TARN TARAN DISTRICT, PUNJAB

DISTRICT SURVEY REPORT

As per Sustainable Sand Mining Management Guidelines, 2016 and Enforcement & Monitoring Guidelines for Sand Mining,2020, Ministry of Environment, Forest and Climate Change (MoEF&CC)

PREPARED BY

SUB-DIVISIONAL COMMITTEE OF TARN-TARAN DISTRICT

ASSISTED BY:

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PREFACE

The Ministry of Environment, Forest and Climate Change (MoEF & CC) has several policy initiatives and enacted environmental and pollution control legislations to prevent indiscriminate exploitation of natural resources and to promote integration of environmental concerns in developmental projects. One such initiative is the Notification on Environmental Impact Assessment (EIA) of developmental projects issued on 14th September,2006 under the provisions of Environment (Protection) Act,1986, making EIA mandatory for certain categories of developmental projects.

Minerals are classified into two groups, namely (i) Major minerals and (ii) Minor minerals. Amongst these two groups, minor mineral has been defined under section 3(e) of Mines and Minerals (Regulation and development) Act, 1957. The minor minerals are further governed by Punjab Minor Mineral Rules, 2013 in this report.

On mining of minor mineral, it is mandatory to have District Survey Report (DSR) by MoEF & CC vide their Notification No. 125 (Extraordinary, Part II Section 3, Sub-section ii), S.O. 141 (E), dated 15th January 2016. This will ensure environmentally sustainable mining for minor mineral under close supervision of district authorities. The notification was made to bring certain amendments with respect to the EIA notification 2006 and in order to have a better control over the legislation, district level committee's for introduced in the system. Preparation of District Survey Reports has been introduced as a part of the above notification. Subsequently, MOEF & CC has published Notification No. 3611 (E), dt. 25th July, 2018 regarding inclusion of the "Minerals Other than Sand" and specified the format of the DSR. Monitoring Guidelines for Sand Mining (EMGSM) January 2020, Issued by Ministry of Environment, Forest and Climate Change is prepared in consideration of various orders/directions issued by Hon'ble NGT in matters pertaining to illegal sand mining and also based on the reports submitted by expert committees and investigation teams. This DSR has been prepared in conformity with the S. O. 141 (E), S. O. 3611 (E) and other sand mining guidelines published by MOEF & CC time to time.

A detailed procedure and format for preparation of District Survey Report (DSR) has been discretely discussed under Para 7(iii) (a) and Annexure (x) of the notification issued by Ministry of Environment, Forest and Climate Change, Government of India on 15th January, 2016. In sort, the purpose is to ensure that mining of minor mineral is done in environmentally sustainable and socially responsible manner. It also helps to identify the areas of deposition where mining can be permitted and also, to identify the areas of aggradation & erosion, to monitor river equilibrium and helps to protect and restore the ecological system. The DSR would also help to calculate the total amount of replenishment, where ever applicable.

Preparation of this DSR required both primary and secondary data generation. The primary data has been generated by the site inspection, ground truthing, survey etc. while secondary data has been generated through various authenticated sources and satellite imagery studies. District survey report also covers the area of General information of the district, Demography, Geomorphology, topography, Forest and Agricultural information, climate condition, rainfall details, Land use pattern, cropping pattern. The DSR would also help to calculate the total amount of replenishment, where ever applicable.

Disclaimer: The data may vary due to flood, heavy rains and other natural calamities. Therefore, it is recommended that SEIAA may take into consideration all its relevant aspects / data while scrutinizing and recommending the application for EC to the concerned authority.

CHAPTER 1: INTRODUCTION

1.0 BACKGROUND AND GENERAL INFORMATION

1.1 BACKGROUND

Whilst sand is a vitally important and essential requirement for all construction work and several other industries, its injudicious mining can lead to severe environmental problems. The deleterious effects of indiscriminate sand and gravel mining include the following:

1. Extraction of bed material in excess of replenishment by transport from upstream causes the bed to lower (degrade) upstream and downstream of the site of removal.
2. In-stream habitat is impacted by the increase in river gradient, suspended load, sediment transport, and sediment deposition. Excessive sediment deposition for replenishment increases turbidity which prevents penetration of light required for photosynthesis and reduces food availability of aquatic fauna.
3. Riparian habitat including a vegetative cover on and adjacent to the river banks controls erosion, provides nutrient inputs into the stream, and prevents intrusion of pollutants in the stream through runoff. Bank erosion and change of morphology of the river can destroy the riparian vegetative cover.
4. Bed degradation is responsible for channel shifting, causing loss of properties and degradation of the landscape; it can also undermine bridge supports, pipelines or other structures.
5. Degradation may change the morphology of the riverbed.
6. Degradation can deplete the entire depth of gravelly bed material, exposing other substrates that may underlie the gravel, which could in turn affect the quality of aquatic habitat. Lowering of the ground water table in the flood plain because of lowering of riverbed level as well as river water level takes place because of extraction and draining out of excessive ground water from the adjacent areas. So, if a floodplain aquifer drains into the stream, groundwater levels can be lowered as a result of bed degradation.
7. Lowering of the water table can destroy riparian vegetation.
8. Excessive pumping of ground water in the process of mining in abandoned channels depletes ground water causing scarcity of irrigation and drinking water.
9. Un-scientific and unregulated sand and gravel mining tends to increase channel bank scouring and erosion. This causes a large degree of meandering of rivers.
10. Rapid bed degradation may induce bank collapse and erosion by increasing the heights of banks.
11. Polluting ground water by reducing the thickness of the filter material especially if mining is taking place at top of recharge fissures.
12. Choking of the sand layer which acts as a filter for ingress of ground water from the river by dumping of finer material, compaction of filter zone due to movement of heavy vehicles. It also reduces the permeability and porosity of the filter material.
13. Removal of sand and gravel from bars may cause downstream bars to erode if they subsequently receive less bed material than is carried downstream from them by fluvial transport.

14. Ecological effects on bird nesting, fish migration, angling, etc.
15. Indiscrete mining activities lead to increased concentration of suspended sediments in the river which in turn causes siltation of water resources projects.
16. Un-scientific and unregulated sand and gravel mining lead to severe health hazards like air quality degradation and dust fog.
17. Direct destruction from heavy equipment operation; discharges from equipment and refueling.
18. Biosecurity and pest risks.

1.2 GENERAL INFORMATION

The District Survey Report of Tarn Taran District has been prepared as per the guide line of Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India vide Notification S.O.-1533(E) dated 14th Sept, 2006 and subsequent MoEF&CC Notification S.O. 141(E) dated 15th Jan, 2016. This report shall guide systematic and scientific utilization of natural resources, so that present and future generation may be benefitted at large. Further, MoEF&CC published a notification S.O. 3611(E) Dated 25th July, 2018 and recommended the format for District Survey Report.

The main objective of DSR is to identify the areas of aggradations or deposition where mining can be allowed; and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and estimation of annual rate of replenishment and allowing time for replenishment after mining in that area. The DSR would also help to calculate the annual rate of replenishment wherever applicable and allow time for replenishment. Besides the sand mining, the DSR also include the potential development scope of in situ minor minerals.

The objectives of the District Survey Report are as following:

1. Identification and Quantification of Mineral Resource and its optimal utilization.
2. To regulate the Sand Mining in the district, identification of site-specific end-use consumers and reduction in demand & supply gaps.
3. Use of information technology (IT) & latest scientific method of mining for surveillance of the sand mining at each step.
4. District Survey report shall enable appraisal and grant Environmental Clearance for cluster of Sand and Gravel Mines. It shall assist concern Department during post Environmental Clearance Monitoring.
5. To check and control the instance of illegal mining.
6. To control the flood in the area.
7. To maintain the livelihood of aquatic habitat.
8. To protect the incursion of ground water in the area. Limiting extraction of material in floodplains to an elevation above the water table generally disturbs more surface area than allowing extraction of material below the water table.
9. To keep accumulated data records viz. details of Mineral Resource, potential area, lease, approved mining plan, co-ordinates of a district at one place.

10. To maintain the records of revenue generation.

The following principles are to be kept in view whilst identifying the areas and extent of mining leases:

i. In-stream extraction of RBM from below the water level of a stream generally causes more changes to the natural hydrologic processes than limiting extraction to a reference point above the water level.

ii. In-stream extraction of RBM below the deepest part of the channel generally causes more changes to the natural hydrologic processes than limiting extraction to a reference point above the thalweg.

iii. Excavating sand from a small straight channel with a narrow floodplain generally will have a greater impact on the natural hydrologic processes than excavations on a braided channel with a wide floodplain.

iv. Extracting sand and gravel from a large river or stream will generally create less impact than extracting the same amount of material from a smaller river or stream.

1.3 STATUTORY FRAMEWORK

Requirement of the District Survey Report and the year-wise modification of decisions and Guidelines are furnished in Table No 1 below:

Table 1: Requirement of District Survey Report and the year-wise modification of Decisions/Guidelines

Year	Particulars
1994	The Ministry of Environment, Forest & Climate Change (MoEF&CC) published Environmental Impact Assessment Notification 1994 which is only applicable for the Major Minerals more than 5 ha.
2006	In order to cover the minor minerals also into the preview of EIA, the MoEF&CC has issued EIA Notification SO 1533 (E), dated 14th September 2006, made mandatory to obtain environmental clearance for both Major& Minor Mineral more than 5 Ha.
2012	Further, Hon'ble Supreme Court wide order dated the 27th February, 2012 in I.A. No.12-13 of 2011 in Special Leave Petition (C) No.19628-19629 of 2009, in the matter of Deepak Kumar etc. Vs. State of Haryana and Others etc., ordered that "leases of minor minerals including their renewal for an area of less than five hectares be granted by the States/Union Territories only after getting environmental clearance from MoEF".
2015	Hon'ble National Green Tribunal, order dated the 13th January, 2015 in the matter regarding sand mining has directed for making a policy on environmental clearance for mining leases in cluster for minor Minerals.

2016	The MoEF&CC in compliance of above Hon'ble Supreme Court's and NGT'S order has prepared "Sustainable Sand Mining Guidelines (SSMG), 2016" in consultation with State governments, detailing the provisions on environmental clearance (EC) for cluster, creation of District Environment Impact Assessment Authority, preparation of District survey report and proper monitoring of minor mineral. There by issued Notification dated 15.01.2016 for making certain amendments in the EIA Notification, 2006 and made mandatory to obtain EC for all minor minerals. Provisions have been made for the preparation of District survey report (DSR)for River bed mining and other minor minerals.
2018	MoEF&CC published a notification S.O. 3611(E) Dated 25th July, 2018 and recommended the format for District Survey Report. The notification stated about the objective of DSR i.e., "Identification of areas of aggradations or deposition where mining can be allowed and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment and allowing time for replenishment after mining in that area".
2020	Enforcement & Monitoring Guidelines for Sand Mining (EMGSM) 2020 has been published modifying Sustainable and Mining Guidelines, 2016 by MoEF&CC for effective enforcement of regulatory provisions and their monitoring. The EMGSM 2020 directed the states to carry out river audits put detailed survey reports of all mining areas online and in the public domain, conduct replenishment studies of river beds, constantly monitor mining with drones, aerial surveys, and ground surveys and set up dedicated task forces at district levels. The guidelines also push for online sales and purchase of sand and other river bed materials to make the process transparent. The guidelines propose night surveillance of mining activity through night-vision drones.
	Source: *MoEF & CC time to time amendment regarding Preparation of DSR*

1.4 METHODOLOGY ADOPTED FOR DSR PREPARATION

The District Survey report (DSR) is comprised of primary data and secondary data published and endorsed by various departments and websites in respect of the geologyof the area, mineral resources, climate, topography, landform, forest, rivers, soil, agriculture, road, transportation, irrigation, etc. Data on lease and mining activities in the district, revenue, etc. are collected and collated from the concerned District MiningOffice. All the data has been reviewed, selected, and collated in order to prepare an authentic and reliable District Survey Report. Besides this, procedure as defined in the MoEF&CC Notification dated 25.07.2018 has been followed for preparing the various chapters of this Districts Survey Report.

1.4.1 IDENTIFICATION OF DATA SOURCES

District Survey Report has been prepared based on the Primary database through field surveys and Secondary data base collected from different sources. It is critical to identify the authentic data sources before collating the data set. The secondary data sources which are used in DSR are mostly Government published data or scientific reports published in reputed journals. The district profile has been prepared on the basis of the District Statistical Handbook published by the Punjab Government as wellas the District Census Report, 2011. Potential mineral resources have been identified based on DGPS field

survey. Mining lease details and the revenue generated from themining of minor minerals have been determined on the basis of available data from the Mining and Revenue Departments of the district. Satellite datasets have been usedfor map preparation related to physiography and land utilization pattern of the district.

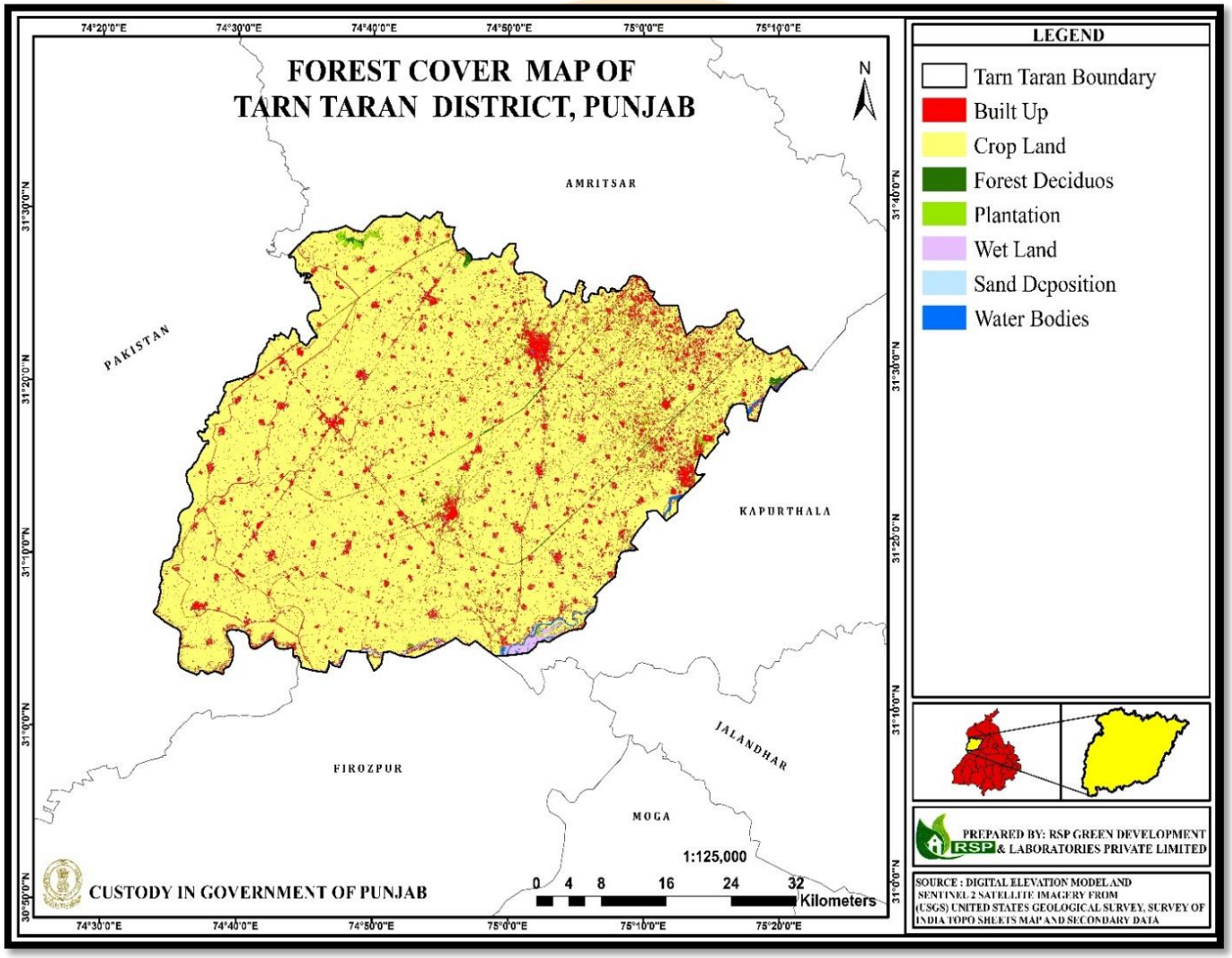
1.4.2 DATA ANALYSIS AND MAP PREPARATION

Dataset to be used for the report preparation has been selected after detail analysis. District Survey Report involves robust data analysis and map generation for clear understanding. The methodology adopted for the preparation of relevant maps are explained below:

1.4.2.1 LAND USE AND LAND COVER MAP

Land Use and Land Cover classification is a complex process and requires consideration of many factors. The major steps of image classification include the determination of a suitable classification system via Visual Image Interpretation, selection of representative samples, Satellite Image (FCC- False Colour Composition) pre-processing, selection of suitable classification approaches, post-classification processing, and accuracy assessment.

FIGURE 1: LAND USE AND LAND COVER MAP OF THE DISTRICT

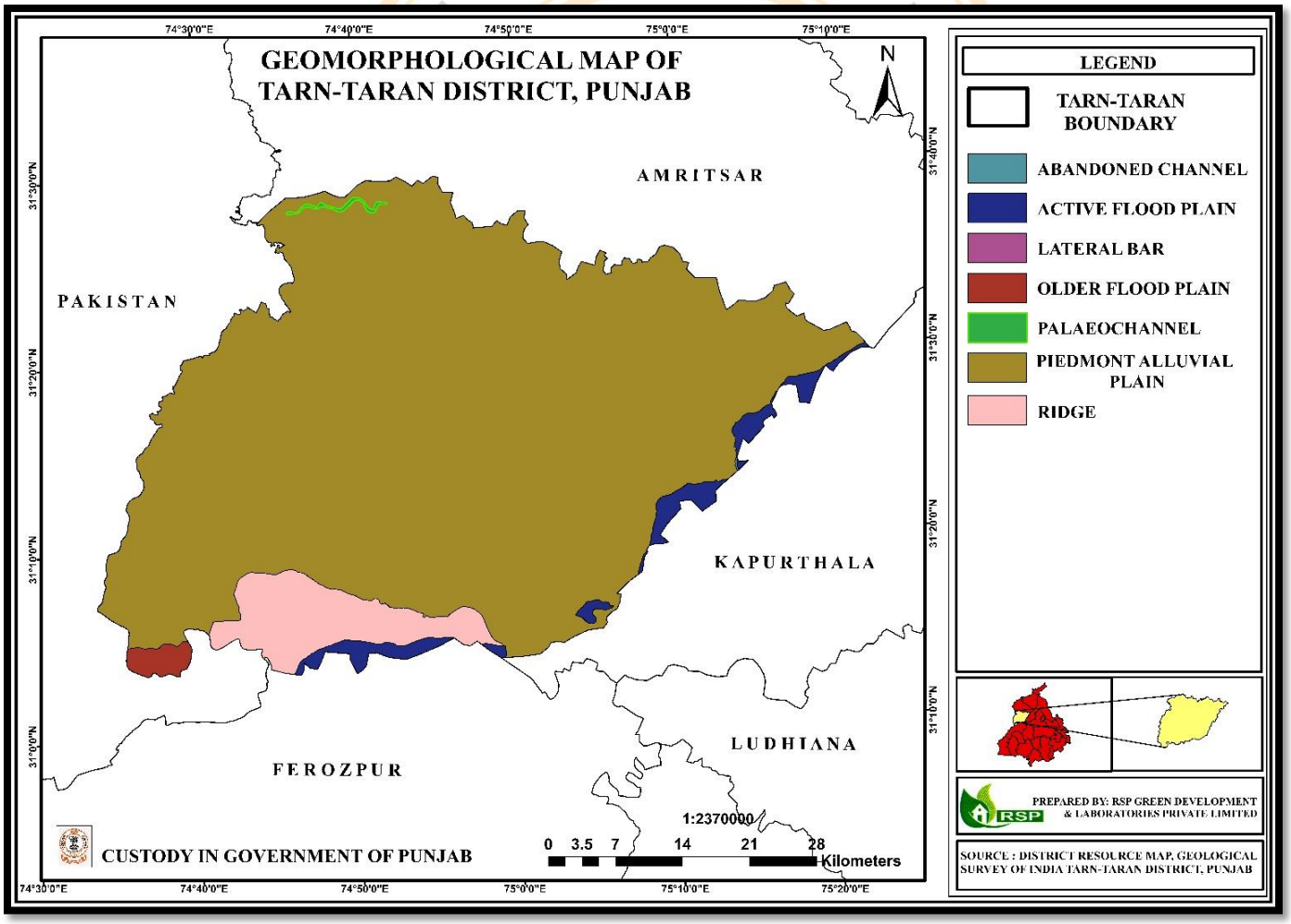


1.4.2.2 GEOMORPHOLOGICAL MAP

The major step for preparing Geomorphological Maps is identifying important features like Alluvial Fans, Alluvial Plains, Hilly Regions, etc. from Satellite Imagery (FCC False Colour Composition) via Visual Image Interpretation and then digitization for preparation of map including all the features according to their location.

Raw Data collection from Ministry of Earth Sciences; data geo-referencing using GIS software; digitization of block boundary, district boundary, state boundary, international boundary, and district headquarter, sub-district headquarter, places, road, railway, river, nala etc.; road name, River name, Railway name has been filled inthe attribute table of the layers; Final layout map is prepared after including scale, legend, north arrow, etc.

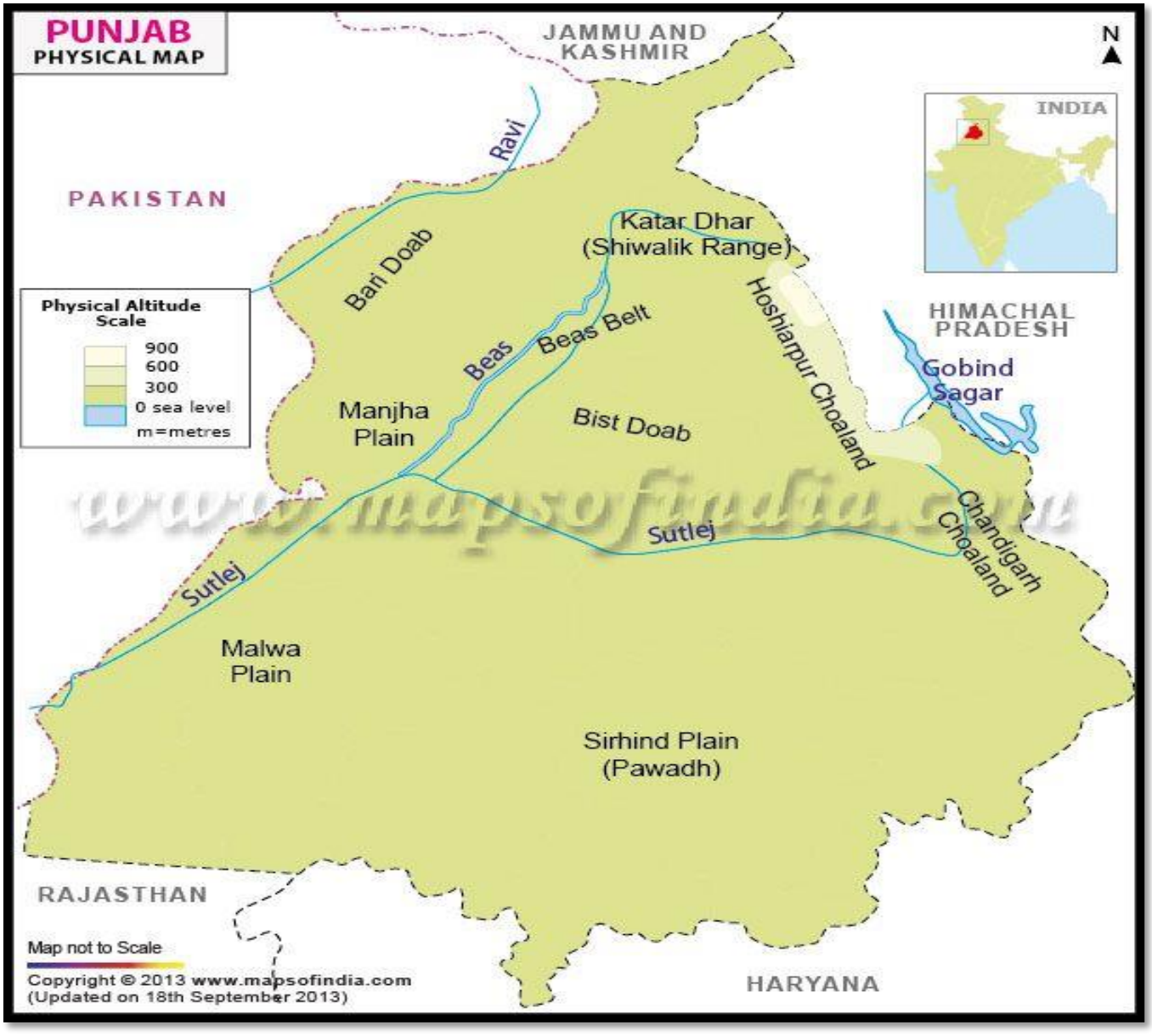
FIGURE 2: GEOMORPHOLOGICAL MAP OF THE DISTRICT



1.4.2.3 PHYSIOGRAPHICAL MAP

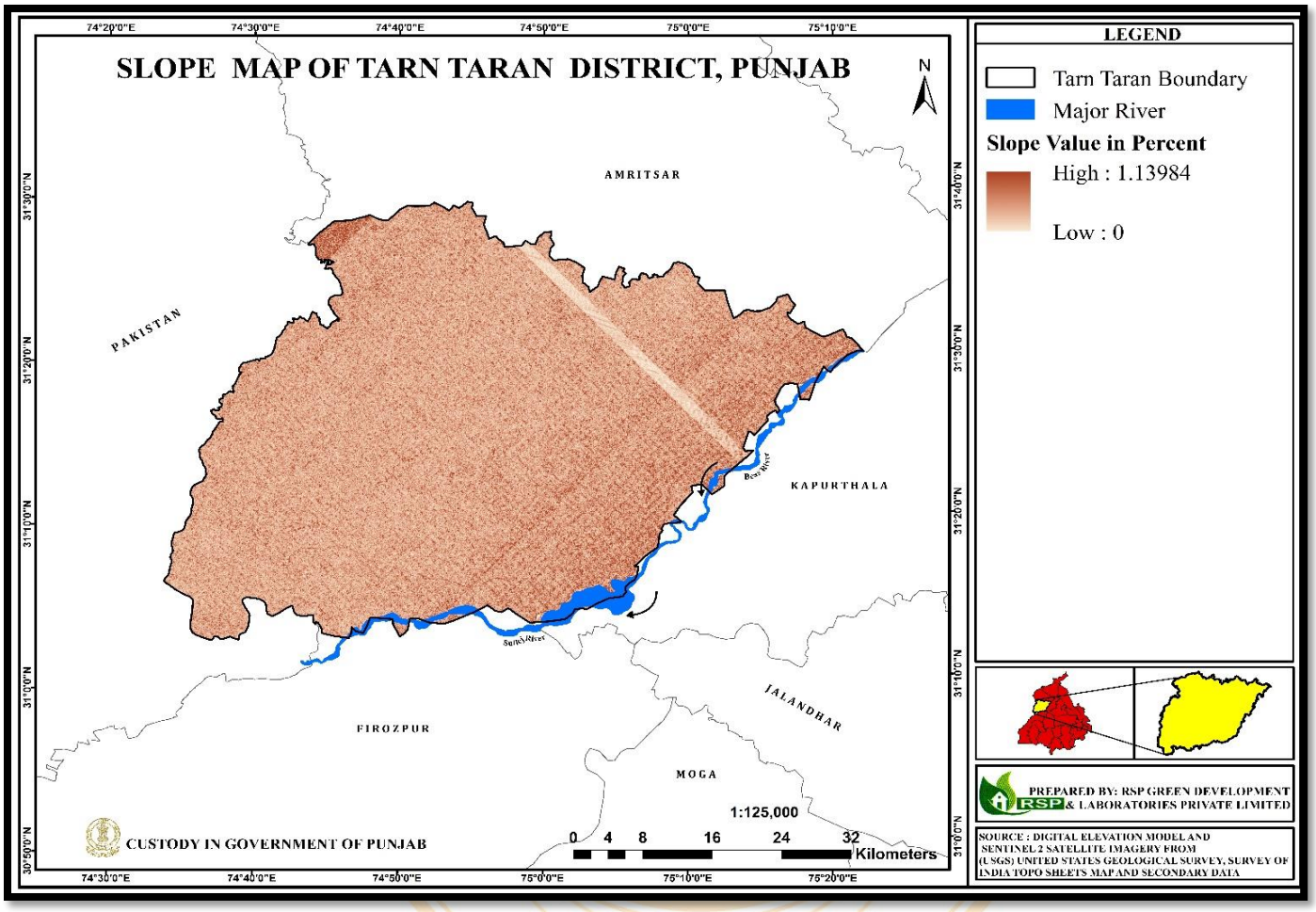
The major step of preparing a Physiographical Map is generating contours at specificintervals to show the elevation of the area using Satellite datasets along with groundtruthing through field surveys.

FIGURE 3: PHYSIOGRAPHICAL MAP OF PUNJAB



Source: *www.mapsofindia.com*

FIGURE 4: SLOPE MAP OF THE DISTRICT



1.4.2.4 BLOCK MAP, TRANSPORTAION MAP AND DRAINAGE MAP

Block, Transportation, and Drainage Maps are prepared after Raw Data collection from National Informatics Centre (NIC Website), data geo-referencing using GIS software; digitization of block boundary, district boundary, state boundary, international boundary, and district headquarters, sub-district headquarters, important places, roads, railways, rivers, nalas etc. Thereafter the road names, River names, Railway names, etc., are filled in the attribute table of the layers and the Final layout Block, Transportation and Drainage Maps are prepared after providing the scale, legend, north arrow, etc.

FIGURE 5: LOCATION MAP OF THE DISTRICT

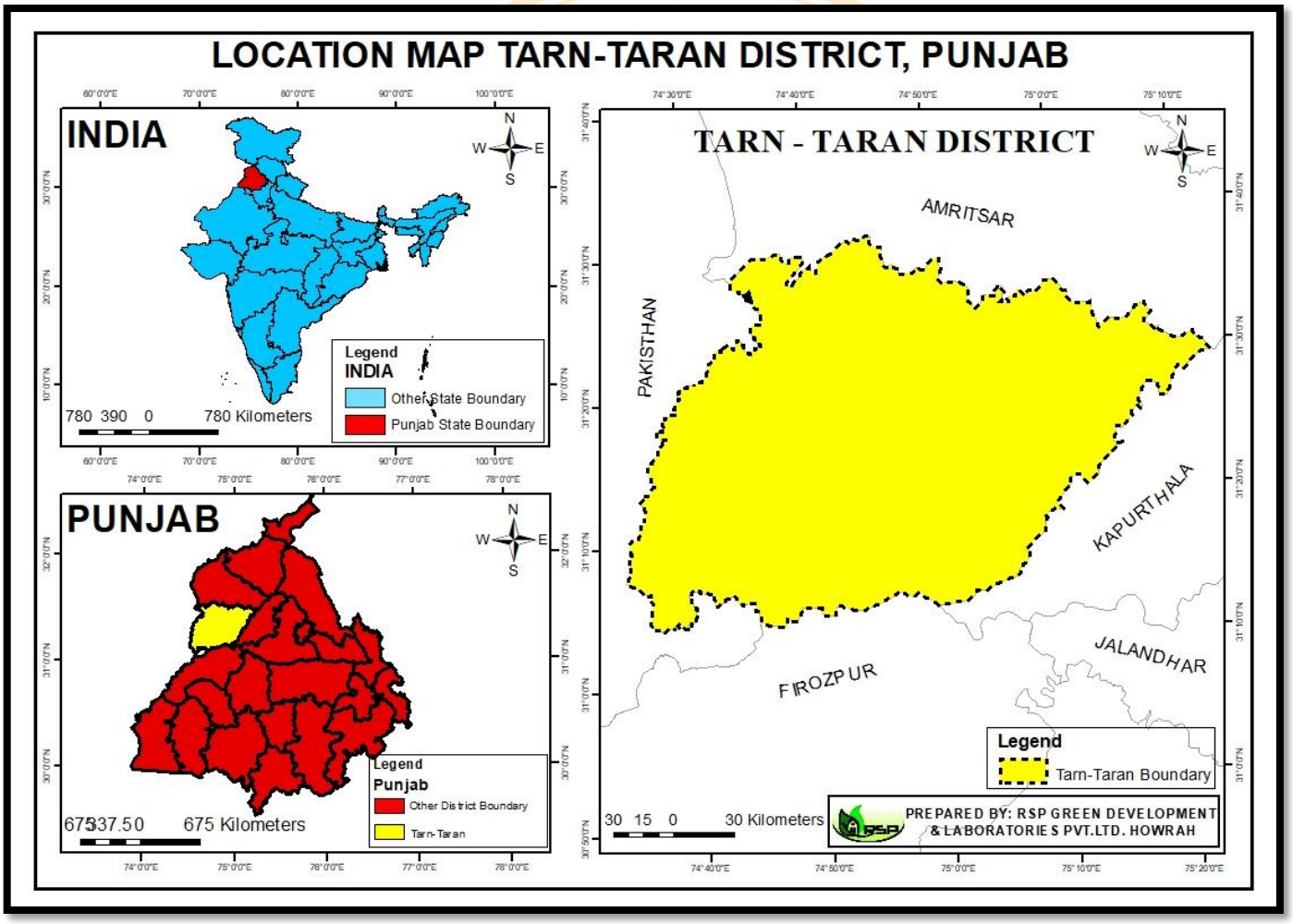


FIGURE 6: BLOCK MAP OF THE DISTRICT

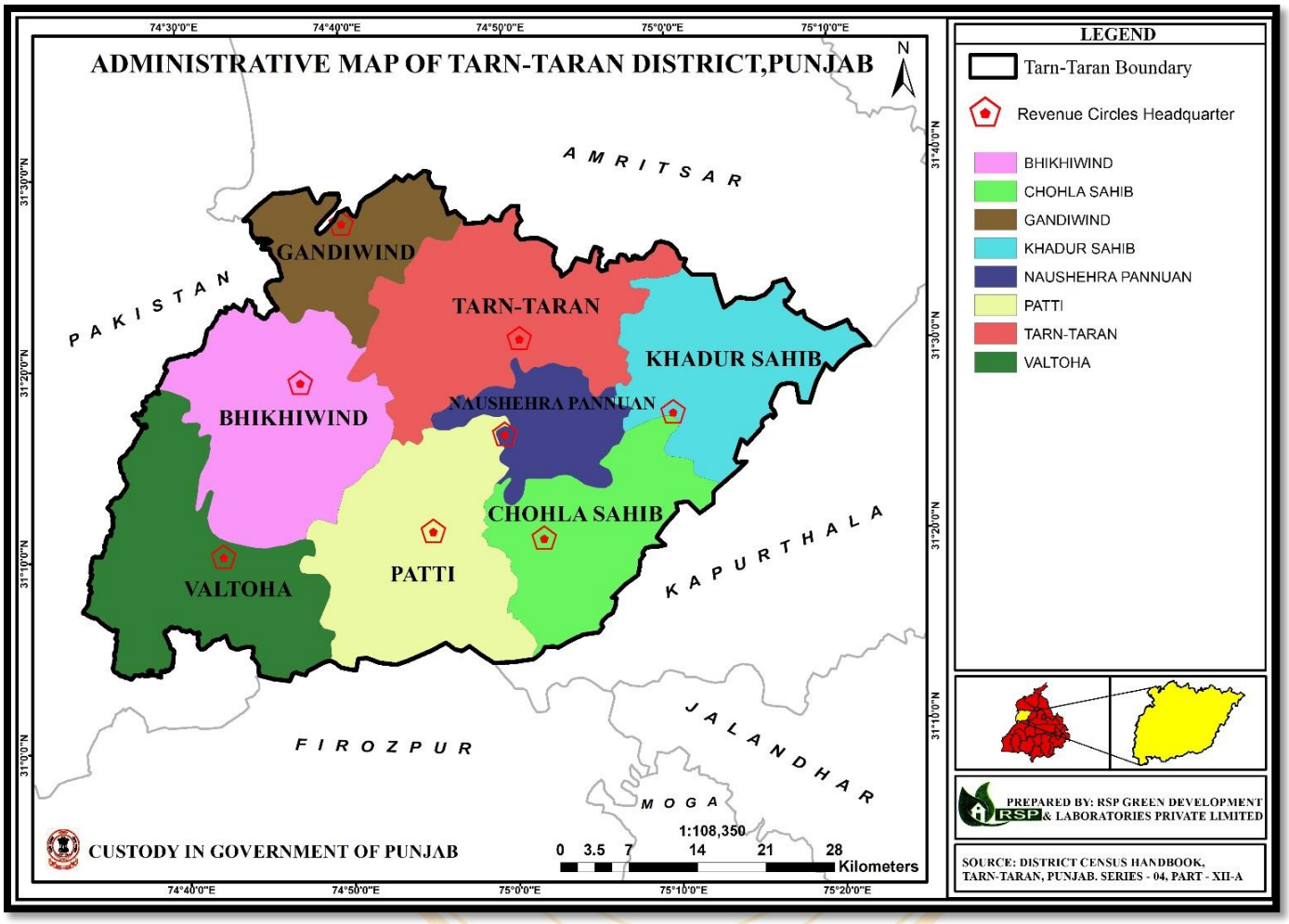
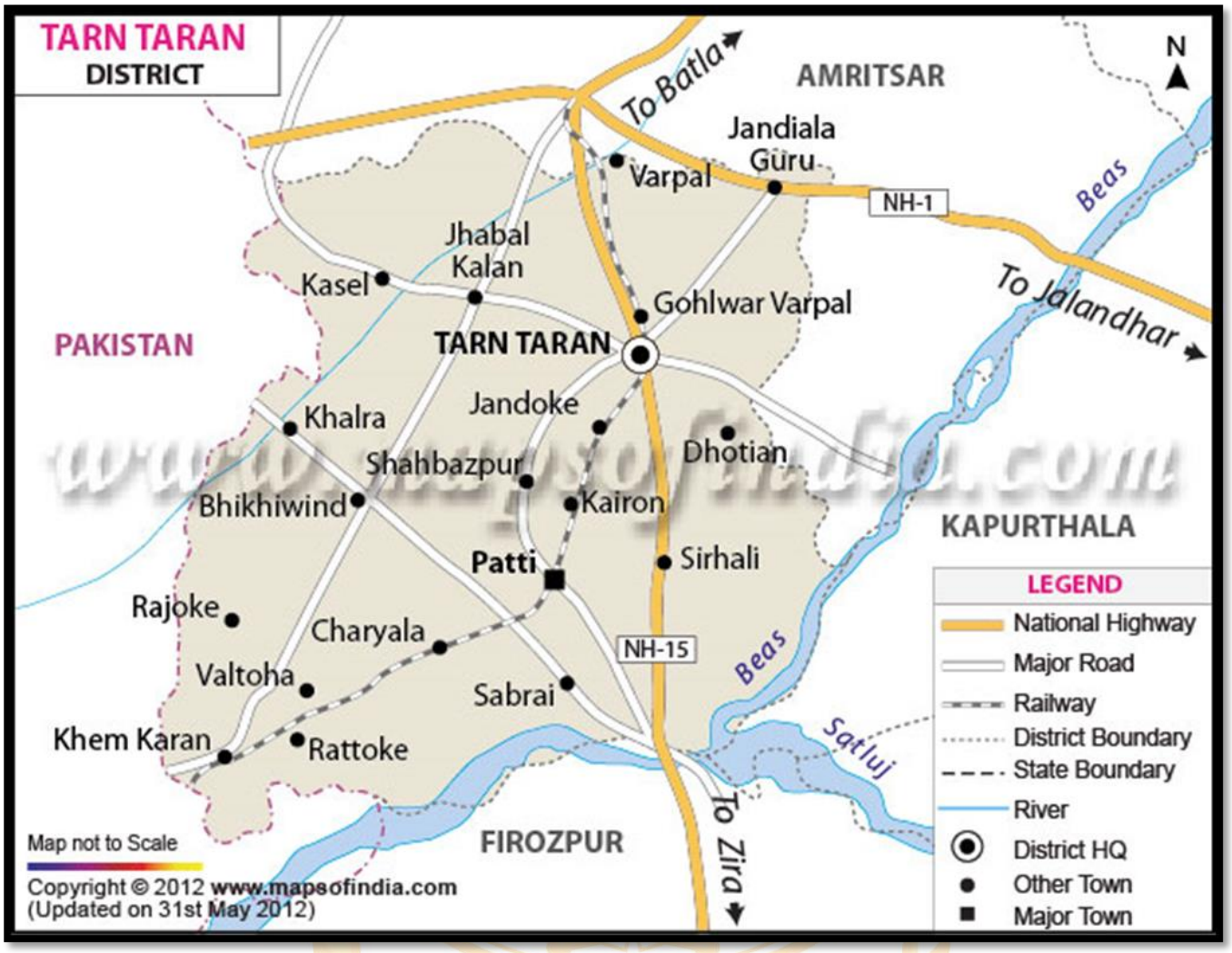
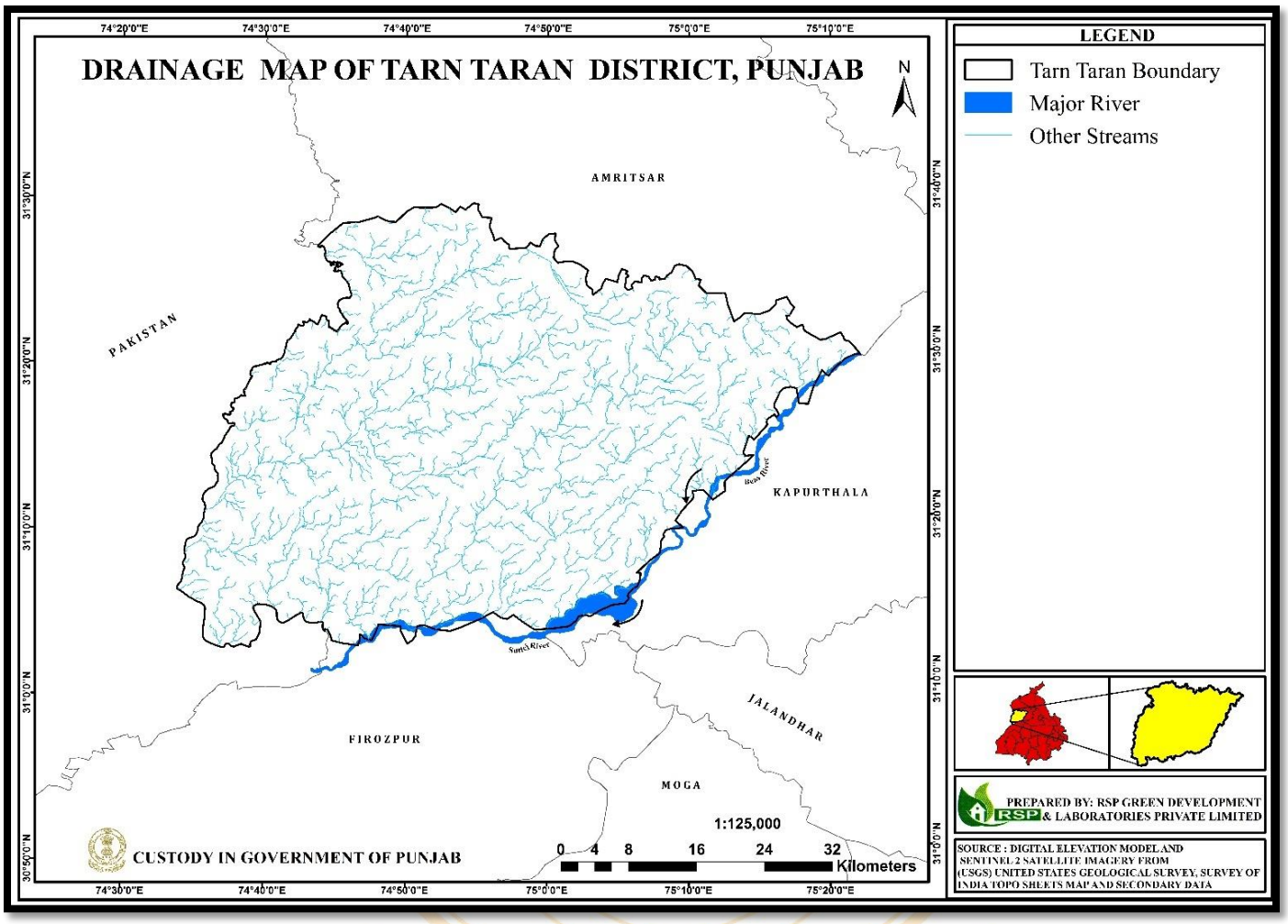


FIGURE 7: TARANSPORT OF THE DISTRICT



Source: *www.mapsofindia.com*

FIGURE 8: DRAINAGE MAP OF THE DISTRICT



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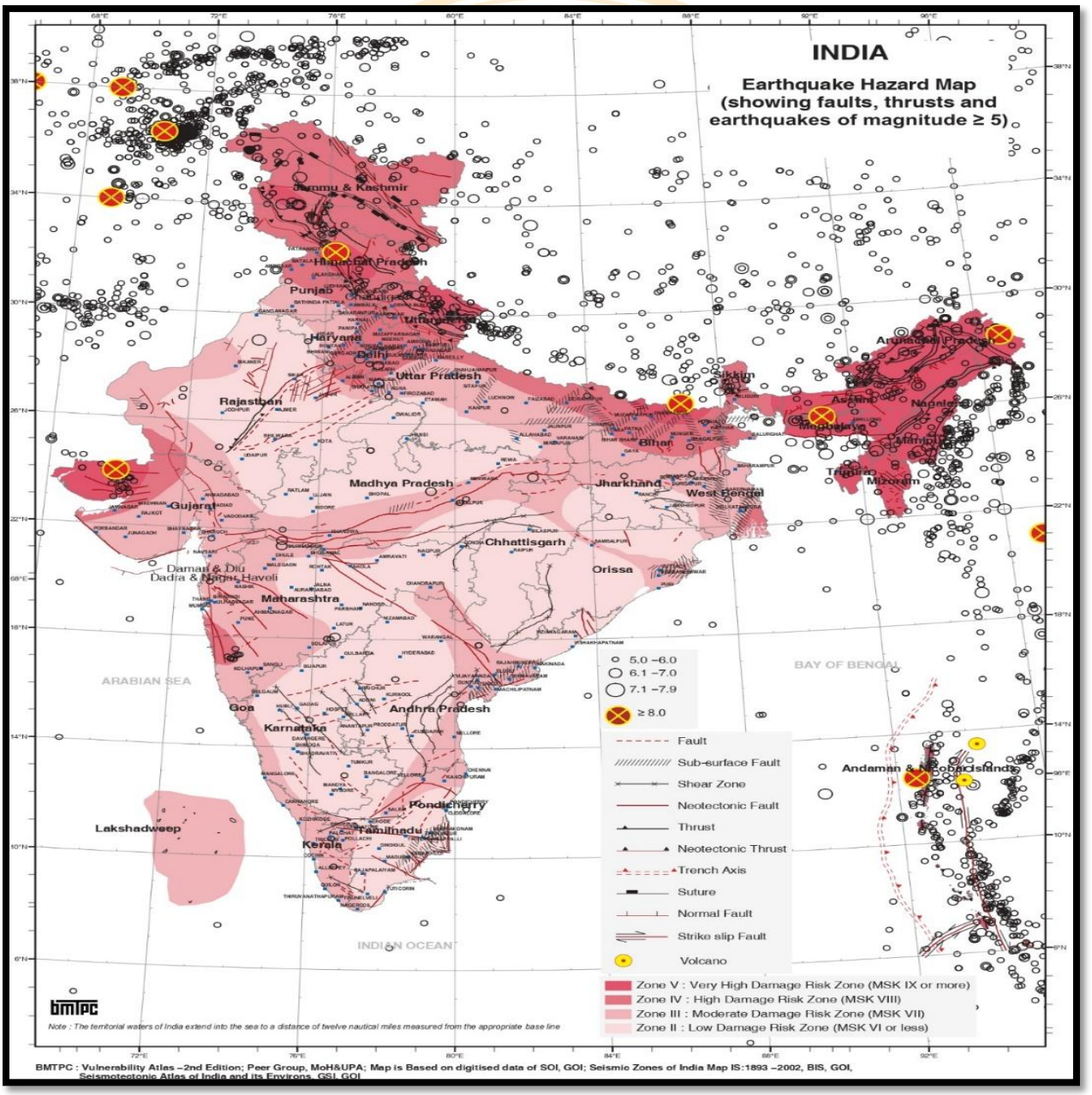
1.4.2.5 EARTHQUAKE, GEOLOGICAL, FLOOD INUNDATION AND CATCHMENT MAPS:

Earthquake, Geological, Flood Inundation and Catchment Maps areprepared after Raw Data collection from National Informatics Centre (NIC Website), data geo-referencing using GIS software; digitization of block boundary, district boundary, state boundary, international boundary, and district headquarter, sub- district headquarters, important places, roads, railways, rivers, nalas etc. Thereafter the road names, River names, Railway names etc., are filled in the attribute table of thelayers and the Final layout Earthquake, Geological, Lineament, Flood Inundation and Catchment Maps are prepared after providing the scale, legend, north arrow, etc.

FIGURE 9: EARTHQUAKE ZONATION MAP



Source: *https://ndma.gov.in/Natural-Hazards/Earthquakes*

FIGURE 10: GEOLOGICAL MAP OF THE DISTRICT

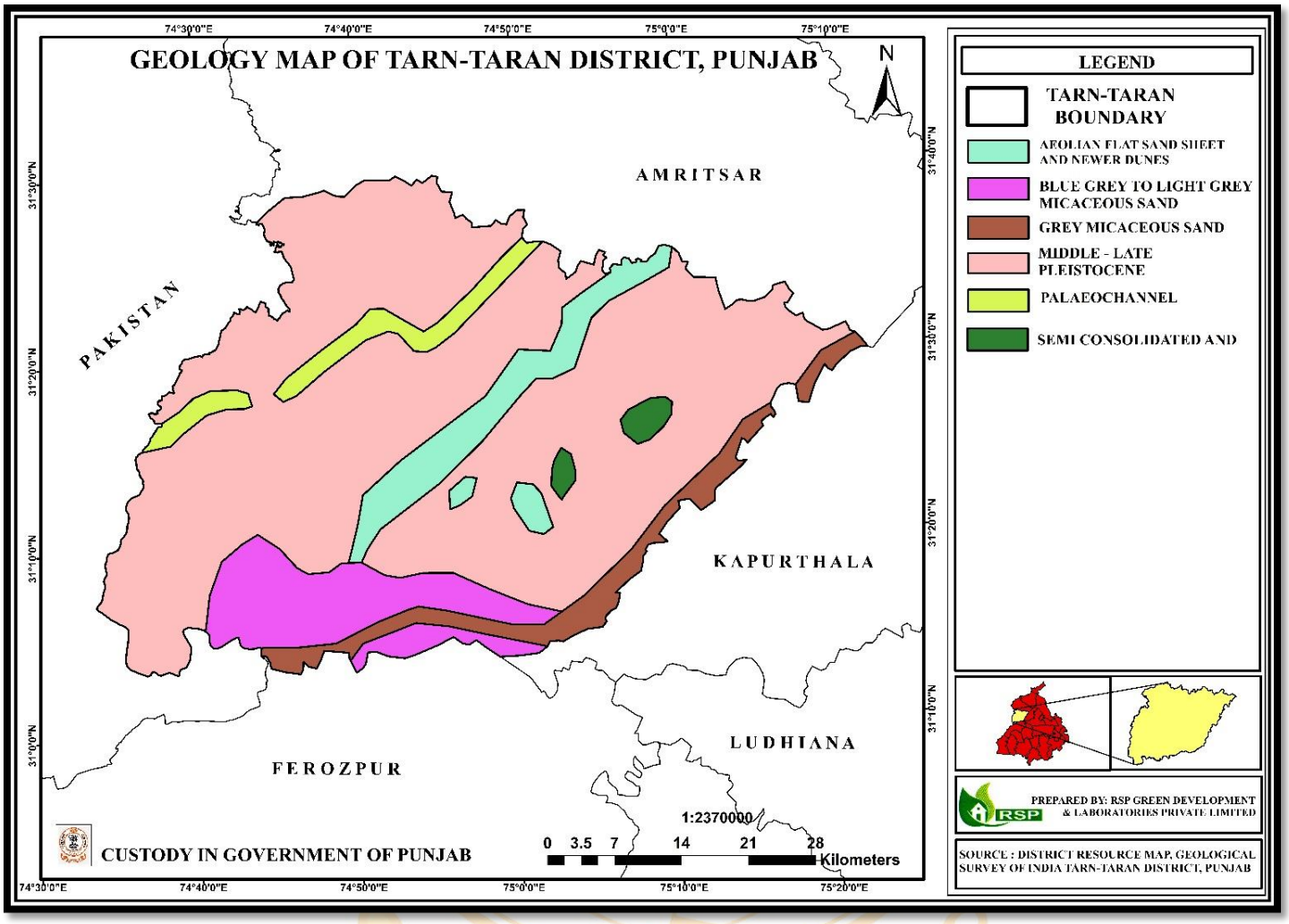


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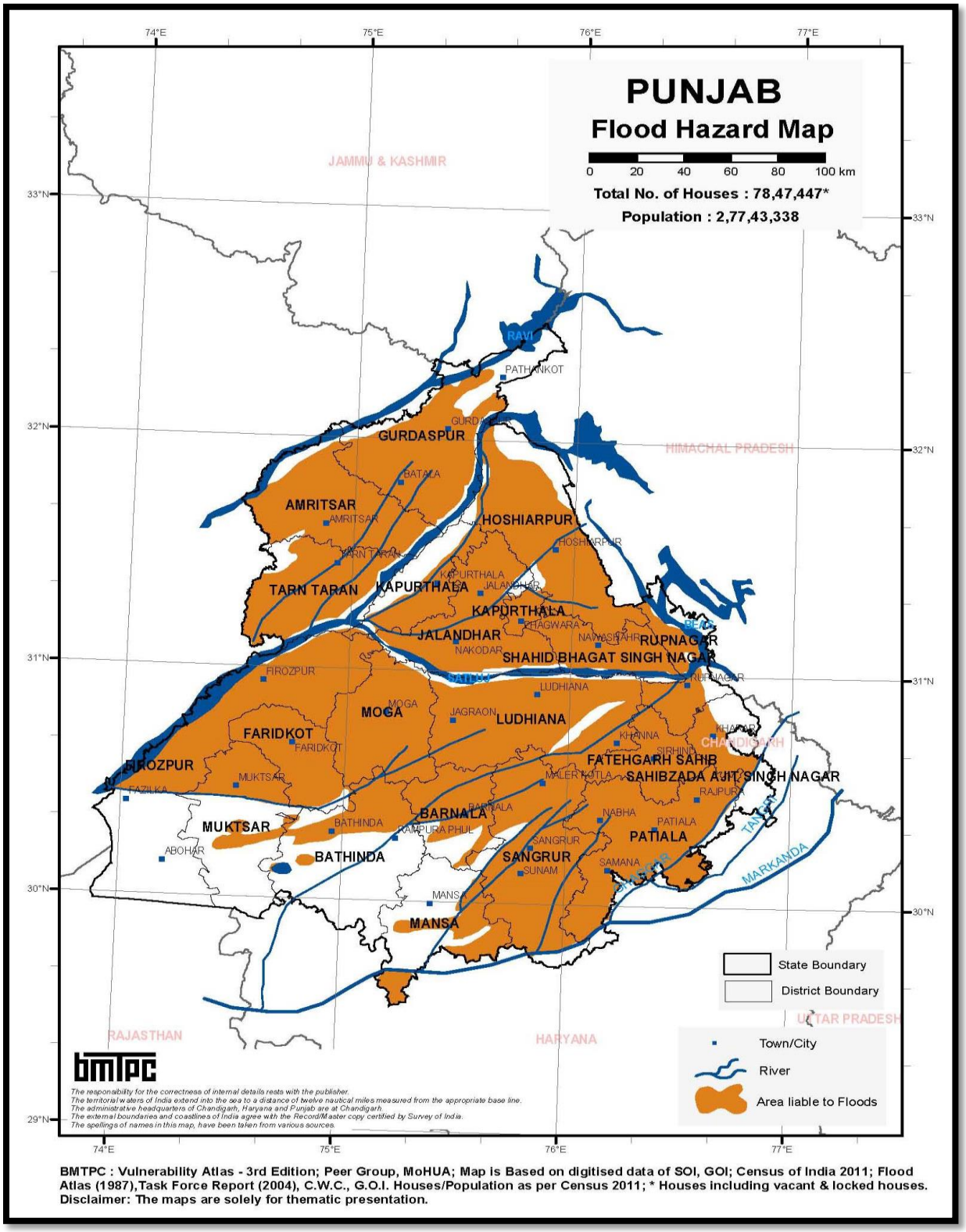
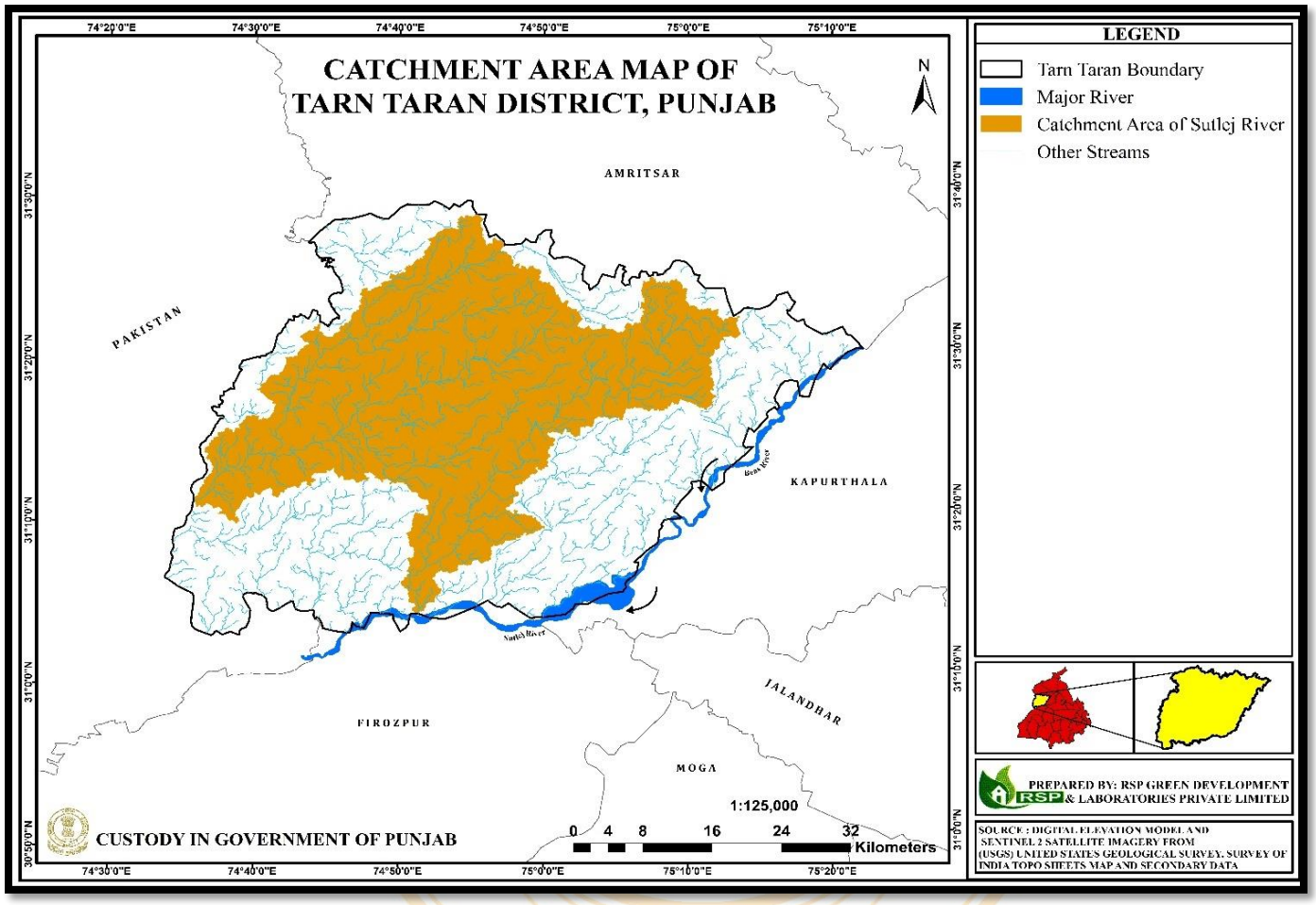
FIGURE 11: FLOOD INUNDATION MAP OF PUNJAB



Source: *https://vai.bmtpc.org/pun.html*

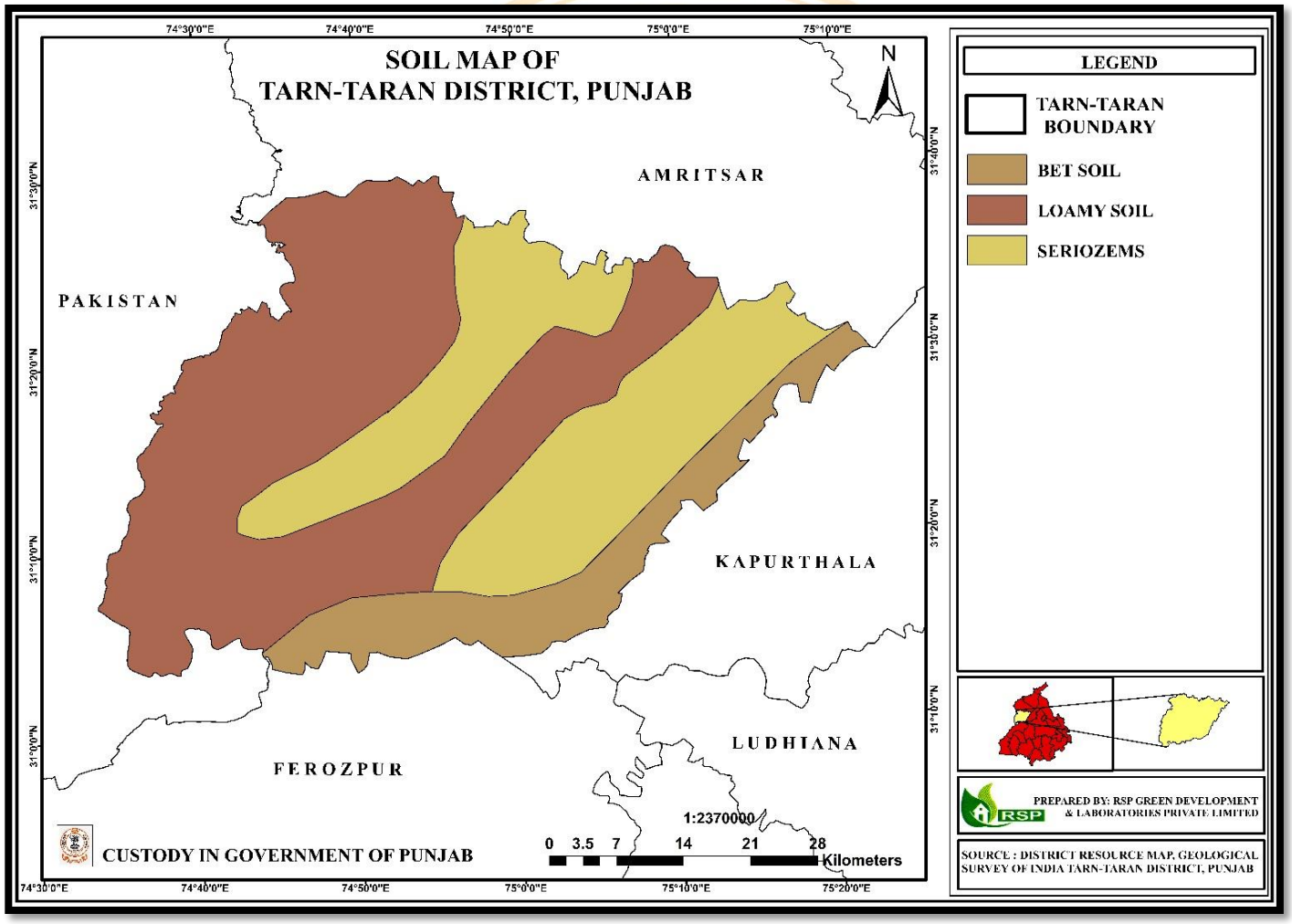
FIGURE 12: CATCHMENT AREA MAP OF THE DISTRICT



1.4.2.6 SOIL MAP

Soil Maps are prepared after Raw Data collection from the National Bureau of Soil Survey and Land Use planning, data geo-referencing using GIS software; digitization ofblock boundary, district boundary, state boundary, international boundary, and district headquarters, sub-district headquarters, important places, roads, railways, rivers, nalas, etc. Thereafter the road names, River names, Railway names, etc., are filled in the attribute table of the layers and the Final layout Soil Maps are prepared after providing the scale, legend, north arrow, etc.

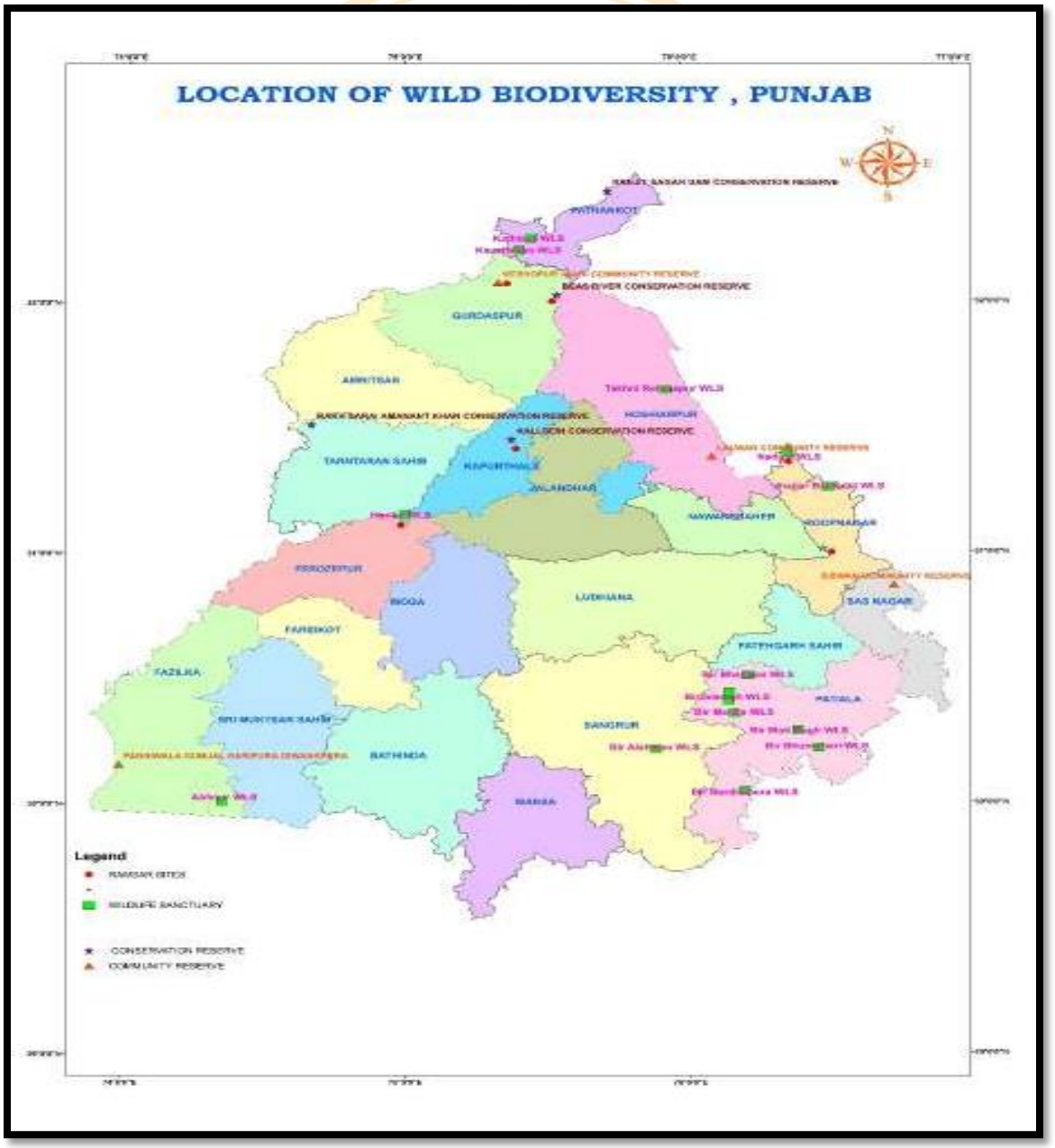
FIGURE 13: SOIL MAP OF THE DISTRICT



1.4.2.7 ECO-SENSITIVE ZONE MAP

Eco-sensitive Zone Maps are prepared after Raw Data collection from Department of Forest, Wildlife & Protected Areas and Toposheet, data geo-referencing using GIS software; digitization of block boundary, district boundary, state boundary, international boundary, and district headquarters, sub-district headquarters, important places, roads, railways, rivers, nalas, etc. Thereafter the road names, Rivernames, Railway names, etc. are filled in the attribute table of the layers and the Final layout Eco-sensitive Zone Maps are prepared after providing the scale, legend, north arrow, etc.

FIGURE 14: ECO-SENSITIVE AND WILDLIFE ZONE MAP



Source: *Forest department of Punjab*

1.4.3 PRIMARY DATA COLLECTION:

Primary data or field data collection is of critical importance in the preparation of DSRs. Field study involves assessment of the mineral resources of the district by means of pitting/ trenching for authentication of sand bar deposition at specific intervals. Thisprovides a clear picture of the extent and distribution of minor minerals in the river beds and other deposition areas in the District.

1.4.4 REPLENISHMENT STUDIES:

One of the principal causes of environmental degradation from in-stream mining is the extraction of minor minerals in excess of the rate at which these are being replenished. Hence accurate and regular replenishment studies are required to be carried out for the entire life cycle of the mining lease. The annual rate of replenishment will, therefore, be carried out each year for all the rivers / streams of the district in which mining is in operation to properly assess the quantities of sand reserves which can be permitted to be extracted.

Physical survey will be carried out using GPS/DGPS/Total Station to define the topography, contours and offsets of the riverbed. The surveys will clearly depict the important attributes of the stretch of the river and nearby civil structures and other features of importance. All sand bars / other sand deposit areas identified through Satellite images will be accurately surveyed on ground to determine the pre-monsoon and post-monsoon mineral deposits from which the replenishment rates will be determined. This information will also be used to determine the eligible spatial area for mining.

1.4.5 DRAFTING OF DISTRICT SURVEY REPORT:

The District Survey Report is prepared to accurately identify the potential mineralized zones with respect to Minor Minerals including River Sand, their suitability for mining, and the anticipated environmental impacts on account of the permitted mining operations. The DSR provides details of the minor mineral potential zones after taking into consideration objections, if any, at public hearings. The overall Format of the DSR is as prescribed in Notification dated 25th July, 2018, of the MOEF&CC.

CHAPTER 2: OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT

2.0 OVERVIEW:

The National Mineral Policy, 1993 facilitated the growth of mineral-based industries through investment in the private sector. As per the policy, processing units that desire to develop captive mines to secure assured supplies of raw material are allowed foreign equity participation in the manner and to the extent applicable to such processing units.

The extraction of sand and gravel from river and stream terraces, floodplains, and channels commonly attracts attention because in some situations excavation of sand and gravel may conflict with other resources such as fisheries, esthetic and recreational functions, or with the need for stable river channels. On one hand, it is possible to excavate sand and gravel from sources located in or near river or stream channels within acceptable environmental limits provided that proper safeguards and practices are utilized. On the other hand, the development of sand and gravel from sources located in or near river or stream channels may create far-reaching environmental impacts if proper safeguards and practices are not followed.

River bed mining or sand mining adjacent to a river or stream has a direct impact on the physical characteristics of the stream such as channel geometry, bed elevation, substratum composition and stability, in-stream roughness of the bed, pro velocity, discharge capacity, sediment transport capacity, turbidity, temperature etc.

In the case of Tarn Taran district, there are two rivers, Beas and Sutlej, which mainly contains alluvial deposits of the Quaternary age comprising sand, silt, clay and kankar.

De-Siltation: Erosion and Siltation are a natural phenomenon. It depends upon various factors like rainfall, physiographic and geologic conditions of the basin, steep terrain slopes, deforestation/watershed degradation, various structural interventions, impoundment of water in reservoirs, etc.

Siltation leads to a reduction in the carrying capacity of the river channels as well as of the reservoirs and results in floods and loss of created useful storage. So, there is a need to build up a "National Silt Management Policy". But there are no explicit Guidelines for de-siltation or silt management in rivers in India. However, there are Guidelines and notifications regulating "Sand Mining" by the Ministry of Environment, Forest and Climate Change (MoEF&CC). Geological Survey of India (GSI) has also framed Guidelines as a model document on the "Impact and Methodology of Systematic and Scientific Mining in the river bed material" for sustainable riverbed mining.

De-silting and dredging are two different parts. Removing fine silt and sediment from the river channel in order to restore the channel capacity is called de-siltation. But de-siltation does not involve widening or deepening the river channel while dredging involves the river channel enlarging through deepening and widening.

De-siltation methods are as follows:

Bar scalping or skimming: It is extraction of sand and gravel from the surface of bars. This method generally requires that surface irregularities be smoothed out and that the extracted material be limited

to what could be taken above an imaginary line sloping upwards and away from the water from a specified level above the river's water surface at the time of extraction (typically 0.3 – 0.6 m).

- **Dry-Pit Channel Excavation:** These are pits excavated within the active channel on dry intermittent or ephemeral stream beds. Dry pits are often left with abrupt upstream margins, from which head cuts are likely to propagate upstream.
- **Wet-Pit Channel Excavation:** It involves excavation of a pit in the active channel below the surface water in a perennial stream or below the alluvial groundwater table.
- **Bar Excavation:** These are pits excavated at the downstream end of the bar as a source of aggregate and as a site to trap sand and gravel. Upon completion, the pit may be connected to the channel at its downstream end to provide side channel habitat.
- **Channel-wide River bed Excavation:** These are across the entire active channel of rivers during the dry season. The river bed is evened out and uniformly lowered.

Agriculture Sand Mining: In early days, sand mining was confined mainly to river beds. As the demand for sand increased, sand mining started in agricultural fields too. This practice is prevalent in Haryana, where the top layer of soil varying between 1 and 2 meters is removed and stacked separately and thereafter the sand deposit which may be 10–15-meter deep is mined. After removing the sand layer up to a maximum depth of 09 meters, the top soil stacked is spread out on the field and the same is brought under the cultivation. Though the level of this land (mined out area) is lowered to the depth of the excavation and in initial years of cultivation the productivity is low, but the productivity of the fields improves with continued cultivation and addition of organic manure in the field.

The following recommendations should be kept in mind for mining in such leases:

1. Mining of sand in such mine leases will require environmental clearance.
2. The lease should be for sand mining either from agricultural fields or river. In the same lease, both types of area should not be included.
3. Mining Plan for the mining lease (non-government) on agricultural fields/Patta land shall only be approved if there is a possibility of replenishment of the mineral or when there is no riverbed mining possibility within 5 km of the Patta land/Khatedari land. For government projects mining should be done by the Government agency and materials should not be used for sale in open market.
4. The slope of the mining area adjacent to agricultural fields should be proper (preferably 45-60 degrees) and an adequate gap (minimum 10 feet) be left from the adjacent agricultural field to avoid erosion and scouring.

2.1 MINING LEASES WITH LOCATION, AREA AND PERIOD OF VALIDITY IN TARN TARAN DISTRICT

The details of existing mining leases with location, area, and period of validity in Tarn Taran are given in **Annexure I and II**.

2.2 DETAILS OF ROYALTY OR REVENUE RECEIVED IN LAST THREE YEARS

Table No 2: Details of Royalty or Revenue received in last three years

Name of Minerals	2019	2020-2021	2021
Sand/Gravel	_	1680260.75	5925198.5
Source: *Revenue department of Tarn-Taran District*			

2.3 DETAILS OF PRODUCTION OF SAND OR BAJRI IN LAST THREE YEARS

Table No 3: Details of Production of sand or bajri in last three years

Name of Minerals	2019	2020-2021	2021
Sand/Gravel	_	19369 MT	68302 MT
Source: *Mines, Irrigation department and Revenue department of Tarn-Taran district*			

CHAPTER 3: PROCESS OF DEPOSITION OF SEDIMENTS IN RIVERS OF THE DISTRICT

3.0 INTRODUCTION

The geological formations in this district are of recent deposits known collectively as the Indo-Gangetic alluvium of the quaternary age, which consists of sand, clay, silt, beds of gravel, and very coarse sand rarely seen. The kankar which is a form of calcium carbonate is found in beds generally at a shallow depth below the ground surface at the upper margin of the impermeable subsoil. Some kankar beds are mainly found in the Varpal, Bala Chak, and Gohlwart areas of Tarn Taran. Geologically, the alluvium is divided into **Khadar** i.e., the newer alluvium which is generally of sandy light-colored, less concretionary in composition, and **Bhangar** i.e., the older alluvium which is more clayey composition, generally of dark appearance and full of kankar. Sometimes a few pebble beds are also present.

The district is made up of the Ravi sub-basin, Beas Sub-basin, and Satluj sub-basin of the Indus Basin. So, physio-graphically the district represents an alluvial plain. The area of the district in the Ravi sub-basin in the northern part of the district is 1440 sq. Km. Whereas Beas sub-basin in the central part of the district covers an area of 783 sq. Km. Satluj sub-basin covers an area of 361 sq km in the eastern part of the district. The topographic gradient is about 0.4m/km in the district**.**

The Beas River forms the eastern and southeastern boundaries of the district. The area is drained into Sutlej and Beas rivers through a network of drains. Due to the higher landscape of the Tarn Taran district, there is stream bank erosion and the formation of gullies/ravines along the Beas.

Rivers and Canals

Some rivers that flow through this region are listed below:

Table No. 4: List of Rivers flow through the District

Sl No.	Name of the River	Length (in Km)	Average Width (in meters)
1.	Sutlej	29 km (Approx.)	3600 meter (approx.)
2.	Beas	70 km (Approx.)	3000 meter (approx.)
			Source: *District Mining Office of Tarn-Taran District*

River Beas:

The Beas is a tributary of the Indus River system. River Beas originates in the Himalayas at an altitude of 2050 m AMSL. In HP, River Beas passes through Kullu, Mandi, and Kangra. On entering the Siwalik hills in Hoshiarpur, Punjab, the river turns to the north forming a boundary with Kangra district, HP. Then bending towards the base of the Siwalik hills, it flows to the south, separating the districts of Gurdaspur and Hoshiarpur in Punjab. After touching Jalandhar district, Punjab, for a short distance, River Beas forms the boundary between Tarn Taran and Amritsar in Punjab. It merges with River Sutlej at Harike, Punjab. The length of River Beas is 470 km. The Beas River marks the easternmost border of Alexander the Great's conquests in 326 BCE. The chief tributaries are Bain, Banganga, Luni, and Uhal. The Sutlej continues into Pakistani Punjab and joins the Chenab River at Uch near Bahawalpur to form

the Panjnad River; the latter in turn joins the Indus River at Mithankot.

Harike Wetland, also known as "Hari-Ke-Pattan". The Harike Lake in the deeper part of it is the largest wetland in Asia and falls in the Tarn Taran district of Punjab. The wetland and the lake were formed by constructing the headworks across the Satluj river, in 1953. The headwork is located downstream of the confluence of the Beas and Satluj rivers. This Wetland is situated about 35 km south of the Tarn Taran town on the NH 15 towards Ferozepur. It is the largest wetland in northern India and is the most important sanctuary in the State. Hari-Ke-Pattan is a natural serene place famous for its bird sanctuary. A number of globally threatened species have also been recorded in Harike. This type of habitat is not met anywhere in Punjab. Harike Lake was declared a 41 sq km wide wildlife sanctuary in 1982. Migratory birds about 350 odd species, coming from far-flung lands of China, Siberia, Afghanistan, and Pakistan, making it a popular place for bird watching and boating, characterize winter (November onwards).

Although the amount of deposition varies from stream to stream depending on factors like catchment, lithology, discharge, river profile, and geomorphology of the river course, where annual deposition is much more even two to three metres, it is observed that during flood season the entire pit that was excavated is completely filled up and as a result the excavated area is replenished with new material.

3.1 ANNUAL DEPOSITION FACTOR:

Rivers are important geological agents for erosion, transportation and deposition. Deposition and erosion in river valleys can strongly modulate the downstream delivery of sediment (Fan and Cai, 2005; Malmon *et al.*,2005). A riverine sediment budget provides an effective conceptual framework within which to quantify sediment mobility, transport, deposition, and storage within a drain-age basin, as well as sediment output from the basin (Walling *et al.*, 2002). It is therefore critical to understand this modulation effect (Walling and Horowitz,2005). Annual deposition of riverbed materials depends on various factors which are as follows:

Geological erosion and soil erosion are the two basic terms used to describe erosion processes. Geological erosion refers to regular or natural erosion brought on by long-term geological processes that wear down mountains and produce floodplains, coastal plains, and other landforms to develop. Soil erosion happens gradually or at an alarming rate, but it is a continual process. It leads to various negative effects, including ongoing topsoil erosion, ecological harm, soil collapse, and many more.

The soil fragments are loosening or being washed away in the valleys, oceans, rivers, streams, or far-off regions throughout this process. Human activities like agriculture and deforestation have contributed to this situation getting worse.

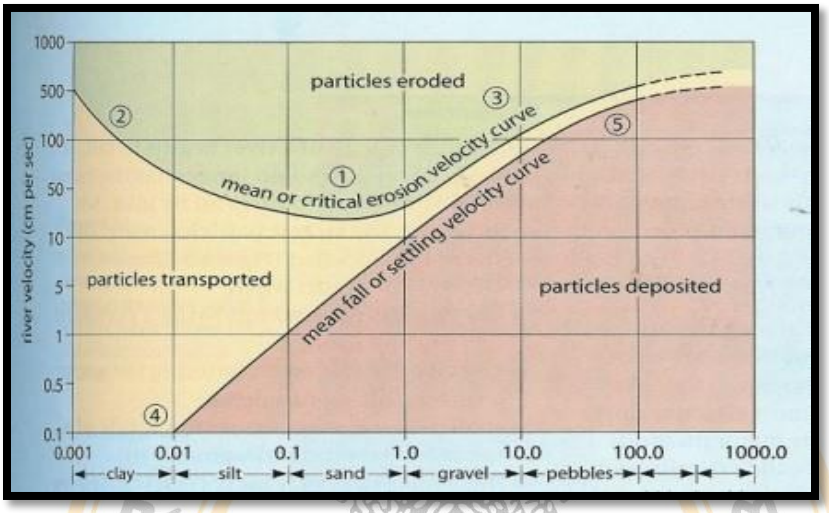
Fluvial erosion is the direct removal of soil particles by moving water. The force of the flowing water and the resistance of the bank material to erosion both affect the pace of fluvial erosion.

3.2 PROCESS OF DEPOSITION:

After erosion, the eroded materials get transported with running water. When the river losses its energy and velocity falls, the eroded material is being deposited. A river can lose its energy when rainfall reduces, evaporation increases, friction close to river banks and when enters a shallow area (flood plain) or towards its mouth where it meets another body of water. Hjulström curve showing the relationship

between particle size and the tendency to be eroded, transported or deposited at different current velocities.

Figure: Hjulström curve



Source: *Sediment Petrology Pettijohn*

3.2.1. MODE OF SEDIMENT TRANSPORT IN RIVERS

Sediment transport is the transportation of detrital particles via air, water, ice, or gravity. When transported by air and water (fluid transport), grains (which may be sand particles) travel as a bed load (by rolling, sliding, and saltation) or in suspension when the turbulence keeps the grains moving.

The amount and size of sediment moving through a river channel are determined by three fundamental controls: competence, capacity and sediment supply.

The sediment load of a river is transported in various ways although these distinctions are to some extent arbitrary and not always very practical in the sense that not all of the components can be separated in practice:

i. Dissolved load

ii. Suspended load

iii. Intermittent suspension (saltation) load

iv. Wash load

v. Bed load

3.2.1.1 DISSOLVED LOAD: The amount of sediment carried in solution by a stream's total sediment load, particularly ions from chemical weathering, is known as the dissolved load. Along with suspended load and bed load, it makes up a significant portion of the overall amounts of debris removed from a river's drainage basin.

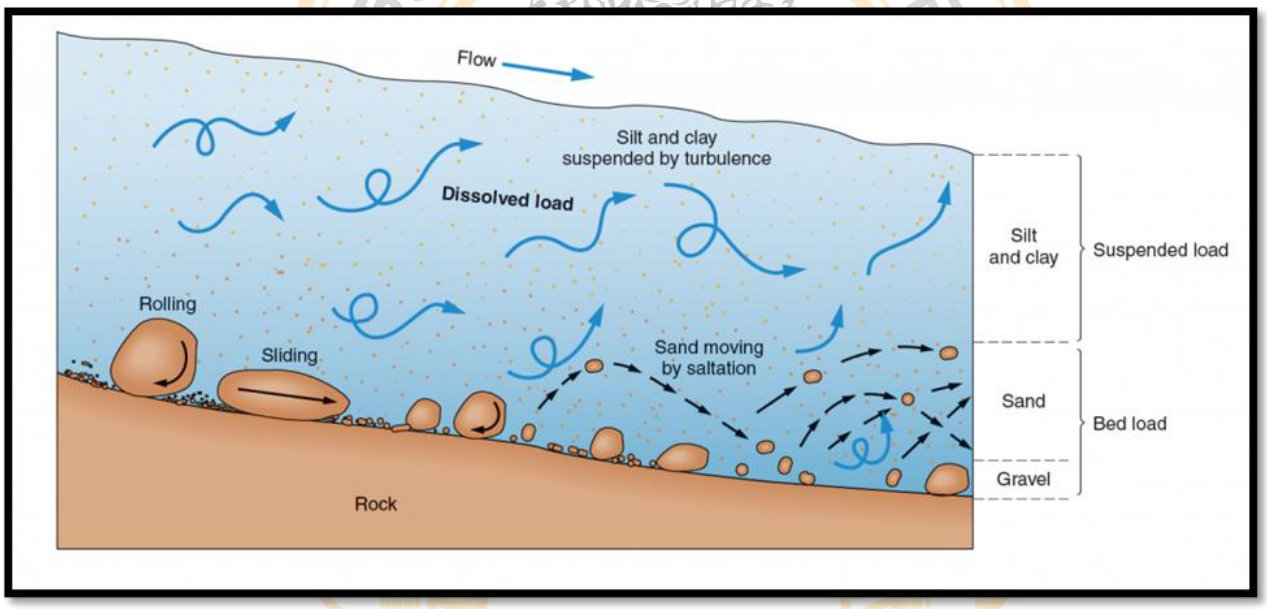
3.2.1.2 SUSPENDED LOAD: The term "suspended load" describes the portion of the total sediment transport that is kept suspended by turbulence in the flowing water for extended periods of time without contact with the stream bottom. It is nearly moving at the same speed as the flowing water.

3.2.1.3 SALTATION LOAD: The portion of the bed load that is moving, either directly or indirectly, as a result of the impact of bouncing, i.e., the intermittent jumping motion of the particles, along the stream bed.

3.2.1.4 WASH LOAD: Particle sizes smaller than those found in substantial amounts in the bed material make up that portion of the suspended load. It is conveyed through the stream without deposition since it is in almost permanent suspension. The discharge of the wash load through a reach is determined solely by the rate at which these particles become available in the catchment area, not by the flow's transport capacity.

3.2.1.5 BED LOAD: Particles that are too large to be carried as suspended load are bumped and pushed along the stream bed as bed load. Bed load sediments do not move continuously. Streams with high velocity and steep gradients do a great deal of down cutting into the stream bed, which is primarily accomplished by movement of particles that make up the bed load.

FIGURE: MODE OF SEDIMENT TRANSPORT IN RIVERS



Source: *https://www.bgs.ac.uk/discovering-geology/geological* processes/deposition/#:~:text=Deposition%20is%20the%20laying%20down,sea%20shells)%20or%20by%20evaporation. *(British Geological Survey)*

CHAPTER 4: GENERAL PROFILE OF THE DISTRICT

4.0 PROFILE OF THE DISTRICT

In the very northwest of India, in the state of Punjab, is the district of Tarn Taran. The main cities of the district are Tarn Taran, Sahib, and Patti. The district headquarters is located at Tarn Taran. The city of Tarn Taran is a holy place for the Sikh community.

The district is divided into three tehsils, Tarn Taran, Patti, and Khadur Sahib, and five sub-tehsils, Jhabal, Chohla Sahib, Khem Karan, Bhikiwind, and Goindwal Sahib. Eight development blocks make up the district: Gandiwind, Bhikiwind, Tarn Taran, Khadur Sahib, Naushera Pannuan, Chohla Sahib, Patti, and Valtoha.

