

Appendix L
Safety Improvements

KY 194 Guardrail

Description	Unit	Quantity	Unit Cost	Cost
Guardrail-Steel W Beam-S Face	LF	625	\$ 25	\$ 15,625
End Treatments	Each	54	\$ 2,000	\$ 108,000
Total				\$ 123,625
Total Rounded			Rounded	\$ 130,000

KY 632 Guardrail

Description	Unit	Quantity	Unit Cost	Cost
Guardrail-Steel W Beam-S Face	LF	1425	\$ 25	\$ 35,625
End Treatments -	Each	102	\$ 2,000	\$ 204,000
Total				\$ 239,625
Total Rounded			Rounded	\$ 250,000

High Friction Pavement

High Friction Pavement	BEG MP	END MP	TOTAL LENGTH (ft)	COST / SQ YD*	LANE WIDTH (ft)	TOTAL COST (rounded)	PRIORITY
	20.5	21.0	0.5	\$ 23	11	\$ 148,000	7
22.4	22.9	0.5	\$ 23	10	\$ 135,000	3	
24.0	24.8	0.8	\$ 23	11	\$ 237,000	8	
0.1	0.7	0.6	\$ 23	11	\$ 178,000	4	
1.5	1.9	0.4	\$ 23	11	\$ 119,000	5	
2.6	3.2	0.6	\$ 23	11	\$ 178,000	2	
5.3	5.8	0.5	\$ 23	10	\$ 135,000	6	

*Unit Bid Tabulation from KY 194 HSIP High Friction September 2013 letting averaged \$23/sq yd.



3 Functionally Obsolete Bridges	Route	Bridge #	Milepoint	Feature Crossed	Description	Length (feet)	Type	Condition	Approach Width (feet)	Curb to Curb Width (feet)	Skew (degrees)	Design Load	Bridge Posting	Posting Status	Sufficiency Rating	Estimated Cost to Replace full width	X 0.25% Design, MOT, & Cont.	TOTAL	PRIORITY
	KY 194*	107N	25.16	JOHNS CREEK	1.5 MI E OF JCT KY 632	131.89	4 Span Concrete Tee Beam	Functionally Obsolete	22	22	45	H 15	5 At/Above Legal Loads	No Restriction	62.30	\$ 593,500	\$ 148,400	\$ 741,900	17
KY 632	111N	1.19	JOHNS CREEK	1.3 MI SE OF JCT KY 194	65.94	2-Span Concrete Tee Beam	Functionally Obsolete	22	24	0	H 15	P Posted for load	Posted for Load	67.40	\$ 297,000	\$ 74,300	\$ 371,300	10	
KY 632	136N	14.00	PETER CREEK	W @ JCT KY 194 @PHELPS	76.12	2-Span Concrete Tee Beam	Functionally Obsolete	28.9	25.9	30	H 20	5 At/Above Legal Loads	No Restriction	67.90	\$ 342,500	\$ 85,600	\$ 428,100	11	

