

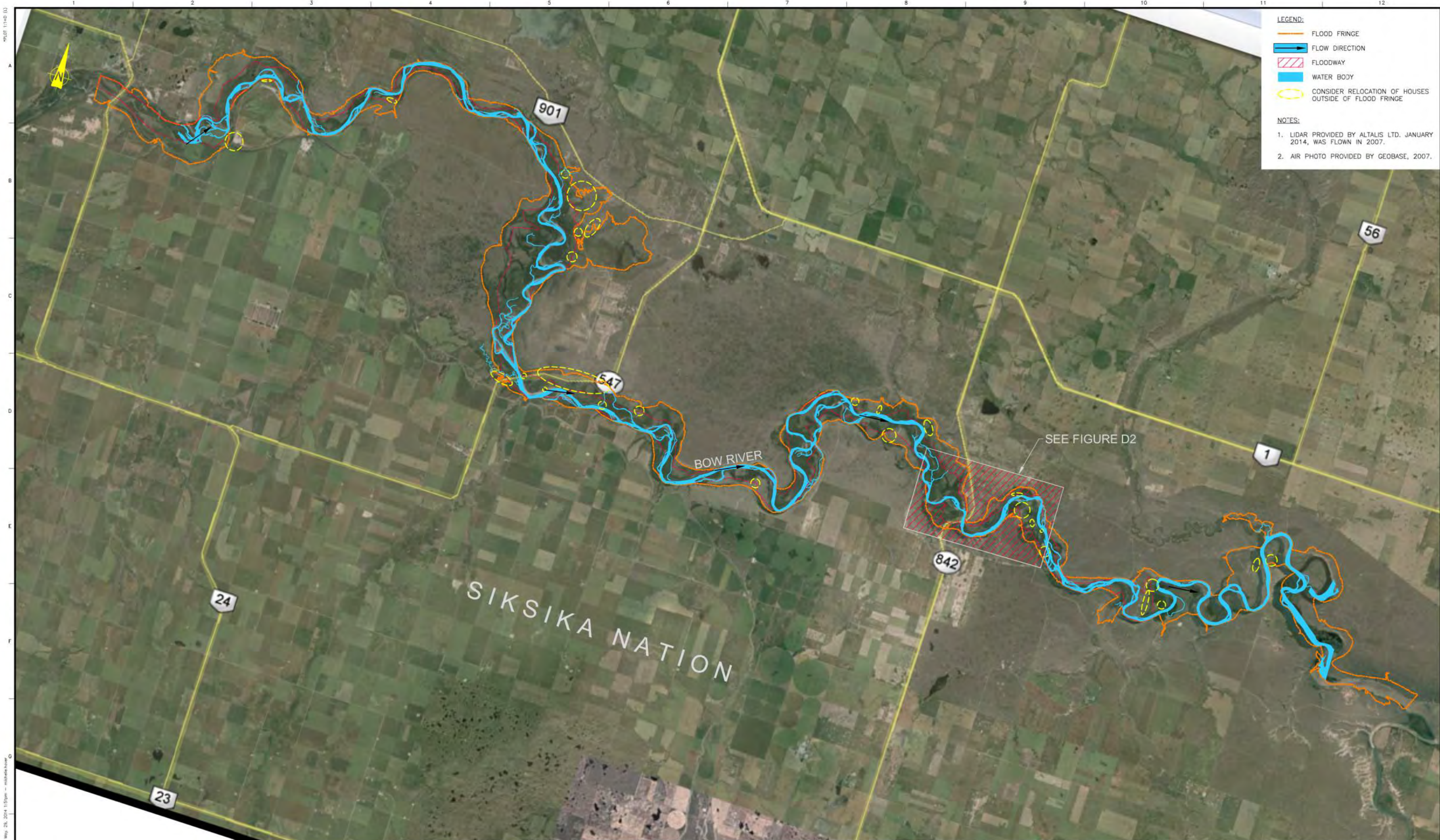


## **Appendix D**

### **Conceptual Design of Flood Defences at Siksika First Nation**

**Conceptual Cost Estimate  
Siksika Flood Defence Dykes**

| Item No. | Item Description                     | Unit           | Quantity  | Unit Price | Extension          |
|----------|--------------------------------------|----------------|-----------|------------|--------------------|
|          | <b>ALLOWANCES</b>                    |                |           |            |                    |
| 1        | Bigger Size Riprap                   | Allow.         | Allowance |            | \$350,000          |
|          | <b>TEMPORARY FACILITIES</b>          |                |           |            |                    |
| 2        | Mobilization and Demobilization      | L.S.           | 1         | Lump Sum   | \$75,000           |
| 3        | Existing and Temporary Roads         | L.S.           | 1         | Lump Sum   | \$25,000           |
|          | <b>SITE PREPARATION</b>              |                |           |            |                    |
| 4        | Clearing & Grubbing                  | ha             | 8         | \$2,000.00 | \$16,600           |
| 5        | Topsoil & Subsoil Stripping          | m <sup>3</sup> | 37297     | \$5.00     | \$186,484          |
| 6        | Care of Water                        | L.S.           | 2         | Lump Sum   | \$25,000           |
|          | <b>FILL PLACEMENT</b>                |                |           |            |                    |
| 7        | Low Permeable Fill                   | m <sup>3</sup> | 217836    | \$10.00    | \$2,178,361        |
|          | <b>GRANULAR AND RIPRAP MATERIALS</b> |                |           |            |                    |
| 8        | Riprap Zone 6B                       | tonnes         | 23481     | \$130.00   | \$3,052,517        |
| 9        | Gravel Armour Zone 5C                | tonnes         | 16977     | \$40.00    | \$679,061          |
| 10       | Non-Woven Geotextile                 | m <sup>2</sup> | 28294     | \$3.00     | \$84,883           |
|          | <b>LANDSCAPING</b>                   |                |           |            |                    |
