Broadway Bridge Feasibility Study
Conceptual Bridge Alternatives

PREPARED FOR:	City of West Sacramento, in cooperation with the City of Sacramento
PREPARED BY	CH2M and Hardesty & Hanover

Introduction

CH2M has been retained by the City of West Sacramento to evaluate the feasibility of a new crossing of the Sacramento River between City of West Sacramento and City of Sacramento (Cities). The crossing will connect with Broadway on the east landing and 5th Street on the West Sacramento landing. The feasibility of a movable span over the main navigation channel has been investigated. Various alignments and structure types have been considered as part of this study.

Site Constraints

Profile and Alignment

The profile is constrained by an at-grade rail crossing on the east landing. On the west landing, the profile will conform to 5th Street. Because of these constraints, along with the vertical clearance requirements of the U.S. Coast Guard (USCG), a movable span will be required.

Numerous alignments have been evaluated and these may impact some of the construction details and bridge types considered. However, all of the alignments being proposed are feasible for the new crossing.

Bike paths will cross under the approach spans of the bridge on both sides of the river, allowing for unimpeded north-south bicycle and pedestrian movement.

Street car travel on the bridge has been considered and is viable for all structural options considered. Deck details can be provided for all structure types that will accommodate street cars and light rail in the future.

Navigation Channel

A site visit was conducted with a representative of the USCG in attendance. The proposed alignments were discussed and a minimum horizontal opening of 170 feet has been identified for the proposed crossing. Based on preliminary discussions with USCG, the southernmost alignment evaluated (Alignment D) will require a minimum horizontal opening of 200 feet.

Hydraulic and Hydrologic

As detailed in the Preliminary Hydraulics Study Technical Memorandum, preliminary hydraulic impacts of the proposed crossing have been evaluated. The number of piers, size and type of the piers, and size and type of any fender systems need to be considered when determining impacts to the 100-year water surface elevation. Foundations will be selected that minimize impacts to the existing water surface elevation.

The Sacramento River falls under the jurisdiction of the Central Valley Flood Protection Board (CVFPB). As such, and based on the classification of the river and the project's location, 3 feet of freeboard above

the 200 year water surface elevation will need to be provided. Because of this constraint and the at-grade crossing on the eastern touch down, the eastern approach roadway is proposed to be placed in the current floodplain between the rail line and the ordinary high-water level of the river on its eastern side. With the east abutment founded near the edge of the river, CVFPB freeboard requirements can be met across the length of the crossing.

Geotechnical

The geotechnical recommendations at this phase of the project are recommending driven pipe piles to support the piers. Large-diameter, cast-in-steel-shell (CISS) piles with diameters of 4 feet and 5 feet are viable at this location. Smaller-diameter, 24-inch CISS piles are proposed to support the approach spans of the crossing.

Based on review of existing subsurface explorations that have been performed, liquefaction and lateral spreading are expected at the project site. Lateral spreading can be mitigated via larger foundations or ground improvements.

Structure Type

Movable Span

Numerous types of movable-span bridge types were considered. A lift span, bascule, and bobtail swing span have all been identified as being appropriate for the site based on the required navigational channel opening width and proposed typical sections. Figures showing preliminary concepts for each of these options are contained in Attachment 1.

Lift Span. A lift span alternative with concrete towers has been developed. The concrete towers are more economical than comparable steel towers. The towers can be cast-in-place (CIP) using jump forms, or assembled using precast segments barged and lifted into place. This alternative will work for all alignments considered, including the southernmost alignment with the longer navigational channel width, as well as all of the structure widths considered.

Bascule. A bascule span is another option that has been considered for the movable bridge. The bascules are required in order to minimize the pier size in the river. A twin leaf bascule would be required for the 64-foot-wide and 84-foot-wide cross sections. A total of four leafs will be required for the 98-foot-wide cross section, because of the increased width.

Bobtail Swing. A bobtail swing bridge is one potential option for the crossing. This alternative is feasible for the two northern alignments and can accommodate the 64-foot-wide and 84-foot-wide typical sections. The 98-foot-wide typical section is not feasible for this option. In addition, the larger navigation opening required for the southern alignment cannot be accommodated with a bobtail swing bridge.

A comparative matrix of the movable-bridge types is included in Attachment 2.

Approach Spans

Structure Type. Numerous structure types have been considered for the approach spans. As the movable span will be the focal point of the crossing, the approach spans should be comprised of conventional structure types. Both precast girders and steel plate girders are being recommended for the approach spans.

The steel plate girders are lightweight, can accommodate the span configurations being considered, and will match the material used for the movable span. Based on planning-level quantities, the assumed cost of a steel plate girder bridge is $375 per square foot.

Precast girders are readily available and require less long-term maintenance than steel girders. Based on planning-level quantities, the assumed cost of a precast girder bridge is $290 per square foot.

CIP post-tensioned box girders are not recommended, as this will require falsework placed in the river. This will increase the project cost and cause environmental impacts that can be avoided by using other construction methods.

Span Configuration. The western approach will require one to two spans. On the eastern approach, anywhere from two to four spans are feasible. Four spans would reduce the overall structure depth of the approaches; however, the extra cost associated with the addition of an extra in-river foundation does not warrant using four spans on the eastern approach. Steel girders can be used for both the two- and three-span approach configurations. Precast girders are not recommended for the two-span alternative due to the 200-foot-long span lengths.

Six variations of alignment type, movable-span type, approach-span type, and approach-span configuration have been developed and are shown in Attachment 3. A summary of each figure is shown in **Table 1**.

Table 1. Summary of General Plan Figures

Figure	Alignment	Movable Span Type	Approach Span Type	Number of Approach Spans
1	Middle	Lift	Steel	Two
2	Middle	Lift	Steel or Precast	Three
3	Middle	Lift	Steel or Precast	Four
4	Middle	Bascule	Steel	Two
5	North	Lift	Steel	Two
6	North	Bascule	Steel or Precast	Three

Cost. Planning-level cost estimates of the 76-foot approach spans were completed to determine average unit costs for the steel plate girder and precast girder options. Based on these quantities, a cost per square foot was developed. This square foot amount was used to come up with the costs for the 86-foot widths shown in **Table 2**. In addition, preliminary cost implications of having two versus three spans on the eastern approach were evaluated. These estimates are included in Attachment 4 and the results are summarized in Table 2, below.

Table 2. Approach Span Cost Comparison (Includes 25 Percent Contingency)

Typical Section Width	Approach Span Type	Number of Approach Spans	Cost	Cost per Square Foot
86 feet	Steel	Two	$15.6M	$375
86 feet	Steel	Three	$15.7M	$375
86 feet	Precast	Four	$12.1M	$290

Aesthetics

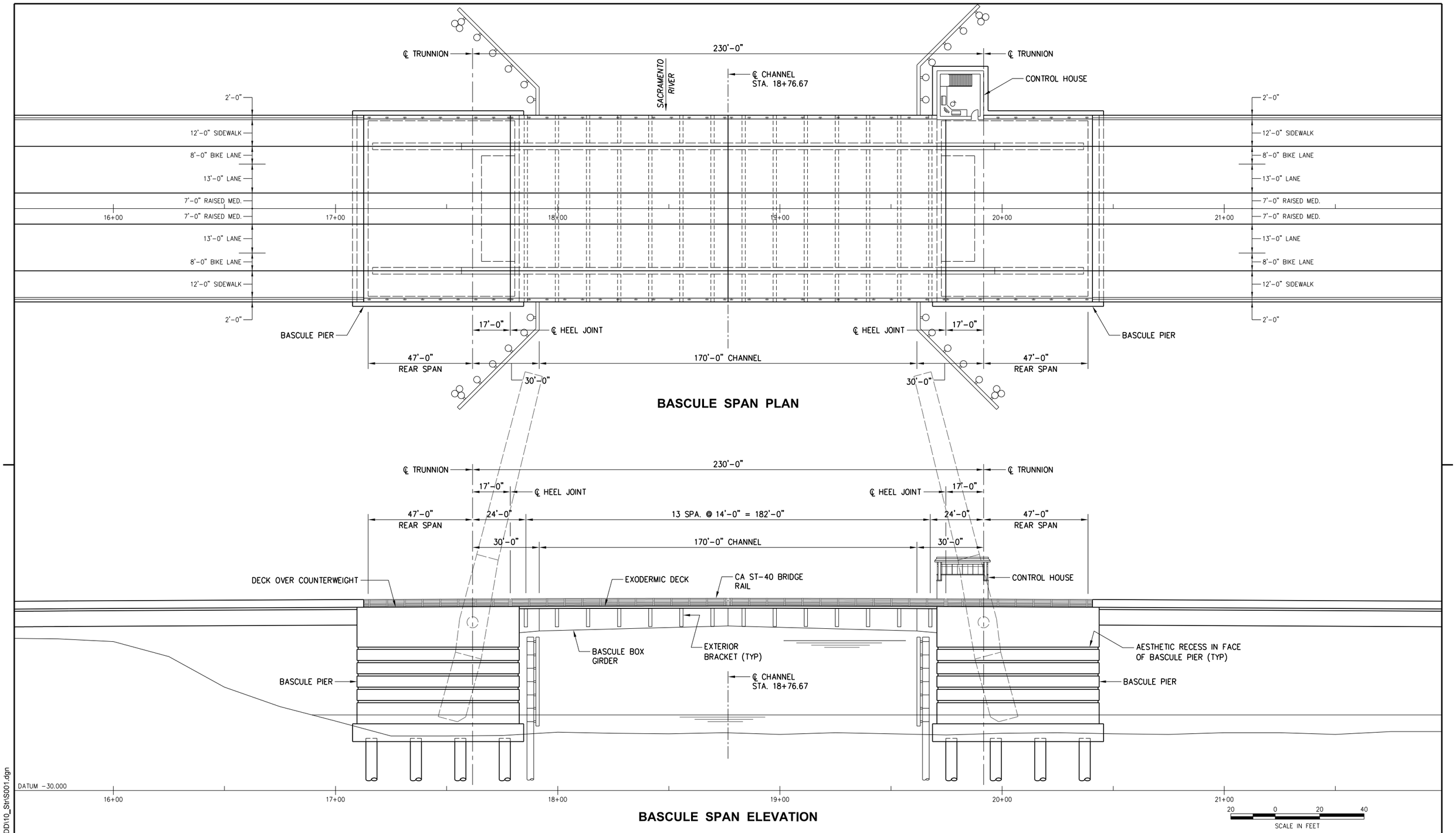
Aesthetics of the new crossing will be dominated by the movable span and its piers. The approach spans and piers will be detailed to enhance the aesthetics of the movable spans and piers. Steel plate girders can be painted to match the movable span. Precast girders can also be painted, should that be desired. Overlooks at pier locations are proposed to provide viewing locations for users on both the upstream and downstream sides of the bridge. An open barrier with a pedestrian and bicycle railing is proposed for use.

Design Criteria

During the type-selection phase of the project, project-specific design criteria will be created. Applicable criteria will include the following design codes:

- Caltrans Seismic Design Criteria (SDC), Version 1.7, April 2013.
- AASHTO LRFD 6th Edition with California Amendments.
- AASHTO Guide Specifications and Commentary for Vessel Collision Design of Highway Bridges, Second Edition, 2009.
- Sacramento Regional Transit Design Criteria.

