

Technical Note
on the Preparatory Survey for the Project for
Implementation of Intelligent Transport System in
Mombasa Region

In response to the request from the Government of the Republic of Kenya, the Government of Japan decided to conduct a Preparatory Survey for the Project for Implementation of Intelligent Transport System in Mombasa Region (hereinafter referred to as “the Project”), and entrusted the Preparatory Survey to Japan International Cooperation Agency (hereinafter referred to as “JICA”).

JICA sent the Preparatory Survey Team for the Outline Design (hereinafter referred to as “the Team”) to Mombasa. The Team held a series of discussions with the officials of County Government of Mombasa (CGM) for 1st Survey at Mombasa. In the course of the discussions, both sides have confirmed the main items described in the attachment. The Team will proceed for further works in the future.

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Mombasa, October 1st, 2021



Masato Okuda

Chief Consultant
Preparatory Survey Team

Japan International Cooperation Agency
Japan



Eng. Albert T. Keno

County Chief Officer- Transport
Department of Transport, Infrastructure &
Public Works

County Government of Mombasa
Republic of Kenya

ATTACHMENT

1. Confirmation of Presentation of Outline of the 1st Survey

The Team explained the Presentation of the Outline of 1st Survey based on the previous discussions and CGM agreed in principle with the contents.

2. Discussion on the contents

2.1 Basic Policy for Intersection selection

CGM agreed on 31 intersections selected by the Team for further selection.

The Team explain A7-6 to A7-9 on A7 corridor, south side of New Nyali Bridge to be considered due to importance of the locations. The Team said that it is not easy to incorporate the three intersections in the Project because there is a plan by KENHA to widen A7 corridor and include flyover on A7-6, A7-8 and A7-9. CGM agreed.

Kenyan side requested in several discussion with KENHA/KURA that A8-5 and A8-6 should remain as existing intersections to allow operation for heavy truck movement for northern corridor. Team understood the situation on the site.

Despite H-3 having no further consideration for signal installation CGM requested for repair of the intersection due to it being damaged by heavy truck movements.

For the case of A8-5, the intersection is still under consideration for signal installation and shall be considered for intersection improvement.

The same situation applies for A8-6.

Further selection will be done by the Team from 31 locations to about 25 locations in consideration of traffic count survey results and any another necessary factors.

2.2 Basic Policy for ITS Components

CGM requested the expansion of existing camera system to cover intersections of the Project and effective use of camera system.

The Team explained the 4types of effective use of the camera system as follows.

1. Incident detection
2. Section travel time finding
3. Illegal Parking detection
4. Red light violation detection.

They recommended the need for the project to have the first two functionalities as a

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priority.

CGM on the other hand requested **strongly** that all the four functionalities of the cameras should be considered.

The Team explained that three (3) locations of VMS should be considered inside the island showing travel time, accidents, and congestion points, etc. CGM agreed.

The Team explained a sample image of the proposed Control Centre with a Videowall. CGM agreed and will prepare a suitable room in the building at Shimanzi.

2.3 Basic Policy for Intersection Improvement

The Team explained on the pavement improvement method and recommended PCCP to be used for existing PCCP road and recommended to use Modified Asphalt Pavement with Polymer for existing Asphalt Road. CGM confirmed that KENHA have used Modified Asphalt Pavement with Polymer at some of their roads.

2.4 Basic Policy for Pedestrian Signal method

The Team explained the high priority locations for installation of the pedestrian signals are three. However, two of the locations have changed from the original plan to different locations. CGM agreed.

2.5 Basic Policy for selecting Communication method

The Team recommended the loop network to provide communication between the intersection signals, Control Centre, and Data Centre. CGM agreed and will request the communication service provider to enhance redundancy for the Project.

2.6 Consideration of Operation & Maintenance

The Team **strongly recommended** that the operation of the ITS should be done by existing operation team, but maintenance structure should be done by a maintenance contractor and additional budget for maintenance is needed. CGM confirmed.

2.7 Consideration and schedule of Environment study

The Team explained according to discussion with NEMA that all project is necessary to conduct EIA in Kenya but project will be categorized into a low risk and Environmental Impact Assessment Summary Project Report is necessary to submit and then approval will be issued. It takes 5 days for issuance of approval.

The Team also explained on the information from NEMA and subcontractor that the most concerned impact of this project activity is removal of roundabout including monument.



CGM confirmed and will support further.

2.8 Soft Components and Technical Cooperation Project

The Team explained the necessary training items after introducing the ITS system for sustainable and effective usage of the system as Soft Components and Technical Cooperation Project. CGM requested the above training should start from the installation period. CGM further, **strongly** requested for inclusion of the technical cooperation project to be considered alongside the Grant Aid project.

2.9 Traffic Count Survey and further analysis

The Team explained the progress of the survey and further analysis using STRADA and micro simulation. CGM requested updated data of STRADA and some training on STRADA.

2.10 Major Undertaking to be taken by the Government of Kenya (Cost Item)

The Team explained the necessary undertakings to be bearded by Kenyan side categorized into three; Before the Tender, During the Project Implementation and After the project. CGM agreed and the Team will estimate such cost through consultations with CGM.

2.11 To be done and supported by Kenyan side

The Team explained the necessary items to be done and supported as follows:

1. Finance (Budget) data for 3-5 years for evaluation of financial capability for operation and maintenance of the System.
2. Completion of POC (Proof of Concept) on CCTV system by the end of 2021 and handover the equipment to CGM by contractor.
3. Formal Request of Grant Project by the end of 2021.

CGM agreed and informed the Team that a Formal Request was sent to Central Government already.



PREPARATORY SURVEY
FOR
THE PROJECT FOR IMPLEMENTATION OF
INTELLIGENT TRANSPORT SYSTEM
IN
MOMBASA REGION

Outline of the 1st Survey

September 30th 2021

NIPPON KOEI CO., LTD.
Katahira & Engineers International
Ingerosec Corporation

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Agenda

1. Collection of Basic Information
2. Basic Policy for Intersection selection
3. Basic Policy for selection of ITS Components
4. Basic Policy for Intersection Improvement method
5. Basic Policy for Pedestrian Signal method
6. Basic Policy for selecting Communication method
7. Consideration of Operation & Maintenance system
8. Consideration and schedule of Environment study
9. Soft Components
10. Traffic Count survey and further analysis
11. Consideration for Northern Economic Corridor
12. Major Undertakings to be taken by the government of Kenya (Cost Item)
13. Basic Policy for Work Demarcation of Power and Communication
14. To be done and supported by Kenyan side
15. Further schedule

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1. Collection of Basic Information

1.3 Work Demarcation between CGM (Inspectorate), National Traffic Police and NTSA (National Transport Safety Authority)

	CGM: Transport/Insp ectorate	National Traffic Police	NTSA
Traffic control	⊙	⊙	
Enforcement	○	⊙ (Court matter)	
Traffic Regulation	⊙		
Traffic accident data		⊙	○
CCTV	⊙	⊙	
Driver's license, Vehicle inspection			⊙
Plate Number Database	○		⊙

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1. Collection of Basic Information

1.3 Existing ITS System and Related situation

➤ ITS System by CGM

- ✓ CCTV Monitoring and Control Centre
- ✓ CCTV Monitoring System
- ✓ Transceiver Communication System

➤ ITS System by National Traffic Police

- ✓ ICC (Integrated Command Control Centre)
- ✓ CCTV Monitoring System
- ✓ ANPR system for black list monitoring for security
- ✓ Transceiver Communication System

➤ RFID Standardization by NTSA

- ✓ RFID has been standardized by NTSA

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1. Collection of Basic Information

1.4 Existing Communication System of CGM

<Existing Communication System>

- **Communication Network among County Government Agencies.**
 - ✓ Optical fiber network (internet and MPLS service) is being deployed by FIBRE LINK under the CONTRACT FOR PROVISION OF INTERNET AND MPLS FOR COUNTY GOVERNMENT OF MOMBASA
- **Communication Network for existing CCTV owned by CGM**
 - ✓ Optical fiber network (dedicated line service) is being deployed by FIBRE LINK
 - ✓ Since the CCTV implementation project has been proceeding under the Proof of Concept(POC) scheme. After the completion of the implementation, the payment for the installation and the maintenance during the POC period will be made and the new contract for the maintenance will be concluded.

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1. Collection of Basic Information

1.4 Existing Communication System

(1) Existing Service Level Agreement(SLA) by FIBRE LINK

Expected Restoration times and associated credits for Critical Faults

Item	Description	Credits
1.	Continuous critical failure not exceeding 6 hours.	No credit
2.	Continuous critical failure between 6-8 hours.	1 day credit
3.	Continuous critical failure between 8-48 hours.	1 week credit
4.	Continuous critical failure exceeding 48 hours.	Half a month credit

※ Critical Faults: Primary Backbone Router Down, Customer Network Down

Expected Restoration times and associated credits for Major Faults

Item	Description	Credits
1.	Continuous major failure not exceeding 8 hours.	No credit
2.	Continuous major failure between 8-24 hours.	1 day credit
3.	Continuous major failure between 24-48 hours.	3 days credit

※ Major Faults: Service impaired or backbone failover, Router Down, Customer Network Impaired

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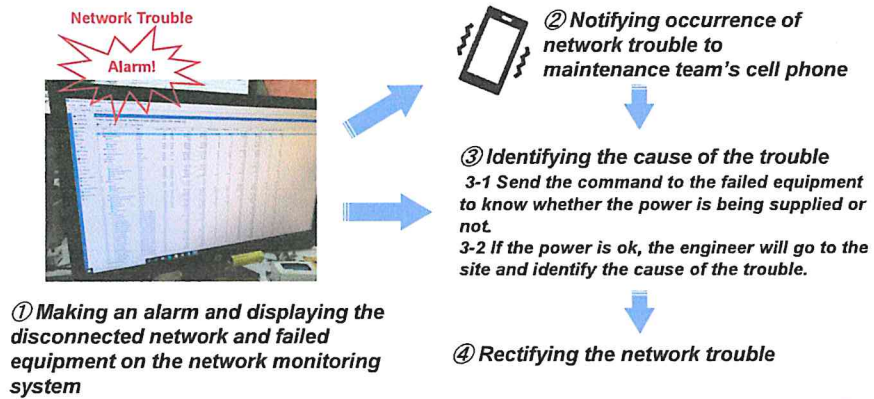
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1. Collection of Basic Information

1.4 Existing Communication System

(2) Optical Fiber Network Maintenance System

The maintenance system for the existing communication system by FIBRE LINK.



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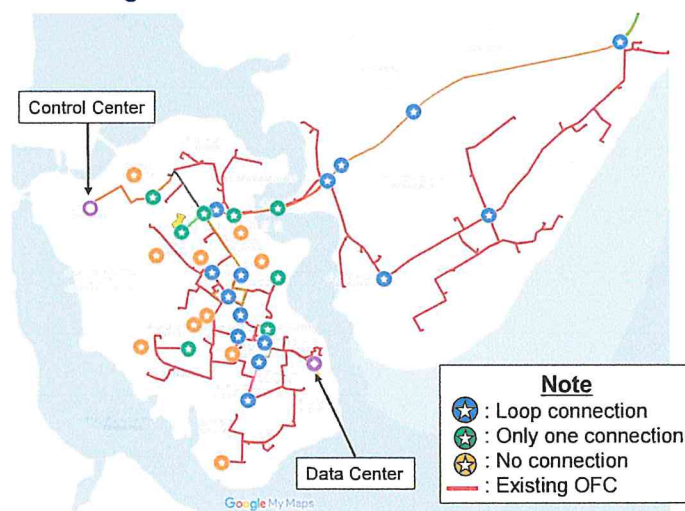
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1. Collection of Basic Information

1.4 Existing Communication System

Existing Communication Network of FIBRE LINK



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1. Collection of Basic Information

1.5 Existing Maintenance System

➤ Existing CCTV Maintenance Situation

(1) Maintenance Service Contract

- ✓ Since the CCTV implementation project has not yet completed, installation and operation is being conducted as a proof of concept (POC).
- ✓ After completion of the project, the maintenance contract between CCTV provider, FIBRE LINK (communication company) and CGM will be made for CCTV and Communication for CCTV.

(2) Maintenance Situation

- ✓ Actual maintenance work for CCTV is limited and not sufficient by CCTV provider.

(3) Current Issues

- ✓ POC will be completed at the end of 2021, and Maintenance work will start according to maintenance contract.

1. Collection of Basic Information

1.6 Existing issue for traffic on Mombasa

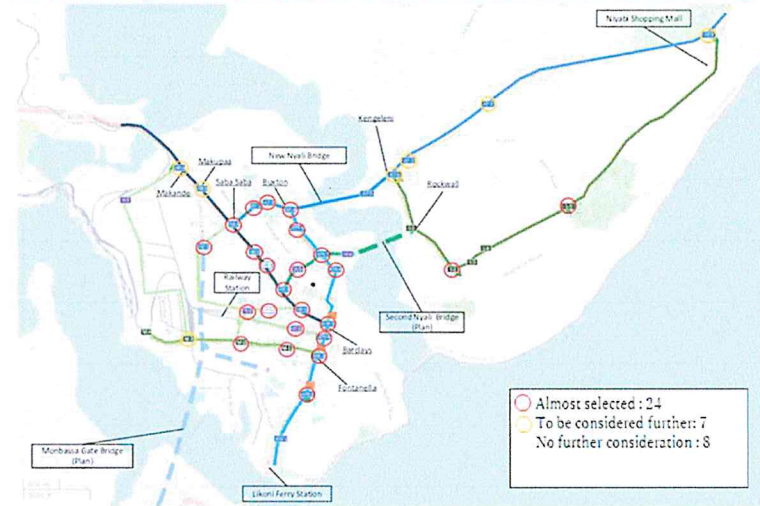
- Chronical congestion at peak hours
- Seriously deteriorated pavement by large-sized vehicle and low quality of used materials
- Too many numbers of Matas, especially at major destinations
- Insufficient capacity of intersections
- Illegal encroachment of roads by street vendors
- Illegal parking around intersection
- Many pedestrians walk in the median since it is used as parking lot.
- Lack of grade separate intersections
- Lack of bridges which connecting island and surrounding land
- Vehicle movement at intersection cannot be proceeded at peak hours without inspector/police
- Lack of Pedestrian crossing
- Unclear or disappearance of marking
- No accumulated and no analysis of traffic data
- Lack of discipline

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2. Basic Policy for Intersection selection

2.1 selecting intersections; 31 location is selected for further study



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2. Basic Policy for Intersection selection

Target intersection selection basic policy

- ❑ Securing traffic flow as a corridor
(Corridor: A8, A7, A7R, Moi Ave.)
- ❑ Congested intersection
- ❑ Consider where there are schools nearby
- ✓ Exclude intersections where traffic is smoothly operated by the current traffic operation.
- ✓ For existing plans (2nd Nyali Bridge, BRT , MGB), after hearing the project schedule, decide whether or not to target it.
- ✓ ⇒The 2nd Nyali Bridge and BRT are not considered. It does not cover intersections planned to be installed by the MGB.
- ✓ Roads (east of Nyali Bridge on A7) where expansion plans and grade separation works will start soon are to be considered.
- ✓ As a result of the field survey, remove the places that are judged not the intersections.

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2. Basic Policy for Intersection selection

1. No Further Consideration; 8 locations

A7R-1	Major traffic is only for ferry users transporting between centre of City and Ferry station. Waiting place by many Matatsu.
M4	Major traffic is only for Track waiting for Port entrance at the rotary in front of Port Gate.
H3	There is some traffic of Track, but not cross intersection with some volumes of traffic.
H4	Traffic is very low and road is narrow now.
A7-5	There is no intersection but underpass crossing only.
L1	There is not much traffic at normal operation without Happy Hour operation.
L3	Small roundabout with less traffic crossing
L4	Small roundabout with less traffic crossing

2. To be Considered further; 7 locations

A8-6	Entrance/Exit of industrial area but median is blocked and Track from Nairobi can not turn right for industrial area directory and go/u-turn at Maputa roundabout and come back and turn left for industrial area.
A8-5	Many Tracks from A8-6 who want to go for industrial area, u-turn at the roundabout, but existing roundabout is big with 3 lines and not serious congested as of now.
M3	There is some Track traffic but, not so much general traffic and not many pedestrians.
A7-6	There is a road widening project starts from this year for three years between A7-6 and A7-9. A7-6 will be flyover.
A7-7	There is a road widening project starts from this year for three years between A7-6 and A7-9. A7-7 will be big affected by this widening project.
A7-8	There is a road widening project starts from this year for three years between A7-6 and A7-9. A7-8 will be flyover.
A7-9	There is a road widening project starts from this year for three years between A7-6 and A7-9. A7-8 will be flyover.

3. Almost selected: According survey, following two intersection is included as almost selected. 24 locations

A8-7	There is some distance between A8-3 and A8-2. And heavy traffic at peak hour between A8 and Kolnaga Road.
H6	Heavy traffic between A8-2 and Haile Selass Road through H6 at peak hour.

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3. Basic Policy for selection of ITS Components

3.1 Basic Policy for ITS Development

- A) . Improve the travel time inside of city
- B) . Reduce the accident
- C) . Utilization of big data for road management and future plan

3.2 Issues of Current System

- The current system lacks ergonomic considerations, making it impossible for the operator to check all the images on the monitor.
- There is no quantitative data to analyze the traffic status for current and future.
- There is no information to provide users both on trip and pre-trip
- There is no way to utilize optimally for existing roads
- The operators cannot manipulate even simple existing system
- Road users have only limited chance to know their violation activities.
- There is no system to identify the violated vehicles
- It is difficult to know the minimum interruption timing to traffic for road/system maintenance work without data.

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3. Basic Policy for selection of ITS Components

3.3 Methods to Achieve the Policy

- Optimization of traffic control (Accident reduction, Improvement of traffic flow)
- Quick response for handling incidents/accidents.
- Accident data collection and analysis for further safety.
- Provide the traffic information to users to enhance the traffic flow.
- Accumulate the data to analyze the traffic status for future traffic planning.

Item	The Summary of Camera System	Match with Methods A) B) C) D) E)	Remarks
Incident detection	- Single CCTV camera enable to detect various incident and categorize by type of incidents. - It can be installed at black spot to detect the dangerous driving vehicles.	○ ○ ○ ○ ○	- The captured incidents will be displayed on Videowall. - Missing of incidents will not happen.
Section travel time finding	- By identifying the license plate, the section travel time between ANPR camera positions can be analyzed. - Mount the ANPR onto the ultrasonic sensor pole for signal system locating more than 150m upstream of the intersection.	○ ○ ○	- This information is useful for MGB also. - Analyzing with incident data, the categorization of traffic status by cause, time, can be accumulated for future planning..
Illegal parking detection	- System issues the alert when vehicle come into the prohibited parking zone by continuous camera monitoring. - It can be installed at busy intersection with parking prohibited zone such as Lebanon intersection.	○ ○	- This enforcement can prevent from deterioration of intersection capacity. - Inspector needs to be site to catch the violated parking vehicle. ⇒ fully automatic is difficult.
Red light violation detection	- Red Light Violation Detection system can be installed Blackspot intersection. - System is composed of ANPR and incident detection camera which are connecting signal	○ ○	- The system will be complicated and gantry for all lanes are required. - The accident database categorized by cause for accident analysis does not exist.

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3. Basic Policy for selection of ITS Components

CCTV for Incident Detection

Single CCTV camera enable to detect and record the various incident and categorize by types of incidents.



Effect:

- Automatic detection reduce the missing incident currently occur.
- Response time will be faster since it issues the alert when incidents are detected.
- As a result, the number of accident will reduce and ensure the smooth flow.

Issue:

- Both incident detection camera and ANPR camera per lane are required for enforcement.
- The system cannot enforce the violated vehicles without database.
- ANPR cannot identify the number under the bumper to bumper situation.

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CCTV to Find the Travel Time by Section



Effect:

- The AI based CCTV cameras will be set as the map above. the system analyze the travel time of major sections between cameras.
- It can be useful data source for providing travel time information to users through VMS and traffic volume will be organized.
- Accumulated data can be used for future project preparation or evaluation of project.
- Selection of VMS location shall be considered future road network.

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CCTV for Parking Violation



Effect:

- Automatic detection reduce the missing illegal parking currently occur.
- Response time will be faster since it issues the alert when illegal parkings are detected.
- As a result, the safe & smooth flow can ensure.

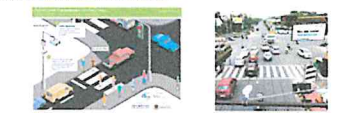
Issue:

- Both illegal parking detection camera and ANPR camera are required for enforcement.
- The system cannot enforce the violated vehicles without database.
- ANPR cannot identify the number under the bumper to bumper situation.
- Clear notification of parking prohibited zone by signage and marking.

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CCTV for Red Light Violation Detection

Red Light Violation Detection system can be installed blackspot intersection.



Effect:

- This system contributes the avoidance of collision accident.
- Both violation detection camera and ANPR camera per lane are required for enforcement.
- The system cannot enforce the violated vehicles without database.
- Both vehicles and pedestrians do not familiar with signal control system. Thus, awareness of traffic signal rules shall be raised amongst residence.

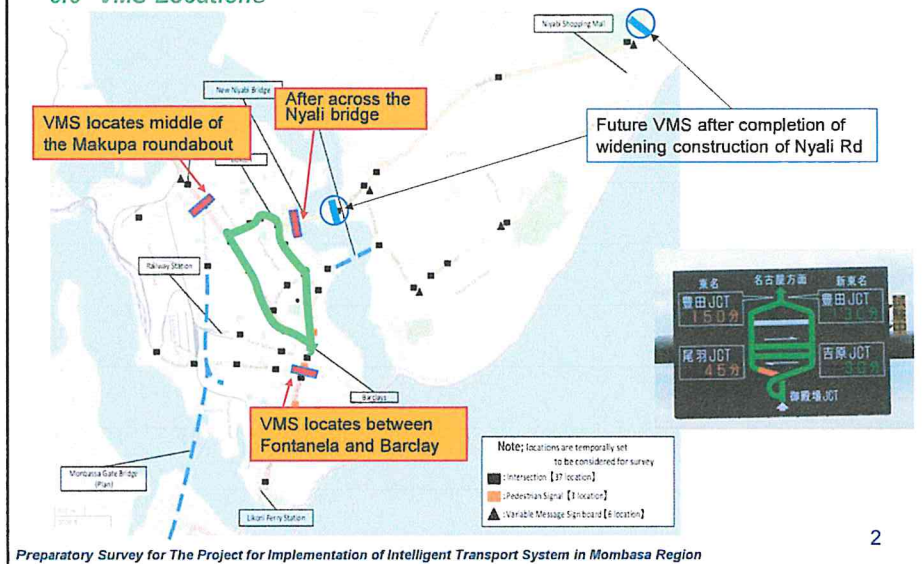
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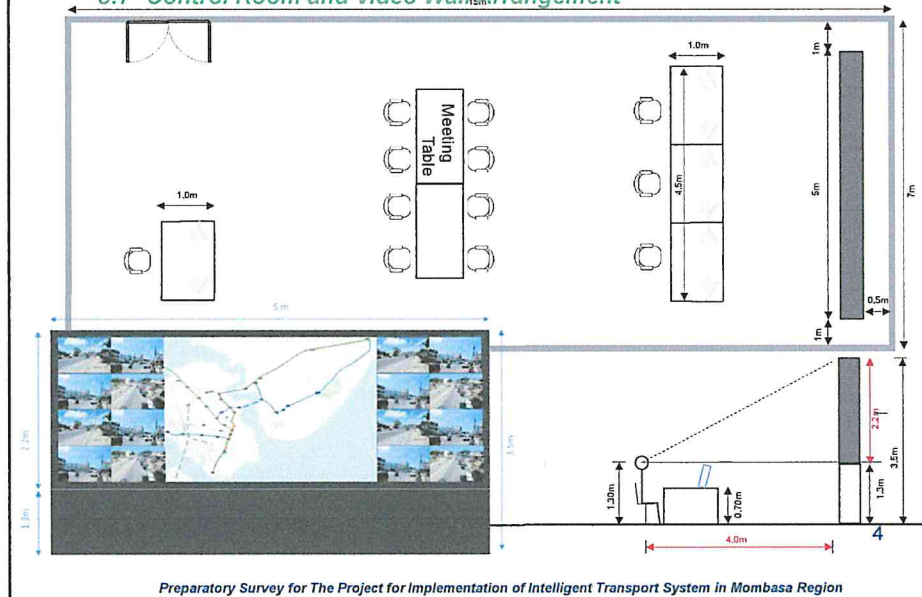
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3.6 VMS Locations



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3.7 Control Room and Video Wall Arrangement



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4. Basic Policy for Intersection Improvement method

4.1 Basic Improvement method

- Ensure the safety by compacting the intersection and setting the refuge for pedestrian
- Ensure the necessary light turn lane by shifting median

A8-2 Lebanone



A8-4 Saba Saba



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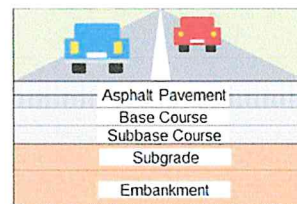
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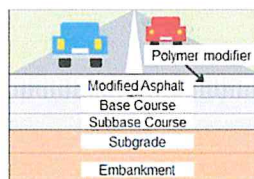
4. Basic Policy for Intersection Improvement method

4.2 Pavement Improvement

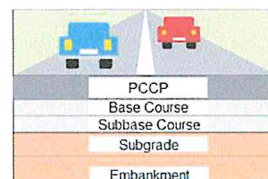
Existing Pavement	Pavement condition	Addition al lanes	Policy for Improvement
Portland Cement Concrete Pavement	Good	Yes	PCCP
		No	No improvement
Asphalt Pavement	Bad	Yes	PCCP
		No	Repaving PCCP
	Good	Yes	Modified Asphalt Pavement with Polymer or PCCP
		No	No improvement
		Yes	Modified Asphalt Pavement with Polymer or PCCP
		No	Repaving Modified Asphalt Pavement with Polymer or PCCP



Asphalt Pavement



Modified Asphalt Pavement with Polymer



Portland Cement Concrete Pavement

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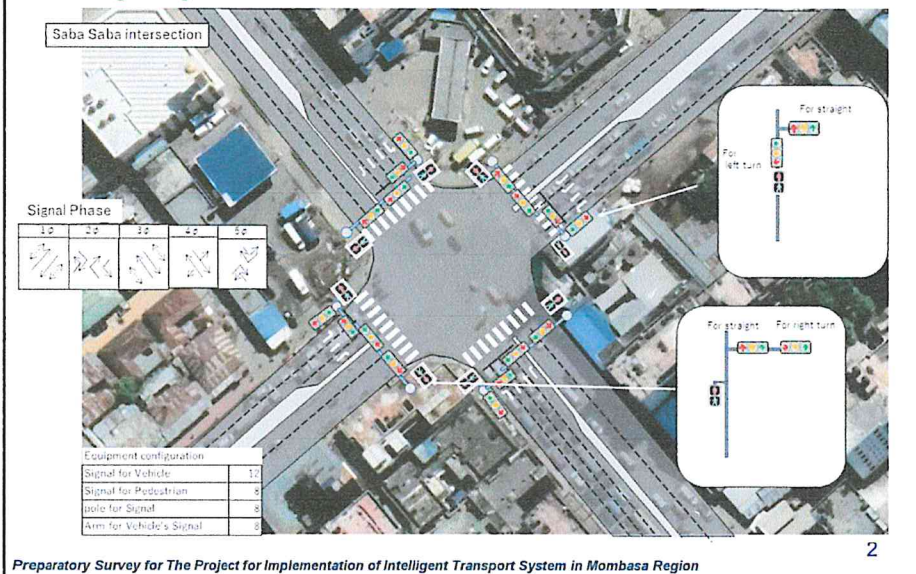
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4. Basic Policy for Intersection Improvement method

4.3 Signal system at intersection



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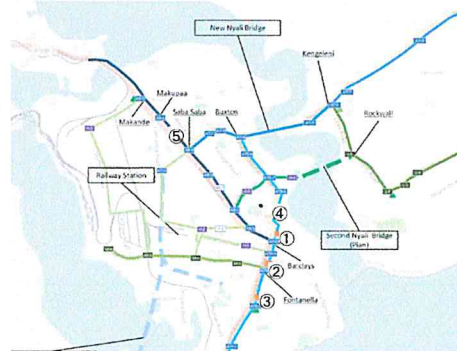
5. Basic Policy for Pedestrian Signal method

5.1 Conditions for Installation of Traffic Signal

1. Location being near by schools, kindergartens and nurseries and needs to secure the safety for students, children, disabled person, elderly person etc.
2. Location where it's hard to cross due to a lot of traffic volume and absence of pedestrian crossing bridge despite having many pedestrians to cross.
3. Location having the round-trip traffic volume on main road of 300 vehicles/hour at most.
4. Location located at more than 150m away from adjacent intersection.

