

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

**NATIONAL WATER SUPPLY AND DRAINAGE BOARD
MINISTRY OF URBAN DEVELOPMENT, CONSTRUCTION AND PUBLIC UTILITIES
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA**

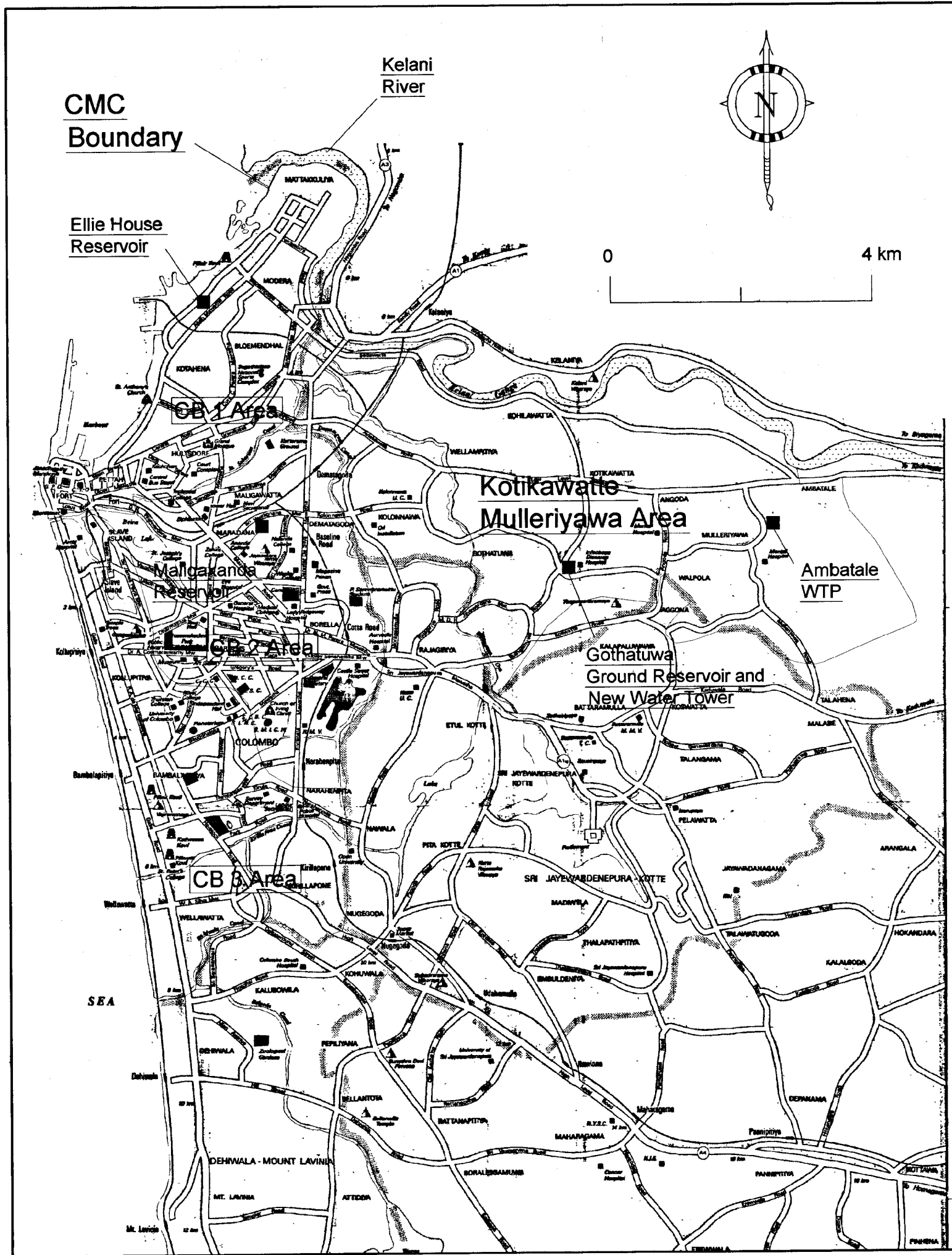
**THE DETAILED DESIGN STUDY
ON
THE PROJECT FOR REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA
IN
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA**

FINAL REPORT

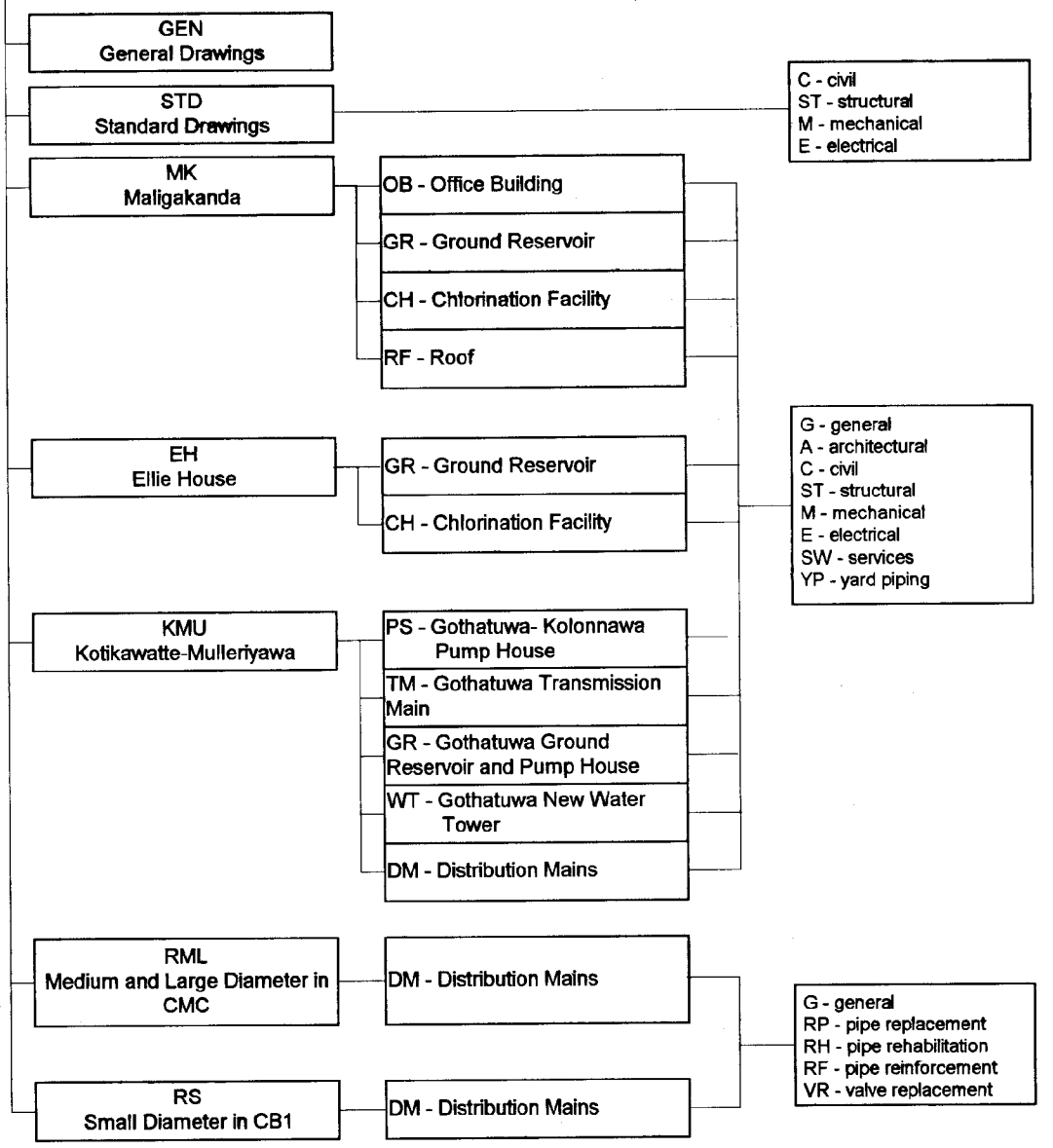
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|  NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | SUB PROJECT: GENERAL | TITLE: PROJECT LOCATION MAP |
| | DESIGNED: <i>[Signature]</i> CHECKED: <i>[Signature]</i> BY TEAM LEADER: <i>[Signature]</i> TEAM LEADER: <i>[Signature]</i> | DRAWN: DJI PA (NWS&D) NUMBER: <i>[Signature]</i> A.G.M (P&D) NUMBER: R.O.A.2 D.G.M (P&D) NUMBER: |

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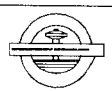
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| | NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | SUB PROJECT: | TITLE: |
| | | GENERAL | LIST OF DRAWINGS |
| | | DESIGNED: <i>D.S.A.</i> | DRAWING: <i>R.D.A.</i> |
| | | CHECKED: <i>Kovase</i> | DATE: JAN 2007 |
| | | DR. TEAM LEADER: <i>D. S. A.</i> | CONTRACT NO: NRW / CW |
| | | TEAM CHIEF: <i>R. D. A.</i> | DRG. NO: GEN - 02 |
| | | TEAM MEMBER: <i>A. S. S.</i> | |

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| KMU/TMC-12 | Gothatuwa Transmission Main (With Distribution Main) from Ambatale Water Treatment Plant to Gothatuwa Ground Reservoir-Cross Section Sheet 4 of 5 |
| KMU/TMC-13 | Gothatuwa Transmission Main (With Distribution Main) from Ambatale Water Treatment Plant to Gothatuwa Ground Reservoir-Cross Section Sheet 5 of 5 |

| Drawing No. | Drawing -Title |
|--|--|
| Gothatuwa Ground Reservoir and Pump House | |
| General | |
| KMU/GR/G-01 | Gothatuwa Ground Reservoir & Pump House - Survey Setting Out Plan |
| KMU/GR/G-02 | Gothatuwa Ground Reservoir & Pump House - Site Grading & Landscaping Plan |
| KMU/GR/G-03 | Gothatuwa Ground Reservoir & Pump House - Excavation Plan |
| Civil | |
| KMU/GR/C-01 | Gothatuwa Ground Reservoir & Pump House - General Layout |
| KMU/GR/C-02 | Gothatuwa Ground Reservoir & Pump House - Plan at 26.25 MMSL |
| KMU/GR/C-03 | Gothatuwa Ground Reservoir & Pump House - Roof Plan of Reservoir & Pump House |
| KMU/GR/C-04 | Gothatuwa Ground Reservoir & Pump House - Elevations and Sections Sheet 1 of 2 |
| KMU/GR/C-05 | Gothatuwa Ground Reservoir & Pump House - Elevations and Sections Sheet 2 of 2 |
| KMU/GR/C-06 | Gothatuwa Ground Reservoir & Pump House - Columns & MS Platform Details |
| KMU/GR/C-07 | Gothatuwa Ground Reservoir & Pump House - Details of Thrust Blocks |
| KMU/GR/C-08 | Gothatuwa Ground Reservoir & Pump House - Miscellaneous Details |
| KMU/GR/C-09 | Gothatuwa Ground Reservoir & Pump House - Washout Drain - Plan, Profile & Details |
| Structural | |
| KMU/GR/ST-01 | Gothatuwa Ground Reservoir & Pump House - Foundation Plan |
| KMU/GR/ST-02 | Gothatuwa Ground Reservoir & Pump House - Floor Slab at 26.25 & Reservoir Roof Slab Plan |
| KMU/GR/ST-03 | Gothatuwa Ground Reservoir & Pump House - Details of Walls 1, 2, 3 & 4 |
| KMU/GR/ST-04 | Gothatuwa Ground Reservoir & Pump House - Details of Walls 5, 6, & 9 |
| KMU/GR/ST-05 | Gothatuwa Ground Reservoir & Pump House - Details of Walls 7, 8, 10 & 11 and Baffle Walls |
| KMU/GR/ST-06 | Gothatuwa Ground Reservoir & Pump House - Details of Thrust Blocks & Sump |
| KMU/GR/ST-07 | Gothatuwa Ground Reservoir & Pump House - Miscellaneous Details - Sheet 1 of 4 |
| KMU/GR/ST-08 | Gothatuwa Ground Reservoir & Pump House - Miscellaneous Details - Sheet 2 of 4 |
| KMU/GR/ST-09 | Gothatuwa Ground Reservoir & Pump House - Miscellaneous Details - Sheet 3 of 4 |
| KMU/GR/ST-10 | Gothatuwa Ground Reservoir & Pump House - Miscellaneous Details - Sheet 4 of 4 |
| KMU/GR/ST-11 | Gothatuwa Ground Reservoir & Pump House - Details of Wall Sections |
| KMU/GR/ST-12 | Gothatuwa Ground Reservoir & Pump House - External Valve Chamber & Housing Details |
| Mechanical | |
| KMU/GR/M-01 | Gothatuwa Ground Reservoir & Pump House - Pump Station - Equipment and Piping Layout Plan |
| KMU/GR/M-02 | Gothatuwa Ground Reservoir & Pump House - Pump Station - Sections and Piping Details Sheet 1 of 2 |
| KMU/GR/M-03 | Gothatuwa Ground Reservoir & Pump House - Pump Station - Sections and Piping Details Sheet 2 of 2 |
| KMU/GR/M-04 | Gothatuwa Ground Reservoir & Pump House - Details of Overhead Hoist |
| KMU/GR/M-05 | Gothatuwa Ground Reservoir & Pump House - Ventilation |
| KMU/GR/M-06 | Gothatuwa Ground Reservoir & Pump House - Details of Diesel Generator |
| Electrical | |
| KMU/GR/E-01 | Gothatuwa Ground Reservoir & Pump House - Earthing, Yard Lighting & Cabling |
| KMU/GR/E-02 | Gothatuwa Ground Reservoir & Pump House - Single-line Diagram |
| KMU/GR/E-03 | Gothatuwa Ground Reservoir & Pump House - Panel Arrangement |
| KMU/GR/E-04 | Gothatuwa Ground Reservoir & Pump House - Equipment Layout and Cabling |
| KMU/GR/E-05 | Gothatuwa Ground Reservoir & Pump House - Instrumentation Connection Diagram |
| KMU/GR/E-06 | Gothatuwa Ground Reservoir & Pump House - Control Logic Diagram - Pump Operation |
| KMU/GR/E-07 | Gothatuwa Ground Reservoir & Pump House - Control Logic Diagram - Automatic Override Operation |
| KMU/GR/E-08 | Gothatuwa Ground Reservoir & Pump House - Control Logic Diagram - Discharge Valve |
| KMU/GR/E-09 | Gothatuwa Ground Reservoir & Pump House - Control Logic Diagram - Link Up Operation |
| KMU/GR/E-10 | Gothatuwa Ground Reservoir & Pump House - Control Logic Diagram - Flow Control Valve (Manual) |
| KMU/GR/E-11 | Gothatuwa Ground Reservoir & Pump House - Control Logic Diagram - Flow Control Valve (Automatic) |
| KMU/GR/E-12 | Gothatuwa Ground Reservoir & Pump House - Flow Meter Chamber, Electrical Power & Instrumentation |
| KMU/GR/E-13 | Gothatuwa Ground Reservoir & Pump House - Lighting & Small Power |
| KMU/GR/E-14 | Gothatuwa Ground Reservoir & Pump House - External Valve Chamber & Housing Electrical Lighting |
| Yard Piping | |
| KMU/GR/YP-01 | Gothatuwa Ground Reservoir & Pump House - Yard Piping - Reservoir Inlet and Outlet Plan |
| KMU/GR/YP-02 | Gothatuwa Ground Reservoir & Pump House - Yard Piping - Inlet Outlet Sections & Chamber Details |
| KMU/GR/YP-03 | Gothatuwa Ground Reservoir & Pump House - Yard Piping - Connection Details of Existing & New Tower |
| Gothatuwa New Water Tower | |
| Structural | |
| KMU/WT/ST-01 | Gothatuwa New Water Tower - General Arrangement - Sheet 1 of 2 |
| KMU/WT/ST-02 | Gothatuwa New Water Tower - General Arrangement - Sheet 2 of 2 |
| KMU/WT/ST-03 | Gothatuwa New Water Tower - R/F Details of Foundations and Shaft |
| KMU/WT/ST-04 | Gothatuwa New Water Tower - R/F Details of Platform |
| KMU/WT/ST-05 | Gothatuwa New Water Tower - R/F Details of Tank |
| KMU/WT/ST-06 | Gothatuwa New Water Tower - Details of Ladders |
| Electro Mechanical | |
| KMU/WT/E-01 | Gothatuwa New Water Tower - Lighting and Lightning Protection |
| Yard Piping | |
| KMU/WT/YP-01 | Gothatuwa New Water Tower - Piping Sections & Details |
| Distribution Mains | |
| General | |
| KMU/DMG-01 | Distribution Main Key Map Existing and Proposed |
| KMU/DMG-02 | Distribution Main Key Map Proposed |
| Civil | |
| KMU/DMC-01 | I. D. H. Road |
| KMU/DMC-02 | Kotikawatta Road - Sheet 1 of 3 |
| KMU/DMC-03 | Kotikawatta Road - Sheet 2 of 3 |
| KMU/DMC-04 | Kotikawatta Road - Sheet 3 of 3 |
| KMU/DMC-05 | Kohilawatta Road - Sheet 1 of 2 |
| KMU/DMC-06 | Kohilawatta Road - Sheet 2 of 2 |
| KMU/DMC-07 | Angoda Road / Siri Sumana Mawatha - Sheet 1 of 4 |
| KMU/DMC-08 | Angoda Road / Siri Sumana Mawatha - Sheet 2 of 4 |
| KMU/DMC-09 | Angoda Road / Siri Sumana Mawatha - Sheet 3 of 4 |
| KMU/DMC-10 | Angoda Road / Siri Sumana Mawatha - Sheet 4 of 4 |

| Drawing No. | Drawing -Title |
|---|---|
| KMU/DMC-10 | Angoda Road / Siri Sumana Mawatha - Sheet 4 of 4 |
| KMU/DMC-12 | Megoda Kolonnawa Road / Katupelella Road - Sheet 2 of 7 |
| KMU/DMC-13 | Megoda Kolonnawa Road / Katupelella Road - Sheet 3 of 7 |
| KMU/DMC-14 | Megoda Kolonnawa Road / Katupelella Road - Sheet 4 of 7 |
| KMU/DMC-15 | Megoda Kolonnawa Road / Katupelella Road - Sheet 5 of 7 |
| KMU/DMC-16 | Megoda Kolonnawa Road / Katupelella Road - Sheet 6 of 7 |
| KMU/DMC-17 | Megoda Kolonnawa Road / Katupelella Road - Sheet 7 of 7 |
| KMU/DMC-18 | Delgahawatta Road - Sheet 1 of 2 |
| KMU/DMC-19 | Delgahawatta Road - Sheet 2 of 2 |
| KMU/DMC-20 | Bandaranayakepura Road - Sheet 1 of 2 |
| KMU/DMC-21 | Bandaranayakepura Road - Sheet 2 of 2 |
| KMU/DMC-22 | Butthgamuwa Road / Koswatta Road / Angoda Road - Sheet 1 of 4 |
| KMU/DMC-23 | Butthgamuwa Road / Koswatta Road / Angoda Road - Sheet 2 of 4 |
| KMU/DMC-24 | Butthgamuwa Road / Koswatta Road / Angoda Road - Sheet 3 of 4 |
| KMU/DMC-25 | Butthgamuwa Road / Koswatta Road / Angoda Road - Sheet 4 of 4 |
| KMU/DMC-26 | Halgahadeniya Road Sheet 1 of 2 |
| KMU/DMC-27 | Halgahadeniya Road Sheet 2 of 2 |
| KMU/DMC-28 | Thapwanaya Road |
| KMU/DMC-29 | Sri Perakum Mawatha / Ranabiru Mawatha - Sheet 1 of 4 |
| KMU/DMC-30 | Sri Perakum Mawatha / Ranabiru Mawatha - Sheet 2 of 4 |
| KMU/DMC-31 | Sri Perakum Mawatha / Ranabiru Mawatha - Sheet 3 of 4 |
| KMU/DMC-32 | Sri Perakum Mawatha / Ranabiru Mawatha - Sheet 4 of 4 |
| KMU/DMC-33 | Old Avissawella Road - Sheet 1 of 9 |
| KMU/DMC-34 | Old Avissawella Road - Sheet 2 of 9 |
| KMU/DMC-35 | Old Avissawella Road - Sheet 3 of 9 |
| KMU/DMC-36 | Old Avissawella Road - Sheet 4 of 9 |
| KMU/DMC-37 | Old Avissawella Road - Sheet 5 of 9 |
| KMU/DMC-38 | Old Avissawella Road - Sheet 6 of 9 |
| KMU/DMC-39 | Old Avissawella Road - Sheet 7 of 9 |
| KMU/DMC-40 | Old Avissawella Road - Sheet 8 of 9 |
| KMU/DMC-41 | Old Avissawella Road - Sheet 9 of 9 |
| KMU/DMC-42 | Gothatuwa Road - Sheet 1 of 2 |
| KMU/DMC-43 | Gothatuwa Road - Sheet 2 of 2 |
| KMU/DMC-44 | Brandyawatta Road - Sheet 1 of 2 |
| KMU/DMC-45 | Brandyawatta Road - Sheet 2 of 2 |
| KMU/DMC-46 | Welwela Road and Nagahawela Road - Sheet 1 of 2 |
| KMU/DMC-47 | Welwela Road and Nagahawela Road - Sheet 2 of 2 |
| KMU/DMC-48 | Abey Siri Perera Mawatha |
| KMU/DMC-49 | Malpura Road |
| KMU/DMC-50 | Dahamwila Mawatha |
| KMU/DMC-51 | Butthgamuwa Road - Sheet 1 of 3 |
| KMU/DMC-52 | Butthgamuwa Road - Sheet 2 of 3 |
| KMU/DMC-53 | Butthgamuwa Road - Sheet 3 of 3 |
| KMU/DMC-54 | M. D. H. Jayawardena Mawatha & Elhena Road - Sheet 1 of 2 |
| KMU/DMC-55 | M. D. H. Jayawardena Mawatha - Sheet 1 of 2 |
| KMU/DMC-56 | M. D. H. Jayawardena Mawatha - Sheet 2 of 2 |
| KMU/DMC-57 | Moravithya Road |
| KMU/DMC-58 | Pethiyagoda Road - Sheet 1 of 2 |
| KMU/DMC-59 | Pethiyagoda Road Sheet 2 of 2 |
| KMU/DMC-60 | Shanthi Mawatha |
| KMU/DMC-61 | Udumulla Road - Sheet 1 of 3 |
| KMU/DMC-62 | Udumulla Road - Sheet 2 of 3 |
| KMU/DMC-63 | Udumulla Road - Sheet 3 of 3 |
| KMU/DMC-64 | Pansala Road / Jayanthi Mawatha / Batahena Road - Sheet 1 of 2 |
| KMU/DMC-65 | Pansala Road / Jayanthi Mawatha / Batahena Road - Sheet 2 of 2 |
| KMU/DMC-66 | Galwelathena Road |
| KMU/DMC-67 | Fever Hospital Road |
| KMU/DMC-68 | Junctions Key |
| KMU/DMC-69 | Junction Details - Sheet 1 of 7 |
| KMU/DMC-70 | Junction Details - Sheet 2 of 7 |
| KMU/DMC-71 | Junction Details - Sheet 3 of 7 |
| KMU/DMC-72 | Junction Details - Sheet 4 of 7 |
| KMU/DMC-73 | Junction Details - Sheet 5 of 7 |
| KMU/DMC-74 | Junction Details - Sheet 6 of 7 |
| KMU/DMC-75 | Junction Details - Sheet 7 of 7 |
| KMU/DMC-76 | Canal Crossing at Delgahawatta Road Bridge - General Arrangement |
| KMU/DMC-77 | Canal Crossing at Delgahawatta Road Bridge - Piping |
| KMU/DMC-78 | Canal Crossing at Angoda Road Bridge - General Arrangement and Piping |
| Structural | |
| KMU/DM/ST-01 | Canal Crossing at Delgahawatta Road Bridge - Structural Details |
| KMU/DM/ST-02 | Canal Crossing at Delgahawatta Road Bridge - Structural Details |
| KMU/DM/ST-03 | Canal Crossing at Angoda Road Bridge - Structural Details |
| Rehabilitation/Reinforcement of Medium and Large Diameter Pipe Network in CMC Area | |
| General | |
| RML/DMA-01 | Key Plan - Rehabilitation of Medium & Large Diameter Pipe |
| RML/DMA-02 | Key Plan - Reinforcement of Medium & Large Diameter Pipe |
| RML/DMA-03 | Key Plan - Replacement of Medium & Large Diameter Valves |

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|  NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | | REV. | DESCRIPTION |
| | | SUB PROJECT: GENERAL TITLE: LIST OF DRAWINGS | |
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM NIPPON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN | | SHEET 2 OF 3 DATE: JUN 2011 CONTRACT NO: NRW / CW DRG. NO: GEN - 03 | |

| Drawing No. | Drawing -Title |
|------------------------------|-------------------------------|
| Scraping & Lining | |
| RML/DMRH-01 | Mattakkuliya Centre Road |
| RML/DMRH-02 | Aluthmawatha Road |
| RML/DMRH-03 | Aluthmawatha Road |
| RML/DMRH-04 | Aluthmawatha Road |
| RML/DMRH-05 | St. Andrew's Road |
| RML/DMRH-06 | Muthuwella Mawatha |
| RML/DMRH-07 | Muthuwella Mawatha |
| RML/DMRH-08 | Ellie House Road |
| RML/DMRH-09 | Lower St. Andrew's Place |
| RML/DMRH-10 | Collage Street |
| RML/DMRH-11 | Kotahena Street |
| RML/DMRH-12 | George R. De Silva Mawatha |
| RML/DMRH-13 | George R. De Silva Mawatha |
| RML/DMRH-14 | Sumanatissa Mawatha |
| RML/DMRH-15 | Sangaraja Mawatha |
| RML/DMRH-16 | Panchikawatta Road |
| RML/DMRH-17 | Grandpass Road |
| RML/DMRH-18 | Grandpass Road |
| RML/DMRH-19 | Galle Road |
| RML/DMRH-20 | Galle Road |
| RML/DMRH-21 | Galle Road |
| RML/DMRH-22 | Galle Road |
| RML/DMRH-23 | Galle Road |
| RML/DMRH-24 | Galle Road |
| RML/DMRH-25 | Galle Road |
| RML/DMRH-26 | Quarry Road |
| RML/DMRH-27 | Alan Mawatha |
| RML/DMRH-28 | Union Place |
| RML/DMRH-29 | Union Place |
| RML/DMRH-30 | Foster Lane |
| RML/DMRH-31 | Bridge Street |
| RML/DMRH-32 | Sir Macan Marker Street |
| RML/DMRH-33 | Dharmapala Mawatha |
| RML/DMRH-34 | Dharmapala Mawatha |
| RML/DMRH-35 | Dharmapala Mawatha |
| RML/DMRH-36 | Elvitigala Mawatha |
| RML/DMRH-37 | Elvitigala Mawatha |
| RML/DMRH-38 | Kinillapone Avenue |
| RML/DMRH-39 | Kinillapone Avenue |
| RML/DMRH-40 | High Level Road |
| RML/DMRH-41 | Dickman's Road |
| RML/DMRH-42 | Dickman's Road |
| RML/DMRH-43 | Kumarathunga Munidasa Mawatha |
| RML/DMRH-44 | Serpentine Road |
| RML/DMRH-45 | Havelock Road |
| RML/DMRH-46 | Havelock Road |
| RML/DMRH-47 | Havelock Road |
| RML/DMRH-48 | Havelock Road |
| RML/DMRH-49 | Havelock Road |
| RML/DMRH-50 | Sea Street |
| RML/DMRH-51 | St. Anthony's Mawatha |
| RML/DMRH-52 | Sri Ram anathan Mawatha |

Addition of New Medium and Large Diameter Mains

| General Reinforcement | |
|------------------------------|--|
| RML/DMRF-01 | Dematagoda Road Sheet 1 of 2 |
| RML/DMRF-02 | Dematagoda Road Sheet 2 of 2 |
| RML/DMRF-03 | School Lane |
| RML/DMRF-04 | Prince of Whales Avenue |
| RML/DMRF-05 | Prince of Whales Avenue |
| RML/DMRF-06 | Sir James Pieris Mawatha/Nawam Mawatha |
| RML/DMRF-07 | R.A. De Mel Mawatha/Perahara Mawatha |
| RML/DMRF-08 | Awis Place |
| RML/DMRF-09 | Mart Road and Sri Nigrodadharama Mawatha |
| RML/DMRF-10 | Saranapala Himi Mawatha Sheet 1 of 2 |
| RML/DMRF-11 | Saranapala Himi Mawatha Sheet 2 of 2 |
| RML/DMRF-12 | Stace Road |
| RML/DMRF-13 | Stace Road |
| RML/DMRF-14 | Ward Place Sheet 1 of 3 |
| RML/DMRF-15 | Ward Place Sheet 2 of 3 |
| RML/DMRF-16 | Ward Place Sheet 3 of 3 |
| RML/DMRF-17 | Bloemendhal Road |
| RML/DMRF-18 | Port Access Road |
| RML/DMRF-20 | Thim birigasaya Road |
| RML/DMRF-21 | Mahakumarage Mawatha |
| RML/DMRF-22 | Culvert Crossing at Port Access Road |
| RML/DMRF-23 | Bridge Crossing at Nawan Mawatha |


| Drawing No. | Drawing -Title |
|--------------------------|--|
| Valve Replacement | |
| RML/DMVR-01 | 10" Valves Proposed for Replacement |
| RML/DMVR-02 | 12" Valves Proposed for Replacement Sheet 1 of 2 |
| RML/DMVR-03 | 12" Valves Proposed for Replacement Sheet 2 of 2 |
| RML/DMVR-04 | 15" Valves Proposed for Replacement |
| RML/DMVR-05 | 20", 27" & 30" Valves Proposed for Replacement |

Rehabilitation of Small Dia. Distribution Main in CB1Area

| General Replacement | |
|----------------------------|--|
| RS/DMG-01 | Key Plan |
| RS/DMG-02 | Key Plan |
| Replacement | |
| RS/DMRP-01 | 1st Cross Street |
| RS/DMRP-02 | 2nd Cross Street |
| RS/DMRP-03 | 3rd Cross Street |
| RS/DMRP-04 | 4th Cross Street |
| RS/DMRP-05 | 5th Cross Street |
| RS/DMRP-06 | Keysoor Street |
| RS/DMRP-07 | Main Street |
| RS/DMRP-08 | Reclamation/Sea Beach Rd |
| RS/DMRP-09 | Maiwatta Road |
| RS/DMRP-10 | Olcott Mawatha |
| RS/DMRP-11 | Maliban Street |
| RS/DMRP-12 | Prince Street |
| RS/DMRP-13 | Sameera's Lane, Market St., China Lane |
| RS/DMRP-14 | Butcher's St., China Lane |
| RS/DMRP-15 | Gabos Lane |
| RS/DMRP-16 | Kadiration Road |
| RS/DMRP-17 | 1 St Rohini Lane |
| RS/DMRP-18 | 2nd Rohini Lane |
| RS/DMRP-19 | Mayuri Lane |
| RS/DMRP-20 | Cafferman's Lane |
| RS/DMRP-21 | Lotus Road |
| RS/DMRP-22 | Sri Wickrema Mawatha |
| RS/DMRP-23 | Franciswatta Road |
| RS/DMRP-24 | Mattakkuliya Farm Road |
| RS/DMRP-25 | Muthuwella Mawatha Sheet 1 of 2 |
| RS/DMRP-26 | Muthuwella Mawatha Sheet 2 of 2 |
| RS/DMRP-27 | Sea Street |
| RS/DMRP-28 | Aluthmawatha Road Sheet 1 of 2 |
| RS/DMRP-29 | Aluthmawatha Road Sheet 2 of 2 |
| RS/DMRP-30 | Modara Street Sheet 1 of 2 |
| RS/DMRP-31 | Modara Street Sheet 2 of 2 |
| RS/DMRP-32 | Vivekananda Hill |
| RS/DMRP-33 | Nadampitiya Road |
| RS/DMRP-34 | Bloemendhal Road Sheet 1 of 4 |
| RS/DMRP-35 | Bloemendhal Road Sheet 2 of 4 |
| RS/DMRP-36 | Bloemendhal Road 3 of 4 |
| RS/DMRP-37 | Bloemendhal Road 4 of 4 |
| RS/DMRP-38 | Messenger Street |
| RS/DMRP-39 | Messenger Street |
| RS/DMRP-40 | Quarry Road |
| RS/DMRP-41 | Hospital Road |
| RS/DMRP-42 | College Street |
| RS/DMRP-43 | Mattakkuliya Centre Road |
| RS/DMRP-44 | Upper St. Andrew's Place |
| RS/DMRP-45 | Ferguson Road |
| RS/DMRP-46 | Mayfield Lane |
| RS/DMRP-47 | Paramananda Mawatha |
| RS/DMRP-48 | Paramananda Mawatha |
| RS/DMRP-49 | Bloemendhal Lane |
| RS/DMRP-50 | Arthur De Silva Mawatha |
| RS/DMRP-51 | Mattakkuliya Church Road |
| RS/DMRP-52 | Prince of Wales Avenue |
| RS/DMRP-53 | Prince of Wales Avenue |
| RS/DMRP-54 | Prince of Wales Avenue |
| RS/DMRP-55 | Prince of Wales Avenue |
| RS/DMRP-56 | Nagalagam Street |
| RS/DMRP-57 | Nagalagam Street |
| RS/DMRP-58 | Rajamalwatta Road |
| RS/DMRP-59 | St. Wilfred's Lane |
| RS/DMRP-60 | St. James Lane |

| Drawing No. | Drawing -Title |
|-----------------------|----------------------------|
| Rehabilitation | |
| RS/DMRP-61 | George R. De Silva Mawatha |
| RS/DMRP-62 | George R. De Silva Mawatha |
| RS/DMRP-63 | Central Road |
| RS/DMRP-64 | New Moor Street |
| RS/DMRP-65 | Dam Street |
| RS/DMRP-66 | Dam Street |
| RS/DMRP-67 | Hultsdorf Street |
| RS/DMRP-68 | Silversmith Street |
| RS/DMRP-69 | Mirania Street |
| RS/DMRP-70 | Sri Sangaraja Mawatha |
| RS/DMRP-71 | Sri Sangaraja Mawatha |
| RS/DMRP-72 | Abdul Jabbar Mawatha |
| RS/DMRP-73 | Kelaniganga Mill Road |
| RS/DMRP-74 | Saunders Place |
| RS/DMRP-75 | Lower St. Andrew's Place |
| RS/DMRP-76 | St. Anthony Street |
| RS/DMRP-77 | Mayfield Road |
| RS/DMRP-78 | Wasala Road |
| RS/DMRP-79 | St. Josep's Street |
| Rehabilitation | |
| RS/DMRH-01 | Sri Wickrama Mawatha |
| RS/DMRH-02 | Vystwyke Road |
| RS/DMRH-03 | Bloemendhal Road |
| RS/DMRH-04 | Bloemendhal Road |
| RS/DMRH-05 | Bloemendhal Road |
| RS/DMRH-06 | Bloemendhal Road |
| RS/DMRH-07 | Walls Lane |
| RS/DMRH-08 | Upper St. Andrew's Place |
| RS/DMRH-09 | Paramananda Mawatha |
| RS/DMRH-10 | Bloemendhal Lane |
| RS/DMRH-11 | Prince of Wales Avenue |
| RS/DMRH-12 | Prince of Wales Avenue |
| RS/DMRH-13 | Hultsdorf Street |
| RS/DMRH-14 | Silversmith Street |
| RS/DMRH-15 | Ellie House Lane |
| RS/DMRH-16 | Mayfield Road |
| RS/DMRH-17 | Wasala Road |
| RS/DMRH-18 | Mattakkuliya Church Road |

| REV. | DESCRIPTION |
|------|-------------|
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|  NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | SUB PROJECT: GENERAL TITLE: LIST OF DRAWINGS | SHEET 3 OF 3 |
| | DESIGNED: <i>Dekan</i> CHECKED: <i>Kumara</i> DR. TEAM LEADER: <i>De Silva</i> TEAM LEADER: <i>De Silva</i> | DATE: JUL 2011 CONTRACT NO: NRW / CW D.O.M (P)D INSR: <i>De Silva</i> D.O.M (P)D INSR: <i>De Silva</i> |

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
 STUDY TEAM
 NIHOH SUIDO CONSULTANTS CO. LTD.,
 TOKYO, JAPAN

LIST OF ABBREVIATIONS (UNLESS NOTED OTHERWISE)

ABBREVIATION DESCRIPTION


| | | |
|------|----|---------------------------------|
| B | -- | Bank |
| BB | -- | Bottom of Bank |
| BWL | -- | Bottom Water Level |
| BH | -- | Bus Halt (Sign Post or Shelter) |
| C | -- | Call Box |
| CB | -- | Culvert - Box |
| CUL | -- | Culvert |
| DF | -- | Dry Fence |
| DIA. | -- | Diameter |
| EDn | -- | Earth Drain |
| EP | -- | Electric Post |
| FDN | -- | Foundation |
| FGL | -- | Finish Grade Level |
| FS | -- | Foundation Stone |
| G | -- | Gate |
| IF | -- | Iron Fence |
| INV. | -- | Invert Level |
| KMP | -- | Kilometer Post |
| LF | -- | Live Fence |
| LP | -- | Lamp Post |
| MDn | -- | Masonry Drain |
| MH | -- | Man Hole |
| MHT | -- | Man Hole (Telecom) |
| MHW | -- | Man Hole (Water) |
| MHS | -- | Man Hole (Sewerage) |
| MP | -- | Mile Post |
| P | -- | Permanent Building |
| PB | -- | Post Box |
| PW | -- | Parapet Wall |
| RE | -- | Road Edge |
| RW | -- | Retaining Wall |
| SE | -- | Shoulder |
| SH | -- | Security Hut |
| SR | -- | Shrine Room |
| SP | -- | Stand Pipe |
| SB | -- | Sign Board |
| TB | -- | Top of Bank |
| TBM | -- | Temporary Benchmark |
| TC | -- | Telephone Cable Box |
| TP | -- | Telephone Post |
| TWL | -- | Top Water Level |
| Ty | -- | Temporary Building |
| TR | -- | Tree |
| U | -- | Undefined |
| UPL | -- | Utility Pipe Line |
| V | -- | Valve |
| W | -- | Masonry Wall |
| WF | -- | Wire Fence |
| WLF | -- | Wire and Live Fence |
| ZF | -- | Galvanized Sheet Fence |