Attachment 1
Lift Span Exhibits



BASCULE SPAN PLAN

BASCULE SPAN ELEVATION

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City of Sacramento &
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BROADWAY BRIDGE over SACRAMENTO RIVER

DOUBLE LEAF BASCULE ALTERNATIVE
GENERAL PLAN & ELEVATION

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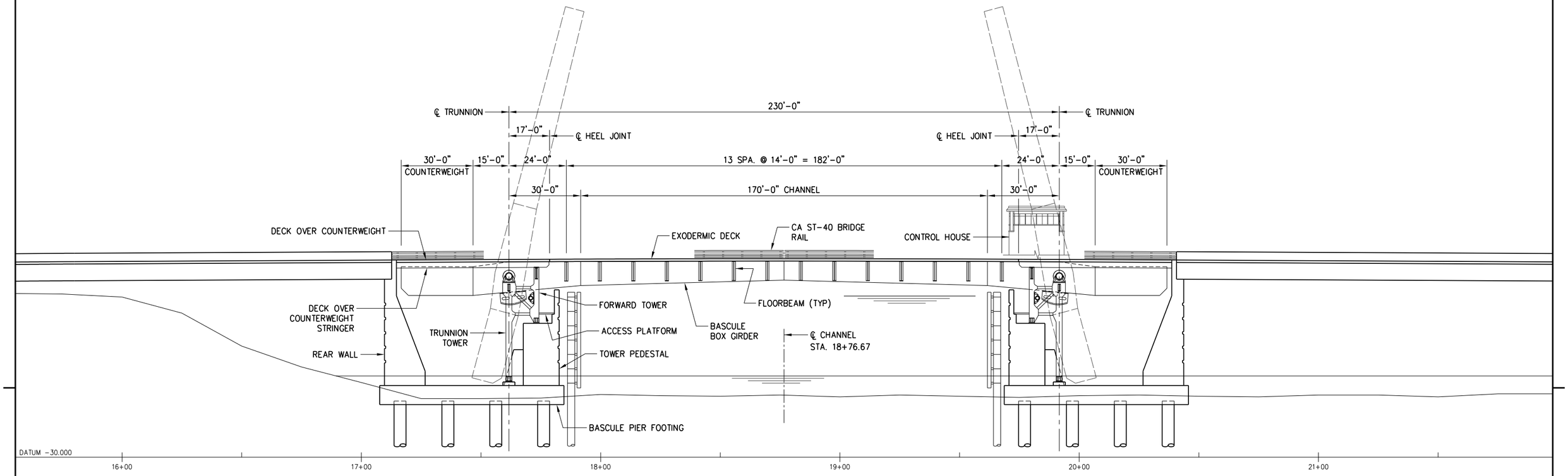

BASCULE SPAN LONGITUDINAL SECTION

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BROADWAY BRIDGE over SACRAMENTO RIVER

DOUBLE LEAF BASCULE ALTERNATIVE
LONGITUDINAL SECTION

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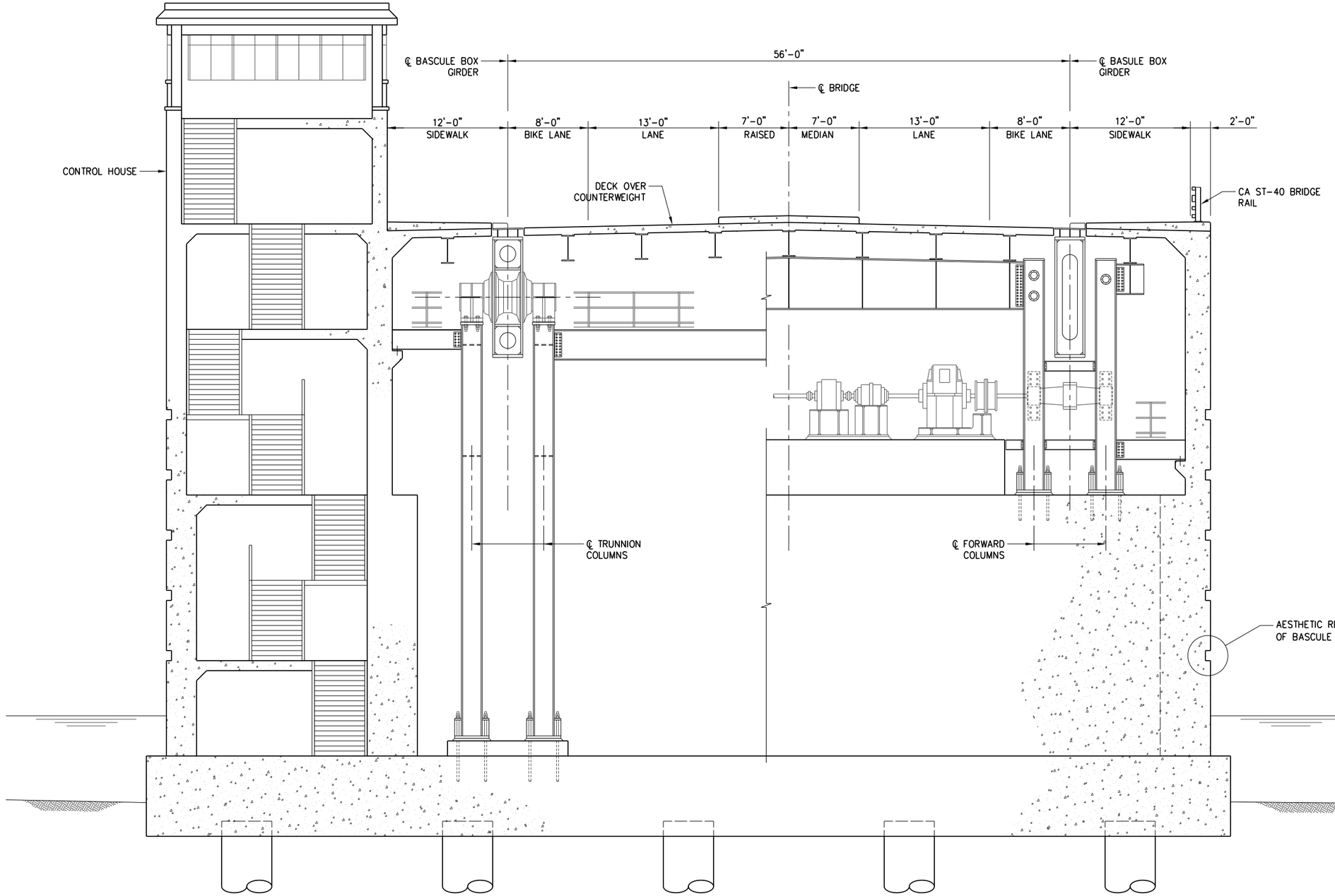

SECTION AT TRUNNION TOWER

SECTION AT FORWARD GIRDER

BASCULE PIER TRANSVERSE SECTION

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BROADWAY BRIDGE over SACRAMENTO RIVER
DOUBLE LEAF BASCULE ALTERNATIVE
PIER TRANSVERSE SECTION

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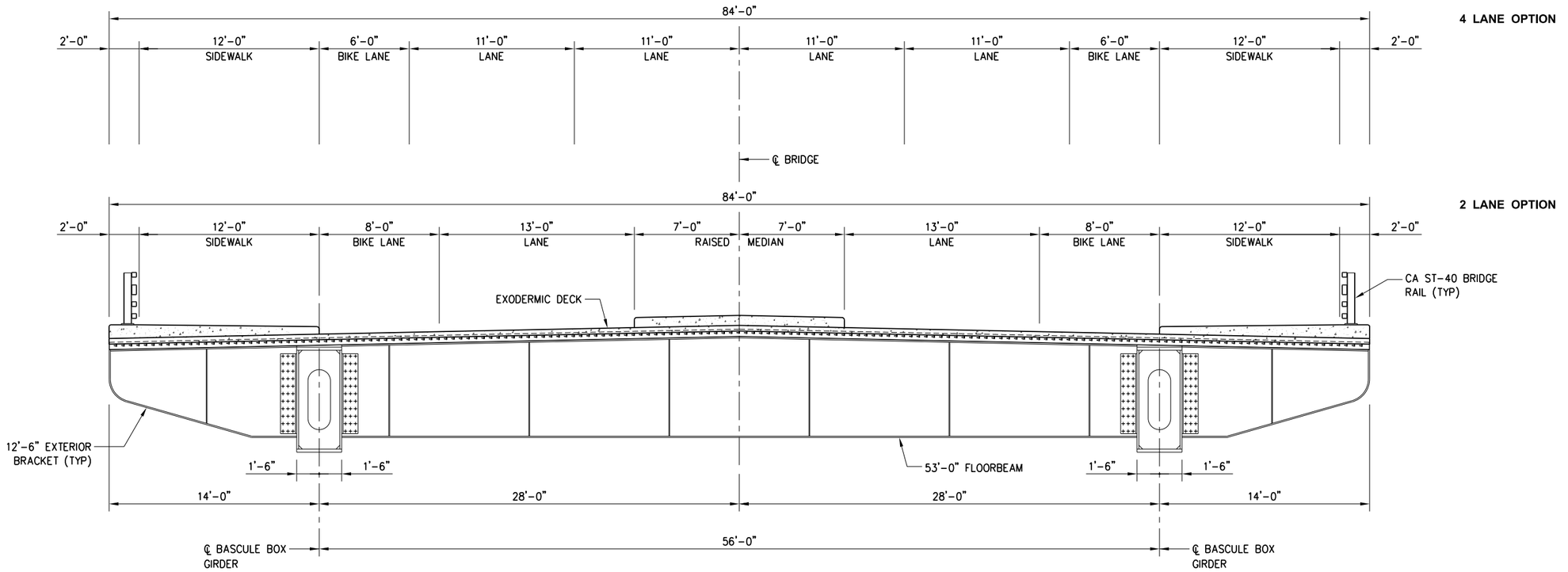

BASCULE SPAN TYPICAL CROSS SECTION

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BROADWAY BRIDGE over SACRAMENTO RIVER

DOUBLE LEAF BASCULE ALTERNATIVE
TYPICAL CROSS SECTION

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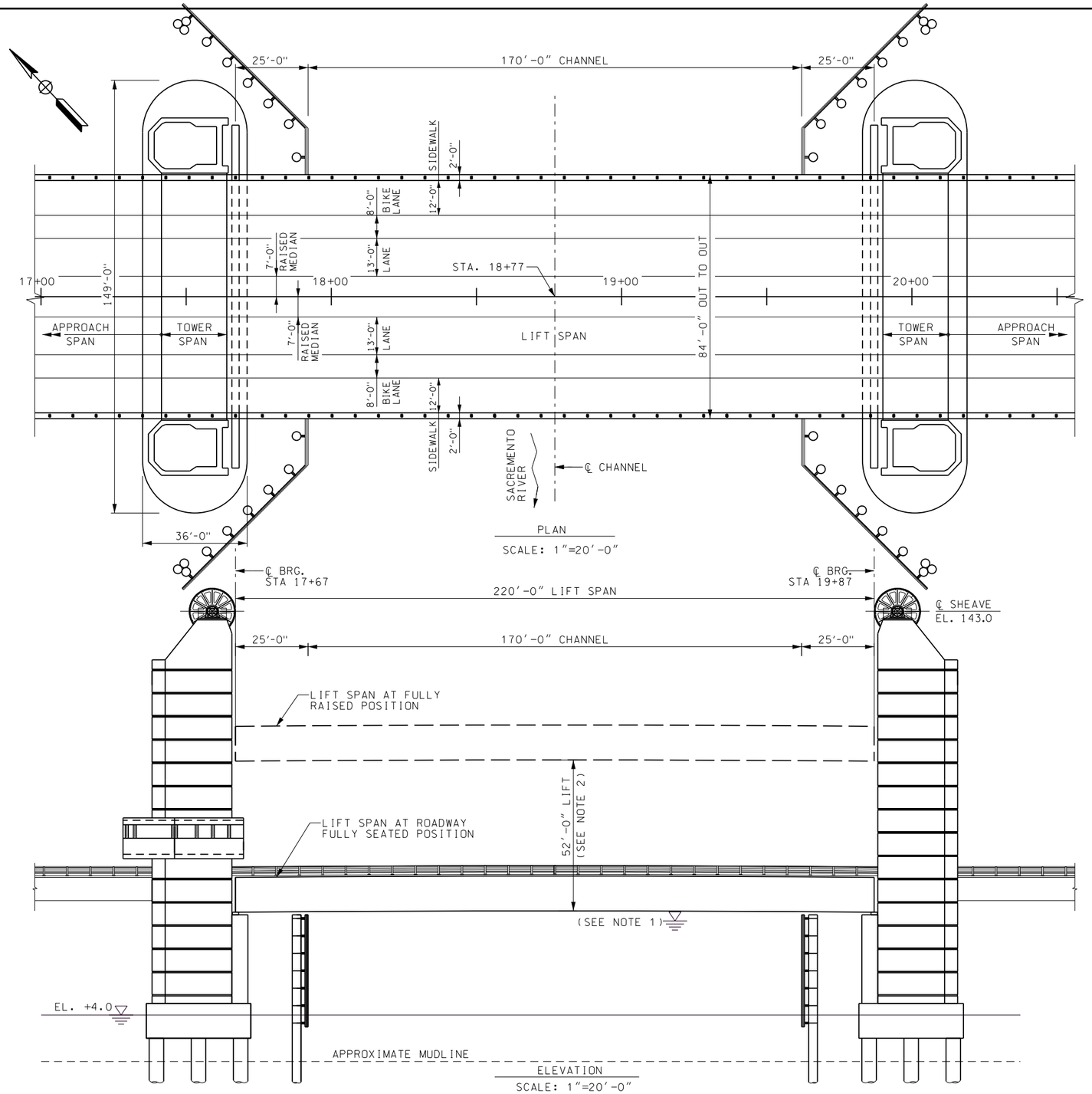

NOTES:

1. 200-YEAR FLOOD ELEVATION = 36.4'
2. 3' MIN. VERTICAL CLEARANCE (LOWERED POSITION)
   55' MIN. VERTICAL CLEARANCE (RAISED POSITION).