5.2 Selection of Pedestrian Signal Locations

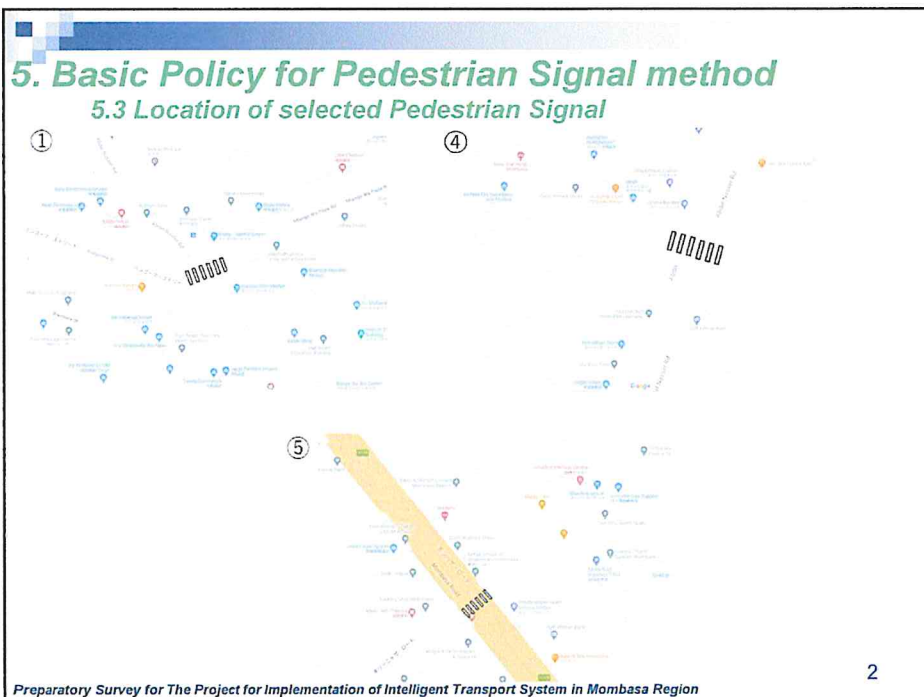
- ① **High priority:** Located at approx. 250m away from the Barclays. Having a lot of pedestrians due to being near by supermarkets. The road is bending, which makes visibility for pedestrians bad.
- ② **Less priority:** Pedestrian crossing is planned to be installed at Fontenanella intersection in this project.
- ③ **Less priority:** Pedestrians are less most of the time except for arrivals and departure time of ferry. Located at less than 50m from the roundabout which makes vehicle speed slow and secure the safety of pedestrians to cross.
- ④ **High priority:** Located at approx. 300m away from ①. Having a lot of pedestrians due to being near by supermarkets.
- ⑤ **High priority:** Located at approx. 300m away from Saba Saba and Makupa. Having a lot of pedestrians due to being nearby hospitals, markets etc.



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6. Basic Policy for selecting Communication method

6.1 There are 2 Options how to connect the traffic signal

	Option 1 Loop Network(OFC Redundancy)	Option 2 Star network(Only one OFC)
Advantages	•High redundancy ⇒Communication is possible even if OFC is cut off somewhere.	•Reduce installation cost ⇒No need to lay a new OFC in two directions. So, installation cost is decrease.
Challenges	•High installation cost ⇒Some places have to installation of new OFC in two directions. So, installation cost is increase.	•No Redundancy ⇒If the OFC is cut off somewhere, there are places where communication is not possible.
Cost	•Installation cost (Initial Cost) $12\\$/m \times 10,000m = 120,000\\$ = 13,200,000KSh$ •Communication cost* (Running Cost per Month) $30,000 \times 31 \text{ intersections} = 930,000KSh$ •Communication cost* (Running Cost per year) $930,000KSh \times 12 = 11,160,000KSh$	•Installation cost (Initial Cost) $12\\$/m \times 2,200m = 26,400\\$ = 2,904,000KSh$ •Communication cost* (Running Cost per Month) $30,000 \times 31 \text{ intersections} = 930,000KSh$ •Communication cost* (Running Cost per year) $930,000KSh \times 12 = 11,160,000KSh$

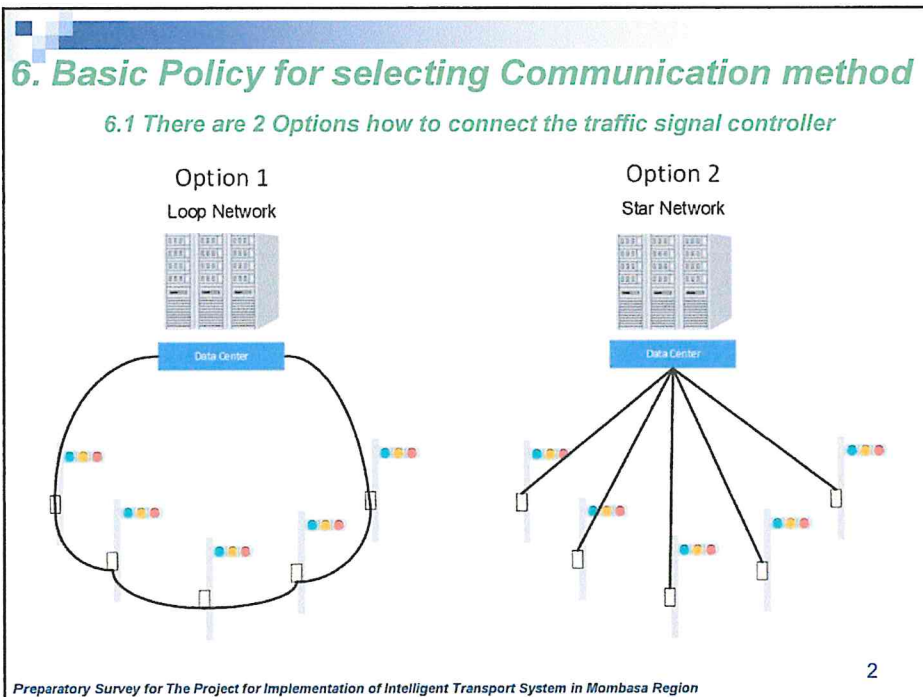
*Communication cost is calculated 30Mbps per intersection 1Mbps=1,000KSh

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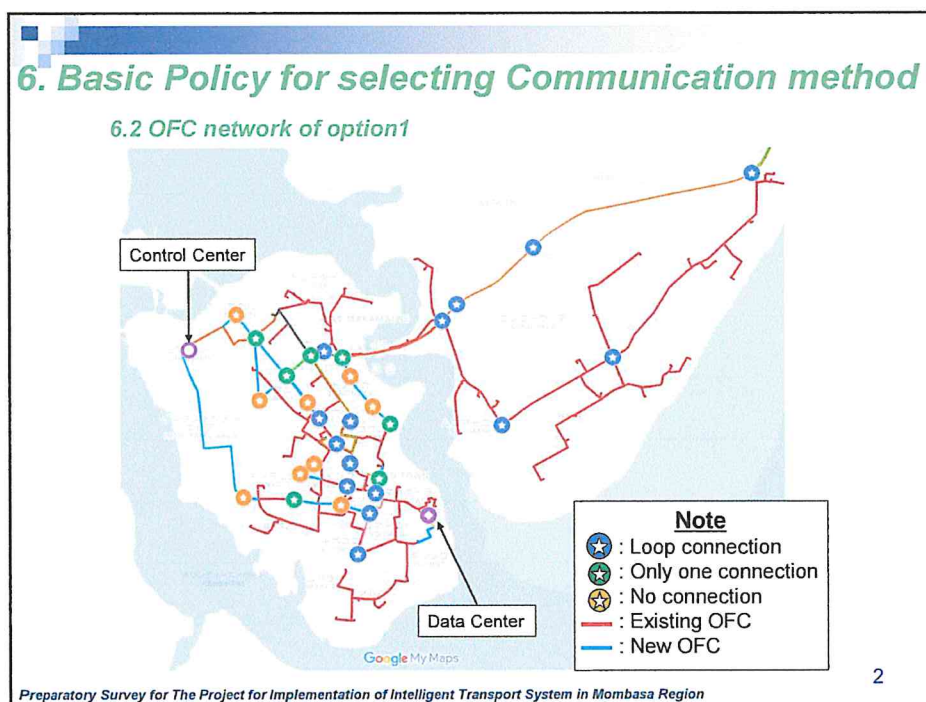
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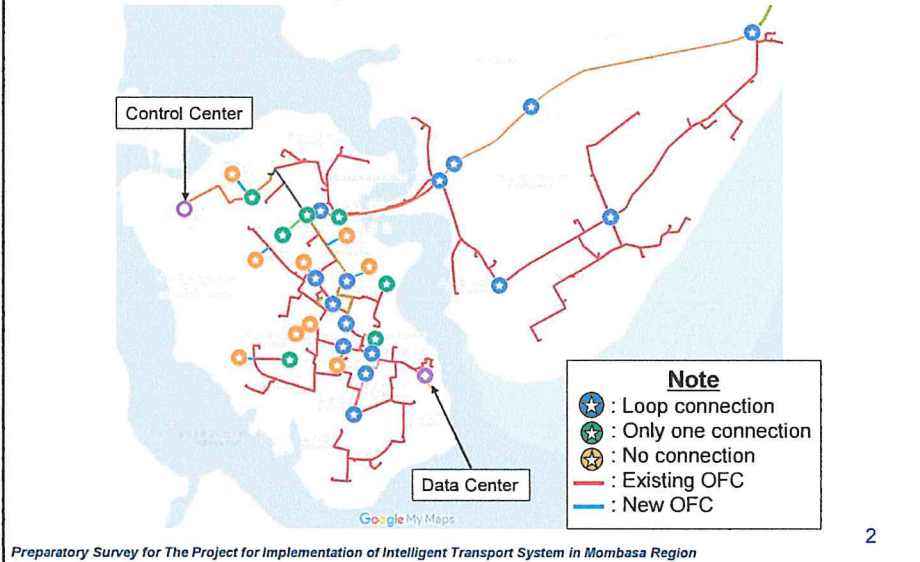
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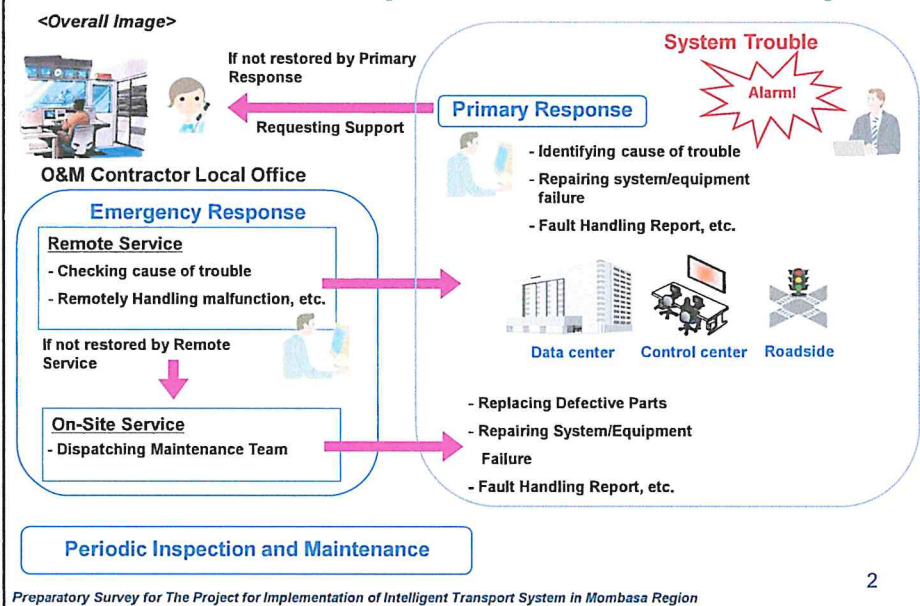
6. Basic Policy for selecting Communication method

6.2 OFC network of option2



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7. Consideration of Operation & Maintenance system



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7. Consideration of Operation & Maintenance system

Type	Main Items of Operation & Maintenance
Operation (by CGM Inspectorate)	<General> - Observing operation status of signal system, servers installed at Data Center from operator console - Checking the error log of each server - Calculation of Availability quarterly based on incident reports <Primary Response at Fault> - Identifying the situations and causes of system malfunctions - Requesting Maintenance Team for response - Reporting the status of system/equipment
Maintenance	<Emergency Response> (Remote Service) - Identifying situations and causes of system malfunction, rectifying malfunction remotely (On-site Service) - Identifying the defective/damaged equipment and parts and replacing defective/damaged equipment and parts with spare parts, repairing retrieved defective/damaged parts <Periodic Inspection & Maintenance> - Visual checking, Cleaning, etc. <System Adjustment> - System parameter setting based on the accumulated traffic data (annually).

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7. Consideration of Operation & Maintenance system

<Approximate Cost for the Maintenance>

No.	Item	Unit	Qty	Unit Price		Total		Remarks
				JPY	KSH	JPY	KSH	
1.	Operation by CGM Inspectorate							
1.1	Cost of remote service (remote service)	month	0.0	-	-	-	-	- Labor costs
1.2	Cost of remote service (remote service)	month	0.0	-	-	-	-	- Labor costs
1.3	Cost of Telephone reception	month	0.0	-	-	-	-	- Labor costs
1.4	General overhead costs	month	0.0	-	-	-	-	-
	Subtotal							
2.	Periodic Inspection & Maintenance							
2.1	Local inspection expenses	time	2.0	-	294,000	-	588,000	Twice a year
2.2	General overhead costs	time	2.0	-	1,688,000	-	3,376,000	Twice a year
	Subtotal							
3.	Emergency Response (Remote Service)							
3.1	Remote service from maintenance office	time	60.0	-	11,700	-	702,000	60 times/year
3.2	General overhead costs	month	12.0	-	154,000	-	1,848,000	
	Subtotal							
4.	Emergency Response (On-site Service)							
4.1	Central System Servers							
1)	Cost of Local engineer	number	1.0	-	30,000	-	30,000	Labor costs
2)	Equipment & Material	number	1.0	-	-	-	-	
3)	General overhead costs	number	1.0	-	75,000	-	75,000	
	Subtotal							
4.2	Roadside Equipment							
1)	Cost of Local engineer	number	3.0	-	84,000	-	252,000	Labor costs
2)	Equipment & Material	number	3.0	504,000	-	1,512,000	-	DOP price
3)	General overhead costs	number	3.0	-	525,000	-	1,575,000	
	Subtotal							
	Total							
						1,692,000	8,448,000	
5.	Administrative Cost	%	10%			169,200	844,800	
	Total					1,861,000	9,292,800	
	Grand Total (KSH)						11,151,000	

Preparatory Survey for The Project for Implementation of Intelligent Transport System in Mombasa Region

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8. Soft Components

- The contents of **Soft Components** in grant aid need to be coordinated with the contents of the next **Technical Cooperation Project** to be planned.
- **Necessary items after introducing the ITS system**
 - Instruction manual . . . Manufacturer of grant aid ?
 - Maintenance plan (item, outsourced contract draft . . . ?
 - Operation manual (operational structure, draft contract for outsourcing) . . . ?
 - OJT (including training in Japan) . . . ?
 - Public relations following traffic signal
 - Formulation of urban traffic management plan . . . ?
 - Traffic safety (3E; Engineering, Enforcement, Education) . . . ?

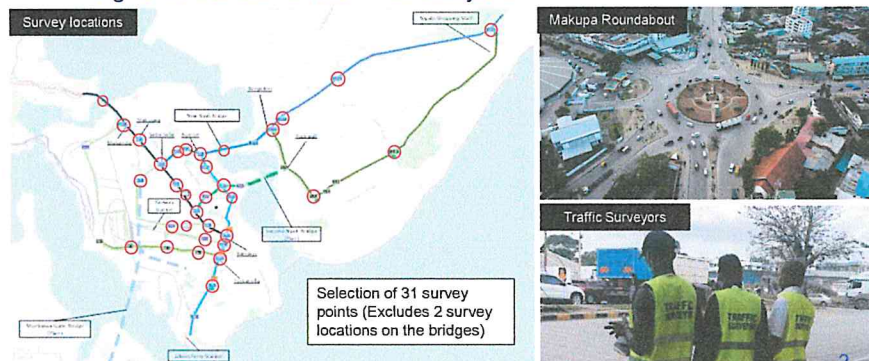
Preparatory Survey for The Project for Implementation of Intelligent Transport System in Mombasa Region

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9. Traffic Count survey and further analysis

- **Traffic Count survey**
 - ✓ 31 traffic survey locations were selected by the JICA survey team
 - ✓ The traffic survey was started on 13th, Sep and will be completed by 2nd, Oct.
- **Further Analysis**
 - ✓ Future traffic volume will be estimated from the survey results, and used for intersection improvement design.
 - ✓ Traffic simulation based on the survey results will be conducted and the signal introduction effect will be analyzed.



Preparatory Survey for The Project for Implementation of Intelligent Transport System in Mombasa Region

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10. Consideration and schedule of Environment study

- Confirmation to NEMA regarding EIA procedure (updated info. is next slide)
[Based on the meeting with NEMA Director, JST, Mr. Ali (CGM): 27th Sep.]
 - ✓ All project is necessary to conduct EIA in Kenya, however, projects will be categorized into high, medium, or low risk project based on the impact of projects
 - ✓ Since impact of this project may be not significant, this project is not categorized as high risk project and categorized as low or medium risk project
 - ✓ Environmental Impact Assessment Summary Project Report is necessary to submit and then approval will be issued. It takes 5 days for issuance of approval.
 - ✓ Only certified consultant can submit The Summary Project Report
 - ✓ The Summary Project Report is received in NEMA Mombasa
 - ✓ Contents of the Summary Project Report is including nature of the project, location of the project, and availability of supportive infrastructure etc.
 - ✓ Site observation with NEMA is necessary
- Hiring certified local consultant as sub-contractor (contract is already concluded)
- Site observation with NEMA and sub-contractor was conducted on 30th Sep.

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10. Consideration and schedule of Environment study

- Submission (Explanation) of detailed information of project activity to NEMA
[Based on the meeting with NEMA official, JST(Maeda), Repcon: 30th Sep.]
 - ✓ Previously NEMA instructed JST to prepare PSR, however, NEMA would like to reconfirm required procedure of EIA for this project based on detailed project activities and site observation result.
 - ✓ JST will have meeting with NEMA on 1st Oct.(tomorrow) to confirm EIA procedure
- The most concerned impact of this project activity is removal of roundabout including monument



Dolphins at A7R-2
(Belong to Mombasa cement)



Kettle at A7R-3 (Fontanella)
(Arab cultural monument)



Newly rehabilitated one at M-3
(Constricting new monument?)

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18th Sep.

11. Consideration for Northern Economic Corridor

- Traffic volume related to Mombasa Port has been decreasing due to the construction of a new berth at main land and the start of operation of SGR in December 2018 (20% of container cargo is borne by SGR).
- However, traffic related to the northern corridor still uses the island road, which is affected by traffic congestion on the island and is also a cause of traffic congestion. This project is effective for the development of the northern corridor and **Free and Open Indo-Pacific (FOIP)**
- NTCCTA is implementing efforts to facilitate traffic in the northern corridor with the cooperation of member countries. Simplification of border crossing procedures, one-stop, etc.

Hearing results of

Northern Corridor Transit and Transport Coordination Authority (NCTTCA)

NCTTCA is an organization created by a treaty in 1985 to cooperate with the six countries of Kenya, Burundi, Congo, Rwanda, Uganda, and South Sudan along the development of the Northern Corridor starting from Mombasa. The headquarters is in Mombasa.

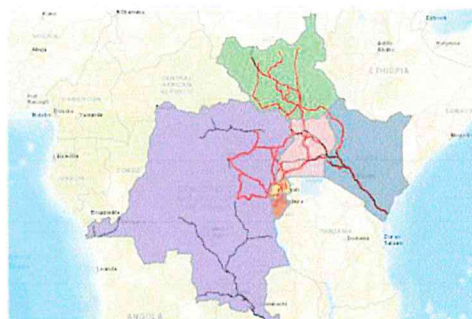
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11. Consideration for Northern Economic Corridor

NORTHERN CORRIDOR MEMBER STATES



Road
 Rail



SGR Mombasa Terminal

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12. Major Undertakings to be taken by the Government of Kenya (Cost Item)

<Before the Tender>

NO	Items	Deadline	In charge	Estimated Cost	Ref.
	To secure and clear the following lands				
	1) right of way of the Project				
	2) temporary construction yard and stock yard near the Project area	before notice of the bidding documents	CGM		
7	3) borrow pit and disposal site near the Project area				
	4) Renovating Centers to accommodate the provided equipment, which includes upgrading of air-conditioning system, replacement of electrical fittings and lighting fixtures, refurbishing of interior finishes, if necessary.				
	To clear, level and reclaim the following sites	before notice of the bidding documents	CGM		
9	1) remove utilities		KeNHA		
	2) existing facilities		KURRA		

Preparatory Survey for The Project for Implementation of Intelligent Transport System in Mombasa Region

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12. Major Undertakings to be taken by the Government of Kenya (Cost Item)

<During the Project Implementation>

NO	Items	Deadline	In charge	Estimated Cost	Ref.
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted	during the Project	CGM		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	CGM		
	1) Providing power supply and communication necessary for the provided equipment at site, Data Center and Control Centre	Before equipment at sites	CGM		
	If any necessary for the Project	During the Project	CGM		
11	To take measure necessary for security and safety of the Project -traffic control around the site and on transportation routes of construction materials -public notification	during the construction	CGM		
14	To implement RAP/ARAP (livelihood restoration program), if necessary	for a period based on livelihood restoration program	CGM		

Preparatory Survey for The Project for Implementation of Intelligent Transport System in Mombasa Region

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12. Major Undertakings to be taken by the Government of Kenya (Cost Item)

<After the Project>

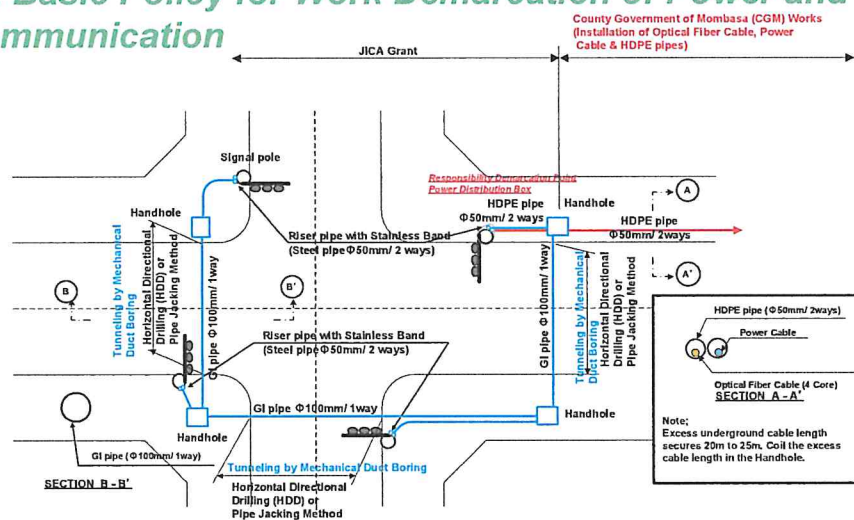
NO	Items	Deadline	In charge	Estimated Cost	Ref.
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	CGM		

Preparatory Survey for The Project for Implementation of Intelligent Transport System in Mombasa Region

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13. Basic Policy for Work Demarcation of Power and Communication



Preparatory Survey for The Project for Implementation of Intelligent Transport System in Mombasa Region

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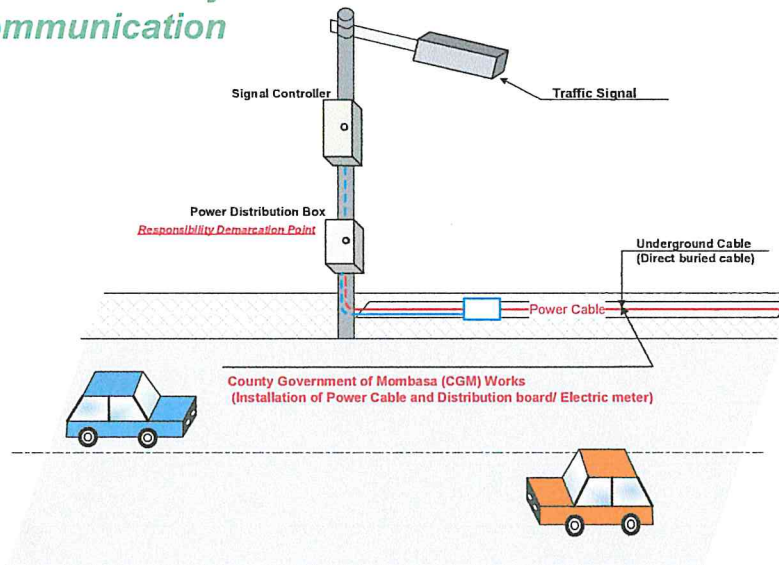
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13. Basic Policy for Work Demarcation of Power and Communication



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14. To be done and supported by Kenyan side

1. Finance (Budget) data for 3-5 years for evaluation of financial capability for operation and maintenance

➤ Traffic Sector/ICT Sector/ Inspectorate sector

2. Completion POC successfully by the end of 2021 and handover the equipment to CGM

3. Formal request of Grant Project by the end of 2021

Preparatory Survey for The Project for Implementation of Intelligent Transport System in Mombasa Region

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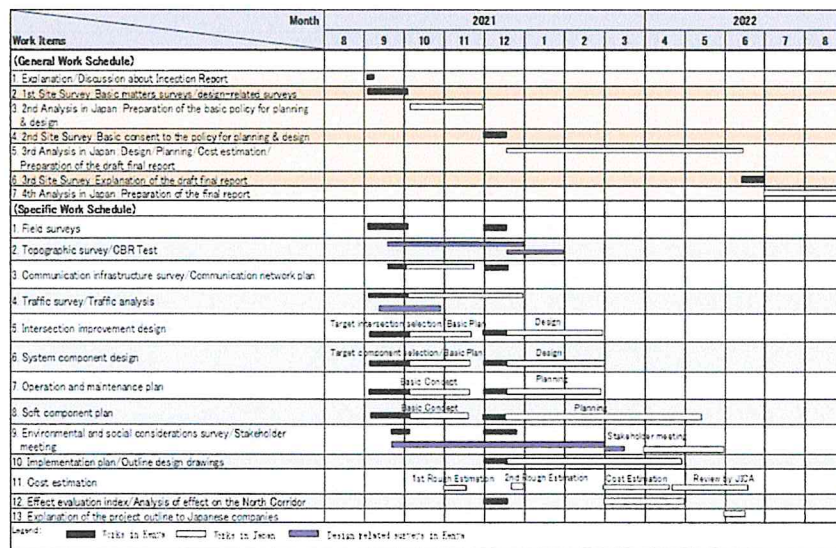
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15. Further Schedule



Preparatory Survey for The Project for Implementation of Intelligent Transport System in Mombasa Region

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Major Undertakings to be taken by the Government of Kenya

Sep 30. 2021

1. Specific obligations of the Government of Kenya which will not be funded with the Grant

(1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MOF		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MOF		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF		
	2) Payment commission for A/P	every payment	MOF		
4	To get approval for IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any).	within 1 month after the signing of the G/A	CGM		
5	To secure the necessary budget and implement land acquisition and resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with RAP	before notice of the bidding documents	CGM		
6	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	until land acquisition and resettlement complete	CGM		
7	To secure and clear the following lands 1) right of way of the Project 2) temporary construction yard and stock yard near the Project area 3) borrow pit and disposal site near the Project area 4) Renovating Centers to accommodate the provided equipment, which includes upgrading of air-conditioning system, replacement of electrical fittings and lighting fixtures, refurbishing of interior finishes, if necessary.	before notice of the bidding documents	CGM		
8	To obtain the planning, zoning, building permit	before notice of the bidding documents	CGM		
9	To clear, level and reclaim the following sites 1) remove utilities 2) existing facilities	before notice of the bidding documents	CGM KeNHA KURRA		
10	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	CGM		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

Note: CGM : County Government of Mombasa

MOF:Ministry of Finance

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KeNHA: Kenya National Highways Authority

KURA: Kenya Urban Roads Authority

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	CGM		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	CGM		
	2) Payment commission for A/P	every payment	MOF CGM		
3	to ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	CGM		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	CGM		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted	during the Project	CGM		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	CGM		
	1) Providing power supply and communication necessary for the provided equipment at site and Control Centre	Before equipment at sites	CGM		
	2) If any necessary for the Project	During the Project	CGM		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	CGM		
8	1) To submit Project Monitoring Report	every month	CGM		
	2) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	CGM		
9	To submit a report concerning completion of the Project	within 6 months after completion of the Project	CGM		

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10	To ensure the safety of persons engaged in the implementation of the Project	during the Project	CGM		
11	To take measure necessary for security and safety of the Project -traffic control around the site and on transportation routes of construction materials -public notification	during the construction	CGM		
12	To implement EMP and EMoP	during the construction	CGM		
13	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	CGM		
14	To implement RAP/ARAP (livelihood restoration program), if necessary	for a period based on livelihood restoration program	CGM		
15	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between CGM and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) - for 2 years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)	CGM		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	CGM		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between CGM and JICA.	for 3 years after the Project	CGM		
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	CGM		

2. Other obligations of the Government of Kenya funded with the Grant

NO	Items	Deadline	Amount (Million)
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DKens

			Japanese Yen)*
1	Civil work and equipment procurement		
2	Detailed design and Supervisory Service		
3	Contingencies		
	Total		XXX

* The Amount is provisional. This is subject to the approval of the Government of Japan.