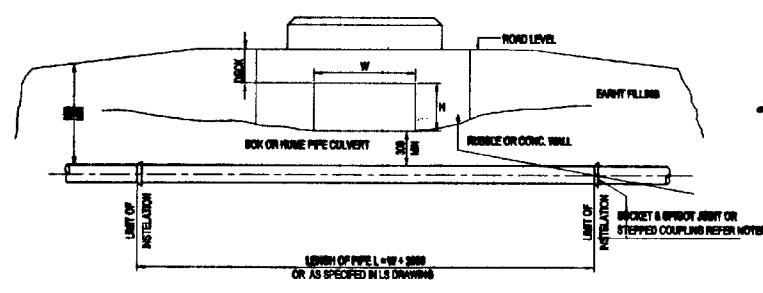
ABBREVIATION DESCRIPTION

| | | |
|----------|----|--------------------------------|
| BV | -- | Butterfly Valve |
| CI | -- | Cast Iron Pipe |
| DI | -- | Ductile Iron Pipe |
| DIA. | -- | Diameter |
| DIS. | -- | Distribution Main |
| FA | -- | Flange Adapter |
| FE | -- | Flanged End |
| FM | -- | Flow Meter |
| GI | -- | Galvanized Iron |
| GV | -- | Gate Valve |
| MOBV | -- | Motor Operated Butterfly Valve |
| MOCV | -- | Motor Operated Control Valve |
| MS | -- | Mild Steel |
| MSL | -- | Mean Sea Level |
| ND | -- | Nominal Diameter |
| O. FLOW | -- | Over Flow |
| PE | -- | Plain End |
| SP | -- | Steel Pipe |
| SS | -- | Stainless Steel |
| SG | -- | Sluice Gate |
| TRA. | -- | Transmission Main |
| uPVC/PVC | -- | PVC Pipe |
| VC | -- | Valve Chamber |
| WP | -- | Water Pipe |
| WV | -- | Water Valve |
| WT | -- | Water Tank |
| WM | -- | Wire Mesh |

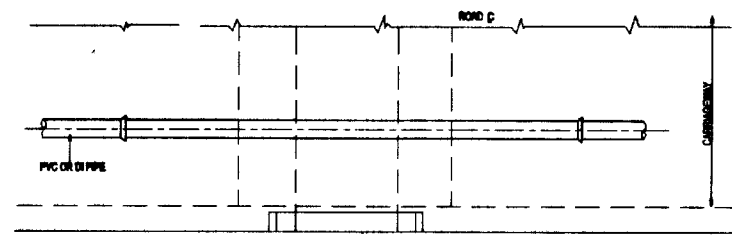
| | | |
|------------|----|------|
| Bore Hole | -- | ● BH |
| Bollard | -- | ⏏ |
| Post Box | -- | 📮 |
| Sign Board | -- | 📜 |
| Call Booth | -- | ☎ |

DO NOT SCALE

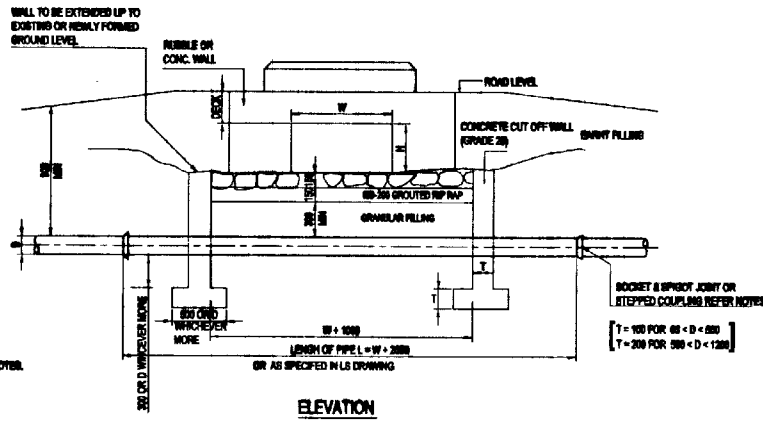
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|--|-----------------------|-------------------------------------|----------------------------------|-----------------------|
|  <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | SUB PROJECT: GENERAL | | TITLE: NOTATIONS & ABBREVIATIONS | |
| | DESIGNED: <i>Alan</i> | DATE: JAN 2011 | CHECKED: <i>[Signature]</i> | CONTRACT No: NRW / CW |
| <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> <p>NIHON SUIDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | | DR. TEAM LEADER: <i>[Signature]</i> | A.S.M (P.O.) NUMBER: | D.R.G. No: GEN - 05 |



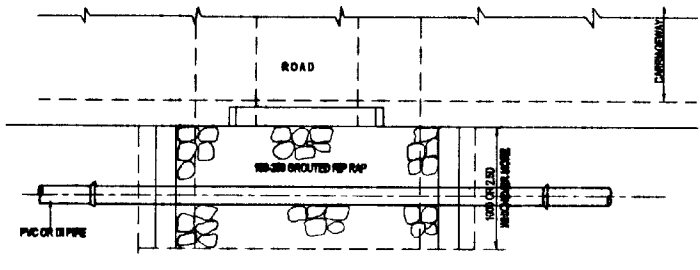
ELEVATION



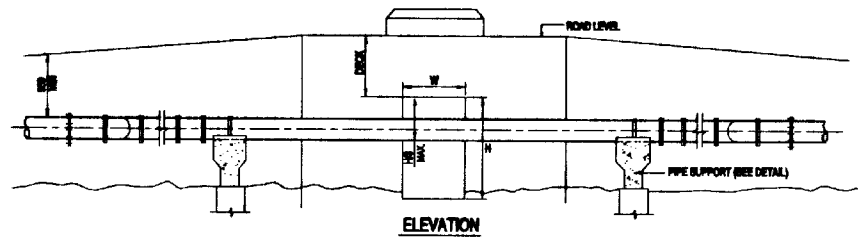
PLAN
CULVERT CROSSING TYPE - A
(INSIDE CARRIAGEWAY AND UNDER THE OPENING)



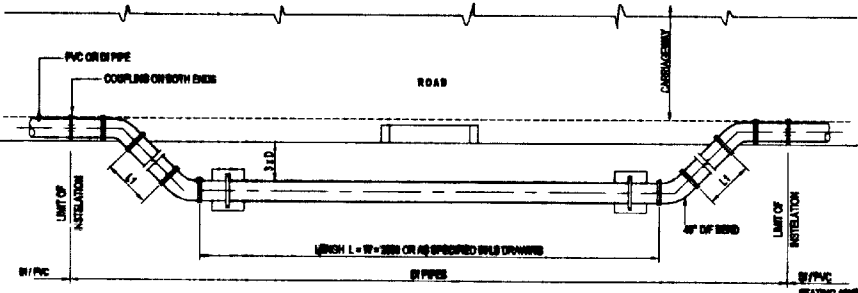
ELEVATION



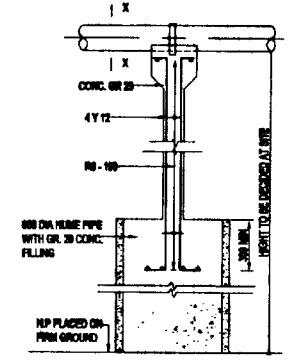
PLAN
CULVERT CROSSING TYPE - D
(OUTSIDE CARRIAGEWAY AND UNDER THE OPENING)



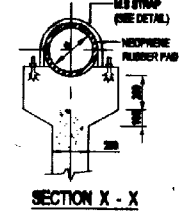
ELEVATION



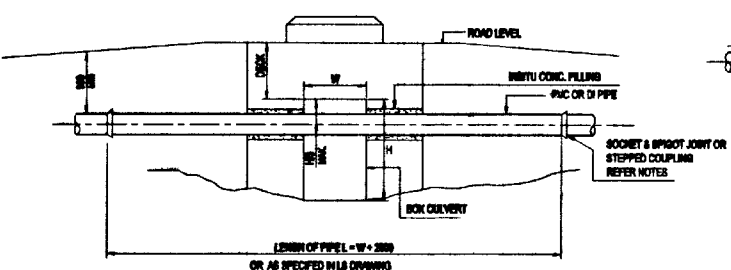
PLAN
CULVERT CROSSING TYPE - F
(OUTSIDE CARRIAGEWAY WITH HORIZONTAL SHIFT)



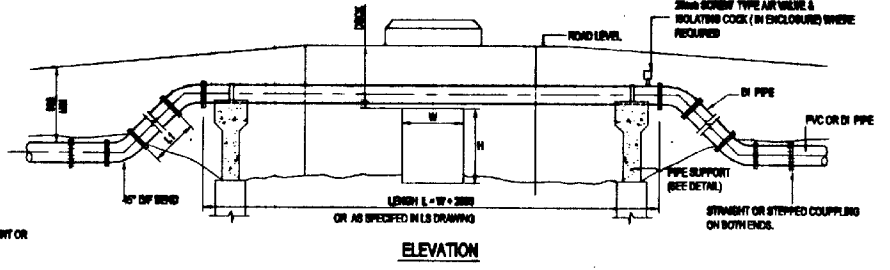
DETAIL OF PIPE SUPPORT



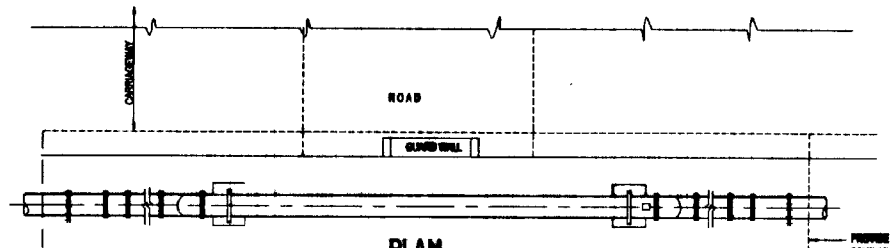
SECTION X - X



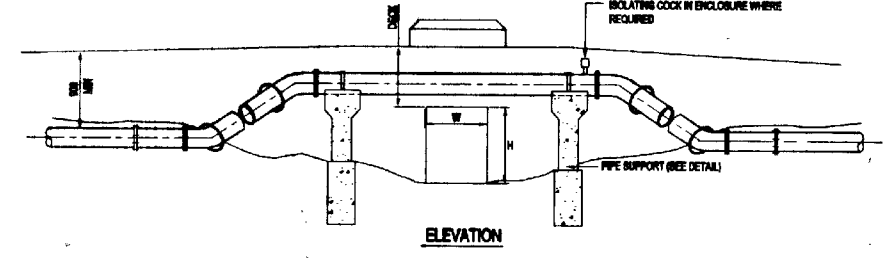
ELEVATION
CULVERT CROSSING TYPE - B
(INSIDE CARRIAGEWAY AND THROUGH THE OPENING)



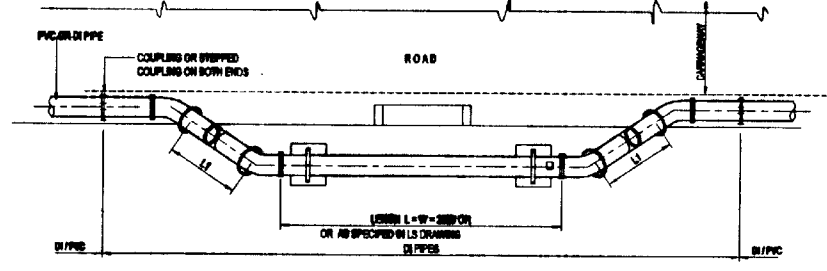
ELEVATION



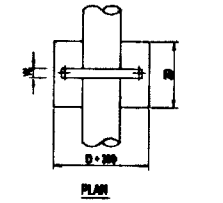
PLAN
CULVERT CROSSING TYPE - E
(OUTSIDE CARRIAGEWAY WITH VERTICAL SHIFT)



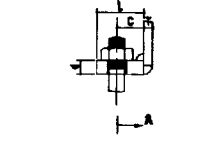
ELEVATION



PLAN
CULVERT CROSSING TYPE - G
(OUTSIDE CARRIAGEWAY AND ABOVE THE OPENING)



PLAN




PLAN

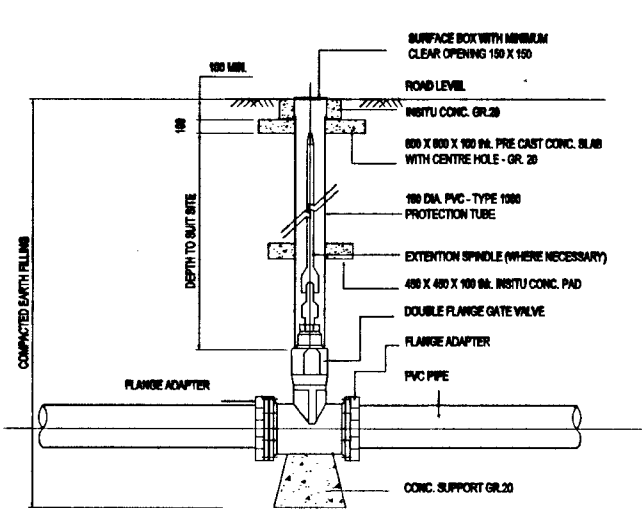
STRAP DETAIL
DETAILS OF STRAP

| PIPE SIZE (D) | T | W | H | L | C | SIZE OF BOLT |
|---------------|----|-----|----|-----|----|--------------|
| 60 - 100 | 4 | 40 | 13 | 45 | 25 | M 12 |
| 200 - 300 | 6 | 60 | 18 | 60 | 30 | M 16 |
| 300 - 450 | 8 | 80 | 20 | 70 | 35 | M 20 |
| 700 - 1100 | 10 | 100 | 25 | 90 | 45 | M 24 |
| 1200 - 1500 | 12 | 120 | 30 | 110 | 55 | M 30 |

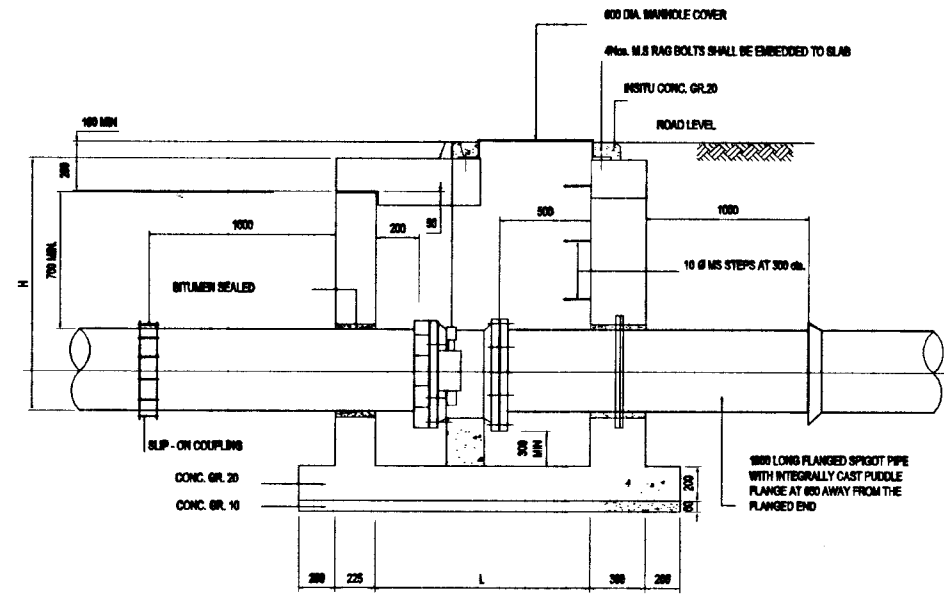
- NOTES**
- FOR TYPES A, B, C, D, E, F, G:**
- FOR 60 & 110 PVC PIPES, PROVIDE SPIGOT JOINTS BETWEEN ENDS OF THE CULVERT. LENGTH BETWEEN SPIGOTS (S) SHALL BE APPROXIMATELY $W + 200$ mm. 60 & 110 mm PIPES SHALL BE PROVIDED WITH 10 mm ENLARGEMENT OF DIAMETER AT 120 & 100 mm RESPECTIVELY. AIRSPACE BETWEEN THE PIPES SHALL BE FILLED WITH SAND. LENGTH OF THE ENLARGEMENT SHALL BE 6-300 mm.
 - FOR 150 & 225 PVC PIPES, USE DI PIPE OF APPROX. $L = W + 200$ AT THE CROSSING WITH 2 HOOD STEPPED COUPLING ON BOTH ENDS.
 - FOR 300 PIPES, PROVIDE SPIGOT JOINTS ON BOTH SIDES OF THE CULVERT. LENGTH BETWEEN SPIGOT (S) SHALL BE APPROXIMATELY $W + 200$.
- FOR TYPE D:**
- PROVIDE CONCRETE WALLS AS SHOWN IN TYPE D.
 - NO OBSTRUCTION TO THE FLOW THROUGH THE CULVERT SHALL OCCUR DUE TO PIPE CROSSING.
 - SOME PLANS MAY NEED SPECIAL BRIDGES.
- FOR ALL TYPES:**
- WHEN MANHOLES ARE DISCONTINUED, THE SOCKET JOINTS, THE SOCKET SHALL BE USED TO FORM THE SOCKET JOINTS. WHEN THE STEPPED COUPLINGS ARE USED, THE MANHOLE MAY BE PROVIDED AT A MINIMUM DISTANCE OF 20 AWAY FROM THE STEPPED COUPLING.
 - PROVIDE THRUST BLOCKS AT ALL BENDS.

DO NOT SCALE

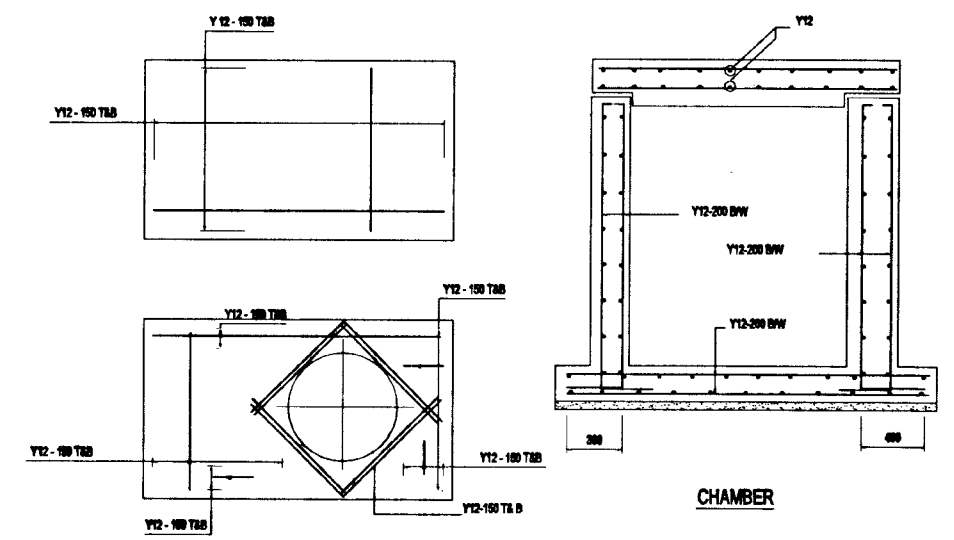
|  <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | SUB PROJECT: STANDARD | TITLE: TYPICAL DETAILS - CULVERT CROSSINGS | | | | | | |
|--|---|---|------|--|--|--|---|--|
| | <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> <p>NIHON SHIKO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | | | | | | | |
| <p>REVISIONS:</p> <table border="1"> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table> | NO. | DESCRIPTION | DATE | | | | <p>DATE: JUN 2001</p> <p>CONTRACT NO: NRW / CW</p> <p>JOB NO: STDC-01</p> | <p>APPROVED:</p> <p>FOR PROJECT MANAGER:</p> <p>FOR DESIGN:</p> <p>FOR CHECKING:</p> |
| NO. | DESCRIPTION | DATE | | | | | | |
| | | | | | | | | |



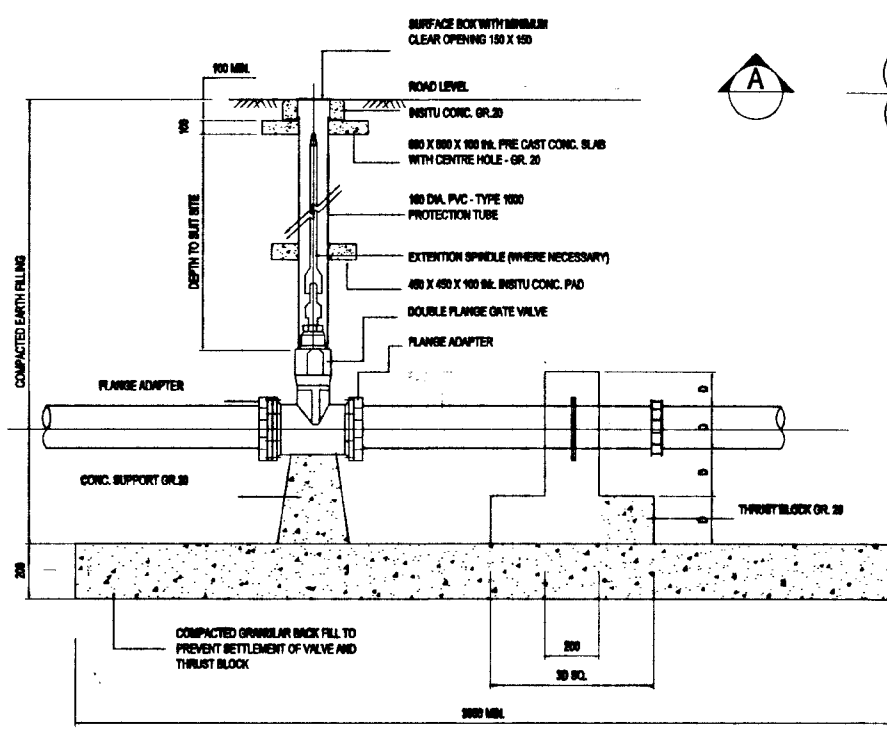
FOR PVC PIPES - 225 & BELOW



SECTION A - A

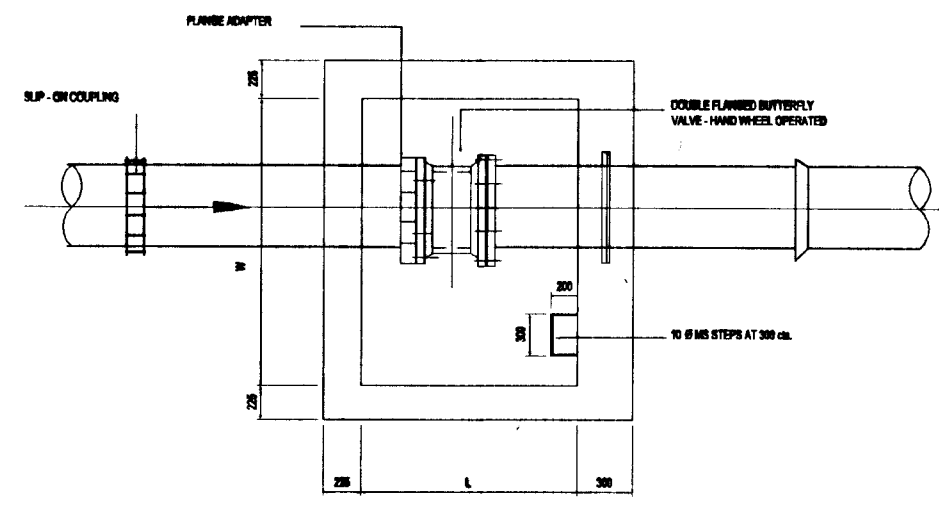


COVER SLABS
REINFORCEMENT DETAILS

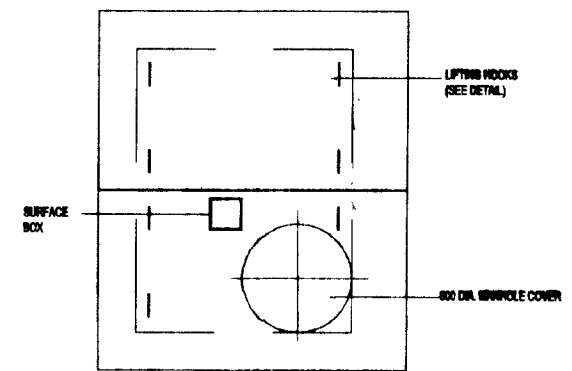


FOR DI PIPES - 250 to 300 (BOTH INCLUSIVE)

DETAILS OF GATE VALVE AND SURFACE BOX ASSEMBLY

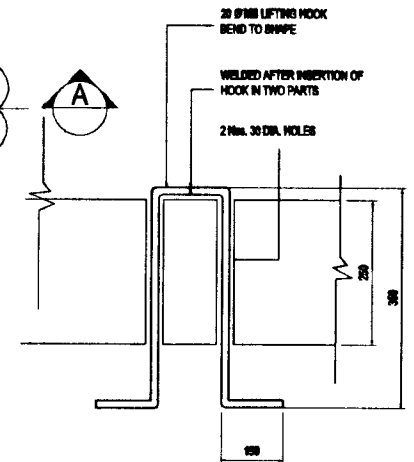


PLAN
(WITHOUT COVER SLAB)

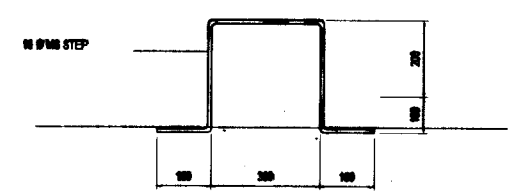


COVER SLAB WITH MANHOLE COVER

DETAILS OF BUTTERFLY VALVE CHAMBER FOR 400 & ABOVE DI PIPES
SCALE: 1:20



DETAILS OF LIFTING HOOK



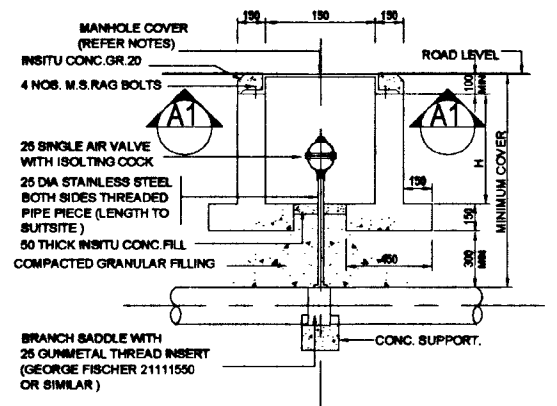
DETAILS OF MS STEPS

| DETAILS OF BUTTERFLY VALVE CHAMBERS | | | | |
|-------------------------------------|-----------|------|------|-------------|
| TYPE | LINE DIA. | L mm | W mm | H (MIN.) mm |
| A | 400-600 | 1300 | 2000 | 1700 |
| B | 700-800 | 1500 | 2000 | 2000 |

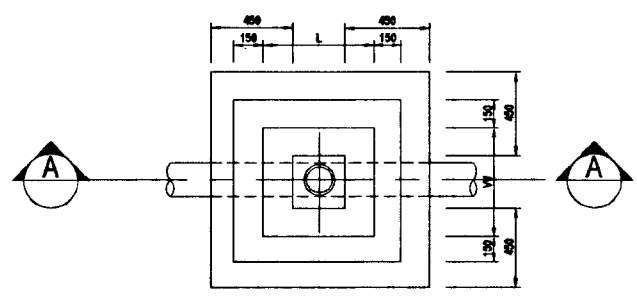
NOTES
1. VALVE CHAMBER DIMENSIONS SHALL BE REVISED TO SUIT THE SIZE OF VALVES AND FITTINGS, IF NECESSARY.

DO NOT SCALE

| | | |
|--|---|---|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: STANDARD DETAILS - VALVE CHAMBERS AND SURFACE BOX</p> |
| | <p>DESIGNED: [Signature]</p> <p>CHECKED: [Signature]</p> <p>BY: TEAM LEADER</p> | <p>DATE: JAN 2001</p> <p>CONTRACT No: NRW / CW</p> <p>DATE: [Signature]</p> |
| <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> <p>NIHON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | | |

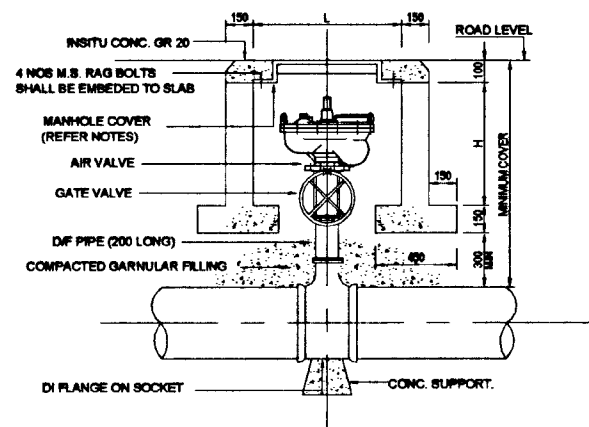


SECTIONAL ELEVATION A - A

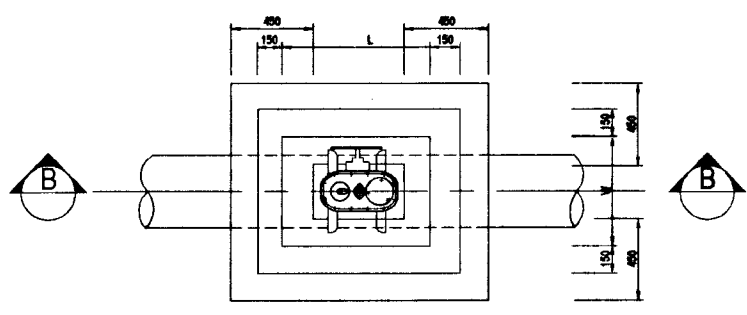


SECTIONAL PLAN A1 - A1
AIR VALVE TYPE - A

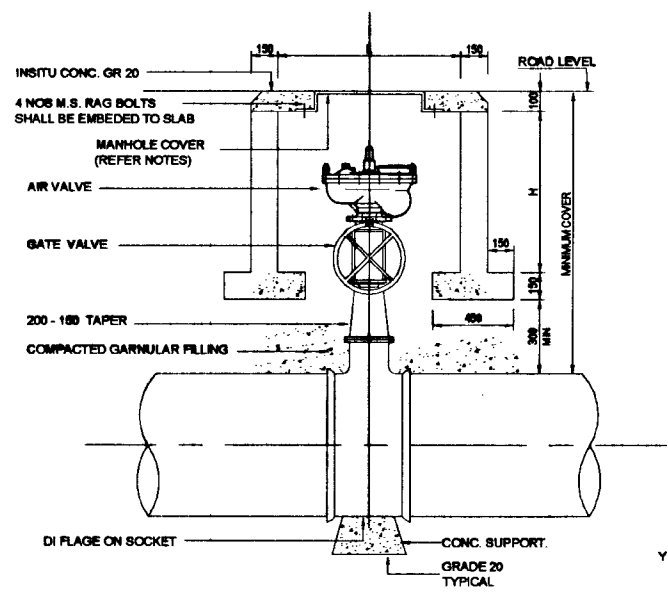
SINGLE AIR VALVE FOR UPVC PIPES UP TO 225



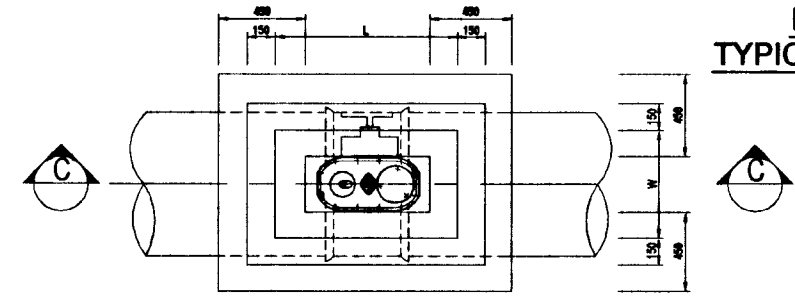
SECTIONAL ELEVATION B - B



PLAN (WITHOUT COVER SLAB)
AIR VALVE TYPE - B
DOUBLE AIR VALVE FOR DI PIPES 250 - 600



SECTIONAL ELEVATION C - C



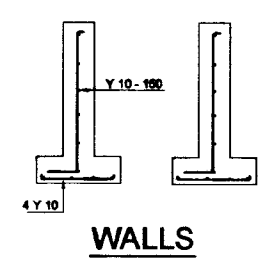
PLAN (WITHOUT COVER SLAB)
AIR VALVE TYPE - C
DOUBLE AIR VALVE FOR DI PIPES 800 - 1200

SIZE OF AIR VALVE ASSEMBLY

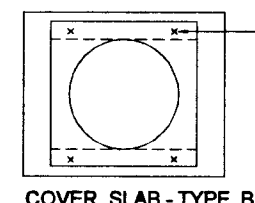
| TYPE | DIAMETER OF MAIN PIPE | INTERNAL DIMENSION (mm) | | | MINIMUM COVER (mm) |
|------|-----------------------|-------------------------|-----|-----|--------------------|
| | | L | W | H | |
| A | UP TO 225 UPVC | 600 | 600 | 600 | 1200 |
| B | 250 - 300 DI | 800 | 600 | 600 | 1200 |
| B | 400 - 600 DI | 800 | 600 | 600 | 1200 |
| C | 700 - 800 DI | 600 | 600 | 600 | 1500 |

SIZE OF AIR VALVE ASSEMBLY

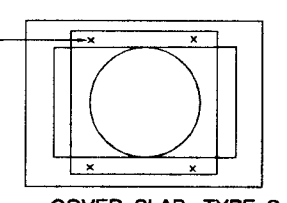
| DIAMETER OF MAIN PIPE | SIZE OF AIR VALVE (PN 10) | SIZE OF ISOLATING GATE VALVE (HAND WHEEL OPERATED) | SIZE OF FLANGED BRANCH OFF | LENGTH OF BRANCH PIECE |
|-----------------------|---------------------------|--|----------------------------|---------------------------------|
| UP TO 225 UPVC | 25 SINGLE AIR VALVE | 25 ISOLATING COCK | - | 80 DI, DF 200 LONG |
| 250 - 300 DI | 80 DOUBLE AIR VALVE | 80 DF GATE VALVE | 80 | 100 DI, DF 200 LONG |
| 400 - 600 DI | 100 DOUBLE AIR VALVE | 100 DF GATE VALVE | 100 | 200 - 150 DI TAPER, DF 300 LONG |
| 700 - 800 DI | 150 DOUBLE AIR VALVE | 150 DF GATE VALVE | 200 | |



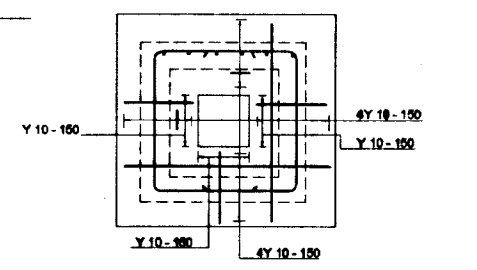
WALLS



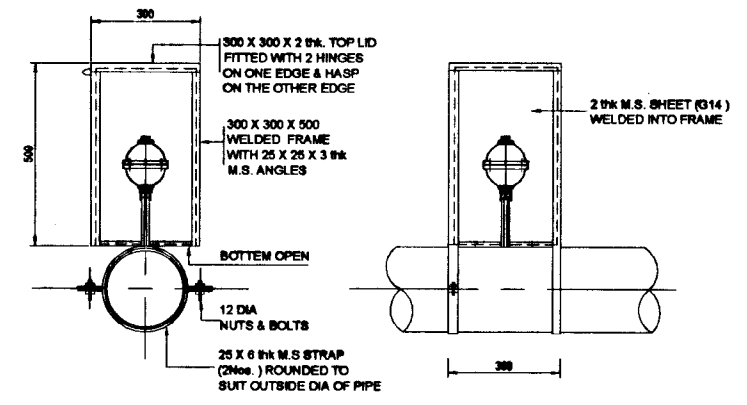
COVER SLAB - TYPE B



COVER SLAB - TYPE C



BASE SLAB TYPICAL REINFORCEMENT DETAILS



AIR VALVE ENCLOSURE (FOR 25 AV)

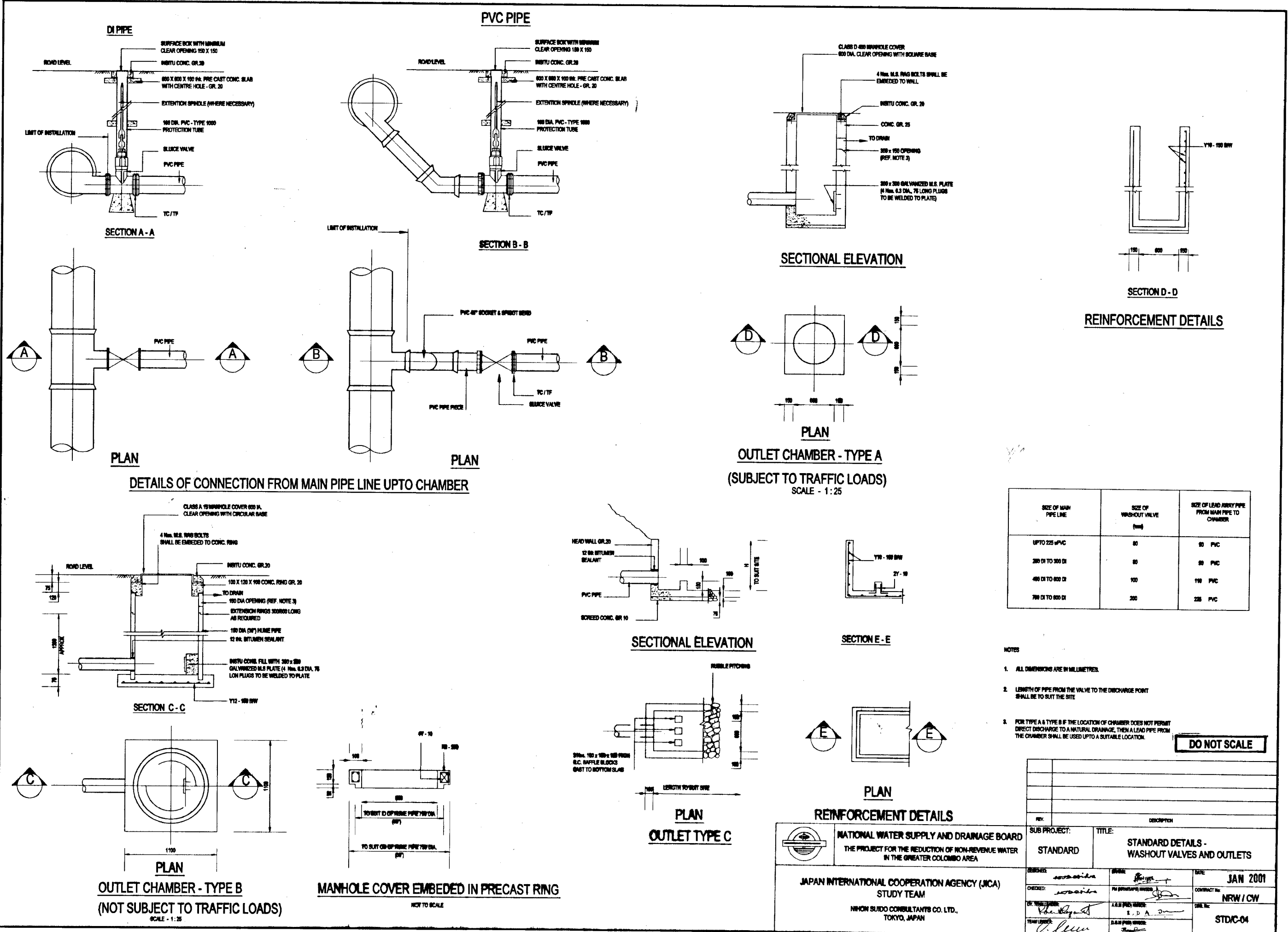
THE ENCLOSURE SHALL BE PAINTED WITH ONE COAT OF ANTI-CORROSION PAINT & 2 COATS BLACK BITUMINES.
THE LID TO BE SECURED WITH A PADLOCK.

