CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 1	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE:	3/4/2025	
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT:	Quantity Summary Report	

ITEM	DESCRIPTION	QUANTITY	UNIT	TYPE
202E11203	PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN	1.00	LS	S
202E22900	APPROACH SLAB REMOVED	167.00	SY	S
503E21100	UNCLASSIFIED EXCAVATION	329.00	CY	S
509E10000	EPOXY COATED REINFORCING STEEL	209,334.00	LB	M
509E20001	CONCRETE REINFORCEMENT, REPLACEMENT OF EXISTING CONCRETE REINFORCEMENT, AS PER PLAN	1,000.00	LB	U
509E25000	UNCOATED STEEL REINFORCEMENT	1,600.00	LB	U
509E30020	NO. 4 DEFORMED GRFP REINFORCEMENT	13,528.00	FT	U
510E10001	DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT, AS PER PLAN	216.00	EACH	M
511E34446	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK	525.00	CY	R
511E34451	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK (PARAPET), AS PER PLAN	137.00	CY	U
511E40512	CLASS QC1 CONCRETE WITH QC/QA, PIER ABOVE FOOTINGS	177.00	CY	S
511E44112	CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT NOT INCLUDING FOOTING	83.00	CY	S
511E46012	CLASS QC1 CONCRETE WITH QC/QA, RETAINING/WINGWALL NOT INCLUDING FOOTING	43.00	CY	S
512E10100	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	1,553.00	SY	S
512E33000	TYPE 2 WATERPROOFING	30.00	SY	S
513E10240	STRUCTURAL STEEL MEMBERS, LEVEL 2	550,447.00	LB	U
513E20000	WELDED STUD SHEAR CONNECTORS	9,400.00	EACH	S
514E00060	FIELD PAINTING STRUCTURAL STEEL, INTERMEDIATE COAT	31,801.00	SF	U
514E00066	FIELD PAINTING STRUCTURAL STEEL, FINISH COAT	31,801.00	SF	U
516E11210	STRUCTURAL EXPANSION JOINT INCLUDING ELASTOMERIC STRIP SEAL	85.00	FT	U
516E13900	2" PREFORMED EXPANSION JOINT FILLER	79.00	SF	S
516E44001	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (FIXED)	5.00	EACH	R
516E44201	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (EXPANSION)	30.00	EACH	R
518E21200	POROUS BACKFILL WITH GEOTEXTILE FABRIC	89.00	CY	S
518E40000	6" PERFORATED CORRUGATED PLASTIC PIPE	114.00	FT	S
518E40010	6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS	102.00	FT	S
526E25001	REINFORCED CONCRETE APPROACH SLABS (T=15"), AS PER PLAN	209.00	SY	S
526E90010	TYPE A INSTALLATION	83.00	FT	S
601E20000	CRUSHED AGGREGATE SLOPE PROTECTION	642.00	SY	U
607E39901	VANDAL PROTECTION FENCE, 6' STRAIGHT, COATED FABRIC, AS PER PLAN	742.00	FT	S
625E33001	STRUCTURE GROUNDING SYSTEM, AS PER PLAN	1.00	EACH	S
846E00111	POLYMER MODIFIED ASPHALT EXPANSION JOINT SYSTEM, AS PER PLAN	35.00	CF	

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 2	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

202E11203	PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN	TOTAL:	1.00	LS

Based on Deck Area

Total Deck Area = 17858.0 sf

Total = $813,102

$/sf = $45.5

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 3	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

202E22900	APPROACH SLAB REMOVED	TOTAL:	167.00	SY

Forward Approach Slab Area	=	751	sf
Rear Approach Slab Area	=	750.86	sf
Total	=	1501.9	sf
	=	167	sy

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 4	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

