

**UMKHOMAZI WATER PROJECT**  
**MODULE 3 – POTABLE WATER MODULE**

**Detailed Feasibility Study**

**Main Report - Volume 2**

**(Drawing Book)**

**Revision 1**

**October 2015**



Planning Services  
Engineering & Scientific Services  
Umgeni Water

Prepared By:

***Knight Piésold***  
CONSULTING

171 Rodger Sishi Road, Westville, 3630

**UMGENI WATER**

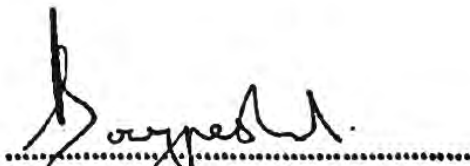
**OCTOBER 2015**

**uMkhomazi Water Project**

**Detailed Feasibility Study - Main Report - Volume 2  
(Drawing Book)**

*Report No. 108/114/12/R1-2*

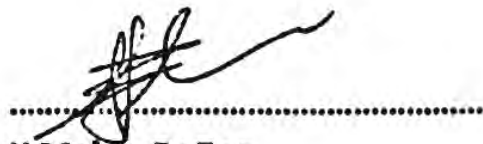
**Prepared by Knight Piésold Consulting**



**A Doorgapershad, Pr Eng**

**Study Leader: Knight Piésold Consulting**

**Approved for Umgeni Water Planning Services by:**



**K Meier, Pr Eng**

**Manager: Planning Services**

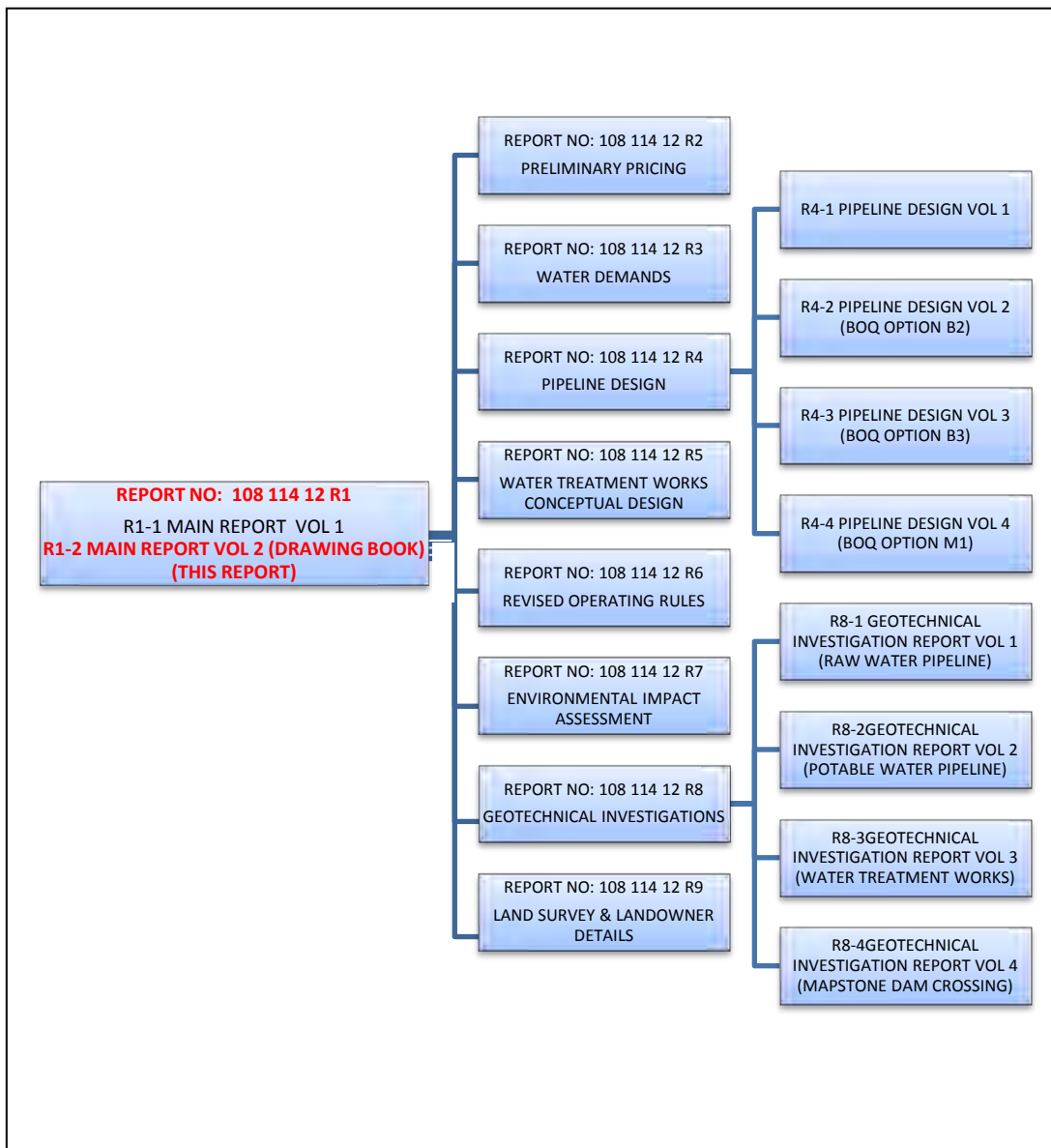
This report is to be referred in bibliographies as:

Umgeni Water (2015). uMkhomazi Water Project. Detailed Feasibility Study, Main Report-  
Volume 2 (Drawing Book). October 2015.

# UMKHOMAZI WATER PROJECT

## MODULE 3 – POTABLE WATER MODULE

### Structure of Suite of Reports



# DOCUMENT CONTROL SHEET

**CLIENT:** Umgeni Water

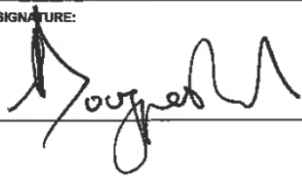
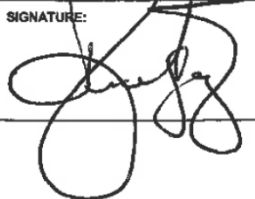
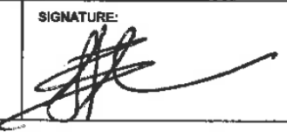
**PROJECT:** uMkhomazi Water Project, Potable Water Module

**PROJECT ASSIGNMENT:** uMkhomazi Water Project P/A No: 30300413/01

**TITLE:** Detailed Feasibility Study, Main Report-Volume 2 (Drawing Book), Revision 1

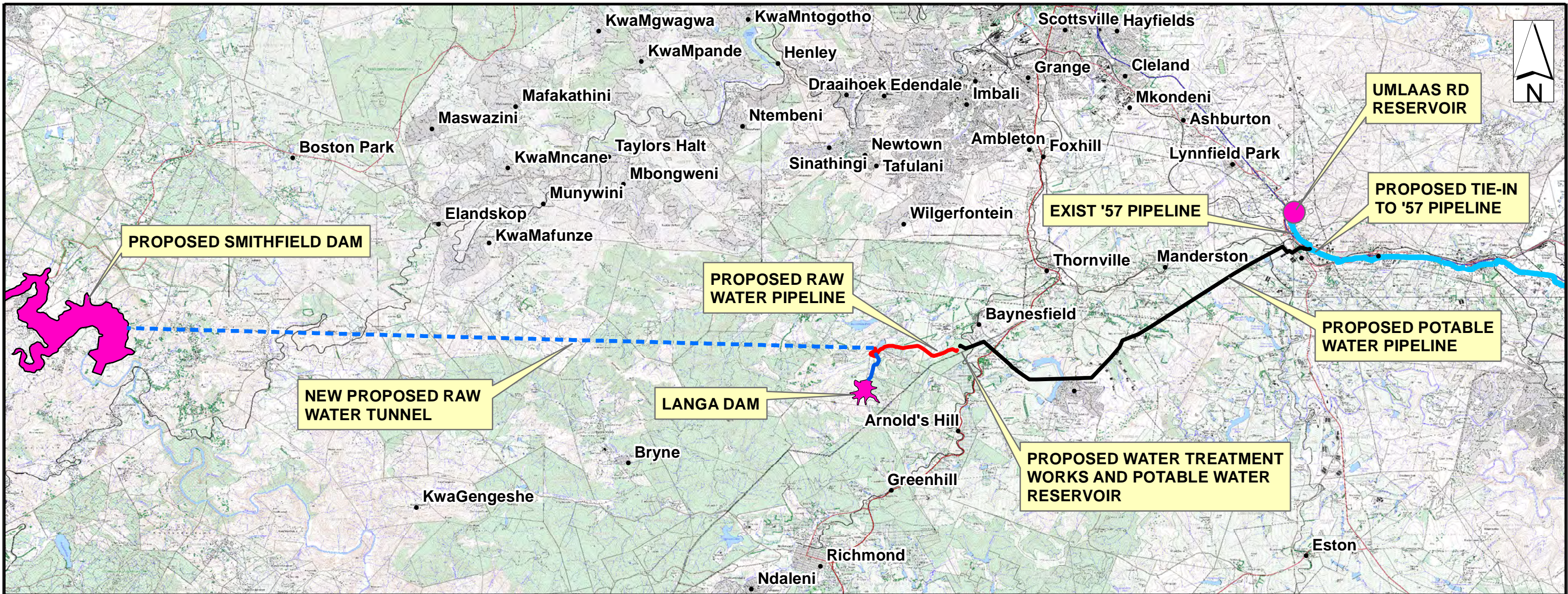
**REVISION HISTORY:**

DATE:	REV. NO.:	DESCRIPTION:	REVISED BY:
31 AUG 2014	A	INTERNAL REVIEW	A. DOORGAPERSHAD
31 OCT 2014	B	CLIENT REVIEW	A. DOORGAPERSHAD
31 OCT 2015	1	CLIENT APPROVAL	A. DOORGAPERSHAD

DESCRIPTION:	PREPARED BY:	REVIEWED BY:	APPROVED BY:
REVISION: 1	NAME: A. DOORGAPERSHAD	NAME: J. WATSON	NAME: K. MEIER
CLIENT APPROVAL	SIGNATURE: 	SIGNATURE: 	SIGNATURE: 

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DRAWING TITLE	DRAWING NUMBER
RAW AND POTABLE WATER COMPONENTS	30300413/A11
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - KEY PLAN	30300413/A26
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 1 OF 13	30300413/A27
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 2 OF 13	30300413/A28
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 3 OF 13	30300413/A29
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 4 OF 13	30300413/A30
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 5 OF 13	30300413/A31
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 6 OF 13	30300413/A32
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 7 OF 13	30300413/A33
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 8 OF 13	30300413/A34
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 9 OF 13	30300413/A35
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 10 OF 13	30300413/A36
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 11 OF 13	30300413/A37
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 12 OF 13	30300413/A38

DRAWING TITLE	DRAWING NUMBER
MAP BOOK OF RECOMMENDED PIPELINE ROUTE - SHEET 13 OF 13	30300413/A39
WTW LOCATION AND PIPELINE ROUTES - OPTION B2	30300413/A13-2
PLAN AND LONGITUDINAL SECTION SHOWING HYDRAULIC GRADE LINES - OPTION B2	30300413/A01
PLAN AND LONGITUDINAL SECTION SHOWING ANCILLARY INFRASTRUCTURE - OPTION B2	30300413/A02
PROPOSED ACCESS ROAD TO WATER TREATMENT WORKS - OPTION B2	30300413/B02-02
WATER TREATMENT WORKS - SITE WORKS	1301.X01.UW-110
WATER TREATMENT WORKS - SITE LAYOUT	1301.X01.UW-100
POTABLE WATER STORAGE RESERVOIR	30300413/G13
MAPSTONE DAM CROSSING - BURIED PIPELINE OPTION	30300413/A09
MAPSTONE DAM CROSSING - SUSPENSION BRIDGE OPTION	30300413/A10
MAPSTONE DAM CROSSING - STEEL BRIDGE OPTION	30300413/A07
MAPSTONE DAM CROSSING - CONCRETE PIERS OPTION	30300413/A08
CONSTRUCTION SERVITUDE LAYOUT - SINGLE PIPELINE	30300413/G15

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PRIMARY DISCIPLINE	CIVIL
DRAWN	I.D. OCT 14
DRAWING CHECK	A.D. OCT 14
DESIGN	A.D. OCT 14
DESIGN CHECK	A.D. OCT 14
PROJECT ENGINEER	A.D. OCT 14

REVISION		REV.No.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.
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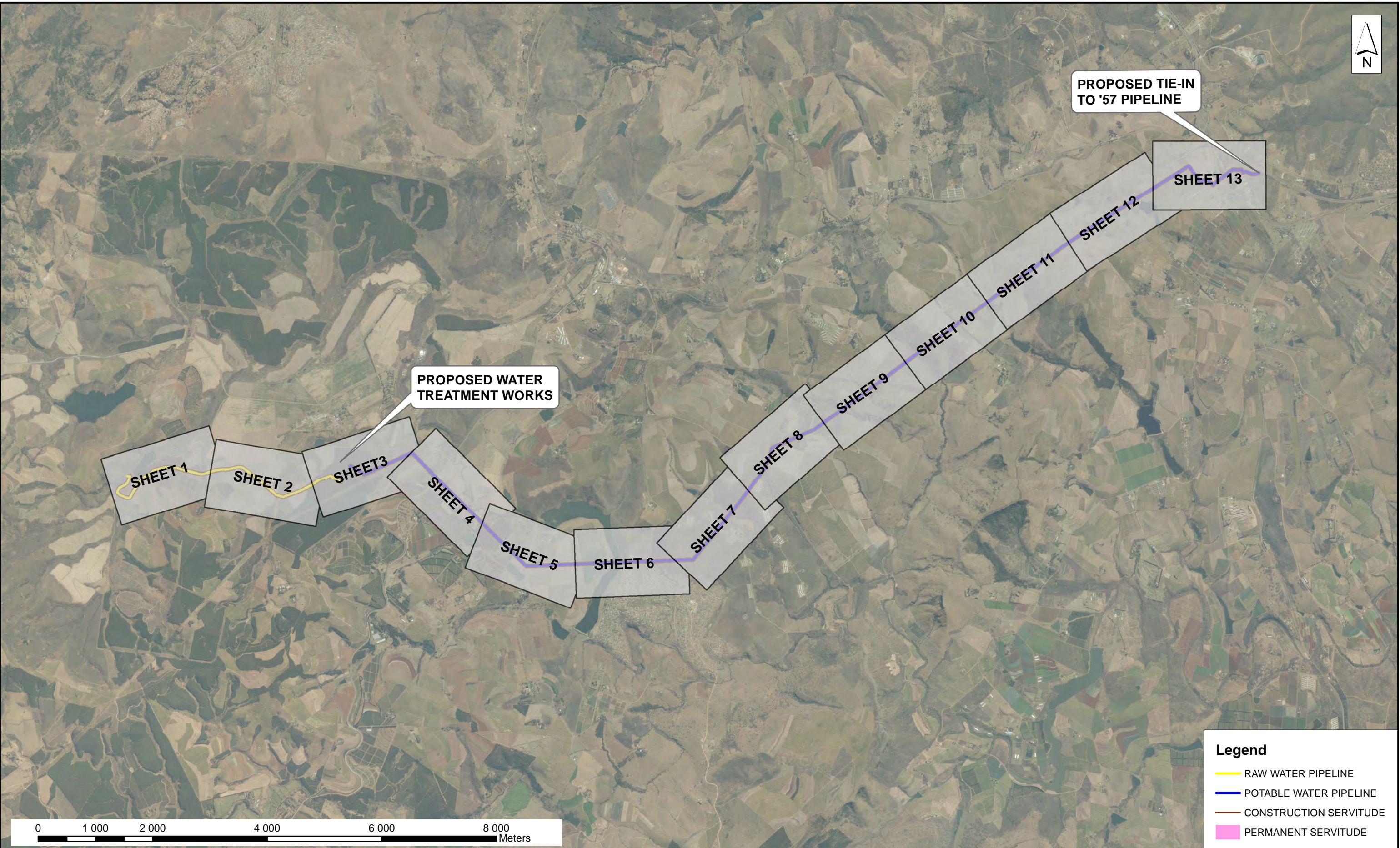
UMKHOMAZI WATER PROJECT  
RAW AND POTABLE WATER COMPONENTS

