

# Technical Memorandum

29 June 2023

<b>To</b>	Gerritt Lacey	<b>Contact No.</b>	+1 604 248-3934 +1 604 248 3907
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<b>From</b>	Lee Williams; Dave Engstrom/ra/2	<b>Project No.</b>	11213132
<b>Project Name</b>	PRRD 2020 Closure Reports		
<b>Subject</b>	Dawson Creek Landfill Conceptual Regrading Plan		

## 1. Introduction

This technical memorandum (Memo) presents a conceptual regrading plan (Regrading Plan) for the Dawson Creek Landfill (Landfill, Site). The Regrading Plan is intended to provide a concept-level design with a budgetary cost estimate in preparation for detailed design and tender for construction in the future.

### 1.1 Scope and Limitations

*This technical memorandum has been prepared by GHD for Peace River Regional District. It is not prepared as, and is not represented to be, a deliverable suitable for reliance by any person for any purpose. It is not intended for circulation or incorporation into other documents. The matters discussed in this memorandum are limited to those specifically detailed in the memorandum and are subject to any limitations or assumptions specially set out.*

## 2. Background

The Landfill was constructed over a historical meander of Dawson Creek, which is approximately 20 metres thick and infilled with fluvial sand and gravel. Waste was placed from the pre-existing north bank of Dawson Creek near Highway 49 to the south towards the existing creek. In 1997, ownership of the Landfill was transferred to the PRRD.

The Landfill stopped receiving waste between 2000 and 2002. After closure, the Site continued to operate as a transfer station and waste was redirected to the Bessborough Landfill. The Site received clean fill material until January 1, 2020. The clean fill was placed at the crest of the Landfill and pushed down slope by hauling contractors.

In 2021, PRRD completed a Closure Plan and Assessment for the Landfill (Closure Plan). The Closure Plan included the following recommendations:

- Remove scattered litter and cover exposed waste on the Landfill.

This Technical Memorandum is provided as an interim output under our agreement with Peace River Regional District. It is provided to foster discussion in relation to technical matters associated with the project and should not be relied upon in any way.

- Develop a cover rehabilitation program.
- Establish final grades of not more than 3H:1V (horizontal to vertical) on side slopes and not less than 5 percent on the Landfill plateau.

### **3. Design Basis**

This Regrading Plan has been prepared in accordance with the Landfill's Closure Plan (GHD, 2021) and the 2016 BC Landfill Criteria (Criteria). Recommended activities include reconstructing cover in areas with over-steepened and eroding slopes, repairing areas of sloughing that may cause future instability, and regrading to eliminate ponding and covering exposed waste. The Regrading Plan is intended to balance cut/fill volumes and minimize disturbance of disposed waste.

Applicable guidelines from BC Landfill Criteria (2016) were used as constraints for the Regrading Plan, including maximum slopes, minimum slopes, final cover thickness, final cover materials and vegetative requirements. GHD assumed that the existing cover system generally consisted of adequate cover material and thickness, unless otherwise noted in the Regrading Plan. The Criteria specifies a maximum hydraulic conductivity of  $1 \times 10^{-5}$  cm/sec for final cover material in "semi-arid" regions, and Dawson Creek falls under the Criteria definition of a "semi-arid" region, based on rainfall data.

#### **3.1 Design Outputs**

Regrading Plan drawings are provided in Attachment 1 along with cut/fill estimates. In general, regrading will consist of the following steps.

##### **In Areas of Cut:**

- Excavate to design elevation.
- Over-excavate 750 mm and prepare surface for final cover.
- Segregate excavated materials.
  - Stockpile excavated clean low permeability material for use as final cover.
  - Stockpile excavated clean aggregate material on Landfill plateau in areas designated by the PRRD.
  - Place waste in direct contact with underlying waste in areas requiring fill or on Landfill plateau, compact waste, and cover waste with final cover.
- Re-establish final cover, including 600 mm clay, 150 mm topsoil, seeding and coconut matting.
- Establish vegetation consistent with existing vegetation.

##### **In Areas of Fill:**

- Place and compact fill material to 750 mm below design elevation.
  - In areas with more than 750 mm fill, compacted waste is acceptable as fill material.
  - Waste used as fill material must be placed in direct contact with underlying waste and covered with final cover.
- Prepare surface for final cover.
- Re-establish final cover, including 600 mm clay, 150 mm topsoil, seeding and coconut matting.
- Establish vegetation consistent with existing vegetation.

Recommendations for specific areas are provided in the following subsections.

