is a matrix of each project component, its anticipated maintenance activities, and their expected frequency. Table 2.1 has categorized project components and maintenance activities to help organize tracking and planning and there may be features that are not specifically listed but could require maintenance on a case-by-case basis.

Table 2.1: Project Components

Project Component	Anticipated Useful Life	Cut-Sheets Included (Appendix A)	Weekly	Monthly			Monthly - Growing Season		Seasonally					As Needed Based on Inspection						
			Litter & Debris Removal	Drainage Structure Clearing	Flow Path Clearing	Wipe Down Surfaces	Mowing	Weed Control	Groundcover & Furnishing Refreshing	Maintenance & Monitoring Structure Clearing	Pruning	Vegetation Harvesting	Winterization	Drainage Structure Maintenance	Pipe Maintenance	Vacuum Porous Surfaces	Dredging [†]	Erosion Repair	Minor Concrete/Masonry Repair	Planting & Mulching
Enhanced Vegetation Maintenance Zones	N / A		✓				✓	✓				✓						✓		✓
Standard Vegetation Maintenance Zones	N / A		✓					✓				✓						✓		✓
Pond Areas	30 Years		✓	✓	✓			✓				✓	✓		✓		✓	✓	✓	✓
Nutrient Separating Baffle Boxes (NSBBs)	50 Years	✓	✓	✓										✓	✓					✓
Outlet Structure	50 Years		✓	✓								✓			✓			✓	✓	
Rain Gardens	30 Years		✓	✓	✓			✓			✓	✓		✓	✓			✓	✓	✓
Natural Stone Step and Wall Units	30 Years		✓		✓				✓											✓
Play Equipment and Surfacing	15 Years	✓	✓		✓	✓			✓											
Site Furnishings	30 Years	✓	✓			✓			✓					✓						✓
Specialized Pavements	20 Years	✓	✓		✓			✓								✓				✓
Storm Sewers	50 Years		✓	✓	✓					✓				✓	✓	✓				✓
Structural Site Elements	50 Years	✓	✓			✓			✓					✓						✓
Subdrainage	30 Years			✓	✓					✓				✓	✓	✓				✓
Utilities	30 Years	✓												✓						✓
Weir Wall	50 Years	✓	✓																	✓

[†]See Dredging in Section 4 for detailed description of this maintenance activity.

See Table 4.1 for detailed description and recommended frequency of routine maintenance activities.



3. Site Safety and Contacts

Safety precautions should be observed while performing any maintenance, inspection, or monitoring activities associated with site features. When potentially hazardous conditions arise, O&M personnel should remove themselves from the situation and secure the site to the maximum extent possible. Presence of any safety concerns that may continue beyond the maintenance, inspection, or monitoring event or potentially impact the safety of the public or other site personnel should be escalated to the proper authorities.

Potential hazards for O&M personnel include but are not limited to:

- Extremely hot or cold weather
- Sun Exposure
- Heavy equipment and machinery
- Sloped surfaces
- Confined space
- Insects and wildlife
- Deep water

All maintenance activities must be performed according to Federal, State, and Local regulations. Entry into confined spaces should only be performed by certified professionals.

To the maximum extent possible vehicle use should be limited to designated path areas, as seen on the map included as Appendix B. Partial closure of paths, or drive aisles may be required for certain maintenance tasks, specifically those requiring specialized equipment such as vacuum trucks. Use of the pond's maintenance bench should be limited to light-weight vehicles with tight turning radii, such as mowers.

The operation, maintenance, and monitoring of the Blake Road project will include coordination between multiple parties. The following list provides a primary list of points of contact for the project.

Contacts

- Minnehaha Watershed District Site Contact
- Alatus Site Contact
- City of Hopkins Contact

4. Operation and Maintenance

Table 4.1 provides a reference for anticipated maintenance activities and the recommended frequency at which this maintenance should be performed. This table intends to cover commonly anticipated maintenance tasks, however additional maintenance needs beyond those outlined in the table, such as full replacement of site features, will likely be necessary.

All maintenance activities should be performed in a manner that reasonably limits impacts to the surrounding natural environment and other site features. Refer to [site's joint maintenance agreements](#) for the designation of responsibility when maintenance activities may impact site features not owned or maintained by the District (i.e. if maintenance activities cause temporary traffic impacts or damage site features not owned or maintained by the District).

Each maintenance activity includes an anticipated expense/effort per maintenance event. The following numbers are only estimates, and may vary based on several factors, such as extent of maintenance required and the ability to combine multiple maintenance tasks into a single maintenance event:

- Low – Maintenance personnel require minimal specialized training and equipment, expense expected to be less than \$2,000 per event
- Moderate – Maintenance personnel require some specialized training and equipment, expense expected to be between \$2,000 and \$10,000 per event
- High - Maintenance personnel require significantly specialized training and equipment, expense expected to be between more than \$10,000 per event.

Table 4.1 Routine Maintenance Activities

Maintenance Activity	Description	Frequency	Expense/Effort
Litter and Debris Removal	Remove trash, debris, and litter from site areas, accessible site components, and accessible pond areas. No structure entry anticipated. Sweep ground and surfaces clear of sediment, litter, and organic debris – bagging and removing as necessary. Sweep loose aggregate / mulch onto proper surface	Weekly	Low
Drainage Structure Clearing	Clear structures and grates to facilitate proper function of drainage structures.	Monthly	Low
Flow Path Clearing	Remove obstructions and debris to promote proper overland flow.	Monthly	Low
Wipe Down Surfaces	Wipe surfaces and equipment clear of debris. Use non-toxic cleaning solutions as necessary.	Monthly	Low
Weed Control	Remove and/or control noxious and invasive weeds. Provide hand weeding of formal planting beds. Weed whips/ herbicide to control weeds in native seeding areas.	Monthly during growing season	Low
Groundcover & Furnishing Refreshing	Remove and sand jagged surfaces and protrusions. Oil wooden benches and surfaces based on aesthetic desired. Fluff engineered wood fiber. Power wash solid stone and wood surfaces. Remove graffiti and repaint. Replace and restore loose aggregate areas.	Annually in early Spring	Low
Maintenance & Monitoring Structure Clearing	Locate and clear access to promote ease of inspection and monitoring. Remove excessive vegetation and debris.	Annually in late Fall	Low
Vegetation Harvesting	Trim back wetland vegetation within 4' of pond edge to a height of 8 inches. Collect and dispose of harvested organic matter offsite.	Annually in late Fall	Low
Pruning	Prune woody vegetation within 5 feet of pedestrian areas for proper structure, removal of dead limbs, and provide 14-foot vertical clearance.	Annually in late Fall	Moderate
Winterization	Turn off pumps, water fountain, drain hoses. Spray rusted or likely to freeze appurtenances with lubricant. Shovel and remove ashes from firepits. Blow out irrigation lines and winterize system.	Annually in late Fall	Low
Drainage Structure Maintenance	Inspect outlet structure and overflow culvert trash grates and flow openings for debris or blockage. Remove debris and test that stoplogs in outlet structures can be lifted. Jet/Vac sumped Drainage Structures, and NSBBs to remove sediment and debris as needed. Dewatering may be necessary.	Annually in late Fall	High
Mowing	Mow pond maintenance bench. Upland vegetation around pond requires less frequent mowing. String trimming permitted in difficult to reach areas.	Annually in late Fall for maintenance bench. Every 2-3 years of upland vegetation.	Low

Maintenance Activity	Description	Frequency	Expense/Effort
Asphalt Trail Maintenance	Pothole patching and crack sealing. Bituminous pavement overlay as required (every 10 years).	As needed, 1-2-year estimate	Moderate
Pipe Maintenance	Jet pipes using combination Jet/Vac Truck. Work to be professionally contracted.	As needed, 1-2 year estimate	Moderate
Vacuum Porous Surfaces	Vacuum porous surfaces and pervious pavers with regenerative air sweeper. Work to be professionally contracted.	As needed, 1-2 year estimate	Moderate
Dredging**	Remove submerged sediment and debris from pond bottom to restore original design elevations. Work to be professionally contracted.	As needed, 10-year estimate	High
Erosion Repair	Remove debris and restore surface flow paths, access paths, and sideslopes to design elevations. Restore undermined structures.	As needed based on inspection	Low
Minor Concrete/ Masonry Repair	Repair spalling, cracking, or displaced/loose concrete or masonry site components. Major repairs to be professionally contracted.	As needed based on inspection	Moderate
Planting & Mulching	Replant bare areas with native plantings based on the original planting plan. Refresh shredded hardwood mulch approximately every 2-3 years in plant beds.	As needed based on inspection	Moderate

**See Dredging Sub-section below

In addition to routine maintenance tasks, corrective maintenance may be needed as site conditions require. Corrective maintenance requests may result from a formal site inspection, or a simple observation from the site owner, staff member, or the community. When corrective maintenance is required, maintenance personnel should be provided with a list of maintenance tasks to be completed from the site owner or inspector prior to performing maintenance. Additional details of inspection requirements are included below.

Vegetation Maintenance

Vegetation maintenance should be performed based upon the designated level of service standards below. Please reference Appendix B for a map showing service level locations. Suggested maintenance requirements below are related to ongoing maintenance following the initial establishment period for the site.

Enhanced Vegetation Maintenance Areas: These areas are highly visible to the public and maintenance activities are performed more frequently. Maintenance frequencies may be increased in response to visitor requests. Shrub and tree pruning should occur annually, mulched areas refreshed annually, and weeding to occur monthly from June through September. Seedheads & grasses from the previous season should be cut back in late May (cut perennials back to 4-6", cut grasses back to top of clump mass). Flopping or drooping-over material may be cut-back annually in late October based on aesthetic preference. Leaf litter left in beds may be used as protective mulch over winter and can be removed in May based on aesthetic preference. Trunk protection should be installed on trees in late October as needed to prevent damage from wildlife.

Standard Vegetation Maintenance Areas: Maintenance is performed at frequencies necessary to ensure a safe, functional, and clean site. Shrub and tree pruning should occur every two to five years, and weeding monthly during the first three years from June through September. Install trunk protection on trees in late October as needed to prevent damage from wildlife.

Dredging

Based on existing knowledge of site groundwater and geotechnical conditions, draining and dewatering of the ponds may be complex and cost intensive. As such, it is recommended that when the pond(s) require dredging, a "wet dredging" approach is considered.

Wet Dredging may be conducted through a combination of shoreline truck, barge, or the use of geotextile tubes. Because the basin bottom will be submerged during wet dredging, it is critical that rod-measurement of removed sediment be conducted prior to, during, and following the dredging event to understand accurate quantities of sediment removed. Dredged material should be tested for potential contamination prior to removal from the site. Contaminated materials may be subject to special requirements for re-use, disposal, or land application.

The need for dredging will be established through inspection and/or monitoring. Sediment depths should be estimated by using a measuring rod at several points within the pond to provide an approximate measurement of sediment depth. A Minnesota company called BioBase provides sonar equipment and analysis for a sonar approach as an alternative to rod measurement, but sonar should not be used for measuring dredge quantities during construction.

When the average sediment depth is approaching 3 feet, the District should begin planning for a near-term dredge project. Dredging volumes at this depth are approximately 3,150 cubic yards of sediment for the North Pond and 1,185 cubic yards of sediment for the South Pond. Additionally, if pond outlet monitoring indicates a consistent degradation in water quality, it may be due to sediment resuspending within the pond and the need for dredging should be evaluated.

Records should be kept of any dredging project that is planned, designed, and performed.

Stormwater Cascade Maintenance This section can be updated as details are finalized with development construction packages and maintenance agreements – outline shown below

The stormwater cascade was constructed as part of the Alatus development. District maintenance of the water quality components is part of the joint maintenance agreement. The cascade system involves pumping, filtering, treating, and conveying detained stormwater from the North Pond through a shallow vegetated channel running through the development and back into the South Pond, providing a continuous filtering/treatment system of the stormwater pond. Relevant features are summarized by the following:

Pump:

- Pumping rate and operation parameters
- Seasonal operation
- O&M considerations

Water Quality Devices:

- Location
- Type
 - Jellyfish filter
 - Phosphosorb
- O&M considerations

Cascade Channel:

- Flow conditions
- Inspection recommendations (assuming vegetation maintenance performed by Alatus)

5. Inspection & Monitoring Program

Inspection

Inspection of all site components shall be performed regularly to reduce the risk of site safety hazards and future maintenance costs. Inspections of features related to stormwater will promote proper function and improved performance. Many of the inspection items are not anticipated to be encountered or encountered often – however this section provides baseline guidance into what should be considered when conducting a site inspection and common responses to these issues if encountered.

Inspections shall be limited to site elements that include maintenance activities, as indicated in Table 2.1. An inspection report should be completed during each inspection. This inspection report should be used by maintenance crews to describe corrective maintenance requirements. All maintenance events, inspections, and corrective maintenance should be documented and kept on record. In addition to inspections occurring at regular time intervals, inspections shall also be performed following major storm events. A major storm event is defined as a rainfall event in excess of 2.5 inches within a 24 hour period (equivalent to the 1-year return period storm), or an event in which intense rainfall, winds, freezing rain, or other natural phenomena could reasonably affect site function.

Inspection activities, recommended frequencies, and suggested corrective maintenance activities to remediate deficiencies are provided in the following tables. Inspections are divided into categories based on similarities in scope and frequency. If inspectors are qualified to perform multiple inspections, they could be conducted simultaneously. **Inspections must at minimum be conducted at a frequency required by the District's MS4 permit.**

Inspection Activities

Routine inspections shall occur, at minimum, annually, after major storm events, and at the discretion of the owner based on community input or site needs.

Table 5.1 Routine Inspection Activities

Inspection Item	Corrective Maintenance Trigger	Typical Corrective Maintenance Action
Algae	Algae present in more than 25% of pond surface area.	Manage algae via physical removal, or addition of water circulation infrastructure.
Animal Burrows	Animal burrows or signs of burrowing present along pond slope or creek bank where it borders pond area.	Fill animal burrows with acceptable media.
Basin Bottom Depth	Basin bottom level exceeds 50% of the design depth measured from the design basin bottom to the permanent pool outlet elevation (Basin bottom elevation +889 for North Pond, basin bottom elevation +890 for South Pond).	Dredge bottom of affected basin areas.
Concrete	Minor concrete or masonry damage such as spalling, cracking, or displaced/loose concrete or masonry site components is present.	Repair damage with parging, patching, or replacement of missing components.
Erosion	Erosion that exceeds 20 square feet observed along basin slopes, access paths, maintenance bench, or near drainage or operations & maintenance structures.	Repair erosion using acceptable media, erosion control fabric, and/or additional planting.
Organic Debris	Excessive organic debris is present within the pond, or near drainage structures, pumps, etc. that may impact site function.	Remove and dispose of, or relocate, organic debris.
Graffiti	Graffiti is present.	Remove graffiti and repaint surfaces as necessary.
Woody Debris	Woody debris is accumulated in an area that inhibits site function or poses an aesthetic or safety issue.	Remove and dispose of woody debris.

Vegetation inspections shall occur, at minimum, annually during the growing season, and at the discretion of the owner based on community input or site needs.

Table 5.2 Vegetation Inspection Activities

Inspection Item	Corrective Maintenance Trigger	Typical Corrective Maintenance Action
Bare Areas	Vegetation is missing from an area of approximately 30 square feet.	Replant/ reseed bare areas with native plantings based on the original planting plan.
Invasive Weeds	Weeds categorized as noxious or invasive are present in planted areas.	Remove noxious or invasive weeds.
Organic Debris	Excessive organic debris present in vegetated areas that may impede the proper growth of desirable vegetation.	Remove and dispose of, or relocate, organic debris.
Tree and Plant Health	Damaged branches, trunks, and tree limbs, leaf dieback or wilting, visible pest infestation.	Prune trees, remove damaged or infested vegetation, consult arborist or plant healthcare specialist for severe pest infestation

Drainage structure inspections shall occur, at minimum, every other year, after major storm events, and at the discretion of the owner based on community input or site needs. **Additional inspections may be required for the outlet structure**, especially following storm events that result in discharge through the outlet structure's overflow weir. Should the baffle box, manholes, or other sumped structures require more frequent maintenance, additional inspections of those structures may be required.

Table 5.3 Drainage Structure Inspection Activities

Inspection Item	Corrective Maintenance Trigger	Typical Corrective Maintenance Action
Nutrient Separating Baffle Box	CCTV camera or visual inspection reveals baffle box sump is greater than 50% filled with sediment or debris or structure inflows/outflows are blocked.	Vacuuming or mechanical removal of sediment and debris.
Concrete	Minor concrete or masonry damage such as spalling, cracking, or displaced/loose concrete or masonry site components is present.	Repair damage with parging, patching, or replacement of missing components.
Fasteners	Structure fasteners are rusted or stuck.	Lubricate or replace fasteners to provide access to structures.
Other Drainage Structures	CCTV Camera or visual inspection reveals structure sumps are greater than 50% filled with sediment or debris. Or structure inflows/outflows are blocked.	Vacuuming or mechanical removal of sediment and debris.
Pipes	CCTV Camera or visual inspection reveals that pipe cross sectional area is more than 30% obstructed by sediment or debris.	Jetting or clearing of pipes.
Railing	Railing atop overflow structure is loose or damaged.	Repair, replace, or tighten railing.

Weir inspections shall occur, at minimum, every five years, after major storm events, and at the discretion of the owner based on community input or site needs. Weir inspections may require the use of a diver in order to properly understand structural deficiencies of submerged features.

Table 5.4 Weir Inspection Activities

Inspection Item	Corrective Maintenance Trigger	Typical Corrective Maintenance Action
Graffiti	Graffiti is present.	Remove graffiti and repaint surfaces as necessary.
Concrete	Minor concrete or masonry damage such as spalling, cracking, or displaced/loose concrete or masonry site components is present.	Repair damage with parging, patching, or replacement of missing components.
Scuppers	Scuppers are damaged or obstructed.	Repair/replace scuppers or clear flow paths, clean scuppers if necessary.
Structural	Signs of structural damage to weir, or movement.	Conduct a professional structural analysis of the weir. Depending on extent of damage observed it may be necessary to dewater the pond. Potential need for diver to perform functions.

Periodic inspections of the play area shall occur, at minimum, twice a year, and at the discretion of the owner based on community input or site needs. Inspections ensure a safe play environment and that play area safety standards are being met.

Table 5.5 Play Area Inspection Activities

Inspection Item	Corrective Maintenance Trigger	Typical Corrective Maintenance Action
Graffiti	Graffiti is present.	Remove graffiti and repaint surfaces as necessary.
Play Surfacing / Mulch	Inconsistent engineered wood fiber depth.	Rake engineered wood fiber to consistent depth, supplement with additional fiber as needed to maintain a 9" depth within a 6' fall radius around play structures.
Play Equipment	Loose hardware, sharp edges, or split wood.	Tighten any loose fasteners, sand any sharp edges,
Precast Acorns	Staining on acorn features, or chips in precast.	Power wash acorns if accumulating stain. Contact precast supplier for patching material and instructions, and patch affected areas.
Wood Post Barrier Fence	Wood splits or checking, degraded rope, loose hardware.	Tighten any loose fasteners, sand any sharp edges created by wood checks, and tighten rope or replace rope as needed.

Periodic inspections of site furnishings, utilities, and structures shall occur, at minimum, twice a year, and at the discretion of the owner based on community input or site needs. Inspections ensure safety standards are being met.

Table 5.6 Site Furnishings Utilities, and Structures

Inspection Item	Corrective Maintenance Trigger	Typical Corrective Maintenance Action
Graffiti	Graffiti is present.	Remove graffiti and repaint surfaces as necessary.
Irrigation	Leaking irrigation or damaged emitter.	Locate leak or replace damaged component. Contract irrigation contractor if necessary.
Natural Stone Step or Wall Unit	Staining on limestone blocks.	Power wash the stone with hot water.
Crushed Aggregate Pavement	Settled or bare areas of crushed aggregate.	Fill low areas with specified material in construction drawings, compact in place.
Metal Structures	Paint chips, flaking, or corrosion.	On painted metal structures, remove excess rust through mechanical means (wire brush or sanding), and apply touch-up paint to cover chips. On galvanized steel structures, remove excess rust through mechanical means (wire brush or sanding), and apply cold galvanize to the affected area.
Wood Benches	Vandalized slats, carved, broken, or split.	Replace broken or carved slats. Minor split or checked slats should be sanded to reduce the chance of splinters. Follow the manufacturer's recommendation on finishing bench tops with oil depending on desired aesthetic.
Bridge	Chipped paint, loose guardrail cables, erosion around bridge abutments.	On galvanized steel structures, remove excess rust through mechanical means (wire brush or sanding), and apply cold galvanize to the affected area. If guardrail cables are loose, first attempt to tighten cable at turnbuckle. If unsuccessful, contact manufacturer for replacement cable and installation instructions. Erosion around bridge abutments should be corrected to prevent undermining of foundations.

