# TYPICAL SPECIFICATION
## ECP Steel Pier™ PPB-350 & PPB-400 Utility Bracket Systems

## Section 1- General

**1.01 Typical Installation Scope**

Furnish labor, equipment, tools and material to install PPB-350 and PPB-400 Pier systems as described in this specification in a workmanlike manner and to design criteria.

1. Prepare site for safe working conditions.
2. Thoroughly investigate the site for any and all underground utilities before excavating.
3. Excavate as required for installation of the product.
4. Prepare stem wall, footing and/or grade beam of the foundation for pier bracket mounting.
5. Install ECP Steel Pier™ bracket and drive stand unit.
6. Securely anchor the drive stand and pier bracket to the structure.
7. Install the drive cylinder and connect hydraulics.
8. Hydraulically drive the steel pier sections to the required installation force.
9. Install lift assemblies, hydraulic lift cylinders and connect hydraulics.
10. Transfer the load to the piers, lift the structure to designed specifications and mechanically secure to maintain elevation.
11. Remove equipment from work area.
12. Backfill and clean work areas.

**1.02 Delivery, Storage and Handling**

All foundation repair products, tools and equipment shall be handled and transported with care to prevent any damage or deformation. Hydraulic components shall be protected from the weather and kept clean of any dust, dirt, mud or debris.

## Section 2 - Product Material

**2.01 Pier Sections**

**2.011 PPB-350 Pier Pipe**

Each pier section shall be manufactured from steel tubing having a nominal outside diameter of 3-1/2” outside diameter and a wall thickness of 0.165”. The pier sections shall be fabricated from mill rolled, induction heat treated steel with a minimum yield strength of 55,000 psi. Each pier section shall be approximately 42" long and shall have a mill-installed coating of zinc-iron alloy, pure zinc galvanizing, a layer of zinc chromate compounds and a clear organic polymer coating. The materials conform to ASTM A500.

**2.0111 Lead Section – PPB-350-S**

The lead section shall have a friction reduction collar welded to the bottom end of the pier pipe. The collar shall be fabricated from steel tubing having a nominal 4" outside diameter by 0.220” wall with a length of 1”. The purpose of the collar is to reduce skin friction on the pier sections that follow; therefore the first section of pier pipe must have this collar attached.

**2.0112 Extension Section – PPB-350-EPS**

The extension section shall have a coupling installed on one end of the pier pipe. This coupling shall be fabricated from steel tubing having a nominal 3-1/8" outside diameter by 0.180” wall thickness with a length of 5-7/8”. Three inches of the coupling shall be inserted into the pier section and secured by two 1/2" button welds.

**2.0113 External Pier Sleeve – PPB-350-SB**

The external pier sleeve shall be manufactured from steel tubing having a nominal outside diameter of 4” outside diameter and a wall thickness of 0.220”. The external pier sleeve sections shall be fabricated from mill rolled, induction heat treated steel with a minimum yield strength of 55,000 psi. Each external pier sleeve section shall be approximately 36” or 42" long and have mill finish. Welded to the external pier sleeve shall be a 3/4" x 3/4" x 3/4" piece of steel that forms a stop.

**2.0114 Inertia Sleeve – PPB-350-IP (Optional)**

The inertia sleeve is a pipe assembly that fits inside the pier pipe during installation to increase the moment of inertia of the pier pipe and strengthens the joints between pier sections. The inertia sleeve shall be installed to the pier pipe through areas of weak soil, areas of unsupported length of pier pipe or where additional pier wall strength is required. The inertia sleeve shall be fabricated from steel tube having a 3-1/8” outside diameter by 0.180” wall and 35-1/4” long. The coupling shall be fabricated from 2-5/8” diameter by 0.188” wall steel tubing that is 12 inches long. Three inches of the coupling shall be inserted into the inertia sleeve section and secured by two 1/2" button welds.

**2.012 PPB-400 Pier Pipe**

Each pier section shall be manufactured from steel tubing having a nominal outside diameter of 4” outside diameter and a wall thickness of 0.220”. The pier sections shall be fabricated from mill rolled, induction heat treated steel with a

minimum yield strength of 55,000 psi. Each pier section shall be approximately 42" long and have mill finish. The materials conform to ASTM A500.