### 3.1.1 Northwest Crest

Slopes on the Northwest Crest are over-steepened and eroded. Soil stockpiles were observed on the plateau adjacent to the Northwest Crest during the Site visit and on aerial imagery. Grading of the Northwest Crest will generally require approximately 2 m to 5 m of cut to meet design grades.

### 3.1.2 West Crest

Slopes on the West Crest are over-steepened and eroded. Soil stockpiles were observed on the plateau adjacent to the West Crest during the Site visit and on aerial imagery. Grading of the West Crest will generally require approximately 1 m to 2 m of fill to meet design grades.

### 3.1.3 South Crest

Slopes on the South Crest are over-steepened and eroded. Grading of the South Crest will generally require approximately 1 m to 3 m cut to meet design grades.

### 3.1.4 Mid-Slope Slide

A portion of cover material on the southwest slope has slid down the slope. Although exposed waste was not observed in the area above the slide (north and east of the slide), the thickness of cover material is likely inadequate in the area above the slide. Filling will be required above the slide to meet design grades and re-establish final cover. The slide material will be cut to meet design grades.

### 3.1.5 Lower Slopes Cover Rehabilitation

Channelling, erosion, and sloughing were observed on the lower slopes of the Landfill, particularly on the west slope, contributing to pathways of unvegetated soils. The larger channels can be identified on the topographic survey.

Recommendations:

- Regrade areas of channelling/erosion/sloughing to meet design grades.
- Restore continuous, erosion-resistant cover system and establish vegetation.
- Cover exposed waste at the southeast toe and in other areas, if encountered.
- Remove scattered litter, if encountered.

### 3.1.6 Landfill Plateau Regrading

The Landfill plateau is generally flatter than 5% in any direction. Signs of ponding and desiccated clay were found in the plateau area, and portions of the plateau area were unvegetated.

Recommendations:

- Regrade area to 10% with final cover, per LF Criteria.
- Consider alternatives to reduce disturbance to the plateau, such as:
  - Pave plateau with asphalt for potential future use as transfer station.
  - Grade plateau to prevent ponding of water (<10%), establish vegetation, and monitor as required.

## 4. Cost Estimate


A capital cost estimate for the Regrading Plan is provided in Table 1 attached to this Memo. The estimated capital costs to execute the Regrading Plan is \$780,000, including a 20% contingency and excluding applicable taxes.

This cost does not include Landfill plateau regrading, which should be added to the cost estimate after a preferred alternative is chosen.

## 5. Closure

Should you have any comments or require clarification on matters pertaining to the information in this Memo, please do not hesitate to contact the undersigned.

Regards,



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Landfill Engineer  
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Table 1