Water Quality / Quantity Monitoring

Permanent monitoring equipment has been installed at various on-site locations. Refer to construction drawings for locations or Appendix B for approximate locations of this equipment. This monitoring equipment allows MCWD to perform intermittent site monitoring, with the intent of:

- Evaluating if project is meeting design targets relating to water quantity and quality.
- Characterizing annual benefit of stormwater system to be used for public communication.
- Determining the need for maintenance or reconfiguration of stormwater quality infrastructure.

The following monitoring equipment is installed onsite:

- Three (3) - ISCO Sampler – measures water quality information such as total nitrogen, total phosphorous, and total suspended solids.
- Three (3) - Flow Rate Measurement Device – measures flow rate and velocity of stormwater entering and exiting the site.

All monitoring equipment is installed in a permanent lockable structure. These structures have been designed to be low profile, and outside of major sightlines as to not distract from the overall site aesthetic. Power will be provided to these structures via wired conduit. Three primary monitoring locations have been established, as shown in Appendix B.

- Near the North NSBB
- Near the South NSBB
- Pond Outlet

Frequent access to these structures will be required for the collection of monitoring data. All structures are accessible from the surface and therefore do not require confined space entry. Sensor installation within storm sewer pipes, and periodic inspection of monitoring equipment will require confined space entry.

Monitoring structures should be inspected whenever accessed (refer to the *Inspection* section above). Should the results of the inspection require corrective maintenance, it should be communicated to the site owner.

If it is observed that key site metrics in water quality or quantity do not meet the intended levels, corrective maintenance may be required. Specifically, monitoring results should be considered when determining the need for pond dredging.



Appendix A

Product-Specific Maintenance Cut-Sheets

**Most
Dependable
Fountains, Inc.**

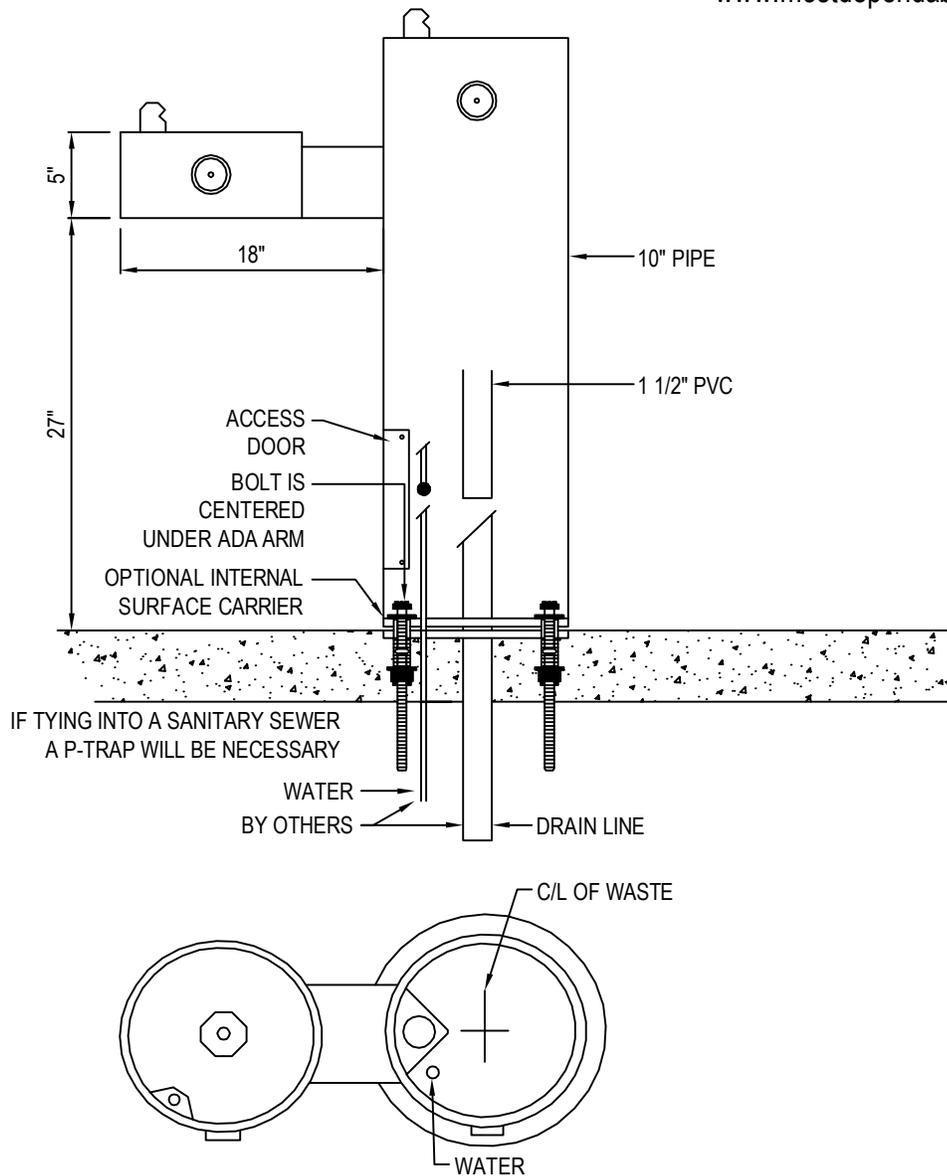
OPERATIONS MANUAL

**MODELS:
440 SMFA
& 440 SMSSFA**

Most Dependable Fountains, Inc[™]
5705 Commander Drive
Arlington, TN 38002
800-552-6331
www.mostdependable.com



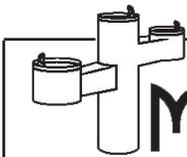
MOST DEPENDABLE FOUNTAINS, INC.
 5705 COMMANDER DR. P.O. BOX 587
 ARLINGTON, TN 38002-0587
 TOLL FREE: 1-800-552-6331
 PHONE: (901) 867-0039
 FAX: (901) 867-0159
 www.mostdependable.com



NOTES:

1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWING.
3. THIS DRAWING IS INTENDED FOR USE BY ARCHITECTS, ENGINEERS, CONTRACTORS, CONSULTANTS AND DESIGN PROFESSIONALS FOR PLANNING PURPOSES ONLY. THIS DRAWING MAY NOT BE USED FOR CONSTRUCTION.
4. ALL INFORMATION CONTAINED HEREIN WAS CURRENT AT THE TIME OF DEVELOPMENT BUT MUST BE REVIEWED AND APPROVED BY THE PRODUCT MANUFACTURER TO BE CONSIDERED ACCURATE.
5. CONTRACTOR'S NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADdetails.com/info AND ENTER REFERENCE NUMBER 3354-1.92.





ORIGINAL SERIES DRINKING FOUNTAIN SPECIFICATIONS

WATER QUALITY (LEAD FREE)

Section 9, California Proposition 6 and the Federal Safe Drinking Water Act. One piece weld construction with MDF standard 3/16" wall thickness.

■ STANDARD PEDESTAL

OR

■ STAINLESS STEEL PEDESTAL

One piece weld construction with MDF standard 304 schedule 10 stainless steel.

RECEPTOR BOWL

18 gauge electro-polished stainless steel bowl. Bowl overlaps pedestal, preventing build-up of residue in visual drinking area. Optional stainless steel Bowl Strainer recommended for areas with sand.

BUBBLER HEAD

Stainless steel anti-squirt head (weighing a pound and a half) mounted with a lock nut and washer to prevent tampering. Lock nut pin holds bubbler in locked position to prevent twisting or turning. The MDF bubbler head has a unique design that features a steady stream trajectory and a built in natural shield from contamination.

PUSH BAR

304 stainless steel with circumference exceeding 8.6". Mushroom style push bar overlaps and prevents sand and other objects from sticking push bar in the ON position. Stainless steel bubbler housing standard.

CONTROL VALVE

Self closing valve requires less than 5 lbs to operate. Non-cartridge O-ring valve delivers steady stream of water through an adjustable valve. This valve design is to operate and function at 30 to 80 PSI. Ideal operating pressure is 60 PSI.

WATER SUPPLY (LEAD FREE)

Maintenance free reinforced nylobraid tubing - **this tubing is not plastic**. It is supplied with a 1/2" MIP threaded inlet with stainless steel strainer. Union fittings at every connection. Supply line stops above grade.

DRAIN

1 1/2" schedule 40 PVC pipe. Drain line stops above grade.

FINISH

Oven baked powder coat. Choice of colors are: green, blue, black, brown, red, yellow, orange, and white. Textured color choices: emerald, sapphire, pyrite, text-black, burgundy, gold vein, copper and sandstone. Stainless steel models are powder coated for added protection. The color chrome is available for stainless steel models only.

ACCESS

Working parts accessible through bowl of fountain for easy service. Supply and waste connections are through the above grade access door. All access plates, brackets, vandal resistant bolts and screws are stainless steel.

INSTALLATION

Surface Mount installation, is designed to be anchored on top of an existing surface (concrete, etc.) with anchor bolts through a mounting plate that is welded to the fountain. Surface Mount Fountains provide an access door with vandal resistant stainless steel screws. Surface mount carrier recommended for all surface mount installations. Access door standard on all pedestal fountains.

WINTERIZATION

Shut off water and drain down.

WARRANTY

One year warranty, labor not included.

SHIPPING WEIGHT

Model 400 SM.....	115 lbs	Model 400 SMSS.....	115 lbs	*Meets ADA for High and Low
Model 410 SM.....	110 lbs	Model 410 SMSS.....	110 lbs	
Model 440 SM*.....	130 lbs	Model 440 SMSS*....	130 lbs	
Model 493 SMSS*..	170 lbs	Model 493 SMSS*....	170 lbs	

MOST DEPENDABLE FOUNTAINS, INC.™
 (800) 552-6331 • (901) 867-0039 • Fax (901) 867-4008
 5705 COMMANDER DR. • ARLINGTON, TN 38002-0587
www.mostdependable.com



INSTALLATION INSTRUCTIONS

Most Dependable Fountains, Inc.™

All **SM (surface mount)** products are designed to be installed on the surface of a new or existing concrete slab. Your contractor needs to provide a 1 ½” PVC drain line (**when applicable**) and water line thru finish grade. Connections are made to our SM products thru our access door, as shown on detail drawings. The water tubing is provided with a ½” male iron pipe connection. This is an excellent location for a cutoff valve. Surface Mount units are anchored to the existing concrete by means of ½” concrete shields with bolts or we recommend ½” quick bolts.

Note: We offer an optional template which is designed to be poured in the concrete slab. It comes with the necessary vandal resist stainless steel bolts and washers need to anchor.

All **DB (direct bury)** products are designed to be installed to a depth of 14” below grade. MDF provides 1 ½” PVC drain line inside the pedestal (**when applicable**) to point of connection by others. MDF also provides reinforced nylobraid flexible tubing with a ½” male iron pipe thread for connection to water supply by others. MDF recommends an optional valve box using a PVC conduit to the pedestal. By using this option you have complete control of your product.

Individual detail drawings available Online or by request.



For more information:
Most Dependable Fountains, Inc.™
www.mostdependable.com
Info@mostdependable.com
800-552-6331
901-867-0039

LIMITED PRODUCT WARRANTY

Most Dependable Fountains, Inc.™

Most Dependable Fountains, Inc.™ warrants that all of its products are guaranteed against defective material or poor workmanship for a period of **one year from date of shipment**. Most Dependable Fountains, Inc.™ liability under this warranty shall be discharged by furnishing without charge any goods, or part thereof, which shall appear to the Company upon inspection to be of defective material or not of first class workmanship. Most Dependable Fountains, Inc.™ will not be liable for the cost of repairs, alterations or replacements, or for any expense connected therewith made by the owner or his agents. Most Dependable Fountains, Inc.™ will not be liable for any damages caused by defective materials or poor workmanship, except for replacements, as provided above. Buyer agrees that Most Dependable Fountains, Inc.™ has made no other warranties either expressed or implied in addition to those above stated. The products manufactured by Most Dependable Fountains, Inc.™ is warranted to function if installation and maintenance instructions provided are adhered to. The units also must be used for the purpose for which they were intended.





Fall Maintenance of No Mow Lawn



Fall is the best time to do lawn maintenance. The soils are usually drier and not saturated with moisture – as commonly occurs in spring– making it easier to perform lawn maintenance activities such as over-seeding, mowing, dethatching and aeration. A No Mow Lawn requires minimal care, but there are a few steps that can be taken in the fall to improve turf quality and promote better growth the following spring.

Overseeding

Fall is the best time to overseed any open areas that result from damage due to animals, construction activities, heavy traffic, or summer fungal diseases. The areas to be reseeded should be lightly worked up or scratched with a rake to expose the soil prior to seeding. The seed can be sprinkled into the open soil, raked in lightly, and firmed by stepping on the soil to firm it. Watering for the first 2–3 weeks helps stimulate germination and growth. Read [Over-Seeding your No Mow Lawn \(PDF\)](#) for detailed information on over-seeding.

De-Thatching

Fine fescue grasses tend to develop a thatch layer just below the soil surface due to the accumulation of dead root material over time. No Mow lawns that are not mowed regularly (every month or so) also tend to develop a “mat” of dead grass material that can make a lawn appear “spotty” and not as full as a mowed lawn. The buildup of thatch and mat slows the emergence of new growth in the spring, so that unmowed fescue lawns appear brown long after mowed lawns have greened-up.

These conditions can be addressed in two ways:

1. Dethatching – The thatch is removed manually using a dethatching rake, or with a machine that aggressively “combs” out the thatch from the grass. Dethatching is best done in fall, but is also effective when conducted in mid -spring.
2. Close Mowing – Late in the fall when night time temperatures have been below freezing for an extended period of time (November to early December), the No Mow lawn can be mowed close to the ground to clean away the year’s growth and remove the mat layer. This can be done by setting your mower on its lowest setting, or by using a string trimmer (weed whacker) to mow right down to the ground. The mowed material should be bagged during mowing or raked up afterwards. Close mowing should never be done during the growing season, as it will scalp the lawn and severely harm the fine fescue grasses. However, close mowing can be safely done in late fall once the grasses begin to enter winter dormancy. Mowing in early spring is more difficult than in fall, as the grass becomes matted down over winter, and is often wet and harder to mow.

Aerating

Lawns on heavy soils with a high clay content often suffer from compaction and poor air transfer to the roots, which require air to breathe and stay healthy. Aeration helps to open up these soils, promoting better root growth and an overall healthier lawn. Aeration is typically done using a machine that removes plugs of soil from the lawn. The resulting holes are then filled with a lighter material, such as a sand and compost mix. This promotes better air flow in the soil and healthier plant growth .

Since the fine fescue grasses in the No Mow Lawn Mix grow best on well-drained sandy and loamy soils, compaction is usually less of an issue than on clay based soils, which are easily compacted. If your No Mow Lawn was seeded on a sandy soil, you should not have to worry about aerating your lawn. Sandy loam soils that are subjected to heavy foot traffic or vehicle use may become compacted, and require occasional aerating.vegetation must be killed or removed. Existing lawn grass, weeds, and other plants will compete with the No Mow seeds for nutrients, moisture, and sunlight. All perennial weeds must be eliminated prior to seeding. Perennial weeds such as quackgrass, bromegrass, thistles, creeping goldenrods and other aggressive plants will present a long-term problem if not controlled prior to seeding your No Mow turf. Annual weeds which are present in the soil as seeds can require your attention in early going (establishment stage), but should not pose a long-term threat.

Tree Leaf Removal & Mulching

Since the fine fescue grasses in the No Mow Lawn mix are the most shade tolerant turf grasses available, they are often seeded in shady areas with trees in the overstory. If the leaves of deciduous trees are allowed to accumulate and mat down on the lawn, they will smother the grass. Oak leaves are particularly problematic, because they are high in tannins and are not readily broken down by soil micro-organisms.

There are two methods for handling tree leaves:

1. Raking – Simply rake off the leaves once they have (all)fallen from the trees. This leaves a nice green carpet of No Mow that will green up ASAP in spring.
2. Use a mulching mower to finely chop the leaves so they cannot mat down and smother the grass. It may require two or three passes with a mulching mower to chop up the leaves sufficiently.

The needles of white pines and red pines do not harm the fine fescue grasses in the No Mow lawn. Spruce needles contain more complex organic compounds and break down more slowly, but generally will not harm an established No Mow lawn. The fine fescue grasses are particularly tolerant of the acid soil conditions that are created by the needles of conifer trees.

Fall Fertilizing

We do not recommend using fertilizers on No Mow. The use of lawn fertilizers that contain phosphorus are not allowed in many communities and near lakes and streams, due to the negative effects on water quality and algae blooms. Do not apply fertilizers that are high in Nitrogen. Fine fescue grasses require only a bare minimum of Nitrogen. Application of nitrogen at any time of year can damage fine fescue turf, and is strongly discouraged.

We offer the following tips and information about soil amendment:

1. Always test your soil before adding soil amendments. In most cases, the soil already has sufficient nutrients to support a fescue lawn. The addition of any fertilizer in such cases is unnecessary and only increases the pollutants in water runoff.
2. The best time to conduct a soil nutrient test is in late summer or early fall (late August to early September). This provides a good estimate of the soil nutrient conditions in advance of fall fertilizing.
3. Fall is the best time to apply fertilizer to lawns composed of cool season grasses, since these grasses have a strong late season growth spurt that builds their root systems for the following year. Fertilizer should not be applied in summer, as cool season grasses typically enter a dormant period and do not take up nutrients efficiently.
4. Loamy and sandy loam soils seldom, if ever, require fertilizing. However, the first step in amending sandy soils is to check the pH to see if liming is necessary. Lime is essential in facilitating the availability of nutrients in the soil. Without first correcting the pH, the addition of any fertilizer is a waste of time.
5. Fine fescues can sometimes benefit from the addition of phosphorus and potassium in early fall, but only if your soil is low in these nutrients. Acid soils can benefit from fall-applied lime. Highly alkaline soils respond well when elemental sulfur is applied in fall to reduce the alkalinity of the soil.
6. A simple soil test for the following nutrients will determine what, if any additional nutrients your soil requires to grow a good lawn: pH (acidity – alkalinity), Calcium, Magnesium, Phosphorus, Potassium.



Parc Vue

landscapeforms®

Product Data Sheet



The landmark collection was inspired by familiar themes in historic design, architecture and nature. Designer John Rizzi took his inspiration from traditional cast iron furniture and asymmetric patterns in nature. The Parc Vue bench achieves a delicate balance between the strength and lively gesture of its frame and the perceived lightness and linear order of its slatted seat. It is a sculptural form that has what Rizzi calls “traditional roots and its own dynamic presence.” In the companion curved and mesh-caged Parc Vue litter receptacle, the designer combines historic reference and contemporary manufacture in an elegant utilitarian object suited to a variety of settings in urban environments.

Bench

- Horizontal strap seat style is standard for backed or backless benches.
- Bench is available in 72" length.
- End arms are available for backed bench and are welded to the end frame.
- Support end frames are of 3/4" steel.
- Seating surface is made of horizontal steel straps (1-1/2" x 3/16"), which are welded to the end frames.
- Parc Vue bench may be specified freestanding with glides or surface mount with anchor tabs.

Litter Receptacles

- Receptacles with liner have 30 gallon capacity; 40 gallon without liner.
- Cast iron base and wire mesh basket comes standard in all powdercoat colors.
- Top-opening or side-opening lid available in rotationally molded polyethylene, and attaches to basket with cable.
- Optional polyethylene urn-shaped liner and lid come in two standard colors (fog and black) to coordinate with wire mesh basket.
- Base has a center hole for optional surface mounting.
- Contact your Landscape Forms representative for details on clear plastic bag option.

