

DETAILED ECONOMIC ANALYSIS

- Costs and Benefits Streams of the Project ULBs -

1. Hussainabad (\$ million)^a

| Year | Cost | | | Benefits | | | | | Net Benefits |
|--------------|--------------|-------------|-------------|---------------------------|----------------------------|-------------------------|-------------|--------------|--------------|
| | Construction | O&M | Total | Non-incremental | | | Incremental | Total | |
| | | | | Savings in resource costs | Savings in collection time | Savings in earning loss | | | |
| 2021 | 0.52 | | 0.52 | | | | | | (0.52) |
| 2022 | 0.77 | | 0.77 | | | | | | (0.77) |
| 2023 | 0.84 | | 0.84 | | | | | | (0.84) |
| 2024 | 1.08 | | 1.08 | | | | | | (1.08) |
| 2025 | 1.13 | 0.03 | 1.16 | 0.34 | 0.23 | 0.10 | 0.02 | 0.70 | (0.46) |
| 2026 | | 0.05 | 0.05 | 0.60 | 0.40 | 0.18 | 0.04 | 1.22 | 1.17 |
| 2027 | | 0.05 | 0.05 | 0.61 | 0.40 | 0.18 | 0.04 | 1.24 | 1.19 |
| 2028 | | 0.05 | 0.05 | 0.62 | 0.41 | 0.19 | 0.04 | 1.26 | 1.21 |
| 2029 | | 0.05 | 0.05 | 0.63 | 0.42 | 0.19 | 0.05 | 1.29 | 1.24 |
| 2030 | | 0.05 | 0.05 | 0.65 | 0.43 | 0.19 | 0.05 | 1.31 | 1.26 |
| 2031 | | 0.06 | 0.06 | 0.66 | 0.44 | 0.20 | 0.05 | 1.34 | 1.28 |
| 2032 | | 0.06 | 0.06 | 0.67 | 0.45 | 0.20 | 0.05 | 1.37 | 1.31 |
| 2033 | | 0.06 | 0.06 | 0.69 | 0.46 | 0.20 | 0.05 | 1.39 | 1.33 |
| 2034 | | 0.06 | 0.06 | 0.70 | 0.46 | 0.21 | 0.05 | 1.42 | 1.36 |
| 2035 | | 0.06 | 0.06 | 0.71 | 0.47 | 0.21 | 0.05 | 1.45 | 1.39 |
| 2036 | | 0.06 | 0.06 | 0.73 | 0.48 | 0.22 | 0.05 | 1.48 | 1.41 |
| 2037 | | 0.06 | 0.06 | 0.74 | 0.49 | 0.22 | 0.05 | 1.50 | 1.44 |
| 2038 | | 0.06 | 0.06 | 0.75 | 0.50 | 0.22 | 0.05 | 1.53 | 1.47 |
| 2039 | | 0.07 | 0.07 | 0.77 | 0.51 | 0.23 | 0.05 | 1.56 | 1.49 |
| 2040 | | 0.07 | 0.07 | 0.78 | 0.52 | 0.23 | 0.06 | 1.59 | 1.52 |
| 2041 | | 0.07 | 0.07 | 0.78 | 0.52 | 0.23 | 0.06 | 1.59 | 1.52 |
| 2042 | | 0.07 | 0.07 | 0.78 | 0.52 | 0.23 | 0.06 | 1.59 | 1.52 |
| 2043 | | 0.07 | 0.07 | 0.78 | 0.52 | 0.23 | 0.06 | 1.59 | 1.52 |
| 2044 | | 0.07 | 0.07 | 0.78 | 0.52 | 0.23 | 0.06 | 1.59 | 1.52 |
| 2045 | | 0.03 | 0.03 | 0.33 | 0.22 | 0.10 | 0.02 | 0.66 | 0.63 |
| Total | 4.34 | 1.20 | 5.54 | 14.09 | 9.36 | 4.21 | 1.01 | 28.66 | 23.13 |
| ENPV | 3.27 | 0.35 | 3.62 | 4.20 | 2.79 | 1.25 | 0.30 | 8.55 | 4.92 |
| EIRR | | | | | | | | | 22.2% |

EIRR = economic internal rate of return, ENPV = economic net present value, O&M = operation and maintenance.

