Due Diligence Report

Document stage:
Project Number: 47176-002
March 2017

IND: Delhi Water Supply Improvement Investment Program
Subproject: Distribution System Improvement-for UGR Command Areas G-02, H-07 and H-08.
Package 2, Project 1
DWSIIP/02

Prepared by the Delhi Jal Board for the Asian Development Bank.

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CURRENCY EQUIVALENTS

(as of 01 March 2017)

Currency Unit	–	Indian Rupee (INR)
INR 1.00	=	$0.01498
$1.00	=	INR 66.7720

ABBREVIATIONS

ADB	–	Asian Development Bank
BPL	–	below poverty line
CWPS		clear water pumping stations
DH	–	displaced households
DJB	–	Delhi Jal Board
DMA	–	district metering area
DP	–	displaced person
DWSIIP	–	Delhi Water Supply Improvement Investment Program
EA	–	executing agency
IA	–	implementing agency
MFF	–	multitranche financing facility
NGO	–	non-governmental organization
PIU	–	Program Implementation Unit
PMC	–	project management consultancy
PMU	–	Program Management Unit
RF	–	resettlement framework
RFCTLARRA	–	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act
SPS	–	Safeguard Policy Statement
UGR	–	Underground reservoir
WTP	–	water treatment plant

NOTES

(i) The fiscal year (FY) of the Government of India and its agencies ends on 31 March.

(ii) In this report, "$" refers to US dollars.

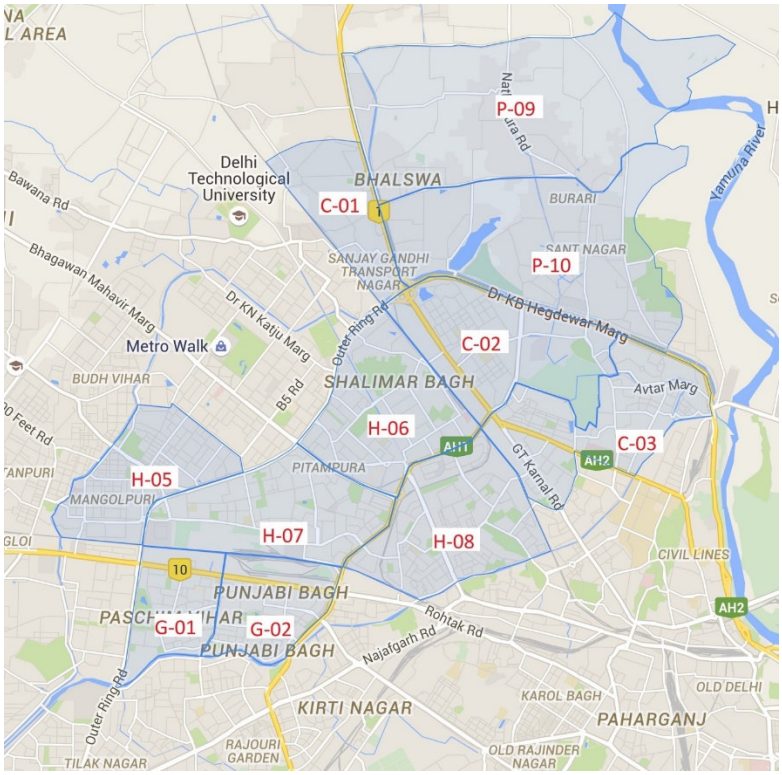
CONTENTS

I. INTRODUCTION

A. Overview of the Investment Program

1. The Delhi Water Supply Improvement Investment Program (DWSIIP) will be implemented over an eight-year period and will improve the infrastructure, management and performance of the water supply services in the proposed Wazirabad Water Treatment Plant (WTP) command area located in North Delhi and having a 2,051 design population of 2.64 million (approximately 10% of Delhi's projected population by that time). The DWSIIP will help achieve the National Capital Territory of Delhi Water Supply Master Plan[1] objectives of reduced nonrevenue water and equitable access to water supply services. The investment program will include the rehabilitation, upgrading and/or replacement of key water supply infrastructure, improvements in the management of the infrastructure and improved customer related services within the Wazirabad WTP command area. The DWSIIP will be implemented as a multi-tranche financing facility (MFF) having two projects. The Wazirabad WTP command area location is presented in **Figure 1**.

Figure 1: Location Map of the Wazirabad WTP Command Area



2. The impact of the DWSIIP will be improved water supply services in the Wazirabad WTP Command Area. The outcome will be improved access to reliable, continuous and sustainable water supply services in the Wazirabad WTP command area.

