No. 728
H.P. Forest Department.

Dated Nahan, the 20/5/2024

From: DFO Nahan.

To: Conservator of Forests,
Nahan Circle, Nahan.

Subject:- **Diversion of 31.72 ha of forest land in favour of Irrigation and Water Resourced Department Haryana Sinchai Bhawan, Sec-5, Panchkula, Haryana, for the construction of Adi Badri Dam on Somb Nadi within the jurisdiction of Nahan Forest Division, Distt. Sirmour, H.P.**

In context of the above citied subject some observations were raised by Regional Office of MoEFCC at Chandigarh vide letter no. FC/HPC/77/2023 dated 11.07.2023 and Point wise Reply to the observations is as under:-

Sr. No.	Observation	Reply
1	Under component-wise break up at B-2.4 of part I, PARIVESH Portal, the total has to be 31.72 ha and proposed dumping site and its area has to be included under component-wise breakup of the forest and non-forest area.	It is clarified that the land for dumping site is not part of 31.72 Ha forest land and neither falls in the jurisdiction of Himachal Pradesh. Separate 1.80 Ha non forest land has been identified for dumping site in Haryana. The details could not be update be included in the component-wise break up at B-2.4 of part I as same cannot be edited at the end of user agency. However the details have been updated in the Check List Serial Number-08 and same is hereby attached and same has been uploaded in additional information at serial no.**31** in Parivash portal of **Part-I** by the user agency
2	All the components (residential colony, dumping site etc) of the proposed project are required to be marked in the KML file and layout plan.	All the components (residential colony, dumping site etc) of the proposed project has been marked in the KML file, SOI toposheet & layout plan and same has been uploaded on the portal by the user agency
3	As per para 9.2 of Handbook of FC 80 and Rules (Guidelines and Clarifications), 2019, a proposal for diversion of forest land for Irrigation/Hydro-electric projects shall invariably be accompanied by detailed CAT plan. Hence, CAT plan needs to be uploaded in Part I.	CAT plan is enclosed and same has been uploaded in additional information at serial no.**30** in Parivash portal of **Part-I** by the user agency
4	As per details at SN B.2.3, under village-wise break up two villages, viz Matar and Bheron are involved in the project, but as per document uploaded at SN K(a) FRA certificate, proceedings of DLC, SDLC and FRC of only Matar village has been uploaded. Hence, complete compliance of FRA or an undertaking to submit the same before S-II including proceedings of Gram Sabha and FRC of Bheron village are required to be uploaded under SN K(a) of the PARIVESH portal.	Undertaking to submit the complete FRA before S-II including proceedings of Gram Sabha and FRC of Bheron village is enclosed and same has been uploaded in additional information at serial no.**34** in Parivash portal of **Part-I** by the user agency.
5	Detailed Muck Management Plan clearly highlighting the generated muck, utilized muck, balanced muck with swell factor along with reclamation plan duly authenticated by DFO concerned needs to be uploaded.	Detailed Muck Management Plan clearly highlighting the generated muck, utilized muck, balanced muck with swell factor along with reclamation plan duly authenticated by DFO is enclosed and same has been uploaded in additional information at serial no.**35** in Parivash portal of **Part-I** by the user agency

6	The polygon as shown in the KML file is not matching with the SOI toposheet. Clarification may be submitted.	It is submitted by the user agency that area has been marked manually on the SOI toposheet and due to very small scale exact marking is not possible. Therefore area marked in kml may please be treated as final diversion area.
7	The proposed diversion area is falling under MDF category as per DSS analysis. Therefore, same may be reviewed and accordingly density of vegetation in Part-II may be updated and the NPV calculation sheet may also be revised.	NPV Calculation has been done as per the standard procedure and same has been uploaded in additional information in Parivash portal Part-II (i.e. Revised NPV)
8	State Govt required to send clarification, if Environment clearance is applicable for the extant proposal or not? If yes then same may be provided.	Environment clearance is enclosed and and same has been uploaded in additional information in Parivash portal Part-I at serial No.33
9	Since the extant proposal involves impounding of water, therefore, State Govt. may clarify, whether there is any type of displacement involved or not? If yes, details of R and R plan (Resettlement and rehabilitation) needs to be provided.	It is clarified by the user agency that there is no displacement involved in this project and hence R&R plan is not required.
10	Due to impounding of waters in the reservoirs, there may be possibility of road/transmission line being affected, the detailsof all road/transmission line, if any, which are likely to be submerged along with the NOC may be provided.	It is certified by the user agency that there is only shifting of 11KV HT lines is involved. HPSEBL, Nahan had demanded Rs. 36,73,203/- for this work. The amount has been deposited with the department. Detail enclosed.
11	Clarification may be uploaded, regarding from where the rawmaterial for the instant dam construction shall be procured.	It is certified by the user agency that HIWRD has finalized the quarry site at village Jaitpur, Distt Yamunanagar (Haryana) for extraction of raw material for this project after due construction material survey. Construction material survey report of Central Soil and Material Research Station New Delhi is attached. Quantification of the quarry site has been done by GSI and report of the same is also enclosed. Case for reservation of minning site stands submitted to Govt.
12	The certificate from the DC, Nahan regarding non-availability of NFL is regarding Nahan Tehsil under Sirmour district. The provisions at 2.3 under Chapter 2 of the Handbook of FC 80 and Rules (Guidelines and Clarifications), 2019, are reproduced below: a) In case, non-forest land for CA is not available in the same district, it should be identified anywhere else in the concerned/State/Union Territory near to the site of diversion as far as possible, so as to minimize adverse impact on the microecology of the area. b) In exceptional cases where non-forest land for CA is not available in the same State/UT inwhich the diversion of forest land is proposed, land for CA canbe identified in any other State/UTs, preferably in neighboring State/UTs. The corresponding amount for carrying out CA shall be deposited in the CAMPA account of the State/UT in which CA is proposed. Hence, it appears that due diligence regarding non- availability of NFL has not been done and the State Govt is required to explore all possibilities of finding NFL in the entire State and if NFL is not available in the State of HP, based on the fact that , the user agency is from the neighboring state of Haryana and providing NFL is the	NFL for CA has been identified by the user agency in Haryana. KML and DGPS map of the NFL along with report of concerned DFO is attached for ready reference. It is stated that adding of details of CA site in part-1 and part-2 has tried to upload on the Parivesh Portal 1.0 but there is no option available to add the information pertaining to CA site located in Haryana State. The options available were only for Himachal Pradesh jurisdiction only However, the matter was also taken by the user agency with the technical team of parivesh portal through online complaint (copy enclosed).

	responsibility of UA, UA is required to provide NFL either in HP or in exceptional circumstances in Haryana to compensate for loss of forest due to non-forestry use of forest.	
13	The specific recommendation of the CF uploaded currently appears to be just a forwarding letter. Hence, specific recommendation from the CF has to be submitted.	Relates to CF

This is for your kind information and further necessary action please.

Divisional Forest Officer,
Nahan Forest Division

Divisional Forest Officer,
Nahan Forest Division,
Nahan, H.P.

CALCULATION OF NET PRESENT VALUE (NPV) OF CONSTRUCTION OF ADI BADRI DAM DISTICT SIRMOUR, H.P.

Name of the Division	Sr. No.	Area in Ha.	No. of trees.	No. of Class III & above trees	No. of trees below class III	Equivalent mature trees (50% Co.6)	Total Mature tree/ Ha (Col.5+ Col.7)	Mature tree/ Ha (Col.8/ Col.3)	Density (Col.9/400)	Eco Class	Rate applicable Dense Forest	Amount (NPV) in Rs. (Col.3* Col.12)
1	2	3	4	5	6	7	8	9	10	11	12	13
Nahan	1	31.72	5172	843	4329	2165	3008	94.82	0.2375	V	1292850/-	41009202/-

Date:- 18.05.2024

Place: Nahan.

Divisional Forest Officer,
Nahan Forest Division, Nahan.

Divisional Forest Officer,
Nahan Forest Division,
Nahan, H.P.

No. 68-69/ABD-FC

Dated 29/02/2024

To

District Forest Officer
Nahan

Subject:- Diversion of 31.72 ha of forest land in favour of Irrigation and Water Resourced Department Haryana Sinchai Bhawan, Sec-5, Panchkula, Haryana, for the construction of Adi Badri Dam on Somb Nadi within the jurisdiction of Nahan Forest Division, Distt. Sirmour, H.P.

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6	The polygon as shown in the KML file is not matching with the SOI toposheet. Clarification may be submitted.	It is submitted that area has been marked manually on the SOI toposheet and due to very small scale exact marking is not possible. Therefore area marked in kml may please be treated as final diversion area.
7	The proposed diversion area is falling under MDF category as per DSS analysis. Therefore, same may be reviewed and accordingly density of vegetation in Part-II may be updated and the NPV calculation sheet may also be revised.	Revised NPV calculations are enclosed.
8	State Govt required to send clarification, if Environment clearance is applicable for the extant proposal or not? If yes then same may be provided.	Environment clearance is enclosed.
9	Since the extant proposal involves impounding of water, therefore, State Govt. may clarify, whether there is any type of displacement involved or not? If yes, details of R and R plan (Resettlement and rehabilitation) needs to be provided.	It is clarified that there is no displacement involved in this project and hence R&R plan is not required.
10	Due to impounding of waters in the reservoirs, there may be possibility of road/transmission line being affected, the details of all road/transmission line, if any, which are likely to be submerged along with the NOC may be provided.	There is only shifting of 11KV HT lines is involved. HPSEBL, Nahan had demanded Rs. 36,73,203/- for this work. The amount has been deposited with the department. Detail enclosed.
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13	The specific recommendation of the CF uploaded currently appears to be just a forwarding letter. Hence, specific recommendation from the CF has to be submitted.	Relates to CF

This is for your kind information and further necessary action please.

Sub Divisional Officer
S. H. Sub Division No.2
Jagadhri

CC:- Executive Engineer, Sarasvati Heritage Division No. 1, Jagadhri for information please.

Full Title of the Project: Construction of Adi Badri Dam
File No: FP/HP/IRRIG/155846/2022
Date of Proposal: 26.05.2022

CHECK LIST SERIAL NUMBER-08

STATEMENT SHOWING DETAILS OF NON FOREST AREA INVOLVED IN THE PROPOSAL

S.No	District	Division	Range/Tehsil /Village	Khasra/ Survey or Compartment Number of Km. Stone	Non Forest Area involved in the proposal (Ha.)	Present land Use	Remarks
1	2	3	4	5	6	7	8
1	Sirmaur	Nahan	Village Matar	96/1	0.67	Agricultural	----
2	Yamunanagar	Yamunanagar	Village Kathgarh		1.80	No use	Mining area (Highly excavated)

Place : Jagadhri

Date : 26.02.2024

Signature of User Agency
Office Seal

Sub Divisional Officer
Sarasvati Heritage Sub Division No. 2
Jagadhri

Full Title of Project: - Construction of Adi Badri Dam on Somb Nadi and its piped link to Sarasvati Nadi and Sarasvati Reservoir
File No: - FP/HP/IRRIG/155846/2022
Date of Proposal: - 26.05.2022

CATCHMENT AREA TREATMENT (CAT) PLAN

Introduction

The study of erosion and sediment yield from catchment is of utmost importance as the deposition of sediment in reservoir reduces its capacity, thus affecting the water available for the designated use. The eroded sediment from catchment when deposited on streambeds and banks causes braiding of river reach. The removal of top fertile soil from catchment also adversely affects the agricultural production. Another crucial factor that adds to the sediment load and which contributes to soil degradation is grazing pressure. Many cattle, sheep, and goats graze the pastures continuously for about six months in a mountainous region.

The lack of proper vegetal cover is a factor to cause degradation and thereby results in severe run off/soil erosion, and subsequently premature siltation of the reservoir. Thus, a well-designed Catchment Area Treatment (CAT) Plan is essential to ameliorate the above-mentioned adverse cause and process of soil erosion. The catchment area treatment involves the understanding of the erosion characteristics of the terrain and suggesting remedial measures to reduce the erosion rate. For this reason, the catchment of the directly draining rivers, streams, tributaries, etc. are treated and the cost is included in the project cost.

The pre-requisite for a watershed management is the collection of multipronged data e.g., geology, geomorphology, topography, soil, land use/land cover, climate, hydrology, drainage pattern, etc. The multi-pronged data generated from various published sources and actual data collected from these watersheds on the above-mentioned parameters forms the basis of the Action Plan for Catchment Area Treatment.

Catchment Area Treatment (CAT) plans for the free draining catchment area of the proposed project has been prepared for areas with high soil erosion intensity. The CAT Plan targets towards overall improvement in the environmental conditions of the region. All the activities are aimed at treating the degraded and potential areas with severe soil erosion. The plan provides benefits due to biological and engineering measures and its utility in maintaining the ecosystem health. The plan with objectives addresses issues such as prevention of gully erosion, enhancing the forest cover for increasing soil holding capacity; and arresting total sediment flow in the reservoir and flowing waters.

Objectives

Integrated watershed management plan minimizes the sedimentation of reservoir. The main aim of the Catchment Area Treatment Plan is to rejuvenate various potential and degraded ecosystems in the catchment area for longevity of the reservoir storage capacity. For this purpose, the action plan has been prepared with the following objectives:

1 To facilitate the hydrological functioning of the catchment and to augment the quality of water of

the river and its tributaries.

2 Conservation of soil cover and to arrest the soil erosion, floods and siltation of the river along with its tributaries and consequent reduction of siltation in the reservoir of the project.
3 Demarcation of the priority of watersheds for treatment based on soil erosion intensity in the catchment area.
4 Rehabilitation of degraded forest areas through afforestation and facilitating natural regeneration of plants.
5 Mitigation of landslide, landslip and rock falls.
6 Soil conservation through biological and engineering measures to reduce sediment load in river and tributaries, incidentally improving the quality of water.
7 Ecosystem conservation resulting from increased vegetal cover and water retaining properties of soil.
8 To meet the fuel and fodder requirements of local people.
9 Promotion of non-conventional energy device to reduce pressure on forest.
10 Employment generation through community participation and conservation.

Catchment Area

The catchment area of Somb Nadi upto the Adi Badri Dam project is about 29.50 Sq. Kms. Major portion of this catchment area is located in the Himachal Pradesh, while the rest in the Haryana State.

It is a small Catchment area, so rainfall over the catchment does not vary much from place to place. Bulk of the total annual rainfall occurs during the four monsoon months of June, July, August and September. The rock types met in the catchment area are Middle Shivaliks consists predominantly of sand stone of light grey colour which vary in thickness from 10 m to 20 m. They are coarse grained and grade from greywacke in lower portion and rkose in the higher portion. They are soft and friable because of lack of calcareous matter which occur in segregation rather than dissimilated throughout the mass as in lower Shivalik. Middle Shivalik fauna particularly the Dhok Pathan formation exhibit very close to Pontain affinities.

Free Draining Catchment

The catchment area of Somb Nadi upto the Adi Badri Dam project is about 29.50 Sq. Kms. which does not have any intercepted catchment. Since the catchment is not intercepted by any other major or medium water resource project on upstream, the Catchment Area Treatment Plan shall be formulated for entire catchment (29.50 sq. km)

The satellite imagery of the free draining catchment is presented in Figure 5.1, and the mosaic map of watershed location is shown in Figure 5.2.

Full Title of Project: - Construction of Adi Badri Dam on Somb Nadi and its piped link to Sarasvati Nadi and Sarasvati Reservoir

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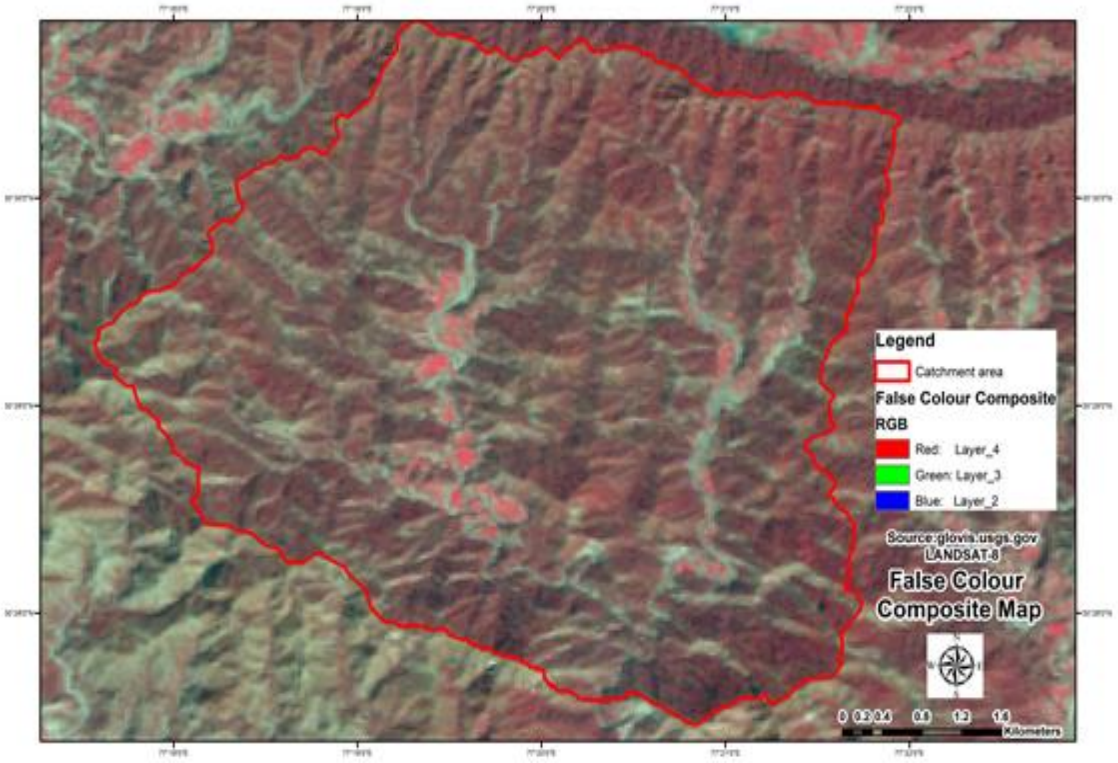

Figure **Error! No text of specified style in document.**.1: FCC of Catchment Area

Full Title of Project: - Construction of Adi Badri Dam on Somb Nadi and its piped link to Sarasvati Nadi and Sarasvati Reservoir

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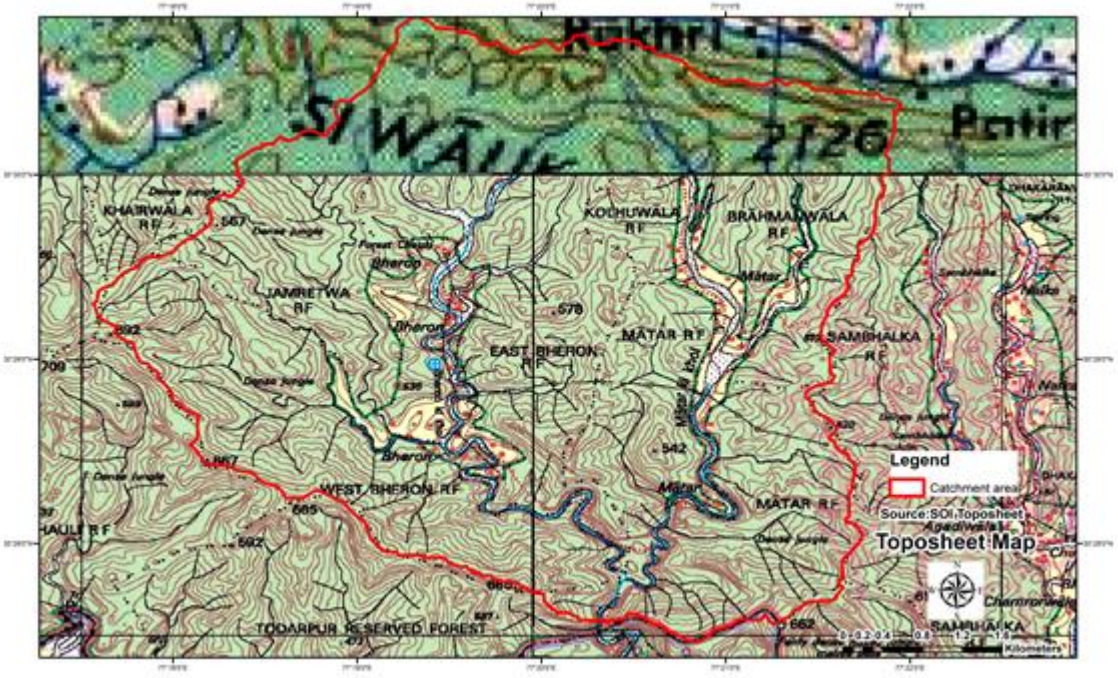

Figure **Error! No text of specified style in document.**.2: Mosaic Map Showing Location of watersheds

Topography and Drainage

The topographic analysis of the project area comprises of sub- mountainous zone where middle Shivalik rocks are exposed in the shape of low hills. The project area lies in the Survey of India (SOI) topographic sheet 53F6 and 53F7. The altitude of the area varies from the lowest 318 m. in the Somb river bed to the highest 580 m. at the top of water divide. The topography sheet indicates that the Sarasvati river originates from the Shivalik hills. The source of river is underground water dipping from small hillock which is now snow fed. It contributes to its ephemeral character. The Adi Badri and its immediate surroundings are also drained by some other small first and second order tributaries which join the Somb river, a right bank tributary from Yamuna river. All the stream/ nallas/ gullies follow the local slope of the area. The drainage map of the catchment is shown in Figure 5.3.

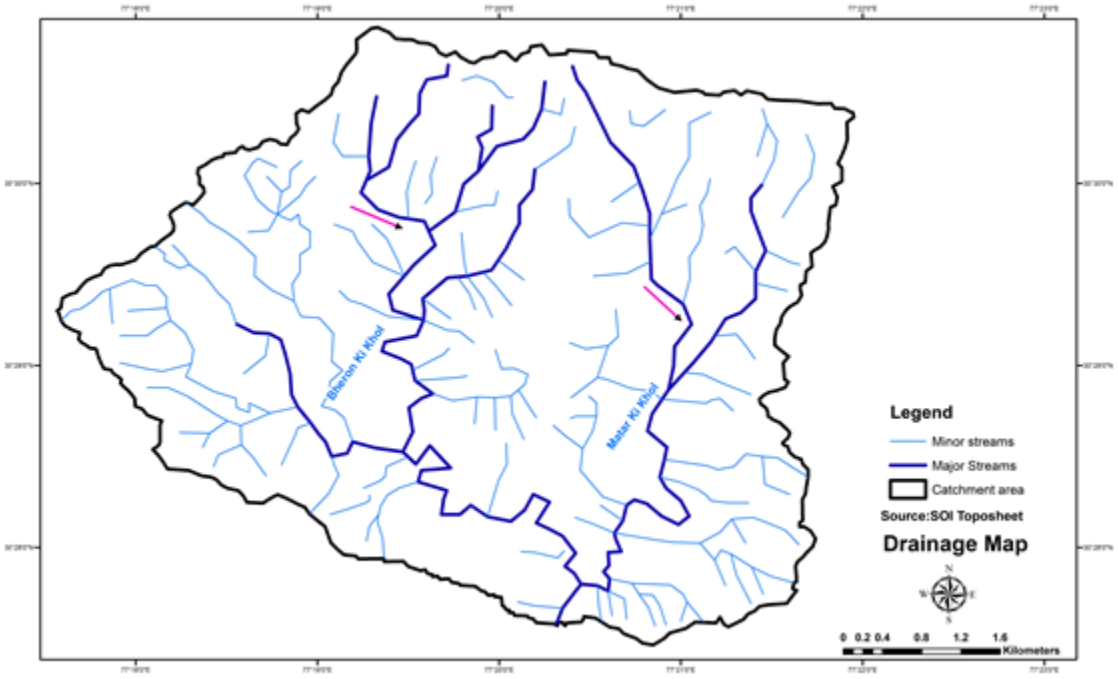

Figure **Error! No text of specified style in document.**.3: Drainage map of the catchment.