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Technical Note
on the Preparatory Survey for the Project for
Implementation of Intelligent Transport System in
Mombasa Region

In response to the request from the Government of the Republic of Kenya, the Government of Japan decided to conduct a Preparatory Survey for the Project for Implementation of Intelligent Transport System in Mombasa Region (hereinafter referred to as “the Project”), and entrusted the Preparatory Survey to Japan International Cooperation Agency (hereinafter referred to as “JICA”).

JICA sent the Preparatory Survey Team for the Outline Design (hereinafter referred to as “the Team”) to Mombasa. The Team held a series of discussions with the officials of County Government of Mombasa (CGM) for 2nd Survey at Mombasa. In the course of the discussions, both sides have confirmed the main items described in the attachment. The Team will proceed for further works in the future.

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Mombasa, December 17th, 2021



Masato Okuda

Chief Consultant
Preparatory Survey Team

Japan International Cooperation Agency
Japan



Eng. Albert T. Keno

County Chief Officer- Transport
Department of Transport, Infrastructure &
Public Works

County Government of Mombasa
Republic of Kenya

ATTACHMENT

1. Confirmation of Presentation of progress of the 2nd Survey and Basic Design Concept

The Team explained the Presentation of the Progress of 2nd Survey and Basic Concept of Design based on the previous discussions and CGM agreed in principle with the contents.

2. Discussion on the contents

2.1 Intersection selection

The Team explained the selecting method on the selected 24 intersections so far and CGM agreed.

The Team explained the number of target intersections can be decreased considering effect and budget constraints and lower priority intersection is judged as follows and CGM agreed:

- Lowest priority of 2 intersections (L-2 and L-5) due to low traffic and isolated although Happy hour operation.
- 2nd lowest priority of 2 intersections (H-1 and H-5) due to low traffic although connection with Core loop and near school/market.
- 3rd lowest priority of 2 intersections (A7-2 and A8-7) due to the intersections being too close to A7-3 and A8-3 Respectively.

2.2 ITS Components

The Team explained the following is the target ITS Components and CGM agreed.

1. Expansion of the existing CCTV System (important 5 location)
2. Accumulation and analysis of traffic information
3. Providing traffic information through VMS (3 locations)
4. Data Centre for control server and storage server
5. Control Centre with Video wall

The Team and CGM decided the location of Control Centre shall be in the building of Operation and Service division, Public Works Building in Shimanzi and The Team provided a sample layout of the proposed Control Centre with a Videowall.

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2.3 Intersection Improvement

The Team explained on the following pavement improvement method and scope and CGM agreed:

(Basic Concept)

- PCCP to be used for existing PCCP road
- Modified Asphalt Pavement with Polymer to be used for existing Asphalt Road.
- Pavement will be applied where median and RA is to be removed and where the existing paving is poor.

(Scope of intersection)

- The section from the starting point for right / left turn shift of each inflow to the intersection.
- For inflow areas where right/left turn lanes are not installed, the section from 30m upstream to the stop line.

(Scope of Median strip improvement)

- Right-turn lane length (minimum 30m) + sliding length (30~40m).

2.4 Pedestrian Signal method

The Team explained the high priority locations for installation of the pedestrian signals are three. However, two of the locations have changed from the original plan to different locations. CGM agreed on new locations.

2.5 Communication method

The Team recommended the loop network to provide communication between the intersection signals, Control Centre, and Data Centre. CGM recommended the FIBRE LINK (existing service provider) as communication provider for the Project. CGM and FIBER LINK agreed to enhance redundancy for the Project before tender.

2.6 Consideration of Operation & Maintenance

As per the request from CGM to consider Japanese ITS Manufacturer to be included in ITS O&M contract(activity), O&M scheme was proposed by the Team for further consideration.

2.7 Consideration and schedule of Environment study

1) EIA procedure,

The following points were confirmed with NEMA

Time for reviewing EIA including ARAP(Abbreviated Resettlement Action Plan) by

no

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NEMA is regulated as 3 months. Thus, EIA will be submitted by end of January 2022 to receive EIA License by June 2022.

- ARAP is not separately reviewed and approved from EIA document.
- Any payment is not required to NEMA for reviewing EIA and issuance of EIA license.
- NEMA agreed with the proposed ideas regarding gender considerations of the project and recommended to state such gender considerations in EIA document.

2) Removal of monuments within roundabout,

The following points were confirmed with the National Museums of Kenya

- The monument on roundabout, the kettle at Fontanella intersection, is not a “monument” defined by NATIONAL MUSEUMS AND HERITAGE ACT. The monument, the kettle at Fontanella intersection, is one of structures (works) for beautification of Mombasa city. Further consultations shall be held with CGM Department of Youth Gender Sports and Cultural Affairs on the procedure of removing and preserving the beautifications within roundabouts.

2.8 Construction Plan

The Team explained the Construction Plan as follows, and CGM, KURA and KeNHA agreed.

- Construction of half of the road and both direction of traffic will be controlled on another half of the road.
- Road construction will be done during day time basically, but night time construction will be done for special congested area and center space of intersection.

2.9 Major Undertaking to be taken by the Government of Kenya (Cost Item)

The Team explained the necessary undertakings to be shouldered by the Kenyan side categorized into three; Before the Tender, During the Project Implementation and After the project. CGM agreed.

1. Before the Tender

1)Secure material yard (including security equipment):

- Main camp yard need to be shown by CGM by middle of January 2022.
- Vacant land in the CGM facility at Shimanzi will be prepared as the sub camp yard.

2)Secure disposal sites for construction waste:

- Disposal site in Mwakirunge will be prepared

3)Secure the location of the traffic control center and data center (including facilities

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related to lighting, air conditioning, security, and emergency power supply) :

-The space in the CGM office at Shimanzi will be prepared as the traffic control center. The existing data center of CGM can be available to host the servers of the Project.

4)Power equipment:

The Team will provide CAD design drawings to Kenya Power by the end of Jan 2022 and Kenya Power will prepare detailed replacement plan including the cost by April 2022. CGM will ensure the budget and formally request the replacement to Kenya Power by Jan 2023.

5)Monuments

Monuments in the target RA will be relocated or removed by the CGM, which will not be an issue in environmental perspective according to NEMA.

6)Parking lots

Parking lots in target intersection will be removed by the CGM.

7)Other facilities that interfere with intersection improvement work:

Using facilities that interfere with intersection improvement works will be removed by CGM. Un-used facilities interfere with intersection improvement can be removed by the Project.

2. During the Project Implementation

Necessary power supply and telecommunication supply for construction and installation of facilities will be supplied by CGM

3. After the Project

-Keeping necessary contract on Operation and Maintenance

2.10 To be done and supported by Kenyan side

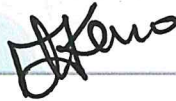
The Team explained the necessary items to be done and supported as follows:

1. Finance (Budget) data for 3-5 years for evaluation of financial capability for operation and maintenance of the System.
2. Completion of Contract Agreement between CGM and CCTV Provider to be finalized by March 2022 and handover the equipment to CGM by contractor.
3. Formal Request of Grant Project by the end of 2021.

CGM agreed and informed the Team that a Formal Request was sent to Central Government already.

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Technical Note
on the Preparatory Survey for the Project for
Implementation of Intelligent Transport System in Mombasa Region
(Additional Survey)

Discussion to explanation on Draft Preparatory Survey Report was done and Minutes of Discussion was agreed on 21st March, 2024.

JICA dispatched the Additional Survey Team to survey the current situation and coordinate with County Government of Mombasa (CGM) and related party for the project for the implementation of Intelligent Transport System in Mombasa Region (herein after referred to as the "Project")

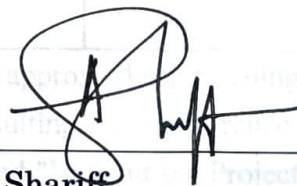
Based on the several discussions between CGM and Additional Survey Team for the Project, both side have confirmed the item described in the attached sheets.

28th May, 2025



Masato Okuda
Chief Consultant
Preparatory Survey Team

Japan International Cooperation
Agency
Japan



Ali A. Shariff
County Chief Officer- Transport
Department of Transport,
Infrastructure & Public Works
County Government of Mombasa
Republic of Kenya

ATTACHEMENT

1. Timeline for the Project Implementation

The Team explained to the Kenyan side that the expected timeline for the project implementation is as attached in Annex_1.

2. Expected outcomes and indicators.

Both sides agreed that key indicators for expected outcomes are as follows. The Kenyan side will be responsible for the achievement of agreed key indicators targeted in year 2030, two(2) years after completion and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative indicators]

Indicator	Basic Value (2021)	Target (2030) [2 years after completion]
Average Travel time (minutes) at traffic peak hour *1	approx. 9.4 minutes	approx. 6.5 minutes
Average Travel speed (km/h) at traffic peak hour *1	approx. 12.3 km/h	approx. 17.8 km/h
Overall benefits of the target intersection (mill yen/year) *2	—	approx. 480 mill yen/year

*1 : Saba Saba Intersection to Barclay intersection (approx. 2km). Evening peak.

*2 : Economic benefit of travel time reduction resulting from difference in estimated travel time between "With the Project Case" and "Without the Project Case" when the road improvement projects (Roads connecting Nairobi direction(A109) and Mombasa port area (A8 and A14) on Mombasa Island) are completed in 2030.

[Qualitative indicators]

- 1) Mitigation of traffic congestion in Mombasa Island by the Project will contribute to vitalization of economic activity.
- 2) The convenience and safety of vehicles, passengers and pedestrians will be enhanced.

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3. Change of scope on CCTV

According to the original plan, traffic monitoring at 22 intersections was to be carried out by utilizing existing CCTV cameras at 17 intersections and installing monitoring cameras by the Project at the remaining 5 intersections where no existing cameras were installed.

However, existing CCTV Cameras in Mombasa island had been replaced by another project for Provision of an Integrated Smart Surveillance system within Mombasa Country (hereinafter referred to as "Smart City Project")

Both sides confirmed following change of scope for CCTV:

- 1) CCTV camera data for traffic monitoring at twenty two(22) intersections can be provided to the Project from the Smart City Project .
- 2) Scope of installation of new CCTV cameras at five (5) intersections for traffic monitoring by the Project is cancelled.
- 3) Instead, dedicated CCTV cameras will be installed for traffic analysis and incident detection at important eight (8) intersections by the Project as is described in Annex_2.

4. Items and measures to be considered for smooth implementation of the Project.

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as described in Annex_3.

4-1 Installation of fiber cable network

Both sides confirmed that the Kenyan side explained that Smart City Project already selected the network vender and ITS Project will be required to select the same vender.

4-2 Coordination with Smart City Project

Both sides confirmed that the coordination between the Project and the Smart City Project shall cover the following areas:

- 1) Integration of CCTV camera data via the shared network.
- 2) Sharing space and location of the new traffic management center

4-3 Relocation of utilities and existing facilities.

The Executing Agency will coordinate with the relevant entities to complete relocation of utilities and existing facilities including the poles for CCTV of Smart City Project before announcement of the tender process .

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4-4 Construction of the new traffic management center building

Both sides confirmed that the operation room for the equipment provided by the Project will be located at the new traffic management center building at the premise of Inspectorate Unit, and that its construction should be completed before announcement of the tender process of the Project.

Kenyan side explained that its construction is expected to be completed before announcement of the tender process .

5. Environmental Impact Assessment (EIA)

Both sides confirmed the Environmental Impact Assessment (hereinafter referred to as "EIA") report will be approved by The National Environment Management Authority (hereinafter referred to as "NEMA") in September 2025.

End

Annex_1: Project Implementation Schedule

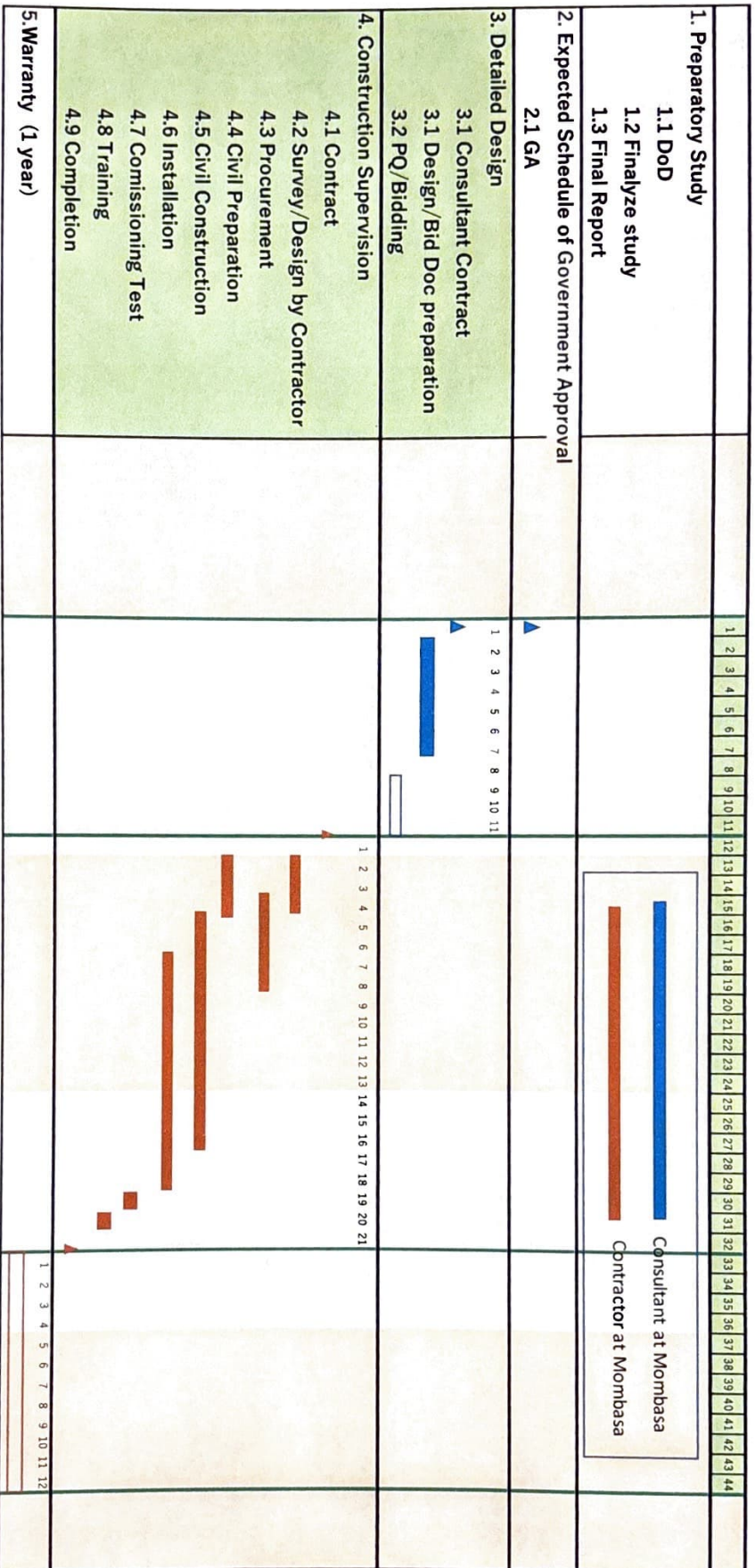
Annex_2: CCTV location

Annex_3: Major Undertakings to be taken by Government of Kenya

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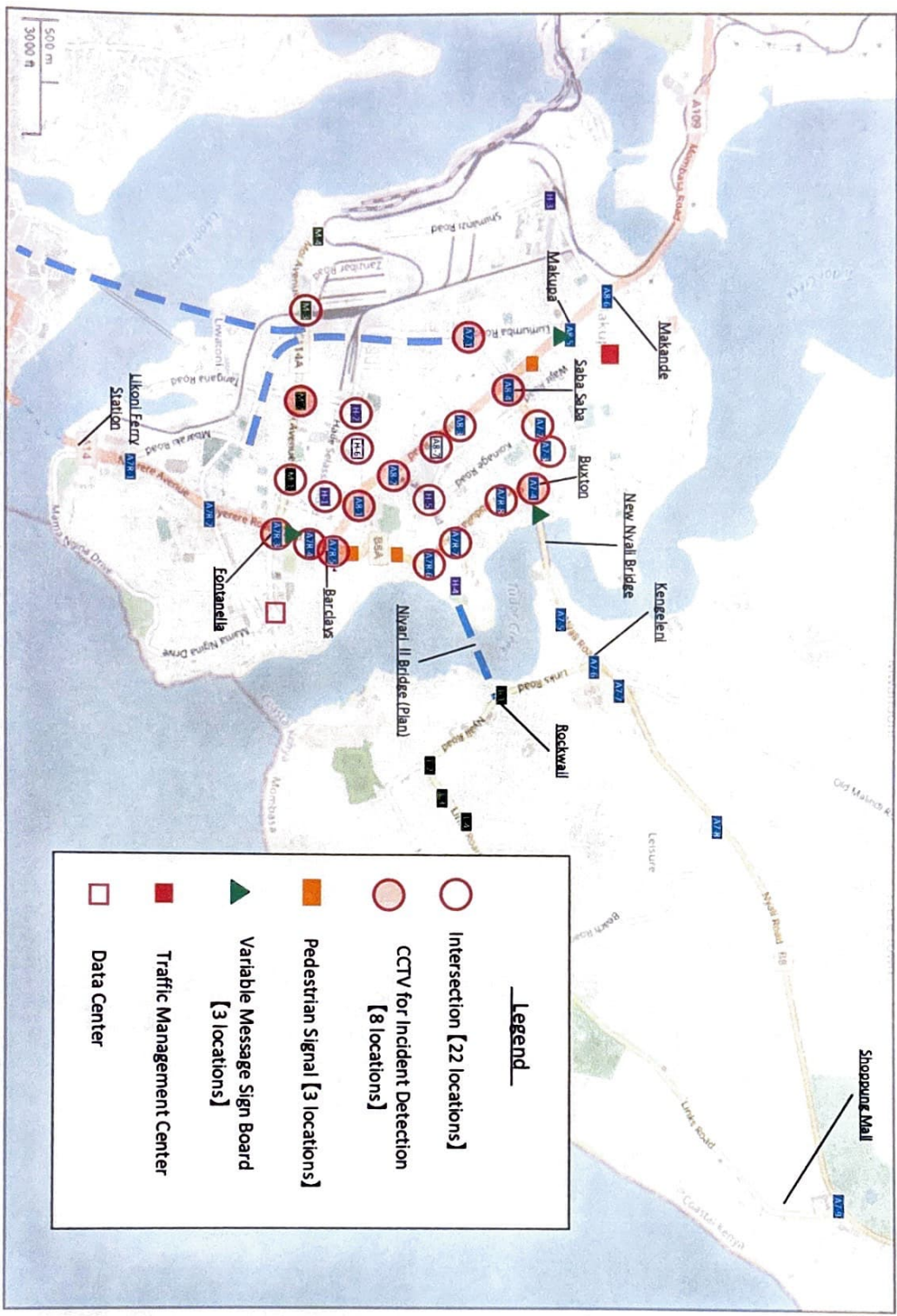
AS

Tentative Implementation Plan of the Project for Mombasa City ITS in Kenya



8

CCTV Location



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Major Undertakings to be taken by the Government of Republic of Kenya

1. Specific obligations of the Government of Republic of Kenya which will not be funded with the Grant**(1) Before the Tender**

NO	Items	Deadline	In charge	Estimated Cost (KES)	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	CGM (NT)	approx. 3,000,000	
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	CGM (NT)		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P Commissioning Fee	within 1 month after the signing of the contract(s)	CGM		
	2) Payment commission for A/P	every payment	CGM		
4	To approve EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any). Commission Fee	until September, 2025	CGM	approx. 3,000,000	
5	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	until land acquisition and resettlement completion	CGM		
6	To secure and clear the following lands	before announcement of the tender process	CGM		
	1) main camp yard, temporary construction yard and stock yard near the Project area				
	2) borrow pit and disposal site near the Project area				
	3) To complete construction of new traffic management center building to accommodate the provided equipment, which will later include raised floor, air-conditioning system, electrical fittings, lighting fixtures and interior finishes.	before announcement of the tender process	CGM	3,000,000	
	4) Implementation of additional Optical Fiber network		CGM	13,265,000	
	5) To complete the CCTV installation and network of Smart City Project for share the Camera data with the Project		CGM		
7	To discuss on intersection design	During detailed design	CGM KURA KeNHA		

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8	To clear, level and reclaim the following sites 1) Removal of the ornament structures, power facilities, communication cables, advertisement board, lighting and the poles for CCTV of Smart City Project from the roundabouts with cooperation of the stakeholders.	before announcement of the tender process	CGM	5,000,000	
9	To submit Project Monitoring Report (with the result of Detailed Design)	before announcement of the tender process	CGM		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

Note: CGM : Mombasa County Government

NT : The National Treasury and Economic Planning

KeNHA : Kenya National Highways Authority

KURA: Kenya Urban Roads Authority

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost (KES)	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	CGM (NT)	approx. 3,000,000	
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A 1) Advising commission of A/P	within 1 month after the signing of the contract(s)	CGM (NT)		
	2) Payment commission for A/P	every payment	CGM (NT)		
3	To ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	CGM		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	CGM		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted.	during the Project	CGM NT		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	CGM		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	CGM		
8	1) To submit Project Monitoring Report	every month	CGM		
	2) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	CGM		
9	To submit a report concerning completion of the Project	within 6 months after completion	CGM		

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		of the Project			
10	To provide Data Centre and Traffic Management Centre with facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s), 1) Electric power distributing line to the equipment. 2) Communication line to the equipment 3) Relocating and adding Mobile Radio Communication System to new Traffic Management Centre.	before start of the equipment installation Before start of the equipment installation During/before installation	CGM CGM (Fiber Link) CGM	2,370,000 2,770,000 300,000	
11	To ensure the safety of persons engaged in the implementation of the Project.	during the Project	CGM		
12	To take measures necessary for security and safety of the Project -traffic control around the site and on transportation routes of construction materials -public notification -immediate action in case of accident -information of security.	during the construction	CGM		
13	To implement EMP and EMoP	during the construction	CGM		
14	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	CGM		
15	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	CGM		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	during warranty period	CGM	6,600,000 1 year only	
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between CGM and JICA.	for 3 years after completion of the Project	CGM		
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost Maintenance Contract fee Communication Bill 2) Operation and maintenance structure Maintenance Contract Assignment of personnel for Operation and maintenance	After completion of the construction	CGM	9,900,900 10,693,069 /Year	

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Appendix-2

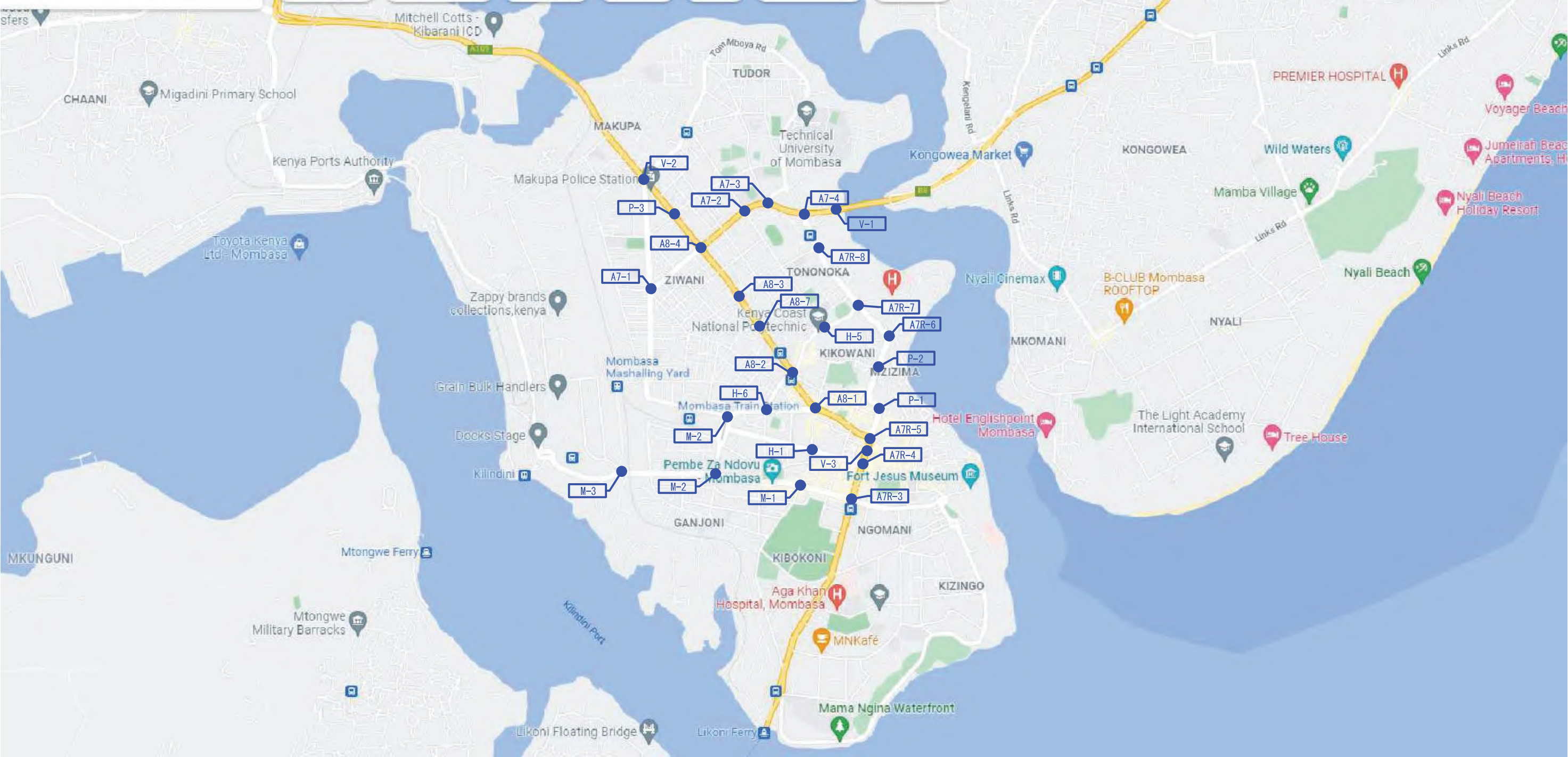
Outline Design Drawings

PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION

Japan International Cooperation Agency

June 2022

NIPPON KOEI CO.,LTD.
Katahira & Engineers International
Ingerosec Corporation



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA



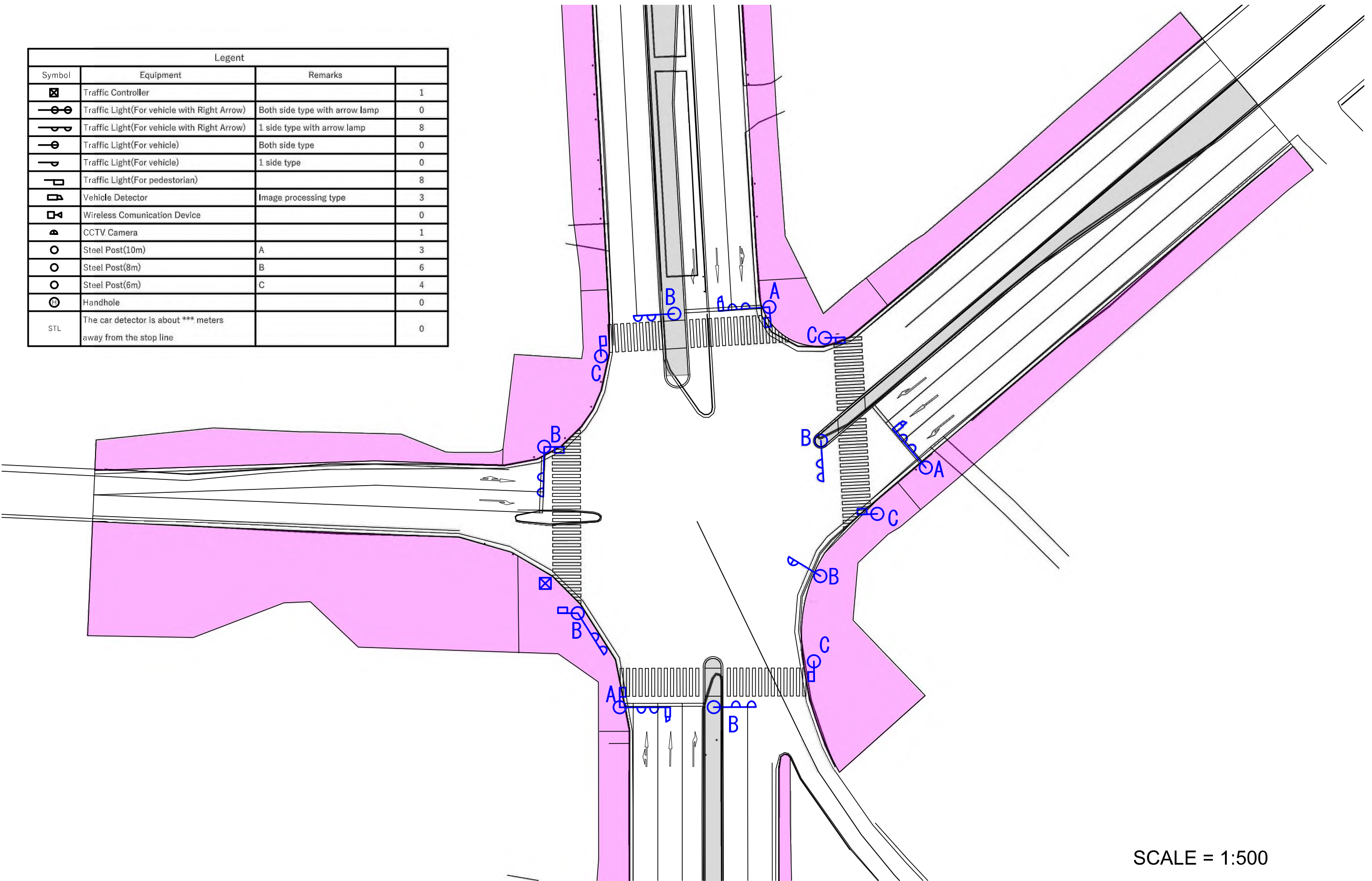
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KATAHIRA & ENGINEERS INTERNATIONAL
INGEROSEC CORPORATION

