OTTAWA LIGHT RAIL TRANSIT PROJECT

INDEPENDENT CERTIFIER DETERMINATION OF DISPUTE BETWEEN THE CITY OF OTTAWA AND RIDEAU TRANSIT GROUP GENERAL PARTNERSHIP

SINKHOLE DELAY

Altus Group Ref.: 20130.103394.014

Prepared for:
The City of Ottawa
and
Rideau Transit Group General Partnership, by its Partners ACS RTG Partner Inc., SNC RTG Partner Inc. and EllisDon RTG Partner Inc.

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1 Introduction

1.1 Project Summary

On February 12, 2013 the City of Ottawa ("the City") entered into a Project Agreement ("the PA") with Rideau Transit Group General Partnership, by its Partners ACS RTG Partner Inc., SNC RTG Partner Inc. and EllisDon RTG Partner Inc. ("RTG") for the procurement of (i) a new light rail transit system, (ii) widening of Highway 417, and (iii) the completion of related Civil Works ("the Project").

During the course of construction of the Project a number of disputes arose, and currently, despite the parties' best efforts to resolve such disputes in accordance with Schedule 27, the PA's Dispute Resolution Procedure, the parties have been unable to resolve a number of disputes.

The following disputes were initiated by RTG September 2019 and updated in May 2020 and have been referred to the Independent Certifier under Section 4.1 of Schedule 27 to the PA:

- #17 Safety Assurance;
- #19 Hydro Ottawa Ltd. Connection Points;
- #23 Design Review;
- #24 Alstom Design;
- #26 Fare Gates;
- #27 Ashwood;
- #31 Improper Payment Deductions; and
- #32 Sinkhole Delay.

This determination relates to the sinkhole delay.

1.2 Statement of Purpose

On February 12, 2013 the City and RTG entered into an agreement with Altus Group Limited ("Altus") to perform certain services in connection with the PA as Independent Certifier ("IC"). Subsequently to the original agreement on September 23, 2020, the parties to the PA and Altus executed an amendment to the Independent Certifier Agreement for Altus to provide additional independent determinations of the eight disputes listed above in accordance with Schedule 27 of the PA - DRP Process.

1.3 Background

RTG are the developers of a new light rail project (design-build-finance and maintain) in the City of Ottawa encompassing 13km and 13 stations, 3 of which are in an underground section.

1.4 Documents Relied Upon

The following documents have been relied upon in the preparation of this determination:

RTG presentations (2nr) dated December 11, 2020
City of Ottawa presentations (3nr) dated December 8 & 11, 2020
City of Ottawa Submission on independence of Experts dated December 18, 2021
RTG submission on independence of experts dated December 18, 2021
City of Ottawa submission to Independent Certifier, 2 volumes dated undated issued under cover of letter dated September 28, 2020
RTG submission to Independent Certifier, 2 volumes dated September 26, 2019

1.5 Matter to be Determined by the Independent Certifier

The principal matter and questions referred by RTG to the Independent Certifier under Schedule 27 of the PA is whether the occurrence of the sinkhole on June 8, 2016 is a Delay Event? And if so, what entitlement do RTG have to time and to extend the Revenue Service Availability Date?

In determining what, if any, time RTG is entitled to under Clause 40 of the PA, a number of issues require consideration:

1. The impact of the tolling agreement executed by RTG and the City on June 7, 2018, on the IC Determination Process
2. Independence of the City's geotechnical expert (Ground Truth Engineering Limited)
3. What is the cause, or likely cause, of the sinkhole that occurred on June 8th, 2016?
4. Is the cause of the sinkhole a Delay Event?
5. What, if any, entitlement do RTG have to time as a consequence of any Delay Event?

2 Altus Group's Determination

2.1 RTG's Claim

RTG claim that the sinkhole event was caused by a defective joint (hymax coupler) in a relocated fire hydrant, the work for which was executed by the City's staff, leading to a watermain failure which precipitated the sinkhole event. In any event, failing this, RTG contend that the watermain burst was caused by an "accident". RTG contends that the hymax coupler failure is a Delay Event as it is defined as a Latent Defect under Section

40.1(a)(xiii) of the PA. The latter "accident" is a Delay Event as it is captured as a Relief Event under Section 40.1(a)(x). The sinkhole RTG's delay expert contend is a critical delay and they are entitled to 281 calendar days extension of time.

