Hagler Bailly Pakistan

DIGBY WELLS ENVIRONMENTAL

Appendix L: Hydrocensus Report

Hagler Bailly Pakistan

Environmental and Social Impact Assessment of Reko Diq Mining Project

Hydrocensus Report – 2022-23 Survey

Final Report

HBP Ref.: R4HC8RKG

October 1, 2024

Reko Diq Mining Company

Quetta

Acronyms

AB	Abandoned Bore
NEQS	National Environmental Quality Standards
DO	Dissolved Oxygen
EC	Electrical Conductivity
FC	Frontier Corps
HBP	Hagler Bailly Pakistan
MB	Monitoring Bore
PB	Production Bore
RDMS	Reko Diq Mine Site
RO	Reverse Osmosis
TCC	Tethyan Copper Company
TDS	Total Dissolved Solids
Units	
ºC	Degrees Celsius
Km	Kilometres
L/s	Liters per second
M	Metres
mS/m	Milli siemens per metre
NTU	Nephelometric Turbidity Unit
ppm	Parts per million

Contents

Exhibits

1. Introduction

Reko Diq Mining Company (RDMC), a joint venture between Barrick Gold Corporation (hereafter Barrick), the Government of Pakistan and the Government of Balochistan, is undertaking a feasibility study for the Reko Diq Mining Project (also referred to as the 'Project') in the western part of Balochistan province of Pakistan. As part of the feasibility study, an Environmental and Social Impact Assessment (ESIA) has been conducted, including a number of detailed specialist studies. The ESIA forms part of the environmental permitting process and will provide a basis for the integration of environmental and social considerations into the Project design. RDMC appointed Digby Wells Environmental (hereafter Digby Wells) and Hagler Bailly Pakistan Pvt. Ltd (hereafter HBP) to carry out the proposed environmental and social studies and permitting process for the Project.

This document provides the findings of the hydrocensus surveys carried out for the proposed Project. It outlines the spatial extent of the hydrocensus survey and the areas of interest. This document also presents the findings of hydrocensus including water availability and findings of in situ water quality testing based on data collected from April 28, 2023 to June 3, 2023 (referred to here in this report as 2023 Survey).

1.1 Objectives of the Hydrocensus Survey

The objectives of the hydrocensus survey were to:

- *Collect Comprehensive Data on Community Water Resources:* Assess the characteristics and status of water resources used by the community. This includes measuring water depth, water levels, and conducting in-situ water quality tests to understand the availability and quality of water for community use.
- *Assess Boreholes Installed by the Project Company:* Gather detailed information on the boreholes installed by Barrick/TCC. This involves recording water depth, monitoring water levels, and performing in-situ water quality tests to evaluate the effectiveness and sustainability of these installations.
- *Evaluate Functional and Non-Functional Water Resources:* Assess both functional and non-functional water resources to determine their current status and identify factors affecting their usability.
- *Identify Trends and Patterns:* Analyse the collected data to identify any trends or patterns in water depth, water levels, and water quality across different types of water resources.

2. Project Description

The Project is a Copper-Gold mining operation with an onsite processing plant to produce a high-quality copper-gold concentrate (the Concentrate) that will be exported for final processing into various products. The current Life-of-Mine (LoM) is 38 years in terms of defined resources (resources that have been identified already) with significant exploration upside.

The construction phase is anticipated to take approximately 40 months, including pre-stripping. The mine will be a truck-and-shovel open pit mining operation with processing facilities that include crushing, grinding, and flotation. The final Concentrate will be railed to Port Qasim for final export by ship.

The mine will be developed in two phases, Phase 1 is expected to have a capacity of 45 Mt per annum (Mtpa) and Phase 2 is expected to have a combined processing capacity of 90 Mtpa. Phase 1 operations are anticipated to commence in 2028 and Phase 2 operations in 2030.

2.1 Reko Diq Mine Site and Associated Facilities

Exhibit 2.1 provides an overview of the RDMS and the major proposed infrastructure.

The core infrastructure that will be established at the RDMS includes:

- Two main pits, Western Porphyry and Tanjeel (**Exhibit 2.1**). The mining method of these pits will be a 24-hour open-pit shovel and truck operation;
- Two designated Waste Rock Dumps (WRD) for the waste rock from the Western Porphyries pit. The Tajeel Pit will have a separate WRD in its proximity.
- Tailings storage facility (TSF).
- A processing plant.

2.1.1 Supporting Infrastructure

The proposed supporting infrastructure at the RDMS includes:

- Several sources for power supply will be utilised for the Project. The Project's estimated peak power requirements will be 183 megawatts (MW) in Phase 1 and 348 MW in Phase 2:
  - Diesel generators during the early works and construction phases until the establishment of the Heavy Fuel Oil (HFO) power station;
  - A Solar Photovoltaic (PV) system with an installed capacity of 183 MW in Phase 1 and 384 MW in Phase 2;
  - It is anticipated that the Project's energy requirements will be met through a grid connection from Year 15 (operational phase).
- Diesel, HFO and other sources of fuel will be railed to the site from Port Qasim and stored in bunded contained atmospheric tanks at the designated storage areas.

- Accommodation Facility to provide on-site accommodation for all employees and contractors;
- Security infrastructure;
- Waste management facilities:

2.1.2 Water Supply and Management

Water for the Construction Phase, Phase 1 and Phase 2 of the Project will be sourced from a sedimentary groundwater system located approximately 70 km to the northwest of the mining area referred to as the Northern Groundwater System (**Exhibit 2.1**). The system represents a small and isolated part of a much larger basin and there are no communities or community water sources located within the proposed borefield and its area of influence.

Water in the system is saline and challenging to access, and as such is not suitable for human consumption or most agricultural or industrial uses without significant treatment and abstraction infrastructure. There are currently no planned developments or users of the target groundwater system, and the scope of the Project would not preclude future use of the broader basin by others. Independent international best practice environmental and social impact assessment and hydrogeological studies, using physical surveying and remote sensing techniques, have demonstrated that there are no surface expressions of the groundwater system and no known dependent biodiversity.

This groundwater system is considered capable of enabling development and sustaining operation of the Project, which is expected to add significantly to the socio-economic advancement within the region and country through employment, infrastructure, and services.

2.2 Transport and Marine Port

The Project will use the existing road and rail networks to transport materials during construction and operational phases and utilise the air transportation option for personnel. The main Project transport routes (Road Transport Route and Rail Transport Route) are shown in **Exhibit 2.2**.

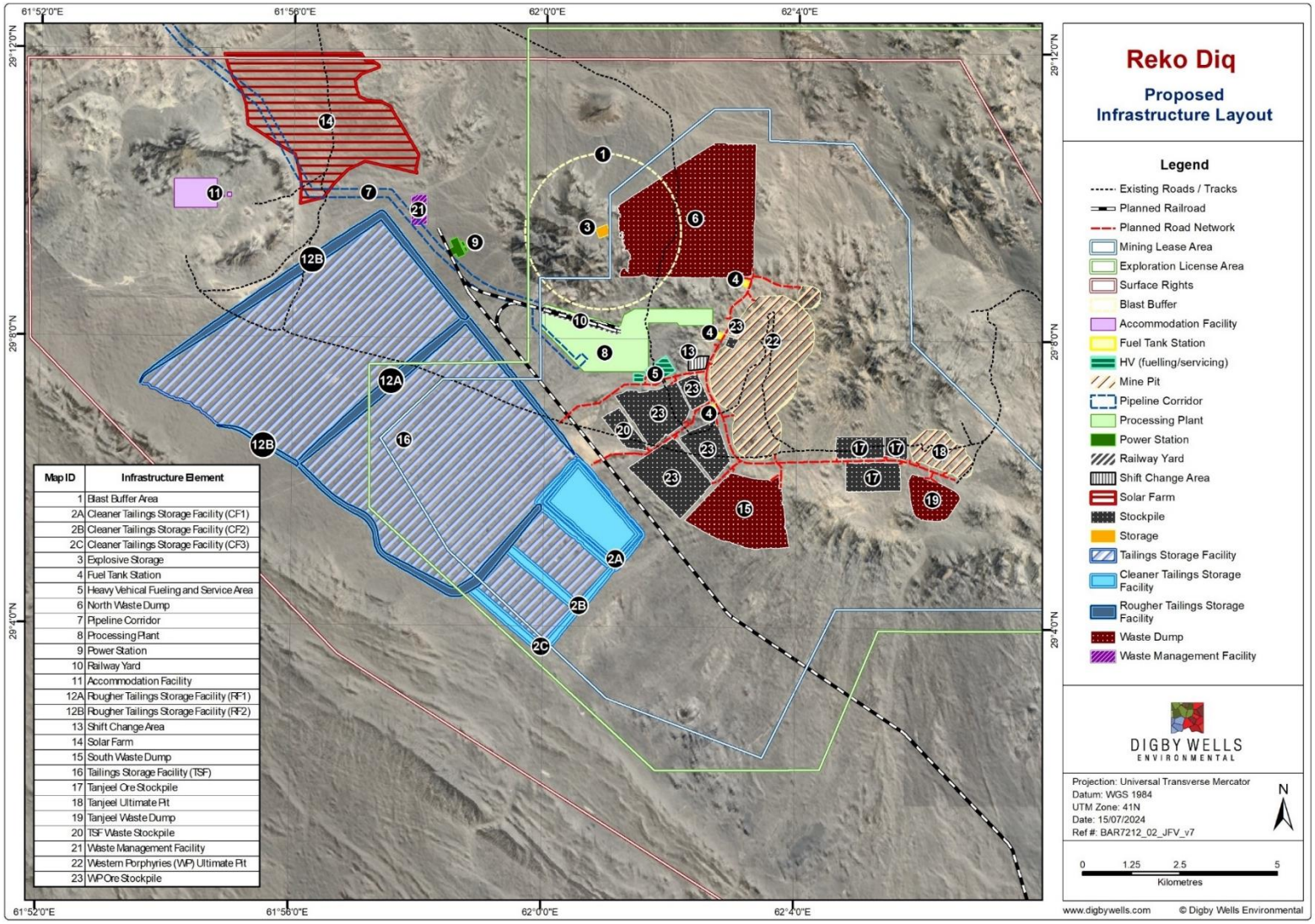
2.2.1 Transport of Concentrate to Port Qasim

The Concentrate will be transported from the RDMS processing plant to Port Qasim via an existing railway line, passing through the Balochistan and Sindh provinces. The existing rail route is approximately 1,350 km in length as outlined in **Exhibit 2.2**.

The Project will make use of the existing PIBT Terminal where all facilities are owned and operated by PIBT. An area will be leased to RDMC for the construction of a Concentrate storage shed.

An extract of the onshore and offshore layout is shown in **Exhibit 2.4**.

Exhibit 2.1: Proposed Reko Diq Mine Site Layout



Map ID	Infrastructure Element
1	Blast Buffer Area
2A	Cleaner Tailings Storage Facility (CF1)
2B	Cleaner Tailings Storage Facility (CF2)
2C	Cleaner Tailings Storage Facility (CF3)
3	Explosive Storage
4	Fuel Tank Station
5	Heavy Vehical Fueling and Service Area
6	North Waste Dump
7	Pipeline Corridor
8	Processing Plant
9	Power Station
10	Railway Yard
11	Accommodation Facility
12A	Rougher Tailings Storage Facility (RF1)
12B	Rougher Tailings Storage Facility (RF2)
13	Shift Change Area
14	Solar Farm
15	South Waste Dump
16	Tailings Storage Facility (TSF)
17	Tanjeel Ore Stockpile
18	Tanjeel Ultimate Pit
19	Tanjeel Waste Dump
20	TSF Waste Stockpile
21	Waste Management Facility
22	Western Porphyries (WP) Ultimate Pit
23	WP Ore Stockpile

Exhibit 2.2: Reko Diq Spatial Extent and Transport Routes (Rail Transport Route and Road Transport Route)

