



**REPUBLIC OF KENYA**

**NAKURU SEWAGE WORKS REHABILITATION  
AND  
EXPANSION PROJECT  
(FEASIBILITY STUDY)**

**FINAL REPORT**

**VOLUME (V) DRAWINGS**

**MARCH 1994**



**JAPAN INTERNATIONAL  
COOPERATION AGENCY**

**MINISTRY OF  
LOCAL GOVERNMENT**

**NIPPON KOEI CO., LTD.  
NIHON SUIDO CONSULTANTS CO., LTD.**

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## LIST OF REPORTS

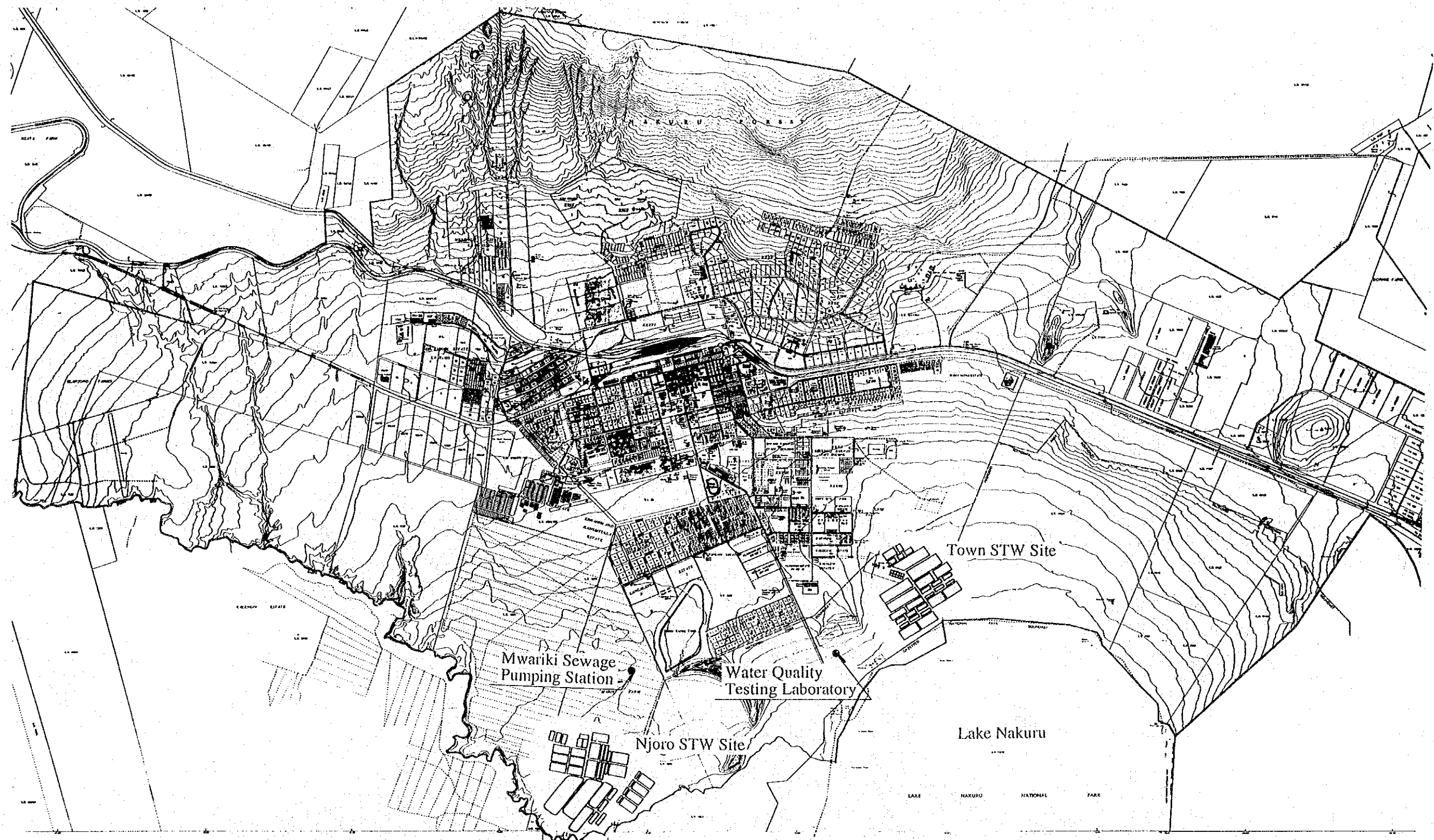
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  - C : Existing Urban Infrastructures
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- VOL. V : DRAWINGS



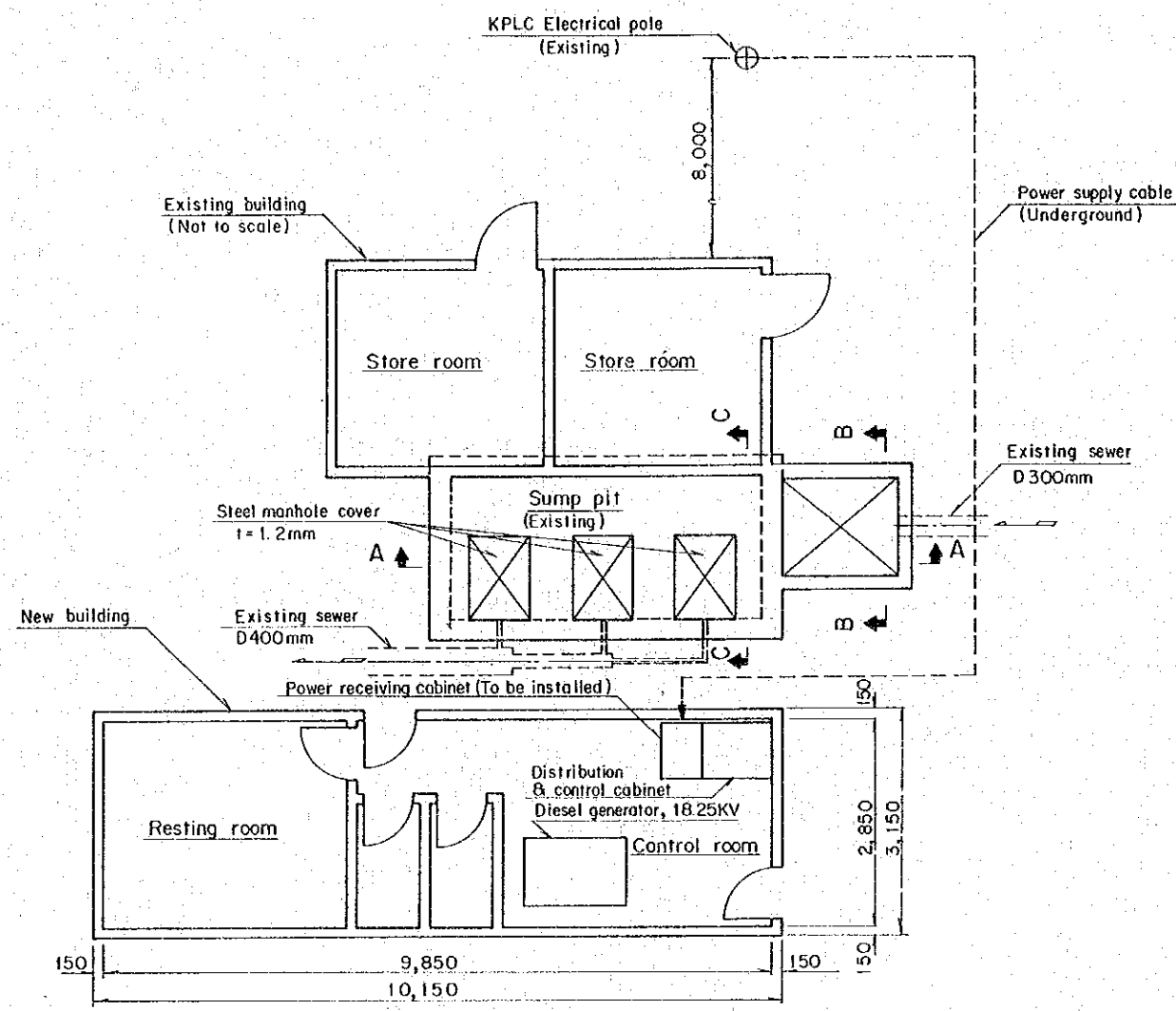
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## LIST OF DRAWING

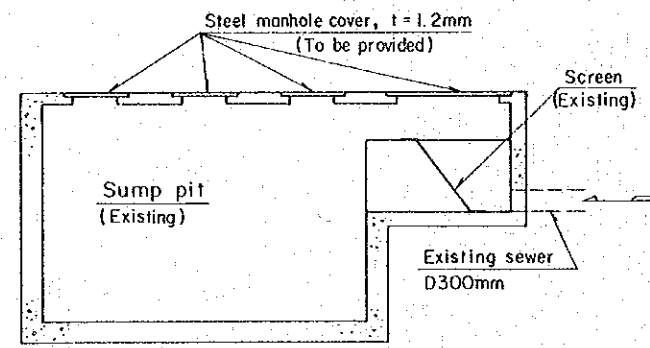
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|-----------|--|-----------|--|
| DWG. G-1  | General Plant of the Project   | DWG. T-10 | Town STW Sections of Waste Stabilization Ponds, Rock Filters and Grass Plots (4/5) |
| DWG. M-1  | Mwariki Pumping Station Electrical Works   | DWG. T-11 | Town STW Sections of Waste Stabilization Ponds, Rock Filters and Grass Plots (5/5) |
| DWG. N-1  | Njoro STW General Plan   | DWG. T-12 | Town STW, Plan, Trickling Filter   |
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| DWG. N-6  | Njoro STW Sections of Waste Stabilization Ponds, Rock Filters and Grass Plots (2/4)          | DWG. S-1  | Stormwater Retention Pond Stormwater Drainage, Longitudinal and Cross Sections     |
| DWG. N-7  | Njoro STW Sections of Waste Stabilization Ponds, Rock Filters and Grass Plots (3/4)          | DWG. S-2  | Stormwater Retention Pond Stormwater Retention Pond, Plan and Sections             |
| DWG. N-8  | Njoro STW Sections of Waste Stabilization Ponds, Rock Filters and Grass Plots (4/4)          | DWG. B-1  | Building Works Mwariki Pumping Station, Plan and Elevation                         |
| DWG. N-9  | Njoro STW Outlet Works Longitudinal Section and Cross Section                                | DWG. B-2  | Building Works Staff House, Type C, Plan and Elevation                             |
| DWG. N-10 | Njoro STW Outlet Works, Plan, Longitudinal Section and Cross Section of Outfall              | DWG. B-3  | Building Works Staff House, Type D, Plan and Elevation                             |
| DWG. T-1  | Town STW General Plan  | DWG. B-4  | Building Works Town STW Control Office, Plan and Elevation                         |
| DWG. T-2  | Town STW Hydraulic Profile   | DWG. B-5  | Building Works Water Quality Testing Laboratory, Plan and Elevation (1/2)          |
| DWG. T-3  | Town STW 3,200 m <sup>3</sup> /day Line, Inlet Works, Plan and Sections                      | DWG. B-6  | Building Works Water Quality Testing Laboratory, Plan and Elevation (2/2)          |
| DWG. T-4  | Town STW 3,200 m <sup>3</sup> /day Line, Inlet Pipe Longitudinal Section and Cross Sections  |           |  |
| DWG. T-5  | Town STW 3,400 m <sup>3</sup> /day Line, Inlet Pipe Longitudinal Section and Cross Sections  |           |  |
| DWG. T-6  | Town STW Plan for Waste Stabilization Ponds, Rock Filters and Grass Plots                    |           |  |
| DWG. T-7  | Town STW Sections of Waste Stabilization Ponds, Rock Filters and Grass Plots (1/5)           |           |  |
| DWG. T-8  | Town STW Sections of Waste Stabilization Ponds, Rock Filters and Grass Plots (2/5)           |           |  |
| DWG. T-9  | Town STW Sections of Waste Stabilization Ponds, Rock Filters and Grass Plots (3/5)           |           |  |



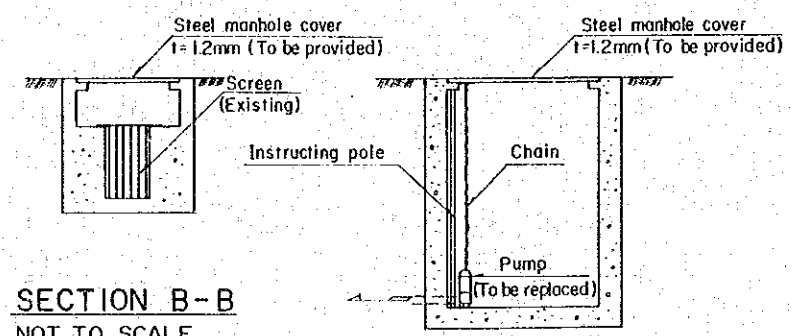
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| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT<br>JAPAN INTERNATIONAL COOPERATION AGENCY | TITLE<br>General Plant of the Project |
|---|--|---------------------------------------|



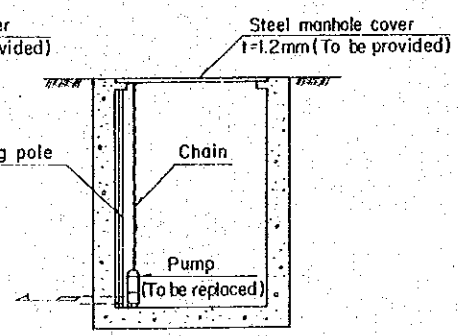
PLAN SCALE A



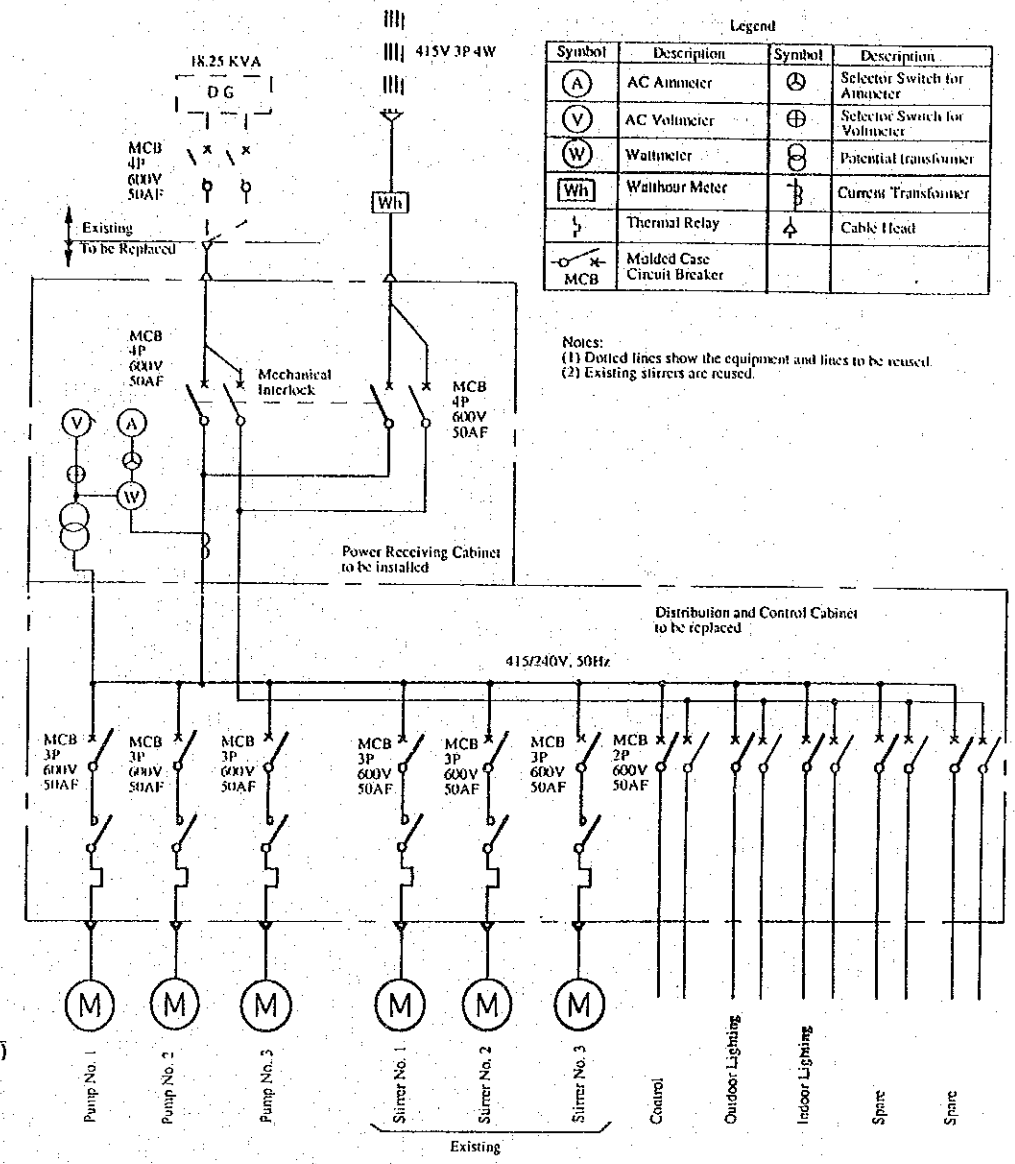
SECTION A-A NOT TO SCALE



SECTION B-B NOT TO SCALE



SECTION C-C NOT TO SCALE



Legend

| Symbol | Description                 | Symbol | Description                   |
|--------|-----------------------------|--------|-------------------------------|
| (A)    | AC Ammeter                  | (⊗)    | Selector Switch for Ammeter   |
| (V)    | AC Voltmeter                | (⊕)    | Selector Switch for Voltmeter |
| (W)    | Wattmeter                   | (⊖)    | Potential transformer         |
| (Wh)   | Watt-hour Meter             | (⊕)    | Current Transformer           |
| (TR)   | Thermal Relay               | (⊕)    | Cable Head                    |
| (MCB)  | Molded Case Circuit Breaker |        |                               |

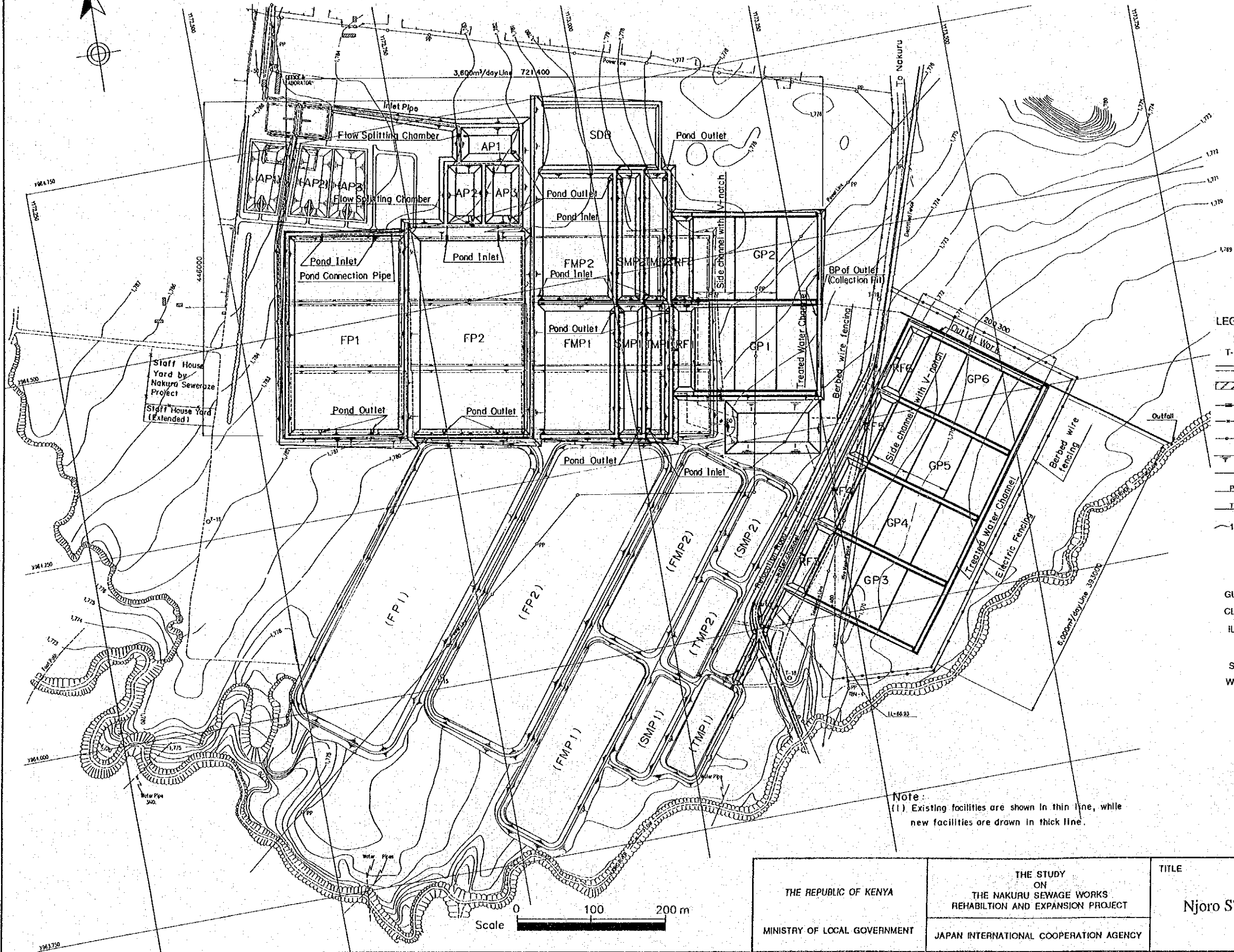
Notes:  
 (1) Dotted lines show the equipment and lines to be reused.  
 (2) Existing stirrers are reused.