**Capital Cost Estimate  
Conceptual Regrading Plan  
Dawson Creek Landfill  
Peace River Regional District**

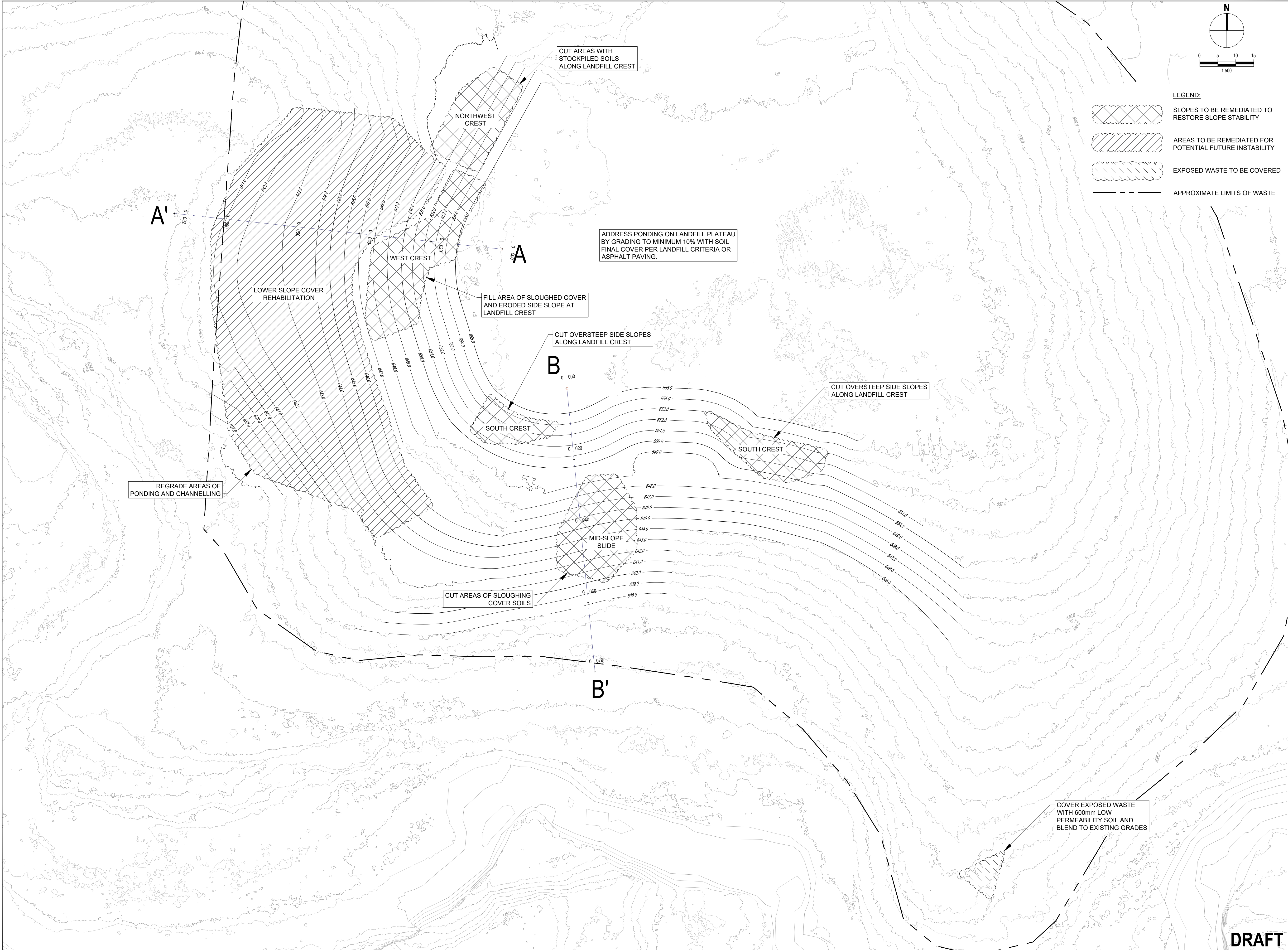
ITEM	SPEC. NO.	DESCRIPTION	EST. QTY.	UNIT	UNIT COST	TOTAL COST
1		Site Clearing - Clearing for surface re-grading and final cover	14,350	m <sup>2</sup>	\$ 0.90	\$ 13,000.00
2		Excavation - Excavation to conform to landfill final contours	6,533	m <sup>3</sup>	\$ 6.80	\$ 45,000.00
3		Fill - Fill to conform to landfill final contours	2,551	m <sup>3</sup>	\$ 13.50	\$ 35,000.00
4		Re-installation of final cover (inlcuding native low-permeability soil, topsoil, seeding and coconut matting)	14,350	m <sup>2</sup>	\$ 39.70	\$ 570,000.00
					<b>Sub Total</b>	<b>\$ 650,000.00</b>
					20% Contingency	\$ 130,000.00
					Sub Total	\$ 780,000.00
					G. S. T. (5%)	\$ 39,000.00
					<b>Total</b>	<b>\$ 819,000.00</b>
<b>Totals</b>						



## Notes:

1. Unit rates based on historical landfill projects in the PRRD with inflation adjustments based on Statistics Canada CPI inflation rates.
2. Estimated costs exclude engineering, contract administration and construcion quality assurance.
3. Estimated costs exclude grading of landfill plateau surface.
4. Costs are rounded up on \$1000 basis, and contingency of 20% is included in cost estimate.

# **Attachment 1**

**Conceptual Regrading Plan Drawings  
(enclosed electronically)**





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SURVEY INFORMATION - EXISTING  
CONDITIONS SURVEYED JULY-13-2022 BY  
McELHANNEY

NO.	-	-	-
NO.	-	-	-
NO.	-	-	-
NO.	-	-	-
NO.	-	-	-

0	ISSUED FOR REVIEW	W.L.	D.E.	04/14/2023
No.	Issue	Checked	Approved	Date

Author	T. WAGSTAFF	Designer	L. WILLIAMS
Drafting Check	L. WILLIAMS	Design Check	D. ENGSTROM
Project Manager	R. ROCCA	Project Director	D. LIDDY

Client

**PEACE RIVER  
REGIONAL DISTRICT**

Project

**DAWSON CREEK LANDFILL**

Date	2023-04-14	Scale	1:500
Project No.	111213132		
Title	<b>CONCEPTUAL REGRAIDING PLAN</b>		