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KY 194

Direction	Beg MP	Leading End Treatment	Description	End MP	Trailing End Treatment	Description	Comments
E				17.849		Radius Rail to approach Rt.	
E	17.864		Radius Rail to approach Rt	18.207	Terminal Section	Radius Rail around approach with Terminal Section End Treatment	
E	18.211	Terminal Section	Radius Rail around approach with Terminal Section End Treatment	18.324	Type 7	Type 7 Trailing End Treatment	Replace Type 7 with Type 4A or Type 1
E	18.349	Non-Standard End Treatment	Non-Standard End Treatment	18.394	Type 7		Replace leading Non-Standard End Treatment with Type 4A End Treatment, replace trailing End Treatment with Type 1 or Type 4A
E	18.405	Non-Standard End Treatment	Non-Standard End Treatment	18.506		Radius around approach	Replace leading Non-Standard End Treatment with Type 4A End Treatment, replace trailing End Treatment with Type 1 or Ty 4A
W	18.436	Type 7		18.416	Type 7	Doesn't appear to be a Type 7, rather rail turned down into ground	Replace leading Type 7 with Type 3, Trailing with Type 4A or Type 1
E	18.516		Radius around approach	18.705	Non-Standard End Treatment	End Treatment Non-Standard End Treatment with flair	Replace trailing End Treatment with Type 4A
E	19.565	Non-Standard End Treatment	Non Standard End Treatment	19.913	Terminal Section	Terminal Section ok it leads down drive out of clear zone	Replace leading Non-Standard End Treatment with Type 4A
E	19.923	Type 7		19.982	Type 7		Replace leading & Trailing End Treatment with Type 1
E	20.002		Radius around approach	20.002	Type 7		Replace trailing End Treatment with Type 4A or Type 1
E	20.107	Type 7		20.402	Terminal Section	sharp radius around entrance with Terminal Section End Treatment	Replace leading End Treatment with Type 4A or Type 1, replace trailing End Treatment with Type 4A
E	20.407	Terminal Section	Terminal Section on entrance, out of clear zone & protected by other GR string	20.468		Radius around approach	
E	20.478	Terminal Section	Terminal Section on approach	20.524	Terminal Section	Terminal Section wraps around entrance	Recommend extending leading & trailing rail down approach another section of Rail. Can leave Terminal Section End Treatment
W	20.524	Terminal Section	Terminal Section around entrance	20.483	Terminal Section	Terminal Section wraps around entrance	Replace trailing Terminal Section with Type 4A or Type 1, Recommend adding section of rail on leading Terminal Section on entrance
E	20.534	Terminal Section	Terminal Section around entrance	20.549	Terminal Section	Terminal Section around entrance	Recommend adding section of rail on leading and trailing Terminal Section

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Direction	Beg MP	Leading End Treatment	Description	End MP	Trailing End Treatment	Description	Comments
E	20.558	Terminal Section	Terminal Section around entrance	20.578	Terminal Section	Terminal Section around entrance	Recommend adding section of rail on leading and trailing Terminal Section
E	20.583	Type 7		20.659	Type 7		Replace Type 7's with Type 4A's or Type 1's
E	20.679	Terminal Section	Terminal Section around entrance	20.725	Terminal Section	Terminal Section around entrance	Recommend adding section of rail on trailing Terminal Section
E	20.77	Type 7		20.88	Type 7		Replace Type 7's with Type 4A's or Type 1's
E	21.015	Terminal Section	Terminal Section around entrance	21.345	Type 7		Replace Type 7 with Type 4A or Type 1
E	21.365	Terminal Section	Terminal Section around approach	21.675	Terminal Section	wraps around approach	Add section of rail to leading Terminal Section.
E	21.726	Non-Standard End Treatment		21.929	Type 7		Replace leading Non-Standard End Treatment with Type 4A, replace Type 7 with Type 1 or Type 4A
E	21.94	Terminal Section	Wraps around approach, OK	21.99	Terminal Section		Add section of rail to trailing Terminal Section.
E	22.221	Terminal Section	Terminal Section around entrance	22.596	Terminal Section	wraps around approach	Replace leading Terminal Section with Type 1 or Type 4A. Existing Trailing Terminal Section acceptable.
W	22.778	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	22.728	Type 7		Replace leading Non-Standard End Treatment & trailing Type 7 with Type 1 or Type 4A.
E	22.783	Type 7		22.964	Type 7		Replace Leading & Trailing Type 7 with Type 4A or Type 1
W	22.807	Terminal Section	Terminal Section at entrance	22.798	Terminal Section	Terminal Section at pulloff	Replace Leading & Trailing Terminal Section with Type 4A or Type 1.
E	23.264	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	23.482	Terminal Section	Terminal Section around entrance	Replace Leading Non-Standard End Treatment with Type 4A or Type 1. - Add section of rail to trailing End Treatment. Address RR steel used for slope
E	23.482	Terminal Section	Terminal Section around entrance	23.581	Terminal Section	Terminal Section around entrance	Add section of Rail to beginning Terminal Section. Replace Trailing Terminal Section with Type 4A or Type 1.
W	23.581	Terminal Section	Terminal Section around approach	23.561	Type 7		Replace leading Terminal Section with Type 4A End Treatment. Replace trailing Type 7 with Type 3