**2.0121 Lead Section – PPB-400-S**

The lead section shall have a friction reduction collar welded to the bottom end of the pier pipe. The collar shall be fabricated from steel tubing having a nominal 4.5" outside diameter by 0.237" wall with a length of 1". The purpose of the collar is to reduce skin friction on the pier sections that follow; therefore the first section of pier pipe must have this collar attached.

**2.0122 Extension Section - PPB-400-EPS**

The extension section shall have a coupling installed on one end of the pier pipe. This coupling shall be fabricated from steel tubing having a suitable outside diameter to fit to the inside of the pier pipe with a length of 5-7/8". Three inches of the coupling shall be inserted into the pier section and secured by two 1/2" button welds.

**2.02 Pier Bracket – PPB-350-BO**

The pier bracket shall be designed to connect the structure to the pier and to transfer the load of the structure to the pier pipe. The pier bracket shall be a welded assembly new, clean steel with a thickness of 1/2" or 5/8" and structural square tubing with a thickness of 3/16" or 1/4" that conforms to ASTM A-36.

The Utility pier bracket shall have a 74 square inch horizontal bearing surface that contacts the bottom of the foundation plate and a vertical mounting plate area of 91 square inches. The 1/2" thick vertical mounting plate shall have four 11/16" diameter holes that will accept 1/2" diameter concrete anchor bolts. The horizontal and vertical bearing plates shall be welded to side pieces, which measure 4" wide, by 18" long.

The following weldments and components attach to the bracket. A 9-7/8" long piece of 1-1/2" square tube with a wall thickness of 1/4" shall be welded vertically to the outer side of each side piece. Four mounting studs shall be welded to the outer front edge of the side pieces. These studs shall be fabricated from 2-1/4" long pieces of 1/2"-13 all-thread bar. Each stud shall be supplied with a 1/2"-13 hex nut. A control sleeve is required to maintain alignment of the 3-1/2" pier pipe within the drive stand. A control sleeve (Only supplied with the Model 350) shall be fabricated from 11-7/8" long piece of 4" square tubing with a wall thickness of 0.188". Welded to the control sleeve shall be a 3/4" x 3/4" x 3/4" piece of steel that forms a stop. Supplied with the bracket shall be two face plates that are used to secure the pier pipe and control sleeve in proper alignment and position within the pier bracket. The face plates shall be 2" by 7-1/4" and contain two 9/16" slots to secure the face plates to the pier bracket.

**2.03 Pier Cap**

The pier cap is a welded assembly that connects the pier pipe to the pier bracket and transfers the structural load to the pier pipe. The pier cap shall be fabricated from 1-1/2" by 4" by 9" long steel conforming to ASTM A-36. Attached to the center of this plate shall be a piece of tubing with a suitable diameter to fit over the pier pipe and shall be cut 1" long. This ring is used to maintain pier pipe alignment. The pier cap shall have two 1" diameter holes for attaching the pier cap to the pier bracket.

**2.04 Bracket Rods and Hex Nuts**

Supplied with the pier bracket shall be two 7/8"–9 all thread bars that measure 18" long and four 7/8"–9 diameter heavy hex nuts conforming to ASTM A-193 Grade B7. The bracket rods and nuts shall be used to attach the pier cap to the pier bracket. These items provide for a maximum lift of the pier system of 4". Larger lifts may be accomplished by using longer bracket rods.

**2.05 Lift Assembly - PPB-350-LA**

The lift assembly shall consist of a lift head, two lift legs and two heavy hex nuts. The lift assembly is used to recover lost elevation and to allow for transfer of the structural load from the pier pipe to the pier bracket assembly. The lift legs are used as extensions to the bracket lift rods and allow attachment for the lift head above the pier cap. A hydraulic ram shall be installed between the lift head and pier cap during structural load transfer and recovery of lost elevations

**2.051 Lift Head**

The lift head shall be fabricated from 1-1/2" by 4" by 9" long steel conforming to ASTM A-36. The lift head shall have two 1" diameter holes to accept the holding/lift rods.