3. The DWSIIP will have three outputs.

[1] Study on Improvement of Water Supply System in Delhi in the Republic of India; Japan International Cooperation Agency September 2011

4. **Output 1**: **Distribution network improved in the Wazirabad WTP Command Area.** This will include (i) establishment and commissioning of district metering areas (DMAs) for NRW reduction; (ii) provision of house service connections to residents, especially the poor and female-headed households; (iii) provision of 24-hour water supply; and (iv) improvement of water supply efficiency by reducing NRW and energy losses of electromechanical machinery.

5. Output 1 will support smart water management in the Wazirabad WTP command area to a prospective population of 2.41 million by year 2025.[2] The key activities of constructing new water supply pipelines, establishing and commissioning DMAs, and providing metered house service connections will benefit the residents through continuous pressurized water supply and reduction of NRW to less than 15%. Appropriate long-term (at least 10 years) operation and maintenance (O&M)-embedded performance-based contracts will be put in place to ensure operational sustainability.

6. **Output 2**: **Water treatment and transmission systems improved in the Wazirabad WTP command area.** This will include (i) rehabilitation and upgrading of the existing 120 million gallons per day (MGD) WTP; (ii) rehabilitation and construction of clear water pumping stations, underground reservoirs (UGRs) and booster stations; and (iii) rehabilitation and construction of new transmission mains.

7. Output 2 will support increasing energy efficiency in clear water pumping, reduction of clear water transmission losses, rehabilitation or construction of the WTP, as appropriate, and avoidance of shut down of the WTP to consistently meet the drinking water quality standards. Old pumping system in the clear water pump stations shall be upgraded with energy efficient pumps and the transmission pipelines shall be replaced. With use of instrumentation and automation through supervisory control and data acquisition (SCADA) at treatment, transmission, storage, and supply, operational efficiency is expected to be improved.

8. **Output 3**: **Institutional capacity, DMA management and program management strengthened.** This will include (i) implementation of capacity development plans including training on gender and establishment of a training center or institute; (ii) organizational restructuring for effective and sustainable DMA management; (iii) establishment of PDF to prepare future projects; (iv) preparation and implementation of an effective community mobilization plan and gender equity and social inclusion (GESI) action plan; (v) preparation and implementation of asset management plan through use of geographic information system (GIS), hydraulic modelling and SCADA system; (vi) implementation of operation and maintenance-embedded performance-based contracts; (vii) establishment and operationalization of water quality monitoring system; and (viii) strengthening of program management capacities.

9. Output 3 will focus promotion of a customer-focused culture within the DJB that includes measures to improve customer satisfaction, accurate and regular meter reading, billing, revenue collection, and an effective customer complaints mechanism. A comprehensive public outreach campaign under the community mobilization component will be the driver under the DWSIIP to mobilize community and enable consumers' involvement in the provision of services by the DJB.

10. Capacity development under Output 3 will help improve organizational efficiencies through data collection and assessment, review and updating of the master plan, network modelling, asset condition assessments, updating the existing GIS, conducting a comprehensive NRW survey,

[2] The NCTD's current population, estimated to be 17.81 million, is expected to grow to 27 million by 2051 as per Water Policy for Delhi (footnote 25).

developing a SCADA system for the WTP, transmission main and distribution system, preparing recommendations for institutional development and DMA-based organizational restructuring.

11. Project 1 of the DWSIIP will include (i) a project management consultant (PMC); (ii) a civil works package (DWSIIP/ 01) for improvement of distribution network, UGR, clear water pumping station, DMA feeder mains and distribution pipes, bulk flow meters and house service connections for UGR command areas C-02 (Chitranjan Das Park Jahangirpuri) and C-03 (Model Town); (iii) a civil works package (DWSIIP/ 02) for improvement of distribution network, UGR, clear water pumping station, DMA feeder mains and distribution pipes, bulk flow meters and house service connections for UGR command areas G-02 (Punjabi Bagh), H-07 (Shakur Basti) and H-08 (Lawrence Road); and (iii) a civil works package (DWSIIP/04) for transmission mains and clear water pumping stations, and instrumentation and automation (SCADA).

