

CMGC Process Report –Construction Phase

For
500 South; 1100 West to I-15
Bountiful, Utah



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Purpose

In accordance with the Memorandum of Understanding SEP 14 (MOU) for Alternative Contracting Process, the CMGC Construction Phase report addresses the following topics from Section 4.1:

- The evaluation criteria applicable to the project.
- The innovations used and an analysis of their savings.
- Comparative analysis between the project final cost and the Independent Cost Estimate (ICE).
- Project data that will aid in the formulation of the Annual Report of all projects to be submitted to FHWA.

In accordance with the Project Justification guidelines outlined in the MOU, “All 7 criteria do NOT have to be considered”. This report will only focus on those items that apply to this project. The evaluation criteria from the MOU that are applicable to this project are:

- A. Design and Constructability
- B. Project Schedule
- C. Risk
- D. Benefit to the Public

In addition to the information required in the MOU, this report contains more information that the Utah Department of Transportation (UDOT) requires for internal evaluation. This information includes a discussion of change orders, a comparison of overruns and under runs, a comparison of advertising date vs. the signed construction contract date, and an explanation of scope extensions.

This report discusses the implementation of the CMGC process during construction on 500 South from 1100 West to I-15 in Bountiful, Utah. This project constitutes the “Urban Reconstruction” project for Region 1 in accordance with the Process (Section 3) of the MOU. This report is the conclusion of the Design Phase report previously published and available on line.

Project Overview

This project, located in Bountiful and West Bountiful, Utah, involves correcting existing roadway geometric design deficiencies, and widening the existing two-lane roadway to five lanes, with two lanes in each direction, and a center turn lane. Shoulders with bike lanes and curb, gutter, and sidewalk are also included. The project includes new pavement, storm drain, utility relocations, curb and gutter, and sidewalks. The project was divided into four phases. The first phase was for utilities, early procurement,

and some demolition. Phase two covered the north half of the roadway, and phase three covered the southern half. The final phase extended the project west from 1100 West to I-15.

The 5th South Bountiful project was beset by economic difficulties. The project was awarded to Geneva Rock Products on June 11, 2008. At that time Geneva Rock Products submitted their pricing proposal stating that the work would be done with a 12% profit margin. This was less than most projects they were bidding at the time but they felt committed to win this project and understood that most of the risk should be mitigated by the time construction commenced. By the time the project was ready to bid many of the bids that UDOT was awarding had profit margins well below the 12% due to nationwide economic difficulties. UDOT felt that Geneva Rock should lower their profit margins to match the difficulties of the other contractors. Geneva Rock felt confident that the input they had given throughout the design had saved the state millions in value engineering efforts and risk mitigation. Furthermore, the proposal that had awarded them the project listed the 12% profit margin and they felt that this amount became contractual. UDOT agreed and moved forward with the project.

As design proceeded it became evident that many of the complexities of this project would result in the need to increase scope. With budget dollars already stretched the economics of the project became tense and many communications between upper management at UDOT and the Contractor showed signs of strain. The contractor was asked to defend his pricing and budget projections. Oddly enough, when compared to other urban widening projects that utilized Design Bid Build processes, the bidding ratios were very similar (ratios of bidding to state average prices of 1.11 for the Wall Street widening project SP-0079(3) compared to 1.12 for 5th South Bountiful). Despite this unfortunate economic pressure, the local team worked well to move the project forward showing a remarkable amount of partnering and innovation that can only be achieved through innovative contracting methods. For more discussion on scope creep and tracking see Appendix D.

Construction Costs

During selection the team determined that the project would be priced about 5% higher than the state pricing averages for the bid items analyzed. Upon award the resulting prices were about 12% above the state averages. For more discussion on the bid analysis please refer to *CMGC Process Report – Design Phase for 500 South; 1100 West to I-15 STP-0068(16)68; Bountiful, Utah*. UDOT contracted with Geneva Rock to provide construction services under the CMGC process for all phases as outlined in Table 1. Table 2 shows the final costs associated with the project including change orders and bid item overruns/underruns.

Table 1 5th South Bountiful Bid Prices

Description	Project No.	PIN	Bid Price	ICE	EE	ICE % Difference
Phase I	S-0068(57)68	7437	\$839,398.00	\$1,080,846.10	\$830,783.40	-22.3%
Phase II	F-0068(58)68	7658	\$8,834,794.00	\$8,347,015.50	\$8,493,950.18	5.8%
Phase III	STP-0068(16)68	4178	\$5,028,377.50	\$4,749,306.95	\$5,105,057.86	5.9%
Phase IV	F-0068(63)68	8218	\$532,809.90	\$555,192.70	\$477,040.50	-4.0%
Total Project			\$15,235,379.40	\$14,732,361.25	\$14,906,831.94	3.4%

Table 2 5th South Bountiful Total Costs

	S-0068(57)68	F-0068(58)68	STP-0068(16)68	F-0068(63)68	Total
Awarded Bid	\$839,398.00	\$8,834,794.00	\$5,028,377.50	\$532,809.90	\$15,235,379.40
Planned Change Orders	\$0.00	\$822,789.90	\$0.00	\$0.00	\$822,789.90
Unplanned Change Orders	\$6,244.66	\$529,380.98	\$354,713.10	\$3,422.40	\$893,761.14
Overruns/ Under runs	-\$12,387.00	\$336,567.86	\$41,102.44	\$59,506.93	\$424,790.23
Incentives/ Disincentives	\$2,500.00	\$6,500.00	-\$3,960.00	\$2,000.00	\$7,040.00
Bituminous/ Fuel Adjustments	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$835,755.66	\$10,530,032.74	\$5,420,233.04	\$597,739.23	\$17,383,760.67

Project Goals

UDOT determined that success on this project required a balance of the following outcomes:

- A high level of safety for motorists, pedestrians, and workers.
- A high level of public satisfaction with the business and property owners, motorists, and other stakeholders through minimizing impacts to traffic.
- Safe disposal of contaminated ground water and soils encountered during construction.

- Construction of a new storm drain system and relocation of utilities associated with the project completed by February 2009.
- Completion of overall project by December 2009 (first 3 phases only).

Key project elements affecting the achievement of these goals include: the level of coordination with business and homeowners, impacts to motorists, coordination with railroad operations (Union Pacific, UTA, and Holly Oil); utility relocations, right-of-way clearance, traffic control (especially routing of tanker trucks to the filling station near 800 West); overall constructability, and project construction phasing.

Innovations – Value Engineering

Throughout the design process the contractor was very careful to document the suggestions that were made by the team. These innovative ideas were evaluated by UDOT and the designers to verify that all ideas were in the best interest of the state. A list of the cost saving innovations that were implemented on the project is presented in Table 3. The top four innovative savings are discussed below, for further discussions on all innovations please see Appendix B. The contractor estimates that cost savings achieved through the use of CMGC was over \$3.8 million as compared to traditional designs and processes that would be achieved through Design Bid Build efforts.

Table 3 Innovations for 5th South Bountiful

Value Engineering - Item	Estimated Direct Savings	Cost of Risk
Balanced Grade	\$364,000.00	\$400,000.00
PCCP versus HMA ¹	\$140,000.00	NA
Comparative Life of PCCP vs. HMA ²	\$2,000,000.00	NA
Slip Line Pipe in Existing Storm Drain	\$540,000.00	High - Avoided trenching or boring through sensitive petrochemical utilities
Specialized Equipment for Installation	\$400,000.00	High - Avoided relocating fiber optic line adjacent to excavation
Install Casings for Utilities	\$85,000.00	High - Avoided later payment to re-route existing utilities with trench or bore operations.
Non-destructive Post Holes	\$150,000.00	High - Avoided underground utilities
Change of Pipe Type to meet Site Conditions	\$130,000.00	High - would have required raising the roadway approximately 1 foot at 1100 West
Create Topsoil on Site	\$50,000.00	NA
Total Estimated Savings	\$3,859,000.00	
Notes: 1. Direct Savings was reduced based on the actual quantities installed per contract to 70,000 sq. yds. 2. Estimate based on providing 2 bonded wearing courses over a 40 year life		

PCCP vs. HMA

The original pavement section for the roadway included a bonded wearing course, HMA, free draining fill, and granular borrow all on top of geogrid. This 36 inch complicated section was more difficult to construct than a traditional 20 inch section of Portland Cement Concrete Pavement (PCCP). The contractor suggested that the roadway section be changed to PCCP. The justification for the change was based on the following reasons:

1. The reduced pavement section resulted in reducing the impact to buried utilities by 90 percent.
2. Current prices for PCCP were about the same cost as asphalt pavement; however, the volatility of the oil market was experiencing wild swings in prices. Since UDOT has standard provisions

to pay for changes in the oil market, the costs associated with the risk were very high. Cement prices remained fairly constant.

3. The service life of PCCP was much higher than a traditional asphalt pavement. The team estimated that with asphalt the roadway would require two coatings of a bonded wearing course over the life span to match PCCP's service life. This cost alone accounts for more than half of the innovative savings reported.

Balance of Roadway Cut and Fill

Besides reducing the impact to buried utilities within the pavement section, the contractor suggested raising the vertical alignment of the roadway 4 inches. This change in the vertical alignment of the roadway enabled balancing of the cut and fill volumes and thereby removed the cost of trucking and spoiling cut materials. Besides avoiding utilities, the team was also weary of the mitigation of hazardous materials in the soil once encountered. Lessening the impact of excavation in any sense would prove beneficial in the long run.

Slip-Lining Existing Storm Drains

Due to the heavy congestion of buried utilities under the roadway, replacing the existing storm drain pipe using open trench methods or boring would have been very expensive, result in costly delays, and create high risks of damaging sensitive utilities. Much of the risk was due to a number of high pressure petrochemical pipes under the roadway. Furthermore, boring would have required permitting by the railroad with associated flagging operations. However, by slip-lining the existing storm drains with smaller smoother pipe, the flow capacity could still be met while avoiding the high risks of boring.

At one location, the existing pipe crossing the roadway was a 48 inch metal corrugated pipe on either end but when the work proceeded it was determined that the previous installation had converted the pipe crossing to a 48 inch arch pipe under the roadway to avoid other buried utilities. To remedy the situation, the contractor used a solid wall HDPE pipe, deformed it into an arch shape on site with bracing slip-lined the pipe in place, and then removed the bracing. The annulus was then filled with flowable fill. This procedure was recommended by the contractor, reviewed by the engineers and approved for use. Figure 1 illustrates the resulting section.

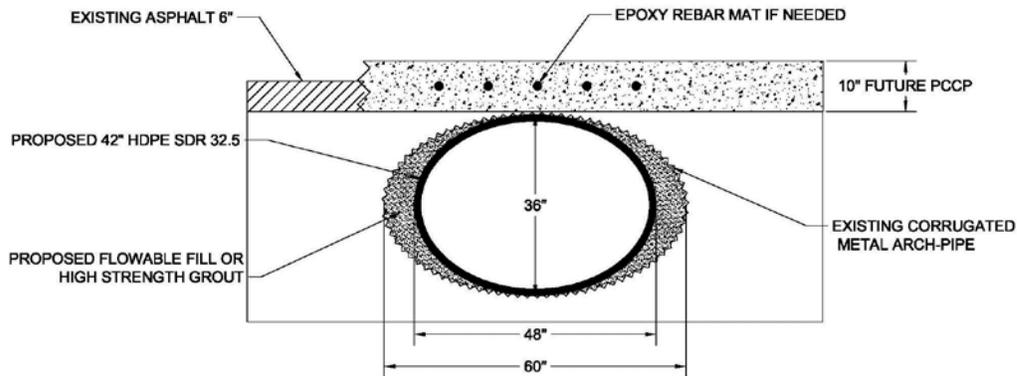


Figure 1 Innovative Slip Lining of Existing Pipe for CMGC Project; 5th South Bountiful

Part of the contract included the installation of a potable water line for West Bountiful city. However, for approximately 400 feet the new water line needed to be installed adjacent to an existing fiber optic line. The local utility quoted the state \$400,000 to move the fiber optic line along the 400 foot segment. This work would have severely impacted the project schedule since there were no current agreements in place to perform the work. The contractor realized that the pipe line could be installed using very small equipment and thereby avoid moving the fiber optic line. However, the use of the small equipment resulted in poor production rates. The contractor accepted this reality and moved forward to keep the project on schedule.

Additional Benefits

Perhaps the most remarkable achievement of the team was to stay cohesive and readily partner with one another despite the political pressures outside the project. Upon interviewing key team members, they all agreed that they felt comfortable with the team and the achievements of this project. This partnering effort continued through the construction effort and resulted in some additional benefits that had no fiscal motivation. During construction there were three specific incidents that showed the teams ongoing partnering efforts.

The first evidence occurred when the contractor discovered an error in the elevations of the storm drain system in Phase 1. The contractor placed a hold on the precast boxes they had ordered and helped in redesigning the storm drain line. To accommodate the new design, the boxes would need to be enlarged; this increase in cost was not passed on to the owner because the contractor felt that they were partially responsible for the original design review and did not catch the error earlier.

During construction it was determined that the elevation of the roadway at 1100 West would need to be raised to accommodate the pipelining process. The contractor provided surveying at the intersection to help the engineering move forward with a speedy redesign without seeking compensation for the added cost to their crews.

Finally, the contractor carefully reviewed the newly designed water systems in the project for the local cities and suggested several alternatives that resulted in overall savings to the city. Both systems will be within the city's budget and fostered good will to the cities and made them supportive to the project. The contractor felt that due to these good will efforts by its staff, the cities were easier to work with when seeking permits for road closures later on in the project.

Risk Assessment and Mitigation

There were four major risks throughout the project. First was the amount of buried utilities directly under the existing pavement. The second major risk was, fluctuating costs of asphalt. The third risk was the timely acquisition of Right of Way. And finally, preliminary studies of the project identified three contamination plumes that existing within the roadway where mitigation would be necessary. Most of these items were identified early on and avoided due to the innovations discussed above. Two of these risks are discussed below. For a more information concerning all risk items see Appendix C.

Hazardous Material

One area of uncertainty was the concern of encountering contaminated soils on site. Preliminary estimates listed the costs of remediation of excavated soils and water at almost \$400,000. Since the team could not effectively eliminate that risk, mitigation efforts focused on developing a plan for addressing contaminated soils and water based on their pollutant levels and set funding aside as a contingency. Luckily the amount of contaminated soils within the project was very minimal and the end results were well within the contingency plan.

Timely Right of Way Acquisition

All right of way was negotiated and processed by UDOT through Region 1 personnel. Knowing that right of way could cause large problems with the construction schedule, the team set out to try and minimize that risk by phasing the project and focusing work on parcels that had been cleared. Breaking up the project in a piecemeal fashion allowed the project to get started early. However, this process had three adverse effects:

1. Increased the amount of paperwork for each of the project files resulted in duplicated efforts of filing and time tracking.
2. Less efficient approach to work. Both the scheduling of work tasks and the use of the land for storage and stockpiling was impacted.
3. Work tasks were approached differently than the standard process. On one section of storm drain the parcel in question was at the lowest point. Instead of waiting to clear the right of way the contractor began installing pipe from the top of the project and moved down. This resulted in constant wet working conditions as drainage was always directed to the point of installation.

