

REDACTED VERSION

ACAR26

SYSTEM OPERATING PARAMETERS



Prepared by the Independent Expert, Coal Network Capacity Co.

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Introduction

1.1. Requirements of 2017 Access Undertaking (UT5)

Aurizon Network's 2017 Access Undertaking (UT5) requires a Capacity Assessment to be undertaken for each coal system within the Central Queensland Coal Network, in accordance with *Part 7A: Capacity*.

The Initial Capacity Assessment Report (ICAR), together with its associated System Operating Parameters (SOP), were issued in October 2021.

UT5 specifies the following requirements:

- an Annual Capacity Assessment (ACAR) is required following the ICAR. This assessment determines the Deliverable Network Capacity (DNC), as defined in UT5 *Section 7A.2*.
- Capacity assessments must be based on analysis undertaken using a dynamic simulation model (the Model) of the CQCN
- The SOP documents the assumptions, inputs and methods applied within the Model to determine DNC.

1.2. Definition of Deliverable Network Capacity

The definition of DNC below is extracted from Part 7A.2 of UT5.

7A.2 Definition of Deliverable Network Capacity

- (a) *For the purpose of this Part 7A, Deliverable Network Capacity means the capacity of the rail infrastructure, expressed as the maximum number of train paths (calculated on a Monthly and annual basis) that can be utilised in each coal system (such train paths needing to be useable including in respect of return journeys), and the mainline and each branch line of that coal system, taking into account the operation of that coal system, having regard to:*
- the way in which the relevant coal system operates in practice, including those matters taken into consideration in formulating the System Operating Parameters;*
 - reasonable requirements in respect of planned maintenance and a reasonable estimate of unplanned maintenance, repair, renewal and Expansion activities on the Rail infrastructure;*
 - reasonably foreseeable delays or failures of Rollingstock occurring in the relevant supply chain, both planned delays and failures and a reasonable estimate of unplanned delays and failures;*
 - reasonably foreseeable delays associated with any restrictions (including speed restrictions, dwell times within train services and between train services and other operating restrictions) affecting the Rail infrastructure;*
 - the context in which the rail infrastructure interfaces with other facilities forming part of, or affecting, the relevant supply chain (including loading facilities, load out facilities and coal export terminal facilities);*
 - the need for Aurizon Network to comply with its obligations to provide access to non-coal traffic under access agreements, Passenger Priority Obligation or Preserved Train Path Obligations;*
 - the supply chain operating mode (including at the loading facilities, load out facilities and coal export terminal facilities);*
 - interfaces between the different coal systems; and*
 - the terms of access agreements (including the number of Train Service Entitlements for each origin and destination combination in that coal system) relating to train services operating in that coal system.*

1.3. Addressing Deliverable Network Capacity

The analysis of DNC considers the operation of each coal system, having regard to the factors identified in **Table 1**. The table also identifies the relevant sections of the SOP where these factors are addressed.

Table 1 - Deliverable Network Capacity factors to be considered

UTS Clause 7A.2(a)	Addressed in SOP Section
(i) <i>the way in which the relevant coal system operates in practice, including those matters taken into consideration in formulating the System Operating Parameters</i>	All
(ii) <i>reasonable requirements in respect of planned maintenance and a reasonable estimate of unplanned maintenance, repair, renewal and Expansion activities on the rail infrastructure</i>	Section 8 Below Rail Operations Section 10 System Delays
(iii) <i>reasonably foreseeable delays or failures of Rollingstock occurring in the relevant supply chain, both planned delays and failures and a reasonable estimate of unplanned delays and failures</i>	Section 9 Above Rail Operations Section 10 System Delays
(iv) <i>reasonably foreseeable delays associated with any restrictions (including speed restrictions, dwell times within train services and between train services and other operating restrictions) affecting the rail infrastructure</i>	Section 9 Above Rail Operations Section 10 System Delays
(v) <i>the context in which the rail infrastructure interfaces with other facilities forming part of, or affecting, the relevant supply chain (including loading facilities, load out facilities and coal export terminal facilities)</i>	Section 6 Train Loadouts Section 7 Inloaders
(vi) <i>the need for Aurizon Network to comply with its obligations to provide access to non-coal traffic under access agreements, Passenger Priority Obligation or Preserved Train Path Obligations</i>	Section 11 Non-Coal Traffic
(vii) <i>the supply chain operating mode (including at the loading facilities, load out facilities and coal export terminal facilities)</i>	Section 6 Train Loadouts Section 7 Inloaders Section 8 Below Rail Operations Section 10 System Delays
(viii) <i>interfaces between the different coal systems</i>	Section 4 Rail Infrastructure
(ix) <i>the terms of access agreements (including the number of Train Service Entitlements for each origin and destination combination in that coal system) relating to train services operating in that coal system</i>	Section 5 Demand

1.4. Information and Redaction

To avoid confusion with industry-standard terminology, including references to gross or net values, the names of loading and unloading rates have been expanded to clearly indicate whether parameters include or exclude operational delays.

Where possible, this document has been prepared on an unredacted basis. However, any information within the SOP that is confidential to an access holder, customer or train operator and cannot be disclosed has either been redacted or moved to appendices, which will be redacted prior to publication.

2. System Operating Parameters

The Independent Expert (IE) uses three layers of documentation to record and determine DNC:

- **Model Basis Documents/Detailed Data Analysis**
Internal documentation showing detailed statistical and data analysis and commentary on assumptions used to manage the Model.
- **System Operating Parameters**
An external document issued annually alongside the ACAR, sets out the assumptions on the operation of each element of the coal supply chain and the interfaces.
- **Annual Capacity Assessment Report**
An external report produced annually that details specific capacity values and their impact on the network and each individual coal system. These reports also highlight year-on-year differences in Model inputs and outputs.

This SOP document sets out:

- the definition of DNC
- the methodology applied
- the input parameters used
- the rationale for selecting these when undertaking the ACAR

2.1. Structure of System Operating Parameters

The SOP is structured into the following key areas:

- General assumptions
- Rail infrastructure
- Demand
- Train loadout (TLO) - representing the upstream boundary of the Model
- Below rail operations
- Above rail operations
- Terminal inloader - for both export and domestic users, representing the downstream boundary of the Model
- System delays
- Non-coal traffic

For each area, the parameters influencing the determination of DNC have been analysed. This document explains how the Model addresses each of these parameters.

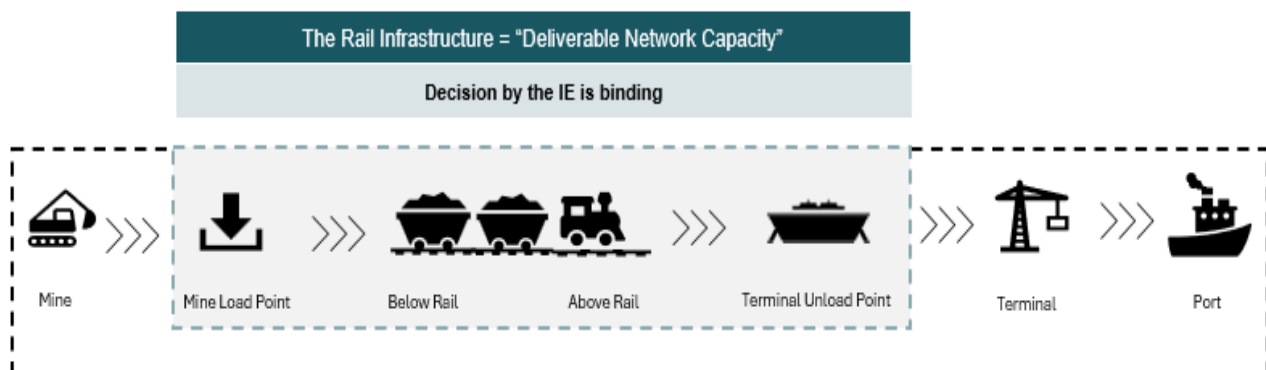
2.2. Model Scope

A Model has been developed using the AnyLogic simulation software to determine the DNC of the CQCN and its individual coal systems.

The scope of the Model aligns with the DNC definition and spans the boundaries between coal flow into wagons at TLOs and coal flow out of wagons at rail receival stations (inloaders).

Within these boundaries, the Model incorporates all components outlined in **Figure 1**.

Figure 1 - Deliverable Network Capacity Boundaries



3. General Assumptions

The Model and SOP are based on several overarching assumptions:

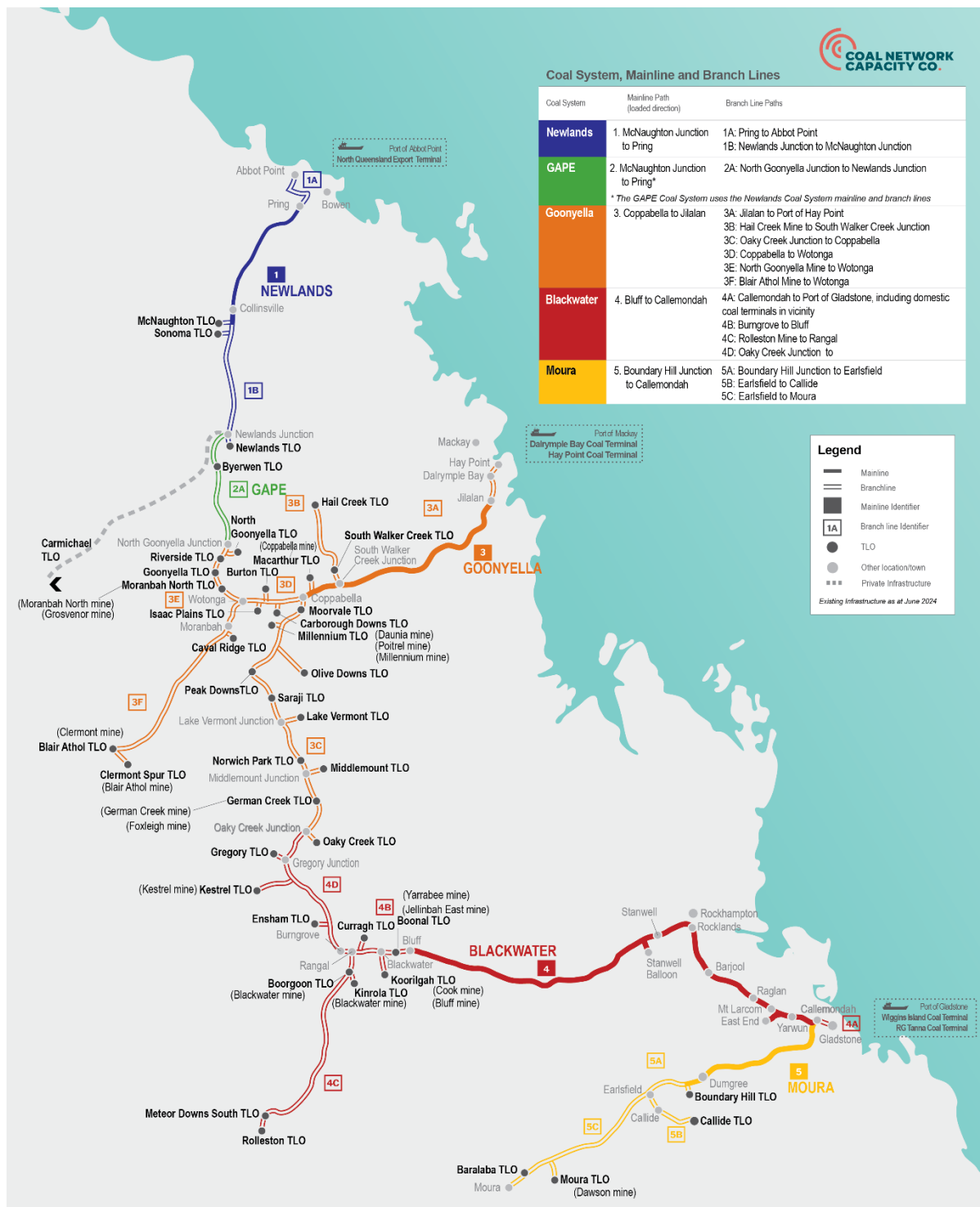
- **Judgement by the IE:** The IE has exercised professional judgement on a wide range of issues in developing SOP assumptions and applying them within the Model. These decisions are highlighted in the relevant SOP sections.
- **Capacity Assessment Period:** Under UT5, each ACAR must assess capacity over a five-year period, or longer if peak contracted capacity is expected beyond five years. Based on the data, the IE has determined that for ACAR26, peak capacity occurs within the five-year period of FY27 to FY31. Accordingly, the capacity assessment period spans 1 July 2026 to 30 June 2031.
- **Train path coverage:** Train Paths include coal for export through terminals, domestic coal users and non-coal traffic.
- **Historical Data Usage:** Unless otherwise stated, the most recent financial year's historical data (July 2024 to June 2025) has been analysed to develop statistical distributions and Model assumptions.
- **Statistical Distributions:** Where statistical distributions are applied as Model inputs, multiple distributions are compared to identify the best fit for historical data. Selection combines quantitative analysis using the Akaike Information Criterion (AIC) and qualitative judgement by the IE.
- **Transitional arrangements:** Approved capital investments or operating practice changes intended to resolve an existing capacity deficit, once implemented by AN or deemed "Prudent and Efficient" by the IE, are included in capacity modelling from their expected completion date. While partial use of the Collinsville passing loop within the Newlands system currently occurs, this has not been considered in ACAR26 (See **section 4.6**).

4. Rail Infrastructure

4.1. Coal Systems

Figure 2 shows the modelled rail infrastructure covering the five coal systems of the CQCN, as defined in UT5. The Newlands System and the GAPE System are not modelled independently of each other as they share common infrastructure.

Figure 2 - Extent of Modelled Rail Infrastructure



The five CQCN coal systems, along with their associated branch lines and mainlines used in the Model to assess the DNC, are outlined in Table 2.

Table 2 - Coal System, Mainline and Branch lines

Coal system	Mainline Path (loaded direction)	Branch Line Paths (including Port Lines)
Newlands	1. McNaughton Junction to Pring	1A: Pring to Abbot Point 1B: Newlands Junction to McNaughton Junction
GAPE	2. McNaughton Junction to Pring*	2A: North Goonyella Junction to Newlands Junction
Goonyella	3. Coppabella to Jilalan	3A: Jilalan to Port of Hay Point 3B: Hail Creek Mine to South Walker Creek Junction 3C: Oaky Creek Junction to Coppabella 3D: Coppabella to Wotonga 3E: North Goonyella Junction to Wotonga 3F: Blair Athol Mine to Wotonga
Blackwater	4. Bluff to Callemondah	4A: Callemondah to Port of Gladstone, including domestic coal terminals in vicinity 4B: Burngrove to Bluff 4C: Rolleston Mine to Rangal 4D: Oaky Creek Junction to Burngrove
Moura	5. Boundary Hill Junction to Callemondah	5A: Boundary Hill Junction to Earlsfield 5B: Earlsfield to Callide 5C: Earlsfield to Moura

*The GAPE System uses the Newlands System Mainline and branch lines.

For ACAR26, the mainline definitions for two coal systems have been extended to include additional track sections:

- Newlands: extending from Collinsville to McNaughton Junction
- Moura: extending from Dumgree to Boundary Hill Junction.

This update ensures that the mainline definition reflects the entire track used by all system traffic. It is a reporting change only and does not affect capacity.

The specific sections of each coal system included in the Model are listed in **Table 3**. Some smaller spur lines connecting TLO's to branch lines or mainlines are included in the Model but may not be explicitly noted in **Table 3**.

Table 3 - Extent of Modelled Rail Infrastructure

Goonyella System	<ul style="list-style-type: none"> • DBCT to Jilalan • HPCT to Jilalan • Jilalan to Coppabella <i>(the Trunk, Goonyella mainline)</i> • Coppabella to Wotonga <i>(the Trunk)</i> • South Walker Junction to Hail Creek mine <i>(the Hail Creek branch)</i> • Coppabella to Oaky Creek Junction <i>(the South Goonyella branch)</i> • Wotonga to North Goonyella <i>(the North Goonyella branch)</i> • Wotonga to Blair Athol <i>(the West Goonyella branch)</i>
Newlands System	<ul style="list-style-type: none"> • NQXT to Kaili • Kaili to Durroburra <i>(North Coast Line)</i> • Durroburra to Pring • Pring to McNaughton Junction <i>(Newlands mainline)</i> • McNaughton Junction to Newlands Junction

GAPE System	<ul style="list-style-type: none"> Newlands Junction to North Goonyella Junction <i>(the Goonyella-Newlands connection)</i>
Blackwater System	<ul style="list-style-type: none"> Oaky Creek to Burngrove <i>(Gregory branch)</i> Rolleston to Rangal <i>(Bauhinia branch)</i> Burngrove to Rangal to Bluff Bluff to Rocklands <i>(Blackwater mainline)</i> Rocklands to Aldoga <i>(North Coast Line)</i> Aldoga to WICET Aldoga to Callemondah <i>(North Coast Line)</i> Callemondah to RGCT Callemondah to NRG (Gladstone Powerhouse) Mt Miller to RTA Yarwun and Fisherman's Landing East End Junction to East End Balloon Loop
Moura System	<ul style="list-style-type: none"> Callemondah to South Gladstone to QAL <i>(Moura Short Line)</i> Callemondah to Boundary Hill Junction <i>(Moura mainline)</i> Boundary Hill Junction to Earlsfield Earlsfield to Callide Earlsfield to Baralaba

For ACAR26, track section lengths within the Model were comprehensively reviewed and selectively updated to improve Model calibration and simulation accuracy, and to better align with actual CQCN network conditions. While individual section lengths are not required to be exact, the Model targets the combined length of grouped sections to be within $\pm 2\%$ of real-world values. Track section lengths primarily affect the Model's application of delays, but do not directly determine journey times, which are governed by Sectional Run Times (SRTs).

Of the 542 modelled track sections, 123 sections, (approximately 23%) were updated, resulting in a net increase of 17.4 km in total modelled track length. Material changes occurred in the following locations:

- Blackwater Port Precinct: +65% (+6.85 km)
- Moura Port Precinct: +18% (+1.9 km)
- Newlands Main Line: +5% (+3.3 km)

4.2. Private Infrastructure

DNC is determined based on rail infrastructure as defined in UT5. While private infrastructure is not part of this definition, it is included in the Model to simulate interface points within the rail network.

The Model considers all private infrastructure for coal and non-coal traffic as detailed in **Appendix D: Modelled Rail Infrastructure for Private Infrastructure**.

Boundary locations where modelled non-coal traffic may enter the CQCN include:

- Newlands-GAPE System: Kaili, Durroburra
- Goonyella System: Yukan, Mt McLaren
- Blackwater System: Rocklands, Nogo, Parana
- Moura System: N/A

4.3. Electrification

Much of the CQCN is electrified and supports electric train operations. Sections that are not electrified, and therefore limited to diesel train operations, are as follows:

- Newlands-GAPE System - entirely unelectrified, including:
 - the Goonyella-Newlands connection
 - the Carmichael branch line
- Goonyella System:
 - Wotonga angle, allowing West Goonyella branch line trains to turn onto the North Goonyella branch line
 - Blair Athol mine at Clermont Spur TLO
- Blackwater System:
 - Mt Miller to RTA Yarwun and Fisherman’s Landing
 - QAL siding
 - Meteor Downs South balloon loop
- Moura System – entirely unelectrified

4.4. Signalling

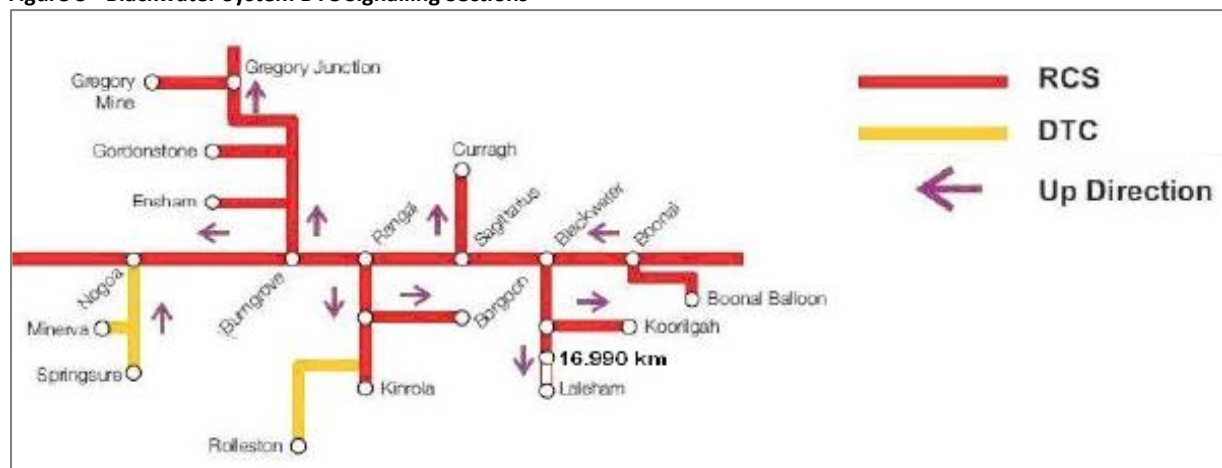
With the implementation of Remote Control Signalling (RCS) in the Newlands system in July 2024 the vast majority of the CQCN now uses RCS. Two minor sections however still use Direct Train Control (DTC) signalling. These sections in the Blackwater and Moura systems are shown in the diagrams below.

The Model considers the signalling systems and infrastructure installed across the network; however, it does not represent all signalling elements in detail. Instead, it uses a simplified representation of signals to reflect operational constraints at a high level.

Blackwater System

The Blackwater System has RCS installed for the passage of coal trains throughout except for the section of the Bauhinia Branch from the Kenmare passing loop to the Rolleston mine where DTC Directional Running operates (note coal services no longer utilize the Springsure branch).

Figure 3 - Blackwater System DTC Signalling Sections

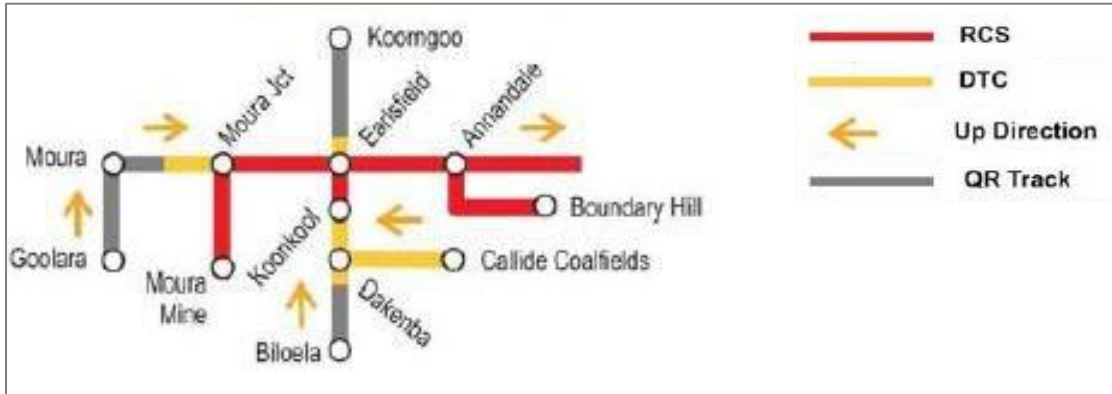


SOURCE: Aurizon Network Report: Blackwater System Information Pack – Issue 7.0 March 2017

Moura System

The Moura System is RCS except for DTC on the Dakenba branch (to Callide) and DTC-MLPI west of Moura mine junction to Baralaba.

Figure 4 - Moura System Signalling



SOURCE: Aurizon Network Report: Moura System Information Pack – Issue 7.0 March 2017

4.4.1. Remote Control Signalling (RCS)

Rail traffic movements are regulated by signals controlled remotely and/or automatically triggered by the passage of trains. Only one train movement is permitted on a signalled section at any given time. This is the default mode of operation in the Model.

4.4.2. Direct Train Control (DTC) signalling

Under DTC signalling, train movements are governed by instructions contained in DTC authorities issued by the AN network control officer to train crews. These authorities grant possession of specific track blocks. When trains cross at passing loops under DTC, additional delays occur beyond the time the first train waits for the second train to pass. Remaining instances of DTC signalling in the CQCN are described as “Directional Running”, where, passing loop turnouts are configured with trailable facing points, allowing trains to pass without manual turnout operation by train crews.

When trains cross at passing loops, additional delays apply beyond Sectional Running Times (SRT) and stop/start durations:

- First train: Stops and incurs a 10 minute delay.
- Second train: Stops, and incurs a 10 minute delay, then departs.
- First train after crossing: Waits an additional six minutes before departing.

4.5. Rail Depots

The modelled rail depots are listed in **Table 4**.

Table 4 - Modelled Rail Depots

Coal systems	Modelled Depots
Newlands-GAPE	Pring, BRC (adjacent to Abbot Point)
Goonyella	Jilalan, Nebo
Blackwater, Moura	Callemondah

Depots are modelled at a macro rather than a detailed micro level. AN's line diagrams identify depot roads as follows:

- Red roads: owned and operated by AN
- Blue roads: owned by Aurizon Operations (AO)
- Yellow roads: owned by other above rail operators

Major wagon and locomotive maintenance occur on the blue and yellow roads.

From a modelling perspective, the Model assumes depot functions as:

- Queueing roads for loaded trains awaiting an inloader and empty trains awaiting dispatch
- Locations where trains may be provisioned, examined, or undergo crew changes

Data provided by above rail operators on provisioning cycles, time required for provisioning, crew change timing within depots, and unit train maintenance for each consist type inform the Model assumptions.

Regularly scheduled break-up, shunting and reconstitution of consists from network track to private maintenance facilities are modelled as block change outs (see **Section 9.2.1 - Planned Maintenance** for details).

The number of roads modelled at each rail depot are listed in **Table 5**.

Table 5 - Number of roads at each rail depot

Rail Depot	Number of Roads
Pring	6
BRC	3
Jilalan	15
Nebo	3
Callemondah	12

At Callemondah, the Model does not differentiate between arrival roads and departure roads. All roads are pooled and can be used for queueing either loaded or empty trains. The Powerhouse roads are treated as separate from the depot. Restrictions on the number of trains that can be provisioned or maintained simultaneously are used to replicate the limitations imposed by the available arrival and departure roads.

4.6. Location Specific Features

The following location specific features are incorporated into the Model:

1. **Collinsville passing loop:** Pring-based trains are currently too long to use the Collinsville passing loop, so this loop has been temporarily removed from the network. Trains instead cross at Birralea or between Briaba and Almoola sections. While shorter trains including BRC trains can use Collinsville, this is not modelled.



■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

6. **Removed passing loops:** the following are removed from the network definition as they are not used by coal trains:

- a. Mt Larcom (not used for coal traffic)
- b. Bajool (used for equipment storage)

7. **South Gladstone to Barney Point:** The track is excluded from the Model

8. **North Coast line:** Not all the sections are included in the Model

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

■ [REDACTED]

11. **Bowen Rail Company (BRC) Operations:** From January 2025, BRC consists can use the Collinsville passing loop. Aurizon Network schedules a crossing at Collinsville in the ITP whenever at least one train is a BRC service. In these cases, BRC trains occupy the scheduled dwell, while non-BRC trains remain on the mainline. The IE has chosen not to include this change because the current Model logic does not support operator-specific functionality for loop usage. This limitation may be resolved if the proposed Transitional Arrangement to extend the loop is implemented, enabling all operators to use the loop.

4.7. Sectional Running Times, Acceleration and Deceleration Delays

Sectional Running Times (SRTs) represent the time required for an empty or loaded train to traverse each track section.

AN's standard SRT assumptions - used primarily for scheduling of trains - are based on a standard uninterrupted run ("pass to pass") time that is amended using system-specific acceleration and/or deceleration offset times to produce anticipated section times for the different train movement scenarios:

- Pass to pass
- Pass to stop
- Start to pass
- Start to stop

The Model does not directly apply the four AN SRT movement types. Instead, it:

- Uses the pass to pass SRT as the underlying base SRT for each section, and
- Applies explicit acceleration and deceleration delays within the Model when trains are required to stop and/or restart during their journey.

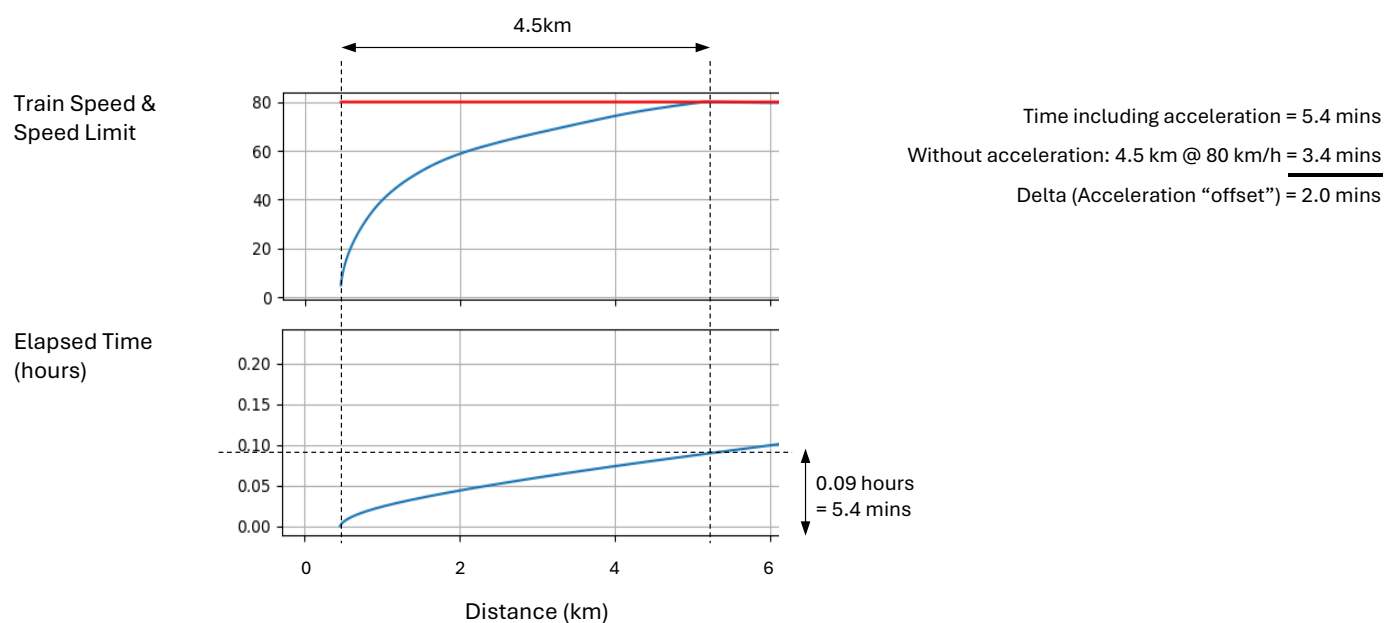
Note: acceleration and deceleration delays are not the time required for a train to accelerate or decelerate but represent the **extra** time required for that operation beyond the normal time to run through the section at normal line speed.

This approach requires the IE to derive the implied acceleration and deceleration delay times inherent in AN’s movement-based SRTs. An illustrative example of this interpretation is provided in **Table 6**.

Table 6 - Example Model Interpretation of AN’s SRTs (Goonyella System)

Movement Type:	Pass to Pass	Pass to Stop	Start to Pass	Start to Stop
AN SRTs (minutes):	13	17	18	22
Model Interpretation:	Base SRT	SRT + stop delay	SRT + start delay	SRT + start + stop
Base SRT (Pass to Pass) (minutes):	13 (Model input)	13	13	13
Start/Stop Delays (minutes):	-	+4 Implied Deceleration (Model input)	+5 Implied Acceleration (Model input)	+9 Implied Acceleration and Deceleration

Other data has raised questions regarding the appropriateness of the acceleration and deceleration implied by AN’s SRTs. For example, the IE has received a sample of data showing that a fully-loaded Goonyella train accelerates from rest on level ground in approximately 5.4 minutes. This is just 2 mins longer than the time taken for the same train to traverse an equivalent distance at line speed (80 km/h), suggesting that a 2 minute acceleration offset may be a more appropriate assumption.



In the light of this information, AN’s standard acceleration/deceleration delays in the Goonyella system appear very conservative (with other systems also displaying various levels of uncertainty). Given the potential disparity, for ACAR26, CNCC sought to evaluate train movement data to adopt a first principles approach to determining:

- The underlying base SRT (pass to pass), and
- The associated acceleration and deceleration delays

Despite intense examination during the ACAR26 process, material differences were identified between AN’s SRT data and observed train performance, primarily the implied acceleration and deceleration delay components.

As this issue could not be resolved within the ACAR26 timetable, SRTs and acceleration/deceleration delays were largely retained from ACAR25, with the following adjustments:

- Changes were made to SRTs in the Callemondah precinct of the Blackwater system to correct track sections that had not been allocated a run time previously
- Changes were made in the vicinity of Abbot Point to better align with run times in track sections adjacent to

the BRC yard

- Modification of acceleration and deceleration delays within port precincts, mine balloon loops and yards to reflect the slower travel speeds through these sections

This remains a material issue for the appropriate determination of capacity in the CQCN and its resolution remains a high priority topic for the IE.

Coal traffic SRTs are provided in **Appendix A: Sectional Running Times**. The stopping and starting delay values applied by the Model for each system are summarised in **Table 7** below.

Table 7 - Stopping and starting delays by coal system

System	ACAR25		ACAR26			
	Start delay (mins)	Stop delay (mins)	Mainline & Branch Lines		Port Precinct, Mine Balloon Loops, Yards	
			Start delay (Acceleration) (mins)	Stop delay (Deceleration) (mins)	Start delay (Acceleration) (mins)	Stop delay (Deceleration) (mins)
Newlands-GAPE	4	2	4	2	1	1
Goonyella	5	4	5	4	1	1
Blackwater	2	3	2	3	1	1
Moura	2	3	2	3	1	1

Non-coal traffic SRT's are provided in **Section 11: Non-Coal Traffic** and **Appendix A: Sectional Running Times**.

5. Demand

5.1. Measurement of Demand

DNC is measured in train paths.

The Model considers demand as a primary driver for train services, representing requests for coal delivery from mines to terminals and domestic users, as well as non-coal traffic. The Model uses Train Service Entitlements (TSEs) as the input for demand, with two TSEs required for each coal service (reflecting the empty and loaded journeys).

Under UT5, the ACAR must be based on a DNC analysis linked to “the extent to which the Deliverable Network Capacity can deliver the committed capacity”. Committed capacity refers to the portion of capacity required to meet TSE’s, renewal obligations, preserved path obligations, and access rights where AN has contractually committed to an expansion or customer specific branch lines.

Consistent with UT5, demand is determined by the aggregate of users’ access agreements. Committed capacity forms the base demand profile against which DNC is assessed. If necessary, demand for all committed capacity is scaled up linearly (i.e. equally for all users) until the Network’s DNC is reached. This assessment is performed at a coal system level.

Demand data for the DNC analysis is based on AN contractual capacity as at December 2025, representing contracted TSEs per 30-day month through and beyond the FY27 to FY31 capacity assessment period. Where access agreements include renewal rights during this period, contracted TSEs per month are extended to June 2031 based on the location and capacity level of the final month of the existing contract.

5.2. Model Implementation of Demand

To simulate demand for train services, the Model generates a list of rail “jobs” for each system, covering all destinations in that system. Each rail job represents one or more train orders for a specific origin/destination pair and includes a timestamp indicating when it becomes available for processing. Destinations may include coal terminals, domestic users, and non-coal traffic exits.

The input for demand is based on the contracted TSEs, expressed as per 30-day month. These values are scaled and adjusted for the number of days in each month using the formula:

$$\text{Monthly Demand TSEs} = 2 \times \text{round} \left(\frac{\text{Contract TSEs per 30 day month} \times \text{days in month}}{2 \times 30} \right)$$

The Model determines rail job priority using one of two methods, depending on the operating mode of the destination terminal.

5.2.1. Even Railings:

- Applies to NQXT, HPCT, RGTCT, WICET, domestic users, and non-coal traffic destinations.
- The list of rail jobs involve single train cycle orders.
- Priority is based on the percentage of contract satisfaction up to that point in the list.
- Rail jobs are available for railing at any time within the month. This approach maintains the intended even railing pattern through prioritisation while allowing flexibility to use sprint capacity during certain periods to offset maintenance impacts elsewhere in the month.

5.2.2. Campaign Railings (including variable cargo assembly):

- Applies to terminals requiring cargo assembly (currently DBCT).

- Without modelling the terminal's internal operation, a dynamic Ship Arrival Table (SAT) is generated from expected tonnes per mine/terminal contract, considering light loading and historical cargo sizes.
- Rail jobs are created for each shipping cargo by dividing parcels by expected payload to determine train paths. The final parcel each month is adjusted to match contracted TSE's.

In systems where both methods apply (currently the Goonyella System), rail jobs are assigned across six-day periods within each month. This period allows five days from first train dispatch to last train dispatch and one day for the final train to return to the terminal. The two methods are merged and sequenced by priority to ensure a balanced treatment across terminal and railing modes.

When testing the network's ability to meet committed capacity, any pending rail jobs at month-end (i.e., trains not dispatched) are removed and cannot be railed later. Jobs are considered completed if the train is dispatched within the month.

5.3. Cross-System Traffic

Cross-system traffic is incorporated into both the Model and the demand profile. Cross-system traffic refers to any train service originating in one coal system and delivering to a destination in a different coal system. Under UT5, GAPE System train services are not classified as cross-system traffic.

Currently, only a small number of contractual cross-system origin-destination routes operate between the Blackwater and Goonyella systems.

6. Train Load Outs

6.1. Overview

The upstream boundaries of the Model are the TLO facilities at each mine, including their associated balloon loops. Coal enters the Model at these facilities and is assumed to be always available, subject to load point constraints.

In the Model, the time trains spend in balloon loops is determined by several factors related to TLO operations, including:

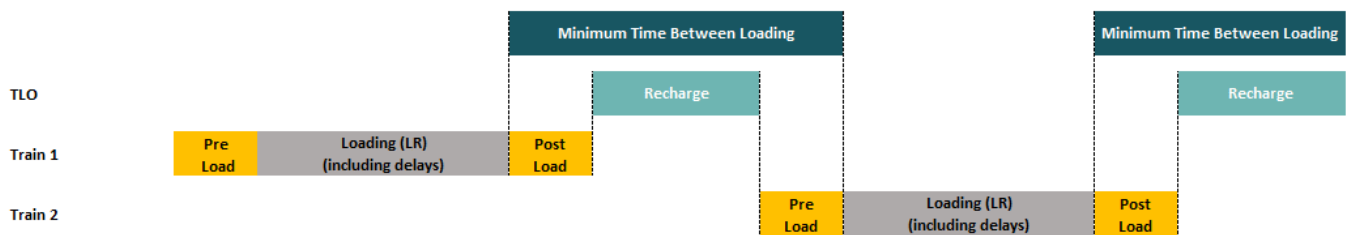
- Access to the TLO facility, regulated by:
 - how many trains the balloon loop can hold (see **Section 6.2 - Balloon Loop Capacities**), which determines whether trains queue in the balloon loop or on the network.
 - the availability of the TLO itself, accounting for planned maintenance (see **Section 6.3 - TLO Availability**).
- The duration that each train spends at the TLO, influenced by:
 - pre and post-load activities
 - train payloads (see **Section 6.4 - Payloads**)
 - equipment Loading Rates (LR), including unplanned delays to both the loading equipment and the operations immediately beyond the TLO (see **Section 6.5 - TLO Load Rates (Including Unplanned Delays)**)
 - minimum separation time between consecutive loadings including the time required for loading equipment to reset and prepare for the next job (i.e. recharge).
- Cycle-related activities such as crew changes, where applicable.
- The time trains spend waiting to re-enter the network, which depends on local network traffic conditions.

The sequence of events within the Model that a train follows on arrival at a TLO is summarised below, and illustrated in **Figure 5**:

- **TLO readiness:** The TLO becomes available after the minimum separation time following the previous train's loading (see **Appendix F: Train Loadout Parameters**).
- **Train readiness:** A pre-load delay occurs before loading begins and can occur in parallel with the minimum time between loading. Previous ACAR assessments applied a standard seven-minute delay for all TLOs. For ACAR26, CNCC adopted a data-driven approach using statistical analysis to determine pre-load delays for each TLO, reflecting observed operational variability (see **Appendix F: Train Loadout Parameters**).
- **Loading:** The train is loaded by the TLO. Loading duration is calculated by dividing the sampled payload by the sampled load rate, with both values drawn from their respective distributions.
- **Post-load activities:** After loading, two activities occur in parallel:
 - the train waits a post-load delay (eight minutes) before moving out of the balloon loop.
 - the TLO begins its minimum separation time in preparation for the next train.

The time a train spends waiting to re-enter the network is determined dynamically by the Model based on prevailing local network traffic conditions and the Model's track booking logic.