12. Project 2 of the DWSIIP will include (i) a civil works package (DWSIIP/ 03) for rehabilitation or construction of the Wazirabad WTP; (ii) a civil works package (DWSIIP/ 05) for improvement of distribution network, UGR, clear water pumping station, DMA feeder mains and distribution pipes, bulk flow meters and house service connections for UGR command areas G-01 (Piragarhi), H-05 (Avantika), H-06 (Pitampura); and (iii) a civil works package (DWSIIP/06) for improvement of distribution network, UGR, clear water pumping station, DMA feeder mains and distribution pipes, bulk flow meters and house service connections for UGR command areas C-01 (Sanjay Gandhi Transport Nagar), P-09 (Burari-A) and P-10 (Burari Transport Planning Authority).

Table 1: Summary of Works Packages Table

	Package	Project	Description
1	DWSIIP /01	1	Distribution Network Improvement in UGR Command Areas C-02 and C-03 Targeting Continuous Pressurized Water Supply and DMA-Based NRW Reduction and Providing House Service Connections.
2	DWSIIP /02	1	Distribution Network Improvement in UGR Command Areas G-02, H-07 and H-08 Targeting Continuous Pressurized Water Supply and DMA-Based NRW Reduction and Providing House Service Connections.
3	DWSIIP /03	2	Augmentation of water supply–Modernization and Operational Improvements of Wazirabad Water Treatment Plant SCADA System in 11 UGR Command Areas.
4	DWSIIP /04	1	Transmission System Improvements-Providing, Laying and Maintaining New Ductile Iron Transmission Pipelines from Wazirabad WTP to various UGRs and , and Automation and Instrumentation: Providing, Installing and Maintaining.
5	DWSIIP /05	2	Distribution Network Improvement in UGR Command Areas G-01, H-05 and H-06 Targeting Continuous Pressurized Water Supply and DMA-Based NRW Reduction and Providing House Service Connections.
6	DWSIIP /06	2	Distribution Network Improvement in UGR Command Areas C-01, P-09 and P-10 Targeting Continuous Pressurized Water Supply and DMA-Based NRW Reduction and Providing House Service Connections.

13. The PMC will be responsible for the technical and financial management and coordination of the DWSIIP including the undertaking of a public outreach program and ensuring safeguard compliance in line with ADB requirements. The Delhi Jal Board (DJB) will also recruit a community mobilization and resettlement plan implementation assistance consultant (CMRC) to assist in the implementation of any land acquisition and resettlement issues arising, including temporary impacts.

14. The UGR command areas included under the DWSIIP are summarized in **Table 2**, together with population estimates and the number of DMAs.

Table 2: UGRs Proposed Under the DWSIIP

Works Package	UGR Ref.	UGR Name	Area (Ha)	Maximum Population (million)	Population (million)		DMAs (No.)
					2011	2051	
P1	C-02	CD Park Jahangirpuri	1018	0.255	0.232	0.264	38
P1	C-03	Model Town	948	0.237	0.166	0.226	33
Sub Total			**1966**	**0.492**	**0.398**	**0.490**	**71**
P2	G-02	Punjabi Bagh	532	0.133	0.129	0.168	24
P2	H-07	Shakur Basti	947	0.237	0.189	0.234	34
P2	H-08	Lawrence Road	972	0.243	0.290	0.305	44
Sub Total			**2451**	**0.613**	**0.608**	**0.707**	**102**
P3	G-01	Piragarhi	484	0.121	0.092	0.121	17
P3	H-05	Avantika	706	0.177	0.319	0.319	46
P3	H-06	Pitampura	926	0.231	0.214	0.240	34
Sub Total			**2116**	**0.529**	**0.624**	**0.680**	**97**
P4	C-01	SGT Nagar	537	0.134	0.076	0.118	17
P4	P-09	Burari A	2356	0.589	0.183	0.289	42
P4	P-10	Burari TPA	3531	0.883	0.312	0.358	51
Sub Total			**6423**	**1.606**	**0.571**	**0.765**	**110**
Total			**12956**	**3.239**	**2.201**	**2.643**	**380**

Note: Maximum population based on 250 persons/ Ha

15. This Involuntary Resettlement Due Diligence Report covers Project 1, **Package 2**,- Distribution Network Improvement in UGR Command Areas G-02, H-07 and H-08 Targeting Continuous Pressurized Water Supply and DMA-Based NRW Reduction and Providing House Service Connections.