| 14       | Topsoil & Subsoil Placement          | m <sup>2</sup> | 10251     | \$1.50     | \$15,377           |
| 15       | Turf Reinforcement Mat               | m <sup>2</sup> | 10251     | \$6.00     | \$61,508           |
| 16       | Hydroseeding                         | m <sup>2</sup> | 10251     | \$3.50     | \$35,880           |
|          | <b>SUBTOTAL</b>                      |                |           |            | <b>\$6,785,671</b> |
|          | <b>CONTINGENCIES @ 25%</b>           |                |           |            | <b>\$1,696,418</b> |
|          | <b>ENGINEERING @ 12%</b>             |                |           |            | <b>\$814,281</b>   |
|          | <b>ESTIMATED TOTAL COST</b>          |                |           |            | <b>\$9,296,000</b> |



**LEGEND:**

- FLOOD FRINGE
- FLOW DIRECTION
- FLOODWAY
- WATER BODY
- CONSIDER RELOCATION OF HOUSES OUTSIDE OF FLOOD FRINGE

**NOTES:**

1. LIDAR PROVIDED BY ALTALIS LTD. JANUARY 2014, WAS FLOWN IN 2007.
2. AIR PHOTO PROVIDED BY GEOBASE, 2007.

SCALE  
1:75 000  
0 0.5 1 1.5 km

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| 13  | 05 | 14 |   | ISSUED FOR FINAL REPORT    | H.M. | G.G.  |
| 14  | 03 | 14 |   | ISSUED FOR CLIENT REVIEW   | G.B. | G.G.  |

**amec**

Client: **SOUTHERN ALBERTA FLOOD RECOVERY TASK FORCE**

|              |          |          |  |              |              |
|--------------|----------|----------|--|--------------|--------------|
| Designed By: | H.M.     | Project: | <b>FLOOD MITIGATION FEASIBILITY STUDY FOR BOW, ELBOW AND OLDMAN RIVER BASINS</b> | Project No.: | CW2174       |
| Drawn By:    | M.H.     |          |  | CADD File:   | 2174-N04.dwg |
| Checked By:  | G.B.     | Title:   | <b>SIKSIKA FLOOD DEFENCE GENERAL PLAN</b>  | Date:        | MARCH 2014   |
| Approved By: | G.G.     |          |  | Drawing No.: | FIGURE D1    |
| Scale:       | AS SHOWN |          |  | Sheet No.:   | 1 of 1       |

I:\0\374\374-104.dwg - FIGURE D1 - May 29, 2014 11:51am - mhahs@amec.com



- LEGEND:**
- FLOOD FRINGE
  - FLOW DIRECTION
  - FLOODWAY
  - FLOOD DYKE / RIPRAP PROTECTION
  - FLOOD DYKE / TRM PROTECTION
  - WATER BODY
- NOTES:**
1. LIDAR PROVIDED BY ALTALIS LTD. JANUARY 2014, WAS FLOWN IN 2007.
  2. AIR PHOTO PROVIDED BY ALBERTA ENVIRONMENT AND SUSTAINABLE RESOURCE DEVELOPMENT, DECEMBER 2013.