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30300413/A11

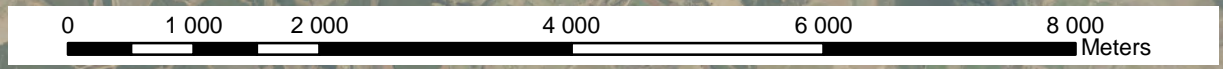
DRG. No. 30300413/A11

REV.0



**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- CONSTRUCTION SERVITUDE
- PERMANENT SERVITUDE



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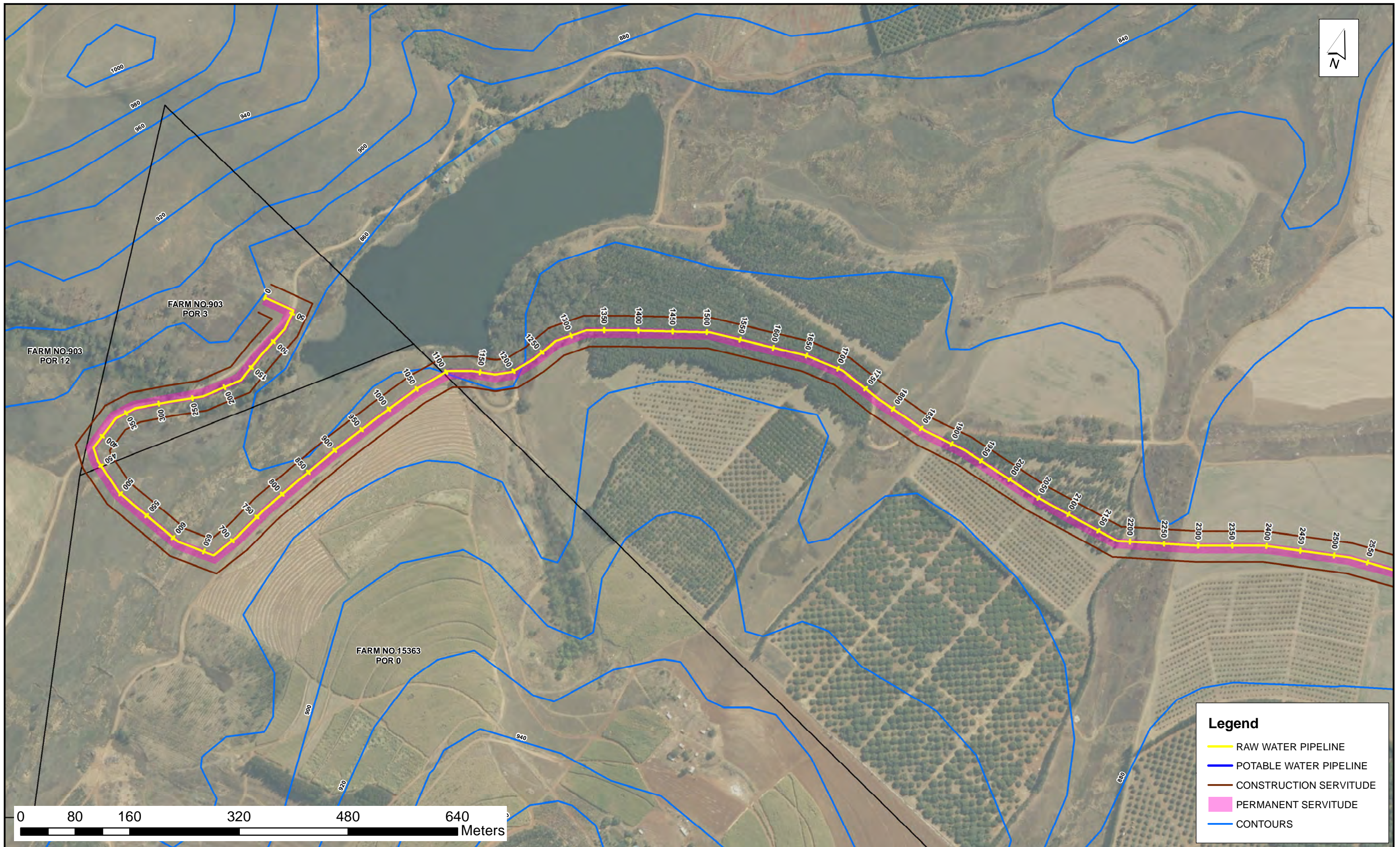
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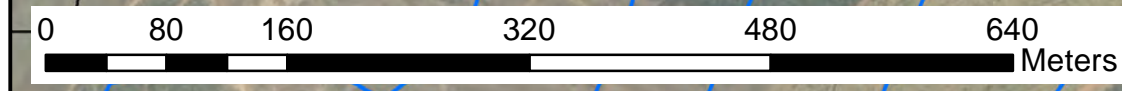
**UMKHOMAZI WATER PROJECT**  
KEY PLAN  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE

DRG. No. 30300413/A26 REV. 0



**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- CONSTRUCTION SERVITUDE
- PERMANENT SERVITUDE
- CONTOURS



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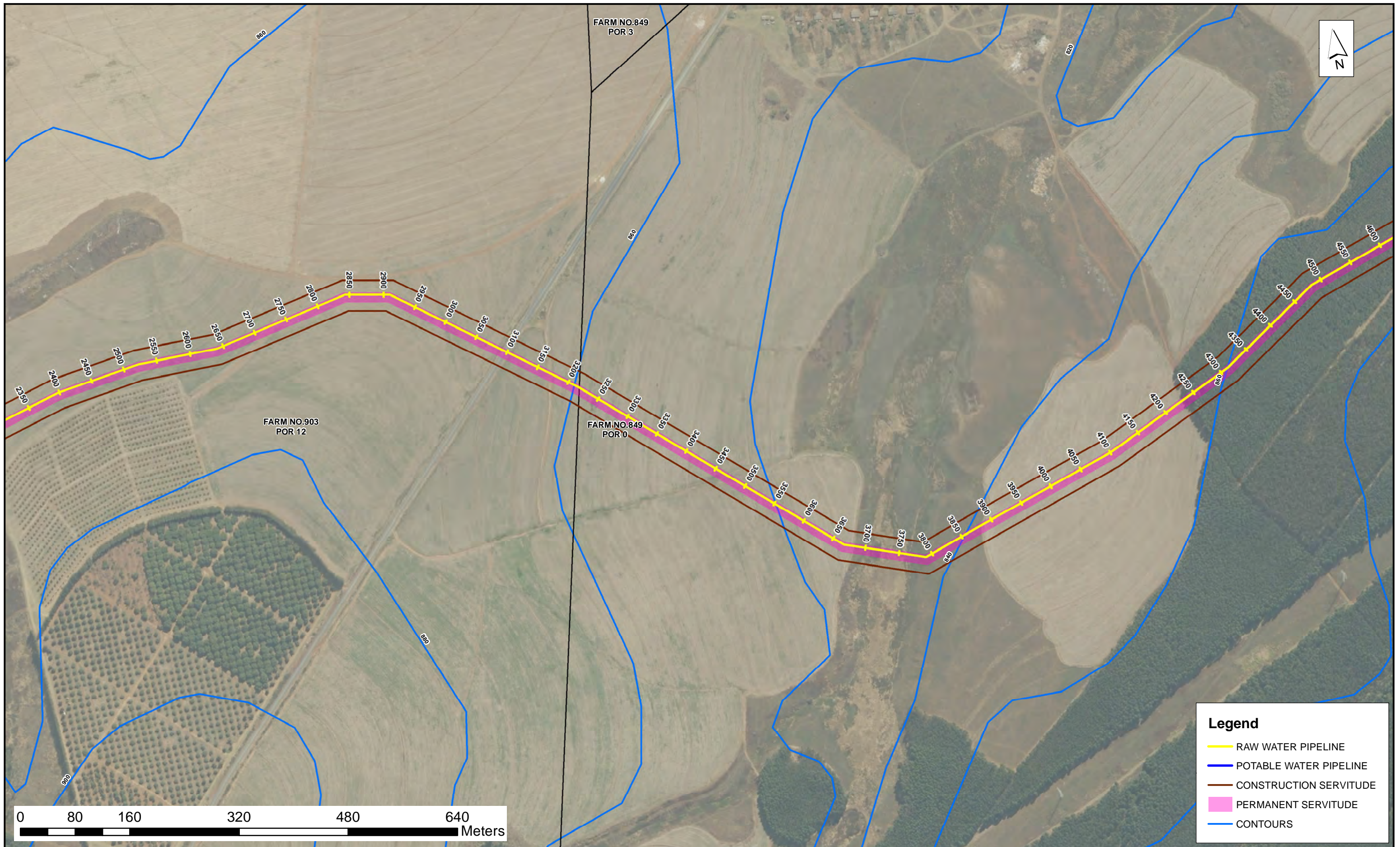
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**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 1 OF 13

DRG. No.30300413/A27 REV. 0



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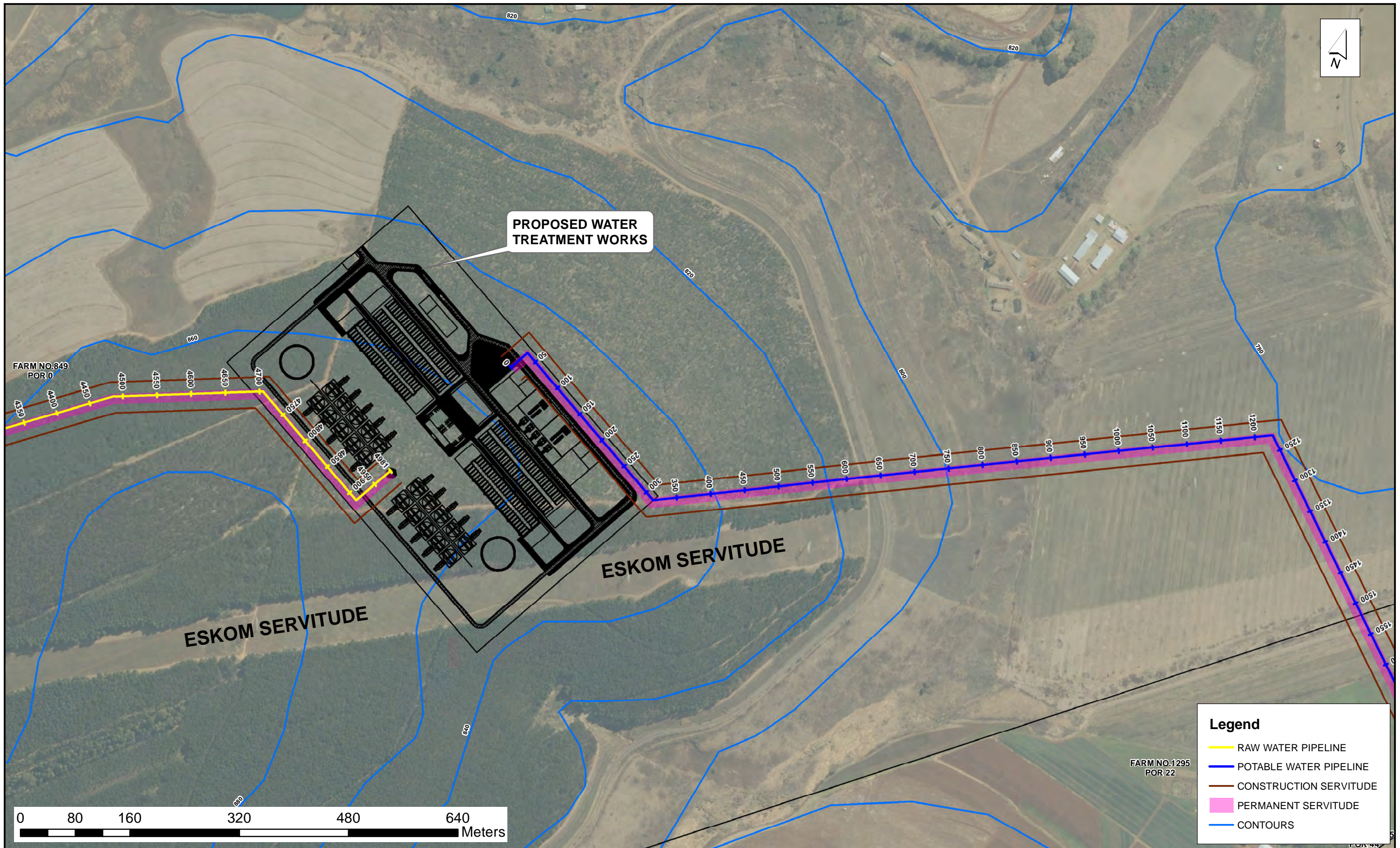


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**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 2 OF 13

DRG. No.30300413/A28 REV. 0





**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- CONSTRUCTION SERVITUDE
- PERMANENT SERVITUDE
- CONTOURS

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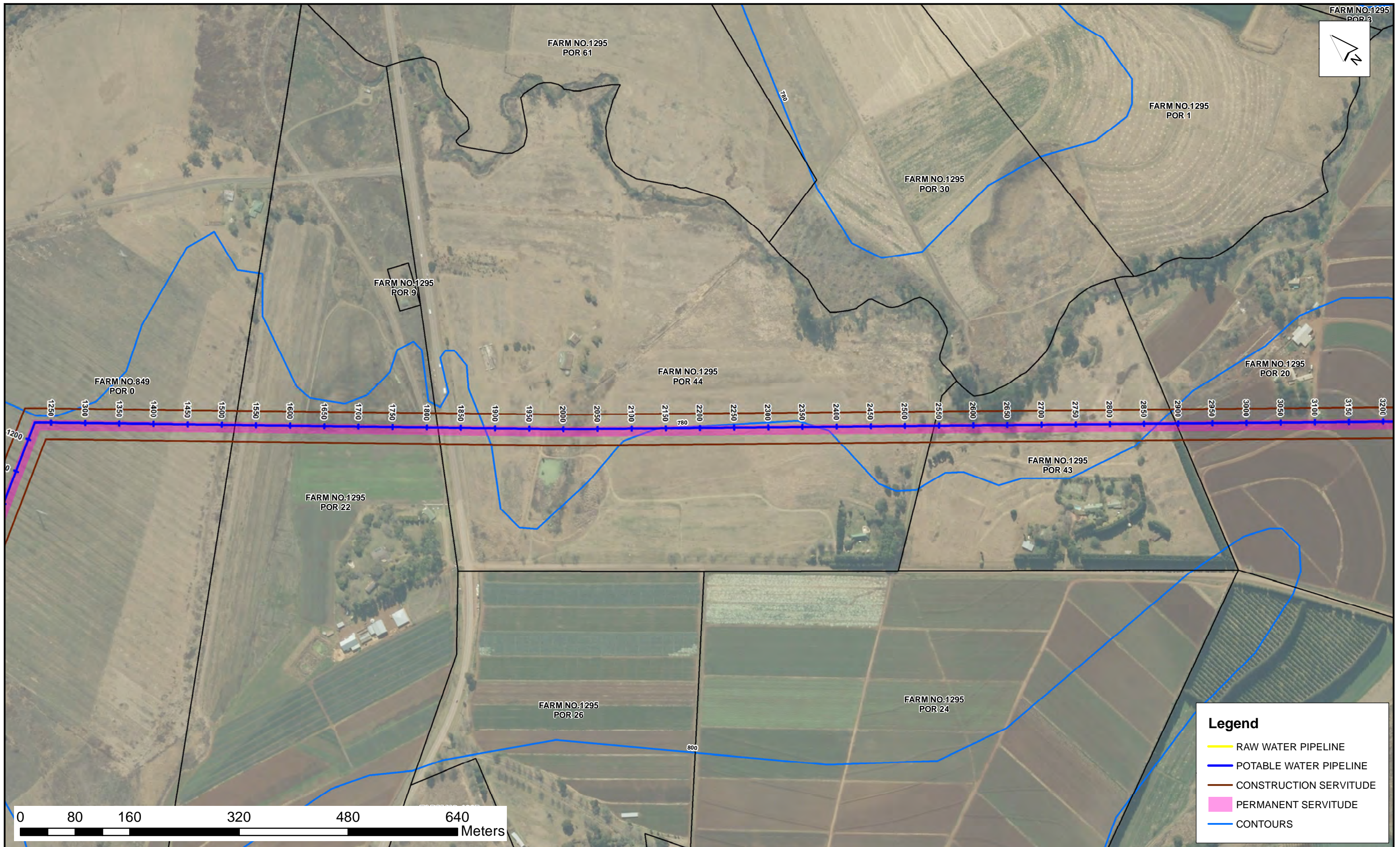
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**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 3 OF 13

DRG. No. 30300413/A29 REV. 0



**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- CONSTRUCTION SERVITUDE
- PERMANENT SERVITUDE
- CONTOURS

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PROJECT ENGINEER	A.D	NOV 14
30300413/A30		

