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Biggs, Pettis, Ingram & Solop, PLLC
111 East Capitol Street, Suite 101

March 17, 2021

Jackson, Mississippi 39201
Re: Oscar Renda Contracting
Request for Additional Compensation
Dated May 20, 2020
Report and Findings

Dear Mr. Chris Solop,

Following your request, we have evaluated Oscar Renda Contracting, Inc.'s (ORC) request for additional compensation of 358 days of contract time extension and compensation of \$70,157,344.00 on the City of Biloxi (CoB) North Contract (or Project). The request for compensation was prepared by the consulting firm Aegis, and its report dated May 15, 2020, (Aegis Report) is the focus of our analysis.

Summary

The Aegis Report is not well founded. It is based mainly on false logic and inaccurate analysis, non-supported calculations, and ignores contractual provisions in order to assert arguments that are incorrect.

Aegis states in its introduction that it was specifically tasked with conducting a forensic schedule analysis which identified and quantified the Project delays through April 2019 and that, in addition, Aegis was to perform a modified Measured Mile analysis to quantify ORC's Loss of Productivity ("LoP") which allegedly resulted from hundreds of utility interferences and design modifications that ORC experienced. Aegis failed to perform this task.

False Logic

Aegis begins its work by accepting what it calls a "Baseline Schedule." This is the same schedule that ORC developed and submitted to CoB at the start of the Project. This schedule is contained in the Aegis Report at Exhibit 19. Its logic is incomplete. As an example, the pumping stations A7790 Pumping Station – Diaz was to be built in 15 days and was to be done after the pumping stations at I-110, Bay Shore, and North Hopkins were demolished in one day. Later the logic is corrected, but that is not the logic that Aegis used.

The logic of the ORC Baseline Schedule had the idea that the Project could be worked by areas and, indeed, the Project scope was broken into Areas: SXSXN, GRN 1&2, GRN 3, GRN 4, GRN 5, GRS 1&2, GRS 3&4, and DIV 1&2. ORC linked each of these Areas in a sequential manner. Indicating that each should be finished before the next is begun. On page 22 of the Aegis Report, this sequencing is explained, as follows:

“The critical path of the Summary Baseline Schedule matched that of the detailed Baseline Schedule and flowed sequentially through the following work area:

GRN2 →GRN1→GRS2→GRS3→GRS4”

This logic is false. GRN2 did not have to finish before the starting of GRN1 and, in fact, these two areas were measured together and not separately. Moreover, GRN1&2 did not have to finish before the start of GRS 2. The reason this is false is that it envisioned that if ORC were installing a sewer line on GRN2 it could only do so until it reached the border of GRN1, then ORC would have to stop placing the sewer line and finish all other work in area GRN2 *before* it could continue with the sewer line beyond the border of GRN2. The same would apply to water lines as well as storm drains. Clearly, that would have provided a great deal of confusion and additional work to uncover the end points and begin again.

Moreover, sewer line placement requires that the line be laid from the lowest point to the highest point. In this way the water which inevitably gets into the excavation will run away from the work that is in progress towards the work already done. Waterlines and storm drains should follow the sewer line placement, because both of these are above the sewer line in elevation.

When the work is tracked by the Areas, as Aegis did on Appendix 09, it will appear that the work stopped and then restarted. This is not because the work actually stopped, but only that the work transcended from one Area into another Area. As will be shown later, this starting and stopping also shows up in the pay estimates, because they are also recorded by Area.

In all of Aegis’s work on schedules analysis it maintains this false idea that one Area must be finished before the next is started. If Aegis would have examined the detail schedules that were published during the Project, Aegis would have discovered this gross error.

Aegis compounds its error by creating what it calls a Revised Baseline Schedule. In its Revised Baseline Schedule, Aegis has decided to add to the Summary Baseline Schedule the impacts caused by the change orders. This is shown on page 23 of the Aegis Report. Here Aegis decides to add the change order days to each of the Areas contained in its schedule. Aegis does not add them in the schedule when they occurred, *but rather at the start of the project*. In real life, however, the work begins in a logical manner and a when a change is discovered that alters the

longest path of a project, only then does it cause the critical path to change. However, Aegis *inserts the change at the start*, thereby asserting that the real critical path was not what the contractor had begun working on but a different path. Therefore during the period from the beginning of the project until the change order was added, the contractor was working on the wrong critical path. This false logic can be seen in the revised sequence proposed by Aegis at p. 23:

SXSN→Division2→Division 1→GRN5→GRN3→GRN4

Consequently, if ORC had been working on the original sequence given above, then ORC would have been spending time working on GRN 1&2 not on SXSN and Division 2. Moreover, the logic of adding the change orders to the Summary Baseline Schedule at the start of the project ignores the progress (or lack of progress) achieved on work already performed.

The method used by Aegis to account for the increased duration of the change orders is also flawed. The below chart is a replication of Aegis’s accounting of the change order days. These are the days Aegis intends to add to the Summary Baseline Schedule to obtain a new critical path for the project.

Work Area	Description	Baseline Duration (CDs)	Revised Duration (CDs)	Delta (CDs)
SXSN	CO No. 7, CO No. 20, CO No. 32, CO No. 54 & CO No. 58	242	352	110
GRN2	CO No. 19, CO No. 22, CO No. 25, CO No. 39, CO No. 43, CO No. 44, & CO No. 46	127	158	31
GRN 1	CO No. 19, CO No. 22, CO No. 25, CO No. 39, CO No. 43, CO No. 44,& CO No. 46	155	186	31
DIV 2	CO No. 31, CO No. 35, CO No. 49, CO No. 50, CO No. 51, CO No. 52, & CO No. 53	123	203	80
DIV1	CO No. 31, CO No. 35, CO No.49, CO No. 50, CO No. 51, CO No. 52, &	184	264	80

	CO No. 53			
GRN 5	CO No. 34	105	137	32
GRN3	CO No. 56	180	181	1
GRS3	CO No. 18 & CO No. 55	203	213	10
GRS4	CO No. 18 & CO No. 55	281	291	10
GRN4	CO No.33	164	208	44
All Areas -Weather	CO No. 24, CO No. 41, Co No. 59, CO No. 60, CO No. 68, Co No. 69, & CO No. 71	0	87	87

I have intentionally re-ordered some of the work areas compared to their order in the Aegis Report to point out a further false idea of Aegis.¹ In the above chart it can be seen the GRN 1&2, DIV1&2, and GRS3&4 have exactly the same number of days added to the schedule (31, 80, and 10). Aegis has no idea which area to apply the delay associated with the change orders and so divides the delay equally. More importantly Aegis applies the rain days in a manner to keep area GRN4 on the critical path instead of applying the rain *when it occurred* as shown in Appendix 6 of the Aegis Report. Clearly, this is false logic as it did not rain continuously for 87 days.

After adding all of these days to the Baseline Schedule (i.e. 516 days) the completion date did not match Change Order 71, which gave a completion date of January 6, 2019. To fix this, Aegis decided to add a new activity (without explanation) called “Time Awarded”. This activity duration is 185 days, and it too was added to keep GRN4 critical.

¹ Aegis does not know how to apply these additional days for GRN 1&2, DIV1&2, and GRS3&4 because the change order did not distribute the days according to these Areas. This is because Areas GRN 1&2, DIV1&2, and GRS3&4 were worked together and the distribution was not made.