2.2 The City's Position

The City rejects RTG's claim that the cause of the sinkhole was defective work undertaken by the City on a hymax coupler on the relocated fire hydrant nor was it an "accident" as defined in the PA and Relief Events, this does not provide RTG with an entitlement to claim a Delay. Furthermore, the cause of the sinkhole was RTG's tunnelling activities which disallows any Relief Event entitlement to RTG in any event.

2.3 Analysis by Altus

2.3.1 Question 1 – What is the impact of the tolling agreement on the IC Determination Process?

The City and RTG entered into a tolling agreement on June 7, 2018. Altus have considered the language of this agreement as it relates to the Independent Certifier process.

It is Altus' view that the tolling agreement does not prevent dispute resolution, indeed it encourages "resolution discussions outside of litigation" at Recital C. So, while it seeks to prevent "commencing" any litigation, it does not prevent utilising the contractual dispute resolution process.

2.3.2 Question 2 – Is the City's Geotechnical Expert, Mr. John Westland, Independent?

In the course of the Parties presentations on the sinkhole issue to the Independent Certifier on December 11, 2020, RTG raised verbal objection to the use of Mr. John

Westland of Ground Truth Engineering Ltd by the City as it's geotechnical expert on the basis that he was conflicted.

RTG's position was that Mr. Westland, by his prior employers' role on the Ottawa LRT Project he was disqualified and in fact, he had previously disqualified himself from acting as an expert for RTG on a similar basis (refer to June 24, 2016 e-mail).

The City's position is that notwithstanding the legal tests for an expert's independence or bias and the proximity of Mr. Westland's relationships and closeness to the OLRT Project none of which would exclude him. Mr. Westland had only disqualified himself or refused to act as an expert for RTG in the June 24, 2016 e-mail as he was employed at GHD Group at the time (who had a role in the tunnel construction). This is no longer the case and his reasons for his extreme precaution at that time are no longer applicable.

Both RTG and the City have made written representations to Altus as to Mr. Westland's independence and ability to act as an expert on December 18, 2020 and Altus are satisfied having considered these that Mr. Westland is independent, impartial and unbiased and his relationship to the project and the Parties does not prevent this nor his acting as an expert in this matter.

2.3.3 Question 3 - What is the cause, or likely cause, of the sinkhole event on June 8, 2016?

RTG's position is that the cause of the sinkhole is the failure of a hymax coupler connecting a new fire hydrant. This work, RTG alleges, was improperly carried out by the City's Drinking Water Services Department on November 12, 2015.

The City's position conversely is that RTG failed to act with due care and diligence in their tunnelling activities and this failure caused a void to form into which the watermain collapsed leading to the sinkhole.

RTG's expert position (DFA Engineering Services Inc.)

RTG's expert report by DFA Engineering Services Inc. ("DFA") on September 10, 2019 concludes that the most likely cause of the sinkhole was the faulty installation of the hymax coupler to connect the fire hydrant. In support of this proposition they further discount the tunnelling as a cause by use of some calculation of vibration levels and some contemporaneous soil logs and reports at the time leading up to the sinkhole incident.

The City's expert position (Ground Truth Engineering Ltd. & McMillen Jacobs Associates)

The Ground Truth Engineering Ltd. ("Ground Truth") report was issued on July 22, 2020. The McMillen Jacobs Associates ("MJA") report was issued on December 22, 2016.

The Ground Truth report is a peer review of the MJA root cause analysis undertaken soon after the sinkhole event. MJA conclude that the sinkhole was highly likely caused by a series of factors of which either RTG were aware or were in their control:

1. The choice of tunnelling method; Sequential Excavation Methodology was risky in the known soil type in their view;
2. The groundwater level and a failure to reduce this prior to advancing the tunnel and not to utilise jet grouting were both omissions;
3. The type of soil into which they were tunnelling i.e. heading from rock into coarse grained till created further risk, see also item 2 above;

4. (2) and (3) above were revealed in borehole tests in the background information to RTG at bid stage.

Furthermore, the City include in their position paper an expert report by Mr. Fabian Papa, a principal of Hydra Tek & Associates to provide comment on the likelihood of failure of hymax coupler being the source of the watermain leak and the sinkhole, as claimed by RTG in their position paper dated July 22, 2020.

