

INTERNATIONAL COURT OF JUSTICE

DISPUTE OVER THE STATUS AND USE OF
THE WATERS OF THE SILALA
(CHILE v. BOLIVIA)

**REJOINDER OF THE PLURINATIONAL
STATE OF BOLIVIA**

ANNEXES 29 TO 30

VOLUME 6 OF 6

15 MAY 2019

LIST OF ANNEXES TO THE REJOINER OF THE PLURINATIONAL STATE OF BOLIVIA

VOLUME 6 OF 6

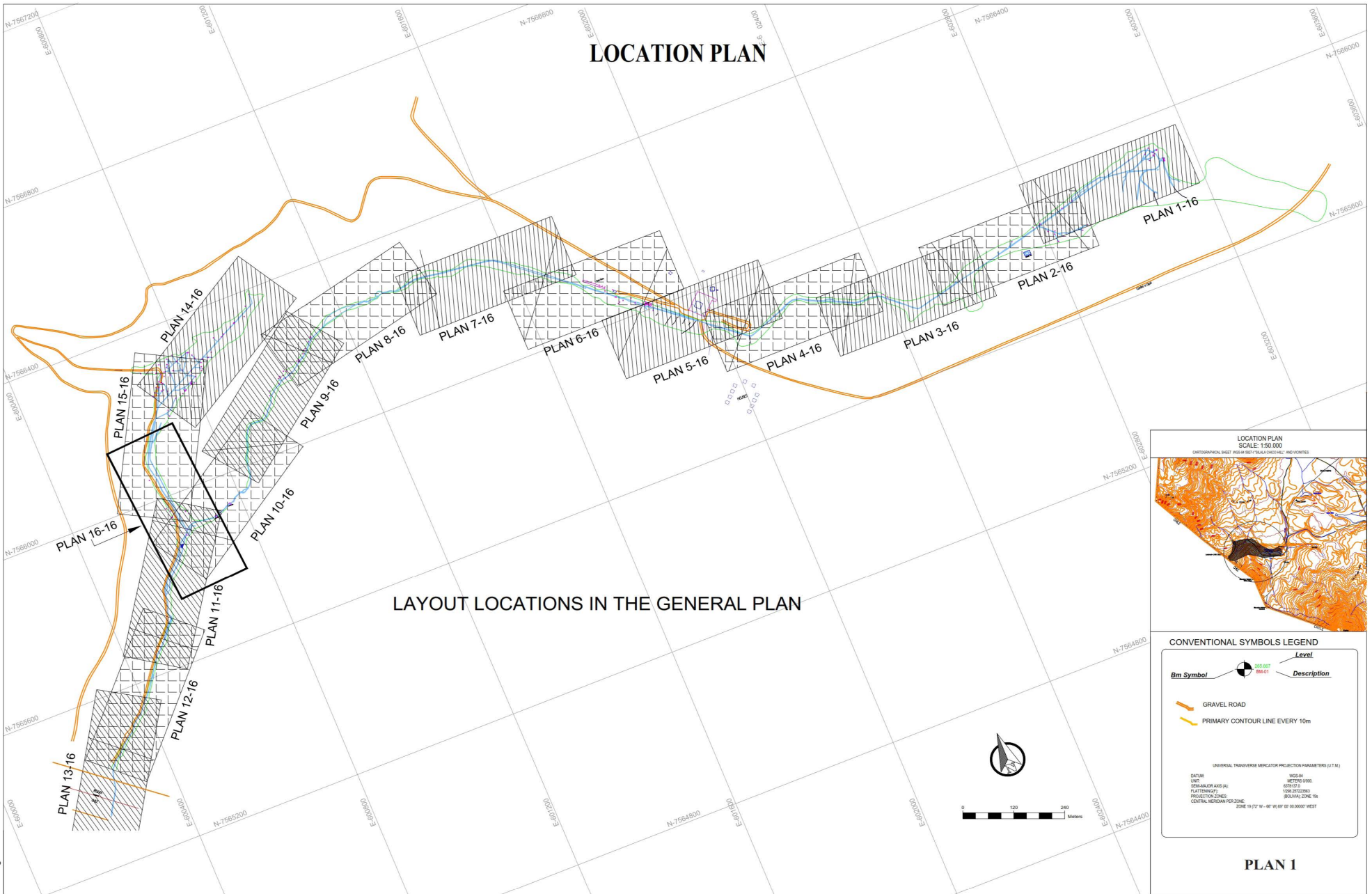
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**INFRASTRUCTURE LAYOUT
PLANS AND DRONE
FOOTAGE
(Appendix A)**

LOCATION PLAN



LAYOUT LOCATIONS IN THE GENERAL PLAN



LOCATION PLAN
SCALE: 1:50,000
CARTOGRAPHICAL SHEET: 1058/8 (RED) TELAUK (PHOENIX) AND VICINITY

CONVENTIONAL SYMBOLS LEGEND

Bm Symbol	Level	Description
	85.027	GRAVEL ROAD
	85.017	PRIMARY CONTOUR LINE EVERY 10m

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (UTM)

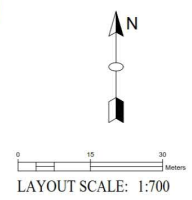
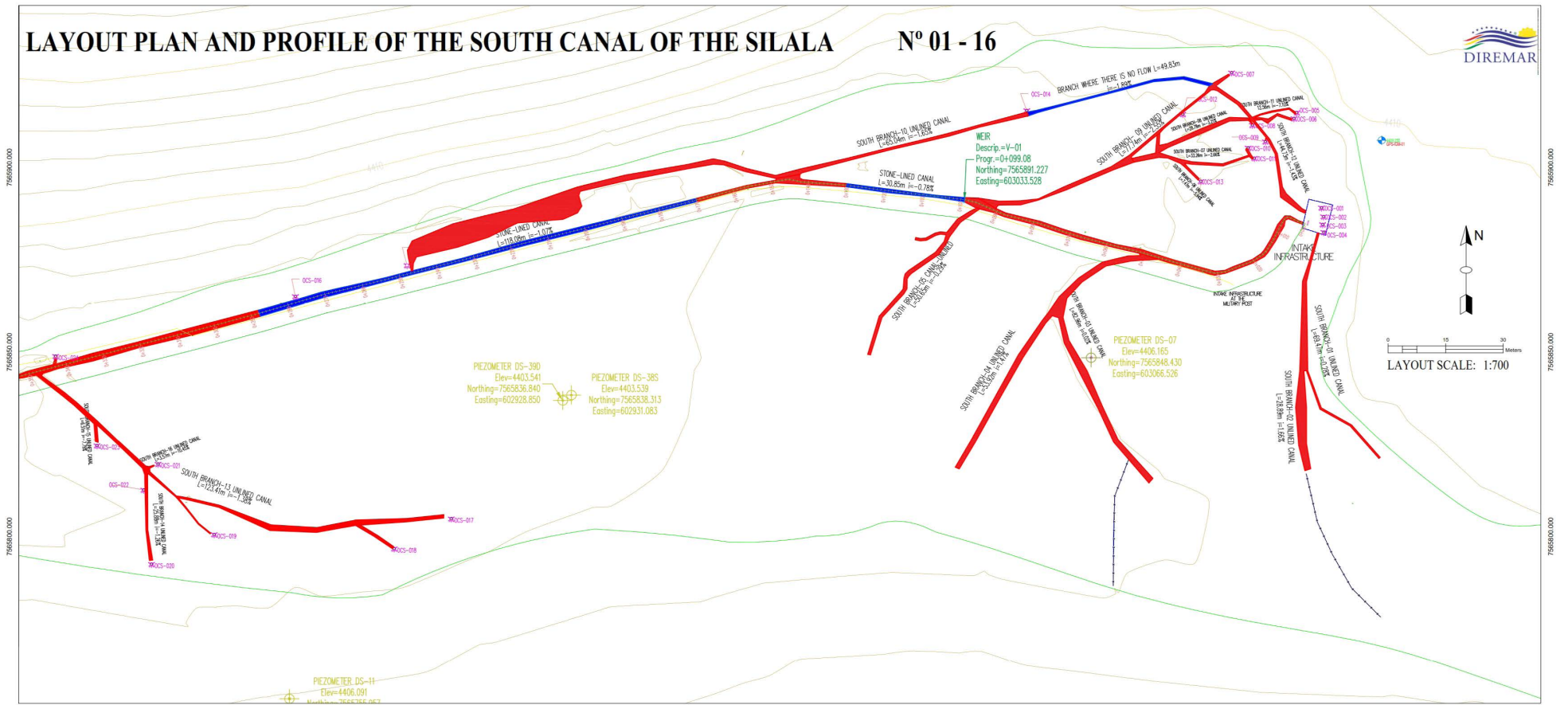
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UNIT:	METERS/1000
SEMI-MAJOR AXIS (A):	6378137
FLATTENING (F):	1/298.2572436
PROJECTION ZONE:	86 (EQUATORIAL ZONE 18)
CENTRAL MERIDIAN PER ZONE:	ZONE 18 (72° W - 60° W) 60° 00' 00" WEST

PLAN 1

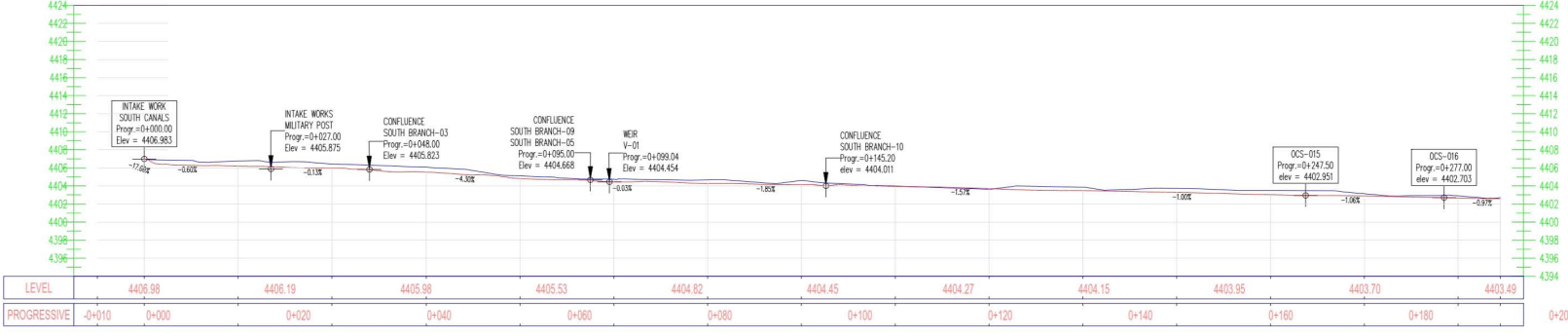
ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 01/16



LAYOUT PLAN AND PROFILE OF THE SOUTH CANAL OF THE SILALA Nº 01 - 16



PROFILE SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

BM symbol	LEVEL	DESCRIPTION
[Symbol]	4406.98	WALLS AND WIRE FENCING
[Symbol]	4406.19	PRIMARY CONTOUR LINE EVERY 5
[Symbol]	4405.98	SECONDARY CONTOUR LINE EVERY 1m
[Symbol]	4405.53	WETLANDS AND SPRINGS
[Symbol]	4404.82	UNLINED CANALS EXCAVATED IN NATURAL SOILS
[Symbol]	4404.45	STONE MASONRY CANALS
[Symbol]	4404.27	BOFEDALES
[Symbol]	4404.15	PVC PIPES
[Symbol]	4403.95	PIEZOMETERS
[Symbol]	4403.70	MINOR STONE DAMS
[Symbol]	4403.49	TERRAIN PROFILE
[Symbol]		CANAL PROFILE

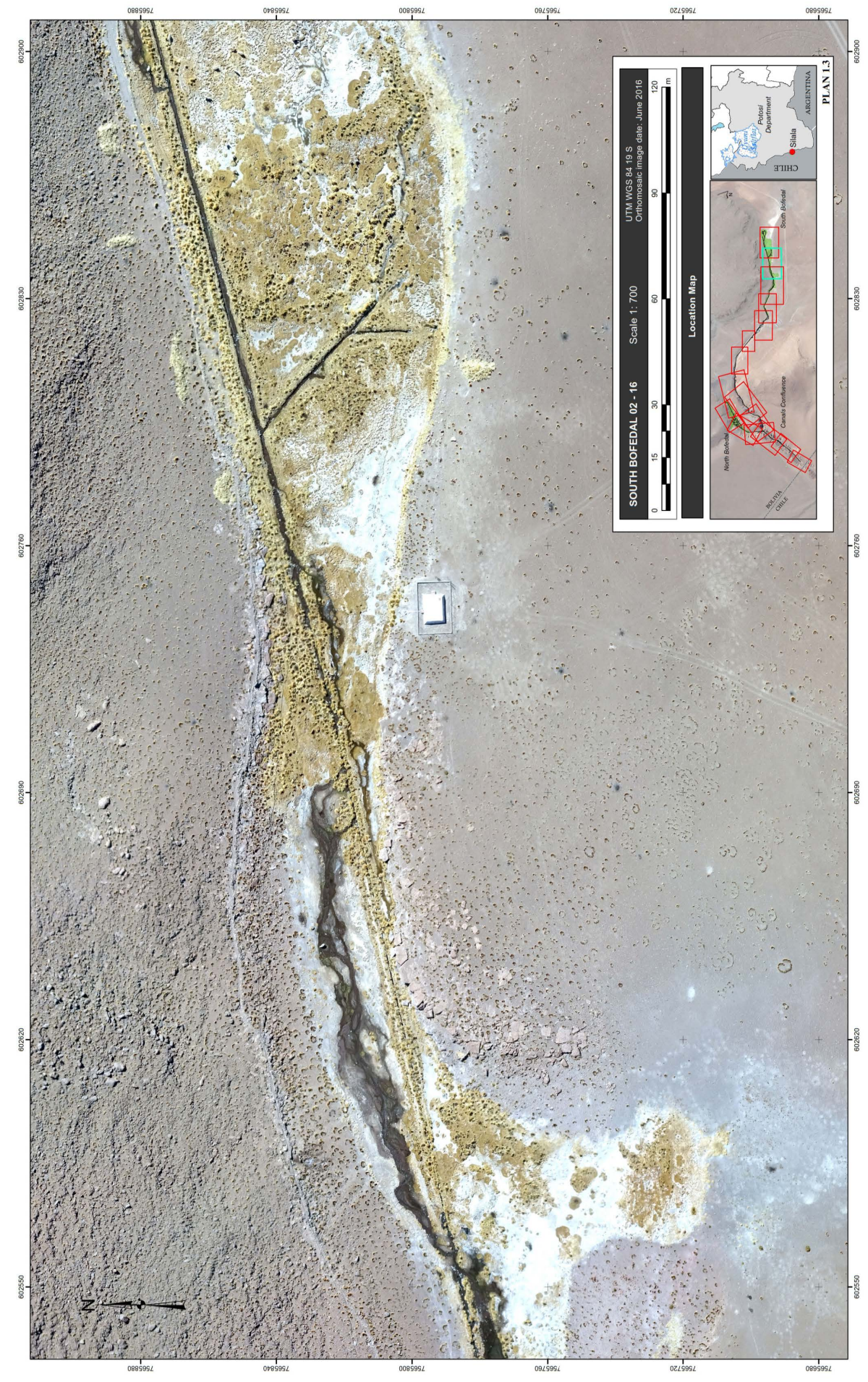
Profile:

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)

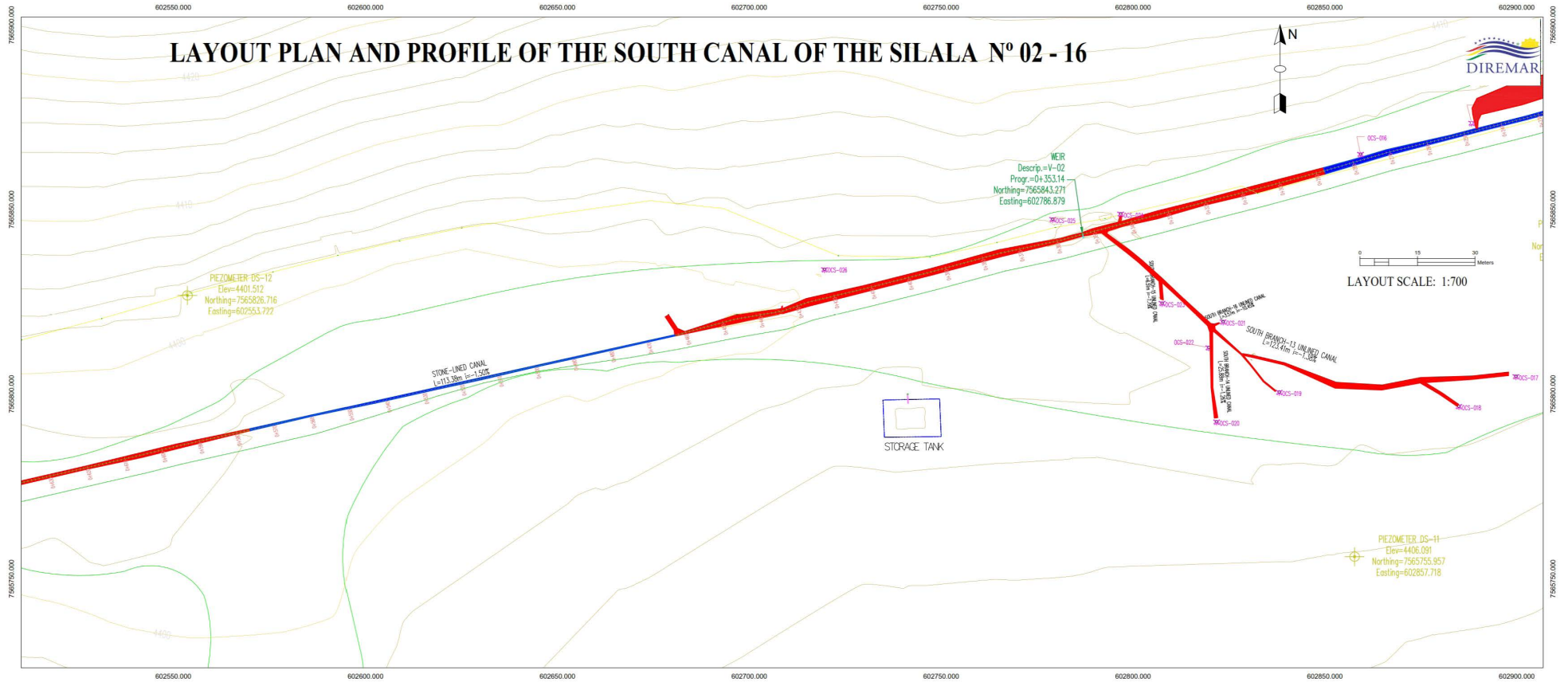
DATUM: WGS 84
 UNIT: METERS
 REFERENCE AXIS: EAST
 PLATTENING: UTM
 PROJECTION ZONES: 18S
 CENTRAL MERIDIAN TRUE ZONE: 80° 00' 00" WEST
 ZONE HEIGHT: 600 000 METERS

PLAN 1.2

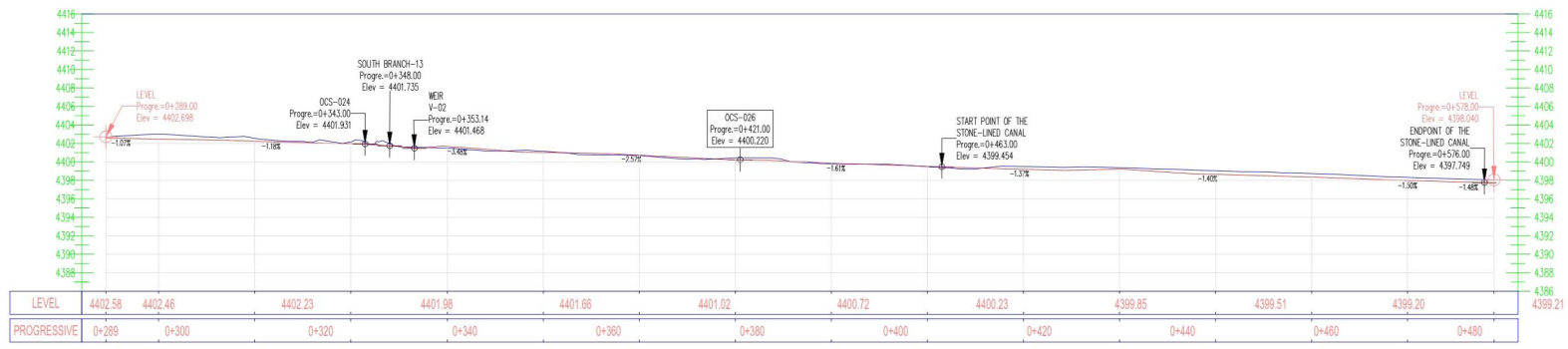
ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 02/16



LAYOUT PLAN AND PROFILE OF THE SOUTH CANAL OF THE SILALA Nº 02 - 16



PROFILE SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

LEVEL

BM symbol: Description: BM-01

PRIMARY CONTOUR LINE EVERY 5
SECONDARY CONTOUR LINE EVERY 1m

WETLANDS AND SPRINGS

UNLINED CANALS EXCAVATED IN NATURAL SOILS

STONE MASONRY CANALS

BOFEDALES

PIEZOMETERS

PVC PIPES

MINOR STONE DAMS

Profile:

TERRAIN PROFILE

CANAL PROFILE

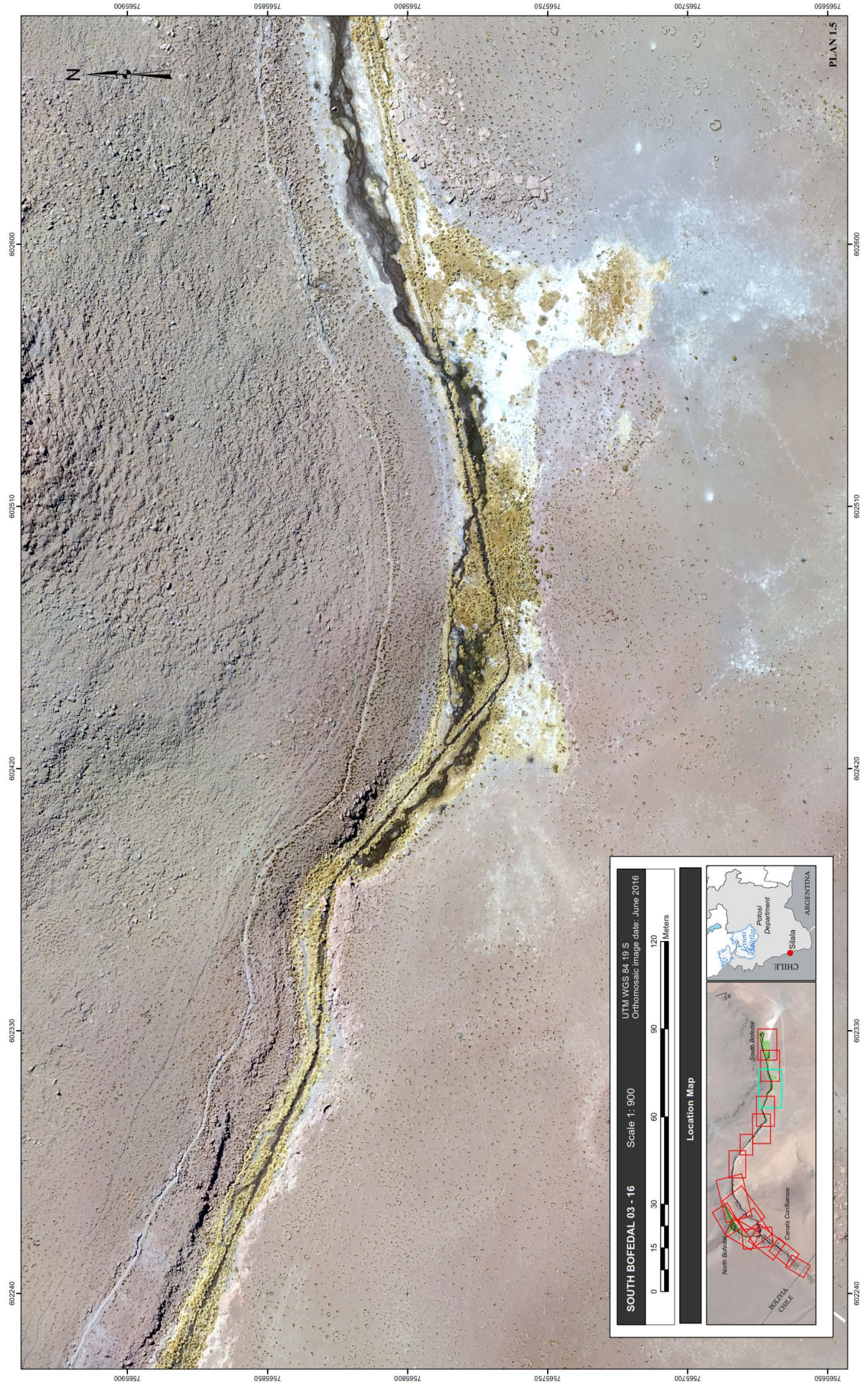
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UNITS: METERS 0000.
SEMI-MAJOR AXIS (A): 6378137.0
FLATTENING (F): 1/298257223.65
PROJECTION ZONE: CENTRAL MERIDIAN ZONE:
ZONE 19 (2° W - 6° W) RP 0° 00.00000° WEST

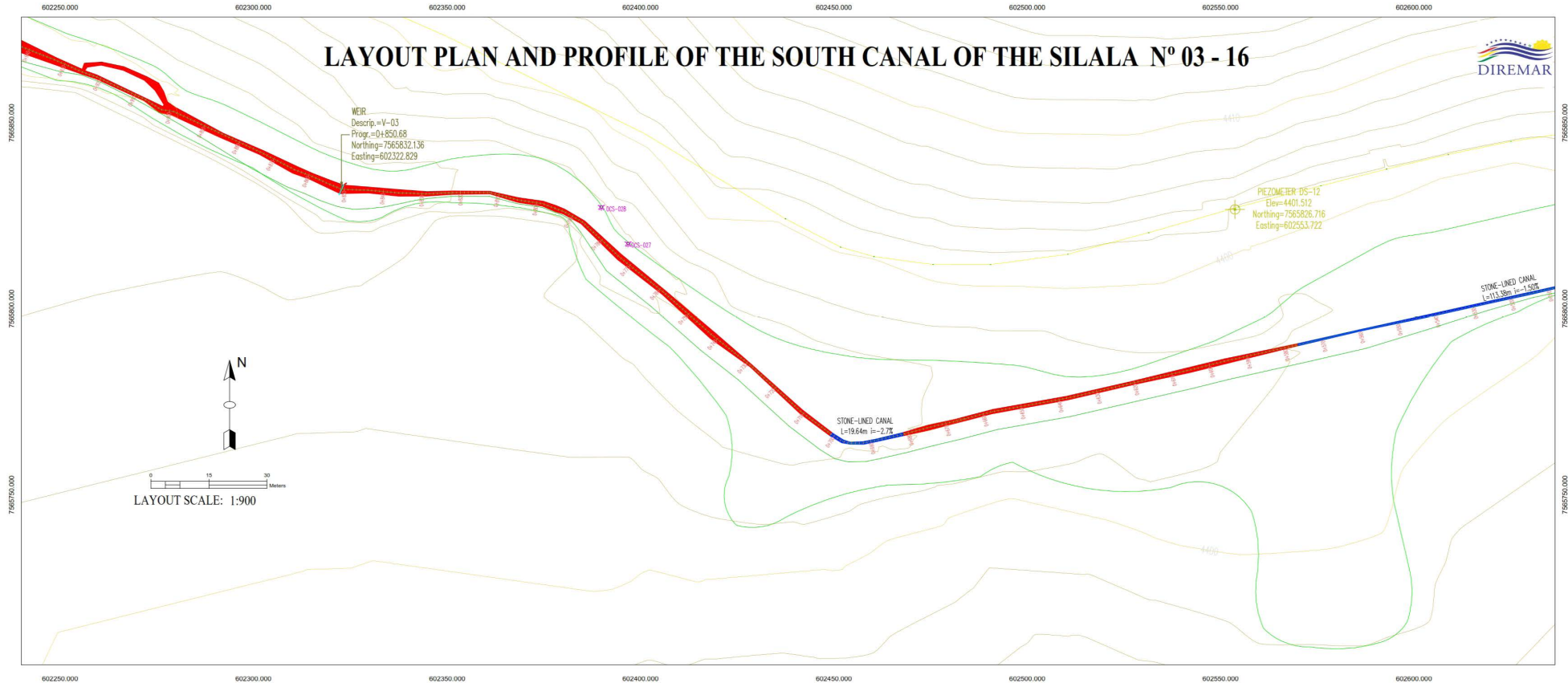
WGS-84
METERS 0000.
6378137.0
1/298257223.65
(BOLMIA) ZONE 19