The reason Aegis was not able to get the correct completion dates is that Aegis used the wrong durations for the areas in its Baseline Schedule. Below I have set out the durations used by Aegis and compared them with the Original Baseline Schedule.

Area	Start Field Work	End of Field Work	Duration	Durations Used by Aegis
GRN2	8/4/2014	7/28/2015	358	127
SXSN	8/4/2014	6/17/2015	317	242
GRN1	12/9/2014	9/9/2015	274	155
DIV2	4/3/2015	10/30/2015	210	123
GRS1	5/13/2015	1/11/2016	243	184
DIV1	8/4/2015	4/11/2016	251	184
GRS2	11/13/2015	5/25/2016	194	143
GRN5	2/4/2016	8/16/2016	194	105
GRS3	4/4/2016	3/15/2017	345	203
GRN3	5/19/2016	2/8/2017	265	180
GRN4	11/15/2016	4/27/2017	164	164
GRS4	10/24/2016	7/31/2017	280	280
Total			3095	2090

As shown above, Aegis used all of the wrong durations except the GRS4 and GRN4, which are the last activities in the Baseline Schedule. Since GRS4 was the last critical activity in the Baseline Schedule it could not be shortened. The reason Aegis used the wrong durations is that in the original Baseline Schedule the Areas overlapped each other. This overlap created a difficulty for Aegis, because when the impacts of the change orders were added the critical path

would be altered. So Aegis shortened certain durations to obtain a critical path to fit a narrative but not the facts.

Thus, when Aegis developed the Revised Baseline Schedule they needed to add an additional activity to keep the revised completion date of 1/6/19 as shown on Change Order 71. That is why the new activity is added called “Time Awarded” of 185 days. Using this false Revised Baseline Schedule Aegis proceeds to add additional delays as shown in the chart below.

Delay Activities	Duration	Critical
SXSN Utility Interferences	69	No
GRN1&2 Design Issues Delay	166	Yes
GRN 1&2 Utility Interferences	28	Yes
GRS 1&2 Utility Interferences	57	Yes
DIV 1&2 Utility Interferences	48	No
GRN5 Utility Interferences	33	No
GRN3 Utility Interferences	18	No
Change Order 36/38 Delay GRS3&4	121	Yes
GRN4 Utility Interferences	18	Yes
GRS3&4 Utility Interferences	83	Yes

The effect of adding these activities resulted in ORC claiming an extending the schedule by another 358 days, of which 222 days (blue highlight above) were caused by extending the activities of GRN4 and GRS 3&4. That is why, as I noted above, Aegis did not alter the duration of either GRS4 or GRN4 and why the Delay activities of Rain and Time Awarded were placed so as to keep GRS4 and GRN4 critical.

Aegis began with the false logic of sequential Areas of work, believing that the work should stop at the limits of each Area, until all work was finished in that Area, before proceeding to the

subsequent Area. Aegis then adds another layer of false logic and facts by changing some of the activity durations and placing new activities in a way to keep certain areas critical, thereby contriving and further increasing the claimed delay.

There are actually only three issues raised by Aegis in the new list of delays, and they are:

Utility Delays

Change Order Delays GRS 3&4 (36/38)

Design Changes GRN1&2

Setting aside, for the time being, the validity of these three categories of delay, it is clear from the above analysis that the Aegis schedule analysis is false.

Utility Delays

Aegis states on page 17 of its Report, as follows:

The effect of a utility interference on ORC is comprised of two separate but related impacts – lost time and equipment idle time. The delay or lost time is when the utility is being fixed, whereas the equipment idle time is when the crew has resumed working, proceeding slowly in order to not strike an additional unknown utility within proximity.

ORC Obligations

Aegis begins by saying that “ORC fulfilled its contractual obligations...” but does not say how those obligations were fulfilled. The Contract calls for ORC to locate the underground utilities, not CoB. These obligations begin with the provisions set out in the section “Testing and Submittals” on page 3 of 9 it is stated:

LOCATE EXISTING UNDERGROUND UTILITIES – The Mississippi One Call Center Confirmation Number² shall be submitted prior to the commencement of any work on the project.

In the General Notes of the drawings the following notices are given:

² In Mississippi, a “locate request” is initiated by dialing 811 or 800-227-6477. After an initial answering message, a customer service representative (CSR) will ask for the location where the excavation will take place. When the call is completed and all information verified, the system will assign a 14-digit confirmation number.

Location of existing underground utilities are shown on the plans based upon the best information available to the Engineer, and has not been independently verified by the Owner or his authorized representative. The Engineer cannot and does not warrant that the information is complete or accurate. The contractor shall coordinate directly with the involved utility Owner to have the exact location of all existing utilities determined before commencing any work and agrees to be fully responsible for any and all damages which might be occasioned by the contractor's failure to exactly locate and preserve and all underground utilities.³

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Contractor shall explore ahead (surface and subsurface) 200 feet of the pipe being laid so that necessary adjustments can be made in the alignment of the pipe in case of conflicts with existing structures, utilities, or any other known or unknown obstruction.⁴

The utility interference claim ignores these provisions of the Contract and wrongly claims that ORC has complied with the contractual provisions. No consideration appears to have been made of these two provisions, which negate the claim with regard to the asserted utility delays.

Instead, Aegis references a clause entitled Cooperation with Utilities, at Section 105.06 of the Redbook (1990), as modified by the Contract. The Report refers to the statement that "All known utilities within the project are shown on the plans." Aegis asserts that, "[b]ecause of this incorrect information, ORC experienced numerous utility interferences outside of ORC's control". This statement has no validity. ORC was not only in control of locating the utilities; ORC was obligated to do so. Section 105.06 is not a representation that there are no utilities other than as shown on the plans. Nor is it a representation that the location of the utilities as shown on the plans are exact. The above General Note 3 expressly states otherwise, and the above General Note 10 expressly states that it is the Contractor's responsibility for making any adjustments due to "known or unknown obstruction."

In the entirety of the Aegis Report, there is no record of a utility not being where marked, rather in every case the Report shows that ORC discovered utilities which were not marked. This occurred because ORC did not undertake its contractual obligation to obtain a Mississippi One Call Center Confirmation Number or failed to contact One Call sufficiently in advance of planned work to avoid any delay alleged to have occurred because of a utility being located that was not as indicated on the plans. Had ORC done so, the utility locator would have marked the

³ See Note 3 in Utilities General Notes in Drawings for each Area.

⁴ See Note 10 in Misc. Water/Sewer/Drainage in Drawings for each Area.

locations. CoB provided all known utility locations, but did not warrant that all utilities were so marked and this fact is made clear on the plans. Had ORC complied with these provisions of the Contract, utilities would have been located in advance of the work so that there would be no lost time or slow progress.

Appendix 04 of the Aegis Report is Inaccurate

Appendix 04 of the Aegis Report lists 497 instances of utility disruptions recorded in the work area. Aegis does not show that ORC actually requested a Confirmation Number for each location nor did Aegis investigate whether the event complained of actually occurred. Consequently, much of what Aegis reports is unsubstantiated.

As an example: On October 26, 2015 Aegis records in Appendix 04 at p. 174 that GRN1&2 encountered a gas and AT&T utility. As a result, it is claimed that ORC lost 4 hours and 7 hours respectively of Impact and 1 hour and 4 hours of slow equipment operation (Idle Time). On November 26, 2015, ORC wrote a letter to HNTB requesting an extension of time because of *rain* on October 26, 2015. ORC's daily report for Area GRN1&2 for October 26, 2015, marks that day as a "rain out" with 2 hours of show up time recorded.