B. Methodology of Study

16. The detailed design for this package is yet to be done. The methodology adopted for the preparation of this report included the (i) study of design and alignment proposals put forth in the Technical Due Diligence Report prepared by the PPTA for the project[3], and (ii) field visits and transect walk was carried out. Field visits have been made to routes of the proposed routes of feeder pipelines, all of which follow the existing roads or right of ways, and mostly are free of encumbrances. Field visits to the project area were carried out in different points in time between May 2014 to February 2017. The due diligence field visits were carried out by the PPTA team members.[4]

[3] The Technical Due Diligence Report has been prepared based on the Master Plan for Delhi's water supply prepared for Delhi Jal Board with support from Japanese International Cooperation Agency (JICA) in the year 2011.

[4] Including the resettlement specialist, team leader and water supply specialist. It also included specialists from the advance project preparation team, which included a water supply specialist and support engineer) and engineers from the office of the Executive Engineer, Dwarka WTP.

II. SUBPROJECT DESCRIPTION

A. Key Components of the Subproject

17. The Distribution Network Improvement (DNI) package 2 includes the command areas of underground reservoirs (UGR) G-02, H-07 and H-08 as explained below.

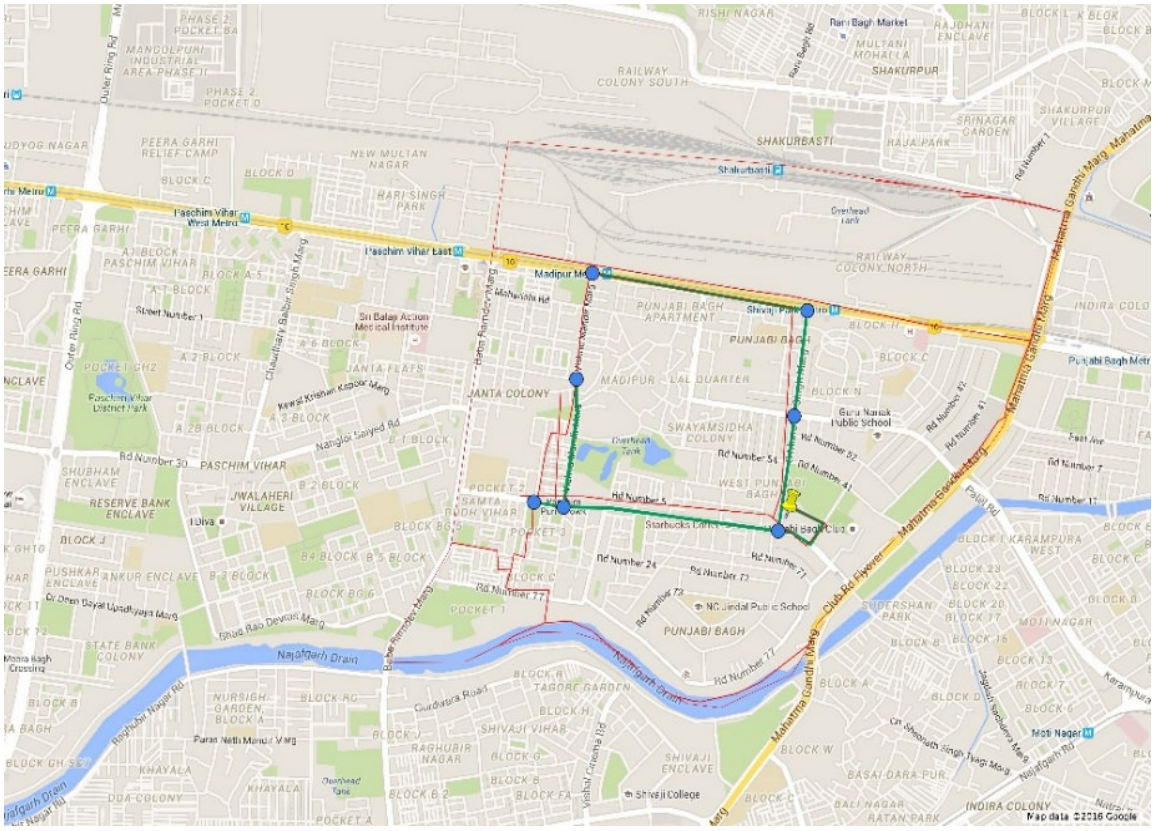
1. G-02 Punjabi Bagh

18. There are in four wards under this UGR command; 57 Paschim Vihar South, 59 Ranibagh, 103 Madhipur A, and 104 Madhipur B. The population proposed to be covered is 168,586 and number of connections proposed are 33,720. The distribution pipe system comprises larger diameter pipes as DMA feeder mains and smaller diameter DMA distribution pipes within the DMAs. The diameters and length of larger diameter pipes and the width of roads along the alignment are presented in **Table 3** below. The pipeline route is depicted in Figure 2. It is also proposed to replace the clear water pumps in the UGR booster station with new 500 HP pump sets, 4 numbers working and 2 numbers standby.