Figure 5 - TLO Train Loading Chart



6.2. Balloon Loop Capacities

Balloon loop configurations differ across mines, influencing how trains queue for TLO access. **Figure 6** illustrates a typical balloon loop arrangement.

Figure 6 - Generic Balloon Loop Layout



The CQCN includes the following balloon loop configurations:

- At some mines, trains must queue on the network if the TLO is occupied and wait until the loading train exits the balloon loop.
- Certain mines can accept an empty train into the balloon loop while the loaded train remains inside, but only after loading has been completed.
- Others allow the next train to enter the balloon loop while the previous train is still loading.
- Some mines can queue multiple trains within the balloon loop before the loaded train exits.

In all cases, the loaded train must vacate the loaded track and exit the balloon loop before the next train can begin loading.

The maximum number of trains per balloon loop used by the Model is detailed in **Appendix F1 TLO Balloon Loop Capacities (Model Inputs)**. For TLOs that can hold one full train while another is loading, the Model represents this as a two-train capacity. Loop capacity is determined not only by physical dimensions, but also by signalling locations and AN's operating practices.

6.3. TLO Availability

The availability of TLO facilities can be limited by maintenance activities on the loading system.

As in previous years, CNCC did not seek maintenance plans directly from producers due to variability in the availability of long-term maintenance schedules. Instead, CNCC relied on examination of historical maintenance records.

For ACAR26, CNCC has applied the same approach as ACAR25, incorporating a small number of longer shutdowns (greater than 48 hours) outside network closures and a program of regular periodic maintenance at each TLO. Expected TLO maintenance hours for are ~4,800 hours across the CQCN.

In the Model, shorter planned maintenance events were applied independently of integrated closures at regular intervals, with equal duration for each occurrence. To avoid unrealistic alignment of maintenance events across TLOs, a random time offset was applied to the first event at each mine. Maintenance times were then reviewed to ensure that they did not coincide with integrated closure events.

For TLOs with no planned maintenance, the Model assumes maintenance occurs only during integrated closures, with no additional downtime outside those events.

6.4. Payloads

Consistent with previous years, payload parameters are derived from an analysis of data provided by above rail operators. This analysis uses payload values supplied on a per train service basis, regardless of cause (empty wagons/part-loaded wagons/low-density coal). Changes to the payload assumptions are only considered where comparative analysis indicates a variation greater than 5% from last year's assessment.

Payload data was assessed to determine:

- full payload
- light payload (all causes)
- probability of a light load event

Within the Model, each time a train arrives at a TLO, a test determines whether the payload will be a full load or a light load. The payload is then sampled from the corresponding distribution. The Model does not link payload with causal factors (e.g. late arrival), but simply by correlation to overall payload data for that TLO-system combination.

Light payloads are defined as values below a specified threshold for each system, with adjustments for routes to restricted loading or unloading locations. Probability distributions are fitted for each TLO on a system-by-system basis (i.e. a single TLO serving two different systems will have separate payload profiles). Where insufficient data exists to establish a statistically reliable sample size, prior-year payload distributions are used.

For ACAR26 the payload analysis indicates a largely stable full-payload profile across systems, together with an overall improvement in both the likelihood and severity of light load outcomes compared to ACAR25:

- Full payload:
 - Outcomes remain broadly consistent with ACAR25
 - Variances in expected full payloads were minimal, remaining within one to two percent of prior year values.
 - Given the low level of change, no changes were made to full payload distribution assumptions.
- Light payload:
 - Updated best fit probability distribution parameters were applied to 30 of the 53 TLO destination combinations assessed, with most exhibiting improved expected light load payload values for all systems.
 - The probability of light load events varied by more than 5% for 45 TLO destination combinations, with the majority experiencing a reduced likelihood of light loading. Improvements were observed across all systems except for Newlands and GAPE systems which deteriorated.

Table 8 summarises the relevant light loading thresholds per system.

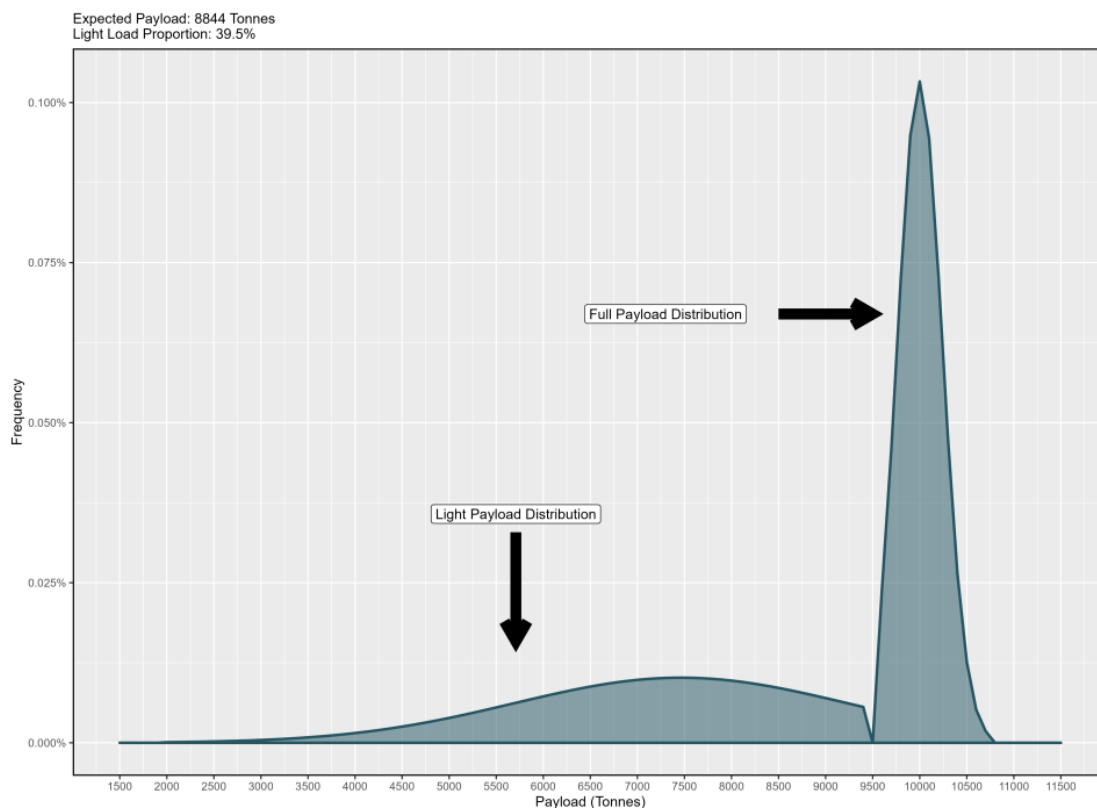
Table 8 - Light Loading Thresholds by Coal System

System	Light Load Threshold (tonnes)	ACAR25	ACAR26
		Chance of Light Load (%)	Chance of Light Load (%)
Newlands-GAPE	6,000	11.8%	13.4%
Goonyella	9,500	21.4%	19.3%
Blackwater	7,000	7.9%	7.9%
Moura ¹	7,000	25.0%	16.1%
Moura short trains			
Moura - 58 wagon train	4,500		■
Moura - 70 wagon train	5,100		■

¹ The reduction in Moura light load probability from ACAR25 reflects the removal of short train tonnes that were previously included in the system calculation.

An example of a payload histogram and fitted distribution for an unidentified TLO is shown in **Figure 7**.

Figure 7 - Example of a Distribution Fitted to Historical Full Payload and Light Payload for a Goonyella System TLO



6.5. TLO Load Rates (Including Unplanned Delays)

Consistent with the approach for payload parameters, TLO load rates are derived from data provided by above rail operators (noting that not all operators record this information). Changes to current model assumptions are only considered where the statistical analysis indicates differences greater than 5% in expected values compared to prior year performance. The LR captures any delays that occur during loading, removing the need to explicitly model specific delay events on loading of trains. This does not capture any delays to the start of loading.

The LR for each TLO was calculated by dividing actual payload by the difference between start and end loading times,

as shown in the formulas below:

$$\text{Load Time} = \text{Loading Complete} - \text{Loading Commence}$$

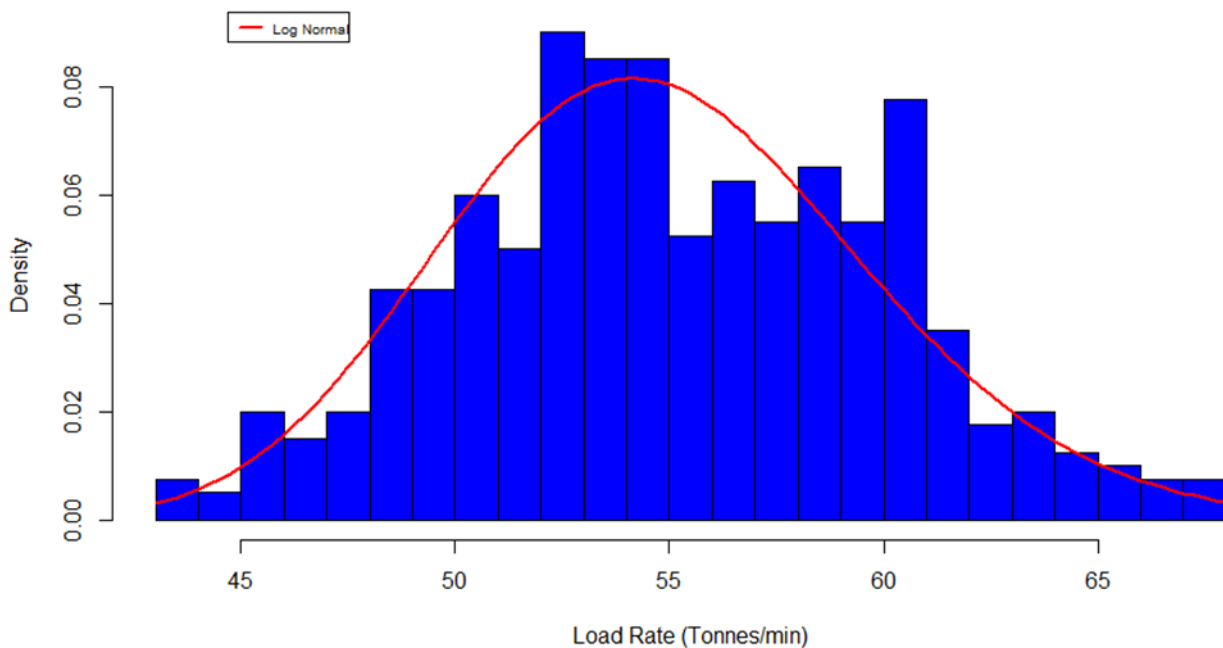
$$\text{Load Rate (including unplanned delays)} = \frac{\text{Train Payload}}{\text{Load Time}}$$

The data for each TLO was fitted to statistical probability distributions. For ACAR26, a change to the “best fit” distribution type was observed for nine TLOs where the probability parameters were updated. Observations on the expected load rate performance based on the FY25 data resulted in:

- 33 TLOs LR remained within 5% of the expected value in ACAR25 and were not altered
- 9 TLOs LR varied by more than 5% of the expected value in ACAR25 and load rate distributions were updated

An example of a LR histogram and fitted distribution for an anonymized TLO is shown in **Figure 8**.

Figure 8 - Example LR Histogram and Fitted Distribution for a Single TLO



Appendix F: Train Loadout Parameters includes detailed data for each modelled TLO, covering load time, load rate (including unplanned delays), planned maintenance outside ICs, light loading assumptions, and pre and post load times.

7. Inloaders

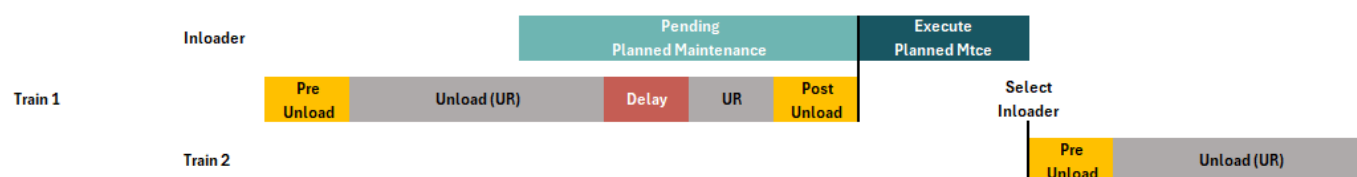
7.1. Overview

The downstream boundaries of the Model are the inloaders located at each export terminal and domestic user facility. Coal exits the Model at these facilities. To model the time that trains spend in the unloading balloon loops, the following components and conditions are captured:

- The availability of the inloaders, accounting for planned maintenance
- The duration that trains spend at the inloaders, allowing for:
 - pre and post unload activities
 - train payloads
 - equipment Unloading Rates (UR) (excluding unplanned delays)
 - delays caused by unloading equipment or downstream operations beyond the inloader
- Availability of network infrastructure for trains to depart the inloaders and return to maintenance or dispatch locations.

The modelled sequence of unloading activities is illustrated in **Figure 9**.

Figure 9 - Gantt Chart for Unloading of Trains



At terminals with multiple inloaders, loaded trains queue until an inloader becomes available. Allocation follows a first-come, first-served basis. Once assigned, the train:

- Moves to the inloader and waits for the pre-unload delay
- Begins unloading its payload at a sampled unload rate
- Completes unloading, waits for the post-unload delay, and prepares to depart. The train may need to wait for network availability before leaving the inloader departure track.

After post-unload completion, the inloader becomes available for the next train, or planned maintenance. However, unloading cannot commence until the departure track is clear.

Terminals provide detailed unscheduled delay data, enabling direct calculation of unscheduled delay length and frequency without assumptions beyond the inloader. These are modelled as failure events based on operating time that represent the unplanned delays in the unloading process (see **Section 7.3 - Inloader Availability**).

Historically, RGTCT applied operating practices and restrictions that reduce the flexibility of inloaders to serve all mines. In consultation with the terminal, and on the basis that mines have alternative (albeit limited) stockpile locations, these restrictions were removed from the Model in ACAR25. The IE's approach to RGTCT restrictions remain unchanged for ACAR26.

7.2. Inloading Loop Capacities

Each inloader balloon loop is assumed to possess one arrival track and one departure track, both utilised during the unloading process. Each loop can accommodate only one train at a time, [REDACTED] (see **Section 4.6 - Location Specific Features**).

7.3. Inloader Availability

Terminal inloader availability is constrained by planned maintenance of the inloading system, and unplanned outages during operating time. For terminals with multiple inloaders, the Model treats each inloader independently.

7.3.1. Planned Maintenance

Although planned outages for a coal system are often aligned, historical data indicates that planned terminal maintenance frequently occurs outside AN's full system shutdowns.

In consultation with the terminal operators and/or owners, a forward view of anticipated maintenance activities was reviewed. Planned terminal maintenance was compared against the planned track integrated closures to determine the extent of maintenance work occurring outside of closure events. Where possible, inloader maintenance event start dates were adjusted to maximise alignment with integrated closure periods (or if not possible, other planned maintenance such as branch line shuts), however inloader outages may still:

- Occur entirely within the track closures
- Overlap with the track closure (start earlier or ending later)
- Fall outside the track closure.

These adjustments were made in consultation with terminals to allow refinement of maintenance plans as demand increases, helping to mitigate potential impacts on coal throughput.

For ACAR26, the shutdown profile for inloaders (i.e. timing and distribution of shutdowns rather than exact hours) remains consistent with previous ACARs across all terminals. However, the following key observations apply:

- [REDACTED]
- [REDACTED]
- **NQXT:** The IE has moved the Newlands-GAPE integrated closure from March 2027 to April 2027 to align with the long inloader shutdown advised by NQXT, on the expectation that Aurizon Network will consider a corresponding realignment of its network shutdown.

When an inloader undergoes planned maintenance, it is unavailable for arriving trains. If a train is unloading when maintenance is scheduled to start, the unloading process is completed before maintenance begins (see Figure 9).

7.3.2. Unplanned Maintenance

Unplanned outages are modelled as randomised delay events during unloading, where the train occupies the inloader but unloading ceases. Delays are applied using Time-to-Failure (TTF) and Time-to-Repair (TTR) parameters sampled from distributions derived from historical unloading data provided by terminals.

Historical unloading events overlapping with other delays were excluded from analysis. Remaining data informed TTF and TTR parameters for each terminal inloader.

Unplanned maintenance distributions for all terminals have been updated using FY25 operational data provided by the terminals. Notably, unplanned events [REDACTED] The terminal has indicated that this rise is due to reliability issues with automated unloading equipment, which are impacting product handling.

7.3.3. Pre and Post Unload Delays

In previous ACARs, a general assumption was made of 7 minutes for pre-load delay and 8 minutes for post-load delay

except where specifically advised by a terminal operator. For ACAR26 the IE has opted to use terminal data, supplemented by above rail operator data where reliable terminal information is unavailable, to evaluate pre and post unload durations. As a result, these durations have been adjusted for certain terminals.

In the case [REDACTED] the IE has retained the ACAR25 assumptions of 7 and 8 minutes respectively because the model is not able to allow the pre unload delay of a second train to occur in parallel with the post unload day of a first train which the terminal advises is able to be accomplished in practice.

7.4. Inloader Unload Rates

Train unloading data was provided by coal terminals and above rail operators for the financial year 2025. The dataset included unload and unplanned delay information.

The unload rate for each Inloader was calculated by dividing actual payload by the unload time using the start and end unloading times, as shown in the formulas below:

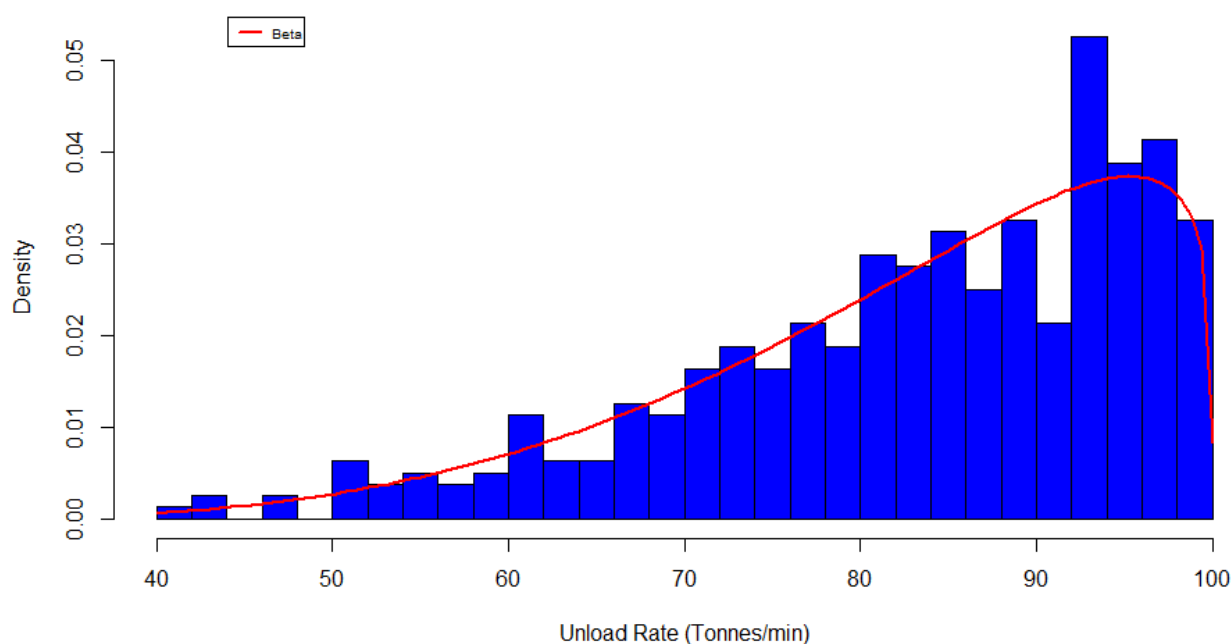
$$\text{Unload Rate (excluding unplanned delays)} = \frac{\text{Train Payload}}{\text{Unload Time}}$$

Each inloader’s unload rate (UR) was fitted to probability distributions, which are applied in the Model.

Figure 10 illustrates a typical spread of URs. Most unload jobs occur at rates close to equipment capability, with variability influenced by downstream activities and train load specific attributions (e.g. sticky coal vs free-flowing coal).

For ACAR26, unload rate distributions (excluding delays) for all terminals have been updated using FY25 operational data. Rates have slightly decreased across most terminals because the minimum cutoff was lowered to reflect the operational variability and slower unload times observed in the data. In response to stakeholder feedback an adjustment was made to IL unload rates at one terminal to address the impacts of wet weather events by examining a longer period of IL performance.

Figure 10 - Example Terminal Unload Rate Distribution



7.5. Inloader Data

Appendix G: Inloader Parameters provides the data used in the Model for each inloader, including unload time, UR, planned maintenance outside FSS, time at terminal and pre and post unload durations.

8. Below Rail Operations

This section describes how the Model reflects the way in which the coal systems operate in practice. The Model does not replicate all real-world processes step by step (e.g., it does not generate a train plan). Instead, it simulates the outcomes of operational planning and execution as they occur in practice.

8.1. Pathing

Train operations on AN's mainlines are coordinated through a published pathing schedule, which applies clockface departure times and dispatch separation intervals for train movements.

ACAR26 continues the approach adopted in ACAR25 where the Model applies clockface paths for empty-leg dispatch but does not enforce clockface departures for loaded travel from mines to terminals. Instead, the Model uses its internal logic to determine when a path is available for a train to depart the mine.

Table 9 – Train Dispatch Frequencies

Coal system	Mainline Path	Clock Face Adherence	Separation (minutes)
Newlands-GAPE	ex Pring, empty	Yes	45
	ex McNaughton Junction, loaded	No	Determined by model logic
Goonyella	ex Jilalan, empty	Yes	20
	ex Coppabella, loaded	No	Determined by model logic
Blackwater	ex Callemondah, empty	Yes	15
	ex Kabra, empty	Yes	
	ex Bluff, loaded	No	Determined by model logic
	ex Rocklands, loaded	No	
Moura	ex Callemondah, empty	Yes	90
	ex Boundary Hill Junction, loaded	No	Determined by model logic

Unlike mainline sections, travel on branch lines is not path-controlled. Instead, they follow headway and track booking requirements. Trains do not wait for a clockface path to travel from a mainline turn-off to a loadout balloon loop. After loading, trains depart balloon loops and travel to terminals on a run-when-ready basis, subject only to the Model's track booking logic.

8.2. Dispatch

In real-world CQCN operations, railing is planned weeks in advance through a complex, vertically separated planning regime designed to coordinate numerous Access Holders and service providers. These plans are then implemented and adjusted during day of operations management.

The Model does not attempt to replicate this multi-layered process or the individual objectives and constraints of its actors. Instead, it seeks to satisfy as much rail demand as it can subject to simulated demand order, TLO and branch line constraints and empty train clockface departure frequency.

Rail jobs are generated from the demand described in **Section 5 - Demand**.

For each idle train arriving at a dispatch location, the Model searches the list of available rail jobs until it finds one that meets all the following criteria:

- **Outstanding demand:** The rail job still has demand to be railed
- **TLO availability:** at the expected train arrival time:

- The daily dispatch limit for the TLO has not been reached
 - The maximum number of trains en route to the TLO has not been exceeded
 - The estimated loading period does not conflict with another train
 - The TLO is not undergoing planned maintenance
- **Train suitability:** The train is suitable for railing between the specified mine and terminal, considering above rail contracts and physical constraints.
 - **Network availability:** The train’s journey to the loadout is not expected to be interrupted by network closures or planned maintenance.
 - **Inloader availability:** The maximum number of trains already dispatched to the relevant terminal has not been exceeded (specific to the Goonyella System due to terminal proximity). These limits are optimised for maximum throughput but are adjusted during periods of IL maintenance to better balance train presentation to the terminals.

If a railing task satisfies all criteria, the train is assigned and begins its cycle (see **Section 9.2 - Train Cycles**), typically starting with a mainline path request. If the rail task cannot be dispatched at that time, the Model proceeds to evaluate the next rail task in the demand list until it identifies a task that can be dispatched. Undispatched rail tasks remain at the top of the dispatch list and are re-assessed in original order as each new rail dispatch time is considered.

8.3. Rail Microsimulation

The Model uses a rail microsimulation engine to manage train movements across the network. This engine monitors and directs train travel while adhering to the following principles:

- **Train routing:** The engine selects the route from the train’s current location to its next task in the cycle. Movement along the route is controlled in increments based on current network status.
- **Planning and executing train movements:** For each train movement, the engine books a sequence of tracks up to the next “safe to stop” section. On dual-track sections, “preferred” tracks are designated for empty and loaded travel. Once booked, the train moves along the reserved tracks, with the engine monitoring progress and applying travel-related events (e.g. delays, see **Section 10 - System Delays**) until the last booked section is reached. This process repeats until the train reaches its destination.
- **Managing train meets to avoid deadlocks:** The track booking algorithm uses a first-come, first-served approach to negotiate train meets locally. It considers track availability and usage to ensure trains only stop in locations where oncoming traffic can pass safely.

8.4. Track Maintenance

The IE receives information from AN on historical and future CQCN track maintenance activities and on train movements for both coal services and non-coal trains, which is used to prepare maintenance-related Model inputs. This includes:

- Integrated closures and major planned maintenance as agreed with the Rail Industry Group for FY27 via AN’s Maintenance Renewal and Strategy Budget (MRSB) process
- Actual maintenance possessions during FY25 – used to assess non-MRSB maintenance activities (described as “minor maintenance”)
- Details regarding non-coal traffic movements, including maintenance-related traffic

8.4.1. Possession-Based Maintenance

Most of AN’s track maintenance activities are represented as track possessions which are temporary closures or occupation of the rail infrastructure for the purposes of carrying out work on or in the proximity of the rail

infrastructure.

In real-world operations, only part of the annual possessions schedule is known at the start of the financial year, with additional possessions added as asset needs arise. In the Model, the dispatch look-ahead is short enough that both long and short term planned possessions can be assumed known when required, so all are included in the maintenance calendar, with the exception of maintenance activities designated by AN as “Emergency” maintenance. These activities are excluded from Model track maintenance inputs as their effects are simulated in the model via system delays (see **Section 10 - System Delays**).

When a possession occurs on one track of a duplicated section, the Model allows the remaining track to carry both up and down traffic. In the Model, planned track maintenance events commence regardless of train presence; if a train is on the section, it is allowed to clear before the closure takes effect. No other train can enter until the planned maintenance activity is complete.

The forward maintenance schedule in the Model considers three types of possession-based track maintenance activities:

1. **Integrated closures (IC):** Full System Shuts and branch line shuts which are included in the MRSB scope
2. **Major Maintenance:** Maintenance and renewal tasks included in the MRSB program, excluding ICs
3. **Minor Maintenance:** Smaller-scale maintenance activities, excluding emergency maintenance

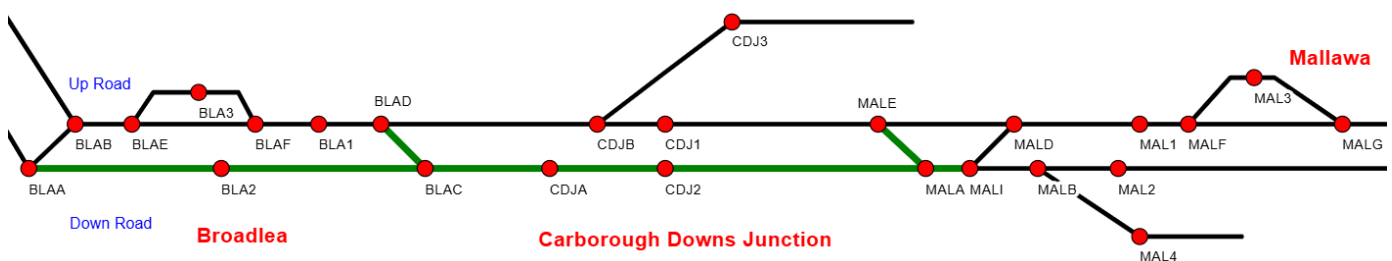
It should be noted that at the present time, CNCC does not assess Electrical Outages that occur without a corresponding Civil Outage at the same location and time. The most common example of this is OHLE maintenance during which electric trains cannot run but diesel trains can use the track. CNCC understands that the Model does not have the ability to differentiate between the effect of maintenance on different traction types.

8.4.1.1. Automated Maintenance Possessions Data Analysis

ACAR26 introduces a fundamental re-engineering of how AN’s maintenance possessions are interpreted and translated into input files for the Model. In ACAR25, this process was semi-automated. AN’s data was processed using a basic script that assessed each Outage ID based on broad location information (“From Station” and “To Station”) and examined the “Infrastructure Summary” text field for information regarding which tracks were affected. Although results were manually reviewed, the large data volume (~30,000 records) meant the process remained subject to human error.

In 2025, CNCC implemented a fully automated process to ingest, analyse and convert AN’s maintenance data (both historical and forecast) into model inputs. This enhanced logic leverages detailed line-item information that specifies every individual track segment affected by an outage ID, with each track segment defined by pairs of two four-letter “node codes”. **Figure 11** below (from AN’s PowerBI Asset Activity reporting) illustrates how node codes identify affected track segments, shown in green.

Figure 11 - AN Track Section Node Codes



(Maintenance possession shown in green)

This methodology shift significantly improves the accuracy of CNCC’s interpretation of AN’s maintenance data.

8.4.1.2. *Integrated Closures*

Integrated closures refer to periods of track possessions where an entire coal system is closed for maintenance, or one or more branch lines are shut to rail traffic. These shuts are for pre-planned periods and typically range from 24 to 108 hours. During these periods, trains are typically stowed at depots, balloon loops, or other network locations, with exact stowage planning dependent on the scope of works for each closure.

Model assumptions regarding integrated closures for future years are based on the MRSB scope.

For integrated closures that affect the mainline of a system - often described as Full System Shuts (FSS) - the model prevents dispatch of trains in order to mirror AN's closure of the system.

In addition to AN's self-identified mainline integrated closures, CNCC has interpreted planned maintenance events as being equivalent to integrated closures when the activity meets the following criteria:

- Duration of at least 24 hours.
- The planned maintenance shuts a mainline section completely (i.e. all tracks are shut)
- Planned maintenance is outside of the shadow of existing integrated closures.

CNCC "reclassifies" these maintenance events as system shuts for modelling purposes. In FY27, these instances are confined to the two 24 hour "maintenance windows" planned for the Newlands-GAPE systems.

During full system shuts (FSS), all loaders within the impacted coal system are unavailable for the duration of the closure. However, operations may continue in adjacent systems if common infrastructure is unaffected. For example:

- In Blackwater, an FSS that does not impact common infrastructure with Moura, allows Moura to operate.
- In Goonyella, if an FSS event affects DBCT and HPCT but leaves certain branch lines open, GAPE trains can continue servicing accessible mines.

For FY27, both the Goonyella and Blackwater systems have one fewer full system shut than FY26, and integrated closure hours have reduced. In the Newlands-GAPE system however, integrated closure hours have increased with the second annual closure now 108 hours rather than 60 hours as has been the practice in the last several years. Integrated closure have increased in the Moura system also, with an additional shut in October.

8.4.1.3. *Major Maintenance*

Major maintenance includes tasks within the MRSB scope that occur outside integrated closure periods. These are accommodated through less extensive possessions, such as single-line closures within duplicated track sections. Model assumptions for major maintenance are based on the industry approved MRSB scope.

In both the Goonyella and Blackwater system, while integrated closure hours have reduced, major maintenance possession hours have increased (Goonyella +394 hours, +45% and Blackwater +922 hours, +63%).

Newlands-GAPE major maintenance hours have increased moderately (+39 hours, + 25%), while in the Moura system BCM activities and maintenance in the Callemondah area see a substantial increase in possession hours (+135 hours, +600%).

8.4.1.4. *Minor Maintenance*

Minor maintenance covers smaller-scale activities, including planned and breakdown maintenance, which are often not scheduled well in advance. To model these, historical below rail maintenance data is analysed to forecast anticipated future minor maintenance profiles. AN provides detailed records of historical minor maintenance possessions, including location, start and end times (scheduled and actual), and categorisation.

In ACAR26, CNCC has introduced automated logic to assess AN's historical minor maintenance data and generate the required model input file, as outlined above.

A key enhancement is the inclusion of new logic to identify jobs occurring in the “shadow” of another outage (the “umbrella” outage) within the minor maintenance profile. This change was necessary to better reflect the impact of minor maintenance, providing a more realistic approach for assessing maintenance capacity impacts. Umbrella maintenance outages may include integrated closures, major maintenance, or other minor maintenance activities.

In addition, ACAR26 also incorporates a step to align projected minor maintenance activities with the historical day-of-week pattern, preserving the observed concentration of minor maintenance tasks during weekday daylight hours.

Finally, certain minor maintenance types identified as tonnage dependent are scaled to reflect their expected extent within a full demand environment.

8.4.2. Moving Maintenance

Discussions with AN subject matter experts identified that the two most prominent examples of moving maintenance are mainline rail grinding and mainline rail resurfacing.

ACAR26 adopts the same inclusion of mainline rail grinding activities as identified in ACAR25, as they continue to be scheduled in the train plan ahead of other rail traffic or maintenance activities. Resurfacing activities and their impacts are not yet considered in the Model.

For ACAR25 a synthesized mainline rail grinding regime was developed from observation of historical CY2024 rail grinding activities, including time spent actively grinding each CQCN section as described in SOP25. For modelling purposes, the track occupancy associated with these grinding activities was converted into maintenance possessions and implemented in the Model. No changes have been made to these assumptions in ACAR26, a summary of which is outlined in **Table 10** below.

Table 10 - Rail Grinding by System

Coal System	Frequency (times per year)	Average Duration (minutes)	Annual Duration (hours)	Annual Section Occupancy (hours)
Newlands-GAPE	2 - 4	51	85	128
Goonyella	8 - 10	60	292	438
Blackwater	2 - 5	58	228	343
Moura	1 - 2	86	18	28

8.4.3. Infrastructure Inspection/Hi-Rail Movements

Infrastructure inspections are conducted using hi-rail vehicles, cars fitted with wheels that allow the car to travel on the rail network. Approximately 80% of recorded hi-rail movements are for regularly scheduled inspections (commonly referred to as “road patrols”), with the remainder associated with ad-hoc maintenance activities.

For ACAR25 a detailed assessment of non-coal traffic records was undertaken to identify road patrol activities and their associated time-based schedules as described in SOP25. No changes to the hi-rail inspection schedules have been made in ACAR26. The model accounts for scheduled infrastructure inspections by representing them as a series of short track possessions as summarised in **Table 11**.

Table 11 - Infrastructure Inspection - Hi-Rail Movements

Coal System	Route	Frequency (every x weeks)	Inspection Duration (hours)
Newlands-GAPE	Abbot Point - Collinsville	2	3
	Collinsville - Abbot Point	2	4
	Briaba - Havilah	2	4

Coal System	Route	Frequency (every x weeks)	Inspection Duration (hours)
	Havilah - Briaba	2	4
	Cockool - North Goonyella Junction	2	4
	North Goonyella Junction - Cockool	2	5
Total			559
Goonyella	Yukan - Ports - Yukan	2	5
	Yukan - South Walker Junction	2	4
	South Walker Junction - Yukan	2	3
	South Walker Junction - North Goonyella Junction	2	4
	North Goonyella Junction - South Walker Junction	2	3
	Moranbah - Blair Athol - Wotonga	2	3
	Coppabella - Dysart	2	4
	Dysart - Coppabella	2	3
	Saraji - Oaky Creek	2	2
Total			793
Blackwater	Rangal - Fairhill	1	1
	Rocklands - Callemondah	1	3
	Ports - East End - Ports	1	2
	Midgee - Dingo	2	5
	Dingo - Midgee	2	1
	Rangal - Rolleston - Rangal	2	4
	Rangal - Duaringa	2	1
	Burngrove - Oaky Creek - Burngrove	2	4
	Dingo - Burngrove	2	3
	Mt Miller - Rocklands	2	3
Total			806
Moura	Dumgree - Callide - Dumgree	1	3
	Earlsfield - Callemondah	2	2
	Earlsfield - Callide	2	2
	Graham - Earlsfield	2	3
	Callemondah - Stowe	2	1
Total			312

The Model excludes the transport of materials and work trains as these movements are generally scheduled around coal and other services.

8.4.4. Below Rail Maintenance Data

Appendix B: Below Rail Maintenance provides a summary of anticipated maintenance for each year of the capacity period, categorised by coal system, mainline and branch line and maintenance type.

9. Above Rail Operations

9.1. Consists and Fleets

The Model applies assumptions regarding the number and type of trains available in each coal system to reflect the fleet sizes required to meet demand. These assumptions may differ from the allocations made by above rail operators under their rail haulage contracts. Consist types are assigned to each origin-destination pair based on historical data

(FY25).

Train consists are classified as either diesel or electric. Diesel consists can access the entire CQCN while electric consists are limited to electrified sections, see **Section 4.3 - Electrification**. Diesel and electric locomotives have different maintenance and provisioning requirements.

Consist lengths, and hence payloads, vary across coal systems and within individual systems. Consist length is not modelled directly, its impact is captured through origin-destination groupings and above rail operator allocations. Payloads for TLO activities are determined using historical data (see **Section 6.4 Payloads**).

Consists are grouped into fleets based on their above rail operator, their motive power, the coal system they are based in, and their maintenance and provisioning depot.

The Model does not include temporary transfers of consists between coal systems to manage demand fluctuations. Consists remain based in their defined system but may travel between systems for specific haulage tasks. For example, Blackwater System-based consists can haul to Gladstone Port via Goonyella System TLOs but do not load at Blackwater or Goonyella TLOs for haulage to the Port of Hay Point. Moura System based consists service only the Moura TLOs.

When assessing DNC, capacity is not constrained by current consist numbers, as DNC measures maximum train paths for the rail infrastructure. Consist numbers are artificially inflated under the assumption that operators will supply the required consists to realise DNC. Additional consists are introduced incrementally until the trade-off between throughput and transit time (cycle time excluding loading and unloading time) reaches an optimal point.

Train reporting data was examined for changes compared with ACAR25.

- Where more than 85% of a mine's production in each system was hauled by a single rail operator, that operator is modelled exclusively for that mine/system combination.
- Where less than 85% was hauled by a single rail operator, multiple rail operators are modelled for that mine/system combination.

CNCC does not hold rail haulage contract details but for ACAR26 rail haulage certain operators did advise CNCC of pending contractual changes which have been combined with the analysis of historical data. Based on these two sources of information, for ACAR26, 7 mine/system combinations were modified.

9.2. Train Cycles

In general, train cycles follow this sequence:

- Dispatch from depot (Pring, BRC, Jilalan, Nebo, Callemondah)
- Travel empty to the TLO
- Load at the TLO
- Travel loaded to inloader
- Unload
- Return empty to the depot for possible provisioning and/or maintenance before the next dispatch

Exceptions to these standard train cycles are outlined in **Section 9.3 - Non-standard Cycles**.

Throughout each cycle, consists obey all necessary pathing and separation rules relevant to their network locations.

9.2.1. Planned Maintenance

The Model incorporates planned above rail maintenance activities such as examinations/inspections, block change

outs (BCO), unit train maintenance and provisioning, and any associated shunting. These assumptions are based on information provided by the above rail operators. All maintenance activities are assumed to occur at the rail depots where the fleet is based (see **Section 4.5 - Rail Depots**).

The Model distinguishes whether maintenance activities occur on AN network infrastructure (and therefore impact track capacity) or on private track infrastructure. For BCOs, only the time required to separate, shunt and reconstitute a consist is considered, which is substantially shorter than conducting a full maintenance activity on AN network infrastructure.

Although planned train maintenance is modelled, its impact on DNC is minimal because capacity is largely unconstrained by fleet size (additional fleet is assumed). The primary effect is on yard capacity and congestion.

9.2.2. Crew Changes

Crew changes occur at various stages of the train cycle, most commonly at depots, TLOs and staging points such as Coppabella, Bluff and Kabra. Actual locations depend on the specific train cycle. Each crew change includes allowances for stopping and starting, as well as time for crew change itself.

The Model assumes crew change times of 10 minutes, except where crew changes are regularly planned to occur concurrent with loading and/or unloading activities where 5 minutes is allocated.

Appendix I: Above Rail Parameters has the detailed information on crew change times for each location.

9.3. Non-Standard Cycles

9.3.1. General

Exceptions to the standard train cycle (see **Section 9.2 - Train Cycles**) include:

- [REDACTED]
- **Trains unloading at specific locations:** Trains that unload at the following locations do not return to the Callemondah depot until the end of their next cycle; instead, they are dispatched from their unload point:
 - WICET
 - Rio Tinto Aluminium (Yarwun)
 - Fisherman’s Landing
 - Stanwell Powerhouse (in the Model, trains unloading at Stanwell Powerhouse return to Bluff for dispatch)
- [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
- **Provisioning at Callemondah:** Most loaded trains passing through Callemondah are provisioned while loaded before unloading at RGTCT.
- **No Provisioning:** No provisioning occurs at the WICET balloon loop or Stanwell Powerhouse.

