

ATTACHMENT E -- METROLINK ASSET INSPECTION SUMMARY



Metro

Los Angeles County
Metropolitan Transportation Authority

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December 13, 2016

SUBJECT: METROLINK ASSET INSPECTION SUMMARY: VALLEY & VENTURA LINES SUMMARY FINDINGS

Metro Engineering staff was asked to provide targeted inspections of several bridges and culverts on the Metrolink Valley and Ventura Subdivision Lines. On November 23, 2016 a team of Metro staff accompanied by Metrolink field personnel conducted the site visit of the Valley Subdivision as requested. The survey of the Ventura Subdivision took place December 8, 2016. The assets inspected are listed in Figures 1 and 2 below (all assets listed are from the “Priority A List” for the “Valley and Ventura Subdivisions” as provided by Metrolink, See *Attachment A*). The following table presents Metro’s independently derived Condition Rating and Recommendations for each of these assets: (The individual inspection reports for these structures are included as *Attachment C* of this brief):

Figure 1: Valley Subdivision: Structures Inspected by Metro

Mile Point:	Name:	Age:	Metro Condition Rating:	Metro Recommendation:
50.51	Bridge 2	107 yrs.	3	Replace
50.57	Culvert 5	66 yrs.	4	Repair Defects and Continue Inspections
50.64	Bridge 1	107 yrs.	3	Replace
50.77	Bridge 4	107 yrs.	3	Replace
52.66	Bridge 7	86 yrs.	4	Repair Defects and Continue Inspections
55.19	Bridge 9	72 yrs.	5	Repair Defects and Continue Inspections
55.91	Culvert 1	94 yrs.	3	Replace

Figure 2: Ventura Subdivision: Structures Inspected by Metro

Mile Point:	Name:	Age:	Metro Condition Rating:	Metro Recommendation:
452.1	Bridge 2	100 yrs.	4	Repair Defects and Continue Inspections
458.71	Bridge 1	91 yrs.	3	Replace

ANALYSIS (Bridges and Culverts):

For the nine ‘Priority A’ assets inspected (listed above), Metro believes five (5) of these structures (those listed with a Condition Rating of “3”) are candidates for replacement.

Of the five assets identified for replacement four of the structures are bridges and one is a culvert. The Metrolink Inspector Condition Ratings for the assets that Metro inspected vary from 4 to 5 indicating a fair to satisfactory condition. However, Metrolink’s Engineering Assessment Ratings are all 3. Note that decimal Metrolink Engineer’s Assessment Rating Codes (3.x, as shown in *Attachment A*) have been

rounded up or down to the nearest whole number as applicable for comparison to Metro’s assigned condition rating. In this case, Metro’s assigned Condition Ratings concur with Metrolink’s Engineering Assessment Rating. Refer to the following Table 1 for a comparison:

TABLE 1	Metro:	Metrolink:	
Asset Name: (Mile Point)	Condition Rating:	Engineer’s Assessment Rating:	Inspector’s Condition Rating:
50.51	3	3.0	5
50.64	3	3.0	5
50.77	3	3.0	5
55.91	3	3.0	4
458.71	3	3.0	4

Metro Cost Estimating Staff has contributed their input and experience in developing a Rough Order of Magnitude cost estimate required to replace the four bridges and culvert. The usual construction cost for railroad bridges is in the order of \$1,500 per square foot. As these four bridges are relatively small in footprint a higher cost of \$2,000 per square foot may be used. Due to the simplicity of the culvert installation, a lower cost estimate of \$1,500 per square foot is appropriate for this structure. The approximate removal and construction costs are presented in Table 2 below:

TABLE 2: Estimated Demolition and Construction Costs for 4 bridges and 1 culvert:

Asset Name: (Mile Point)	Square Footage:	Cost Dollars	Contingency (30% Dollars)	Metro’s Total: (Dollars)	Metrolink’s Total: (Dollars)
50.51	26 x 6	\$ 312,000	\$ 94,000	\$ 406,000	\$ 840,000
50.64	26 x 8	\$ 416,000	\$ 125,000	\$ 541,000	\$ 840,000
50.77	27 x 8	\$ 432,000	\$ 130,000	\$ 562,000	\$ 840,000
55.91	27 x 8	\$ 324,000	\$ 97,000	\$ 421,000	\$ 350,000
458.71	42 x 15	\$ 1,260,000	\$ 378,000	\$ 1,638,000	\$ 1,960,000
Sum:				\$ 3,568,000	\$ 4,830,000

ANALYSIS (Rail Ties):

Metro’s Director of Track Work Engineering observed the condition of the ties along the Valley Subdivision and agrees that the ties within the zones indicated by Metrolink in *Attachment A*, do require replacement. This would include the 8,450 ‘Group A’ ties and 8,000 Group B Ties identified. The ties are spaced at approximately 20 inches on center; therefore this would result in a total of 5 miles of replacement on the Valley Subdivision. Replacement of these ties would be in compliance with FRA Track Safety Standards Compliance Manual.