Soil

The soil resource map of Himachal Pradesh and Haryana (NBSS Publication No 50) has been used in the present study. The soils of the catchment area belong to soil mapping unit 84, 89, 72, 66, 93 and 94. The soil belonging to soil mapping unit 94 are deep well drained, fine loamy soils on moderately sloping hill slope with loamy surface texture and moderate erosion and are associated with moderately deep well drained coarse loamy soils and moderate erosion. Taxonomically these are Dystric Eutrochrepts to Typic Udorthents and Eutrochrepts. The soil map is presented in Figure 5.4.

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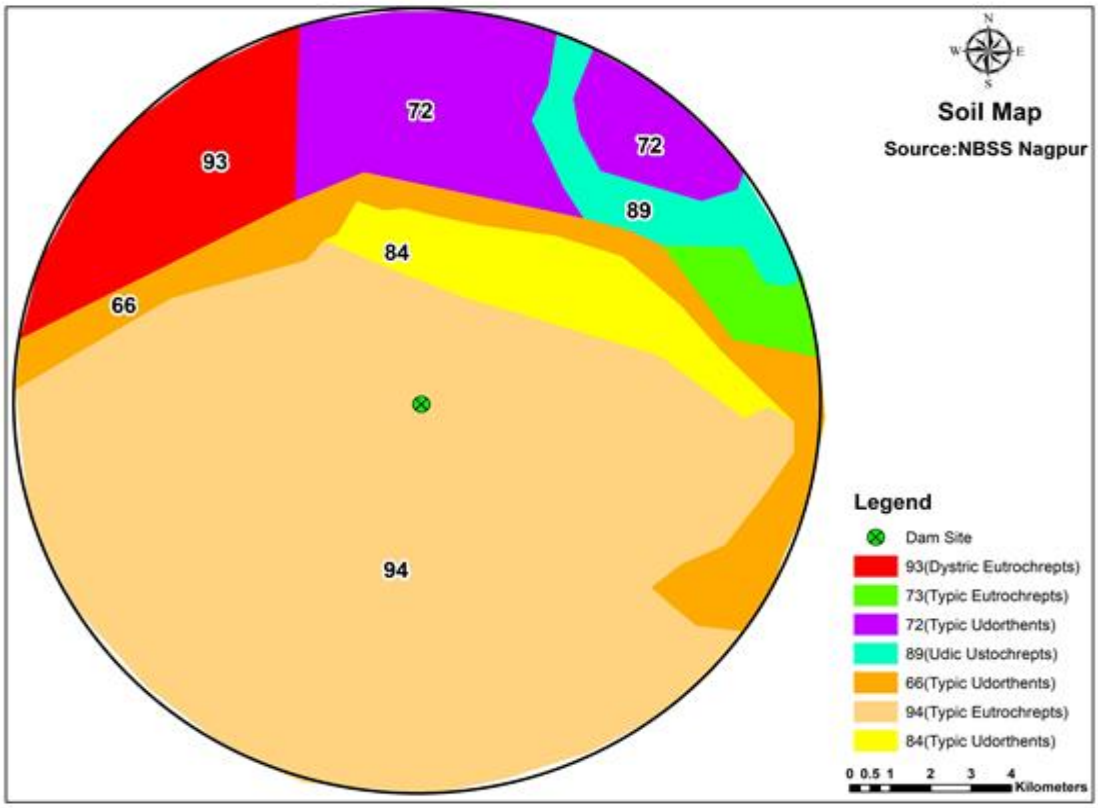

Figure **Error! No text of specified style in document.**.4: Soil Map of the Catchment including study area

Land use

Land use-Land Cover Classification

Based on satellite data and toposheets, a land-use map has been prepared and verified in detail during ground surveys i.e. crosschecked with ground truths. The Land use/ Land-cover map of the catchment area is presented in Figure 5.5 and its details are presented in Table 5.2.

Land use Categories and Erosion

The erosion acts differently in different land-use types. It is important to understand the nature of erosion in a land-use class to further plan for treatment.

Agricultural Land

The catchment area is having 1.56 sq km agriculture land which is 5.29%

Settlement

There are some settlements in the catchment area which are 0.22% of total catchment area.

Open Forest Land

Open forest covers about 9.09 sq. km area constituting 30.81% of the catchment

Dense Forest

Dense forest covers about 18.31 sq. km area constituting 62.07% of the catchment

River / Water body

Around 0.031 sq. km area constituting 0.11% of the catchment area is classified under water bodies.

Dry River Bed

Around 0.38 sq. km area constituting 1.29% of the catchment area is classified underDry River Bed.

Table **Error! No text of specified style in document.**.1: Land use Details in the Catchment

Class	Area(Sq Km)	%
Agricultural Land	1.56	5.29
Dry River Bed	0.38	1.29
Water body	0.031	0.11
Dense Forest	18.31	62.07
Open Forest	9.09	30.81
Settlement	0.13	0.44
Total	29.50	100

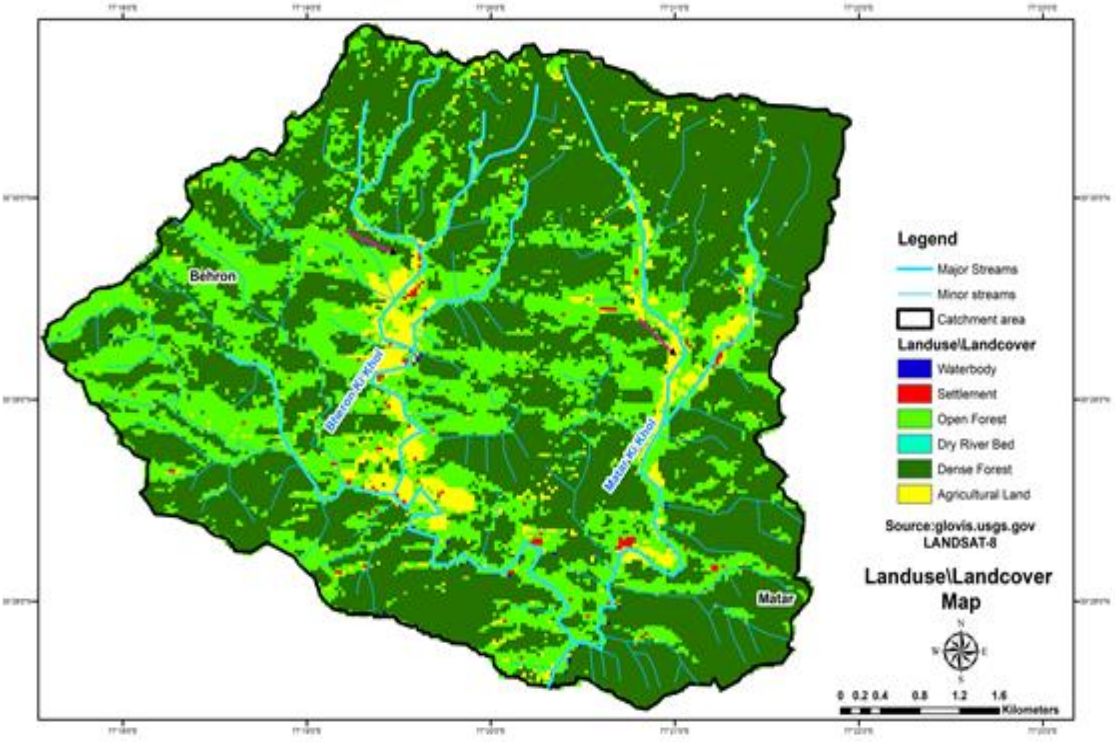

Figure **Error! No text of specified style in document.**.5: Land use Map of Catchment Area

Slope

The slope of a watershed plays a key role in controlling the soil and water retention thereby affecting the land-use capability. The percentage of the slope in a watershed determines the soil erosion susceptibility and forms the basis for classifying different of the watershed into suitable classes for formulating effective soil erosion conservation measures. Broadly, the following slope classes and ranges (Table 5.3) as per norms of All India Soil and Land Use Survey were adopted to classify the slopes for the present study.

Table **Error! No text of specified style in document.**.2: Slope Ranges of Catchment area

Sr. No	Slope Range (Degrees)	Description
1.	0-3.6	Very Gentle Slope
2.	3.6-7.6	Gentle Slope
3.	7.6-12.4	Moderate Slope
4.	12.4-18	Moderately Steep
5.	18-24	Steep
6.	Above 24	Very Steep

The Slope map of the free draining catchment is presented in Figure 5.6 and slope details are as presented under Table 5.4. The data shows the slopes dominated by moderately steep sloping (31.02) to moderately sloping (27.24).

Table **Error! No text of specified style in document.**.3: watershed Wise Areas Under Different Slope Classes

Slope Class	Area (Sq km)	%
0-2(Nearly level)	1.5	5.10
2-5(Very Gentle Sloping)	2.41	8.10
5-8(Gently Sloping)	1.25	4.25
8-15(Moderate Sloping)	8.04	27.24
15-30(Moderately Steep sloping)	9.12	31.02
30-50(Steep Sloping)	5.2	17.56
Above 50 (Very Steeply Sloping)	1.98	6.73
Total	29.50	100

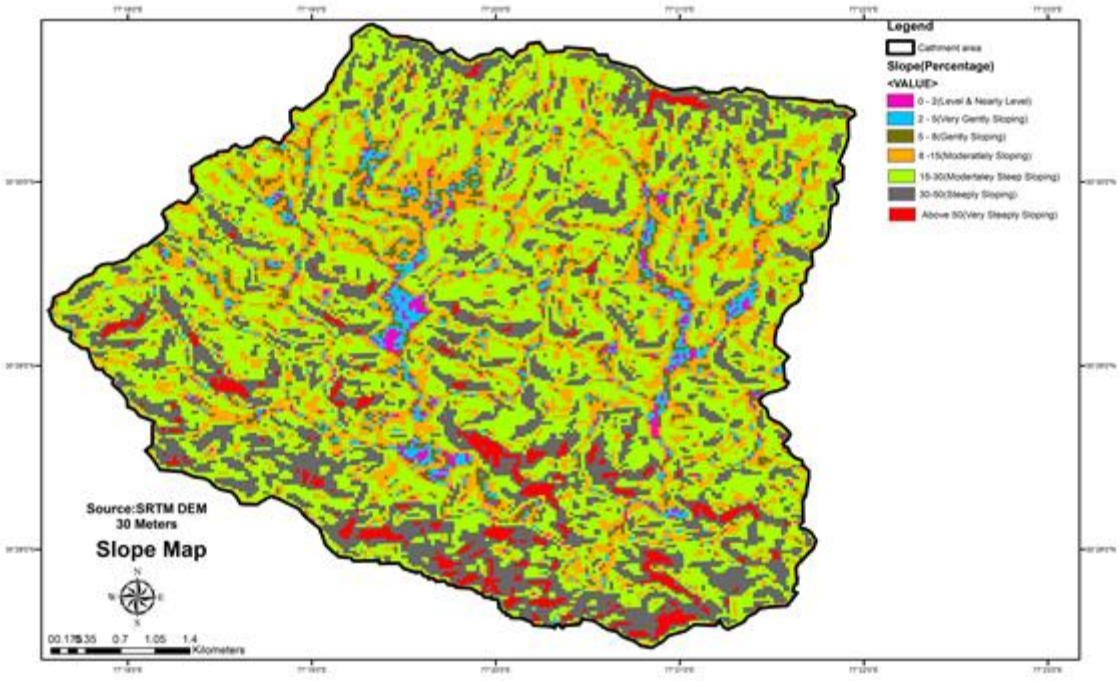

Figure **Error! No text of specified style in document.**.6: Slope Map of Free Draining Catchment

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Methodology Used for the Study

Superimposing topography, slope, soil and land use data/maps, a tentative estimation of erosion prone areas and landslides area in the catchment were made. The vulnerable and problematic areas were identified in different physiographic zones.

These data sets were used for preparation of the thematic maps, calculation of sediment yield index and Erosion Intensity Units.

Soil Loss Using Silt Yield Index (SYI) Method

- The Silt Yield Index Model (SYI), considering sedimentation as product of erosivity, erodibility and aerial extent was conceptualized in the All India Soil and Land Use Survey (AISLUS) as early as 1969 and has been in operational use since then to meet the requirements of prioritization of smaller hydrologic units within river valley project catchment areas.
- Methodology for the calculation of sediment yield index developed by All India Soil and Land Use Survey (Development of Agriculture, Govt. of India) was followed in this study.

Erosion Intensity and Delivery Ratio

- Determination of erosion intensity unit is primarily based upon the integrated information on soil characters, physiography, slope, land-use/land-cover, lithology and structure. This is achieved through super-imposition of different thematic map overlays. Based upon the field data collected during the field survey and published data, weightage value and delivery ration were assigned to each erosion intensity unit. The composite map for delineating different erosion intensity units was prepared through superimposition of the maps showing soil types, slope and land-use/land-cover. This thematic mapping of erosion intensity for entire catchment was done using the overlay and union techniques. Based on ground truth, verification conducted during fieldwork and published data, weightage and delivery ratio was assigned to each erosion intensity units. The composite erosion intensity map was then superimposed on the drainage map with sub-watershed boundaries to evolve CEIU for individual sub-watershed.
- Each element of erosion intensity unit is assigned a weightage value. The cumulative weightage values of the erosion intensity units represent approximately the relative comparative erosion intensity within the watersheds. A basic factor of K=10 was used in determining the cumulative weightage values. The value of 10 indicated an equilibrium condition between erosion and deposition. Any value of K (10+X) is suggestive of erosion intensity in an ascending order whereas the value of K (10-X) is suggestive of deposition intensity in descending order.

- The delivery ratios were calculated for each composite erosion intensity unit. The delivery ration

suggests the percentage of eroded material that finally finds entry into the reservoir or river/stream. Total area of different erosion intensity classes (composite erosion intensity unit) in each watershed was then calculated.

- The delivery ratio is generally governed by the type of material, soil erosion, relief length ratio, cover conditions, distance from the nearest stream, etc. However, in the present study the delivery rations to the erosion intensity units were assigned upon their distance from the nearest stream (being the most crucial factor responsible for delivery of the sediments) per the following scheme. The delivery ratio criteria adopted for the study is presented in Table 5.5.

Table **Error! No text of specified style in document.**.4: Delivery Ratio (DR) Criteria Adopted for the Project

Nearest Stream	Delivery Ratio (DR)
0-0.9 km	1.00
1.0-2.0 km	0.90
2.1-5.0 km	0.80
5.1-15.0 km	0.70
15.1-30.0 km	0.50

Sediment Yield Index and Prioritization of Watersheds

- The erosivity determinates are the climatic factors and soil and land attributes that have direct or reciprocal bearing on the units of the detached soil material. The relationship can be expressed as:

Soil erosivity = f (Climate, physiography, slope, soil parameters land use/land cover, soil management)

- The Silt Yield Index (SYI) is defined as the Yield per unit area and SYI value for hydrologic unit is obtained by taking the weightage arithmetic mean of the products of the weightage value and delivery ratio over the entire area of the hydrologic unit by using suitable empirical equation.

- Prioritization of smaller hydrological units within the vast catchments is based on the SYI of the smaller units. The boundary values of range of SYI values for different priority categories are arrived at by studying the frequency distribution of SYI values and locating the suitable breaking point. The watersheds /sub-watersheds are subsequently rated into various categories corresponding to their respective SYI values.

- The application of SYI model for prioritization of sub-watersheds in the catchment areas involves the evaluation of:
  - Climatic factors comprising total precipitation, its frequency and intensity

- Geomorphic factors comprising land forms, physiography, slope and drainage characteristics
- Surface cover factors governing the flow hydraulics
- Management factors.

- The data on climatic factors can be obtained for various locations in the catchment area from the meteorological stations whereas the field investigations are required for estimating the other attributes.
- The various steps involved in the application of model are:
- Preparation of a framework of sub-watershed through systematic delineation
- Rapid reconnaissance surveys on 1:50,000 scale leading to the generation of a map indicating erosion-intensity mapping units.
- Assignment of weightage values to various mapping units based on relative silt-yield potential.
- Computing Silt Yield Index for individual watersheds/sub watersheds.
- Grading of watersheds/sub-watersheds into very high, high medium, low and very low priority categories.
- The area of each of the mapping units is computed and silt yield indices of individual sub-watersheds are calculated using the following equations:

Silt Yield Index

$SYI = (Ai \times Wi \times Di) \times 100/Aw$; where I = 1 to n

Where

Ai = Area of ith (EIMU)

Wi = Weightage value of ith mapping unit

Di = Delivery ratio

n = No. of mapping units

Aw = Total area of sub-watershed

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The SYI values for classification of various categories of erosion intensity rates were taken for the present study as:

	Priority Category	SYI Values
1.	Very High	>1300
2.	High	1200-1299
3.	Medium	1100-1199
4.	Low	1000-1099
5.	Very low	<1000

Accordingly, the sediment Yield Index has been calculated for sub-watersheds. The computation of SYI for watershed is presented in Table 5.6.

Table **Error! No text of specified style in document.**.5: SYI and Priority Rating as per Erosion Intensity

Erosion intensity	Area* (ha)	Weightage	Area x weight-age	Delivery ratio	Gross silt yield	Sediment yield index	Priority
Severe	0	18	0	0.80	0	1137	Medium
Severe	58	16	928	0.85	789		
Moderate	311	14	4354	0.90	3919		
Slight	906	12	10872	0.90	9785		
	1275				14493		

Catchment Area Treatment Plan

It is known that there are mainly five categories of Land uses for which a proper treatment plan should be developed. First is the Agricultural Land as this activity can never be eliminated, because the faulty practice results in heavy loss of fertile soil. Second, being open forestland for obvious conservation reasons. Third is scrub or degraded land, which contributes heavily to the silt load and possibilities exist to bring this area under pastures and other plantation to meet the local demand of fuel and fodder and thus decreasing the biotic pressure on the forests and leading to environment friendly approach of sustainable development. The fourth and most important category is Barren land because with practically no vegetal cover, the area produces huge amount of silt load. The fifth is dense forestland

where in a few places soil conservation measures are required. For treatment of catchment area, the areas that require treatment have been delineated from the Composite Erosion Intensity Unit Map. The sum of weightages was reclassified as per Table 5.7 below to further subdivide the area as per the erosion intensity classes. The weightages for Land use, Slope and Soil were summed to get the Erosion Intensity Classes.

Table **Error! No text of specified style in document.**.6: Erosion Intensity and Weightages

Erosion Intensity Class	Sum of weightages
Very severe (E5)	12 to 14
Severe (E3)	9 to 11
Moderate (E3)	6 to 8
Slight (E2)	4 to 5
Negligible (E1)	0 to 3

After exclusion of rocks and inaccessible terrain, only those areas which fall under very severe and severe erosion intensity category would be taken up for conservation treatment measures in very high priority category micro-watersheds, whereas in the rest of micro-watersheds belonging to other priority categories, the area falling under very severe erosion intensity class shall be taken for treatment with biological and engineering measures under the CAT Plan.

Considering the topographic factors, soil type, climate, land-use/land-cover in the catchment area following engineering and biological measures have been proposed to be undertaken with the aim to check the soil erosion, prevent/check siltation of reservoir and to maintain its storage capacity in the long run.

The Erosion Intensity Map of the free draining catchment has been generated based on SYI data and is presented in Figure 5.6 and the statistics are presented in Table 5.8. As per SYI assessment, the sub-watershed has been prioritized as Medium and low.

Table 5.7: Erosion Intensity Categories in Watersheds (sq. km)

Class	**Area(Sq Km)**
Slight erosion	17.73
Moderate Erosion	9.75
Severe Erosion	2.02
Total	29.50

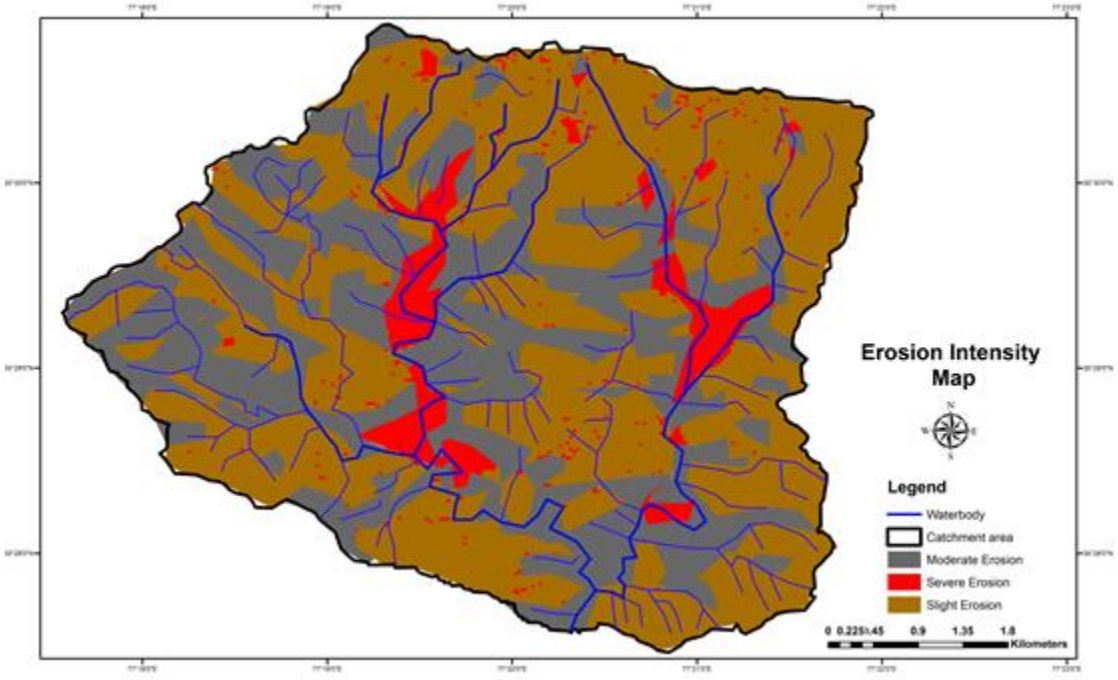

Figure **Error! No text of specified style in document.**.7: Erosion Intensity Map of Free Draining Catchment Area

Treatment of Watershed

There are mainly five categories of land uses for which a proper treatment plan should be developed. First is the agricultural land, as this activity can never be eliminated. In addition, agriculture activities, if faulty, result in heavy loss of fertile soil. Second, is open forestland for conservation. Third, is scrub or degraded land, which contributes heavily to silt load. Possibilities exist to bring this area under pastures and plantation to meet local demand of fuel and fodder and thus decreasing the biotic pressure on the forests leading to environment friendly approach of sustainable development. The fourth and most important category is barren land because with practically no vegetal cover the area produces huge amount of silt load. The fifth is dense forestland where a few places soil conservation measures are required.

Areas falling under severe erosion intensity category would be taken up for conservation treatment measures. In the present case, an area of 58 ha has been proposed to be treated under the CAT plan. This area includes 50 ha area of catchment which shall be treated by biological measures and 8 ha area under hard engineering measures.

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Considering the topographic factors, soil type, climate, land-use/land-cover in the catchment area following measures have been proposed to be undertaken with aim to check soil erosion, prevent/check siltation of reservoir and to maintain its storage capacity in the long run.

Activities to be undertaken

Normal Afforestation

In critically degraded areas, plantation of locally useful diverse and indigenous plant species such as timber plantation species, fodder species, fuel wood species, grasses, shrubs and legumes, medicinal and aromatic plants would be undertaken. The forestation will include rising of multi-tier mixed vegetation of suitable local species in the steep and sensitive catchment areas of rivers/streams with the objective of keeping such areas under permanent vegetative cover. Furthermore, degraded areas would also be brought under vegetation cover. Suitable trees of economic value to local people shall be raised in the degraded forest areas near to villages with the objective of supplementing income of the villagers.