[REDACTED]

[REDACTED]



9.4. Stowage

In practice, consists are stowed during ICs at depots, balloon loops, or on the network, as main depots lack sufficient roads to store all consists. Stowage locations are customised to each FSS to allow a rapid recovery to normal operations, so their planning varies by ICs.

The Model does not explicitly simulate stowage procedures but reflects its effects by:

- Preventing dispatch to a mine if predicted travel overlaps with a scheduled FSS (using a minimum travel time and a multiplier of 1.5 for delays).
- Allowing dispatched trains to travel until a shut begins, then stopping them at strategic locations to replicate staggered restarts.
- Applying a 48 hour look-ahead for cross-system train services from the Newlands-GAPE System to Goonyella System mines to avoid trapping trains during Newlands System shuts, which would otherwise impose Goonyella System FSSs.

10. System Delays

10.1. General Delays

Trains occasionally stop due to breakdowns, failures and faults that occur within the supply chain. These faults may arise, for example, from rollingstock defects, track or signalling defects, telemetry failures or obstructions on the track. Such stops are recorded as delays, and a single fault may result in delays to multiple trains.

In the Model, fault events are inputs, while delays are outputs. The Model generates fault events which cause a “primary” delay to the directly affected train and then determines the consequential delay impact (“secondary” delays), based on which other nearby trains’ progress is impeded.

To match the Model’s functionality, AN delay data was filtered to exclude those delays explicitly modelled elsewhere in the Model:

- Delays associated with Temporary Speed Restrictions (TSR) are modelled separately (see **Section 10.3 - Temporary Speed Restrictions**), and were excluded.
- Delays attributable to TLOs, inloaders or major force majeure events were excluded.

The AN delay codes used to identify and distinguish between primary and secondary delays are provided in **Appendix H: Delay Parameters**.

Faults are modelled as “track failures” that occur only when a train is present on the track. These failures are linked to track sections and to train distance travelled. Model inputs include statistical distributions for:

- Time to Fail (TTF) - distance travelled between faults (kilometres)
- Time to Repair (TTR) - duration of the fault (minutes)

ACAR26 refines the ACAR25 approach by using data from the most recent three financial years and deriving separate TTF and TTR distributions by system track subsection (in ACAR25, a single TTF and TTR distribution was applied uniformly across each System). For ACAR26, separate distributions are derived for:

- each Port Precinct
- each Mainline
- each Branch Line

This increased granularity improves representation of observed delay behaviour within each system, supports identification of influential or problematic track sections, and enables a more accurate assessment of the impacts of track failures on overall system performance.

Table 12 summarises the observed variations in general delay frequency and duration in ACAR26 relative to ACAR25.

Table 12 - Summary of observed changes in general delays

System	Delay Frequency (TTF)	Delay Duration (TTR)
Newlands-GAPE	Improved across all lines except the port line (1A: Pring to Abbot Point), which exhibits a ~47% increase in delay events relative to the ACAR25 system value.	Reduced by ~8 minutes across all lines except GAPE (2A: North Goonyella Junction to Newlands Junction), where delay duration increased by ~5 minutes.
Goonyella	Improved across all lines except the port line (3A: Jilalan to Port of Hay Point), which shows a ~41% increase in delay events relative to ACAR25 system values. Line 3E (North Goonyella Mine to Wotonga) shows the largest improvement, with delay frequency reducing by 73%.	Mixed outcomes. Most lines, including the mainline, show reductions of ~5-12 minutes. Delay duration increased on the port line (3A) and branch line 3B (Hail Creek Mine to South Walker Creek Junction) by ~17 and ~12 minutes respectively.
Blackwater	Delay frequency increased on three of five lines relative to the ACAR25 system value, most notably on the port line (4A: Callemondah to Port of Gladstone), which increased by ~79%. Branch lines 4B (Burngrove to Bluff) and 4D (Rolleston Mine to Rangal) increased by ~15%. The mainline improved by ~24%.	Delay duration increased across all lines. Increases were modest (~2-4 minutes) on most lines, except for the port line (4A) which experienced an increase of ~38 minutes relative to ACAR25 system values.
Moura	Delay frequency reduced on three of five lines relative to ACAR25 system values. Branch lines 5B (Earlsfield to Callide) and 5A (Boundary Hill Junction to Earlsfield) increased by ~46% and ~20% respectively. The mainline shows a notable improvement of ~44%.	Delay duration improved across all lines, with reductions ranging from ~9 to ~25 minutes, except for the port line (4A), which recorded an increase of ~16 minutes relative to ACAR25 system values.

10.2. Crew Change Delays

Crew change delays are treated separately from other delays as they are attached to specific activities (crew changes) and their locations. These delays represent additional time beyond the regular crew change durations provided by above rail operators.

ACAR26 maintains the assumptions for crew change delay from ACAR25:

- A scheduled crew change has a 16% chance of overrun
- A median overrun duration of 5 minutes

10.3. Temporary Speed Restrictions (TSRs)

Occasionally, circumstances will require the placement of TSRs on different track sections. When a TSR is in place, trains must travel at reduced speed across the affected section, adding extra time to the SRT. This additional time includes:

- deceleration to the lower speed
- travel across the restricted length at the lower speed
- acceleration back to the normal speed for that section

For ACAR26, TSR data for the financial years FY23, FY24 and FY25 was reviewed to establish the parameters for inclusion in the Model. Only events with a duration of between 1 and 365 days were considered. Geographic and seasonal factors influence TSR's, so each track section was categorised into four groups based on total time under TSRs:

- no TSRs
- Low impact TSRs
- Mid impact TSRs
- High impact TSRs

For each of the three TSR-affected groups, the following were determined:

- time between TSR events (Time between Failures (TBF))
- duration of individual TSR events (Time to repair (TTR))
- time penalty for consists traversing impacted sections during an event

Exponential distributions were applied to the TBF and TTR data for each group, and the most appropriate distribution was applied to time penalty data. TSR's are applied in the Model by month and per track section. A summary of these parameters is provided in **Table 13**.

For duplicated track sections, TSRs are assumed to have an equal probability (1/3) of being applied to the up track, down track, or both tracks, regardless of whether the section falls into the low, mid, or high TSR group.

The outcome of the TSR data inputs showed the following trend insights for ACAR26 compared to ACAR25:

- TSR frequency improved, with the time between events increasing by 15% for High TSR section, 13% for Mid TSR sections and 9% for Low TSR sections.
- TSR durations deteriorated across all three categories, where durations increased by 16% for High TSR section, 12% for Mid TSR sections and 7% for Low TSR sections.
- TSR time penalty on consists travelling across each section remained consistent across all TSR groups.

Table 13 - Temporary Speed Restriction parameters

TSR Group	Description	Expected Value
Low TSR	Time Between events per section (TBF) (minutes)	173,000
	Event Duration (TTR) (minutes)	45,000
	Individual consist time penalty (minutes)	2.3
Mid TSR	Time Between events per section (TBF) (minutes)	76,000
	Event Duration (TTR) (minutes)	56,000
	Individual consist time penalty (minutes)	2.1
High TSR	Time Between events per section (TBF) (minutes)	47,000
	Event Duration (TTR) (minutes)	59,000
	Individual consist time penalty (minutes)	1.8

10.4. Cancellations

A train service can be cancelled in practice for several reasons, and the cause of each cancellation is allocated to either above rail, below rail, mine or other (including port and force majeure).

Major uncommon train cancellation events, as determined by CNCC, such as infrequent extreme events that disrupt operations in part of the supply chain (e.g. cyclones, major accidents, IT failures) are excluded from the Model and are removed from data sets. These major events are not modelled. However, smaller events that may be commercially classified as force majeure are retained within the dataset and used in the model assumptions.

A cancellation occurs in the Model after a train is assigned a rail job and dispatch path. The consequence is a delay in servicing the rail job, equivalent to a separation time between dispatch paths.

The cancellation probability is specified for each coal system and calculated using the following formula:

$$\text{Cancellation \% (probability)} = \frac{\text{Cancelled + Terminated}}{(\text{Cancelled + Terminated + Arrived})}$$

For ACAR26, cancellation data was reviewed for financial years FY23, FY24 and FY25. Each train service was assigned a status of cancelled, terminated or arrived and the cancelled services were then summarised by the responsible party (i.e. above rail, below rail, mine, port).

Table 14 outlines the ACAR26 cancellation assumptions used in the Model. The cancellation trends for above rail and below rail were consistent with previous ACAR analyses, while other cancellations (force majeure, port, uncategorised) increased slightly in the Newlands, GAPE, Goonyella and Blackwater systems.

In FY25, the prevailing trend of cancellations attributed to ‘Adjoining Operations Loading (Direct)’ and ‘Service Cancelled/Altered by Operator’ continued, considered by CNCC to reflect situations where mines had no coal available. The highest “no coal” cancellation rates were recorded in Blackwater (11.4%) and Goonyella (8.67%). For capacity modelling, the ACAR framework assumes full demand; therefore, “no coal” cancellations are adjusted to reflect their rarity under such conditions.

Table 14 - Cancellation Assumptions (Model Inputs)

Coal System	ACAR26 Cancellations				
	Total	Below Rail	Above Rail	Mine	Other
Newlands-GAPE	15.3%	1.1%	6.9%	2.9%	4.5%
Newlands-GAPE Adjusted ¹	12.7%	1.1%	6.8%	2.3%	2.5%
Goonyella	21.9%	2.9%	8.0%	6.2%	4.8%
Goonyella Adjusted ¹	17.7%	3.0%	7.2%	3.7%	3.9%
Blackwater	21.2%	1.8%	7.1%	9.4%	2.9%
Blackwater Adjusted ¹	14.9%	1.9%	6.4%	4.6%	1.9%
Moura	19.4%	2.2%	7.1%	7.2%	2.8%
Moura Adjusted ¹	16.6%	2.3%	7.0%	4.8%	2.4%

Note: 1. Cancellation rates are adjusted to exclude the impact of cancellations caused by lack of coal availability and major disruption events

10.5. Yard Congestion (Newlands and GAPE Systems)

In 2024, CNCC worked with participants in the Newlands and GAPE Systems to examine train movements and congestion in the Pring-Abbot port mini cycle. This initiative provided the analytical basis for modelling yard congestion caused by train cancellations, where trains can experience extended wait times when the next scheduled service is cancelled.

To capture the effects of cancellation-related wait times in the yard, the Model applies additional train “maintenance” activities as a proxy for these delays, limited to depots in the Newlands and GAPE systems.

This analysis identified two types of delays that occur:

- **Higher frequency short delays:** after 10 trips, trains undergo a delay of approximately 1.5 hours to account for scheduled changes due to cancellations.
- **Less frequent long delays:** after 20 trips, trains experience a delay of 18 hours, representing cases where the next scheduled service is cancelled and cannot be rescheduled. In these instances, trains remain in the depot or are staged on the network until the next available cycle.

Implementation of this mechanism improved alignment between model results at historical volumes and observed historical yard occupancy.

11. Non-Coal Traffic

11.1. Overview

AN is required to provide access for non-coal traffic under access agreements, passenger priority obligation and preserved train path obligations, including those under *sections 265 and 266 of the Transport Infrastructure Act, 1994 (Qld)*. Timetabled services must be prioritised ahead of cyclic traffic (i.e. coal traffic), except where the unloading destination is a domestic power station.

The Model includes non-coal traffic operating on a regular weekly schedule, which is prioritised over all coal traffic. Ad-hoc non-coal traffic are not included.

Contracted and preserved train path data for non-coal services are current as at January 2025. While the Model accounts for below rail impacts such as delays, maintenance, and ICs on coal systems where non-coal operates, it does not include above rail activities such as delays, maintenance, provisioning, or depot trips, assuming these occur outside AN rail infrastructure.

Entry and exit paths into the coal system that involve private infrastructure are also considered.

Non-coal timetabled traffic includes:

- Passenger trains
- Rockhampton Tilt Train (between Brisbane and Rockhampton)
- Spirit of Queensland (between Brisbane and Cairns)
- Spirit of the Outback (between Brisbane and Longreach, via Emerald)
- Agricultural products – grain and livestock
- Freight
- Limestone

In the Model, non-coal traffic operate according to its own timetable and SRTs, as detailed in **Appendix A: Sectional Running Times**.

11.2. Non-Passenger Traffic

Timetables provided by AN were adjusted, where necessary, to fit with an MTP-style plan for compatibility with path dispatch in the Model.

These timetables are entered into the Model as regular weekly schedules, each defined by a start junction, an end junction, and a departure time. A path aligned with each timetabled departure is reserved ahead of time to ensure the timetable is met. Once injected into the network, non-passenger traffic then interacts with coal traffic.

SRTs for non-passenger traffic were calculated from the scheduled section run times given in the data provided. Distinct SRT inputs were derived for each of the following traffic types:

- Limestone
- Livestock and freight
- Grain

11.3. Passenger Traffic

Passenger traffic services operate on:

- Blackwater System: North Coast Line between Parana (at Gladstone) and Rocklands
- Blackwater System: Central West Line between Rocklands and Nogoia
- Newlands System: North Coast Line between Durroburra and Kaili

Timetables were sourced from published QR timetables.

11.3.1. Blackwater System

The Model ensures passenger traffic is prioritised over all other traffic by preserving paths rather than dispatching actual trains. The key assumption is that, in any potential interaction with other traffic, passenger trains receive priority. Because passenger trains generally travel faster than other traffic, the preceding path is also removed to maintain clear running.

Timetables are input to the Model as:

- Start junction (path dispatch location)
- End junction
- Departure time (at dispatch location)
- Number of paths to remove

11.3.2. Newlands System

The Spirit of Queensland operates in the Newlands System upstream of the path dispatcher at Pring. This traffic is modelled as a regular timetable, similar to other non-passenger traffic.

Passenger traffic runs to its own SRTs.

12. Abbreviations

The following abbreviations are used throughout this document:

ABBREVIATION	MEANING
ACAR	Annual Capacity Assessment Report
AIC	Akaike Information Criterion
AN	Aurizon Network
AO	Aurizon Operations
BCO	Block Change Outs
BRC	Bowen Rail Company
CQCN	Central Queensland Coal Network
DBCT	Dalrymple Bay Terminal
DNC	Deliverable Network Capacity
DTC	Direct Train Control
FL	Fisherman's Landing
FSS	Full System Shut
FY	Financial Year
GAPE	Goonyella to Abbott Point Expansion
HPCT	Hay Point Coal Terminal
ICAR	Initial Capacity Assessment Report
IC	Integrated Closure
IE	Independent Expert
LR	Load Rate (including unplanned delays)
MLPI	Main Line Points Indicators
Model	CQCN Dynamic Simulation Model
MRSB	Maintenance Renewal & Strategy Budget
MTP	Monthly Train Plan
NQXT	North Queensland Export Terminal
NRG	Gladstone Powerhouse

ABBREVIATION	MEANING
NTSF	Nebo Train Support Facility
OR	OneRail
PN	Pacific National
QR	Queensland Rail
QAL	Queensland Alumina Limited
QCA	Queensland Competition Authority
QCL	Cement Australia (Fisherman's Landing)
RCS	Remote Control Signalling
RGCT	RG Tanna Coal Terminal
RRS	Rail Receival Station (Inloader)
RTA Yarwun	Rio Tinto's Yarwun Alumina Refinery
SAT	Ship Arrival Table
SOP	System Operating Parameters
SRT	Sectional Running Time
Stanwell	Stanwell Powerhouse
TLO	Train Loadout
TBF	Time Between Failures
TSE	Train Service Entitlement
TSR	Temporary Speed Restriction
TTF	Time to Fail
TTR	Time to Repair
UR	Unload Rate (excluding unplanned delays)
UT5	Aurizon Network 2017 Access Undertaking
WICET	Wiggins Island Coal Export Terminal
OHLE	Overhead Line Equipment

Appendix A: Sectional Running Times

This Appendix contains input Sectional Running Times for:

- Coal trains in the CQCN; and
- Non-coal trains in the CQCN

A1 Coal trains

A1.1 Newlands-GAPE

The following tables of SRTs for Empty and Loaded running are for Pring-based diesel trains travelling in the Newlands and GAPE Systems. Only sections that Pring-based trains travel on are included.

Location from	Location to	Empty (minutes)	Loaded (minutes)
Newlands Trunk			
Abbot Point	BRC Junction	7	9
BRC Junction	Kaili	4	8
Kaili	Durroburra	6	10
Durroburra	Pring	9	4
Pring	Buckley	5	6
Buckley	Armuna	14	15
Armuna	Aberdeen	12	10
Aberdeen	Binbee	12	9
Binbee	Briaba	14	15
Briaba	Almoola	16	31
Almoola	Collinsville	6	6
Collinsville	McNaughton Junction	2	4
McNaughton Junction	Sonoma Junction	8	7
Sonoma Junction	Birrallee	10	10
Birrallee	Cockool	17	16
Cockool	Havilah	16	18
Havilah	CRN Junction	12	12
CRN Junction	Newlands Junction	2	2
Northern missing link (GAPE)			
Newlands Junction	Leichardt Range	4	7
Leichardt Range	Byerwen Junction	11	12
Byerwen Junction	Suttor Creek	11	11
Suttor Creek	Eaglefield Creek	21	24
Eaglefield Creek	North Goonyella Junction	8	8
North Goonyella Branch			
North Goonyella	Riverside Junction	13	14
Riverside	Goonyella	5	6
Goonyella	Moranbah North Junction	5	4

Location from	Location to	Empty (minutes)	Loaded (minutes)
Moranbah North Junction	Wotonga	15	16
West Goonyella Branch			
Wotonga	Moranbah	19	15
Moranbah	Caval Ridge Junction	3	5
Caval Ridge Junction	Villafranca	13	17
Villafranca	Mount McLaren	18	22
Mount McLaren	Blackridge	21	23
Blackridge	Blair Athol Junction	15	21
Wotonga to Coppabella			
Wotonga	Isaac Plains Junction	3	2
Isaac Plains Junction	Mallawa	3	3
Mallawa	Carborough Downs Junction	8	12
Carborough Downs Junction	Broadlea	5	5
Broadlea	Coppabella	13	19
South Goonyella Branch			
Coppabella	Moorvale Junction	5	16
Moorvale Junction	Ingsdon	2	4
Ingsdon	Millennium Junction	5	8
Millennium Junction	Red Mountain	7	7
Red Mountain	Olive Downs Junction	4	4
Olive Downs Junction	Winchester	5	4
Winchester	Peak Downs	13	12
Peak Downs	Harrow	13	15
Harrow	Saraji	6	8
Saraji	Lake Vermont Junction	16	18
Lake Vermont Junction	Dysart	3	2
Dysart	Stephens	7	7
Stephens	Norwich Park	9	11
Norwich Park	Middlemount Junction	12	17
Mine Spurs			
Blair Athol Junction	Blair Athol (Clermont Mine)	3	2
Byerwen Junction	Byerwen	2	6
Caval Ridge Junction	Caval Ridge	15	12
Isaac Plains Junction	Isaac Plains	5	2
Lake Vermont Junction	Lake Vermont	11	7
McNaughton Junction	McNaughton	8	6
Middlemount Junction	Middlemount	21	11
Newlands Junction	Newlands	8	9
Riverside	Riverside Balloon	4	1
Sonoma Junction	Sonoma	9	1
Millennium Junction	Millennium Balloon	2	4

A1.2 Goonyella

The following tables of SRTs for empty and loaded running are for Jilalan and Nebo-based electric and diesel trains travelling in the Goonyella System.

Location from	Location to	Empty (minutes)	Loaded (minutes)
Goonyella Trunk			
Dalrymple Bay	Dalrymple Bay Staging	3	3
Dalrymple Bay Staging	Dalrymple Crossover Points	4	5
Hay Point	Hay Point Entry	4	8
Hay Point Entry	Dalrymple Crossover Points	9	4
Dalrymple Crossover Points	Praguelands	7	6
Praguelands	Jilalan	6	1
Jilalan	Yukan	7	8
Yukan	Black Mountain	13	19
Black Mountain	Hatfield	12	12
Hatfield	Bolingbroke	11	12
Bolingbroke	Balook	13	14
Balook	Wandoo	9	12
Wandoo	Waitara	12	14
Waitara	Braeside	8	8
Braeside	Mindi	10	13
Mindi	South Walker Junction	7	7
South Walker Junction	Tootoolah	6	6
Tootoolah	Macarthur Junction	3	4
Macarthur Junction	Coppabella	9	5
Coppabella	Broadlea	11	19
Broadlea	Carborough Downs Junction	5	4
Carborough Downs Junction	Mallawa	9	9
Mallawa	Isaac Plains Junction	2	4
Isaac Plains Junction	Wotonga	2	3
South Goonyella Branch			
Coppabella	Moorvale Junction	6	13
Moorvale Junction	Ingsdon	2	2
Ingsdon	Millennium Junction	3	7
Millennium Junction	Red Mountain	7	6
Red Mountain	Olive Downs Junction	4	5
Olive Downs Junction	Winchester	5	4
Winchester	Peak Downs	13	12
Peak Downs	Harrow	13	14
Harrow	Saraji	6	10
Saraji	Lake Vermont Junction	15	22
Lake Vermont Junction	Dysart	4	3
Dysart	Stephens	7	7

Location from	Location to	Empty (minutes)	Loaded (minutes)
Stephens	Norwich Park	9	11
Norwich Park	Middlemount Junction	12	17
Middlemount Junction	Bundoora	2	3
Bundoora	German Creek	4	4
German Creek	Oaky Creek	17	20
Oaky Creek	Lilyvale	13	12
Lilyvale	Gregory Junction	1	2
North Goonyella Branch			
Wotonga	Moranbah North Junction	16	17
Moranbah North Junction	Goonyella	4	3
Goonyella	Riverside	4	4
Riverside	North Goonyella Junction	12	15
West Goonyella Branch			
Wotonga	Moranbah	17	16
Moranbah	Caval Ridge Junction	3	3
Caval Ridge Junction	Villafranca	16	16
Villafranca	Mount McLaren	17	21
Mount McLaren	Blackridge	21	22
Blackridge	Blair Athol Junction	16	19
Mine Spurs			
South Walker Junction	Bidgerley Junction	5	1
Bidgerley Junction	South Walker (Bidgerley Balloon)	6	2
Bidgerley Junction	Hail Creek	38	30
Blair Athol Junction	Blair Athol (Clermont Mine)	2	3
Carborough Downs Junction	Carborough Downs	9	2
Caval Ridge Junction	Caval Ridge	13	11
Goonyella	Goonyella Balloon	2	1
Isaac Plains Junction	Isaac Plains	5	2
Macarthur Junction	Macarthur (Coppabella Mine)	5	1
Mallawa	Burton	3	1
Middlemount Junction	Middlemount	19	9
Millennium Junction	Millennium	2	2
Moorvale Junction	Moorvale	6	1
Moranbah North Junction	Moranbah North	3	4
North Goonyella Junction	North Goonyella	3	3
Oaky Creek Junction	Oaky Creek	4	3
Olive Downs Junction	Olive Downs Balloon	12	16
Peak Downs	Peak Downs Balloon	5	2
Riverside	Riverside Balloon	4	1
Saraji	Saraji Balloon	1	2

A1.3 Blackwater

The following tables of SRTs for empty and loaded running are for Callemondah-based electric and diesel trains travelling in the Blackwater System and Goonyella System.

Location from	Location to	Empty (minutes)	Loaded (minutes)
North Coast Line			
Callemondah	Mount Miller	12	14
Mount Miller	Wiggins Island Junction	5	4
Wiggins Island Junction	Yarwun	1	2
Yarwun	Aldoga	6	7
Aldoga	Mount Larcom	9	12
Mount Larcom	Ambrose	4	6
Ambrose	Epala	5	5
Epala	Raglan	7	10
Raglan	Marmor	11	11
Marmor	Bajool	8	9
Bajool	Archer	9	11
Archer	Midgee	7	8
Midgee	Rocklands	8	10
Blackwater Trunk			
Rocklands	Gracemere	5	8
Gracemere	Kabra	11	15
Kabra	Warren	6	6
Warren	Wycarbah	11	10
Wycarbah	Westwood	9	10
Westwood	Windah	10	19
Windah	Grantleigh	10	12
Grantleigh	Tunnel	8	9
Tunnel	Edungalba	12	19
Edungalba	Aroona	9	10
Aroona	Duaringa	7	10
Duaringa	Wallaroo	13	13
Wallaroo	Tryphinia	11	14
Tryphinia	Dingo	12	14
Dingo	Umolo	5	7
Umolo	Parnabal	6	4
Parnabal	Walton	5	4
Walton	Bluff	11	13
Bluff	Boonal Balloon Points	9	12
Boonal Balloon Points	Blackwater	12	13
Blackwater	Sagittarius	3	6
Sagittarius	Rangal	3	5
Rangal	Burngrove	7	8

Location from	Location to	Empty (minutes)	Loaded (minutes)
South Goonyella Branch			
Burngrove	Washpool Junction	7	8
Washpool Junction	Crew	1	1
Crew	Mackenzie	12	14
Mackenzie	Fairhill	11	12
Fairhill	Yan Yan	12	13
Yan Yan	Gregory Junction	9	10
Gregory Junction	Lilyvale	2	2
Lilyvale	Oaky Creek Junction	12	15
Oaky Creek Junction	German Creek Junction	16	17
German Creek Junction	Bundoora	2	4
Bundoora	Middlemount Junction	2	2
Middlemount Junction	Norwich Park	14	14
Norwich Park	Stephens	10	12
Stephens	Dysart	8	7
Dysart	Lake Vermont Junction	3	5
Rolleston (Bauhinia) Branch			
Rangal	Tikardi	7	6
Tikardi	Boorgoon Junction	5	6
Boorgoon Junction	Kinrola Junction	6	8
Kinrola Junction	Kenmare	23	22
Kenmare	Memooloo	27	34
Memooloo	Starlee	33	33
Starlee	Meteor Downs Junction	19	20
Meteor Downs Junction	Rolleston	8	13
Domestic and Export Terminals			
Golding	Gladstone Powerhouse Junction	9	7
Gladstone Powerhouse Junction	Callemondah	9	14
Gladstone Powerhouse	Callemondah	12	5
Wiggins Island	Wiggins Island Staging	8	6
Wiggins Island Staging	Wiggins Island Junction	6	7
Comalco Balloon Junction	Fisherman's Landing	9	6
Stanwell Powerhouse	Warren	4	4
Mine Spurs			
Blackwater	Taurus	40	32
Boonal Balloon Points	Boonal Balloon	2	3
Boorgoon Junction	Boorgoon Balloon	4	1
Gregory Junction	Gregory Balloon	8	3
Kinrola Junction	Kinrola	6	4
Lake Vermont Junction	Lake Vermont	12	19
Mackenzie	Ensham	12	10
Oaky Creek Junction	Oaky Creek	6	6

Location from	Location to	Empty (minutes)	Loaded (minutes)
Sagittarius	Curragh	13	11
Taurus	Koorilgah	7	4
Yan Yan	Gordonstone Balloon	13	12

A1.4 Moura

The following tables of SRTs for empty and loaded running are for Callemondah-based diesel trains travelling in the Moura System.

Location from	Location to	Empty (minutes)	Loaded (minutes)
Moura Trunk			
Callemondah	Byellee	6	11
Byellee	Stowe	17	15
Stowe	Graham	4	9
Graham	Stirrat	10	9
Stirrat	Clarke	20	24
Clarke	Fry	11	11
Fry	Mount Rainbow	21	24
Mount Rainbow	Dumgree	19	29
Dumgree	Boundary Hill Junction	11	14
Boundary Hill Junction	Annandale	3	1
Annandale	Earlsfield	7	14
Earlsfield	Belldeen	26	23
Belldeen	Moura Mine Junction	23	39
Callide Branch			
Earlsfield	Koonkool	7	2
Koonkool	Dakenba	31	30
Dakenba	Callide Coalfields	17	21
Mine Spurs			
Boundary Hill Junction	Boundary Hill	7	4
Moura Mine Junction	Moura Mine	2	2
Moura Mine Junction	Baralaba Balloon Loop	31	31
Gladstone Surrounds			
Gladstone QAL SDG	South Gladstone	5	4
Parana	Callemondah	13	12
South Gladstone	Parana	7	10

A2 Non-Coal Trains

A2.1 Limestone

The following table of SRTs for up and down running is for diesel trains carrying Limestone and travelling between East End and Fisherman’s Landing in the Blackwater System. Only sections that these trains travel on are included.

Location from	Location to	Up (minutes)	Down (minutes)
East End Mine	East End Junction	10	10
East End Junction	Aldoga	15	15
Aldoga	Yarwun	9	9
Yarwun	Mt Miller	6	6
Mt Miller	Comalco Junction	3	3
Comalco Junction	Fisherman’s Landing Unloader	10	10
Callemondah	Mt. Miller	5	5
Wiggins Island Junction	Yarwun	2	2
Mt Miller	Wiggins Island Junction	4	4

A2.2 Passenger

The following table of SRTs for up and down running is for the diesel Spirit of Queensland passenger trains travelling in the Newlands System. Only sections that these trains travel on are included.

Location from	Location to	Up (minutes)	Down (minutes)
QNIP02	Durroburra	2	2
Durroburra	Kaili	6	6
Kaili	QNIP01	3	3

A2.3 Freight and Livestock

The following table of SRTs for up and down running is for diesel Freight and Livestock trains travelling in the Blackwater and Newlands Systems. Only sections that these trains travel on are included.

Location from	Location to	Up (minutes)	Down (minutes)
Parana	Callemondah	9	9
Callemondah	Mt Miller	8	6
Mt Miller	Yarwun	5	5
Yarwun	Aldoga	8	8
Aldoga	Mt Larcom	8	7
Mt Larcom	Ambrose	4	4
Ambrose	Epala	5	4
Epala	Raglan	6	6
Raglan	Marmor	8	7
Marmor	Bajool	6	7
Bajool	Archer	7	7
Archer	Midgee	6	5
Midgee	Rocklands	5	5
Rocklands	Gracemere	9	10
Gracemere	Kabra	4	4

Location from	Location to	Up (minutes)	Down (minutes)
Kabra	Warren	10	11
Warren	Wycarbah	9	10
Wycarbah	Westwood	7	9
Westwood	Windah	9	13
Windah	Grantleigh	10	10
Grantleigh	Tunnel	7	9
Tunnel	Edungalba	10	19
Edungalba	Aroona	10	11
Aroona	Duaringa	10	7
Duaringa	Wallaroo	10	11
Wallaroo	Tryphinia	11	11
Tryphinia	Dingo	11	11
Dingo	Umolo	7	8
Umolo	Parnabal	3	4
Parnabal	Walton	8	4
Walton	Bluff	13	11
Bluff	Boonal Balloon Points	12	9
Boonal Balloon Points	Boonal	1	1
Boonal	Blackwater	10	10
Blackwater	Sagittarius	6	3
Sagittarius	Rangal	4	4
Rangal	Burngrove	6	6
Burngrove	Tolmies	2	2
Tolmies	Comet	17	23
Comet	Yamala	18	19
Yamala	Nogoa	20	20
QNIP02	Durroburra	1	1
Durroburra	Kaili	6	6
Kaili	QNIP01	2	2

A2.4 Grain

The following table of SRTs for up and down running is for diesel Grain trains travelling in the Blackwater and Goonyella Systems. Only sections that these trains travel on are included.

Location from	Location to	Up (minutes)	Down (minutes)
Parana	Callemondah	9	9
Callemondah	Mt Miller	9	6
Mt Miller	Yarwun	6	4
Yarwun	Aldoga	8	8
Aldoga	Mt Larcom	8	7
Mt Larcom	Ambrose	5	4
Ambrose	Epala	5	4
Epala	Raglan	6	7
Raglan	Marmor	7	7
Marmor	Bajool	7	7

Location from	Location to	Up (minutes)	Down (minutes)
Bajool	Archer	7	7
Archer	Midgee	7	6
Midgee	Rocklands	5	7
Rocklands	Gracemere	9	10
Gracemere	Kabra	4	4
Kabra	Warren	10	11
Warren	Wycarbah	9	10
Wycarbah	Westwood	7	9
Westwood	Windah	9	13
Windah	Grantleigh	10	10
Grantleigh	Tunnel	7	9
Tunnel	Edungalba	11	13
Edungalba	Aroona	8	8
Aroona	Duaringa	8	8
Duaringa	Wallaroo	10	11
Wallaroo	Tryphinia	11	11
Tryphinia	Dingo	11	11
Dingo	Umolo	6	6
Umolo	Parnabal	6	6
Parnabal	Walton	4	4
Walton	Bluff	6	7
Bluff	Boonal Balloon Points	9	8
Boonal Balloon Points	Boonal	1	1
Boonal	Blackwater	9	10
Blackwater	Sagittarius	3	3
Sagittarius	Rangal	4	4
Rangal	Burngrove	6	6
Burngrove	Tolmies	2	2
Tolmies	Comet	17	23
Comet	Yamala	18	19
Yamala	Nogoa	20	20
Yukan	Black Mountain	12	16
Black Mountain	Hatfield	11	13
Hatfield	Bolingbroke	9	9
Bolingbroke	Balook	13	13
Balook	Wandoo	9	9
Wandoo	Waitara	12	14
Waitara	Braeside	6	6
Braeside	Mindi	11	11
Mindi	South Walker Junction	6	6
South Walker Junction	Tootoolah	5	5
Tootoolah	Macarthur Junction	4	4

Location from	Location to	Up (minutes)	Down (minutes)
Macarthur Junction	Coppabella	5	6
Coppabella	Broadlea	13	13
Broadlea	Carborough Downs Junction	3	4
Carborough Downs Junction	Mallawa	7	11
Mallawa	Isaac Plains Junction	3	5
Isaac Plains Junction	Wotonga	2	3
Wotonga	Moranbah	13	14
Moranbah	Caval Ridge Junction	3	3
Caval Ridge Junction	Villafranca	15	15
Villafranca	Mt McLaren	16	18

Appendix B: Below Rail Maintenance

B1 Maintenance Hours by Mainline and Branch Line¹

Main / Branch Line	AN's Reporting Corridor	FY27												FY28-FY31	
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual Total	Annual Total
1. M.L. – McNaughton Junction to Pring 1A: B.L. - Pring to Abbot Point 1B: B.L. - Newlands Junction to McNaughton Junction 2A: B.L. - North Goonyella Junction to Newlands	Newlands Mainline (incl Gape and Ports)	64	37	479	243	175	37	47	42	456	223	75	41	1,919	1,919
3. M.L. - Coppabella to Jilalan 3A: B.L. - Jilalan to Port of Hay Point	Goonyella Mainline (incl Ports)	442	501	211	373	328	391	89	224	149	266	177	73	3,225	3,225
3B: B.L. - Hail Creek Mine to South Walker Creek Junction	Hail Creek Branch	148	108	2	65	7	42	17	36	3	60	11	7	504	504
3C: B.L. - Oaky Creek Junction to Coppabella	Gregory Branch (Goonyella)	89	124	68	165	257	65	53	22	121	187	156	32	1,338	1,338
3E: B.L. - North Goonyella Mine to Wotonga 3D: B.L. - Coppabella to Wotonga	North Goonyella Branch	137	199	116	111	98	85	77	74	27	153	142	56	1,276	1,276
3F: B.L. - Blair Athol Mine to Wotonga 3D: B.L. - Coppabella to Wotonga	Blair Athol Branch	143	213	80	92	137	76	61	111	30	144	147	60	1,293	1,293
4. M.L. - Bluff to Callemondah 4A: B.L. - Callemondah to Port of Gladstone	Blackwater Mainline (incl Ports)	584	626	569	506	450	352	476	368	426	540	673	306	5,876	5,876
4B: B.L. - Burngrove to Bluff	Koorilgah Branch	7	34	18	40	46	39	81	60	116	104	36	27	607	607
4C: B.L. - Rolleston Mine to Rangal	Rolleston Branch	26	21	19	37	54	41	74	64	84	135	18	35	608	608
4D: B.L. - Oaky Creek Junction to Burngrove	Gregory Branch (Blackwater)	9	7	12	55	98	32	85	19	92	25	26	8	469	469
5. M.L. – Boundary Hill Junction to Callemondah 5A: B.L. – Boundary Hill Junction to Earlsfield 5C: B.L. - Earlsfield to Moura	Moura Mainline (incl Ports)	33	171	34	197	130	49	227	69	47	29	156	49	1,191	1,191
5B: B.L. - Earlsfield to Callide	Callide Branch	18	9	10	23	19	22	84	6	20	76	20	11	318	318

¹ Consistent with AN's reporting method, maintenance possessions hours that impact multiple mainlines and branch lines are attributed to each affected line. For example, branch line 3D is counted in both the North Goonyella and Blair Athol branch totals. This results in differences between aggregated totals and the figures presented in Appendix B2 (Maintenance Hours by maintenance type and coal system).

B2 Maintenance Hours by Maintenance Type and Coal System

System	Maintenance Type	FY27												FY28– FY31	
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual Total	Annual Total
CQCN	Integrated Closures	-	228	106	228	180	36	120	36	140	144	260	-	1,478	1,478
	Reclassified Integrated Closures	-	-	-	24	-	-	-	-	-	24	-	-	48	48
	Major Maintenance	600	394	379	371	357	302	235	349	403	372	358	96	4,216	4,216
	Minor Maintenance	817	628	699	723	1,103	689	626	487	561	682	653	507	8,174	8,174
	Total	1,417	1,249	1,184	1,346	1,640	1,027	982	871	1,104	1,221	1,271	603	13,915	13,915
Newlands-GAPE	Integrated Closures	-	-	106	-	60 ¹	-	-	-	104	-	-	-	270	270
	Reclassified Integrated Closures	-	-	-	24	-	-	-	-	-	24	-	-	48	48
	Major Maintenance	-	-	6	92	8	-	7	9	4	29	3	3	160	160
	Minor Maintenance	63	37	46	31	71	37	38	33	32	69	70	39	567	567
	Total	63	37	158	147	139	37	45	42	140	122	73	41	1,045	1,045
Goonyella	Integrated Closures	-	108	-	60	60	36	-	36	-	60	60	-	420	420
	Reclassified Integrated Closures	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major Maintenance	354	122	108	174	136	207	15	97	66	81	32	-	1,390	1,390
	Minor Maintenance	413	251	283	250	541	230	194	165	226	231	294	177	3,254	3,254
	Total	767	481	391	484	737	474	209	297	292	371	386	177	5,064	5,064
Blackwater	Integrated Closures	-	60	-	84	60	-	36	-	36	84	100	-	460	460
	Reclassified Integrated Closures	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major Maintenance	234	242	266	87	189	95	161	217	331	260	324	91	2,497	2,497
	Minor Maintenance	303	276	334	363	395	350	364	252	255	283	221	247	3,643	3,643
	Total	537	578	599	534	644	445	560	469	622	628	645	338	6,600	6,600
Moura	Integrated Closures	-	60	-	84	-	-	84	-	-	-	100	-	328	328
	Reclassified Integrated Closures	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major Maintenance	12	30	-	18	24	-	53	26	2	2	-	2	169	169
	Minor Maintenance	38	64	36	79	95	71	31	38	48	98	67	45	710	710
	Total	50	154	36	181	119	71	167	64	50	100	167	47	1,207	1,207

¹ The 60 hours of IC shown for Newlands-GAPE in November 2026 reflects a Gregory Branch Line shut in the Goonyella system. AN's MRSB provided to the IE indicated that this shut included the Eaglefield Creek to North Goonyella section, which, in the Model, prevents dispatch to Goonyella-based mines for the Newlands-GAPE system. While AN has since amended the MRSB, the correction was not identified in time to update the SOP or ACAR26 Model inputs.