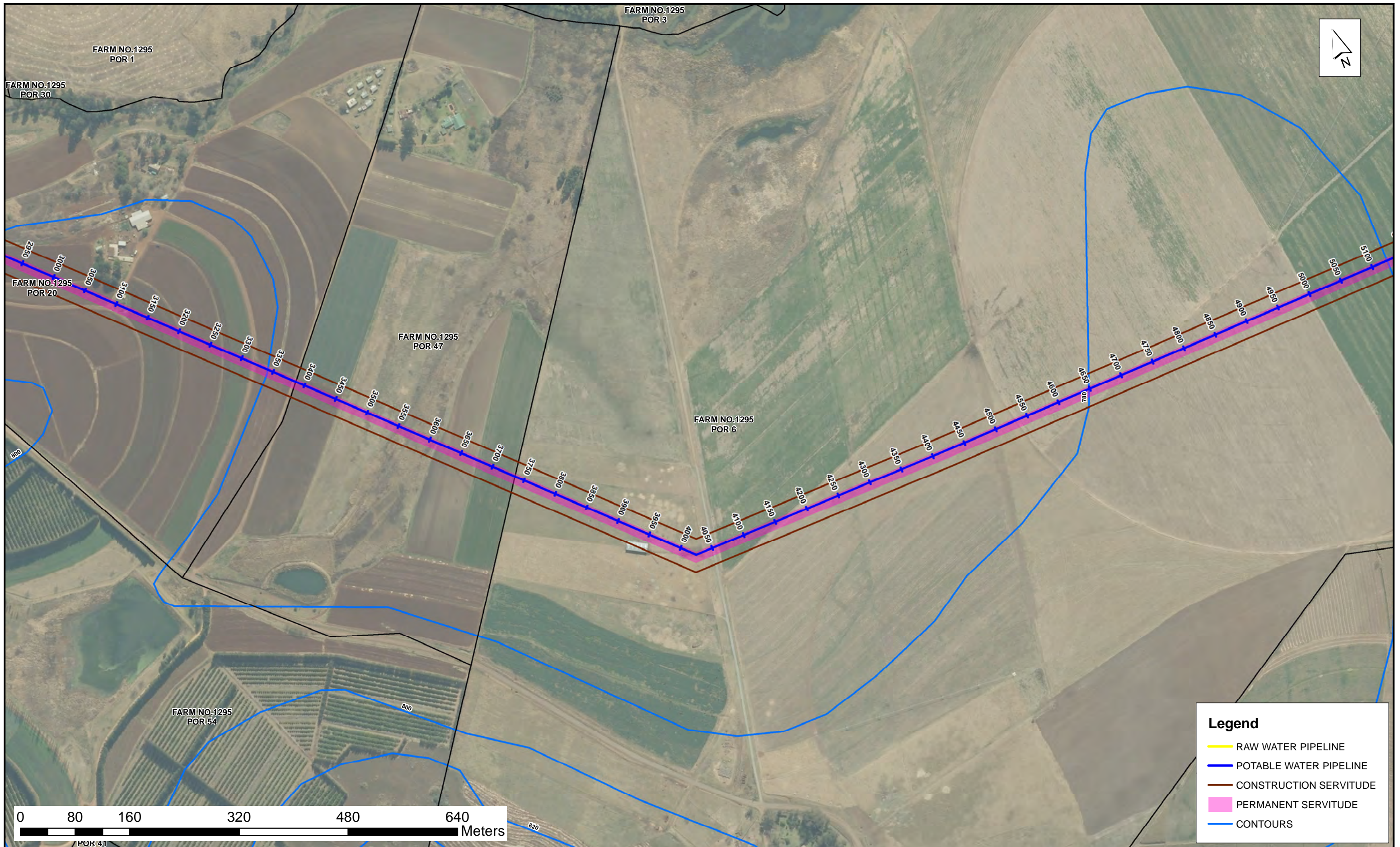
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**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 4 OF 13

DRG. No.30300413/A30 REV. 0



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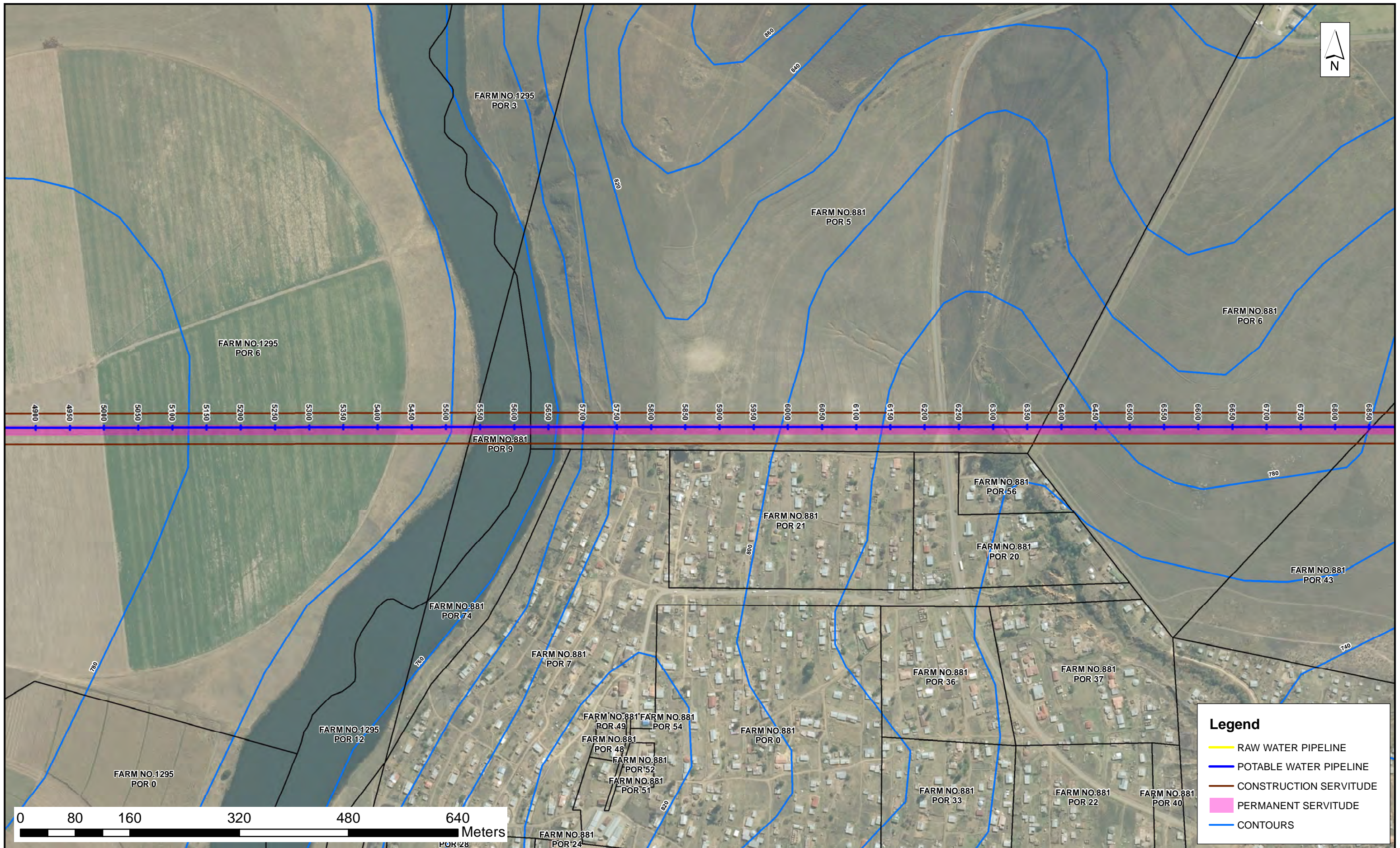
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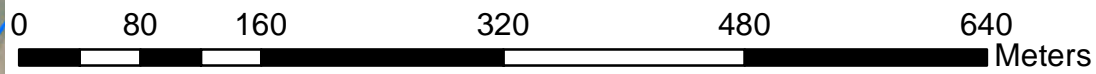
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MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 5 OF 13

DRG. No. 30300413/A31 REV. 0



**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- CONSTRUCTION SERVITUDE
- PERMANENT SERVITUDE
- CONTOURS



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30300413/A32		

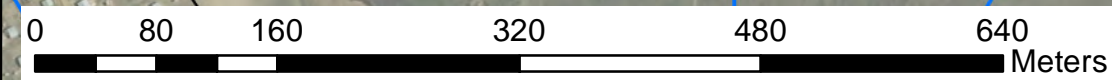
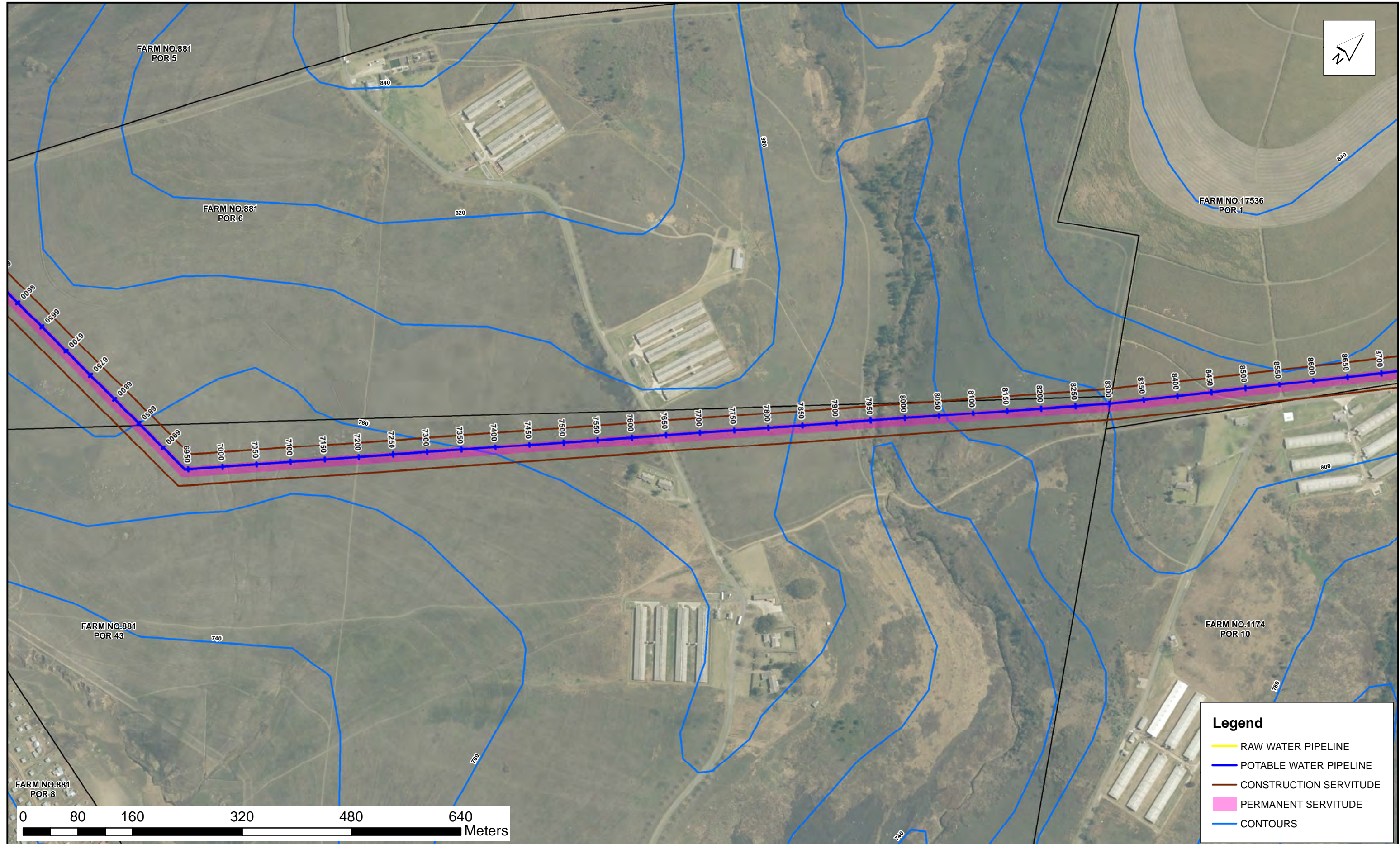
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**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 6 OF 13

DRG. No. 30300413/A32 REV. 0



Legend	
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<span style="color: blue;">—</span>	POTABLE WATER PIPELINE
<span style="color: brown;">—</span>	CONSTRUCTION SERVITUDE
<span style="background-color: pink; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span>	PERMANENT SERVITUDE
<span style="color: blue;">—</span>	CONTOURS

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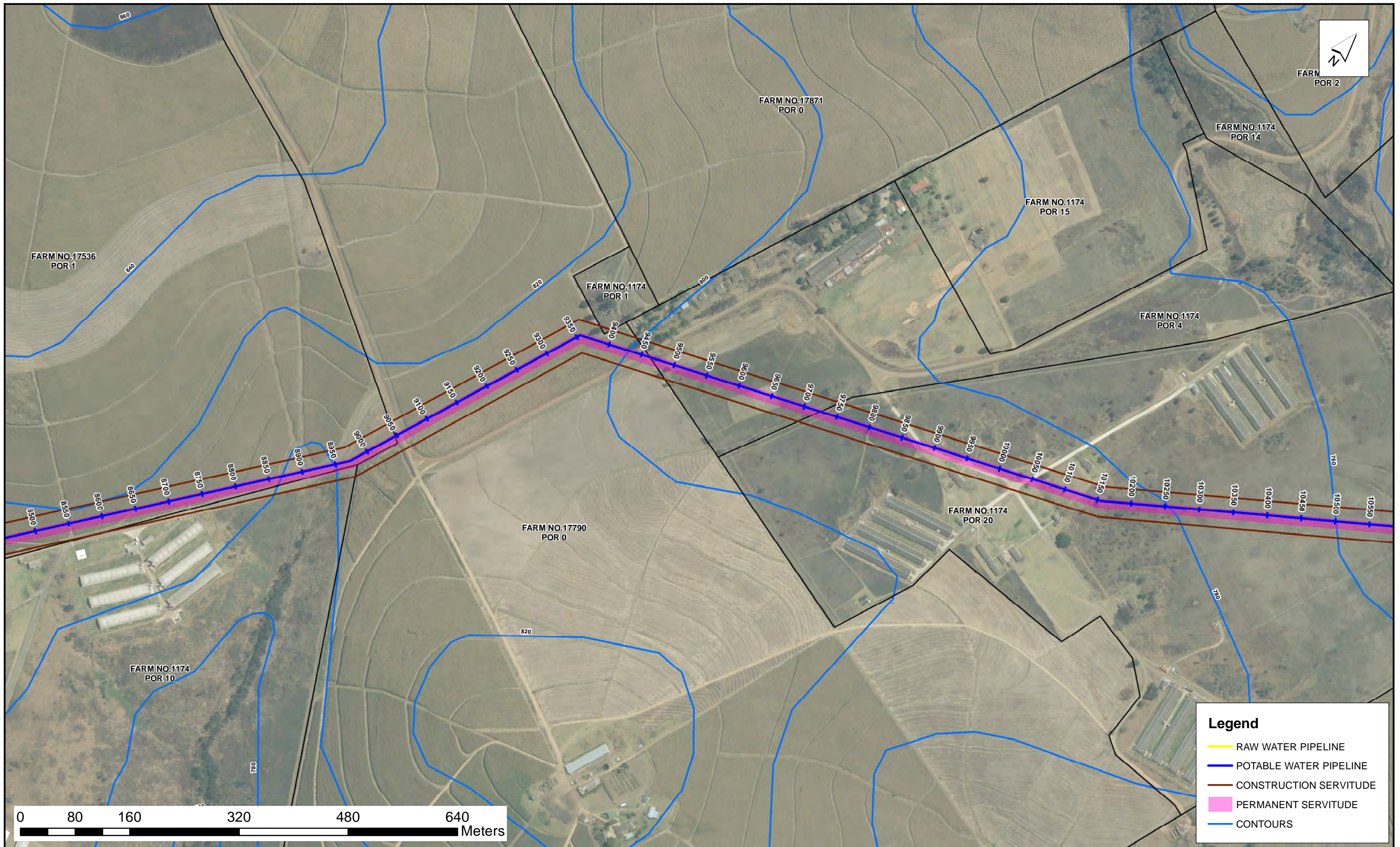
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**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 7 OF 13