Table 3: DMA Feeder Main Pipes

Diameter mm	Length in m	Road Width in m
400	160	16
500	1667	26
600	2045	32
900	445	60
Grand Total	**4317**	

Figure 2: Route of DMA Feeder Main G-02



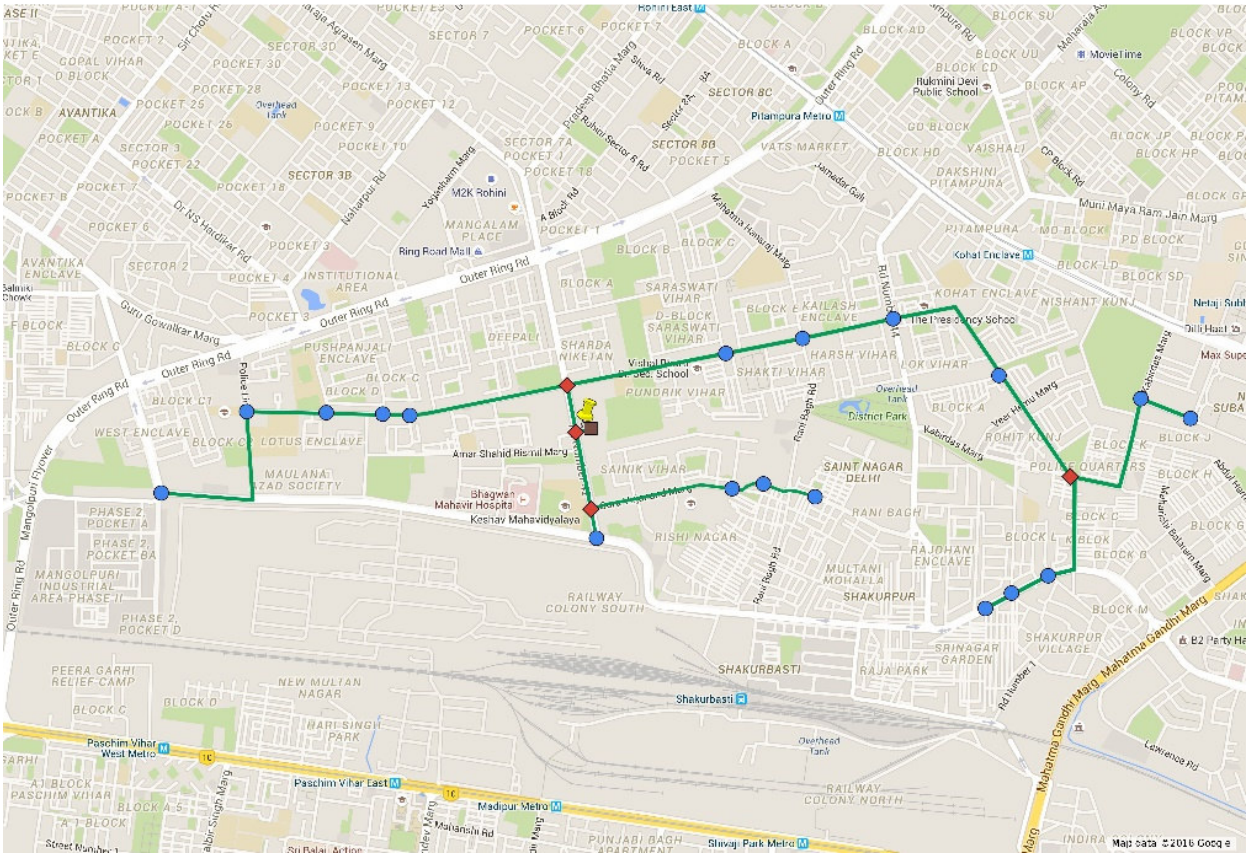
2. H-07 Shakur Basti

19. This UGR commands four wards; 59 Ranibagh, 60 Saraswati Vihar, 62 Rampura, 63 Kohat Enclave, and 64 Shakurpur. The population assigned to this is 234,291 and number of connections proposed are 46,870. The population proposed to be covered is 168,586 and number of connections proposed are 33,720. The distribution pipe system comprises larger diameter pipes as DMA feeder mains and smaller diameter DMA distribution pipes within the DMAs. The diameters and length of larger diameter pipes and the width of roads along the alignment are presented in Table 4 below. The pipeline route is depicted in **Figure 3**. It is also proposed to replace the clear water pumps in the UGR booster station with new 500 HP pump sets, 4 numbers working and 2 numbers standby.