SINGLE LINE DIAGRAM

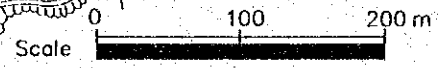


Note:  
 (1) Diesel generator shall be removed from existing building and be installed at new building

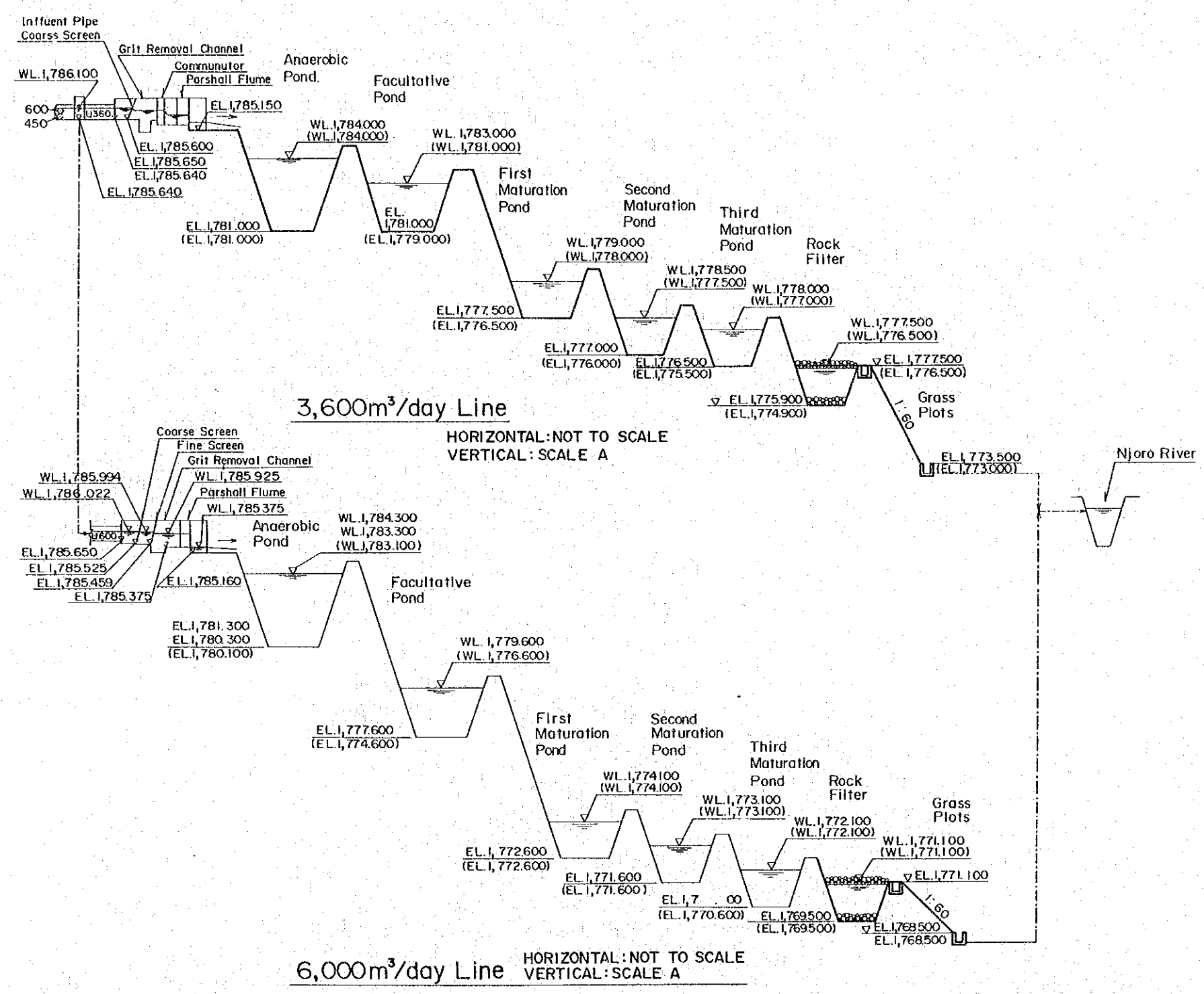
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|   | JAPAN INTERNATIONAL COOPERATION AGENCY  |  |



Note:  
 (1) Existing facilities are shown in thin line, while new facilities are drawn in thick line.



|   |  |                                     |
|---|--|-------------------------------------|
| THE REPUBLIC OF KENYA<br><br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT<br><br>JAPAN INTERNATIONAL COOPERATION AGENCY | TITLE<br><br>Njoro STW General Plan |
|---|--|-------------------------------------|



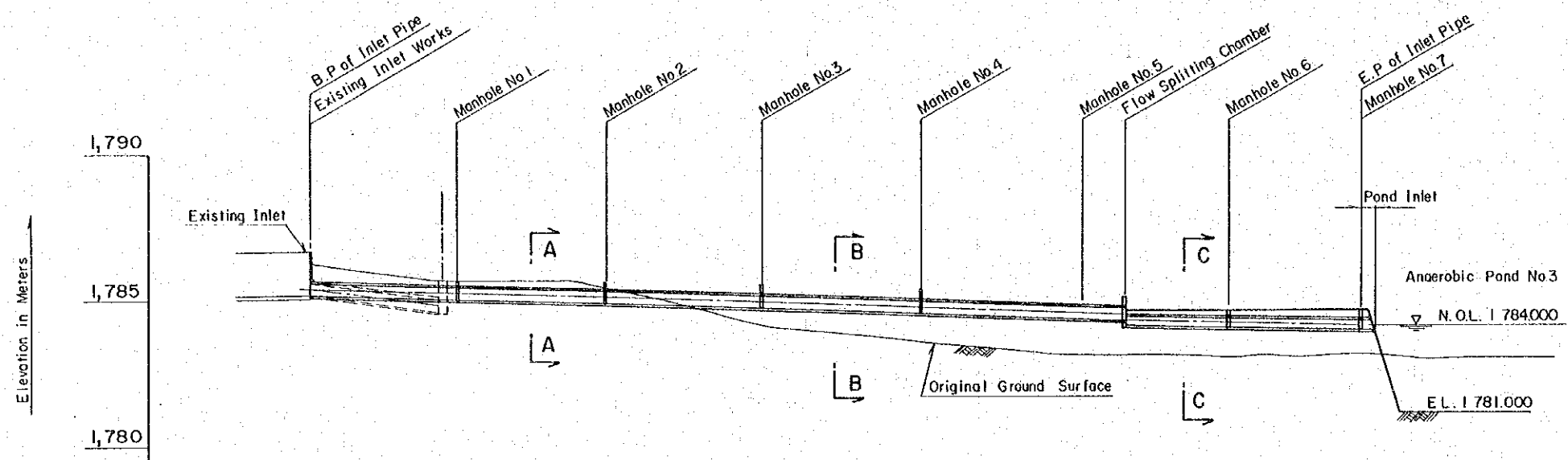
Note :

- (1) In case two elevations are shown, the upper figure is of the 1st pond and the lower figure of the 2nd pond.
- (2) Existing facility is shown in a thin line and rehabilitation / additional facility in thicker line.



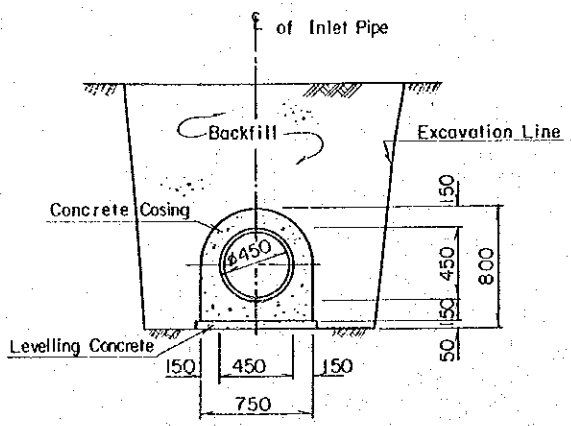
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| <p>THE REPUBLIC OF KENYA</p> <p>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY ON THE NAKURU SEWAGE WORKS REHABILITATION AND EXPANSION PROJECT</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE</p> <p>Njoro STW Hydraulic Profile</p> |
|--|--|---|



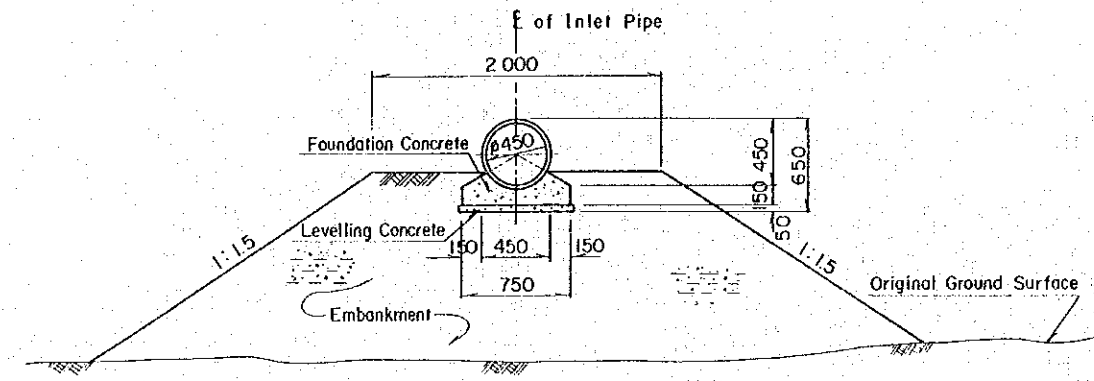


|                           |  |                          |          |                          |          |
|---------------------------|--|--------------------------|----------|--------------------------|----------|
| ORIGINAL GROUND LEVEL (m) |  | 1785.250                 | 1785.300 | 1784.000                 | 1783.000 |
| FINISHED GROUND LEVEL (m) |  | 1785.150                 | 1784.817 | 1784.217                 | 1783.617 |
| INVERT LEVEL (m)          |  | 1785.150                 | 1784.817 | 1784.017                 | 1783.500 |
| GRADIENT                  |  | 1:300                    |          | 1:200                    |          |
| PIPE AND SIZE             |  | 450mm Dia. Concrete Pipe |          | 300mm Dia. Concrete Pipe |          |
| CHAINAGE (m)              |  | 0+000                    | 0+000    | 280+000                  | 315+000  |

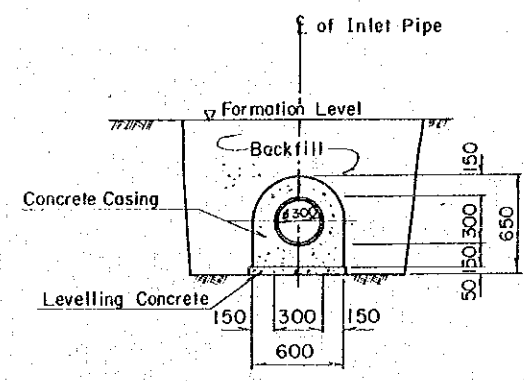
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VERTICAL : SCALE B



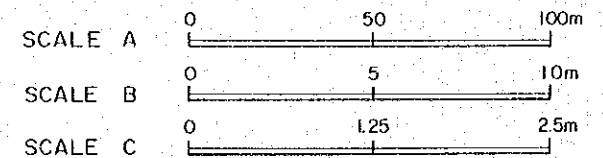
SECTION A-A SCALE C



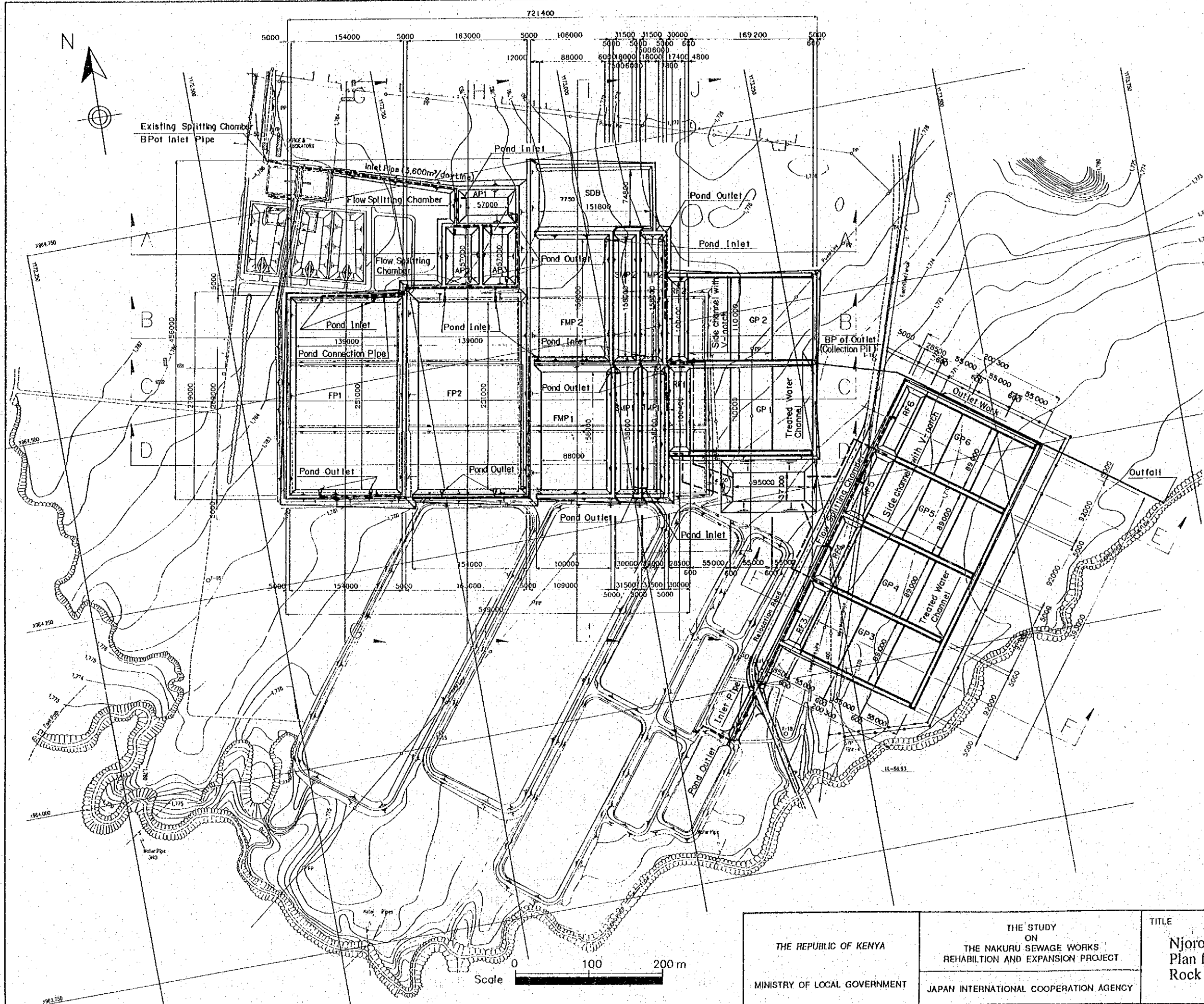
SECTION B-B SCALE C



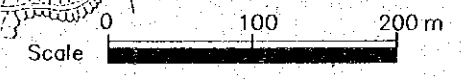
SECTION C-C SCALE C



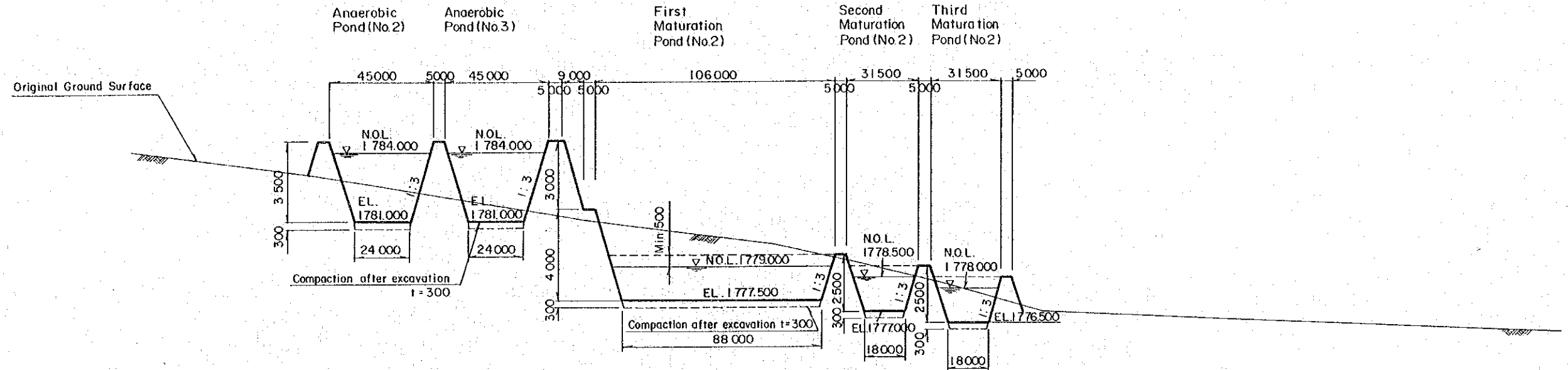
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| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE<br>Njoro STW 3,600 m <sup>3</sup> /day Line,<br>Inlet Pipe Longitudinal Section<br>and Cross Sections |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   |   |



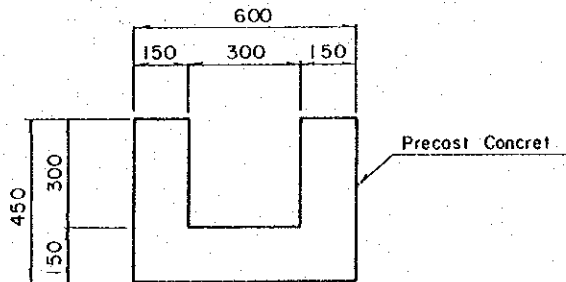
- LEGEND**
- T-4 ⊙ Traverse Point (I.P.C)
  - Untarmaced Road & Track
  - ▨ House Building
  - Trench
  - Barbed Wire Fence, Mesh Fence
  - Electrified Fence
  - Embankment
  - Gate Valve
  - PP-PL Power Post & Power Line
  - IP-IL Telephone Post & Telephone Line
  - ~1,775~ Contour Line (Elevation Above Mean Sea Level V.1.1m)
  - 77.74 Spot Height (Elevation Above Mean Sea Level 1,774.74m)
  - GL=84.16 Ground Level 1,784.16m
  - CL=84.20 Crown Level 1,784.20m
  - IL=79.78 Invert Level 1,779.78m
  - ⊙ Trees
  - SL ○ Security Light
  - WT ● Water Top
  - AP Anaerobic Pond
  - FP Facultative Pond
  - FMP First Maturation Pond
  - SMP Second Maturation Pond
  - TMP Third Maturation Pond
  - RF Rock Filter
  - GP Grass Plots
  - SDB Sludge Drying Bed



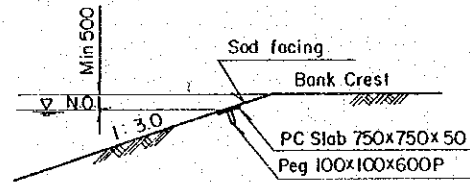
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| <p>THE REPUBLIC OF KENYA</p> <p>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY ON THE NAKURU SEWAGE WORKS REHABILITATION AND EXPANSION PROJECT</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE</p> <p><b>Njoro STW</b><br/>Plan for Waste Stabilization Ponds, Rock Filters and Grass Plots</p> |
|--|--|---|