Tarn Taran had a population of 1,119,627 in 2011, with 589,369 males and 530,258 females. According to provisional data released by Census India 2011, the population density of Tarn Taran district in the year 2011 is 464 people per square kilometre.

4.1 ADMINISTRATIVE SET-UP OF THE DISTRICT

Table No 5: Tahsil-wise list of census villages in Tarn Taran district, Punjab, India

Sl. No.	Tahsil	Total villages
1.	Khadur Sahib	96
2.	Patti	199
3.	Tarn Taran	198
	Source: *Census Report 2011, Tran-Taran District*	

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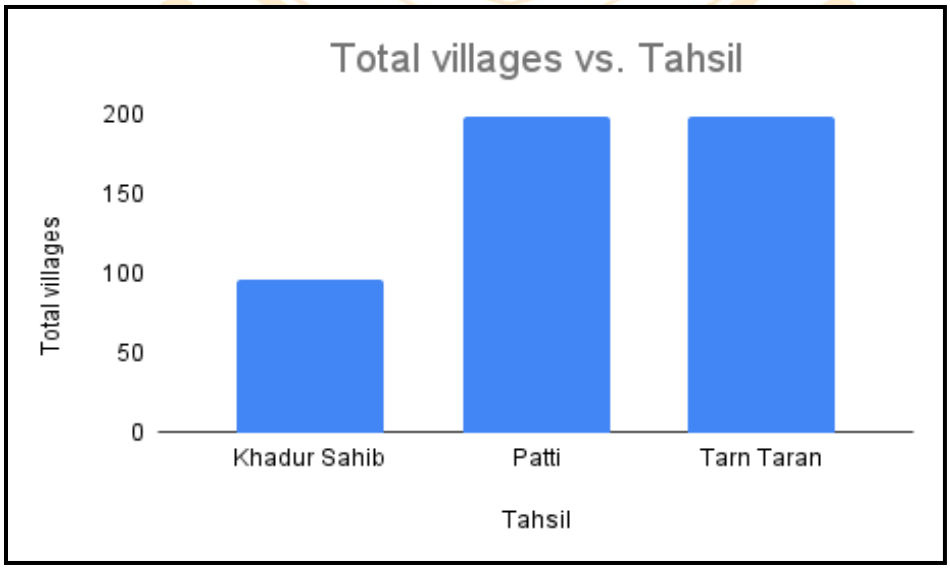
Chart 1: Showing number of villages present in each tahsil of Tarn Taran district



Source: *Census Report 2011, Tran-Taran District and Table No. 05*

Table No 6: Administrative units of the district Tarn Taran

Administrative Units	Year	Unit	Statistics
i) Tehsils /Sub divisions	2011	Nos.	3
ii) Sub-Tehsil	2011	Nos.	7
iii) Blocks	2011	Nos.	8
iv) Panchayat Simitis	2011	Nos.	8
v) Nagar Nigam	2011	Nos.	0
vi) Nagar Palika	2011	Nos.	0
vii) Gram Panchayats	2011	Nos.	534
viii) Inhabited villages	2011	Nos.	477
xi) Assembly Area	2011	Nos.	4
Source: *Census Report 2011, Tran-Taran District*			

Table No 7: District at a glance

Country	India
State	Punjab
Region	Majha
District	Tarn Taran
Total area	2583 square kilometers
Population	• Total1,119,627 • Density 460/km²
Official language	Punjabi
Literacy	69.4%
Source: *Census Report 2011, Tran-Taran District*	

4.1.1 DETAILS OF BLOCKS OF TARN TARAN

Table No 8: Details of Blocks of Tarn Taran

Block Name	Area (Sq. Km)
TARN TARAN	380.080
VALTOHA	362.027
PATTI	373.410
BHIKHIWIND	364.364
NAUSHEHRA PANNUAN	137.188
CHOHLA SAHIB	257.791
KHADUR SAHIB	282.491
GANDIWIND	184.763
Source: *Census Report 2011, Tran-Taran District and Map No.06*	

4.2 LAND UTILIZATION PATTERN OF THE DISTRICT

Land cover: Land cover is the physical material at the surface of the earth. Land covers include grass, asphalt, trees, bare ground water, *etc*. Land cover data documents how much of a region is covered by forests, wetlands, impervious surfaces, agriculture, and other land and water types. Water types include wetlands or open water.

Land use: Land use not only shows how people use the landscape but also the utilization of land resources naturally. Therefore, the land of a particular region can be used for the purpose of infrastructural development, settlements, amusement &recreation, conservation of wildlife and wildlife habitat, agriculture& farming, or mixed uses and can be defined as "land use". Land use applications involve both baseline mapping and subsequent monitoring, since timely information is required to know what current quantity of land is in what type of use and to identify the land use changes from year to year.

Deciduous forest: Deciduous Forest is mainly dominated by woody vegetation cover, *i.e.*, >60% along within average plant height of more than 2 meters. The floral communities are dominated by the trees which hold broad leaves with an inimitable feature of the annual cycle of leaf-on and leaf-off periods means the trees shed their leaves at a particular season of each year, mainly in late winter.

Cropland: Temporarily cropped area followed by harvest and a bare soil period (*e.g.*, single and multiple cropping systems). Different types of crop cultivation and cropping arrangement are specified according to the seasons (*e.g.*, Kharif, rabi, zaid). Cropland includes areas that are used for common crop production and are also used for the adapted crops for harvest.

Built-up land: The urbanized area, *i.e.*, any land on which buildings and/or non-building structures are present, normally as part of a larger developed environment such as: a developed land lot, rural area, or urban area. The land is covered by buildings and other anthropogenic infrastructures.

Mixed forest: In mixed forests, the vegetation composition principally displays the presence of trees and also includes shrubs and bushes. The mixed type of forest is neither predominated by broad-leaved trees nor by coniferous floral species.

Fallow land: Fallow land is farmland without crops and usually needs a year to recover its fertility to grow crops. Such kinds of land are acquired for cultivation temporarily and are kept uncultivated for one or more seasons for its reclamation.

Waste land: Sparsely vegetated land with signs of erosion and land deformation that could be attributed to lack of appropriate water and soil management, or natural causes. These are land identified as currently underutilized and could be reclaimed to productive uses with reasonable effort. Degraded forest (<10% tree cover) with signs of erosion is classified under wasteland. An empty area of land, especially in or near a city, which is not used to grow crops or built on, or used in any way and/or a place, time, or situation containing nothing positive or productive, or completely without a particular quality or activity.

Water body: Areas with surface water, either impounded in the form of ponds, lakes, reservoirs, or flowing as streams, rivers, etc. Can be either fresh or salt-water bodies.

Plantations: A *plantation* is a large-scale estate meant for farming that specializes in cash crops. The crops that are grown include cotton, coffee, tea, cocoa, sugar cane, sisal, oil seeds, oil palms, rubber trees, fruits, commercial horticulture plantations, orchards, and tree cash crops.

Wetland: A wetland is a distinct ecosystem that is inundated by water, either permanently or seasonally. The primary factor that distinguishes wetlands from other land forms or water bodies is the characteristic vegetation of aquatic plants adapted to the unique hydric soil. Land with a permanent mixture of water and herbaceous or woody vegetation. The vegetation can be present either in salt, brackish, or fresh water.

The land use pattern of this district is as follows:

Table No 9: Land use pattern of the district

Class Name	Area in sq.km
Deciduous Forest	15
Cropland	1983
Built-up land	272
Mixed Forest	
Shrub land	
Barren land/Wet land	8
Fallow land	
Waste land	
Waterbodies	7
Sand Deposition	14
Plantation	68
TOTAL	2367

Source: *Forest department of Tarn-Taran district*

Forest

The major land mass under forest area of the Punjab Shiwaliks spreading between rivers Ravi and Ghaggar in a North East direction. The remaining forest area is in blocks in plains and along railway lines, roads, and canal strips.

The data provided by the district forest department during the survey are as follows:-

Table No 10: List of Forests

Sl. No.	Name of Forest	Tehsil	Area in Acres
1	Rakh Gagrewal (R.F.)	Khadoor Sahib	522
2	Rakh Sarai Amanat Khan (C.R.F.)	Tarn Taran	1223
	TOTAL		**1745**
Source: *Forest department of Tarn-Taran district*			

FIGURE 15: FOREST COVER MAP OF THE DISTRICT

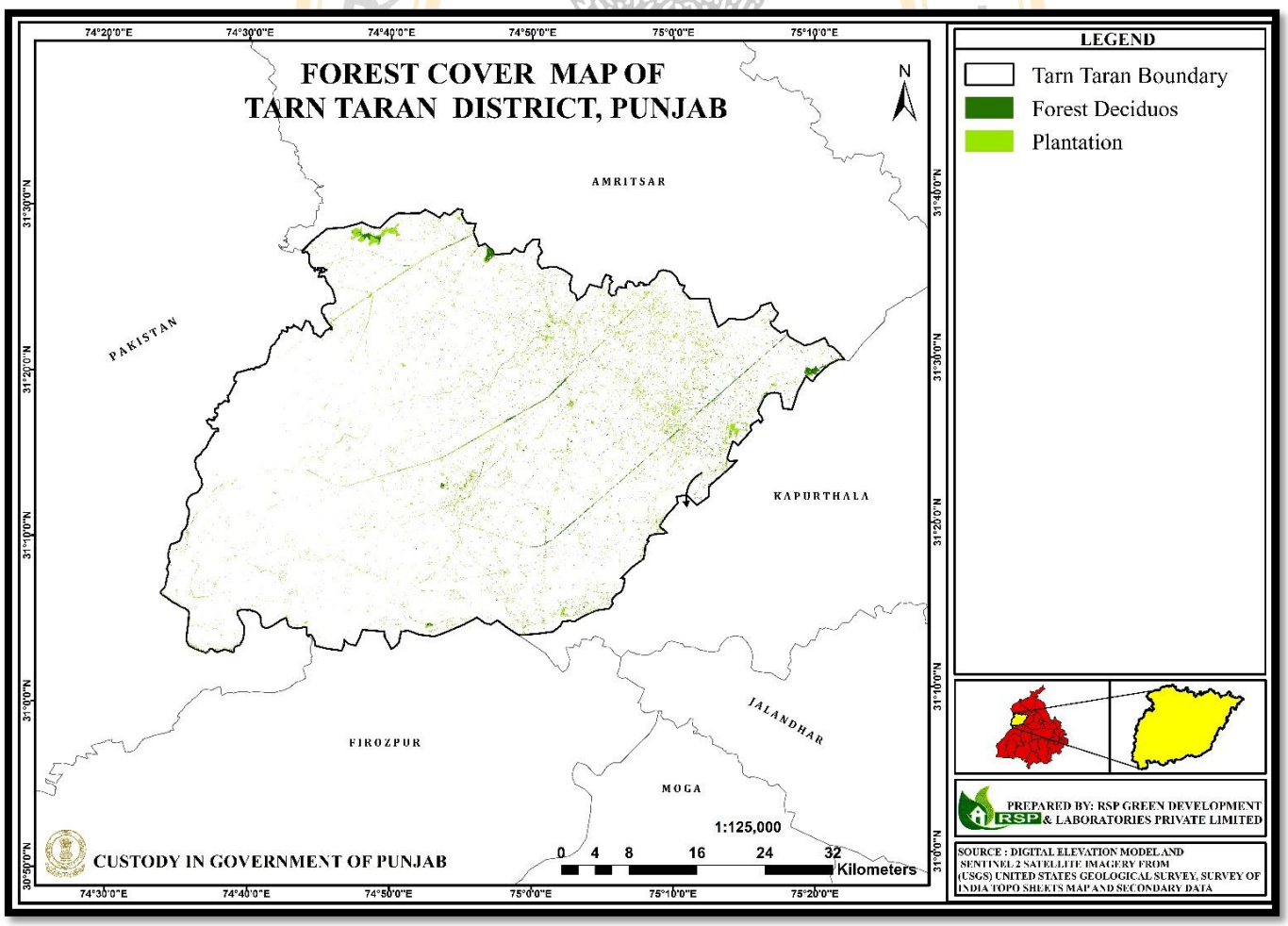


Table No 11: List of Block Forests

Sl. No.	Name of Block Forest	Tehsil	Area in Acres
1	Malahwala	Patti	136-5-0
2	Kirrian	Patti	45-0-0
3	Kamboh Dariwala	Khadoor Sahib	10-1-2
4	Dhunda	Khadoor Sahib	11-5-14
5	Manakde	Khadoor Sahib	14-5-6
6	Marrar	Patti	28-6-13
7	Harike	Patti	20-7-04
8	Booh	Patti	45-1-8
9	Chak Gagrewal	Khadoor Sahib	119-6-12
10	Hansa Wala	Khadoor Sahib	4-4-13
11	Bhadur Nagar	Patti	17-7-8
12	Kulla Pharm	Patti	49-7-18
13	Kiri bodal	Khadoor Sahib	18-5-22
14	Jalalabad	Khadoor Sahib	137-2-3
15	Bhalojala	Khadoor Sahib	11-0-5
16	Chak desal	Khadoor Sahib	109-1-13
17	Darapur Tata	Khadoor Sahib	38-2-6
18	Verowal	Khadoor Sahib	200-3-0
19	Gajal	Patti	22-0-0
20	Kot Budha	Patti	30-4-4
21	Sbrah-2	Patti	0-0-7
		TOTAL	**1072-5-18**
	Grant Total		**2817-5-18**

Source: *Forest department of Tarn-Taran district*

Details of Evache land Transferred to the Punjab Forest department in 1971 vide Letter no. 1257-58 dated 14.06.1979.

Table No 12: Block Forest area with Khasra Number

Sl. No.	Name of the Village /City	Hadbast No.	Total area of Block Forest (hector)	Khasra No.	Remarks
1	Bhadur Nagar	198	8.8	48/16,17,18,19,20/1,22,23,24,25,26,61/1,2,3,4,6/1,7,8,14/9,13/2,14.	Unclassified Forest
2	Marrar	186	14.2	11/3,4,5,6,7,9/12,12,13,14,15,16,11/17,18,19,22,23,24,25,12/1,2,3,8,12/9,10,11,12,13/1,20,16/2,3,4,5/2,7/2.	Protected Forest
3	Harike	187	4.5	78/3,4,7,11,12,13,14,15,16,78/17,86/15,87/7,8/2,9/2,12/1,88/1/2,2/2,116/11,12,13,19,20,22,23,117/15,16.	Protected Forest
4	Malahwala	351	68.2	13/11,4/11,12,13/1,14/2,15,16,17,18,19,22,23,24,25,8/11/2,12/1,12/2,13,14,15,16,17,18,19,20,21,22,5/23,24,6/16/1,24,6/16/11,24,25,7/4,5,6,7,8,13,14,15,16,17,23,24,8/1,2,3,4,7,8,18/9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,9/1/2,2,3,4,8,10,11,12,13,19,20,21,22,1,2,9,10,11,12,19,20,21,22,11/1,2,3,4,5,7,9,10,11,12,13,14,15,11/6,11/16,17,18,19,20,23,24,25,12/3,4,5,6,7,8,13,14,15,16,17,18,12/25,13/5,14/1,2,3/1,3/2,4,5,6,7,8/1,8/2,8/3,9/1,10/2,11,12,13,14,18,19,20,15/1	Protected Forest
5	Gajal	199	11	63/2,22,23,84/21,23,25,85/16,17,96/1,2,3,4,5,6,7,8,9,10,11,12,13,14.	Unclassified Forest
6	Booh	18	20.8	36/31,21,22,40/4,7,14,41/1,10,11,42/5,6,7,8,12/2,13,14,15,17,18,19/1,42/19/2,21/2,22/2,43/1/2,9/2,10,12/1,13/1,18/2,19,22/1,23/1,24,25,46/2,3/2,46/4/1,4/2,5,6/1,15/1,47/2/2/3,3,15,48/10/2,12/2,18/1,19,20,21,22/1,58/1/1.	Protected Forest
7	Kirrian	356	22.5	13/3/2,3/1,4/1,5/1,7/2,8/2,18/2,13/1,14/1,18/2,19,21,22,23/1,23/1,2/1,3/1,21/2/2,10,12,201/2/2,23/21/1/2,24/16,16/2,17,34/10/2,11/1,78/5/2,79/8/3,9,11,12,13,80/6,15,16,80/17,23,24,25/1/2,81/2,3/1,4/1,8/2,9/2,10,12/1/2,3/1,4/1,8/2,9/2,10,12/1/2,20/1/2,99/2,3,4/1/2,5/1/2,7/2/2,9,12/1,17/2/2.	Protected Forest

8	Kamboh Dariwala	355	5.0	385,391,392,393,401,402,403,404,405,406,407,408.	Protected Forest
9	Kulla Pharm	169	24.5	34/16,25/2,35/19/2,20,21,22/1,23/2,24/2,25/2,42/1,2,3,4,5,6,7,8,9,10,42/11,12,13,14,15,16,17,18,19,20,21,22,23,24,25/1,25/2,43/5,6,15,16,43/25,48/1,2,5,8/2,9,10,13/2,49/3,4,5,6,7,14,15,16/2,17.	Protected Forest
				Source: *Forest department of Tarn-Taran district*	

Agriculture and Irrigation

The district Tarn Taran is mainly an agricultural district. The economy of this district majorly depends upon agriculture. There are two main harvesting seasons i.e., Kharif (sawani) and Rabi (harhi). Rice (166000 Ha) is the most dominant Kharif crop grown in the district. Some other Kharif crops cultivated here are maize, bajra, sugar cane, and cotton. Wheat (185800 Ha) is the most dominant Rabi crop grown in the district. Some other Ravi crops cultivated here are gram and barley.

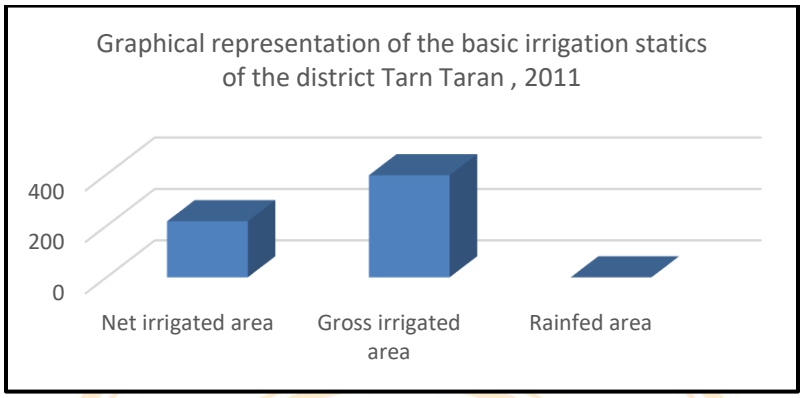
Some areas of this district are double-cropped areas. The area of double-cropped area in the district is 219899.23ha which is 90.91% of the total geographical area of the district. Rice-wheat is the major crop rotation followed in the district. The total area under agriculture comprising crop land and plantations is found to be 220744.99ha which is 91.25 percent of the TGA of the district.

The irrigation system of this district is very well. 44.73% of irrigation comes from groundwater sources. About 71% area of Patti block and 59% area of Tarn Taran Block is irrigated by canal water, and the rest of the area of the district is irrigated with groundwater. Almost 86.5% of the area is irrigated in comparison to the gross cropped area. Hence, 7132 Ha of the total area is cultivable in the Tarn Taran LPA.

Table No 13: Irrigation Pattern of the district Tarn Taran

Irrigation	**Area in Hectare**
Net irrigated area	218
Gross irrigated area	397
Rainfed area	0
Source: *Agriculture Contingency Plan for District: TARN TARAN, 2011*	

Chart 2: Graphical representation of the basic irrigation statics of the district Tarn Taran, 2011



Source: *Agriculture Contingency Plan for District: TARN TARAN, 2011 and Table No. 13*

Horticulture

The major horticultural vegetable crops found in this district are potatoes, brinjals, tomatoes, Cabbages, cauliflowers, chilies, lady's finger, mushrooms, onion, peas, and other crops like paddy, wheat, maize, and oilseed are cultivated here. The major horticultural fruit crops grown in the district are banana, sugarcane, amla, guava, ber, lemon, grapes, mango, muskmelon, watermelon, peach, and plum.

Table No. 14: Horticulture Fruit crops are grown in the district Tarn Taran

Horticulture fruit crops	Area (000' ha)
Kinnows	0.1
Mango	0.1
Guava	0.3
Orange and Malta	0.02
Peach	0.05
Plum	0.01
Litchi	0.001
Pear	0.8
Lemon	0.03
Ber	0.02
Source*: Agriculture Contingency Plan for District: TARN TARAN, 2011*	

Table No. 15: Major Horticulture vegetable grown in the district, Tarn Taran

Horticulture Vegetable	Area (000' ha)
Potato	0.3
Onion	0.01
Winter vegetable	0.5

Summer vegetable	0.2
Source: *Agriculture Contingency Plan for District: TARN TARAN, 2011*	

Mining

The upper surface of the Tarn Taran district is made with the recent deposits of the Indo-Genetic alluvium, which consists of alluvial sand, clay, and soil. The entire area in the district is covered by quaternary alluvium that comprises fine to coarse sand, silt, and clay, with intercalations of pebbles and kankar.

Sand is mainly produced at the time of mining operations on the surface of the earth, near the river beds, and the sand quarrying below the surface of the earth. It is the basic raw material for building any concrete structure. In some areas of this district, some brick earth and foundry sand are also found.

Previously the local people used to lift sand etc. from the river beds to meet their requirements. But now, after the generation of the Punjab Minor Mineral rules in 1964, and amended rules in 2013 mining is regulated in accordance with the rules.

4.3 FLOODS IN PUNJAB:

Floods are one of the major natural disasters in the state of Punjab. Punjab is the landof 5 rivers and the rivers play an important role in the development of agriculture andthe economy of the state. But at the same time, the rivers cause floods and floods cause loss of human life and widespread property damage.

More than five hundred persons have died due to floods in Punjab from 1990 to 2010.The floods affect the northern part of the state more than its southern part. The areasI close proximity of the rivers Ravi, Beas, Satluj, and Ghagghar are the most vulnerable areas from a flood point of view. Floods occur mostly in the monsoon season (July- September) on account of heavy rainfall in the catchment area as well as in the plain area of the State.

4.4 DEMOGRAPHY:

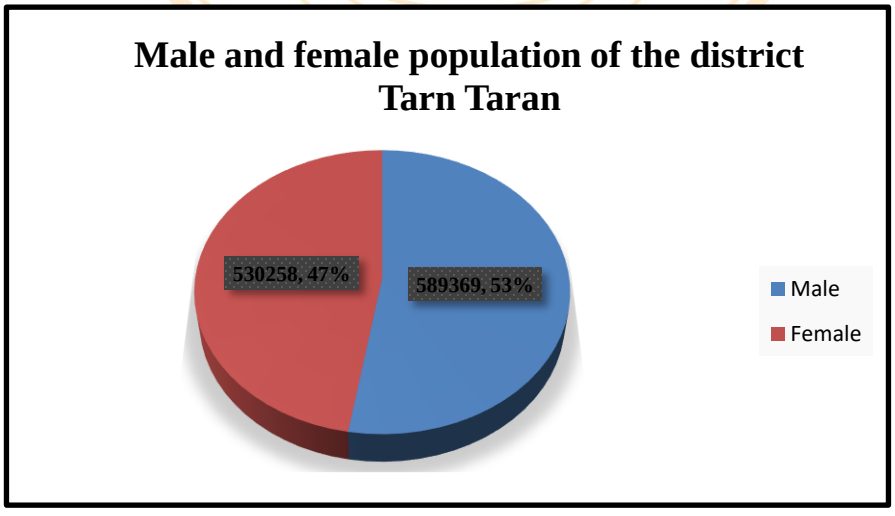
The district has a population of 11,19,627 people as of the 2011 Census, with 5,89,369 men and 5,30,258 women living there. The sex ratio in the district is 900 females for every 1000 males. According to the 2011 Census, Sikhs make up 93.33 percent of the district's population, making them the predominant religion. Between 2001 and 2011, the district's population grew at a rate of 19.23%, with 18.40% males and 20.16% females. 464 people live in each square kilometer in the district. There were 15,505 children born in the district in 2017, of which 8,420 were boys and 7,085 were girls. In the same year the number of deaths in the district was 10,231 out of which 5.814 were males and 4,417 were females. According to the 2011 census, the principal language in the district is Punjabi with 98.99%.

Higher than the state average of 75.84 %, Tarn Taran has a literacy rate of 79.33 %, with males reading at an 82.39 % and females at 76 %. In Tarn Taran Sahib, 11.2 % of people under the age of six and 15 % of people over the age of sixty-five were residing. Only 3% of its citizens have relocated abroad.

Table No 16: Tarn Taran District of Census Data (2011 & 2001)

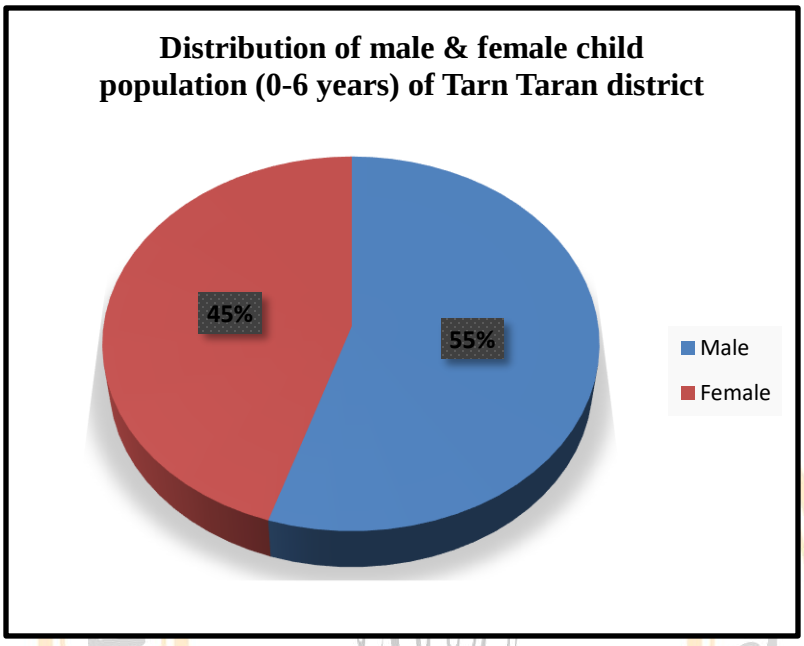
Description	2011	2001
Population	11.20 Lakhs	9.39 Lakhs
Actual Population	1,119,627	939,057
Male	589,369	497,768
Female	530,258	441,289
Population Growth	19.23%	16.26%
Area Sq. Km	2,414	2,414
Density/km^2	464	389
Proportion to Punjab Population	4.04%	3.86%
Sex Ratio (Per 1000)	900	887
Child Sex Ratio (0-6 Age)	820	784
Average Literacy	67.81	59.90
Male Literacy	73.24	66.70
Female Literacy	61.85	52.30
Source: *Census Report of 2001 and 2011,Tarn-Tarn District*		

Chart 3: Male and female population of the district Tarn Taran



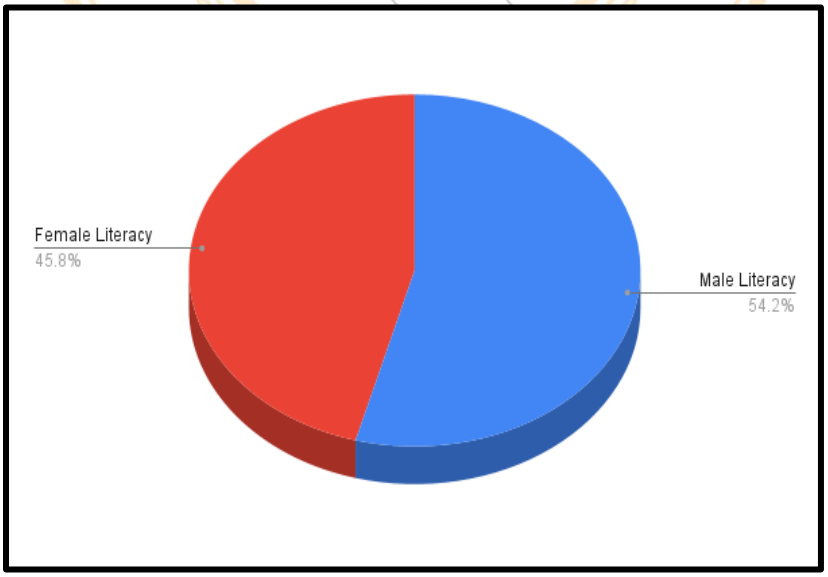
Source: *Census Report of 2001 and 2011, Tarn-Tarn District and Table No. 14*

Chart 4: Distribution of male & female child population (0-6 years) of Tarn Taran district



Source: *Census Report of 2001 and 2011, Tarn-Tarn District and Table No. 14*

Chart 5: Tarn Taran District's literacy rate



Source: *Census Report of 2001 and 2011, Tarn-Tarn District and Table No. 14*

4.5 CROPPING PATTERN

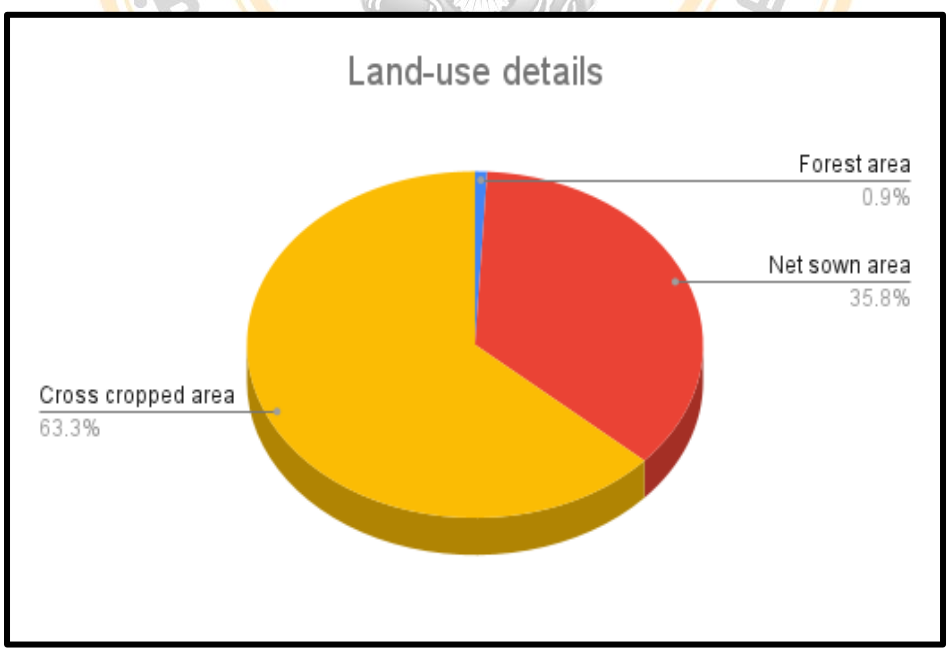
Tarn Taran is mostly an agricultural region. Most of the land that is suitable for agriculture is under cultivation, which makes up the bulk of the economy. The main Rabi crops grown in the district are- wheat (185800 hectares), gram, and barley, whereas Kharif crops grown are- rice (166000 hectares), maize, bajra, sugar cane, and cotton.

Table 17: Details of land-use in the district of Tarn Taran

Sl. No.	Land-use (Hectare)	Statistics
1	Forest area	5176
2	Net sown area	217541
3	Cross cropped area	384541
4	Cropping intensity	>200 %

Source: *Forest department of Tarn-Taran district*

Chart 6: Land-use details of Tarn-Taran district



Source: *Forest department of Tarn-Taran district and Table No. 15*

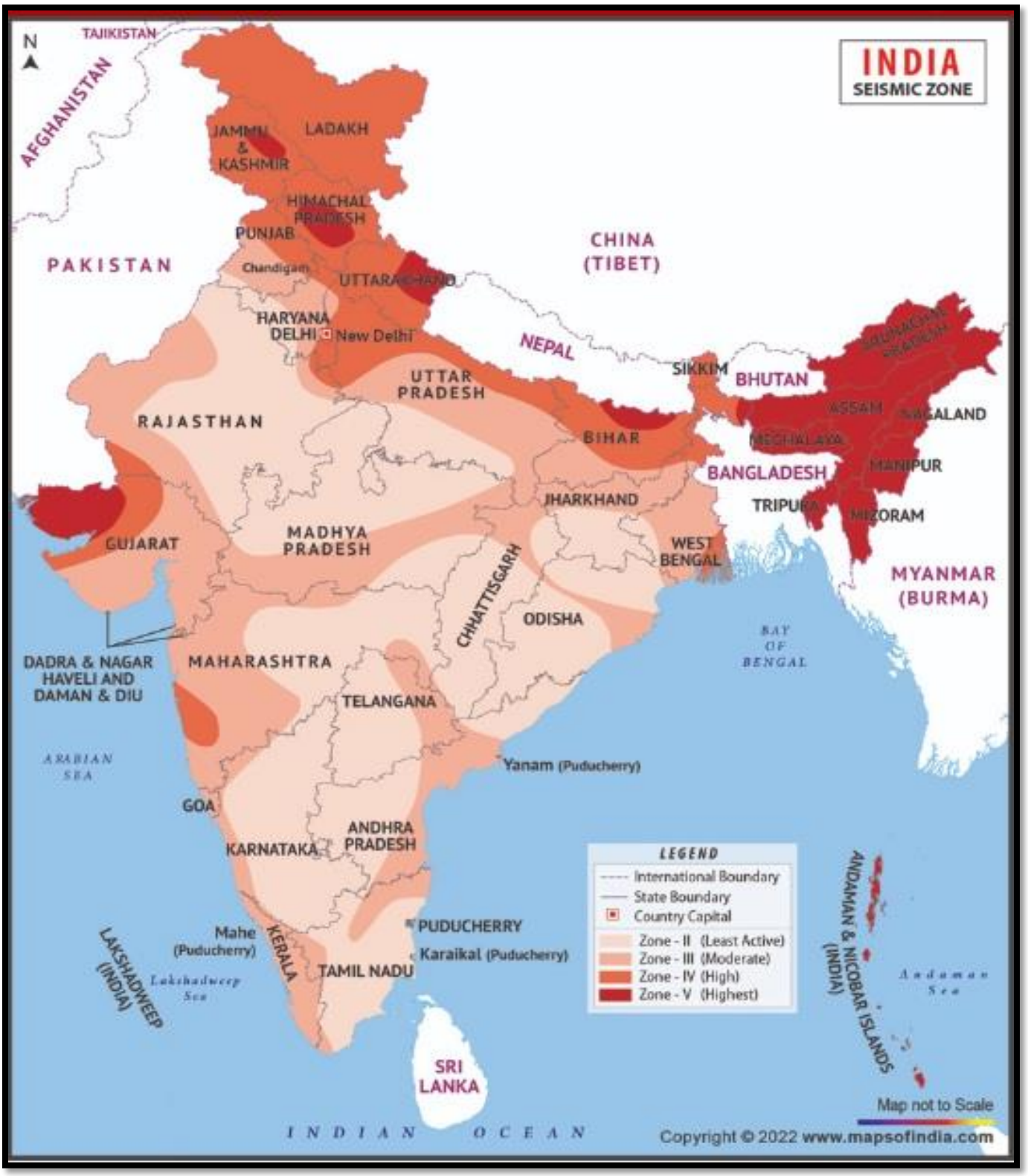
4.6 LAND FORM AND SEISMICITY

Tarn Taran's district area occupies the Indo-Gangetic alluvial plain of the Quaternary age. The average elevation of the district is 220 m. seismologically, the northern part of the Tarn Taran district comes under the influence of seismic zone IV, and rest of the district comes under seismic zone III.

Table No. 18: Seismic Zone Intensity on MM scale

SEISMIC ZONE	INTENSITY ON MM SCALE
II	Low intensity zone
III	Moderate intensity zone
IV	Severe intensity zone
V	Very severe intensity zone
Source: Ministry of Earth Science, Seismic Mapping Posted On: 30 JUL 2021 2:27PM by PIB Delhi	

FIGURE NO 16: SEISMIC ZONE MAP OF INDIA



***Source**: www.mapsofindia.com*

4.7 FLORA AND FAUNA

The plains in the state of Punjab have very few block forests, with most of the tree cover being in the form of "strip forests" alongside the vast network of roads, rails, canals, drains, bunds etc. The "Block" forest cover in Punjab is mainly located in the sub-mountainous "Kandi" tract along the Northern boundary of the state adjoining Himachal Pradesh. Though this sub-mountainous Kandi tract is only 2 % of the geographical area of Punjab, it has a significant role to play in regulating the hydrology of the state.

4.7.1 MAJOR FLORA OF DISTRICT TARN TARAN

The 8,600 ha of government land that makes up the Harike Wildlife Sanctuary is distributed among the districts of Ferozepur, Taran Tarn, and Kapurthala. Here the emphasis has been given to the flora that is present in the Tarn Taran district. According to the classification of forests, the sanctuary belongs to the type of Northern Tropical Dry Deciduous Forest. The primary tree species include the following: *Acacia nilotica*, *Dalbergia sissoo*, *Eucalyptus sissoo*, *Albizia lebbeck*, *Ficus religiosa*, *Azadirachta indica*, *Ficus benghalensis*, *Mangifera indica*, *Prosopis spicigera* and so on.

4.7.2 FAUNA

Tarn Taran district hosts a portion of Harike Wildlife Sanctuary. Large Cormorant, Darter, Purple Moorhen, Bar-Headed Goose, Pintail, Common Teal, Shovellor, Common Poachard, Red Crested Poachard, White-Eyed Pochard, Indus River Dolphin, etc. are some of the main wildlife species found in the sanctuary. Recognized as a Ramsar Site, it attracts lots of migratory birds in the winter.

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CHAPTER 5: PHYSIOGRAPHY OF THE DISTRICT

5.0 INTRODUCTION

General Land Form

The district Tarn Taran is located in the northwest part of Punjab State and covers an area of 2,414 sq. km. It is bounded by the Amritsar district in the north, Kapurthala district in the east, Ferozepur district in the south, and Pakistan in the west. The district headquarters is located at Tarn Taran.

The general slope of the district is from northwest to southeast. The highest altitude is 219.95 m AMSL (approximately) towards the NW direction and the lowest altitude is 219.90 m AMSL (approximately) in the SE direction. The Landform of this district is a part of the Indo-Gangetic alluvial plain. This belt exhibits a steep slope in the north, which become flat in the south. The majority of the district is covered by alluvial deposits comprising sand of various grades and clays with varying amounts of silt and kankar.

Soil and Rock Pattern

The soil pattern of this area can be grouped into 2 units-alluvial fan and alluvial plains. Alluvial fans are mainly found in the foothills deposited by hill torrents. These alluvial fans coalesced to form the Kandi formation and Sirowal formation, which runs parallel to Siwalik. The major part of the district is covered by alluvial deposits that comprise sand of various grades and clays with varying amounts of silt and kankar. The soils in the district can be grouped under Reddish Chestnut Soils and Tropical Arid Brown Soils (Weakly Solonized). These soils have formed from the alluvium deposited by rivers of the Indus system. Reddish Chestnut Soils are found in Balachaur tehsil while Tropical Arid Brown soils are found in the remaining parts of the district.

The physical properties of the soil of these areas are saline and alkaline. Soils, where the salt content is exceeding 0.2%, are considered to be high salt soils and this concentration is injurious to plant growth. Soils, where the pH values exceed 9.0 have been classified as high alkali soils. The alkali soils present in the area have low fertility as compared to normal soils. These soils are deficient in NPK

5.1 CLIMATIC CONDITIONS

The district's climate can be categorized as tropical steppe, semi-arid, and hot. It is primarily distinguished by general dryness, with the exception of a brief period during the southwest monsoon season. The cold season lasts from November to March, the hot season lasts from April to June, the southwest monsoon season lasts from the last week of June to the middle of September, and the post-monsoon season lasts from September to the beginning of November. The district's climate is affected by a number of western disturbances during the cold season. The weather is extremely hot, dry, and uncomfortable from April to June, during the summer season. From July to September, the climate turns humid and cloudy.

The mean maximum and mean minimum temperature of Tarn Taran is 40.5°C (May & June) and 4.5°C (January) respectively.

5.2 HYDROGEOLOGY

Alluvial deposits of Quaternary age, which include sand, silt, clay, and kankar, form the subsurface reservoir beneath the Tarn Taran district. Five to nine permeable granular zones with varying thicknesses have been discovered through groundwater exploration to a depth of 500 metres. These zones are separated by clay layers that are between 5 and 18 metres thick. In this area, groundwater is found below the water table in confined to semi-confined conditions. The deep tube wells have a discharge range of 1788 to 4504 lpm at a drawdown range of 2 to 10 m.

In the pre-monsoon and post-monsoon seasons, respectively, the depth to water level ranges from 11.30 m to 19.62 m bgl. The flow direction is indicated by the water table's predominant slope, which is from north to southwest. Over a period of ten years, water levels decrease at a rate of 0.45 m/year (2002 to 2011). In the northwest and southern parts of the district, seasonal fluctuation shows a decline in water levels from 0.00 m to 2.00 m, whereas the central and western parts of the district show an increase in water levels from 0.00 m to 2.00 m.

Table 19: Details of Groundwater Study in the district of Tarn Taran

Sl. No.	Parameters	Tarn Taran
1	Depth water level (pre-monsoon) (mbgl-meter below ground level)	7.97-21
2	Depth water level (post-monsoon) (mbgl-meter below ground level	8.23- 21.5
3	Rate of decline of groundwater (m/yr)	0.29
4	Net Annual Groundwater availability (ham)	116164
5	Stage of Ground Water Development (%)	160
6	Water Type (Shallow Groundwater)	CaMg- HCO_3
7	EC (µS/cm)	355-120
8	Water course	Upper Bari Doab canal
Source: *Central Ground Water Authority, Tarn-Taran District*		

The district's shallow groundwater is alkaline in composition and is generally potable. However, a small number of locations have reported shallow groundwater with high fluoride levels. At Harike, arsenic levels have been reported to be higher than the BIS standard's permissible limit.

Ground Water Development

The entire district is covered in quaternary alluvium, which includes pebbles and kankar intercalations in addition to fine to coarse sand, silt, and clay. Boreholes that have been drilled to a depth of about 100 meters encountered 70–90% sand.

The area's exploratory drilling has shown that the groundwater is fresh up to a depth of 500 meters. Under water-table conditions, groundwater occurs in alluvium composed of silt, clay, and sand. It also occurs under semi-confined to confined conditions in deeper granular zones. Water depth in the region varies from 11 m to 19 m below the surface of the land. The level of groundwater is checked four times

a year by the Central Ground Water Board. The water level in the district is seen to have decreased between the years 2002 and 2011, at a rate of about 0.45 m/year.

The depth of reach of water in the area ranges from about 1 to 20 meters below the land surfaces. In general, the Beas and Sutlej's high banks have a deep-water table. However, the water table is very shallow near the canal-irrigated area as well as in the Beas and Sutlej floodplains. Waterlogging conditions are common in many of the canal-irrigated areas. Additionally, land salinization is seen in areas where there is water logging. Except for in the district's southern region, where it is of lower quality and is saline to bitter, the groundwater that is accessible in the majority of the area is typically fresh but hard. In general, the groundwater is suitable for domestic and agricultural uses.

The Ground Water Estimation Committee's recommended methodology was used to estimate the potential block-wise groundwater resource (1997). The Tarn Taran district's groundwater resources and development potential, as of March 31, 2009, are listed below by block.

FIGURE 17: DEPTH OF WATER LEVEL MAP OF THE DISTRICT (PRE-MONSOON 2021)

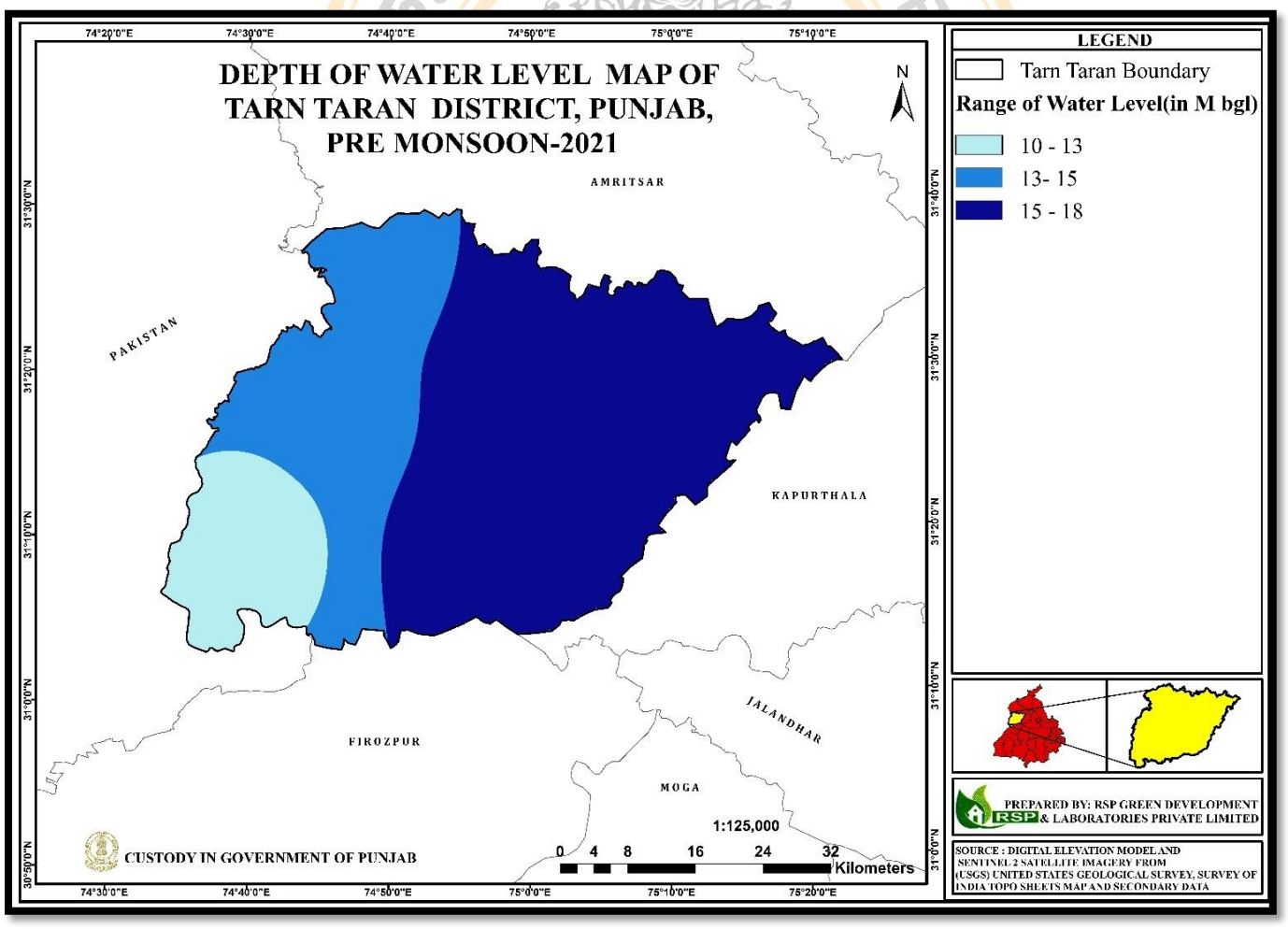

FIGURE 18: DEPTH OF WATER LEVEL MAP OF THE DISTRICT (POST-MONSOON 2021)

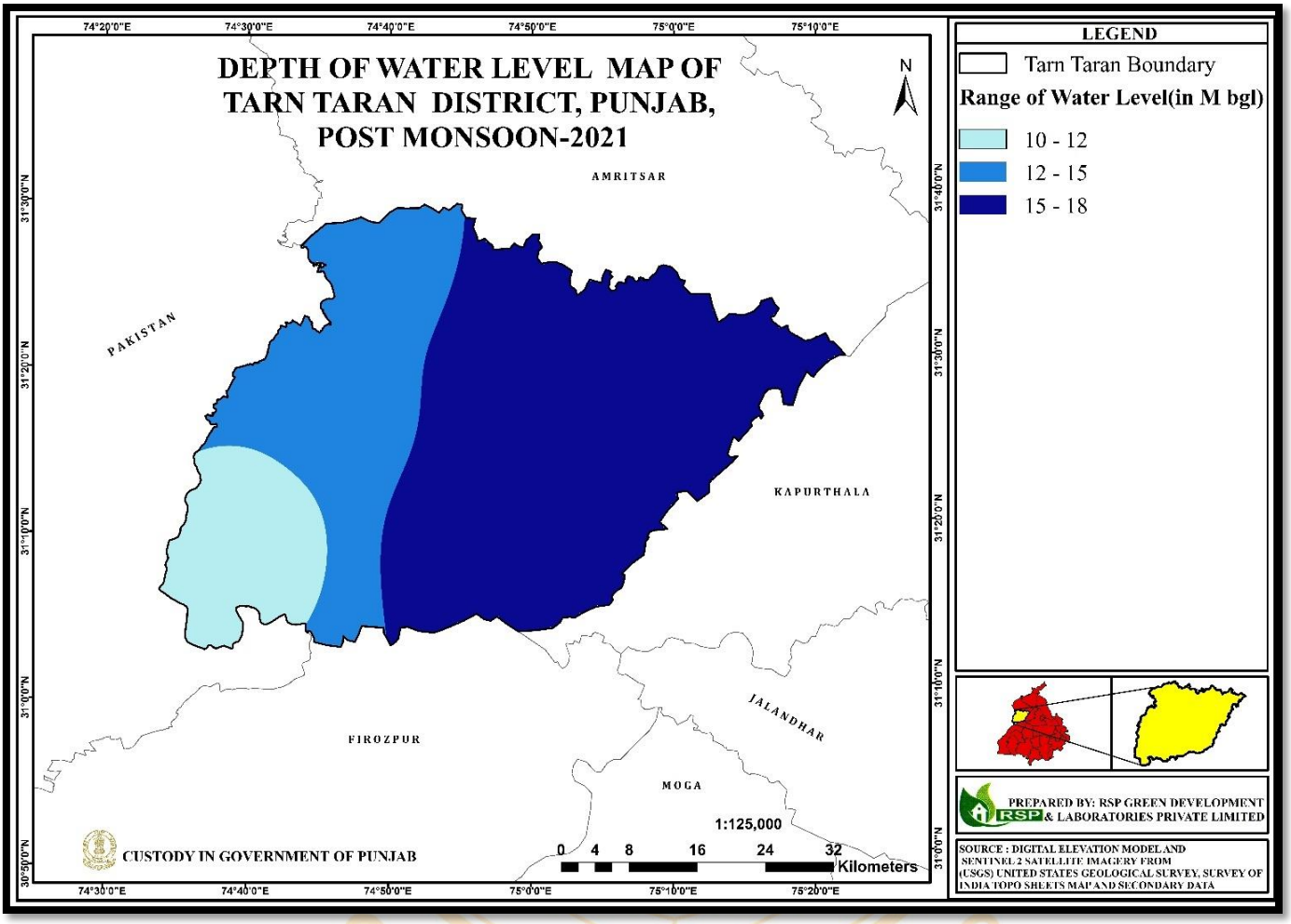

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Table 20: Block-wise Groundwater Resource of Tarn Taran district as on 31.03.2009

Block Name	Net Annual Ground Water Availability(ham)	Existing Gross Ground Water Draft for irrigation (ham)	Existing Gross Ground Water Draft for all uses(ham)	Provision for Domestic & Industrial Requirement Supply to 2025 (ham)	Net Ground Water Availability for future irrigation development (ham)	Stage Ground Water Development (%)	Category
Bhikiwind	13209	21956	22298	544	-9290	169	Over-Exploited
Chola sahib	11160	18663	18909	390	-7894	169	Over-Exploited
Gandiwind	16149	28626	28922	470	-12947	179	Over-Exploited
Naushehra Panuan	7864	16278	16493	343	-8756	210	Over-Exploited
Khadur sahib	15633	25711	26031	509	-10586	167	Over-Exploited
Patti	12380	25483	25883	632	-13735	209	Over-Exploited
Tarn Taran	14704	27842	28397	870	-14008	193	Over-Exploited
Valtoha	13268	21883	22078	310	-8925	166	Over-Exploited
Total	**104368**	**186441**	**189011**	**4068**	**-86141**	**181**	Over-Exploited

Source: *Central ground water board Tarn-Taran district*

5.3 MONTH WISE RAINFALL

The district typically receives 545 mm of rain annually, which is unevenly distributed over the area. Peak rainy days last for around 30 days. The southwest monsoon, which makes up 74% of the total, begins in the final week of June and ends in the middle of September. August and July are the wettest months. Following western disturbances and thunderstorms 26% of the annual rainfall falls during non-monsoon months.

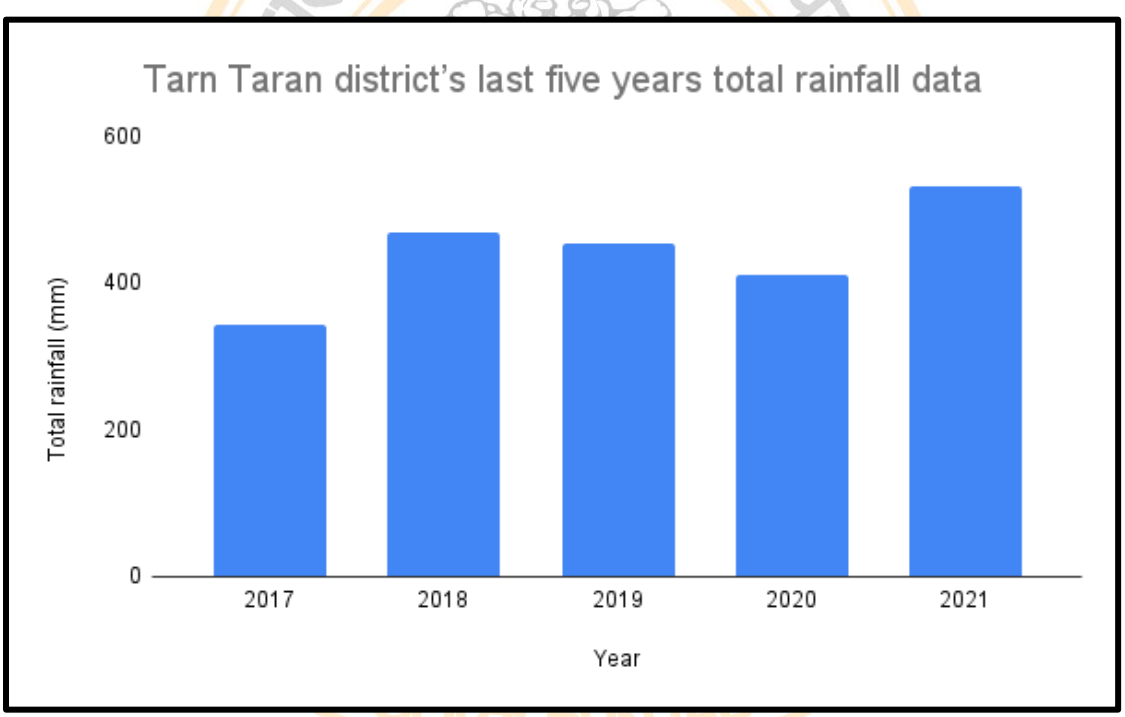
Normal Annual Rainfall: 545 mm

Normal monsoon Rainfall: 405 mm

Table No 21: Five years rainfall data of Tarn Taran District (Month wise rainfall)

Sr. No	Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
1.	2017	46.1	2.7	13.0	5.4	16.7	107.8	62.6	59.3	9.3	0.0	2.4	18.0	**343.3**
2.	2018	6.7	12.0	2.3	2.3	6.0	73.1	123.2	14.8	224.3	4	0	0.0	**468.8**
3.	2019	11.7	57.0	6.7	10.1	18.3	13.7	164.6	111.4	19.3	0.0	21.0	20.5	**454.2**
4.	2020	60.9	0.0	67.1	5.1	0.0	0.0	161.0	68.6	10.3	0.0	31.4	6.4	**410.8**
5.	2021	17.5	0.0	11.8	37.1	12.3	9.2	176.7	52.8	177.5	36.3	0.0	0.0	**531.2**
Source: *State Mines Department of Punjab*														

Chart 7: Tarn-Taran district's last five years total rainfall data



Source: *State Mines Department of Punjab and Table No. 21*

5.4 DRAINAGE SYSTEM WITH A DESCRIPTION OF MAIN RIVERS

The state, Punjab, falls under Indus Valley River System. The rivers of the Indus Valley River System flow through India and then enter Pakistan. To share the water of these rivers between the two countries, a treaty called Indus Waters Treaty was signed by India & Pakistan in 1960 at Karachi, which was brokered by World Bank. According to this treaty, the waters of three eastern rivers, i.e., Sutlej, Beas and Ravi are allocated to India and the waters of three western rivers, i.e., Chenab, Jhelum, and Indus are assigned to Pakistan.

The district, Tarn Taran, is broadly drained by two rivers, Beas and Sutlej. The river Beas forms the

eastern and southeastern boundaries of the district. It originates from Beas Kund near Rohtang Pass, Kullu District of Himachal Pradesh. The elevation is 4361 meters above the mean sea level. It enters Punjab near Talwara town of Hoshiarpur district. The total length of Beas from its source is 460 km and the total catchment area is 30303 sq. km. The famous tributaries of Beas are Parvati, Spin, malana, Chakki, uhal, Pong, Sarswari, Black Bein, Kamahi devi Khad, etc. After flowing through plains for about 150 km, Beas joins Sutlej at Harike. The river Sutlej originates near the Darma Pass, Mansarovar Lake in Tibet. The elevation is 4600 meters above mean sea level. It enters Punjab near Nangal Town of Rupnagar district. The total length of the river is 1050 km. Tributaries like Sirsa, Siswan Budha Nala and White Bein join it. After flowing through Punjab, it finally enters Pakistan near Suleimanki near Fazilka district of Punjab.

Name of the River, Area Drained (sq. Km), and % Area drained in the District have been prescribed in the Table-22 given below:-

Table No 22: Drainage system with description of main rivers

Sl. No.	Name of the River	Area drained (sq.km.)	% Area drained in the district
1.	Beas	93.70	46%
2.	Sutlej	689.45	29%
Source: *Map No. 8 and 12 Drainage Map and District Mining Office, Tarn-Taran District*			

Table No. 23 (part 1): Salient features of important rivers and streams

Sl. No.	Name of the River/Stream	Total length in the District (km)	Place of origin	Altitude of origin
1.	Beas	48	Rohtang pass	4361 meters
2.	Sutlej	30	Darma Pass near Mansarovar Lake,Tibet	4600 metres
Source: *Map No. 8 and 12 Drainage Map and District Mining Office, Tarn-Taran District*				

Table No 23 (Part-2): Salient Features of Important Rivers and Streams

Boulder (MT)	Bajri (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)
-	-	**768715.07**	**4589229.04**
Annual Deposition			
-	-	**611227.94**	**366736.76**
Source: *Field Survey Data*			

CHAPTER 6: GEOLOGY AND MINERAL WEALTH

6.0 GEOLOGY

Regional geology: Physiographically India divides into three regions, namely Peninsular India, Extra Peninsular India, and Indo-Gangetic plain. Peninsular India is mainly composed of Precambrian rocks and has Proterozoic & Phanerozoic cover while the Extra-peninsula is composed of a tertiary group of rocks. Punjab holds ground in all three divisions. A very large portion of Punjab lies within Indo-Gangetic plains, which continue south-westwards through Sind to the Arabian Sea and south-eastwards through North-West Provinces, Behar & Bengal to the Bay of Bengal. The Indo-Gangetic Plain is identified as Punjab-Rajasthan Plain, Ganga Plain, Bengal Plain, and Brahmaputra Plain (Singh 1987; Singh & Ghosh 1994). The Punjab-Rajasthan Plain has been comprising Indus Plain in the west and the Punjab-Haryana Plain in the east (Singh 1996; Srivastava et.al. 2006).

Geologically the state, Punjab, divides into two regions viz. the Siwalik foothills and the alluvial fill of Indus drainage basin. The dominant physiographic characteristics of Punjab are i) Lahore – Sargodha Ridge in the west; ii) Delhi-Jagadhari Ridge in the east; iii) Delhi-Lahore Ridge in the south and iv) Siwalik ridges in the northeast.

Geomorphologically the State is divided into six major physiographic units –

1. **Siwalik Hills**: It mainly comprises the districts – Gurdaspur, Rupnagar, S.B.S. Nagar and Hoshiarpur, covering nearly 2.6% of the total area of the state.
2. **Piedmont Plain**: Piedmont Plain area is the transition zone area between Siwalik Hills and alluvial plains which spreads over 10 – 15 km in the districts – Gurdaspur, Hoshiarpur, S.B.S. Nagar, S.A.S. Nagar, and Rupnagar. The area is characterized by gentle slopes, having an elevation ranging between 300-375 m MSL, with undulations. Piedmont Plain mainly comprises finer sediments that are transported by seasonal rivulets.
3. **Alluvial Plain:** It occupies roughly 77% of the total geographical area of the state, spreading over Tarn Taran, Amritsar, Gurdaspur, Doaba, and Malwa Plain. The plains between Beas and Sutlej rivers constitute Doaba Plains. The area included mainly Jalandhar, Kapurthala and Hoshiarpur districts. Malwa Plain mainly covers the area of the south and south-west of river Sutlej. The districts mainly fall under Malwa Plain are Fategarh Sahib, Bhatinda, Ferozepur, Faridkot, Ludhiana, Moga, Mansa, Sri Muktsar Sahib, Patiala, S.B.S. Nagar, Sangrur and Rupnagar.
4. **Sand Dunes**: It is generally found as low ridges along the courses of the old rivers and choes.
5. **Flood Plains**: It covers approximately 10% of the total area of the state. The main rivers of the state – Ravi, Beas, Satluj, and Ghaggar and their seasonal rivulets and choes mainly comprise the flood plain. Due to the continuous erosion and deposition character of the flood plain, there is no consolidation of sediments into pedogenic horizons.
6. **Paleochannels**: It occupies a low-lying topographic position on the landscape and is the remnant of old active channels. In short, these are the result of the continual changes in the courses of the major rivers and their tributaries, which are rendered inactive and silted over a period of time.

The Geological Survey of India has classified the state into Newer Alluvium, Older Alluvium, and Siwalik. The base configuration indicates that the Punjab basin appears to be deeper on the northern side

and shallower southward and deepest towards NW. The Neogene and Quaternary units are classified as i) **Siwalik Supergroup** and ii) the **Quaternary alluvium** comprising older alluvium and newer alluvium. Quaternary alluvium sediments lie unconformably over the Siwalik Supergroup.

i) **Siwalik Supergroup**: It presents an almost continuous record of Neogene terrestrial sequence with only minor hiatuses and is well known for its rich repository of vertebrate fauna along with significant invertebrate and plant fossils. It is further classified into three subgroups namely Lower Siwalik, Middle Siwalik, and Upper Siwalik. The rocks of the Lower and Middle Siwalik Group are exposed as NW-SE trending ridges in the northeastern part of the Gurdaspur district while the Upper Siwalik rocks are exposed in Ropar, Hoshiarpur, and Gurdaspur districts.

A) **Lower Siwalik Subgroup** is mainly represented by **Chinji Formation**. It is chiefly composed of fine to medium-grained, sporadically pebbly sandstone and chocolate to maroon claystone. The Chinji Formation has been assigned a Middle Miocene to Upper Miocene age.

B) **Middle Siwalik Subgroup** is dominated by multistoried sandstones with occasional claystone which were deposited in a floodplain environment. It is mainly comprising Nagri Formation and Dhok Pathan Formation.

- **Nagri Formation**: It overlies Chinji Formation of the Lower Siwalik Subgroup. It comprises alternating red clay and conglomerates. This formation is dated as Upper Miocene.
- **Dhok Pathan Formation**: In general, Dhok Pathan Formation is an important fossil-yielding unit of Siwalik Group, ranging in age between Upper Miocene to Lower Pliocene. The Formation is mainly consisting of poorly sorted massive, grey, coarse-grained, and micaceous sandstone with a minor conglomerate.

C) **Upper Siwalik Subgroup** largely consists of sandstone, clay, and conglomerate horizons deposited under a fluviatile environment. It is divided into three formations viz. Tatrot Formation, Pinjor Formation, and Boulder Conglomerate Formation.

- **Tatrot Formation**: It is the basal most unit of the Upper Siwalik that lies above the Dhok Pathan Formation and consists of conglomerates, soft sandstones and orange & brown clays. The conglomerate bed is found at the base of the formation and indicates a physical break in sedimentation after the deposition the Middle Siwalik (Krishnan, 1949)
- **Pinjor Formation**: It consists of light grey to white coarse sandstones and light pink siltstones, conglomerates, and clays.
- **Boulder Conglomerate Formation**: It lies above the Pinjor Formation and is the youngest unit of the Siwalik Group. It mainly consists of conglomerates but sandstones, siltstones, and clays are also present. The sediments of this formation are coarse in nature, deposited under glacial regime & almost unfossiliferous. It ranges from Middle to Upper Pleistocene in age.

ii) **Quaternary Alluvium Sediments**: It is subdivided into (a) Older Alluvium, (b) Newer Alluvium, and (c) Aeolian Deposits.

Older Alluvium is mainly consisting of reddish clay, silt and sand with kankar, grey medium to coarse calcareous sand with kankar and subrounded to subangular unsorted pebble, gravel, and cobble bed. The Newer Alluvium is composed of blue to white-grey micaceous sand with an alluvium interband of purple and red clay. The Aeolian Deposits are spread throughout Punjab, except in the areas covered by hard rocks of Siwalik Supergroup. Based on the degree of consolidation, these can be divided into (a) stabilized and consolidated older dunes, (b) intermediate and semi-consolidated dunes, and (c) newer, mobile and

reversible dunes.

Local geology: Geological formation encountered within the district comprises unconsolidated alluvial deposits of Quaternary age. Aquifer material comprises chiefly fine to medium-grained sand. The concretionary form of calcium carbonate, known as *Kankar* is found in beds at a shallow depth below the ground surface at the upper margin of the impermeable subsoil. The general geological sequence of the formation is given below:

Table No 24: Stratigraphic Succession of Tarn Taran

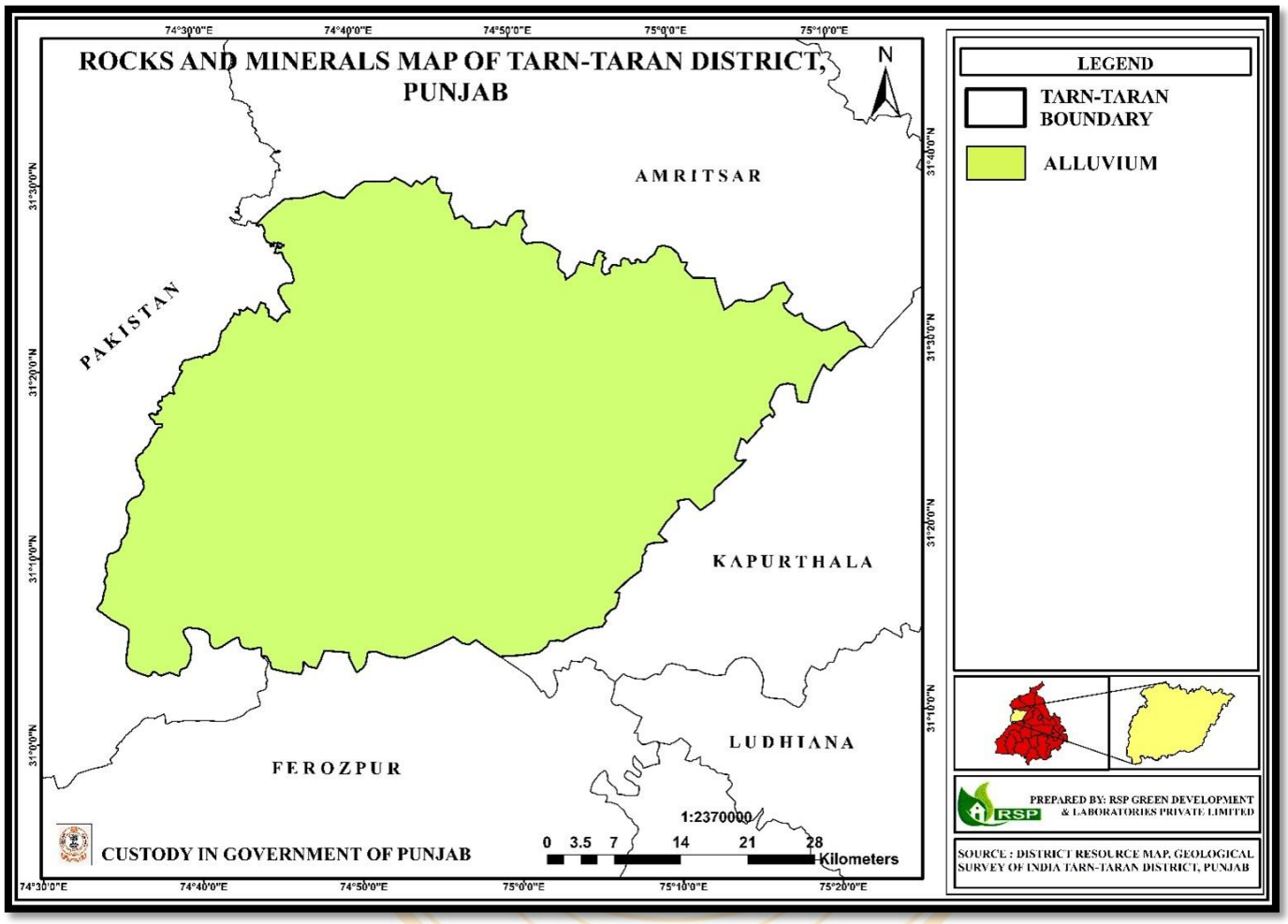
GROUP	AGE	FORMATION	LITHOLOGY
Quaternary	Recent to Upper Pleistocene	Newer Alluvium	Gravel beds, alluvial fans, and river terraces. They contain sand and clay in varying proportions.
Purana	Upper Tertiary	Upper Siwalik	Conglomerate beds, friable sandstone, siltstone and clay beds.
Source: *Geological Survey Of India, Northern Wing*			

6.1 MINERAL WEALH

Overview of mineral resources (covering all minerals)

The district is poor as regards mineral wealth. A few minor minerals are, however, found. The whole of the district is composed of the recent deposits known collectively as the Indo-Gangetic alluvium, which consists of alluvial sand, clay, and loam. Apart from the clay used for brick making, the concretionary form of calcium carbonate, known as *Kankar*, is found in beds generally at a slight depth below the surface at the upper margin of the impermeable subsoil, from where it is excavated to form material for road-making.

FIGURE 19: ROCKS AND MINERAL MAP OF THE DISTRICT



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CHAPTER 7: ESTIMATION OF DEPOSITS AND REPLENISHMENT STUDIES

7.0 GENERAL

Replenishment defines rejuvenation of riverbed sand deposition phenomena. The word replenishment is the fulcrum of riverbed sedimentation under different depositional environmental conditions, especially during rainy seasons.

The rate of gross or absolute silt production (erosion) in the watershed and the ability of the stream system to transport the eroded material in a river have a direct relation with the quantity of sediment delivered into a river. The rate of gross erosion is dependent upon many physical factors like climatic conditions, nature of the soil, the slope of the area, topography and land use. Hydro-physical conditions of the watershed govern the capability of transporting the eroded material. It has been observed that the average rate of sediment production decreases as the size of the drainage area increases. And also, larger the watershed, the lesser the variation between the rates. The larger watershed presents more opportunities for deposition of silt during its traverse from the point of production. The watershed the with maximum land use class of forest generates a very low rate of production unless the forests are degraded or open forest. The cultivated watersheds with unscientific farming produce a very high rate of silt production. The total amount of eroded material, which reaches a particular hydraulic control point, is termed sediment yield. Rotational mining is being adopted to facilitate the replenishment of the excavated pits during the rainy season. Thus, the mineable area is to be divided into two blocks i.e., the upstream block and the downstream block. The mining of these blocks is suggested on a rotation basis in such a way that pit of the previous year mining will act as depository for the monsoon season. Sand is extracted from the said lot during one year; more than the extracted quantity of the same are automatically replenished by rainfall in the monsoon by the river/nallah itself on account of its flow and velocity.

For the sustainability of river sand mining, it is necessary that the mine pits formed as a result of sand excavation are refilled with sand by the natural process of replenishment in a reasonable period of time so that the area is again available for mining. The rate of excavation should be decided in accordance with the rate of replenishment which is the rate at which sand/gravel is deposited on the river flood plain during the river during monsoon season. However, determination of a site-specific rate of replenishment is quite difficult as it is dependent on several factors such as geology and topography of the catchment area of the river, breadth of the flood plain, rainfall in that particular year (which is quite variable and not very much predictable much in advance) etc. Dandy-Bolton formula is generally used to calculate the sediment yield. But it is to be kept in mind that to prepare the mining plans of the mines, the factor of annual replenishment is to be taken into consideration while calculating the mineral reserves. It has also been observed that during flooding, all the pits replenish with sand. Hence, mined-out areas in the pre-monsoon season will be completely replenished with sand during the monsoon. Therefore, it has been assumed that the pits will be replenished after each monsoon.

The main river of the district is **Beas** and **Sutlej**. Beas originates from Beas Kund near Rohtang Pass in Kullu district of Himachal Pradesh and the river Sutlej originates from Darma pass near Man Sarovar Lake in Tibet. At Harike, Beas meets Sutlej and finally enters Pakistan near Suleimanki near Fazilka District of Punjab.

Base Flow is influenced by incoming groundwater to aquifers and is closely related to watershed

characteristics. Understanding baseflow characteristics is of great importance to river ecosystems and water management. Baseflow is the portion of stream flow that is delayed subsurface flow and generally maintained by groundwater discharge. Regardless of the specific climatic environment, its main features are tightly related to geological catchment properties. Understanding the baseflow process is important to deal with various water resource issues, such as water resources management strategies, low flow conditions assessment, hydrological modeling calibration, and water quality studies. However, no direct approach exists for continuously measuring the variability of streamflow recession under different conditions and the corresponding baseflow, because the baseflow is usually affected by diverse climatological and geological factors, with considerable variations in spatio-temporality watershed characteristics (*e.g*., geology, land use, soil type, *etc*.) and climatic conditions influence baseflow discharge to streams. Addressing such processes requires quantitative estimates of baseflow discharge across a gradient of watershed types. The development of quantitative methods for baseflow estimation is also necessary to understand water budgets (Stewart *et al.,* 2007), estimate groundwater discharge (Arnold and Allen, 1999) and associated effects on stream temperature (Hill *et al.,* 2013), and address questions of the vulnerability and response of the water cycle to natural and human-induced change in environmental conditions, such as stream vulnerability to legacy nutrients (Tesoriero *et al.,* 2013). Given the importance of baseflow, many methods have been used to quantify the baseflow component of stream discharge beginning with Boussinesq (1877). Approaches for baseflow estimation can be grouped into two general categories: graphical hydrograph separation (GHS) methods, which rely on stream discharge data alone, and tracer mass balance (MB) methods, which rely on chemical constituents in the stream, stream discharge, and the streamflow end-member constituent concentrations (runoff and baseflow). Many different approaches for GHS exist, including recession curve methods and digital filter methods. Recession curve methods are generally considered more objective than digital filter methods because they provide an assumed integrated signal of basin hydrologic and geologic characteristics through identification of a linear recession constant based on the falling limb of the hydrograph (Barnes, 1939; Hall, 1968; Gardner *et al.,* 2010).

However, in the present context, in case of the rivers of Tarn Taran district, the volume (weight) of the precipitated sand has been derived during Pre-monsoon and Post-monsoon period along with the thickness of the sand layers deposited during pre-monsoon as well as post-monsoon periods. But, to erect hydrograph model which is essential for estimation of depth of base flow, data on daily discharge of water volume (weight) is required. Hence, it can be proposed that if these data are provided from the concerned authority of the state government (secondary data- already requested for providence), depth of base flow as well as the hydrograph model can be estimated. The quantitative estimation of the depth of base flow cannot be done due to absence of data. But a relative comparison between the mining depth and depth of baseflow has been done on the basis of collected data by making pit on the river bed.

7.1 COMMON METHODS FOR REPLENISHMENT:

- **List of instruments:** DGPS, GPS and Hammer.
- **List of software:** ARC GIS, Google Earth, Microsoft and Google Maps.

7.1.1 CATCHMENT YIELD CALCULATION

The total quantity of surface water that can be expected in a given period from a stream at the outlet of its catchment is known as yield of the catchment in that period.The annual yield from a catchment is the end product of various processes such as precipitation, infiltration and evapotranspiration operating on the catchment. Catchment Yield can be estimated using following formula:

Catchment Yield (m^3) =Catchment area (m^2) * Runoff coefficient (%) *Rainfall (mts/annum)

The runoff generated from a watershed is estimated using Strange's Tables Method to get obtain approximate yield results. Runoff from a catchment is dependent upon annual rainfall as well as catchment area and characteristics such as soil types and thetype of groundcover / land usage. Remote sensing is used for demarcation of catchment boundaries and computation of catchment area relevant to the drainage system. Strange's table is used to determine the Runoff coefficient of the catchment.

7.1.2 PEAK FLOOD DISCHARGE CALCULATION

The term "peak discharge" stands for the highest concentration of runoff from thebasin area. The accurate estimation of flood discharge remains one of the major challenges as it depends upon physical characteristics of the catchment area and the flood intensity, duration and distribution pattern. There have been many different approaches for determining the peak runoff from an area. As a result, many different models (equations) for peak discharge estimation have been developed. Formulae used for Peak Discharge calculation are as below:

i. As per Dicken's formula, $Q = CA^{3/4}$

Where: **Q** is Maximum flood discharge (m3/sec); A is Area of catchment in Sq. Km and C is Constant whose value varies widely between 2.8 to 5.6 for catchments inplains and 14 to 28 for catchments in hills

ii. As per Jarvis formula, $Q = CA^{1/2}$

Where: **Q** is Maximum flood discharge (m3/sec); A is Area of catchment in Sq. Km and **C** is Constant whose value varies between 1.77 as minimum and 177 as maximum.Limiting or 100 percent chance floods are given by the value of C of 177.

iii.As per Rational formula, $Q = CIA$

Where: **Q** is Maximum flood discharge (m3/sec); A is Area of catchment in Sq. Km and **C** is the Runoff coefficient (ratio of runoff to total rainfall) which depends on the characteristics of the catchment area.

I is Intensity of rainfall (in m/sec).

7.1.3 BED LOAD TRANSPORT CALCULATION

The most difficult problem in river engineering is to accurately predict bed load transport rates in torrential floods flowing from mountainous streams. Three modes of transport namely; rolling, sliding and saltation may occur simultaneouslyin bed load transport. The different modes of transportation are closely related, and it is difficult, if not impossible, to separate them completely. There are a number of equations to compute the total sediment load. Most of these equationshave some theoretical and empirical bases.

Ackers and White Equation:

Ackers and White (1973) used dimensional analysis based on flow power conceptand their proposed formula is as follows.

C**t =** C**s** G**s (d50/h) (**V**/U*)** n **' [(**Fgr**/A1) − 1]** m

The dimensionless particle dgr is calculated by:

dgr= d50 (g(Gs-1)/v2)1/3

The particle mobility factor Fgr is calculated by:

Fgr = (U*n ′/(Gs-1) g d_{50})1/2 * (V/ (5.66log (10h/ d_{50}))1-n'

Where,

$A1$ = Critical particle mobility factor

Cs = Concentration coefficient in the sediment transportfunction

Ct = Total sediment concentration

$d50$= Median grain size

dgr= Dimensionless particle diameter

Fgr= Particle mobility parameter

g= Acceleration of gravity

Ds, Sg = Specific gravity

h= Water depth

m= Exponent in the sediment transport function

n'= Manning roughness coefficient

U= Shear velocity

V= Mean flow velocity

v= Kinematic viscosity

Meyer – Peter's equation:

Meyer-Peter's equation is based on experimental work carried out at Federal Institute of Technology, Zurich. Mayer-Peter gave a dimensionless equation based,for the first time, on rational laws. Mayer-Peter equations giving an empirical correlation of bed load transport rates in flumes and natural rivers. The simplified Meyer-Peter's equation is given below:

gb = 0.417[τ0 (η'/ η)1.5 - τc]1.5

Where,

gb = Rate of bed load transport (by weight) in N per m width of channel per second.η'= Manning's coefficient pertaining to grain size on an unrippled bed and Stricklerformula i.e., η'= (1/24) x d1/6 where d is the median size (d50) of the bed sedimentin m.

η = The actual observed value of the rugosity coefficient on rippled channels. Its value is generally taken as 0.020 for discharges of more than 11cumecs, and 0.0225 for lower discharges.

τc = Critical shear stress required to move the grain in N/m2 and given by equation τc = 0.687da, where da is mean or average size of the sediment in mm. This arithmetic average size is usually found to vary between d50 and d60.

τ0= Unit tractive force produced by flowing water i.e., γwRS. Truly speaking, its value should be taken

as the unit tractive force produced by the flowing water onbed = 0.97γwRS. R is the hydraulic mean depth of the channel (depth of flow for wider channel) and S is the bed slope.

7.1.4 SEDIMENT YEILD ESTIMATION

Sedimentation occurs as the stream velocity decreases thus reducing its ability tocarry sediment. Coarse sediments deposit first, which may then interfere with thechannel conveyance and may cause rivers to meander and form distributaries. Asthe area of the flowing water increases, the depth decreases, the velocity is reduced, and eventually even fine sediments begin to get deposited. As a result, deltas may be formed in the upper portion of reservoirs. The deposited material may later be moved to deeper portions of the reservoir by hydraulic processes within the water body.

There are many sediment transport equations which are suitable for use in the prediction of the rate of replenishment of rivers. Some of the common equationsused to estimate sediment yields are:

- Dandy – Bolton Equation
- Modified Universal Soil Loss Equation (MUSLE) developed by Williams andBerndt (1977)

Dandy – Bolton Equation:

The formula uses catchment area and mean annual runoff as the key variables.It does not differentiate between the characteristics of basins and streams.

Dandy and Bolton equation estimates all types of sediment yield i.e., through Sheet and rill Erosion, gully Erosion, Channel Bed and bank erosion and mass movement etc. Dandy- Bolton determined the combined influence of runoff and drainage area to compute the sediment yield. They developed two equations i.e., for run off less than 2 inch and for run off more than 2 inches, which are given below:

For run off less than 2 inches:

(Q<2in) S=1289*(Q) 0.46*[1.43-0.26 Log (A)]

For run off more than 2 inches:

(Q > 2 in): S= 1958*(e -0.055*Q) *[1.43-0.26 Log (A)]

Where: S = Sediment yield (tons/sq miles/yr) Q = Mean Annual runoff (inch)

A = Net drainage are in sq mile

Modified Universal Soil Loss Equation (MUSLE):

Modified universal soil loss equation (MUSLE) for estimation of sediment yieldis also used widely. MUSLE is a modification of the Universal Soil Loss Equation(USLE). USLE is an estimate of sheet and rill soil movement down a uniform slope using rain- fall energy as the erosive force acting on the soil (Wischmeier and Smith 1978). Depending on soil characteristics (texture, structure, organicmatter, and permeability), some soils erode easily while others are inherentlymore resistant to the erosive action of rain- fall.

MUSLE is similar to USLE except for the energy component. USLE depends strictly upon rainfall as the source of erosive energy. MUSLE uses storm-basedrunoff volumes (weight) and runoff peak flows to simulate erosion and sediment yield (Williams 1995). The use of runoff variables rather than rainfall erosivity as thedriving force enables MUSLE to estimate sediment yields for individual storm events. The generalized formula of MUSLE is as below:

Y=11.8*(Q*qP).56 *K*Ls*C*P

Where,

Y = sediment yield of stream (t/yr/km2), Q = average annual runoff (m3),K = soil erodibility factor,

qP = Highest discharge recorded (m3/s), Ls = gradient/slope length,C = cover management factor,

P = erosion control practice.

7.2 ILLUSTRATIVE EXAMPLE FOR CARRING OUT REPLENISHMENT STUDIES

Though the above empirical formulae can be used for rough estimation of sediment yields, the "Volumetric method" based on the actual DGP field survey is the only reliable methodology to accurately determine the mineral yield potential for individual mining sites and the rate of replenishment of each such site. Hence, this method is preferred over the other methods.

In this report, for volume (weight) estimation of sand (Depth x Area) has been adopted. The sand bars are interpreted with the help of satellite imageries and Ground truthing followed by actual DGP survey is done for all the identified sand bars.

7.2.1 IDENTIFICATION OF AREAS OF AGGRADATION/DEPOSITION

For the identification of areas of aggradation / deposition where mining can be allowed and proximity to infrastructural structures and installations where mining shall be prohibited, the following methodology has been adopted:

7.2.1.1 FIELD DATA COLLECTION

i. Physical closed traverse surveys on continuous basis were done for the river stretchesand accordingly relative elevation levels of the deposition zones were captured with the DGPS.

ii. Permanent physical benchmarks were also identified and were established through DGPS. In surveying, a "bench mark" is a post or other permanent mark established ata known elevation that is used as the basis for measuring the elevation of other topographical points.

iii. Sampling of the mining materials was done at regular intervals for the estimation of average Bulk Density of the minor materials.

iv. Some photographs taking during the DGPS survey are given in **Annexure X.**

7.2.1.2 CRITERIA FOR IDENTIFICATION OF NO MINING ZONES

i. Benchmark (BM) with respect to mean Sea Level (MSL) should be established in miningchannel reaches (MCR) below which no mining shall be allowed.

ii. Mining is to be permitted only in the central 3/4th of the channel where deposition/aggradation of the material has been identified whereas the remaining ¼thwidth needs to be kept as no mining zone for the protection of banks.

iii. Identifying the mining and no mining zones shall be done after determining the area of sensitivity by ascertaining the distance of the mining area from the protected areas,forest areas, bridges, important structures, habitation etc. and based on the sensitivitythe area needs to be defined in sensitive and non-sensitive categories.

iv. As far as possible mining operations should be avoided in the sensitive areas unless local conditions require otherwise. Such deviations may only be of temporary nature and are to be permitted by the DLTF

after recording the reasons for the same.

7.2.1.3 DATA COMPILATION

Deposits of minor minerals were mapped from satellite imageries of high resolution such as Cartosat-1 and latest multispectral satellite imagery obtained from NRC Hyderabad or Open source available. The satellite image gives the deposits available in the river stretch and theirzones of deposition has been marked in the image which was later verified through physical survey (Field data collection). Following data were compiled for identification of deposits: -

i. Elevation levels of the different mineral potential areas.

ii. Export DGPS and physical measured data and its geo-referencing using software (ArcGIS/ERDAS etc.).

iii. Aerial extent of each deposit was mapped using satellite imageries of 10 m x 10 m resolution such as sentinel. The satellite image gives the deposits available in the riverstretch and their zones of deposition has been verified with DGPS and physical data and is marked in the image with the help of Arc GIS.

iv. Further, the area falling in the vicinity of various geomorphological and physical structures mentioned in the SSMG 2016 and EMGSM 2020 guidelines, Main water Channel, High level bridges etc., have been marked as no mining zones as per the distances prescribed in the aforementioned guidelines.

Development of cross profiles: Cross section lines are chosen based on the drastic variation of the river widths, proximity of the operating sand ghats and the position of the sand bars.

Cross-sectional maps of the deposition blocks are given in Annexure IX

Assessment of sediment load in the river: Assessment of sediment load in a river is subjective to study of the whole catchment area, weathering index of the various rock types which acts as a source of sediments in the specific river bed, rainfall data of the area for a period not less than 20 years, and finally the detail monitoring of the bed upliftment with time axis. Again, the sediment load estimation is not dependent variable of the imaginary district boundary, but it largely depends upon the aerial extents of the catchment areas, which crossed the district and state boundaries.

7.3 METHODOLOGY FOR CALCULATING THE TOTAL POTENTIAL OF MINOR MINERAL IN THE RIVER BED ANNUAL DEPOSITION

For estimating the reserve of River Bed Material [Sand/Gravel (Minor Mineral)], the following parameters are considered:

i. The volumes (weight) of the reserves are calculated on the basis of the established width, thickness and length of the deposit as per actual field data.

ii. The tonnage of the reserve quantity is obtained by multiplying the above volume (weight) with the bulk density of _ tonnes per cum (as per lab report).

iii. The depth of the reserves has been estimated considering the available deposit thicknessand the water level/red line.

