FRASER GRAIN TERMINAL
Rail Operations Plan

Parrish & Heimbecker Limited
Fraser Grain Terminal Project
June 28, 2018
FWS Job # 08-17-115C
Revision 10
TABLE OF CONTENTS

0- EXECUTIVE SUMMARY
1- OPERATIONS DESCRIPTION
2- ANNEX A – DRAWINGS
3- ANNEX B – TIME IN MOTION STUDY
0 - EXECUTIVE SUMMARY

The ‘Rail Operation Time in Motion Study’, attached in Annex B, contains the complete analysis of rail operations to supply the new Fraser Grain Terminal (FGT). The plant layout and operations shall divide the trains into eight – 14 car strings. Full rail development will be done in two phases.

Phase 1 of rail construction consists of a new loop track serving the new rail unloading building, plus a new spur serving the new rail/truck loading structure. This is the minimum change required to allow the FGT to function under current operating conditions.

The Time In Motion Study provides overall switching time, car movements and approximate overall operating times for rail service to the FGT with no changes or track extensions required in the Port Authority Rail Yard (PARY). Overall times for delivering, shunting, and re-assembling trains are provided in the study.

Incoming track radius at the unloading building is 9 degrees, and curvature leaving the building is 11 degrees, to match up to existing Track 90 at the south end of the site.

A future expansion of the PARY is also to be considered as Phase 2 of this project. The expansion will consist of changes to Tracks 94, 95 and 96, and other changes in the PARY yard. This phase will be implemented only when operating conditions at FSD change, or if there is a business case to support it. This track design and operation minimizes the number of new switches.

Implementation of Phase 2 would not significantly increase overall switching time or the number of rail movements per train unloaded. Operation and switching of full and empty cars to/from the PARY will be similar to that indicated in the Phase 1 Time in Motion Study, but starting with cars on Tracks 94 & 95 instead of Tracks 92& 93. The operation will not result in any additional movements across the road crossings of Robson Road at either Plywood or Elevator Road.

Operation of the JV rail facility will be unaffected by operation of FGT, except for timing of movements on shared tracks in the PARY.
1 - OPERATIONS DESCRIPTION

Full rail development will be done in two phases. In Phase 1, a new loop track will be installed to serve the new rail unloading building, plus a new spur serving the new rail/truck loading structure. This is the minimum change required to allow the Fraser Grain Terminal (FGT) to function under current operating conditions. A future expansion to the Port Authority Rail Yard (PARY) is also to be considered as Phase 2 of this project.

Phase 2 of rail construction will be required only when operating conditions at FSD change, such as accommodating a new coal or potash terminal, or CN delivery service to the PARY changes. For example, if CN service requires bringing in a full unit train before removing an empty, the Phase 2 PARY extension would be required.

In Phase 1, FGT will receive 112-car unit trains from P&H’s prairie terminal system, with grain ready for export shipping. Please refer to Mott Macdonald drawings 391747-MMD-00-P0-DR-RW-1000 through -1002.

Trains will be delivered and removed by CN on tracks 92 & 93 of the existing PARY for supplying FGT. P&H operations will utilize a yard locomotive to break cars and deliver them to the FGT rail unloading building where a hydraulically powered rail car indexer will advance a 14-car string across the pit to unload one car at a time.

A single 14-car string can be accommodated on the site without fouling any of the features:
- Track switches,
- Site access road,
- Robson Road

While cars are being unloaded, the yard locomotive will return to the PARY to bring the next string of cars to the rail unloading building. The yard locomotive will also push out empty cars back into the PARY. The indexer or locomotive is always connected to secure trains. Yard locomotive for switching to and from FGT is operated and provided by FSD.

The rail spur track serving the rail/truck loading structure is designed to accommodate one 10-car string. A new hydraulically powered rail car indexer would be used to advance the cars during the loading process. The indexer or locomotive is always connected to secure trains.

