

**PRE-CAST ABUTMENTS AND APPROACH
SLAB ERECTION PLAN
FOR THE
CAVENDISH ER BRF 0146 (13)**



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5-23-14

PREPARED BY COLD RIVER BRIDGES, LLC
REVIEWED BY SAVOY ENGINEERING
May 12th 2014

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ERECTION SEQUENCE:

Crane #1 is link-belt RTC 90 TON hydraulic crane. Crane #1 will be positioned as show on sheet sk1 for abutments A and B. Pre-cast abutments will be staged in the areas shown on sheets SK1. Abutment # 1 will be set left to right. Abutment 2 will be set left to right. Approach slabs will be positioned behind the crane

CRANE RADIUS AND WEIGHTS:

RTC 8090
OUTRIGGERS FULLY EXTENDED
28,800 LBS COUNTERWEIGHT
BOOM LENGTH=80'

| DESCRIPTION | WEIGHT (KIPS) | RIGGING (KIPS) | TOTAL LOAD (KIPS) | SET RADIUS (FT) | CAPACITY (KIPS) |
|----------------------|------------------|-------------------|-------------------------|-----------------------|--------------------|
| ABUT # 1 SECT 14'-0" | 40.2 | 1.2 | 41.4 | 35 | 46.4 |
| ABUT # 1 SECT 13'-4" | 44.2 | 1.2 | 45.4 | 26 | 55.7 |
| ABUT #1 SECT 13'-0" | 37.4 | 1.2 | 38.6 | 32 | 51 |
| ABUT #1 SECT 10'10" | 35.6 | 1.2 | 36.8 | 40 | 39.3 |
| APPROACH SLAB A | 26 | 1.2 | 27.2 | 30 | 55.7 |
| APPROACH SLAB B | 26 | 1.2 | 27.2 | 30 | 55.7 |
| APPROACH SLAB C | 26 | 1.2 | 27.2 | 34 | 51 |
| APPROACH SLAB D | 26 | 1.2 | 27.2 | 38 | 39.3 |

| DESCRIPTION | WEIGHT (KIPS) | RIGGING (KIPS) | TOTAL LOAD (KIPS) | SET RADIUS (FT) | CAPACITY (KIPS) |
|------------------------|------------------|-------------------|-------------------------|-----------------------|--------------------|
| ABUT # 2 SECT 14'-0" | 40.2 | 1.2 | 41.4 | 28 | 55.7 |
| ABUT # 2 SECT 13'-0" | 37.4 | 1.2 | 38.6 | 33 | 51 |
| ABUT # 2 SECT 11'-27/8 | 35.6 | 1.2 | 36.8 | 31 | 55.7 |
| ABUT #2 SECT 10'-0" | 35.2 | 1.2 | 36.4 | 40 | 39.3 |
| APPROACH SLAB E | 30.1 | 1.2 | 31.3 | 35 | 51 |
| APPROACH SLAB F | 30.1 | 1.2 | 31.3 | 30 | 55.7 |
| APPROACH SLAB G | 30.1 | 1.2 | 31.3 | 30 | 55.7 |
| APPROACH SLAB H | 30.1 | 1.2 | 31.3 | 31 | 55.7 |

***CRANE CAPACITY 360 DEGREE CHART.

RIGGING:**ABUTMENT AND APPROACH SLABS:**

Rigging will consist of 4 orange swg-500 synthetic endless slings with a capacity of 40 kips. Slings will be connected directly to the crane block. 25 ton shackles will be used to connect the slings to the Dayton superior P52-20 ton lifting devices.

LIFTING FORCES:

Lifting forces were analyzed as part of the shop drawings and calculations previously submitted by Cold River Bridges, LLC.