Mr. Papa's conclusions are summarized as follows:

1. Although the hymax couplers installation deflection exceeded the manufacturers specifications, given the loading and the manufacturer allowed tolerances, this deflection is within permissible tolerances.
2. Hydra Tek concluded from their measurement that the angle of deflection was 10° and not 16.6° as claimed by RTG, which exceeds manufacturers specifications by only 2°.
3. The restraint harness was typical, and any additional loading caused by the angle of deflection was minimal.

Altus's conclusions from the expert reports and position papers presented by the City and RTG are:

1. It is noted that RTG's expert report was prepared by DFA on September 10, 2019; more than 3 years after the sinkhole incident.
2. RTG's expert DFA concluded in its executive summary:

   "While the absence of available physical evidence makes it impossible to definitively determine the cause of the failure the most likely cause is the faulty installation of the hymax coupler"

3. The first suggestion by RTG that the hymax coupler was the source of the watermain leak and sinkhole was in the DFA report (September 2019).
4. DFA's vibration analysis is not based on actual data from which it draws its conclusions but experimental data and broad theory in the area.
5. MJA's report was published on December 22, 2016 and so to Altus' mind is more contemporaneous with the incident.
6. The only evidence "suggestive" of a problem with the hymax coupler is a photograph. This is not conclusive.
7. Altus find the combination of MJA's, Ground Truth and Hydra Tek's expert reports are more persuasive as to the cause of the sinkhole and this is for a combination of reasons:
    a. The analysis of data recorded at the time;
    b. The analysis of prevailing ground conditions;
    c. The "coincidence" of the timing and proximity of tunnelling activities;
    d. The lack of evidence as to a leak on the surface of Rideau i.e. the bottom up theory; and;
    e. The lack of compelling evidence at the time of the sinkhole beyond a photograph as to the hymax coupler theory.

Altus are therefore persuaded by the City's experts reports that due to the indicating factors identified above that it is very likely that the cause of the sinkhole was RTG's tunnelling activities.

2.3.4 Question 4 – Is the cause of the sinkhole a Delay Event?

RTG claim that the sinkhole is a Delay Event on the basis of:

1. It is a Relief Event under Section 40.1(a)(x) of the PA; and,
2. It is a Latent Defect under Section 40.1(a)(xiii) of the PA.

The City's position is that a proper reading of the PA provisions excludes RTG's claim and furthermore that RTG were a direct or indirect cause of the sinkhole event, both of which disqualifies them from claiming any contract relief.

The Hymax Coupler failure was a Latent Defect?

In Section 2.3.3 – Question 3, we analysed what we believe to be the likely cause of the sinkhole event and we have discounted the hymax coupler failure as the cause for the reasons noted, but most significantly insufficient evidence to support this claim.

Therefore, we conclude that this dismisses one limb of the RTG claim that the cause of the sinkhole was a Latent Defect under Section 40.1(a)(xiii).

The Sinkhole Event is a Relief Event?

RTG contend that there are two Relief Events that provide relief in the event of the sinkhole as occurred on June 8, 2016. These are:

1. PA Schedule 43.1(a)(iii) – accidental loss or damage to the civic works or the systems;
2. PA Schedule 43.1(a)(viii) – with respect to tunnel work only, bursting or overflowing of water tanks; apparatus or pipes;

It is acknowledged by RTG at 43.1 (a) of the Project Agreement that it order for it to be able to claim a Relief Event the Event:

> *"does not arise (directly or indirectly) as a result of any act or omission of the Party claiming relief and (i) in the case of Project Co claiming relief, as a result of any act or omission of any Project Co Party".*

Here Altus agrees with the City's analysis of the exclusion above in so far as the language does not require RTG to have been the cause of the sinkhole, merely that they were a part of the chain of events that led to the sinkhole. Furthermore, that they need not have acted negligently, although we believe from the expert reports their actions did contribute to (if not cause) the sinkhole in the poor ground conditions; of which, RTG had been made aware of in the Background Information.

2.3.4.1 Does RTG's election of the Maximum Risk Model on Geotechnical Matters Have a Bearing?

Altus believe it is relevant to this matter that RTG, in the RFP process, elected to assume a higher geotechnical risk profile for additional compensation. At the heart of this matter, if you exclude the hymax coupler as a cause, is a geotechnical matter and by assuming all the risk in this regard it is difficult for RTG to now pass this risk back to the City.

So, to Altus' view even if we cannot say for certainty that the tunnelling was the cause of the sinkhole, it is undeniable that a geotechnical matter was at the heart of the event and RTG's construction activities were at least contributory to the event and the ground risk/geotechnical was a matter RTG had assumed for an additional consideration at RTG's own election.