	Style	Depth	Width / Length	Height	Weight
	backless	22"	72"	18"	107 lb
	backed	25"	72"	36"	160 lb
	backed with arms	25"	72"	36"	173 lb

	Style	Diameter	Height	Weight
	side-opening	22"	43"	72 lb
	top-opening	22"	36"	71 lb

Parc Vue

landscapeforms®

Product Data Sheet



Finishes

- Metal is finished with Landscape Forms' proprietary Pangard II® polyester powdercoat, a hard yet flexible finish that resists rusting, chipping, peeling and fading.
- Call for standard color chart.

To Specify

- Bench: Specify bench model, backless or backed.
- If backed, choose with or without end arms.
- Select freestanding or surface mount, and powdercoat color.
- Litter: Select top or side-opening litter, and with or without liner.
- Specify top and liner color, select powdercoat color for metal basket and base.

Designed by John Rizzi

Parc Vue designs are protected by U.S. Patent Nos. D528,831; D548,916; D532,630; D534,021; D550,421

Visit our landscapeforms.com for more information. Specifications are subject to change without notice. Landscape Forms supports the Landscape Architecture Foundation at the Second Century level.
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anovafurnishings.com

INF24L6T - Infinity 2' x 6' Linear Thermory® Bench

73.50" flat bench with Thermory planks and galvanized steel frame and supports.

Material

The linear bench is composed of 1.50" x 3.50" actual Thermory planks and 7-gauge galvanized steel frame and supports. The bench is 73.50" long and 24.00" wide. The bench supports 200 lbs. per linear foot.

The bench is designed to be surface mounted using predrilled 0.50" diameter holes in the supports to prevent movement. Mounting hardware is not included.

Low-maintenance Thermory is made from thermally-modified North American White Ash—a sustainably-harvested and renewable temperate hardwood. It is an environmentally-friendly hardwood and a great alternative to commonly used tropical rainforest hardwoods because of its dimensional stability and Class 1 durability (25+ years). Thermory has a lower carbon footprint than tropical hardwoods.

Finish

Hot dipped galvanized steel components are corrosion resistant and compliant with ASTM A123. Galvanized steel components are 100% recyclable and require no coating or maintenance over their service life.

Thermory is a lustrous chocolate brown color when new and will naturally age to uniform silver/gray over time. The color-changing process begins immediately and varies with the amount of UV-exposure.

Color

See website or sales representative for color choices.

Assembly

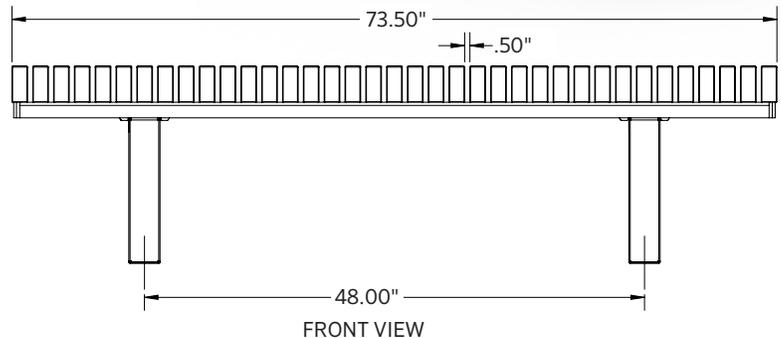
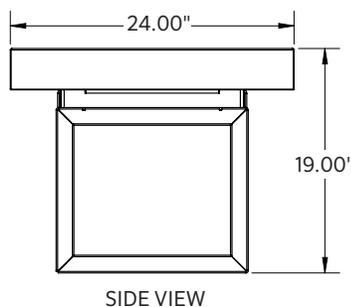
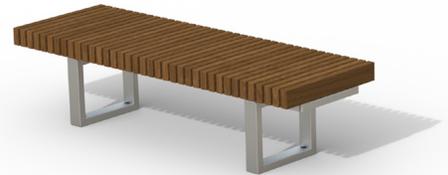
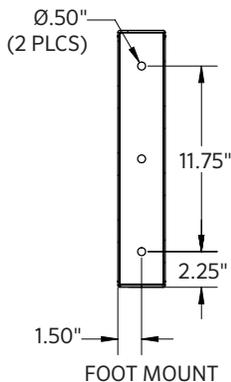
Each linear section ships partially assembled. Assembly includes stainless steel hardware.

Maintenance

Clean with mild soap and water. Let dry thoroughly. To maintain original color, regularly apply standard deck oil, such as Cutek® Extreme Wood Protection Oil.

Warranty

10-year limited structural warranty from the date of purchase. See full details on multi-year warranties for components at www.anovafurnishings.com/warranty.aspx.



SHIPPING INFORMATION

Unit Weight	Unit Shipping Wt. UPS	Unit Shipping Wt. Truck (1+ Units)	Unit Ship Size w/ Pallet	Max Units Per Pallet	Pallet Size/Wt. (32" X 74")	Total No. Pkgs.	Shipping Class
175 lbs.	N/A	182 lbs./unit	75.11 cu. ft.	18	100 lbs.	5	70



DERO
A PLAYCORE Company



Hoop Rack

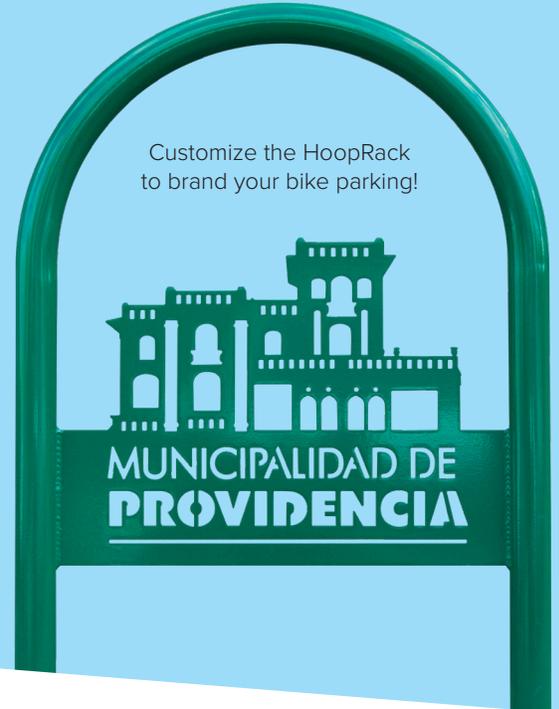
The Hoop Rack is a proven design that provides high security and easy bike parking. The Hoop Rack uses thick pipe construction and the full radius of the bend makes the Hoop an attractive and functional bike rack. This bike rack can also be put on rails for mobility and is popular in bike corrals.

Hoop Rack



YOUR **LOGO** HERE

Customize the HoopRack to brand your bike parking!



FINISH OPTIONS

Galvanized



Stainless

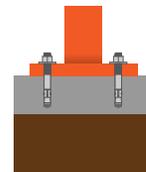


Powder Coat

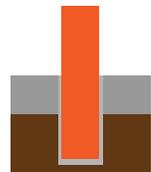
- | | | | | |
|-------------------------|--------------------|-------------------------|-----------------------|--------------------------|
| White | Black | Light Gray
RAL 7042 | Deep Red
RAL 3003 | Yellow
RAL 1023 |
| CNH Bright
Yellow | Orange
RAL 2004 | Beige
RAL 1001 | Iron Gray
RAL 7011 | Hunter Green
RAL 6005 |
| Light Green
RAL 6018 | Green
RAL 6016 | Sepia Brown
RAL 8014 | Blue
RAL 5005 | Sky Blue
RAL 5015 |
| Dark Purple | Flat Black | Wine Red
RAL 3005 | Bronze | Silver
RAL 9007 |

MOUNT OPTIONS

Surface



In-Ground

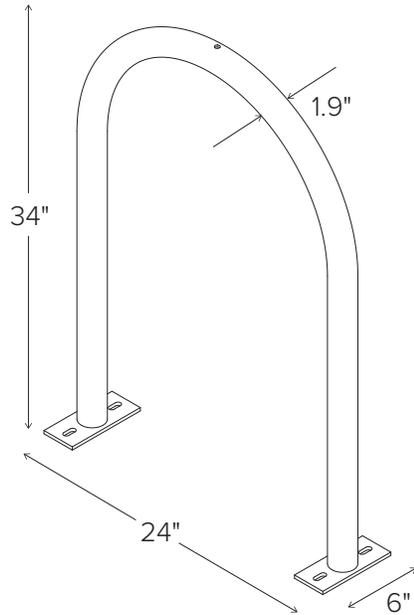


Tamper-resistant fasteners available upon request

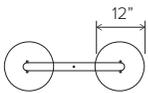
Rail



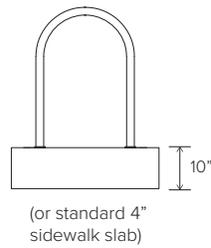
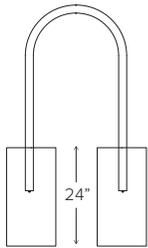
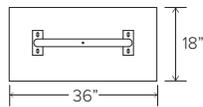
**OPTIONAL
LEAN BAR**



IN-GROUND MOUNT



SURFACE MOUNT



CAPACITY 2 Bikes

MATERIALS 1.5" schedule 40 pipe (1.9" OD)

FINISHES

- Galvanized**
An after fabrication hot dipped galvanized finish is our standard option.
- Powder Coat**
Our powder coat finish assures a high level of adhesion and durability by following these steps:
1. Sandblast
2. Epoxy primer electrostatically applied
3. Final thick TGIC polyester powder coat
- Stainless**
Stainless Steel: 304 grade stainless steel material finished in either a high polished shine or a satin finish.

MOUNT OPTIONS

- Surface**
Foot Mount has two 2.5" x 6" x .25" feet with two anchors per foot. Specify foot mount for this option. Tamper-resistant fasteners available upon request.
- In-Ground**
In-ground mount is embedded into concrete base. Specify in-ground mount for this option
- Rail**
Rail Mounted Downtown Racks are bolted to two parallel rails which can be left freestanding or anchored to the ground. Rails are heavy duty 3" x 1.4" x 3/16" thick galvanized mounting rails. Specify rail mount for this option.



90



45A



45B



60A

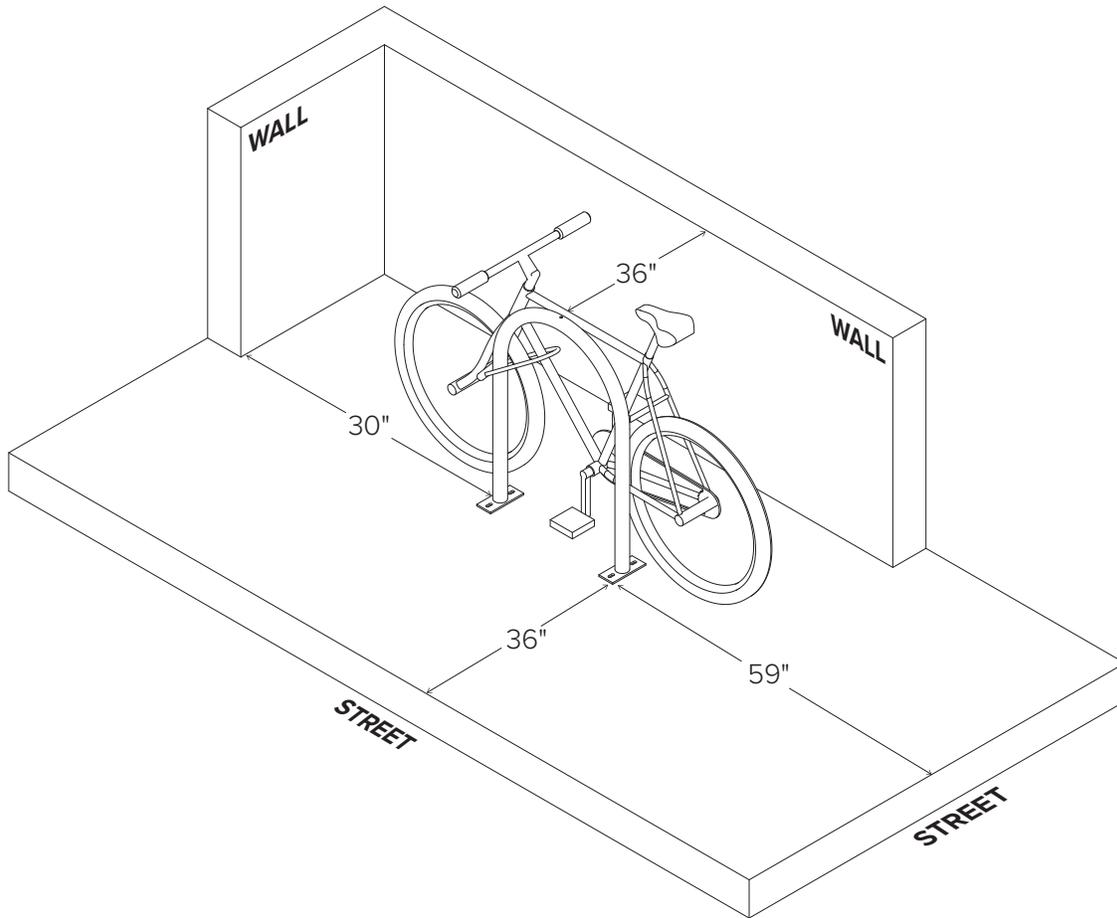


60B

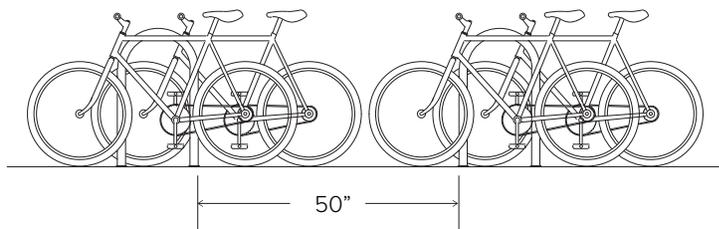
OPTIONAL LEAN BAR

- Add Lean Bar**

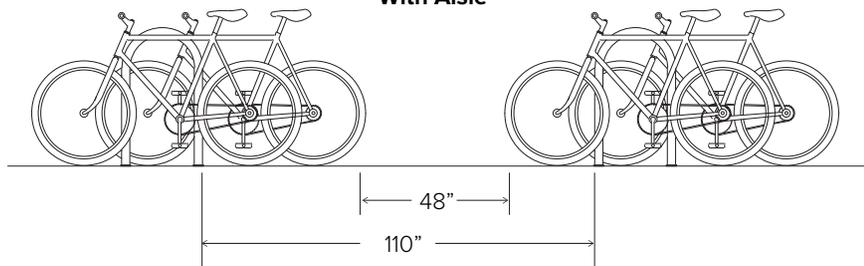




No Aisle



With Aisle

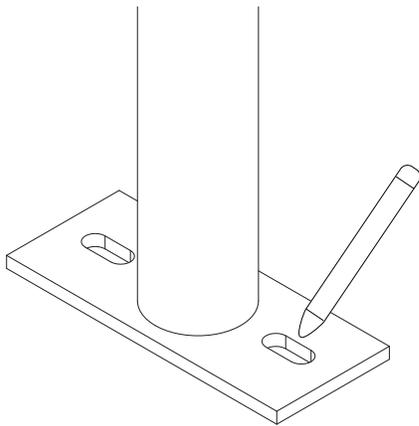



TOOLS NEEDED

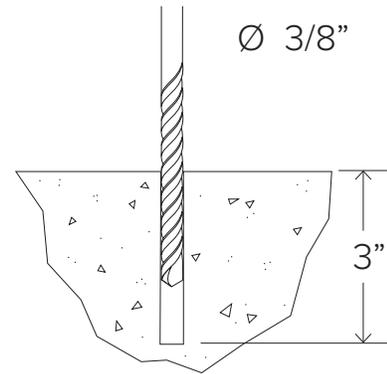
Marker or Pencil
 Masonry Drill Bit 3/8"
 Drill (Hammer drill recommended)
 Hammer
 Wrench 9/16"
 Level

RECOMMENDED BASE MATERIAL

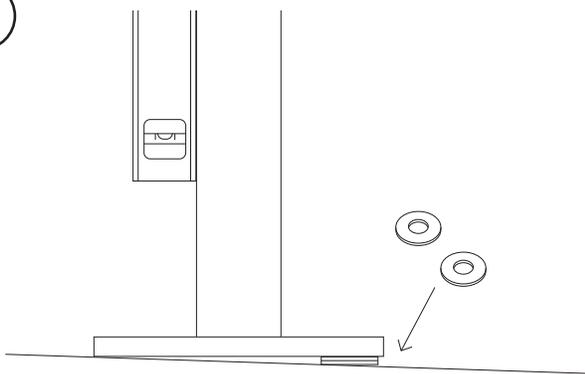
Solid concrete is the best base material for installation. To ensure the proper anchors are shipped with your rack, ask your Dero representative which anchor is appropriate for your application. Be sure nothing is underneath the base material that could be damaged by drilling.

1


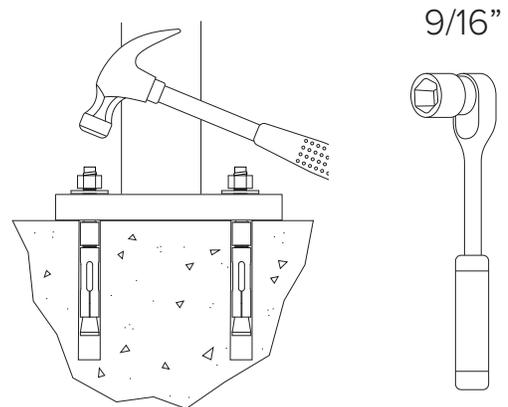
Place the rack in the desired location. Use a marker or pencil to outline the holes of the flange onto the base material.

2


Drill 3/8" diameter holes 3" deep into surface. Make sure the holes are at least 3" away from any cracks in the base material.

3


Place rack (and washers to level rack if necessary) over holes.

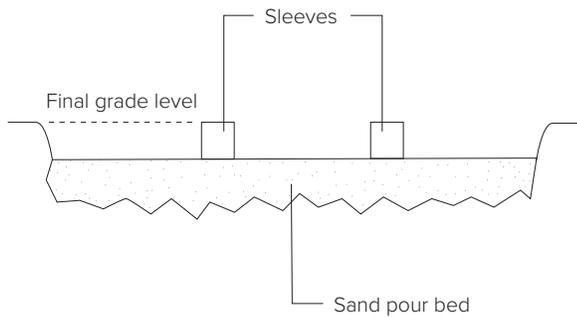
4


Thread nuts onto anchors, leaving approximately 1/4" of the anchor protruding, and tap into surface. Tighten nuts down to secure rack.

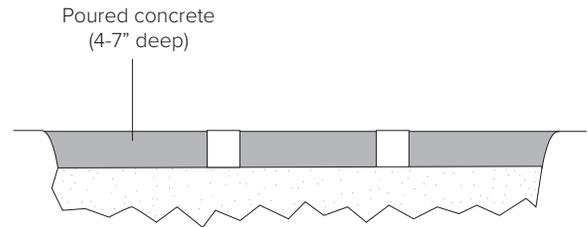

TOOLS NEEDED

Level
 Cement mixing tub
 Shovel

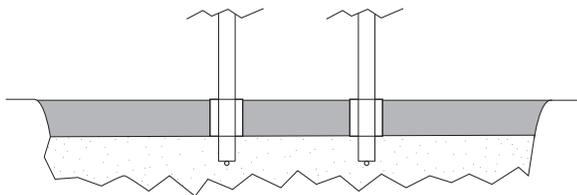
Trowel
 Corrosion-Resistant Sleeve (min. 3" diameter)
 Materials to build brace (see "Install Tip" at bottom of page)

1


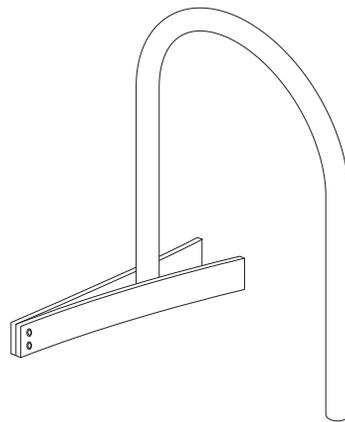
Place corrosion resistant sleeve (min. 3" inside diameter) in sand pour bed in exact location where rack will be installed. Make sure top of sleeve is at same level as desired finished concrete surface. Fill sleeve with sand to keep it in place and prevent it from filling with concrete.