SCALE  
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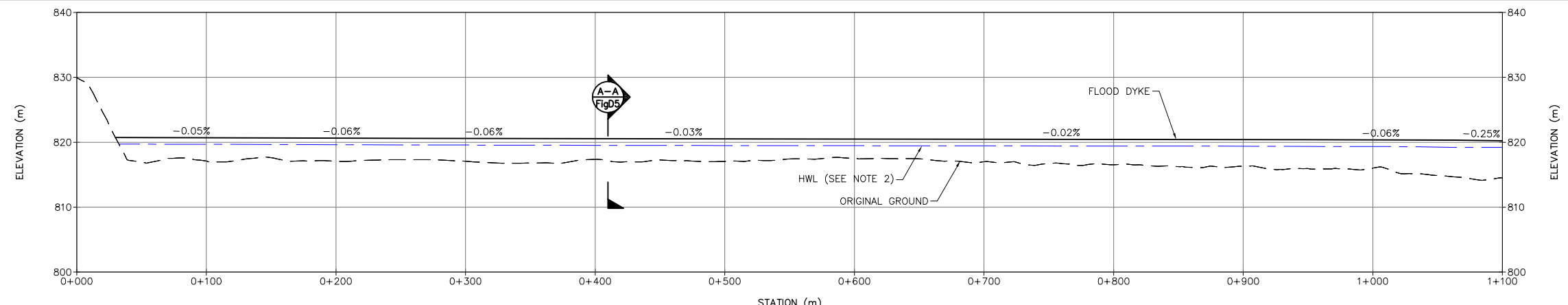
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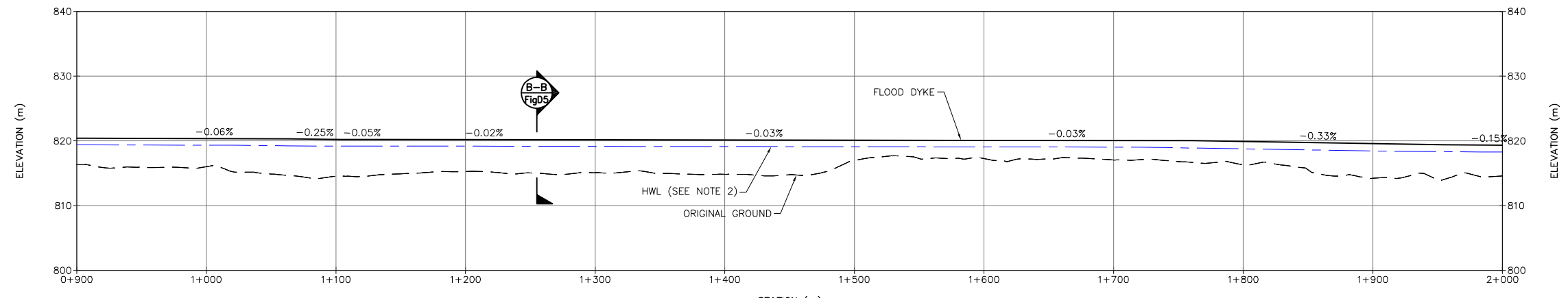
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Client: **SOUTHERN ALBERTA FLOOD RECOVERY TASK FORCE**

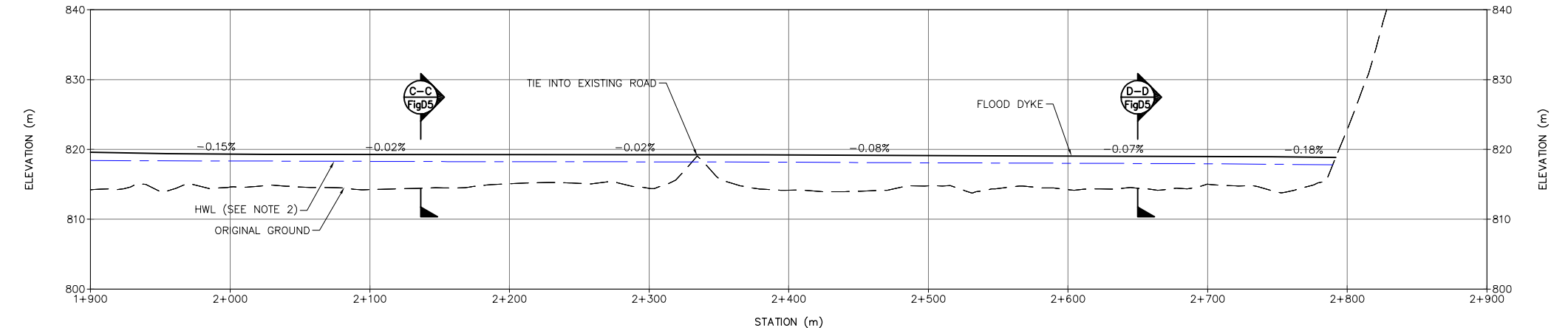
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| Designed By: | H.M. | Project:   | <b>FLOOD MITIGATION FEASIBILITY STUDY FOR BOW, ELBOW AND OLDMAN RIVER BASINS</b> | Project No.: | CW2174       |
| Drawn By:    | M.H. | GADD File: | 2174-N01.dwg   | CADD File:   | 2174-N01.dwg |
| Checked By:  | G.B. | Title:     | <b>SIKSIKA FLOOD DEFENCE CONCEPTUAL PLAN</b>                                     | Date:        | MARCH 2014   |
| Approved By: | G.G. | Scale:     | AS SHOWN   | Drawing No.: | FIGURE D2    |
|              |      |            |  | Sheet No.:   | 1 of 1       |