2.3.5 Question 5 – What entitlement do RTG have to time?

2.3.5.1 BRG's Delay Analysis – As-planned vs. As-built

BRG, RTG's delay expert has utilized the 'As-planned vs. As-built' methodology to determine the quantum of delays caused by the Sinkhole event. This methodology is based on comparing the actual time frame of the activities that have been carried out on the Project against the planned time frame, and the difference reflects the total delays encountered on the Project. Altus note that BRG have not performed any culpability and/or concurrency analysis after the occurrence of the delay event which impacted the Revenue Service Availability (RSA) Date other than the sinkhole event. It is pertinent to mention therefore, that by only considering the sinkhole event, and excluding other delay events, BRG's methodology has not portrayed a true or fulsome analysis of delays caused by the parties.

BRG did not perform any culpability analysis whether during the impact of the delay event "in this case the sinkhole" or after the start of the delay event in order to determine the following:

1. Concurrent delays; and
2. Dominant delays which are causing delay to the RSA Date.

It is worthy to mention, and in accordance to the common practices of the construction industry, that in the case of concurrent delays neither parties are entitled to cover any cost damages resulting from concurrent delays. Accordingly, it is important to categorize and determine cause/liability of delays to be able to quantify each type of delay, and therefore entitlement of delays and/or damages.

In view of the above, the delay analysis which was performed by BRG is incomplete and needs to consider culpable and concurrent delays while performing the delay analysis and prior to determining the entitlement of time caused by the delay event.

2.3.5.2 Sinkhole Event

This event occurred on June 8, 2016 on Rideau Street located west of the new Rideau Station construction. The water main was broken causing a water flood into the soil and a sinkhole on the Rideau Street. The progress of the underground tunnel works was impacted by the sinkhole.

2.3.5.3 High-Level Analysis of Culpability and Concurrency

Altus has performed a high-level delay analysis by selecting two windows after the occurrence of the sinkhole utilizing the same methodology of BRG 'As-planned vs. As-built' but taking into consideration the culpable delays caused by RTG and the dominant cause delays that impacted the RSA Date.

2.3.5.3.1 Window# 1 - Up to December 21, 2016

See Figure 1 in Appendix A for reference.

This window utilized the December 21, 2016 schedule update which was after the occurrence of the sinkhole by almost six (6) months to determine the impact of the sinkhole on the RSA Date and identify the new critical path of the Project. This schedule update has been selected as a six (6) month period is considered a sufficient period after the sinkhole event to be aware of the impacts and to plan ahead the remaining activities of the Project and determine any difficulties resulting from the sinkhole event. In addition, this schedule update includes the sinkhole event and its relevant/impacted activities.

After reviewing the Baseline Schedule dated September 13, 2013 and comparing it with the December 21, 2016 as-built schedule, it is apparent from the delay analysis chart, Figure 1 of Appendix A, that the RSA Date had not been impacted and the date remains

unchanged i.e. May 23, 2018. The December 21, 2016 schedule update contains the sinkhole event and relevant successor activities including:

- Remediation work for Rideau Street Sinkhole and re-opening it for traffic which took place from June 8 to June 30, 2016;
- Re-design, review and preparation to resume excavation which took place from June 9 to August 4, 2016; and
- New excavation plan activities which started on August 5, 2016 and were planned to be completed on February 27, 2017.

Taking into consideration the above remediation activities of the sinkhole and relevant subsequent activities that shall be performed after the occurrence of the sinkhole, the RSA Date was not impacted and the Project was anticipated to be completed as planned on May 23, 2018. Therefore, 6 months after the sinkhole event RTG were still maintaining that the Project was not in delay as of December 21, 2016.

However, a summary of the new critical path activities of the Project as of December 21, 2016 is as follows:

- New excavation plan due to the sinkhole i.e. Segment 2 guideway;
- CPR Overpass structures – Segment 1;
- Mann Ave Bridge – Segment 3;
- Bayview station construction;
- Parliament station construction;
- Rideau station construction;
- Trackwork for Segments 1, 2 and 3;
- Vehicle 2 testing and validation (Dynamic Tests); and

- Testing and commissioning.

2.3.5.3.2 Window# 2 - From December 21, 2016 to December 21, 2018

See Figure 2 in Appendix A for reference.