PLAN 1.4

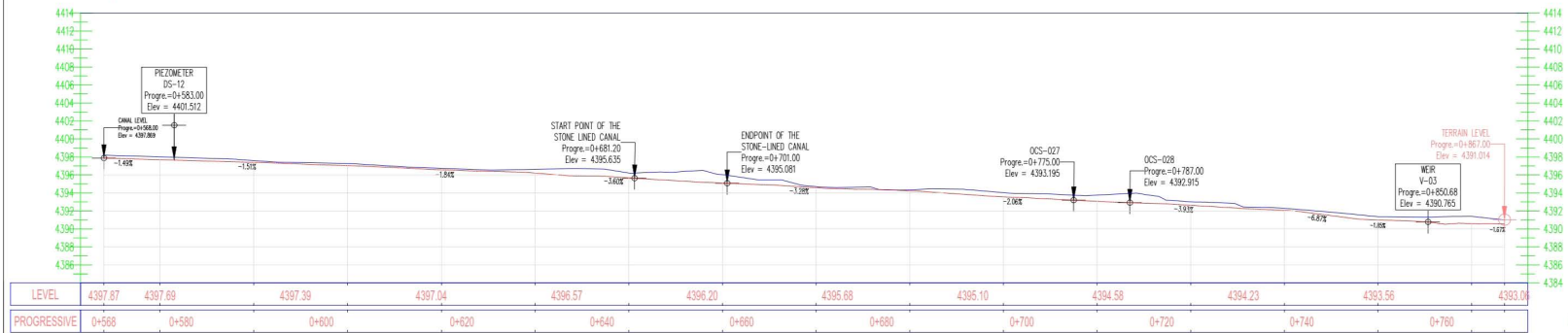
ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 03/16



LAYOUT PLAN AND PROFILE OF THE SOUTH CANAL OF THE SILALA N° 03 - 16



PROFILE SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

- | BM Symbol | Level | Description |
|-----------------|-------|---|
| | BM-01 | |
| | | PRIMARY CONTOUR LINE EVERY 5 |
| | | SECONDARY CONTOUR LINE EVERY 1m |
| | | WETLANDS AND SPRINGS |
| | | UNLINED CANALS EXCAVATED IN NATURAL SOILS |
| | | STONE-LINED CANALS |
| | | BOFEDALES |
| | | PVC PIPES |
| | | PIEZOMETERS |
| Profile: | | |
| | | TERRAIN PROFILE |
| | | CANAL PROFILE |

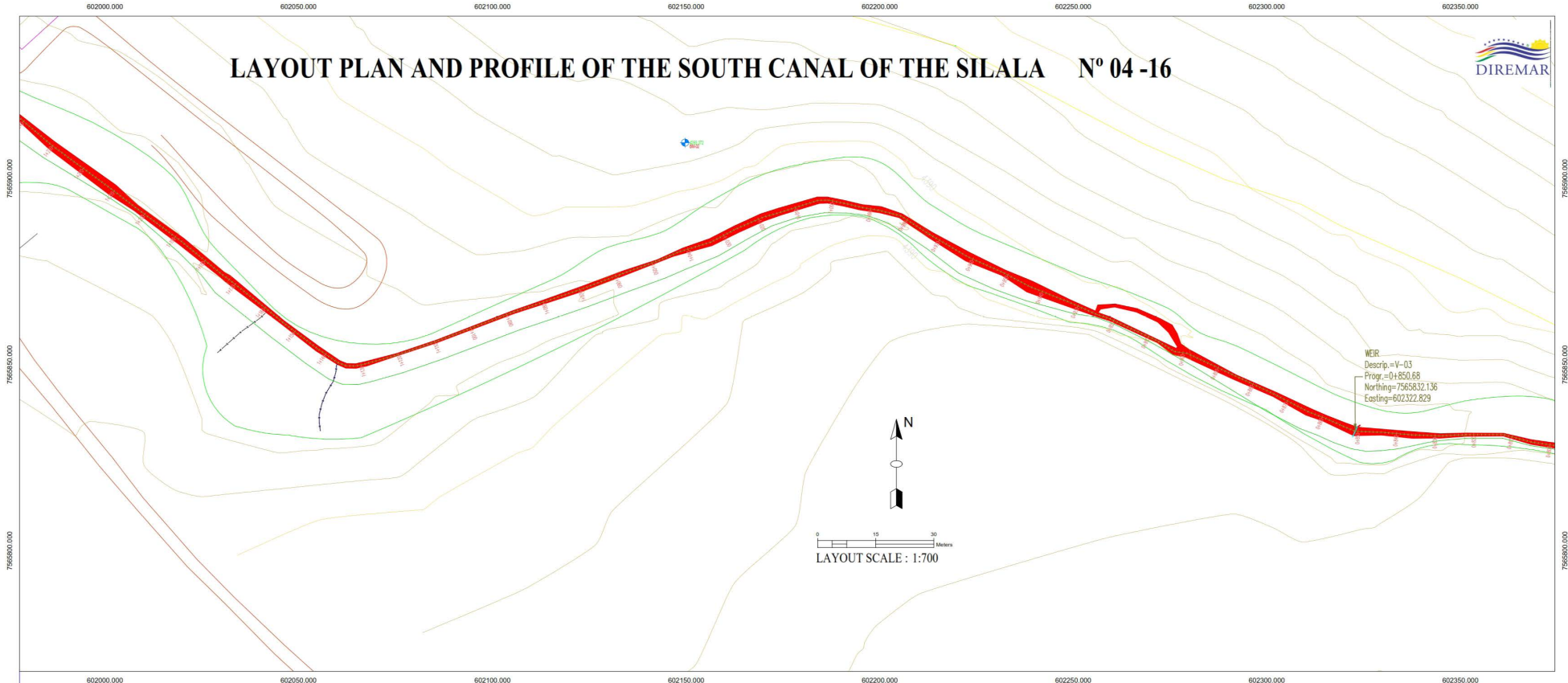
UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (UTM)

DATUM: WGS-84
 UNITS: METERS 0000,
 SEMI-MAJOR AXIS (A): 6378137.0
 FLATTENING (F): 1/29825722.3563
 PROJECTION ZONES: (BOLIVIA) ZONE 19a
 CENTRAL MERIDIAN PER ZONE: ZONE 19 (72° W - 66° W) 69° 00' 00.000000° WEST

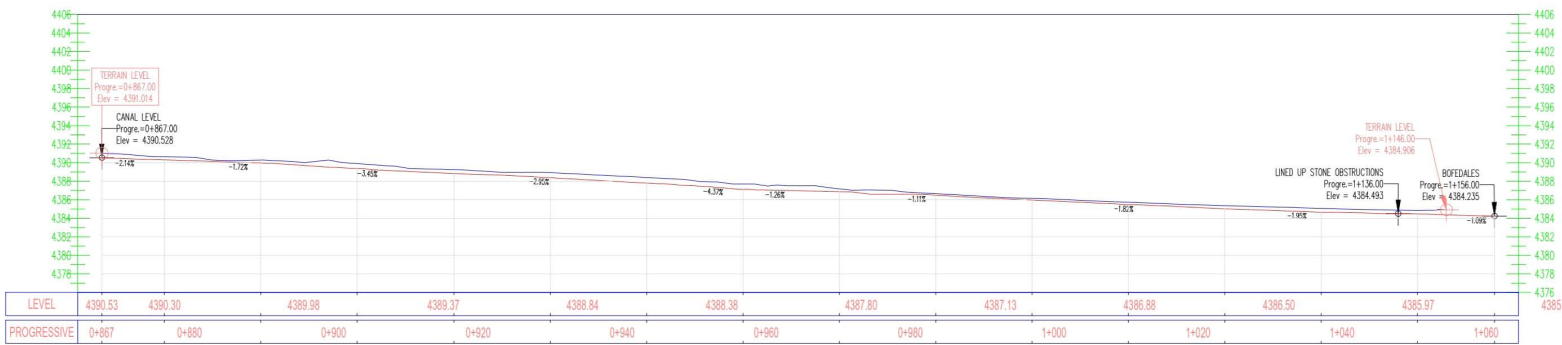
ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 04/16



LAYOUT PLAN AND PROFILE OF THE SOUTH CANAL OF THE SILALA N° 04 -16



SCALE PROFILE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

BM Symbol	Level	Description
	Level	BM-01
	Level	PRIMARY CONTOUR LINE EVERY 5
	Level	SECONDARY CONTOUR LINE EVERY 1m
	Level	WETLANDS AND SPRINGS
	Level	UNLINED CANALS EXCAVATED IN NATURAL SOILS
	Level	BOFEDALES
	Level	PVC PIPES
	Level	PIEZOMETERS
	Level	MINOR STONE DAMS

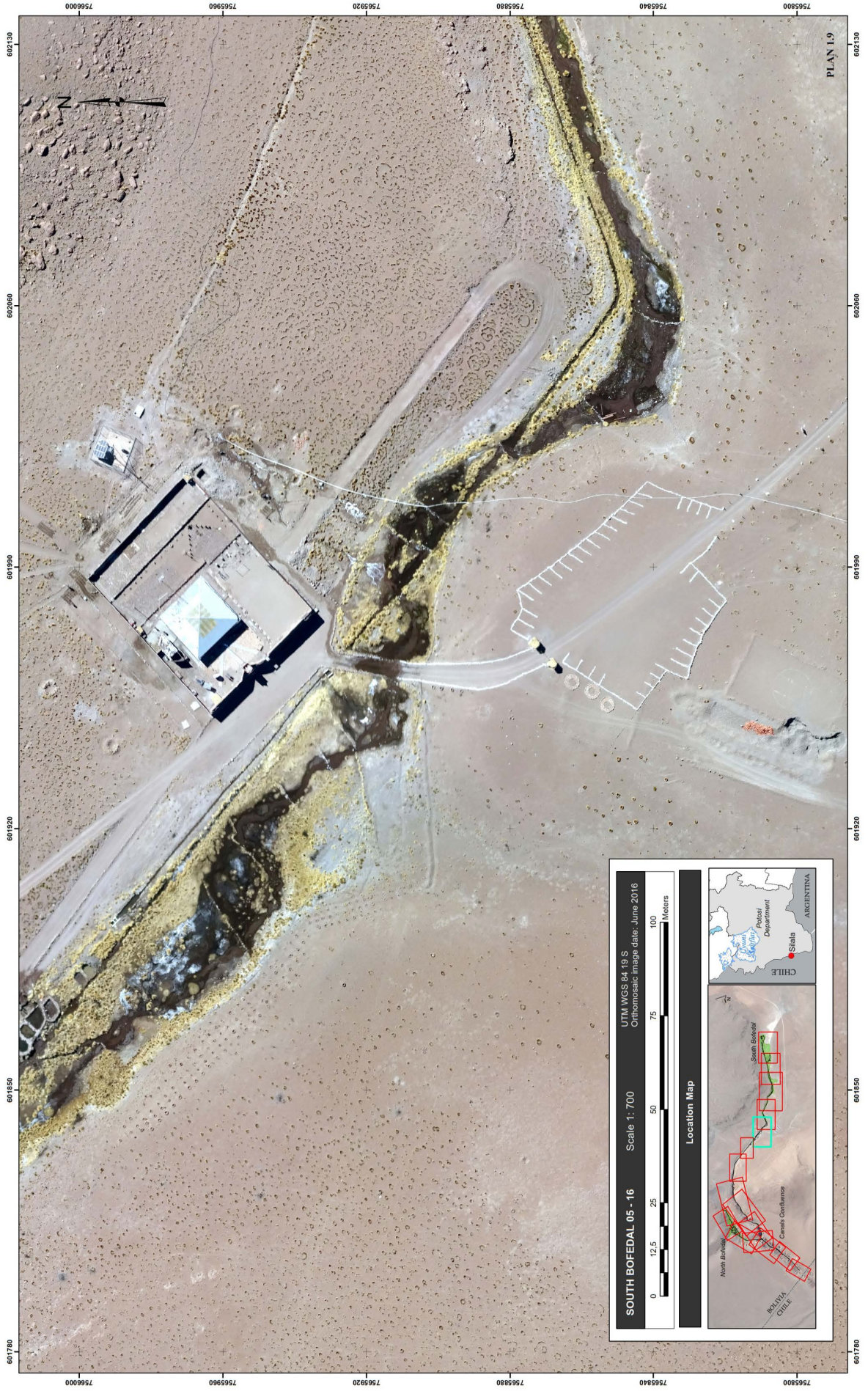
Profile:

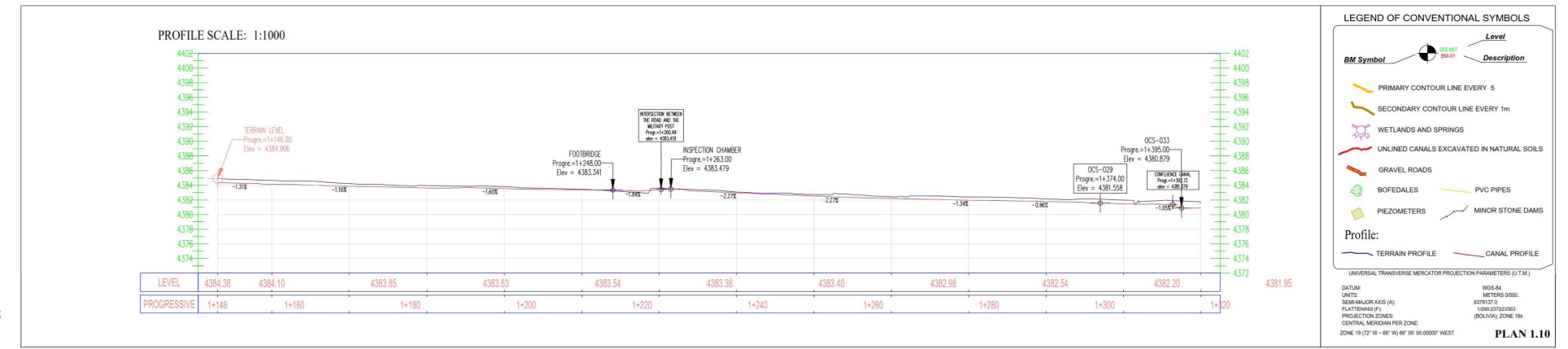
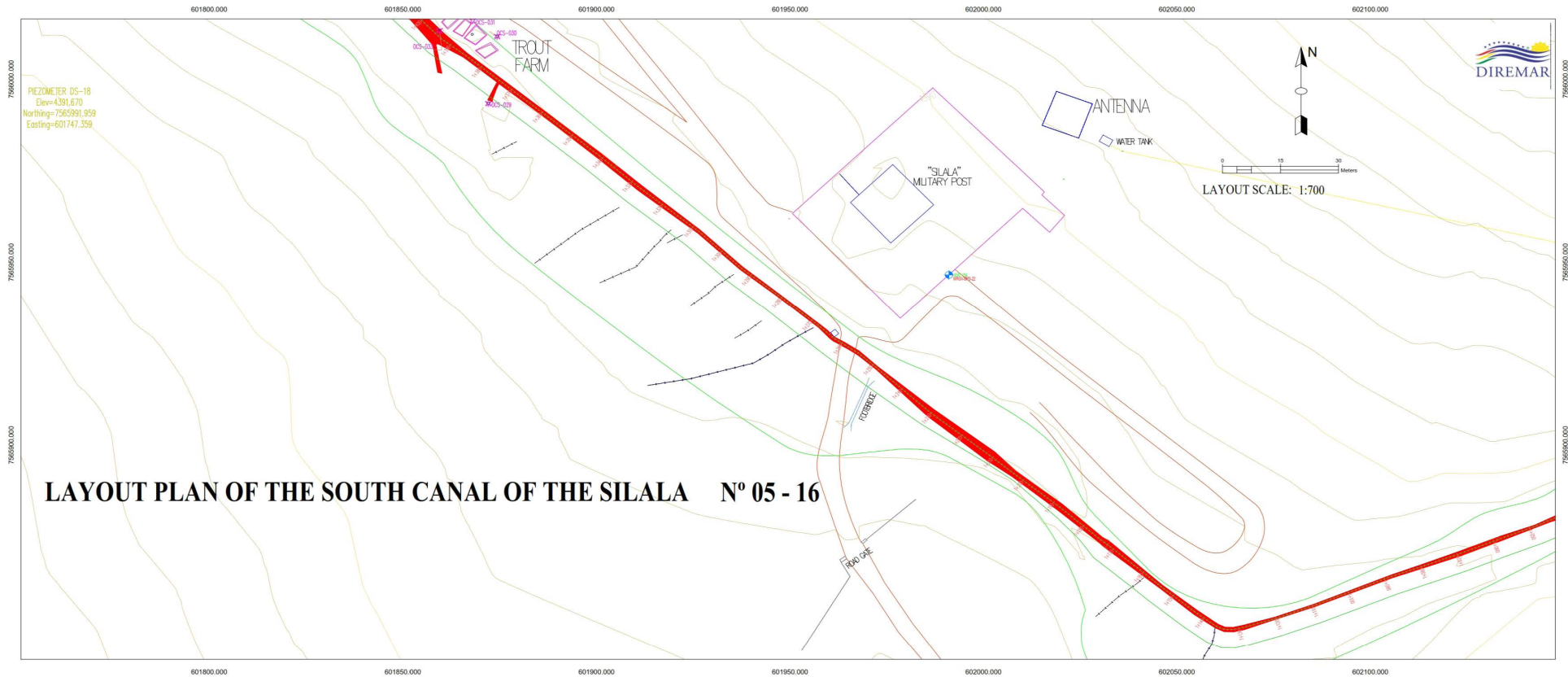
- TERRAIN PROFILE
- CANAL PROFILE

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)

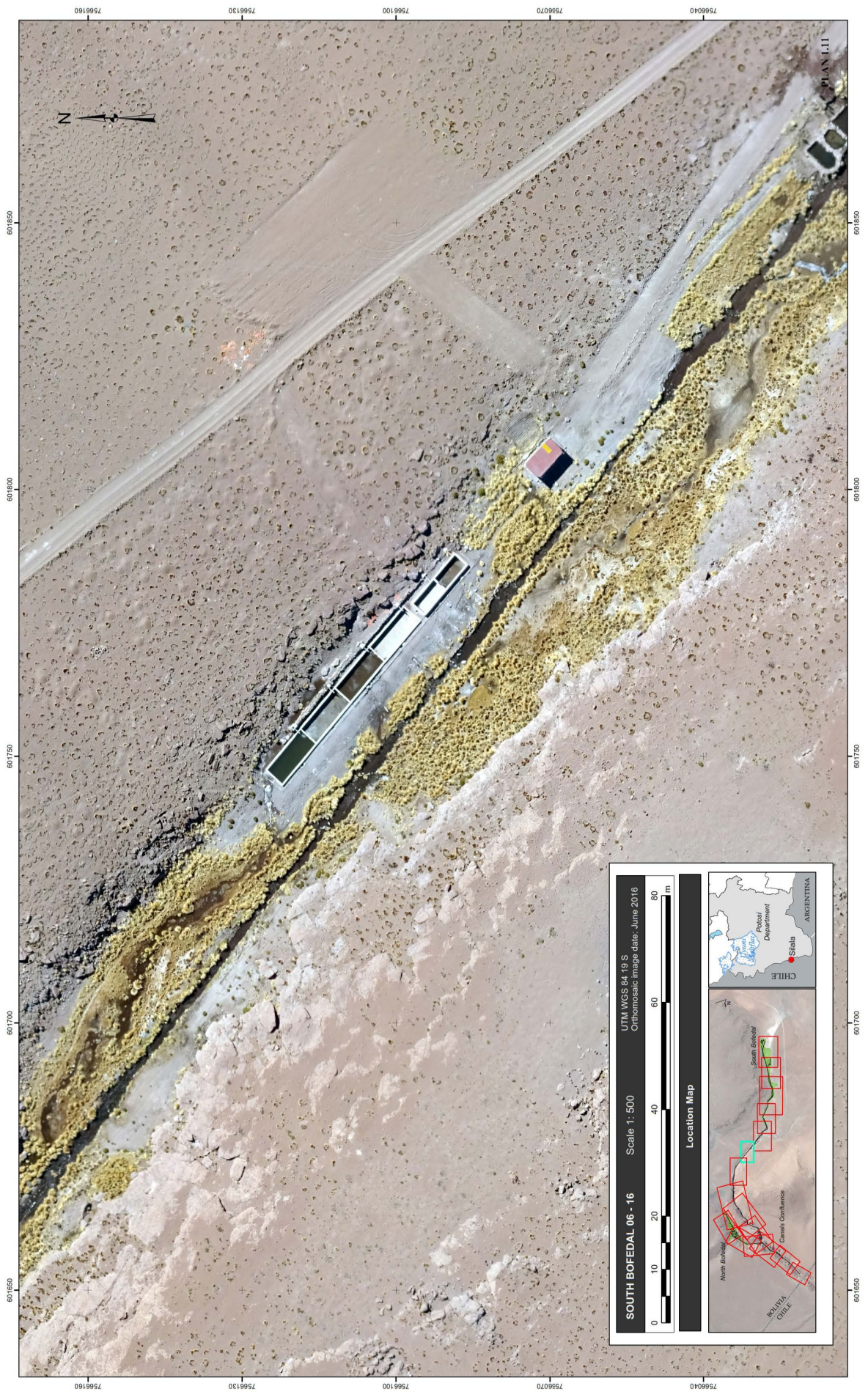
DATUM: WGS-84
 UNITS: METERS 0000.
 SEMI-MAJOR AXIS (A): 6378137.0
 FLATTENING (F): 1/298257223.863
 PROJECTION ZONE: CENTRAL MERSINA PER ZONE.
 ZONE 19 (7° W - 8° W) 6° 00' 00.000000" WEST

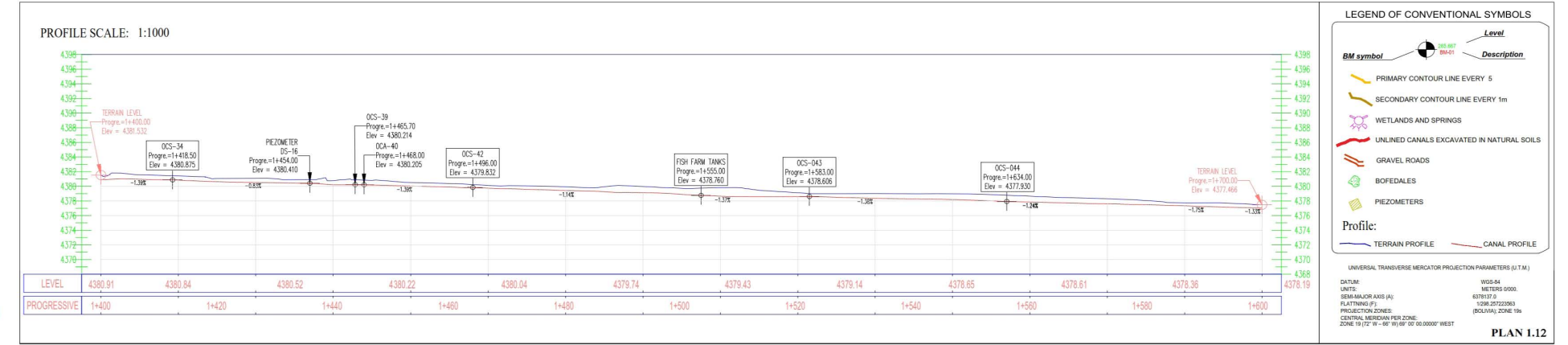
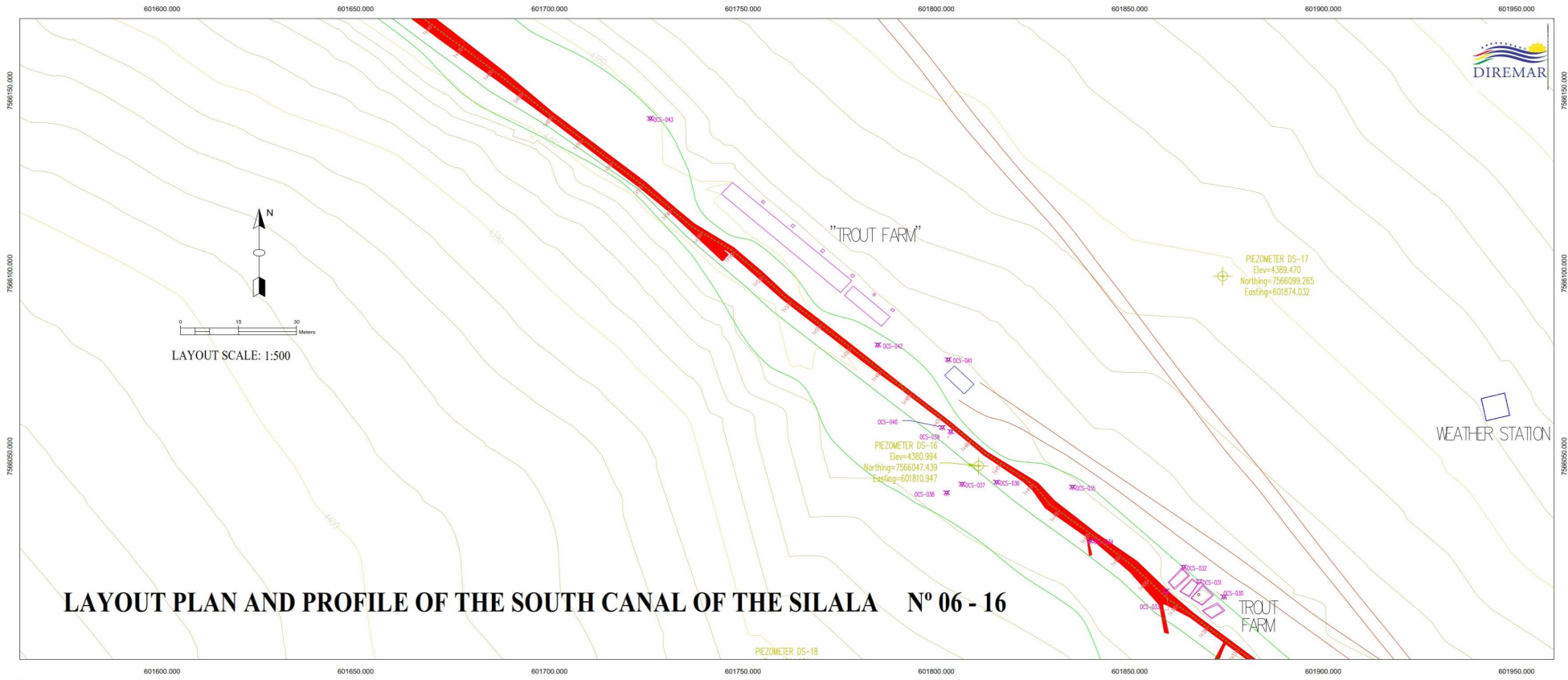
ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 05/16