**A** PROFILE STA. 0+000 TO 1+100  
 SCALE HOR. 1:2000  
 VER. 1:400

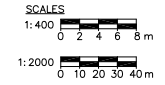


**A** PROFILE STA. 0+900 TO 2+000  
 SCALE HOR. 1:2000  
 VER. 1:400



**A** PROFILE STA. 1+900 TO 2+850  
 SCALE HOR. 1:2000  
 VER. 1:400

- NOTES:**
1. ALL DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.
  2. HIGH WATER LEVEL (HWL) IS BASED ON 1% EXCEEDANCE (100-YEAR) FLOOD EVENT.



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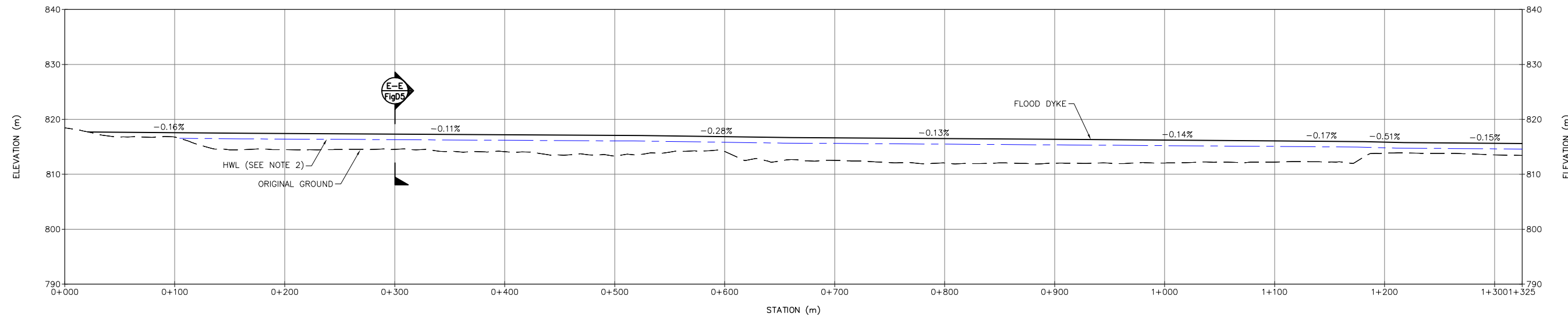
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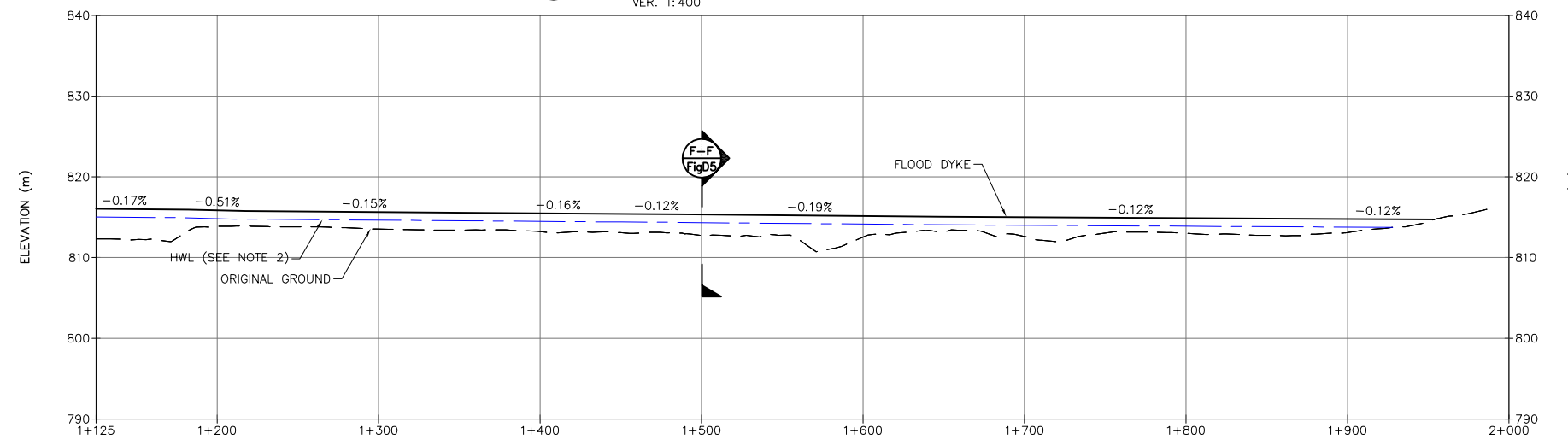
Client: **SOUTHERN ALBERTA FLOOD RECOVERY TASK FORCE**

