**PART-A**

**GUJRAT CANAL DIVISION**

**GUJRAT**

**CHAPTER – 1**

**SALIENT FEATURES OF THE GUJRATCANAL DIVISION**

* 1. **Location:**

The Gujrat Canal Division operates under the Sargodha Irrigation Zone in Punjab, Pakistan, and plays a vital role in water management, irrigation infrastructure maintenance, and flood protection. It is responsible for the operation and upkeep of canals, distributaries, and flood protection structures within Gujrat and Mandi Bahauddin Districts.

* 1. **General Description:**

This division plays a pivotal role in the maintenance and management of flood protection infrastructures, including bunds and spurs, along the right banks of the Chenab River and Munawar Tawi. It also oversees several hill torrents such as Bhimber Nallah, Bhinder Nallah, Halsi Nallah, and Dawara Nallah, spanning across the Gujrat and Mandi Bahauddin Districts.

The division is responsible for approximately 52.54 miles of flood protection bunds and spurs along the right bank of the Chenab River, and manages an extensive canal network totaling 171.53 miles within the Gujrat District. These infrastructures are essential for safeguarding the lives and properties of thousands of residents residing along the riverbanks, particularly during the monsoon season when the risk of flooding is heightened.

In addition to structural measures, the Gujrat Canal Division collaborates with the District Disaster Management Authority (DDMA) to implement non-structural measures such as early warning systems and community awareness programs. These efforts are designed to enhance the resilience of local communities against flood hazards. A comprehensive index plan detailing all flood protection structures along the hill torrents, River Chenab, and Munawar Tawi is attached as **Annex-A.**

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* 1. **ADMINISTRATIVE SETUP**

The Gujrat Canal Division operates under the Executive Engineer and is structured into two sub-divisions for efficient management. The administrative hierarchy is as follows:

* Executive Engineer, Gujrat Canal Division, Gujrat
* Sub Divisional Officer, Gujrat Canal Sub-Division, Gujrat
* Sub Divisional Officer, S&I Sub-Division, Gujrat
* Seven (07) Sub Engineers

Organization Chart of the division is shown in the figure-01.

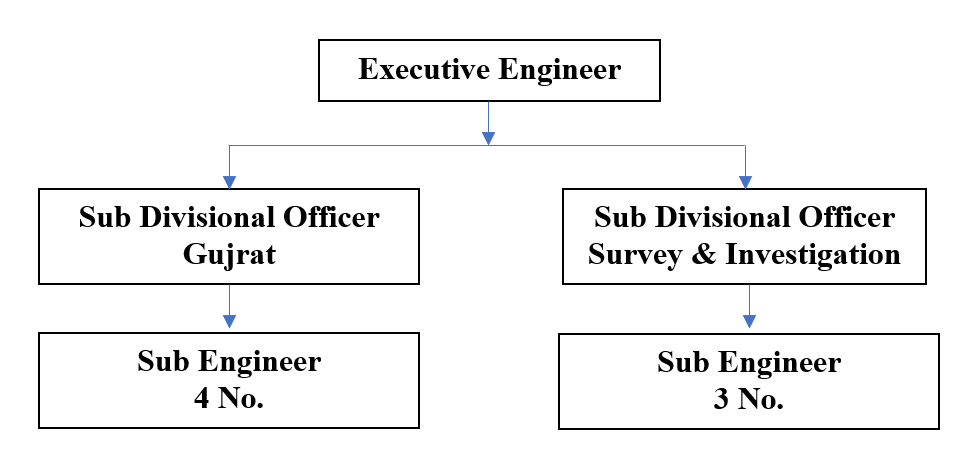


Figure 1: Organization chart of the Gujrat canal Division, Gujrat

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**CHAPTER – 2**

**FLOOD PROTECTION AND RIVER TRAINING WORKS**

**2.1 DESIGN PARAMETER OF TRAINING WORKS**

The design parameter of different water bodies fall under the jurisdiction of Gujrat Canal division are mentioned below:

**2.1.1. RIVER CHENAB**

The Chenab River originates from the hills of occupied Jammu and Kashmir and, upon entering Pakistan, comes under control at the Marala Barrage in District Sialkot. Other important structures on this river include the Alexandra Railway Bridge and G.T. Road Bridges near Gujrat city.

Prior to 1983, the river flowed along its left bank; however, in subsequent flood seasons, it gradually drifted to the right bank. This rightward drift became significant enough that the Irrigation and Power Department was forced to construct several spurs along the right bank over a reach of about 25 miles. These works aimed to check erosion and embankment failures along the right bank and to prevent the Alexandra Bridge from being bypassed by the river.

The Gujrat Division’s area of responsibility along the Chenab covers the right bank from the downstream end of the Marala Head Works to the escape of the lower Jhelum canal. The river reaches are divided as follows:

* Marala-Alexandra Bridge Reach (District Gujrat)
* Alexandra Bridge–Khanki Barrage Reach (District Gujrat)
* Qadirabad Head Works to Escape Reach (District M.B. Din)

Below is a detailed summary of the works in these reaches.

1. **Marala to Alexandra Bridge (River reach)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr.No.** | **Name of spur** | **Location** | **Length of spur** | **Length of shank** | **Length of head** | **Top width** | **Side slope of shank** |
| 1. | Spur No. 1 U/S Alexandra Bridge. | Distt:  Gujrat | 7753’ | 6423’ | 1330’ | 25’ | 2:1 |
| 2. | Spur NO.2 near Pandi village | -do- | 8805’ | 7475’ | 1330’ | 25’ | 2:1 |
| 3. | Mole head prong U/S side of spur No.2. | -do- | 450’ | -- | -- | 25’ | 2:1 |
| 4. | Slopping stud U/S spur No. 2 near village Patwan converted in Hockey spur. | -do- | 1630’ | 1060’ | 570’ | 25’ | 2:1 |
| 5. | J- Head Spur No. 3 near kotli village. | -do- | 3980’ | 2600’ | 1380’ | 25’ | 2:1 |
| 6. | J- Head Spur No. 4 near Dera Nasir. | -do- | 2657’ | 1300’ | 1357’ | 25’ | 2:1 |
| 7. | Slopping stud U/S spur No. 4 near village kot Ghulam. | -do- | 1056’ | -- | -- | 25’ | 2:1 |
| 8. | J- Head Spur No. 5 near Lambore village | -do- | 4235’ | 2905’ | 1330’ | 25’ | 2:1 |
| 9. | J- Head Spur No. 6 near kot Nikka village. | -do- | 3590’ | 2250’ | 1340’ | 25’ | 2:1 |
| 10. | J- Head Spur No. 7 near Dawara Nallah. | -do- | 3847’ | 2500’ | 1347’ | 25’ | 2:1 |
| 11. | Guide bank/spur No. 8 near Shahbazpur village. | -do- | 1925’ | 500’ | 1425’ | 25’ | 2:1 |
| 12. | Slopping stud U/S spur No. 8 near village Changanwali. | -do- | 2070’ | -- | -- | 25’ | 2:1 |
| 13. | Guide bank/spur No. 9 near Dera Hakim Ali. | -do- | 1820’ | 750’ | 1320’ | 25’ | 2:1 |
| 14. | Guide bank spur No. 10 near Sajawal village. | -do- | 1760’ | 500’ | 1260’ | 25’ | 2:1 |
| 15. | Guide bank/Spur No. 11 near Chopala village. | Distt: Gujrat | 1790’ | 400’ | 1390’ | 25’ | 2:1 |
| 16. | Restoring plug bund of river creek near Shampurkhokhran in District Gujrat (FPSP). | -do- | 900’ | 1700’ including length of head | -- | 20’ | 2:16 |
| 17. | Protective measure against erosion of River Chenab to Sherines of Hazrat Ammoon and Hazrat Tanooh (Aleh Salam) near village Sheikh Chugani in District Gujrat. | -do- | 465’ | 1700’ including length of head | -- | 15’ | 1:2` |
| 18. | J-head spur near village Shampur. | -do- | 2394’ | 1644’ | 750’ | 25’ | 2:1 |
| 19. | Guide wall spur near village Nut Sharki. | -do- | 1013’ | 620’ | 293’ | 20’ | 2:1 |
| 20. | Construction of Inverted Hockey Stud No. 1&2 near village Behlolpur on right bank of River Chenab. | -do- | 520’ | 365’ | 155’ | 25’ | 2:1 |
| i) | Gunda Bund No. 1 | -do- | 833’ | 833’ | -- | 25’ | 2:1 |
| ii) | Gunda Bund No. 2 | -do- | 442’ | 442’ | -- | 25’ | 2:1 |
| 21. | Construction of Guide Wall Spur near village Kot Ghulam on right bank of River Chenab. | -do- | 973’ | 633’ | 340’ | 25’ | 2:1 |
|  | **Total length** | **54908 (10.98 Miles)** | | | | | |

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1. **ALEXANDRA TO KHANKI HEADWORKS (River Reach)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr.No.** | **Name of spur** | **Location** | **Length of spur** | **Length of shank** | **Length of head** | **Top width** | **Side slope of shank** |
| 1. | J-head spur near village Samma Mohla. | Distt: Gujrat | 2887’ | 2187’ | 700’ | 25’ | 2:1 |
|  | **Total** | **2887’ (0.58 Miles)** | | | | | |

1. **QADIRABAD BARRAGE TO OUTFALL LJC ESCAPE (RIVERREACH)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr.No.** | **Name of spur** | **Location** | **Length of spur (in ft.)** | **Length of shank** | **Length of head** | **Top width (in ft.)** | **Side slope of shank** |
| 1 | Guide wall spur opposite village Kalashadian. | Distt: MBDin | 1170 | -- | -- | 30 | 2:1 |
| 2 | Guide wall spur village Bari &Randali. | Distt: MBDin | 1387 | -- | -- | 25 | 2:1 |
| 3 | Stone pitched guide wall and stud. | Distt: MBDin | 700 | -- | -- | 20 | 2:1 |
| 4 | Inverted Hockey Spur near village Bari. | Distt: MBDin | 2034 | -- | -- | 20 | 2:1 |
|  | **Total** | **5291’ (1.06 Miles)** | | | | | |

**Guide wall spur near village Kot Ghulam**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Length | 973 ft. |
| 2 | Location | Along right bank of River Chenab near village Kot Ghulam |
| 3 | Side slopes | 2:1 on both side |
| 4 | Top width | 25 ft. |
| 5 | Free board | 5’ |

**Inverted Hockey Stud No. 1 & 2 near village Behlolpur**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Length | 520 ft.  Length of Gunda Bund No.1 =833 ft.  Length of Gunda Bund No.2 =442 ft. |
| 2 | Location | Along right bank of River Chenab near village Behlolpur |
| 3 | Side slopes | 2:1 on both side |
| 4 | Top width | 25 ft. |
| 5 | Free board | 5’ |

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**CHUKNAWALI FLOOD BUND**

This bund is situated downstream Qadirabad Barrage for protection of 15-R disty and village abadies of Tehsil Phalia District Mandi Bahauddin. Its total length is 12.38 miles and is quite safe to combat high floods in River Chenab. Salient features of Chuknawali flood bund are as under:

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Length | 12.38 Miles |
| 2 | Location | along right bank of River Chenab Jaggokalan to D/S UJC |
| 3 | Side slopes | 3:1 inner & 2:1 outer side. |
| 4 | Top width | 20’ |
| 5 | Free board | 5’ above HFL of 1973 |

**Guide wall spur near village Bari &Randiali.**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Lengthof guide wall | 1387 ft. |
| 2 | Location | along right bank of River Chenab Jaggokalan to D/S UJC |
| 3 | Side slopes | 2:1 |
| 4 | Thickness of pitching | 2 ft. |
| 5 | High flood level | 669.60 ft. |
| 6 | Top level of guide wall. | 669.60 ft. |
| 7 | Top level of apron | 654.50 ft. |

**Sloping studnear village Bari &Randiali.**

|  |  |  |
| --- | --- | --- |
| 1. | Length | Straight part = 100 feet  Sloping part = 192 feet  Total = 292 feet |
| 2. | Top width | 15 feet |
| 3. | Side slopes | 1:1 |

**Inverted Hockey spur near village Bari**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Length of Hockey | | 1076 Feet |
| 2. | Top width | | 20 feet |
| 3. | Side slopes | | 2:1 |
| 4. | Thickness of pitching | 2 ft. | |
| 5. | Top level of apron | 677.0 ft. | |

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**2.1.2. RIVER MUNAWAR TAWI**

River Munawar Tawi originates from the foot-hills of Indian Occupied Jammu & Kashmir and has a vast catchment area. Due to the steep river slope, flashy floods during the monsoon season are a common occurrence in this river. This flood discharge eventually outfalls in River Chenab at the upstream of Marla Headwork’s. Over the past few years, River Munawar Tawi had developed a gradual trend of rightward drift and is, therefore, posing threat to the basic infrastructure, fertile agricultural lands, and village abadies situated on the right bank of the said River.

To mitigate the rightward drift of River Munawar Tawi and protect settlements, infrastructure, and agricultural land, three Guide Bank Spurs were constructed upstream of Marala Headworks at the following locations:

1. Near Village Lashkari Chak
2. Near Village Barmala
3. Near Village Surkhpur

During an unexpected freshet in March 2003, an old creek was reactivated, leading to severe erosion at the downstream shank of the spur near Surkhpur. This resulted in the Surkhpur-Marala Road coming under direct impact from the river, posing a significant threat to the infrastructure and adjacent land.As an immediate remedial measure, the affected portion of the spur and road was reinforced with stone pitching. To develop a sustainable long-term solution, a model study was conducted, which recommended specific improvements to the guide wall spurs near Surkhpur and Barmala. These measures aimed to enhance the stability of the spurs, safeguard the road infrastructure, and protect nearby agricultural lands from further erosion.

The Irrigation Department subsequently initiated a summary for approval from the Chief Minister of Punjab to execute the proposed works under the Annual Development Program (ADP) for the financial year 2004-2005. The proposal was approved, and the necessary construction and reinforcement works have been successfully completed.

**NO. GUIDE BANK SPURS ON RIGHT BANK OF RIVER MUNAWAR TAWI IN DISTRICT GUJRAT.**

A salient feature is given as under:-

Location = Originate from Azad Jammu Kashmir to River Chenab

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**Surkhpur** Length = 1777’

Side slopes = 2:1 either Side

Top width=20ft.

**Barmala** Length = 1666’ Side slopes = 2:1 either Side

Top width=20ft.

**Chak lashkri** Length = 1277’ Side slopes = 2:1 either Side

Top width=20ft.