DRG. No.30300413/A33 REV. 0



**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- CONSTRUCTION SERVITUDE
- PERMANENT SERVITUDE
- CONTOURS

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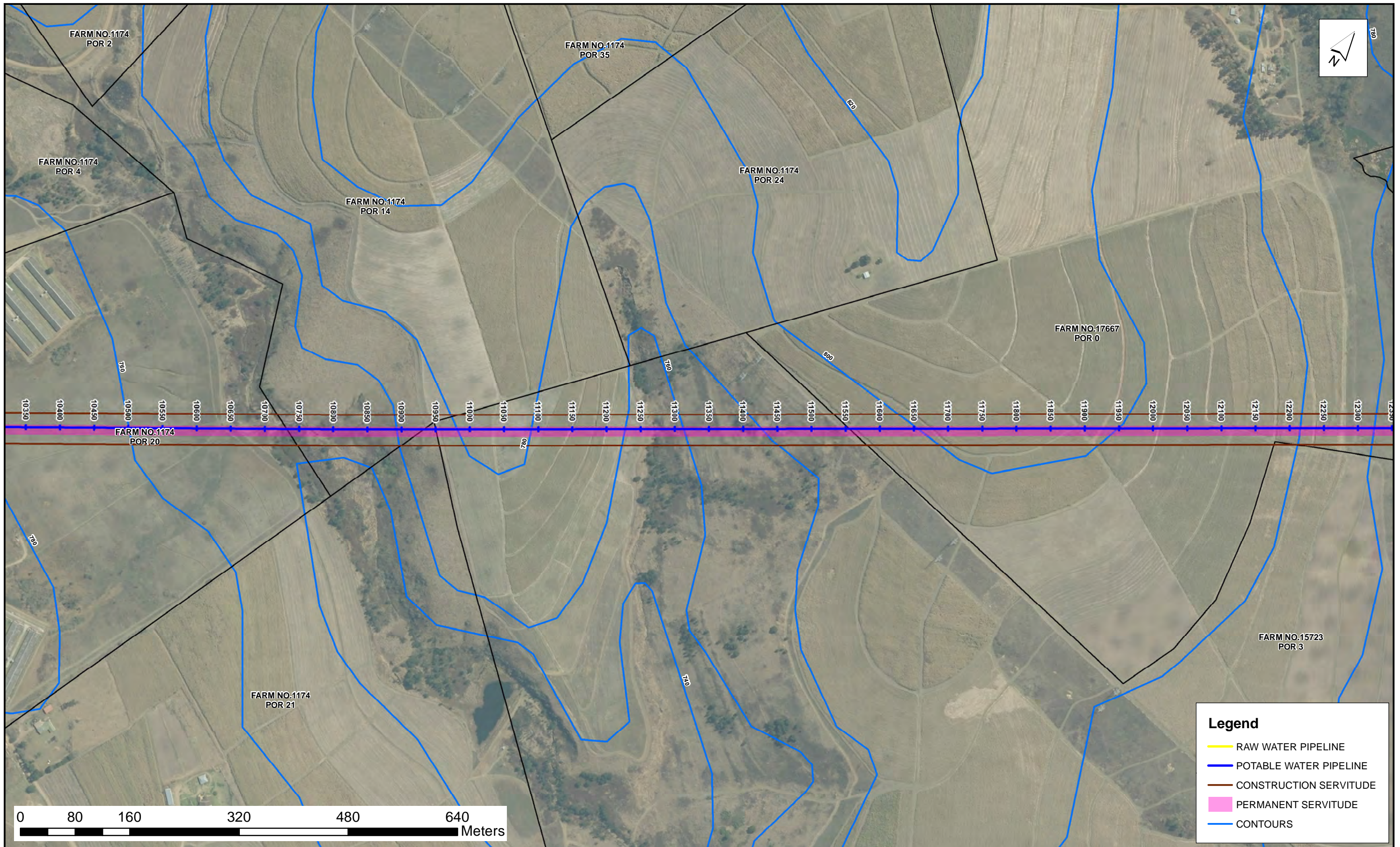
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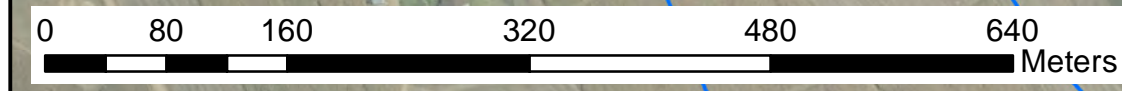
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MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 8 OF 13

DRG. No. 30300413/A34 REV. 0



**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- CONSTRUCTION SERVITUDE
- PERMANENT SERVITUDE
- CONTOURS



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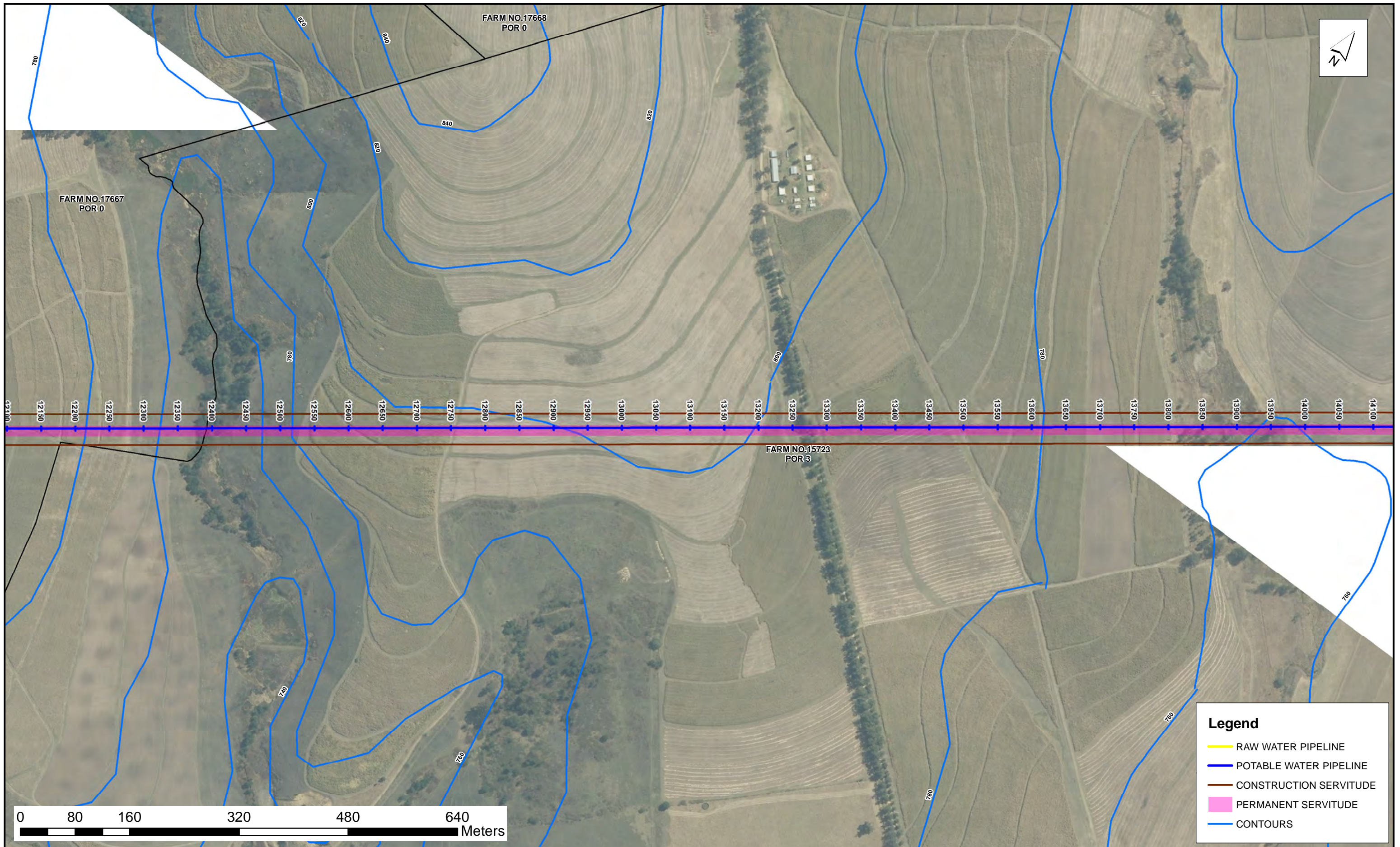
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**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 9 OF 13

DRG. No.30300413/A35 REV. 0



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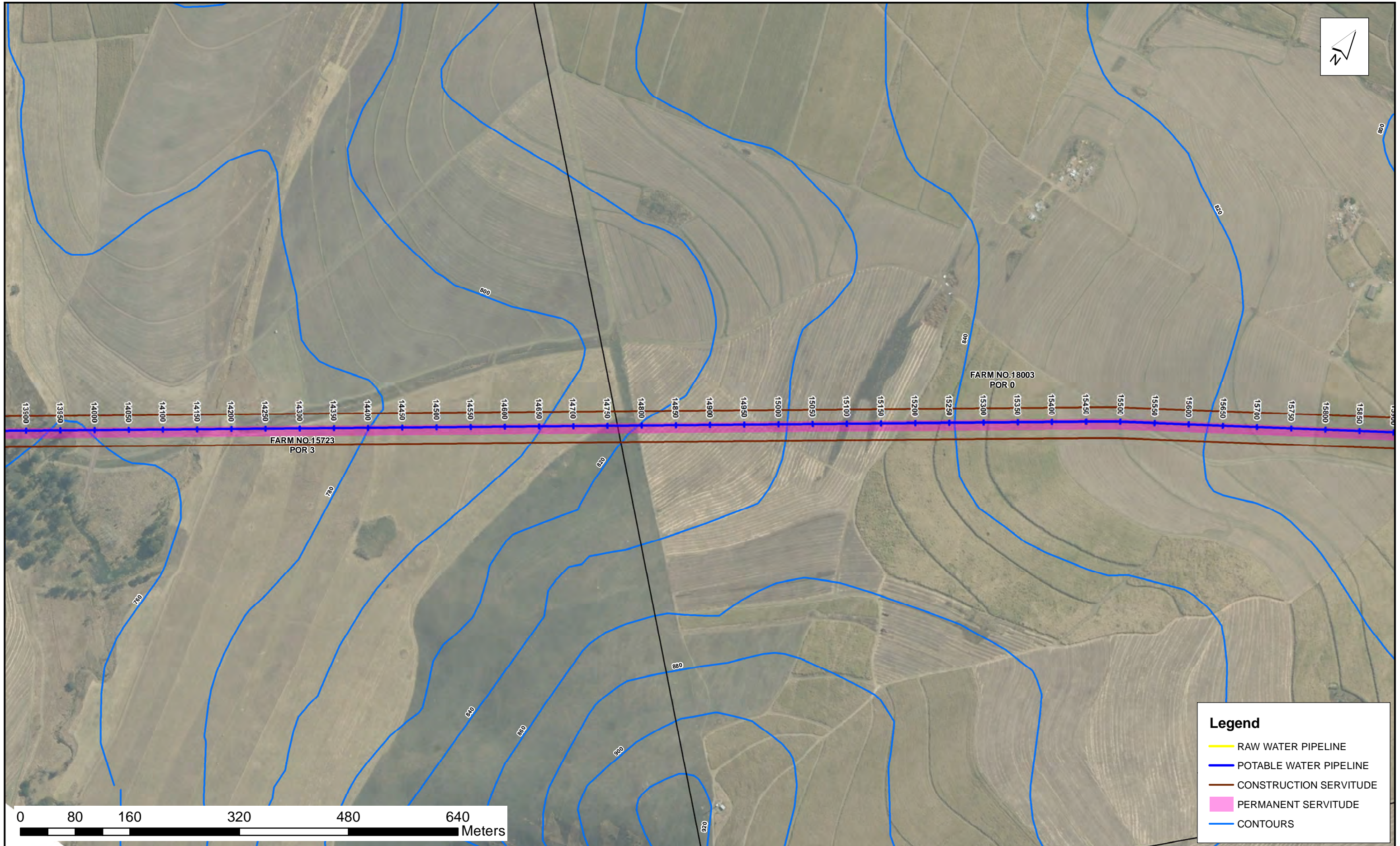


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**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 10 OF 13

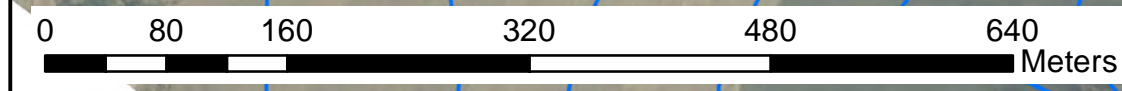
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**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- CONSTRUCTION SERVITUDE
- PERMANENT SERVITUDE
- CONTOURS



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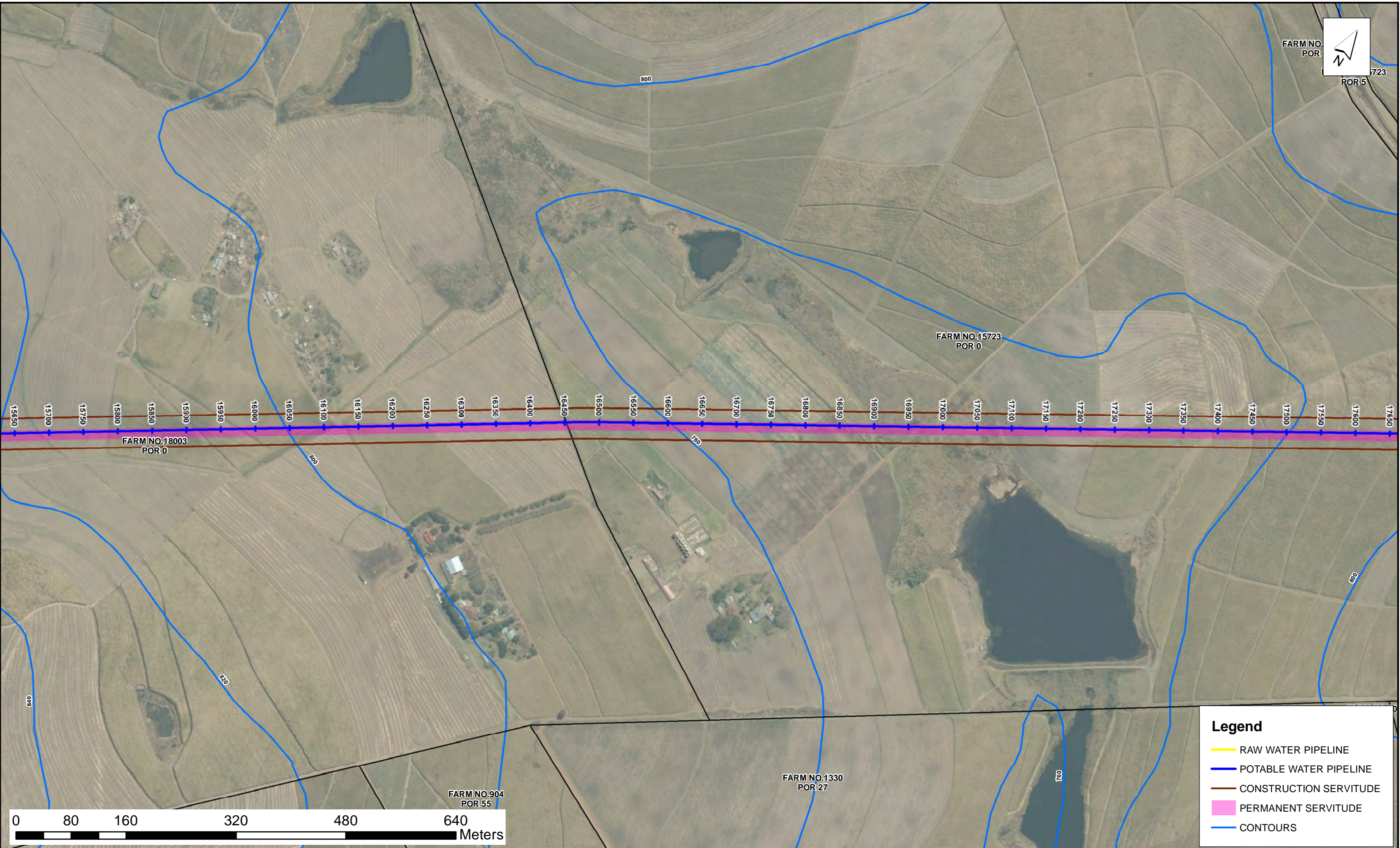


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**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 11 OF 13

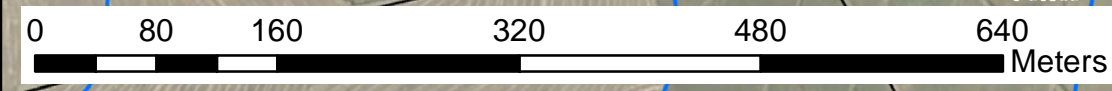
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FARM NO. 15723  
POR 5



**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- CONSTRUCTION SERVITUDE
- PERMANENT SERVITUDE
- CONTOURS



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PRIMARY DISCIPLINE	CIVIL	
DRAWN	I.D	NOV 14
DRAWING CHECK	A.D	NOV 14
DESIGN	A.D	NOV 14
DESIGN CHECK	A.D	NOV 14
PROJECT ENGINEER	A.D	NOV 14
30300413/A38		