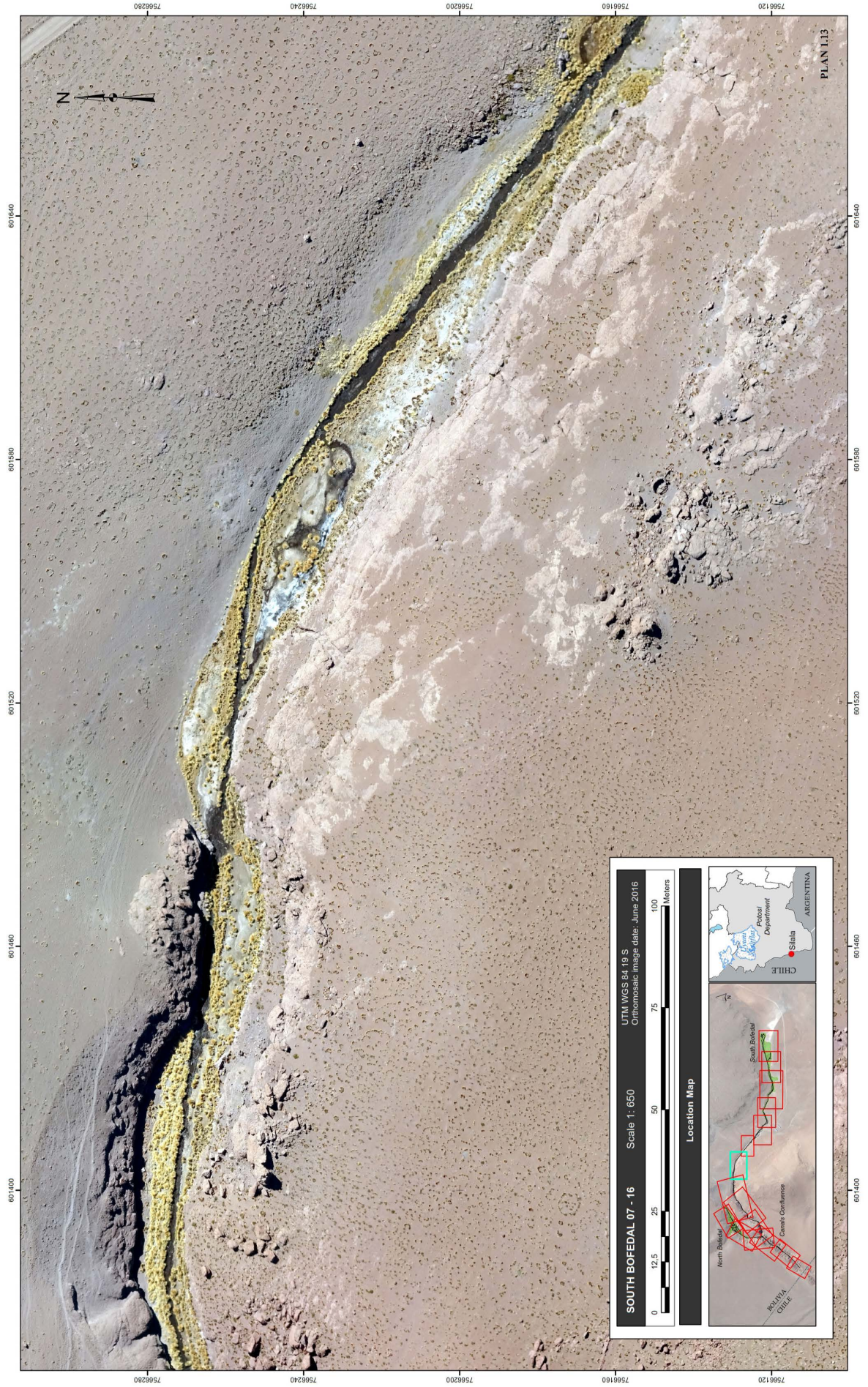


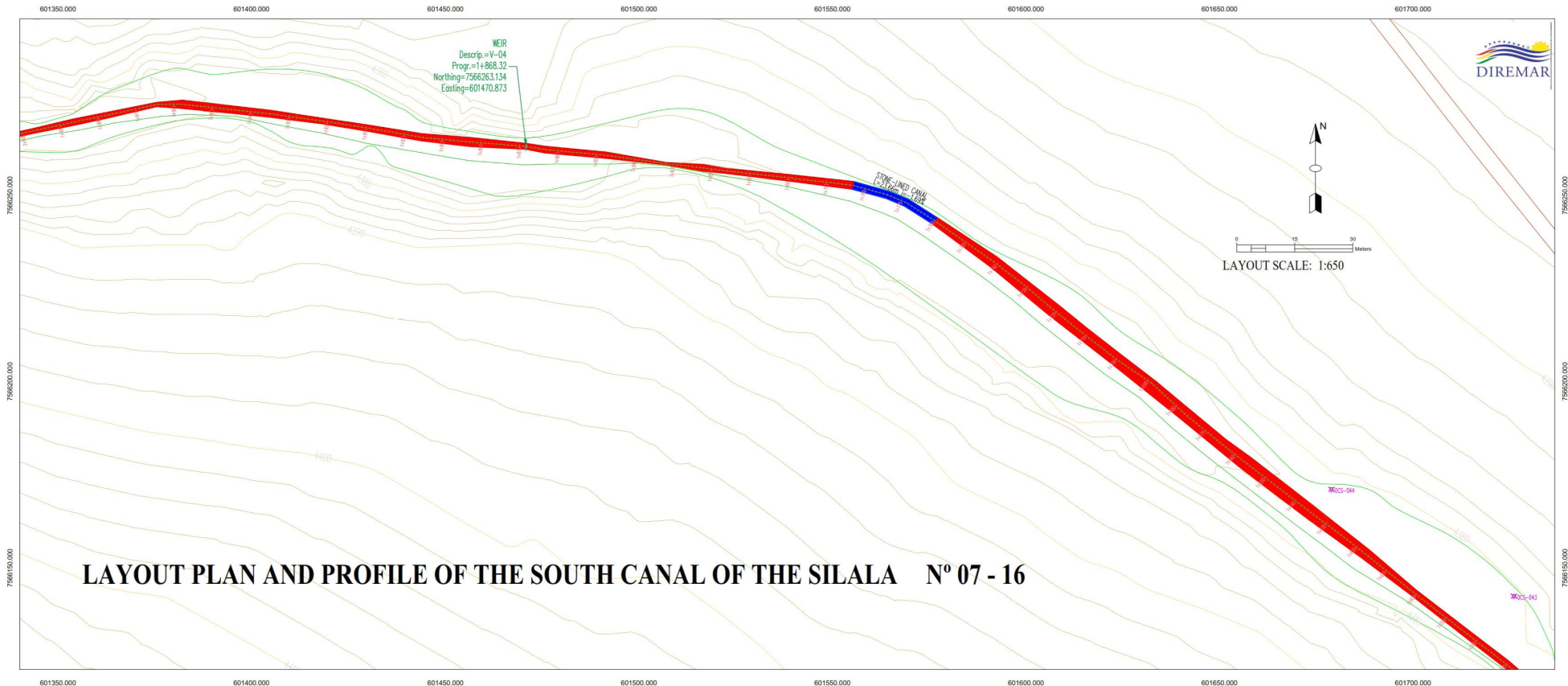
ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 06/16



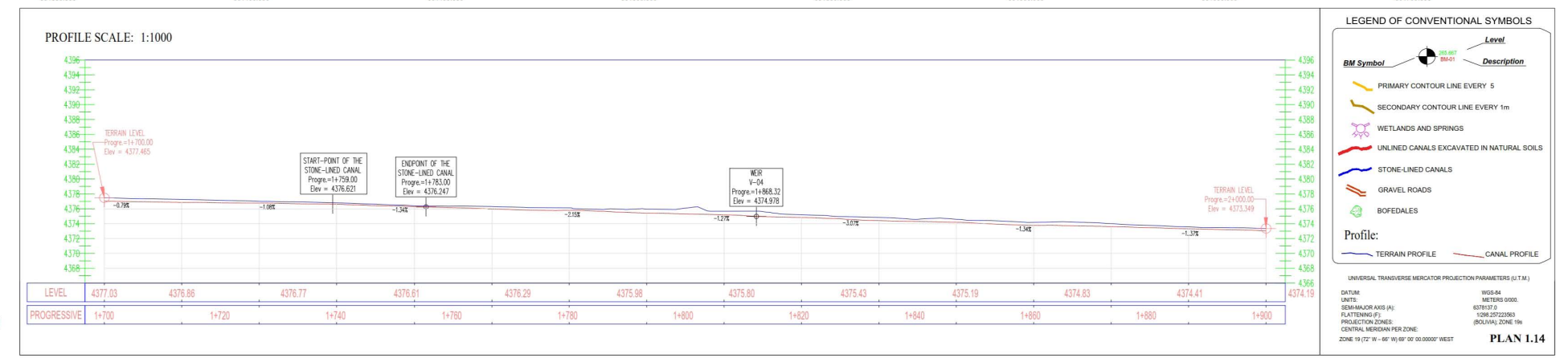


ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 07/16





LAYOUT PLAN AND PROFILE OF THE SOUTH CANAL OF THE SILALA N° 07 - 16



LEGEND OF CONVENTIONAL SYMBOLS

BM Symbol **Level** **Description**

- PRIMARY CONTOUR LINE EVERY 5
- SECONDARY CONTOUR LINE EVERY 1m
- WETLANDS AND SPRINGS
- UNLINED CANALS EXCAVATED IN NATURAL SOILS
- STONE-LINED CANALS
- GRAVEL ROADS
- BOFEDALES

Profile:

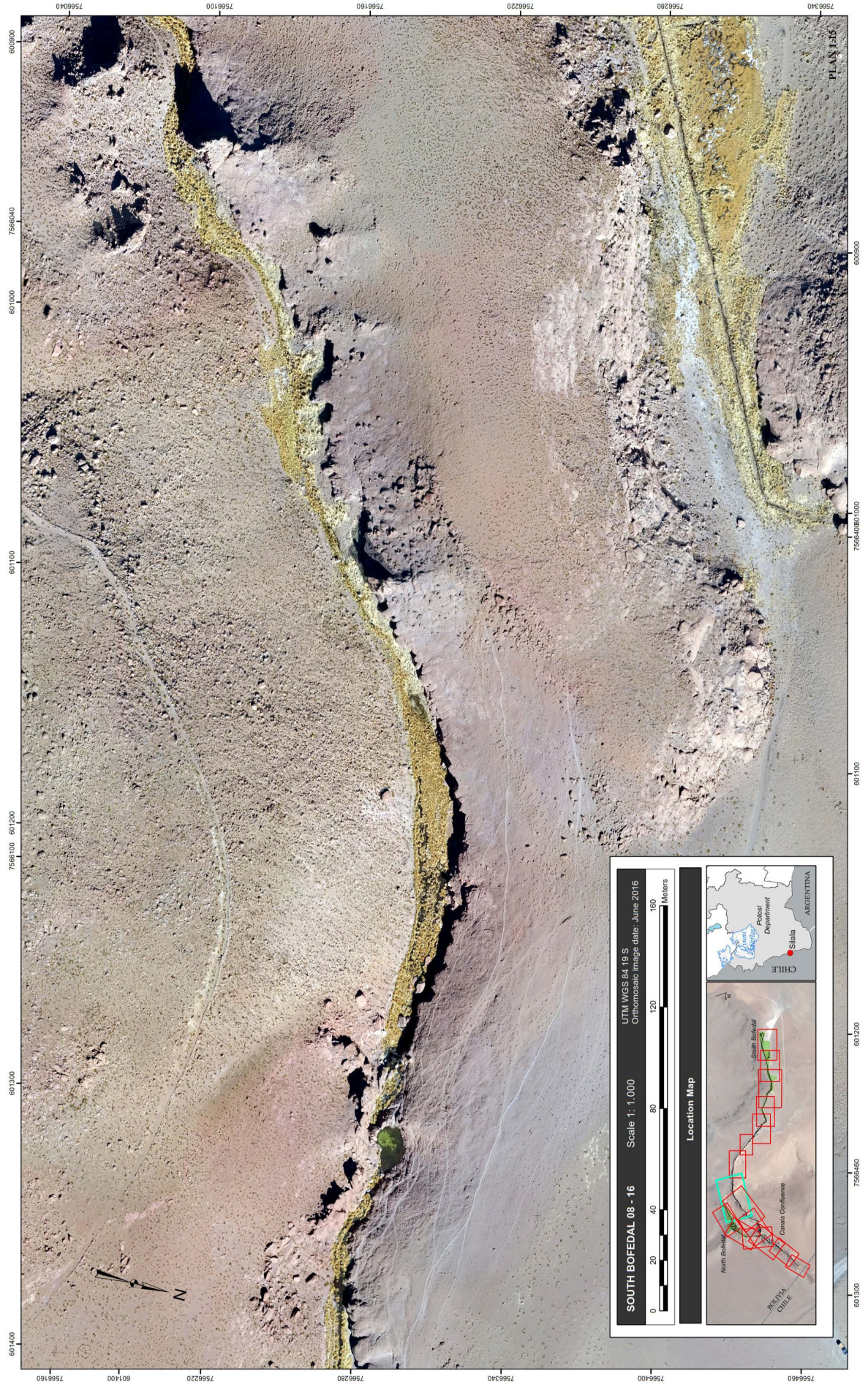
- TERRAIN PROFILE
- CANAL PROFILE

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)

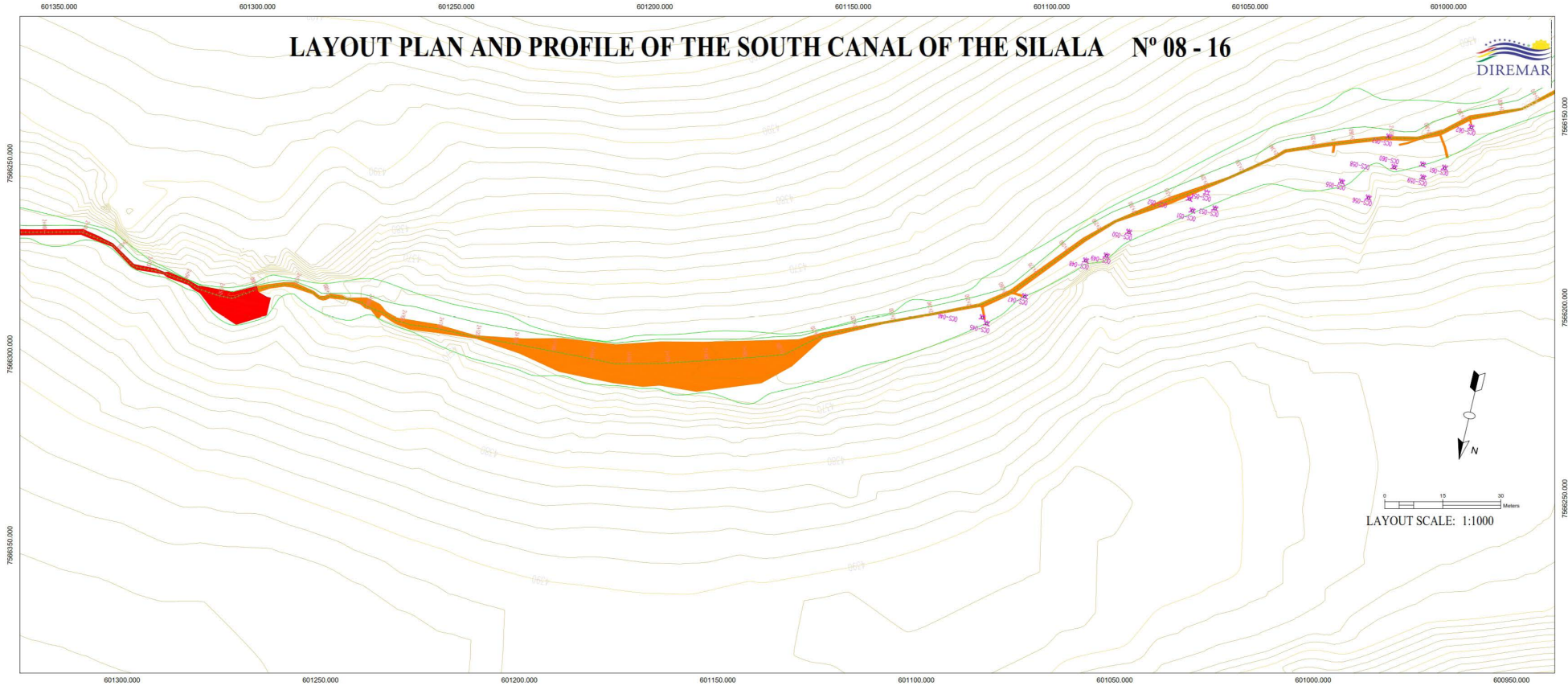
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 SEMI-MAJOR AXIS (A): 6378137.0
 FLATTENING (F): 1/298257223.865
 PROJECTION ZONE: (BOLIVIA) ZONE 19a
 CENTRAL MERIDIAN PER ZONE:
 ZONE 19 (72° W - 66° W) 69° 00' 00.000000" WEST

PLAN 1.14

ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 08/16

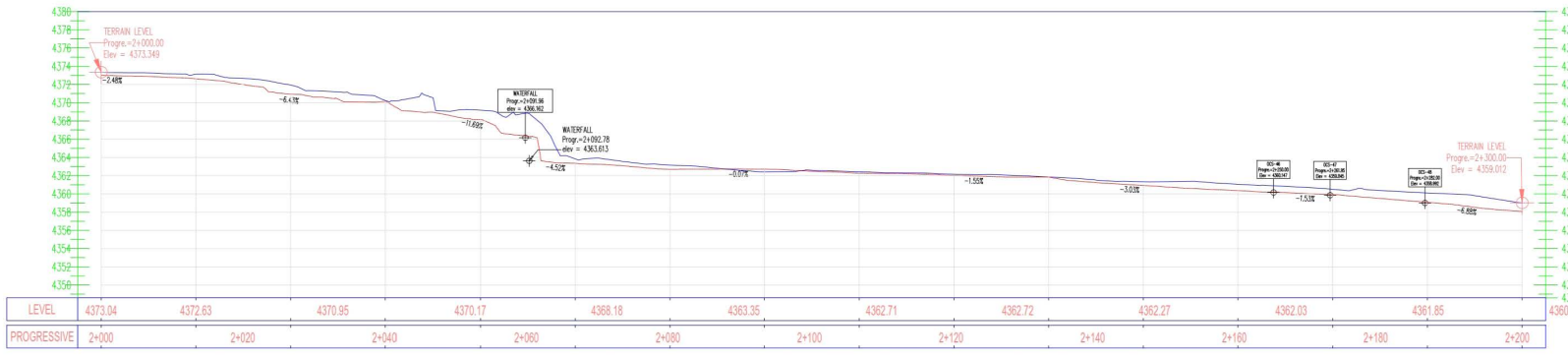


LAYOUT PLAN AND PROFILE OF THE SOUTH CANAL OF THE SILALA N° 08 - 16



LAYOUT SCALE: 1:1000

PROFILE SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

- | BM Symbol | Level | Description |
|-----------|---|-------------|
| | PRIMARY CONTOUR LINE EVERY 5 | |
| | SECONDARY CONTOUR LINE EVERY 1m | |
| | WETLANDS AND SPRINGS | |
| | UNLINED CANALS EXCAVATED IN NATURAL SOILS | |
| | CANALS FLOWING ON ROCKS | |
| | GRAVEL ROADS | |
| | BOFEDALES | |
- Profile:**
- TERRAIN PROFILE
 - CANAL PROFILE

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)

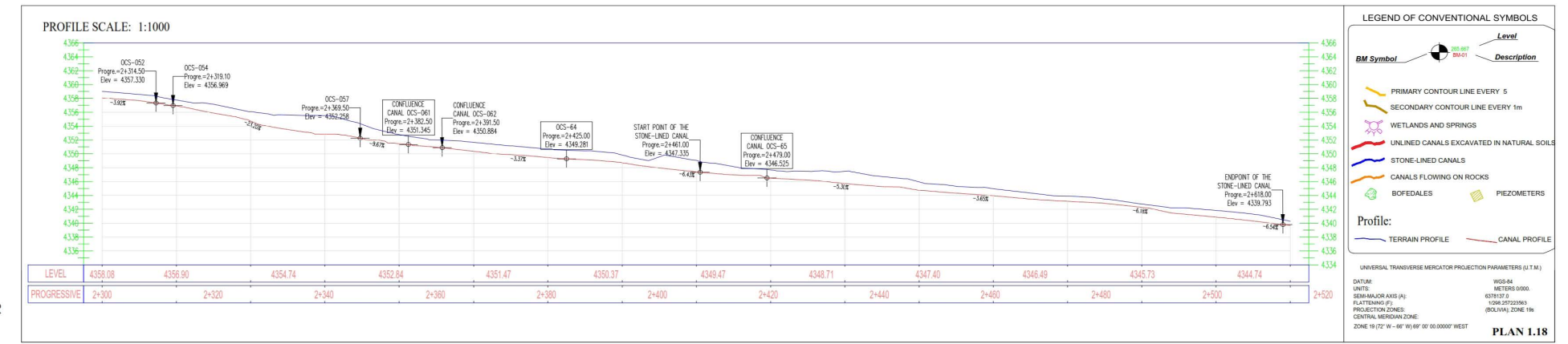
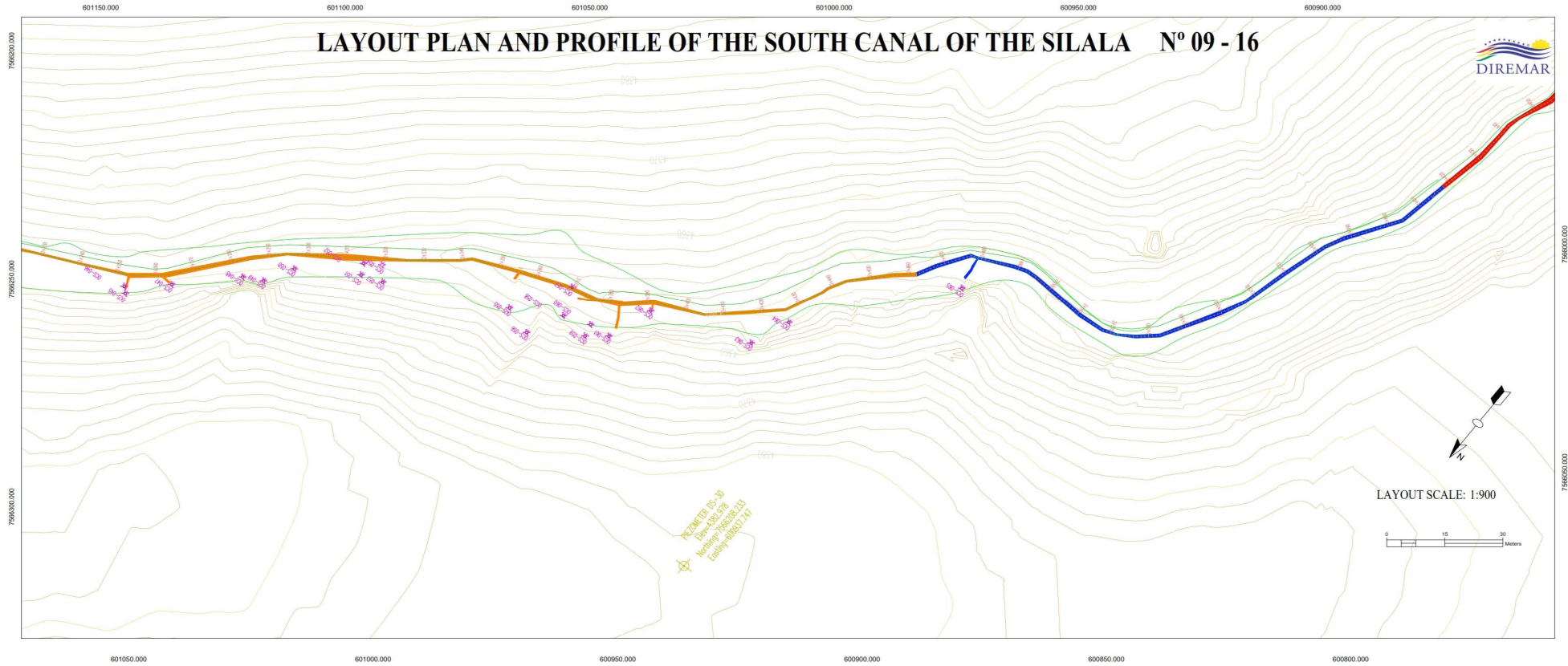
DATUM: WGS-84
 UNITS: METERS 0000.
 SEMI-MAJOR (A): 6378137.0
 PROJECTION (P): 1/28 25722363
 (BOLIVIA), ZONE 19h