All of these resulted in reduced productivity rates. However, the team interviews (see Appendix A) suggest that if the team had waited for the right of way to be cleared prior to beginning work, the project may have been delayed by up to two years. By implementing the phasing strategy, the project was able to move forward and reach substantial completion soon after the last parcel was obtained.

Analysis of Performance Measures

Besides estimated cost savings due to the contractor's input during design, CMGC projects typically use the contractor to help implement another level of plan review. This review results in fewer errors in the design and smoother implementation in construction. However, the freedom of controlling scope and construction progression by phasing enables the project managers more control of project budget. For this reason when comparing change orders and overruns it is important to combine the two cost categories into a combined impact.

Change Orders and Overruns

Table 5 shows a description of the change orders for all four phases of the project. The description of the change order is the title found on the C-100 form that is created by the Resident Engineer for each change in the scope of work. The amount anticipated is the estimated value of the new work that is estimated prior to its completion. The Amount Paid is the total value paid toward the new contract items that were created via the change order. This amount can fluctuate from the Amount Anticipated because of overruns of the new bid items, cancellation of that work after the change order is approved, or large credits included in the change due to cancellation credits from the original contract. Bid item underrun/overruns are only considered with the original bid items. If a bid item is redefined it will be credited in a large underrun and added back to the contract via a change order. This is why, for

comparison purposes UDOT adds the underruns and the change orders together for comparison as seen in Table 4.

Table 4 Change Order/Overrun Cost Comparison for 5th South Bountiful and Other Delivery Methods

	Overruns/Under runs as Percent of Original Bid	Change Orders as Percent of the Original Bid	Total Change to Contract
5th South Bountiful (all phases)	2.79%	11.27%	14.06%
Comparable Design Bid Build Project ¹	12.40%	20.74%	33.14%
6 year average Design Bid Build ²	-4.80%	14.60%	9.80%
Notes: 1. Comparable project is a similar urban roadway widening project: SP-0079(3)3; WALL, 30TH & 31ST IN OGDEN 2. 5 year average includes all federally funded projects from 2005 to 2011 3rd quarter.			

Though the 5th South Bountiful Project experienced cost increases during construction, they were better controlled than costs associated with other urban reconstruction projects. The widening of Wall Street between 30th and 31st streets in Ogden (SP-0079(3)3) showed a total change in the construction contract of over 33% due to change orders and overruns. This design-bid-build project showed many characteristics that the 5th South Bountiful project had. However, the team was able to control cost increases during construction to 14% for the CMGC project. This shows a cost savings of close to 19% compared to the project on Wall Street. Urban reconstruction projects are very complex and generally have high risks associated with utilities, and right of way issues. These risks generally result in construction delays which can lead to substantial costs to the Department as the contractor is held in retention. Because of the CMGC design process, delays to the project were scheduled between the bidding of the individual phases which resulted in no retention costs to the Department.

Table 5 Change Order by Phase for 5th South Bountiful

Project Number	C.O. No.	Description	Amount Anticipated ³	Amount Paid (As of Feb 27, 2012) ⁴	Foreseen ¹	Unforeseen ²	Specification Change (SC)	Responsible Party
S-0068(57)68	1	PULL 3 3/4" UTILITY SERVICES	\$2,930.00	-\$2,432.09		X		Utilities
	2	WATERLINE BEDDING MATERIAL SPEC CHANGE	\$0.00	\$0.00		X	X	Contractor
	3	LEGACY END SECTION	\$7,394.50	\$7,394.50		X		Design (UDOT/Consultant)
	4	REMOVE AND RELOCATE LEGACY SIGNS	\$1,282.25	\$1,282.25		X		Design (UDOT/Consultant)
	5	WEST BOUNTIFUL 12" WATERLINE REFUND	-\$2,432.09	\$0.00		X		Construction Division
F-0068(58)68	1	ACP REMOVAL AND FILL REPLACEMENT	\$144,600.00	\$171,030.20		X		Design (UDOT/Consultant)
	2	ASBESTOS REMOVAL	\$920.00	\$920.00		X		Contractor
	3	SALMON FENCE RELOCATION	\$2,288.50	\$2,288.50		X		Design (UDOT/Consultant)
	4	24 INCH PVC. IRRIGATION FOR WEBWE BASIN	\$84,864.25	\$84,864.25		X		Construction Division
	5	NON-PARTICIPATING 10" QUESTAR CASING	\$15,186.00	\$15,186.00		X		Utilities
	6	REDUCTION IN TRAINING HOURS	-\$44,000.00	\$0.00		X		Construction Division
	7	SIGNALS, DRAINAGE, AND FENCING ADDITIONS TO PROJECT	\$104,357.79	\$113,593.92		X		Construction Division
	8	WATERLINE SERVICE	\$7,455.92	\$7,455.92		X		Design (UDOT/Consultant)
	9	HMA SPEC CHANGE FOR DRIVEWAYS	-\$1,626.50	\$57,139.02		X		Project Engineer
	10	WATERLINE LOOPS AND FENCE	\$31,589.25	\$43,837.80		X		Design (UDOT/Consultant)
	11	24 FT OF SURFACING FROM 1200 WEST TO REDWOOD	\$1,187,848.72	\$822,789.90	X			Project Manager
	12	IRRIGATION CHANGES	\$11,845.00	\$11,845.00		X		Design (UDOT/Consultant)
	13	CHANGE ROW FENCE TYPE	\$600.00	\$0.00		X		Construction Division
	14	ADDITIONAL LANDSCAPING	\$21,235.86	\$21,220.37		X		Design (UDOT/Consultant)
STP-0068(16)68	1	ASBESTOS REMOVAL	\$19,232.61	\$21,687.75		X		Construction Division
	2	EXPERIMENTAL GFRP DOWEL BAR INSTALLATION	\$0.00	\$0.00		X	X	Materials
	3	INCREASE TRAINING HOURS	\$15,000.00	\$17,235.00		X	X	Construction Division
	4	1/2 INCH HMA	\$0.00	\$41,528.30		X	X	Construction Division
	5	MAILBOXES	\$14,403.25	\$12,886.95		X		Construction Division
	6	ASBESTOS REMOVAL, 1156 WEST 500 SOUTH	\$13,816.35	\$30,014.95		X		Design (UDOT/Consultant)
	7	HOLLY GATES	\$460.00	\$460.00		X		Design (UDOT/Consultant)
	8	ADDITIONAL MOB/TC FOR REDWOOD ROAD EXTENSION	\$64,107.61	\$64,107.61		X		Local Government
	9	INSURANCE AND LANDSCAPING	\$20,241.44	\$22,078.98		X		Construction Division
	10	MICRO-SURFACING	\$30,256.00	\$30,977.01		X		Construction Division

Project Number	C.O. No.	Description	Amount Anticipated ³	Amount Paid (As of Feb 27, 2012) ⁴	Foreseen ¹	Unforeseen ²	Specification Change (SC)	Responsible Party
	11	R/R PCCP FOR QUESTAR AND QWEST	\$25,640.00	\$25,640.00		X		Utilities
	12	PRV AND MISC	\$26,732.59	\$26,813.14		X		Construction Division
	13	QUESTAR ACCESS, WOODS CROSS MONUMENT CREDIT, ADDITIONAL ROAD EX. & UBC	\$7,185.25	\$6,731.51		X		Contractor
	14	ADDITIONAL BOX CULVERT REMOVAL	\$1,960.00	\$1,960.00		X		Project Manager
	15	SURVEY MONUMENTS AND HANDRAIL	\$13,318.00	\$11,133.80		X		Construction Division
	16	A1-CANAL	\$28,876.84	\$28,876.00		X		No Fault
	17	EXTRA WORK FOR REDWOOD ROAD WOODS CROSS NON PARTICIPATING	\$16,724.87	\$12,582.10		X		Design (UDOT/Consultant)
	18	ERRANT VEHICLE DAMAGE ⁵	\$14,991.20	\$0.00		X		Contractor
F-0068(63)68	1	SPECIFICATION CHANGE FOR NOTICE TO CONTRACTORS	\$0.00	\$0.00		X		Design (UDOT/Consultant)
	2	EXTRA RR INSURANCE	\$2,875.00	\$2,875.00		X		Design (UDOT/Consultant)
	3	DELETED	\$0.00	\$0.00		X		No Fault
	4	DELETED	\$0.00	\$0.00		X		No Fault
	5	REMOVE PAVEMENT MESSAGES	\$547.40	\$547.40		X		Design (UDOT/Consultant)
		Total ⁶	\$1,892,707.86	\$1,716,003.64				
		Total for Foreseen Change Orders	\$1,187,848.72	\$822,789.90				
		Total for Unforeseen Change Orders	\$704,311.74	\$893,213.74				
	*Notes:	1. Foreseen change orders are project items that were recognized during the design and planning stages and were either planned on being addressed in the field or drawings were prepared with discrepancies. 2. Unforeseen change orders are project items that were first realized during construction. 3. Anticipated Amount is the value of the change order as entered into PDDBS, Amount Paid is the amount that UDOT paid for items that the change order addressed. 4. Significant differences between Amount Anticipated and Amount Paid are due to Underruns or Overruns as reported below. 5. This change order did not add bid items to the original bid list; it only justified the overrun on existing bid items. Actual costs will be reflected in the bid item overrun totals. 6. Total project costs estimated from PDDBS as of February 27, 2012. Actual costs will be determined once the landscape establishment period ends.						

Delivery Process and Timeline

The delivery of the 5th South Bountiful project was unique in that the work began and proceeded prior to obtaining all of the right-of-way and before securing funding for the entire scope. However, in an effort to move forward, the Department opted to segment the project into various phases based on the right-of-way and funding available. In some cases projects are begun once the funding is in place but right-of-way is still in negotiation. If this is the case the project runs the risk of delaying construction and paying the contractor a retainer fee throughout the delay. With CMGC both of these issues were avoided by phasing the project. Figure 2 shows a project delay between Phase 2 and Phase 3 (F-0068(58)68 and STP-0068(16)68 respectively). This delay was initiated by the Department based on funding issues with the State however, because the delay was set between two separate phases of work, no retainer fee was paid to the contractor. Unfortunately, the delay disabled the original goal of having the work done by February 2009. The design team agrees that phasing the project enabled the team to move forward and save at least a year on the final delivery time. In accordance with the dates in Figure 2, if Phase 1 was not started until Phase 4 (assuming the final phase was initiated when everything was clear) the project saved almost 18 months.

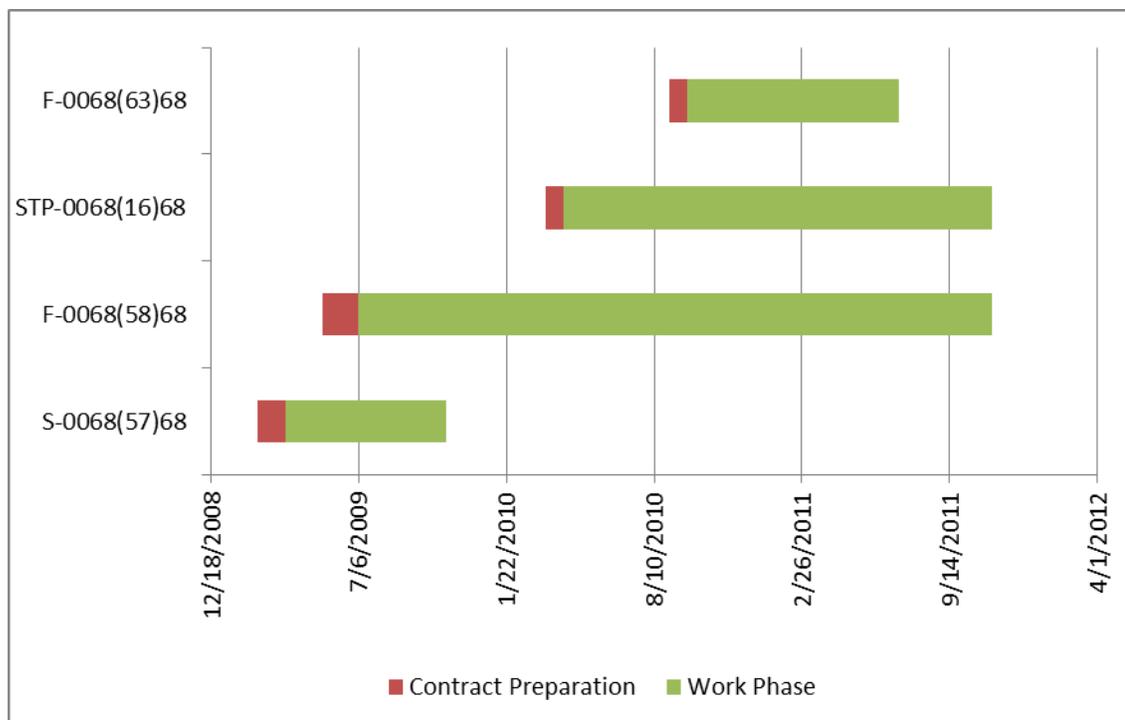


Figure 2 Timeline of Construction from Award to Substantial Completion of CMGC Project; 5th South Bountiful

Lessons Learned

As the Substantial Completion date of the final phase drew near, the UDOT project manager, UDOT Resident Engineer and the Contractor’s Project Manager (Charles Mace, Ben Maughan, and Steve Sussdorff respectively) were interviewed concerning the performance of the project. During the interviews the following key issues were identified as “Lessons Learned”:

- It was helpful to keep our CM portion of the contract open through part of construction, this enabled us to continue to meet and have input during construction (Charles Mace and Ben Maughan)
- Project phasing causes much more paper work and keeping records for each phase’s materials is more difficult. (Charles Mace and Ben Maughan)
- Phasing was done to accommodate ROW acquisitions (Charles Mace and Ben Maughan)
- Phasing helped to avoid costs due to delays for utilities and ROW. The delay between phase 2 and 3 was by choice from the department but there were no claims processed because the contracts on the construction of phases 3 and 4 were held until the Department decided to move forward. (Charles Mace and Ben Maughan)
- Phasing makes the planning and logistics of the overall project more difficult. When we began design we could look at the project as a whole and use some areas for the staging, storage etc. However, when the project became phased we could only work on the project piecewise within the bounds of that phase. (Steve Sussdorff)
- Ideas are better generated with a small design group of less than about 10 people. Even if the project is large, breakout sessions into smaller groups of less than 10 people are much more effective. (Steve Sussdorff)

For the full list of Lessons Learned and other information gathered in the interview see the Appendix A.