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Direction	Beg MP	Leading End Treatment	Description	End MP	Trailing End Treatment	Description	Comments
E	23.621	Type 7		23.99	Terminal Section	Terminal Section around approach	Replace leading Type 7 with Type 4A or Type 1. Trailing Terminal Section leads to small bridge, no good place to end rail
E	23.995	Terminal Section	Terminal Section around approach	24.22		Radius around approach	Add section of rail to leading Terminal Section. Several sections of RR Steel used to stabilize slides.
E	24.377	Type 7		24.456	Terminal Section		Replace leading Type 7 with Type 1 or Type 4A. Recommend extending rail on trailing Terminal Section.
E	24.465	Terminal Section	Terminal Section around entrance	24.55	Non-Standard End Treatment		Leading Terminal Section not desirable, but ok. Replace trailing Non-Standard End Treatment with Type 1.
E	24.565	Terminal Section	Terminal Section around entrance	24.621	Terminal Section	Terminal Section around entrance	Leading Terminal Section OK. Add section of rail to trailing End Treatment.
E	24.625	Terminal Section	Terminal Section around entrance	24.675	Terminal Section	Terminal Section around approach	Add section of rail to leading and trailing End Treatment's.
E	24.69	Terminal Section	Terminal Section around approach	24.72	Terminal Section	Terminal Section around entrance	Replace trailing Terminal Section with Type 4A.
E	24.882	Terminal Section	Terminal Section around approach	24.912	Type 7		Replace leading Terminal Section with Type 4A, and trailing Type 7 with Type 4A or Type 1
E	24.927	Type 7		25.062	Terminal Section	Terminal Section around entrance	Replace leading Type 7 with Type 1 or Type 4A. Trailing Terminal Section ok.
W	25.152	GR to Br	Non standard Guardrail to Bridge Connector	25.077	Terminal Section	Terminal Section around approach	Can leave Trailing or replace with Type 4A or Type 1.
E	25.096	Type 7		25.147	GR to Br	Non standard Guardrail to Bridge Connector	Replace Guardrail to Bridge End Connector. Replace leading Type 7 with Type 4A or Type 1.
E	25.172	GR to Br	Non standard Guardrail to Bridge Connector	25.182	Terminal Section	Terminal Section around pulloff	Replace Guardrail to Bridge End Connector. Replace Trailing Terminal Section with Type 4A or Type 2A
W	25.187	Non-Standard End Treatment	Non-Standard End Treatment around pulloff	25.177	GR to Br	Non standard Guardrail to Bridge Connector	Replace Leading Non-Standard End Treatment with Type 4A or Type 1, and replace Guardrail to Bridge End Connector
E	26.29	Terminal Section	Terminal Section around approach	26.295	Terminal Section	Terminal Section around entrance	Leading & Trailing Terminal Section acceptable.
W	26.3	Terminal Section	Terminal Section around entrance	26.29	Terminal Section	Terminal Section around entrance	Leading & Trailing Terminal Section acceptable.

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Direction	Beg MP	Leading End Treatment	Description	End MP	Trailing End Treatment	Description	Comments
W	26.633	Non-Standard End Treatment	Non-Standard End Treatment around pulloff	26.613	Terminal Section	Terminal Section around entrance	Replace Leading Non-Standard End Treatment with Type 4A. Extend GR on trailing end.
E	26.618	Terminal Section	Terminal Section around approach	26.628	Non-Standard End Treatment	Non-Standard End Treatment	Leading Terminal Section ok. Replace Trailing End Treatment with Type 4A