The same procedure shall be followed for acquiring post monsoon data, its reserve estimationand then correlating between pre and post monsoon volumes (weight) as per table given below:

Table No 25: Estimation of Sand Reserves in Pre & Post monsoon period in Sand bars

Sl. NO.	Deposit zone code	Ave. RL (m)	Area in Sq.m.	Ave. Thickness (m)	Quantity (Weight) (MT)	Sl. NO.	Deposit zone code	Ave. RL (m)	Area in Sq.m.	Ave. Thickness (m)	Quantity (Weight) (MT)	Difference (MT) 'YY'
PRE-MONSOON						**POST-MONSOON**						
1	PB-TT-BEAS-01	212.63	76600	1.37	173154.30	1	PB-TT-BEAS-01	212.57	76600	1.43	180737.70	7583.40
2	PB-TT-BEAS-02	212.93	354900	1.52	890089.20	2	PB-TT-BEAS-02	212.88	354900	1.57	919368.45	29279.25
3	PB-TT-BEAS-03	211.28	88100	1.37	199150.05	3	PB-TT-BEAS-03	211.24	88100	1.41	204964.65	5814.60
4	PB-TT-BEAS-04	211.98	34800	1.52	87278.40	4	PB-TT-BEAS-04	211.97	34800	1.53	87852.60	574.20
5	PB-TT-BEAS-08	217.48	166200	1.52	416829.60	5	PB-TT-BEAS-08	217.47	166200	1.53	419571.90	2742.30
6	PB-TT-BEAS-09	218.32	47500	1.68	131670.00	6	PB-TT-BEAS-09	218.28	47500	1.72	134805.00	3135.00
7	PB-TT-BEAS-10	223.48	6400	1.52	16051.20	7	PB-TT-BEAS-10	223.46	6400	1.54	16262.40	211.20
TOTAL					**1,914,222.75**						**1,963,562.70**	**49,339.95**
8	PB-TT-SUT-01	200.32	491500	1.6764	1420490.8344	8	PB-TT-SUT-01	200.17	491500	1.8288	1549626.3648	129135.5304
9	PB-TT-SUT-02	199.32	119600	1.6764	345657.5866	9	PB-TT-SUT-02	199.25	119600	1.7452	359843.4861	14185.8995
10	PB-TT-SUT-03	198.86	89700	1.6764	259243.18992	10	PB-TT-SUT-03	198.82	89700	1.7236	266542.3301	7299.1402

Sl. NO.	Deposit zone code	Ave. RL (m)	Area in Sq.m.	Ave. Thickness (m)	Quantity (Weight) (MT)	Sl. NO.	Deposit zone code	Ave. RL (m)	Area in Sq.m.	Ave. Thickness (m)	Quantity (Weight) (MT)	Difference (MT) 'YY'
11	PB-TT-SUT-04	199.77	375000	1.6764	1081906.6500	11	PB-TT-SUT-04	199.67	375000	1.7811	1149477.4125	67570.7625
12	PB-TT-SUT-05	199.32	214000	1.6764	617408.0616	12	PB-TT-SUT-05	199.25	214000	1.7536	645840.3584	28432.2968
13	PB-TT-SUT-06	200.32	48900	1.6764	141080.6272	13	PB-TT-SUT-06	200.18	48900	1.8233	153443.2758	12362.6486
14	PB-TT-SUT-07	199.48	56700	1.524	146898.3600	14	PB-TT-SUT-07	199.37	56700	1.627	156826.5300	9928.1700
15	PB-TT-SUT-08	200.32	192400	1.6764	548316.9120	15	PB-TT-SUT-08	200.22	192400	1.7754	580697.8320	32380.9200
16	PB-TT-SUT-09	200.67	29500	1.6764	82983.4764	16	PB-TT-SUT-09	200.62	29500	1.7321	85740.6821	2757.2057
17	PB-TT-SUT-10	200.13	55400	1.524	141672.8688	17	PB-TT-SUT-10	199.98	55400	1.6653	154808.2864	13135.4176
18	PB-TT-SUT-11	201.48	886000	1.524	2287347.2160	18	PB-TT-SUT-11	201.32	886000	1.6848	2528689.3632	241342.1472
19	PB-TT-SUT-12	202.48	223000	1.524	575709.2880	19	PB-TT-SUT-12	202.34	223000	1.6635	628407.0870	52697.7990
TOTAL					**7,650,100.38**						**8259943.01**	**611227.94**

Source: *Field Survey Data and DGPS Data*

Note: From Department of Forests and Wildlife Preservation (Forest Branch), Government of Punjab, notification no. 34/13/2017-Ft-5/1052756/1 Chandigarh, date 29/08/2017, it had been noted that "River Beas with all its water channels from 52 Head Talwara to Harike Barrage including all Government areas in River Beas."

Table No 26: Sediment Load Comparison Pre & Post monsoon periods for different rivers of the district

River Name	Pre-monsoon No of Ghats	Post-monsoon No of Ghats	Pre-monsoon Sediment Load (MT)	Post-monsoon Sediment Load (MT)	Difference (MT)	Percentage Variance
BEAS	7	7	**1,914,222.75**	**1,963,562.70**	**49,339.95**	2.51
SUTLEJ	12	12	**7648715.07**	**8259943.01**	**611227.94**	7.40
Total			**9,562,937.82**	**10,223,505.71**	**660,567.89**	
Source: *Field Survey Data*						

For river Beas,

Total number of sand block – 7

- Total quantity (weight) of riverbed material – **1,914,222.75** MT (pre-monsoon)
- Total quantity (weight) of riverbed material – **1,963,562.70** MT (post-monsoon)
- Percentage of variance – 2.51 %

For river Sutlej,

Total number of sand block – 12

- Total quantity (weight) of riverbed material – **7648715.07** MT (pre-monsoon)
- Total quantity (weight) of riverbed material – **8259943.01**MT (post-monsoon)
- Percentage of variance – 7.39%

Therefore, this year Annual replenishment rate of river Beas is 97.49% & SUTLEJ is 92.61 %.

No mining zone:

A definition of a protected area was established by IUCN in 1994, which is described as

> "*An area of land and /or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.*"

Mining has a range of environmental consequences for protected areas, whether operations are undertaken within them or nearby. The types of impact may be listed as follows:

• Direct land take and loss of vegetation cover in the mined area and other parts directly affected by associated activities such as deposition of tailings, or consequences such as subsidence;

• Pollution affects, especially on water supplies, aggravated by accidents (e.g., to tailing dams);

• Impacts due to access associated with mining (roads, railways, pipelines, power lines etc.), which permit illegal hunting, habitat fragmentation and alien invasions;

• Secondary effects of human immigration in association with real or perceived livelihood opportunities

(e.g., on water supplies, illegal hunting, harvesting of vegetation, alien invasions, illegal land settlements);

• Impacts on other protected area values from noise and visual intrusion, arising from both mining and secondary activities, including transportation.

The 2020 guidelines for sand mining stress on protecting rivers and habitats of species including turtles and calls for such sensitive areas to be declared as no-mining zones. It also called for using the latest technology for surveillance of illegal mining as well as estimating minable reserves.

A United Nations Environment report has said that, led by China and India, the world is mining sand at unsustainable levels exceeding the replenishment rate and that can have far-reaching social and environmental implications. Unsustainable sand mining practices are rampant in India. Despite a set of guidelines in 2016 to curb the practice, illegal and unsustainable sand mining has continued to be common, spurring the Indian government to take another step toward enforcing rules. The environment ministry has now come out with, Enforcement & Monitoring Guidelines for Sand Mining 2020‟ to regulate sand mining and check illegal mining.

This comes four years after the Government's Sustainable Sand Management Guidelines 2016, which was unsuccessful in putting an end to rampant illegal sand mining across the country. The latest guidelines suggest the use of technologies like drones with night vision for surveillance of sand mining sites, steps to identify sources of sand, procedures for replenishment of sand, post environmental clearance monitoring of sand mining sites, a procedure for environmental audit of such areas and steps to control the instances of illegal mining.

Among these, the focus on monitoring of sand mines after environment clearance is considerable given that so far it has been an area where the performance of authorities, central or state, is considered very poor.

The need for the latest version of the guidelines was felt after illegal and unsustainable sand mining continued despite the 2016 guidelines and many court cases. Since 2016, the National Green Tribunal, in many of the cases, stressed on the need of regulating sand mining and passed several orders. The court in some cases even expressed concern over the death of officials who tried to stop illegal mining and noted that on the ground level, illegal mining is still going on. The guidelines are thus a result of many such orders by the NGT wherein the tribunal passed directions to control it.

The new guidelines also laid special emphasis on the protection of rivers and species from sand mining as it called for surveys for identifying the stretches with freshwater turtles or turtle nesting zones. "Similarly, stretches shall be identified for other species of significant importance to the river ecosystem. Such stretches with adequate buffer distance shall be declared as no-mining zone and no mining shall be permitted," the guidelines said.

It also called for a survey report in every district for identifying the sand bearing area but also the "mining and no mining zones" considering various environmental and social factors like the distance of the mining area from the protected area, forest, bridges, important structures and habitation. According to the Sand Mining Framework 2018 of the central Government's Ministry of Mines, in India, there is a shortage of sand in the country, similar to the situation in other developed and developing countries. It estimated that the demand of sand in the country is around 700 million tons (in the financial year 2017) and it is increasing at the rate of 6-7 percent annually even as the quantity of natural generation of sand is static.

Due to uncertainties and inadequateness in supply, the selling rate of the material varies significantly

leading to black marketing and illegal mining of the mineral. It noted that illegal and uncontrolled extraction of sand has an adverse environmental impact.

Protect the rivers from illegal sand mining

The main sources of sand in India are considered to be rivers (riverbed and flood plain), lakes and reservoirs, agricultural fields, coastal/marine sand and manufactured sand.

The guidelines spanning over 83 pages focus on identifying sand mining sources, its quantification and feasibility for mining considering various environmental factors like proximity of protected area, wetlands, creeks, forest etc. and presence of important structures, places of archaeological importance, habitation, prohibited area etc.

To protect the rivers from illegal sand mining, the guidelines said that abandoned stream channels on the floodplains should be preferred rather than active channels and their deltas and floodplains.

A kml file has been made to represent "No-mining-Zone" in the district.

7.3 TOTAL POTENTIAL OF MINOR MINERAL IN THE RIVER BED ANNUAL DEPOSITION

The annual deposition of riverbed minerals is shown in the Table given below:

Table No 27: Annual deposition

River Name	Zone	Type of Material	Quantity (weight) in MT (as per 'YY')	60% of Quantity (weight) in MT
BEAS	PB-TT-BEAS-01 TO PB-TT-BEAS-04 AND PB-TT-BEAS-08 TO PB-TT-BEAS-10	**Sand**	**49,339.95**	**29603.97**
SUTLEJ	PB-TT-SUT-01 To PB-TT-SUT-14	**Sand**	**611227.94**	**366736.76**
TOTAL			**660,567.89**	**396,340.73**

Source: *Field Survey Data*

**** As de-siltation is not a part of natural phenomenon. So, for the calculation of Annual deposition table de-siltation locations are excluded. It is included in mineral potential table for the district.**

1. Sand bar area recommended for mineral concession in the above table has been calculated as per the Enforcement & Monitoring Guidelines for Sand Mining (EMGSM) 2020.
2. As per guidelines, mining depth has been restricted to 3 meters depth and distancefrom the bank is ¼th of river width and not be less than 7.5 meters.
3. Also, mining is prohibited up to a distance of 1 kilometer (1 km) from major bridgesand highways on both sides, or five times (5x) of the span (x) of a bridge/public civilstructure (including water intake points) on up-stream side and ten times (10x) thespan of such bridge on down-stream side, subjected to a minimum of 250 meters on the upstream side and 500 meters on the downstream side.
4. Sand bar deposits acting as potential sites for sand mining along with other aspectsas mentioned above are illustrated in Satellite images in **Annexure VIII**

7.5 DETAILS OF POTENTIAL SOURCES /SITES OF RIVER BED MATERIAL

Potential sensitive sites for mining near forests, protected areas, habitation, bridges etc., shallbe avoided. For this, a sub-divisional committee may be formed which after the site visit shalldecide its suitability for mining. The list of mining leases as per the recommendation of the Committee needs to be defined in the following format given in as **Annexure-V**.

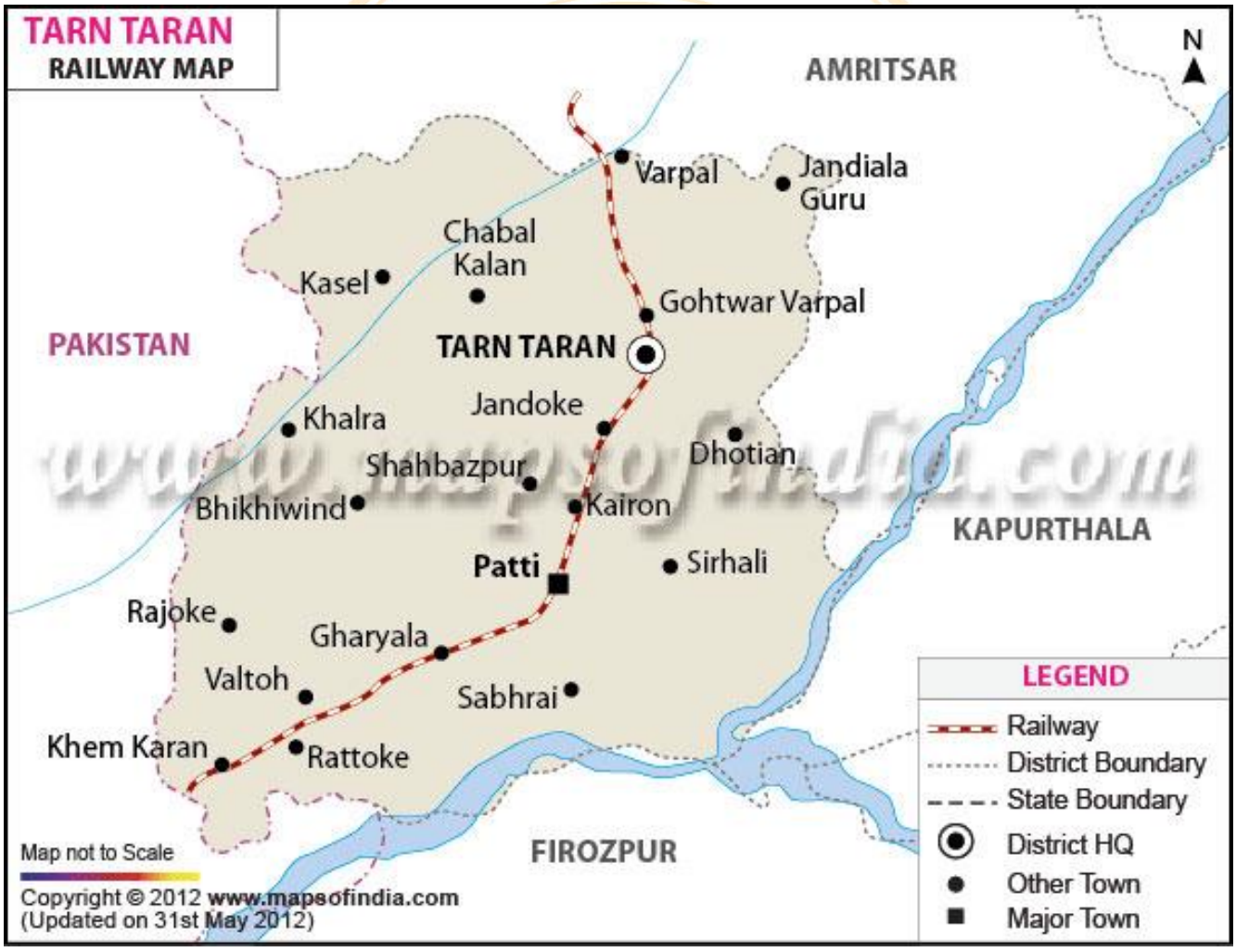
The Sub-Divisional Committee shall make recommendations regarding the suitability of all potential mining sites and also record the reason for approving the specific mining leases on the basis of its field inspections. The details regarding cluster and contiguous cluster formation will be provided as in **Annexure-VI**.

CHAPTER 8: TRANSPORTATION ROUTE PLAN (RAILWAY, ROAD)

8.1 TRANSPORTATION ROUTE PLAN (RAILWAY, ROAD)

Tarn Taran district was formed in 2006 out of Amritsar district. It is one of the border districts that lies in North West frontier of Punjab. The district is well connected via rail, and road with other districts. Tarn Taran Junction railway station provides cross connectivity between Amritsar-Khemkaran and Beas-Tarn Taran railway lines. The district is well connected through national highways (NH 54, NH 35B, etc) to the rest of Punjab state. There is no commercial airport in the district. The nearest airport is Amritsar International Airport.

FIGURE 20: RAILWAY MAP OF THE DISTRICT



Source: *www.mapsofindia.com*

8.1 TRANSPORTATION ROUTE FOR THE MINING SITE

Details of Transportation route for the mining sites are given in **Annexure XI**

CHAPTER 9: REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING

9.1 ENVIRONMENTAL SENSITIVITY

The second most exploited natural resource on earth after water is river bed material. River sand is preferred for construction due to its quality. But the unscientific way of mining from river bed leads to alter river channel morphology, physical habitats and food webs. It also increases the velocity of flow in the river which destroy the flow-regime and eventually erodes the river banks. Removal of vegetation and destruction of soil profile destroys habitat above and below the ground and faunal population decrease.

Sand aquifers helps in recharging the water table and sand mining causes the sinking of water tables in the nearby areas.

9.2 SAND MINING IMPACT

1. Sand aquifers helps in recharging the water table and sand mining causes sinking of water tables in the nearby areas. Mining also leads to Air pollution & Noise Pollution in the nearby areas.
2. In-stream mining directly alters the channel geometry and bed elevation. By removingsediment from the channel, in-stream material extraction disrupts the pre-existing balance between sediment supply and transporting capacity, typically inducing incisions upstream and downstream of the extraction site. The resultant incision alters the frequency and pattern of floodplain inundation along with the river courses, lowers valley floor water tables, and frequently leads to the destruction of bridges and other structures.

9.3 REMEDIAL MEASURES

In Sustainable Sand Mining Management Guidelines, 2016, Page No. 73 to 78, it is clearly stated that the relevant conditions for the Environmental Clearance for a specific mining lease, which should be strictly adhered to by all stakeholders, including Project Proponent, Mining Department, Contract labor, other Government Departments and District Administration. Regular monitoring of operational mining sites should be done according to Hon'ble NGT directions and the inspection report should be sent to SEIAA and other stake holders as also uploaded on their websites. Special attention should be given to ensure compliance with the following important conditions:

9.3.1 SUSTAINABLE MINING PRACTICES

1. Without Environmental Clearance, no commercial sand mining is permissible on the basis of approved DSR/Mining Plan by the concerned authority.
2. The depth of mining in riverbed is always less then base flow depth or 3 meters, whichever is less.
3. Mining shall be done in layers to avoid ponding effect in mining site.
4. Haphazard extraction is to be strictly avoided.

5. No mining should be carried out in the designated "No-Mining Zone"/ "Eco Sensitive Zone" / "Restricted Zone".
6. Annual replenishment studies, where ever applicable, must be carried out for the river.
7. Stream / any water channel should not be diverted/blocked for the purpose of sand mining.
8. IT tools as prescribed in the Sustainable Sand Mining Guideline,2016 and Enforcement & Monitoring Guidelines for Sand Mining,2020, should be utilized for monitoring the operational mining block.
9. Restricted sand mining operation has to be carried out for mitigation of noise during mining operation.
10. Transportation of mineral shall be carried out through covered trucks only.
11. Mining site has to be maintained in clean and hygienic conditions at all the times.
12. During rainy season mining practices should be stopped.
13. All mines/quarries are to be properly reclaimed before the final closure of the mine.
14. During mining operation green belt development through plantation is most important for environment safe guard, which should be under supervision of Forest department. Different type of species should be planted near lease periphery to keep environment clean at post mining period through reclamation. Where specific usefulness of land could be decided, a forestation is normally planned through the site could have been considered for better possibilities of land use.
15. There is no very high risk and hazard identification is carried for undesirable events that can leads. During sand mining operation, risk factors, viz. accidents during loading and transportation, inundation/flooding and quick sand conditions, should be minimize. The mining operation are mostly done manually and/or semi-mechanized way.
16. All mining operations will be carried out under the supervision of an experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS. The mining site will be supplied with first aid facilities and all the workers will have unrestricted access to these facilities.

9.3.2 MONITORING THE MINING OF MINERALS AND THEIR TRANSPORTATION

1. Proper check and control of extracted minor minerals is a critically important aspect of the DSR. IT tools as prescribed in the SSMG, 2016 and EMGSM, 2020 are to be utilizedto ensure that no illegal mining takes place and transportation is done in an environmentally safe manner.
2. For each mining lease site, the access should be controlled in such a way that all vehicles carrying minerals from that area are tracked and accounted for.
3. Mining activities should be monitored regularly in order to ensure effective compliance of stipulated EC conditions and of the provisions under the Minor Mineral Concessions Rules framed by the State Govt.

9.3.3 NOISE MANAGEMENT:

1. Noise that produced at the time of mining process should be checked and controlled at source

2. Noise level should be kept within the permissible limits.
3. Restricted sand mining operation has to be carried out between in day time.

9.3.4 AIR POLLUTION AND DUST MANAGEMENT:

1. To control the air pollution due to loading at mining site suitable measure should be taken.
2. Air pollution due to transportation of mining material should be controlled and water sprinkling should be done regularly.
3. Air pollution arising due to mining activities should be kept within permissible limit.
4. Vehicles carrying minerals shall not be over loaded and have to be covered vehicles. Wheel-washing facility should be installed and used.

9.3.5 BIO-DIVERSITY PROTECTION AND COMPENSATION

1. No mining lease shall be granted in the forest area without forest clearance in accordance with the provisions of the Forest Conservation Act, 1980 and the rules made thereunder.
2. Protection of turtle and bird habitats shall be ensured.
3. Felling of trees near the quarries is prohibited. For mining lease located in proximity to National Parks / Sanctuarys or in Eco-Sensitive Zones of Protected Areas, latest orders dated 03.06.2022 of the Hon'ble Supreme Court in T N Godavarnam case will be meticulously complied with.
4. Spring sources should not be affected due to mining activities. Necessary Protection measures are to be incorporated.
5. No mining shall be done within Wildlife Sanctuary Area.

9.3.6 MANAGEMENT OF INSTABILITY AND EROSION

1. The top soil of the mining area should be utilized properly. If the top soil can't be used at that time, it should be stored separately keeping the view that the bacterial organism should not die and should be spread out in the nearby area.
2. The EC should ensure that adequate steps are taken to check soil erosion and control debris flow etc. by constructing engineering structures.
3. Oversized material should be used to control erosion and movement of sediments.
4. Overhangs should be strictly prohibited to be formed due to mining and mining shall not be allowed in areas where subsidence of rocks is likely to occur due to steep angle of repose of the slope.
5. Minor mineral extraction shall not be allowed to landslide prone areas and extraction shall be avoided during rainy season.
6. Controlled clearance of riparian vegetation to be undertaken.

9.3.7 WASTE MANAGEMENT

1. Cleaning and hygienic activity should be maintained in mining areas.
2. Earmarked places approved by mining plan to be used for waste disposal
3. Rubbish / Debris / Gangue shall not be dumped back in the River / Stream.

9.3.8 POLLUTION PREVENTION

1. All possible precautions for the protection of environment and control of pollution should be taken by Project Proponent and his labor.
2. All machinery used in operations and transportation must meet the relevant prescribed pollution control standards.

9.3.9 PROTECTION OF INFRASTRUCTURE

1. Mining activities should be prohibited in areas which may endanger roads, bridges and other structures including flood protection works, places of cultural, religious, historical, and archeological importance etc.
2. For carrying out mining in proximity to any bridge or embankment, appropriate safety zone should be worked out on case-to-case basis, taking into account the structural parameters, location aspects and flow rate, and no mining should be carried out in the safety zone so worked out.

9.3.10 BASELINE SURVEYS AND RECLAMATION PLAN ON COMPLETION OF MINING OPERATION

1. All mines/quarries are to be properly reclaimed before the final closure of the mine as per statute.
2. A baseline survey of conditions before commencement of mining operations is to be prepared. This should include relevant cross-section data between two permanent benchmarks set back from the top of bank. The elevations should be referenced on the basis of the established bench marks.
3. To depict the vertical extent of the proposed excavation, mining cross-section data should be plotted over the baseline data.
4. The cross-section of the fully replenished bar should be the same as that of the baseline data.
5. A planimetric map must be prepared showing the aerial extent of the excavation and extent of the riparian buffers.
6. A plantation plan should be prepared by the concerned DFO as prescribed.
7. Proper monitoring plan is to be prepared and implemented.

9.4 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

1. Risk assessment involves the assigning of a level of risk to each of the common health and safety hazards at a workplace, followed by the ranking of those hazards.
2. Risk analysis is the systematic study of risks encountered during various stages of mining operations. Risk analysis seek to identify the risks involved in mining operations, to understand how and when they arise, and estimate the impact (financial or otherwise) of adverse outcomes.
3. Most of the sand mining operations in the district are done manually except where semi-mechanized means have been specifically permitted

9.4.1 IDENTIFICATION OF RISKS DUE TO RIVER SAND MINING

When river bed mining is done on a scientific basis and in compliance with the conditions of the EC,

the risk of land degradation is minimized. There will be no Over Burden or waste generation as the sand is exposed in the river bed and is easily extractable manually. There will be minimal stacking of soil or the creation of Over Burden dumps. Since mining is permissible up to maximum depth of 3m below the surface level there is not much chance of slope failure or bench failure in the mines. However, there are some identified risks in the mining activity which are as under:

A. Accident during sand loading and transportation

B. Inundation/ Flooding

C. Quick Sand Condition

9.4.2 MITIGATION MEASURES TO PREVENT ACCIDENT DURING LOADING AND TRANSPORTATION

1. During manual loading the truck should be bought to a lower so that the loading operation is facilitated by the worker.
2. The workers will be provided with gloves and safety shoes during loading.
3. Opening of the side covers of the truck should be done carefully and with prior warning so as to prevent injury to the workers.
4. Mining activities should be done during daylight hour only.
5. The truck will be covered with tarpaulin and to prevent any spillage
6. To avoid danger while reversing the trackless vehicles especially at the embankment and tipping points, all areas for reversing of Lorries should be free of workers as far as possible.
7. All transportation within the main working will be carried out directly under the supervision and control of the management.
8. Overloading should not be permitted and the maximum permissible speed limit should be ensured.
9. Trucks must be maintained regularly and the drivers should have a valid driving license.

9.4.3 MEASURES TO PREVENT ACCIDENTS DURING INUNDATION/FLODING

To minimize the risk of flooding/ inundation following measures will be under taken:

1. Mining activities should be completely stopped during rainy season
2. Proper weather information particularly on non-monsoon rainy days should be kept during the operational period of mines so that precautionary measures can be undertaken.

9.4.4 MEASURES FOR MITIGATION TO QUICKSAND CONDITION

1. Quick sand zone and deep-water zone will be clearly demarcated and all the mine workers will made aware of the location.
2. Mining will do strictly as per the approved mining plan.

9.4.5 DISASTER MANAGEMENT PLAN

All mining operations will be carried out under the supervision of an experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS. All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955, and other laws applicable to mines

will be strictly complied with. During heavy rainfall and during the monsoon season the mining operations will be closed. Proper coordination with Irrigation Department should be maintained so that at the time of release of water from any dam upstream of the mining site, suitable warning/information is given in advance. Special attention and requisite precautions shall be taken while working in areas of geological weakness like the existence of slip, fault, etc. The mining site will be supplied with first aid facilities and all the workers will have unrestricted access to these facilities.

CHAPTER 10: PUBLIC CONSULTATION

10.0 PUBLIC CONSULTATION

"Public Consultation" is very important in the policy development process. It is a regulatory process by which the public's (Stakeholder's) input on matters affecting them is sought. Accordingly, public consultation should encourage stakeholder ownership and buy-in to the policy development process by seeking assistance with data and information collection, analyses and the identification of other persons, businesses, institutes and other organizations that may have valuable data or information.

10.1 PROCEDURE FOR PUBLIC CONSULTATION

Preliminary Draft DSR consisting of list of potential mining zones was uploaded Public domain on dated of public domain 30/09/2022 and 11/11/2022 on website (https://tarntaran.nic.in/notice/district-survey-report/). Seeking comments/observation/suggestions from the general public/various stakeholders. Press releases for same was given in newspaper. The final list of sand mining areas after the public hearing are given in as a format of **Annexure-V, Annexure VI** and **Annexure VII.**

• No comments and observation were received during this period. Newspaper cuttings were attached in this District Survey Report.

CHAPTER 11: CONCLUSIONS

11.0 CONCLUSIONS

Sand mining (used here as a generic term that includes mining of any riverine aggregates regardless of particle size) is a global activity that is receiving increasing media attention due to perceived negative environmental and social impacts. As calls grow for stronger regulation of mining, there is a need to understand the scientific evidence to support effective management. This paper summarizes the results of a structured literature review addressing the question, the review found that most investigations have focused on temperate rivers where sand mining occurred historically but has now ceased. Channel incision was the most common physical impact identified; other physical responses, including habitat disturbance, alteration of riparian zones, and changes to downstream sediment transport, were highly variable and dependent on river characteristics. Ecosystem attributes affected included macro invertebrate drift, fish movements, species abundance and community structures, and food web dynamics. Studies often inferred impacts on populations, but supporting data were scarce. Limited evidence suggests that rivers can sustain extraction if volumes (weight) are within the natural sediment load variability. Significantly, the countries and rivers for which there is science-based evidence related to sand mining are not those where extensive sand mining is currently reported. The lack of scientific and systematic studies of sand mining in these countries prevents accurate quantification of mined volumes (weight) or the type, extent, and magnitude of any impacts. Additional research into how sand mining is affecting ecosystem services, impacting biodiversity and particularly threatened species, and how mining impacts interact with other activities or threats is urgently required.

The rapid rise in urbanization and construction of large-scale infrastructure projects are driving increasing demands for construction materials globally. United Nations Environment Programme (UNEP; 2014) estimated that between 32 and 50 billion tonnes of sand and gravel are extracted globally each year with demand increasing, especially in developing countries (Schandl et al., 2016).

Rivers are a major source of sand and gravel for numerous reasons: cities tend to be located near rivers so transport costs are low; river energy grinds rocks into gravels and sands, thus eliminating the cost of mining, grinding, and sorting rocks; and the material produced by rivers tends to consist of resilient minerals of angular shape that are preferred for construction (whereas wind-blown deposits in deserts are rounder and less suitable). Here, we use “sand mining” as a generic term to embrace extraction of riverine aggregates regardless of particle size. Sand mining activities are one of many recognized pressures affecting riverine ecosystems, where biodiversity is already in rapid decline (World Wildlife Fund, 2018). Increasingly, there are media reports about the negative environmental and social impacts of sand mining, and as calls grow for stronger regulation of mining (Schandl et al., 2016), there is a need to understand the scientific evidence of mining impacts to underpin management.

Impacts of sand mining on rivers may be direct or indirect. Direct impacts are those in which the extraction of material is directly responsible for the ecosystem impact, such as due to the removal of flood plains habitat. Indirect impacts are related to ecosystem changes that are propagated through the system due to physical changes in the river system resulting from sand extraction. For example, the removal of material from a river can alter the channel, river hydraulics, or sediment budget which in turn can alter the distribution of habitats and ecosystem functioning. These types of impacts can be difficult to attribute to sand mining, as they may require long time frames to emerge, and other interventions can result in similar changes. The situation is further complicated by the existence of

geomorphic thresholds in river systems (Schumm, 1979). Alterations linked to removal of sand from rivers may not be gradual and/or linear, and only limited changes may be observed for an extended period, but once a threshold is reached, change may become rapid and irreversible. Whether the impacts of sand mining are positive, neutral, or negative depends on the situation and perceptions of different stakeholders.

During the preparation of the present report prominent rivers/ streams has been studied in detail. It is suggested that the auctions of quarries be done regularly to meet out the local demand subject to the approval from the joint Inspection Committee as per Punjab Minor Mineral Rules 2013.These mineral concessions shall also reduce demand load and will be helpful to minimize illegal extraction of minerals, failure of which may result in to illegal mining at odd hours and shall be haphazard and more detrimental to the local ecology. Irrespective of it following geo-scientific considerations are also suggested to be taken into account during the river bed mining in a particular area:

1. Abandoned stream channels or terrace and inactive floodplains may be preferred rather than active channels and their deltas and floodplains.

2. Stream should not be diverted to form inactive channel.

3. Mining below subterranean water level should be avoided as a safeguard against environmental contamination and over exploitation of resources.

4. Mining area should be demarcated on the ground with Pucca pillars so as to avoid illegal unscientific mining.

Further, to assess the minor mineral resources other than sand a thorough and detailed exploration should be carried out. Regarding, sand mining a proper replenishment study pertaining to pre- monsoon and post monsoon data is certainly on the cards.

11.1 ASSISTANCE

For any quarry, you may contact to

a) Mr. Pinaki Roy, Managing Director, M/s. RSP Green Development and Laboratories., Howrah, West Bengal, Mobile No: 9830585501/9830808501

b) Smt. Mousumi Chakraborty, Director, M/s. RSP Green Development and Laboratories., Howrah, West Bengal, Mobile No: 9830285501/8777074252

c) Mr. Arpan Bhattacharjee, Project Manager, M/s. RSP Green Development and Laboratories., Howrah, West Bengal, Mobile No: 9163516033

d) Mr. Vishal Mehta, Executive Engineer-cum-District Mining Officer, District, Mobile No: 8427587930

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CHAPTER 12: EXECUTIVE SUMMARY

The purpose of District Survey Report (DSR) is to identify the mining potential areas where mining can be allowed; and to distinguish areas where mining will not be allowed due to proximity to infrastructural structures and installations, areas of erosion, areas of environmental sensitivities etc. The DSR would also help to estimate the annual rate of replenishment wherever applicable.

The district survey report on TARN TARAN district is prepared by **SUBDIVISIONAL COMMITTEE OF TARN TARAN DISTRICT** and assisted by RSP GREEN DEVELOPMENT AND LABORATORIES PVT. LTD., Howrah, West Bengal.

Methodology for the preparation of DSR:

For the preparation of DSR, there are two types of data is being used – Field Data and Secondary data.

Secondary data was collected from the different district departments like District Administration, Forest department, Irrigation department, Revenue department, Mining department etc. All the data has been reviewed, selected, and collated to prepare an authentic and reliable District Survey Report. Besides this, procedure as defined in the MoEF&CC Notification dated 25.07.2018 and as per the model DSR has been followed for preparing the various chapters of this District Survey Report.

Field data was collected two times during pre-monsoon and post-monsoon for determining the replenishment rate and identification of minor mineral potential sites.

Chapters included in District Survey Report, TARN TARAN:

The district survey report of TARN TARAN district includes Brief profile of the district, Land Use and Land Pattern, climate, rainfall, cropping pattern, drainage system, geology, soil and rock pattern, mineral wealth, revenue for the last three years, no mining zone, eco sensitive zone, remedial measures to mitigate the impact of mining, various maps and tables, etc. The main objective of DSR is to find minor mineral potential zones which helps in increasing district's revenue while taking into consideration the sustainability of sites.

The DSR of TARN TARAN include minor mineral riverbed potential zones (Page no. **63 & 64**) and include a localized replenishment study which is discussed in chapter 7 (Page no. **56 to 68**). The consolidated detail of riverbed/desilting/agriculture sites is attached at Annexure - A.

General Information of the district:

TARN TARAN district is situated in the western part of the Punjab State. TARN TARAN district is latitude is 31° 27' 42.0228" N and longitude is 74° 55' 36.2028" E and its total area is around 2583 square kilometers.

The Deputy Commissioner has overall charge of the district, and is the hub of the district administration. For administrative purposes, the Deputy Commissioner, TARN TARAN, has to play triple role as Deputy Commissioner, as District Collector and as District Magistrate. In his/her multifarious duties, the Deputy Commissioner is assisted by the following officers for carrying out day to day work in various fields :-

1. Additional Deputy Commissioner
2. Assistant Commissioner (General)

3. Assistant Commissioner (Grievances)
4. Executive Magistrate
5. District Revenue Officer
6. District Development and Panchayat Officer
7. Sub Divisional Magistrates
8. Civil Defense Officer
9. Urban Ceiling Officer

The Deputy Commissioner is the Chief Revenue Officer as District Collector and is responsible for collection of Revenue and other Govt. dues recoverable as arrears of Land Revenue. He/She deals with the Natural Calamities like draught, unseasonal rains, hailstorms, floods and fire etc.

The district is divided into four sub-divisions (Khadoor Sahib, Patti, Bhikhiwind & Tarn Taran) and eight blocks (Tarn Taran, Khadur Sahib, Bhikhiwind, Chohla Sahib, Gandiwind, Naushehra Pannua, Patti, Valtoha). The following Sub-division Level Committees have been constituted in district TARN TARAN for the preparation of DSR.

SUB DIVISION PATTI	**SUB DIVISION KHADOOR SAHIB**
SUB DIVISIONAL MEGISTRATE, PATTI	SUB DIVISIONAL MEGISTRATE, KHADOOR SAHIB
DISTRICT FOREST OFFICER, AMRITSAR	DISTRICT FOREST OFFICER, AMRITSAR
EXECUTIVE ENGINEER, DRANAIGE CUM MINING TARANTARN	EXECUTIVE ENGINEER, DRANAIGE CUM MINING TARANTARN
EXECUTIVE ENGINEER, PPCB, AMRITSAR	EXECUTIVE ENGINEER, PPCB, AMRITSAR
EXECUTIVE ENGINEER, PWD B&R, TARANTARN AT AMRITSAR.	EXECUTIVE ENGINEER, B&R, TARANTARN AT AMRITSAR
EXECUTIVE ENGINEER, JANDIALA DIVISION, UBDC, AMRITSAR	EXECUTIVE ENGINEER, JANDIALA DIVISION, UBDC, AMRITSAR
CHIEF AGRICULTURE OFFICER, TARANTARN	CHIEF AGRICULTURE OFFICER, TARANTARN
BDPO PATTI	BDPO KHADOOR SAHIB/ CHOLA SAHIB

Methodology used to identify potential riverbed:

- With the help of recent satellite imagery (United State Geographical Survey, Sentinrl – 2 Satellite Image, Resolution – 10 m, Date – Oct 2022), river stretch for the district was identified.
- Field survey along with DGPS was conducted to identify the riverbed potential zone coordinate and depth of deposition during pre- and post-monsoon.
- After that the concerned sub-divisional committee visit was conducted for finalizing the deposition zones/pockets.
- With the comment /remarks, all the finalized zones/pockets/blocks were included in DSR and put on public Domain for the period of one month on dated 30-sep-2022, and later some sites were added and draft and again put in public domain on 11-nov-2022.
- After getting comments on Public domain, all the potential sites were kept in DSR for the mining purpose.

N.B. No comments are arrived from Public Domain.

Potential riverbed and agriculture mining site for the district:

Altogether **19** riverbed mining sites are finalized for the district TARN TARAN. Out of 19 sites, 7 sites fall in River Beas having an area of 77.45 Ha (774,500 sq. m.) and 12 riverbed sites concluded in River Sutlej, cover 278.17 Ha (2781700 sq.m.) area. The total minable mineral quantity for the district is approximately 3**96,340.73** MT and the replenishment rate for this year was calculated around 97.49 % for Beas and 92.61 % for Sutlej.

There is one patta land for proposed agriculture mining, having an area of 7 Ha and total minable reserve is **77,097.54 MT.**

BEAS RIVER:

The Himalayas are the youngest of mountain ranges that manifests landforms like river terraces, debris fans, migrated or capture streams, active faults, alluvial fans, which are the result of complex geological, geomorphological, hydrological, and tectonic process actively engaged in landform evolution and modification (Khan et al., 2021). Traces of these morpho-tectonic processes can be observed in basin geometry, drainage network patterns, and relief configuration (Molin et al., 2004; Necea et al., 2005). Many studies (Agarwal et al., 2009, 2008; Bali et al., 2012, 2011; Bull & McFadden, 1977; Chorley et al., 1985; Clarke, 1966; Keller, 1986; Strahler, 1957) have made use of these morpho-tectonic parameters to address the more significant question, i.e., landform evolution.

Beas River originates from Beas Kund and forms a major left-bank tributary of the Indus river system in Northwestern Himalaya. The whole catchment of the river Beas (20,303 sq.km.) extends over the Higher Himalaya, Lesser Himalaya, and Shiwalik Himalaya; therefore, the river experiences a wide range of topography, climate, and vegetation from its source to the sink. The total length of the Beas River is 460 km, which is bounded within 31° 15′ N to 32° 30′ N latitudes and 75° 30′ E to 78° 0′ E longitudes.

The river follows the path through district of Mandi and further goes to district of Kangra at Sanghol that is located at a height of 1920 feet. The river then divides into three different tributaries at Reh located in Kangra that later merges at a height of 1000 feet in Mirthal. Once reaching Shivalik hills near Hoshiarpur, the river changes its course to a sharp northern turn and passes through the Kangra district. Later, it takes another sharp curve at foot of Shivalik hills and turns the path to southern direction while extricating Gurdaspur and Hoshiarpur districts. As it reaches the Jalandhar district, it separates the districts of Amritsar and Kapurthala. The Beas River ends before merging into Sutlej River taking the course through the southern west route of district Kapurthala in the state of Punjab traversing the total path of 290 miles. Few of the major tributaries that this river forms through the entire course are Bain, Luni, Banganga and Uhal.

The River meanders down from the Himalayan foothills to the Harike Headworks, where its course is diverted into a number of channels. The River is dotted with islands, sand bars and braided channels creating a complex environment supporting substantial biodiversity. More than 500 species of birds are documented along this stretch, along with more than 90 fish species. In September 2019, the reserve was declared a Ramsar site under the aegis of the 1971 Ramsar Convention on Wetlands of International Importance.

The presence of bhulan, as the dolphin is locally known, and the reintroduction of the long-snouted gharial, also critically endangered, into the Beas led the Punjab government to declare the 185-km Beas stretch a conservation reserve in 2017 — the first river in India to be accorded this status. In September 2019, the reserve was declared a Ramsar site under the aegis of the 1971 Ramsar Convention on Wetlands of International Importance.

From Department of Forests and Wildlife Preservation(Forest Branch), Government of Punjab, notification no. 34/13/2017-Ft-5/1052756/1 Chandigarh, date 29/08/2017, it had been noted that "**River Beas with all its water channels from 52 Head Talwara to Harike Barrage including all Government areas in River Beas.**"

सत्यमेव जयते

Methodology adopted to calculate Replenishment Rate for the District, Tarn Taran:

Replenishment Rate is the rate at which sediment is transported into the river channel, which is under examination or subjected to sand extraction. This volume (weight) is often considered as sustainable yield of that river. Estimation of sediment discharge through stream bed and its residence period (temporary deposition) is one of the most difficult tasks in sediment budgeting as it requires sophisticated instruments (BTMA, DNS, USD-49, pump samplers etc.) and establishment of many gauging stations. Many variables influence sediment yield from a drainage basin. They include climate, drainage area, soils, geology, topography, vegetation and land use. The effect of any of these variables may vary greatly from one geographic location to another, and the relative importance of controlling factors often varies within a given land resource area. It is axiomatic that during high flow period, coarser sediment which is otherwise moved by siltation (i.e., partially suspension and partially bed load) will completely be in suspension in the overlying waters. The best way for sediment discharge computation is to collect and analyze water samples from a river reach where the entire particles come into suspension. It can be assumed that the Bajri and other coarser sediments in suspension would be deposited mainly in the river segment. The replenishment rate approach has the virtue of scaling extraction to the river load in a general way, but bed load transport can be notoriously variable from year to year. Thus, this approach is probably better if permitted extraction rates are based on new

deposition that year rather than on long-term average bed load yields.

There are many sediment transport equations which are suitable for use in the prediction of the replenishment rate of rivers/ watershed. Some of the famous sediment transport equations are: -

1. Dandy – Bolton Equation

2. Modified Universal Soil Loss Equation (MUSLE) developed by Williams and Berndt (1977)

The district TARN TARAN have two rivers having potential sites viz. Sutlej and Beas. Salient features of Sutlej and Beas River is as follow:

Sl. No.	Name of the River	Catchment Area (sq.km.)
1.	Sutlej	689.45
2.	Beas	93.70

❖ DANDY-BOLTON EQUATION APPLICATION FOR THE DISTRICT:

Dandy Bolton equation is commonly used to calculate the sedimentation yield. for specific location variability often occurs due to local factors. However, this equation gives rough estimation of mean sedimentation yield. There are two equations i.e. for runoff less 2 inches & for runoff more than 2 inches.

The average annual rainfall of TARN TARAN district is approximately 545 mm (2017-2021). Total runoff which will contribute sediment yield will be considered as 75% of total rainfall i.e. 408.75 mm.

The computations for total annual suspended and bed load sediment yield are given below.

Sediment Yield for runoff less than 2 inches, $S=1280\ Q\ 0.26[1.43-0.26\ \log\ (A)]$

For, runoff more than 2 inches, $S=1965\ e-0.055Q\ [1.43-0.26\log\ (A)]$

SL. NO.	FACTORS		Probable Replenishment
1.	**RIVER**	SUTLEJ	
	CATCHMENT AREA	689.45 sq.km.	
	Average Annual Runoff	408.75 mm	
	Sediment Yield Formula: For Q < 2 in: S = 1280 Q0.46[1.43 - 0.26 log(A)] For Q > 2 in: S = 1965 e-0.055Q [1.43 - 0.26 log(A)] Here: Q (in) = Mean Annual run off = 408.75 mm A(mi2) = Catchment area = 689.45 Sq.km Source: - Calculation of sediment yield by the Dandy- Bolton formula-@ponce.sdsu.edu		Stream or basin: Sutlej Sediment yield = 227.16 M. tons/km2/yr Sediment yield = 156613.96 M. tons/yr
Conclusion: The area 689.45 sq. Km. represents the catchment area of the Sutlej River, Thus, about 156613.96 M. tons/year sediment will be re-deposited every year in the catchment area.			

SL. NO.	FACTORS		Probable Replenishment
2	**RIVER**	Beas	
	CATCHMENT AREA	93.70 sq.km.	
	Average Annual Runoff	408.75 mm	
	Sediment Yield Formula: For Q < 2 in: S = 1280 Q0.46[1.43 - 0.26 log(A)] For Q > 2 in: S = 1965 e-0.055Q [1.43 - 0.26 log(A)] Here: Q (in) = Mean Annual run off = 408.75 mm A(mi2) = Catchment area = 93.70 Sq.km Source: - Calculation of sediment yield by the Dandy- Bolton formula-@ponce.sdsu.edu		Stream or basin: BEAS Sediment yield = 291.2 M. tons/km2/yr Sediment yield = 27285.06 M. tons/yr
Conclusion: The area 93.70 sq. Km. represents the catchment area of the Beas River, Thus, about 27285.06 M. tons/year sediment will be re-deposited every year in the catchment area.			

All the above-mentioned hypothetical formulas have some limitations. Dandy - Bolton may provide a quick, rough approximation of mean sediment yields on a regional basis for preliminary watershed planning but it does not differentiate in basin wide smaller streams and their characteristics. MUSLE includes only one type of sediment yield (sheet and rill Erosion).

It is very clear that after the excavation from the riverbed, the area is act as a riverbed depositional site during rainy season. So, for the actual estimation of sediment deposition, a replenishment pit (3 mx3mx3m) shall be dug at three points viz. upstream, middle stream and downstream along the length of river. Initial levels shall be taken with DGPS before the rainy season. After the rainy season, levels were taken again. The difference shall give the depth replenishment of sand. The depth multiplying with influence area will give the total replenishment volume (weight) of sand in the lease area of river.

It is recommended that the lessee should study for continuous two - three year and will submit the actual replenishment to the MOEF & CC.

Annexure -A

Source	No. of sites	Area (Ha)	Estimated mineable reserve (lakh tons with 2 decimals)	Rate of replenishment	App. Annual qty. to be mined (lakh tons)	Remarks
River bed	19	355.62	9,562,937.82	Sutlej – 92.61 % Beas – 97.49 %	5,737,762.69	
Agriculture land, pattas etc.	1	2.83	128,495.90	NA	77,097.54	
Desilting sites (ponds, lakes, dams etc.)	NA	NA	NA	NA	NA	
M-sand	NA					
Total	**20**	**358.45**	**9,691,433.72**	**NA**	**5814860.23**	

ANNEXURE – I

- **Details of Sand / M –Sand Source**

  a) Rivers,

  b) De-siltation location: (Lakes/Ponds/Dams etc)

  c) Patta Lands/khatedari Land

  d) M-Sand Plants

a) Rivers:

River Name/ M-Sand plant	Total stretch of River (in Km)	Type Of River
Sutlej	29	Perennial
Beas	56	Perennial
Source: *Executive Engineer-cum-District Mining Office, Tarn-Taran*		

a) List of De-siltation location (Lake, Pond, Dams, River)

Name	Maintain/ Controlled by Sate Govt./PSU etc.	Location	Khasra No.	District	Tehsil	Village	Size (Ha)
Kot Budda-2	**Sate Govt.**	---	---	Tarn-Taran	---	---	3.00
Gagrewal	**Sate Govt.**	---	---	Tarn-Taran	---	---	19.07
Source: *Executive Engineer-cum-District Mining Office, Tarn-Taran*							

b) List of Patta Lands / Khatedari land

Owner	Sr. No.	Area (Acre)	Khasra No.	Location		District	Tehsil	Village	Agricultural Land (Yes / No)
				Latitude	Longitude				
Satpal Singh	1	7	139//24,23,146//3,5,6,7,8,13,14,15	31.159089N 31.157539N 31.15738N 31.157899N 31.157878N 31.158563N 31.158606N 31.158964N	74.91149E 74.911607E 74.910925E 74.91085E 74.909454E 74.909438E 74.910855E 74.910839E	Tarn Taran	Patti	Booh	Yes
Source: *Executive Engineer, Bari Doab Drainage division, Tarn-Taran*									

c) M-Sand plants with location:

Plant Name	Owner	District	Tehsil	Village	Geolocation		Quantity (Tonnes /Annum)
					Latitude	Longitude	
NA							

ANNEXURE – II

- **List of Potential Mining Leases (existing & proposed)**
  - **Rivers**
  - **Patta Lands/khatedari Land: (existing & proposed)**
  - **De-Siltation Location: (Lakes/Ponds/Dams etc.) (existing & proposed)**
  - **M-Sand Plants: (existing & proposed)**

DISTRICT SURVEY REPORT OF TARN-TARAN DISTRICT, PUNJAB

a) List of existing mining leases of the district with location, area, period for each minor mineral:

Sl.No.	River Details	Name of the mines or Desilting sites	Lease Details	Had bast No.	Area (Ha)	Depth (m)	Coordinates		Distance in (km) from PA/BR/WC	Distance from Forest Area (in km)	Mining Leases within 500 meters (if yes cluster area)	Total excavation in tonnes/ Annum considering digging depth max as 3 meters	Mineral to be mined (Sand/Bajri/RBM etc)	Existing /Proposed
							Latitude	Longitude						
1	Beas	Munda Pind, TheKhadoor Sahib, District: Tarn-Taran.	–	–	22.73	–	–	–	–	–	–	–	Sand	Existing
2	Sutlej	Jhungian Peer Baksh	–	–	4.86	–	31°7'43.20" N 31°7'43.00" N 31°7'43.80" N 31°7'43.74" N 31°7'36.35" N 31°7'33.68" N 31°7'33.46" N	74°45'33.60" E 74°45'26.22" E 74°45'26.26" E 74°45'23.34" E 74°45'24.34" E 74°45'26.69" E 74°45'33.89" E	–	–	–	–	Sand	Existing

3	Sutlej	Bhajoke	–	–	4.86	–	31°7'34.40" N 31°7'34.59" N 31°7'38.49" N 31°7'38.45" N 31°7'40.27" N 31°7'40.19" N 31°7'41.29" N 31°7'41.44" N 31°7'43.38" N 31°7'43.22" N 31°7'41.50" N 31°7'41.57" N 31°7'43.66" N 31°7'43.57" N	74°45'48.02" E 74°45'54.54" E 74°45'54.43" E 74°45'52.15" E 74°45'52.12" E 74°45'48.11" E 74°45'43.02" E 74°45'51.16" E 74°45'50.98" E 74°45'47.92" E 74°45'53.23" E 74°45'55.34" E 74°45'55.32" E 74°45'53.16" E	–	–	–	–	Sand	Existing
4	Beas	Bhalojla-2, Tarn-Taran.	–	–	1.82	–	–	–	–	–	–	–	Sand	Existing
5	Sutlej	Balarke	–	–	1.85	–	31°7'43.18" N 31°7'43.33" N 31°7'37.33" N 31°7'37.06" N 31°7'37.87" N	74°45'57.39" E 74°46'0.09" E 74°45'59.78" E 74°45'57.87" E 74°45'56.97" E	–	–	–	–	Sand	Existing
6	Satluj	Dhun Dhaywala, Tarn-Taran.	–	–	4.45	–	–	–	–	–	–	–	Sand	Existing
7	Sutlej	Kot Budda-1	–	–	4.05	–	31°7'48.42" N 31°7'52.46" N 31°7'52.52" N 31°7'48.42" N	74°46'40.36" E 74°46'40.06" E 74°46'54.70" E 74°46'54.58" E	–	–	–	–	Sand	Existing

8	Satluj	Kot Budda2, TarnTaran.	–	–	3	–	–	–	–	–	–	–	Sand	Existing
9	Sutlej	Jaloke	–	–	3.23	–	----	----	–	–	–	–	Sand	Existing
10	Beas	Garka, Tarn-Taran.	–	–	2.05	–	–	–	–	–	–	–	Sand	Existing
11	Sutlej	Booh	–	–	2.43	–	----	----	–	–	–	–	Sand	Existing
12	Sutlej	Ram Singh Wala	–	–	3.54	–	----	----	–	–	–	–	Sand	Existing
13	Beas	Bhalojla-I, The: Patti, Tarn-Taran.	–	–	0.91	–	–	–	–	–	–	–	Sand	Existing
Total					**59.77**									
Source: *Executive Engineer-cum-District Mining Office, Tarn-Taran and Field survey data*														

b) List of Patta Lands / Khatedari land

Owner	Sr. No.	Area (Acre)	Khasra No.	District	Tehsil	Village	Location		Total Reserve (MT)	Total Mineral to be mined (MT)	Existing/Proposed
							Longitude	Latitude			
Satpal Singh	1	7	139//24, 23,146//3,5,6,7,8,13,14,15	Tarn Taran	Patti	Booh	74.91149E 74.911607E 74.910925E 74.91085E 74.909454E 74.909438E 74.910855E 74.910839E	31.159089N 31.157539N 31.15738N 31.157899N 31.157878N 31.158563N 31.158606N 31.158964N	**128,495.9**	**77,097.54**	Proposed

Source: *Executive Engineer, Bari Doab Drainage division, Tarn-Taran*

c) List of De-siltation location (Lake, Pond, Dams, River)

Name	Maintain/Controlled by Sate Govt./PSU etc.	Location	Khasra No.	District	Tehsil	Village	Size (Ha)	Quantity (MT)	Existing /Proposed
NA									

d) M-Sand plants with location

Plant Name	Owner	District	Tehsil	Village	Geolocation		Quantity (Tonnes/Annum)	Existing/Proposed
					Latitude	Longitude		
NA								

ANNEXURE – III

- **list of Cluster and Contiguous Clusters**
  - **Clusters:**
  - **Contiguous Clusters:**

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- **Cluster details :**

River Name	Cluster No.	Lease No.	Location (Riverbed/Patta Land)	Village	Area (in Ha)	Total Excavation (Ton)	Total Mineral Excavation (Ton)
NA							

- **Contiguous Cluster details:**

River Name	Contiguous Cluster No.	Cluster No.	Number of leases in the cluster	Location (Riverbed/ Patta Land)	Distance between clusters	Village	Area of Cluster (Ha)	Total Mineral Excavation (Ton)
NA								

ANNEXURE – IV

- **Transportation Routes for Individual leases and leases in Cluster**

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- **Transportation Routes for individual leases details:**

Lease No.	Transportation Route No.	Number of tippers /days of lease	Number of tippers /days of all the lease on route	Length of the Route in Km	Type of Road (black Topped/ unpaved)	Recommendation for road (Black Topped/ unpaved)	The road will be constructed by Govt. / Lease Owner	Route Map & Location
NA								

- **Transportation Routes for leases in Cluster details:**

Cluster No.	Transportation Route No.	Number of tippers / days of cluster	Number of tippers / days of all the clusters on route	Length of Route in km	Type of Road (Black Topped / unpaved)	Recommendation for road (Black Topped / unpaved)	The road will be Constructed by Govt. / Lease Owner	Route Map & Location
NA								

ANNEXURE – V

- **Final list of Potential Mining Leases : (Proposed)**
- **Final list of Patta land: (Proposed)**
- **De-siltaion Location: (Lakes/Ponds/Dams etc.) (Proposed)**
- **Final list of Sand/M – Sand Source: (Proposed)**

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➢ Final List of potential Mining Leases (Proposed) (Sutlej River)

Sl No.	River Details	Lease Details	Area (In Ha)	Coordinates		Depth	Distance (In Km) From PA/BR/ WC	Distance From Forest Area (In Km)	Mining Leases Within 500 meters (if Yeas cluster area In Ha)	Total Excavation in (MT/Yr.) (Mine Depth max as 3m)	Mineable Reserve (MT)	Mineral to be mined (Sand/ Bajri/ RBM etc.)	Existing / Proposed
				Latitude	Longitude								
1	SUTLEJ	PB-TT-SUT-01	49.15	31° 6'40.89"N 31° 6'42.15"N 31° 6'49.25"N 31° 6'52.68"N 31° 6'54.09"N 31° 6'55.05"N 31° 6'56.85"N 31° 6'57.31"N 31° 6'56.76"N 31° 6'55.91"N 31° 6'53.84"N 31° 6'47.31"N 31° 6'45.55"N 31° 6'45.97"N 31° 6'47.81"N 31° 6'48.66"N 31° 6'50.52"N 31° 6'51.86"N 31° 7'1.83"N 31° 7'3.97"N 31° 7'6.74"N 31° 7'8.14"N 31° 7'12.40"N 31° 7'17.35"N	74°44'50.68"E 74°44'20.71"E 74°44'8.24"E 74°44'9.63"E 74°44'10.79"E 74°44'11.96"E 74°44'14.80"E 74°44'16.76"E 74°44'21.20"E 74°44'23.30"E 74°44'26.37"E 74°44'32.92"E 74°44'35.66"E 74°44'37.32"E 74°44'38.43"E 74°44'39.50"E 74°44'43.25"E 74°44'45.00"E 74°44'42.06"E 74°44'42.54"E 74°44'44.08"E 74°44'46.10"E 74°44'47.20"E 74°44'50.76"E	1.6764	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**1420490.8344**	**852294.50**	SAND	**Proposed**

PREPARED BY: **SUB – DIVISION COMMITTEES OF TARN-TARAN DISTRICT**
ASSISTED BY: **RSP GREEN DEVELOPMENT AND LABORATORIES PVT. LTD.**

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				31° 7'12.98"N 31° 7'9.65"N 31° 7'6.02"N 31° 6'59.05"N 31° 6'56.14"N 31° 6'53.73"N	74°44'49.58"E 74°44'49.59"E 74°44'51.47"E 74°44'53.98"E 74°44'54.24"E 74°44'55.65"E								
2	SUTLEJ	PB-TT- SUT-02	11.96	31° 7'0.88"N 31° 7'15.13"N 31° 7'17.16"N 31° 7'22.28"N 31° 7'27.43"N 31° 7'7.04"N	74°44'58.43"E 74°44'54.62"E 74°44'55.63"E 74°44'56.74"E 74°45'5.30"E 74°45'0.78"E	1.6764	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**345657.5866**	**207394.55**	SAND	**Proposed**
3	SUTLEJ	PB-TT-SUT-03	8.97	31° 7'41.13"N 31° 7'36.11"N 31° 7'30.02"N 31° 7'34.01"N 31° 7'35.97"N 31° 7'40.85"N	74°45'40.43"E 74°45'41.23"E 74°45'23.24"E 74°45'19.66"E 74°45'25.23"E 74°45'36.52"E	1.68	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**259243.18992**	**155545.91**	SAND	**Proposed**
4	SUTLEJ	PB-TT-SUT-04	37.5	31° 7'37.89"N 31° 7'48.25"N 31° 7'53.36"N 31° 7'54.25"N 31° 7'53.05"N 31° 7'50.36"N 31° 7'45.06"N 31° 7'38.68"N 31° 7'38.87"N 31° 7'39.18"N 31° 7'41.84"N 31° 7'42.70"N 31° 7'39.33"N 31° 7'38.51"N	74°47'42.39"E 74°47'42.73"E 74°47'21.43"E 74°47'6.55"E 74°46'58.37"E 74°47'10.35"E 74°47'10.31"E 74°47'19.48"E 74°47'22.24"E 74°47'24.27"E 74°47'30.19"E 74°47'35.59"E 74°47'37.71"E 74°47'42.21"E	1.6764	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**1081906.6500**	**649143.99**	SAND	**Proposed**
5	SUTLEJ	PB-TT-	21.4	31° 7'54.77"N 31° 8'8.26"N	74°46'56.20"E 74°46'55.54"E	1.6764	**No Forest,**	**No Forest available**	--	**617408.0616**	**370444.84**	SAND	**Proposed**

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		SUT-05		31° 8'5.13"N 31° 8'1.14"N 31° 7'59.25"N 31° 7'55.94"N 31° 7'56.13"N 31° 7'51.54"N 31° 7'54.97"N 31° 7'55.52"N 31° 7'57.00"N	74°46'58.53"E 74°47'5.95"E 74°47'8.12"E 74°47'16.83"E 74°47'46.21"E 74°47'39.05"E 74°47'22.05"E 74°47'10.76"E 74°47'4.46"E		**Bridges available within 1 Km**	**within 1 Km**					
6	SUTLEJ	PB-TT-SUT-06	4.89	31° 7'59.27"N 31° 7'50.71"N 31° 7'49.98"N 31° 7'50.09"N 31° 7'50.86"N 31° 7'51.58"N 31° 7'52.96"N 31° 7'58.90"N	74°47'52.55"E 74°47'52.44"E 74°47'47.80"E 74°47'45.78"E 74°47'43.98"E 74°47'42.91"E 74°47'45.74"E 74°47'51.52"E	1.6764	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**141080.6272**	**84648.38**	SAND	**Proposed**
7	SUTLEJ	PB-TT-SUT-07	5.67	31° 8'1.34"N 31° 8'10.54"N 31° 8'9.19"N 31° 7'59.85"N	74°49'0.69"E 74°49'14.56"E 74°49'16.78"E 74°49'9.48"E	1.524	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**146898.3600**	**88139.02**	SAND	**Proposed**
8	SUTLEJ	PB-TT-SUT-08	19.24	31° 8'0.10"N 31° 7'59.54"N 31° 8'7.05"N 31° 8'10.50"N 31° 8'18.79"N 31° 8'19.50"N 31° 8'18.46"N 31° 8'12.06"N 31° 8'10.74"N 31° 8'7.63"N 31° 8'5.06"N 31° 8'0.10"N	74°49'27.38"E 74°49'14.41"E 74°49'17.80"E 74°49'19.92"E 74°49'27.06"E 74°49'28.82"E 74°49'31.90"E 74°49'37.05"E 74°49'34.12"E 74°49'31.35"E 74°49'30.96"E 74°49'27.38"E	1.6764	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**548316.9120**	**328990.15**	SAND	**Proposed**

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				31° 7'59.48"N	74°49'14.36"E								
9	SUTLEJ	PB-TT-SUT-09	2.95	31° 8'42.74"N 31° 8'46.91"N 31° 8'48.21"N 31° 8'50.61"N 31° 8'53.76"N 31° 8'50.77"N 31° 8'49.42"N 31° 8'46.06"N 31° 8'44.52"N	74°50'27.31"E 74°50'28.70"E 74°50'30.04"E 74°50'34.79"E 74°50'43.14"E 74°50'39.44"E 74°50'35.27"E 74°50'33.78"E 74°50'31.91"E	1.6764	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**82983.4764**	**49790.09**	SAND	**Proposed**
10	SUTLEJ	PB-TT-SUT-10	5.54	31° 9'6.31"N 31° 9'4.55"N 31° 9'3.62"N 31° 9'2.71"N 31° 8'59.47"N 31° 8'57.28"N 31° 8'55.31"N 31° 8'54.78"N 31° 8'54.70"N 31° 8'53.88"N 31° 8'53.58"N 31° 8'52.83"N 31° 8'51.22"N 31° 8'51.84"N 31° 8'53.07"N 31° 8'54.82"N 31° 8'56.61"N 31° 8'59.65"N 31° 9'5.77"N	74°51'0.07"E 74°51'0.49"E 74°50'58.81"E 74°50'55.08"E 74°50'50.35"E 74°50'45.80"E 74°50'43.03"E 74°50'40.78"E 74°50'38.72"E 74°50'35.96"E 74°50'35.64"E 74°50'33.58"E 74°50'31.76"E 74°50'31.26"E 74°50'31.70"E 74°50'34.95"E 74°50'39.39"E 74°50'44.46"E 74°50'57.10"E	1.524	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**141672.8688**	**85003.72**	SAND	**Proposed**
11	SUTLEJ	PB-TT-SUT-11	88.6	31° 9'20.05"N 31° 9'18.88"N 31° 9'15.73"N 31° 9'9.16"N 31° 9'7.46"N	74°51'47.98"E 74°51'49.15"E 74°51'49.58"E 74°51'54.21"E 74°51'54.68"E	1.524	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**2287347.2160**	**1372408.33**	SAND	**Proposed**

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				31° 9'5.08"N	74°52'0.16"E								
				31° 9'3.66"N	74°52'9.67"E								
				31° 9'2.15"N	74°52'8.84"E								
				31° 8'54.27"N	74°51'54.59"E								
				31° 8'54.95"N	74°51'53.91"E								
				31° 8'59.67"N	74°51'53.33"E								
				31° 9'0.04"N	74°51'52.11"E								
				31° 8'57.44"N	74°51'51.67"E								
				31° 8'56.47"N	74°51'51.02"E								
				31° 8'51.60"N	74°51'50.58"E								
				31° 8'50.72"N	74°51'47.89"E								
				31° 8'51.18"N	74°51'45.99"E								
				31° 8'54.15"N	74°51'45.03"E								
				31° 8'55.88"N	74°51'42.91"E								
				31° 8'58.05"N	74°51'31.78"E								
				31° 8'57.70"N	74°51'27.25"E								
				31° 8'56.14"N	74°51'21.34"E								
				31° 8'53.05"N	74°51'5.93"E								
				31° 9'1.73"N	74°50'58.82"E								
				31° 9'6.06"N	74°51'7.33"E								
				31° 9'9.32"N	74°51'9.64"E								
				31° 9'16.11"N	74°51'24.61"E								
				31° 9'18.97"N	74°51'37.11"E								
				31° 9'19.09"N	74°51'39.84"E								

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12	SUTLEJ	PB-TT-SUT-12	22.3	31° 9'13.79"N 31° 9'9.38"N 31° 9'9.44"N 31° 9'9.20"N 31° 9'8.95"N 31° 9'6.31"N 31° 9'5.54"N 31° 9'5.31"N 31° 9'6.18"N 31° 9'6.71"N 31° 9'7.63"N 31° 9'8.29"N 31° 9'10.02"N 31° 9'11.92"N 31° 9'19.04"N 31° 9'20.54"N 31° 9'20.15"N 31° 9'18.78"N 31° 9'16.08"N	74°52'28.27"E 74°52'21.75"E 74°52'21.05"E 74°52'20.62"E 74°52'18.48"E 74°52'15.47"E 74°52'14.08"E 74°52'12.85"E 74°52'8.11"E 74°52'7.54"E 74°52'7.72"E 74°52'7.16"E 74°52'2.75"E 74°52'0.03"E 74°51'52.10"E 74°51'51.97"E 74°52'0.43"E 74°52'9.68"E 74°52'17.65"E	1.524	**No Forest, Bridges available within 1 Km**	**No Forest available within 1 Km**	--	**575709.2880**	**345425.57**	SAND	**Proposed**
TOTAL			**278.17**							**7648715.07**	**4589229.04**		

Source: *Field Survey Data and DGPS Data*

DISTRICT SURVEY REPORT OF TARN - TARAN DISTRICT, PUNJAB

- **Final List of potential Mining Leases (Proposed) (Beas River)**

Sl.No.	River Details	Name of the mines or Desilting sites	Lease Details	Hadbast No.	Area (Ha)	Depth (m)	Coordinates		Distance in (km) from PA/BR/WC	Distance from Forest Area (in km)	Mining Leases within 500 meters (if yes cluster area)	Total excavation in tonnes/ Annum considering digging depth max as 3 meters	Mineral to be mined (Sand/ Bajri/ RBM etc)	Status
							Latitude	Longitude						
1	Beas	PB-TT-BEAS -01	–	–	7.66	1.37	31°16'38.71"N 31°16'39.82"N 31°16'41.35"N 31°16'42.08"N 31°16'42.62"N 31°16'43.99"N 31°16'44.40"N 31°16'39.05"N 31°16'37.59"N 31°16'37.14"N 31°16'40.13"N 31°16'39.48"N	75°4'49.76"E 75°4'51.13"E 75°4'54.23"E 75°4'56.42"E 75°4'58.66"E 75° 5'1.75"E 75° 5'3.90"E 75°5'18.21"E 75°5'14.18"E 75° 5'8.84"E 75°4'58.35"E 75°4'52.89"E	**In Forest conservation area**	**In Forest conservation area**	173154.30	103892.58	Sand	**Proposed But Rejected by subdivisional Committee's for site in forest conservation area**
2	Beas	PB-TT-BEAS -02	–	–	35.49	1.52	31°18'59.93"N 31°19'2.84"N 31°19'9.83"N 31°19'25.53"N 31°19'30.95"N	75°7'2.15"E 75° 7'0.94"E 75°6'58.83"E 75°6'57.84"E 75°6'59.84"E	**In Forest conservation area**	**In Forest conservation area**	890089.20	534053.52	Sand	**Proposed But Rejected by subdiv**

							31°19'40.09"N 31°19'46.39"N 31°19'44.06"N 31°19'41.10"N 31°19'37.37"N 31°19'33.98"N 31°19'31.75"N 31°19'25.09"N 31°19'21.51"N 31°19'13.75"N 31°19'12.10"N 31°19'5.36"N 31°19'3.16"N 31°19'1.51"N	75° 7'7.21"E 75°7'14.46"E 75°7'16.06"E 75°7'17.02"E 75°7'17.17"E 75°7'15.74"E 75°7'14.52"E 75°7'14.19"E 75°7'10.42"E 75°7'5.69"E 75° 7'5.12"E 75° 7'5.28"E 75° 7'4.71"E 75° 7'3.83"E						**isional Committee's for site in forest conservation area**
3	Beas	PB - TT-BEAS -03	–	–	8.81	1.37	31°19'16.04"N 31°19'17.36"N 31°19'19.65"N 31°19'20.69"N 31°19'21.47"N 31°19'22.31"N 31°19'23.61"N 31°19'25.98"N 31°19'27.71"N 31°19'29.98"N 31°19'29.97"N 31°19'28.56"N 31°19'27.18"N 31°19'26.38"N 31°19'25.65"N 31°19'24.51"N 31°19'23.79"N	75°7'13.58"E 75°7'14.11"E 75°7'14.15"E 75°7'14.38"E 75°7'14.07"E 75°7'14.14"E 75°7'14.99"E 75°7'15.83"E 75°7'17.06"E 75°7'20.13"E 75°7'20.69"E 75°7'22.65"E 75°7'23.89"E 75°7'25.26"E 75°7'25.61"E 75°7'25.60"E 75°7'25.34"E	**In Forest conservation area**	**In Forest conservation area**	199150.05	119490.03	Sand	**Proposed But Rejected by subdivisional Committee's for site in forest conservation area**

							31°19'22.18"N 31°19'18.53"N 31°19'17.53"N	75°7'25.35"E 75°7'22.09"E 75°7'20.52"E						
4	Beas	PB-TT-BEAS-04	–	–	3.48	1.52	31°19'32.92"N 31°19'38.16"N 31°19'40.46"N 31°19'41.20"N 31°19'41.95"N 31°19'45.50"N 31°19'47.27"N 31°19'49.27"N 31°19'53.30"N 31°19'50.76"N 31°19'50.39"N 31°19'49.99"N 31°19'49.48"N 31°19'48.88"N 31°19'48.18"N 31°19'46.89"N 31°19'45.42"N 31°19'44.00"N 31°19'43.21"N 31°19'42.98"N 31°19'41.10"N 31°19'35.96"N 31°19'35.46"N 31°19'33.66"N	75°7'27.13"E 75°7'21.60"E 75°7'19.97"E 75°7'19.86"E 75°7'20.20"E 75°7'23.55"E 75°7'24.80"E 75°7'25.05"E 75°7'24.87"E 75°7'25.58"E 75°7'25.79"E 75°7'25.81"E 75°7'26.17"E 75°7'26.33"E 75°7'26.37"E 75°7'26.00"E 75°7'24.20"E 75°7'23.80"E 75°7'23.81"E 75°7'24.25"E 75°7'25.13"E 75°7'25.93"E 75°7'26.24"E 75°7'26.75"E	**In Forest conservation area**	**In Forest conservation area**	87278.40	52367.04	Sand	**Proposed But Rejected by subdivisional Committee's for site in forest conservation area**
5	Beas	PB-TT-BEAS	–	–	16.62	1.524	31°25'56.76"N 31°25'58.86"N 31°26'13.72"N 31°26'16.65"N	75°12'19.54"E 75°12'17.93"E 75°12'16.18"E 75°12'17.33"E	**In Forest conservation area**	**In Forest conservation area**	416829.60	250097.76	Sand	**Proposed But Rejected by**

		-08					31°26'23.30"N 31°26'25.30"N 31°26'24.96"N 31°26'22.97"N 31°26'20.76"N 31°26'19.05"N 31°26'15.10"N 31°26'13.89"N 31°26'9.23"N 31°26'5.27"N 31°25'56.78"N	75°12'30.95"E 75°12'35.90"E 75°12'37.22"E 75°12'38.50"E 75°12'36.72"E 75°12'34.88"E 75°12'28.23"E 75°12'25.39"E 75°12'23.92"E 75°12'21.92"E 75°12'19.52"E						**subdivisional Committee's for site in forest conservation area**
6	Beas	PB-TT-BEAS-09	–	–	4.75	1.6764	31°26'35.48"N 31°26'36.96"N 31°26'36.97"N 31°26'37.59"N 31°26'38.77"N 31°26'40.10"N 31°26'42.47"N 31°26'43.39"N 31°26'44.73"N 31°26'45.34"N 31°26'45.23"N 31°26'44.49"N 31°26'42.65"N 31°26'40.13"N 31°26'39.57"N 31°26'38.94"N 31°26'38.33"N 31°26'37.12"N	75°12'34.08"E 75°12'35.81"E 75°12'36.69"E 75°12'38.68"E 75°12'39.79"E 75°12'40.30"E 75°12'40.51"E 75°12'42.11"E 75°12'45.28"E 75°12'47.68"E 75°12'48.80"E 75°12'49.93"E 75°12'50.17"E 75°12'49.32"E 75°12'48.34"E 75°12'44.03"E 75°12'42.18"E 75°12'40.88"E	**In Forest conservation area**	**In Forest conservation area**	131670.00	79002	Sand	**Proposed But Rejected by subdivisional Committee's for site in forest conservation area**
7	Beas	PB-TT-	–	–	0.64	1.524	31°28'31.09"N 31°28'32.13"N	75°14'52.22"E 75°14'53.00"E	**In Forest conser**	**In Forest conser**	16051.20	9630.72	Sand	**Proposed But**

		BEAS -10					31°28'32.91"N 31°28'34.01"N 31°28'36.27"N 31°28'37.54"N 31°28'37.61"N 31°28'37.44"N 31°28'37.14"N 31°28'35.40"N 31°28'31.47"N	75°14'53.27"E 75°14'55.01"E 75°14'55.52"E 75°14'55.52"E 75°14'55.79"E 75°14'57.61"E 75°14'59.44"E 75°14'56.46"E 75°14'52.87"E	**vation area**	**vation area**				**Rejected by subdivisional Committee's for site in forest conservation area**
	Total				**77.45**						**1,914,222.75**	**1148533.65**		
Source: *Executive Engineer-cum-District Mining Office, Tarn-Taran and Field survey data*														

- **River bed Sites of River Beas from Sr. No. 1 to 7 have been proposed by Sub Divisional Committee with the condition from Forest and Wild life department, stating that, mining at above sites will take place only after approval of Forest and wild life Department as these sites are part of Forest Conservation Reserve.**

Note: From Department of Forests and Wildlife Preservation(Forest Branch), Government of Punjab, notification no. 34/13/2017-Ft-5/1052756/1 Chandigarh, date 29/08/2017, it had been noted that *"River Beas with all its water channels from 52 Head Talwara to Harike Barrage including all Government areas in River Beas."*

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- **Final List of proposed Patta Lands/Khatedari land:**

Owner	Sr. No.	Area (Acre)	Khasra No.	District	Tehsil	Village	Location		Total Reserve (MT)	Total Mineral to be mined (MT)	Existing/Proposed
							Longitude	Latitude			
Satpal Singh	1	7	139//24, 23,146//3,5,6,7,8,13,14,15	Tarn Taran	Patti	Booh	74.91149E 74.911607E 74.910925E 74.91085E 74.909454E 74.909438E 74.910855E 74.910839E	31.159089N 31.157539N 31.15738N 31.157899N 31.157878N 31.158563N 31.158606N 31.158964N	128,495.9	77,097.54	Proposed

Source: *Executive Engineer, Bari Doab Drainage division, Tarn-Taran and Field survey data*

- **Final List of Proposed De-siltation location (Lake, Pond, Dams, River):**

Name	Maintain/ Controlled by Sate Govt./PSU etc.	Location		District	Tehsil	Village	Size (Ha)	Quantity (MT/Year)	Existing/Proposed
		Latitude	Longitude						
NA									

- **Final List of Proposed M-Sand Plants:**

Plant Name	Owner	District	Tehsil	Village	Geo-Location	Quantity MT/Annum	Existing/ Proposed
NA							

ANNEXURE – VI

- **Final list of Cluster and Contiguous Clusters**

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- **Cluster details**

River Name	Cluster No.	Lease No.	Location (Riverbed/ Patta Land)	Village	Area (in Ha)	Total Excavation (Ton)	Total Mineral Excavation (Ton)
NA							

- **Contiguous Cluster details**

River Name	Contiguous Cluster No.	Cluster No.	Number of leases in the cluster	Location (Riverbed/Patta Land)	Distance between clusters	Village	Area of Cluster (Ha)	Total Mineral Excavation (Ton)
NA								

ANNEXURE – VII

- **Final Transportation Routes for individual leases and leases in Cluster(s):**

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- **Transportation Routes for individual leases details Of Sutlej (Riverbed):**

Lease No.	Transportation Route No.	Number of tippers /days of lease	Number of tippers /days of all the lease on route	Length of the Route in Km	Type of Road (black Topped/ unpaved)	Recommendation for road (Black Topped/ unpaved)	The road will be constructed by Govt. / Lease Owner	Route Map & Location
PB-TT-SUT-01	A1 - A2	316	216	0.98Km	Kacha road	1. Treatment of roadfrom local sources. 2. Regular Sprinkling of Water. 3. Management of traffic	**Lease Owner**	Annexure - XI
PB-TT-SUT-02	B1 - B2	77	77	0.96KM	Kacha road		**Lease Owner**	Annexure - XI
PB-TT-SUT-03	C1 - C2	58	58	0.99KM	Kacha road		**Lease Owner**	Annexure - XI
PB-TT-SUT-04	D1 - D1	240	240	1.71KM	Kacha road		**Lease Owner**	Annexure - XI
PB-TT-SUT-05	E1 - E2	137	137	0.99KM	Kacha road		**Lease Owner**	Annexure - XI
PB-TT-SUT-06	F1 - F2	31	31	1.66KM	Kacha road		**Lease Owner**	Annexure - XI
PB-TT-SUT-07	G1 - G2	33	33	0.54KM	Kacha road		**Lease Owner**	Annexure - XI
PB-TT-SUT-08	H1- H2	122	122	.70KM	Kacha road		**Lease Owner**	Annexure - XI

PB-TT-SUT-09	I1 - I2	18	18	0.584KM	Kacha road		**Lease Owner**	Annexure - XI
PB-TT-SUT-10	J1 - J2	31	31	0.62KM	Kacha road		**Lease Owner**	Annexure - XI
PB-TT-SUT-11	K1 - K2	108	108	1.29KM	Kacha road		**Lease Owner**	Annexure - XI
PB-TT-SUT-12	L1 - K2	116	116	1.25KM	Kacha road		**Lease Owner**	Annexure - XI
	Total	**1187**		**5.63**				

Source: *Field Survey Data*

- **Transportation Routes for individual leases details Of Beas (Riverbed):**

Lease no	Transportation route no	Number of tipers/ day of all the lease	Number of tipers/day of all the lease on route	Length of route in km	Type of road (black topped/ unpaved)	Recommendation for road (black topped/unpaved)	The road will be constructed by govt/ lease owner	Route map & location
PB -TT - BEAS - 01	A - A'	64	64	2.13	Kacha road	1. Treatment of roadfrom local sources. 2.Regular Sprinkling of Water. 3.Management of traffic	Lease Owner	Annexure - XI
PB -TT - BEAS - 02	B - B'	130	130	4.92	Kacha road		Lease Owner	Annexure - XI
PB -TT - BEAS - 03	C - C'	74	74	0.8	Kacha road		Lease Owner	Annexure - XI

PB -TT - BEAS - 04	D - D'	32	32	1.1	Kacha road		Lease Owner	Annexure - XI
PB -TT - BEAS - 08	E - E'	74	74	1.52	Kacha road		Lease Owner	Annexure - XI
PB -TT - BEAS - 09	F - F'	49	49	2	Kacha road		Lease Owner	Annexure - XI
PB -TT - BEAS - 10	G - G'	6	6	0.99	Kacha road		Lease Owner	Annexure - XI
	Total	**429**	**429**	**13.46**				
								Source: *Field Survey Data*

- **Transportation Routes for individual leases details (Agriculture):**

Sr.No.	**Transportation Route No.**	**No. Of Tippers/ Days of lease**	**No. Of tippers / Days of all the lease on the Route**	**Length of the route in KM**	**Type of Road(Black top / Unpaved**	**Recommendations for Road Black Top/ Unpaved**	**Road will be constructed by Govt/ Lease owner**	**Route map and loaction**
1	A - B	29	29	2.14KM	Kacha road	1.Treatment of roadfrom local sources. 2.Regular Sprinkling of Water. 3.Management of traffic	Lease Owner	Annexure - XI
								Source: *Field Survey Data*

Note: The above mentioned transportation routes are as per the present infrastructure, which may change according to the development / identification of new routes, after temporary acquisition of land if required. The final transportation routes shall be as per the approved mining plan and as per the environment clearance granted by the competent authority.

