SKEW MIN.
EL.
MIN.
MIN.
PILES TO BE DESIGNED.
(MIN. OF 5 PILES)

ROADWAY
REF. LINE
2'-6"

4'-0" MAX.
#5 BARS
ALL PILES TO BE VERTICAL

PIER
1'-3"
1'-3"
MAXIMUM SPA.  8'-0"
MINIMUM SPA.  3'-0"

" PIER
#4 BARS @ 1'-0"
4" LEG

CAP TYPE DETAIL
USE WITH ECONOMY FOR COLUMNS ON LARGE SPANS.

PILE ENCASED PIER

STANDARD 13.03

BILL OLIVA
7-19

APPROVED

NOTES

CONCRETE PILES INTERCUTTED WILL BE ALLOWED AND SHALL BE DONE IN ACCORDANCE WITH STANDARD SPEC.
CONCRETE PILES UNDERWATER SHALL NOT EXCEED 10 FEET IN DEPTH UNLESS APPROVED OTHERWISE.

CONSTRUCTION JOINTS ARE NOT REQUIRED, REGARDLESS OF LENGTH OF PILE ENCASED PIER.

CONCRETE PILES UNDERWATER SHALL NOT EXCEED 10 FEET IN DEPTH UNLESS APPROVED OTHERWISE.

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DESIGNER NOTES

SEE BRIDGE MANUAL SECTION 13.11.5 FOR GUIDANCE ON COFFERDAMS.

SEE BRIDGE MANUAL SECTION 13.2.3 AND STANDARD 13.09 FOR GUIDANCE ON PILE SPLICE DETAIL.

COFFERDAMS SHALL BE DWATERED PRIOR TO PLACING PIER CONCRETE.

At pier __, Cofferdam and cofferdam dwatering required.

Concrete poured underwater shall not exceed 10.0 feet in depth, unless approved otherwise.

Concrete poured underwater will be allowed and shall be done in accordance with standard spec 502.3.5.3.

At pier __, concrete poured underwater will be allowed and shall be done in accordance with standard spec 502.3.5.3.

At pier __, concrete poured underwater will be allowed and shall be done in accordance with standard spec 502.3.5.3.
PILING 2" PER FT.

BATTER EXTERIOR ELEVATION LOOKING UP STATION

PILE SPA. (MEASURED AT BOTTOM OF CAP)

PIER SET HAS TAKEN PLACE. CONC. MAY BE PLACED AFTER CONC. IS POURED BUT BEFORE INITIAL CURE. #5 BARS @ 1'-0" (2'-0" LONG)

DESIGNER notes

A

A

ENGINEER'S DISCRETION.

END VIEW

BATTER EXTERIOR ELEVATION 1'-0 FT.

ELEVATION LOOKING UP STATION

SKEW ANGLE ROADWAY REF. LINE

% OF PIER

MIN. SPA. = 3'-0", MAX. SPA. = 8'-0" (MIN. OF 5 PILES)

MAX. SPANS THRU MAX. SPA. ELEV. OF PIER, PILE SPA. MEASURED AT BOTTOM OF CAP

SECTION A-A

PLATE XX SHOWN

PLANE OF STRUCTURE SYM. ABOUT X OF BEAM SEATS GIVE ELEVATIONS ROADWAY REF. LINE

MIN. SPA. 3'-6" /

PLAN

STREAMBED STABLE

MIN. SPA. 1'-6"

MAX. SPA. 2'-0"

3 EQ. SPA.

STANDARD 13.01 FOR CRITERIA

STANDARD 13.02 FOR DETAIL.

BEVELLED 2"X6" KEYWAY. SEE CONSTRUCTION JT. FORMED BY SURFACED ROADWAY, MIN. WALL THICKNESS OF 2.5".

MAX. FLOW LAYERS OF COATED LAP)(1'-5" UNCOATED LAP

PILES SHALL BE PAINTED IN ACCORDANCE WITH SECTION 550.3.11.3 OF THE STANDARD SPECIFICATIONS.

PIER SHALL BE SPACED AT INTERMEDIATE CASH-IN-PLACE HORIZONTAL WALL THICKNESS OF 2.5".

WHILE USE DESIGNERS PRIOR APPROVAL DURING DESIGN OF THE STRUCTURES DEVELOPMENT CHIEF, (608) 266-0075.

BUREAU OF STRUCTURES

APPROVED: Bill Oliva

DATE: 1-20

STANDARD 13.04
PIER HEIGHT TO BE DESIGNED.

