Memo

To:	Kevin Porter, P.E. City of Sparks

From:	Brian Janes, P.E.	Email:	brian.janes@atkinsglobal.com
Date:	2 March 2020	Phone:	775-789-9831
Ref:	100057174	cc:	

Subject: East Prater Storm Drain Design

The intersection of East Prater Way and Vista Boulevard has been impacted and inundated by runoff from short duration, high intensity storms several times in recent years. The most recent was 2017 where the intersection was shut down for approximately 8 hours and under approximately 1 foot of water which caused a major impact to motorists, businesses, and the public safety response.

The intersection of East Prater Way and Vista Boulevard is a critical intersection for the City. It accommodates approximately 28% of the north/south travel through Sparks. The average annual daily traffic count north and south on Vista Boulevard for 2018 was 27,100 vehicles. Impacts to this intersection affect a significant amount of the traveling public, adjacent businesses, and critical care/emergency response facilities (Brookdale Sparks, Brookdale Vista, Renown Urgent Care, Sparks PD, Enchanted Preschool, Northern Nevada Medical Center, and various assisted living support services). When this type of incident occurs, one to two Sparks police officers need to be posted to control the intersection and traffic backs up all the way to the I-80 Vista offramp. Diverted traffic is forced onto limited adjacent routes and creates a widespread traffic jam. Closure of the intersection takes critical resources from the police department as well as affects response time for fire and medical services which can no longer access the intersection. The widespread gridlock also significantly affects response times for police, fire, and medical services.

Inundation of the intersection is primarily due to the large contributing watershed of the Pah Rah Range (east of Vista) and the flat topography on Vista Boulevard and East Prater Way. The design team developed a design for a pump station that will convey an additional 30 cfs (+/-) from the intersection to the North Truckee Drain and protect the intersection for storms up to the 5-year return interval. During larger events, the intersection will still flood but will have a reduced duration. To protect the intersection against larger events, it is recommended that runoff be retained/detained within the Pah Rah Range before it impacts the intersection.

This preliminary construction cost estimate is more than what was originally budgeted due to current construction costs and the pump station; however, given the criticality of the intersection and the anticipated performance of the pump station, the team recommends this approach. Given a pump station life cycle of approximately 60 years with a pump replacement estimated at 30 years, we estimate that the pump station will achieve a benefit/cost ratio of 1.0 at approximately year 15 and a ratio of over 3.0 for its lifecycle. The benefit/cost calculation approximated costs for: emergency response impact, traffic delay, business loss, environmental issues, and direct closure costs.

Vista-Prater SD Cost / Benefit Ratio

Project Cost		
Construction Cost	$	4,074,702
O&M Cost/Yr	$	35,000
Pump Repl(30 yr)	$	210,000

Project Benefit		
Hourly Impact for 5-year RI		8
Direct Cost to Close Intersection	$	11,136
Emergency Response Impact	$	480,000
Traffic Delay Impact	$	685,712
Business Impact	$	198,000
Environmental Impacts	$	21,447
Total cost	**$**	**1,396,295**

(Full impact felt every 5 years, 1/3 impact every 2.5 years with significant minor storm)

	Cost		Benefit		Ratio
Year 1	$	4,109,702			
Year 2	$	4,144,702	$	460,777	0.111
Year 3	$	4,179,702			
Year 4	$	4,214,702			
Year 5	$	4,249,702	$	1,857,073	0.437
Year 6	$	4,284,702			
Year 7	$	4,319,702	$	2,317,850	0.537
Year 8	$	4,354,702			
Year 9	$	4,389,702			
Year 10	$	4,424,702	$	3,714,145	0.839
Year 11	$	4,459,702			
Year 12	$	4,494,702	$	4,174,923	0.929
Year 13	$	4,529,702			
Year 14	$	4,564,702			
Year 15	$	4,599,702	$	5,571,218	1.211
Year 16	$	4,634,702			
Year 17	$	4,669,702	$	6,031,995	1.292
Year 18	$	4,704,702			
Year 19	$	4,739,702			
Year 20	$	4,774,702	$	7,428,290	1.556
Year 21	$	4,809,702			
Year 22	$	4,844,702	$	7,889,068	1.628
Year 23	$	4,879,702			
Year 24	$	4,914,702			
Year 25	$	4,949,702	$	9,285,363	1.876
Year 26	$	4,984,702			
Year 27	$	5,019,702	$	9,746,140	1.942
Year 28	$	5,054,702			
Year 29	$	5,089,702			
Year 30	$	5,334,702	$	11,142,436	2.089
Year 31	$	5,369,702			
Year 32	$	5,404,702	$	11,603,213	2.147
Year 33	$	5,439,702			
Year 34	$	5,474,702			
Year 35	$	5,509,702	$	12,999,508	2.359
Year 36	$	5,544,702			
Year 37	$	5,579,702	$	13,460,286	2.412
Year 38	$	5,614,702			
Year 39	$	5,649,702			
Year 40	$	5,684,702	$	14,856,581	2.613
Year 41	$	5,719,702			
Year 42	$	5,754,702	$	15,317,358	2.662
Year 43	$	5,789,702			
Year 44	$	5,824,702			
Year 45	$	5,859,702	$	16,713,654	2.852
Year 46	$	5,894,702			
Year 47	$	5,929,702	$	17,174,431	2.896
Year 48	$	5,964,702			
Year 49	$	5,999,702			
Year 50	$	6,034,702	$	18,570,726	3.077
Year 51	$	6,069,702			
Year 52	$	6,104,702	$	19,031,504	3.118
Year 53	$	6,139,702			
Year 54	$	6,174,702			
Year 55	$	6,209,702	$	20,427,799	3.290
Year 56	$	6,244,702			
Year 57	$	6,279,702	$	20,888,576	3.326
Year 58	$	6,314,702			
Year 59	$	6,349,702			
Year 60	$	6,384,702	$	22,284,871	3.490

Direct Cost to Close Intersection	Qty	Unit Price/ hr	Total	Duration
Officers / patrol cars	4	100	$ 3,200	
PW Staff / trucks	4	68	$ 2,176	
Loader/sweeper/vactor/10 wheeler	4	180	$ 5,760	
Emergency Response Impact				
Fire	1	15000	$ 120,000	
PD	2	15000	$ 240,000	
EMT	1	15000	$ 120,000	
Traffic Delay Impact				
Peak Evening AADT	7236			
Private Trips	5427	14	$ 303,912	*4 hr impact
Commercial Trips	1809	50	$ 361,800	*4 hr impact
Accident Damage	2	$10,000	$ 20,000	
Business Impact				
Commercial Industrial Area Along Vista Dr	85	100	$ 68,000	
Businesses North of Prater/ Vista Int to Los Altos	35	100	$ 14,000	*4 hr impact
Businesses in Truckee Meadows (outside Sparks)	450	20	$ 36,000	*4 hr impact
Financial Impact to NNMC, Renown	2	5000	$ 80,000	
Environmental Impacts				
Carbon Emissions	7236	0.05	$ 1,447	*4 hr impact
Stormwater quality		10000	$ 10,000	
Sanitary Sewer Overflow		10000	$ 10,000	