TEMPORARY STOPPAGE:

This work is being performed during a shut-down. Rt 131 is closed to all traffic. No temporary stoppage is anticipated.

| 28,800 lb Counterweight – Fully Extended Outriggers – 360° Rotation (All Capacities Are Listed In Pounds) | | | | | | | | | | | | |
|--|------------------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|-------------|
| Radius (ft) | Boom Length (ft) | | | | | | | | | | | Radius (ft) |
| | 38 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | |
| 8 | 167,200 | | | | | | | | | | | 8 |
| 10 | 155,800 | 152,000 | 117,900 | 70,800 | | | | | | | | 10 |
| 12 | 139,600 | 138,600 | 108,800 | 70,800 | 85,100 | | | | | | | 12 |
| 15 | 116,300 | 118,400 | 106,500 | 70,800 | 78,400 | 54,200 | | | | | | 15 |
| 20 | 85,300 | 87,500 | 87,900 | 63,500 | 76,500 | 52,000 | 49,100 | 27,200 | | | | 20 |
| 25 | 66,200 | 68,500 | 69,000 | 54,800 | 68,500 | 45,600 | 45,200 | 36,300 | 28,000 | 26,900 | | 25 |
| 30 | 53,200 | 55,500 | 56,100 | 47,800 | 55,700 | 40,600 | 42,200 | 35,900 | 28,000 | 26,500 | 24,400 | 30 |
| 35 | | 46,200 | 46,800 | 42,500 | 46,400 | 36,500 | 38,300 | 35,500 | 28,000 | 26,300 | 24,100 | 35 |
| 40 | | 39,600 | 40,100 | 38,100 | 39,300 | 33,000 | 34,900 | 33,400 | 28,000 | 26,100 | 24,000 | 40 |
| 45 | | | 34,200 | 34,500 | 33,800 | 30,100 | 32,100 | 30,300 | 26,100 | 25,900 | 23,800 | 45 |
| 50 | | | 28,500 | 28,900 | 28,900 | 27,600 | 28,500 | 27,900 | 24,100 | 25,200 | 23,700 | 50 |
| 55 | | | 23,700 | 24,600 | 24,700 | 24,700 | 24,300 | 23,800 | 22,300 | 23,500 | 23,600 | 55 |
| 60 | | | | 21,100 | 21,200 | 21,300 | 20,900 | 20,400 | 20,700 | 21,900 | 21,700 | 60 |
| 65 | | | | | 18,500 | 18,500 | 18,600 | 18,900 | 19,300 | 19,300 | 18,900 | 65 |
| 70 | | | | | 17,300 | 16,200 | 17,500 | 17,700 | 17,400 | 17,000 | 16,600 | 70 |
| 75 | | | | | | 14,900 | 15,900 | 15,700 | 15,400 | 15,000 | 14,700 | 75 |
| 80 | | | | | | 14,100 | 14,200 | 14,100 | 13,700 | 13,400 | 13,000 | 80 |
| 85 | | | | | | | 12,800 | 12,700 | 12,400 | 12,000 | 11,700 | 85 |
| 90 | | | | | | | 11,600 | 11,500 | 11,200 | 10,800 | 10,500 | 90 |
| 95 | | | | | | | | 10,400 | 10,100 | 9,700 | 9,400 | 95 |
| 100 | | | | | | | | 9,400 | 9,100 | 8,700 | 8,400 | 100 |
| 105 | | | | | | | | 6,300 | 8,200 | 7,900 | 7,600 | 105 |
| 110 | | | | | | | | | 7,400 | 7,100 | 6,800 | 110 |
| 115 | | | | | | | | | | 6,400 | 6,100 | 115 |
| 120 | | | | | | | | | | 5,800 | 5,500 | 120 |
| 125 | | | | | | | | | | | 4,900 | 125 |
| 130 | | | | | | | | | | | 4,400 | 130 |

This information is not for crane operation. Operator must refer to the in-cab information for crane operation. Rated lifting capacities shown on fully extended outriggers do not exceed 85% of the tipping loads and on tires do not exceed 75% of the tipping loads.



Round Slings Tubular Polyester Round Slings

Lift Capacities according to polyester round sling type (color) and hitch used.