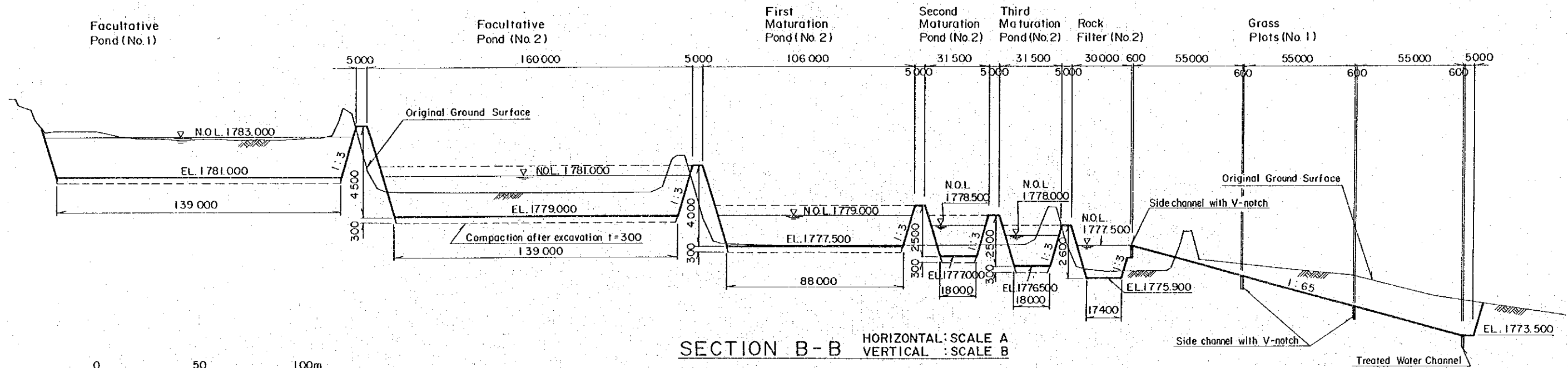
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VERTICAL: SCALE B



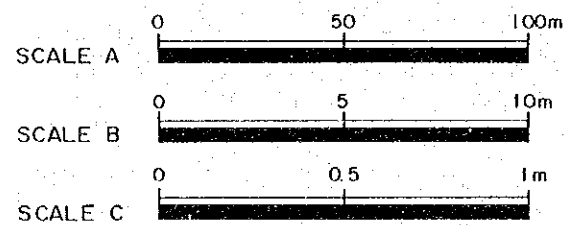
DETAIL "X" SCALE C



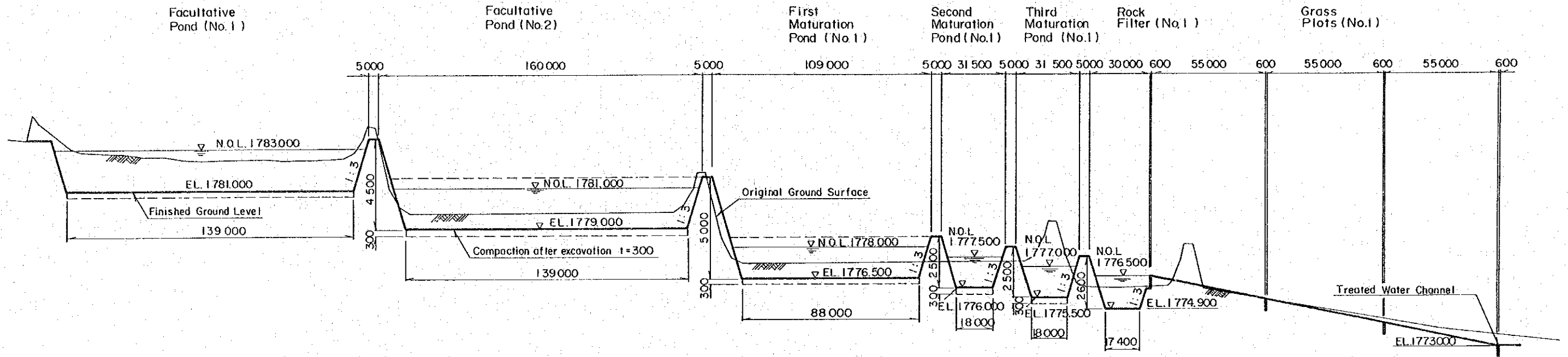
SLOPE PROTECTION DETAIL SCALE B



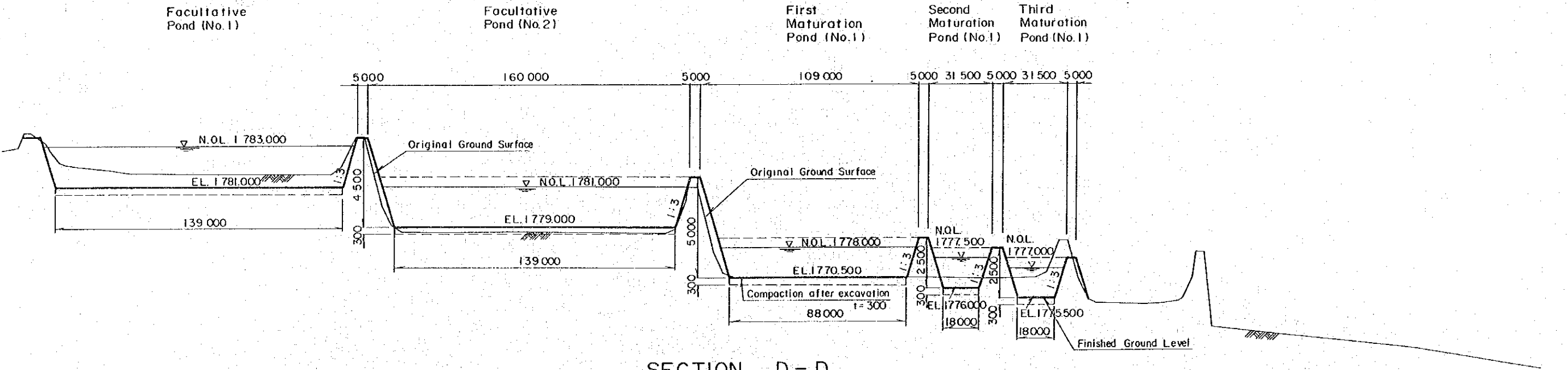
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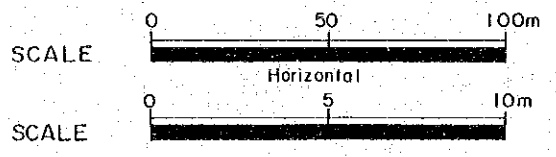
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| <p>THE REPUBLIC OF KENYA<br/>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY<br/>ON<br/>THE NAKURU SEWAGE WORKS<br/>REHABILITATION AND EXPANSION PROJECT<br/>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE<br/>Njoro STW<br/>Sections of Waste Stabilization Ponds,<br/>Rock Filters and Grass Plots (1/4)</p> |
|---|---|--|



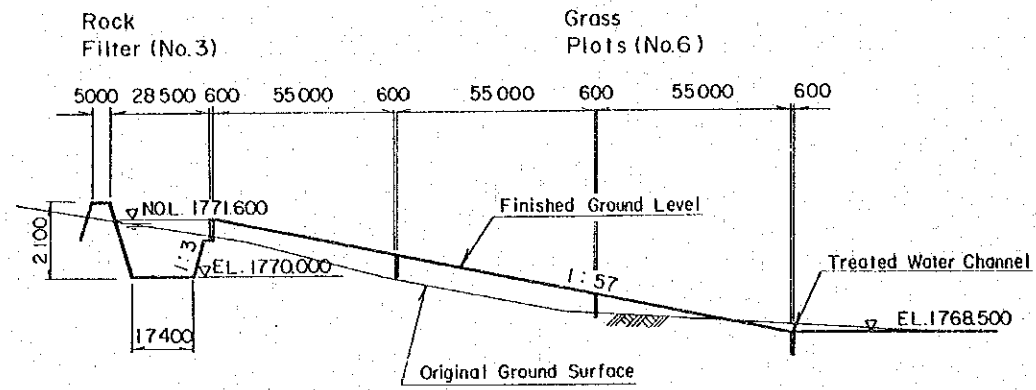
SECTION C-C



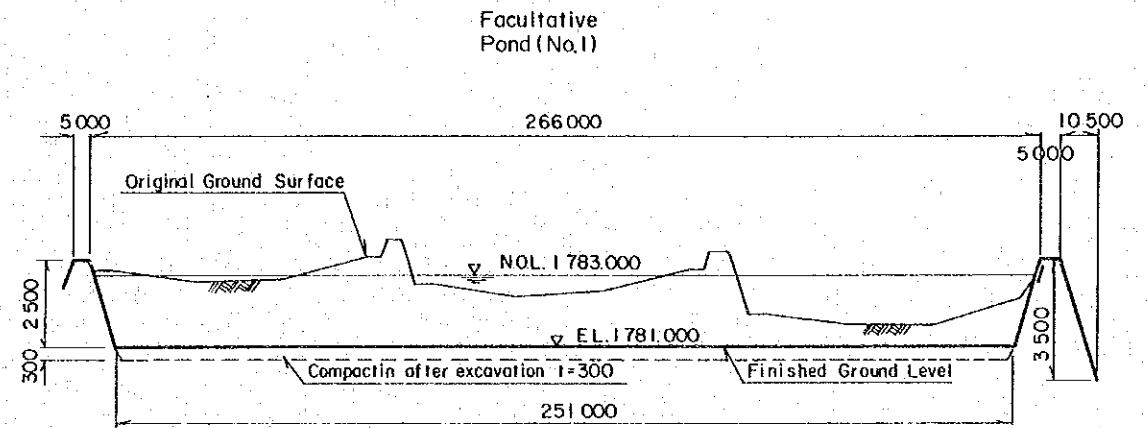
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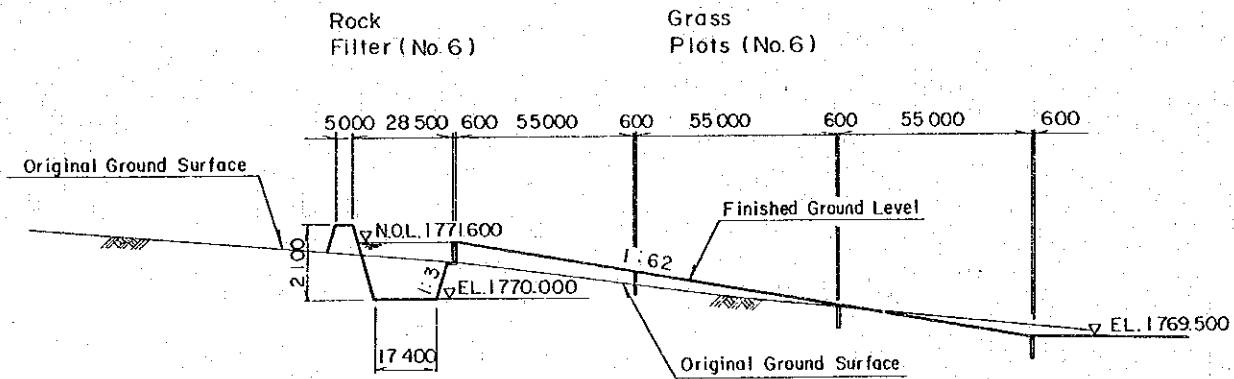
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|---|--|--|



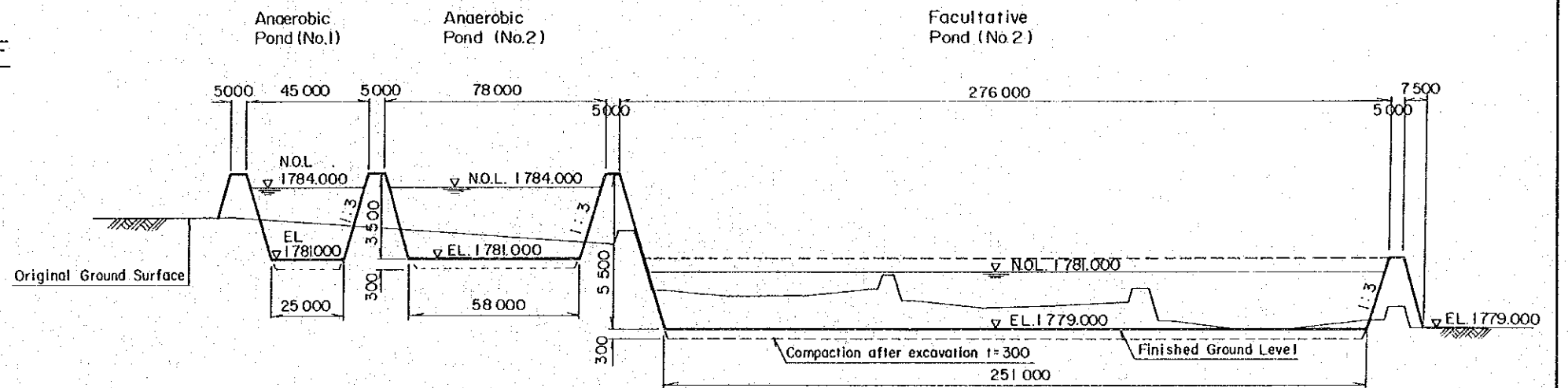
SECTION E-E



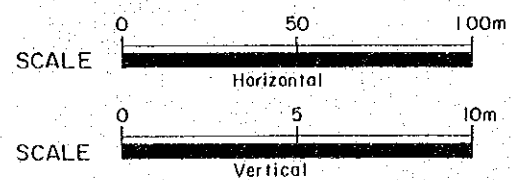
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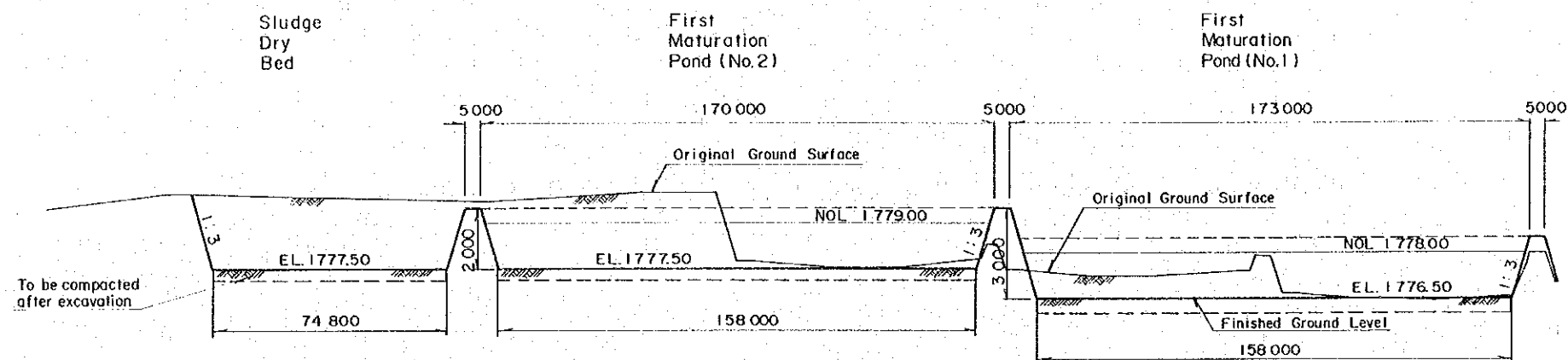
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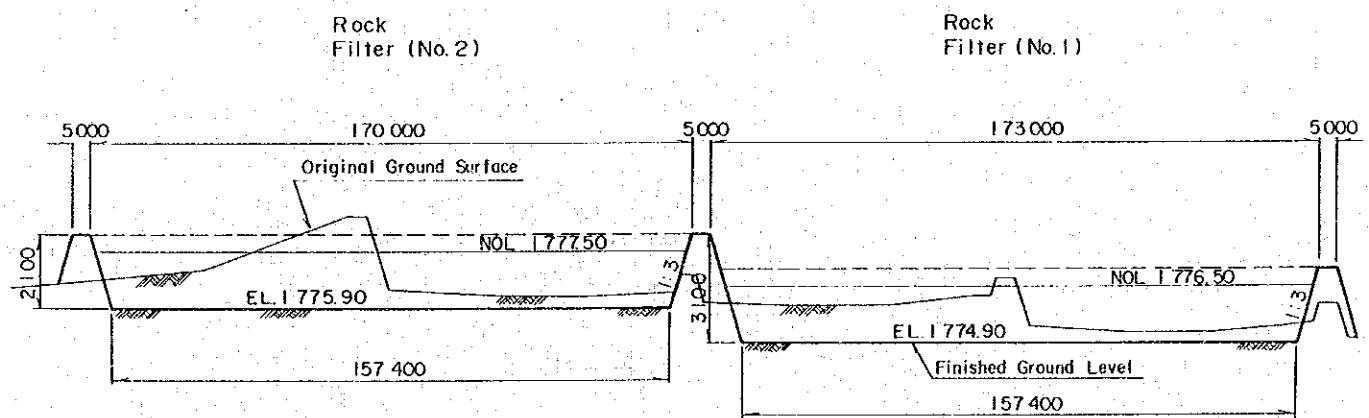
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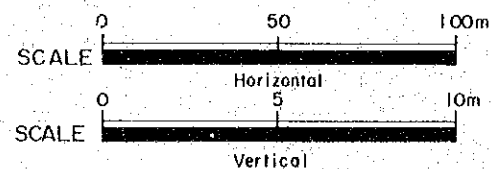
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|   | JAPAN INTERNATIONAL COOPERATION AGENCY   |  |



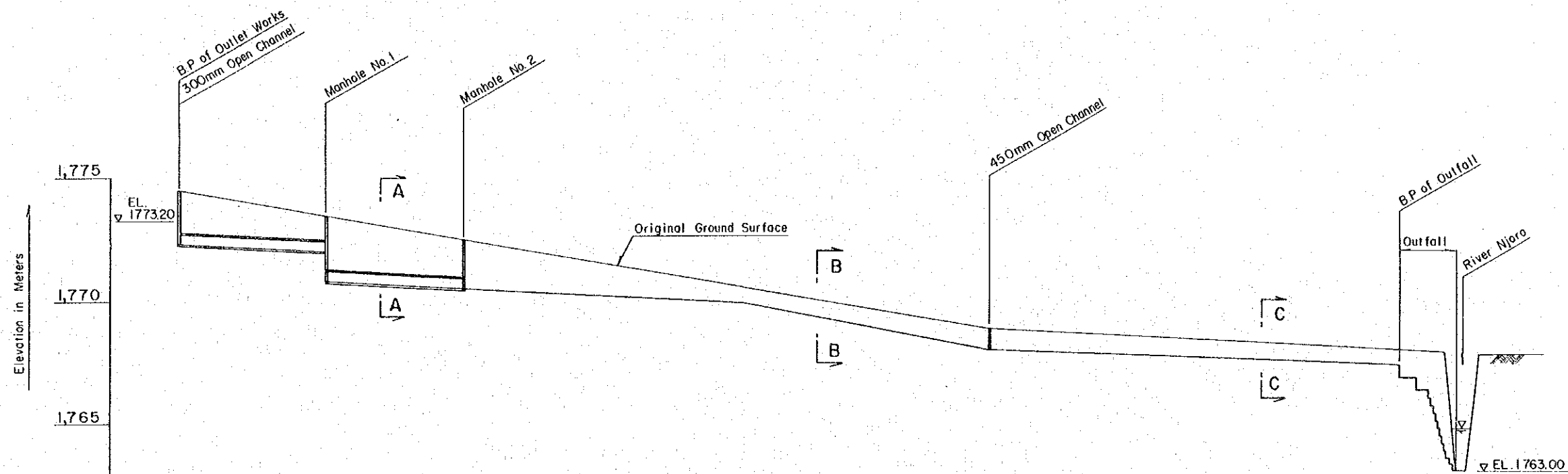
SECTION I - I



SECTION J - J

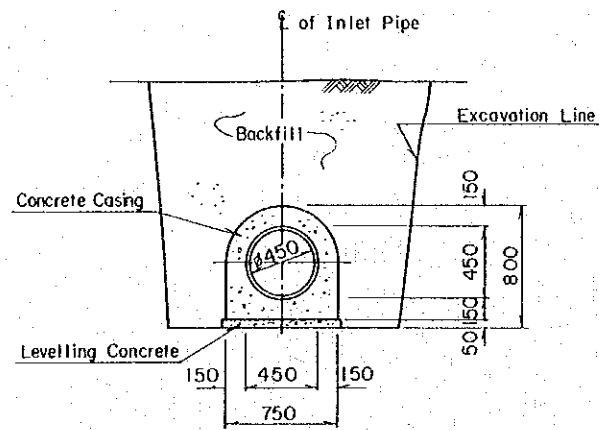


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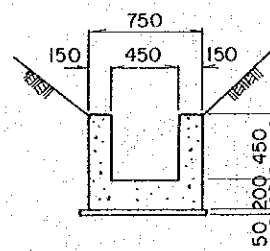


|                            |                          |          |                    |                    |          |
|----------------------------|--------------------------|----------|--------------------|--------------------|----------|
| ORIGINAL GROUND LEVELS (m) | 1774.400                 | 1772.500 | 1768.800           | 1768.000           |          |
| FINISHED GROUND LEVELS (m) |                          |          |                    |                    |          |
| INVERT LEVELS (m)          | 1771.650                 | 1770.500 | 1769.925           | 1767.300           | 1763.000 |
| GRADIENT                   | 1 : 200                  |          | 1 : 50             | 1 : 235            |          |
| PIPE AND SIZE              | 450mm Dia. Concrete Pipe |          | 450mm Open Channel | 675mm Open Channel |          |
| CHAIANGE (m)               | 0000                     | 115000   | 230000             | 330000             | 495000   |