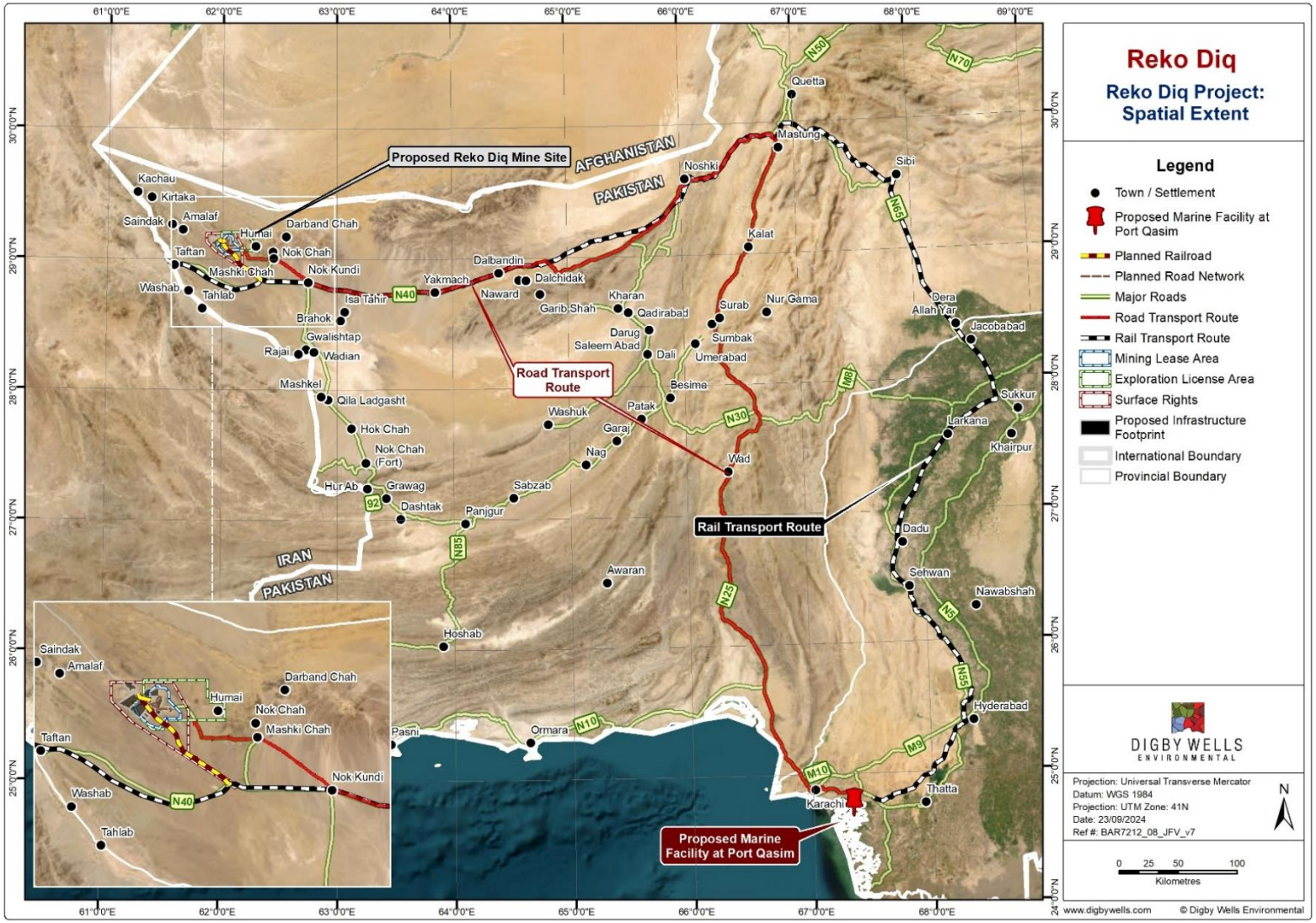


Exhibit 2.3: Proposed Rail Yard Layout at Port Qasim

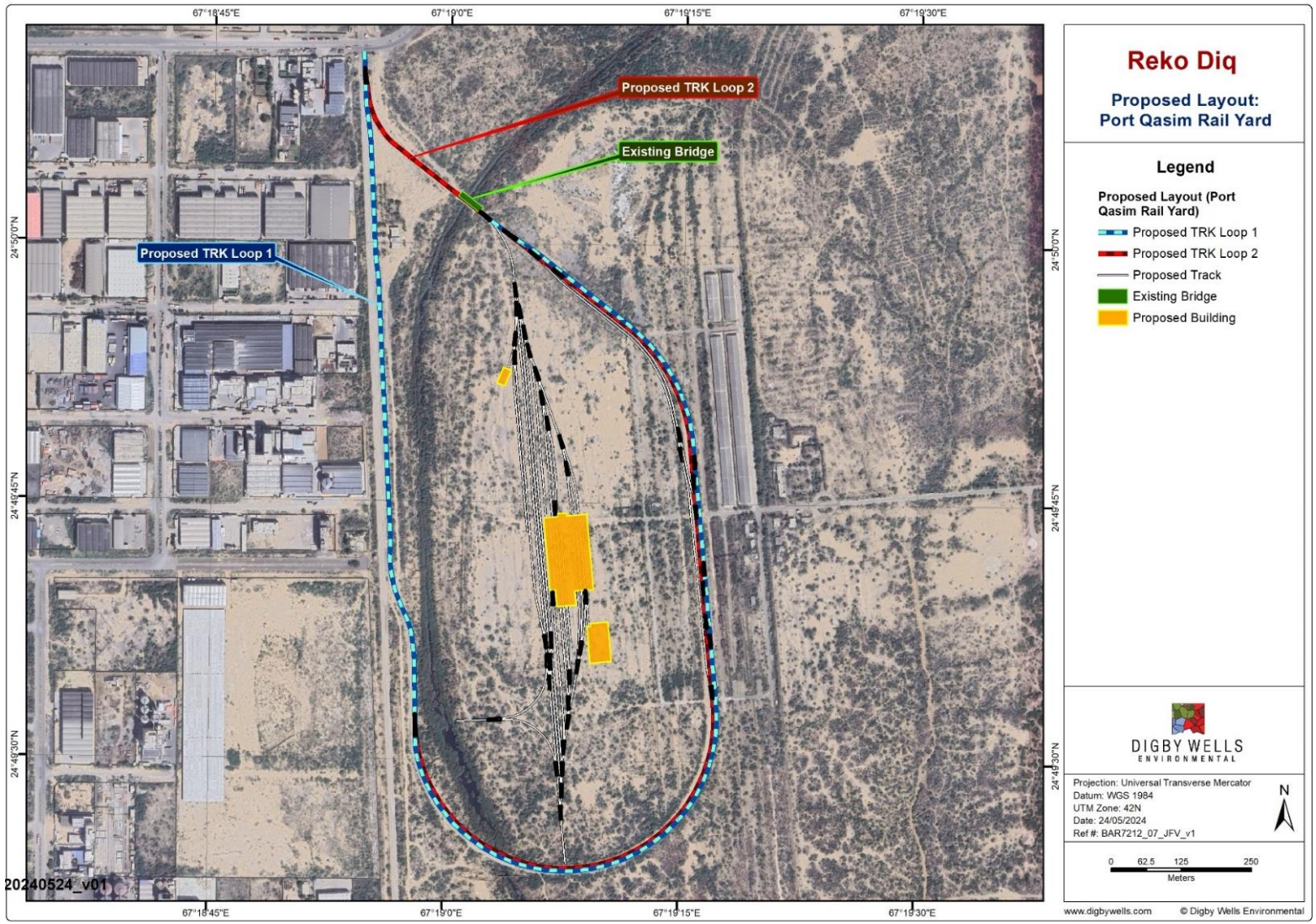
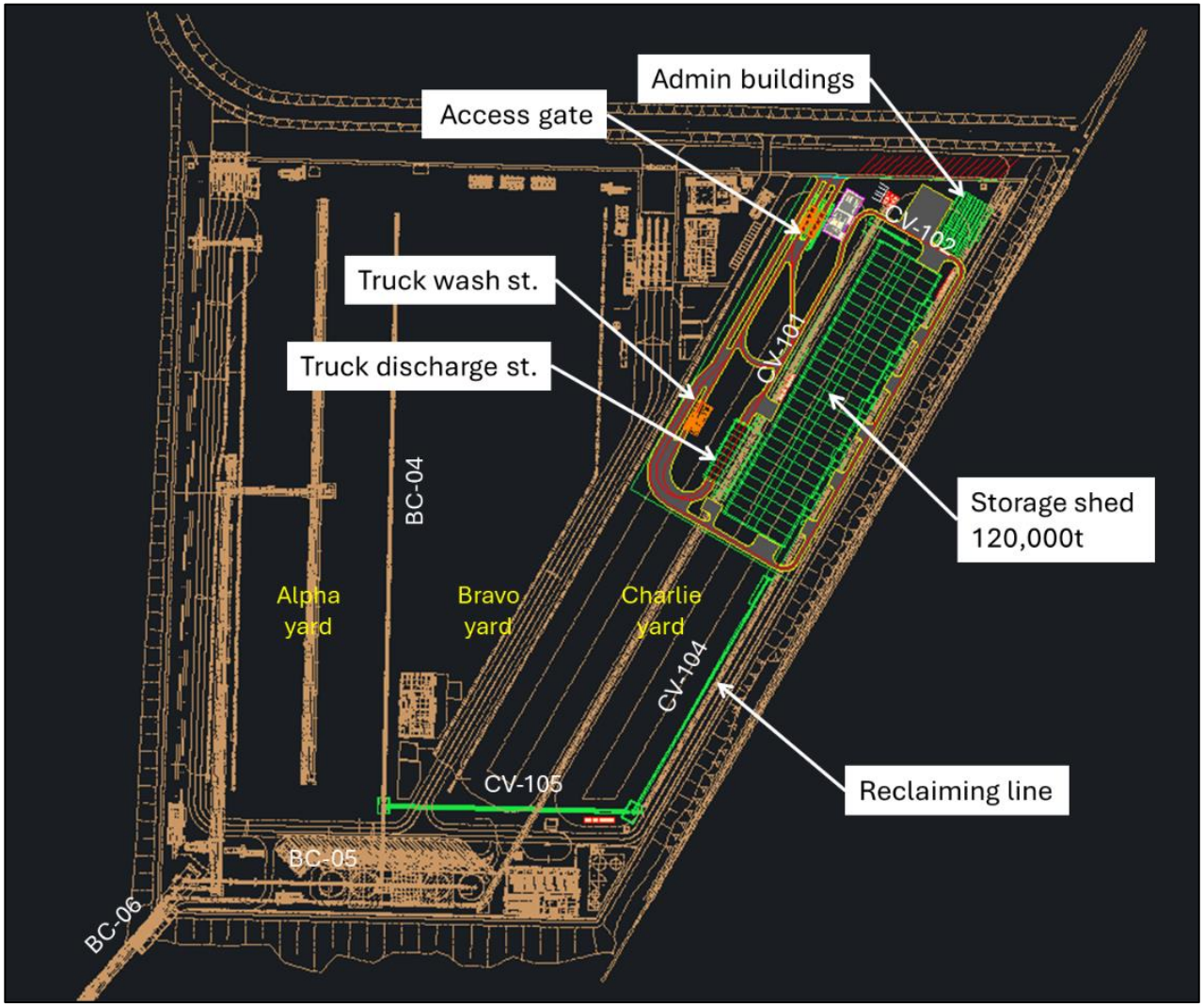


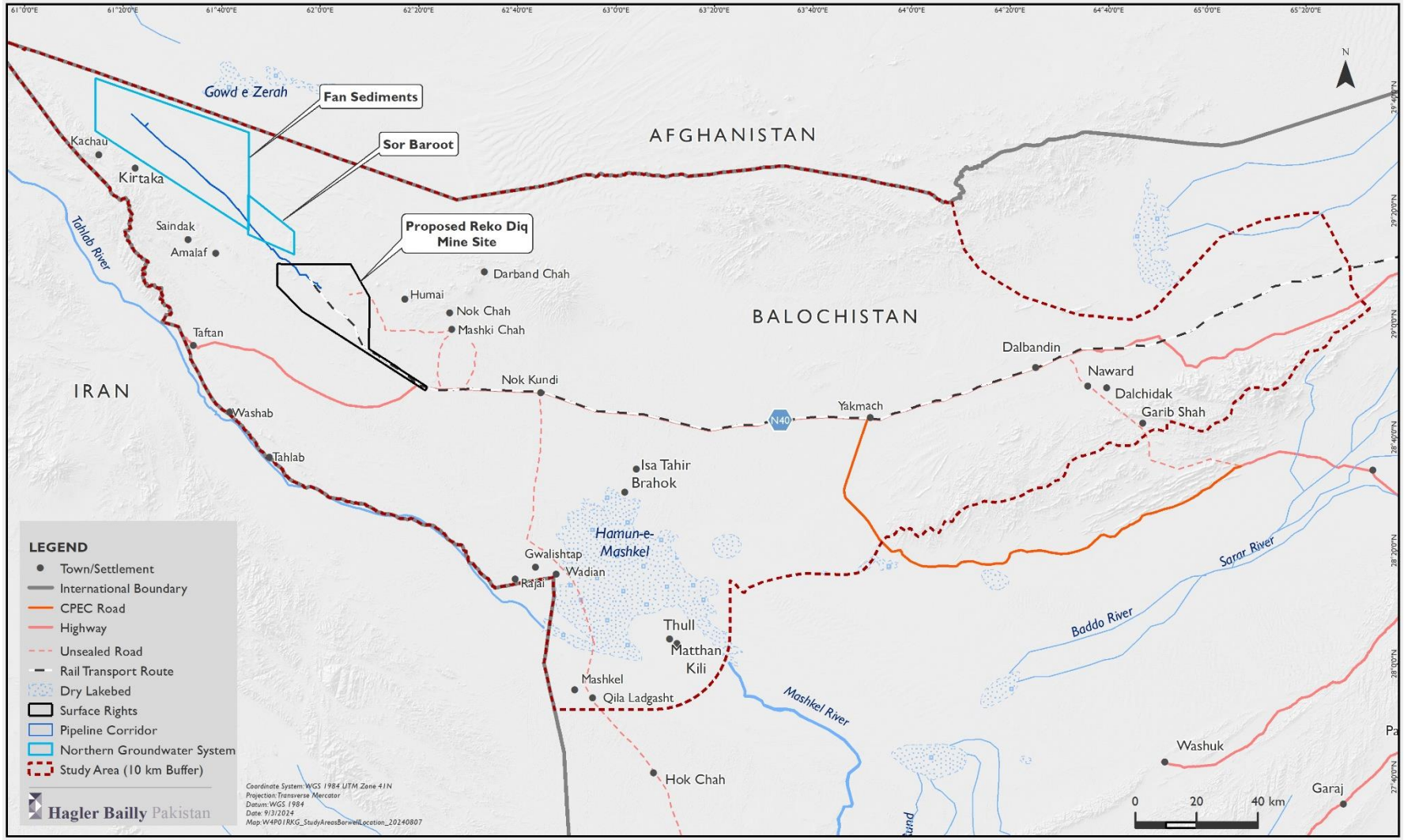
Exhibit 2.4: Layout of Concentrate Facilities at PIBT at Port Qasim



3. Methodology

The Study Area for the hydrocensus surveys focuses on three tehsils in Chagai District namely; Taftan, Nok Kundi, and Dalbandin. Additionally, areas at 10 km from the Pipeline Corridor, 25 km from the boundary of the Northern Groundwater System and Southern Groundwater System were also delineated and added to the Study Area. The extensive scope of the Study Area spans beyond where the Project's groundwater related impacts can be reasonably expected to occur. This area was selected to inform potential future water users and other exploratory works related to groundwater abstraction in the wider region as part of good practice. **Exhibit 3.1** shows the map of Study Area for the Surveys.

Exhibit 3.1: Study Area for Hydrocensus Survey



3.1 Community Water Resources

The hydrocensus of community water resources was carried out in both Surveys to map resources including dug wells, boreholes, and springs/*Karez*. The subsequent subsections provide the description of settlements selected for this hydrocensus and the details of community water resources surveyed.

The hydrocensus was conducted in 22 settlements during the 2022 Survey which included:

- Settlements near Reko Diq Mine Site Area: Humai, Mashki Chah, Nok Chah, and Darband Chah, Nok Kundi and Dalbandin
- Settlements near Northern Groundwater System Kachau, Bore Chah, Kirtaka, Beeduk, Maki and Maskin
- Settlements near Southern Groundwater System: Rajai, Wadian, Qila Ladgasht and Gwalishtap.
- Other Settlements: Taftan, Tahlab, Washab, Amalaf and Saindak

The hydrocensus for community water resources in the 2023 Survey included 19 settlements:

- Settlements near Reko Diq Mine Site Area: Humai, Mashki Chah, Nok Chah, and Darband Chah and Nok Kundi.
- Settlements near Northern Groundwater System: Kachau, Bore Chah, Kirtaka, Beeduk, Maki and Maskin
- Settlements near Southern Groundwater System: Qila Ladgasht, Patangaz, Rajai, Wadian and Gwalishtap.

Some of the settlements such as Taftan, Saindak etc., were not included in the 2023 Survey. The details for exclusion of these settlements are provided in **Section 3.4**.

Exhibit 3.2 through **Exhibit 3.13** illustrate the location maps of surveyed community water resources. The description of the location IDs of community water resources are defined as follows:

- For community water resources within the Study Area of Reko Diq Mine Site, IDs were assigned as WX, where W presents water resources within the Study Area of Reko Diq Mine Site while X presents the location number of water resource. Following this approach, W1 corresponds to first water resources within the Study Area of Reko Diq Mine Site which was in Humai settlement. Most of the community water resources within the Study Area of Reko Diq Mine Site were marked based on the Client information and via satellite imagery. In case of identification of new borewells during surveys, the IDs were given as NW1, NW2 etc.
- For the water resources within settlements near Hamun-e-Mashkel, the IDs were given using settlement name initials e.g., IT1 is a water resources in Isa Tahir settlement. Similarly, B1 corresponds to water resource in Brahok settlement.