| CODE | COLOR | CAPACITIES IN LBS. | | | MINIMUM LENGTH |
|---------|--------|--------------------|--------|---------|----------------|
| | | VERTICAL | CHOKER | BASKET | |
| SWG30 | PURPLE | 2,650 | 2,120 | 5,300 | 3 ft. |
| SWG60 | GREEN | 5,300 | 4,240 | 10,600 | 3 ft. |
| SWG90 | YELLOW | 8,400 | 6,720 | 16,800 | 3 ft. |
| SWG120 | TAN | 10,600 | 8,500 | 21,200 | 3 ft. |
| SWG150 | RED | 13,200 | 10,560 | 26,400 | 3 ft. |
| SWG180 | ORANGE | 16,800 | 13,440 | 33,600 | 3 ft. |
| SWG240 | BLUE | 21,200 | 17,000 | 42,400 | 3 ft. |
| SWG300 | ORANGE | 25,000 | 20,000 | 50,000 | 3 ft. |
| SWG360 | GREY | 31,700 | 25,300 | 63,400 | 3 ft. |
| SWG500 | ORANGE | 40,000 | 32,000 | 80,000 | 3 ft. |
| SWG600 | BROWN | 52,900 | 42,300 | 105,800 | 6 ft. |
| SWG800 | OLIVE | 66,100 | 52,880 | 132,200 | 6 ft. |
| SWG1000 | BLACK | 90,000 | 72,000 | 180,000 | 6 ft. |

Removal from Service

A polyester round sling shall be removed from service if any of the following is visible:

- If polyester round slings identification tag is missing or unreadable.
- Melting, charring or weld spatter of any part of the polyester round sling.
- Holes, tears cuts, embedded particles, abrasive wear, or snags that expose the core fibers of the polyester round sling.
- Broken or worn stitching in the cover which exposes the core fibers.
- Fittings when damaged, stretched or distorted in any way.
- Polyester round slings that are knotted.
- Acid or alkalis burns of the polyester round sling.
- Any conditions which cause doubt as to the strength of the polyester round sling.

8 Part Braided Round Slings

| CODE | COLOR | RATED CAPACITIES IN LBS. | | | APPROXIMATE MEASUREMENTS | | | | | |
|---------|--------|--------------------------|---------|---------|--------------------------|-------------------|-------------------------|-------------------------|-------------------------|----------------|
| | | VERTICAL | CHOKER | BASKET | MINIMUM LENGTH (FT.) | WEIGHT (LBS./FT.) | STANDARD EYE (EL) (IN.) | WIDTH AT LOAD (W) (IN.) | THICKNESS AT LOAD (IN.) | EYE DIA. (IN.) |
| SWG30 | PURPLE | 8,800 | 7,100 | 17,600 | 4 1/2 | 1.1 | 15 | 3 1/2 | 1 | 1 3/4 |
| SWG60 | GREEN | 18,000 | 14,400 | 36,000 | 5 | 1.5 | 15 | 4 | 1 9/8 | 2 |
| SWG90 | YELLOW | 28,500 | 22,800 | 57,000 | 5 1/2 | 2.2 | 15 | 4 3/4 | 1 5/8 | 2 1/2 |
| SWG120 | TAN | 36,000 | 28,800 | 72,000 | 5 1/2 | 2.6 | 15 | 5 | 1 3/4 | 2 1/2 |
| SWG150 | RED | 44,900 | 35,900 | 89,800 | 6 1/2 | 3.6 | 20 | 6 | 2 1/6 | 2 3/4 |
| SWG180 | ORANGE | 57,100 | 45,600 | 114,200 | 7 | 4.1 | 20 | 6 1/4 | 2 1/2 | 3 1/4 |
| SWG240 | BLUE | 72,000 | 57,600 | 144,000 | 9 | 5.6 | 20 | 7 1/2 | 2 3/4 | 3 3/4 |
| SWG360 | GREY | 105,400 | 84,300 | 210,800 | 9 1/2 | 8.3 | 30 | 9 1/2 | 3 1/4 | 4 1/2 |
| SWG600 | BROWN | 180,200 | 144,100 | 360,400 | 10 1/2 | 12.0 | 30 | 13 | 3 3/4 | 5 1/2 |
| SWG800 | OLIVE | 224,400 | 179,500 | 448,800 | 13 | 16.0 | 30 | 13 1/2 | 4 1/2 | 6 |
| SWG1000 | BLACK | 306,000 | 244,000 | 612,000 | 14 1/2 | 20.0 | 31 | 15 3/4 | 5 1/4 | 6 1/2 |

Endless and Eye & Eye styles of Round Slings are made to a tolerance of $\pm 1\%$ of the specified length ($\pm 1"$ minimum tolerance) and can stretch 3% at rated capacity.

Braided Round Slings length tolerance is $\pm 5\%$ of the ordered length (sling at rest). At its rated capacity, braided Round Slings will stretch approximately 9%.