^a Numbers and/or percentages may not sum precisely because of rounding.

Source: Asian Development Bank estimate

2. Jhumri Telaiya (\$ million)^a

| Year | Cost | | | Benefits | | | | Total | Net Benefits |
|--------------|--------------|-------------|--------------|---------------------------|----------------------------|-------------------------|-------------|--------------|--------------|
| | Construction | O&M | Total | Non-incremental | | | Incremental | | |
| | | | | Savings in resource costs | Savings in collection time | Savings in earning loss | | | |
| 2021 | 1.71 | | 1.71 | | | | | | (1.71) |
| 2022 | 2.55 | | 2.55 | | | | | | (2.55) |
| 2023 | 2.78 | | 2.78 | | | | | | (2.78) |
| 2024 | 3.55 | | 3.55 | | | | | | (3.55) |
| 2025 | 3.74 | 0.15 | 3.89 | 1.00 | 0.67 | 0.30 | 0.20 | 2.17 | (1.71) |
| 2026 | | 0.26 | 0.26 | 1.76 | 1.17 | 0.52 | 0.21 | 3.66 | 3.39 |
| 2027 | | 0.27 | 0.27 | 1.79 | 1.19 | 0.54 | 0.21 | 3.73 | 3.46 |
| 2028 | | 0.27 | 0.27 | 1.83 | 1.21 | 0.55 | 0.22 | 3.80 | 3.53 |
| 2029 | | 0.28 | 0.28 | 1.87 | 1.24 | 0.56 | 0.22 | 3.88 | 3.60 |
| 2030 | | 0.29 | 0.29 | 1.90 | 1.26 | 0.57 | 0.22 | 3.96 | 3.67 |
| 2031 | | 0.30 | 0.30 | 1.94 | 1.29 | 0.58 | 0.23 | 4.04 | 3.75 |
| 2032 | | 0.30 | 0.30 | 1.98 | 1.32 | 0.59 | 0.23 | 4.12 | 3.82 |
| 2033 | | 0.30 | 0.30 | 2.02 | 1.34 | 0.60 | 0.24 | 4.21 | 3.90 |
| 2034 | | 0.31 | 0.31 | 2.06 | 1.37 | 0.62 | 0.24 | 4.29 | 3.99 |
| 2035 | | 0.31 | 0.31 | 2.10 | 1.40 | 0.63 | 0.25 | 4.38 | 4.07 |
| 2036 | | 0.31 | 0.31 | 2.15 | 1.43 | 0.64 | 0.25 | 4.47 | 4.16 |
| 2037 | | 0.31 | 0.31 | 2.19 | 1.46 | 0.65 | 0.26 | 4.56 | 4.25 |
| 2038 | | 0.31 | 0.31 | 2.23 | 1.48 | 0.67 | 0.26 | 4.65 | 4.34 |
| 2039 | | 0.31 | 0.31 | 2.28 | 1.51 | 0.68 | 0.27 | 4.74 | 4.42 |
| 2040 | | 0.32 | 0.32 | 2.32 | 1.54 | 0.69 | 0.27 | 4.83 | 4.52 |
| 2041 | | 0.32 | 0.32 | 2.32 | 1.54 | 0.69 | 0.27 | 4.83 | 4.51 |
| 2042 | | 0.32 | 0.32 | 2.32 | 1.54 | 0.69 | 0.27 | 4.83 | 4.51 |
| 2043 | | 0.32 | 0.32 | 2.32 | 1.54 | 0.69 | 0.27 | 4.83 | 4.51 |
| 2044 | | 0.32 | 0.32 | 2.32 | 1.54 | 0.69 | 0.27 | 4.83 | 4.51 |
| 2025 | | 0.13 | 0.13 | 0.97 | 0.64 | 0.29 | 0.11 | 2.01 | 1.88 |
| Total | 14.33 | 6.01 | 20.34 | 41.69 | 27.70 | 12.44 | 4.99 | 86.83 | 66.49 |
| ENPV | 10.81 | 1.82 | 12.63 | 12.41 | 8.24 | 3.70 | 1.52 | 25.87 | 13.24 |
| EIRR | | | | | | | | | 20.1% |

EIRR = economic internal rate of return, ENPV = economic net present value, O&M = operation and maintenance.

^a Numbers and/or percentages may not sum precisely because of rounding.