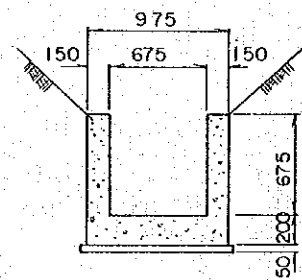
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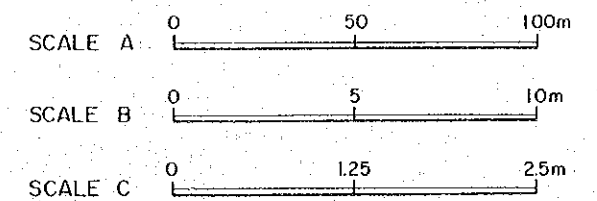
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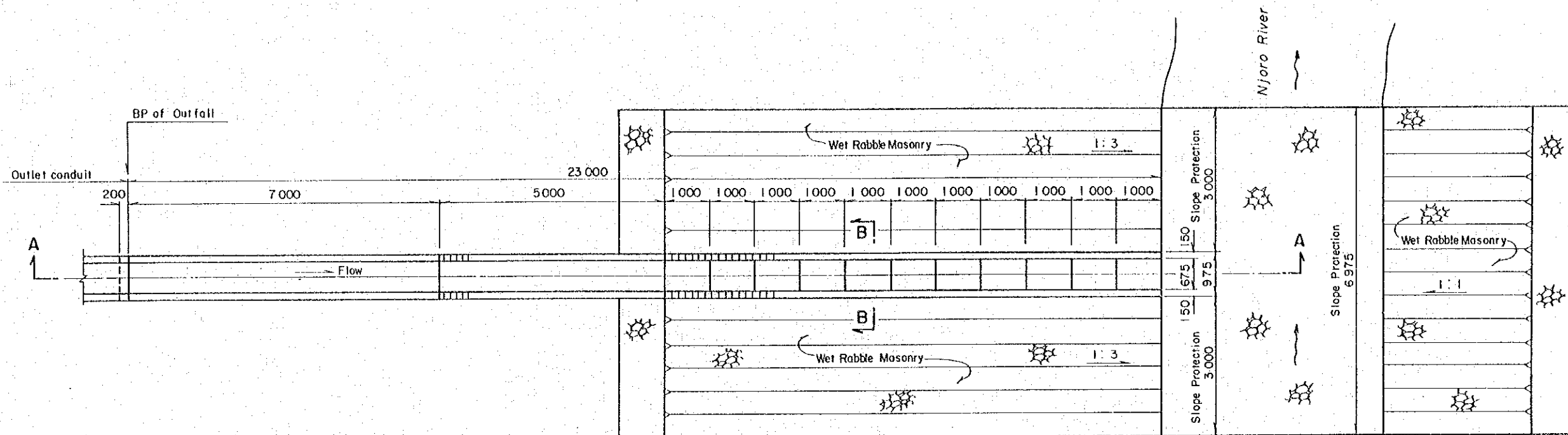
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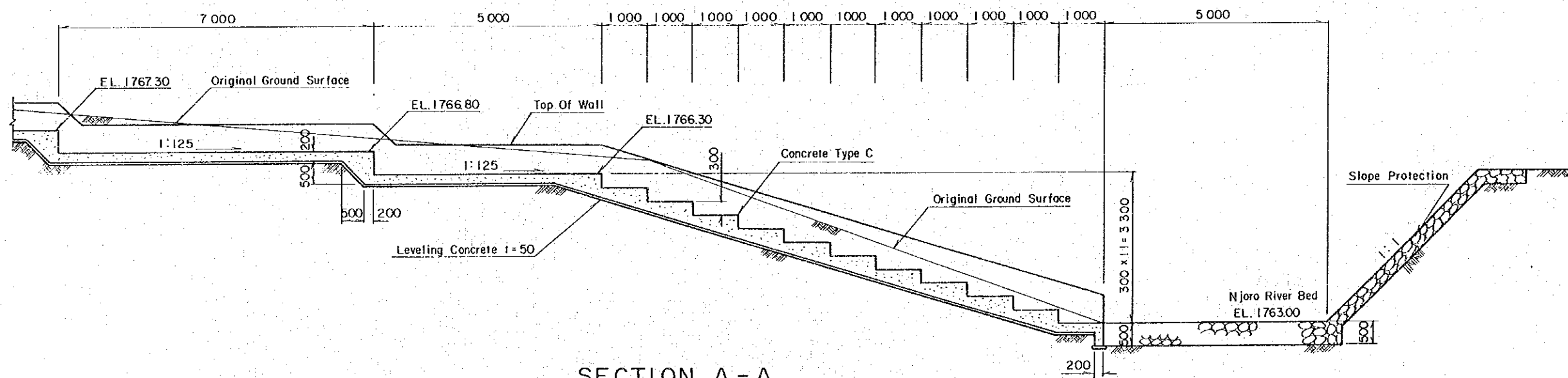
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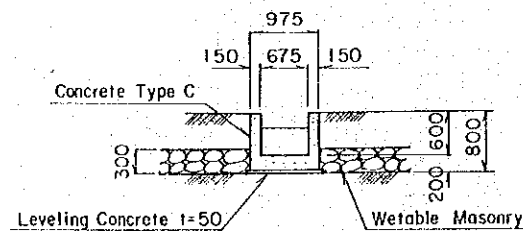
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| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE<br>Njoro STW<br>Outlet Works Longitudinal Section<br>and Cross Section |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   |  |



PLAN



SECTION A-A

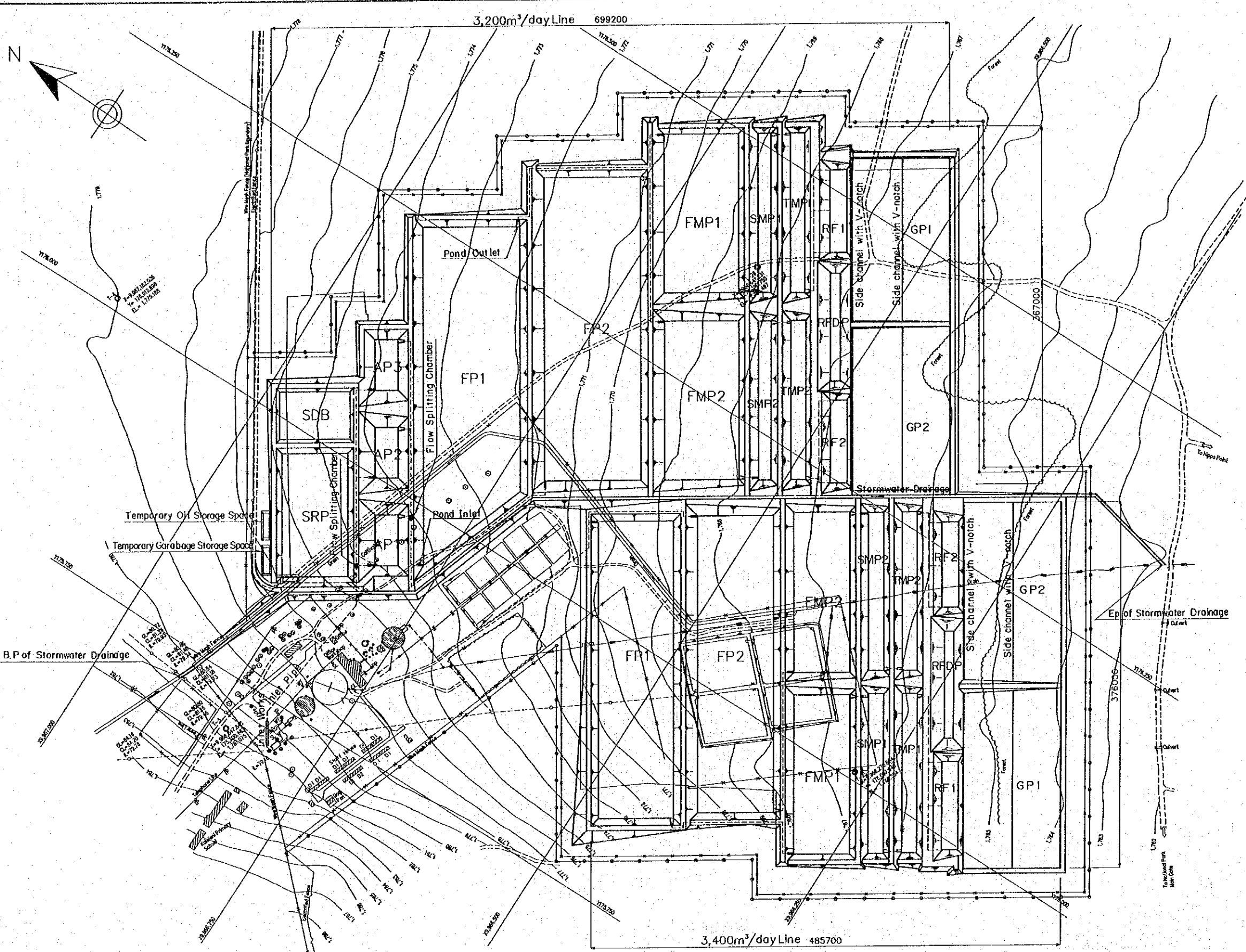


SECTION B-B



|   |   |  |
|---|---|--|
| <p>THE REPUBLIC OF KENYA<br/>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY<br/>ON<br/>THE NAKURU SEWAGE WORKS<br/>REHABILITATION AND EXPANSION PROJECT<br/>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE<br/>Njoro STW<br/>Outlet Works, Plan, Longitudinal Section<br/>and Cross Section of Outfall</p> |
|---|---|--|

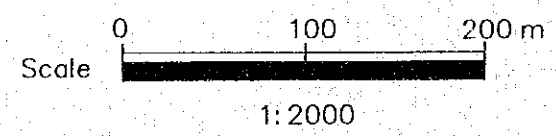




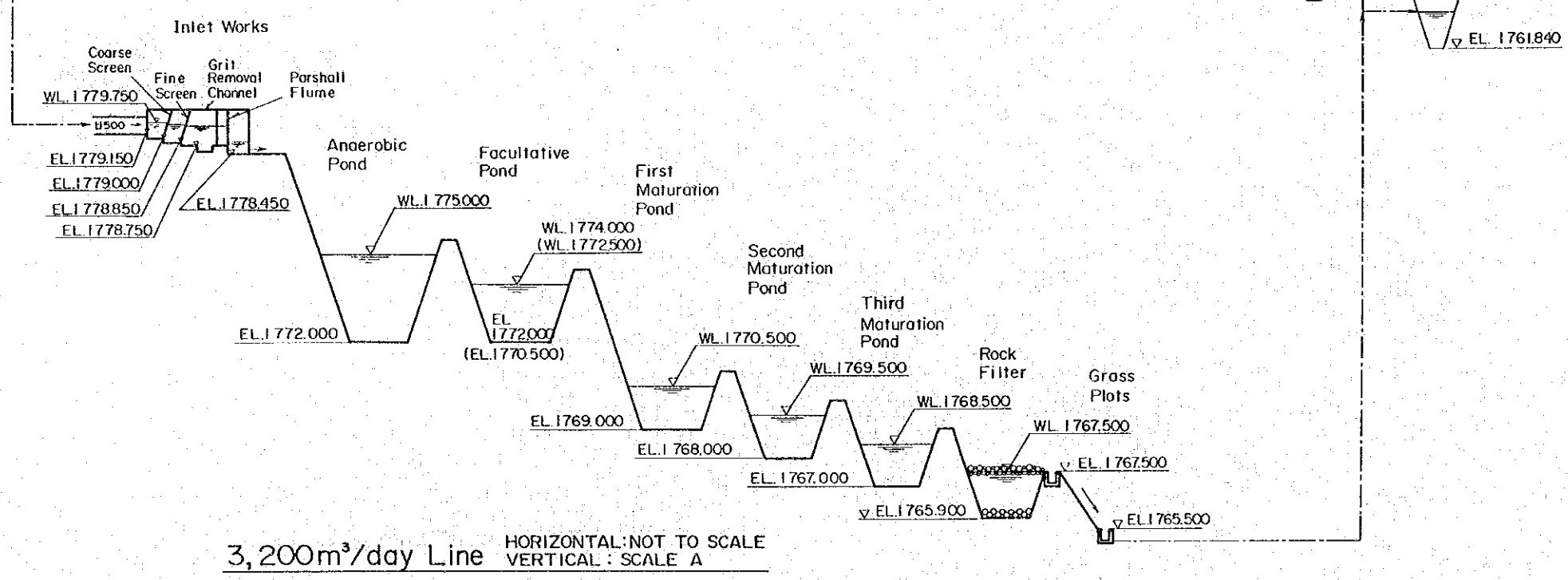
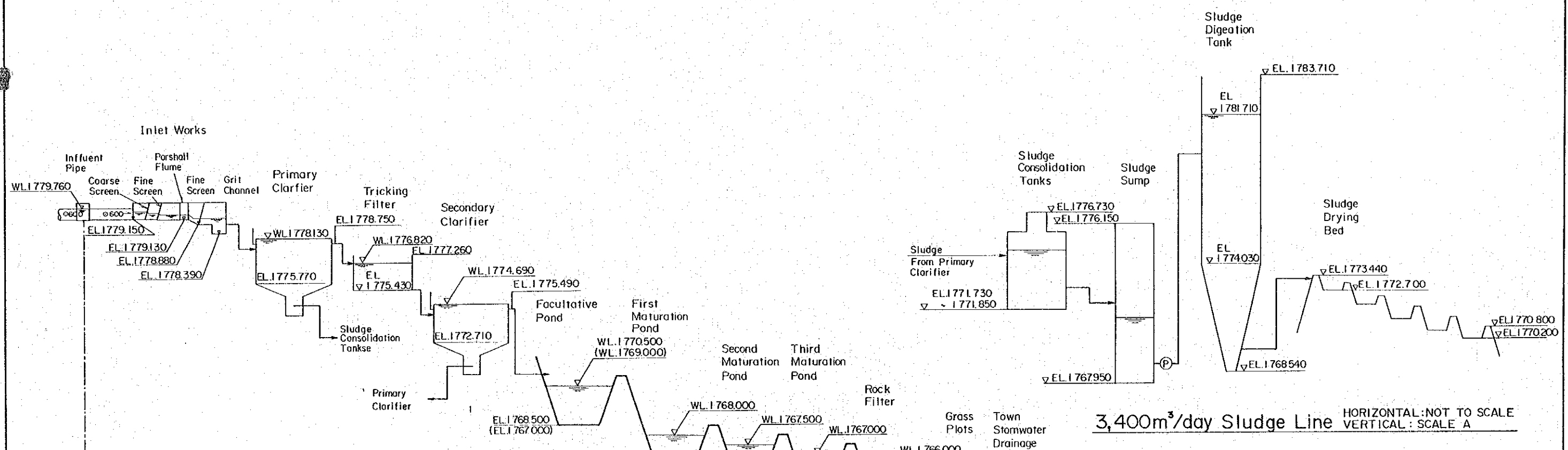
**LEGEND**

|          |  |
|----------|--|
| T-4 ⊙    | Traverse Point (L.P.C)                                 |
| —        | Unlarmaced Road & Track                                |
| ▨        | House Building   |
| —        | Trench   |
| —        | Barbed Wire Fence, Mesh Fence                          |
| —        | Electrified Fence                                      |
| —        | Embankment   |
| —        | Gate Valve   |
| —        | Power Post & Power Line                                |
| —        | Telephone Post & Telephone Line                        |
| ~ 1,775  | Contour Line (Elevation Above Mean Sea Level V.1.1m)   |
| 77.74    | Spot Height (Elevation Above Mean Sea Level 1,774.74m) |
| GL=84.16 | Ground Level 1,784.16m                                 |
| CL=84.20 | Crown Level 1,784.20m                                  |
| IL=79.78 | Invert Level 1,779.78m                                 |
| ⊙        | Trees  |
| SL ⊙     | Security Light   |
| WT ●     | Water Top  |
| AP       | Anaerobic Pond   |
| FP       | Facultative Pond                                       |
| FMP      | First Maturation Pond                                  |
| SMP      | Second Maturation Pond                                 |
| TMP      | Third Maturation Pond                                  |
| RF       | Rock Filter  |
| GP       | Grass Plots  |
| SDB      | Sludge Drying Bed                                      |

Temporary Oil Storage Space  
 Temporary Garbage Storage Space



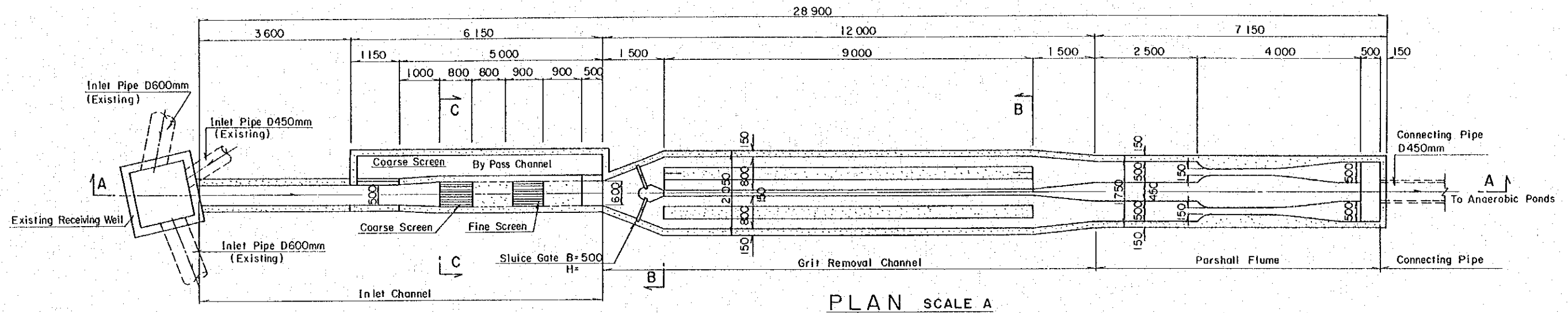
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|---|--|-----------------------|
| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE                 |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   | Town STW General Plan |



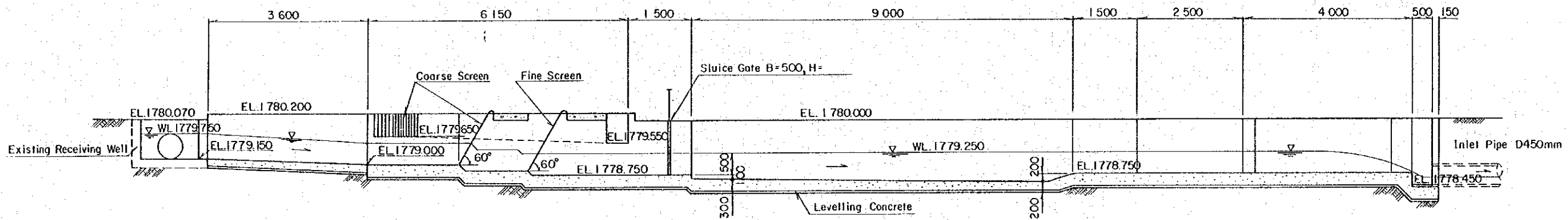
Note: — Proposed Facilities  
 — Existing Facilities



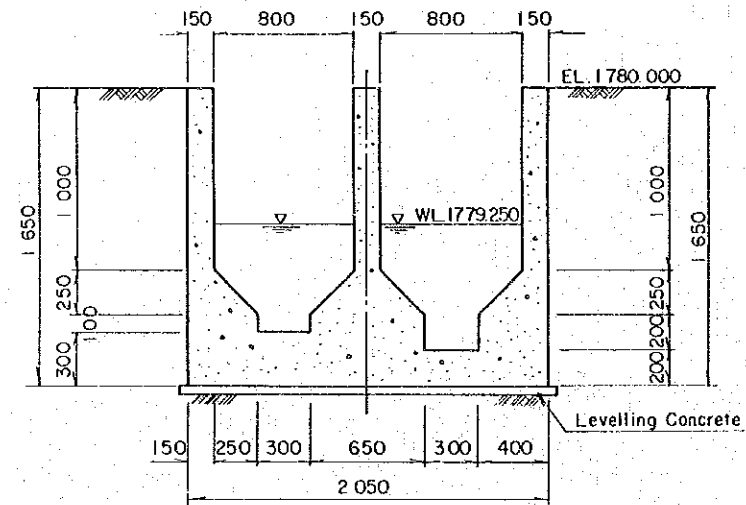
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| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE                      |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   | Town STW Hydraulic Profile |