**Note: Matched lengths of slings must be specified at time of order.
Higher capacity round slings available upon request.**

Swift Lift® System

The Swift Lift System is a quick connect-disconnect system that allows precast concrete elements to be handled repeatedly, with speed, safety and economy. It is a non-welded system and void of threaded connections. The quality, reusable Swift Lift Lifting Eye's heavy duty construction will provide years of good service.

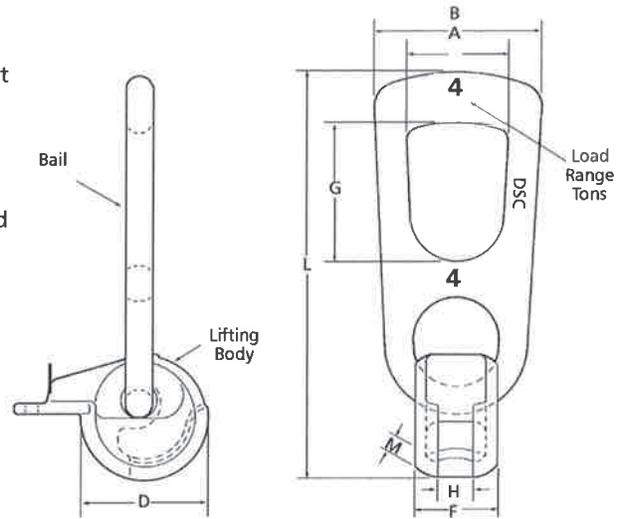
The Swift Lift System is available with safe load ratings of 1, 2, 4, 8 and 20 tons. Each component is clearly marked with its maximum safe working load. The System is extremely versatile and can be utilized for vertical and diagonal pulls. It can be used to lift concrete elements from a horizontal to a vertical position without the aid of a tilting table.

P50 Swift Lift® Universal Lifting Eye

The Swift Lift Universal Lifting Eye (P50) consists of a flat-sided, spherical lifting body and a high strength bail. The lifting body has a T-shaped slot that permits rapid attachment and release of the head on Swift Lift Anchors.

The design of the P50 Universal Lifting Eye permits the bail to freely rotate 180°, while the complete lifting eye may rotate through a 360° arc. This design feature allows precast concrete elements to be turned, tilted and/or rotated under load.

Dayton Superior does not recommend the use of this lifting eye for edge lifting of thin precast concrete panels.



| P50 Swift Lift Universal Lifting Eye Dimensions | | | | | | |
|---|-------|-------|-------|-------|-------|--------|
| Rated Load Tons | A | B | D | F | G | L |
| 1 | 1.87" | 2.95" | 2.20" | 1.26" | 2.80" | 7.40" |
| 2 | 2.34" | 3.58" | 2.68" | 1.61" | 3.41" | 9.06" |
| 4 | 2.76" | 4.65" | 3.46" | 2.22" | 3.46" | 11.14" |
| 8 | 3.47" | 6.30" | 4.41" | 2.83" | 4.52" | 15.79" |
| 20 | 4.18" | 7.09" | 6.00" | 4.29" | 5.31" | 20.00" |

The rated load provides a factor of safety of approximately 5 to 1 (ultimate to rated load).

P50 Inspection and Maintenance

The P50 Universal Lifting Eye may be subjected to wear, misuse, overloading and other factors that can affect the lifting eye's rated load. Therefore, it is imperative that the lifting eye be user-inspected at least once a month to determine its general condition and degree of wear.