NOTES

- CHAMBER SIZE GIVEN IN THE DRG. ARE THE MINIMUM.
- CHAMBER SIZE AND THE MINIMUM EARTH COVER DETERMINED ACCORDING TO THE DIMENSIONS GIVEN IN STANTON CATALOGUE THESE SIZES SHALL BE REVISED WHEN OTHER PRODUCTS ARE USED.
- MANHOLE COVER SHALL BE OF RIGID, HEAVY DUTY (CLASS) D 400 VENTILATED TYPE WITH 600 DIA. MINIMUM CLEAR OPENING.
- MANHOLE FRAME SHALL BE FIRMLY FIXED TO THE CHAMBER WITH 4 Nos. RAG BOLTS OR SIMILAR MANNER.
- ALL IN-SITU CONCRETE, SUPPORTS AND THRUST RESTRAINTS GRADE 20 UNLESS OTHERWISE NOTED.

DO NOT SCALE

| | | |
|--|-------------------------|-------------------------------|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | SUB PROJECT: | TITLE: |
| | STANDARD | TYPICAL DETAILS AIR VALVES |
| <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> <p>NIHOW SUBSO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | DESIGNED: <i>esseln</i> | DATE: JUN 2001 |
| | CHECKED: <i>esseln</i> | CONTRACT No: NRW/CW |
| | BY: <i>esseln</i> | DATE: <i>esseln</i> |



DETAILS OF CONNECTION FROM MAIN PIPE LINE UPTO CHAMBER

OUTLET CHAMBER - TYPE A
(SUBJECT TO TRAFFIC LOADS)
SCALE - 1:25

OUTLET CHAMBER - TYPE B
(NOT SUBJECT TO TRAFFIC LOADS)
SCALE - 1:25

MANHOLE COVER EMBEDDED IN PRECAST RING
NOT TO SCALE

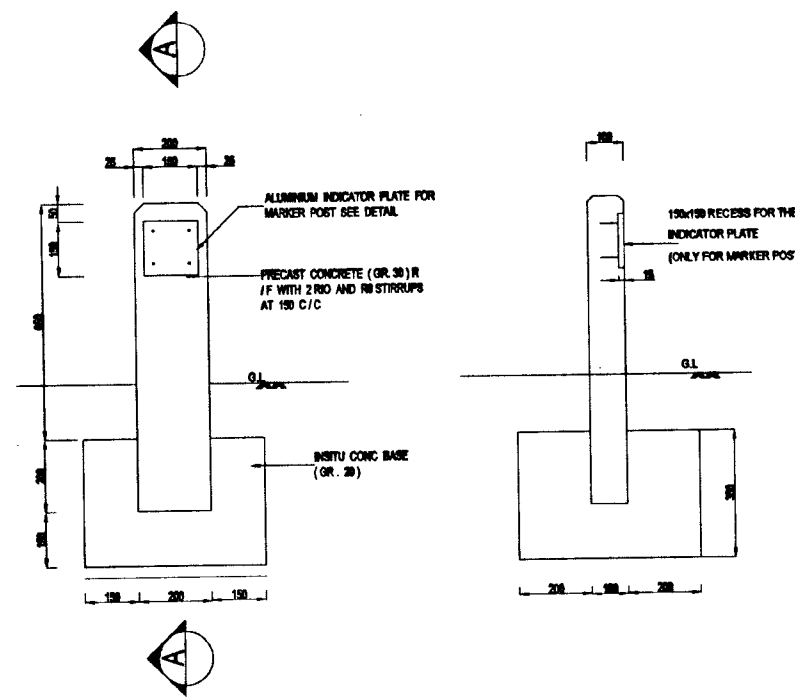
| SIZE OF MAIN PIPE LINE | SIZE OF WASHOUT VALVE (mm) | SIZE OF LEAD AWAY PIPE FROM MAIN PIPE TO CHAMBER |
|------------------------|----------------------------|--|
| UPTO 225 Ø PVC | 80 | 80 PVC |
| 280 DI TO 300 DI | 80 | 80 PVC |
| 400 DI TO 600 DI | 100 | 100 PVC |
| 700 DI TO 800 DI | 200 | 225 PVC |

- NOTES
- ALL DIMENSIONS ARE IN MILLIMETRES.
 - LENGTH OF PIPE FROM THE VALVE TO THE DISCHARGE POINT SHALL BE TO SUIT THE SITE
 - FOR TYPE A & TYPE B IF THE LOCATION OF CHAMBER DOES NOT PERMIT DIRECT DISCHARGE TO A NATURAL DRAINAGE, THEN A LEAD PIPE FROM THE CHAMBER SHALL BE USED UPTO A SUITABLE LOCATION.

DO NOT SCALE

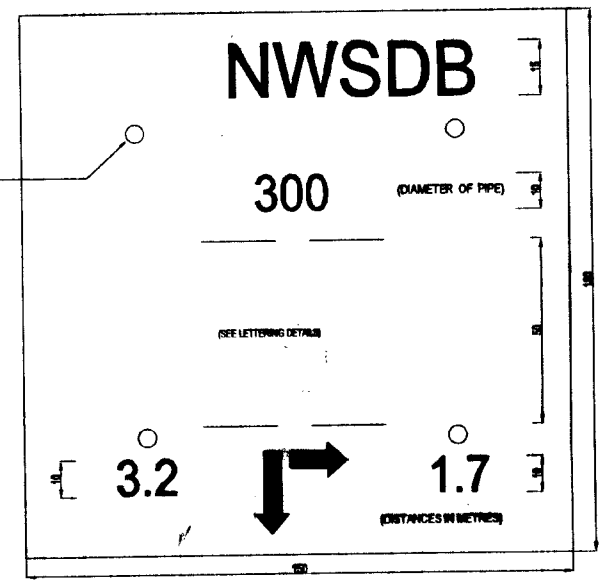
| | | |
|--|--|---|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: STANDARD DETAILS - WASHOUT VALVES AND OUTLETS</p> |
| | <p>DESIGNER: <i>[Signature]</i></p> <p>CHECKED: <i>[Signature]</i></p> <p>DR. YOSHIOBUKI <i>[Signature]</i></p> <p>TEAM LEADER: <i>[Signature]</i></p> | <p>DATE: JAN 2001</p> <p>CONTRACT NO: NRW / CW</p> <p>SCALE: STDIC-04</p> |

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM
NIHON SUIDO CONSULTANTS CO. LTD., TOKYO, JAPAN

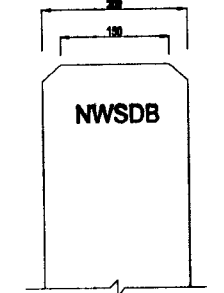


FRONT ELEVATION
SECTION A-A
DETAIL OF MARKER POST & BOUNDARY POST
SCALE : 1:10

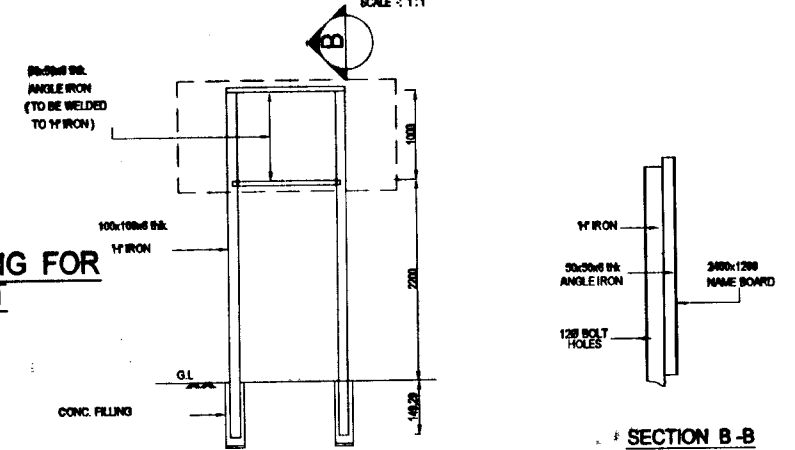
NOTE :
FOR BOUNDARY POST, AN ENGRAVING SHOULD BE MADE IN THE CONCRETE INSTEAD OF THE INDICATOR PLATE (REF. DETAIL.)



NOTE : PLATE SHALL BE 3mm THK. ALUMINUM PLATE, WITH LETTERING ETCHED OR ENGRAVED
DETAIL OF INDICATOR PLATE FOR MARKER POST
SCALE : 1:1

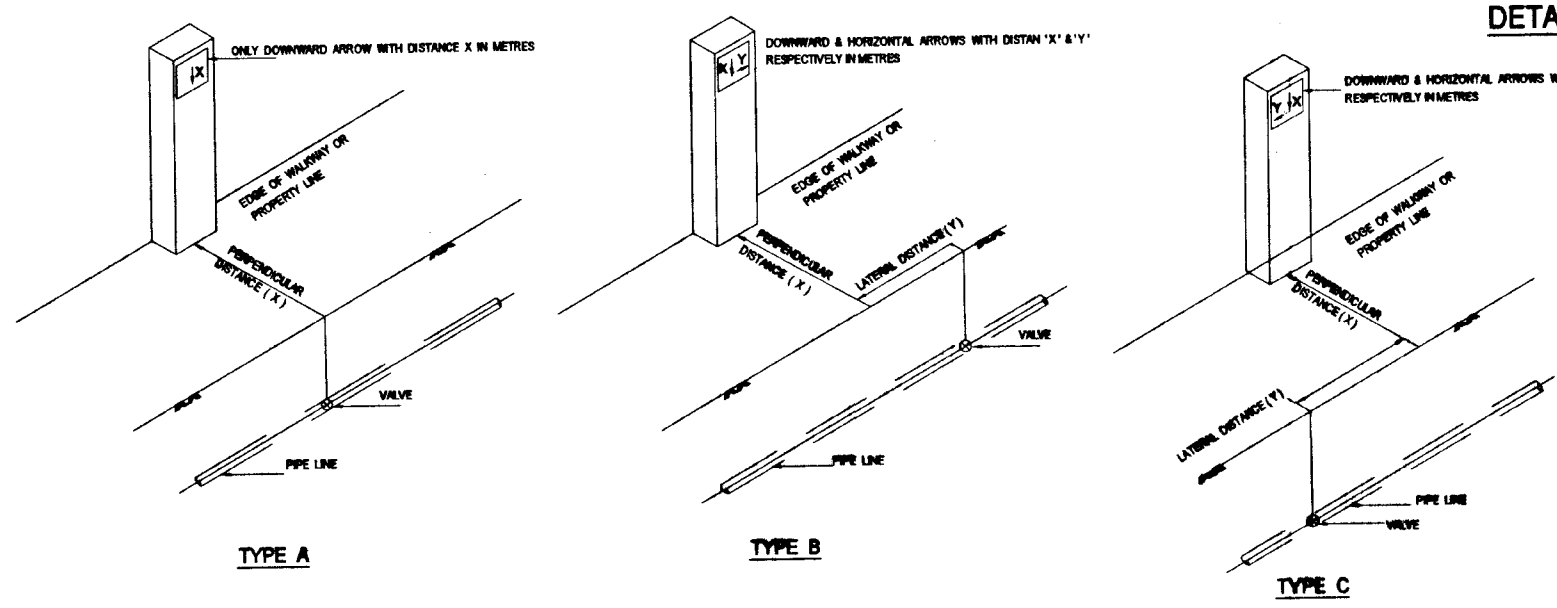


DETAIL OF ENGRAVING FOR BOUNDARY POST
SCALE : 1:5



SECTIONAL ELEVATION
DETAILS OF NAME BOARD
SECTION B-B

GV - FOR GATE VALVE
H - FOR FIRE HYDRANT
WO - FOR WASHOUT
AV - FOR AIR VALVE
BV - FOR BUTTERFLY VALVE



TYPES OF INSTALLATION OF MARKER POST
NOT TO SCALE

| TYPE OF THE FITTING | SIZE OF FITTING WHERE MARKER POST IS REQUIRED |
|---------------------|---|
| GATE VALVE | FOR VALVES OF SIZE 150 AND ABOVE |
| FIRE HYDRANT | ALL |
| WASHOUT VALVE | FOR PIPE LINE SIZES 150 AND ABOVE |
| AIR VALVE | ALL |
| BUTTERFLY VALVE | ALL |

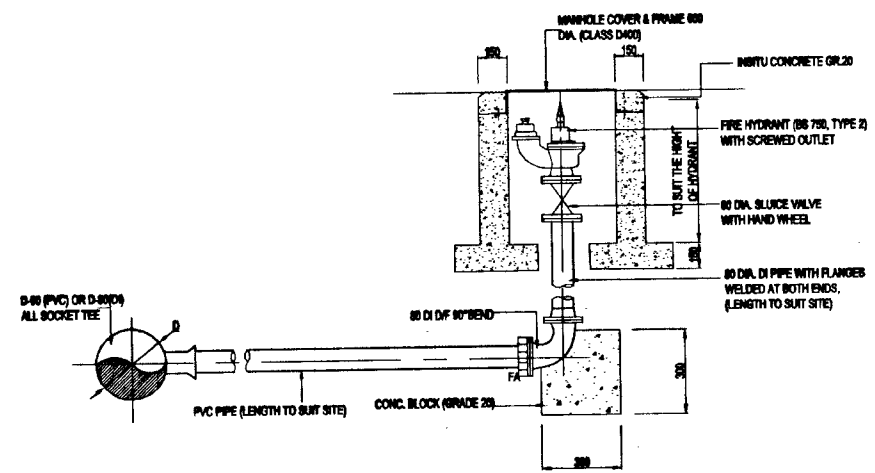
- NOTE :
- MARKER POST FOR FIRE HYDRANTS SHALL BE PAINTED WITH LUMINOUS YELLOW PAINT TO THE APPROVAL OF ENGINEER.
 - INDICATOR PLATE SHALL BE FIXED TO THE RECESS IN POST WITH 4 NOS OF 25mm LONG BRASS SCREW NAIL AND PLASTIC ANCHOR PLUGS.
 - MARKER POST SHALL BE INSTALLED ON THE SAME SIDE OF THE ROAD WHERE THE FITTING IS INSTALLED.
 - TYPE 'W' INSTALLATION SHALL BE USED WHERE EVER POSSIBLE.
 - IF MORE THAN ONE FITTING ARE INSTALLED CLOSE TO EACH OTHER, RELEVANT PLATES SHALL BE INSTALLED ON THE SAME POST ONE BELOW THE OTHER, WITH NECESSARY INDICATIONS.
 - BOUNDARY POSTS SHALL BE INSTALLED ON THE ON THE BOUNDARY OF ACQUIRED LAND, AT ALL CORNERS.

DO NOT SCALE

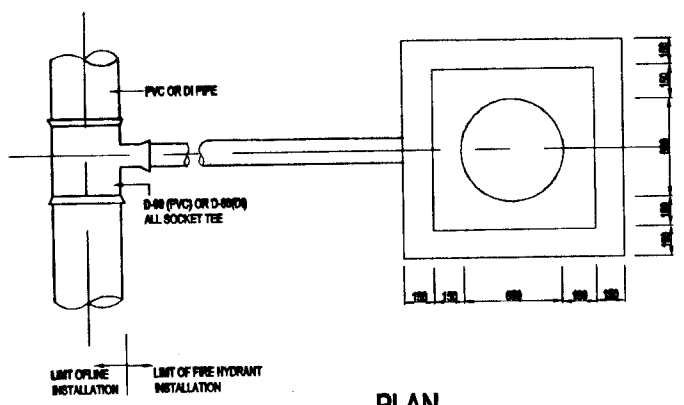
INSTALLATION GUIDE

| | | | | |
|--|--|----------|--------|--|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | SUB PROJECT: | STANDARD | TITLE: | STANDARD DETAILS - MARKER POSTS AND BOUNDARY POSTS |
| | <p>DATE: JAN 2001</p> <p>CONTRACT NO: NRW / CW</p> <p>STD/C-05</p> | | | |

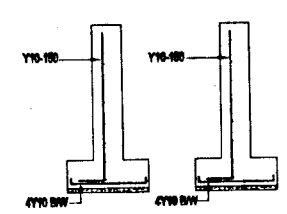
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
STUDY TEAM
NIPPON KAIEN KAISHI CO. LTD., TOKYO, JAPAN



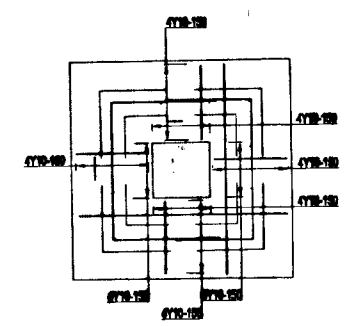
ELEVATION



PLAN



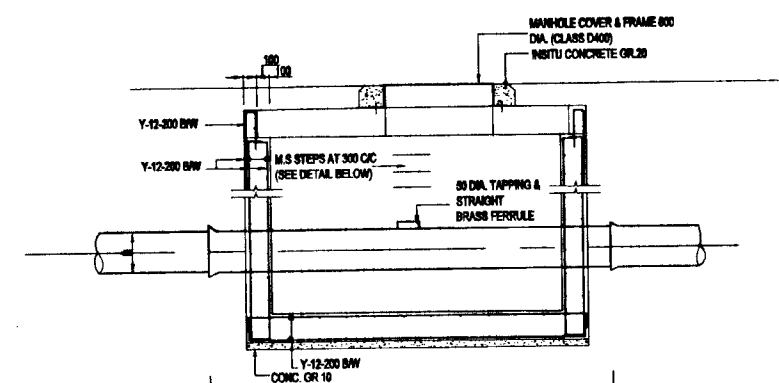
ELEVATION



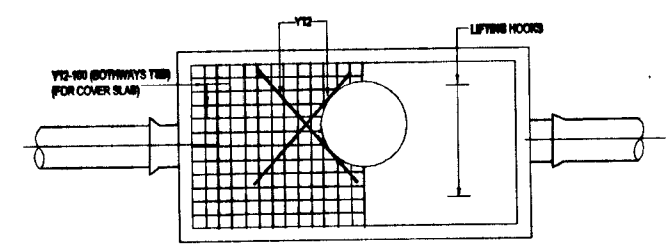
PLAN

R/F DETAILS OF CHAMBER

DETAILS OF FIRE HYDRANT AND CHAMBER



ELEVATION

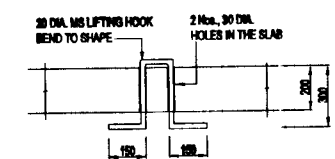


R/F DETAILS - TOP SLAB

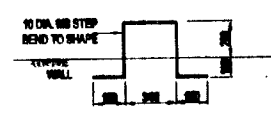
PLAN

WASTE METER INSTALLATION TYPE - A

(FOR PIPE LINE 250 mm AND ABOVE)



DETAILS OF LIFTING HOOK



DETAILS OF MS STEPS

SELECTION OF WASTE METER INSTALLATION

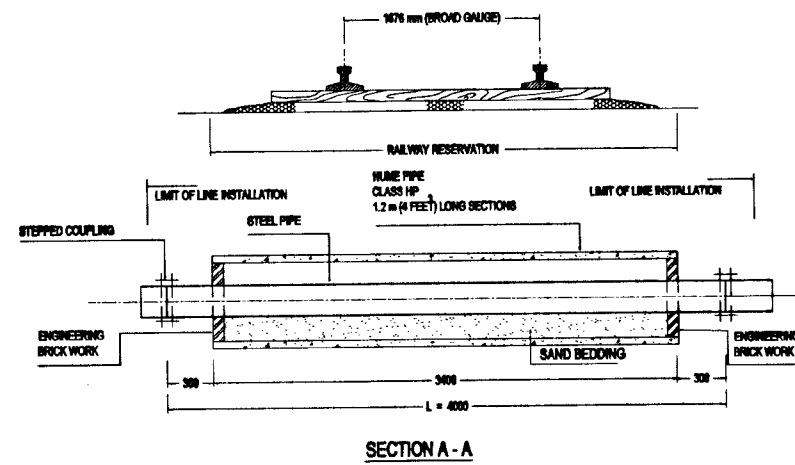
| PIPE DIA. (mm) | | TYPE OF INSTALLATION | TYPE OF WASTE METER | SIZE OF CHAMBER |
|----------------|-----|----------------------|------------------------------------|-----------------|
| D1 | D2 | | | |
| 600 | — | TYPE A | INSERTION TYPE | 1000 x 800 |
| 600 | — | TYPE A | INSERTION TYPE | 1000 x 800 |
| 400 | — | TYPE A | INSERTION TYPE | 1000 x 800 |
| 300 | — | TYPE A | INSERTION TYPE | 1000 x 800 |
| 200 | — | TYPE A | INSERTION TYPE | 1000 x 800 |
| 225 | 150 | TYPE B | HELICAL ROTARY TYPE 150 mm DIA. | 1400 x 800 |
| 150 | 100 | TYPE B | HELICAL ROTARY TYPE 100 mm DIA. | 1400 x 800 |

NOTES:

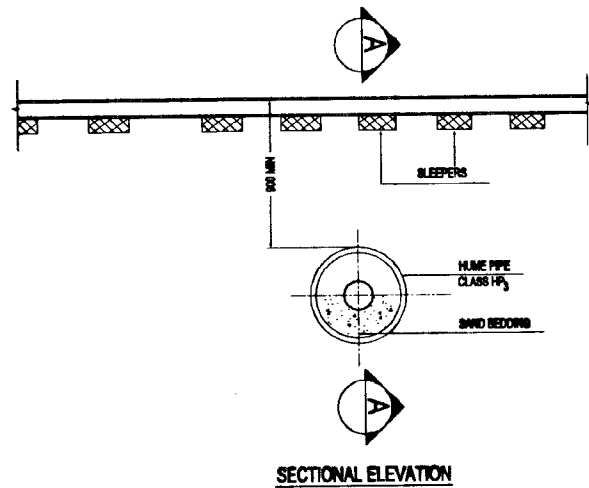
- THE HEIGHT OF THE CHAMBER SHALL BE DECIDED TO SUIT THE SITE.
- IN WASTE METER ARRANGEMENT, FOR THE PIPES OF DIA. 225 mm AND LESS, THE WASTE METER NEED NOT BE INSTALLED INSTEAD OF THE METER AND THE FLANGE & PIPE PIECE SHOWN, ANOTHER FLANGE & PIPE PIECE OF EQUIVALENT LENGTH SHALL BE INSTALLED.

DO NOT SCALE

| | | |
|--|--|--|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | <p>DESIGNED: <i>was</i></p> <p>CHECKED: <i>was</i></p> <p>DT. TEAM LEADER: <i>Wasantha</i></p> <p>TEAM LEADER: <i>P. Luv</i></p> | <p>DATE: JAN 2001</p> <p>CONTRACT NO: NRW / CW</p> <p>DWG. NO: STDIC-06</p> |
| | <p>REVISIONS:</p> <p>NO. DESCRIPTION</p> | <p>DATE</p> <p>BY</p> <p>FOR APPROVAL:</p> <p>DATE</p> <p>BY</p> |
| <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> <p>NIHON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | | |

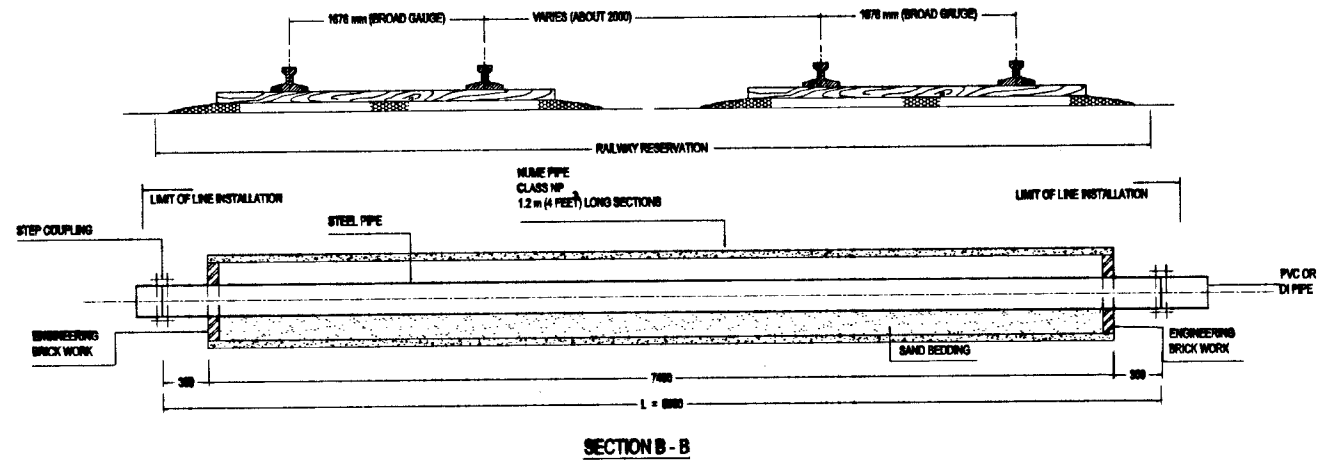


SECTION A - A

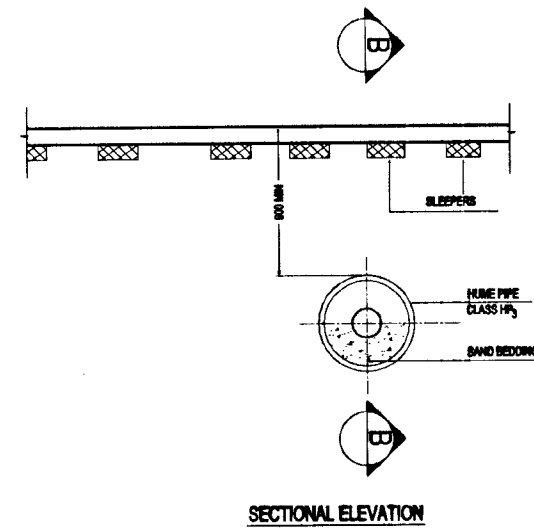


TYPICAL RAILWAY CROSSING - SINGLE TRACK

NOT TO SCALE



SECTION B - B



TYPICAL RAILWAY CROSSING - DOUBLE TRACK


NOT TO SCALE

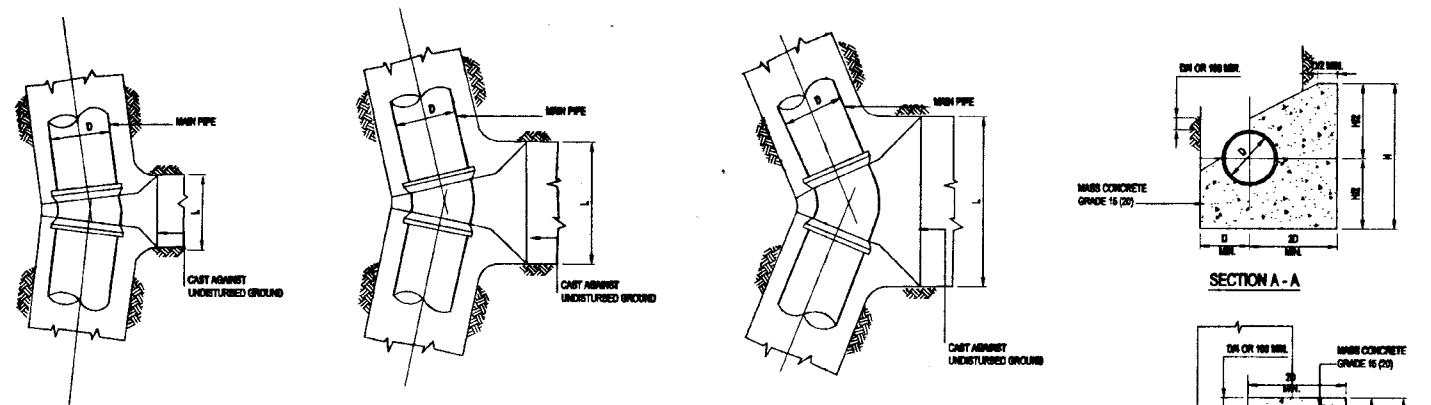
| RECOMMENDED USE OF PIPES | | |
|-------------------------------|------------------|------------------------|
| SIZE & TYPE OF PIPE LINE (mm) | PIPE AT CROSSING | SIZE OF HUME PIPE (mm) |
| 150 Dia. U PVC | 150 Dia. STEEL | 381 (15") |
| 225 Dia. U PVC | 200 Dia. STEEL | 457 (18") |
| 300 Dia. DI | 300 Dia. STEEL | 609 (24") |
| 400 Dia. DI | 400 Dia. STEEL | 762 (30") |
| 500 Dia. DI | 500 Dia. STEEL | 914 (36") |
| 600 Dia. DI | 600 Dia. STEEL | 1219 (48") |
| 800 Dia. DI | 800 Dia. STEEL | 1575 (62") |

NOTES:

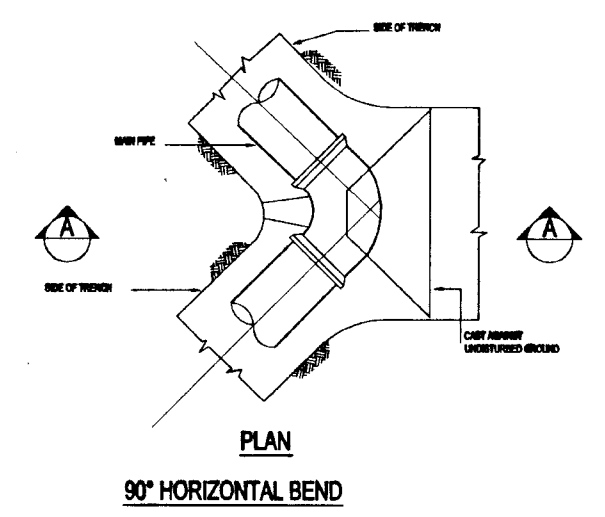
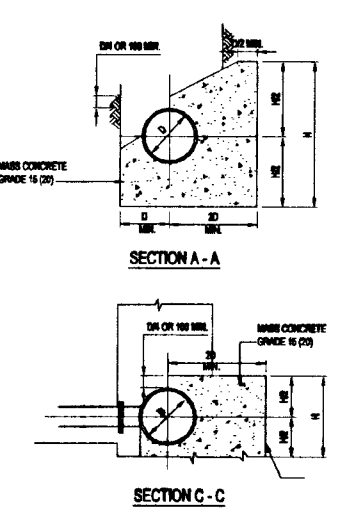
- HUME PIPES SHALL BE OF 4 ft. (1200 mm) LONG
- A SINGLE PIPE SHALL BE USED WITHIN THE HUME PIPE
- WHEN TWO PIPES ARE LAID IN PARALLEL THE HUME PIPES SHOULD BE LAID AT A MINIMUM HORIZONTAL DISTANCE OF 400 mm, UNLESS OTHERWISE SHOWN IN DRAWINGS.
- ALL DIMENSIONS ARE IN MILLIMETRES.

DO NOT SCALE

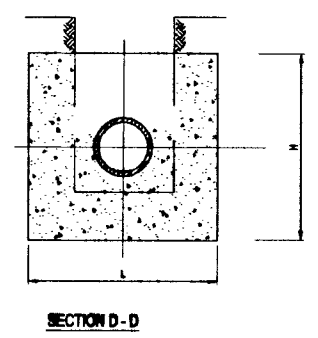
| | | |
|--|--|--|
|  <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | SUB PROJECT: STANDARD | TITLE: STANDARD DETAILS RAILWAY CROSSING |
| | <p>DESIGNED: <i>[Signature]</i> DATE: JAN 2001</p> <p>CHECKED: <i>[Signature]</i> CONTRACT NO: NRW / CW</p> <p>DR. YONG THONG: <i>[Signature]</i> LAST PAGES: <i>[Signature]</i> SHEET NO: STD/C-07</p> <p>TEAM LEADER: <i>[Signature]</i> S.D.M (P&I) NUMBER: <i>[Signature]</i></p> | |
| <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM NIHON KAIYO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | | |



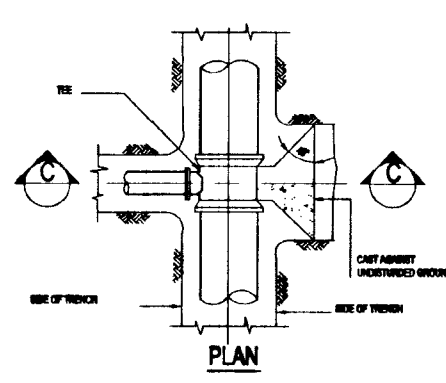
PLAN 11 1/4° HORIZONTAL BEND PLAN 22 1/2° HORIZONTAL BEND PLAN 45° HORIZONTAL BEND



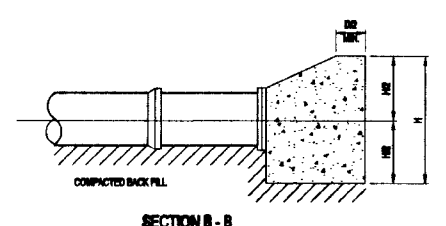
PLAN 90° HORIZONTAL BEND



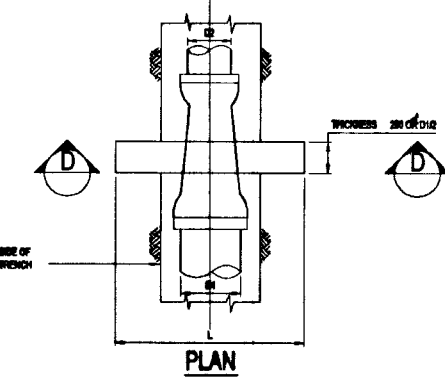
SECTION D-D



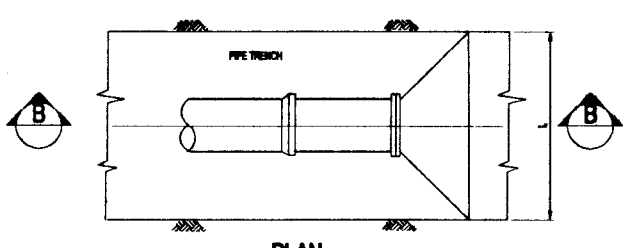
THRUST BLOCK FOR TEE



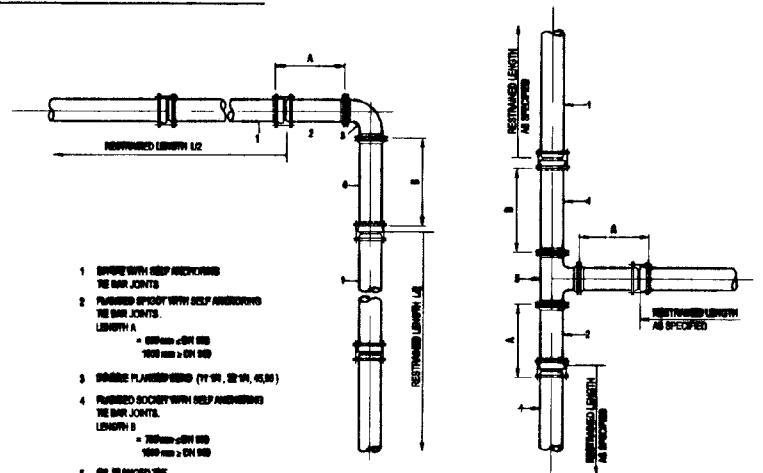
SECTION B-B



THRUST BLOCK FOR TAPER



PLAN THRUST BLOCK FOR ENDCAP/BLANK FLANGE



ARRANGEMENT OF RESTRAINED PIPES

1. SANDRE WITH SELF ANCHERING THE BAR JOINTS.
2. PLUMBED SMOOTH WITH SELF ANCHERING THE BAR JOINTS. LENGTH A = 200mm ± DN 100, 250mm ± DN 150.
3. DOUBLE FLANGED WITH SELF ANCHERING THE BAR JOINTS. LENGTH B = 200mm ± DN 100, 250mm ± DN 150.
4. PLUMBED SMOOTH WITH SELF ANCHERING THE BAR JOINTS. LENGTH C = 200mm ± DN 100, 250mm ± DN 150.
5. ALL PLUMBED TEE.

DIMENSIONS OF THRUST BLOCKS

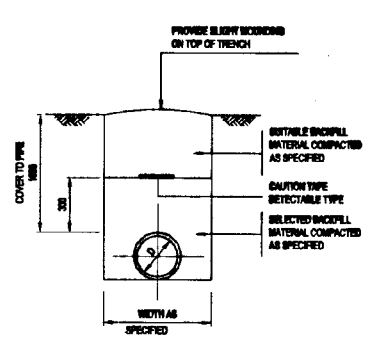
OTHER DIMENSIONS (TEST PRESSURE 7.5 BARS)

| Pipe Dia D mm | Dimensions of thrust block in mm | | | | TEEB (Size of branch off & END CAPS) | | | TAPERS | | | | | |
|------------------|----------------------------------|-----|------|------|--------------------------------------|-----|-----|--------|---------------|------------------|---------------|------------------|------|
| | L | H | L | H | L | H | L | H | Top dia in mm | Thrust block dia | Top dia in mm | Thrust block dia | |
| 50 | 100 | 100 | 140 | 140 | 100 | 100 | 100 | 200 | 200 | 110 | 80 | 220 | 220 |
| 75 | 150 | 150 | 210 | 210 | 150 | 150 | 150 | 300 | 300 | 160 | 110 | 310 | 310 |
| 100 | 170 | 170 | 230 | 230 | 170 | 170 | 170 | 400 | 400 | 190 | 130 | 350 | 350 |
| 150 | 250 | 250 | 300 | 300 | 250 | 250 | 250 | 600 | 600 | 250 | 190 | 450 | 450 |
| 200 | 320 | 320 | 400 | 400 | 320 | 320 | 320 | 800 | 800 | 300 | 250 | 550 | 550 |
| 250 | 400 | 400 | 570 | 570 | 400 | 400 | 400 | 1000 | 1000 | 350 | 300 | 650 | 650 |
| 300 | 480 | 480 | 670 | 670 | 480 | 480 | 480 | 1200 | 1200 | 400 | 350 | 750 | 750 |
| 350 | 550 | 550 | 770 | 770 | 550 | 550 | 550 | 1470 | 1470 | 450 | 400 | 850 | 850 |
| 400 | 620 | 620 | 880 | 880 | 620 | 620 | 620 | 1670 | 1670 | 500 | 450 | 950 | 950 |
| 450 | 700 | 700 | 1070 | 1070 | 700 | 700 | 700 | 2000 | 2000 | 550 | 500 | 1050 | 1050 |
| 500 | 800 | 800 | 1280 | 1280 | 800 | 800 | 800 | 2400 | 2400 | 600 | 550 | 1150 | 1150 |

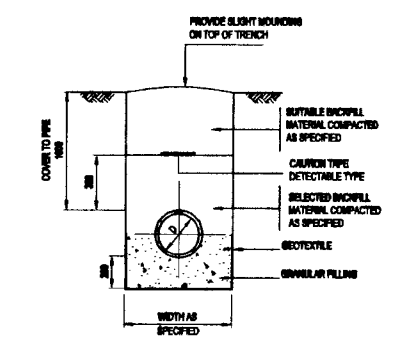
TRANSMISSION MAINS (TEST PRESSURE 10 BARS)

| Pipe Dia D mm | Dimensions of thrust block in mm | | | | TEEB (Size of branch off & END CAPS) | | | TAPERS | | | | |
|------------------|----------------------------------|------|------|------|--------------------------------------|------|------|--------|---------------|------------------|---------------|------------------|
| | L | H | L | H | L | H | L | H | Top dia in mm | Thrust block dia | Top dia in mm | Thrust block dia |
| 600 | 800 | 800 | 1000 | 1200 | 1700 | 1700 | 2300 | 2300 | 500 | 500 | 1500 | 1500 |
| 650 | 1000 | 1000 | 1400 | 1400 | 2040 | 2040 | 2800 | 2800 | 600 | 600 | 1650 | 1650 |
| 700 | 1200 | 1200 | 1670 | 1670 | 2520 | 2520 | 3400 | 3400 | 700 | 700 | 1800 | 1800 |

1. THE DIMENSIONS GIVEN IN THESE TABLES ARE VALID ONLY FOR NON-SUBMERGED CONDITION.
2. FOR SUBMERGED CONDITION DOUBLE THE VALUE OF AREA (L x H). L x H SHALL BE SELECTED TO SUIT SITE CONDITION.