Conclusion

The 5th South Bountiful project consisted of widening an existing roadway that was flanked on both sides with commercial, private, and industrial properties. The existing alignment was made more complex with a number of highly sensitive utilities and environmental hazards. Like all urban reconstruction projects, 5th South Bountiful was viewed as an extremely complex project. For this reason UDOT opted to deliver this project using the CMGC delivery method. Despite these challenges, the project moved forward with cost savings of over \$3.8 million due to innovations and risk reduction and constrained additional costs during construction to those typical of other much less complicated projects. When compared to the widening of Wall Street in Ogden, CMGC saved the project almost 23% from the original construction budget in the reduction of change orders and overruns. Perhaps the best way to summarize the success of

the 5th South Bountiful project is with the comments from the project managers of UDOT and Geneva Rock (the Contractor):

“CMGC has spoiled me. Now when I am partnering on other jobs I know what it is like to have the contractor give me everything” – Charles Mace, UDOT Project Manger

“CMGC enables me to come to work knowing that I am on a team when problems arise, rather than knowing I will spend the day butting heads” – Steve Sussdorff, Geneva Rock Products Project Manager.

APPENDIX A – Personal Interview Notes

CMGC Interview Questions

UDOT Project Manager- Charles Mace (August 16, 2011)

Resident Engineer – Ben Maughan (August 16, 2011)

Contractor Project Manager - Stephen Sussdorff (September 27, 2011)

Project Description: 5th South Bountiful
Pin: 4178, 7437, 7658, 8218
Project Phase: All four phases
Anticipated Construction Cost: \$15,235,379.40
Anticipated Construction Time: 415 working days
NTP (1st phase): 3-19-2009
Substantial Completion (4th Phase): 11-10-2011

Project Schedule

<p>Was the construction schedule shortened by the design effort? By how much?</p>	<ul style="list-style-type: none"> • Yes, the first phase allowed early work that was only done with input from the contractor. Their input changed the methodology so the whole approach was different. We could have never bid methodology. (Charles Mace and Ben Maughan) • If we had waited for both the money and ROW to be clear before starting the work, we would still be waiting. However the design itself did speed up the project even with the difficulties of addressing ROW and funding issues (Steve Sussdorff)
<p>Did Phasing the project allow for a faster delivery? If so how much time do you think was saved by phasing the project?</p>	<ul style="list-style-type: none"> • Phasing advanced the scheduled. We were able to start work when the entire ROW was not yet acquired. This saved 10 months to a year. (Charles Mace and Ben Maughan) • Phase II would have been advertised about 15 months ago (May of 2010). Instead it was advertised in May of 2009. (Charles Mace and Ben Maughan)

Design and Constructability

<p>Does the team feel that the overall constructability of the project was enhanced? If so in what ways?</p>	<ul style="list-style-type: none"> • The contractor proposed the methodology of slipping all of the new utilities into an abandoned pipe line under the roadway. This eliminated boring pipe in an area that had a lot of utilities under the roadway and conflicting with the railroad. This new approach saved a lot of time, reduced our risk due to time delays and associated payments to the contractor. (Charles Mace and Ben Maughan) • If we had followed the standard design to address these issues we would have trenched the roadway and would have been exposed to a lot of risk. (Charles Mace and Ben Maughan) • Definitely, the team at 5th So. Bountiful had a genuine trust with each member; we could rely on things happening the way we agreed. (Steve Sussdorff) • The suggestions that were generated resulted in a project that was easier to construct. Examples included the roadway section change to PCCP which was much less complex and labor intensive and less expensive. Other issues included slip lining the storm drainage to avoid buried utilities and more. (Steve Sussdorff)
<p>How has the slip lining of the existing culvert worked in the field? Do you think that this was better than boring new pipe runs?</p>	<ul style="list-style-type: none"> • Yes, it worked well. Open cut trenches were not an option due to all the buried utilities. Using boring would have been very expensive due to the all the contingencies that would have been necessary for the buried utilities. In either case had we encountered any hazardous materials in the operation the costs would have become even greater. All of these issues were avoided. (Steve Sussdorff)

Innovation

<p>What innovations were used to enhance the project?</p>	<ul style="list-style-type: none"> • The contractor suggested using a new light weight storm drain inlet that allowed a shallow installation and kept the pipe out of the high pressure gas line alignment. This saved the project \$300,000-\$400,000 because we did not have to loop the gas lines. (Charles Mace and Ben Maughan) • Traditional concrete boxes were too large and too deep to install given the constraints around the petro-chemical and
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	<p>high pressure gas lines that were in the area. At two of the locations the utilities were so thick there would have been no way to use concrete boxes. We had suggested the use of these light weight FRP boxes in our proposal as an innovation to help reduce the depth of the storm drain and avoid any contaminated soils. At first UDOT said no but when we uncovered the utilities on site it was the only feasible solution and they agreed to use them. The savings of \$300,000-\$400,000 are very conservative and only account of the difference in installation. They do not account for the reduced risks. (Steve Sussdorff)</p> <ul style="list-style-type: none"> • The A1a Canal had a type of overflow basin that had these massive gates on it. From previous experience with these gates we knew it was going to be expensive. The subcontractor bid \$50,000 for new gates. However, we talked to the owner of the canal and got their input as to what they needed and we downsized the gates but still would meet the demands of the canal company. They agreed and the new price was about \$25,000. (Steve Sussdorff) • Another example was concerning the drainage in a parking lot adjacent to the project. Due to impacts with the project we were directed to put a drainage basin to help with drainage issues. However, due to the other buried utilities in the area the estimate for this installation became about \$50,000. We recommended doing some repaving in the parking lot that routed the drainage off of the property and into the new drainage system. The solution was about \$5,000. (Steve Sussdorff)
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Risk

<p>Did the contractor’s phasing plan help work around the outstanding ROW issues?</p>	<ul style="list-style-type: none"> • The contractor pushed to get work done when it could be done. This helped to motivate the team to keep things moving including the ROW acquisitions. (Charles Mace and Ben Maughan) • Yes, in phase 2 there was a 54 inch storm drain line that had a conflict with ROW in the low area. In order to avoid the prolonged ROW issues and delay the drainage
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	<p>installation we began installing the storm drain from the high point to the low point. This is contrary to regular practice and made it difficult for us to work as water would drain down the newly installed pipe to our work area. However, we wanted to keep moving forward. (Steve Susdorff)</p> <ul style="list-style-type: none"> • At Holly Oil we installed a 42 inch pipe along the fence line while ROW negotiations were ongoing concerning the fence. Once we were almost done we received permission to remove the fence (Steve Susdorff) • There was a non-identified power pole on private property that we had to remove. Since this had been overlooked the negotiations started late. We moved forward in a good faith effort with the property owner and executed the required work at risk to keep the schedule moving. (Steve Susdorff)
<p>Has coordination with the Utilities been smoother due to the early involvement with the contractor?</p>	<ul style="list-style-type: none"> • Yes, they helped eliminate a large part of the conflicts due to their innovations. (Charles Mace and Ben Maughan) • Yes, one good example was that we planned on slip lining the storm drain at 1100 West which, on both ends, was a 48 inch CMP. However when we got ready to install the pipe we found that underneath the roadway (to avoid some high pressure petro chemical lines) the existing pipe became an arch pipe section. With our existing HDPE pipe on site we deformed the pipe to match the cross section during installing and then let it expand to match the pipe that was in place. This was approved by UDOT and the manufacturer of the pipe. (Steve Susdorff)
<p>Do you feel that the contractor's suggestion to use PCCP was a benefit?</p>	<ul style="list-style-type: none"> • Yes, PCCP continues to be less expensive. (Charles Mace and Ben Maughan) • UDOT got a bargain on the PCCP. The original section of asphalt roadway was very complex and more difficult to install. It was probably over designed. Furthermore, the cost of oil was very high at the time of construction verses during the proposal stage. Since UDOT has provisions in their specifications for escalating fuel costs, they would have paid a lot more for asphalt than anyone anticipated. Concrete on the other hand has no escalating cost specification. Furthermore the section of concrete was

	<p>shallower overall which not only reduced costs of excavation but also reduced the risk of encountering contaminated soils. Preliminary estimates showed a savings of \$4-\$5 per square yard. (Steve Sussdorff)</p>
<p>Did slip lining the pipes reduce the amount of involvement with the railroad? Do you think this saved any time?</p>	<ul style="list-style-type: none"> • Yes, during phase 2 we mostly avoided all interaction with the railroad except on crossing with the UTA which was done in a week. Boring would have required permits and coordination efforts. (Steve Sussdorff) • We did get stung with UTA because some previous work had not been properly marked and we ended up cutting the loops for the railroad crossing sensors. We felt that this was due to the improper marking of the loop installation but UDOT felt that we were responsible and it cost us about \$22,000. (Steve Sussdorff)

Change Orders

<p>What was the total cost of Change Orders?</p>	<ul style="list-style-type: none"> • See table in report for change order discussion.
<p>Do you think that the number of change orders was reduced due to the CMGC process?</p>	<ul style="list-style-type: none"> • Yes, there may have been a number of changes in the field that could have been mitigated with better design review. However, for a project this complicated we feel that we were very successful due to the contractor’s input. (Charles Mace and Ben Maughan) • It was good to work with a contractor that had a vested interest in the design. They had an ownership in the decisions that the team made and when things did not work out, they did not come looking for more money. (Charles Mace and Ben Maughan) • Yes, both the number and size of the change orders were drastically reduced. If it had been Design Bid Build it would have been change ordered to death with ROW and phasing issues however, we knew that these things were part of agreement when we started and we worked within the frame given (Steve Sussdorff).
<p>As a contractor, was your approach to</p>	<ul style="list-style-type: none"> • Yes, if I thought that the issue was something that we could have anticipated in design and we did not catch it I

<p>change orders different with CMGC? In what ways</p>	<p>hesitated asking for money. However, if it was something that we pushed during design and it was ignored, then I happily asked for the change order when the issue occurred in construction. (Steve Susdorff)</p>
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Environmental Stewardship

<p>Did raising the pavement section and decreasing the required fill, help avoid contaminated soils and conflicts with utilities?</p>	<ul style="list-style-type: none"> • There were 3 contaminant plumes that were identified in the area of excavation. These had been mapped out and labeled as possibly being in our work zone. The team set aside contingency money in Phase I to deal with the event of encountering these soils. A plan was put in place as to what would be done with contaminated soils based on the level of contamination. Ultimately we did not encounter them but we were prepared to minimize the impact on the project had we found them. (Charles Mace and Ben Maughan)
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Lessons Learned

<p>What did you learn in the CM/GC process?</p>	<ul style="list-style-type: none"> • It was helpful to keep our CM portion of the contract open through part of construction, this enabled us to continue to meet and have input during construction. That was valuable. For example the A1 canal was over designed, the contractor was the first to point that out and ended up reducing a lot of costs associated with that canal and saved us money. (Charles Mace and Ben Maughan) • We had times when the contractor’s idea was something that did not work, because they felt they were part of the team they did not charge us for it. (Charles Mace and Ben Maughan) • CMGC has ruined me for partnering. Now when I meet with other contractors on other projects I always believe they can give more because of what I have seen on this project. (Charles Mace and Ben Maughan) • We had an excellent contractor and a system that worked to address a very complex project. (Charles Mace and Ben Maughan)
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	<ul style="list-style-type: none"> • Phasing causes much more paper work and keeping records for each phase’s materials is difficult. (Charles Mace and Ben Maughan) • Phasing was done to accommodate ROW acquisitions (Charles Mace and Ben Maughan) • Phasing caused issues with timing of utilities and the when their work could be done. (Charles Mace and Ben Maughan) • Phasing helped to avoid costs due to delays for utilities and ROW. The delay between phase 2 and 3 was by choice from the department but there were no claims processed because the contracts on the construction of phases 3 and 4 were held. (Charles Mace and Ben Maughan) • Phasing makes the planning and logistics of the overall project more difficult. When we began design we could look at the project as a whole and use some areas for the staging, storage etc. However, when the project became phased we could only work on the project piecewise within the bounds of that phase. (Steve Susdorff) • Phasing causes a paperwork challenge as the recording of standard project information is multiplied and time cards must be recorded per phase rather than in just one big project. (Steve Susdorff) • Ideas are better generated with a small design group of less than about 10 people. Even if the project is large, breakout sessions into smaller groups of less than 10 people are much more effective. (Steve Susdorff)
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General Notes/Other Items

<p>As a contractor, what benefits does CMGC provide you?</p>	<ul style="list-style-type: none"> • It is a much more enjoyable working atmosphere with true partnering. I never felt like they were working against me. The contracting business can get ugly when you and the owner are at odds. (Steve Susdorff)
<p>What are the challenges to CMGC for a contractor</p>	<ul style="list-style-type: none"> • Every member of the team has to buy into the philosophy. If we all listen to each other it works. If one or two of the members don’t buy-in it won’t work. (Steve Susdorff)
<p>As a Contractor, how does CMGC impact your . . .</p>	<ul style="list-style-type: none"> • Bidding? You have the best design for the project and you understand and know the plans better because you were

	<p>part of the team in designing the project. Because it is not competitive I will put in reasonable and defensible production rates. Oftentimes with low bid you can talk yourself out of risks that are part of the project and end up getting caught during construction. (Steve Sussdorff)</p> <ul style="list-style-type: none"> • Scheduling? Again you know the work better. You have had time to digest what it is going to take and you have already begun making provisions for things that might happen in the back of your mind. • Profit Margins? You can keep them reasonable. During the initial proposal for this project we provided a profit margin in our proposal that was much less than what we were using on other jobs. However, we decided that much of the risk would be removed and we wanted to work on this project. At the time the profit margin we presented was very reasonable. However, when the economy took a downturn and many of the other contractors reduced their profit margins to just cover overhead, UDOT came and said we needed to reduce our agreed upon profit margins. We felt that they were part of the contract and reasonable so we stood our ground. (Steve Sussdorff)
<p>What would your advice be to contractors who have never done CMGC and are nervous about the process?</p>	<ul style="list-style-type: none"> • Pursue it. We set up a special projects group to write the proposal. Because much of it is based on qualifications you need to spend time and money on the proposal with qualified people who know how to do that kind of work. (Steve Sussdorff) • Stick to stuff you are good at so you can make the process work for you. (Steve Sussdorff) • I don't see small contractor's doing [CMGC] much. Rules are so strict and highly specific (standard specifications). They are kind of closed out to the process. (Steve Sussdorff)
<p>How would you rate the CMGC process now that the project is completed?</p>	<ul style="list-style-type: none"> • Good, I enjoyed it. For projects that have a lot of risks associated with possible delays CMGC is the best way to go because we can avoid delay costs with the contractor. (Charles Mace and Ben Maughan) • This project won a Partnering award from the AGC.