Because GRN1&2 is on the false critical path developed by Aegis, the asserted 11 hours of lost time as well as the 5 hours of lost equipment time is included in Aegis's monetary damage calculation. Aegis could have checked ORC's daily reports, but either chose not to or chose to ignore the information in them. In either event, the claim made for 11 hours for events on October 26, 2015 is false.⁵

As another example:

On November 26, 2015, ORC wrote a letter to HNTB requesting an extension of time because of rain on November 9, 2015. Appendix 04 records that in Area SXSXN a water line was encountered, which caused a loss of 11 man hours. If 11 hours were lost the day was not a rain day but rather a normal working day. The ORC request arose because, according to the CoB, its record shows that it rained heavily the previous two days (November 7th and 8th) and the ground was wet. Therefore the foreman wrote on the ORC daily report: "Had to fight incoming water for a majority of the day."

The CoB daily report records the work done that day by ORC. The details are set out below:

⁵ See Exhibit 1

Description of work	Pay Item	Quantities Installed
Removal of Paved Driveway	907-202-B	109.44 sy
610 Lime Stone	907-304-E	3.02 cy
Concrete Sidewalk	907-608-A	4998.88 sy
Rollover Curb	907-609-B	24.0 Lf
Concrete Driveway	907-614-A	109.44 Sy

The daily reports of ORC record that the men worked 10.25 hours on November 9, 2015. See p. 174. Aegis, however, records 11 hours. One must ask why Aegis would record 11 hours when only 10.25 were worked. The answer is simple. Aegis eventually converts all of the hours recorded in Appendix 04 to calendar days. Aegis makes this conversion by dividing by 8 hours per day. In this way Aegis converts a single day (in this case 11 hrs) to a greater number (1.4) days when only one (1.0) day was lost.

Aegis's assertions are meritless. Firstly, there was no utility involved; secondly, the full day was not lost because of rain; and thirdly, because Aegis overstates the loss when converting to calendar days.⁶

As yet another example:⁷ On November 20, 2017, Aegis records that four (4) hours were lost due to a gas line in GRS3&4. In fact, Aegis records two (2) events of gas line disruptions on the same day, but the daily reports of ORC only record one. See p. 179. Obviously, Aegis wrongly claims that two (2) events happened. More important is the fact that on ORC's daily report there are only two (2) men working. CoB's daily report for the same day shows that there were fifty (50) men working in GRS3&4 but working in multiple areas. Two men working on "Elmer St" encountered a gas line and recorded four hours lost. Aegis claims that these two men caused a loss of ½ day to the whole project and that the cost of that day was 4 hours x 495/hr = \$1,980.00

⁶ See Exhibit 2

⁷ See Exhibit 3

plus 4 hours of equipment idle time multiplied by 454.38 or \$1,817.52. In total, Aegis claims for \$3,797.52 cost allegedly incurred by ORC for this one day.

Two men being stopped for 4 hours did not stop the other 50 men and could not have delayed the whole project. It is also apparent from the ORC daily report that no equipment was employed by this crew.

Aegis, in this case, claimed two events when there was only one, claimed that the project was stopped when it was not, and does not even explain why these two men broke a gas line while pumping down a backup sewer.

Rain Days vs. Appendix 04

Many of the days listed by Aegis in Appendix 04 were reported as rain days by ORC during the period of the contract. I have prepared an exhibit which lists all of the days wherein Aegis claims that man hours were lost during a working day but ORC previously claimed were whole days lost due to weather. They cannot both be correct.⁸

Additionally, many of these days have been included in the accounting of additional rain days and, therefore, cannot be counted twice. It is true that they could be removed from the accounting and the total rain days be reduced, but those change orders have been accepted and signed without reservation.

Equipment Time Lost

Aegis states that “the equipment idle time is when the crew has resumed working, proceeding slowly in order to not strike an additional unknown utility within proximity”. There is no evidence of these hours of slow operation in ORC’s daily reports.⁹ In Appendix 04, Aegis asserts that on June 27, 2015, two (2) hours were lost due to a fiber optic line not being marked and that six (6) hours were lost because of slow equipment operation. See p. 173. But see ORC daily report at Exhibit 5.

The report does confirm that the two men were working at a location where a fiber optic line was located, but the problem was *not* that it was unmarked. Rather the foreman could not reach USIC (the locator) and so had to dig by hand. Aegis asserts that this problem was caused by CoB. Moreover, Aegis asserts that six (6) hours of equipment use was lost due to this problem.

⁸ See Exhibit 4

⁹ See Exhibit 5

There are no equipment hours recorded on this report. Aegis apparently made up “facts” to support a narrative of alleged lost hours and lost time.

It is also important to note Aegis’s determination that two (2) hours were lost on the whole project duration because these two men could not proceed other than by hand-digging to put the fire hydrant in at the right elevation. There were more than fifty (50) men working on this day and the idea that two (2) men losing 2 hours would slow the project is not correct.

None of the ORC daily reports I reviewed show hours of slow operation. Nor is there an indication by the foreman that equipment is operating, much less operating slowly.

Here again Aegis’s assertions don’t fit the facts: firstly, there was no utility delay; secondly, there was no lost time; and, thirdly, Aegis asserts a loss where none was recorded. This event occurred because the foreman could not reach USIC, not because of a mismarked utility or an unmarked utility.

As noted above, Aegis’s schedule is *not* a project schedule because it does not correctly link activities together to allow an accurate prediction of the critical path. Moreover, the durations are manipulated by Aegis to achieve a pre-conceived result and impacts are added to keep certain Areas critical. Consequently, Appendix 04 is in no way reliable and cannot be used to demonstrate impact to the Baseline Schedule and thereby determine a critical path.

Additionally, Appendix 04 does not support any increased duration in the first place, as there is no showing of CoB liability for unmarked or mismarked utilities. A cursory review of the ORC daily reports reveals that they are unreliable for the purpose Aegis intended.

Change Order Delays GRS 3&4 (36/38)

GRN 1&2 Design Changes

According to Aegis, the delay to Area GRN 1&2 is concurrent with the delay of Area GRS 3&4. In both GRN 1&2 and GRS 3&4, Aegis argues that one hundred twenty (120) days are excusable *and* compensable. This is incorrect, as the wording on the Change Order made reservation for time but not money. There is insufficient information provided to determine if the durations asserted are correct. Aegis does not explain why the additional time is due.

GRS 3&4 Design Changes

In this section of the Aegis Report, Aegis states that the design was deficient and therefore there were additional delays caused by the deficient design. Aegis, however, is not an engineering firm, and so on page 4 it is stated that Aegis expresses no view of technical or engineering matters. Yet in this section Aegis clearly states that the design was deficient. Aegis does not explain what was deficient about the design save for the fact that the size of the sheet piles specified would not meet the conditions imposed by CSX.

In fact, nothing was deficient save for the fact that ORC's professional engineers' design (required by the Contract) could not meet CSX requirements because of the pile size. These requirements for pile size could have only been known once the design was performed using soil conditions and loading from CSX. The period of design was always unknown from the start of the contract.