2


Pour concrete and allow to cure.

3


After appropriate cure time, dig out sand from sleeves and insert rack, making sure it is level and at the appropriate height. Pour in Super Por-Rok or epoxy grout and allow to set.

TIP


An easy way to brace the rack while the grout sets is to bolt two 1x4" boards together at one end and clamp them onto the legs of the rack like a clothes pin.

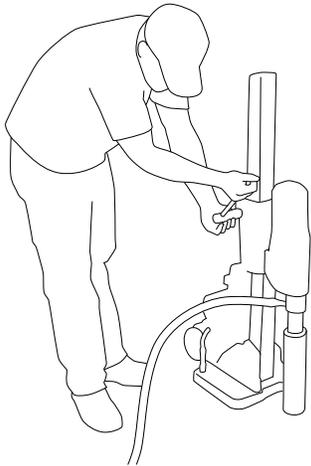


TOOLS NEEDED

Level
Cement mixing tub
Shovel
Access to water hose

Trowel
Hole coring machine with 4" bit
Materials to build brace (see "Install Tip" at bottom of page)

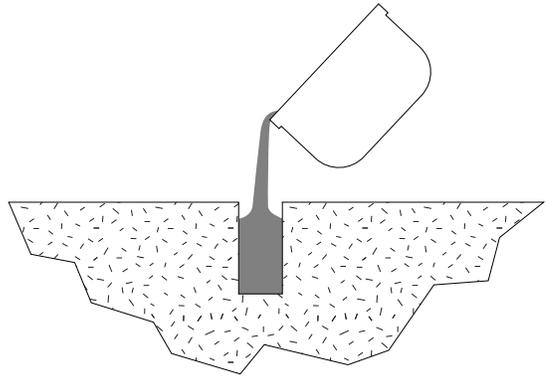
1



Ø 3" min.
↓ 10" min.

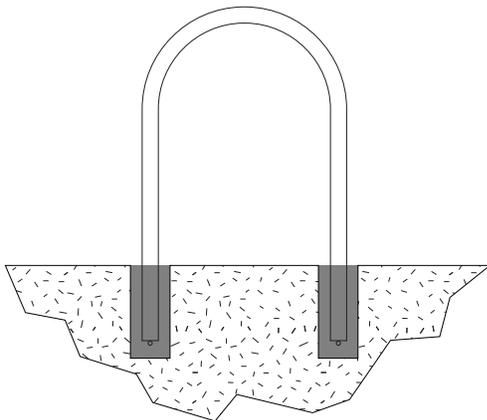
Core holes no less than 3" diameter (4" recommended) and no less than 10" deep into sidewalk.

2



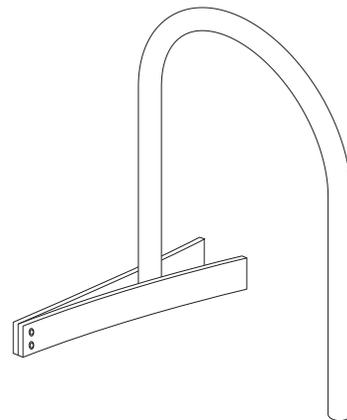
Fill holes with Super Por-Rok or epoxy grout.

3



Place rack into holes, making sure the rack is level until the grout has set. 33"-36" of the rack should remain above the surface.

TIP



An easy way to brace the rack while the grout sets is to bolt two 1x4" boards together at one end and clamp them onto the legs of the rack like a clothes pin.

RAIL MOUNTED OPTIONS

Rail mounted Hoop Racks are standard foot mounted racks attached with bolts to a rail as in the diagram at left. Rail mounted racks provide more flexibility than other mounting options while providing the same degree of security.

Rail mounted racks can be left freestanding, or they can be anchored to the ground using several anchors. This option allows for easier snow removal and sweeping. Installation of Rail mounted racks is also much less expensive than embedding the racks into the ground.

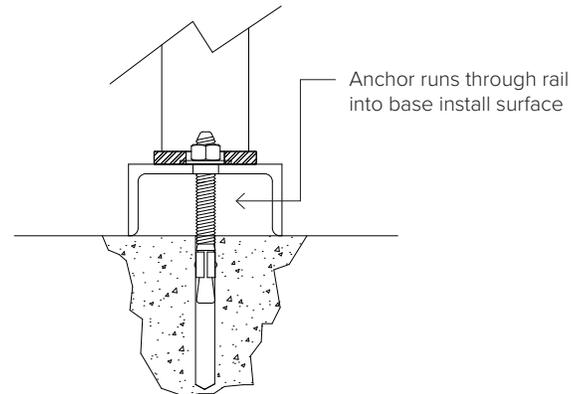
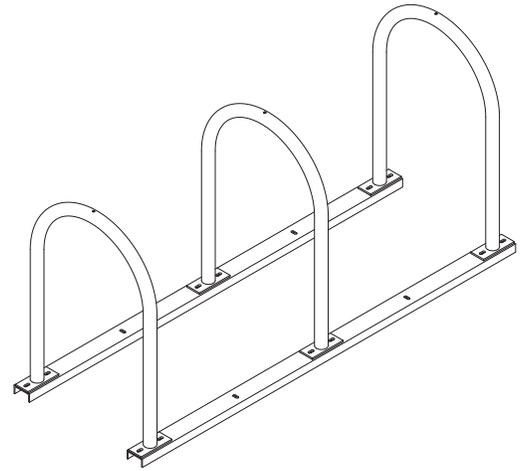
* Note: Though racks may be painted, the rails will remain with only a galvanized finish

ADVANTAGES:

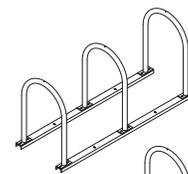
- Easier and inexpensive installation
- Can be left freestanding or anchored to the ground
- Easier to remove for sweeping and snow removal

APPLICATIONS:

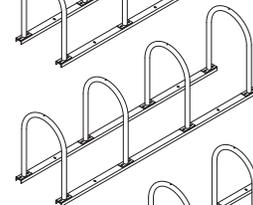
- Installation to pavers
- Asphalt Installations
- Ground, dirt, or mulch
- Situations where the rack needs to be moved occasionally



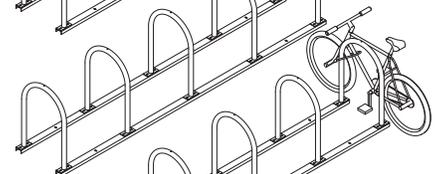
3 Unit Rack
69" Long
Parks 6 Bikes



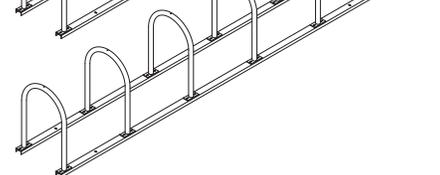
4 Unit Rack
100.5" Long
Parks 8 Bikes



5 Unit Rack
132" Long
Parks 10 Bikes



6 Unit Rack
163.5" Long
Parks 12 Bikes

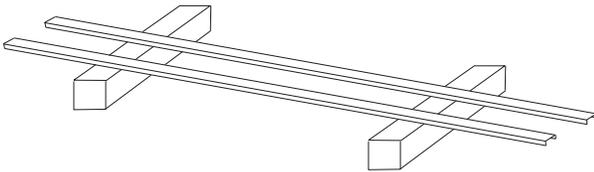



TOOLS NEEDED

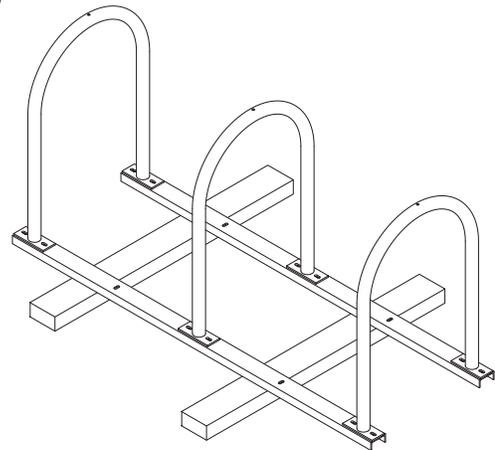
9/16" Socket set
 Two 4"x4"x28" (or larger) blocks
 4 bolts, nuts and washers for every rack
 (included). If using a tamper resistant nuts,
 install two tamper resistant nuts with each rack.

ANCHORING THE RAILS

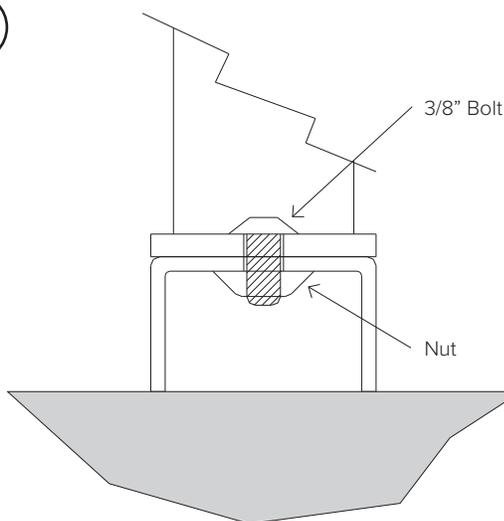
To anchor the rails to concrete, place 3.75" wedge anchor through holes in the rail into the concrete. Secure with nut.

1


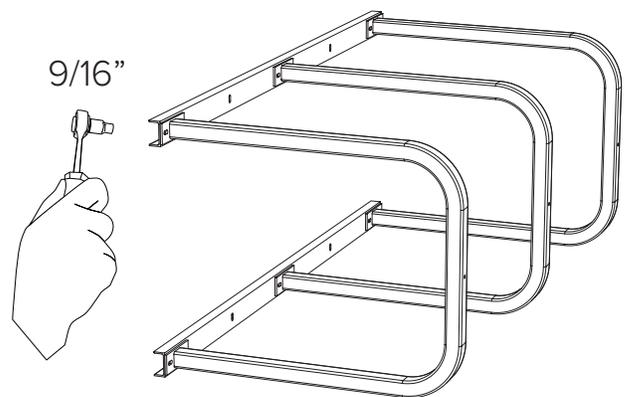
Lay out the two channel beams where the rack will be placed. Place the two beams on top of the two blocks of wood so that the open part of the channel faces the ground.

2


Place racks on beams so holes in rack flanges line up with beam slots

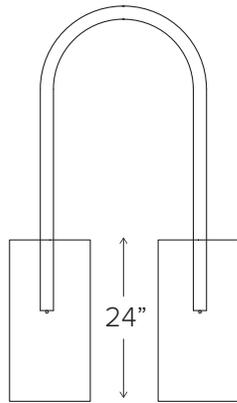
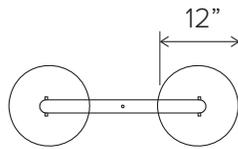
3


Put bolts through rack flange holes and beams so bolt head faces up. **HAND** tighten the nuts using new flange nuts.

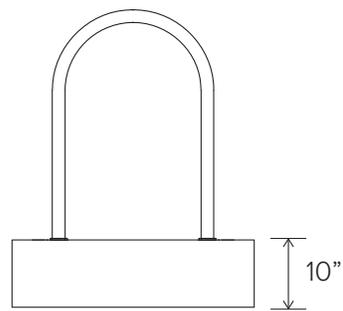
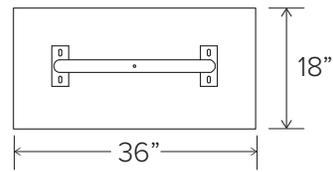
4


Once nuts are on, tip assembled rack over and use a 9/16" socket to tighten nuts. Before fully tightening nuts, make sure the racks are straight on beams. If using tamper resistant nuts, use access tool to tighten nuts. Do not overtighten the tamper resistant nuts. Tip rack upright.

IN-GROUND MOUNT

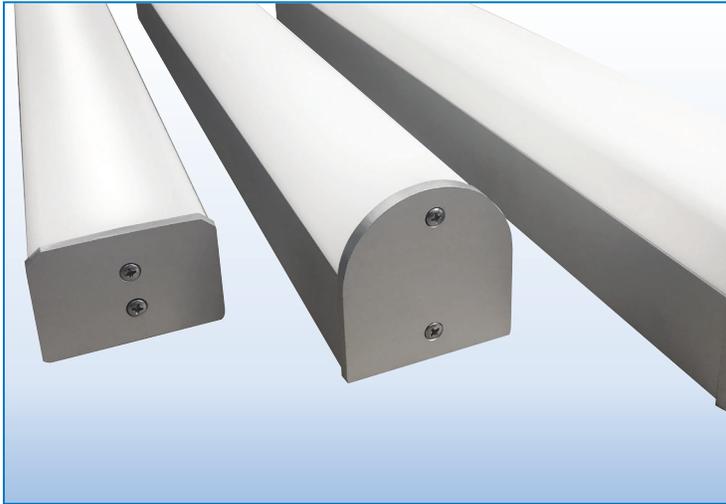


SURFACE MOUNT

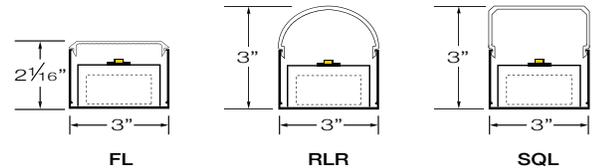


(or standard 4" sidewalk slab)

LED WET LOCATION



PROJECT:
TYPE:



SPECIFICATIONS

HOUSING	3" Wide extruded aluminum housing up to 12' long. Continuous runs available.
FINISH	Satin anodized or white paint finish standard. Custom finish optional.
LENS	3 Options extruded DR acrylic, snap-on frosted widespread lens. See page 2 for details.
LED DRIVER	Integral, universal voltage; 0-10V dimming standard; 1% or 10% dimming.
MOUNTING	SURFACE MOUNT: See page 2 for details and options.
LED's	(LED boards) 50,000 hours. (L70), 80 CRI, 2700K, 3000K, 3500K and 4000K.
CERTIFICATION	ETL/CSA listed for wet locations. 2001431 MADE IN THE USA

LED COLOR & LUMEN OPTIONS

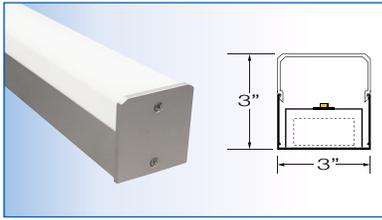
4' – 24" BOARDS		LUMENS PER FOOT – WATTS PER FOOT – LUMENS PER WATT								
LED COLOR	CRI	LOW			MEDIUM			HIGH		
WHITE 2700K	80	500 L/FT	3.5 W/FT	136 L/W	870 L/FT	6.5 W/FT	130 L/W	1160 L/FT	9.0 W/FT	127 L/W
WHITE 3000K	80	530 L/FT	3.5 W/FT	144 L/W	915 L/FT	6.5 W/FT	137 L/W	1220 L/FT	9.0 W/FT	133 L/W
WHITE 3500K	80	535 L/FT	3.5 W/FT	144 L/W	920 L/FT	6.5 W/FT	137 L/W	1225 L/FT	9.0 W/FT	133 L/W
WHITE 4000K	80	560 L/FT	3.5 W/FT	151 L/W	970 L/FT	6.5 W/FT	145 L/W	1290 L/FT	9.0 W/FT	140 L/W

Higher lumen packages available.

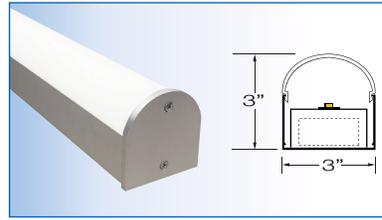
PART NUMBER

SERIES	LUMENS	COLOR	VOLTS	FEED	OPTIONS	FINISH	LENGTH
EL3-SQL-LED	L LOW	27K 2700K	UNV1 (120/277) 1% DIM	EF END FEED	MS MOTION SENSOR	S SATIN	2' 8"
EL3-RLR-LED	M MEDIUM	3K 3000K		FD FIELD DRILL	MSP BI-LEVEL MOTION SENSOR	W WHITE	3' 9"
EL3-FL-LED	H HIGH	35K 3500K	UNV (120/277) 10% DIM	CR CONTINUOUS RUNS	JBP J BOX PLATE	C CUSTOM	4' 10"
	CP CUSTOM PROGRAMMED (Specify Lumens/FT or Watts/FT)	4K 4000K		CONSULT FACTORY FOR CONTINUOUS RUNS FEED			5' 11"
							6' 12"
							7'

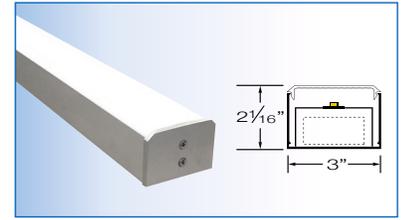
LENS OPTIONS



EL3 – SQL – LED
SQUARE LENS



EL3 – RLR – LED
ROUND LENS



EL3 – FL – LED
FLAT LENS

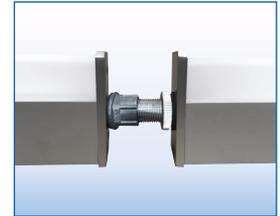
FEED OPTIONS



EF – END FEED
1/2" END FEED CONNECTOR
(INCLUDED)



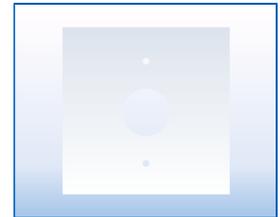
FD – FIELD DRILL
ONLY ON BACK OF HOUSING



CR – CONTINUOUS RUNS
AVAILABLE. CONSULT
FACTORY FOR DETAILS

MOUNTING OPTIONS

- Surface Mount
- Consult factory for pendant mount or any other mounting requirements.
- Mounting holes must be field drilled and siliconed covered.
- Drain holes must be field drilled at lowest point of fixture.
- 2' Fixture requires off center service hole due to 12" driver.
- Narrow housing will not cover recessed J Box. Whip feed recommended. Use optional "JBP" canopy plate for J-Box mount.



J-BOX PLATE
JBP 5" FLAT CANOPY PLATE
TO COVER J-BOX

SENSOR OPTIONS

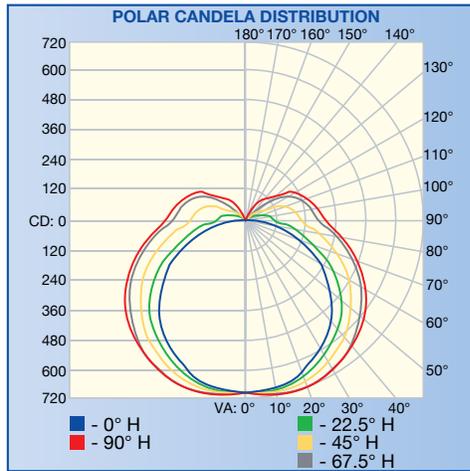


- MOTION SENSOR**
- MS** MOTION SENSOR
 - MSP** PROGRAMMABLE BI-LEVEL
(MOTION/LIGHT SENSOR
MOUNTS UNDER LENS
ADDS 3" TO FIXTURE LENGTH)

FIXTURE LENGTHS

NOMINAL LENGTH	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'
ACTUAL LENGTH	26"	35"	50"	57"	74"	90"	98"	112"	122"	134"	146"

PHOTOMETRICS / CANDELA DISTRIBUTION .IES files available online or by calling the factory.