With a view to conserve and augment the state's rich medicinal plant resources in its natural habitat through adaptive and participatory management of the local people, cultivation of high priority medicinal plant species shall be undertaken. Thrust shall be given to organic cultivation of medicinal plants.

Effective fencing would also be provided for protection of saplings. Before any new area is taken up, eradication of weeds and unpalatable grass species is important. It is, therefore, recommended that some parts of the pasture should be closed for seeding purpose only.

Civil Structures

- Brush wood Check Dams and Retaining Walls

Brushes wood check dams are useful in arresting further erosion of depressions, channels, and gullies on the denuded landslides. In addition, retaining walls of stone masonry and RCC would be constructed to provide support at the base of threatened slopes.

- Slope Modification by Stepping or Terracing

The slope stability increases considerably by grading it. The construction of steps or terraces to reduce the slope gradient is one of the measures.

- Gully Control-Check Dams

Gullies are mainly formed because physiographic, soil type, and heavy biotic interference in an area. The scouring of streams at their peak flows and sediment-laden run-off cause gullies. The gullies would be required to be treated with engineering/mechanical as well as vegetative methods. Check dams would

be constructed in some of the areas to promote growth of vegetation that will consequently lead to the stabilization of slopes/area and prevention of further deepening of gullies and erosion. Diverse types of check dams would be required for different conditions comprising of different materials depending upon the site conditions and the easy availability of material (stones) at local level and transport accessibility. Generally, brush wood check dams are recommended to control the erosion in the first order basin/streams in upper reaches and dry random stone masonry check dam shall be provided in the lower reaches where discharge is higher. In such stream where discharge and velocity of flow are still higher gabion structure shall be provided. Lower down the sub-watershed, i.e., in the third order drainage silt retention dams in the form of gabion structure shall be provided.

- Stream bank Protection

Stream bank erosion is caused by variety of reasons such as destruction of vegetative cover, mass movement on unstable bank slopes, undermining of top portion of lower bank by turbulent flow and sliding of slopes when saturated with water. The Stream Bank Protection would include wire crate boulder spurs in two to three tiers depending upon the high flood level of the streams.

- Contour Staggered Trenches

Contour staggered trenches are mainly provided to trap the silt and runoff. This is also done to prepare a fertile base for plantation, in moderately steep to very, very steep slopes.

Cost Analysis of Different Works under Biological Measures

Afforestation

Out of the total stock to be planted under afforestation, 20% species shall be tree species having medicinal values and 10% of fruit bearing wild species useful to wildlife shall also be planted. The cost analysis per hectare of afforestation with 1100 plants/ha, with five strands barbed wire fencing stretched across RCC fence posts inclusive of maintenance for five years has been worked out as Rs. 1.70 lakh/ ha as shown in Table-1.9. The rate analysis is as per minimum labor wages of Rs. 232/day with 10% annual enhancement. The cost of materials has been adopted as per prevalent market rates.

Plantation under normal afforestation component shall be carried through identified user groups in catchment area. Plantations will be maintained for five years.

The cost of works under normal afforestation component encompassing the free draining catchment area of the project has been assessed as Rs.85.00 lakh and is shown in Table-5.9.

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Table **Error! No text of specified style in document.**.8: Per Ha. Cost Norms for Model Plantation Works

Sl.No.	Particular of Work	Quantity	Rate/Man days per unit	Total Man days	Total Amount
First year preparation year					
A. Labour Oriented Works					
1	Survey and demarcation of plantation area	1 ha	0.45 mandays /ha	0.45	104.40
2	Weeding of obnoxious weeds except lantana	1 ha	4 mandays/ha	4	928.00
3	Dag Belling with line for siting pits	1100	2.5 mandays/1000 no.	2.75	638.00
4	Digging pits 45x45x45 cm	1100	5 mandays/100 no.	55	12760.00
5	Filling pits with FYM mix with soil and Pesticides	1100	1.5 mandays/100 no.	16.5	3828.00
6	Preparation of Path	40m	30 mandays/km	7.2	1670.40
	Total Labour cost (A)				19928.8
B. Material Component					
1	Cost of FYM including carriage @ 10% of volume of pit i.e. 1100(0.45x0.45x0.45) x0.1	10.03 m3	1200 / m3	0	12036
2	Providing fertile soil including carriage @ 10% of volume of pit i.e. 1100(0.45x0.45x0.45) x0.1	10.03 m3	500 Rs/m3	0	5016
3	Applying cost of Neem Cake @ 30g/pit	33 Kg	55 Rs/ Kg	0	1815
4	Cost of plant	1210 No.	11 Rs/Plant	0	13310
5	Cost of Service Pipe	100 RM	55 Rs/m	0	5500
6	Proportionate cost for providing irrigation implements like tank, pipe fittings and electric motor etc.	1 job	L.S.	0	4200
7	Proportionate cost for providing chowkidar hut	1 job	L.S.	0	2000
	Total Material cost (B)				43877
C. Chain Link Fencing Work					
1(a)	Cost of 2m high RCC pole @ 2.5m c/c (140x1.1)/2.5=62	62	296.3/no.	0	18370.60
1(b)	GST@18%	Rs 18370.6	0.18	0	3306.70
2(a)	Cost of barbed wire in five strands (141x5)/7=100	100 Kg	90 Rs /kg	0	9000.00
2(b)	GST@18%	9000	0.18	0	1620.00

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Sl.No.	Particular of Work	Quantity	Rate/Man days per unit	Total Man days	Total Amount
3(a)	Cost of U-nails	10 Kg	90 Rs /kg	0	900.00
3(b)	GST@18%	900	0.18	0	162.00
4(a)	Cost of GI wire	3 Kg	100 Rs /kg	0	300.00
4(b)	GST@18%	300	0.18	0	54.00
5	Cost of labour for stretching and fixing barbed wire and other miscellaneous work	141	0.16 Man days / RM	6.56	1521.90
6	Excavation of pit for poles	62	2.5 mandays/100 No.	1.55	359.60
7	Cost of fixing poles in pit with PCC 1:3:6 mix	2.32 m3	3643/m3	0	8451.80
8	Erection of poles	62	Rs 80/ Pole	0	4960.00
	Total Fencing cost (C)				49006.60
	Total Cost First year				112812.40
Second Year - Plantation Work					
A. Labour Oriented Works					
1	Carriage of plant raised in nursery over a distance of 45 Km	1210 No.	170/100 No.	0	2057.00
2	Carriage of plants from road side to plantation site by manual labour up to 2 Km	1100	0.4Mandays/100 No	4.4	1122.00
3	Planting saplings in pits	1100	1.8 Man days/100 No	19.8	5049.00
4	Carrying out first weeding, nirai operations and application of fertilizer and pesticides including replacing of dead plants of previous year	1100	1.25 mandays/100 No.	13.75	3506.25
5	Carrying out second weeding, nirai operations and application of fertilizer and pesticides including replacing of dead plants of previous year	1100	1 mandays/100 No.	11	2805.00
6	Spraying pesticides and insecticides	1100	0.6 mandays/100 No.	6.6	1683.00
7	Applying Irrigation	1 job	L.S.	0	1600
8	Clearing of Fire lines	180 RM	2.25 mandays/Km	0.41	104.55
	Total Labour oriented Works cost (A)				17926.80
B. Material Component					
1	Cost of fertilizer (DAP/Urea) and Pesticides @ 40g and 10g / plant respectively	55 Kg	24 Rs/kg	0	1320
2	Cost of Diesel for Irrigation	1 Job	L.S.	0	1000
3	Contingency	1 Job	L.S.	0	200
	Total Material Component Cost				2520

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Sl.No.	Particular of Work	Quantity	Rate/Man days per unit	Total Man days	Total Amount
	(B)				
	Total Second Year				20446.80
Third Year - Maintenance					
A. Labour Oriented Works					
1	Repair of fencing	1 ha.	2 mandays/ha.	2	560.00
2	Cost of replacing of dead plants(10% mortality)	110	Rs 15 /No.	0	1650.00
3	Carriage of plant raised in nursery over a distance of 45 Km	110 No.	170/100 No.	0	187.00
4	Carriage of plants from road side to plantation site by manual labour upto 2 Km	110	0.4Mandays/100 No	0.44	123.20
5	Carrying out first weeding, nirai operations and application of fertilizer and pesticides including replacing of dead plants of previous year	1100	1.25 mandays/100 No.	13.75	3850.00
6	Carrying out second weeding, nirai operations and application of fertilizer and pesticides including replacing of dead plants of previous year	1100	1 mandays/100 No.	11	3080.00
7	Spraying pesticides and insecticides	1100	0.6 mandays/100 No.	6.6	1848.00
8	Applying Irrigation	1 job	L.S.	0	1600
9	Clearing of Fire lines	180 RM	2.25 mandays/Km	0.41	114.80
	Total Labour oriented Works cost (A)				13013.00
B. Material Component					
1	Cost of fertilizer (DAP/Urea) and Pesticides @ 40g and 10g / plant respectively	55 Kg	24 Rs/kg	0	1320.00
2	Cost of Diesel for Irrigation	1 Job	L.S.	0	1000.00
3	Contingency	1 Job	L.S.	0	200.00
	Total Material Component Cost (B)				2520.00
	Total Third Year				15533.00
Fourth Year - Second year of Maintenance					
A. Labour oriented works					
1	Carrying out first weeding, nirai operations and application of fertilizer and pesticides including replacing of dead plants of previous year	1100	1.25 mandays/100 No.	13.75	4235.00
2	Applying Irrigation	1 job	L.S.	0	1950.00

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Sl.No.	Particular of Work	Quantity	Rate/Man days per unit	Total Man days	Total Amount
3	Watch and ward	1 job	L.S.	0	3000.00
	Total Labour oriented Works cost (A)				9185.00
B. Material Component					
1	Cost of Diesel for Irrigation	1 Job	L.S.	0	1100.00
2	Contingency	1 Job	L.S.	0	200.00
	Total Material Component (B)				1300.00
	Total Fourth Year				10485.00
Fifth Year - Third year of Maintenance					
A. Labour oriented works					
1	Fencing repair	1 ha.	2 mandays/ha.	2	678.00
2	Watch and ward	1 job	L.S.	0	3300.00
	Total Labour oriented Works cost (A)				3978.00
B. Material Component					
1	Contingency	1 Job	L.S.	0	220.00
	Total Material Component Cost (B)				220.00
	Total Fifth Year				4198.00
Sixth Year - Fourth year of Maintenance					
A. Labour oriented works					
1	Watch and ward	1 job	L.S.	0	3600
	Total Labour oriented Works cost (A)				3600
B. Material Component					
1	Contingency	1 Job	L.S.	0	240
	Total Material Component Cost (B)				240
	Total Sixth Year				3840
Seventh Year - Fifth year of Maintenance					
A. Labour oriented works					
1	Watch and ward	1 job	L.S.	0	2100
	Total Labour oriented Works cost (A)				2100
B. Material Component					
1	Contingency	1 Job	L.S.	0	300
	Total Material Component (B)				300
	Total Seventh Year				2400

Abstract of Cost of Plantation and Maintenance	
First year-preparation	112812.40
Second Year-Plantation	20446.80
Third year-First year of Maintenance	15533.00
Fourth year-Second year of Maintenance	10485.00
Fifth year-Third year of Maintenance	4198.00
Sixth year-Fourth year of Maintenance	3840.00
Seventh year-Fifth year of Maintenance	2400.00
Total Cost	169715.20

Sl.No.	Particular of Work	Quantity	Rate/Man days per unit	Total Man days	Total Amount
					Say Rs 1.70 Lakh/ha.

Table **Error! No text of specified style in document.**.9: Cost Estimate for Afforestation Measures

watershed	Area under Afforestation (Ha.)	Cost @ Rs. 1.70lakh/- ha. (Rs. in lakh)
Saraswati Catchment	50	85

COST ANALYSIS OF DIFFERENT WORKS UNDER SOIL AND WATER CONSERVATION MEASURES

Cost Analysis of Vegetative Structure, Civil Structures for Land Slide and Stream Bank Stabilization and Moisture Retention Operations

These structures are to be constructed as landslide control and stream bank stabilization over visually active slides and eroded banks of the main river and its tributaries falling under "Severe" erosion intensity areas to control the sediment flow and further degradation of the free draining catchment areas. Since these measures are to be carried out by construction of individual structure such as wire crate spurs, check dams, contour staggered trenches, catch water drains, retaining walls etc. on site specific basis, the cost of each of such structure must be analyzed on the basis of dimensions adopted. The analysis of rates of such structures is presented in Table 5.11.

Table **Error! No text of specified style in document.**.10: Cost Analyses of Structures

S. No.	Item	Quantity	Unit	Rate	Amount
1.	Dry Rubble Stone masonry (DRSM) Check Dam				
(a)	Excavation in foundation with 50% soft rock and 50% E and B involving peak and jumper work in 5.60 m x 1.80 m x 0.50 m = 5.04 cubic meter	5.04	Cum	224.88	1133.39
(b)	Collection of boulder	23.52	Cum	175.25	4121.88
	I-Step 5 x 1.5 x 1.25 = 9.38				
	II – Step 7 x 1.0 x 0.75 = 5.25				
	Wing Walls 2 x 3.75x 0.6 x 1.5 = 6.75 Total 21.38 x1.1= 23.52				
(c)	Carriage of boulder by manually beyond initial 100 m lead up to 1 km	21.38	Cum	561.00	11994.18
(d)	Labour charges for dry stone masonry with outer face stone dressed and 100 m lead.	21.38	Cum	277.50	5932.95
				Total	23182.40
				Add 3% Contingencies	695.47
				Grand Total Rs.	23877.87
				Say Rs.	24000.00

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S. No.	Item	Quantity	Unit	Rate	Amount
2.	Wire Crate Check Dam				
(a)	Excavation in foundation with 50% soft rock and 50% E and B involving peak and jumper work in 6.60 m x 2.30 m x 0.50 m = 7.59 cubic meter	7.59	Cum	224.88	1706.84
(b)	Collection of boulder	35.24	Cum	175.25	6175.81
	Foundation Step - 6.0 x 2.0 x 1.0 m = 12 cubic meters				
	I- Step - 6.0 m x 1.9m x 1.0m = 11.40 cubic meter				
	II- Step – 6.0 m x 1.8m x 0.8 m = 8.64 cubic meter				
	Total requirement of boulder = 32.04 x 1.1 = 35.24 cubic meter				
(c)	Carriage of boulder manually average lead 1 km	32.04	M^3	561.00	17974.44
(d)	Weaving of wire netting of GI wire mesh size 15 cm x 15 cm	113.2	M^2	21.75	2462.10
	Foundation Step-2(6x2+6x1+2x1) = 40 m^2				
	I- Step-2(6x1.9+6x1+2x1) = 38.8 m^2				
	II- Step- 2(6x1.8 + 6x0.8 + 2x0.8) = 34.4 m^2				
	Total = 113.2 m^2				
(e)	Filling of boulder and hand packing in wire crates	32.04	M^3	144.25	4621.77
(f)	Cost of GI wire	2.25	Qtl	8000	18000.00
(g)	Carriage of GI wire manually to an average lead of 1 km	2.25	Qtl	83.50	187.88
				Total Rs.	51128.84
				Add 3% Contingencies	1533.86
				Grand Total Rs.	52662.70
				Say Rs.	52700
3.	RR Dry stone masonry / RM Average dimension = 5 m long, 2m high and side slope 1:4				
a.	Excavation in foundation with 50% soft rock and 50% E and B 5 x 1.10 x 0.3 = 1.65	1.65	Cum	224.88	371.05
b.	RR stone masonry dry 5 x (1.10 + 0.60 / 2) x 2.0 = 8.5 cum	8.5	Cum	277.50	2358.75
				Total	2729.80
				Add 3% Contingencies	81.89
				Grand Total	2811.69
				Or say	2800.00
				Total	15725.00
4.	Contour staggered trenches ,0.45mx0.45m / R.M.	1	R.M	31.79	31.79
				Say	32.00

Abstract of Works under Civil Structures

The Break-up of works under different sub-watersheds in respect of vegetative structure, civil structures for land slide and stream bank stabilization and moisture retention operations with their costs is shown in Table-5.12.

Table.11: Abstract of Works under Civil Structures

DRSM check dam @ Rs. 0.24 lakh each		Wire Crate Check Dam @ Rs. 0.527 lakh each		Contour Staggered Trenches@Rs32/m		Total Cost (Rs. lakh)
Number	Cost	Number	Cost	Meter	Cost	
35	8.40	7	3.69	2400	0.77	21.39

Cost of Other Components of CAT Plan

Apart from the forestry works and drainage line treatment in the catchment area there are other aspects of the CAT Plan to be addressed and their cost included in the overall cost estimate of the plan. The eco-restoration works, documentation and publication, monitoring and evaluation and providing environmental services are some of the integral ingredients, which have to be considered and included while formulating the CAT plans.

Implementation of Support Infrastructure Cost

In order to execute the catchment area treatment plan, the forest department would be requested to establish a catchment area treatment cell for which the executing agency shall need necessary infrastructure support. Accordingly, provisions have been made for purchase of office equipment. The cost of works proposed under the head works out to Rs. 1.50 lakh and is shown in Table-5.13.

Table **Error! No text of specified style in document.**.12: Cost Estimate for Support Infrastructure

S. No.	Particular	Quantity	Unit	Rate (Rs. Lakh)	Amount (Rs. Lakh)
1	Purchase of Computers complete with accessories and Laser printer	1	No.	1.00	1.00
2	Purchase of Fax Machine	1	No.	0.10	0.10
3	Purchase of GPS and Survey instruments	LS	-	-	0.40

Full Title of Project: - Construction of Adi Badri Dam on Somb Nadi and its piped link to Sarasvati Nadi and Sarasvati Reservoir
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S. No.	Particular	Quantity	Unit	Rate (Rs. Lakh)	Amount (Rs. Lakh)
	Total				1.50

Provision for Micro Plans

Based on the ground truth reality in each of the village forest department committee or society under different sub-watersheds, comprehensive micro plan for execution of the work must be prepared as per norms. The micro plan for each beats of sub-watershed shall be prepared in consultation with the members of concerned VFDCs with due regards to the environmental functions and productive potential of the forests and their carrying capacity. For this purpose, a provision of Rs. 0.50 lakh is being made.

Provision for Proper Documentation

Emphasis should be laid on the publicity of the work proposed under the plan and work carried out on annual basis so that transparency is maintained and proper documentation of the work is carried out for future reference, and testing the efficacy of the work in due course of time. On this count, a provision of Rs. 0.50 lakh is proposed. The documentation would inter alia include implementation report, progress reports, photography, videography etc. Publication of the work done may be distributed to concerned panchayat and village Forest Development Committees/Societies for wider dissemination.

Provision for Monitoring and Evaluation

The success of implementation of a CAT Plan can be fathomed by increase in vegetal cover on hill slopes and the enhancement. Various engineering and biological measures have been aimed at treating degraded and potential areas of severe to very severe soil erosion by increasing soil holding capacity and thus reducing sediment flow in the water. Therefore, for recording soil and silt data at regular intervals one small laboratory/observatory shall be established at dam site, where the regular discharges of the streams and silt samples shall be monitored twice a day for ten years.

A close watch on annual basis shall be maintained in respect of such areas where habitat improvement works have been carried out to verify the work executed on site itself and also to ascertain the rate of survival of plants and / or any damage to the new work. For monitoring of works under forestry operation, the use of remote sensing technique by using digital satellite imagery of IRS P6 LISS-VI with high resolution should be made obligatory. The monitoring through satellite scene should be done before commencement of works under CAT plan and in a block of two years after completion of CAT plan. The work of monitoring of various works under the CAT plan should be entrusted to an external

agency which has long experience of carrying out similar work on land use data and evaluating environment impact.

A provision of Rs. 1.50 lakhs being made for monitoring and evaluation activities including the expenditure likely to be incurred on conducting meetings / seminar / workshops at the head quarter and outside. This will include payments made to the non-official members of the monitoring evaluation committee on accounts of their expenditure on traveling and boarding etc. The payment to the external agencies shall also be met out from this part.

Provision for Providing Environmental Services

A provision of Rs.3.00 lakhs being made under this sub-head for carrying out such works, which enhance the environmental status and reduce the adverse impact on the environment and ecology. Funds for identified and approved activities for Payment for Environmental Services have also been provided under this component. The scheme inter-alia includes construction of contour trenches, incentives for fire protection on private as well as on government land/forests, provision of funds for live hedge fence on land and Payment for Environmental Services as per approved Forest Department activities and norms.

Fire management and control plan expenditure for the catchment area will be done under the PES Component. For success and survival of bioengineering plantations, protection against the fire will also be very important. In general protection against forest fire hazards and incidents following indicative action points are proposed to manage and control fire in the catchment area;

- To prevent and tackle fire incidences awareness campaign against the fire hazards and involvement of local people in controlling and prevention of fire incidences to be ensured.
- Identification of sensitive hot spots on past record and accordingly increased patrolling by deploying of appropriate manpower during fire-season.
- Maintenance of fire-lines as per the Working Plan.
- Winter control burning to be ensured as per the Working Plan.
- Strengthening of communication network to ensure timely and immediate response to tackle fire incidences.
- Enforcing fire rules and regulations especially during the fire season.
- Need based fire equipment be purchase and to be kept at appropriate places.
- Fire watchtowers and fire huts to house equipment and manpower during fire season be constructed based on requirement after getting approval from the Conservator of Forests.

Necessary veterinary assistance by providing medicines and other support to maintain hygiene and health of the animal stock based on the suggestions of local veterinary office will be provided at pre-identified sites along with time schedule to be worked out as per the migration period/ time. The cost

of medicines and other assistance based on realistic assessment and inputs from Veterinary Office/ Department will be charged to PES.

Provision for Forest Protection

The need for rigorous watch and ward of the forest covered under the catchment area becomes more imperative in view of proposed new plantation under the CAT plan and due to increased human activity in the form of labour, who shall be engaged for forestry works. Thus, fire protection measures including construction and maintenance of fire lines, construction of check-posts, watch towers must be

undertaken. Besides these construction / repair of forest, boundary pillars shall also be carried out. The forest staff shall have to be properly equipped with modern utility gadgets like walky-talky, GPS and fire-fighting equipment's. For these a provision of Rs. 1.00 lacs is being earmarked.

INSTITUTIONAL MECHANISM

Role of Project Proponent

The Forest department would implement the Catchment Area Treatment Plan. A joint inspection group is suggested that would include officers drawn from State Forest Department and officials from the Environment Cell of state Water Resources Department. The management will have liaison with the forest officials. As far as the financial disbursement to undertake activity, involvement of various stake holders and collaborative public participation should be encouraged to have transparency in the system.

CAT Implementation

The designated Environmental Officer of state Water Resources Department would coordinate with the forest department for the implementation of the proposed Plan. The Environment Officer would evaluate/monitor financial aspects. The modalities of financial disbursement need to be worked out. The implementing agency shall submit completion certificate in the light of guidelines fixed by the state Forest Department. The implementation of CAT Plan should have enough flexibility and should be subject to changes as per requirements of specific ecosystem and periodic gains.

Project Monitoring and Reporting Procedures

Meetings would be held every three months to resolve problems arising in plan implementation. A Joint committee may be formed with the Environment Cell of Project Proponent and State Forest Department; the team members must ensure implementation and monitoring of the CAT works and review the progress from time to time. Quarterly progress reports and completion certificates would be submitted to Project Proponent for evaluation and disbursement of finance. In addition, the work done should be published through public awareness campaigns. Visual and print media may be used. Such efforts would resolve conflicts which otherwise are potential sources for project delays.

Full Title of Project: - Construction of Adi Badri Dam on Somb Nadi and its piped link to Sarasvati Nadi and Sarasvati Reservoir

File No: - FP/HP/IRRIG/155846/2022

Date of Proposal: - 26.05.2022

SUMMARY OF COST OF WORKS

The cost of all works proposed in the CAT plan is enumerated in Table-5.14.