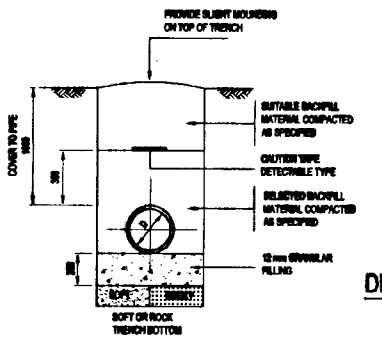


BEDDING TYPE - A NORMAL GROUND



BEDDING TYPE - C FOR SOFT OR PEATY GROUND

- NOTES
- FOR BEDDING TYPE - C:
- SPRINKLER FILLING SHALL BE OF GROUP GW UNDER UNIFIED SOIL CLASSIFICATION (USC) SYSTEM WITH UNIFORMITY COEFFICIENT Cu > 4 AND COEFFICIENT OF CURVATURE Cc BETWEEN 1 & 3.

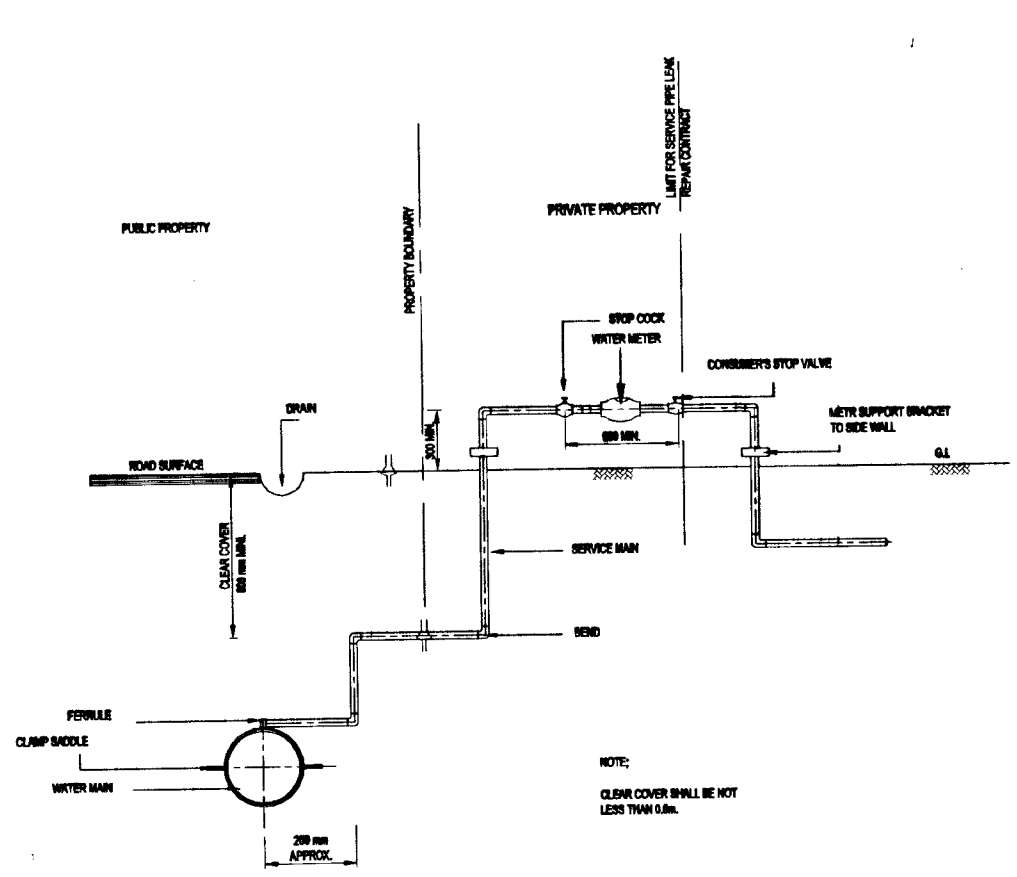


BEDDING TYPE - B FOR WEAK GROUND OR ROCKY TRENCH BOTTOM

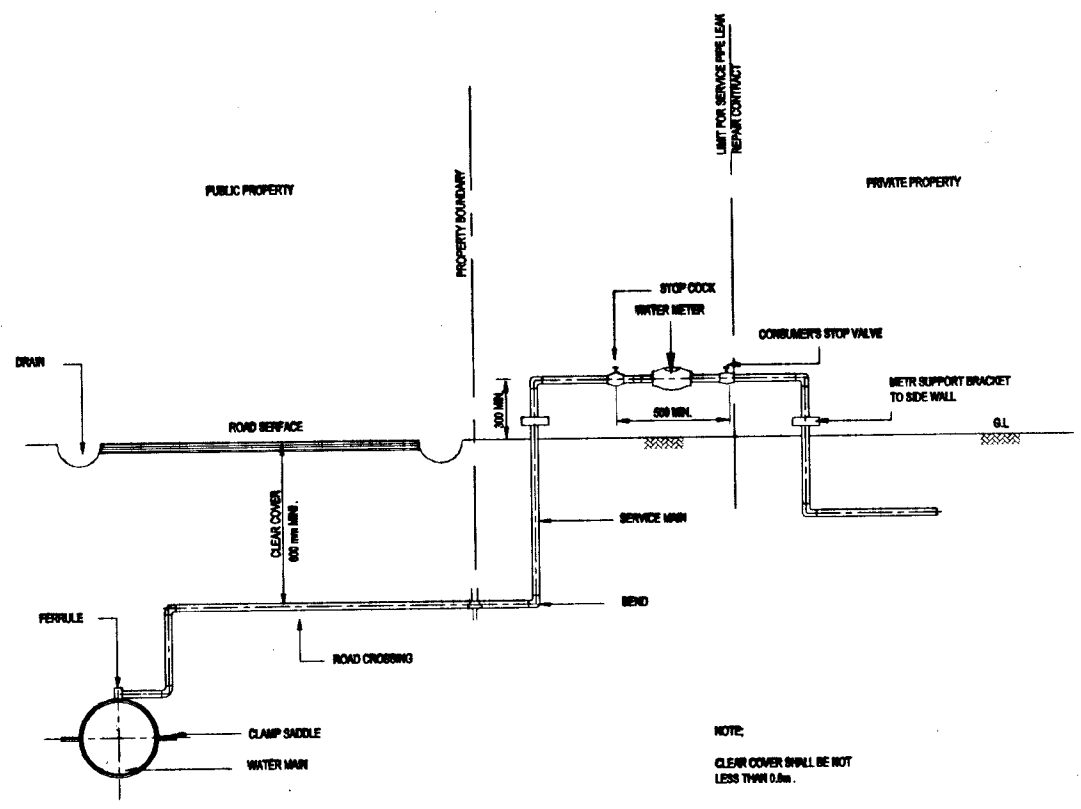
DO NOT SCALE

| Normal Pipe Dia. mm | Minimum Cover mm | Normal Trench Width mm |
|---------------------|------------------|------------------------|
| 60, 75 | 200 | 60 |
| 100, 150, 200, 250 | 300 | 110 |
| Above 300 | 500 | 160 |

| | | | |
|--|--|---|---------------------------------|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM NIWON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | <p>SUB PROJECT: STANDARD</p> <p>TITLE: STANDARD DETAILS - THRUST BLOCKS, PIPE BEDDINGS, TRENCHES - DISTRIBUTION MAIN & TRANSMISSION MAIN</p> | <p>DATE: JAN 2001</p> <p>CONTRACT NO: NRW / CW</p> <p>SNA. NO: STD / C-08</p> | |
| | <p>DESIGNED: <i>wasanda</i></p> <p>CHECKED: <i>wasanda</i></p> <p>DR. TITLE: <i>Handwritten</i></p> <p>TEAM LEADER: <i>Handwritten</i></p> | <p>DATE: <i>Handwritten</i></p> <p>CONTRACT NO: <i>Handwritten</i></p> <p>SNA. NO: <i>Handwritten</i></p> | |
| | <p>REVISION:</p> <p>NO. 1</p> | <p>REVISION:</p> <p>NO. 1</p> | <p>REVISION:</p> <p>NO. 1</p> |
| | <p>DATE: <i>Handwritten</i></p> | <p>DATE: <i>Handwritten</i></p> | <p>DATE: <i>Handwritten</i></p> |




DETAILS OF SERVICE CONNECTION WHEN THE WATER MAIN AND THE PROPERTY ARE ON THE SAME SIDE OF THE ROAD.

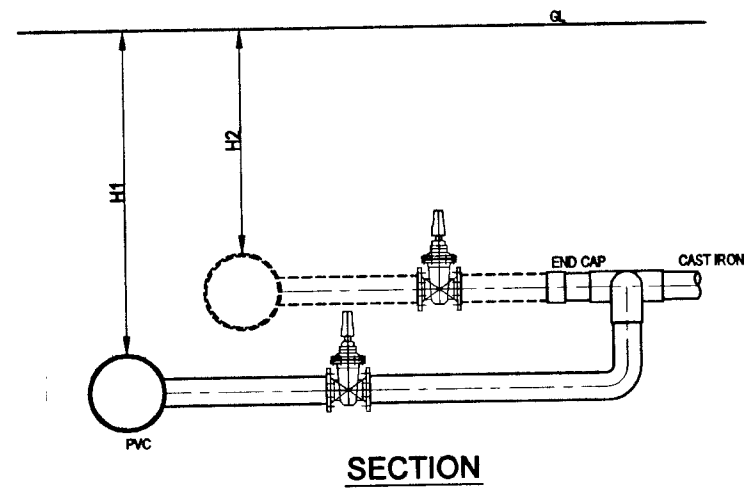


DETAILS OF SERVICE CONNECTION WHEN THE WATER MAIN AND THE PROPERTY ARE ON OPPOSITE SIDES OF THE ROAD.

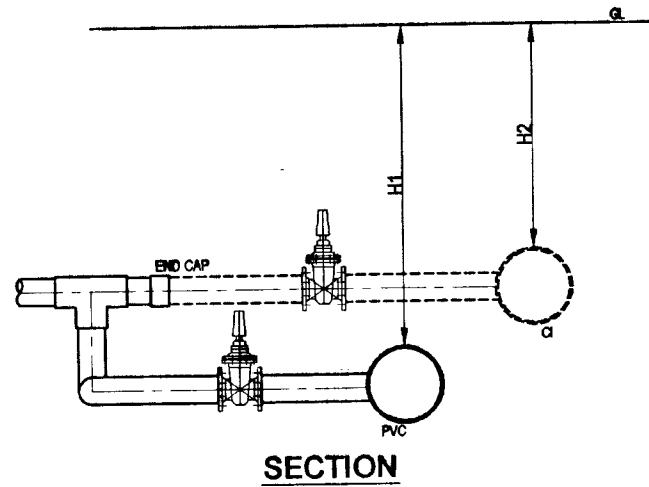
DO NOT SCALE

| | | | |
|---|----------------------------------|--|---|
|  NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | | SUB PROJECT: STANDARD | TITLE: STANDARD DETAILS - SERVICE CONNECTIONS |
| DESIGNER: <i>[Signature]</i> | DRAWN: <i>[Signature]</i> | DATE: JAN 2001 | CONTRACTOR: NRW / CW |
| CHECKER: <i>[Signature]</i> | IN CHARGE: <i>[Signature]</i> | DR. TEAM LEADER: <i>[Signature]</i> | DRAIN PIPING ENGINEER: <i>[Signature]</i> |
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM NIWON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN | | SHEET NO.: STD/C-09 | |

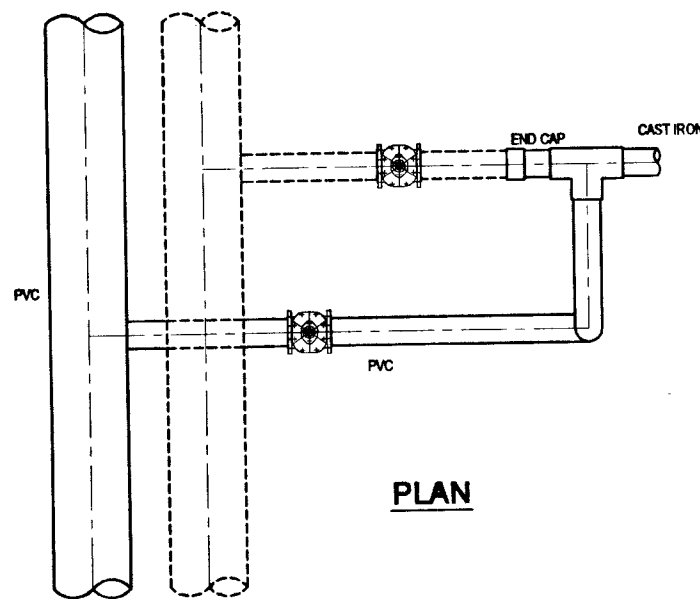
TYPICAL CONNECTION TO THE EXISTING BRANCH PIPES



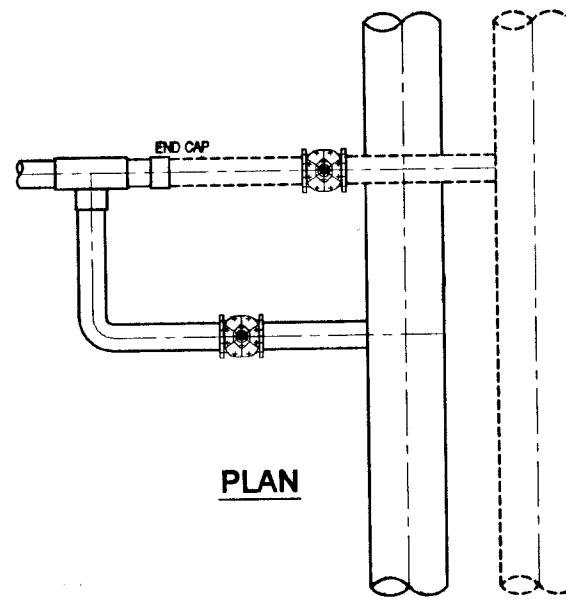
SECTION



SECTION

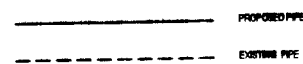


PLAN

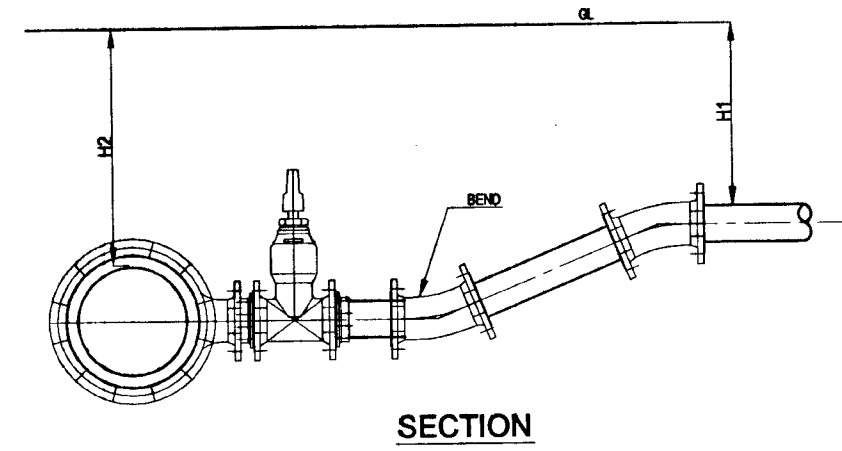


PLAN

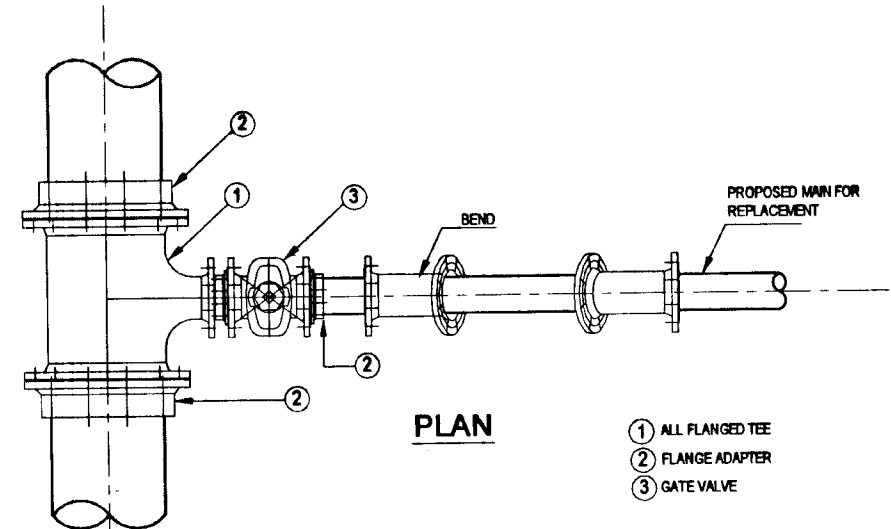
H1 > H2
EXISTING PIPE ARE ABOVE THE PROPOSED MAINS



TYPICAL CONNECTION TO THE EXISTING MEDIUM AND LARGE DIAMETER MAIN



SECTION




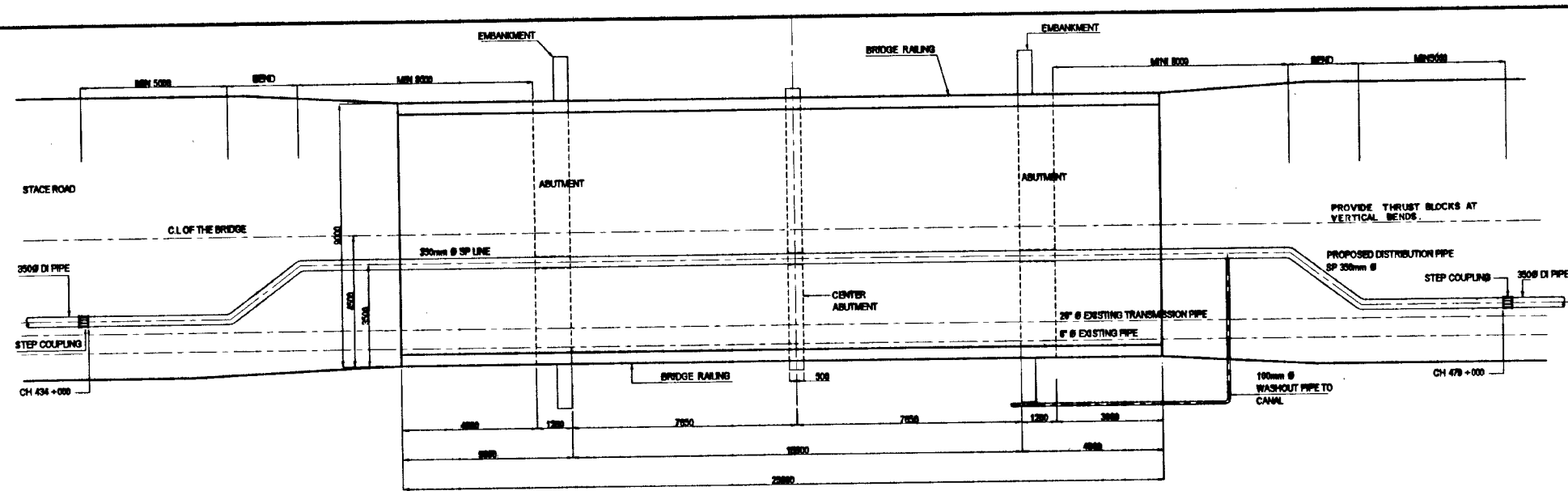
PLAN

- ① ALL FLANGED TEE
- ② FLANGE ADAPTER
- ③ GATE VALVE

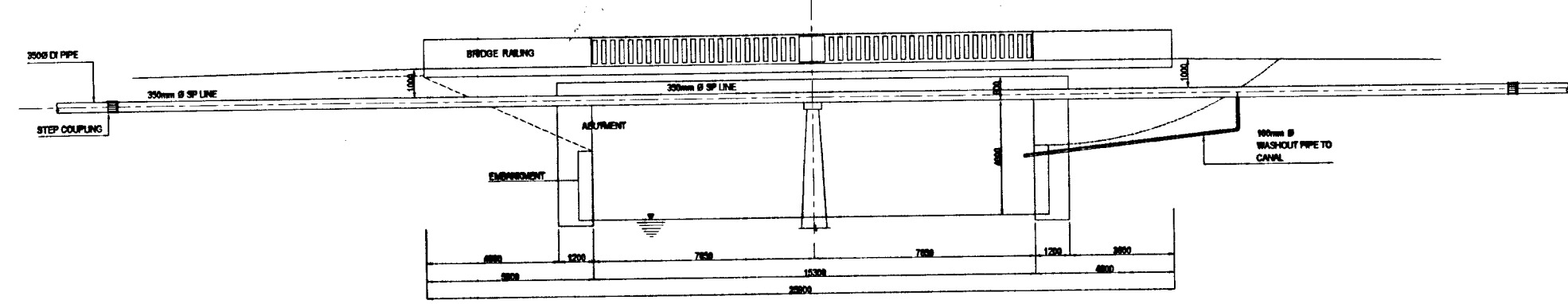
H2 > H1
EXISTING MAIN IS BELOW THE PROPOSED EXISTING MAIN.

DO NOT SCALE

| | | | | | |
|--|--|---|---|--|--|
|  NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | | SUB PROJECT: | | TITLE: | |
| | | STANDARD | | STANDARD DETAILS - PIPE CONNECTIONS | |
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM NIPPON KAIWA CONSULTANTS CO. LTD., TOKYO, JAPAN | | DRAWN: <i>[Signature]</i> CHECKED: <i>[Signature]</i> DATE: JAN 2009 | PREPARED BY: <i>[Signature]</i> A.S.P. NO. <i>[Signature]</i> CONTRACT NO.: NRW / CW | DATE: JAN 2009 CONTRACT NO.: NRW / CW STD/C-10 | |



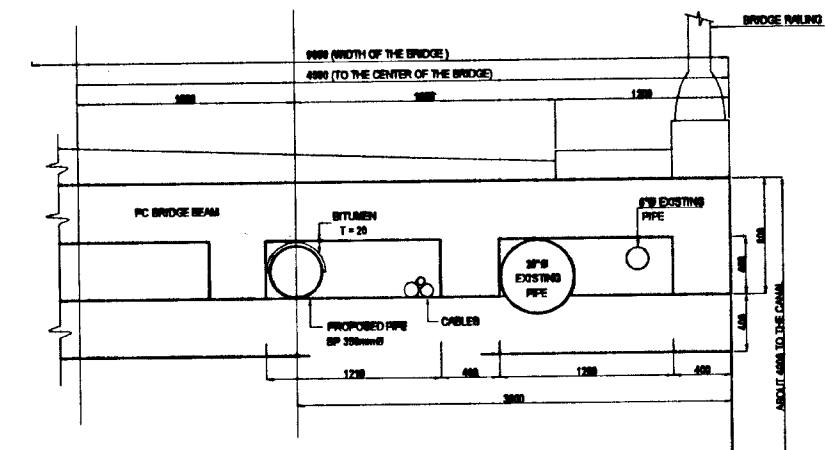
PLAN



SIDE VIEW

STACE ROAD BRIDGE PIPELINE CROSSING

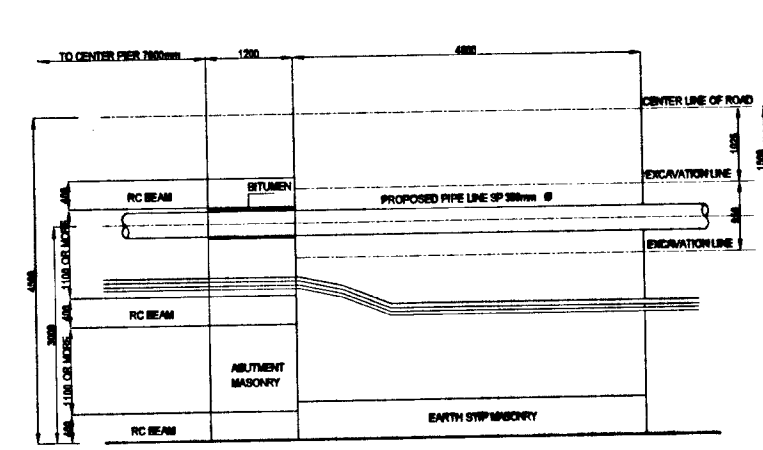
SCALE 1 : 100



SECTION AT ABOUTMENT / CENTERPIER
STACE ROAD BRIDGE
DETAILS OF PROPOSED PIPE LOCATION

SCALE 1 : 50

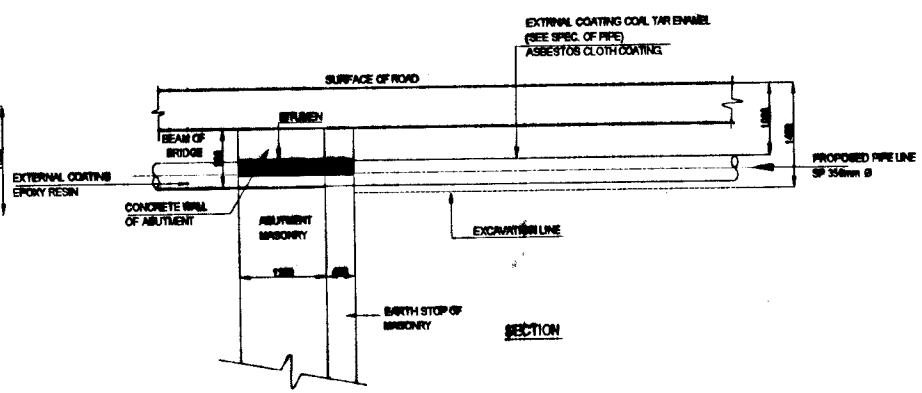
DO NOT SCALE




PLAN

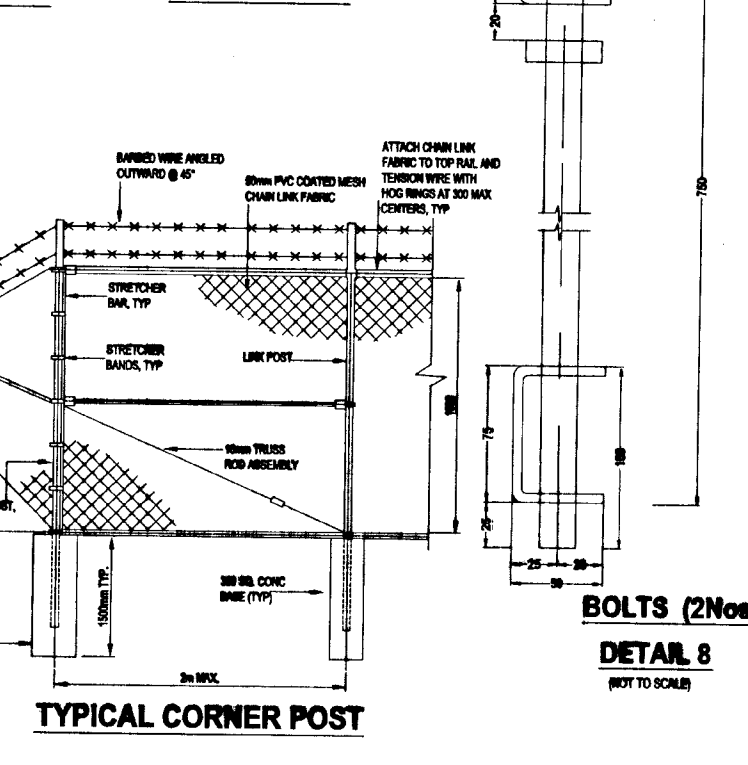
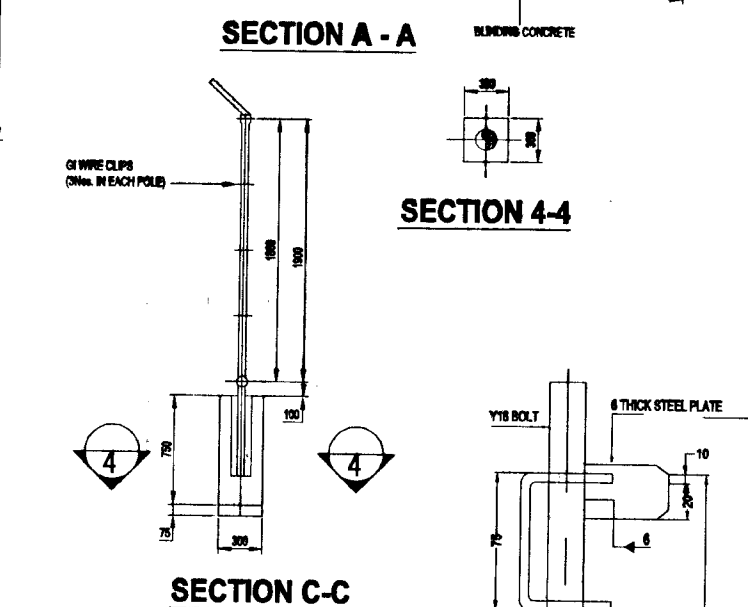
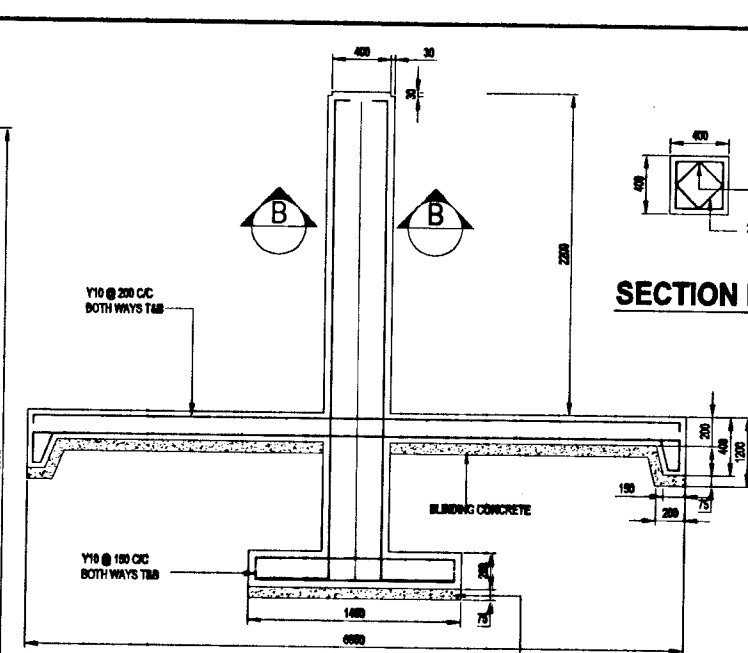
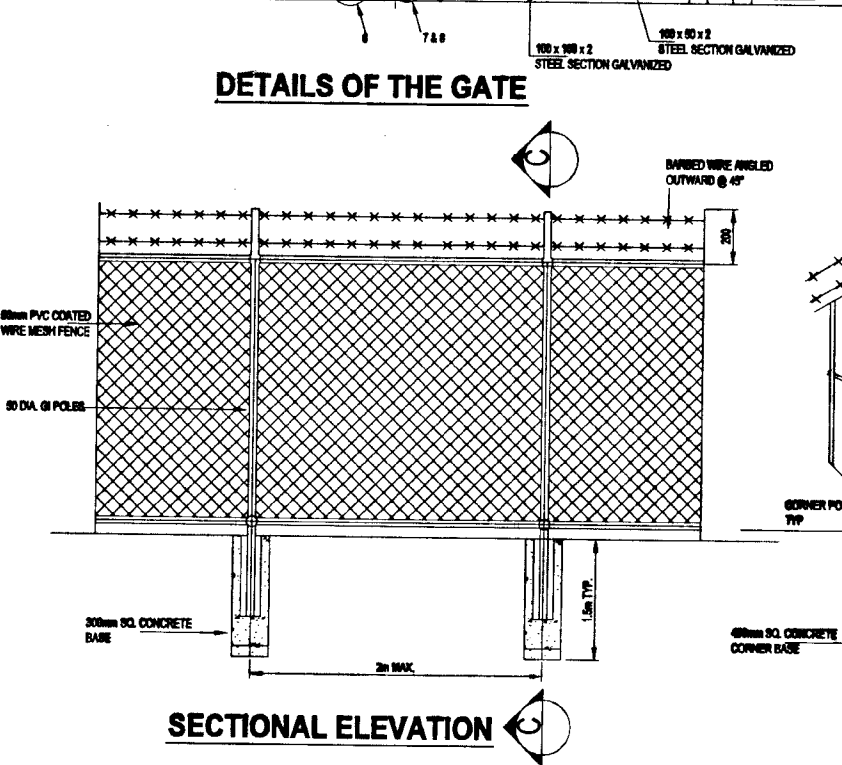
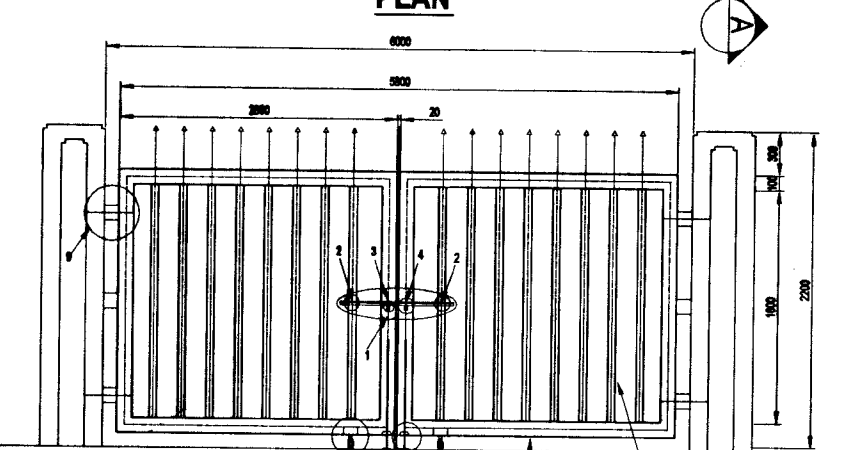
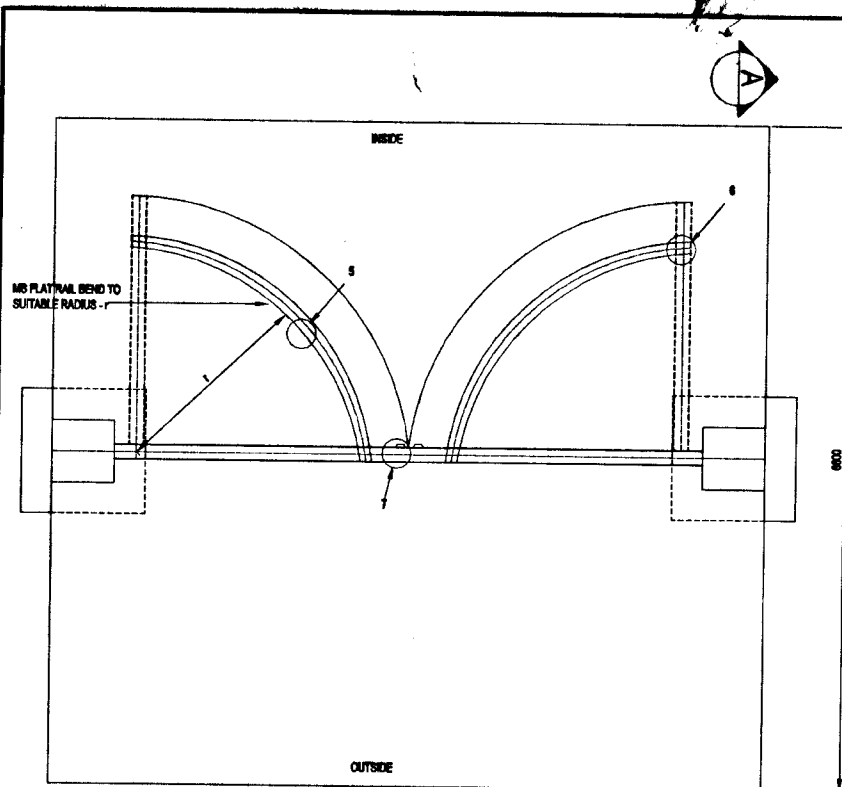
STACE ROAD PIPE LINE CROSSING
DETAILS OF PROPOSED PIPELINE LOCATION