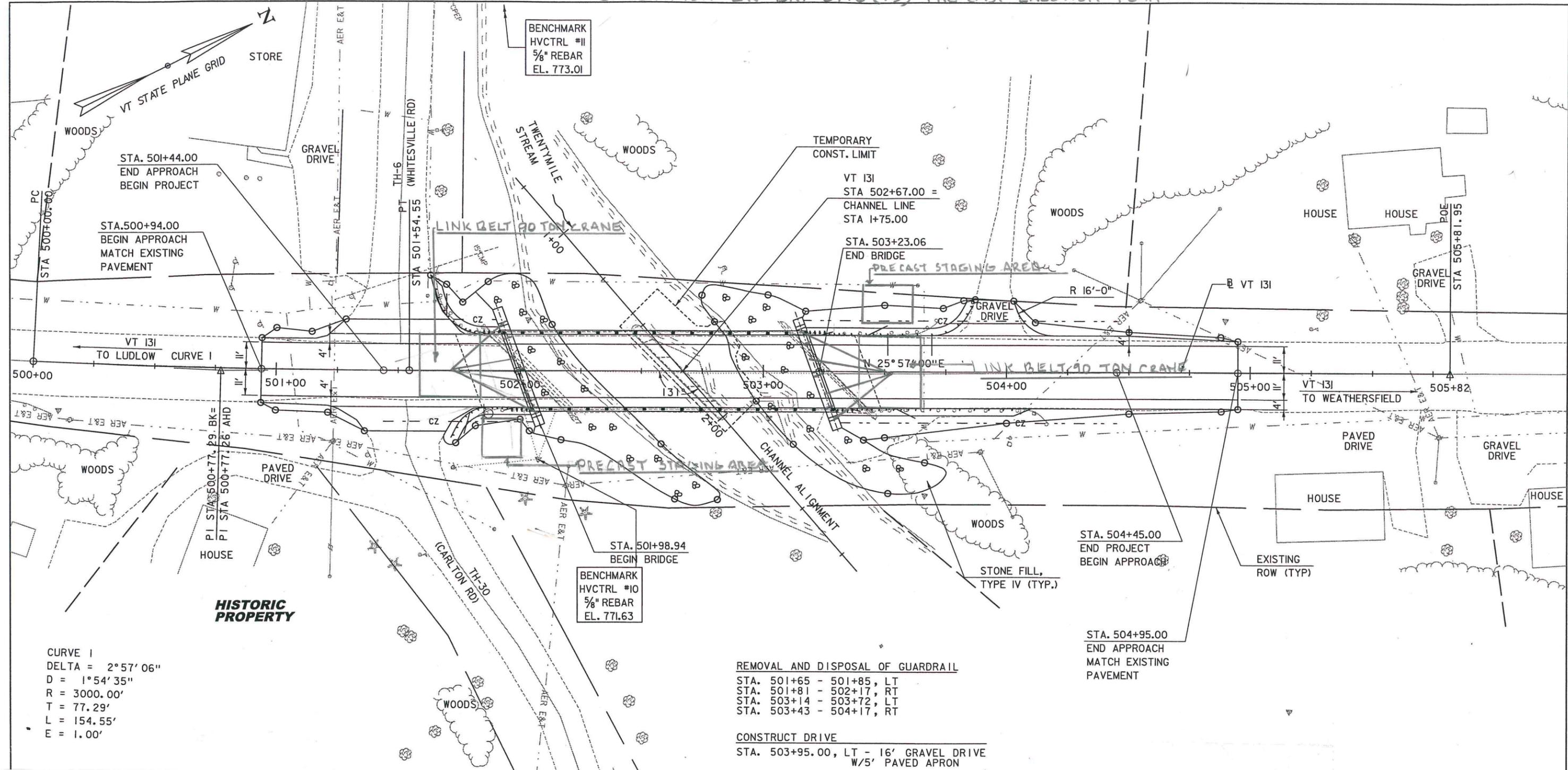
During the user's monthly inspection, the lifting eye should be checked for evidence of heat application. If evidence of heat application is found, the unit must be scrapped. Check for a bent or twisted bail and discard all units found to have these flaws. Also, check to make certain that the bail rotates freely in all directions.

At least once every three months, dimensions "H" and "M" on each unit should be checked. The upper limits are shown in the chart. If either of these limits is exceeded, the P50 Universal Lifting Eye must be removed from service and destroyed.

The proper method for scrapping a lifting eye is to cut through the bail with a cutting torch to render the unit useless as a lifting device.