Table 4: DMA Feeder Main Pipes in H-07

Diameter mm	Length m	Road Width in m
300	1362	16
400	1187	16
500	3037	16
600	1000	16
700	998	26
900	196	26
1000	77	32
Grand Total	**7857**	

Figure 3: Route of DMA Feeder Main H-07



3. H-08 Lawrence Road

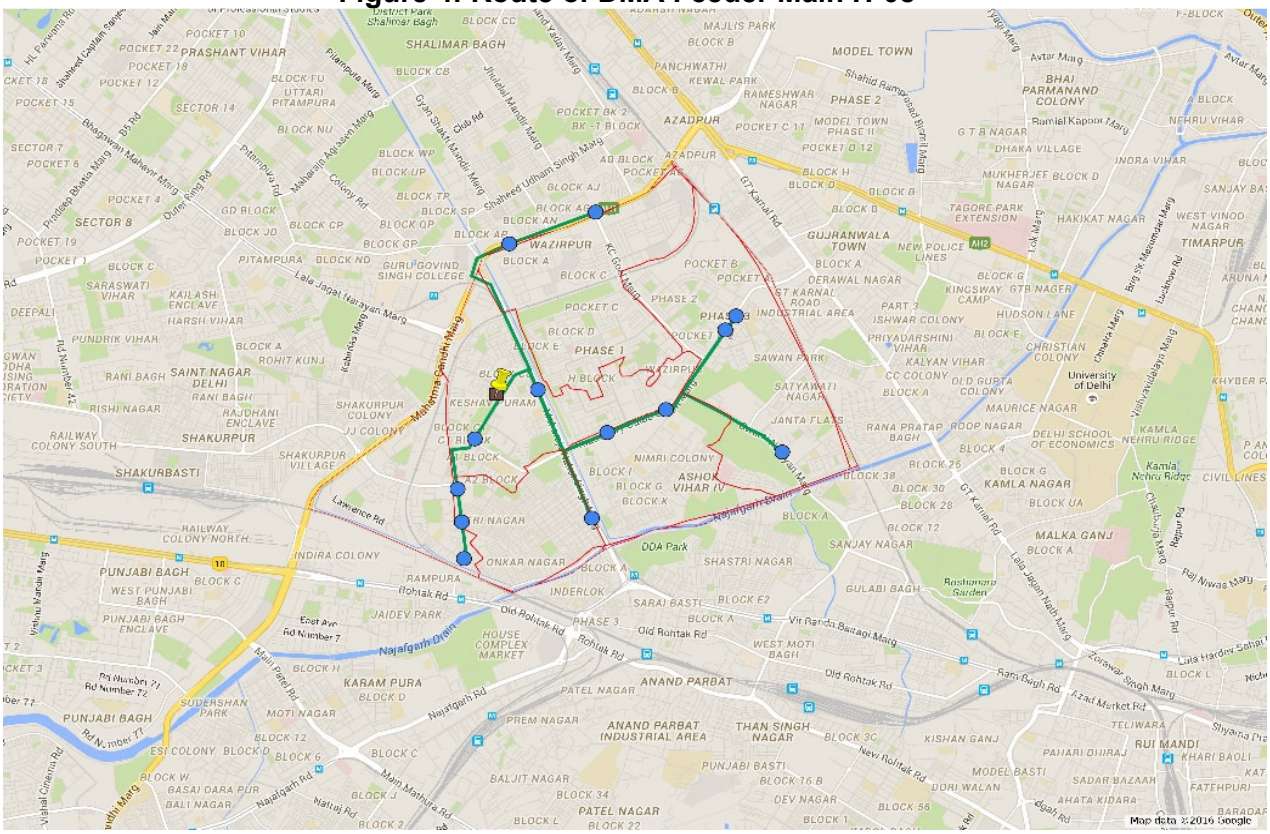
20. This UGR command area is spread across six wards; 61 Trinagar, 62 Rampura, 65 Nimri Colony, 66 Sawan Park, 67 Wazirpur, and 68 Ashok Vihar. The population assigned is 301,522 and the number of connections expected is 61,030. The population proposed to be covered is 168586 and number of connections proposed are 33,720. The distribution pipe system comprises larger diameter pipes as DMA feeder mains and smaller diameter DMA distribution pipes within the DMAs. The diameters and length of larger diameter pipes and the width of roads along the alignment are presented in Table 3 below. The pipeline route is depicted in **Figure 4**. It is also proposed to replace the clear water pumps in the UGR booster station with new 700 HP pump sets, 4 numbers working and 2 numbers standby.