THE PREPARATORY SURVEY FOR THE
PROJECT FOR
IMPLEMENTATION OF INTELLIGENT
TRANSPORT SYSTEM IN MOMBASA REGION

TITLE
Location Map

Drawing No.	G-1
SCALE	S=1/30000
DATE	

Legent			
Symbol	Equipment	Remarks	
☒	Traffic Controller		1
⊖	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
⊖	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	8
⊖	Traffic Light(For vehicle)	Both side type	0
⊖	Traffic Light(For vehicle)	1 side type	0
⊖	Traffic Light(For pedestrian)		8
⊖	Vehicle Detector	Image processing type	3
⊖	Wireless Communication Device		0
⊖	CCTV Camera		1
○	Steel Post(10m)	A	3
○	Steel Post(8m)	B	6
○	Steel Post(6m)	C	4
⊖	Handhole		0
STL	The car detector is about *** meters away from the stop line		0



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MOMBASA REPUBLIC OF KENYA

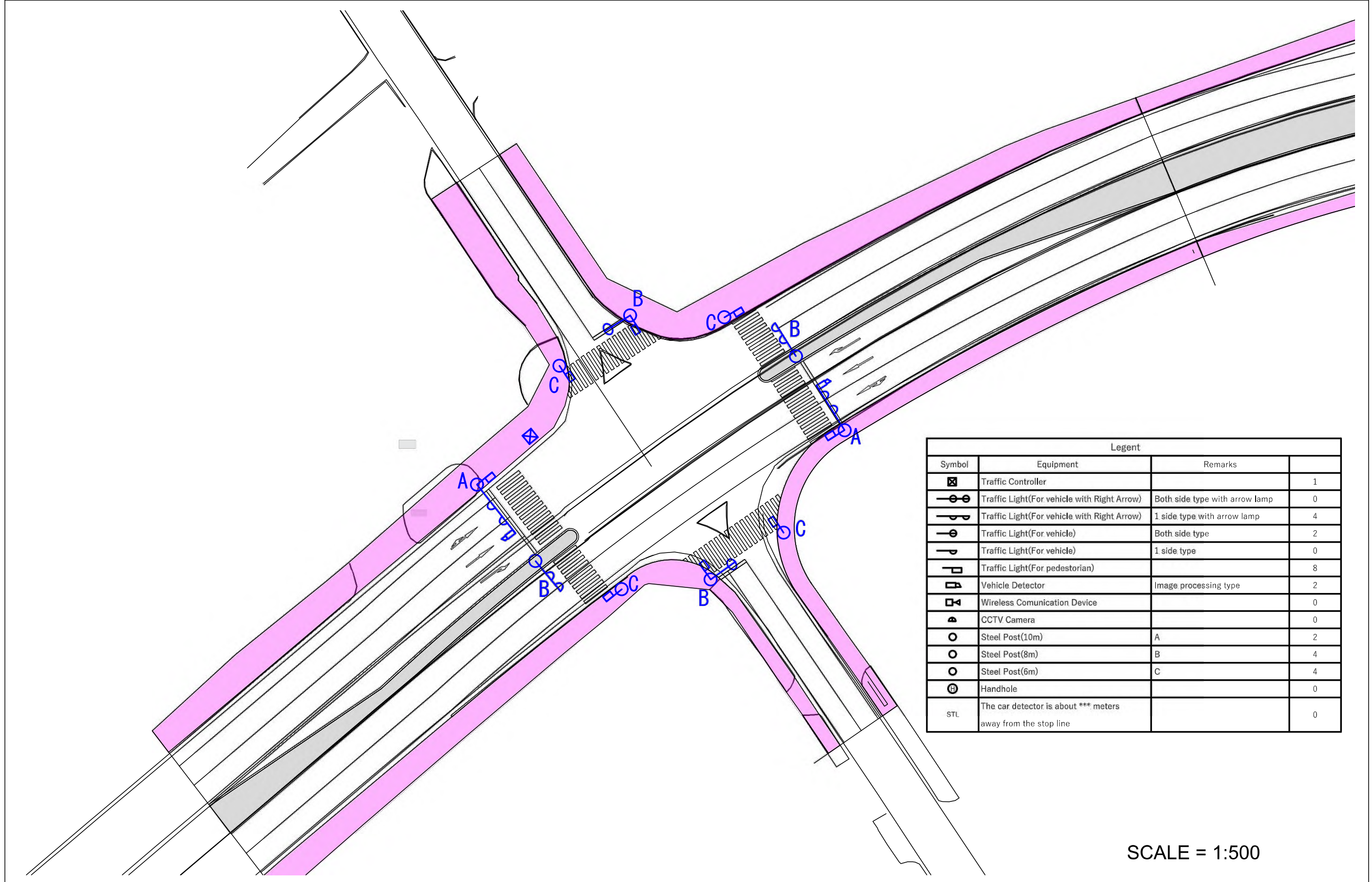


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THE PREPARATORY SURVEY FOR THE
PROJECT FOR
IMPLEMENTATION OF INTELLIGENT
TRANSPORT SYSTEM IN MOMBASA REGION

TITLE
Detail Location of Traffic Signal (A7-1)

Drawing No.	S-1
SCALE	S=1/500
DATE	



Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	4
	Traffic Light(For vehicle)	Both side type	2
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		8
	Vehicle Detector	Image processing type	2
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	2
	Steel Post(8m)	B	4
	Steel Post(6m)	C	4
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA



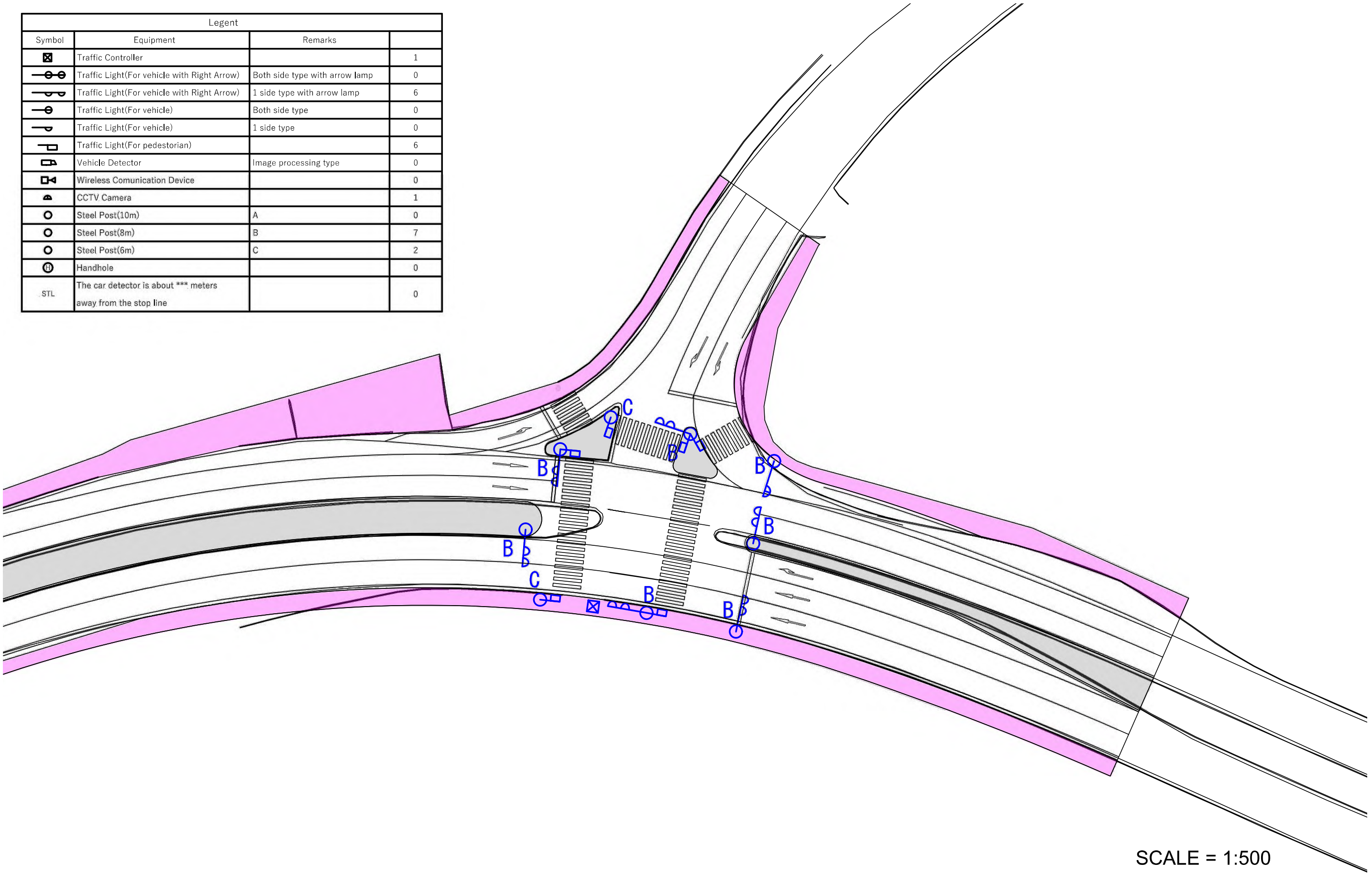
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NIPPON KOEI CO.,LTD.
KATAHIRA & ENGINEERS INTERNATIONAL
INGEROSEC CORPORATION

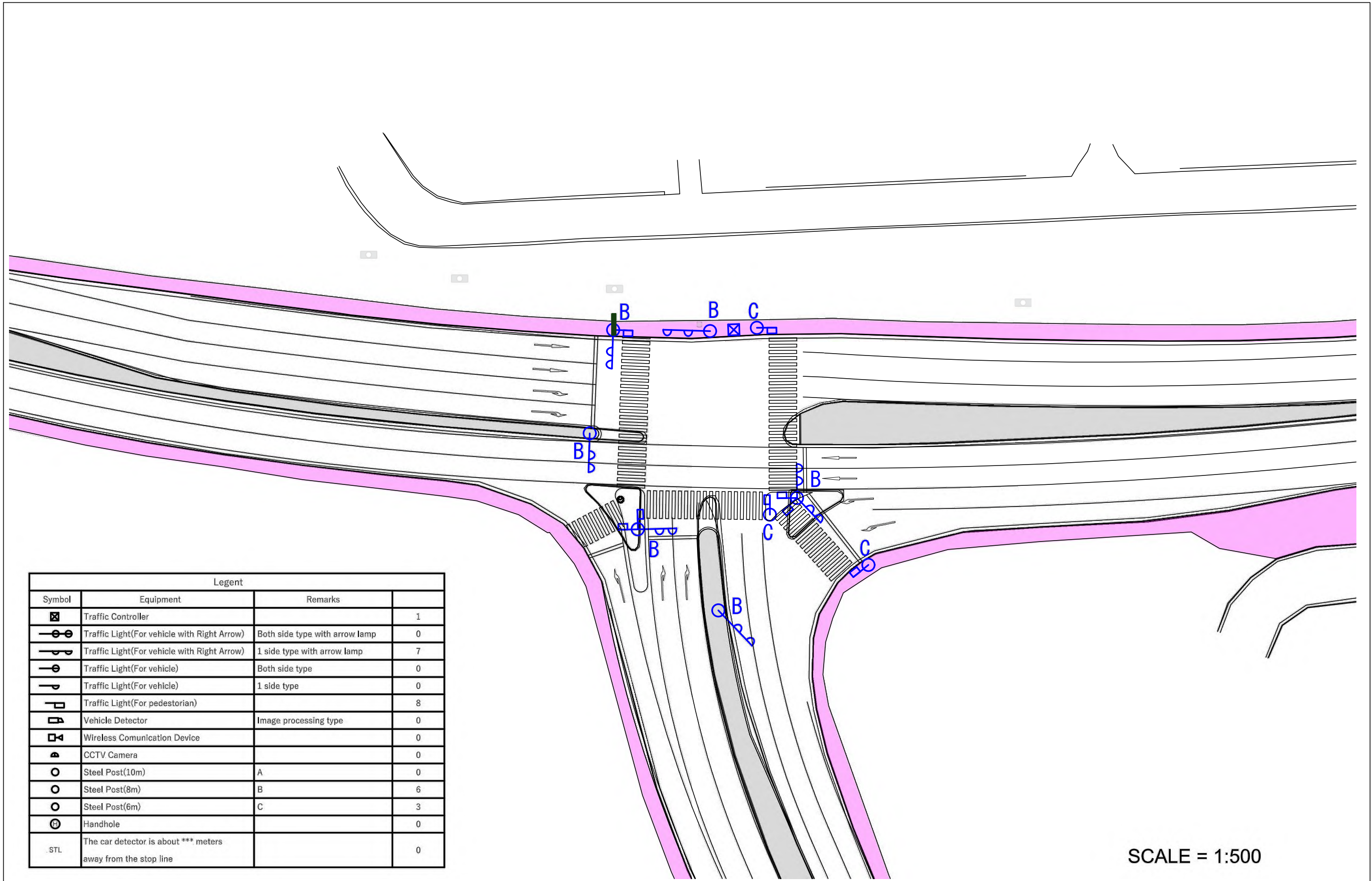
THE PREPARATORY SURVEY FOR THE
PROJECT FOR
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TRANSPORT SYSTEM IN MOMBASA REGION

TITLE
Detail Location of Traffic Signal (A7-2)

Drawing No.	S-2
SCALE	S=1/500
DATE	

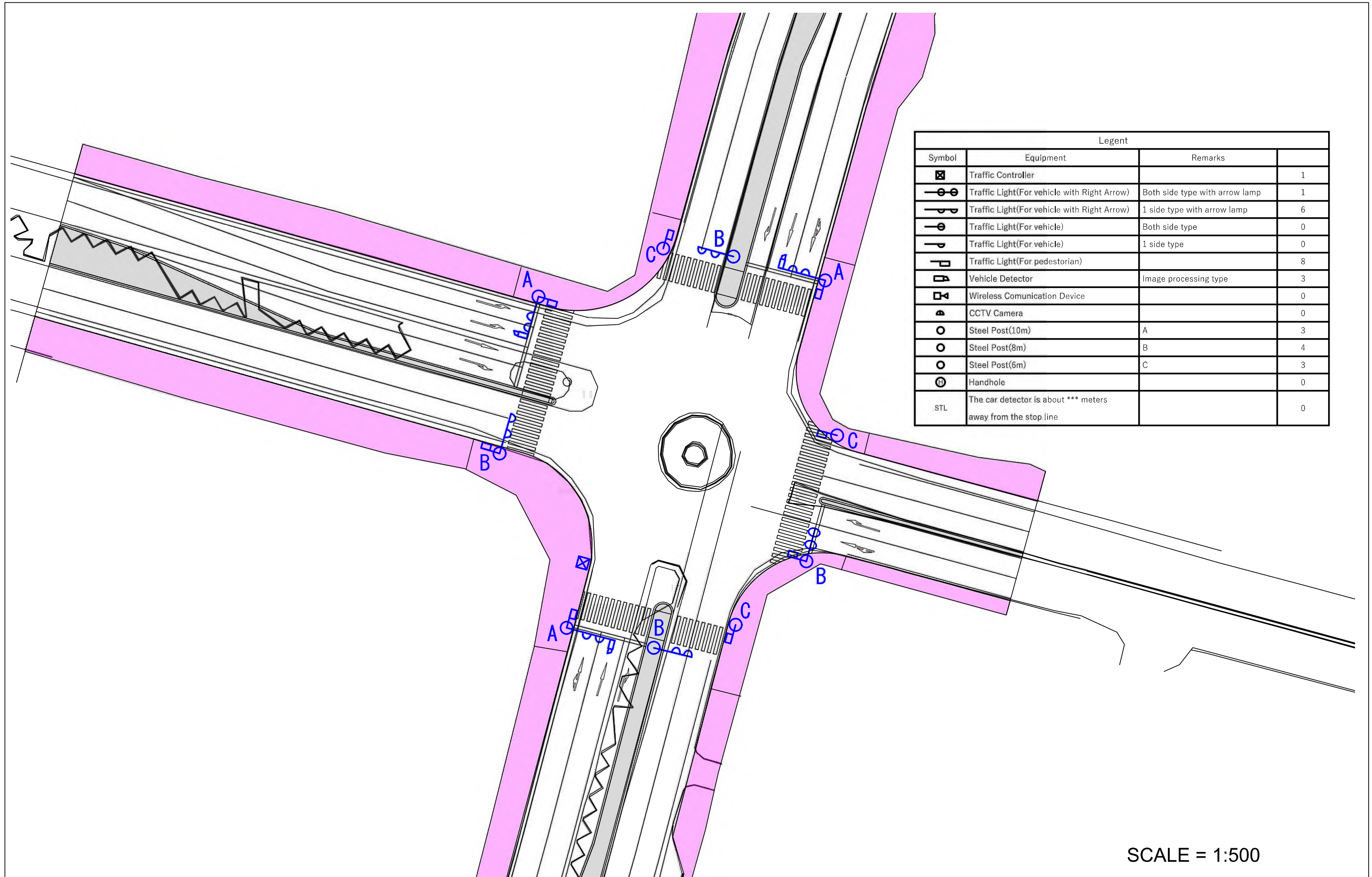
Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	6
	Traffic Light(For vehicle)	Both side type	0
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		6
	Vehicle Detector	Image processing type	0
	Wireless Communication Device		0
	CCTV Camera		1
	Steel Post(10m)	A	0
	Steel Post(8m)	B	7
	Steel Post(6m)	C	2
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0





Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	7
	Traffic Light(For vehicle)	Both side type	0
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		8
	Vehicle Detector	Image processing type	0
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	0
	Steel Post(8m)	B	6
	Steel Post(6m)	C	3
	Handhole		0
.STL	The car detector is about *** meters away from the stop line		0

SCALE = 1:500



SCALE = 1:500



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA

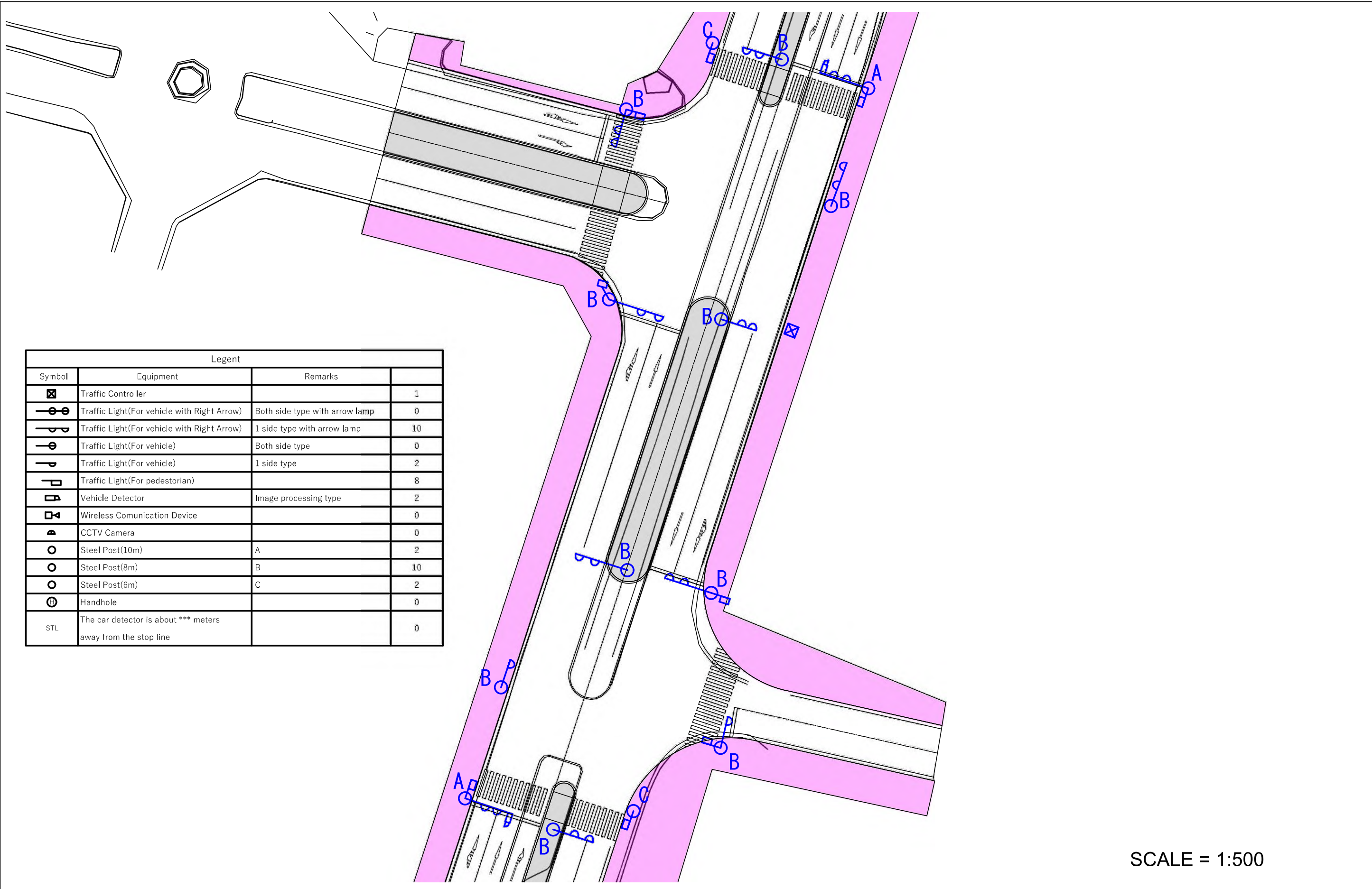


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INGEROSEC CORPORATION

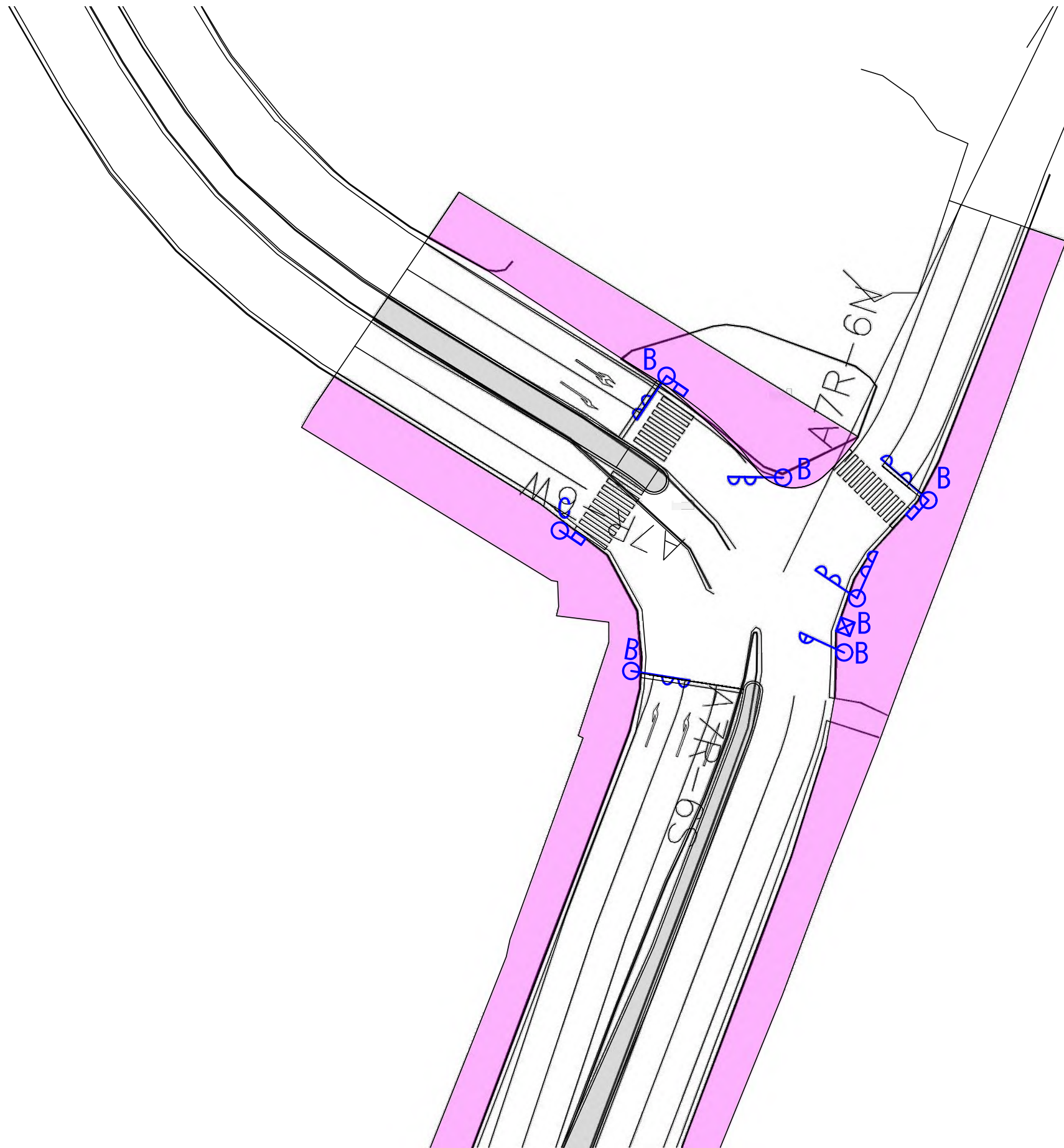
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TRANSPORT SYSTEM IN MOMBASA REGION

TITLE
Detail Location of Traffic Signal (A7R-3)

Drawing No.	S-5
SCALE	S=1/500
DATE	

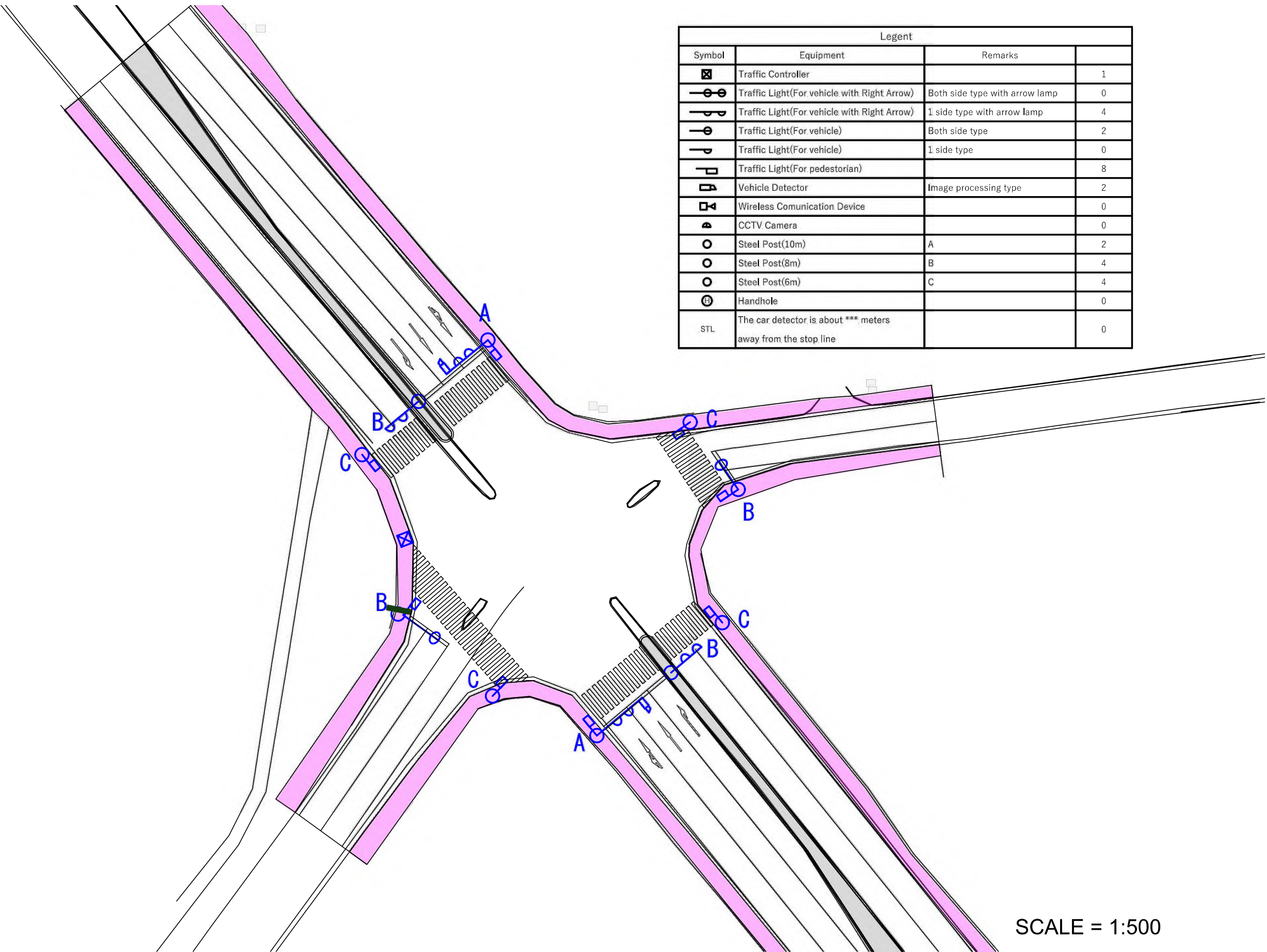


SCALE = 1:500



Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	6
	Traffic Light(For vehicle)	Both side type	0
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		3
	Vehicle Detector	Image processing type	0
	Wireless Communication Device		0
	CCTV Camera		1
	Steel Post(10m)	A	0
	Steel Post(8m)	B	6
	Steel Post(6m)	C	1
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0

