# Index 455-400 Precast Concrete Sheet Pile Wall (Conventional)

## **Design Criteria**

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AASHTO LRFD Bridge Design Specifications; Structures Design Guidelines (SDG)

## **Design Assumptions and Limitations**

These piles are typically jetted into place rather than driven like a bearing pile. If shallow rock formations exist within the wall limits, other wall types must be considered.

A cast-in-place reinforced concrete bulkhead cap is required to structurally tie the tops of the concrete sheet piles together and to provide corrosion protection for the reinforcing and prestressing steel that extend from the tops of the piles.

These piles can be used for cantilevered walls or tied-back walls. Project specific designs and details are required for tie-backs. If the length of piles required for a cantilevered wall exceeds the limits shown on the standard drawings, consider using tie-backs.

These piles can be used in all environments with the appropriate concrete admixtures.

The grouted keyway used in combination with plastic filter fabric (the limits of both are defined by dimension "X") are assumed to not be watertight. Thus they contain the soil behind the wall while still allowing groundwater behind the wall to weep through. No other separate weep holes are generally required. The bottom of the "X" dimension is required to be 1'-8" below the mud line.

The tip elevation of piles shall be determined by the Geotechnical Engineer.

WALL THICKNESS	STRAND DIA. (in.)	SECTION MODULUS (in <sup>3</sup> )	STRESS* (psi)
T=10 in.	0.5	500	1150
T=10 in.	0.6	500	1160
T=12 in.	0.5	720	1100
T=12 in.	0.6	720	1160

\* Unit Prestress after losses

See additional information on the Standard.

## **Plan Content Requirements**

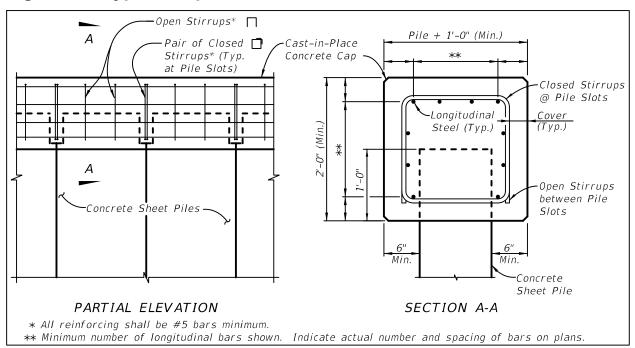
In the Structures or Roadway Plans:

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Prepare Wall Control Drawings and related drawings as specified in **SDM** Chapter 19 and **FDM** 262, and include them in the plans. Use combinations of straight and corner piles to accommodate project specific geometric requirements.

Show one Starter Pile location for a given wall. In the Elevation View, show the wall construction sequence proceeding away from the Starter Pile by locating the 11" by 11" corner clip on each Typical Pile on the side farthest away from the Starter Pile. Consider necessary tie-ins with adjacent structures and other boundary restrictions when selecting the Starter Pile location.

Prepare project specific cast-in-place concrete bulkhead cap, tie-back and utility accommodation details and include them in the plans. See Figure 1 for typical cap details. In the Materials Note on the General Notes Sheet, specify the concrete class for the cast-in-place cap in accordance with the retaining wall environment classification. See *SDG* 1.4.



## Figure 1 Typical Cap Details

Complete the following "Concrete Sheet Pile Wall with Prestressed Soil Anchors Data Table", "Concrete Sheet Pile Wall with Dead Man Anchors Data Table" or "Concrete Sheet Pile Wall, Cantilever Data Table" as applicable and include it on the supplemental sheets. Complete the Notes and add/modify/delete as necessary. See Introduction I.3 for more information regarding use of Data Tables.