No repairs or welding to the P50 Swift Lift Universal Lifting Eye are permitted.

| Limiting Dimensions on P-50 Swift Lift Universal Lifting Eye | | |
|--|-----------------|---------------------|
| Rated Load (Tons) | H Maximum Width | M Minimum Thickness |
| 1 | 0.512" | 0.217" |
| 2 | 0.709" | 0.236" |
| 4 | 0.984" | 0.315" |
| 8 | 1.260" | 0.472" |
| 20 | 1.811" | 0.709" |



CURVE 1
 DELTA = 2°57'06"
 D = 1°54'35"
 R = 3000.00'
 T = 77.29'
 L = 154.55'
 E = 1.00'

REMOVAL AND DISPOSAL OF GUARDRAIL
 STA. 501+65 - 501+85, LT
 STA. 501+81 - 502+17, RT
 STA. 503+14 - 503+72, LT
 STA. 503+43 - 504+17, RT

CONSTRUCT DRIVE
 STA. 503+95.00, LT - 16' GRAVEL DRIVE
 W/5' PAVED APRON

RTC 8090
 OUTRIGGERS FULLY EXTENDED
 28,800 LBS COUNTERWEIGHT
 BOOM LENGTH=80'
ABUTMENT # 1

RTC 8090
 OUTRIGGERS FULLY EXTENDED
 28,800 LBS COUNTERWEIGHT
 BOOM LENGTH=80'
ABUTMENT # 2

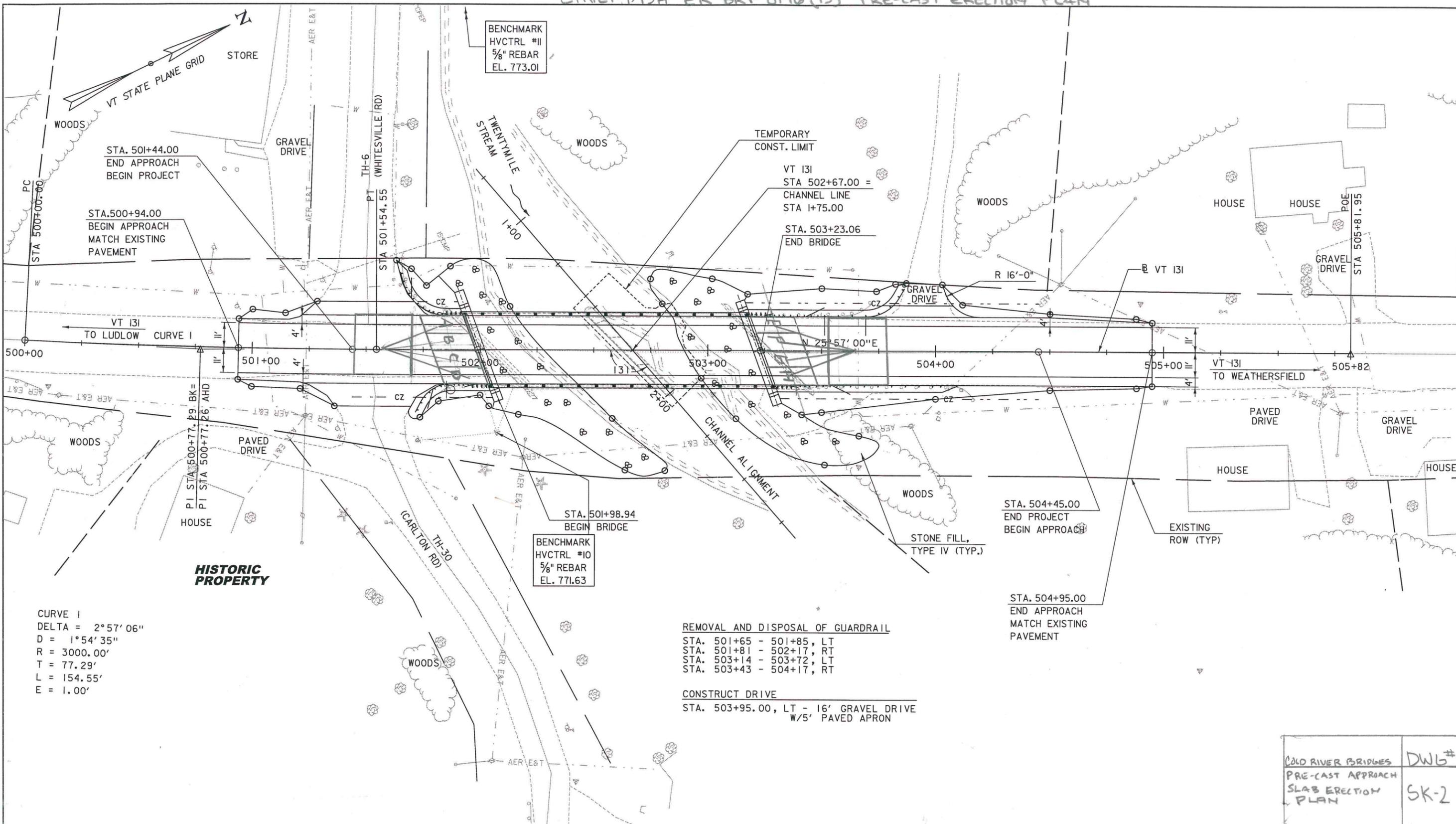
COLD RIVER BRIDGES DWG#
 PRE-CAST ABUTMENT
 ERECTION PLAN SK1

| DESCRIPTION | WEIGHT (KIPS) | RIGGING (KIPS) | TOTAL LOAD (KIPS) | SET RADIUS (FT) | 360 DEGREE CAPACITY (KIPS) |
|-----------------------|---------------|----------------|-------------------|-----------------|----------------------------|
| ABUTMENT SECT 14'-0" | 40.2 | 1.2 | 41.4 | 35 | 46.4 |
| ABUTMENT SECT 13'-4" | 44.2 | 1.2 | 45.4 | 26 | 55.7 |
| ABUTMENT SECT 13'-0" | 37.4 | 1.2 | 38.6 | 32 | 51 |
| ABUTMENT SECT 10'-10" | 35.2 | 1.2 | 36.4 | 40 | 39.3 |

LAYOUT

| DESCRIPTION | WEIGHT (KIPS) | RIGGING (KIPS) | TOTAL LOAD (KIPS) | SET RADIUS (FT) | 360 DEGREE CAPACITY (KIPS) |