Exhibit 3.2: Location of Community Water Resources Surveyed

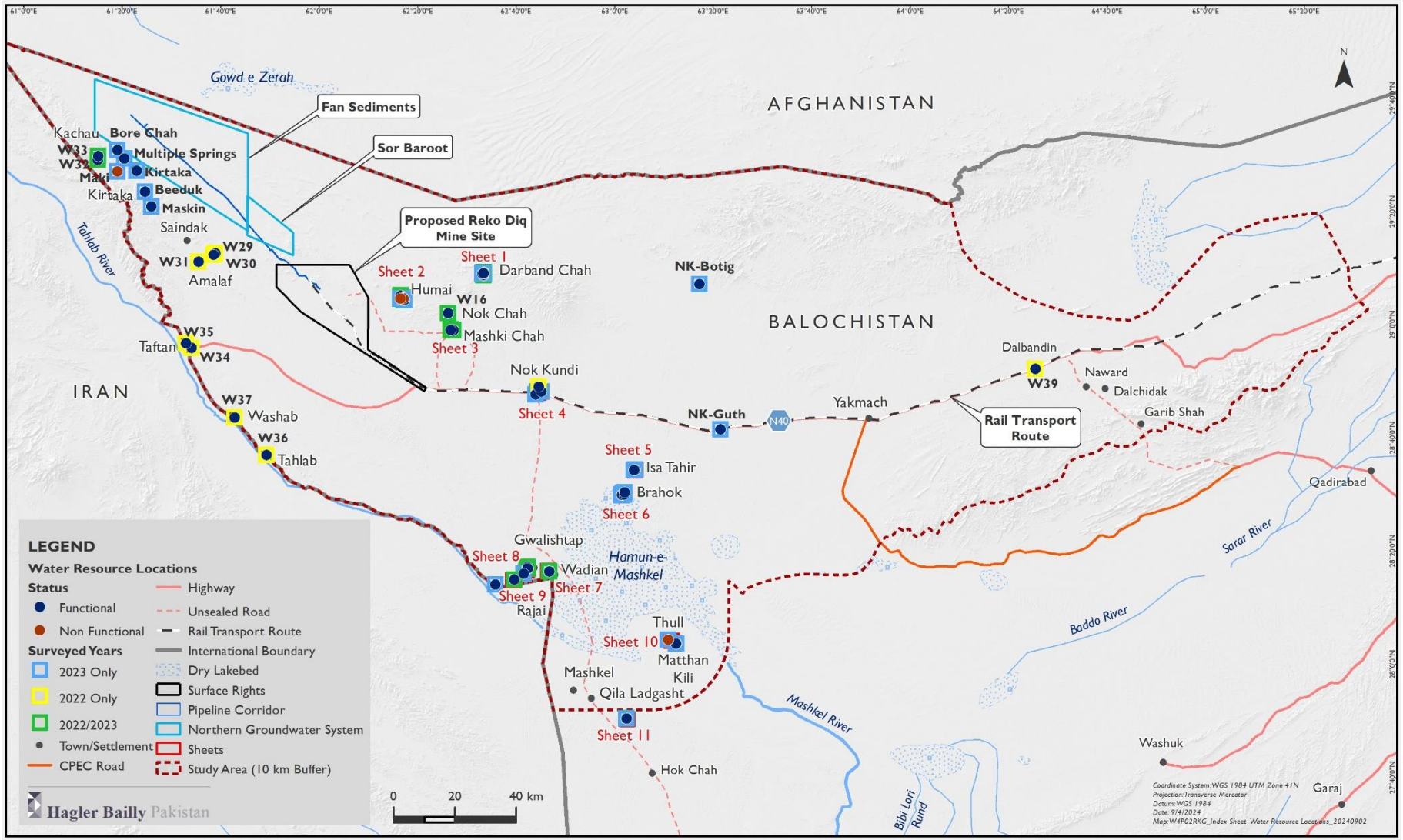


Exhibit 3.3: Surveyed Community Water Resources in Darband Chah – Sheet 1

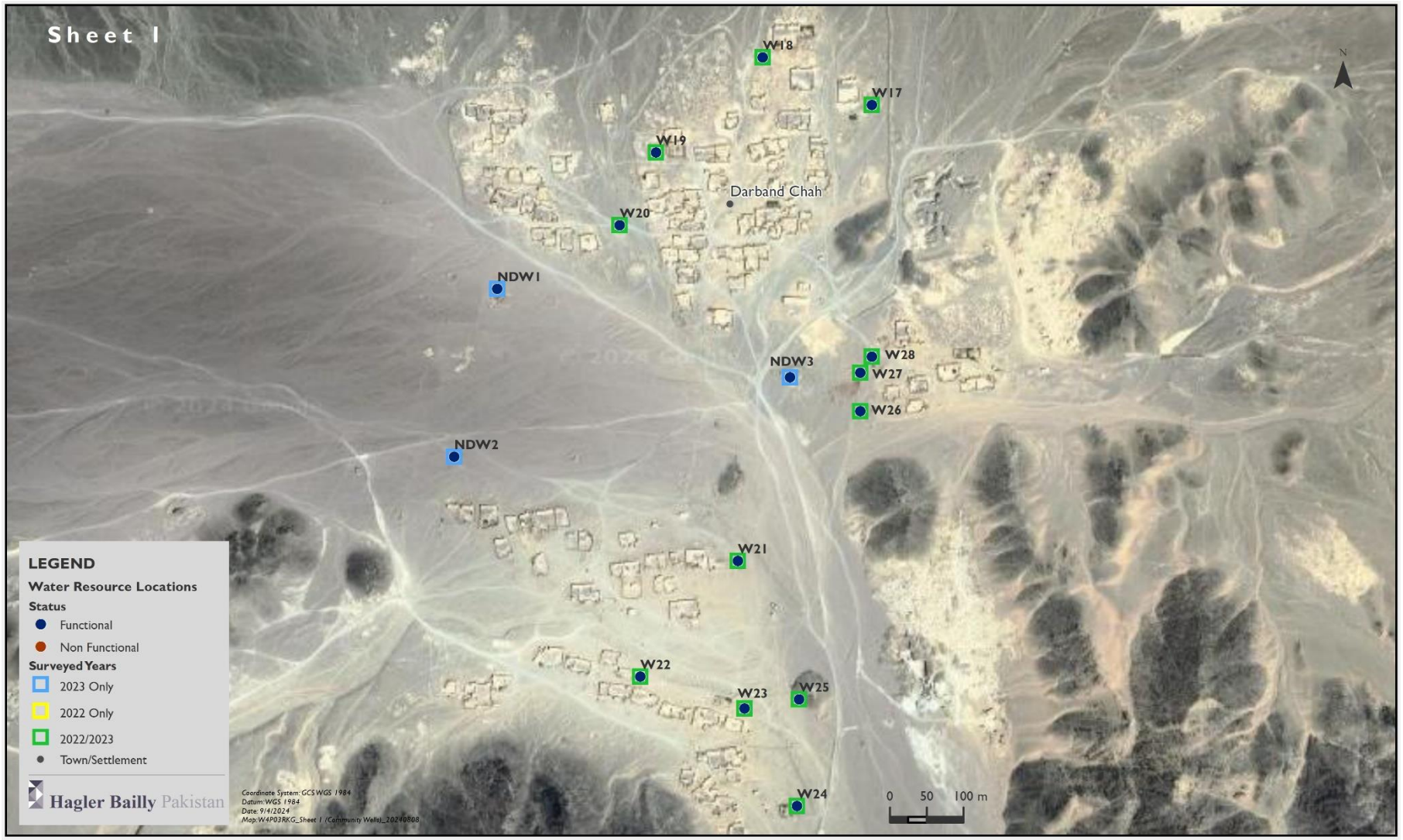


Exhibit 3.4: Surveyed Community Water Resources in Humai – Sheet 2

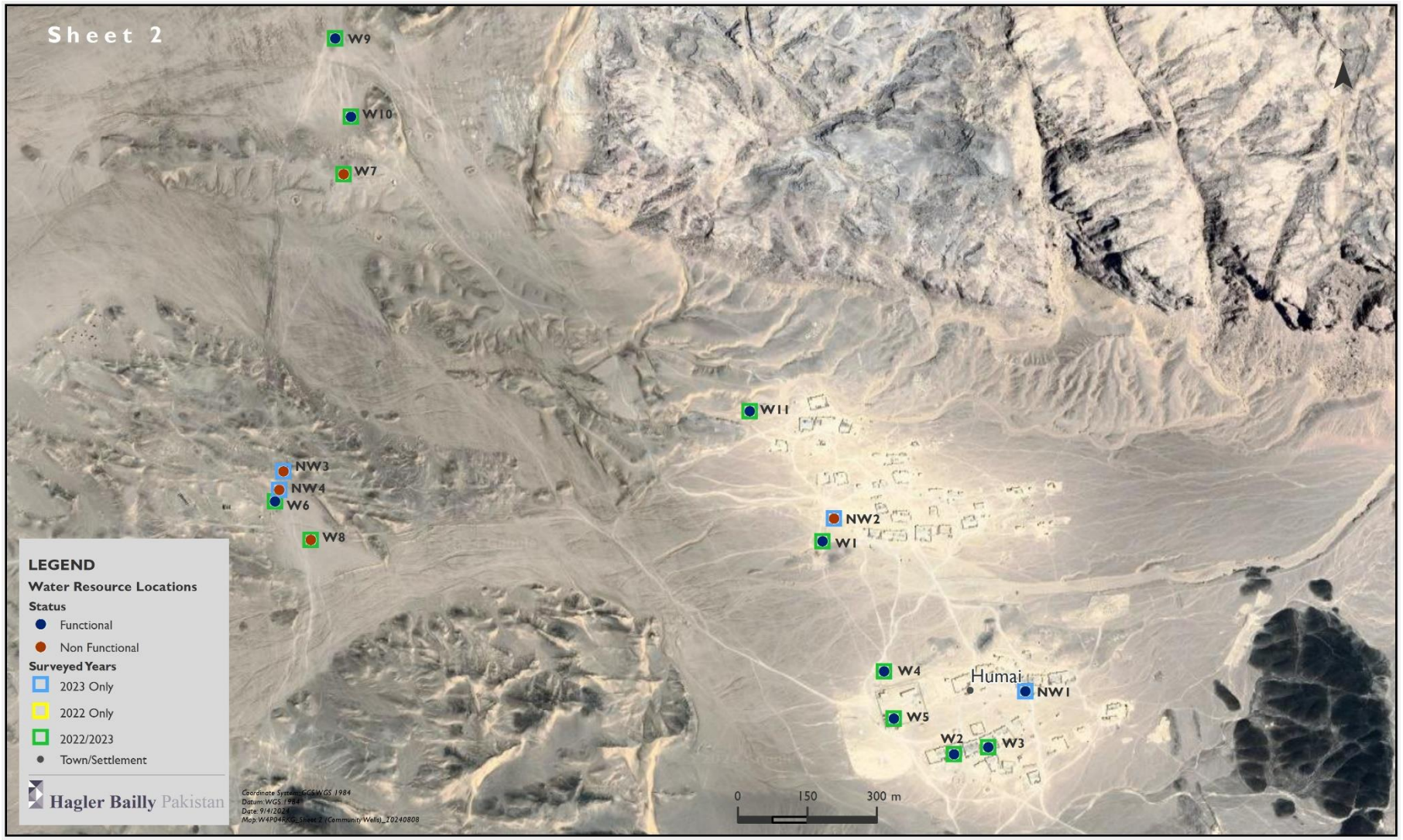


Exhibit 3.5: Surveyed Community Water Resources in Mashki Chah – Sheet 3

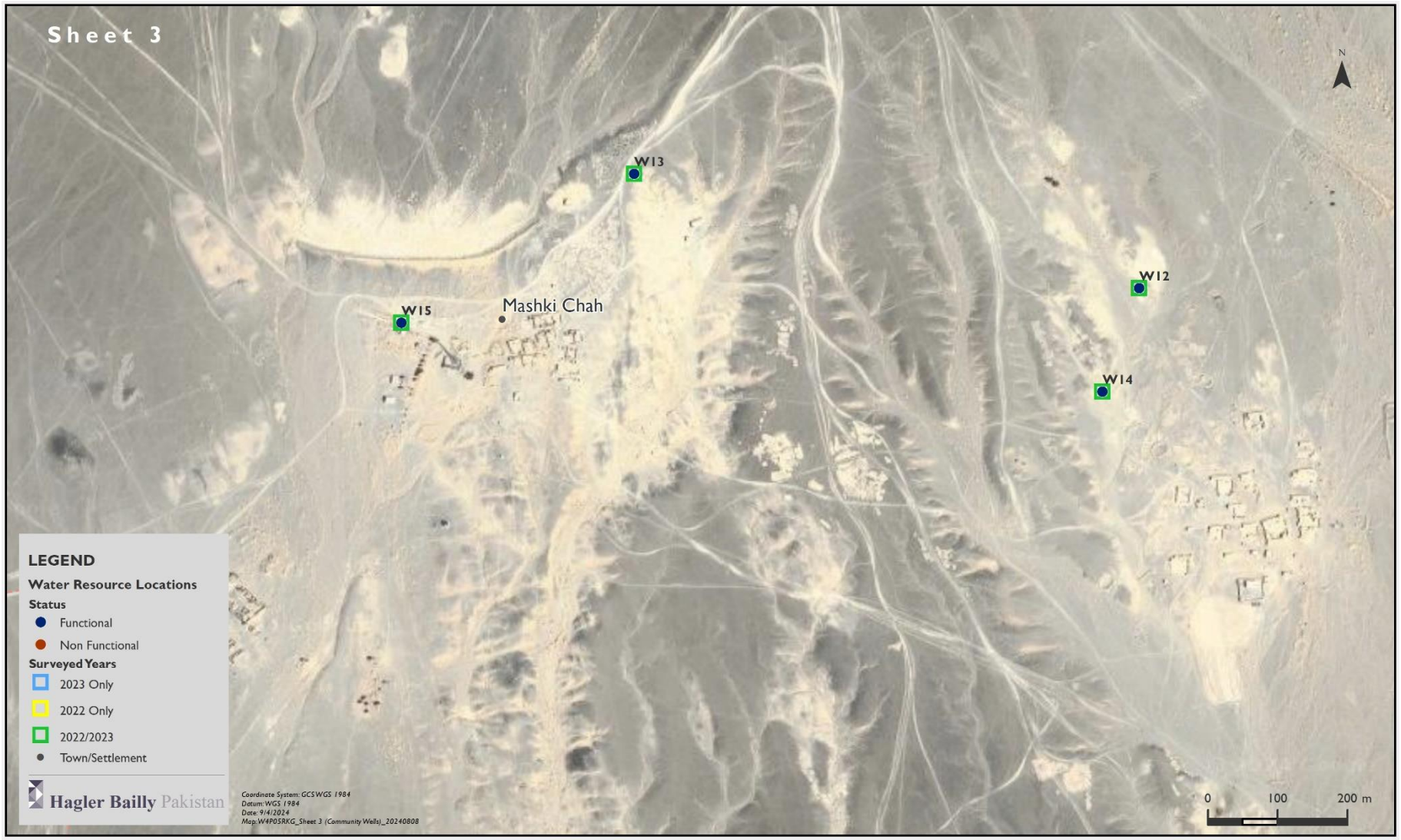


Exhibit 3.6: Surveyed Community Water Resources in Nok Kundi – Sheet 4

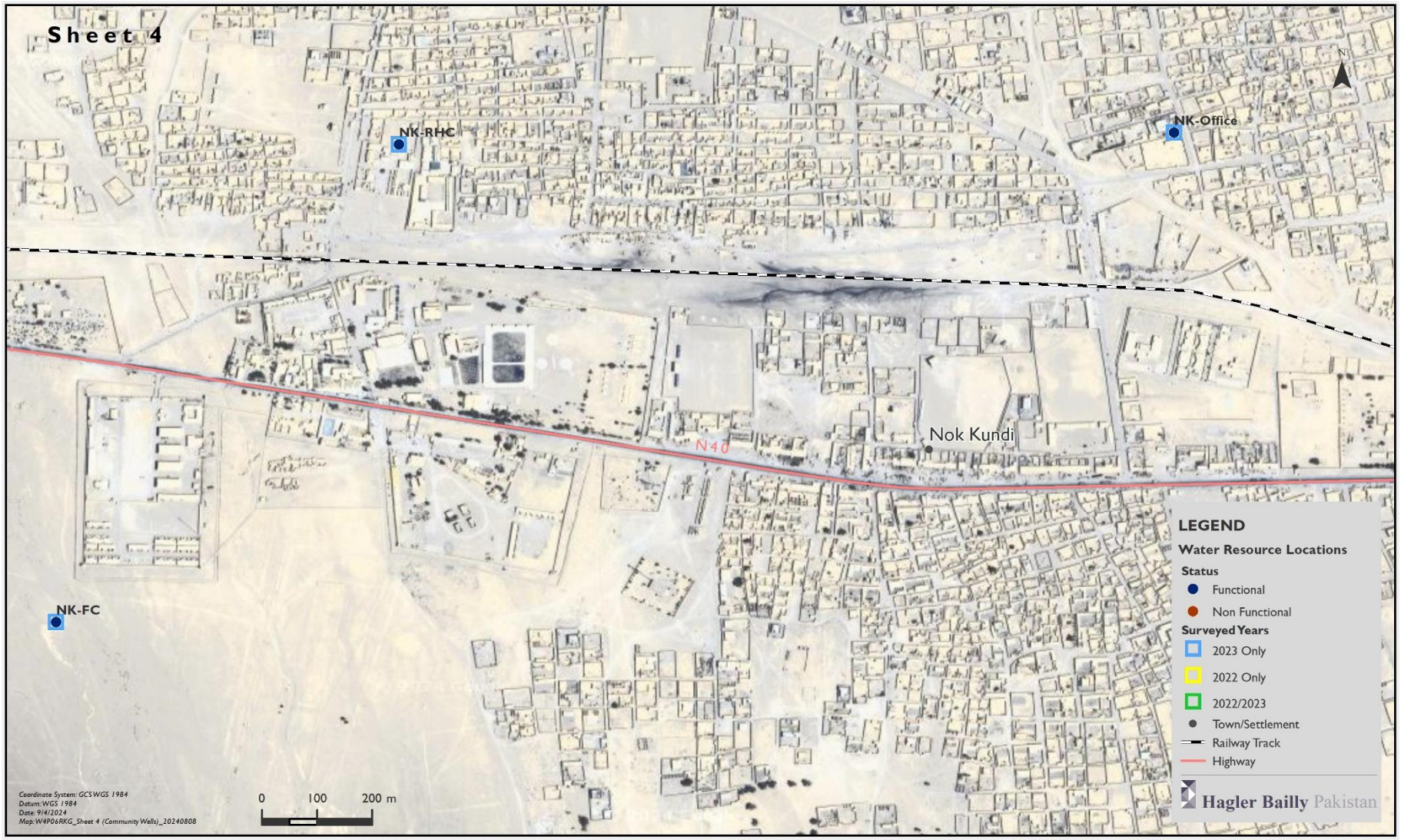


Exhibit 3.7: Surveyed Community Water Resources in Isa Tahir – Sheet 5

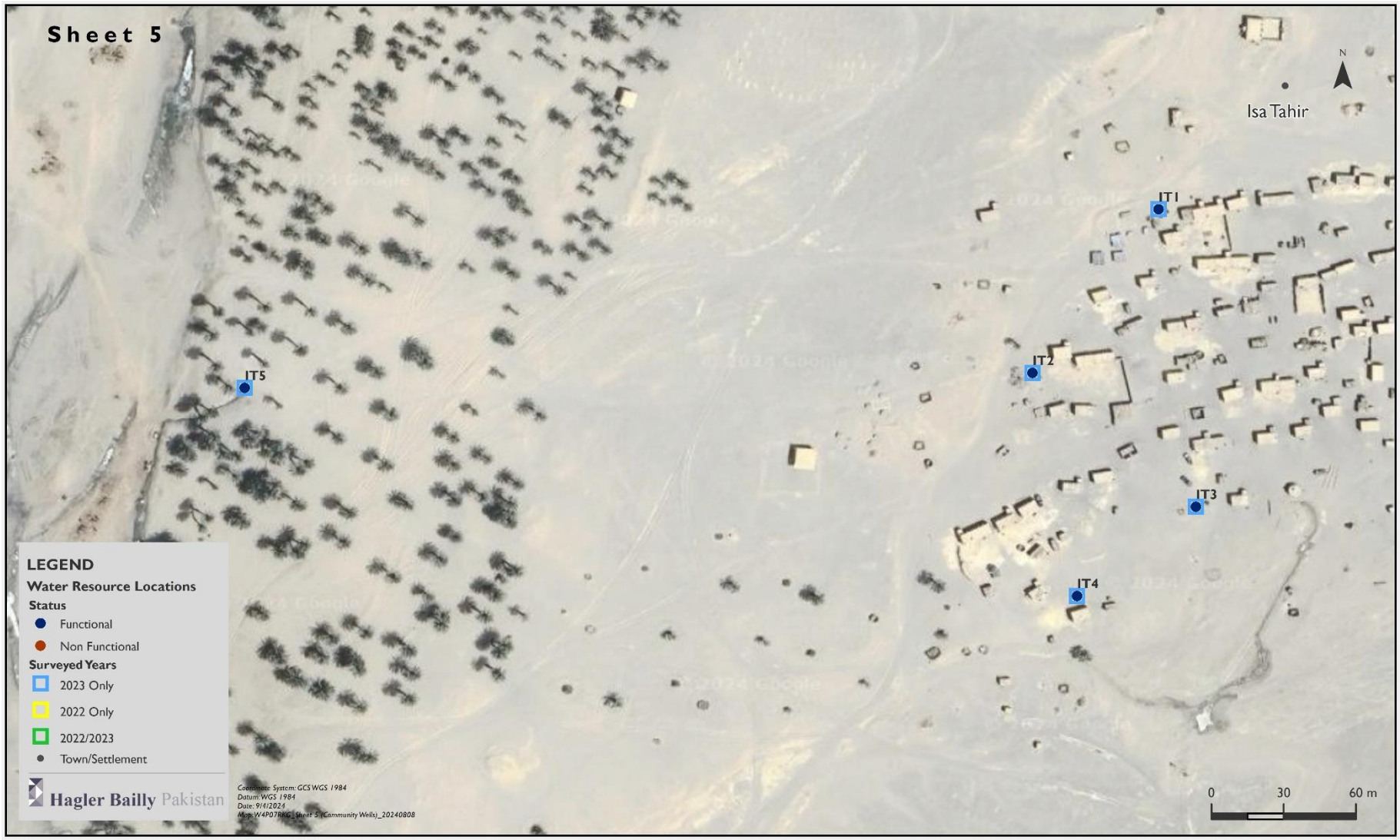


Exhibit 3.8: Surveyed Community Water Resources in Brahok – Sheet 6

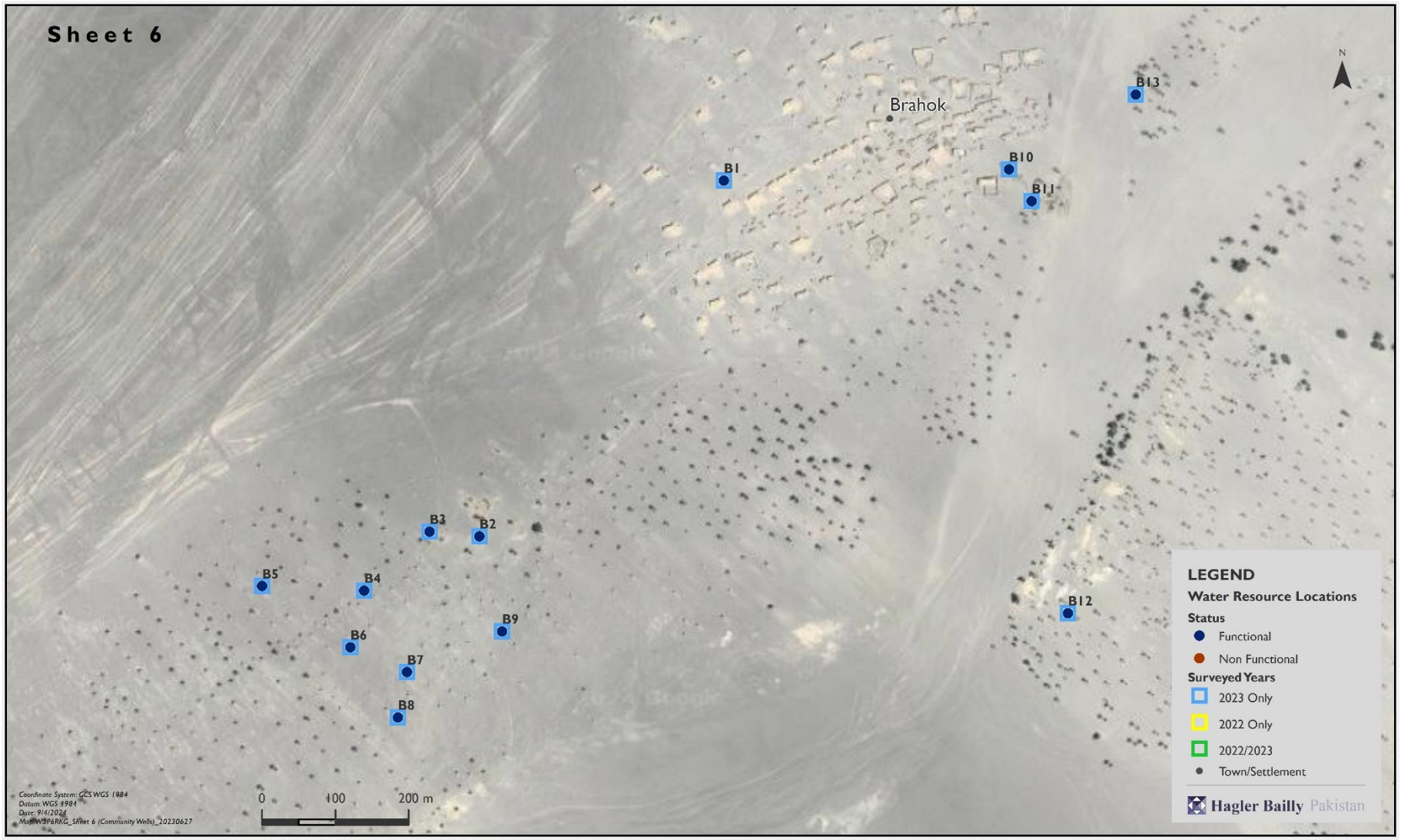


Exhibit 3.9: Surveyed Community Water Resources in Wadian – Sheet 7

Exhibit 3.10: Surveyed Community Water Resources in Gwalishtap – Sheet 8

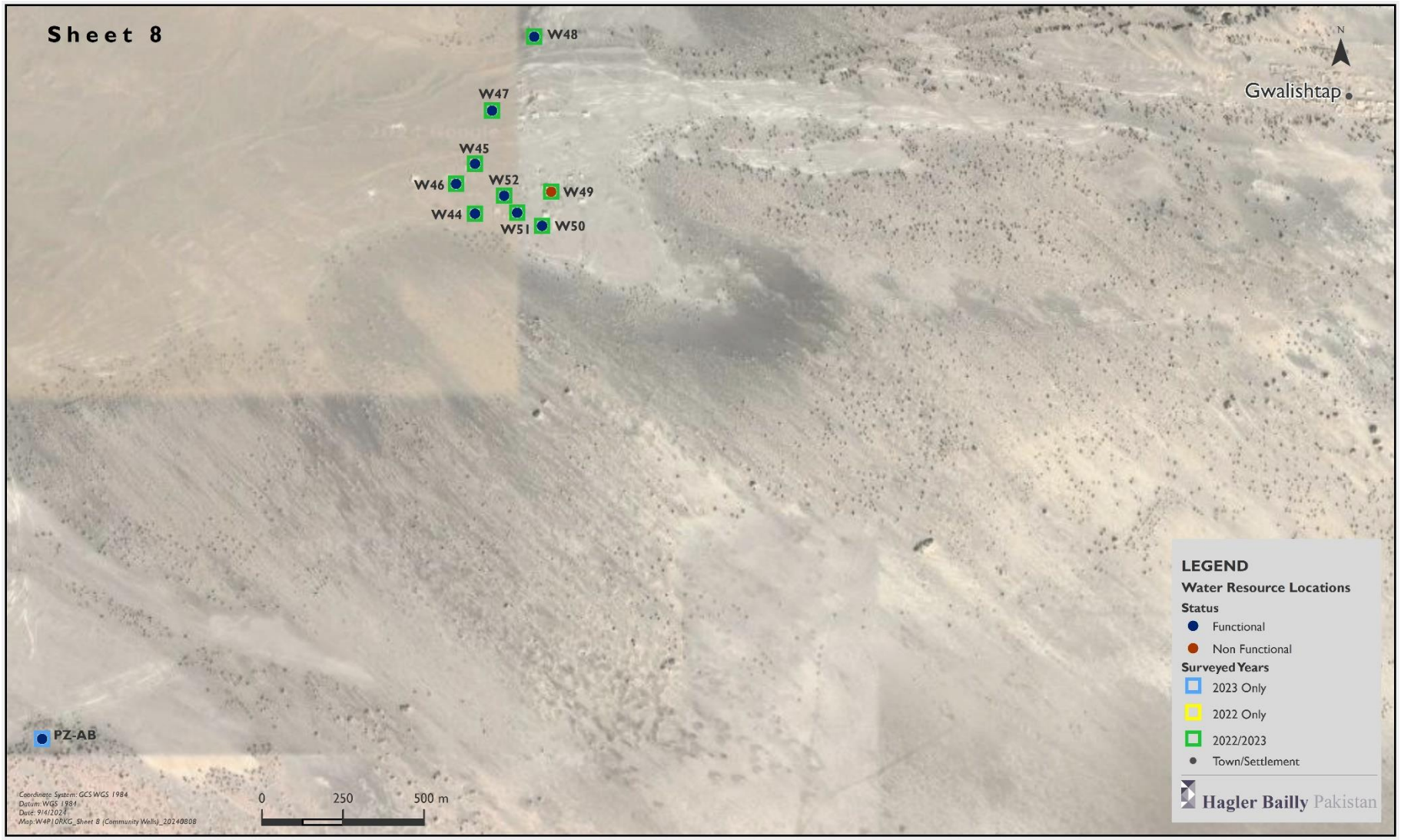


Exhibit 3.11: Surveyed Community Water Resources in Rajai – Sheet 9

Exhibit 3.12: Surveyed Community Water Resources in Matthan and Thull – Sheet 10

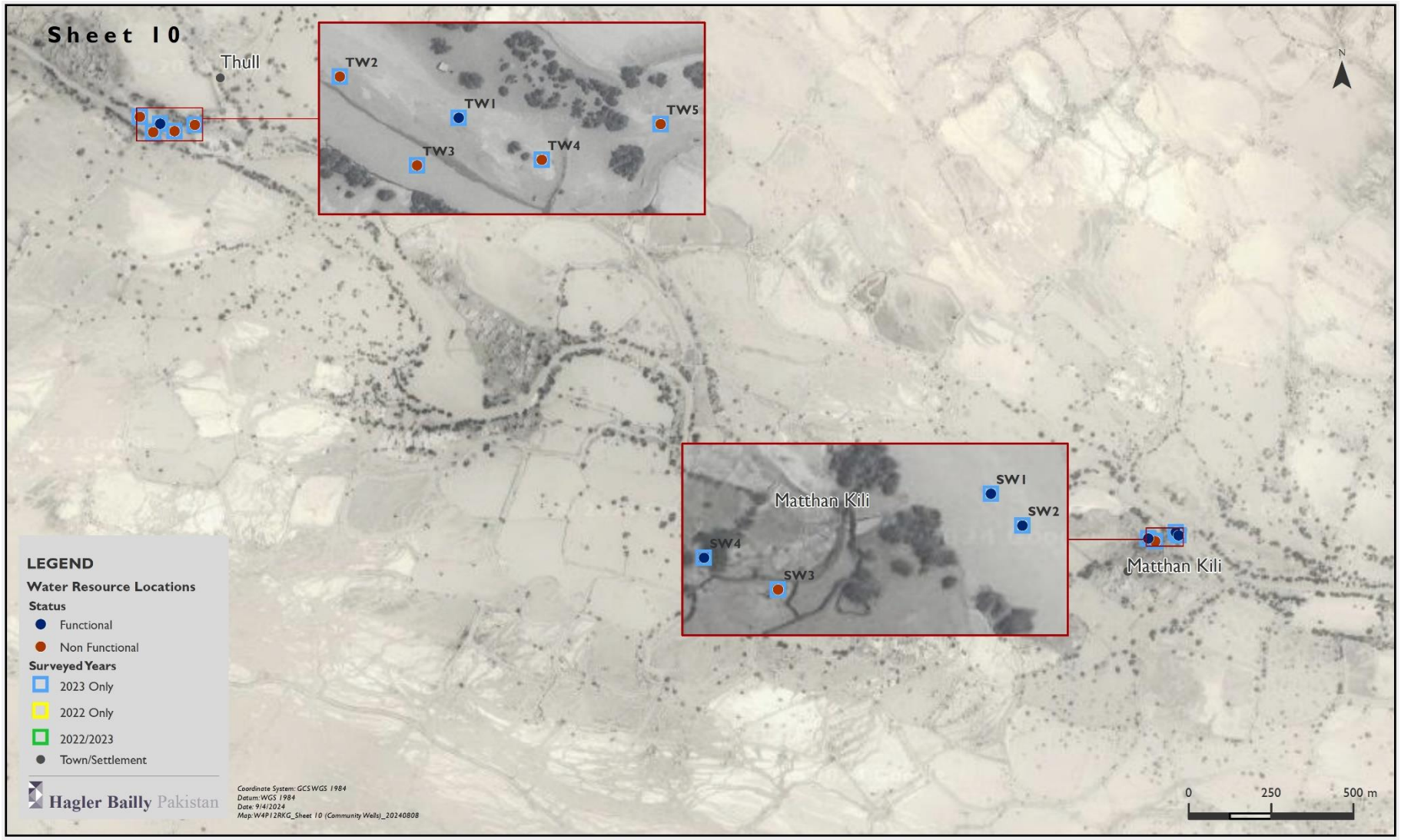


Exhibit 3.13: Surveyed Community Water Resources in Qila Ladgasht – Sheet 11

Exhibit 3.14: Photographs of Community Water Resources

Borehole at W1 – Humai

Dug well at W4 – Humai

Team doing on-site parameters testing at dug well W13– Mashki Chah