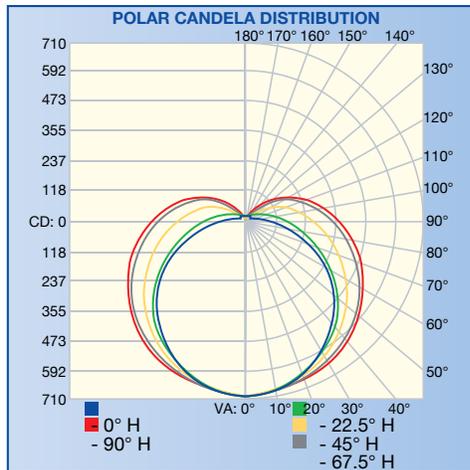


EL3 – SQL – LED 3" SQUARE LENS

POLAR GRAPH

REPORT NO.: 103499092LAX-001

Based on 4' linear fixture at medium lumens (35K 903L/FT x 4'= 3612L)

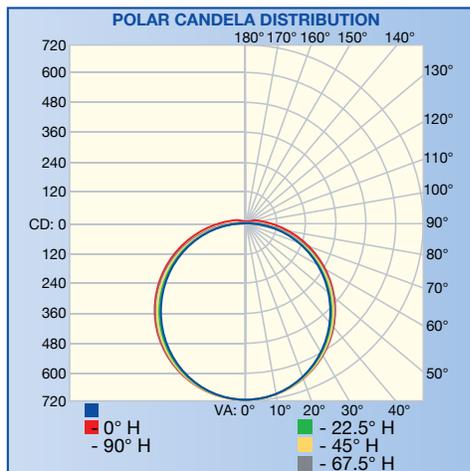


EL3 – RLR – LED 3" ROUND LENS

POLAR GRAPH

REPORT NO.: 103499092LAX-002

Based on 4' linear fixture at medium lumens (35K 903L/FT x 4'= 3612L)



EL3 – FL – LED 3" FLAT LENS

POLAR GRAPH

REPORT NO.: 103499092LAX-003

Based on 4' linear fixture at medium lumens (35K 903L/FT x 4'= 3612L)



211 North Lindbergh Blvd.
 St. Louis, MO 63141
 800.231.1327tel| 314.754.0835 fax
specify@anovafurnishings.com
anovafurnishings.com

INF24C1230T - Infinity 2' Curved 1230 Bench, Thermory®

77.00" arc length flat bench with Thermory planks and galvanized steel frame and supports.

Material

The curved bench is composed of 1.50" x 3.50" actual Thermory planks and 7-gauge galvanized steel frame and supports. The bench is 77.00" long and 24.00" wide. The bench supports 200 lbs. per linear foot.

The bench is designed to be surface mounted using predrilled 0.50" diameter holes in the supports to prevent movement. Mounting hardware is not included.

Low-maintenance Thermory is made from thermally-modified North American White Ash—a sustainably-harvested and renewable temperate hardwood. It is an environmentally-friendly hardwood and a great alternative to commonly used tropical rainforest hardwoods because of its dimensional stability and Class 1 durability (25+ years). Thermory has a lower carbon footprint than tropical hardwoods.

Finish

Hot dipped galvanized steel components are corrosion resistant and compliant with ASTM A123. Galvanized steel components are 100% recyclable and require no coating or maintenance over their service life.

Thermory is a lustrous chocolate brown color when new and will naturally age to uniform silver/gray over time. The color-changing process begins immediately and varies with the amount of UV-exposure.

Color

See website or sales representative for color choices.

Assembly

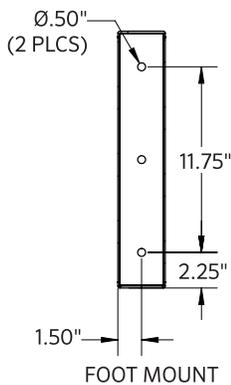
Each curve section ships partially assembled. Assembly includes stainless steel hardware.

Maintenance

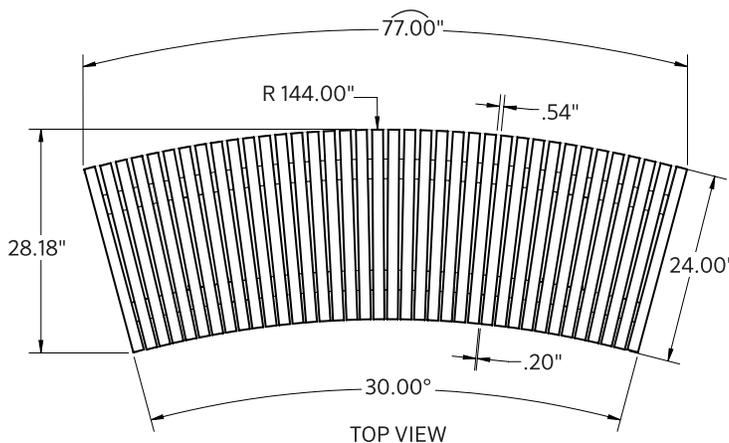
Clean with mild soap and water. Let dry thoroughly. To maintain original color, regularly apply standard deck oil, such as Cutek® Extreme Wood Protection Oil.

Warranty

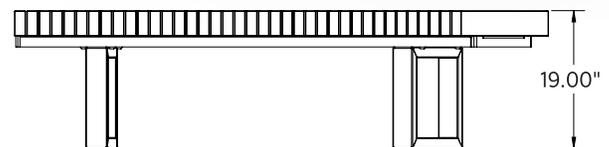
10-year limited structural warranty from the date of purchase. See full details on multi-year warranties for components at www.anovafurnishings.com/warranty.aspx.



FOOT MOUNT



TOP VIEW



SIDE VIEW

SHIPPING INFORMATION

Unit Weight	Unit Shipping Wt. UPS	Unit Shipping Wt. Truck (1+ Units)	Unit Ship Size w/ Pallet	Max Units Per Pallet	Pallet Size/Wt. (32" X 74")	Total No. Pkgs.	Shipping Class
180 lbs.	N/A	187 lbs./unit	75 cu. ft.	18	100 lbs.	5	70

ULD-50001

Lador 1 Floodlight



Mounting Options



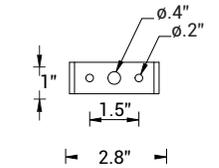
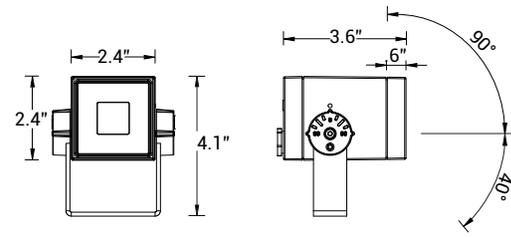
Threaded Knuckle (ULD-50041)



Pedestal Mount (ULD-50081)



3w LED 190 Lumens
IP66 • Suitable For Wet Locations
IK08 • Impact Resistant (Vandal Resistant)
Weight 1.5 lbs



Mounting Detail

Construction

Aluminum
 Less than 0.1% copper content – Marine Grade 6060 extruded & LM6 Aluminum High Pressure die casting provides excellent mechanical strength, clean detailed product lines and excellent heat dissipation.

Pre paint
 8 step degrease and phosphate process that includes deoxidizing and etching as well as a zinc and nickel phosphate process before product painting.

Memory Retentive -Silicon Gasket
 Provided with special injection molded "fit for purpose" long life high temperature memory retentive silicon gaskets. Maintains the gaskets exact profile and seal over years of use and compression.

Thermal management
 LM6 Aluminum is used for its excellent mechanical strength and thermal dissipation properties in low and high ambient temperatures. The superior thermal heat sink design by Ligman used in conjunction with the driver, controls thermal below critical temperature range to ensure maximum luminous flux output, as well as providing long LED service life and ensuring less than 10% lumen depreciation at 50,000 hours.

Surge Suppression
 Standard 10kv surge suppressor provided with all fixtures.

BUG Rating
 B3 - U3 - G4

Finishing
 All Ligman products go through an extensive finishing process that includes fettling to improve paint adherence.

Paint
 UV Stabilized 4.9Mil thick powder coat paint and baked at 200 Deg C. This process ensures that Ligman products can withstand harsh environments. Rated for use in natatoriums.

Inspired by Nature Finishes
 The Inspired by nature Finishing is a unique system of decorative powder coating. Our metal decoration process can easily transform the appearance of metal or aluminum product into a wood grain finish.

This patented technology enables the simulation of wood grain, and even marble or granite finish through the use of decorative powder coating.

The wood grain finish is so realistic that it's almost undistinguishable from real wood, even from a close visual inspection. The system of coating permeates the entire thickness of the coat and as a result, the coating cannot be removed by normal rubbing, chipping, or scratching.

The Coating Process
 After pre-treatment the prepared parts are powder coated with a specially formulated polyurethane powder. This powder provides protection against wear, abrasion, impact and corrosion and acts as the relief base color for the finalized metal decoration.

The component is then wrapped with a sheet of non-porous film with the selected decoration pattern printed on it using special high temperature inks.

This printed film transfer is vacuum-sealed to the surface for a complete thermo print and then transferred into a customized oven. The oven transforms the ink into different forms within the paint layer before it becomes solid. Finally, the film is removed, and a vivid timber look on aluminum remains.

Wood grain coating can create beautiful wood-looking products of any sort. There are over 300 combinations of designs currently in use. Wood grains can be made with different colors, designs, etc.

Our powder coatings are certified for indoor and outdoor applications and are backed by a comprehensive warranty. These coatings rise to the highest conceivable standard of performance excellence and design innovation.

- Added Benefits**
- Resistance to salt-acid room, accelerated aging
 - Boiling water, lime and condensed water resistant
 - Anti-Graffiti, Anti-Slip, Anti-Microbial, Anti-Scratch
 - Super durable (UV resistant)
 - TGIC free (non-toxic)

Hardware
 Provided Hardware is Marine grade 316 Stainless steel.

Anti Seize Screw Holes
 Tapped holes are infused with a special anti seize compound designed to prevent seizure of threaded connections, due to electrolysis from heat, corrosive atmospheres and moisture.

Crystal Clear Low Iron Glass Lens
 Provided with tempered, impact resistant crystal clear low iron glass ensuring no green glass tinge.

Optics & LED
 Precise optic design provides exceptional light control and precise distribution of light. LED CRI > 80

Lumen - Maintenance Life
 L80 /B10 at 50,000 hours (This means that at least 90% of the LED still achieve 80% of their original flux)

Square surface architectural floodlight range. Four sizes of square artistic precision with wide range of beam distributions.

A range of square outdoor IP66 floodlight projectors that meets both aesthetic and functional applications. This cubic floodlight range is available with 4 different sizes, starting with a small 2.4" square profile at 3w, and increases proportionately to 3" at 11w, 4.5" at 21w and 5.5" square at 40w. This glare free luminaire is available in Narrow 10° beam, Medium 19°, Wide 33°, Very Wide 71° and Elliptical 41°x14° beam patterns.

This luminaire is engineered to meet harsh outdoor environments, as well as being able to be used as a decorative indoor product. The Lador is provided with an integral driver and has accessories that include; dichroic color filters, linear spread lens, honeycomb louvres and anti-glare visors.

This floodlight also has a unique aiming and locking system for precise mounting and beam aiming.

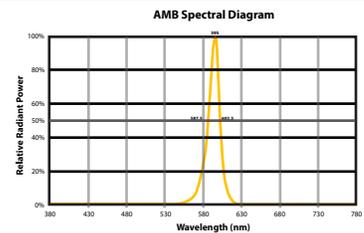
The Lador product family consists of; floodlights, wall sconces, ceiling mounted squares and cluster column event poles.

This luminaire is available with a natatorium rated coating.

Additional Options (Consult Factory For Pricing)

A51114 Linear Spread	A51821 Honeycomb Louvre	A50641 Ground Spike	A52831 Anti Glare Visor
Dichroic Color Filters	A50181 24" Arm Pedestal	A50281 24" Arm Threaded Knuckle	

CITY OF FLAGSTAFF & TURTLE FRIENDLY COMPLIANT



Narrow-Spectrum Amber LEDs
 Peak wavelength between 585 & 595 nanometers and a full width of 50% power no greater than 15 nanometers.



ULD-50001

Lador 1 Floodlight

PROJECT		DATE	
----------------	--	-------------	--

QUANTITY		TYPE		NOTE	
-----------------	--	-------------	--	-------------	--

ORDERING EXAMPLE || ULD-50001-3w LED - N - W30 - 02 - 120/277v

ULD-50001					
LAMP	BEAM	LED COLOR	FINISH COLOR		
3w LED 190lm	N - Narrow 10° M - Medium 19° W - Wide 33° VW - Very Wide 71° E - Elliptical 41° x 14°	W27 - 2700K W30 - 3000K W35 - 3500K W40 - 4000K	01 - BLACK RAL 9011 02 - DARK GREY RAL 7043 03 - WHITE RAL 9003 04 - METALLIC SILVER RAL 9006 05 - MATTE SILVER RAL 9006 06 - LIGMAN BRONZE 07 - CUSTOM RAL	120v	
			INSPIRED BY NATURE FINISHES SW01 - OAK FINISH SW02 - WALNUT FINISH SW03 - PINE FINISH DF - DOUGLAS FIR FINISH CW - CHERRY WOOD FINISH NW - NATIONAL WALNUT FINISH SU01 - CONCRETE FINISH SU02 - SOFTSCAPE FINISH SU03 - STONE FINISH SU04 - CORTEN FINISH		
			THERE IS AN ADDITIONAL COST FOR THESE FINISHES		

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ADDITIONAL OPTIONS

- | | | |
|-----------------------------|--|-------------------------------|
| NAT - Natatorium Rated | A52831 - Anti Glare Visor | DICHROIC COLOR FILTERS |
| A51114 - Linear Spread Lens | AMB - Turtle Friendly Amber LED | A51116 - Red Color Filter |
| A51821 - Honeycomb Louvre | A50181 - Surface Pedestal 24" Extended Arm | A51117 - Blue Color Filter |
| A50641 - Ground Spike | A50281 - 1/2" Threaded 24" Extended Arm | A51118 - Amber Color Filter |
| | | A51119 - Green Color Filter |

More Custom Finishes Available Upon Request

Consult factory for pricing and lead times



Lador Product Family



Lador 1

- ULD-50001-3w-222lm
- ULD-50002-6w RGBW-253lm



Lador 2

- ULD-50011-11w-904lm
- ULD-50012-13w RGBW-568lm



Lador 3

- ULD-50021-21w-1975lm
- ULD-50022-18w RGBW-1016lm



Lador 4

- ULD-50031-39w-3568lm
- ULD-50032-36w RGBW-1929lm



Lador 5

- ULD-30001-3w-222lm



Lador 6

- ULD-30011-11w-904lm



Lador 7

- ULD-30021-11w-904lm



Lador 8

- ULD-30031-39w-3568lm



Lador 9

- ULD-80001-3w-222lm



Lador 10

- ULD-80011-11w-904lm



Lador 11

- ULD-80021-21w-1975lm



Lador 12

- ULD-80031-39w-3568lm



Lador 13/14/15

- ULD-20011-4x21w-4x1975lm [13']
- ULD-20021-4x39w-4x3568lm [13']
- ULD-20012-4x21w-4x1975lm [19.6']
- ULD-20022-4x39w-4x3568lm [19.6']
- ULD-20011-4x21w-4x1975lm [26.2']
- ULD-20011-4x39w-4x3568lm [26.2']



Lador 1 TKM

- ULD-50041-3w-222lm



Lador 2 TKM

- ULD-50051-11w-904lm



Lador 3 TKM

- ULD-50061-21w-1975lm



Lador 4 TKM

- ULD-50071-39w-3568lm



Lador 20

- ULD-50081-3w-222lm



Lador 21

- ULD-50091-11w-904lm



Lador 22

- ULD-50101-21w-1975lm



Lador 23

- ULD-50111-39w-3568lm



DERO
A PLAYCORE Company



Rolling Rack

The graceful design and high security of the Rolling Rack has made this type of bike rack a standard for many schools and communities. The Rolling Rack can be used as a single-sided or double-sided parking bike rack. This rack uses thick pipe construction and allows for one of the wheels and frame to be secured using a u-style bike lock.

Just your size.

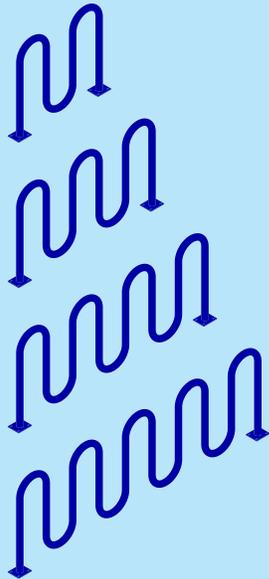
The Rolling Rack is available in 4 lengths to meet your bike parking capacity needs.

RR2H
38"
5 Bikes

RR3H
63"
7 Bikes

RR4H
87"
9 Bikes

RR5H
111"
11 Bikes



Tamper-resistant fasteners available upon request



FINISH OPTIONS

Galvanized



Stainless



Powder Coat



White



Black



Light Gray
RAL 7042



Deep Red
RAL 3003



Yellow
RAL 1023



CNH Bright
Yellow



Orange
RAL 2004



Beige
RAL 1001



Iron Gray
RAL 7011



Hunter Green
RAL 6005



Light Green
RAL 6018



Green
RAL 6016



Sepia Brown
RAL 8014



Blue
RAL 5005



Sky Blue
RAL 5015



Dark Purple



Flat Black



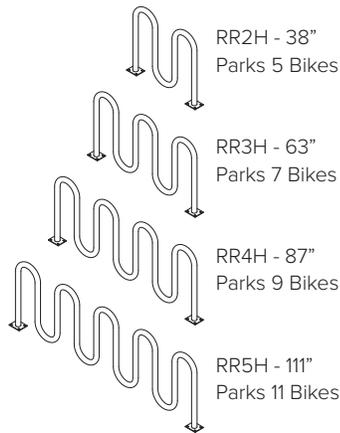
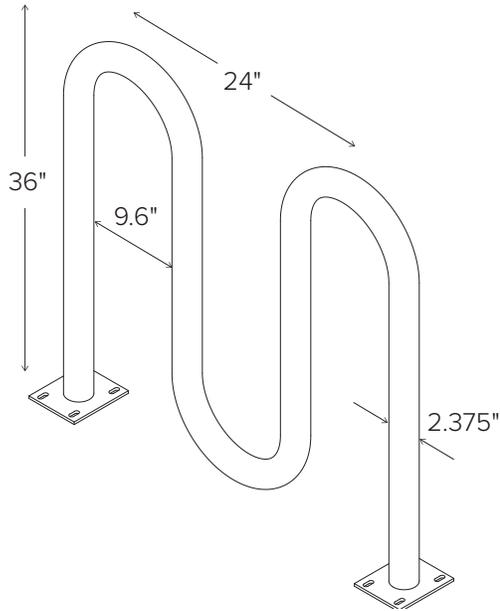
Wine Red
RAL 3005



Bronze



Silver
RAL 9007



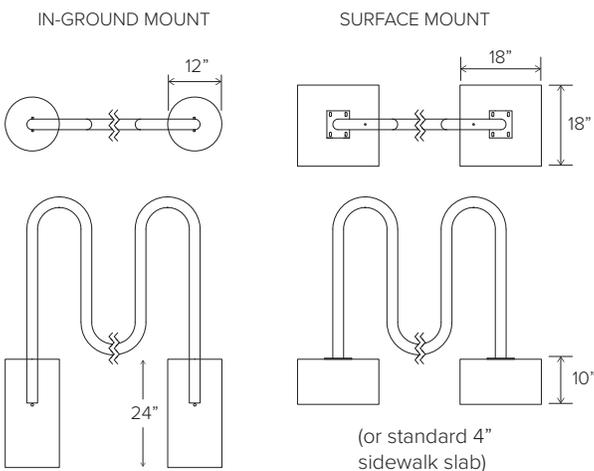
CAPACITY

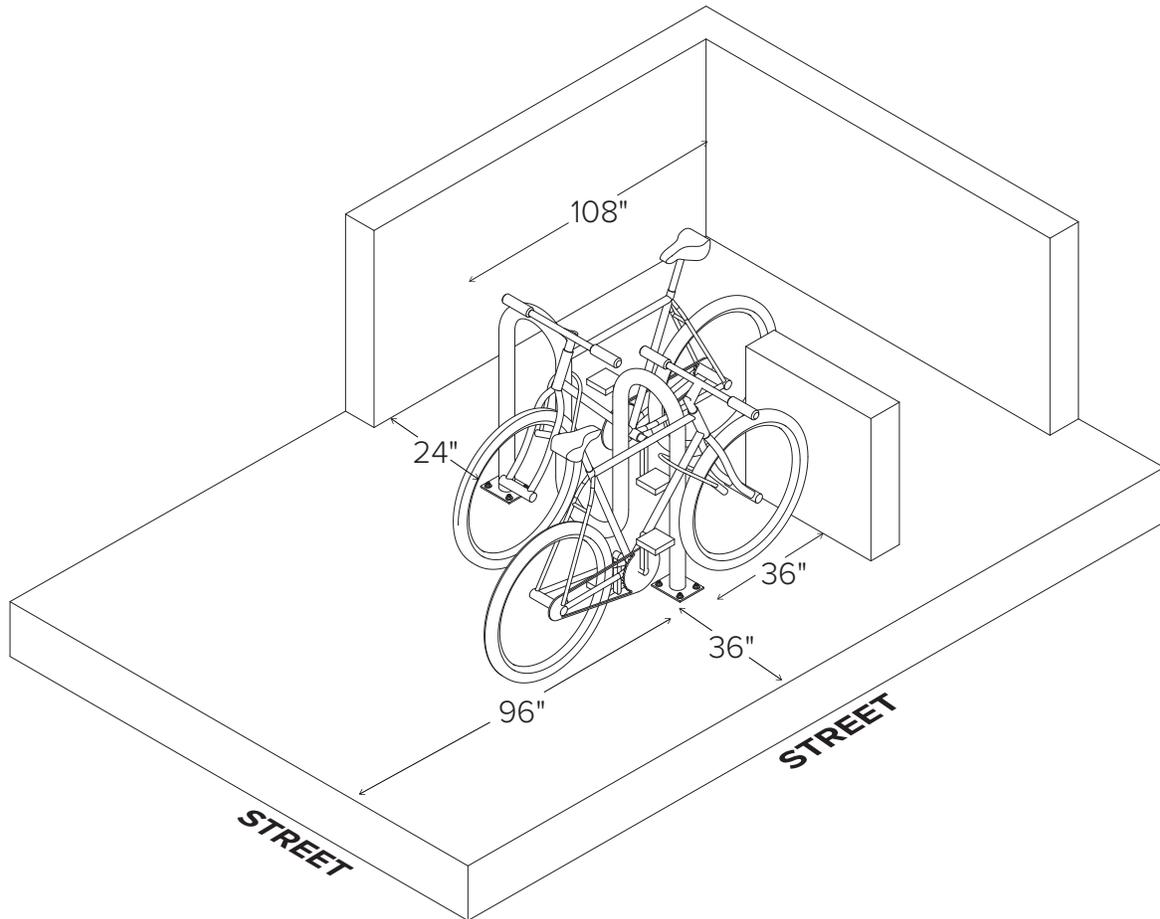
- RR2H:** 5 Bikes
- RR3H:** 7 Bikes
- RR4H:** 9 Bikes
- RR5H:** 11 Bikes

MATERIALS 2" schedule 40 pipe (2.375" OD)

- FINISHES**
- Galvanized**
An after fabrication hot dipped galvanized finish is our standard option.
 - Powder Coat**
Our powder coat finish assures a high level of adhesion and durability by following these steps:
1. Sandblast
2. Epoxy primer electrostatically applied
3. Final thick TGIC polyester powder coat
 - Stainless**
Stainless Steel: 304 grade stainless steel material finished in either a high polished shine or a satin finish.