Source: Asian Development Bank estimate.

3. Medininagar (\$ million)^a

| Year | Cost | | | Benefits | | | | | Net Benefits |
|--------------|--------------|-------------|--------------|---------------------------|----------------------------|-------------------------|-------------|--------------|--------------|
| | Construction | O&M | Total | Non-incremental | | | Incremental | Total | |
| | | | | Savings in resource costs | Savings in collection time | Savings in earning loss | | | |
| 2021 | 1.91 | | 1.91 | | | | | | (1.91) |
| 2022 | 2.85 | | 2.85 | | | | | | (2.85) |
| 2023 | 3.12 | | 3.12 | | | | | | (3.12) |
| 2024 | 3.98 | | 3.98 | | | | | | (3.98) |
| 2025 | 4.18 | 0.18 | 4.37 | 1.04 | 0.69 | 0.31 | 0.25 | 2.29 | (2.08) |
| 2026 | | 0.32 | 0.32 | 1.81 | 1.20 | 0.54 | 0.25 | 3.80 | 3.49 |
| 2027 | | 0.33 | 0.33 | 1.83 | 1.22 | 0.55 | 0.25 | 3.85 | 3.52 |
| 2028 | | 0.35 | 0.35 | 1.86 | 1.23 | 0.55 | 0.26 | 3.90 | 3.55 |
| 2029 | | 0.37 | 0.37 | 1.88 | 1.25 | 0.56 | 0.26 | 3.96 | 3.59 |
| 2030 | | 0.39 | 0.39 | 1.91 | 1.27 | 0.57 | 0.26 | 4.01 | 3.62 |
| 2031 | | 0.41 | 0.41 | 1.93 | 1.28 | 0.58 | 0.27 | 4.06 | 3.65 |
| 2032 | | 0.43 | 0.43 | 1.96 | 1.30 | 0.58 | 0.27 | 4.11 | 3.69 |
| 2033 | | 0.43 | 0.43 | 1.98 | 1.32 | 0.59 | 0.27 | 4.17 | 3.74 |
| 2034 | | 0.44 | 0.44 | 2.01 | 1.33 | 0.60 | 0.28 | 4.22 | 3.79 |
| 2035 | | 0.44 | 0.44 | 2.04 | 1.35 | 0.61 | 0.28 | 4.28 | 3.84 |
| 2036 | | 0.44 | 0.44 | 2.06 | 1.37 | 0.62 | 0.28 | 4.33 | 3.89 |
| 2037 | | 0.45 | 0.45 | 2.09 | 1.39 | 0.62 | 0.29 | 4.39 | 3.94 |
| 2038 | | 0.45 | 0.45 | 2.11 | 1.40 | 0.63 | 0.29 | 4.44 | 3.99 |
| 2039 | | 0.46 | 0.46 | 2.14 | 1.42 | 0.64 | 0.29 | 4.49 | 4.04 |
| 2040 | | 0.46 | 0.46 | 2.17 | 1.44 | 0.65 | 0.30 | 4.55 | 4.09 |
| 2041 | | 0.47 | 0.47 | 2.17 | 1.44 | 0.65 | 0.30 | 4.55 | 4.08 |
| 2042 | | 0.47 | 0.47 | 2.17 | 1.44 | 0.65 | 0.30 | 4.55 | 4.08 |
| 2043 | | 0.48 | 0.48 | 2.17 | 1.44 | 0.65 | 0.30 | 4.55 | 4.07 |
| 2044 | | 0.48 | 0.48 | 2.17 | 1.44 | 0.65 | 0.30 | 4.55 | 4.07 |
| 2025 | | 0.20 | 0.20 | 0.90 | 0.60 | 0.27 | 0.12 | 1.89 | 1.69 |
| Total | 16.05 | 8.44 | 24.49 | 40.39 | 26.83 | 12.05 | 5.67 | 84.94 | 60.45 |
| ENPV | 12.10 | 2.48 | 14.58 | 12.23 | 8.12 | 3.65 | 1.75 | 25.75 | 11.17 |
| EIRR | | | | | | | | | 18.0% |

EIRR = economic internal rate of return, ENPV = economic net present value, O&M = operation and maintenance.

^a Numbers and/or percentages may not sum precisely because of rounding

Source: Asian Development Bank estimate.