ZONE 19 (7° W - 06° W) 69° 00' 00.000000" WEST

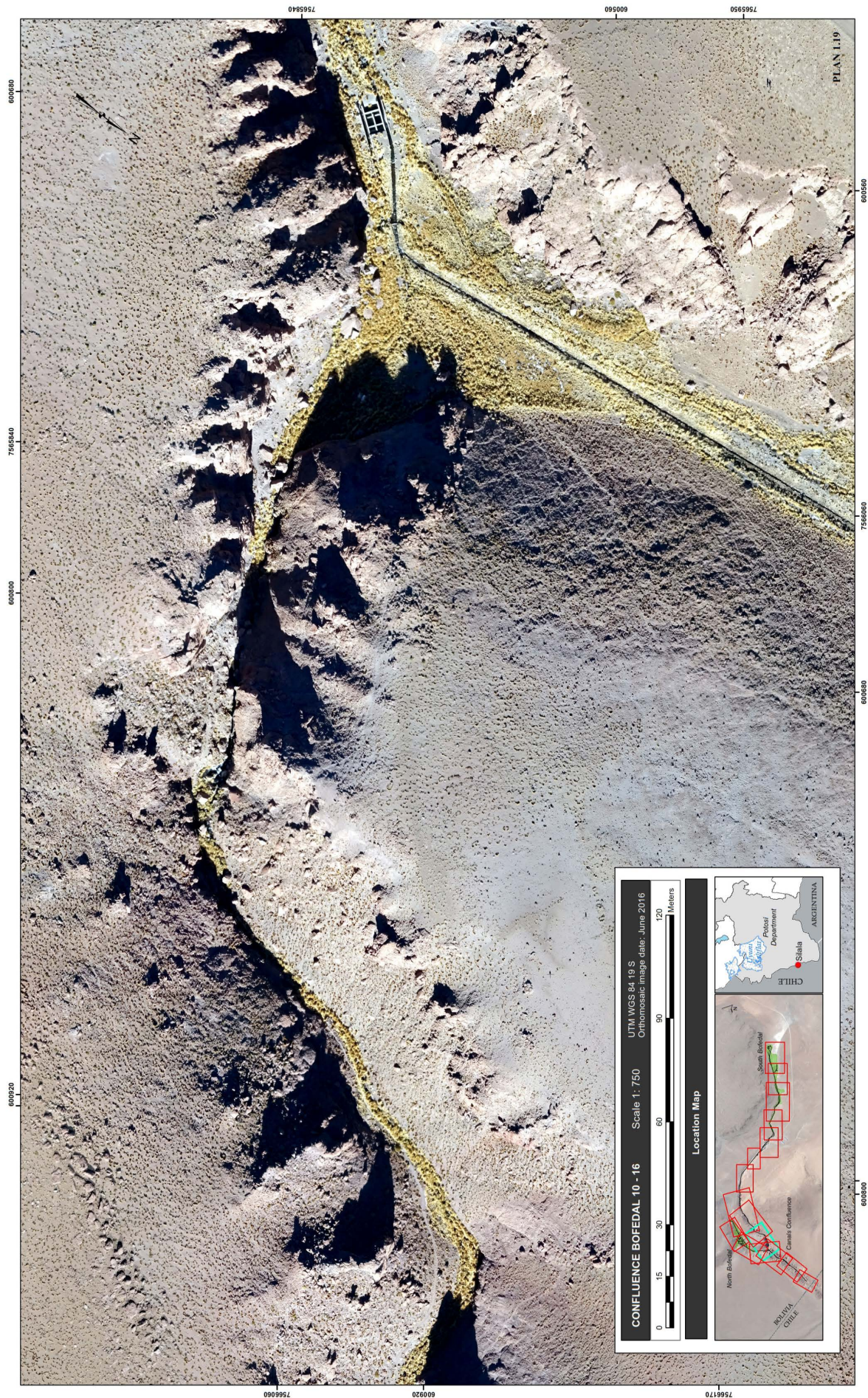
PLAN 1.16

ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 09/16

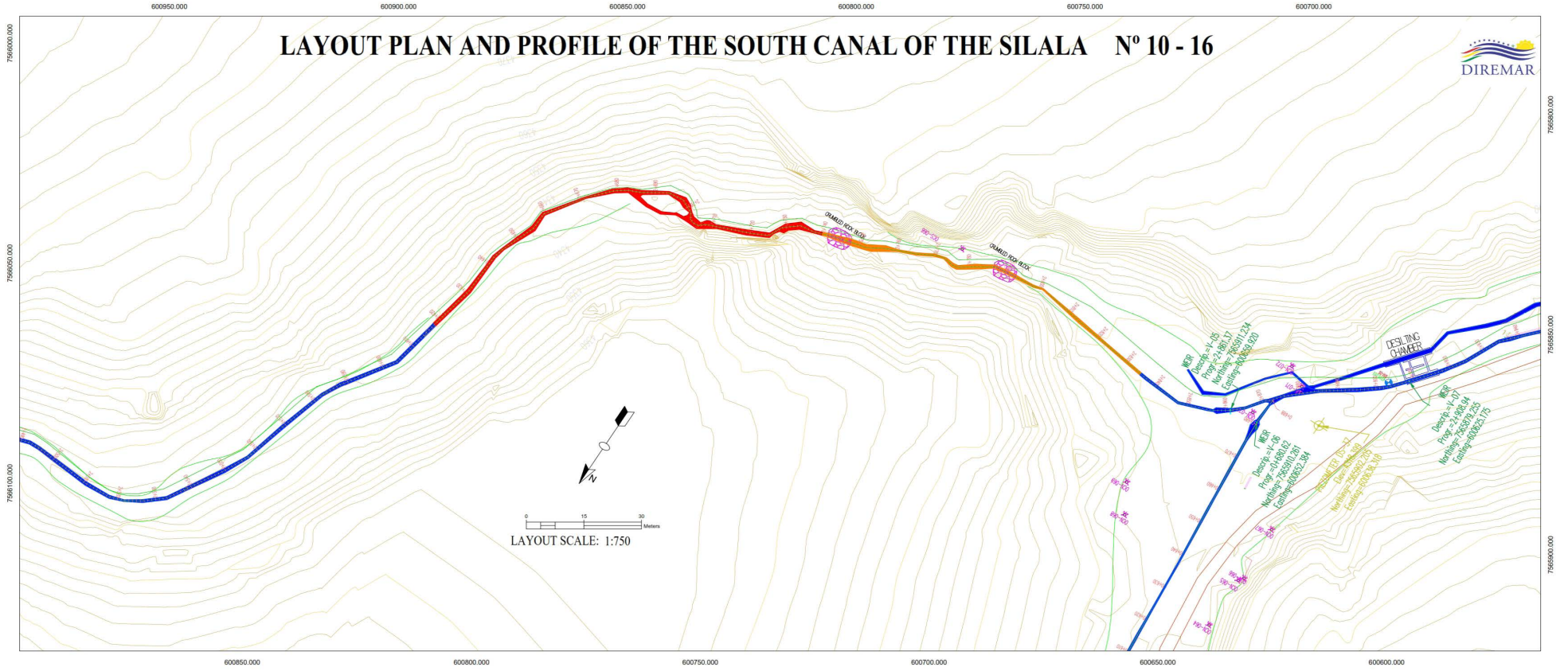




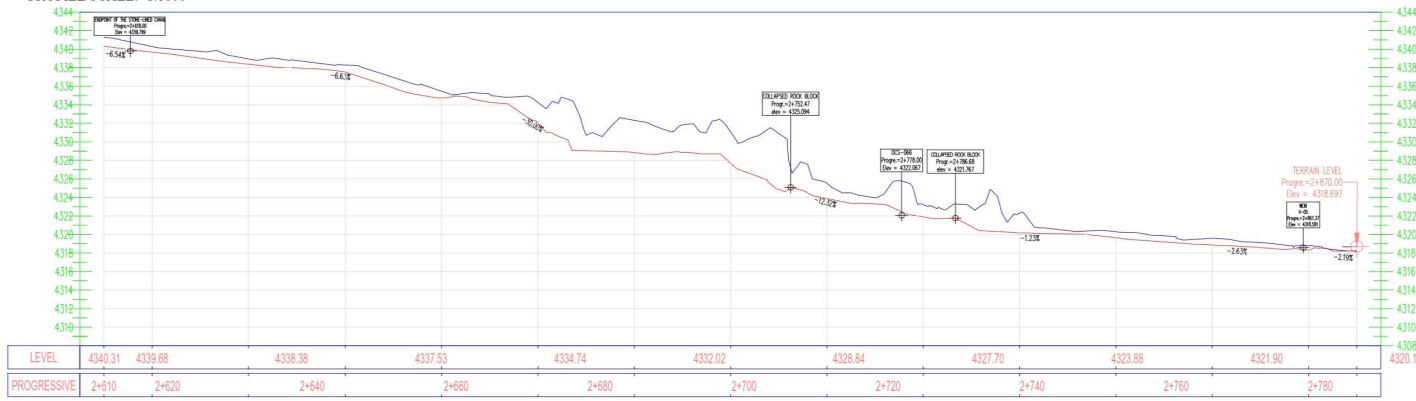
ORTHOMOSAIC UAV IMAGE OF THE SOUTH WETLAND 10/16



LAYOUT PLAN AND PROFILE OF THE SOUTH CANAL OF THE SILALA Nº 10 - 16



PROFILE SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

- BM Symbol** **Level** **Description**
- PRIMARY CONTOUR LINE EVERY 5
- SECONDARY CONTOUR LINE EVERY 1m
- WETLANDS AND SPRINGS
- UNLINED CANALS EXCAVATED IN NATURAL SOILS
- STONE-LINED CANALS
- CANALS FLOWING ON ROCKS
- GRAVEL ROADS
- BOFEDALES
- PIEZOMETERS
- Profile:**
 - TERRAIN PROFILE
 - CANAL PROFILE

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)
 DATUM: WGS-84
 UNITS: METERS 0000.
 SEMI-MAJOR AXIS (A): 6378137.0
 FLATTENING (F): 1/29825722.3563
 PROJECTION ZONE: CENTRAL MERIDIAN ZONE: (BOLIVIA) ZONE 19a
 ZONE 19 (72° W - 66° W) 69° 00' 00.000000" WEST
PLAN 1.20

ORTHOMOSAIC UAV IMAGE OF THE CONFLUENCE WETLAND 11/16



Confluence Bofedal
 It is the second bofedal that has been affected the most by the canalization infrastructure. It is characterized by a predominant presence of vegetation that forms grasslands or prairies, and a smaller fragmented bofedal area. This bofedal has a reduced surface area of 99 m².

PLAN 1.21

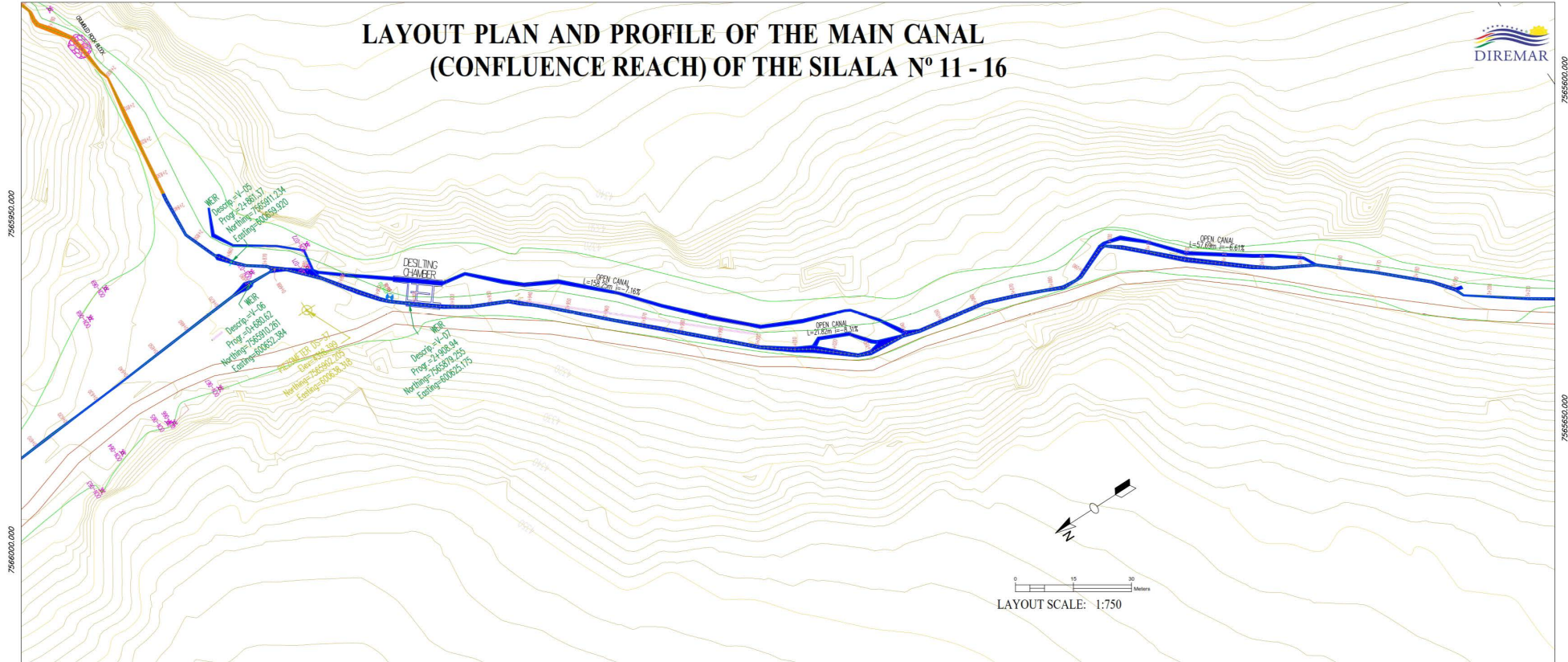
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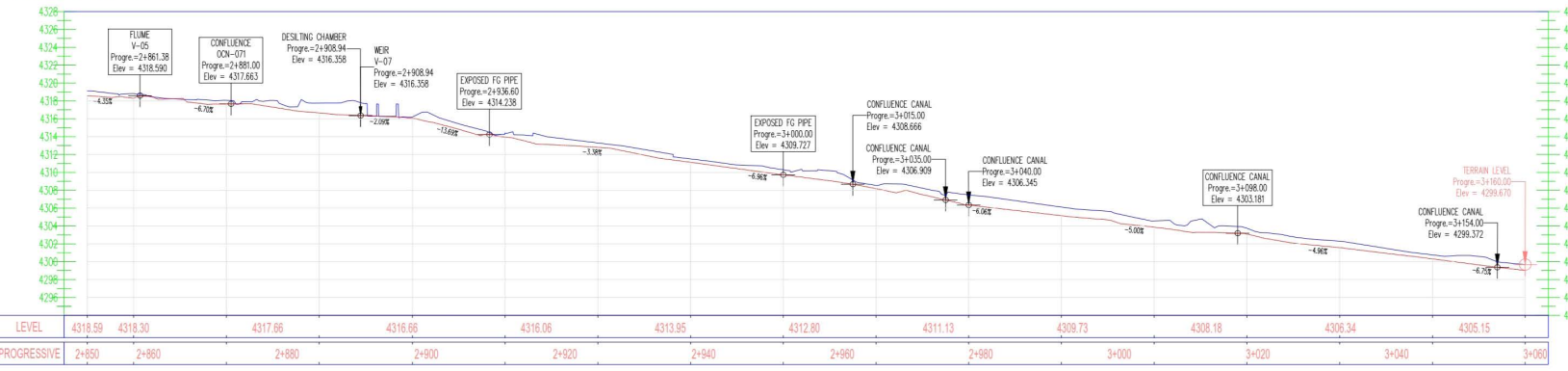
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LAYOUT PLAN AND PROFILE OF THE MAIN CANAL (CONFLUENCE REACH) OF THE SILALA N° 11 - 16



LAYOUT SCALE: 1:750

PROFILE SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

BM Symbol	Level	Description
(Symbol)	(Symbol)	PRIMARY CONTOUR LINE EVERY 5
(Symbol)	(Symbol)	SECONDARY CONTOUR LINE EVERY 1m
(Symbol)	(Symbol)	WETLANDS AND SPRINGS
(Symbol)	(Symbol)	STONE-LINED CANALS
(Symbol)	(Symbol)	CANALS FLOWING ON ROCKS
(Symbol)	(Symbol)	GRAVEL ROADS
(Symbol)	(Symbol)	BOFEDALES
(Symbol)	(Symbol)	PIEZOMETERS

Profile:

- (Blue line) TERRAIN PROFILE
- (Red line) CANAL PROFILE

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)

DATUM: WGS-84
 UNITS: METERS 0000.
 SEMI-MAJOR AXIS (A): 6378137.0
 FLATTENING (F): 1/298252563.8
 PROJECTION ZONES: CENTRAL MERIDIAN ZONE
 ZONE 19 (72° W - 66° W) 6P 07 00.00000° WEST

PLAN 1.22

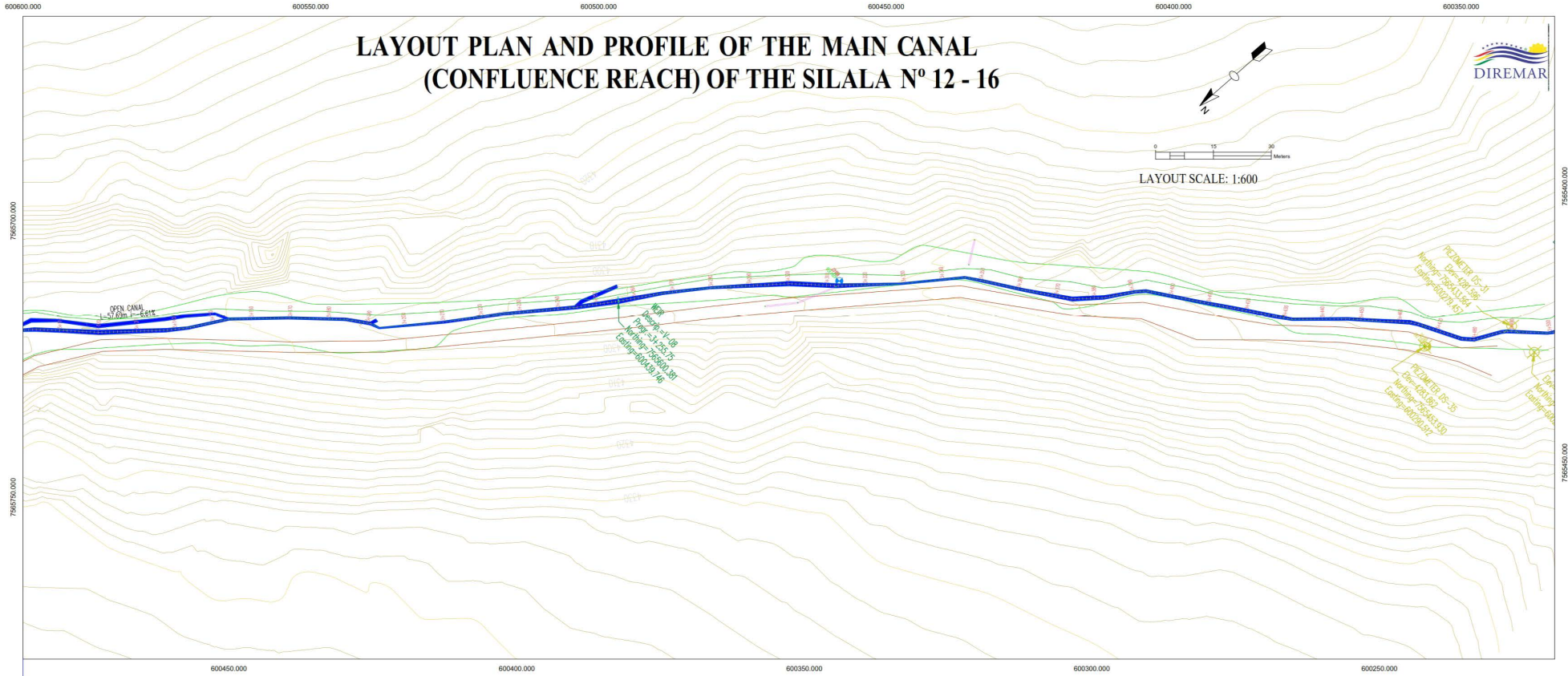
ORTHOMOSAIC UAV IMAGE OF THE MAIN CANAL 12/16



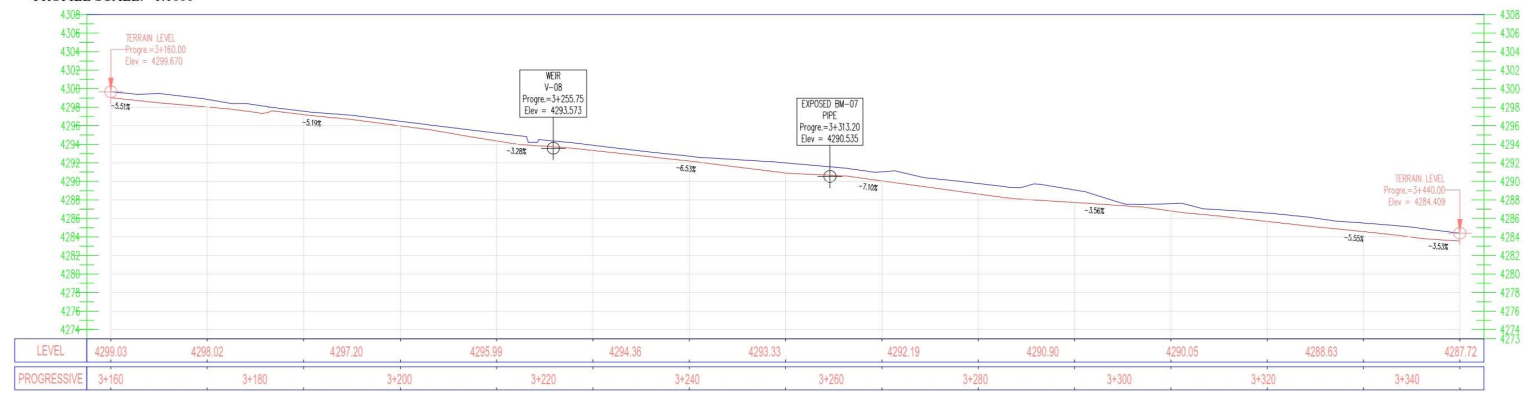
LAYOUT PLAN AND PROFILE OF THE MAIN CANAL (CONFLUENCE REACH) OF THE SILALA N° 12 - 16



LAYOUT SCALE: 1:600



PROFILE SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

BM Symbol	Level	Description
	BM-01	
		PRIMARY CONTOUR LINE EVERY 5
		SECONDARY CONTOUR LINE EVERY 1m
		STONE-LINED CANALS
		PIPELINES
		GRAVEL ROADS
		BOFEDALES
		PIEZOMETERS

Profile:

- TERRAIN PROFILE
- CANAL PROFILE

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)

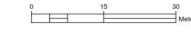
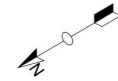
DATUM: WGS-84
 UNITS: METERS 0000.
 SEMI-MAJOR AXIS (A): 6378137.0
 FLATTENING (F): 1/298.257222503
 PROJECTION ZONE: (BOLIVIA), ZONE 19h
 CENTRAL MERIDIAN ZONE: ZONE 19 (72° W - 86° W) 69° 00' 00.000000° WEST

PLAN 1.24

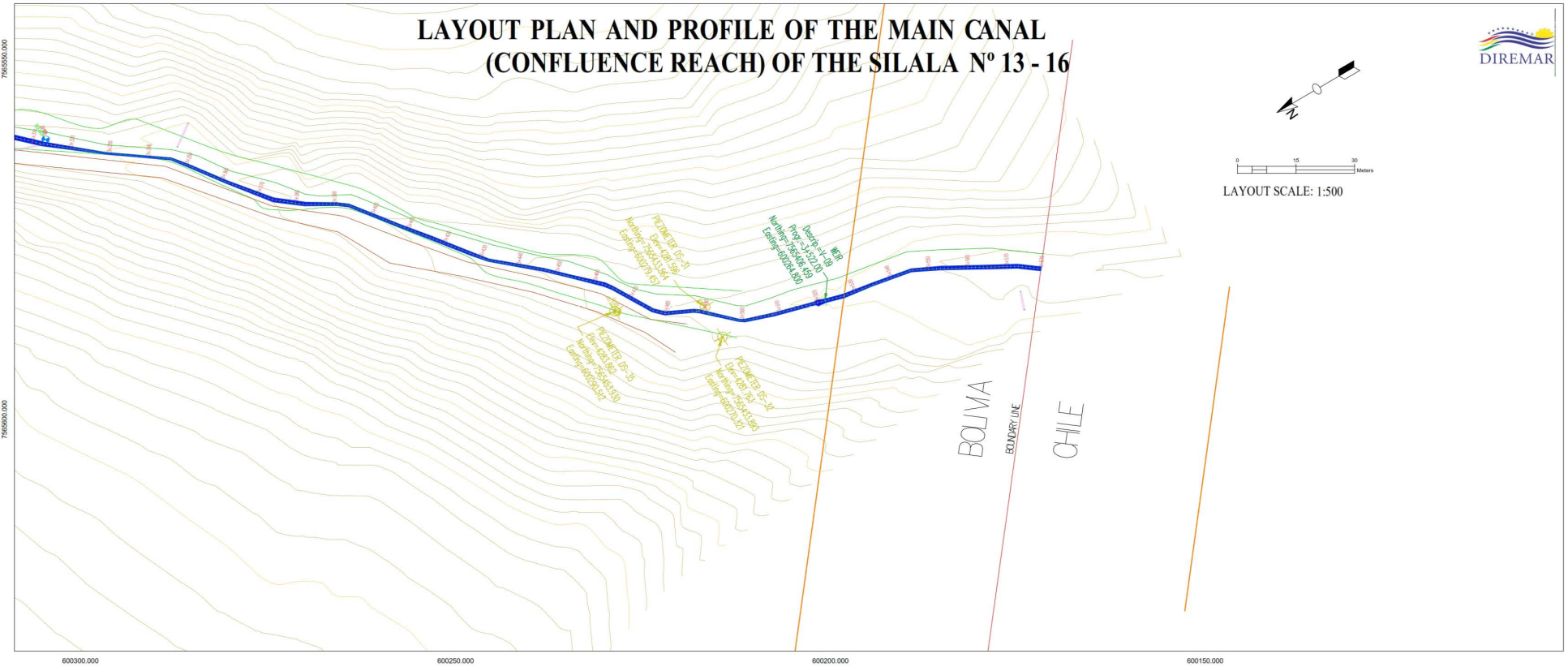
ORTHOMOSAIC UAV IMAGE OF THE MAIN CANAL 13/16



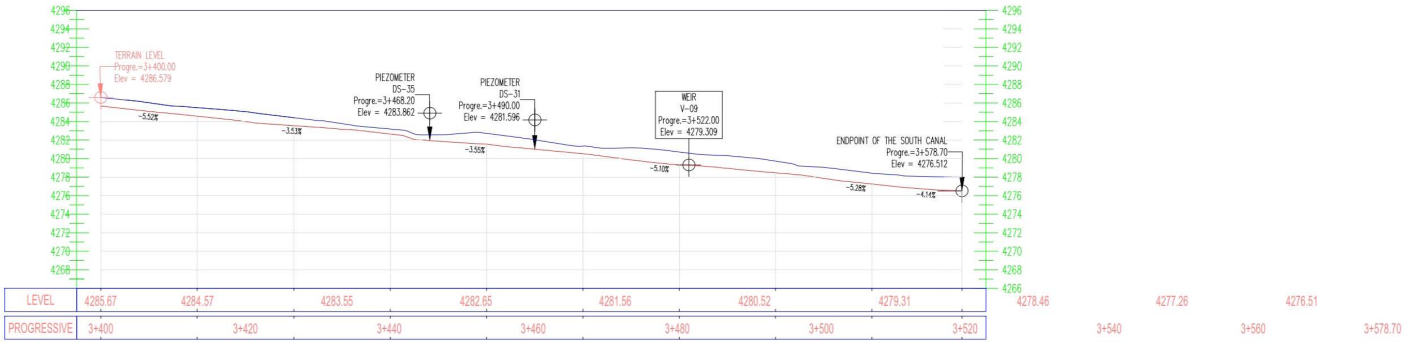
LAYOUT PLAN AND PROFILE OF THE MAIN CANAL (CONFLUENCE REACH) OF THE SILALA N° 13 - 16



LAYOUT SCALE: 1:500



PROFILE SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

- | BM SYMBOL | ELEVATION | DESCRIPTION |
|-----------|-----------|---------------------------------|
| | | PRIMARY CONTOUR LINE EVERY 5 |
| | | SECONDARY CONTOUR LINE EVERY 1m |
| | | STONE-LINED CANALS |
| | | PIPELINES |
| | | GRAVEL ROADS |
| | | BOFEDALES |
| | | PIEZOMETERS |
- Profile:
- TERRAIN PROFILE
 - CANAL PROFILE