Team collecting water sample from Dug well at W12 – Mashki Chah

Dug well at W16 – Nok Chah

Borehole at W18 – Darband Chah

Borehole at NK-FC – Nok Kundi

Water sample collection from the borehole at NK-Botig – Nok Kundi

Dug well at IT1– Isa Tahir

Spring at IT5 – Isa Tahir

Dug well at B2– Brahok

Dug well at SW2– Matthan (Killi Saleem)

Dug well at W41– Qila Ladgasht

Borehole at RW1 – Patangaz

Borehole at W54 – Rajai

Dug well at W56 – Wadian

Spring/Karez at Beeduk

Spring/Karez at Kirtaka

Spring/Karez at Maskin

Spring/Karez at PZ-AB

Borehole at SW4 – Matthan (Killi Saleem)

Dug well at TW1– Thul

Spring/Karez at Bore Chah

Ghulam Qadir water spring

3.2 RDMC Boreholes

A hydrocensus was carried out from May 15, 2023, to June 03, 2023, to map the boreholes owned by Barrick.

The hydrocensus was conducted in 4 areas identified which included:

- Reko Diq Mine Site Area
- Northern Groundwater System
- Southern Groundwater System
- Other Settlements

Exhibit 3.16 illustrates the location map of surveyed boreholes.

The location ID have been assigned based on the location. The boreholes located within the Fan Sediment Water Supply area were IDed as '*FS'*, Reko Diq Mine Site Area were as '*WW'*, Patangaz Water Supply Area as '*PT'*, Nok Kundi Area as '*NK'*, Hamun-e-Mashkel Water Supply Area as '*HiM'*, and Upper Tahlab Water Supply Area as '*TCC'*. Within the location IDs, the term *'PB'* refers to production bore, and *'MB'* refers to monitoring bore.