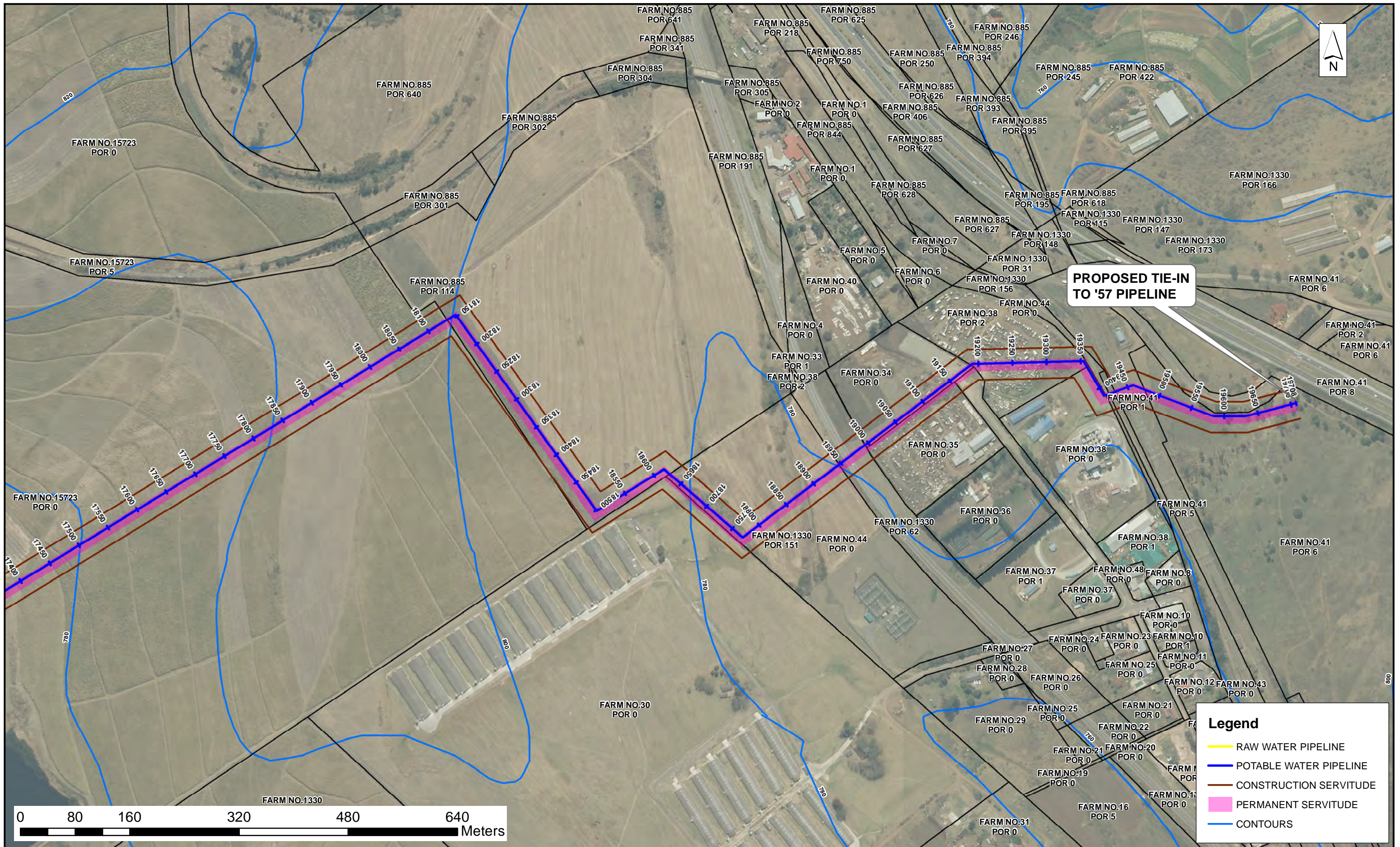
REV.No.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.
0	NOV 14	INFORMATION	I.D	A.D	



REFERENCE DRAWINGS		
DRAWING No.	MAKERS No.	TITLE

**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 12 OF 13

DRG. No.30300413/A38 REV. 0



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PRIMARY DISCIPLINE	CIVIL	
DRAWN	I.D	NOV 14
DRAWING CHECK	A.D	NOV 14
DESIGN	A.D	NOV 14
DESIGN CHECK	A.D	NOV 14
PROJECT ENGINEER	A.D	NOV 14
30300413/A39		

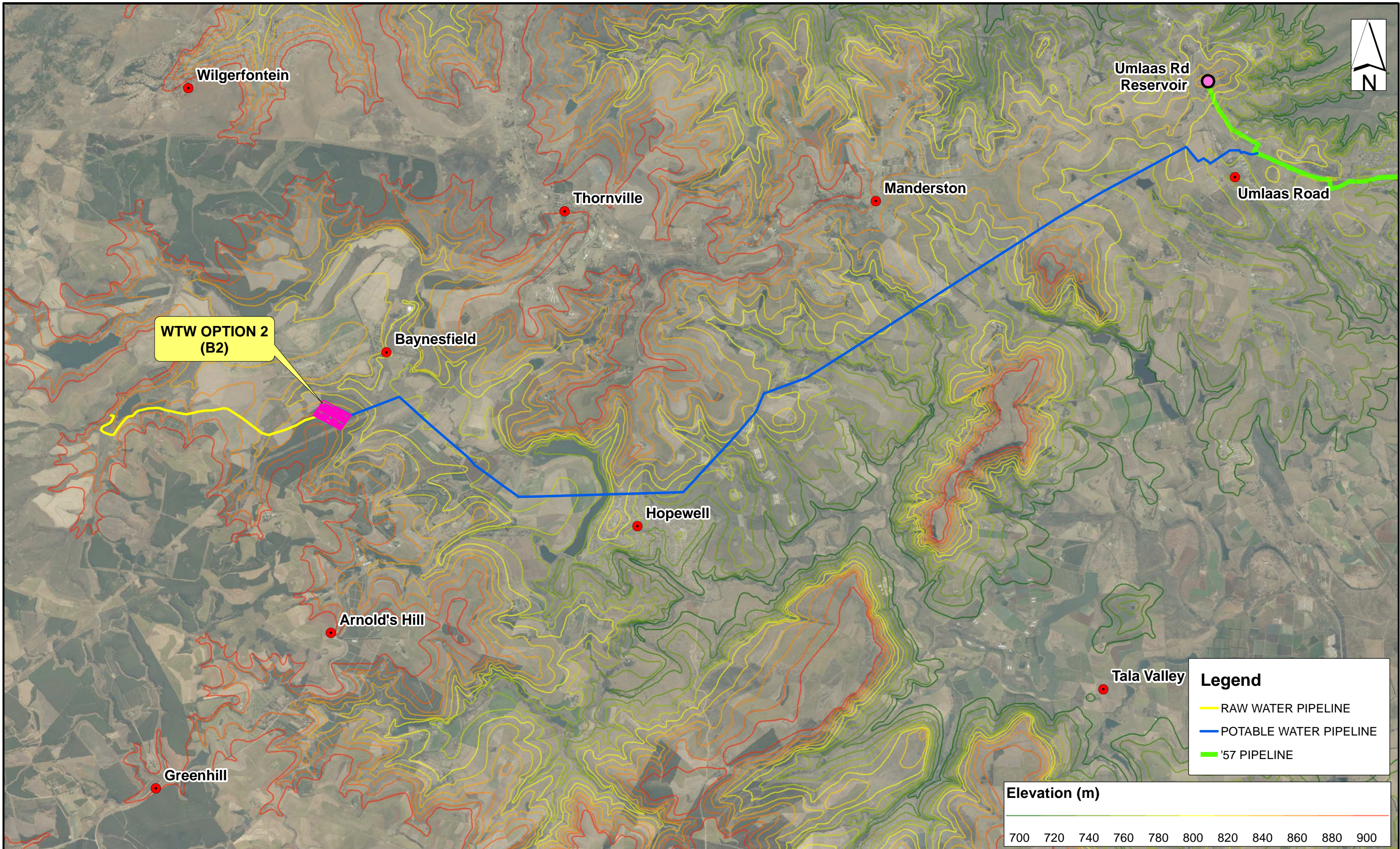
REV.No.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.
0	NOV 14	INFORMATION	I.D	A.D	



REFERENCE DRAWINGS		
DRAWING No.	MAKERS No.	TITLE

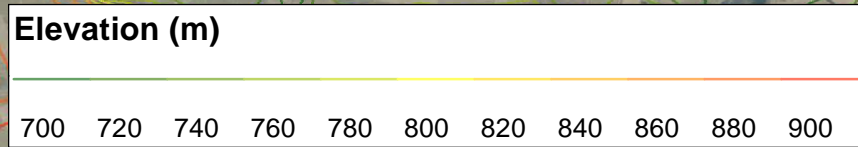
**UMKHOMAZI WATER PROJECT**  
MAPBOOK OF RECOMMENDED PIPELINE ROUTE  
SHEET 13 OF 13

DRG. No. 30300413/A39 REV. 0



**Legend**

- RAW WATER PIPELINE
- POTABLE WATER PIPELINE
- '57 PIPELINE



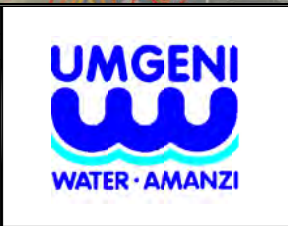
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PRIMARY DISCIPLINE	CIVIL	REV.No.	DATE	DESCRIPTION	DRAWN I.D.	CHKD. A.D.	APPD.
DRAWN	I.D.	0	OCT 15	INFORMATION			
DRAWING CHECK	A.D.		OCT 15				
DESIGN	A.D.		OCT 15				
DESIGN CHECK	A.D.		OCT 15				
PROJECT ENGINEER	A.D.		OCT 15				

30300413/A13-2

REVISION							
REV.No.	DATE	DESCRIPTION	DRAWN I.D.	CHKD. A.D.	APPD.		
0	OCT 15	INFORMATION					



REFERENCE DRAWINGS		
DRAWING No.	MAKERS No.	TITLE

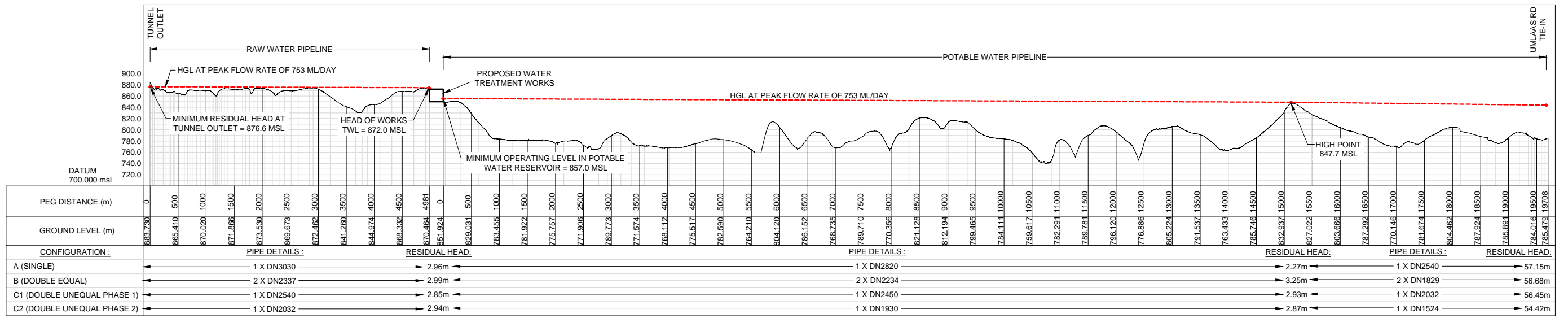
**UMKHOMAZI WATER PROJECT**  
**OPTION B2**  
**WTW LOCATION & PIPELINE ROUTES**

DRG. No.30300413/A13-2 REV.0



PLAN  
SCALE 1:60000

LEGEND	
<span style="color: yellow;">—</span>	RAW WATER PIPELINE
<span style="color: cyan;">—</span>	POTABLE WATER PIPELINE
<span style="color: red; border-bottom: 1px dashed red;">—</span>	HYDRAULIC GRADE LINE (HGL)



LONGITUDINAL SECTION  
SCALE : HOR 1:75000  
VER 1:7500

NOTE:  
ALL PIPES ARE STEEL, EPOXY  
LINED AND SINTAKOTE COATED



PRIMARY DISCIPLINE	CIVIL
DRAWN	I.D JULY 14
DRAWING CHECK	A.D JULY 14
DESIGN	I.D JULY 14
DESIGN CHECK	A.D JULY 14
PROJECT ENGINEER	A.D JULY 14

30300413/A01

REVISION		
REV.No.	DATE	DESCRIPTION
0	JULY 14	INFORMATION



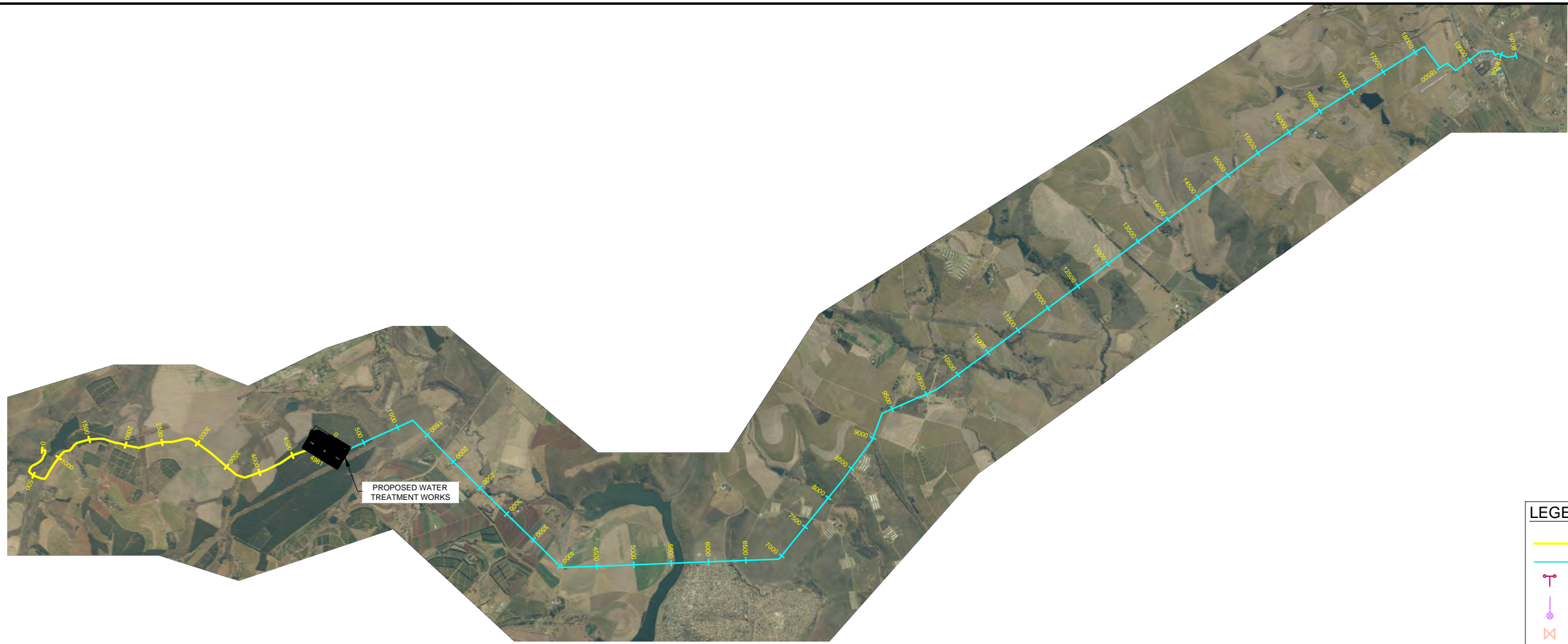
REFERENCE DRAWINGS		
DRAWING No.	MAKERS No.	TITLE

**UMKHOMAZI WATER PROJECT**  
**POTABLE WATER MODULE**

PLAN AND LONGITUDINAL SECTION SHOWING HYDRAULIC  
GRADE LINES - PIPELINE ROUTE OPTION B2

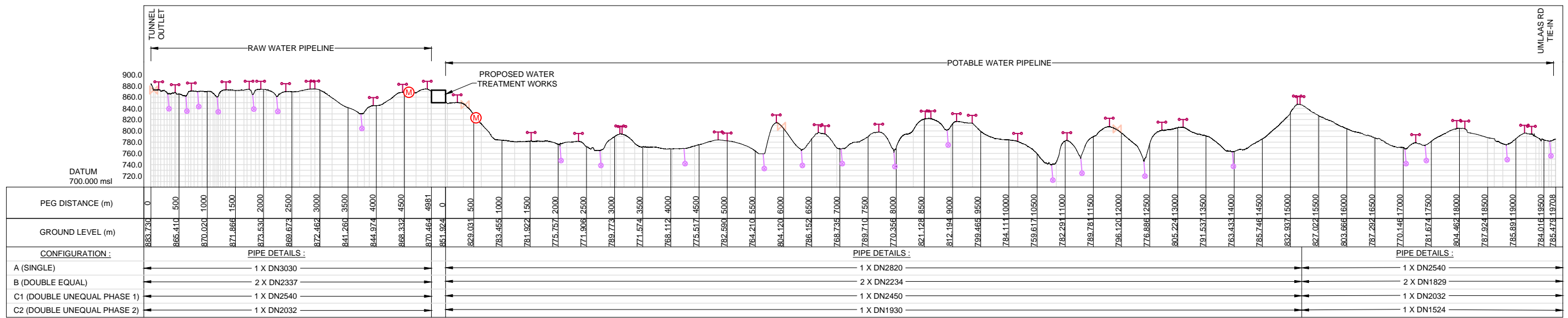
DRG. No. 30300413/A01 REV. 0

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PLAN  
SCALE 1:60000

LEGEND	
	RAW WATER PIPELINE
	POTABLE WATER PIPELINE
	AIR VALVE CHAMBER
	SCOUR VALVE CHAMBER
	ISOLATING VALVE CHAMBER
	METER CHAMBER