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)

DATUM: SEMAMAR (S)

UNITS: METERS 0000

SEMI-MAJOR AXIS (A): 6378137.3

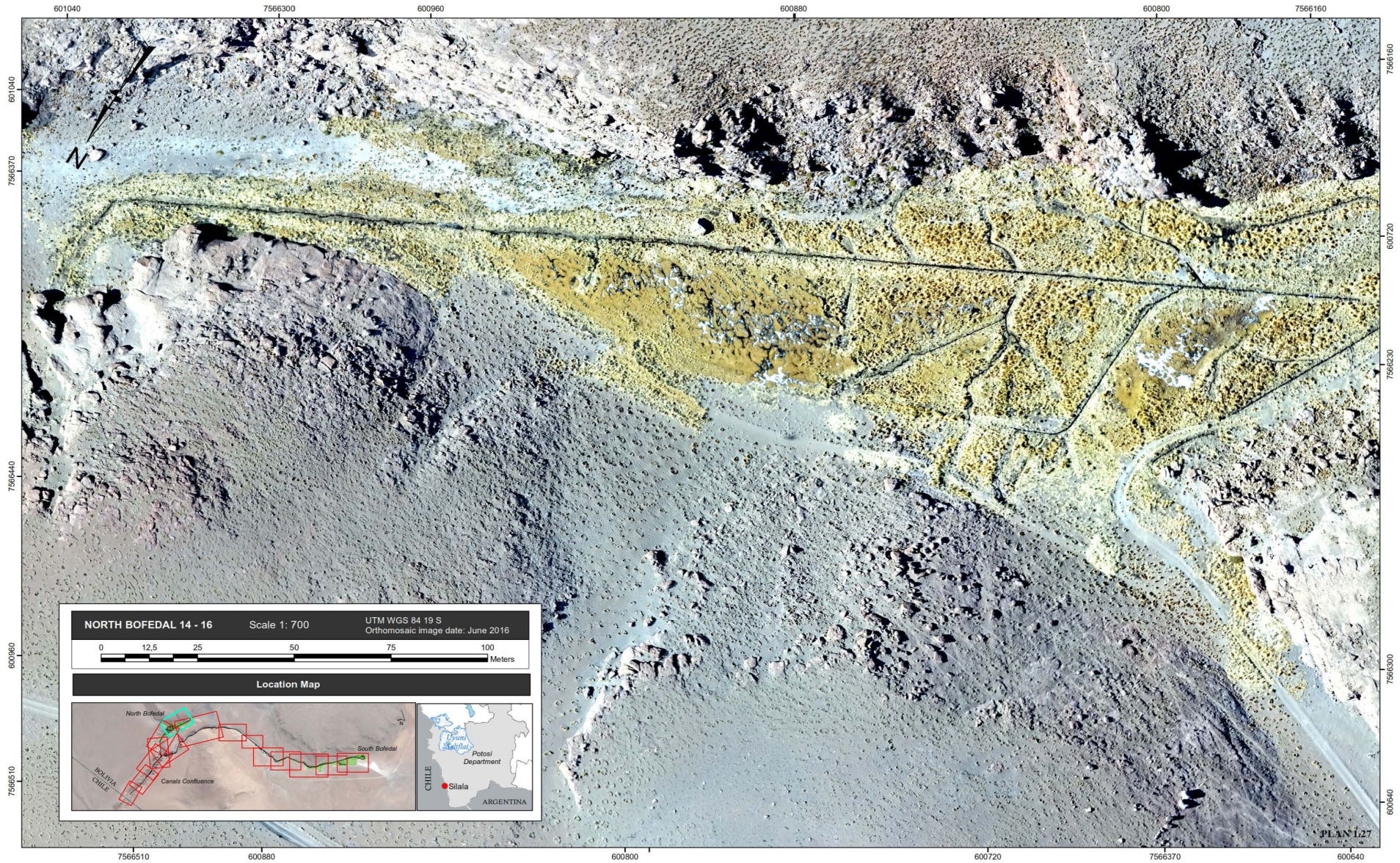
FLATTENING (F): 1/298.257222503

PROJECTION ZONES: (BOLIVIA) ZONE 19k

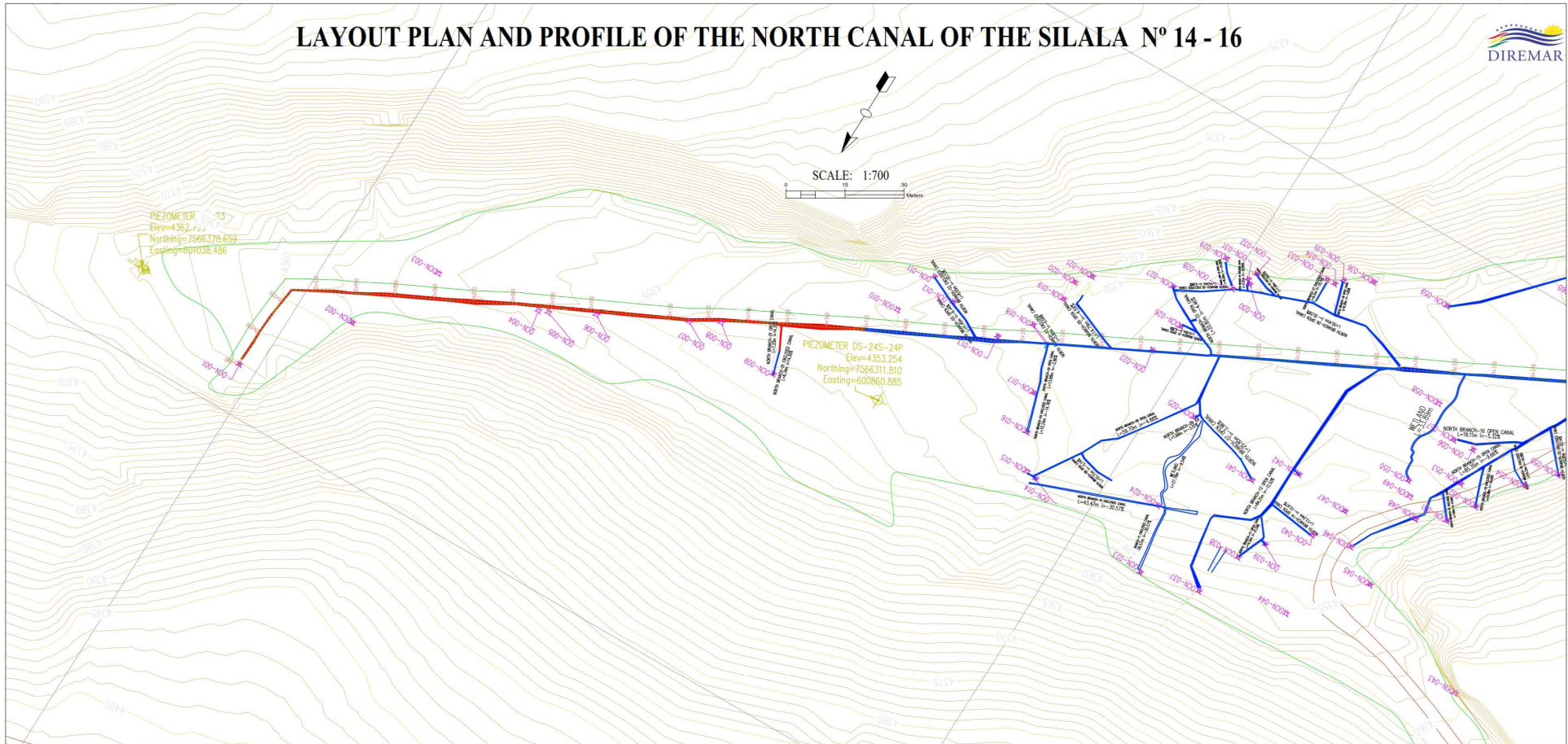
CENTRAL MERIDIAN ZONE: ZONE 19 (72° W - 86° W) 69° 00' 00.00000" WEST

PLAN 1.26

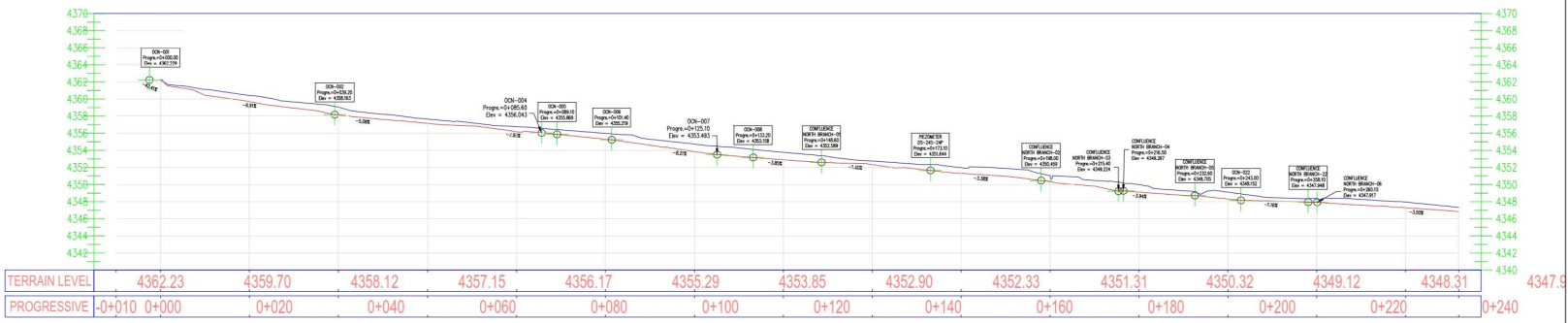
ORTHOMOSAIC UAV IMAGE OF THE NORTH WETLAND 14/16



LAYOUT PLAN AND PROFILE OF THE NORTH CANAL OF THE SILALA N° 14 - 16



SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

- Bm Symbol
 - PRIMARY CONTOUR LINE EVERY 5
 - SECONDARY CONTOUR LINE EVERY 1m
 - UNLINED CANALS EXCAVATED IN NATURAL SOILS
 - STONE-LINED CANALS
 - CANAL COVERED WITH STONE
 - GRAVEL ROADS
 - BOFEDALES
 - PIEZOMETERS
 - PIPELINES
- Profile:
- TERRAIN PROFILE
 - CANAL PROFILE

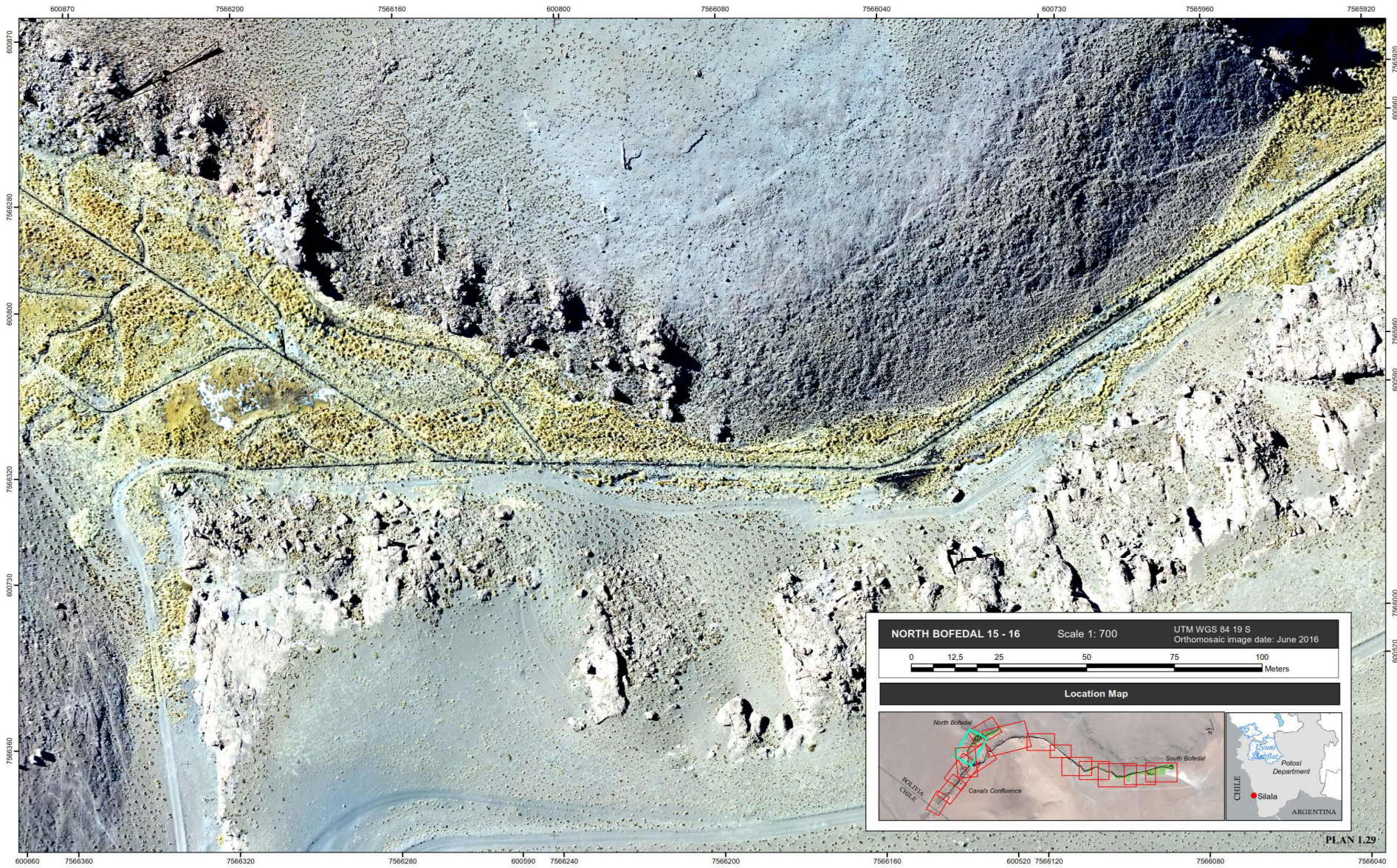
UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)

DATUM: SENEGALOR AGS (A)
UNIT: METERS
PLATEAU: 10° 00' 00" N
PROJECTION ZONES: CENTRAL REGION (E) ZONE 19
CENTRAL REGION (W) ZONE 18

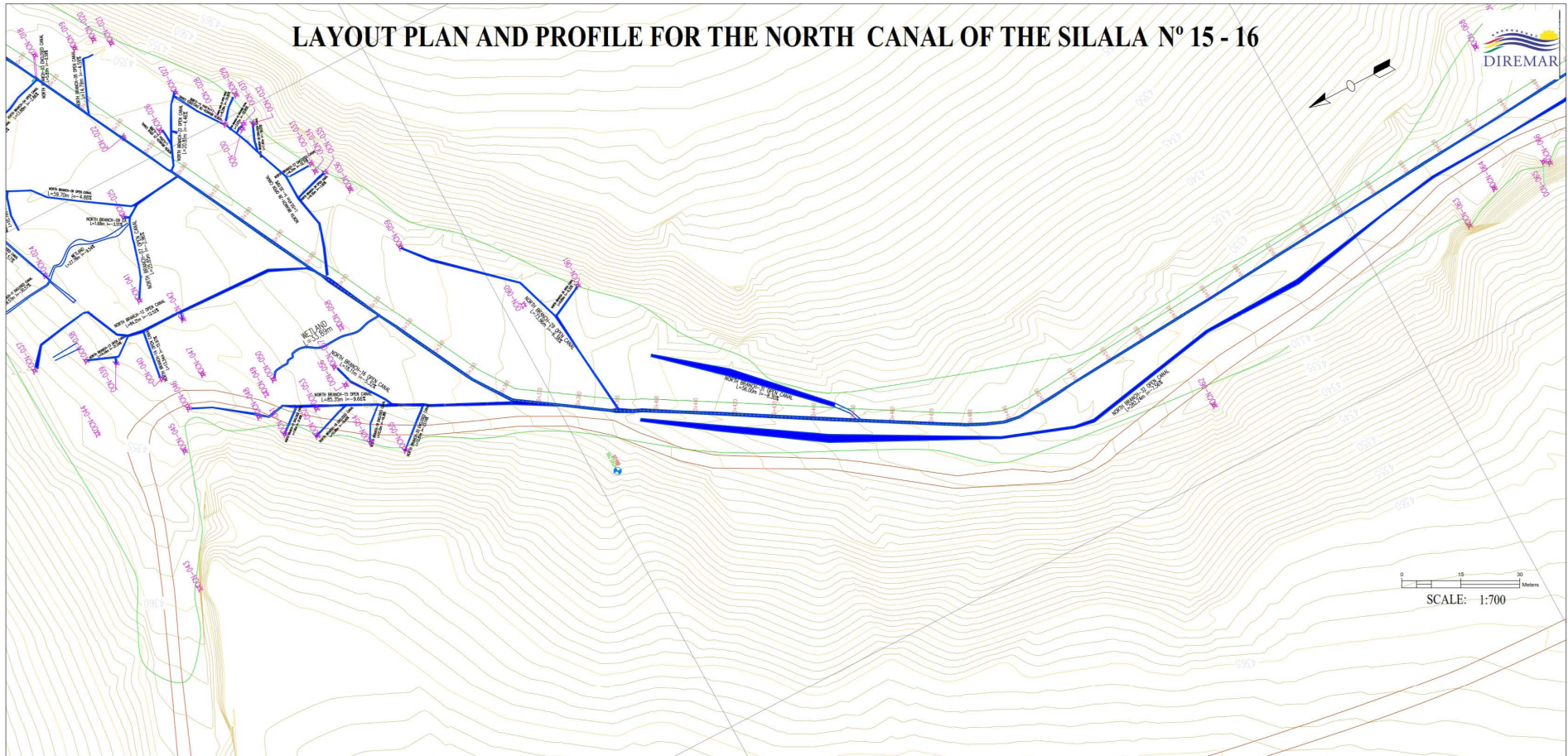
WGS 84
METERS
10° 00' 00" N
10° 00' 00" W
CENTRAL REGION (E) ZONE 19
CENTRAL REGION (W) ZONE 18

PLAN 1.28

ORTHOMOSAIC UAV IMAGE OF THE NORTH WETLAND 15/16

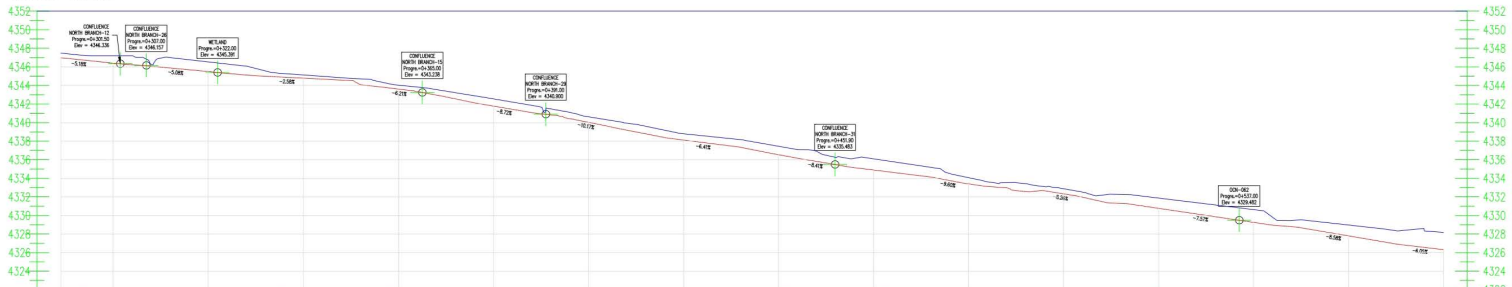


LAYOUT PLAN AND PROFILE FOR THE NORTH CANAL OF THE SILALA N° 15 - 16



0 10 20 Meters
SCALE: 1:700

SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

- | Bm symbol | Description |
|-----------|---------------------------------|
| | Level |
| | PRIMARY CONTOUR LINE EVERY 5 |
| | SECONDARY CONTOUR LINE EVERY 1m |
| | STONE-LINED CANALS |
| | CANAL COVERED WITH STONE |
| | GRAVEL ROADS |
| | BOFEDALES |
| | PIEZOMETERS |
| | PIPELINES |
| | TERRAIN PROFILE |
| | CANAL PROFILE |

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (UTM)
 DATUM: WGS 84
 UNIT: METERS (SI)
 FLATENING: 0
 PROJECTION: UTM
 CENTRAL MERIDIAN PER ZONE: 109 25 22 293
 ZONE: 18 Q UJ
 SCALE FACTOR: 0.999 600 3
 FALSE EASTING: 500 000
 FALSE NORTING: 0
 REFERENCE ELLIPSOID: Spheroid
 REFERENCE FLATTENING: 1/298 257 223 750
 REFERENCE MERIDIAN: 109 25 22 293
 REFERENCE POINT: 0
 REFERENCE ELLIPSOID: Spheroid
 REFERENCE FLATTENING: 1/298 257 223 750
 REFERENCE MERIDIAN: 109 25 22 293
 REFERENCE POINT: 0

PLAN 1.30

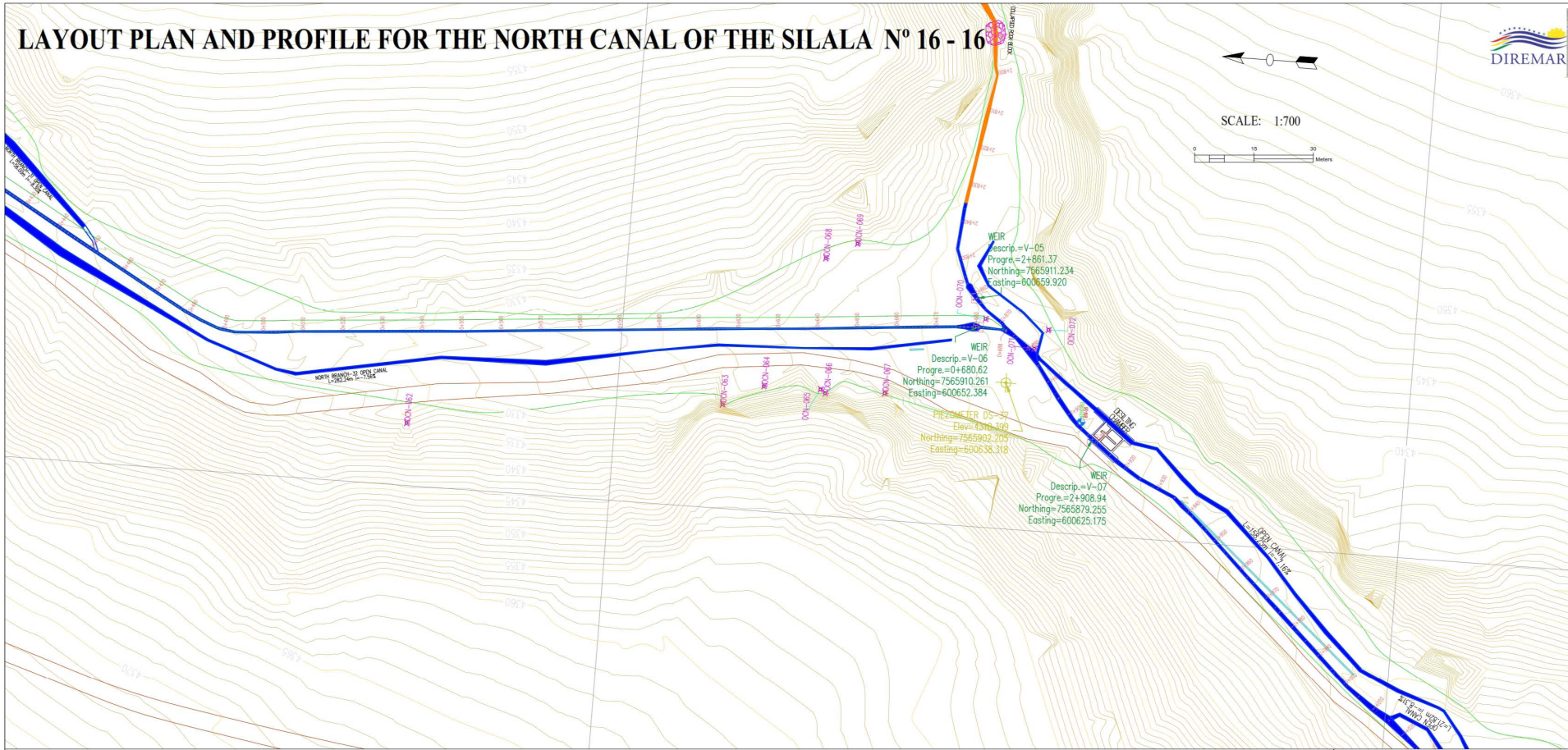
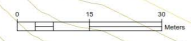
ORTHOMOSAIC UAV IMAGE OF THE NORTH WETLAND 16/16



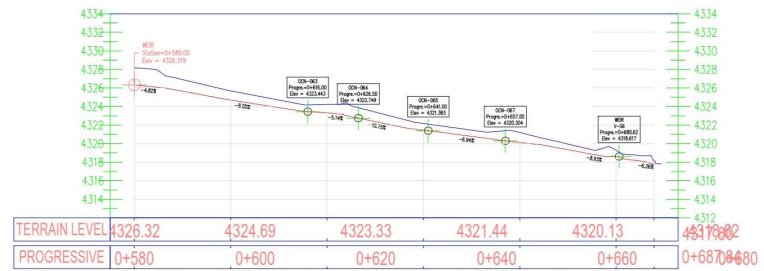
LAYOUT PLAN AND PROFILE FOR THE NORTH CANAL OF THE SILALA N° 16 - 16



SCALE: 1:700



SCALE: 1:1000



LEGEND OF CONVENTIONAL SYMBOLS

Bm Symbol		Level		
		Description		
		PRIMARY CONTOUR LINE EVERY 5		
		SECONDARY CONTOUR LINE EVERY 1m		
		STONE-LINED CANALS		
		CANALS FLOWING ON ROCKS		
		GRAVEL ROADS		PIPELINES
		BOFEDALES		PIEZOMETERS
Profile:				
		TERRAIN PROFILE		CANAL PROFILE