**2.052 Lift Leg & Hex Nut**

Supplied with the lift head shall be two lift leg assemblies constructed from 7/8" – 9 all thread rod that measure nominally 9" long conforming to ASTM A-193 Grade B7. One end of the all thread bar shall be threaded into a 2-1/2" long thread bar coupler to a depth of 1" and welded in place. Also supplied with each lift leg shall be a 7/8" – 9, heavy hex nut. Total length of the lift leg shall be 10-1/2".

## 2.06 Anchor Bolts

**2.061 HUS-EZ Screw Anchor**

The screw anchors are comprised of a body with a hex washer head. The nominal diameter shall be 1/2 inch and the length shall be 6 inches conforming to ICC-ESR Evaluation Report ESR-2369. The anchor shall be manufactured of heat

treated carbon steel with an 8 μm thick zinc coating. (Hilti Kwik HUS-EZ 1/2" x 6" #00418077)

**2.062 Expansion Anchor**
The expansion anchor shall be wedge type with a single piece three section wedge conforming to Federal Specification A-A 1923-A, Type 4 and ICC-ES Evaluation Report ESR-1385. Anchor shall be zinc plated conforming to ASTM B633. Anchor bolt size: 1/2" diameter by 7" long and shall be supplied with a flat washer and hex nut. (Hilti Kwik Bolt III #282529 or equal.; or as specified by the engineer.)

## Section 3 – Tools and Equipment

**3.01 Drive Stand – PPB-350-DS**
The proprietary drive stand is a welded assembly designed to maintain vertical alignment of the pier bracket, drive cylinder and pier pipe during pier installation. The drive stand shall be a welded assembly of 1/2", 5/8" and 1" thick cold rolled flat bar stock conforming to ASTM A-36 and 3/8" and 1/2" thick hot rolled steel conforming to ASTM A-29. Supplied with the drive stand shall be three face plates and six hex nuts. The face plates shall be installed to enhance the integrity and safety of the drive stand under full load and provides pier pipe support. The upper face plate retains the drive cylinder and has two 9/16" mounting holes. The lower face plates retain and guide the pier pipe and have two 9/16" slots for attachment to the drive stand. Two tapered drive stand pins are required to attach the drive stand to the pier bracket. These pins shall be formed from 15/16" diameter steel bar and shall be 15-1/2" long.

**3.02 Drive Cylinder Assembly – PPB-350-DC**
The drive cylinder assembly shall be a double acting with a special cylinder head designed to fit the proprietary drive stand, a rod aligner and a pier drive adapter on the end of the piston rod designed to install the 3-1/2" diameter by 0.165 wall thickness pier pipe. The drive cylinder shall have a 3-1/4" diameter bore and 2" diameter cylinder rod. The stroke shall be 24". Working pressure may vary from 3,000 to 10,000 depending upon the installing contractor**.**

**CAUTION: The operator must identify which cylinder he is using and verify the working pressure of the cylinder prior to using the hydraulics**.

**3.03 Hydraulic Pumps**

**3.031 Pier Installation Pump – HYD-5204**
A gasoline or electrically operated hydraulic pump is required to install the pier pipe. The pump shall be capable of providing 10,000 psi of hydraulic pressure and a dual flow rate of 480 $in^3$/min up to 2,000 psi and a rate of 100 $in^3$/min above 2,000 psi. The pump shall have a 4-way, 3 position valve for double acting cylinder service. (Enerpac PGM-5204R or equal)

**3.032 Hand Pump – HYD-801**
One or more hand pumps may be required to transfer structural load and to recover lost elevation. The hand pump(s) are connected to hydraulic lifting rams via a manifold arrangement. This provides uniform force to several pier placements at the same time. The hand pump assembly shall provide two stages of displacement at pressures up to 10,000 psi. Below 400 psi the displacement shall be 2.4 $in^3$ per stroke and above 400 psi, 0.15 $in^3$. (Enerpac P801 or equal)