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## Index 455-400 Precast Concrete Sheet Pile Wall (Conventional)

				CONC	RETE SHE	ET PILE W	'ALL WITH	PRESTRE.	SSED SOIL	ANCHORS E	DATA TABLE	Ē							Table	Date 07-01-12
	CONSTRUCTION INFORMATION															DESIGN	METER	METERS		
WALL LOCA				CONCRETE SH		E SHEET PILE FABRICATION			ANCHORS							SOIL ELEVATION		WATER ELEVATION		
			ТҮРЕ			PILE THICKNESS	GROOVE LENGTH	CORNER ANGLE	MAXIMUM ANCHOR	FACTORED ANCHOR	SERVICE ANCHOR	MINIMUM UNBONDED	INST ALLATION ANGLE BELOW	MINIMUM WALL TIP	TOP OF WALL	OF	BACK OF	OF		FACTORED DESIGN SURCHARGE
STATION (begin to end)	OFFSET (ft)	WALL NO.	(See Detail A)	NUMBER REQUIRED	L (ft)	T (in)	X (ft)	Ø (degrees)	SPACING (ft)	LOAD (kips/ft)	LOAD (kips/ft)	LENGTH (ft)	HORIZONTAL (degrees)	ELEVATION (ft)	ELEV. (ft)	WALL (ft)	WALL (ft)	WALL (ft)	WALL (ft)	LOAD (psf)

\* Minimum of Design Ground Surface or Design Scour Depth.

## NOTES:

				C	ONCRETE	SHEET PI	LE WALL V	VITH DEA	D MAN ANC	HORS DATA	TABLE					Table	Date 07-01-12
						CONSTRUC	TION INF	ORMATIO	v				L	DESIG	I PARA	METER	85
			CONCRETE SHEET PILE FABRICATION						ANCHORS				SOIL WA				
WALL LOC	TION		TYPE		PILE LENGTH	PILE THICKNESS	GROOVE LENGTH	CORNER ANGLE	ANCHOR BAR	ANCHOR BAR	MINIMUM WALL TIP	TOP OF WALL	* FRONT OF	BACK OF	FRONT OF	BACK OF	FACTORED DESIGN SURCHARGE
STATION (begin to end)	OFFSET (ft)	WALL NO.	(See Detail A)	NUMBER REQUIRED	L (ft)	T (in)	X (ft)	Ø (degrees)	SPACING (ft)	DIAMETER (in)	ELEVATION (ft)	ELEV. (ft)	WALL (ft)	WALL (ft)	WALL (ft)	WALL (ft)	LOAD (psf)

\* Minimum of Design Ground Surface or Design Scour Depth.

### NOTES:

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	CONCRETE SHEET PILE WALL, CANTILEVER DATA TABLE													Table Date 07-01-12	
			DESIGI	V PARA	AMETERS										
WALL LOC.	ATION											DIL ATION		TER ATION	
STATION (begin to end)	OFFSET (ft)	WALL NO.	TYPE (See Detail A)	NUMBER REQUIRED	PILE LENGTH L (ft)	PILE THICKNESS T (in)	GROOVE LENGTH X (ft)	CORNER ANGLE Ø (degrees)	MINIMUM WALL TIP ELEVATION (ft)	WALL TOP ELEV. (ft)	FRONT OF WALL (ft)	BACK OF WALL (ft)	FRONT OF WALL (ft)	BACK OF WALL (ft)	DESIGN LIVE LOAD (psf)
														<u> </u>	

NOTES: 1. Work the Data Table with Index 455-400. 2. Environmental Classification is 3. Concrete for cast-in-place retaining wall cap shall be Class ((with/without)) silica fume, metakaolin or ultrafine fly ash.

# Payment

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Item number	Item Description	Unit Measure
400-2-8	Concrete Class II, Bulkhead	CY
400-3-8	Concrete Class III, Bulkhead	CY
400-4-8	Concrete Class IV, Bulkhead	CY
415-1-8	Reinforcing Steel - Bulkhead	LB
415-2-8	Reinforcing Steel - Stainless, Bulkhead	LB
451-70-AA	Prestressed Soil Anchor	EA
455-14-AA	Concrete Sheet Piling	LF
455-87	Anchor Bar, Steel	EA