Although not shown on the drawings, a concrete rail crossing slab will be provided where the FGT loop rail crosses the Metro Vancouver Annacis No.3 Water Main, to ensure no load is transferred to the pipe.

The existing JV Facility operations will continue to operate by having cars staged in the PARY. Phase 1 includes a minor vertical realignment of existing track to the Joint Venture (JV) facility, in order to connect to new track. Horizontal alignment of existing track to the JV facility is not affected. The JV facility utilizes Tracks 94, 95 and 96 to receive full cars, stage strings for unloading, and store empties, unchanged from the existing operation.

The JV shed will still operate unloading 10-car strings. Operation of the JV rail facility will be unaffected by operation of FGT, except for timing of movements on shared tracks in the PARY.
Phase 2 of rail construction will be required only when operating conditions at FSD change, such as accommodating a new coal or potash terminal, or CN delivery service to the PARY changes. For example, if CN service requires bringing in a full unit train before removing an empty, then Phase 2 PARY extension would be required.

Phase 2 consists of changes to Tracks 94, 95 and 96, and other changes in the PARY. Please refer to Mott Macdonald drawings 391747-MMD-00-P0-DR-RW-1003 through -1005. Track alignment lengths will be extended as follows: Track 94 by 888 m, Track 95 by 877 m, Track 96 by 907 m. Final lengths after extension are shown on Mott Macdonald drawing 391747-MMD-00-P0-DR-RW-1003.

Implementation of Phase 2 would not significantly increase overall switching time or the number of rail movements per train unloaded. Operation and switching of full and empty cars to/from the PARY will be similar to that indicated in the Phase 1 Time in Motion Study, but starting with cars on Tracks 94 & 95 instead of Tracks 92& 93. The operation will not result in any additional movements across the road crossings of Robson Road at either Plywood or Elevator Road.

Phase 2 of rail construction, if required, would not likely need to be completed prior to Fall Harvest of 2021.
<table>
<thead>
<tr>
<th>Drawing No.</th>
<th>Rev.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>391747-MMD-00-P0-DR-RW-0000</td>
<td>C</td>
<td>Fraser Grain Terminal Proposed Grain Export Facility Rail Layout Rail Concept Plan</td>
</tr>
<tr>
<td>391747-MMD-00-P0-DR-RW-0001</td>
<td>D</td>
<td>Fraser Grain Terminal Proposed Grain Export Facility Rail Layout Rail Concept Plan General Notes and Typical Sections</td>
</tr>
<tr>
<td>391747-MMD-00-P0-DR-RW-1000</td>
<td>D</td>
<td>Fraser Grain Terminal Proposed Grain Export Facility Rail Layout Rail Concept Plan – Phase 1 Sheet 1 of 3</td>
</tr>
<tr>
<td>391747-MMD-00-P0-DR-RW-1001</td>
<td>D</td>
<td>Fraser Grain Terminal Proposed Grain Export Facility Rail Layout Rail Concept Plan – Phase 1 Sheet 2 of 3</td>
</tr>
<tr>
<td>391747-MMD-00-P0-DR-RW-1002</td>
<td>C</td>
<td>Fraser Grain Terminal Proposed Grain Export Facility Rail Layout Rail Concept Plan – Phase 1 Sheet 3 of 3</td>
</tr>
<tr>
<td>391747-MMD-00-P0-DR-RW-1003</td>
<td>C</td>
<td>Fraser Grain Terminal Proposed Grain Export Facility Rail Layout Rail Concept Plan – Phase 2 Sheet 1 of 3</td>
</tr>
<tr>
<td>391747-MMD-00-P0-DR-RW-1004</td>
<td>D</td>
<td>Fraser Grain Terminal Proposed Grain Export Facility Rail Layout Rail Concept Plan – Phase 2 Sheet 2 of 3</td>
</tr>
<tr>
<td>391747-MMD-00-P0-DR-RW-1005</td>
<td>D</td>
<td>Fraser Grain Terminal Proposed Grain Export Facility Rail Layout Rail Concept Plan – Phase 2 Sheet 3 of 3</td>
</tr>
</tbody>
</table>
**GENERAL NOTES**