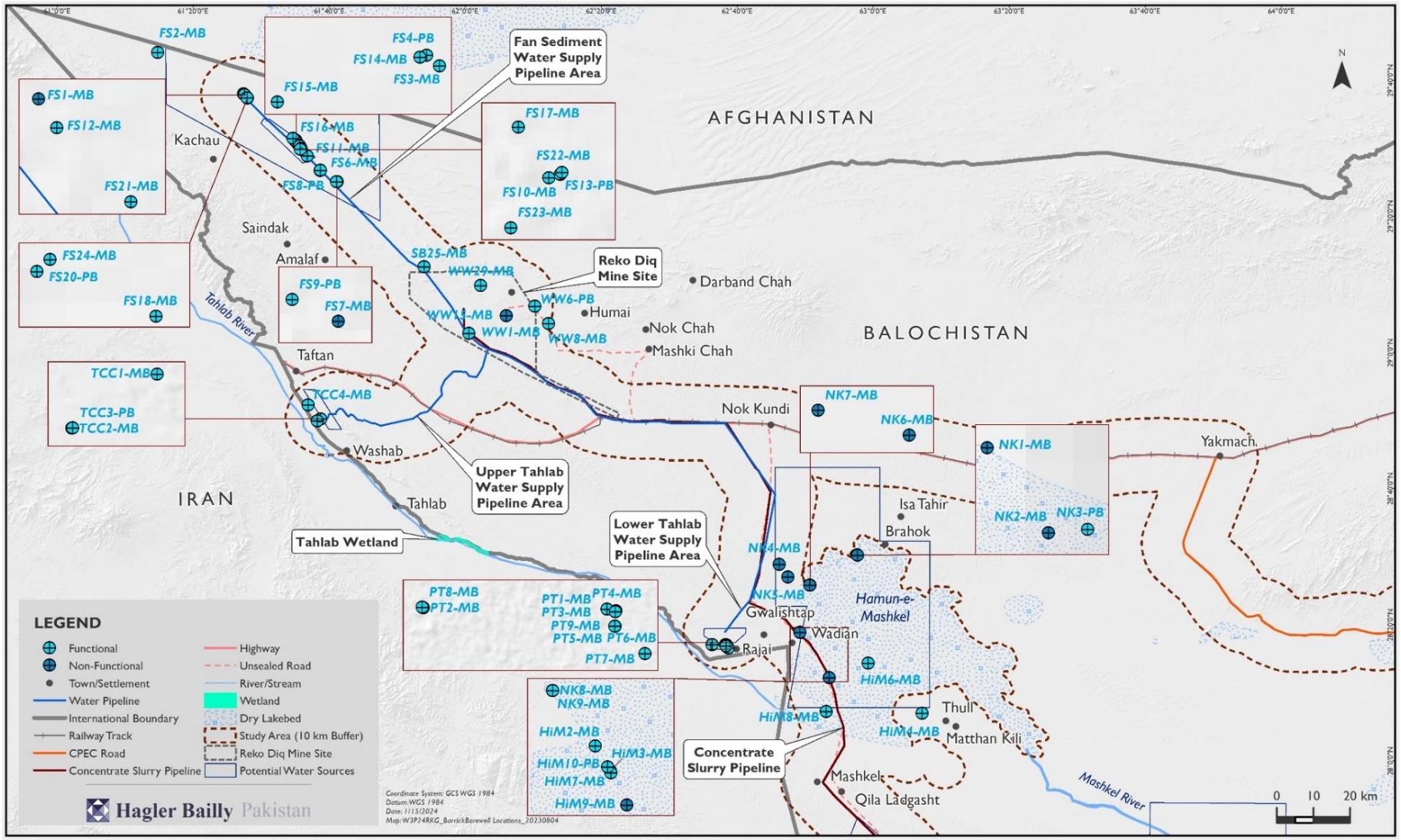
Exhibit 3.15: Details of the Boreholes Surveyed

Borehole ID	*Coordinates*	*Location*
FS1-MB	*29º38'01.06" N; 61º27'25.75" E*	Northern Groundwater System
FS2-MB	*29º44'05.37" N; 61º14'46.74" E*	
FS3-MB	*29º31'09.16" N; 61º35'07.36" E*	
FS4-PB	*29º31'09.77" N; 61º35'06.61" E*	
FS5-MB	*29º30'44.56" N; 61º35'21.71" E*	
FS6-MB	*29º26'44.49" N; 61º38'42.23" E*	
FS7-MB	*29º25'05.01" N; 61º41'10.45" E*	
FS8-PB	*29º26'47.47" N; 61º38'44.08" E*	
FS9-PB	*29º25'06.41" N; 61º41'07.50" E*	
FS10-MB	*29º29'57.79" N; 61º35'50.21" E*	
FS11-MB	*29º28'53.54" N; 61º36'46.97" E*	
FS12-MB	*29º37'58.51" N; 61º27'27.35" E*	
FS13-PB	*29º29'58.29" N; 61º35'51.84" E*	
FS14-MB	*29º31'09.67" N; 61º35'06.21" E*	
FS15-MB	*29º31'07.04" N; 61º34'57.81" E*	
FS16-MB	*29º31'27.44" N; 61º34'42.19" E*	
FS17-MB	*29º30'05.05" N; 61º35'45.84" E*	
FS18-MB	*29º37'24.07" N; 61º28'00.22" E*	
FS19-MB	*29º30'22.34" N; 61º35'40.18" E*	
FS20-PB	*29º37'25.76" N; 61º27'57.07" E*	
FS21-MB	*29º37'51.87" N; 61º27'33.99" E*	
FS22-MB	*29º29'58.59" N; 61º35'52.09" E*	
FS23-MB	*29º29'50.71" N; 61º35'44.77" E*	

Borehole ID	*Coordinates*	*Location*
FS24-MB	*29º37'25.40" N; 61º27'56.66" E*	
WW1-MB	*29°05'22.40" N; 62º06'05.20" E*	Reko Diq Mine Site Area
WW6-PB	*29°06'47.81" N; 62°10'15.59"E*	
WW8-MB	*29º04'13.40" N; 62º12'17.50" E*	
WW15-MB	*29°02'48.80" N; 62°00'34.80" E*	
WW29-MB	*29°09'50.49" N; 62°02'17.27" E*	
SB25-MB	*29°12'34.30" N; 61°54'00.30" E*	
Humai Well	*29º06'01.50" N; 62º16'47.40" E*	
PT1-MB	*28º16'59.80" N; 62º38'25.90" E*	Southern Groundwater System
PT2-MB	*28º17'01.91" N; 62º36'20.18" E*	
PT3-PB	*28º16'59.49" N; 62º38'25.37" E*	
PT4-MB	*28º17'00.90" N; 62º38'20.08" E*	
PT5-MB	*28º16'49.80" N; 62º38'25.29" E*	
PT6-MB	*28º16'59.26" N; 62º38'25.48" E*	
PT7-MB	*28º16'31.95" N; 62º38'44.88" E*	
PT8-MB	*28º17'02.20" N; 62º36'19.63" E*	
PT9-MB	*28º16'49.90" N; 62º38'25.14" E*	
NK1-MB	*28º30'12.80" N; 62º57'41.70" E*	Nok Kundi Area
NK2-MB	*28º30'11.00" N; 62º57'43.00" E*	
NK3-PB	*28º30'11.10" N; 62º57'43.80" E*	
NK4-MB	*28º28'49.60'' N; 62º46'13.40'' E*	
NK5-MB	*28º26'57.40" N; 62º47'29.90" E*	
NK6-MB	*28º25'47.50" N; 62º50'43.40" E*	
NK7-MB	*28º25'47.60" N; 62º50'43.00" E*	
NK8-MB	*28º18'50.00" N; 62º49'15.00" E*	
NK9-MB	*28º18'50.30" N; 62º49'14.60" E*	
HiM1-AB	*28º17'03.48" N; 62º50'49.08" E*	Southern Groundwater System
HiM2-MB	*28º15'36.60" N; 62º51'44.00" E*	
HiM3-MB	*28º14'10.30" N; 62º52'36.70" E*	
HiM4-MB	*28º06'57.80" N; 63º07'14.40" E*	
HiM5-AB	*28º08'02.85" N; 63º07'11.45" E*	
HiM6-MB	*28º14'17.37" N; 62º59'17.87" E*	
HiM7-MB	*28º14'02.72" N; 62º52'39.16" E*	
HiM8-MB	*28º07'11.45" N; 62º53'08.29" E*	
HiM9-MB	*28º12'10.20" N; 62º53'34.90" E*	
HiM10-PB	*28º14'23.80" N; 62º52'26.60" E*	
HiM Lake	*28º28'37.70" N; 62º53'44.70" E*	

Borehole ID	*Coordinates*	*Location*
HiM Spear	*28º28'38.30" N; 62º53'44.70" E*	
HiM-Spearpoint	*28º28'48.00" N; 62º54'00.00" E*	
TCC1-MB	*28°50'12.34" N; 61°38'44.99" E*	Other Settlements
TCC2-MB	*28°49'54.70" N; 61°38'17.13" E*	
TCC3-PB	*28°49'54.77" N; 61°38'17.36" E*	
TCC4-MB	*28°52'16.32" N; 61°36'54.40" E*	

Exhibit 3.16: Location of the RDMC Boreholes Surveyed



3.3 Survey Methodology and Equipment

The following information was collected at each water resource:

- Type of water resource i.e., dug well, borewell, spring/*karez*, artisan wells etc.
- Geographical description including nearest settlement name, neighbourhood (if applicable), and geographical coordinates,
- Operational status of the water resource i.e., functional or non-functional,
- Water level and depth to water table,
- Anecdotal information on usage including:
  - Approximate water extraction rate,
  - Approximate number of users, and
  - Water extraction method.
- In situ water quality testing of pH, electrical conductivity (EC), total dissolved solids (TDS), dissolved oxygen (DO), turbidity and temperature,
- Time and date of measurement, and
- Photographs.

3.3.1 Equipment Used for the Hydrocensus Data Collection

The equipment for the hydrocensus survey included instrument for in situ water quality testing and equipment for estimating water levels.

In Situ Testing

The in situ testing parameters included pH, EC, TDS, temperature, turbidity, and DO. Hanna Instruments Portable EC/TDC/Resistivity/Salinity Meter HI92192 was used for in situ testing of water quality parameters. The hydrocensus monitoring forms shared by DWE were filled during the field to note the well information and onsite testing parameters. In situ testing was conducted using the following approach:

- For springs, a direct water sample was collected and tested.
- For community wells, the water was collected using community available rope/bucket system or submersible pumps with pipes/ stainless bailers. At locations where direct collection from wells was not possible, water from the distribution point to the communities was collected and tested.
- For boreholes installed by Barrick, stainless-steel bailers were used to collect water for in situ testing.

Water Levels

Water levels were measured using water level metres (Geotech ET water level metres which allows measurement of up to 200 m depth).

Sample Collection, Handling and Shipment for Analysis

A total of 105 water quality samples were collected from the community water resources and Barrick boreholes identified and selected by Barrick and DWE. The samples were sent to the i2 Analytical Laboratory for analysis. These samples were collected using the following approach.

- The samples were collected using stainless-steel bailers. The bailers were disinfected by rinsing with distilled water and then with sample water before each use to avoid any contamination.
- Water samples were collected in amber glass bottles.
- For sample preservation, the temperature of water samples was maintained at less than 4ºC.

3.4 Exclusions and Assumptions

Some of the settlements including Taftan, Saindak, Amalaf, Washab, Tahlab, and Dalbandin were excluded from the 2023 Survey. These settlements were previously surveyed in 2022.

As part of the hydrocensus surveys, HBP team collected 59 water samples from water resources located and identified by Barrick. As the scope of these activities was limited to water sample collection and dispatch to the international laboratory, the water quality results of these samples are not included in this report.

The actual locations of some of the boreholes was 400-450 metres (m) away from the geographical information shared by Barrick and DWE. Additionally, the shared information provided identical geographical coordinates for three boreholes (identified as NK1, NK2, and NK3-PB). Two out of these boreholes (NK1 and NK2) were severely damaged, rendering the water table inaccessible and preventing data collection. The third borehole (NK3-PB) was found to be functional. Despite having similar coordinates, NK3-PB was identified based on the marking on the well casing and its diameter.

4. Results

This section presents the findings of hydrocensus survey of the community water resources and RDMC installed boreholes as part of the 2022 and 2023 Survey. This section also provides the details of water resource location, water levels, well depths, and in situ water quality analysis.

The following types of water resources were surveyed within the Study Area:

- **Dug Wells:** A dug well is created by manually digging a hole into the ground, to access shallow groundwater aquifers. Dug wells are often shallow, usually no deeper than 30 feet (10 meters), and have a large diameter. The walls of a dug well are often lined with materials like stones, bricks, or concrete to prevent collapse and contamination from surface water.
- **Boreholes:** These are the holes that are drilled and constructed by machines with a solid protective well structure and casing which makes these wells safer to use.
- **Springs/*Karez*:** This is an underground water resource created naturally without any human or machine effort.
- **Artesian Boreholes:** An artesian borehole is a type of hole in which water can flow to the surface naturally because of the natural pressure exerted on the aquifer. The pressure is created when water from a higher elevation area percolate down into the aquifer through the permeable layer and becomes trapped between the impermeable layers. If a hole is drilled into this aquifer, the water tends to rise to a level above the top of the aquifer, creating a flowing or spouting hole.

4.1 Community Water Resources

4.1.1 Mine Site and Surrounding Areas

Exhibit 4.1 and **Exhibit 4.2** provides results of field data for water quality analysis. **Exhibit 4.3, Exhibit 4.4** and **Exhibit 4.5** present laboratory analysis results and **Exhibit 4.6** provides pictures.

Exhibit 4.1: Mine Site and Sorrounding Areas – General Characteristics

Sample ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
Humai Well	429922.0	3219326.0	997.0	NA	NA	
W1	430952.1	3219251.9	977.3	79	NA	0.6
W11	430815.4	3219531.9	972.8	8	NA	0.3
NDW1	456819.5	3227652.3	1162.4	21	NA	0.3
NDW2	456764.6	3227425.7	1163.1	22	NA	0.5
NW3	429934.1	3219404.2	960.4	NA	NA	NA

Sample ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
NW4	429925.5	3219365.5	960.5	NA	NA	NA
W8	429986.9	3219259.4	961.6	NA	NA	NA
NW2	430971.6	3219298.6	977.4	NA	NA	NA
W12	447302.7	3209106.8	900.3	2	NA	0.6
NW1	431333.9	3218929.2	983.3	33	NA	0.8
W13	446666.9	3209268.6	908.9	5	NA	0.6
W14	447254.0	3208958.4	898.6	3	NA	0.2
W10	430069.0	3220165.6	960.2	3	NA	0.1
W15	446378.4	3209056.0	904.6	6	NA	0.4
NDW3	457166.4	3227538.9	1160.4	22	NA	1.2
W6	429917.5	3219349.9	957.3	5	NA	0.1
W16	445636.8	3214551.7	978.6	14	NA	0.6
W17	457261.6	3227905.3	1165.1	24	NA	0.3
W18	457136.9	3227983.1	1166.4	68	NA	0.9
W19	457007.1	3227838.5	1164.1	23	NA	0.7
W20	456963.8	3227737.2	1162.3	21	NA	0.6
W2	431199.4	3218795.6	980.2	11	NA	0.2
W21	457104.9	3227285.5	1157.7	20	NA	0.6
W22	456984.4	3227128.6	1160.5	21	NA	0.5
W23	457108.3	3227088.6	1157.2	18	NA	0.6
W24	457170.5	3226951.5	1154.8	18	NA	0.4
W25	457174.4	3227100.7	1153.9	20	NA	0.9
W26	457250.0	3227486.4	1159.2	21	NA	0.4
W27	457245.3	3227537.9	1159.9	37	NA	NA
W28	457262.3	3227560.5	1160.6	21	NA	0.5
W29	369629.5	3234161.1	899.5	24	NA	NA
W30	368980.8	3233635.9	909.7	30	NA	NA
W3	431264.9	3218811.5	981.4	13	NA	0.2
W31	364098.4	3231368.8	996.8	55	NA	
W4	431070.4	3218974.5	978.0	9	NA	0.4
W7	430051.5	3220053.9	960.6	NA	NA	NA
W9	430037.7	3220338.3	960.3	3	NA	0.5

Exhibit 4.2: Mine Site and Surroundings Field Data – Community Locations

Bore ID	Date[1]	Water Level (mL)	PH		EC (mS/m)		TDS (ppm)		Temp (ºC)		DO (mg/L)		Turbidity (NTU)	
			2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
W1	9/13/2022	8.01	7.23	6.75	567	637.00	4010	3185	NA	28.91	NA	3.95	NA	0.63
W10	9/13/2022	2.63	7.78	7.46	491	504.00	3480	2520	NA	28.98	NA	5.66	NA	5.41
W11	9/13/2022	7.81	7.95	7.81	368	405.30	2580	2026	NA	21.71	NA	7.27	NA	120.00
W12	9/14/2022	1.10	8.03	7.59	388	390.90	2760	1955	NA	24.54	NA	7.22	NA	50.50
W13	9/14/2022	1.45	7.50	7.13	395	379.90	2790	1899	NA	25.95	NA	6.19	NA	6.93
W14	9/14/2022	2.91	7.68	7.23	418	417.30	2980	2087	NA	27.00	NA	6.16	NA	17.30
W15	9/14/2022	5.01	7.72	7.07	399	396.50	2820	1982	NA	25.15	NA	6.64	NA	2.74
W16	9/14/2022	13.94	8.04	8.51	371	370.50	2640	1852	NA	33.33	NA	9.16	NA	2.92
W17	9/15/2022	23.72	7.30	7.14	413	431.50	2920	2175	NA	25.83	NA	5.66	NA	2.99
W18	9/15/2022	25.75	- NA	6.80	NA	226.90	-	1135	NA	26.64	NA	6.06	NA	3.23
W19	9/15/2022	22.27	6.80	7.31	451	434.00	3200	2170	NA	32.87	NA	4.82	NA	8.95
W2	9/13/2022	10.34	7.68	7.23	345	343.60	2440	1718	NA	26.62	NA	5.49	NA	1.85
W20	9/15/2022	20.88	7.14	7.23	405	390.80	2860	1954	NA	25.84	NA	5.99	NA	9.99
W21	9/15/2022	18.16	6.52	7.04	520	550.90	3700	2754	NA	25.08	NA	8.34	NA	4.52
W22	9/15/2022	20.38	6.86	6.79	437	434.40	3100	2172	NA	26.65	NA	5.44	NA	0.57
W23	9/15/2022	17.34	6.90	7.48	511	534.20	3620	2671	NA	24.78	NA	8.05	NA	1.92
W24	9/15/2022	16.05	7.41	6.50	525	508.00	3730	2540	NA	28.16	NA	4.87	NA	1.75
W25	9/15/2022	16.50	6.96	7.26	437	425.80	3100	2129	NA	24.74	NA	5.04	NA	9.99