**3.04 Single Acting Hydraulic Cylinder – HYD-254**
A single acting hydraulic cylinder shall be positioned at each placement during the load transfer phase of the restoration. The hydraulic cylinder shall be rated at 10,000 psi of hydraulic pressure and heavy duty return spring. The minimum cylinder bore shall be 5.16 $in^2$ and a stroke of 4". (Enerpac RC-254 or equal)

**3.05 Pressure Gauges**

**3.051 Drive Cylinder Pressure Gauge – HYD-4088**
A pressure gauge shall be provided to monitor the installation force placed upon the pier pipe. The gauge shall be capable of measuring 0 – 10,000 psi with a minimum gauge face of 4" and minor graduations of 100 psi. (Enerpac G4088L or equal)

**3.052 Hand Pump Pressure Gauge – HYD-3525**
A pressure gauge shall be provided to monitor the lifting force applied to the structure during restoration. The pressure gauge shall be capable of measuring 0 – 10,000 psi with a minimum gauge face of 2-1/2" and minor graduations of 200 psi. (Enerpac G2535L or equal)

## Section 4 – Steel Pier Installation

### Warning!

**Utilities: Thoroughly investigate the job site for the possible existence and location of all underground utilities before proceeding. Avoid any contact with ALL underground utilities!**

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| **Excavations:** | **Collapsing soil can be dangerous. Follow OSHA requirements at all times. Do not enter any excavation if there are any questions about the stability of the soil.** |
| **Pier Placement:** | **Excessive distance between pier placements can damage the concrete foundation from structural overload. Verify that the foundation has sufficient structural integrity to carry the load between placements.** |
| **Pier Placement:** | **Thoroughly investigate the exterior of the structure adjacent to the proposed placement especially directly above the drive stand and drive cylinder. Movements of tools and equipment during pier installation may damage electrical boxes, faucets, windowsills, sliding doors and other architectural elements.** |
| **Drive Cylinder:** | **Verify the working pressure of the hydraulic drive cylinder prior to using the hydraulics. Do not exceed the hydraulic drive cylinder manufacturer's working pressure during pier installation. When operating near the maximum cylinder pressure, cylinder rod extensions should be restricted to no more than 15 inches to prevent damage to the drive cylinder actuator rod.** |
| **Hydraulic Equipment:** | **Inspect all hydraulic equipment prior to using. Do not use any leaking or damaged components such as cracked, crimped or cut hoses, leaking fittings, etc.** |
| **Heavy Lifting:** | **Many pieces of equipment used to install steel foundation underpinning are very heavy. Use proper lifting techniques, back supports, and help from others when lifting heavy objects.** |
| **Safety Devices:** | **When driving pier pipe all face plates must be fastened in place on the drive stand and pier bracket to enhance the integrity of the system and to secure the pier pipe.** |
| **Safety Devices:** | **All persons in and around the work area must use personal safety protection.** |

**Warning!** **FAILURE TO HEED THESE WARNINGS OR TO FOLLOW SAFE WORK HABITS MAY RESULT IN SERIOUS INJURY OR DEATH!**

**4.01 Excavating to Expose Footing or Grade Beam**

An excavation shall be prepared adjacent to the foundation to expose the stem wall and footing or the bottom of the grade beam. The excavation shall be to a depth of 14 inches below the bottom of the foundation and 12" beneath it. The excavated work area must be wide enough for safe working conditions, typically 3 to 4 feet wide by 3 to 4 feet away from the structure is usually adequate at the footing, taper or shore deep excavations per OSHA guidelines. Move excavated soil away from the work area by at least two feet and store in such a manner that the soil will not erode or cause damage to the owner's property.

**4.02 Footing or Grade Beam Preparation**

If the structure has a spread footing foundation, it shall be notched by removing the extended edge of the footing back to the stem wall for a distance along the footing of at least 18 inches in the area of the pier placement. To accomplish this a pneumatic or electrical chipping hammer with a chipping bit and then a bushing tool for smoothing the face shall be used. When preparing either a notched footing or a grade beam, the bottom area of concrete that will bear upon the pier bracket must be prepared to a smooth and level condition. Prior to acceptance of preparation, a level shall be used to verify that the portion of the footing upon which the bracket will bear is level both perpendicular to the foundation and parallel to the structure.