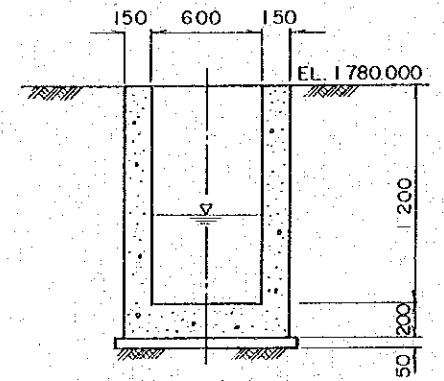
PLAN SCALE A



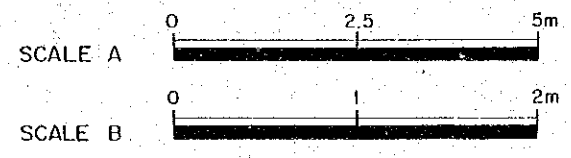
SECTION A-A SCALE A



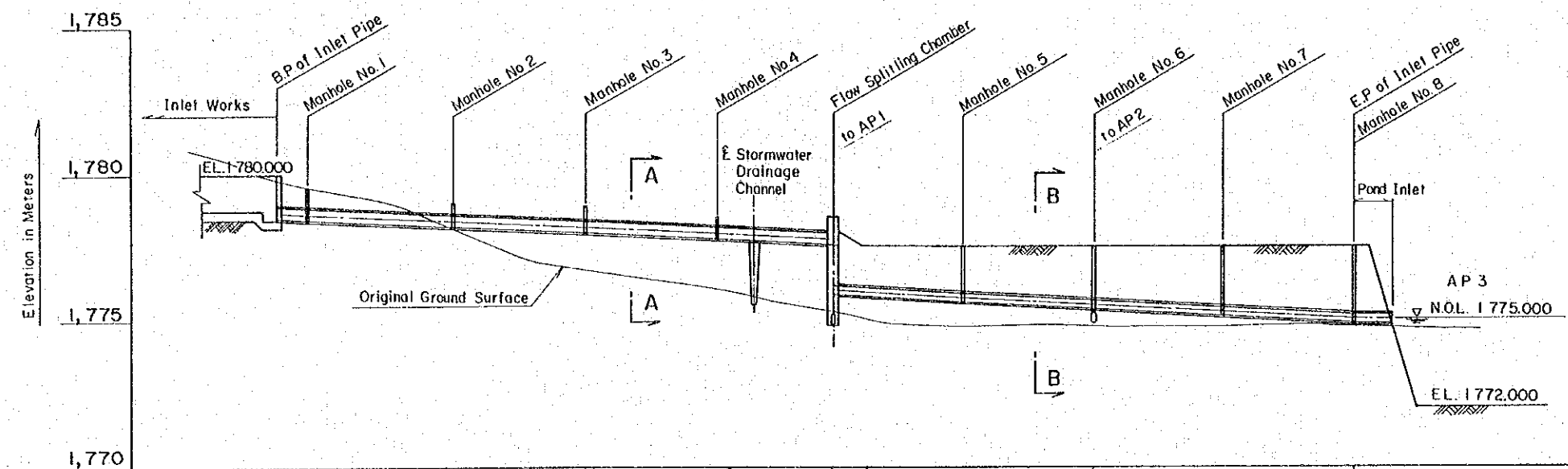
SECTION B-B SCALE B



SECTION C-C SCALE B

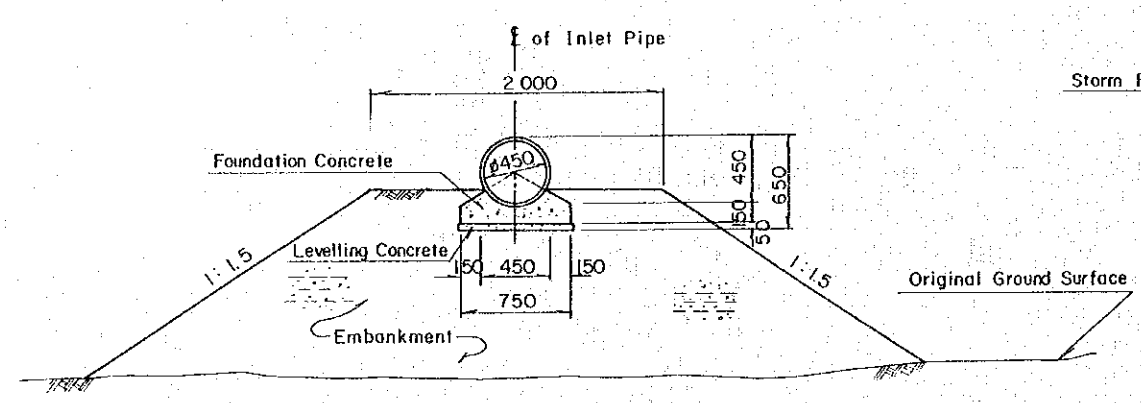


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|---|---|--|
| <p>THE REPUBLIC OF KENYA<br/>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY<br/>ON<br/>THE NAKURU SEWAGE WORKS<br/>REHABILITATION AND EXPANSION PROJECT<br/>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE<br/>Town STW 3,200 m<sup>3</sup>/day Line,<br/>Inlet Works, Plan and Sections</p> |
|---|---|--|

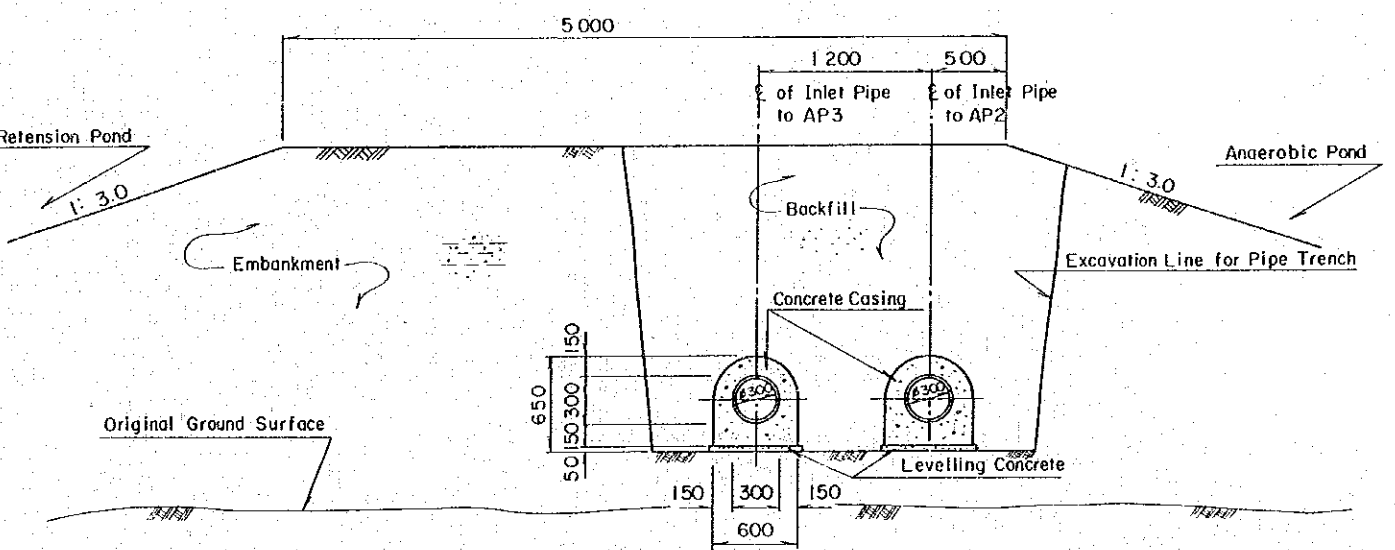


|                           |           |                          |           |           |           |                                     |           |                          |           |
|---------------------------|-----------|--------------------------|-----------|-----------|-----------|-------------------------------------|-----------|--------------------------|-----------|
| ORIGINAL GROUND LEVEL (m) |           | 1,779.000                | 1,778.000 | 1,777.000 | 1,776.000 | 1,775.000                           | 1,774.000 | 1,773.000                | 1,772.000 |
| FINISHED GROUND LEVEL (m) | 1,778.450 | 1,778.000                | 1,777.500 | 1,777.000 | 1,776.500 | 1,776.000                           | 1,775.500 | 1,775.000                | 1,774.500 |
| INVERT LEVEL (m)          | 1,778.450 | 1,778.000                | 1,777.500 | 1,777.000 | 1,776.500 | 1,776.000                           | 1,775.500 | 1,775.000                | 1,774.500 |
| GRADIENT                  |           | 1 : 200                  |           |           |           | 1 : 90                              |           |                          |           |
| PIPE AND SIZE             |           | 450mm Dia. Concrete Pipe |           |           |           | 300mm Dia. Concrete Pipe<br>2 Lanes |           | 300mm Dia. Concrete Pipe |           |
| CHAINAGE (m)              | 0.000     | 38.000                   | 63.000    | 87.000    | 155.000   | 190.000                             | 202.000   | 280.000                  | 370.000   |

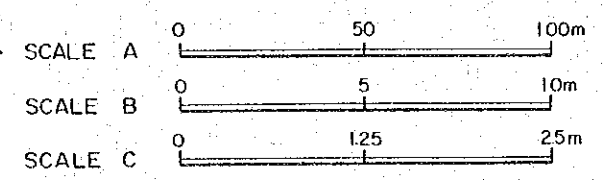
LONGITUDINAL SECTION HORIZONTAL : SCALE A  
VERTICAL : SCALE B



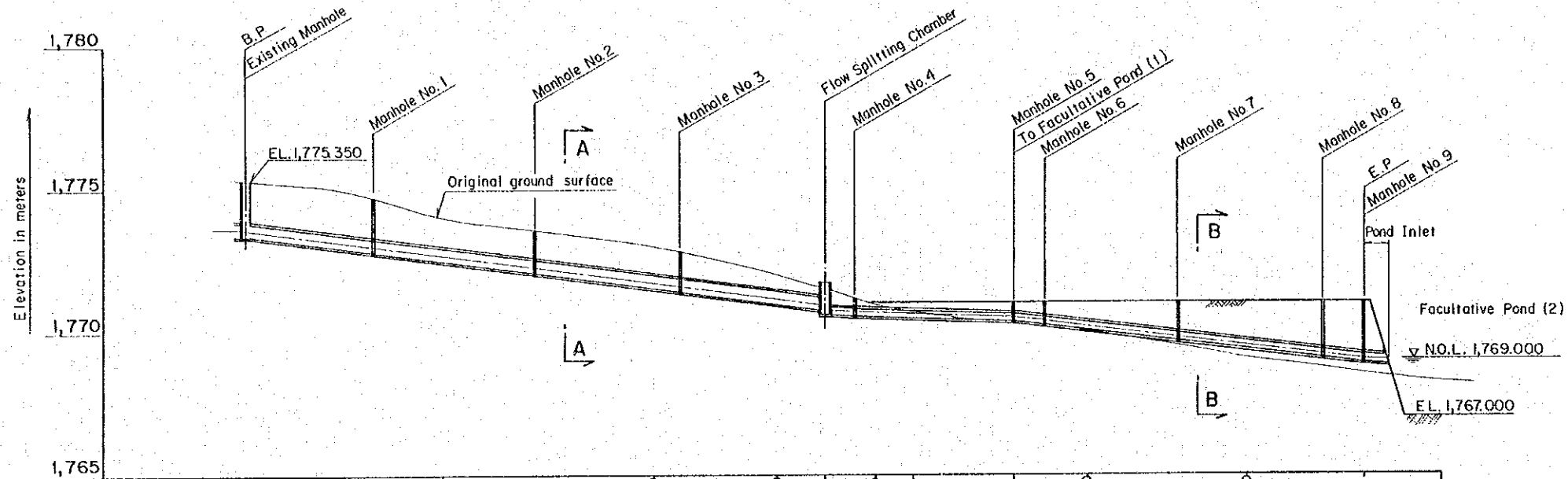
SECTION A-A SCALE C



SECTION B-B SCALE C

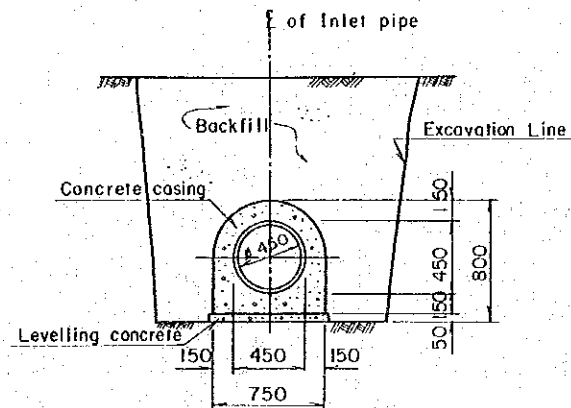


|   |  |   |
|---|--|---|
| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE   |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   | Town STW 3,200 m <sup>3</sup> /day Line,<br>Inlet Pipe Longitudinal Section<br>and Cross Sections |

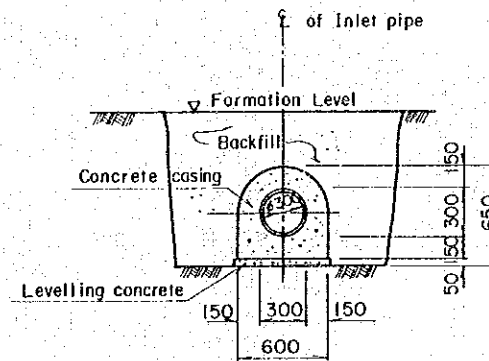


|                           |                          |           |           |                                     |           |           |                          |           |
|---------------------------|--------------------------|-----------|-----------|-------------------------------------|-----------|-----------|--------------------------|-----------|
| ORIGINAL GROUND LEVEL (m) | 1,775.350                | 1,775.000 | 1,774.000 | 1,773.000                           | 1,772.000 | 1,771.000 | 1,770.000                | 1,769.000 |
| FINISHED GROUND LEVEL (m) | 1,775.350                | 1,775.000 | 1,774.000 | 1,773.000                           | 1,772.000 | 1,771.000 | 1,770.000                | 1,769.000 |
| INVERT LEVEL (m)          | 1,773.370                | 1,773.350 | 1,773.350 | 1,773.350                           | 1,773.350 | 1,773.350 | 1,773.350                | 1,773.350 |
| GRADIENT                  | 1:80                     |           | 1:300     |                                     |           | 1:102     |                          |           |
| PIPE AND SIZE             | 450mm Dia. Concrete Pipe |           |           | 300mm Dia. Concrete Pipe<br>2 Lanes |           |           | 300mm Dia. Concrete Pipe |           |
| CHAINAGE (m)              | 0.000                    | 175.000   | 177.000   | 266.000                             | 266.000   | 388.000   | 388.000                  | 388.000   |

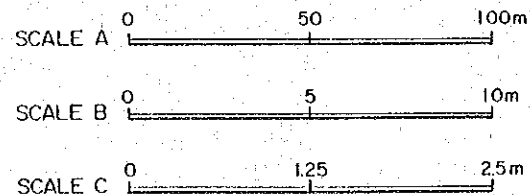
LONGITUDINAL SECTION HORIZONTAL SCALE A  
VERTICAL SCALE B



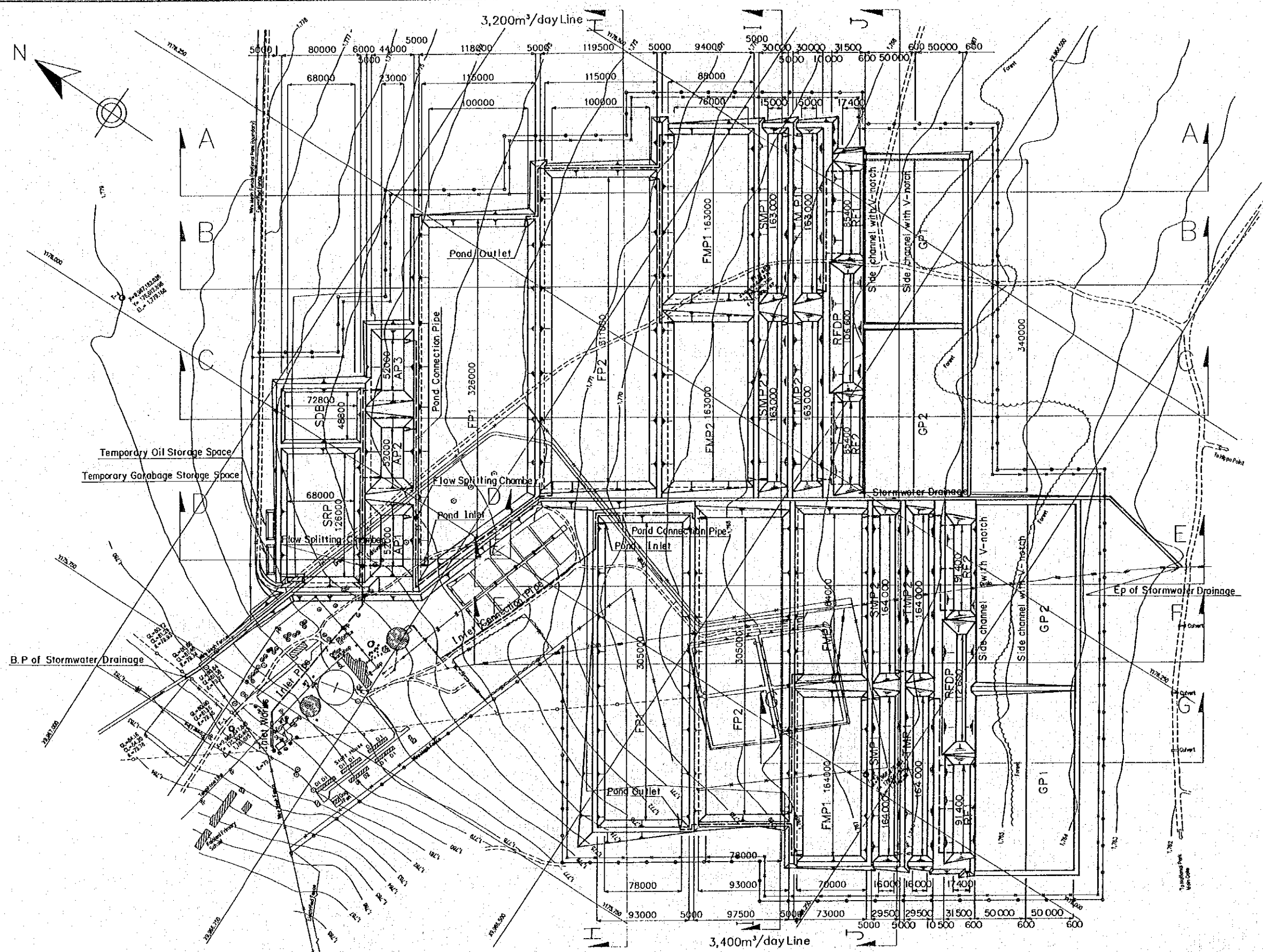
SECTION A-A SCALE C



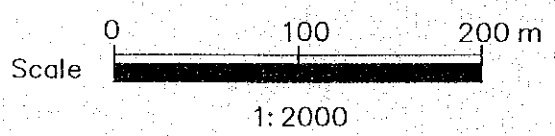
SECTION B-B SCALE C



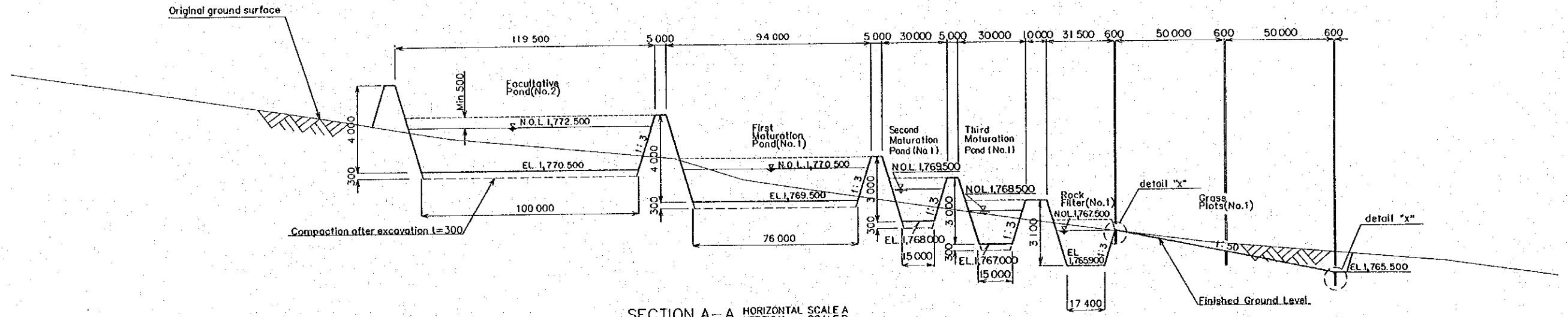
|   |  |  |
|---|--|--|
| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE<br>Town STW 3,400 m <sup>3</sup> /day Line,<br>Inlet Pipe Longitudinal Section<br>and Cross Sections |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   |  |