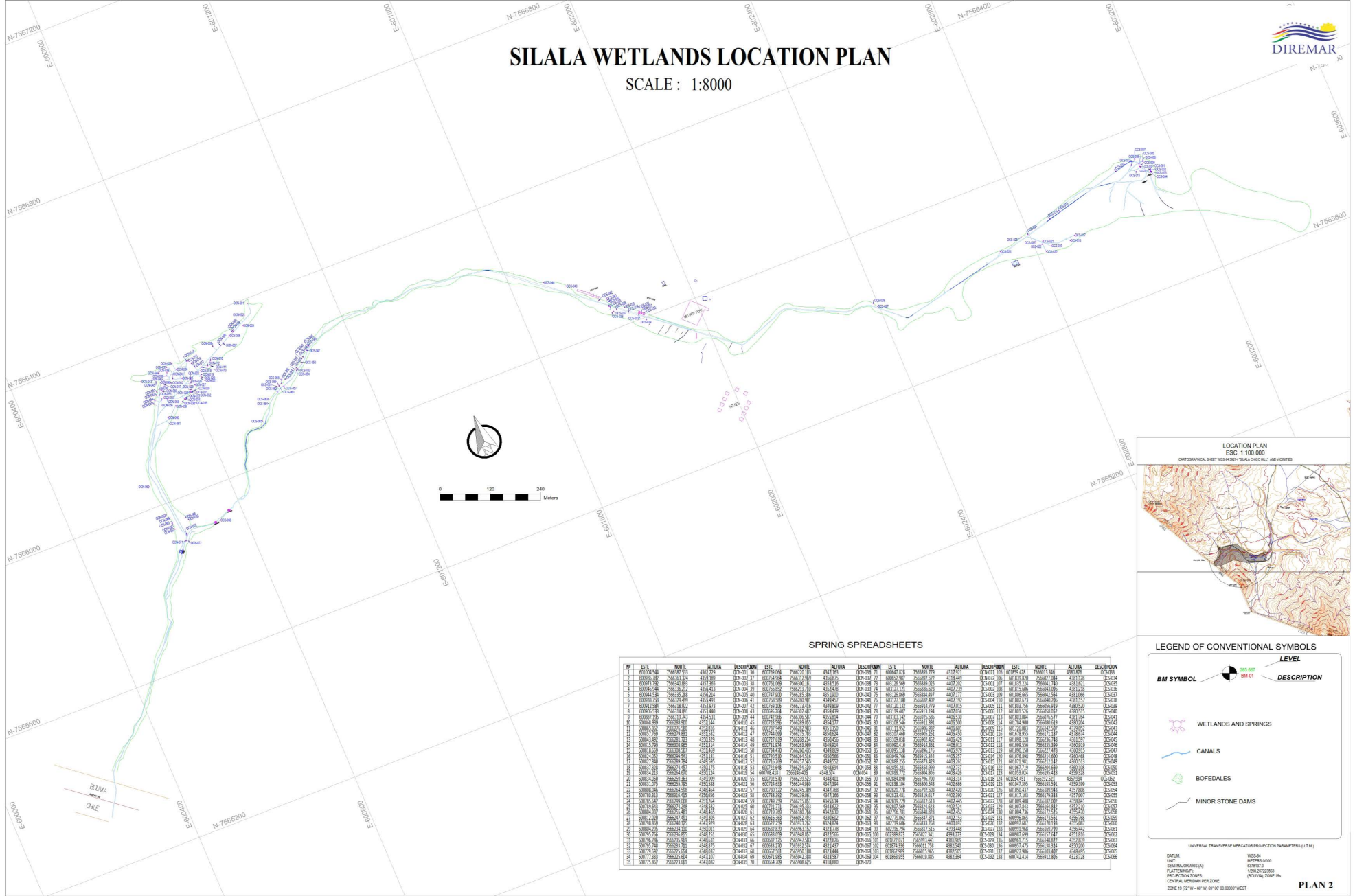
UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (UTM)

DATA: UNITS: SI (METERS); DIRECTION: NORTH; FLATTENING: 0; PROJECTION ZONE: 18S; CENTRAL MERIDIAN PER ZONE: 15° 00' 00" W; FALSE EASTING: 500000; FALSE NORTING: 10000000; SCALE FACTOR: 0.999632; SPHEROID: Spheroid of Everest; ZONE: 18S

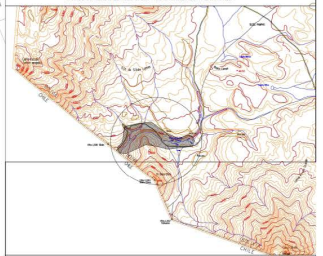
PLAN 1.32

SILALA WETLANDS LOCATION PLAN

SCALE : 1:8000



LOCATION PLAN ESC. 1:100.000



SPRING SPREADSHEETS

#	ESTE	NORTE	ALTIMA	DESCRIPCION	ESTE	NORTE	ALTIMA	DESCRIPCION	ESTE	NORTE	ALTIMA	DESCRIPCION	ESTE	NORTE	ALTIMA	DESCRIPCION
1	00003534	75669235	435917	036103	00003534	75669235	435917	036103	00003534	75669235	435917	036103	00003534	75669235	435917	036103
2	00003536	75669237	435919	036105	00003536	75669237	435919	036105	00003536	75669237	435919	036105	00003536	75669237	435919	036105
3	00003538	75669239	435921	036107	00003538	75669239	435921	036107	00003538	75669239	435921	036107	00003538	75669239	435921	036107
4	00003540	75669241	435923	036109	00003540	75669241	435923	036109	00003540	75669241	435923	036109	00003540	75669241	435923	036109
5	00003542	75669243	435925	036111	00003542	75669243	435925	036111	00003542	75669243	435925	036111	00003542	75669243	435925	036111
6	00003544	75669245	435927	036113	00003544	75669245	435927	036113	00003544	75669245	435927	036113	00003544	75669245	435927	036113
7	00003546	75669247	435929	036115	00003546	75669247	435929	036115	00003546	75669247	435929	036115	00003546	75669247	435929	036115
8	00003548	75669249	435931	036117	00003548	75669249	435931	036117	00003548	75669249	435931	036117	00003548	75669249	435931	036117
9	00003550	75669251	435933	036119	00003550	75669251	435933	036119	00003550	75669251	435933	036119	00003550	75669251	435933	036119
10	00003552	75669253	435935	036121	00003552	75669253	435935	036121	00003552	75669253	435935	036121	00003552	75669253	435935	036121
11	00003554	75669255	435937	036123	00003554	75669255	435937	036123	00003554	75669255	435937	036123	00003554	75669255	435937	036123
12	00003556	75669257	435939	036125	00003556	75669257	435939	036125	00003556	75669257	435939	036125	00003556	75669257	435939	036125
13	00003558	75669259	435941	036127	00003558	75669259	435941	036127	00003558	75669259	435941	036127	00003558	75669259	435941	036127
14	00003560	75669261	435943	036129	00003560	75669261	435943	036129	00003560	75669261	435943	036129	00003560	75669261	435943	036129
15	00003562	75669263	435945	036131	00003562	75669263	435945	036131	00003562	75669263	435945	036131	00003562	75669263	435945	036131
16	00003564	75669265	435947	036133	00003564	75669265	435947	036133	00003564	75669265	435947	036133	00003564	75669265	435947	036133
17	00003566	75669267	435949	036135	00003566	75669267	435949	036135	00003566	75669267	435949	036135	00003566	75669267	435949	036135
18	00003568	75669269	435951	036137	00003568	75669269	435951	036137	00003568	75669269	435951	036137	00003568	75669269	435951	036137
19	00003570	75669271	435953	036139	00003570	75669271	435953	036139	00003570	75669271	435953	036139	00003570	75669271	435953	036139
20	00003572	75669273	435955	036141	00003572	75669273	435955	036141	00003572	75669273	435955	036141	00003572	75669273	435955	036141
21	00003574	75669275	435957	036143	00003574	75669275	435957	036143	00003574	75669275	435957	036143	00003574	75669275	435957	036143
22	00003576	75669277	435959	036145	00003576	75669277	435959	036145	00003576	75669277	435959	036145	00003576	75669277	435959	036145
23	00003578	75669279	435961	036147	00003578	75669279	435961	036147	00003578	75669279	435961	036147	00003578	75669279	435961	036147
24	00003580	75669281	435963	036149	00003580	75669281	435963	036149	00003580	75669281	435963	036149	00003580	75669281	435963	036149
25	00003582	75669283	435965	036151	00003582	75669283	435965	036151	00003582	75669283	435965	036151	00003582	75669283	435965	036151
26	00003584	75669285	435967	036153	00003584	75669285	435967	036153	00003584	75669285	435967	036153	00003584	75669285	435967	036153
27	00003586	75669287	435969	036155	00003586	75669287	435969	036155	00003586	75669287	435969	036155	00003586	75669287	435969	036155
28	00003588	75669289	435971	036157	00003588	75669289	435971	036157	00003588	75669289	435971	036157	00003588	75669289	435971	036157
29	00003590	75669291	435973	036159	00003590	75669291	435973	036159	00003590	75669291	435973	036159	00003590	75669291	435973	036159
30	00003592	75669293	435975	036161	00003592	75669293	435975	036161	00003592	75669293	435975	036161	00003592	75669293	435975	036161

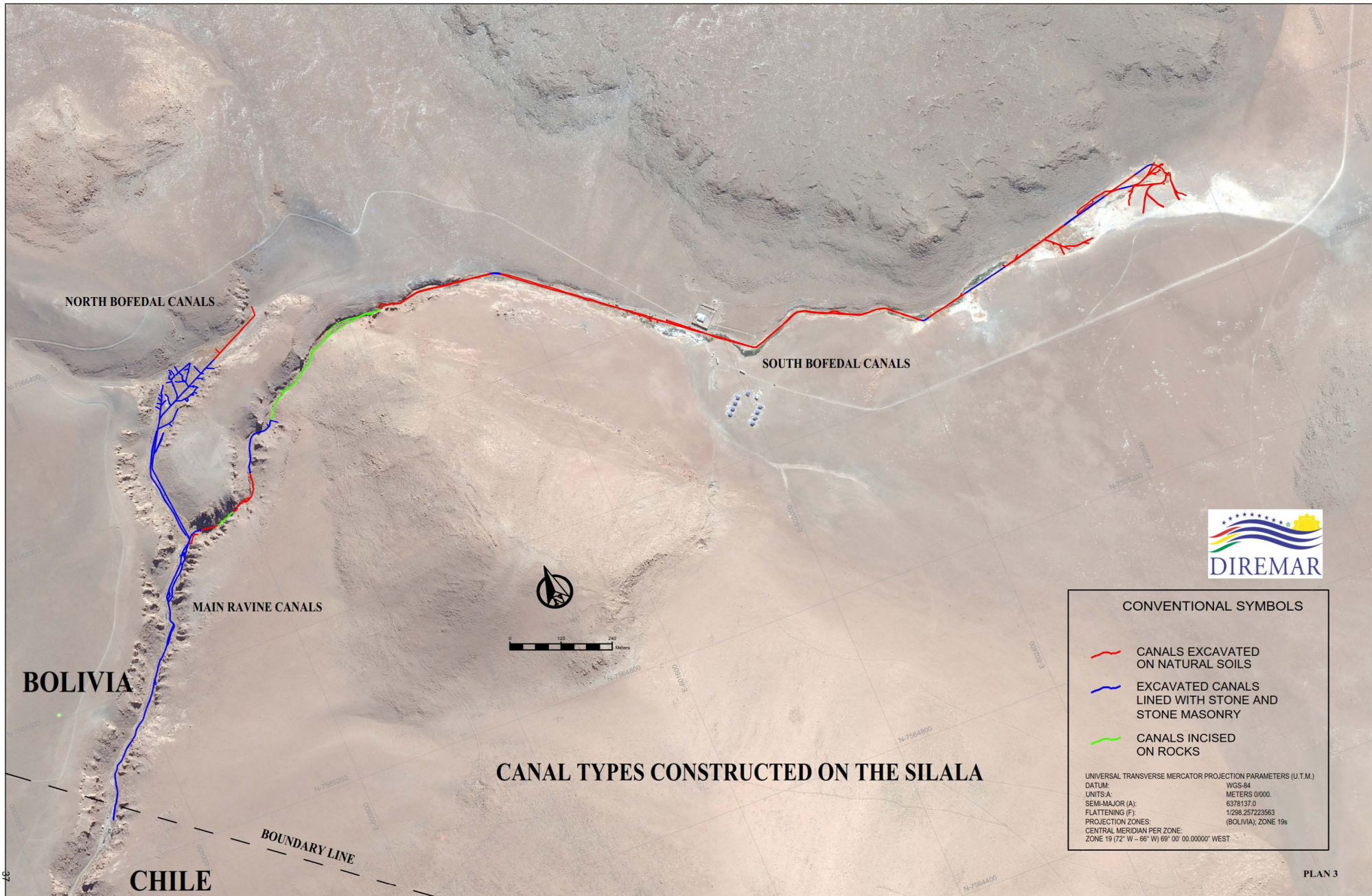
LEGEND OF CONVENTIONAL SYMBOLS

	WETLANDS AND SPRINGS
	CANALS
	BOFEDALES
	MINOR STONE DAMS

UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (UTM)

DATUM: WGS84
UNIT: METERS
SEMI-MAJOR AXIS (A): 6378137
FLATTENING (F): 1/29825263
PROJECTION ZONES: (BOQUA) ZONE 18a
CENTRAL MERIDIAN (Easting): 560000
ZONE: 18 02' W - 46' 00" BY '07 00:3000" WEST

PLAN 2



NORTH BOFEDAL CANALS

SOUTH BOFEDAL CANALS

MAIN RAVINE CANALS

BOLIVIA

CHILE

BOUNDARY LINE



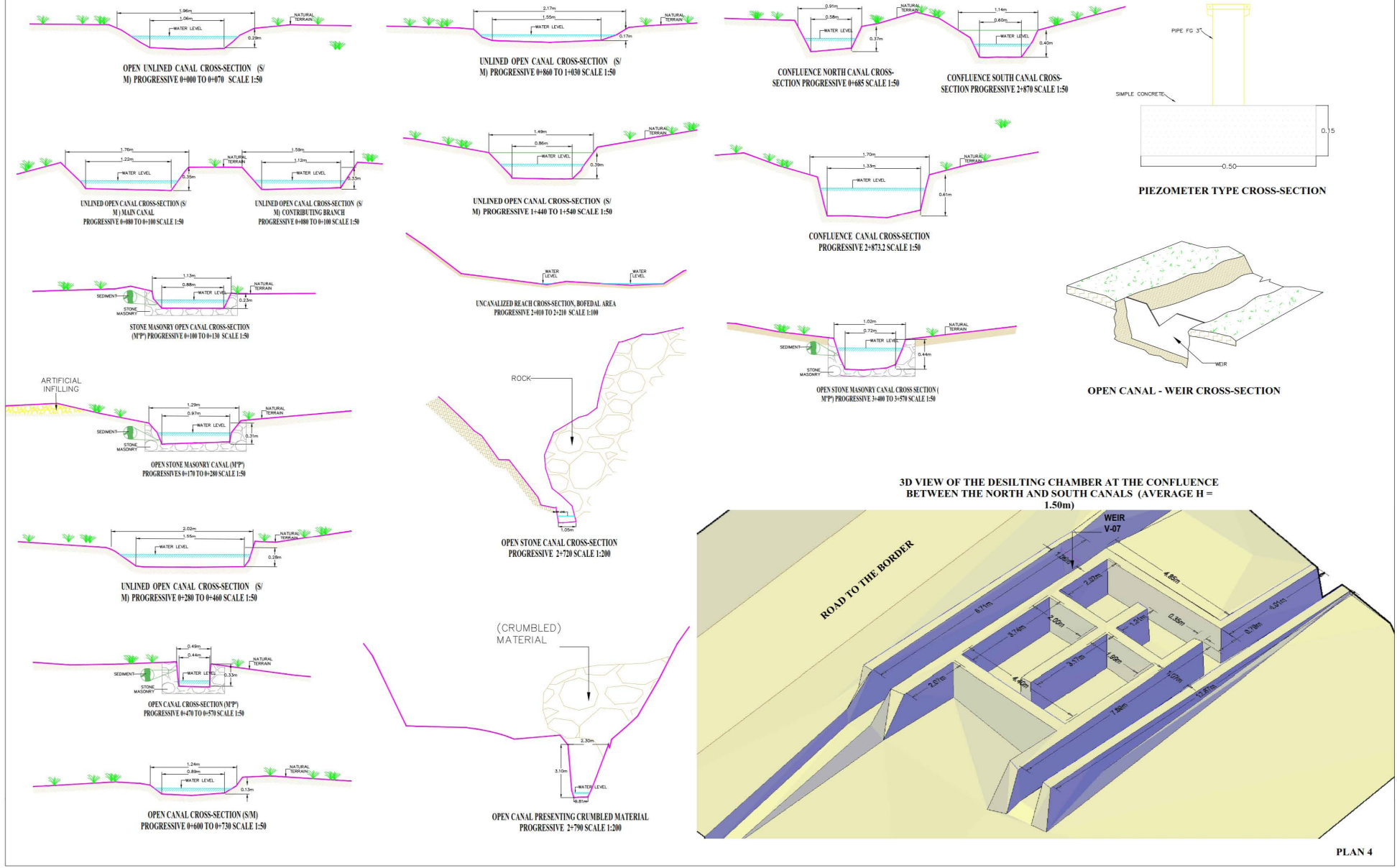
CONVENTIONAL SYMBOLS

- CANALS EXCAVATED ON NATURAL SOILS
- EXCAVATED CANALS LINED WITH STONE AND STONE MASONRY
- CANALS INCISED ON ROCKS

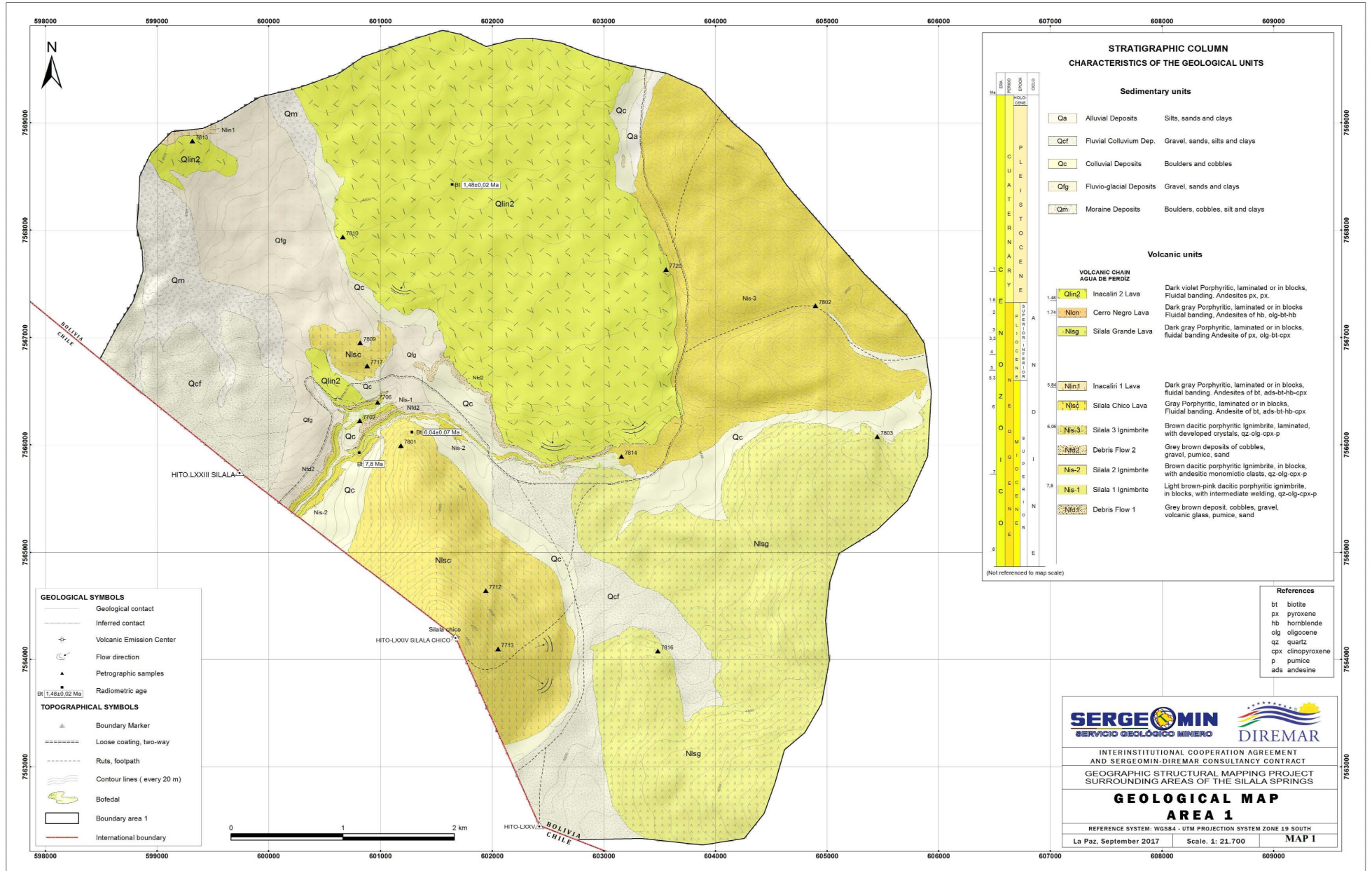
UNIVERSAL TRANSVERSE MERCATOR PROJECTION PARAMETERS (U.T.M.)
 DATUM: WGS-84
 UNITS-A: METERS 0'000.
 SEMI-MAJOR (A): 6378137.0
 FLATTENING (F): 1/298.257223563
 PROJECTION ZONES: (BOLIVIA); ZONE 19s
 CENTRAL MERIDIAN PER ZONE:
 ZONE 19 (72° W - 66° W) 69° 00' 00.000000" WEST

CANAL TYPES CONSTRUCTED ON THE SILALA

SILALA CANALS DETAIL PLAN



**GEOLOGICAL MAPS OF
THE SILALA
(Appendix B)**



SERGE MIN
SERVICIO GEOLÓGICO MINERO

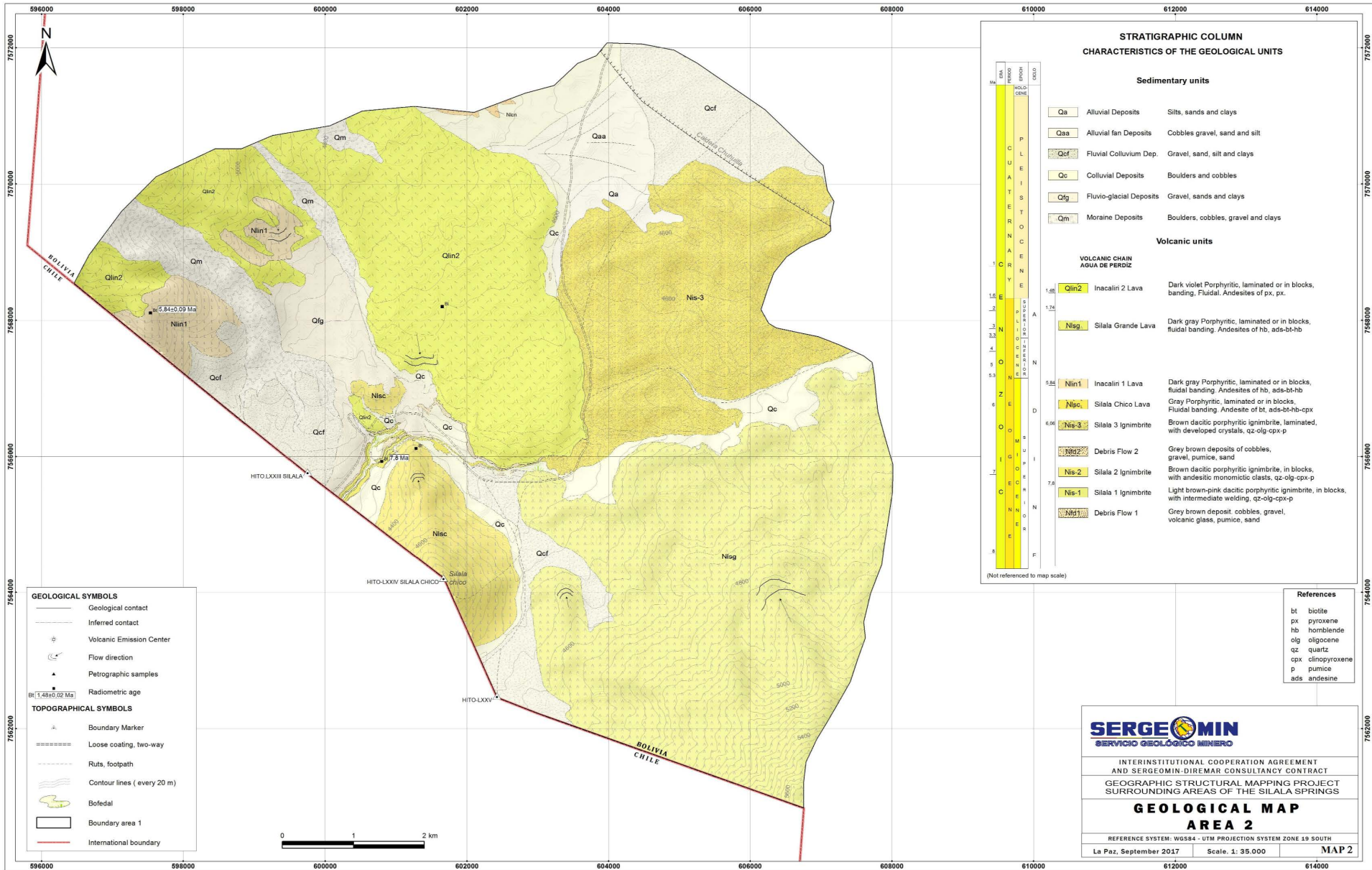
DIREMAR

INTERINSTITUTIONAL COOPERATION AGREEMENT
 AND SERGE MIN-DIREMAR CONSULTANCY CONTRACT

GEOGRAPHIC STRUCTURAL MAPPING PROJECT
 SURROUNDING AREAS OF THE SILALA SPRINGS

GEOLOGICAL MAP
AREA 1

REFERENCE SYSTEM: WGS84 - UTM PROJECTION SYSTEM ZONE 19 SOUTH
 La Paz, September 2017 Scale: 1: 21.700 MAP 1



- GEOLOGICAL SYMBOLS**
- Geological contact
 - Inferred contact
 - Volcanic Emission Center
 - Flow direction
 - Petrographic samples
 - Radiometric age
- TOPOGRAPHICAL SYMBOLS**
- Boundary Marker
 - Loose coating, two-way
 - Ruts, footpath
 - Contour lines (every 20 m)
 - Bofedal
 - Boundary area 1
 - International boundary



STRATIGRAPHIC COLUMN
CHARACTERISTICS OF THE GEOLOGICAL UNITS

UNIT	DESCRIPTION	CHARACTERISTICS
Sedimentary units		
Qa	Alluvial Deposits	Silts, sands and clays
Qaa	Alluvial fan Deposits	Cobbles gravel, sand and silt
Qcf	Fluvial Colluvium Dep.	Gravel, sand, silt and clays
Qc	Colluvial Deposits	Boulders and cobbles
Qfg	Fluvio-glacial Deposits	Gravel, sands and clays
Qm	Moraine Deposits	Boulders, cobbles, gravel and clays
Volcanic units		
VOLCANIC CHAIN		
AQUA DE PERDIZ		
Qlin2	Inacali 2 Lava	Dark violet Porphyritic, laminated or in blocks, fluidal banding. Andesites of px, px.
Nisg	Silala Grande Lava	Dark gray Porphyritic, laminated or in blocks, fluidal banding. Andesites of hb, ads-bt-hb
Nlin1	Inacali 1 Lava	Dark gray Porphyritic, laminated or in blocks, fluidal banding. Andesites of hb, ads-bt-hb
Nisc	Silala Chico Lava	Gray Porphyritic, laminated or in blocks, fluidal banding. Andesite of bt, ads-bt-hb-cpx
Nis-3	Silala 3 Ignimbrite	Brown dacitic porphyritic ignimbrite, laminated, with developed crystals, qz-olg-cpx-p
Nis-2	Silala 2 Ignimbrite	Brown dacitic porphyritic ignimbrite, in blocks, with andesitic monomictic clasts, qz-olg-cpx-p
Nis-1	Silala 1 Ignimbrite	Light brown-pink dacitic porphyritic ignimbrite, in blocks, with intermediate welding, qz-olg-cpx-p
Nid1	Debris Flow 1	Grey brown deposit cobbles, gravel, volcanic glass, pumice, sand
Nid2	Debris Flow 2	Grey brown deposits of cobbles, gravel, pumice, sand