Aegis lists its breakdown of the extension of time as follows:

35 CDs for design
62 CDs for sheet piling delivery 11/02/16 –1/12/17
23 CDs for installation.

Item 1 above refers to an email from Sarah Harris to ORC. In this email, it is agreed that an additional change order for "days" will be included. Aegis includes these days in its request for 358 days of extended cost. These extended costs are included in the unit price negotiation and incorporated into the signed Change Order. Unit pricing by its nature includes the overhead cost to execute the specified unit. Therefore, there is no justification for inclusion of the days associated with Change Order 36 in the 358 days of extended overhead.

Item 2 above refers to the shipping time for sheet piles to the United States. The duration of delivery was always included in the work. There are no sheet piles manufactured in the United States. All sheet piling is purchased from Germany. Therefore the shipping time of 62 days was included for the original estimated sheet piles, thus there is no increase in time for the project.

Item 3 refers to an increase in installation time. Aegis does not provide any information save for the fact that ORC told Aegis that this was the increased time. Given that the pile design was not known at the time of the contract award, it is difficult to see a justification for a longer pile

driving duration. The piles had to be driven in any event and the time was included in the Contract.

There is no record that I could find that the 35 days extension in Item 1 was ever included in a change order. Therefore I believe that these additional 35 days should be added to the Contract Time. To be clear, ORC should have 35 CDs added, but no additional cost—overhead or otherwise—for those additional days.

Aegis's Measured Mile Analysis

At p. 28 of its Report, Aegis presents this as the definition of a “measured mile analysis: “The measured mile analysis is the industry standard for determining and measuring LoP. This analysis compares tasks which were not impacted by design changes, delays or disruptions to identical (or near identical) tasks which were impacted by design changes, delays or disruptions.” In a measured contract, the schedule does not lend itself to measurement in bar activities. While it is possible to represent activities as a bar (as Aegis has done) it is inaccurate to do so separated by Areas. This is because the individual work activities are not dependent on Area designation but physical location. As an example: if work starts on a storm drain line but has to stop awaiting a utility relocation, the duration of the work becomes discontinuous. Therefore it no longer is correctly represented by a single bar. Moreover, if work shifts to another area, that shift is not represented by the single bar. To an outside observer, the work appears to be taking longer when in fact it is being done non-sequentially as far as the schedule is concerned. As an example: GRN 1&2 water line begins work at the start of the Project but does not get to 100% until February 2019. That work actually took place for a total duration of only 15 months but spanned 34 months.

Although ORC lists a number of issues which it says caused delay and disruptions to the Project execution, it does not demonstrate that time was lost in the construction because of these issues. Specifically, ORC does not measure disruptions for Design Changes, Deficient Design Documents, Elimination of Construction Management Services, Delayed Response to RFI, or Weather Impacts, but focuses exclusively on impacts associated with what it calls “Differing Site Conditions”. These delays and disruptions rely solely upon the discovery of underground utilities that ORC claims were not properly marked. These disruptions are called by ORC, “differing site conditions”.

According to the terms of the Mississippi Standard Specification for Road and Bridge Construction (1990) (“Redbook”) at Section 104.02.2 the term “differing site conditions” pertain to “conditions ... encountered at the site differing materially from those indicated in the contract or ... unknown physical condition of an unusual nature, differing materially from those

ordinarily encountered and generally recognized as inherent in the work provided for in the contract are encountered at the site” and “the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions”.

However, the discovery of underground utilities on this Project neither differs materially from those indicated in the contract nor are they unusual in nature.

Aegis asserts these delays to ORC in its Appendix 04, where it lists on daily basis underground utilities encountered in each Area of the Project. Appendix 04 lists the day the utility was encountered, the service encountered, and the hours lost as recorded on the daily reports by the foreman of that Area. The hours recorded are summed by Area and divided by 8 hours per day to arrive at the total days lost due to these recorded events.

On page 17 of the ORC claim, the sum of all Areas is listed in this schedule.

Area	Total Impacts	Lost Time (Hrs)	Lost Time (CDs)	Non-Delay Equipment Idle Time (hrs)
SXSN	90	548.00	68.50	222.50
GRN1&2	62	330.50	41.31	170.50
GRN3	31	143.50	17.94	106.50
GRN4	15	81.00	10.13	47.50
GRN5	43	266.00	33.25	92.00
GRS1&2	66	456.25	57.03	76.25
GRS3&4	122	683.00	85.38	301.00
DIV1&2	68	385.00	48.13	176.50
Total	497	2393.25	361.67	1192.75

ORC asserts that the delay or lost time is when the unexpected utility is being fixed, whereas the equipment idle time is when the crew resumed working, proceeding slowly in order not to strike an additional unknown utility within proximity. While some of the lost time is recorded on

ORC’s daily reports, the idle equipment time is not recorded, nor is the total working hours of the equipment recorded. Individual pieces of equipment are listed but in many cases there is no indication of the hours of operation. Aegis claims the cost set out below is the direct cost of disruptions asserted in Appendix 04.

Lost Time	Labor Hourly Cost	Labor Burden	Total Labor Cost	Equipment Hourly Cost	Equipment Total Cost	Total Cost
2893.25	\$300.00	\$195.00	\$1,432,159	\$454.38	\$1,314,635	\$2,746,794

Analysis of Disruption Appendix 04

To determine if the events alleged in Appendix 04 in fact caused disruption, I analyzed the production on the day of claimed disruption and compared it with the production on the day before, when there was no claim of disruption. This analysis would reveal if disruption actually existed, because the crew would be nearly the same, the work area would be nearly the same and the type of work would be nearly the same. In all probability the weather would be nearly the same temperature. These conditions being similar or nearly the same give the best basis for analyzing if the unmarked utility had any influence on the progress of the Project as claimed by Aegis and ORC. A Summary of our findings in the asserted “measured mile” is set out below. The backup data is included in an Exhibit 6.

Claim of Disruption			No Claim of Disruption		
Date	Area	Earnings per MH	Date	Area	Earnings per MH
8/8/2014	SXSN	\$437.64	8/7/2014	SXSN	\$166.90
8/19/2014	SXSN	\$316.76	8/20/2014	SXSN	\$430.89
9/11/2014	SXSN	\$373.95	9/12/14	SXSN	\$120.21
9/19/2014	SXSN	\$204.05	9/18/2014	SXSN	\$269.07
9/23/2014	SXSN	\$210.66	9/24/2014	SXSN	\$284.35

11/4/2014	SXSN	\$313.36	10/30/2014	SXSN	\$6.18
11/6/2014	SXSN	\$209.47	11/5/2014	SXSN	\$351.76
11/20/2014	SXSN	\$83.60	11/19/2014	SXSN	\$101.71
12/4/2014	SXSN	\$84.21	12/5/2014	SXSN	\$103.83
3/2/2015	SXSN	\$188.35	3/3/2015	SXSN	\$267.96
3/17/2015	SXSN	\$108.26	3/16/2015	SXSN	\$71.49
3/19/2015	SXSN	\$76.16	3/20/2015	SXSN	\$33.74
3/31/2015	SXSN	\$154.91	3/30/2015	SXSN	\$160.20
4/1/2015	SXSN	\$151.97	4/2/2015	SXSN	\$64.70
5/19/2015	SXSN	\$163.73	5/20/2015	SXSN	\$12.26
6/9/2015	SXSN	\$56.01	6/8/2015	SXSN	\$103.86
6/11/2015	SXSN	\$130.09	6/12/2015	SXSN	\$199.60
6/15/2015	SXSN	\$89.46	6/16/2015	SXSN	\$29.07
8/5/2015	SXSN	\$4.26	8/4/2015	SXSN	\$32.91
8/24/2015	SXSN	\$82.62	8/23/2015	SXSN	\$20.36
1/19/2016	SXSN	\$37.33	1/18/2016	SXSN	\$61.34
Total Earnings		\$3,476.85			\$2,892.39

As can be seen in the above analysis, the earnings were nearly the same, differing by only approximately \$600.00.