Table 5: DMA Feeder Main Pipes in H-08

Diameter mm	Length m	Road Width m
300	2084	32
400	1698	26
500	2196	26
600	436	26
700	526	32
800	1154	42

Diameter mm	Length m	Road Width m
900	362	32
1000	106	32
Grand Total	**8562**	

Figure 4: Route of DMA Feeder Main H-08



III. METHODOLOGY FOR MINIMIZING IMPACTS

21. The anticipated impacts of the project will be:

i. Accessibility and traffic disruptions: This is likely to happen in sections where the work is being carried out due to the movement of labour and machinery and actual zones of digging trenches, especially along narrow, internal roads.

ii. Access disruptions to residents and customers to shops: During construction access can be hindered due to digging and collection of excavated soil along the road, especially in areas with narrow roads and congested areas.

To minimize involuntary resettlement impacts during construction the proposed pipelines will be laid below the blacktop section of the road and trenchless technology will be used. This technology ensures that roads are not cut open to lay the pipes and hence reduces health and

safety risks associated with open cut trenches such as risk of falling, dust, and traffic disruptions. As the area required to conduct trenchless pipelaying is minimal, this technology helps to minimize involuntary resettlement impacts such as livelihood loss to people conducting business alongside the road (as need for temporary relocation during construction is greatly reduced).

The methodology used for mitigating the anticipated impacts as given in the Environmental Management Plan for the project will be as follows:

Table 6: Mitigation impacts for Anticipated Impacts

Anticipated Impact	Mitigation Measures
Accessibility and Traffic Disruptions	Prepare Traffic Management Plan (TMP) in consultation with the Traffic Police – a generic plan to be prepared, and it shall be made specific to meet the conditions at each section/road taking into consideration diameter of pipe, work area and road width. **Type of roads and measures for fine tuning the alignment of pipelines:** (i) Finalize the alignment to have least disturbance to the traffic; in many main roads, one line on each side (either or main carriage way or on service roads) is used for parking; this location may be ideal if the parking is temporarily disallowed for the duration of work. Barricade and confine the work to parking lane. This will avoid any disturbance to traffic movement; (ii) In roads where there is a road shoulder, align the pipeline in the shoulder; (iii) In roads where there is no parking lane or shoulder, pipe will have to be laid on the carriage way. As far as possible, align the pipeline into the edge of the road; if this requires closure of one traffic lane, take precautions to reduce the traffic (by informing people about the work, and alternative routes that can be taken etc.,) (iv) In narrow roads, pipeline works will completely disturb the traffic (mainly 2-wheelers, 3-wheelers, pedestrians, limited cars). In such cases, works shall be undertaken from junction to junction (about 100 m), so that traffic can be stopped and diverted to other parallel roads. Barricade the area with reflectors (if hard barricading is not feasible) and provide dust screens (3 m height); (v) In internal narrow roads of most of the localities, roads are less than 3 m width in most cases. In these roads, small diameter pipelines will be laid, mostly in the middle of the road. Existing traffic is only of 2-wheelers and rickshaws, which will be disturbed during the work. In such cases, work shall be conducted section wise (one road from junction to junction at a time) and completing the work in minimum possible time (2 days); **Measures to minimize traffic and accessibility disruptions:** (i) Barricade and confine the work area; (ii) Minimize the work area / barricaded area along the roads to the minimum possible width; adopt vertical trench cutting, where required, using shoring; (iii) Confine all the activities within in the barricaded area, including material & waste/surplus soil stocking; (iv) Avoid material/surplus soil stocking in congested areas – immediately remove from site/ or brought to the site as and when required; (v) Transport material, waste etc., during low traffic periods (eg, before 8 AM); (vi) Minimize access disruptions to adjacent properties; vehicle access may be controlled however, pedestrian access should always be available; if