CONCLUSION:

In conclusion, Metro Engineering's Assessment of Metrolink's provided list of 'Priority A' structures (bridges and culverts) is that only approximately half of these structures are recommended for replacement. As noted on page 1 of this report, Metro's recommendation is for Replacement of roughly half of the assets we inspected. The remainder of the structures, in our opinion, are in 'Fair to Satisfactory' condition and we recommended that repairs (as detailed in the individual inspection reports, see *Attachment C*) are performed for the defects identified. These 'Fair to Satisfactory' structures may then be inspected on a regular schedule and reevaluated in the future.

Metro's Rough Order of Magnitude cost estimate approximately is 25% less than the estimate provided by Metrolink. Track ties will require replacement. Approximately 5 miles of ties are recommended for replacement along the Valley Subdivision this includes both 'Priority A' and 'Priority B' identified segments (see *Attachment A*). Metro agrees that the rail ties require replacement within the segments indicated by Metrolink.

Regards,

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Attachments:

Attachment A:

Bridge & Rail Tie Rehabilitation Project Priority List (As Provided by Metrolink, November 2016)

Attachment B:

SCRRRA: Bridge and Safety Management Condition and Priority Defect Rating System

Attachment C:

Selected Bridge and Culvert Inspection Reports (By Metro for Metrolink)

Bridge - Rehabilitation Project Priority List (As Provided by Metrolink, November 2016):

Bridge Rehab Projects Priority List															
Subdiv/Category	Priority	MP	Cost	Scope	Year Built	Engineer's Assessment Rating	Inspector's Condition Rating	Inspection Date	Begin Contract	Finalize Contract Pkg	Advertise Contract	Award Contract	Begin Construction	End Construction	
Valley	Priority A Bridges	1	50.64	\$840,000	Replace rail top	1909	3.2	5	7/14/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		2	50.51	\$840,000	Replace rail top	1909	3.3	5	7/14/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		3	46.91	\$840,000	Replace rail top	1938	3.3	5	7/22/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		4	50.77	\$840,000	Replace rail top	1909	3.4	5	7/13/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		5	47.45	\$500,000	Replace rail top	1938	3.4	5	7/20/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		6	50.46	\$840,000	Replace rail top	1909	3.5	5	7/15/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		7	52.66	\$500,000	Replace rail top	1930	3.5	5	7/12/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		8	44.98	\$500,000	Replace rail top	1944	3.5	5	8/4/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		9	55.19	\$500,000	Replace rail top	1944	3.5	5	7/11/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		10	47.03	\$840,000	Replace rail top	1938	3.6	5	7/21/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		11	47.39	\$1,120,000	Replace rail top	1938	3.6	5	7/21/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		12	48.08	\$500,000	Replace rail top	1938	3.6	4	7/19/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		13	54.05	\$500,000	Replace rail top	1946	3.6	5	7/12/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
	Subtotal		\$9,160,000												
Valley	Priority B Bridges	1	8.41	\$500,000	Replace rail top	1906	3.9	5	9/20/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		2	10.63	\$1,260,000	Replace rail top	1906	3.9	5	9/19/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
	Subtotal		\$1,760,000												
Valley	Priority A Culverts	1	55.91	\$350,000	Replace clay pipe - collapsed	1922	3.2	4	8/13/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		2	53.84	\$350,000	Replace timber box	1904	3.3	4	8/17/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		3	49.99	\$280,000	Replace timber box	1922	3.4	4	11/9/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		4	44.16	\$280,000	Replace timber box	1939	3.4	4	1/9/16	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		5	50.57	\$280,000	Replace timber box	1980	3.4	4	10/20/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		6	55.75	\$280,000	Replace timber box	1927	3.5	5	8/18/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		7	48.74	\$280,000	Replace clay pipe - joint displacement	1900	3.5	4	11/11/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		8	54.13	\$280,000	Replace clay pipe - crushing, displacement	1922	3.6	5	8/17/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		9	59.42	\$350,000	Replace cast iron pipe - cracking, displacement	1922	3.6	4	8/13/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		10	66.78	\$420,000	Replace RCP - separated joints	1921	3.7	4	8/4/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		11	52.99	\$700,000	Replace aged cast iron pipe	1900	3.7	3	10/26/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		12	49.69	\$280,000	Replace CMP - deflected; strut added	1988	3.8	4	11/9/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		13	49.53	\$420,000	Replace aged cast iron pipe	1900	3.8	5	11/10/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		14	52.32	\$350,000	Replace aged cast iron pipe	1900	3.9	5	10/27/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
		15	52.38	\$420,000	Replace aged cast iron pipe	1900	3.9	5	10/27/15	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
	Subtotal		\$5,320,000												
Ventura	Priority A Bridges	1	488.71	\$1,960,000	Replace Timber Trestle - major cracking	1925	3.0	4	3/8/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		2	452.1	\$840,000	Replace rail top	1916	3.3	5	3/14/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
	Subtotal		\$2,800,000												
Ventura	Priority B Bridges	1	436.96	\$655,200	Replace rail top	1939	3.9	5	4/1/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
		2	484.12	\$655,200	Replace rail top	1901	3.9	5	4/4/16	11/1/2016	7/1/2017	8/1/2017	10/1/2017	11/1/2017	2/1/2018
	Subtotal		\$1,310,400												
Ventura	Priority B Culverts	1	436.46	\$150,000	Replace culvert - part rail top	1925	3.9	4	10/16/14	11/1/2016	1/31/2017	2/28/2017	4/30/2017	6/1/2017	8/1/2017
			Subtotal		\$150,000										