Table **Error! No text of specified style in document.**.13: Cost Estimate of CAT Plan

S. No.	Particulars	Amount (Rs. In Lac)
1.	Habitat treatment works under free draining catchment	
(a)	afforestation (50 ha @ Rs. 170000/ ha)	85.00
	Sub- total (1)	**85.00**
2.	Soil and water conservation measures	
(a)	DSRM check dam (45 no. @Rs 24000/ha each)	10.80
(b)	Wire crate check dam (10 no. @ Rs 52700/each)	5.27
(c)	Contour staggered trenches (2.90km @Rs 32/km)	0.93
	Sub- total (2)	**17.00**
3	Other Components of CAT Plan	
(a)	Implementation of Support Infrastructure Cost	1.50
(b)	Provision for Micro Plan	0.50
(c)	Documentation	0.50
(d)	Provision for Monitoring and Evaluation Activities	1.50
(e)	Provision for providing Environmental Services	3.00
(f)	Forest Protection	1.00
	Sub- total (3)	**8.00**
	Grand Total.	**110.00**

Full Title of Project: - Construction of Adi Badri Dam on Somb Nadi and its piped link to Sarasvati Nadi and Sarasvati Reservoir

File No: - FP/HP/IRRIG/155846/2022

Date of Proposal: - 26.05.2022

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	Sub- total (2)	**17.00**
3	Other Components of CAT Plan	
(a)	Implementation of Support Infrastructure Cost	1.50
(b)	Provision for Micro Plan	0.50
(c)	Documentation	0.50
(d)	Provision for Monitoring and Evaluation Activities	1.50
(e)	Provision for providing Environmental Services	3.00
(f)	Forest Protection	1.00
	Sub- total (3)	**8.00**
	Grand Total.	**110.00**

Executive Engineer
Sarasvati Heritage Div. No. 1
Jagadhri

Full Title of the Project: Construction of Adi Badri Dam
File No: FP/HP/IRRIG/155846/2022
Date of Proposal: 26.05.2022

UNDERTAKING FOR SUBMISSION OF FRA CERTIFICATES

It is to certify that I Sub Divisional Officer, Sarasvati Heritage Sub Division No. 2, Canal colony Jagadhri, have applied for diversion of 31.72 ha. of forest area for the purpose of construction of Adi Badri Dam of Somb Nadi and its piped link to Sarasvati River and Sarasvati Reservoir.

I hereby undertake to submit the complete FRA certificates before S-II including proceedings of Gram Sabha and FRC of Bheron village.

Sub Divisional Officer,
S. H. S/Division No.2,
Jagadhri

Place: Jagadhri
Date: 26.02.2024

Full Title of Project: - Construction of Adi Badri Dam on Somb Nadi and its piped link to Sarasvati Nadi and Sarasvati Reservoir
File No: - FP/HP/IRRIG/155846/2022
Date of Proposal: - 26.05.2022

MUCK MANAGEMENT PLAN

1. INTRODUCTION

The project envisages construction of a concrete gravity dam of 101.06 m length and 37.5 m hight from foundation level on Somb River in the territory of Himachal Pradesh. Large quantity of material would be excavated from the foundation, abutments and other appurtenant works. Muck generated from excavation of any project component is required to be disposed in a planned manner so that it takes a least possible space and is not hazardous to the environment.

2. MUCK GENERATION

In the proposed project, muck generation is envisaged during excavation of foundation and abutments. The muck generation and disposal are given in **Table-1.**

Name of the Project	Quantity of muck generated (in cum)	Quantity of muck with 25% swell factor (in cum)	Total quantity if muck/debris including swell factor (in cum)	Estimated quantity of muck/debris proposed to be utilized (in cum)	Estimated quantity of muck/debris proposed to be dumped (in cum)	Name of the dumping site	Capacity of Dumping site (in cum)
Adi Badri Dam	110000	27500	137500	33000	104500	Kathgarh (Haryana)	119320

3. DUMPING SITE

The following points were considered and followed as guidelines for finalization of the areas to be used as dumping sites:

i) The dumping sites have been selected as close as possible to the project area to avoid long distance transport of muck.

ii) The sites are free from active landslides or creep and care has been taken that the sites do not have a possibility of toe erosion and slope instability.

iii) The dumping sites are either at higher level than the flood level or are away from the river course so that the possibility of muck falling into the river is

avoided.

iv) There is no active channel or stream flowing through the dumping sites.

v) The sites are far away from human settlement areas.

The selection of muck disposal sites was done based upon site inspections and available best conditions of the land availability, land stability, accessibility, sloping

pattern, no vegetative and tree cover, away from any ecological sensitive area, river bed conditions and away from high flood levels of the Somb river and its tributaries. After surveys suitable site was identified and dumping site is located on the right bank of Somb River in the Panchayat land of village Kathgarh District Yamunanagar Haryana. The proposed location is spread over land area of **approx 1.8 ha**. All possible alternate sites were inspected and examined before rejecting or selecting any site. The dumping site:

i) have no forest cover,
ii) the settlement areas are far away from the identified dumping sites so as to have least impact on human life,
iii) the proposed dumping sites are located at a distance varying from 60m to 70m away from the HFL at these sites as all the dumping sites are at a higher level than the flood level from the river course to provide protection from high flood, and
iv) The identified muck sites are close to the sites from where muck is to be generated to avoid hazards related to transport of muck to long distances.

4. DUMPING PROCESS & REHABILITATION

The generated muck will be carried in dumper trucks covered with heavy duty tarpaulin properly tied to the vehicle. All precautionary measures will be followed during the dumping of muck. All dumpers will be well maintained to avoid any chances of loose soil from being falling during the transportation. Dumping would be avoided during the high speed wind, so that suspended particulate matters (SPM) level could be maintained. Further, the dumping will be avoided during heavy traffic. After the dumping the surface of dumps will be sprayed with water with the help of sprinklers and then compacted.

The muck brought by dumpers will be spread in layers and then compacted by rollers till the top level is achieved. The process shall be repeated up to 50 cm level below the desired height which shall be laid with good soil for providing grass cover. The muck disposal area will ultimately be covered with fertile soil and suitable plants

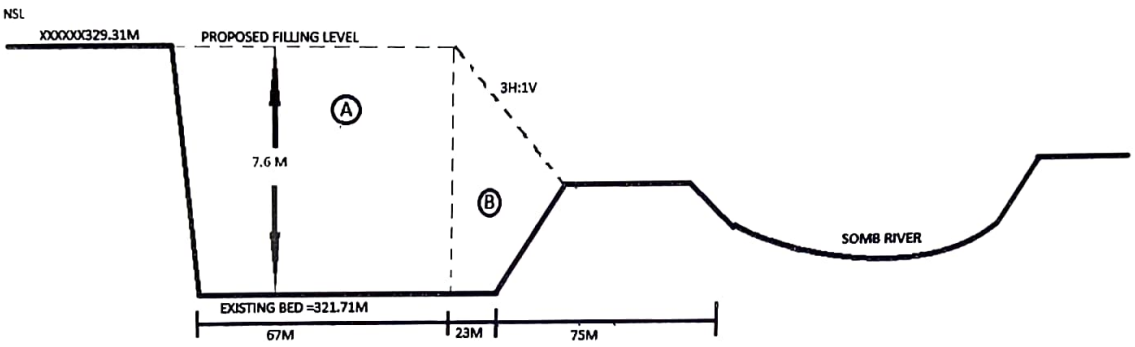
will be planted adopting suitable bio-technological measures. The project authorities would ensure that the dumping yards blend with the natural landscape by developing the site with gentle slope. These sites can also be developed later as recreational parks and tourist spots with sufficient greenery by planting trees.

All measures would be adopted to ensure that the dumping of muck does not cause injury or inconvenience to the people or the property around the area. The spillage of muck into the river at any site would be prevented by ensuring that dumping is carried out at a minimum distance of 50 m away from the active river bank. The top surface would be leveled and graded after the capacity of any dumping site is exhausted. The top surface will be covered with soil. Plantation at the dumping site will be done along with the participation of The State Forest department.

Sub Divisional Officer
Sarasvati Heritage Sub Division No. 2
Jagadhri

Saurabh
Divisional Forest Officer,
Nahan Forest Division,
Nahan, H.P.

SECTION OF PROPOSED DUMPING SITE



1.VOL OF (A) = 67X7.6X200 = 101840 CUM
2. VOL OF(B)= $\frac{1}{2}$ X23X7.6X200 =17480 CUM
3.TOTAL VOL = 119320 CUM

LOCATION - VILLAGE KATHGARH, DISTT. YAMUNA NAGAR, HARYANA

AREA OF LAND - 1.80 Ha.

DISTANCE FROM PROJECT SITE - Approx. 3.5 KM D/S

LAND OWNERSHIP - PANCHAYAT

Sub Divisional Officer
Sarasvati Heritage Sub Division No. 2
Jagadhri

Executive Engineer
Sarasvati Heritage Division No. 1
Jagadhri

Divisional Forest Officer,
Nahan Forest Division,
Nahan, H.P.

F. No. J-12011/20/2018-IA.I (R)
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)

2nd floor, Vayu Block,
Indira Paravaran Bhawan,
Aliganj, Jor Bagh Road,
New Delhi - 110 003

Dated: 12th October, 2022

To,

The Sub Divisional Officer
Sarasvati Heritage Sub Division No. 2
Irrigation & Water Resources Department
Government of Haryana
Jagadhri - 135001, Haryana
E-mail Id: xenshdjdr@gmail.com

Sub: Adi Badri Dam on Somb Nadi and its piped link to Saraswati Nadi and Saraswati Reservoir, Dist. - Yamunanagar, Haryana by M/s Irrigation and Water Resources Department, Haryana - reg.

Madam/ Sir,

This has reference to your letter dated 11.11.2019 submitting proposal for grant of Terms of Reference for conducting EIA study for proposed construction of Adi Badri Dam on Somb Nadi and its piped link to Saraswati Nadi and Saraswati Reservoir, Dist. - Yamunanagar, Haryana by M/s Irrigation and Water Resources Department, Haryana to obtain prior Environmental Clearance under the provisions of the EIA Notification, 2006, as amended.

2. Following information has been submitted by the project proponent:

i. In order to restore water of Somb Nadi to Saraswati Nadi, it is proposed to construct Adi Badri Dam on Somb Nadi and its piped link to Saraswati Nadi and Saraswati reservoir. Adi Badri dam reservoir and Saraswati reservoir would help in recharging the ground water in Himachal Pradesh and Haryana. Recharge will also take along the course of Saraswati Nadi.
ii. The project involves construction of 33.4 m high and 160 m long dam and a pipe link of length of 8.82 km to Saraswati reservoir having a capacity of 861 ha-m. The catchment area of Somb Nadi up-to Adi Badri dam is about 29.50 km.
iii. About 31.16 ha of forestland diversion is involved.
iv. There is no displacement of family in the project and land required for pipelink.
v. The Saraswati reservoir is already in possession. The **Kalesar Wildlife Sanctuary** is approximately 8.529 km from the dam site.
vi. The estimated cost of the project is about Rs.108.70 crores.
vii. It was also mentioned that the proposed project is not a direct irrigation project. The outcome of the project is rejuvenation of Saraswati Nadi, flood control and ground water recharge.

viii. It was observed by the EAC that project aimed for the purpose of revival of Saraswati Nadi as a heritage project with following additional benefits

a. Ground Water Recharge
b. Flood Control
c. Fish Farming
d. Recreation/Tourism

ix. The project proponent has submitted the project component details as under: -

Sr.no	Particulars		Details
1.	Submergence upto FRL of 344.0 m	:	14.38 ha
2.	Submergence upto 345.388 m level for 25 years return period flood routing. (for acquiring landed property)	:	16.04 ha
3.	Level upto which built up property to be acquired (Level attained during 50 year return period flood)	:	345.515 m
4.	No. of villages whose abadi would fully or partially submerged	:	Nil
5.	Total land required for the Reservoir, Somb Sarasvati Barrage and its Appurtenant works and Somb Sarasvati Link Channel	:	For Somb Sarasvati Barrage and appurtenant work, colonyandrest house =20 ha For pipeline 2.86 ha (equivalent land) Sarasvati Reservoir = 109 ha Total = 131.1 ha (324 acre)
6.	Transmission lines	:	Only some LT lines of tube wells would need relocation. One 66 KV HT line in the Sarasvati Reservoir area will also need shifting.
8	Length of embankments and quantity of stonework required:		
a)	Length of embankments & guide bunds	:	(For equivalent section of 12.4 m,(otherwise length will be more) = 500.0 m
b)	Quantity of stone needed	:	5420 Cum
c)	Quantity of Filter material needed		2710 cum
d)	Stone needed for Somb Sarasvati Barrage	:	2600 Cum (approximately)
9	Roads submerged	:	Nil
10	Tube wells submerged	:	These will come with the land to be acquired
Somb Sarasvati Barrage and its Appurtenant works:			

i)	No. of bays		10 (with breast wall type gates)
ii)	Width of each bay	:	6.0 m
iii)	Width of Piers	:	2.0 m

iv)	Crest level	:	339.0 m
v)	Top of pier	:	348.0 m
vi)	Gate size	:	6.0 m x (5.0 + 0.15 F.B.)
vii)	FRL	:	344.0 m
11	System for stop logs:		
i)	2 or 3 piece stop logs		
ii)	Monorail crane for lifting of stop logs		
7.2	Bridge over the barrage	:	Two way bridge with carriageway of 7.50 m.
12	Head Regulator for Somb Sarasvati Link Channel:		
i)	No. of bays	:	2 (breast wall type gate arrangement)
ii)	Width of each bay	:	3.0 m
iii)	Width of Pier	:	1.5 m
iv)	Crest Level	:	337.5 m
v)	Bottom level of breast wall	:	340.0 m
vi)	Discharge	:	50 cumecs (maximum)
13	Conveyance pipeline from SSB Reservoir to S.R Reservoir:		
i)	Length of pipeline	:	7120 m + 450 m (for branch line)
ii)	Diameter of pipe	:	1000 mm
iii)	No. of pipes	:	2
iv)	Type of pipe material	:	RCC pressure pipe of P1 class for 1825 m andof P2 class for5500 m and MS pipe for end 20 m.
v)	FSL at head	:	339.5 m (for design of pipeline)
vi)	FSL at Tail	:	332.0 m (FSL at Sarasvati Reservoir)
14	Sarasvati Reservoir:		
14.1	Area of Panchayat land of villages of Rampur Heriyan, Rampur Kamboyan and Chhalaur proposed to be used for Sarasvati Reservoir	:	269.0 acres
14.2	Sarasvati reservoir levels:		
i)	Bed Level	:	312.50 m
ii)	MDDL	:	313.40 m
iii)	FRL/ MWL	:	332.0 m
iv)	Top of level of embankment	:	333.50 m

v)	Length of embankment along its center line	:	4.92 km
14.3	Sarasvati Reservoir Areas and Capacities:		
i)	Area at El. 312.5 m	:	61.1388 ha (151.07 Acres)
ii)	Area at FRL/ MWL at el 332.5 m	:	90.1763 ha (222.83 Acres)
iii)	Area at top of Embankment (inner edge)	:	92.410 ha (228.35 Acres)
iv)	Slope area from 312.5 m to 332.0 m	:	29.0375 ha
v)	Slope area as percentage of total reservoir area at FRL	:	32.20%
vi)	Reservoir capacity without excavation		774.44 Ha-m
vii)	Capacity of Sarasvati reservoir at FRL without excavation (But by using 2312000 cum earth on embankment and for SSB bunds	:	1000.0 ha- m
viii)	Capacity of the Sarasvati reservoir at FRL with excavation upto El. 312.5 m	:	1475.33 ha- m
ix)	Dead storage capacity of Sarasvati reservoir		69.50 Ha-m
x)	Live storage capacity of Sarasvati Reservoir		1405.83 Ha-m (1475.33-69.50)
xi)	Reservoir losses from 1 st October to 31 st May	:	119.24 Ha- m (When Adi Badri Dam will be in position.)
xii)	Availability of water from the Sarasvati Reservoir from 1 st October to 31 st May		1286.59 ha- m (1405.83-119.24) or 21.5 Cs during this period (at 50% dependability) [if Adi Badri Dam will be constructed]
xiii)	Reservoir losses for whole year		196.25 ha-m (If Adi Badri Dam not constructed)
xiv))	Availability of water for whole year if Adi Badri Dam is not constructed.	:	894 ha-m or 7.80 Cs (at 50% dependability) without Adi Badri Dam)
14.4	Excavation and its uses:		

i)	Total excavation required for attaining bed level of 312.50 m	:	701.45 ha- m = 70.145 lac cum
ii)	Reservoir excavated earth to be used on Sarasvati Reservoir Embankment	:	20.425 lac cum
iii)	Reservoir excavated earth to be used on Somb Barrage Reservoir embankments	:	2.695 lac cum
iv)	Balance earth to be disposed off 'anywhere'	:	47.025 lac cum
v)	Quantity of stone needed for	:	94632 Cum

	Sarasvati Reservoir		
	(Total quantity of stone needed for the project = 5420 + 2600 + 94632 =1,02,652 Cum)		
	Filter material for whole project = 2710 + 47181 = 49891 cum		

3. The proposal was earlier considered by the EAC (River Valley & Hydro-electric) in its meeting 17th & 24th held on 27.08.2018 & 27.05.2019 respectively. The EAC (River Valley & Hydro-electric) observed that the instant project does not involve any components of irrigation/hydropower generation which are listed in the 1(c) of the Schedule of EIA, Notification, 2006, as amended. The EAC, based on the information available found that the project involves infrastructure development. The above project activity in the present form may not be considered in Category 1(c) by this committee and therefore the same was returned as it does not require EC under 1(c) of the Schedule of EIA, Notification, 2006.

Since this project site is close to archaeologically important area as well as ecologically sensitive zones and as the proposed project which involves construction of barrage with change in the flow pattern in the downstream and resultant change in the ecology, it was felt that this project must be appraised by the Ministry for studying the environmental implications of the proposed barrage construction on entire river eco-system including environmental flow, downstream uses as well as change in upstream ecology. Accordingly, it was decided that the Joint Committee (River Valley & Hydro-electric and Infrastructure-II) will examine the environmental implications associated with project that involve creation of infrastructure in the river with respect to these projects and to suggest appropriate mitigation measures. Accordingly, the Joint Committee has deliberated on the proposal in its meetings held on 16.02.2021, 16.09.2021 and 17.05.2022 respectively, and suggested Environmental Safeguard Measures for sustainable implementation of the proposed construction of Adi Badri Dam and its piped link to Sarasvati River & Sarasvati Reservoir. Based on the suggestions of Joint Committee, Ministry hereby suggested following environmental safeguard measures for sustainable implementation of the proposed project:

A. Environmental Management:

i. Monitoring stations for regular monitoring (Monsoon Season and Post Monsoon Season) of various environmental parameters viz., Water Quality, Ambient Air Quality and Noise levels as per the prescribed guidelines at designated locations (Surface water quality at two locations of Somb nadi U/s of Adi Badri Dam and 2 locations of Sarswati Reservoir D/s of Adi Badri dam) may be installed.

ii. Appropriate Air Pollution Control (APC) system should be in place for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed standards.

iii. Necessary control measures such as water sprinkling arrangements, etc. should be taken up to arrest fugitive dust at all the construction sites.

iv. The Environmental flow in the Somb River for the project should be maintained as per the direction given by the Hon'ble NGT vide its Order dated 09.08.2017 in the matter of Pushp Saini Verses Ministry of Environment, Forest & Climate Change to preserve the ecosystem of the Somb River and it may become a perennial resource.

v. A detailed plan should be prepared and implemented in consultation with IARI for watersheds development in the catchment area of Somb River (up to its confluence with Yamuna River) and identified stretch of Sarawasti River for long term survival of both rivers.

vi. All the equipment likely to generate high noise should be appropriately enclosed or inbuilt noise enclosures be provided to meet the ambient noise standards as notified under the Noise Pollution (Regulation and Control) Rules, 2000, as amended in 2010 under the Environment Protection Act (EPA), 1986.

vii. The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.

viii. Necessary steps should be under taken to control growth of weeds like Bolivia, water hyacinth, etc in reservoir area.

B. Waste management

ix. Muck disposal be carried out only in the approved and earmarked sites. The dumping sites should be located sufficiently away from the HFL of the river. Efforts be made to reuse the muck for construction and other filling purposes and balanced be disposed of at the designated disposal sites. Once the muck disposal sites are inactive, proper treatment measures like both engineering and biological measures be carried out so that sites are stabilized quickly.

x. Restoration of construction area including dumping site of excavated materials should be ensured by levelling, filling up of burrow pits, landscaping etc. The area should be properly treated with suitable plantation.

xi. Sanitation and Solid Waste Management Plan for domestic waste from colonies and labour camps etc. should be prepared and implemented in consultation with public health department. Land filling of plastic waste should be avoided. Efforts be made to avoid one time use of plastics.

C. Green Belt and Wildlife Management

xii. Wildlife Conservation & Management Plan for conservation and preservation of endemic, rare and endangered species of flora and fauna including the measures for free movement

of wild animals should be prepared and implemented in consultation with State Forest Department after approval of Principal Chief Conservator of Forests & Chief Wildlife Warden.

xiii. To enrich the habitat of the project site, peripheral plantation of different plant species and grassing of the slop of embankment of reservoir should be undertaken in consultation with State Forest Department.

xiv. Compensatory afforestation in lieu of project affected areas, soil & moisture conservation should be implemented as per the prevailing law/act.

xv. Fish ladder/pass should be provided for migration of fishes in consultation with CIFRI and CWC. Regular monitoring of this facility may be carried out to ensure it effectiveness.

D. Public and Human health issues

xvi. Resettlement & Rehabilitation plan should be implemented in terms of the provisions of the State Government, as applicable.

xvii. Budget provisions should be made for the community and social development plan including community welfare schemes and may be implemented in toto.

xviii. Provision should be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

xix. The labourers to be engaged for construction works should be thoroughly examined periodically (at least quarterly) by qualified health personnel and adequately treated before issuing them work permit.

xx. Public Health Delivery Plan including the provisions for drinking water facility for the local community should be prepared and implemented.

xxi. Preventive measures viz. fuming and spraying of mosquito control should be done in and around the labour colonies, affected villages, stagnated pools, etc. Provisions should be made to not to create any stagnated pools to avoid creation of breeding grounds of the vector borne diseases.

E. Risk Mitigation and Disaster Management:

xxii. Early Warning Telemetric system should be installed in the upper catchment area of the project for advance intimation of flood forecast.

xxiii. Drilling and blasting should be done only either by licensed explosive agent or by the proponent after obtaining required approvals from Competent Authorities.

xxiv. Emergency preparedness and Disaster Management Plan should be prepared for any eventuality of the dam failure and should be implemented before commencement of the project.

xxv. Stabilization of muck disposal sites using biological and engineering measures to ensure that muck does not roll down the slopes and should be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area. The engineering measures for the muck disposal arrangements be evolved after carrying out required slope stability analysis.

xxvi. Catchment Area Treatment Plan should be prepared in consultation with the State Forest Department and should be implemented in synchronization with the construction of the project.

xxvii. Measures for prevention of animal overgrazing in catchment and reservoir areas and control of sediment and pollution in reservoir areas should be taken.

F. Statutory compliance

xxviii. Forest clearance should be obtained under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.

xxix. Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 should be obtained from the concerned State Pollution Control Board/ Committee.

xxx. NOC should be obtained from National Commission of Seismic Design Parameters (NCSDS) of CWC.

xxxi. NBWL Clearance should be obtained, if applicable.