|--------------------------|---------------|----------------|-------------------|-----------------|----------------------------|
| ABUTMENT SECT 14'-0" | 40.2 | 1.2 | 41.4 | 28 | 55.7 |
| ABUTMENT SECT 13'-0" | 37.4 | 1.2 | 38.6 | 33 | 51 |
| ABUTMENT SECT 11'-2-7/8" | 35.6 | 1.2 | 36.8 | 31 | 55.7 |
| ABUTMENT SECT 10'-0" | 35.2 | 1.2 | 36.4 | 40 | 39.3 |

CANEMDISH BR BRF 0146 (13) PRE-LAST ERECTION PLAN



CURVE I
 DELTA = 2°57'06"
 D = 1°54'35"
 R = 3000.00'
 T = 77.29'
 L = 154.55'
 E = 1.00'

REMOVAL AND DISPOSAL OF GUARDRAIL
 STA. 501+65 - 501+85, LT
 STA. 501+81 - 502+17, RT
 STA. 503+14 - 503+72, LT
 STA. 503+43 - 504+17, RT

CONSTRUCT DRIVE
 STA. 503+95.00, LT - 16' GRAVEL DRIVE
 W/5' PAVED APRON

COLD RIVER BRIDGES
 PRE-CAST APPROACH
 SLAB ERECTION
 PLAN
 DWG#
 SK-2

| DESCRIPTION | WEIGHT (KIPS) | RIGGING (KIPS) | TOTAL LOAD (KIPS) | SET RADIUS (FT) | CAPACITY (KIPS) | LAYOUT | DESCRIPTION | WEIGHT (KIPS) | RIGGING (KIPS) | TOTAL LOAD (KIPS) | SET RADIUS (FT) | CAPACITY (KIPS) |
|-----------------|---------------|----------------|-------------------|-----------------|-----------------|--------|-----------------|---------------|----------------|-------------------|-----------------|-----------------|
| APPROACH SLAB A | 26 | 1.2 | 27.2 | 30 | 55.7 | | APPROACH SLAB E | 30.1 | 1.2 | 31.3 | 35 | 51 |
| APPROACH SLAB B | 26 | 1.2 | 27.2 | 30 | 55.7 | | APPROACH SLAB F | 30.1 | 1.2 | 31.3 | 30 | 55.7 |
| APPROACH SLAB C | 26 | 1.2 | 27.2 | 34 | 51 | | APPROACH SLAB G | 30.1 | 1.2 | 31.3 | 30 | 55.7 |
| APPROACH SLAB D | 26 | 1.2 | 27.2 | 38 | 39.3 | | APPROACH SLAB H | 30.1 | 1.2 | 31.3 | 31 | 55.7 |