[1] Water levels recorded in 2022 are not representative of static water level as these were not measured but recorded from the landowner

Bore ID	*Date*[1]	*Water Level (mL)*	*PH*		*EC (mS/m)*		*TDS (ppm)*		*Temp (ºC)*		*DO (mg/L)*		*Turbidity (NTU)*	
			2022	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*
W26	9/15/2022	18.47	8.05	7.18	246	389.90	1750	1949	NA	26.12	NA	4.48	NA	9.99
W27	9/15/2022	19.22	7.96	6.52	498	477.50	3610	2388	NA	27.12	NA	4.86	NA	1.59
W28	9/15/2022	20.49	7.89	7.76	488	326.90	3720	1634	NA	32.08	NA	5.73	NA	1.20
W3	9/13/2022	12.67	7.72	7.23	326	327.60	2380	1638	NA	27.60	NA	5.24	NA	20
W4	9/18/2022	8.28	8.08	7.27	360	373.20	2580	1867	NA	24.03	NA	6.15	NA	225
W5	9/18/2022	RO Plant	8.35	7.75	20	17.80	156	89	NA	29.97	NA	6.11	NA	0.99
W6	9/13/2022	4.52	7.76	7.65	428	427.40	3010	2137	NA	24.32	NA	7.41	NA	3.63
W7	9/28/2022	7.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W8	9/28/2022	7.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W9	9/28/2022	2.39	7.98	7.81	488	495.30	3480	2477	NA	22.71	NA	6.54	NA	4.05
NDW1	9/28/2022	20.69	6.51	NA	528.60	NA	2643	NA	26.88	NA	5.06	NA	3.56	NA
NDW2	9/29/2022	21.60	6.55	NA	484.40	NA	2422	NA	26.43	NA	4.22	NA	9.99	NA
NDW3	9/29/2022	18.50	7.39	NA	421.50	NA	2107	NA	25.94	NA	5.19	NA	5.97	NA
NK-Botig	9/29/2022	8.01	7.94	NA	170.80	NA	854	NA	26.68	NA	3.54	NA	5.51	NA
NW1	9/29/2022	15.57	7.19	NA	327.80	NA	1639	NA	27.65	NA	5.27	NA	1.96	NA
NW2	9/29/2022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NW3	9/29/2022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NW4	9/13/2022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W38	9/29/2022	20.00	8.23	NA	1.98	NA	1380	NA	NA	NA	NA	NA	NA	NA
W39	9/29/2022	55.00	8.77	NA	1.48	NA	1060	NA	NA	NA	NA	NA	NA	NA
NK-FC	9/29/2022	11.41	7.40	NA	1165.00	NA	5825	NA	30.21	NA	3.30	NA	361.00	NA

Bore ID	*Date*[1]	*Water Level (mL)*	*PH*		*EC (mS/m)*		*TDS (ppm)*		*Temp (ºC)*		*DO (mg/L)*		*Turbidity (NTU)*	
			2022	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*
NK-Guth	9/29/2022	76.51	8.15	NA	146.10	NA	731	NA	34.60	NA	3.18	NA	3.52	NA
NK-Office	9/29/2022	9.90	7.20	NA	866.10	NA	4331	NA	29.55	NA	3.39	NA	17.70	NA
NK-RHC	10/1/2022	8.21	7.18	NA	741.70	NA	3708	NA	31.49	NA	3.27	NA	4.98	NA
Humai Well	10/1/2022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Exhibit 4.3: Mine Site and Surrounds Laboratory Data

Sample ID	*pH*	*EC (mS/m)*	*TDS (mg/L)*	*Turbidity (NTU)*
W13	7.80	390.00	2700.00	NA
W12	8.10	400.00	2800.00	1.6
W14	7.50	430.00	2900.00	NA
W15	7.60	410.00	2900.00	17
W16	7.90	380.00	2600.00	1.7
W6	7.60	440.00	3500.00	5.6
NK-Guth	8.20	150.00	910.00	17
NK-FC	7.70	1300.00	8500.00	4.7
NK-Botig	8.00	170.00	1100.00	14
NK-RHC	7.40	760.00	6100.00	NA
NK-Office	7.60	900.00	7100.00	NA

Exhibit 4.4: RDMC Boreholes at Mine Site –Inorganic Compounds (Laboratory Analysis)

Sample ID	*SO_4 mg/l*	*NO^3-N mg/L*	*NH_4 mg/l*	*HCO^3 mg/L*
W13	662	4.31	0.11	250
W12	661	4.09	0.06	250
W14	736	3.43	0.08	310
W15	682	4.26	NA	280
W16	610	7.27	0.03	190
W6	803	2.12	0.07	200
NK-Guth	217	2.62	NA	120
NK-FC	1750	0.22	0.13	120
NK-Botig	197	4.24	NA	200
NK-RHC	1530	NA	NA	180
NK-Office	2460	NA	NA	75

Exhibit 4.5: RDMC Boreholes at Mine Site –Heavy Metal Parameters (Laboratory Analysis)

Sample ID	*As mg/l*	*Cd mg/l*	*Cr mg/l*	*Cu mg/l*
W13	0.01	0.000090	0.0014	0.0035
W12	0.01	0.000040	0.0011	0.0034

Sample ID	*As mg/l*	*Cd mg/l*	*Cr mg/l*	*Cu mg/l*
W14	0.01	0.000060	0.0006	0.0024
W15	0.01	0.000020	0.0017	0.0035
W16	0.00	0.000020	0.0069	0.0032
W6	0.01	0.000030	0.0015	0.0030
NK-Guth	0.00	NA	0.0150	0.0018
NK-FC	0.00	NA	0.0003	NA
NK-Botig	0.01	NA	0.0044	0.0024
NK-RHC	0.04	0.000030	0.0055	0.0029
NK-Office	0.02	NA	0.0048	0.0011

Exhibit 4.6: Photographs of Community Water Resources Surrounding the Mine Site

Borehole at W1 – Humai

Dug well at W4 – Humai

Team doing on-site parameters testing at dug well W13– Mashki Chah

Team collecting water sample from Dug well at W12 – Mashki Chah

Dug well at W16 – Nok Chah

Borehole at W18 – Darband Chah

4.1.2 Northern Groundwater System

Exhibit 4.7 and **Exhibit 4.8** provide results of field data for water quality analysis. **Exhibit 4.9, Exhibit 4.10** and **Exhibit 4.11** present laboratory analysis results and **Exhibit 4.12** provides pictures.

Exhibit 4.7: Northern Groundwater System – General Characteristics

Sample ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
Beeduk	346597	3254262	1167.5	NA	NA	0.0
Bore Chah	337565	3267824	956.6	NA	NA	0.0
Kirtaka	343922	3261119	996.7	5	NA	1.0
Maki	337595	3260876	1311.2	NA	NA	NA
Maskin	348635	3249434	1300.9	5	NA	0.0
Multiple Springs	339811	3265092	960.8	NA	NA	0.0
W32	331210	3264650	1166.7	NA	NA	0.0
W33	331328	3265838	1141.2	NA	NA	0.0

Exhibit 4.8: Northern Groundwater System Field Data – Community Locations

Bore ID	*Date*[2]	*Water Level (mL)*	*PH*		*EC (mS/m)*		*TDS (ppm)*		*Temp (ºC)*		*DO (mg/L)*		*Turbidity (NTU)*	
			2022	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*
W32	9/18/2022	BDL	9.25	7.68	2.74	277.70	1900.00	1388.00	NA	25.28	NA	3.59	NA	5.09
W33	9/18/2022	BDL	7.87	7.63	0.92	83.80	647.00	419.00	NA	32.17	NA	3.23	NA	3.84
Bore Chah	5/22/2023	BDL	7.93	NA	287.50	NA	1438.00	NA	26.67	NA	3.58	NA	3.99	NA
Multiple Springs	5/22/2023	BDL	7.58	NA	494.50	NA	2473	NA	28.90	NA	3.43	NA	3.19	NA
Kirtaka	5/22/2023	4.84	8.00	NA	457.10	NA	2285	NA	27.35	NA	3.50	NA	54.30	NA
Maki	5/23/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beeduk	5/23/2023	BDL	7.55	NA	147.10	NA	735	NA	27.12	NA	3.48	NA	2.94	NA
Maskin	5/23/2023	4.83	8.07	NA	294.70	NA	1473	NA	26.13	NA	3.51	NA	1.35	NA

[2] Water levels recorded in 2022 are not representative of static water level as these were not measured but recorded from the landowner

Exhibit 4.9: Northern Groundwater System Laboratory Data – Community Locations

Sample ID	*pH*	*EC (mS/m)*	*TDS (mg/L)*	*Turbidity (NTU)*
W33	8.50	91.00	720	4.60
W32	8.30	270.00	1800	5.20
Kirtaka	7.70	500.00	3600	13
Bore Chah	8.10	300.00	2400	2.60
Maskin	8.40	310.00	2100	2.60
Beeduk	7.90	160.00	1300	NA
Multiple Springs	7.80	490.00	4100	4.70

Exhibit 4.10: RDMC Boreholes at Northern Groundwater System –Inorganic Compounds (Laboratory Analysis)

Sample ID	*SO_4 mg/l*	*NO^3-N mg/L*	*NH_4 mg/l*	*HCO^3 mg/L*
W33	188	4.99	NA	120
W32	607	4.90	0.03	150
Kirtaka	1120	0.09	NA	50
Bore Chah	1110	1.03	NA	79
Maskin	714	5.62	NA	130
Beeduk	388	6.01	NA	150
Multiple Springs	1390	0.13	NA	85

Exhibit 4.11: RDMC Boreholes at Mine Site –Heavy Metal Parameters (Laboratory Analysis)

Sample ID	*As mg/l*	*Cd mg/l*	*Cr mg/l*	*Cu mg/l*
W33	0.01	NA	0.0015	0.0067
W32	0.02	0.000030	0.0036	0.0043
Kirtaka	0.35	0.000080	0.0003	0.0041
Bore Chah	0.00	0.000050	0.0004	0.0032
Maskin	0.01	NA	0.0014	0.0022
Beeduk	0.00	NA	0.0030	0.0036
Multiple Springs	0.00	0.000040	0.0003	0.0038

Exhibit 4.12: Photographs of Community Water Resources in the Northern Groundwater System

Spring/Karez at Beeduk

Spring/Karez at Kirtaka

Spring/Karez at Maskin

Spring/Karez at Bore Chah

4.1.3 Southern Groundwater System

Exhibit 4.13 and **Exhibit 4.14** provide results of field data for water quality analysis. **Exhibit 4.15, Exhibit 4.16** and **Exhibit 4.17** present laboratory analysis results and **Exhibit 4.18** provides pictures.

Exhibit 4.13: Southern Groundwater System – General Characteristics

Sample ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
W40	471585	3131682	521.9	6.18	NA	0.2
W41	475175	3190545	701.2	4.74	NA	NA
W42	637416	3196418	851.4	6.57	NA	NA
W43	461016	3125995	505.7	40.99	NA	0.7
W44	474720	3188940	685.7	6.49	NA	0.3
W45	534573	3176613	642.4	6.35	NA	0.0
W46	527635	3224009	991.4	69.22	NA	1.7
W47	470237	3129529	520.8	43.66	NA	0.0
W48	506315	3163394	528.6	2.81	NA	0.6
W49	506649	3163468	531.3	NA	NA	0.0
W50	506604	3163398	531.1	6.37	NA	0.0
W51	506661	3163343	531.2	6.59	NA	0.0
W52	506618	3163309	530.2	7.03	NA	0.0
W53	503217	3156008	505.2	7.85	NA	0.6
W54	502725	3155891	506.2	48.52	NA	0.0
W55	503065	3155903	506.2	3.97	NA	0.8
W56	503092	3155862	506.3	5.77	NA	0.4
B1	503136	3155307	502.5	2.83	NA	0.3
B10	502428	3155408	504.6	82.67	NA	0.3
B11	503897	3082181	539.4	4.11	NA	0.0

Sample ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
B12	503930	3082181	539.6	3.65	NA	0.3
B13	503820	3082205	539.5	1.97	NA	0.6
B2	502457	3155276	504.2	3.89	NA	0.0
B3	502276	3155255	503.6	2.99	NA	0.0
B4	502343	3155221	504.1	2.79	NA	0.0
B5				2.76	NA	NA
B6				2.48	NA	NA
B7				3.00	NA	NA
B8				1.95	NA	NA
B9				2.94	NA	NA
IT1				5.18	NA	NA
IT2				4.73	NA	NA
IT3				6.79	NA	NA
IT4				4.64	NA	NA
IT5				1.39	NA	NA
PZ-AB				NA	NA	NA
QN1				5.30	NA	NA
QN2				4.67	NA	NA
QN3				4.64	NA	NA
RW1				23.76	NA	NA
SW1				11.98	NA	NA
SW2				7.48	NA	NA

Sample ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
SW3				NA	NA	NA
SW4				16.87	NA	NA
TW1				9.74	NA	NA
TW2				Dry	NA	NA
TW3				Dry	NA	NA
TW4				9.24	NA	NA
TW5				6.43	NA	NA

Exhibit 4.14: Southern Groundwater System Field Data – Community Locations

Bore ID	*Date*[3]	*Water Level (mL)*	*PH*		*EC (mS/m)*		*TDS (ppm)*		*Temp (ºC)*		*DO (mg/L)*		*Turbidity (NTU)*	
			2022	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*
W40	9/28/2022	4.29	8.24	7.78	1.21	62.50	866	312	NA	28.55	NA	7.08	NA	9.61
W41	9/28/2022	4.22	8.24	7.68	1.47	150	1050	750	NA	26.79	NA	5.62	NA	9.99
W42	9/28/2022	4.24	8.17	7.64	1.29	120.70	913	604	NA	28.82	NA	4.81	NA	5.41
W43	9/28/2022	4.64	8.02	7.71	1.23	128.50	876	642	NA	29.66	NA	6.12	NA	9.63
W44	9/29/2022	5.60	7.86	7.31	10.74	1180	7700	5902	NA	28.08	NA	5.87	NA	7.48
W45	9/29/2022	5.87	8.50	7.68	5.42	528	3850	2640	NA	27.13	NA	6.37	NA	9.99
W46	9/29/2022	6.12	8.14	7.45	5.71	461.50	4040	2308	NA	31.31	NA	5.90	NA	5.72
W47	9/29/2022	6.38	8.10	7.52	4.95	532	3530	2660	NA	32.24	NA	5.86	NA	4.57
W48	9/29/2022	2.53	8.39	7.75	4.81	453.50	3400	2267	NA	31.02	NA	6.69	NA	3.28

[3] Water levels recorded in 2022 are not representative of static water level as these were not measured but recorded from the landowner

Bore ID	Date[3]	Water Level (mL)	PH		EC (mS/m)		TDS (ppm)		Temp (ºC)		DO (mg/L)		Turbidity (NTU)	
			2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
W49	9/29/2022	12	8.27	NA	10.20	NA	7220	NA	NA	NA	NA	NA	NA	NA
W50	9/29/2022	5.30	7.96	7.30	10.01	1939	7090	9696	NA	32.93	NA	5.61	NA	1.54
W51	9/29/2022	5.54	7.90	7.54	10.05	1066	7120	5331	NA	33.42	NA	5.78	NA	1.43
W52	9/29/2022	5.59	8.26	7.69	11.44	1132	8050	5662	NA	29.55	NA	5.69	NA	4.15
W53	9/29/2022	7.42	8.23	7.68	4.68	469.40	3310	2347	NA	30.69	NA	7.44	NA	5.20
W54	9/29/2022	7.06	- NA	7.71	- NA	241.90	- NA	1209	NA	32.60	NA	6.08	NA	9.99
W55	10/1/2022	3.20	8.30	7.61	6.75	684.40	4790	3422	NA	26.85	NA	7.38	NA	4.40
W56	10/1/2022	5.24	8.19	7.31	7.64	820.20	5370	4101	NA	25.83	NA	5.80	NA	9.72
B1	5/5/2023	2.42	7.45	NA	2234	NA	11170	NA	29.07	NA	5.15	NA	9.99	NA
B10	5/5/2023	2.02	7.84	NA	508.90	NA	2545	NA	36.88	NA	4.92	NA	5.23	NA
B11	5/5/2023	1.82	7.26	NA	1199	NA	5999	NA	28.23	NA	5.08	NA	9.99	NA
B12	5/5/2023	1.90	7.83	NA	407.90	NA	2039	NA	27.72	NA	5.07		6.58	
B13	5/5/2023	1.11	7.53	NA	580.90	NA	2904	NA	26.08	NA	4.76	NA	7.51	NA
B2	5/5/2023	2.95	7.53	NA	504.10	NA	2521	NA	29.10	NA	5.26	NA	0.90	NA
B3	5/5/2023	2.49	7.59	NA	488.30	NA	2442	NA	28.51	NA	5.84	NA	9.99	NA
B4	5/5/2023	2.22	7.71	NA	577.60	NA	2888	NA	29.32	NA	6.25	NA	9.99	NA
B5	5/5/2023	2.38	7.51	NA	628.30	NA	3142	NA	29.09	NA	6.02	NA	8.02	NA
B6	5/5/2023	2.06	7.75	NA	464.30	NA	2321	NA	30.50	NA	5.97	NA	8.77	NA
B7	5/5/2023	2.10	7.85	NA	248.70	NA	1243	NA	27.79	NA	6.29	NA	9.99	NA
B8	5/5/2023	1.85	7.73	NA	685.10	NA	3436	NA	26.58	NA	5.18	NA	9.99	NA
B9	5/5/2023	2.20	7.75	NA	939.40	NA	4697	NA	30.19	NA	6.04	NA	6.20	NA