LONGITUDINAL SECTION  
SCALE : HOR 1:75000  
VER 1:7500

NOTE:  
ALL PIPES ARE STEEL, EPOXY  
LINED AND SINTAKOTE COATED

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PRIMARY DISCIPLINE: CIVIL

DRAWN	I.D.	JULY 14
DRAWING CHECK	A.D.	JULY 14
DESIGN	I.D.	JULY 14
DESIGN CHECK	A.D.	JULY 14
PROJECT ENGINEER	A.D.	JULY 14

30300413/A02

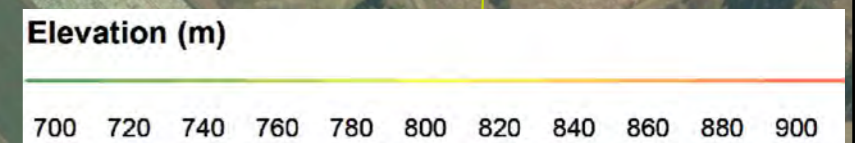
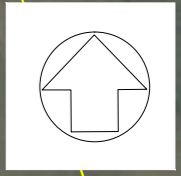
REVISION		
REV.No.	DATE	DESCRIPTION
0	JULY 14	INFORMATION

REFERENCE DRAWINGS		
DRAWING No.	MAKERS No.	TITLE

**UMKHOMAZI WATER PROJECT**  
**POTABLE WATER MODULE**

PLAN AND LONGITUDINAL SECTION SHOWING ANCILLARY  
INFRASTRUCTURE - PIPELINE ROUTE OPTION B2

DRG. No. 30300413/A02      REV. 0



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PRIMARY DISCIPLINE	CIVIL		
DRAWN	K.G	FEB 2014	
DRAWING CHECK	P.G	MAR 2014	
DESIGN	P.G	MAR 2014	
DESIGN CHECK	A.D	MAR 2014	
PROJECT ENGINEER	A.D	MAR 2014	
30300413/B02-02			

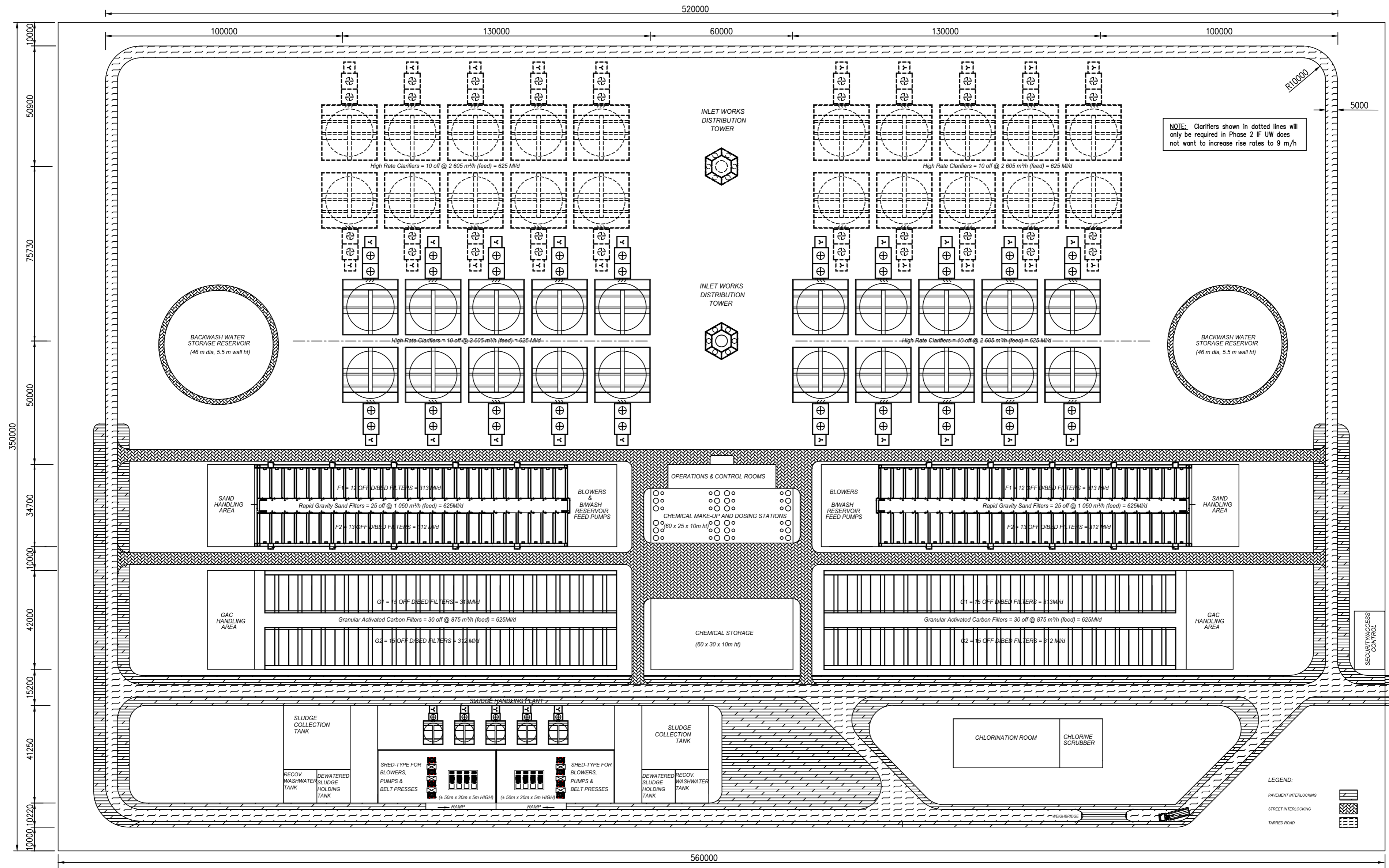
REVISION			
REV.No.	DATE	DESCRIPTION	APPD.
A	03/2014	FOR INFORMATION	K.G P.G
B	10/2015	FOR INFORMATION	K.G P.G



REFERENCE DRAWINGS		
DRAWING No.	MAKERS No.	TITLE

**UMKHOMAZI WATER PROJECT**  
**POTABLE WATER MODULE**  
PROPOSED ACCESS ROAD TO WTW  
PIPELINE ROUTE OPTION B2

DRG. No. 30300413/B02-02 REV. B



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PRIMARY DISCIPLINE	DISCIPLINE	REV. No.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.
DRAWN	A.S.	APRIL_13	7	JUL2015			
DRAWING CHECK	-	-	-	FINAL-WITH_UW_COMMENTS			
DESIGN	G.L.	-	-	REV			
DESIGN CHECK	-	-	-	REV			
PROJECT ENGINEER	-	-	-	REV			
				REV			
				REV			
				REV			
				REV			



DRAWING No.	MAKERS No.	TITLE

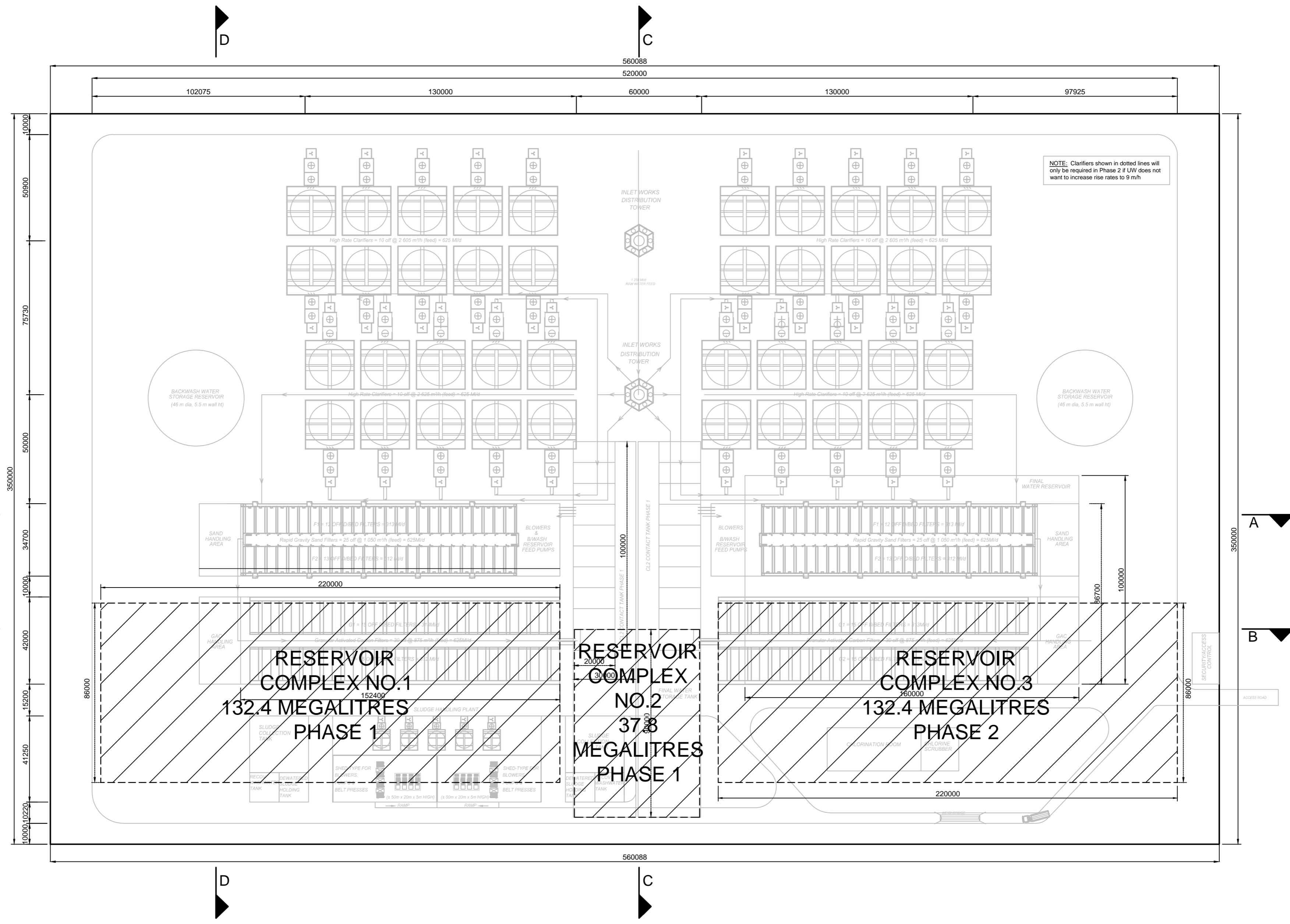
PROJECT:	<b>uMKHOMAZI PROJECT</b>
	<b>1 250 ML/d WATER TREATMENT WORKS</b>
TITLE:	<b>SITE WORKS</b>
SHEET:	<b>SHEET 1 OF 1</b>
DRG. No.	<b>1301.X01.UW-110</b>
REV. 7	

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DRAWINGNO.







NOTE: Clarifiers shown in dotted lines will only be required in Phase 2 if UW does not want to increase rise rates to 9 m/h



PRIMARY DISCIPLINE	CIVIL
DRAWN	K.G. OCT 2014
DRAWING CHECK	P.G. OCT 2014
DESIGN	P.G. OCT 2014
DESIGN CHECK	A.D. OCT 2014
PROJECT ENGINEER	A.D. OCT 2014

REVISION		REV.No.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.
A		10/2014	10/2014	WATER TREATMENT WORKS AND STORAGE RESERVOIR - SHEET 1	K.G.	A.D.	
B		10/2015	10/2015	WATER TREATMENT WORKS AND STORAGE RESERVOIR - SHEET 1	K.G.	A.D.	



REFERENCE DRAWINGS		TITLE
DRAWING No.	MAKERS No.	

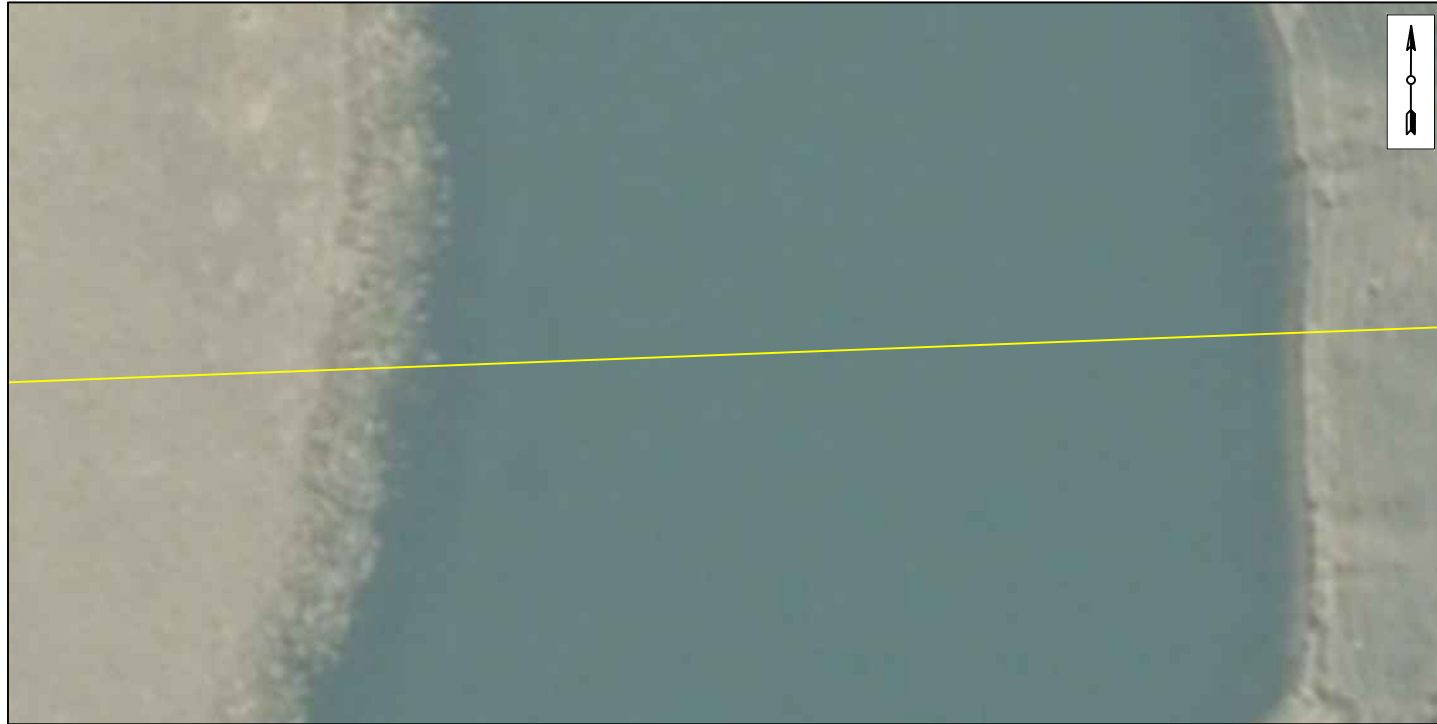
UMKHOMAZI WATER PROJECT  
 POTABLE WATER STORAGE RESERVOIR  
 SHEET 1

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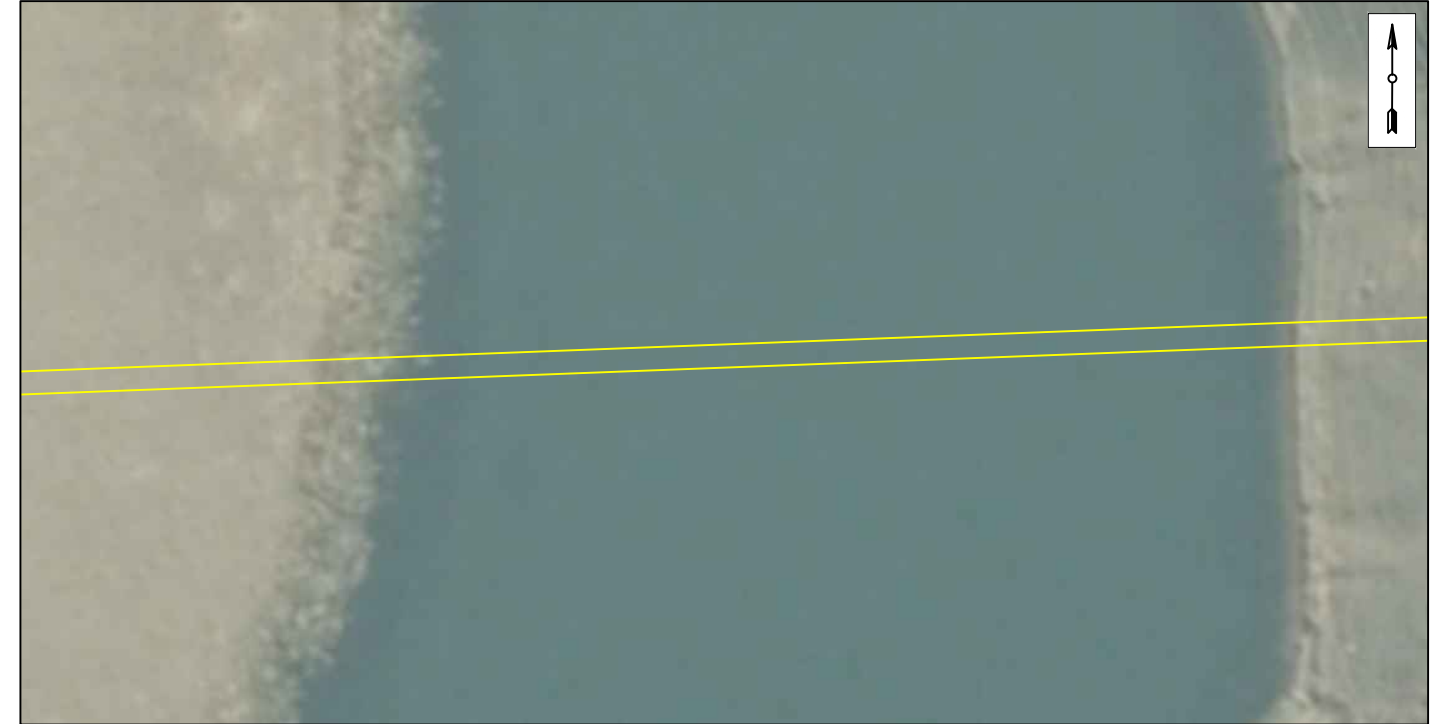
30300413/G13