G. Miscellaneous

xxxi. Stipulations made by the State Pollution Control Board and the State Government should be adhered.

xxxii. Any changes made in the scope of the project, necessary clearance should be obtained as per EIA Notification, 2006 and as amended.

xxxiii. Workforce employed for the project should be provided with LPG and kerosene, so the workforce will not cut trees for firewood.

xxxiv. PP should procure/extract construction material only from those Pvt. Agencies/ corporations /etc. that are having all applicable legal/statutory clearances.

xxxv. A dedicated team of persons having post graduate qualification in environmental sciences/ environmental management/ environmental engineering should be deployed for effective monitoring and implementation of all environmental safeguards measures.

xxxvi. The responsibility of implementation of environmental safeguards and carrying out environmental monitoring rests fully with Government of Haryana.

xxxvii. Study on post construction impacts on environmental flow, change in upstream and downstream ecology of entire river ecosystem should be conducted after every 5 years of implementation of the project through reputed government expert institution.

Yours faithfully,

12.10.2022

(Yogendra Pal Singh)
Scientist 'E'
Email Id: yogendra78@nic.in
Tele: 011-20819364

Copy to:

1. Guard File

ASP/FC/DPR

NO. SRM-DRA(Adi Badri)-DC/2018- 13135
OFFICE OF THE DEPUTY COMMISSIONER, DISTRICT SIRMAUR (HP)
*****

Dated, Nahan, the 23/08/2018

To

The Executive Engineer
Sarasvati Heritage Division No. 1,
Jagadhar (HR).

Sub:- Reg. estimate for SOP to shifting of 11 KV HT line-C/o Adi Badri Dam.

Sir,

With reference to the subject cited above please find enclosed herewith estimate of Rs. 36,73,203.00 for shifting of 11 KV HT line for c/o Adi Badri Dam submitted by Sr. Executive Engineer, Electrical Division, HPSEBL, Nahan for your further necessary action.

Encl:As above

D.M.P
29/08/18
XEN
29/8/18

Yours faithfully

District Revenue Officer
(Nodal Officer)
District Sirmaur.

Saraswati Heritage Divn. ... Jagadhari
... 1091
... 1-0
Date 29/8/18
D.A.O./D.A.O.
Xen Saraswati Heritage Divn. No. 1
JAGADHRI

for: [illegible]

HP STATE ELECTRICTY BOARD LTD.

NAME OF WORK:- Estimate for SOP to Shifting of 11 KV HT Line for Mantra Devi temple alongwith L 11/0.4 KV 25 KVA DTR's due to construction of Dam at Adi Badri in (E) Section Shambhuwala under D Nahan No. II.

MAIN ABSTRACT OF COST

Sr. No.	Description	Amount
1	Cost of 11 KV HT Line as per Ann-A attached	3002551.78
2	Cost of 11/0.4 KV, 25 KVA S/Stn as per Ann-B attached	372397.63
3	Cost of 3 Phase LT Line as per Ann-C attached	295253.23
	Chief Electrical inspector fees	3000.00
	Total:-	**3673202.64**
Say Rs. 36,73,203/-only		

Sr. Executive Engineer,
Electrical Division HPSEBL,
Nahan

"Annx-A"

HP STATE ELECTRICITY BOARD LTD,

NAME OF WORK:- Estimate for SOP to Shifting of 11 KV HT Line for Mantra Devi temple alongwith LT & 11/0.4 KV 25 KVA DTR's due to construction of Dam at Adi Badri in (E) Section Sharnbhuwala under ESD Nahan No. II.

ABSTRACT OF COST (11 KV H.T Line)

SR.NO.	DESCRIPTION	QTY.	UNIT	RATE	AMOUNT
1	Prov. ST Pole 9 mtr. long	44	Nos.	7491	329604
2	Prov. RCC Muff 2.0mm	44	Nos.	1531	67364
3	Prov. AAAC 7/3.15mm2 conductor.	13574	Mtr.	45	610830
4	Prov.MS CI X-Arm 2800x100x50x6mm	11.2	Mtr.	389	4357
5	Prov.MS CI X-Arm 2800x75x40x6mm	11.2	Mtr.	168	1882
6	Prov.C.I X-arm 2400x100x50x6mm for x-arm	52.8	Mtr.	389	20539
7	Prov.MSAI-X- Bracing Set 2(2700+1500X50X50X6mm)	92.4	Mtr.	150	13860
8	Prov.C I X-arm 1500x100x50x6mm for Single pole str.	33	Mtr.	389	12837
9	Prov. AI Knee Bracing Set 2(750X50X50X6mm)	33	Mtr.	150	4950
10	Prov. 11 KV GO. Switch 400 Amp Complete with feeting	2	Nos.	5638	11276
11	Prov.11KV pin insulator with pin	99	Nos.	133	13167
12	Prov.11KV Disc Insulator complete with fitting	66	Nos.	1268	83688
13	Prov.11KV HT stay set complete with fitting	35	Nos.	762	26670
14	Prov. Stay Wire 7/8 SWG	280	Kg	54	15120
15	Prov. HT Earthing Set Complete with fitting	8	Nos.	2471	19768
16	Prov.GI Wire 8SWG	462	Kg	51	23562
17	Prov.Danger Plates	32	Nos.	115	3680
18	Prov.Nuts & Bolts off sizes	98	Kg	85	8330
19	Prov.M.S. Flat Half Clamp	58	Nos.	58	3364
20	Prov.Barbed Wire	35	Kg	68	2380
21	Prov. Earth Hook	66	Nos.	30	1980
22	Prov. Egg Insulator	35	Nos.	30	1050
23	Prov. 11 KV Top Clamp	22	Nos.	66	1452
24	Prov. Aluminum Paint	44	Ltr	346	15224
25	Prov. Full Clamp	49	Nos.	217	10633
	Misc & Sundery charges		L/S		10000
	Total				**1317567**
	Add 3% Contigencies Charges				39527
	Add Transportation Charges as per cost data 2017-18	4.480	Km	31460	140941
	Add Erecton Charges as per cost data 2017-18	4.480	Km	177308	794340
	Total				**2292374**
	Add 11% Departmental Charges				252161
	Total				**2544535**
	Add 9 % SGST				229008
	Add 9 % CGST				229008
	Grand Total				**3002552**

Say Rs. 30,02,552/-only.

Sr. Executive Engineer,
Electrical Division, HPSEBL,
Nahan

"Anm-B"

HP STATE ELECTRICTY BOARD LTD.

NAME OF WORK: Estimate for SOP to Shifting of 11 KV HT Line for Mantra Devi temple alongwith LT & 11/0.4 KV 25 KVA DTR's due to construction of Dam at Adi Badri in (E) Section Shambhuwala under ESD Nahan No. II.

Cost of (11/.4 KV 25 KVA S/STN) FITTING

Sr. No.	Description	Unit	Qty	Rate	Amount
1	11/0.4KV , Distribution Transformer, 25 KVA	Nos.	1	44814	44814.00
2	S/T pole 9m Long W/L 200 Kg.	Nos.	2	7491	14982.00
3	RCC Muff	Nos.	2	1531	3062.00
4	C.I. (2800x100x50x6)mm for X-Arm	Mtr.	11.2	389	4356.80
5	C.I. 460x100x50x6mm for Supporting Main Channel	Mtr.	0.92	389	357.88
6	C.I. 2800x75x40x6mm for Fuse Unit, AB. Switch	Mtr.	11.2	168	1881.60
7	A.I. 2800x50x50x6mm for L.A.& LT Box	Mtr.	8.4	150	1260.00
8	11 KV G.O. Switch 400 Amp Complete with fetting	Set	1	5638	5638.00
9	D.O. Fuse Unit	Set	1	1881	1881.00
10	Lightening Arrestor	Nos.	3	1170	3510.00
11	Disc Insulator complete	Nos.	3	1268	3804.00
12	Stay Set complete	Set	4	762	3048.00
13	Stay Wire (7/3.15 mm) (6.0 Kg per stay set)	Kg.	30	54	1620.00
14	Pipe Earthing S/Stn type (s/stn metering str)	Nos.	3	2935	8805.00
15	GI wire 8 SWG	Kg.	60	51	3060.00
16	LT-Panel for 25 KVA S/Stn with MCCB	Nos.	1	19078	19078.00
17	Half Clamps	Nos.	22	66	1452.00
18	M.S. Nut & Bolts Off Sizes	Kg.	25	85	2125.00
19	G.I. Thimbles	Nos.	16	36	576.00
20	Danger Plate	Nos.	1	115	115.00
21	Barbed Wire	Kg.	15	68	1020.00
22	L.T. Cable (3.5 Core) 35mm2	Mtr.	15	93	1395.00
23	Energy Meter (3 Phase 4 Wire) DLMS Compliant 50 A CT Type for 25 KVA T/F	Nos.	1	10887	10887.00
24	Alluminium Paint	Ltr	4	346	1384.00
25	LT shant capacitor	KVAR	9	688	6192.00
26	Chain link fencing for the safety of S/stn	Each	1	40000	40000.00
	Misc & Sundries to complete the Job				10000.00
	TOTAL				**196304.28**
	Add Erection Charges as cost data 2017-18				69923.00
	Add Transportation Charges as cost data 2017-18				12200.00
	Add 3% Contingencies Charges				5889
	Sub-Total:-				**284316**
	Add 11% Deptt. Charges				31275
	Sub-Total:-				**315591**
	Add 9% CGST				28403
	Add 9% SGST				28403
	Sub Total				**372397.63**

Say Rs. 3,72,398/-only.

Sr. Executive Engineer,
Electrical Division, HPSEBL,
Nahan

"Ann-C"

HP STATE ELECTRICITY BOARD

E OF WORK:- Estimate for SOP to Shifting of 11 KV HT Line for Mantra Devi temple alongwith LT & 11/0.4 KV VA DTR's due to construction of Dam at Adi Badri in (E) Section Shambhuwala under ESD Nahan No. II.

ABSTRACT OF COST (L.T Line)

.NO.	DESCRIPTION	QTY.	UNIT	RATE	AMOUNT
1	Prov. ST Pole 8 mtr. long	5	Nos.	5384	26920
2	Prov. RCC Muff 1.8mm	5	Nos.	1287	6435
3	Prov AAAC 7/3.15 mm	1940	Mtr.	31	60140
4	Prov.GI Wire 8SWG	53	Kg	51	2703
5	Prov.Shackle insulator with D- Iron	12	Nos.	54	648
6	Prov.Shacle insulator with Nuts & bolts	8	Nos.	33	264
7	Prov. LT stay set complete with fitting	2	Nos.	628	1256
8	Prov. LT stay Wire 7/10 SWG	12	Nos.	54	648
9	Prov. Egg Insulator	2	Nos.	30	60
10	Prov.Nuts & Bolts Off sizes	10	Kg	85	850
11	Prov. Stay Clamp	2	Nos.	66	132
13	Prov. Eye Hook Bolt	5	Nos.	30	150
14	Prov. PVC Cable 50mm 3.5 core	30	Mtr.	200	6000
15	Prov. Aluminum Paint	5	Ltr	346	1730
	Misc & Sundery complete the job.				10000
	Total				**117936**
	Add 3% Contigencies Charges				3538
	Add Transportation Charges as per cost data17-18	0.480	Km	39243	18837
	Add Erecton Charges as per cost data 2017-18 3Ø	0.480	Km	177308	85108
	Total				**225419**
	Add 11% Departmental Charges				24796
	Total				**250215**
	Add 9% SGST on Erection				22519
	Add 9% CGST on Erection				22519
	Grand Total				**295253**

Say Rs 1505447/-only.

Sr.Executive Engineer,
Elect. Division, HPSEBL,
Nahan.

HP STATE ELECTRICITY BOARD LTD.

Name of Work:- Estimate for SOP to Shifting of 11 KV HT Line for Mantra Devi temple alongwith LT & 11/0.4 KV 25 KVA DTR's due to construction of Dam at Adi Badri in (E) Section Shambhuwala under ESD Nahan No. II.

Credit Sheet

S.No	Description of item	Unit	Qty	Rate	Amount	remarks
1	Dismentling of AAAC 7/2.50mm Conductor	Mtr	15025	10	150250	
2	Dismentling of 9 Mtr Long Steel Tublar Pole	Nos	31	2700	83700	
3	Dismentling of 8 Mtr Long Steel Tublar Pole	Nos	25	1750	43750	
4	Dismentling of M.S. channel iron cross arm 2800x100x50x6mm	Nos	7	250	1750	
5	Dismentling of M.S. channel iron cross arm 2400x100x50x6mm	Nos	10	250	2500	
6	Dismentling of M.S. channel iron cross arm 1500x100x50x6mm	Nos	30	250	7500	
7	Dismentling of 11/0.4 KV, 25 KVA Transformer.	Nos	1	22000	22000	
	G/Total:-				311450	

Note:- Dismantled material shall be used in R/M Works & Credit shall be given to R/M Works

Sr. Executive Engineer,
Electrical Division HPSEBL,
Nahan

HIMACHAL PRADESH STATE ELECTRICITY BOARD LTD.

Name of Work:- Estimate for Prov. SoP for Shifting of 11kv HT & LT line to Mansa Devi Temple in (E) Section S/wala DESD Nahan-II

ABSTRACT OF MATERIAL for LT line

SR. NO	POLE NO	S.T. POLE 8 MTR LONG IN NOS	RCC MUFF IN NOS.	LENGTH OF SPAN IN MTR	AAAC 7/2.50 IN MTRS	G.I. WIRE 8 SWG IN MTRS	SHACKLED INSULATOR WITH D-IRON IN NOS	SHACKLED INSULATOR WITH NUTS AND BOLTS IN NOS	STAY SET IN SETS	EGG INSULATOR IN NOS	STAY WIRE 7/10 SWG IN KG	Alu. Paint	EARTHING HOOKS IN NOS	NUTS AND BOLTS OFF SIZE IN KG	REMARKS
1	P0	[illegible]	[illegible]	—	—	—	4	—	1	1	6	1	1	2	
2	P1	1	1	110	440	110	—	4	—	—	—	1	1	2	
3	P2	1	1	120	480	120	4	—	1	1	6	1	1	2	
4	P3	1	1	140	560	140	—	4	—	—	—	1	1	2	
5	P4	1	1	110	440	110	4	—	—	—	—	1	1	2	
		5	5	480	1920	480	12	8	2	2	12	5	5	10kg	

Required AAAC 7/2.50 mm 1920 + 3% cutting & sagging = 1980 mtr
" GI wire 8SWG = 480 + 3% cutting & sagging = 50 kg.

Sr Executive Engineer
Electrical Division
HPSEB Ltd Nahan

Asstt. Engineer
Elect. Sub Division

Estimate for SOP to Shifting of 11 KV HT Line for Mantra Devi temple alongwith LT & 11/0.4 KV 25 KVA DTR's due to construction of Dam at Ml Badri in (E) Section Shambhuwala under ESD Nahan No. II.

Inventory

Sr. No.	Pole No.	ST Pole 9 mts in Nos.	RCC Muff 2.0mm	Length of Span in meters	AAAC 7/3.15 in meters	GI Wire 8 SWG in Mtrs	Prov.MS CI X-Arm 2800x100x50x6mm	Prov.MS CI X-Arm 2800x75x40x6mm	Prov.C.I X-arm 2400x100x50x6mm for x-arm	Prov.MSAI-X-Bracing Set 2(2700+1500X50X50X6mm)	Prov.C.I X-arm 1500x100x50x6mm for Single pole str.	Prov. AI Knee Bracing Set 2(750X50X50X6mm	Prov. 11 KV GO. Switch 400 Amp Complete with feeting	Prov.11KV pin insulator with pin	Prov.11KV Disc Insulator complete with fitting	Prov.11KV HT stay set complete with fitting	Prov. Stay Wire 7/8 SWG	Prov. HT Earthing Set Complete with fitting	11KV Danger Plate in Nos	Prov Nuts & Bolts of sizes	Prov M.S. Flat Half Clamp	Prov Barbed Wire	Prov. Earth Hook	Prov. ZZ Insulator	Prov. 11 KV Top Clamp	Prov. Aluminum Paint	Prov. Full Clamp	Remarks
1	P0	2	2	90	270	90	2	2	2	1	0	0	1	3	6	2	16	1	1	6	2	2	2	2	0	2	4	G.O Switch
2	P1	1	1	110	330	110	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	0	2	0	1	1	1	R/T
3	P2	1	1	120	360	120	0	0	0	0	1	1	0	3	0	1	8	0	1	3	1	1	2	1	1	1	1	A/P
4	P3	2	2	260	780	260	0	0	2	1	0	0	0	3	6	2	16	0	1	6	4	2	2	2	0	2	2	D/P
5	P4	1	1	110	330	110	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
6	P5	1	1	170	510	170	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
7	P6	2	2	130	390	130	0	0	2	1	0	0	0	3	6	4	32	1	1	4	4	1	2	2	0	2	1	D/P
8	P7	1	1	110	330	110	0	0	0	0	1	1	0	3	0	0	0	0	1	1	1	1	2	0	1	1	1	R/T
9	P8	2	2	120	360	120	0	0	2	1	0	0	0	3	6	2	16	0	1	3	4	1	2	2	0	2	2	D/P
10	P9	1	1	160	480	160	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
11	P10	1	1	105	315	105	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
12	P11	1	1	110	330	110	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
13	P12	2	2	270	810	270	0	0	2	1	0	0	0	3	6	2	16	1	1	3	4	1	2	2	0	2	2	D/P
14	P13	1	1	180	540	180	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
15	P14	1	1	195	585	195	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
16	P15	2	2	105	315	105	2	2	2	1	0	0	1	3	6	2	16	1	1	0	2	2	2	2	0	2	4	G.O Switch
17	P16	1	1	115	345	115	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	0	2	0	1	1	1	R/T
18	P17	1	1	160	480	160	0	0	0	0	1	1	0	3	0	1	8	0	1	3	1	1	2	1	1	1	1	A/P
19	P18	1	1	170	510	170	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	0	2	0	1	1	1	R/T
20	P19	2	2	110	330	110	0	0	2	1	0	0	0	3	6	2	16	1	1	3	4	1	2	2	0	2	2	D/P
21	P20	1	1	115	345	115	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
22	P21	1	1	130	390	130	0	0	0	0	1	1	0	3	0	1	8	0	1	3	1	1	2	1	1	1	1	A/P
23	P22	2	2	125	375	125	0	0	2	1	0	0	0	3	6	4	32	1	1	4	4	1	2	4	0	2	1	D/P
24	P23	1	1	110	330	110	0	0	0	0	1	1	0	3	0	1	8	0	1	3	1	1	2	1	1	1	1	A/P
25	P24	2	2	240	720	240	0	0	2	1	0	0	0	3	6	4	32	1	1	1	4	1	2	4	0	2	1	D/P
26	P25	1	1	105	315	105	0	0	0	0	1	1	0	3	0	1	8	0	1	3	1	2	2	1	1	1	1	A/P
27	P26	2	2	120	360	120	0	0	2	1	0	0	0	3	6	2	16	0	1	0	2	1	2	2	0	2	4	D/P
28	P27	1	1	160	480	160	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	2	2	0	1	1	1	R/T
29	P28	2	2	110	330	110	0	0	2	1	0	0	0	3	6	2	16	1	1	0	2	1	2	2	0	2	4	D/P
30	P29	1	1	95	285	95	0	0	0	0	1	1	0	3	0	1	8	0	1	3	1	1	2	1	1	1	1	A/P
31	P30	1	1	80	240	80	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
32	P31	1	1	95	285	95	0	0	0	0	1	1	0	3	0	0	0	0	1	2	1	1	2	0	1	1	1	R/T
33	P32	1	1	95	285	95	0	0	0	0	1	1	0	3	0	1	8	0	0	3	1	1	2	1	1	1	1	A/P
Total:-		44	44	4450	13440	4480	4	4	22	11	22	22	2	99	66	35	280	8	32	98	58	35	66	35	22	44	49	
						Chanel in meters	11.2	11.2	52.8	92.4	33	33																

AAAC 7/3.15mm Conductor add 1% Cutting & wastage = 13440*1% = 134.4 = Total Cond. 13440+134.4 = 13574 mtr.

GI wire 8 SWG add 1% cutting & wastage 4480*1% 44 = 4524 MTR.

GI wire 8 SWG in Kg = 4524*0.102 = 461.4 Kg. Say 462 Kg.

Assistant Engineer,
Electrical Sub Division

Inventory of Dismentaling material for LT Line at Mantra Devi Temple Shambhuwala

Sr.No.	Pole No.	ST Pole 9 mts In Nos.	Length of Span in meters	AAAC 7/2.50 in meters	GI Wire S SWG In Mtrs	Remarks
1	EP0	1	80	320	80	
2	EP1	1	60	240	60	
3	EP2	1	80	320	80	
4	EP3	1	65	260	65	
5	EP4	1	70	280	70	
6	EP5	1	80	320	80	
7	EP6	1	100	400	100	
8	EP7	1	75	300	75	
9	EP8	1	90	360	90	
10	EP9	1	120	480	120	
11	EP10	1	60	240	60	
12	EP11	1	100	400	100	
13	EP12	1	50	200	50	
14	EP13	1	80	320	80	
15	EP14	1	120	480	120	
16	EP15	1	50	200	50	
17	EP16	1	60	240	60	
18	EP17	1	70	280	70	
19	EP18	1	80	320	80	
20	EP19	1	50	200	50	
21	EP20	1	90	360	90	
22	EP21	1	70	280	70	
23	EP22	1	40	160	40	
24	EP23	1	50	200	50	
25	EP24	1	50	200	50	
Total:-		25	1840	7360	1840	
					Chanel in meters	

Total Dismental Conductor for LT Line 7.360 Kms

Assistant Engineer,
Electrical Sub-Division,
HPSEBL, Nahan No. II

Sr.Executive Engineer,
Elect. Division, HPSEBL,
Nahan

Inventory of Dismentaling material for HT Line at Mantra Devi Temple Shambhuwala

Sr.No.	Pole No.	ST Pole 9 mts In Nos.	Length of Span in meters	AAAC 7/2.50 in meters	GI Wire 8 SWG In Mtrs	Prov.MS CI X-Arm 2800x100x50x6mm	Prov.C.I X-arm 2400x100x50x6mm for x-arm	Prov.C.I X-arm 1500x100x50x6mm for Single pole str.	11/0.4 KV 25 KVA Transformer	Remarks
1	EP0	1	110	330	110	1	2	2	1	
2	EP1	1	115	345	115	0	0	1		
3	EP2	1	120	360	120	0	0	1		
4	EP3	1	80	240	80	0	0	2		
5	EP4	2	120	360	120	1	2	1		
6	EP5	1	100	300	100	0	0	1		
7	EP6	1	110	330	110	0	0	1		
8	EP7	1	180	540	180	0	0	1		
9	EP8	1	110	330	110	0	0	1		
10	EP9	2	95	285	95	1	2	1		
11	EP10	1	80	240	80	0	0	2		
12	EP11	2	140	420	140	1	0	1		
13	EP12	1	110	330	110	0	0	1		
14	EP13	1	70	210	70	0	0	1		
15	EP14	1	120	360	120	0	0	1		
16	EP15	1	60	180	60	1	2	1		
17	EP16	1	70	210	70	0	0	2		
18	EP17	1	105	315	105	0	0	1		
19	EP18	2	130	390	130	1	0	1		
20	EP19	1	80	240	80	0	0	1		
21	EP20	1	50	150	50	0	0	1		
22	EP21	2	95	285	95	1	0	1		
23	EP22	1	60	180	60	0	0	1		
24	EP23	1	75	225	75	0	0	1		
25	EP24	1	110	330	110	0	2	1		
26	EP25	1	60	180	60	0	0	1		
Total:-		31	2555	7665	2555	7	10	30	1	
Chanel in meters						19.6	24.0	45		