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BROADWAY BRIDGE over SACRAMENTO RIVER

VERTICAL LIFT ALTERNATIVE
GENERAL PLAN & ELEVATION

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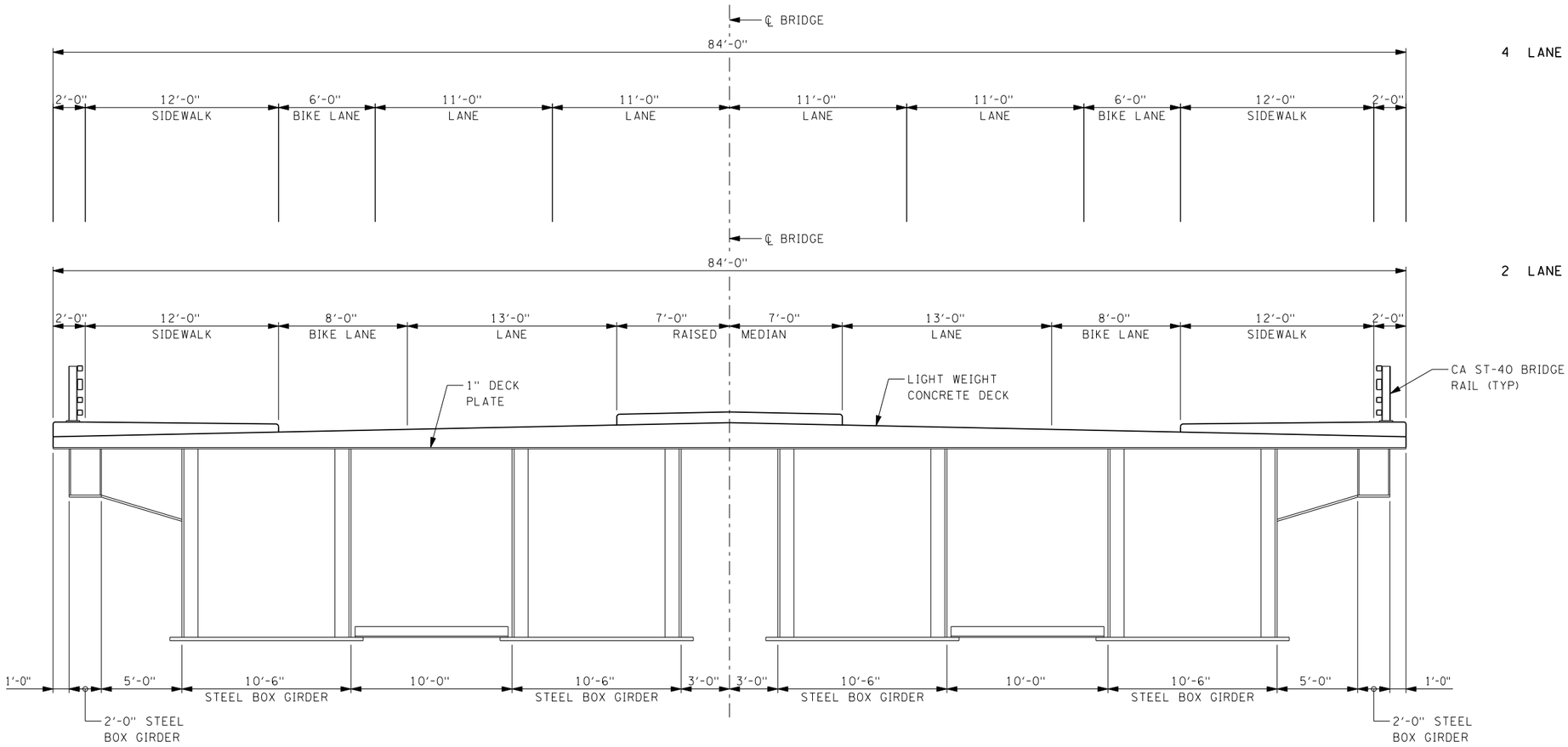

LIFT SPAN TYPICAL CROSS SECTION

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BROADWAY BRIDGE over SACRAMENTO RIVER

VERTICAL LIFT ALTERNATIVE
LIFT SPAN GENERAL SECTION

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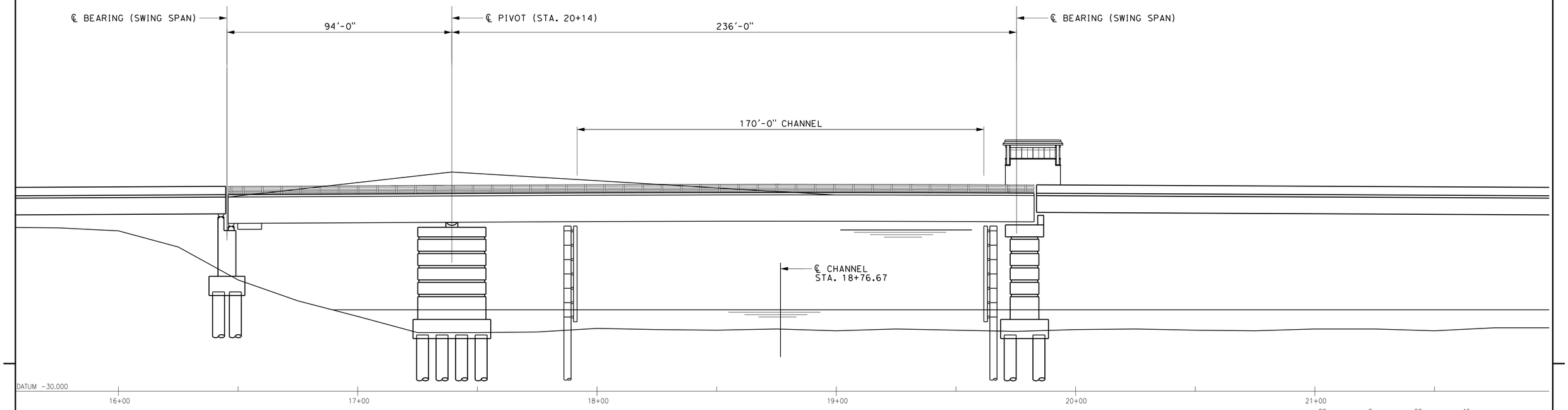

ELEVATION

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City of Sacramento &
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BROADWAY BRIDGE over SACRAMENTO RIVER

BOBTAIL SWING - ELEVATION

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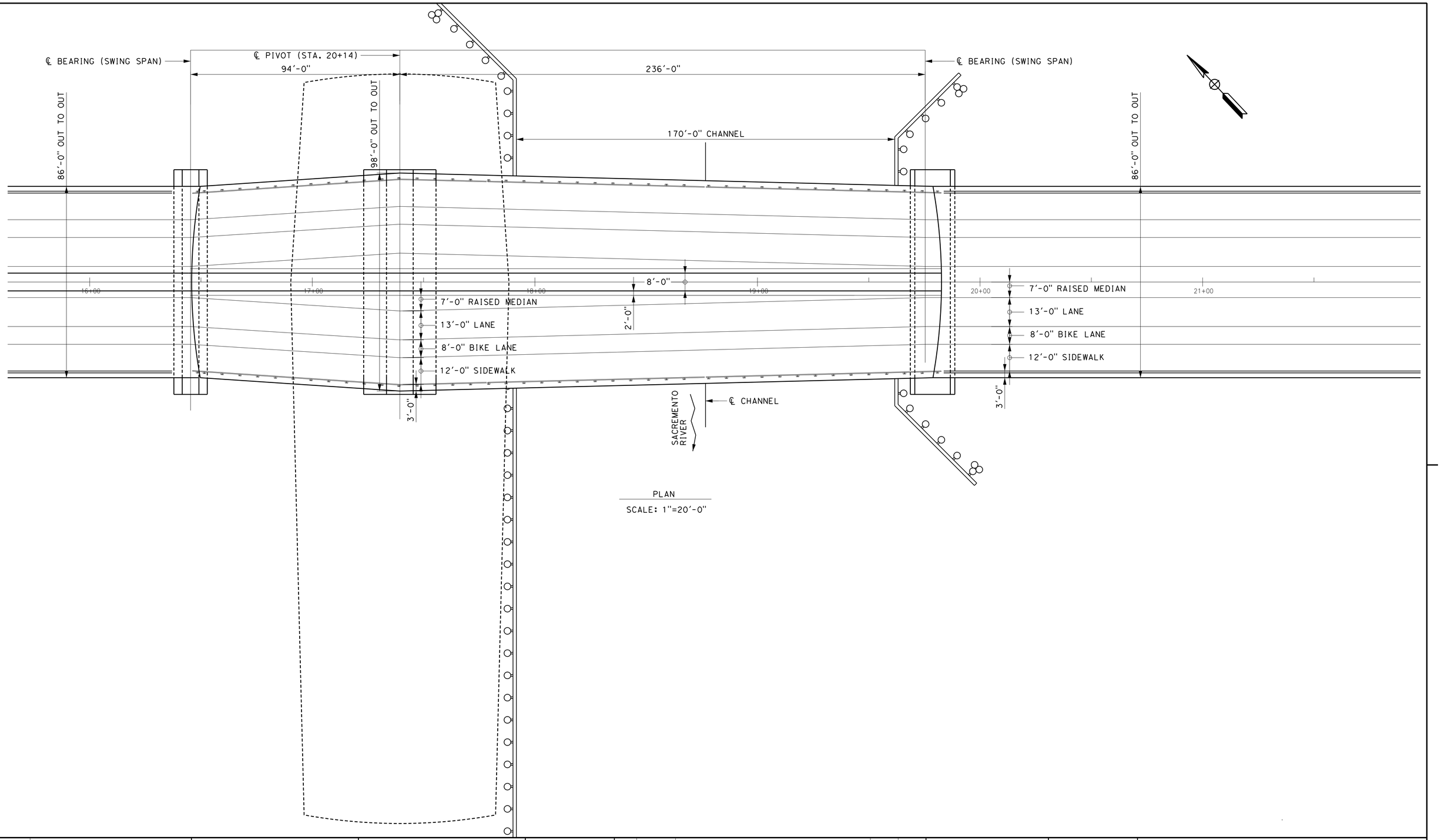

PLAN

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BROADWAY BRIDGE over SACRAMENTO RIVER