I carried out a further analysis of still other Areas to determine if the inclusion of other Areas showed any significant difference. Aegis's list of disruptions in its Appendix 04 contains 345 days of individual disruptions. I have not analyzed each and every day contained in the Appendix

04 list, but I have analyzed 185 of those days, which is more than 50% of the days listed. The results of that analysis, excluding rain days, are set out below.¹⁰

Area	Disrupted	Non-Disrupted
SXSN	\$3,476.85	\$2,892.39
GRN1&2	\$3,875.44	\$2,384.07
GRN3	\$467.91	\$240.88
GRN5	\$346.42	\$245.13
GRS1&2	\$2,432.16	\$2,467.36
GRS3&4	\$2,916.67	\$2,394.81
Sum	\$13,515.45	\$10,624.64

From this analysis it is clear that OCR's production was better or nearly the same on the days ORC claimed that it was disrupted compared to the days for which no claim of disruption has been alleged. The only conclusion is that the claims of slowdown or equipment idle time on the daily reports is *not* supported by the work performed under "non-disrupted" conditions. Moreover, there is no loss of productivity associated with either unmarked utilities or a slowing down of the Project.

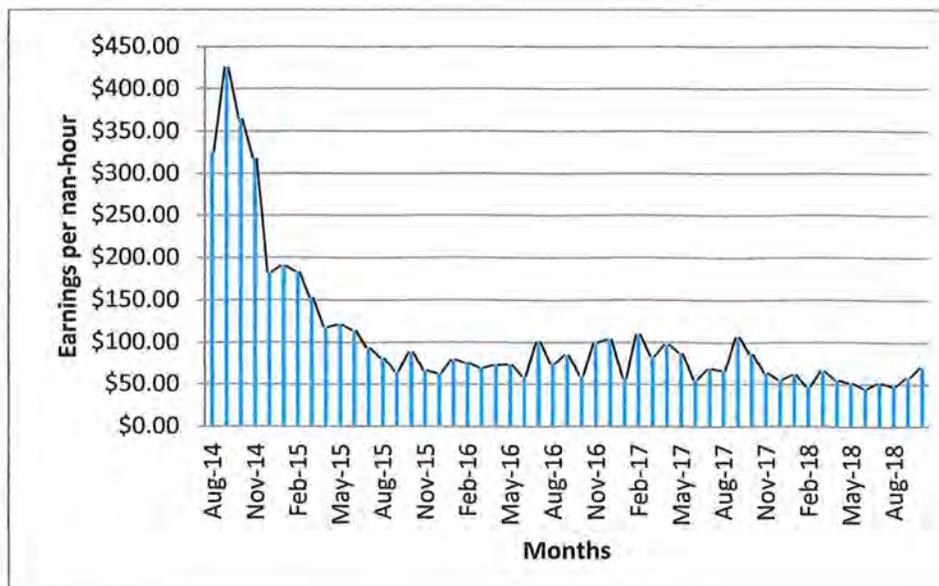
On page 5, Aegis states that "[t]he Contract is a measured form, and is therefore based on installed quantities." This is correct, and utility relocation or improvement projects are normally based upon this type of contract. On page 8, Aegis reinforces this argument by saying that "ORC was unable to meet its anticipated production rates." Utility contracts are often bid on this basis. As an example, many sewer line projects are bid a production rate of 200 ft per day. Aegis confirms that this method was also used by ORC. Aegis does not explain where these anticipated production rates are recorded, but Aegis appears to use them in its analysis.

¹⁰ See Exhibit 6

This is an important fact, because when production is the basis of a contract, the unit rates must include: overhead rates, equipment operation costs, and all other general construction costs. Thus, when work is added, the unit rates automatically increase the funds which pay for those costs, because all costs are rolled into the contractor's calculation of what the unit prices for work will be to capture them. Therefore, if 200 feet of gravity line is added to a contract, so is the cost of remaining on the project for a longer period of time and this cost is included in the added units.

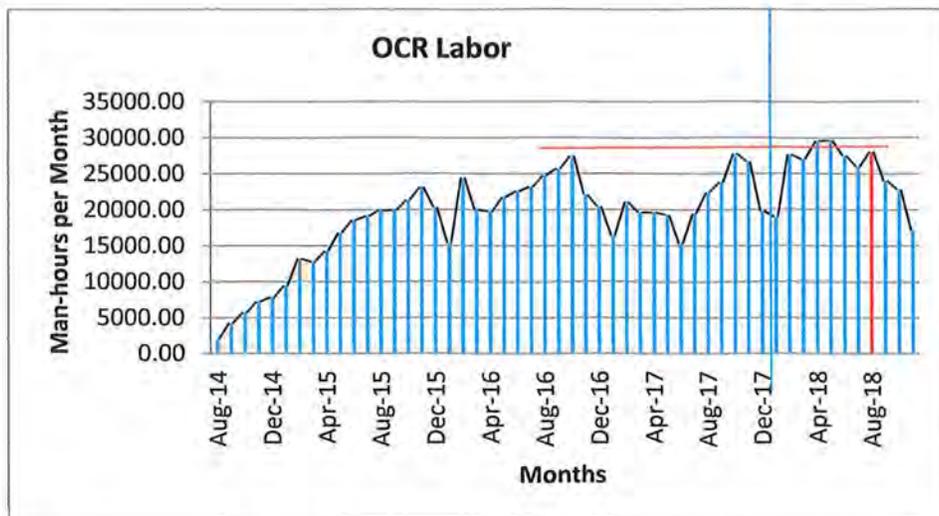
Thus, it is evident that if no productivity was lost, there can be no delay to the project. Aegis's assertion of delays is not correct as there is no showing by Aegis that production was reduced because of alleged utility interferences. Since Aegis itself claims that progress is based upon "installed quantities" and there is no change in the rate of installed quantities as shown in the above analysis, there can be no delay to the project. There is no basis to support the assertion of delay.

I also conducted an overall productivity analysis of earnings per man-hour expended. Below is the result of dividing monthly earnings by monthly man-hours expended.



In the above graph, the earnings have been represented in dollars per man-hour. As can be seen, the earnings are quite high in the early months of work but quickly fall to \$50 - \$100 per man-hour expended.

The chart above is the monthly labor man-hours productivity based upon expended man-hours by ORC based upon its time sheets supplied during information exchange. The chart below is the monthly man-hours expended. It should be noted that at the beginning of the Project the productivity (earnings per man-hour) were at the highest and the labor expenditure at the lowest



The chart above is a record of the monthly man-hours expended by ORC during the project. The red horizontal line is used to measure the man-hours lost due to a drop in labor force beginning in October 2017. The vertical red line is the time it took to regain this drop in labor.

Examining the productivity chart, it can be seen that during the first six months, ORC earned \$10,816,261.00¹¹ and out of those earnings ORC earned \$7,287,510 on water main 6 inch through 16 inch, the distribution of earnings on water main installation is set out below.

