ATTACHEMENT 7 – ECONOMIC ANALYSIS – FLOOD DAMAGE REDUCTION COST AND BENEFITS

The existing California Avenue Storm Drain Basin (the Basin) has insufficient capacity to store the urban stormwater runoff from a series of back-to-back storm events like the ones the City of San Joaquin (the City) experienced this past year. During back-to-back storm events, stormwater fills the basin to capacity and floods into City streets via storm drain inlets and manholes. The attached exhibit titled Estimated Limits of Potential Street Flooding shows the streets expected to flood when the basin reaches capacity. In order to prevent flooding, the City has been forced to rent, setup, and operate a portable pump to dewater the Basin between storm events. This operation is not permanent and is not a fail-safe against potential flooding, and requires expenditure of many man hours and energy.

The initial cost of the project will consist of construction of the lift station and associated facilities. This initial cost includes: administration, environmental compliance, engineering, construction administration, and contingencies. From Table 6 of Attachment 4, the initial cost of the project is $234,390. In addition to the initial cost, the project will have annual operation and maintenance costs over the project life of 20 years, and a replacement cost for the pumps at 10 years. Based on these costs, the total present value of discounted costs is $253,737. Table 14 provides a breakdown of the calculation of the total present value of discounted costs.

The benefits of the Project include:

- avoided physical damage to City infrastructure
- avoided transportation system disruptions
- avoided emergency response costs for dewatering, debris removal, and cleanup.

The Project will create a permanent solution to prevent flooding due to lack of capacity of the Basin. The City will have the capability to dewater the basin between storm events through the use of a permanent lift station, without expending time and resources on renting and manning the temporary pump.

Without the Project, the Basin has the potential to overflow during back-to-back storm events like the City experienced this past year. When this takes place, stormwater floods into City streets, causing damage to City street infrastructure. The primary damage caused by street flooding is damage to the asphalt concrete street surface. It was assumed that damage would occur to asphalt concrete 2 inches in thickness for the limits shown on the map Estimated Limits of Potential Street Flooding. Table 11, Figure 1, and Table 12 were used to calculate the present value of expected annual damage benefits. The present value of expected annual damage benefits is $55,056.

Street flooding due to overflow of the Basin can also cause transportation system disruptions. Street flooding has the potential to limit the use of the street by drivers. With the Project, street flooding will be prevented, allowing full use of streets by drivers and eliminating potential detours or dangers to drivers. The Project will allow for the function of the transportation network as designed.

Over the years, flooding due to overflow of the basin has inflicted costs on the City. The City has been forced to pay for rental of portable pumps to dewater the Basin. The City has also been required to use its own manpower hours to dewater the Basin and cleanup streets. Approximately 300 man hours are spent annually on preventative measures, monitoring, dewatering, and cleanup. The project will eliminate the time and funds the City is forced to incur for temporary dewatering and cleanup operations. The cost savings for elimination of temporary dewatering operations are calculated in Table E1. The total present value of discounted cost savings is $132,418.

The City has approximately 4,000 residents; 94% of whom have low-moderate incomes, per a HUD-CDBG authorized survey, and 35% are below the federal poverty level, per the U.S. Census. They endure chronic high unemployment (40.6% in January 2011) and many other indicators of decades of socio-economic distress. As a result, City resources are limited. The public infrastructure is outdated, and can only be improved with the help of federal and state grant funds.

The Basin is immediately adjacent to 84 multi-family units of affordable housing, 20 additional units of senior housing, and approximately 46 single family homes on surrounding streets. The basin serves more than 20% of the dwelling units in the City. The proposed project will prevent the potential for flood damage to the residences adjacent to the Basin, to City streets, and will remove the need for emergency City action.

Table 11 - Event Damage

Hydrologic Event	Event Probability	Damage if Flood Structures Fail[1]	Probability Structural Failure		Event Damage		Event Benefit ($)
			Without Project	Wth Project	Without Project	With Project	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
					(c.) x (d)	(c.) x (e)	(f) -g)
10-Year	0.100	$ -	0.00	0.00	$ -	$ -	$ -
20-Year	0.050	$ 137,200	0.50	0.00	$ 68,600	$ -	$ 68,600
50-Year	0.020	$ 137,200	1.00	0.00	$ 13 ,200	$ -	$ 137,200

(1) Assumed damage to asphalt pavement of flooded streets.

Table 12 - Present Value of Expected Annual Damage Benefits

(a)	Expected Annual Damage Without Project		$ 4,800
(b)	Expected Annual Damage With Project		$ -
(c.)	Expected Annual Damage Benefit	(a) - (b)	$ 4,800
(d)	Present Value Coefflcient[1]		11.47
(e)	Present Value of Future Benefits	(c.) x (d)	$ 55,056

[1]6% discount rate20 -year analysis period

Figure 1 - Loss-Probability Curve