SCALE = 1:500



Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	4
	Traffic Light(For vehicle)	Both side type	2
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		8
	Vehicle Detector	Image processing type	2
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	2
	Steel Post(8m)	B	4
	Steel Post(6m)	C	4
	Handhole		0
.STL	The car detector is about *** meters away from the stop line		0

SCALE = 1:500



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA

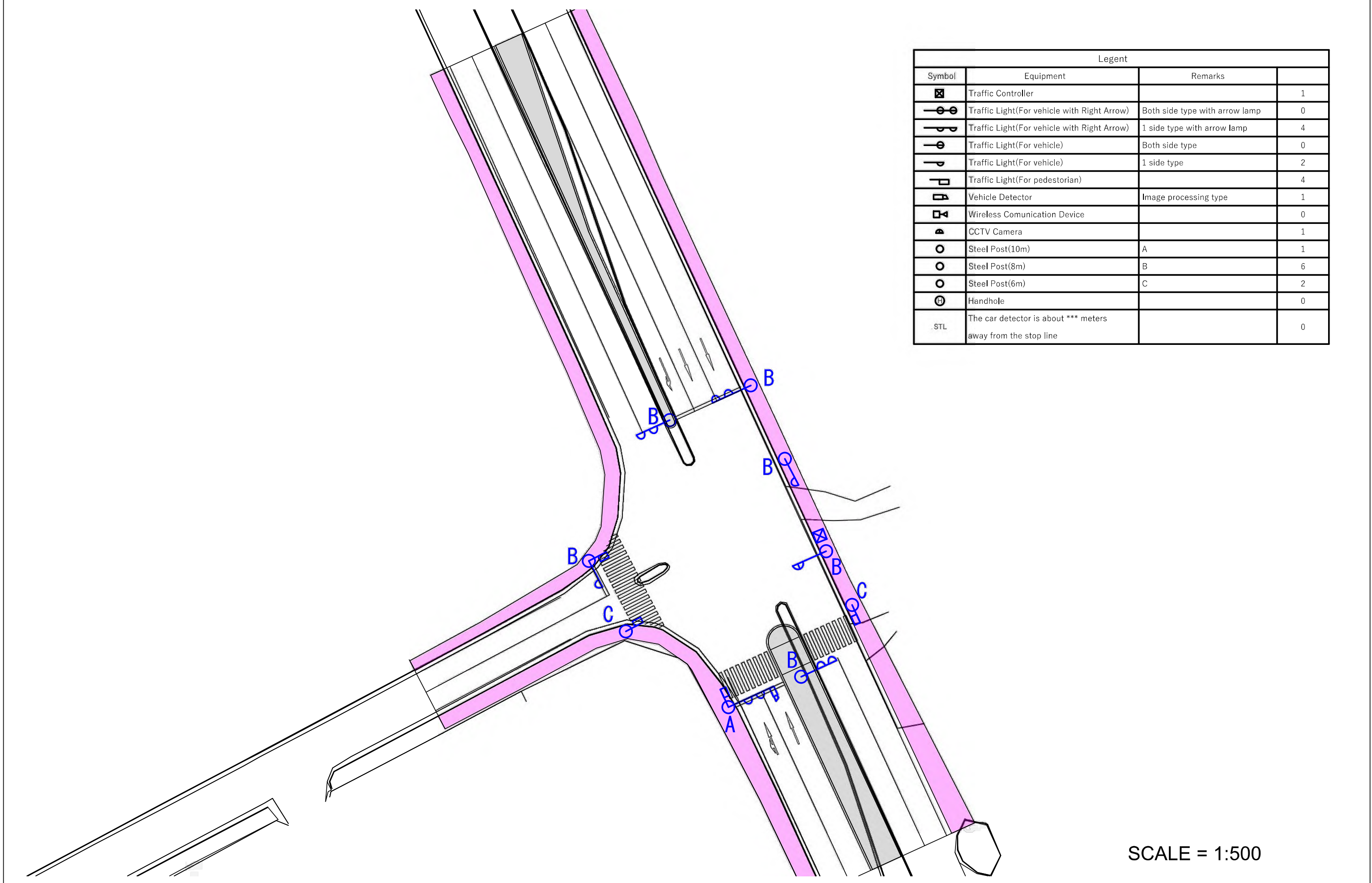


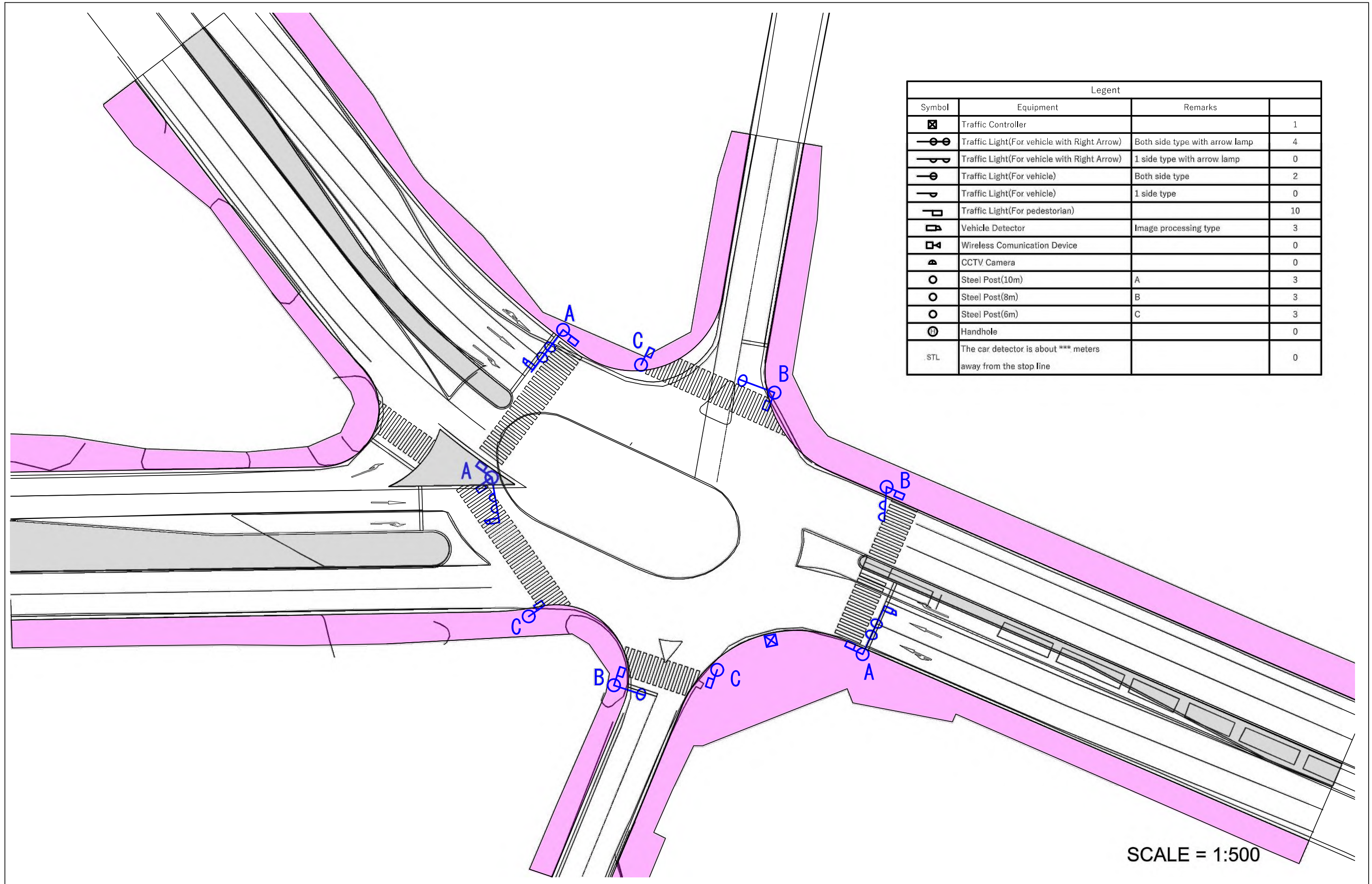
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INGEROSEC CORPORATION

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IMPLEMENTATION OF INTELLIGENT
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TITLE
Detail Location of Traffic Signal (A7R-7)

Drawing No.	S-9
SCALE	S=1/500
DATE	





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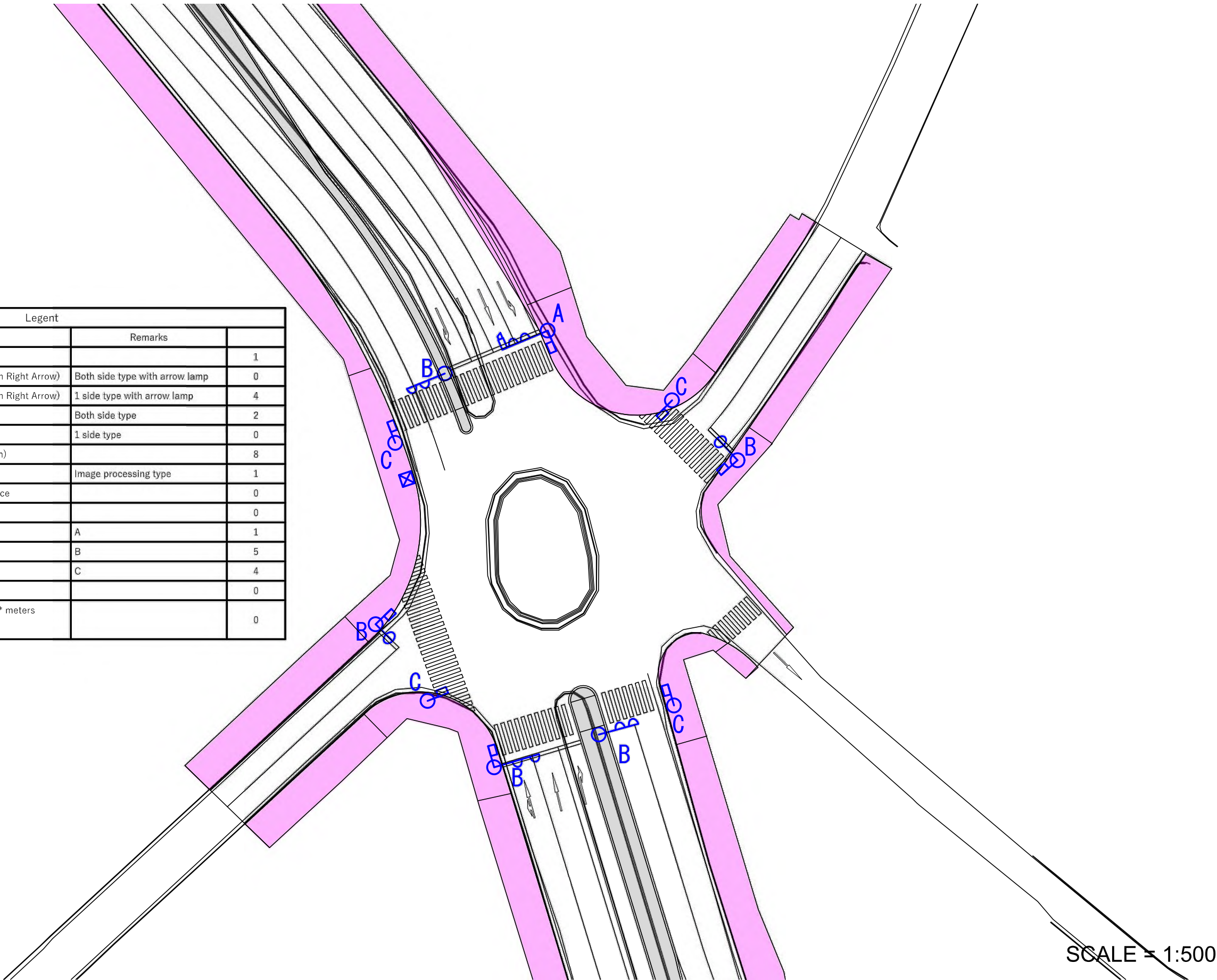
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TRANSPORT SYSTEM IN MOMBASA REGION

TITLE
Detail Location of Traffic Signal (A8-1)

Drawing No.	S-11
SCALE	S=1/500
DATE	

Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	4
	Traffic Light(For vehicle)	Both side type	2
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		8
	Vehicle Detector	Image processing type	1
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	1
	Steel Post(8m)	B	5
	Steel Post(6m)	C	4
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0



SCALE = 1:500



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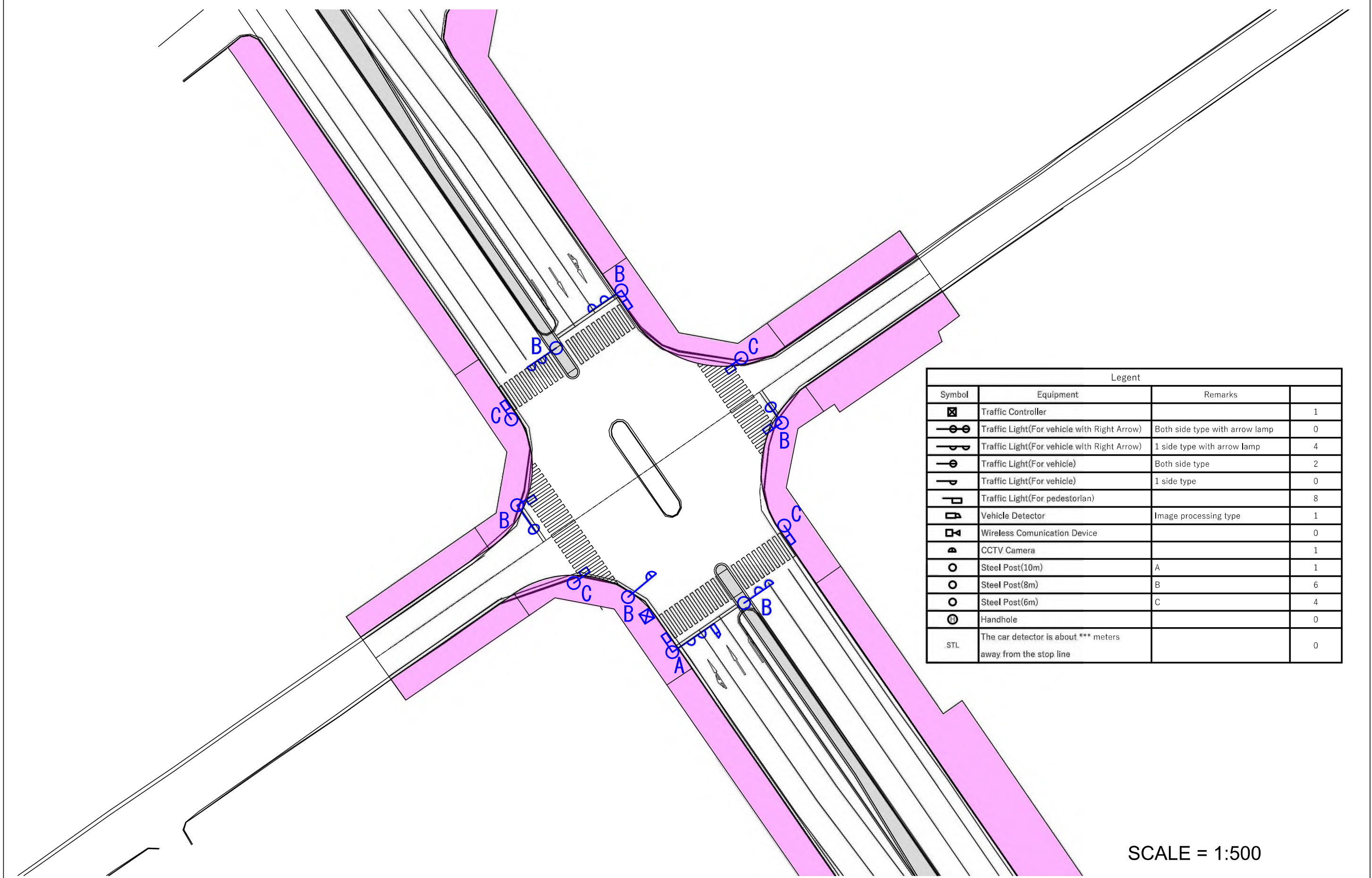


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TITLE
Detail Location of Traffic Signal (A8-2)

Drawing No.	S-12
SCALE	S=1/500
DATE	



SCALE = 1:500



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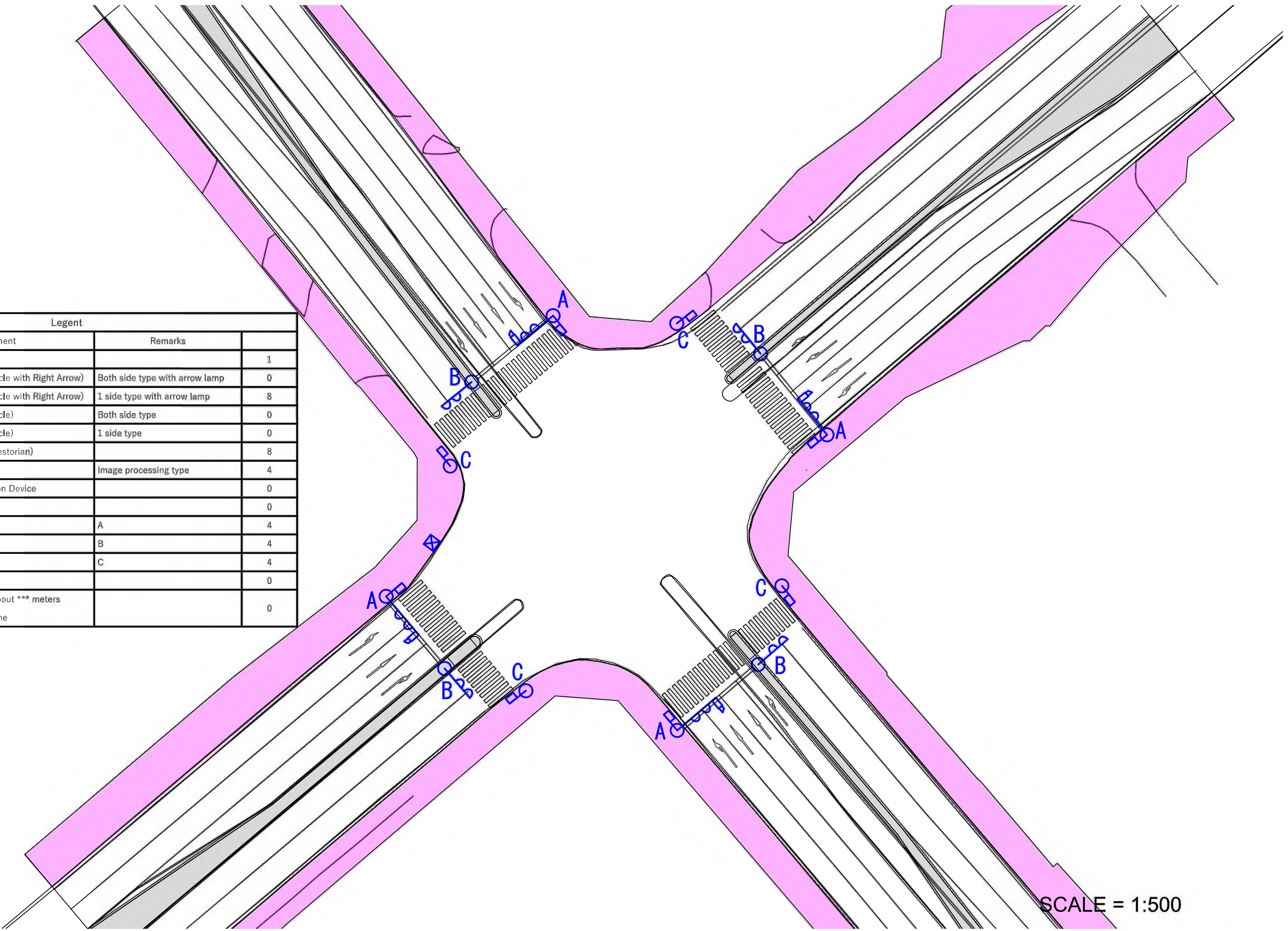
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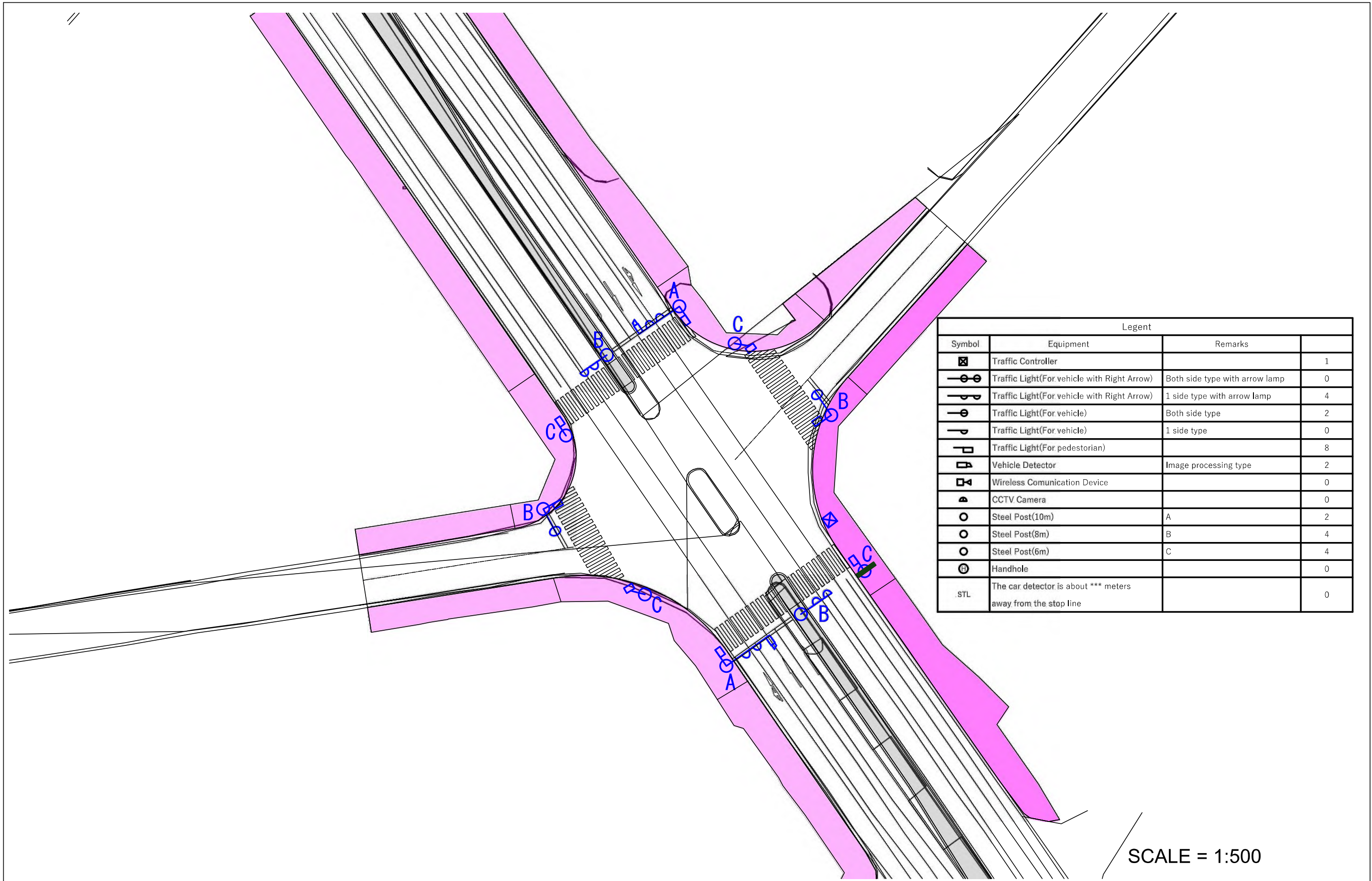
TITLE
Detail Location of Traffic Signal (A8-3)

Drawing No.	S-13
SCALE	S=1/500
DATE	

Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	8
	Traffic Light(For vehicle)	Both side type	0
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		8
	Vehicle Detector	Image processing type	4
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	4
	Steel Post(8m)	B	4
	Steel Post(6m)	C	4
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0



SCALE = 1:500



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA

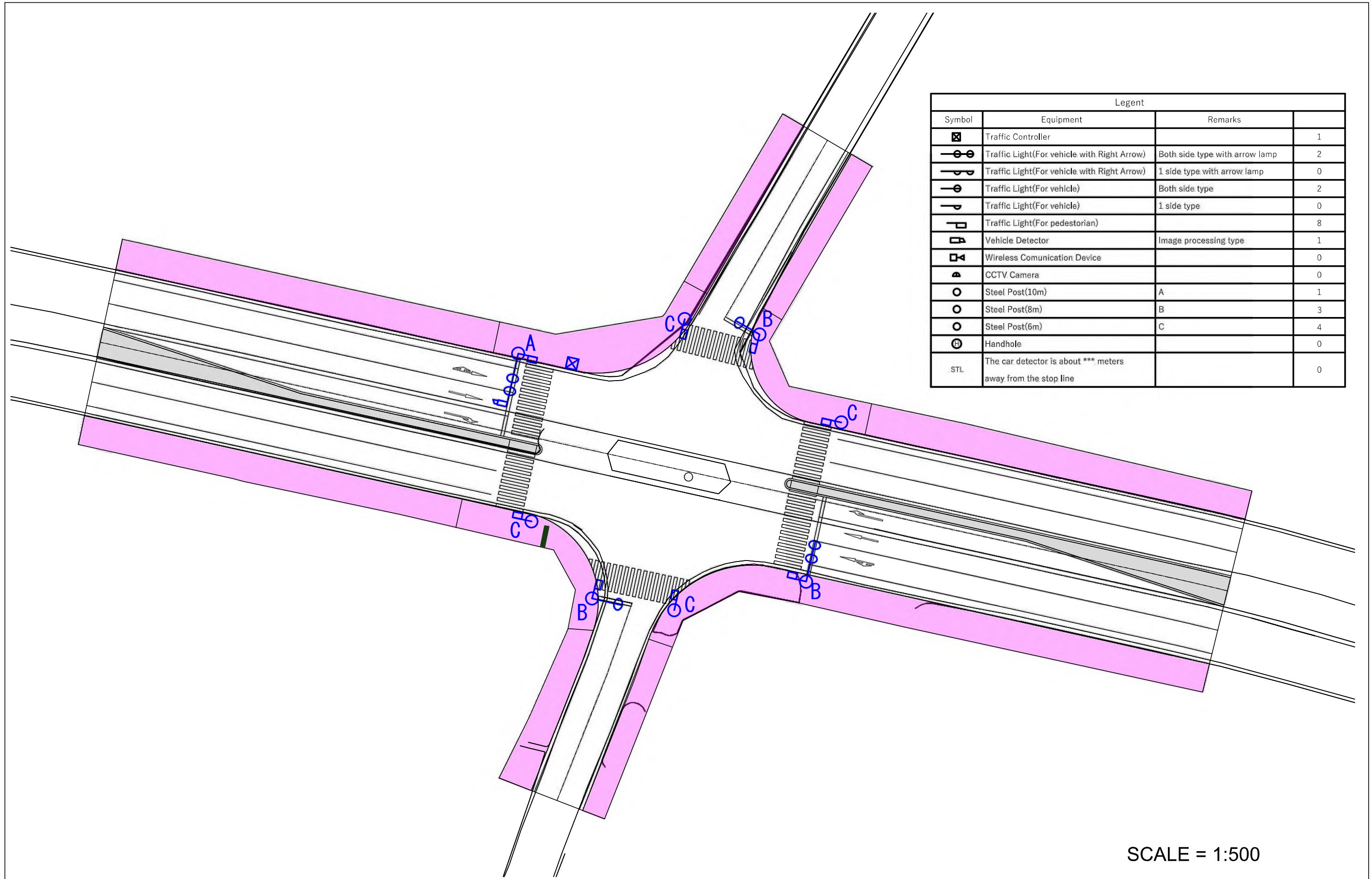


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IMPLEMENTATION OF INTELLIGENT
TRANSPORT SYSTEM IN MOMBASA REGION

TITLE
Detail Location of Traffic Signal (A8-7)