APPENDIX B – Innovation Savings Estimates

Table 6 Innovation and Risk Savings Estimate As Recorded by the Contractor for the 5th South Bountiful

APPROX IDEA DATE	CMGC TEAM VALUE ENG IDEA IDENTIFIED	CMGC TEAM REASON FOR VALUE ENG IDEA	DETAILED VALUE ENGINEERING DESCRIPTION	COST IMPACTS	SCHEDULE IMPACTS
Aug-08	1. Where possible raise the new grade by 4"	The roadway excavation was at 60,000cy, with less than 20,00cy of fill. Almost 40,000cy would have to be hauled away and wasted	<p>Off hauling and wasting material is significantly more expensive than hauling with onsite equipment and embanking. Raising the grade cuts excavation and raises fill. Geneva had originally envisioned a process of recycling about 8" of existing pavement and road base into the granular borrow. This brought the overall item into balance.</p> <p>As a nice side benefit, the raising of the grade 4" and the thinning of the PCCP surface section by another 3" has greatly cut down on the possible UG utility conflicts, and helped eliminate the hazardous water plume problem</p>	<p>At the 30% Cost model w/o raising the grade or recycling into GB, Rd exc est. cost of \$821,000. With the raise and recycling by the 90% cost model the estimate was only \$457,000</p> <p>reduced possible Utility conflicts from 14,000 down to less than 2,000. The hazardous water problem was once estimated at \$400,000</p>	<p>Less excavation takes less time.</p> <p>Both of these mitigated problems could have stopped the project</p>
Mar-09	2. Use the PCCP surface section instead of the RFP HMA section	PG 64-34 Binder prices were too volatile and the HMA surface section was too complex	<p>Substitute the PCCP surface section(10"PCCP, 4"UTBC,6"GB=20") for the RFP design surface section(5/8"BWC,7.5"HMA, 6"FDR, 9"GB, and Geogrid=23")</p> <p>As a nice side benefit, the PCCP section has a 40yr expected service life vs. only 20yr for the RFP HMA section.</p> <p>With the PCCP section, UDOT does not face any escalation costs</p>	<p>The actual bid price for the full PCCP section is \$72/sy. For the RFP HMA section Geneva quoted \$76/sy. Over 80,000sy = \$300,000 savings</p> <p>To make the HMA section last to 40 yr will require 2 BWC surface treatments worth at least \$2million in today's \$\$</p> <p>Who knows what PG64-34 will be next year?</p>	<p>The PCCP section is simpler and easier to install. Also the PCCP can be placed later into the fall</p>

APPROX IDEA DATE	CMGC TEAM VALUE ENG IDEA IDENTIFIED	CMGC TEAM REASON FOR VALUE ENG IDEA	DETAILED VALUE ENGINEERING DESCRIPTION	COST IMPACTS	SCHEDULE IMPACTS
Feb-09	3. Slip HDPE pipe inside existing storm drains	Boring or Open trench excavation could not be safely done in 4 key areas that had a total of 18 High Pressure Gas lines in the way	<p>For the 2 RR Crossing slips the existing 48" CMP were so deep that Geneva had to use "Snaptite" 19-24ft sectional HDPE liners that could be lowered into trench boxes and connected together with a mechanical joint rather than a large fusion machine</p> <p>At the 2 RR crossings Geneva was able to feed the Snaptite liners from trench boxes outside the RR clear zone limits</p> <p>At the 1100W HDPE slip, the old 48" CMP was thought to be round. It was actually a 36x54 Arch. Geneva figured out a way to "squash" the 42" HDPE to 34x 52, Strut it with 4x4's and slip the liner into position. This was the only way to stay below the surface design elevation and stay above 5 HP gas lines</p> <p>The 34" HDPE slip avoided a very wet bore or open trench installation in ground water that may be contaminated. The slip also avoided the Chevron HP Gas Line</p> <p>Another nice side benefit is that Geneva was also able to slip the West Bountiful Water line at the same time as the UPRR/UTA HDPE slip.</p>	<p>If boring would have been allowed, the 400ft would have cost at least \$400,000. Geneva installed the associated storm drains for about \$120,000</p> <p>About \$10,000 in RR Flagging was avoided</p> <p>If this had to be open trenched, a costly low profile Concrete Box Culvert would be the only thing that would fit in the room available. Savings of at least \$50,000</p> <p>Another savings of at least \$50,000</p> <p>Another 16" bore would likely have cost another \$150,000</p>	<p>Holly Oil said they would not allow a mechanical bore anywhere near their 12 HP Lines.</p> <p>This method of pipe lining had no effect on the trains or 500S traffic</p> <p>A complete road closure was completely avoided</p> <p>Another complete road closure was avoided</p> <p>Another complete road closure was avoided</p>
Mar-09	4. Use very small equipment to install the W. Bountiful Water line	The W. Bountiful waterline was designed in line with 2 large Fiber optic lines and the future Holly Decorative wall.	If the Waterline from about Sta 84+00 to 88+00 was installed as designed with standard trenching methods, one of the fiber optic lines would have to be relocated for about 400ft. Geneva thought it could be installed with very small equipment without moving the FO line or being in the way of the new wall	URS contacted Qwest prior to this idea and were quoted \$400,000 for the relocation	An agreement with Qwest to do this work would delay the early Utility package by months.

APPROX IDEA DATE	CMGC TEAM VALUE ENG IDEA IDENTIFIED	CMGC TEAM REASON FOR VALUE ENG IDEA	DETAILED VALUE ENGINEERING DESCRIPTION	COST IMPACTS	SCHEDULE IMPACTS
Jul-09	5. Geneva installed casings for Questar and Comcast when the Holly RR Crossing was reconstructed	It became obvious that the existing Comcast system w/ 4 poles on the North side were going to become a schedule breaker if we could not speed up their relocation to the South side.	Geneva pushed the idea of installing "dummy" 12"ADS casings under the Holly RR while the crossing was being reconstructed. Questar also liked the idea and asked that we install a 8" steel casing for their relocation this fall. UDOT will have to pay for these relocates one way or the other. This deleted to very costly horizontal bores, that would have to be drilled 25ft down to avoid the 2 -1800psi hydrogen lines.	This shows on the UDOT books as a \$15,000 Change Order, when in reality it deleted at least \$100,000 of very expensive horizontal bores	We were able to get Comcast out of our way. This Falls Questar distribution line relocation will be much easier.
Mar-09	6. Geneva suggested non destructive Vac Truck exc of the Holly Wall Post Holes	The original Wall design involved a combination of a heavy Block wall topped with an Owell 8ft post and panel wall	Because of the extreme UG utility congestion in the area where the Holly wall had to be installed, it seemed impossible to mechanically drill the post holes w/o a catastrophic hit. A very expensive combination of block retaining wall, spread footings and 8ft wall seemed like the only answer. By adding "Non-Destructive" post hole digging to the spec, Owell thought it possible to just install a 10ft decorative wall that could also retain the 1-3ft fills.	The combination wall was estimated at almost \$400,000. The Vac truck has been very successful and the 10ft wall will only cost about \$250,000 including necessary temp fence relocations.	We will still be able to get the Holly wall in ahead of the North Side 36ft PCCP
Mar-09	7. Geneva discovered a serious bust in the storm drain elevations in the Early Utility Package	As part of Geneva's QA/QC program, we check all critical elevations. A 1.5ft bust was found in the SD design for the Early Utility Package	We were finally getting some field work started. To keep the project moving, Geneva put a hold on the precast boxes at Duracrete, took it upon themselves to redesign the boxes to fit the real existing situation, and stretched the boxes so the new SD line could be installed where the existing SD line was to eliminate further conflicts.	Geneva's design required larger boxes, and URS was able to redesign the 36" SD Trunk line into a more desirable location on the South side. THIS WAS ALL DONE AT NO COST TO UDOT!!!	Geneva kept the Early Package moving, and it was finished on time even though we had a major design change.
Jul-09	8. After the 1100W HDPE slip line was installed in the only place it would fit, it was obvious the PCCP surface would have to be raised in the 1100W area.	The 1100W HDPE slip was absolutely the only answer for the SD system to function without a major reconstruct. However it forced the SD system at 1100W up about 0.9ft.	It became obvious that the PCCP surface would have to be redesigned at 1100W. Geneva brought in it's QA/QC survey crew and took several shots. These were relayed to URS, and they quickly redesigned the 1100W intersection PCCP surface.	Geneva provided this service in a very timely manner at no cost to UDOT	The project was kept on schedule by attaching potential problems before they became insurmountable.

APPROX IDEA DATE	CMGC TEAM VALUE ENG IDEA IDENTIFIED	CMGC TEAM REASON FOR VALUE ENG IDEA	DETAILED VALUE ENGINEERING DESCRIPTION	COST IMPACTS	SCHEDULE IMPACTS
Apr-09	9. Geneva recommended using 54"ADS pipe vs. 54" RCP for the main SD Trunk line	There was a very limited envelope to get the main SD trunk line in above the North sewer laterals, and below the minimum cover of 2ft. The thickness of the RCP walls and bells may not fit	As it turned out, even with the grade being raised 4", and the thinner walled 54"ADS being used, Geneva ran into the sewer system 3 times. We had to loop these sewer laterals almost flat to get the 54"ADS to fit. If 54" RCP had been used, major adjustments to the sewer mainline would have been necessary for at least 400ft. Geneva has suffered through 3 breaks in the 54"ADS pipe by getting heavy equipment to close to the very shallow cover	The 54"ADS pipe material was about \$50/ft cheaper, for a savings over the 2632ft = \$130,000. Major sewer adjustments could have easily run \$100/ft in the middle of 500 South Geneva will bare the fault and cost of these repairs	Although we lost unexpected time at the 3 sewer loops, we kept the project moving forward.
Mar-09	10. Geneva recommended stripping and using onsite Topsoil for future Landscape needs	The overall project would need about 5,000cy of topsoil for the landscaping. If this was all "Contractor Furnished", the expense would be huge	At the PSE, the Region #1 environmental and landscape manager preferred an onsite topsoil versus a gravel pit generated topsoil. By taking advantage of the 4 AC office site, Geneva was able to stockpile organic soils, and then screen out the rocks, roots, and trash. As a side note, Geneva tried to use the 3" x 1/2" rock generated by the screening operation as fill to help supplement the imported E-fill.	Imported topsoil would have cost at least \$20/cy or \$100,000. Geneva will be able to offer onsite screened topsoil for half that cost Geneva did not ask for any compensation for this screened material	Onsite topsoil will require less truck traffic Unfortunately the rock still had roots in it, so it was rejected for structural fill
Mar-09	11. Geneva carefully checked the W. Bountiful and Woods Cross water systems	Geneva recommended many misc alternatives for both the water systems that made better systems at less cost	Geneva recommended removal of doubled up valves, loops, and casings. The savings were passed on to the cities, and both systems will be under budget. We have been willing to adjust to actual field situations without major change orders, and have looked ahead to avoid possible future conflicts	Minor savings in valves and loops that have fostered good will to both cities and made them partners in the project rather than adversaries	Both cities have been willing partners to consider road closures beneficial to all

APPENDIX C – Risk Matrix

Table 7 Risks as Recorded by the Contractor for 5th South Bountiful

CMGC TEAM KEY RISK IDENTIFIED	CMGC TEAM RISK MITIGATION EFFORT	DETAILED MITIGATION DESCRIPTION	COST IMPACTS	SCHEDULE IMPACTS
<p>1. Untimely ROW Acquisition (very limited mitigation)</p>	<p>1. Split up Project into Multiple GMP's to take advantage of Key areas where ROW had cleared</p> <p>2. Geneva has worked with UDOT ROW team to solve physical problems private owners needed solved before they would sign off</p> <p>3. Geneva has been willing to work around "limitations of Operations" within each GMP to keep project moving forward.</p> <p>4. UDOT ROW has worked hard and will beat their budget by almost \$2million.</p>	<p>As of Sept 2009, there still are ROW problems. Without Multiple GMP's or Phases, this project would still not be started</p> <p>Geneva has done work outside the contract for Mrs. Sanders Wells, and Salmon Electric SD Box and 2" water service so these individuals would sign key ROW agreements. There will likely be more.</p> <p>For the North side GMP Phase 2, all the "limitations of operations" were to be cleared by July 5, 2009. There have been significant holdouts at the Auto Auction, Kingston, Montana refineries, and Salmon that have just cleared. Geneva moved it's crews wherever there was room to work. This has been very inefficient and costly. Geneva has not requested extra cost or time for these problems.</p> <p>IF UDOT ROW HAS BEAT THEIR BUDGET BY \$2 MILLION, WHAT EFFECT HAS THIS TOUGH NEGOTIATING HAD ON ROW TIMING?</p>	<p>Have extended Supervision and Traffic control costs - add \$500,000</p> <p>Geneva has only asked for the value of the work performed-less than \$10,000</p> <p>This has cost Geneva at least \$100,000 in lost efficiency, and has resulted in hauling pipe spoils that might have been embanked. This will effect the amount of E-Fill Geneva brings in under C.O.</p> <p>CAN THIS \$2MILLION SAVINGS BE USED TO COVER OTHER UNEXPECTED COSTS??</p>	<p>Have added at least 1 year to original schedule</p> <p>Helped sign off key parcels for the North side.</p> <p>Bouncing the crews around has cost Geneva at least 2 weeks that will push the PCCP to the weather limits</p>
<p>2. Hazardous material Remediation (completely mitigated)</p>	<p>1. URS established a method to test Ground water while Geneva performed Early exploratory Potholing</p> <p>2. In Geneva's Original RFP they proposed keeping all UG utility installations as shallow as possible to stay above the possible contaminated ground water table</p>	<p>Through the sampling and testing it became apparent that the level of the contamination, if encountered, would not require expensive remediation, and URS worked out details with the local sewer district to handle reasonable amounts of contaminated water</p> <p>Geneva proposed raising the overall new road grade by 4" to better balance the site Earthwork quantities. As a nice side affect the new storm drains were at least 4" higher. This has been absolutely critical on the 54"SD which just clears the sewer system at minimum 2ft cover.</p>	<p>At one time we thought these costs could go as high as \$400,000. They now seem completely mitigated</p>	<p>A hazardous cleanup would have destroyed this projects schedule</p>