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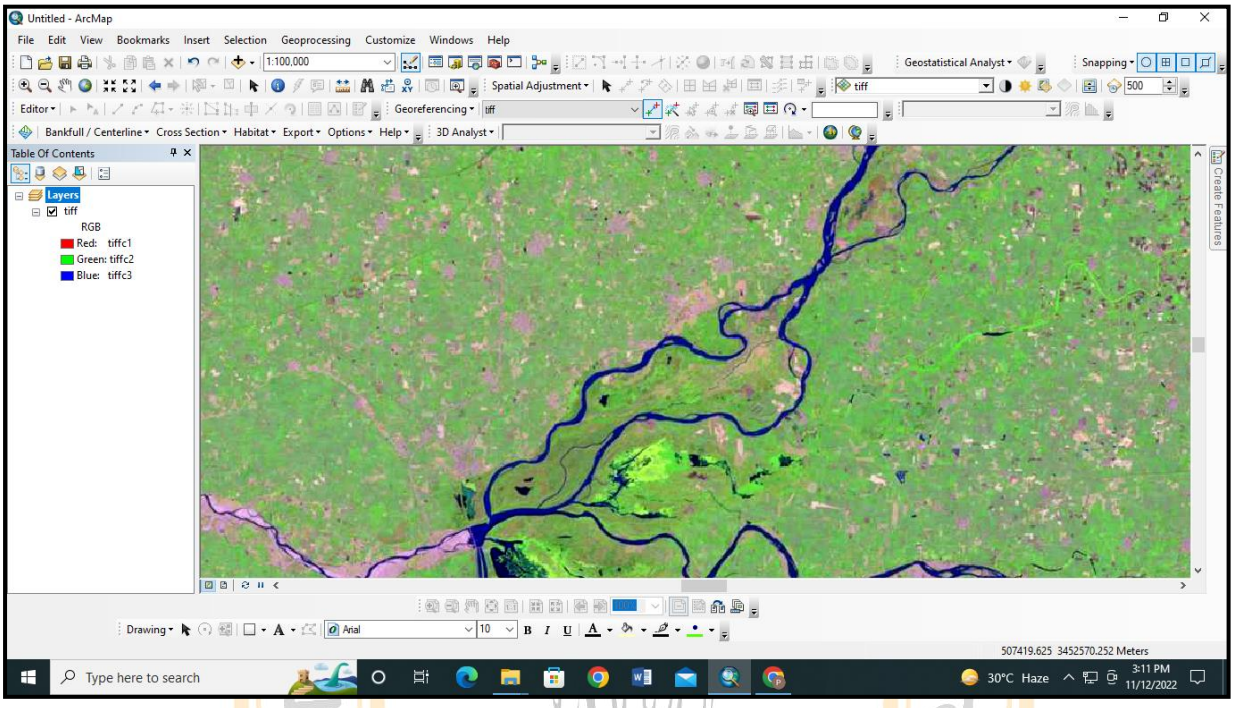
- **Transportation Routes for leases in Cluster details**

Cluster No.	Transportation Route No.	Number of tippers / days of cluster	Number of tippers / days of all the clusters on route	Length of Route in km	Type of Road (Black Topped / unpaved)	Recommendation for road (Black Topped / unpaved)	The road will be Constructed by Govt. / Lease Owner	Route Map & Location
----								

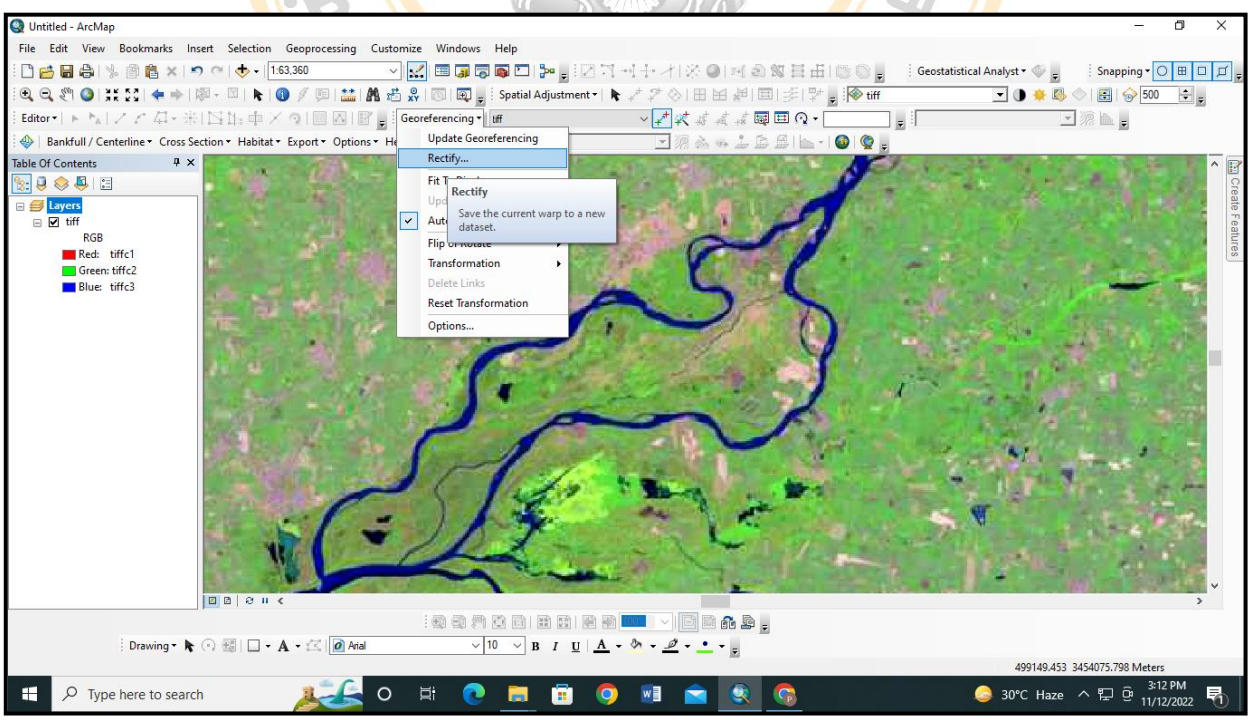
ANNEXURE-VIII

- **SATTELITE IMAGE**
- **FINAL POTENTIAL SAND MINING SITES**
- **NO MINING ZONE**
- **ORIGINAL GROUND LEVEL (OGL)**
- **GROUND CONTROL POINT (GCP)**
- **RESTRICTED AREA**
- **FOREST AREA**
- **RIGHT FPB**
- **LEFT FPB**

DISTRICT SURVEY REPORT OF TARN-TARAN DISTRICT, PUNJAB

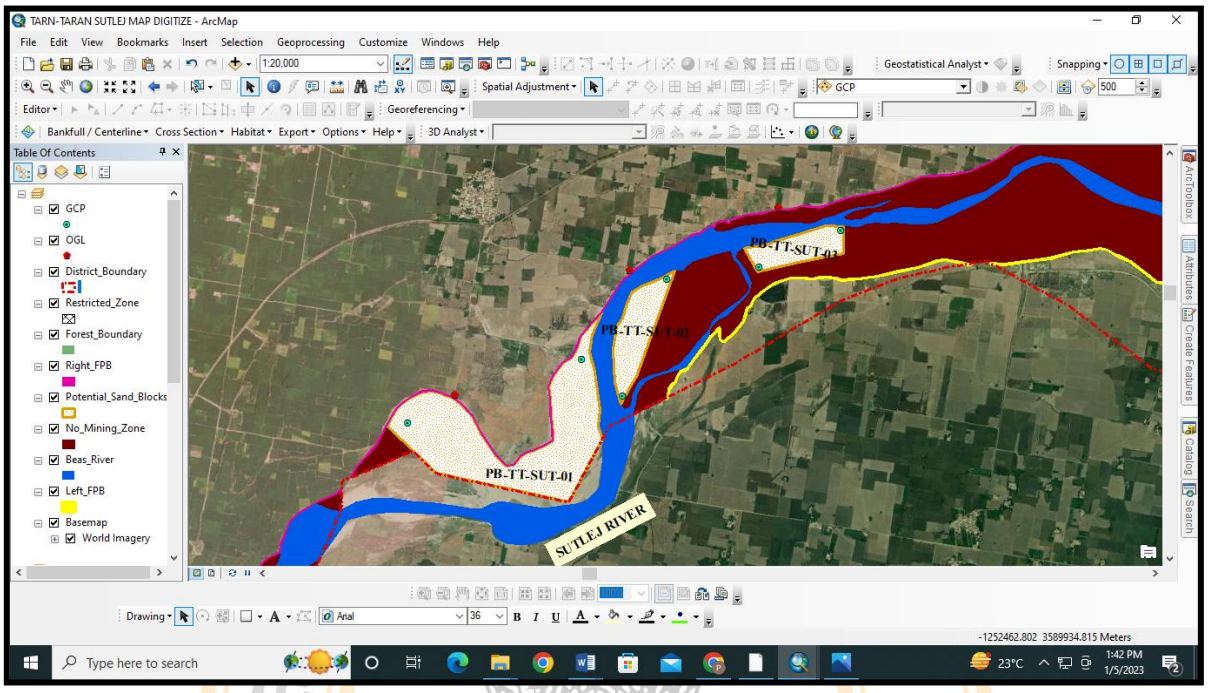


Satellite Image of the river Stretch under consideration

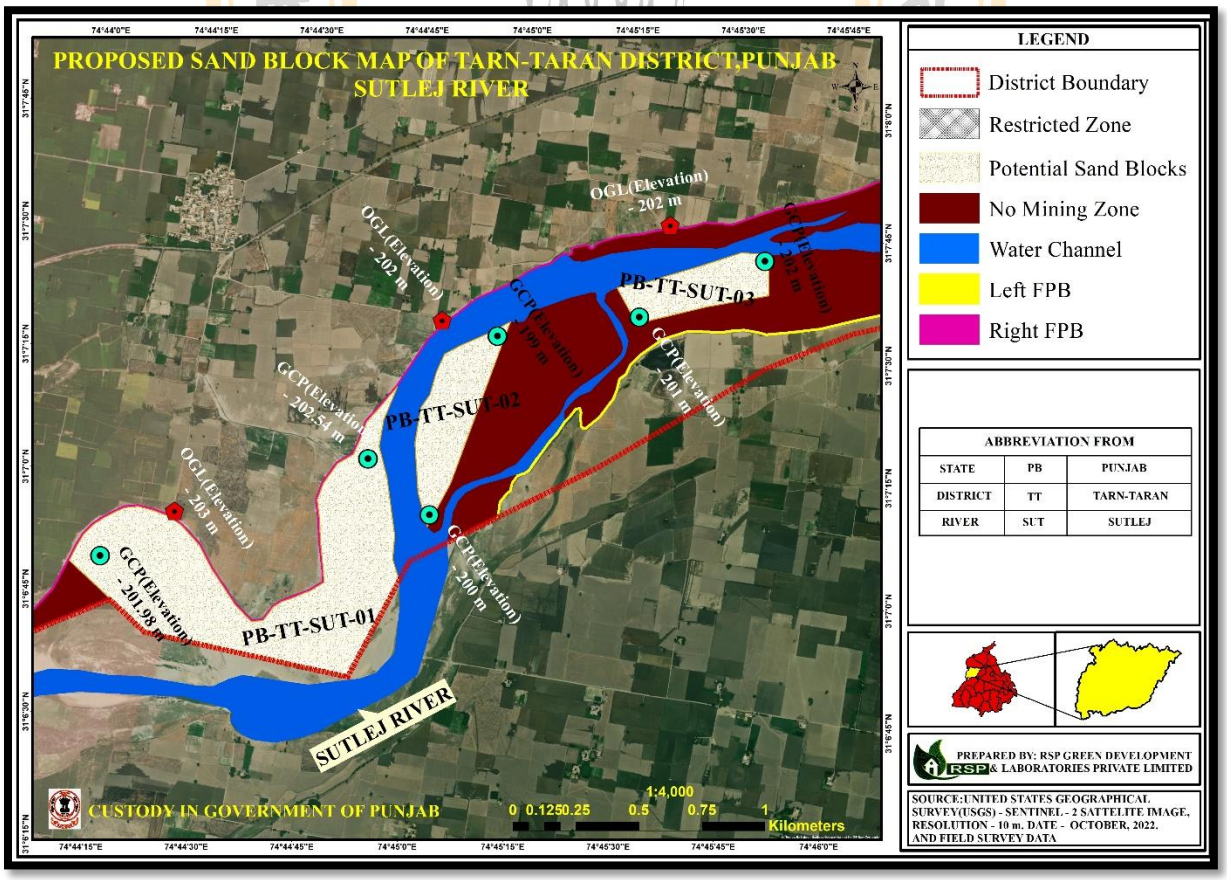


Georeferencing and rectification of the Satellite Image

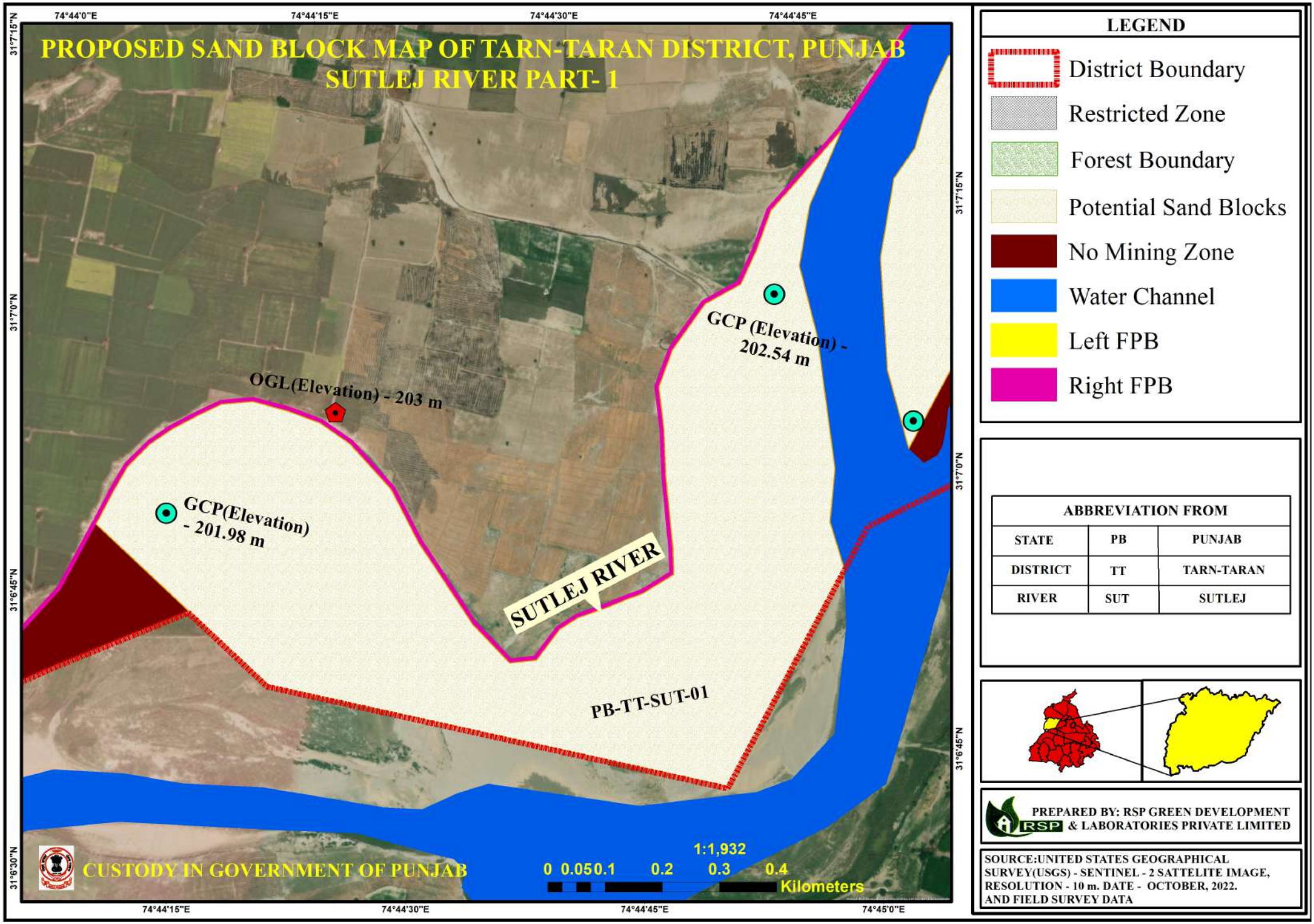
DISTRICT SURVEY REPORT OF TARN-TARAN DISTRICT, PUNJAB

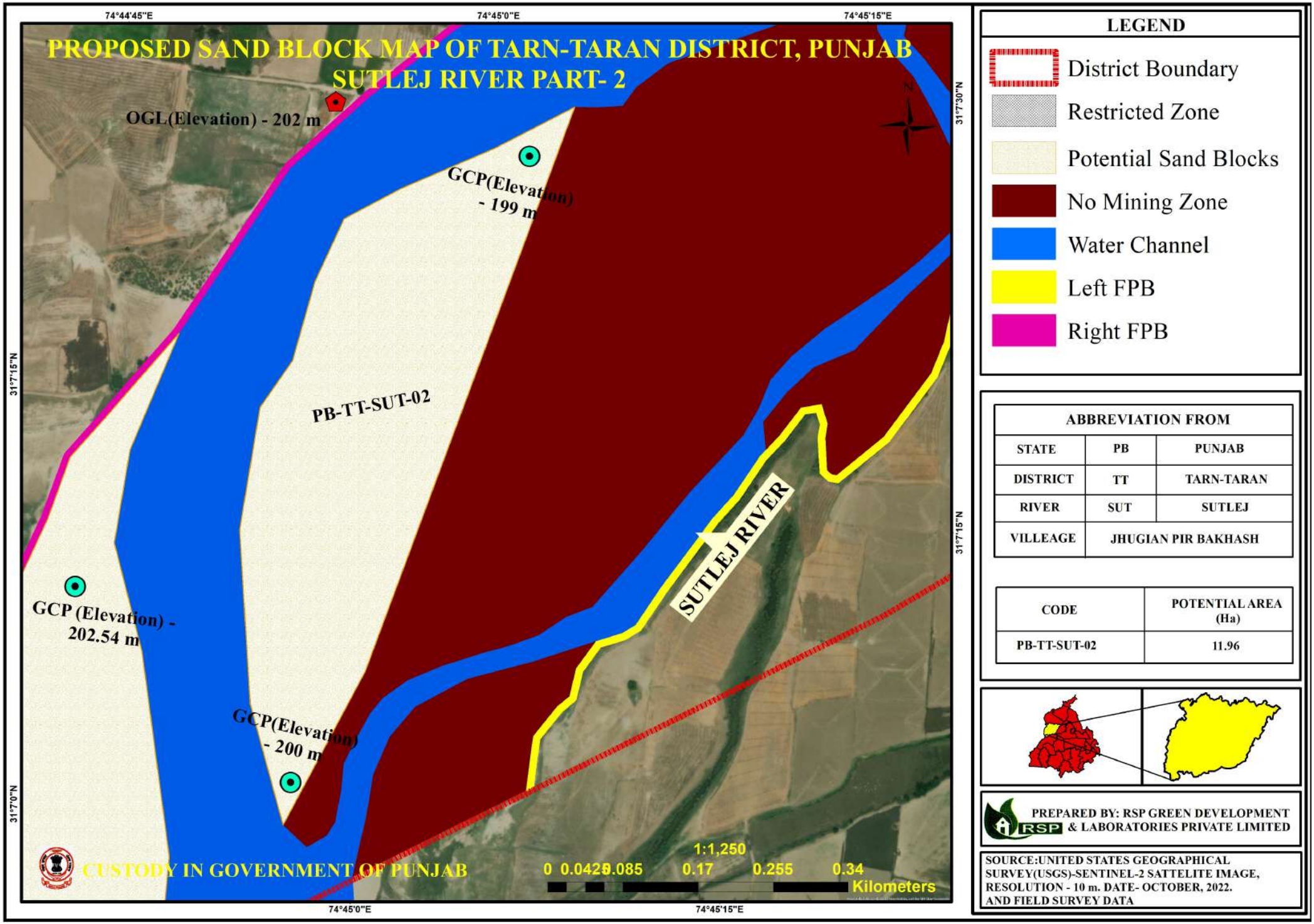


Digitization of the Satellite Image While Using Shape File

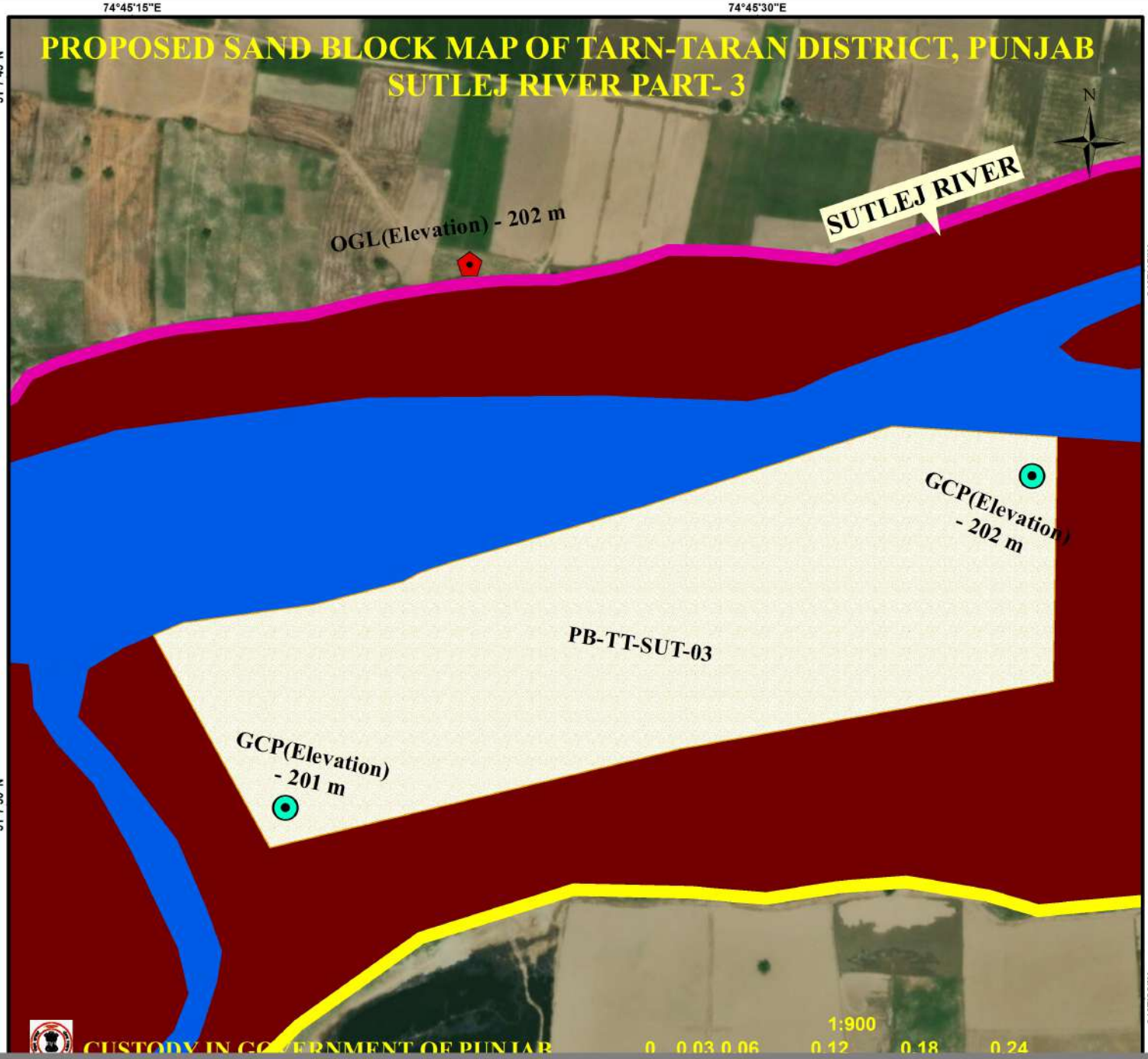


Map Depicting Deposition Zones, No Mining Zones, and Structures etc.


PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 1
74°44'0"E
74°44'15"E
74°44'30"E
74°44'45"E
74°45'0"E
31°7'15"N
31°7'0"N
31°6'45"N
31°6'30"N
OGL(Elevation) - 203 m
GCP (Elevation) - 202.54 m
GCP(Elevation) - 201.98 m
SUTLEJ RIVER
PB-TT-SUT-01
CUSTODY IN GOVERNMENT OF PUNJAB
1:1,932
0 0.05 0.1 0.2 0.3 0.4
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA


PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 2
74°44'45"E
74°45'0"E
74°45'15"E
31°7'30"N
31°7'15"N
31°7'0"N
OGL(Elevation) - 202 m
GCP(Elevation) - 199 m
PB-TT-SUT-02
SUTLEJ RIVER
GCP (Elevation) - 202.54 m
GCP(Elevation) - 200 m
CUSTODY IN GOVERNMENT OF PUNJAB
1:1,250
0 0.0425 0.085 0.17 0.255 0.34
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
VILLEAGE JHUGIAN PIR BAKHASH
CODE
POTENTIAL AREA (Ha)
PB-TT-SUT-02
11.96
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE- OCTOBER, 2022. AND FIELD SURVEY DATA

PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 3



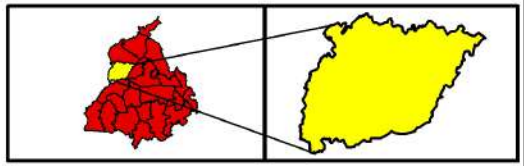
CUSTODY IN GOVERNMENT OF PUNJAB

LEGEND

- District Boundary
- Restricted Zone
- Potential Sand Blocks
- No Mining Zone
- Water Channel
- Left FPB
- Right FPB

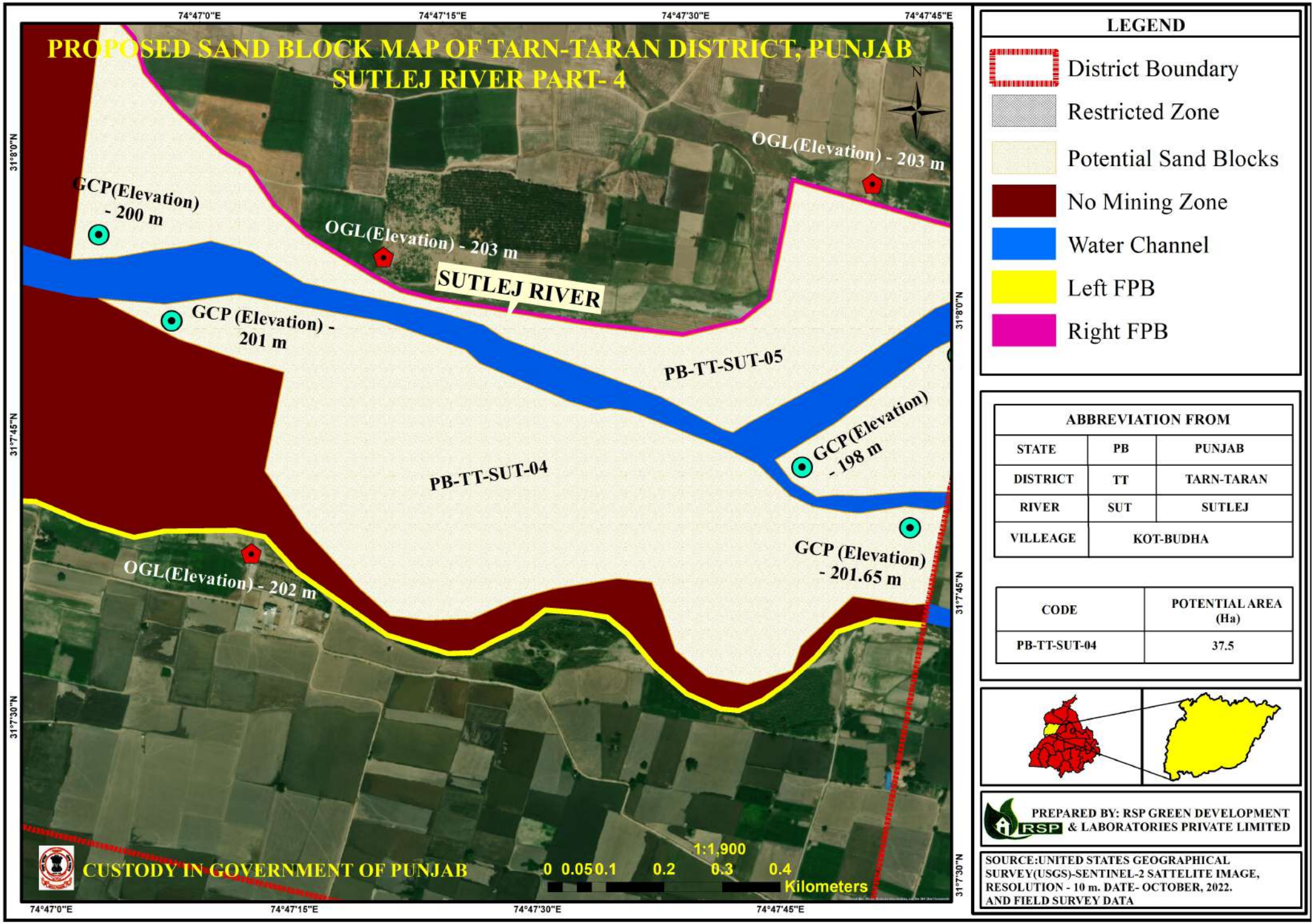
ABBREVIATION FROM		
STATE	PB	PUNJAB
DISTRICT	TT	TARN-TARAN
RIVER	SUT	SUTLEJ
VILLEAGE	JHUGIAN PIR BAKHASH	

CODE	POTENTIAL AREA (Ha)
PB-TT-SUT-03	8.97



PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED

SOURCE:UNITED STATES GEOGRAPHICAL

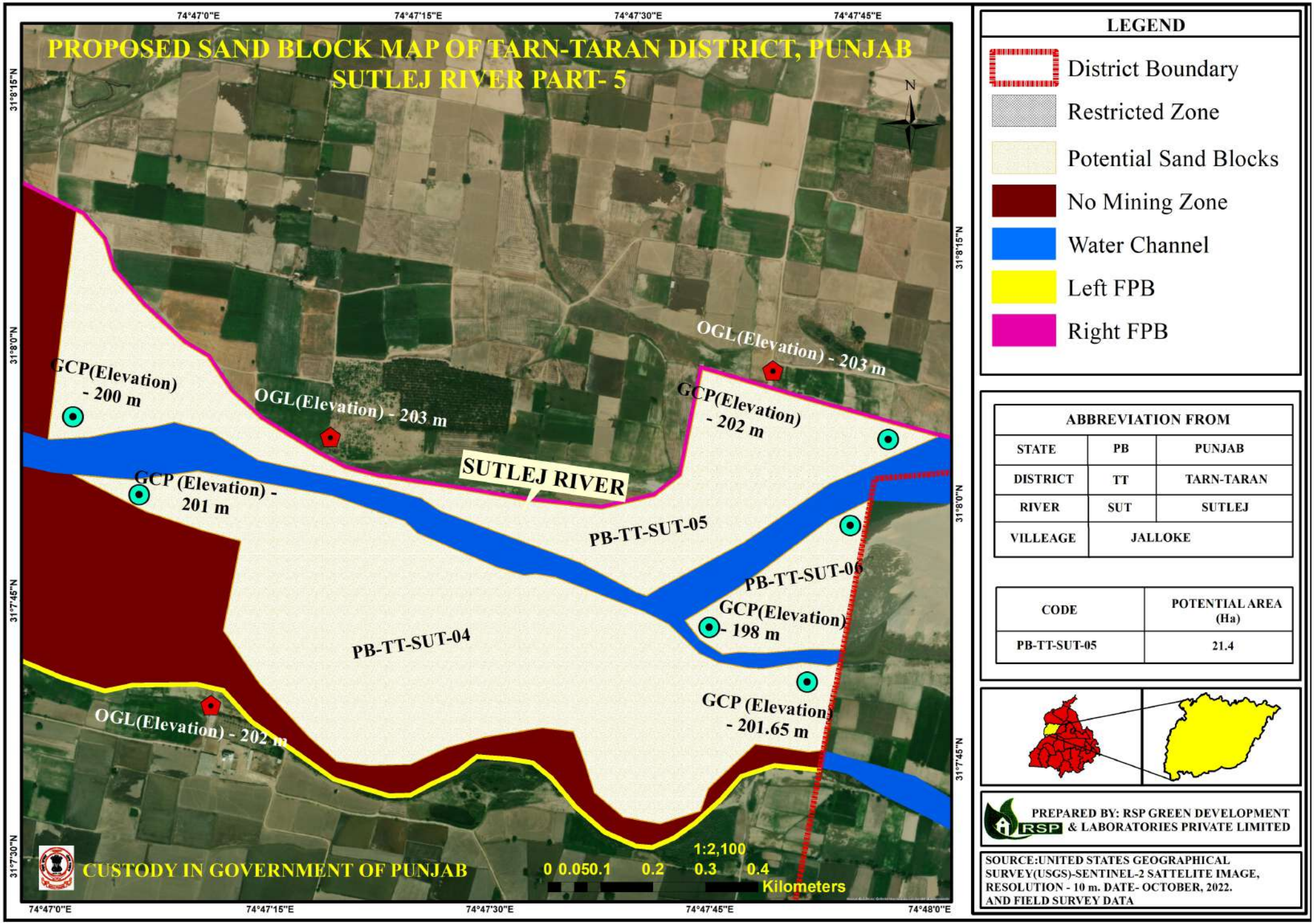


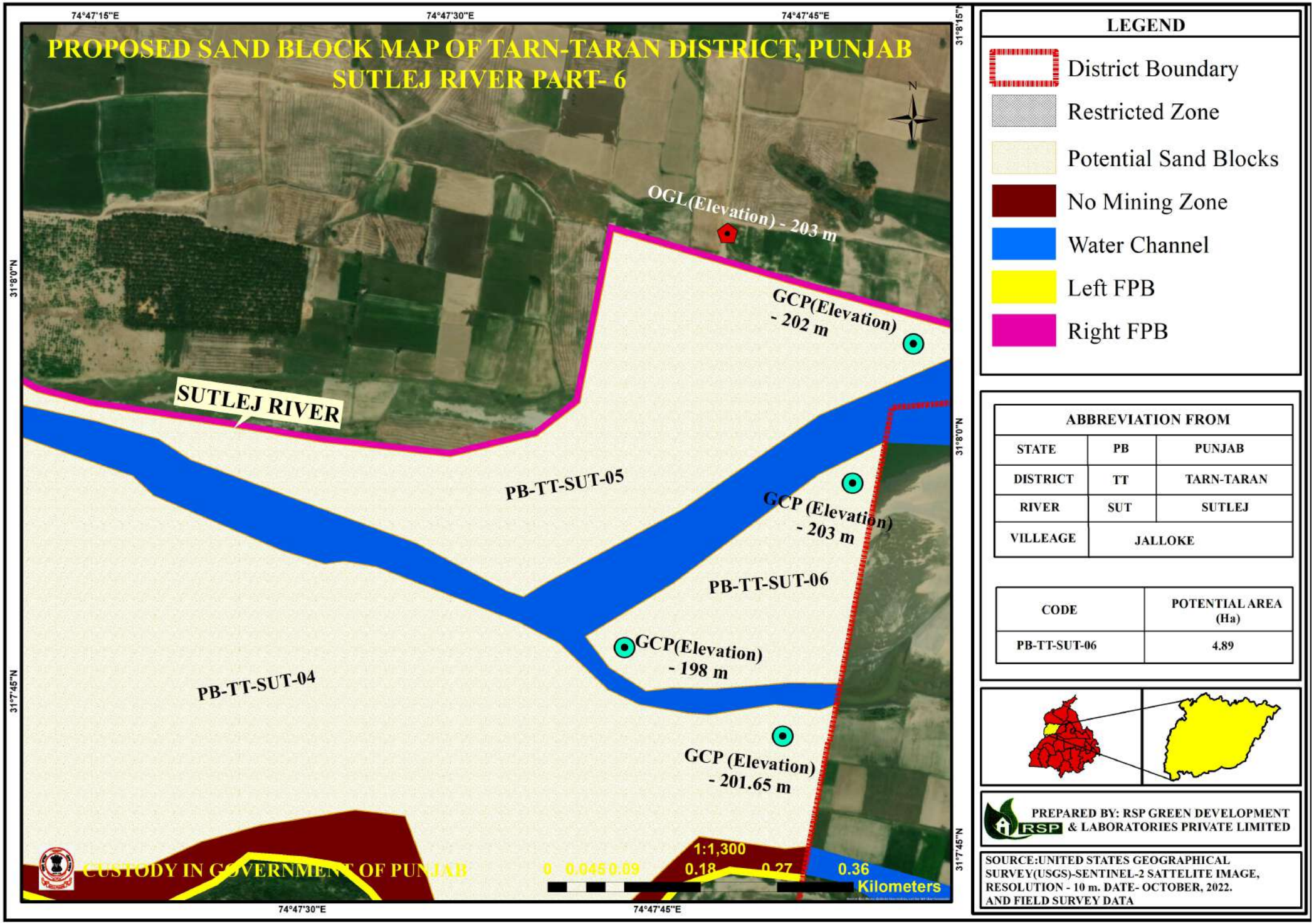
ABBREVIATION FROM		
STATE	PB	PUNJAB
DISTRICT	TT	TARN-TARAN
RIVER	SUT	SUTLEJ
VILLEAGE	KOT-BUDHA	

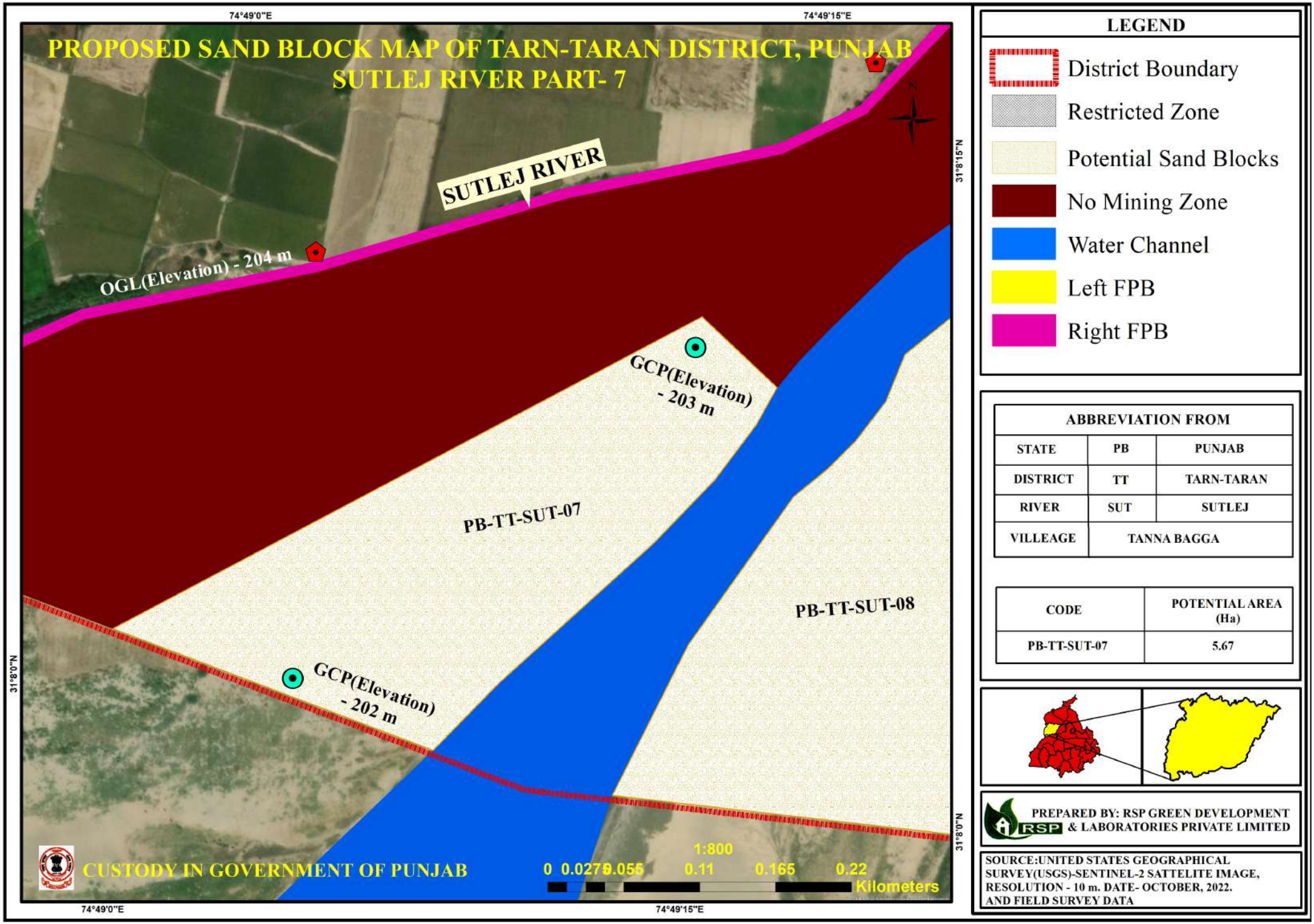
CODE	POTENTIAL AREA (Ha)
PB-TT-SUT-04	37.5

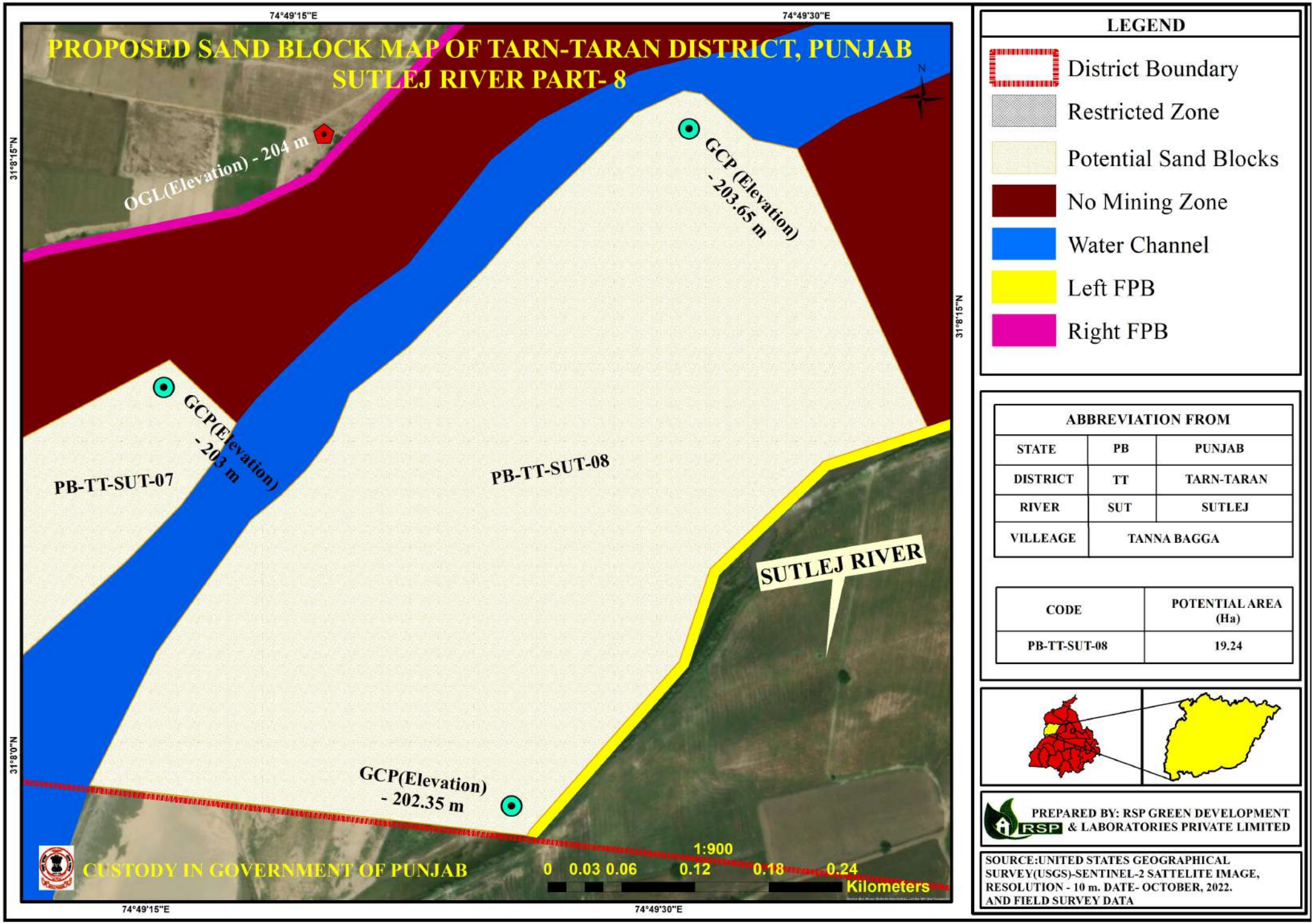
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED

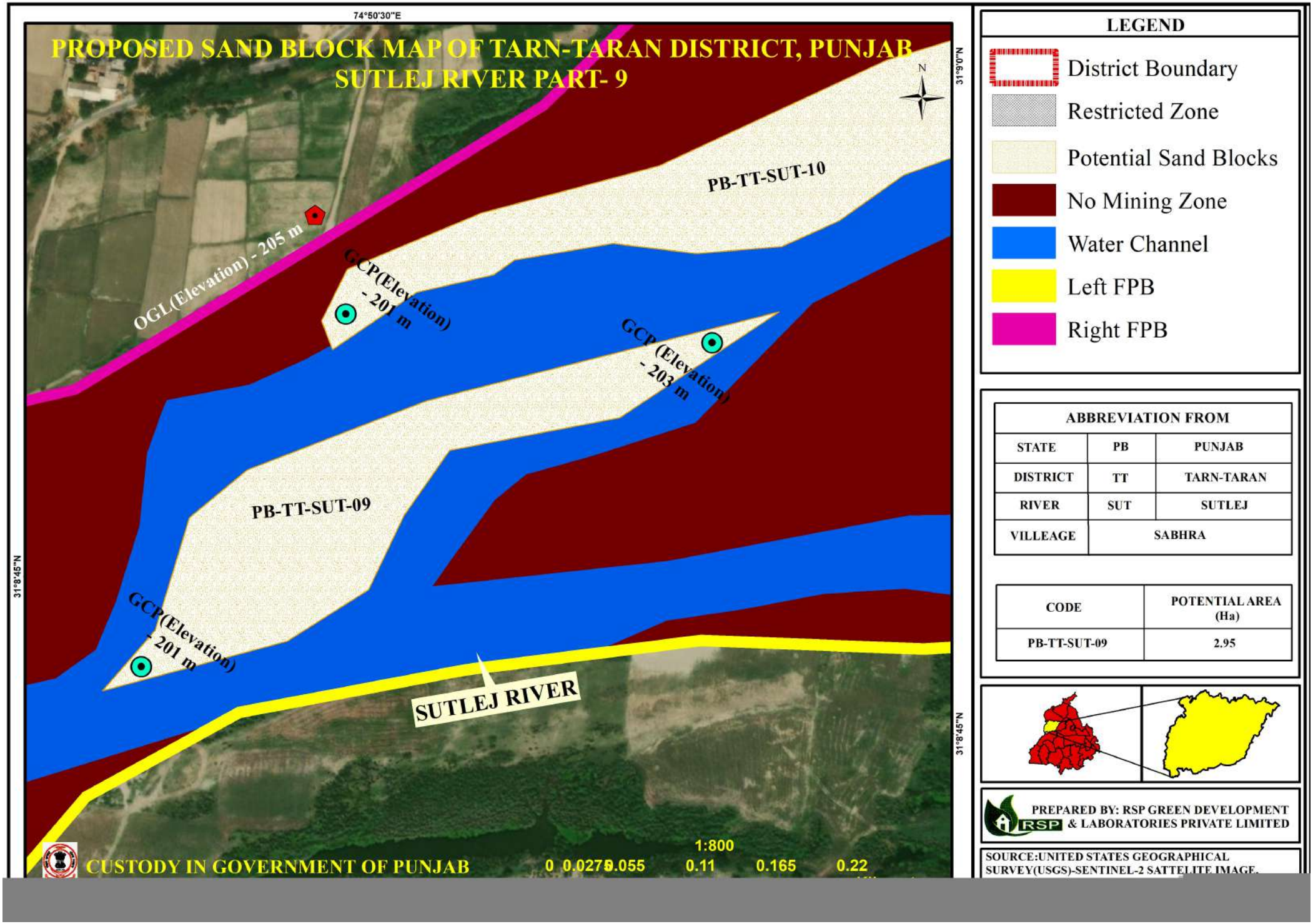
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE- OCTOBER, 2022. AND FIELD SURVEY DATA

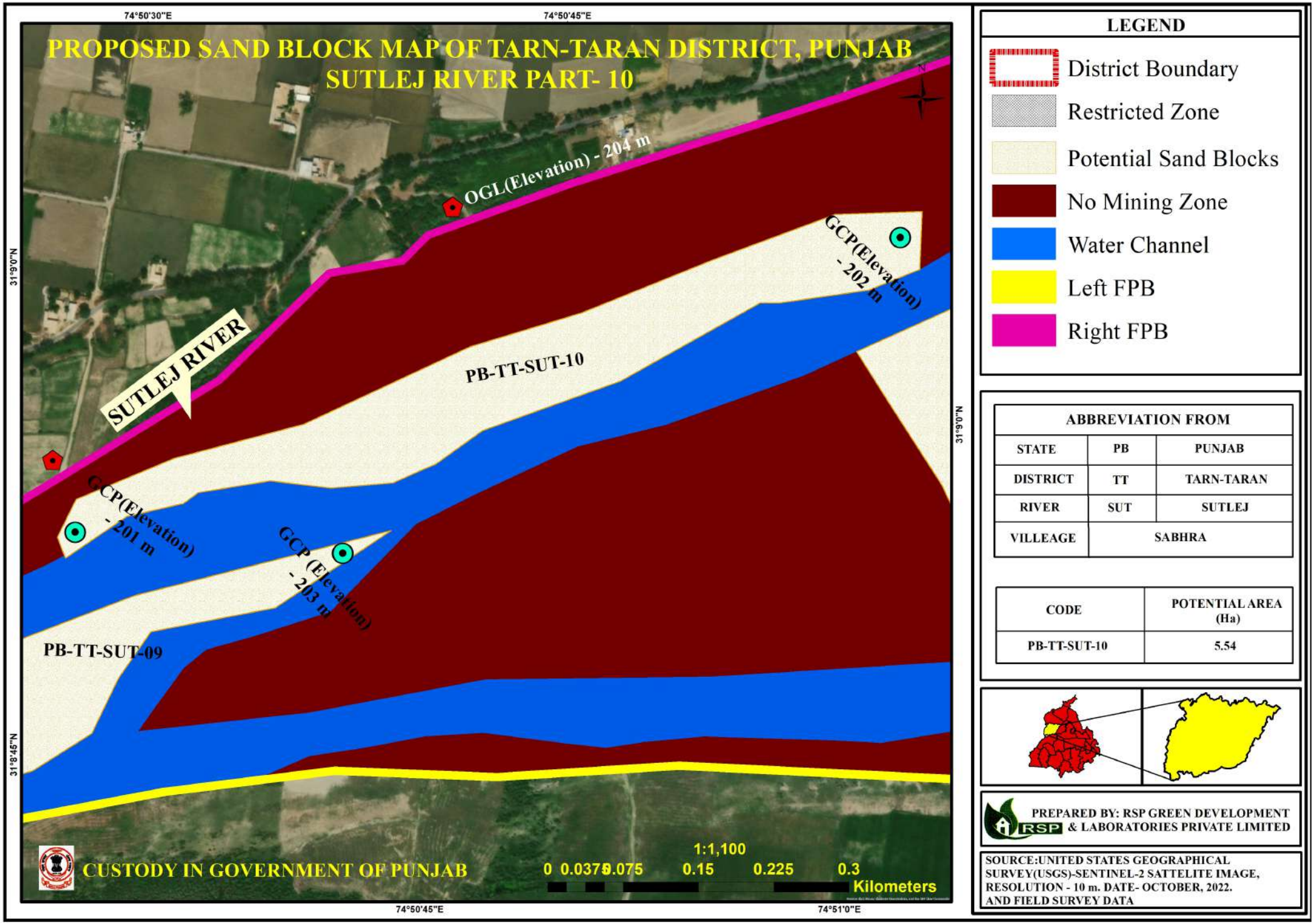

PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 5
74°47'0"E
74°47'15"E
74°47'30"E
74°47'45"E
74°48'0"E
31°8'15"N
31°8'0"N
31°7'45"N
31°7'30"N
N
GCP(Elevation) - 200 m
OGL(Elevation) - 203 m
OGL(Elevation) - 203 m
GCP(Elevation) - 202 m
SUTLEJ RIVER
GCP (Elevation) - 201 m
PB-TT-SUT-05
PB-TT-SUT-06
GCP(Elevation) - 198 m
PB-TT-SUT-04
GCP (Elevation) - 201.65 m
OGL(Elevation) - 202 m
CUSTODY IN GOVERNMENT OF PUNJAB
1:2,100
0 0.050.1 0.2 0.3 0.4
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
VILLEAGE JALLOKE
CODE
POTENTIAL AREA (Ha)
PB-TT-SUT-05
21.4
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE- OCTOBER, 2022. AND FIELD SURVEY DATA


PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 6
74°47'15"E
74°47'30"E
74°47'45"E
31°8'0"N
31°7'45"N
N
OGL(Elevation) - 203 m
GCP(Elevation) - 202 m
SUTLEJ RIVER
PB-TT-SUT-05
GCP (Elevation) - 203 m
PB-TT-SUT-06
GCP(Elevation) - 198 m
PB-TT-SUT-04
GCP (Elevation) - 201.65 m
CUSTODY IN GOVERNMENT OF PUNJAB
1:1,300
0 0.045 0.09 0.18 0.27 0.36
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
VILLEAGE JALLOKE
CODE
POTENTIAL AREA (Ha)
PB-TT-SUT-06
4.89
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE- OCTOBER, 2022. AND FIELD SURVEY DATA


PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 7
74°49'0"E
74°49'15"E
31°8'15"N
31°8'0"N
SUTLEJ RIVER
OGL(Elevation) - 204 m
GCP(Elevation) - 203 m
GCP(Elevation) - 202 m
PB-TT-SUT-07
PB-TT-SUT-08
CUSTODY IN GOVERNMENT OF PUNJAB
1:800
0 0.0275 0.055 0.11 0.165 0.22
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
VILLEAGE TANNA BAGGA
CODE
POTENTIAL AREA (Ha)
PB-TT-SUT-07
5.67
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE- OCTOBER, 2022. AND FIELD SURVEY DATA


PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 8
74°49'15"E
74°49'30"E
31°8'15"N
31°8'0"N
OGL(Elevation) - 204 m
GCP (Elevation) - 203.65 m
GCP(Elevation) - 203 m
GCP(Elevation) - 202.35 m
PB-TT-SUT-07
PB-TT-SUT-08
SUTLEJ RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:900
0 0.03 0.06 0.12 0.18 0.24
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
VILLEAGE TANNA BAGGA
CODE
POTENTIAL AREA (Ha)
PB-TT-SUT-08
19.24
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE- OCTOBER, 2022. AND FIELD SURVEY DATA


74°50'30"E
PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 9
N
31°9'0"N
31°8'45"N
PB-TT-SUT-10
PB-TT-SUT-09
OGL(Elevation) - 205 m
GCP(Elevation) - 201 m
GCP (Elevation) - 203 m
GCP(Elevation) - 201 m
SUTLEJ RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:800
0 0.0275 0.055 0.11 0.165 0.22
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
VILLEAGE SABHRA
CODE
POTENTIAL AREA (Ha)
PB-TT-SUT-09
2.95
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE.



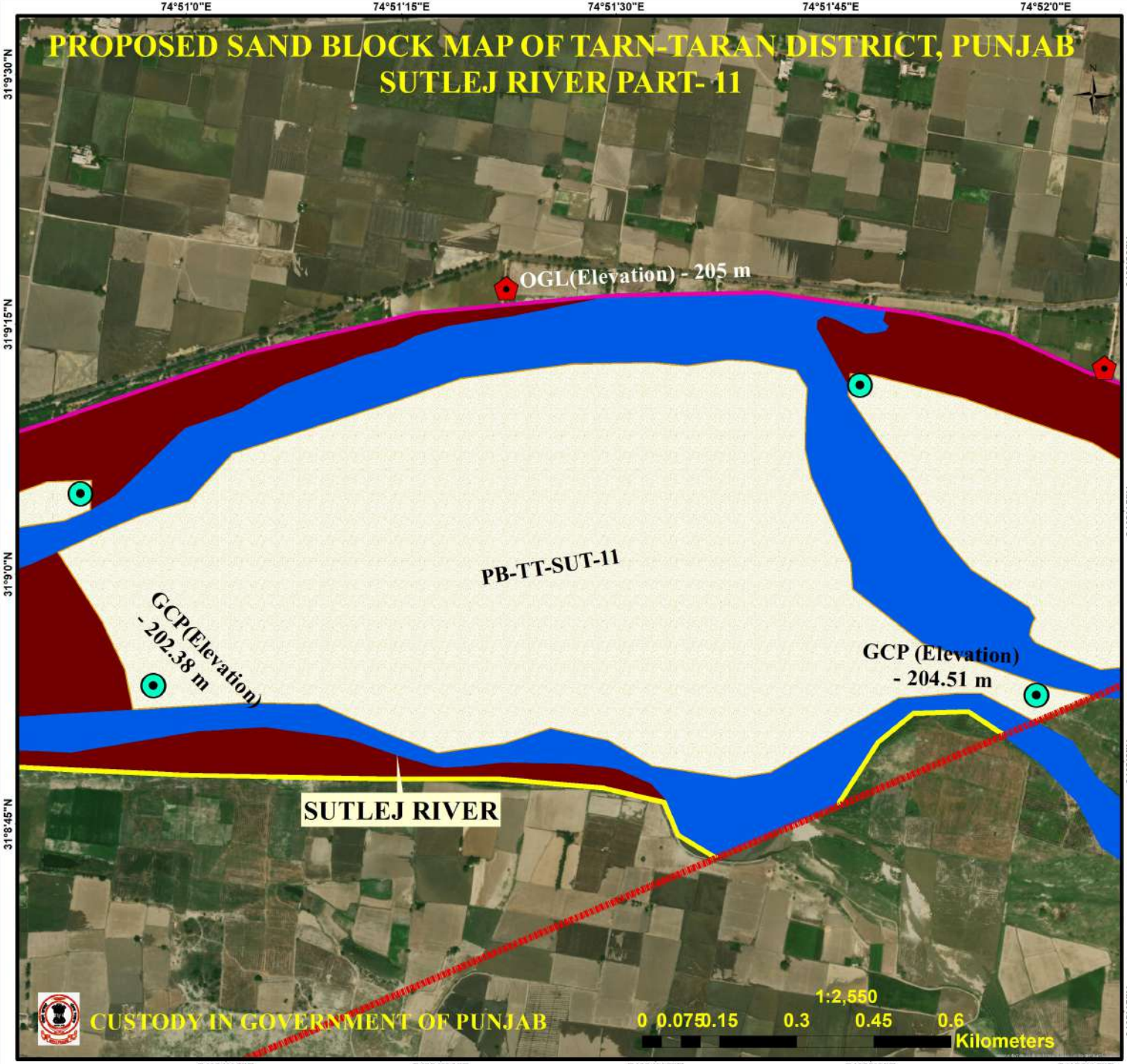
ABBREVIATION FROM		
STATE	PB	PUNJAB
DISTRICT	TT	TARN-TARAN
RIVER	SUT	SUTLEJ
VILLEAGE	SABHRA	

CODE	POTENTIAL AREA (Ha)
PB-TT-SUT-10	5.54

PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED

SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE- OCTOBER, 2022. AND FIELD SURVEY DATA

PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 11

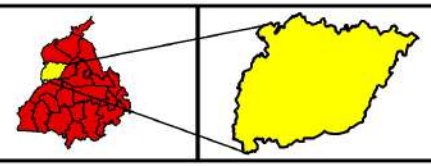


LEGEND

- District Boundary
- Restricted Zone
- Potential Sand Blocks
- No Mining Zone
- Water Channel
- Left FPB
- Right FPB

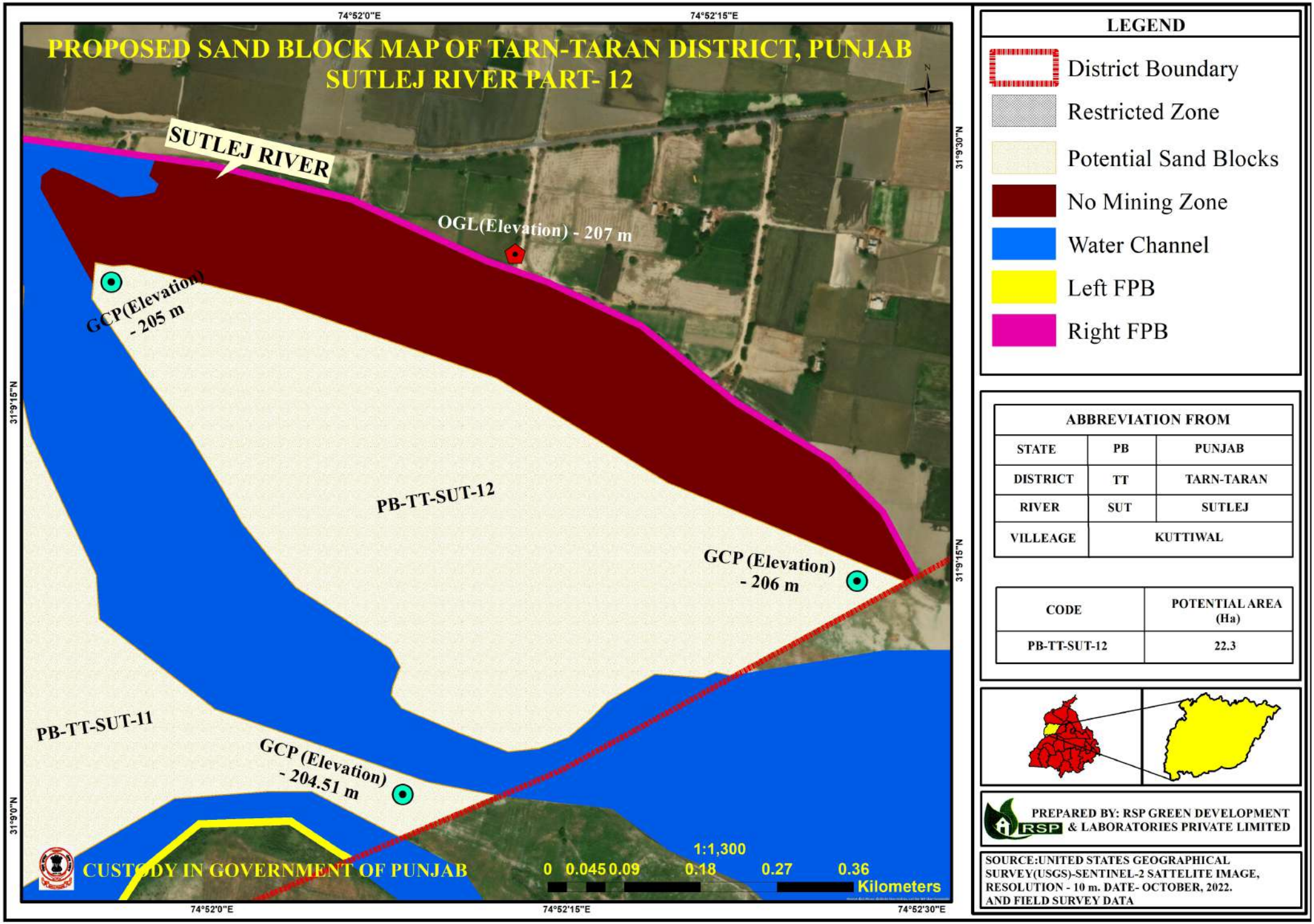
ABBREVIATION FROM		
STATE	PB	PUNJAB
DISTRICT	TT	TARN-TARAN
RIVER	SUT	SUTLEJ
VILLEAGE	SABHRA	

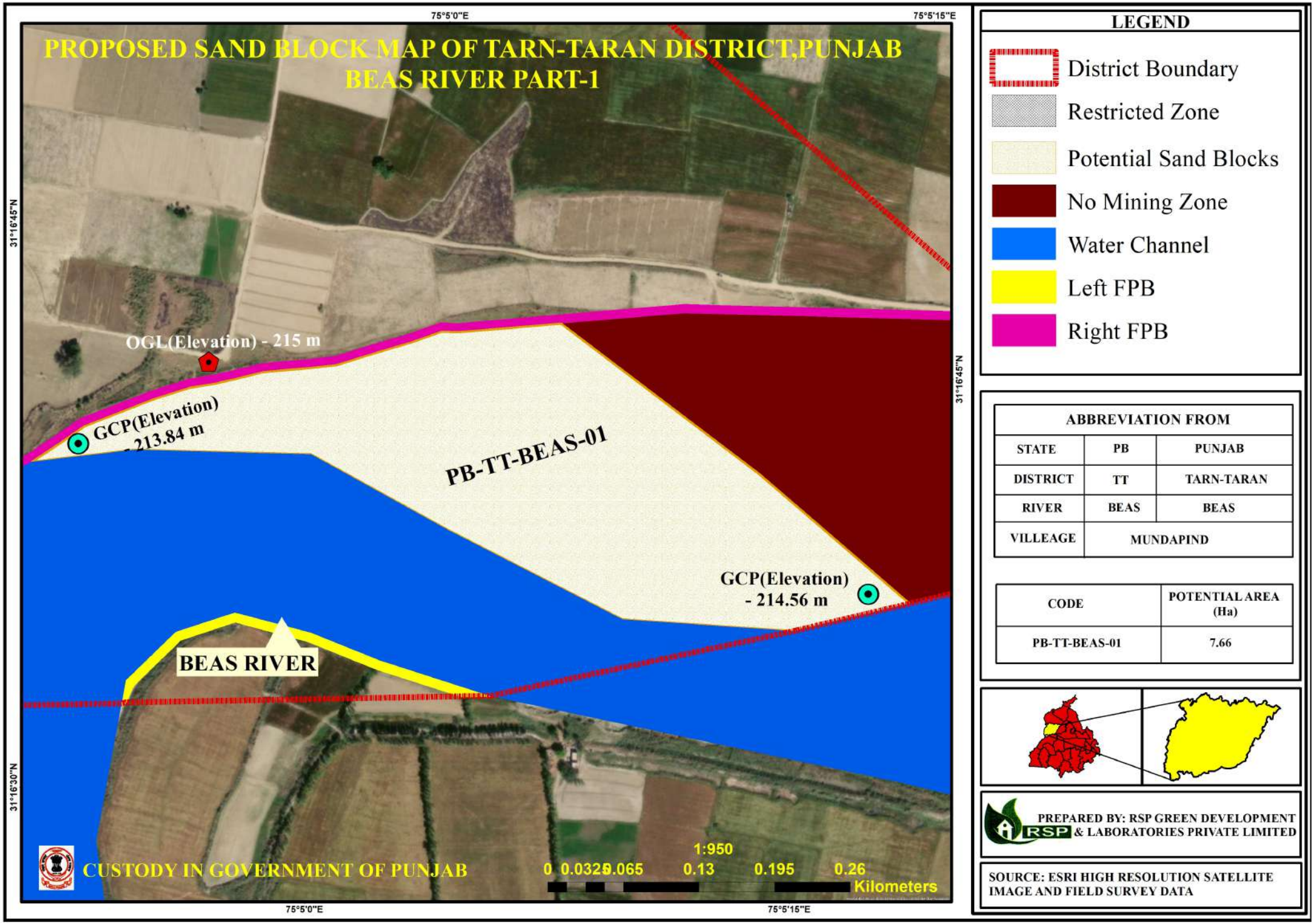
CODE	POTENTIAL AREA (Ha)
PB-TT-SUT-11	88.6

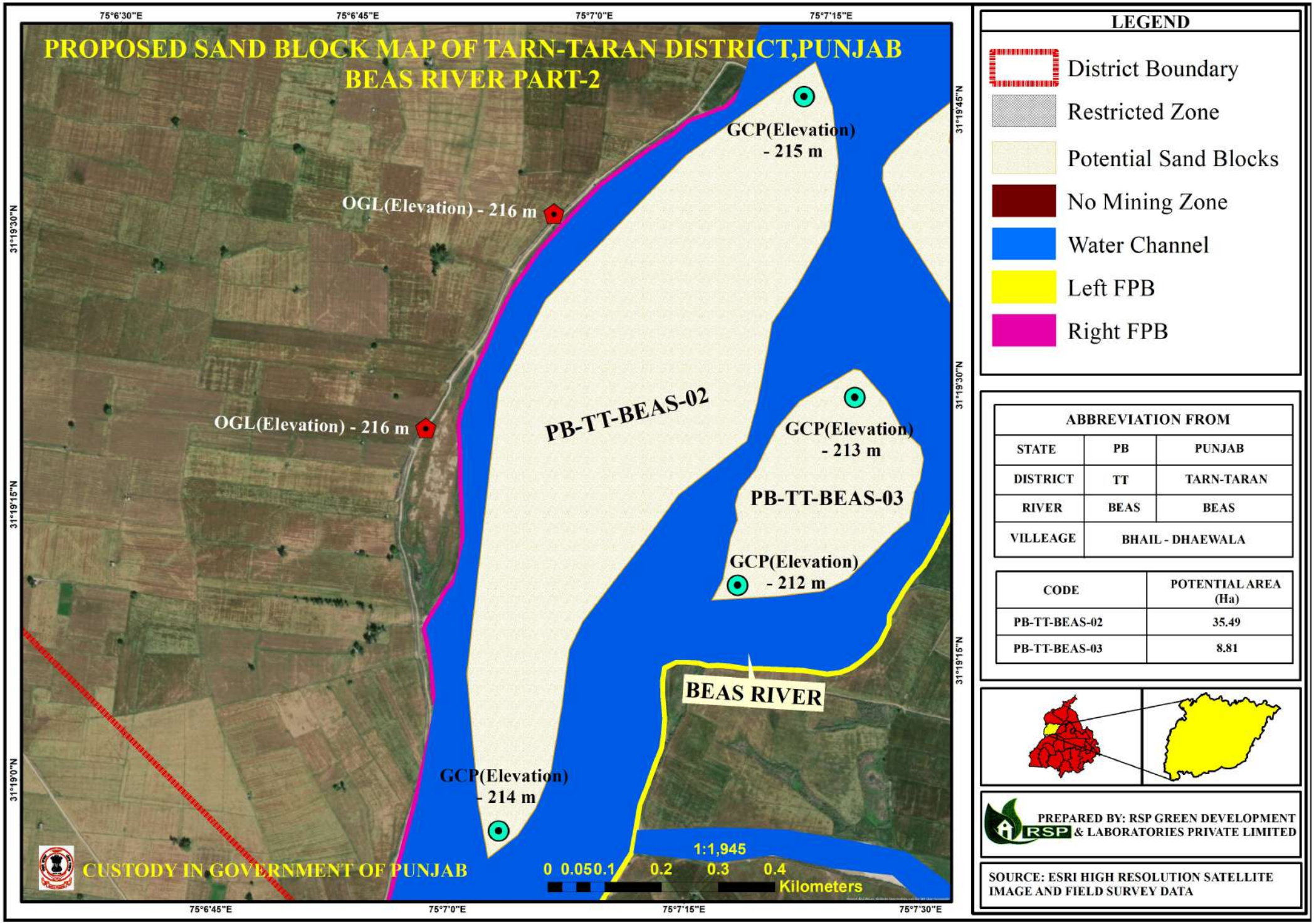


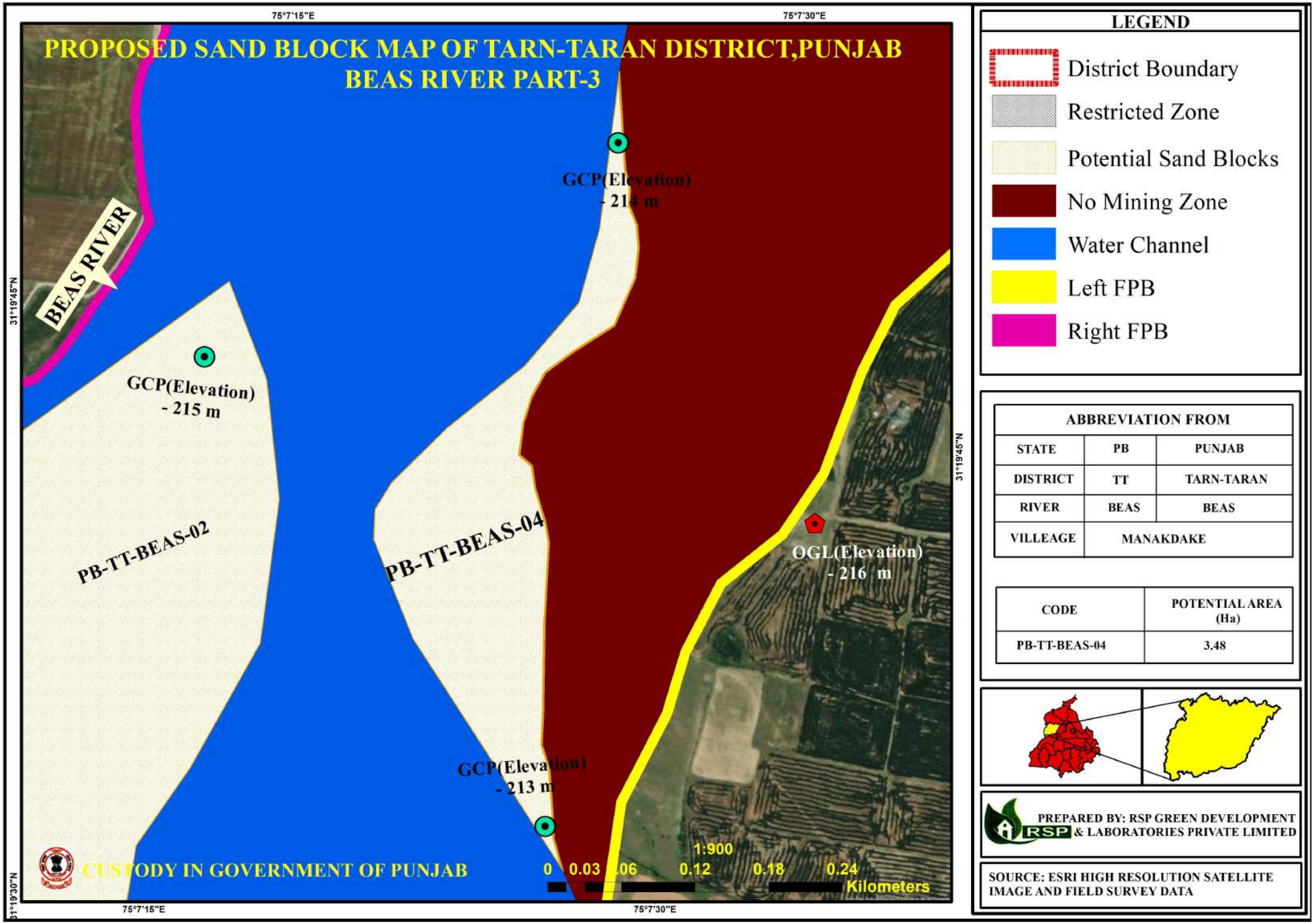
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED

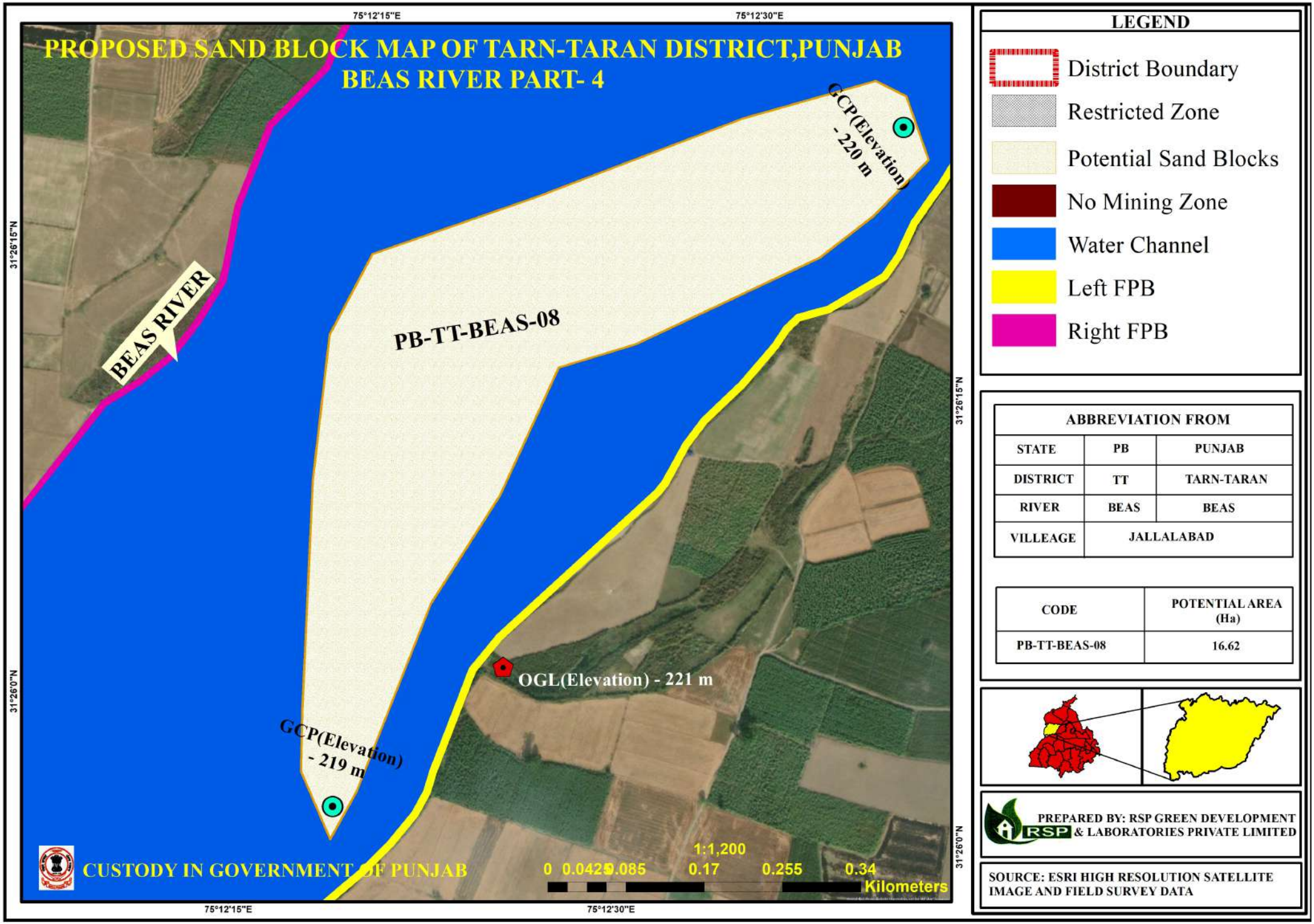
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE- OCTOBER, 2022. AND FIELD SURVEY DATA

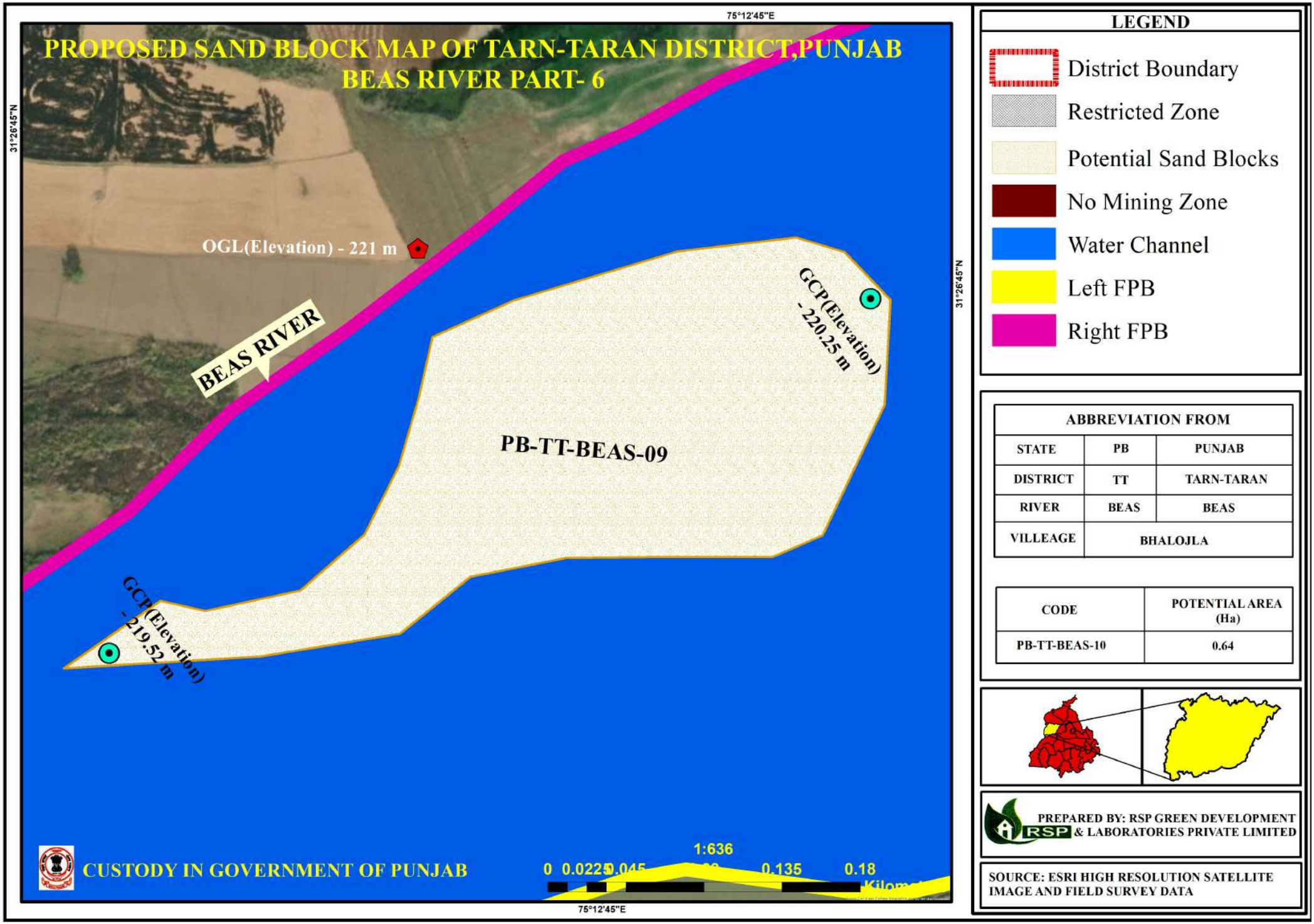

PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT, PUNJAB
SUTLEJ RIVER PART- 12
SUTLEJ RIVER
OGL(Elevation) - 207 m
GCP(Elevation) - 205 m
PB-TT-SUT-12
GCP (Elevation) - 206 m
PB-TT-SUT-11
GCP (Elevation) - 204.51 m
CUSTODY IN GOVERNMENT OF PUNJAB
74°52'0"E
74°52'15"E
74°52'30"E
31°9'30"N
31°9'15"N
31°9'0"N
1:1,300
0 0.045 0.09 0.18 0.27 0.36
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
VILLEAGE KUTTIWAL
CODE
POTENTIAL AREA (Ha)
PB-TT-SUT-12
22.3
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS)-SENTINEL-2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE- OCTOBER, 2022. AND FIELD SURVEY DATA

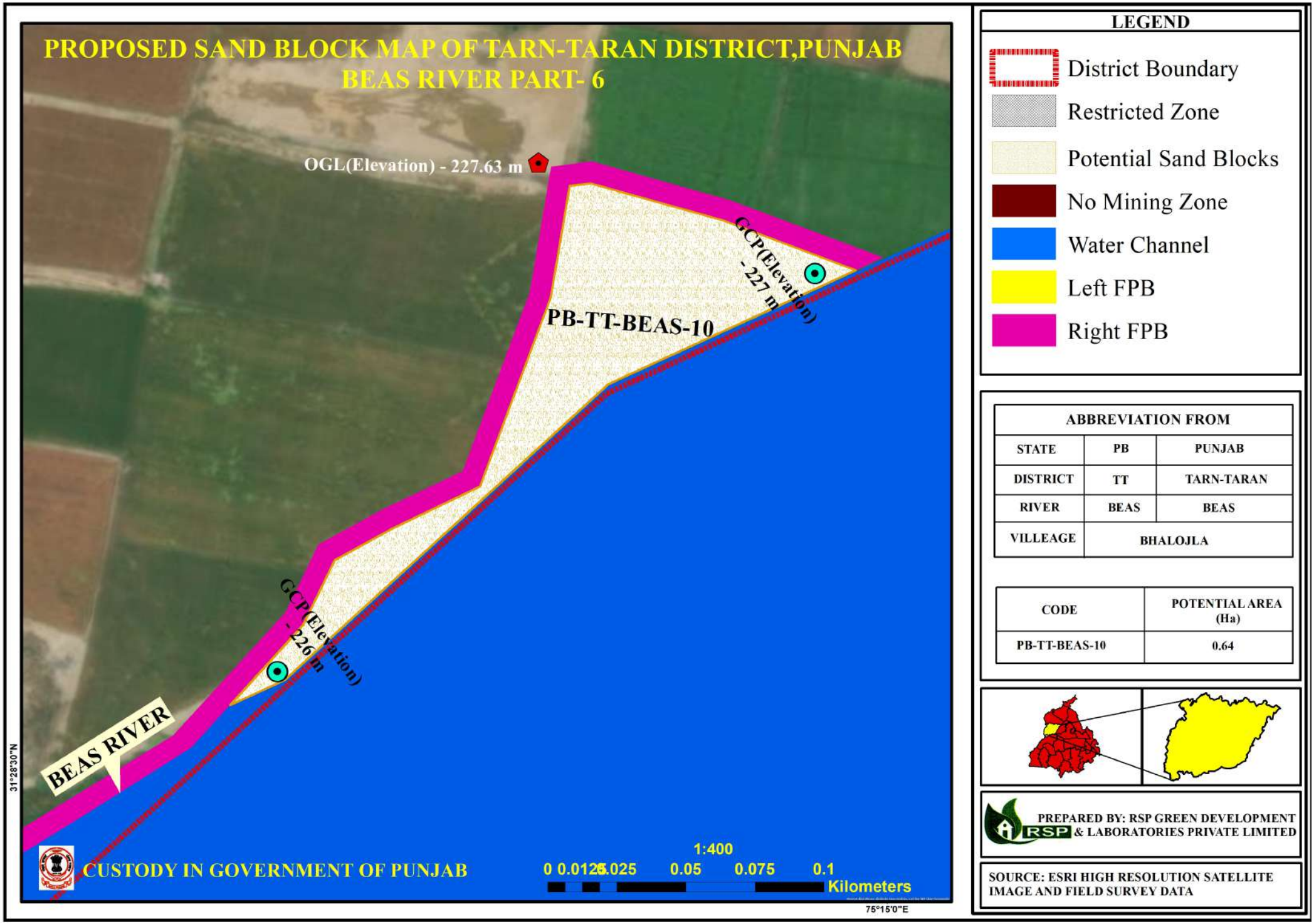

PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT,PUNJAB
BEAS RIVER PART-1
75°5'0"E
75°5'15"E
31°16'45"N
31°16'30"N
OGL(Elevation) - 215 m
GCP(Elevation)
- 213.84 m
PB-TT-BEAS-01
GCP(Elevation)
- 214.56 m
BEAS RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:950
0 0.0325 0.065 0.13 0.195 0.26
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
VILLEAGE MUNDAPIND
CODE
POTENTIAL AREA (Ha)
PB-TT-BEAS-01
7.66
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE: ESRI HIGH RESOLUTION SATELLITE IMAGE AND FIELD SURVEY DATA


PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT,PUNJAB
BEAS RIVER PART-2
75°6'30"E
75°6'45"E
75°7'0"E
75°7'15"E
75°7'30"E
31°19'45"N
31°19'30"N
31°19'15"N
31°19'0"N
GCP(Elevation) - 215 m
OGL(Elevation) - 216 m
OGL(Elevation) - 216 m
PB-TT-BEAS-02
GCP(Elevation) - 213 m
PB-TT-BEAS-03
GCP(Elevation) - 212 m
BEAS RIVER
GCP(Elevation) - 214 m
CUSTODY IN GOVERNMENT OF PUNJAB
1:1,945
0 0.05 0.1 0.2 0.3 0.4
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
VILLEAGE BHAIL - DHAEWALA
CODE
POTENTIAL AREA (Ha)
PB-TT-BEAS-02 35.49
PB-TT-BEAS-03 8.81
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE: ESRI HIGH RESOLUTION SATELLITE IMAGE AND FIELD SURVEY DATA


PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT,PUNJAB
BEAS RIVER PART-3
75°7'15"E
75°7'30"E
31°19'45"N
31°19'30"N
BEAS RIVER
GCP(Elevation)
- 214 m
GCP(Elevation)
- 215 m
PB-TT-BEAS-02
PB-TT-BEAS-04
OGL(Elevation)
- 216 m
GCP(Elevation)
- 213 m
CUSTODY IN GOVERNMENT OF PUNJAB
1:900
0 0.03 0.06 0.12 0.18 0.24
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
VILLEAGE MANAKDAKE
CODE
POTENTIAL AREA (Ha)
PB-TT-BEAS-04
3.48
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE: ESRI HIGH RESOLUTION SATELLITE IMAGE AND FIELD SURVEY DATA


PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT,PUNJAB
BEAS RIVER PART- 4
75°12'15"E
75°12'30"E
31°26'15"N
31°26'0"N
BEAS RIVER
PB-TT-BEAS-08
GCP(Elevation) - 220 m
OGL(Elevation) - 221 m
GCP(Elevation) - 219 m
CUSTODY IN GOVERNMENT OF PUNJAB
1:1,200
0 0.0425 0.085 0.17 0.255 0.34
Kilometers
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
VILLEAGE JALLALABAD
CODE
POTENTIAL AREA (Ha)
PB-TT-BEAS-08
16.62
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE: ESRI HIGH RESOLUTION SATELLITE IMAGE AND FIELD SURVEY DATA

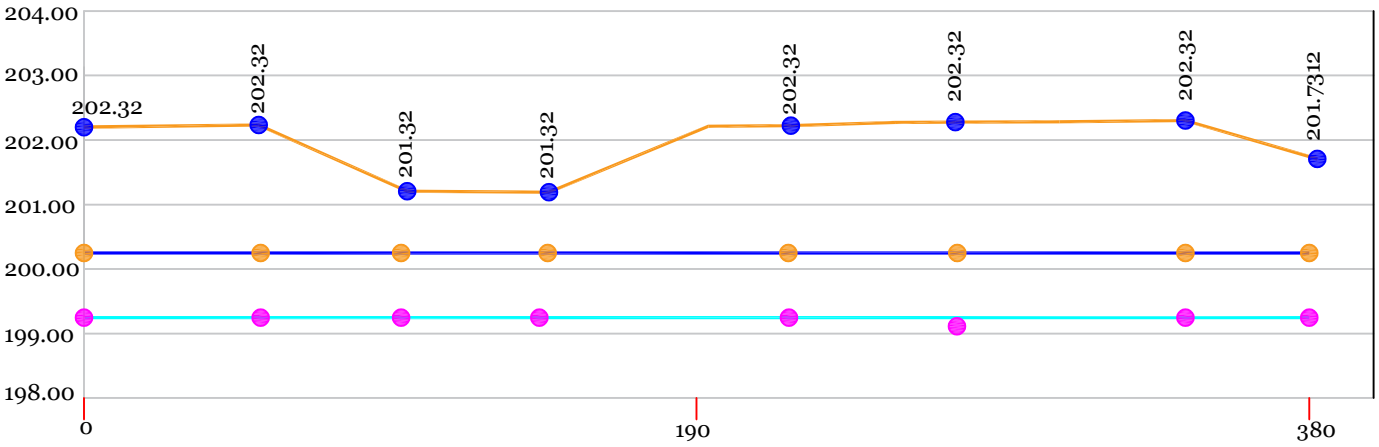

PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT,PUNJAB
BEAS RIVER PART- 6
75°12'45"E
31°26'45"N
OGL(Elevation) - 221 m
BEAS RIVER
PB-TT-BEAS-09
GCP(Elevation) - 220.25 m
GCP(Elevation) - 219.52 m
CUSTODY IN GOVERNMENT OF PUNJAB
1:636
0 0.0225 0.045 0.135 0.18
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
VILLEAGE BHALOJLA
CODE
POTENTIAL AREA (Ha)
PB-TT-BEAS-10
0.64
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE: ESRI HIGH RESOLUTION SATELLITE IMAGE AND FIELD SURVEY DATA


PROPOSED SAND BLOCK MAP OF TARN-TARAN DISTRICT,PUNJAB
BEAS RIVER PART- 6
OGL(Elevation) - 227.63 m
PB-TT-BEAS-10
GCP(Elevation) - 227 m
GCP(Elevation) - 226 m
BEAS RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:400
0 0.0125 0.025 0.05 0.075 0.1
Kilometers
31°28'30"N
75°15'0"E
LEGEND
District Boundary
Restricted Zone
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
VILLEAGE BHALOJLA
CODE
POTENTIAL AREA (Ha)
PB-TT-BEAS-10
0.64
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE: ESRI HIGH RESOLUTION SATELLITE IMAGE AND FIELD SURVEY DATA

ANNEXURE-IX

Cross-section of the Final Proposed Zones with Thelweg point

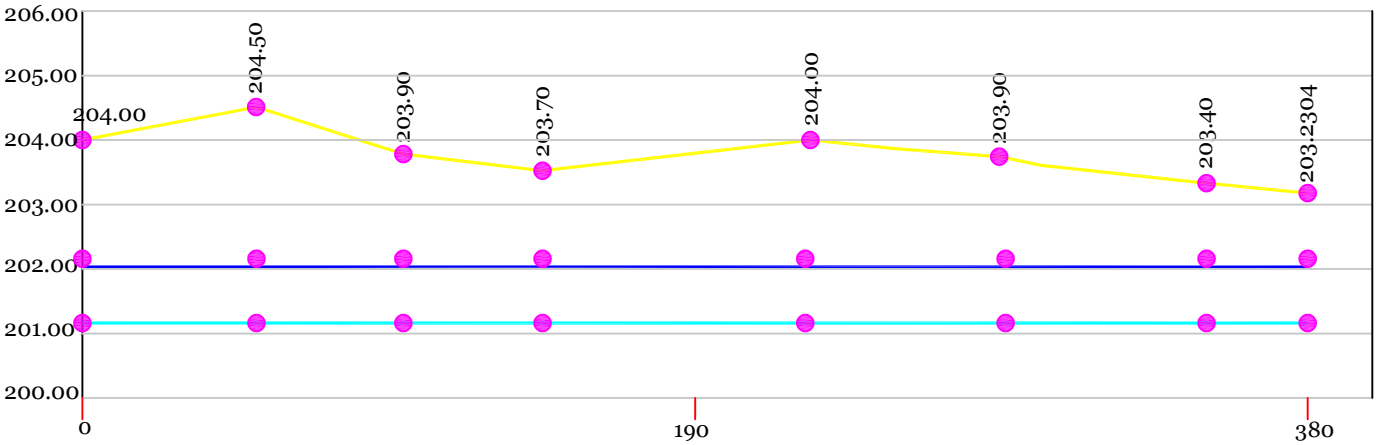
PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 01(A-A')
Ave Depth = (2+2+1+1+2+2+2+1.4112)/8= 1.6764(M)
VOLUME=491500 x 1.6764 x 1.724 = 1420490.8344(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