503E21100 UNCLASSIFIED EXCAVATION **TOTAL: 329.00 CY**

a. Behind Abutment

Depth of Excavation = 9.22 ft

Additional Length to Excavation = 1.5 ft

Abutment Width = 39.255 ft

Excavation Cross-Sectional Area = 56.326 sft

Volume per Abutment = 2211.1 cft

= 81.892 cy

b. In Front of Abutment

Assumed Depth of Excavation = 3 ft

Length of Excavation = 43.255 ft

Excavation Cross-Sectional Area = 4.5 sft

Volume per Abutment = 194.65 cft

= 7.2092 cy

c. Behind and Infront of wingwall

Length of Wingwall = 17 ft

Wingwall Height = 9.2192 ft

Additional Length to Excavation = 1.5 ft

Grand total = 329 cy

Excavation Cross-Sectional End Area = 56.326 sft

Volume per Wingwall = 319.18 cft

= 11.822 cy

(This volume is assumed to lap with the volume behind the abutment. So, this overlap deals with the soil on the outside.

(Width of Foundation * Length of Foundation * Assumed Depth) - (Volume of Pier Column) = Volume

= 185.86 cft Per Column

Number of Columns = 15 Total = 2787.9 cft

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 5	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE:	3/4/2025	
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT:	Quantity Calculations	

509E10000 EPOXY COATED REINFORCING STEEL **TOTAL: 209,334.00 LB**

Deck	143777.00	lbs
Abutment and Wingwall	12238.00	lbs
Pier	38042.00	lbs
Railing	15277.00	lbs
Total =	209334.00	lbs

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 6	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE:	3/4/2025	
PROJECT LOCATION:		SUBJECT:	Quantity Calculations	

509E20001	CONCRETE REINFORCEMENT, REPLACEMENT OF EXISTING CONCRETE REINFORCEMENT, AS PER PLAN	TOTAL:	1,000.00	LB

Total from general notes = 1000 lbs

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 7	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:		SUBJECT: Quantity Calculations		

509E25000 UNCOATED STEEL REINFORCEMENT TOTAL: 1,600.00 LB

A518 BAR = 245 LB

A604 BAR = 1298 LB

A527 BAR = 44 LB

A528 BAR = 13 LB

TOTAL = 1600 LB

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 8	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:		SUBJECT: Quantity Calculations		

509E30020	NO. 4 DEFORMED GRFP REINFORCEMENT	TOTAL:	13,528.00	FT

From Rebar Calcs = 13528 ft

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 9	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

510E10001	DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT, AS PER PLAN	TOTAL:	216.00	EACH

Number of A518 bars = 54

Number of A604 bars = 162

Total Number of Dowels = 216

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	75926	0	0
CHECKED BY:	DOR	SHEET #: 10	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

511E34446 CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK **TOTAL: 525.00 CY**

Interior Deck

Bridge Deck Thickness	=	8.50	in	=	0.71	ft	
Width	=	28.68	ft				
Bridge Floor Length	=	490.00	ft				

Total = 490.00 x 28.68 x 0.71 = 9955.51 cft

Overhang Deck

Bridge Deck Thickness	=	11.875	in	=	0.99	ft	
Total Width	=	7.98	ft				
Bridge Floor Length	=	490.00	ft				

Total = 490.00 x 7.98 x 0.99 = 3871.05 cft

Haunch

Average Haunch Thickness	=	2.126	in	=	0.18	ft	
Haunch Width	=	15.80	in	=	1.32	ft	
Span 1 Beam Length	=	66.05	ft				
Span 2 Beam Length	=	92.00	ft				
Span 3 Beam Length	=	84.00	ft				
Span 4 Beam Length	=	84.00	ft				
Span 5 Beam Length	=	95.25	ft				
Span 6 Beam Length	=	69.05	ft				
Total Length	=	490.35	ft				
No. of Beams per Span	=	3.00					

Total = 490.35 x 1.32 x 0.18 x 3.00 = 343.22 cft

Total Volume = 9955.51 cft + 3871.05 cft + 343.22 cft

= 14169.78 cft

= 525.00 cy

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 11	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

511E34451	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK (PARAPET), AS PER PLAN	TOTAL: 137.00	CY