Total Dismental Conductor for HT Line 7.665 Kms

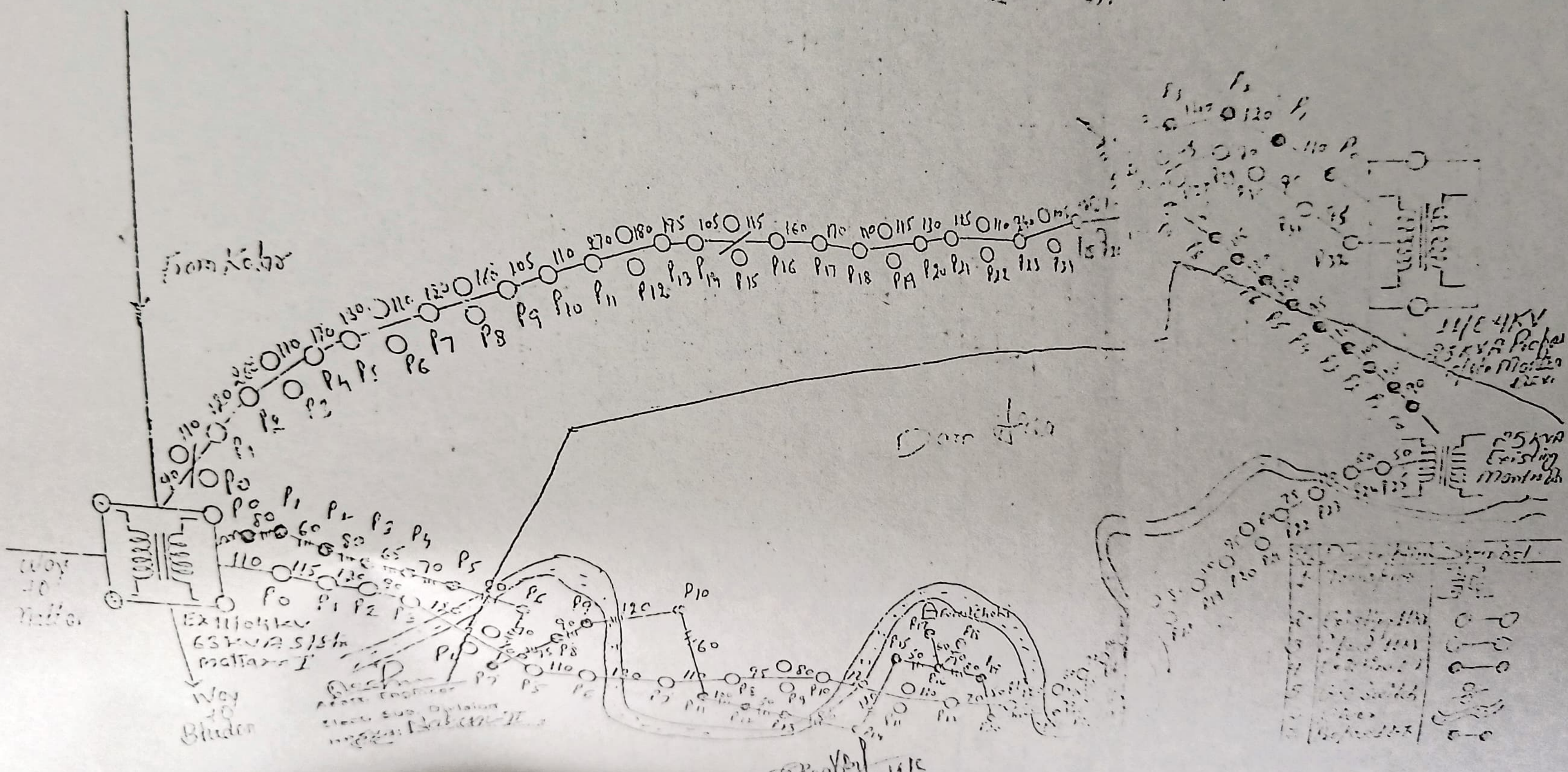
Dismentaling of 1 No, 11/0.4 KV, 25 KVA Transformer

Assistant Engineer,
Electrical Sub-Division,
HPSEBL, Nahan No. II

Sr.Executive Engineer,
Elect. Division, HPSEBL,
Nahan

... stimate for Prov. SOP for ... of 11KV ... to Mantra Devi temple in (E) Section S/Wala UESD Nahan-II

Single Line Diagram :



Sr. Executive Engineer
Electrical Op.
HPSEB Ltd. ...

E:/FCA 2021-22/FCA2 2021-22 COMPUTER-VKK PAGE- 1225 E-Mail : dfo.fatehabad@yahoo.co.in

वन विभाग, कार्यालय
वन मण्डल अधिकारी, फतेहाबाद वन मण्डल, फतेहाबाद

पुराना कोर्ट रोड, नजदीक पी0डब्ल्यु0डी0 रेस्ट हाउस, फतेहाबाद–125050, फोन–01667–220313 (का0/फैक्स)

क्रमांक....2149..... दिनांक .../9-02-2024

सेवा में

Executive Engineer,
Saraswati Heritage Division No. 1'
Jagadhari (Hry.)

विषय :– **Compensatory Afforestation (CA) Scheme in lieu of 31.72 Ha. Forest Land to be diverted for construction of Adi Badri Dam.**

उपरोक्त विषय के सम्बन्ध में हरियाणा सरकार के प्रख्यात प्रोजेक्ट हेतू एफ.सी.ए.–1980 के प्रावधानों के अनुसार प्रतिपुर्ति पौधारोपण हेतू सिंचाई विभाग हरियाणा सरकार द्वारा फतेहाबाद जिला में गैर वन भूमि की पहचान की है, जो कि उक्त भूमि फतेहाबाद वन मण्डल की ज्युरिस्डीक्शन में आती है। अतः निम्न सूचि अनुसार भूमि के डी.जी.पी.ए. मैप आगामी आवश्यक कार्यवाही हेतू भेजे जाते हैं।

Sr. No.	C.A Site name	Area (Ha.)
1	Bhurthali Open Land	7.8534429
2	Babanpur Open Land	6.9125473
3	Mehmra Open Land	3.9178689
4	Bhunderwas Open Land	2.5621699
5	Nangal Open Land	4.034209996
6	Meyond Begamwali	4.044327137
7	Damkora	2.39777
	G.Total	**31.722336133**

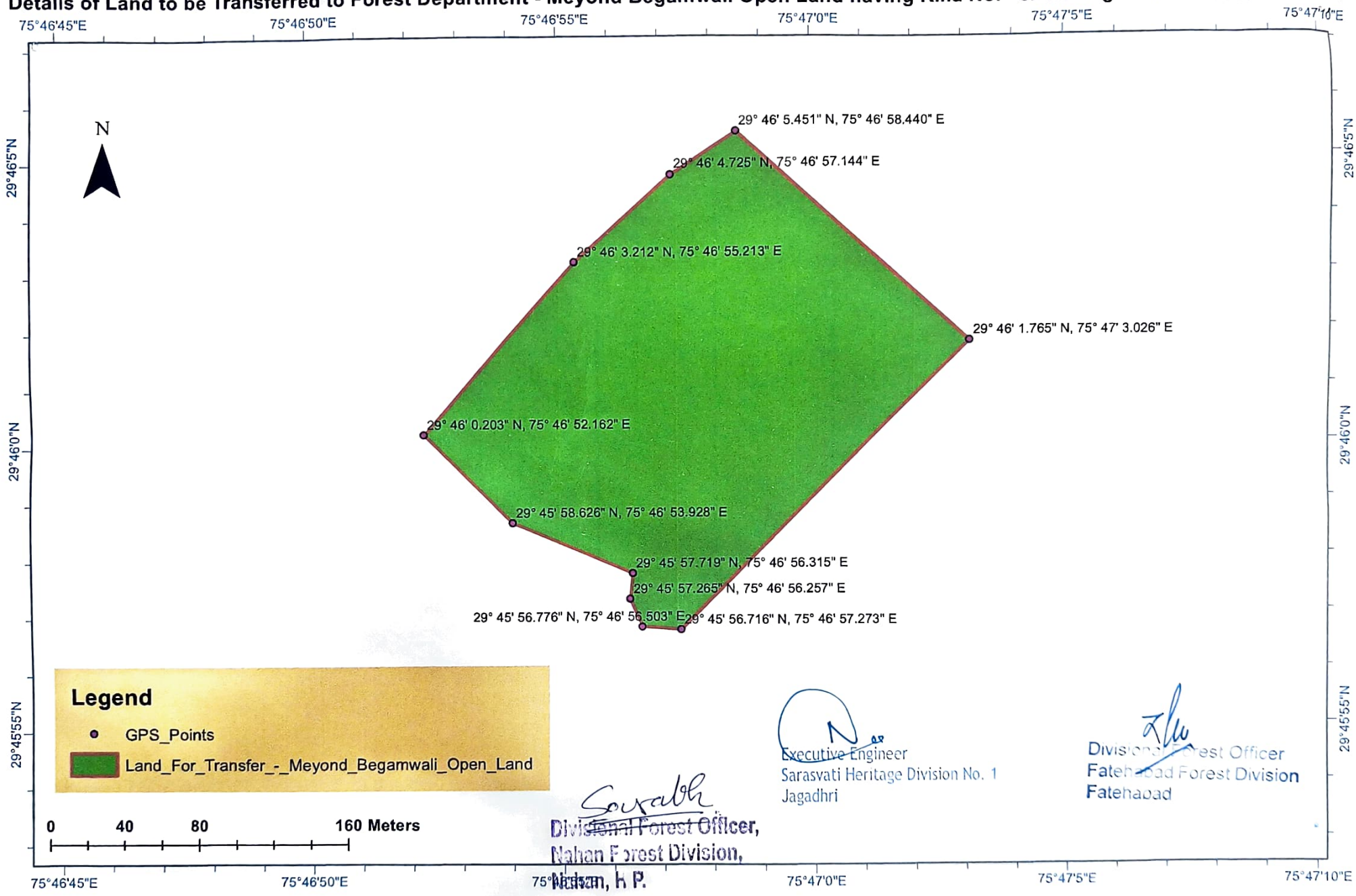
इसके अतिरिक्त आपको लिखा जाता है कि आप उक्त भूमि स्थानान्तरण करने उपरांत निशानदेही करवाकर रिकार्ड अनुसार भूमि का पूर्ण कब्जा देगें।

सलंग्न/डी.जी.पी.एस. मैप

Saraswati Heritage Divn. No 1 Jagadhari
Diary No. 295
Case No. 1-W/ABD
Date 20-2-24
D.S./D.H./D.A.O.
Xen Saraswati Heritage Divn. No-1
JAGADHARI

वन मण्डल अधिकारी,
फतेहाबाद।
Divisional Forest Officer
Forest Division
Fatehabad

Details of Land to be Transferred to Forest Department - Meyond Begamwali Open Land having Killa No. - 92 having Area of 4.04432137 Ha.

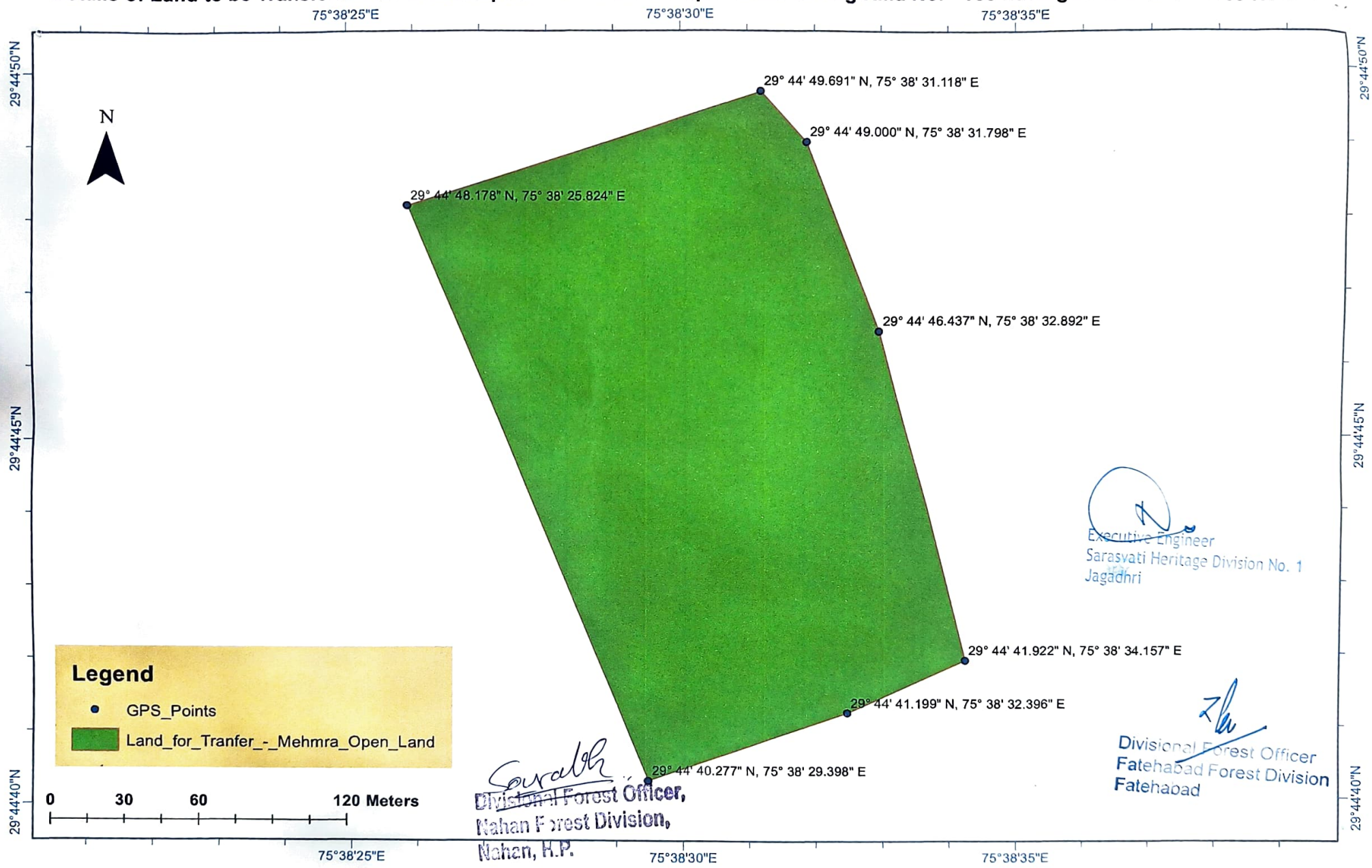


Executive Engineer
Sarasvati Heritage Division No. 1
Jagadhri

Divisional Forest Officer
Fatehabad Forest Division
Fatehabad

Divisional Forest Officer,
Nahan Forest Division,
Nahan, H.P.

Details of Land to be Transferred to Forest Department - Mehmra Open Land having Killa No. - 158 having Area of 3.9178689 Hectare

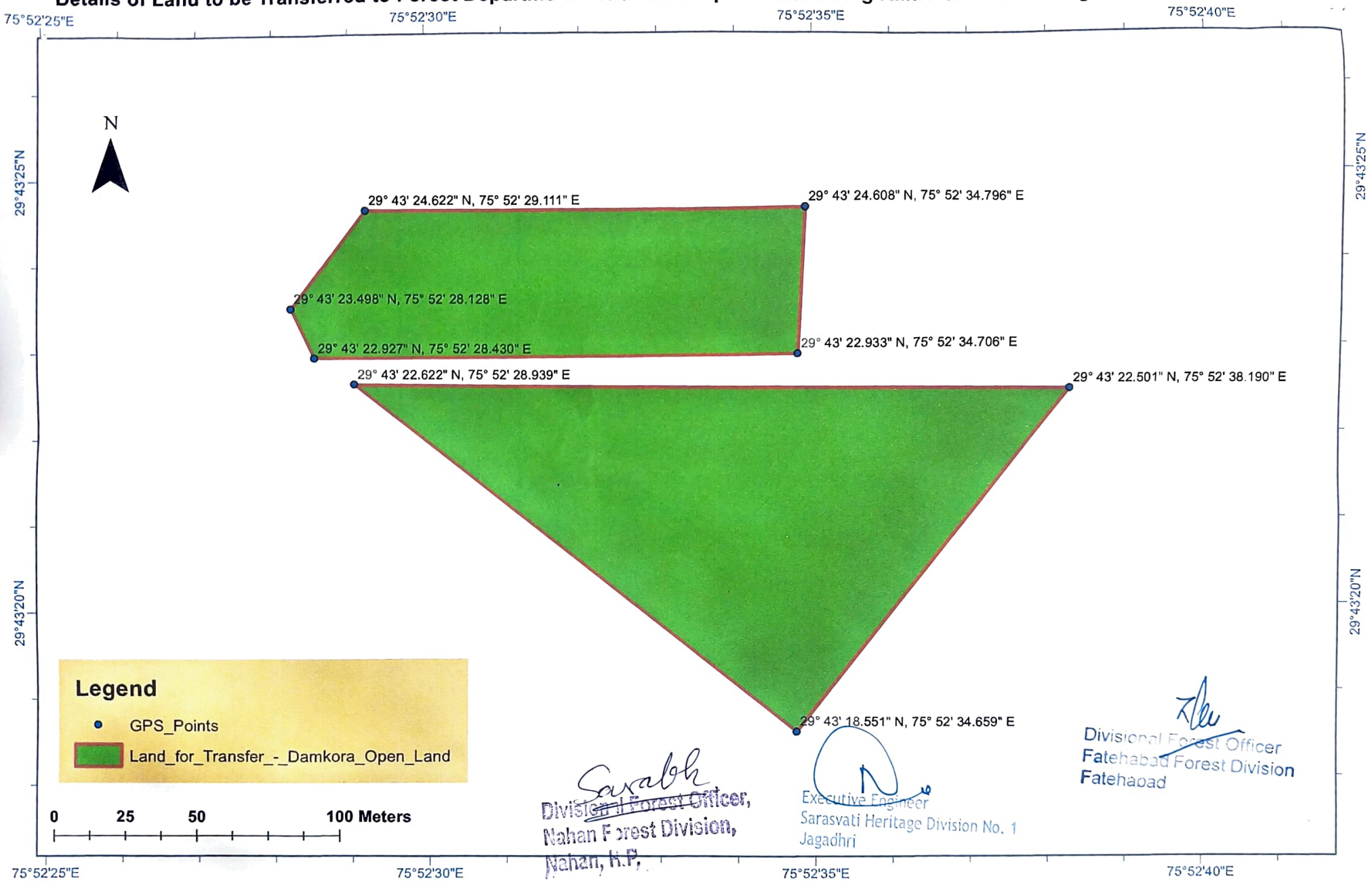


Executive Engineer
Sarasvati Heritage Division No. 1
Jagadhri

Divisional Forest Officer
Fatehabad Forest Division
Fatehabad

Divisional Forest Officer,
Nahan Forest Division,
Nahan, H.P.

Details of Land to be Transferred to Forest Department - Dhamkora Open Land having Killa No. - 68/2 having Area of 2.39777 Hectare

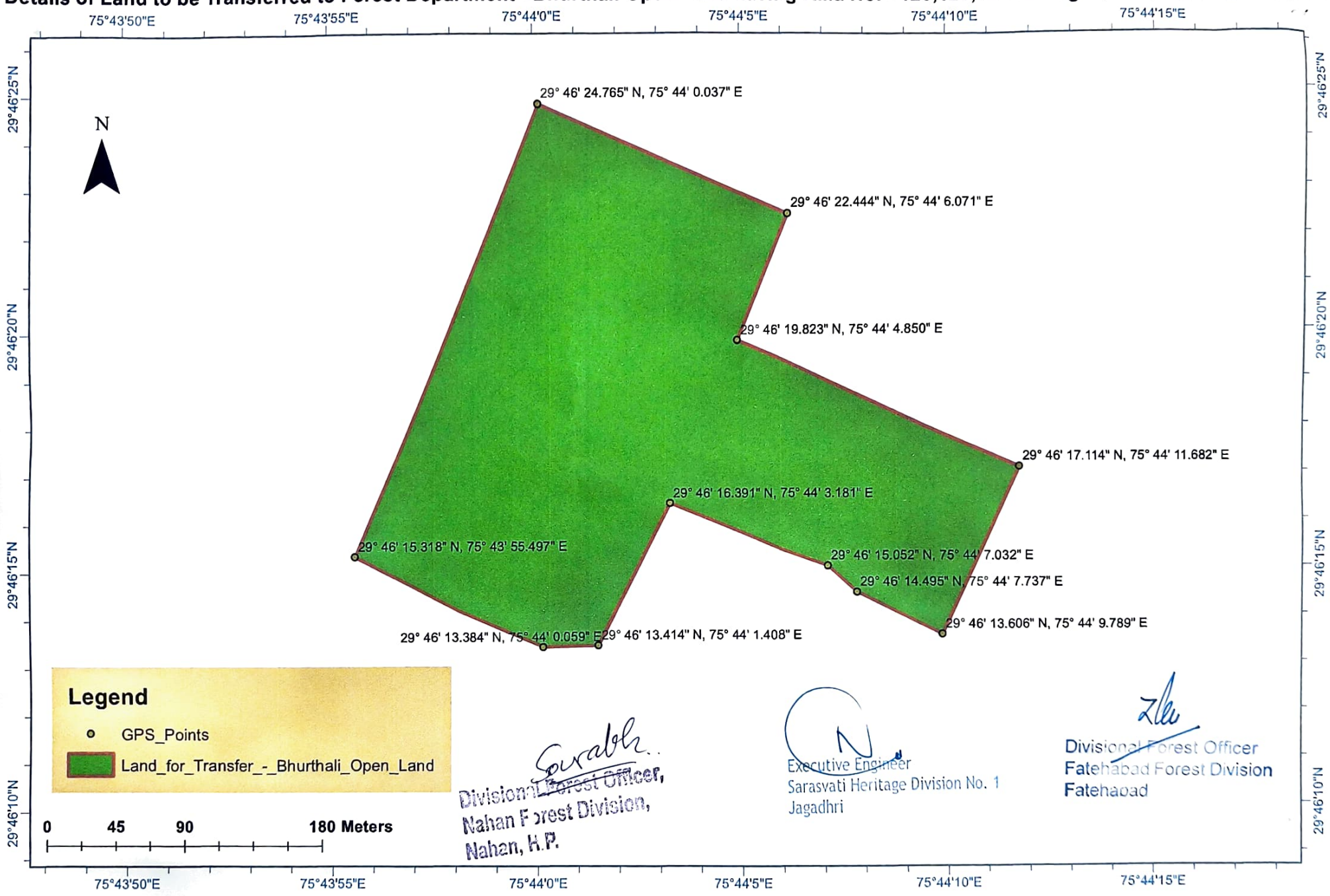


Sarabh
Division I Forest Officer,
Nahan Forest Division,
Nahan, H.P.