POST MONSOON

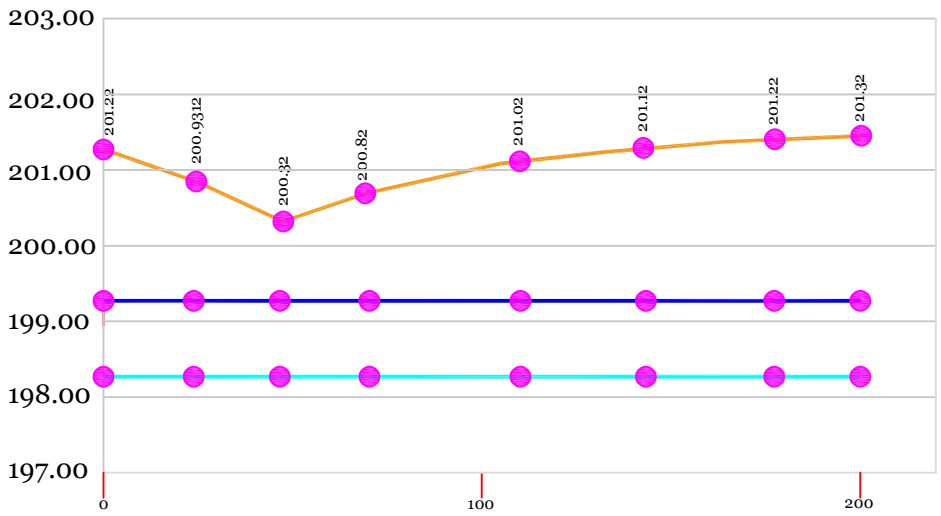


CROSS SECTION OF PB - TT - SUT - 01(A-A')
Ave Depth = (2+2.5+1.9+1.7+2+1.9+1.4+1.2304)/8= 1.8288(M)
VOLUME=491500 x 1.8288 x 1.724 = 1549626.3648(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

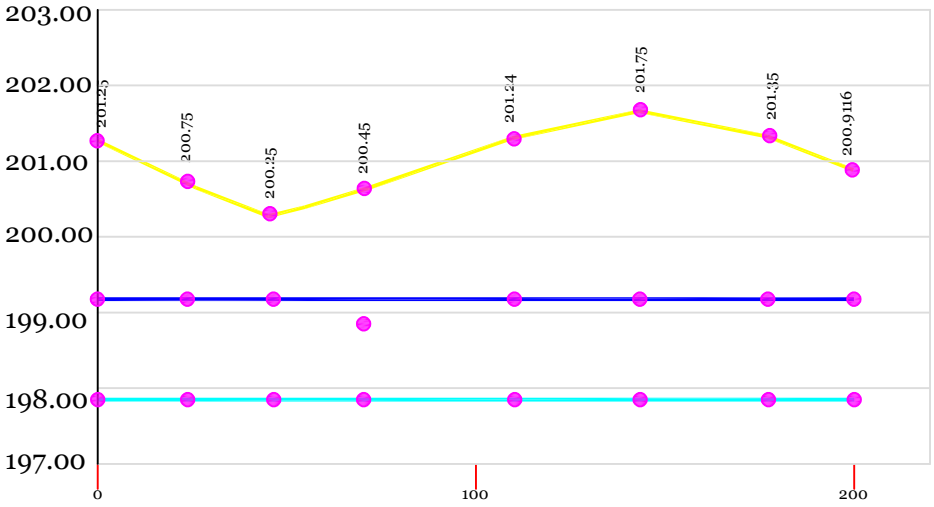
SOURCE : FIELD SURVEY

PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 02(A-A')
Ave Depth = (1.9+1.6112+1+1.5+1.7+1.8+1.9+2)/8= 1.6764(M)
VOLUME=119600 x 1.6764 x 1.724 = 345657.58656(MT)

POST MONSOON



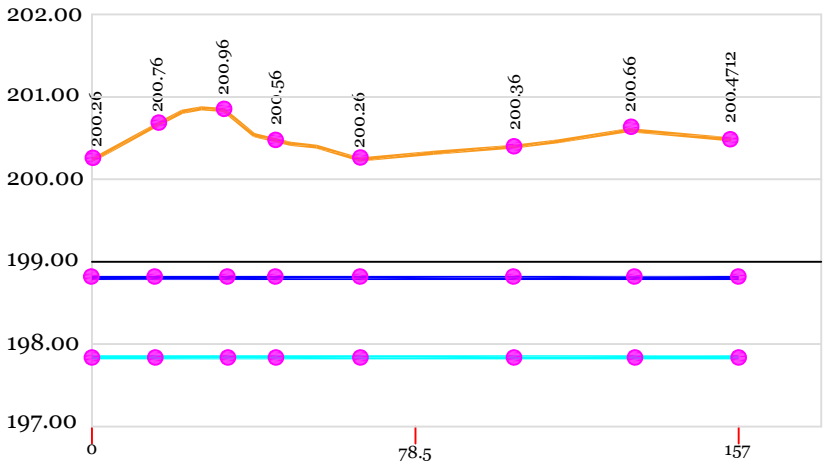
RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

CROSS SECTION OF PB - TT - SUT - 02(A-A')
Ave Depth = (2+1.5+1+1.2+2+2.5+2.1+1.6616)/8= 1.7452(M)
VOLUME=119600 x 1.7452 x 1.724 = 359843.4861(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

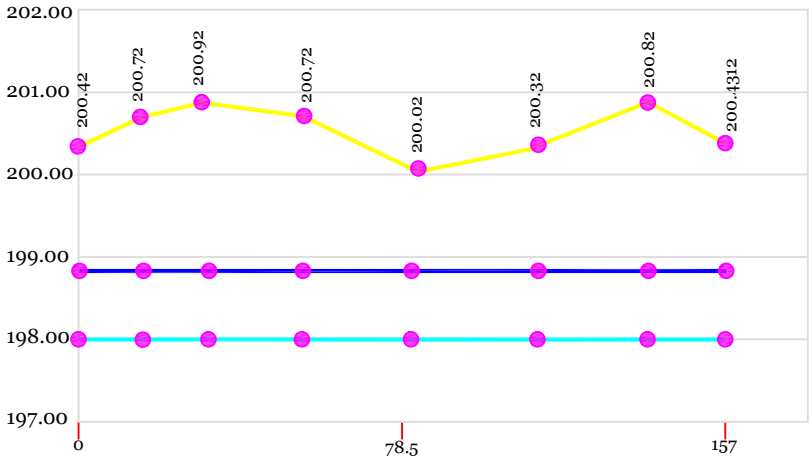
SOURCE : FIELD SURVEY

PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 03(A-A')
Ave Depth = (1.4+1.9+2.1+1.7+1.4+1.5+1.8+1.6112)/8= 1.6764(M)
VOLUME=89700 x 1.6764 x 1.724 = 259243.18992(MT)

POST MONSOON



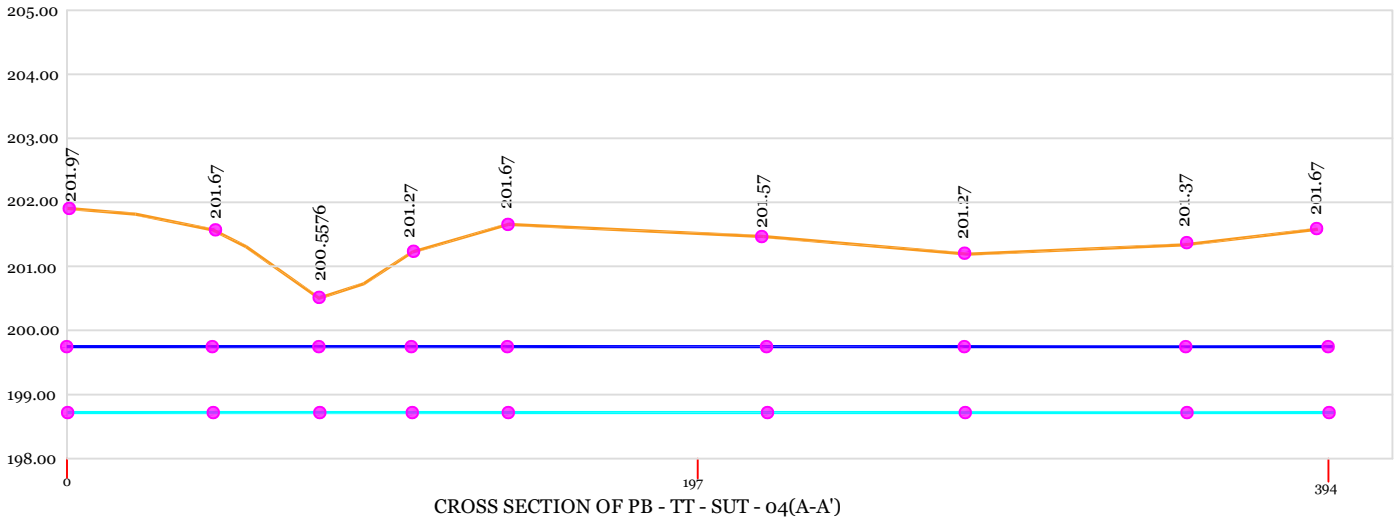
CROSS SECTION OF PB - TT - SUT - 03(A-A')
Ave Depth = (1.6+1.9+2.1+1.9+1.2+1.5+2+1.6112)/8= 1.7236(M)
VOLUME=89700 x 1.7236 x 1.724 = 266542.3301(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

PRE MONSOON



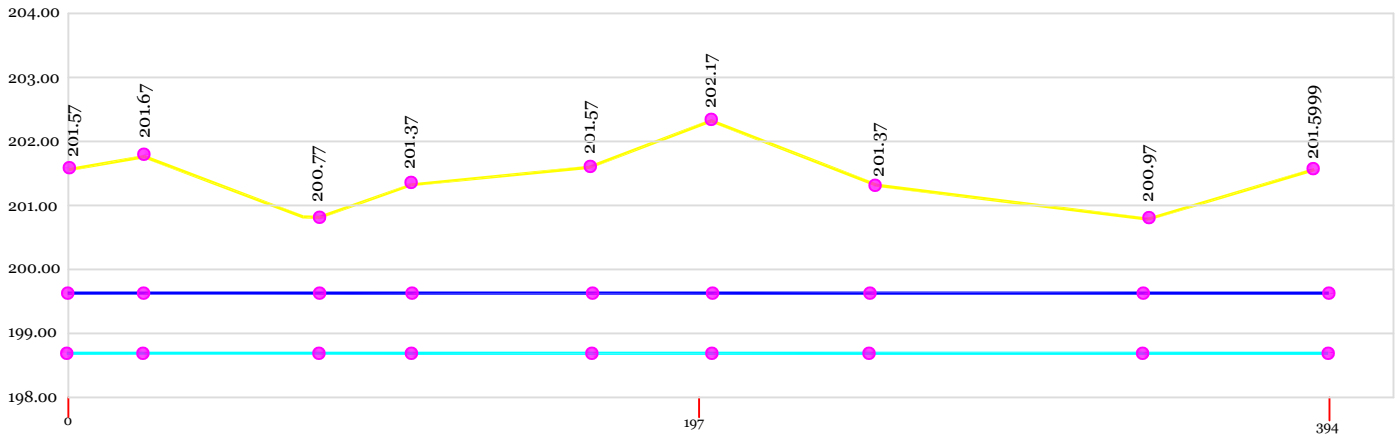
CROSS SECTION OF PB - TT - SUT - 04(A-A')

Ave Depth = (2.2+1.9+0.7876+1.5+1.9+1.8+1.5+1.6+1.9)/9= 1.6764(M)

VOLUME=375000 x 1.6764 x 1.721 = 1081906.6500(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

POST MONSOON



CROSS SECTION OF PB - TT - SUT - 04(A-A')

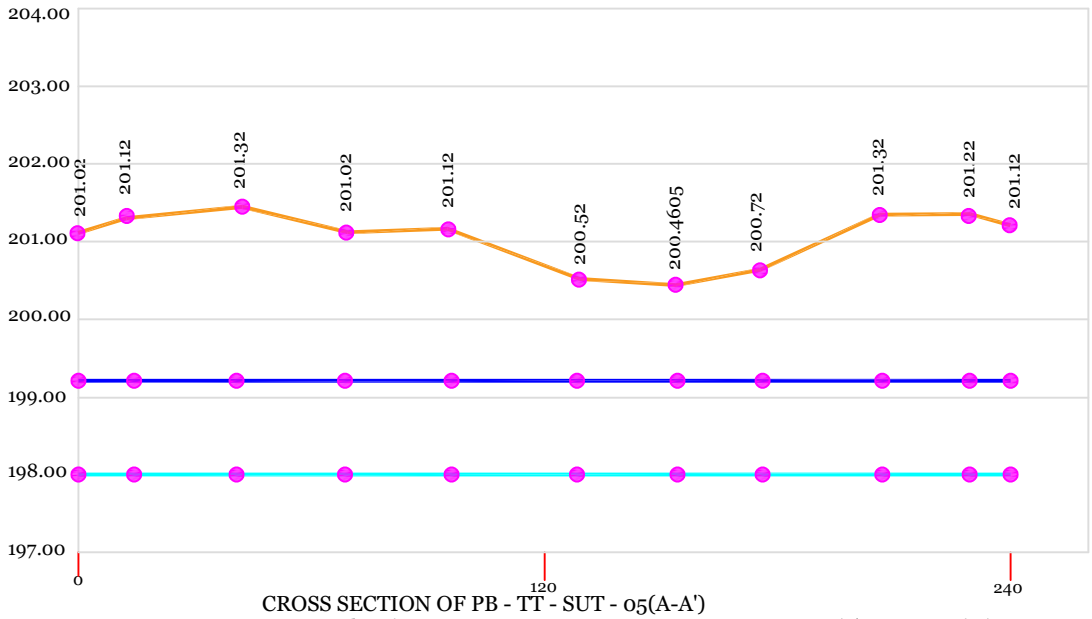
Ave Depth = (1.9+2+1.1+1.7+1.9+2.5+1.7+1.3+1.9299)/9= 1.7811(M)

VOLUME=375000 x 1.7811 x 1.721 = 1149477.4125(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

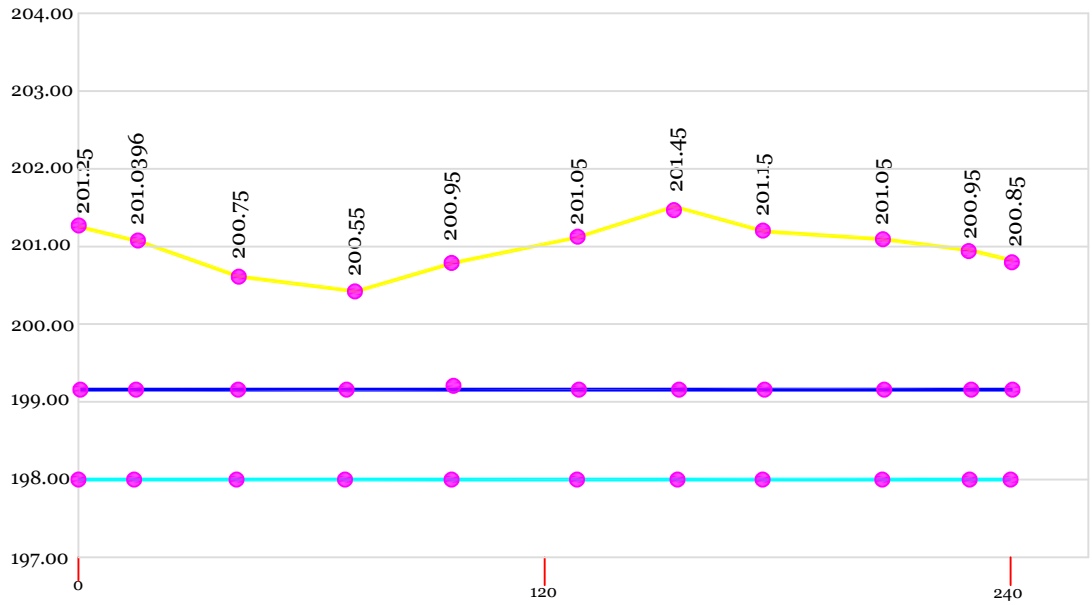
PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 05(A-A')
Ave Depth = (1.7+1.8+2+1.7+1.8+1.2+1.1405+1.4+2+1.9+1.8)/11= 1.6764(M)
VOLUME=214000 x 1.6764 x 1.721 = 617408.0616 (MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

POST MONSOON

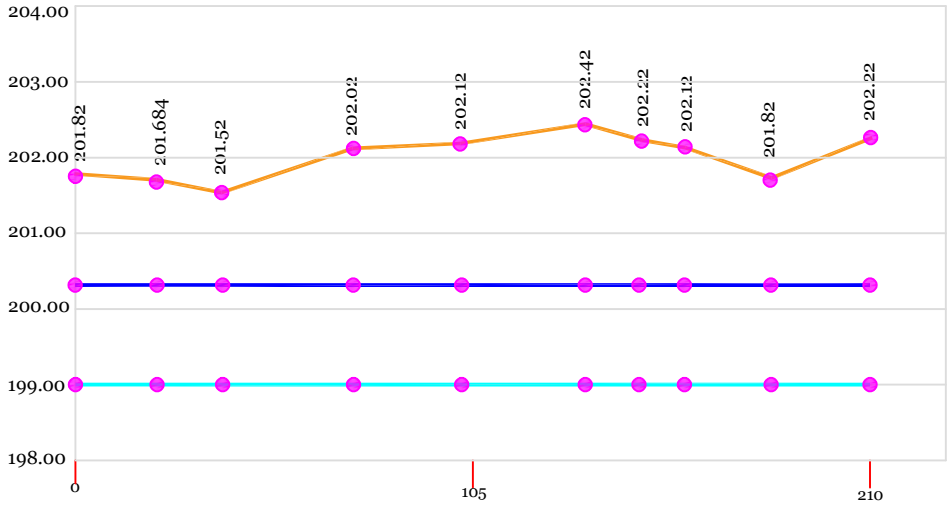


CROSS SECTION OF PB - TT - SUT - 05(A-A')
Ave Depth = (2+1.7896+1.5+1.3+1.7+1.8+2.2+1.9+1.8+1.7+1.6)/11= 1.7536(M)
VOLUME=214000 x 1.6764 x 1.721 = 645840.3584(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

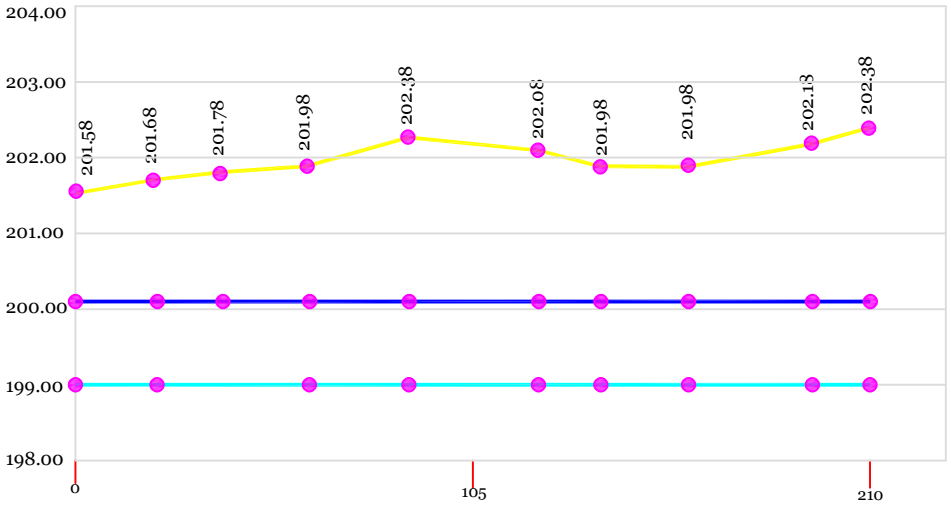
SOURCE : FIELD SURVEY

PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 06(A-A')
Ave Depth = (1.5+1.364+1.2+1.7+1.8+2.1+1.9+1.8+1.5+1.9)/10= 1.6764(M)
VOLUME=48900 x 1.6764 x 1.721 = 141080.6272(MT)

POST MONSOON

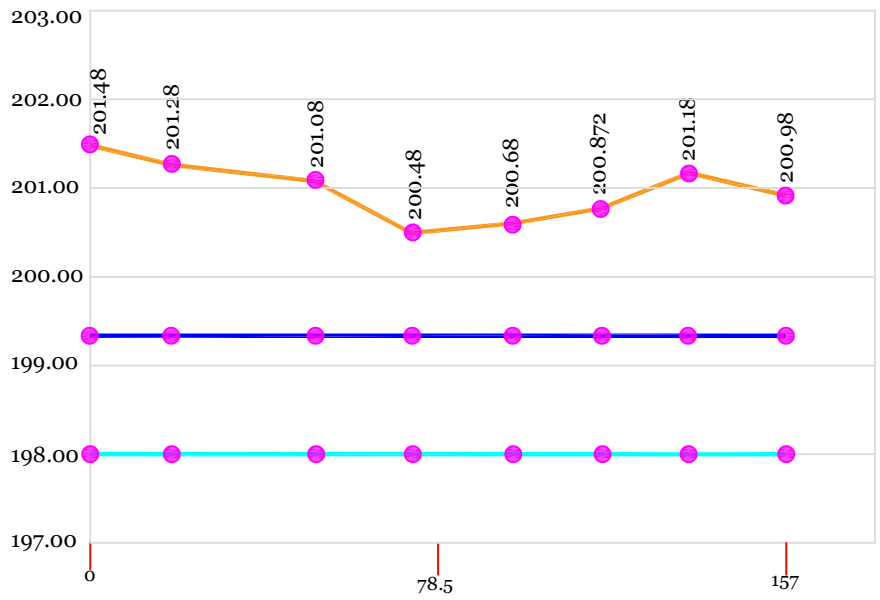


CROSS SECTION OF PB - TT - SUT - 06(A-A')
Ave Depth = (1.4+1.5+1.6+1.8+2.2+1.9+1.8+1.8+2+2.2)/10= 1.8233(M)
VOLUME=48900 x 1.8233 x 1.721= 153443.2758(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

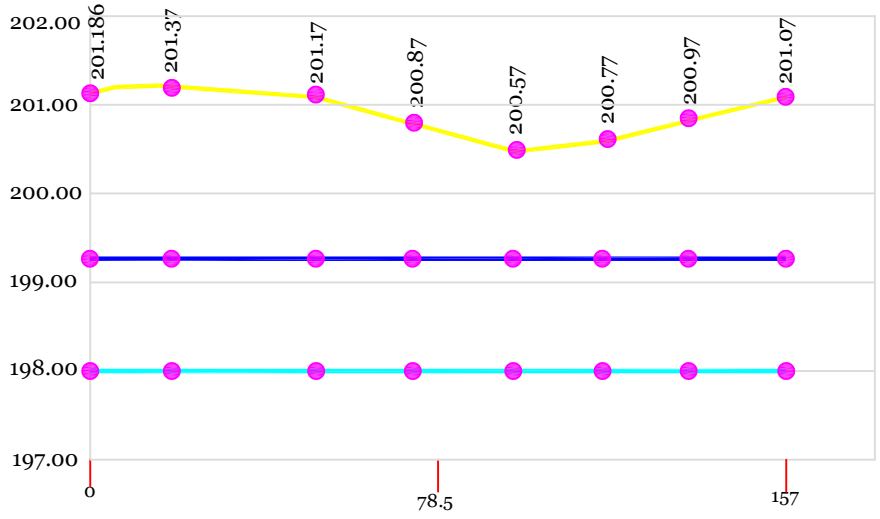
SOURCE : FIELD SURVEY

PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 07(A-A')
Ave Depth = (2+1.8+1.6+1+1.2+1.392+1.7+1.5)/8= 1.524(M)
VOLUME=192400 x 1.524 x 1.7 = 146898.3600(MT)

POST MONSOON



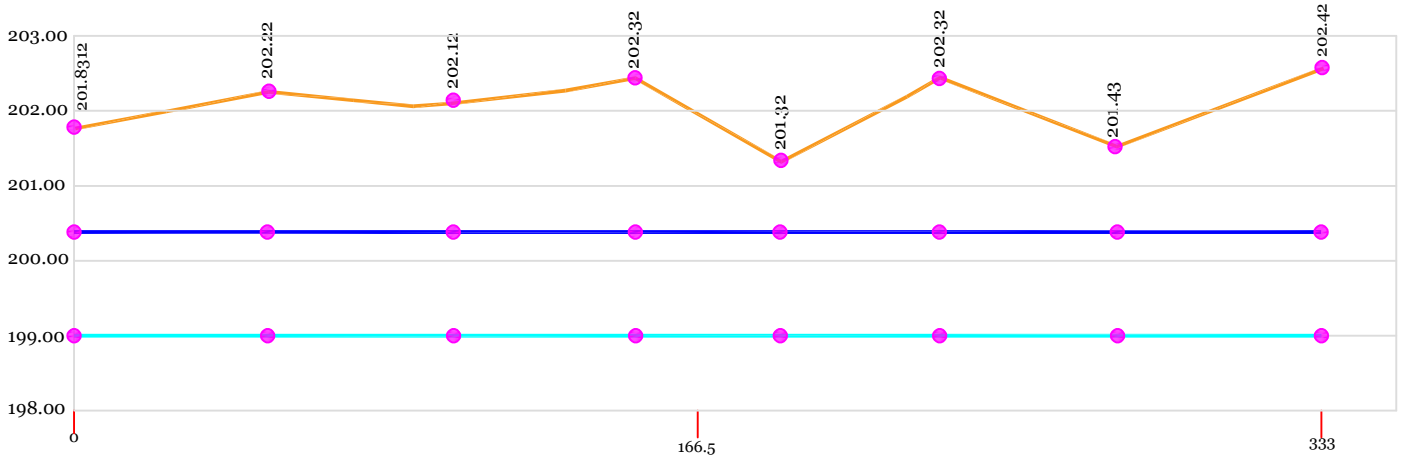
CROSS SECTION OF PB - TT - SUT - 07(A-A')
Ave Depth = (1.816+2+1.8+1.5+1.2+1.4+1.6+1.7)/8= 1.6270(M)
VOLUME=56700 x 1.6270 x 1.7 = 156826.5300(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

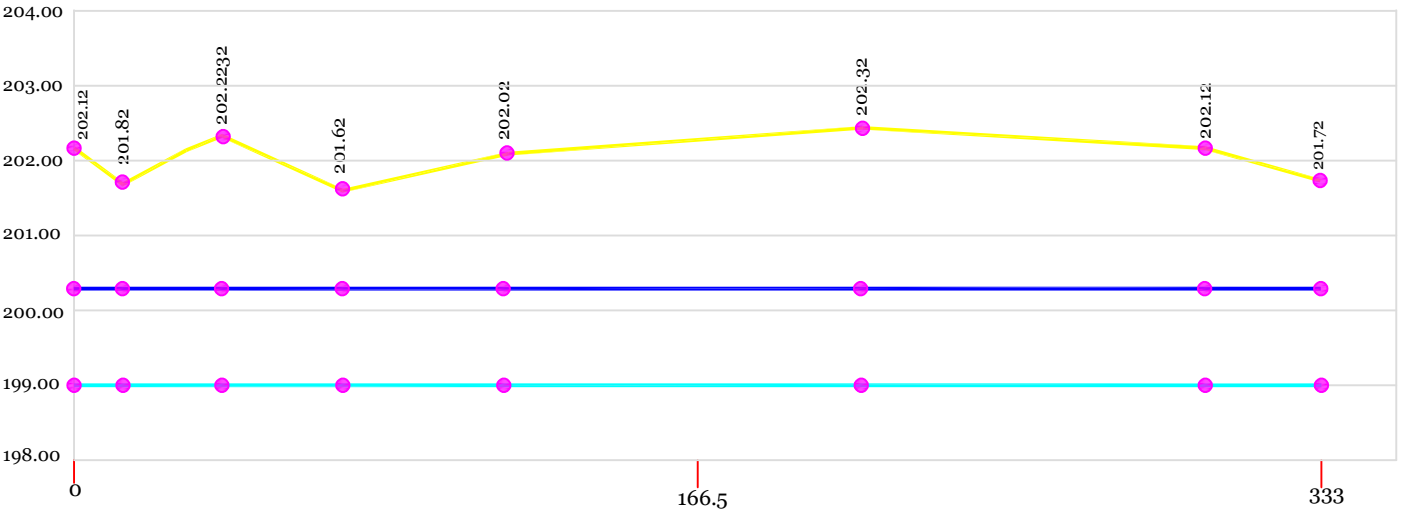
PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 08(A-A')
Ave Depth = (1.5112+1.9+1.8+2+1+2+1.11+2.1)/8= 1.6764(M)
VOLUME=192400 x 1.6764 x 1.7 = 548316.9120(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

POST MONSOON

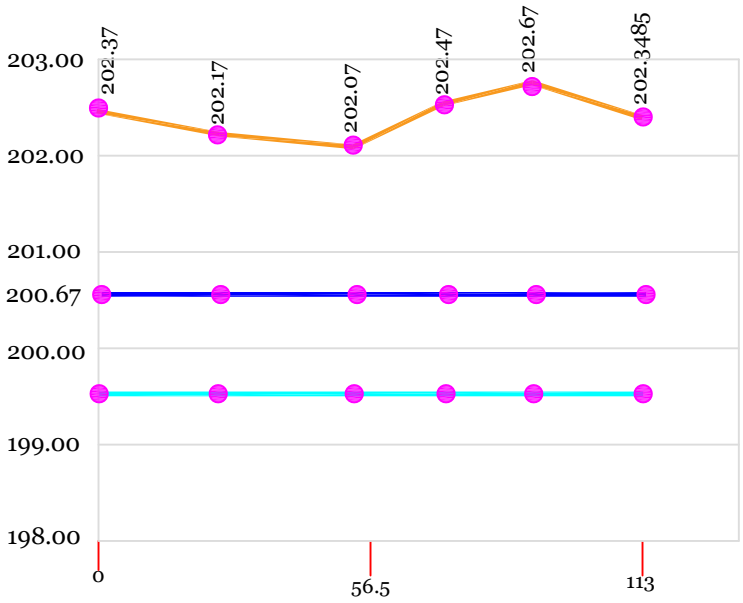


CROSS SECTION OF PB - TT - SUT - 08(A-A')
Ave Depth = (1.9+1.6+2.0032+1.4+1.8+2.1+1.9+1.5)/8= 1.7754(M)
VOLUME=192400 x 1.7754 x 1.7 = 580697.8320(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

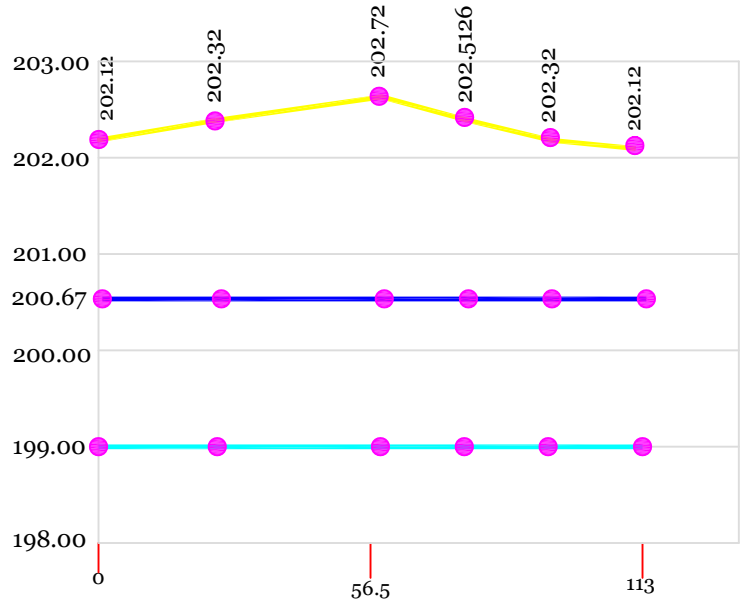
SOURCE : FIELD SURVEY

PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 09(A-A')
Ave Depth = (1.7+1.5+1.4+1.8+2+1.6584)/6= 1.6764(M)
VOLUME=29500 x 1.6764 x 1.678 = 82983.4764(MT)

POST MONSOON



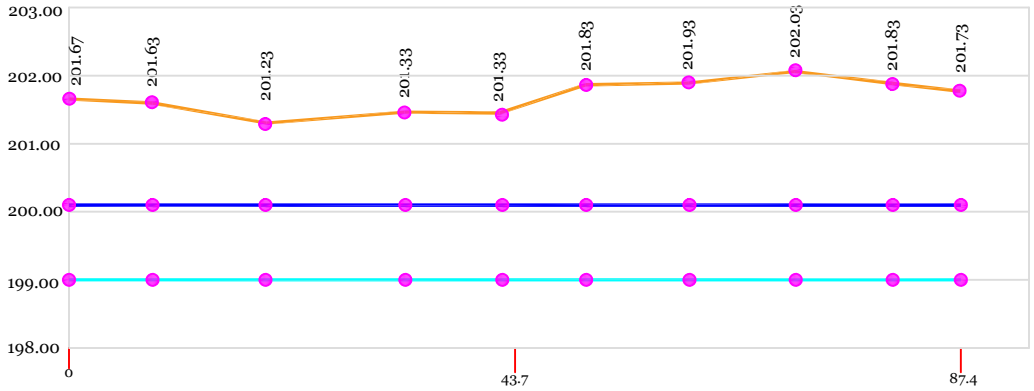
CROSS SECTION OF PB - TT - SUT - 09(A-A')
Ave Depth = (1.5+1.7+2.1+1.8926+1.7+1.5)/6= 1.7321(M)
VOLUME=29500 x 1.7321 x 1.678 = 85740.6821(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

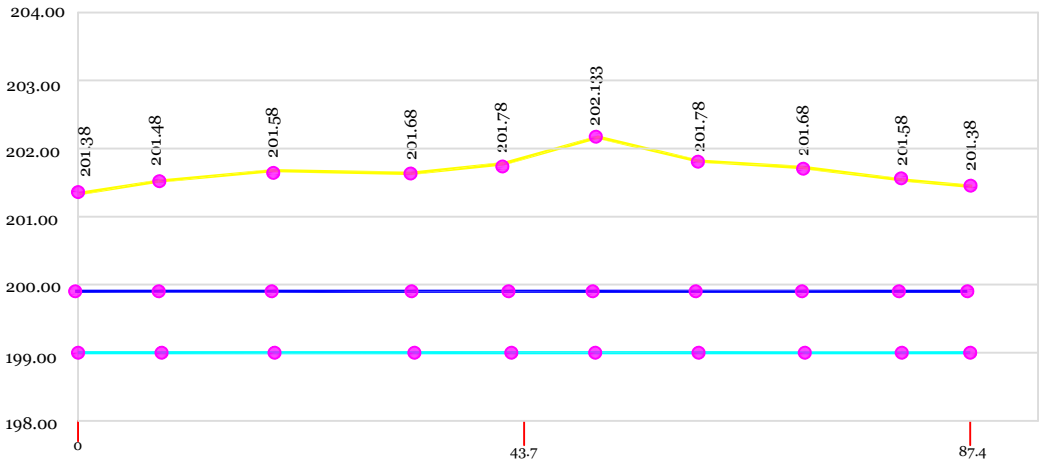
SOURCE : FIELD SURVEY

PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 10(A-A')
Ave Depth = (1.54+1.5+1.1+1.2+1.2+1.7+1.8+1.9+1.7+1.6)/10= 1.524(M)
VOLUME=55400 x 1.524 x 1.678 = 141672.8688(MT)

POST MONSOON



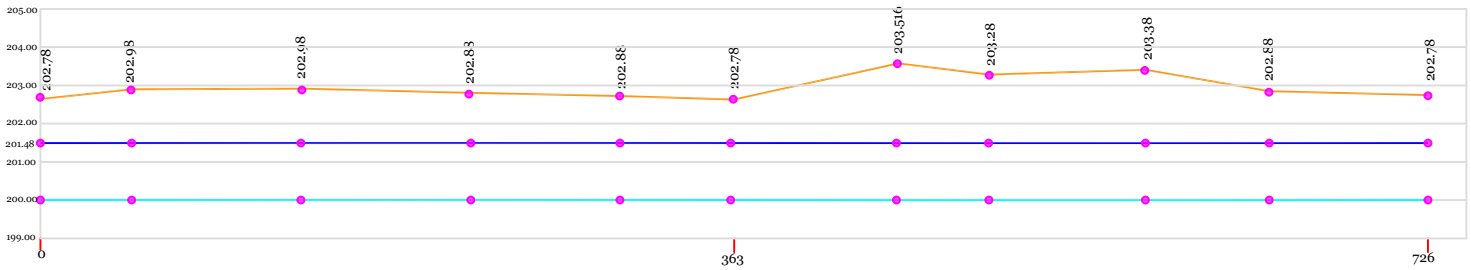
CROSS SECTION OF PB - TT - SUT - 10(A-A')
Ave Depth = (1.4+1.5+1.6+1.7+1.8+2.153+1.8+1.7+1.6+1.4)/10= 1.653(M)
VOLUME=55400 x 1.653 x 1.678 = 154808.2864(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

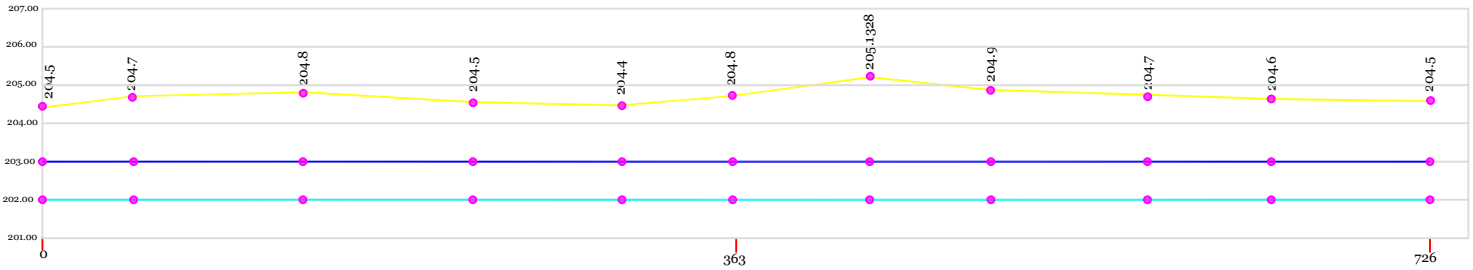
PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 11(A-A')
Ave Depth = (1.3+1.5+1.5+1.4+1.4+1.3+2.036+1.8+1.9+1.4+1.3)/11= 1.524(M)
VOLUME=886000 x 1.524 x 1.694 = 2287347.2160(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

POST MONSOON

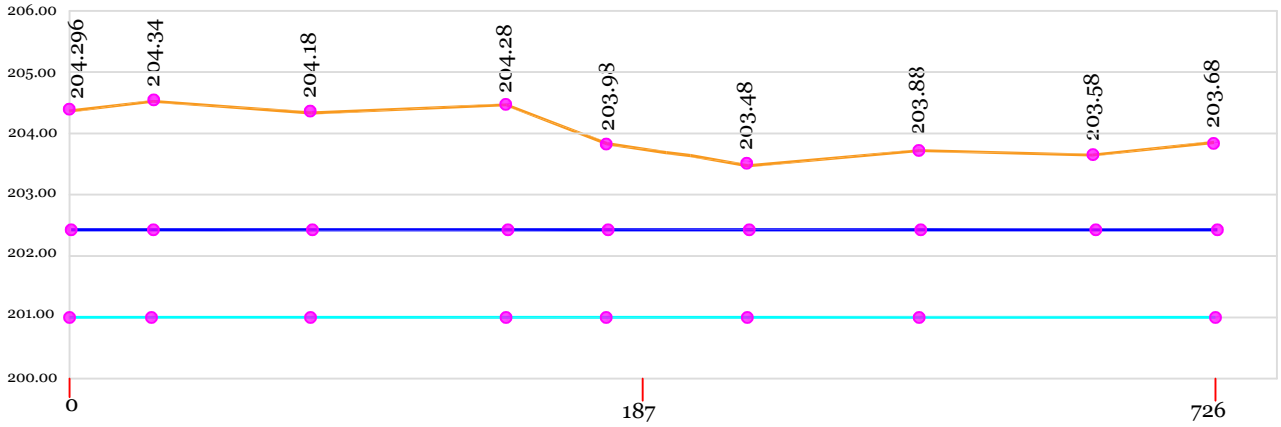


CROSS SECTION OF PB - TT - SUT - 11(A-A')
Ave Depth = (1.5+1.7+1.8+1.5+1.4+1.8+2.1328+1.9+1.7+1.6+1.5)/11= 1.6848(M)
VOLUME=886000 x 1.6848 x 1.694 = 2528689.3632(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

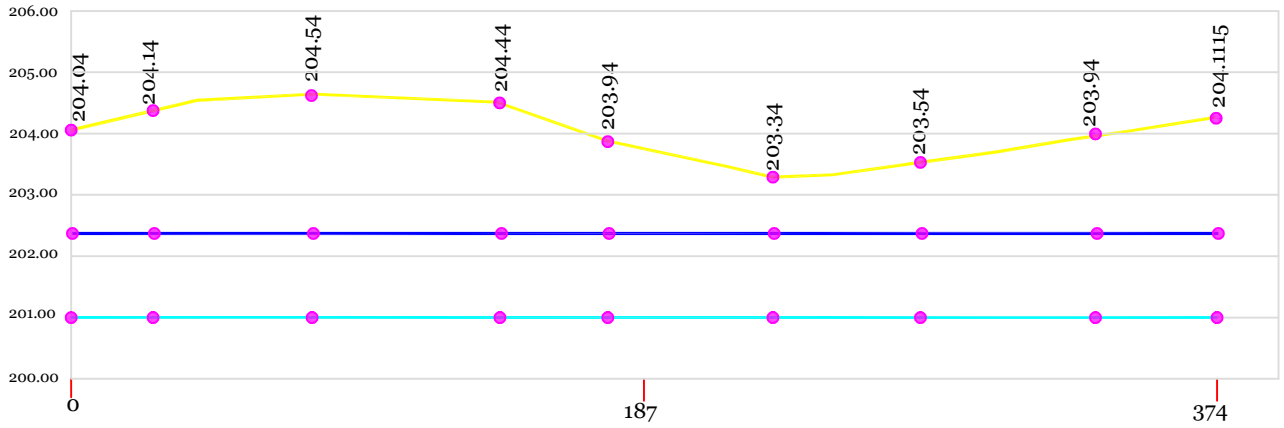
PRE MONSOON



CROSS SECTION OF PB - TT - SUT - 12(A-A')
Ave Depth = (1.816+2.2+1.7+1.8+1.5+1+1.4+1.1+1.2)/9= 1.524(M)
VOLUME=223000 x 1.524 x 1.694 = 575709.2880(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

PRE MONSOON

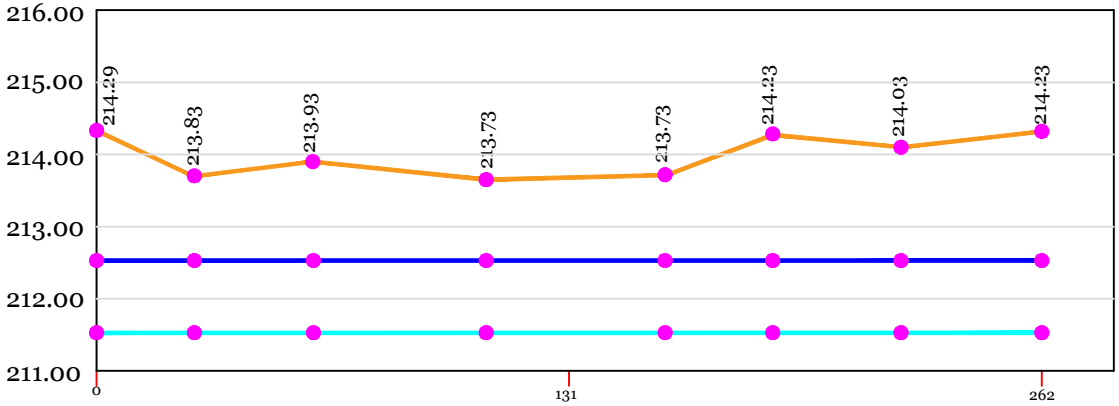


CROSS SECTION OF PB - TT - SUT - 12(A-A')
Ave Depth = (1.7+1.8+2.2+2.1+1.6+1+1+1.2+1.6+1.7715)/9= 1.6635(M)
VOLUME=223000 x 1.6635 x 1.694 = 628407.0870(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

PRE MONSOON

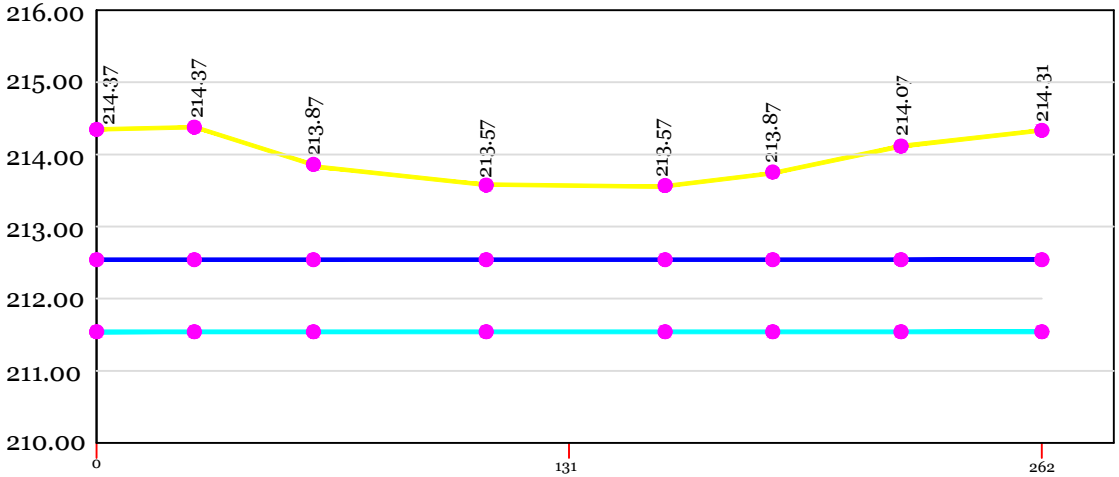


CROSS SECTION OF PB-TT-BEAS-01(A-A')

Ave Depth = (1.66+1.2+1.3+1.1+1.1+1.6+1.4+1.6)/8= 1.37(M)

VOLUME=76600 x 1.66 x 1.65 = 173154.30(MT)

POST MONSOON



RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

CROSS SECTION OF PB-TT-BEAS-01(A-A')

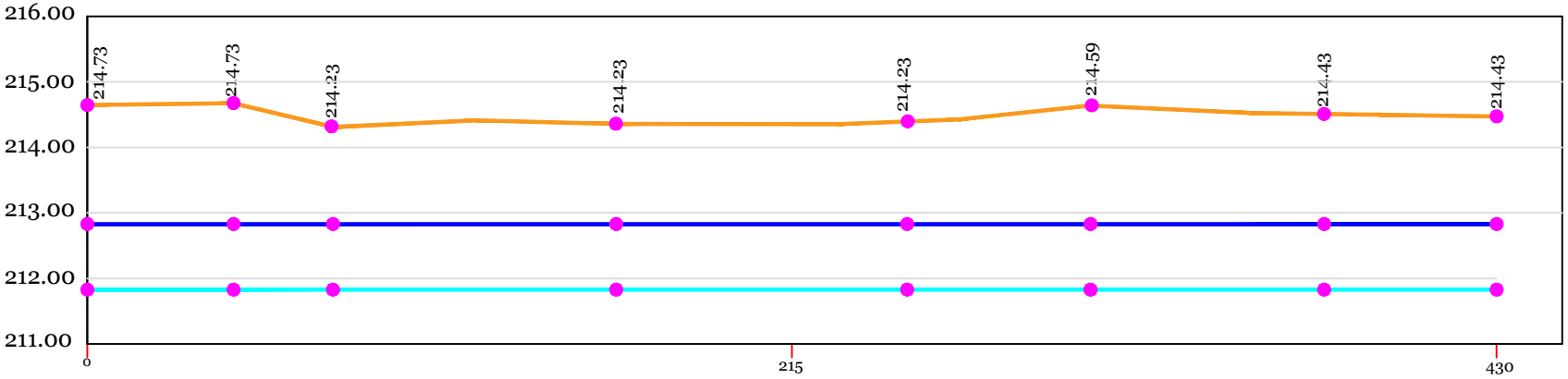
Ave Depth = (1.8+1.8+1.3+1+1+1.3+1.5+1.74)/8= 1.43(M)

VOLUME=76600 x 1.43 x 1.65 = 180737.70(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

PRE MONSOON



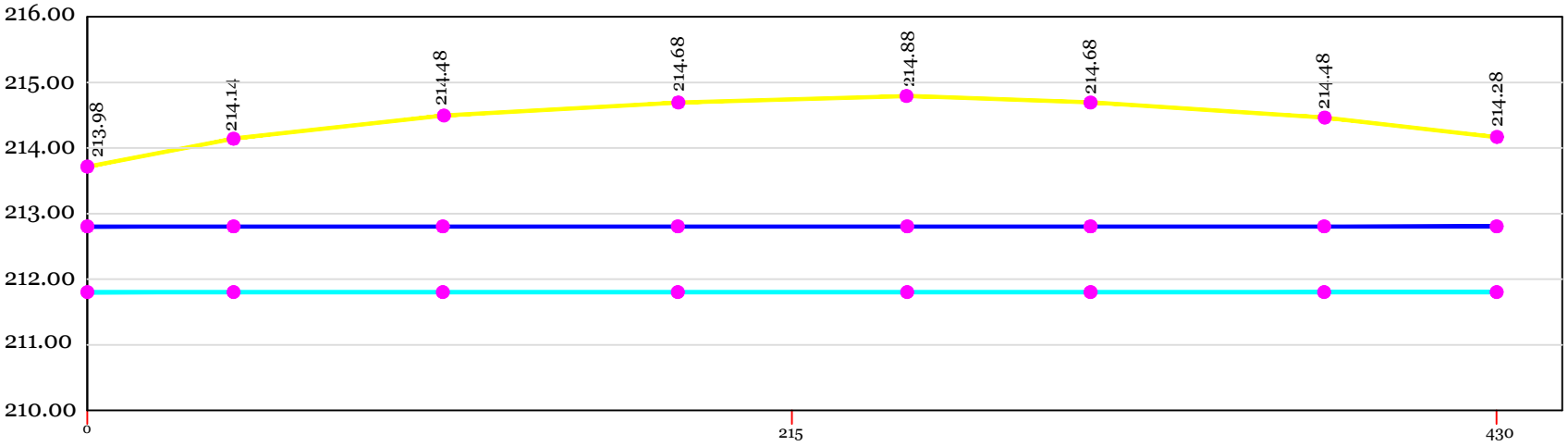
CROSS SECTION OF PB-TT-BEAS-02(A-A')

Ave Depth = (1.8+1.8+1.3+1.3+1.3+1.66+1.5+1.5)/8= 1.52(M)

VOLUME=354900 x 1.52 x 1.65 = 890089.20(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

POST MONSOON



CROSS SECTION OF PB-TT-BEAS-02(A-A')

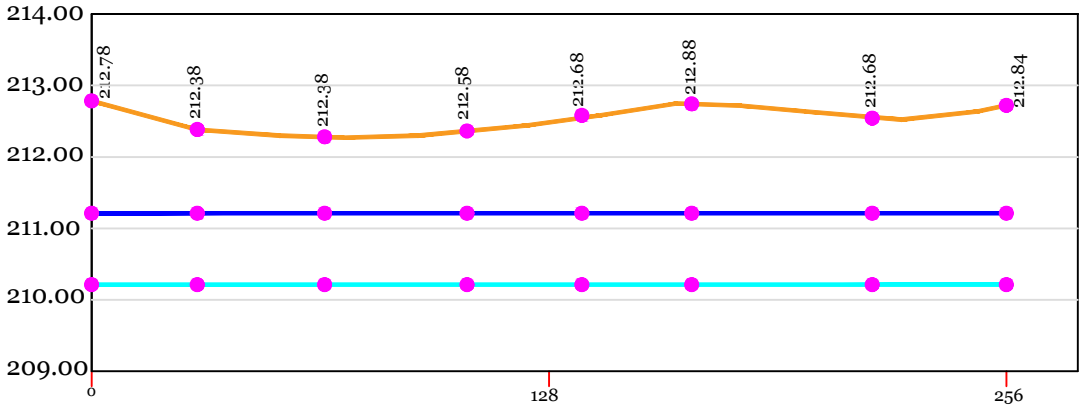
Ave Depth = (1.1+1.26+1.6+1.8+2+1.8+1.6+1.4)/8= 1.57(M)

VOLUME=354900 x 1.57 x 1.65 = 919368.45(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

PRE MONSOON

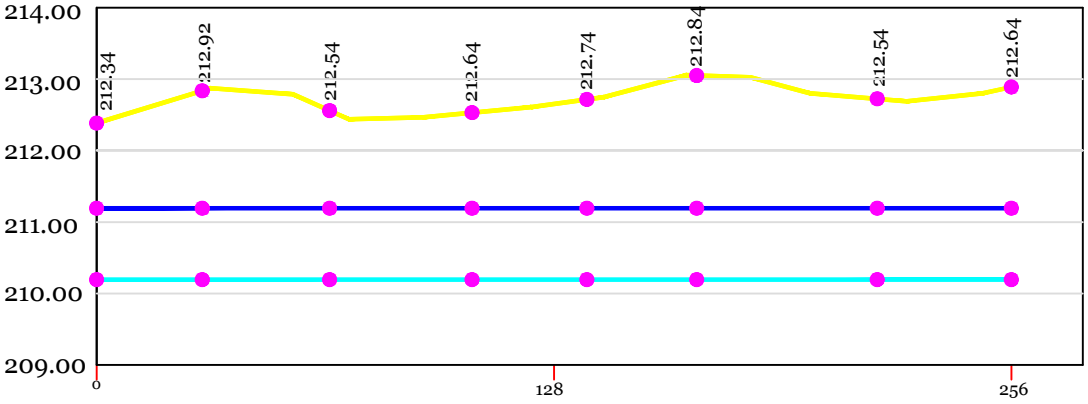


CROSS SECTION OF PB-TT-BEAS-03(A-A')

Ave Depth = (1.5+1.1+1.1+1.3+1.4+1.6+1.4+1.56)/8= 1.37(M)

VOLUME=88100 x 1.37 x 1.65 = 199150.05(MT)

POST MONSOON



RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

CROSS SECTION OF PB-TT-BEAS-03(A-A')

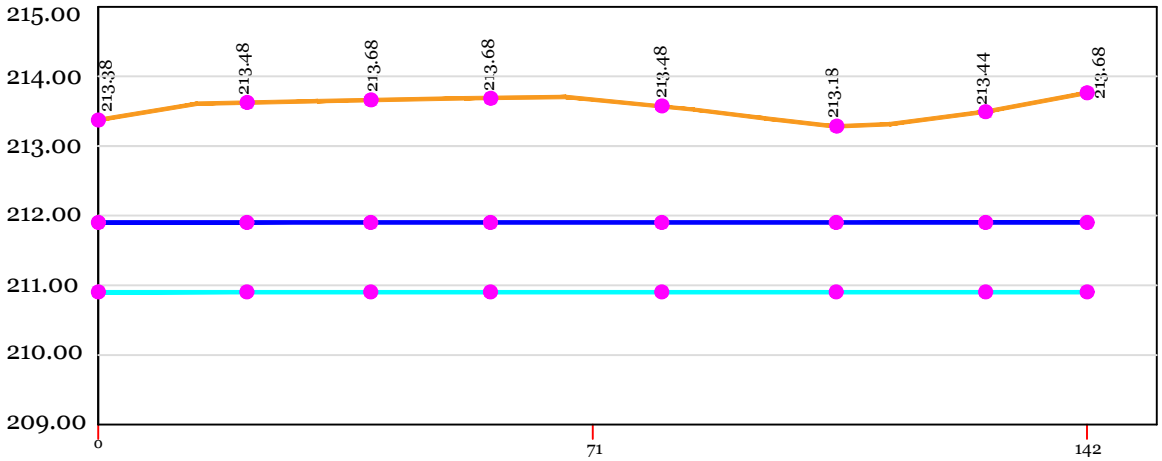
Ave Depth = (1.1+1.68+1.3+1.4+1.5+1.6+1.3+1.4)/8= 1.41(M)

VOLUME=88100 x 1.41 x 1.65 = 204964.65(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

PRE MONSOON

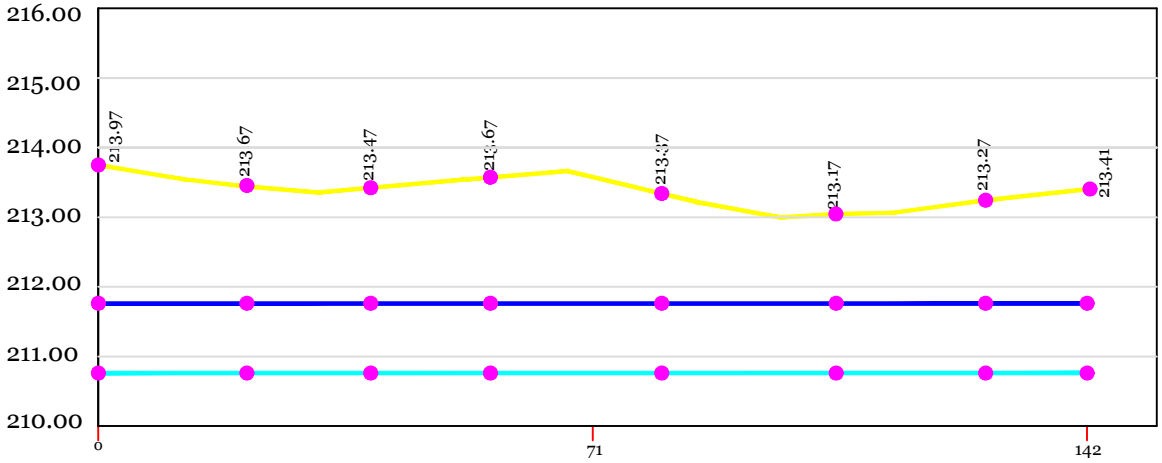


CROSS SECTION OF PB-TT-BEAS-04(A-A')

Ave Depth = (1.4+1.5+1.7+1.7+1.5+1.2+1.46+1.7)/8= 1.52(M)

VOLUME=34800 x 1.52 x 1.65 = 87278.40(MT)

POST MONSOON



CROSS SECTION OF PB-TT-BEAS-04(A-A')

Ave Depth = (2+1.7+1.5+1.7+1.4+1.2+1.3+1.44)/8= 1.53(M)

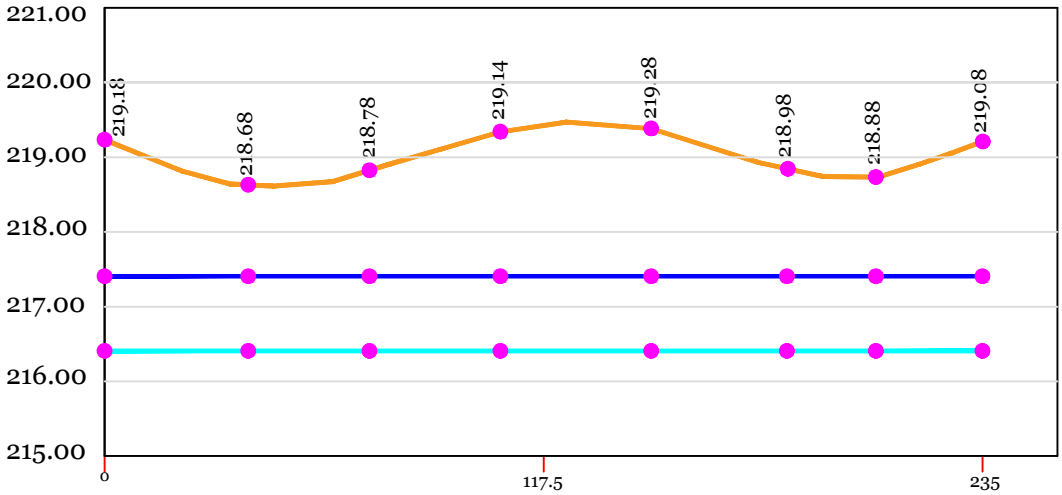
VOLUME=34800 x 1.53 x 1.65 = 87852.60(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

PRE MONSOON

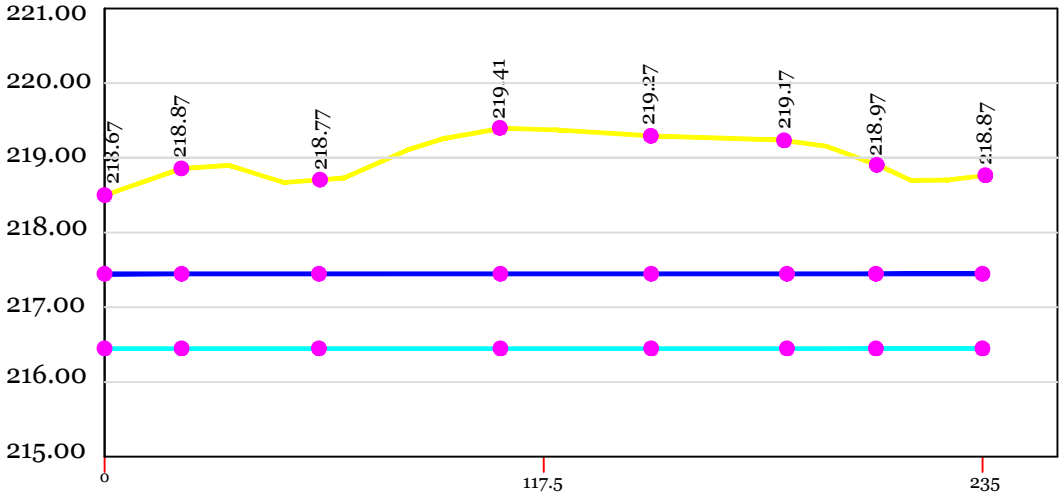


CROSS SECTION OF PB-TT-BEAS-08(A-A')

Ave Depth = (1.7+1.2+1.3+1.66+1.8+1.5+1.4+1.6)/8= 1.52(M)

VOLUME=166200 x 1.52 x 1.65= 416829.60(MT)

POST MONSOON



RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

CROSS SECTION OF PB-TT-BEAS-08(A-A')

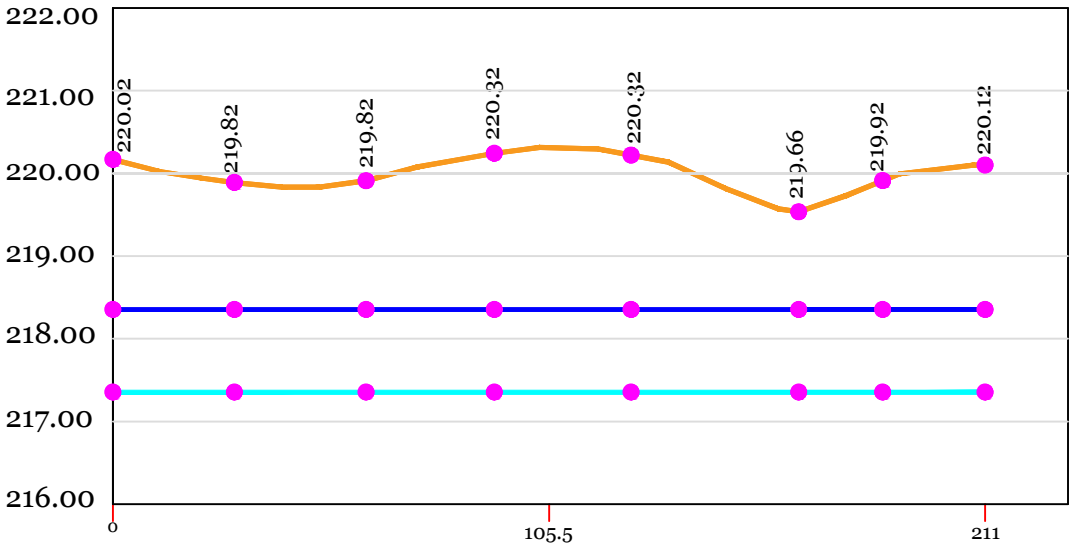
Ave Depth = (1.2+1.4+1.3+1.94+1.8+1.7+1.5+1.4)/8= 1.53(M)

VOLUME=166200 x 1.53 x 1.65 = 419571.90(MT)

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

PRE MONSOON

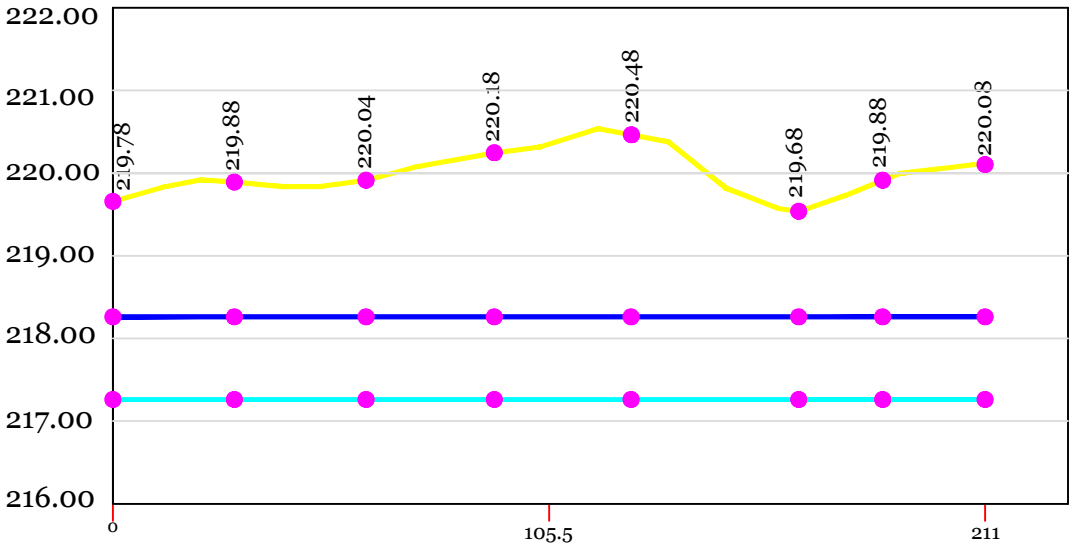


CROSS SECTION OF PB-TT-BEAS-09(A-A')

Ave Depth = (1.7+1.5+1.5+2+2+1.34+1.6+1.8)/8= 1.68(M)

VOLUME=47500 x 1.68 x 1.65 = 131670.00(MT)

POST MONSOON



CROSS SECTION OF PB-TT-BEAS-09(A-A')

Ave Depth = (1.5+1.6+1.76+1.9+2.2+1.4+1.6+1.8)/8= 1.72(M)

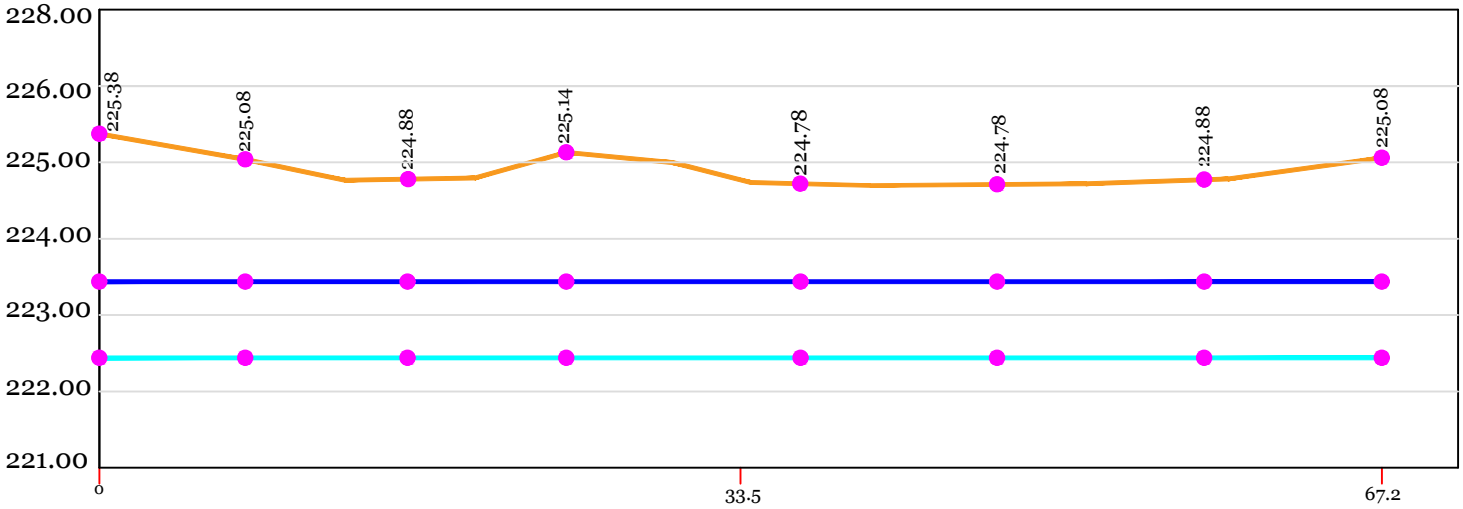
VOLUME=47500 x 1.72 x 1.65 = 134805.00(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

SOURCE : FIELD SURVEY

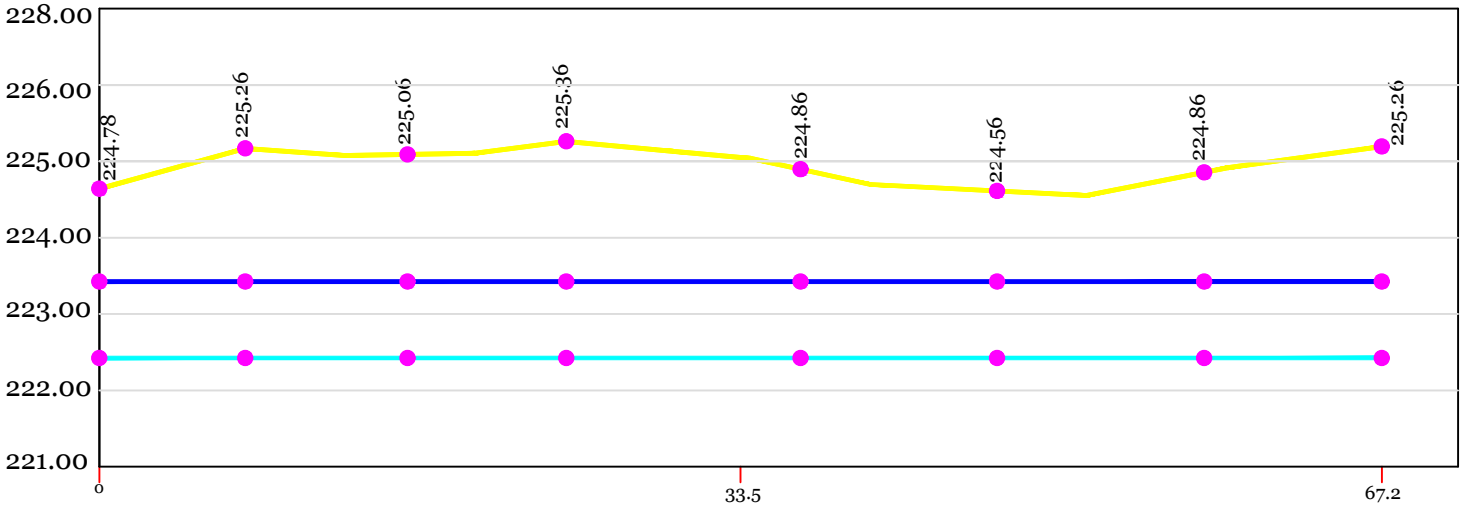
PRE MONSOON



CROSS SECTION OF PB-TT-BEAS-10(A-A')
Ave Depth = (1.9+1.6+1.4+1.66+1.3+1.3+1.4+1.6)/8= 1.52(M)
VOLUME=6400 x 1.52 x 1.65 = 16051.20(MT)

RED LINE	
THALWEG LINE	
PRE MONSOON ELEVATION	
POST MONSOON ELEVATION	

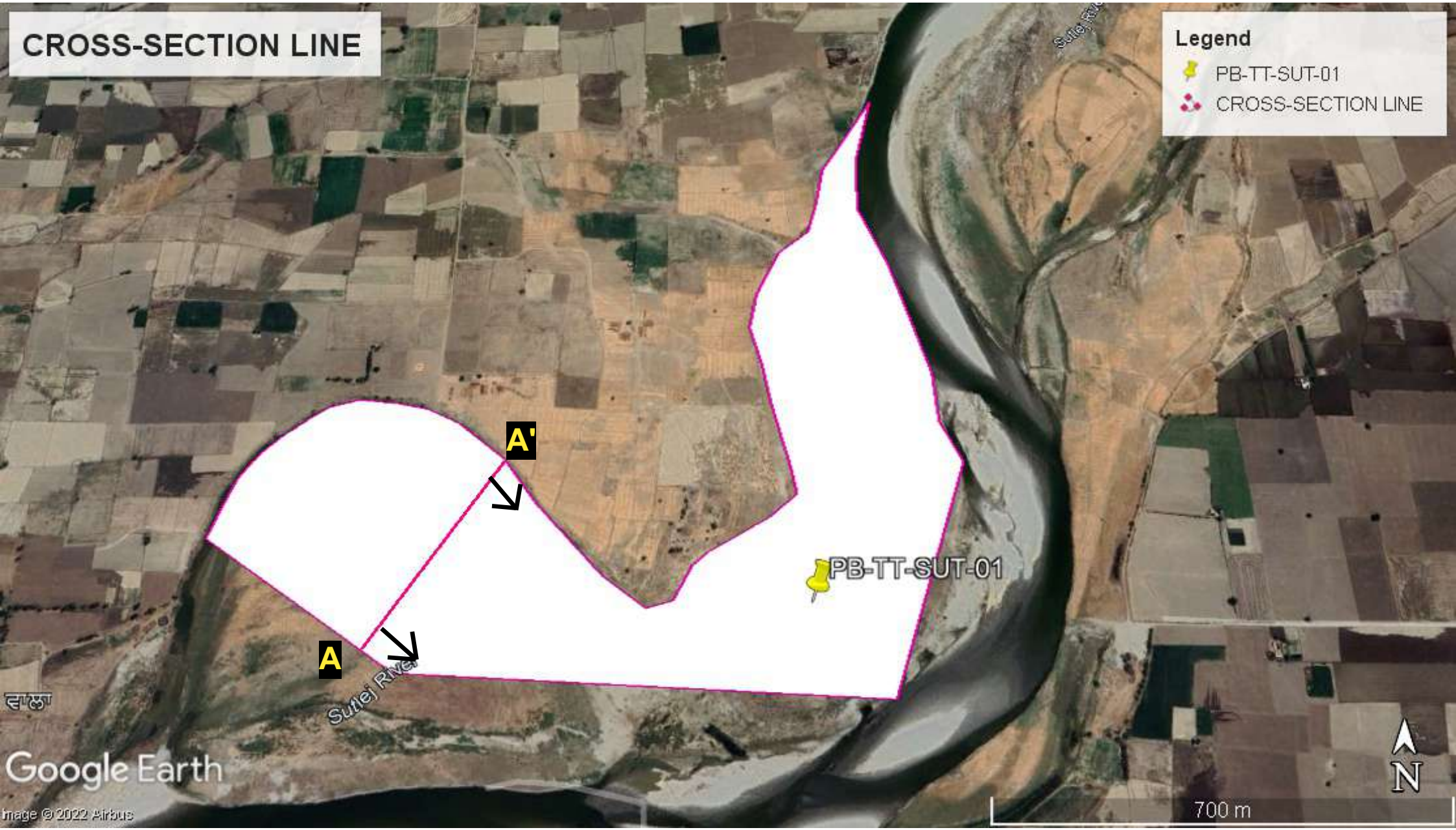
POST MONSOON

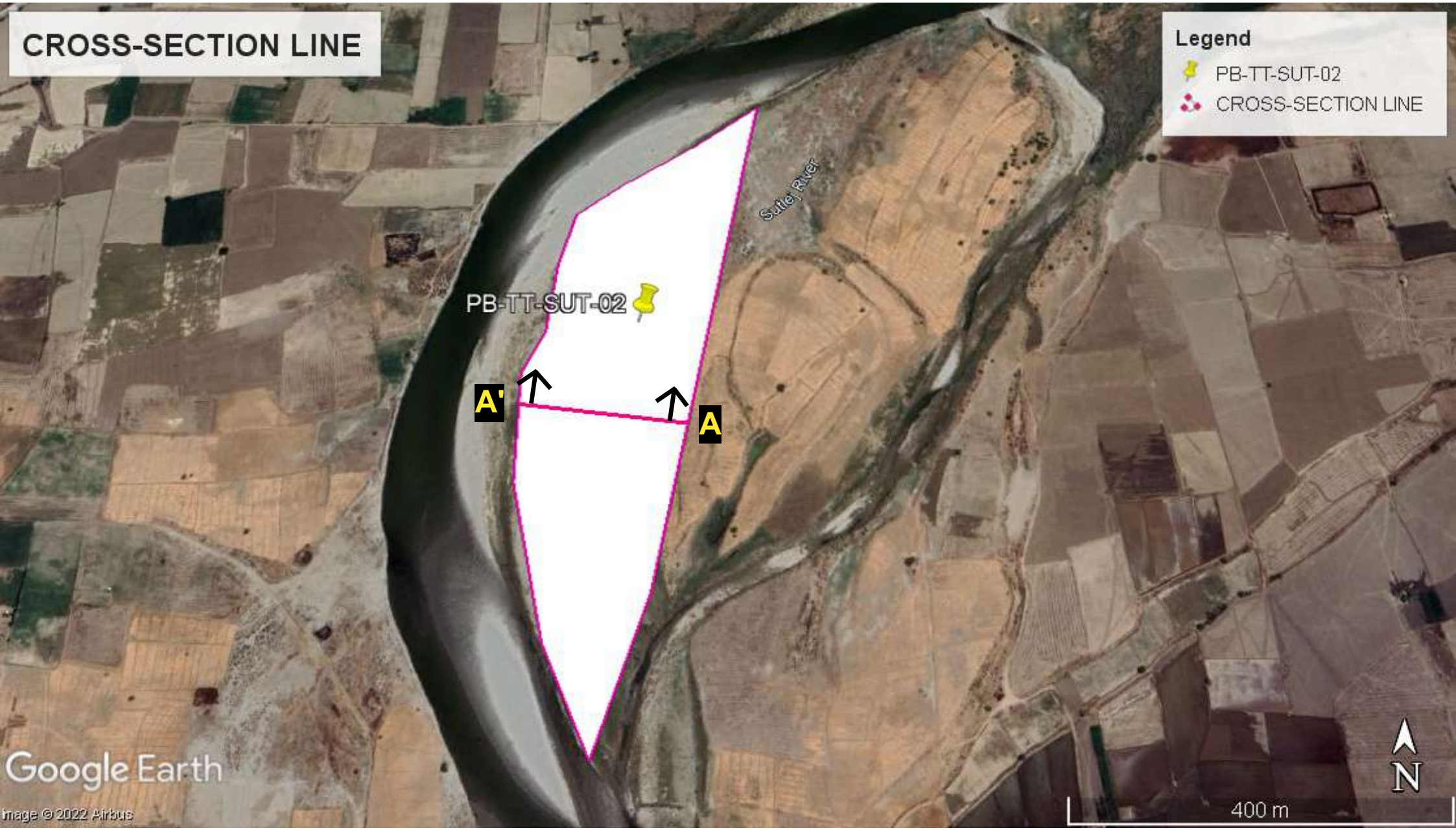


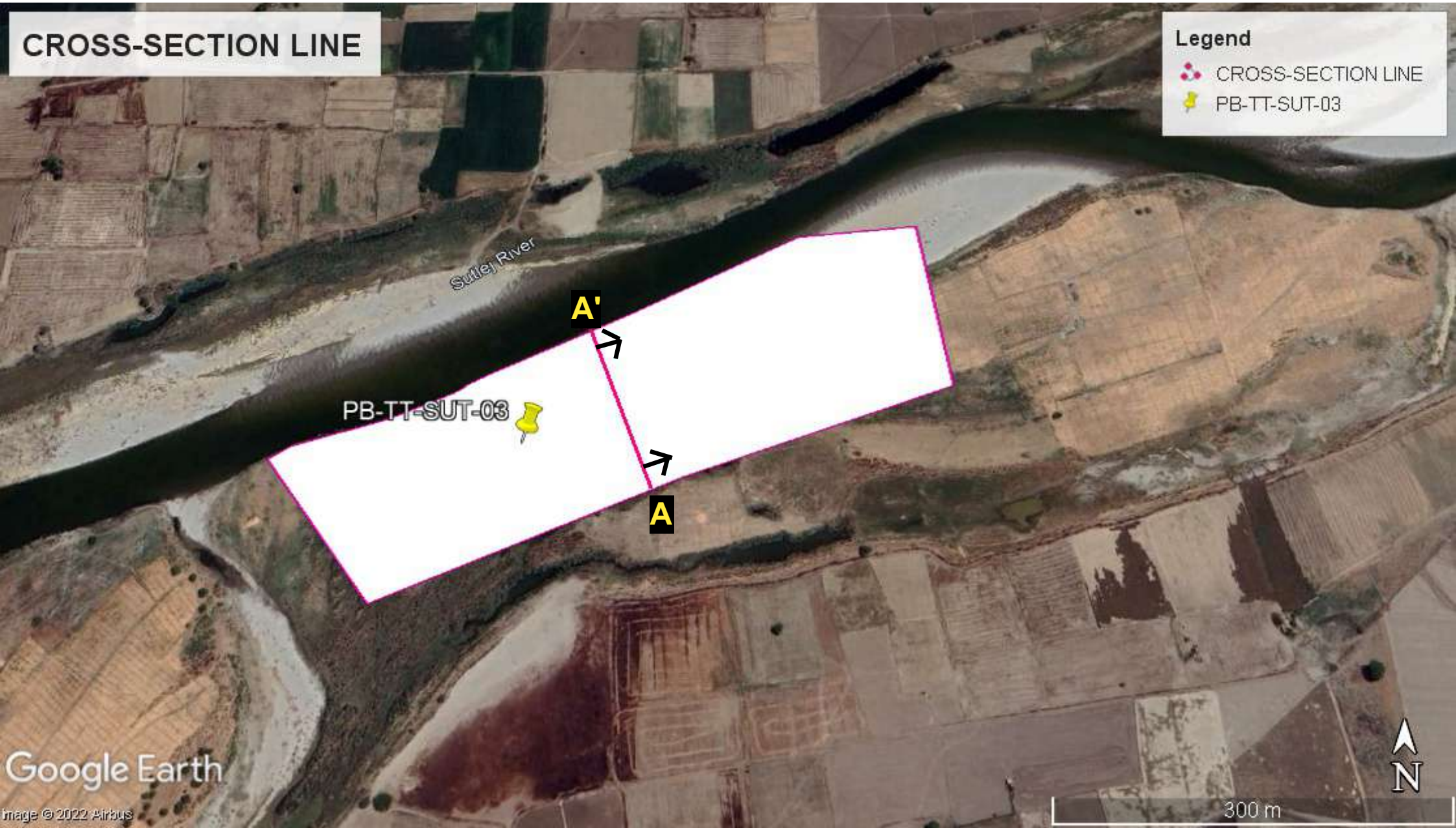
CROSS SECTION OF PB-TT-BEAS-10(A-A')
Ave Depth = (1.32+1.8+1.6+1.9+1.4+1.1+1.4+1.8)/8= 1.54(M)
VOLUME=6400 x 1.54 x 1.65 = 16262.40(MT)