**IMPORTANT: If any reinforcing bar becomes exposed during these operations, consult with an Engineer before removing or cutting any steel reinforcing.**

**4.03 Pier Bracket Installation**

Place the steel installation base, or other suitable material, in the bottom of the excavation at the approximate point of the pier installation. Connect the lift assembly and pier cap to the pier bracket. Obtain a short piece of pier pipe, approximately 22" to 24" long depending upon the excavation, and place it in the pier bracket. Install the control sleeve over the pier pipe and face plates to the pier bracket by dropping the plates over the studs on either side of the pier bracket.

Maneuver the pier bracket into place under the footing; place the lower end of the piece of pier pipe into the centering ring of the installation base at the bottom of the excavation. Place a hydraulic ram between the lift assembly and the pier cap. Activate the hydraulic ram with a hand pump to bring the bearing plate of the pier bracket in contact with the previously prepared area at the bottom of the footing or grade beam.

If careful inspection reveals that the pier bracket is not plumb (vertical) and evenly bearing across all of the bottom of the footing and against the vertical face of the foundation, then the assembly must be removed and further preparation work must be performed. If only minor correction is required, lower the bracket about two inches and place quick setting, high strength grout on the bearing plate and realign the pier bracket.

Carefully check for alignment and proper bearing between the pier bracket and the bottom of the footing, plus verify proper contact between the pier bracket and the vertical face of the foundation. Activate the cylinder to achieve even bearing between the pier bracket and the footing.

Bolt Bracket to the foundation element. The procedure depends upon type of anchor bolt used. **Use no more than one bolt on each side of the mounting plate**:

- Drill no more than two 1/2" x 6", minimum, deep holes to accept the Hilti Kwik HUS-EZ 1/2" x 6" Screw Anchor Bolts. Clean drilled hole with compressed air to remove all concrete powder. Tighten bolts to a measured torque of 45 ft-lbs using a calibrated torque wrench.
- Drill and install two 1/2" x 7" long concrete expansion anchors, flat washers and hex nuts. Tighten to securely fasten the bracket in position.

After the grout sets continue with the installation. Remove the lift assembly and hydraulic ram from the pier bracket. Lower the drive stand into the excavated area then slide the drive stand horizontally over the two pieces of 1-1/2" square tubing on the pier bracket. The 15/16" diameter tapered drive stand stand pins shall be installed through the holes in the drive stand that are directly above and aligned with the two 1-1/2" square tubes, and into the lower drive stand holes.

Slide the lower end of the drive cylinder into slots at the top of the drive stand. Secure the drive cylinder to the drive stand by placing the upper face plate with two holes over the two studs at the top of the drive stand. Connect all of the hydraulics between the drive cylinder and the hydraulic pump.

With the installation base still at the bottom of the excavation, remove the face plates, control sleeve and short piece of pier pipe from the bracket. Place a lead pier section into the drive stand with the friction reduction collar facing downward. Slide the control sleeve over the pier pipe. Secure the face plate with pier guides over the studs and nuts on the drive stand and the face plates over each pair of studs on pier bracket. Activate the drive cylinder to apply a seating load on the drive stand assembly. When the drive stand has raised enough to remove all of the slack from fabrication tolerances, drill and install at least two 1/2" concrete anchors are required to secure the drive stand in position. If the drive stand is shimmed and not flush with the wall, longer anchor bolts are necessary. Expansion anchor bolts 1/2" x 10" are recommended if the drive stand is shimmed more than one inch.

Retract the drive cylinder to take pressure off the lead pier section. Remove the installation base.