GENERALLY THE CAP IS CAPPED AND Casing Girders EXAGGERATED TO MIN. 2'-0". THE CAP IS GREATER THAN THE CEMENTED WIDTH.
**SEAT DETAILS**

**SLOPING BEAM**

**SEAT DETAILS**

**MULTI-COLUMNED PIER WITH RECTANGULAR COLUMNS**

**DESIGNER NOTES**

All bar sizes to be based on Class C Tension Lap Splice Length Standards shown.

Slope top of column to match cap when the bottom of the cap is sloped. Vertical system of cap reinforcement to clear vertical column reinforcement.

Laps may be made in two places when columns are extra wide as necessary to satisfy the minimum 2" distance between adjacent to bearings.

Bearing seat areas small or level except for the two cases listed below:

1. For columns with elastomeric bearing pads when the bottom of the cap slopes more than 1", see standard 13.07.

2. When a cap is used for concrete slab superstructures make the top of the cap parallel to grade, see standard 13.07.

Beam seats may be angled to match the design engineer's direction.

See standard 13.07 for additional reinforcing steel in bearing area for beam seats of non-sloped caps that are 4" or more above lower beam seat.

Prestressed girder between girders on 2"x6" beveled keyway joint formed by beveled keyway.

Maximum length of single pour = 65'-0" when required (see standard 12.09 for alternate construction joint details).

Span structures and for all concrete slab column when cap is sloping give elevations at center of column height.

Columns and foundations should have splayed corners in both directions. Typical (min. mat steel = #6 at 1'-0"

Columns when mat is thickened or for pile and spread footings) bars to be designed as shown.

2'-4" min. 6" typ.

9" min. cl.

Look up station giving column heights.

2'-6" min.

6" typ.

#5 u-bars

3" min.

6" max.

1" bevel

Maximum length of single pour = 65'-0" when required (see standard 12.09 for alternate construction joint details).

Beam seats may be angled to match skew at the design engineer's discretion.

Give elevations of beam seats when the lap is greater than one-half the normal length. Normally this lap is omitted and footing dowels extended unless otherwise shown.

When a cap is used for concrete slab superstructures make the top of the cap parallel to grade, see standard 13.07.

Beam seats may be angled to match the design engineer's direction.

Columns when mat is thickened or for pile and spread footings) bars to be designed as shown.

2'-4" min. 6" typ.

9" min. cl.

Looking up station giving column heights.

2'-6" min.

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2'-4" min. 6" typ.

9" min. cl.

Look up station giving column heights.
PIER CAP REINFORCEMENT DETAILING

**DESIGNER NOTES**

- **PLAN**
  - Provide adequate clearance for post-installed anchors.
  - Cap width
  - **SECTION THRU PIER CAP**
    - Detail multiple layers of bar steel to avoid spaces that are too thin. Bunched bars may be used instead of lapping them.
    - Provide reinforcement necessary to support main reinforcement.

- **Support Main Reinforcement.**
  - Provide post-installed anchors locating on pier cap sheets.
  - Abutment reinforcement layout similar to pier cap reinforcement detailing.

**NOTE**

- Provide transverse stirrup bars as needed to prevent slippage between anchor bolts and reinforcement.

**BILL OLIVA**

**STANDARD 13-08**
PIER ENCASED PIER (TYPES)

- hammerhead (see Standard 13.02)
- solid wall (as shown on this standard)

Pile Encased Pier types:

1. Type 1 - cofferdam bid item not provided. Consider providing underwater inspection bid item.
2. Type 2 - cofferdam and underwater inspection bid items required. Underwater inspection bid item.
3. Type 3 - cofferdam and seal bid items required. Seal bid item.

Pile Encased Pier Alternative:

- Solid Wall Pier (as shown on this standard)
- Concrete Masonry Seal (as shown on this standard)

Design Notes:

- Pile types shown on this standard are based on the observed streambed stability factors. Adjust the elevation limits accordingly when selecting the appropriate bid items and plan notes.

Bill Oliva
DESIGNER NOTES

- Concrete Masonry Seal: 502.1100
- Cofferdams (structure): 206.5000

Other factors (velocity, H2 elevation, etc.) should also be considered when selecting the appropriate bid items and plan notes.

Plan Notes:

- Pile types shown on this standard are based on the observed streambed stability factors. Adjust the elevation limits accordingly when selecting the appropriate bid items and plan notes.

Bill Oliva
DESIGNER NOTES

- Concrete Masonry Seal: 502.1100
- Cofferdams (structure): 206.5000

Other factors (velocity, H2 elevation, etc.) should also be considered when selecting the appropriate bid items and plan notes.
51-INCH VERTICAL CONCRETE BARRIER AND TRANSITION

SECTION A-A
BETWEEN COLUMNS

SECTION B-B
TRANSITION REGION

DESIGNER NOTES

INTEGRAL BARRIER DETAILS