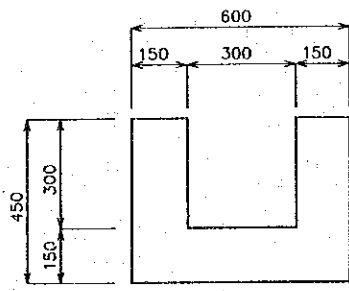
- LEGEND**
- T-4 ⊙ Traverse Point (I.P.C)
  - — — — — Untarmaced Road & Track
  - ▨ House Building
  - — — — — Trench
  - — — — — Barbed Wire Fence, Mesh Fence
  - — — — — Electrified Fence
  - — — — — Embankment
  - — — — — Gate Valve
  - PP-PL Power Post & Power Line
  - IP-TL Telephone Post & Telephone Line
  - ~ 1,775 ~ Contour Line (Elevation Above Mean Sea Level V.1.1m)
  - 77.74 Spot Height (Elevation Above Mean Sea Level 1,774.74m)
  - GL=84.16 Ground Level 1,784.16m
  - CL=84.20 Crown Level 1,784.20m
  - IL=79.78 Invert Level 1,779.78m
  - ⊙ Trees
  - SL ○ Security Light
  - WT ● Water Top
  - AP Anaerobic Pond
  - FP Facultative Pond
  - FMP First Maturation Pond
  - SMP Second Maturation Pond
  - TMP Third Maturation Pond
  - RF Rock Filter
  - GP Grass Plots
  - SDB Sludge Drying Bed



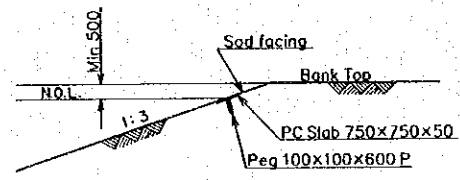
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|---|--|--|
| THE REPUBLIC OF KENYA<br><br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE<br><br>Town STW<br>Plan for Waste Stabilization Ponds,<br>Rock Filters and Grass Plots |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   |  |



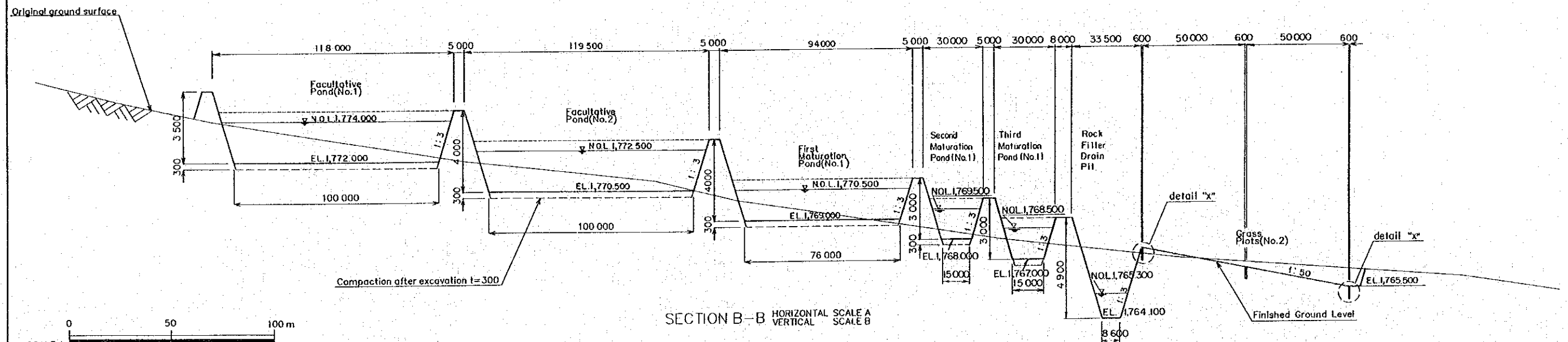
SECTION A-A HORIZONTAL SCALE A  
VERTICAL SCALE B



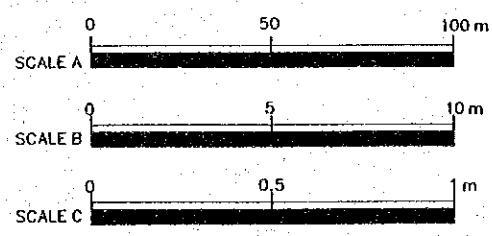
DETAIL "X" SCALE C



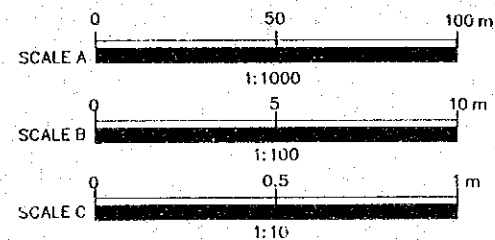
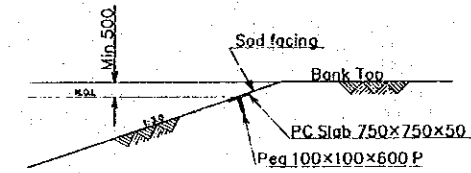
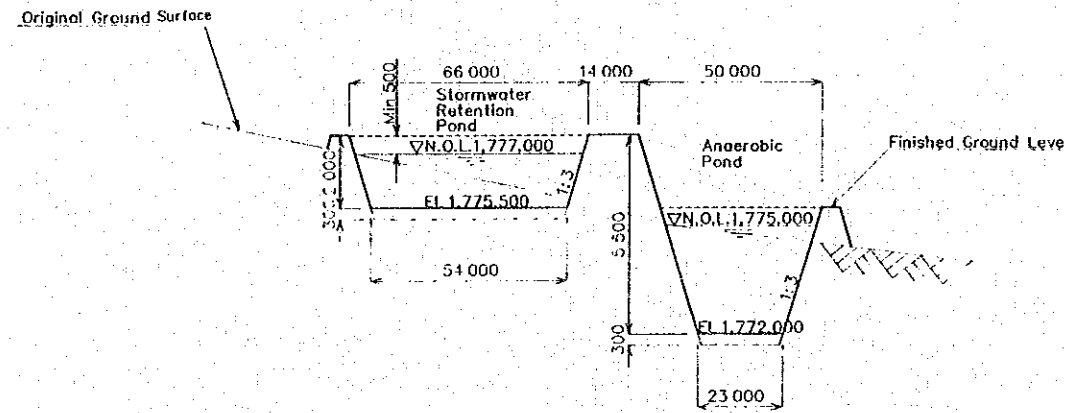
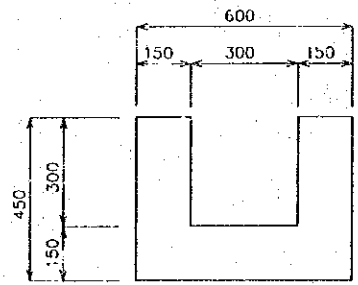
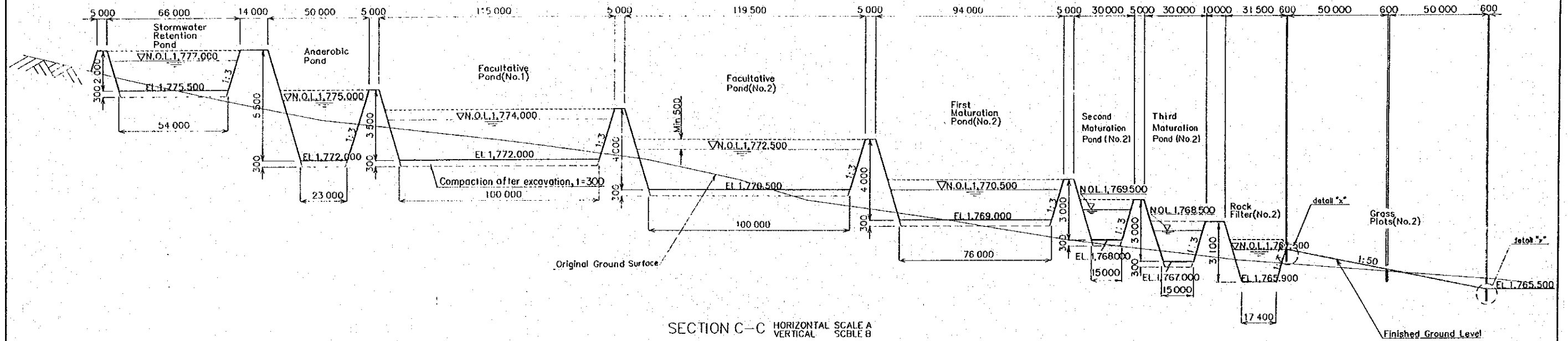
SLOPE PROTECTION DETAIL SCALE B



SECTION B-B HORIZONTAL SCALE A  
VERTICAL SCALE B

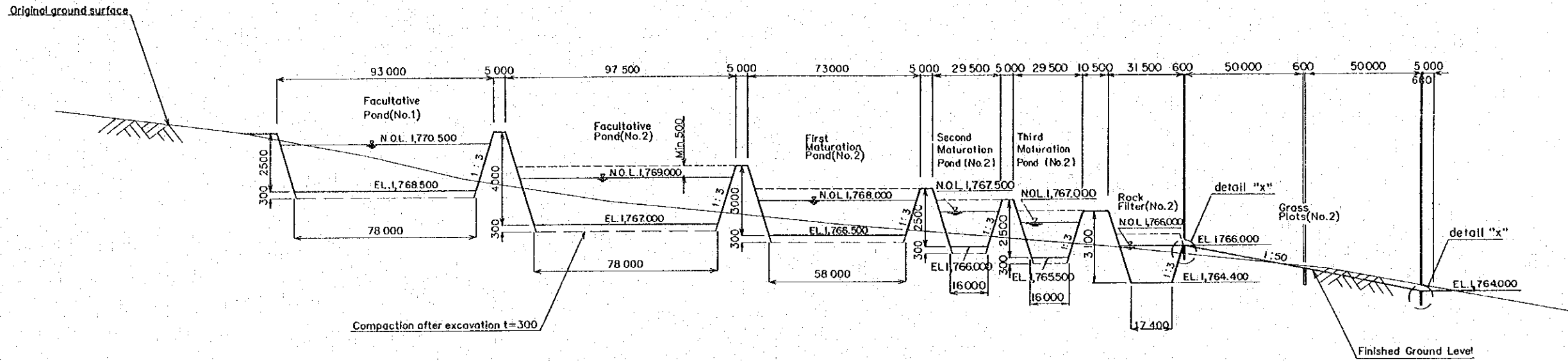


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|---|---|---|
| <p>THE REPUBLIC OF KENYA<br/>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY<br/>ON<br/>THE NAKURU SEWAGE WORKS<br/>REHABILITATION AND EXPANSION PROJECT<br/>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE<br/>Town STW<br/>Sections of Waste Stabilization Ponds,<br/>Rock Filters and Grass Plots (1/5)</p> |
|---|---|---|

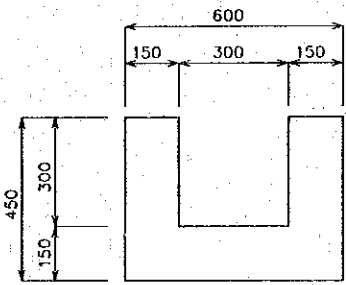


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| <p>THE REPUBLIC OF KENYA<br/>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY ON THE NAKURU SEWAGE WORKS REHABILITATION AND EXPANSION PROJECT<br/>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE<br/>Sections of Waste Stabilization Ponds, Rock Filters and Grass Plots (2/5)</p> |
|---|---|--|

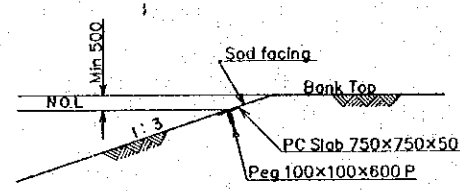




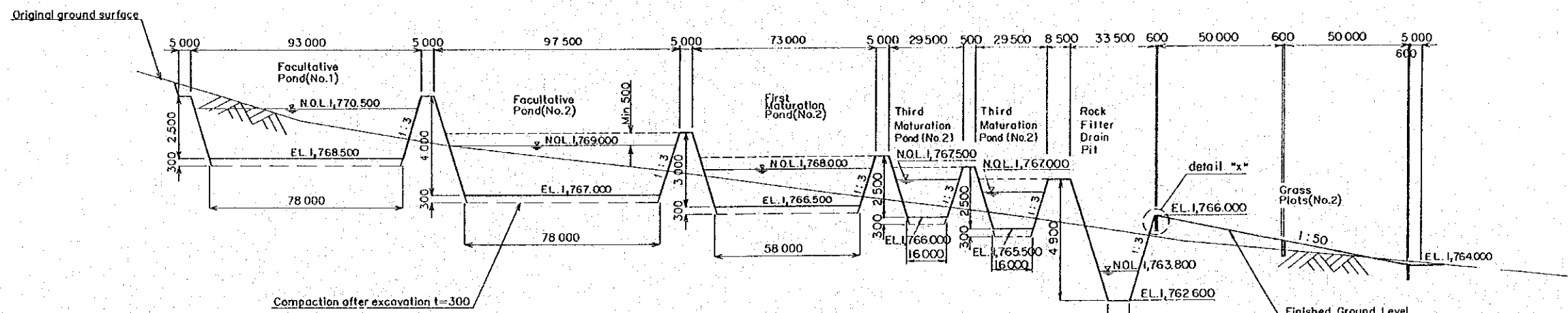
SECTION E - E HORIZONTAL SCALE A  
VERTICAL SCALE B



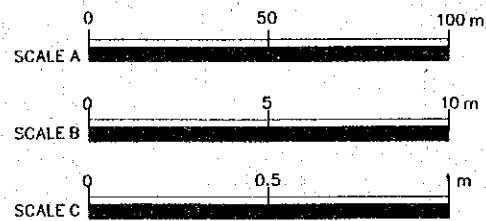
DETAIL "X" SCALE C



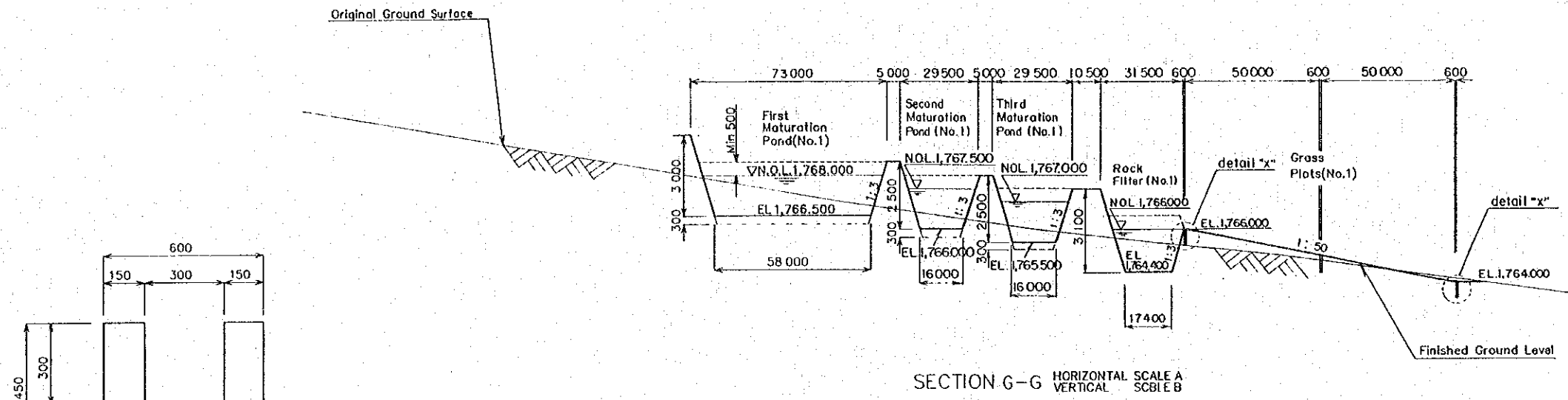
SLOPE PROTECTION DETAIL SCALE B



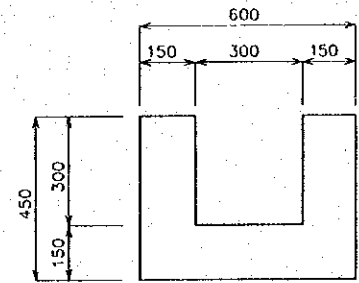
SECTION F - F HORIZONTAL SCALE A  
VERTICAL SCALE B



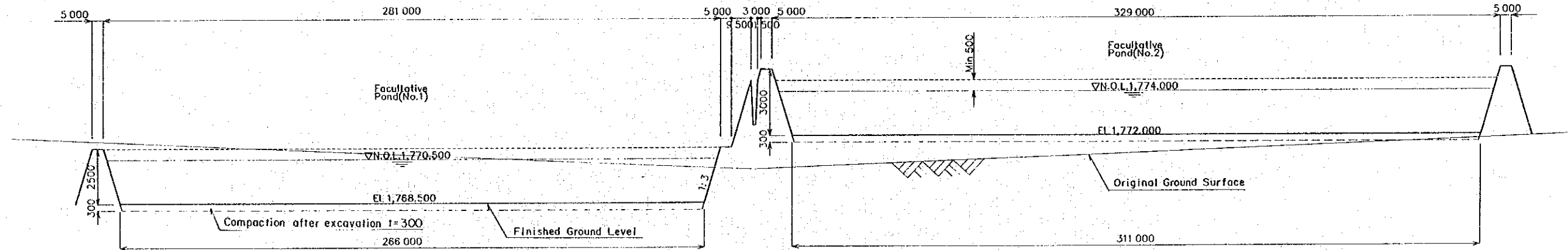
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|---|---|---|
| <p>THE REPUBLIC OF KENYA<br/>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY<br/>ON<br/>THE NAKURU SEWAGE WORKS<br/>REHABILITATION AND EXPANSION PROJECT<br/>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE<br/>Town STW<br/>Sections of Waste Stabilization Ponds,<br/>Rock Filters and Grass Plots (3/5)</p> |
|---|---|---|



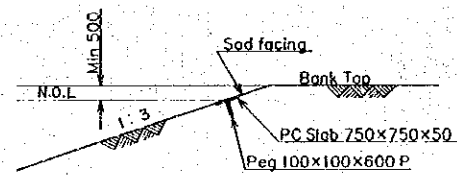
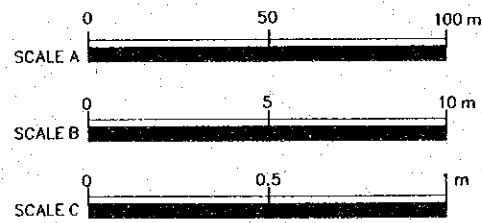
SECTION G-G HORIZONTAL SCALE A  
VERTICAL SCALE B



DETAIL "X" SCALE C

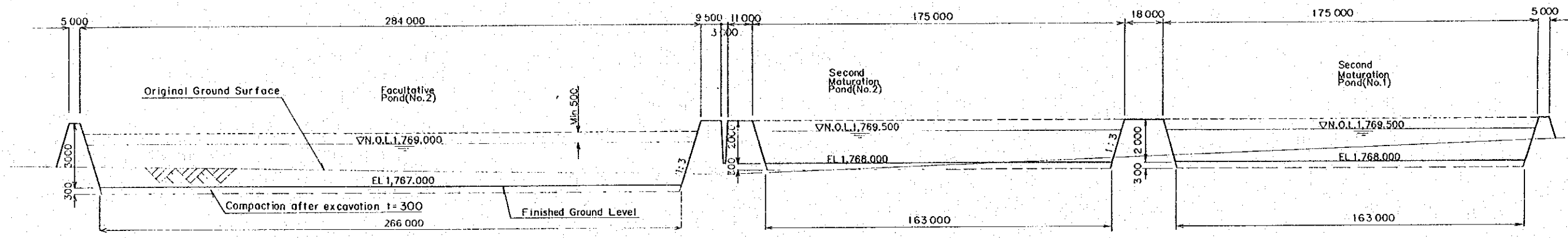


SECTION H-H HORIZONTAL SCALE A  
VERTICAL SCALE B

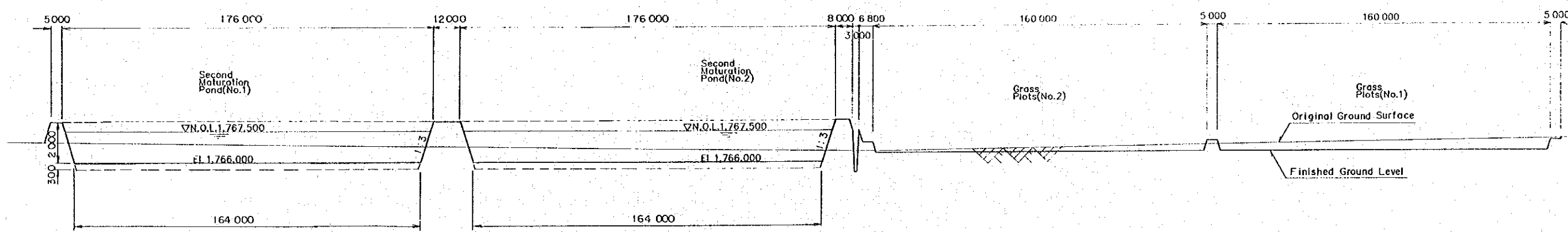


SLOPE PROTECTION DETAIL SCALE B

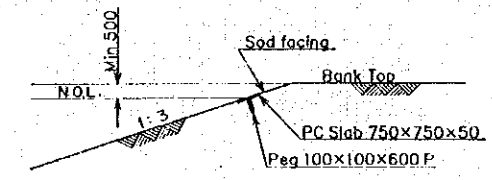
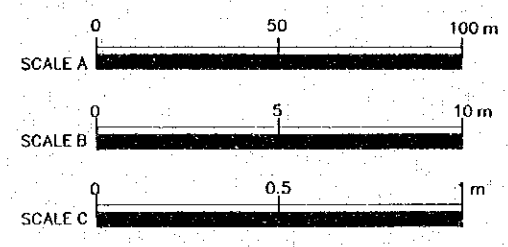
|                                     |  |   |
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| <p>THE REPUBLIC OF KENYA</p>        | <p>THE STUDY<br/>ON<br/>THE NAKURU SEWAGE WORKS<br/>REHABILITATION AND EXPANSION PROJECT</p> | <p>TITLE<br/>Town STW<br/>Sections of Waste Stabilization Ponds,<br/>Rock Filters and Grass Plots (4/5)</p> |
| <p>MINISTRY OF LOCAL GOVERNMENT</p> | <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>  |   |