**4.04 Driving Pier Pipe**

**IMPORTANT: The installation base plate must be removed from the bottom of the excavation and the control sleeve must be in place over the pier pipe before proceeding.**

Drive the lead pier section into the soil using the hydraulic drive cylinder to nearly the full extension of the cylinder rod. Retract the cylinder rod; install the coupling shoulder of a drive tool into the top of the installed pier section. Drive the pier downward into the soil again to the length of the hydraulic drive cylinder stroke. Repeat this operation with an additional drive tool as required to fully install the pier pipe. Retract the cylinder rod; remove the drive tools, guides and face plates. Document the force used to drive each section of pier pipe. (Optional – Install an inertia sleeve before installing the next pier section. – See 4.05) Install the coupled end of an extension pier section into the top of the driven pier section. Replace the guides and face plates.

**CAUTION: Safe operation dictates that the drive cylinder working pressure shall not be exceeded and all face plates be securely in place during pier installation. When operating near the maximum cylinder pressure, cylinder rod extensions should be restricted to no more than 15 inches to prevent damage to the drive cylinder actuator rod.**

The pier installation process shall continue adding extension pier sections until the design load or a suitable bearing stratum is reached. Hold the final driving load on the pier to check for pier creep.

**4.05 Installing Pier Sleeving (Optional – Only on PPB-350)**

Pier sleeves are used to stiffen the pier pipe and to strengthen the coupled joints between pier sections in weak soils or in applications where the pier pipe is unsupported. Sleeving shall extend at least three feet below the area of unsupported pipe or weak soil layer such as in areas where the Standard Penetration Test (SPT) blow count "N" is less than 5. Inertia sleeving must be installed concurrent with pier installation and external sleeving shall be installed after the pier has reached verified suitable bearing.

**4.051 Installing Inertia Sleeve (Optional – Only on PPB-350)**

**NOTE: The inertia sleeve must be installed concurrent with the pier sections. The installer must have general knowledge of depth to suitable load bearing for the pier to be able to calculate the point to commence inertia sleeve installation to be able to fully protect the pipe in the area of weak soils.**

When driving pier pipe, the inertia sleeve shall be installed into the pier section prior to inserting the next extension pier section. The coupling end of the inertia sleeve shall be inserted first into the pier pipe. The inertial sleeve shall drop by gravity into the coupling at the bottom end of the extension section. This process shall be continued through the area of week soil or in areas where additional pier bending strength is required.

**4.052 Installing External Pier Sleeves (Optional- Only on PPB-350)**

The external pier sleeving shall be installed over the pier using the drive stand and drive cylinder. A specialized drive tool for installing the external pier sleeving shall be used to push the sleeve sections. Care must be taken to insure that the joints in the sleeving are staggered a minimum of 18 inches from the joints in the pier pipe. This process shall be continued through the area of week soil or in areas where additional pier bending strength is required.

**4.06 Field Proof Loading**

Load test the pier to the required proof load above the design or working load, or until lift of the structure is encountered. We do not recommend proof loading the system to a load greater than 1.5 times the anticipated service load.. The maximum proof load allowed for PPB-350 Steel Pier™ system is 64,500 pounds and for PPB-400 Steel Pier™ system is 74,000 pounds however many concrete footings will not be able to resist a loading of this magnitude.

Proof loads above the capacity of the drive cylinder may be tested by removing the drive cylinder, installing steel block bridging in the stand to accommodate a 25 to 50 ton short single acting ram between the pier pipe and the steel block. Connect the ram to a hand pump and gauge assembly. Activate the ram to apply the required proof load to the system. Document the results of the proof test. Remove hydraulic drive cylinder and drive stand from the pier bracket.

**4.07 Cutting Final Pier Section to Length**

After verifying the pier capacity, it may be necessary to cut the final pier section. The pier pipe shall be cut very carefully to insure that the cut is perpendicular to the axis of the pipe. The pier bracket is shipped with bracket lift rods sized for lifts up to 4". For larger lifts, longer bracket lift rods are required. For most projects with lifts less than 4", the length of the final pier section must be cut to allow it to protrude above the top of the pier bracket approximately 4". The length to cut the pier section will vary depending upon the required lift.