Plot Date: 17 April 2023 - 11:48 AM

Plotted By: Tyler Wagstaff

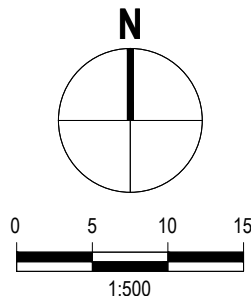
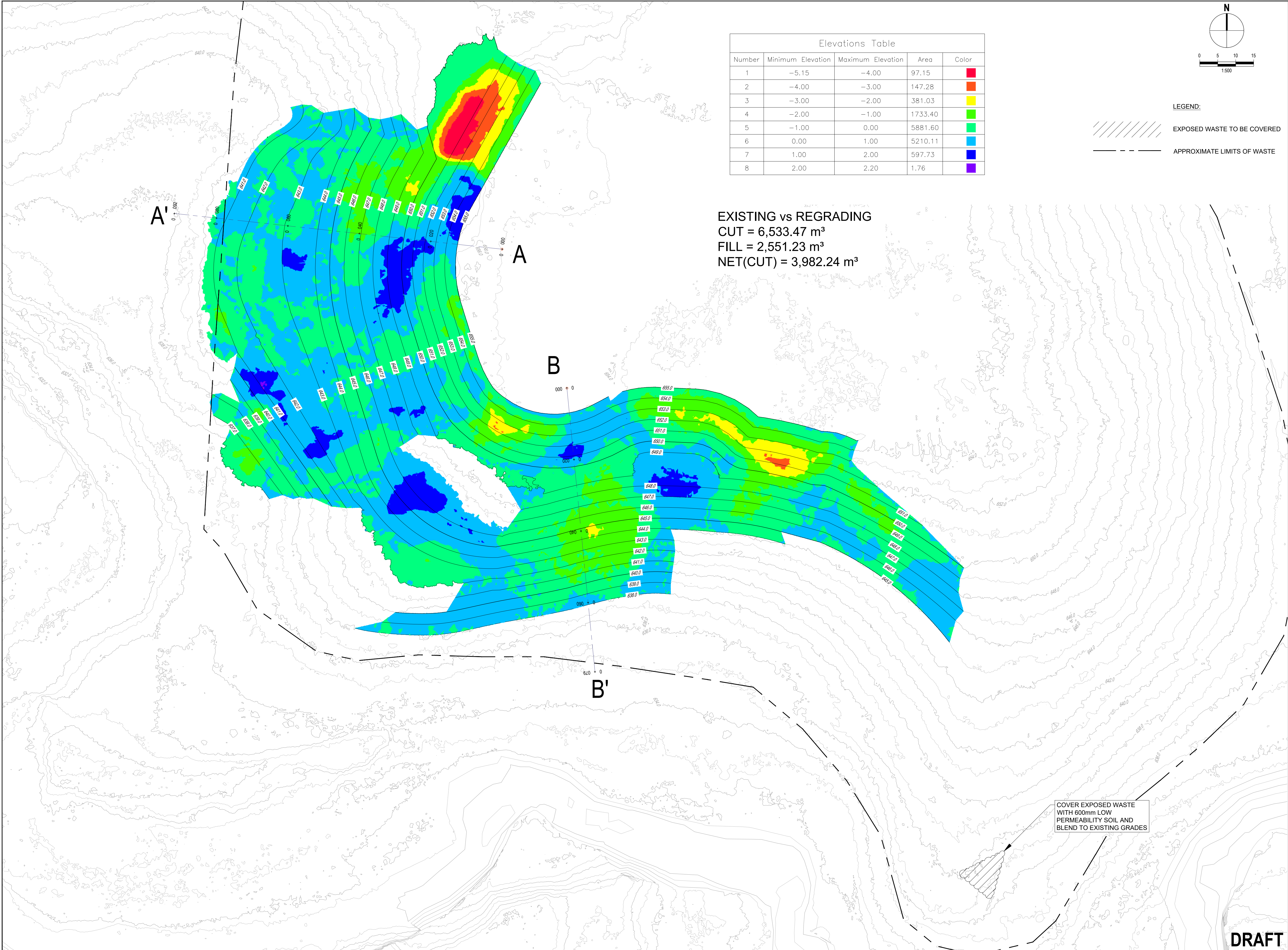
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LEGEND:



EXPOSED WASTE TO BE COVERED



APPROXIMATE LIMITS OF WASTE



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Author	T. WAGSTAFF	Designer	L. WILLIAMS
Drafting Check	L. WILLIAMS	Design Check	D. ENGSTROM
Project Manager	R. ROCCA	Project Director	D. LIDDY