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| Designed By: | H.M.     | Project: <b>FLOOD MITIGATION FEASIBILITY STUDY FOR BOW, ELBOW AND OLDMAN RIVER BASINS</b> | Project No.: | CW2174       |
| Drawn By:    | M.H.     |   | CADD File:   | 2174-N01.dwg |
| Checked By:  | G.B.     | Title: <b>SIKSIKA FLOOD DEFENCE SOUTH DYKE PROFILE</b>                                    | Date:        | MARCH 2014   |
| Approved By: | G.G.     |   | Drawing No.: | FIGURE D3    |
| Scale:       | AS SHOWN |   | Sheet No.:   | 1 of 1       |

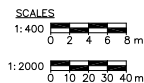
- NOTES:
1. ALL DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.
  2. HIGH WATER LEVEL (HWL) IS BASED ON 1% EXCEEDANCE (100-YEAR) FLOOD EVENT.



**B** PROFILE STA. 0+000 TO 1+325  
 FigD2 SCALE HOR. 1:2000  
 VER. 1:400



**B** PROFILE STA. 1+125 TO 2+000  
 FigD2 SCALE HOR. 1:2000  
 VER. 1:400



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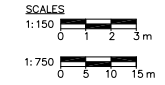
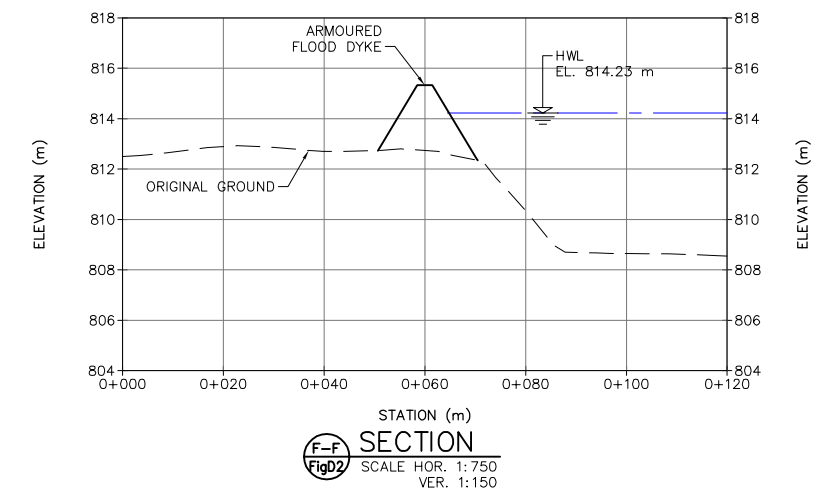
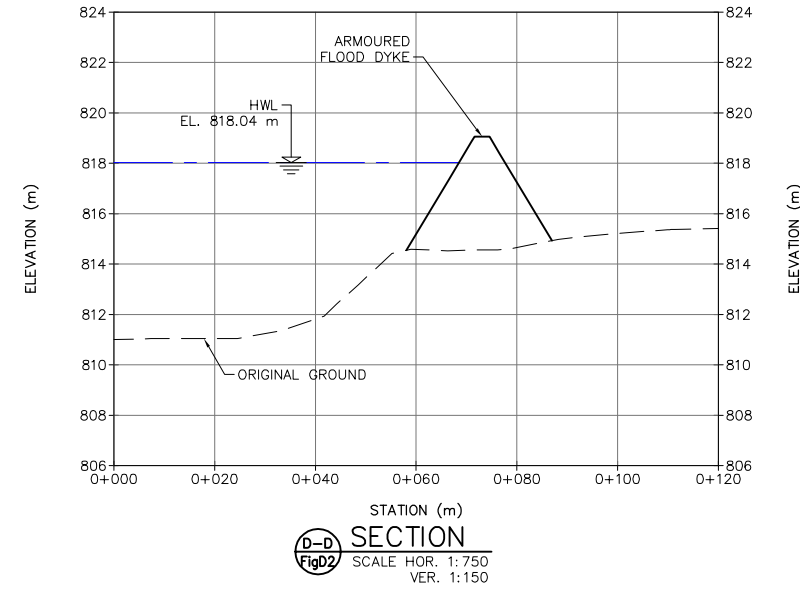
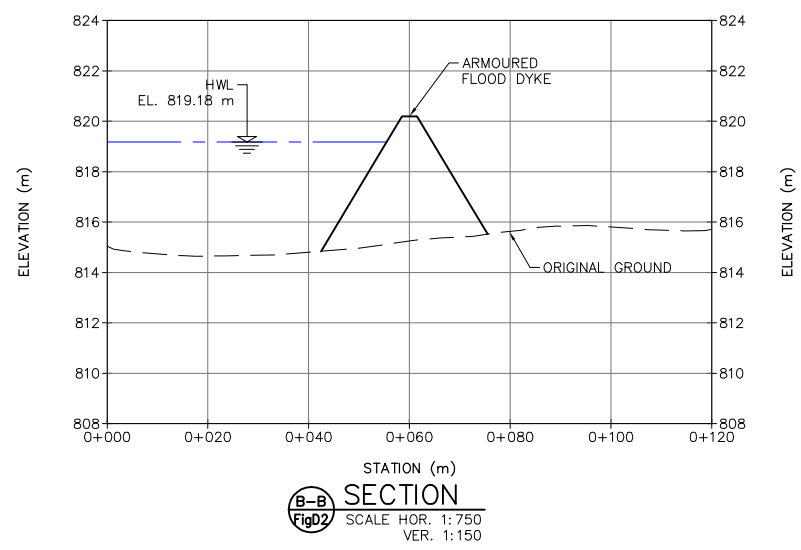
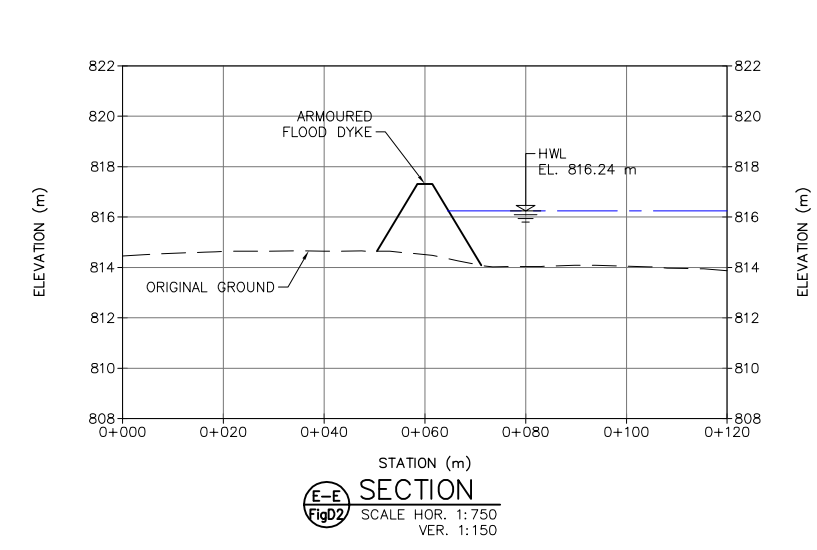
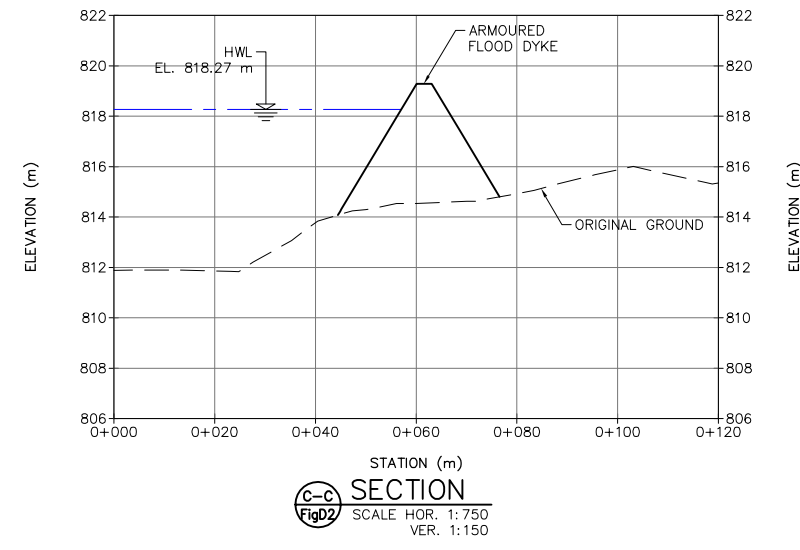
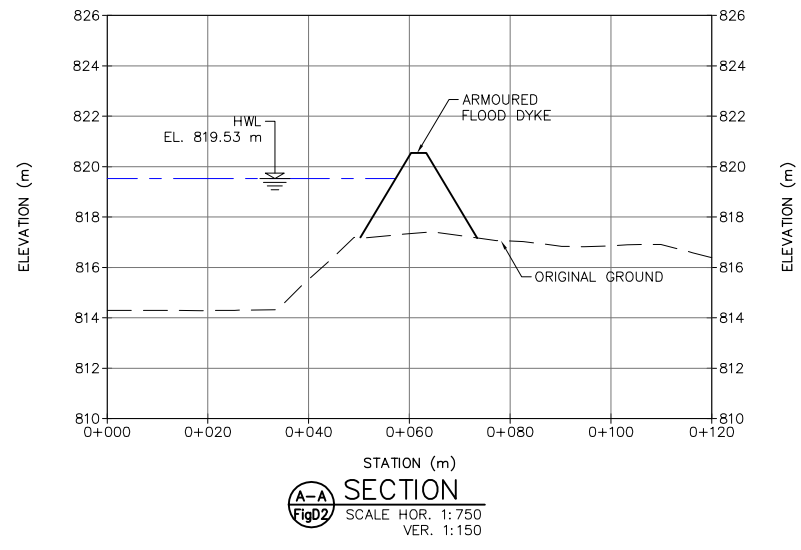
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Client: **amec**  
**SOUTHERN ALBERTA FLOOD RECOVERY TASK FORCE**