- MOUNT OPTIONS**
- Surface**
Foot Mount has two 5" x 6" x .25" feet with four anchors per foot. Specify foot mount for this option. Tamper-resistant fasteners available upon request.
 - In-Ground**
In-ground mount is embedded into concrete base. Specify in-ground mount for this option



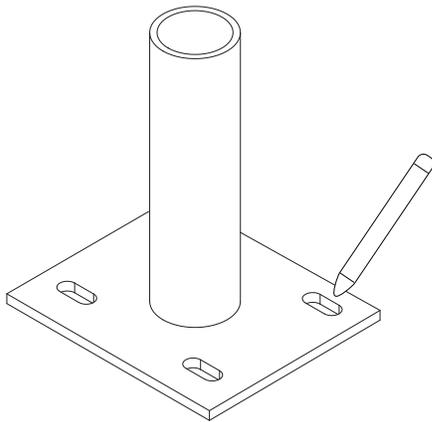



TOOLS NEEDED

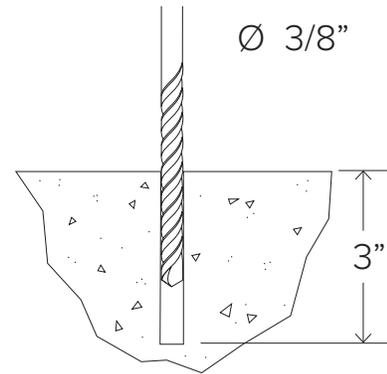
Marker or Pencil
 Masonry Drill Bit 3/8"
 Drill (Hammer drill recommended)
 Hammer
 Wrench 9/16"
 Level

RECOMMENDED BASE MATERIAL

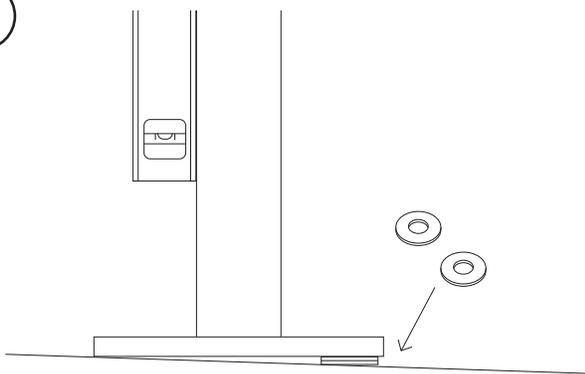
Solid concrete is the best base material for installation. To ensure the proper anchors are shipped with your rack, ask your Dero Rack representative which anchor is appropriate for your application. Be sure nothing is underneath the base material that could be damaged by drilling.

1


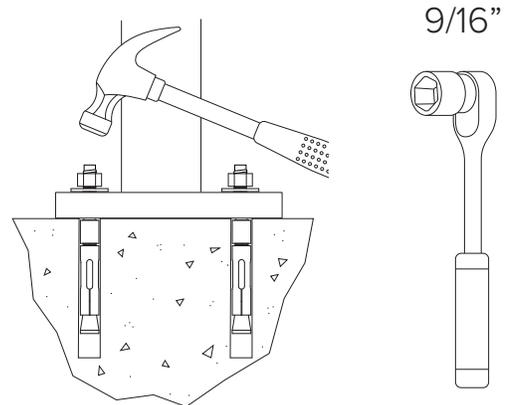
Place the rack in the desired location. Use a marker or pencil to outline the holes of the flange onto the base material.

2


Drill 3/8" diameter holes 3" deep into surface. Make sure the holes are at least 3" away from any cracks in the base material.

3


Place rack (and washers to level rack if necessary) over holes.

4


Thread nuts onto anchors, leaving approximately 1/4" of the anchor protruding, and tap into surface. Tighten nuts down to secure rack.

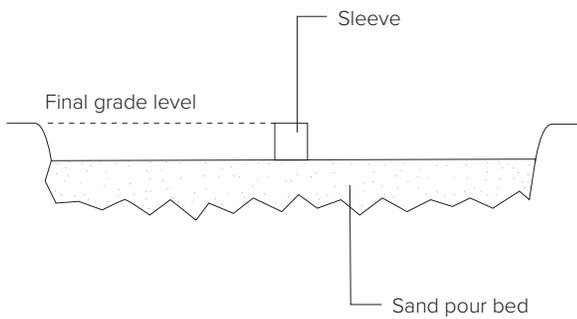


TOOLS NEEDED

Level
Cement mixing tub
Shovel

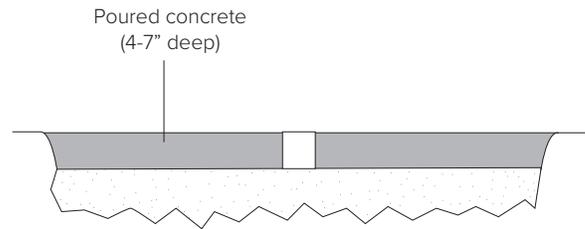
Trowel
Corrosion-Resistant Sleeve (min. 3" diameter)
Materials to build brace (see "Install Tip" at bottom of page)

1



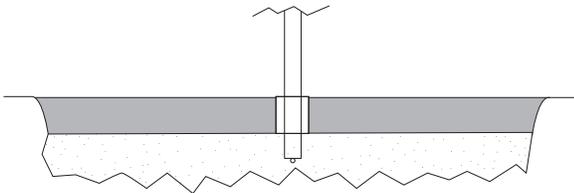
Place corrosion resistant sleeve (min. 3" inside diameter) in sand pour bed in exact location where rack will be installed. Make sure top of sleeve is at same level as desired finished concrete surface. Fill sleeve with sand to keep it in place and prevent it from filling with concrete.

2



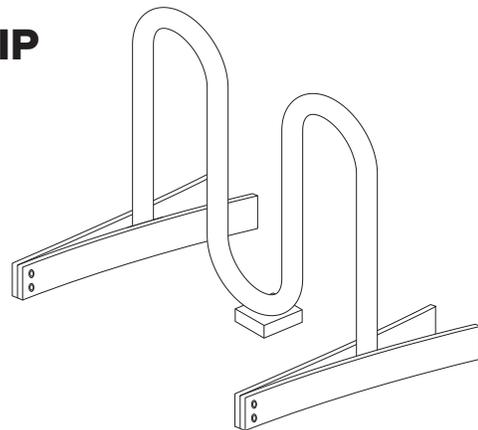
Pour concrete and allow to cure.

3



After appropriate cure time, dig out sand from sleeves and insert racks, making sure they are level and at the appropriate height. Pour in Super Por-Rok or epoxy grout and allow to set.

TIP



An easy way to brace the rack while the grout sets is to bolt two 1x4" boards together at one end and clamp them onto the rack like a clothes pin.

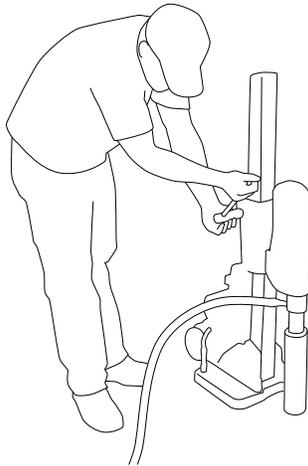


TOOLS NEEDED

Level
Cement mixing tub
Shovel
Access to water hose

Trowel
Hole coring machine with 4" bit
Materials to build brace (see "Install Tip" at bottom of page)

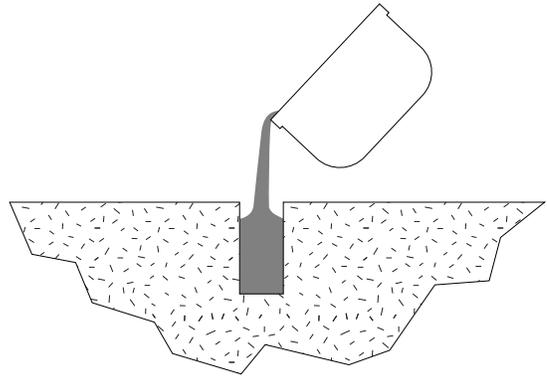
1



Ø 3" min.
↓ 10" min.

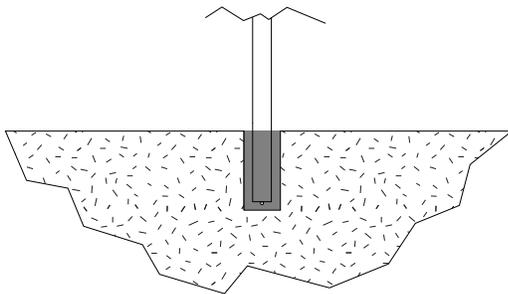
Core holes no less than 3" diameter (4" recommended) and no less than 10" deep into sidewalk.

2



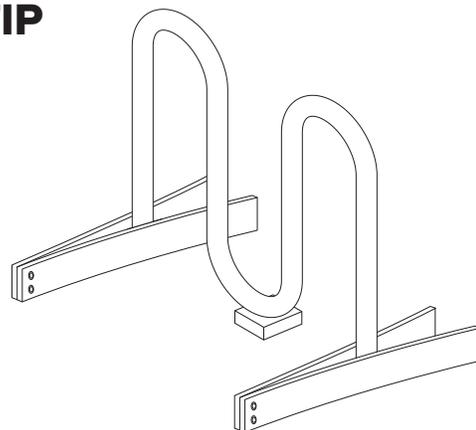
Fill holes with Super Por-Rok or epoxy grout.

3



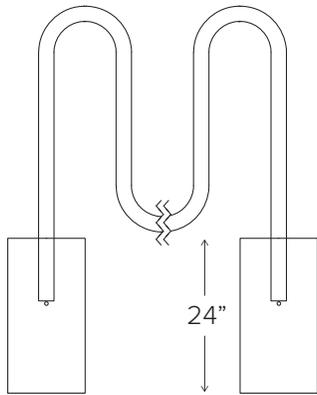
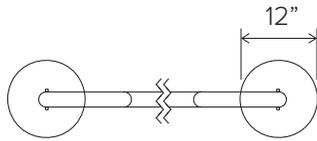
Place rack into holes, making sure the rack is level until the grout has set. 33"-36" of the rack should remain above the surface.

TIP

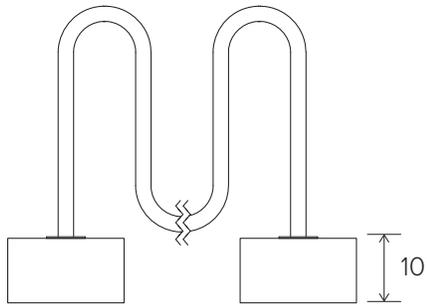
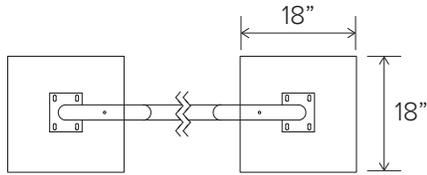


An easy way to brace the rack while the grout sets is to bolt two 1x4" boards together at one end and clamp them onto the legs of the rack like a clothes pin.

IN-GROUND MOUNT



SURFACE MOUNT



(or standard 4" sidewalk slab)



Gardco PureForm LED post top features a sleek, low profile design. Comfort optics are designed to enhance visual comfort by reducing glare. Type 1, 2, 3, and 5 optical distributions are available with lumen output up to 9000 lumens. A full range of control options provides additional energy savings. Optional integral emergency battery backup is available for path-of-egress illumination.

Project: _____

Location: _____

Cat.No: _____

Type: _____

Lamps: _____ Qty: _____

Notes: _____

Ordering guide

example: PPT-196L-450-NW-G2-T3-1-UNV-DGY

Prefix	Number of LEDs	Drive Current	LED Color - Generation	Mounting	Distribution	Emergency	Voltage
PPT							
PPT PureForm post top, comfort optics	196L 196 LEDs	450 450mA 650 650mA 1150 1150mA ¹ 1675 1675mA ¹ 2100 2100mA ^{1,2}	WW-G2 Warm White 3000K, 80CRI Generation 2 NW-G2 Neutral White 4000K, 80CRI Generation 2 CW-G2 Cool White 5000K, 70CRI Generation 2 WY-G2 Warm Yellow 2700K, 80CRI Generation 2 ³ BW-G2 Balanced White 3500K (80CRI) Generation 2 ³	T3 Mounts to a 3" x 4" Tenon (standard) T2 Mounts to a 2-3/8" x 4" Tenon (must be ordered and shipped as a separate accessory)	1 Comfort Type 1 2 Comfort Type 2 3 Comfort Type 3 5 Comfort Type 5	Leave blank for no battery EBPC Emergency battery pack cold weather ^{2,4,5,6,7} EBP Emergency battery pack ^{14,5,7}	120 120V 208 208V 240 240V 277 277V 347 347V 480 480V UNV 120-277V (50/60Hz) HVU 347-480V (50/60Hz)
	140L 140 LEDs		AM-G2 Amber Generation 2 ^{3,11}				

Options				
Dimming controls	Motion sensing	Photo-sensing	Electrical/Shield	Finish
DD 0-10V External dimming (by others) ⁴ FAWS Field Adjustable Wattage Selector ^{4,5} LLC Integral wireless module ^{4,6,7,13} BL Bi-level functionality ^{4,13} DynaDimmer: Automatic Profile Dimming ^{4,7} CS50 Security 50% Dimming, 7 hours CM50 Median 50% Dimming, 8 hours CS30 Security 30% Dimming, 7 hours CM30 Median 30% Dimming, 8 hours	IMRI3 Integral with #3 lens ¹²	PCB Photocontrol Button ^{7,8} TLRD5 Twist Lock Receptacle 5 Pin ^{9,14} TLRD7 Twist Lock Receptacle 7 Pin ^{9,14} TLRPC Twist Lock Receptacle w/Photocell ^{9,10,14}	Fusing F1 Single (120, 277, 347VAC) ⁸ F2 Double (208, 240, 480VAC) ⁸ F3 Canadian Double Pull (208, 240, 480VAC) ⁸ Surge Protection (10kA standard) SP2 Increased 20kA EHS External house side shield (factory installed)	Textured BK Black WH White BZ Bronze DGY Dark Gray MGY Medium Gray Customer specified RAL Specify optional color or RAL (ex: RAL7024) CC Custom color (Must supply color chip for required factory quote)

- 1150, 1675, and 2100mA not available with emergency battery backup (EBP).
- 2100mA not available with emergency battery backup cold weather (EBPC).
- Extended lead times apply. Contact factory for details.
- Not available with other control options.
- Not available with motion sensor.
- Not available with photocontrol.
- Not available in 347 or 480V.
- Must specify input voltage.
- Dimming will not be connected to NEMA receptacle if ordering with other control options.
- Not available in 480V.
- Not available in 2100mA.
- Not available with DD and FAWS dimming control options.
- Must specify a motion sensor lens.
- Cannot be combined with HVU and BL-IMRI3.



PPT PureForm LED post top

with comfort optics

PureForm Accessories¹ (order separately)

PPT-T2

FSIR-100

Post top tenon adapter for 2 3/8" x 4"

BL Optional Remote Programming Tool

1. Consult Signify to confirm whether specific accessories are BAA-compliant.

LED Wattage and Lumen Values – 5000K

Ordering Code	LED QTY	System Current (mA)	Color Temp	Avg System Wattage (W)	Type 1			Type 2			Type 3			Type 5		
					Lumen Output	BUG Rating	Efficacy (Lm/W)	Lumen Output	BUG Rating	Efficacy (Lm/W)	Lumen Output	BUG Rating	Efficacy (Lm/W)	Lumen Output	BUG Rating	Efficacy (Lm/W)
PPT-196L-450-CW-G2-x-UNV	196	450	5000	21	2090	B1-U0-G1	100	2103	B1-U0-G1	101	2411	B1-U0-G1	115	2323	B1-U0-G1	111
PPT-196L-650-CW-G2-x-UNV	196	650	5000	30	3012	B2-U0-G2	100	3031	B1-U0-G1	101	3474	B2-U0-G2	116	3347	B2-U0-G1	112
PPT-196L-1150-CW-G2-x-UNV	196	1150	5000	51	5148	B3-U0-G3	101	5180	B2-U0-G2	102	5938	B2-U0-G2	116	5721	B3-U0-G2	112
PPT-196L-1675-CW-G2-x-UNV	196	1675	5000	74	7185	B3-U0-G3	97	7230	B3-U0-G3	98	8288	B3-U0-G3	112	7984	B3-U0-G2	108
PPT-196L-2100-CW-G2-x-UNV	196	2100	5000	93	8598	B3-U0-G3	92	8652	B3-U0-G3	93	9918	B3-U0-G3	107	9554	B3-U0-G2	103

LED Wattage and Lumen Values – 4000K

Ordering Code	LED QTY	System Current (mA)	Color Temp	Avg System Wattage (W)	Type 1			Type 2			Type 3			Type 5		
					Lumen Output	BUG Rating	Efficacy (Lm/W)	Lumen Output	BUG Rating	Efficacy (Lm/W)	Lumen Output	BUG Rating	Efficacy (Lm/W)	Lumen Output	BUG Rating	Efficacy (Lm/W)
PPT-196L-450-NW-G2-x-UNV	196	450	4000	21	1991	B1-U0-G1	95	2003	B1-U0-G1	96	2296	B1-U0-G1	110	2212	B1-U0-G1	106
PPT-196L-650-NW-G2-x-UNV	196	650	4000	30	2868	B2-U0-G2	96	2886	B1-U0-G1	96	3309	B2-U0-G2	110	3187	B2-U0-G1	106
PPT-196L-1150-NW-G2-x-UNV	196	1150	4000	51	4903	B3-U0-G3	96	4933	B2-U0-G2	97	5656	B2-U0-G2	111	5448	B3-U0-G2	107
PPT-196L-1675-NW-G2-x-UNV	196	1675	4000	74	6843	B3-U0-G3	93	6886	B3-U0-G3	93	7894	B3-U0-G3	107	7604	B3-U0-G2	103
PPT-196L-2100-NW-G2-x-UNV	196	2100	4000	93	8188	B3-U0-G3	88	8240	B3-U0-G3	89	9446	B3-U0-G3	101	9099	B3-U0-G2	98

LED Wattage and Lumen Values –3000K

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 1			Type 2			Type 3			Type 5		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
PPT-196L-450-WW-G2-x-UNV	196	450	3000	21	1914	B1-U0-G1	92	1926	B1-U0-G1	92	2208	B1-U0-G1	106	2127	B1-U0-G1	102
PPT-196L-650-WW-G2-x-UNV	196	650	3000	30	2758	B2-U0-G2	92	2775	B1-U0-G1	93	3182	B2-U0-G2	106	3065	B2-U0-G1	102
PPT-196L-1150-WW-G2-x-UNV	196	1150	3000	51	4714	B3-U0-G3	92	4744	B2-U0-G2	93	5438	B2-U0-G2	107	5239	B3-U0-G2	103
PPT-196L-1675-WW-G2-x-UNV	196	1675	3000	74	6579	B3-U0-G3	89	6621	B3-U0-G3	90	7590	B3-U0-G3	103	7312	B3-U0-G2	99
PPT-196L-2100-WW-G2-x-UNV	196	2100	3000	93	7873	B3-U0-G3	85	7923	B3-U0-G3	85	9083	B3-U0-G3	98	8749	B3-U0-G2	94

Values from photometric tests performed in accordance with IESNA LM-79 and are representative of the configurations shown. Actual performance may vary due to installation and environmental variables, LED and driver tolerances, and field measurement considerations. It is highly recommended to confirm performance with a photometric layout.