¹¹ Excluding Mobilization payments

Distribution By Area		
Area	Linear Feet	Earnings
GRN1&2	29138.00	1,856,415.00
DIV1&2	28775.00	1,927,580.00
SXSN	22560.00	1,871,940.00
GRN5	17017.00	1,249,965.00
GRS3&4	8831.00	149,520.00
GRN3	3021.00	232,090.00
Total	109,342.00	7,287,510.00

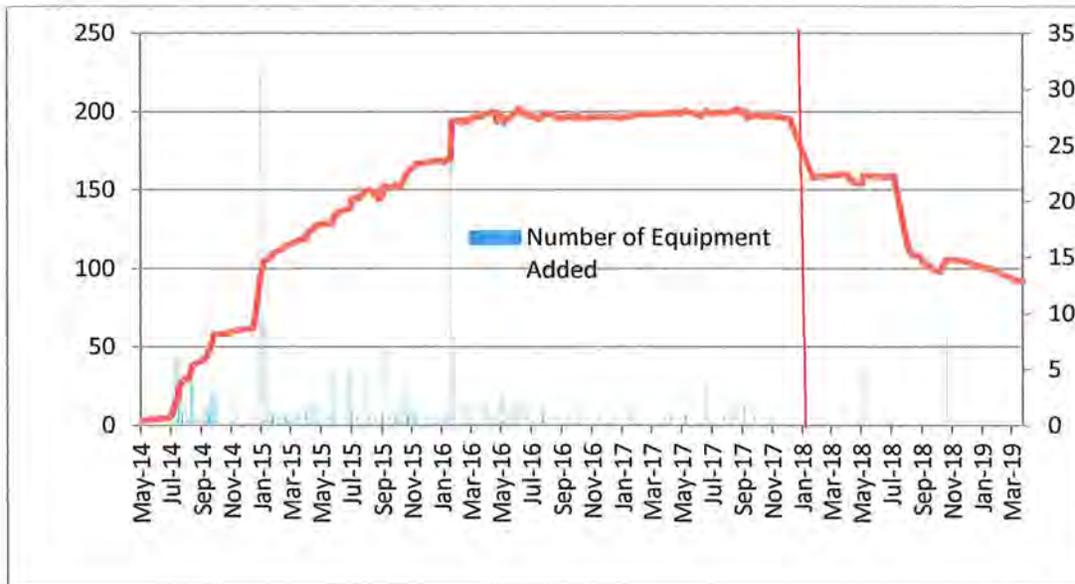
From this distribution it is evident that in the first six months ORC installed primarily water systems and did so, not according to the schedule, which required the completion of all the water lines in SXSN before proceeding to the next Area, but, rather, sequentially as the pipe routing dictated. This sequential laying of pipe is confirmed by both CoB daily reports as well as ORC daily reports.

It is also apparent in a number of ORC daily reports that ORC's decision to lay water line in advance of the sewer resulted in conflicts when the sewer was installed, causing further self-imposed delays to ORC's progress.

Acceleration of Man-hours and Equipment

Aegis asserts that ORC began its acceleration in October 2014 and continued that acceleration until April 2019, the cut off for the Aegis Report. Aegis asserts that the basis of acceleration is that ORC worked in more areas than planned, and therefore employed more labor and more equipment as constructive acceleration. That is the need to mitigate damages because of denied extensions of time.

On January 25, 2018, CoB notified ORC that they were in default for failure to finish the Project on time. On the chart below, I have plotted the number of pieces of equipment on the Project based on the dates given in the Aegis Report. I have also marked this date of notification of default with a red vertical line. At this date ORC did not accelerate the equipment but rather *removed* equipment from the Project.



To analyze the assertion of constructive acceleration, I have prepared the chart below which depicts the months remaining to complete the Project as change orders are added.

In October 2014, at the time Aegis asserts that acceleration began, ORC was spending just over 5000 man-hours per month or about twenty (20) people. ORC peak labor did not come until two years later. That slow build-up of labor could hardly be called an acceleration of work.

In October 2016, however, ORC did begin to decrease its work force as shown on the above graph, and that decrease continued until October 2017. During the following four (4) months, ORC again decreased its labor force. As a result, by February 2018, ORC had accumulated a short fall of 99,000 man-hours below its peak labor of October 2016. It would take the months of July 2018 through November 2018 to recover this short fall in labor.

Aegis's only basis for asserting acceleration is that the Baseline Schedule called for two (2) Areas to be worked at one time, and because ORC was working in more than two (2) Areas, Aegis believed that the cause of working in more than two Areas was a result of the alleged disruptions. Aegis does not, nor can it, show that disruption caused ORC to work the water mains in multiple areas during the first six (6) months of the Project. Yet Aegis asserts that after three (3) months of work, constructive acceleration began for that reason.

The chart below demonstrates that extensions of time were give throughout the Project and that the assertion of constructive acceleration is not valid.

Date	CO #	Days Awarded	Completion Date	Days to Finish	Months to Finish
3/27/2015	7	4	8/12/2017	869	28.97
9/24/2015	18	5	8/17/2017	693	23.10
11/3/2015	19	6	8/23/2017	659	21.97
11/3/2015	20	5	8/28/2017	664	22.13
2/22/2016	22	5	9/2/2017	558	18.60
2/22/2015	24	20	9/22/2017	943	31.43
2/22/2015	25	30	10/22/2017	973	32.43
9/2/2016	31	120	2/19/2018	535	17.83
6/24/2016	32	14	3/5/2018	619	20.63
6/22/2016	33	44	4/18/2018	665	22.17
6/22/2016	34	32	5/20/2018	697	23.23
6/22/2016	35	35	6/24/2018	732	24.40
1/27/2017	39	12	7/6/2018	525	17.50
4/21/2017	41	22	7/28/2018	463	15.43
8/22/2017	43	5	8/2/2018	345	11.50
8/22/2017	44	3	8/5/2018	348	11.60
8/22/2017	46	1	8/6/2018	349	11.63
8/22/2017	49	1	8/7/2018	350	11.67
8/22/2017	50	1	8/8/2018	351	11.70
8/22/2017	51	1	8/9/2018	352	11.73

8/22/2017	52	1	8/10/2018	353	11.77
8/22/2017	53	1	8/11/2018	354	11.80
9/29/2017	54	85	11/4/2018	401	13.37
9/29/2017	55	15	11/19/2018	416	13.87
9/29/2017	56	1	11/20/2018	417	13.90
9/29/2017	58	2	11/22/2018	419	13.97
10/10/2017	59	13	12/5/2018	421	14.03
9/11/2017	60	6	12/11/2018	456	15.20
6/12/2018	68	11	12/22/2018	193	6.43
10/12/2018	69	11	1/2/2019	82	2.73
1/4/2019	71	4	1/6/2019	2	0.07

The above chart calculates the completion date from the days awarded from the start of work and determines the number of months remaining to completion from the date the change order was approved. The point being, is that up until October 2017, ORC had significant amount of time to finish the work, yet it is at this date that ORC chose to reduce its labor force.

There is no acceleration. Moreover, Aegis's equipment calculations have no foundation, both because ORC's records in the daily reports do not support the operation of equipment for 176 hours per month, and there is no basis in the Contract to make such a calculation. Moreover, the calculations begin before the contract start date and end beyond the date of Aegis report.

Loss of Productivity

Aegis has chosen SXSXN as its measured mile and used April 2016 as its completion date. Aegis then measures the duration of all other Areas to calculate the variance between SXSXN and the other Project Areas. SXSXN was not 100% complete, as asserted by Aegis, and the items below were performed at a much later date than chosen by Aegis in its measured mile analysis.