SBR-3 Concrete Rail

Concrete Height	=	3.00	ft							
Concrete Top Width	=	0.83	ft							
Concrete Bottom Width	=	1.50	ft							
Rail Length	=	490.00	ft	+	490.00	ft	+	16.6145	ft	= 996.61 ft

*Extra at Ends on Approach Slab

Total = 3488.15 cft = 129.19 cys

SBR-3 Transition

Concrete Volume	=	1.74	cys	(Standard Bridge Drawing SBR-3-20)
No. of Transition	=	3.00		

Total = 5.22 cys

Impact Attenuator Transition

Transition Volume	=	1.74	cys	
SBR-3 C to E Volume	=	0.46	cys	Average end area for sections between L and N on Plans
Concrete Block Volume	=	0.48	cys	
Combined	=	1.76	cys	Transition - C to E + Block

Total Volume = 129.19 cys + 5.22 cys + 1.76 cys

= 137.00 cys

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 12	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

511E40512 CLASS QC1 CONCRETE WITH QC/QA, PIER ABOVE FOOTINGS TOTAL: 177.00 CY

Columns

Pier 1 Height	=	17.96	ft	(ELEV F - ELEV G + 3')
Pier 2 Height	=	18.66	ft	
Pier 3 Height	=	20.00	ft	
Pier 4 Height	=	18.31	ft	
Pier 5 Height	=	17.09	ft	

Column Width = 3.5 ft

Volume = 98.4 cy

Pier Cap

Pier 1 Cap Height	=	3.16	ft
Pier 2 Cap Height	=	3.19	ft
Pier 3 Cap Height	=	3.22	ft
Pier 4 Cap Height	=	3.05	ft
Pier 5 Cap Height	=	3.28	ft

Top Area = 14.81 sy

Volume = 78.5 cy

Total = 177 cy

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 13	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

511E44112 CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT NOT INCLUDING FOOTING TOTAL: 83.00 CY

Rear Abutment

Average Abutment Height = 9.08 ft
Average Stem Height = 4.75 ft
Average Backwall Height = 4.32 ft

Backwall Area = 6.94 sft
Stem Area = 18.828 sft

Length of Abutment = 39.255 ft

Volume = 1092.7 cft
= 40.5 cy

Corner Backwall
Length = 2.50 ft (Each Side)

Volume = 75.057 cf

Corner Fillet
Top area = 2.33 sf (Measured in CAD)
Height = 2.57 ft (6" below app slab seat)

Volume = 6.0 cf

Forward Abutment

Average Abutment Height = 9.36 ft
Average Stem Height = 5.05 ft
Average Backwall Height = 4.31 ft

Backwall Area = 6.91 sft
Stem Area = 20.03 sft

Length of Abutment = 39.255 ft

Volume = 1141.0 cft
= 42.3 cy

Corner Backwall
Length = 2.50 ft (Each Side)

Volume = 77.529 cf

Corner Fillet
Top area = 2.33 sf (Measured in CAD)
Height = 2.56 ft (6" below app slab seat)

Volume = 6.0 cf

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 14	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

511E46012	CLASS QC1 CONCRETE WITH QC/QA, RETAINING/WINGWALL NOT INCLUDING FOOTING	TOTAL: 43.00	CY

Wingwall

Side Area				Block Area			
Rear Left	=	128.28	sf	Rear Left	=	46.706	sf
Rear Right	=	124.53	sf	Rear Right	=	43.103	sf
Forward Left	=	123.87	sf	Forward Left	=	43.772	sf
Forward Right	=	128.5	sf	Forward Right	=	52.689	sf
Side Thickness	=	1.5	ft	Block Thickness	=	2	ft

Fillet Volumes

Rear Left	=	11.096	cf
Forward Right	=	11.796	cf

Volume per Wingwall

Rear Left	=	296.92	cf
Rear Right	=	273.01	cf
Forward Left	=	273.34	cf
Forward Right	=	309.93	cf
Total	=	1153.2	cf
	=	43	cy

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 15	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

