

JOB TITLE:
 JOB NO.: SHEET NO.:
 CALCULATED BY: DATE: **4/21/2022**
 CHECKED BY: DATE:

AASHTO-LRFD 2004 - CONCRETE SLAB & WALL DESIGN

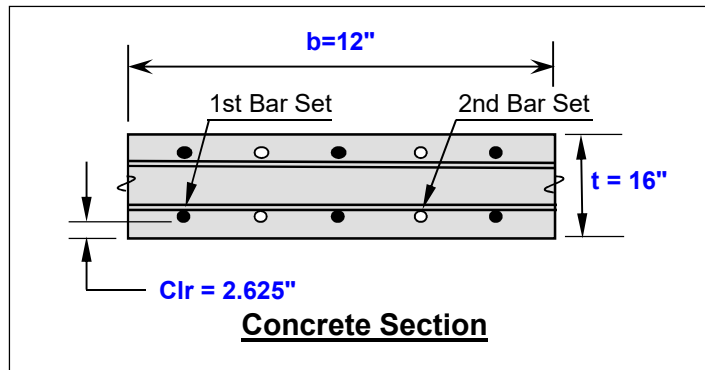
LOCATION OF DESIGN SECTION: Some Location

FLEXURE CHECK:

Factored Moment, Mu =	20.51	k-ft
Service Moment, Ms =	16.49	k-ft
Concrete Strength, f'c =	4.50	ksi
Yield Strength, fy =	60.00	ksi
Total Depth, t =	16.00	in
Effective Width, b =	12.00	in
1st Bar Set Size =	#6	
1st Bar Set Spacing =	8.00	in
2nd Bar Set Size =	None	
2nd Bar Set Spacing =	0.0	in
Average Bar Spacing =	8.00	in
Reinforcing Bar Area =	0.66	si
Clear Cover =	2.625	in
Effective Depth, de =	13.00	in

SHEAR CHECK:

Vu Max =	15.55	kips
Mu @ Vu Max =	20.51	k-ft
Φ Shear =	0.9	



STRENGTH DESIGN CAPACITY:

Φ =	0.9
β =	0.65
a =	0.86 in

$\Phi M_n = \Phi A_s F_y (d - a/2)$

Φ Mn =	37.33	k-ft	OK
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MAXIMUM REINFORCING CHECK:

ρ Max = 0.017404

As Max =	2.71	si	OK
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MINIMUM REINFORCING CHECK:

S5.4.2.6	fr =	0.509	ksi
	S =	512	in ³
S5.7.3.3.2-1	Mcr =	21.72	k-ft

Mr ≥ Lesser of:	1.2 x Mcr =	26.07	k-ft	S5.7.3.3.2(a)
	1.33 x Mu =	27.28	k-ft	S5.7.3.3.2(b)
	Mr =	37.33	k-ft	OK

Shrink. & Temp. Steel, As min. =	0.35	si	S5.10.8.2
As Prov. =	0.66	si	OK

CRACK CONTROL:

AASHTO LRFD 5.7.3.4:

Z ₁ =	170 for moderate exposure conditions,
Z ₂ =	130 for severe exposure conditions,
Z ₃ =	100 for precast box culverts,
Z ₄ =	155/β for cast-in-place box culverts;
=	122.919 k/in

Allowable Stress in Reinforcing:

dc =	2.375	in
A =	38.00	
Z(Input) =	133	k/in
fa =	29.655	ksi

Actual Stress in Reinforcing:

ρ =	0.004	
n =	7.50	
ρn =	0.032	
k =	0.222	
j =	0.926	
fs =	24.908	ksi
	OK	

SHEAR CHECK:

$V_u > \Phi V_c$ $\Phi V_c = \Phi \left[0.0676 \sqrt{f'_c} + 4.6 \frac{A_s V_u d_e}{b d} \right] b d_e =$ **22.38** kips **OK**