CMGC TEAM KEY RISK IDENTIFIED	CMGC TEAM RISK MITIGATION EFFORT	DETAILED MITIGATION DESCRIPTION	COST IMPACTS	SCHEDULE IMPACTS
	<p>3. The whole Team worked out the Slipping of HDPE pipe inside existing 48" CMP storm drains. Eliminating Bores or open trenching at four of the deepest and most likely areas to intercept hazardous materials on the job.</p>	<p>Geneva proposed going to a PCCP section vs. the RFP HMA section based on cost and durability. The PCCP section is only 20" thick, so overall site excavation was 3" less than the HMA 23" section. As a nice side affect we gained another 3" less excavation.</p> <p>We used regular and "Snaptite" HDPE Slip lining at the UTA/UPRR Crossing, The Holly RR Crossing, 1100W crossing, and the A-1-2 canal crossing to save time and money over Boring or Open trenching. As a nice side affect, we eliminated excavation in the deepest, wettest, and most likely places for ground water contamination.</p>		
<p>3. Asphalt Supply(and cost control) (completely mitigated)</p>	<p>1. By the 30% cost model, PG 64-34 had already shot up almost 50% and would add over \$2million to the project</p> <p>2. With Geneva's recent acquisition of Western Quality Concrete, we had the ready resources to offer a PCCP option.</p> <p>3. UDOT Region #1 surfacing design recommended a PCCP surfacing design of 10" PCCP, 4" UTBC, and 6"GB to work thru the cost model.</p>	<p>Even though this was a CMGC project, AC Binder escalation clauses still applied, and UDOT could be facing huge cost overruns to keep up with the very volatile PG Oil market</p> <p>The PCCP used stable cement powder as a binder, and UDOT was not on the hook for price escalations. The surface envelope was simpler, easier to construct, and offered less depth that had to be disturbed.</p> <p>Geneva proposed going to a PCCP section vs. the RFP HMA section based on cost and durability. The PCCP section is only 20" thick, so overall site excavation was 3" less than the HMA 23" section. As a nice side affect we gained another 3" less excavation.</p>	<p>PG 64-34 is now around \$700/ton; so the cost impact would have been zero if everything was paved now. Who knows what it will be next year?</p> <p>Geneva's price for the complete HMA section was \$76/SY. The actual bid price for the PCCP section was about \$72/sy. Savings over 80,000sy=\$300,000</p> <p>The PCCP has a 40 yr life vs. 20yr for the HMA section. To extend the HMA to 40yr would take 2 added BWC surface restorations worth at least \$2million in today's dollars</p>	<p>PCCP can generally be installed later into the season</p> <p>The PCCP section is thinner and simpler. PCCP can generally be installed later into the fall</p> <p>Eliminates at least 2 future resurfacing contracts and the public impacts</p>

CMGC TEAM KEY RISK IDENTIFIED	CMGC TEAM RISK MITIGATION EFFORT	DETAILED MITIGATION DESCRIPTION	COST IMPACTS	SCHEDULE IMPACTS
<p>4. MOT at Holly Oil (completely mitigated)</p>	<p>1. For the road work between 800W and 1100W, Geneva was able to install about 12ft of temp HMA on the South side and move all traffic out of the way</p> <p>2. To Reconstruct the Holly RR, the Onsite UDOT team was able to get a full weekend road closure and detour truck traffic over legacy highway.</p> <p>3. Through a complete project cooperative meeting, Geneva has been allowed to modify the existing Median Island just west of the UPRR.</p>	<p>This side shift detour has worked well, and Geneva's crews(as well as other utility locate crews) have worked unencumbered.</p> <p>The new crossing could not have been built correctly without this full closure</p> <p>This will allow for the 800W intersection to be built. It will still require very difficult phasing to get the Oil Trucks into the North Holly Filling Station</p>	<p>Hard to evaluate. The cost of the temp HMA should be offset by more efficient work conditions not under traffic</p> <p>Resulted in better quality surface and line for the RR</p> <p>Impossible to pave 800W in a phased manner without this modification.</p>	<p>hard to evaluate</p> <p>Sometimes its less inconvenience for a 3 day full closure, than a partial closure for 2 weeks?</p>
<p>5. Third Party Utility Relocations (significantly mitigated)</p>	<p>1. Raising the grade to balance the Earthwork, and using the 3" shallower PCCP surface section, resulted in 7" less of existing ground that had to be dug into for the new surface envelope.</p> <p>2. The four HDPE slip linings mentioned above eliminated digging or Boring around some of the most UG Utility congested areas on the project.</p>	<p>URS/PEC ran a study. The Original design had over 14,000 possible UG utility conflicts. The combination to raise the grade 7" reduced it to under 1,200.</p> <p>Not only were these areas the most congested, they also had 18 of the 23 possible HP gas lines on the project. Boring or Horizontal drilling at any of these areas would likely NOT been approved by Holly Oil, Chevron, Pioneer, or Questar. THE CONSEQUENCES OF A HIT WOULD BE CATASTROPHIC TO THE WASATCH FRONT.</p>	<p>A major Utility hit could have unlimited costs for all</p> <p>If Bores were allowed, they would have cost at least \$1000/lf in these congested, dangerous conditions. For the 600ft involved we saved at least \$500,000</p>	<p>A major hit would shut this project down</p> <p>If we had to bore any one of these four, we would still be trying to get permits from the RR's!!</p>

CMGC TEAM KEY RISK IDENTIFIED	CMGC TEAM RISK MITIGATION EFFORT	DETAILED MITIGATION DESCRIPTION	COST IMPACTS	SCHEDULE IMPACTS
	<p>3. By making both the West Bountiful Water line, and Woods Cross Waterline part of this project, the team was able to work out what could have been insurmountable conflicts.</p> <p>4. By installing key Utility casings at the Holly RR Crossing while Geneva had the tracks tore open for the Crossing reconstruct, very expensive and time consuming horizontal bores for Questar, Rocky Mountain Power, and Comcast were avoided.</p> <p>5. By making Woods Cross a partner in the Storm Drain System, we were able to take advantage of their future sediment pond. Upsizing the SD trunk line from 30" to 54" was expensive, but was probably offset by not having to build a separate sediment pond system for UDOT's portion of SD Flow.</p> <p>6. By communicating with Questar, we arrived at a better time for them to replace their whole south side distribution line this fall, rather than wasting money looping several conflicts on the old steel line that needed to be replaced. The new HDPE line will be under the new south sidewalk; a better location for future business service tie-ins</p>	<p>Woods Cross had already awarded the 12" waterline last Fall, and it was designed to go exactly in the ONLY location we could fit the 54" SD in without major sewer line rework.</p> <p>At this location there were 2-1800psi Hydrogen lines at 15-20ft deep. Holly would only allow bores below 25ft; an impossibly expensive depth. They would also have been in the contaminated ground water plumes.</p> <p>We do not know the cost of ROW for the UDOT sediment pond. However, it would have had to be on Kingston Property(they have been extremely hard to deal with). Eventually Woods Cross would have had to build the current sediment system to meet their future SD needs as the 500 South area builds out commercial.</p> <p>The new south side HDPE distribution line will cost more than all the misc steel loops, but Questar is very willing to cover the extra cost. This is a line they needed to replace. The neighborhood will have a safer system.</p>	<p>The only other place the 54"SD would fit was down the center of the existing road. Traffic control costs would have added at least \$500,000 and slow installation another \$500,000</p> <p>Geneva will only charge about \$15,000 for this in a C.O. If the Utilities horizontal drilled these 120ft, it may have cost UDOT 5 times that thru Utility agreement work</p> <p>Extremely hard to evaluate. The sediment pond costs \$370,000; the upsized Trunk line from 30" to 54" was about \$800,000. What portion of this will UDOT get back from Woods Cross?</p> <p>UDOT should save some \$\$\$ off there utility agreement with Questar??</p>	<p>This would have ruined the schedule</p> <p>We would not be able to pave this Fall w/o getting Comcast poles out of our way</p> <p>UDOT ROW would likely still be fighting Kingstons for the new sediment pond property</p> <p>This should help the schedule in phase 3 if Questar reacts quickly</p>

CMGC TEAM KEY RISK IDENTIFIED	CMGC TEAM RISK MITIGATION EFFORT	DETAILED MITIGATION DESCRIPTION	COST IMPACTS	SCHEDULE IMPACTS
<p>6. Railroad Crossing Construction (limited mitigation)</p>	<p>1. We have the Holly RR crossing Track work and panels complete. It required a huge amount of coordination between many stake holders. We still have 2 more rounds of gate work to finish. This has been expensive work</p> <p>2. UPRR and UTA intend to install their own crossing work in Phase 3 now. This will still be a coordination nightmare, that UDOT will no longer have control of, but they will still have to pay for it somewhere.</p>	<p>Whether we coordinate it, or Holly had someone else do this work for them directly, UDOT still would have had to pay for this work. By having Geneva coordinate the work, we feel the schedule was dramatically improved.</p>	<p>This RR Crossing work can be paid under Construction or the Utility agreements. Take your choice??</p>	

APPENDIX D –Scope Creep Tracking

Attached documents from the contractor



Charles A. Mace, P.E. Project Manager
Rodney A Terry, P.E. Resident Engineer
Reuel Alder, Innovative Contracting Engineer
UDOT Region 1
166 West Southwell St.
Ogden, UT 84404-4194

Sept 28, 2009

RE: STP-0068(16)68; S-0068(57)0068; F-0068(58)0068; 500 South W Bountiful CMGC – All phases defense of Project Cost Creep

Gentlemen,

On Sept 15, 2009, I received a very disappointing phone call from Rudy Alder, stating that Cory Pope Region #1 director was not interested in any further CMGC projects due to the extreme Cost Creep and Overruns on the 500 South, West Bountiful Project. It is my goal to sway Cory's opinion. We on the CMGC team as well as the actual field construction team have worked too hard on a VERY DIFFICULT project to end up with this assessment. I will prove that the added work was necessary; that the CMGC team worked diligently to control the added costs and RISKS; and that Geneva Rock turned in bids on the core items for less cost than was originally given in the RFP.

To try and track the cost creep, everyone needs to know what was proposed in the Original CMGC RFP of June 4, 2008, and what it was based on. The information given out for the RFP was very sketchy at best. We were given an artist's rendition of the future typical roadway section, a surfacing design (Geogrid, 9"GB, 6"FDR, 7.5"HMA, and 5/8"BWC), some very general description of possible ground water contamination, a very general construction schedule, and whatever we could glean from visiting the site between Redwood and I-15. During one of our site visits we ran into PEC engineers, and noticed they had a Plan-in-Hand overall layout of the road. We emailed the UDOT bidding team requesting a copy of the layout, and were refused because they wanted our unbiased innovation, and did not want to give out an unfair advantage over the other contractors. We had to rely on our past experiences, and envision the job as best we could in a 25 pages or less RFP. From the scores received, and the debriefing after the award, the UDOT evaluation team seemed extremely pleased, especially with our Cost Model Schedule and our direct and open description of the major items we were asked to price. Our overall Cost Model Schedule was \$12.5 million consisting of \$250,000 for CMGC design tasks, \$2.5 million for Early Utility Installation and \$9.8 million for Main Roadway Construction.

One of Geneva's key tasks for the CMGC Design was preparing a Cost Model and Schedule for the design periods of Original RFP, 30%, and 90%. To get a good overview of the cost estimates and project growth over the 3 periods go to the 4 – 11x17 – 90% Cost Model Comparison sheets attached. From this you can see the general growth as follows:

1. Original RFP of June 4, 2008 – Cost Model schedule total = **\$12.5 million**
2. 30% Cost Model of Aug 25, 2008 - **\$16.1 million**- Major added or unforeseen work
 - **Reduced** CMGC design fees by \$89,000
 - **Reduce** early Utility costs by replacing RR Bores w/ HDPE slip lines, and better defining storm drain lengths - \$853,000
 - Increase cost of Traffic Control to reflect actual phase plans, and RR flagging -\$530,000
 - **Reduce** demo and Removal costs by \$80,000



- Increase Roadway Exc costs to reflect extreme unbalance resulting in off haul and wasting 35,000cy - \$281,000
 - **Reduce** Storm drains installed in upper surfacing - \$13,000
 - **City Utilities and Betterments were still not defined at 30%**
 - Increase Surfacing costs by \$1, 531, 00, with all of it coming from an increase of PG 64-34 binder costs from \$725/ton to \$960/ton in just 3 months!!
 - Increase signs and striping by going from paint to tape striping - \$220,000
 - Increase concrete flatwork costs by extensive median islands not envisioned at RFP time in a Industrial area -\$356,000
 - Increase fencing costs overlooked at RFP time-\$125,000
 - Increase Electrical costs to cover added signals, decorative lighting, and ATMS-\$385,000
 - Increase Landscaping for extensive median islands - \$160,000
 - Did not include any RR crossing work in the original RFP – adds - \$578,000
 - Did not include any hazardous waste cleanup in original RFP- wild add- \$405,000
3. 90% Cost Model of April 6, 2009 - **\$17.2 million**- Major added or unforeseen work since 30% cost model:
- Increase CMGC design fees back up to \$245,000 – increase of \$84,000, but still \$5,000 below original. Caused by extended design time, ROW time, and UDOT shutdown
 - Reduce scope and cost of early Utilities down to \$840,000. Most of the utility costs are scoped into the main surface storm drain. This appears to save \$804,000 from the 30% model. There was actually even more saved, because this included \$192,000 for the West Bountiful Waterline and \$143,000 for 1400ft of 36” storm drain that had to be added out to the Legacy drain.
 - Increased Mobilization and Traffic Control to account for the lengthened schedule from 10 months to 13months. Added \$311,000
 - Increased demo and removals by \$28,000 to account for an old box culvert that has to be demoed and filled
 - **Reduced** roadway excavation by \$424,000. Total volume was reduced by raising the grade 4”. A major portion of the existing HMA and underlying base was to be recycled for granular borrow.
 - **Increase** the remaining storm drains. We totally lost the fall of 2008 early utility window, and major portions of the Storm Drain system had to be installed here. Added \$985,000 to the 30% cost model. However, if you combine this with the early storm drain work, the overall cost increases by \$181,000. Then from this deduct the \$192,000 for the West Bountiful Water line, and \$143,000 for the 1400ft of 36”, and the overall storm drain costs actually decreased by \$154,000!!
 - **Finally the City Betterments and Utilities were becoming defined.** We added 2 West Bountiful waterlines, a Woods Cross water line, an extensive 48” storm detention system, upgrade of the Weber Basin Irrigation system, and possibly a new Weber Basin pressured system. Total costs when \$192,000 West Bountiful line form early Package is included – add \$1,552,000.
 - **Reduce surfacing section from 30% cost model by going to PCCP.** With the price of PG 64-34 bouncing all over the map, it was finally decided to go to a PCCP surface section (6”GB, 4”UTBC & 10”PCCP). This reduced the surfacing back down to within



\$56,000 of the original RFP, covered the cost of unforeseen tapers out on Redwood, and gave a surface that will last twice as long as HMA.