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Direction	Beg MP	Leading End Treatment	Description	End MP	Trailing End Treatment	Description2	Comments
			KY 632				
E	1.188						3 Bridge ends not protected with rail
E	2.238			2.269			Vertical drop into creek not protected with rail
E	2.948	Type 7		2.983	Type 7		Replace leading and trailing Type 7's with Type 1 or Type 4
E	3.708			3.748			Vertical drop into creek not protected with rail
E	3.947	Type 7		4.011	Type 7		Replace leading and trailing Type 7's with Type 1 or Type 4
E	4.037		Radius around Approach	4.06	Type 7		Replace trailing Type 7's with Type 1 or Type 4
E	4.08	Type 7		4.121	Type 7		Replace leading and trailing Type 7's with Type 1 or Type 4
E	5.104	Terminal Section	Radius around entrance	5.135	Terminal Section	Terminal Section around entrance	Add section of rail on Leading & Trailing Terminal Section
E	5.374	?	Non standard End Treatment	5.404	Type 7		Replace Non standard leading End Treatment and Type 7 trailing End Treatment with Type 1 or Type 4
E	5.45	Type 7		5.485	Terminal Section	Terminal Section around entrance	Replace leading and trailing End Treatment's with Type 1 or Type 4
E	5.637	Type 7		5.682	Type 7		Replace leading and trailing Type 7 with Type 1 or Type 4
E	6.313	Type 7		6.343	Type 7		Replace leading and trailing Type 7 with Type 1 or Type 5
W	8.276		Radius around Approach	8.205	Type 7		Replace trailing Type 7 with Type 1 or Type 4.
E	8.281	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	8.357	Terminal Section	Terminal Section around entrance	Replace leading Non-Standard End Treatment with Type 4. Add section of rail to trailing Terminal Section.
E	8.373	Terminal Section	Terminal Section around entrance	8.433	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Add section of rail on Leading Terminal Section. Replace trailing Non-Standard End Treatment with Type 1 or Type 4
E	8.454	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	8.993	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace leading & trailing Non-Standard End Treatment with Type 4 or Type 1.
E	9.043	Non-Standard End Treatment	Non-Standard End Treatment at entrance	9.191	Non-Standard End Treatment	Non-Standard End Treatment at entrance	Extend rail at leading & Trailing or replace with Type 4 or Type 1
E	9.201	Non-Standard End Treatment	Non-Standard End Treatment at entrance	9.328	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace leading & trailing Non-Standard End Treatment with Type 4 or Type 1

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Direction	Beg MP	Leading End Treatment	Description	End MP	Trailing End Treatment	Description2	Comments
E	9.348	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	9.45	Non-Standard End Treatment	Non-Standard End Treatment at entrance	Replace leading & trailing Non-Standard End Treatment with Type 4 or Type 1
E	9.455	Non-Standard End Treatment	Non-Standard End Treatment at entrance	9.481	Non-Standard End Treatment	Non-Standard End Treatment at entrance	Replace leading & trailing Non-Standard End Treatment with Type 4 or Type 1
E	9.491	Non-Standard End Treatment	Non-Standard End Treatment at entrance	9.521	Type 7		Replace leading Non-Standard End Treatment & trailing Type 7 with Type 4 or Type 1
W	9.729	Type 7		9.619	Type 7		Replace leading & trailing Type 7 with Type 1 or Type 4.
E	9.714	Type 7		9.74	Non-Standard End Treatment		Replace leading Type 7 & trailing Non-Standard End Treatment with Type 1 or Type 4.
E	9.75	Non-Standard End Treatment		9.873	Non-Standard End Treatment	county bridge at end of rail	Replace leading & trailing Non-Standard End Treatment with Type 1 or Type 4.
E	9.878	Non-Standard End Treatment	county bridge at beginning of rail	9.923	Non-Standard End Treatment		Replace leading & trailing Non-Standard End Treatment with Type 1 or Type 4.
E	9.938	Non-Standard End Treatment		9.953	Non-Standard End Treatment	county bridge at end of rail	Replace leading & trailing Non-Standard End Treatment with Type 1 or Type 4.
E	9.958	Non-Standard End Treatment	county bridge at beginning of rail	9.973	Non-Standard End Treatment		Replace leading & trailing Non-Standard End Treatment with Type 1 or Type 4.
E	9.978	Type 7		10.014	Non-Standard End Treatment	county bridge at end of rail	Replace leading Type 7 & trailing Non-Standard End Treatment with Type 1 or Type 4.
E	10.019	Non-Standard End Treatment	county bridge at beginning of rail	10.034	Non-Standard End Treatment	county bridge at end of rail	Replace leading Non-Standard End Treatment & trailing Terminal Section with Type 1 or Type 4.
E	10.044	Non-Standard End Treatment	county bridge at beginning of rail	10.065	Non-Standard End Treatment	county bridge at end of rail	Replace leading Non-Standard End Treatment & trailing Terminal Section with Type 1 or Type 4.
E	10.07	Non-Standard End Treatment	county bridge at beginning of rail	10.096	Non-Standard End Treatment	county bridge at end of rail	Replace leading Non-Standard End Treatment & trailing Terminal Section with Type 1 or Type 4.
E	10.106	Non-Standard End Treatment	county bridge at beginning of rail	10.131	Non-Standard End Treatment	Non-Standard End Treatment at entrance	Replace leading Non-Standard End Treatment & trailing Terminal Section with Type 1 or Type 4.
E	10.136	Non-Standard End Treatment	Non-Standard End Treatment at entrance	10.366	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace leading Non-Standard End Treatment & trailing Terminal Section with Type 1 or Type 4.
E	10.396	Non-Standard End Treatment	Non-Standard End Treatment at entrance	10.457		radius around approach	Replace leading Non-Standard End Treatment with Type 4 or Type 1.
E	10.463		Radius around Approach	10.474	Type 1		
E	10.509	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	10.704	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace leading & trailing Non-Standard End Treatment with Type 4 or Type 1.
E	10.724	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	11.244	Non-Standard End Treatment	Non-Standard End Treatment	Replace leading & trailing Terminal Section with Type 4 or Type 1.