(Not referenced to map scale)

- References**
- bt biotite
 - px pyroxene
 - hb hornblende
 - olg oligocene
 - qz quartz
 - cpx clinopyroxene
 - p pumice
 - ads andesine

SERGEOMIN
SERVICIO GEOLOGICO MINERO

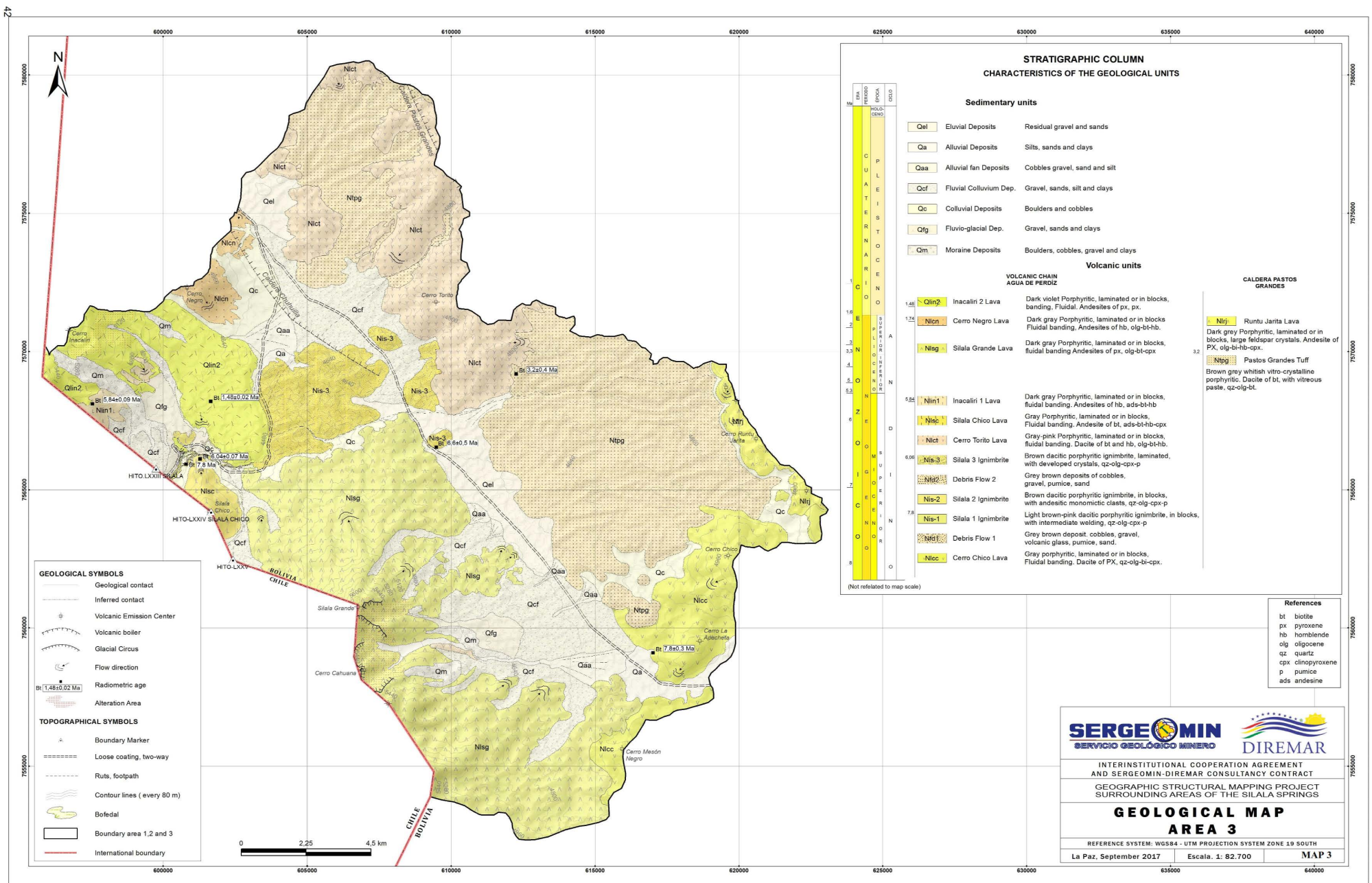
INTERINSTITUTIONAL COOPERATION AGREEMENT
AND SERGEOMIN-DIREMAR CONSULTANCY CONTRACT

GEOGRAPHIC STRUCTURAL MAPPING PROJECT
SURROUNDING AREAS OF THE SILALA SPRINGS

GEOLOGICAL MAP
AREA 2

REFERENCE SYSTEM: WGS84 - UTM PROJECTION SYSTEM ZONE 19 SOUTH

La Paz, September 2017 Scale: 1: 35.000 **MAP 2**



GEOLOGICAL SYMBOLS

- Geological contact
- Inferred contact
- Volcanic Emission Center
- Volcanic boiler
- Glacial Circus
- Flow direction
- Radiometric age
- Alteration Area

TOPOGRAPHICAL SYMBOLS

- Boundary Marker
- Loose coating, two-way
- Ruts, footpath
- Contour lines (every 80 m)
- Bofedal
- Boundary area 1,2 and 3
- International boundary

STRATIGRAPHIC COLUMN
CHARACTERISTICS OF THE GEOLOGICAL UNITS

Sedimentary units

Qel	Eluvial Deposits	Residual gravel and sands
Qa	Alluvial Deposits	Silts, sands and clays
Qaa	Alluvial fan Deposits	Cobbles gravel, sand and silt
Qcf	Fluvial Colluvium Dep.	Gravel, sands, silt and clays
Qc	Colluvial Deposits	Boulders and cobbles
Qfg	Fluvio-glacial Dep.	Gravel, sands and clays
Qm	Moraine Deposits	Boulders, cobbles, gravel and clays

Volcanic units

Qlin2	Inacaliri 2 Lava	Dark violet Porphyritic, laminated or in blocks, banding, Fluidal. Andesites of px, px.
Nicn	Cerro Negro Lava	Dark gray Porphyritic, laminated or in blocks Fluidal banding, Andesites of hb, olg-bi-hb.
Nisg	Silala Grande Lava	Dark gray Porphyritic, laminated or in blocks, fluidal banding Andesites of px, olg-bi-cpx
Nin1	Inacaliri 1 Lava	Dark gray Porphyritic, laminated or in blocks, fluidal banding, Andesites of hb, ads-bi-hb
Nisc	Silala Chico Lava	Gray Porphyritic, laminated or in blocks, Fluidal banding, Andesite of bt, ads-bi-hb-cpx
Nict	Cerro Torito Lava	Gray-pink Porphyritic, laminated or in blocks, fluidal banding, Dacite of bt and hb, olg-bi-hb.
Nis-3	Silala 3 Ignimbrite	Brown dacitic porphyritic ignimbrite, laminated, with developed crystals, qz-olg-cpx-p
Nipg	Debris Flow 2	Grey brown deposits of cobbles, gravel, pumice, sand
Nis-2	Silala 2 Ignimbrite	Brown dacitic porphyritic ignimbrite, in blocks, with andesitic monomictic clasts, qz-olg-cpx-p
Nis-1	Silala 1 Ignimbrite	Light brown-pink dacitic porphyritic ignimbrite, in blocks, with intermediate welding, qz-olg-cpx-p
Nictf	Debris Flow 1	Grey brown deposit, cobbles, gravel, volcanic glass, pumice, sand.
Nicc	Cerro Chico Lava	Gray porphyritic, laminated or in blocks, Fluidal banding, Dacite of PX, qz-olg-bi-cpx.

Volcanic Chain
AGUA DE PERDIZ

Caldera Pastos Grandes

Nlri	Runtu Jarita Lava	Dark grey Porphyritic, laminated or in blocks, large feldspar crystals, Andesite of PX, olg-bi-hb-cpx.
Ntpg	Pastos Grandes Tuff	Brown grey whitish vitro-crystalline porphyritic, Dacite of bt, with vitreous paste, qz-olg-bt.

(Not related to map scale)

References

- bt biotite
- px pyroxene
- hb hornblende
- olg oligoclase
- qz quartz
- cpx clinopyroxene
- p pumice
- ads andesine

SERGEOMIN
SERVICIO GEOLOGICO MINERO

DIREMAR

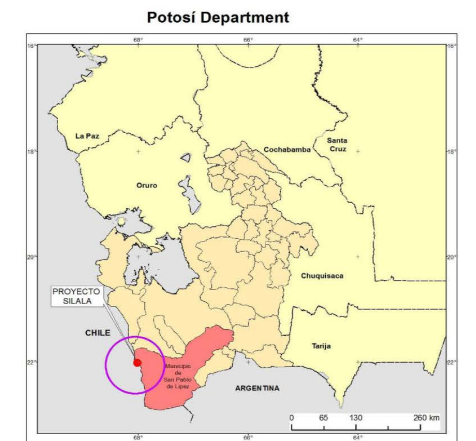
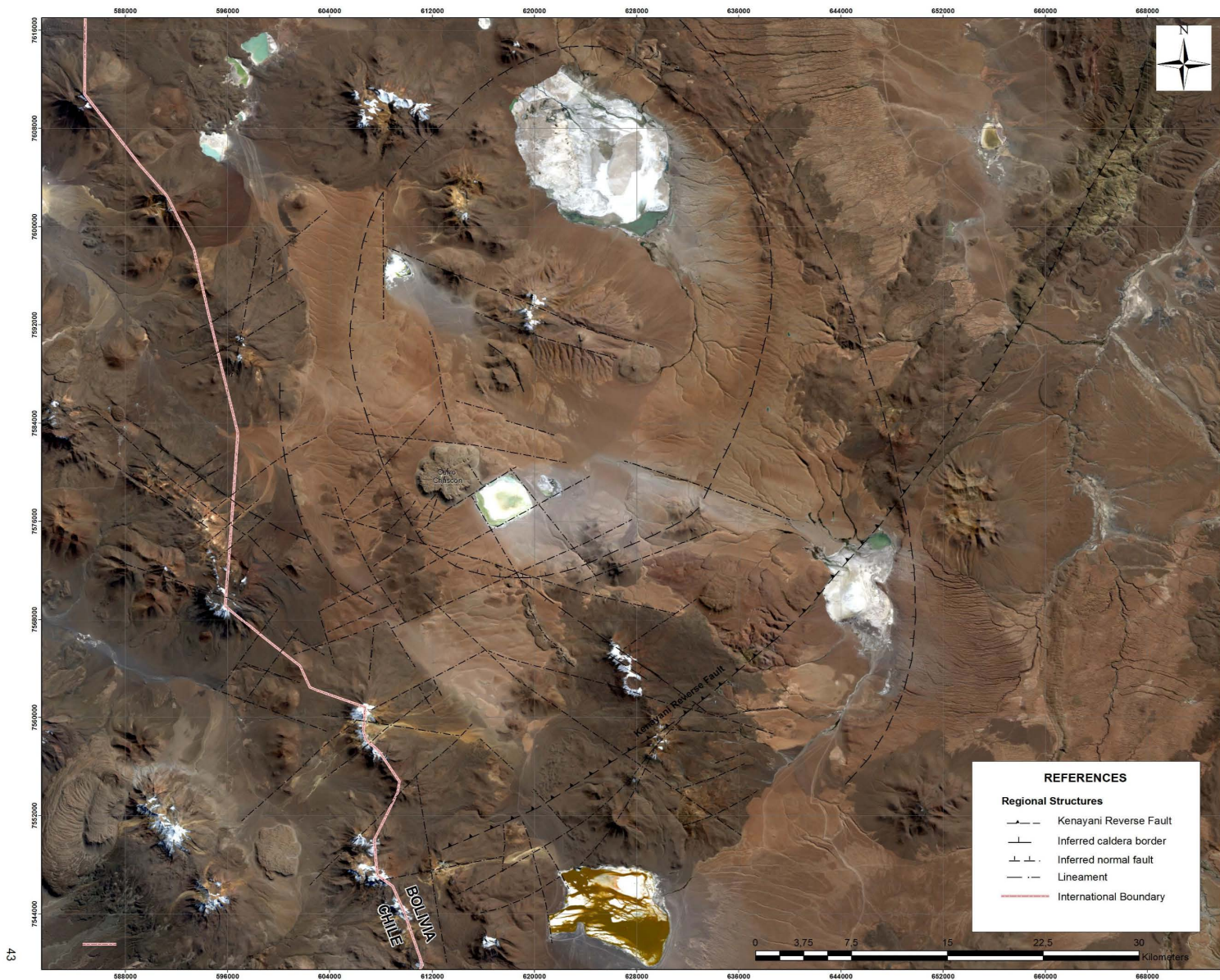
INTERINSTITUTIONAL COOPERATION AGREEMENT
AND SERGEOMIN-DIREMAR CONSULTANCY CONTRACT

GEOGRAPHIC STRUCTURAL MAPPING PROJECT
SURROUNDING AREAS OF THE SILALA SPRINGS

GEOLOGICAL MAP
AREA 3

REFERENCE SYSTEM: WGS84 - UTM PROJECTION SYSTEM ZONE 19 SOUTH

La Paz, September 2017 Escala: 1: 82.700 MAP 3






INTERINSTITUTIONAL COOPERATION AGREEMENT
AND SERGEOMIN-DIREMAR CONSULTANCY CONTRACT

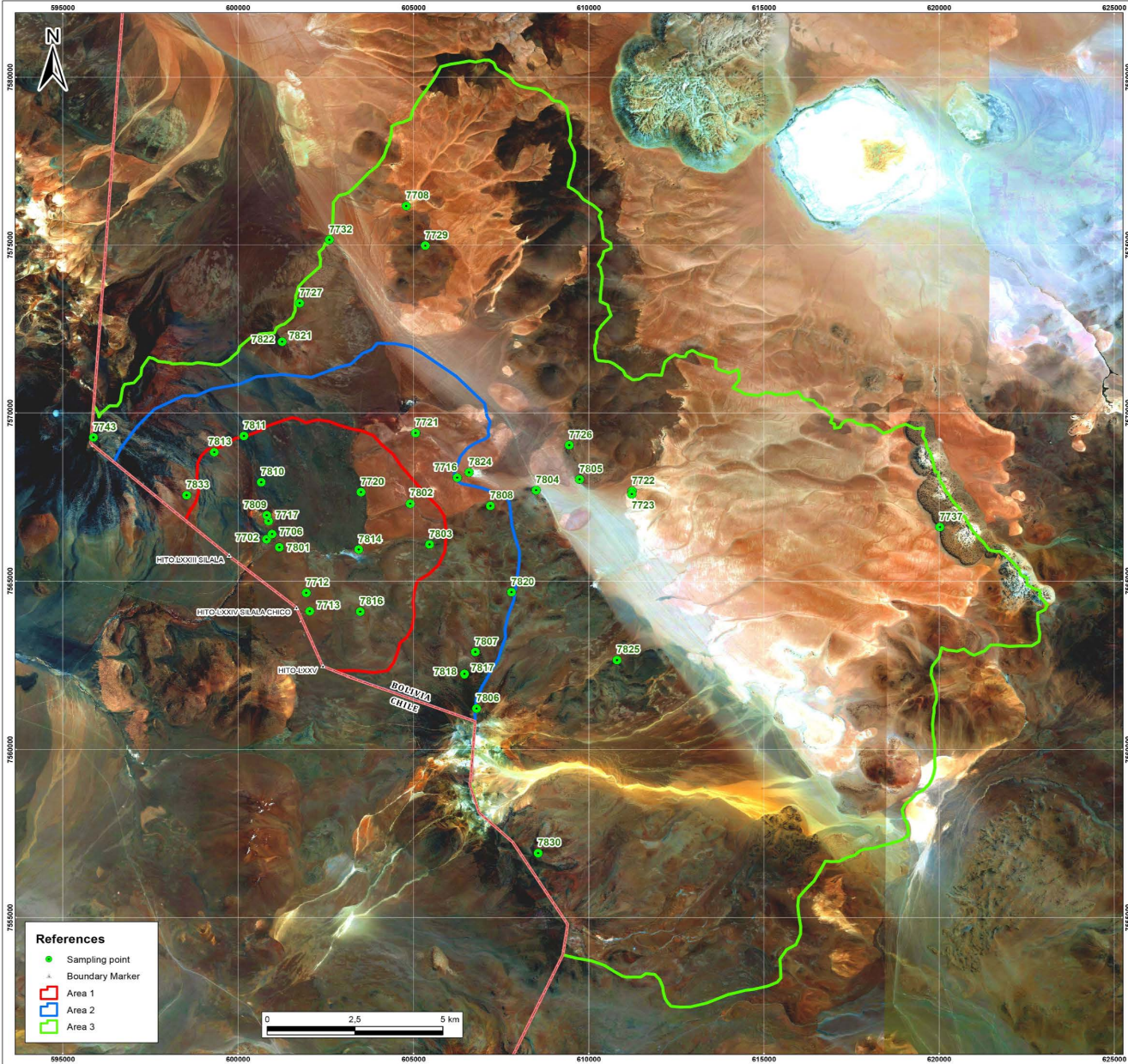
GEOGRAPHIC STRUCTURAL MAPPING PROJECT
SURROUNDING AREAS OF THE SILALA SPRINGS

**MAP OF FAULTS AND LINEAMENTS SURROUNDING
AREA OF THE SILALA SPRINGS**

REFERENCE SYSTEM: WGS84 - UTM PROJECTION SYSTEM ZONE 19 SOUTH

La Paz, September 2017 Scale: 1: 220.800 Map N° 7

MAP 4



MINING GEOLOGICAL SERVICE
STRATEGIC MANAGEMENT FOR MARITIME VINDICATION, SILALA AND INTERNATIONAL WATER RESOURCES
GEOLOGICAL MAPPING OF THE SURROUNDING AREA TO THE SILALA SPRINGS
LABORATORY SUMMARY TABLE

N°	EAST	NORTH	ELEVATION (m.a.s.l.)	SAMPLE CODE	LITHOLOGY	NAME OF THE ROCK
1	600813	7566226	4383	7702	TUFF	ANDESITIC IGNI MBRITE
2	600973	7566397	4395	7706	IGNIMBRITE	ANDESITIC IGNI MBRITE
3	601181	7565996	4457	7801	IGNIMBRITE	BIOTITE ANDESITIC
4	604898	756798	4543	7802	IGNIMBRITE	BIOTITE DACITE
5	605450	7566080	4602	7803	LAVA	PYROXENITE ANDESITIC
6	608497	7567689	4583	7804	LAVA	BIOTITE ANDESITIC
7	609739	7568018	4596	7805	LAVA	BIOTITE DACITE
8	604787	7576138	4522	7708	TUFF	ANDESITIC IGNI MBRITE
9	601942	7564641	4606	7712	LAVA	BIOTITE DACITE
10	606789	751214	5649	7806	LAVA	PYROXENITE ANDESITIC
11	606758	7562878	5041	7807	LAVA	ANDESITIC IGNI MBRITE
12	602052	7564099	4766	7713	LAVA	BIOTITE ANDESITIC
13	607188	7567230	4596	7808	LAVA	ANDESITIC IGNI MBRITE
14	606242	758071	4596	7716	TUFF	BIOTITE DACITE
15	600871	7566783	4437	7717	LAVA	BIOTITE DACITE
16	603511	7567642	4500	7720	LAVA	QUARTZ PYROXENITE ANDESITIC
17	605051	7569399	4580	7721	IGNIMBRITE	BIOTITE DACITE
18	600816	7566953	4485	7809	LAVA	BIOTITE ANDESITIC
19	600661	7567938	4547	7810	LAVA	PYROXENITE BASALT
20	600166	7569312	4671	7811	BASAL BRECCIA	PYROXENITE ANDESITIC
21	399917	7568831	4759	7813	BASAL BRECCIA	ANDESITIC IGNI MBRITE
22	603440	7565926	4422	7814	TUFF	HORNBLENDE ANDESITIC
23	603483	7564079	4558	7816	LAVA	PYROXENITE ANDESITIC
24	606447	7562228	5165	7817	LAVA	PYROXENITE ANDESITIC
25	606447	7562228	5165	7818	LAVA	PYROXENITE ANDESITIC
26	611232	7567663	4626	7722	TUFF	BIOTITE DACITE
27	607792	7564663	4802	7820	LAVA	PYROXENITE ANDESITIC
28	611225	7567577	4640	7723	TUFF	QUARTZ ANDESITIC
29	609442	7569033	4653	7726	LAVA	HORNBLENDE AND DACITE OF BIOTITE
30	601256	7572117	5181	7821	LAVA	HORNBLENDE ANDESITIC
31	601256	7572117	5181	7822	LAVA	HORNBLENDE ANDESITIC
32	601757	7573261	4833	7727	LAVA	OXIDISED BIOTITE ANDESITIC
33	602604	7575147	4607	7732	LAVA	OXIDISED BIOTITE ANDESITIC
34	605330	7574972	4741	7729	LAVA	OXIDISED BIOTITE ANDESITIC
35	606578	7568225	4555	7824	ARGILLITE	ARGILLITE
36	610800	7562642	4647	7825	LAVA	PYROXENITE ANDESITIC
37	620023	7566997	4864	7757	LAVA	PYROXENITE ANDESITIC
38	619703	756092	5107	7827	LAVA	PYROXENITE DACITE
39	608546	7556011	5420	7830	LAVA	HORNBLENDE ANDESITIC
40	595872	7569264	5631	7743	LAVA	HORNBLENDE ANDESITIC
41	598332	7567548	4609	7833	LAVA	HORNBLENDE ANDESITIC

INTERINSTITUTIONAL COOPERATION AGREEMENT
 AND SERGEOMIN-DIREMAR CONSULTANCY CONTRACT

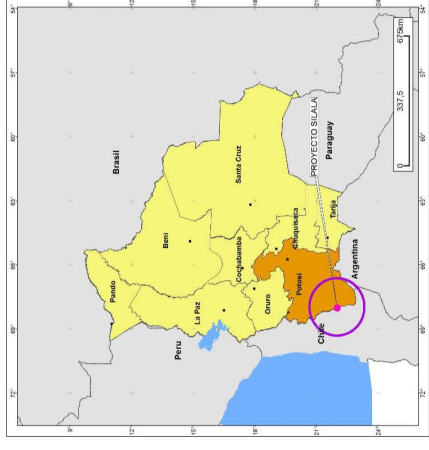
GEOGRAPHIC STRUCTURAL MAPPING PROJECT
 SURROUNDING AREAS OF THE SILALA SPRINGS

SAMPLING MAP

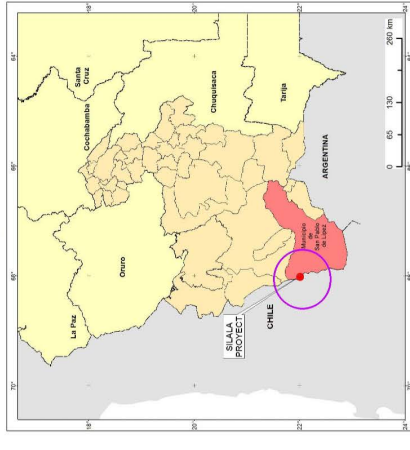
REFERENCE SYSTEM: WGS84 - UTM PROJECTION SYSTEM ZONE 19 SOUTH


La Paz, September 2017 Scale: 1: 84.700 MAP 5

LOCATION MAP
Plurinational State of Bolivia




Potosí Department





SERGEOMIN
SERVICIO GEOLOGICO MINERO

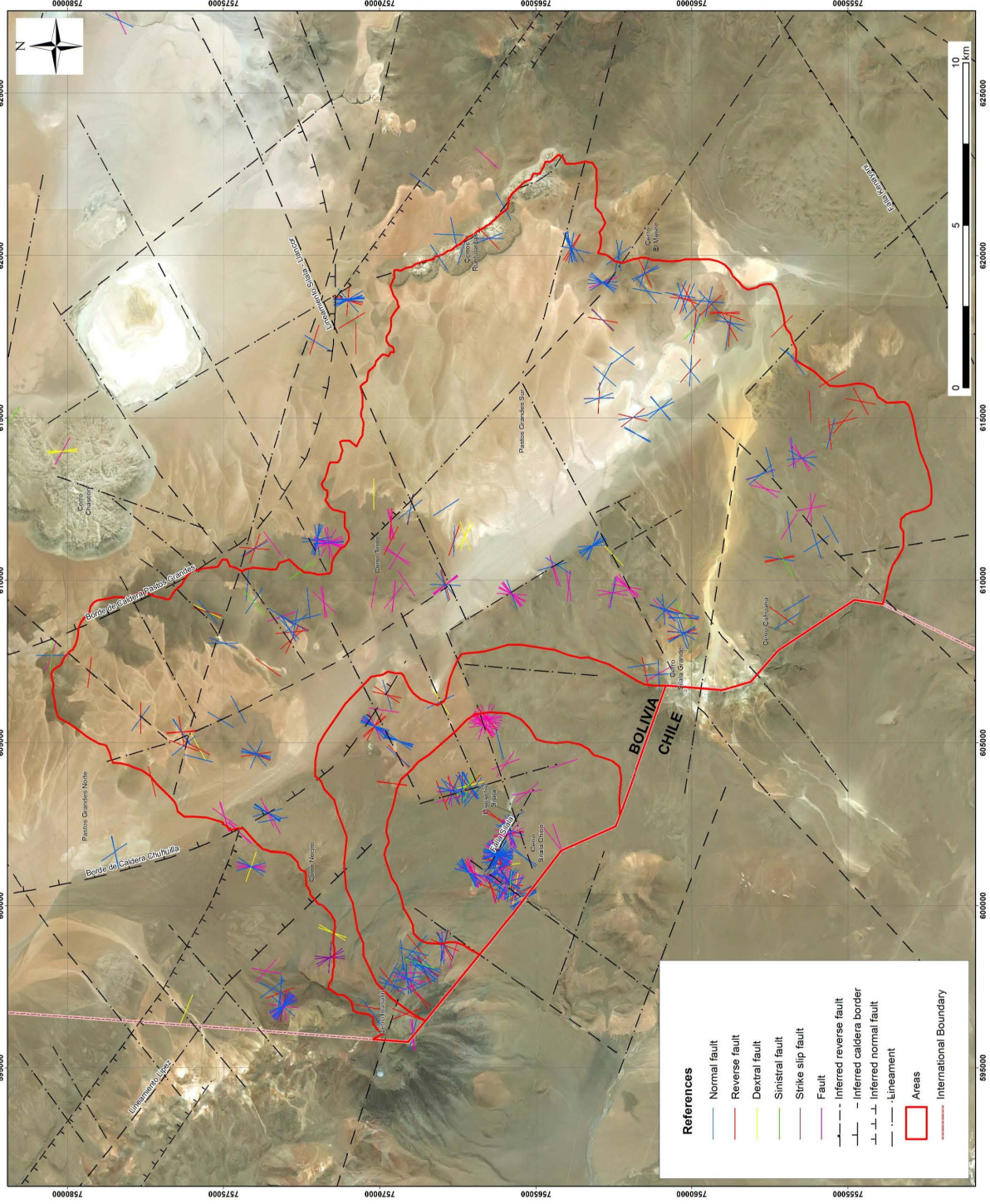


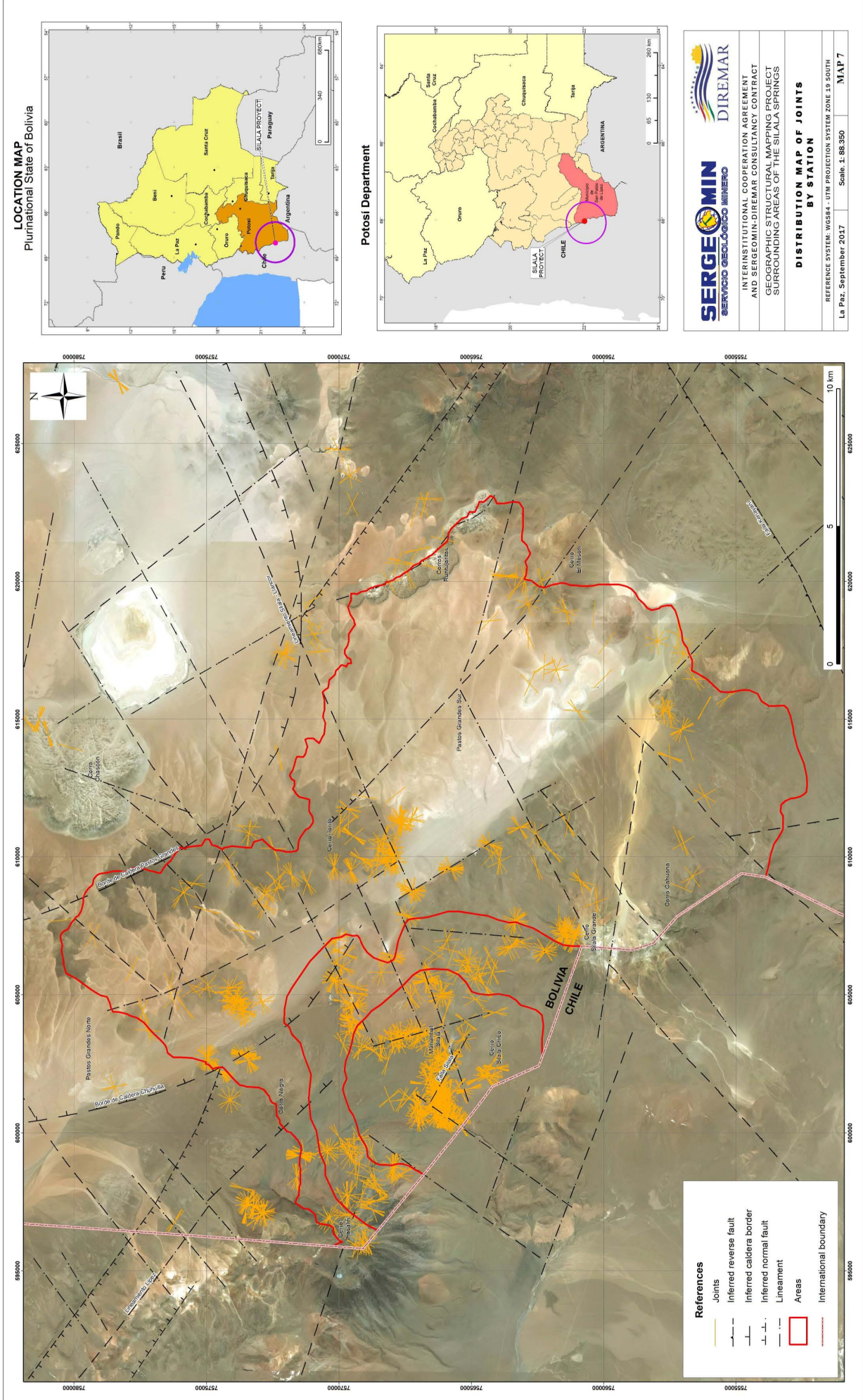
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INTERINSTITUCIONAL COOPERATION AGREEMENT
 AND SERGEOMIN-DIREMAR CONSULTANCY CONTRACT
 GEOGRAPHIC STRUCTURAL MAPPING PROJECT
 SURROUNDING AREAS OF THE SILALA SPRINGS