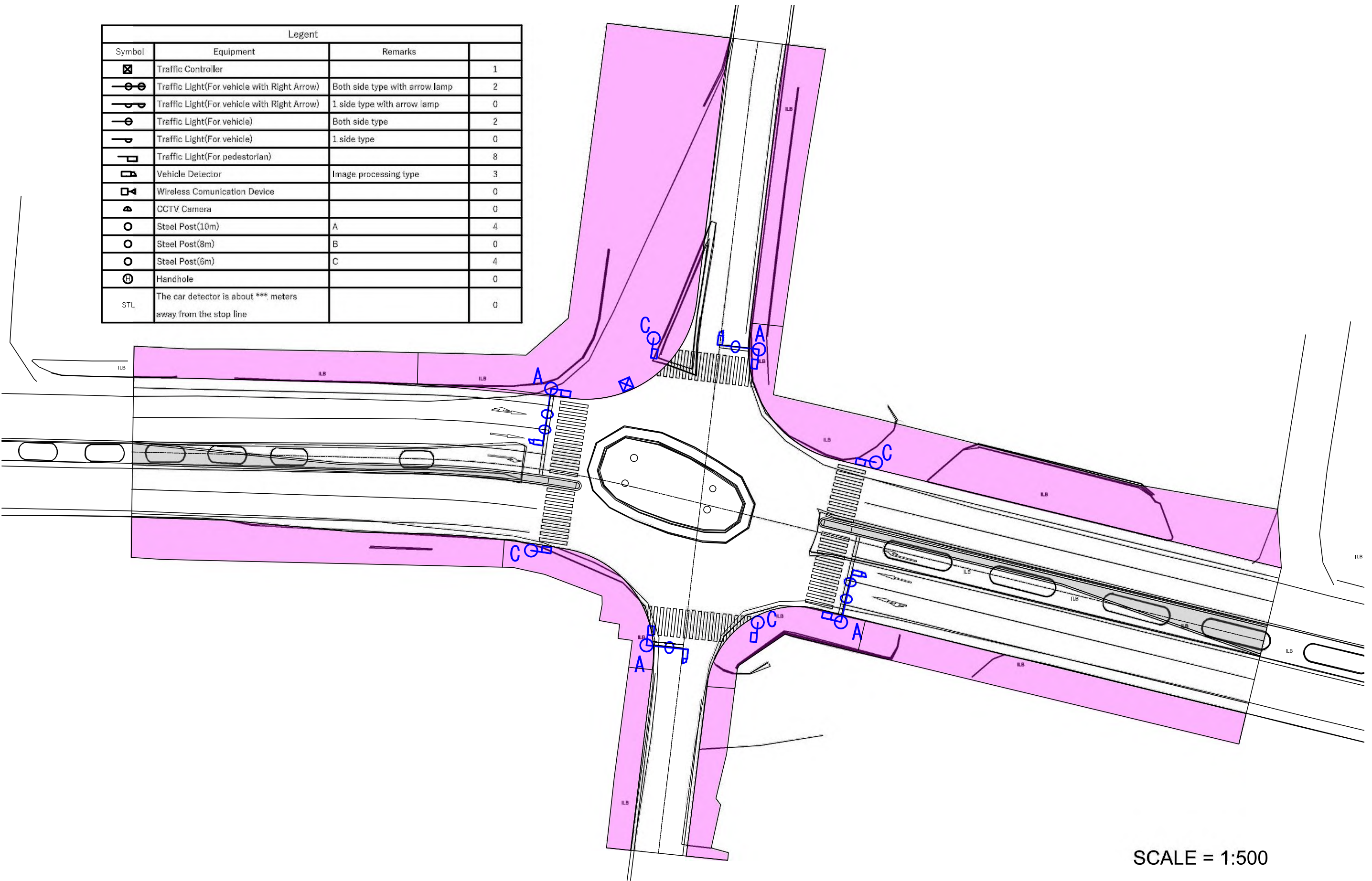
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SCALE	S=1/500
DATE	



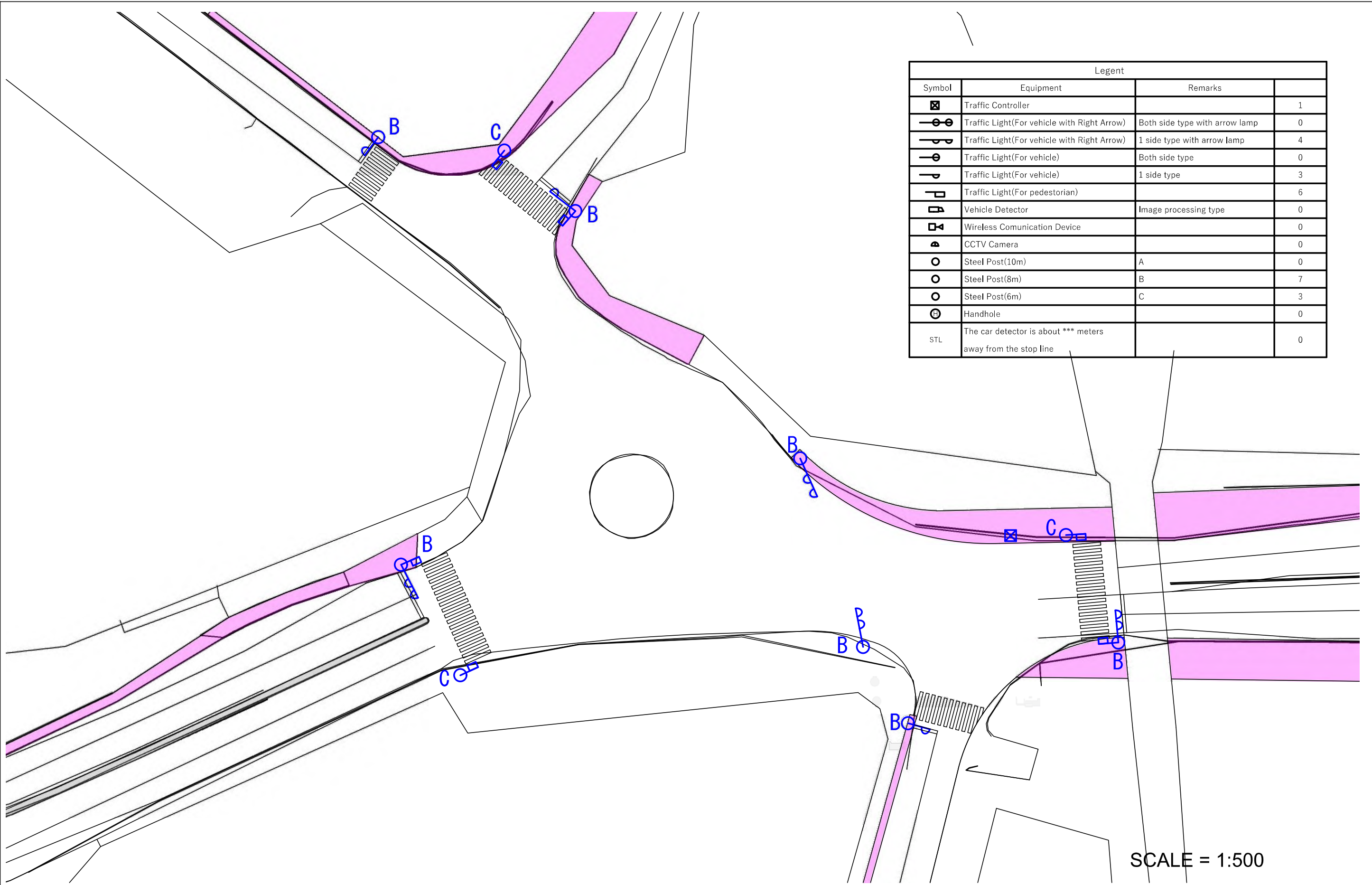
Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	2
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	0
	Traffic Light(For vehicle)	Both side type	2
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		8
	Vehicle Detector	Image processing type	1
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	1
	Steel Post(8m)	B	3
	Steel Post(6m)	C	4
	Handhole		0
.STL	The car detector is about *** meters away from the stop line		0

SCALE = 1:500

Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	2
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	0
	Traffic Light(For vehicle)	Both side type	2
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		8
	Vehicle Detector	Image processing type	3
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	4
	Steel Post(8m)	B	0
	Steel Post(6m)	C	4
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0



SCALE = 1:500



Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	4
	Traffic Light(For vehicle)	Both side type	0
	Traffic Light(For vehicle)	1 side type	3
	Traffic Light(For pedestrian)		6
	Vehicle Detector	Image processing type	0
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	0
	Steel Post(8m)	B	7
	Steel Post(6m)	C	3
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0

SCALE = 1:500



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA

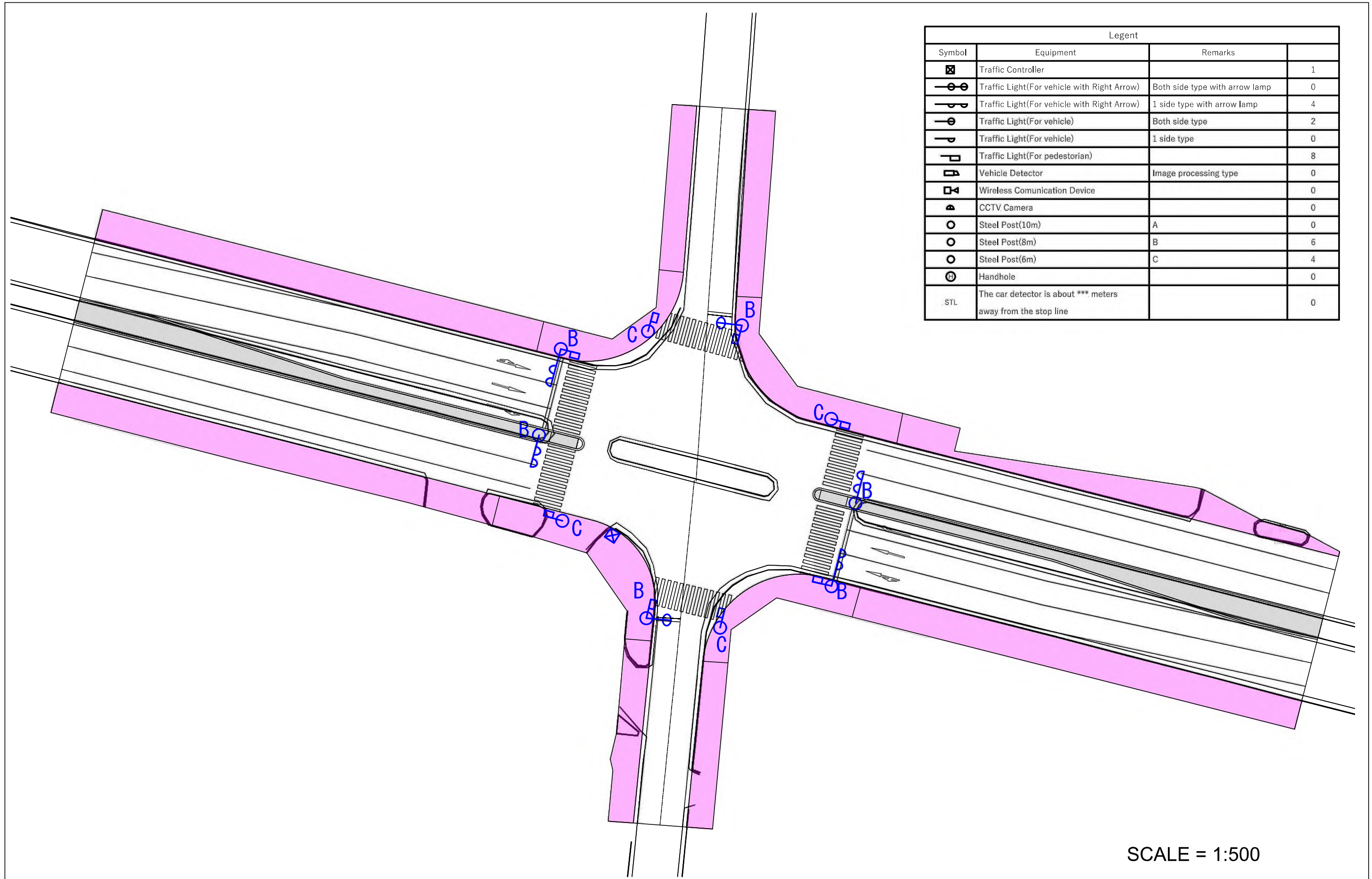


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TRANSPORT SYSTEM IN MOMBASA REGION

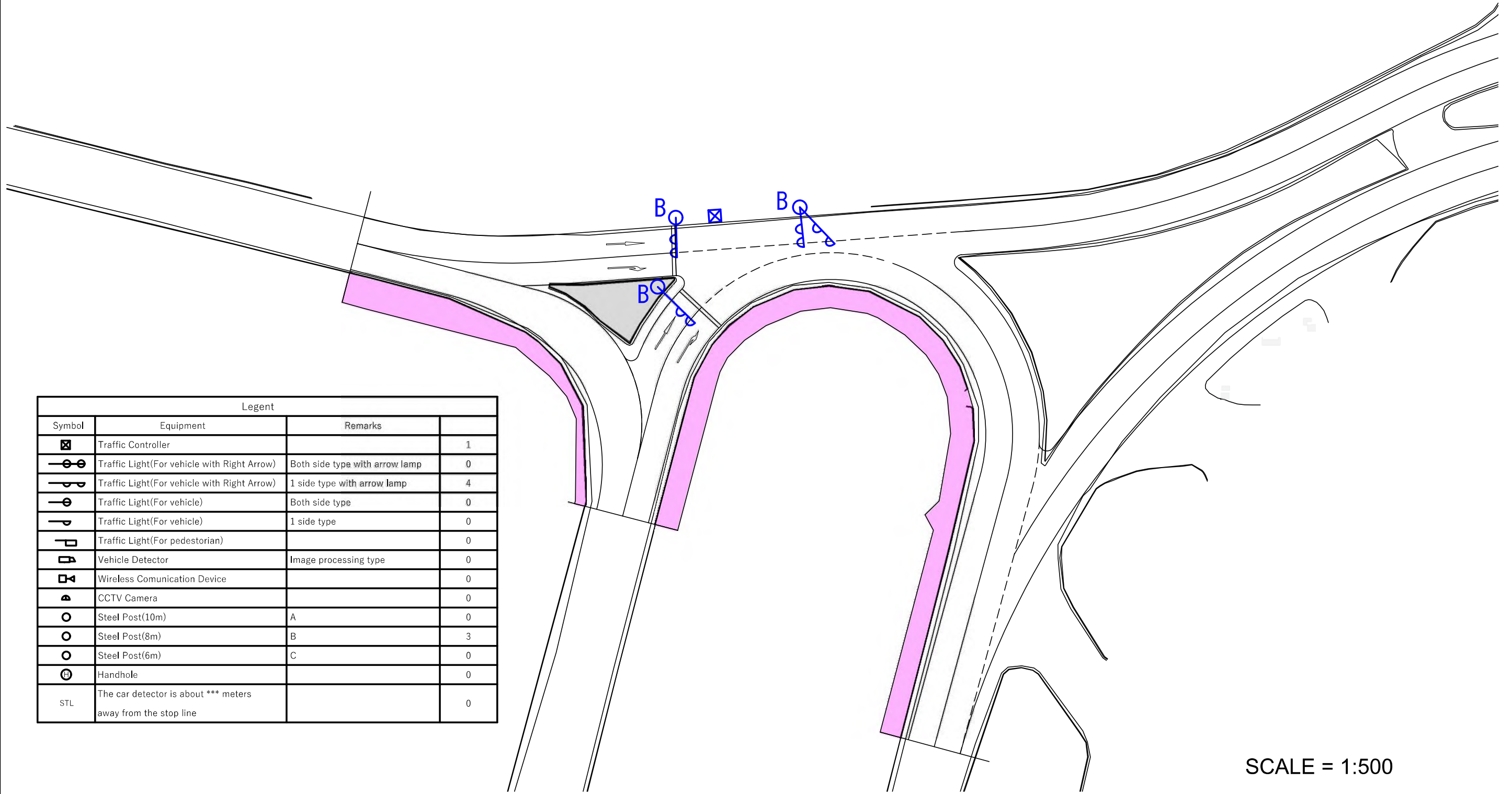
TITLE
Detail Location of Traffic Signal (M-3)

Drawing No.	S-18
SCALE	S=1/500
DATE	



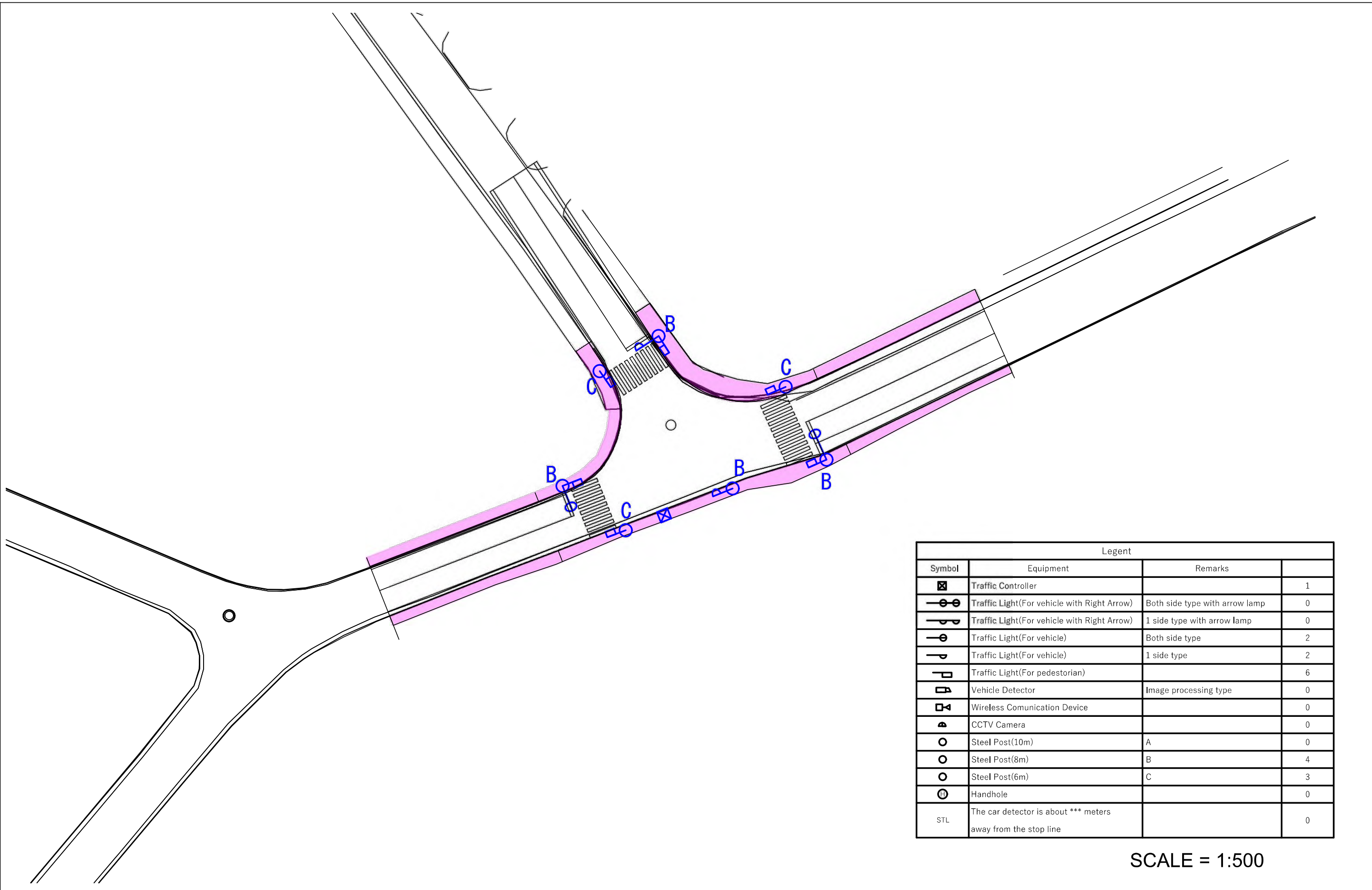
Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	4
	Traffic Light(For vehicle)	Both side type	2
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		8
	Vehicle Detector	Image processing type	0
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	0
	Steel Post(8m)	B	6
	Steel Post(6m)	C	4
	Handhole		0
.STL	The car detector is about *** meters away from the stop line		0

SCALE = 1:500



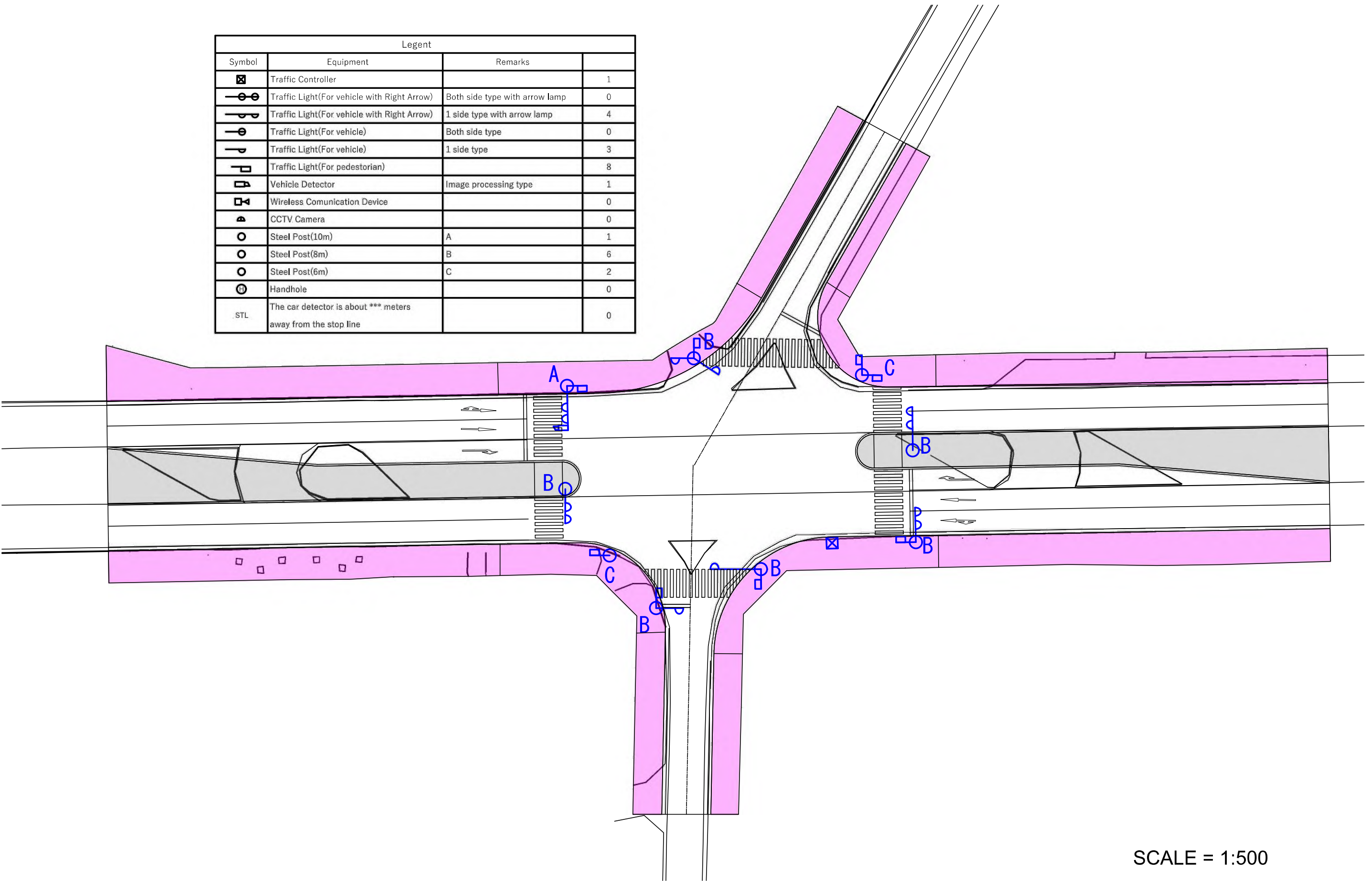
Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	4
	Traffic Light(For vehicle)	Both side type	0
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		0
	Vehicle Detector	Image processing type	0
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	0
	Steel Post(8m)	B	3
	Steel Post(6m)	C	0
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0

SCALE = 1:500



SCALE = 1:500

Legent			
Symbol	Equipment	Remarks	
☒	Traffic Controller		1
⊖	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
⊖	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	4
⊖	Traffic Light(For vehicle)	Both side type	0
⊖	Traffic Light(For vehicle)	1 side type	3
⊖	Traffic Light(For pedestorian)		8
⊖	Vehicle Detector	Image processing type	1
⊖	Wireless Communication Device		0
⊖	CCTV Camera		0
○	Steel Post(10m)	A	1
○	Steel Post(8m)	B	6
○	Steel Post(6m)	C	2
⊖	Handhole		0
. STL	The car detector is about *** meters away from the stop line		0



COUNTY GOVERNMENT OF
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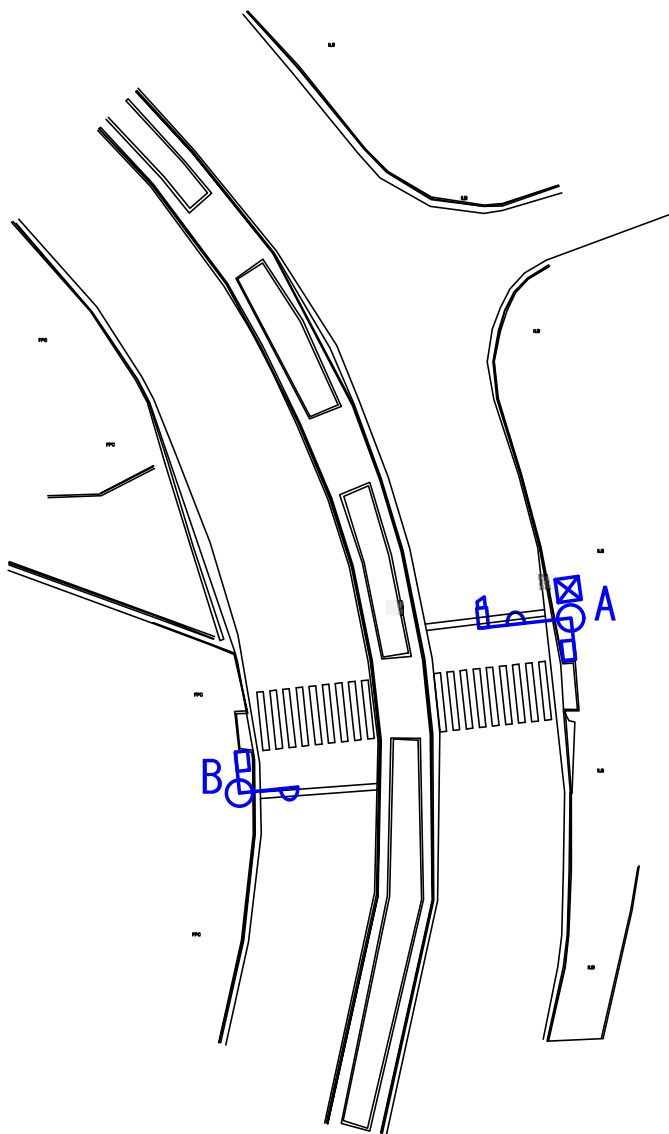
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INGEROSEC CORPORATION

THE PREPARATORY SURVEY FOR THE
PROJECT FOR
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TRANSPORT SYSTEM IN MOMBASA REGION

TITLE
Detail Location of Traffic Signal (H-6)