512E10100 SEALING OF CONCRETE SURFACES (EPOXY-URETHANE) TOTAL: 1,553.00 SY

Sealing of Railing on Bridge

Height of Railing =	3	ft
Slanted Face =	3.0542	ft
Top of Railing =	0.9271	ft
Deck Thickness =	0.9167	ft
Deck Lip =	0.1667	ft
Under Deck Limit =	0.5	ft
Sum =	8.5646	ft
Total Length of Railing =	980.33	ft
Subtotal =	8396.2	sf

Sealing of Railing for BTA (Conservative)

Height of Railing =	3	ft
Slanted Face =	3.0542	ft
Top of Railing =	0.9271	ft
Deck Lip =	0.1667	ft
Sum =	7.148	ft
Total Length of Railing BTA =	53.313	ft
Impact Block Railing Total =	175.79	sf
Subtotal =	556.87	sf

Sealing of Abutments

Height of slope below Beam Seat =	1	ft
Beam Seat Width =	2.25	ft
Backwall Height - Joint =	3.9067	ft
Length of Beamseat =	39.167	ft
Area of Abutment on Beamseat =	280.3	sf
Length of Side of Beamseat =	5.2547	ft
Area of Beamseat Sides =	5.2547	sf
Length of Rest of Abutment =	3.8272	ft
Area of Rest of Abutment =	18.779	sf
Area of Single Abutment =	304.34	sf
Number of Abutments =	2	
Subtotal =	608.67	sf
Total =	13975	sf
=	1553	sy

Sealing of Wingwalls

Average Height =	2.745	ft	(Beamseat to 0)
Length of Wingwall =	17	ft	
Odd Wingwall =	15.917	ft	
Side Area of Wingwalls =	183.69	sf	
Width Face of Wingwall =	1.5	ft	
Height of Abut. and Below =	5.49	ft	
Number of Wingwalls =	4		
Face of Abutment Area =	32.94	sf	
Subtotal =	216.63	sf	

Sealing of Piers

Average Column Height =	18.40	ft	
Average Soil Height =	4.00	ft	(Conservative)
Circumference of Column =	10.996	ft	
Pier Cap Perimeter =	81.662	ft	
Average Pier Cap Height =	3.18	ft	
Top Area =	133.29	sf	
Bottom Area =	104.42	sf	
Subtotal =	4196.7	sf	

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 16	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE:	3/4/2025	
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT:	Quantity Calculations	

512E33000	TYPE 2 WATERPROOFING	TOTAL:	30.00	SY

Height	=	3	ft
Width of abutment backwall	=	43.573	ft
One Abutment	=	130.72	ft
Total	=	261.44	ft
	=	29.049	sy

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 17	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

513E10240 STRUCTURAL STEEL MEMBERS, LEVEL 2 — TOTAL: 550,447 LB

Beam

					Beam Used	Weight (lbs/ft)	Beam Weight (lbs)
(Add 0.5 ft on end)	Span 1	=	66.05	ft	W40x199	199	13144
	Span 2	=	92.00	ft	W40x199	199	18308
	Span 3	=	84.00	ft	W40x199	199	16716
	Span 4	=	84.00	ft	W40x199	199	16716
	Span 5	=	95.25	ft	W40x199	199	18955
(Add 0.5 ft on end)	Span 6	=	69.05	ft	W40x199	199	13741
						Total Weight =	97580 lbs

No. of Beams Lines = 5.00

Weight of Steel Beam = 97580 ft x 5.00
= 487902.4 lb

Cross Frame

Steel Section	=	L3.5x3.5x3/8
Weight per linear foot	=	8.5 lb/ft
Length of Cross Frames	=	29.412 ft
Total Number of Cross Frames	=	72.00

Strut

Steel Section	=	L3.5x3.5x3/8
Weight per linear foot	=	8.5 lb/ft
Length of Strut	=	14.538 ft
Total Number of Struts	=	62.00

Skewed Crossframe

Steel Section	=	L4x4x1/2
Weight per linear foot	=	12.80 lb/ft
Number of Skewed Cross Frames	=	20.00
Assumed Length Increase	=	34.64