BOBTAIL SWING - PLAN

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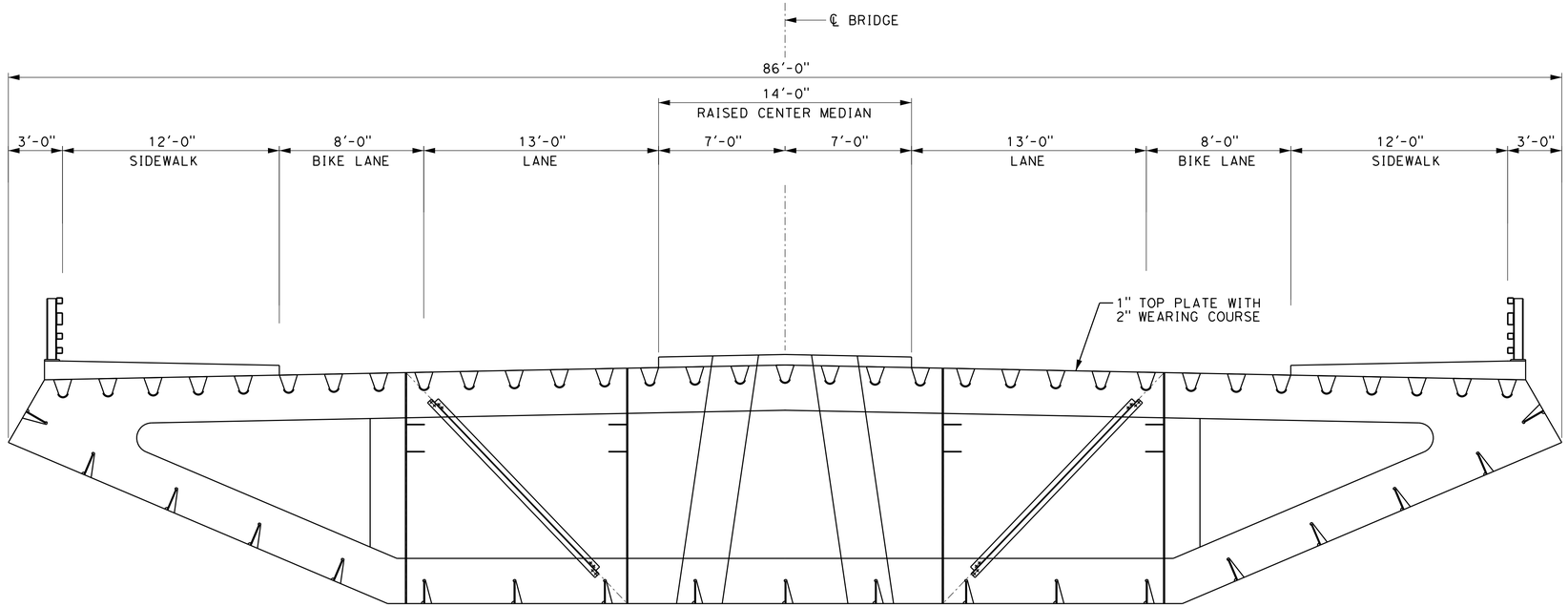
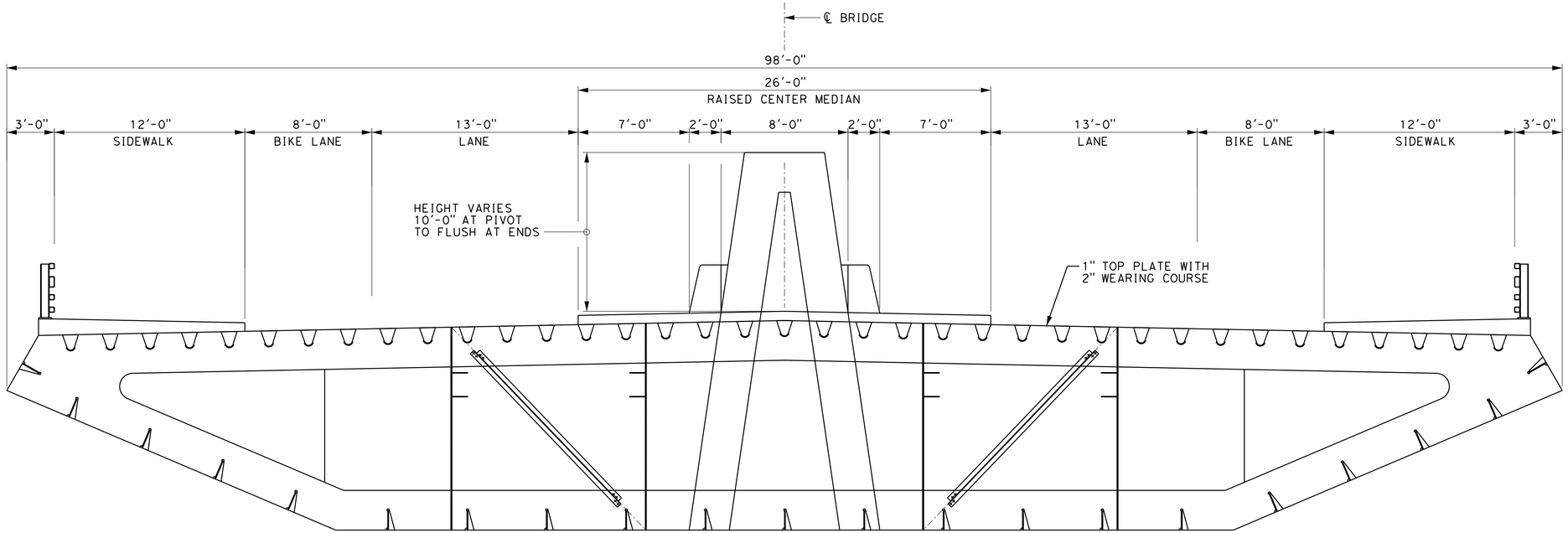


BOB-TAIL SWING SPAN CROSS SECTION AT TOE/HEEL
SCALE: 1/4" = 1'-0"



BOB-TAIL SWING SPAN CROSS SECTION AT PIVOT
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City of Sacramento &
City of West Sacramento
BROADWAY BRIDGE over SACRAMENTO RIVER

BOBTAIL SWING - SECTIONS

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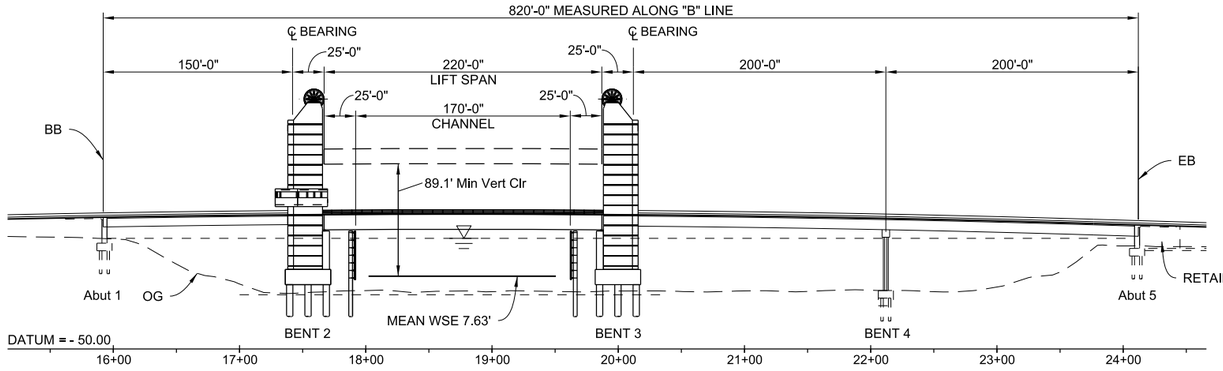
Attachment 2
Broadway Bridge Comparative Matrix

Broadway Bridge Comparative Matrix

Movable Bridge Type	Aesthetics	Environmental	Superstructure	Constructability	Capital Cost	O&M Cost	Opening Time
Vertical Lift	Consistent with bridge types currently on river; options for contemporary or tradtitional aesthetic of towers and span	Minimal river impacts with two smaller tower footprints	Multisteel box girders provide most economic and simplistic option; traditional steel truss option available	Concrete towers provide Contractor flexibility with precast and cast-in-place options; anticipated week long restriction for erection of movable span	Lowest with exception of 2 lane (64 foot width) configuration	Low O&M costs with incorporation of concrete towers; most desirable option for rail integration and maintenance	Shortest
Bobtail Swing	Low profile superstructure; option for contemporary (orthotropic box section) or traditional (steel through truss) aesthetic of span	Minimal river impacts with single pivot pier footprint	Steel orthotropic box section; traditional steel through truss option available	Can be erected in open position while maintaining navigation channel	Lowest for two lanes (64-foot width) configuration	Higher O&M cost for hydraulic drive system; similar O&M cost for traditional gear drive option	Longest
Double Leaf Bascule	Larger piers create bulkiest appearance in river	Increased river impacts with two larger bascule pier footprints; greatest hydraulic impacts	Steel through truss option available with overhead counterweight and reduced pier size; four leaves likely required for widest (98 feet) typical section option	Anticipated month-long partial restiction/closure of navigation channel to facilitate erection of movable span	Highest	Low O&M costs; least desirable option for rail integration and maintenance	Shortest

Notes:
O&M = operation and maintenance

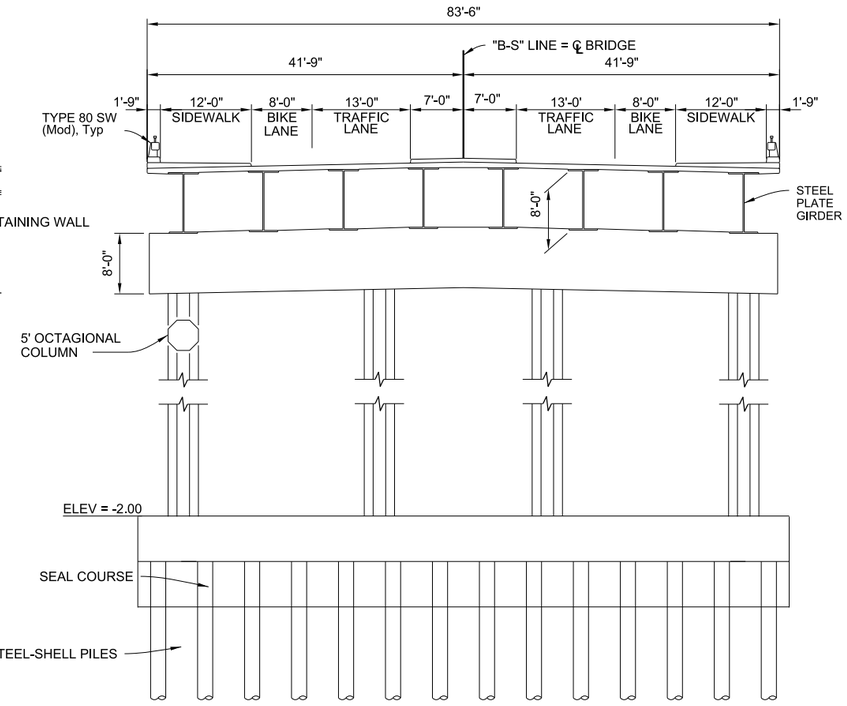
Attachment 3
General Plans



INDICATES 200 Yr WATER SURFACE ELEVATION

DEVELOPED ELEVATION

1" = 60'-0"



TYPICAL SECTION (APPROACH SPAN)