**2.1.3 BHIMBER NALLAH**

Bhimber Nallah is a non-perennial hill torrent originating from the hills of Jammu & Kashmir, with a catchment area of approximately 415 square miles. It flows downstream and outfalls into the Chenab River from its right bank, just upstream of Khanki Headworks. Due to its steep gradient, the nallah generates high-velocity flash floods, posing a serious threat to the plains of District Gujrat. During the 1988 flood season, a peak discharge of 78,000 cusecs was recorded, highlighting the destructive potential of this watercourse. The average annual rainfall in its catchment ranges between 26 and 38 inches, significantly influencing flood events. Several important towns and critical infrastructure, including Lalamusa, RattowalSyedan, Grand Trunk (GT) Road, Railway Line, and High-Tension (HT) Transmission Lines, lie within its flood-prone zone. To mitigate flood risks and safeguard these areas, the Lalamusa Flood Bund has been constructed along the right bank of Bhimber Nallah, serving as a vital flood protection barrier to prevent potential devastation.

1. **LALAMUSA FLOOD BUND**

Lalamusa flood bund was constructed along the right bank of Bhimber Nullah from kharian-Jalalpur Jattan Defence road to G.T road bridge (Rehmania bridge) near Gujrat city District Gujrat.A series of 33 No. stone sloping spur have been constructed on Lalamusa Flood Bund for its protection against erosion and to keep the active current sufficiently away from the main bund which are shown in table 02.Data of Lalamusa flood bund is as under in table 01.

Table 1: Salient features of Lalamusa flood bund.

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Length | RD 0-81270 (16.25 miles) |
| 2 | Location | Along right bank Bhimber Nallah from kharian-Jalalpur Jattan Defence road to G.T road bridge (Rehmania bridge) near Gujrat city District Gujrat. |
| 3 | Side slopes | 3:1 on inner side = 2:1 outer side |
| 4 | Top width | 20’ |
| 5 | Free board | 5’ above HFL of 1992 |

Table 2: details of Spur at Lalamusa flood bund

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **RD of spur** | **Length of spur** | **Detail of spur** |
| 1. | 13300 | 125’ | Stone sloping spur |
| 2. | 13370 | 150’ | -do- |
| 3. | 14145 | 160’ | -do- |
| 4. | 14300 | 156’ | Stone sloping spur |
| 5. | 14450 | 130’ | -do- |
| 6. | 14600 | 120’ | -do- |
| 7. | 14820 | 75’ | -do- |
| 8. | 14950 | 75’ | -do- |
| 9. | 15115 | 150’ | -do- |
| 10. | 15270 | 150’ | -do- |
| 11. | 15570 | 75’ | -do- |
| 12. | 25970 | 77’ | -do- |
| 13. | 26070 | 100’ | -do- |
| 14. | 26350 | 90’ | -do- |
| 15. | 26470 | 87’ | -do- |
| 16. | 26720 | 87’ | -do- |
| 17. | 29060 | 125’ | -do- |
| 18. | 29170 | 120’ | -do- |
| 19. | 41070 | 110’ | -do- |
| 20. | 41170 | 100’ | -do- |
| 21. | 41295 | 90’ | -do- |
| 22. | 41420 | 100’ | -do- |
| 23. | 41570 | 115’ | -do- |
| 24. | 41670 | 100’ | -do- |
| 25. | 41870 | 100’ | -do- |
| 26. | 66120 | 75’ | -do- |
| 27. | 66270 | 80’ | -do- |
| 28. | 66520 | 75’ | -do- |
| 29. | 66655 | 75’ | -do- |
| 30. | 66980 | 100’ | -do- |
| 31. | 67155 | 120’ | -do- |
| 32. | 67320 | 120’ | -do- |
| 33. | 67735 | 115’ | -do- |

**VULNERABLE SITES OF LALAMUSA FLOOD BUND**

Vulnerable sites are protected with stone pitching supported with stone apron at the base. Detail of stone pitched sites is Chachian, Guliana, Aiko, Dahu, Kamla, Bhand, Qazi Imam Shah, Syeda Goll, Gill, Kot Bella.chakha

1. RD 9000-10000 = 1000

1. **BHIMBER RIGHT BUND**

Bhimber right bund was constructed on right bank of Bhimber Nallah with bridge on G.T road and bridge on Gujrat-Sargodha Road as its starting and terminating point respectively.Salient features of Bhimber Right bund are as under:

Table 3: Salient features of Bhimber right bund

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Length | RD 0+000-21+550 (4.31 miles) |
| 2 | Location | Along left bank of Bhimber Nallah from G.T road Rehmanianwala Bridge to Sargodha Gujrat Road. |
| 3 | Side slopes | 3:1 inner side = 2:1 outer side |
| 4 | Top width | 20.0’ |
| 5 | Free board | 3.20’ |
| 6 | Vulnerable villages | Dhool, Vanse, Changanwali, Melo, Qasibabad, Khokhar |

1. **BHIMBER LEFT BUND**

Bhimber left bund was constructed on left bank of Bhimber Nallah with bridge on G.T road and bridge on Gujrat-Sargodha Road as its starting and terminating point respectively. Salient features of Bhimber left bund is as under:

Table 4: Salient features of Bhimber left bund

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Length | RD 0+000-19+050 (3.81 miles) |
| 2 | Location | Along left bank of Bhimber Nallah from G.T. Road Rehmanianwala bridge to Sargodha Gujrat Road. |
| 3 | Side slopes | 3:1 inner side = 2:1 outer side |
| 4 | Top width | 20.0’ |
| 5 | Free board | 3.0’ |
| 6 | Vulnerable villages | Sanawal, Sheikh Sukha. |

* + 1. **BHINDER NULLAH**

Bhinder Nallah is a left-bank tributary of Bhimber Nallah, with their confluence located near Village Musa Kamala, just upstream of the old G.T. Road Bridge. Historically, Bhinder Nallah caused severe flooding in Gujrat city and nearby villages, including Musa Kamala and Phullarwan, posing a significant threat to both human settlements and infrastructure.

1. **MUSA KAMALA FLOOD BUND**

To mitigate flood risks and safeguard these areas, the Musa Kamala Flood Bund was constructed along the left bank of Bhinder Nallah. This protective embankment, spanning 15,000 feet in length, begins near the Gujrat Airport strip and extends up to the G.T. Road Bridge.Salient features of this flood bund are given as under:

Table 5: Salient features of Musa Kamala Flood Bund

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Length | RD 0+000-15+000(3.0 miles) |
| 2 | Location | Along left bank of Bhinder Nallah from village Kamala to Rehmanianwala bridge at G.T Road Gujrat. |
| 3 | Side slopes | 3:1 inner side and 2:1 outer side |
| 4 | Top width | 20.0’ |
| 5 | Free board | 5’ above HFL of 1973 |

A total of 17 spurs have been strategically constructed to reinforce the flood bund and protect it from erosion. These spurs play a crucial role in deflecting the strong water currents away from the embankment, preventing potential breaches and ensuring the long-term stability of the flood protection infrastructure.

Table 6: Details of Spur's atMusa Kamala flood bund

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Location of Spur (RD)** | **Length of spur** | **Detail of spur** |
| 1. | 6+965 | 3620 ft | Earthen with stone pitching & apron at nose. |
| 2. | 7+450 | 370 ft. | -do- |
| 3. | 7+925 | 180 ft. | -do- |
| 4. | 8+500 | 185 ft. | -do- |
| 5. | 8+975 | 185 ft. | -do- |
| 6. | 9+250 | 150 ft. | Stone sloping spur |
| 7. | 9+550 | 250 ft. | -do- |
| 8. | 9+700 | 150 ft. | -do- |
| 9. | 10+050 | 320 ft. | Earthen with stone pitching & apron at nose. |
| 10. | 10+250 | 200 ft. | -do- |
| 11. | 10+550 | 370 ft. | -do- |
| 12. | 12+325 | 180 ft. | -do- |
| 13. | 12+700 | 108 ft. | -do- |
| 14. | 12+915 | 170 ft. | -do- |
| 15. | 13+160 | 170 ft. | -do- |
| 16. | 13+510 | 200 ft. | -do- |
| 17. | 13+865 | 220 ft. | -do- |

1. **Flood Embankment on Rainy Nallah near Village Keeranwala East.**

Table 7: Salient features of flood embankment on rainy nullah near keeranwala east,

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Length | 0-5000 (1.0 Mile) |
| 2 | Location | Along left bank of Bhimber Nallah |
| 3 | Side slopes | 2:1 on both side |
| 4 | Top width | 15 ft. |
| 5 | Free board | 5’ |

**2.1.5. HALSI NULLAH**

Halsi Nullah, a natural water channel in Gujrat city, originates from the hilly areas near Jammu and Kashmir. Its primary sources of water include rainwater runoff, seasonal streams from nearby hills, and domestic and industrial discharges from urban areas. Over the years, Halsi Nullah has faced significant flooding challenges, particularly during the monsoon season when heavy rains cause it to overflow. Major floods, such as those in 1976,1992, 2010,2014 and 2017, resulted in severe damage to property, displacement of residents, and disruption of daily life

1. **Gujrat Flood Bund:**

To protect Gujrat City and surrounding settlements, a flood protection bund, known as "Gujrat Flood Bund (RD 4+000-33+500)” was constructed along the right bank of Halsi Nullah. Recognizing the need for enhanced flood protection, the bund was extended from RD 33+500 to RD 55+200 to further mitigate flood risks.

Due to a court-issued stay order in 1957, construction from RD 0+000 to RD 4+000 could not be carried out at that time. However, in 2004-05 and 2005-06, the remaining sections of the bund from RD 0+000-4000 and RD 33+500-54+200 were successfully completed.The salient features of the Gujrat Flood are mentioned below:

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| **Existing Flood Bund (RD 4+000-33+500)** | | |
| 1 | Length | RD 4+000-33+500 (5.9 miles) |
| 2 | Location | Along right bank of Halsi Nallah in the vicinity of Gujrat City. |
| 3 | Side slopes | 3:1 inner side and 2:1 outer side |
| 4 | Top width | 20.0’ |
| 5 | Free board | 5’ above HFL of 1973 |
| **Newly Constructed Sections (RD 0+000-4+000)** | | |
| 1 | Length | 0.80 miles |
| 2 | Side slopes | 3:1 inner side and 2:1 outer side |
| 3 | Top width | 20.0’ |
| 4 | Free board | 5 feet above HFL |
| **Newly Constructed Sections (RD 33+500-54+200)** | | |
| 1 | Length | 4.27 miles (including 650' tie bund) |
| 2 | Side slopes | 2:1 & 1:1 |
| 3 | Top width | 20 feet |
| 4 | Free board | 5 feet above HFL |

Table 8: Salient features of Gujrat flood bund

A series of 47 stone spurs has been strategically constructed to reinforce the flood bund and protect it from erosion caused by the high-velocity flood currents of Halsi Nullah.The detailed specifications and locations of these spurs are provided below:

Table 9: Details of stone spur on Gujrat flood bund

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Location of Spur (RD)** | **Length of spur** | **Details of Spur** |
| 1. | 4+350 | 52.50’ | Stone sloping spur |
| 2. | 4+475 | 42.5’ | -do- |
| 3. | 4+650 | 57.5’ | -do- |
| 4. | 11+700 | 48.04’ | -do- |
| 5. | 11+850 | 40.0’ | -do- |
| 6. | 12+000 | 40.0’ | -do- |
| 7. | 12+974 | 40.0’ | -do- |
| 8. | 14+885 | 77.0’ | -do- |
| 9. | 15+070 | 60.0’ | -do- |
| 10. | 15+195 | 55.0’ | -do- |
| 11. | 15+320 | 54.0’ | -do- |
| 12. | 15+495 | 55.0’ | -do- |
| 13. | 17+232 | 55.0’ | -do- |
| 14. | 25+150 | 35.0’ | -do- |
| 15. | 25+250 | 35.0’ | -do- |
| 16. | 25+380 | 35.0’ | -do- |
| 17. | 25+480 | 40.0’ | -do- |
| 18. | 25+620 | 30.0’ | -do- |
| 19. | 25+720 | 35.0’ | -do- |
| 20. | 25+850 | 25.0’ | -do- |
| 21. | 25+950 | 30.0’ | -do- |
| 22. | 28+000 | 40.0’ | -do- |
| 23. | 28+335 | 40.0’ | -do- |
| 24. | 28+420 | 85.0’ | -do- |
| 25. | 28+640 | 40.0’ | -do- |
| 26. | 28+790 | 45.0’ | -do- |
| 27. | 28+940 | 50.0’ | -do- |
| 28. | 29+060 | 60.0’ | -do- |
| 29. | 4+950 | 30.0’ | Earthen with stone pitched nose. |
| 30. | 5+500 | 50.0’ | -do- |
| 31. | 6+000 | 60.0’ | -do- |
| 32. | 7+800 | 75.0’ | -do- |
| 33. | 8+000 | 40.0’ | -do- |
| 34. | 12+100 | 40.0’ | -do- |
| 35. | 16+500 | 120.0’ | -do- |
| 36. | 17+100 | 75.0’ | -do- |
| 37. | 18+800 | 40.0’ | -do- |
| 38. | 19+200 | 100.0’ | -do- |
| 39. | 21+500 | 1200.0’ | -do- |
| 40. | 25+100 | 30.0’ | -do- |
| 41. | 27+500 | 30.0’ | -do- |
| 42. | 27+500 | 75.0’ | -do- |
| 43. | 29+500 | 75.0’ | -do- |
| 44. | 29+650 | 40.0’ | -do- |
| 45. | 29+950 | 80.0’ | -do- |
| 46. | 16+000 | 10.0’ | On Bhimber right flood bund |
| 47. | 15+400 | 100.0’ | On Bhimber right flood bund |

To enhance structural resilience, earthen flood bunds have been constructed with inner slopes (right & left side) pitched in crucial locations. Retaining walls were built where space for bund construction was limited due to roads, population settlements.

Table 10: Details of Pitched length

|  |  |  |
| --- | --- | --- |
| **Side** | **Location (RD)** | **Length (ft.)** |
| **Left Side** | Tie Bund | 350' |
|  | RD 37500-37750 | 250' |
|  | RD 38750-40500 | 1750' |
|  | RD 46750-48000 | 1250' |
|  | RD 47200-54200 | 7000' |
| **Right Side** | RD 33500-40000 | 6500' |
|  | RD 40000-43000 | |  | | --- | |  |   3000' |
|  | RD 43000-47200 | 4200' |

Table 11: Details of retaining wall

|  |  |  |
| --- | --- | --- |
| **Location (RD)** | **Length (ft.)** | **Remarks** |
| 39000-41000 | 2000' | Opposite Village Gorali |
| 46800-48500 | 1700' | Opposite Village Kathala Chenab |

**VULNERABLE VILLAGES ALONG HALSI NALLAH:**

Gorali, Gorala, Kathala, Kalra, Malhowal, Ghazi Khan Kalwari, Gagian, Jamalpur, Mararpur.