B3 Moving Maintenance – Rail Grinding per Section

Section From	Section To	Frequency (times per year)	Average Duration (minutes)	Annual Duration (minutes)	Annual Section Occupancy (minutes)
Newlands-GAPE Systems					
Briaba	Almoola	4	109	436	654
Almoola	Briaba	4	75	300	450
Almoola	Collinsville	4	14	56	84
Collinsville	Almoola	4	24	96	144
Collinsville	McNaughton	4	7	28	42
McNaughton Junction	Sonoma Junction	4	29	116	174
Sonoma Junction	Birralee	4	42	168	252
Binbee	Briaba	3	79	237	356
Briaba	Binbee	3	65	195	293
Pring	Buckley	2	19	38	57
Buckley	Pring	2	20	40	60
Buckley	Armuna	2	93	186	279
Armuna	Buckley	2	53	106	159
Armuna	Aberdeen	2	75	150	225
Aberdeen	Armuna	2	62	124	186
Aberdeen	Binbee	2	61	122	183
McNaughton Junction	Collinsville	2	10	20	30
Binbee	Aberdeen	2	52	104	156
Sonoma Junction	McNaughton	2	24	48	72
Birralee	Sonoma Junction	2	30	60	90
Birralee	Cockool	2	79	158	237
Cockool	Birralee	2	66	132	198
Havilah	Cockool	2	112	224	336
Cockool	Havilah	2	79	158	237
Carmichael Junction	Havilah	2	69	138	207
Havilah	Carmichael Junction	2	57	114	171
Carmichael Junction	Newlands Main Line	2	8	16	24
Newlands Main Line	Carmichael Junction	2	11	22	33
Byerwen Junction	Leichhardt Range	2	61	122	183
Leichhardt Range	Byerwen Junction	2	53	106	159
Byerwen Junction	Suttor Creek	2	46	92	138
Suttor Creek	Byerwen Junction	2	71	142	213
Suttor Creek	Eaglefield Creek	2	89	178	267
Eaglefield Creek	Suttor Creek	2	171	342	513
North Goonyella Junction	Eaglefield Creek	2	34	68	102
Durroburra	Kaili	2	36	72	108
Kaili	Durroburra	2	28	56	84
Kaili	BRC Junction	2	13	26	39
Abbot Point Staging	BRC Junction	2	25	50	75
BRC Junction	Kaili	2	14	28	42
BRC Junction	Abbot Point Staging	2	27	54	81

Section From	Section To	Frequency (times per year)	Average Duration (minutes)	Annual Duration (minutes)	Annual Section Occupancy (minutes)
Total				5,106	7,659

Goonyella System					
Yukan	Black Mountain	8	109	872	1,308
Black Mountain	Hatfield	8	71	568	852
Wandoo	Waitara	8	72	576	864
Waitara	Braeside	8	51	408	612
Braeside	Mindi	8	76	608	912
Mindi	South Walker	8	51	408	612
South Walker Junction	Tootoolah	8	37	296	444
Tootoolah	Macarthur Junction	8	28	224	336
Macarthur Junction	Coppabella	8	31	248	372
Coppabella	Macarthur Junction	10	39	390	585
Macarthur Junction	Tootoolah	10	32	320	480
Tootoolah	South Walker	10	36	360	540
South Walker Junction	Mindi	10	51	510	765
Mindi	Braeside	10	76	760	1,140
Braeside	Waitara	10	55	550	825
Waitara	Wandoo	10	101	1,010	1,515
Wandoo	Balook	10	72	720	1,080
Balook	Bolingbroke	10	127	1,270	1,905
Bolingbroke	Hatfield	10	75	750	1,125
Hatfield	Black Mountain	10	90	900	1,350
Black Mountain	Yukan	10	110	1,100	1,650
Yukan	Oonooie	10	23	230	345
Hatfield	Bolingbroke	10	69	690	1,035
Bolingbroke	Balook	10	108	1,080	1,620
Balook	Wandoo	10	51	510	765
Oonooie	Jilalan	10	36	360	540
Jilalan	Oonooie	10	36	360	540
Oonooie	Yukan	10	21	210	315
Jilalan	Praguelands	8	36	288	432
Praguelands	Dalrymple Crossover	8	45	360	540
Dalrymple Crossover Points	Praguelands	8	33	264	396
Praguelands	Jilalan	8	38	304	456
Total				17,504	26,256

Blackwater System					
Walton	Bluff	2	57	114	171
Umolo	Parnabal	2	45	90	135
Parnabal	Walton	2	46	92	138
Callemondah	Gladstone	2	44	88	132
Gladstone Powerhouse Junction	Callemondah	2	9	18	27

Section From	Section To	Frequency (times per year)	Average Duration (minutes)	Annual Duration (minutes)	Annual Section Occupancy (minutes)
Gladstone Powerhouse Junction	Golding	2	19	38	57
Golding	Gladstone	2	19	38	57
Warren	Wycarbah	3	119	357	536
Westwood	Windah	3	87	261	392
Tryphinia	Dingo	3	95	285	428
Bajool	Archer	3	75	225	338
Tunnel	Edungalba	3	69	207	311
Windah	Grantleigh	3	76	228	342
Gracemere	Kabra	3	89	267	401
Duaringa	Wallaroo	3	65	195	293
Wallaroo	Tryphinia	3	88	264	396
Archer	Midgee	3	67	201	302
Aldoga	Mt. Larcom	3	50	150	225
Edungalba	Aroona	3	66	198	297
Ambrose	Epala	3	55	165	248
Midgee	Archer	3	58	174	261
Yarwun	Aldoga	3	58	174	261
Grantleigh	Tunnel	3	43	129	194
Wycarbah	Westwood	3	61	183	275
Aroona	Duaringa	3	52	156	234
Callemondah	Mt. Miller	3	45	135	203
Rocklands	Midgee	3	36	108	162
Dingo	Umolo	3	36	108	162
Mt. Miller	Yarwun	3	40	120	180
Dingo	Tryphinia	4	89	356	534
Windah	Westwood	4	64	256	384
Wycarbah	Warren	4	85	340	510
Epala	Raglan	4	82	328	492
Grantleigh	Windah	4	68	272	408
Raglan	Marmor	4	61	244	366
Tunnel	Grantleigh	4	70	280	420
Marmor	Raglan	4	55	220	330
Kabra	Warren	4	80	320	480
Kabra	Gracemere	4	79	316	474
Marmor	Bajool	4	51	204	306
Bajool	Marmor	4	49	196	294
Raglan	Epala	4	53	212	318
Archer	Bajool	4	44	176	264
Rocklands	Gracemere	4	54	216	324
Midgee	Rocklands	4	47	188	282
Warren	Kabra	4	44	176	264
Westwood	Wycarbah	4	40	160	240
Gracemere	Rocklands	4	38	152	228

Section From	Section To	Frequency (times per year)	Average Duration (minutes)	Annual Duration (minutes)	Annual Section Occupancy (minutes)
Edungalba	Tunnel	5	83	415	623
Aroona	Edungalba	5	64	320	480
Mt. Larcom	Aldoga	5	63	315	473
Tryphinia	Wallaroo	5	98	490	735
Wallaroo	Duaringa	5	61	305	458
Aldoga	Yarwun	5	50	250	375
Walton	Parnabal	5	42	210	315
Duaringa	Aroona	5	62	310	465
Umolo	Dingo	5	49	245	368
Bluff	Walton	5	45	225	338
Ambrose	Mt. Larcom	5	43	215	323
Parnabal	Umolo	5	44	220	330
Yarwun	Mt. Miller	5	34	170	255
Epala	Ambrose	5	46	230	345
Mt. Miller	Callemondah	5	32	160	240
Mt. Larcom	Ambrose	5	49	245	368
Total				13,705	20,558

Moura System					
Fry	Mt. Rainbow	2	214	428	641
Mt. Rainbow	Dumgree	1	116	116	174
Stirrat	Clarke	1	111	111	167
Byellee	Stowe	1	71	71	106
Graham	Stirrat	1	72	72	109
Clarke	Fry	1	76	76	113
Stowe	Graham	2	28	55	83
Annandale	Earlsfield	1	50	50	74
Callemondah	Byellee	1	23	23	35
Stirrat	Graham	2	57	114	171
Total				1,115	1,673

B4 Infrastructure Maintenance – Hi-Rail (Road Patrol) Schedule per System

System	Route	Week Schedule: Week A (Start - Stop Times per Week Day)					Week Schedule: Week B (Start - Stop Times per Week Day)				
		Mon	Tue	Wed	Thu	Fri	Mon	Tue	Wed	Thu	Fri
Newlands-GAPE	Abbot Point - Collinsville					8:30 - 11:00					
	Collinsville - Abbot Point									8:30 - 12:00	
	Briaba - Havilah							8:30 - 12:00			
	Havilah - Briaba			8:30 - 12:00							
	Cockool - North Goonyella Junction		8:30 - 12:30								
	North Goonyella Junction - Cockool							10:00 - 14:30			
	Total - Hours per week day		-	4.0	3.5	-	2.5	-	4.5	3.5	-
Goonyella	Yukan - Ports - Yukan	8:30 - 13:30									
	Yukan - South Walker Junction							8:30 - 12:30			
	South Walker Junction - Yukan								10:00 - 12:30		
	South Walker Junction - North Goonyella Junction	9:30 - 13:30									
	North Goonyella Junction - South Walker Junction							10:30 - 13:30			
	Moranbah - Blair Athol - Wotonga		9:30 - 12:30								
	Coppabella - Dysart			9:30 - 13:30							
	Dysart - Coppabella								9:00 - 12:00		
	Saraji - Oaky Creek					10:00 - 12:00					
Total - Hours per week day	9.0	3.0	4.0	2.0	-	3.0	4.0	5.5	-	-	
Blackwater	Rangal - Fairhill	10:30 - 11:30						10:30 - 11:30			
	Rocklands - Callemondah	10:00 - 13:00						10:00 - 13:00			
	Ports - East End - Ports		9:30 - 11:30						9:30 - 11:30		
	Midgee - Dingo			8:00 - 12:30							
	Dingo - Midgee								9:30 - 10:30		
	Rangal - Rolleston - Rangal			7:00 - 10:30							
	Rangal - Duaringa								10:30 - 11:30		
	Burngrove - Oaky Creek - Burngrove					8:00 - 12:00					
	Dingo - Burngrove								8:30 - 11:00		

System	Route	Week Schedule: Week A (Start - Stop Times per Week Day)					Week Schedule: Week B (Start - Stop Times per Week Day)				
		Mon	Tue	Wed	Thu	Fri	Mon	Tue	Wed	Thu	Fri
	Mt Miller - Rocklands									8:30 - 11:00	
	Total - Hours per week day	4.0	2.0	8.0	4.0	-	4.0	5.5	1.0	2.5	-
Moura	Dumgree - Callide - Dumgree		9:00 - 11:30					9:00 - 11:30			
	Earlsfield - Callemondah			9:30 - 11:30							
	Earlsfield - Callide					8:00 - 9:30					
	Graham - Earlsfield							9:00 - 12:00			
	Callemondah - Stowe									9:00 - 9:30	
	Total - Hours per week day	-	2.5	2.0	-	1.5	-	2.5	3.0	-	0.5

Appendix C: Non-coal Traffic Timetables

C1 Summary of Non-Coal Traffic Timetables

Traffic type		From	To	Number of modelled services per week	Number of coal train paths used
Passenger	Rockhampton Tilt	Gladstone	Rocklands	8	2
		Rocklands	Gladstone	8	2
	Spirit of QLD	Gladstone	Rocklands	6	2
		Rocklands	Gladstone	6	2
		Durroburra	Kaili	6	1
		Kaili	Durroburra	6	1
	Spirit of Outback	Gladstone	Nogoa	3	2
		Nogoa	Gladstone	3	2
	Limestone	East End mine	Fisherman's Landing	44	1
		Fisherman's Landing	East End mine	44	1
Livestock	Parana	Rocklands	5	1	
	Rocklands	Parana	5	1	
	Rocklands	Nogoa	4	1	
	Nogoa	Rocklands	4	1	
	Durroburra	Kaili	4	1	
	Kaili	Durroburra	4	1	
Freight	Parana	Rocklands	63	1	
	Rocklands	Parana	64	1	
	Rocklands	Nogoa	2	1	
	Nogoa	Rocklands	2	1	
	Durroburra	Kaili	33	1	
	Kaili	Durroburra	33	1	
Grain	Parana	Rocklands	1	1	
	Rocklands	Parana	1	1	
	Rocklands	Nogoa	-	1	
	Nogoa	Rocklands	-	1	
	Yukan	Mt McLaren	4	1	
	Mt McLaren	Yukan	4	1	

Appendix D: Modelled Rail Infrastructure for Private Infrastructure

Private Infrastructure

Private Infrastructure that has been modelled within the Model includes:

In the Newlands and GAPE Systems:

- Boundaries to QR managed track: Kaili and Durroburra
- Byerwen Junction to Byerwen balloon loop
- Carmichael Junction to Carmichael Mine balloon loop. This infrastructure has been updated to include actual private rail network including passing loops along with scheduled sectional run times
- BRC Rail Yard (adjacent to Abbot Point terminal)

In the Goonyella System:

- Nebo Depot
- Caval Ridge Junction to Caval Ridge balloon loop
- Olive Downs Junction to Olive Downs balloon loop
- Middlemount Junction to Middlemount balloon loop

In the Blackwater System:

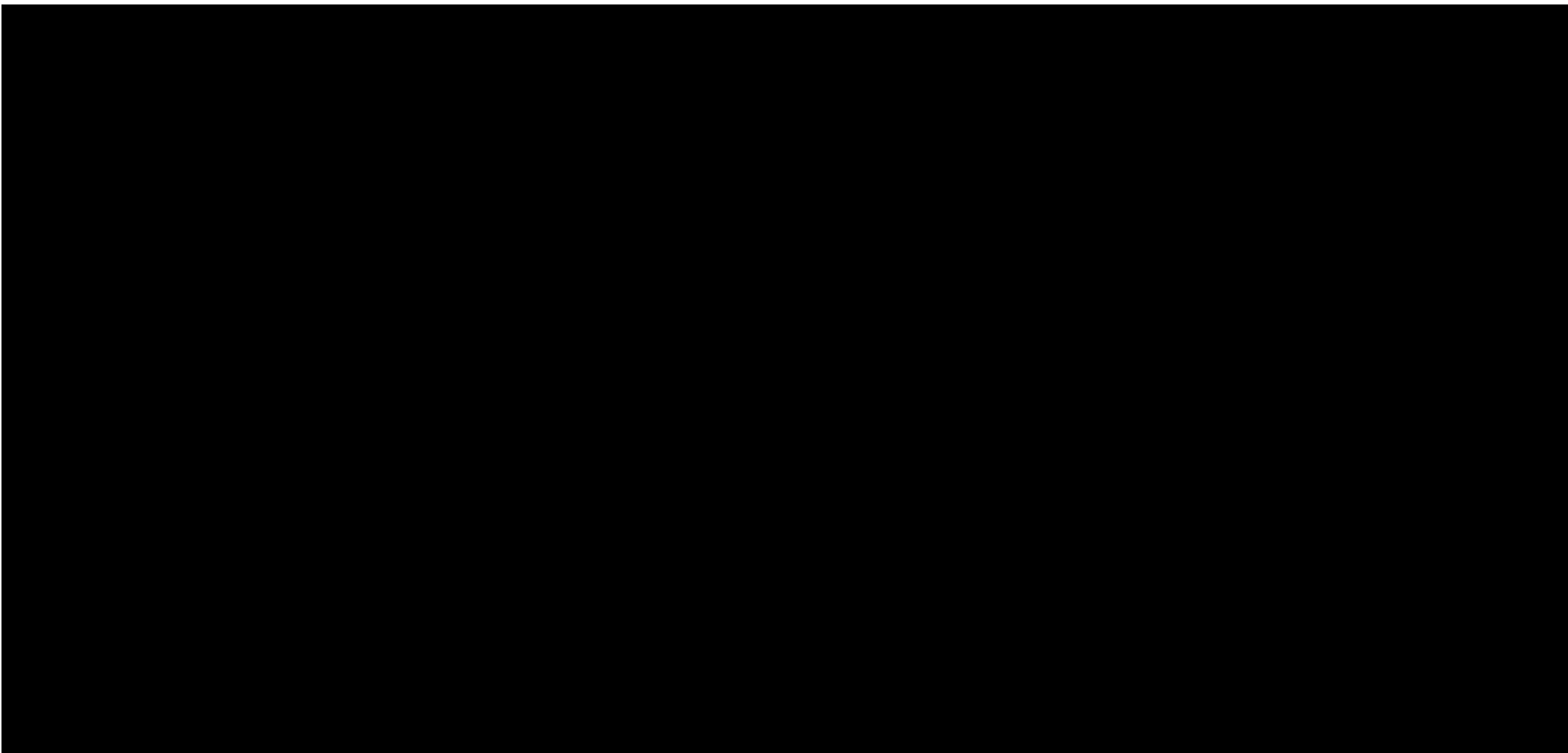
- East End Junction to East End balloon loop
- Meteor Downs South Spur line and balloon loop

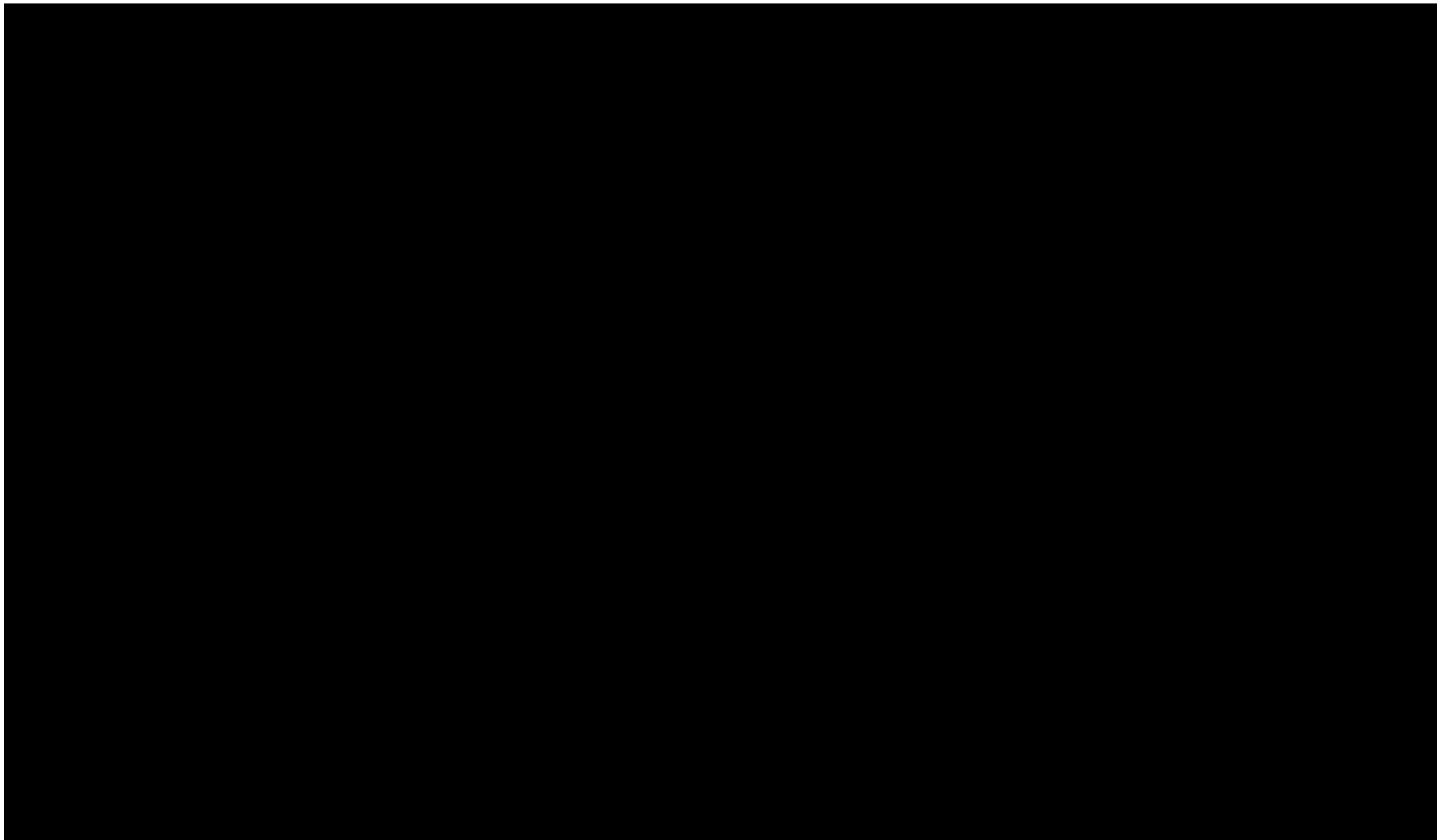
In the Moura System:

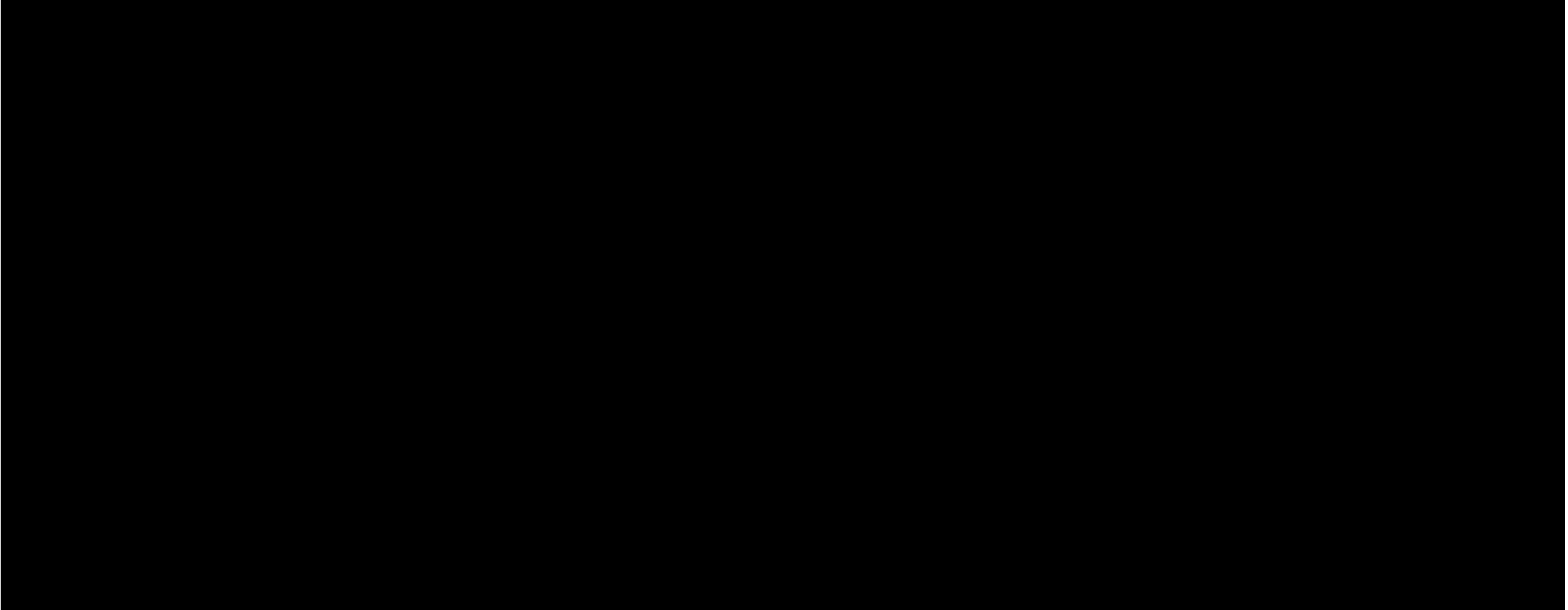
- QAL junction to QAL siding
- Baralaba Junction to Baralaba balloon loop

Appendix E: Committed Capacity Demand (TSEs) (Scaled)

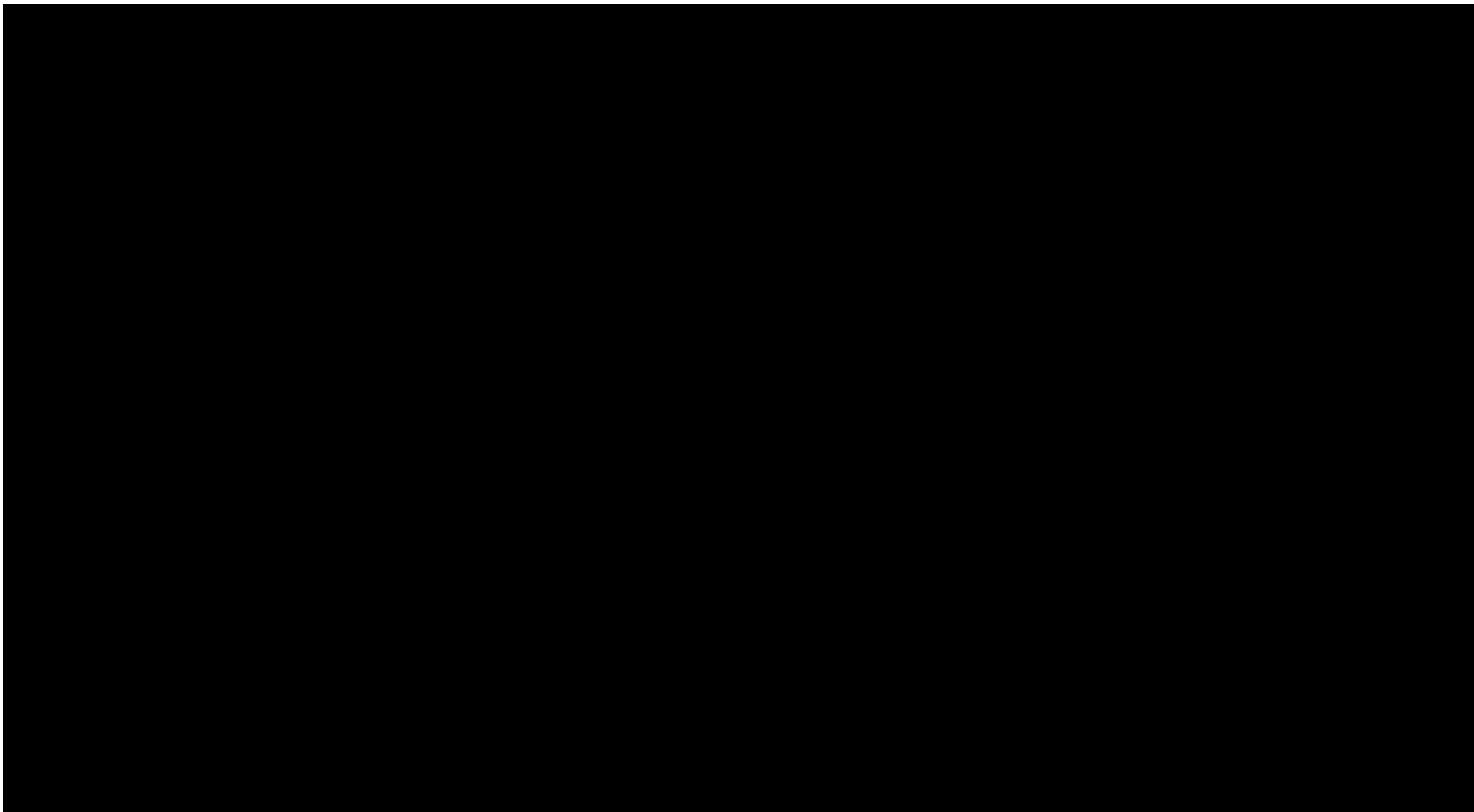
E1 FY27 Committed Capacity - Scaled (TSEs)

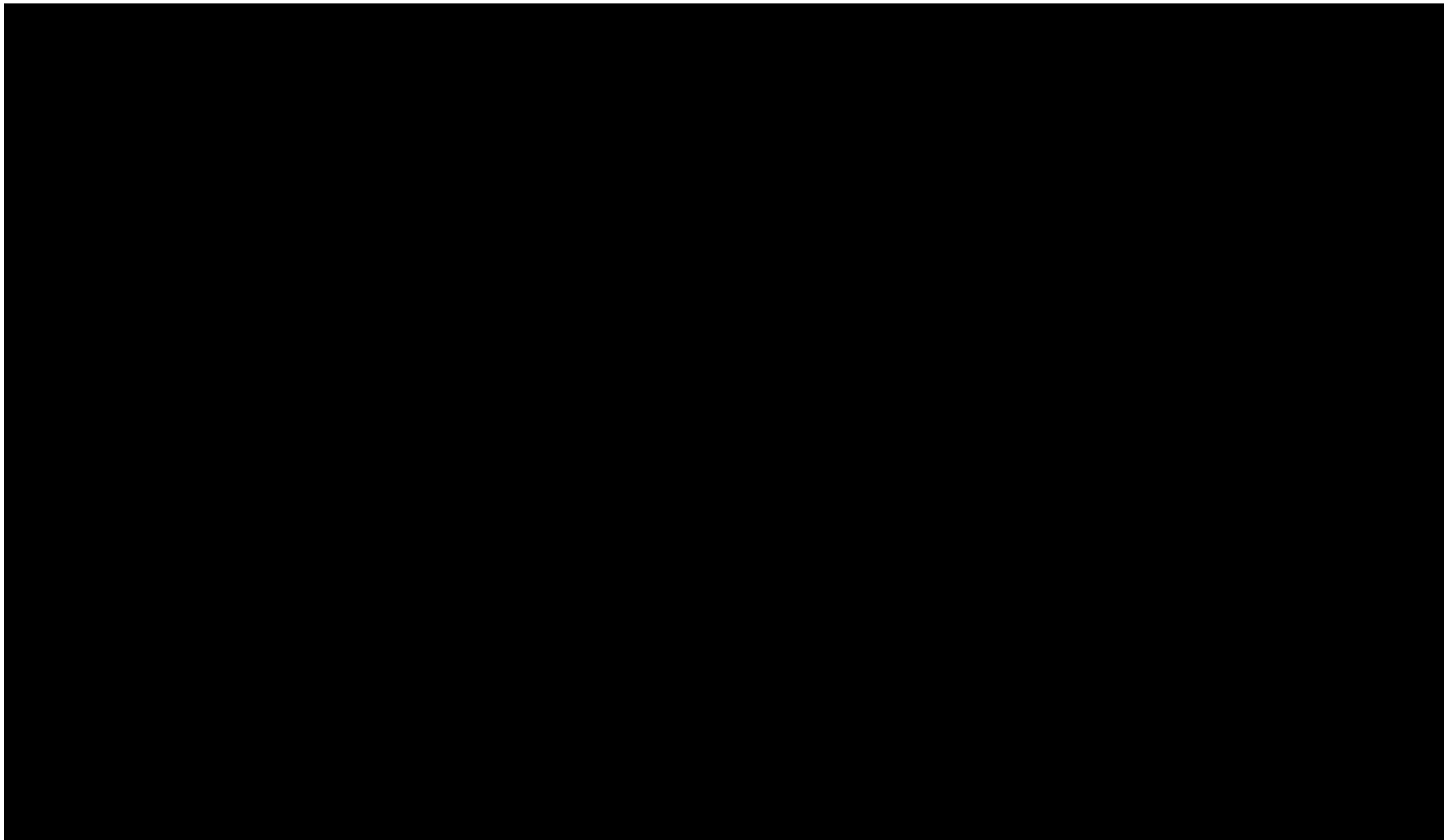


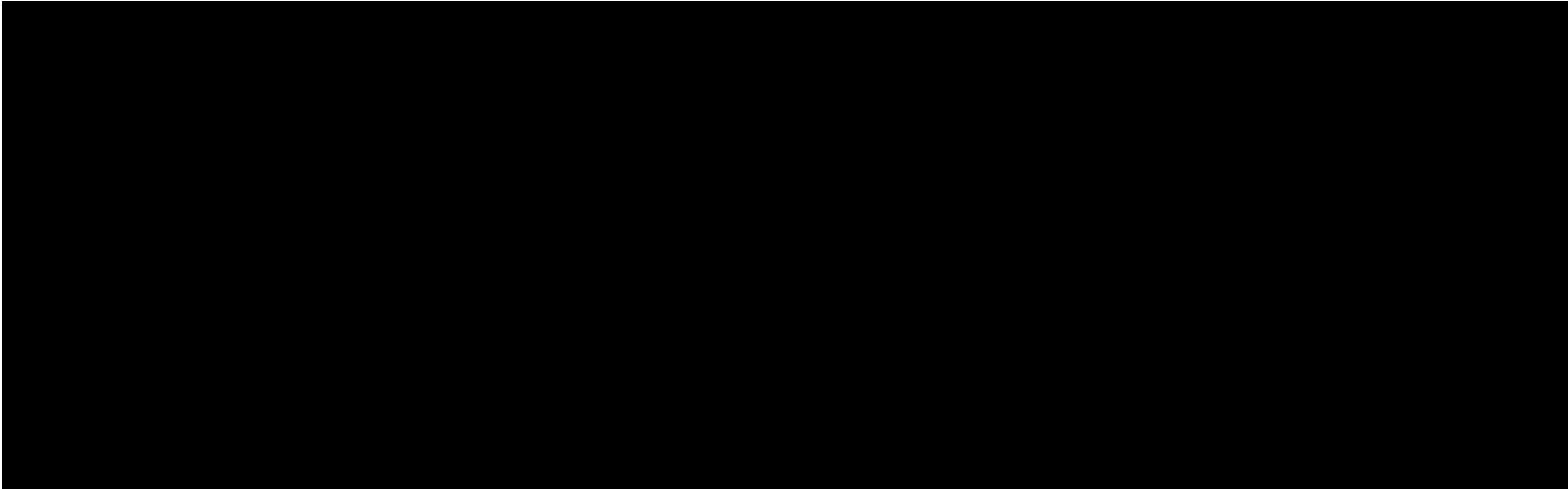




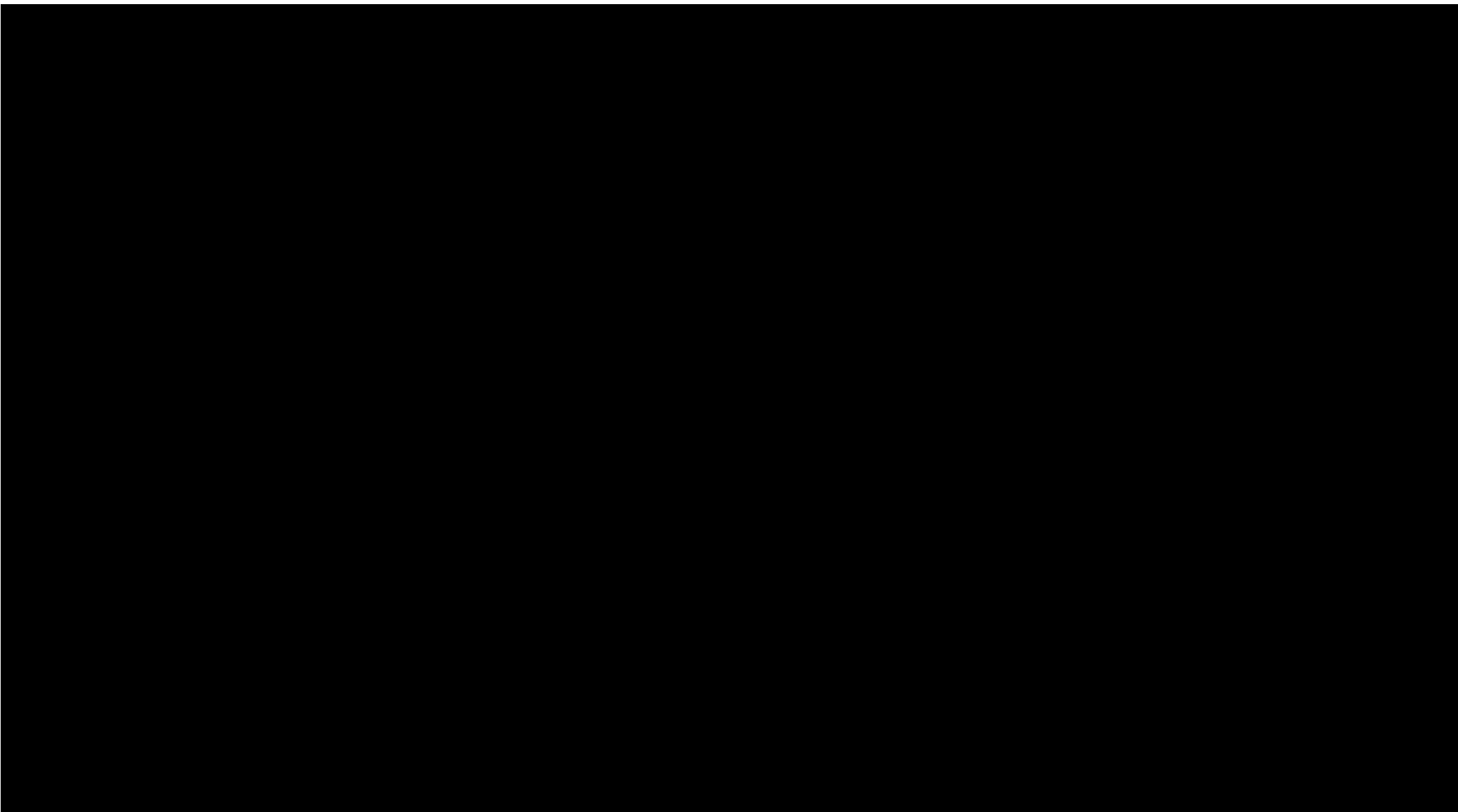
E2 FY28 Committed Capacity - Scaled (TSEs)

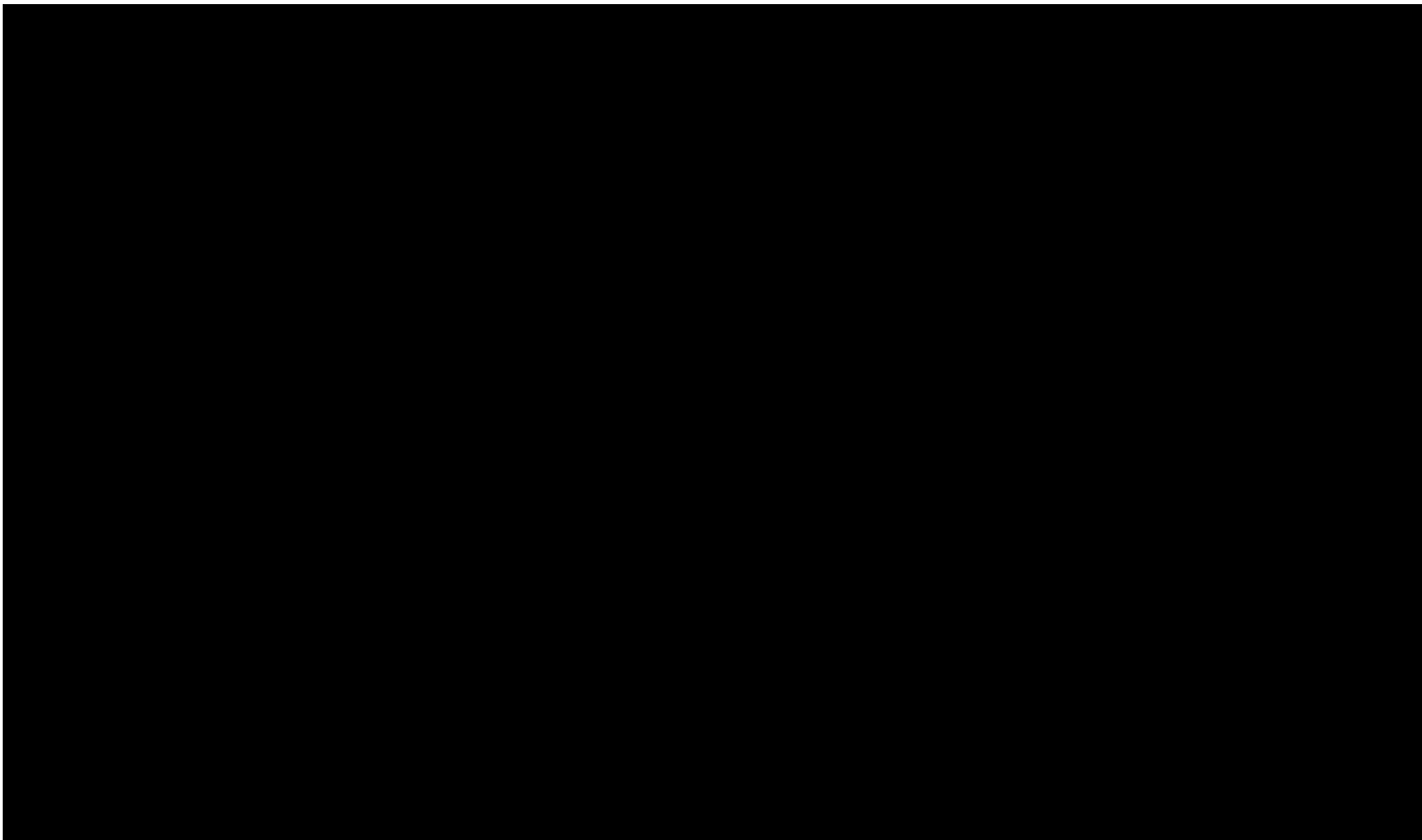


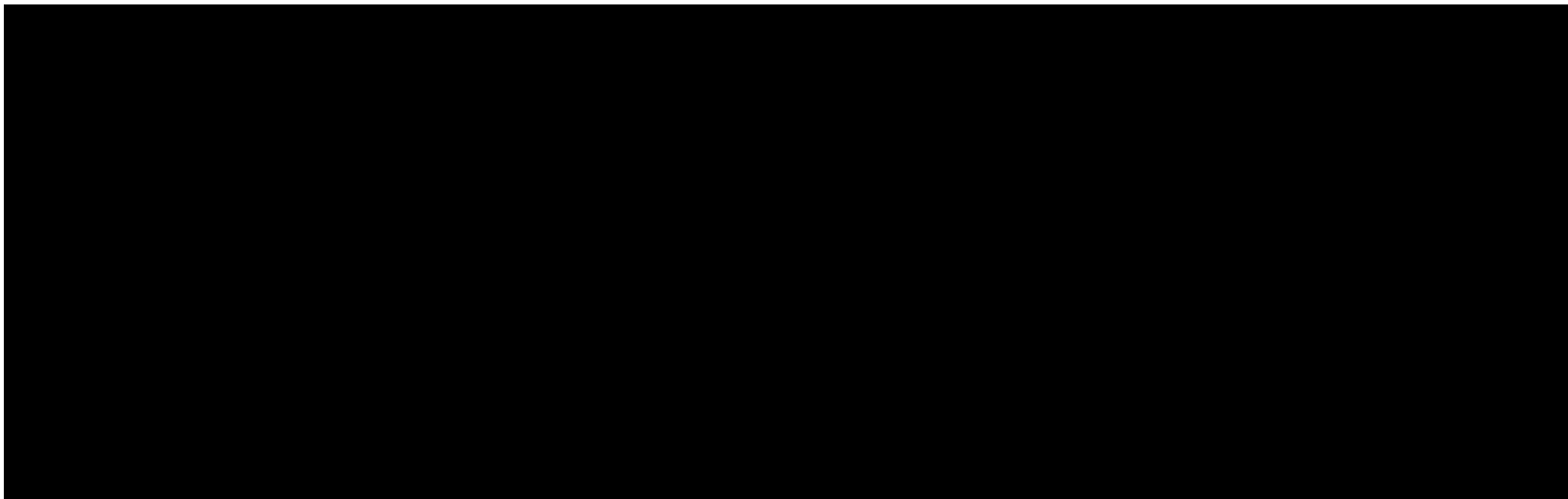




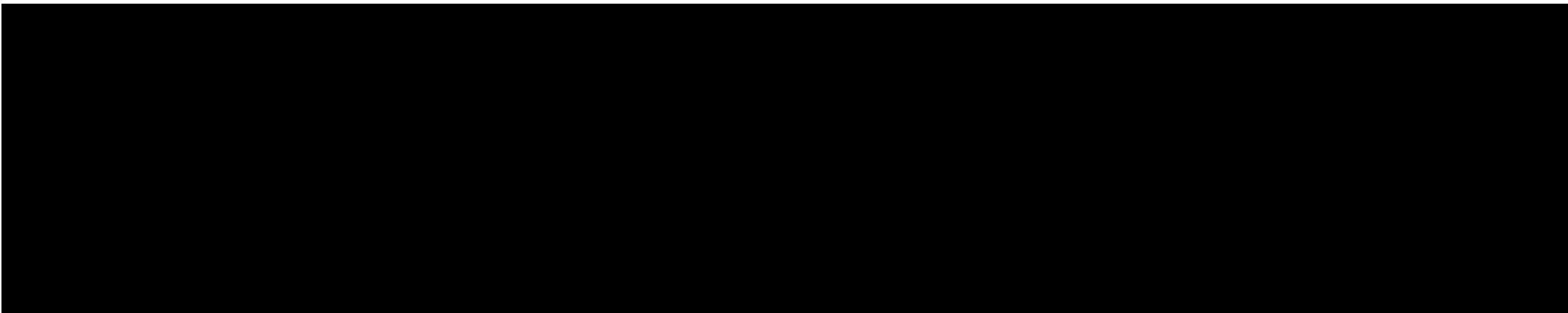
E3 FY29 Committed Capacity - Scaled (TSEs)