End Diaphragm

Steel Section	=	L4x4x3/8
Weight per linear foot	=	9.80 lb/ft
Length of Angles	=	23.01
Number of Skewed Cross Frames	=	8.00

Total Weight of Framing = 29.412 ft x 8.5 lb/ft x 72.00
+ 14.538 ft x 8.5 lb/ft x 62.00
+ 23.006 ft x 9.8 lb/ft x 8.00
+ 34.64 ft x 12.80 lb/ft x 20.00
= 36332.0 lb

Adding 5% for connections and splice

Total weight = 550,447 lb

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 18	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE:	3/4/2025	
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT:	Quantity Calculations	

513E20000	WELDED STUD SHEAR CONNECTORS	TOTAL:	9,400.00	EACH

Shear stud connector per beam line	=	1880	ea.	(From Shear Stud Calculations)
Total Beam Lines	=	5		
Total	=	9400	ea.	

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 19	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

514E00060 FIELD PAINTING STRUCTURAL STEEL, INTERMEDIATE COAT TOTAL: 31,801.00 SF

Beam

For W40x199

h	=	38.70	in
w	=	15.80	in
tw	=	0.65	in
tf	=	1.07	in
*Painting region	=	10.29	ft

*(top flange width not considered for painting)

Span 1 Beam Length	=	66.05	ft
Span 2 Beam Length	=	92.00	ft
Span 3 Beam Length	=	84.00	ft
Span 4 Beam Length	=	84.00	ft
Span 5 Beam Length	=	95.25	ft
Span 6 Beam Length	=	69.05	ft
Total Length	=	490.354	ft
No. of Beams per Span	=	5.00	

Surface Area = 10.29 ft x 490.35 ft x 5.00

= 25232.8 sf

Framing

For L3.5x3.5x3/8				For L4x4x3/8				For L4x4x1/2			
h	=	3.50	in	h	=	4.0	in	h	=	4.0	in
w	=	3.50	in	w	=	4.00	in	w	=	4.00	in
tw	=	0.38	in	tw	=	0.38	in	tw	=	0.50	in
tf	=	0.38	in	tf	=	0.38	in	tf	=	0.50	in
Painting region	=	1.17	ft	Painting region	=	1.33	ft	Painting region	=	1.33	ft
Length	=	3019.020	ft	Length	=	184.048	ft	Length	=	692.711	ft
Surface Area	=	3522.19	sf		=	245.40	sf		=	923.62	sf

Adding 40% to Framing for connections plates and Splice

Total Surface Area = 31,801.00 sf

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 20	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE:	3/4/2025	
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT:	Quantity Calculations	

514E00066	FIELD PAINTING STRUCTURAL STEEL, FINISH COAT	TOTAL:	31,801.00	EACH

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 21	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

516E11210	STRUCTURAL EXPANSION JOINT INCLUDING ELASTOMERIC STRIP SEAL	TOTAL:	85.00	FT

Forward Abut = 42.281 ft

Rear Abut = 42.281 ft

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 22	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

516E13900	2" PREFORMED EXPANSION JOINT FILLER	TOTAL:	79.00	SF

Wingwall and Approach Slab Lengths

Northwest =	15.748	ft	
Southwest =	15.269	ft	
Northeast =	15.269	ft	
Southeast =	16.54	ft	
Sum =	62.823	ft	
Height =	1.25	ft	(Approach slab thickness)
Total =	79	sf	

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 23	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

516E44001	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (FIXED)	TOTAL:	5.00	EACH

Total Beam Lines = 5

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 24	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

516E44201	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (EXPANSION)	TOTAL:	5.00	EACH

Total Beam Lines = 5

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 25	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

516E44201	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (EXPANSION)	TOTAL:	5.00	EACH

Total Beam Lines = 5

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 26	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

516E44201	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (EXPANSION)	TOTAL:	5.00	EACH

Total Beam Lines = 5

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 27	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