SCALE 1 : 50



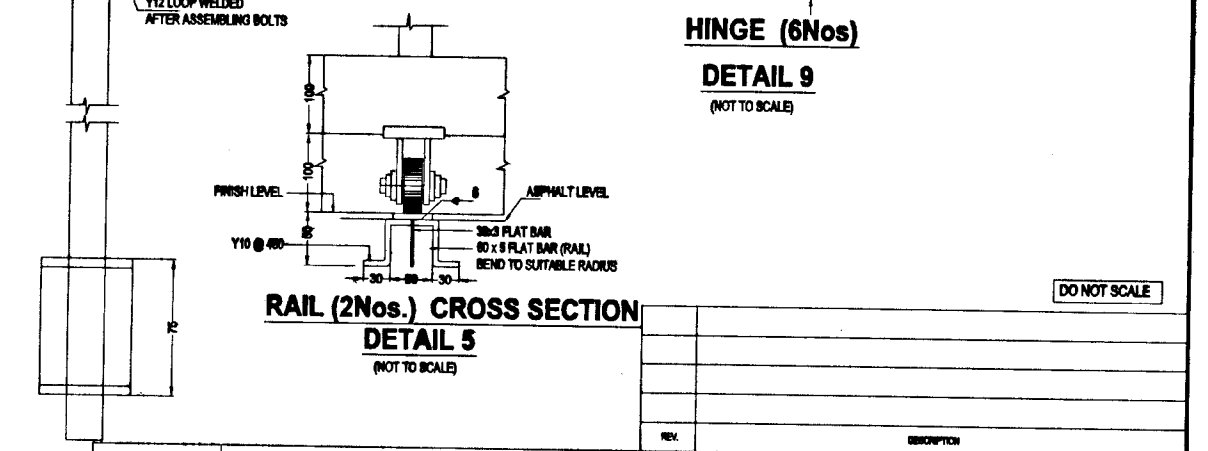
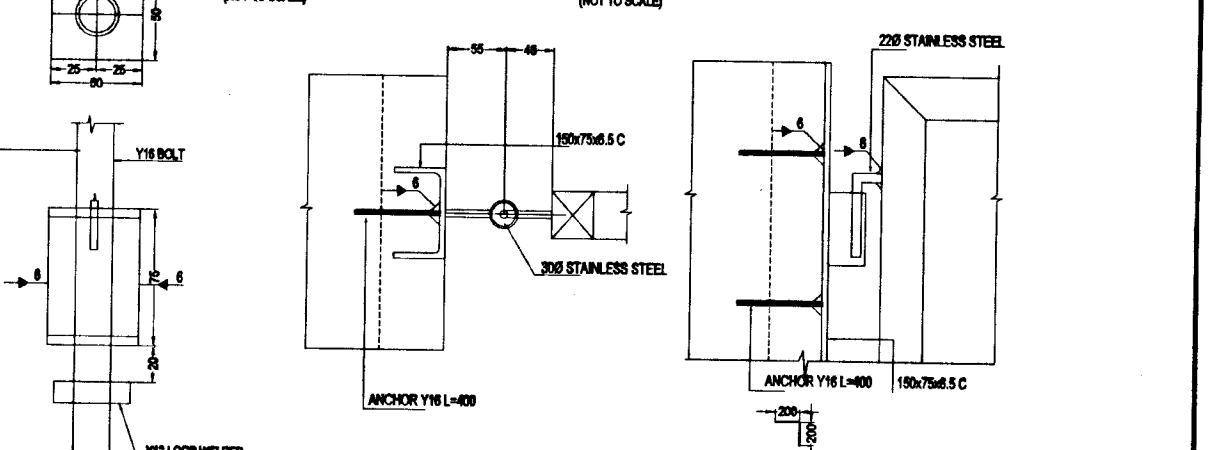
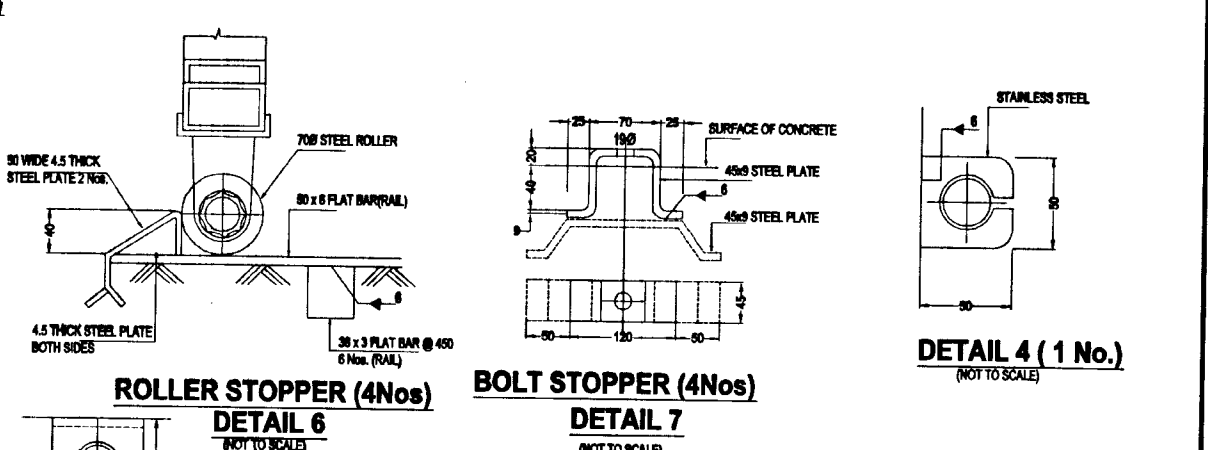
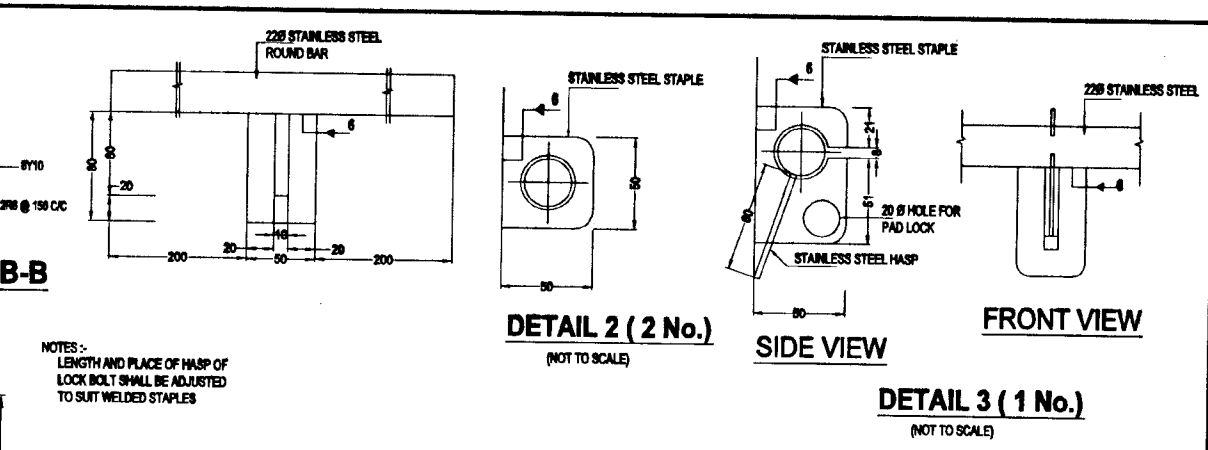
SECTION

| | | |
|---|---------------------------------------|---|
|  <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> <p>NIHON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: STANDARD DETAILS STACE ROAD BRIDGE PIPE LINE CROSSING</p> |
| | <p>DATE: JAN 2007</p> | <p>CONTRACT NO: NRW / CW</p> |
| | <p>BY: YEAR / LEADER: [Signature]</p> | <p>DATE: [Signature]</p> |
| | <p>DATE: [Signature]</p> | <p>DATE: [Signature]</p> |



SECTION B-B

BOLTS (2Nos)
DETAIL 8
(NOT TO SCALE)



| REV. | DESCRIPTION |
|------|-------------|
| | |
| | |
| | |

| | | | |
|--|--|------------------------------|---|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: STANDARD DETAILS - GATE & FENCE</p> |
| <p>DESIGNED: [Signature]</p> | <p>DRAWN: [Signature]</p> | <p>DATE: JUL 2001</p> | <p>CONTRACT No: NRW / CW</p> |
| <p>CHECKED: [Signature]</p> | <p>IN CHARGE: [Signature]</p> | <p>DATE:</p> | <p>CONTRACT No:</p> |
| <p>DR. TEAM LEADER: [Signature]</p> | <p>A.G.M (P.W.D) INCHARGE: [Signature]</p> | <p>DATE:</p> | <p>CONTRACT No:</p> |
| <p>TEAM LEADER: [Signature]</p> | <p>D.A.M (P.W.D) INCHARGE: [Signature]</p> | <p>DATE:</p> | <p>CONTRACT No: STD/C-12</p> |

DO NOT SCALE

GENERAL NOTES - STRUCTURAL

- For the purpose of construction, the drawings shall not be scaled and only written or calculated dimensions be used.
- The drawings shall only be used for the purpose intended and shall be read in conjunction with the specifications, mechanical drawings, civil drawings, and other relevant structural drawings.
- All dimensions are in millimetres (mm) and all levels are in metres.
- Allowance shall be made for the use of 150 mm kickers for columns and walls.
- The cement, unless specifically stated otherwise, shall be Ordinary Portland Cement complying to BS 12.
- All non pre-stressing reinforcement shall be high yield deformed bars type II as per BS 4449 or BS 4461 with specified characteristic strength of 460 N/mm² (marked as 'Y') or plain round hot-rolled mild-steel bars as per BS 4449 with specified characteristic strength of 250 N/mm² (marked as 'R'). The BRC fabric reinforcement shall be as per BS 4483 with the wires complying with BS 4482. Pre-stressing steel shall be super stabilized low relaxation strands or wires with ultimate guaranteed tensile strength not less than 1860 N/mm² complying with BS 5896.
- All laps between adjacent bars shall comply with the requirements of the relevant British standards.
- Splices in the reinforcement shall be made only at the positions shown or as otherwise approved by the Engineer.
- The Lap lengths shall be provided for the smaller of the two bars lapped and the lap lengths shall be according to the following table.

| Bar Dia. (mm) | Lap Length (mm) |
|---------------|-----------------|
| 10 | 650 |
| 12 | 750 |
| 16 | 1000 |
| 20 | 1300 |
| 25 | 1600 |
| 32 | 2000 |

- Unless individually shown on the reinforcement details, the normal cover to the reinforcing bars are as follows.

| Part of the structure | Formed and not exposed to weather/water | Formed and exposed to weather/water | Not formed and cast against blinding |
|---|--|-------------------------------------|--------------------------------------|
| Foundations (and other structural parts below ground) | 50 | 50 | 50 |
| Ground Floor | 40 | 50 | 50 |
| Walls | 40 | 50 | 50 |
| Ties in columns | 30 | 50 | - |
| Ties in Beams | 30 | 50 | 50 |
| Suspended slabs | 40 for water retaining structures & 25 for others. | 50 | 50 |
| Stairs | 40 for water retaining structures & 25 for others. | - | - |
| Roof Slabs & parapets | 40 | 50 | - |

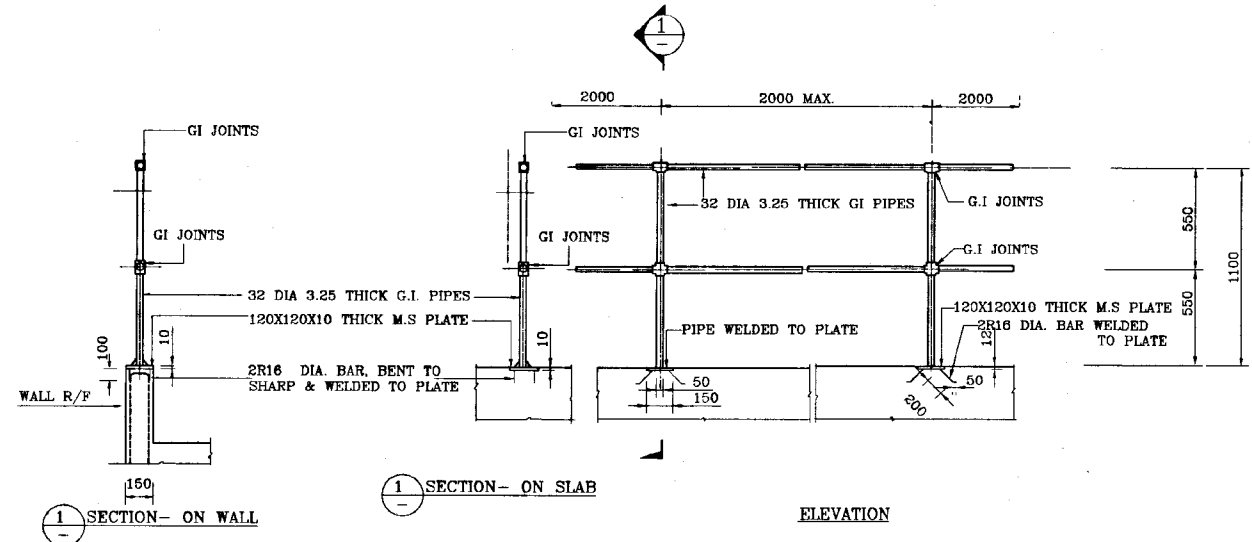
- Unless specifically stated otherwise, the grade of concrete shall be as follows.
15 for binding concrete & 20 for benching and filler material.
25 for reinforced non pre-stressed cast in-situ concrete other than classified as water retaining structures.
35A for water retaining structures.
40 for post tensioned concrete walls.
50 for factory controlled pre-stressed concrete elements.
- The Contractor shall be responsible to provide openings for equipment and ducts whether shown or not on structural drawings.
- The Contractor shall verify equipment locations and sizes to suit vendor submittals. Civil requirements, shop drawings for all trades shall be prepared by the contractor and submitted for the Engineer's approval prior to execution of concrete works.
- The construction joints are not shown on drawings. The contractor shall prepare shop drawings showing construction joints, water stop layouts with intersection pieces, site jointing methods, fixing details etc. to suit concrete pour sizes as specified in specifications and shall be submitted for the Engineer for approval prior to construction.
- Where existing structures are to be modified to accommodate pipe openings, floor opening etc. the contractor shall prepare and submit specimens, design calculations and drawings clearly indicating how the works will be executed. Special consideration shall be given to loss of permanent support, loss of strength due to openings etc.
- Bar bending schedules for reinforcing steel in all structures including pre-cast and pre-stressed concrete members shall be prepared by the contractor and submitted to the Engineer for approval in accordance with the specifications.

- The contractor shall be responsible in protecting structures against foundation uplift during the construction.
- Provide dovetail inserts at 1.0m interval embedded in concrete walls, beams and columns to be faced with masonry.
- All the exposed concrete edges shall have a 20 mm chamfer.
- All structural steel sections including plates used for the fabrication of ladders and other accessories shall be hot dip galvanized unless stated otherwise and no welding or drilling holes shall be permitted after galvanizing.
- The following notations are used in labeling reinforcing bars.
e.g. "Y (or T) 20-150 C/C" :- Y (or T)- high yield, (R - mild steel), 20 - bar dia & 150 - spacing in mm.
BB :- Bottom bottom layer, BT :- Bottom top Layer
TT :- Top top layer and TB :- Top bottom layer.
NF :- Near Face, FF :- Far Face

- All anchor bolts shall be stainless steel adhesive anchors with following load characteristics.

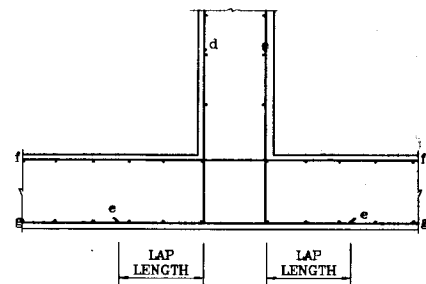
| Size of Anchor bolt (mm) | 12 | 16 | 20 |
|--------------------------|----|----|----|
| Load in kN | | | |
| Tensile | 30 | 50 | 75 |
| Shear | 35 | 60 | 75 |

- All concrete surfaces including columns and baffle walls in contact with potable water of water retaining structures (such as water sumps, water reservoirs, and elevated water towers) shall be coated with elastomeric cementitious coating approved by the Water Research Council (WRC) of UK for the use of potable water.

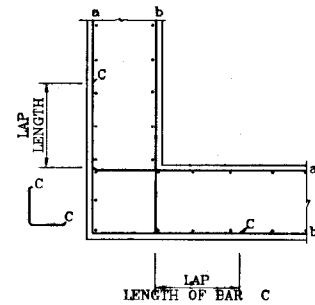


DETAILS OF HAND RAILS

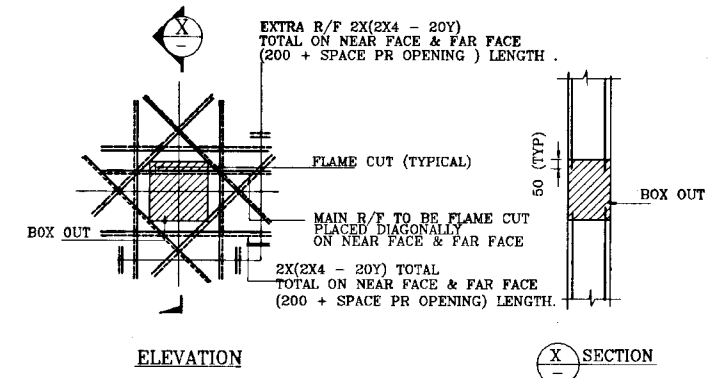
SCALE - 1:20



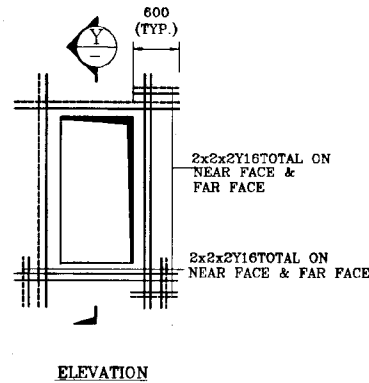
R/F DETAIL - WALL TO WALL



R/F DETAIL - WALL TO WALL AT CORNERS



DETAILS OF BOX OUTS FOR PIPE OPENINGS (TYPICAL)

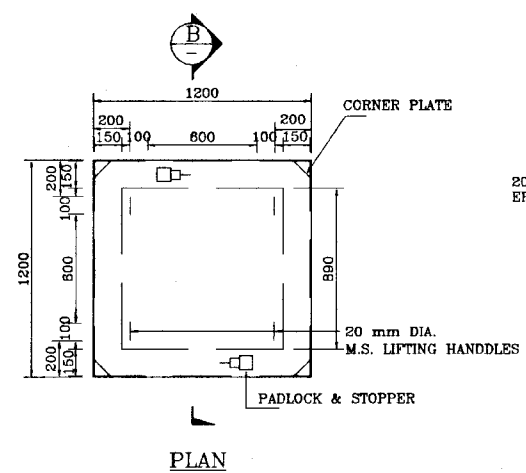


TOWERS - EXTRA R/F AT WALL OPENING (TYPICAL)

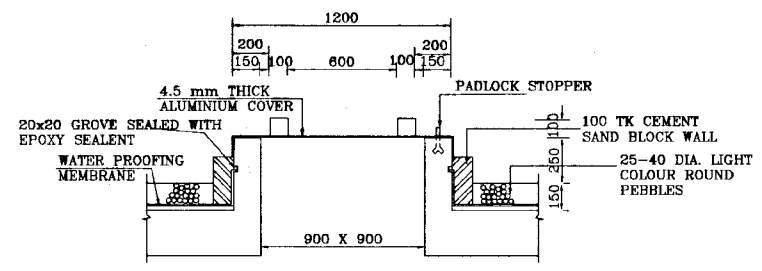
DO NOT SCALE

| REV. | DESCRIPTION | SUB PROJECT | TITLE |
|-----------------|-------------------|---|---|
| | | NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | STANDARD DETAILS - STRUCTURAL SHEET 1 OF 3 |
| DESIGNED | ANOMA | DATE | JAN 2001 |
| CHECKED | PM (NRWS/PS) NWSB | CONTRACT No. | NRW/CW |
| DT. TEAM LEADER | TEAM (NRWS) NWSB | DRG. No. | STD/ST-01 |
| TEAM LEADER | DRG. (NRWS) NWSB | | |

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
STUDY TEAM
NIHON SUDO CONSULTANTS CO. LTD.,
TOKYO, JAPAN

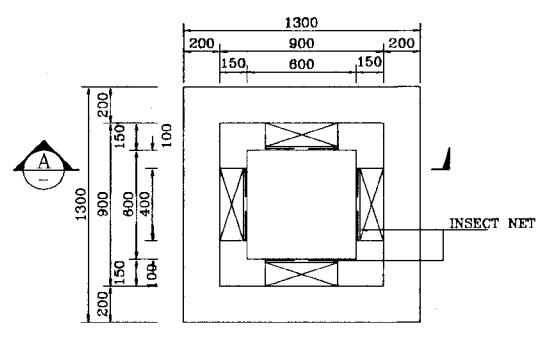


PLAN

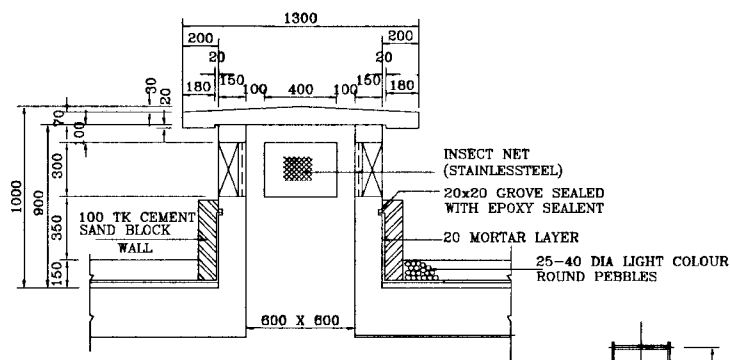


SECTION B

DETAILS OF TYPICAL ACCESS MANHOLE (AMH)
SCALE - 1:20

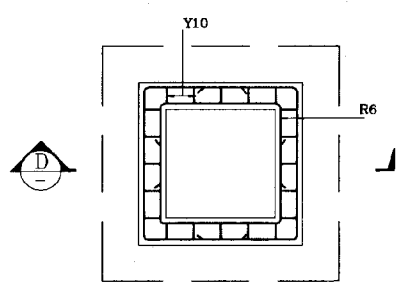


PLAN

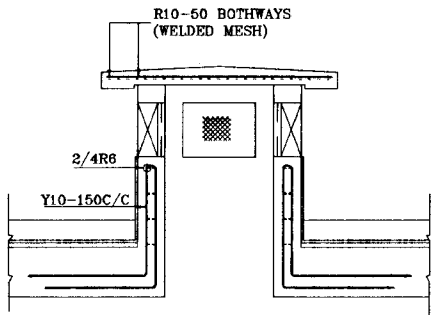


SECTION A

DETAILS OF TYPICAL AIR VENT (AV)
SCALE - 1:20

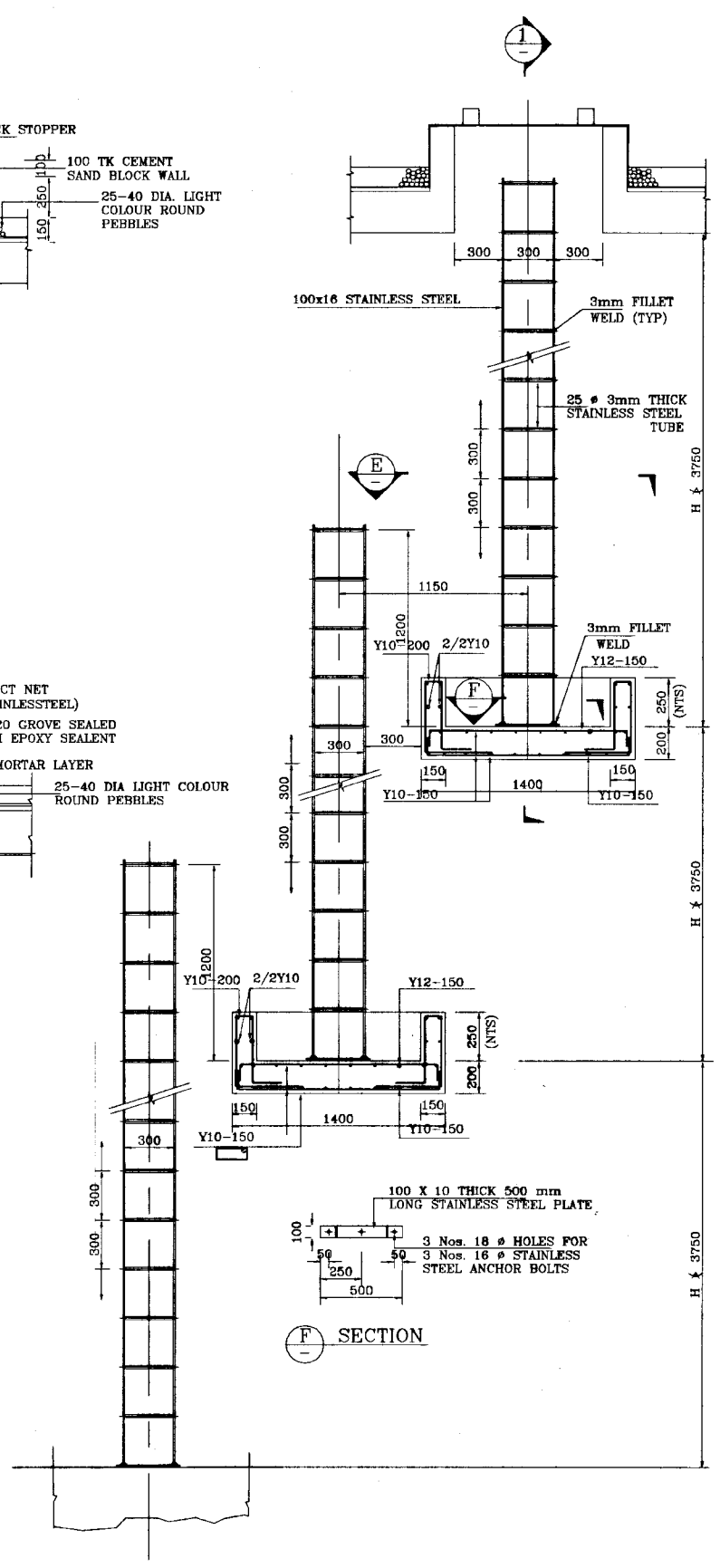


PLAN



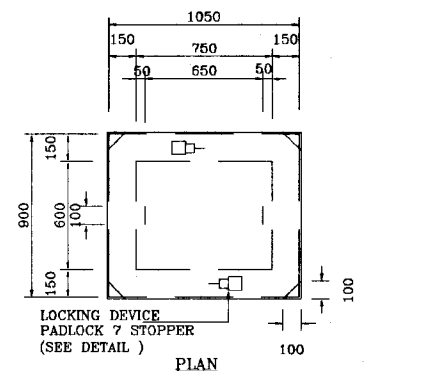
SECTION D

R/F DETAILS OF TYPICAL AIR VENT (AV)
SCALE - 1:20

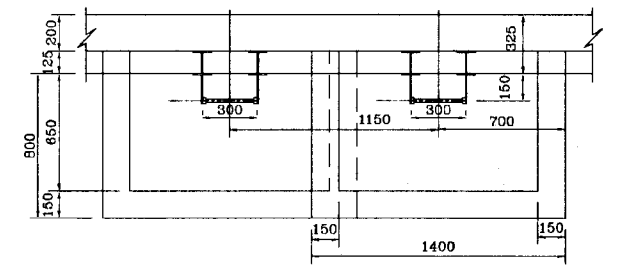


ELEVATION

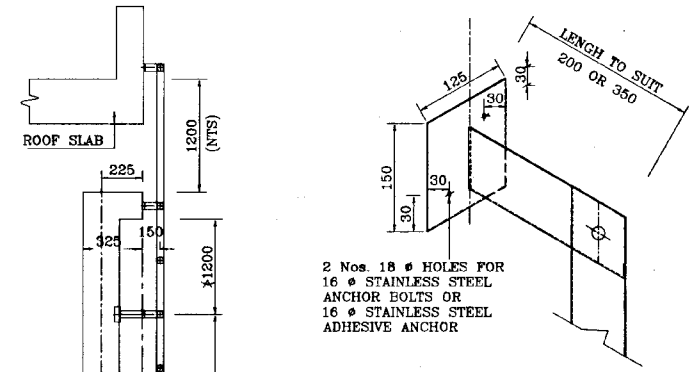
DETAILS OF MANHOLE LANDING PLATFORMS & LADDERS
SCALE - 1:20



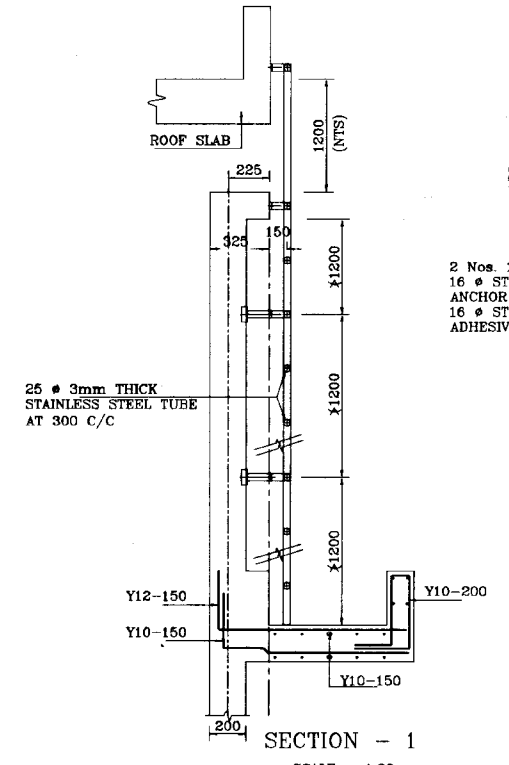
DETAIL OF MANHOLE COVER
SCALE - 1:20



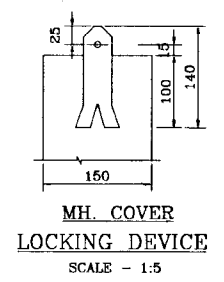
SECTION E
SCALE - 1:20



DETAIL AT 'A'
SCALE - 1:5



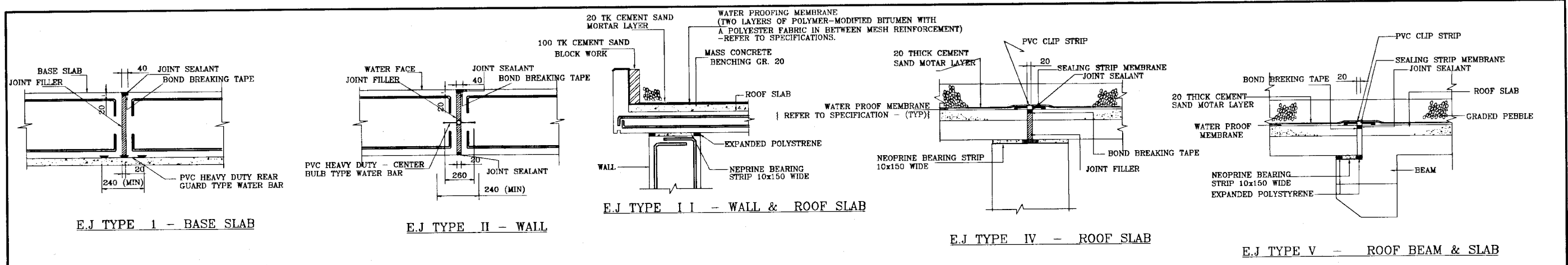
SECTION - 1
SCALE - 1:20



MH COVER
LOCKING DEVICE
SCALE - 1:5

DO NOT SCALE

| | | | | |
|--|--|--|---|---|
| | | NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | | |
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM NIKON SUIDO CONSULTANTS CO. LTD. TOKYO, JAPAN | | SUB PROJECT TITLE STANDARD DETAILS - STRUCTURAL SHEET 2 OF 3 | DESIGNED CHECKED DV. TEAM LEADER TEAM LEADER | DATE JAN 2001 CONTRACTING NRW/CW DRG No. STD/ST-02 |



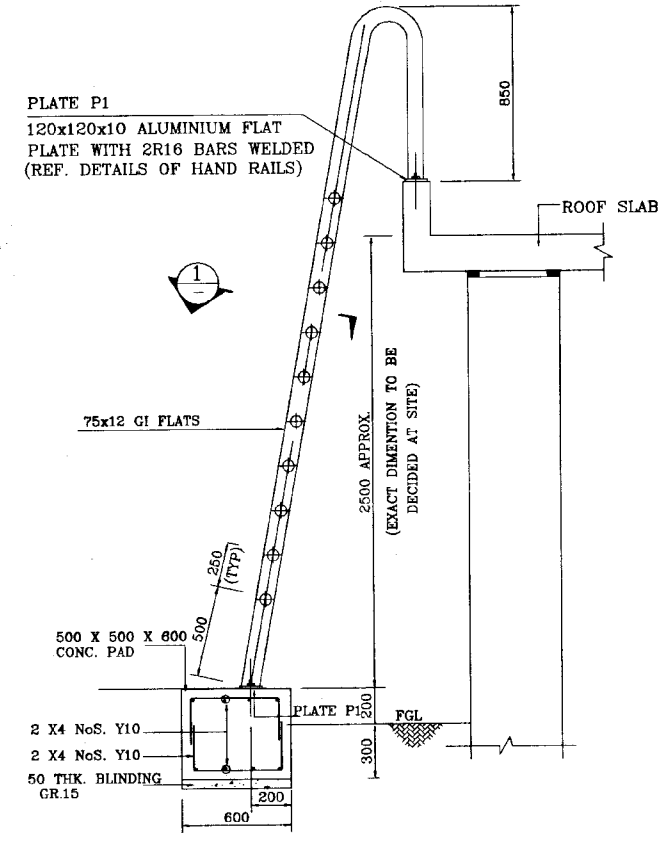
E.J. TYPE I - BASE SLAB

E.J. TYPE II - WALL

E.J. TYPE III - WALL & ROOF SLAB

E.J. TYPE IV - ROOF SLAB

E.J. TYPE V - ROOF BEAM & SLAB



TYPICAL EXTERNAL LADDER - FOR RESERVOIRS (HOT DIP GALVANIZED) SCALE - 1 : 20

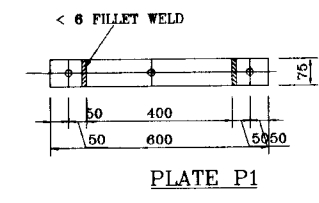
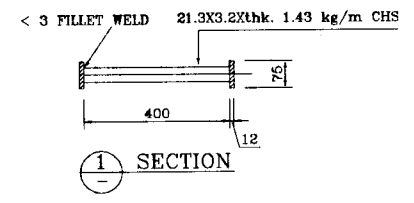
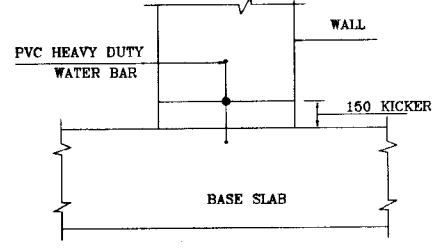
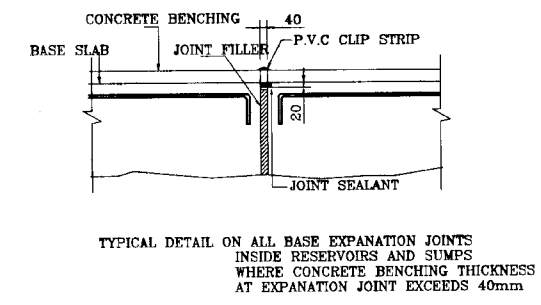


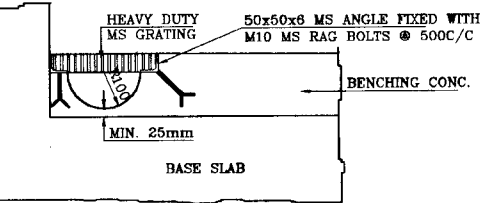
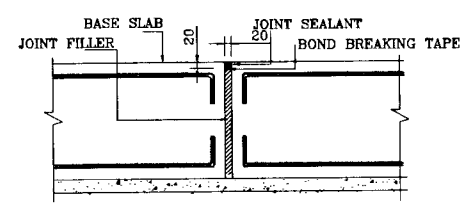
PLATE P1



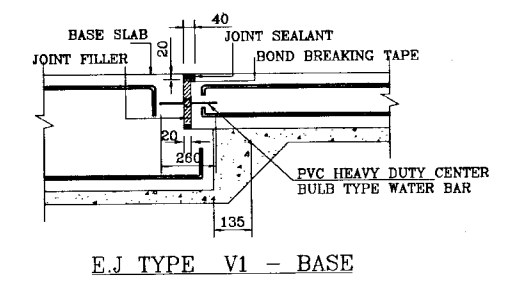
E.J. TYPE VIII CONSTRUCTION JOINT SCALE - 1 : 20



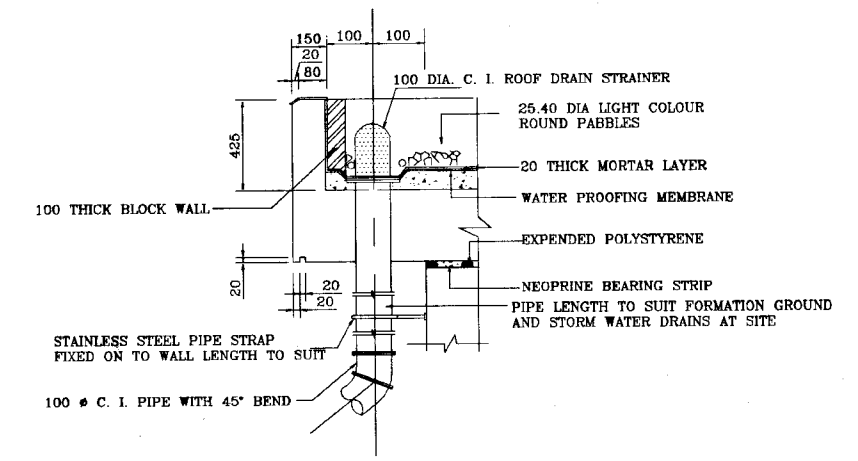
E.J. TYPE VII



DETAIL OF GUTTER DRAIN SCALE: - 1:10



E.J. TYPE VI - BASE



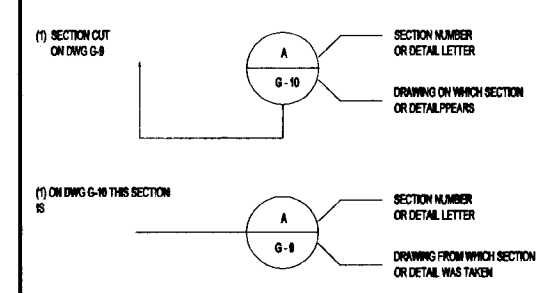
DETAIL OF ROOF DRAIN

DO NOT SCALE

| | | | | |
|---|---------------------|---|---------------|---|
| | | NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | | SUB PROJECT TITLE STANDARD DETAILS - STRUCTURAL SHEET 3 OF 3 |
| DESIGNED | ANOMA | DATE | JAN 2001 | |
| CHECKED | PM (NRWS/PS) / MSUB | CONTRACTING | NRW / CW | |
| BY TEAM LEADER | AGM (PS) / MSUB | DRG. No. | STD / ST - 03 | |
| TEAM LEADER | DM (PS) / MSUB | | | |
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM NIHON SUIDO CONSULTANTS CO. LTD., TOKYO, JAPAN | | | | |