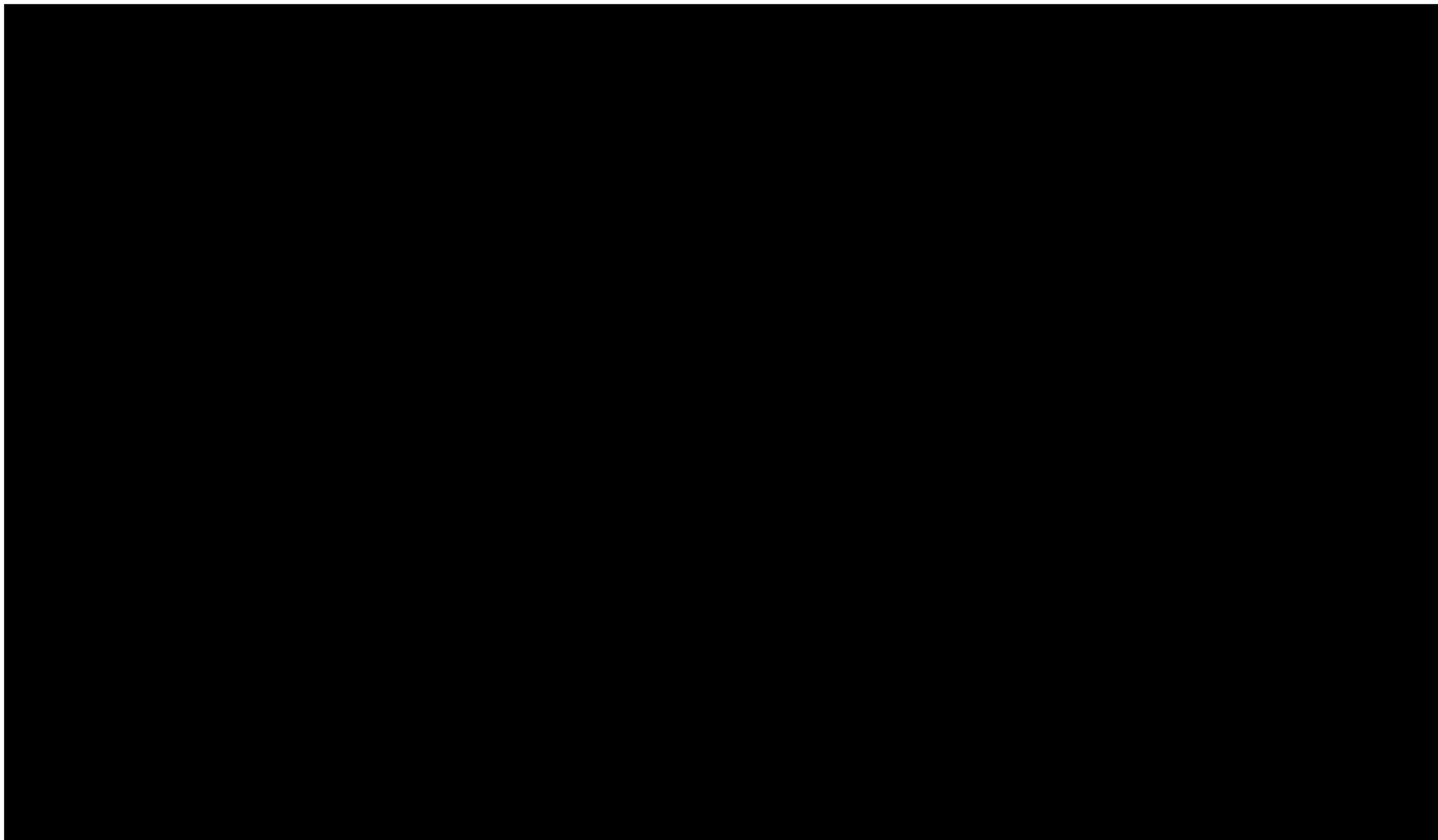


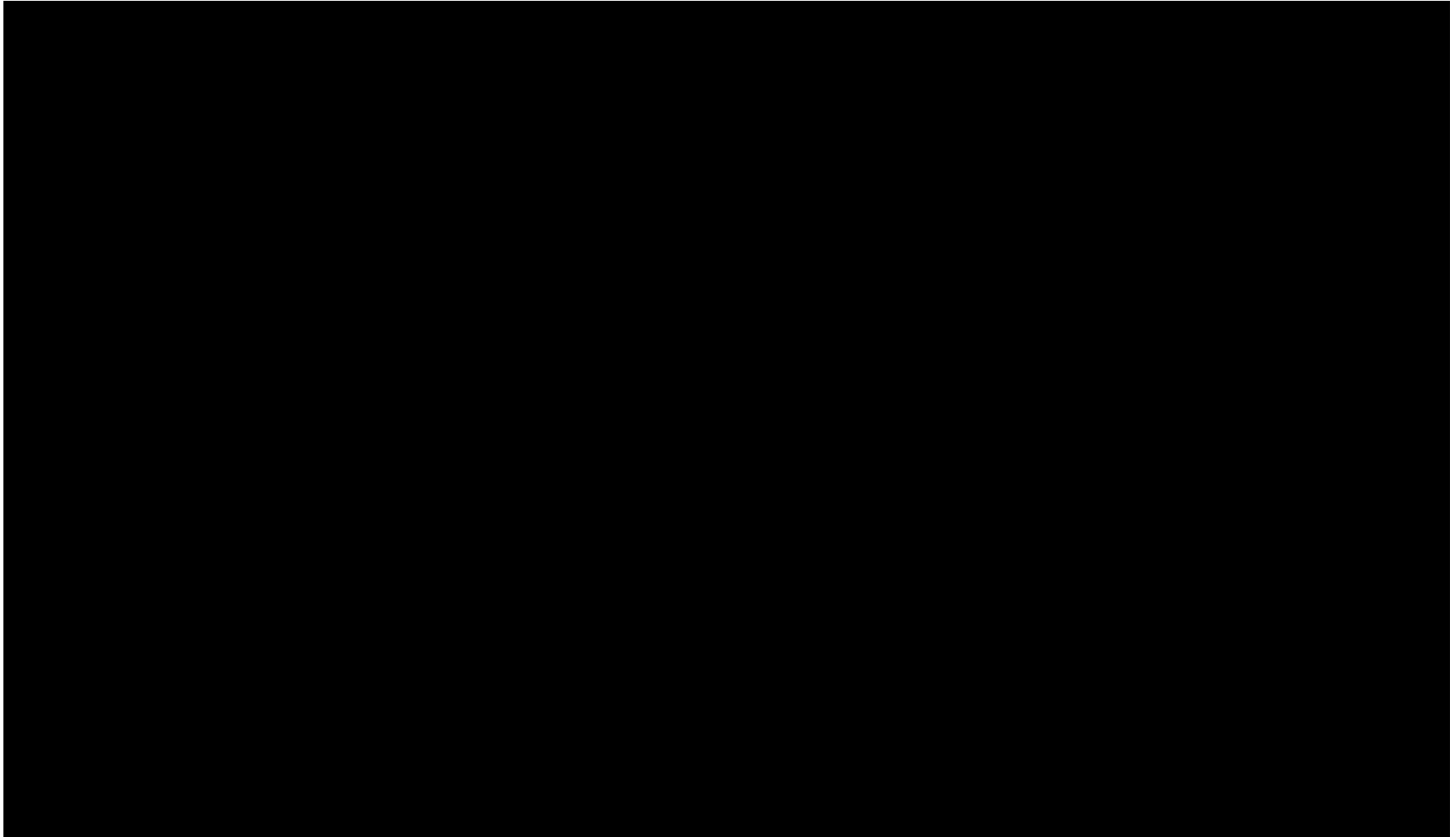


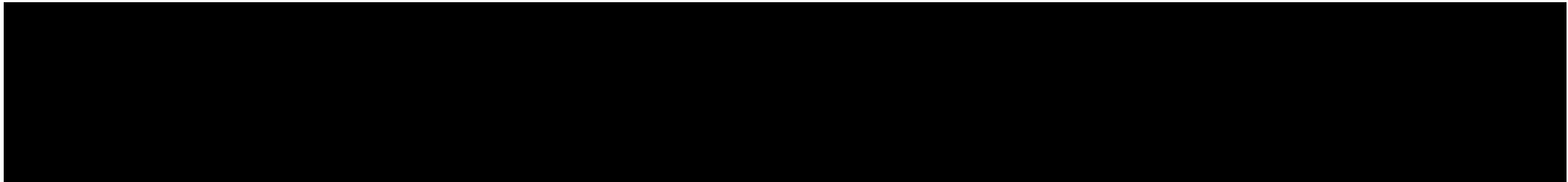


E4 FY30 Committed Capacity - Scaled (TSEs)

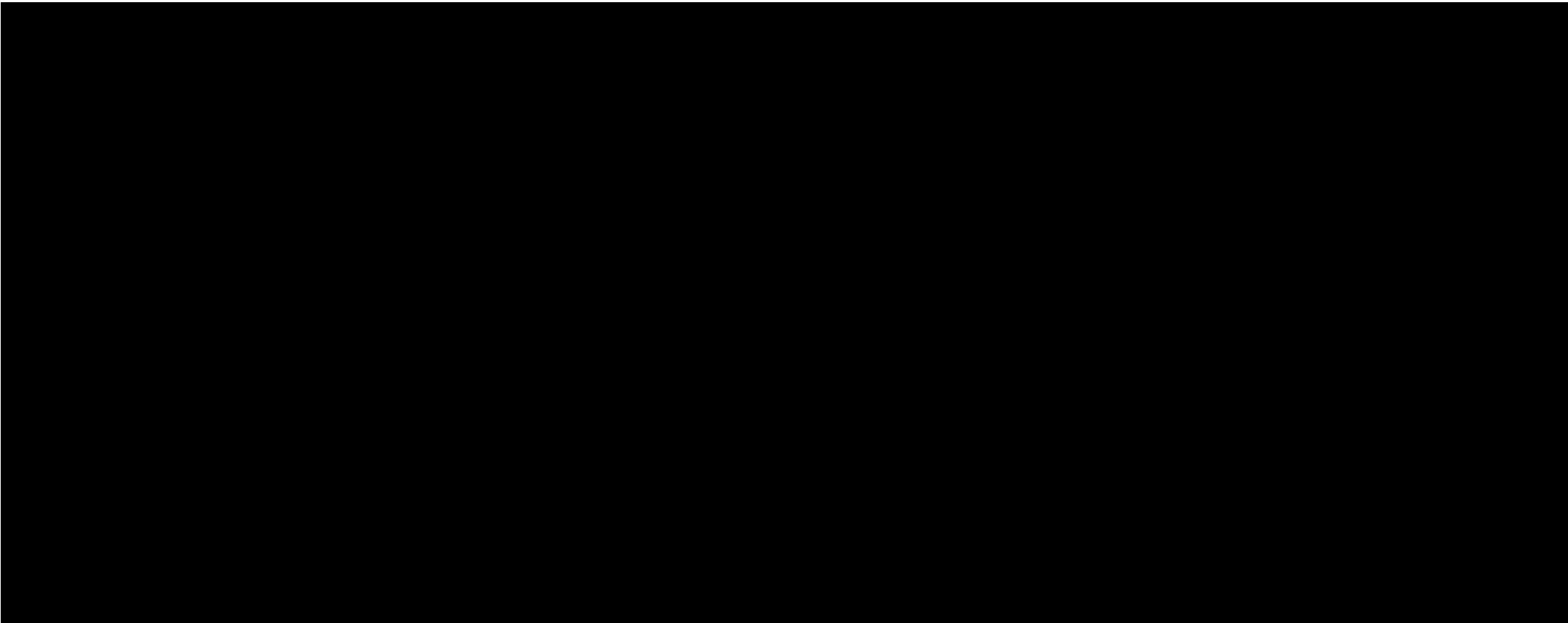


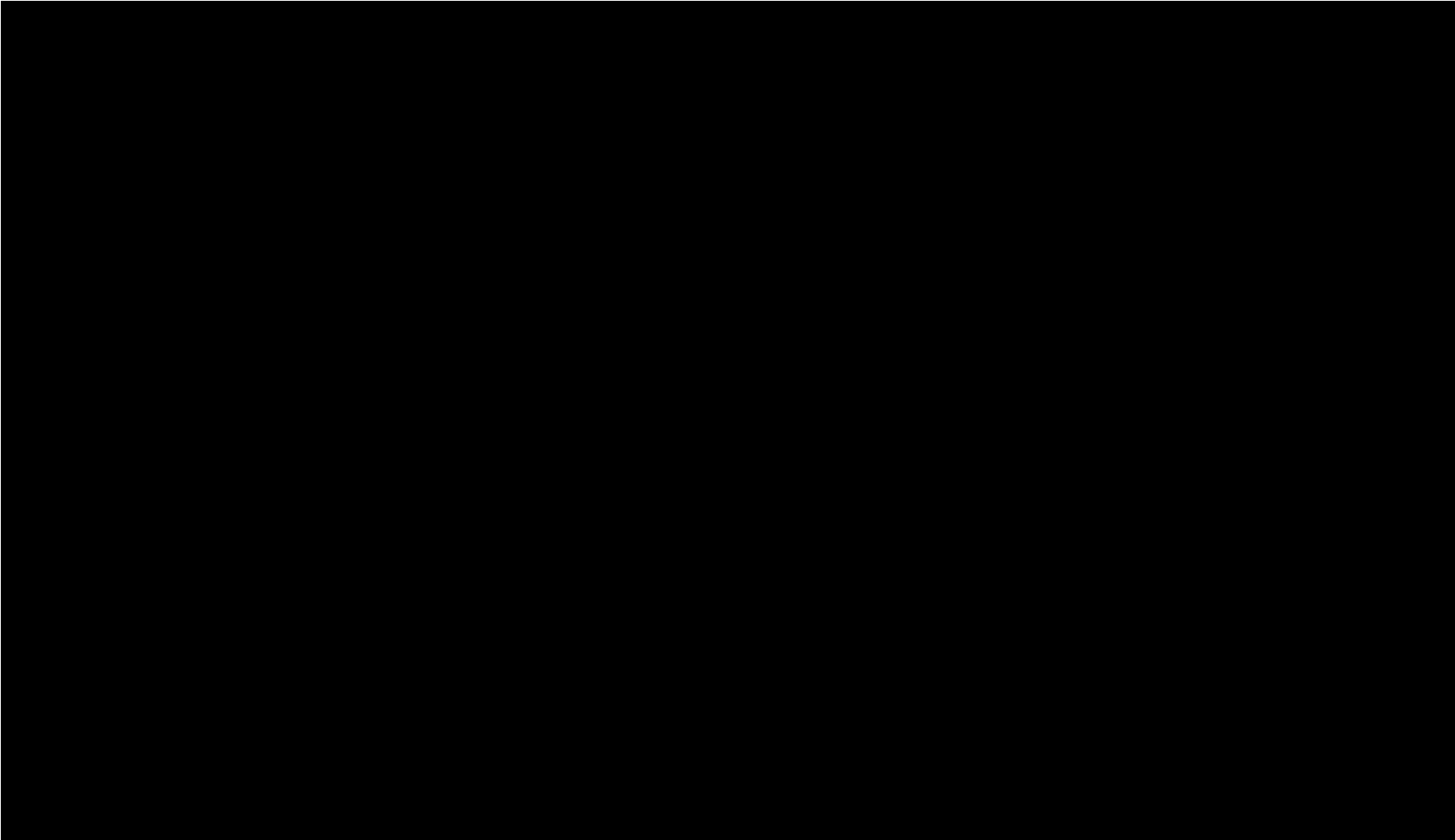


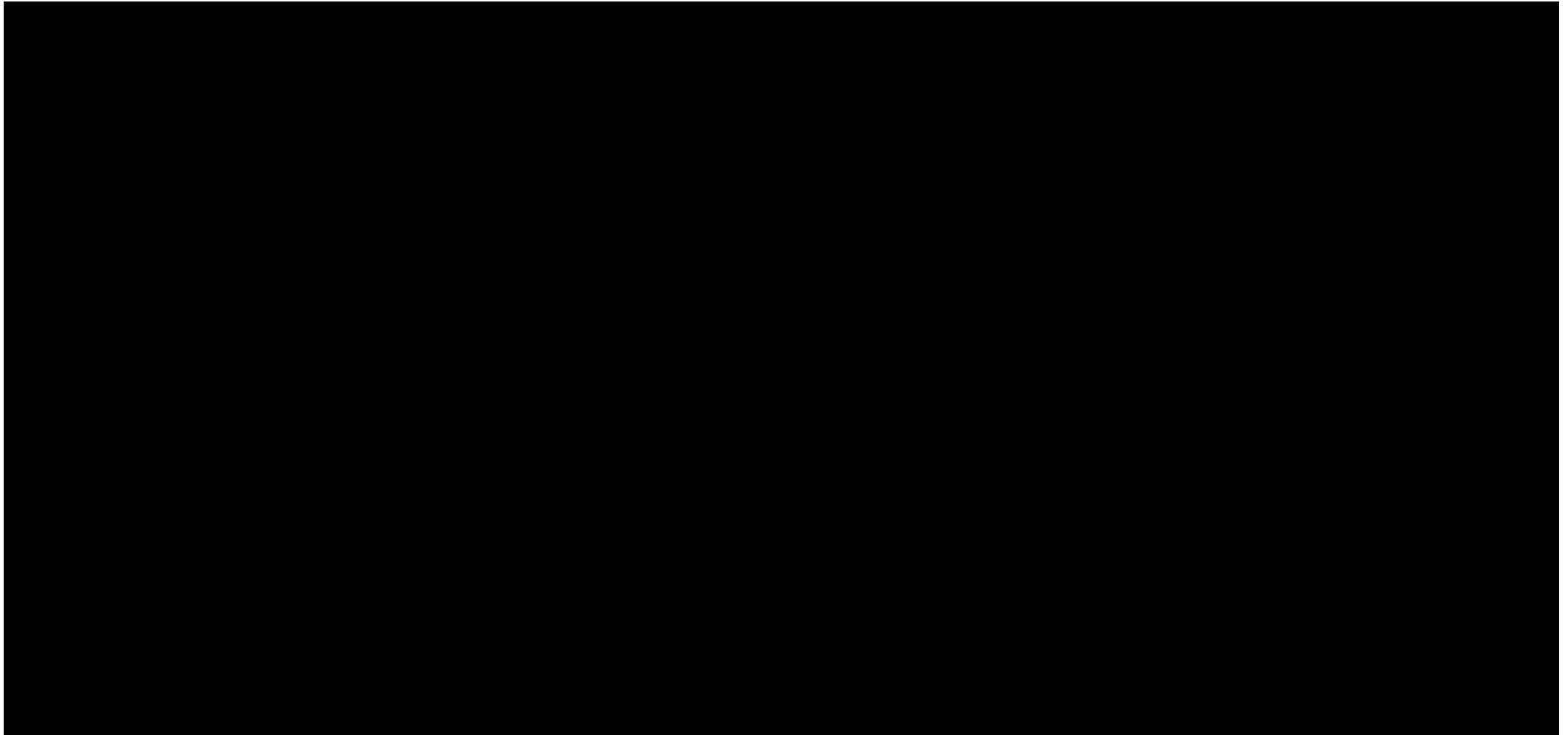




E5 FY31 Committed Capacity - Scaled (TSEs)



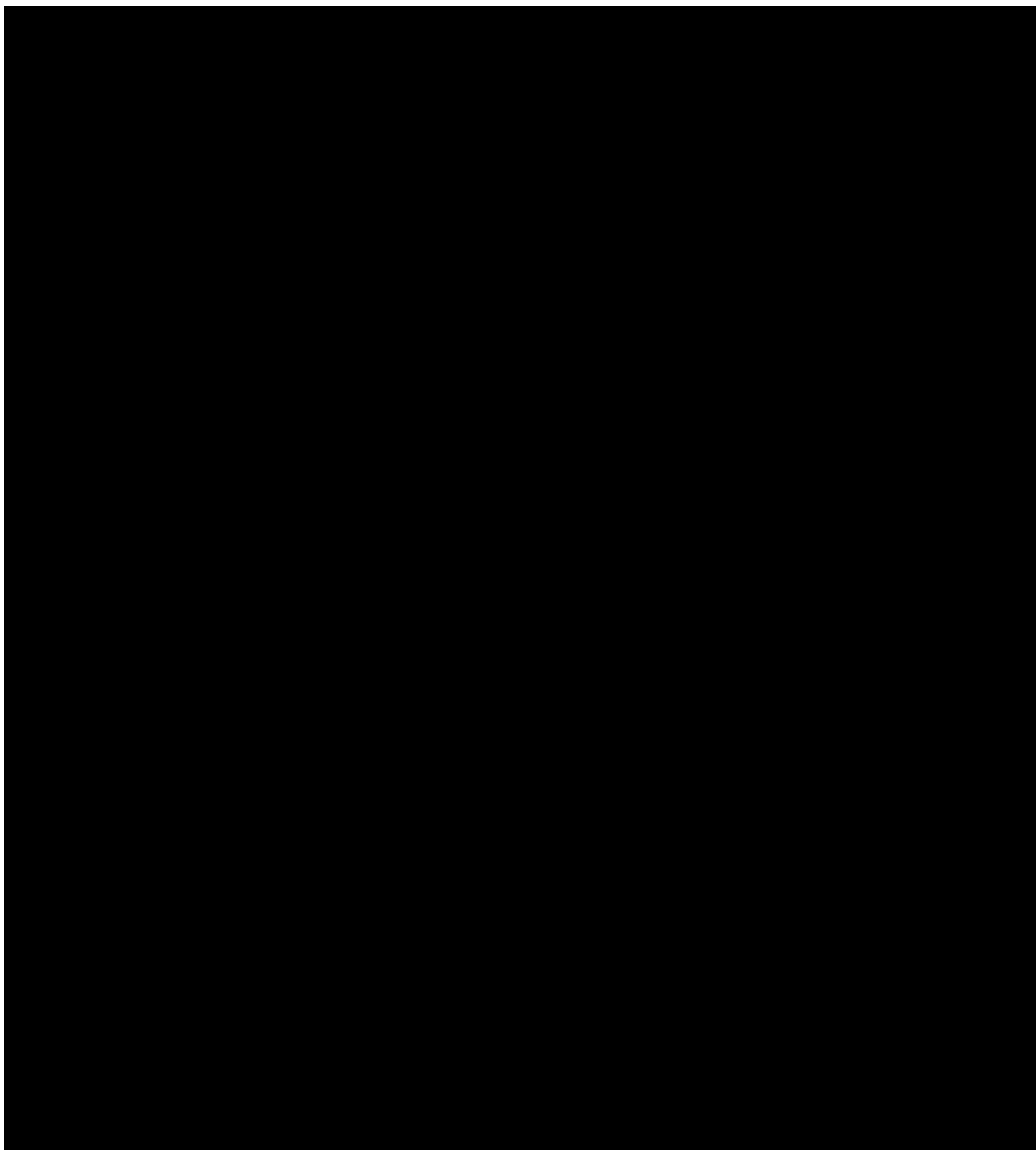




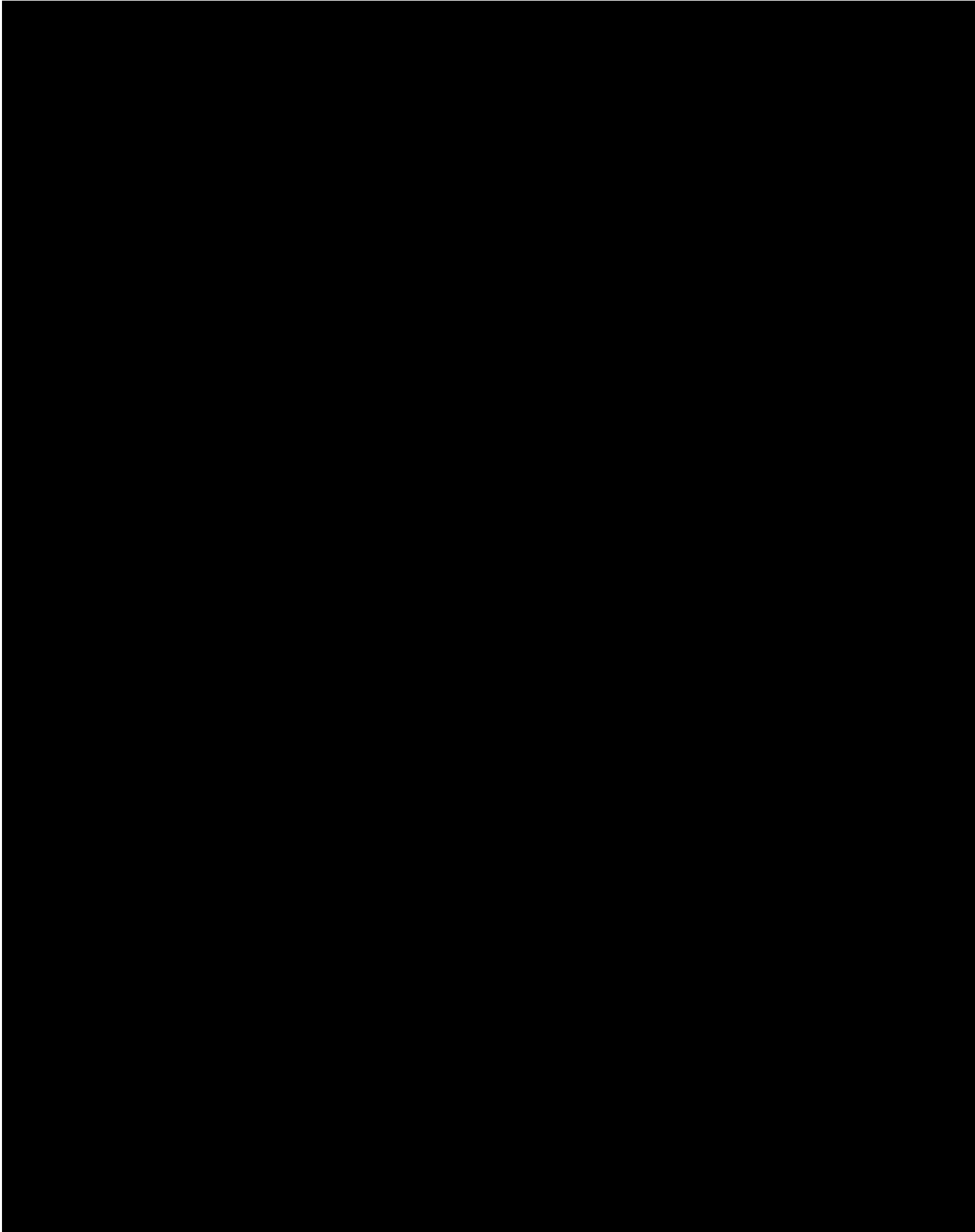
Appendix F: Train Loadout Parameters

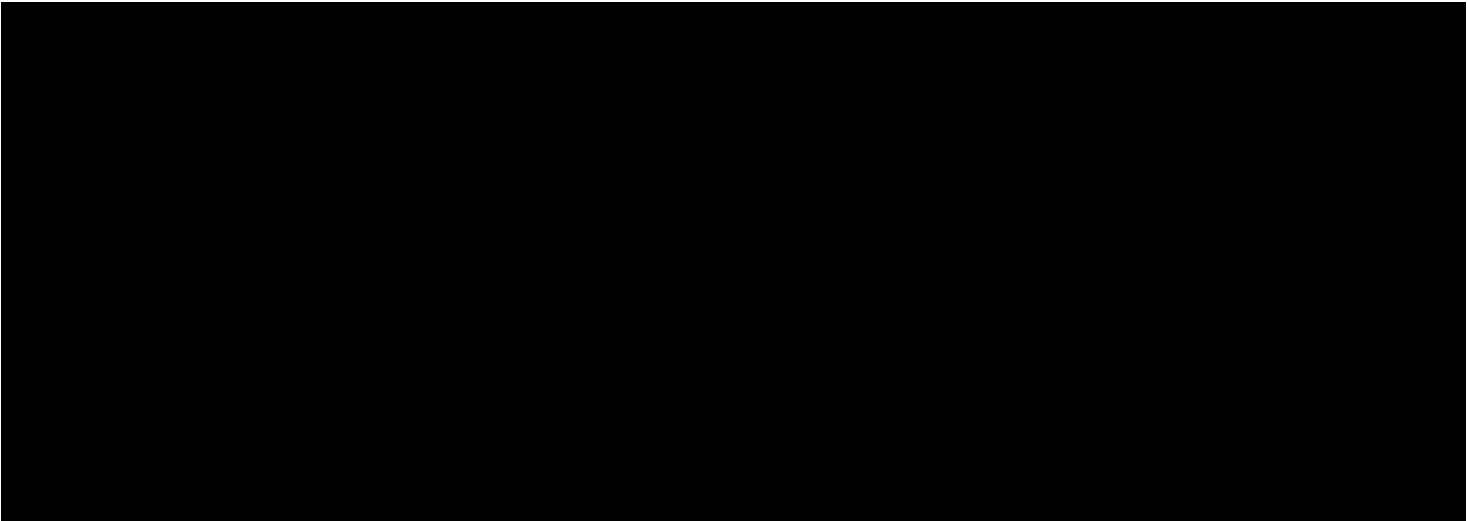
The following data relates to Train Loadout key parameters used in the Model.

F1 TLO Balloon Loop Capacities (Model Inputs)

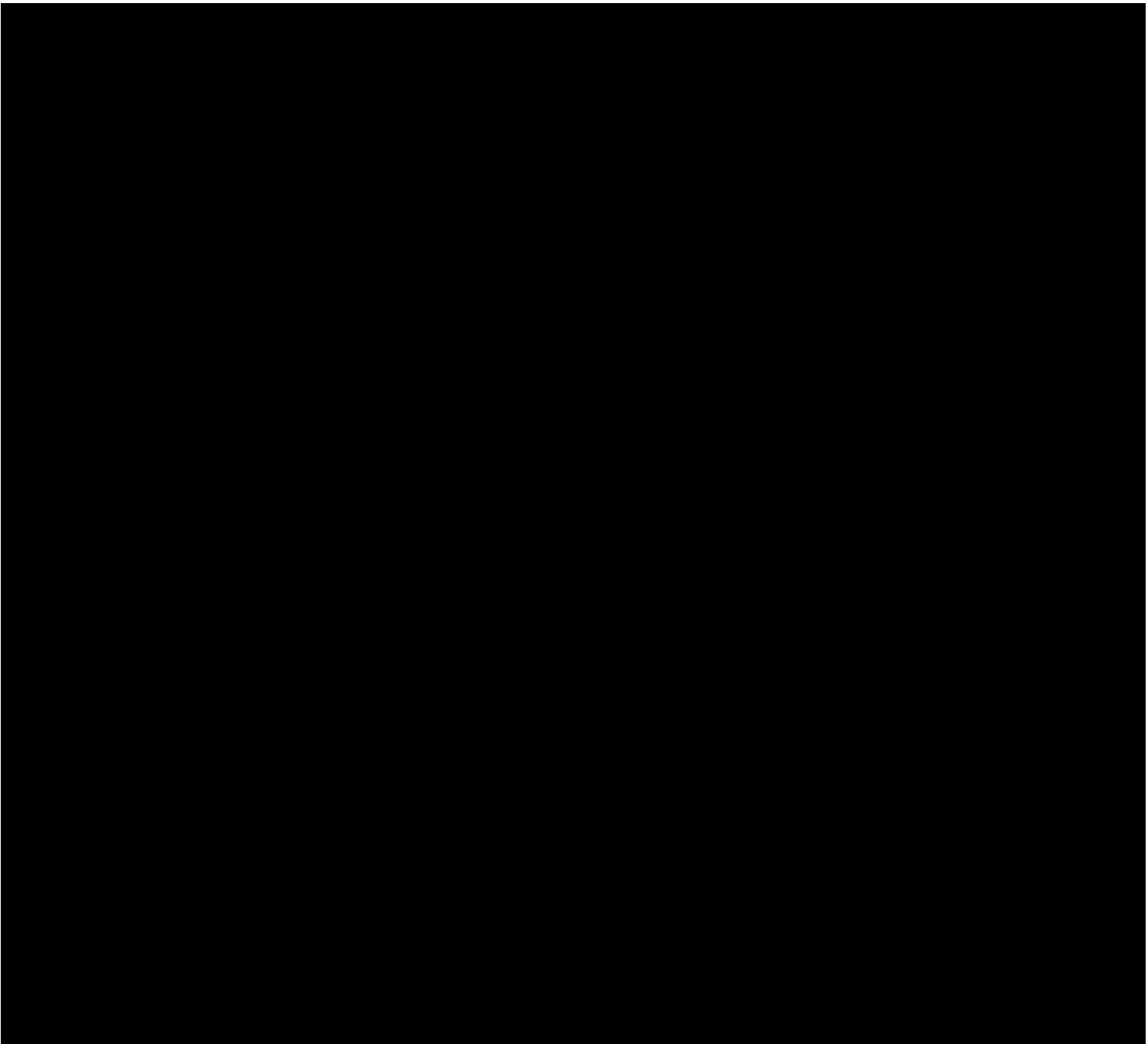


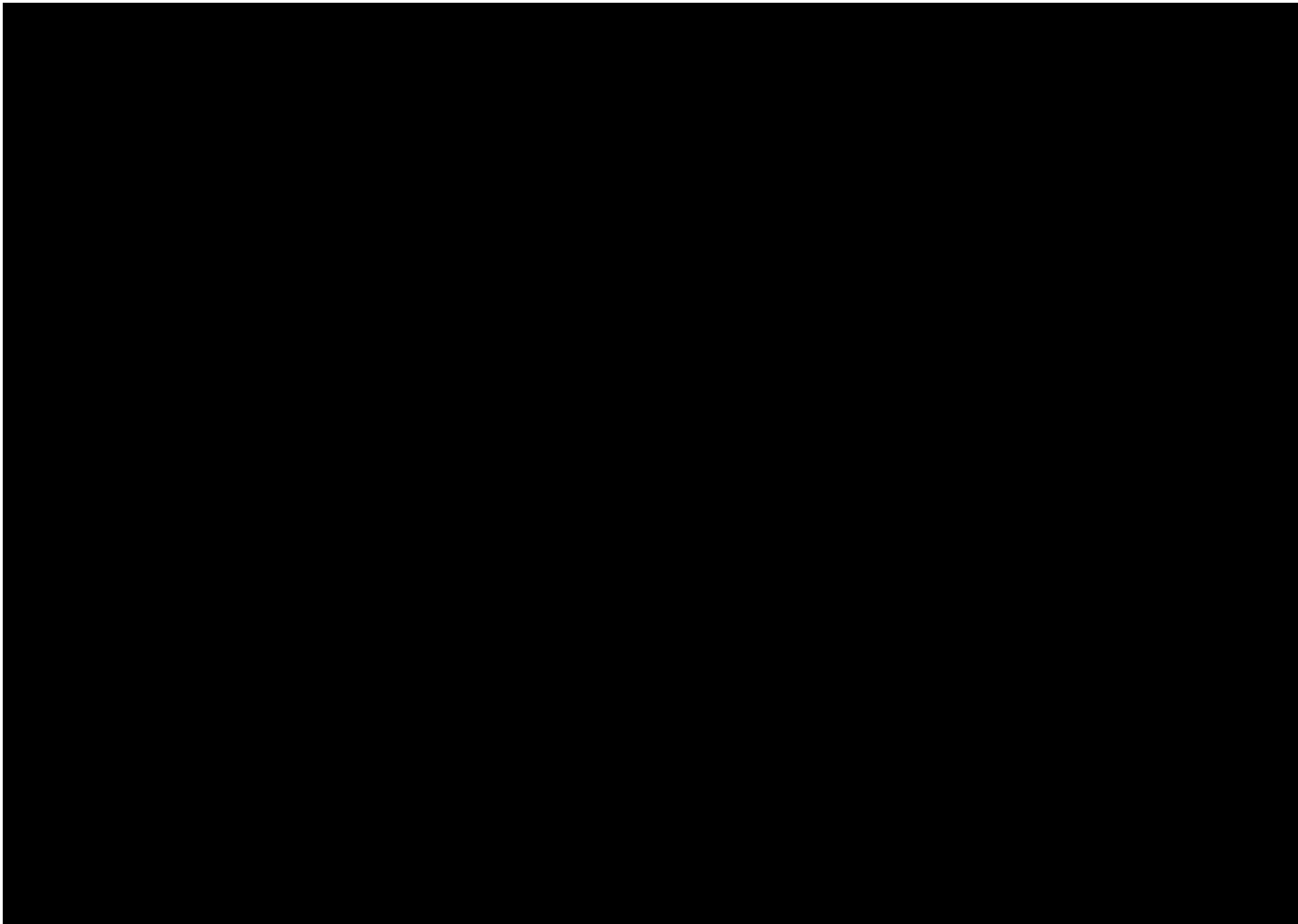
F2 TLO Planned Maintenance (Outside IC Events) (Model Inputs)