- Increase striping again to not only Tape, but ground in Tape!! Add \$93,000
 - Increase Concrete Flatwork another \$68,000. However, this covers major quantity adds of driveway concrete and stamped concrete.
 - Major design adds of block walls, decorative walls, and barrier increase \$494,000!!
 - Reduce electrical costs by being more realistic with decorative lights – decrease \$ 50,000
 - Beautification added to landscaping in mow strips, monuments, and trees and scrubs – Add \$154,000
 - As RR crossing work becomes more defined, sub quotes start skyrocketing. We needed a true RR designer for this work. Crossings are now up to \$1,160,000!!
 - Through comprehensive testing and raising of overall project design grade hazardous wastes become a minimal risk. Cut back down to only \$20,000 cost
4. **On the last page of the 11X17 90% Cost Model comparison, Geneva tried to itemize other contributors of Funds, and what has really been added:**
- There is about \$1.5 million in betterments that West Bountiful, Woods Cross, and Weber Basin water should pay for.
 - There is about \$65,000 that Holly Oil will put in for the wall
 - And there is about \$500,000 of Beatifications that the cities and Obama Bucks should cover.
 - If we do not install the \$1.2 million worth of RR Crossing work, UDOT will likely have to pay it in another way to have the RR's do it.
 - There has been about \$2.9 million of extras added.
 - **IF THE FUNDS FROM ELSEWHERE AND THE ADDED WORK IS TAKEN AWAY, GENEVA HAS ACTUALLY REDUCED THE COST AND RISK INVOLVED WITH THE ORIGINAL CORE WORK BY OVER \$1.5 MILLION!!**

All of the above additions and savings are on paper only. What has happened for the real contract field work? **WHAT HAVE THE REAL COSTS BEEN, AND WHERE WILL THEY LIKELY END UP??**

1. **CMGC Design Costs** – We originally estimated the Geneva's participation in the Design process at \$250,000. Our original contract expected to last thru April 2009 was \$161,000. Due to the overall lengthening, it will likely go through Oct 2009, and will cost about \$210,000, \$40,000 less than the original RFP estimate.
2. **Early Utility Package** – This was Bid for \$840,000, and took on some of the most risky work of the whole project. We installed the HDPE slip lines at half the cost of boring, and deleted the risk of dealing with 18 of the 23 high pressure gas lines on the project. We were able to piggyback West Bountiful's water line through the same slip line, and save them at least \$200,000. At the very start of this phase we discovered a huge elevation bust in the storm drain design. We reacted quickly, redesigned almost all the SD boxes ourselves, and did not charge UDOT anything even though the SD boxes were larger. We had 3 minor change orders, and the final contract will be less than the original \$840,000 Bid.



3. **North side Phase 2 Package** – This bid was rejected the first time because we were 11% over the ICE, but only 6% over the EE. On the second bid we were successful at \$8,835,000. Our first challenge was to slip line a 42” HDPE pipe inside an unexpected 36x54” Arch CMP under 1100W. Due to 3 more High pressure gas lines directly under the CMP, there was no choice but to slip this old CMP. We devised a way to squash the new HDPE pipe, strut the squashed shape at 34 x 52, and slip it thru the old CMP. We did not charge UDOT anything, even though we took a huge risk making this innovative idea work. Also the shallow depth of the old CMP at 1100W pushed the overall SD trunk line almost a foot higher than designed. We recognized this, took survey shots, and helped URS redesign the PCCP surface through this area. Once again we did not charge UDOT anything. The Limitations of operations said all North ROW was to clear by July 5. Key parcels did not clear until late August. We bounced our crews all over the job working around these properties. We have not asked UDOT for any money, even though we should have. This has cost us at least \$100,000 and a month on our schedule. We will end up with 5 major change orders. UDOT has demanded that we remove ALL existing HMA from the project, and the HMA is averaging 10” thick, not the 6-7” UDOT coring said it was. This extra HMA removal will cost about \$90,000. Besides throwing away 10,000tons of pulverized HMA and base, very little of the excavation has been good enough to embank. None of the pipe spoils have been either. This has resulted in an E-Fill change order to bring in makeup fill that could cost as much as \$100,000. However in the process we have eaten ALL the expensive off haul and waste of all the bad material that should have been embanked at half the cost. This will cost us more than the \$50,000 that Geneva is kicking in to solve this problem. While we had the Holly RR tracks tore open for reconstruction, UDOT asked us to install an 8” casing for Questar, and a 12” ADS pipe for others such as Comcast to get there relocates done cheaply. This is a CO of about \$15,000, but this will easily be saved many times over if Questar and Comcast had to bore their utility relocates and charge them to the overall project through their utility relocate agreements. We also had to replace a 24” x 500ft irrigation line for Weber Basin Water. We tried to make UDOT/URS aware of this conflict at least 6 months ago. We were ignored. Weber Basin and The Bureau of Reclamation FORCED this upgrade, and the CO will be about \$80,000. In the course of the SD installation we have had to loop waterlines, sewer lines, lower fiber optic lines, etc that should have been designed out or done by third party relocation. We will be asking for an itemized CO at the end to cover these costs of about \$30,000. We do not anticipate any other major CO’s. With ALL of the above extras added in, our phase 2 contract will come to about \$9.2 million. This is only a cost creep of less than 4%. Under a normal design/bid/build we would not have shared in any of these costs, and we would have asked for at least twice the amount. We have tried very hard to live up to our commitment of being a good CMGC partner.



4. **South side Phase 3 package** – This has not bid yet, and is being delayed like all the other packages by ROW and RR agreements. For the bid items and quantities we have been given, this bid will be somewhere around \$7-8 million depending on what we actually have to do for the RR's.

When we first started the CMGC process we had a risk assessment meeting to identify and mitigate major risks. The six top risks were: Timely ROW acquisition, hazardous material remediation, Asphalt supply/price, MOT for Holly RR Crossing reconstruct, Third party Utility relocations, and dealing with the RR's in general.

ROW acquisition has been our nemesis. This project will overrun by a full year because of it alone. We have been very proactive in how we have phased the project, and moved our crews around uncleared properties. We have performed work for private individuals at the request of UDOT ROW to get them to sign their ROW agreements, even at the risk of not being paid.

Through a good testing program by URS, and our effort to keep the Utilities as shallow as possible through the grade raise, we have not had ANY hazardous waste remediation costs. **THIS HAS BEEN A MAJOR SAVINGS FOR ALL.**

We suggested PCCP as an alternate to the original design HMA section. Without any PG 64-34 oil escalation, the complete HMA surfacing section (w/ geogrid, GB, FDR, HMA, & BWC) was priced at almost \$76/sy. Our bid price for the equivalent PCCP surface section (GB, UTBC, & PCCP) is just over \$72/sy. For the 80,000sy on the project this is a savings of \$300,000, and the expected surface life is DOUBLED to 40 years!! There is NO PG 64-34 escalation risk to UDOT with PCCP!!

We have completed the risky RR track work at Holly oil. There is still some gate and signal work to come, but we have overcome this risk with a good all around onsite team effort. Thank you UDOT for getting the Legacy detour pushed through for a long weekend.

The third party Utility relocations have also been a struggle. We have spent considerably more to bird dog this than we anticipated. Our project engineer has spent at least 50% of his time coordinating and pushing Rocky Mtn Power, Questar, Qwest, and Comcast. He has managed to keep them about one day ahead of our crews.

The dealings with the RR's have been as expected; SLOW! They will affect the phase 3 bid letting, and Geneva will likely suffer through another costly work slow down like we did for the 6 weeks it took to award phase 2.

We have attached two matrixes to show how we attached the major risks, and the constructability changes the CMGC team has made on the 500 South project. There has been extensive savings in cost, risk, and overall safety to the local neighborhood. Geneva is proud of its contribution to the 500 South Project, and feels that we have more than lived up to our commitment as a partner to design and build a very difficult project.

Sincerely,

500 SOUTH 90%PS&E COST MODEL SCHEDULE NARRATIVE

GENEVA ROCK 4/6/2009

To date, Geneva Rock has assembled 3 distinctly different schedules driven by 3 different emphasis:

1. Initial RFP Cost Model Schedule – This schedule was driven by earliest possible completion and taking advantage of dryer Fall conditions to install the UG Utilities. The dryer conditions would also put the possible contaminated ground water plumes to the lowest level. The general phasing broke the project into 3 segments, with each segment being broken down again by North and South for construction.
2. 30%PIH Cost Model Schedule – ROW acquisition became the main driver in this schedule, and we switched our emphasis to start anywhere we could legally get property to work on.
3. 90% PSE Cost Model Schedule – After going through the “lack of funds shutdown”, efficiency and cost control have become more of a driver. However, the schedule is still really controlled by ROW acquisition. The segment phasing has become obsolete, and we now have 5 distinct GMP’s that are ROW and cost driven.
 - Early Utility Package – We needed to get started. This bid February 19, and is now just getting off the ground. It should be finished by the end of May 2009.
 - North side Package – This is the next area that ROW will likely clear. It will involve installing most of the UG utilities and getting PCCP on the North 3-12ft lanes, the middle 14ft turn/median island lane, and 1-12ft lane on the south adjacent to the median islands. This will cover the north side from Redwood to the UPRR. It will likely include the Holly RR Crossing reconstruct, and the signals. This is scheduled to bid May 5, 2009 with a very quick award turn around. We need to be working on it no later than May 30, with most work complete by Nov 15, 2009.
 - Landscape/Stimulus Package – This will bid about the same time as the North side, but will have all the Federal Money and Rules involved with it to take advantage of Federal Stimulus money. The work cannot start until curb & gutter is down on the North side about Sept 15, 2009. To get the median islands complete will require working into mid December.
 - South side Package – For some strange reason ROW acquisition on the south side did not even start until the funds were turned back on in January 2009. This has forced the break off of the south side due to no ROW and problems with Rocky Mountain Power Pole movement. In general, this package will complete the last 24ft of south side PCCP, and all flatwork and park strip landscaping on the south. ROW is not expected to clear until late summer. We assumed a Sept 1, 2009 Bid date. With fast turn around on award, we will complete up through road base before a winter shutdown in late Nov 2009. The work will open back up in Apr 2010, and be complete in June 2010.
 - East End Package - We are also experiencing ROW problems between I-15 and the UTA RR. This should also bid about Sept 1, 2009. We will only be able to get the north side waterline and storm drain in, with most of the work performed Apr to Aug 2010.

We have attached a very detailed schedule for those of you who wish to dig into the details. For those that don't here is a list of key milestone dates:

1. Early Utility Package – Bid Feb 19; awarded March 19, should be complete by the end of May 2009.
2. North side Package – Planned to bid May 5; quick turnaround on the award so we can start the end of May; UG utilities and storm drain complete mid Sept; Exc, Gran Borrow, UTBC complete by Mid October; PCCP starts Sept 1, with 3 passes complete by Mid November; Misc HMA Sept 1 thru Oct 15; Concrete Flatwork Sept 15 thru Nov 15; Signal work Sept 1 thru Oct 15, and the Holly RR crossing two back to back weekends in Sept. All North side work to the UPRR should be complete end of Nov 2009.
3. Stimulus Landscape Package – This will bid about the same time as the north side package to meet Federal Stimulus Bidding requirements. UDOT is trying to wrap all the Federal money and rules into this 1 package. Work really can't start until the North side curb&gutter is in Sept 15, and by Federal rules will have to finish in December 2009.
4. South side Package - We hope to bid this Sept 1, and be working by mid Sept. We plan on completing everything up through Road base Fall 2009. PCCP will be placed Spring 2010, with the package wrapping up by the end of June 2010.
5. East End Package – This may be part of the South side package bid in Sept 2009. We will only get the UG utilities in on the North side Fall 2009. Since we will not be able to pave any this Fall, we will be limited to what we can tear up. Most of this Package will be completed April thru August 2010.

Once again this is our third full blown detailed schedule. It will likely not be our last. We will stay as flexible as possible to fit ROW and Utility Constraints as they come up.