4. Ranchi (\$ million)^a

| Year | Cost | | | Benefits | | | | | Net Benefits |
|--------------|--------------|--------------|---------------|---------------------------|----------------------------|-------------------------|--------------|---------------|---------------|
| | Construction | O&M | Total | Non-incremental | | | Incremental | Total | |
| | | | | Savings in resource costs | Savings in collection time | Savings in earning loss | | | |
| 2021 | 10.19 | | 10.19 | | | | | | (10.19) |
| 2022 | 15.18 | | 15.18 | | | | | | (15.18) |
| 2023 | 16.60 | | 16.60 | | | | | | (16.60) |
| 2024 | 21.19 | | 21.19 | | | | | | (21.19) |
| 2025 | 22.28 | 0.59 | 22.87 | 3.10 | 2.06 | 0.93 | 0.57 | 6.66 | (16.21) |
| 2026 | | 1.01 | 1.01 | 5.42 | 3.60 | 1.62 | 0.58 | 11.21 | 10.21 |
| 2027 | | 1.02 | 1.02 | 5.52 | 3.67 | 1.65 | 0.59 | 11.43 | 10.41 |
| 2028 | | 1.03 | 1.03 | 5.63 | 3.74 | 1.68 | 0.60 | 11.65 | 10.62 |
| 2029 | | 1.04 | 1.04 | 5.74 | 3.81 | 1.71 | 0.61 | 11.87 | 10.83 |
| 2030 | | 1.05 | 1.05 | 5.85 | 3.88 | 1.75 | 0.62 | 12.10 | 11.05 |
| 2031 | | 1.06 | 1.06 | 5.96 | 3.96 | 1.78 | 0.64 | 12.33 | 11.27 |
| 2032 | | 1.07 | 1.07 | 6.07 | 4.03 | 1.81 | 0.65 | 12.57 | 11.50 |
| 2033 | | 1.08 | 1.08 | 6.19 | 4.11 | 1.85 | 0.66 | 12.81 | 11.73 |
| 2034 | | 1.09 | 1.09 | 6.31 | 4.19 | 1.88 | 0.67 | 13.05 | 11.96 |
| 2035 | | 1.10 | 1.10 | 6.43 | 4.27 | 1.92 | 0.69 | 13.30 | 12.20 |
| 2036 | | 1.11 | 1.11 | 6.59 | 4.38 | 1.97 | 0.70 | 13.63 | 12.52 |
| 2037 | | 1.13 | 1.13 | 6.75 | 4.48 | 2.01 | 0.72 | 13.97 | 12.84 |
| 2038 | | 1.14 | 1.14 | 6.92 | 4.59 | 2.06 | 0.74 | 14.31 | 13.18 |
| 2039 | | 1.15 | 1.15 | 7.09 | 4.71 | 2.12 | 0.76 | 14.67 | 13.52 |
| 2040 | | 1.16 | 1.16 | 7.26 | 4.82 | 2.17 | 0.78 | 15.03 | 13.87 |
| 2041 | | 1.17 | 1.17 | 7.26 | 4.82 | 2.17 | 0.78 | 15.03 | 13.86 |
| 2042 | | 1.18 | 1.18 | 7.26 | 4.82 | 2.17 | 0.78 | 15.03 | 13.85 |
| 2043 | | 1.20 | 1.20 | 7.26 | 4.82 | 2.17 | 0.78 | 15.03 | 13.83 |
| 2044 | | 1.21 | 1.21 | 7.26 | 4.82 | 2.17 | 0.78 | 15.03 | 13.82 |
| 2025 | | 0.51 | 0.51 | 3.03 | 2.01 | 0.90 | 0.32 | 6.26 | 5.75 |
| Total | 85.43 | 22.10 | 107.54 | 128.89 | 85.61 | 38.47 | 14.00 | 266.98 | 159.44 |
| ENPV | 64.43 | 6.71 | 71.15 | 38.25 | 25.41 | 11.42 | 4.24 | 79.32 | 8.17 |
| EIRR | | | | | | | | | 10.4% |

EIRR = economic internal rate of return, ENPV = economic net present value, O&M = operation and maintenance.

^a Numbers and/or percentages may not sum precisely because of rounding

Source: Asian Development Bank estimate.