	necessary provide temporary pedestrian access (eg, over the trench) using wooden planks/metal sheets; (vii) Plan transportation (for material and waste) routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; (viii) Schedule transport and hauling activities during non-peak hours; (ix) Locate entry and exit points in areas where there is low potential for traffic congestion; (x) Keep the site free from all unnecessary obstructions; (xi) Drive vehicles in a considerate manner; (xii) Coordinate with Traffic Police for temporary road diversions, where necessary, and for provision of traffic aids if transportation activities cannot be avoided during peak hours; (xiii) Notify affected public by public information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. Provide information to the public through media – newspapers and local cable television (TV) services; (xiv) At work site, public information/caution boards shall be provided including contact for public complaints; (xv) Immediately consolidate the backfilled soil and restore the road surface; if immediate road restoration is not possible, provide a layer of plain cement concrete (PCC) of suitable mix on the backfilled trench so that dust generation, erosion is arrested and it will also provide a smooth riding surface for the traffic until the road is properly restored;
Disruption of access to residents and customers to shops	(i) Inform all businesses and residents about the nature and duration of any work well in advance so that they can make necessary preparations; (ii) Do not block any access; leave spaces for access between barricades/mounds of excavated soil and other stored materials and machinery, and providing footbridges so that people can crossover open trenches; (iii) Adopt trenchless technology to avoid any blockage of access; (iv) Barricade the construction area and regulate movement of people and vehicles in the vicinity, and maintain the surroundings safely with proper direction boards, lighting and security personnel – people should feel safe to move around; (v) Control dust generation; (vi) Immediately consolidate the backfilled soil and restore the road surface; if immediate road restoration is not possible, provide a layer of plain cement concrete (PCC) of suitable mix on the backfilled trench so that dust generation, erosion is arrested and it will also provide a smooth riding surface for the traffic until the road is properly restored. This will also avoid any business loss due to dust and access inconvenience of construction work; (vii) Employ best construction practices, including trenchless technology, speed up construction work with better equipment, increase workforce, etc in predominantly commercial area, and with sensitive features like hospitals, and schools; (viii) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (ix) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

22. If any impacts, permanent or temporary, are identified after the completion of the final scheme design or during construction, the affected persons will be compensated or assisted in accordance with the DWSIIP Resettlement Framework.

IV. CONSULTATION, PARTICIPATION AND DISCLOSURE

23. Public consultation and participation for the DWSIIP has not yet been carried out. This section will therefore be updated at the appropriate time.

24. Following ADBs SPS 2009 requirements this Involuntary Resettlement Due Diligence Report will be posted on the official website of the DJB and the website of the ADB after approval and endorsement of the report by the DJB and the ADB.

V. FINDINGS

25. The distribution network system will be laid below the existing blacktop of roads, predominantly using trenchless technology which causes minimal disruptions (para 21) . **Tables 3, 4** and **5** provide the diameter of the pipelines to be laid and the road width. There is sufficient black top width available for laying of the pipelines. No land acquisition will be required.

VI. CONCLUSION AND RECOMMENDATION

26. This due diligence report will have to be updated and disclosed on the completion of the detailed design of the package. The cutoff date for the package will be established after the detailed design and before the contract of civil works. Meaningful consultation involving various stakeholders in the project areas will have to be conducted and recorded. The community mobilization and resettlement team will assist the activities.

ANNEX 1: PACKAGE 2 DISTRIBUTION NETWORK PICTURES SHOWING ROAD WIDTH FOR LAYING OF PIPELINES

ATTACHED SAMPLES OF PICTURES OF THE ROAD CONDITION OF THE PROJECT SITES (PIPELINES ALIGNMENT TO CONFIRM THE AVAILABLE WIDTH OF THE ROAD THUS IMPACTS CAN BE AVOIDED- LOOK AT THE PICTURES OF SAMPLE DDR FROM KOLKATA PROJECT). SAMPLES OF BUSY ROAD AREAS AND MARKET/ BUSINESS AREAS SHOULD BE INCLUDED. INCLUDE INFORMATION ON THE LOCATION/ NAME OF THE ROAD AND THE RELEVANT UGR COMMAND NUMBER.

A. Punjabi Bagh UGR

<table>
<tr><td>  </td><td> 
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<tr><td>Ward No 103, Madipur</td><td>Road No 65, Punjabi Bagh</td></tr>
<tr><td>  </td><td> 
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<tr><td>Mahindra Park Road Rani Bagh</td><td>Paschim Vihar Market</td></tr>
</table>

B. Shakur Basti UGR

	
Towards Shakur Basti Railway station	Shakurpur Village
	
Harsh Vihar	Shakurpur

C. Lawrence Road UGR

	
Ashok Vihar Road	Pitampura
	
Pitampura	Wazirpur