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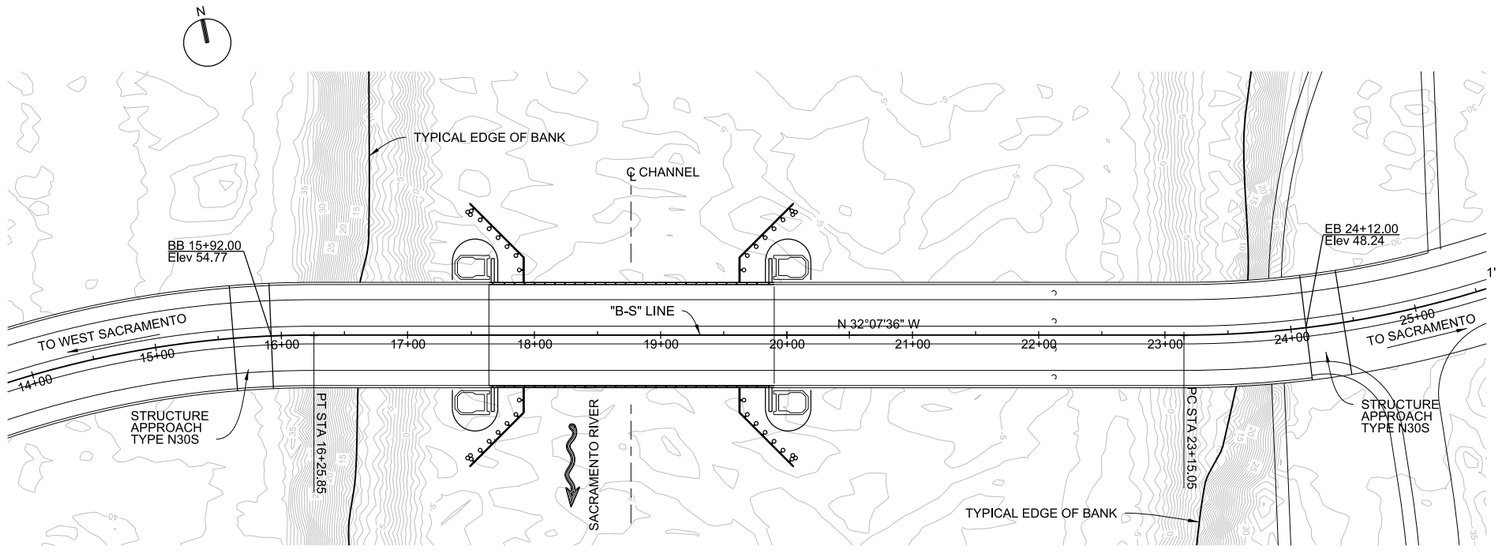
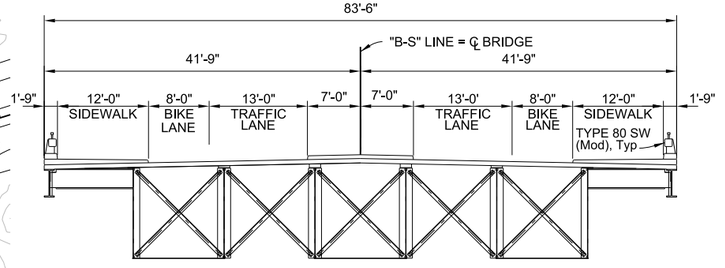


PLAN

1" = 60'-0"



TYPICAL SECTION (LIFT SPAN)

1" = 10'-0"

CITY OF WEST SACRAMENTO

City of SACRAMENTO

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		M. NEGRETTE	P. WALKER					

ch2m: Hardesty & Hanover

BROADWAY BRIDGE FEASIBILITY STUDY
SACRAMENTO RIVER
2-SPAN-EAST APPROACH
SOUTH ALIGNMENT

VERIFY SCALE

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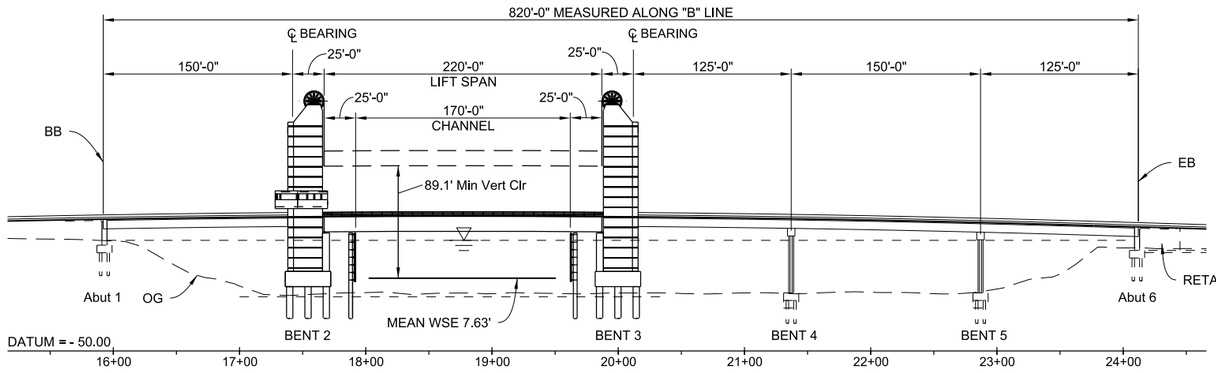
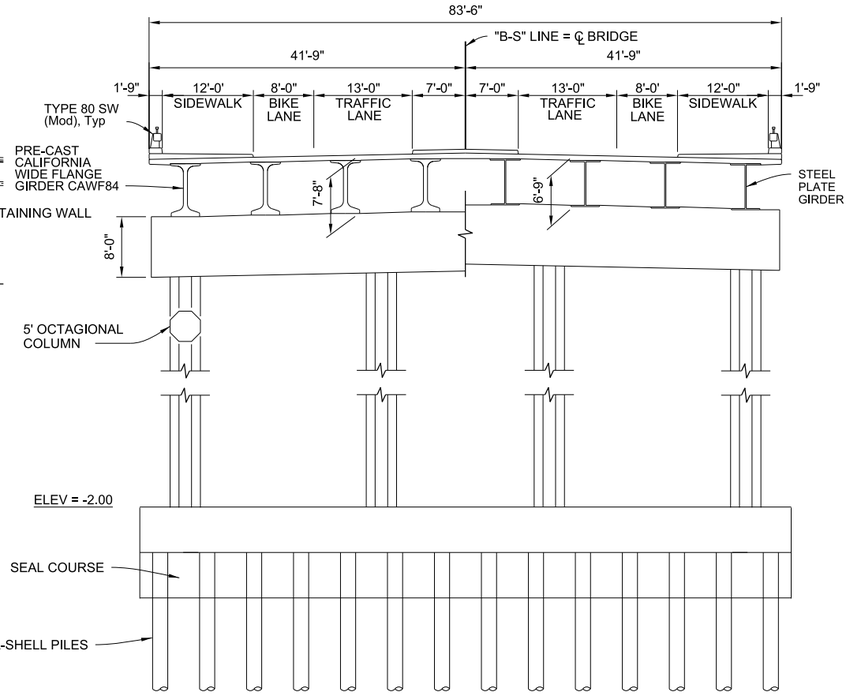


INDICATES 200 Yr WATER SURFACE ELEVATION

DEVELOPED ELEVATION

1" = 60'-0"



NOTE:
GIRDER ALTERNATIVES SYMETRIC ABOUT ℄ BRIDGE

TYPICAL SECTION (APPROACH SPAN)

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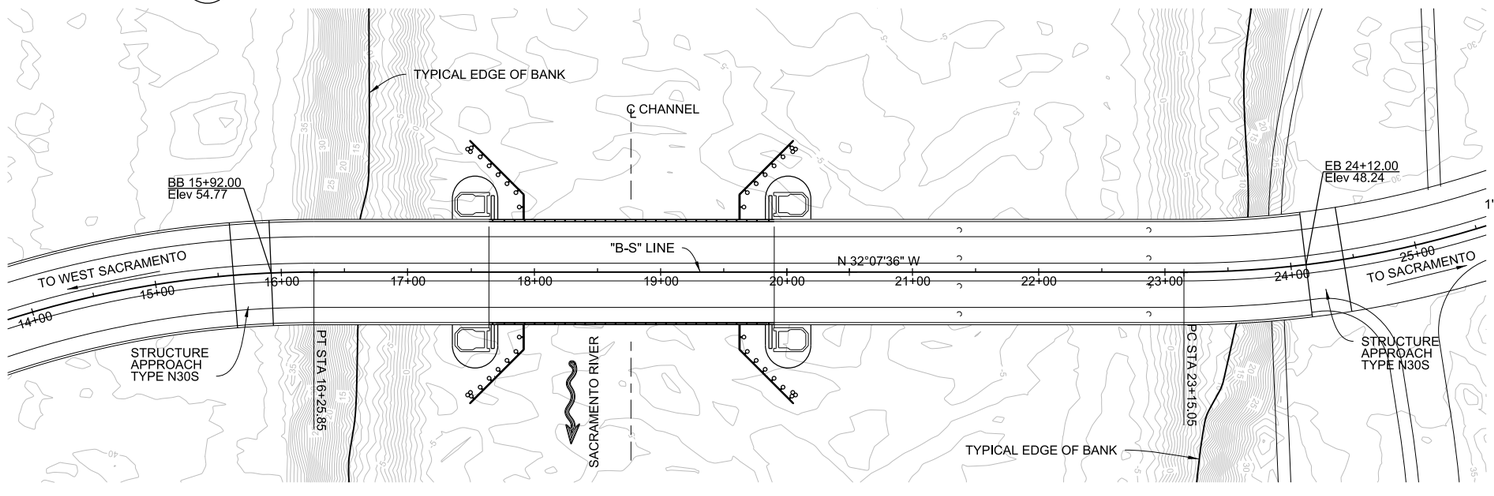
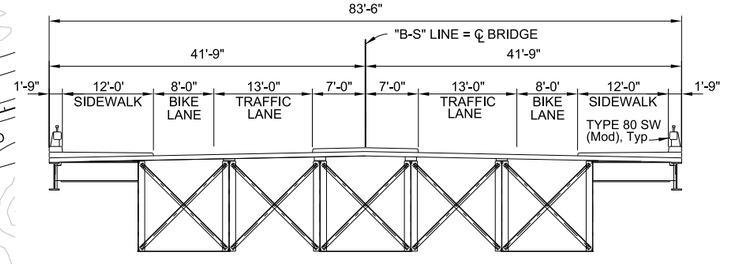


PLAN

1" = 60'-0"



TYPICAL SECTION (LIFT SPAN)

1" = 10'-0"

BROADWAY BRIDGE FEASIBILITY STUDY
SACRAMENTO RIVER
3-SPAN-EAST APPROACH
SOUTH ALIGNMENT

NO.	DATE	DSGN	DR	CHK	APVD
		M. NEGRETTE	P. WALKER		

REVISION BY APVD

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE
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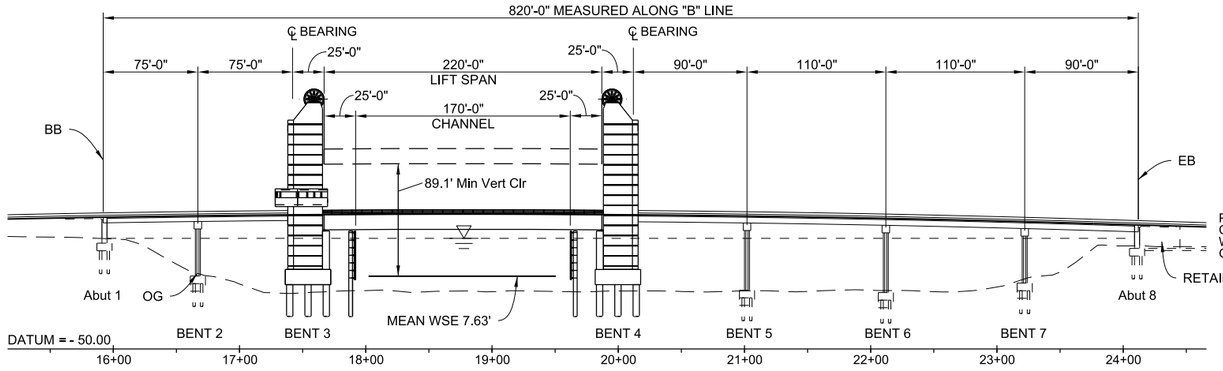
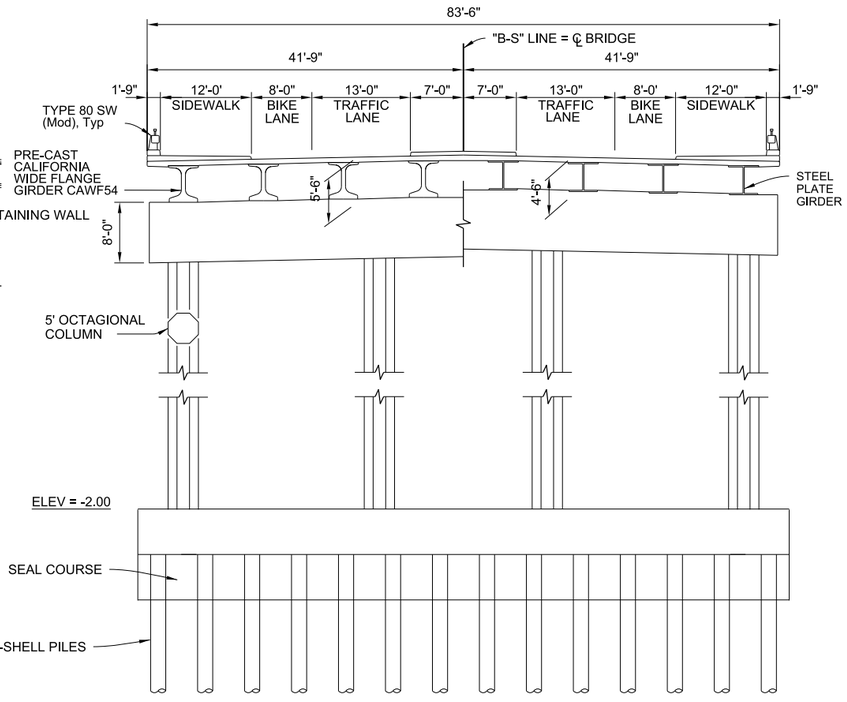
SHEET of