1. **ALLDIMENSIONSANDINMETERSUNLESSNOTEDOTHERWISE.**

2. **SOLUTIONS IN WATER TO DISEASES DUE TO HYGIENIC VARIANTS BASED ON DUAL FREQUENCY (DUAL HARMONIC) CARRIER PULSE OPTIMIZATION TECHNOLOGY TO LIMIT THE DEGREE OF DISEASES.**

3. **ROAD POWER WILL NOT RUN ON THE MANIFEST SPUR TRACK OR THE SEMI LOOP TRACK UNDER CURRENT OPERATIONS.**

4. **THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES AS PER TC-10 FOR RAILWAY LOADING. CN REVIEW AND ACCEPTANCE FOR UTILITY RELOCATIONS AND PROTECTION IS REQUIRED PRIOR TO INSTALLATION OF MIL TRACKS.**

5. **EXISTING GROUND SHALL BE INSPECTED BY A GEOTECHNICAL ENGINEER.**

6. **PAVEMENT POST FOR FUTURE MANIFEST STUB TRACK TO BE HAYES TYPE WG OR HD OR ITS EQUIVALENT.**

7. **INSTALLATION OF NEW TRACKS.**

8. **NEW RAIL SHALL BE 115RE WITH BOLTED JOINTS.**

9. **TYPICAL CUT SUBDRAIN SECTION**

10. **BALLAST SHALL CONFORM WITH CN ENGINEERING SPECIFICATIONS FOR INDUSTRIAL TRACKS (NOV. 15, 2015).**

11. **BALLAST SHALL COMPLY WITH CN ENGINEERING SPECIFICATIONS FOR INDUSTRIAL TRACKS (NOV. 15, 2015).**

12. **ROAD POWER IS LIMITED TO 15 M.P.H.**

13. **PRIOR TO CONSTRUCTION SUBGRADE TO BE INSPECTED BY A GEOTECHNICAL ENGINEER.**


15. **THIS DRAWING IS IN GROUND-LEVEL COORDINATES BASED ON BC LAND SURVEYOR UNDERHILL GEOMATICS LTD. DRAWING “V12145-01-TOPO -GROUND-R5.dwg” JOB No. V12145A, DATED ON JANUARY 13, 2013.**

16. **ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.**

17. **“V12145-01-TOPO -GROUND-R5.dwg” JOB No. V12145A, DATED ON JANUARY 13, 2013.**
NOTES

1. FOR GENERAL NOTES, SEE DRAWING 391747-MMD-00-P0-DR-RW-0001.
2. ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
3. ELEVATIONS ARE IN METERS, TO GEODETIC DATUM BASED ON DUAL FREQUENCY DIFFERENTIAL CARRIER PHASE GPS OBSERVATIONS TO BCLI AND BCVC ACP STATIONS.

PLAN

LEGEND:
- PROPERTY BOUNDARY
- PROPOSED TRACK
- EXISTING TRACK
- CLEARANCE POINT
- PROPOSED SHORTEST TRACK
- PROPOSED LOOP TRACK
- NEW RAIL UNLOADING BUILDING
- NEW No. 9 TURNOUT
- ROBSON ROAD
- UPDATED PROPERTY

TRACK CAPACITY GRAIN EXPORT FACILITY

<table>
<thead>
<tr>
<th>TRACK</th>
<th>TOTAL ALIGNMENT LENGTH</th>
<th>CLEAR LENGTH</th>
<th>NO. OF 60' CARS</th>
<th>COMMODITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M FT</td>
<td>M FT</td>
<td></td>
<td>AGRICULTURAL</td>
</tr>
<tr>
<td>PROPOSED LOOP TRACK</td>
<td>2750</td>
<td>679</td>
<td>2228</td>
<td>AGRI/COAL</td>
</tr>
<tr>
<td>PROPOSED MANIFEST TRACK</td>
<td>5351</td>
<td>1457</td>
<td>4780</td>
<td>AGRICULTURAL</td>
</tr>
<tr>
<td>PROPOSED MANIFEST TRACK</td>
<td>1751</td>
<td>476</td>
<td>1561</td>
<td>AGRICULTURAL</td>
</tr>
</tbody>
</table>