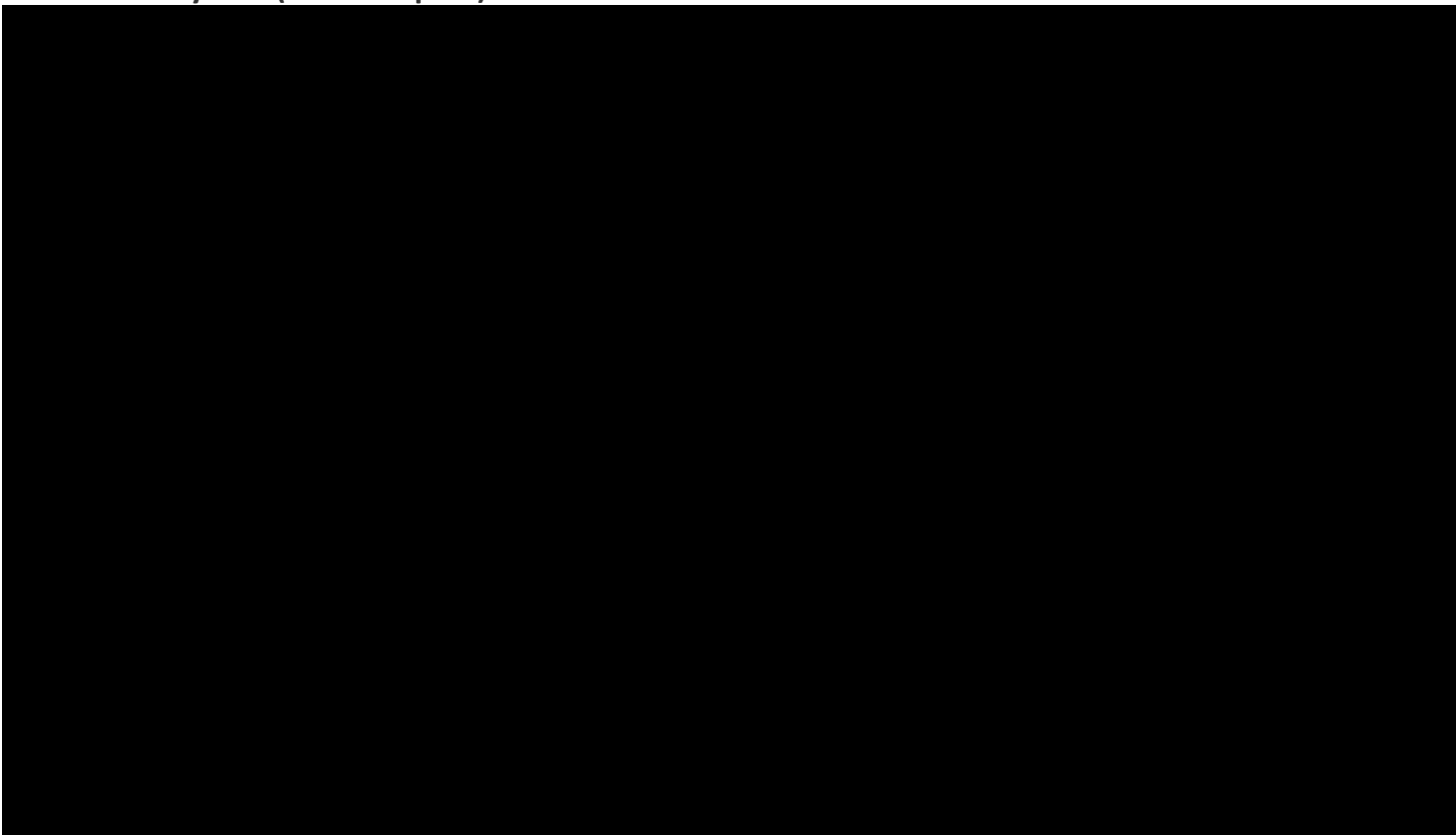


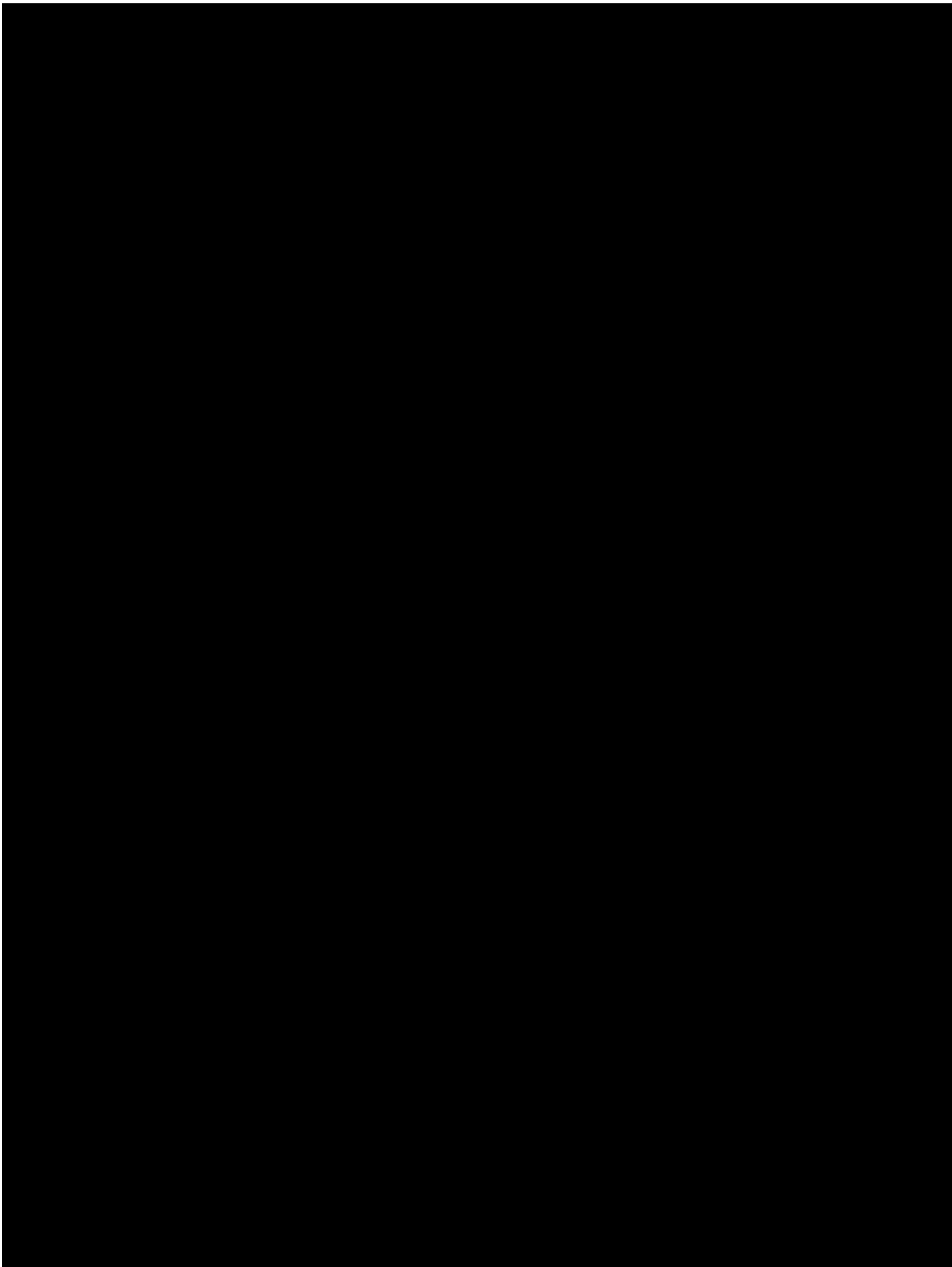
F3 TLO Load Rate (Including Unplanned Delays) (Model Inputs)



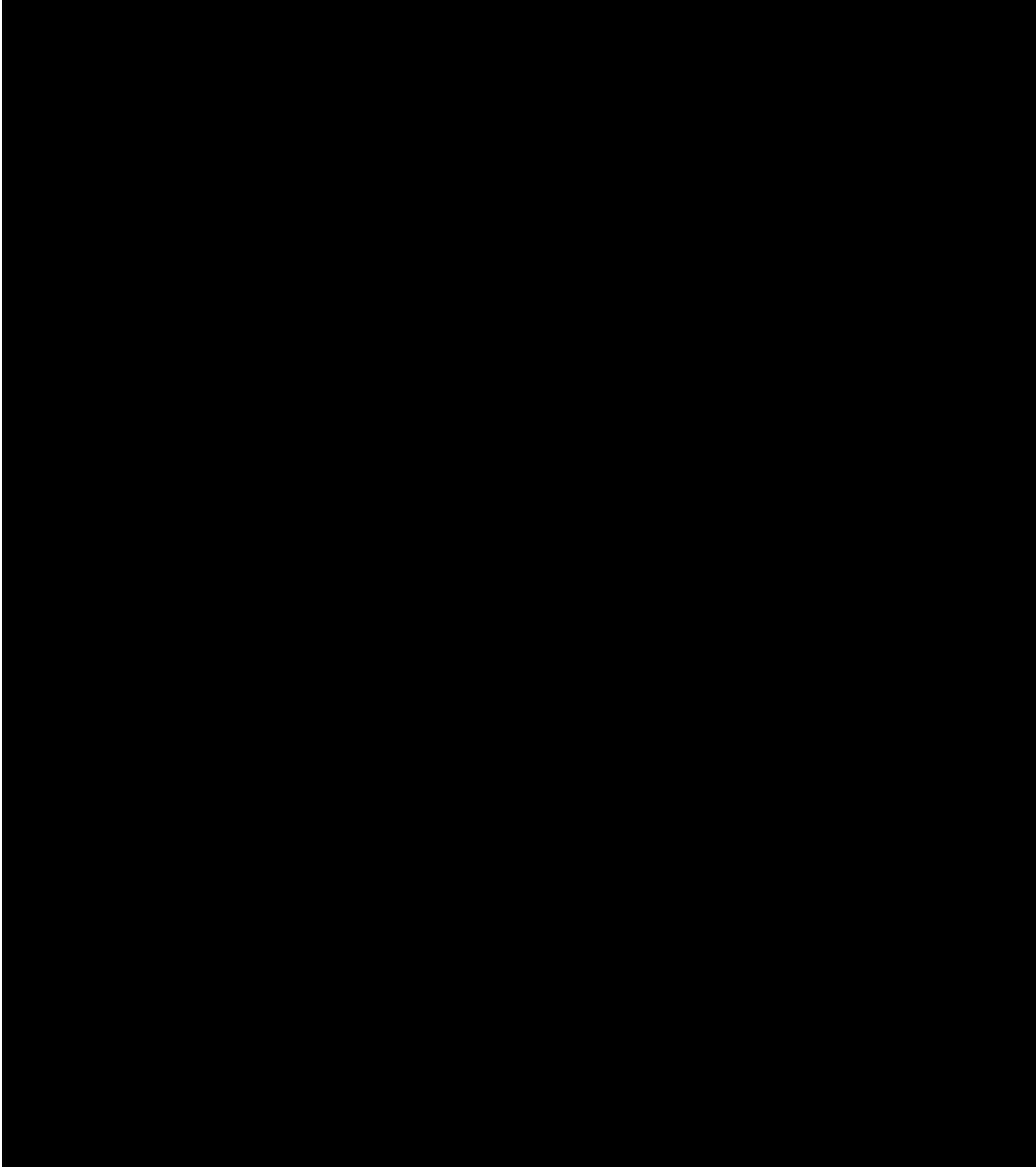


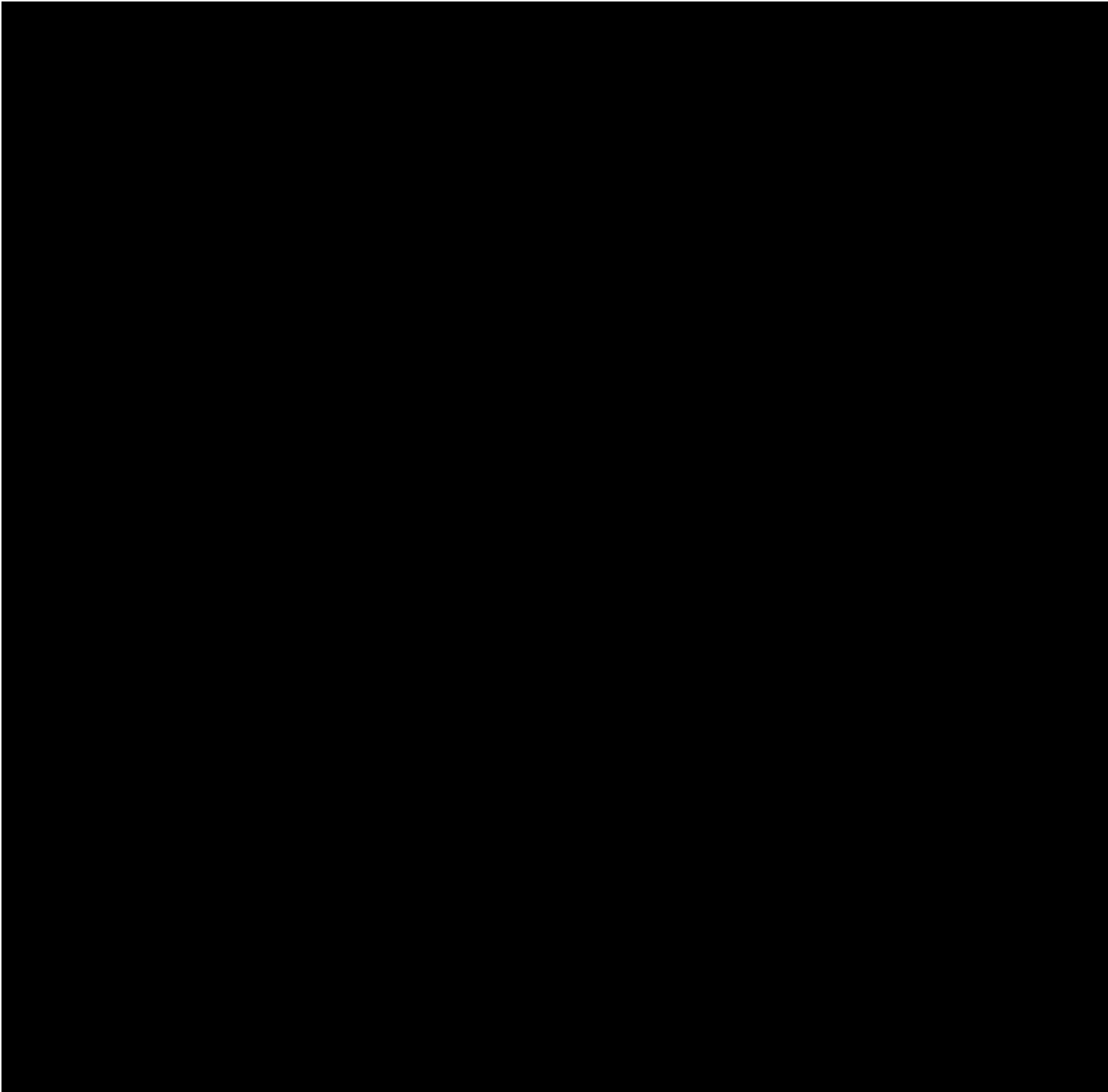
F4 Full Payload (Model Inputs)



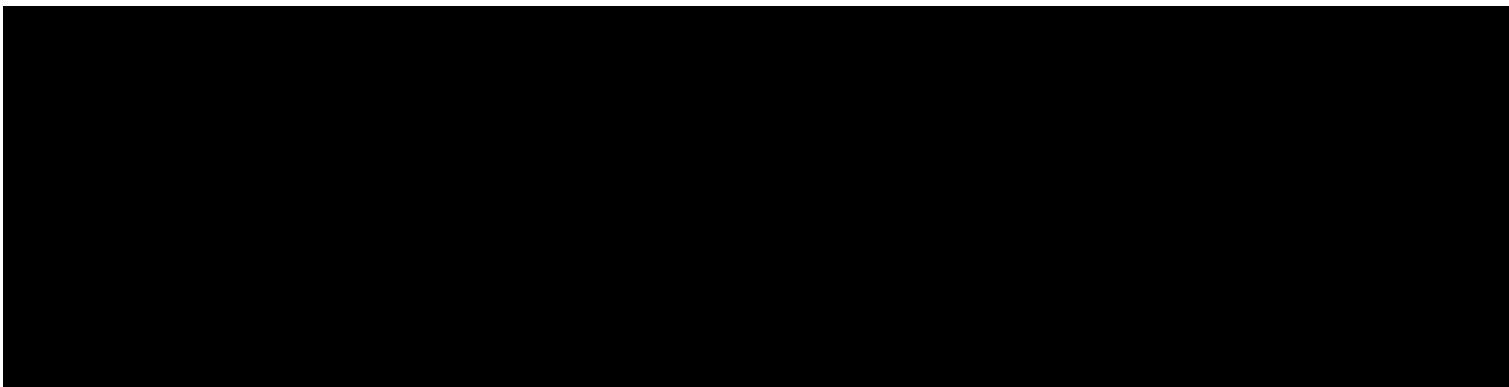


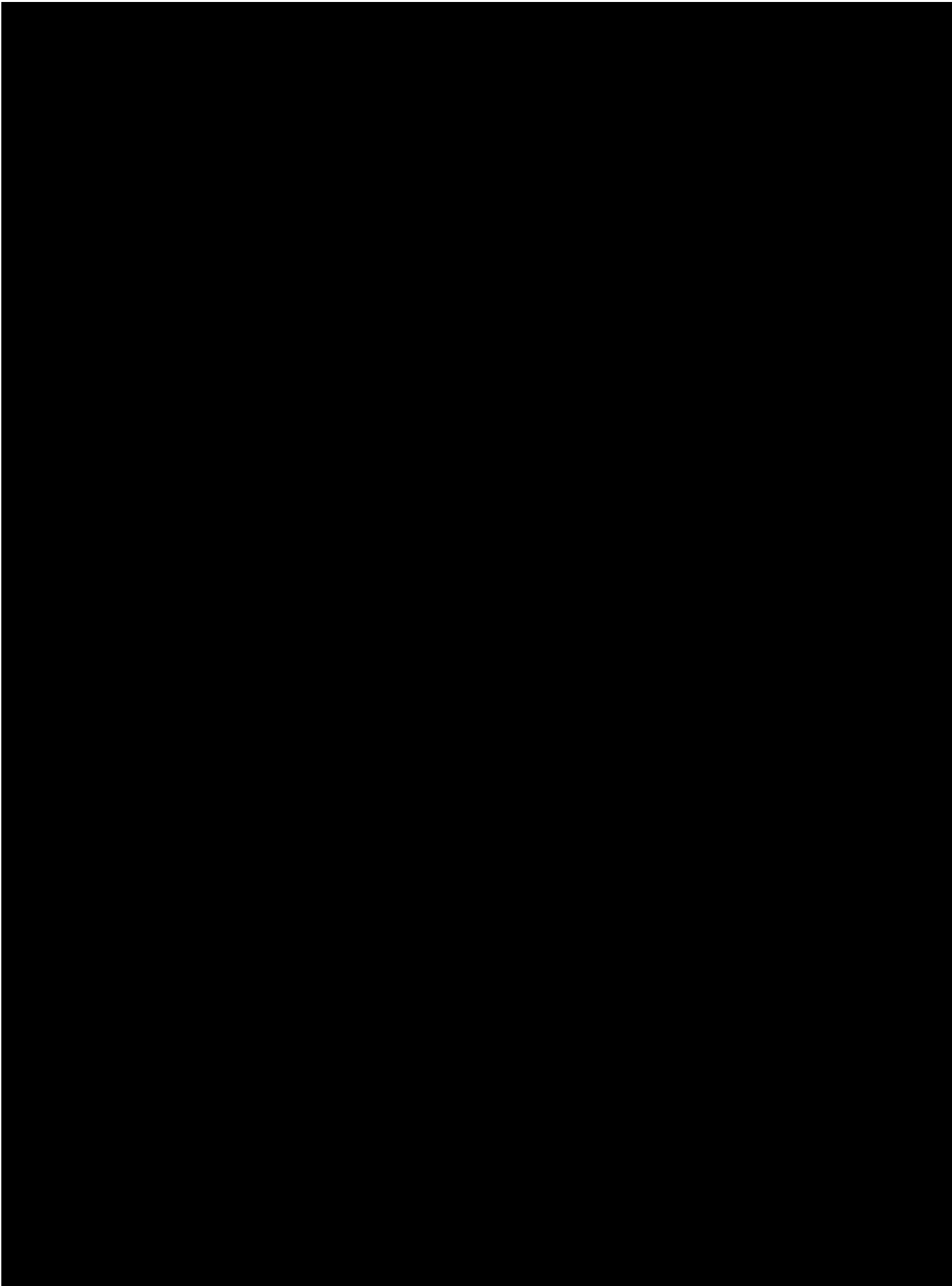
F5 Lightload Payload (Model Inputs)

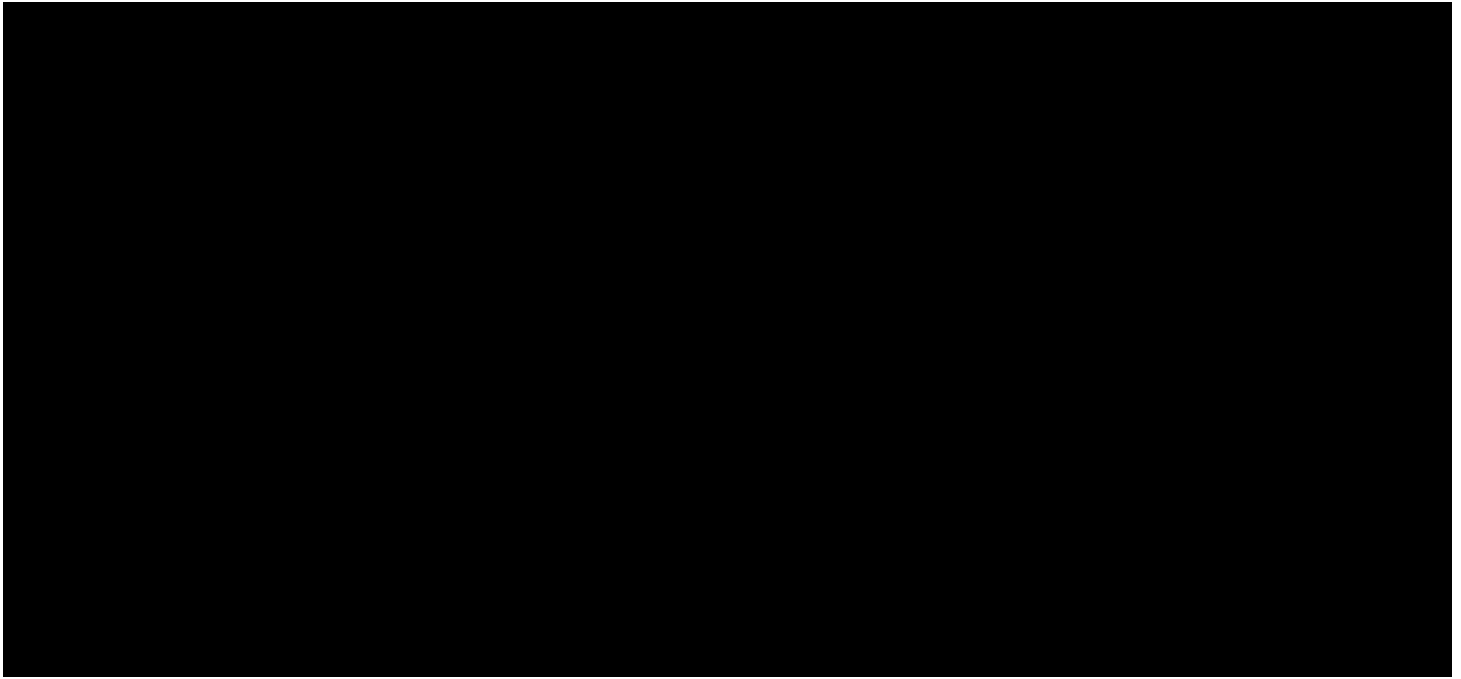




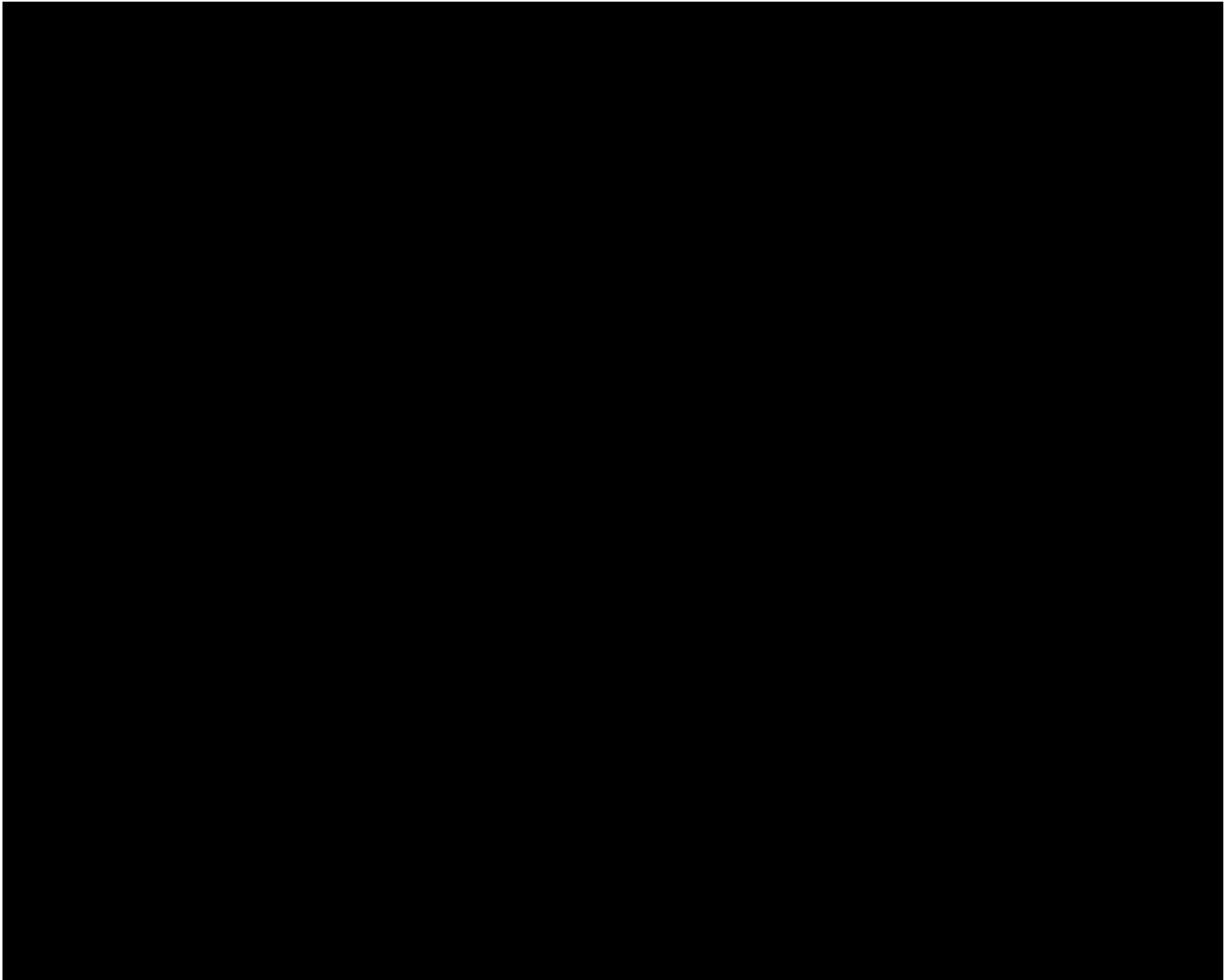
F6 Load Time at TLO (Model Inputs)

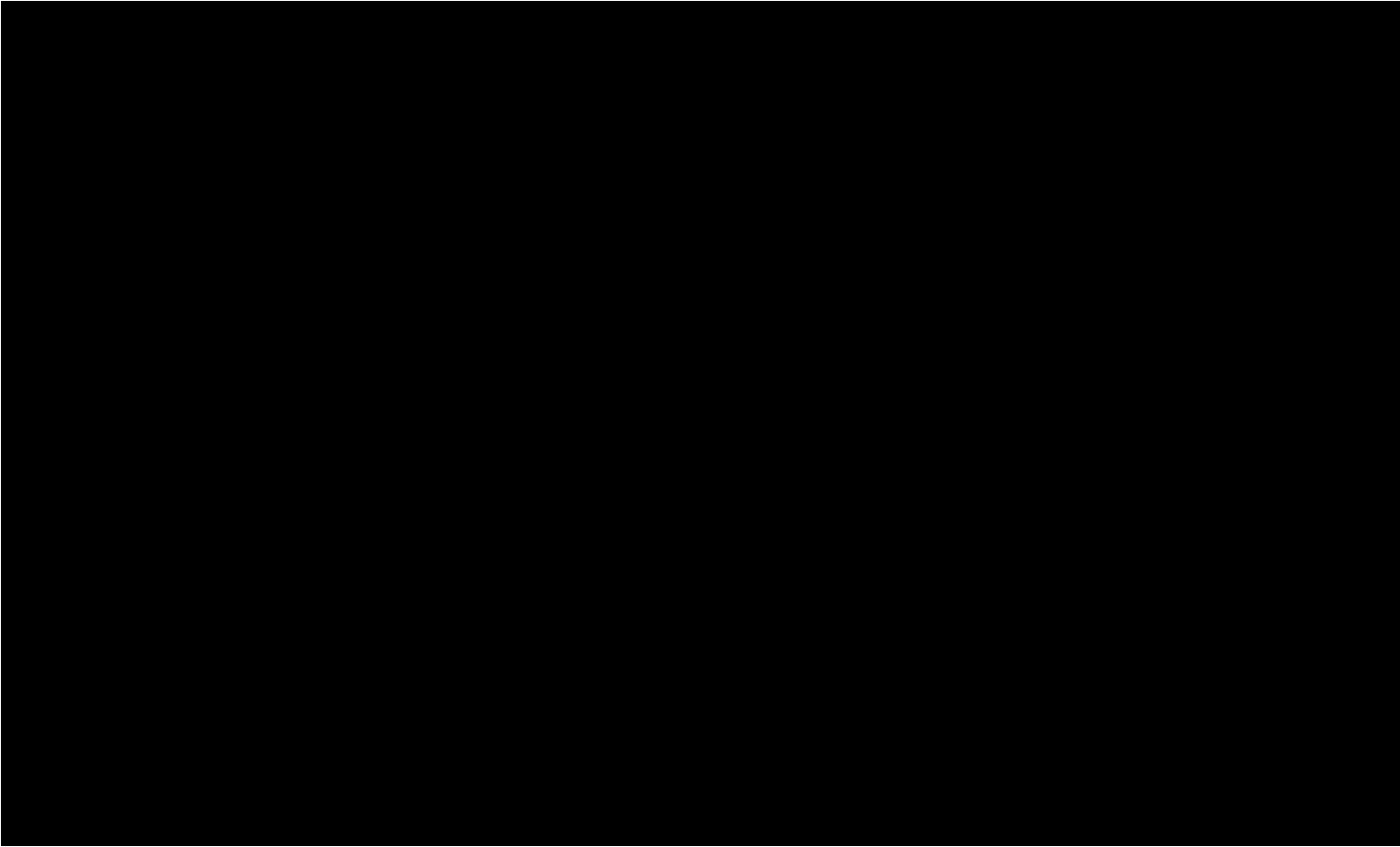






F7 TLO Dispatch Separation Time (Model Inputs)

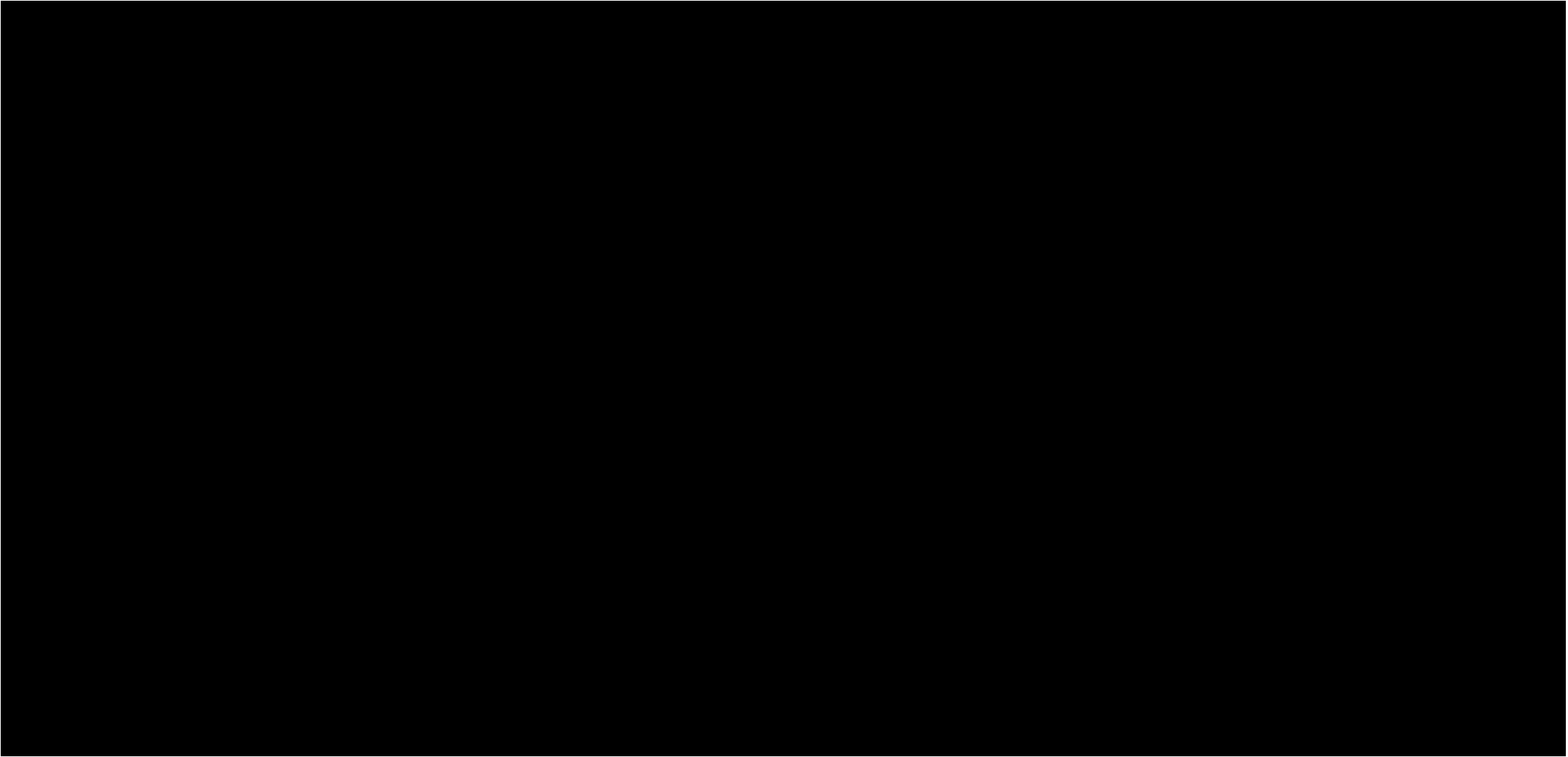


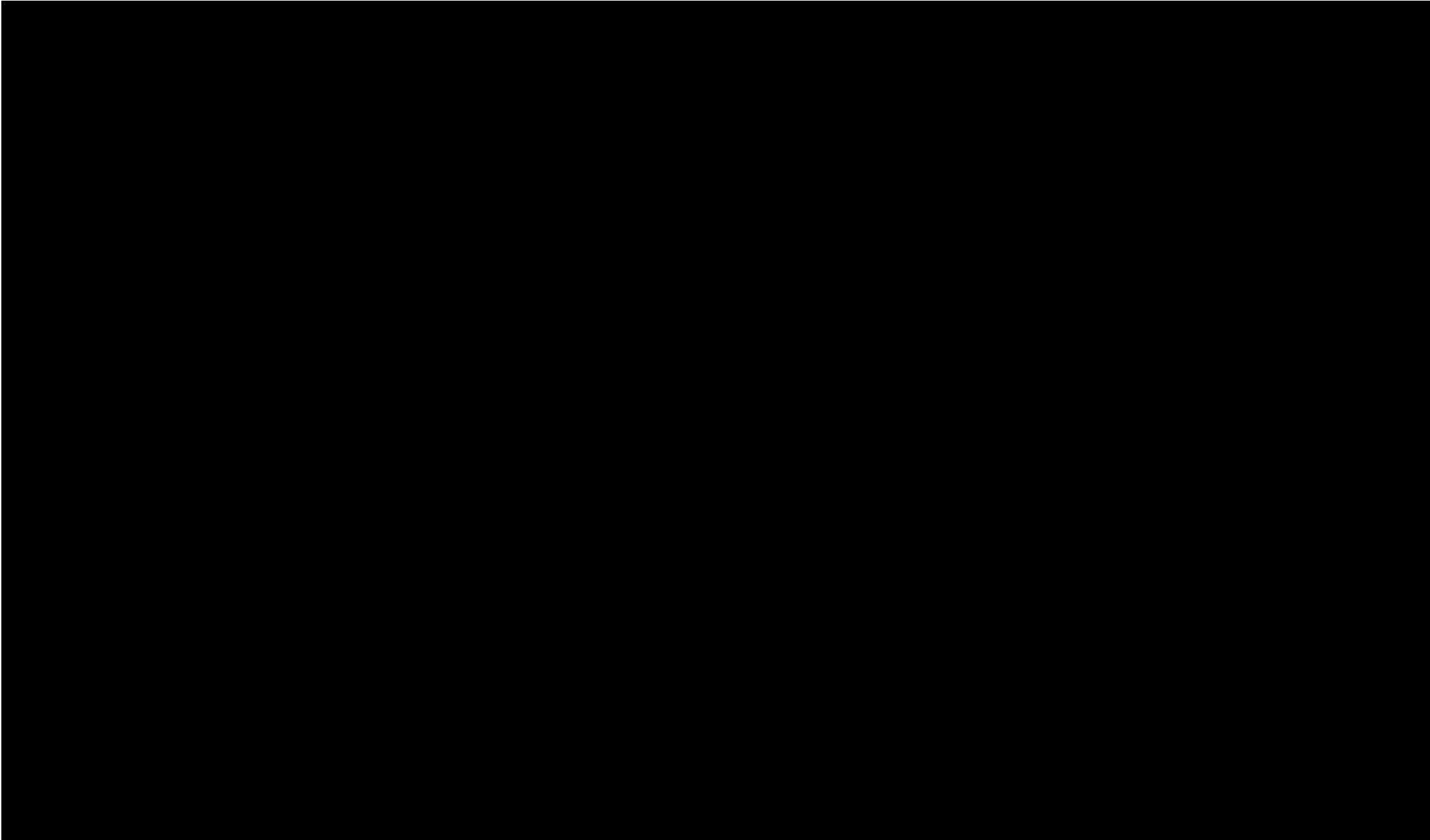


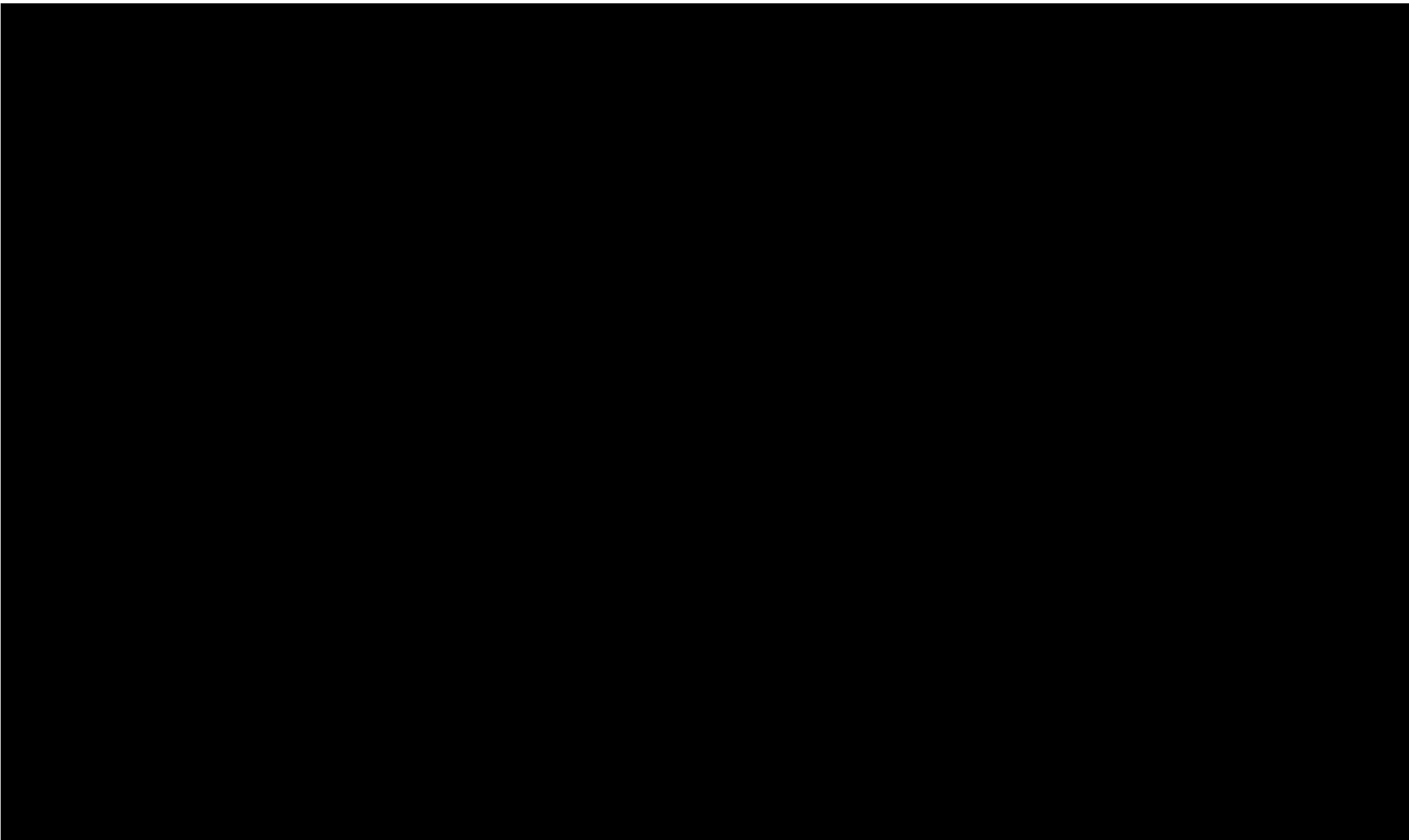
Appendix G: Inloader Parameters

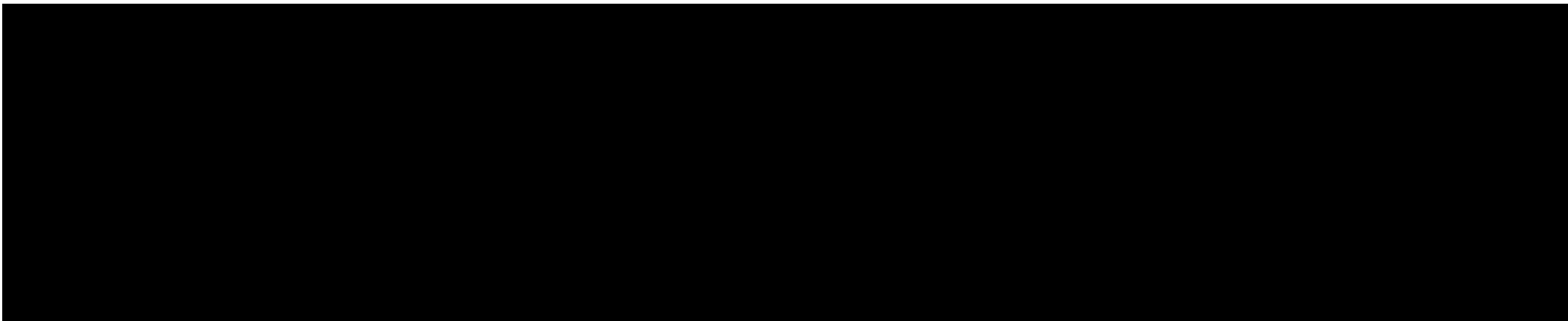
The following data relates to Inloader key parameters used in the Model.