NOTE: Some data may be scaled based on tests of similar (but not identical) luminaires. Contact factory for configurations not shown.

LED Wattage and lumen values (Emergency Mode)

Ordering Code	LED Qty	LED Current (mA)	Color Temp.	Temp. Range (°C)	Lumen Outputs									
					Avg. System Watts		Type 1		Type 2		Type 3		Type 5	
					Normal Mode	Emergency Mode	Normal Mode	Emergency Mode	Normal Mode	Emergency Mode	Normal Mode	Emergency Mode	Normal Mode	Emergency Mode
PPT-196L-450-NW-G2-x-EBP-UNV	196	450	4000	0 to 40	22	10	1971	1526	1951	1510	2421	1747	2254	1744
PPT-196L-650-NW-G2-x-EBP-UNV	196	650	4000	0 to 40	30	10	2636	1526	2609	1510	3237	1747	3014	1744
PPT-196L-450-NW-G2-x-EBPC-UNV	196	450	4000	-20 to 40	22	18	1971	2178	1951	2155	2421	2493	2254	2490
PPT-196L-650-NW-G2-x-EBPC-UNV	196	650	4000	-20 to 40	30	18	2636	2178	2609	2155	3237	2493	3014	2490
PPT-196L-1150-NW-G2-x-EBPC-UNV	196	1150	4000	-20 to 40	52	18	4736	2178	4686	2155	5816	2493	5415	2490
PPT-196L-1675-NW-G2-x-EBPC-UNV	196	1675	4000	-20 to 40	75	18	6574	2178	6506	2155	8074	2493	7517	2490

For emergency EBPC and EBP option, published values are based on initial lumens.

Predicted Lumen Depreciation Data

Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions. L70 is the predicted time when LED performance depreciates to 70% of initial lumen output. Calculated per IESNA TM21-11. Published L70 hours limited to 6 times actual LED test hours

Ambient Temperature °C	Driver mA	Calculated L70 Hours	L70 per TM-21	Lumen Maintenance % at 60,000 hrs
25°C	up to 2100mA	>100,000 hours	>60,000 hours	>84%

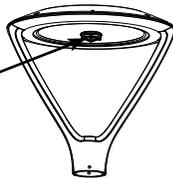
PPT PureForm LED post top with comfort optics

Dimensions – Post Top Luminaire

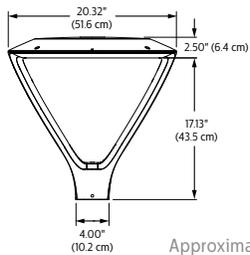
Effective Projected Area ft² / m²

Type	Single
PPT	0.35 ft ² /0.032m ²

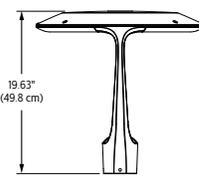
Approximate Motion Sensor Placement



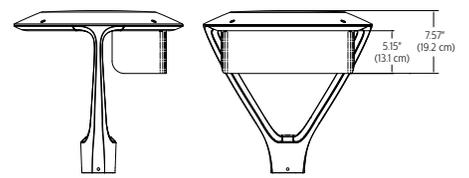
Front View



Side View



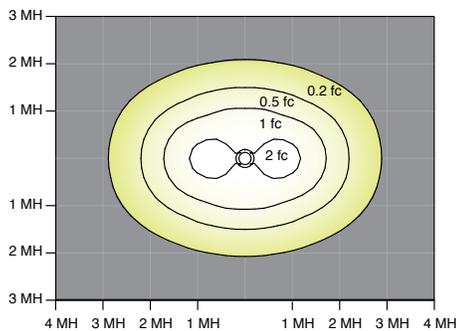
Luminaire with EHS Shield



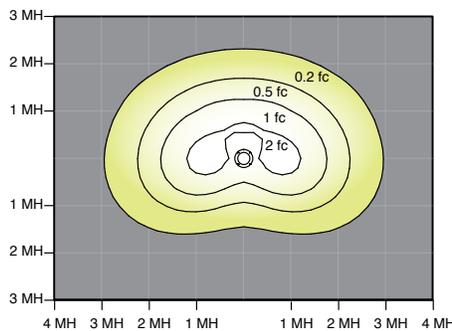
Approximate Luminaire Weight:
Standard: 20 lbs (9.1 kg)
With battery pack: 26 lbs (11.8 kg)

Optical Distributions

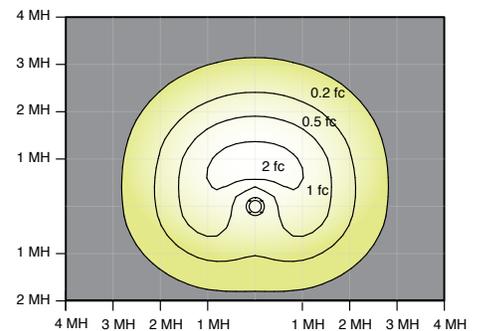
Based on configuration PPT-196L-2100-NW-G2 mounted at 20ft.



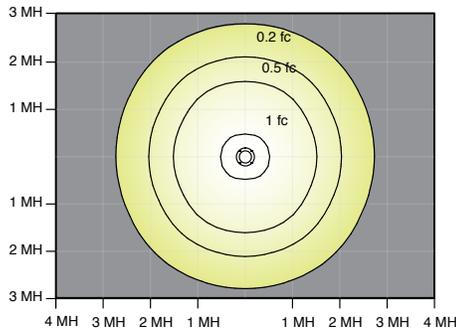
Comfort Type 1



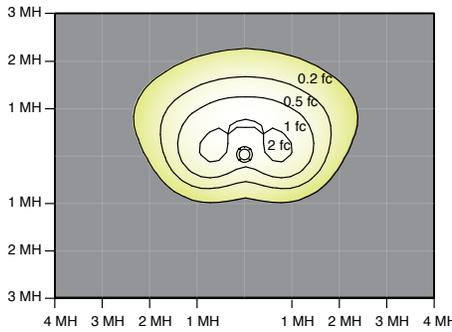
Comfort Type 2



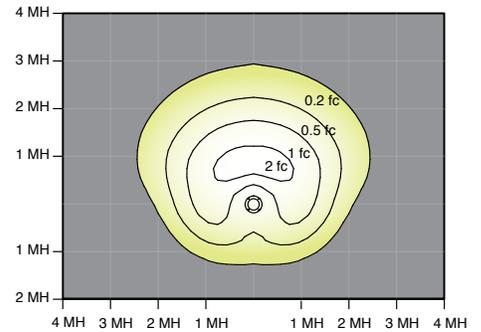
Comfort Type 3



Comfort Type 5



Comfort Type 2 with EHS



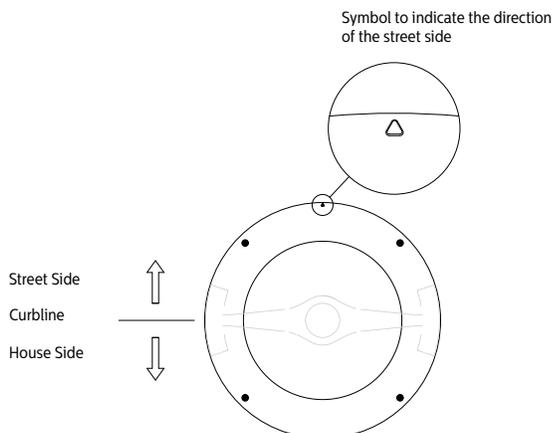
Comfort Type 3 with EHS

Asymmetric Optical Orientation Information

Standard Optic Position

Aimed Between The Yoke Supports

Luminaires ordered with asymmetric optical systems in the standard optic position will have the optical system oriented as shown below:



PPT PureForm LED post top

with comfort optics

Specifications

Housing

Two-piece sealed enclosure with main part of the housing designed as the structural and heat sink frame, enclosed by cover to give its unique form. It also includes yoke arm with arm covers. All die-cast parts are made of low-copper, die-cast aluminum alloy for a high resistance to corrosion. The sleek profile with optimized surface area allows housing to provide excellent convection heat transfer with minimum use of heat fins, giving the freedom to have a clean minimalist aesthetic design. Luminaire housing rated to IP66, tested in accordance to Section 9 of IEC 60598-1.

Vibration resistance

Luminaire is tested and rated 3G over 100,000 cycles conforming to standards set forth by ANSI C136.31-2010. Testing includes vibration to 3G acceleration in three axes, all performed on the same luminaire.

Light engine

Light guide technology provides low-glare, uniform illumination. Composed of LEDs strategically positioned on the edge of the optical plate. Light engine luminous opening size optimized to best achieve a balance between lumen output and optical performance with the need to provide visual comfort. Light engine frame ensures contact with housing to provide heat conduction and sealing against the elements. Light engine is RoHS compliant. Standard color temperatures: 3000K +/- 130K, 4000K +/- 130K, 5000K +/- 225K. Minimum CRI of 70. Also available in 2700K and Amber (Dominant wavelength 589nm, peak wavelength 633nm, and minimum wavelength 486nm) with extended lead times. Contact factory for details.

Energy saving benefits

System efficacy up to 111 lms/W with significant energy savings over Pulse Start Metal Halide luminaires. Optional control options provide added energy savings during unoccupied periods.

Optical systems

The advanced LED comfort optical system provides Types 1, 2, 3, and 5. Composed of high performance UV-stabilized optical grade lens with molded micro-optics to achieve desired distribution optimized to get an exceptional lighting uniformity. Performance tested per LM-79 and TM-15 (IESNA) certifying its photometric performance. Luminaire designed with 0% uplight (U0 per IESNA TM-15).

Mounting

PureForm Post Top mounts standard to a 3" x 4" Tenon, but can also be mounted to a 2-3/8" x 4" Tenon if a separate sleeve is ordered as an accessory.

Control options

0-10V dimming (DD): Access to 0-10V dimming leads supplied through the yoke of the luminaire (for secondary dimming controls by others). Cannot be used with other control options.

Field Adjustable Wattage Selector (FAWS): Luminaire equipped with the ability to manually adjust the wattage in the field to reduce total luminaire lumen output and light levels. Comes pre-set to the highest position at the lumen output selected. Use chart below to estimate reduction in lumen output desired. Cannot be used with other control options or motion response.

FAWS Position	Percent of Typical Lumen Output
1	25%
2	50%
3	55%
4	65%
5	75%
6	80%
7	85%
8	90%
9	95%
10	100%

Note: Typical value accuracy +/- 5%

Automatic Profile Dimming (CS/CM): Standard dimming profiles provide flexibility towards energy savings goals while optimizing light levels during specific dark hours. Dimming profiles include two dimming settings including dim to 30% or 50% of the total lumen output. When used in combination with not programmed motion response it overrides the controller's schedule when motion is detected. After 5 minutes with no motion, it will return to the automatic dimming profile schedule. Automatic dimming profile scheduled with the following settings:

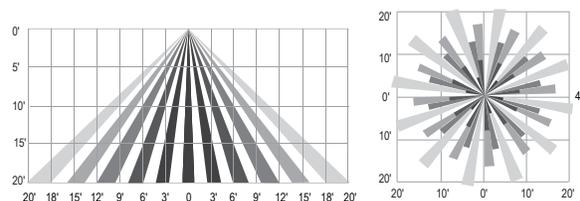
- **CS50/CS30:** Security for 7 hours night duration (Ex., 11 PM - 6 AM)
- **CM50/CM30:** Median for 8 hours night duration (Ex., 10 PM - 6 AM)

All above profiles are calculated from mid point of the night. Dimming is set for 6 hours after the mid point and 2, or 3 hours before depending of the duration of dimming. Cannot be used with other dimming control options.

Emergency Battery Backup (EBP/EBPC): Emergency battery packs included integral to the luminaire, allowing for a consistent look between emergency and non-emergency luminaires. EBP is suitable for use in ambient temperature conditions from 0°C (32°F) to 40°C (104°F) available on 450mA and 650mA only. EBPC cold weather rated down to -20°C (-4°F) available on all wattage except the 2100mA configuration. Both systems are designed to have a secondary driver with relay to immediately detect AC power loss to power luminaire for a minimum of 90 minutes from the time power is lost. Available with 120-277V, or 'UNV' only.

Wireless system (LLC): Optional wireless controller integral to luminaire ready to be connected to a Limelight system (sold by others). The system allows you to wirelessly manage the entire site, independent lighting groups or individual luminaires while on-site or remotely. Based on a high-density mesh network with an easy to use web-based portal, you can conveniently access, monitor and manage your lighting network remotely. Wireless controls can be combined with site and area, pedestrian, and parking garage luminaires as well, for a completely connected outdoor solution. Equipped with motion response with #3 lens (LLC3-IMR13) for 8-25' mounting heights. Also available with remote pod accessory where pod is mounted separate from luminaire to pole or wall.

LLC-IMR13 Luminaire with #3 lens



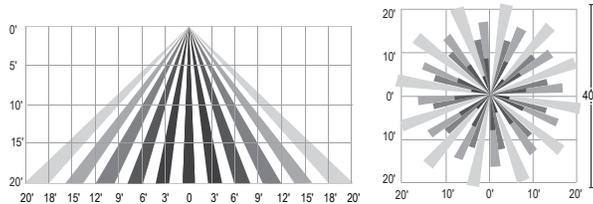
Motion response options

Bi-Level Infrared Motion Response (BL-IMR13): Motion Response module is mounted integral to luminaire factory pre-programmed to 50% dimming when not ordered with other control options. BL-IMR13 is set/operates in the following fashion: The motion sensor is set to a constant 50%. When motion is detected by the PIR sensor, the luminaire returns to full power/light output. Dimming on low is factory set to 50% with 5 minutes default in "full power" prior to dimming back to low. When no motion is detected for 5 minutes, the motion response system reduces the wattage by 50%, to 50% of the normal constant wattage reducing the light level. Other dimming settings can be provided if different dimming levels are required. This can also be done with FSIR-100 Wireless Remote Programming Tool (contact Technical Support for details).

PPT PureForm LED post top with comfort optics

Infrared Motion Response with Other Controls (IMRI3): When used in combination with other controls (Automatic Dimming Profile), motion response device will simply override controller's schedule with the added benefits of a combined dimming profile and sensor detection. In this configuration, the motion response device cannot be re-programmed with FSIR-100 Wireless Remote Programming Tool. The profile can only be re-programmed via the controller.

Infrared Motion Response Lenses (IMRI3): Infrared Motion Response Integral module is available lens #3 (IMRI3), which is designed for mounting heights up to 20' with a 40' diameter coverage area. See chart for approximate detection patterns:



Electrical

Twist-Lock Receptacle (TLRD5/TLRD7/ TLRPC): Twist Lock Receptacle with 5 pins enabling dimming or with 7 pins with additional functionality (by others) can be used with a twistlock photoelectric cell or a shorting cap. Dimming Receptacle Type B (5-pin) and Type D-24 (7-pin) in accordance to ANSI C136.41. Can be used with third-party control system. Receptacle located on top of luminaire housing. When specifying receptacle with twistlock photoelectric cell, voltage must be specified. When ordering Twist-lock receptacle (TLRD5 or TLRD7), photocell or shorting cap is not included.

Driver: Driver efficiency (>90% standard). 120-480V available (restrictions apply). Open/short circuit protection. Optional 0-10V dimming to 10% power. RoHS compliant.

Button Photocontrol (PCB): Button style design for internal luminaires mounting applications. The photocontrol is constructed of a high impact UV stabilized polycarbonate housing. Rated voltage of 120V or 208-277V with a load rating of 1000 VA. The photocell will turn on with 1-4Fc of ambient light.

Surge protection (SP1/SP2): Surge protection device tested in accordance with ANSI/IEEE C62.45 per ANSI/IEEE C62.41.2 Scenario I Category C High Exposure 10kV/10kA waveforms for Line-Ground, Line-Neutral and Neutral-Ground, and in accordance with DOE MSSLC Model Specification for LED Roadway Luminaires Appendix D Electrical Immunity High test level 10kV/10kA. 20kV / 10kA surge protection device that provides extra protection beyond the SP1 10kV/10kA level.

Buy American Act of 1933 (BAA):

This product is manufactured in one of our US factories and, as of the date of this document, this product was considered a commercially available off-the-shelf (COTS) item meeting the requirements of the BAA. This BAA designation hereunder does not address (i) the applicability of, or availability of a waiver under, the Trade Agreements Act, or (ii) the "Buy America" domestic content requirements imposed on states, localities, and other non-federal entities as a condition of receiving funds administered by the Department of Transportation or other federal agencies. Prior to ordering, please visit www.signify.com/baa to view a current list of BAA-compliant products to confirm this product's current compliance.

Listings

UL/cUL wet location listed to the UL 1598 standard, suitable for use in ambient temperatures from -40° to 40°C (-40° to 104°F). Most PureForm PPT comfort configurations are qualified under Standard DesignLights Consortium® category. Consult DLC Qualified Products list to confirm your specific luminaire selection is approved. CCTs 3000K and warmer are Dark Sky Approved.

Finish

Each standard color luminaire receives a fade and abrasion resistant, electrostatically applied, thermally cured, triglycidic isocyanurate (TGIC) textured polyester powdercoat finish. The surface treatment achieves a minimum of 1000 hours for salt spray resistant finish in accordance with testing performed and per ASTM B117 standard. Standard colors include bronze (BZ), black (BK), white (WH), dark gray (DGY), and medium gray (MGY). Consult factory for specs on optional or custom colors.

Warranty

PureForm luminaires feature a 5-year limited warranty. See signify.com/warranties for complete details and exclusions.