This window utilized the December 21, 2018 schedule update to determine the dominant cause of the RSA Date delay. This schedule update has been selected as it contains the as built and near completion activities for the whole project up to the RSA Date which shows the dominant cause of RSA Date delay and concurrent delays, if any.

After reviewing the schedule update dated December 21, 2018 and comparing it with the December 21, 2016 as-built schedule, it is apparent from the delay analysis chart, Figure 2 of Appendix A, that the dominant cause of delay is related to stations construction activities and Vehicle Manufacture & Testing which prolonged up to February 26, 2019 and caused a delay to the RSA Date. These activities are not related to the sinkhole event and are causing a critical delay to the RSA Date.

On the other hand, was RTG unable to perform other works not related to the sinkhole in a timely manner and without impacting the RSA Date regardless of the impact of the sinkhole event on the Project? The answer is definitely no. As apparent from the delay analysis chart Figure 2, the stations construction and Vehicle Manufacture & Testing are driving and impacting the RSA Date.

2.3.5.4 Conclusion

As demonstrated in the foregoing sections, BRG did not perform any culpability and/or concurrency analysis particularly after the occurrence of the sinkhole event to determine the cause/liability of the delays other than the impact of sinkhole event. After performing

a high-level delay analysis for two different time windows, it is apparent that the sinkhole event did not impact the RSA Date as of December 21, 2016 i.e. after six (6) months of the occurrence of the sinkhole. Furthermore, the dominant cause of the delays as of December 21, 2018 was not the Sinkhole event. There were numerous activities/works that have significantly delayed the RSA Date such as Vehicle manufacture and testing, and stations construction.

Therefore, the RSA Date was not impacted by the sinkhole event as this event was not the dominant cause of delay and was concurrent with other delays not related to the sinkhole event as demonstrated previously.

3 Conclusions & Independent Certifier's Determination

3.1 What is the Impact of the Tolling Agreement on the IC Determination Process?

It is Altus' opinion that the tolling agreement does not prevent the utilization of the Dispute Resolution Process and seeking an IC determination.

3.2 Is the City Geotechnical Expert, Mr. John Westland, Independent and Impartial?

Having considered the City and RTG's presentations and arguments on this matter, Altus are satisfied that Mr. John Westland is impartial, unbiased and independent and his report may be considered by Altus in reaching a determination on the sinkhole matter.

3.3 What is the cause of the Sinkhole Event on June 8, 2016

Altus concludes that there is insufficient evidence to support the claim that the faulty installation of the hymax coupler by the City was the cause of any water main leak and the sinkhole. Altus are persuaded by the City's expert reports that the sinkhole, due to a number of indicating factors therein, that it is very likely that the RTG tunnelling activities were the cause of the sinkhole.

3.4 Is the Cause of the Sinkhole a Delay Event

Altus dismisses RTG's claim that the hymax coupler was the cause of the sinkhole as there is no real evidence to support this claim and so, a Latent Defect cannot be the cause of a Delay Event.

As to whether RTG's tunnelling activities which we believe to be the probable cause of the sinkhole is a Delay Event, as Relief Event, either as an "accident" or a "bursting" or "overflowing of water tanks, apparatus or pipes".

In both cases Altus concludes that the tunnelling activities cannot qualify as Relief Events as the sinkhole was as a consequence of an "*act or omission of the Party claiming*".

It is acknowledged by RTG at 43.1(a) of the PA that in order to be able to claim a Relief Event, the event:

> *"does not arise (directly or indirectly) as a result of any act or omission of the Party claiming relief and (i) in the case of Project Co. claiming relief, as a result of any act or omission of any Project Co. Party."*

Furthermore, the sinkhole event occurred as a consequence of the underlying geotechnical risk in the area of tunnelling which is a matter that RTG assumed responsibility for and an additional consideration and cannot now "pass this risk back" to the City.

Altus therefore find that RTG do not have a claim for a Delay Event for the reasons summarised above and that RTG should look to other contractual protections and security such as insurance to cover any costs incurred.

3.5 RTG's Potential Entitlement to Time

Although Altus have concluded that RTG do not have a claim for a Delay Event we did nonetheless undertake an analysis of the RTG delay analysis.