INDICATES 200 Yr WATER SURFACE ELEVATION

DEVELOPED ELEVATION

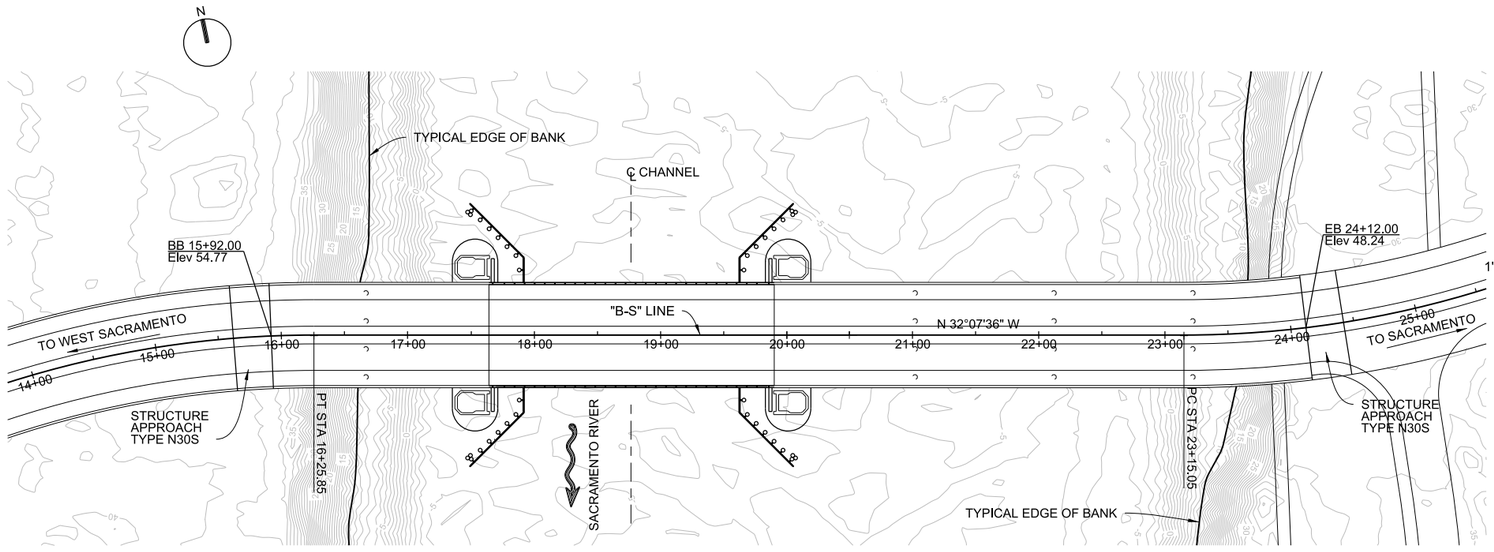
1" = 60'-0"



NOTE:
GIRDER ALTERNATIVES SYMETRIC ABOUT ℄ BRIDGE

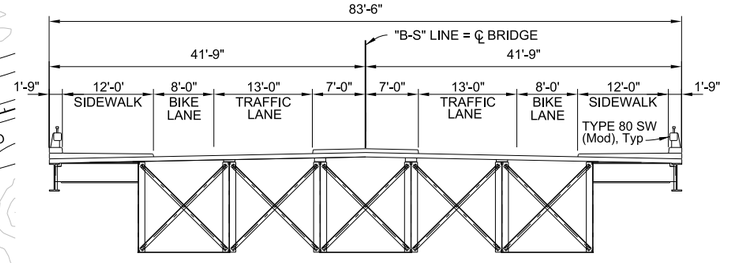
TYPICAL SECTION (APPROACH SPAN)

1" = 10'-0"



PLAN

1" = 60'-0"



TYPICAL SECTION (LIFT SPAN)

1" = 10'-0"

City of WEST SACRAMENTO

City of SACRAMENTO

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD	REVISION
		M. NEGRETTE	P. WALKER					

ch2m: Hardesty & Hanover

BROADWAY BRIDGE FEASIBILITY STUDY
SACRAMENTO RIVER
4-SPAN-EAST APPROACH
SOUTH ALIGNMENT

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE
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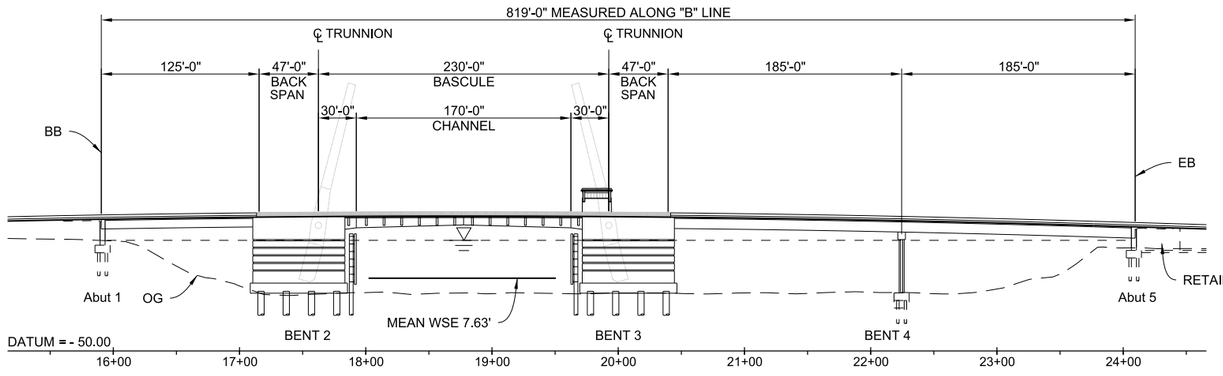
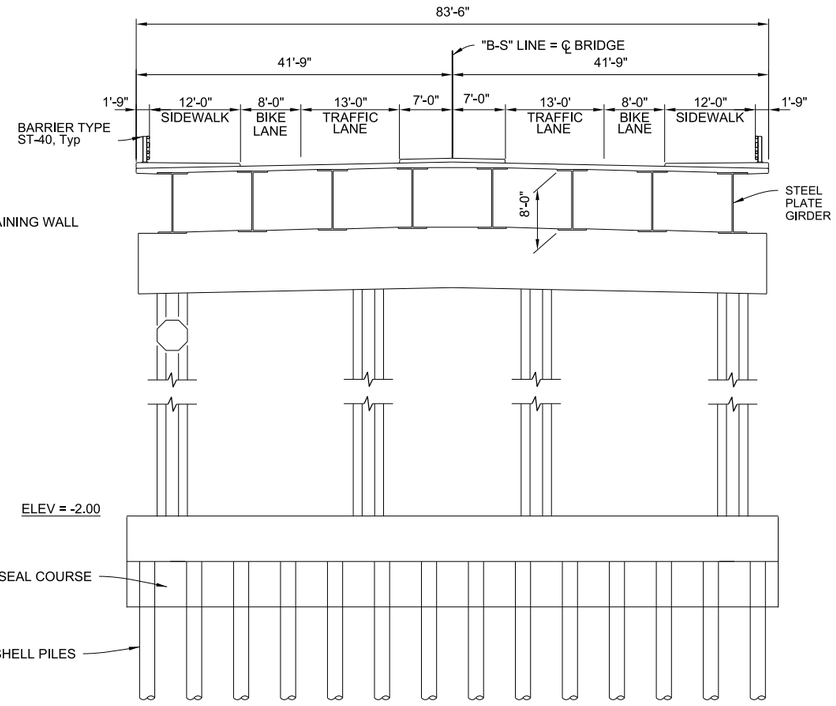
DWG
SHEET of



INDICATES 200 Yr WATER SURFACE ELEVATION

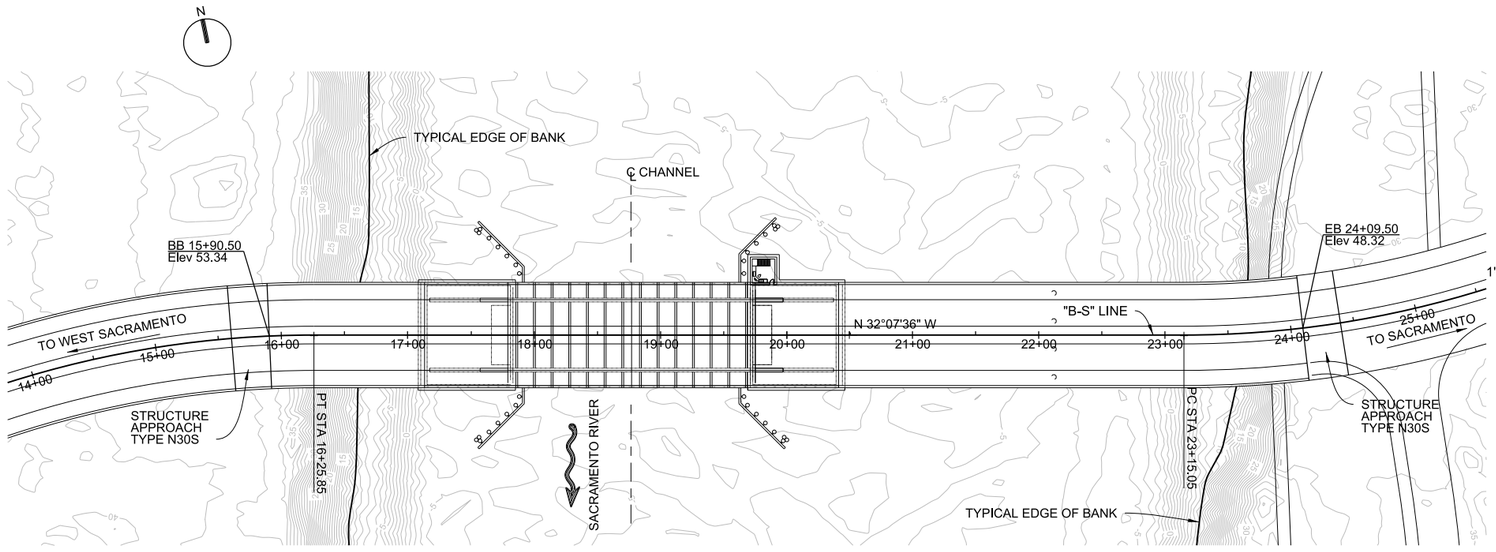
DEVELOPED ELEVATION

1" = 60'-0"



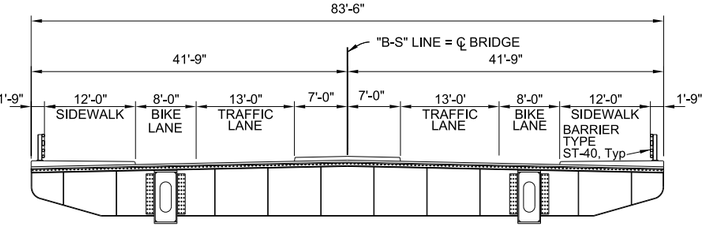
TYPICAL SECTION (APPROACH SPAN)

1" = 10'-0"



PLAN

1" = 60'-0"



TYPICAL SECTION (LIFT SPAN)

1" = 10'-0"