Rail Tie - Rehabilitation Project Priority List (As Provided by Metrolink, November 2016):

Track Projects Priority List						
Priority Designation	Priority A Projects	Value	Condition Notes	Timeline		
1	2500 Ties between MP 46 - MP 48, MP 63 - MP 64	\$500,000	Over 30% of the wood ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017		
2	3000 Ties between MP 52 - MP 54	\$825,000	Approximately 25% of the Wood Ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017		
3	Lang Station Rd Crossing	\$400,000	Crossing and track structure need to be replaced (Main Track and siding)	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017		
4	2950 Ties between MP 54 - MP 59	\$787,500	Up to 20% of the wood ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017		
5	Acton Spur Turnout	\$500,000	Spur was constructed in 1966. Speed in siding was just raised due to Acton Project. Turnout needs to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017		
	Total Priority A Track Projects:	\$3,012,500				
	Priority B Projects					
1	4000 Ties Between MP 9 - MP 11	\$1,000,000	Over 30% of the wood ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017		
2	4000 Ties Between MP 6 - MP 8	\$1,000,000	Approximately 25% of the Wood Ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017		
	Total Priority B Track Projects:	\$2,000,000				

ATTACHMENT A

Ventura Subdivision	Priority Designation	Priority A Projects	Value	Condition Notes	Timeline
	1	2700 Ties between MP 447 - MP 450	\$675,000	Over 30% of the wood ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
	2	1300 Ties between MP 444 - MP 446	\$325,000	Approximately 25% of the Wood Ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
	3	Turnout at MP 460	\$375,000	Turnout needs to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
	4	800 Ties Between MP 451 - MP 452	\$200,000	Up to 20% of the wood ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
	5	3600 Ties Between MP 458 - MP 462	\$900,000	Approximately 15% of the Wood Ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
	6	3600 Ties Between MP 454 - MP 458	\$900,000	Approximately 10%-15% of the Wood Ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
	Total Priority A Track Projects:		\$3,375,000		
	Ventura Subdivision	Priority Designation	Priority B Projects	Value	Condition Notes
1		3400 Ties between MP 434 - MP 439	\$850,000	Over 30% of the wood ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
2		2400 Ties Between MP 430 - MP433	\$600,000	Approximately 25% of the Wood Ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
3		Rail Replacement - Curve 439.24 (1650')	\$247,500	Curve needs to be transposed from high side to low side, with new rail on the high side. Low Rail has already been transposed and was originally placed in 1966. High Rail is experiencing some gauge and head wear and still has some life in it. Head-Free rail to be replaced as well.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
4		1200 Ties Between MP 427 - MP 429	\$300,000	Approximately 20% of the Wood Ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
5		Turnout at CP Santa Susana	\$375,000	Turnout needs to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
6		Katherine Rd Crossing	\$400,000	Crossing and track structure need to be replaced (Main Track and Siding)	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
7		Rail Replacement - Curve 433.1 (1100')	\$165,000	Curve needs to be transposed.	
8		Hidden Ranch Drive Crossing	\$400,000	Crossing is 33 years old and needs to be rehabilitated.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
9		600 Ties Between MP 433 - MP 434	\$150,000	Approximately 15% of the Wood Ties in this segment need to be replaced.	Advertise Contract - 2/2017; Award Contract/NTP - 4/2017; Begin Construction - 6/2017; End Construction - 12/2017
Total Priority B Track Projects:		\$3,487,500			
Note: 2350' of rail on another project was removed from the list resulting in a reduction for the Subdivision of \$150,000.					