Our conclusion having reviewed this is:

1. RTG's delay expert have not to Altus's mind given proper consideration prior to or after the sinkhole event of any culpable delay on RTG's part in the assessment or calculation of any delay; and

2. In reviewing RTG's as built schedules of the December 21, 2016 and December 21, 2018 we concluded firstly that 6 months after the occurrence of the sinkhole event RTG were still reporting the RSA (revenue service availability) had NOT been impacted and secondly analysis of the December 2018 as built demonstrates that the dominant causes of a failure to achieve RSA were other stations construction activities and vehicle delivery, testing and commissioning and not the sinkhole.

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APPENDIX A - FIGURES

Figure 1 -Window# 1 - Up to December 21, 2016

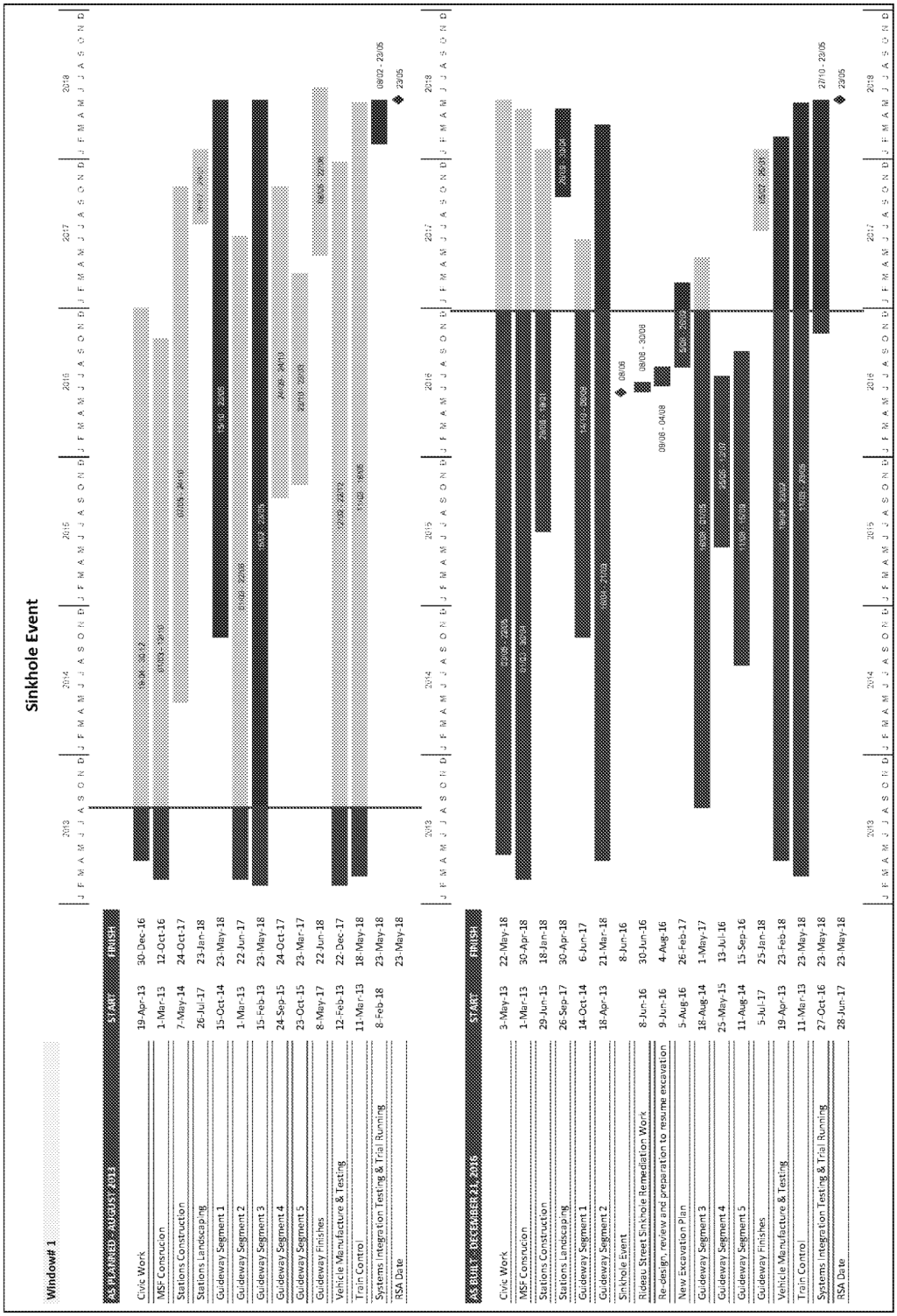

Figure 2 - Window# 2 - From December 21, 2016 to December 21, 2018