* + 1. **DAWARA NULLAH**

Dawara Nullah is a small hill torrent originating from the foothills of Azad Jammu & Kashmir. It flows downstream and outfalls into the right side of the River Chenab near the Marala-Alexandra Bridge reach of the river.Historically, Dawara Nullah has been responsible for inundating Village Khewa Hafiz, Hayat Garh, and several other adjoining abadies near Jalalpur Jattan, posing a significant flood risk to local communities.

To mitigate flood risks and protect these vulnerable villages, an embankment along the right bank of Dawara Nullah was constructed during 1989-90. This embankment, known as Dawara Nullah Bund, serves as a flood protection barrie

Dawara Nullah a small hill torrents originates from foot hills in Azad Jammu & Kashmir and outfalls in River Chenab at its right side in Marala-Alexandra bridge reach of River Chenab. It is used to inundate village Khewa Hafiz, Hayat Garh and other adjoining several abadies near Jalal Pur Jattan. An embankment on right bank of Dawara Nullah was constructed during 1989-90 for protection of above mentioned villages. This embankment is named as Dawara Nullah flood Bund and has a length 4800’. Its salient features are as under:

Table 12: Salient features of Dawara nullah flood bund

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Description** | **Data** |
| 1 | Length | RD 0+000-4+100 (0.82 miles) |
| 2 | Location | Along right bund of River Chenab from foot hills of Azad Jamu & Kashmir to village Khewa Hafiz. |
| 3 | Side slopes | 2:1 inner side and 2:1 outer side |
| 4 | Top width | 20.0’ |
| 5 | Free board | 5’ |
|  | Pitched section | (RD 0+000-0+250) 250’  ( RD 0+670-2+170) 1500’ |

* 1. **LOCATION MAP**

Location Map is attached as **Annex-A XEN/GRT**

**CHAPTER – 3**

**BRIEF HISTORY OF PAST FLOOD EVENTS**

Unexpected heavy rainfall in the first week of September 1992 caused historic floods in the catchment areas of the Jhelum and Chenab Rivers simultaneously. The discharge at Marala Barrage in the Chenab River reached 845,090 cusecs on September 10, 1992, at 18:00 hours. Similarly, the flow at Qadirabad Barrage was only 41,681 cusecs at 18:00 hours on September 9, 1992, but began rising on the morning of September 10, reaching 948,530 cusecs on September 11. The floodwater spread extensively on the right bank of the Chenab River, causing severe damage to the riverbanks.

In the subsequent flood seasons, the main river channel drifted towards the right side between Marala and Alexandra Bridge. As a result, the river entirely shifted towards its right bank, leading to serious problems such as embayment, land erosion, bank sloughing, and inundation of agricultural lands, basic infrastructure, and villages. This ongoing erosion resulted in the loss of several villages and thousands of acres of valuable agricultural land. To address this issue, an effective flood management plan was developed, and model studies were conducted by the Irrigation Research Institute. Consequently, 11 spurs were constructed along the right bank of the Chenab River from downstream of Marala Headworks to Alexandra Bridge in District Gujrat.

**Flood Season 1997**

Heavy rains began in District Gujrat on August 26, 1997, and continued incessantly for 36 hours. The situation worsened on August 27-28, when an exceptionally high flood of 775,525 cusecs, combined with a dangerous windstorm and heavy rainfall, led to a critical emergency. Flooding in the local nallahs exacerbated the crisis, rendering the situation uncontrollable. The following spurs and guide banks sustained heavy damage:

* J-Head Spurs No. 2, 3, 4, 6, and 8
* Guide Bank Spur No. 9
* Guide Bank Spur No. 10

Restoration of these damaged structures was completed between 1997 and 1999

**Flood Season 2010**

A high flood of 319,733 cusecs was recorded downstream of Qadirabad Barrage on August 7, 2010. As a result, a loop developed between the guide wall spur on the right bank of the Chenab River opposite Village Randiali, the inverted hockey spur opposite Village Bahri, and the J-Head Spur near Village Chakori in District Mandi Bahauddin. The sites were inspected by the Executive Engineer, Gujrat Canal Division, on August 16, 2010. The conditions were critical:

* The apron of the Inverted Hockey Spur at Bahri from RD 0-70 was completely launched, with pitching slipping into the scour pit in various sections.
* The shank of the spur was washed away over a 70-foot length.
* The apron and solid portion of J-Head Spur Chakori were also severely damaged.

A model study was conducted by the Irrigation Research Institute, and restoration work was completed during the fiscal year 2011-2012.

**Damaged Infrastructure Restored in 2010**

* **Lalamusa Extension Flood Bund:** Protection and restoration from erosion by Bhimber Nallah, including pitching with an apron.

During the subsequent flood seasons of 2011 and 2012, the discharges received in the Chenab River were 166,383 cusecs and 170,210 cusecs, respectively. Fortunately, no significant damages occurred.

**Flood Season 2013**

A high flood of 369,960 cusecs was recorded downstream of Marala Barrage, causing damage to various infrastructures on the right bank of the Chenab River. The following restoration works were carried out under Para 2.89 of the PWD Code:

|  |  |
| --- | --- |
| Sr. No. | Name of Scheme |
| 1 | Construction of 3 solid stone studs for the protection of Village Shahbazpur. |
| 2 | Protection and restoration of a hockey spur for Village Behlolpur from erosion. |

Additionally, a heavy flood occurred in Bhimber Nallah, originating from Jammu and Kashmir and outfalling into the Chenab River upstream of Khanki Headworks. The discharge reached 50,596 cusecs, causing damage to Lalamusa Flood Bund and Lalamusa Extension Flood Bund, which protect Lalamusa City and nearby settlements. Restoration efforts included:

|  |  |
| --- | --- |
| Sr. No. | Name of Scheme |
| 1 | Protection and restoration of Lalamusa Extension Flood Bund (RD 7-8) from erosion. |
| 2 | Restoration of damaged section between RD 17-18 of Lalamusa Flood Bund. |

**Flood Season 2014**

A peak discharge of 856,464 cusecs was recorded downstream of Marala Barrage on September 6, 2014, causing extensive damage to flood protection structures and settlements on the right bank of the Chenab River in District Gujrat. Downstream of Khanki Barrage, the discharge reached 947,099 cusecs, devastating agricultural lands and livestock. Downstream of Qadirabad Barrage, 903,504 cusecs of floodwater caused extensive damage to bunds, embankments, and guide walls in District Mandi Bahauddin.

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**CHAPTER – 4**

**DESIGN DATA, HISTORIC PEAK FLOOD DATA AND PREVIOUS FIVE YEARS FLOOD DATA OF HEAD WORKS/BARRAGES AND OR OTHERCONTROL POINTS**

* 1. **FLOOD LIMITS**

Flood limits of the Head works/ Barrages are mentioned below:

**4.1.1. Marala Head Works**

Normal flood = 0.0 – 1.0 lac Cs.

Low flood = 1.0 – 1.5 lac Cs.

Medium flood = 1.5 – 2.0 lac Cs.

High flood = 2.0 – 4.0 lac Cs.

Very high flood = 4.0 – 6.0 lac Cs.

Exceptionally high flood = 6.0 & above.

**4.1.2. Khanki Head Works**

Low flood = 1.0 – 1.5 lac Cs.

Medium flood = 1.5 – 2.0 lac Cs.

High flood = 2.0 – 4.0 lac Cs.

Very high flood = 4.0 – 6.0 lac Cs.

Exceptionally high flood = 6.0 & above.

**4.1.2. Qadirabad Head Works**

Normal flood = 0.0 – 1.0 lac Cs.

Low flood = 1.0 – 1.5 lac Cs.

Medium flood = 1.5 – 2.0 lac Cs.

High flood = 2.0 – 4.0 lac Cs.

Very high flood = 4.0 – 6.0 lac Cs.

Exceptionally high flood = 6.0 – 8.0 Lac Cs.

Super Flood = 8.0 – and above

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**4.2 TIME LAGS OF FLOODS**

The estimated time for floodwater to travel between key control points along the Chenab River is outlined below:

**From Border to Marala Headworks (8 km):**

* Time Required: 2 hours

**From Akhnoor to Marala Headworks:**

* Low Flood: 9-10 hours
* Medium Flood: 8-9 hours
* High Flood: 7-8 hours
* Very High Flood: 5 hours
* Exceptionally High Flood: 4 hours

**Floodwater Travel Time for Discharges Above 100,000 Cusecs**

* Marala to Alexandra Bridge (42 km): 5-6 hours
* Alexandra Bridge to Khanki (14 km): 1.5-2 hours
* Khanki to Qadirabad (28 km): 3-4 hours

**4.3. HIGHEST FLOODS**

The table below provides the highest recorded flood discharges at key control points along the Chenab River during the extreme flood events of 1992 and 2014:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **MaralaBarrage (Cusecs)** | **AlexandrBridge (Cusecs)** | **Khanki Headworks (Cusecs)** | **Qadirabad Barrage (Cusecs)** |
| 1992 | 845,090 | 650,000 | 910,000 | 948,530 |
| 2014 | 856,464 | 780,216 | 947,099 | 903,504 |

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**4.4 PEAK DISCHARGES.**

The yearly peak discharges of river and nullah located in the jurisdiction of Gujrat Canal Division are mentioned below :

**4.4.1. RIVER CHENAB AT MARALA**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | **Peak**  **Flood** | **Year** | **Peak**  **Flood** | **Year** | **Peak**  **Flood** |
| 1925 | 139596 | 1959 | 870795 | 1993 | 409490 |
| 1926 | 202765 | 1960 | 599303 | 1994 | 472570 |
| 1927 | 237718 | 1961 | 272003 | 1995 | 439970 |
| 1928 | 686000 | 1962 | 331362 | 1996 | 766860 |
| 1929 | 718000 | 1963 | 204158 | 1997 | 775525 |
| 1930 | 254000 | 1964 | 215863 | 1998 | 213705 |
| 1931 | 260238 | 1965 | 144677 | 1999 | 214765 |
| 1932 | 332326 | 1966 | 618338 | 2000 | 247610 |
| 1933 | 366000 | 1967 | 190386 | 2001 | 160950 |
| 1934 | 228000 | 1968 | 155262 | 2002 | 224780 |
| 1935 | 253000 | 1969 | 219302 | 2003 | 313024 |
| 1936 | 177500 | 1970 | 203733 | 2003 | 147318 |
| 1937 | 145759 | 1971 | 175143 | 2004 | 93150 |
| 1938 | 261700 | 1972 | 132915 | 2005 | 345479 |
| 1939 | 203000 | 1973 | 769550 | 2006 | 332956 |
| 1940 | 167100 | 1974 | 192630 | 2007 | 252409 |
| 1941 | 297000 | 1975 | 582600 | 2007 | 148627 |
| 1942 | 301500 | 1976 | 549400 | 2008 | 174977 |
| 1943 | 256900 | 1977 | 437125 | 2009 | 94168 |
| 1944 | 150500 | 1978 | 456394 | 2010 | 282418 |
| 1945 | 207650 | 1979 | 248111 | 2011 | 166383 |
| 1946 | 263540 | 1980 | 199981 | 2012 | 169914 |
| 1947 | 253720 | 1981 | 527462 | 2013 | 369960 |
| 1948 | 432000 | 1982 | 647098 | 2014 | 856464 |
| 1949 | 251956 | 1983 | 171579 | 2015 | 153408 |
| 1950 | 540761 | 1984 | 160042 | 2016 | 412065 |
| 1951 | 193847 | 1985 | 222595 | 2017 | 187470 |
| 1952 | 209570 | 1986 | 241800 | 2018 | 168278 |
| 1953 | 316898 | 1987 | 114140 | 2019 | 211296 |
| 1954 | 820090 | 1988 | 481365 | 2020 | 298884 |
| 1955 | 344090 | 1989 | 352115 | 2021 | 171156 |
| 1956 | 272200 | 1990 | 160020 | 2022 | 210936 |
| 1957 | 1100000 | 1991 | 40560 | 2023 | 192960 |
| 1958 | 478457 | 1992 | 845090 | 2024 | 160950 |

**4.4.2. RIVER CHENAB AT ALEXANDRA BRIDGE.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | **Peak**  **Flood** | **Year** | **Peak**  **Flood** | **Year** | **Peak**  **Flood** |
| 1932 | 269000 | 1966 | 439763 | 2000 | 120063 |
| 1933 | 242926 | 1967 | 162625 | 2001 | 143424 |
| 1934 | 144576 | 1968 | 110000 | 2002 | 229780 |
| 1935 | 256754 | 1969 | 160223 | 2003 | 311873 |
| 1936 | 152264 | 1970 | 149106 | 2004 | 64340 |
| 1937 | 99516 | 1971 | 179714 | 2005 | 283019 |
| 1938 | 255716 | 1972 | 171690 | 2006 | 359400 |
| 1939 | 166948 | 1973 | 640000 | 2007 | 298752 |
| 1940 | 124310 | 1974 | 116315 | 2007 | 192414 |
| 1941 | 164819 | 1975 | 448000 | 2008 | 101000 |
| 1942 | 203644 | 1976 | 500000 | 2010 | 286817 |
| 1943 | 233000 | 1977 | 340000 | 2011 | 169705 |
| 1944 | 160000 | 1978 | 126000 | 2012 | 170210 |
| 1945 | 174795 | 1979 | 103556 | 2013 | 405068 |
| 1946 | 214311 | 1980 | 116990 | 2014 | 780216 |
| 1947 | 310000 | 1981 | 206049 | 2015 | 134340 |
| 1948 | 404000 | 1982 | 279240 | 2016 | 257200 |
| 1949 | 212000 | 1983 | 185645 | 2017 | 155575 |
| 1950 | 243500 | 1983 | 185645 | 2018 | 139120 |
| 1951 | 138472 | 1985 | 201800 | 2019 | 186000 |
| 1952 | 114900 | 1986 | 309964 | 2020 | 274800 |
| 1953 | 246156 | 1987 | 133160 | 2021 | 126200 |
| 1954 | 812500 | 1988 | 842246 | 2022 | 156000 |
| 1955 | 812500 | 1989 | 433400 | 2023 | 142960 |
| 1956 | 213600 | 1990 | 309415 | 2024 | 119103 |
| 1957 | 1100000 | 1991 | -- |  |  |
| 1958 | 420000 | 1992 | 650000 |  |  |
| 1959 | 560000 | 1993 | 600000 |  |  |
| 1960 | 325000 | 1994 | 217000 |  |  |
| 1961 | 225000 | 1995 | 441000 |  |  |
| 1962 | 292345 | 1996 | 786000 |  |  |
| 1963 | 150846 | 1997 | 619000 |  |  |
| 1964 | 286271 | 1998 | 260000 |  |  |
| 1965 | 163964 | 1999 | 105113 |  |  |