G1 Inloader Planned Maintenance (Model Inputs)

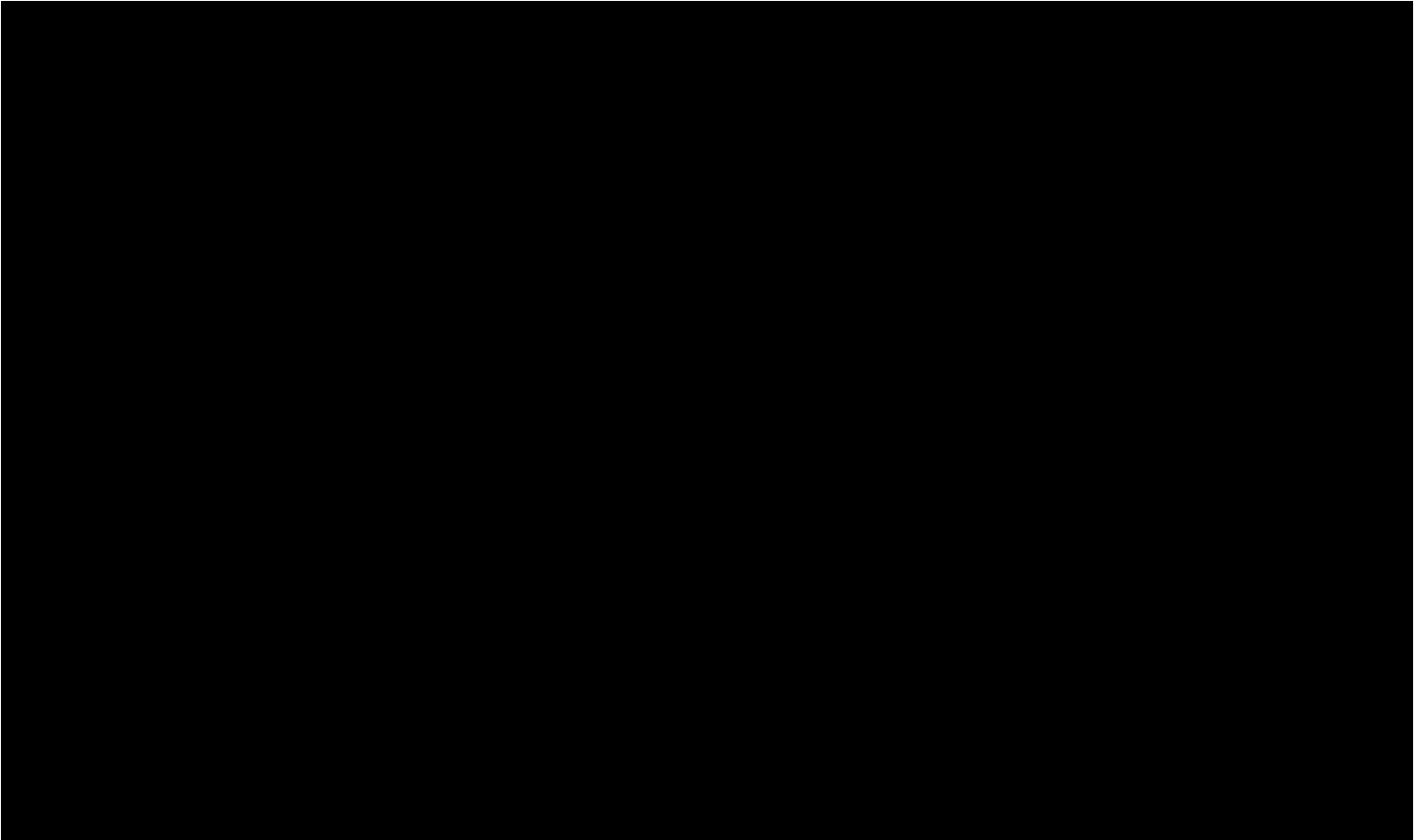




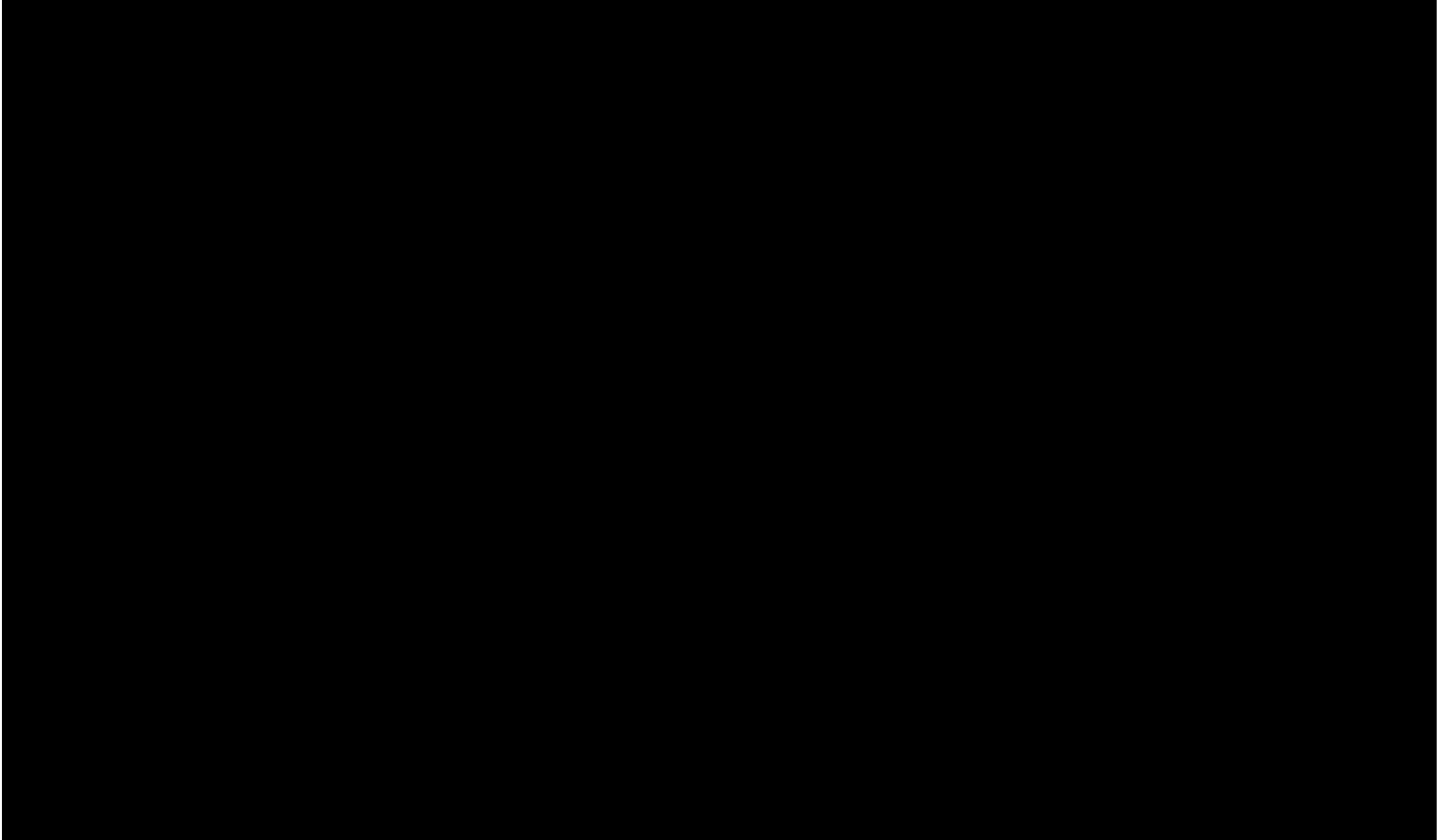




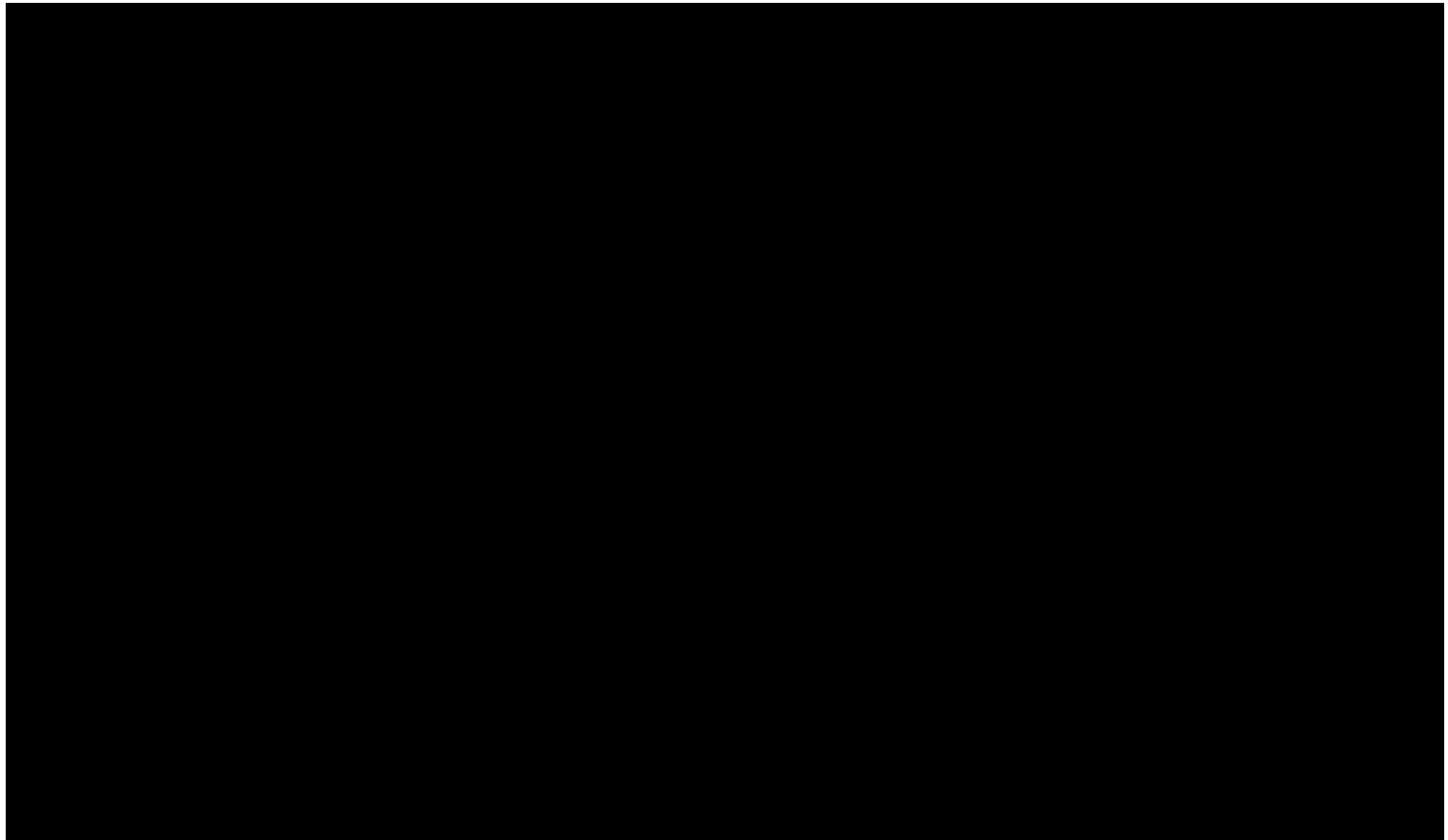
G2 Inloader Unload Rate (Excluding Unplanned Delays) (Model Inputs)



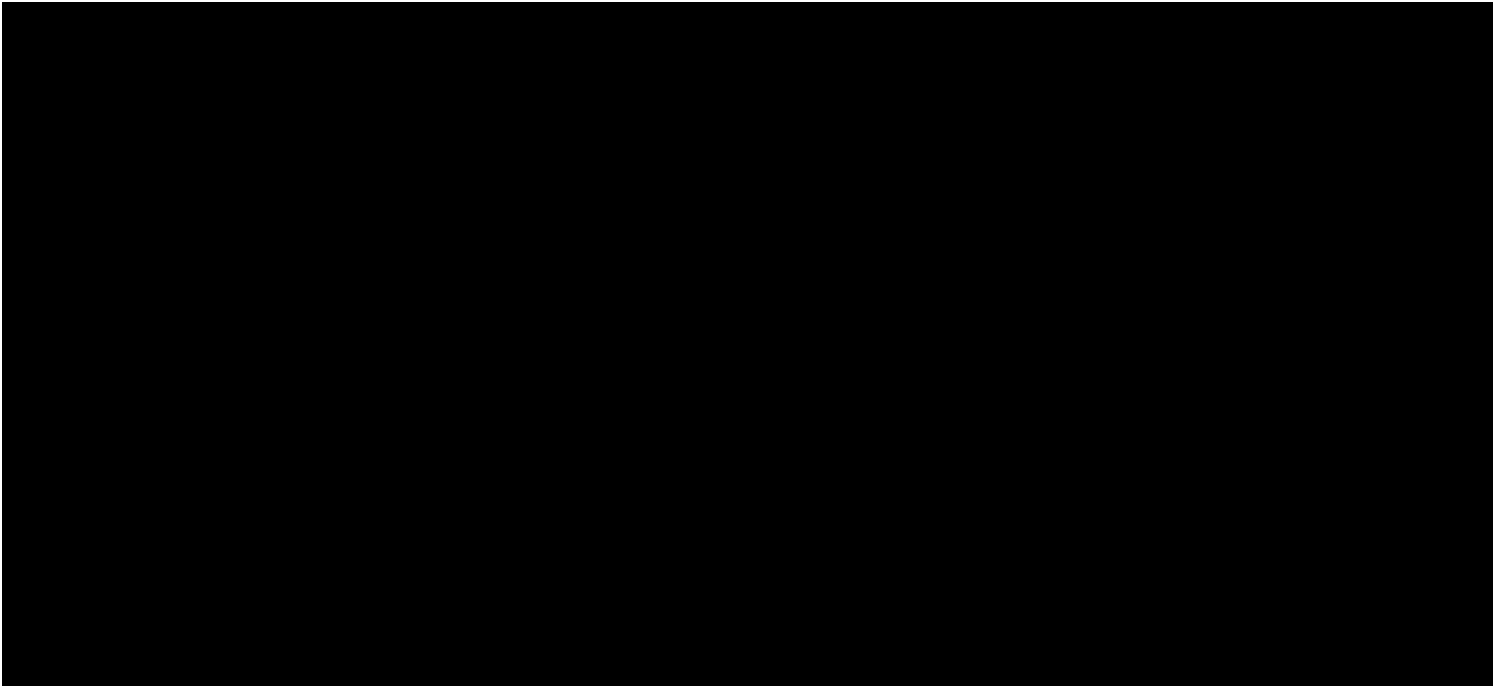
G3 Inloader Unplanned Maintenance – Cycle (Model Inputs)



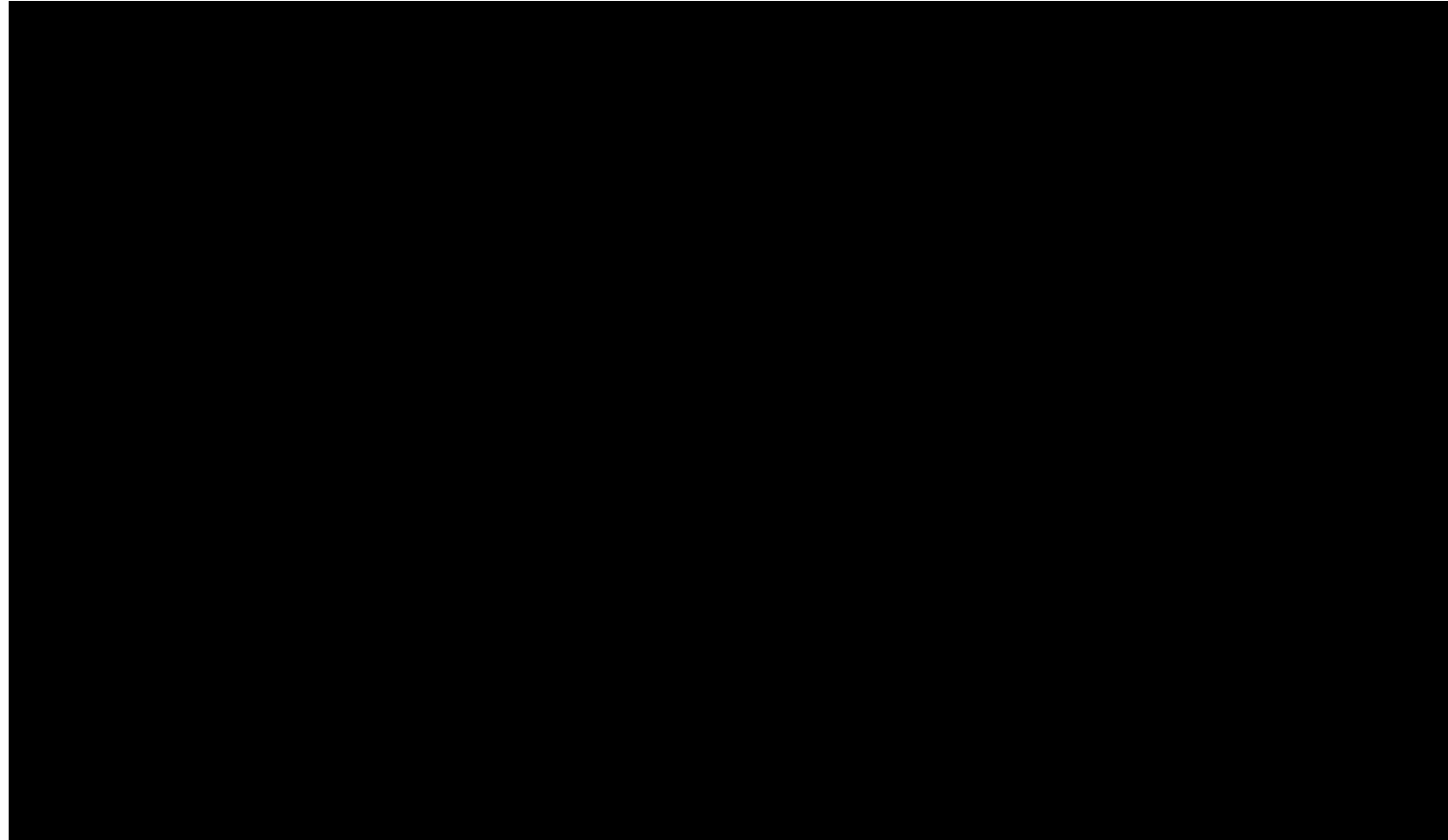
G4 Inloader Unplanned Maintenance – Duration (Model Inputs)



G5 Unload Time at Terminal (Model Outputs)



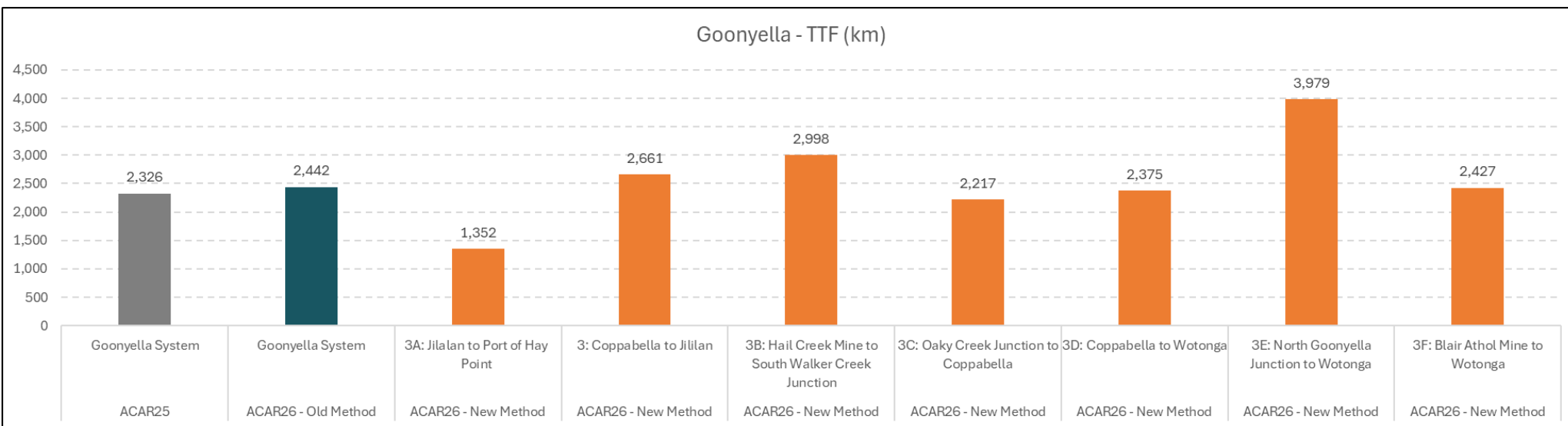
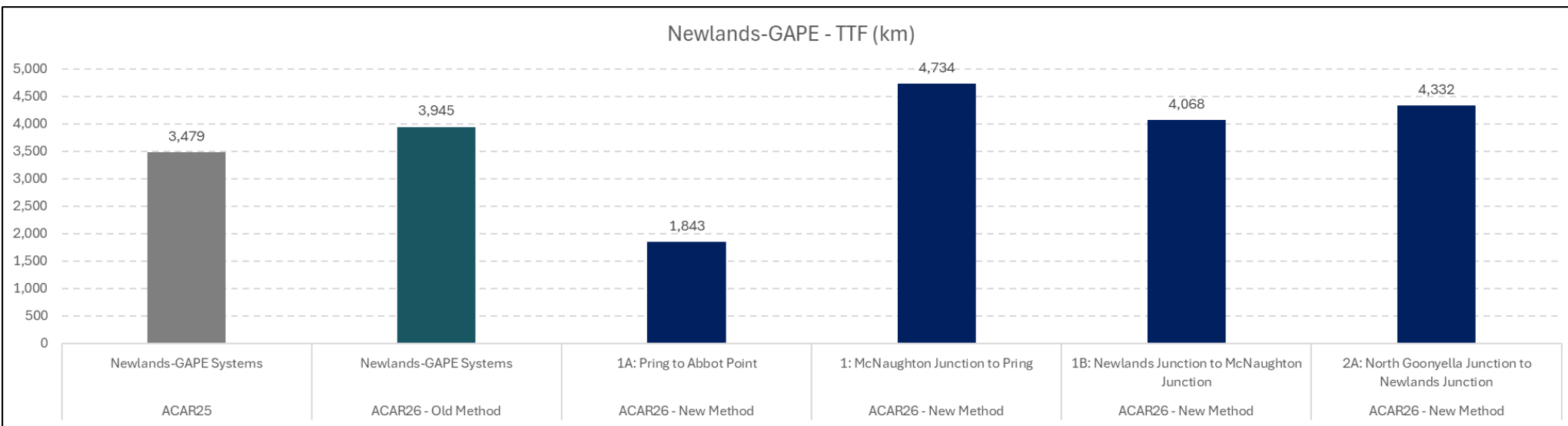
G6 Inloader Pre and Post Unload Delay Times (Model Inputs)



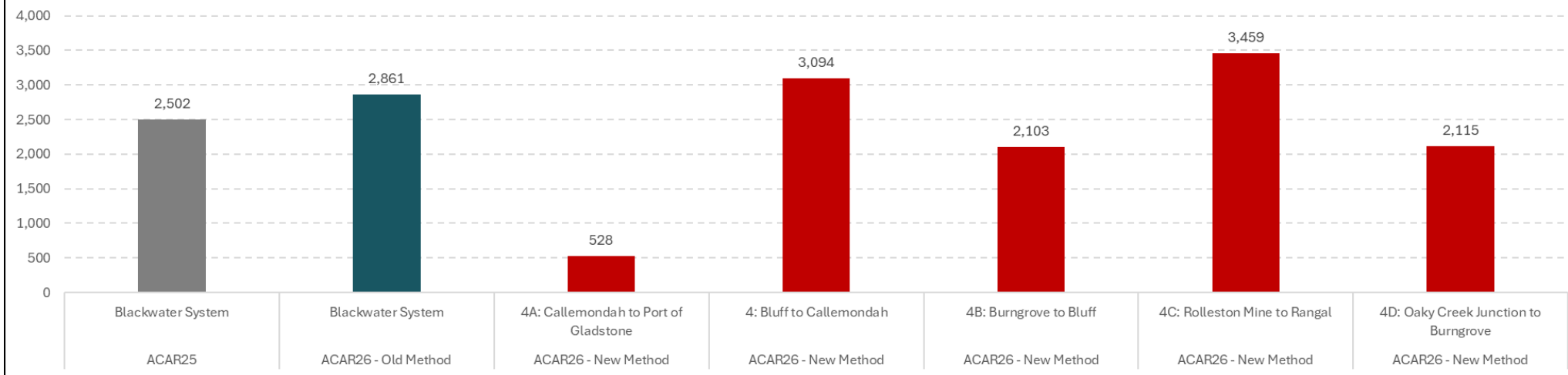
Appendix H: Delay Parameters

H1 General Delays Frequency (TTF) per Coal System (Model Inputs)

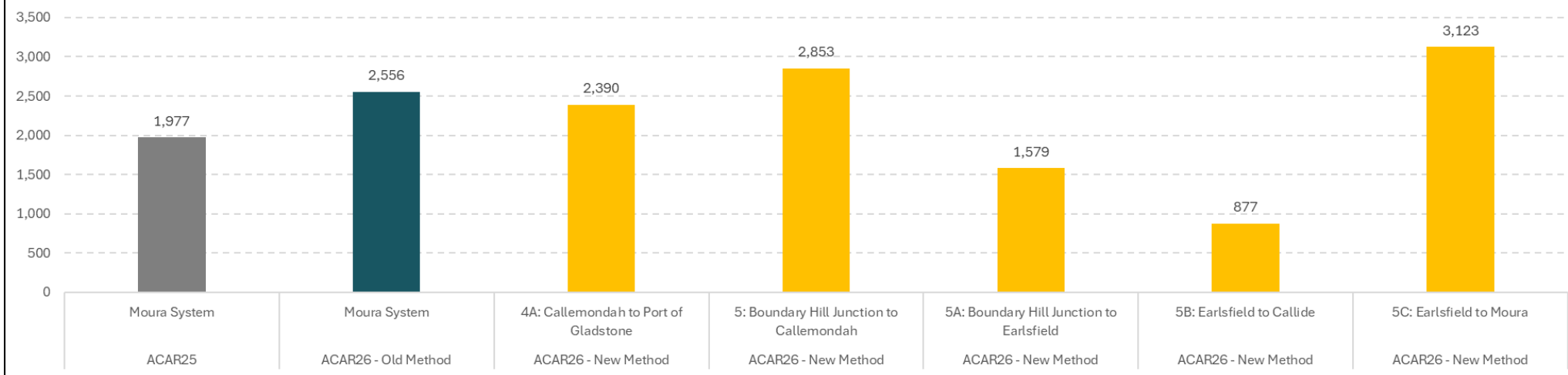
Coal system	Type	Details	Expected track usage between primary track delays (kilometres)	Track usage between primary track delays distribution	
				Distribution	Rate
Newlands-GAPE	Main line	1. M.L. - McNaughton Junction to Pring	4,734	EXPONENTIAL	2.11E-07
	Port Precinct	1A: B.L. - Pring to Abbot Point	1,843	EXPONENTIAL	5.42E-07
	Branch line	1B: B.L. - Newlands Junction to McNaughton Junction	4,068	EXPONENTIAL	2.46E-07
		2A: B.L. - North Goonyella Junction to Newlands Junction	4,332	EXPONENTIAL	2.31E-07
Goonyella	Main line	3. M.L. - Coppabella to Jilalan	2,661	EXPONENTIAL	3.76E-07
	Port Precinct	3A: B.L. - Jilalan to Port of Hay Point	1,352	EXPONENTIAL	7.40E-07
	Branch line	3B: B.L. - Hail Creek Mine to South Walker Creek Junction	2,998	EXPONENTIAL	3.34E-07
		3C: B.L. - Oaky Creek Junction to Coppabella	2,217	EXPONENTIAL	4.51E-07
		3D: B.L. - Coppabella to Wotonga	2,375	EXPONENTIAL	4.21E-07
		3E: B.L. - North Goonyella Mine to Wotonga	3,979	EXPONENTIAL	2.51E-07
		3F: B.L. - Blair Athol Mine to Wotonga	2,427	EXPONENTIAL	4.12E-07
Blackwater	Main line	4. M.L. - Bluff to Callemondah	3,094	EXPONENTIAL	3.23E-07
	Port Precinct	4A: B.L. - Callemondah to Port of Gladstone	528	EXPONENTIAL	1.89E-07
	Branch line	4B: B.L. - Burngrove to Bluff	2,103	EXPONENTIAL	4.75E-07
		4C: B.L. - Rolleston Mine to Rangal	3,459	EXPONENTIAL	2.89E-07
		4D: B.L. - Oaky Creek Junction to Burngrove	2,115	EXPONENTIAL	4.73E-07
Moura	Main line	5. M.L. - Boundary Hill Junction to Callemondah	2,853	EXPONENTIAL	3.51E-07
	Port Precinct	4A: B.L. - Callemondah to Port of Gladstone	2,390	EXPONENTIAL	4.18E-07
	Branch line	5A: B.L. - Boundary Hill Junction to Earlsfield	1,579	EXPONENTIAL	6.33E-07
		5B: B.L. - Earlsfield to Callide	877	EXPONENTIAL	1.14E-06
		5C: B.L. - Earlsfield to Moura	3,123	EXPONENTIAL	3.20E-07



Blackwater - TTF (km)

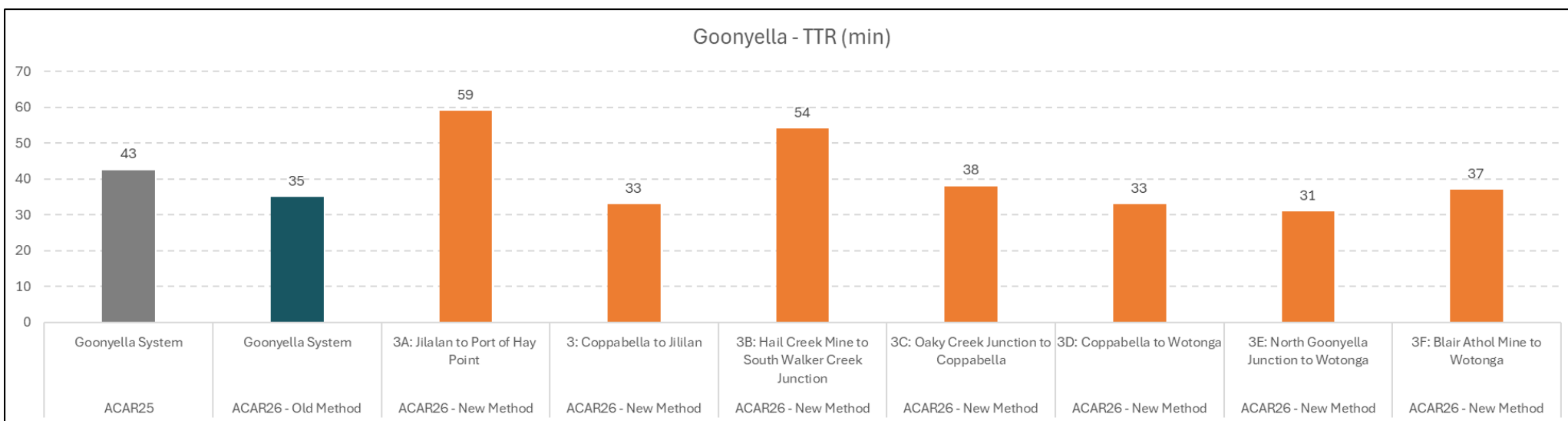
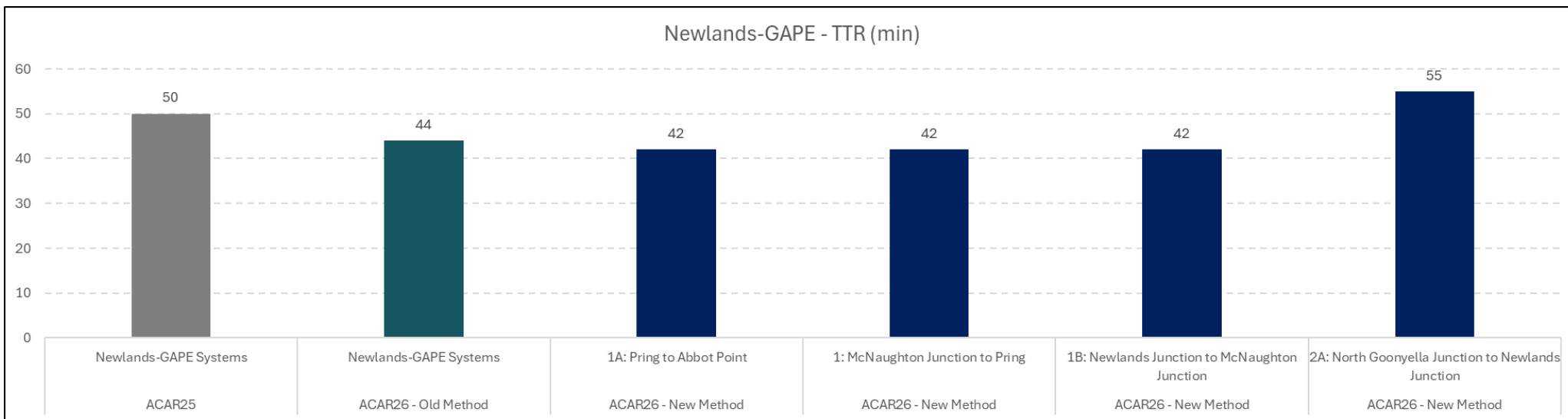


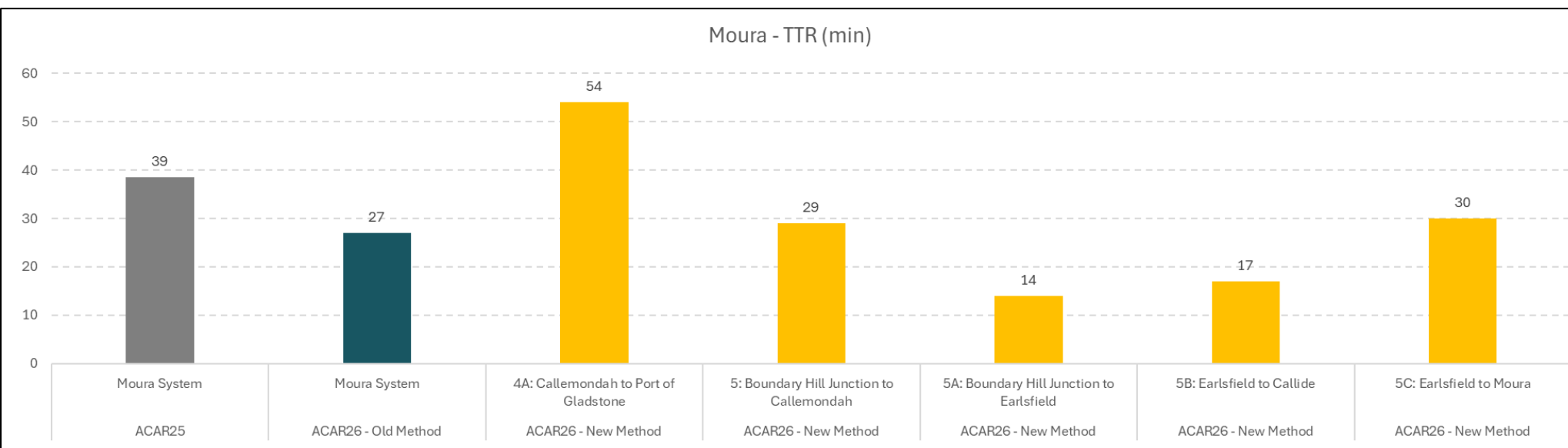
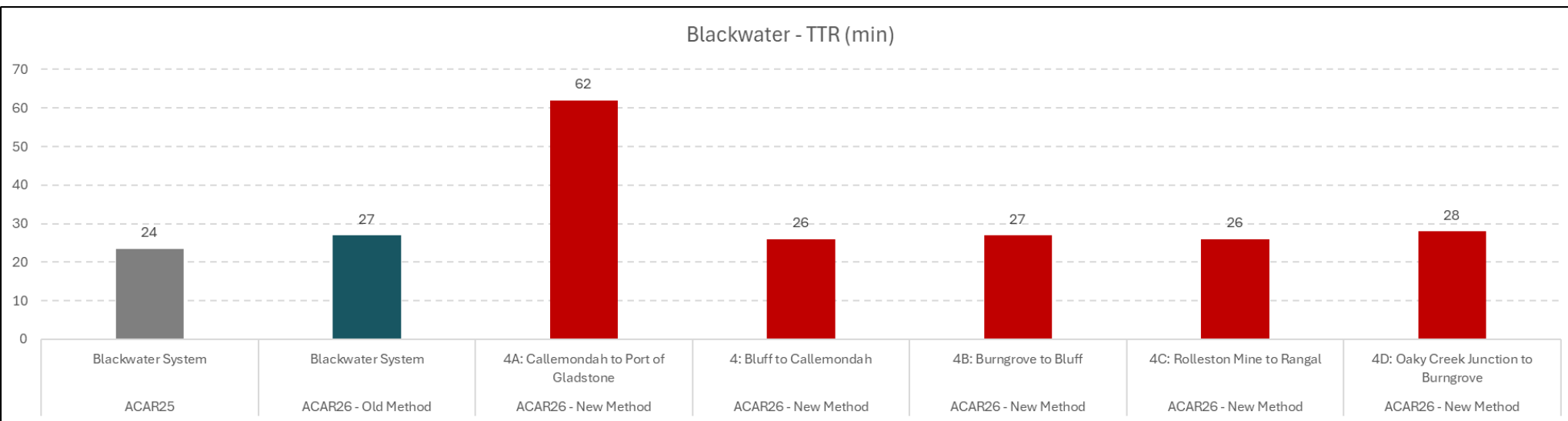
Moura - TTF (km)