NSBB[®] Nutrient Separating Baffle Box[®]

Operation and Maintenance Manual

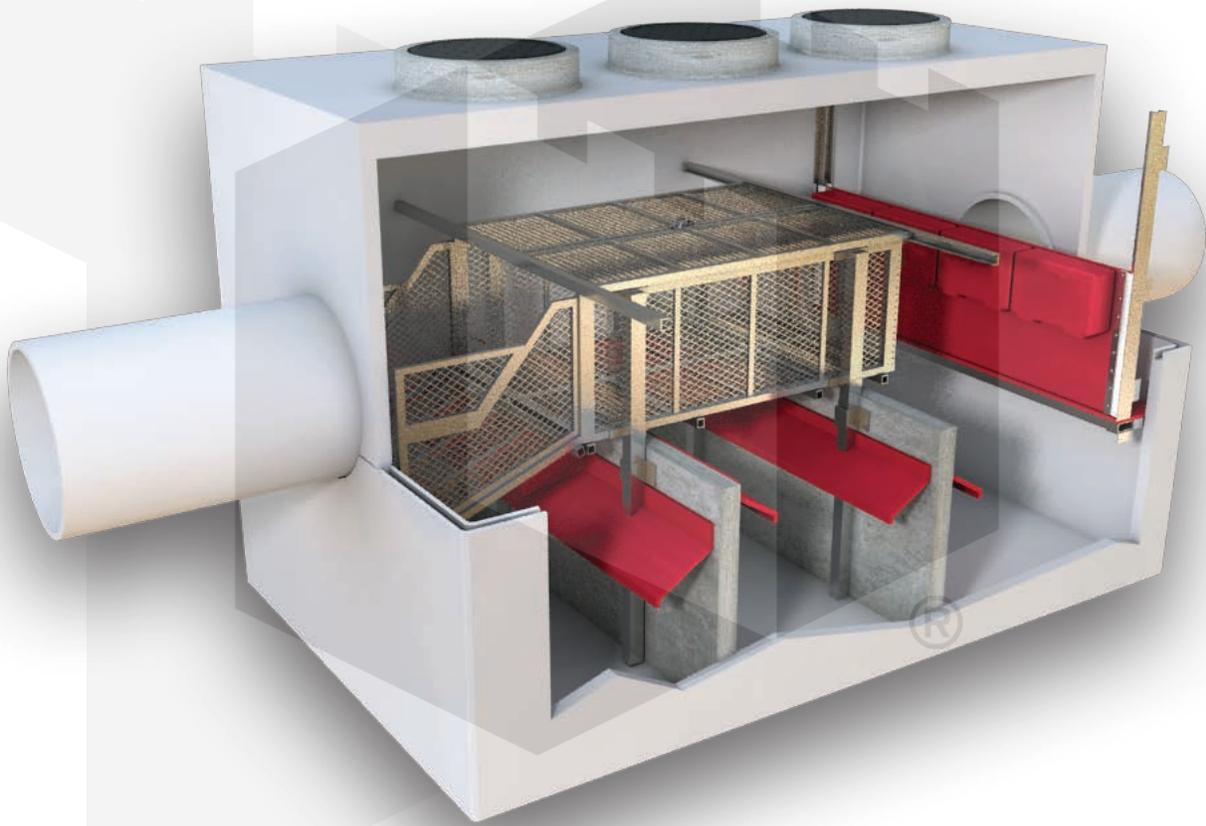


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WARNING

Read the Following Information, Instructions and Warnings Before Inspecting, Cleaning or Performing Maintenance on this Stormwater Treatment Device.

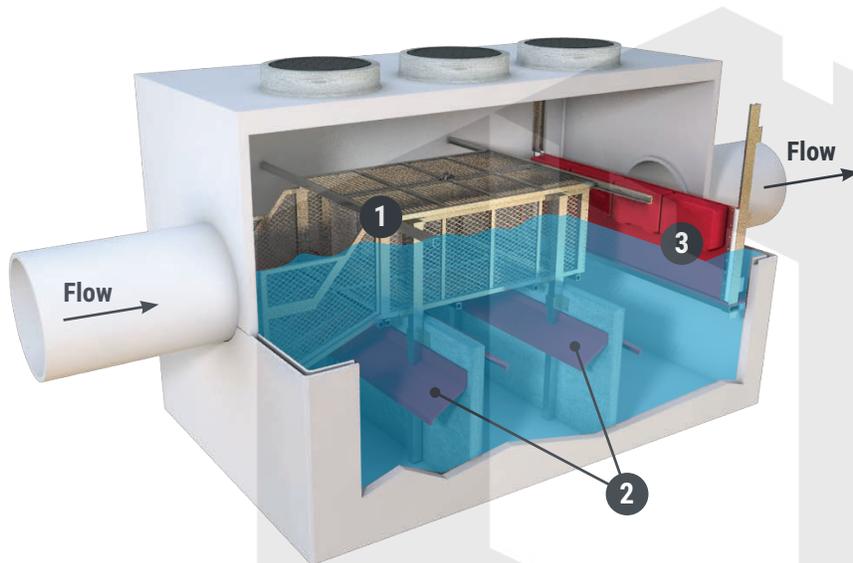
This manual is intended to explain the specifics of the Oldcastle Infrastructure Nutrient Separating Baffle Box and to review the aspects of existing regulations and safety procedures. It is the responsibility of all personnel to familiarize themselves with, understand and comply with all applicable local, state and federal laws before attempting to inspect or service this unit. All precautions and procedures in this manual are current at the time of printing but are subject to change based on the development of new processes and procedures. Oldcastle Infrastructure assumes no responsibility and is not accountable for any injuries, fines, penalties or losses that occur involving any procedure in this manual or other unaddressable actions taken. The Nutrient Separating Baffle Box performance is based on the procedures being followed in this manual. Non-Compliance with the outlined measures will be the responsibility of the owner.

GENERAL INFORMATION

The Nutrient Separating Baffle Box (NSBB) is a key component of your stormwater management program. To maintain proper operation, maintenance of these units is essential. The NSBB designed and manufactured by Oldcastle Infrastructure contains patented technologies to treat and manage stormwater. The NSBB is highly effective in capturing Nitrogen, Phosphorus, Total Suspended Solids, organics, trash, oils and grease. Independent testing has shown the NSBB is capable of capturing up to 95% of trash, 90% of Total Suspended Solids, 20% of nitrogen and 19% of phosphorus. Oldcastle Infrastructure recommends inspections be conducted semi-annually for the first year and annually thereafter for optimal removal efficiency.

During Storm Event

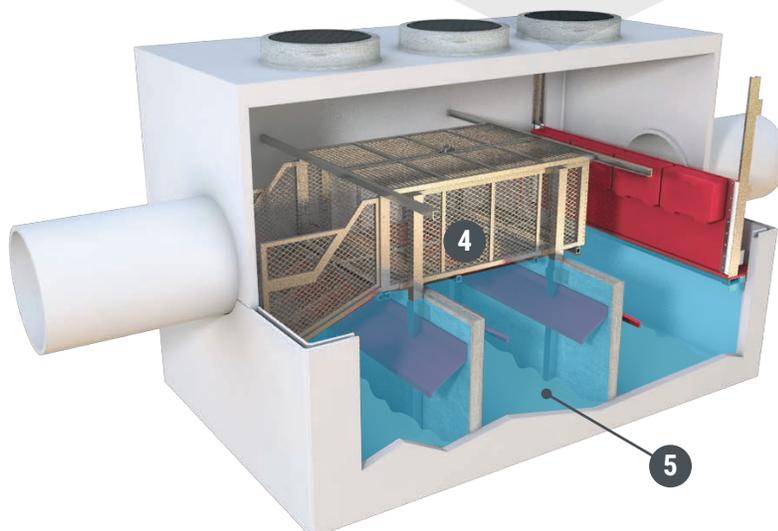
Nutrient rich organics and litter are captured in the screen system.



1. Runoff filters through the screen and skimmer leaving pollutants behind. Left over runoff evaporates over time.
2. Turbulence deflectors prevent captured sediment from becoming resuspended.
3. Hydrocarbons and other floating debris are trapped upstream of the floating skimmer.

After Storm Event

Debris dry out between storm events while pollutants are stored above the static water. As a result, the system does not turn septic.



4. Nutrient pollutant load is not lost to static water and will not be flushed out during the next storm event.
5. Separating organic matter from the static water prevents bacterial buildup.

INSPECTION INFORMATION

Oldcastle Infrastructure recommends the following guidelines for inspection: After installation and the site has stabilized, post construction inspections should be conducted after every runoff event. To ensure the Nutrient Separating Baffle Box obtains optimal pollutant removal efficiencies, subsequent sediment accumulation inspections should be conducted a minimum of every six (6) months. In the event the sediment accumulation equals or exceeds 80% of the minimum sediment storage volume (Fig 1), then all accumulated sediment must be removed.

Fig 1: Nutrient Separating Baffle Box® (NSBB®) Sizing Summary

STANDARD SIZING								
MODEL	STRUCTURE SIZE (FT X FT)	MAX PIPE SIZE (IN)	MIN RIM TO INVERT DEPTH ^(a) (FT)	SUMP DEPTH (FT)	SEDIMENT STORAGE ^(b) (CF)	TREATMENT FLOW RATES		MAX PEAK FLOW ^(e) (CFS)
						50% REMOVAL, 75 MICRON NJCAT ^(c) (CFS)	80% REMOVAL, 150 MICRON ^(d) (CFS)	
NSBB-48	4 x 8	24	4.17	3.0	15.0	2.49	4.60	29
NSBB-510	5 x 10	30	5.08	4.1	23.8	3.89	8.03	37
NSBB-612	6 x 12	36	5.17	5.0	34.3	5.60	12.70	69
NSBB-816	8 x 16	48	6.00	6.2	61.3	9.96	26.00	114
NSBB-1020	10 x 20	60	7.08	7.6	95.0	15.56	45.40	202
NSBB-1224	12 x 24	72	8.83	9.0	138.0	22.40	71.70	296

TRASH CAPTURE SIZING								
MODEL	STRUCTURE SIZE (FT X FT)	MAX PIPE SIZE (IN)	MIN RIM TO INVERT DEPTH ^(a) (FT)	SUMP DEPTH (FT)	SUMP VOLUME (CF)	SCREEN VOLUME	5MM TRASH CAPTURE ^(f) (CFS)	MAX PEAK FLOW ^(g) (CFS)
NSBB-48-TC	4 x 8	24	4.17	3.0	88.1	25.8	28.80	25
NSBB-612-TC	6 x 12	36	5.17	3.0	204.1	54.5	42.80	64
NSBB-816-TC	8 x 16	48	6.00	3.0	360.0	124.6	72.00	108

(a) Minimum Rim to Invert Depth based on Max Pipe Size listed. For depths less than minimum contact Soln Engr for design assistance.

(b) Sump depth for all Trash Capture approved model sizes is 3.0' typical.

(c) 50% Maximum Sediment Storage Volume per NJCAT verification.

(d) Based on NJCAT verification for 50% removal of D50 = 75 micron.

(e) Based on AET Tech, LLC Technical Memo (Smith, 7/20/18). Contact Soln Engr for alternative particle size treatment flows.

(f) Based on empty 5mm Screen Basket.

(g) Based on a Hydraulic Grade Line at 6" above maximum pipe size. For smaller pipe sizes confirm capacity with Soln Engr.

INSPECTION PROCEDURE

- | Inspect the unit from surface.
- | Open access points (Manhole / Hatch) and secure properly.
- | Visually inspect screen system to determine overall debris accumulation.
- | Inspect sediment chambers under screen system.
- | Inspect condition of joints and inflow / outflow pipe grout areas.

INSPECTION CHECKLIST

Inspection Checklist and Maintenance Guidance: Nutrient Separating Baffle Box.
To be completed at Time of Inspection or Maintenance.

OWNER NAME

LOCATION

ADDRESS

PHONE

DATE & TIME

SITE CONDITIONS

INSPECTION ITEMS	RECOMMENDED INTERVAL	COMMENTS
Access Openings	Semi-annually	
Screen System	Semi-annually	
Skimmer	Semi-annually	
Sediment Chambers	Semi-annually	
Vault Condition	Semi-annually	

1. Inspection items are to determine accessibility into Nutrient Separating Baffle Box.
2. Inspect screen system for debris volume and broken parts.
3. Inspect sediment chambers for estimated quantity.
4. Inspect general condition of vault for any clogged areas.

MAINTENANCE ITEMS	VOLUME COLLECTED	DATE	COMMENTS
Screen System			
Sediment Chambers			

1. Inspection items are to determine accessibility into Nutrient Separating Baffle Box.
2. After cleaning screen system, open bottom doors and vacuum out sediment chambers. (Estimate Volume Collected)

NSBB[®] COMPONENTS

Component Descriptions

The Nutrient Separating Baffle Box is a multi stage, self contained treatment system. Each subsequent component in the system protects prior stages from clogging. These stages include screening, separation and hydrocarbon absorption.

- | Screening is provided by a rectangular basket system which is suspended above the static water level of the sedimentation chambers. The screening filter has a storage capacity of several cubic yards depending on the model. The primary function of the basket is to capture gross solids like trash and nutrient rich debris. The screening system contains debris and provides a dry storage state to prevent nutrient leaching and contamination of static water, causing a septic state.
- | Sediment Separation is facilitated by three settling chambers each with a capacity of several cubic yards depending on the model. These chambers work to target smaller sediments and particulate metals.



View of Nutrient Separating Baffle Box and SkimBoss Upflow Filter

REQUIREMENTS & PARTS

Minimum Equipment Requirements

The use of a vacuum truck is required for servicing of the Nutrient Separating Baffle Box. Service crews are recommended to check all local, state and federal guidelines for servicing and disposal of any collected debris and sediments.

Structural Components

The structural components of the NSBB are designed to have a life span of several decades. Structural inspections are not required unless stipulated in guidelines set by the local municipality, state or federal agencies.

Replacement Parts

All interior components are designed and sized to be assembled and removed from the NSBB for servicing or for parts replacement. This can easily be accomplished via the access ports atop the structure. For any replacement parts or further instructions please contact:

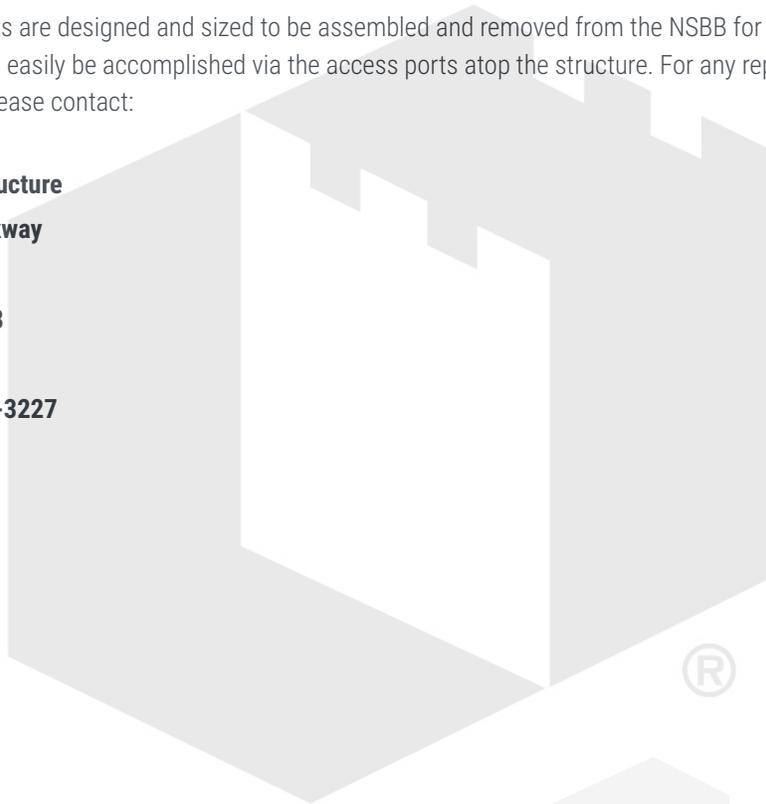
Oldcastle Infrastructure

7000 Central Parkway

Suite 800

Atlanta, GA 30328

Phone: (888) 965-3227



SERVICING SUMMARY

Service Information

Maintenance activities include the removal of captured sediments and debris. Maintenance can be performed from outside the NSBB through access points such as manhole covers or hatches installed in the vault surface above the sediment chambers. During maintenance, the screen system may have either SunGlide™ Sliding Doors or Hinged Doors.

These top doors open to gain access to the debris captured by the screen system. This system also has bottom doors that open to give access to the sediment collected in the settling chambers. A vacuum truck is required for debris and sediment removal. Although not every circumstance can be covered in this manual, a situation may arise where the structure needs to be entered. Servicing does not require specialized tools.

Caution!

Any Service Work done in traffic areas must meet all DOT Roadway Work guidelines and necessary safety procedures.

Warning!

All OSHA confined space requirements must be met while cleaning any of the Nutrient Separating Baffle Box structures.

Service Procedure

1. Open the access openings (Manhole, Hatch or Grate) on the top of the Baffle Box.
2. Vacuum the debris captured by the screen system to expose the sediment collection chambers.
3. Open the bottom doors to the basket system to expose the sediment collection chambers. These doors have eyebolts to attach the service tool in order to open the bottom doors which hinge off to the side.
4. Vacuum each sediment chamber until they are empty.
5. After cleaning the sediment chambers close the bottom screen doors of the screen system. Lower or Slide the top doors and assure they lock correctly (if equipped with SunGlide Lids).
6. When all maintenance work is completed, be sure to close the access covers or hatches.

Note

All vacuum servicing of NSBB components can be done with the use of any vacuum truck designed for catch basin cleaning.

When possible, maintenance should be performed from the surface level.

SCREEN MAINTENANCE

Screen Maintenance Procedure

The Nutrient Separating Baffle Box Screen Basket is recommended to be inspected every 6 months and cleaned every 12 months.

1. Remove all manhole covers (or open hatches or grates) to gain access to the screening basket.
2. Remove all trash, litter, debris, organics and sediments captured by the screened basket either manually or with the use of a vacuum truck. The vacuum hose will not damage the screen.
3. Remove vacuum hose and replace manhole covers or hatch doors.
4. Transport all debris, trash, litter, organics and sediments to an approved disposal facility in accordance with local and state requirements.

Note

The screen basket must be cleaned before vacuuming each sediment separation chamber.

The bottom of the screen basket is designed with three hinged panels that are lifted vertically to access each separation chamber.



Nutrient Separating Baffle Box with trash / debris collected inside the screening system basket.

CHAMBER MAINTENANCE

Separation Chamber Maintenance Procedure

The Nutrient Separating Baffle Box Hydrodynamic Separation Chambers are recommended to be inspected every six (6) months and cleaned every twelve (12) months.

1. Remove all manhole covers (or open hatches or grates) to gain access to the separation chambers.
2. Lower vacuum truck hose into the first separation chamber through the screening basket closest to the inflow pipe. Pressure washing may be needed to remove compacted sediments.
3. Repeat this process in each separation chamber.
4. Remove vacuum hose and lower hinged panels of screening basket back to a horizontal position.



Open lower screen panels to remove sediments via vacuum truck.

POST SERVICING PROTOCOL

After completing inspection or maintenance, the service operator should prepare a record of service. The record should include maintenance activities performed, amount and description of debris collected and system condition.

- | The owner will retain the service / inspection record for a minimum of five (5) years from the date of maintenance, or in accordance to specified EPA / DEP requirements.
- | All records should be made available to the governing municipalities for inspection upon request at any time.
- | Transport all debris, trash, litter, organics and sediments to an approved facility for disposal in accordance with local and state requirements.



Nutrient Separating Baffle Box with collected trash, organics and debris inside the screened basket system ready for disposal.

WARRANTY

Warranty Information

Oldcastle Infrastructure products are engineered and manufactured with the intent of being a permanent part of the infrastructure. Oldcastle Infrastructure warrants its products to be free from manufacturing defects for a period of 5 years from the purchase date. In the event a warranty claim is made and determined to be valid, Oldcastle Infrastructure will replace or repair the product at their own discretion. Warranty claims must be submitted, evaluated and approved by Oldcastle Infrastructure for the claim to be determined valid. All warranty work must be authorized by Oldcastle Infrastructure prior to work beginning not covered by this warranty. There are no warranties expressed or implied other than what is specified herein. Abusive treatment, neglect or improper use of the Nutrient Separating Baffle Box will not be covered by this warranty.

CONTACT INFORMATION

General Inquires

For additional information concerning installation, general usage, maintenance products, warranties or replacement parts please contact:

Oldcastle Infrastructure

7000 Central Parkway

Suite 800

Atlanta, GA 30328

Phone: (888) 965-3227







Appendix B

Site Access and Vegetation Maintenance Map