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| Designed By: | H.M.     | Project: <b>FLOOD MITIGATION FEASIBILITY STUDY FOR BOW, ELBOW AND OLDMAN RIVER BASINS</b> | Project No.: | CW2174       |
| Drawn By:    | M.H.     |   | CADD File:   | 2174-N01.dwg |
| Checked By:  | G.B.     | Title: <b>SIKSIKA FLOOD DEFENCE NORTH DYKE PROFILE</b>                                    | Date:        | MARCH 2014   |
| Approved By: | G.G.     |   | Drawing No.: | FIGURE D4    |
| Scale:       | AS SHOWN |   | Sheet No.:   | 1 of 1       |

- NOTES:**
1. ALL DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.
  2. HIGH WATER LEVEL (HWL) IS BASED ON 1% EXCEEDANCE (100-YEAR) FLOOD EVENT.
  3. ALL SECTIONS LOOKING DOWNSTREAM.



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| 14  | 03 | 14 | ISSUED FOR CLIENT REVIEW | G.B.                       | G.G.       |
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Client: **amec**

**SOUTHERN ALBERTA FLOOD RECOVERY TASK FORCE**

Designed By: H.M.  
 Drawn By: M.H.  
 Checked By: G.B.  
 Approved By: G.G.  
 Scale: AS SHOWN