1:1000 SCALE

FWS GROUP OF COMPANIES
275 Commerce Drive
Winnipeg, MB R3P 1B3

PARRISH & HEBBENBROOK LTD.
300 Burnet Street
Vancouver, BC V6C 2B5

MOTT MACDONALD
Suit 1000, Bentall 3
100 Burnet Street
Vancouver, BC V6C 2B5

Suite 1888, Bentall 5
550 Burrard Street
Vancouver, BC, V6C 2B5
Canada
604.681.4400
www.mottmac.com/americas

G. YANG 2018/04/06
R. HAY 2018/04/06
S. RIDDICK 2018/04/11
J. SUTCLIFFE 2018/04/13

ISSUED FOR CN ACCEPTANCE

This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

S. RIDDICK 2018/04/11
J. SUTCLIFFE 2018/04/13
1. FOR GENERAL NOTES, SEE DRAWING 391747-MMD-00-P0-DR-RW-0001.
2. ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
3. ELEVATIONS ARE REFERENCED TO GEODETIC DATUM BASED ON DUAL FREQUENCY DIFFERENTIAL CARRIER PHASE GPS OBSERVATIONS TO BCLI AND BCVC ACP STATIONS.

PLAN SCALE 1:1000

LEGEND:
- PROPERTY BOUNDARY
- PROPOSED TRACK
- EXISTING TRACK
- (TO BE REMOVED)

G. YANG 2018/04/06
R. HAY 2018/04/06
S. RIDDICK 2018/04/11
J. SUTCLIFFE 2018/04/13

Mott MacDonald Canada Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

PARRISH & HEIMBECKER LTD.
355 Burrard Street
Vancouver, BC V6C 2G8
Canada
Suite 1888, Bentall 5
550 Burrard Street
Vancouver, BC V6C 2B5
Canada
604.681.4400
www.mottmac.com/americas

1:1000
IFR
C
STD

GRAIN EXPORT FACILITY
BROWNSVILLE, YALE SUBDIVISION M.P. 119.0
PROPOSED TERMINAL RAIL LAYOUT
PHASE 1 - SHEET 3 OF 3

DRAWN BY: HAY73246
UPDATED PROPERTY BOUNDARIES
LIMIT OF CONSTRUCTION
PROPOSED FUTURE TRACK
CLEARANCE POINT

391747-MMD-00-P0-DR-RW-1002
FOR GENERAL NOTES, SEE DRAWING 391747-MMD-00-P0-DR-RW-0001.

ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.

ELEVATIONS ARE IN METERS, TO GEODETIC DATUM BASED ON DUAL FREQUENCY DIFFERENTIAL CARRIER PHASE GPS OBSERVATIONS TO BCLI AND BCVC ACP STATIONS.

AERIAL IMAGE TAKEN FROM BING MAP © 2018 MICROSOFT CORPORATION © 2018 DIGITALGLOBE © CNES (2018) DISTRIBUTION AIRBUS DS.
NOTES
1. FOR GENERAL NOTES, SEE DRAWING 391747-MMD-00-P0-DR-RW-0001.
2. ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
3. ELEVATIONS ARE IN METERS, TO GEODETIC DATUM BASED ON DUAL FREQUENCY DIFFERENTIAL CARRIER PHASE GPS OBSERVATIONS TO BCLI AND BCVC ACP STATIONS.