SXSN Oct-18

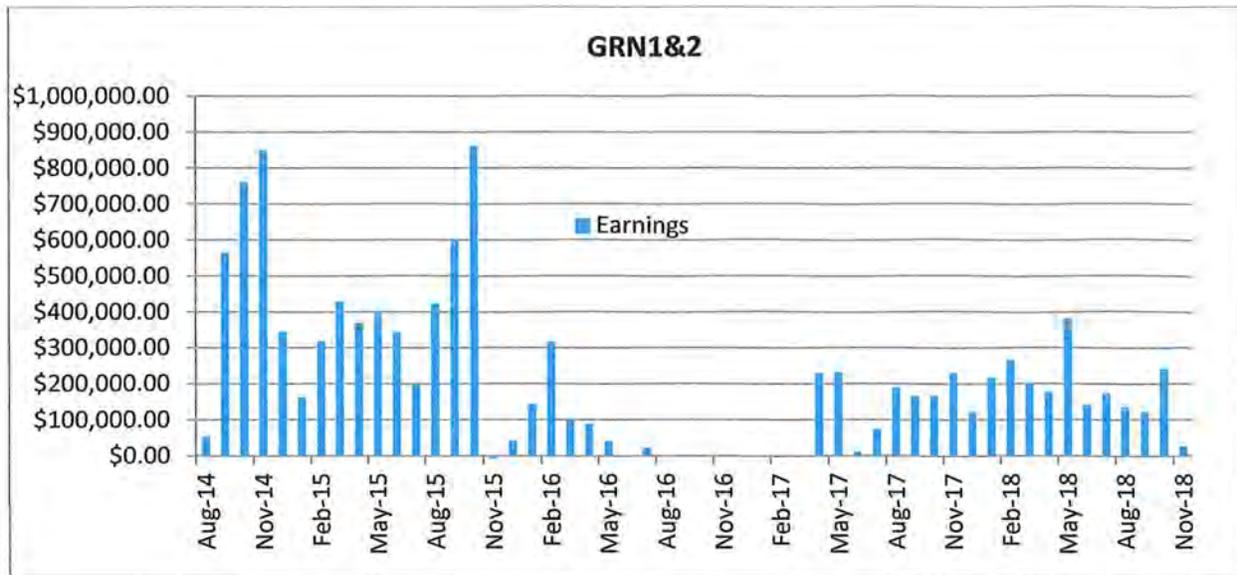
603-C-A	15" REINFORCED CONCRETE PIPE, CLASS III	1415.00	LF	\$50.00	513.00	\$25,650.00
603-C-A	18" REINFORCED CONCRETE PIPE, CLASS III	527.00	LF	\$52.00	308.00	\$16,016.00
603-C-A	24" REINFORCED CONCRETE PIPE, CLASS III	1477.00	LF	\$58.00	771.00	\$44,718.00
603-C-A	30" REINFORCED CONCRETE PIPE, CLASS III	267.00	LF	\$65.00	171.00	\$11,115.00
603-C-A	36" REINFORCED CONCRETE PIPE, CLASS III	446.00	LF	\$75.00	34.00	\$2,550.00
603-C-A	54" REINFORCED CONCRETE PIPE, CLASS III	420.00	LF	\$110.00	20.00	\$2,200.00
603-C-E	18"x11" CONCRETE ARCH PIPE, CLASS III	265.00	LF	\$55.00	111.00	\$6,105.00
603-C-E	22"x13" CONCRETE ARCH PIPE, CLASS III	1105.00	LF	\$57.00	36.00	\$2,052.00
603-C-E	29"x18" CONCRETE ARCH PIPE, CLASS III	2003.00	LF	\$63.00	22.00	\$1,386.00
603-C-E	44"x27" CONCRETE ARCH PIPE, CLASS III	2631.00	LF	\$84.00	192.00	\$16,128.00
603-C-E	58"x36" CONCRETE ARCH PIPE, CLASS III	877.00	LF	\$110.00	79.00	\$8,690.00
603-C-E	65"x40" CONCRETE ARCH PIPE, CLASS III	595.00	LF	\$124.00	29.00	\$3,596.00
603-C-	73"x45" CONCRETE ARCH PIPE,	720.00	LF	\$140.00	18.00	\$2,520.00

E	CLASS III					
SXSN	Apr-19					
907-624-A	27" LARGE DIAMETER PVC GRAVITY SEWER MAIN	820.00	LF	\$300.00	5.00	\$1,500.00
SXSN	Jun-19					
907-612-D	1" WATER SERVICE	4596.00	LF	\$40.00	20.00	\$800.00

Consequently, the SXSN performance duration used by Aegis is not correct, and even more so because Aegis reduces this duration to account for disruptions shown in Appendix 04, which have been disproved.

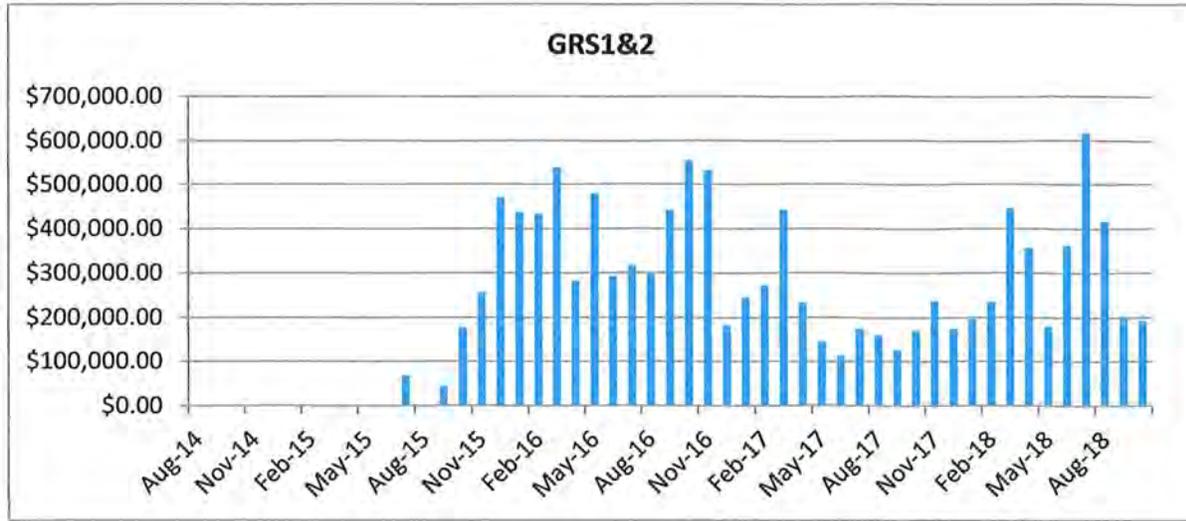
More importantly, Aegis's analysis relies upon the schedule durations which Aegis modified and for which there is no justification. The schedule itself is flawed because it envisions a completion of one Area before another can be performed and because the delays claimed in Appendix 04 are not delays to either the Area progress or to the critical path. Aegis's methodology is incorrect, as is its choice of SXSN as its measured mile.

Below I have set out the earnings of GRN 1&2. In this chart it can be seen that almost all work stopped on GRN 1&2 from May 2016 until May 2017. That is, almost no work was performed in this Area. The Aegis Report does not explain why no work could be done in this Area for twelve (12) months, nor does Aegis mention this fact in its analysis.