Client  
**PEACE RIVER  
REGIONAL DISTRICT**

Project  
**DAWSON CREEK LANDFILL**

Date	2023-04-14	Scale	1:500
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Project No.  
**111213132**

Title  
**CUT AND FILL BALANCE**

Size  
ANSI D

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**CI-0102**

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Project Manager	R. ROCCA	Project Director	D. LIDDY

Client	PEACE RIVER REGIONAL DISTRICT
Project	DAWSON CREEK LANDFILL

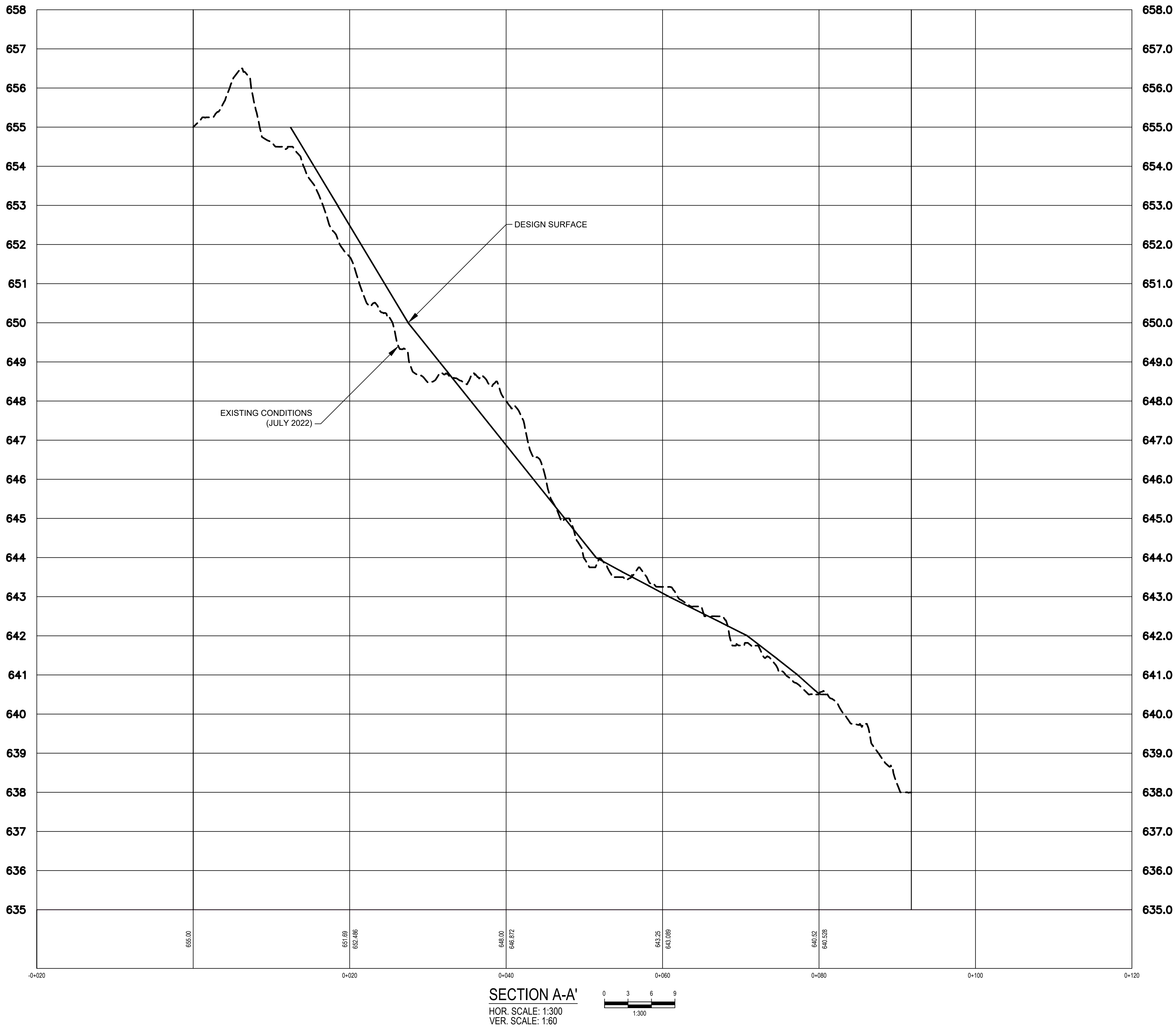
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Project No.	111213132
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Title	SECTION A-A'	Size	ANSI D
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Project  
**DAWSON CREEK LANDFILL**

Date	2023-04-14	Scale	AS SHOWN
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Project No.  
111213132

Title	SECTION B-B'	Size	ANSI D
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