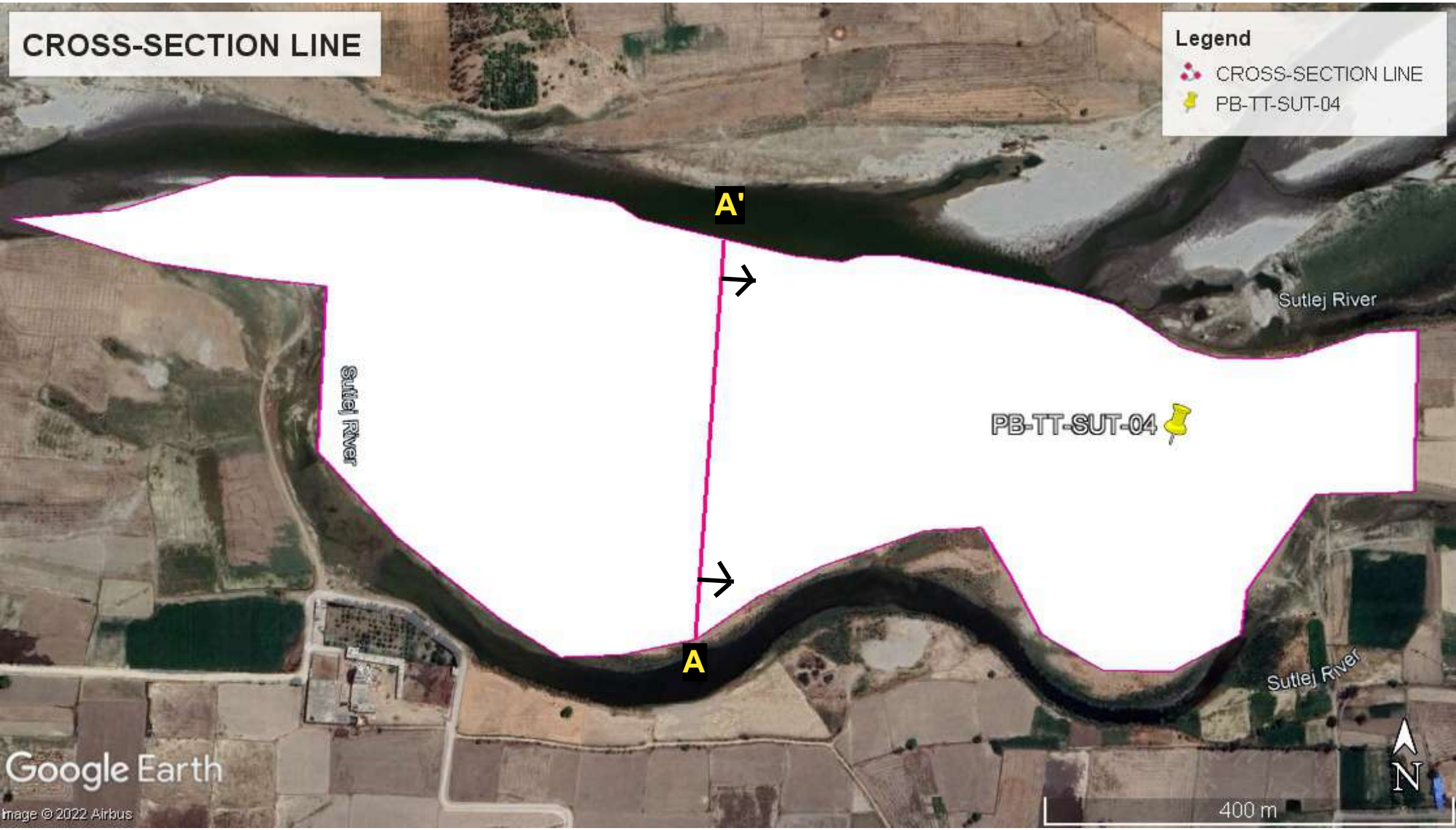
PREPARED BY : RSP GREEN DEVELPMENT AND LABORATORIES PVT. LTD

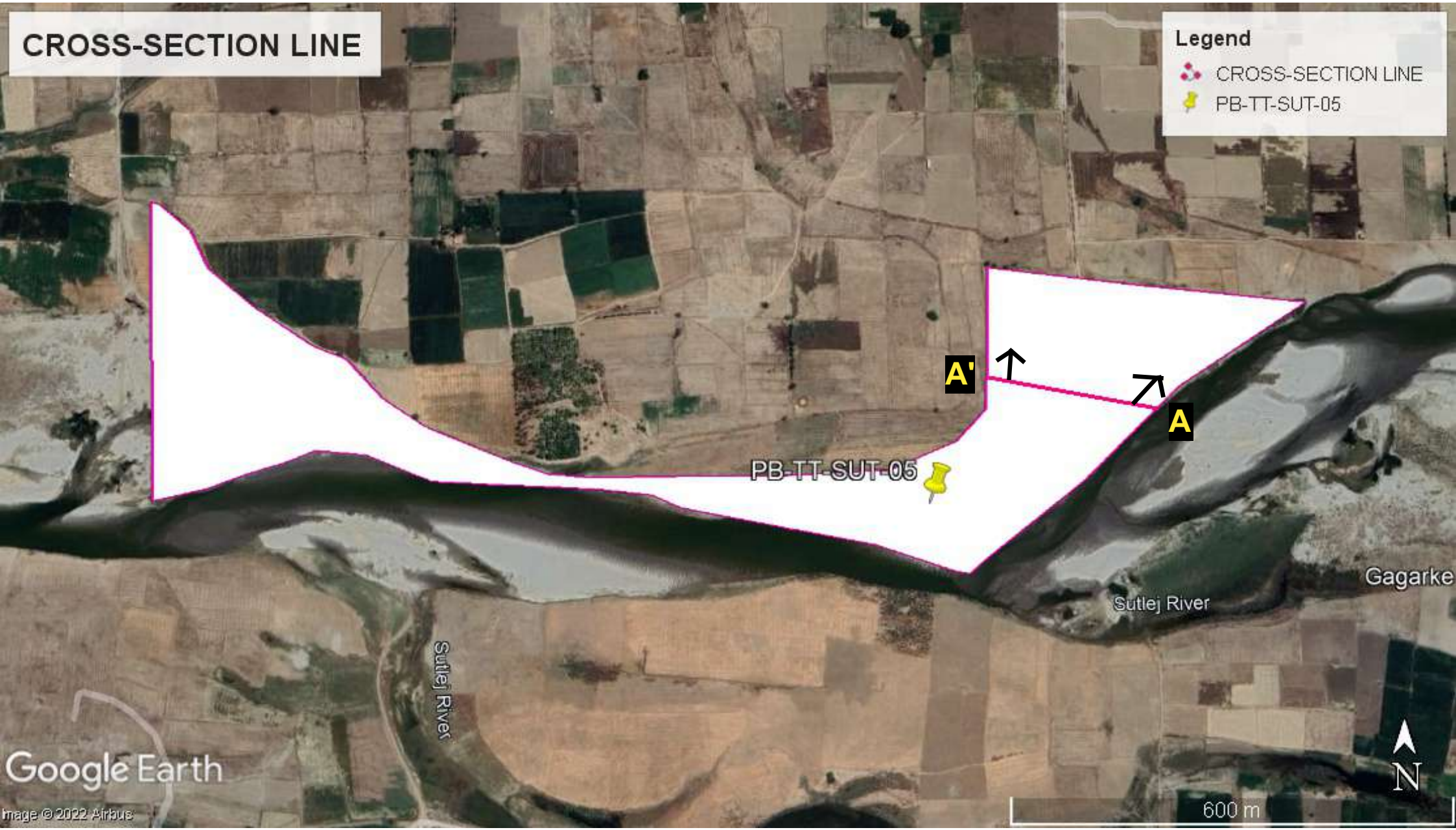
SOURCE : FIELD SURVEY

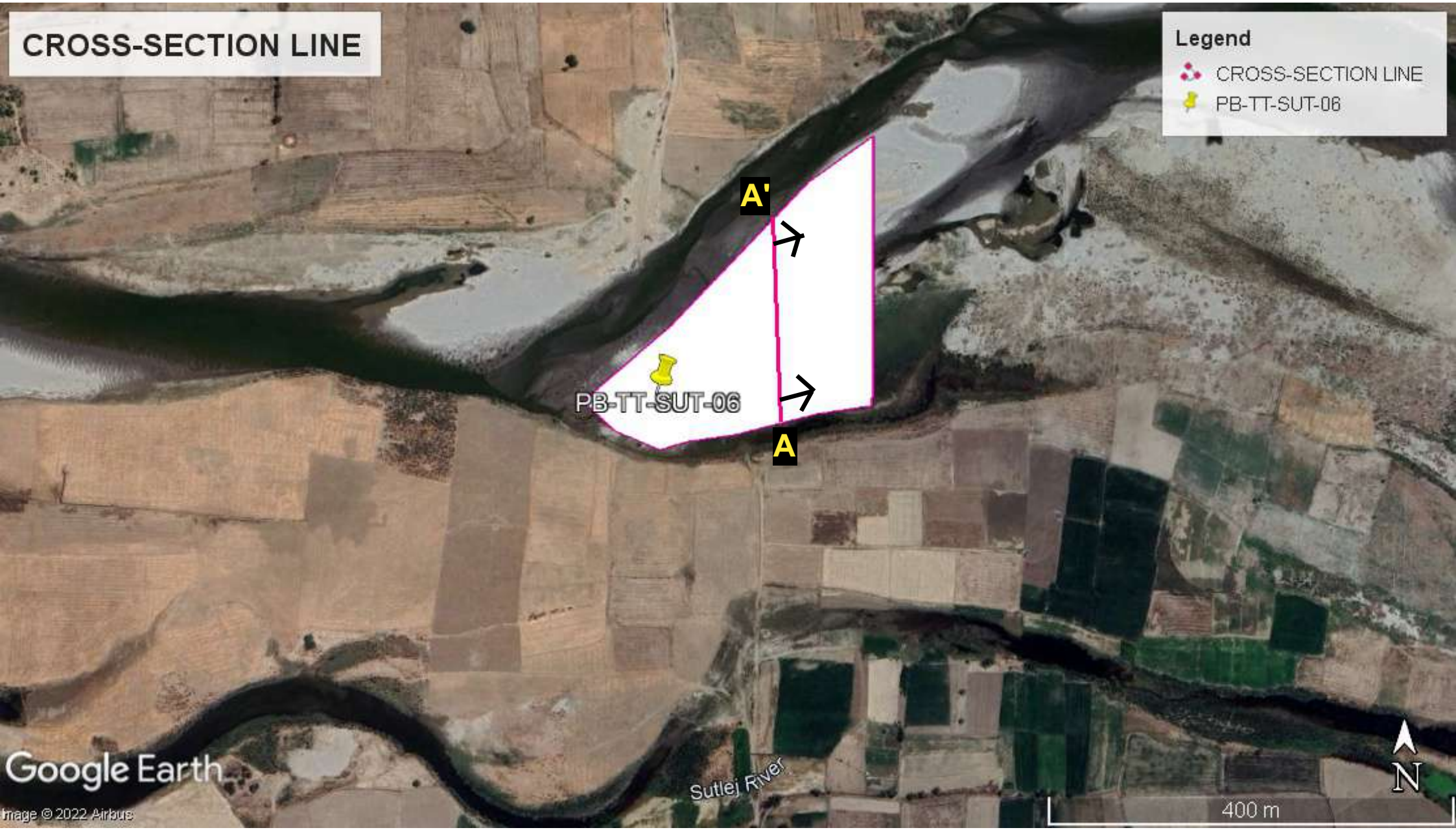

CROSS-SECTION LINE
Legend
PB-TT-SUT-01
CROSS-SECTION LINE
A'
A
PB-TT-SUT-01
Sutlej River
Google Earth
Image © 2022 Airbus
N
700 m

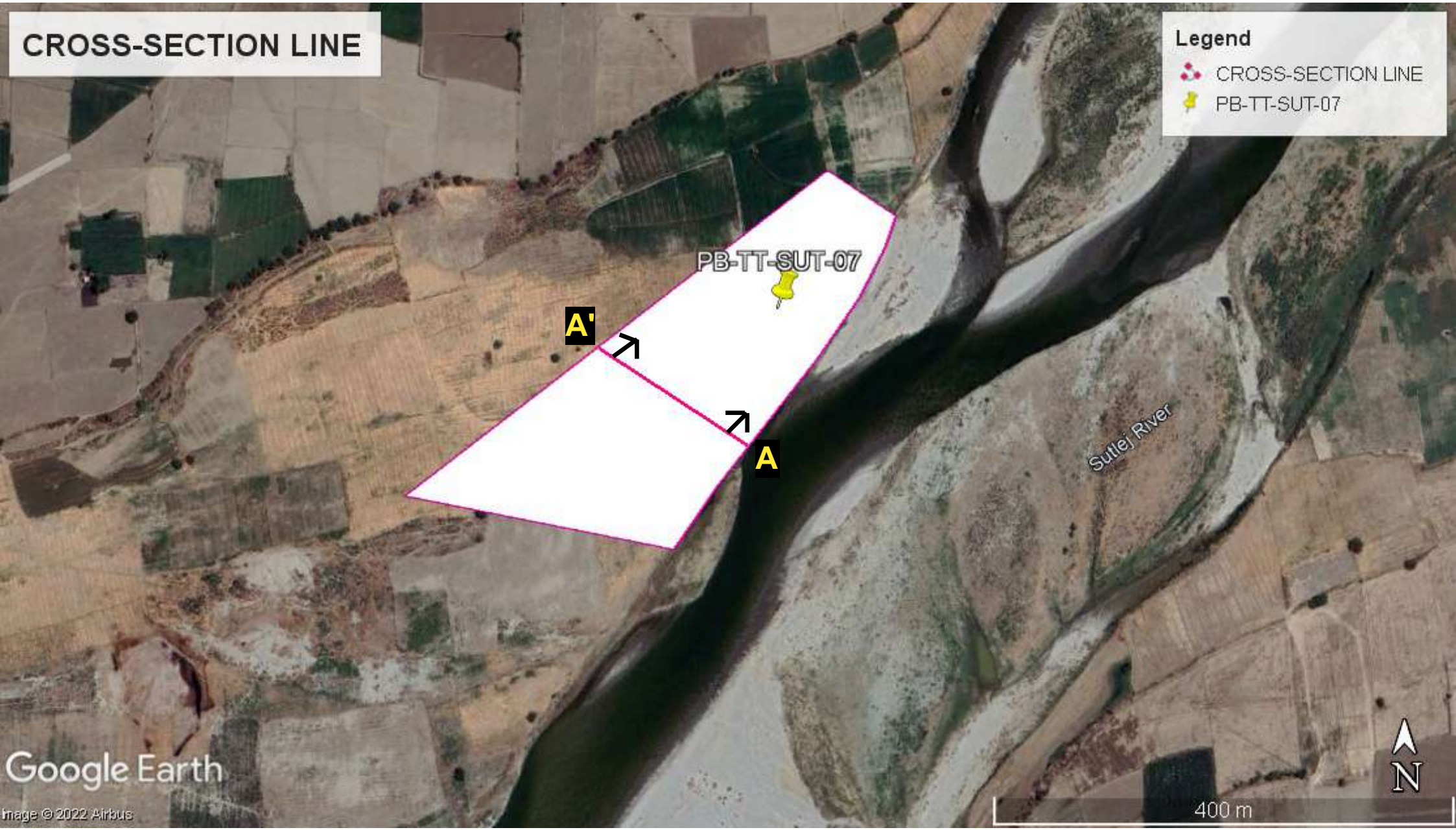

CROSS-SECTION LINE
Legend
PB-TT-SUT-02
CROSS-SECTION LINE
Sutlej River
PB-TT-SUT-02
A'
A
Google Earth
Image © 2022 Airbus
N
400 m

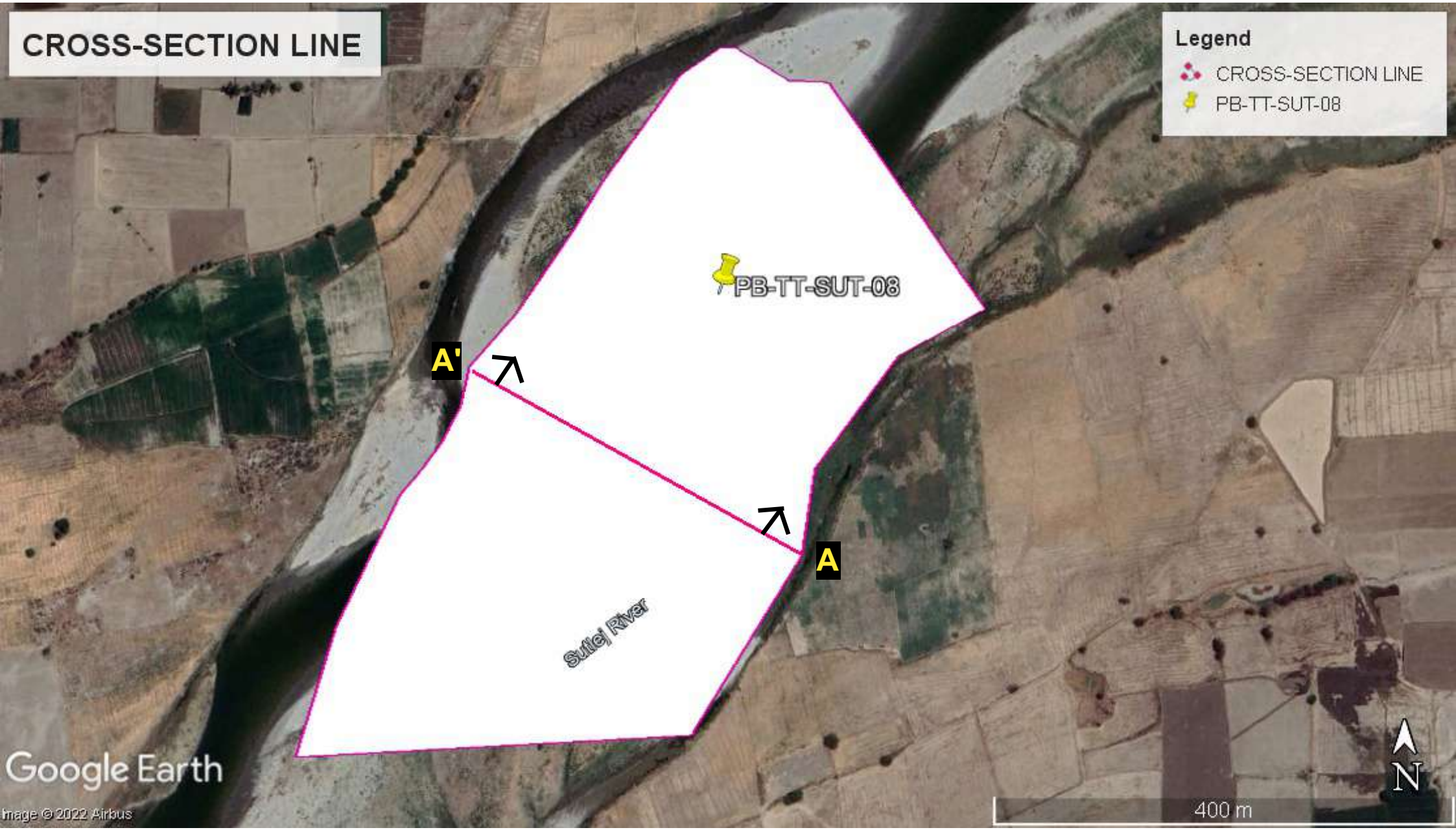

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-SUT-03
Sutlej River
A'
A
PB-TT-SUT-03
Google Earth
Image © 2022 Airbus
N
300 m

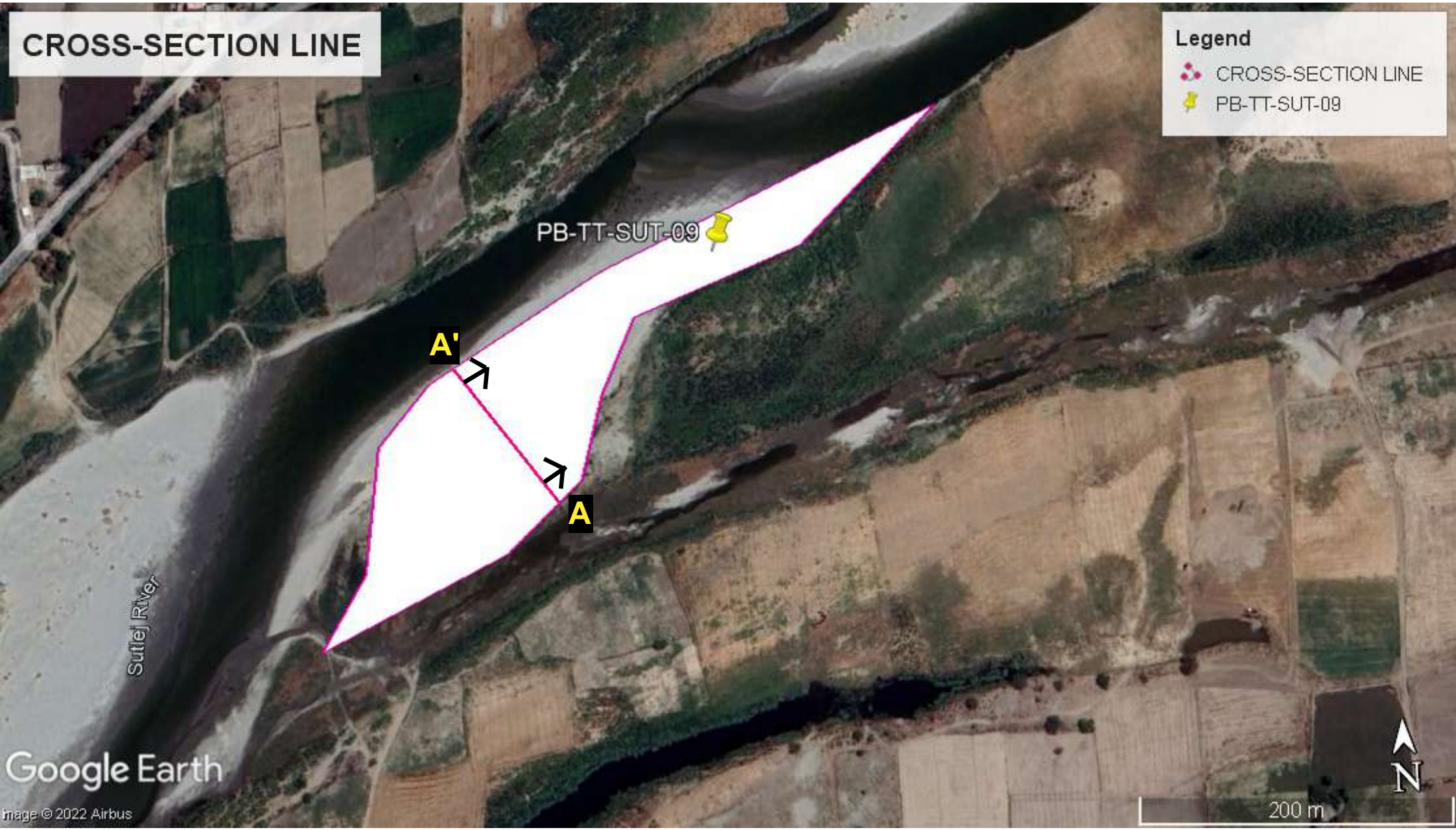

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-SUT-04
A'
A
Sutlej River
Sutlej River
PB-TT-SUT-04
Sutlej River
Google Earth
Image © 2022 Airbus
N
400 m

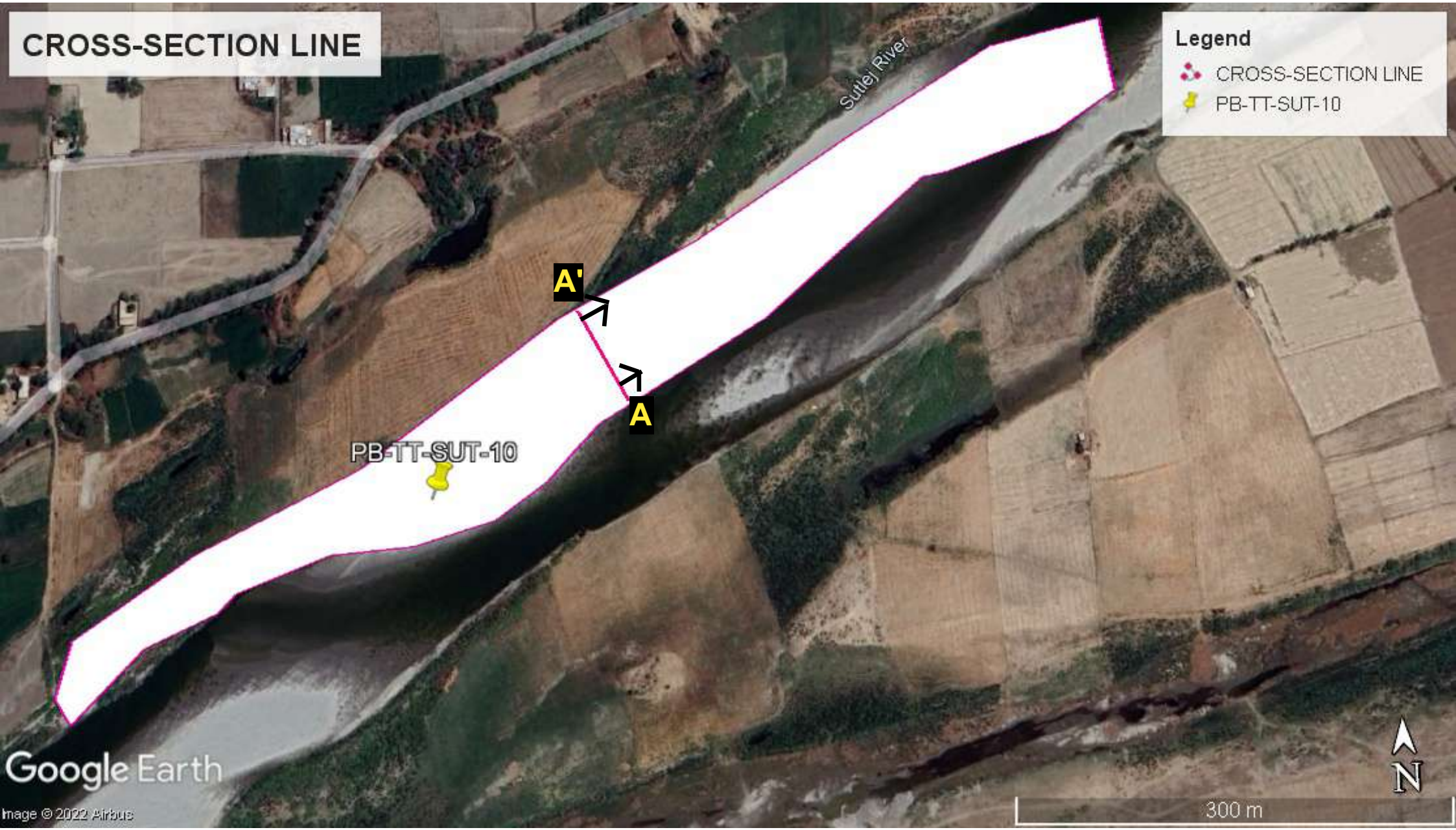

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-SUT-05
A'
A
PB-TT-SUT-05
Sutlej River
Sutlej River
Gagarke
Google Earth
Image © 2022 Airbus
N
600 m

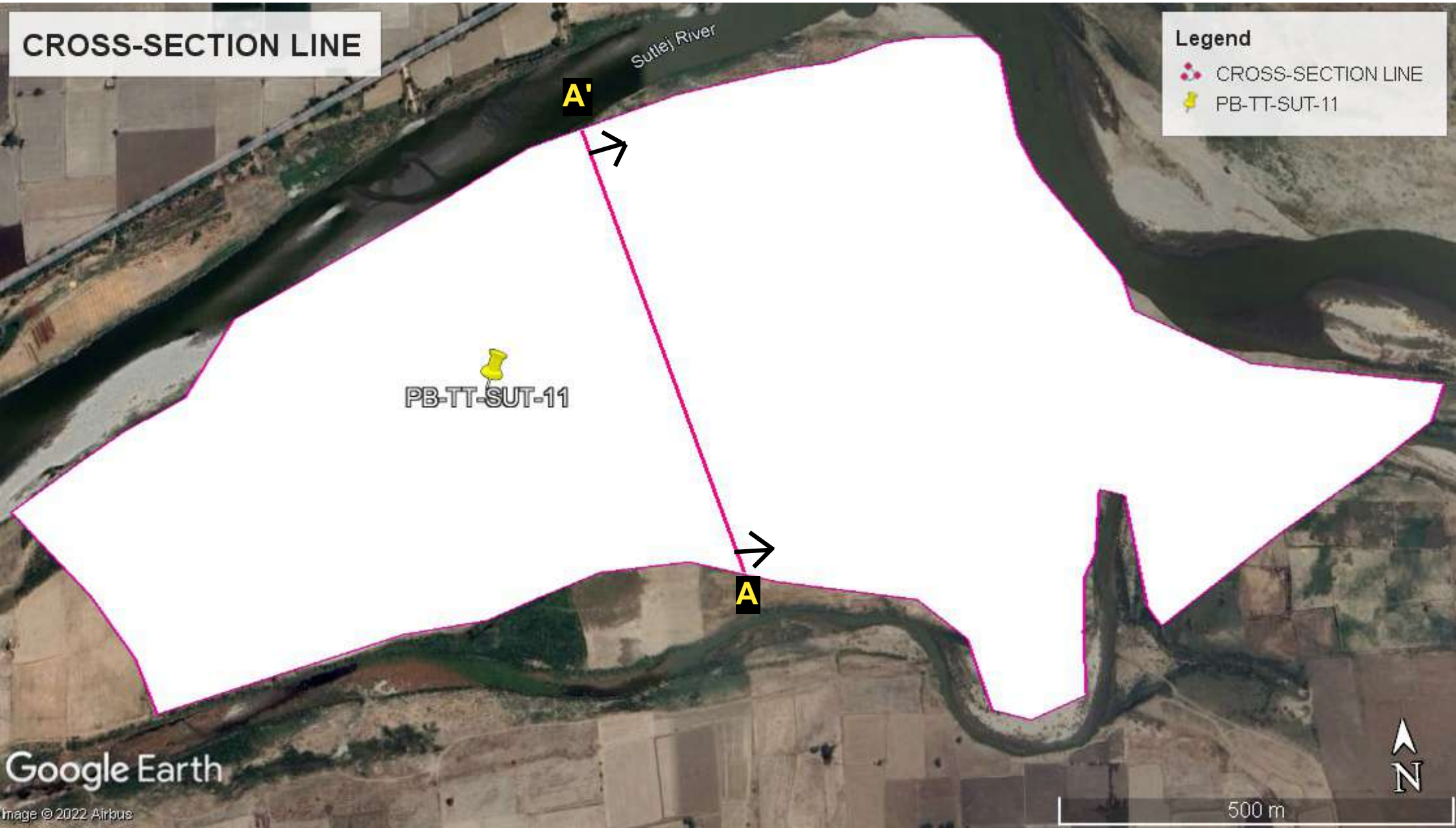

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-SUT-06
A'
A
PB-TT-SUT-06
Sutlej River
Google Earth
Image © 2022 Airbus
N
400 m

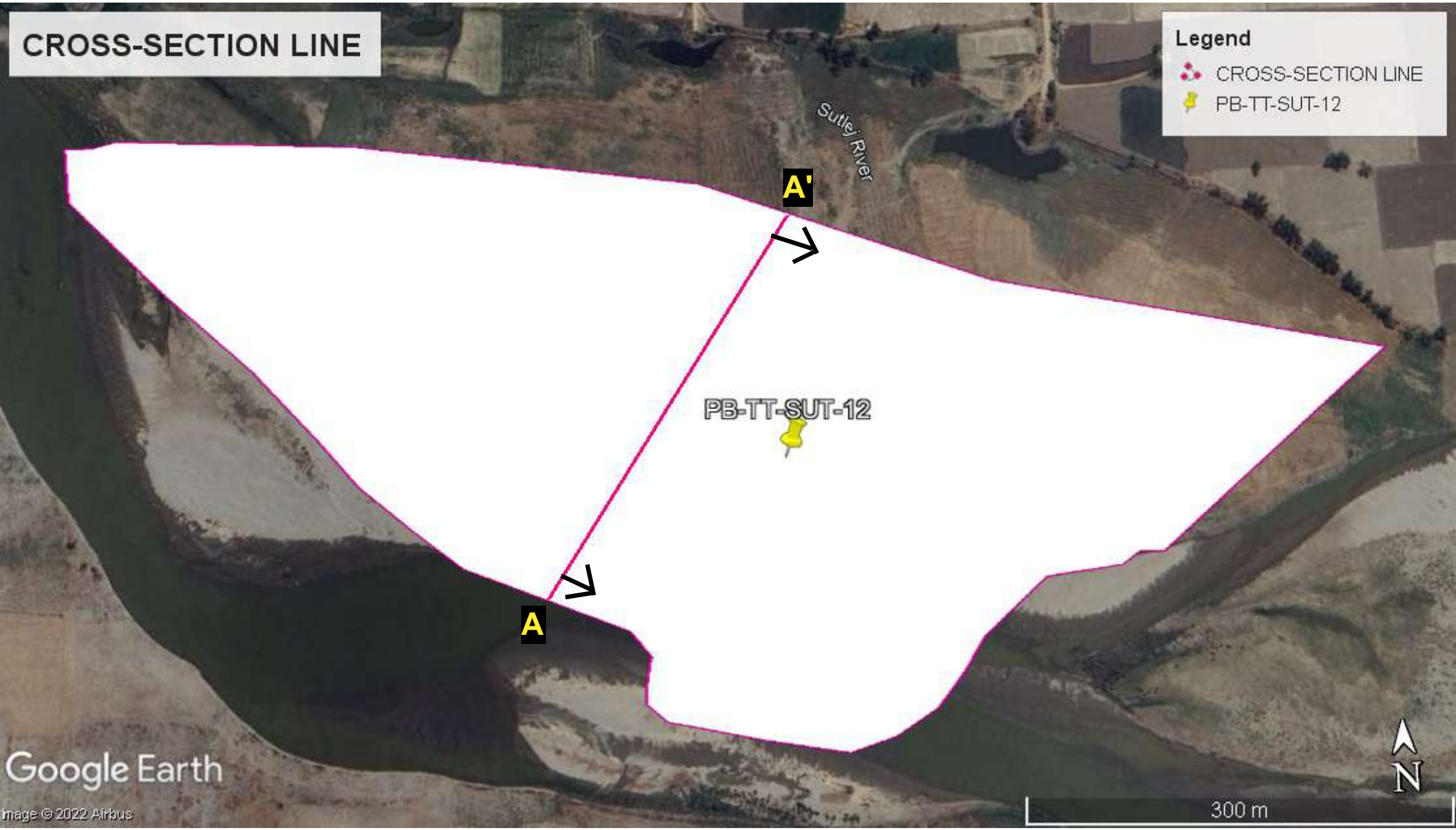

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-SUT-07
PB-TT-SUT-07
A'
A
Sutlej River
Google Earth
Image © 2022 Airbus
N
400 m

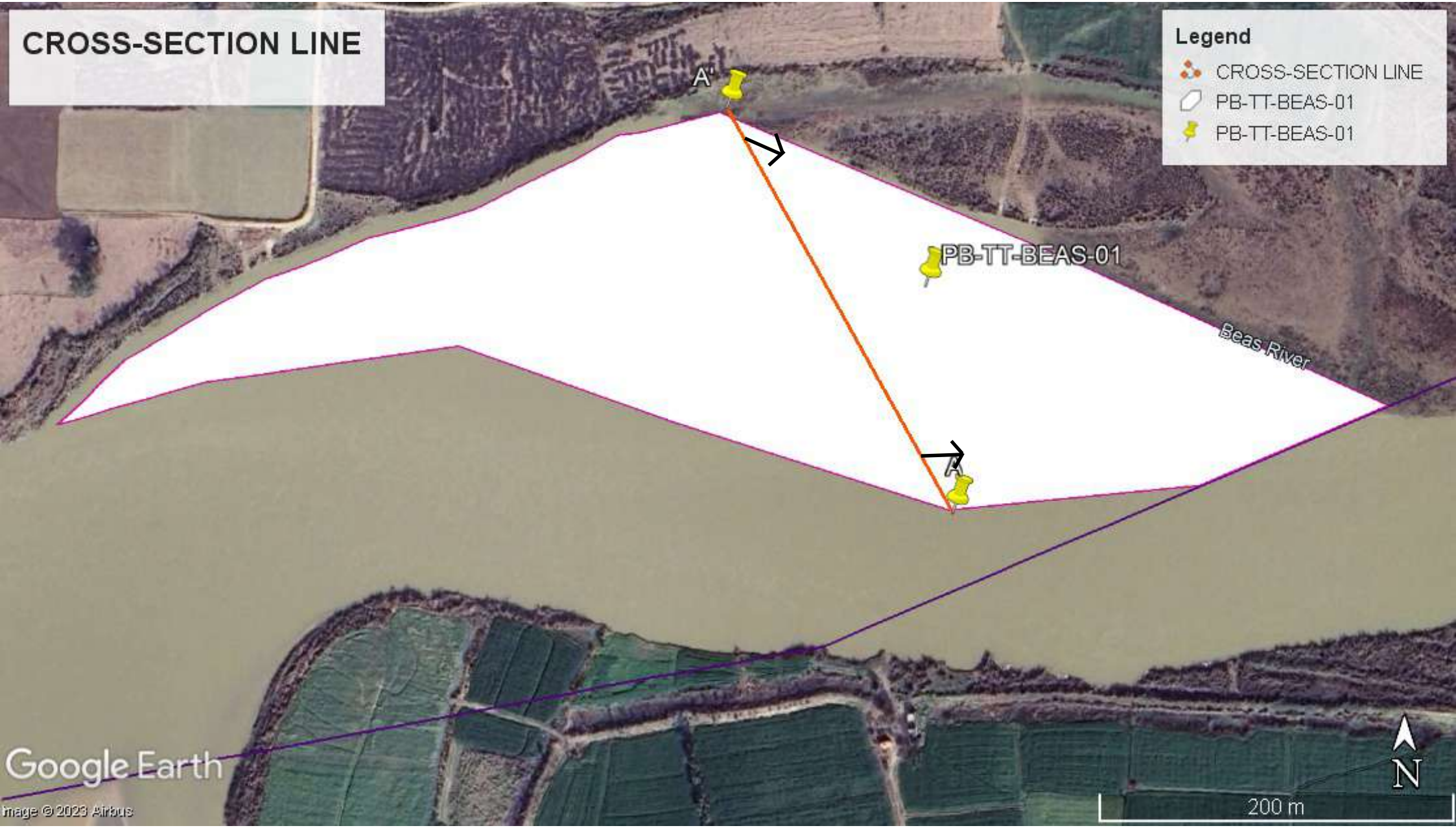

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-SUT-08
PB-TT-SUT-08
A'
A
Sutlej River
Google Earth
Image © 2022 Airbus
N
400 m

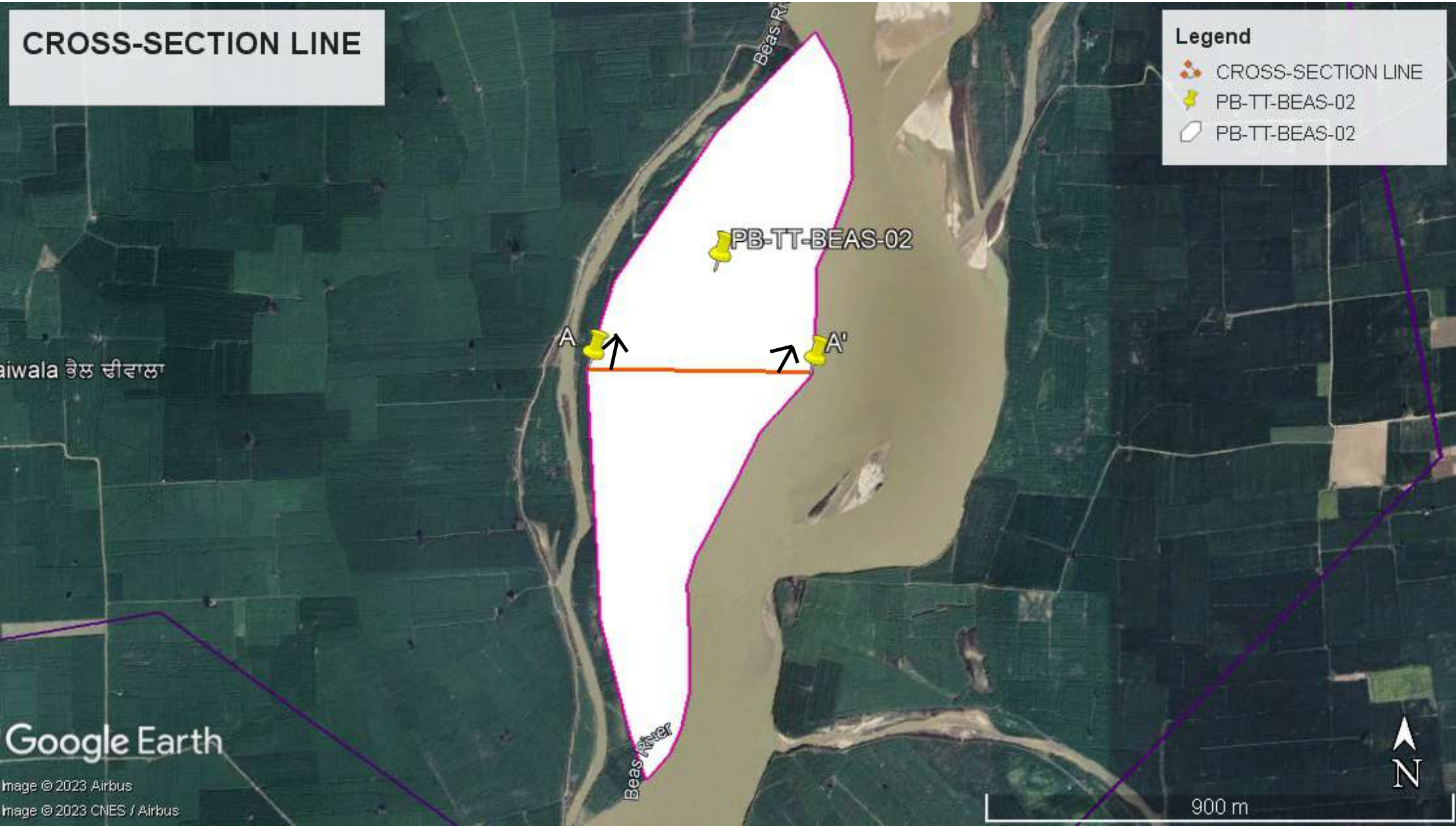

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-SUT-09
PB-TT-SUT-09
A'
A
Sutlej River
Google Earth
Image © 2022 Airbus
N
200 m

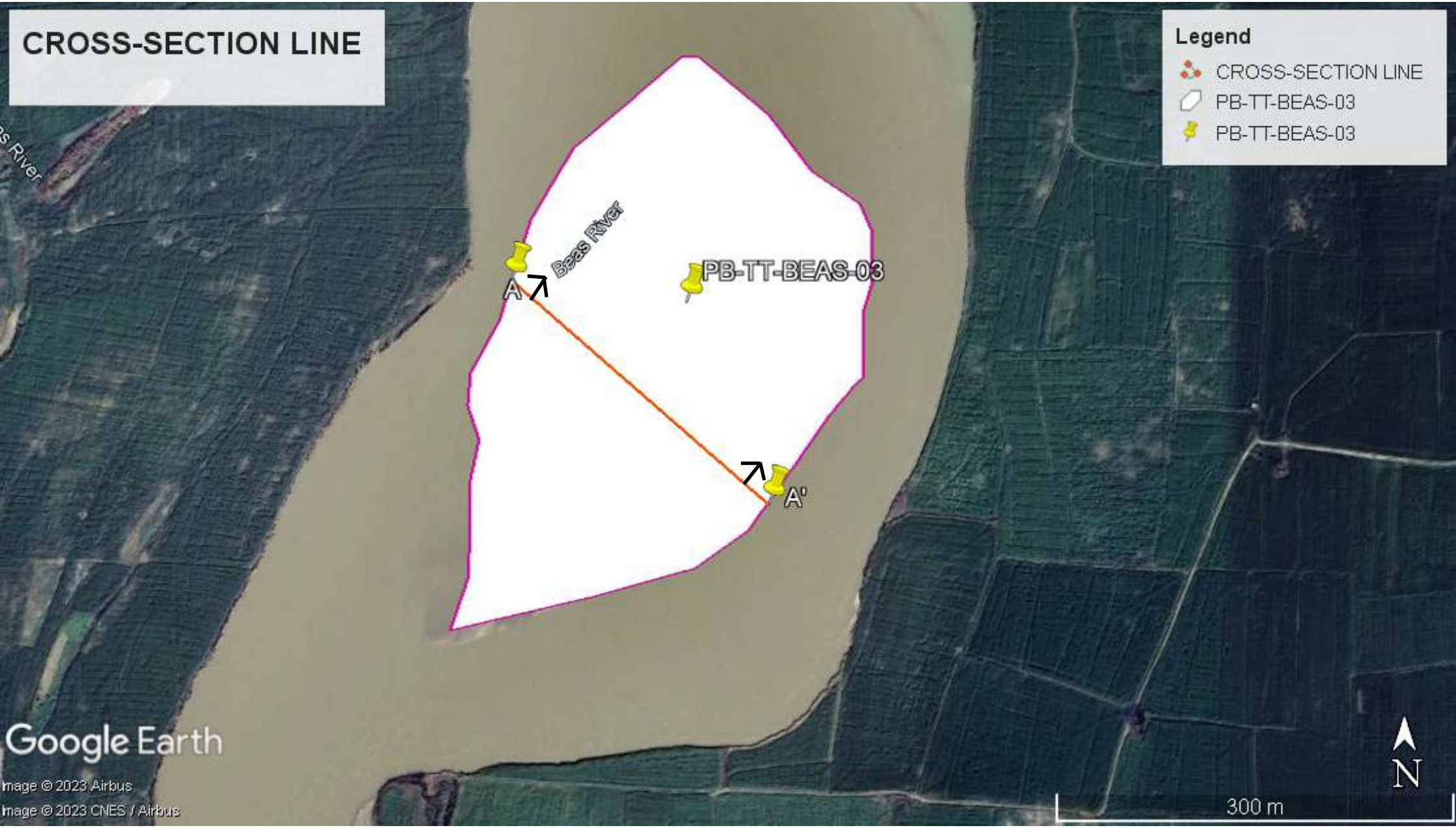

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-SUT-10
Sutlej River
A'
A
PB-TT-SUT-10
Google Earth
Image © 2022 Airbus
N
300 m

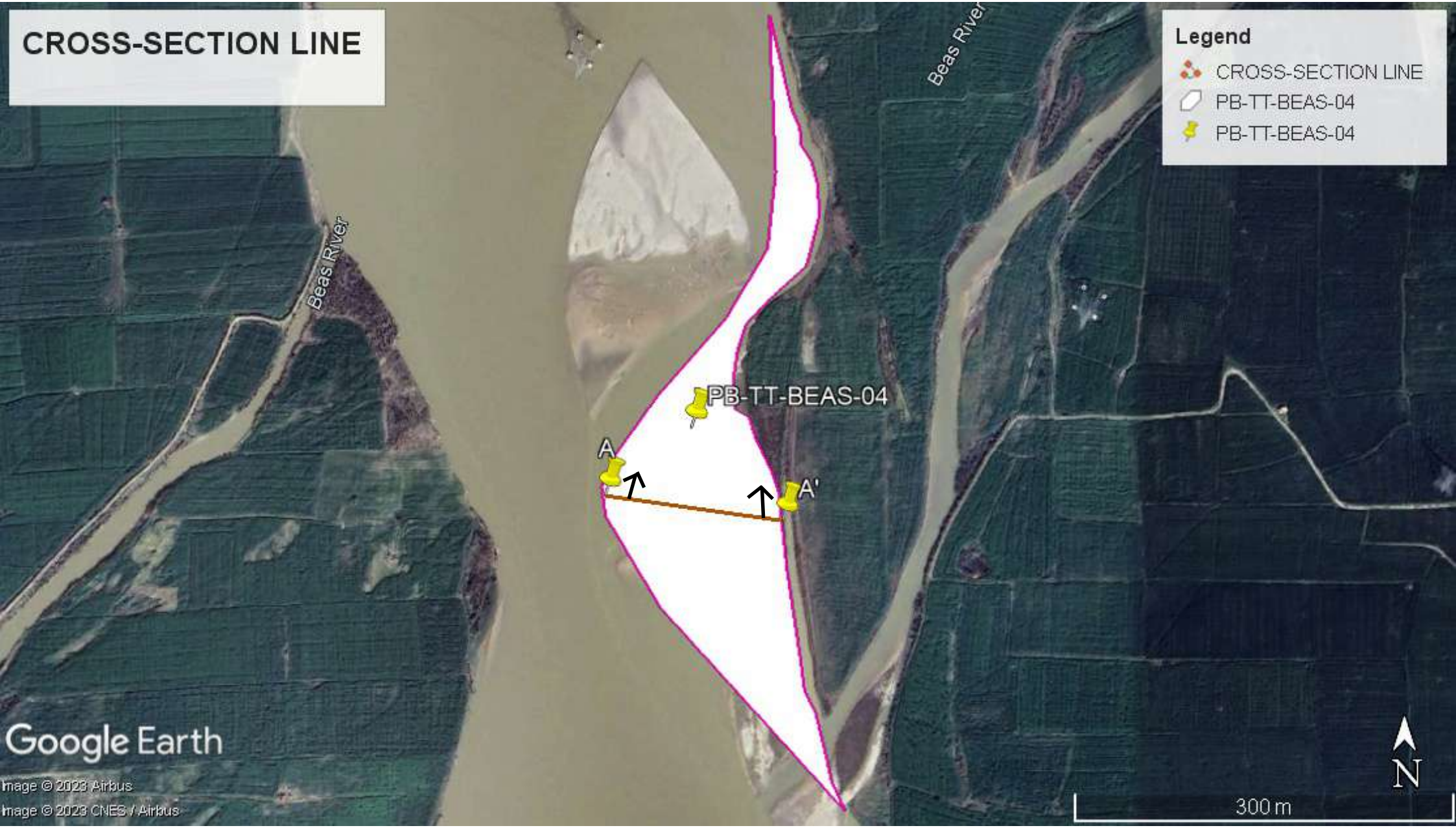

CROSS-SECTION LINE
Sutlej River
A'
A
PB-TT-SUT-11
Legend
CROSS-SECTION LINE
PB-TT-SUT-11
Google Earth
Image © 2022 Airbus
N
500 m

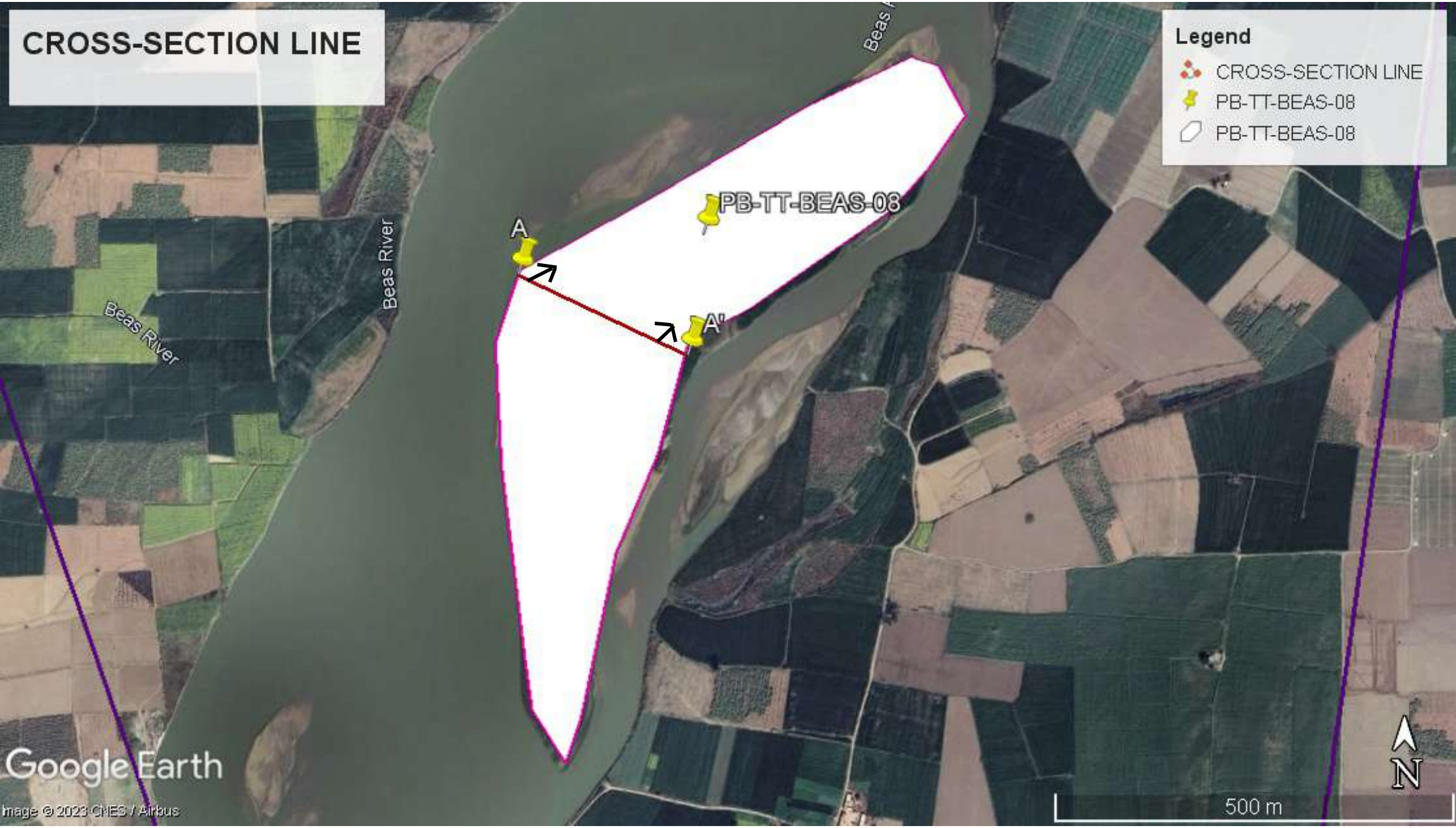

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-SUT-12
Sutlej River
A'
A
PB-TT-SUT-12
Google Earth
Image © 2022 Airbus
N
300 m

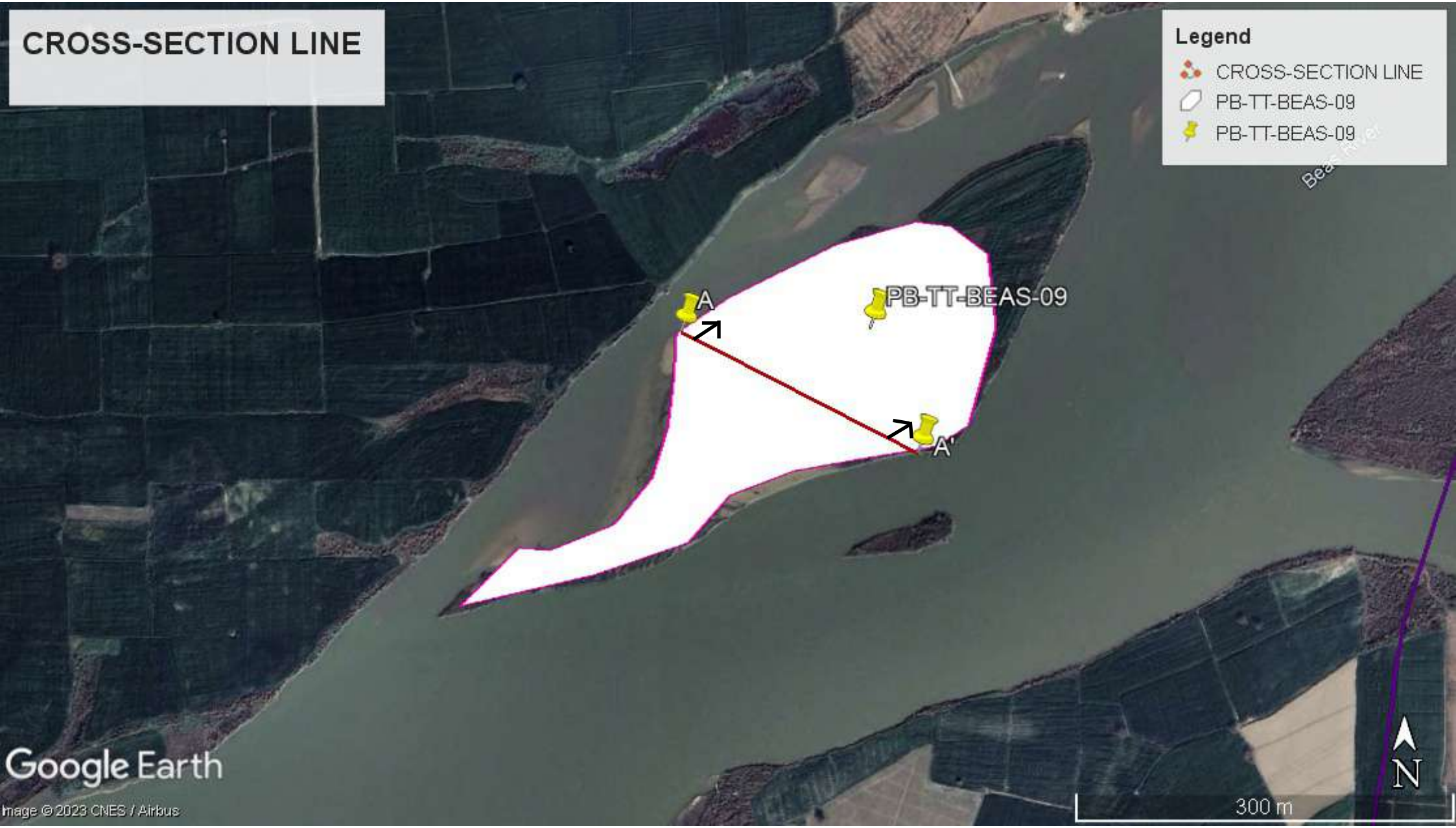

CROSS-SECTION LINE
A'
A
PB-TT-BEAS-01
Beas River
Legend
CROSS-SECTION LINE
PB-TT-BEAS-01
PB-TT-BEAS-01
Google Earth
Image © 2023 Airbus
N
200 m


CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-BEAS-02
PB-TT-BEAS-02
PB-TT-BEAS-02
A
A'
Beas River
aiwala ਭੈਲ ਢੀਵਾਲਾ
Google Earth
Image © 2023 Airbus
Image © 2023 CNES / Airbus
N
900 m

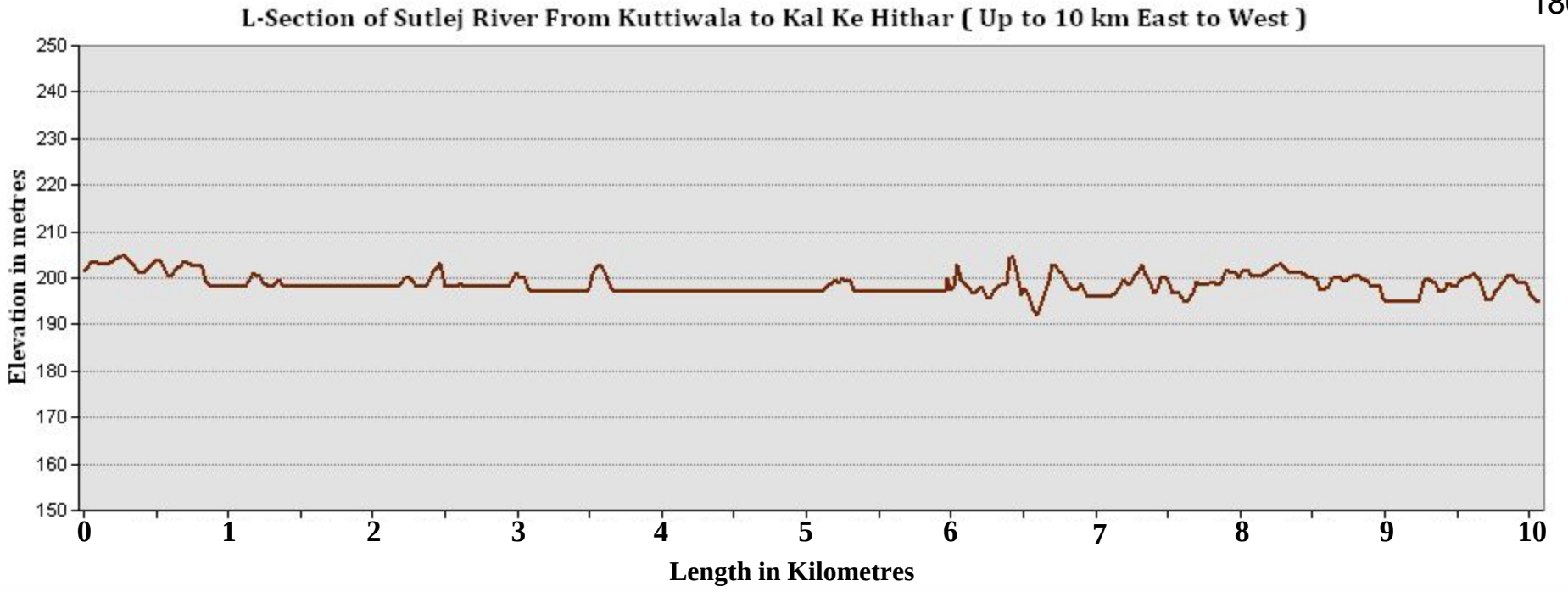

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-BEAS-03
PB-TT-BEAS-03
Beas River
PB-TT-BEAS-03
A
A'
Google Earth
Image © 2023 Airbus
Image © 2023 CNES / Airbus
N
300 m

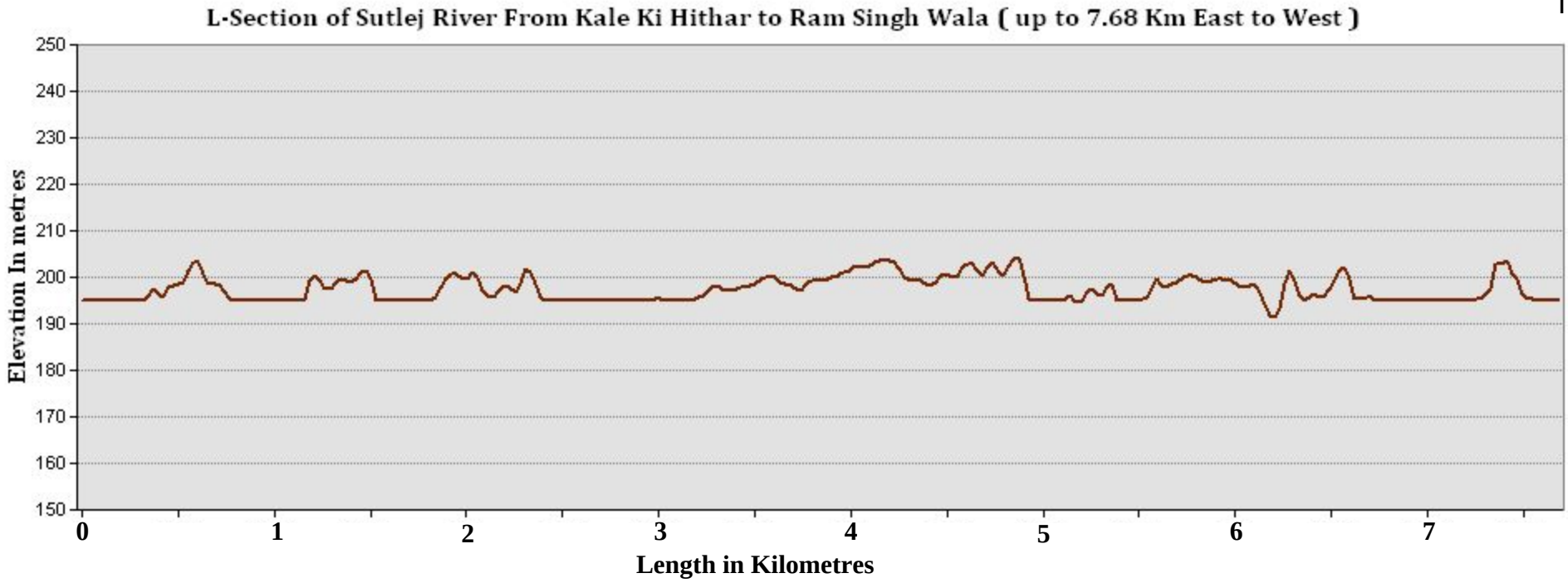

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-BEAS-04
PB-TT-BEAS-04
Beas River
Beas River
PB-TT-BEAS-04
A
A'
Google Earth
Image © 2023 Airbus
Image © 2023 CNES / Airbus
N
300 m

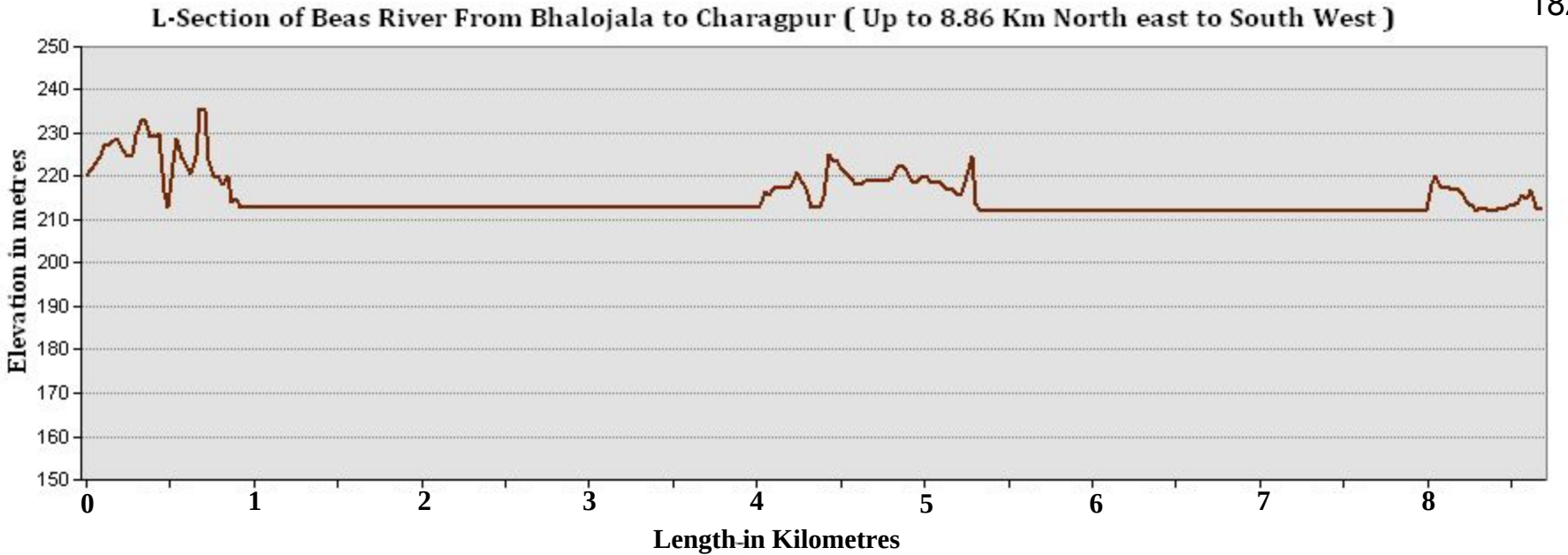

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-BEAS-08
PB-TT-BEAS-08
PB-TT-BEAS-08
A
A'
Beas River
Beas River
Google Earth
Image © 2023 CNES / Airbus
N
500 m


CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-BEAS-09
PB-TT-BEAS-09
A
A'
PB-TT-BEAS-09
Google Earth
Image © 2023 CNES / Airbus
300 m
N

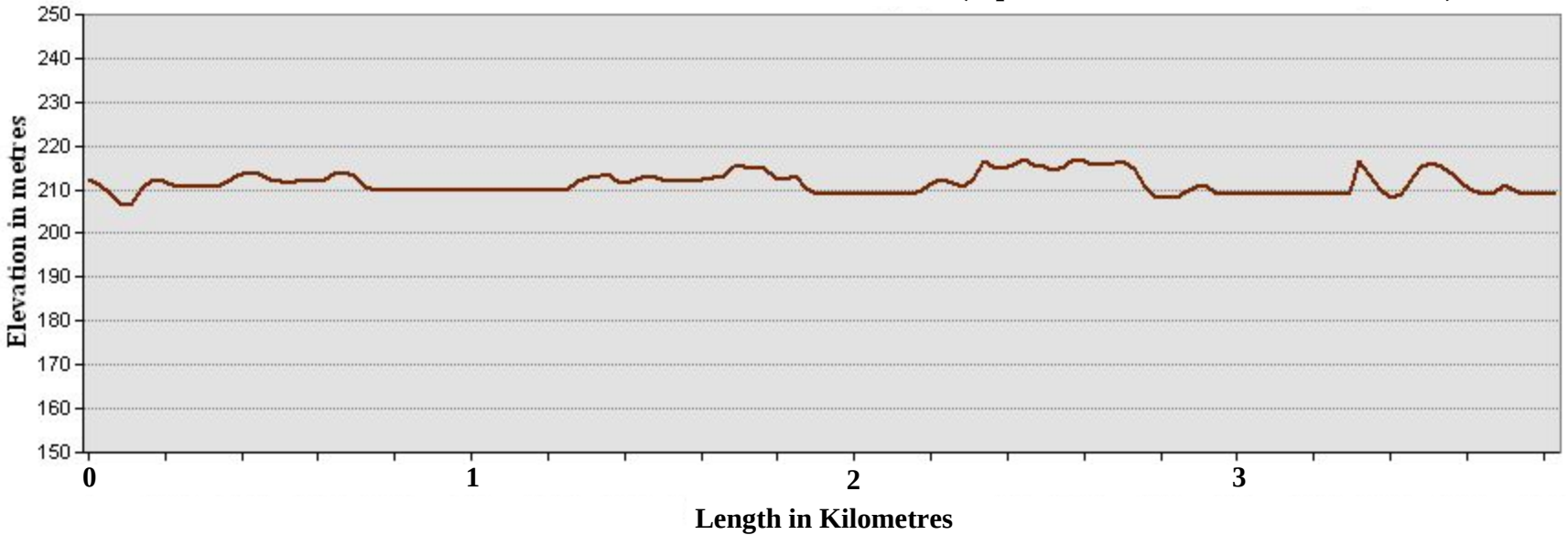

CROSS-SECTION LINE
Legend
CROSS-SECTION LINE
PB-TT-BEAS-10
PB-TT-BEAS-10
A
A'
PB-TT-BEAS-10
Beas River
Google Earth
Image © 2023 CNES / Airbus
N
100 m

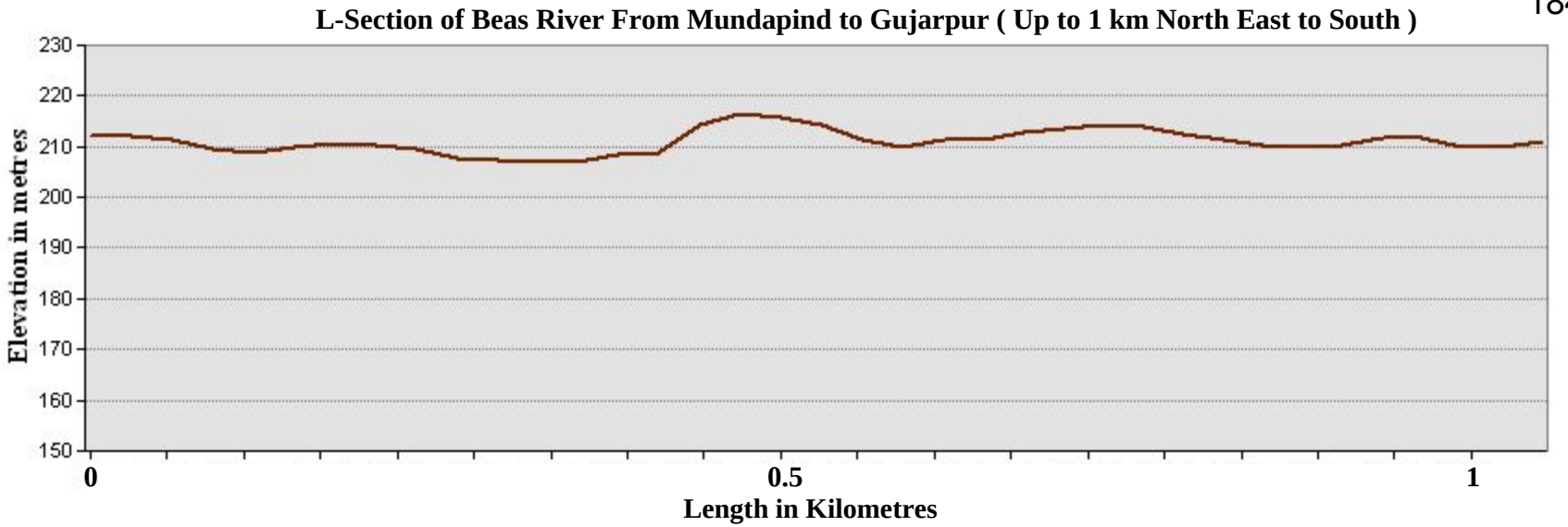

L-Section of Sutlej River From Kuttiwala to Kal Ke Hithar (Up to 10 km East to West)
Elevation in metres
250
240
230
220
210
200
190
180
170
160
150
0
1
2
3
4
5
6
7
8
9
10
Length in Kilometres

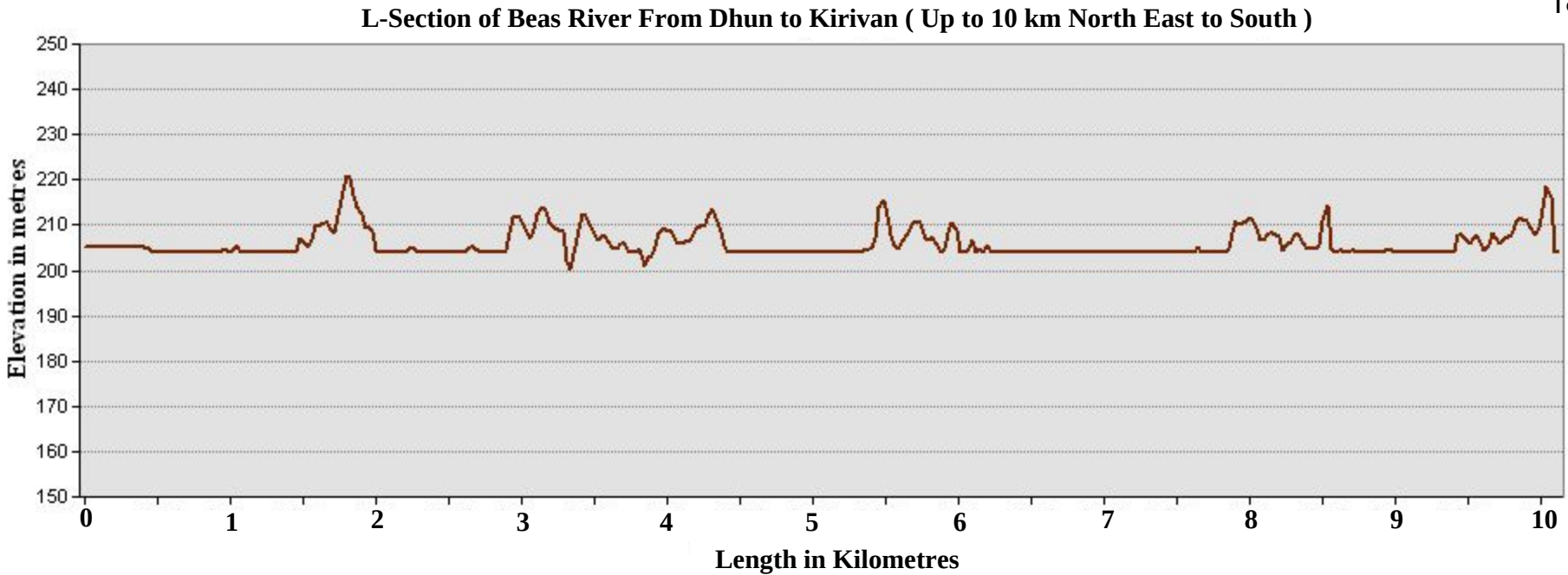

L-Section of Sutlej River From Kale Ki Hithar to Ram Singh Wala (up to 7.68 Km East to West)
Elevation In metres
250
240
230
220
210
200
190
180
170
160
150
0
1
2
3
4
5
6
7
Length in Kilometres

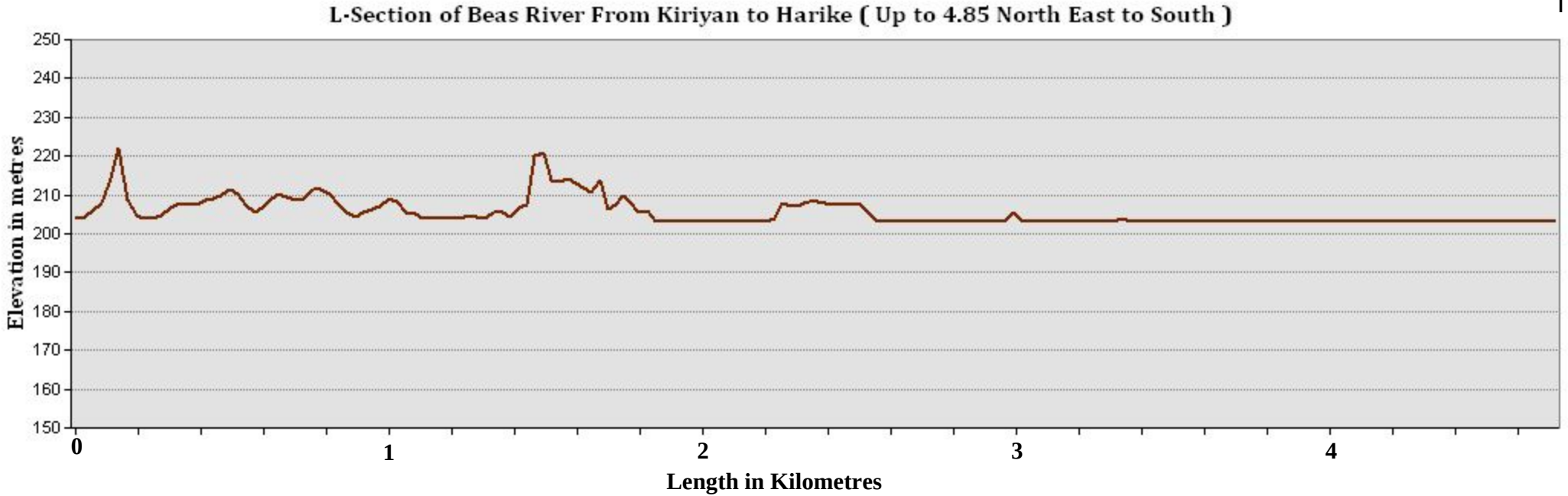

L-Section of Beas River From Bhalojala to Charagpur (Up to 8.86 Km North east to South West)
Elevation in metres
250
240
230
220
210
200
190
180
170
160
150
0
1
2
3
4
5
6
7
8
Length in Kilometres

L-Section of Beas River From Miani to Chaudhriwal (Up to 3.90 km North East to South)




L-Section of Beas River From Mundapind to Gujarpur (Up to 1 km North East to South)
Elevation in metres
230
220
210
200
190
180
170
160
150
0
0.5
1
Length in Kilometres


L-Section of Beas River From Dhun to Kirivan (Up to 10 km North East to South)
Elevation in metres
250
240
230
220
210
200
190
180
170
160
150
0
1
2
3
4
5
6
7
8
9
10
Length in Kilometres


L-Section of Beas River From Kiriyan to Harike (Up to 4.85 North East to South)
Elevation in metres
250
240
230
220
210
200
190
180
170
160
150
0
1
2
3
4
Length in Kilometres

ANNEXURE-X

FIELD PHOTOGRAPHS

PHOTOGRAPH 1: Post-monsoon river pattern of Sutlej River, Tarn Taran.

PHOTOGRAPH 2: Baseflow analysis in the river Sutlej, Tarn Taran.

PHOTOGRAPH 3: Depositional study of sediment in river Sutlej in Tarn Taran district.

PHOTOGRAPH 4: DGPS survey for determining Thalweg point of River Sutlej, Tarn Taran.

PHOTOGRAPH 5: Sample collection at Sutlej River, Tarn Taran.

PHOTOGRAPH 6: Temporary benchmark creation in Sutlej River, Tarn Taran.

PHOTOGRAPH 7: Sand depositional pattern in Sutlej River, Tarn Taran.

PHOTOGRAPH 8: DGPS survey for Thalweg Point determination River Sutlej, Tarn Taran.

PHOTOGRAPH 9: Sediment deposition in River Beas, Tarn Taran.

PHOTOGRAPH 10: DGPS Survey in river Beas of Tarn Taran district.

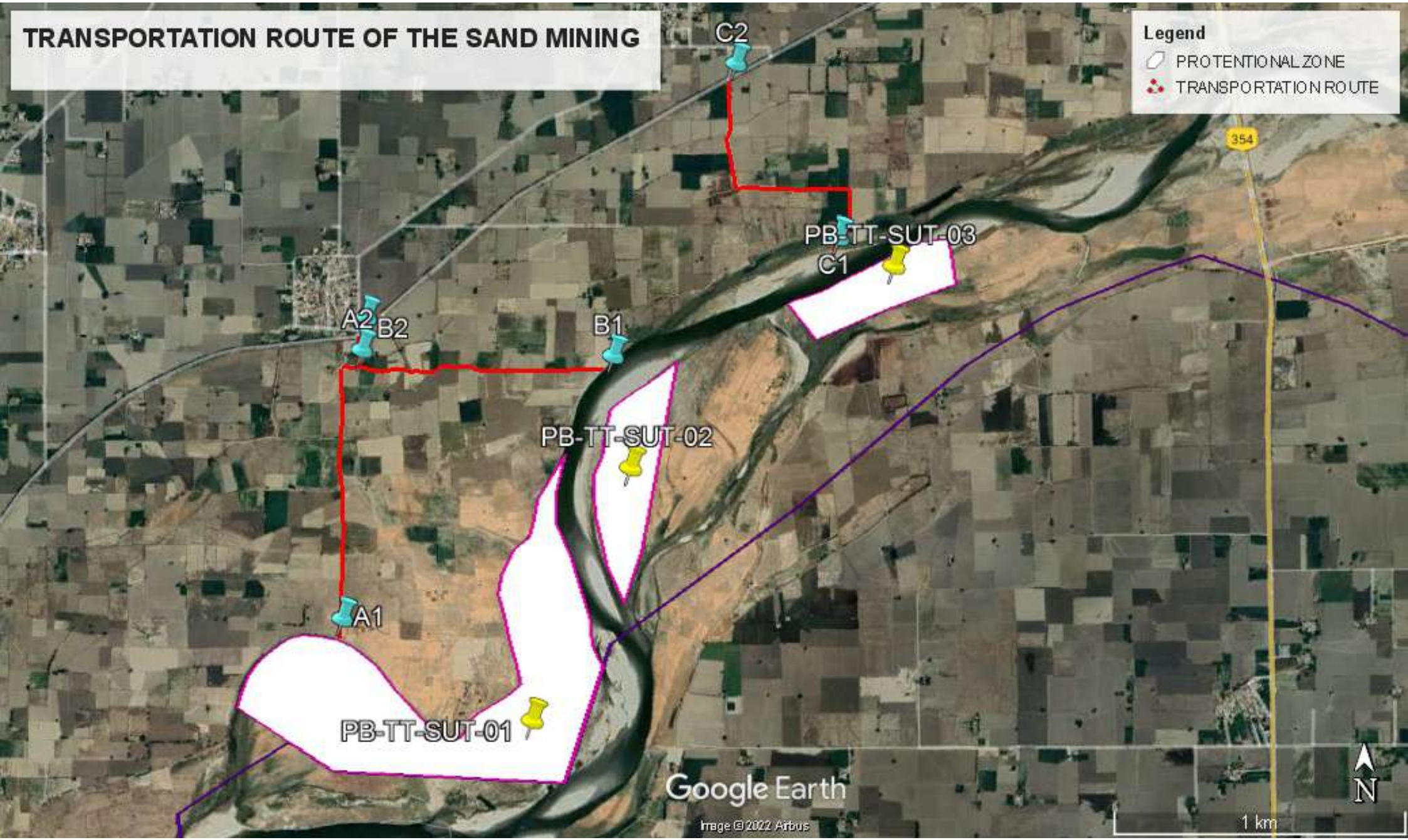
PHOTOGRAPH 11: DGPS Survey of high land of River Beas, Tarn Taran.

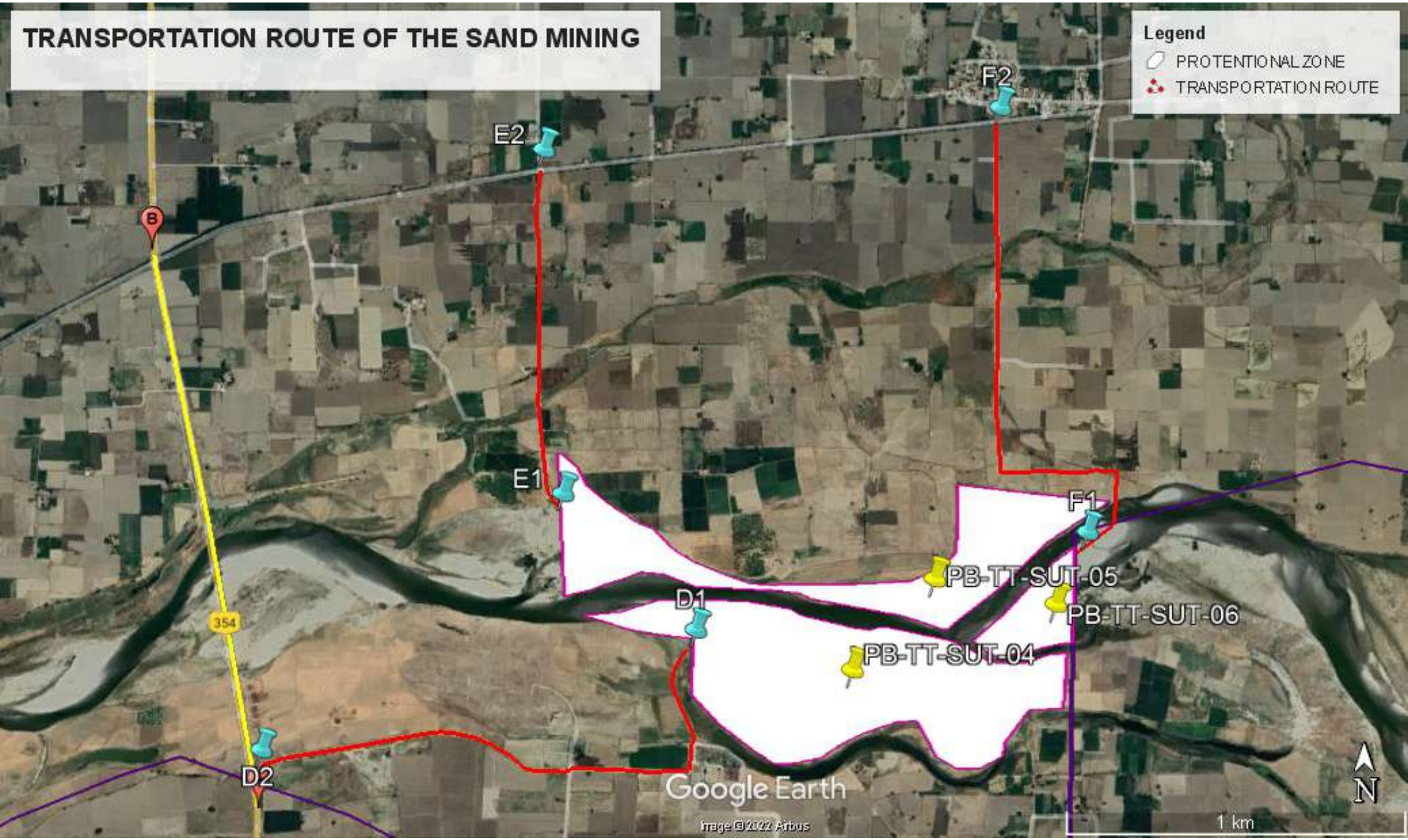
PHOTOGRAPH 12: Sample collection at River Beas, Tarn Taran.

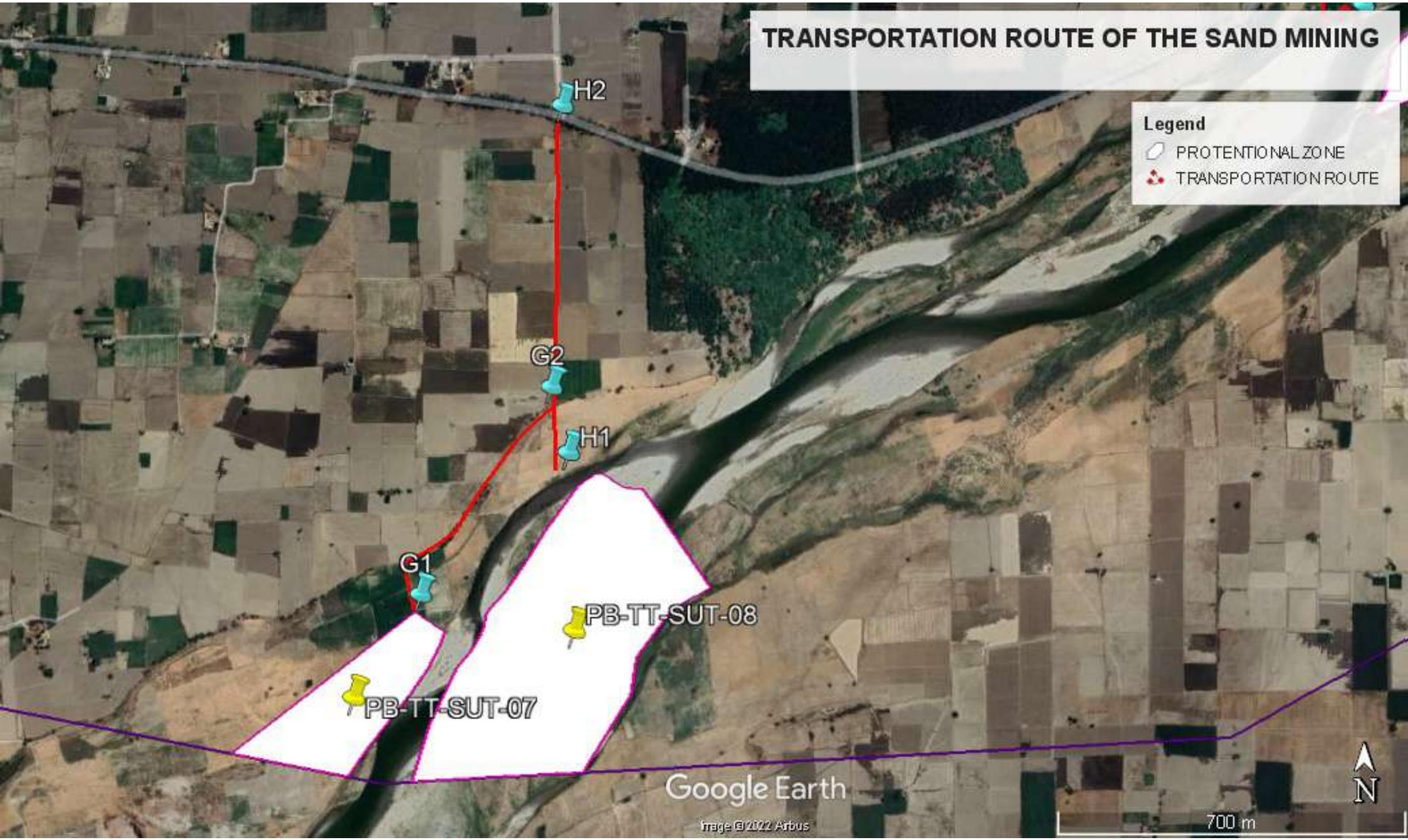
PHOTOGRAPH 13: Temporary benchmark creation in Beas River, Tarn Taran.