H2 General Delays Duration (TTR) per Coal System (Model Inputs)

Coal System	Type	Details	Expected general delays (P50) (minutes)	Expected general delays (P70) (minutes)	Lower Limit (minutes)	Upper Limit (minutes)
Newlands-GAPE	Main line	1. M.L. - McNaughton Junction to Pring	42	70	4	1,440
	Port Precinct	1A: B.L. - Pring to Abbot Point	42	88	1	1,440
	Branch line	1B: B.L. - Newlands Junction to McNaughton Junction	42	68	1	1,440
		2A: B.L. - North Goonyella Junction to Newlands Junction	55	88	1	1,440
Goonyella	Main line	3. M.L. - Coppabella to Jilalan	33	62	1	1,440
	Port Precinct	3A: B.L. - Jilalan to Port of Hay Point	59	104	4	1,440
	Branch line	3B: B.L. - Hail Creek Mine to South Walker Creek Junction	54	90	1	1,440
		3C: B.L. - Oaky Creek Junction to Coppabella	38	66	1	1,440
		3D: B.L. - Coppabella to Wotonga	33	60	1	1,440
		3E: B.L. - North Goonyella Mine to Wotonga	31	55	1	1,440
	3F: B.L. - Blair Athol Mine to Wotonga	37	64	1	1,440	
Blackwater	Main line	4. M.L. - Bluff to Callemondah	26	50	1	1,440
	Port Precinct	4A: B.L. - Callemondah to Port of Gladstone	62	94	4	1,440
	Branch line	4B: B.L. - Burngrove to Bluff	27	47	3	1,440
		4C: B.L. - Rolleston Mine to Rangal	26	49	3	1,440
	4D: B.L. - Oaky Creek Junction to Burngrove	28	51	3	1,440	
Moura	Main line	5. M.L. - Boundary Hill Junction to Callemondah	29	50	2	1,440
	Port Precinct	4A: B.L. - Callemondah to Port of Gladstone	54	88	6	1,440
	Branch line	5A: B.L. - Boundary Hill Junction to Earlsfield	14	36	2	1,440
		5B: B.L. - Earlsfield to Callide	17	31	2	1,440
	5C: B.L. - Earlsfield to Moura	30	50	2	1,440	





H3 Aurizon Network Delay Codes used to assess General Delays (Model Inputs)

Delays included		Delays excluded	
Code	Name	Code	Name
231	Signalling - Signalling Faults not requiring attendance by Trackside Systems Personnel	210	Possession
250	Network Control decisions/actions/communication	211	Track Maintenance Activity
315	Lift Load	212	Major Maintenance Possession
399	Delays caused by incident or accident	220	Speed Restriction
412	Rollingstock	230	Safe Working Authority
435	Unable to Maintain Section Run Time	232	Separation of Electric Trains
471	Operator Stowing Activity	309	Network Stowing Activity
503	Network - Train or OTV with Infrastructure	310	Crossing Activities
512	Network - Mainline	311	Wait Mine/Port/Yard Availability
513	Network - Yard/Siding	312	Section Clear
520	Caused by System Irregularity or Failure	313	Scheduled/Uniform Depart Time
522	Network - Fire/Explosion	314	Delays when trains held due passenger/travel train
526	Caused by System Irregularity or Failure	316	Train through crossovers (bidirectional duplicated track only)
528	Network - SPAD	320	Wait Loading and or Connecting Train
529	Network - Error or Omission	322	Wait Schedule Depart Time/Path
550	Network - Dewirement	325	Optimiser Path Alteration / Allocation
551	Obstruction/Damage/Failure/Malfunction of OHTWE - Network	350	Delays due to weather conditions
560	Track Defect	360	Late Entry from Non-Aurizon
563	On-Track Vehicle Issues	370	Due to Adjoining operations loading facility
568	Decisions/actions/communications	398	Automatic System Variance
570	Signal Failure	400	Rollby
571	Wrong Side of Signal Failure	401	Reliability Examination
572	Track Circuit Failure	404	Loco Change
573	Telemetry Failure	407	Turn Train
574	Points Failure	408	Provision Train
575	UTC/DTC Faults	413	Operator Rollingstock Restriction
576	ATP/ATC/AWS/ETCS Ground Equipment Failure	414	Diesel Hauled Train on Electric Schedule
577	Level Crossing Failure	430	Train Crew Change
579	Infrastructure Protection Systems Issues	432	Crew Change Ends
580	System Issues	437	Traincrew
582	Damage to trackside Equipment - Network	440	Time Scheduled to Load
586	Field	441	Time Scheduled to Unload
590	Train Scheduling Irregularity	450	Shunting Activities / Attach / Detach
601	Other - Train or OTV with Livestock/Animals	455	Wait Connecting Trains / Path Deviation
607	Between Train/OTV and Motor Vehicle - Unallocated	461	Operator Agreed Deviation
609	Between Train/OTV and Person/Cyclist - Unallocated	470	Crossing/Queuing due to customer alterations
612	Other - Mainline	500	Network - Train or OTV with Motor Vehicle
613	Other - Yard/Siding	505	Network - Between Trains and/or OTV
622	Other - Fire/Explosion	516	Network Staff - Network

Delays included		Delays excluded	
629	Other - Safeworking Error or Omission	521	Network - Dangerous Goods
630	Other - Train or OTV with Motor Vehicle	533	Network - Between Trains and/or OTV
631	Operator - Train or OTV with Person/Cyclist	558	Caused by Controller
638	Animals on or near the Track	559	Caused by Controller
643	Emergency Services request to hold rail traffic - Unallocated	561	Structures (Bridges, Culverts)
655	OHTWE - Unallocated	562	Track Maintenance and Repair
657	Objects on - Track	565	Broken Rail
661	Storm/Lightning Strike/Wind - Unallocated	585	Control Panel
665	Heat	591	Network Possession or Isolation Irregularity
675	Signalling - Unallocated	602	Other - Train or OTV with Person/Cyclist
678	Network Control Centre Incidents	604	Other - Train or OTV with Object
681	Electrical Structure Defect	605	Other - Between Trains and/or OTV
690	Incident Delay Received from Queensland Rail	610	Other - Motor Vehicle Collision with Infrastructure
712	Operator - Mainline	611	Between Motor Vehicle and Staff - Unallocated
713	Operator - Yard/Siding	624	Rock/Landslides
718	Operator Property - Non-Network - Operator	625	General Complaints
728	Operator - SPAD	628	Other - SPAD
729	Operator - Error or Omission	640	Public Property
760	Locomotives - Operator	645	Aurizon Property
761	ATP/ATC/AWS/ETCS, Radio and DTC Faults	650	Other - Dewirement
762	Wagons/Carriages - Operator	663	Flooding/Washouts - Unallocated
764	Pantograph	680	Mine - Load Facility Incident/Irregularity
765	Train Parting	683	Network Declared Force Majeure Incident
766	DED Activation and confirmed fault	703	Operator - Train or OTV with Infrastructure
767	Wheels / Braking	706	Operator - Train or OTV with Motor Vehicle
768	Wagon Door	716	Operator Staff - Operator
770	Loco Stalling / Failure	722	Operator - Fire/Explosion
781	Operator - Over height	732	Between Train/OTV and Train/OTV
782	Operator - Over load	733	Operator - Between Trains and/or OTV
552a	Overcurrent	750	Operator - Dewirement
552b	Double Trips	763	Self Propelled Passenger Units
572b	Axle Counter Failure	771	Maintenance
603A	Other - Train or OTV with Infrastructure	780	Operator - Loading Incident/Irregularity
612A	Port - Derailment Mainline	785	Passengers - General - Operator
612B	Mine - Derailment Mainline	795	Traincrew Incident
613A	Port - Derailment Yard/Siding	796	Operator - Rollback SPAD
646A	Person	380A	Empty run time on unmodelled non Aurizon network
		380B	Loaded run time on unmodelled non Aurizon network
		603B	Other - Motor Vehicle with Infrastructure
		613B	Mine - Derailment Yard/Siding
		617a	Aurizon Property
		617b	Public Property
		646B	Vehicle

Delays included		Delays excluded	
		647A	Rollingstock
		647B	Aurizon Property
		680a	Port - Unload Facility Incident/Irregularity
		780A	Operator - Unloading Incident/Irregularity
		ADJ	Adjustment
		ITA	Integration Timing Alignment
		PIN	Execution Only - Activity has Pinned Departure Time

H4 TSR Frequency (Model Inputs)

Group	Expected Time between TSR Events (hours)	Month	Distribution	Rate
LowTSR	2,945	January	EXPONENTIAL	5.66E-06
	2,828	February	EXPONENTIAL	5.89E-06
	2,816	March	EXPONENTIAL	5.92E-06
	2,984	April	EXPONENTIAL	5.59E-06
	2,484	May	EXPONENTIAL	6.71E-06
	3,061	June	EXPONENTIAL	5.44E-06
	2,730	July	EXPONENTIAL	6.10E-06
	2,888	August	EXPONENTIAL	5.77E-06
	3,122	September	EXPONENTIAL	5.34E-06
	3,444	October	EXPONENTIAL	4.84E-06
	2,799	November	EXPONENTIAL	5.96E-06
	2,516	December	EXPONENTIAL	6.63E-06
MidTSR	1,408	January	EXPONENTIAL	1.18E-05
	1,224	February	EXPONENTIAL	1.36E-05
	1,068	March	EXPONENTIAL	1.56E-05
	979	April	EXPONENTIAL	1.70E-05
	1,471	May	EXPONENTIAL	1.13E-05
	1,603	June	EXPONENTIAL	1.04E-05
	1,201	July	EXPONENTIAL	1.39E-05
	1,217	August	EXPONENTIAL	1.37E-05
	1,211	September	EXPONENTIAL	1.38E-05
	1,369	October	EXPONENTIAL	1.22E-05
	1,281	November	EXPONENTIAL	1.30E-05
	1,109	December	EXPONENTIAL	1.50E-05
HighTSR	603	January	EXPONENTIAL	2.76E-05
	950	February	EXPONENTIAL	1.75E-05
	519	March	EXPONENTIAL	3.21E-05
	640	April	EXPONENTIAL	2.60E-05
	798	May	EXPONENTIAL	2.09E-05
	1,091	June	EXPONENTIAL	1.53E-05
	1,007	July	EXPONENTIAL	1.66E-05
	677	August	EXPONENTIAL	2.46E-05
	881	September	EXPONENTIAL	1.89E-05
	803	October	EXPONENTIAL	2.07E-05
	677	November	EXPONENTIAL	2.46E-05
	718	December	EXPONENTIAL	2.32E-05

H5 TSR Duration (Model Inputs)

Group	Expected TSR Duration (hours)	Distribution	Rate	Upper Bound (hours)
LowTSR	744	EXPONENTIAL	2.24E-05	8,760
MidTSR	933	EXPONENTIAL	1.79E-05	8,760
HighTSR	986	EXPONENTIAL	1.69E-05	8,760

H6 TSR Penalty (Model Inputs)

Group	Expected TSR Impact (minutes)	Distribution	Parameter	Value (minutes)
LowTSR	2.28	WEIBULL	alpha	1.402
			beta	2.502
MidTSR	2.11	WEIBULL	alpha	1.516
			beta	2.339
HighTSR	1.83	WEIBULL	alpha	1.751
			beta	2.055

H7 TSR Delay – Section Level (Model Inputs and Model Outputs)

TSR values represent the median 50th percentile (P50) across the five-year assessment period.

System	Line	Model Section Name	Model Outputs		Model Inputs
			TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
Newlands-GAPE	1. M.L. - McNaughton Junction to Pring	sPring2ToBuckley1	2.8	15%	LowTSR
		sBuckley2ToArmuna1	1.3	32%	MidTSR
		sArmuna2ToAberdeen1	2.2	18%	LowTSR
		sAberdeen2ToBinbee1	1.9	18%	LowTSR
		sBinbee2ToBriaba	2.3	26%	LowTSR
		sBriabaToPelicanCreek	2.1	17%	LowTSR
		sPelicanCreekToAlmoola	1.9	25%	LowTSR
		sAlmoolaToCollinsville1	2.3	12%	LowTSR
	1A: B.L. - Pring to Abbot Point	sAbbotPointJunctionToKaili			NoTSR
		sKailiToDurroburra	2.0	17%	LowTSR
		sDurroburraToPring1			NoTSR
	1B: B.L. - Newlands Junction to McNaughton Junction	sCollinsville2ToMcNaughtonJunction	2.1	24%	LowTSR
		sMcNaughtonJunctionToSonomaJunction	2.1	11%	LowTSR
		sSonomaJunctionToBirralee1	1.8	16%	LowTSR
		sCockool2ToHavilah1	1.8	41%	MidTSR
		sHavilah2ToAdaniCarmichaelJunction	1.6	36%	MidTSR
		sAdaniCarmichaelJunctionToNewlandsJunction	2.0	12%	LowTSR
	2A: B.L. - North Goonyella Junction to Newlands Junction	sNewlandsJunctionToLeichhardtRange1			NoTSR
		sLeichhardtRange2ToByerwenJunction			NoTSR
		sByerwenJunctionToSuttorCreek1	2.5	6%	LowTSR

System	Line	Model Section Name	Model Outputs		Model Inputs
			TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
Goonyella	3. M.L. - Coppabella to Jilalan	sSuttorCreek2ToEaglefieldCreek1	1.7	21%	LowTSR
		sEaglefieldCreek2ToNorthGoonyellaJunction	1.7	18%	LowTSR
		sJilalan2ToYukan1	3.0	15%	LowTSR
		sYukan2ToBlackMountain	1.4	43%	HighTSR
		sBlackMountainToHatfieldChoke	1.9	19%	LowTSR
		sHatfieldChokeToHatfield1	2.0	18%	LowTSR
		sHatfield2ToBolingbroke	1.6	56%	HighTSR
		sBolingbrokeToBalook	1.3	52%	HighTSR
		sBalookToWandoo	2.2	32%	MidTSR
		sWandooToWaitara1	1.9	40%	MidTSR
		sWaitara2ToBraeside	1.9	36%	MidTSR
		sBraesideToMindi	2.4	26%	MidTSR
		sMindiToSouthWalkerJunction	1.7	52%	HighTSR
		sSouthWalkerJunctionToTootoolah	2.3	30%	MidTSR
		sTootoolahToMacarthurJunction	2.1	36%	MidTSR
	sMacarthurJunctionToCoppabella1	2.1	51%	MidTSR	
	3A: B.L. - Jilalan to Port of Hay Point	sDalrympleCrossoverPointsToDalrympleBayEntry			NoTSR
		sDalrympleCrossoverPointsToPraguelands	2.2	44%	MidTSR
		sPraguelandsToJilalan1	2.2	43%	MidTSR
	3B: B.L. - Hail Creek Mine to South Walker Creek Junction	sSouthWalkerJunctionToBidgerleyJunction	2.3	13%	LowTSR
		sBidgerleyJunctionToBeeCreekJunction			NoTSR
		sBeeCreekJunctionToHailCreekBalloon			NoTSR
	3C: B.L. - Oaky Creek Junction to Coppabella	sMoorvaleJunctionToIngsdon1	1.6	13%	LowTSR

System	Line	Model Section Name	Model Outputs		Model Inputs
			TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sIngsdon2ToMillenniumJunction	2.5	17%	LowTSR
		sMillenniumJunctionToRedMountain1	2.1	31%	MidTSR
		sRedMountain2ToOliveDownsSouthJunction	1.9	11%	LowTSR
		sOliveDownsSouthJunctionToWinchester1			NoTSR
		sWinchester2ToPeakDowns1	1.7	34%	MidTSR
		sPeakDowns2ToHarrow1	2.2	26%	MidTSR
		sHarrow2ToSaraji1	2.2	15%	LowTSR
		sSaraji2ToDunsmure1	1.8	32%	MidTSR
		sLakeVermontJunctionToDysart1	1.2	27%	LowTSR
		sDysart2ToStephens1	1.7	53%	MidTSR
		sStephens2ToNorwichPark1	1.7	26%	LowTSR
		sNorwichPark2ToSiennaJunction	2.0	22%	LowTSR
		sBundoorra2ToGermanCreekJunction	2.3	9%	LowTSR
		sDunsmure2ToLakeVermontJunction	2.0	46%	MidTSR
		sMiddlemountJunctionToBundoorra1	2.2	14%	LowTSR
		sOakCreekPassingLoop2ToGregoryJunction	1.3	15%	LowTSR
	3D: B.L. - Coppabella to Wotonga	sCoppabellaAngleWestToBroadlea1	1.7	41%	MidTSR
		sBroadlea2ToCarboroughDownsJunction	2.4	23%	LowTSR
		sCarboroughDownsJunctionToMallawa	2.2	24%	MidTSR
		sMallawaToIsaacPlainsJunction	2.4	23%	LowTSR
		sIsaacPlainsJunctionToWotonga	2.9	23%	LowTSR
	3E: B.L. - North Goonyella Mine to Wotonga	sWotongaAngleNorthToMoranbahNorthPassingLoop1	1.6	48%	HighTSR
		sMoranbahNorthJunctionToGrosvenorWestJunction	2.0	19%	LowTSR

System	Line	Model Section Name	Model Outputs		Model Inputs
			TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sGrosvenorWestJunctionToFisherCreekJunction	2.2	29%	LowTSR
		sFisherCreekJunctionToGoonyellaJunction	2.5	24%	LowTSR
		sGoonyellaJunctionToRiverside1	2.5	28%	LowTSR
		sRiversideJunctionToMabbinCreekJunction	1.9	22%	LowTSR
		sMabbinCreekJunctionToNorthGoonyellaJunction	2.3	24%	LowTSR
	3F: B.L. - Blair Athol Mine to Wotonga	sWotongaAngleSouthToMoranbah1	2.7	18%	LowTSR
		sMoranbah2ToCavalRidgeJunction	2.1	14%	LowTSR
		sCavalRidgeJunctionToCarmichaelBranchJunction	1.1	23%	LowTSR
		sCarmichaelBranchJunctionToVillafranca1	1.4	18%	LowTSR
		sVillafranca2ToMountMcLaren1	1.9	15%	LowTSR
		sMountMcLaren2ToBlackridge1	1.1	37%	MidTSR
		sBlackridge2ToBlairAtholGrainlineJunction	1.4	15%	LowTSR
		sBlairAtholGrainlineJunctionToBlairAtholJunction	1.2	19%	LowTSR
Blackwater	4. M.L. - Bluff to Callemondah	sWigginsIslandJunctionToYarwun	2.0	59%	HighTSR
		sYarwunToAldoga1	2.3	13%	LowTSR
		sAldoga2ToEastEndJunction	1.9	41%	MidTSR
		sEastEndJunctionToMtLarcom1	1.5	46%	MidTSR
		sMtLarcom2ToAmbrose	1.8	21%	LowTSR
		sAmbroseToEpala1	2.6	35%	MidTSR
		sEpala2ToRaglan1	1.7	39%	MidTSR
		sRaglan2ToTwelveMileCreek	2.0	36%	MidTSR
		sTwelveMileCreekToMarmor	1.9	31%	MidTSR
		sMarmorToBajool1	1.3	46%	HighTSR

System	Line	Model Section Name	Model Outputs		Model Inputs
			TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sBajool2ToArcher	1.8	46%	HighTSR
		sArcherToMidgee	1.6	45%	MidTSR
		sMidgeeToRocklands1	1.5	51%	HighTSR
		sRocklands2ToSheepwash	1.5	30%	LowTSR
		sSheepwashToGracemere	2.8	40%	LowTSR
		sGracemereToScrubbyCreek	2.0	18%	LowTSR
		sScrubbyCreekToKabra1	1.2	11%	LowTSR
		sKabra2ToWarren	2.4	9%	LowTSR
		sWarrenToKennedyCreek	1.7	55%	HighTSR
		sKennedyCreekToWycarbah	1.9	53%	HighTSR
		sWycarbahToWestwood1	2.1	14%	LowTSR
		sWestwood2ToWindah1	2.9	10%	LowTSR
		sWindah2ToGrantleigh1	2.0	49%	MidTSR
		sGrantleigh2ToCutting	1.7	33%	MidTSR
		sCuttingToTunnel	1.6	49%	MidTSR
		sTunnelToEdungalba	1.9	50%	MidTSR
		sEdungalbaToAroona1	2.1	46%	MidTSR
		sAroona2ToDuaringa1	1.5	58%	HighTSR
		sDuaringa2ToWallaroo	2.6	25%	MidTSR
		sWallarooToTryphinia1	1.7	32%	MidTSR
		sTryphinia2ToDingo	1.8	18%	LowTSR
		sDingoToUmolo	2.0	15%	LowTSR
		sUmoloToParnabal	2.0	10%	LowTSR

System	Line	Model Section Name	Model Outputs		Model Inputs
			TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sParnabalToWalton	2.7	33%	MidTSR
		sWaltonToBluff1	1.9	41%	MidTSR
	4A: B.L. - Callemondah to Port of Gladstone	sCallemondahEntryToMtMillerCrossover	1.4	41%	MidTSR
		sMtMillerToComalcoJunction			NoTSR
		sComalcoJunctionToFishermansLandingBalloon			NoTSR
		sMtMillerToWigginsIslandJunction			NoTSR
		sParanaToSouthGladstone	1.6	28%	LowTSR
	4B: B.L. - Burngrove to Bluff	sBluff2ToBoonalPoints	1.8	45%	HighTSR
		sBoonalPointsToBoonal	2.3	24%	LowTSR
		sBoonalToBlackwater1	2.5	38%	MidTSR
		sBlackwaterAngleToTaurusJunction	2.6	21%	LowTSR
		sTaurusJunctionToKoorilgahBalloon	1.7	20%	LowTSR
		sBlackwater2ToSagittarius	2.2	16%	LowTSR
		sSagittariusToCurraghBalloon	2.1	11%	LowTSR
		sSagittariusToRangal	1.5	34%	MidTSR
	sRangalToBurngroveJunction	2.1	15%	LowTSR	
	4C: B.L. - Rolleston Mine to Rangal	sRangalToTikardi1	2.0	10%	LowTSR
		sTikardi2ToBoorgoonJunction	2.1	21%	LowTSR
		sBoorgoonJunctionToKinrolaJunction	2.1	40%	MidTSR
		sKinrolaJunctionToKenmare1	1.6	10%	LowTSR
		sKenmare2ToMemooloo1	1.7	38%	MidTSR
		sMemooloo2ToStarlee1	1.7	31%	MidTSR
	sStarlee2ToMeteorDownsSouthJunction	2.0	28%	LowTSR	

System	Line	Model Section Name	Model Outputs		Model Inputs
			TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
	4D: B.L. - Oaky Creek Junction to Burngrove	sMeteorDownsSouthJunctionToRollestonBalloon	1.3	25%	LowTSR
		sGregoryJunctionToYanYan2	2.6	12%	LowTSR
		sYanYan2ToKestrelBalloon	2.0	26%	LowTSR
		sYanYan1ToFairhill1	1.7	33%	MidTSR
		sFairhill2ToEnshamJunction	1.7	26%	LowTSR
		sEnshamJunctionToCrew1	2.3	42%	MidTSR
		sCrew2ToWashpoolJunction	2.4	22%	LowTSR
		sWashpoolJunctionToBurngroveJunction	1.7	13%	LowTSR
Moura	5. M.L. - Boundary Hill Junction to Callemondah	sByelleeToStowe1	2.1	49%	MidTSR
		sStowe2ToGraham	2.4	21%	LowTSR
		sGrahamToStirrat1	1.3	15%	LowTSR
		sStirrat2ToClarke1	1.9	49%	HighTSR
		sClarke2ToFry1	2.3	22%	MidTSR
		sFry2ToMtRainbow1	1.7	19%	LowTSR
		sMtRainbow2ToDumgree1	1.5	18%	LowTSR
	5A: B.L. - Boundary Hill Junction to Earlsfield	sDumgree2ToBoundaryHillJunction	1.8	17%	LowTSR
		sBoundaryHillJunctionToAnnandale1	2.4	26%	LowTSR
		sAnnandale2ToEarlsfield	2.1	42%	MidTSR
	5B: B.L. - Earlsfield to Callide	sEarlsfieldToKoonkool1			NoTSR
		sKoonkool2ToDakenba1	1.4	14%	LowTSR
		sDakenba2ToCallideBalloon	2.0	36%	MidTSR
	5C: B.L. - Earlsfield to Moura	sEarlsfieldToBelldeen1	1.2	40%	MidTSR
sBelldeen2ToMouraJunction		2.7	13%	LowTSR	

System	Line	Model Section Name	Model Outputs		Model Inputs
			TSR delay (minutes)	TSR Duration (Proportion of time in a year during which TSR delay is applied)	TSR Group
		sMouraJunctionToBaralabaJunction	2.3	17%	LowTSR

H8 Yard Congestion - Duration (Model Inputs)

coal system	Yard	Delay Type	Expected delay (minutes)	Duration distribution			
				Distribution	Rate	Lower bound (minutes)	Upper bound (minutes)
Newlands-GAPE	Pring & BRC Depots	Long delay	1080	EXPONENTIAL	9.26E-04	720	1,440
		Short delay	90	EXPONENTIAL	1.11E-02	30	150

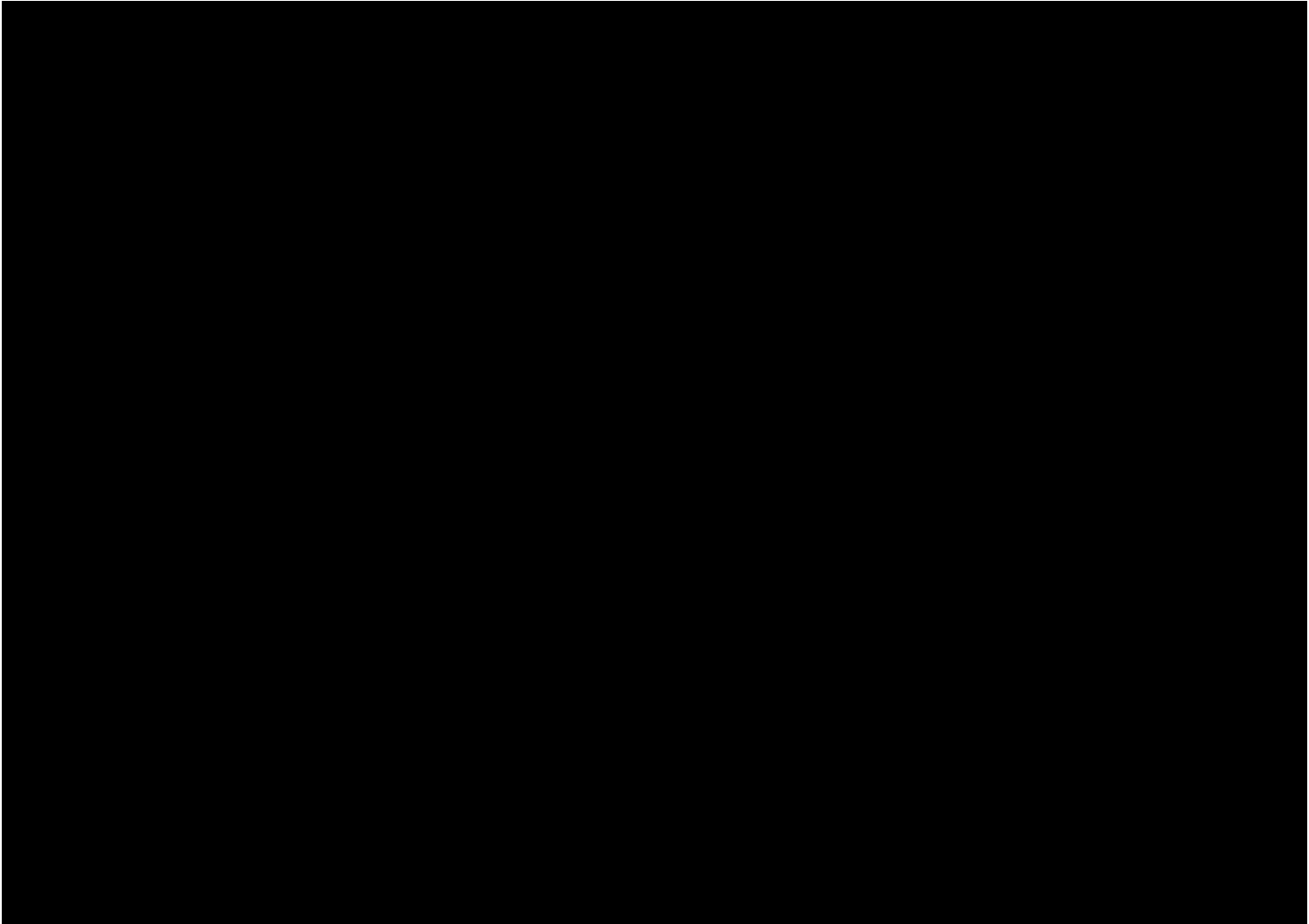
H9 Yard Congestion - Frequency (Model Inputs)

coal system	Yard	Delay Type	Expected frequency (number trips)	Frequency distribution		
				Distribution	Lower bound (number trips)	Upper bound (number trips)
Newlands-GAPE	Pring & BRC Depots	Long delay	20	UNIFORM	15	25
		Short delay	10	UNIFORM	5	15

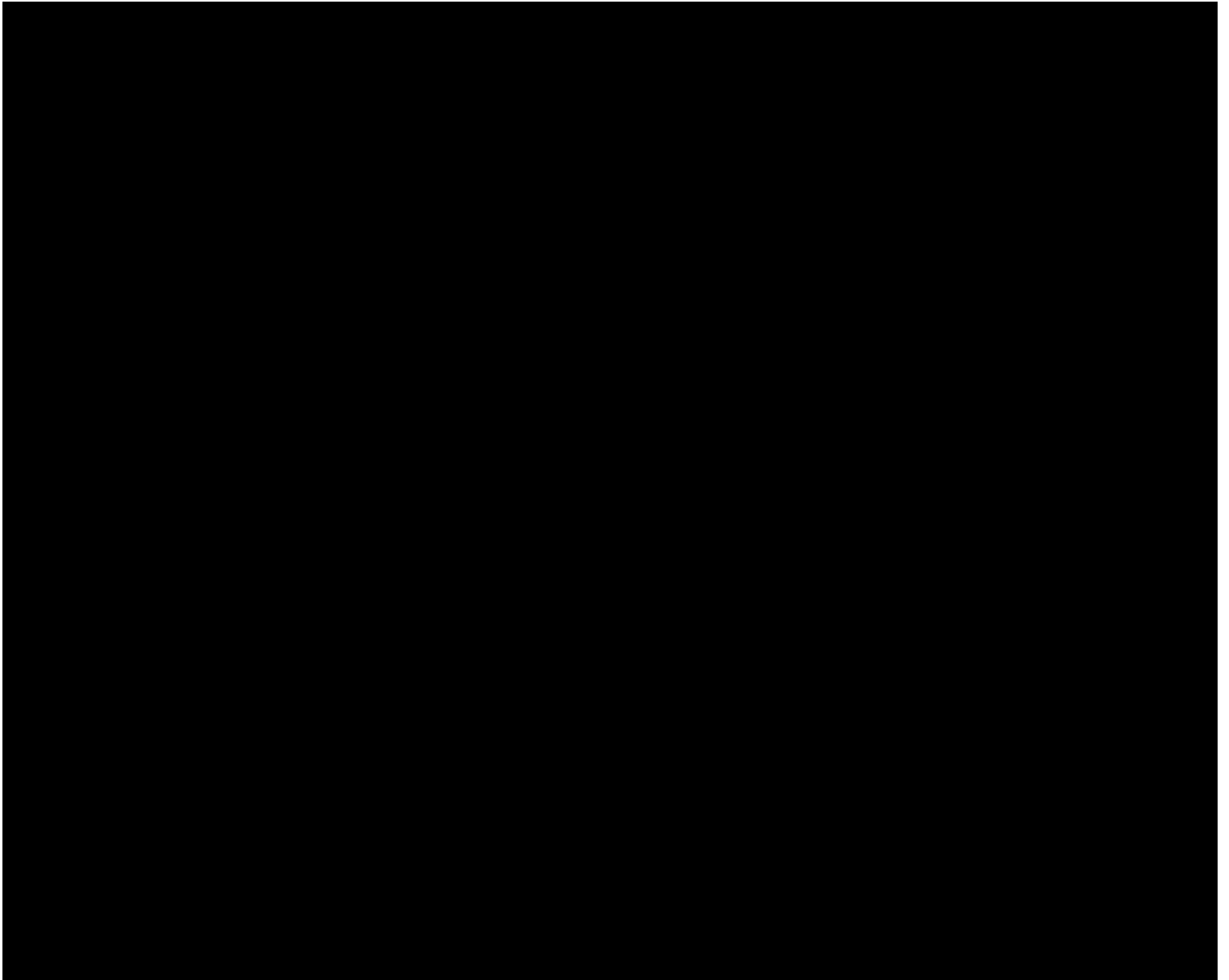
Appendix I: Above Rail Parameters

The following data relates to above rail operators that is used in the Model.

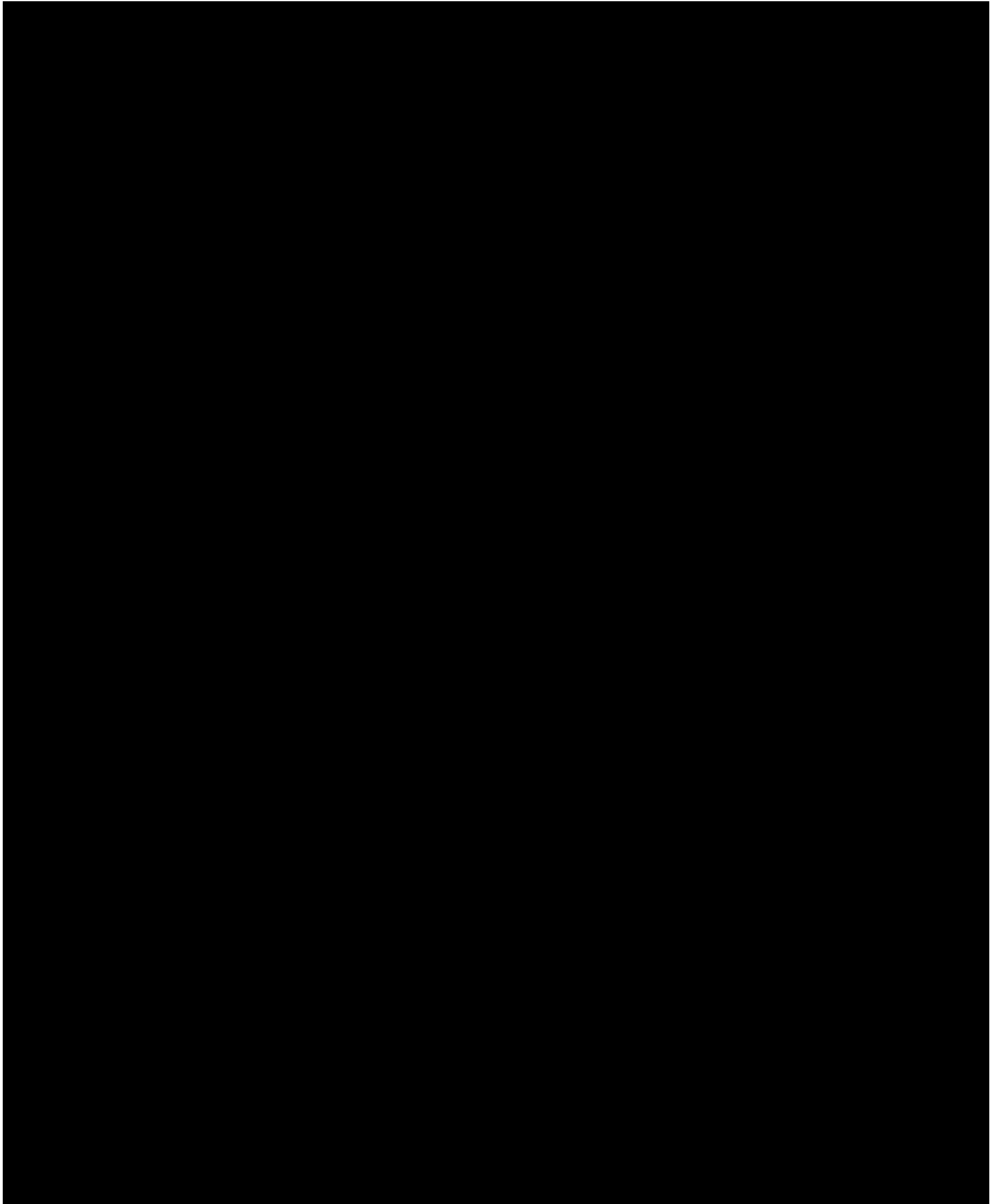
I1 Consists (Model Inputs)

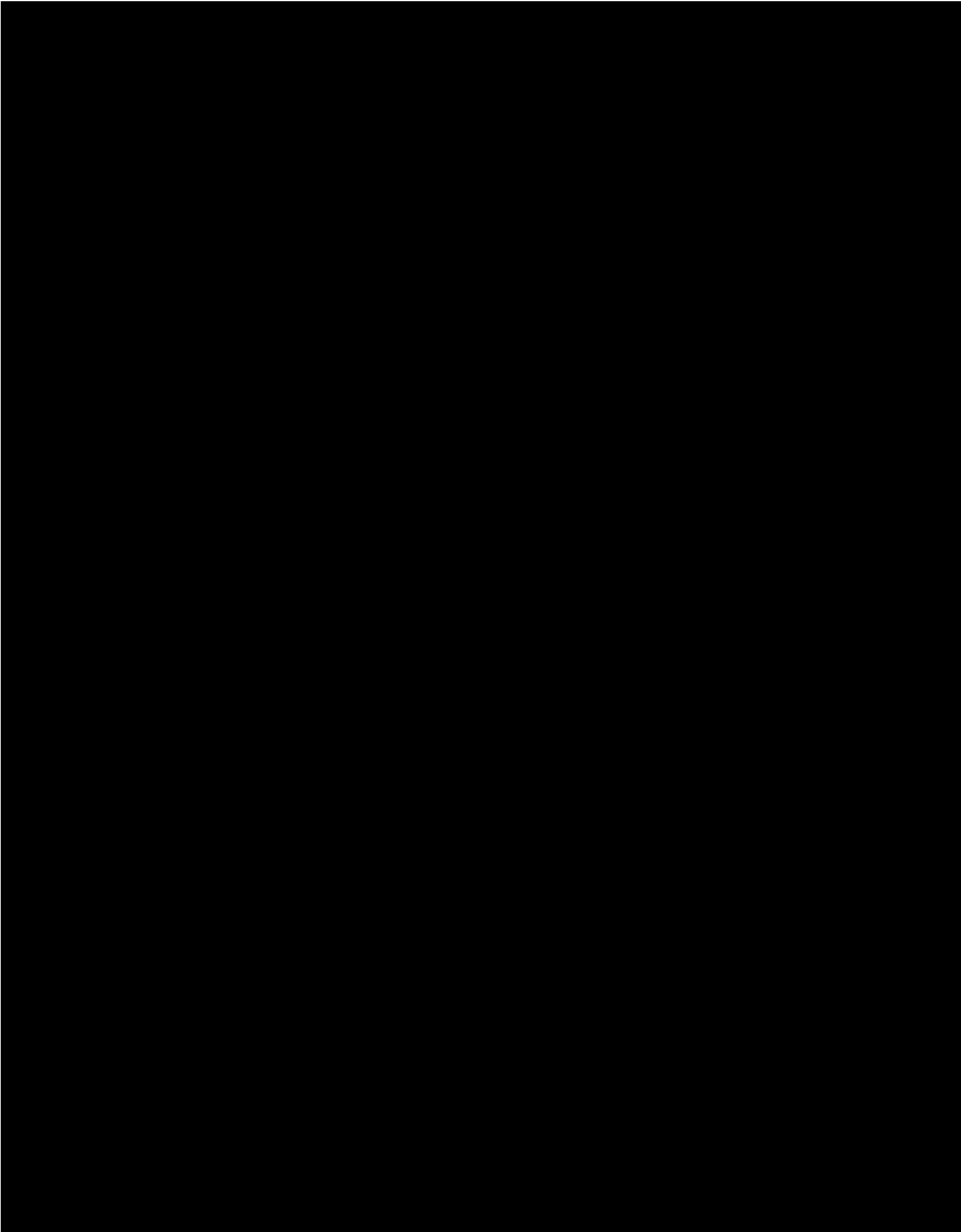


12 Crew Change Locations (Model Inputs)



13 Train Maintenance per Depot Assumptions (Model Inputs)





I4 Mine to fleet relationships (Model Inputs)