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Direction	Beg MP	Leading End Treatment	Description	End MP	Trailing End Treatment	Description2	Comments
E	11.309	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	11.436	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace leading & trailing Non-Standard End Treatment with Type 4 or Type 1.
E	11.476	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	12.09	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace leading & trailing Non-Standard End Treatment with Type 4 or Type 1.
E	12.13	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	12.383	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace leading & trailing Non-Standard End Treatment with Type 4 or Type 1.
E	12.403	Non-Standard End Treatment	Non-Standard End Treatment around approach	12.503	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace leading & trailing Non-Standard End Treatment with Type 4 or Type 1.
E	12.533	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	12.822		Radius around approach - ties to bridge	Replace leading Non-Standard End Treatment with Type 4 or Type 1.
E	12.827	Terminal Section	Radius around approach- ties to bridge	12.892	Type 7	GR ends before county bridge	Replace Type 7 with Type 4 or Type 1
E	12.912	Type 7	county bridge at beginning of rail	13.021		radius around to county road bridge	Replace Type 7 with Type 4 or Type 2
E	12.026		radius around county road approach to bridge	13.111	Type 7	Ties down before county bridge	Replace Type 7 with Type 1 or Type 4
E	13.121	Type 7	Ties down before county bridge	13.14	Type 7	Ties down before county bridge	Replace leading & trailing Type 7 with Type 1 or Type 4.
E	13.15	Type 7	Ties down before county bridge	13.246	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace Type 7 and Non-Standard End Treatment with Type 1 or Type 4.
E	13.289	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	13.464	?	End Treatment obscured	Replace leading Non-Standard End Treatment with Type 4 or Type 1.
E	13.498	?	End Treatment obscured	13.518	Type 7	county bridge at end of rail	Replace Type 7 with Type 4 or type 1.
E	13.528	Type 7	county bridge at beginning of rail	13.589	Type 7	county bridge at end of rail	Replace leading & trailing Type 7 with Type 1 or Type 4.
E	13.559	Type 7	county bridge at beginning of rail	13.64	Type 7	county bridge at end of rail	Replace leading & trailing Type 7 with Type 1 or Type 4.
E	13.65	Type 7	county bridge at beginning of rail	13.745	Type 7		Replace leading & trailing Type 7 with Type 1 or Type 4.
E	13.754	Terminal Section	extends down entrance - ok	13.799	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace trailing Non-Standard End Treatment with Type 1 or Type 4.
E	13.859	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	13.854	Non-Standard End Treatment	Non-Standard End Treatment at entrance	Replace Leading & trailing Non-Standard End Treatment with Type 1 or Type 4.
E	13.859	Type 7		13.908	Non-Standard End Treatment	Non-Standard End Treatment at pulloff	Replace leading Type 7 & trailing Non-Standard End Treatment with Type 1 or Type 4.
W	13.908	Non-Standard End Treatment	Non-Standard End Treatment at entrance	13.889	Non-Standard End Treatment	Non-Standard End Treatment around approach	Replace leading & Trailing Non-Standard End Treatment with Type 1 or Type 4.

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Direction	Beg MP	Leading End Treatment	Description	End MP	Trailing End Treatment	Description2	Comments
	14						Protect bridge ends with GR.