Executive Engineer
Sarasvati Heritage Division No. 1
Jagadhri

Divisional Forest Officer
Fatehabad Forest Division
Fatehabad

Details of Land to be Transferred to Forest Department - Bhurthali Open Land having Killa No. - 120,121,122 having Area of 7.8534429 Hectare

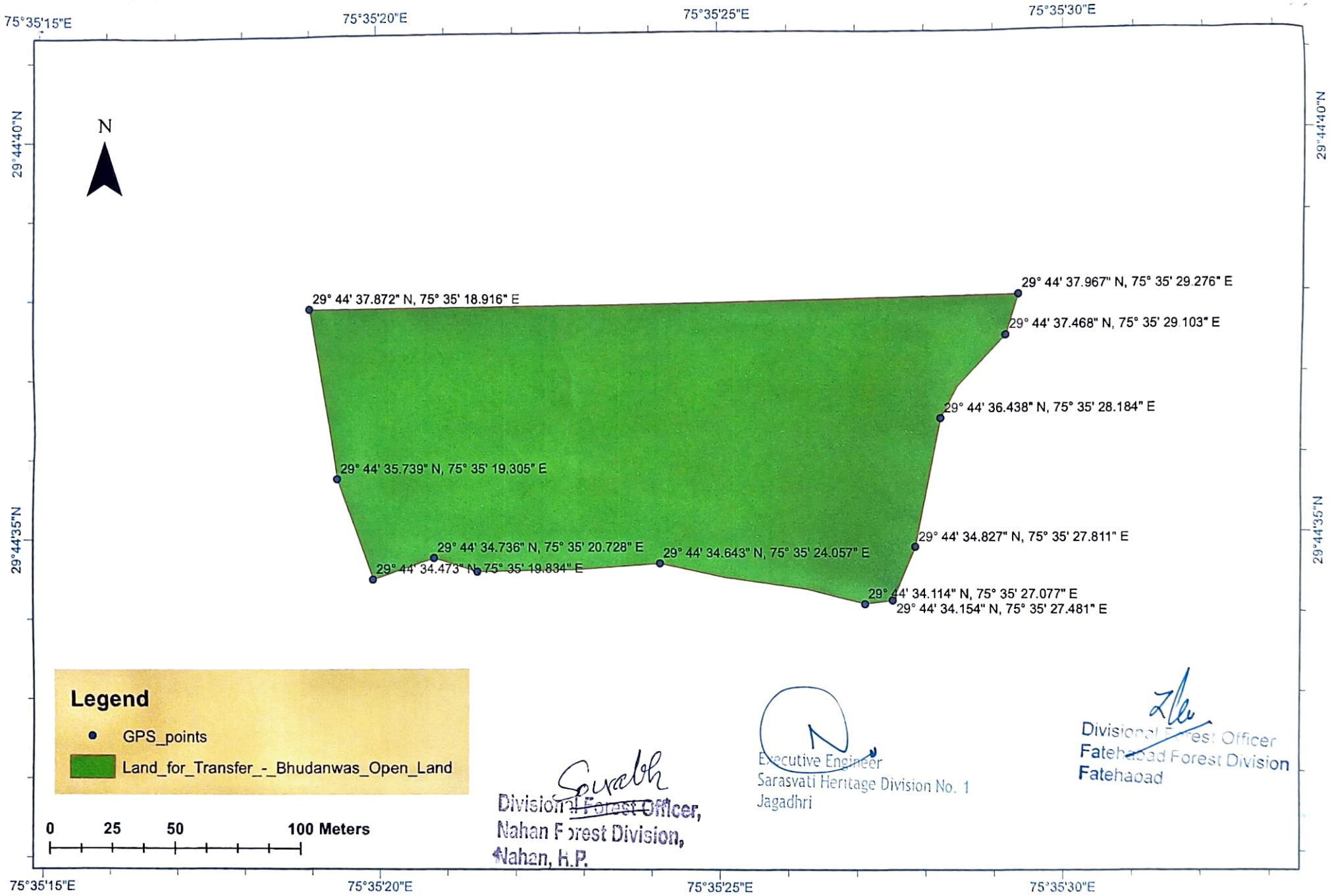


Divisional Forest Officer,
Nahan Forest Division,
Nahan, H.P.

Executive Engineer
Sarasvati Heritage Division No. 1
Jagadhri

Divisional Forest Officer
Fatehabad Forest Division
Fatehabad

Details of Land to be Transferred to Forest Department - Bhudanwas Open Land having Killa No. - 117 having Area of 2.5621699 Hectare

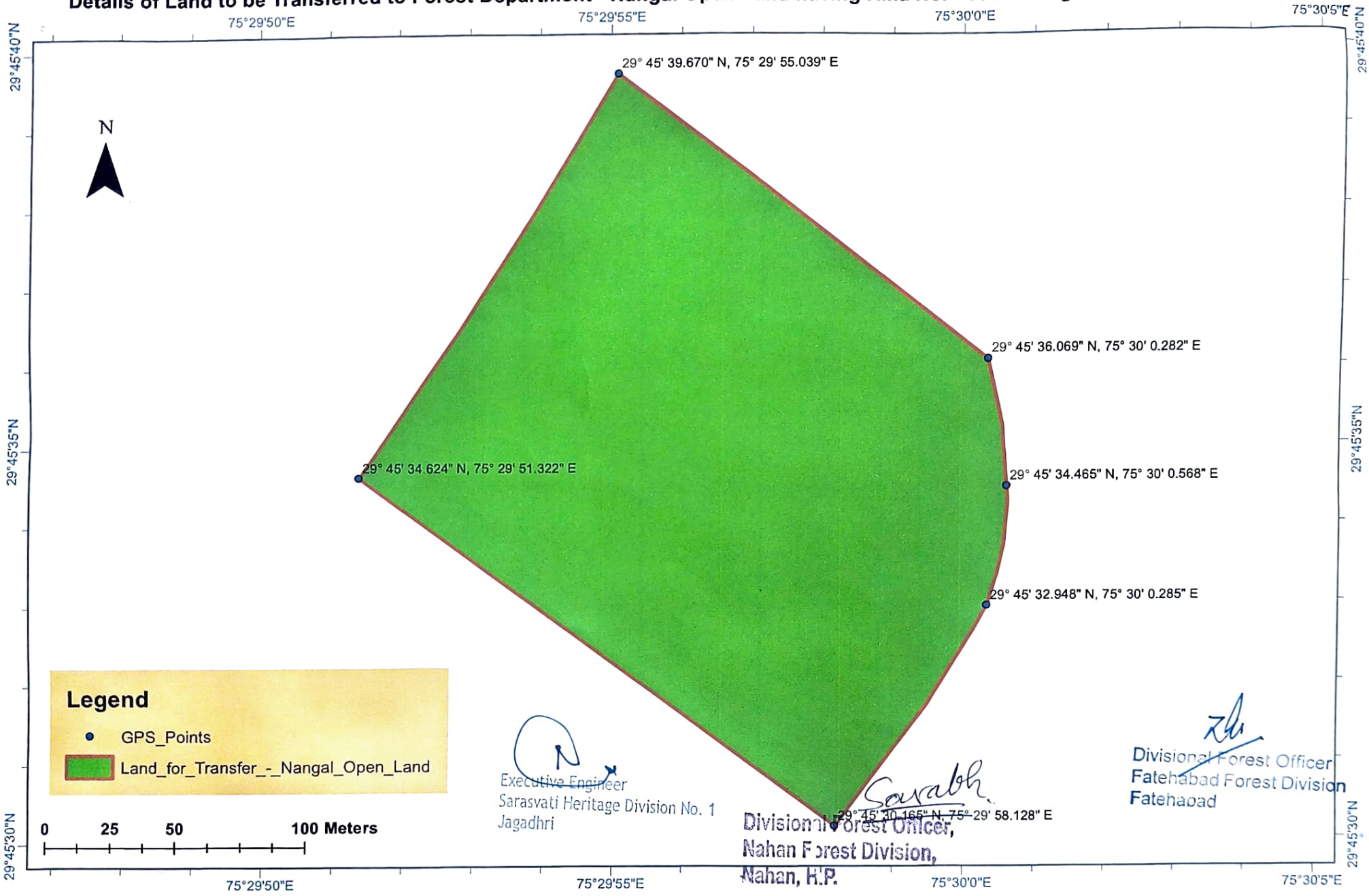


Division Forest Officer,
Nahan Forest Division,
Nahan, H.P.

Executive Engineer
Sarasvati Heritage Division No. 1
Jagadhri

Divisional Forest Officer
Fatehabad Forest Division
Fatehabad

Details of Land to be Transferred to Forest Department - Nangal Open Land having Killa No. - 168 having Area of 4.034209996 Ha.



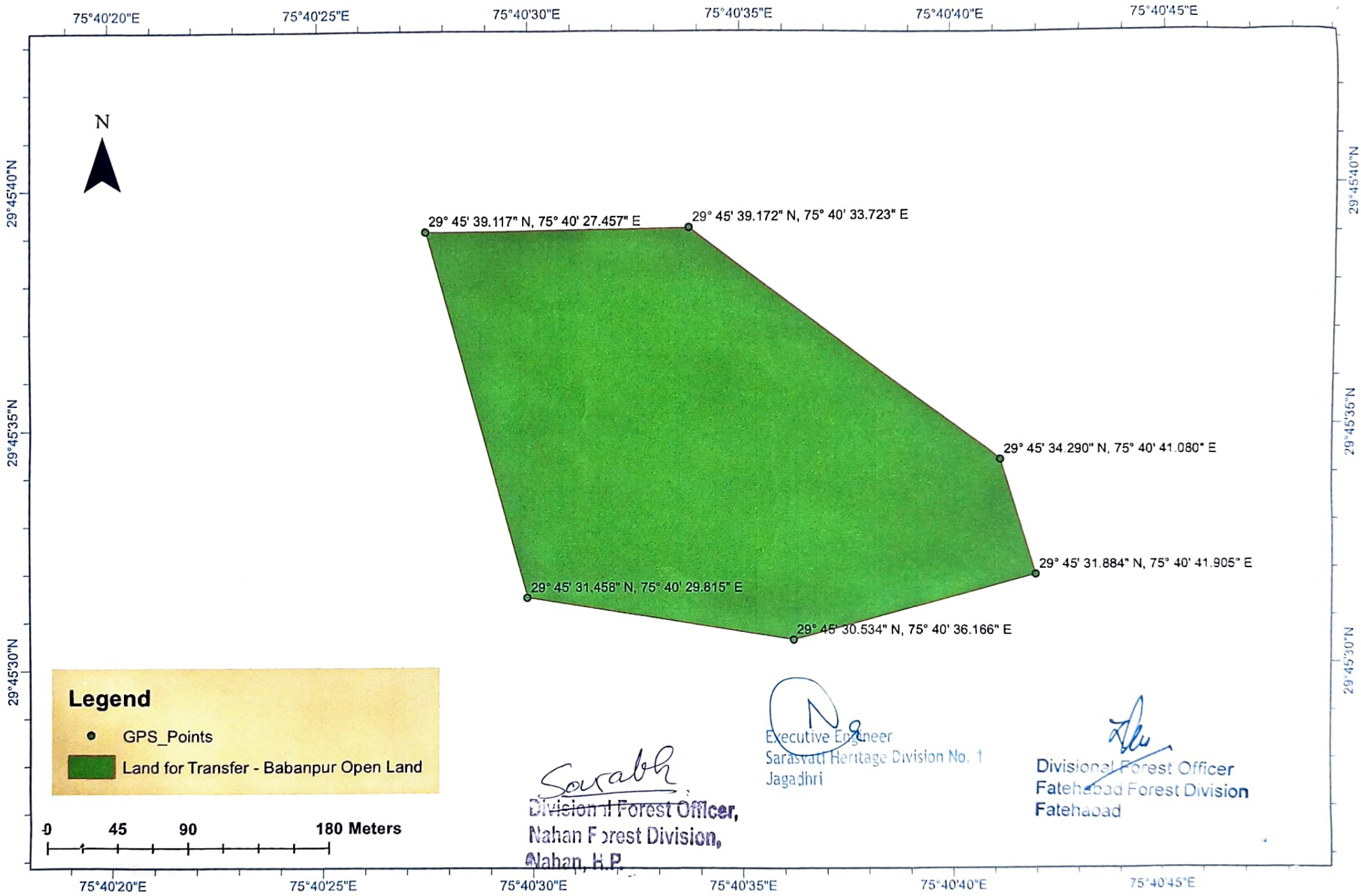
Executive Engineer
Sarasvati Heritage Division No. 1
Jagadhri

Saurabh

Divisional Forest Officer,
Nahan Forest Division,
Nahan, H.P.

Divisional Forest Officer
Fatehabad Forest Division
Fatehabad

Details of Land to be Transferred to Forest Department - Babanpur Open Land having Killa No. - 178 having Area of 6.9125473 Hectare



Executive Engineer
Sarasvati Heritage Division No. 1
Jagadhri

Divisional Forest Officer
Fatehabad Forest Division
Fatehabad

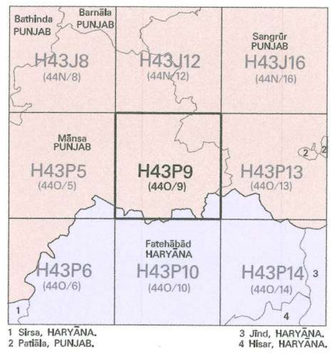
Saurabh
Division II Forest Officer,
Nahan Forest Division,
Nahan, H.P.

निर्यात के लिए नहीं NOT FOR EXPORT

OPEN SERIES MAP

No. H43P9

Scale 1:50,000



1 Sirsa, HARYĀNA.
2 Patiāla, PUNJAB.
3 Jind, HARYĀNA.
4 Hisar, HARYĀNA.

भारतीय सर्वेक्षण विभाग | SURVEY OF INDIA

1st Edition 2009. Price : Rs. 50 /-

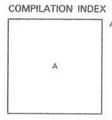
CONVENTIONAL SYMBOLS

Express highway: with toll; with bridge; with distance stone . . . .
Roads, metalled: according to importance . . . . .
Roads, double carriageway: according to importance . . . . .
Unmetalled road. Cart-track. Pack-track with pass. Foot-path. . . . .
Streams: with track in bed; undefined. Canal . . . . .
Dams: masonry or rock-filled; earthwork. Weir . . . . .
River: dry with water channel; with island & rocks. Tidal river . .
Submerged rocks. Shoal. Swamp. Reeds . . . . .
Wells: lined; unlined. Tube-well. Spring. Tanks: perennial; dry . . .
Embankments: road or rail; canal. Broken ground . . . . .
Railways, broad gauge: double; single with station; under constrn. . .
Railways, other gauges: double; single with distance stone; do . . .
Mineral line or tramway. Kilns. Cutting with tunnel . . . . .
Contours with sub-features. Rocky slopes. Cliffs . . . . .
Sand features: (1)flat,(2)sand-hills (permanent). (3)dunes(shifting). . .
Towns or Villages: inhabited; deserted. Fort . . . . .
Huts: permanent; temporary. Tower, Antiquities. . . . . ddddd
Temple. Chhatri. Church. Mosque. Idgāh. Tomb. Graves . . . . .
Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage . . . . .
Mine. Vine on trellis. Grass. Scrub . . . . .
Palms: palmyra; other. Plantain. Coniifer. Bamboo. Other trees . . .
Areas: cultivated; wooded. Surveyed tree . . . . .
Boundary, international . . . . .
" state: demarcated; undemarcated . . . . .
" district; subdivision, tahsil or tāluk; forest . . . . .
Boundary pillars: surveyed; unlocated; village trijunction. . . . . .
Heights, triangulated; station; point; approximate. . . . . △ 200 .200 .200
Bench-mark: geodetic; tertiary; canal . . . . . BM 63·3 .BM 63·3 .63
Post office. Telegraph office. Overhead tank. . . . . PO T
Rest house or Inspection bungalow. Circuit house. Police station . . PB
Camping ground. Forest: reserved; protected . . . . . CG RF PF
Spaced names: administrative; locality or tribal . . . . . KIKRI NĀGA
Hospital. Dispensary. Veterinary: Hospital / Dispensary . . . . . H
Aerodrome. Heliport. Tourist site . . . . .
Power line: with pylons surveyed; with poles unsurveyed . . . . .

NOTES :-

Heights are in metres and above Indian mean sea level.
Contours are approximate.
Tanks, shown dry in this area usually contain water from July to March.
Unmetalled roads and cart-tracks in this sheet are generally motorable in dry season. Permission to use those along canals is required from the Irrigation authorities.
A relative height , , 6' , represents the approximate height, in metres, between the top and bottom of a steep slope.
A relative height, e.g., , 3r , marked along a canal, indicates the height of the top of the canal embankment above the adjacent country.
Canal distance stones along Boha Distributary, Budhlāda Branch (SIRHIND CANAL), Siddowāla Branch, (SIRHIND CANAL), Sudhi Distributary, Kuhāla Branch and Minor No.5 are 1,000 feet apart every existing stone is shown whereas along BHĀKRA CANAL Main Branch, Barreta Drain, Sirkhed Choe, Bādalgarh Distributary and Ratangarh Distributary these are 1,000 feet apart and every existing fifth stone is shown.
The state boundary between Haryāna and Punjāb States has been surveyed as pointed out by the local officials on the ground but has not been verified by the Governments concerned.
3,000-acorn rectangulation stones of BHĀKRA Dam Project Survey based on Origin 30°00'N, 75°15'E with their numbers are shown as tertiary bench-marks thus X^{556}_{1}, BM. 218·2.

COMPILATION INDEX



A. Compiled from 1:25,000 survey, 1964-65.
Updated for major details during 2005-06.

Projection – UTM Datum – WGS 84

Magnetic Variation from True North about 1° East in 2005.
(Increasing by about 1' annually).

500 m to 1 cm 1:50,000 2 cm to 1 km

Metres 1000 500 0 1 2 3 Kilometres

CONTOUR INTERVAL 10 METRES

For further details about this map, please contact
Director
Punjab, Haryana & Chandigarh Geo-Spatial Data Centre
Survey of India, Sector 32 A
Chandigarh.
Fax : 0172 – 2604671

WEBSITE – www.surveyofindia.gov.in

REG. No. -WPG D'09 (P, H & C GDC-1:50,000)

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Department of Science & Technology, Government of India.

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Executive Engineer
Sarasvati Heritage Div. No. 1
Jagadhri

Sub Divisional Officer
Sarasvati Heritage Sub Division No. 2
Jagadhri

| Located at: D:\Work\osm_50\osm_punjab\h43p9\3_grs\H43P9_COMB_EXPOSE.GRS | Size: 641.685 x 669.812 mm | Date: 16-DEC-11 - 16:03:19 | SmartID: L31U9 | Resolution: ppi | Dot: | Inks : Yellow Magenta Cyan Black | Configuration: bctrans1.ppd | Emulsion: Right Reading |

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No. H43P13

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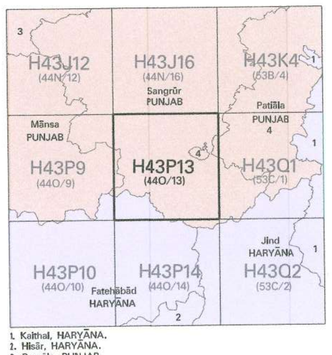


1. Kaithal, HARYĀNA.
2. Hisār, HARYĀNA.
3. Barnāla, PUNJAB.

भारतीय सर्वेक्षण विभाग SURVEY OF INDIA

1st Edition 2009. Price : Rs. 50/-

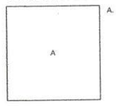
CONVENTIONAL SYMBOLS

Express highway: with toll; with bridge; with distance stone
Roads, metalled: according to importance
Roads, double carriageway: according to importance
Unmetalled road. Cart-track. Pack-track with pass. Foot-path
Streams: with track in bed; undefined. Canal
Dams: masonry or rock-filled; earthwork. Weir
River: dry with water channel; with island & rocks. Tidal river
Submerged rocks, Shoal. Swamp. Reeds
Wells: lined; unlined. Tube-well. Spring. Tanks: perennial; dry
Embankments: road or rail; tank. Broken ground
Railways, broad gauge: double; single with station; under constrn.
Railways, other gauges: double; single with distance stone; do
Mineral line or tramway. Kils. Cutting with tunnel
Contours with sub-features. Rocky slopes. Cliffs
Sand features: (i)flat.(2)sand-hills (permanent). (3)dunes(shifting).
Towns or Villages: inhabited; deserted. Fort
Huts: permanent; temporary. Tower, Antiquities
Temple. Chhatri. Church. Mosque. Idgah. Tomb. Graves
Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage
Mine. Vine on trellis. Grass. Scrub
Palms; palmyra; other. Plantain. Conifer. Bamboo. Other trees
Areas: cultivated; wooded. Surveyed tree
Boundary, International
" state: demarcated; undemarcated
" district; subdivision, tahsil or taluk; forest
Boundary pillars: surveyed; unlocated; village trijunction
Heights, triangulated; station point: approximate. △ 200 .200 .200
Bench-mark: geodetic; tertiary; canal . BM 63-3 .BM 63-3 .63
Post office. Telegraph office. Overhead tank
Rest house or Inspection bungalow. Circuit house. Police station
Camping ground. Forest: reserved; protected . CG RF P F
Spaced names: administrative; locality or tribal . KIKRI NĀGA
Hospital. Dispensary. Veterinary: Hospital / Dispensary
Aerodrome. Helipad. Tourist site
Power line: with pylons surveyed; with poles unsurveyed

NOTES :-

Heights are in metres and above Indian mean sea level.
Contours are approximate.
Tubewells are numerous throughout the sheet; only the important ones have been shown.
Canal distance stones are 5,000 feet apart and every existing one is shown except along Main Drain No. 1, and in the area south of Ghaggar River, where these are 1,000 feet apart and every existing fifth stone is shown.
All cart-tracks and unmetalled roads along canals are generally motorable throughout the year. Permission to use these is required from the Irrigation authorities. Other cart-tracks and unmetalled roads are generally motorable in dry season.
A relative height, e.g. 3m, marked along a canal, indicates the height of the top of the canal embankment above the adjacent country.
A relative height, cfr, represents the approximate height, in metres, between the top and bottom of steep slopes.
The state boundary between Haryāna and Punjab states has been surveyed as pointed out by the local officials on the ground but has not been verified by the Governments concerned.
3,000-acre rectangulation stones of Bhākra Dam Project Surveys based on Origin 30° 0' N, 75° 15' E with their numbers are shown as tertiary bench-marks thus:- F 220 , BM 222-0.

COMPILATION INDEX



A. Compiled from 1:25,000 survey, 1986-87.
Updated for major details during 2005-06.

Projection – UTM Datum – WGS 84

Magnetic Variation from True North about 1° East in 2005.
(Increasing by about 1' annually).

1:50,000
500 m to 1 cm 2 cm to 1 km
Metres 1000 500 0 1 2 3 Kilometres
CONTOUR INTERVAL 10 METRES

For further details about this map, please contact
Director
Punjab, Haryana & Chandigarh Geo-Spatial Data Centre
Survey of India, Sector 32 A
Chandigarh.
Fax : 0172 – 2604671

WEBSITE – www.surveyofindia.gov.in

REG. No. -WPG D'09 (P, H & C GDC-1:50,000)

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Department of Science & Technology, Government of India.

PRINTED AT THE WESTERN PRINTING GROUP OF SURVEY OF INDIA.

Executive Engineer
Sarasvati Heritage Div. No. 1
Jagadhri

Sd
Sub Divisional Officer
Sarasvati Heritage Sub Division No. 2
Jagadhri

| Located at: D:\Work\osm_50\osm_punjab\H43P13\3_grs\H43P13_comb_EXPOSE.GRS | Size: 643.275 x 675.125 mm | Date: 16-DEC-11 16:02:59 | SmartID: 4O044U Resolution: ppi | Dot: | Inks : Yellow Magenta Cyan Black | Configuration: bctrans1.ppd | Emulsion: Right Reading |

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No. H43P5

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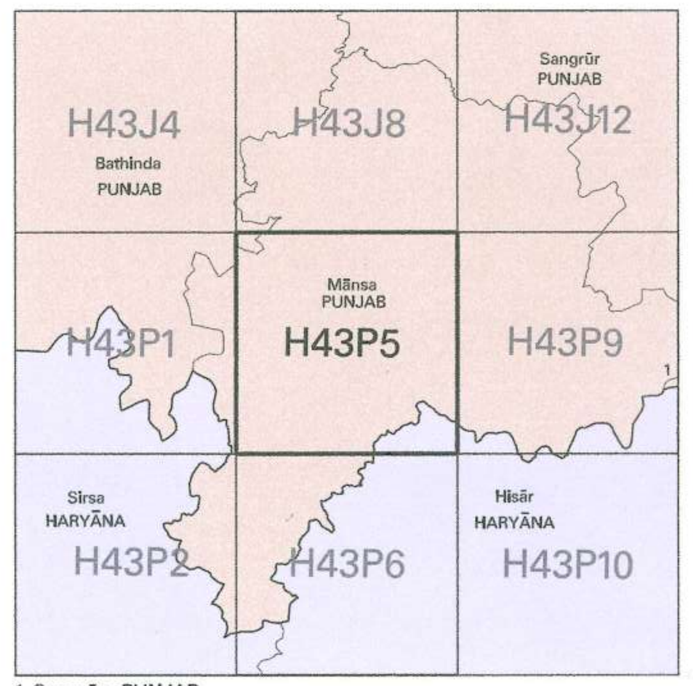

1 Sangrūr, PUNJAB.

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- Railways, other gauges: double; single with distance stone; do
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- Mine. Vine on trellis. Grass. Scrub
- Palms: palmyra; other. Plantain. Conifer. Bamboo. Other trees
- Areas: cultivated; wooded. Surveyed tree
- Boundary, international
- " state: demarcated; undemarcated
- " district; subdivision, tahsil or tāluk; forest
- " Pillars: surveyed; unlocated; village trijunction.
- Heights, triangulated; station; point; approximate. △ 200 .200 .200
- Bench-mark: geodetic; tertiary; canal. BM 63·3 .BM 63·3 .63
- Post office. Telegraph office. Overhead tank.
- Rest house or Inspection bungalow. Circuit house. Police station
- Camping ground. Forest: reserved; protected CG RF PF
- Spaced names: administrative; locality or tribal KIKRI NĀGA
- Hospital. Dispensary. Veterinary hospital
- Aerodrome. Helipad. Tourist site
- Power line: with pylons surveyed; with poles unsurveyed

NOTES :–

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Tanks shown dry, in this area usually contain water from July to October.