CITY OF WEST SACRAMENTO

City of SACRAMENTO

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD	REVISION
		M. NEGRETTE	P. WALKER					

ch2m: Hardesty & Hanover

BROADWAY BRIDGE FEASIBILITY STUDY
SACRAMENTO RIVER
2-SPAN-EAST APPROACH
SOUTH ALIGNMENT

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

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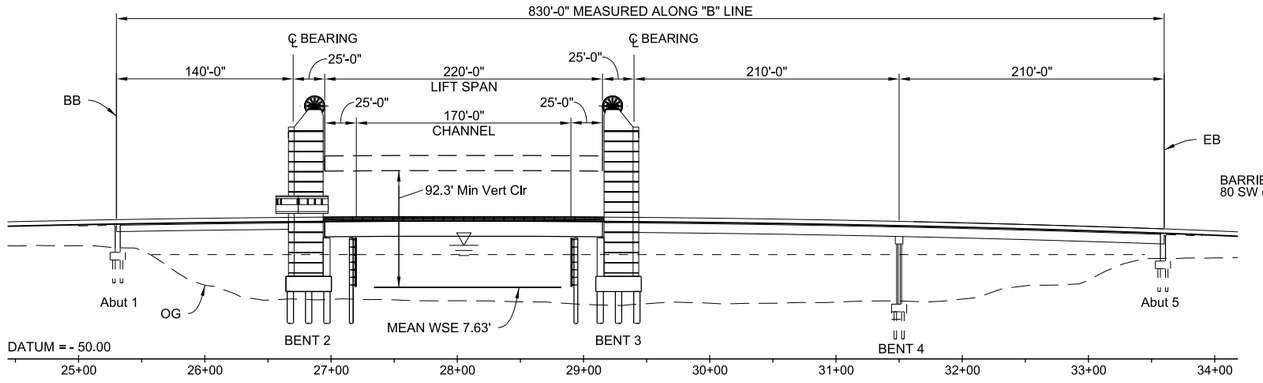
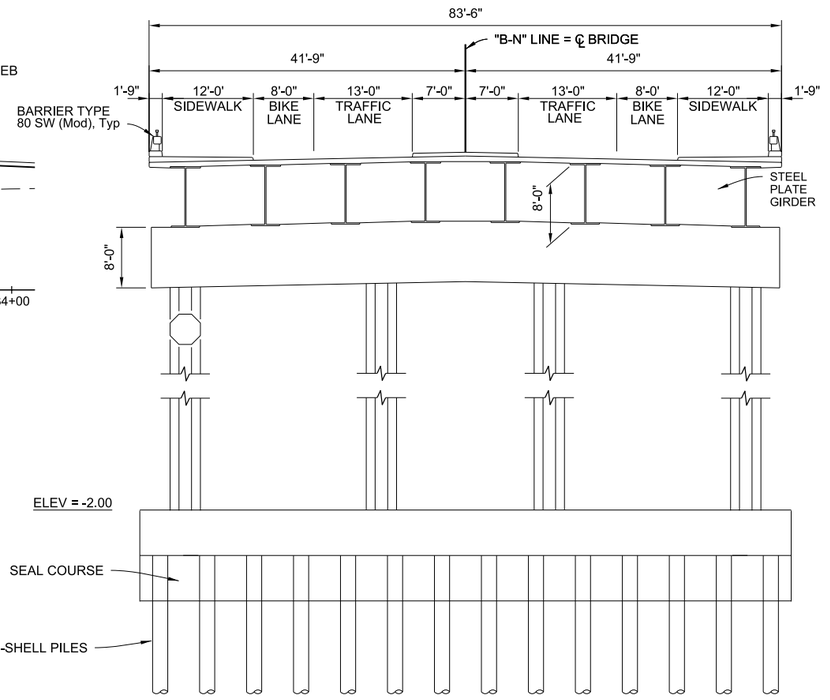


INDICATES 200 Yr WATER SURFACE ELEVATION

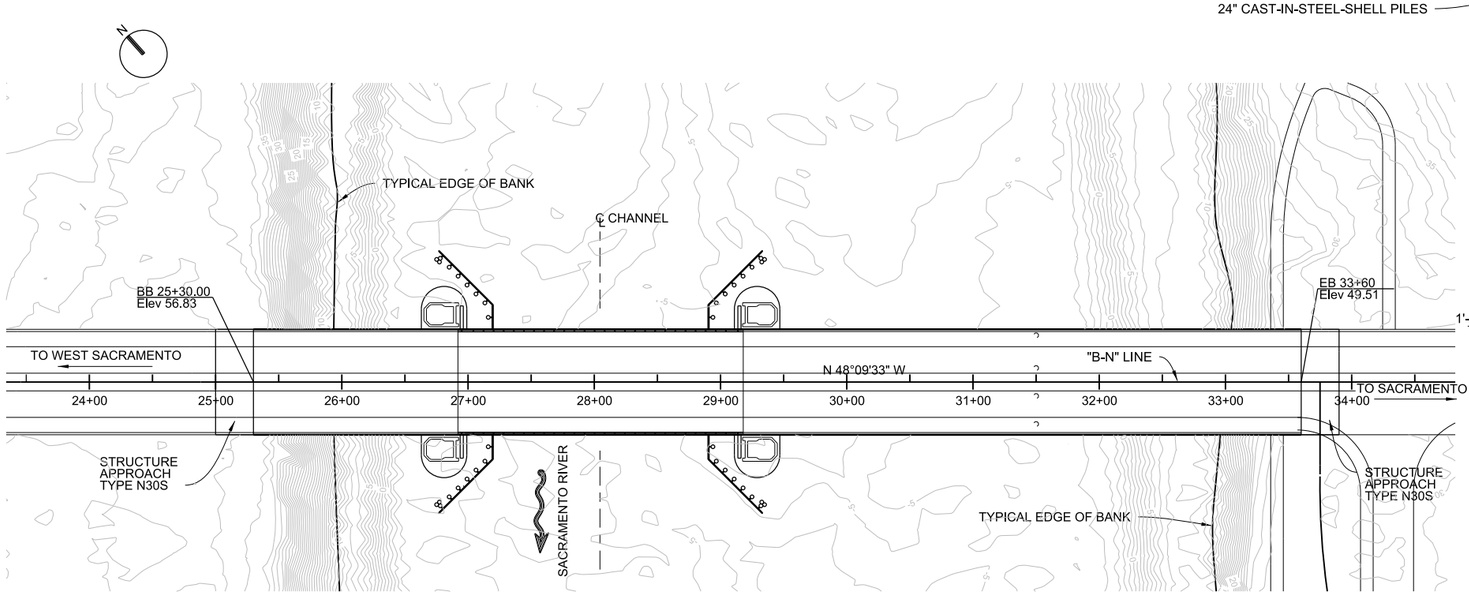
DEVELOPED ELEVATION

1" = 60'-0"



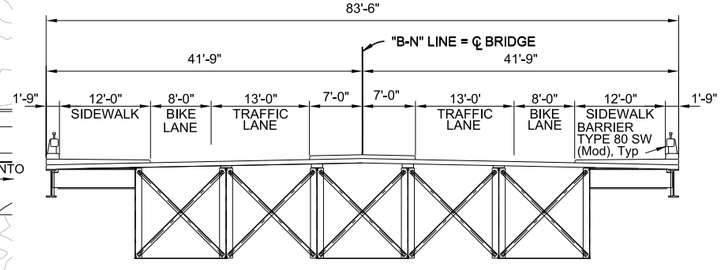
TYPICAL SECTION (APPROACH SPAN)

1" = 10'-0"



PLAN

1" = 60'-0"



TYPICAL SECTION (LIFT SPAN)

1" = 10'-0"

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
		M. NEGRETTE	P. WALKER				

REVISION

REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2M HILL.

CITY OF WEST SACRAMENTO

City of SACRAMENTO

ch2m: Hardesty & Hanover

BROADWAY BRIDGE FEASIBILITY STUDY
SACRAMENTO RIVER
2-SPAN-EAST APPROACH
NORTH ALIGNMENT

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
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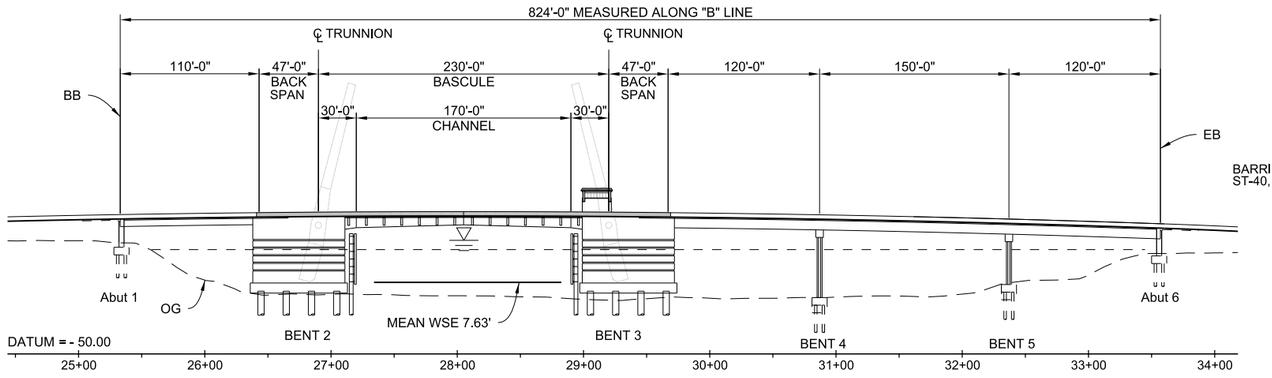

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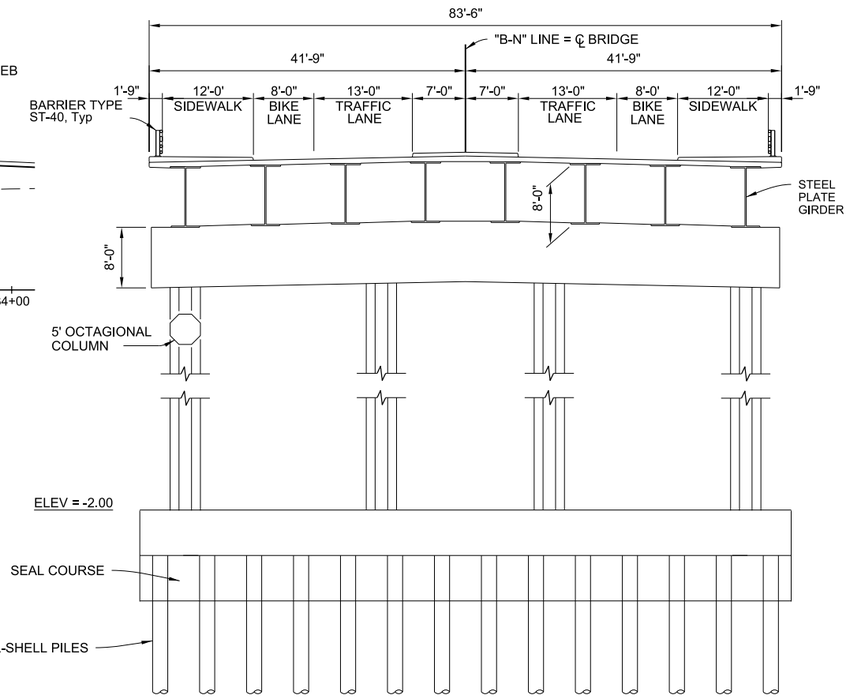

TYPICAL SECTION (APPROACH SPAN)