DRG. No. 30300413/G13

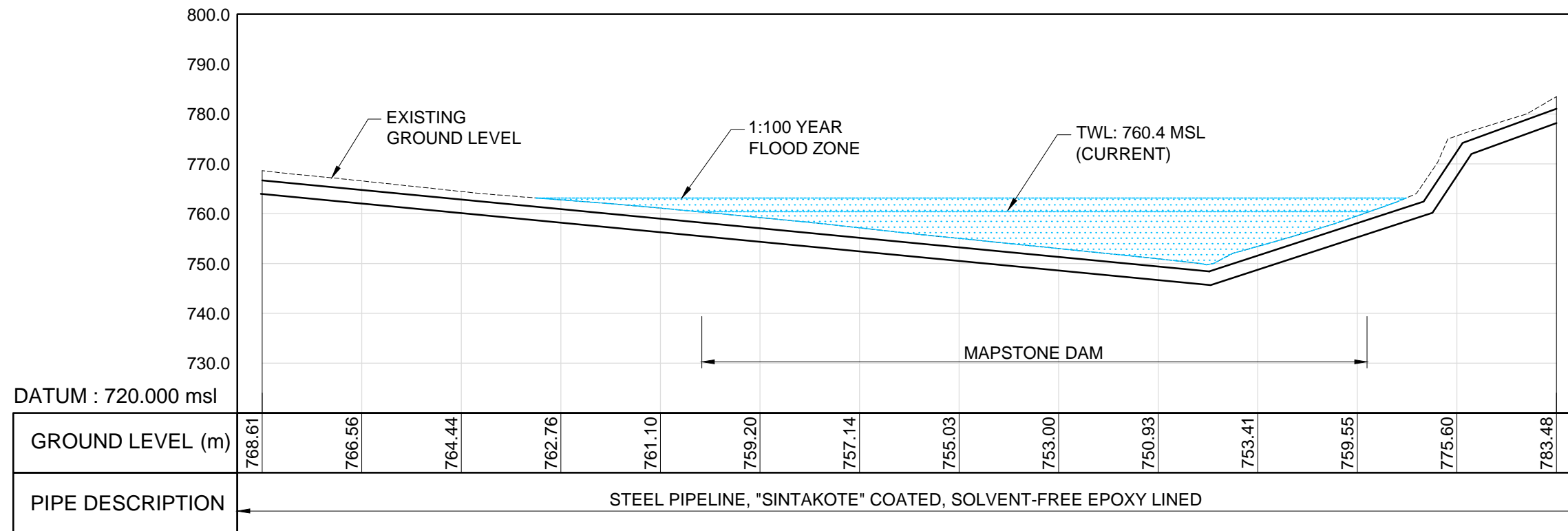
REV. B



PIPE TRENCH - SINGLE PIPE OPTION  
PLAN  
SCALE 1:1000



PIPE TRENCH - DOUBLE PIPE OPTION  
PLAN  
SCALE 1:1000



LONGITUDINAL SECTION  
SCALE : HOR 1:1000  
VER 1:1000



PRIMARY DISCIPLINE	CIVIL
DRAWN	I.D JULY 14
DRAWING CHECK	A.D JULY 14
DESIGN	I.D JULY 14
DESIGN CHECK	A.D JULY 14
PROJECT ENGINEER	A.D JULY 14

30300413/A09

REV. No.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.
0	JULY 14	INFORMATION	I.D	A.D	



DRAWING No.	MAKERS No.	TITLE

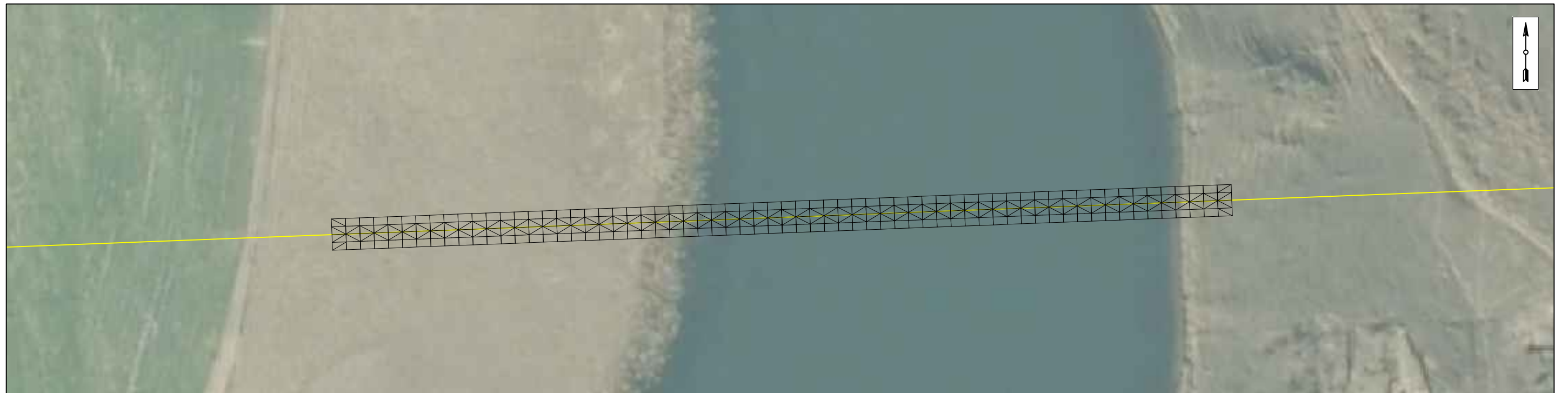
UMKHOMAZI WATER PROJECT  
POTABLE WATER MODULE

MAPSTONE DAM CROSSING  
BURIED PIPELINE OPTION

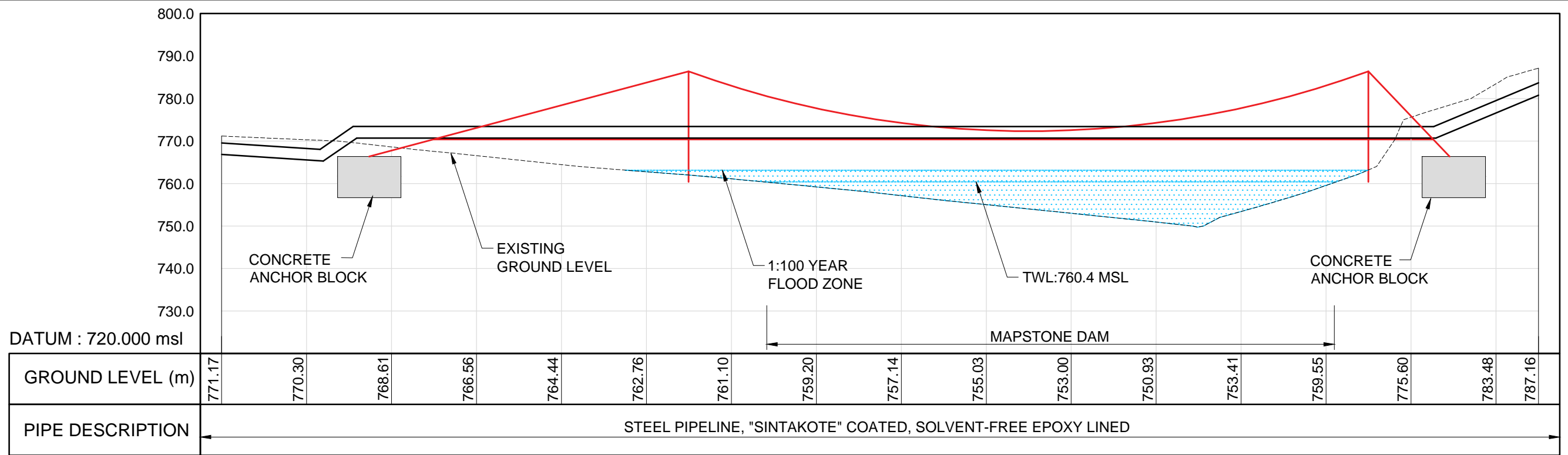
DRG. No. 30300413/A09

REV. 0

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SUSPENSION BRIDGE - SINGLE PIPE OPTION  
 PLAN  
 SCALE 1:1000



LONGITUDINAL SECTION  
 SCALE : HOR 1:1000  
 VER 1:1000



PRIMARY DISCIPLINE	CIVIL	
DRAWN	I.D	JULY 14
DRAWING CHECK	A.D	JULY 14
DESIGN	I.D	JULY 14
DESIGN CHECK	A.D	JULY 14
PROJECT ENGINEER	A.D	JULY 14

30300413/A10

REV. No.	DATE	DESCRIPTION	DRAWN I.D	CHKD. A.D	APPD.
0	JULY 14	INFORMATION			



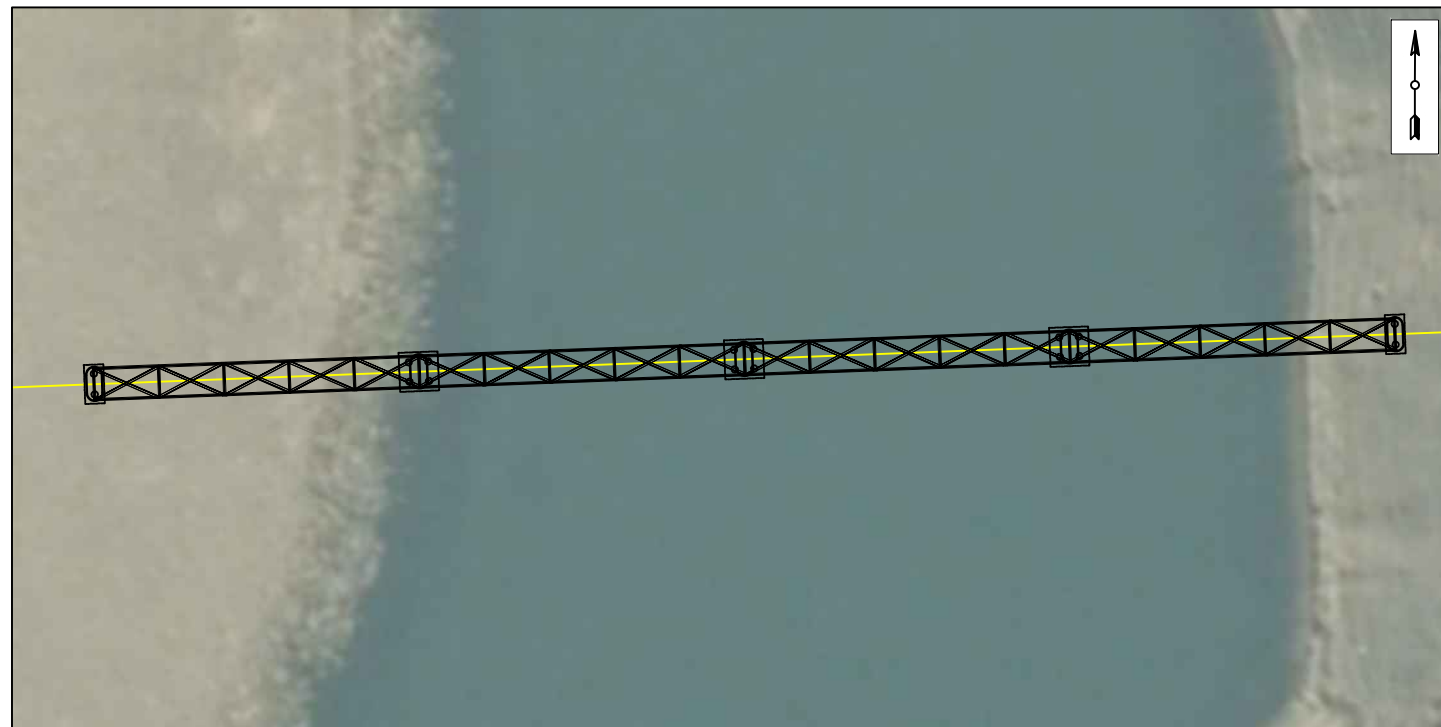
DRAWING No.	MAKERS No.	TITLE

UMKHOMAZI WATER PROJECT  
 POTABLE WATER MODULE  
 MAPSTONE DAM CROSSING  
 SUSPENSION BRIDGE OPTION

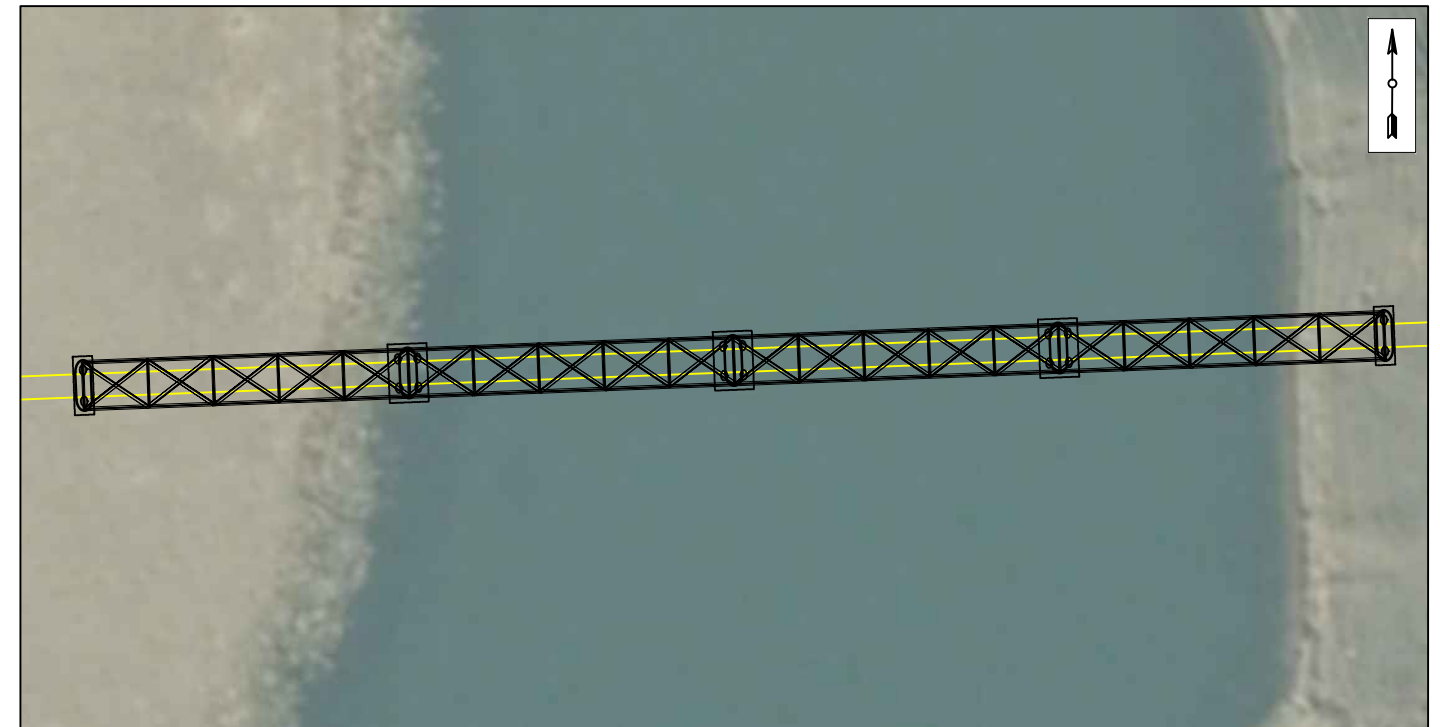
DRG. No. 30300413/A10

REV. 0

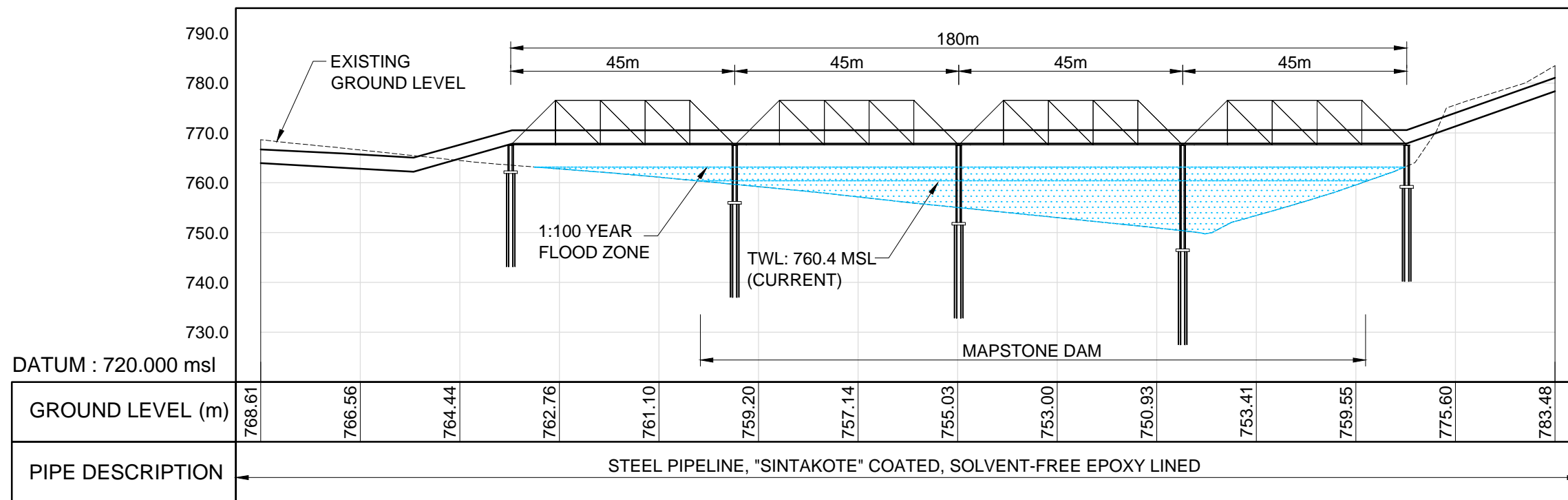
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BRIDGE CROSSING - SINGLE PIPE OPTION  
PLAN  
SCALE 1:1000