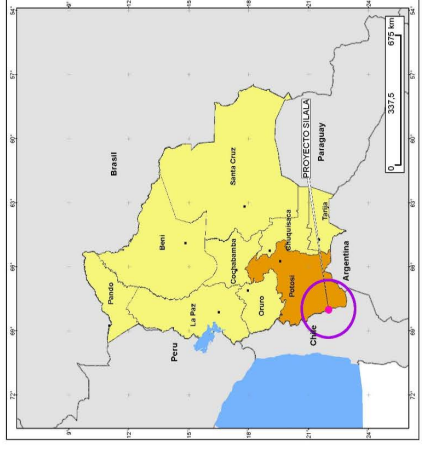
**FAULT DISTRIBUTION MAP
BY STATION**

REFERENCE SYSTEM: WGS84 - UTM PROJECTION SYSTEM ZONE 19 SOUTH
 La Paz, September 2017 Scale: 1: 88.300 MAP 6

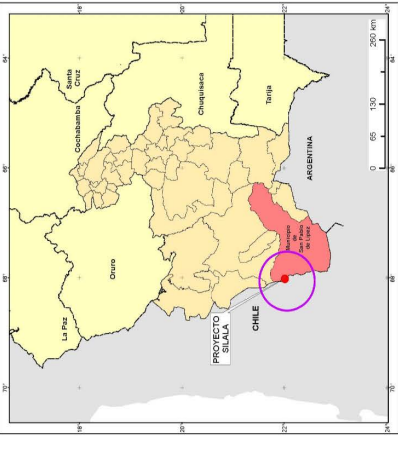




LOCATION MAP
Plurinational State of Bolivia



Potosí Department



SERGEOMIN
SERVICIO GEOLOGICO MINERO

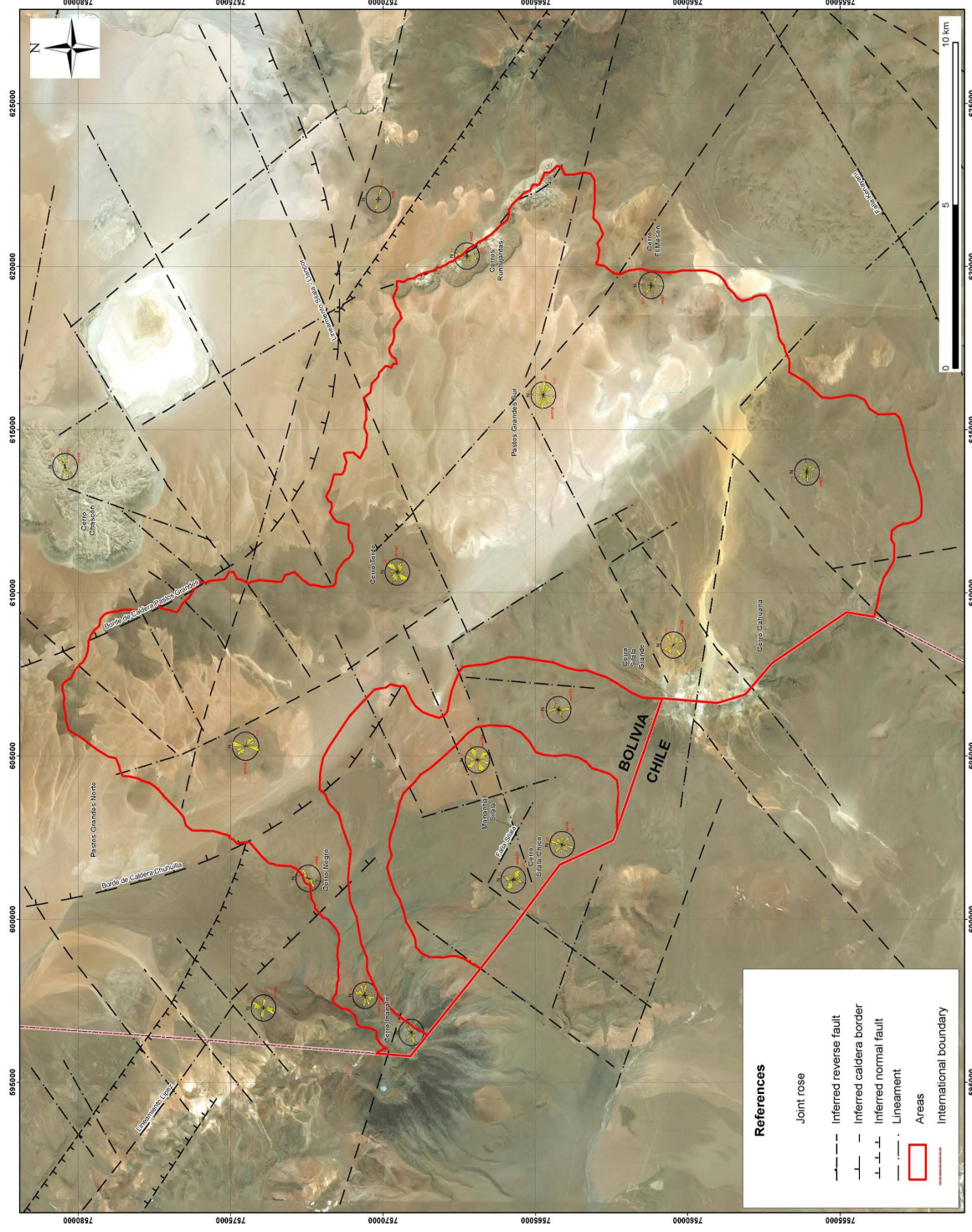
DIREMAR

INTERINSTITUTIONAL COOPERATION AGREEMENT
AND SERGEOMIN-DIREMAR CONSULTANCY CONTRACT

GEOGRAPHIC STRUCTURAL MAPPING PROJECT
SURROUNDING AREAS OF THE SILALA SPRINGS

**MAP WITH ROSE DIAGRAMS
AND JOINTS**

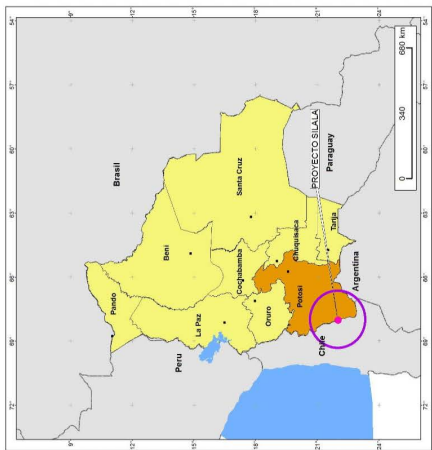
REFERENCE SYSTEM: WGS84 - UTM PROJECTION SYSTEM ZONE 19 SOUTH
La Paz, September, 2017 Scale: 1:88,800 MAP 8



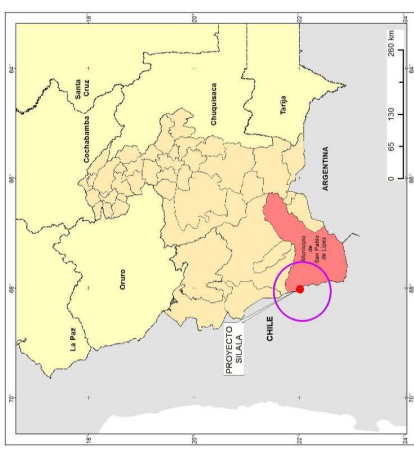
References

- Joint rose
- Inferred reverse fault
- Inferred caldera border
- Inferred normal fault
- Lineament
- Areas
- International boundary

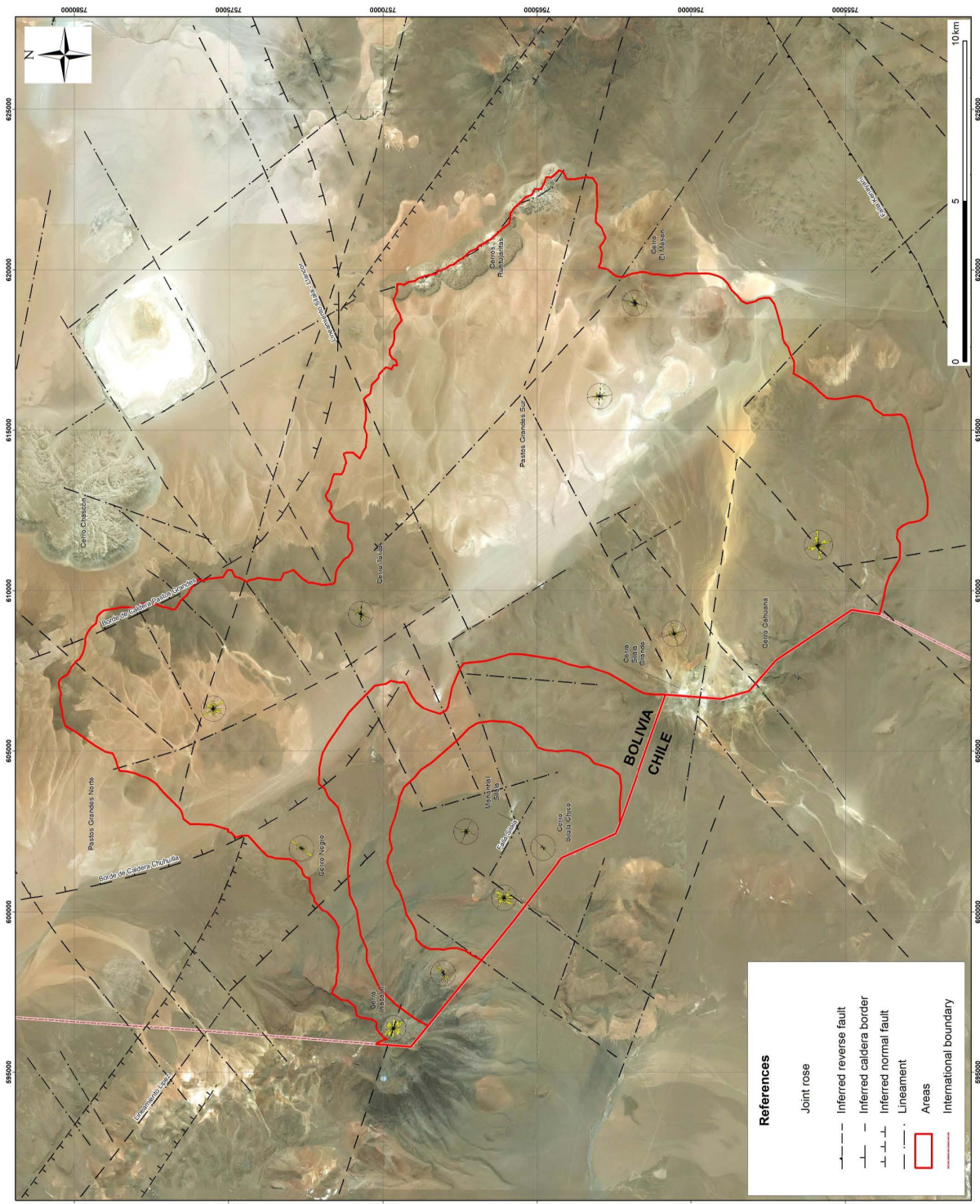
LOCATION MAP
Plurinational State of Bolivia



Potosí Department



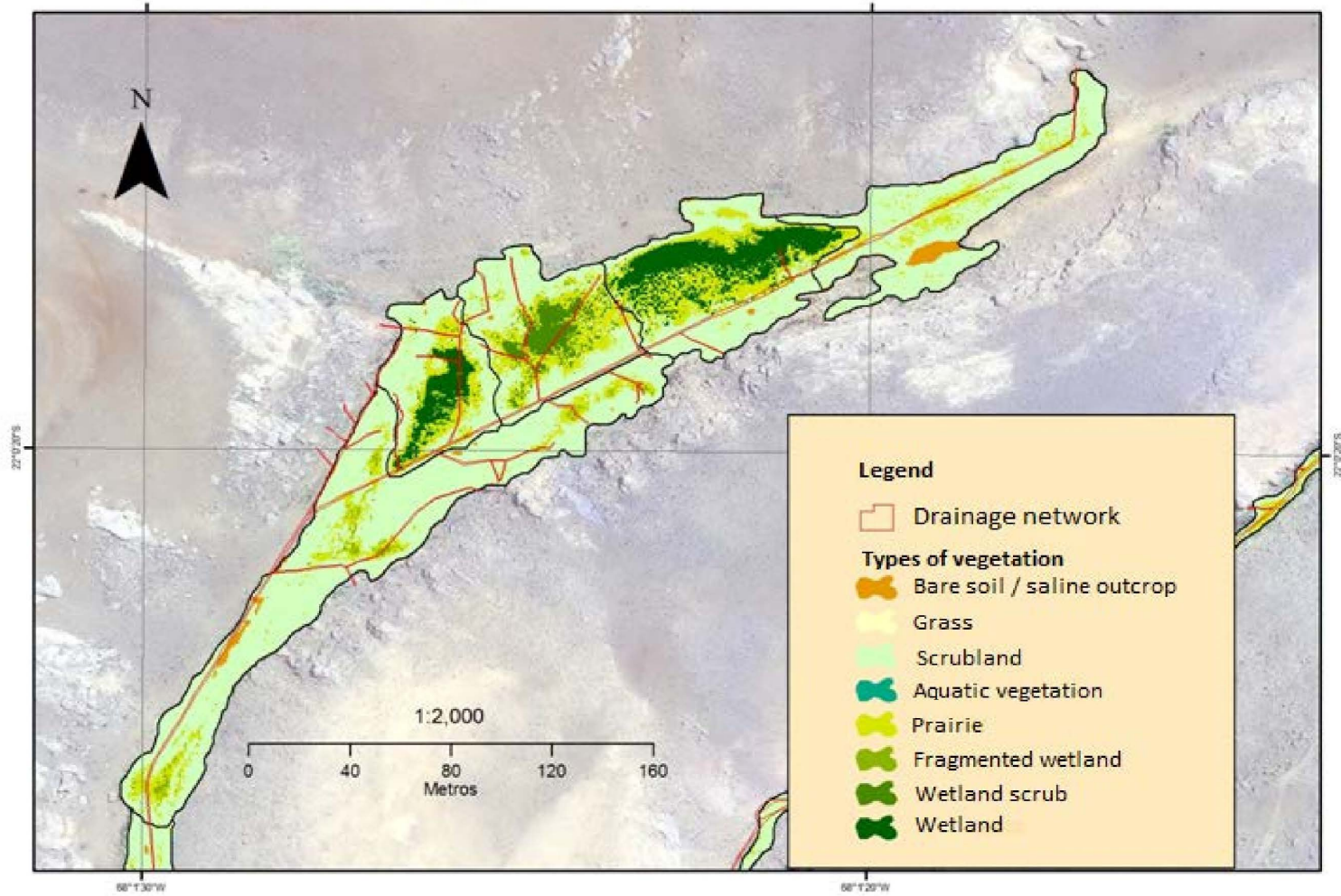
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	INTERINSTITUTIONAL COOPERATION AGREEMENT AND SERGEO MINO DIREMAR CONSULTANCY CONTRACT
	GEOGRAPHIC STRUCTURAL MAPPING PROJECT SURROUNDING AREAS OF THE SILALA SPRINGS
MAP WITH ROSE DIAGRAMS OF FAULTS	
REFERENCE SYSTEM: WGS84 - UTM PROJECTION SYSTEM ZONE 18 SOUTH	
La Paz, September 2017 Scale: 1:88.000 MAP 9	



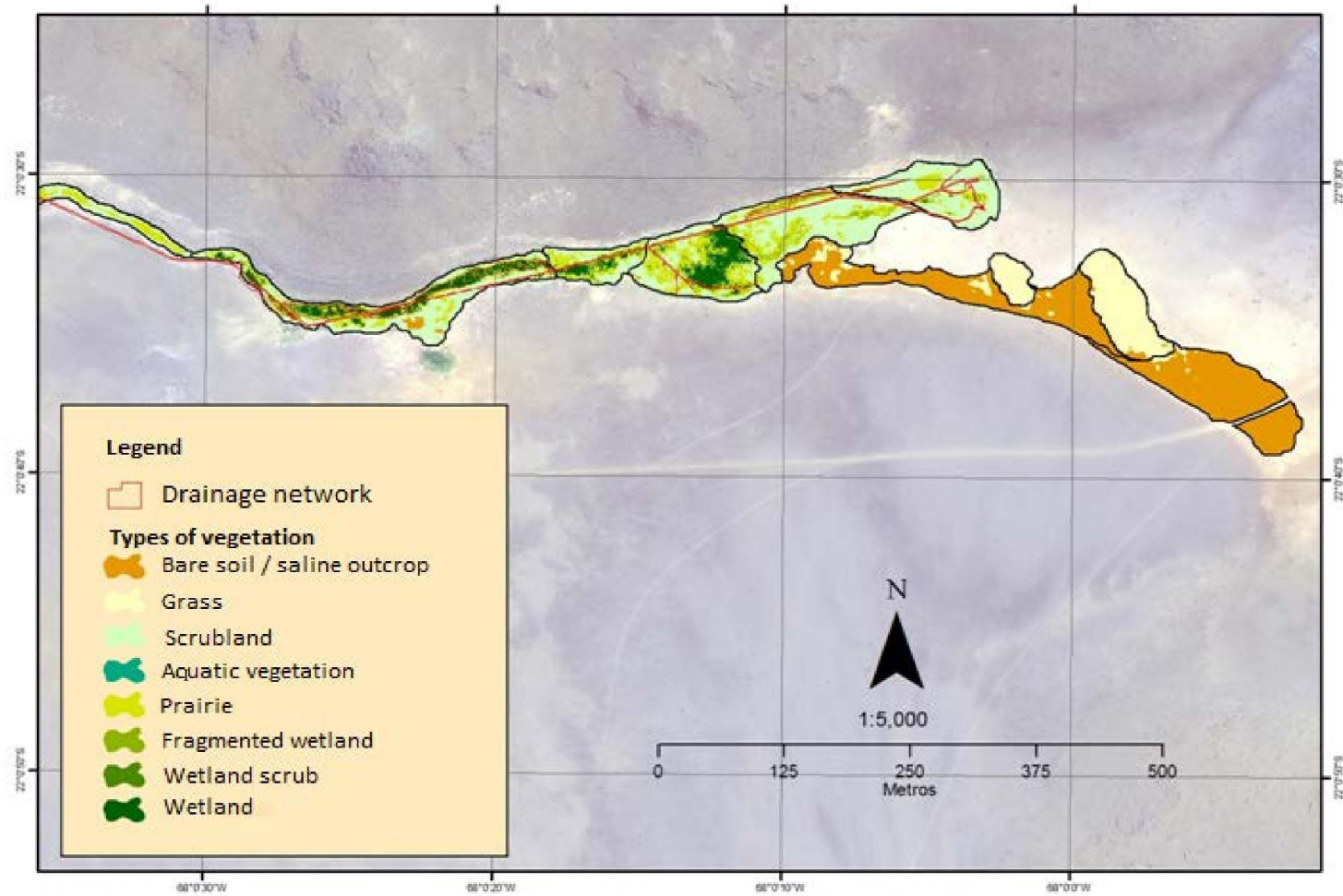
**WETLANDS
DEGRADATION IMAGES
(Appendix C)**

TYPES OF VEGETATION IN THE NORTH WETLAND

IMAGE 1

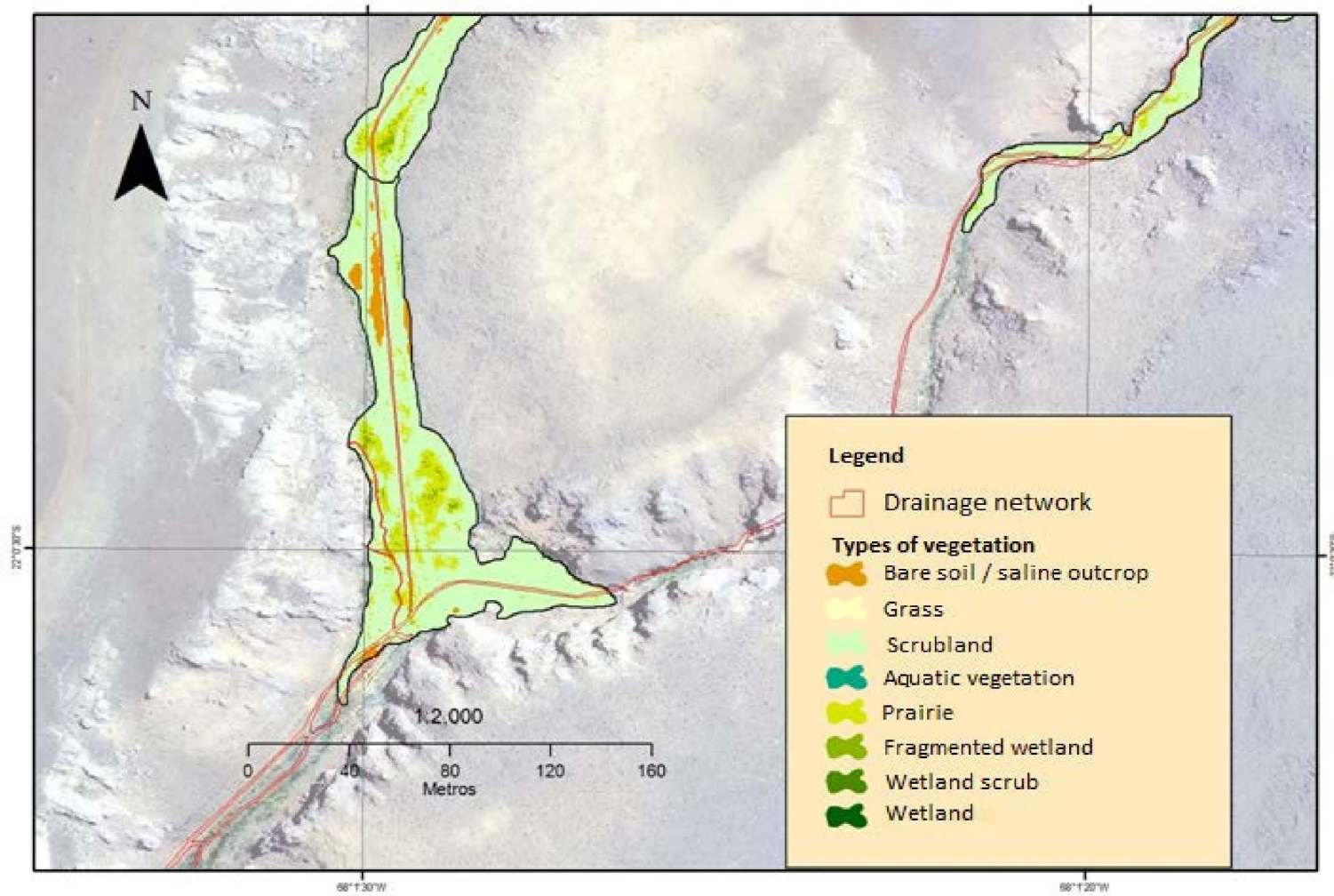


TYPES OF VEGETATION IN THE SOUTH WETLAND



TYPES OF VEGETATION IN THE CONFLUENCE WETLAND

IMAGE 3



ANNEX 30

DVD CONTAINING “ARTIFICIAL WORKS IMPACT ON THE SILALA” (VIDEO)