SYMBOLS

| | | | | | |
|--|---|--|--|--|--|
| | SUPPLY AIR DUCT | | GATE VALVE (GV) | | INJECTOR |
| | EXHAUST OR RETURN AIR DUCT | | GLOBE VALVE (GLV) | | PIPE SUPPORT |
| | TURNING VANES IN DUCT | | BALL VALVE (BLV) | | FLANGED FITTINGS |
| | SUPPLY GRILLE | | DIAPHRAGM VALVE (DV) | | SCREWED FITTINGS |
| | ROUND OR DIAMETER | | BUTTERFLY VALVE (BV) | | MECHANICAL (ACTAULIC) FITTINGS |
| | AT | | PLUG VALVE (PV) | | UNION |
| | PROPERTY LINE | | DOUBLE DOOR CHECK VALVE (CV) | | MECHANICAL (ACTAULIC) COUPLING (M.E.C) |
| | SOIL BORING | | NEEDLE VALVE | | SLEEVE TYPE FLEXIBLE COUPLING (SC) |
| | PERMANENT BENCH MARK SURVEY MONUMENT | | ELECTRIC MOTOR OPERATOR | | MECHANICAL FLEXIBLE JOINT (M.F.J) |
| | ANGLE | | SOLENOID ACTUATOR | | RUBBER FLEXIBLE JOINT (R.F.J) |
| | SQUARE | | HYDRAULIC OR PNEUMATIC CYLINDER ACTUATOR | | REDUCER |
| | PIPE DESCRIPTION | | PRESSURE REGULATING VALVE | | DRAIN TRAP |
| | PIPE SIZE AND TYPE / FLUID ABBREVIATION | | FLOAT VALVE | | FLOOR DRAIN |
| | | | AIR VALVE (AV) | | FLOOR SINK |
| | | | Y-STRAINER OR U-STRAINER | | CENTRIFUGAL OR TURBINE PUMP OR FAN |
| | | | REDUCER OR REDUCING BUSHING | | FIRE EXTINGUISHER |
| | | | DIRECTION OR FLOW | | FIRE HOSE CABINET |
| | | | OPEN EQUIPMENT DRAIN | | FENCE |
| | | | HOSE BIB OR ANGLE HOSE VALVE | | NEW AC PAVEMENT |
| | | | CENTRIFUGAL OR TURBINE PUMP OR FAN | | MAGNETIC FLOW METER |
| | | | BLOWER OR COMPRESSOR | | CONTOUR LINE EXISTING |
| | | | TURBINE TYPE FLOW METER | | |
| | | | MAGNETIC FLOW METER | | |
| | | | ULTRASONIC FLOW METER | | |
| | | | MEASURING ELEMENT INSERT TYPE FLOW METER | | |
| | | | BACK FLOW PREVENTER | | |
| | | | ROOM THERMOSTAT | | |
| | | | PRESS GAUGE W/ PET COCK | | |
| | | | PRESSURE SWITCH W/ PET COCK | | |
| | | | MULTI PORT VALVE - 3 WAY | | |
| | | | RUPTURE DISK | | |
| | | | PRESSURE REDUCING VALVE | | |
| | | | CONE VALVE | | |



ABBREVIATION

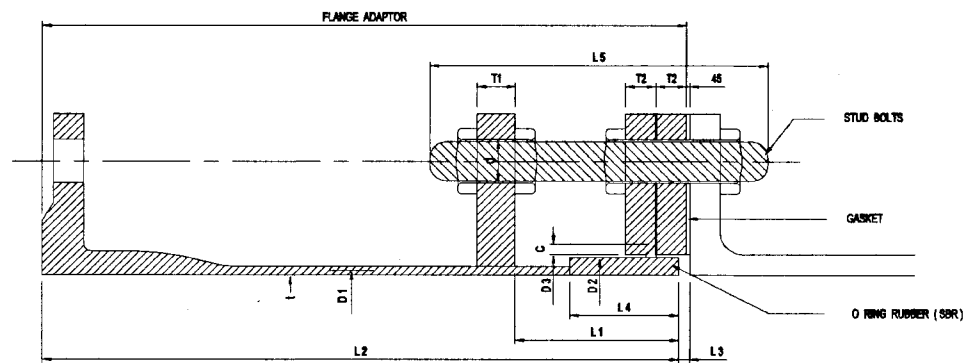
| | | | |
|-------|---------------------------|---------|--------------------------------|
| AC | ACTIVATED CARBON | MAX | MAXIMUM |
| A/C | AIR CONDITIONING | MH | MANHOLE |
| ACP | ASBESTOS CEMENT PIPE | MIN | MINIMUM |
| APPD | APPROVED | M.O | MOTOR-OPERATED |
| APROX | APPROXIMATE | N | NORTH |
| BEL | BOTTOM ELEVATION | NO. | NUMBER |
| BF | BLANK FLANGE | NTS | NOT TO SCALE |
| BM | BENCH MARK | OD | OUTSIDE DIAMETER |
| B.LDG | BUILDING | OS&Y | OUT SIDE SCREW & TORQUE |
| C | CENTER LINE | PCL | PIPE CENTER LINE |
| CIP | CAST IRON PIPE | PEP | POLYETHYLENE PIPE |
| CTR | CENTER | PVC | POLYVINYL CHLORIDE OR PVC PIPE |
| DF | DOUBLE FLANGE | R | RADIUS OF CURVE |
| DA.# | DIAMETER | RC | REINFORCED CONCRETE |
| DIP | DUCTILE IRON PIPE | RCP | RC PIPE |
| DWG | DRAWING NO | RENF | REINFORCEMENT |
| E | EAST | R.F.J | RUBBER FLEXIBLE JOINT |
| EFF | EFLUENT | PR | PUSH-ON RUBBER RING JOINT |
| EL | ELEVATION | R.O.W | RIGHT OF WAY |
| EXH | EXHAUST | PMT | PAVEMENT |
| EXIST | EXISTING | S | SOUTH OR SLOPE |
| FGL | FINISHED GROUND ELEVATION | SC | SLEEVE COUPLING |
| FH | FIRE HYDRANT | SCH | SCHEDULE |
| FIG | FIGURE | SHT | SHEET |
| FIN | FINISHED | SP | STEEL PIPE |
| FLJ | FLEXIBLE JOINT | SS | STAINLESS STEEL |
| FL | FLOOR | STA | STATION |
| FLD | FLOOR DRAIN | THK | THICK |
| FLG | FLANGE OR FLANGED | TK | TANK |
| GALV | GALVANIZED | TP | TELEPHONE OR TP POLE |
| GSP | GALVANIZED STEEL PIPE | TYP | TYPICAL |
| H | HIGH | TWL | TOP WATER LEVEL |
| HOR | HORIZONTAL | TYP DWG | TYPICAL DRAWING |
| HP | HIGH POINT | UG | UNDER GROUND |
| HWO | FLEXIBLE JOINT | VERT | VERTICAL |
| ID | INSIDE DIAMETER | W/ | WITH |
| INF | INFLUENT | WI | WATER LEVEL |
| INV | INVERT | YD | YARD |
| JT | JOINT | | |
| L | LENGTH OR LOW | | |

PROCESS FLUID ABBREVIATION

| | |
|-----|----------------------|
| AC | ACTIVATED CARBON |
| AL | ALUM |
| AW | FILTER AIR WASH |
| BW | FILTER BACKWASH |
| BWR | BACKWASH WATER REUSE |
| CL | CHLORINE GAS |
| CLS | CHLORINE SOLUTION |
| CO | COAGULATED WATER |
| CUS | CAUSTIC SODA |
| FW | FILTERED WATER |
| FNW | FINISHED WATER |
| IA | INSTRUMENT AIR |
| LM | LIME MILK |
| LW | LIME WATER |
| PD | PLANT DRAIN |
| PE | POLYMER |
| PW | PLANT WATER |
| RW | RAW WATER |
| SA | SAMPLING LINE |
| SD | SLUDGE DRAIN |
| SE | SETTLED WATER |
| SW | SURFACE WASH WATER |
| SL | STOP LOG |
| V | VACUUM |
| WI | WITH |
| WW | WASTE WATER |

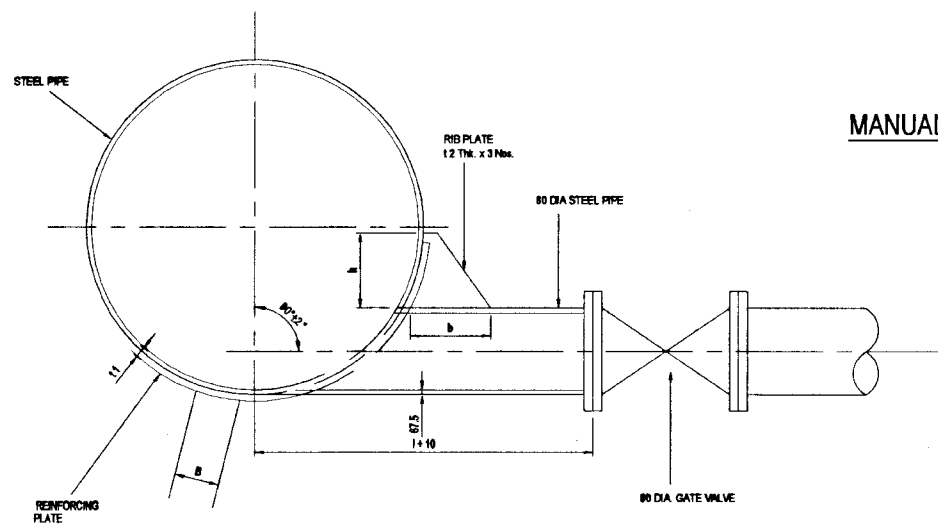
DO NOT SCALE

| | | |
|--|---|--|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: LEGEND AND SYMBOLS</p> |
| | <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> <p>NIHON SUIDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | <p>DESIGNED: [Signature]</p> <p>CHECKED: [Signature]</p> <p>DR. TEAM LEADER: [Signature]</p> <p>TEAM LEADER: [Signature]</p> |



| NOMINAL DIA. | D1 | D2 | D3 | C | I | T1 | T2 | L1 | L2 | L3 | L4 | d | STUD BOLT | | O RING DIA. | |
|--------------|-------|-----|-----|---|-----|----|----|-----|-----|----|-----|----|-----------|-----|-------------|---|
| | | | | | | | | | | | | | SIZE | No. | | |
| 200 | 219.1 | 222 | 223 | 4 | 5.8 | 23 | 26 | 96 | 385 | 8 | 80 | 23 | 20 | 4 | 210 | 4 |
| 250 | 273.0 | 273 | 274 | 4 | 6.8 | 24 | 21 | 100 | 405 | 8 | 80 | 28 | 24 | 4 | 220 | 4 |
| 300 | 323.9 | 325 | 326 | 7 | 6.9 | 25 | 22 | 100 | 423 | 10 | 80 | 28 | 24 | 4 | 230 | 6 |
| 350 | 355.8 | 382 | 383 | 7 | 6.0 | 26 | 23 | 110 | 443 | 10 | 80 | 28 | 24 | 4 | 240 | 6 |
| 400 | 408.4 | 412 | 413 | 7 | 6.0 | 26 | 24 | 110 | 463 | 10 | 80 | 31 | 27 | 4 | 250 | 6 |
| 450 | 467.2 | 483 | 484 | 7 | 6.0 | 30 | 25 | 120 | 483 | 10 | 80 | 31 | 27 | 4 | 260 | 6 |
| 500 | 508.0 | 514 | 516 | 8 | 6.0 | 30 | 25 | 120 | 483 | 10 | 80 | 34 | 30 | 8 | 260 | 6 |
| 600 | 608.0 | 618 | 620 | 8 | 6.0 | 32 | 26 | 120 | 483 | 10 | 80 | 37 | 33 | 8 | 270 | 6 |
| 700 | 711.2 | 718 | 720 | 8 | 7.0 | 34 | 27 | 140 | 583 | 10 | 100 | 37 | 33 | 8 | 300 | 8 |
| 800 | 812.8 | 820 | 822 | 8 | 8.0 | 35 | 28 | 150 | 583 | 10 | 100 | 40 | 36 | 220 | 310 | 8 |

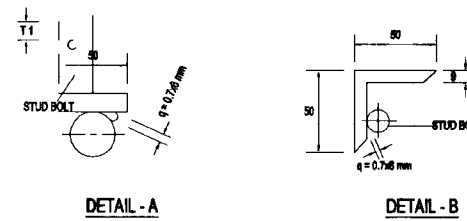
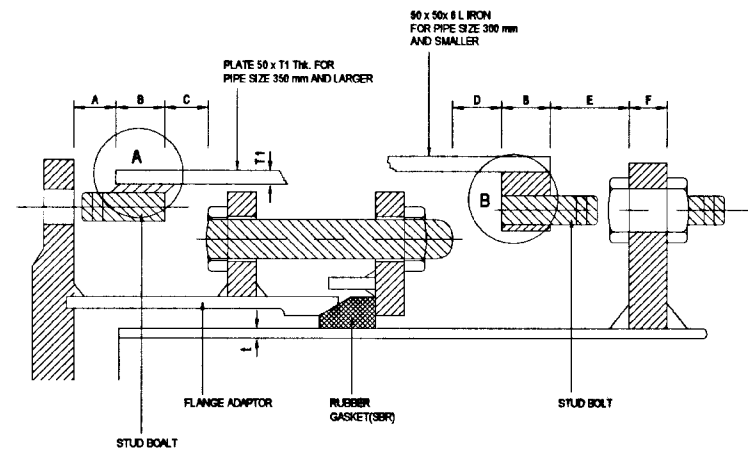
FLANGE ADAPTOR TYPE - A
DETAIL B



TYPICAL DISCHARGE HEADER WASHOUT DESIGN
DETAIL E

| NOMINAL DIA. | I | R/F PLATE | RIB PLATE | | |
|--------------|-----|-----------|-----------|----|----|
| | | | t1 | b | h |
| 200 | 250 | - | - | - | - |
| 250 | 250 | - | - | - | - |
| 300 | 300 | 70 | 6.0 | 80 | 90 |
| 350 | 350 | 70 | 6.0 | 70 | 50 |
| 400 | 400 | 70 | 6.0 | 70 | 50 |
| 450 | 450 | 80 | 6.0 | 80 | 80 |
| 500 | 450 | 80 | 6.0 | 80 | 80 |

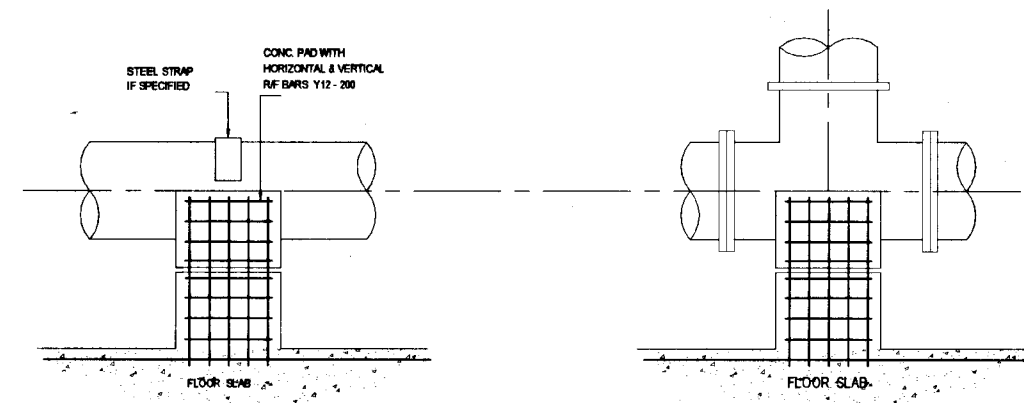
MANUAL AIR RELIEF & HOUSE CONNECTION
DETAIL D



FLANGE ADAPTOR TYPE - B
DETAIL C

| NOMINAL DIA. | A | B | C | D | E | F | T1 | STUD BOLT | |
|--------------|----|----|-----|----|-----|----|----|-----------|------|
| | | | | | | | | No. | SIZE |
| 150 | 35 | 85 | 70 | 20 | 85 | 25 | - | M20 | 4 |
| 200 | 35 | 80 | 75 | 20 | 100 | 25 | - | M20 | 4 |
| 250 | 40 | 70 | 75 | 20 | 100 | 25 | - | M24 | 4 |
| 300 | 40 | 85 | 85 | 20 | 110 | 25 | - | M24 | 4 |
| 350 | 40 | 85 | 85 | 20 | 110 | 27 | 12 | M24 | 4 |
| 400 | 40 | 55 | 85 | 20 | 115 | 28 | 16 | M24 | 4 |
| 450 | 45 | 50 | 85 | 20 | 120 | 30 | 16 | M27 | 5 |
| 500 | 50 | 70 | 110 | 20 | 140 | 32 | 16 | M30 | 5 |
| 600 | 50 | 85 | 115 | 20 | 145 | 36 | 16 | M33 | 5 |
| 700 | 55 | 85 | 120 | 20 | 150 | 40 | 16 | M33 | 8 |

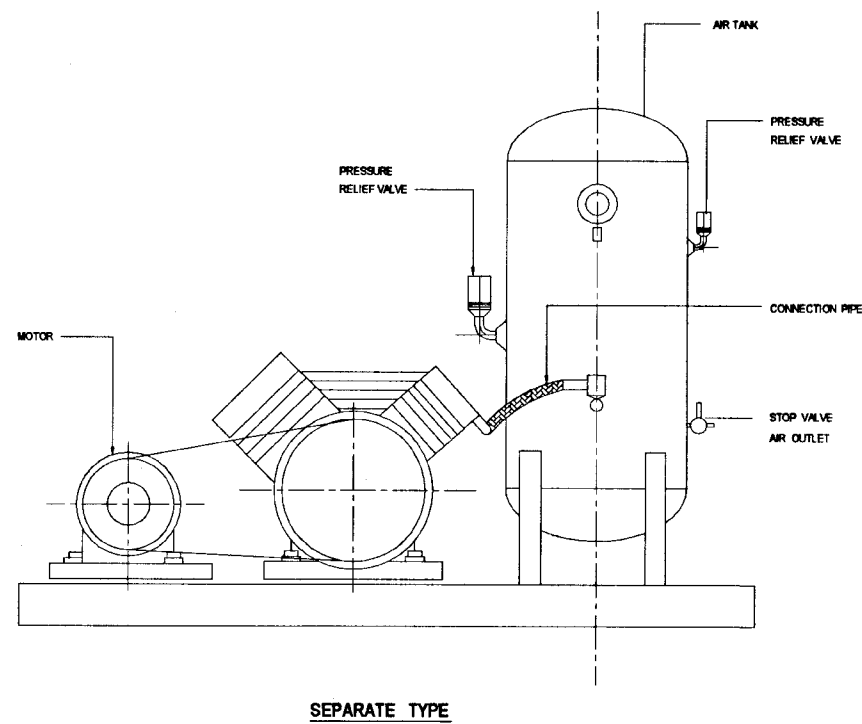
- NOTE:
1. ALL DIMENSIONS SHALL BE MIN. REQUIREMENTS & IN MILLIMETRES
 2. MAX. WORKING PRESSURE SHALL BE 1.568 MPa
 3. MATERIALS SHALL BE STEEL HAVING MIN. YIELD POINT 228 N/mm²



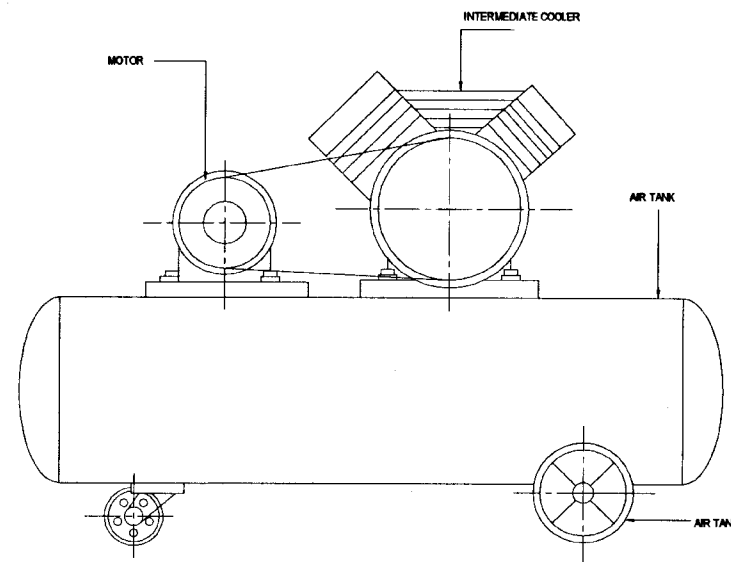
CONCRETE PAD CONSTRUCTION
DETAIL A

DO NOT SCALE

| | | | |
|--|---------------------------------|---|----------------------------|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: STANDARD MECHANICAL DETAILS</p> | |
| | <p>DESIGNED: [Signature]</p> | <p>DRAWN: [Signature]</p> | <p>DATE: JAN 2007</p> |
| | <p>CHECKED: [Signature]</p> | <p>APPROVED: [Signature]</p> | <p>CONTRACT NO: NRW/CW</p> |
| | <p>TEAM LEADER: [Signature]</p> | <p>D.G.M. (P&I) ENGINEER: [Signature]</p> | <p>DWG. NO: STD/M-02</p> |
| <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> <p>NIHON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | | | |

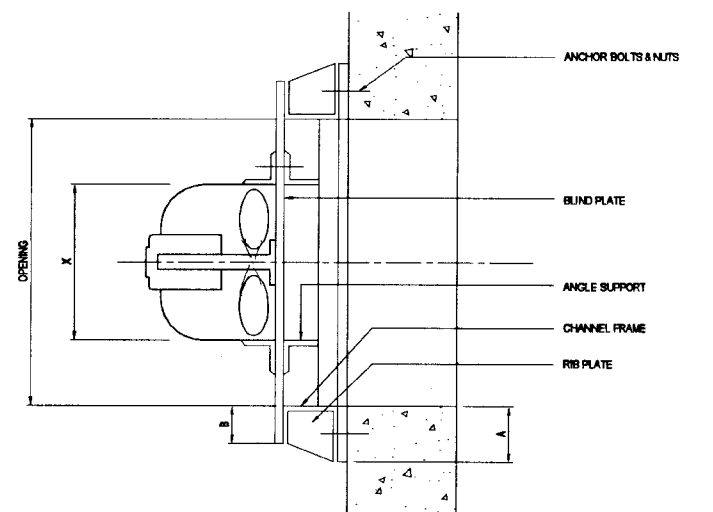


SEPARATE TYPE



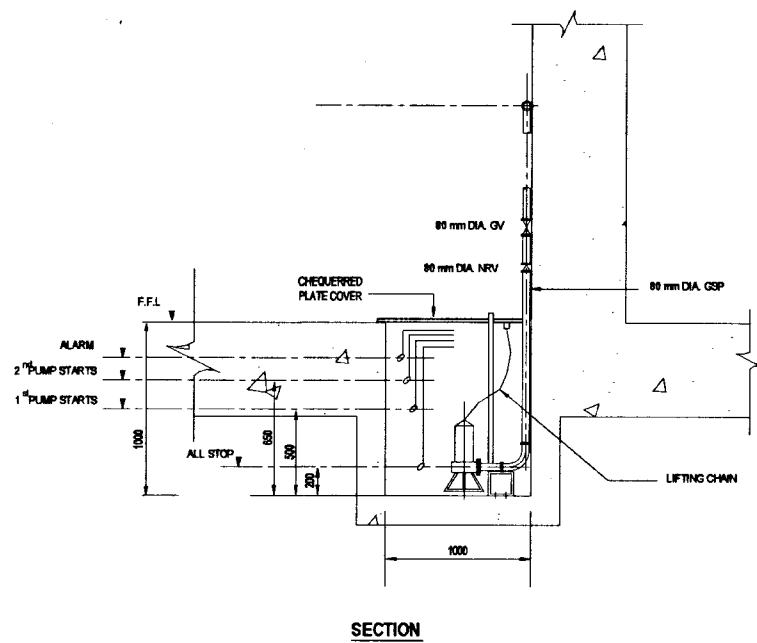
SELF CONTAINED TYPE

AIR COMPRESSOR - A



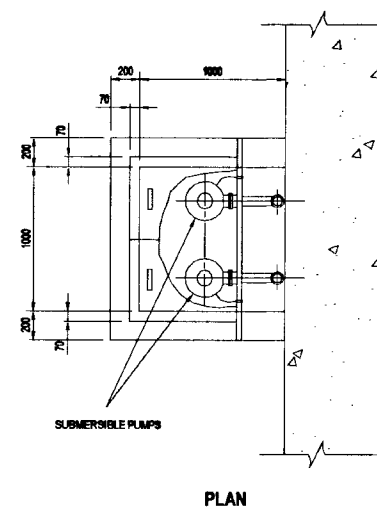
| OPENING | 400 | 600 | 800 | 1200 |
|--------------------------------|--------------------|--------------------|--------------------|--------------------|
| MOTOR OUTPUT APPLIED | 0.015 - 0.050 kW | 0.1 - 0.25 kW | 0.4 - 0.75 kW | 1.5 - 2.2 kW |
| CHANNEL FRAME (A x B x C x Th) | 75 x 95 x 75 x 4.5 | 100 x 80 x 100 x 6 | 100 x 80 x 100 x 6 | 100 x 70 x 125 x 6 |
| ANGLE SUPPORT | 6 x 50 x 50 | 6 x 65 x 65 | 6 x 65 x 65 | 6 x 75 x 75 |
| BLANK PLATE (Th) | 2.3 | 3.2 | 3.2 | 4.6 |

PROPELLER FAN INSTALLATION TYPICAL - B

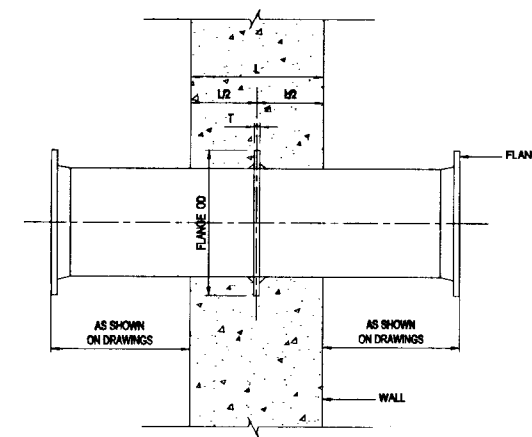


SECTION

TYPICAL DETAIL OF SUBMERSIBLE PUMPS - C



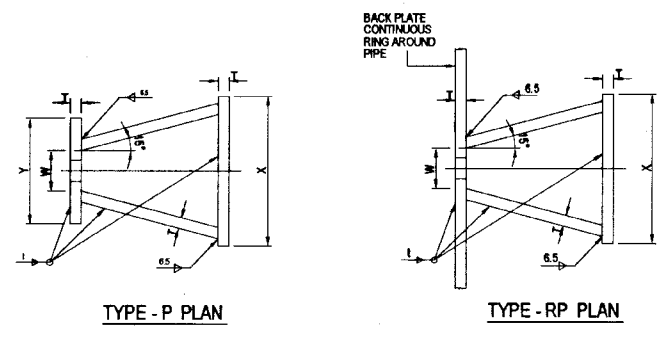
PLAN



TYPICAL PIPE THROUGH WALL - D

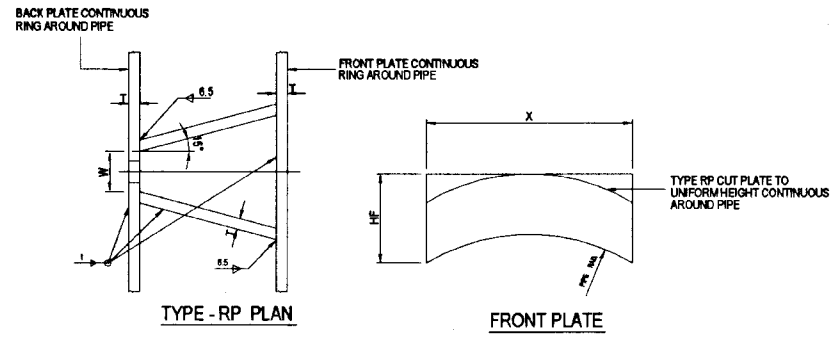
DO NOT SCALE

| | | |
|--|--|---|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: STANDARD MECHANICAL DETAILS</p> |
| | <p>SHEET 2 OF 3</p> | |
| <p>DESIGNED: [Signature]</p> | <p>DATE: JAN 2001</p> | <p>CONTRACT NO: NRW / CW</p> |
| <p>CHECKED: [Signature]</p> | <p>PI (NWS&D) INCH: [Signature]</p> | <p>DRG. NO: STD / M - 03</p> |
| <p>TY. TEAM LEADER: [Signature]</p> | <p>ALM (P&I) INCH: R. D. [Signature]</p> | |
| <p>TEAM LEADER: [Signature]</p> | <p>D.S.M (P&I) INCH: [Signature]</p> | |



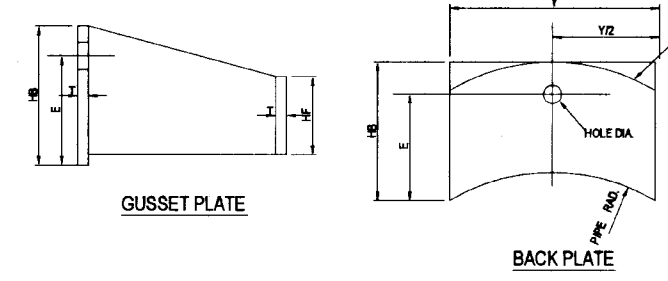
TYPE - P PLAN

TYPE - RP PLAN



TYPE - RP PLAN

FRONT PLATE



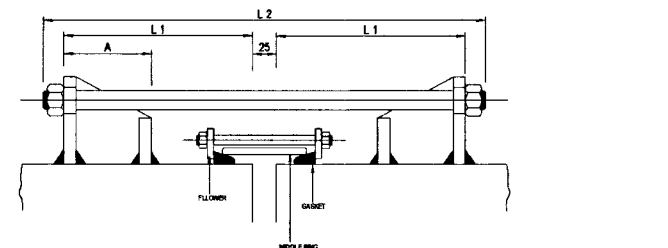
GUSSET PLATE

BACK PLATE

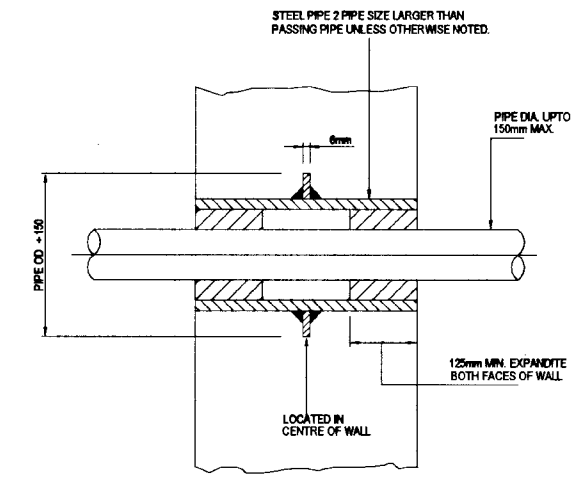
CUT TYPE RP AND TYPE RP PLATE TO UNIFORM HEIGHT EXT. PLATE CONTINUOUS AROUND PIPE

NP 16 CLASS

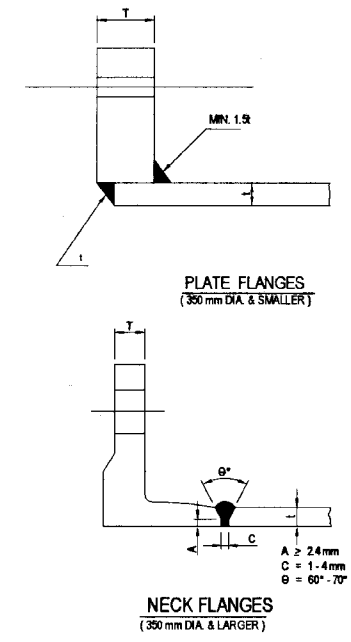
| NOMINAL DIA. | TYPE | A | Y | W | X | HB | E | HF | HOLE DIA. | STUD. NO. OF STUD. | T | L1 | L2 | ARRANGEMENT OF STUDS ON PIPES | HEIGHT OF MIDDLE RING | |
|--------------|------|-----|------|----|------|-----|-----|----|-----------|--------------------|----|----|-----|-------------------------------|----------------------------------|-----|
| 150 | P | 140 | 128 | 41 | 128 | 108 | 80 | 51 | 23 | 20 | 2 | 13 | 310 | 690 | HORIZONTAL | 100 |
| 200 | P | 140 | 128 | 41 | 128 | 108 | 80 | 51 | 25 | 22 | 2 | 13 | 310 | 690 | HORIZONTAL | 100 |
| 250 | RP | 146 | RING | 44 | 153 | 115 | 83 | 51 | 27 | 24 | 2 | 13 | 460 | 990 | HORIZONTAL | 178 |
| 300 | RP | 192 | RING | 50 | 192 | 127 | 96 | 64 | 33 | 30 | 2 | 16 | 480 | 1030 | HORIZONTAL | 178 |
| 350 | RR | 223 | RING | 54 | RING | 137 | 96 | 64 | 36 | 33 | 2 | 16 | 505 | 1080 | HORIZONTAL | 178 |
| 400 | RR | 273 | RING | 60 | RING | 143 | 100 | 64 | 42 | 38 | 2 | 19 | 555 | 1180 | HORIZONTAL | 178 |
| 450 | RR | 330 | RING | 67 | RING | 152 | 102 | 64 | 48 | 45 | 2 | 22 | 615 | 1300 | HORIZONTAL | 178 |
| 500 | RR | 330 | RING | 67 | RING | 152 | 102 | 64 | 51 | 48 | 2 | 25 | 615 | 1300 | 45° ABOVE & BELOW HORIZONTAL CL. | 178 |
| 600 | RR | 330 | RING | 67 | RING | 152 | 102 | 64 | 51 | 45 | 4 | 22 | 615 | 1300 | 45° ABOVE & BELOW HORIZONTAL CL. | 178 |
| 700 | RR | 330 | RING | 67 | RING | 152 | 102 | 64 | 51 | 48 | 4 | 25 | 615 | 1300 | 45° ABOVE & BELOW HORIZONTAL CL. | 178 |
| 800 | RR | 400 | RING | 76 | RING | 172 | 110 | 64 | 55 | 52 | 4 | 25 | 685 | 1440 | 45° ABOVE & BELOW HORIZONTAL CL. | 178 |
| 900 | RR | 400 | RING | 76 | RING | 172 | 110 | 64 | 60 | 56 | 4 | 25 | 813 | 1700 | 45° ABOVE & BELOW HORIZONTAL CL. | 254 |
| 1000 | RR | 400 | RING | 76 | RING | 172 | 110 | 64 | 60 | 56 | 4 | 25 | 815 | 1700 | 45° ABOVE & BELOW HORIZONTAL CL. | 254 |
| 1100 | RR | 400 | RING | 76 | RING | 172 | 110 | 64 | 60 | 56 | 6 | 25 | 815 | 1700 | 45° ABOVE & BELOW HORIZONTAL CL. | 254 |
| 1200 | RR | 400 | RING | 76 | RING | 172 | 110 | 64 | 60 | 56 | 8 | 25 | 815 | 1700 | | 254 |
| 1400 | RR | 400 | RING | 76 | RING | 172 | 110 | 64 | 60 | 56 | 10 | 25 | 815 | 1700 | | 254 |
| 1500 | RR | 400 | RING | 76 | RING | 172 | 110 | 64 | 60 | 56 | 12 | 25 | 815 | 1700 | | 254 |
| 1600 | RR | 400 | RING | 76 | RING | 172 | 110 | 64 | 60 | 56 | 14 | 25 | 815 | 1700 | | 254 |
| 1800 | RR | 400 | RING | 76 | RING | 172 | 110 | 64 | 60 | 56 | 16 | 25 | 815 | 1700 | | 254 |



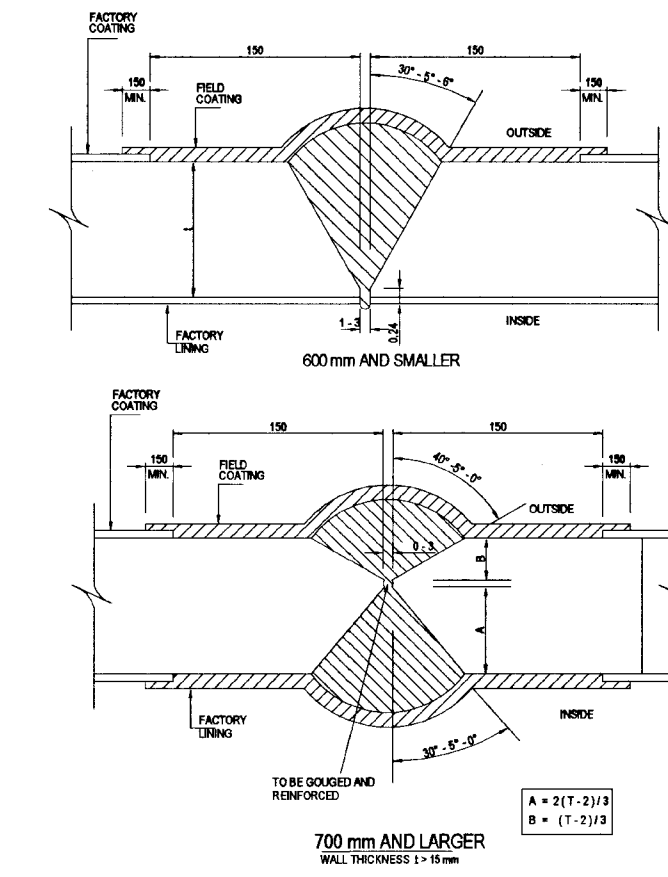
TYPICAL JOINT HARNESS FOR DETAIL A SLEEVE COUPLING



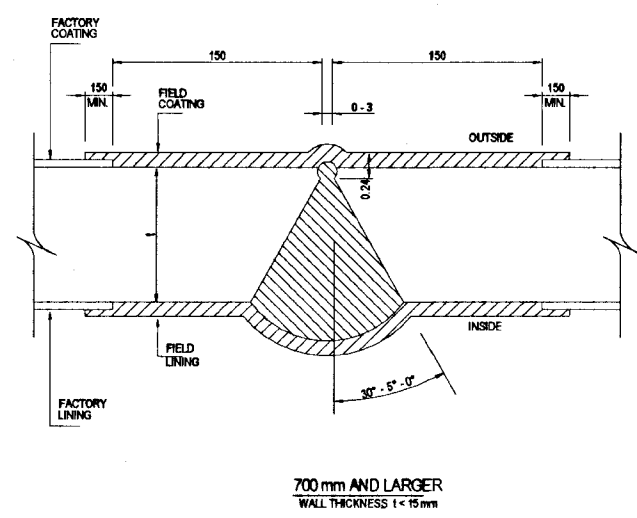
TYPICAL SMALL PIPE SLEEVE IN CONCRETE WALL FOR DETAIL B



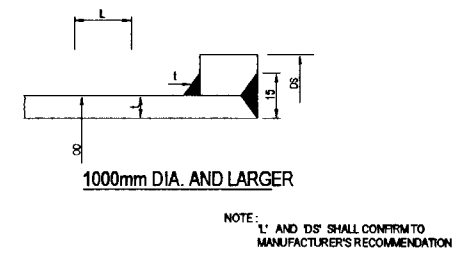
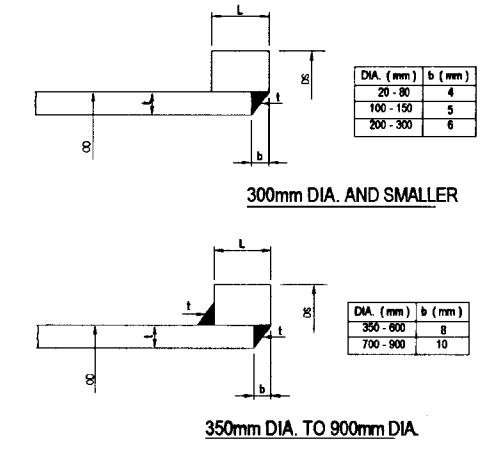
TYPICAL FLANGES FOR DETAIL C STEEL PIPES & FITTINGS