**4.4.3. RIVER CHENAB AT KHANKI.**

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | **Peak**  **flood** | **Year** | **Peak**  **flood** | **Year** | **Peak**  **Flood** |
| 1925 | 266809 | 1960 | 809524 | 1995 | 650000 |
| 1926 | 224640 | 1961 | 353994 | 1996 | 851000 |
| 1927 | 223796 | 1962 | 346279 | 1997 | 847000 |
| 1928 | 441497 | 1963 | 186435 | 1998 | 214954 |
| 1929 | 747000 | 1964 | 176590 | 1999 | 170815 |
| 1930 | 194376 | 1965 | 200618 | 2000 | 309253 |
| 1931 | 292098 | 1966 | 636670 | 2001 | 155648 |
| 1932 | 271769 | 1967 | 209767 | 2002 | 240389 |
| 1933 | 246163 | 1968 | 235397 | 2003 | 371888 |
| 1934 | 177813 | 1969 | 274357 | 2003 | 172593 |
| 1935 | 259730 | 1970 | 251954 | 2004 | 106934 |
| 1936 | 15946 | 1971 | 293293 | 2005 | 368078 |
| 1937 | 105835 | 1972 | 811723 | 2006 | 418740 |
| 1938 | 261685 | 1973 | 1000496 | 2007 | 300197 |
| 1939 | 175979 | 1974 | 189446 | 2008 | 202000 |
| 1940 | 128393 | 1975 | 666241 | 2009 | 74550 |
| 1941 | 168687 | 1976 | 615043 | 2010 | 327637 |
| 1942 | 210357 | 1977 | 472130 | 2011 | 131492 |
| 1943 | 238169 | 1978 | 433096 | 2012 | 186413 |
| 1944 | 164719 | 1979 | 246867 | 2013 | 410332 |
| 1945 | 180122 | 1980 | 194814 | 2014 | 947099 |
| 1946 | 149681 | 1981 | 563856 | 2015 | 163967 |
| 1947 | 236583 | 1982 | 243260 | 2016 | 418736 |
| 1948 | 438529 | 1983 | -- | 2017 | 184346 |
| 1949 | 224949 | 1984 | 134897 | 2018 | 182025 |
| 1950 | 986658 | 1985 | 148482 | 2019 | 181944 |
| 1951 | 217868 | 1986 | 341000 | 2020 | 286230 |
| 1952 | 264065 | 1987 | 109413 | 2021 | 183688 |
| 1953 | 315330 | 1988 | 844050 | 2022 | 210945 |
| 1954 | 806774 | 1989 | 512225 | 2023 | 204041 |
| 1955 | 230490 | 1990 | 270015 | 2024 | 163215 |
| 1956 | 340663 | 1991 | 314553 |  |  |
| 1957 | 1086460 | 1992 | 910000 |  |  |
| 1958 | 401682 | 1993 | 366680 |  |  |
| 1959 | 1021018 | 1994 | 509113 |  |  |

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**4.4.4. RIVER CHENAB ATQADIRABAD**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Peak discharge** | **Year** | **Peak discharge** |
| 1968 | 221607 | 1998 | 259713 |
| 1969 | 360038 | 1999 | 630500 |
| 1970 | 240401 | 2000 | 291349 |
| 1971 | 312098 | 2001 | 136575 |
| 1972 | 249259 | 2002 | 226398 |
| 1973 | 854341 | 2003 | 367408 |
| 1974 | 198228 | 2003 | 159296 |
| 1975 | 669819 | 2004 | 90043 |
| 1976 | 628741 | 2005 | 379572 |
| 1977 | 482871 | 2006 | 443206 |
| 1978 | 428009 | 2007 | 311382 |
| 1979 | 240785 | 2008 | 194038 |
| 1980 | 178582 | 2009 | 55535 |
| 1981 | 575440 | 2010 | 319733 |
| 1982 | 245030 | 2011 | 164604 |
| 1983 | 303120 | 2012 | 180789 |
| 1984 | 108476 | 2013 | 403403 |
| 1985 | 321917 | 2014 | 903504 |
| 1986 | 318117 | 2015 | 175054 |
| 1987 | 342758 | 2016 | 416492 |
| 1988 | 892266 | 2017 | 164660 |
| 1989 | 497649 | 2018 | 172031 |
| 1990 | 290417 | 2019 | 159544 |
| 1991 | -- | 2020 | 258954 |
| 1992 | 948530 | 2021 | 167812 |
| 1993 | 434754 | 2022 | 202149 |
| 1994 | 425567 | 2023 | 185749 |
| 1995 | 644397 | 2024 | 148323 |
| 1996 | 853231 |  |  |
| 1997 | 873442 |  |  |

**4.4.5. BHIMBER NULLAHRECORDED AT RAILWAY CROSSING G.T.ROAD GUJRAT.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr.No.** | **Year** | **Maximum** | **Approximate discharge** |
| 1. | 1973 | 782.00 | 77898 |
| 2. | 1975 | 782.00 | 77898 |
| 3. | 1976 | 781.00 | 68367 |
| 4. | 1977 | 781.00 | 68367 |
| 5. | 1978 | 782.00 | 77898 |
| 6. | 1979 | 777.00 | 34709 |
| 7. | 1980 | 777.00 | 34706 |
| 8. | 1981 | 778.00 | 42402 |
| 9. | 1982 | 777.00 | 34709 |
| 10. | 1983 | 777.00 | 34706 |
| 11. | 1984 | 779.50 | 5130 |
| 12. | 1985 | 782.00 | 77898 |
| 13. | 1986 | 778.00 | 42404 |
| 14. | 1987 | 778.20 | 42600 |
| 15. | 1988 | 782.40 | 77938 |
| 16. | 1989 | 778.00 | 42402 |
| 17. | 1990 | 770.80 | 42009 |
| 18. | 1991 | 778.10 | 42407 |
| 19. | 1992 | 780.00 | 59256 |
| 20. | 1993 | 775.80 | 42282 |
| 21. | 1994 | 780.00 | 59256 |
| 22. | 1995 | 778.00 | 42402 |
| 23. | 1996 | 777.20 | 42358 |
| 24. | 1997 | 778.50 | 42538 |
| 25. | 1998 | 775.00 | 20951 |
| 26. | 1999 | 777.00 | 42834 |
| 27. | 2000 | 773.10 | 42135 |
| 28. | 2001 | 775.40 | 42260 |
| 29. | 2002 | 776.00 | 27541 |
| 30. | 2003 | 775.00 | 20951 |
| 31. | 2004 | 777.00 | 34706 |
| 32. | 2005 | 776.00 | 27542 |
| 33. | 2006 | 772.00 | 5300 |
| 34. | 2006 | 777.00 | 34706 |
| 35. | 2007 | 773.03 | 9737 |
| 36. | 2008 | 775.00 | 20951 |
| 37. | 2009 | 773.00 | 9737 |
| 38. | 2010 | 777.50 | 38991 |
| 39. | 2011 | 772.00 | 5300 |
| 40. | 2012 | 776.00 | 27541 |
| 41. | 2013 | 777.00 | 34706 |
| 42. | 2014 | 779.00 | 50596 |
| 43. | 2015 | 774.00 | 14991 |
| 44 | 2016 | 775.00 | 20951 |
| 45 | 2017 | 773.00 | 9737 |
| 46 | 2018 | 776.00 | 27541 |
| 47 | 2019 | 771.00 | 1874 |
| 48 | 2020 | 774.00 | 14991 |
| 49 | 2021 | 772.00 | 5300 |
| 50 | 2022 | 774.00 | 14991 |
| 51 | 2023 | 773.00 | 9737 |
| 52 | 2024 | 779.50 | 54926 |

**4.4.6. HALSI NALLAH RECORDED AT GUJRAT JALALPUR JATTAN BRIDGE CROSSING AT RD 18+500 GUJRAT FLOOD BUND.**

|  |  |
| --- | --- |
| **Year** | **Maximum gauge** |
| 1976 | 11.60 |
| 1980 | 4.90 |
| 1981 | 10.00 |
| 1982 | 8.00 |
| 1983 | 2.00 |
| 1984 | 9.50 |
| 1985 | 10.50 |
| 1986 | 10.00 |
| 1987 | 9.00 |
| 1988 | 11.00 |
| 1989 | 10.40 |
| 1990 | 9.00 |
| 1991 | 10.00 |
| 1992 | 7.00 |
| 1993 | 8.00 |
| 1994 | 10.50 |
| 1995 | 10.80 |
| 1996 | 7.60 |
| 1997 | 10.00 |
| 1998 | 8.00 |
| 1999 | -- |
| 2000 | 4.20 |
| 2001 | 5.50 |
| 2002 | 5.40 |
| 2003 | 5.50 |
| 2004 | 4.00 |
| 2005 | -- |
| 2006 | 6.00 |
| 2007 | 4.00 |
| 2008 | 4.50 |
| 2009 | 3.00 |
| 2010 | 5.50 |
| 2011 | 4.00 |
| 2012 | 7.20 |
| 2013 | 6.00 |
| 2014 | 7.00 |
| 2015 | 5.00 |
| 2016 | 4.00 |
| 2017 | 7.00 |
| 2018 | 5.00 |
| 2019 | 3.00 |
| 2020 | -- |
| 2021 | 2.00 |
| 2022 | -- |
| 2023 | -- |
| 2024 | 4.50 |

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**CHAPTER - 5**

**FLOOD FIGHTING STRATEGY**

To effectively combat flooding, the following plan will be implemented for each river, nallah, and protective structure.

**5.1. RIVER CHENAB**

During the flood season, a comprehensive flood-fighting strategy will be implemented for managing spurs along the right bank of the River Chenab in Gujrat District. The Survey & Investigation (S&I) Gujrat office will be responsible for overseeing Spur Nos. 1 to 11 and three spurs on the River Munawar Tawi. In case of an emergency, upon request from the Sub Divisional Officer (S&I), the Executive Engineer, Gujrat, will deploy additional personnel from the Gujrat Sub Division to assist with flood-fighting operations. Temporary control points and emergency response camps will be established at each spur, equipped with essential flood-fighting materials to ensure a prompt response to any potential breaches or structural damage. The assigned Sub Engineers and Sub Divisional Officers will be responsible for implementing protective measures, including reinforcing vulnerable sections, conducting timely repairs, and continuously monitoring the spurs for early signs of erosion or instability. The Executive Engineer, Gujrat Canal Division, will oversee all flood-fighting operations, ensuring coordinated execution of protective actions. In extreme flood situations, the District Coordination Officer (DCO) and District Police Officer (DPO) of Gujrat will be contacted to provide additional support, ensuring a rapid and effective response to mitigate potential risks.

**Chuknanwali Flood Bund**

Sub Engineer Kalupindi Section and Sub Divisional Officer Gujrat Sub Division are in charge of this flood bund. The flood does not touch this bund up to 5.0 lac cusecs discharge below Qadirabad Barrage. At a discharge of 6.50 lac cusecs below Qadirabad Barrage, Sub Engineer Kalupindi will shift to RD 147+000 of Chuknanwalidisty (15-R) for watching the bund. Between 6.5 to 8.0 lac cusecs of discharge below Qadirabad Barrage, sheet flow will touch the bund at RD 128+000-tail. However, watching against sheet flow will be continued. When the discharge below Qadirabad Barrage exceeds 8.00 lac cusecs, the Sub Divisional Officer Gujrat will also shift his camp to this bund and supervise watching operations.

In extreme flood situations, the District Coordination Officer (DCO) and District Police Officer (DPO) of Mandi Bahaudin will be contacted to provide additional support, ensuring a rapid and effective response to mitigate potential risks.

**5.2. BHIMBER NALLAH**

1. **Lalamusa Flood Bund**

During medium flood conditions, a campsite will be maintained at RD 39+000–40+000 of the Lalamusa Flood Bund. Additionally, an emergency camp will be set up at RD 5+000 for the duration of the flood season. A detailed list of flood-fighting materials for each control point is attached. The Sub-Engineer of the Gujrat Section and the Sub-Divisional Officer (SDO) of the Gujrat Sub-Division will be responsible for overseeing all flood-fighting operations for this bund.

1. **Bhimber Left &Right Flood Bund**

Flood-fighting operations will be conducted under the supervision of the Sub Divisional Officer, with the Sub Engineer of Gujrat Section in charge. During high flood temporary camps/control points will be established at RD 7+500 (left side) and RD 17+000 (right side). Necessary establishment, will be deployed per shift during the flood season. Essential flood-fighting materialswill be available at control points to handle emergencies.

**5.3. BHINDER NULLAH**

1. **Musakamala Flood Bund**

At the beginning of the flood season, a temporary campsite will be established at RD 14+000 of the Musakamala Flood Bund. All necessary flood-fighting equipment and resources will be available to effectively manage emergency situations. The Sub-Engineer of the Gujrat Section and the Sub-Divisional Officer of the Gujrat Sub-Division will be responsible for overseeing operations. If needed, an additional Sub-Engineer from the division will be deputed to provide assistance during flood emergencies.

1. **Keeranwala East Flood Embankment**

The Keeranwala East Flood Embankment, situated along the right edge of Bhinder Nallah, extends for 1.01 miles. Its current condition is satisfactory and will be regularly monitored to ensure stability and effectiveness in flood protection.

**5.4. HALSI NULLAH**

1. **GUJRAT FLOOD BUND**

The Gujrat Flood Bund is located on the right side of Halsi Nullah, beginning at Village Loraan and extending to its confluence with the River Chenab. The structure is well-maintained, with a carpeted road on top. In the event of a high flood, a temporary campsite will be established at RD 18+500 for flood-fighting operations.

**5.5.** **DAWARA NULLAH**

**DAWARA NULLAH FLOOD BUND**

The Dawara Nullah Flood Bund is situated on the right side of Dawara Nullah, starting from the crossing point of the Jalalpur-Gujrat Road. In the event of a high flood, a temporary campsite will be established on the bund, equipped with necessary facilities and flood-fighting materials to manage emergency situations effectively.

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**CHAPTER – 6**

**FLOOD DAMAGES RESTORATION WORKS**

A peak discharge of 856,464 cusecs was recorded downstream of Marala Barrage on September 6, 2014, causing extensive damage to flood protection structures and settlements on the right bank of the Chenab River in District Gujrat. Downstream of Khanki Barrage, the discharge reached 947,099 cusecs, devastating agricultural lands and livestock. Downstream of Qadirabad Barrage, 903,504 cusecs of floodwater caused extensive damage to bunds, embankments, and guide walls in District Mandi Bahauddin.