Bore ID	Date[3]	Water Level (mL)	PH		EC (mS/m)		TDS (ppm)		Temp (ºC)		DO (mg/L)		Turbidity (NTU)	
			2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
IT1	5/5/2023	3.61	7.61	NA	626.80	NA	3134	NA	25.50	NA	5.82	NA	3.43	NA
IT2	5/5/2023	4.26	7.54	NA	559.50		2798		26.33		6.40		5.05	
IT3	5/5/2023	5.34	7.44	NA	539.50	NA	2697	NA	26.97	NA	5.78	NA	9.99	NA
IT4	5/5/2023	4.02	7.47	NA	750.80	NA	3754	NA	26.43	NA	6.39	NA	9.99	NA
IT5	5/5/2023	0.65	7.98	NA	439.30	NA	2196	NA	29.82	NA	6.39	NA	2.84	NA
PZ-AB	5/13/2023	BDL	7.70	NA	1013	NA	5068	NA	30.13	NA	3.64	NA	11.20	NA
QN1	5/6/2023	4.56	7.70	NA	115.10	NA	575	NA	28.40	NA	5.92	NA	9.49	NA
QN2	5/6/2023	4.26	7.47	NA	396.70	NA	1984	NA	27.92	NA	5.15	NA	6.91	NA
QN3	5/6/2023	4.26	7.64	NA	144.10	NA	720	NA	27.57	NA	4.78	NA	9.16	NA
RW1	5/2/2023	6.91	8.05	NA	126.70	NA	633	NA	31.46	NA	6.33	NA	9.95	NA
SW1	5/8/2023	6.46	7.54	NA	109.60	NA	998	NA	28.66	NA	4.89	NA	3.52	NA
SW2	5/8/2023	7.12	8.08	NA	102.70	NA	514	NA	25.46	NA	6.09	NA	28.40	NA
SW3	5/8/2023	NA	NA	NA	NA		NA		NA		NA		NA	
SW4	5/8/2023	9.06	7.39	NA	814.40	NA	4072	NA	26.43	NA	6.48	NA	2.16	NA
TW1	5/7/2023	8.64	7.78	NA	787.40	NA	3937	NA	26.58	NA	4.74	NA	21.80	NA
TW2	5/7/2023	Dry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TW3	5/7/2023	Dry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TW4	5/7/2023	7.99	7.34	NA	229.30	NA	1147	NA	28.41	NA	4.10	NA	89.60	NA
TW5	5/7/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Exhibit 4.15: Southern Groundwater System Laboratory Data – Community Locations

Sample ID	*pH*	*EC (mS/m)*	*TDS (mg/L)*	*Turbidity (NTU)*
PVTBH49	7.30	830	5000	NA
PVTBH46	7.90	490	3600	2.9
GOVBH7 Dup	7.90	170	1100	NA
LGT5	7.70	990	7500	87.0
Ghulam Qadir	8.10	470	3300	1.3
PVTBH146 Dup	7.70	1200	8500	12.0

Exhibit 4.16: RDMC Boreholes at Northern Groundwater System –Inorganic Compounds (Laboratory Analysis)

Sample ID	*SO_4 mg/l*	*NO^3-N mg/L*	*NH_4 mg/l*	*HCO^3 mg/L*
PVTBH49	693.00	2.08	0.13	68.00
PVTBH46	1340.00	5.32	0.03	100.00
GOVBH7 Dup	194.00	4.56	NA	200.00
LGT5	2380.00	2.35	0.02	120.00
Ghulam Qadir	719.00	1.42	0.04	60.00
PVTBH146 Dup	1740.00	NA	0.13	120.00

Exhibit 4.17: RDMC Boreholes at Mine Site –Heavy Metal Parameters (Laboratory Analysis)

Sample ID	*As mg/l*	*Cd mg/l*	*Cr mg/l*	*Cu mg/l*
PVTBH49	0.00	0.000050	0.03100	0.00150
PVTBH46	0.01	NA	0.03100	0.00180
GOVBH7 Dup	0.01	NA	0.00440	0.00240
LGT5	0.01	NA	0.01500	0.00190
Ghulam Qadir	0.00	0.000030	0.04200	0.00190
PVTBH146 Dup	0.00	NA	NA	0.00090

Exhibit 4.18: Photographs of Community Water Resources in the Southern Groundwater System

Borehole at NK-FC – Nok Kundi

Water sample collection from the borehole at NK-Botig – Nok Kundi

Dug well at IT1– Isa Tahir

Spring at IT5 – Isa Tahir

Dug well at B2– Brahok

Dug well at SW2– Matthan (Killi Saleem)

Dug well at W41– Qila Ladgasht

Borehole at RW1 – Patangaz

Borehole at W54 – Rajai

Dug well at W56 – Wadian

Ghulam Qadir water spring

Spring/Karez at PZ-AB

Borehole at SW4 – Matthan (Killi Saleem)

Dug well at TW1– Thul

4.1.4 Other Settlements

Exhibit 4.31 and **Exhibit 4.20** provide results of field data for water quality analysis. **Exhibit 4.21** and **Exhibit 4.22**present laboratory analysis results.

Exhibit 4.19: Other Settlements – General Characteristics

Bore ID	*Date*[4]	*Water Level (mL)*	*PH*		*EC (mS/m)*		*TDS (ppm)*		*Temp (ºC)*		*DO (mg/L)*		*Turbidity (NTU)*	
			2022	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*
W29	9/17/20	NA	7.94	NA	7.28	NA	5180	NA	NA	NA	NA	NA	NA	NA
W30	9/17/20	NA	7.97	NA	5.52	NA	3920	NA	NA	NA	NA	NA	NA	NA
W31	9/17/20	NA	8.20	NA	2.37	NA	1680	NA	NA	NA	NA	NA	NA	NA
W34	9/19/20	NA	8.10	NA	5.24	NA	3740	NA	NA	NA	NA	NA	NA	NA
W35	9/19/20	4.84	8.10	NA	3.28	NA	2300	NA	NA	NA	NA	NA	NA	NA
W36	9/21/20	NA	8.11	NA	4.68	NA	3310	NA	NA	NA	NA	NA	NA	NA
W37	9/21/20	NA	8.08	NA	6.92	NA	4920	NA	NA	NA	NA	NA	NA	NA

[4] Water levels recorded in 2022 are not representative of static water level as these were not measured but recorded from the landowner

Exhibit 4.20: Other Settlements Laboratory Data – Community Locations

Sample ID	*pH*	*EC (mS/m)*	*TDS (mg/L)*	*Turbidity (NTU)*
W56	7.30	830	5000	NA
W53	7.90	490	3600	2.9
NK-B1	7.90	170	1100	NA
PZ-AB	7.70	990	7500	87.0
W48	8.10	470	3300	1.3
NK-F1	7.70	1200	8500	12.0

Exhibit 4.21: Community Boreholes at Other Settlements –Inorganic Compounds (Laboratory Analysis)

Sample ID	*SO_4 mg/l*	*NO^3-N mg/L*	*NH_4 mg/l*	*HCO^3 mg/L*
W56	693	2.08	0.13	68
W53	1340	5.32	0.03	100
NK-B1	194	4.56	NA	200
PZ-AB	2380	2.35	0.02	120
W48	719	1.42	0.04	60
NK-F1	1740	NA	0.13	120

Exhibit 4.22: Community Boreholes at Other Settlements –Heavy Metal Parameters (Laboratory Analysis)

Sample ID	*As mg/l*	*Cd mg/l*	*Cr mg/l*	*Cu mg/l*
W56	0.00	0.000050	0.03100	0.00150
W53	0.01	NA	0.03100	0.00180
NK-B1	0.01	NA	0.00440	0.00240
PZ-AB	0.01	NA	0.01500	0.00190
W48	0.00	0.000030	0.04200	0.00190
NK-F1	0.00	NA	NA	0.00090

4.2 RDMC Boreholes

4.2.1 Mine Site and Surrounding Areas

Exhibit 4.23 and **Exhibit 4.24** provide results of field data for water quality analysis. **Exhibit 4.25** presents laboratory analysis results and **Exhibit 4.26** provides pictures.

Exhibit 4.23: RDMC Boreholes at Mine Site – General Characteristics

Sample ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*
SB-025	393079.7	3231696.0	916.2	156	NA
WW010	401182.0	3231943.0	904.0	NA	NA
WW015	403583.1	3213583.8	871.0	114	140
WW001	412554.4	3218241.1	966.0	NA	NA
WW029	406459.8	3226541.9	924.8	263	140
salty well	419342.6	3220815.2	922.3	10	NA
WW8-MB	422604.7	3216045.1	839.6	12	NA

Exhibit 4.24: RDMC Boreholes at Mine Site – General Water Quality Parameters

Sample ID	*Date*	*Water Level (mbTOC)*	*Water Level (mRL)*	*pH*	*EC (mS/m)*	*TDS (ppm)*	*Temp (ºC)*	*DO (mg/L)*	*Turbidity (NTU)*
SB-025	2023/05/24	68.3	847.9	7.1	2151.0	10760.0	27.7	3.3	1000.0
WW010	2023/05/26	NA	NA	NA	NA	NA	NA	NA	NA
WW015	2023/05/24	10.1	860.7	6.4	16030.0	80180.0	27.7	1.7	187.0
WW001	2023/05/24	NA	NA	NA	NA	NA	NA	NA	NA
WW029	2023/05/24	60.5	863.9	7.6	2039.0	10200.0	27.5	3.3	482.0
salty well	2023/05/24	4.6	917.0	7.3	2022.0	10110.0	26.0	3.4	6.0
WW8-MB	2023/05/21	0.3	839.0	7.6	4757.0	23790.0	28.0	3.0	18.5

Exhibit 4.25: RDMC Boreholes at Mine Site – General Water Quality Parameters (Laboratory Analysis)

Sample ID	*pH*	*EC (mS/m)*	*TDS (mg/L)*	*Turbidity (NTU)*
SB-025	7.1	2300	17000	190
SB-30	7.1	2300	17000	640
WW015	6.7	29000	180000	140
WW029	7.5	2400	16000	89
salty well	7.5	2400	16000	4
WW8-MB	7.6	5700	37000	3

Exhibit 4.26: Photographs of the Mine Site RDMC Boreholes

Borehole WW1-MB

Borehole WW6-PB

Borehole WW8-MB

Borehole WW15-MB

Borehole WW29-MB

Borehole SB25-MB

4.2.2 Northern Groundwater System

Exhibit 4.27 and **Exhibit 4.28** provide results of field data for water quality analysis. **Exhibit 4.29, Exhibit 4.30** and **Exhibit 4.31** present laboratory analysis results and **Exhibit 4.32** provides pictures.

Exhibit 4.27: RDMC Boreholes at Northern Groundwater System – General Characteristics

Sample ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
FSWW010-MB	364031	3264135	564.7	268	100	1.2
FSWW011-MB	365535	3262139	576.4	246	100	1.1
FSWW012-MB	350686	3279106	546.5	186	100	1.0
FSWW013-PB	364074	3264151	564.8	180	300	1.2
FSWW014-MB	362873	3266363	554.5	77	100	1.2
FSWW015-MB	362645	3266285	554.7	220	100	1.0
FSWW016-MB	362232	3266918	551.6	69	100	1.0
FSWW017-MB	363916	3264361	563.4	163	100	1.0
FSWW018-MB	351556	3278034	546.2	159	100	1.1
FSWW019-MB	363769	3264895	560.5	60	100	1.1

Sample ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
FSWW001-MB	350643	3279184	547.1	NA	50	NA
FSWW020-PB	351471	3278086	546.5	135	250	1.2
FSWW021-MB	350862	3278899	546.4	70	100	1.0
FSWW022-MB	364082	3264160	564.5	81	100	1.1
FSWW023-MB	363881	3263920	567.5	165	100	1.1
FSWW024-MB	351460	3278075	546.2	53	100	1.1
FSWW002-MB	330401	3290691	526.1	230	50	1.0
FSWW003-MB	362904	3266347	555.9	116	50	0.2
FSWW004-PB	362883	3266365	555.3	199	250	1.1
FSWW005-MB	363281	3265585	558.3	149	50	1.3
FSWW006-MB	368593	3258131	603.4	229	50	0.9
FSWW007-MB	372552	3255022	622.5	NA	50	NA
FSWW008-PB	368644	3258221	602.8	195	300	1.0
FSWW009-PB	372474	3255066	622.6	209	300	1.2

Exhibit 4.28: Northern Groundwater System Field Data – RDMC Locations

Bore ID	*Date*[5]	*Water Level (mbTOC)*	*Water Level (mRL)*	*pH*	*EC (mS/m)*	*TDS (ppm)*	*Temp (ºC)*	*DO (mg/L)*	*Turbidity (NTU)*
FSWW010-MB	2023/05/17	63.6	499.9	7.8	990.3	4951.0	29.1	3.5	34.5
FSWW011-MB	2023/05/17	75.0	500.4	7.6	1106.0	5528.0	30.6	3.4	26.6
FSWW012-MB	2023/05/15	47.2	498.2	7.8	590.9	2955.0	31.5	3.5	86.7
FSWW013-PB	2023/05/17	63.1	500.5	7.8	1018.0	5092.0	28.0	3.5	4.1
FSWW014-MB	2023/05/16	53.1	500.2	8.0	872.1	4360.0	32.2	3.4	337.0
FSWW015-MB	2023/05/16	53.6	500.1	8.1	816.6	4083.0	33.0	3.3	47.5
FSWW016-MB	2023/05/16	50.1	500.5	7.8	811.4	4057.0	30.3	3.5	402.0
FSWW017-MB	2023/05/17	62.1	500.3	7.5	972.7	4863.0	28.3	3.5	21.7
FSWW018-MB	2023/05/16	46.9	498.2	7.8	1018.0	5090.0	30.2	3.4	37.3
FSWW019-MB	2023/05/16	59.1	500.3	7.5	1111.0	5555.0	33.2	3.3	35.0
FSWW001-MB	2023/05/15	Dry	NA	NA	NA	NA	NA	NA	NA
FSWW020-PB	2023/05/15	47.1	498.2	8.0	571.3	2857.0	31.7	3.5	6.2
FSWW021-MB	2023/05/15	47.1	498.3	8.0	563.6	2818.0	32.3	3.4	69.0

[5] Water levels recorded in 2022 are not representative of static water level as these were not measured but recorded from the landowner

Bore ID	*Date*[5]	*Water Level (mbTOC)*	*Water Level (mRL)*	*pH*	*EC (mS/m)*	*TDS (ppm)*	*Temp (ºC)*	*DO (mg/L)*	*Turbidity (NTU)*
FSWW022-MB	2023/05/17	63.2	500.2	7.8	1013.0	5067.0	28.4	3.5	110.0
FSWW023-MB	2023/05/17	66.1	500.3	7.7	792.9	3964.0	30.5	3.4	34.6
FSWW024-MB	2023/05/15	47.1	498.0	7.9	573.6	2868.0	29.8	3.5	7.4
FSWW002-MB	2023/05/26	52.3	472.8	10.5	623.4	3117.0	31.6	3.4	265.0
FSWW003-MB	2023/05/26	53.9	501.8	10.7	798.1	3991.0	31.0	3.4	225.0
FSWW004-PB	2023/05/16	54.0	500.2	8.5	867.1	4336.0	32.6	3.3	49.6
FSWW005-MB	2023/05/16	57.3	499.7	10.2	802.9	4015.0	33.7	3.2	291.0
FSWW006-MB	2023/05/26	99.9	502.6	8.7	1313.0	6566.0	30.8	3.3	484.0
FSWW007-MB	2023/05/26	NA	NA	NA	NA	NA	NA	NA	NA
FSWW008-PB	2023/05/17	99.3	502.4	9.1	762.6	3813.0	30.9	3.4	125.0
FSWW009-PB	2023/05/18	114.8	506.6	8.6	1383.0	6917.0	31.1	3.3	125.0

Exhibit 4.29: Northern Groundwater System Laboratory Data – RDMC Locations

Sample ID	*pH*	*EC (mS/m)*	*TDS (mg/L)*	*Turbidity (NTU)*
FSWW011-MB	7.4	1200	8700	3
FSWW013-PB	7.7	1100	8000	13
FSWW016-MB	7.7	820	6000	10
FSWW017-MB	7.3	950	7500	92
FSWW019-MB	7.6	1200	8600	19
FSWW020-PB	7.7	560	4100	2
FSWW002-MB	10.5	600	4500	47
FSWW004-PB	8.1	870	8600	8
FS26	7.9	910	6700	3
FSWW005-MB	10.0	820	6000	100
FSWW008-PB	9.3	740	5500	31
FSWW009-PB	7.9	1400	9600	66