TYPICAL STEEL PIPE FOR DETAIL D BUTT WELDING JOINT



TYPICAL SHOULDERED ENDS FOR DETAILS E VICTAULIC COUPLINGS



DO NOT SCALE

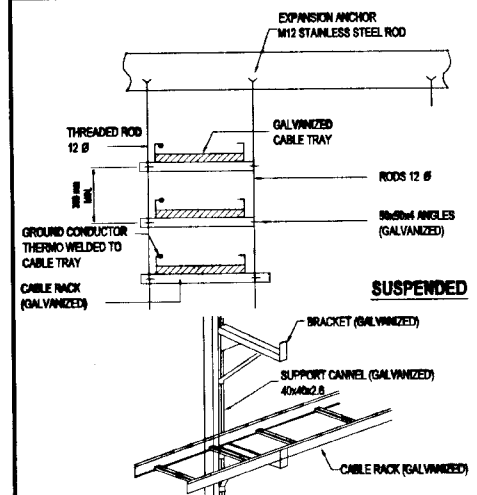
| | | |
|--|---|---|
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| | <p>DESIGNED: <i>[Signature]</i></p> | <p>DRAWN: <i>[Signature]</i></p> |
| <p>CHECKED: <i>[Signature]</i></p> | <p>IN CHARGE: <i>[Signature]</i></p> | <p>CONTRACT NO: NRW / CW</p> |
| <p>BY TEAM LEADER: <i>[Signature]</i></p> | <p>A.S.M (P.D) NUMBER: <i>[Signature]</i></p> | <p>DWG. NO: STD / M - 04</p> |
| <p>TEAM LEADER: <i>[Signature]</i></p> | <p>D.G.M (P.D) NUMBER: <i>[Signature]</i></p> | <p>SHEETS OF 3</p> |

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM
NIHON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN

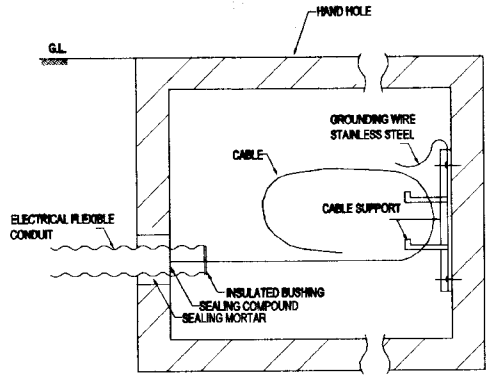
| SYMBOLS | | ABBREVIATION | | | | | | | | | | | |
|---------|---|--------------|----------------------------|------|---------------------------------|------|---|-----|--|-----|---|--------|----------------------------|
| | R | | LOCALLY MOUNTED | A | AMMETER or ALARM | G | GENERATOR | OC | OVERCURRENT RELAY | T | TRANSFORMER or TEMPERATURE | COS-1 | NORMAL TEST |
| | CLR | | PANEL MOUNTED | ACB | AIR CIRCUIT BREAKER | GCB | GAS CIRCUIT BREAKER | OCB | OIL CIRCUIT BREAKER | TB | TERMINAL BLOCK | COS-2 | LOCAL REMOTE |
| | REACTOR | | REAR OF PANEL MOUNTED | AN | ANNUNCIATOR | GD | GROUND DETECTOR | OOG | OVERCURRENT GROUND RELAY | TG | TACHOMETER GENERATOR | COS-3 | MANUAL-AUTO |
| | CAPACITOR | | ADD OR SUMMATE | AS | AMMETER CHANGE OVER SWITCH | GL | SIGNAL LAMP(GREEN) | OL | SIGNAL LAMP(ORANGE, AMBER) | THR | THERMAL RELAY | COS-4 | MANUAL-LINK-UP |
| | BATTERY | | SUBTRACT | AUT | AUTOMATIC | GPT | GROUNDING POTENTIAL TRANSFORMER | OLC | ONE-LOOP CONTROLLER | TS | TUMBLER SWITCH or TORQUE SWITCH | COS-5 | LINK-UP-AUTO-MANUAL |
| | L.A. | | MULTIPLY | AUX | AUXILIARY (RELAY PANEL) | GT | GROUNDING TERMINAL | OLT | ON LOAD TAP CHANGER | TT | TESTING TERMINAL | COS-6 | NO 1 STANDBY- NO 2 STANDBY |
| | F OF PF | | DIVIDE | AVR | AUTOMATIC VOLTAGE REGULATOR | GSP | GENERATOR SWITCHGEAR PANEL | OV | OVER VOLTAGE RELAY | Tth | TURBIDITY | COS-7 | NO 1.2- 2.3 - 3.1 |
| | S C R | | EXTRACT SQUARE ROOT | B | BATTERY | H | HEATER | OVG | OVER VOLTAGE GROUND RELAY | Td | | COS-8 | NO 1.2.3-2.3.4-3.4.1-4.1.2 |
| | MOTOR | | RESISTOR-CURRENT CONVERTOR | BC | BATTERY CHAGER | HCP | HIGH VOLTAGE MOTOR CONTROL PANEL | P | PRESSURE | V | VOLTMETER | COS-9 | NO 1- TOTAL NO2 |
| | GENERATOR | | | BCT | BUSHING CURRENT TRANSFORMER | HRM | HOUR METER | PB | PULL BOX | VO | ZERO PHASE VOLT METER | COS-10 | TIMER LEVEL |
| | TRANSFORMER | | | BL | BELL | HVS | HIGH VOLTAGE SWITCHGEAR | PPS | PUSH BUTTON SWITCH WITH LIGHT | VAF | REACTIVE POWER METER | COS-11 | NO.1- NO.2 |
| | DELTA CONNECTION | | | BS | BUTTON SWITCH or BUZZER STOP | I | INDICATOR | PCT | POTENTIAL CURRENT TRANSFORMER | VCB | VACUUM CURRENT BREAKER | COS-13 | NO.1- INDIVIDUAL - NO.2 |
| | STAR CONNECTION | | | BZ | BUZZER | I | ILLUMINATING LAMP | PF | POWER FACTOR METER or POWER FUSE | VCS | VACUUM SWITCH | | |
| | P T | | | C | CONDENSER or CONTROLLER | IM | INDUCTION MOTOR | PH | ACIDITY | VR | VOLTAGE RELAY | CS-1 | ON - OFF |
| | G P T | | | CLR | CURRENT LIGHTING RESISTOR | JB | JUNCTION BOX | PS | PRESSURE SWITCH | VS | VOLTMETER CHANGE-OVER SWITCH | CS-2 | RUN - STOP |
| | C T | | | COS | CHANGE-OVER SWITCH | KS | KNIFE SWITCH | PT | POTENTIAL TRANSFORMER OR PRESSURE TRANSDUCER | W | WATT METER | CS-3 | OPEN - STOP - CLOSE |
| | Z C T | | | CT | CURRENT TRANSFORMER | L | LEVEL | Q | TOTALIZER or INTEGRATOR | WHC | WATT HOUR METER COUNTER | CS-4 | FORWARD - STOP - REVERSE |
| | TESTING VOLTAGE TERMINAL | | | CTR | CONTROLLER | LA | LIGHTING ARRESTER or LEVEL ALARM | R | RESISTOR or RECORDER or RELAY | Z | POSITION | CS-5 | UP - STOP - DOWN |
| | TESTING CURRENT TERMINAL | | | CS | CONTROLLER SWITCH | LC | LOAD CENTER | RC | REMOTE CONTROLLER | ZCT | ZERO PHASE SEQUENCE CURRENT TRANSFORMER | CS-6 | OPEN CLOSE |
| | DRAWER TYPE | | | DG | DIRECTIONAL GROUND RELAY | LCP | LOCAL CONTROL PANEL | RCL | RESIDUAL CHLORINE | | | CS-7 | RUN - TEST |
| | D S | | | DL | DUMMY LOAD | LS | LIMIT SWITCH OR ELECTRODE LIQUID LEVEL SENSOR | RDF | DEPRETIAL RELAY | | | | |
| | CIRCUIT BREAKER | | | DOV | DC OVERVOLTAGE GROUND RELAY | LT | LAMP TEST OR LEVEL TRANSMITTER | RF | RECTIFIER | | | | |
| | K S | | | DR | DISCHARGING RESISTOR | LR | LAMP RESET | RL | SIGNAL LAMP (RED) | | | | |
| | MC or VCS | | | DS | DISCONNECTING SWITCH | M | MOTOR or MANUAL | RS | ROTARY SWITCH | | | | |
| | INDICATING INSTRUMENT | | | DUV | DC UNDER VOLTAGE RELAY | MAN | MANUAL | S | SWITCH or SETTER | | | | |
| | RELAY | | | E | EARTH | MC | ELECTROMAGNETIC CONTACTOR | SC | STATIC CAPACITOR | | | | |
| | RESISTOR | | | ELCB | EARTH LEAKAGE CIRCUIT BREAKER | MCCB | MOLDED CASE CIRCUIT BREAKER | SCR | SILICON CONTROLLED RECTIFIER | | | | |
| | CONDUIT SURFACE | | | EMS | EMERGENCY SWITCH | MOBV | MOTOR OPERATED BUTTER FLY VALVE | SH | SHUNT or SPACE HEATER | | | | |
| | ELECTRICAL FLEXIBLE CONDUIT RUN CONCEALED UNDERGROUND | | | ER | ELECTRODE LIQUID LEVEL SENSOR | MOCV | MOTOR OPERATED CONTROL VALVE | SL | SIGNAL LAMP | | | | |
| | CABLE RUN EXPOSED IN CABLE RACK | | | EX | EXCITER | MCP | MONITOR AND CONTROL PANEL | SR | SERIES REACTOR | | | | |
| | CABLE RUN EXPOSED IN CABLE PIT | | | F | FUSE or FLOW or FREQUENCY METER | MCP | MONITOR AND CONTROL PANEL | STR | STARTING RESISTOR | | | | |
| | CONDUIT RUN CONCEALED IN FLOOR | | | FI | FAULT INDICATOR | MCB | MINIATURE CIRCUIT BREAKER | STT | STRATING TRANSFORMER | | | | |
| | GROUNDING | | | FL | FLUORESCENT LAMP | MCC | MOTOR CONTROL CENTRE | STX | STARTING REACTOR | | | | |
| | ER | | | FLTS | FLOAT SWITCH | MOF | METERING OUTFIT | SV | SOLENOID VALVE | | | | |
| | TRANSMITTER | | | FE | ELECTRIC FLEXIBLE CONDUIT | N | TACHOMETER | SY | SYNCHRONISM INDICATOR | | | | |
| | P S | | | | | | | | | | | | |

DO NOT SCALE

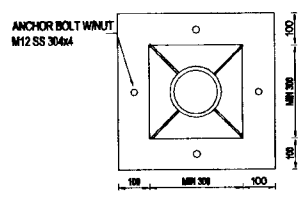
| | | | | | |
|---|--|-----------------|---------------------|-----------------------|--|
| | | SUB PROJECT: | | TITLE: | |
| | | STANDARD | | LEGEND AND SYMBOLS | |
| NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | | DESIGNED: | DRAWN: | DATE: JAN 2001 | |
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM | | CHECKED: | IN CHARGE: | CONTRACT NO: NRW / CW | |
| NINON SUIDO CONSULTANTS CO. LTD., TOKYO, JAPAN | | BY TEAM LEADER: | A.S.M (PRO) NUMBER: | DRAWN BY: | |
| | | TEAM LEADER: | D.S.M (PRO) NUMBER: | STD / E - 01 | |



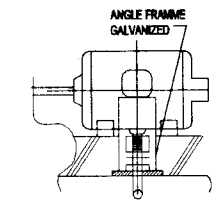
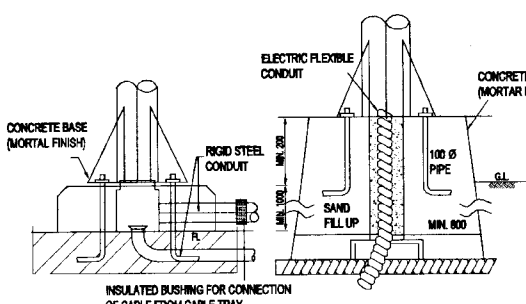
SUSPENDED



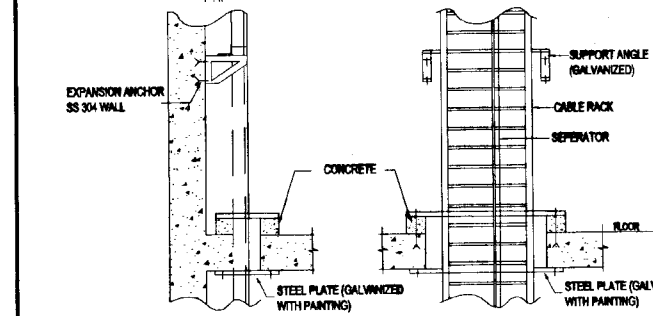
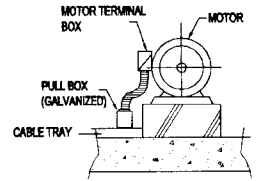
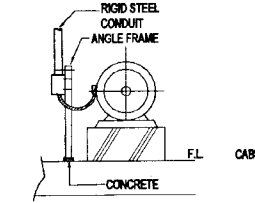
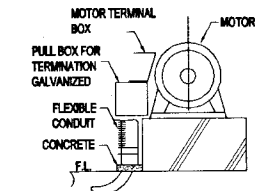
**TYPICAL JOINT OF HAND HOLE AND ELECTRIC FLEXIBLE
DETAIL E-3**



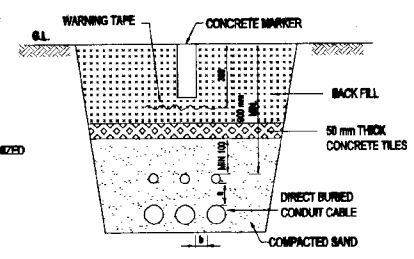
**TYPICAL INSTALLATION OF LOCAL CONTROL BOX
(PIPE STANDING TYPE INDOOR, OUT DOOR)
DETAIL E-5**



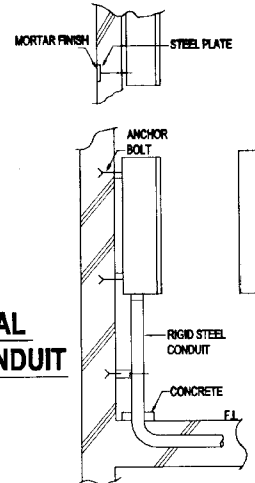
TYPICAL INSTALLATION OF MOTOR



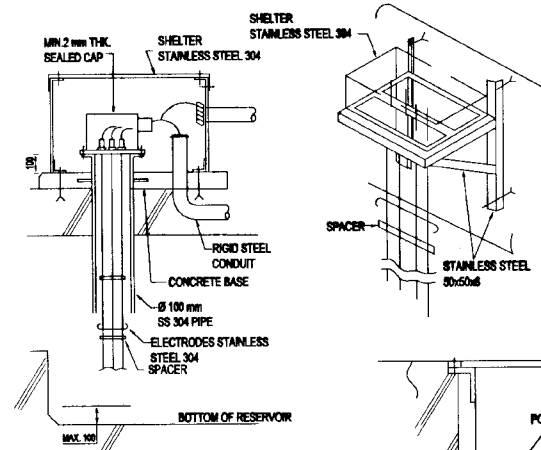
WALL MOUNTED



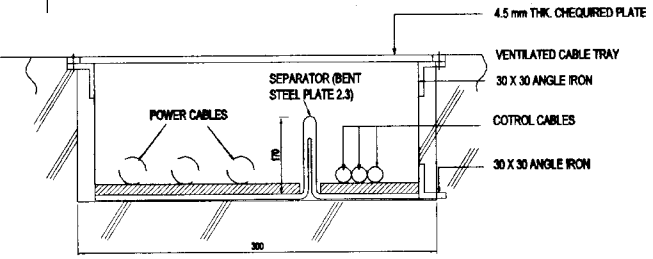
**TYPICAL INSTALLATION OF ELECTRICAL DIRECT BURIED CABLE OR ARMORED CONDUIT
DETAIL E-4**



**TYPICAL INSTALLATION OF LOCAL CONTROL BOX
(WALL MOUNTING TYPE, INDOOR, OUT DOOR)**

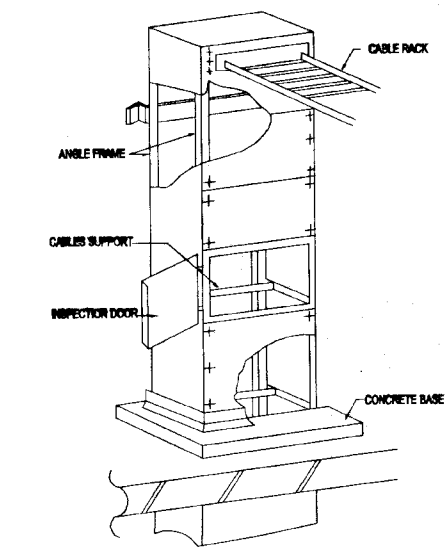


**TYPICAL INSTALLATION OF LEVEL SENSING ELECTRODES
DETAIL E-8**

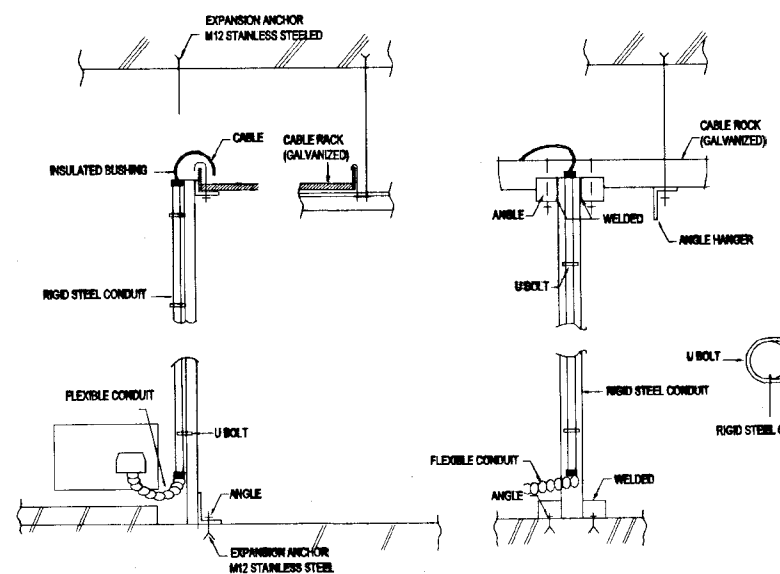


**TYPICAL CABLE TRAY MOUNTED ON FLOOR
DETAIL E-10**

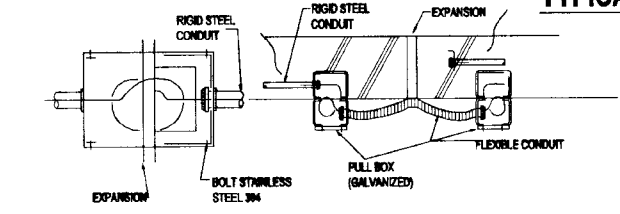
**TYPICAL INSTALLATION OF CABLE RACK
(ALL BOLT AND NUTS SHALL BE STAINLESS STEEL)
DETAIL E-1**



**TYPICAL INSTALLATION OF CABLE DUCT
DETAIL E-2**



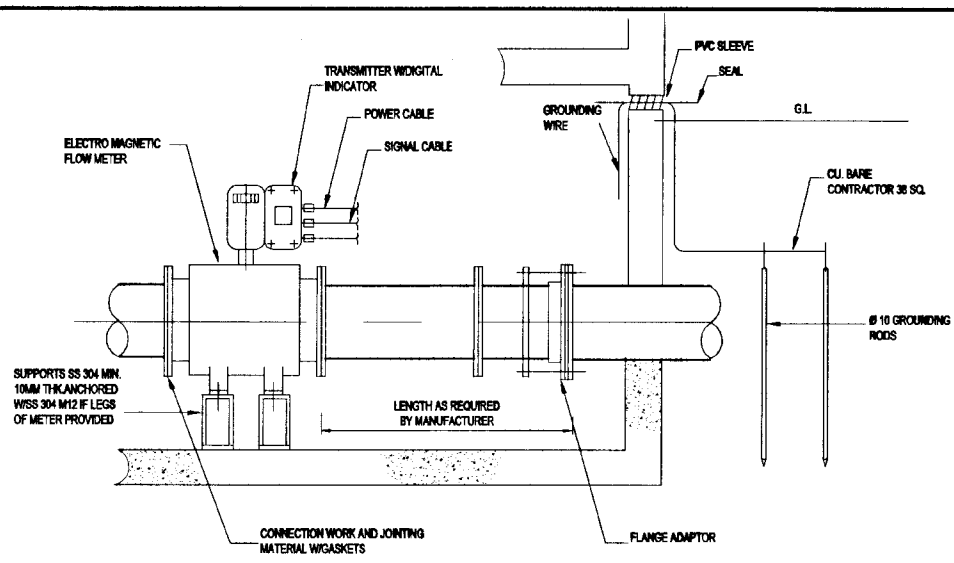
**TYPICAL INSTALLATION OF CONDUIT ATTACHED WITH CABLE RACK
DETAIL E-11**



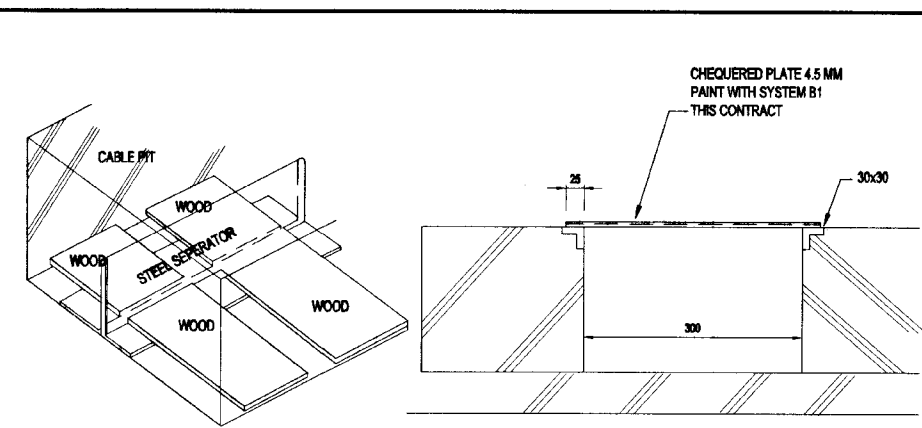
**TYPICAL WIRING OF EXPANSION PARTS
DETAIL E-9**

DO NOT SCALE

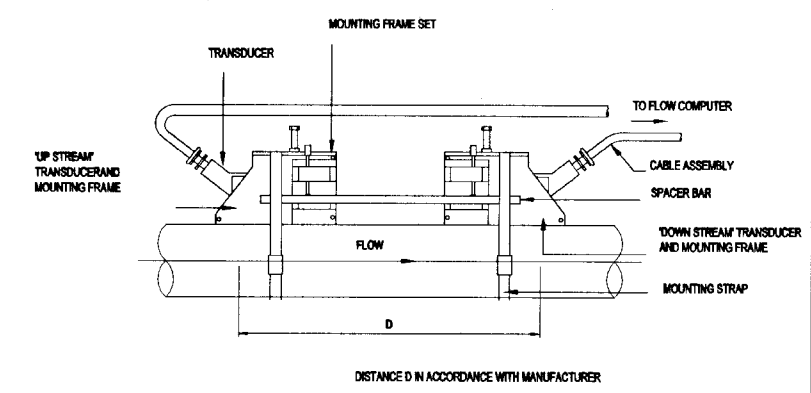
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|---|---|--|--|
| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> <p>NIHON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | SUB PROJECT: STANDARD TITLE: STANDARD ELECTRICAL DETAILS | SHEET 1 OF 2 DATE: JAN 2001 | |
| | SEARCHED: [Signature] CHECKED: [Signature] | DRAWN: [Signature] PM (NWS&D) INCHARGE: [Signature] | CONTRACT NO: NRW / CW DRG. NO: STD / E-02 |
| | BY: [Signature] TEAM LEADER: [Signature] | A.G.M (NWS&D) INCHARGE: E. D. A. J. D.G.M (NWS&D) INCHARGE: [Signature] | |
| | | | |
| | | | |



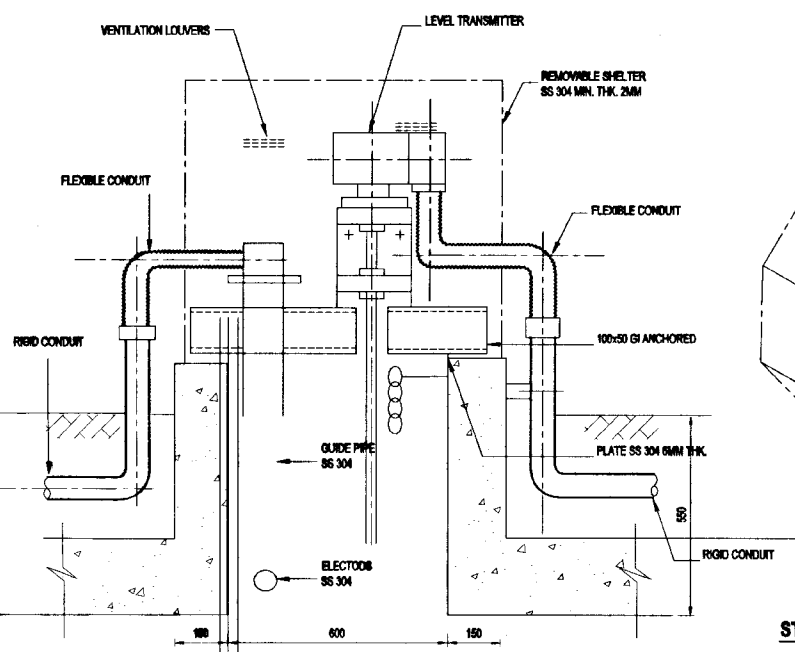
**TYPICAL INSTALLATION OF MAGNETIC FLOW METER
DETAIL E - 13**



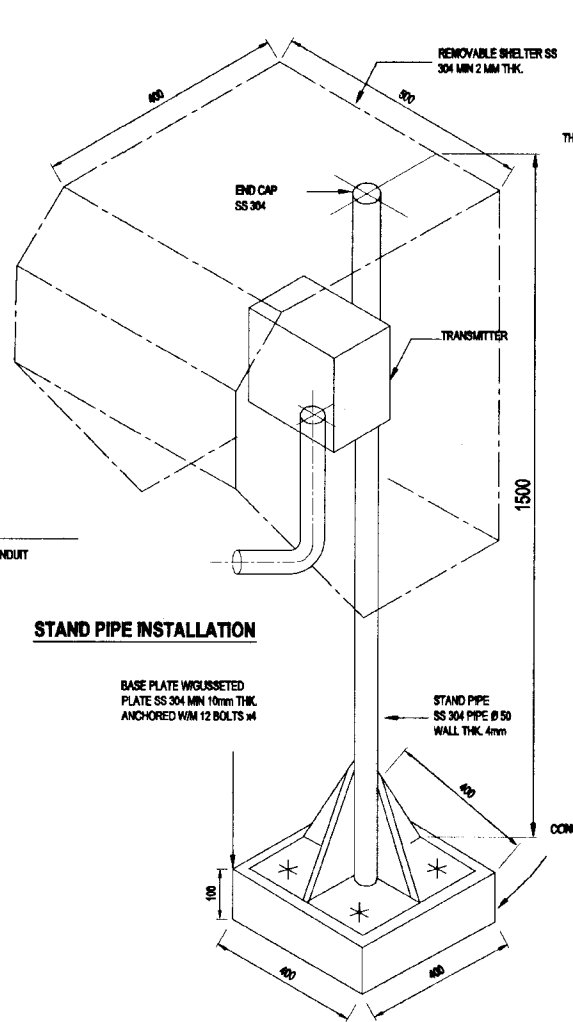
**TYPICAL ELECTRIC CABLE PIT COVER
DETAIL E - 15**



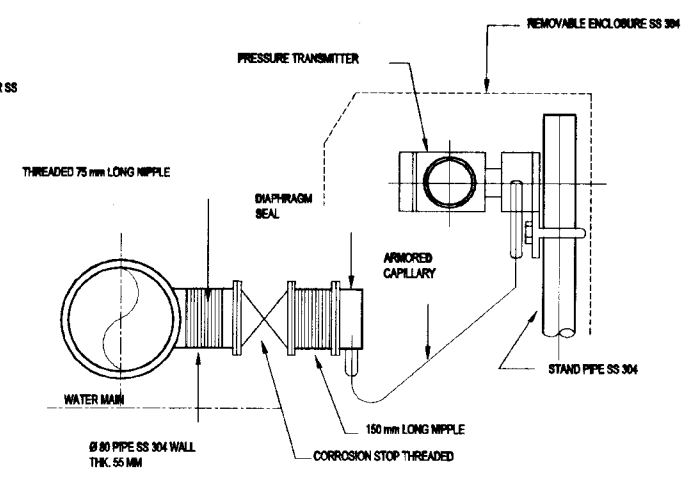
**TYPICAL INSTALLATION FOR TRANSIT TIME FLOW METER
DETAIL E - 16**



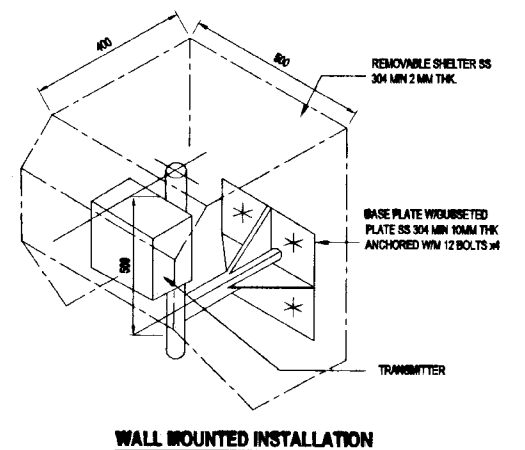
**LEVEL PROBE AND LEVEL SENSOR
TYPICAL INSTALLATION
DETAIL E - 14**



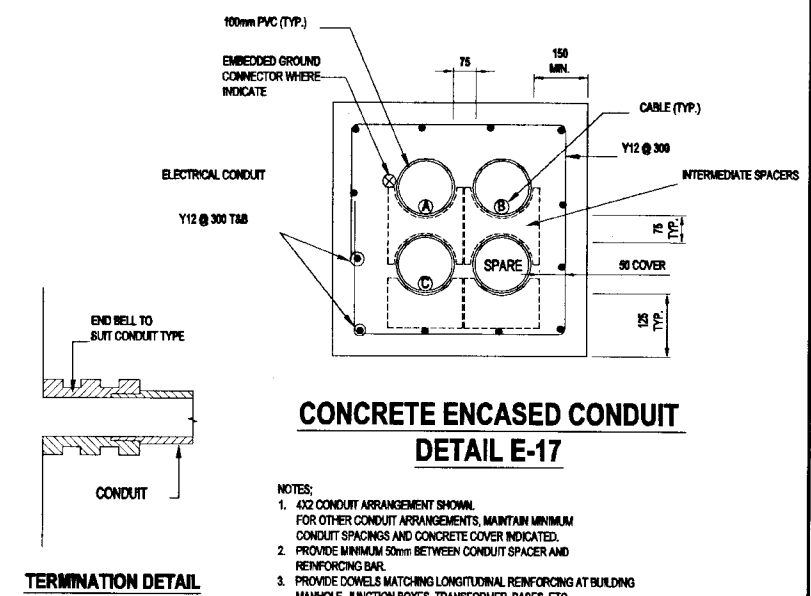
**TYPICAL PRESSURE TRANSMITTER
INSTALLATION
DETAIL E-12**



**TYPICAL INSTALLATION OF DIAPHRAGM
SEAL WITH FILLED CAPILLARY SYSTEM**



WALL MOUNTED INSTALLATION




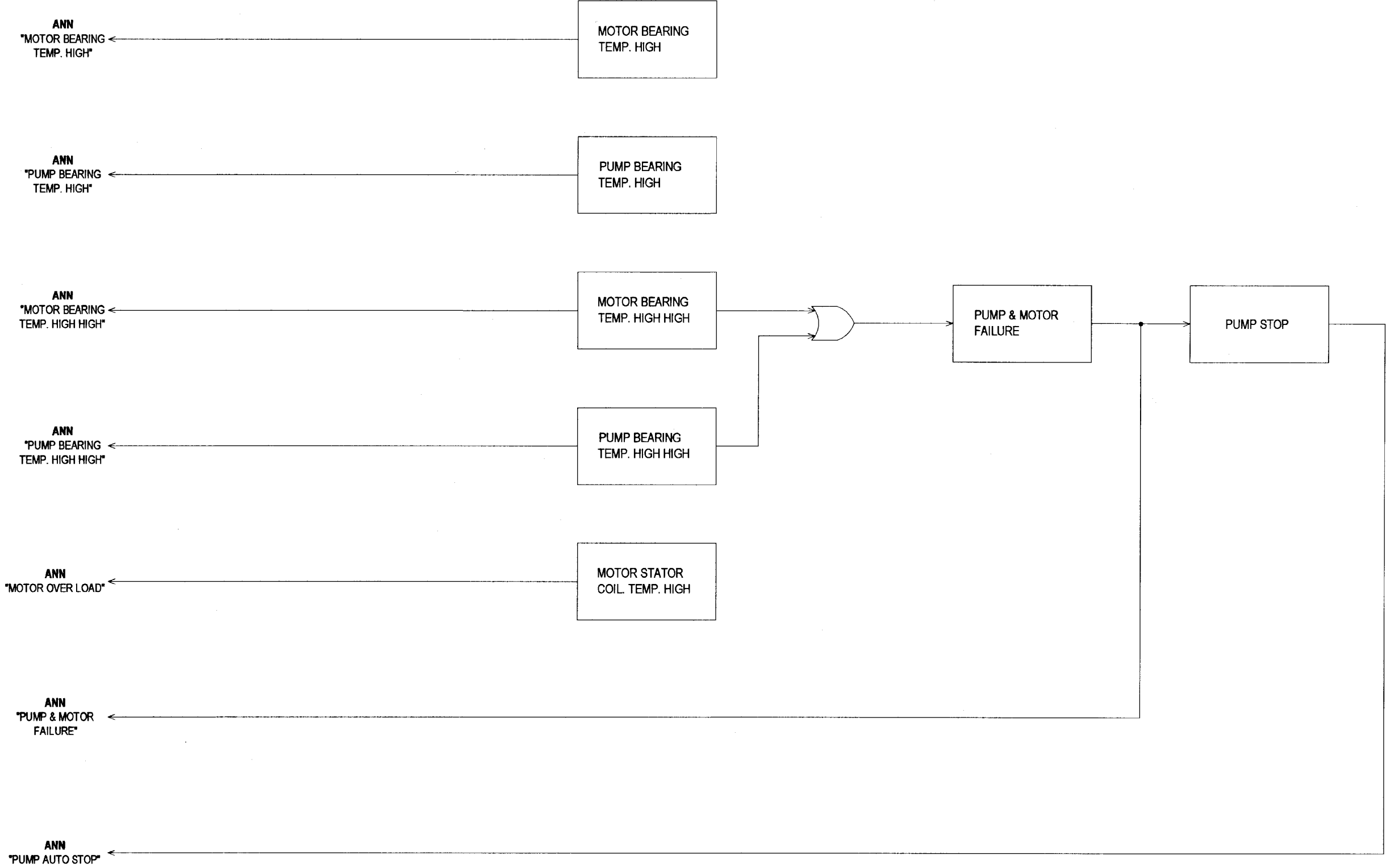
**CONCRETE ENCASED CONDUIT
DETAIL E-17**

- NOTES:
1. 4X2 CONDUIT ARRANGEMENT SHOWN. FOR OTHER CONDUIT ARRANGEMENTS, MAINTAIN MINIMUM CONDUIT SPACINGS AND CONCRETE COVER INDICATED.
 2. PROVIDE MINIMUM 50mm CONCRETE COVER AND REINFORCING BAR.
 3. PROVIDE DOWELS MATCHING LONGITUDINAL REINFORCING AT BUILDING MANHOLE, JUNCTION BOXES, TRANSFORMER, BASES, ETC.
 4. PROVIDE MINIMUM COVER OF 120mm ABOVE TOP OF CONCRETE ENCASEMENT.