**4.071 Critical Final Pier Section Length – 15" to 30" Long**

When the service load exceeds 35,000 pounds and the final pier section length is between 15 inches and 30 inches long, the coupled joint will be situated close to the bottom of the utility bracket. To prevent damage to the coupled joint one of the following must occur:

1. Exchange the final cut section and the last installed full length section of pipe. The exchange will place the full length of extension in the area of the pier bracket and the coupled joint 42 inches below the pier cap.
2. Install a 4" diameter by 42 inch long external pier sleeve over the coupled joint in the critical area. (Model 350 only)
3. Fill the pier sections with grout and transfer the load to the pier pipe only after the grout has cured.

**4.08 Load Transfer**

A pier cap, lift assembly and bracket lift rods shall be installed with nuts on each bracket. A 25-ton ram shall then be placed between each pier cap and lift assembly. Each ram shall be connected through a cut-off valve to one or more manifolds, gauges, and hydraulic hand pump systems. Transfer the structural load to the piers uniformly and evenly by activating many hydraulic rams simultaneously. As the hand pump is actuated, force is applied to the pier caps. As the load is transferred from the foundation to the piers, the interior and exterior of the structure must be carefully monitored to insure that the restoration occurs to plan and the structure is stabilized or lifted to the design elevation. As each placement reaches the desired load and/or elevation, the cut-off valve for the ram at the pier is closed and the pressure recorded for that placement. The hex nuts at the top of the bracket rods located above the pier caps shall be advanced to the surface of the pier cap and secured.

Remove the lift assemblies, hydraulic rams and lifting hydraulics from each pier placement. Clean all hydraulics, replace dust caps on the hydraulic couplings and store the equipment in a clean, dry environment.

**IMPORTANT: After the restoration is complete the void created between the foundation and soil may need to be filled with grout depending upon the type of foundation, type of soil on the site and the amount of lift. Consult a registered professional engineer when in doubt.**

**4.09 Backfill and Cleanup**

Remove all scrap and other construction debris from the site. Remove all tools and equipment, clean them and store them. The excavations shall now be backfilled using the soil that was removed and stored nearby. The backfill shall be placed into the holes in small lifts of 6" to 8" and then properly tamped to achieve maximum density. After the backfilling operation is complete, the soil at the perimeter must have a positive slope away from the perimeter of the foundation.

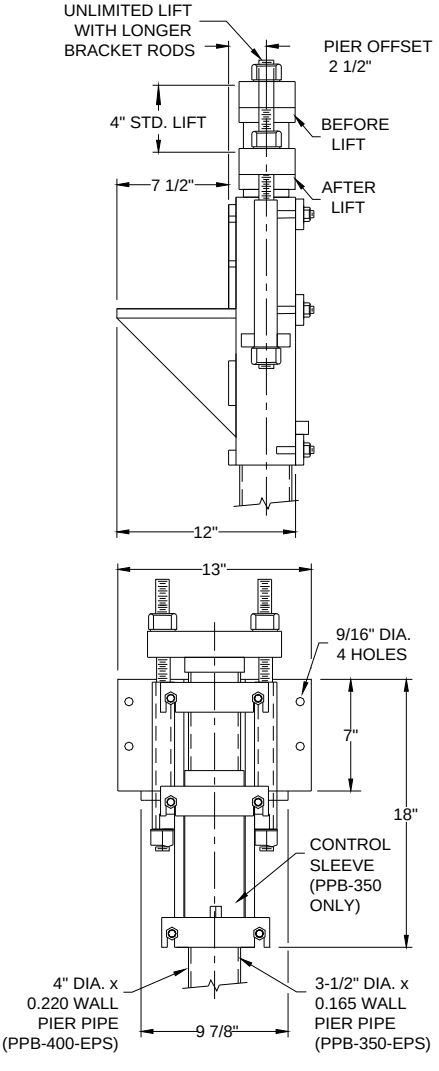
Dispose of all construction debris in a safe and legal manner.