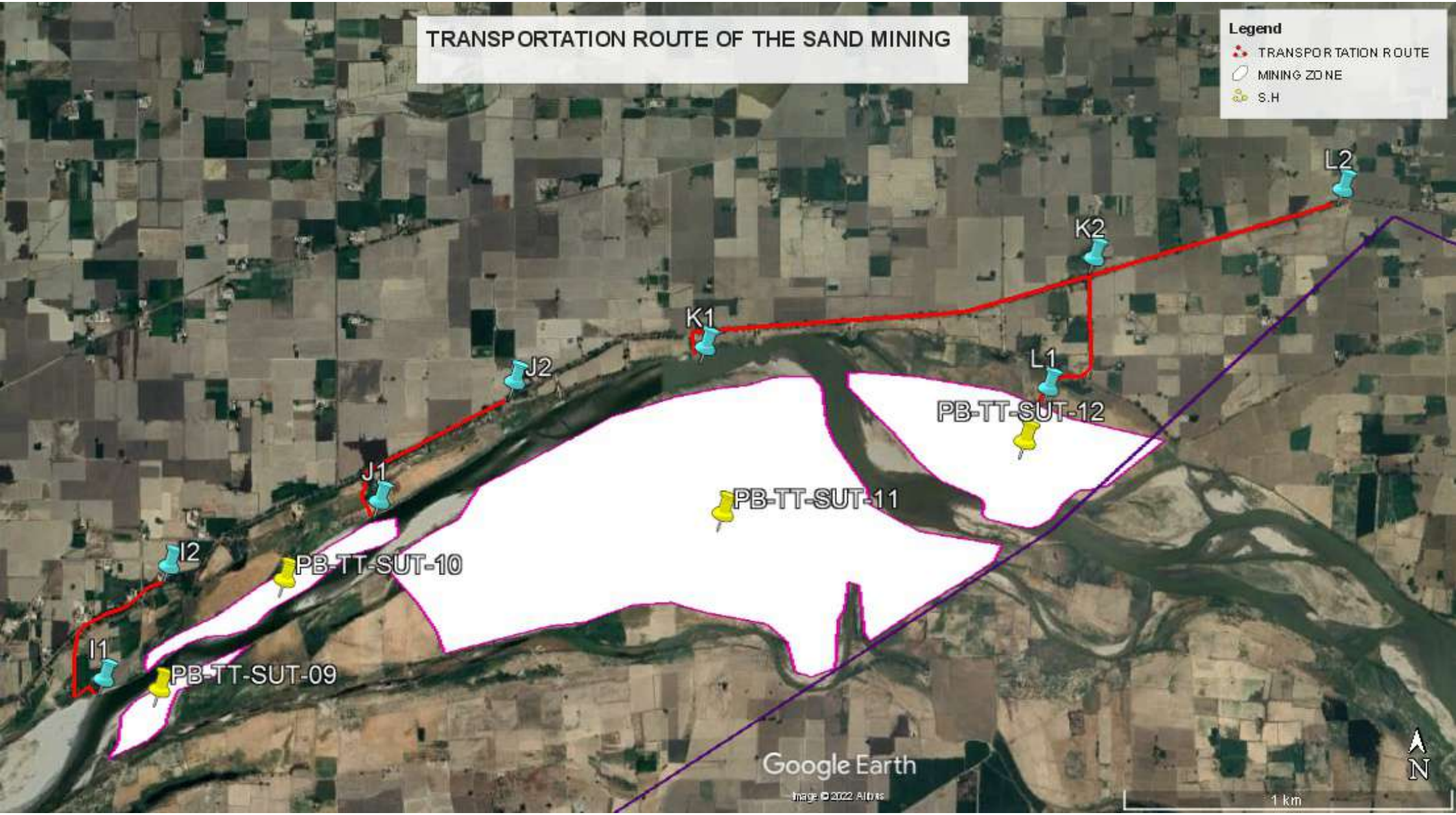
ANNEXURE-XI

Map of Transport routes of the Mining Sites

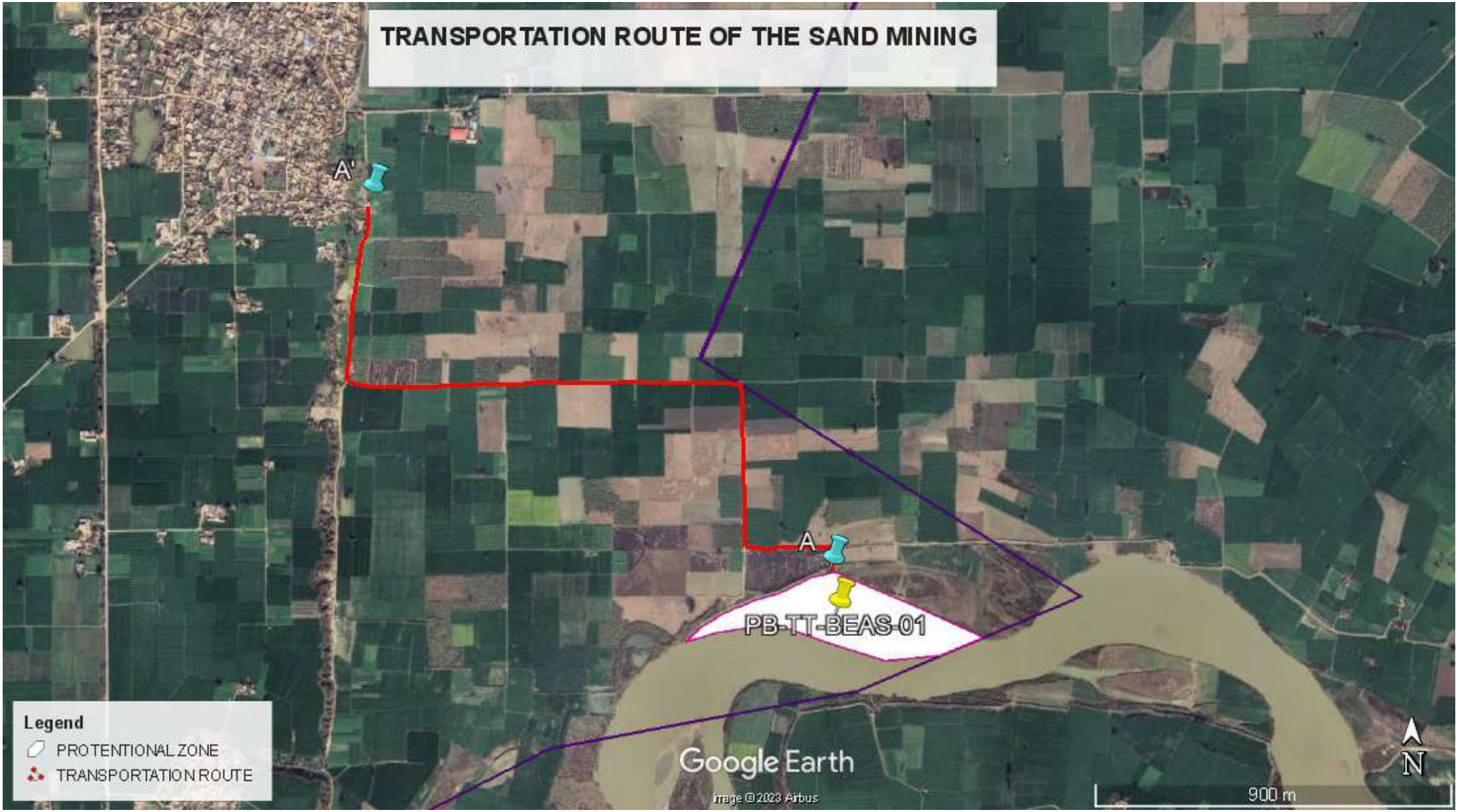

TRANSPORTATION ROUTE OF THE SAND MINING
Legend
PROTENTIONAL ZONE
TRANSPORTATION ROUTE
C2
C1
PB-TT-SUT-03
A2
B2
B1
PB-TT-SUT-02
A1
PB-TT-SUT-01
354
Google Earth
Image © 2022 Airbus
N
1 km


TRANSPORTATION ROUTE OF THE SAND MINING
Legend
PROTENTIONAL ZONE
TRANSPORTATION ROUTE
F2
E2
B
E1
F1
PB-TT-SUT-05
D1
PB-TT-SUT-06
PB-TT-SUT-04
354
D2
Google Earth
Image © 2022 Airbus
N
1 km

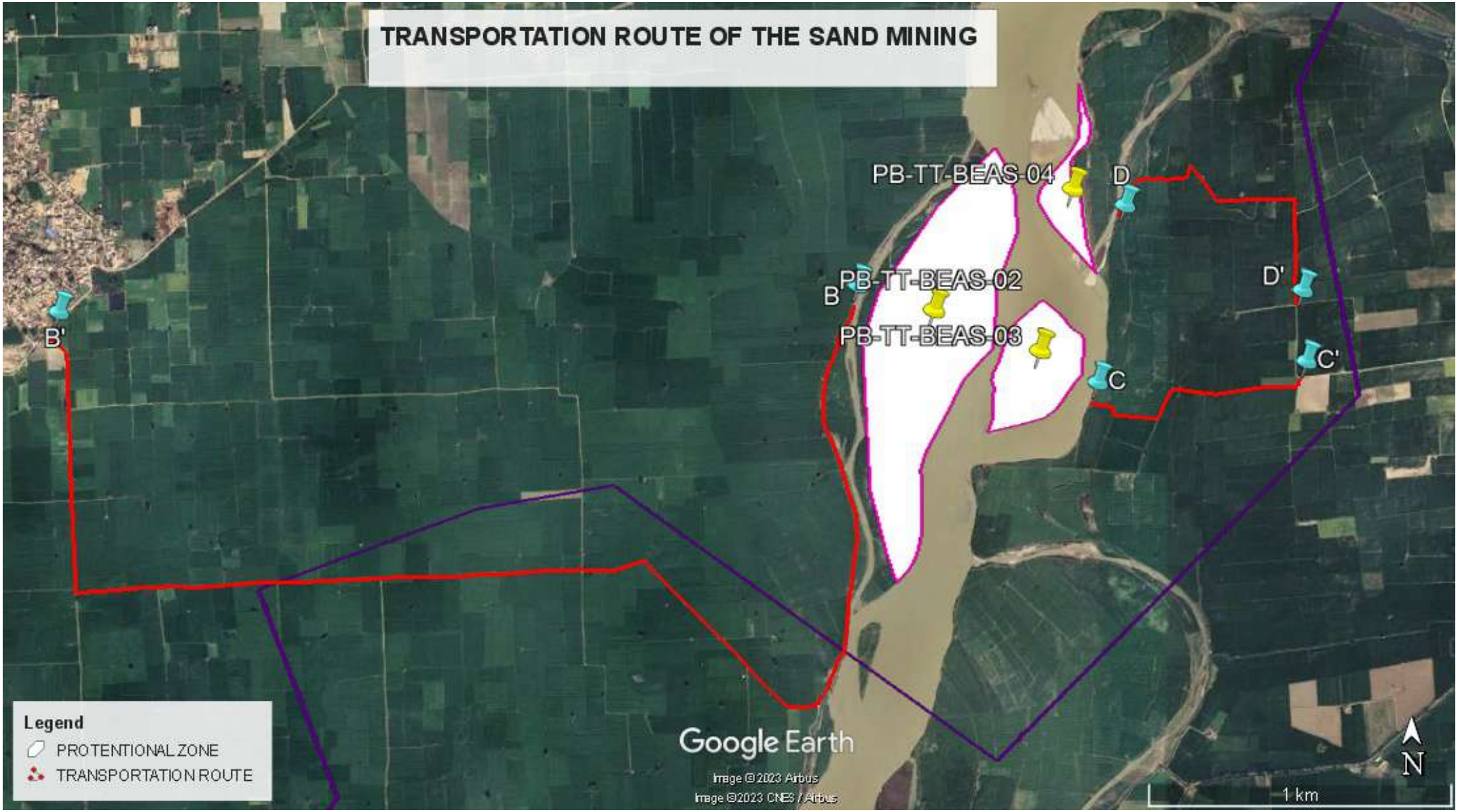

TRANSPORTATION ROUTE OF THE SAND MINING
Legend
PROTENTIONAL ZONE
TRANSPORTATION ROUTE
H2
G2
H1
G1
PB-TT-SUT-08
PB-TT-SUT-07
Google Earth
Image © 2022 Airbus
N
700 m

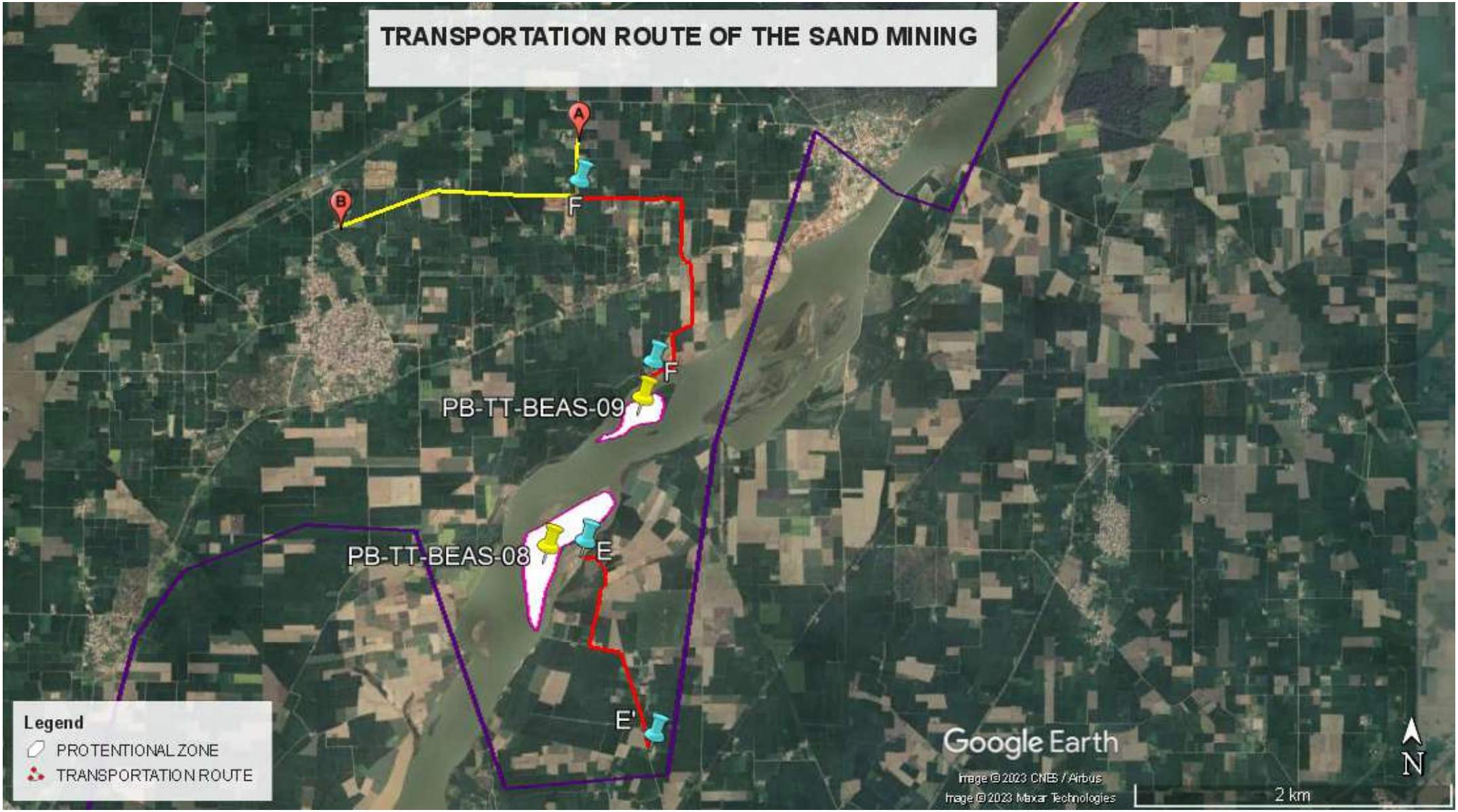

TRANSPORTATION ROUTE OF THE SAND MINING
Legend
TRANSPORTATION ROUTE
MINING ZONE
S.H
L2
K2
K1
J2
L1
PB-TT-SUT-12
J1
PB-TT-SUT-11
I2
PB-TT-SUT-10
I1
PB-TT-SUT-09
Google Earth
Image © 2022 Airbus
N
1 km


AGRICULTURE MINING SIDE DETAILS
SATPAL SINGH
A
B
1
2
Legend
MINING SIDE
S.H
SATPAL SINGH
TRANSPORTATION ROUTE
Google Earth
Image © 2022 Airbus
900 m
N


TRANSPORTATION ROUTE OF THE SAND MINING
A'
A
PB-TT-BEAS-01
Legend
PROTENTIONAL ZONE
TRANSPORTATION ROUTE
Google Earth
Image © 2023 Airbus
900 m
N


TRANSPORTATION ROUTE OF THE SAND MINING
G'
G
PB-TT-BEAS-10
Legend
PROTENTIONAL ZONE
TRANSPORTATION ROUTE
Google Earth
Image © 2023 CNES / Airbus
Image © 2023 Maxar Technologies
600 m
N


TRANSPORTATION ROUTE OF THE SAND MINING
PB-TT-BEAS-04
D
PB-TT-BEAS-02
B
D'
B'
PB-TT-BEAS-03
C'
C
Legend
PROTENTIONAL ZONE
TRANSPORTATION ROUTE
Google Earth
Image © 2023 Airbus
Image © 2023 CNES / Airbus
N
1 km


TRANSPORTATION ROUTE OF THE SAND MINING
A
B
F
F
PB-TT-BEAS-09
PB-TT-BEAS-08
E
E'
Legend
PROTENTIONAL ZONE
TRANSPORTATION ROUTE
Google Earth
Image © 2023 CNES / Airbus
Image © 2023 Maxar Technologies
2 km
N

ANNEXURE – XII

LITHOLOGY OF AGRICULTURE MINING SITES

❖ LITHOLOG FOR THE AGRICULTURE MINING SITES

There is only one agricultural site in the district Tarn Taran. It is observed that the agriculture mine site is located mainly in and around the Sutlej River. A generalized lithology has been developed for a deep understanding the strata.

Litholog for agriculture site in and around the Sutlej River

The photograph showing a thin layer of top soil and deposition of sand in a symmetric way. The formation also indicates about the sand presence at the site.

Litholog up to 3 Meters	
Soil	0.3 Meter
Sand	2.7 Meter

Sr. No.	Name	Calculation	Total Reserve	Total Mineral to be mined
1	Satpal Singh	2.7x (7x 4046.86) x 1.68	128495.9MT	77097.54MT

ANNEXURE-XIII

LAYOUT PLAN FOR EACH THE SAND BLOCK WITH SAND BLOCK, NO MIMNING ZONE, BENCHMARK, FOREST AREA, RESTICTED AREA, OGL, GCP ETC.

DISTRICT SURVEY REPORT OF TARN TARAN DISTRICT, PUNJAB

❖ Permanent Benchmarks established and Benchmarks along with coordinates

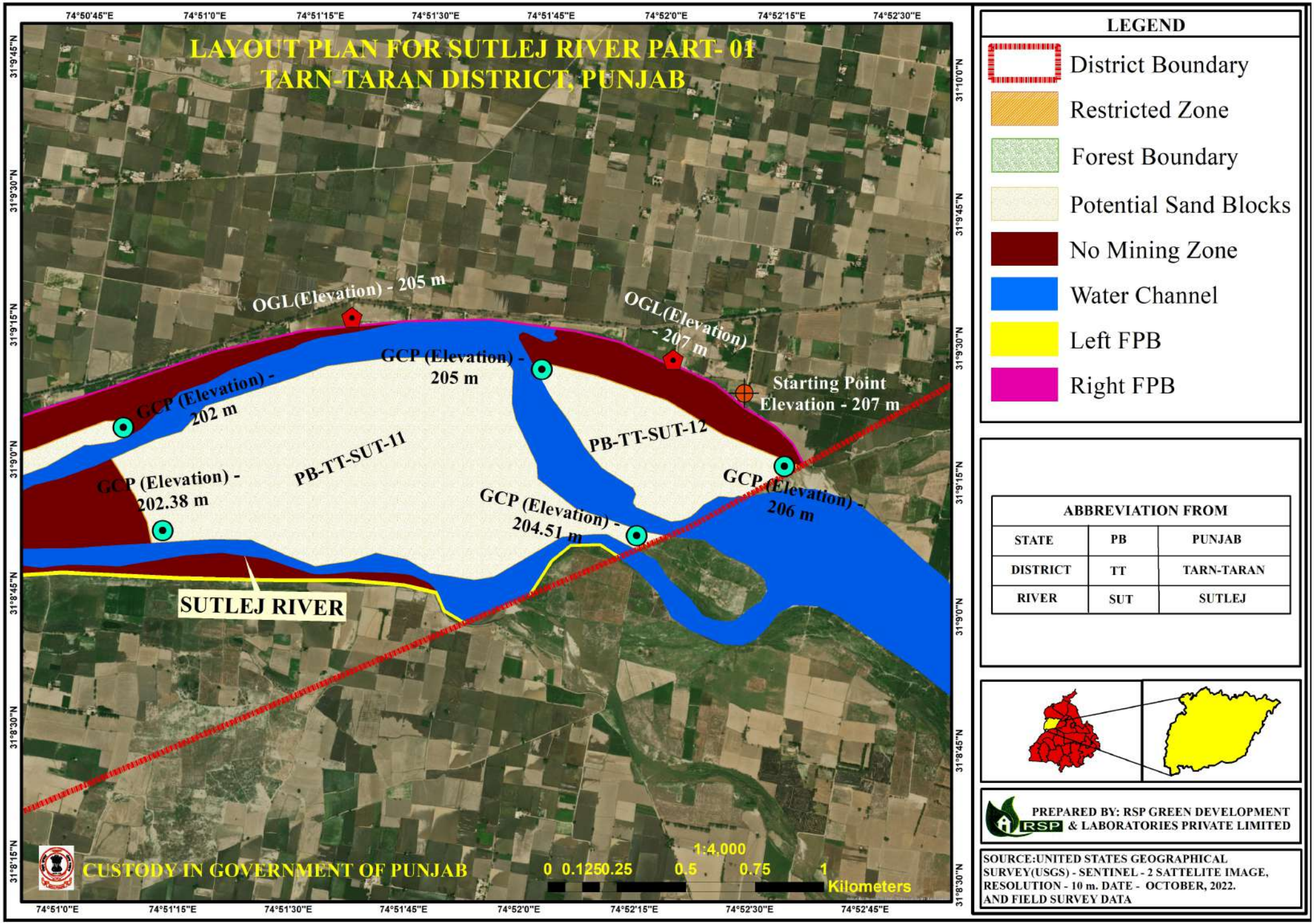
Sr. No.	Name of the sand zone	Location		Area (in Ha.)	Benchmark			
					Code	Coordinates		Distance from the sand zone
		Latitudes	Longitudes			Latitudes	Longitudes	
1	PB-TT-SUT-01	31° 6'40.89"N 31° 6'42.15"N 31° 6'49.25"N 31° 6'52.68"N 31° 6'54.09"N 31° 6'55.05"N 31° 6'56.85"N 31° 6'57.31"N 31° 6'56.76"N 31° 6'55.91"N 31° 6'53.84"N 31° 6'47.31"N 31° 6'45.55"N 31° 6'45.97"N 31° 6'47.81"N 31° 6'48.66"N 31° 6'50.52"N 31° 6'51.86"N 31° 7'1.83"N 31° 7'3.97"N 31° 7'6.74"N 31° 7'8.14"N 31° 7'12.40"N 31° 7'17.35"N 31° 7'12.98"N 31° 7'9.65"N 31° 7'6.02"N 31° 6'59.05"N 31° 6'56.14"N 31° 6'53.73"N	74°44'50.68"E 74°44'20.71"E 74°44'8.24"E 74°44'9.63"E 74°44'10.79"E 74°44'11.96"E 74°44'14.80"E 74°44'16.76"E 74°44'21.20"E 74°44'23.30"E 74°44'26.37"E 74°44'32.92"E 74°44'35.66"E 74°44'37.32"E 74°44'38.43"E 74°44'39.50"E 74°44'43.25"E 74°44'45.00"E 74°44'42.06"E 74°44'42.54"E 74°44'44.08"E 74°44'46.10"E 74°44'47.20"E 74°44'50.76"E 74°44'49.58"E 74°44'49.59"E 74°44'51.47"E 74°44'53.98"E 74°44'54.24"E 74°44'55.65"E	49.15	**BM_SUT_01 (Elevation – 201 m Place – Kot Budha Mullah wala Bridge**	**31°8'4.27"N 31°7'38.42"N**	**74°46'15.71"E 74°46'21.35"E**	2564 m
2	PB-TT-SUT-02	31° 7'0.88"N 31° 7'15.13"N 31° 7'17.16"N 31° 7'22.28"N 31° 7'27.43"N 31° 7'7.04"N	74°44'58.43"E 74°44'54.62"E 74°44'55.63"E 74°44'56.74"E 74°45'5.30"E 74°45'0.78"E	11.96				2084 m
3	PBTT-SUT-03	31° 7'41.13"N 31° 7'36.11"N 31° 7'30.02"N	74°45'40.43"E 74°45'41.23"E 74°45'23.24"E	8.97				1068 m

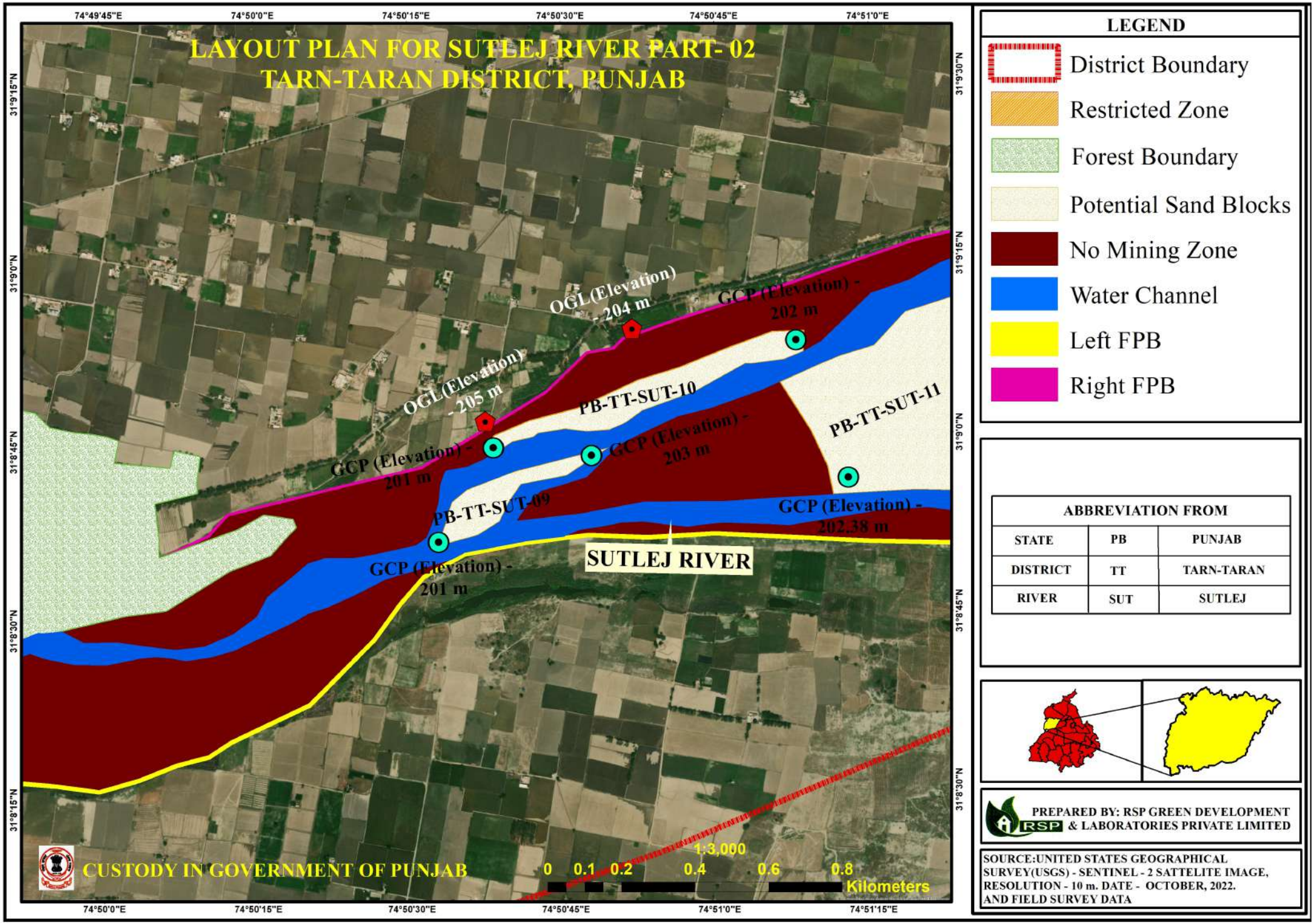
		31° 7'34.01"N 31° 7'35.97"N 31° 7'40.85"N	74°45'19.66"E 74°45'25.23"E 74°45'36.52"E					
4	PB-TT-SUT-04	31° 7'37.89"N 31° 7'48.25"N 31° 7'53.36"N 31° 7'54.25"N 31° 7'53.05"N 31° 7'50.36"N 31° 7'45.06"N 31° 7'38.68"N 31° 7'38.87"N 31° 7'39.18"N 31° 7'41.84"N 31° 7'42.70"N 31° 7'39.33"N 31° 7'38.51"N	74°47'42.39"E 74°47'42.73"E 74°47'21.43"E 74°47'6.55"E 74°46'58.37"E 74°47'10.35"E 74°47'10.31"E 74°47'19.48"E 74°47'22.24"E 74°47'24.27"E 74°47'30.19"E 74°47'35.59"E 74°47'37.71"E 74°47'42.21"E	37.5				1048 m
5	PB-TT-SUT-05	31° 7'54.77"N 31° 8'8.26"N 31° 8'5.13"N 31° 8'1.14"N 31° 7'59.25"N 31° 7'55.94"N 31° 7'56.13"N 31° 7'51.54"N 31° 7'54.97"N 31° 7'55.52"N 31° 7'57.00"N	74°46'56.20"E 74°46'55.54"E 74°46'58.53"E 74°47'5.95"E 74°47'8.12"E 74°47'16.83"E 74°47'46.21"E 74°47'39.05"E 74°47'22.05"E 74°47'10.76"E 74°47'4.46"E	21.4				992 m
6	PB-TT-SUT-06	31° 7'59.27"N 31° 7'50.71"N 31° 7'49.98"N 31° 7'50.09"N 31° 7'50.86"N 31° 7'51.58"N 31° 7'52.96"N 31° 7'58.90"N	74°47'52.55"E 74°47'52.44"E 74°47'47.80"E 74°47'45.78"E 74°47'43.98"E 74°47'42.91"E 74°47'45.74"E 74°47'51.52"E	4.89				2193 m
7	PB-TT-SUT-07	31° 8'1.34"N 31° 8'10.54"N 31° 8'9.19"N 31° 7'59.85"N	74°49'0.69"E 74°49'14.56"E 74°49'16.78"E 74°49'9.48"E	5.67				4329 m
8	PB-TT-SUT-08	31° 8'0.10"N 31° 7'59.54"N 31° 8'7.05"N 31° 8'10.50"N 31° 8'18.79"N 31° 8'19.50"N 31° 8'18.46"N	74°49'27.38"E 74°49'14.41"E 74°49'17.80"E 74°49'19.92"E 74°49'27.06"E 74°49'28.82"E 74°49'31.90"E	19.24				4688 m

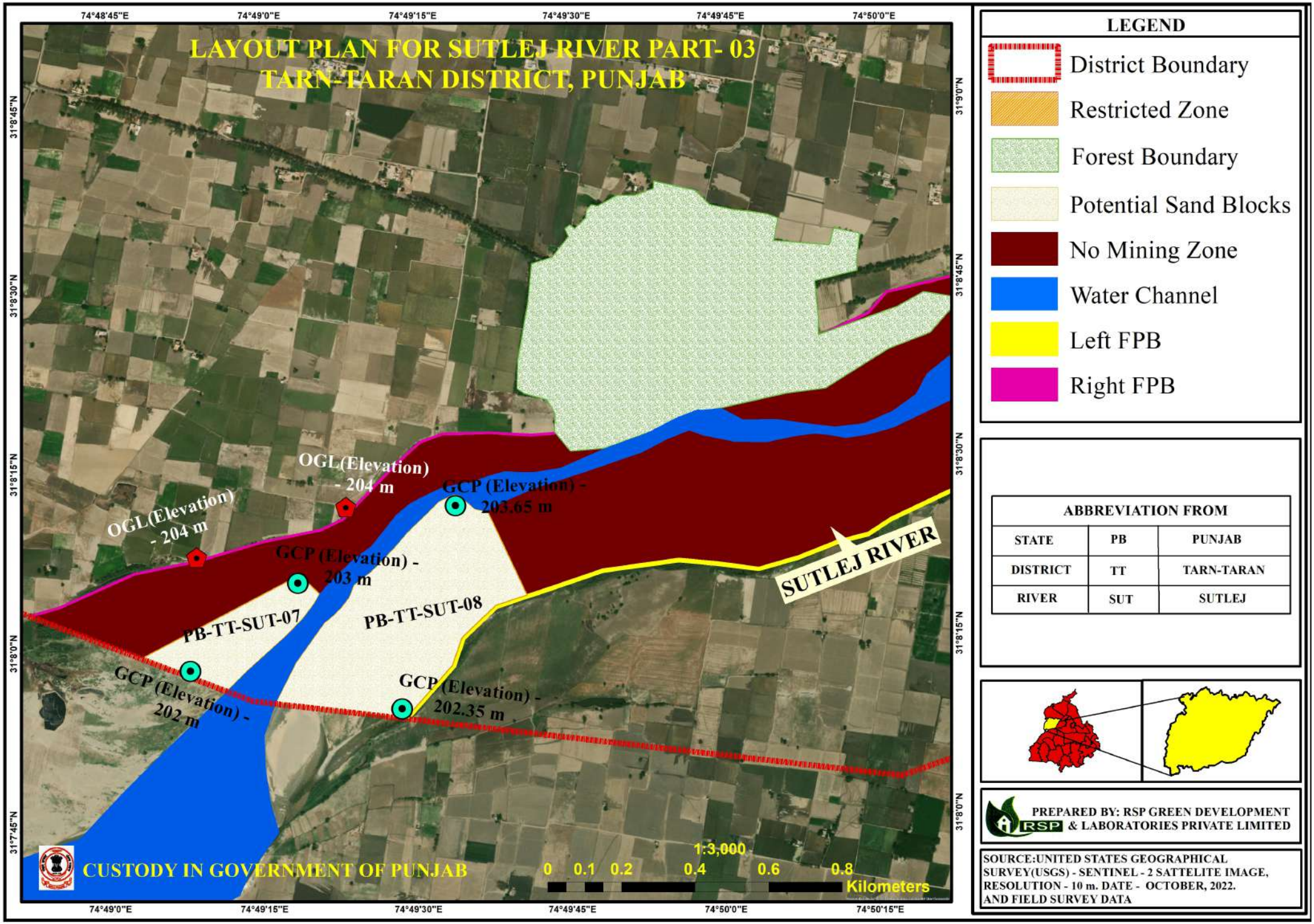
		31° 8'12.06"N 31° 8'10.74"N 31° 8'7.63"N 31° 8'5.06"N 31° 8'0.10"N 31° 7'59.48"N	74°49'37.05"E 74°49'34.12"E 74°49'31.35"E 74°49'30.96"E 74°49'27.38"E 74°49'14.36"E					
9	PB-TT-SUT-09	31° 8'42.74"N 31° 8'46.91"N 31° 8'48.21"N 31° 8'50.61"N 31° 8'53.76"N 31° 8'50.77"N 31° 8'49.42"N 31° 8'46.06"N 31° 8'44.52"N	74°50'27.31"E 74°50'28.70"E 74°50'30.04"E 74°50'34.79"E 74°50'43.14"E 74°50'39.44"E 74°50'35.27"E 74°50'33.78"E 74°50'31.91"E	2.95				6772 m
10	PB-TT-SUT-10	31° 9'6.31"N 31° 9'4.55"N 31° 9'3.62"N 31° 9'2.71"N 31° 8'59.47"N 31° 8'57.28"N 31° 8'55.31"N 31° 8'54.78"N 31° 8'54.70"N 31° 8'53.88"N 31° 8'53.58"N 31° 8'52.83"N 31° 8'51.22"N 31° 8'51.84"N 31° 8'53.07"N 31° 8'54.82"N 31° 8'56.61"N 31° 8'59.65"N 31° 9'5.77"N	74°51'0.07"E 74°51'0.49"E 74°50'58.81"E 74°50'55.08"E 74°50'50.35"E 74°50'45.80"E 74°50'43.03"E 74°50'40.78"E 74°50'38.72"E 74°50'35.96"E 74°50'35.64"E 74°50'33.58"E 74°50'31.76"E 74°50'31.26"E 74°50'31.70"E 74°50'34.95"E 74°50'39.39"E 74°50'44.46"E 74°50'57.10"E	5.54				6947 m
11	PB-TT-SUT-11	31° 9'20.05"N 31° 9'18.88"N 31° 9'15.73"N 31° 9'9.16"N 31° 9'7.46"N 31° 9'5.08"N 31° 9'3.66"N 31° 9'2.15"N 31° 8'54.27"N 31° 8'54.95"N 31° 8'59.67"N 31° 9'0.04"N 31° 8'57.44"N 31° 8'56.47"N 31° 8'51.60"N	74°51'47.98"E 74°51'49.15"E 74°51'49.58"E 74°51'54.21"E 74°51'54.68"E 74°52'0.16"E 74°52'9.67"E 74°52'8.84"E 74°51'54.59"E 74°51'53.91"E 74°51'53.33"E 74°51'52.11"E 74°51'51.67"E 74°51'51.02"E 74°51'50.58"E	88.6				7878 m

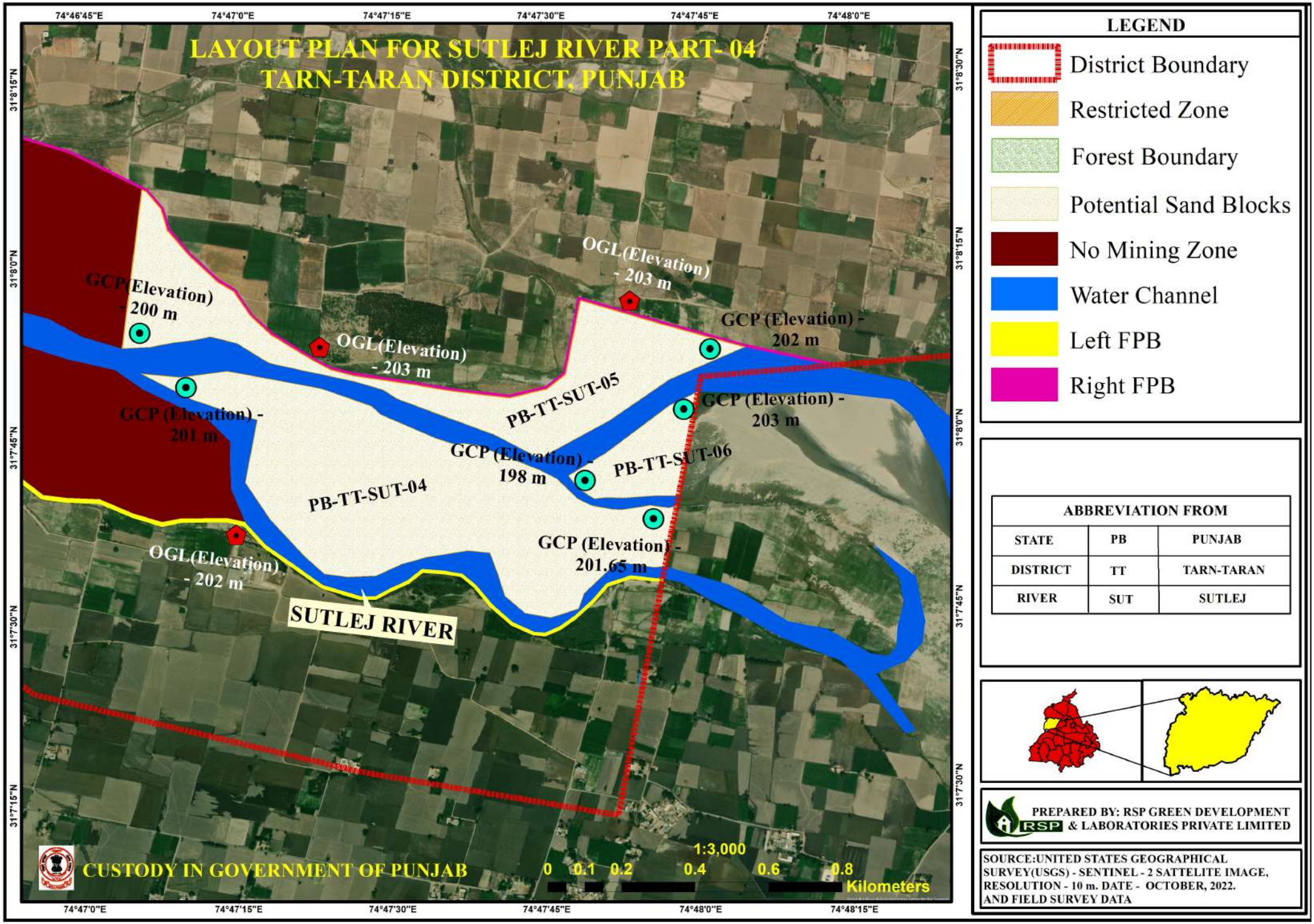
		31° 8'50.72"N 31° 8'51.18"N 31° 8'54.15"N 31° 8'55.88"N 31° 8'58.05"N 31° 8'57.70"N 31° 8'56.14"N 31° 8'53.05"N 31° 9'1.73"N 31° 9'6.06"N 31° 9'9.32"N 31° 9'16.11"N 31° 9'18.97"N 31° 9'19.09"N	74°51'47.89"E 74°51'45.99"E 74°51'45.03"E 74°51'42.91"E 74°51'31.78"E 74°51'27.25"E 74°51'21.34"E 74°51'5.93"E 74°50'58.82"E 74°51'7.33"E 74°51'9.64"E 74°51'24.61"E 74°51'37.11"E 74°51'39.84"E					
12	PB-TT-SUT-12	31° 9'13.79"N 31° 9'9.38"N 31° 9'9.44"N 31° 9'9.20"N 31° 9'8.95"N 31° 9'6.31"N 31° 9'5.54"N 31° 9'5.31"N 31° 9'6.18"N 31° 9'6.71"N 31° 9'7.63"N 31° 9'8.29"N 31° 9'10.02"N 31° 9'11.92"N 31° 9'19.04"N 31° 9'20.54"N 31° 9'20.15"N 31° 9'18.78"N 31° 9'16.08"N	74°52'28.27"E 74°52'21.75"E 74°52'21.05"E 74°52'20.62"E 74°52'18.48"E 74°52'15.47"E 74°52'14.08"E 74°52'12.85"E 74°52'8.11"E 74°52'7.54"E 74°52'7.72"E 74°52'7.16"E 74°52'2.75"E 74°52'0.03"E 74°51'52.10"E 74°51'51.97"E 74°52'0.43"E 74°52'9.68"E 74°52'17.65"E	22.3				9263 m
13	PB-TT-BEAS-01	31°16'38.71"N 31°16'39.82"N 31°16'41.35"N 31°16'42.08"N 31°16'42.62"N 31°16'43.99"N 31°16'44.40"N 31°16'39.05"N 31°16'37.59"N 31°16'37.14"N 31°16'40.13"N 31°16'39.48"N	75°4'49.76"E 75°4'51.13"E 75°4'54.23"E 75°4'56.42"E 75°4'58.66"E 75° 5'1.75"E 75° 5'3.90"E 75°5'18.21"E 75°5'14.18"E 75° 5'8.84"E 75°4'58.35"E 75°4'52.89"E	7.66	**BM_BEAS_01 (Elevation – 219 m Place – Tarn Taran Kapurthala Road)**	**31°22'24.38"N 31°22'31.16"N**	**75°10'7.73"E 75° 9'41.11"E**	12989 m

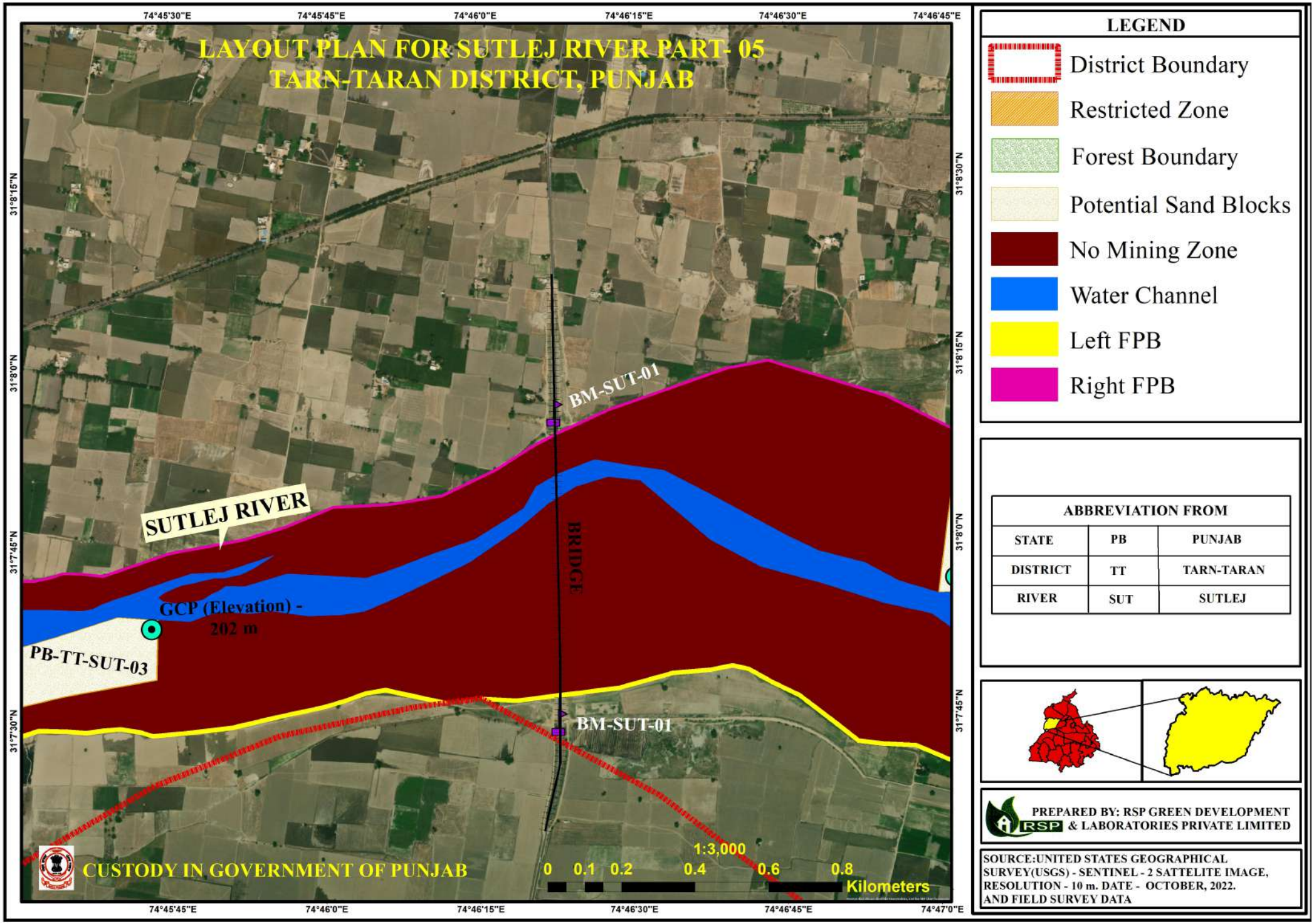
14	PB-TT-BEAS-02	31°18'59.93"N 31°19'2.84"N 31°19'9.83"N 31°19'25.53"N 31°19'30.95"N 31°19'40.09"N 31°19'46.39"N 31°19'44.06"N 31°19'41.10"N 31°19'37.37"N 31°19'33.98"N 31°19'31.75"N 31°19'25.09"N 31°19'21.51"N 31°19'13.75"N 31°19'12.10"N 31°19'5.36"N 31°19'3.16"N 31°19'1.51"N	75°7'2.15"E 75° 7'0.94"E 75°6'58.83"E 75°6'57.84"E 75°6'59.84"E 75° 7'7.21"E 75°7'14.46"E 75°7'16.06"E 75°7'17.02"E 75°7'17.17"E 75°7'15.74"E 75°7'14.52"E 75°7'14.19"E 75°7'10.42"E 75°7'5.69"E 75° 7'5.12"E 75° 7'5.28"E 75° 7'4.71"E 75° 7'3.83"E	35.49				6563 m

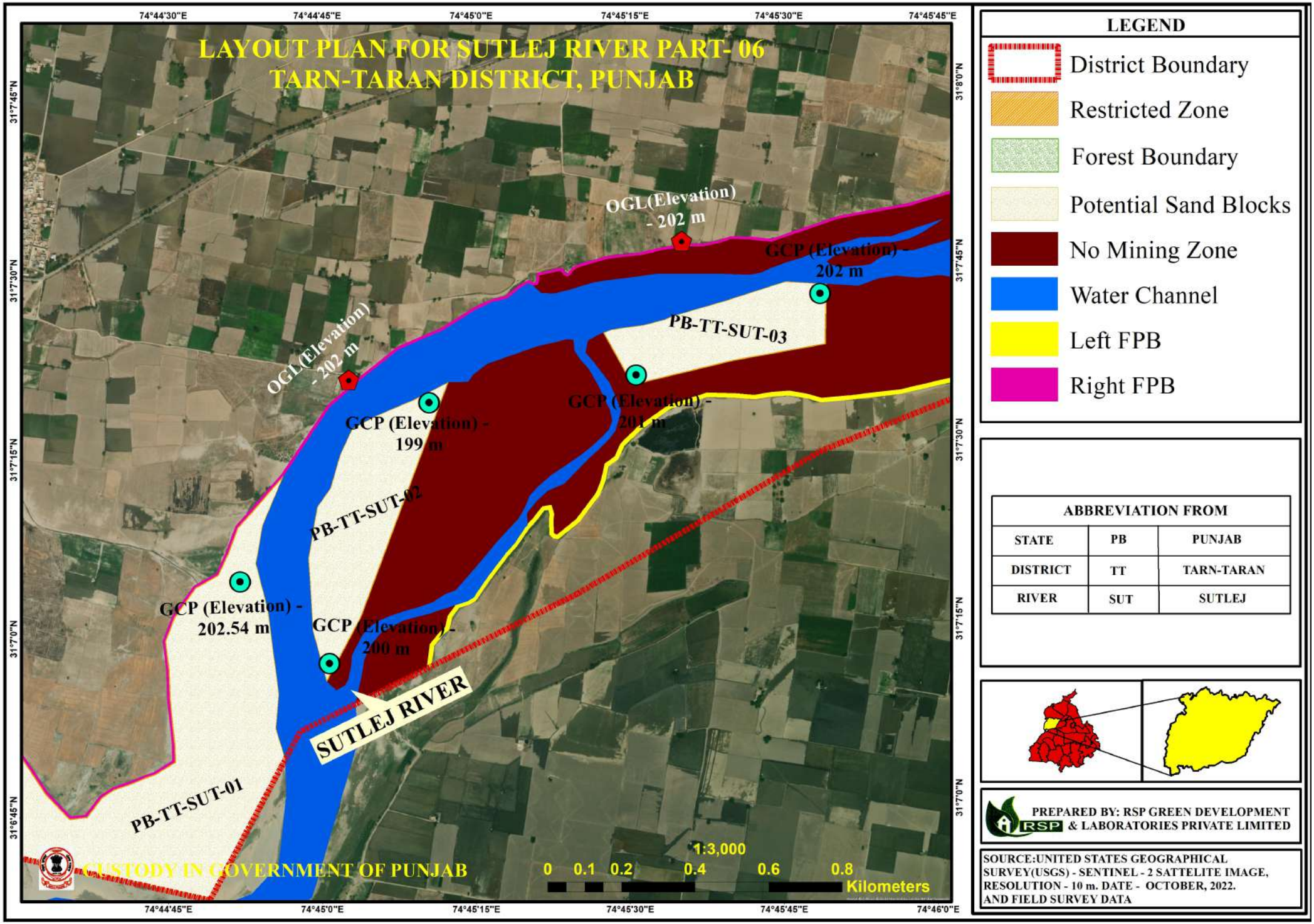

LAYOUT PLAN FOR SUTLEJ RIVER PART- 01
TARN-TARAN DISTRICT, PUNJAB
74°50'45"E
74°51'0"E
74°51'15"E
74°51'30"E
74°51'45"E
74°52'0"E
74°52'15"E
74°52'30"E
74°52'45"E
31°9'45"N
31°9'30"N
31°9'15"N
31°9'0"N
31°8'45"N
31°8'30"N
31°8'15"N
31°10'0"N
OGL(Elevation) - 205 m
OGL(Elevation) - 207 m
GCP (Elevation) - 205 m
GCP (Elevation) - 202 m
GCP (Elevation) - 202.38 m
GCP (Elevation) - 204.51 m
GCP (Elevation) - 206 m
Starting Point Elevation - 207 m
PB-TT-SUT-11
PB-TT-SUT-12
SUTLEJ RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:4,000
0 0.125 0.25 0.5 0.75 1
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

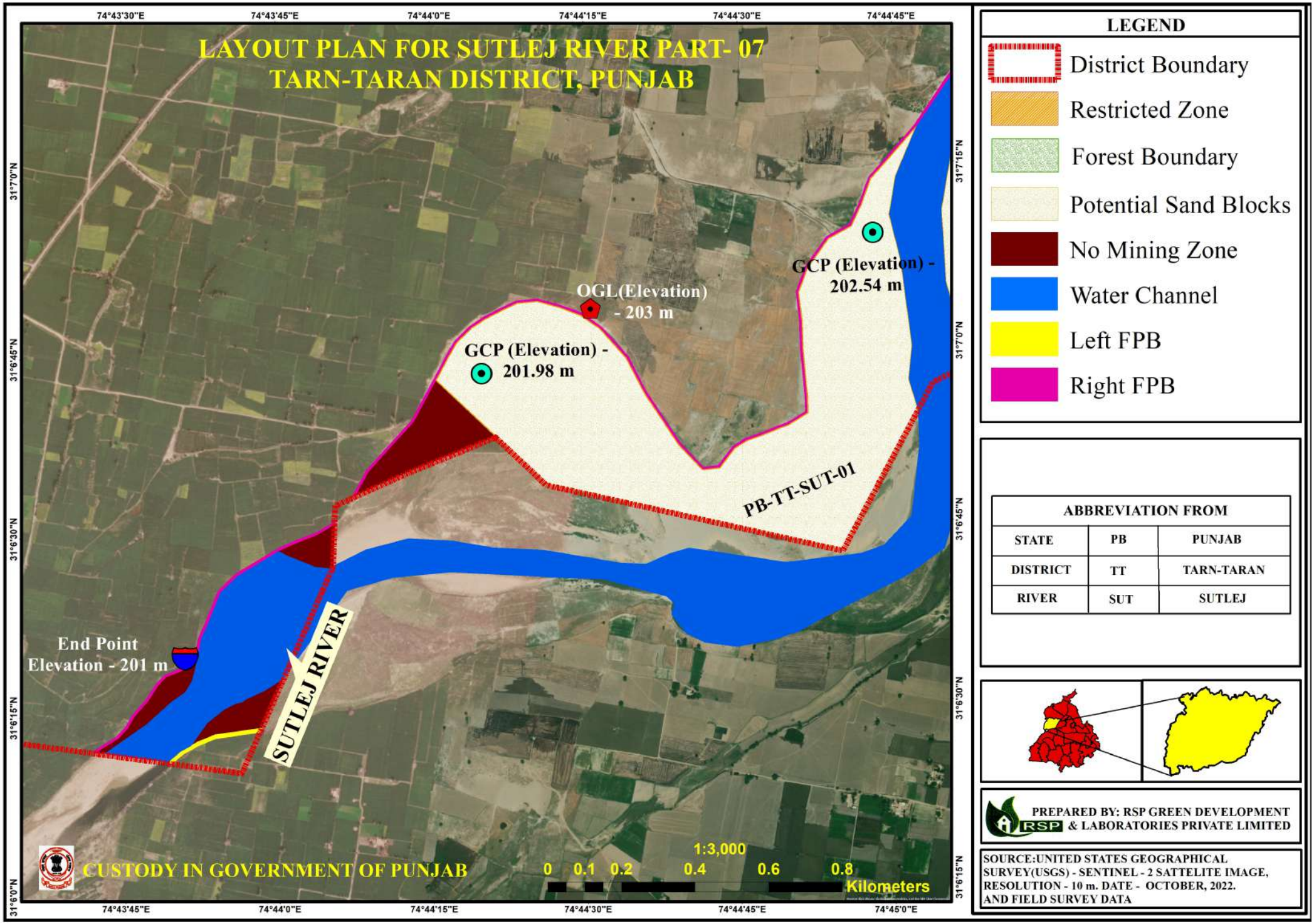

LAYOUT PLAN FOR SUTLEJ RIVER PART- 02
TARN-TARAN DISTRICT, PUNJAB
74°49'45"E
74°50'0"E
74°50'15"E
74°50'30"E
74°50'45"E
74°51'0"E
74°51'15"E
31°9'15"N
31°9'0"N
31°8'45"N
31°8'30"N
31°8'15"N
31°9'30"N
OGL(Elevation) - 204 m
GCP (Elevation) - 202 m
OGL(Elevation) - 205 m
PB-TT-SUT-10
PB-TT-SUT-11
GCP (Elevation) - 201 m
GCP (Elevation) - 203 m
PB-TT-SUT-09
GCP (Elevation) - 202.38 m
GCP (Elevation) - 201 m
SUTLEJ RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

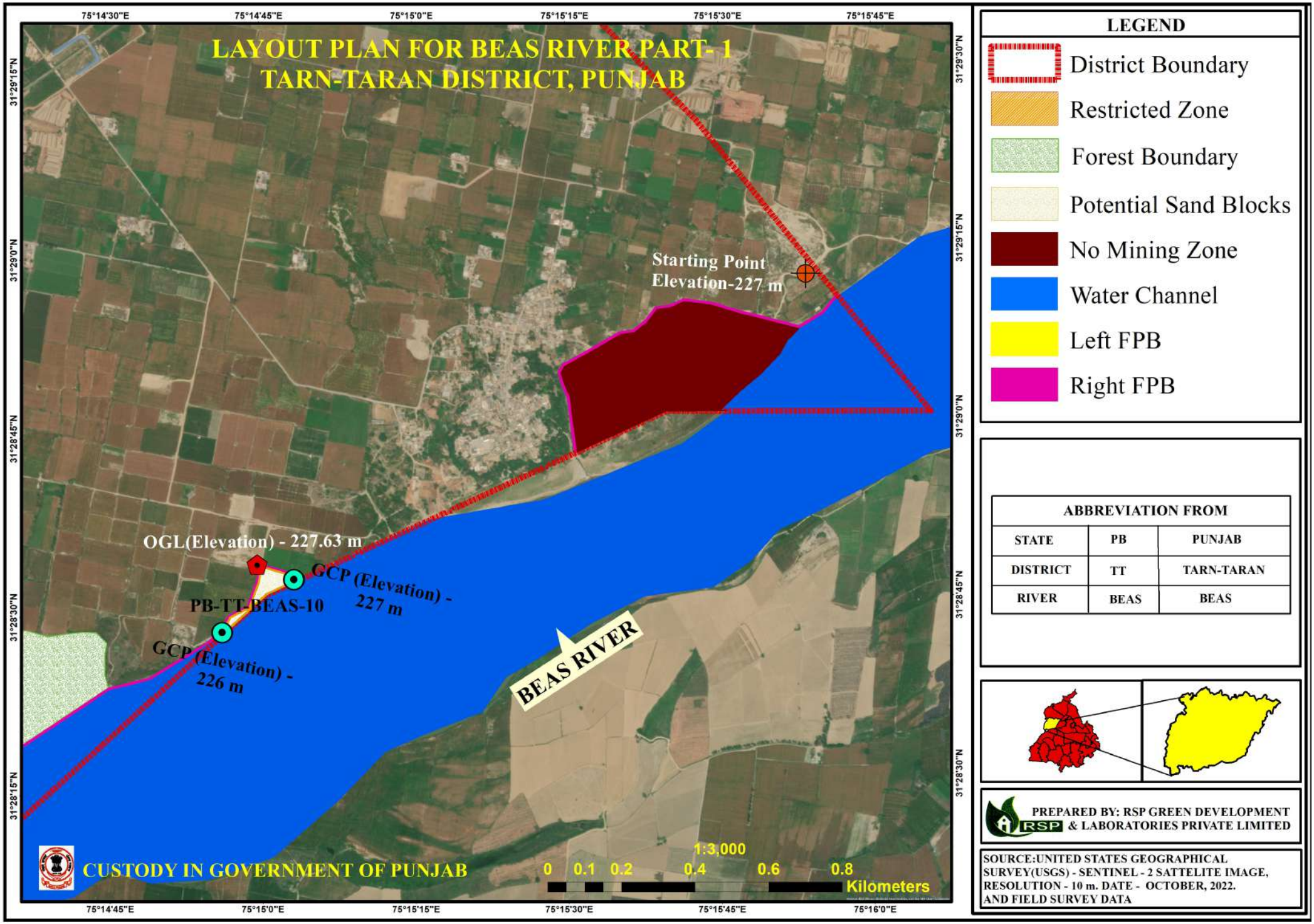

LAYOUT PLAN FOR SUTLEJ RIVER PART- 03
TARN-TARAN DISTRICT, PUNJAB
74°48'45"E
74°49'0"E
74°49'15"E
74°49'30"E
74°49'45"E
74°50'0"E
74°50'15"E
31°8'45"N
31°8'30"N
31°8'15"N
31°8'0"N
31°7'45"N
OGL(Elevation) - 204 m
OGL(Elevation) - 204 m
GCP (Elevation) - 203.65 m
GCP (Elevation) - 203 m
PB-TT-SUT-07
PB-TT-SUT-08
GCP (Elevation) - 202 m
GCP (Elevation) - 202.35 m
SUTLEJ RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

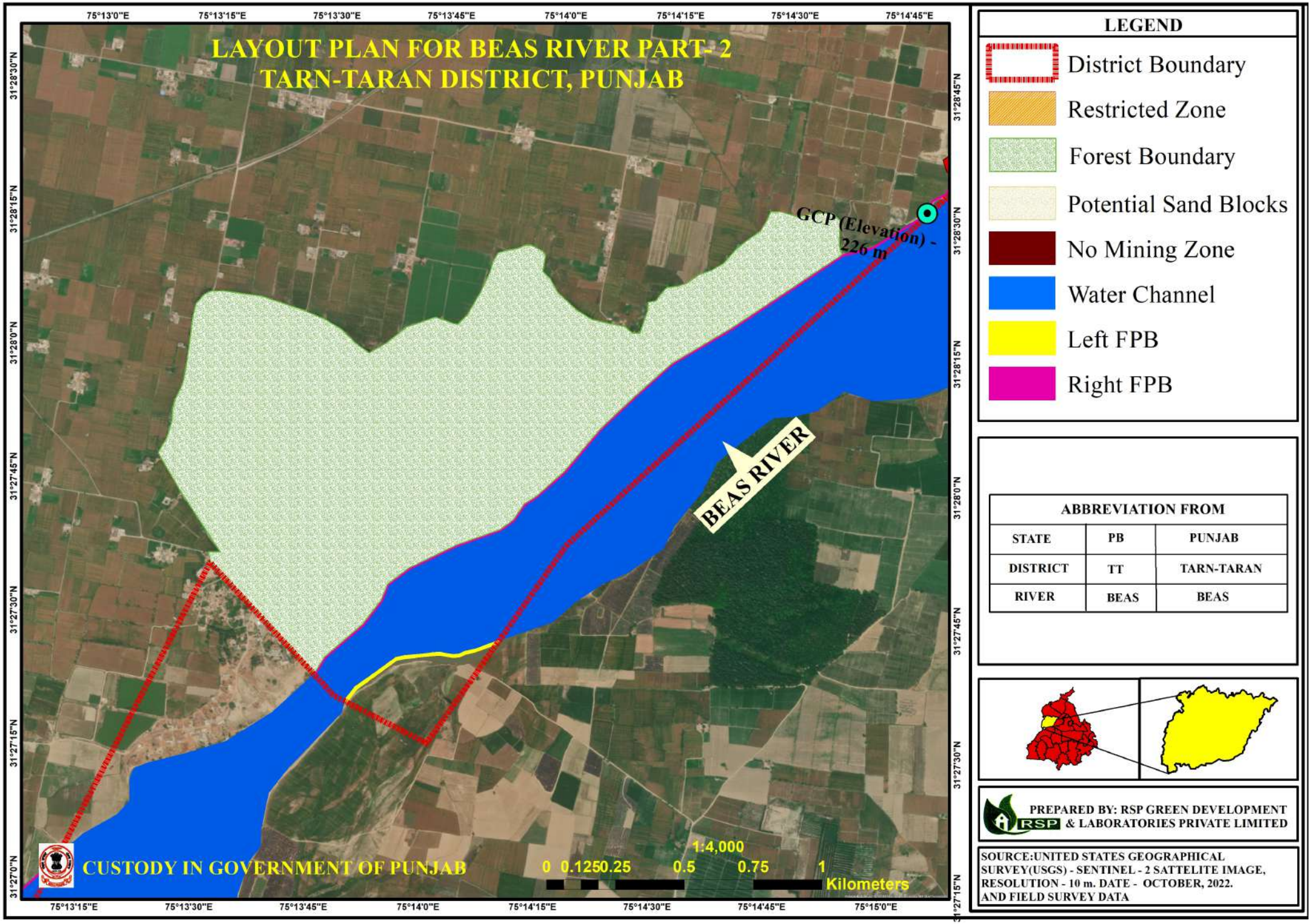

LAYOUT PLAN FOR SUTLEJ RIVER PART- 04
TARN-TARAN DISTRICT, PUNJAB
74°46'45"E
74°47'0"E
74°47'15"E
74°47'30"E
74°47'45"E
74°48'0"E
74°48'15"E
31°8'15"N
31°8'0"N
31°7'45"N
31°7'30"N
31°7'15"N
31°8'30"N
GCP(Elevation) - 200 m
OGL(Elevation) - 203 m
OGL(Elevation) - 203 m
GCP (Elevation) - 202 m
GCP (Elevation) - 201 m
PB-TT-SUT-05
GCP (Elevation) - 203 m
GCP (Elevation) - 198 m
PB-TT-SUT-06
PB-TT-SUT-04
GCP (Elevation) - 201.65 m
OGL(Elevation) - 202 m
SUTLEJ RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

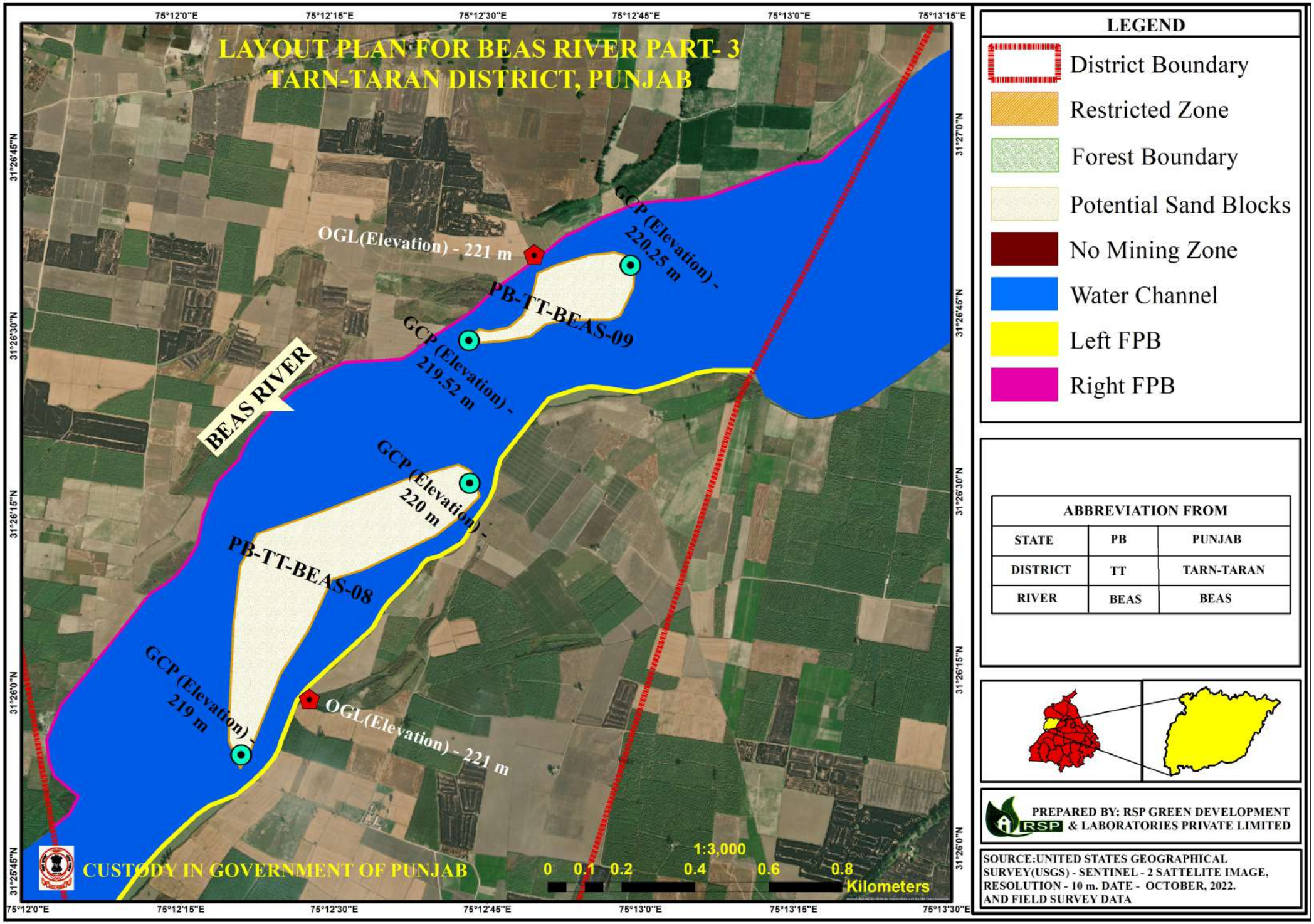

LAYOUT PLAN FOR SUTLEJ RIVER PART- 05
TARN-TARAN DISTRICT, PUNJAB
74°45'30"E
74°45'45"E
74°46'0"E
74°46'15"E
74°46'30"E
74°46'45"E
74°47'0"E
31°8'15"N
31°8'0"N
31°7'45"N
31°7'30"N
SUTLEJ RIVER
BM-SUT-01
BRIDGE
GCP (Elevation) - 202 m
PB-TT-SUT-03
BM-SUT-01
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

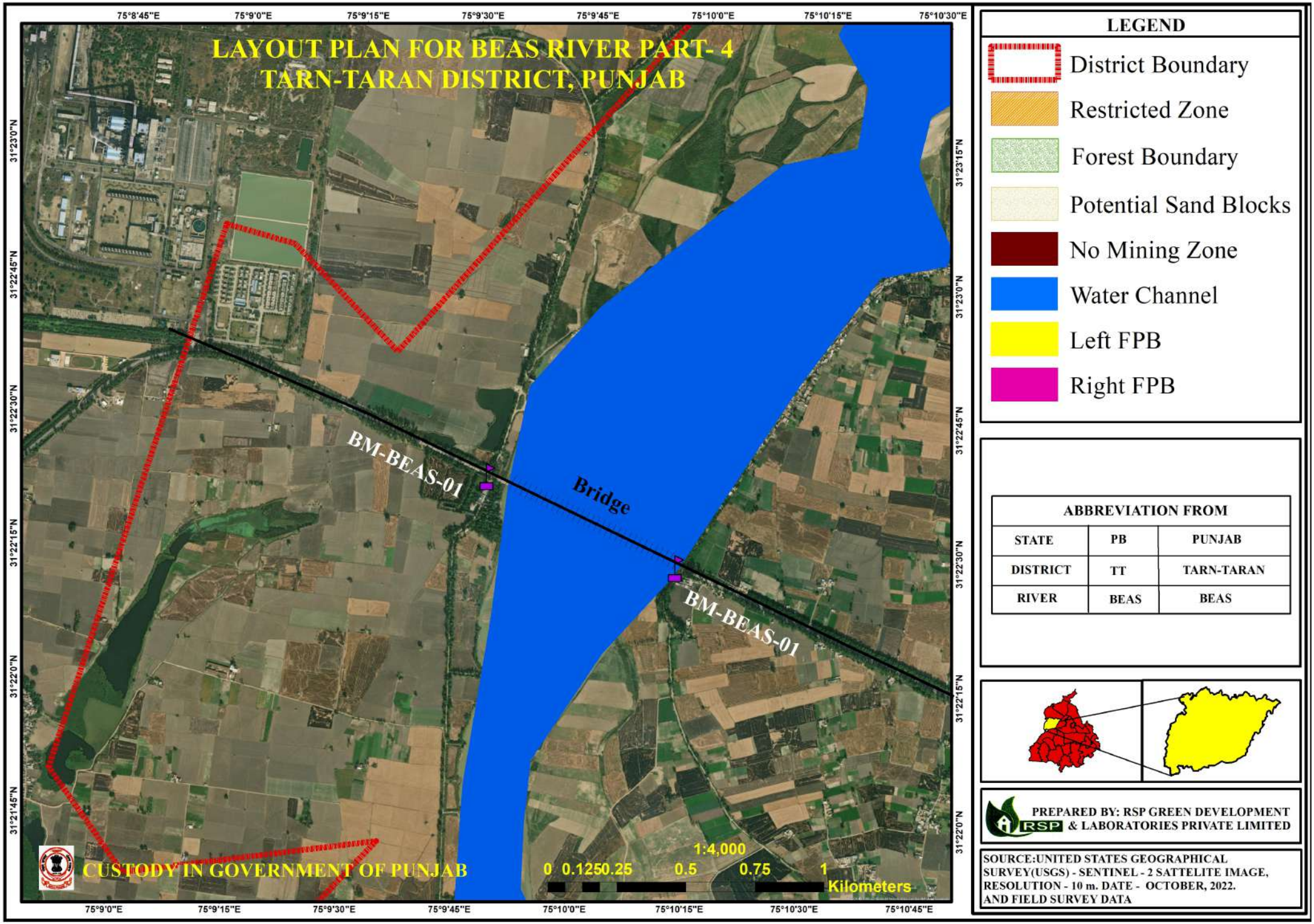

LAYOUT PLAN FOR SUTLEJ RIVER PART- 06
TARN-TARAN DISTRICT, PUNJAB
74°44'30"E
74°44'45"E
74°45'0"E
74°45'15"E
74°45'30"E
74°45'45"E
74°46'0"E
31°7'45"N
31°7'30"N
31°7'15"N
31°7'0"N
31°6'45"N
31°8'0"N
OGL(Elevation) - 202 m
GCP (Elevation) - 202 m
PB-TT-SUT-03
OGL(Elevation) - 202 m
GCP (Elevation) - 199 m
GCP (Elevation) - 201 m
PB-TT-SUT-02
GCP (Elevation) - 202.54 m
GCP (Elevation) - 200 m
SUTLEJ RIVER
PB-TT-SUT-01
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

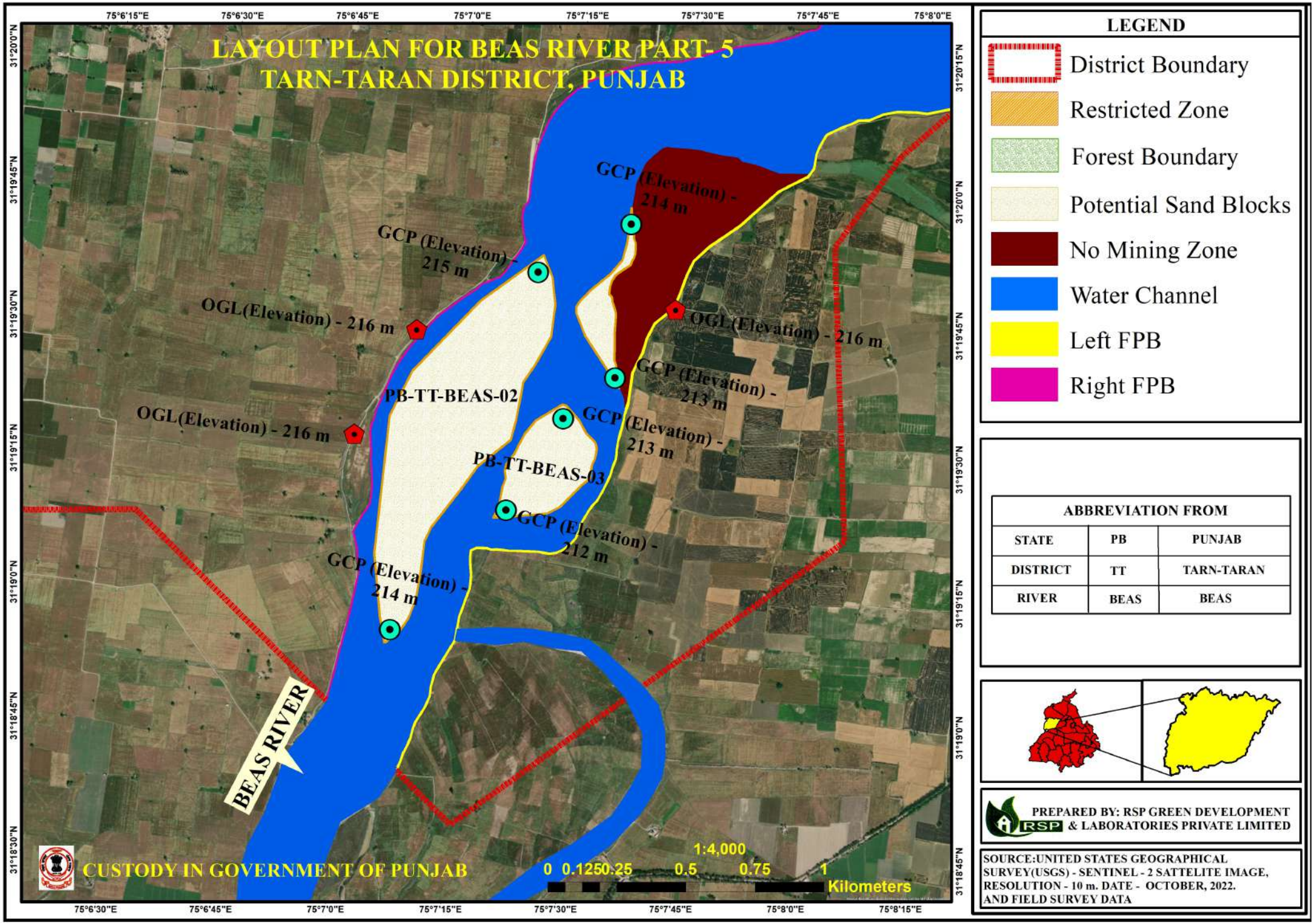

LAYOUT PLAN FOR SUTLEJ RIVER PART- 07
TARN-TARAN DISTRICT, PUNJAB
74°43'30"E
74°43'45"E
74°44'0"E
74°44'15"E
74°44'30"E
74°44'45"E
74°45'0"E
31°7'0"N
31°6'45"N
31°6'30"N
31°6'15"N
31°6'0"N
31°7'15"N
OGL(Elevation) - 203 m
GCP (Elevation) - 201.98 m
GCP (Elevation) - 202.54 m
PB-TT-SUT-01
End Point Elevation - 201 m
SUTLEJ RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER SUT SUTLEJ
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

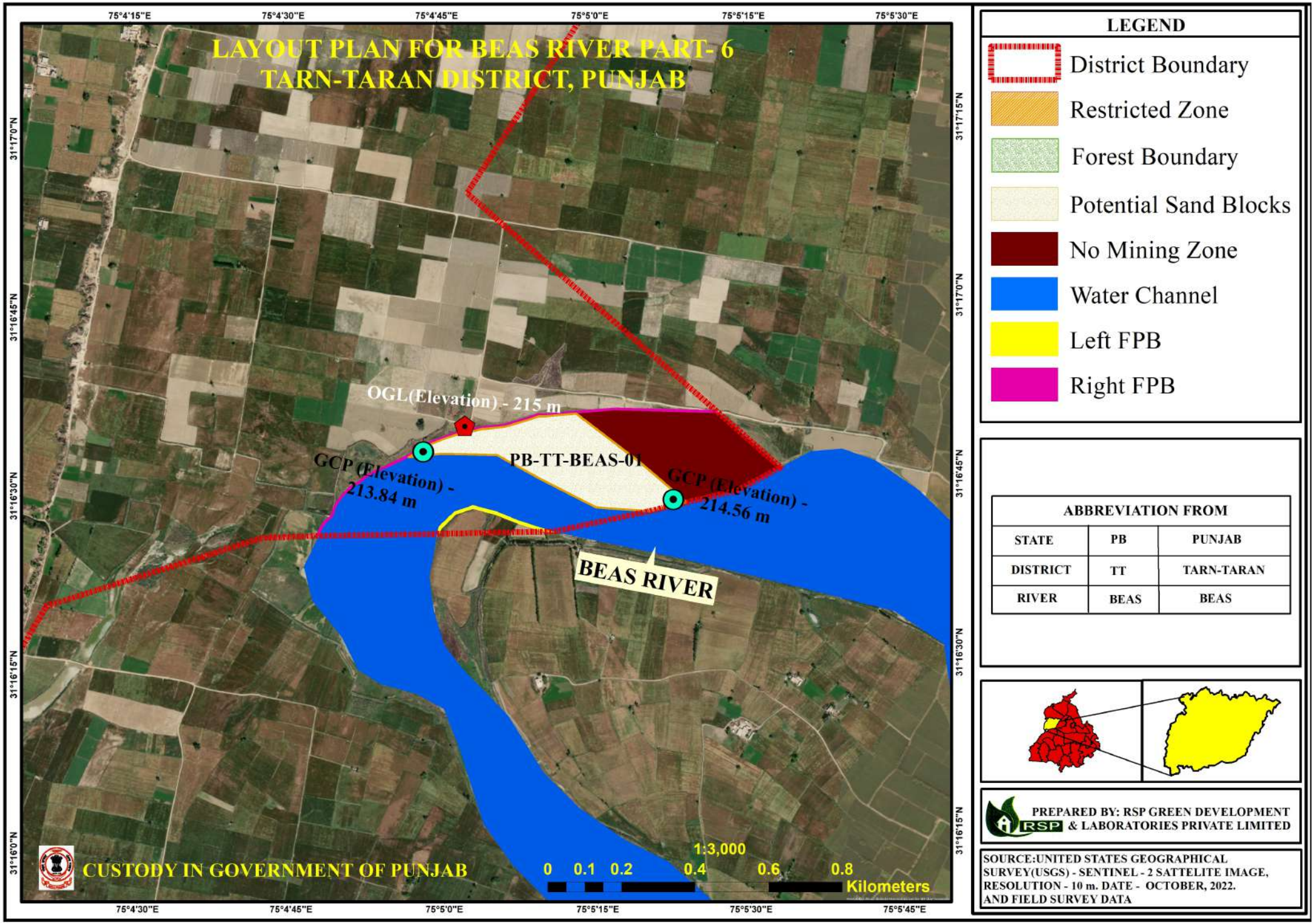

LAYOUT PLAN FOR BEAS RIVER PART- 1
TARN-TARAN DISTRICT, PUNJAB
75°14'30"E
75°14'45"E
75°15'0"E
75°15'15"E
75°15'30"E
75°15'45"E
75°16'0"E
31°29'15"N
31°29'0"N
31°28'45"N
31°28'30"N
31°28'15"N
31°29'30"N
Starting Point
Elevation-227 m
OGL(Elevation) - 227.63 m
GCP (Elevation) - 227 m
PB-TT-BEAS-10
GCP (Elevation) - 226 m
BEAS RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

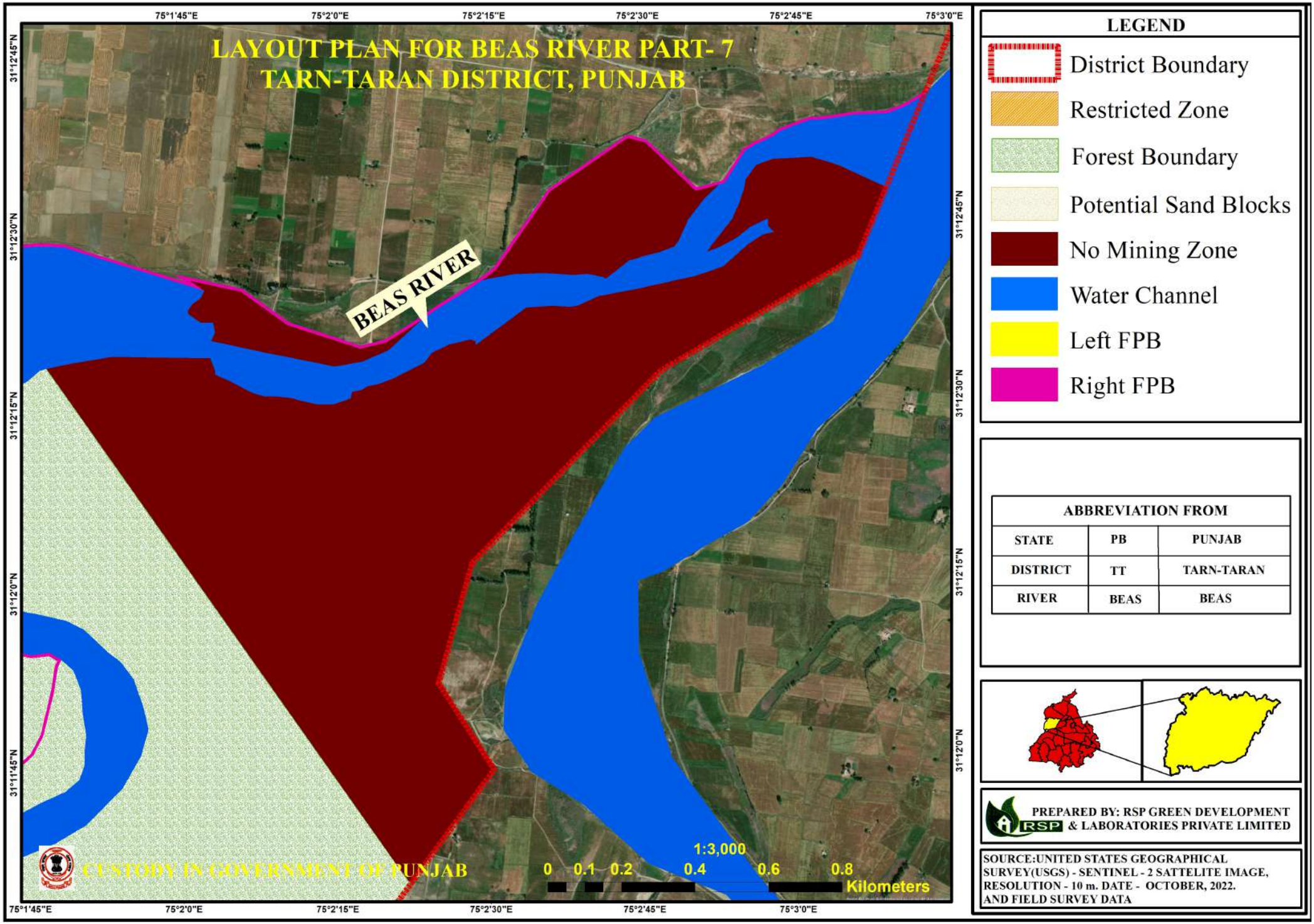

LAYOUT PLAN FOR BEAS RIVER PART- 2
TARN-TARAN DISTRICT, PUNJAB
75°13'0"E
75°13'15"E
75°13'30"E
75°13'45"E
75°14'0"E
75°14'15"E
75°14'30"E
75°14'45"E
75°15'0"E
31°28'30"N
31°28'15"N
31°28'0"N
31°27'45"N
31°27'30"N
31°27'15"N
31°27'0"N
GCP (Elevation) - 226 m
BEAS RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:4,000
0 0.125 0.25 0.5 0.75 1
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