BRIDGE CROSSING - DOUBLE PIPE OPTION  
PLAN  
SCALE 1:1000



LONGITUDINAL SECTION  
SCALE : HOR 1:1000  
VER 1:1000

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PRIMARY DISCIPLINE	CIVIL	
DRAWN	I.D	JULY 14
DRAWING CHECK	A.D	JULY 14
DESIGN	I.D	JULY 14
DESIGN CHECK	A.D	JULY 14
PROJECT ENGINEER	A.D	JULY 14

30300413/A07

REV. No.	DATE	DESCRIPTION	DRAWN I.D	CHKD. A.D	APPD.
0	JULY 14	INFORMATION			



REFERENCE DRAWINGS

DRAWING No.	MAKERS No.	TITLE

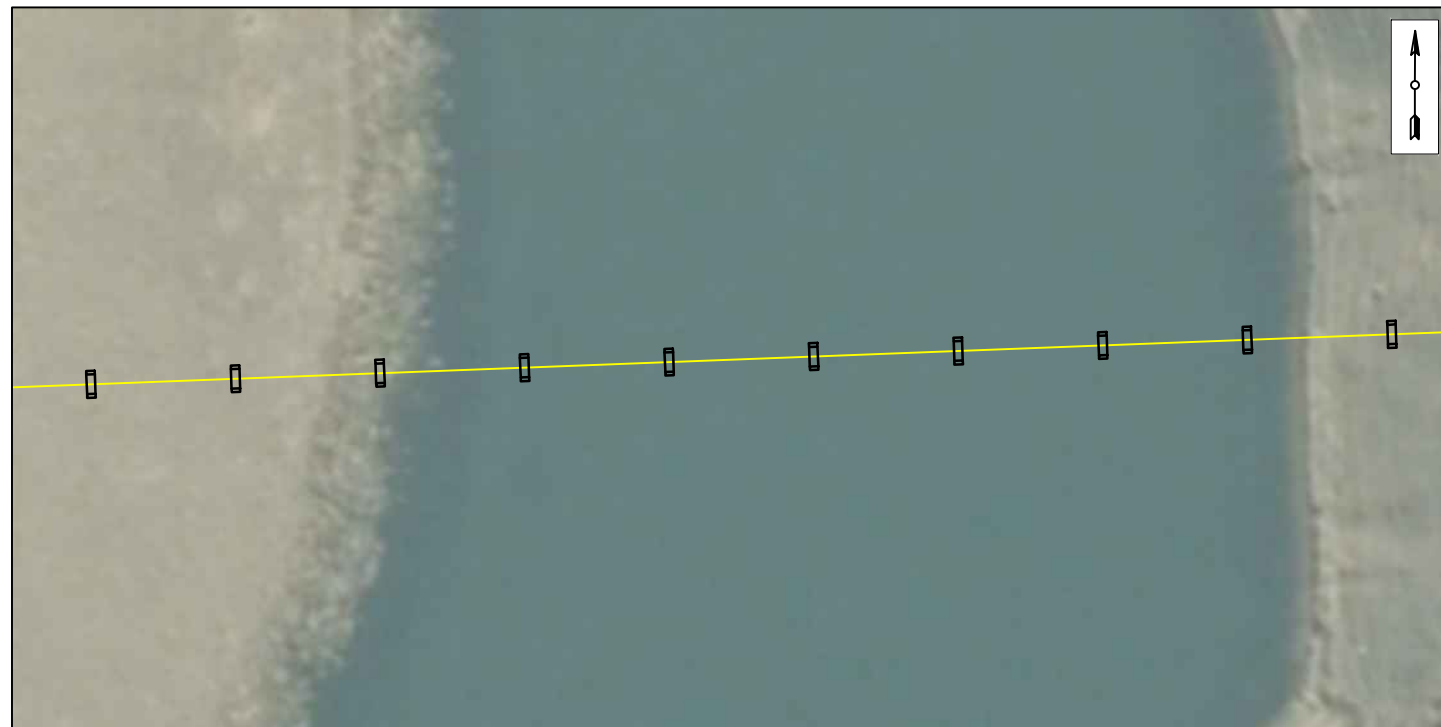
UMKHOMAZI WATER PROJECT  
POTABLE WATER MODULE

MAPSTONE DAM CROSSING  
STEEL BRIDGE CROSSING

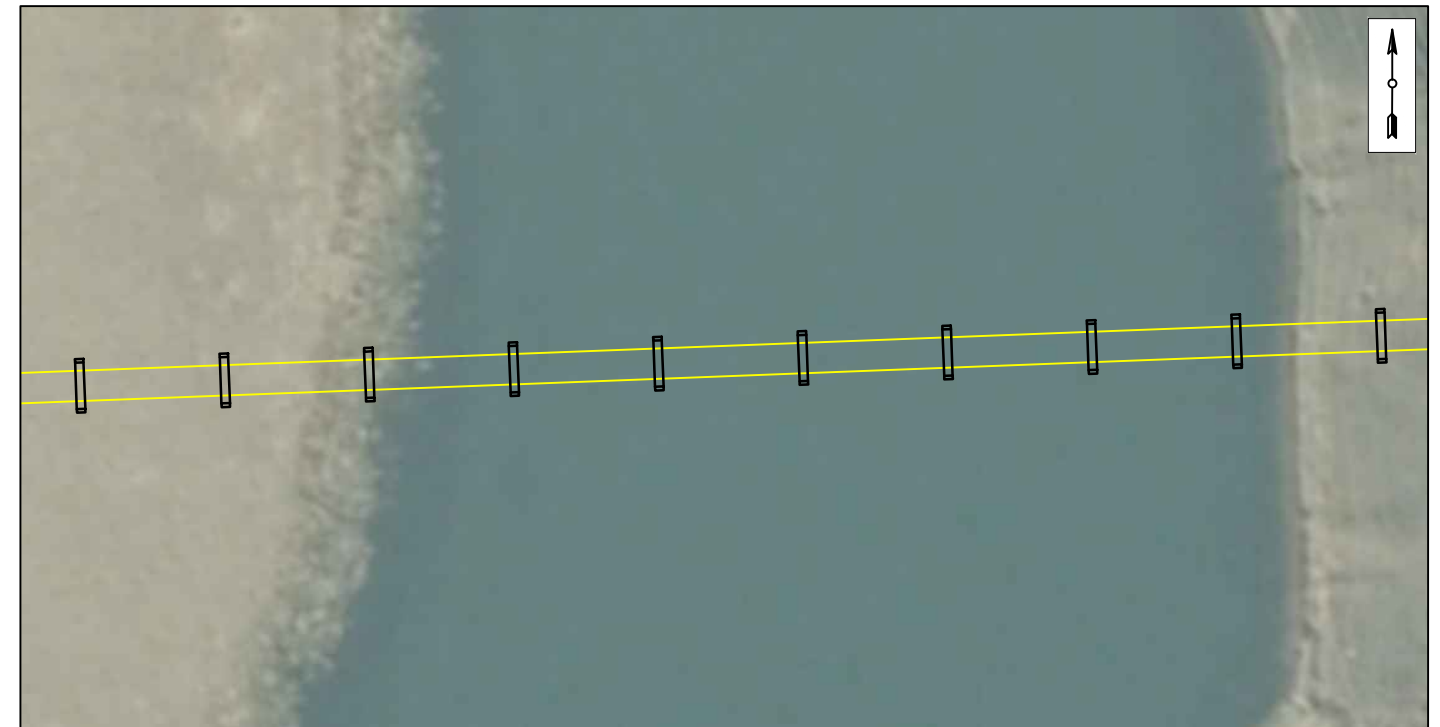
DRG. No. 30300413/A07

REV. 0

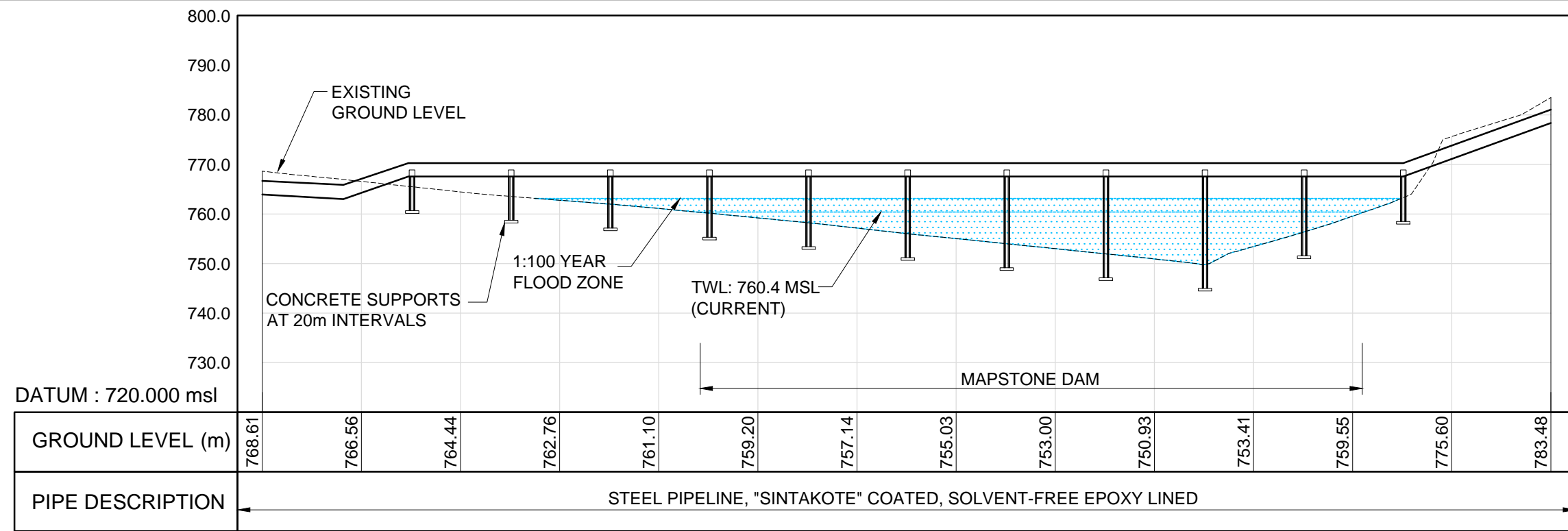
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PIPE SUPPORTS - SINGLE PIPE OPTION  
PLAN  
SCALE 1:1000



PIPE SUPPORTS - DOUBLE PIPE OPTION  
PLAN  
SCALE 1:1000



LONGITUDINAL SECTION  
SCALE : HOR 1:1000  
VER 1:1000

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PRIMARY DISCIPLINE	CIVIL	
DRAWN	I.D	JULY 14
DRAWING CHECK	A.D	JULY 14
DESIGN	I.D	JULY 14
DESIGN CHECK	A.D	JULY 14
PROJECT ENGINEER	A.D	JULY 14

30300413/A08

REV. No.	DATE	DESCRIPTION	DRAWN I.D	CHKD. A.D	APPD.
0	JULY 14	INFORMATION			



REFERENCE DRAWINGS		
DRAWING No.	MAKERS No.	TITLE

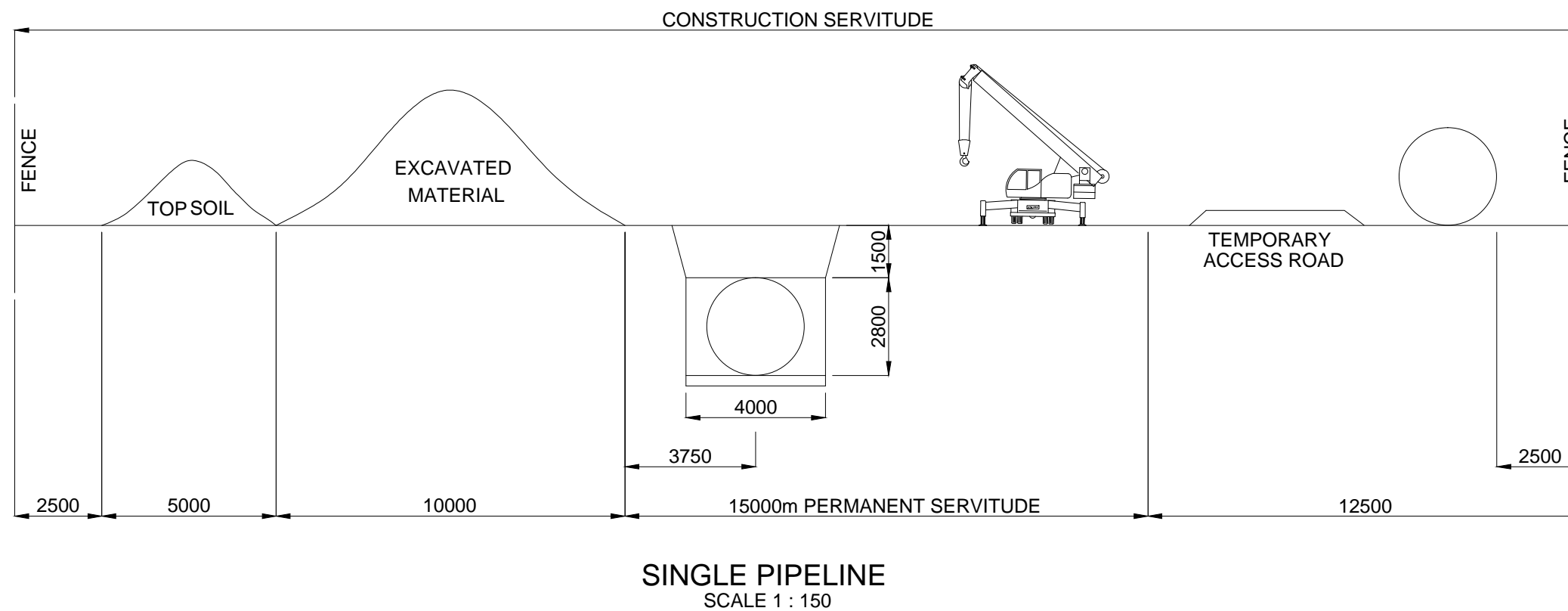
UMKHOMAZI WATER PROJECT  
POTABLE WATER MODULE

MAPSTONE DAM CROSSING  
CONCRETE PIERS OPTION

DRG. No. 30300413/A08

REV. 0

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PRIMARY DISCIPLINE	CIVIL	
DRAWN	K.G	OCT 2014
DRAWING CHECK	P.G	OCT 2014
DESIGN	P.G	OCT 2014
DESIGN CHECK	A.D	OCT 2014
PROJECT ENGINEER	A.D	OCT 2014

30300413/G15

**REVISION**

REV.No.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.

**REFERENCE DRAWINGS**

DRAWING No.	MAKERS No.	TITLE

**UMKHOMAZI WATER PROJECT**

CONSTRUCTION SERVITUDE LAYOUT  
SINGLE PIPELINE

DRG. No. 30300413/G15

REV. A

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