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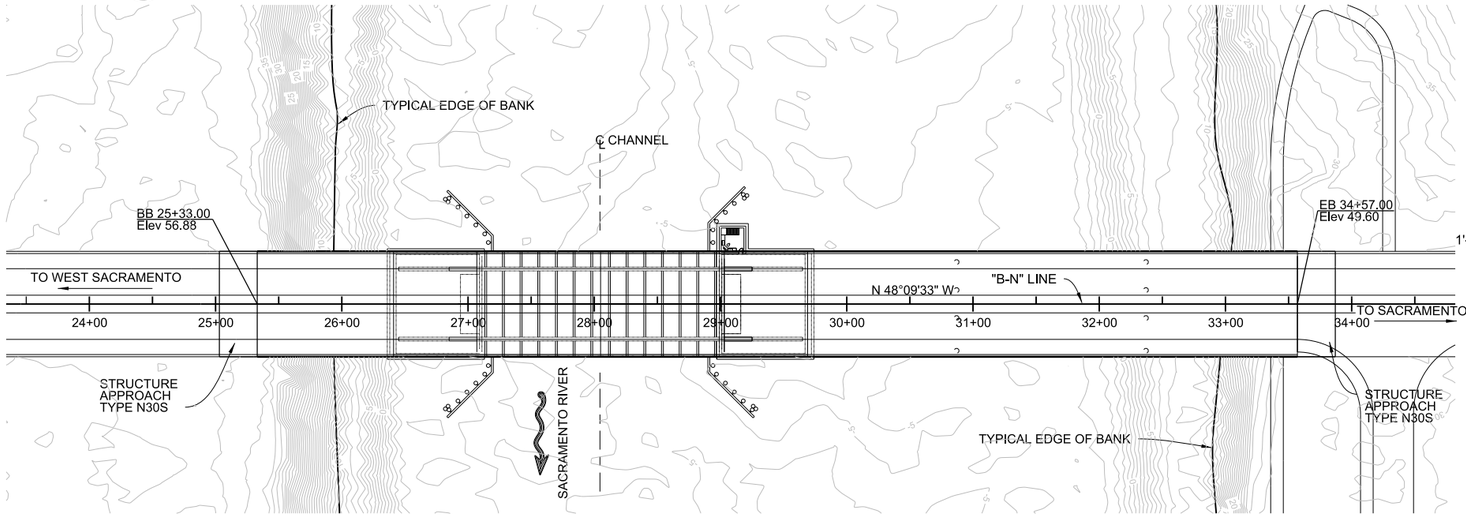
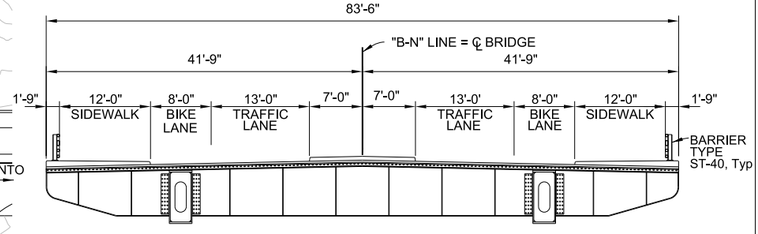


PLAN

1" = 60'-0"



TYPICAL SECTION (LIFT SPAN)

1" = 10'-0"

CITY OF WEST SACRAMENTO

City of SACRAMENTO

NO.	DATE	DSGN	DR	CHK	APVD	REVISION	BY	APVD
		M. NEGRETTE	P. WALKER					

ch2m: Hardesty & Hanover

BROADWAY BRIDGE FEASIBILITY STUDY
SACRAMENTO RIVER
3-SPAN-EAST APPROACH
NORTH ALIGNMENT

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE
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Attachment 4
Approach Span Cost Estimates

	GENERAL PLAN ESTIMATE	X	ADVANCE PLANNING ESTIMATE

Revised - December 3, 2007

RCVD BY: **IN EST:** **OUT EST:**

BRIDGE: Broadway Bridge **BR. No.:** **DISTRICT:** 03
TYPE: Steel Plate Girder - 2 Span East Approach **RTE:** Broadway
CU: **CO:** Sacramento
EA: **PM:**

LENGTH: 550.00 **WIDTH:** 76.00 **AREA (SF)=** 41,800

DESIGN BY: CH2M
 # OF STRUCTURES IN PROJECT : 1 **EST. NO.** 1
PRICES BY : M. Negrete **COST INDEX:** 2015
PRICES CHECKED BY : **DATE:**
QUANTITIES BY: M. Negrete **DATE:** 6/29/2015

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	STRUCTURE EXCAVATION (TYPE A)		CY	166	$600.00	$99,540.00
2	STRUCTURE EXCAVATION (BRIDGE)		CY	498	$60.00	$29,868.00
3	SEAL COURSE CONCRETE		CY	139	$300.00	$41,610.00
4	24" CAST-IN-DRILLED-HOLE CONCRETE PILING		LF	3,640	$200.00	$728,000.00
5	FURNISH 24" CAST-IN-STEEL SHELL CONCRETE PILE		LF	1,820	$145.00	$263,900.00
6	DRIVE 24" CAST-IN-STEEL SHELL CONCRETE PILE		EA	26	$9,000.00	$234,000.00
7	STRUCTURAL CONCRETE, BRIDGE		CY	1,598	$1,200.00	$1,917,960.00
8	STRUCTURAL CONCRETE, BRIDGE FOOTING		CY	480	$600.00	$288,000.00
9	STRUCTURAL CONCRETE, APPROACH SLAB		CY	169	$750.00	$126,750.00
10	BAR REINFORCING STEEL (BRIDGE)		LB	396,346	$2.00	$792,692.00
11	JOINT SEAL (MR = 2")		LF	152	$135.00	$20,520.00
12	FURNISH STRUCTURAL STEEL (BRIDGE)		LB	1,349,000	$2.50	$3,372,500.00
13	ERECT STRUCTURAL STEEL (BRIDGE)		LB	1,349,000	$1.40	$1,888,600.00
14	CONCRETE BARRIER (TYPE 80)		LF	1,100	$350.00	$385,000.00
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SUBTOTAL	$10,188,940
TIME RELATED OVERHEAD	$1,018,894
MOBILIZATION (@ 10 %)	$1,245,315
SUBTOTAL BRIDGE ITEMS	$12,453,149
CONTINGENCIES (@ 25%)	$3,113,287
BRIDGE TOTAL COST	$15,566,436
COST PER SQ. FOOT	$372.40
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	$15,566,436
BUDGET ESTIMATE AS OF	**$15,566,000**

COMMENTS:

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year

Years Beyond Midpoint	Escalated Budget Est.
1	$15,566,000
2	$15,566,000
3	$15,566,000
4	$15,566,000
5	$15,566,000

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.

[ ] GENERAL PLAN ESTIMATE [X] ADVANCE PLANNING ESTIMATE

Revised - December 3, 2007

RCVD BY: **IN EST:** **OUT EST:**

BRIDGE: Broadway Bridge **BR. No.:** **DISTRICT:** 03
TYPE: Steel Plate Girder - 3 Span East Approach **RTE:** Broadway
CU: **CO:** Sacramento
EA: **PM:**

LENGTH: 550.00 **WIDTH:** 76.00 **AREA (SF)=** 41,800

DESIGN BY: CH2M
 # OF STRUCTURES IN PROJECT : 1 **EST. NO.** 1
PRICES BY : M. Negrete **COST INDEX:** 2015
PRICES CHECKED BY : **DATE:**
QUANTITIES BY: M. Negrete **DATE:** 6/29/2015

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	STRUCTURE EXCAVATION (TYPE A)		CY	332	$600.00	$199,140.00
2	STRUCTURE EXCAVATION (BRIDGE)		CY	498	$60.00	$29,868.00
3	SEAL COURSE CONCRETE		CY	277	$300.00	$83,190.00
4	24" CAST-IN-DRILLED-HOLE CONCRETE PILING		LF	3,640	$200.00	$728,000.00
5	FURNISH 24" CAST-IN-STEEL SHELL CONCRETE PILE		LF	3,640	$145.00	$527,800.00
6	DRIVE 24" CAST-IN-STEEL SHELL CONCRETE PILE		EA	52	$9,000.00	$468,000.00
7	STRUCTURAL CONCRETE, BRIDGE		CY	1,861	$1,200.00	$2,232,720.00
8	STRUCTURAL CONCRETE, BRIDGE FOOTING		CY	683	$600.00	$409,620.00
9	STRUCTURAL CONCRETE, APPROACH SLAB		CY	169	$750.00	$126,750.00
10	BAR REINFORCING STEEL (BRIDGE)		LB	480,684	$2.00	$961,368.00
11	JOINT SEAL (MR = 2")		LF	152	$135.00	$20,520.00
12	FURNISH STRUCTURAL STEEL (BRIDGE)		LB	1,045,000	$2.50	$2,612,500.00
13	ERECT STRUCTURAL STEEL (BRIDGE)		LB	1,045,000	$1.40	$1,463,000.00
14	CONCRETE BARRIER (TYPE 80)		LF	1,100	$350.00	$385,000.00
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SUBTOTAL	$10,247,476
TIME RELATED OVERHEAD	$1,024,748
MOBILIZATION (@ 10 %)	$1,252,469
SUBTOTAL BRIDGE ITEMS	$12,524,693
CONTINGENCIES (@ 25%)	$3,131,173
BRIDGE TOTAL COST	$15,655,866
COST PER SQ. FOOT	$374.54
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	$15,655,866
BUDGET ESTIMATE AS OF	**$15,656,000**

COMMENTS:

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year

Years Beyond Midpoint	Escalated Budget Est.
1	$15,656,000
2	$15,656,000
3	$15,656,000
4	$15,656,000
5	$15,656,000

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.

[ ] GENERAL PLAN ESTIMATE [X] ADVANCE PLANNING ESTIMATE

Revised - December 3, 2007

RCVD BY: **IN EST:** **OUT EST:**

BRIDGE: Broadway Bridge **BR. No.:** **DISTRICT:** 03
TYPE: Precast Wide Flange Girders **RTE:** Broadway
CU: **CO:** Sacramento
EA: **PM:**

LENGTH: 550.00 **WIDTH:** 76.00 **AREA (SF)=** 41,800

DESIGN BY: CH2M
 # OF STRUCTURES IN PROJECT : 1 **EST. NO.** 1
PRICES BY : M. Negrete **COST INDEX:** 2015
PRICES CHECKED BY : **DATE:**
QUANTITIES BY: M. Negrete **DATE:** 6/29/2015

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	STRUCTURE EXCAVATION (TYPE A)		CY	332	$600.00	$199,140.00
2	STRUCTURE EXCAVATION (BRIDGE)		CY	498	$60.00	$29,868.00
3	SEAL COURSE CONCRETE		CY	277	$300.00	$83,190.00
4	24" CAST-IN-DRILLED-HOLE CONCRETE PILING		LF	3,640	$200.00	$728,000.00
5	FURNISH 24" CAST-IN-STEEL SHELL CONCRETE PILE		LF	3,640	$145.00	$527,800.00
6	DRIVE 24" CAST-IN-STEEL SHELL CONCRETE PILE		EA	52	$9,000.00	$468,000.00
7	FURNISH PRECAST PRESTRESSED CONCRETE WIDE FLANGE GIRDER (120' - 130')		EA	16	$40,000.00	$640,000.00
8	FURNISH PRECAST PRESTRESSED CONCRETE WIDE FLANGE GIRDER (140' - 150')		EA	16	$60,000.00	$960,000.00
9	ERECT PRECAST PRESTRESSEC CONCRETE WIDE FLANGE GIRDER		EA	32	$5,000.00	$160,000.00
10	STRUCTURAL CONCRETE, BRIDGE		CY	1,861	$1,200.00	$2,232,720.00
11	STRUCTURAL CONCRETE, BRIDGE FOOTING		CY	683	$600.00	$409,620.00
12	STRUCTURAL CONCRETE, APPROACH SLAB		CY	169	$750.00	$126,750.00
13	BAR REINFORCING STEEL (BRIDGE)		LB	480,680	$2.00	$961,360.00
14	JOINT SEAL (MR = 2")		LF	152	$135.00	$20,520.00
15	CONCRETE BARRIER (TYPE 80)		LF	1,100	$350.00	$385,000.00
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SUBTOTAL	$7,931,968
TIME RELATED OVERHEAD	$793,197
MOBILIZATION (@ 10 %)	$969,463
SUBTOTAL BRIDGE ITEMS	$9,694,628
CONTINGENCIES (@ 25%)	$2,423,657
BRIDGE TOTAL COST	$12,118,284
COST PER SQ. FOOT	$289.91
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	$12,118,284
BUDGET ESTIMATE AS OF	**$12,118,000**

COMMENTS:

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year

Years Beyond Midpoint	Escalated Budget Est.
1	$12,118,000
2	$12,118,000
3	$12,118,000
4	$12,118,000
5	$12,118,000

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.