SCALE 1:1000

CLIENT:
FWS GROUP OF COMPANIES
275 Commerce Drive
Winnipeg, MB R3P 1B3

PARRISH & HEIMBECKER LTD.
355 Burrard Street
Vancouver, BC V6C 2G8

Suite 1888, Bentall 5
550 Burrard Street
Vancouver, BC, V6C 2B5
Canada
604.681.4400
www.mottmac.com/americas

ENGINEER'S SEAL:

APPROVED:

Coordination:

Engineer Check:

Drawn By:

Designed By:

Title:

Security:

Drawing Number:

Rev:

Status:

Scale at D Size:

Dwg Check:

Drawn:

Date

Rev

Engineer's Seal:

Approved:

Coordination:

Engineer Check:

Drawn By:

Designed By:

Title:

Security:

Drawing Number:

Rev:

Status:

Scale at D Size:

Dwg Check:

Drawn:

Date

Rev

Approved:

Coordination:

Engineer Check:

Drawn By:

Designed By:

Title:

Security:

Drawing Number:

Rev:

Status:

Scale at D Size:

Dwg Check:

Drawn:

Date

Rev

Approved:

Coordination:

Engineer Check:

Drawn By:

Designed By:

Title:

Security:

Drawing Number:

Rev:

Status:

Scale at D Size:

Dwg Check:

Drawn:

Date

Rev

Approved:

Coordination:

Engineer Check:

Drawn By:

Designed By:

Title:

Security:

Drawing Number:

Rev:

Status:

Scale at D Size:

Dwg Check:

Drawn:

Date

Rev

Approved:

Coordination:

Engineer Check:

Drawn By:

Designed By:

Title:

Security:

Drawing Number:

Rev:

Status:

Scale at D Size:

Dwg Check:

Drawn:

Date

Rev

Approved:

Coordination:

Engineer Check:

Drawn By:

Designed By:

Title:

Security:

Drawing Number:

Rev:

Status:

Scale at D Size:

Dwg Check:

Drawn:

Date

Rev

Approved:

Coordination:

Engineer Check:

Drawn By:

Designed By:

Title:

Security:

Drawing Number:

Rev:

Status:

Scale at D Size:

Dwg Check:

Drawn:

Date

Rev

Approved:

Coordination:

Engineer Check:

Drawn By:

Designed By:

Title:

Security:

Copyrighted material may not be copied, photocopied, reproduced, transmitted or translated into any other language or medium without written permission from Mott MacDonald Canada Ltd. This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.
1. FOR GENERAL NOTES, SEE DRAWING 391747-MMD-00-P0-DR-RW-0001.
2. ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
3. ELEVATIONS ARE IN METERS, TO GEODETIC DATUM BASED ON DUAL FREQUENCY DIFFERENTIAL CARRIER PHASE GPS OBSERVATIONS TO BCLI AND BCVC ACP STATIONS.

**LEGEND:**
- PROPERTY BOUNDARY
- PROPOSED TRACK
- EXISTING TRACK
- EXISTING TRACK (TO BE REMOVED)
- UPDATED PROPERTY BOUNDARIES
- LIMIT OF CONSTRUCTION
- PROPOSED FUTURE TRACK
- CLEARANCE POINT
- POTENTIAL PARY EXPANSION AREA

**NOTES:**
- 1:N000
  1:800
  1:500
  1:200
  1:100
  1:50
  1:20

**SCALE:**
- PLAN 1:1000

**Drawn By:**
- G. YANG 2018/04/06
- S. RIDDICK 2018/04/11
- J. SUTCLIFFE 2018/04/13

**Checked By:**
- R. HAY 2018/04/06
- S. RIDDICK 2018/04/11

**Engineer's Seal:**
- YAN84726

**Client:**
- FWS GROUP OF COMPANIES
  - 275 Commerce Drive
  - Winnipeg, MB R3P 1B3

**App'd:**
- A 2018/04/30
- B 2018/05/14
- C 2018/05/28
- D 2018/06/25

**App'd For CN Acceptance:**
- SCR JDS

**G.R.A.I.N. Export Facility**
- BROWNSVILLE, YALE SUBDIVISION M.P. 119.0
- PROPOSED TERMINAL RAIL LAYOUT
- PHASE 2 - SHEET 3 OF 3