Exhibit 4.30: RDMC Boreholes at Northern Groundwater System –Inorganic Compounds (Laboratory Analysis)

Sample ID	*SO_4 mg/l*	*NO^3-N mg/L*	*NH_4 mg/l*	*HCO^3 mg/L*
FSWW016-MB	7.70	820	6000	10.00
FSWW020-PB	7.70	560	4100	1.60
FSWW008-PB	9.30	740	5500	31.00

Sample ID	*SO_4 mg/l*	*NO^3-N mg/L*	*NH_4 mg/l*	*HCO^3 mg/L*
FSWW017-MB	7.30	950	7500	92.00
FSWW019-MB	7.60	1200	8600	19.00
FS26	7.90	910	6700	2.60
FSWW011-MB	7.40	1200	8700	2.70
FSWW013-PB	7.70	1100	8000	13.00
FSWW004-PB	8.10	870	8600	7.70
FSWW005-MB	10.00	820	6000	100.00
FSWW009-PB	7.90	1400	9600	66.00
FSWW002-MB	10.50	600	4500	47.00

Exhibit 4.31: RDMC Boreholes at Northern Groundwater System –Heavy Metal Parameters (Laboratory Analysis)

Sample ID	*As mg/l*	*Cd mg/l*	*Cr mg/l*	*Cu mg/l*
FSWW016-MB	0.00	0.000060	0.00090	0.00300
FSWW020-PB	0.01	0.000030	0.05200	0.00240
FSWW008-PB	0.00	0.000030	0.00420	0.00320
FSWW017-MB	0.00	0.000060	0.01700	0.00660
FSWW019-MB	0.00	0.000050	0.00160	0.00410
FS26	0.00	0.000030	0.00040	0.00440
FSWW011-MB	0.00	0.000080	0.01200	0.00450
FSWW013-PB	0.00	0.000110	0.02800	0.00160
FSWW004-PB	0.00	0.000030	0.00040	0.00280
FSWW005-MB	0.00	NA	0.00060	0.00180
FSWW009-PB	0.00	0.000020	NA	0.00150
FSWW002-MB	0.00	NA	0.00040	NA

Exhibit 4.32: Photographs of the Northern Groundwater System RDMC Boreholes

Borehole FS1-MB

Borehole FS8-PB

Borehole FS15-MB

Borehole FS24-MB

4.2.3 Southern Groundwater System

Exhibit 4.33 and **Exhibit 4.34** provide results of field data for water quality analysis. **Exhibit 4.35, Exhibit 4.36** and **Exhibit 4.37** present laboratory analysis results and **Exhibit 4.38** provides pictures.

Exhibit 4.33: RDMC Boreholes at Southern Groundwater System – General Characteristics

Bore ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
HiM Lake	489795	3150064	493.0	NA	NA	NA
HiM Spear	489795	3150082	494.0	NA	NA	NA
HiMWW010-PB	487644	3123786	465.3	NA	300	0.4
HiMWW001-AB	484993	3128707	465.9	NA	NA	NA
HiMWW002-MB	486482	3126029	466.1	NA	100	1.2
HiMWW003-MB	487918	3123367	466.1	NA	100	1.0
HiMWW004-MB	511849	3110057	469.0	11	NA	NA
HiMWW005-AB	511770	3112067	468.4	NA	NA	NA
HiMWW006-MB	498852	3123585	465.8	13	100	0.8
HiMWW007-MB	487986	3123140	466.1	NA	NA	1.3
HiMWW008-MB	488768	3110484	465.5	7	100	1.4
HiMWW009-MB	489500	3119671	465.6	NA	100	0.0
HiM-Spearpoint	489799	3150081	493.8	NA	NA	NA
NKWW001-MB	496249	3152964	468.7	NA	200	
NKWW002-MB	496300	3152933	468.3	NA	50	0.8
NKWW003-PB	496279	3152927	469.0	NA	300	0.0
NKWW004-MB	477524	3150444	519.3	NA	50	1.3
NKWW005-MB	479600	3146985	492.3	NA	50	1.1
NKWW006-MB	484858	3144831	468.6	NA	150	1.0
NKWW007-MB	484849	3144836	469.0	NA	50	1.3
NKWW008-MB	482423	3131992	466.2	NA	200	0.0
NKWW009-MB	482435	3131983	466.2	NA	50	0.0
PTWW001-MB	464749	3128636	503.4	24	50	1.1
PTWW002-MB	461325	3128711	509.9	46	50	1.1
PTWW003-PB	464734	3128627	503.7	148	250	1.1
PTWW004-MB	464589	3128670	503.6	146	100	1.1
PTWW005-MB	464732	3128329	502.7	148	100	1.0

Bore ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
PTWW006-MB	464738	3128620	503.2	10	100	0.9
PTWW007-MB	465263	3127777	500.7	10	100	0.7
PTWW008-MB	461310	3128720	509.8	28	100	1.1
PTWW009-MB	464727	3128331	502.8	10	100	1.0

Exhibit 4.34: Southern Groundwater System Field Data – RDMC Locations

Bore ID	*Date*[6]	*Water Level (mbTOC)*	*Water Level (mRL)*	*pH*	*EC (mS/m)*	*TDS (ppm)*	*Temp (ºC)*	*DO (mg/L)*	*Turbidity (NTU)*
HiM Lake	2023/05/06	NA	NA	NA	NA	NA	NA	NA	NA
HiM Spear	2023/05/06	NA	NA	NA	NA	NA	NA	NA	NA
HiMWW010-PB	2023/05/12	0	464.954	7.8	629.9	3149.0	32.8	3.7	2.3
HiMWW001-AB	2023/05/13	NA	NA	NA	NA	NA	NA	NA	NA
HiMWW002-MB	2023/05/12	0	464.88	7.8	668.0	3340.0	33.6	3.6	12.7
HiMWW003-MB	2023/05/12	0	465.148	7.8	615.5	3078.0	33.2	3.7	1.9
HiMWW004-MB	2023/05/10	9.76	457.786	7.7	5307.0	26540.0	29.1	3.9	410.0
HiMWW005-AB	2023/05/10	NA	NA	NA	NA	NA	NA	NA	NA
HiMWW006-MB	2023/05/13	11.882	453.153	8.0	2212.0	11060.0	32.4	3.3	772.0
HiMWW007-MB	2023/05/13	NA	NA	NA	NA	NA	NA	NA	NA
HiMWW008-MB	2023/05/13	6.843	457.27	7.9	4394.0	21970.0	31.5	3.1	709.0
HiMWW009-MB	2023/05/12	NA	NA	NA	NA	NA	NA	NA	NA
HiM-Spearpoint	2023/05/06	NA	NA	NA	NA	NA	NA	NA	NA
NKWW001-MB	2023/05/12	NA	NA	NA	NA	NA	NA	NA	NA
NKWW002-MB	2023/05/12	NA	NA	NA	NA	NA	NA	NA	NA
NKWW003-PB	2023/05/12	0	468.96	8.0	853.7	4268.0	30.9	3.6	5.5
NKWW004-MB	2023/05/12	NA	NA	NA	NA	NA	NA	NA	NA
NKWW005-MB	2023/05/12	NA	NA	NA	NA	NA	NA	NA	NA
NKWW006-MB	2023/05/12	NA	NA	NA	NA	NA	NA	NA	NA
NKWW007-MB	2023/05/12	NA	NA	NA	NA	NA	NA	NA	NA
NKWW008-MB	2023/05/12	NA	NA	NA	NA	NA	NA	NA	NA
NKWW009-MB	2023/05/12	0	466.22	8.2	502.8	2514.0	31.8	3.6	2.7
PTWW001-MB	2023/05/11	7.775	494.512	10.8	680.0	3400.0	29.8	3.4	143.0
PTWW002-MB	2023/05/11	10.995	497.802	10.5	402.9	2015.0	31.5	3.3	221.0

[6] Water levels recorded in 2022 are not representative of static water level as these were not measured but recorded from the landowner

Bore ID	*Date*[6]	*Water Level (mbTOC)*	*Water Level (mRL)*	*pH*	*EC (mS/m)*	*TDS (ppm)*	*Temp (ºC)*	*DO (mg/L)*	*Turbidity (NTU)*
PTWW003-PB	2023/05/11	7.465	495.066	8.9	712.2	3561.0	33.3	4.1	28.1
PTWW004-MB	2023/05/09	7.508	495.015	8.0	678.0	3390.0	31.7	4.9	641.0
PTWW005-MB	2023/05/09	6.79	494.912	7.8	683.4	3417.0	31.6	4.1	58.5
PTWW006-MB	2023/05/11	9.457	492.819	7.9	502.6	2513.0	34.4	4.8	1000.0
PTWW007-MB	2023/05/09	7.849	492.166	7.8	359.2	1796.0	32.2	4.9	49.8
PTWW008-MB	2023/05/11	1.462	507.263	7.6	478.4	2392.0	32.6	4.4	15.6
PTWW009-MB	2023/05/09	9.091	492.672	7.8	419.7	2099.0	31.3	5.5	58.2

Exhibit 4.35: Southern Groundwater System Laboratory Data – RDMC Locations

Sample ID	*pH*	*EC (mS/m)*	*TDS (mg/L)*	*Turbidity (NTU)*
HiMWW010-PB	7.8	650	4700	5
HiM12	7.8	600	4500	12
HiMWW002-MB	7.9	670	4800	66
HiMWW004-MB	7.4	7200	43000	41
HiMWW006-MB	8.0	2800	17000	120
HiMWW008-MB	7.7	7800	49000	36
NKWW003-PB	7.9	850	6200	5
NK20	7.8	860	6300	26
NKWW009-MB	8.2	500	3300	36
NK18	8.2	500	3400	84
PTWW003-PB	8.8	740	4600	34
PT13	8.8	750	5300	14
PTWW008-MB	7.8	480	3600	2

Exhibit 4.36: RDMC Boreholes at Southern Groundwater System –Inorganic Compounds (Laboratory Analysis)

Sample ID	*SO_4 mg/l*	*NO^3-N mg/L*	*NH_4 mg/l*	*HCO^3 mg/L*
HiMWW002-MB	1250	1.69	NA	71
NK18	890	0.05	0.07	54
HiM12	1210	2.24	NA	66
NK20	1260	1.60	0.05	29
PTWW003-PB	757	0.15	0.07	51
PTWW008-MB	1110	1.53	0.02	120

Sample ID	*SO_4 mg/l*	*NO^3-N mg/L*	*NH_4 mg/l*	*HCO^3 mg/L*
HiMWW010-PB	1440	2.07	0.06	74
HiMWW008-MB	5140	6.27	0.28	95
PT13	770	0.14	0.07	59
HiMWW006-MB	1460	0.29	69.00	590
HiMWW004-MB	4990	0.35	0.26	86

Exhibit 4.37: RDMC Boreholes at Southern Groundwater System –Heavy Metal Parameters (Laboratory Analysis)

Sample ID	*As mg/l*	*Cd mg/l*	*Cr mg/l*	*Cu mg/l*
HiMWW002-MB	0.0027	NA	0.0650	0.0059
NK18	0.0071	0.000020	0.0012	0.0016
HiM12	0.0017	NA	0.0270	0.0019
NK20	0.0032	NA	0.0074	0.0035
PTWW003-PB	0.0002	NA	NA	0.0007
PTWW008-MB	0.0017	0.000020	0.0110	0.0010
HiMWW010-PB	0.0018	NA	0.0430	0.0037
HiMWW008-MB	0.0019	0.000200	0.0004	0.0040
PT13	0.0002	NA	NA	NA
HiMWW006-MB	0.0632	NA	0.0016	NA
HiMWW004-MB	0.0017	0.000100	0.0004	0.0068

Exhibit 4.38: Photographs of the Southern Groundwater System RDMC Boreholes

Borehole PT1-MB

Borehole PT8-PB

Borehole NK3-PB

Abandoned Borehole NK8-MB

Destroyed Borehole NK9-MB

Dry HiM Lake

HiM-Spearpoint

HiM Spear

Borehole HiM3-MB

Borehole HiM10-PB

Borehole TCC1-MB

Borehole TCC3-PB

4.2.4 Other Settlements

Exhibit 4.38 and **Exhibit 4.39** provide results of field data for water quality analysis. **Exhibit 4.40, Exhibit 4.41** and **Exhibit 4.42** present laboratory analysis results.

Exhibit 4.39 RDMC Boreholes at Other Settlements– General Characteristics

ID	*Easting*	*Northing*	*Elevation (mamsl)*	*Depth (m)*	*Well construction (casing diameter - mm)*	*Stick up (m)*
TCC#1MB	367891	3190653	745.0	229	NA	1.5
TCC#2MB	367129	3190119	731.2	210	NA	1.8
TCC#3PB	367136	3190121	730.9	191	NA	1.6
TCC#4MB	364938	3194504	740.2	109	NA	1.8

Exhibit 4.40: Other Settlements Field Data – RDMC Locations

Bore ID	*Date*[7]	*Water Level (mbTOC)*	*Water Level (mRL)*	*pH*	*EC (mS/m)*	*TDS (ppm)*	*Temp (ºC)*	*DO (mg/L)*	*Turbidity (NTU)*
TCC#1MB	2023/05/31	66.431	677.125	9.8	276.2	1381.0	30.7	3.4	951.0
TCC#2MB	2023/05/31	53.329	676.034	10.1	282.9	1415.0	30.6	3.4	547.0
TCC#3PB	2023/05/31	53.131	676.259	9.1	392.6	1963.0	32.9	3.3	133.0
TCC#4MB	2023/05/31	55.131	683.247	9.4	248.0	1240.0	32.7	3.2	135.0

[7] Water levels recorded in 2022 are not representative of static water level as these were not measured but recorded from the landowner

Exhibit 4.41: Other Settlements Laboratory Data – RDMC Locations

Sample ID	*pH*	*EC (mS/m)*	*TDS (mg/L)*	*Turbidity (NTU)*
TCC#1MB	9.7	290	2200	100
TCC#2MB	9.7	270	1700	47
TCC#3PB	8.5	390	2400	10
TCC#4MB	9.4	330	2100	41

Exhibit 4.42: RDMC Boreholes at Other Settlements –Inorganic Compounds (Laboratory Analysis)

Sample ID	*SO_4 mg/l*	*NO^3-N mg/L*	*NH_4 mg/l*	*HCO^3 mg/L*
TCC#2MB	13.7	0.23	0.06	42
TCC#3PB	388.0	0.14	0.89	47
TCC#4MB	536.0	0.05	0.83	55
TCC#1MB	386.0	0.06	0.68	31

Exhibit 4.43: RDMC Boreholes at Other Settlements –Heavy Metal Parameters (Laboratory Analysis)

Sample ID	*As mg/l*	*Cd mg/l*	*Cr mg/l*	*Cu mg/l*
TCC#2MB	0.0010	NA	NA	0.0007
TCC#3PB	0.0003	NA	NA	0.0010
TCC#4MB	0.0002	NA	NA	0.0030
TCC#1MB	0.0007	NA	NA	NA

4.3 General Discussion of Results

4.3.1 Mine Site and Surrounding Areas

Seven RDMC boreholes and 35 community water resources were identified within the Mine Site and the surrounding areas.

The water levels range between 0.3 mbgl and 74 mbgl, with an equivalent range between 839 mRL and 1155 mRL. The field pH is circumneutral (ph of 7) for both the RDMC boreholes and the community water resources. The field electrical conductivity (EC) and total dissolved solids (TDS) indicates the groundwater is saline.

The RDMC boreholes have an EC and TDS that is an order of magnitude higher than the community water resources. The EC and TDS laboratory results indicate an average of 408 mS/m and 2 900 mg/L for the community water resources and 7 350 mS/m and 47 167 mg/L for the RDMC boreholes.

4.3.2 Northern Groundwater System

24 RDMC boreholes and eight community water resources were identified within the Northern Groundwater System. The water levels range between artesian and 115 mbgl, with an equivalent range between 473 mRL and 1296 mRL. The field pH is slightly alkaline (pH of 8) for both the RDMC boreholes and the community water resources. The field electrical conductivity (EC) and total dissolved solids (TDS) indicates the groundwater is saline. The EC and TDS laboratory results indicate an average of 303 mS/m and 2 289 mg/L for the community water resources and 931 mS/m and 6 983 mg/L for the RDMC boreholes

4.3.3 Southern Groundwater System

30 RDMC boreholes and 55 community water resources were identified within the Southern Groundwater System. The water levels range between artesian and 77 mbgl, with an equivalent range between 453 mRL and 980 mRL. The field pH is slightly alkaline (ph of 8 to 9) for both the RDMC boreholes and the community water resources. The field electrical conductivity (EC) and total dissolved solids (TDS) indicates the groundwater is saline. The EC and TDS laboratory results indicate an average of 675 mS/m and 4,792 mg/L for the community water resources and 1,511 mS/m and 9,653 mg/L for the RDMC boreholes.