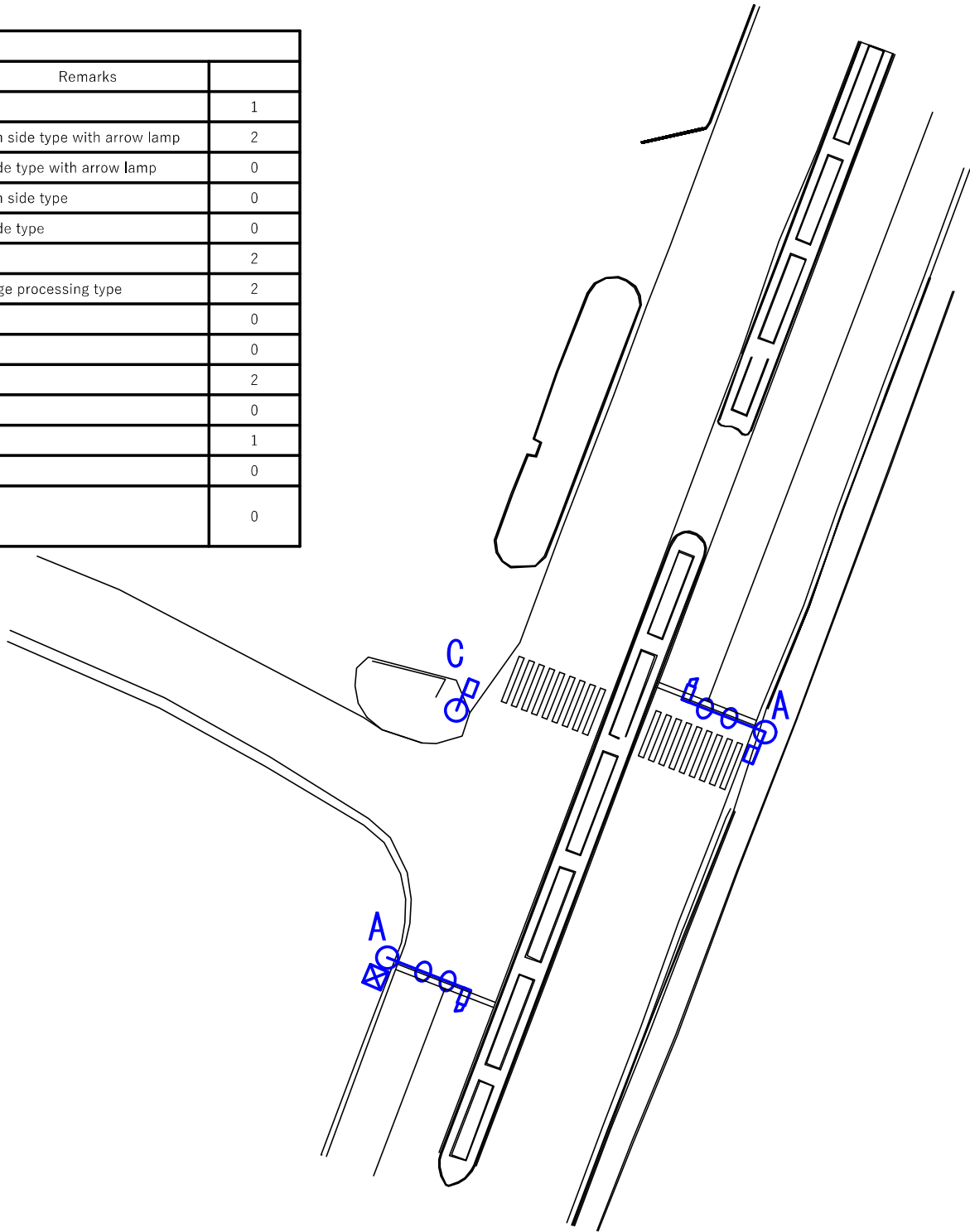
Drawing No.	S-22
SCALE	S=1/500
DATE	

Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	0
	Traffic Light(For vehicle)	Both side type	0
	Traffic Light(For vehicle)	1 side type	2
	Traffic Light(For pedestorian)		2
	Vehicle Detector	Image processing type	1
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	1
	Steel Post(8m)	B	1
	Steel Post(6m)	C	0
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0



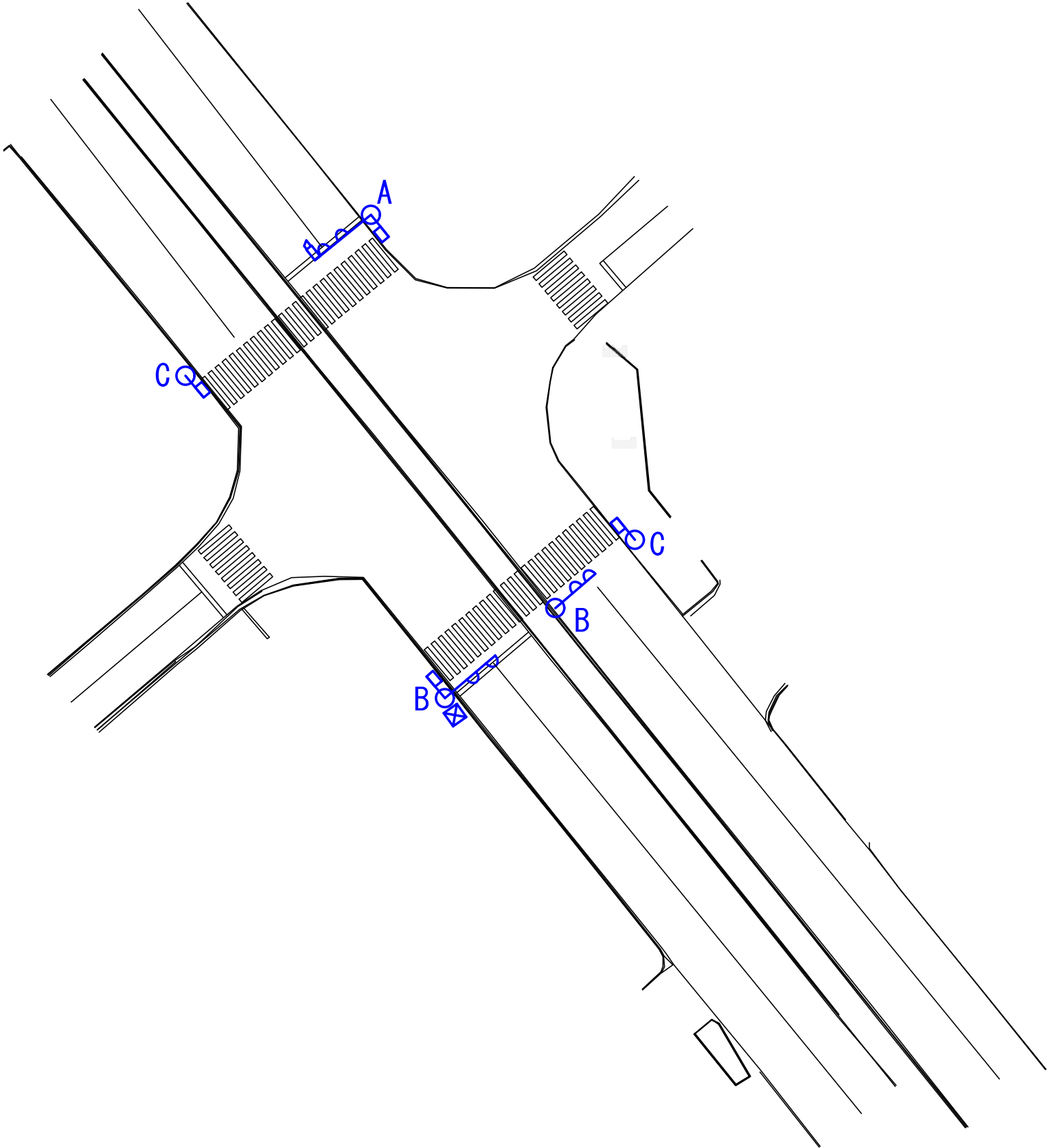
SCALE = 1:500

Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	2
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	0
	Traffic Light(For vehicle)	Both side type	0
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		2
	Vehicle Detector	Image processing type	2
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	2
	Steel Post(8m)	B	0
	Steel Post(6m)	C	1
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0

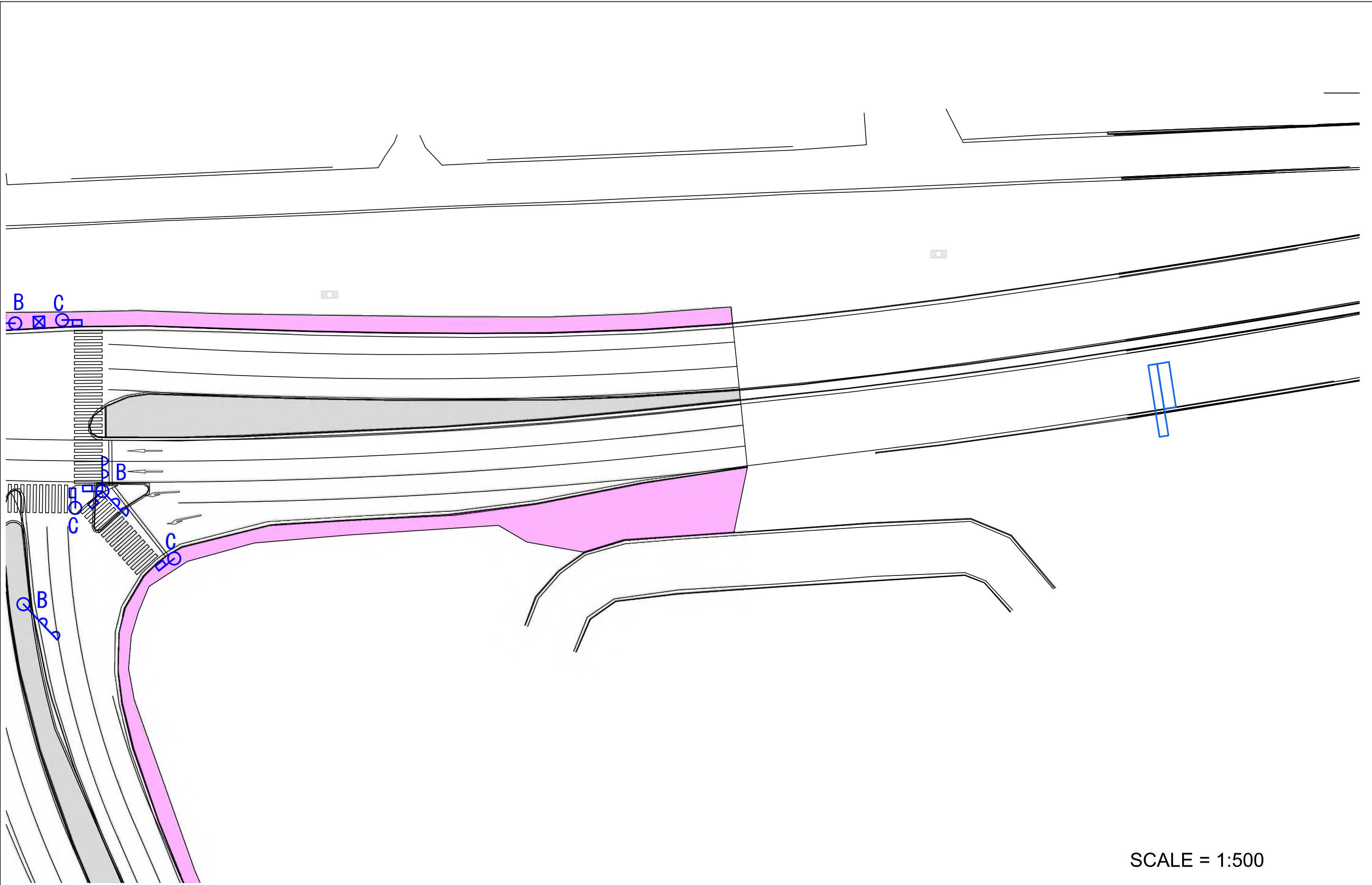


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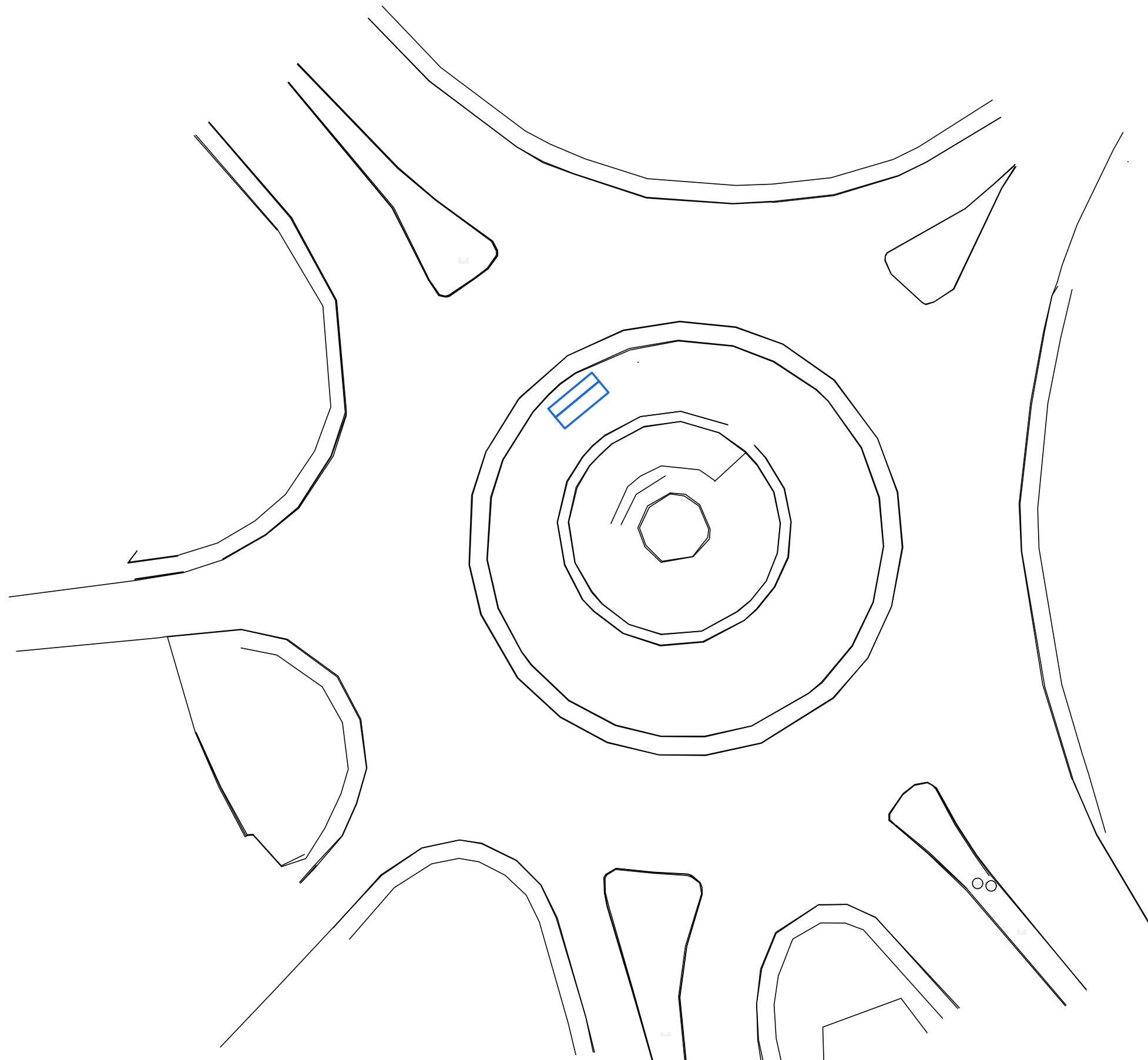
Legent			
Symbol	Equipment	Remarks	
	Traffic Controller		1
	Traffic Light(For vehicle with Right Arrow)	Both side type with arrow lamp	0
	Traffic Light(For vehicle with Right Arrow)	1 side type with arrow lamp	3
	Traffic Light(For vehicle)	Both side type	0
	Traffic Light(For vehicle)	1 side type	0
	Traffic Light(For pedestorian)		4
	Vehicle Detector	Image processing type	1
	Wireless Communication Device		0
	CCTV Camera		0
	Steel Post(10m)	A	1
	Steel Post(8m)	B	2
	Steel Post(6m)	C	2
	Handhole		0
STL	The car detector is about *** meters away from the stop line		0



SCALE = 1:500



SCALE = 1:500



SCALE = 1:500



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THE PREPARATORY SURVEY FOR THE
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TITLE

VMS Location (V-2) (I)

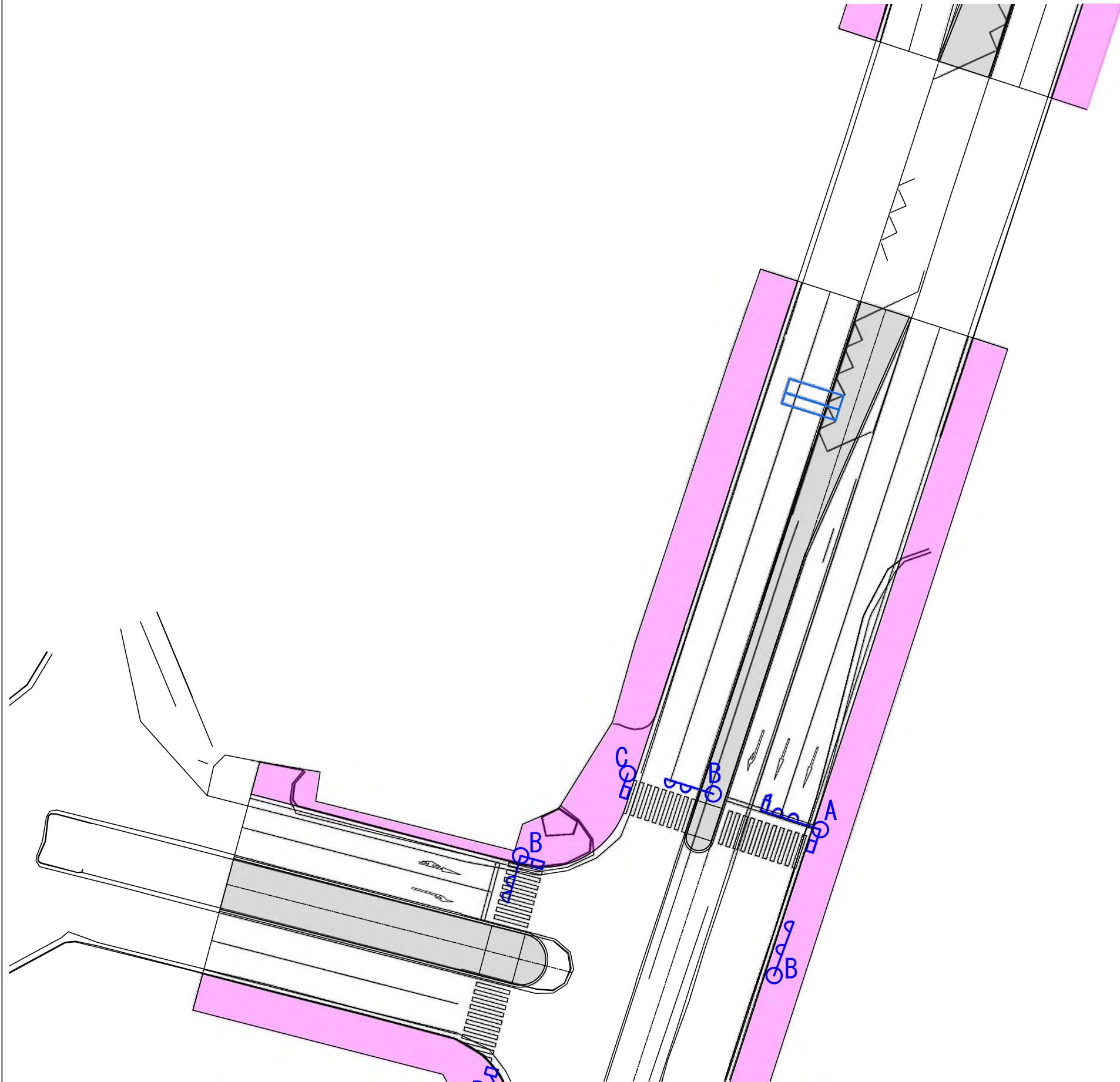
Drawing No.

S-27

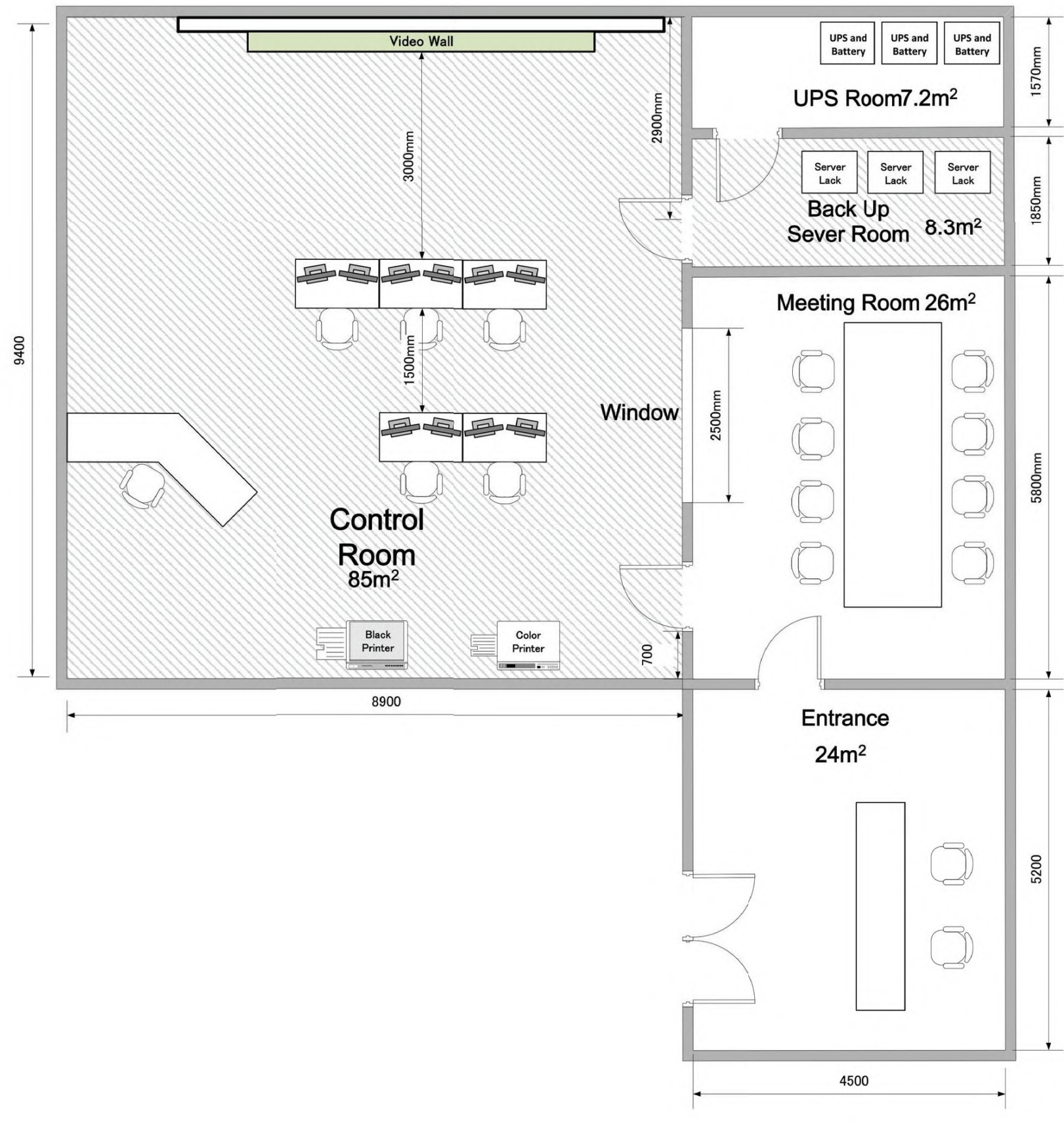
SCALE

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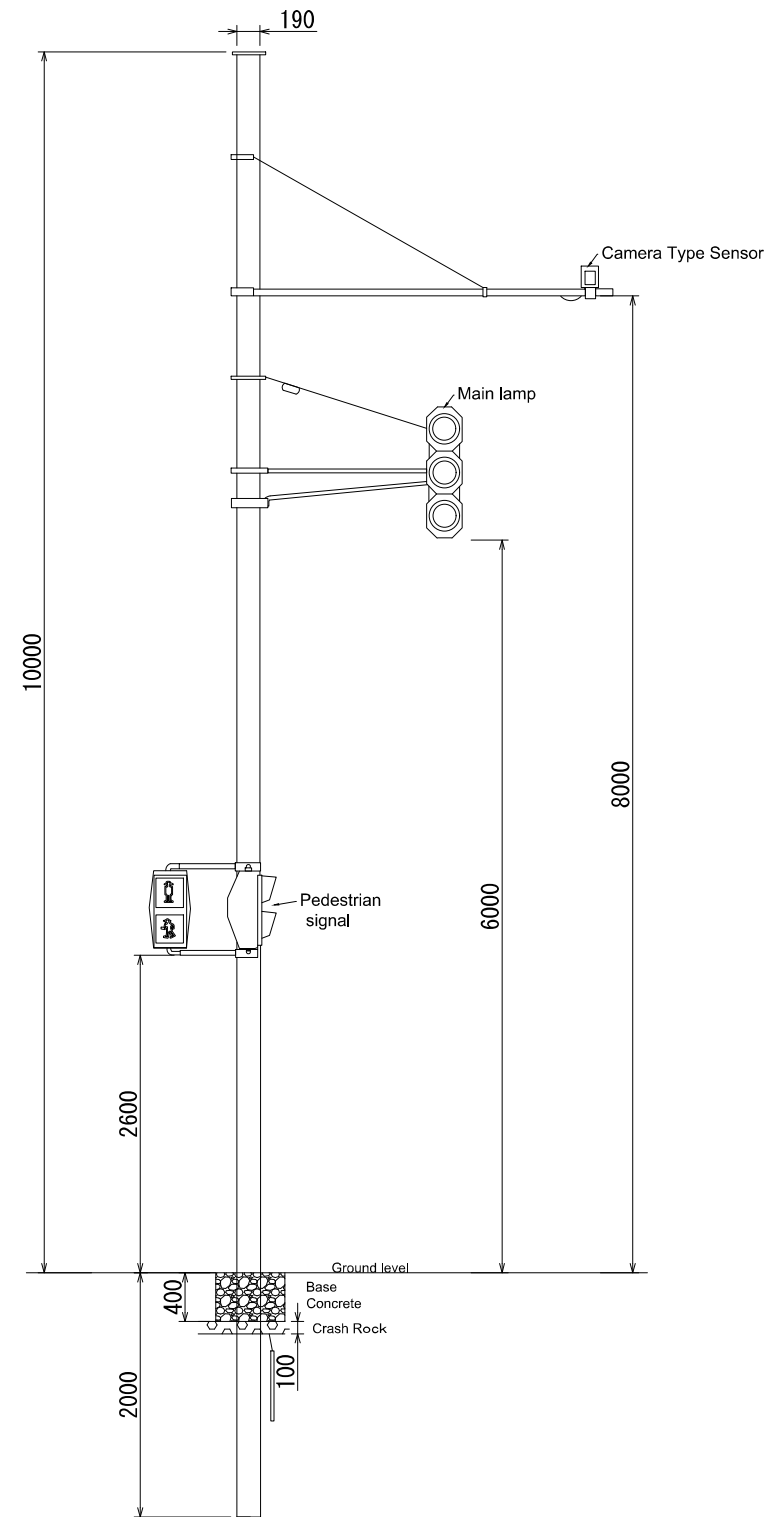
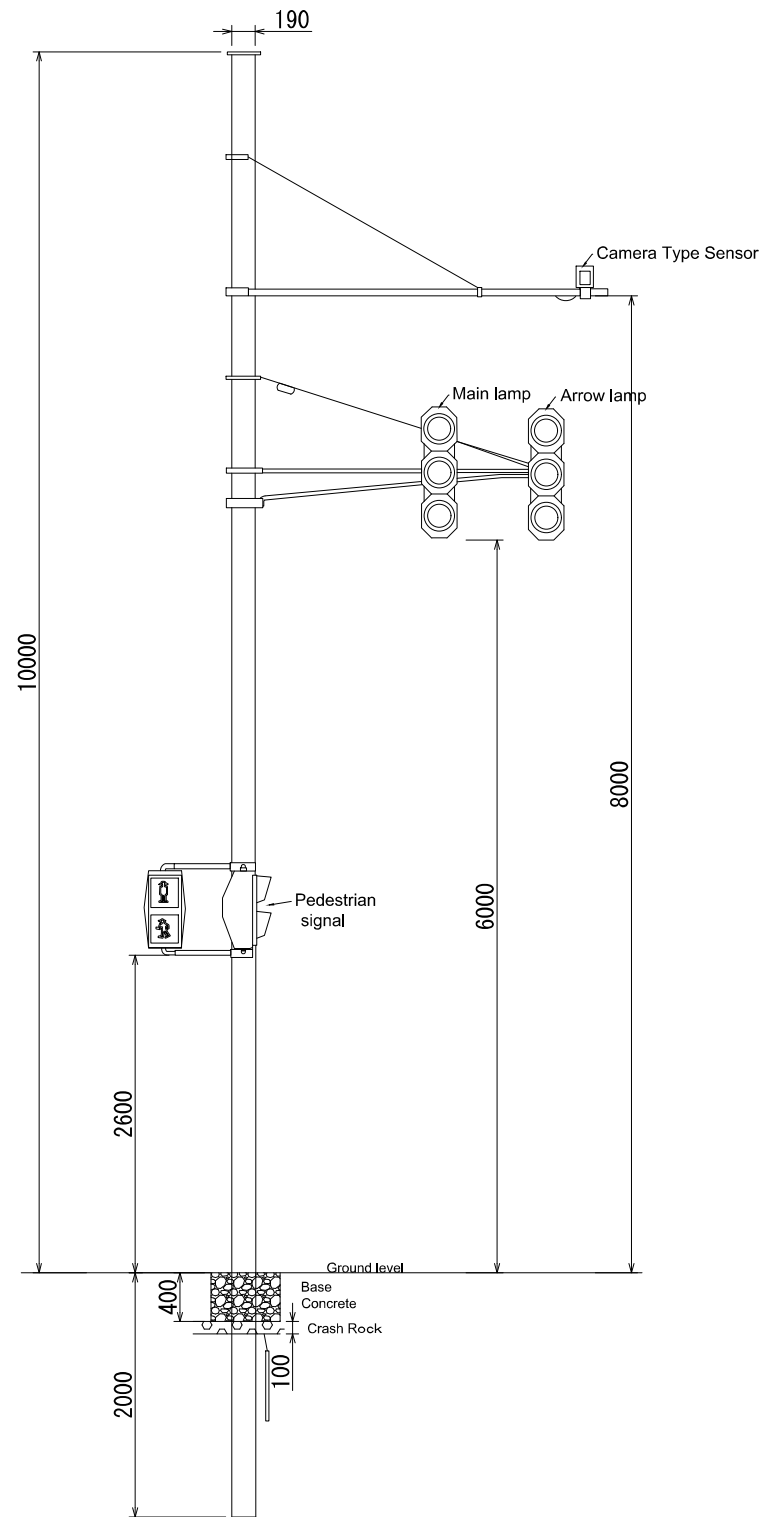
DATE