**Restoration Works Undertaken (2014-2016)**

|  |  |  |
| --- | --- | --- |
| Sr. No. | Name of Infrastructure | |
| 1 | Restoration of J-Head Spur No. 2 near Village Pandi. |
| 2 | Restoration of J-Head Spur No. 3 near Kotli Village. |
| 3 | Restoration of J-Head Spur No. 4 near Dera Nasir. |
| 4 | Restoration of J-Head Spur at Samma Mohla. |
| 5 | Restoration of J-Head Spur No. 8 near Village Shahbazpur. |
| 6 | Restoration of J-Head Spur near Village Shampur. |
| 7 | Restoration of Inverted Hockey Spur near Village Behlolpur. |

**Critical Works Executed (2015-2016)**

|  |  |
| --- | --- |
| Sr. No. | Name of Infrastructure |
| 1 | Restoration of Guide Wall Spur No. 8 near Village Shahbazpur. |
| 2 | Protection and restoration of inverted hockey spur for Village Behlolpur |
| 3 | Restoration of Guide Bank Spur near Village Sukhpur on River Munawar Tawi. |

**Works Executed Under Para 2.89 of PWD**

**2015-16**

* Restoration of Ganda Bund near Village Behlolpur.

**2016-17**

* Checking erosive action of river Chenab U/S Stud No.1 near village Behlolpur.
* Protecting Lala Musa extension bund between RD 6-7 by providing solid stone studs.
* Restoration of damaged apron of spur No. 8 near village Shahbazpur damaged during flood 2016.
* Checking erosive action of River Munwar Tawi at Guide bank spur near village Barmala.
* Constructing solid stone studs on right bank of River Chenab to protect village Bhutta Marran

**2017-18**

* Repairing pitching and launched apron of J-head Spur No. 5 on right bank of River Chenab.
* Repairing of Ganda Bund No. 2 on right bank of River Chenab.
* Restoration of Guide bank Spur at right bank of Munawar Tawi near village Surkhpur.
* Restoration of Guide Wall Bahri Randiali.
* Restoring of Solid Stone Stud near village Bahri.(Damages due to flood 2014 in River Chenab)
* Restoration of Inverted Hockey spur RD 0+000 to 0+815 near village Bahri on right bank of river Chenab.

**2018-19**

* Protection of the right bank of Nullah Bhimber near Village Dadu Barsala.

**2023-24**

* Protection Of Guide wall near Village Kot Ghulam From erosive action Of River Chenab, damaged during flood 2023.

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**CHAPTER – 7**

**FLOOD FIGHTING WATCHING ARRANGEMENT**

**7.1. PRE-FLOOD ARRANGEMENT**

To ensure preparedness for the flood season, necessary flood-fighting materials have been stocked in advance. The availability of reserve stock of stone materialand their designated locations are as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SR. NO.** | **NAME OF STRUCTURE** | **SANCTIONED LIMIT**  **(Lac CFT)** | **AVAILABLE AT SITE**  **(LAC CFT)** | **BALANCE QUANTITY REQUIRED**  **(LAC CFT)** |
| 1 | J-head spur No. 1 U/S Alexandra bridge. | 0.50 | 0.26 | 0.24 |
| 2 | J-head spur No. 2 near village Pandi. | 1.00 | 0.17 | 0.83 |
| 3 | J-head spur No. 3 near village Kotli. | 0.50 | 0.32 | 0.18 |
| 4 | J-head spur No. 4 near village Dera Hakim. | 0.50 | 0.31 | 0.19 |
| 5 | J-head spur No. 5 near village Lambor. | 0.50 | 0 | 0.50 |
| 6 | J-head spur No. near village Kot Nikka. | 0.50 | 0.11 | 0.39 |
| 7 | J-head spur No. 7 near village Dawara Nallah. | 0.50 | 0.15 | 0.35 |
| 8 | J-head spur No. 8 near village Shahbazpur. | 1.00 | 0.20 | 0.80 |
| 9 | Guide bank spur No. 9 near Dera Hakim. | 1.00 | 0 | 1.00 |
| 10 | Guide bank spur No. 10 near Sajawal. | 0.75 | 0.26 | 0.49 |
| 11 | Guide bank spur No. 11 near village Chopala. | 0.75 | 0.25 | 0.50 |
| 12 | Guide bank near village Barmala on River Tawi. | 0.50 | 0 | 0.50 |
| 13 | Guide bank near village Surkhpur on River Tawi. | 0.50 | 0 | 0.50 |
| 14 | Guide bank near village Lashkari Chak on River Tawi. | 0.50 | 0 | 0.50 |
| 15 | Lalamusa flood bund | 0.80 | 0.14 | 0.66 |
| 16 | Musakamala flood bund. | 0.50 | 0 | 0.50 |
| 17 | Bhimber left flood bund. | 0.50 | 0 | 0.50 |
| 18 | Bhimber right flood bund. | 0.50 | 0 | 0.50 |
| 19 | Chuknawali flood bund. | 0.50 | 0 | 0.50 |
| 20 | Guide wall on kalashadian. | 1.00 | 0.84 | 0.16 |
| 21 | Guide wall/spur of Sheikh Choghani. | 0.35 | 0 | 0.35 |
| 22 | J-head spur D/S Alexandra bridge to check erosion near village Samma, Mohla, Qilladar and Sandar etc. on right bank of River Chenab Tehsil & District Gujrat. | 1.00 | 0.70 | 0.30 |
| 23 | J-head spur near village Shampur on right bank of River Chenab. | 1.00 | 0 | 1.00 |
| 24 | Restoration of Existing Ganda Bund and Extension of Ganda Bund near village Behlolpur. | 0.40 | 0.27 | 0.13 |
| 25 | Pitchng on inner slopes of Halsi Nallah from RD 46000-48000 & RD 33500-51500 to check sloughing bank erosion and spill of Halsi Nallah. | 2.00 | 1.40 | 0.60 |
| 26 | Sloping spur D/S spur No. 3 to check erosion on River Chenab near village Patwan. | 0.50 | 0 | 0.50 |
| 27 | Sloping stud D/S spur No. 4 near village Kot Ghulam. | 0.50 | 0 | 0.50 |
| 28 | Sloping stud U/S spur No. 8 near village Changanwali. | 0.50 | 0 | 0.50 |
| 29 | Guide wall spur near Bari and Randiali. | 1.00 | 0 | 1.00 |
|  | **Grand Total** | **20.05** | **5.380** | **14.670** |

**7.2. WATCHING ESTABLISHMENT**

During the flood season, a dedicated watching establishment will be engaged on a monthly basis for the monitoring and general maintenance of flood protection structures. Continuous day and night surveillance will be carried out in July, August, and September, as these months present the highest flood risk. In the event of a very high flood or an emergency, the strength of the watching establishment will be increased with the express approval of the Executive Engineer, Gujrat Canal Division. This proactive approach will ensure the timely detection of vulnerabilities, effective reinforcement of flood defenses, and swift emergency response when required.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sr No.** | **Site Description** | **Flood Limits** | | | | |
| **Low** | **Medium** | **High** | **Very High** | **Exceptionally High** |
| **Establishment (8-12 HourShift)** | | | | |
| 1 | Lalamusabund.RD 0+000-81+270 (16.25 Miles) | 3 | 4 | 6 | 8 | 10 |
| 2 | Bhimber left bund. RD 0+000-19+050 (3.81 Mile) | 2 | 3 | 4 | 6 | 8 |
| 3 | Bhimber right bund. RD 0+000- 21+550 (4.31 Miles) | 2 | 3 | 4 | 6 | 8 |
| 4 | Musakamala flood bund RD 0+000-15+500 (3.0 Miles) | 2 | 3 | 5 | 6 | 8 |
| 5 | Gujrat flood bund. RD 0+000-54+200 (10.80 Miles) | 3 | 4 | 4 | 8 | 10 |
| 6 | Dawara Nallah. RD 0+000-4+100 (0.82 Miles) | 1 | 1 | 4 | 4 | 6 |
| 7 | 11 No. spurs on right bank of River Chenab & 3 No. Guide bank spurs. (17.23 Miles) | 14 | 14 | 16 | 20 | 24 |
| 8 | Chuknawali flood bund RD 0+000 -61+900 (12.38 Miles) | 3 | 4 | 6 | 8 | 10 |
| 9 | Guide wall spur Kala Shadian, Bari &Randiali.Hockeybari (0.92 Miles) | 2 | 3 | 4 | 6 | 8 |
| 10 | Samma MohlaSpur.RD 0+000 -5+774 (1.15 Miles) | 2 | 3 | 6 | 8 | 10 |
| 11 | 3 No. Guide wall spur on Munawar Tawi River. (0.94 Miles) | 3 | 4 | 5 | 8 | 12 |
| 12 | J-head spur near village Shampur. RD 0+000 - 4+788 (0.96 Miles) | 2 | 4 | 6 | 8 | 10 |
| 13 | Flood embankment keeranwala East RD 0+000 -5+000 (1.00 Miles) | 1 | 1 | 2 | 2 | 2 |

**7.3. ARRANGEMENT AT SENSITIVE SITES**

To ensure effective flood response, necessary flood-fighting camps will be established at sensitive sites by 15th June 2025. These camps will be strategically located to facilitate immediate action in case of emergency. The detailed site-wise arrangements are as follows:

1. **River Chenab**

* 17 No. Spurs: Each spur will have necessary temporary camps equipped with flood-fighting materials to handle emergencies.

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1. **Bhimber Nullah**

* Lalamusa Bund: RD 14000, 29000, 40000
* Lalamusa 1st Extension
* Lalamusa 2nd Extension: RD 11500, 20000
* Bhimber Left Bund: RD 7500
* Bhimber Right Bund: RD 17000

1. **Bhinder Nullahs**

* Musakamala Bund: RD 10000, 14000

1. **Halsi Nullah**

* Gujrat Flood Bund: RD 11000, 18500
* Additional Camps: One near Kuthala Chenab & one at RD 13300

1. **Chuknanwali Flood Bund**

* Camp Location: RD 166000

All designated flood-fighting camps will be stocked with essential materials and personnel to ensure swift response during flood situations.

**7.4. WATCHING MATERIAL**

To ensure effective monitoring and maintenance of flood protection structures, essential flood-fighting materials will be stocked at designated sites.The following materials are required for the upcoming flood season. Procurement will be done upon receipt of the requisite funds before the 2025 flood season.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Item** | **Gujrat Sub Division** | **S & I Sub Division** | **Total** | **Available** | **Balance required** |
| 1 | K. Oil | 02 Tin | 02 Tin | 04 Tin | - | 04 Tin |
| 2 | Chimneys for lanterns | 05 No. | 05 No. | 10 No. | 05 No. | 05 No. |
| 3 | Gunny bags with suit & sewing needles | 50 No. | 50 No. | 100 No. | 50 No. | 50 No. |
| 4 | Ballies | 50 No. | 50 | 100 No. | 50 No. | 50 No. |
| 5 | Service cable | 02 | 02 | 04 | 02 | 02 Coil |
| 6 | Wicks | 24 No. | 20 | 44 No. | 24 No. | 20 No. |
| 7 | Sprit | 02 Bottle | 01 Bottle | 03 Bottle | - | 03 Bottle |
| 8 | Match box | 01 Dozen | 01 Dozen | 02 Dozen | - | 02 Dozen |
| 9 | Petrol | 500 Ltrs. | 500 Ltrs | 1000 Ltrs | - | 1000 Ltrs |
| 10 | M. Oil | 100 Ltrs. | 100 Ltrs | 200 Ltrs | - | 200 Ltrs |
| 11 | Wireless set Walky Talky VX-300 | 01 No. | 01 | 02 No. | 01 No | 01 No. |
| 12 | Spare chargeable cells AA size | 06 No. | 06No. | 12 No | - | 12No. |
| 13 | Gas lamp/Stove with 2 KG gas filled cylinder | 01 No. | 01No. | 02 No. | 01 No. | 01 No. |
| 14 | Cooking utensils 6 persons set | 01 No. | 01 No. | 02 No. | 01No. | 01No. |
| 15 | Base set | 02 No. | 01 No. | 03 No. | 02 No. | 01 No. |
| 16 | Torches with cells | 20 No. | 20 No. | 40 No. | 20 No. | 20 No. |
| 17 | Axes | 50 No. | 20 No. | 70 No. | 50 No. | 20 No. |
| 18 | Kassies with handles | 70 No. | 50 No. | 120 No. | 50 No. | 70 No. |
| 19 | Baskets | 110 No. | 100 No. | 210 No. | 110 No. | 100 No. |
| 20 | Handles for kassies | 50 No. | 50 No. | 100 No. | - | 100 No. |
| 21 | Gas lamps | 15 No. | 15 No. | 30 No, | 15 No. | 15 No. |
| 22 | G.I. wire | 1200 kg. | 1000 Kg | 2200 Kg | 1200 Kg | 1000 Kg |
| 23 | Generator Set large | 01 No. | 01 No. | 02 No. | 01 No. | 01 No. |
| 24 | Generator set small | 01 No. | 01 No. | 02 No | 01 No. | 01 No. |
| 25 | Service cable | 30 Ft. | 20 Ft | 50 Ft | - | 50 Ft |
| 26 | Tents | 04 No. | 04 No. | 08 No. | 04 No. | 04 No. |
| 27 | Patha ban | 10 Kg | 20 Kg | 30 Kg | 10 Kg | 20 Kg |
| 28 | Shouldari | 8 No. | 08 | 16 No. | 07 No. | 09 No. |
| 29 | Table with six Chairs | 04 Set | 04 Set | 08 No. | 05 No. | 03 No. |
| 30 | Camping Chairs | 2 Dozen | 02 Dozen | 04 Dozen | - | 04 Dozen |
| 31 | Charpai | 6 No. | 06 | 12 No. | 08 No. | 04 No. |
| 32 | Pillow | 6 No. | 06 | 12 No. | 06 No. | 06 No. |

**7.5. ARRANGEMENT FOR SOUNDING & PROBING**

Currently, there are no proper arrangements for sounding and probing in this division.

**7.6. LIGHTING ARRANGEMENT**

During peak flood hours, flood-fighting operations will be conducted round the clock. Adverse weather conditions, such as windstorms and rain, can render lanterns and gas lamps ineffective. To ensure uninterrupted operations, reliable generator sets with all necessary accessories will be placed at each flood bund.

**7.7. RATION ARRANGEMENT**

The responsibility for ration arrangements falls under the purview of the District Administration.