SECTION I-I HORIZONTAL SCALE A VERTICAL SCALE B

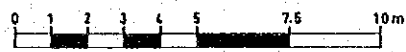
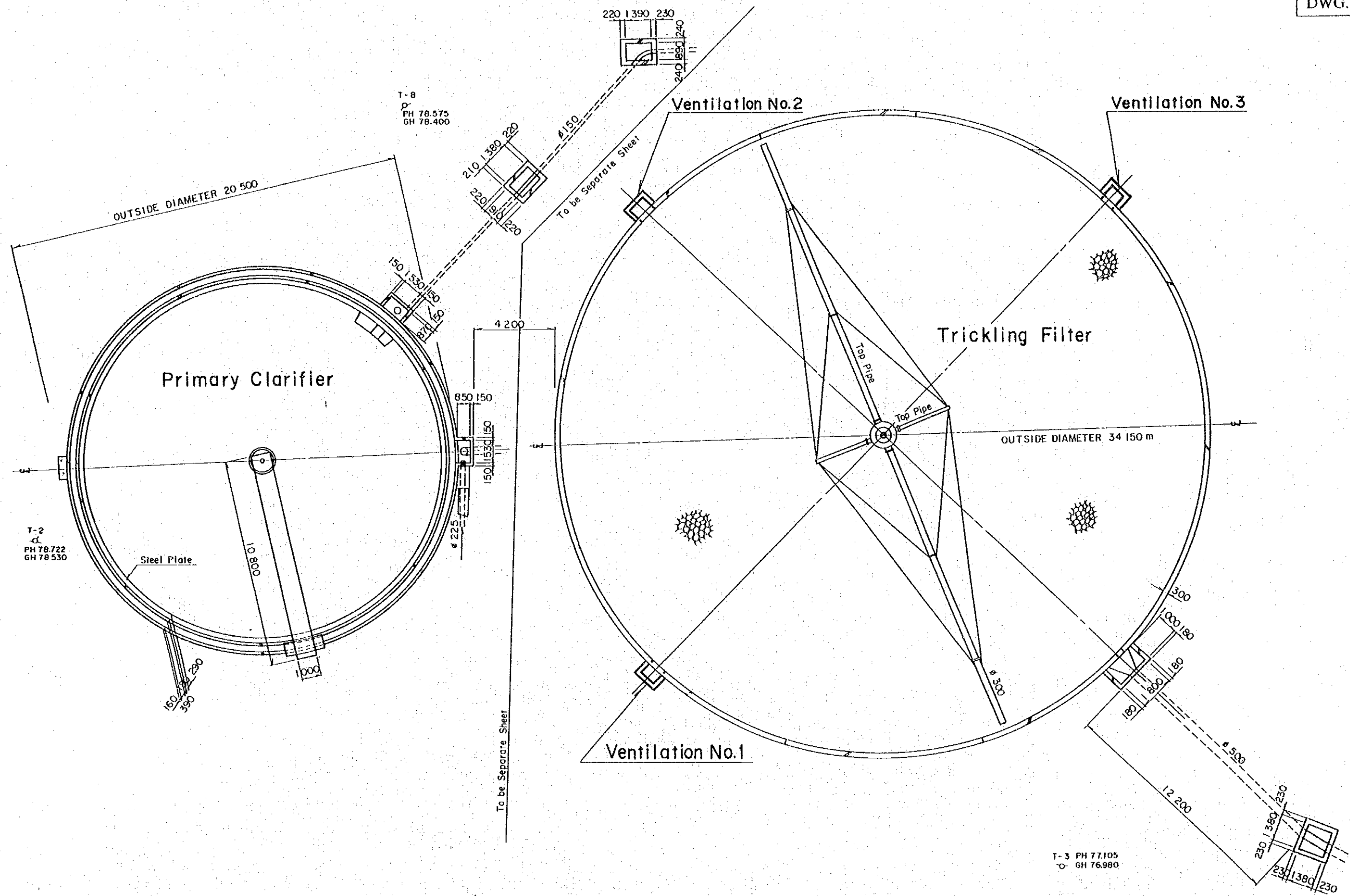


SECTION J-J HORIZONTAL SCALE A VERTICAL SCALE B

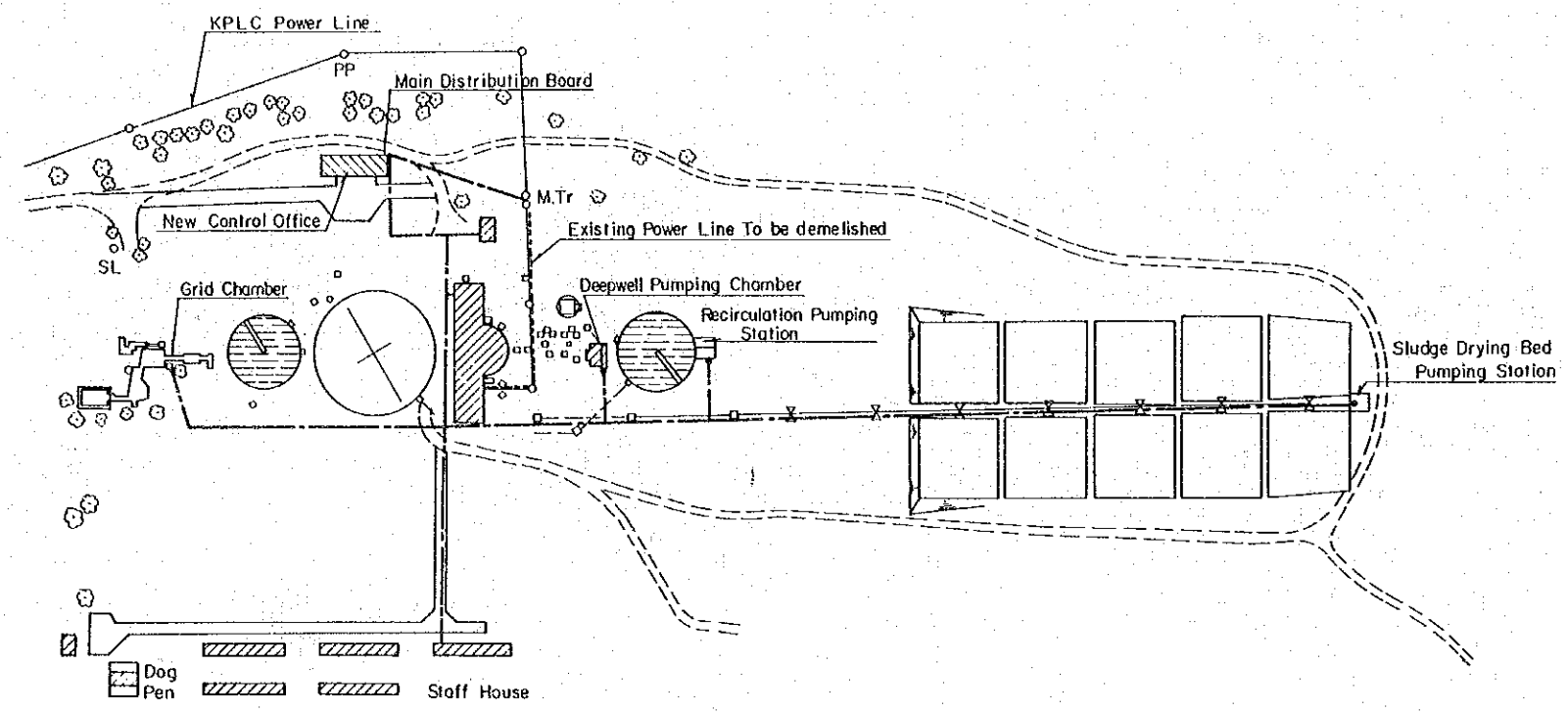


SLOPE PROTECTION DETAIL SCALE B

|   |  |   |
|---|--|---|
| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE<br>Town STW<br>Sections of Waste Stabilization Ponds,<br>Rock Filters and Grass Plots (5/5) |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   |   |

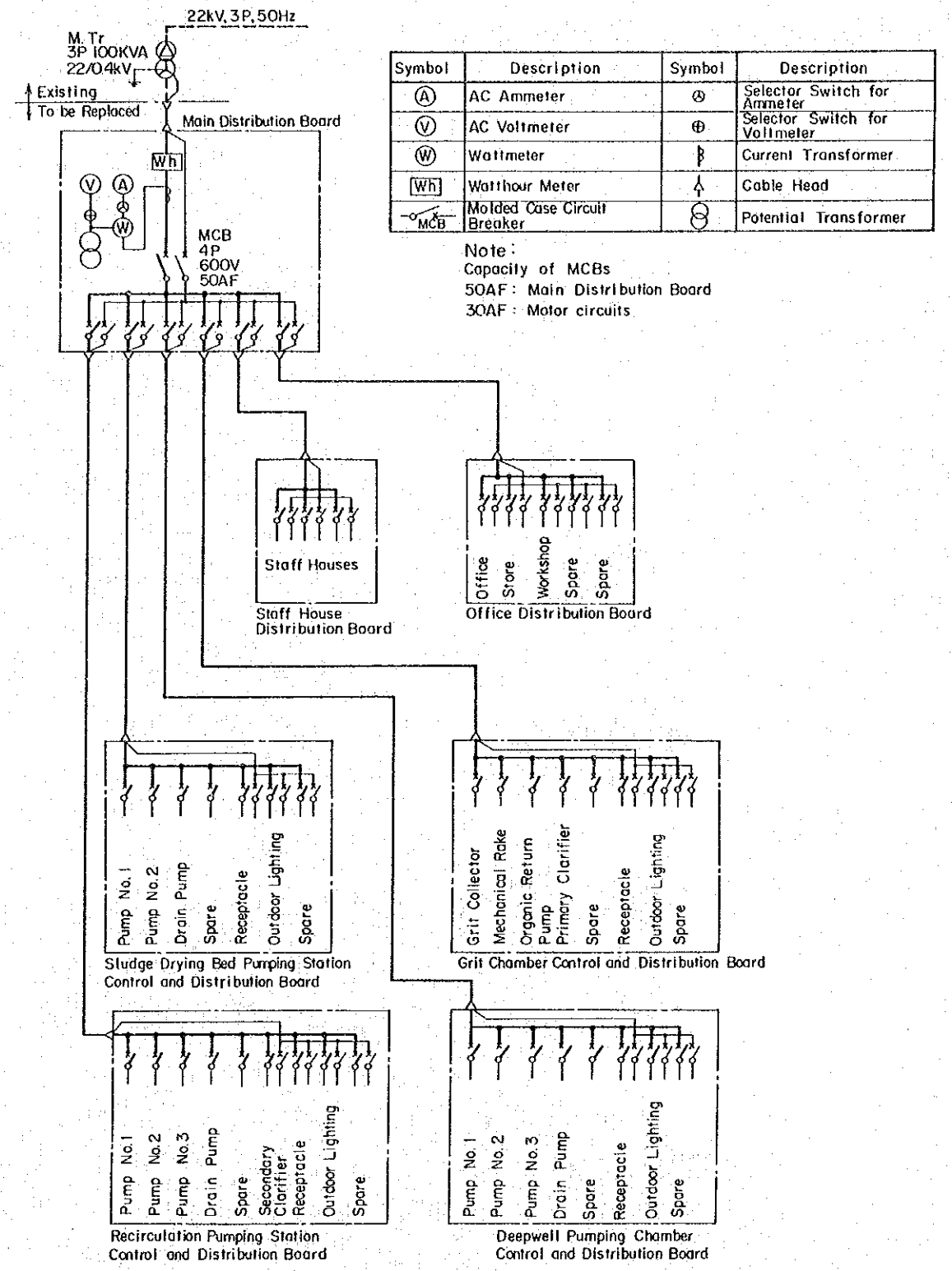
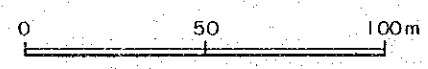


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|--|--|--|
| <p>THE REPUBLIC OF KENYA</p> <p>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY<br/>ON<br/>THE NAKURU SEWAGE WORKS<br/>REHABILITATION AND EXPANSION PROJECT</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE</p> <p>Town STW, Plan, Trickling Filter</p> |
|--|--|--|



PLAN SCALE A

SCALE A

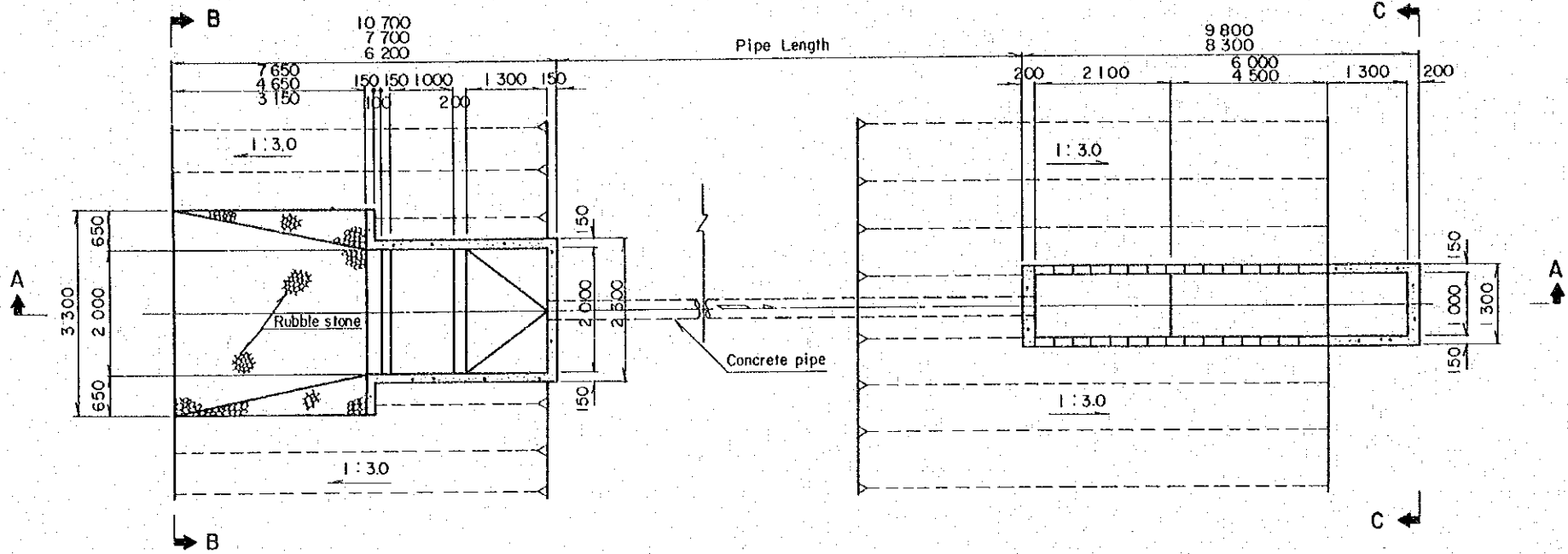


| Symbol | Description                 | Symbol | Description                   |
|--------|-----------------------------|--------|-------------------------------|
| (A)    | AC Ammeter                  | ⊕      | Selector Switch for Ammeter   |
| (V)    | AC Voltmeter                | ⊕      | Selector Switch for Voltmeter |
| (W)    | Wattmeter                   | ⊕      | Current Transformer           |
| [Wh]   | Watt-hour Meter             | ⊕      | Cable Head                    |
| MCB    | Molded Case Circuit Breaker | ⊕      | Potential Transformer         |

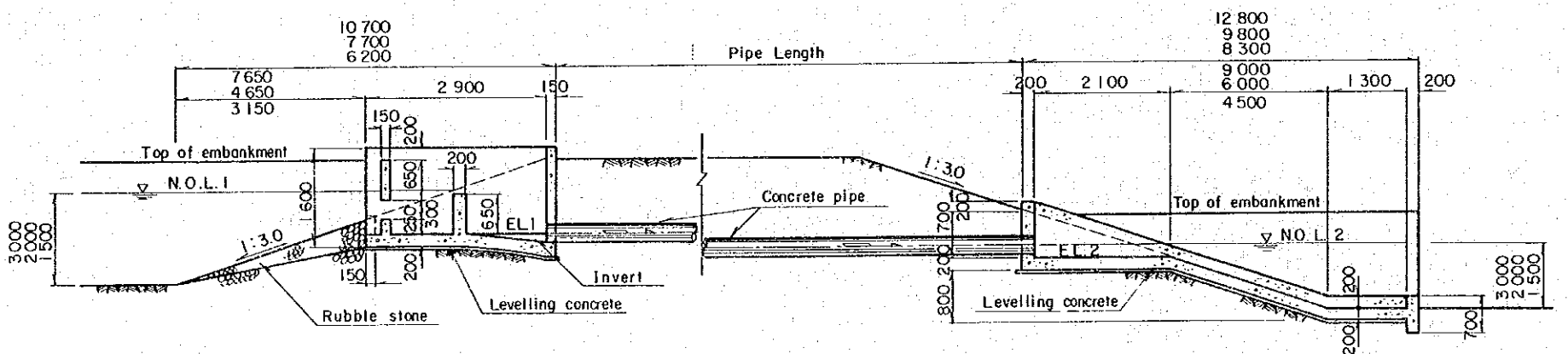
Note:  
Capacity of MCBs  
50AF: Main Distribution Board  
30AF: Motor circuits

SINGLE LINE DIAGRAM

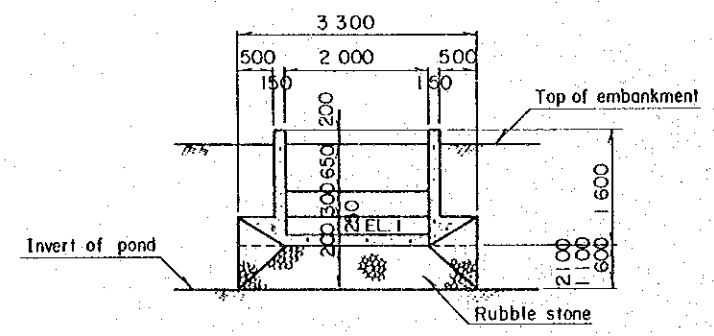
|   |  |                              |
|---|--|------------------------------|
| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE                        |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   | Town STW<br>Electrical Works |



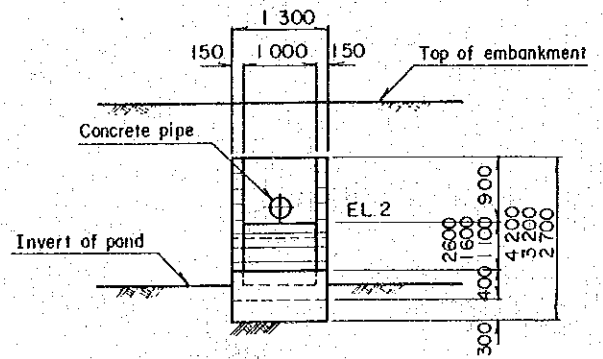
PLAN SCALE A



SECTION A-A SCALE A



SECTION B-B  
SCALE A



SECTION C-C  
SCALE A



Town 3,200 m<sup>3</sup>/day

|           | Line  | Pipe Dia (mm) | Pipe Length (m) | NOL. 1    | NOL. 2    | EL. 1     | EL. 2     |
|-----------|-------|---------------|-----------------|-----------|-----------|-----------|-----------|
| AP - FP   | No. 1 | 300 - 450     | 50              | 1,775.000 | 1,774.000 | 1,774.300 | 1,773.800 |
|           | No. 2 | 300 - 450     | 420             | 1,775.000 | 1,772.500 | 1,774.300 | 1,772.300 |
| FP - FMP  | No. 1 | 300           | 220             | 1,774.000 | 1,770.500 | 1,773.300 | 1,770.300 |
|           | No. 2 | 300           | 150             | 1,772.500 | 1,770.500 | 1,771.800 | 1,770.300 |
| FMP - SMP | No. 1 | 300           | 5               | 1,770.500 | 1,769.500 | 1,769.800 | 1,769.300 |
|           | No. 2 | 300           | 5               | 1,770.500 | 1,769.500 | 1,769.800 | 1,769.300 |
| SMP - TMP | No. 1 | 300           | 5               | 1,769.500 | 1,768.500 | 1,768.800 | 1,768.300 |
|           | No. 2 | 300           | 5               | 1,769.500 | 1,768.500 | 1,768.800 | 1,768.300 |
| TMP - RF  | No. 1 | 300           | 45              | 1,768.500 | 1,767.500 | 1,767.800 | -         |
|           | No. 2 | 300           | 5               | 1,786.500 | 1,767.500 | 1,767.800 | -         |

