

## 5. Drainage Facilities

<i>Classification</i>	<i>Description</i>	<i>Tracs</i>	<i>CO #</i>	<i>Savings</i>
Jack and Bore	In lieu of jacking and boring a 24" storm drain pipe, the storm drain was installed using the more conventional method of trenching.	H659801C	1	(\$5,037.75)
Manhole	Eliminate construction of new manhole and replace it with a storm drain collar. Existing access to storm drain system is located within 100 feet. This eliminated a massive excavation necessary to construct the manhole, resulting in minimal impact to traffic.	H643401C	126	(\$4,724.50)
Pump House	The contractor redesigned the pump house outlet structure from a pressurized system to a gravity feed system. These design changes resulted in reduced piping, simplified outlet controls and reduced pump requirements. Also the shoring system required to construct the pump station walls was redesigned from a standard cast-in-place wall to a permanent soldier-beam tieback retaining wall system.	H561001C	11	(\$193,664.00)
Storm Drain	Although the plan's did not allow the option of cast-in-place pipe for various storm drains due to the type of soil, the contractor provided the designer geotechnical data for specific locations which the designer found conducive for CIP pipe.	H387601C	33	(\$56,007.50)
	In lieu of constructing the manholes as shown on the plans, the storm drain system was modified by shifting the location of the trunk line and catch basins were modified to provide access.	H441502C	2	(\$19,493.00)
	VE proposal to eliminate concrete keyed pipe collars required during the installation of several of the corrugated metal pipe runs.	H457201C	3	(\$8,876.96)
	Substitute the 78" & 60" storm drain pre-cast pipe with the same size cast-in-place pipe.	H483102C	3	(\$24,009.00)
	Relocate the storm drain main trunk so adjacent catch basins tie directly into it; this eliminated the need for most manholes.	H502801C	6	(\$33,441.92)
	The contractor recognized that by extending two pipe culverts to drain into a main box culvert was less expensive than draining the two culverts into a single box culvert and then tying the box culvert into the main box culvert.	H538101C	17	(\$10,139.00)
	The contractor recognized a cost savings to the storm drain system: 1. Rather than tie catch basins directly into the main storm drain, at certain locations they tied into a collector line which in turn tied into the main storm drain. This facilitated construction because the main storm drain was significantly deeper than the catch basins. 2. Eleven manholes were eliminated from the storm drain system by realigning the storm drain in several locations. This eliminated angle points in the system, where manholes would have been needed.	H538101C	5	(\$60,172.95)
	The plans call for a new 18" collector line that ties into an existing parallel running 90" storm drain. In lieu of a section of the 18" collector, tie catch basins directly into the 90" storm drain.	H560901C	4	(\$22,785.00)

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Storm Drain	The contractor realized a savings could be generated by simplifying the construction of pipe tie-ins. Fabrication of special "T" and "Y" sections of pipe was eliminated. Instead the tie-ins were constructed by continuing existing pipe line, cutting out tie-in, inserting connecting pipe and forming collars.	H568604C	14	(\$37,800.00)
	The contractor proposed a minor realignment of a 8' x 8' box culvert storm drain system which significantly reduced the fill height above the box culvert. The reduced fill enabled the contractor to redesign the 8' x 8' box culvert to a 108" diameter cast-in-place pipe.	H591201C	20	(\$55,713.61)
	The contractor recognized that by realigning a 96" pipe, and thus reducing the fill on top of it, allows the pipe to be constructed as cast-in-place in lieu of a specially designed D-load.	H591201C	7	(\$80,850.00)
	In lieu of lining existing culverts these were replaced by new culverts. This allowed changes in the construction sequencing phasing, thereby reducing quantities of temporary concrete barrier and temporary impact attenuators.	H595505C	3	(\$82,260.00)
	In lieu of removal of the existing CBC and adjoining manhole, the proposed CMP was constructed inside the existing CBC and a baffle wall was constructed where the new CMP ties into the existing manhole.	H604801C	1	(\$4,741.51)
	The contractor proposed to use some of the waste to build false cut with some drainage channels resulting in shorter pipe runs. Also by changing some manhole locations, pipe runs were shortened.	H630101C	1	(\$50,091.81)
	Revise drainage system to eliminate the need to close roadway during construction of pipe run and junction structure.	H643401C	54	(\$2,455.05)
	The Contractor proposed an alternative temporary storm drainage system, which eliminates installation and removal of temporary catch basins and storm drain pipes. The Contractor will modify the permanent drainage system to utilize it for temporary drainage as well.	H787401C	8	(\$23,790.11)
Temporary Drainage	Relocate temporary crossover at the end of the project, negating the need for temporary drainage CMP.	H595507C	11	(\$23,647.50)
Utility Conflict	Modify design of storm drain system to reduce and/or eliminate water line realignments detailed in plans.	H510601C	19	(\$57,398.99)
	Contract plans specify RCP, Class HE III 19" x30" pipe because the as-builts showed a conflict with the proposed storm drain and an existing SRP line. The contractor potholed this area to confirm that a 24" pipe could be installed below the SRP irrigation line without conflict. As a result of the contractor's findings, HDPE pipe may be substituted for the specified RCP pipe at considerable cost savings.	H538101C	16	(\$10,890.79)