**END OF SPECIFICATION**

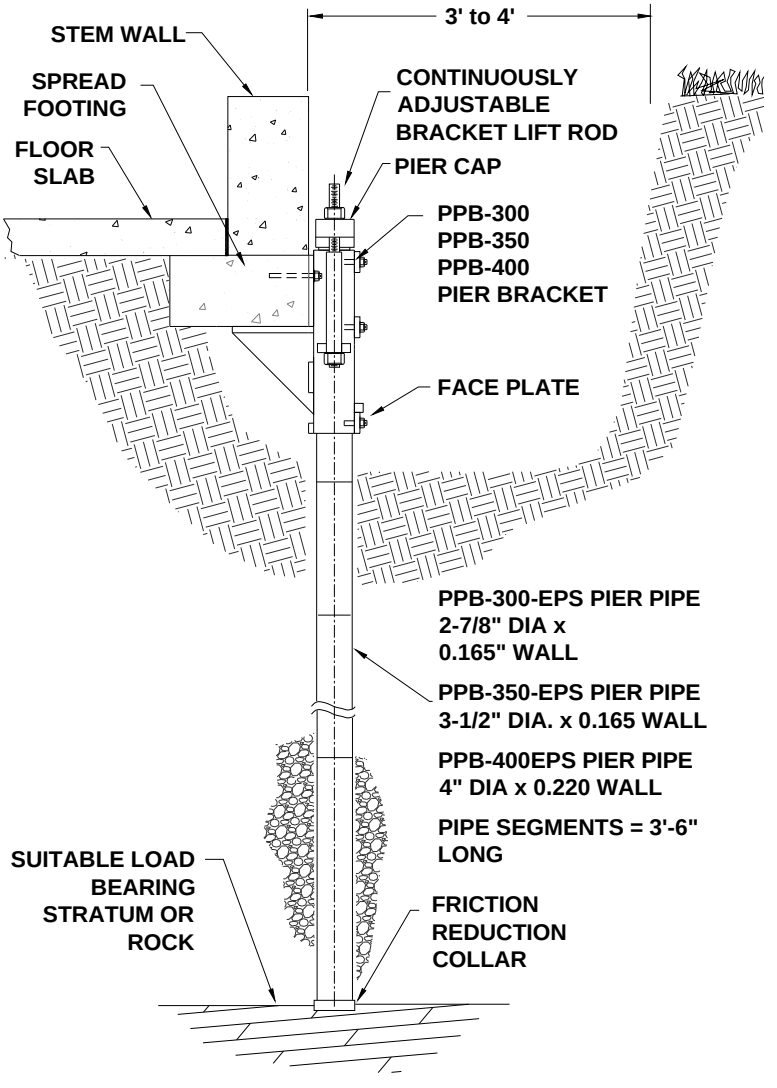
*Earth Contact Products, LLC reserves the right to change design features, specifications and products without notice, consistent with our efforts toward continuous product improvement. Please check with Earth Contact Products at 972 480-0007 or 913 393-0007 to verify that you are using the most recent specifications.*

## ECP Steel Pier™ PPB-350 & PPB-400 Utility Bracket Pier Systems

- **PPB-400 Ultimate Capacity – 99,000 lb.**
- **PPB-400 Max. Proof Test – 74,000 lb.**
- **PPB-350 Ultimate Capacity – 86,000 lb.**
- **PPB-350 Max. Proof Test – 64,500 lb.**
- **74 Square Inches Bearing Surface**
- **Installs From Outside or Inside Structure**
- **Standard Lift – 4" Fully Adjustable With Higher Lifts Available**
- **Friction Reduction Collar On Lead Pier Section**
- **3-1/2" Dia. (PPB-350) or 4" Dia. (PPB-400) Galvanized Pier Pipe**
- **Installs With Portable Equipment**
- **Installs With Little or No Vibration**
- **Installs To Rock or Verified Load Bearing Stratum**
- **100% of Piers Proof Tested When Installed**
- **U.S. Patent No. 6,193,422**
- **Manufacturer's Warranty**




**PPB-350 & PPB-400 Utility Bracket Details**




**PPB-350 & PPB-400 Utility Bracket Application Drawing**

*The capacity of the PPB-350 and PPB-400 Utility foundation support system is a function of the capacity of pier pipe and soil surrounding the pipe, capacity of the load bearing stratum, foundation bracket, foundation strength and strength of the bracket to foundation connection. Actual capacities could be lower than the bracket capacity.*