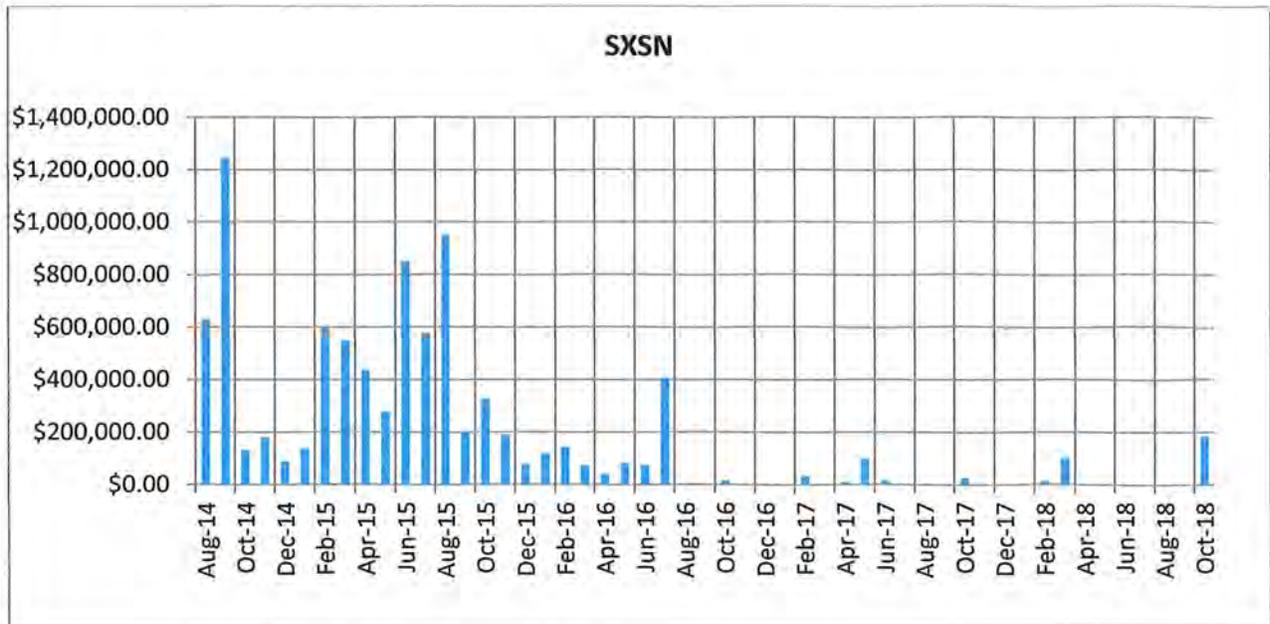
Aegis asserts that the completion of GRN 1&2 allowed the start of GRS 1&2. However, GRN 1&2 was not worked in a continuous basis but, rather, intermittently as can be seen in the graph above. Below is the same graph of earnings for GRS 1&2. From the comparison of the two graphs, it is evident that GRS 1&2 is able to start without the completion of GRN 1&2. Thus, the logic which states that this Area must be finished before the next Area can start is not supported by the actual starting of different Areas. There is obviously *no* dependency. If there is no dependency, there can be no critical path that states there is a dependency.

Aegis's logic is wrong because of this lack of dependency, and if the logic is wrong then the schedule that uses this logic is also wrong. A critical path is only composed of activities that are dependent upon one another and without this dependence, by definition, there can be no critical path.



The basis of the Aegis schedule is that an Area must be finished before other Areas can start, and that is clear from the schedule shown on page 26 of the Aegis Report. The fact remains, however, that the dependence is in completing a line of piping (Water, Sewer, and Storm) irrespective of the Area. This is why Aegis's use of the schedule is incorrect. Piping cannot be installed to some imaginary line and stopped awaiting the completion of all other piping work in the Area before proceeding. It must proceed sequentially even if it enters an adjacent Area.

When worked in this way, it will appear on the earning charts (similar to those above), that the work stopped, but in fact, that work has continued in an adjacent Area. Thus, it is only the way the work is recorded—not the work itself. Similarly, if the schedule is recorded in the same way, then it will appear to have stopped as well. As can be seen above for GRN1&2 the work appears to stop, but in fact, the pipe crew just moved to another Area.



Above is a similar graph of SXS. Note that work slows in October 2014, and this is because at that time, ORC is installing waterline and has moved on to GRN1&2 above. Thus, the earnings fall for SXS but rise for GRN1&2. This is yet another reason that SXS cannot serve as an appropriate “measured mile”. Aegis could have carried out detailed calculations as I did above, where labor is measured by the quantities installed. That would be the correct method of analysis. If Aegis had done so, they would have arrived at the same results that I did, which show there was no loss of productivity.

One of the main reasons why ORC experienced difficulty with its productivity is that there was significant turnover of the labor force. I sampled the timesheets of ORC and determined that from month to month the labor force changed.¹²

The analysis is contained in Exhibit 7 and in Exhibit 7; I have colored the laborers *leaving* in red and the laborers being *hired* in yellow. From this Exhibit, it is evident that over a ten (10) month period, there is significant turnover in ORC’s crews. This in itself leads to loss of productivity and is one of the more difficult problems for construction contractors.

¹² See Exhibit 7

Change Orders (CO) & Change Order Requests (COR)

Aegis makes a schedule of all COs & CORs that had been issued with a comparison of days awarded and days requested. Aegis then asserts that the difference is excusable and compensable through its claim of acceleration. In part, Aegis asserts that these denied requests for extensions of time gave justification for the claim of constructive acceleration. No other information is given, save for the assertion that these should have been awarded.

Aegis does not, nor could Aegis show, a relationship between the COR/CO requests and the justification for constructive acceleration. As I have shown above, there was ample time to finish the project if sufficient labor were employed. ORC, however, had difficulty keeping labor on the project and was slow to increase its labor force.

Aegis also lists the monetary value of the COs requested and compares those values to the amounts awarded and asserts that the difference of \$2,452,032 is due and payable. Similarly, with the CORs, Aegis lists the values requested of \$308,754 and asserts that they are payable.

There is no information given as to justification, only an assertion that the amounts are due. Therefore there is no basis for analysis, other than my foregoing analyses and demonstration that the grounds for claiming additional time or compensation are meritless.¹³

Summary

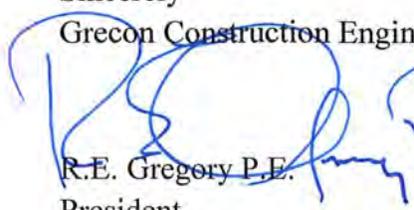
Aegis's analysis is mostly false in that it begins with a schedule which cannot represent the Project advancement as it violates the principle of all schedules that the relationships between activities must be required by the sequence of construction. Aegis ignored this principle and chose to use a schedule which also ignored this requirement. As a result, the relationships between the Areas the Project was separated into do not exist. Without these relationships, there is no critical path. Aegis's work not only accepted this schedule, Aegis also modified the schedule in a way to make an invalid analysis appear valid, which it is not.

I reserve the right to modify this report if new information becomes available. I trust that this report will meet your needs and that if you need further information you will let me know.

¹³ Excepted from this determination is that an additional 35 Calendar Days should be added, but with no additional compensation, with regard to my discussion of GRS3&4 design changes above.

Sincerely

Grecon Construction Engineers, Inc.



R.E. Gregory P.E.
President