**ADDRESS:**
- Suite 1000, Bentall 5
  - 550 Burrard Street
  - Vancouver, BC V6C 2G8
- Suite 1888, Bentall 5
  - 550 Burrard Street
  - Vancouver, BC, V6C 2B5
  - Canada

**Phone:**
- 604.681.4400

**Website:**
- www.mottmac.com/americas
3- ANNEX B

TIME IN MOTION STUDY
Rail Operation Time in Motion Study
Fraser Grain Terminals

May 29, 2018
Rail Operation Time in Motion Study

Fraser Grain Terminals

May 29, 2018
Issue and revision record

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Originator</th>
<th>Checker</th>
<th>Approver</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2018-04-06</td>
<td>C Au</td>
<td>A Wells</td>
<td>S Riddick</td>
<td>Issued for Information</td>
</tr>
<tr>
<td>B</td>
<td>2018-04-13</td>
<td>C Au</td>
<td>A Wells</td>
<td>S Riddick</td>
<td>Re-Issued</td>
</tr>
<tr>
<td>C</td>
<td>2018-05-29</td>
<td>C Au</td>
<td>A Wells</td>
<td>S Riddick</td>
<td>Revised as per VFPA comments</td>
</tr>
</tbody>
</table>

Document reference: 391747-MMD-00-P0-RP-RW-0001

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2 Operating Plan Development</td>
<td>2</td>
</tr>
<tr>
<td>3 Operation Timings</td>
<td>3</td>
</tr>
<tr>
<td>A. Operating Plan</td>
<td>4</td>
</tr>
</tbody>
</table>
1 Introduction

The rail operation servicing the proposed Fraser Grain Terminal (FGT) will consist of an unloading process taking place on a new dedicated loop track and train storage within the existing Port Authority Rail Yard (PARY), adjacent to the terminal.

The PARY will serve multiple operations by Fraser Surrey Docks and the new dedicated FGT loop will share the lead tracks to the loop from the PARY with other on-site operators.

FGT will primarily be served by a rail unloading operation but will also service a smaller rail loading operation. An unloading train will be stored in the PARY and split into multiple strings. Each string will be moved to the unloading facility, unloaded and then stored back in the yard. Once the entire train has been unloaded, it will be reassembled in the yard for departure.

The Time in Motion Study will focus only on the unloading operation of a single unit grain train that will be stored on Tracks 92 and 93 within the PARY. It does not take into account other FSD operations, including, but not limited to, existing JV Facility operations which remain unchanged.
2 Operating Plan Development

Track Layout
Layout of PARY tracks are as per the existing configuration.

Layout of FGT rail loop as per drawing submitted to Port of Vancouver for Permitting and Environmental Review by CMC Engineering 1419-G-05-501 Rev 5.

Track Availability
Within the PARY, the entirety of Tracks 92 and 93 will be available for storage. The unloading loop and leads, the PARY west ladder, central ladder and Track 95 will be available for use but not for storage upon.

Train Configuration
A 112-car train has been assumed for this operation with 60-foot grain cars.

Road power will bring the entire train into the PARY. The Road crew will split the train in 2 and store as 2 strings on Tracks 92 and 93 and then will depart with the road power. Yard crew and power will then split the 2 strings into 8 strings of 14 cars on Tracks 92 and 93 and clear the crossovers. The first string will then be pulled to the dumper to begin the unloading process.

Crewing Assumptions
It has been assumed that there will be a yard rail crew who will be responsible for all train movements and actions within the yard and for any action that includes the use of the locomotive.

There will also be an unloading crew at the dumper who will be responsible for the indexing and unloading the rail cars. The unloading crew will be responsible for applying the handbrakes to the string of cars when the indexer is disengaged.

Timing Parameters
It has been assumed that the train will be set up within the PARY as required prior to the beginning of the unloading process.