ATTACHMENT B

SCRRA: Bridge and Safety Management Policy 7.4.1 Condition and Priority Defect Rating System:

Condition Codes:

1	Failed , Stop Trains.
2	Imminent Failure , Take appropriate action. Provide detailed inspection.
3	Poor , Defects are sound with serious or advancing defects. Interim inspections warranted.
4	Fair , Defects are sound with minor problems. Interim inspections warranted.
5	Satisfactory , Minor defects or exceptions.
6	Good , No defects or exceptions noted.

Priority Codes:

Code:	Correction Period:	Description:
A	15 days	Imminent safety issue (non-redundant failure or failure of direct load path)
B	1 year	Early or Pre-failure (redundant systems or indirect load path)
C	3 years	Non-critical defects (not immediate safety concern).
D	5 years	Monitor Defects.

MTA / SCRRA JOINT REVIEW – VALLEY SUBDIVISION



Picture 1: One of two SCRRA Hy-Rail Vehicles used to complete the field visit with MTA.

As part of SCRRA's on-going efforts to secure Track and Structures rehabilitation funding SCRRA and MTA staff took part in a joint review of portions of the Valley Subdivision deemed to be at risk for potential speed reductions if rehabilitation work is delayed.

On November 23, 2016 6 staff from MTA and 5 from SCRRA conducted a Hy-Rail trip from approximately Milepost 58 (Aliso

Canyon Road) to Milepost 48 (Burke Road Private Crossing). The purpose of the trip was for MTA staff to review proposed rehabilitation work locations, priorities, and provide context as to what projects MTA provided funding would address.

The primary focus of the review was wood crosstie and structure condition but other aspects of railroad rehabilitation work such as rail, crossings, and embankments were reviewed, including potential mud slide conditions caused by the Sand brush fire in July.

In addition to reviewing general conditions from the Hy-Rail vehicles the group stopped several times to more carefully examine crosstie and structure conditions, particularly of the older bridges of the "Rail Top" design type.

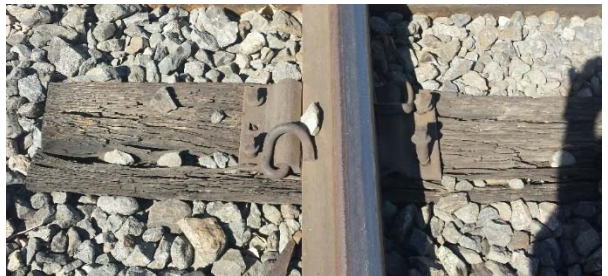
Overall, it was the consensus of the MTA team that certain segments of the crosstie conditions visited, as reported by SCRRA, were approaching serious levels of deterioration, and while still meeting FRA Track Safety Standards it is reasonable that substantial crosstie replacement projects should begin as soon as possible.



Picture 2: SCRRA Staff and MTA Staff Inspecting a Wood Box Culvert on the Valley Subdivision



Picture 3: Failed Tie Condition on the Valley Subdivision



Picture 4: Failed Tie with Raised Lags



Picture 5: The inside of one of the top 3 Priority "Rail-Top" Bridges on the Valley Subdivision

Similarly, it was agreed that 3 of the 5 of SCRRRA's highest priority bridges and 1 of 2 culverts visited for replacement were sufficiently justified for replacement as soon as possible. It was also determined that two of the lower priority bridges and one of the culverts visited, likely could be further assessed and possibly deferred a number of years in order to concentrate available funding on the most urgent candidates.

The MTA and SCRRRA representatives intend to conduct similar reviews of the Ventura, San Gabriel and River Subdivisions in order to more effectively prioritize and allocate rehabilitation funding.

Participants in this Hy-Rail Review were:

MTA:

Sam Mayman, Jeanet Owens, Androush Danielians, Zoric Sheynman, Craig Remley, Dan Mahgerefteh

SCRRRA:

Darrell Maxey, Wayne Mauthe, Aaron Azevedo, Daniel Villagomez, Ivan Robles



Picture 6: SCRRRA and MTA Staff inspecting a "Rail-Top" Bridge on the Valley Subdivision