Town 3,400 m<sup>3</sup>/day

|           | Line  | Pipe Dia (mm) | Pipe Length (m) | NOL. 1    | NOL. 2    | EL. 1     | EL. 2     |
|-----------|-------|---------------|-----------------|-----------|-----------|-----------|-----------|
| FP - FMP  | No. 1 | 300           | 160             | 1,770.500 | 1,768.000 | 1,769.800 | 1,767.800 |
|           | No. 2 | 300           | 150             | 1,769.000 | 1,768.000 | 1,768.300 | 1,767.800 |
| FMP - SMP | No. 1 | 300           | 5               | 1,768.000 | 1,767.500 | 1,767.300 | 1,767.300 |
|           | No. 2 | 300           | 5               | 1,768.000 | 1,767.500 | 1,767.300 | 1,767.300 |
| SMP - TMP | No. 1 | 300           | 5               | 1,767.500 | 1,767.000 | 1,766.800 | 1,766.800 |
|           | No. 2 | 300           | 5               | 1,767.500 | 1,767.000 | 1,766.800 | 1,766.800 |
| TMP - RF  | No. 1 | 300           | 80              | 1,767.000 | 1,766.000 | 1,766.300 | -         |
|           | No. 2 | 300           | 15              | 1,767.000 | 1,766.000 | 1,766.300 | -         |

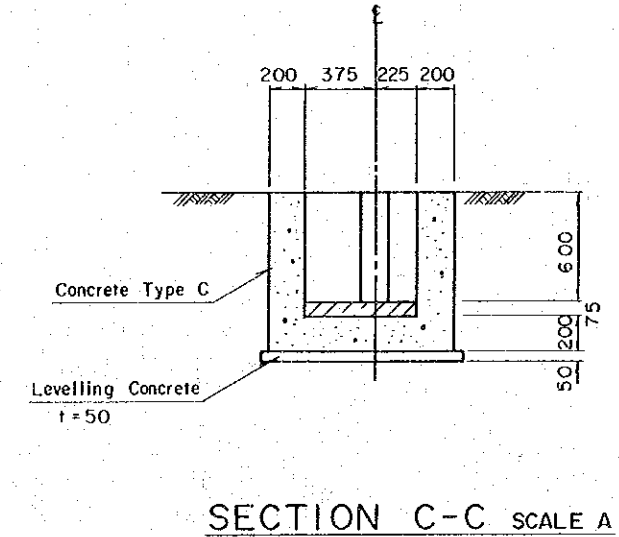
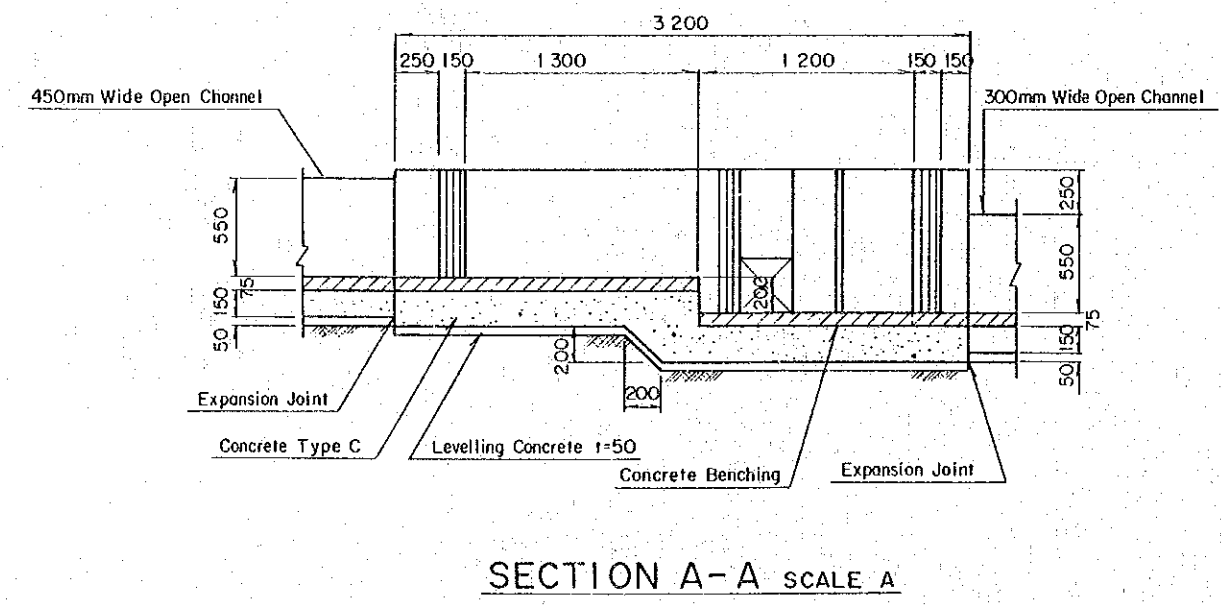
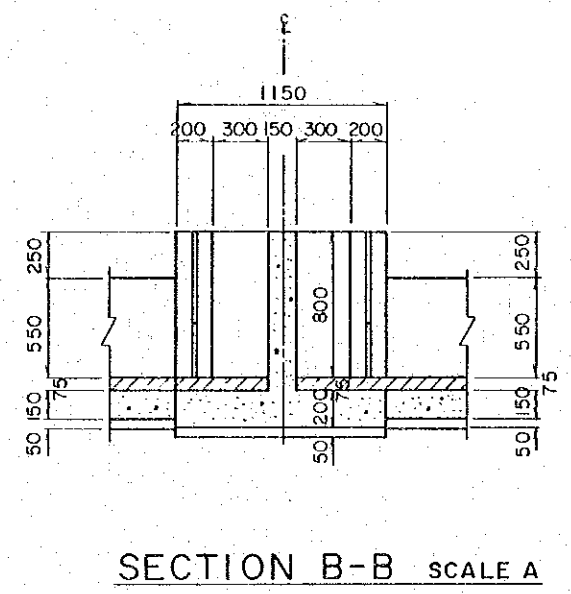
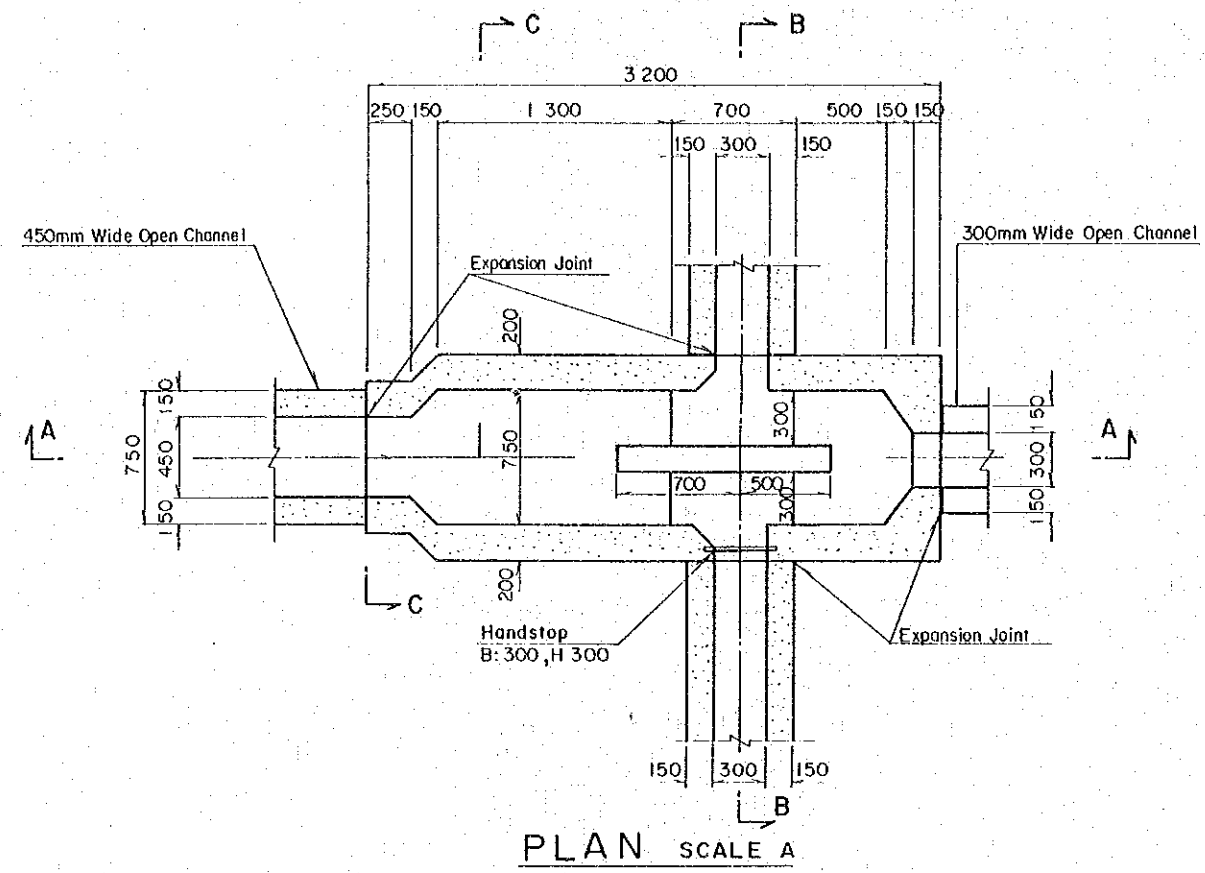
Njoro 3,600 m<sup>3</sup>/day

|           | Line  | Pipe Dia (mm) | Pipe Length (m) | NOL. 1    | NOL. 2    | EL. 1     | EL. 2     |
|-----------|-------|---------------|-----------------|-----------|-----------|-----------|-----------|
| AP - FP   | No. 1 | 300 - 450     | 420             | 1,784.000 | 1,783.000 | 1,783.300 | 1,782.800 |
|           | No. 2 | 300 - 450     | 70              | 1,784.000 | 1,781.000 | 1,783.300 | 1,780.800 |
| FP - FMP  | No. 1 | 300           | 190             | 1,783.000 | 1,778.000 | 1,782.300 | 1,777.800 |
|           | No. 2 | 300           | 185             | 1,781.000 | 1,779.000 | 1,780.300 | 1,778.800 |
| FMP - SMP | No. 1 | 300           | 5               | 1,778.000 | 1,777.500 | 1,777.300 | 1,777.300 |
|           | No. 2 | 300           | 5               | 1,779.000 | 1,778.500 | 1,778.300 | 1,778.300 |
| SMP - TMP | No. 1 | 300           | 5               | 1,777.500 | 1,777.000 | 1,776.800 | 1,776.800 |
|           | No. 2 | 300           | 5               | 1,778.500 | 1,778.000 | 1,777.800 | 1,777.800 |
| TMP - RF  | No. 1 | 300           | 110             | 1,777.000 | 1,776.500 | 1,776.300 | -         |
|           | No. 2 | 300           | 50              | 1,778.000 | 1,777.500 | 1,777.300 | -         |

Njoro 6,000 m<sup>3</sup>/day

|          | Line     | Pipe Dia (mm) | Pipe Length (m) | NOL. 1    | NOL. 2    | EL. 1 | EL. 2 |
|----------|----------|---------------|-----------------|-----------|-----------|-------|-------|
| TMP - RF | No. 3, 4 | 375           | 300             | 1,772.100 | 1,771.100 | -     | -     |
|          | No. 5, 6 | 375           | 535             | 1,772.100 | 1,771.100 | -     | -     |

|   |  |   |
|---|--|---|
| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE<br>Njoro and Town STWs<br>Pond Connection Pipes,<br>Plan and Sections |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   |   |



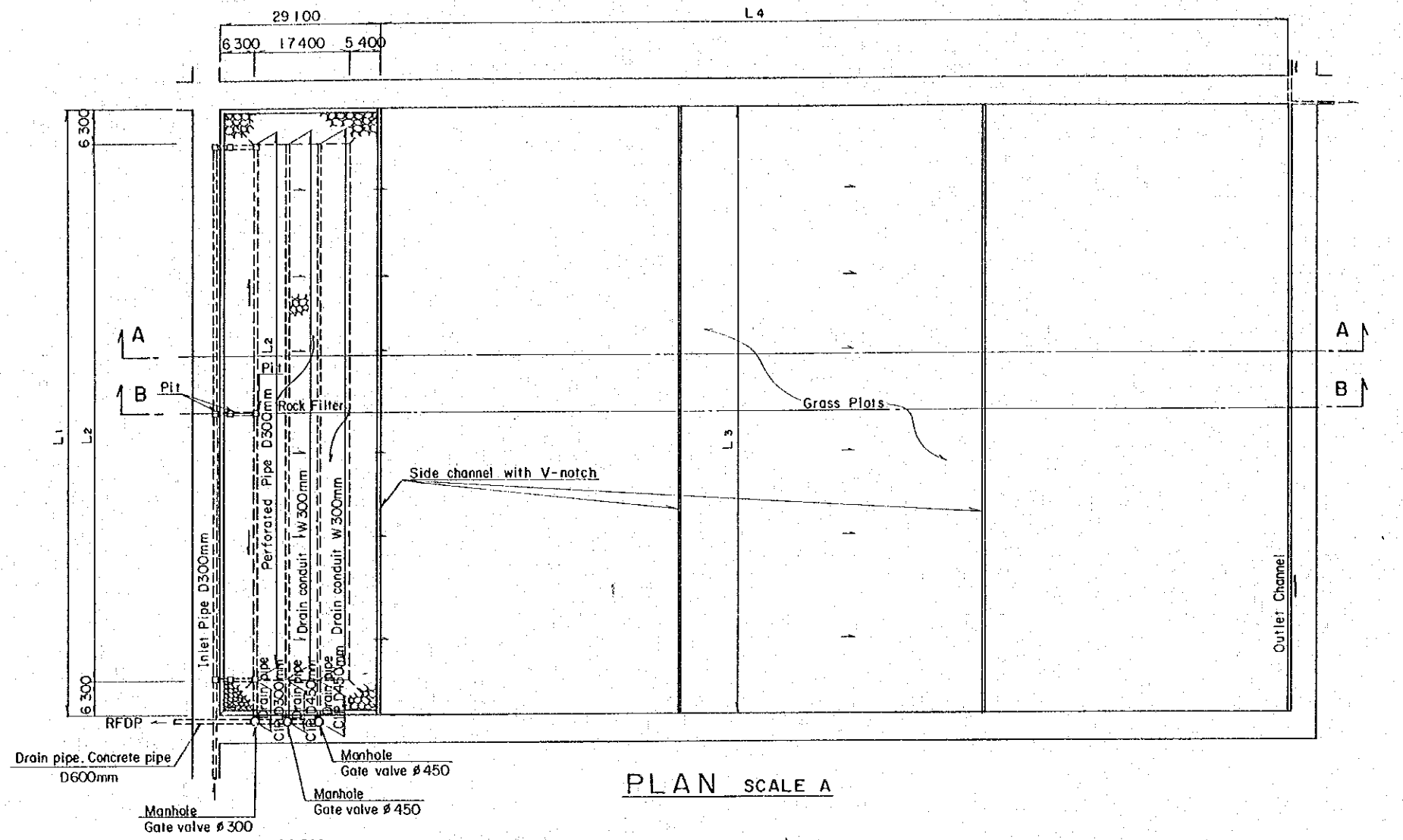
|  |  |   |
|--|--|---|
| <p>THE REPUBLIC OF KENYA</p> <p>MINISTRY OF LOCAL GOVERNMENT</p> | <p>THE STUDY<br/>ON<br/>THE NAKURU SEWAGE WORKS<br/>REHABILITATION AND EXPANSION PROJECT</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p> | <p>TITLE</p> <p>Njoro and Town STWs<br/>Flow Splitting Chamber,<br/>Plan and Sections</p> |
|--|--|---|

Dimensions of Rock Filters & Grass Plots

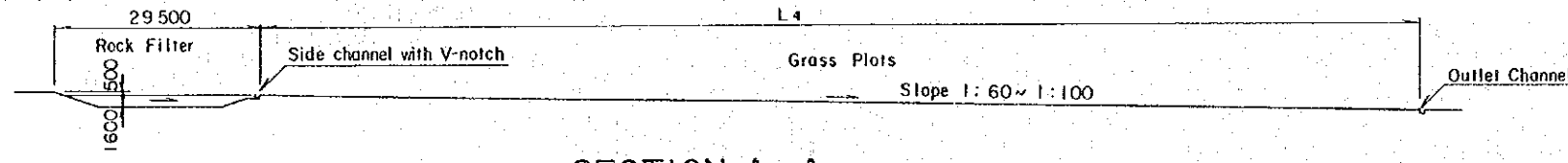
| Sewage Treatment Works              | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> |
|-------------------------------------|----------------|----------------|----------------|----------------|
| TOWN 3,400m <sup>3</sup> /day Line  | 104000         | 91400          | 170000         | 100600         |
| TOWN 3,200m <sup>3</sup> /day Line  | 98000          | 85400          | 160000         | 100600         |
| NJORO 3,600m <sup>3</sup> /day Line | 110000         | 97400          | 110000         | 166200         |
| NJORO 6,000m <sup>3</sup> /day Line | 92000          | 79400          | 92000          | 166200         |

Elevation of Rock Filters & Grss Plots

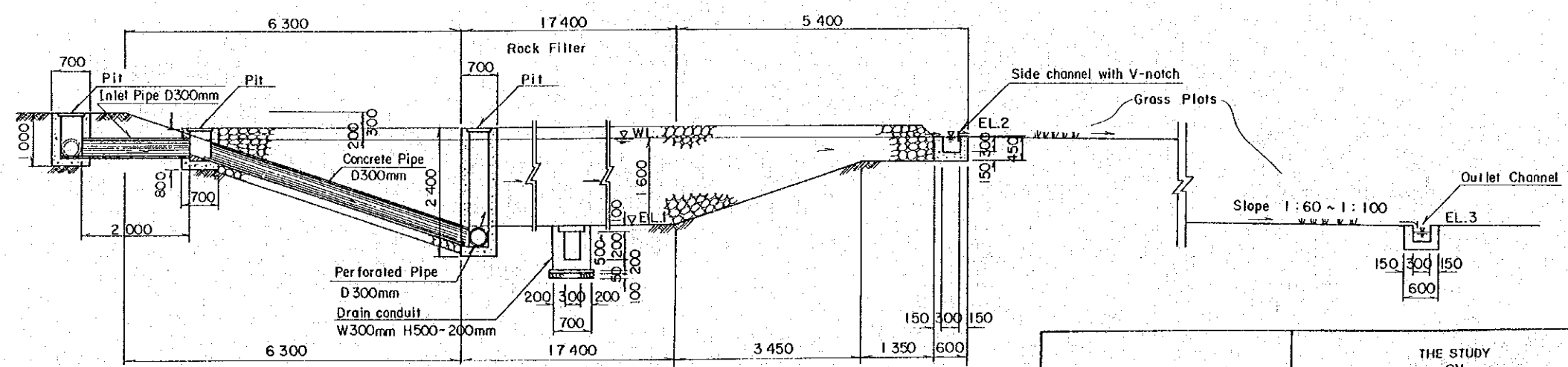
| Sewage Treatment Works         | WL        | EL 1      | EL 2      | EL 3      |
|--------------------------------|-----------|-----------|-----------|-----------|
| TOWN 3,400m <sup>3</sup> /day  | 1,766.000 | 1,764.400 | 1,766.000 | 1,764.000 |
| TOWN 3,200m <sup>3</sup> /day  | 1,767.500 | 1,765.900 | 1,767.500 | 1,765.500 |
| NJORO 3,600m <sup>3</sup> /day | 1,776.500 | 1,774.900 | 1,776.500 | 1,773.000 |
| NJORO 6,000m <sup>3</sup> /day | 1,771.600 | 1,770.000 | 1,771.100 | 1,768.500 |



PLAN SCALE A



SECTION A-A SCALE A



SECTION B-B SCALE B



|   |  |   |
|---|--|---|
| THE REPUBLIC OF KENYA<br>MINISTRY OF LOCAL GOVERNMENT | THE STUDY<br>ON<br>THE NAKURU SEWAGE WORKS<br>REHABILITATION AND EXPANSION PROJECT | TITLE   |
|   | JAPAN INTERNATIONAL COOPERATION AGENCY   | Njoro and Town STWs<br>Rock Filter and Grass Plot<br>Plan and Section |