516E44201	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (EXPANSION)	TOTAL:	5.00	EACH

Total Beam Lines = 5

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 28	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

516E44201	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (EXPANSION)	TOTAL:	5.00	EACH

Total Beam Lines = 5

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 29	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

516E44201	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (EXPANSION)	TOTAL:	5.00	EACH

Total Beam Lines = 5

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 30	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

518E21200 POROUS BACKFILL WITH GEOTEXTILE FABRIC **TOTAL: 89.00 CY**

Abutments

Total Top area = 148.49 sf

Top area of Wingwall Blocks	=	31.989 sf	Height of Wingwall Block	=	4.90 ft
Top Area of Wingwall Fillet	=	2.335 sf	Height of Wingwall Fillet	=	4.90 ft
Top Area of Corner Fillet	=	2.335 sf	Height of Corner Fillet	=	2.57 ft

Volume of Concrete in Way = 174.31 cf

Volume of Total Top Area = 1368.9 cf

Volume Per Abutment = 1194.6 cf

= 44.246 cy

Total = 89 cy

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 31	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE:	3/4/2025	
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT:	Quantity Calculations	

518E40000	6" PERFORATED CORRUGATED PLASTIC PIPE	TOTAL:	114.00	FT

Total = 114 ft See LAK-6 Drainage Pipe Length Calculation

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 32	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

518E40010	6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS	TOTAL:	102.00	FT

Grand Total = 102 ft See Drainage Pipe Length Calculation

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 33	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

526E25001	REINFORCED CONCRETE APPROACH SLABS (T=15"), AS PER PLAN	TOTAL:	209.00	SY

Reinforced Bridge Approach Slab

Area Measured in CAD for Rear Approach	=	99.39	sy
Area Measured in CAD for Forward Approach	=	109.08	sy

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 34	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

526E90010	TYPE A INSTALLATION	TOTAL:	83.00	FT

Rear Approach = 40.433 ft

Forward Approach = 41.71 ft * slightly different than usual, but similar

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 35	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

601E20000	CRUSHED AGGREGATE SLOPE PROTECTION	TOTAL:	642.00	SY

Rear Abutment

Slope = 26.565 deg

Area measured in CAD = 2350.6 sf Area adjusting from Slope = 1.118

Toe of Slope Key Length = 75.621 ft

Area = 2703.7 sf

= 300.41 sy

Forward Abutment

Area measured in CAD = 2674.2 sf Area adjusting from Slope = 1.118

Toe of Slope Key Length = 78.477 ft

Area = 3068.4 sf

= 340.93 sy

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 36	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE:	3/4/2025	
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT:	Quantity Calculations	

607E39901	VANDAL PROTECTION FENCE, 6' STRAIGHT, COATED FABRIC, AS PER PLAN	TOTAL:	742.00	FT

Length of Protection fence over North Railing	=	380	ft
Length of Protection fence over South Railing	=	361.635	ft
Total	=	742	ft

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 37	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

625E33001	STRUCTURE GROUNDING SYSTEM, AS PER PLAN	TOTAL:	1.00	EACH

Abutment Electrodes	=	4	(Note 4 in HL-50.21)
Number at Pier 2	=	2	(Note 5 in HL-50.21)
Number at Pier 4	=	2	(Note 3 in HL-50.21)
Total	=	8	

CHA COMPUTATION PAD

		PROJECT	PHASE	ORG
COMPLETED BY:	CAE	74567	0	0
CHECKED BY:	DOR	SHEET #: 38	OF 38	
PROJECT NAME:	LAK-6-2.06	DATE: 3/4/2025		
PROJECT LOCATION:	Willoughby Hills (LAK County)	SUBJECT: Quantity Calculations		

846E00111	POLYMER MODIFIED ASPHALT EXPANSION JOINT SYSTEM, AS PER PLAN	TOTAL:	35.00	CF

Width =	1.6667	ft
Thickness =	0.25	ft
Length of Joint Rear =	40.433	ft
Length of Joint Fwd. =	41.71	ft
Total =	35	cf