The clock will start at the beginning of the unloading process of String 1 and will finish when the final unloaded String 8 has been stored back in the PARY and the train is ready to be put back together for departure.
3 Operation Timings

The unloading operation will only be delayed by the yard operations once, when moving String 5 from the PARY to the unloading facility. It will result in a delay of two minutes to the unloading operation.

The timings were generated using the inputs in Table 1.

**Table 1: Action Inputs**

<table>
<thead>
<tr>
<th>Action</th>
<th>Time/Speed</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partially dump car (stationary)</td>
<td>0:01:24</td>
<td>0:03:00 dumping time provided by FWS</td>
</tr>
<tr>
<td>Finish dumping car while indexing</td>
<td>0:01:36</td>
<td></td>
</tr>
<tr>
<td>Index to next car (no dumping)</td>
<td>0:00:29</td>
<td>Provided by FWS</td>
</tr>
<tr>
<td>Couple cars</td>
<td>0:03:00</td>
<td>Assumed by Mott MacDonald</td>
</tr>
<tr>
<td>Switch flipped</td>
<td>0:00:30</td>
<td>Assumed by Mott MacDonald</td>
</tr>
<tr>
<td>Handbrakes applied or released</td>
<td>0:01:00</td>
<td>Assumed by Mott MacDonald</td>
</tr>
<tr>
<td>Locomotive spots 1st and 2nd car</td>
<td>0:02:00</td>
<td>Assumed by Mott MacDonald</td>
</tr>
<tr>
<td>Coupled Speed</td>
<td>5 mph = 2.24 m/s</td>
<td>Assumed by Mott MacDonald</td>
</tr>
<tr>
<td>Uncoupled Speed</td>
<td>8 mph = 3.58 m/s</td>
<td>Assumed by Mott MacDonald</td>
</tr>
</tbody>
</table>

Table 2 below summarizes the start times that the strings begin unloading. Unloading is completed at 7:06, while the train is ready to be reassembled for departure at 7:22.

**Table 2: Start Time of Strings**

<table>
<thead>
<tr>
<th>String</th>
<th>Start Time (H:MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0:00</td>
</tr>
<tr>
<td>2</td>
<td>0:54</td>
</tr>
<tr>
<td>3</td>
<td>1:48</td>
</tr>
<tr>
<td>4</td>
<td>2:41</td>
</tr>
<tr>
<td>5</td>
<td>3:37</td>
</tr>
<tr>
<td>6</td>
<td>4:31</td>
</tr>
<tr>
<td>7</td>
<td>5:25</td>
</tr>
<tr>
<td>8</td>
<td>6:19</td>
</tr>
</tbody>
</table>

The schematic of the operating plan is included in Appendix A.

Additional times relevant to the overall spotting and pickup of a unit train are as indicated below:

- CN train delivery operations: approx. 45 mins
- Splitting spotted train into 14-car strings and setting up first string for unloading: approx. 1:45 hrs
- Re-assembly of empty strings for CN pickup: approx. 1:00 hr
- CN train removal operations: approx. 1:30 to 2:00 hrs
A. Operating Plan

The following schematic contains the operating plan for rail operations to happen concurrently with the unloading operations 391747-MMD-00-P0-SK-RW-0001 – Proposed Operations.
7 strings of 14 loaded cars are stored on Tracks 92 and 93. One string of 14 loaded cars is indexed into the dumper.

All times rounded to nearest minute

00:00
00:39

Locomotive attaches to String 2 and pulls cars clear of Track 92.
Locomotive pushes string of loaded cars down any clear track until it is clear of Track 95.