**7.8. P.O.L ARRANGEMENT FOR VEHICLE**

In the event of fuel shortages due to disrupted communication channels, the Executive Engineer Incharge will make timely arrangements to maintain an adequate reserve of petrol, oil, and lubricants (P.O.L). Reserves will be secured at strategic locations, including petrol pumps in Gujrat, Lalamusa, Jalalpur Jattan, and Phalia, in consultation with the concerned District Coordination Officer.

**7.9. TRANSPORTATION**

Currently, the Gujrat Canal Division has three 4x4 vehicles available. If additional vehicles are required, they will be arranged from other departments. Additionally, one tractor trolley is available in the division, capable of transporting up to 200cft of material or manpower to emergency sites as needed.

**7.10. LAW AND ORDER**

Past experience has shown that during flood emergencies, some inhabitants attempt to cut protective bunds upstream to divert floodwaters away from their locality, leading to law-and-order situations. To prevent such incidents, the District Administration is required to ensure:

* Adequate day and night patrolling to guard against unauthorized bund breaches.
* Deployment of a sufficient police force to deter and manage any open and defiant attempts to breach bunds.

In such situations, the District Coordination Officer and the District Police Officer must promptly provide the necessary police force, accompanied by a magistrate, upon receiving reports from Irrigation Department officers.

**7.11. MEDICAL ARRANGEMENT FOR LABOUR**

Medical arrangements for laborers engaged in flood-fighting efforts will be managed by the District Administration.

**7.12. LIAISON WITH OTHER DEPARTMENT**

Proactive coordination will be established with the District Coordination Officer and District Police Officer. A list of volunteers will be prepared in advance, ensuring quick mobilization during emergencies. Additionally, a record of designated village lumberdars, assigned by Civil Authorities, will be maintained to facilitate coordination.

**7.13. ROLE OF THE ARMY**

The Pakistan Army will inspect flood infrastructure before the flood season. Any deficiencies identified will be addressed by the Irrigation Department before the onset of the flood season. In case of emergencies, the Irrigation Department will promptly report the situation to the relevant Army authorities for necessary action.

**7.14. DUTY OF TELEPHONE ATTENDANT**

A telephone attendant will be available round the clock at the Divisional Flood Emergency Camp to ensure continuous communication. The duty roster is as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Shift No..** | **Name of Official** | **Cell No.** | **Time** | |
| **From** | **To** |
| 1 | Dilawar Hussain Signaler | 0301-6266124 | 7.00 AM | 3.00 PM |
| 2 | Rashid Ahmad Signaler | 0344-6226558 | 3.0 PM | 11.00 PM |
| 3 | Muhammad Yasin Head Signaler | 0300-6253671 | 11.00 PM | 7.00 AM |

Additionally, the telephone number of the Telegraph Office at Canal Colony, Gujrat is 053-9260395.

**7.15. WIRELESS ARRANGEMENTS**

Efficient communication methods will be employed using departmental wireless sets, canal telegraphs, messengers, and mobile units. To strengthen communication, mobile wireless sets have already been purchased and assigned as follows:

Executive Engineer Gujrat (Code: ‘AMJAD GUJRAT’)

S.D.O Gujrat (Code: ‘SADIQ GUJRAT’)

Sub-Engineers (Code: Individual names)

During the flood season, a central emergency camp will be established at Spur No. 8 (Right Bank of the River Chenab) for District Gujrat, which has been deemed the most strategic location for monitoring and controlling flood response activities.

Continuous communication with the Flood Information Center, Lahore is essential for obtaining real-time flood and rainfall data from upper catchments. Furthermore, a base station has been installed in coordination with the Executive Engineer, Murala, to receive and relay current flood-related information.

**CALLING CODE DATA OF IRRIGATION OFFICERS ON WIRELESS**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Officer/official with designation** | **Calling Code** | **Police control/frequency** |
| 1. | Chief Engineer, Sargodha | Farzand Sargodha | Sargodha |
| 2. | Superintending Engineer, Mandi Bahauddin | Amjad-1 Jhelum | Mohsin Control/162.975 |
| 3. | Executive Engineer, Gujrat | Amjad Gujrat | Azam Control/162.800 |
| 4. | Executive Engineer, Jhelum | Amjad Jhelum | Mohsin Control/162.975 |
| 5. | Executive Engineer, Marala | Amjad Marala | Nisar Sialkot/162.975 |
| 6. | Sub Divisional Officer, Gujrat | Sadiq Gujrat | Azam Control/162.800 |
| 7. | Sub Engineer, Headquarter | Toqeer Jameel | Azam Control/162.800 |
| 8. | Sub Engineer, Spur 1-5  Leave Reserve-I & II | Nasir Maqsood | -- |
| 9. | Sub Engineer, Munawar Tawi | Muhammad Hamza Hassan | -- |
| 10. | Sub Engineer, Kalupindi | Usama Zafar | -- |
| 11. | Sub Engineer, Surkhpur | Muhammad Hamza Hassan | -- |
| 12. | Sub Engineer, Sajjawal | Khurram Shahzad | -- |
| 13. | Sub Engineer, Shahbaz pur | Khurram Shahzad | -- |

**FREQUENCY FOR THE POLICE CHANNELS**

|  |  |  |
| --- | --- | --- |
| Channel No.1 | 157.975 | Lahore |
| Channel No.2 | 162.800 | Azam Control Gujrat |
| Channel No.3 | 162.850 | Zulfiqar, Gujranwala |
| Channel No.4 | 160.775 | Atta Control Chakwal |
| Channel No.5 | 162.900 | Shaheen, Murree |
| Channel No.6 | 162.925 | --- |
| Channel No.7 | 162.950 | -- |
| Channel No.8 | 162.975 | Mohsin, Jhelum |
| Channel No.9 | 160.025 | --- |
| Channel No.10 | 161.400 | Nisar,Sialkot |
| Channel No.11 | 163.850 | Salah-ud-Din, M.B.Din |
| Channel No.12 | 163.875 | Hassan, P.C Rawat |
| Channel No.13 | 163.900 | --- |
| Channel No.14 | 163.925 | --- |
| Channel No.15 | 163.950 | --- |
| Channel No.16 | 163.975 | Faisalabad |

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**CHAPTER – 8**

**DETAIL OF ENCROACHMENT**

There are no encroachments on any flood protection works within Gujrat Canal Division. However, some private properties have been constructed by original owners on flood banks, particularly in Gujrat Sub-Division. As the department has not acquired this land, these constructions do not fall under the category of encroachments.

|  |  |  |  |
| --- | --- | --- | --- |
| Total Encroachment | Removal | Balance | Action to be Taken |
| --------------------------Nil-------------------------------- | | | |

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**CHAPTER – 9**

**DUTY ROSTER/FLOOD FIGHTING PROGRAM**

9.1. Executive Engineer, Gujrat Canal Division:

The Executive Engineer is the overall in-charge of flood protection activities within the jurisdiction of Gujrat Canal Division, covering Districts Gujrat and Mandi Bahauddin. He is responsible for supervising and maintaining flood protection measures during the flood season and coordinating with civil and military authorities, as well as the Superintending Engineer, Mandi Bahauddin Canal Circle.

9.2. Sub Divisional Officer, Gujrat Sub Division.

Responsible for flood protection along the Chenab from Chuknanwali Flood Bund to Qadirabad, including key areas such as Kala Shadian, Lalamusa, Muskamala, and Bhimber L/R. Oversees critical spurs near Alexandra Bridge and ensures the safety of Gujrat city’s flood defenses. Liaises with authorities for coordinated response.

* **Primary Camp**: Shadiwal Canal Rest House
* **Field Camp**: Muskamala Flood Bund
* **Communication Base**: Police Frequency, Gujrat

9.3. Sub Divisional Officer, S&I Canal Sub Division.

Manages flood bunds around Gujrat city, covering small spurs and mole head spurs along Bhimber Nullah, Halsi Nullah, and Dawara Nullah. Supervises flood structures along the right bank of the Chenab from downstream Marala to Alexandra Bridge, including stone studs near Changanwali. Coordinates with the Army, District Civil Administration, and the Executive Engineer.

* **Primary Camp**: Canal Colony, Gujrat
* **Field Camp**: Spur No. 8
* **Communication Base**: Police Frequency, Gujrat

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9.4. Sub Engineers

**Attached at Headquarters (For Emergency Response)**

* Sub Engineer, Gujrat

**Field Assignments**

* **Gujrat Section& Chakori Section**:

1. Lalamusa flood bund,
2. Lalamusa Extension flood bund
3. Muskamala Flood Bunds,
4. Bhimber L/R Flood Bund,

* **Kalupindi Section**:

1. Chuknawali Flood Bund
2. Kala Shadian, Bari
3. Randiali Guide Walls.

* **Chuknawali Section**:

1. J-head spur (Samma Mohla)

* **Sub Engineer**-I:

1. Guide bank Spur Chak Lashkari, Barmala and surakhpur
2. Inverted hockey spur behlolpur
3. J-Head Spur shampur

* **Sub Engineer**-II

1. Guide wall Natt sharki
2. Guide bank spur 9,10,11
3. Gujrat flood bund

* **Sub Engineer**-III

1. J-Head Spur No. 1,2,3,4,5,6,7
2. Guide bank spur 8 (Old & New)
3. Shahbazpur flood bund

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**CHAPTER – 10**

**EMERGENCY TELEPHONE NUMBERS**

To ensure swift communication and coordination during flood emergencies, the following key contacts are provided:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sr. No.** | **Designation** | | **Office** | **Residence** |
|  | **IRRIGATION DEPARTMENTLAHORE** | | | |
| 1. | Minister, Irrigation | 042-99212809-10 | |  |
| 2. | Secretary, I&P Department Lahore | 042-99212117-18 | | 042-35731116 |
| 3. | Addl. Secretary (Admn.) Lahore. | 042-99212119 | | -- |
| 4. | Addl. Secretary (OP) Lahore. | 042-99212129 | | 042-5224359 |
| 5. | Addl. Secretary (Technical) Lahore. | 042-99212123 | | 042-6818219 |
| 6. | Deputy Secretary (Admn.) Lahore. | 042-99212126 | | 042-570392 |
| 7. | Deputy Secretary (OP) Lahore. | 042-99212127 | | 042-7848174 |
| 8. | Deputy Secretary (Development) Lahore. | 042-99212128 | | 042-7586597 |
| 9. | Section Officer (Flood) Lahore. | 042-99212134 | | 042-7581015 |
|  | **SARGODHA IRRIGATION ZONE** | | | |
| 1. | Chief Engineer, Irrigation Sargodha | 048-9230445 | | 048-9230451 |
| 2. | Executive Engineer (OP) Sargodha. | 048-9230446 | | 048-729067 |
| 3. | Superintending Engineer, Mandi Bahauddin Canal Circle Mandi Bahauddin | 0544-9270332 | | 0544-9270332 |
| 4. | Telegraph Office Jhelum. | 0544-9270330 | | -- |
| 5. | Executive Engineer, Jhelum Canal Division. | 0544-9270331 | | 0544-9270331 |
| 6. | Executive Engineer, GujratCanal Division. | 053-9260398  Fax -9260396 | | 053-9260398 |
| 7. | Sub Divisional Canal Officer Gujrat. | 053-9260395 | | 053-9260395 |
| 8. | Sub Divisional Canal Officer SohawaM.B.Din. | 0546-506562 | | 0546-506562 |
| 9. | Sub Divisional Canal Officer BusalM.B.Din. | 0546-506561 | | 0546-506561 |
| 10. | Sub Divisional Canal Officer Phalia. | 0546-596811 | | 0546-596811 |
| 11. | Sub Divisional Officer S&I Gujrat | 053-9260397 | | 053-9260397 |
| 12. | Telegraph office Gujrat (Flood Emergency Office) | 053-9260395 | |  |
|  | **HEADWORKS DIVISIONS** | | | |
| 1. | Executive Engineer, Murala. | 052-3502102 | | -- |
| 2. | Executive Engineer, Khanki. | 055-6605255 | | -- |
| 3. | Executive Engineer, Qadirabad. | 054-7550198 | | 054-7424272 |
|  | **DISTRICT ADMINISTRATION GUJRAT** | | | |
| 1. | District Administrator, Gujrat. | 053-9260071-72 | | 053-511109 |
| 2. | District Coordination Officer, Gujrat. | 053-9260010 | | 053-9260011 |
| 3. | District Police Officer, Gujrat. | 053/9260026-30-31 | | 053-9260027 |
| 4. | E.D.O (Revenue), Gujrat. | 053-9260066 | | 053-9230077 |
| 5. | District Officer (Revenue), Gujrat. | 053-9260061 | | 053-9260062 |
| 6. | District Flood Control Officer, Gujrat. | 053-9260066 | | -- |
| 7. | D.D.O (Revenue) Gujrat. | 053-9260063 | | 053-9260064 |
| 8. | D.D.O (Revenue) Kharian. | 053-37532200 | | -- |
| 9. | D.D.O (Revenue) Sarai-Alamgir. | 053-37651812 | | 0544-614703 |
| 10. | S.D.P.O Sadar Gujrat. | 053-9260046 | | -- |
| 11. | D.S.P Kharian. | 053-37511950 | | -- |
| 12. | D.S.P Sara-i-Alamgir. | 053-37511950 | | -- |
|  | **DISTRICT ADMINISTRATION MANDI BAHAUDDIN.** | | | |
| 1. | District Administrator, Mandi Bahauddin. | | 0546-520900 | 0546-299009/ 599002 |
| 2. | District Coordination Officer, M.B.Din. | | 0546-504220 | 0546-504200 |
| 3. | District Police Officer, M.B.Din. | | 0546-502324 | -- |
| 4. | E.D.O (Revenue) M.B.Din. | | 0546-501825 | 0546-506340 |
| 5. | D.D.O (Revenue) Phalia. | | 0546-596460 | 0546-596690 |
| 6. | D.D.O (Revenue) M.B.Din. | | 0546-506488 | 0546-505145 |
| 7. | D.D.O (Revenue) Malakwal. | | 0546-591276 | 0546-591368 |

**PAKISTAN BROAD CASTING CORPORATIONNEWS ORGANIZATIONLAHORE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Designation** | **Office** | **Residence** |
| 1. | Deputy Controller Incharge News Editor | 042-99200674 | 042-5862694 |
| 2. | Deputy Controller News | 042-99200681-4 | Ext. |
| 3. | Radio F.M 105 Gujrat. | 053-3520320 & 3520785 |  |
| 4. | Radio F.M 98 M.B.Din | 0546-509798 |  |

**PAKISTAN TELEVISION CORPORATION LAHORE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Designation** | **Office** | **Residence** |
| 1. | News Room | Direct  042-99200617  042-99200618 | -- |
| Exchange  042-99200651-59 | -- |
| Fax  042-99200620 |  |

**FLOOD CONTROL CENTER PUNJAB**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Designation** | **Office** | **Residence** |
| 1. | Flood warning Center, 46-Jail Road Lahore. | 042-99205371 | Fax 042-99205372 |
| 2. | Flood Cell, I&P Secretariat Lahore. | 042-99212134 | Fax 042-99212116 |
| 3. | Police Wireless Control, Jail Road Lahore. | 042-99210062 | -- |
| 4. | Flood Emergency Board of Rev. Punjab. | 042-99204408 | Fax-042-99204405 |
| 5. | National Flood Forecasting Bureau Lahore. | 042-7586479 | 042-7562874 |
| 6. | Senior Meteorologist | 042-99240402 | -- |
| 7. | Chief Engineer (D&F) Zone Lahore | 042/99233551 | -- |
| 8. | Director Flood (D&F) Zone Lahore | 042/99233552 | -- |
| 9. | Flood Cell I &PSecretariat Lahore | 042/99212134 |  |
| 10. | National flood forecasting Bureau Lahore | 042/99200208 | 042/7583747 |

**MILITARY ENGINEERS**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Headquarters Engineers, 30-Corps Gujranwala Cantonment. | 0432-269/2353 | -- |
| 2. | 24-Engineers Battalion, Sialkot Cantonment Sialkot. | 0432-571/5186 | -- |
| 3. | Headquarters Engineers 1-Corps,Kharian Cantonment. | 05771-095/2364 | -- |
| 4. | 15-Div. Sialkot | 0432-571/3223 & 3225 |  |
| 5. | 10-Brigade Sialkot | 0432-571/4202 |  |

**CHAPTER – 11**

**STANDARD OPERATING PROCEDURE (SOP) FOR BREACHING SECTIONS**

**11.1 HISTORY OF THE BREACING SECTION**

There is no breaching section on any flood protection work in Gujrat Canal Division.