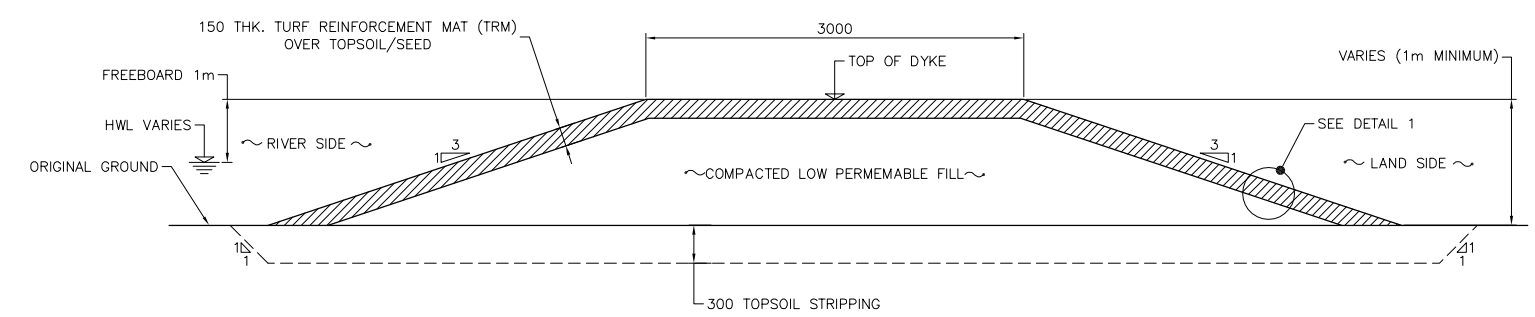
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Title: **SIKSIKA FLOOD DEFENCE DYKE SECTIONS**

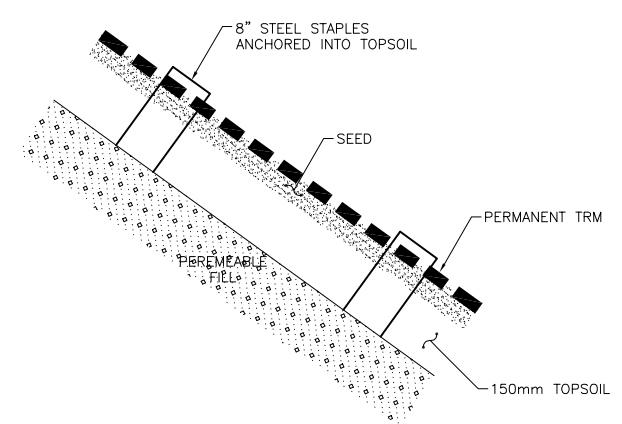
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 Sheet No.: 1 of 1

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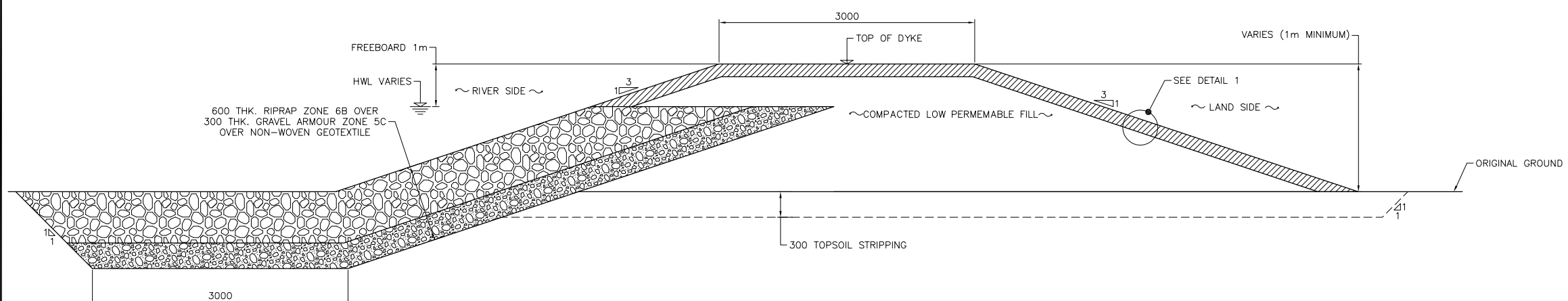
NOTES:  
 1. ALL DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.



TYPICAL SECTION - FLOOD DYKE (TRM PROTECTION)  
 SCALE 1:30



1 DETAIL  
 SCALE NTS



TYPICAL SECTION - FLOOD DYKE (RIPRAP PROTECTION)  
 SCALE 1:30

SCALE  
 1:30  
 0 200 400 600 mm

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**SOUTHERN ALBERTA FLOOD RECOVERY TASK FORCE**

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| Drawn By:    | M.H. | CADD File: | 2174-N01.dwg   | Date:        | MARCH 2014 |
| Checked By:  | G.B. | Title:     | <b>SIKSIKA FLOOD DEFENCE TYPICALS</b>  | Drawing No.: | FIGURE D6  |
| Approved By: | G.G. | Scale:     | AS SHOWN   | Sheet No.:   | 1 of 1     |

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