Prepared by Stephen R. Sussdorff PE, Geneva Rock PM

500 South CMGC 90% COST MODEL COMPARISON

GENEVA ROCK April 6, 2009

MAJOR WORK GROUPS	ORIGINAL JUNE 4 RFP					30% COST MODEL AUG 25					90% COST MODEL APR 6				
KEY INDIVIDUAL WORK ITEMS	QUANTITY	UNIT	U.P.	TOTAL \$	COMMENTS	QUANTITY	UNIT	U.P.	TOTAL \$	COMMENTS	QUANTITY	UNIT	U.P.	TOTAL \$	COMMENTS
<u>GENEVA DESIGN TASKS</u>															
POTHOLING & FIELD INVESTIGATION	1	LS	100000	\$ 100,000		150	EA	350	\$ 52,500		178	EA	350	\$ 62,300	
ONGOING CONSTRUCTABILITY & MEETINGS	1	LS	100000	\$ 100,000		8	MO	11200	\$ 89,600		13	MO	11200	\$ 145,600	
REVIEWS, COST MODELS & BID GMP's	1	LS	50000	\$ 50,000		2	EA	9650	\$ 19,300		4	EA	9650	\$ 38,600	
<u>GENEVA DESIGN TASKS GROUP TOTAL</u>				<u>\$ 250,000</u>					<u>\$ 161,400</u>					<u>\$ 246,500</u>	
<u>EARLY CONSTRUCTION</u>															
MOBE,SURVEY,TRAFF CONT,ENVIRO	1	LS	500000	\$ 500,000		1	LS	199000	\$ 199,000		1	LS	185000	\$ 185,000	
MISC DEMO/REMOVALS											1	LS	51504	\$ 51,504	INCLUDES TREE,PIPE,BOX,HYD RELOCATE
JACK/BORE UPRR/UTA	100	LF	1300	\$ 130,000		112	LF	338	\$ 37,856	SLIP w/ 18" HDPE	295	LF	236.12	\$ 69,655	INCLUDE CLEAN/GROUT
JACK/BORE HOLLY RR	50	LF	800	\$ 40,000		88	LF	413	\$ 36,344	SLIP w/ 42" HDPE	103	LF	451.12	\$ 46,465	INCLUDE CLEAN/GROUT
18-48"SD TRUNKLINE	13500	LF	110	\$ 1,485,000		7286	LF	172	\$ 1,253,192		1715	LF	66.94	\$ 114,802	
SD CATCH BASINS/CLEANOUTS	66	EA	5000	\$ 330,000		32	EA	3557	\$ 113,824		11	EA	3345.45	\$ 36,800	
36" ADDED REDWOOD TO LEGACY				\$ -					\$ -		1437	LF	89	\$ 127,893	ADDED
SD CLEANOUTS FOR ADDED 36"				\$ -					\$ -		4	EA	3900	\$ 15,600	ADDED
CONCRETE SD OUTFALL AT CANAL A-1-A	10	CY	1200	\$ 12,000		3	EA	1170	\$ 3,510	NOW 48" ES				\$ -	
LISTED WEST BOUNTIFUL CITY BETTERMENTS	1	LS		\$ -	\$\$ UNKNOWN @RFP	1	LS		\$ -	STILL UNKNOWN	1	LS	191678	\$ 191,678	WEST HALF STA 82-91 W. BOUNTIFUL
LISTED WOODS CROSS CITY BETTERMENTS	1	LS		\$ -	\$\$ UNKNOWN @RFP	1	LS		\$ -	STILL UNKNOWN				\$ -	
<u>EARLY CONSTRUCTION GROUP TOTAL</u>				<u>\$ 2,497,000</u>					<u>\$ 1,643,726</u>					<u>\$ 839,398</u>	
<u>MAIN ROADWAY CONSTRUCTION</u>															
<u>STARTUP WORK</u>															
MOBE & SUPERVISION	1	LS	800000	\$ 800,000		10	MO	84500	\$ 845,000		13	MO	78300	\$ 1,017,900	NOW FOR 13 MONTHS DUE TO ROW
TRAFFIC CONTROL	1	LS	170000	\$ 170,000		10	MO	70000	\$ 700,000		13	MO	58100	\$ 755,300	
SURVEY	1	LS	100000	\$ 100,000		1	LS	100000	\$ 100,000		1	LS	110000	\$ 110,000	
EROSION CONTROLS					PART OF EARLY CONST.	0	LS	0	\$ -		8334	LF	8.75	\$ 72,923	WAS TO BE DONE EARLY GMP BEFORE
<u>STARTUP SUB-GROUP TOTAL</u>				<u>\$ 1,070,000</u>					<u>\$ 1,645,000</u>					<u>\$ 1,956,123</u>	
<u>DEMO/REMOVALS/RECONSTRUCTS</u>															
RELOCATE FIRE HYDRANTS	30	EA	2000	\$ 60,000		24	EA	1634	\$ 39,216		10	EA	3500	\$ 35,000	
RELOCATE WATER SERVICES	40	EA	1000	\$ 40,000		10	EA	784	\$ 7,840		13	EA	500	\$ 6,500	
30%WATERLINE LOOPS ADDED						15	EA	1452	\$ 21,780		0	EA	0	\$ -	NOW PART OF WATER PACKAGES
CLEAR & GRUB	23.5	AC	5000	\$ 117,500		10	AC	1980	\$ 19,800		10	AC	0	\$ -	NOW INCIDENTAL TO Roadway exc
30%REMOVE TREES ADDED						12	EA	430	\$ 5,160		12	EA	400	\$ 4,800	
REMOVE PIPE CULVERT	5100	LF	5	\$ 25,500		2300	LF	5	\$ 11,500		6660	LF	5	\$ 33,300	
REMOVE CATCH BASINS	40	EA	1000	\$ 40,000		26	EA	501	\$ 13,026		20	EA	500	\$ 10,000	
REMOVE CONCRETE FLATWORK	7000	SF	2	\$ 14,000		21636	SF	0.90	\$ 19,472		25092	SF	1	\$ 25,092	
REMOVE CURB & GUTTER	4000	LF	6	\$ 24,000		4333	LF	3	\$ 12,999		4755	LF	4	\$ 19,020	
ADJUST UTILITIES TO GRADE	38	EA	1000	\$ 38,000		113	EA	632	\$ 71,416	MH,VALVES,BOXES	111	EA	660	\$ 73,260	
UNRECOGNIZED HOUSE REMOVAL		EA		\$ -	NO IDEA @ RFP	5	EA	9225	\$ 46,125		5	EA	13500	\$ 67,500	
ADDED BOX CULVERT REMOVAL/BF											1	EA	28000	\$ 28,000	SIGNIFICANT BACKFILL COST
UNRECOGNIZED MISC REMOVALS		EA		\$ -	NO IDEA @ RFP	1	LS	10989	\$ 10,989		1	LS	12000	\$ 12,000	
<u>DEMO SUB-GROUP TOTAL</u>				<u>\$ 359,000</u>					<u>\$ 279,323</u>					<u>\$ 314,472</u>	
<u>ROADWAY EXCAVATION</u>															
DUST CONTROL WATER						2640	MG	14.24	\$ 37,594		3000	MG	7	\$ 21,000	
MILL OFF EXIST ACP TO POM						37000	SY	4.71	\$ 174,270		37000	SY	4	\$ 148,000	NOW INCIDENTAL TO ROAD EXC
PULV 9-12" EXIST ACP/UTBC TO STOCKPILE						13000	CY	5.90	\$ 76,700		9000	CY	6	\$ 54,000	
EXC TO EMB WEST FILLS						13000	CY	15.01	\$ 195,130		18000	CY	9	\$ 162,000	
EXC/WASTE EXCESS MATERIAL						35500	CY	11.2	\$ 397,600		0	CY		\$ -	RAISE GRADE 4"& 20"PCCP SECTION
ORIGINAL RFP ROADWAY EXC	60000	CY	10	\$ 600,000					\$ -	54,500CY				\$ -	BALANCED PROJECT AT 38,000 CY
ADDED EXC FOR REDWOOD TAPERS											1500	CY	23	\$ 34,500	
ADDED EXC MISC STREETS & I-15 RAMPS											1500	CY	25	\$ 37,500	
<u>ROAD EXC SUB-GROUP TOTAL</u>				<u>\$ 600,000</u>					<u>\$ 881,294</u>					<u>\$ 457,000</u>	

500 South CMGC 90% COST MODEL COMPARISON

GENEVA ROCK April 6, 2009

MAJOR WORK GROUPS	ORIGINAL JUNE 4 RFP					30% COST MODEL AUG 25					90% COST MODEL APR 6				
KEY INDIVIDUAL WORK ITEMS	QUANTITY	UNIT	U.P.	TOTAL \$	COMMENTS	QUANTITY	UNIT	U.P.	TOTAL \$	COMMENTS	QUANTITY	UNIT	U.P.	TOTAL \$	COMMENTS
STORM DRAINS IN SURFACE ENVELOPE															
12-18" SD IN SURFACE ENVELOPE	4500	LF	75	\$ 337,500		2862	LF	62.15	\$ 177,873		2599	LF	56	\$ 145,544	
SURFACE CATCH BASINS	0			\$ -		36	EA	3048	\$ 109,728		44	EA	3500	\$ 154,000	
18-54" SD TRUNKLINE NOT DONE EARLY	0	LF	0	\$ -		0	LF	0	\$ -		7163	EA	118	\$ 845,234	INCLUDES 2650LF OF 54" AND 100FT 42"SLIP
TRUNKLINE CB/COB's	0			\$ -			EA		\$ -		37	EA	3700	\$ 136,900	IN ORIG RFP TO BE DONE BY DEC 2008
UNRECOGNIZED A-1-2 CANAL PIPE	0			\$ -		120	LF	310	\$ 37,200	ASSUME 48"rcp w/ ES	120	LF	230	\$ 27,600	
SD IN SURFACING SUB-GROUP TOTAL				\$ 337,500					\$ 324,801					\$ 1,309,278	
CITY UTILITIES NOT DONE EARLY															
EAST HALF OF W. BOUNTIFUL WATER				\$ -					\$ -		1	LS	280680	\$ 280,680	
WOODS CROSS WATER	0			\$ -					\$ -		1	LS	353172	\$ 353,172	NO CASING,FLOW FILL, AND ONLY 2 LOOPS
ADDED 48"RCP W/ DETENTION POND	0			\$ -					\$ -		1	LS	370000	\$ 370,000	
FIX WEBER BASIN 16"IRRIGATION NORTH	0			\$ -					\$ -		500	LF	63	\$ 31,500	NEEDS TO BE ADDED TO SCOPE
WEBER BASIN 16"DIP SOUTH SIDE STA 61-11	0			\$ -					\$ -		5000	LF	65	\$ 325,000	NEEDS TO BE ADDED TO SCOPE
CITY BETTERMENT SUB-GROUP TOTAL				\$ -					\$ -					\$ 1,360,352	
SURFACING SECTION															
GEOGRID/GEOTEXTILE	45500	SY	6	\$ 273,000		78000	SY	5.84	\$ 455,520		0	SY		\$ -	
GRANULAR BORROW	54500	TON	14	\$ 763,000		19400	CY	26.14	\$ 507,116		16000	PCY	20	\$ 320,000	
UTBC	25500	TON	18	\$ 459,000		24000	TON	18	\$ 432,000	ONLY MISC GRAVEL DRIVE	10400	PCY	40	\$ 416,000	
FDR-MIX IN EMULSION	45500	SY	15	\$ 682,500		12900	CY	99.18	\$ 1,279,422		0	SY		\$ -	
UTBC GRAVEL DRIVES & UNDER HMA DRIVES				\$ -		15500	SF	1.85	\$ 28,675	ONLY MISC GRAVEL DRIVE	15500	SF	1.75	\$ 27,125	
HMA	40000	TON	80	\$ 3,200,000		32900	TON	80.31	\$ 2,642,199		0	TON		\$ -	
30%HMA DRIVES w/UTBC UNDER				\$ -		7500	SF	6.66	\$ 49,950		0	SF		\$ -	
30% PG 64-34 OIL ESCALATION				\$ -		1634	TON	960	\$ 1,568,640		0	TON		\$ -	
BONDED WEAR COURSE (BWC)	86000	SY	8	\$ 688,000		80700	SY	7.84	\$ 632,688		0	SY		\$ -	
PCCP 10" MAINLINE				\$ -					\$ -		79928	SY	63	\$ 5,035,464	
ADDED HMA FOR REDWOOD & MISC				\$ -					\$ -		2534	TON	125	\$ 316,750	NO PRIME
ADDED HMA MILLING AT TIE-INS				\$ -					\$ -		2600	SY	2.5	\$ 6,500	
SURFACING SUB-GROUP TOTAL				\$ 6,065,500					\$ 7,596,210					\$ 6,121,839	
PERMANENT SIGNSTRIPE															
ORIG RFP STRIPING(PAINT)	1	LS	125000	\$ 125,000					\$ -					\$ -	
30% TAPE STRIPING/MESSAGES				\$ -		70000	LF	4.27	\$ 298,900		65000	LF	5.6	\$ 364,000	TAPE PLUS GRIND-IN
ORIG RFP SIGNS	1	LS	7000	\$ 7,000					\$ -					\$ -	
30% SIGNS W/ RELOCATES				\$ -		135	EA	396	\$ 53,460		128	EA	635	\$ 81,280	INCLUDES MANY RELOCATE/REMOVE
SIGN/STRIPE SUB-GROUP TOTAL				\$ 132,000					\$ 352,360					\$ 445,280	
CONCRETE FLATWORK															
EDGE CURB & Gutter	19500	LF	18	\$ 351,000		17724	LF	17.82	\$ 315,842		17508	LF	17	\$ 297,636	
SIDEWALKS/DRIVES/FLATWORK	92000	SF	5	\$ 460,000		90013	SF	5.11	\$ 459,966		126680	SF	5.15	\$ 652,402	ADDED 37,000SF AT \$5/SF=\$185,000 ???
UNRECOGNIZED B5/B4 MEDIAN CURB	0			\$ -		16815	LF	21.67	\$ 364,381	ADDED MEDIAN ISLANDS	3275	LF	28	\$ 91,700	
UNRECOGNIZED OTHER MEDIAN CONC.	0			\$ -		25	EA	1080	\$ 27,000	ADDED MEDIAN ISLANDS	23	EA	750	\$ 17,250	
V.E. ADDED ISLAND INVERTED C&G	0			\$ -					\$ -		6599	LF	18	\$ 118,782	
ADDED PATTERN CONCRETE				\$ -					\$ -		4162	SF	13	\$ 54,106	MOST ADDED FOR LANDSCAPE
ADDED CONC STAIRS W/ RAIL				\$ -					\$ -		1	LS	4000	\$ 4,000	
CONCRETE FLATWORK SUB-GROUP TOTAL				\$ 811,000					\$ 1,167,189					\$ 1,235,876	

**500 South CMGC
90% COST MODEL COMPARISON**

GENEVA ROCK April 6, 2009

MAJOR WORK GROUPS

KEY INDIVIDUAL WORK ITEMS

ORIGINAL JUNE 4 RFP

QUANTITY UNIT U.P. TOTAL \$ COMMENTS

30% COST MODEL AUG 25

QUANTITY UNIT U.P. TOTAL \$ COMMENTS

90% COST MODEL APR 6

QUANTITY UNIT U.P. TOTAL \$ COMMENTS

FENCING & WALLS

UNRECOGNIZED FENCE IN RFP	0 LF	0	\$ -	NO IDEA @ RFP
30% FENCE RELOCATE OR REMOVAL			\$ -	
30% TEMP STOCK FENCE			\$ -	
30% CHAINLINK AND GATES			\$ -	
30% FIELD FENCE & GATES			\$ -	
ADDED NOISE WALL			\$ -	
ADDED MISC WALLS			\$ -	
ADDED MSE BLOCK WALLS			\$ -	
ADDED HOLLY DECORATIVE WALL			\$ -	
ADDED JERSEY BARRIER			\$ -	
<u>FENCE SUB-GROUP TOTAL</u>			<u>\$ -</u>	

7100 LF	3.10	\$ 22,010
4400 LF	3.69	\$ 16,236
2200 LF	25.45	\$ 55,990
4600 LF	6.75	\$ 31,050
		\$ -
		<u>\$ 125,286</u>

7564 LF	3	\$ 22,692	
3678 LF	2.5	\$ 9,195	
1500 LF	32	\$ 48,000	
4500 LF	7	\$ 31,500	
222 LF	30	\$ 6,660	RECENTLY ADDED
141 SF	28	\$ 3,948	RECENTLY ADDED
6537 SF	49	\$ 320,313	RECENTLY ADDED
1600 LF	105	\$ 168,000	RECENTLY ADDED
184 LF	50	\$ 9,200	RECENTLY ADDED-\$506,000 !!!!!
		<u>\$ 619,508</u>	

ELECTRICAL/SIGNALS/LIGHTS/ATMS

ORIG RFP ELECTRICAL	1 LS	250000	\$ 250,000
30% REDWOOD/1100W SIGNALS			\$ -
30% EXTENSIVE HIGHWAY LIGHTING			\$ -
30% ATMS SYSTEM			\$ -
<u>ELECTRICAL SUB-GROUP TOTAL</u>			<u>\$ 250,000</u>

1 LS	153500	\$ 153,500
71 EA	4155	\$ 295,005
9500 LF	19.7	\$ 187,150
		<u>\$ 635,655</u>

1 LS	224000	\$ 224,000	
37 EA	4892	\$ 181,004	NUMBER & TYPE NEEDS TO BE CONTROLLED
6500 LF	27.85	\$ 181,025	
		<u>\$ 586,029</u>	

LANDSCAPING & BEAUTIFICATION

ORIG RFP LANDSCAPE	82500 SF	2	\$ 165,000	NO IDEA OF ISLANDS
30% SHOULDER TOPSOIL/SEEDING			\$ -	
30% PARKSTRIPS/ISLANDS			\$ -	
30%REPAIR PRIVATE LANDSCAPE			\$ -	
ADDED TREES			\$ -	
ADDED PLANTS & SHRUBS			\$ -	
ADDED MONUMENT SIGNS			\$ -	
ADDED CONCRETE MOW STRIP			\$ -	
<u>LANDSCAPE SUB-GROUP TOTAL</u>			<u>\$ 165,000</u>	

9000 SY	2.67	\$ 24,030
5000 SY	49.2	\$ 246,000
3400 SY	16.2	\$ 55,080
		\$ -
		<u>\$ 325,110</u>

30000 SY	2.37	\$ 71,100	
10000 SY	17.1	\$ 171,000	
35657 SY	1.8	\$ 64,183	
197 EA	365	\$ 71,905	RECENTLY ADDED
4465 EA	12	\$ 53,580	RECENTLY ADDED
2 EA	12000	\$ 24,000	RECENTLY ADDED
1963 LF	12	\$ 23,556	RECENTLY ADDED-\$173,000 !!!!!
		<u>\$ 479,324</u>	