**11.2 LOCATION, DESIGN, QUANTITY AND VARIETY OF THE**

**EXPLOSIVE REQUIRED FOR DETONATION**

---------- NIL ----------

**11.3 ARRANGEMENT OF EXPLOSIVES AND SECURITY OF EXPLOSIVE STORES.**

---------- NIL ----------

**11.4 LIST OF THE SECURITY STAFF ALONGWITH DETAIL OF THEIR TRAINING ETC.**

---------- NIL ----------

**11.5 DETAIL OF MECHANICAL MEANS AS STAND BY ARRANGEMENTS IN CASE OF DETONATION FAILURE.**

---------- NIL ----------

**11.6 DUTY ROSTER IN CASE OF CRITICAL SITUATION.**

---------- NIL ----------

**11.7 BREACHING COMMITTEE WITH THEIR ACTION PLAN**

---------- NIL ----------

**11.8 LIST OF THE VILLAGES LIKELY TO BE INUNDATED IN CASE OF BREACH.**

---------- NIL ----------

**11.9 ANNOUNCEMENT AND DETAIL OF EVACUATION ARRANGEMENTS**

---------- NIL ----------

**11.10 DETAILS OF COORDINATION WITH CIVIL/ARMY AUTHORITIES**

---------- NIL ----------

**11.11 PARALLEL COMMUNICATION ARRANGEMENTS**

---------- NIL ----------

**11.12 INDEX PLAN**

---------NIL-----------

|  |  |  |
| --- | --- | --- |
| **Executive Engineer**  Gujrat Canal Division Gujrat | **Superintending Engineer**  Mandi Bahauddin Canal Circle Mandi Bahauddin | **Chief Engineer**  Irrigation Sargodha Zone  Sargodha |

**PART – B**

**GUJRAT CANAL DIVISION**

**GUJRAT**

**CHAPTER – 12**

**VULNERABLE SITES ON FLOOD BUNDS/STRUCTURES**

**12.1. APPREHENDED BRACHES IN FLOOD BUNDS/STRUCTURES**

The following flood bunds and structures are identified as vulnerable to potential breaches due to high flood levels in the River Chenab and its tributaries:

* Lalamusa Flood Bund – Right bank of Bhimber Nullah, between RD 9000-10000 (Site 1).
* Bhimber Right Flood Bund – Left bank of Bhimber Nullah, between RD 3000-4000 and RD 9000-10000 (Site 2).

**12.2. Operation of Breaching Sections.**

There are no designated breaching sections within the jurisdiction of Gujrat Canal Division.

**12.3. Breaches due to rising of flood water, deterioration of flood bunds etc.**

No breaches have been recorded due to rising floodwaters or the deterioration of flood bunds.

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**CHAPTER – 13**

**EMERGENCY CONTINGENCY PLAN FOR**

**VULNERABLE SITES**

1. **Lalamusa Flood Bund – Right Bank of Bhimber Nallah (RD 9+000 - 10+000)**

**13.1. Flood Water Route Plan & Levels**

A detailed plan illustrating the expected floodwater route in case of a breach, along with elevation levels, is attached as Annex-B.

**13.2. Villages and Settlements Likely to be affected**

In the event of a breach, the following villages and settlements are at risk of inundation:

* Makan
* Lalamusa
* Mir Dad
* Miana Kot

**13.3. Strategy and Actions for Flood Prevention & Mitigation**

The Lalamusa Flood Bund, spanning 16.25 miles along the right edge of Bhimber Nallah, is vulnerable during the monsoon season due to the rapid influx of rainwater from the catchment area. Any damage to this bund may result in:

* Flooding of villages and G.T. Road
* Extensive damage to agricultural lands, affecting crops like rice, fodder, and maize

**13.3.1. Arrangements**

In case of a breach or emergency situation, immediate countermeasures will include:

* Tree launching
* Stone dumping
* Placement of gunny bags

**13.3.2. Establishment of Flood Fighting Camps**

A flood monitoring and response camp will be established at RD 9+000 along Lalamusa Flood Bund.

| Sr. No. | Flood Bund Name | Camp RD | Beldars | Mate | Gauge Reader | Chowkidar |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | Lalamusa Flood Bund | 9000 | 5 | 1 | -- | 1 |

**13.3.3. Duties of Officers/Officials & Camp Sites**

| Officers (Name, Designation & Contact) | Officials (Name, Designation & Contact) |
| --- | --- |
| Sh. Zia Ullah  Sub Divisional Officer, Gujrat  (0321-7743303) | Toqeer Jameel,  Sub Engineer, Gujrat Section  (0347-6015702) |

**Roles & Responsibilities:**

* The Executive Engineer of Gujrat Canal Division oversees all flood-related activities, including maintenance, supervision, and coordination with civil and military authorities.
* The Sub Divisional Officer monitors key flood protection structures, ensures Gujrat city's safety, coordinates with relevant authorities.
* The Sub Engineer of Surkhpur Section manages Lalamusa Flood Bund, ensuring 24/7 monitoring with a dedicated labor force for infrastructure protection.

**13.3.4. Availability of Departmental Machinery**

There is no departmental machinery available within this division.

**13.3.5. Machinery Available from Private Sources**

In case of emergency, the following machinery can be hired from private contractors:

* Dozer
* Excavator Machine
* Dumper
* Tractor with Trolley

**13.3.6. Flood Fighting Material Required**

Details are provided on Page No. 37-38.

**13.3.7. Flood Fighting Material Available**

Details are provided on Page No. 37-38.

**13.4. Infrastructure & Utilities in the Area**

The following essential infrastructure and utilities are present in the flood-prone area:

* Electric Lines
* Sui Gas Pipelines
* Telephone Installations
* Road Net works
* Buildings

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1. **Bhimber Right flood bund along left bank of Bhimber Nallah between RD 3000-4000 & 9000-10000.**

**13.1. Plan showing route of Flood Water coming out of the breach supported with levels.**

A detailed plan illustrating the expected floodwater route in case of a breach, along with elevation levels, is attached as Annex-B.

**13.2. Detail of villages abadies likely to be affected and this should also be shown on the plan.**

In the event of a breach, the following villages and settlements are at risk of inundation:

* + Vanis
  + Dhul Khurd
  + Changanwali
  + Mulo

**13.3. Strategy and action taken be explained in detail.**

The Bhimber Right Flood Bund, spanning 4.31 miles along the right bank of Bhimber Nallah, is crucial in protecting the adjacent villages. If the bund sustains damage during a flood, water could inundate these settlements, cross the Gujrat-Sargodha Road, and eventually return to the river.

**13.3.1. Arrangements**

To mitigate flood damage, the following measures will be implemented:

* Tree Launching: Deployment of trees to reduce the force of floodwaters.
* Gunny Bags: Filling and strategic placement to reinforce vulnerable areas.
* Stone Dumping: Strengthening of weakened embankments using stone materials.

**13.3.2. Establishment of Flood Fighting Camps**

| Sr. No. | Flood Bund Name | Camp RD | Beldars | Mate | Gauge Reader | Chowkidar |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | Bhimber right flood bund | 3000 | 5 | 1 | -- | 1 |
|  | 9000 | 5 | 1 | -- | 1 |

**13.3.3. Duties of Officers/Officials and their camp sites.**

| Officers (Name, Designation & Contact) | Officials (Name, Designation & Contact) |
| --- | --- |
| Sh. Zia Ullah  Sub Divisional Officer, Gujrat  (0321-7743303) | Toqeer Jameel,  Sub Engineer, Gujrat Section  (0347-6015702) |

**Roles & Responsibilities:**

* The Executive Engineer of Gujrat Canal Division oversees all flood-related activities, including maintenance, supervision, and coordination with civil and military authorities.
* The Sub Divisional Officer monitors key flood protection structures, ensures Gujrat city's safety, coordinates with relevant authorities.
* The Sub Engineer of Chakori Section manages Bhimber right Flood Bund, ensuring 24/7 monitoring with a dedicated labor force for infrastructure protection.

**13.3.4. Availability of Departmental Machinery**

There is no departmental machinery available within this division.

**13.3.5. Machinery Available from Private Sources**

In case of emergency, the following machinery can be hired from private contractors:

* Dozer
* Excavator Machine
* Dumper
* Tractor with Trolley

**13.3.6. Flood Fighting Material Required**

Details are provided on Page No. 37-38.

**13.3.7. Flood Fighting Material Available**

Details are provided on Page No. 37-38.

**13.4. Infrastructure & Utilities in the Area**

The following essential infrastructure and utilities are present in the flood-prone area:

* Electric Lines.
* Sui Gas Pipelines
* Telephone Installations
* Road Net works.
* Buildings.

**Superintending Engineer** **Executive Engineer**

Mandi Bahauddin Canal Circle Gujrat Canal Division

Mandi Bahauddin Gujrat

**Chief Engineer**

Irrigation Sargodha Zone

Sargodha

**CHAPTER-14**

**ACTION PLAN**

**14.1. Re-shuffling / Recouping plan of reserve stock stone Departmentally.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Name of Flood Infrastructures having reserve stock stone.** | **Available Quantity of Stone (Lac Cft)** | **Sites where stone can be used during Flood emergency** |
| 1 | Ganda Bund near village Bhelolpur on right bank of River Chenab. | 0.27 | 1. J-head spur near village shampur on right bank of River Chenab. 2. Guide bank near village surkhpur on River Tawi. 3. Guide bank near village Lashkari Chak on River Tawi. |
| 2 | J-head spur near village Samma & Mohla | 0.70 | Lalamusa Flood Bund, Bhimber right Flood Bund, Bhimber Left Flood Bund & Musa Kamala Flood Bund |
| 3 | J-head spur No. 1 U/S Alexandra Bridge.  J-head spur No. 2 near village Pandi.  J-head spur No.3 near village Kotli  J-Head Spur 4 near village Dera Hakim on right bank of River Chenab. | 1.06 | 1. J-head Spur No. 5 near village Lamboor 2. J-head Spur No. 6 near village Kot Nikka. 3. J-Head Spur No. 7 near village Dewara Nallah. 4. J Guide bank spur No. 9 near Dera Hakim on right bank of River Chenab. |

**14.2. Detail of inlet. Outlet crossing along with closing methodology.**

**--------Nil------**

**14.3. Deployment Machinery (Medium to high flood)**

Attached at Page 56-58

**14.4. Deployment Machinery (High to very high flood)**

Attached at Page 59-61

**14.5. Deployment Machinery ( Very High to exceptionally high flood)**

Attached at Page 62-64

**14.6. Police Deployment plan**

Attached at page 65

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**14.7. Details of synthetic bags with capacity of 500 kg and 1000 kg**

|  |  |  |  |
| --- | --- | --- | --- |
| **Synthetic Bags Capacity** | **Required** | **Available** | **Balance** |
| 500 Kg | 400 No. | Nil | 400 No. |
| 1000 Kg | 500 No. | Nil | 500 No. |

**14.8 Details of polythene sheet of black color to protect upstream slope against wave action and to control seepage through embankments**

|  |  |  |
| --- | --- | --- |
| **Polythene Sheet** | **Required** | **Available** |
| Nil | Nil | Nil |

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**ACTION PLAN DURING FLOODS ON RIVER CHENAB**

