Sheet Pile Cutoff Walls Construction Guidance Checklist

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Scan the code for our Construction Management playlist on YouTube

Sheet Pile Cutoff Wall Introduction

Sheet pile cutoff walls are used in stream construction to reduce seepage of subsurface water beneath a drop structure to prevent piping or erosion of underlying subgrade soils.

Sheet Pile Cutoff Wall Introduction

- Sheet pile refers to any retaining wall type that is installed into the ground by driving.
- Sheet pile can be made of steel, aluminum, vinyl, or fiberglass. Steel is most commonly used for District projects on permanent installations.
- Sheet pile is made with different lengths, widths and web shapes.
- Sheet pile can be installed with a crane or an excavator.
- Sheet pile cutoff walls can be capped with steel or concrete and some are buried with topsoil for aesthetic reasons.

Sheet Pile Materials

- Verify that the steel type, web shape, and gauge thickness matches what is specified, and its markings are correct for the applicable ASTM Standard.
- Verify that the length and depth are correct.
- Verify that the type of joint connections that allow each steel sheet to connect to each other match specifications. Ball and socket joints are typically used on District projects.
- Sheet pile for cutoff wall applications should be provided with no lift holes If lifting holes are needed, steel patches will need to be welded over the holes.
- The most common steel sheet piling used for District projects is PZ 22 where P = piling, Z = web shape, and 22 = the weight of material in LBS/SF

Sheet Pile Materials

Sheet pile should be stored onsite in a manner that keeps the sheets free of mud, dirt, and debris and is commonly set on wood stringers as shown below for this purpose.

Sheet Pile Materials

Sheet pile can be installed in two different orientations depending on its use. It can be installed with a deep web (left photo) to resist overturning, or it can be installed with a shallow web (right photo) when it is used for scour.

Sheet Pile Installation

Sheet pile is typically driven into the ground using the following equipment:

- Pile driving hammer mounted on a crane typically used for long sheet pile lengths (i.e, greater than 20-ft)
- Vibratory head on a excavator bucket commonly used for medium sheet pile lengths in the 10-15 foot range.
- Excavator bucket for temporary measures (i.e., coffer dam) as long as the steel sheets are not damaged and the joints are not compromised.

Crane mounted driver head

Vibratory head on excavator

Sheet Pile Installation

Sheet pile is not allowed to be installed by equipment that damages the sheets. The top picture is a concrete breaker attachment meant to demolish concrete flatwork.

- A concrete breaker attachment to an excavator is not meant to install sheet pile. This damages the top of the sheets and is not allowed.
- Torn or bent sheets can allow water to leak through the cutoff wall, and make it difficult to weld on a steel cap.

Sheet Pile Installation

Sheet pile shall be installed according to the Drawings and specifications.

- Verify that all sheets are installed in the correct orientation and are plumb and level.
- Verify that all ball and socket joints are connected properly, and no gaps have been left between the sheets.
- Confirm that all of the depths and top elevations of the sheets have been met.

Sheet Pile Cutoff Wall Installation

When steel caps are used, some onsite welding will be required to attach the cap to the sheet pile. Ensure that proper safety precautions (i.e., keep away from flammable vegetation, water/fire extinguisher onsite) are taken to protect against fire during any onsite welding activities.

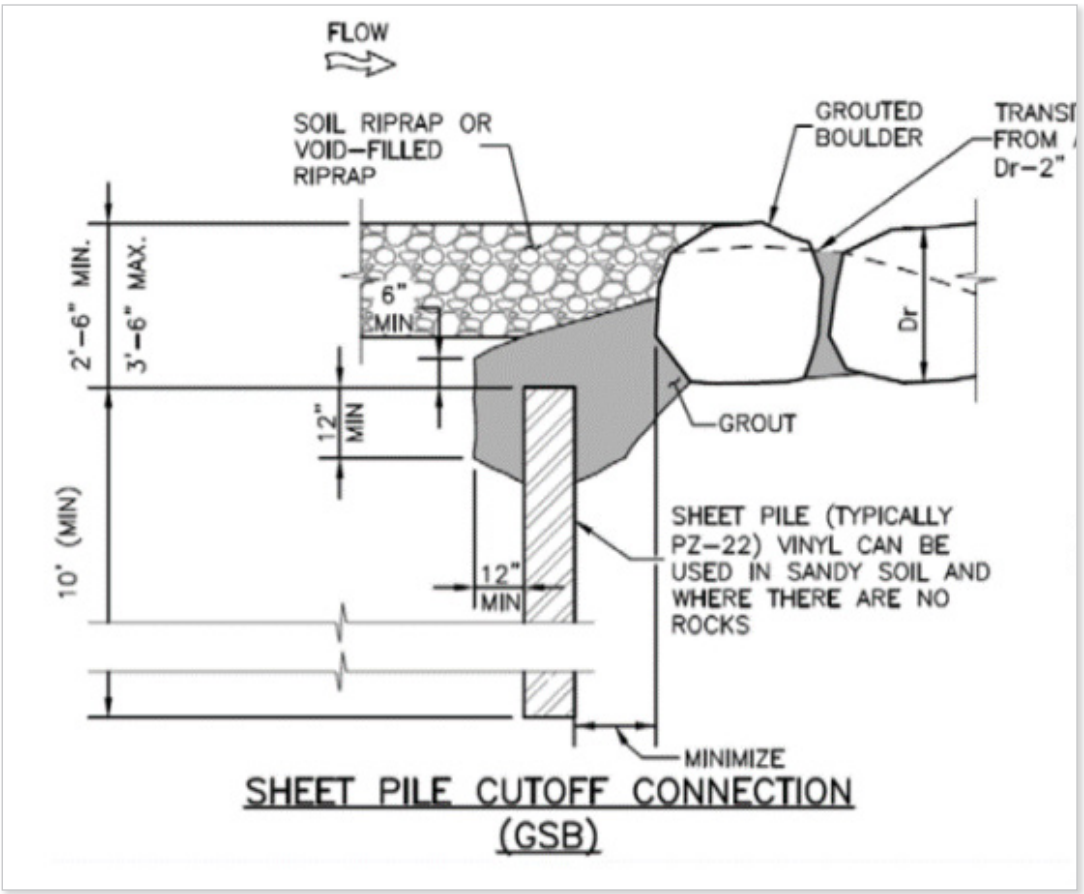
Sheet Pile Cutoff Wall Installation

A concrete cap on top of sheet pile usually consists of rebar, concrete forms and concrete. It is poured in place to match the dimensions on the plans. Verify the following:

- Sheet pile should be embedded into the concrete cap a minimum of 6-inches to ensure a watertight connection.
- Rebar is typically threaded through holes in the sheet pile – verify that these holes are fully encapsulated by the concrete.

Sheet Pile Cutoff Wall Installation

At grouted boulder drop structures, sheet pile is sometimes embedded into the grouted structure as shown below. To ensure a watertight connection, the sheet pile should stick up above the ground surface as shown below so that a minimum of 12-inches is embedded in the grout. The grout should be placed in a manner that fully encapsulates the sheet pile with a minimum of 12-inches of grout on each side.



Sheet Pile Cutoff Wall Installation

Sheet pile cutoff walls can also be incorporated into sculpted concrete drop structures as shown here.

Finished Installation:

Example of finished sheet pile cutoff wall with a concrete cap.

Finished Installation:

Example of a properly constructed cutoff wall with a steel cap that is straight and plumb.