Tube-wells are numerous throughout the sheet, only the important ones have been shown.

Unmetalled roads and cart-tracks in this sheet are generally motorable in dry season. Permission to use those along canals is required from the Irrigation authorities.

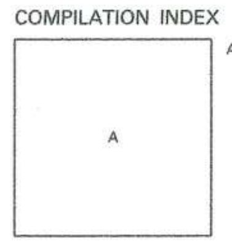
Canal distance stones along BHĀKRA CANAL Main Branch and Sirhindchoe Drain are 1,000 feet apart and every existing fifth stone is shown, Other canal distance stones are 5,000 feet apart and existing ones have been shown.

Avenues of trees, exist along all main and branch canals in this sheet.

The state boundary between Haryāna and Punjab States has been surveyed as pointed out by the local officials on the ground but has not been verified by the Governments concerned.

3,000-acre rectangulation stones of Bhākra Dam Project Surveys based on Origin 30°00′ N, 75°15′ E with their numbers are shown as tertiary bench-marks thus:– $E^{11}\frac{301}{1}$ .BM 213·7.

COMPILATION INDEX



A. Surveyed during 1984-85.
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Projection – UTM Datum – WGS 84

Magnetic Variation from True North about 1° East in 2000. (Increasing by about 2′ annually).

1:50,000

500 m to 1 cm — 2 cm to 1 km

Metres 1000 500 0 1 2 3 Kilometres

CONTOUR INTERVAL 10 METRES

For further details about this map, please contact
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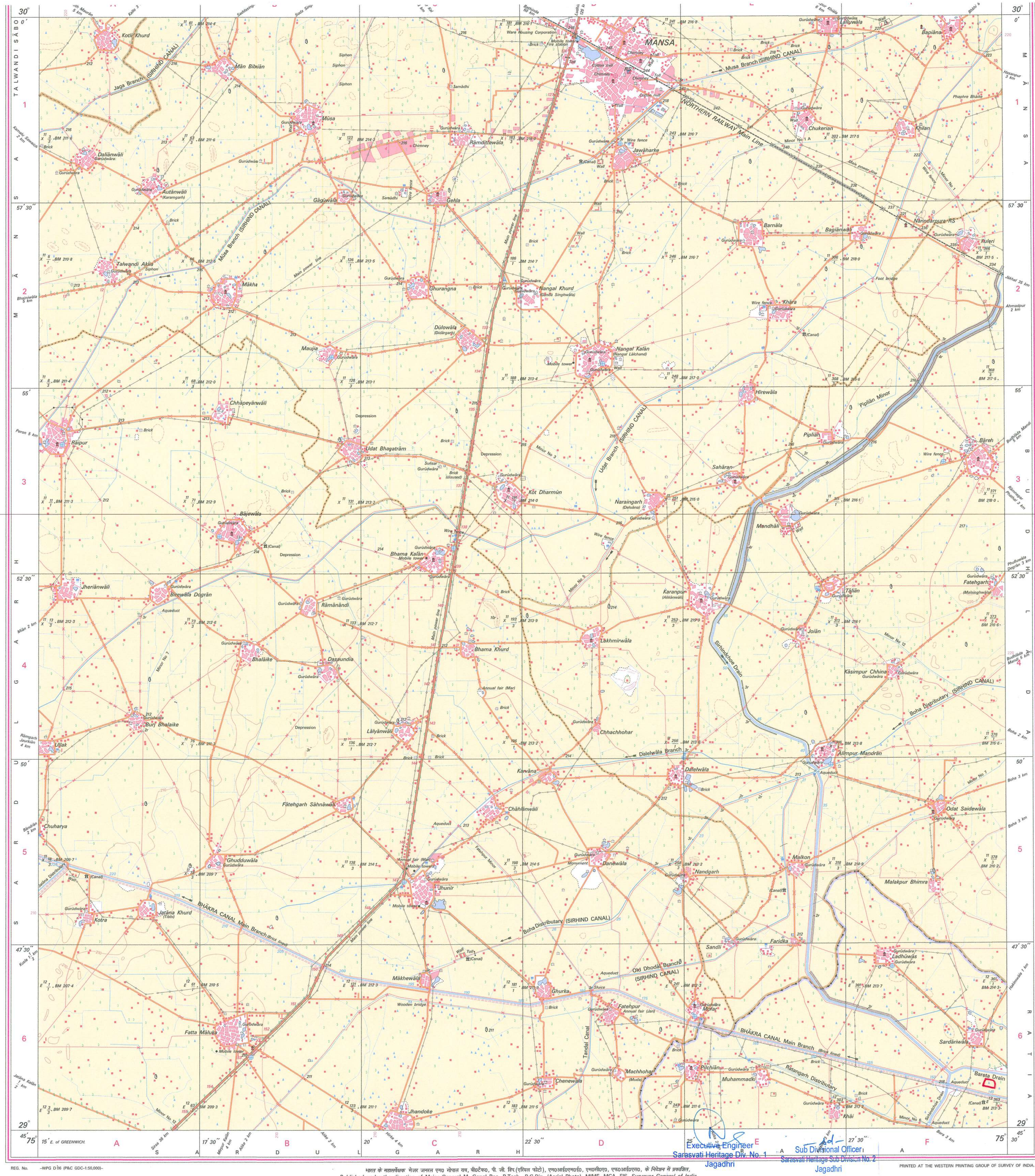

REG. No. -WPG D 06 (P&C GDC-1:50,000)-

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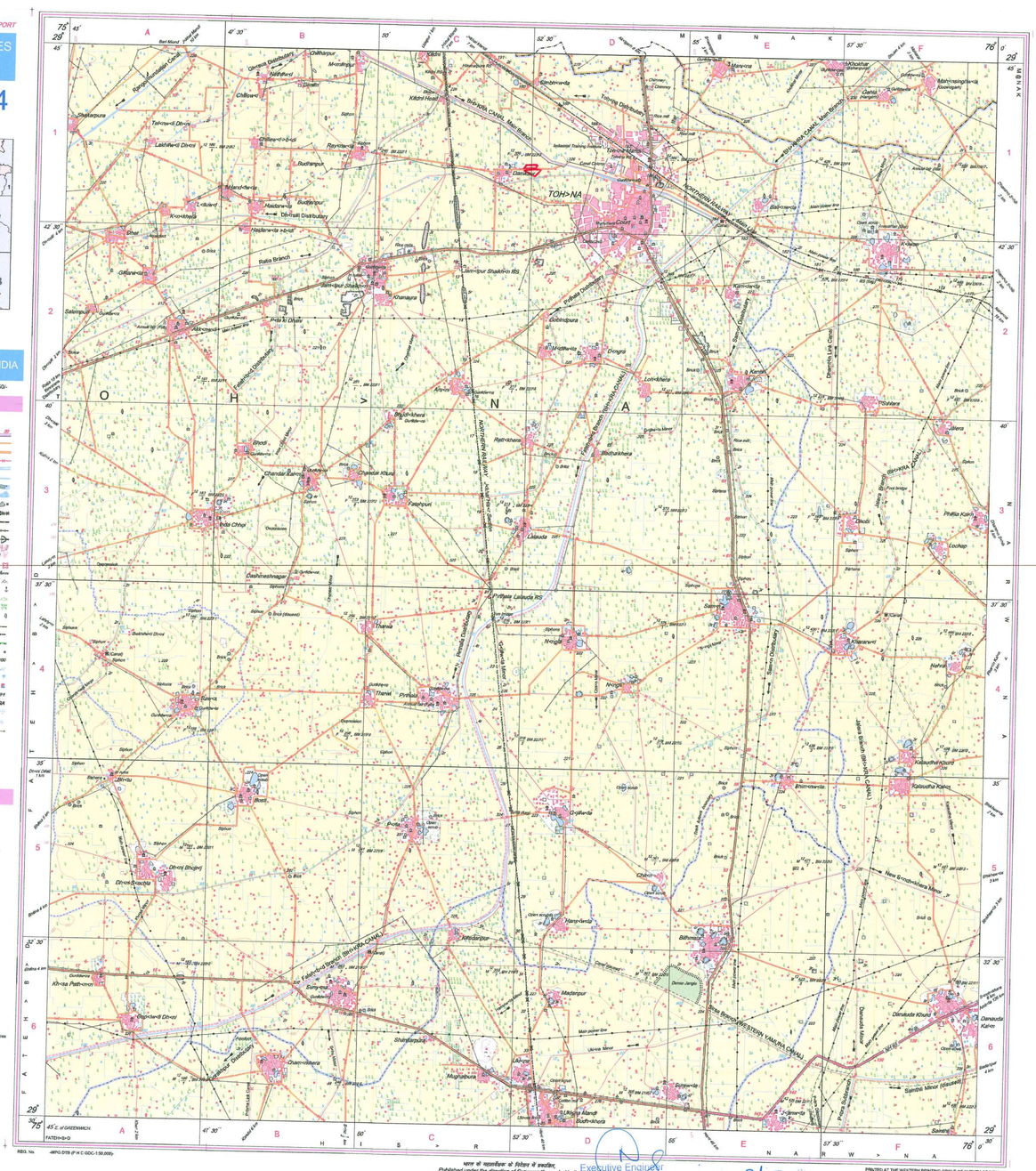

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No. H43P14

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REFERENCE

NH 65 National Highway No. 65

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A relative height, e.g., 2r, marked along a canal, indicates the height of the top of the canal embankment above the adjacent country.

The triangulated heights and contours in this sheet have not been adjusted to the heights of the spirit-levelled bench - marks and may not be strictly in accordance with them.

Tanks, shown dry, in this area usually contain water from July to March.

3000- acre rectangulation stones of Bhākra Dam Project Surveys based on Origin 30° 00' N, 75° 15' E with their numbers are shown as tertiary bench - marks thus........ $F\ ^{12}\ \frac{318}{3}$. BM 222·5.

The state boundary between Haryāna and Punjab states has been surveyed as pointed out by the local officials on the ground but has not been verified by the Governments concerned.

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Sd
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Sarasvati Heritage Sub Division No. 2
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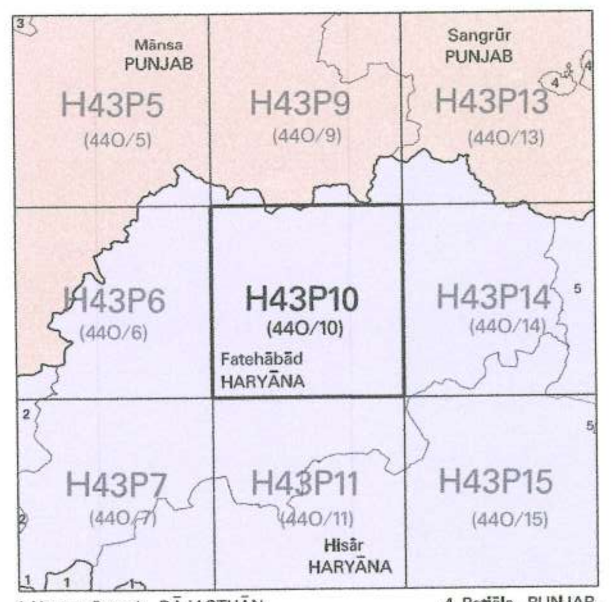

1 Hanumāngarh, RĀJASTHĀN.
2 Sirsa, HARYĀNA.
3 Bathinda, PUNJAB.
4 Patiāla, PUNJAB.
5 Jīnd, HARYĀNA.

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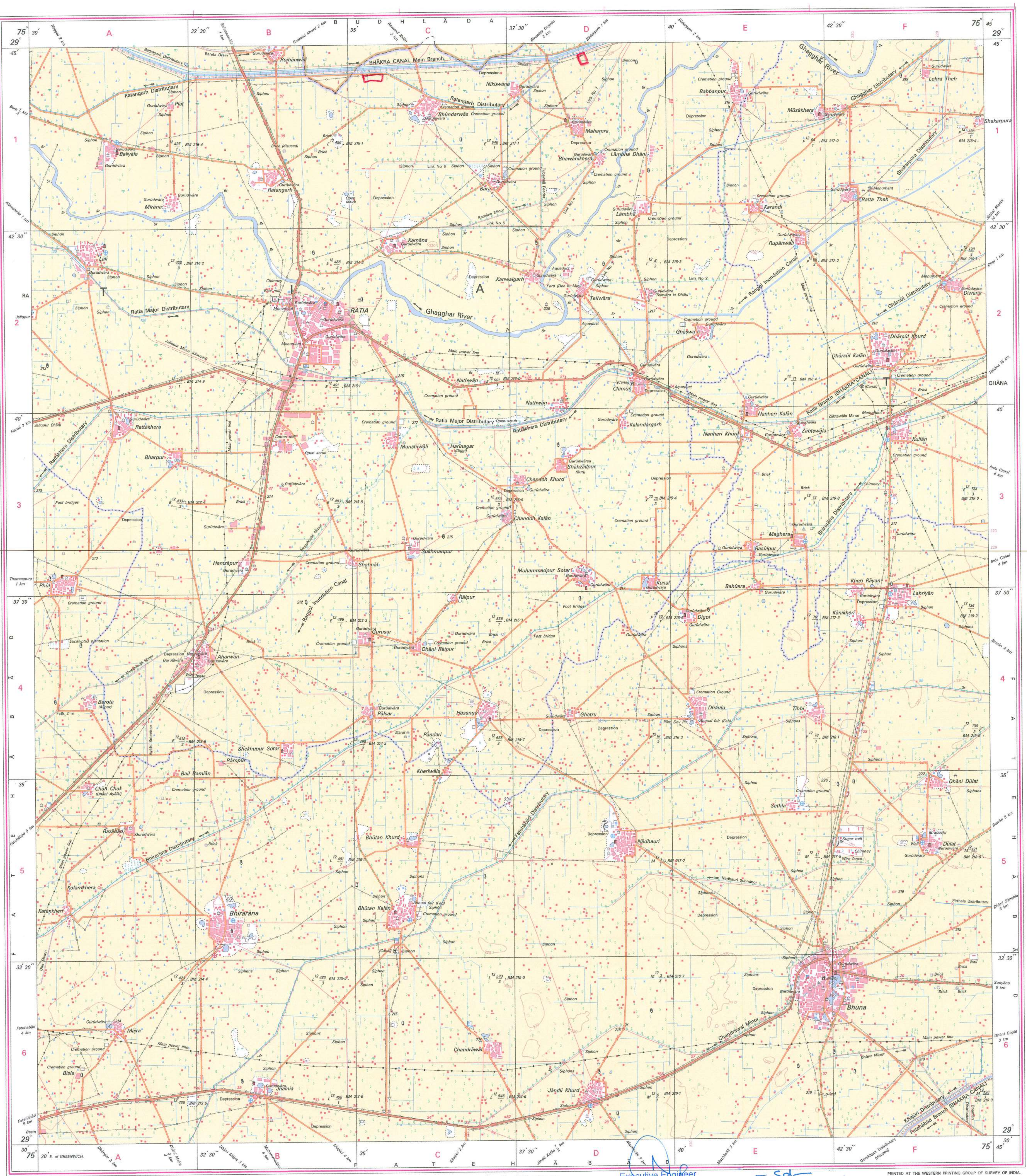

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Full Title of Project: - Construction of Adi Badri Dam on Somb Nadi and its piped link to Sarasvati Nadi and Sarasvati Reservoir
File No: - FP/HP/IRRIG/155846/2022
Date of Proposal: - 26.05.2022

Check List No. 29

Cost Benefit Analysis Calculations

Table 1: Estimation of Cost for Cost Benefit Analysis

Sl.	Particulars	MoEF Guidelines	Reserve forest compensation (In Rs. Lakhs)
1	Ecosystem services losses due to proposed forest diversion	Economic value of loss of ecosystem services due to diversion of forests shall be the net present value (NPV) of the forest land being diverted. **Calculation attached as annexure-A**	410.09
2	Loss of animal husbandry productivity, including loss of fodder	To be quantified and expressed in monetary terms or 10% of NPV applicable whichever is maximum. **Calculation attached as annexure-B**	41.00
3	Cost of human settlement	To be quantified and expressed in monetary terms as per approved R&R plan.	200.00
4	Loss of public facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric lines, railways, etc.) on forest land, which would require forest land if these facilities were diverted due to the project	To be quantified and expressed in monetary terms on actual cost basis at the time of diversion.	Nil
5	Possession value of forest land diverted	30% environmental cost (NPV) due to loss of forest.	123.03
6	Cost of suffering of oustees	The social cost of rehabilitation of oustees (in addition to the cost likely to be incurred in providing residence, occupation and social services as per R&R plan) be worked out as 1.5 times of what oustees should have earned in two years had not been shifted.	Nil
7	Habitat fragmentation cost	50% of NPV applicable as per thumb rule	205.04
8	Compensatory afforestation and soil & moisture conservation cost	The actual cost of compensatory afforestation and soil moisture conservation and its maintenance in future at present discounted value.	190.27
	Total		**1169.43**

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Table 2: Estimating benefits of forest diversion in CBA

S. No.	Parameters	MoEF Guidelines	Descriptions	Cost (In Rs. Lakhs)
1.	Increase in productivity attributable to the specific project	To be quantified and expressed in monetary terms avoiding double counting.	Due to lack of irrigation facilities in the area, farmers are unable to grow good crops in a scientific manner. With the ground water recharge due to proposed project, the farmers can grow rotational crops which will improve their income and overall economic growth of the area. Thus, had the water available from this project been used for irrigation, it would have been very beneficial. This comes out to be Rs. 467.51 Lakhs. **Calculation attached as annexure-c**	467.51
2.	Benefits of economy due to specific project	The incremental economic benefit in monetary terms due to the activities attributed to the specific project.	The overall output of the business established in the vicinity of the area will be increased as the project will attract tourism. The area will be developed by tourism department by providing tourist attraction for wild life, picnic spots, gardens etc. This place will be of great tourist attraction as the area is very near to Kapal Mochan-tirath. Increase in productivity with respect to tourism. Increase in District GDP/per capita income[1] would be a direct indicator for benefit to the economy. This comes to Rs.4258 lakhs at 8% NPV rates. **Calculation attached as annexure-D**	4258.00
3.	No. of population benefited due to specific project	As per DPR	Nil	Nil

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4.	Economic benefits due to direct and indirect employment due to the project	As per DPR	200 employees during the construction phase will be employed for a period of two years. During the construction period approx. 120000 man-days will be generated and after the construction indirect employment will be generated due to development of shops along the project road. 120000 man-days will be benefitted in terms of salary and wages @ Rs.500/day = Rs. 600lakhs	600.00
5.	Economic benefits due to Compensatory afforestation	Benefits from such Compensatory afforestation accruing over next 50 years monetized and discounted to the present value should be included as benefits of the compensatory afforestation for benefits of CA the guidelines of the ministry for NPV estimation may be consulted.	Considering the total forest diverted area for CA i.e. 31.72 ha and the NPV of forest the total Economic benefit would be Rs.489.66 Lakhs once the total CA is done and similar benefits are accrued as in forest areas. As provided by forest department.	489.66
			Total	**5815.17**

Table 3: Benefit/Cost Ratio

Total Benefit	5815.17
Total Cost	1169.43
Benefit/Cost Ratio	**4.97**

Sub Divisional Officer
Sarasvati Heritage Sub Division No. 2
Jagadhri

Executive Engineer
Sarasvati Heritage Division No. 1
Jagadhri

Divisional Forest Officer,
Nahan Forest Division,
Nahan, H.P.

Full Title of Project: - Construction of Adi Badri Dam on Somb Nadi and its piped link to Sarasvati Nadi and Sarasvati Reservoir
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Annexure-A

Calculation of NPV:-

Forest Land	31.72 Ha
Eco class of the forest	Class V
NPV rate of Class V Forest	1005210/- per hactare
NPV value of Forest Land	31.72x1292850= Rs. 410009202/-

Annexure-B

Loss of animal husbandry productivity, including loss of fodder is maximum of followings:-

1. 10 % of NPV = 41.00 lacs

2. Quantified in monetary terms:-

Surface forest land	31.72 ha
Forest cover	Sub Tropical Broad Leaved Hill Forest
Eco-Class of the forest	Class-V
Rate of fodder production	Rs. 4514/ha/yr
Economic value of fodder production.	4515x31.72=143216

Loss of animal husbandry productivity, including loss of fodder is 41.00 lacs.

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Annexure-C

YEAR	Production (GDP Per capita in Sirmaur District of HP)
2018	33982.00
2019	34661.64
2020	35354.87
2021	36061.97
2022	36783.21
2023	37518.87
2024	38269.25
2025	39034.64
2026	39815.33
2027	40611.64
2028	41423.87
2029	42252.35
2030	43097.39
2031	43959.34
2032	44838.53
2033	45735.30
2034	46650.00
2035	47583.00
2036	48534.66
2037	49505.36
2038	50495.46
8% of GDP Per capita in Sirmaur District of HP	**4258.40 Cost (In Rs. Lakhs)**

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Annexure-D

Notional Irrigation Benefits have been worked out as under:

Net usable water during depletion period (at 50% dependability) from the water stored in the AdiBadri Dam Reservoir and AdiBadri Dam water stored in the spare capacity of Sarasvati Reservoir = 767.13 ha-m

Let notionally 1/3rd of water is used in Kharif and 2/3rd in Rabi crop.

Therefore water used for Rabi Crops = 767.13 X 2/3=511.42 ha-m

Rabi Discharge:-

Thus available water for Rabi crops = 511.42 ha-m = 511.42 ha-m x 4.087 CS – days

= 2090.17 CS- Days

No. of full supply days for Rabi = 67

One CS of water when runs for 67 days, it can irrigate (1000/2.4) x 0.62 x 0.60 =155 Acre Rabi Crop

Thus 67 Cs-day water can irrigate 155 Acre Rabi Crop

Total water in Rabi season = 2090.17 CS- Days

Thus net Notional Rabi irrigation = (2090.17 *155)/67 = 4835.5 Acre or 1957 Ha

It is propose to achieve 100% notional irrigation in Rabi.

Thus CCA = 1957 x 100/100= 1957 Ha

Rabi crop benefits = Rs. 20498 / ha (Figure agreed by NABARD for NABARD Financial Projects)

Total Rabi crop Notional Irrigation benefits = 20198 x 1957 = 395.27 Lacs

Kharif crops:

Water proposed to be notionally

Used in Kharif season = 567.13-511.42= 255.71 Ha-m

Thus availability of water for Kharif = 255.71x4.087=1045 CS-Days

No. of full supply days for Kharif period= 95 days

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Kharif Discharge= 1045/95=11 CS

One Cusec can irrigate = (1000/2.4)x0.62 x0.40=103.3 Acres

Therefore possible Notional irrigation in Kharif =11x103.3=1136.3 Acres or 460 Ha

Intensity of irrigation = (460/1957)x 100 =23.5%

Net Kharif Benefits = Rs. 15704 per Ha

Total Notional Kharif Benefits =15704x460=72,23,840 say 72.24 Lakhs

Total Notional Irrigation Benefits = 395.27 + 72.24 = 467.51 Lakhs