**14.3 (DEPOLYMENT MACHINARY MEDIUM TO HIGH FLOOD)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Name of structure** | **Length in mile** | **Vulnerable reach** | | **Camp location** | **Site incharge by name & Cell No.** | **Machinery deployed** | | | | | **Availability of stone Lac cft** |
| **Excavator** | **Dozer** | **Trolleys/ Dumpers** | **Tractor with front blade** | **Labour (Beldar+ Mate)** |
| 1 | 2 | 3 | 4 | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | Bhimber Right Flood Bund | 4.310 | RD 3-4, 9-10 | | RD 3-4 & 9-10 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | 1 | 0 | 1 Tractor Trolleys | 0 | 6 Beldar | 0 |
| 2 | Bhimber Left Flood Bund | 3.810 | RD 3-4 | | RD 3-4 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | 1 | 0 | 1 Tractor Trolleys | 0 | 6 Beldar + 1 Mate | 0 |
| 3 | Lalamusa Flood Bund | 10.800 | RD 9-10 | | RD 14, 29 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702)) | 1 | 0 | 2 Tractor Trolleys | 0 | 12 Beldar + 2 Mate | 0 |
| 4 | Lalamusa extension Flood Bund | 5.454 |  | | RD 11 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | 1 | 0 | 2 Tractor Trolleys | 0 | 6 Beldar + 1 Mate | 0 |
| 5 | J-Head Spur Samman Mohala | 0.580 |  | J-Head Spur Samma Mohla | | Usama Zafar(Sub EngineerKalupindi section  0340-4522717 | 1 | 0 | 1 Tractor Trolleys | 0 | 3 Beldar | 0 |
| 6 | J-Head Spur No.2 | 1.760 |  | J-Head Spur No.2 | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 1 Tractor Trolleys | 0 | 3 Beldar | 0.17 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Name of structure** | **Length in mile** | **Vulnerable reach** | | **Camp location** | **Site incharge by name & Cell No.** | **Machinery deployed** | | | | | **Availability of stone Lac cft** |
| **Excavator** | **Dozer** | **Trolleys/ Dumpers** | **Tractor with front blade** | **Labour (Beldar+ Mate)** |
| 1 | 2 | 3 | 4 | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 7 | J-Head Spur No.3 | 0.800 | 0 | | J-Head Spur No.3 | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 1 Tractor Trolleys | 0 | 3 Beldar | 0.32 |
| 8 | J-Head Spur No.4 | 0.530 | 0 | | J-Head Spur No.4 | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 1 Tractor Trolleys | 0 | 4 Beldar | 0.31 |
| 9 | J-Head Spur No.8 | 0.380 | 0 | | J-Head Spur No.8 | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 2 Tractor Trolleys | 0 | 4 Beldar | 0.20 |
| 10 | Guide Wall Spur No.9 | 0.410 | 0 | | Guide Wall Spur No.9 | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 1 Tractor Trolleys | 0 | 4 Beldar | 0 |
| 11 | Guide Wall Spur No.11 | 0.360 | 0 | | Guide Wall Spur No.11 | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 1 Tractor Trolleys | 0 | 3 Beldar | 0.25 |
| 12 | J-Head Spur Shampur | 0.480 | 0 | J-Head Spur Shampur | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 2 Tractor Trolleys | 0 | 4 Beldar | 0 |
| 13 | Inverted Hockey Spur Behlolpur | 0.081 | 0 | Inverted Hockey Spur Behlolpur | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 2Tractor Trolleys | 0 | 3 Beldar | 0 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Name of structure** | **Length in mile** | **Vulnerable reach** | **Camp location** | **Site incharge by name & Cell No.** | **Machinery deployed** | | | | | **Availability of stoneLac cft** |
| **Excavator** | **Dozer** | **Trolleys/ Dumpers** | **Tractor with front blade** | **Labour (Beldar+ Mate)** |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 14 | Guide wall Spur Surkhpur | 0.355 |  | Guide bank Spur Surkhpur | Muhammad Hamza Hassan(Sub Engineer  0341-0108014) | 1 | 0 | 2 Tractor Trolleys | 0 | 3 Beldar | 0 |
| **TOTAL** | | **30.11** |  |  |  | **14** | **0** | **20 Tractor Trolleys** | **0** |  |  |

Note: - Payment for machinery and work charge employee subject to verification by M/S NESPAK.

**ACTION PLAN DURING FLOODS ON RIVER CHENAB**

**14.4 (DEPOLYMENT MACHINARY HIGH TO VERY HIGHFLOOD)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Name of structure** | **Length in mile** | **Vulnerable reach** | | | **Camp location** | **Site incharge by name & Cell No.** | | **Machinery deployed** | | | | | | | | | **Availability of stone Lac cft** | |
| **Excavator** | **Dozer** | | **Trolleys/ Dumpers** | | **Tractor with front blade** | | **Labour (Beldar+ Mate)** | |
| 1 | 2 | 3 | 4 | | | 5 | 6 | | 7 | 8 | | 9 | | 10 | | 11 | | 12 | |
| 1 | Bhimber Right Flood Bund | 4.310 | RD 3-4, 9-10 | | | RD 3-4 & 9-10 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | | 1 | 0 | | 1 Tractor Trolleys | | 0 | | 6 Beldar | | 0 | |
| 2 | Bhimber Left Flood Bund | 3.810 | RD 3-4 | | | RD 3-4 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | | 1 | 0 | | 1 Tractor Trolleys | | 0 | | 6 Beldar + 1 Mate | | 0 | |
| 3 | Lalamusa Flood Bund | 10.800 | RD 9-10 | | | RD 14, 29 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | | 1 | 0 | | 2 Tractor Trolleys | | 0 | | 12 Beldar + 2 Mate | | 0 | |
| 4 | Lalamusa extension Flood Bund | 5.454 |  | | | RD 11 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | | 1 | 0 | | 1 Tractor Trolleys | | 0 | | 6 Beldar + 1 Mate | | 0 | |
| 5 | J-Head Spur Samman Mohala | 0.580 |  | | J-Head Spur Samma Mohla | | Usama Zafar(Sub Engineer Kalupindi section  0340-4522717 | | 1 | 0 | | 2 Tractor Trolleys | | 0 | | 3 Beldar | | 0 | |
| 6 | J-Head Spur No.2 | 1.760 |  | | J-Head Spur No.2 | | Khurram Shahzad (Sub Engineer S&I (03466802709) | | 1 | 0 | | 1 Tractor Trolleys | | 0 | | 3 Beldar | | 0.17 | |
| **Sr. No.** | **Name of structure** | **Length in mile** | **Vulnerable reach** | | **Camp location** | | | **Site incharge by name & Cell No.** | **Machinery deployed** | | | | | | | | | | **Availability of stone Lac cft** | |
| **Excavator** | | **Dozer** | | **Trolleys/ Dumpers** | | **Tractor with front blade** | | **Labour (Beldar+ Mate)** | |
| 1 | 2 | 3 | 4 | | 5 | | | 6 | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | |
| 7 | J-Head Spur No.3 | 0.800 |  | | J-Head Spur No.3 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | 0 | | 1 Tractor Trolleys | | 0 | | 3 Beldar | | 0.32 | |
| 8 | J-Head Spur No.4 | 0.530 |  | | J-Head Spur No.4 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | 0 | | 1 Tractor Trolleys | | 0 | | 4 Beldar | | 0.31 | |
| 9 | J-Head Spur No.8 | 0.380 |  | | J-Head Spur No.8 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | 0 | | 2 Tractor Trolleys | | 0 | | 4 Beldar | | 0.20 | |
| 10 | Guide Wall Spur No.9 | 0.410 |  | | Guide Wall Spur No.9 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | 0 | | 1 Tractor Trolleys | | 0 | | 4 Beldar | | 0 | |
| 11 | Guide Wall Spur No.11 | 0.360 |  | | Guide Wall Spur No.11 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | 0 | | 1 Tractor Trolleys | | 0 | | 3 Beldar | | 0.25 | |
| 12 | J-Head Spur Shampur | 0.480 |  | J-Head Spur Shampur | | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | 0 | | 1 Tractor Trolleys | | 0 | | 4 Beldar | | 0 | |
| 13 | Inverted Hockey Spur Behlolpur | 0.081 |  | Inverted Hockey Spur Behlolpur | | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | 0 | | 2 Tractor Trolleys | | 0 | | 3 Beldar | | 0 | |
| 14 | Guide wall Spur Surkhpur | 0.355 |  | Guide bank Spur Surkhpur | | | | Muhammad Hamza Hassan (Sub Engineer  0341-0108014) | 1 | | 0 | | 2 Tractor Trolleys | | 0 | | 3 Beldar | | 0 | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sr. No. | Name of structure | Length in mile | Vulnerable reach | Camp location | Site incharge by name & Cell No. | Machinery deployed | | | | | Availability of stone Lac cft |
| **Excavator** | **Dozer** | **Trolleys/ Dumpers** | **Tractor with front blade** | **Labour (Beldar+ Mate)** |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 15 | Gujrat Flood Bund | 16.840 |  | RD 33,50 | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 2 Tractor Trolleys | 0 | 6 Beldar | 1.40 |
| 16 | Chuknawali Flood Bund | 12.390 |  | RD 111,147 | Usama Zafar(Sub Engineer Kalupindi section  0340-4522717 | 1 | 0 | 2 Tractor Trolleys | 0 | 8 Beldar +2 Mate | 0 |
| **TOTAL** | | **59.34** |  |  |  | **16** | **0** | **23 Tractor Trolleys** | **0** |  |  |

Note: - Payment for machinery and work charge employee subject to verification M/S NESPAK.

**PLAN DURING FLOODS ON RIVER CHENAB**

**14.5 (DEPOLYMENT MACHINARY HIGH TO EXCEPTIONALLY HIGH FLOOD)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Name of structure** | **Length in mile** | **Vulnerable reach** | | | **Camp location** | **Site incharge by name & Cell No.** | | **Machinery deployed** | | | | | | | | | | **Availability of stoneLac cft** | |
| **Excavator** | **Dozer** | | | **Trolleys/ Dumpers** | | **Tractor with front blade** | | **Labour (Beldar+ Mate)** | |
| 1 | 2 | 3 | 4 | | | 5 | 6 | | 7 | 8 | | | 9 | | 10 | | 11 | | 12 | |
| 1 | Bhimber Right Flood Bund | 4.310 | RD 3-4, 9-10 | | | RD 3-4 & 9-10 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | | 1 | 0 | | | 1 Tractor Trolleys | | 0 | | 6 Beldar | | 0 | |
| 2 | Bhimber Left Flood Bund | 3.810 | RD 3-4 | | | RD 3-4 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | | 1 | 0 | | | 1 Tractor Trolleys | | 0 | | 6 Beldar + 1 Mate | | 0 | |
| 3 | Lalamusa Flood Bund | 10.800 | RD 9-10 | | | RD 14, 29 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | | 1 | 0 | | | 2 Tractor Trolleys | | 0 | | 12 Beldar + 2 Mate | | 0 | |
| 4 | Lalamusa extension Flood Bund | 5.454 |  | | | RD 11 | Toqeer Jameel , (Sub Engineer Gujrat Section (03476015702) | | 1 | 0 | | | 1 Tractor Trolleys | | 0 | | 6 Beldar + 1 Mate | | 0 | |
| 5 | J-Head Spur Samman Mohala | 0.580 |  | | | J-Head Spur Samma Mohla | Usama Zafar(Sub Engineer Kalupindi section  0340-4522717 | | 1 | | 0 | | 2 Tractor Trolleys | | 0 | | 3 Beldar | | 0.70 | |
| 6 | J-Head Spur No.2 | 1.760 |  | | | J-Head Spur No.2 | Khurram Shahzad (Sub Engineer S&I (03466802709) | | 1 | | 0 | | 1 Tractor Trolleys | | 0 | | 3 Beldar | | 0.17 | |
| **Sr. No.** | **Name of structure** | **Length in mile** | **Vulnerable reach** | | **Camp location** | | | **Site incharge by name & Cell No.** | **Machinery deployed** | | | | | | | | | | | **Availability of stone Lac cft** | |
| **Excavator** | | | **Dozer** | | **Trolleys/ Dumpers** | | **Tractor with front blade** | | **Labour (Beldar+ Mate)** | |
| 1 | 2 | 3 | 4 | | 5 | | | 6 | 7 | | | 8 | | 9 | | 10 | | 11 | | 12 | |
| 7 | J-Head Spur No.3 | 0.800 |  | | J-Head Spur No.3 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | | 0 | | 2 Tractor Trolleys | | 0 | | 3 Beldar | | 0.32 | |
| 8 | J-Head Spur No.4 | 0.530 |  | | J-Head Spur No.4 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | | 0 | | 1 Tractor Trolleys | | 0 | | 4 Beldar | | 0.31 | |
| 9 | J-Head Spur No.8 | 0.380 |  | | J-Head Spur No.8 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | | 0 | | 2 Tractor Trolleys | | 0 | | 4 Beldar | | 0.20 | |
| 10 | Guide Wall Spur No.9 | 0.410 |  | | Guide Wall Spur No.9 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | | 0 | | 1 Tractor Trolleys | | 0 | | 4 Beldar | | 0 | |
| 11 | Guide Wall Spur No.11 | 0.360 |  | | Guide Wall Spur No.11 | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | | 0 | | 1 Tractor Trolleys | | 0 | | 3 Beldar | | 0.25 | |
| 12 | J-Head Spur Shampur | 0.480 |  | J-Head Spur Shampur | | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | | 0 | | 2Tractor Trolleys | | 0 | | 4 Beldar | | 0 | |
| 13 | Inverted Hockey Spur Behlolpur | 0.081 |  | Inverted Hockey Spur Behlolpur | | | | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | | | 0 | | 2 Tractor Trolleys | | 0 | | 3 Beldar | | 0 | |
| 14 | Guide wall Spur Surkhpur | 0.355 |  | Guide bank Spur Surkhpur | | | | Muhammad Hamza Hassan (Sub Engineer  0341-0108014) | 1 | | | 0 | | 2 Tractor Trolleys | | 0 | | 3 Beldar | | 0 | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Name of structure** | **Length in mile** | **Vulnerable reach** | **Camp location** | **Site incharge by name & Cell No.** | **Machinery deployed** | | | | | **Availability of stoneLac cft** |
| **Excavator** | **Dozer** | **Trolleys/ Dumpers** | **Tractor with front blade** | **Labour (Beldar+ Mate)** |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 15 | Gujrat Flood Bund | 16.840 |  | RD 33,50 | Khurram Shahzad (Sub Engineer S&I (03466802709) | 1 | 0 | 2 Tractor Trolleys | 0 | 6 Beldar | 1.40 |
| 16 | Chuknawali Flood Bund | 12.390 |  | RD 111,147 | Usama Zafar(Sub Engineer Kalupindi section  0340-4522717 | 1 | 0 | 2 Tractor Trolleys | 0 | 6Beldar +2 Mate | 0 |
| **TOTAL** | | **59.34** |  |  |  | **16** | **0** | **25 Tractor Trolleys** | **0** |  |  |

Note: - Payment for machinery and work charge employee subject to verification by M/S NESPAK.

**14.6 POLICE DEPLOYMENT PLAN**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S.No.** | **Vulnerable sites** | **Concerned Canal Division** | **Concerned Police station &Districe** | **Police persons to be deployed** | | **Remarks (if any)** |
| **Inspector/ SI/ASI** | **Constable** |
| **1** | Lalamusa flood bund along right bank of Bhimbr Nallah between RD 9000-10000 | Gujrat | Lalamusa  ,Gujrat | Sub Inspector  = 02 Nos. | 8 Nos |  |
| **2** | Bhimber Right flood bund along left bank of Bhimber Nallah between RD 3000-4000 & 9000-10000 | Gujrat | Rehmanian,  Gujrat | Sub Inspector  = 02 Nos. | 8 Nos |  |

**(Chapter 15)**

**BACK UP DIVISIONS (IN CASE OF BREACH)**

It is certified that no breaching section exists in the jurisdiction of thisDivision. The backup Division is Mandi Bahauddin Canal Division Mandi Bahauddin.

**Executive Engineer**

Gujrat Canal Division

Gujrat