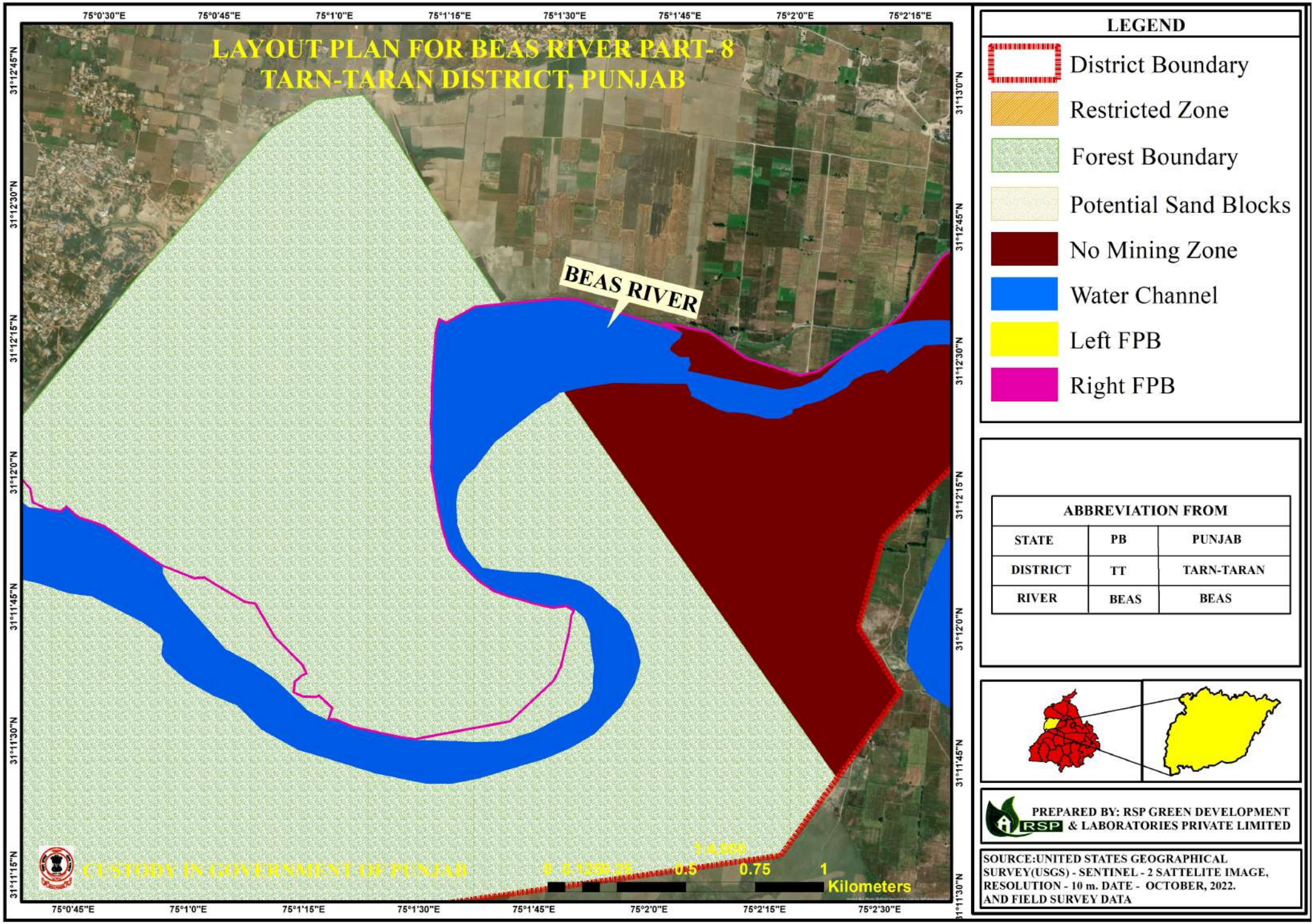

LAYOUT PLAN FOR BEAS RIVER PART- 3
TARN-TARAN DISTRICT, PUNJAB
BEAS RIVER
PB-TT-BEAS-09
PB-TT-BEAS-08
OGL(Elevation) - 221 m
GCP (Elevation) - 220.25 m
GCP (Elevation) - 219.52 m
GCP (Elevation) - 220 m
GCP (Elevation) - 219 m
OGL(Elevation) - 221 m
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

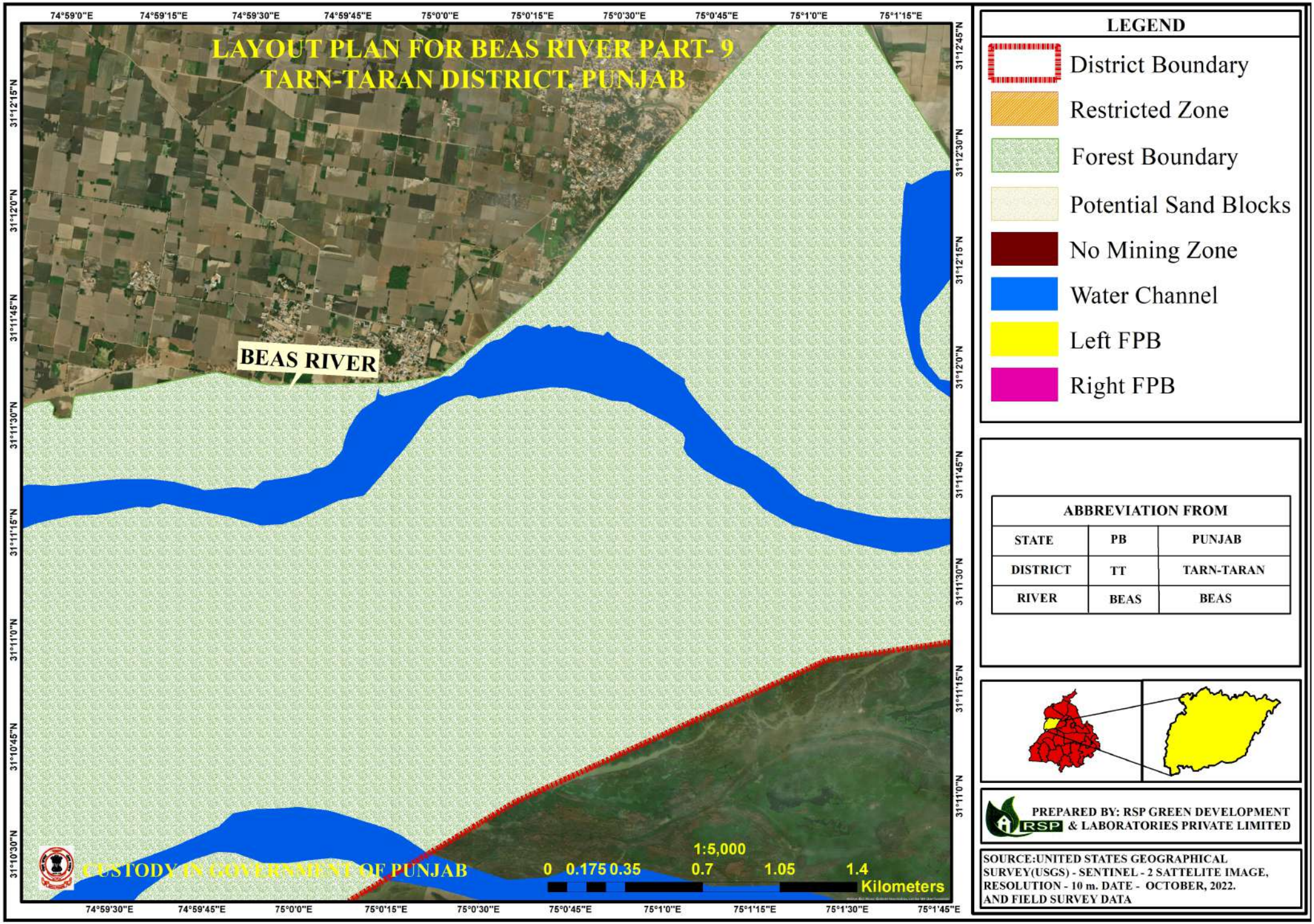

LAYOUT PLAN FOR BEAS RIVER PART- 4
TARN-TARAN DISTRICT, PUNJAB
75°8'45"E
75°9'0"E
75°9'15"E
75°9'30"E
75°9'45"E
75°10'0"E
75°10'15"E
75°10'30"E
31°23'0"N
31°22'45"N
31°22'30"N
31°22'15"N
31°22'0"N
31°21'45"N
31°23'15"N
BM-BEAS-01
Bridge
BM-BEAS-01
CUSTODY IN GOVERNMENT OF PUNJAB
1:4,000
0 0.1250.25 0.5 0.75 1
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

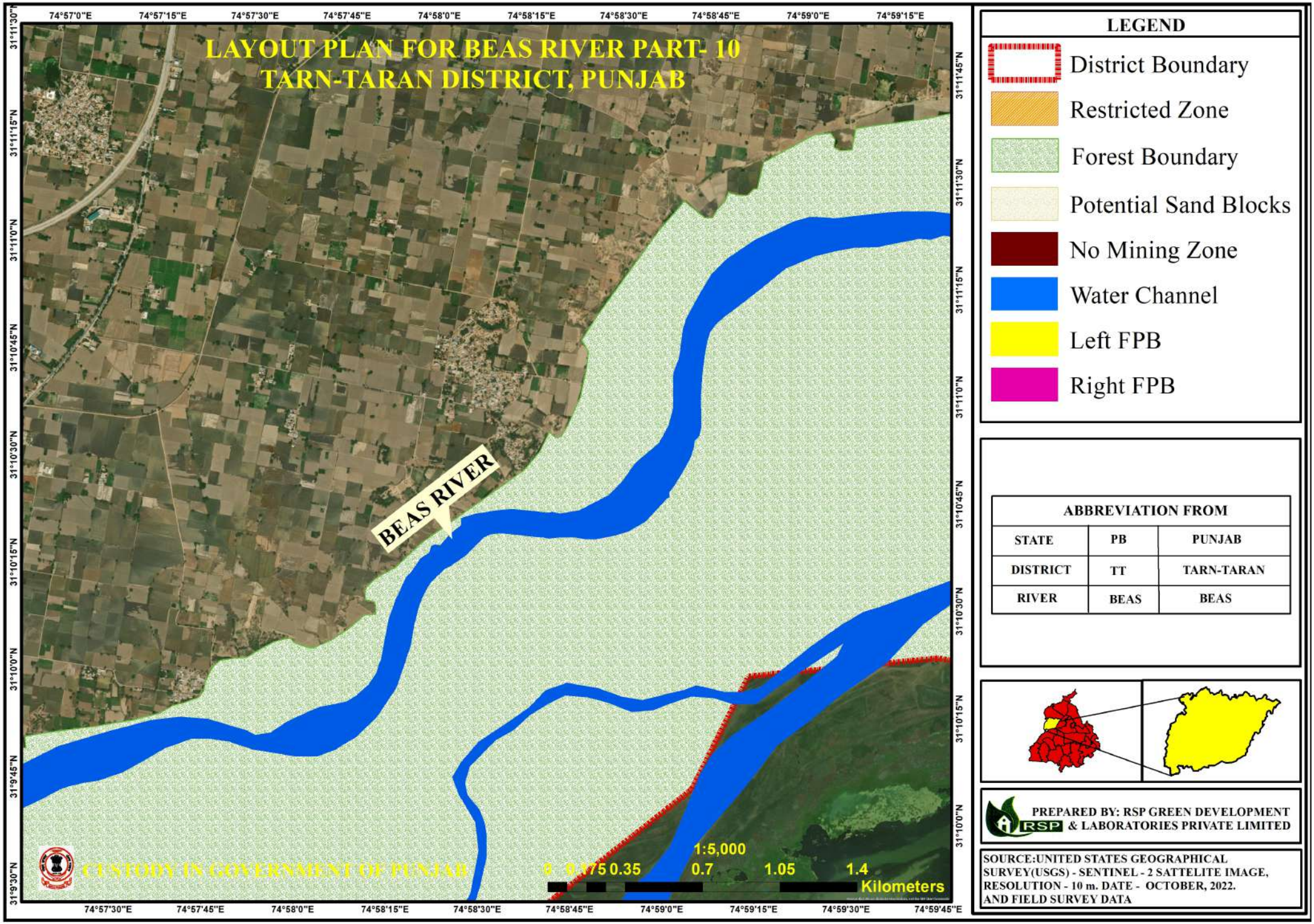

LAYOUT PLAN FOR BEAS RIVER PART- 5
TARN-TARAN DISTRICT, PUNJAB
GCP (Elevation) - 214 m
GCP (Elevation) - 215 m
OGL(Elevation) - 216 m
OGL(Elevation) - 216 m
PB-TT-BEAS-02
GCP (Elevation) - 213 m
OGL(Elevation) - 216 m
GCP (Elevation) - 213 m
PB-TT-BEAS-03
GCP (Elevation) - 212 m
GCP (Elevation) - 214 m
BEAS RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:4,000
0 0.125 0.25 0.5 0.75 1
Kilometers
75°6'15"E
75°6'30"E
75°6'45"E
75°7'0"E
75°7'15"E
75°7'30"E
75°7'45"E
75°8'0"E
75°8'15"E
31°20'0"N
31°19'45"N
31°19'30"N
31°19'15"N
31°19'0"N
31°18'45"N
31°18'30"N
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

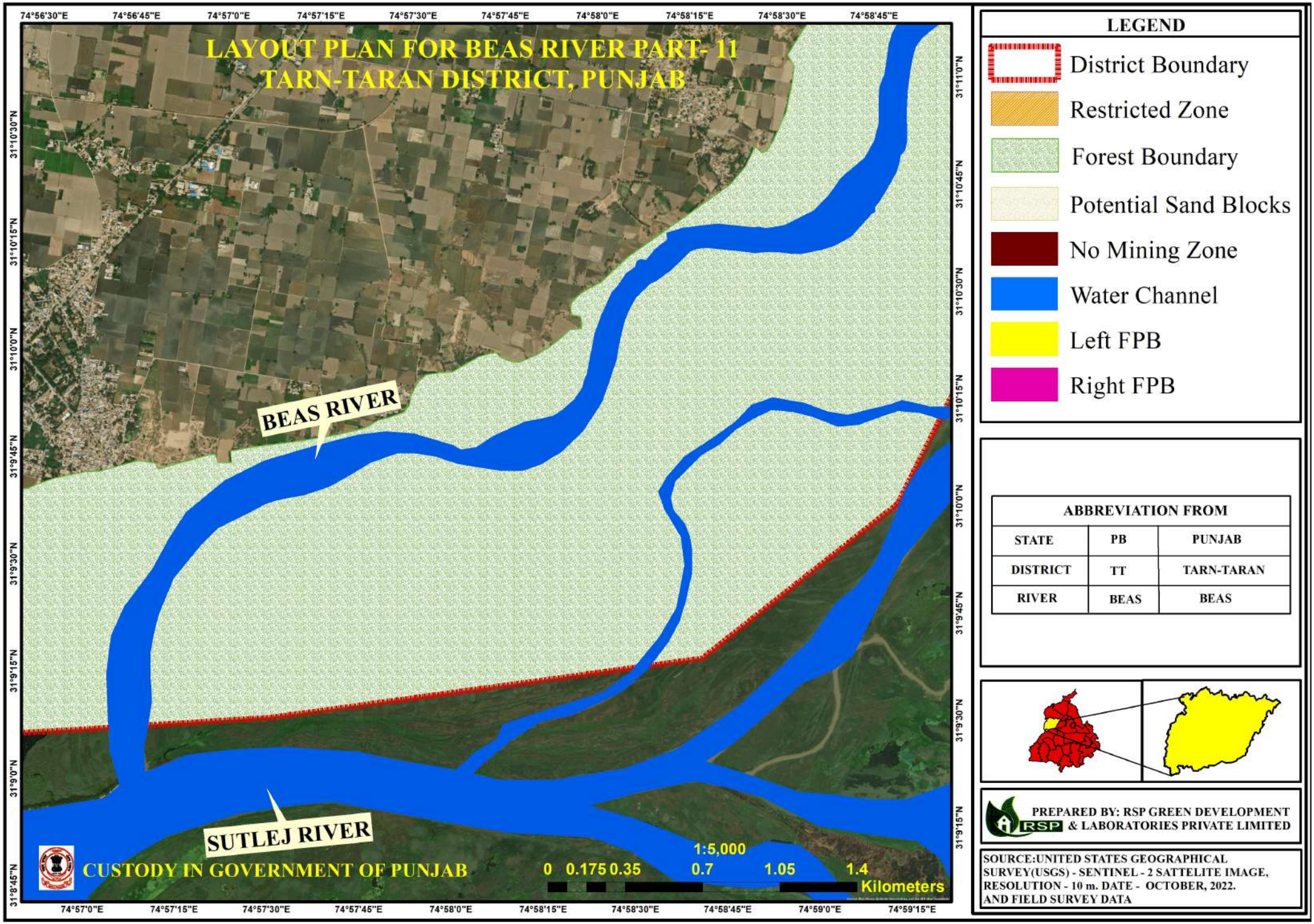

LAYOUT PLAN FOR BEAS RIVER PART- 6
TARN-TARAN DISTRICT, PUNJAB
75°4'15"E
75°4'30"E
75°4'45"E
75°5'0"E
75°5'15"E
75°5'30"E
75°5'45"E
31°17'0"N
31°16'45"N
31°16'30"N
31°16'15"N
31°16'0"N
OGL(Elevation) - 215 m
PB-TT-BEAS-01
GCP (Elevation) - 213.84 m
GCP (Elevation) - 214.56 m
BEAS RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

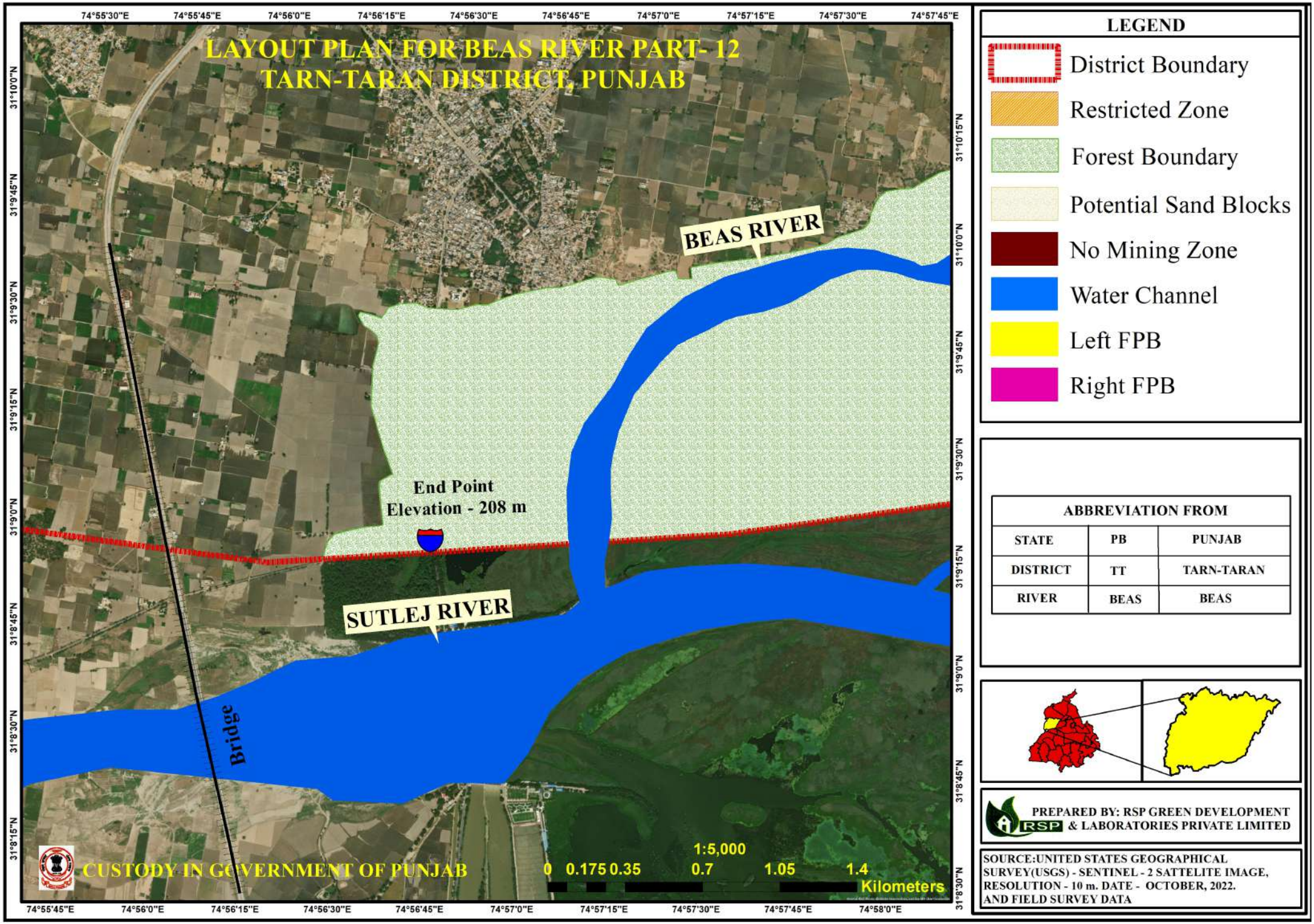

LAYOUT PLAN FOR BEAS RIVER PART- 7
TARN-TARAN DISTRICT, PUNJAB
BEAS RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:3,000
0 0.1 0.2 0.4 0.6 0.8
Kilometers
75°1'45"E
75°2'0"E
75°2'15"E
75°2'30"E
75°2'45"E
75°3'0"E
31°12'45"N
31°12'30"N
31°12'15"N
31°12'0"N
31°11'45"N
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA


LAYOUT PLAN FOR BEAS RIVER PART- 8
TARN-TARAN DISTRICT, PUNJAB
BEAS RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:4,000
0 0.125 0.25 0.5 0.75 1
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA


LAYOUT PLAN FOR BEAS RIVER PART- 9
TARN-TARAN DISTRICT, PUNJAB
BEAS RIVER
74°59'0"E
74°59'15"E
74°59'30"E
74°59'45"E
75°0'0"E
75°0'15"E
75°0'30"E
75°0'45"E
75°1'0"E
75°1'15"E
75°1'30"E
75°1'45"E
31°12'45"N
31°12'30"N
31°12'15"N
31°12'0"N
31°11'45"N
31°11'30"N
31°11'15"N
31°11'0"N
31°10'45"N
31°10'30"N
CUSTODY IN GOVERNMENT OF PUNJAB
1:5,000
0 0.175 0.35 0.7 1.05 1.4
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA


LAYOUT PLAN FOR BEAS RIVER PART- 10
TARN-TARAN DISTRICT, PUNJAB
BEAS RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
1:5,000
0 0.175 0.35 0.7 1.05 1.4
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA


LAYOUT PLAN FOR BEAS RIVER PART- II
TARN-TARAN DISTRICT, PUNJAB
BEAS RIVER
SUTLEJ RIVER
CUSTODY IN GOVERNMENT OF PUNJAB
74°56'30"E
74°56'45"E
74°57'0"E
74°57'15"E
74°57'30"E
74°57'45"E
74°58'0"E
74°58'15"E
74°58'30"E
74°58'45"E
74°59'0"E
74°59'15"E
31°10'30"N
31°10'15"N
31°10'0"N
31°9'45"N
31°9'30"N
31°9'15"N
31°9'0"N
31°8'45"N
31°11'0"N
31°10'45"N
1:5,000
0 0.175 0.35 0.7 1.05 1.4
Kilometers
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
Left FPB
Right FPB
ABBREVIATION FROM
STATE PB PUNJAB
DISTRICT TT TARN-TARAN
RIVER BEAS BEAS
PREPARED BY: RSP GREEN DEVELOPMENT & LABORATORIES PRIVATE LIMITED
SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA


LAYOUT PLAN FOR BEAS RIVER PART- 12
TARN-TARAN DISTRICT, PUNJAB
BEAS RIVER
End Point
Elevation - 208 m
SUTLEJ RIVER
Bridge
CUSTODY IN GOVERNMENT OF PUNJAB
1:5,000
0 0.175 0.35 0.7 1.05 1.4
Kilometers
74°55'30"E
74°55'45"E
74°56'0"E
74°56'15"E
74°56'30"E
74°56'45"E
74°57'0"E
74°57'15"E
74°57'30"E
74°57'45"E
74°58'0"E
31°10'0"N
31°9'45"N
31°9'30"N
31°9'15"N
31°9'0"N
31°8'45"N
31°8'30"N
31°8'15"N
LEGEND
District Boundary
Restricted Zone
Forest Boundary
Potential Sand Blocks
No Mining Zone
Water Channel
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Right FPB
ABBREVIATION FROM
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SOURCE:UNITED STATES GEOGRAPHICAL SURVEY(USGS) - SENTINEL - 2 SATTELITE IMAGE, RESOLUTION - 10 m. DATE - OCTOBER, 2022. AND FIELD SURVEY DATA

ANNEXURE – XIV

BULK DENSITY REPORT
DEMAND & SUPPLY OF DISTRICT FEROZEPUR
SUB DIVISIONAL COMMITTEE REPORTS
CERTIFICATES OF DIVISIONAL FOREST OFFICER
NEWS PAPER CUTTING

RSP Green Development and Laboratories Pvt. Ltd.
An ISO 9001 : 2015 & ISO 14001 : 2015 Certified Company
QCI-NABET ACCREDITED ENVIRONMENTAL CONSULTANT
CIN NO : U74999WB2017PTC219565
NABET / EIA / 1922 / IA0049

Ref - RSP/DSR/PUNJAB/22-23/128 **DATE – 12.01.2023**

To
The Executive Engineer-cum-District Mining Officer,
Tarn Taran, Punjab.

SUB – Bulk Density Reports

Respected sir,

We, RSP Green Development and laboratories after Soil Chemical analysis by **M.L. Jackson, Green Vission (NABL)** stated the following observation of Bulk Density for different blocks in Sutlej River of Tarn-Taran.

Sl.No.	Block Code	Bulk Density (gm/cc)_
1	PB-TT- SUT-01	1.724
2	PB-TT- SUT-02	
3	PB-TT- SUT-03	
4	PB-TT- SUT-04	1.721
5	PB-TT- SUT-05	
6	PB-TT- SUT-06	
7	PB-TT- SUT-07	1.7
8	PB-TT- SUT-08	
9	PB-TT- SUT-09	1.678
10	PB-TT- SUT-10	
11	PB-TT- SUT-11	1.694
12	PB-TT- SUT-12	

RSP Green Development and Laboratories Pvt. Ltd.
An ISO 9001 : 2015 & ISO 14001 : 2015 Certified Company
QCI-NABET ACCREDITED ENVIRONMENTAL CONSULTANT
CIN NO : U74999WB2017PTC219565
NABET / EIA / 1922 / IA0049

We, RSP Green Development and laboratories after Soil Chemical analysis by **M.L. Jackson, Green Vission (NABL)** stated the following observation of Bulk Density for different blocks in Beas River of Tarn-Taran

Sl.No.	Block Code	Bulk Density (gm/cc)_
1	PB-TT- BEAS-01	1.65
2	PB-TT- BEAS-02	1.65
3	PB-TT- BEAS-03	1.65
4	PB-TT- BEAS-04	1.65
5	PB-TT- BEAS-08	1.65
6	PB-TT- BEAS-09	1.65
7	PB-TT- BEAS-010	1.65

One Agricultural Mining site Bulk Density Repoprt,

Sl.No.	Owner Name	Bulk Density (gm/cc)_
01	Satpal Singh	1.68

For RSP Green Development and laboratories Pvt. Ltd.

Thank You,

Best Regards,

RSP GREEN DEVELOPMENT AND LABORATORIES PVT. LTD. HOWRAH

Mousumi Chakraborty.
(Director)

[Extract from the Punjab Government Gazette (Extra), dated the 18th November, 1999]

GOVERNMENT OF PUNJAB

DEPARTMENT OF FORESTS AND WILDLIFE PRESERVATION

Notification

The 18th November, 1999

No. 34/7/99-Ft-1V/16393.—Whereas,—*vide* Government of Punjab, Forest Department, Notification No. 34(21)92-Ft-1V/10818, dated the 8th September, 1992, Harike pond area has been declared as Wildlife Sanctuary for all kinds of wild Birds and wild Animals for a period of next [illegible] years and killing, capturing, shooting and hunting of all kinds of wild Birds and wild Animals or [illegible]ying of fire arms in this area, has been strictly prohibited, under sub-section (1) of section 18 of the Wildlife (Protection) Act, 1972 (Act No.53 of 1972) ;

And whereas the area described in the specifications below has been considered by the State Government to be of adequate ecological, faunal, floral, geomorphological, natural and zoological significance for the purpose of protecting, propagating and developing wildlife and its environment;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 26-A of [illegible] Act, and all other powers enabling him in this behalf, the Governor of Punjab is pleased to specify the limits of the area as described in the specifications below which shall be comprised within the Sanctuary and declare that the said area shall be Sanctuary from the date of publication of this notification in the Official Gazette:—

SPECIFICATIONS

of the District	Locality	Boundaries
1	2	3
Amritsar, Ferozepur and Kapurthala	Hariko Head Works upstream pond area and downstream Government area.	North.—River Beas bundh area terminated Village Kirian, Kambo Dhaewala, Chamba Kalan, Marar and Hariko (district Amritsar), Marsh and River area (Government land) of Village Kirian, Kambo Dhaowala, Chamba Kalan, Marar and Hariko. South.—Left bund of Rajasthan Canal (excluding Gurdwara Nanaksar, Harike Ishar Dham having an area of 104 Kanal 16 Marla) terminating at Bengaliwala bridge and left bank of drain touching Village Mauzgarh (Ferozepur) upto left marginal bund terminating and having curve at Village Bhottiwala (Ferozepur), Government land of Village Rasulpur and Bhottiwala in North of bund (district Ferozepur). East.—Government land of Village Jajjitpur, Khara, Mand Fathepur, Nikki, Mand Kambo, Mand Kirian, Pipal, Singh-Ke-Kalan (district Kapurthala) and Kot Khaim Khan (district Ferozepur.)

[illegible]

1	2	3
itsar, Ferozapur and urthala	Harike Head Works upstream pond area and downstream Government area,—*concld.*	West.—Hariko-Makhu Road (Government land) of downstream Hariko (district Amritsar), Government land of Village Talwandi Nepalan (district Ferozepur), Harike Head Works, River Sutlej downstream running water upto boundary touching Village Talwandi Nepalan
	(Total area 86 Sq. Km.)	

J. S. KESAR,

Financial Commissioner and Secretary to Government, Punjab,
Department of Forests and Wildlife Preservation.

A REPORT ON DEMAND AND SUPPLY IN DISTRICT TARN TARAN

In compliance with the Supreme Court orders dated 10.11.2021, District Survey Reports (DSR) are being prepared by Sub-Divisional Committees in various Districts in State of Punjab as per Enforcement & Monitoring Sand Mining Guidelines-2020 issued by the Government of India. According to the EMSMG-2020 guidelines, demand, and supply of the riverbed materials through market survey needs to be carried out. In addition to this, riverbed materials demand for the next 5 years needed to be considered.

To evaluate the Demand and Supply of Riverbed Material in the State of Punjab, one Three-member committee has been constituted by office of Superintending Engineer, Patiala Drainage Circle Water Resources Department Punjab vide office letter no. 1558 dated 05.11.2022 as below;

1. Dr. Rajinder Ghai, Executive Engineer
2. Sh. Shyam Verma, Sub Divisional Officer
3. Sh. Navneet Singh, Asst. Design Engineer

The Supply aspects of study shall be catered by District Survey Report as Quantity/Reserves will be there under potential mining sites (proposed) for auctioning/leasing out. Therefore, a separate study of supply of material shall not be required. The supply aspect can be controlled or managed at the level of Water Resources Department (Mines and Geology) Punjab.

For studying demands of materials, various consumers like Roads, Industries, Buildings, Construction related Departments and private individuals are involved. Therefore, a comprehensive study has been done to get reliable /trustworthy data in this regard.

Firstly, yhe committee decided to adopt *Cement Consumption Methodology* out of two available methodologies (other being *RBI Index Base*

ethodology) in Sand Mining Framework March-2018 to calculate minerals demands in the state of Punjab.

The committee visited various offices like GST Department Punjab Patiala and Director Census, Punjab and hold meeting at Head Office Level on dated 2.12.2022 with various concern Departments in this regard. The cement consumption in State of Punjab has been taken from the information provided by GST Department Punjab vide letter No. FileNo.ET-GST1017/253/2022-PAT-ETC-GST-1 dated 08.12.2022

TABLE 1: CEMENT CONSUMPTION

Sr. No	Year	Quantity of Cement (MT)	Rate of Growth (%age)
(1)	(2)	(3)	(6)
1	2017-18	60,03,928	--
2	2018-19	75,30,208	25.42 %
3	2019-20	75,92,704	0.83 %
4	2020-21	72,52,730	(-) 4.48 %
5	2021-22	1,04,47,711	44.05 %

Source : Office of Taxation Commissioner Punjab Patiala

At Sr. No 4, Growth Rate is (-) 4.48% due to COVID-19 pandemic is ignored, and average growth rate of cement consumption is calculated as 23.43%. In addition to this, a 5% incremental growth is there to this for development of various smart cities projects and rapid urbanisation due to liberal policies in state. Therefore, the committee has taken 28.43% annual growth in cement consumption

BLE 2: PROJECTED DEMAND OF SAND

Sr. No	Year	Projected Qty. of Cement (MT)	Conversion Factor	Projected Demand of Sand Qty. (MT)
(1)	(2)	(3)	(4)	(5)
1	2021-22	1,04,47,711	--	2,61,19,277
2	2022-23	1,34,18,462	2.5	3,35,46,155
3	2023-24	1,72,33,929	2.5	4,30,84,823
4	2024-25	2,21,34,305	2.5	5,53,35,762
5	2025-26	2,84,28,076	2.5	7,10,70,190
6	2026-27	3,65,11,447	2.5	9,12,78,618
7	2027-28	4,68,93,282	2.5	11,72,33,204

As in para 5.1.1.3 of *Sand Mining Framework March-2018*, 65% out of total cement consumed across the country is used in Housing Sector, whereas cement consumption is 20% and 15% in Infrastructure and Commercial & Industries Sectors respectively. In the housing sector sand is mostly used with cement and usage of gravel with cement and sand is negligible and hence neglected in calculations. Hence, 35% of total cement used in country is used with Sand and Gravel. Also, Gravel is approximately twice the Quantity of Sand (by weight) used with cement in Infrastructure Sector and Commercial & Industries Sector.

Conversion Factor for Gravel (from Sand)

Proportions of Infrastructure and Commercial & Industries Sectors

= 20% + 15% = 35%

Factor for Converting Sand into Gravel

= 2.0

Or $\frac{35}{100} \times 2.0 = 0.70$

TABLE 3: PROJECTED DEMAND OF SAND AND GRAVEL

Sr. No	Year	Projected Demand of Sand Qty. (MT)	Conversion Factor (x 0.7)	Projected Demand of Gravel Qty. (MT)
(1)	(2)	(3)	(4)	(5)
1	2022-23	3,35,46,155	0.70	2,34,82,309
2	2023-24	4,30,84,823	0.70	3,01,59,376
3	2024-25	5,53,35,762	0.70	3,87,35,033
4	2025-26	7,10,70,190	0.70	4,97,49,133
5	2026-27	9,12,78,618	0.70	6,38,95,033
6	2027-28	11,72,33,204	0.70	8,20,63,243

Also, Committee has observed that there have been construction or Infrastructure activities where riverbed materials are required without cement consumption. The committee further explored more sources of Demand where Riverbed Materials is consumed, and cement is not consumed. In recent years, National Highway or Expressways projects across State of Punjab have been undertaken by MORTH under Bharatmala Pariyojana.

To assess approximate overall riverbed materials demand, inclusion of demands from such big projects was required. The information of proposed/yet to be constructed National Highway or Expressways Project in State of Punjab is as shown below;

.NO.	DESCRIPTION	LANES (NOS.)	LENGTH (IN KM)
NATIONAL EXPRESSWAY 5 (NE-5)			
1	Ghagga (Patiala)-Bhawanigarh (Sangrur)	4	30.90
2	Bhawanigarh (Sangrur)-Bhogiwal (Malerkotla)	4	36.90
3	Bhogiwal (Malerkotla)-Mullanpur Dakha (Ludhiana)	4	35.00
4	Mullanpur Dakha-Nakodar-Kang Sahbu	4	34.00
5	Kang Sahbu (Jalandhar)-Khojewal (Kapurthala)	4	15.50
6	Khojewal (Kapurthala)-Sri Hargobindpur	4	43.00
7	Sri Hargobindpur-Gurdaspur	4	35.30
8	Details awaited (Gursaspur-Balsua)	4	25.80
9	Balsua (Gurdaspur)-Gurah Baildaran (Kathua)	4	44.60
NATIONAL EXPRESSWAY 5A (NE-5A)			
10	Nakodar (Jalandhar)-Dhunda (Tarn Taran)	4	41.00
11	Dhunda (Tarn Taran)-Manawala Khurd (Tarn Taran)	4	30.00
12	Manawala Khurd (Tarn Taran)-Harsha Chhina (Amritsar)	4	28.00
NATIONAL HIGHWAY (NH754 A TO NEE-5A)			
13	Tibba (Kapurthala)-Sangat Kalan (Bathinda)	6	155.00
14	Sangat Kalan (Bathinda)-Lohgarh/ Chautala (Sirsa)	4	30.00
	Total Length (KMs)		585

2614 cum per KM per Lane of Riverbed Material is consumed approximately in the above proposed National Highway/ Expressways. The total of **96,97,940 MT** of Riverbed Material is required in Two years and 48,48,970 MT is demand annually

As per information provided by Punjab Mandi Board, periodic repair work of Road is undertaken by the Departments in the State . Hence, it can be assumed that at least one time repair work (only bituminous layer) of whole length of Road is done in five years of span by Mandi Board Punjab and PWD B&R Punjab. The demand for such repair work has been calculated accordingly and shown in Table 5 below.

TABLE 5 : PROJECTED DEMAND OF GRAVEL IN REPAIR WORK OF EXISTED ROADS

SR. NO	YEAR	LANE (NOS.)	LENGTH (KM)	GRAVEL QTY. PER KM PER LANE (CUM)	PROJECTED DEMAND OF GRAVEL QTY. (MT)
(1)	(2)	(3)	(4)	(5)	(6)
1	Length of Existing NH/NE in State of Punjab	4	3501	573	1,12,34,522
2	Length of Existing SH in State of Punjab	4	859	573	27,55,429
3	Length of Existing MDR in State of Punjab	2	1697	573	27,22,667
4	Length of Existing Other Roads in State of Punjab	1.5	4624	573	55,64,420
5	Length of Link Roads under 80 Market Committees fall under the jurisdiction of PWD (B&R) department	1	32890	291	1,33,98,465
6	Length of Link Roads under 74 Market Committees fall under the jurisdiction of Punjab Mandi Board	1	31988	291	1,30,31,016
TOTAL PROJECTED DEMAND (MT)					4,87,06,518

Demand of Riverbed Material (Gravel)as Repair Work is done once in 5 years = 97,41,304 MT

The total Projected Demand of Riverbed Material in Roads becomes,

= 97,41,304 MT+ 48,48,970 MT

=145,90,240 MT

Hence, annual Demand of Riverbed Material for Roads (where cement is not used or negligible used) becomes **1,45,90,240 MT per Year**

E 6: PROJECTED GROSS DEMAND OF GRAVEL

SR. NO	YEAR	PROJECTED DEMAND OF SAND QTY. (MT)	PROJECTED DEMAND OF GRAVEL QTY. (MT) AS PER TABLE 3 & TABLE 5		
			WITH CEMENT	WITHOUT CEMENT	TOTAL
(1)	(2)	(3)	(4)	(5)	(6)
1	2022-23	3,35,46,155	2,34,82,309	1,45,90,240	7,16,18,704
2	2023-24	4,30,84,823	3,01,59,376	1,45,90,240	8,78,34,439
3	2024-25	5,53,35,762	3,87,35,033	1,45,90,240	10,86,61,035
4	2025-26	7,10,70,190	4,97,49,133	1,45,90,240	13,54,09,563
5	2026-27	9,12,78,618	6,38,95,033	1,45,90,240	16,97,63,891
6	2027-28	11,72,33,204	8,20,63,243	1,45,90,240	21,38,86,687

The above report has been submitted with recommendation for requirement of evaluate the Demand and Supply of Riverbed Material for the purpose of preparation of District Survey Reports in the State of Punjab as per the Enforcement and Monitoring Guidelines for Sand Mining, 2022.

(Er. Shyam Verma)
Sub Divisional Officer
Morinda, Ropar Division

(Er. Navneet Singh)
Assistant Design Engineer
Mining Head Office

(Dr. Rajinder Ghai)
Executive Engineer-cum-
District Mining Officer,
Mohali

(Dr. Harinder Pal Singh Bedi)
Superintending Engineer
Drainage Circle Patiala

ਪੰਜਾਬ ਸਰਕਾਰ,
ਵਣ ਅਤੇ ਜੰਗਲੀ ਜੀਵ ਸੁਰੱਖਿਆ ਵਿਭਾਗ, ਪੰਜਾਬ,
ਦਫਤਰ ਵਣ ਮੰਡਲ ਅਫਸਰ, ਅੰਮ੍ਰਿਤਸਰ।
ਫਾਰੈਸਟ ਕੰਪਲੈਕਸ, ਤਾਰਾਂ ਵਾਲਾ ਪੁੱਲ, ਅੰਮ੍ਰਿਤਸਰ।
ਫੋਨ/ਫੈਕਸ ਨੰ : 0183-2585480
Email : dfoamritsar@rediffmail.com

ਸੇਵਾ ਵਿਖੇ

ਜਿਲ੍ਹਾ ਮਾਈਨਿੰਗ ਅਫਸਰ,
ਤਰਨ ਤਾਰਨ

ਨੰਬਰ .....10064..... ਮਿਤੀ 12/12/2022

ਵਿਸ਼ਾ:- **Regarding preparation of District Survey Report.**

ਉਪਰੋਕਤ ਵਿਸ਼ੇ ਸਬੰਧੀ ਆਪ ਜੀ ਵੱਲੋਂ ਮਾਈਨਿੰਗ ਬਾਰੇ ਜਿਲ੍ਹਾ ਤਰਨ ਤਾਰਨ ਨਾਲ ਸਬੰਧਤ ਜਾਰੀ ਕੀਤੀ ਲਿਸਟ ਸਬੰਧੀ ਰਿਪੋਟ ਨਾਲ ਨੱਥੀ ਪ੍ਰੋਫਾਰਮੇ ਤੇ ਤਿਆਰ ਕਰਕੇ ਆਪ ਜੀ ਨੂੰ ਸੂਚਨਾ ਅਤੇ ਲੋੜੀਂਦੀ ਕਾਰਵਾਈ ਲਈ ਭੇਜੀ ਜਾਂਦੀ ਹੈ।

ਨੱਥੀ ਉਪਰਵਾਂਗ

ਵਣ ਮੰਡਲ ਅਫਸਰ,
ਅੰਮ੍ਰਿਤਸਰ।

Sr. No.	Tehsil	Village Name (Tentative)	Village Hadbast/ Khasra No.	Name of Mines	Name of Owner	Area (Hac.)	Quantity (MT)	Site Type	Remarks
1	2	3	4	5	6	7	8	9	10
1	Khadoor Sahib	Munda pind		PB-TT-BEAS-01		7.66	94558.5	Riverbed Site	ਪੰਜਾਬ ਸਰਕਾਰ ਦੇ ਨੋਟੀਫਿਕੇਸਨ ਨੰਬਰ 34/13/2017-ਐਫ ਟੀ-5/1052756/1 ਮਿਤੀ 29-08-2017 ਰਾਹੀ ਬਿਆਸ ਦਰਿਆ ਨੂੰ ਕੰਜਰਵੇਸਨ ਰਿਜਰਵ ਘੋਸਿਤ ਕੀਤਾ ਗਿਆ ਹੈ । ਇਸ ਲਈ ਇਸ ਦਰਿਆ ਤੇ ਕੋਈ ਮਾਈਨਿੰਗ ਨਹੀ ਹੋ ਸਕਦੀ ।
2	Khadoor Sahib	Bhail Dhaewala, Manak Dheke, dhunda		PB-TT-BEAS-02		35.49	486781.5	Riverbed Site	
3	Khadoor Sahib	Dhunda		PB-TT-BEAS-03		8.81	108754.5	Riverbed Site	
4	Khadoor Sahib	Dhunda		PB-TT-BEAS-04		3.48	47731.5	Riverbed Site	
5	Khadoor Sahib	Manakdake, Dhunda		PB-TT-BEAS-05		4.85	59871	Riverbed Site	
6	Khadoor Sahib	Dhunda		PB-TT-BEAS-06		9.96	109288.5	Riverbed Site	
7	Khadoor Sahib	Dhunda		PB-TT-BEAS-07		7.65	104928	Riverbed Site	
8	Khadoor Sahib	Jallalabad		PB-TT-BEAS-08		16.62	227959.5	Riverbed Site	
9	Khadoor Sahib	Narotampur, Rakh Gagrewal		PB-TT-BEAS-09		4.75	71665.5	Riverbed Site	
10	Khadoor Sahib	Bhalojla,		PB-TT-BEAS-10		0.64	8778	Riverbed Site	
11	Khadoor Sahib	Bhalojla		PB-TT-BEAS-11		13.24	181600.5	Riverbed Site	
12	Patti	Ram Singh Wala		PB-TT-SUT-1		2.05	28117.5	Riverbed Site	ਰੇਜ ਅਫਸਰ ਪੱਟੀ/ਹੰਜ ਸਟਾਫ ਵੱਲ ਮਾਈਨਿੰਗ ਵਿਭਾਗ ਨਾਲ ਮੌਕਾ ਵੇਖਿਆ ਗਿਆ । ਮੌਕੇ ਮੁਤਾਬਕ ਕੋਈ ਵੀ ਵਣ ਰਕਬਾ ਮਾਈਨਿੰਗ ਰਕਬੇ ਵਿੱਚ ਨਹੀ ਆਉਦਾ ਹੈ ।
13	Patti	Ram Singh Wala		PB-TT-SUT-2		3.97	78414	Riverbed Site	
14	Patti	Radhalke, Ram Singh Wala, Jhugian Peer Baksh		PB-TT-SUT-3		49.15	741156	Riverbed Site	
15	Patti	Radalke, jhugian Peer Baksh		PB-TT-SUT-4		11.96	59898	Riverbed Site	
16	Patti	Jhugian Pir Bakhash, Bhojoke		PB-TT-SUT-5		8.98	180447	Riverbed Site	
17	Patti	Kot-Budha, jaloke		PB-TT-SUT-6		32.92	490951.5	Riverbed Site	
18	Patti	Jalloke, Kot budha		PB-TT-SUT-7		13.95	210472.5	Riverbed Site	
19	Patti	Jalloke		PB-TT-SUT-8		4.16	58389	Riverbed Site	
20	Patti	Ghullewal, Mallahawala, Godhaike		PB-TT-SUT-9		5.67	77770.5	Riverbed Site	
21	Patti	Ghullewal, Godhaike		PB-TT-SUT-10		19.24	290284.5	Riverbed Site	
22	Patti	Gullewal		PB-TT-SUT-11		2.95	44508	Riverbed Site	
23	Patti	Sabhra, Gullewal		PB-TT-SUT-12		12.74	143469	Riverbed Site	
24	Patti	Sabhra		PB-TT-SUT-13		80.8	1104138	Riverbed Site	
25	Patti	Sabhra, Kuttiwal		PB-TT-SUT-14		34.23	469498.5	Riverbed Site	
26	patti	booh		1	Satpal singh	3.5		Agricultural Site	

1. It is certified that the land proposed for above potential sand mining site i.e (Sr no 1-26) does not include in areas Notified under section 4 and 5 of PLPA Act 1900. 2

2. It is certified that the land proposed for above potential sand mining site i.e (Sr no 12-26) are not falling in the Eco-sensitive Zone of Wildlife Sanctuary & Conservation Reserves cover under **Wildlife Protection Act 1972** and **Punjab Wildlife Preservation Act 1959** and mining sites Sr No 1-11 which are river Bed sites of Beas river are part of **Beas River Conservation Reserve as** per Forest Notification 34/13/2017-ft-5/1052756/1 dated 29-08-2017

3. Site present at Sr. no 12-26 are not part of any Sanctuary and Conservation Reserve whereas site at Sr 1-11 are part of **Beas River Conservation Reserve.**

Divisional Forest Officer
Amritsar

Report by Sub-Divisional Committee Visit of Aggradation Points, Tehsil-Patti, District -Tarn Taran on 23/8/2022.

Sr. No	Site Name	Village	Coordinates	Site Accessible	Sand Deposit Available (Y/N)	Remarks
1.	PB-TT-SUT-01	Ram Singh Wala	31° 6'13.34"N 74°43'46.42"E	Not Accessible	Yes	Near International Border, site is small and far away from metaled road. Recommended to be dropped.
2.	PB-TT-SUT-02	Ram Singh Wala	31° 6'17.55"N 74°43'56.98"E	Not Accessible	Yes	Near International Border, site is small and far away from metaled road. Recommended to be dropped.
3.	PB-TT-SUT-03	Ram Singh Wala	31° 6'23.18"N 74°43'58.61"E	Not Accessible	Yes	Near International Border, site is small and far away from metaled road. Recommended to be dropped.
4.	PB-TT-SUT-04	Radhalke	31° 6'40.89"N 74°44'50.68"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity.
5.	PB-TT-SUT-05	Jhugian Pir Bakhash	31° 7'0.88"N 74°44'58.43"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity

	PB-TT-SUT-06	Kot-Budha	31° 7'54.25"N 74°47'6.55"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity. 400 mtr distance from kot budha forest land
7.	PB-TT-SUT-07	Jalloke	31° 7'54.77"N 74°46'56.20"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity. 600 mtr distance from kott budha forest land
8.	PB-TT-SUT-08	Jalloke	31° 7'59.27"N 74°47'52.55"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity. 900 mtr distance from kott budha forest land
9.	PB-TT-SUT-09	Tanna Bagga	31° 8'1.34"N 74°49'0.69"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity
10.	PB-TT-SUT-10	Tanna Bagga	31° 8'0.10"N 74°49'27.38"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity
11.	PB-TT-SUT-11	Sabhra	31° 8'49.42"N 74°50'35.27"E	Accessible	Yes	Near Flood protection work of drainage department. Recommended to be dropped.
12.	PB-TT-SUT-12	Sabhra	31° 8'2.71"N 74°50'55.08"E	Accessible	Yes	Near Flood protection work of drainage department. Recommended to be dropped.

	PB-TT-SUT-13	Sabhra	31° 9'14.74"N 74°51'51.22"E	Accessible	Yes	Near Flood protection work of drainage department. Recommended to be dropped.
14.	PB-TT-SUT-14	Kuttiwal	31° 9'22.84"N 74°51'49.04"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity.

Environment Engineer,
PPCB,Amritsar

Executive Engineer, construction Div No. 2
PWD(B&R),Tarn Taran at Amritsar

Chief Agriculture Officer,
Tarn Taran.

Executive Engineer,
Jandiala Division, UBDC,
Amritsar

Divisional Forest Officer,
Amritsar.

Block Development and Panchayat officer,
Patti , Distt. Tarn Taran.

Executive Engineer-Cum-
District Mining Officer, Tarn Taran.

Sub-Divisional Magistrate-cum-Chairman
Sub-Divisional Committee,
Patti.

A REPORT OF SUB-DIVISION LEVEL COMMITTEE PATTI SITE VISIT OF POTENTIAL SAND MINING SITES TEHSIL PATTI DISTRICT TARNTARAN ON DATED : 9/12/22 REGARDING

In connection with the above, it is submitted that the Sub-Division Level Committee Patti constituted by the Hon'ble Sub Divisional Magistrate vide his office order Ref No. MC /541 dated 8.12.2022, conducted a joint site visit on Dt. 9/12/20222 for the purpose of inclusion in the District Survey Report of Tarntaran sand mining sites shown below;

River Bed Sand Mining Sites

S. No.	Site Name	Tehsil	Area Sqm	Co-ordinates	Remarks
1	PB-TT-SUT-01	Patti	20340	**Lat. 31.103683, Long 74.728361** **Lat. 31.106113, Long 74.730990**	Site could not be visited due non availability of any access to the site. As access is not feasible to the site hence it is not recommended
2	PB-TT-SUT-02	Patti	58690	**Lat. 31.104298, Long 74.730866** **Lat. 31.108367, Long 74.733464**	
3	PB-TT-SUT-03	Patti	491480	**Lat. 31.113687, Long 74.736061** **Lat. 31.118357, Long 74.747539**	Recommended
4	PB-TT-SUT-04	Patti	119560	**Lat. 31.119792, Long 74.748565** **Lat. 31.12346, Long 74.751122**	Recommended
5	PB-TT-SUT-05	Patti	89796	**Lat. 31.12605, Long 74.755597** **Lat. 31.12745, Long 74.761309**	Recommended

Agriculture Mining Sites

Sr. No.	Name of Land Owner	Village Name	Hadbast No.	Khasra No.	Area(Acres)
1	Satpal Singh S/o Dalbir Singh	Booh	188	139//24,23,146//3,5,6,7 8,13,14,15	7 acres

The inspection report along with observation of respective Members of Sub-Division Level Committee Patti in this regard are shown below as :-

1. **Divisional Forest Officer, Department of Forests and Wildlife Prevention Punjab**
   The land of the above said sand mining site is neither included in Areas notified u/s 4 & 5 of PLPA Act, 1900 nor in Ares falling in the Eco-Sensitive Zones Of Wildlife Sanctuary & Conservation Reserves cover under Wildlife Protection Act, 1972 and Punjab Wildlife Preservation Act, 1959. This land of above said sand mining sites 1 to 5 and 1 agricultural site is not forest land and there is no objection in this regard.

2. **Environmental Engineer, Punjab Pollution Control Board**
   It has been observed that Environmental Clearance should be obtained from the competent authority and consent under Air Act 1981 and Water Act 1974 should be taken before starting the work of extracting sand from the said quarry

3. **Block Development and Panchayat Officer**
   It has been observed that Gram Panchayat of village Ram Singh Wala, Radhalke, Chugian Pir baksh, Booh does not have any objection if sand mining is being done in the above proposed sand mining sites. The above said sand mining sites and 1 agricultural site are more than 50 meters from any Public Works such as Public Roads and Buildings or Residential Areas and more than 10 meters from Village Roads, 7.5 meters from nearby Private/Government Land.

4. **Executive Engineer, Building & Roads, Punjab Public Works Department**

It has been observed that the above said sand mining sites and 1 agricultural site are more than 1.0 KM from any Bridge Or National Highway and more than 500 meters upstream/downstream of any High Level Bridge and 250 meters upstream/downstream of other bridges. There is no objection in this regard.

5. **Executive Engineer, Irrigation Branch, Department of Water Resources Punjab**

It has been observed that the above said sand mining sites and 1 agricultural site are more than 50 meters distance from any Reservoir, Tank, Canal etc.. There is no objection in this regard.

6. **Executive Engineer, Drainage-cum-Mining, Department of Water Resources Punjab**

It has been observed that the above said sand mining sites and 1 agricultural site , there is no Flood Protection Embankment within 100 meters (inside/outside) of the above said sand mining site. All sites have availability of sand but site no. 1 and 2 riverbed, does not have any access, from any road , as there is temporary creek and agricultural field lie in between. There is no objection in this regard.

7. **Chief Agriculture Officer, Department of Agriculture Punjab**

It has been observed that the crop is standing in the land of the above sand mining sites and 1 agricultural site are and also in the nearby fields. There is no objection in this regard.

Keeping in the view the above said,

For Agricultural Site: there is sand available as per report of consultant and there is direct access from village road to site

For PB-TT-SUT-05: Sand is available and Access is available from irrigation bhund to site but it is possible through private land.

For PB-TT-SUT-04 &3: Sand is available at site but there is creek passing between site no. 4 and access road. Also access to site from bhund is through private land as there is no Government road.

For PB-TT-SUT-01 & 2: Sites could not be visited by sub divisional committee as there is no access to site from bhund, spur or any village road..

Further, It is worth mentioning that sites are recommended on the basis of sand availability as visible to the naked eye and on preliminary observation. Reports have been done and recommendations given on the basis of checklist provided by the mining department.

The potential sand mining sites 3,4,5 tehsil Patti District Tarn Taran is recommended for inclusion in District Survey Report of TarnTaran .

Member 1

Divisional Forest Officer
Department of Forests and Wildlife Prevention Punjab
Amritsar

Member 2

Environmental Engineer,
Punjab Pollution Control Board
Amritsar

Member 3

Executive Engineer,
Building & Roads,
Punjab Public Works Department
Tarn Taran at Amritsar

Member 4

Executive Engineer,
Irrigation Branch,
Jandiala Division, UBDC
Department of Water Resources Punjab

Member 5

Chief Agriculture Officer,
Department of Agriculture Punjab
Taran Taran

Member 6

Block Development and Panchayat Officer,
Patti, Distt. Tarn Taran.

Member Secretary

Executive Engineer,
Drainage-cum-Mining,
Department of Water Resources Punjab
Tarn Taran
(Member Secretary)

Chairman

Sub Divisional Magistrate-cum-Chairman,
Patti

A REPORT OF SUB-DIVISION LEVEL COMMITTEE KHADOOR SAHIB SITE VISIT OF POTENTIAL SAND MINING SITES TEHSIL KHADOOR SAHIB DISTRICT TARNTARAN ON DATED: 14/12/22 REGARDING

In connection with the above, it is submitted that the Sub-Division Level Committee Khadoor Sahib constituted by the Hon'ble Sub Divisional Magistrate vide his office order Ref No. Steno /1061 dated 13.12.2022, conducted a joint site visit on Dt. 14/12/20222 for the purpose of inclusion in the District Survey Report of Tarn Taran sand mining sites shown below;

Sr. No	Site Name	Tehsil	Coordinates	Sand Deposit Available (Y/N)
1.	PB-TT-BEAS-01	Khadoor Sahib	31°16'42"N 75° 05'04"E	Yes
2.	PB-TT-BEAS-02	Khadoor Sahib	31°19'21"N 75° 07'02"E	Yes
3.	PB-TT-BEAS-03	Khadoor Sahib	31° 19'23"N 75° 07'18"E	Yes
4.	PB-TT-BEAS-04	Khadoor Sahib	31° 19'40"N 75° 07'23"E	Yes
5.	PB-TT-BEAS-05	Khadoor Sahib	31° 19'51"N 75° 07'19"E	Yes
6.	PB-TT-BEAS-06	Khadoor Sahib	31° 20'11"N 75° 07'35"E	Yes
7.	PB-TT-BEAS-07	Khadoor Sahib	31° 20'14"N 75° 07'49"E	Yes
8.	PB-TT-BEAS-08	Khadoor Sahib	31° 26'14"N 75°12'23"E	Yes
9.	PB-TT-BEAS-09	Khadoor Sahib	31° 26'41"N 75°12'44"E	Yes
10.	PB-TT-BEAS-10	Khadoor Sahib	31° 28'36"N 75°14'56"E	Yes
11.	PB-TT-BEAS-11	Khadoor Sahib	31° 28'59"N 75°15'31"E	Yes

River Bed Sand Mining Sites

The inspection report along with observation of respective Members of Sub-Division Level Committee Khadoor Sahib in this regard are shown below as :-

1. **Divisional Forest Officer, Department of Forests and Wildlife Prevention Punjab**

   The land of the above said sand mining site are not included in Areas notified u/s 4 & 5 of PLPA Act, 1900 but they are included under Beas forest conservation reserve act vide Notification No. Van-2/Notification/14971-15000 dated 20/09/2017. Any mining activity will be take place after the approval of forest and wildlife department.

2. **Environmental Engineer, Punjab Pollution Control Board**

   It has been observed that Environmental Clearance should be obtained from the competent authority and consent under Air Act 1981 and Water Act 1974 should be taken before starting the work of extracting sand from the said quarry

3. **Block Development and Panchayat Officer**

It has been observed that Gram Panchayat of village Mundapind, Bhail Dhayewala, Dhunda, Jalalabad, Rampura Narotampura, Bhlojala does not have any objection if sand mining is being done in the above proposed sand mining sites. The above said sand mining sites are more than 50 meters from any Public Works such as Public Roads and Buildings or Residential Areas and more than 10 meters from Village Roads, 7.5 meters from nearby Private/Government Land.

4. **Executive Engineer, Building & Roads, Punjab Public Works Department**

It has been observed that the Sr. No.1, and Sr No. 6 to Sr. No.11 sand mining sites are more than 1.0 KM from any Bridge or National Highway and more than 500 meters upstream/downstream of any high-level bridge and 250 meters upstream/downstream of other bridges. There is no objection in this regard.

It has been observed that the Sr No. 2 to Sr. No.5 sand mining sites are less than 1.0 KM from proposed NHAI Project (High Level Bridge) passing through village Dhunda land. There is objection in this regard.

5. **Executive Engineer, Irrigation Branch, Department of Water Resources Punjab**

It has been observed that the above said sand mining sites are more than 50 meters distance from any Reservoir, Tank, Canal etc. There is no objection in this regard.

6. **Executive Engineer, Drainage-cum-Mining, Department of Water Resources Punjab**

It has been observed that the above said sand mining sites there is no Flood Protection Embankment within 100 meters (inside/outside) of the above said sand mining site. There is no objection in this regard.

7. **Chief Agriculture Officer, Department of Agriculture Punjab**

It has been observed that the crop is standing in the land of the above sand mining sites are in the nearby fields. There is no objection in this regard.

Keeping in the view the above said,

For PB-TT-BEAS-01 to PB-TT-BEAS-09: Sand is available and no access through any route is available to site because proposed sites fall within active river channel.

For PB-TT-BEAS-02 to PB-TT-BEAS-05: Sites fall within 1.0 Kms distance from proposed NHAI Project (High Level Bridge) passing through village Dhunda land.

For PB-TT-BEAS-06 & PB-TT-BEAS-07: flow of river Beas will turn towards the village settlement. Hence not recommended.

For PB-TT-BEAS-05: In between site there is High Voltage Tower. Hence not recommended.

For PB-TT-BEAS-09: There is marshy land near the sand which hinders the movement of vehicles towards the site.

For PB-TT-BEAS-11: Due to mining activity at proposed site the flow of river Beas will turn towards the village Bhalojala. Hence not recommended.

All the above Sites Sr. No. 1 to 11 are part of river Beas which is part of Beas River Conservation Reserve. And there is no route to approach the sites. Minning at above sites will be recommended only after the approval of forest and wild life department.

Member 1

Divisional Forest Officer
Department of Forests and Wildlife
Preservation Punjab
Amritsar

Member 2

Environmental Engineer,
Punjab Pollution Control Board
Amritsar

Member 3

16.12.22

Executive Engineer,
Building & Roads
Punjab Public Works Department
Tarn Taran at Amritsar

Member 4

Executive Engineer
Irrigation Branch,
Canal Division, UBDC
Department of Water Resources Punjab

Member 5

Chief Agriculture Officer,
Department of Agriculture Punjab
Tarn Taran

Member 6

Block Development and Panchayat
Officer,
Khadoor Sahib, Distt. Tarn Taran

Member 7

Block Development and Panchayat
Officer,
Chohla Sahib, Distt. Tarn Taran

Member 8
Member Secretary

Executive Engineer,
Drainage cum Mining,
Department of Water Resources Punjab
Tarn Taran

Chairman

Sub Divisional Magistrate cum
Ex-Officio
Khadoor Sahib

ਪੰਜਾਬ ਸਰਕਾਰ
ਵਣ ਅਤੇ ਜੰਗਲੀ ਜੀਵ ਸੁਰੱਖਿਆ ਵਿਭਾਗ,
ਦਫਤਰ ਵਣ ਮੰਡਲ ਅਫਸਰ, ਜੰਗਲੀ ਜੀਵ ਮੰਡਲ, ਫਿਰੋਜਪੁਰ।
ਮੱਲਵਾਲ ਕਦੀਮ ਫਿਰੋਜਪੁਰ।
(ਅਮਲਾ ਸ਼ਾਖਾ)
E-mail: dfowildlifefzr@gmail.com ਫੋਨ ਨੰਬਰ 01632-279412

ਸੇਵਾ ਵਿਖੇ

ਕਾਰਜਕਾਰੀ ਇੰਜੀਨੀਅਰ ਕਮ
ਜ਼ਿਲਾ ਮਾਈਨਿੰਗ ਅਫਸਰ,
ਤਰਨਤਾਰਨ ।

ਨੰਬਰ.3049 ਮਿਤੀ.05-12-2022

ਵਿਸ਼ਾ:- **Regarding No objection Certificate for Potential sand mining sites in Distt. Tarn Taran as per list attached.**

ਹਵਾਲਾ:- **ਆਪ ਜੀ ਦੇ ਦਫਤਰ ਦਾ ਪੱਤਰ ਨੰ 2722/W/Mining ਮਿਤੀ 01-12-2022**

ਉਪਰੋਕਤ ਵਿਸ਼ੇ ਤੇ ਹਵਾਲੇ ਅਧੀਨ ਪੱਤਰ ਦੇ ਸਬੰਧ ਵਿੱਚ ਆਪ ਜੀ ਵੱਲੋਂ ਜ਼ਿਲ੍ਹਾ ਤਰਨਤਾਰਨ ਵਿੱਚ 26 ਤਜਵੀਜ਼ਤ ਮਾਈਨਿੰਗ ਸਾਈਟਾਂ ਦੀ ਲਿਸਟ ਭੇਜਦੇ ਹੋਏ ਇਤਰਾਜਹੀਣਤਾ ਸਰਟੀਫਿਕੇਟ ਦੀ ਮੰਗ ਕੀਤੀ ਗਈ ਸੀ। ਇਸ ਸਬੰਧੀ ਆਪ ਨੂੰ ਲਿਖਿਆ ਜਾਂਦਾ ਹੈ ਜ਼ਿਲ੍ਹਾ ਤਰਨਤਾਰਨ ਦੀਆਂ ਕੁੱਲ 26 ਮਾਈਨਿੰਗ ਸਾਈਟਾਂ ਦੀ ਲਿਸਟ ਵਿੱਚੋਂ ਲੜੀ ਨੰ: 1 ਤੋਂ ਲੈ ਕੇ 11 ਤੱਕ ਮਾਈਨਿੰਗ ਸਾਈਟਾਂ ਜੋ ਕਿ ਤਹਿਸੀਲ ਖਡੂਰ ਸਾਹਿਬ ਵਿੱਚ ਪੈਂਦੀਆਂ ਹਨ, ਇਸ ਸਬੰਧੀ ਵਣ ਰੇਂਜ ਅਫਸਰ, ਜੰਗਲੀ ਜੀਵ ਰੇਂਜ, ਹਰੀਕੇ ਨੇ ਆਪਣੇ ਦਫ਼ਤਰੀ ਪੱਤਰ ਨੰ 610/ਹਰੀਕੇ ਮਿਤੀ 05-12-2022 ਰਾਂਹੀ ਇਸ ਦਫਤਰ ਨੂੰ ਰਿਪੋਟ ਕੀਤੀ ਹੈ ਕਿ ਬਿਆਸ ਦਰਿਆ ਨੂੰ ਪੰਜਾਬ ਸਰਕਾਰ ਵੱਲੋਂ ਨੋਟੀਫਿਕੇਸ਼ਨ ਨੰਬਰ 34/13/2017-Ft/1052756/1 ਮਿਤੀ 29-08-2017 ਰਾਂਹੀ ਬਿਆਸ ਕੰਜਰਵੇਸ਼ਨ ਰਿਜ਼ਰਵ ਘੋਸ਼ਿਤ ਕੀਤਾ ਗਿਆ ਹੈ ਅਤੇ ਸਾਲ 2019 ਵਿੱਚ ਰਾਮਸਰ ਸਾਈਟ ਵੀ ਘੋਸ਼ਿਤ ਕਰ ਦਿੱਤਾ ਗਿਆ ਸੀ। ਬਿਆਸ ਦਰਿਆ Gharial, Indus River Dolphin, Indian Smooth otter, Turtles ਆਦਿ ਕਿਸਮ ਦੇ ਜਾਨਵਰਾਂ ਦਾ ਹੈਬੀਟਾਟ (ਰਹਿਣ ਬਸੇਰਾ) ਹੈ। ਇਹ ਜਾਨਵਰ ਜੰਗਲੀ ਜੀਵ ਸੁਰੱਖਿਆ ਐਕਟ 1972 ਅਧੀਨ Schedule-1, Species ਹਨ । ਇਸ ਲਈ ਲੜੀ ਨੰ: 1 ਤੋਂ ਲੈ ਕੇ 11 ਤੱਕ ਵਣ ਰੇਂਜ ਅਫਸਰ, ਜੰਗਲੀ ਜੀਵ ਰੇਂਜ, ਹਰੀਕੇ ਦੀ ਰਿਪੋਟ ਮੁਤਾਬਕ ਮਾਇੰਨਿੰਗ ਨਹੀਂ ਕੀਤੀ ਜਾ ਸਕਦੀ। ਇਸ ਤੋਂ ਇਲਾਵਾ ਤਹਿਸੀਲ ਪੱਟੀ ਅਧੀਨ ਪੈਂਦੀਆਂ ਲੜੀ ਨੰ: 12 ਤੋਂ ਲੈ ਕੇ 26 ਤੱਕ ਤਜਵੀਜ਼ਤ ਮਾਇਟਿੰਗ ਸਾਈਟਸ ਜੰਗਲੀ ਜੀਵ ਸੈਂਚੁਰੀ, ਹਰੀਕੇ, ਅਤੇ ਹਰੀਕੇ ਸੈਂਚੁਰੀ ਦੇ ਈਕੋ-ਸੈਂਸਟਿਵ ਜੋਨ ਤੋਂ ਬਾਹਰ ਹਨ। ਰਿਪੋਰਟ ਆਪ ਨੂੰ ਸੂਚਨਾ ਅਤੇ ਯੋਗ ਕਾਰਵਾਈ ਲਈ ਭੇਜੀ ਜਾਂਦੀ ਹੈ।

ਨੱਥੀ:-ਸਾਈਟਾਂ ਦੀ ਲਿਸਟ

ਵਣ ਮੰਡਲ ਅਫਸਰ,
ਜੰਗਲੀ ਜੀਵ ਮੰਡਲ,
ਫਿਰੋਜਪੁਰ।

OFFICE OF DIVISIONAL FOREST OFFICER, DEPARTMENT OF FORESTS AND WILDLIFE PREVENTION PUNJAB, FEROZPUR

Sr. No.	Tehsil	Village Name (Tentative)	Village Hadbast/ Khasra No.	Name of Mines	Name of Owner	Area (Hac.)	Quantity (MT)	Site Type
1	2	3	4	5	6	7	8	9
1	Khadoor Sahib	Munda pind		PB-TT-BEAS-01		7.66	94558.5	Riverbed Site
2	Khadoor Sahib	Bhail Dhaewala, Manak Dheke, dhunda		PB-TT-BEAS-02		35.49	486781.5	Riverbed Site
3	Khadoor Sahib	Dhunda		PB-TT-BEAS-03		8.81	108754.5	Riverbed Site
4	Khadoor Sahib	Dhunda		PB-TT-BEAS-04		3.48	47731.5	Riverbed Site
5	Khadoor Sahib	Manakdake, Dhunda		PB-TT-BEAS-05		4.85	59871	Riverbed Site
6	Khadoor Sahib	Dhunda		PB-TT-BEAS-06		9.96	109288.5	Riverbed Site
7	Khadoor Sahib	Dhunda		PB-TT-BEAS-07		7.65	104928	Riverbed Site
8	Khadoor Sahib	Jallalabad		PB-TT-BEAS-08		16.62	227959.5	Riverbed Site
9	Khadoor Sahib	Rampur Narotampur, Rakh Gagrewal		PB-TT-BEAS-09		4.75	71665.5	Riverbed Site
10	Khadoor Sahib	Bhalojla,		PB-TT-BEAS-10		0.64	8778	Riverbed Site
11	Khadoor Sahib	Bhalojla		PB-TT-BEAS-11		13.24	181600.5	Riverbed Site
12	Patti	Ram Singh Wala		PB-TT-SUT-1		2.05	28117.5	Riverbed Site
13	Patti	Ram Singh Wala		PB-TT-SUT-2		3.97	78414	Riverbed Site
14	Patti	Radhalke, Ram Singh Wala, Jhugian Peer Baksh		PB-TT-SUT-3		49.15	741156	Riverbed Site
15	Patti	Radalke, jhugian Peer Baksh		PB-TT-SUT-4		11.96	59898	Riverbed Site

16	Patti	Jhugian Pir Bakhash, Bhojoke		PB-TT-SUT-5		8.98	180447	Riverbed Site
17	Patti	Kot-Budha, jaloke		PB-TT-SUT-6		32.92	490951.5	Riverbed Site
18	Patti	Jalloke, Kot budha		PB-TT-SUT-7		13.95	210472.5	Riverbed Site
19	Patti	Jalloke		PB-TT-SUT-8		4.16	58389	Riverbed Site
20	Patti	Ghullewal, Mallahawal a, Godhaike		PB-TT-SUT-9		5.67	77770.5	Riverbed Site
21	Patti	Ghullewal, Godhaike		PB-TT-SUT-10		19.24	290284.5	Riverbed Site
22	Patti	Gullewal		PB-TT-SUT-11		2.95	44508	Riverbed Site
23	Patti	Sabhra, Gullewal		PB-TT-SUT-12		12.74	143469	Riverbed Site
24	Patti	Sabhra		PB-TT-SUT-13		80.8	1104138	Riverbed Site
25	Patti	Sabhra, Kuttiwal		PB-TT-SUT-14		34.23	469498.5	Riverbed Site
26	Patti	Booh		1	Satpal singh	3.5		Agricultural Site

1. It is certified that the land proposed for above potential sand mining sites i.e (Sr. no. 1-26) does not include in areas Notified under section 4 and 5 of **PLPA Act 1900**.

2. It is certified that the land proposed for above potential sand mining sites i.e (Sr. no. 12-26) are not falling in the Eco-sensitive Zones of Wildlife Sanctuary & Conservation Reserves cover under **Wildlife Protection Act 1972** and **Punjab Wildlife Preservation Act 1959** and mining sites Sr. no. 1-11 which are river Bed sites of Beas river are part of **Beas River Conservation Reserve** as per Forest Department Notification 34/13/2017-ft-5/1052756/1 dated 29.8.2017 .

3. Sites present at Sr. no. 12-26 are not part of any Sanctuary and Conservation Reserve whereas sites at Sr. 1-11 are part **of Beas River Conservation Reserve.**

DIVISIONAL FOREST OFFICER
WILDLIFE DIVISION FEROZPUR

Final Report by Sub-Division Level Committee Tehsil-Patti, District -Tarn Taran

Committee Constituted by SDM Patti which conducted joint site visit at mining sites on 23.08.2022

Sr. No	Site Name	Village	Coordinates	Site Accessible	Sand Deposit Available (Y/N)	Remarks
1.	PB-TT-SUT-01	Ram Singh Wala	31° 6'13.34"N 74°43'46.42"E	Not Accessible	Yes	Near International Border, site is small and far away from metaled road. Recommended to be dropped.
2.	PB-TT-SUT-02	Ram Singh Wala	31° 6'17.55"N 74°43'56.98"E	Not Accessible	Yes	Near International Border, site is small and far away from metaled road. Recommended to be dropped.
3.	PB-TT-SUT-03	Ram Singh Wala	31° 6'23.18"N 74°43'58.61"E	Not Accessible	Yes	Near International Border, site is small and far away from metaled road. Recommended to be dropped.
4.	PB-TT-SUT-04	Radhalke	31° 8 '55.60"N 74°50'41.42"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity.
5.	PB-TT-SUT-05	Jhugian Pir Bakhash	31° 9'0.88"N 74°51'58.43"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity

6.	PB-TT-SUT-06	Kot-Budha	31° 7'54.25"N 74°47'6.55"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity. 400 mtr distance from kot budha forest land
7.	PB-TT-SUT-07	Jalloke	31° 7'54.77"N 74°46'56.20"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity. 600 mtr distance from kott budha forest land
8.	PB-TT-SUT-08	Jalloke	31° 7'59.27"N 74°47'52.55"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity. 900 mtr distance from kott budha forest land
9.	PB-TT-SUT-09	Tanna Bagga	31° 8'1.34"N 74°49'0.69"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity
10.	PB-TT-SUT-10	Tanna Bagga	31° 8'0.10"N 74°49'27.38"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity
11.	PB-TT-SUT-11	Sabhra	31° 8'49.42"N 74°50'35.27"E	Accessible	Yes	Amended Site around 250 meter from Flood protection work of drainage department.
12.	PB-TT-SUT-12	Sabhra	31° 8'2.71"N 74°50'55.08"E	Accessible	Yes	Near Flood protection work of drainage department. Recommended to be dropped.

13.	PB-TT-SUT-13	Sabhra	31° 9'14.74"N 74°51'51.22"E	Accessible	Yes	Near Flood protection work of drainage department. Recommended to be dropped.
14.	PB-TT-SUT-14	Kuttiwal	31° 9'22.84"N 74°51'49.04"E	Accessible	Yes	Connecting metaled roads are of low load bearing capacity.

Environment Engineer,
PPCB,Amritsar

Executive Engineer, construction Div No. 2
PWD(B&R),Tarn Taran at Amritsar

Chief Agriculture Officer,
Tarn Taran.

Executive Engineer,
Jandiala Division, UBDC,
Amritsar

Divisional Forest Officer,
Amritsar.

Block Development and Panchayat officer,
Patti , Distt. Tarn Taran.

Executive Engineer-Cum-
District Mining Officer, Tarn Taran.

Sub-Divisional Magistrate-cum-Chairman
Sub-Divisional Committee,
Patti.

GOVERNMENT OF PUNJAB
Department of Mines & Geology

ਜ਼ਿਲ੍ਹਾ ਪ੍ਰਸ਼ਾਸਨ ਤਰਨ-ਤਾਰਨ District Survey Report (DSR) ਤਿਆਰ ਕਰਨ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਹੈ, ਜੋ RSP Green Development & Laboratories Pvt.Ltd. ਦੇ ਸਲਾਹਕਾਰ ਦੁਆਰਾ ਤਿਆਰ ਕੀਤੀ ਜਾ ਰਹੀ ਹੈ। Sustainable Sand Mining Management Guidelines, 2016 and Enforcement & Monitoring Guidelines for Sand Mining 2020 Issued buy MoEF & CC ਅਤੇ ਭਾਰਤ ਦੇ ਮਾਣਯੋਗ ਸੁਪਰੀਮ ਕੋਰਟ, ਭਾਰਤ ਦੇ ਮਾਣਯੋਗ ਹਾਈ ਕੋਰਟ ਅਤੇ ਮਾਣਯੋਗ National Green Tribunal ਦੁਆਰਾ ਜਾਰੀ ਵੱਖ-ਵੱਖ ਨਿਰਦੇਸ਼ਾਂ ਦੇ ਅਨੁਸਾਰ District Survey Report ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ। ਜੇਕਰ ਕੋਈ ਜ਼ਮੀਨ ਮਾਲਕ ਆਪਣੀ ਜ਼ਮੀਨ ਰੇਤ ਅਤੇ ਬਜਰੀ ਦੀ ਮਾਈਨਿੰਗ ਲਈ ਨਿਲਾਮ ਕਰਨਾ ਚਾਹੁੰਦਾ ਹੈ ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਆਪਣੀਆਂ ਅਰਜ਼ੀਆਂ ਮਾਲ ਰਿਕਾਰਡ ਸਮੇਤ Executive Engineer, Bari Doab Drainage Division-Cum-District Mining Officer, Tarn-Taran ਅਤੇ SDM Office (ਤਰਨ-ਤਾਰਨ/ਪੱਟੀ/ਖਡੂਰ ਸਾਹਿਬ/ਭਿੱਖੀਵਿੰਡ) ਵਿਚ ਜਮਾ ਕਰਵਾਈਆਂ ਜਾਣ ਤਾਂ ਜੋ ਇਹ Purposed sites ਨੂੰ ਜ਼ਿਲ੍ਹਾ ਸਰਵੇਖਣ ਰਿਪੋਰਟ ਵਿਚ ਸ਼ਾਮਲ ਕੀਤਾ ਜਾਵੇ।

ਕਾਰਜਕਾਰੀ ਇੰਜੀਨੀਅਰ-ਕਮ-
ਜ਼ਿਲਾ ਮਾਈਨਿੰਗ ਆਫਿਸਰ, ਤਰਨ-ਤਾਰਨ

DPR/0/12/77/2021/15569

Government of Punjab
Department of Mines & Geology

ਜ਼ਿਲ੍ਹਾ ਪ੍ਰਸ਼ਾਸਨ ਤਰਨ ਤਾਰਨ District Survey Report (DSR) ਤਿਆਰ ਕਰਨ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਹੈ, ਜੋ RSP Green Development & Laboratories Pvt. Ltd. ਦੇ ਸਲਾਹਕਾਰ ਦੁਆਰਾ ਤਿਆਰ ਕੀਤੀ ਜਾ ਰਹੀ ਹੈ। Sustainable Sand Mining Management Guidelines, 2016 and Enforcement & Monitoring Guidelines for Sand Mining, 2020 issued by MoEF & CC ਅਤੇ ਭਾਰਤ ਦੇ ਮਾਨਯੋਗ ਸੁਪਰੀਮ ਕੋਰਟ, ਭਾਰਤ ਦੇ ਮਾਨਯੋਗ ਹਾਈਕੋਰਟ ਅਤੇ ਮਾਨਯੋਗ National Green Tribunal ਦੁਆਰਾ ਜਾਰੀ ਵੱਖ-ਵੱਖ ਨਿਰਦੇਸ਼ਾਂ ਦੇ ਅਨੁਸਾਰ District Survey Report ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ। ਜੇਕਰ ਕੋਈ ਜ਼ਮੀਨ ਮਾਲਕ ਆਪਣੀ ਜ਼ਮੀਨ, ਰੇਤ ਅਤੇ ਬਜਰੀ ਦੀ ਮਾਈਨਿੰਗ ਲਈ ਨਿਲਾਮ ਕਰਨਾ ਚਾਹੁੰਦਾ ਹੈ ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਆਪਣੀਆਂ ਅਰਜ਼ੀਆਂ ਮਾਲ ਰਿਕਾਰਡ ਸਮੇਤ Executive Engineer, Bari Doab Drainage Division-cum-District Mining Officer, Tarn Taran ਅਤੇ SDM office (ਤਰਨ ਤਾਰਨ/ਪੱਟੀ/ਖਡੂਰ ਸਾਹਿਬ/ਭਿੱਖੀਵਿੰਡ) ਵਿਚ ਜਮ੍ਹਾਂ ਕਰਵਾਈਆਂ ਜਾਣ ਤਾਂ ਜੋ ਇਹ Purposed Sites ਨੂੰ ਜ਼ਿਲ੍ਹਾ ਸਰਵੇਖਣ ਰਿਪੋਰਟ ਵਿਚ ਸ਼ਾਮਲ ਕੀਤਾ ਜਾਵੇ।

DPR/Pb/15569 ਸਹੀ/- ਕਾਰਜਕਾਰੀ ਇੰਜੀਨੀਅਰ-ਕਮ-ਜ਼ਿਲ੍ਹਾ ਮਾਈਨਿੰਗ ਅਫਸਰ, ਤਰਨ ਤਾਰਨ।

Government of Punjab
Department of Mines & Geology

ਜ਼ਿਲ੍ਹਾ ਪ੍ਰਸ਼ਾਸਨ ਤਰਨ ਤਾਰਨ District Survey Report (DSR) ਤਿਆਰ ਕਰਨ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਹੈ, ਜੋ RSP Green Development & Laboratories Pvt. Ltd. ਦੇ ਸਲਾਹਕਾਰ ਦੁਆਰਾ ਤਿਆਰ ਕੀਤੀ ਜਾ ਰਹੀ ਹੈ। Sustainable Sand Mining Management Guidelines, 2016 and Enforcement & Monitoring Guidelines for Sand Mining, 2020 issued by MoEF & CC ਅਤੇ ਭਾਰਤ ਦੇ ਮਾਨਯੋਗ ਸੁਪਰੀਮ ਕੋਰਟ, ਭਾਰਤ ਦੇ ਮਾਣਯੋਗ ਹਾਈ ਕੋਰਟ ਅਤੇ ਮਾਨਯੋਗ National Green Tribunal ਦੁਆਰਾ ਜਾਰੀ ਵੱਖ-ਵੱਖ ਨਿਰਦੇਸ਼ਾਂ ਦੇ ਅਨੁਸਾਰ District Survey Report ਤਿਆਰ ਕੀਤੀ ਜਾਵੇਗੀ। ਜੇਕਰ ਕੋਈ ਜ਼ਮੀਨ ਮਾਲਕ ਆਪਣੀ ਜ਼ਮੀਨ, ਰੇਤ ਅਤੇ ਬਜਰੀ ਦੀ ਮਾਈਨਿੰਗ ਲਈ ਨਿਲਾਮ ਕਰਨਾ ਚਾਹੁੰਦਾ ਹੈ ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਆਪਣੀਆਂ ਅਰਜ਼ੀਆਂ ਮਾਲ ਰਿਕਾਰਡ ਸਮੇਤ Executive Engineer, Bari Doab Drainage Division-cum-District Mining Officer, Tarn Taran ਅਤੇ SDM office (ਤਰਨ ਤਾਰਨ/ਪੱਟੀ/ਖਡੂਰ ਸਾਹਿਬ/ਭਿੱਖੀਵਿੰਡ) ਵਿਚ ਜਮ੍ਹਾਂ ਕਰਵਾਈਆਂ ਜਾਣ ਤਾਂ ਜੋ ਇਹ Purposed Sites ਨੂੰ ਜ਼ਿਲ੍ਹਾ ਸਰਵੇਖਣ ਰਿਪੋਰਟ ਵਿਚ ਸ਼ਾਮਲ ਕੀਤਾ ਜਾਵੇ।

DPR/Pb/15569 ਸਹੀ/- ਕਾਰਜਕਾਰੀ ਇੰਜੀਨੀਅਰ-ਕਮ-ਜ਼ਿਲ੍ਹਾ ਮਾਈਨਿੰਗ ਅਫਸਰ, ਤਰਨ ਤਾਰਨ।

GOVERNMENT OF PUNJAB
DEPARTMENT OF WATER RESOURCES

ਆਮ ਜਨਤਾ ਨੂੰ ਸੂਚਿਤ ਕੀਤਾ ਜਾਂਦਾ ਹੈ ਜ਼ਿਲ੍ਹਾ ਤਰਨਤਾਰਨ ਨਾਲ ਸਬੰਧਤ 25 ਨੰ: ਖੱਡਾਂ ਵਿਚੋਂ ਮਾਈਨਿੰਗ ਕਰਨ ਲਈ ਇਸ ਦਫ਼ਤਰ ਵੱਲੋਂ ਡਿਸਟ੍ਰਿਕ ਸਰਵੇ ਰਿਪੋਰਟ ਤਿਆਰ ਕੀਤਾ ਗਿਆ ਹੈ। ਇਹ ਡੀ.ਐਸ.ਆਰ. ਡਿਪਟੀ ਕਮਿਸ਼ਨਰ, ਤਰਨਤਾਰਨ ਜੀ ਦੀ ਵੈੱਬਸਾਈਟ tarntaran.nic.in 'ਤੇ ਅਪਲੋਡ ਕਰ ਦਿੱਤਾ ਗਿਆ ਹੈ। ਜੇਕਰ ਕੋਈ ਵਿਅਕਤੀ ਇਸ ਡੀ.ਐਸ.ਆਰ. ਸਬੰਧੀ ਆਪਣੇ ਸੁਝਾਅ ਦੇਣਾ ਚਾਹੁੰਦਾ ਹੈ ਤਾਂ ਉਹ ਨਿਮਨਹਸਤਾਖ਼ਰ ਦੇ ਦਫ਼ਤਰ Executive Engineer, Bari Doab Drainage Division, Amritsar ਵਿਚ ਲਿਖਤੀ ਤੌਰ ਤੇ ਜਾਂ ਇਸ ਦਫ਼ਤਰ ਦੀ ਈ-ਮੇਲ ਆਈਡੀ. xenbaridoab@gmail.com 'ਤੇ ਦੇ ਸਕਦਾ ਹੈ।

ਸਹੀ/- ਕਾਰਜਕਾਰੀ ਇੰਜੀਨੀਅਰ,
ਬਾਰੀ ਦੁਆਬ ਜਲ ਨਿਕਾਸ ਮੰਡਲ, ਅੰਮ੍ਰਿਤਸਰ।

DPR/Pb/18178

Government of Punjab
Department of Water Resources

ਆਮ ਜਨਤਾ ਨੂੰ ਸੂਚਿਤ ਕੀਤਾ ਜਾਂਦਾ ਹੈ ਕਿ ਜ਼ਿਲਾ ਤਰਨਤਾਰਨ ਨਾਲ ਸਬੰਧਤ 25 ਨੰ. ਖੱਡਾਂ ਵਿਚੋਂ ਮਾਈਨਿੰਗ ਕਰਨ ਲਈ ਇਸ ਦਫਤਰ ਵਲੋਂ ਡਿਸਟ੍ਰਿਕਟ ਸਰਵੇ ਰਿਪੋਰਟ ਤਿਆਰ ਕੀਤੀ ਗਈ ਹੈ। ਇਹ ਡੀ. ਐੱਸ. ਆਰ. ਡਿਪਟੀ ਕਮਿਸ਼ਨਰ, ਤਰਨਤਾਰਨ ਜੀ ਦੀ ਵੈੱਬਸਾਈਟ tarntaran.nic.in 'ਤੇ ਅਪਲੋਡ ਕਰ ਦਿੱਤੀ ਗਈ ਹੈ। ਜੇਕਰ ਕੋਈ ਵਿਅਕਤੀ ਇਸ ਡੀ. ਐੱਸ. ਆਰ. ਸਬੰਧੀ ਆਪਣੇ ਸੁਝਾਅ ਦੇਣਾ ਚਾਹੁੰਦਾ ਹੈ ਤਾਂ ਉਹ ਨਿਮਨਹਸਤਾਖਰ ਦੇ ਦਫਤਰ Executive Engineer, Bari Doab Drainage Divison, Amritsar ਵਿਚ ਲਿਖਤੀ ਤੌਰ 'ਤੇ ਜਾਂ ਇਸ ਦਫਤਰ ਦੀ ਈ-ਮੇਲ ਆਈ. ਡੀ. xenbaridoab@gmail.com 'ਤੇ ਦੇ ਸਕਦਾ ਹੈ।

ਕਾਰਜਕਾਰੀ ਇੰਜੀਨੀਅਰ,
ਬਾਰੀ ਦੁਆਬ ਜਲ ਨਿਕਾਸ ਮੰਡਲ,
ਅੰਮ੍ਰਿਤਸਰ

DPR/NA/12/12308/2021/18178