00:42

NOTES:
ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS

LEGEND:
- LOADED CARS
- UNLOADED CARS
- LOCOMOTIVE
FGT RAIL TIME IN MOTION STUDY
PROPOSED OPERATIONS

NOTES:
ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS
LEGEND:
- LOADED CARS
- UNLOADED CARS
- LOCOMOTIVE

00:46

Locomotive pulls string of loaded cars to unloading string.
NOTES:

ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS
LEGEND:

- LOADED CARS
- UNLOADED CARS
- LOCOMOTIVE

00:54

Locomotive couples onto String 1 and spots 1st and 2nd cars of String 2 above dumper pit.
01:00

Locomotive uncouples from String 2 and begins pushing unloaded String 1 towards yard.
FGT RAIL TIME IN MOTION STUDY
PROPOSED OPERATIONS

NOTES:
ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS

LEGEND:
- LOADED CARS
- UNLOADED CARS
- LOCOMOTIVE

01:10

Locomotive pushes String 1 of unloaded cars onto Track 93 where String 2 had previously been stored.
FGT RAIL TIME IN MOTION STUDY
PROPOSED OPERATIONS

NOTES:
ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS
LEGEND:
- LOADED CARS
- UNLOADED CARS
- LOCOMOTIVE

Locomotive uncouples from String 1, travels to String 3 and couples on.

01:22
01:33

Locomotive pulls String 3 along Track 95 towards the dumper.
FGT RAIL TIME IN MOTION STUDY
PROPOSED OPERATIONS

NOTES:
ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS

LEGEND:
- LOADED CARS
- UNLOADED CARS
- LOCOMOTIVE

01:48

Locomotive couples onto String 2 and spots 1st and 2nd cars of String 3 above dumper pit.
Locomotive uncouples from String 3 and pushes String 2 back onto Track 93.
02:10

Locomotive uncouples from String 2 and travels to String 4 via Track 95 before coupling on pulling loaded string to dumper.
FGT RAIL TIME IN MOTION STUDY
PROPOSED OPERATIONS

NOTES:
ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS

LEGEND:
- LOADED CARS
- UNLOADED CARS
- LOCOMOTIVE

02:41

Locomotive couples onto String 3 and spots 1st and 2nd cars of String 4 above dumper pit.
Locomotive uncouples from String 4 and pushes String 3 onto Track 93 where String 4 was initially stored.
03:14

Locomotive uncouples from String 3, travels to String 5 and couples on, in order to pull to dumper.
Pause unloading for 00:02 while awaiting for String 5 to arrive.
Locomotive couples onto String 4 and spots 1st and 2nd cars of String 5 above dumper pit.
Locomotive uncouples from String 5 and pushes String 4 along Track 95 onto Track 93.
NOTES:
ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS
LEGEND:
- LOADED CARS
- UNLOADED CARS
- LOCOMOTIVE

Locomotive uncouples from String 4, travels to String 6 and couples on, in order to pull to dumper.
Locomotive couples onto String 5 and spots 1st and 2nd cars of String 6 above dumper pit.

04:31
04:52

Locomotive uncouples from String 6 and pushes String 5 back onto Track 92.
Locomotive uncouples from String 5, travels to String 7, and couples on, in order to pull to dumper.
FGT RAIL TIME IN MOTION STUDY
PROPOSED OPERATIONS

NOTES:
ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS

LEGEND:

LOADED CARS

UNLOADED CARS

LOCOMOTIVE

05:25

Locomotive couples onto String 6 and spots 1st and 2nd cars of String 7 above dumper pit.
Locomotive uncouples from String 7 and pushes String 6 back onto Track 92.
Locomotive uncouples from String 6, travels to String 8 and couples on, in order to pull to dumper.
Locomotive couples onto String 7 and spots 1st and 2nd car of String 8 above dumper pit.

06:19
Locomotive uncouples from String 8 pushes String 7 back onto Track 92.
07:06

Unloading complete.
FGT RAIL TIME IN MOTION STUDY
PROPOSED OPERATIONS

NOTES:
ALL TIMES IN HH:MM
UNIT TRAIN CONSISTING OF 112 CARS

LEGEND:
- LOADED CARS
- UNLOADED CARS
- LOCOMOTIVE

Locomotive pushes String 8 back onto Track 92 and uncouples.
Train is ready to be reassembled for departure.

07:22