TERMINATION DETAIL


DO NOT SCALE

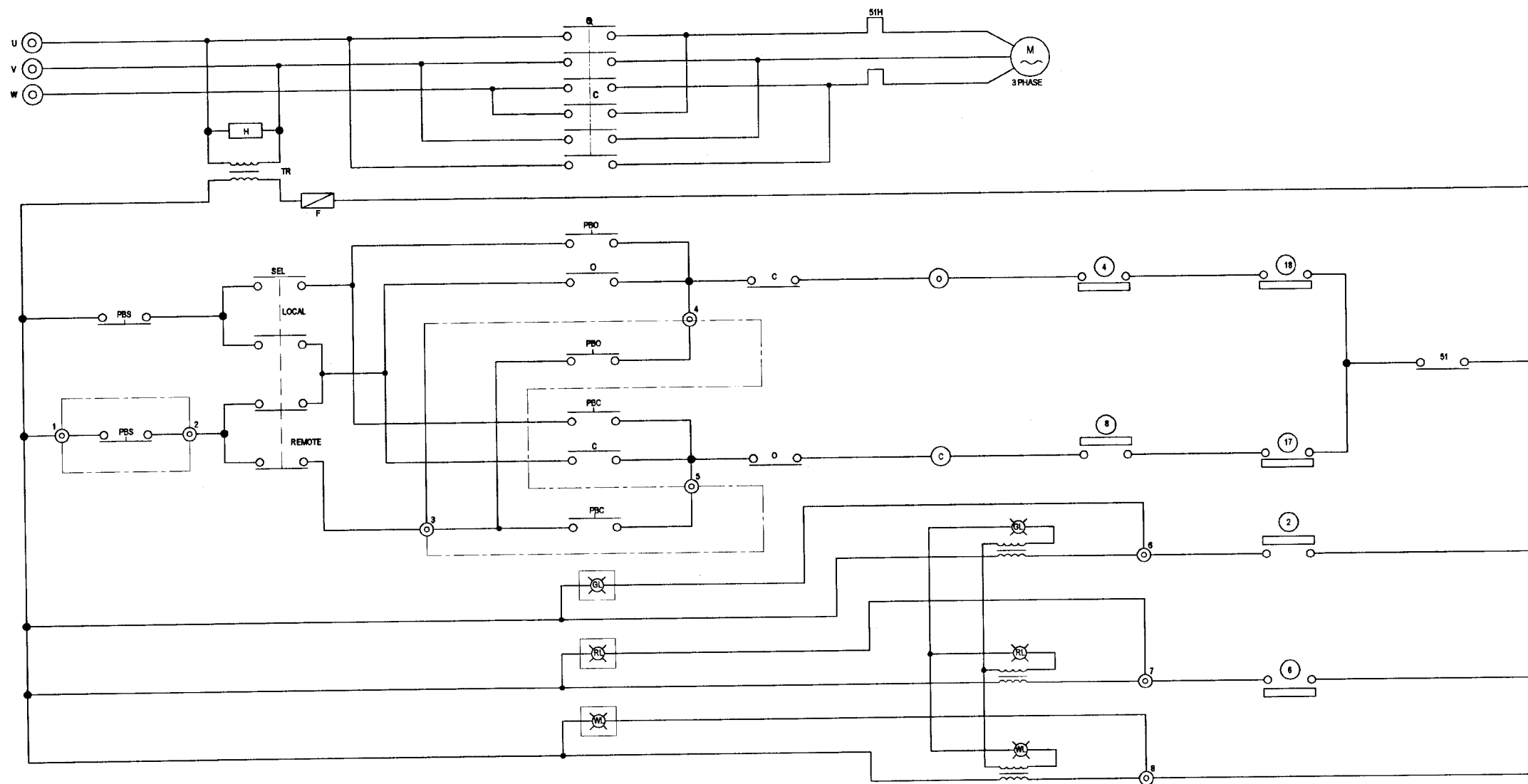
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|  NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | | SUB PROJECT: STANDARD TITLE: STANDARD ELECTRICAL DETAILS SHEET 2 OF 2 | |
| DESIGNED: <i>[Signature]</i> CHECKED: <i>[Signature]</i> DT. TEAM LEADER: <i>[Signature]</i> TEAM LEADER: <i>[Signature]</i> | DRAWN: <i>[Signature]</i> PM (NRW/S&D) NRWSC: <i>[Signature]</i> A.S.M (P&D) NRWSC: <i>[Signature]</i> D.A.M (P&D) NRWSC: <i>[Signature]</i> | DATE: JAN 2001 CONTRACT NO: NRW / CW DRG. NO: STD / E-03 | |



DO NOT SCALE

| REV. | DESCRIPTION |
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|---|--|---|------------------------------|
|  NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | SUB PROJECT: | TITLE: | |
| | STANDARD | STANDARD ELECTRICAL DETAILS CONTROL LOGIC DIAGRAM PUMP & MOTOR FAILURE DETAIL | |
| | DESIGNED: <i>H. D. S. Jayasinghe</i> | DRAWN: <i>R. D. A. Jayasinghe</i> | DATE: JAN 2001 |
| | CHECKED: <i>R. D. A. Jayasinghe</i> | IN CHARGE: <i>R. D. A. Jayasinghe</i> | CONTRACT NO: NRW / CW |
| BY TEAM LEADER: <i>H. D. S. Jayasinghe</i> | A.S.M. (P&ID) NUMBER: <i>R. D. A. Jayasinghe</i> | DRG. NO: STD / E - 04 | |
| TEAM LEADER: <i>H. D. S. Jayasinghe</i> | D.O.M. (P&ID) NUMBER: <i>R. D. A. Jayasinghe</i> | | |

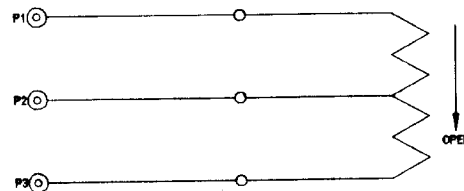


- LEGEND**
- (O) - OPENING MAGNET SWITCH COIL
 - (C) - CLOSING MAGNET SWITCH COIL
 - O.C - MAGNET SWITCH MAIN CONTACTS AND AUXILIARY CONTACTS
 - 51 - THERMAL RELAY CONTACT
 - 51H - THERMAL RELAY HEATER
 - F - FUSE
 - H - SPACE HEATER
 - (2) (4) - OPENING LIMIT SWITCH
 - (8) (18) - CLOSING LIMIT SWITCH
 - (18) - OPENING TORQUE SWITCH
 - (17) - CLOSING TORQUE SWITCH
 - P B O - OPEN PUSH BUTTON SWITCH
 - P B C - CLOSE PUSH BUTTON SWITCH
 - P B S - STOP PUSH BUTTON SWITCH
 - S E L - SELECTOR SWITCH
 - (RL) - FULLY OPEN INDICATOR LIGHT (RED)
 - (GL) - FULLY CLOSE INDICATOR LIGHT (GREEN)
 - (WL) - SOURCE SIGNAL INDICATOR LIGHT (WHITE)
 - (C) - TERMINAL BLOCK
 - TR - TRANSFORMER

LIMIT SWITCH CONTACT DEVELOPMENT

| ROTOR | CONT. No. | VALVE POSITION | | FUNCTION |
|-------|-----------|----------------|--------------|----------|
| | | f - close | f - open | |
| OPEN | 1 | Close Contact | Open Contact | SPARE |
| | 2 | Close Contact | Open Contact | SPARE |
| | 3 | Close Contact | Open Contact | SPARE |
| | 4 | Close Contact | Open Contact | SPARE |
| CLOSE | 5 | Close Contact | Open Contact | SPARE |
| | 6 | Close Contact | Open Contact | SPARE |
| | 7 | Close Contact | Open Contact | SPARE |
| | 8 | Close Contact | Open Contact | SPARE |

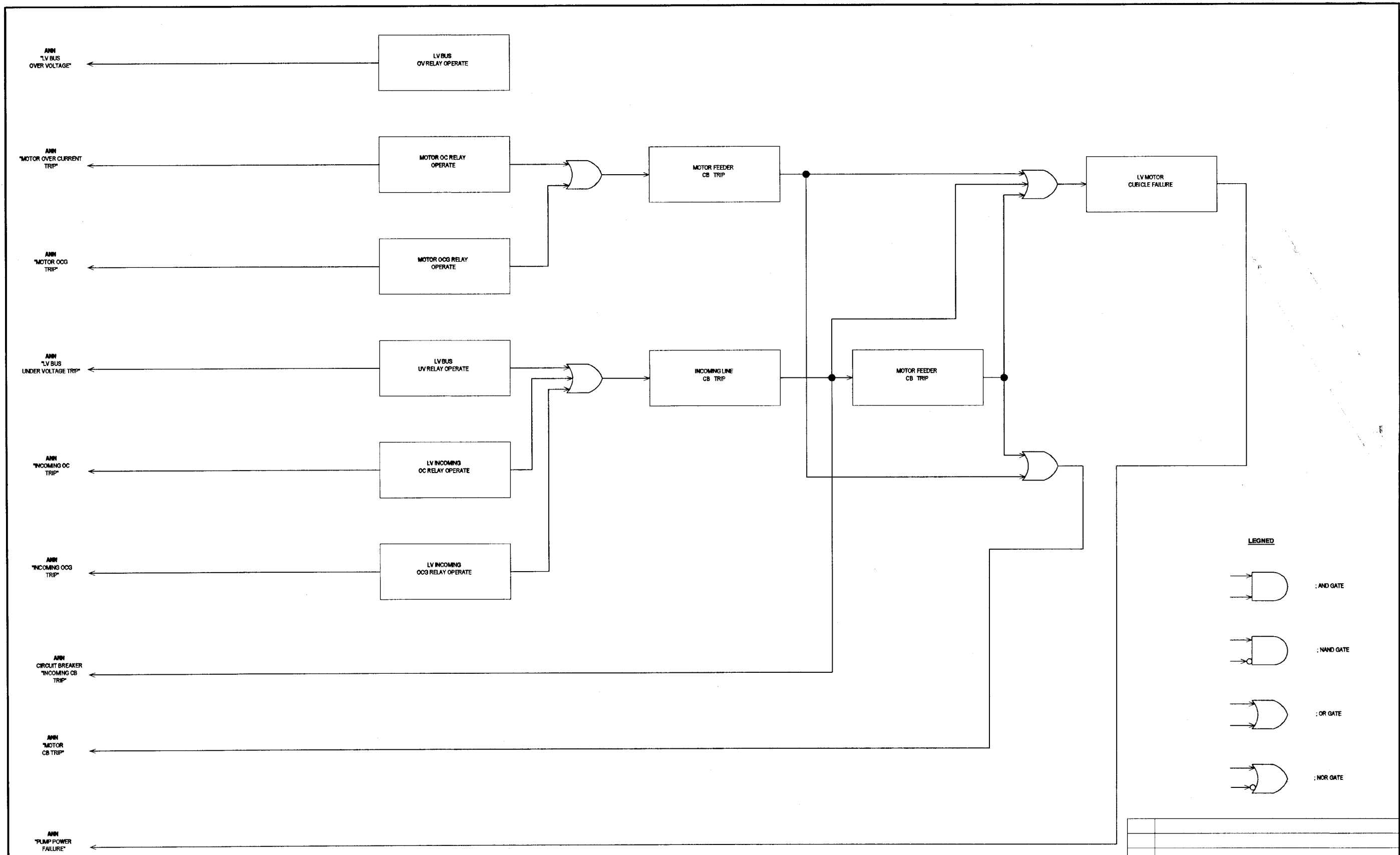
(/) CLOSE CONTACT
 (—) OPEN CONTACT




POTENTIOMETER
(IF SPECIFIED)

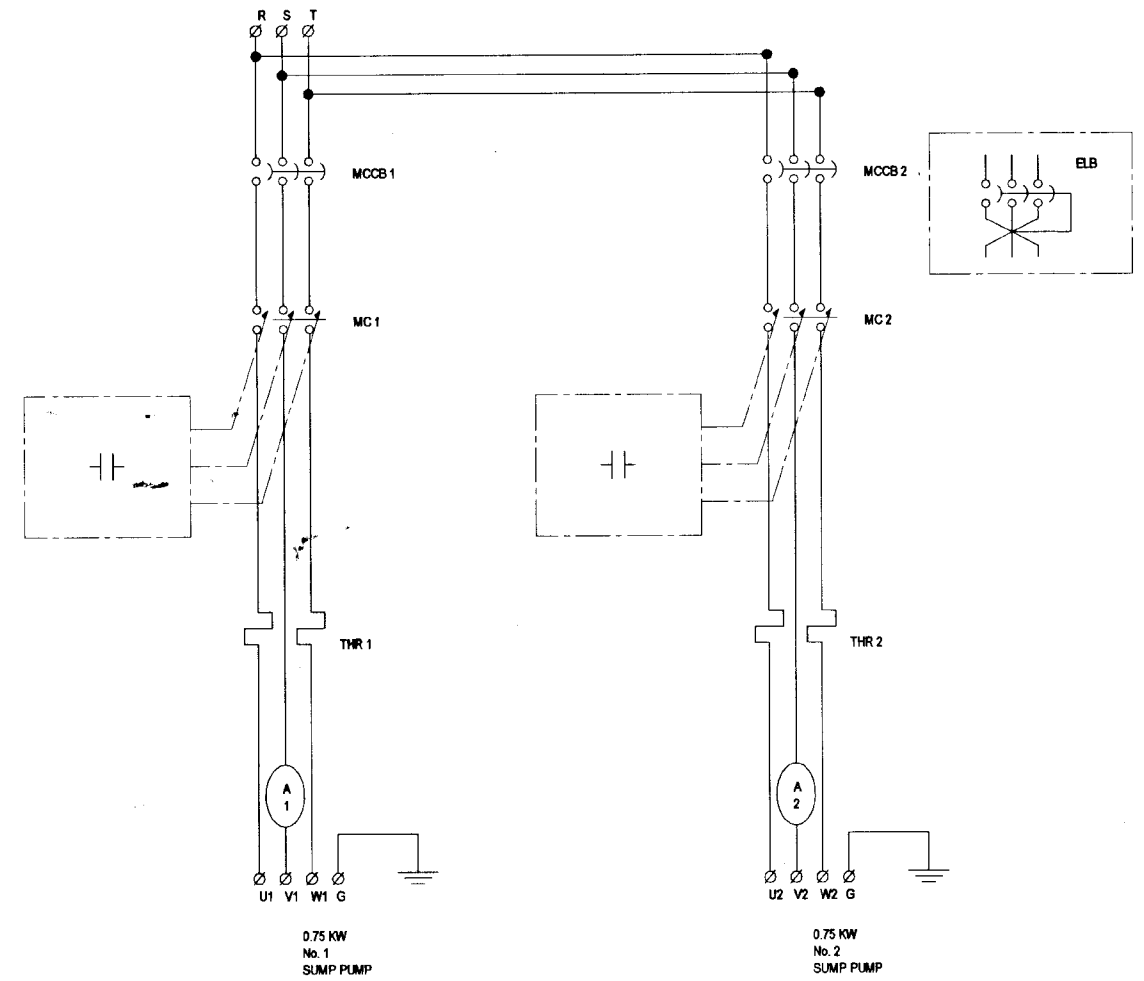
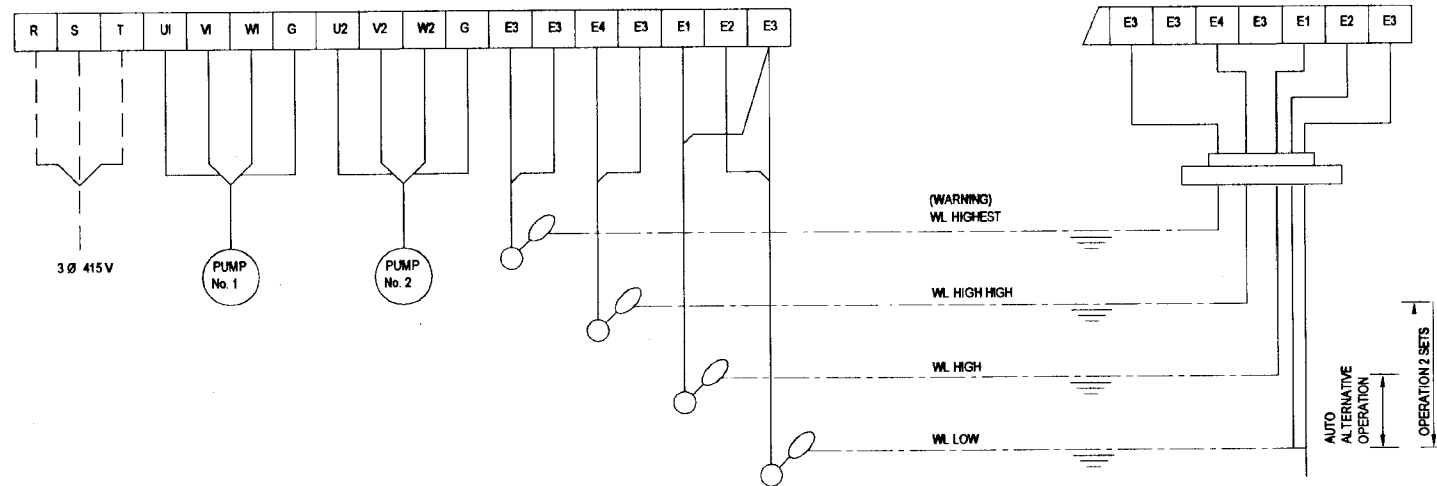
DO NOT SCALE

| | | | |
|--|---|---|--|
| | | NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | |
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM NIHON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN | | SUB PROJECT: STANDARD TITLE: STANDARD ELECTRICAL DETAILS SCHEMATIC DIAGRAM FOR MOTOR OPERATED VALVES | DATE: JAN 2001 CONTRACT No: NRW / CW Dwg. No: STD / E - 05 |
| DESIGNED: <i>H. S. Jayasinghe</i> | DRAWN: <i>S. S. Jayasinghe</i> | DATE: JAN 2001 | |
| CHECKED: <i>R. S. Jayasinghe</i> | IN CHARGE: <i>S. S. Jayasinghe</i> | CONTRACT No: NRW / CW | |
| BY TEAM LEADER: <i>H. S. Jayasinghe</i> | A.S.M (P/2) NUMBER: <i>S. S. Jayasinghe</i> | DWG. No: STD / E - 05 | |
| TEAM LEADER: <i>H. S. Jayasinghe</i> | D.S.M (P/2) NUMBER: <i>S. S. Jayasinghe</i> | | |



DO NOT SCALE


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|--|--|--|
|  NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | SUB PROJECT: STANDARD | TITLE: STANDARD ELECTRICAL DETAILS CONTROL LOGIC DIAGRAM PUMP POWER FAILURE |
| | DESIGNED: <i>H. S. Jayasinghe</i> CHECKED: <i>R. D. A. Jayasinghe</i> DR. TEAM LEADER: <i>R. D. A. Jayasinghe</i> TEAM LEADER: <i>R. D. A. Jayasinghe</i> | DRAWN: <i>R. D. A. Jayasinghe</i> ALUM. (PMD) NUMBER: <i>R. D. A. Jayasinghe</i> D.O.M. (PMD) NUMBER: <i>R. D. A. Jayasinghe</i> |



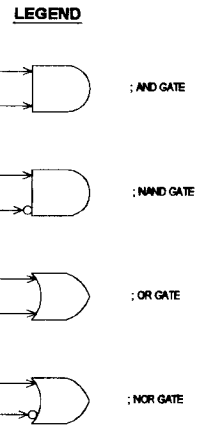
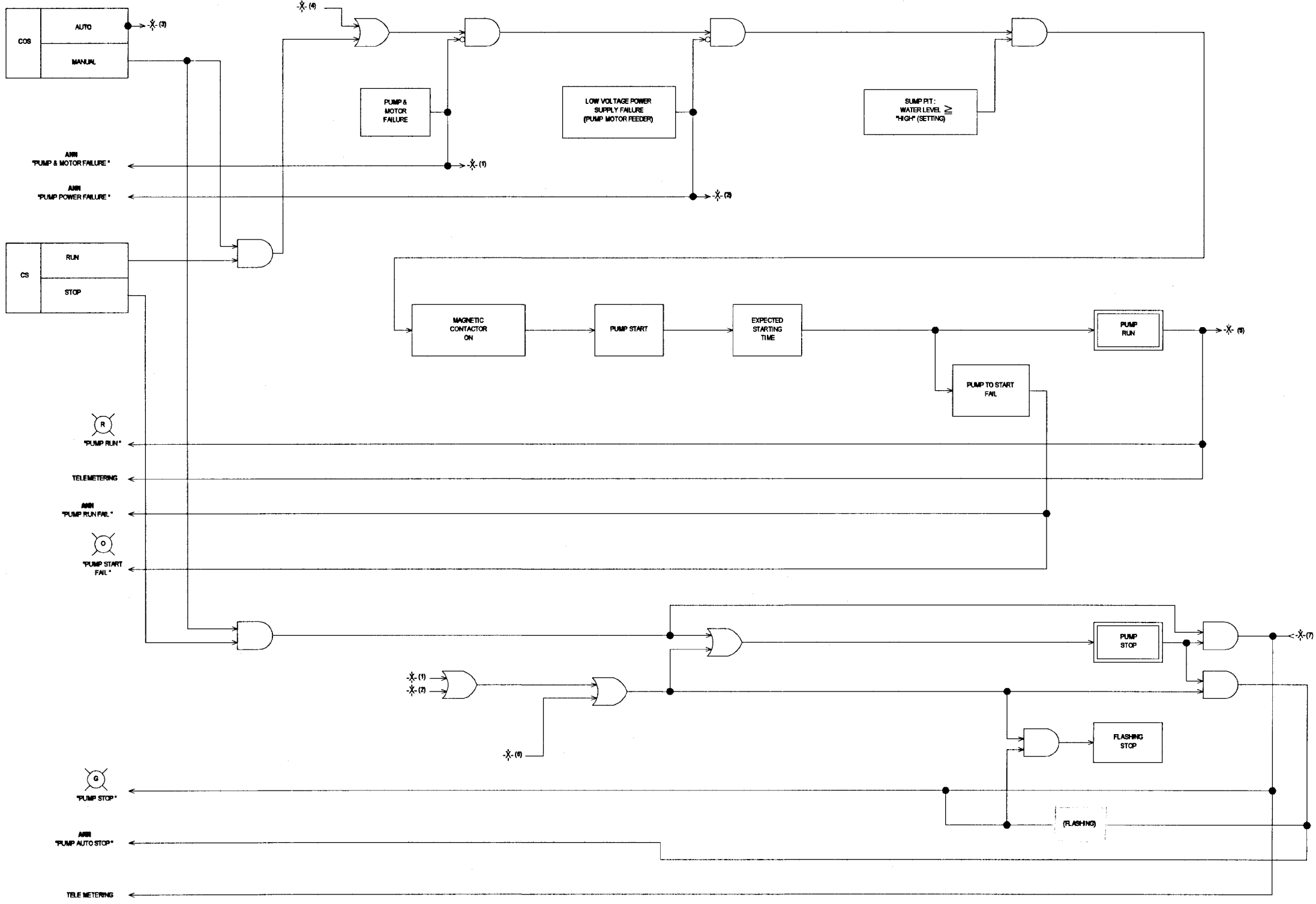
DO NOT SCALE

NOTE 1 AUTOMATIC ALTERNATE OPERATION ;
 A (ON) → B (ON) → A (OFF) → B (OFF) → B (ON) → A (ON)

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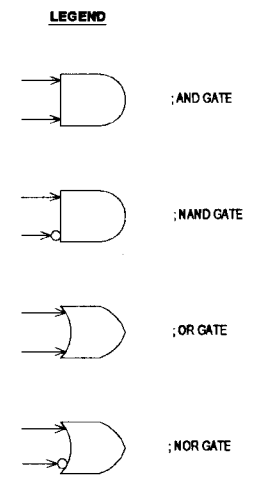
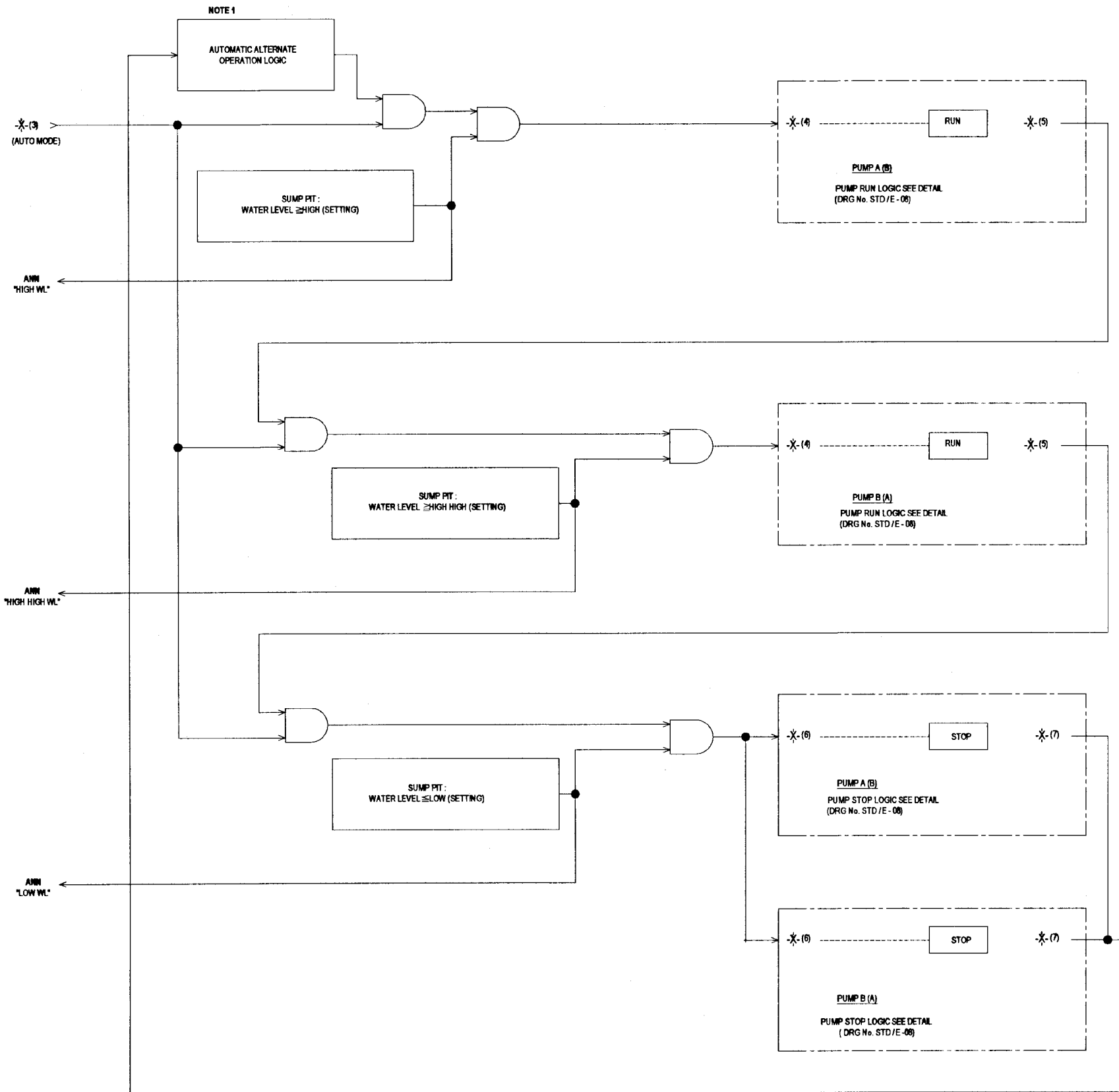
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|  <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | SUB PROJECT: STANDARD | TITLE: STANDARD ELECTRICAL DETAILS SCHEMATIC SUMP PUMPS DIAGRAM | |
| | DESIGNED: <i>[Signature]</i> | DRAWN: <i>[Signature]</i> | DATE: JAN 2001 |
| | CHECKED: <i>[Signature]</i> | PM (PW/SWP) INCHG: <i>[Signature]</i> | CONTRACT NO: NRW / CW |
| | DT. CHALLENGER: <i>[Signature]</i> | A.B.M (PW) INCHG: <i>[Signature]</i> | DRG. NO: STD / E - 07 |
| TEAM LEADER: <i>[Signature]</i> | D.G.M (PW) INCHG: <i>[Signature]</i> | | |

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
 STUDY TEAM
 NIHON SUIDO CONSULTANTS CO. LTD.,
 TOKYO, JAPAN



DO NOT SCALE

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| <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: STANDARD ELECTRICAL DETAILS CONTROL LOGIC DIAGRAM - SUMP PUMP OPERATION</p> |
| | <p>DESIGNED: <i>[Signature]</i></p> | <p>DRAWN: <i>[Signature]</i></p> |
| <p>CHECKED: <i>[Signature]</i></p> | <p>PLANNING/DESIGN NUMBER: <i>[Signature]</i></p> | <p>CONTRACT NO: NRW / CW</p> |
| <p>DR. TEAM LEADER: <i>[Signature]</i></p> | <p>A.Q.M (P&ID) NUMBER: R. D. A. J.</p> | <p>SNO. No:</p> |
| <p>TEAM LEADER: <i>[Signature]</i></p> | <p>D.Q.M (P&ID) NUMBER: <i>[Signature]</i></p> | <p>STD / E - 08</p> |

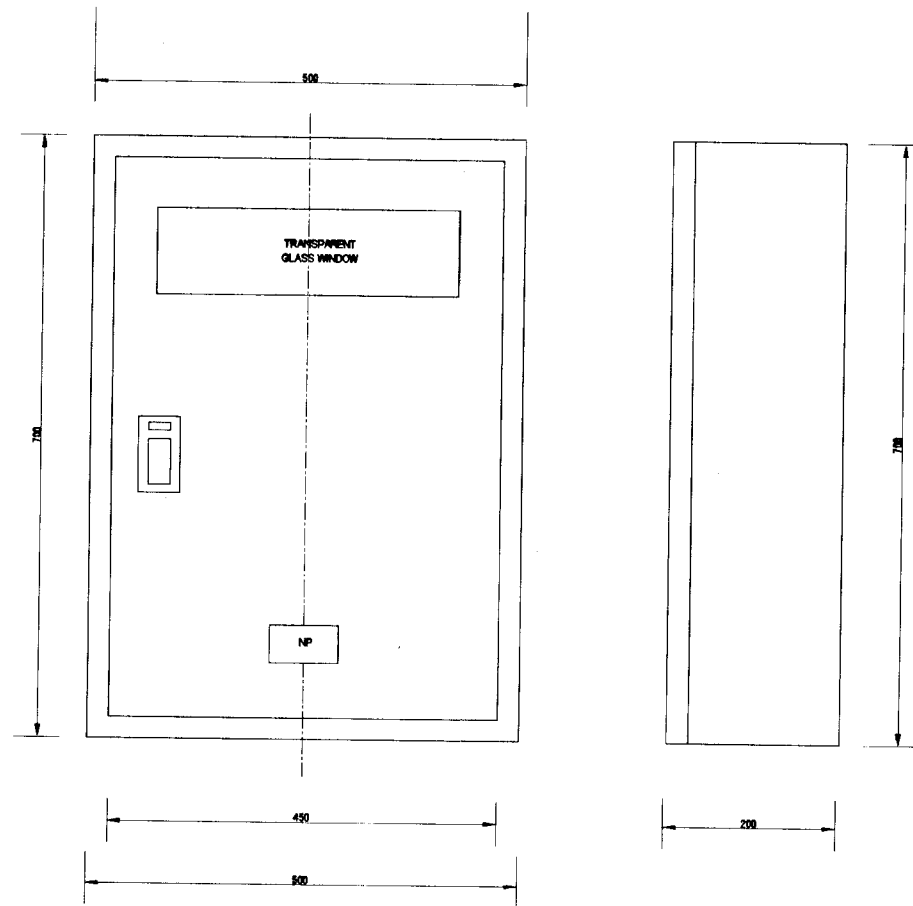


NOTE 1 AUTOMATIC ALTERNATE OPERATION :
 A (ON) → B (ON) → A (OFF) → B (OFF) → B (ON) → A (ON)

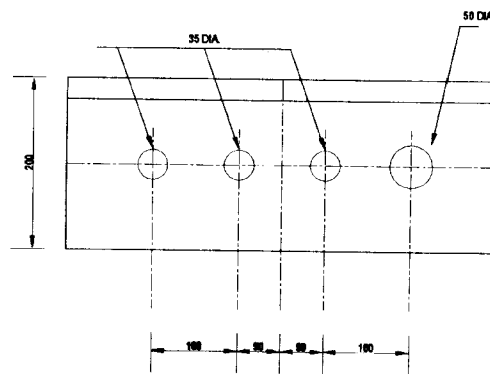
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| NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA | SUB PROJECT: STANDARD | TITLE: STANDARD ELECTRICAL DETAILS CONTROL LOGIC DIAGRAM SUMP PUMP AUTOMATIC OVERRIDE OPERATION |
| | DESIGNED: <i>[Signature]</i> | DATE: JAN 2001 |
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM NIPON SUDO CONSULTANTS CO. LTD. TOKYO, JAPAN | CHECKED: <i>[Signature]</i> | CONTRACT No: NRW / CW |
| | DRY TEAM LEADER: <i>[Signature]</i> | DRG. No.: STD / E - 09 |
| | TEAM LEADER: <i>[Signature]</i> | |




ELEVATION

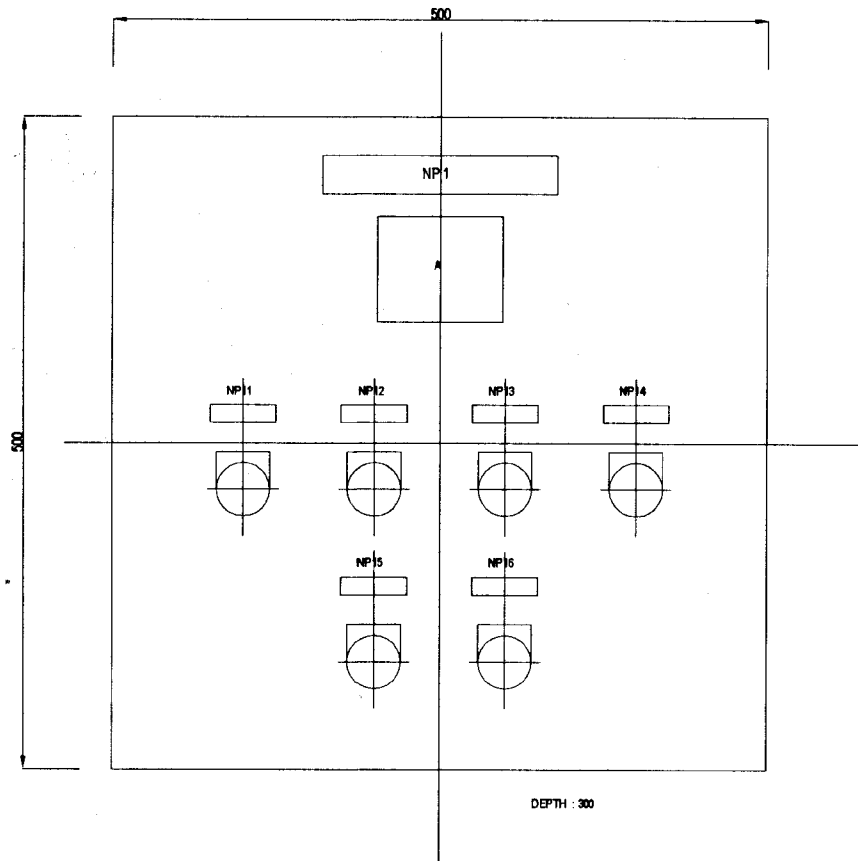


PLAN

FOR TENDER PURPOSE ONLY

DO NOT SCALE

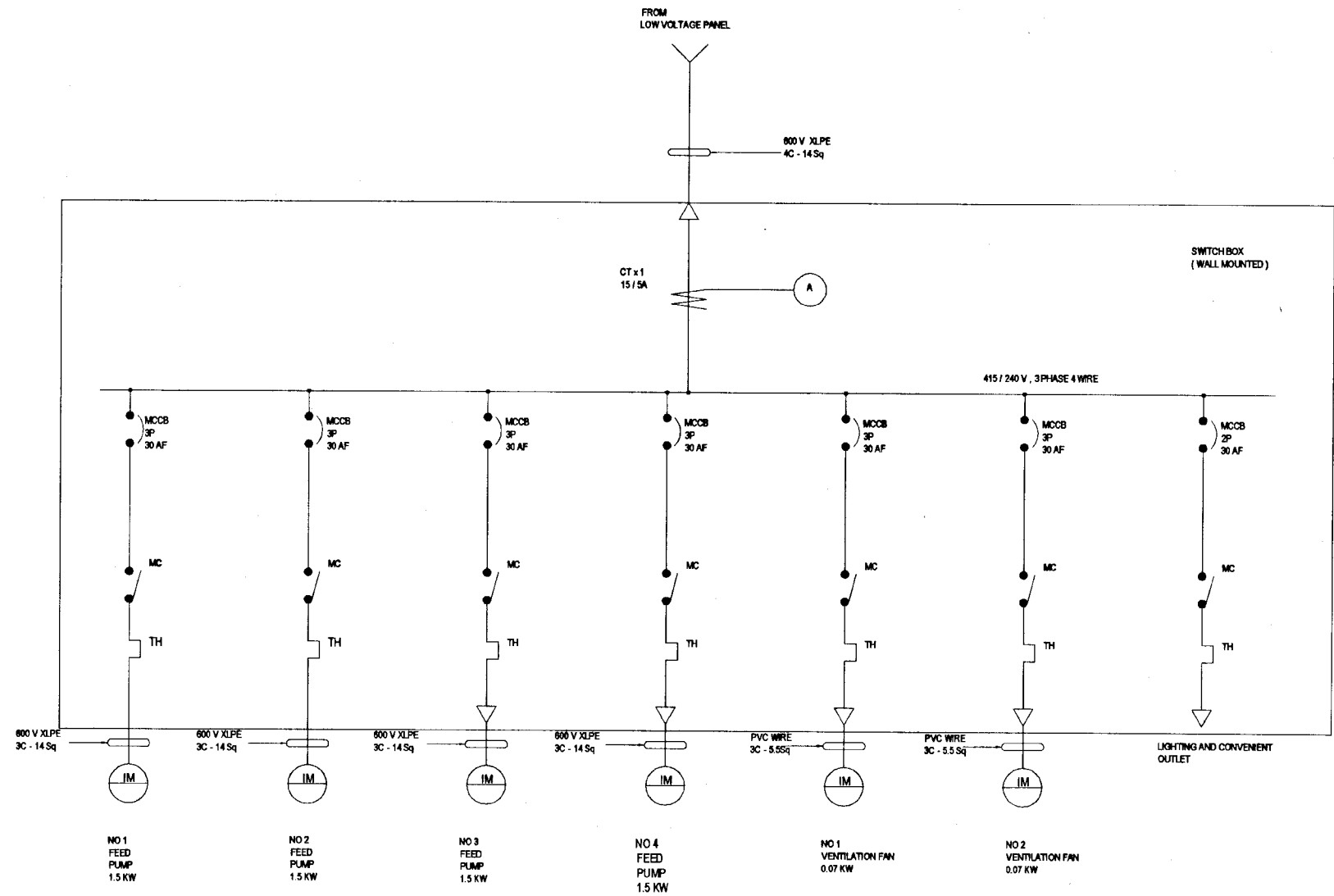
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|  <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: STANDARD ELECTRICAL DETAILS SUMP PUMP CONTROL PANEL ENCLOSURE DETAILS</p> | <p>DATE: JAN 2001</p> |
| | <p>DESIGNED: <i>[Signature]</i></p> | <p>DRAWN: <i>[Signature]</i></p> | <p>CHECKED: <i>[Signature]</i></p> |
| <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> | <p>BY TEAM LEADER: <i>[Signature]</i></p> | <p>A.S.M. (P&I) NUMBER: R D A 2</p> | <p>DWG. NO.: STD / E - 10</p> |
| <p>NIHON SUDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | <p>TEAM LEADER: <i>[Signature]</i></p> | <p>D.S.M. (P&I) NUMBER:</p> | |



NOTE 1

CONTROL SWITCH SHALL BE PUSH BUTTON AND ALTERNATE TYPE NOT MOMENTARY TYPE


| NP | DESCRIPTION |
|-------|---------------------------------|
| NP 1 | SWITCH BOX (CHLORINATION) |
| NP 11 | FEED PUMP No. 1 (1.5 KW) |
| NP 12 | - DO - No. 2 (1.5 KW) |
| NP 13 | - DO - No. 3 (1.5 KW) |
| NP 14 | - DO - No. 4 (1.5 KW) |
| NP 15 | VENTILATION FAN No. 1 (0.07 KW) |
| NP 16 | - DO - No. 2 (0.07 KW) |



NOTE 2

FOR VENTILATION FAN MOTOR, HAVING SMALL OUTPUT (0.07 KW), SINGLE PHASE MAY BE APPLIED

DO NOT SCALE

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|--|--|--|------------------------------|
|  <p>NATIONAL WATER SUPPLY AND DRAINAGE BOARD THE PROJECT FOR THE REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA</p> | <p>SUB PROJECT: STANDARD</p> | <p>TITLE: STANDARD ELECTRICAL DETAILS CHLORINATION FACILITY POWERSUPPLY SYSTEM (ELLIE HOUSE, MALIGAKANDA RESERVOIRS)</p> | |
| | <p>JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) STUDY TEAM</p> | <p>DATE: JAN 2001</p> | <p>CONTRACT NO: NRW / CW</p> |
| <p>NIHON SUIDO CONSULTANTS CO. LTD., TOKYO, JAPAN</p> | <p>DESIGNED: [Signature]</p> <p>CHECKED: [Signature]</p> <p>DT. TEAM LEADER: [Signature]</p> <p>TEAM LEADER: [Signature]</p> | <p>DATE: [Signature]</p> <p>PA. (PERS/OPS) INCHARGE: [Signature]</p> <p>A.S.M (P&I) INCHARGE: [Signature]</p> <p>D.G.M (P&I) INCHARGE: [Signature]</p> | <p>DWG. No: STD / E - 11</p> |