RECONSTRUCT RAILROAD CROSSINGS

ORIG RFP UNRECOGNIZED RR WOR	0 LS	0	\$ -	ASSUMED UPRR RECONST.
30% HOLLY RR CROSSING			\$ -	ALL RR CROSSINGS
30%UTA RR CROSSING			\$ -	
INCIDENTAL EXC/GB/UTBC			\$ -	
<u>RAILROAD SUB-GROUP TOTAL</u>			<u>\$ -</u>	

1 LS	332000	\$ 332,000	
1 LS	246000	\$ 246,000	
0 SY	0	\$ -	ASSUMED PAID IN ROAD
		<u>\$ 578,000</u>	

1 LS	605000	\$ 605,000	NEED RR CONSULTANT
1 LS	545000	\$ 545,000	NEED RR CONSULTANT
2 EA	5000	\$ 10,000	
		<u>\$ 1,160,000</u>	

REMOVE & DISPOSE HAZARDOUS

HAZARDOUS SOIL REMEDIATION	0 LS	0	\$ -	ALL AWARE BUT NO WAY
HAZARDOUS WATER REMEDIATION	0 LS	0	\$ -	TO QUANTIFY
<u>HAZARDOUS SUB-GROUP TOTAL</u>			<u>\$ -</u>	

100 TON	3769	\$ 376,900
1000 MG	28.40	\$ 28,400
		<u>\$ 405,300</u>

1 LS	10000	\$ 10,000	MINOR CONTINGENCY COST
1 LS	10000	\$ 10,000	MINOR CONTINGENCY COST
		<u>\$ 20,000</u>	

COMPLETE TOTALS

\$ 12,537,000

\$ 16,106,495

\$ 17,150,978

500 South CMGC 90% COST MODEL COMPARISON

GENEVA ROCK April 6, 2009

ORIGINAL JUNE 4 RFP

30% COST MODEL AUG 25

90% COST MODEL APR 6

QUANTITY	UNIT	U.P.	TOTAL \$	COMMENTS	QUANTITY	UNIT	U.P.	TOTAL \$	COMMENTS	QUANTITY	UNIT	U.P.	TOTAL \$	COMMENTS
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WHO PAYS FOR WHAT??

COMPLETE TOTALS

			\$ 12,537,000				\$ 16,106,495				\$ 17,150,978			
GENEVA DESIGN TASKS PAID BY CONSULTANT SERVICES			\$ 250,000				\$ 161,400				\$ 246,500			
WEST BOUNTIFUL EARLY WATER	1 LS		\$ -	\$\$ UNKNOWN @RFP	1 LS		\$ -	STILL UNKNOWN	1 LS	191678		\$ 191,678	WEST HALF STA 82-91 W. BOUNTIFUL	
CITY BETTERMENT SUB-GROUP TOTAL			\$ -				\$ -	STILL UNDEFINED			\$ 1,360,352	PORTIONS STILL UNDEFINED		
ADDED HOLLY DECORATIVE WALL				NOT EVEN DREAMED OF				STILL UNDEFINED	1600 LF	105		\$ 168,000	HOLLY & OBAMA \$\$ TO PAY??	
EXTENSIVE DECORATIVE HIGHWAY LIGHTING			\$ -				\$ 295,005	OVERKILL	37 EA	4325		\$ 160,025	CITIES & OBAMA \$\$ TO PAY PORTION??	
LANDSCAPE SUB-GROUP TOTAL			\$ 165,000				\$ 325,110				\$ 479,324	CITIES & OBAMA \$\$ TO PAY PORTION??		
RAILROAD SUB-GROUP TOTAL			\$ -				\$ 578,000				\$ 1,160,000	ROW \$ POOL TO PAY AS UTILITY ADJ???		
TOTAL OF POTENTIAL OUTSIDE \$\$			\$ 415,000				\$ 1,359,515				\$ 3,765,879			
ESTIMATED CONSTRUCTION TO PAY			\$ 12,122,000				\$ 14,746,980				\$ 13,385,099			

ITEMIZE PROJECT CREEP COST

MOBE & SUPERVISION EXTENDED 3 MONTHS									3 MO	77100		\$ 231,300	NOW FOR 13 MONTHS DUE TO ROW	
TRAFFIC CONTROL EXTENDED 3 MONTHS									3 MO	58100		\$ 174,300	CONSIDERABLE TEMP TAPE STRIPING & HM	
36" ADDED REDWOOD TO LEGACY			\$ -				\$ -		1437 LF	89		\$ 127,893	ADDED SO WEST END WOULD DRAIN	
SD CLEANOUTS FOR ADDED 36"			\$ -				\$ -		4 EA	3900		\$ 15,600	ADDED SO WEST END WOULD DRAIN	
UNRECOGNIZED HOUSE REMOVAL	EA		\$ -	NO IDEA @ RFP	5 EA	9225	\$ 46,125		5 EA	13500		\$ 67,500	WE WERE NOT GIVEN ANY ALIGNMENT @RF	
ADDED BOX CULVERT REMOVAL/BF									1 EA	28000		\$ 28,000	UNKNOWN & NEED MUCH BF TO FILL	
UNRECOGNIZED MISC REMOVALS	EA		\$ -	NO IDEA @ RFP	1 LS	10989	\$ 10,989		1 LS	12000		\$ 12,000	WE WERE NOT GIVEN ANY ALIGNMENT @RF	
ADDED EXC FOR REDWOOD TAPERS									1500 CY	23		\$ 34,500	BEYOND ORIG START & END PARAMETERS	
ADDED EXC MISC STREETS & I-15 RAMPS									1500 CY	25		\$ 37,500	BEYOND ORIG START & END PARAMETERS	
UNRECOGNIZED A-1-2 CANAL PIPE	0		\$ -		120 LF	310	\$ 37,200	ASSUME 48"rcp w/ ES	120 LF	230		\$ 27,600	NEEDS TO BE UPGRADED FOR LONG TERM	
UPSIZING TRUNKLINE FROM 30" TO 36-54"	0 LF	0	\$ -		0 LF	0	\$ -		4200 LF	80		\$ 845,234	ADDED FUTURE WOODS X SD WATER VOLU	
UPSIZING TRUNKLINE CB's DUE TO LARGER PIPE SIZE	0		\$ -		EA		\$ -		37 EA	1000		\$ 136,900	ADDED FUTURE WOODS X SD WATER VOLU	
ADDED HMA FOR REDWOOD & MISC			\$ -				\$ -		2534 TON	125		\$ 316,750	BEYOND ORIG START & END PARAMETERS	
ADDED HMA MILLING AT TIE-INS									2600 SY	2.5		\$ 6,500	BEYOND ORIG START & END PARAMETERS	
CHANGE STRIPPING TO TAPE THEN GRIND IN					70000 LF	2	\$ 140,000	UPGRADE TO TAPE	65000 LF	3		\$ 195,000	TAPE PLUS GRIND-IN	
UNRECOGNIZED B5/B4 MEDIAN CURB	0		\$ -		16815 LF	21.67	\$ 364,381	ADDED MEDIAN ISLANDS	3275 LF	28		\$ 91,700	WE WERE NOT GIVEN ANY ALIGNMENT @RF	
UNRECOGNIZED OTHER MEDIAN CONC.	0		\$ -		25 EA	1080	\$ 27,000	ADDED MEDIAN ISLANDS	23 EA	750		\$ 17,250	WE WERE NOT GIVEN ANY ALIGNMENT @RF	
V.E. ADDED ISLAND INVERTED C&G	0		\$ -				\$ -		6599 LF	18		\$ 118,782	WE WERE NOT GIVEN ANY ALIGNMENT @RF	
ADDED PATTERN CONCRETE									4162 SF	13		\$ 54,106	MOST ADDED FOR LANDSCAPE	
ADDED CONC STAIRS W/ RAIL									1 LS	4000		\$ 4,000	RECENTLY ADDED-NECESSARY??	
ADDED NOISE WALL			\$ -				\$ -		222 LF	30		\$ 6,660	RECENTLY ADDED-NECESSARY??	
ADDED MISC WALLS									141 SF	28		\$ 3,948	RECENTLY ADDED-NECESSARY??	
ADDED MSE BLOCK WALLS									6537 SF	49		\$ 320,313	RECENTLY ADDED-NECESSARY??	
ADDED JERSEY BARRIER							\$ -		184 LF	50		\$ 9,200	RECENTLY ADDED-NECESSARY??	
HAZARDOUS SUB-GROUP TOTAL			\$ -				\$ 405,300					\$ 20,000	HAZARDOUS NOW JUST A CONTINGENCY	
TOTAL PROJECT CREEP \$\$			\$ -				\$ 1,030,995				\$ 2,902,536			

WHAT WOULD PROJECT COST IF BETTERMENTS AND CREEP COULD BE ELIMINATED??

\$ 12,122,000

\$ 13,715,985

\$ 10,482,563



3 February 2009

Steve Sussdorf
Geneva Rock

RE: Utility Conflicts with 5th South Design Road Surfaces (20" . 24" . & 36") [PIN 4178]

Dear Steve,

We have investigated the utility conflicts with the three different pavement designs URS suggested: 20", 24", and 36". Our findings are shown below:

Utility Type	Pavement Design (In ft)		
	20"	24"	36"
Cable TV	22	38	826
Culvert	0	0	278
Electrical	42	10	24
Fiber Optic	412	899	6,149
Gas	62	124	1,201
Telephone	640	1,281	5,766
Water	0	0	136
Total Linear Feet	1,178	2,352	14,380
Percentage of 36"	8.19%	16.36%	
Reduction from 36"	91.81%	83.64%	
Percentage of 24"	50.09%		
Reduction from 24"	49.91%		

As you can see, the decrease of affected utilities from the 36" to the 20" pavement design is significant. Our findings are limited by the amount of potholing that was scheduled for this project and assumptions were made to connect any vertical information. Please let me know if you have any concerns or questions regarding this analysis or other aspects of the project.

Sincerely,

Dan Snell



Reuel (Rudy) Alder
Innovative Contracting Engineer
UDOT Project Development
4501 South 2700 West, Box 148460
Salt Lake City, UT 84114-8460

Feb 18, 2009

RE: STP-0068(16)68; 500 South W Bountiful CMGC – Value Engineering and Risk Mitigation associated with shallower PCCP Surfacing Envelope.

Rudy,

Due to the ongoing volatility in the Asphalt Binder market, we decided to go to the PCC Paving option for the 500 South West Bountiful project. This decision was based on a cost analysis only, with no benefit given to the PCCP on long term durability or other risks the shallower PCCP option helped mitigate. By our estimates, the designed HMA section (consisting of envelope excavation, geogrid, 9” of granular borrow, 6” of FDR base, 7.5” of HMA, and 5/8” bonded wearing course) would cost about \$6.4 million for the 82,000SY of surfacing. The HMA section estimate was based on the original RFP PG 64-34 binder price of \$725/ton. The PCCP section (consisting of envelope excavation, 6” of granular borrow, 4” of base course, and 10” of PCCP) would cost about \$6.5 million for the same area. Since the PG 64-34 price has varied from \$725 up to \$1450/ton over the last 6 months, and each \$100/ton increase would cost the project over \$300,000, the price stability of cement powder proved PCCP to be the best cost option. PG 64-34 oil prices are on the rise again, with the latest prices from Paramount quoted at \$850/ton. By the time we pave, we could see prices of \$1200/ton, resulting in a PCCP savings of over \$900,000.

Once again, the above analysis and decision was based on direct costs to the project today. However, there are other advantages the PCCP section offers to the 500 South project and to the overall CMGC process that will not show up as a direct savings to UDOT now.

- 1. Drastic Lowering of Potential Utility Conflicts** - When we announced the decision to go to the PCC Paving envelope in our Feb 3 online meeting, both URS and PEC cheered. Dan Snell with PEC said we cut our potential for utility conflicts in half. Dan has since sent us the attached letter of Feb 3, outlining the potential utility conflicts as the surfacing envelope design evolved. The original design had the option to have 20” of Granular Borrow (total surface envelope of 35”), or 9” of Granular Borrow with a BX1200 Geogrid (total surface envelope of 23”). Both options cost about the same, but an envelope excavation of 36” had 14,380 potential Utility Conflicts, and the 24” envelope excavation had only 2,352 potential Utility Conflicts. The lesser 23” surface section was chosen going into the CMGC RFP process. Since then we have worked together, and raised the grade from the UPRR to Redwood Road by 4” (to save \$400,000 in excess dirt haul off), and now have gone to the 20” overall PCCP surface section. By PEC’s calculations these two changes will cut the number of potential Utility Conflicts in half again to 1,178. Obviously there will not be 1,178 utilities that will have to be moved, or that we could hit with our pipe crews, but we certainly have drastically cut those odds. A simple Cable TV hit is now costing us about \$5,000 each, and to move a Fiber Optic line like the one we avoided for the West Bountiful Waterline was estimated at \$400,000 by Qwest. I think this reduction of Potential Utility



Conflicts could be worth over \$1 million to everyone involved, and drastically reduce a potential catastrophic hit on one of the several high pressure petroleum lines in the area.

2. **Double Design Life of PCCP vs. HMA** – In our surfacing meeting of Jan 29, Dave Holmgren (UDOT Region#1 Surfacing Manager) said the 10”PCCP surface would have a design life of 40 years, and the 7.5”HMA with Bonded Wear Course had a design life of 20 years. What is the value of the extra 20 years of life? To extend the life of the HMA surface to 40 years, UDOT would likely have to put out at least two milling and resurfacing maintenance projects at 20 years and 30 years. These projects as a minimum would include mobilization, traffic control, milling 1”, some type of AC resurfacing, adjusting surface valves/manholes to grade, and restriping with tape for about \$1 million for the 82,000sy at today’s prices (The recent UDOT project F-R199 (4) SR-93/105/106 for 76,000sy of BWC went for \$1,030,000). We think the 40 year life of the 10”PCCP section saves UDOT at least \$2 million.

As I have stated in the past with my West Bountiful waterline example (e-mail of 11/13/08), UDOT should not be judging the results of the CMGC process on the unit prices that show up on our GMP’s alone. In this case of the PCCP option, we will show a \$100,000 increase over our RFP HMA design section, yet indirectly we will save everyone involved at least \$4 million in the long run and drastically reduce risks to the public. Isn’t this what CMGC is all about? I hope UDOT will consider the CMGC process on other complex projects such as 500 South and Syracuse Road. For the small cost of the CMGC RFP bids (bore by Geneva), and the small CMGC constructability fees we have charged UDOT on these projects, we feel CMGC is a superior project delivery method.

Sincerely,

Stephen R. Sussdorff
Geneva Rock PM

Attachment:
PEC letter of Feb 3, 2009