SCALE = 1:500



 Raised Floor



SCALE = 1:60



COUNTY GOVERNMENT OF
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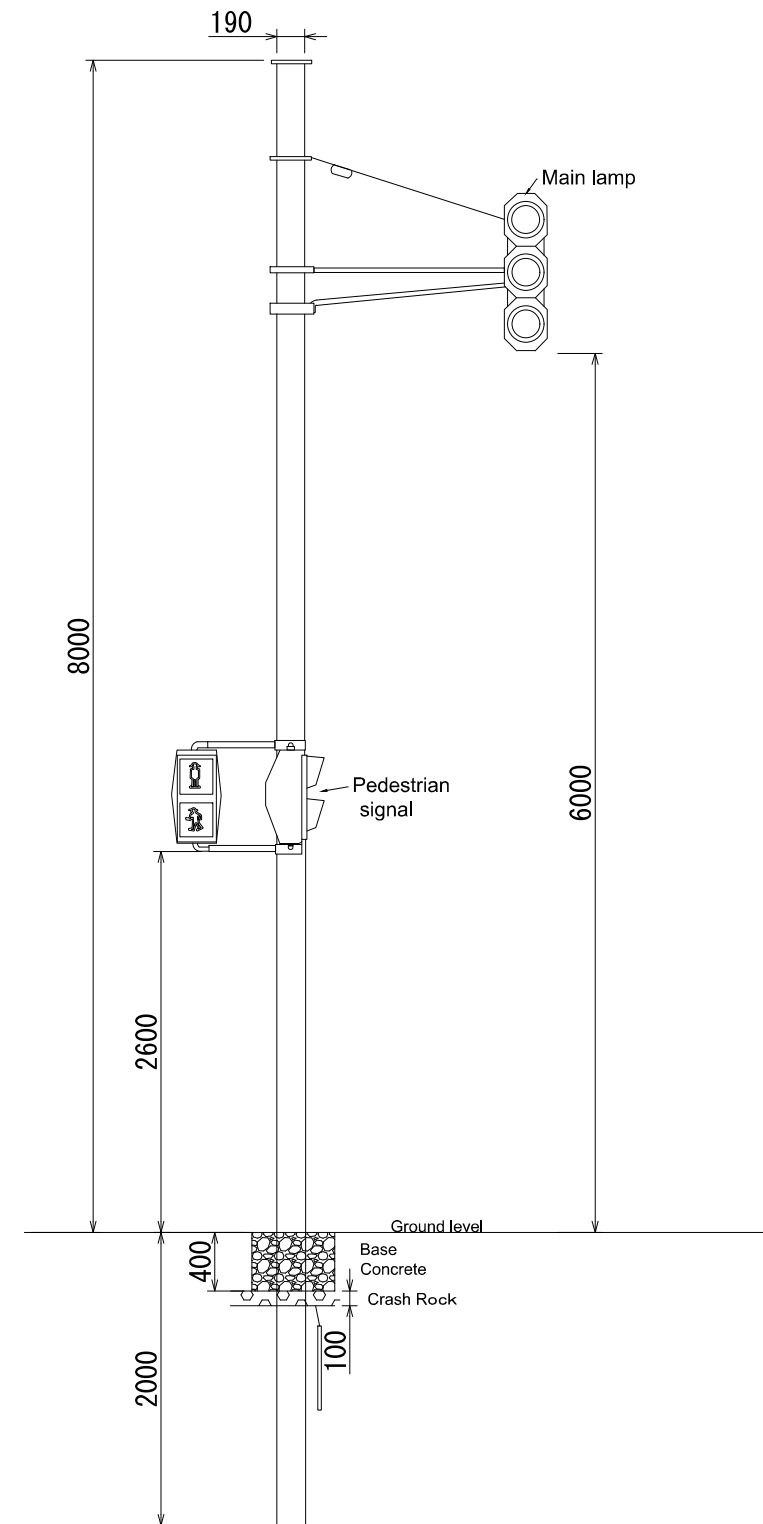
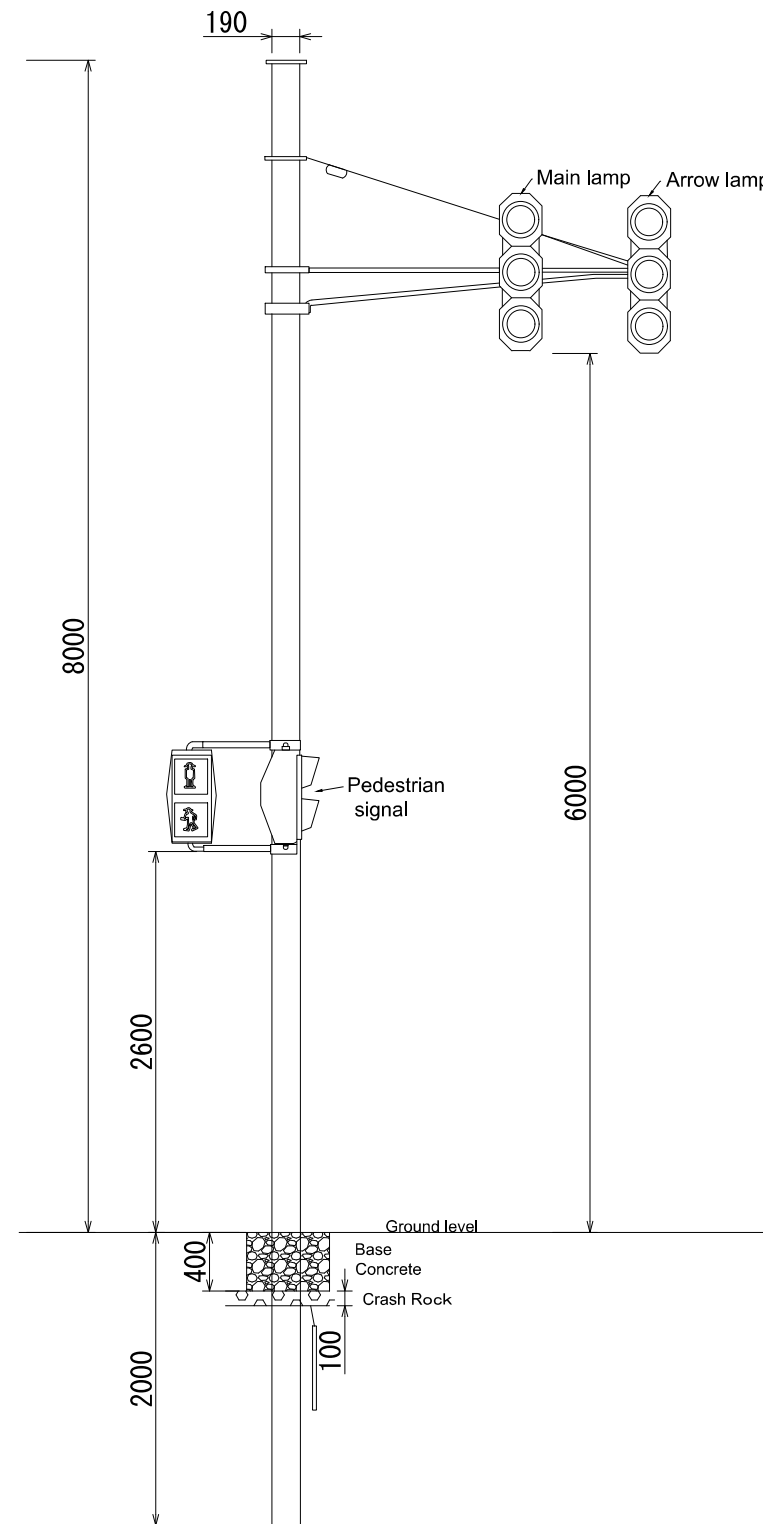


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TITLE
Typical drawing of Signal Pole (A Type)

Drawing No.	T-1
SCALE	S=1/60
DATE	



SCALE = 1:60



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA

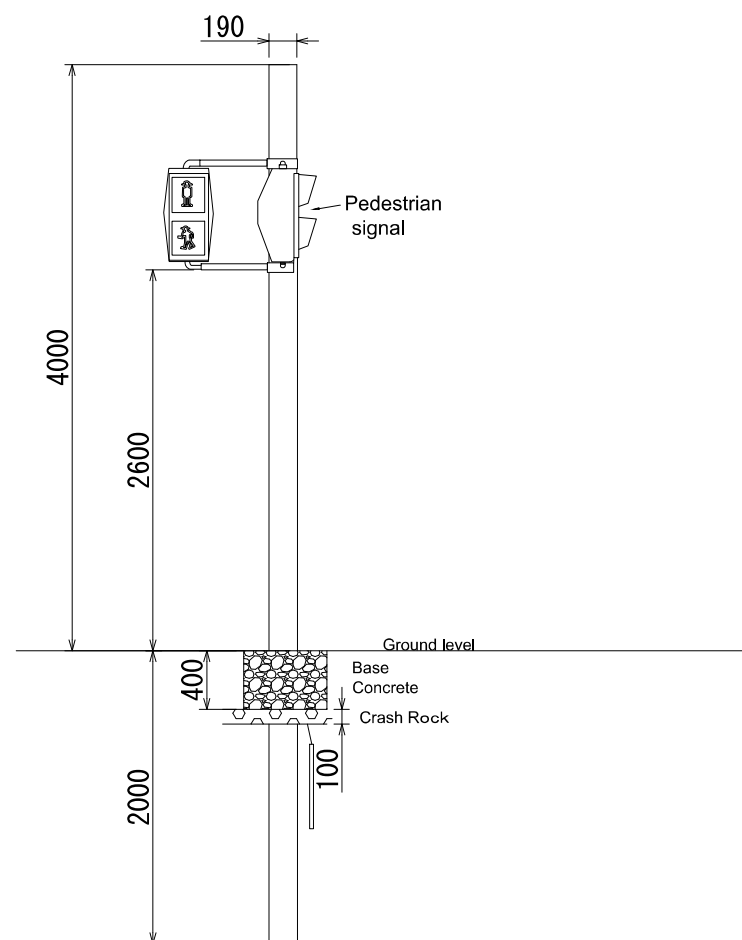


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THE PREPARATORY SURVEY FOR THE
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TITLE
Typical drawing of Signal Pole (B Type)

Drawing No.	T-2
SCALE	S=1/60
DATE	



SCALE = 1:60



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA



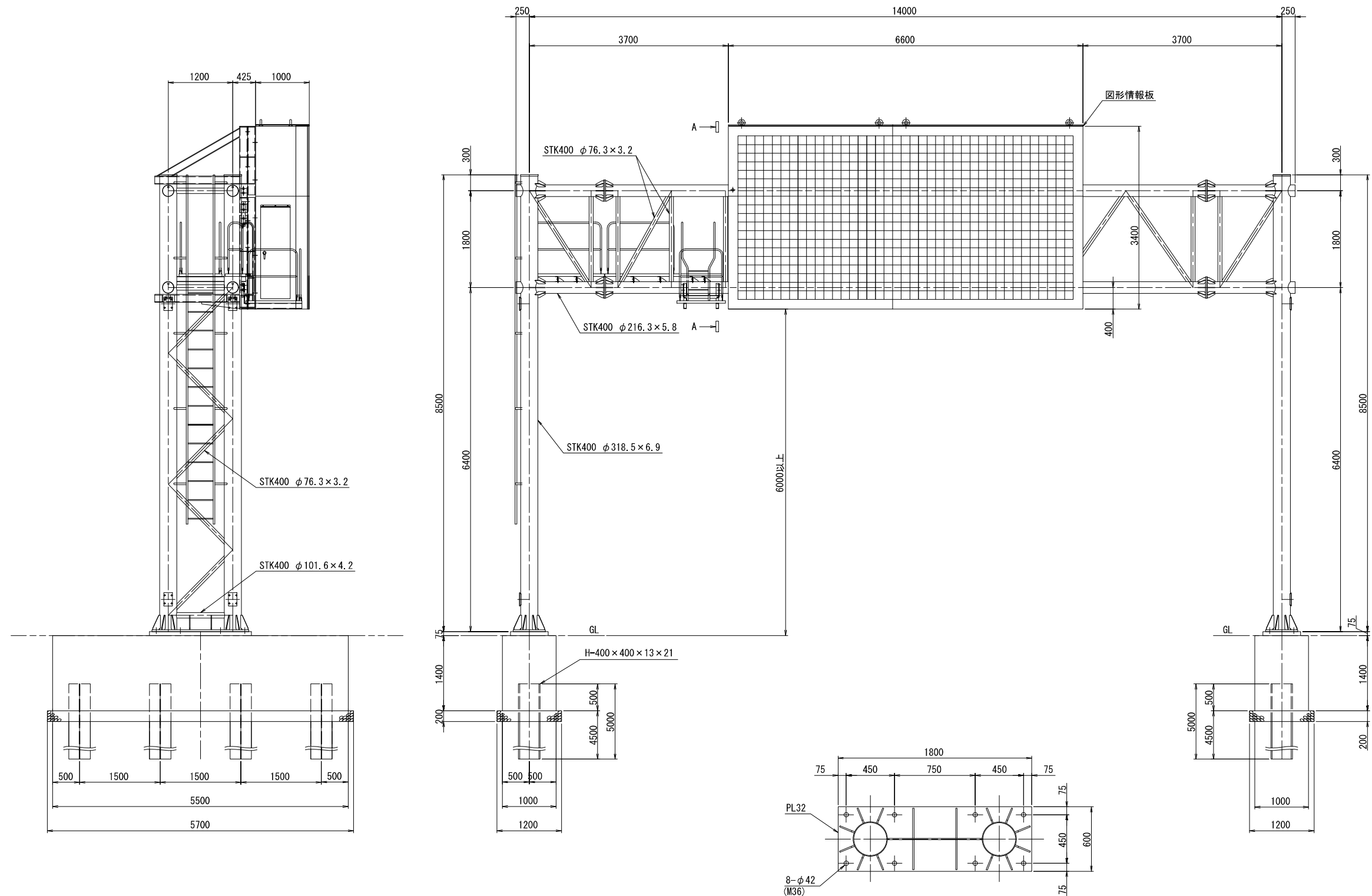
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THE PREPARATORY SURVEY FOR THE
PROJECT FOR
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TITLE
Typical drawing of Signal Pole (C Type)

Drawing No.	T-3
SCALE	S=1/60
DATE	

SCALE = 1:80



SCALE = 1:40



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA



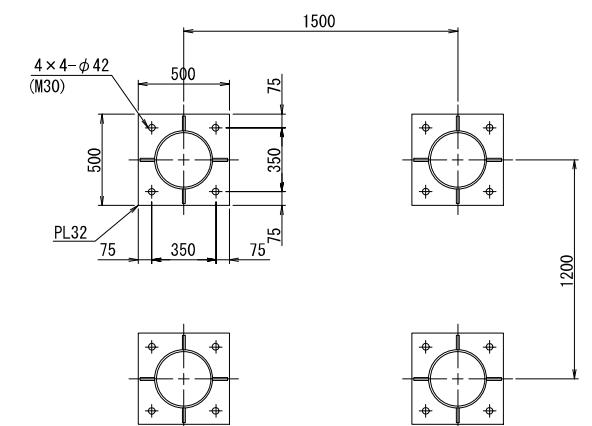
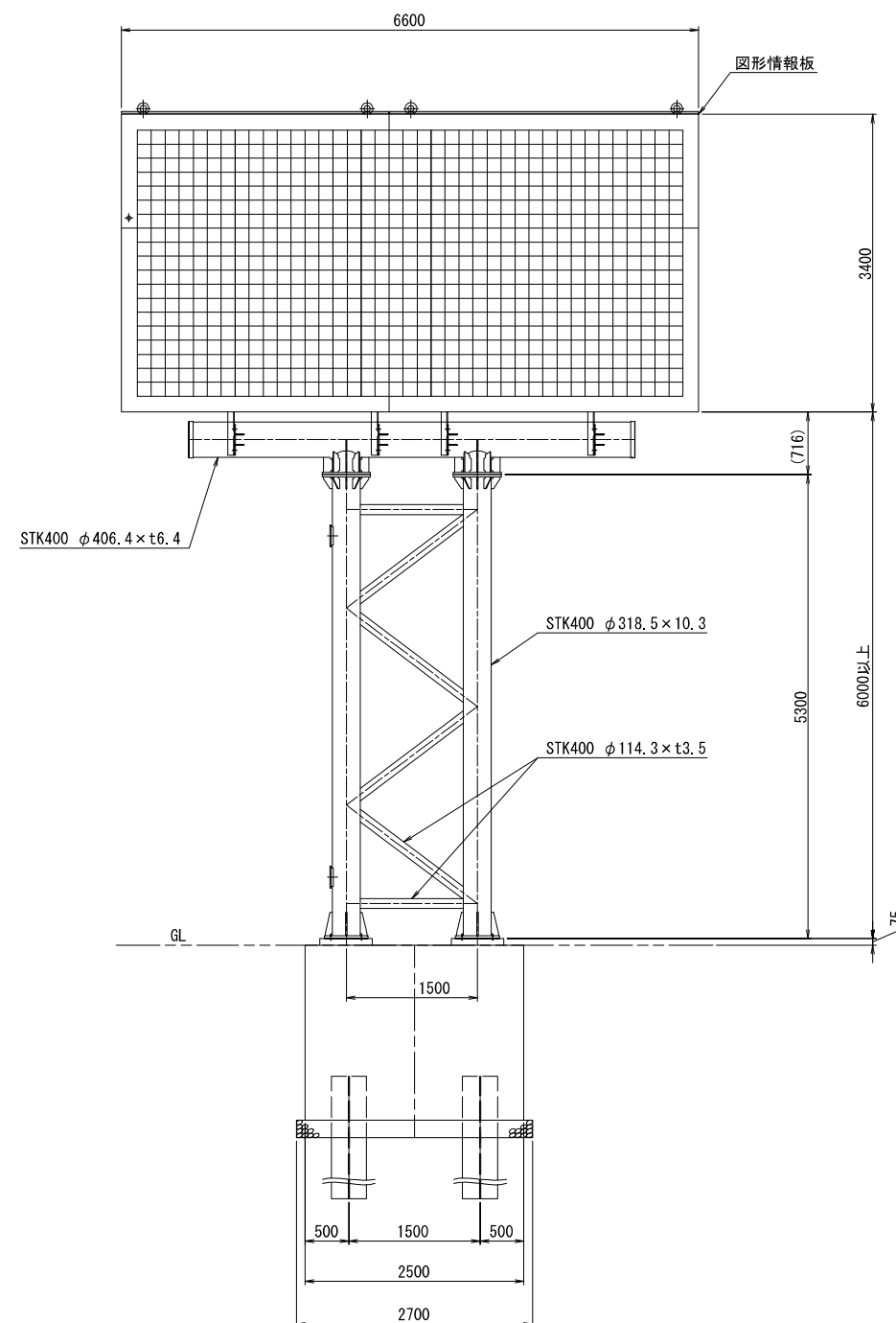
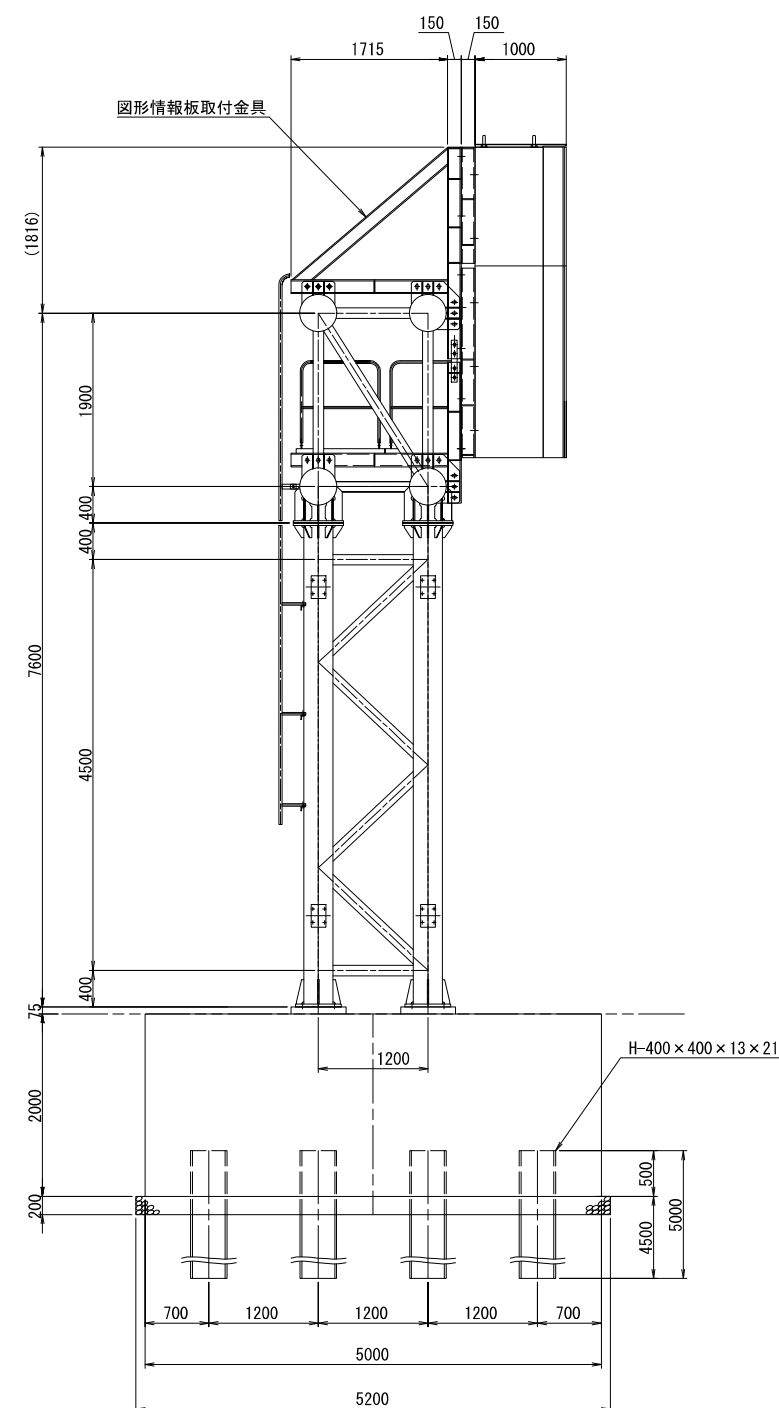
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THE PREPARATORY SURVEY FOR THE
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TITLE
Typical drawing of VMS (Gantry)

Drawing No.	T-4
SCALE	S=1/80 S=1/40
DATE	

SCALE = 1:80



SCALE = 1:40



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA



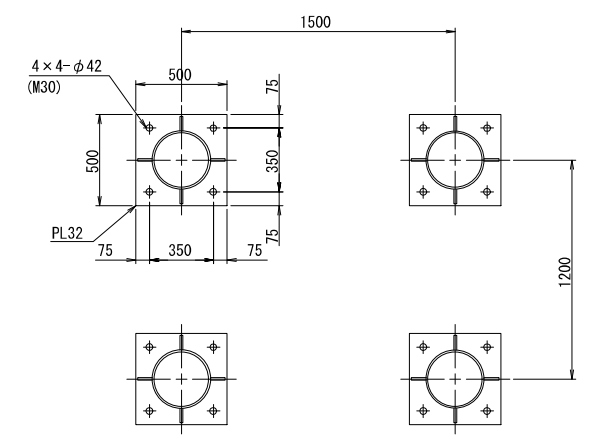
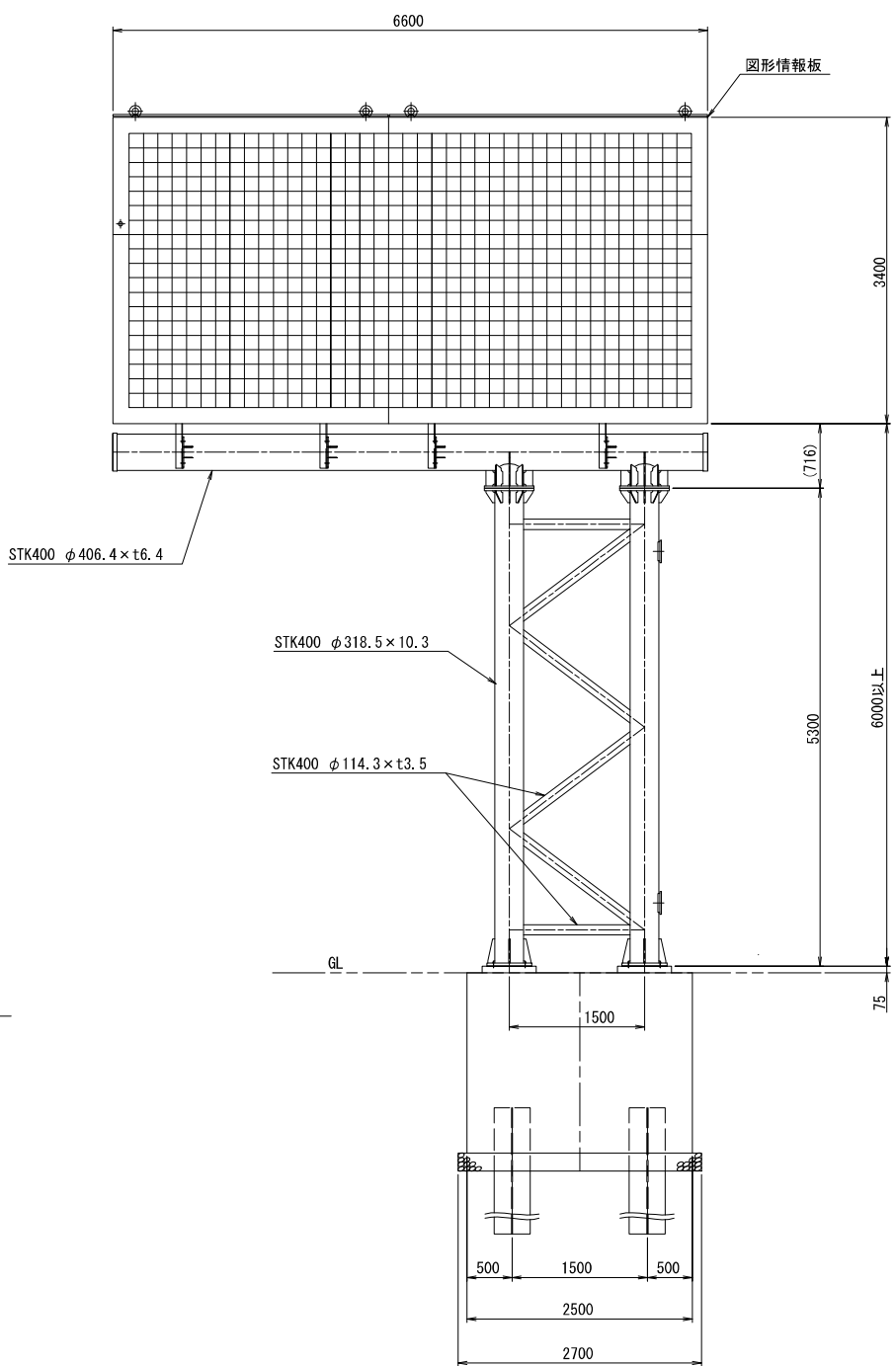
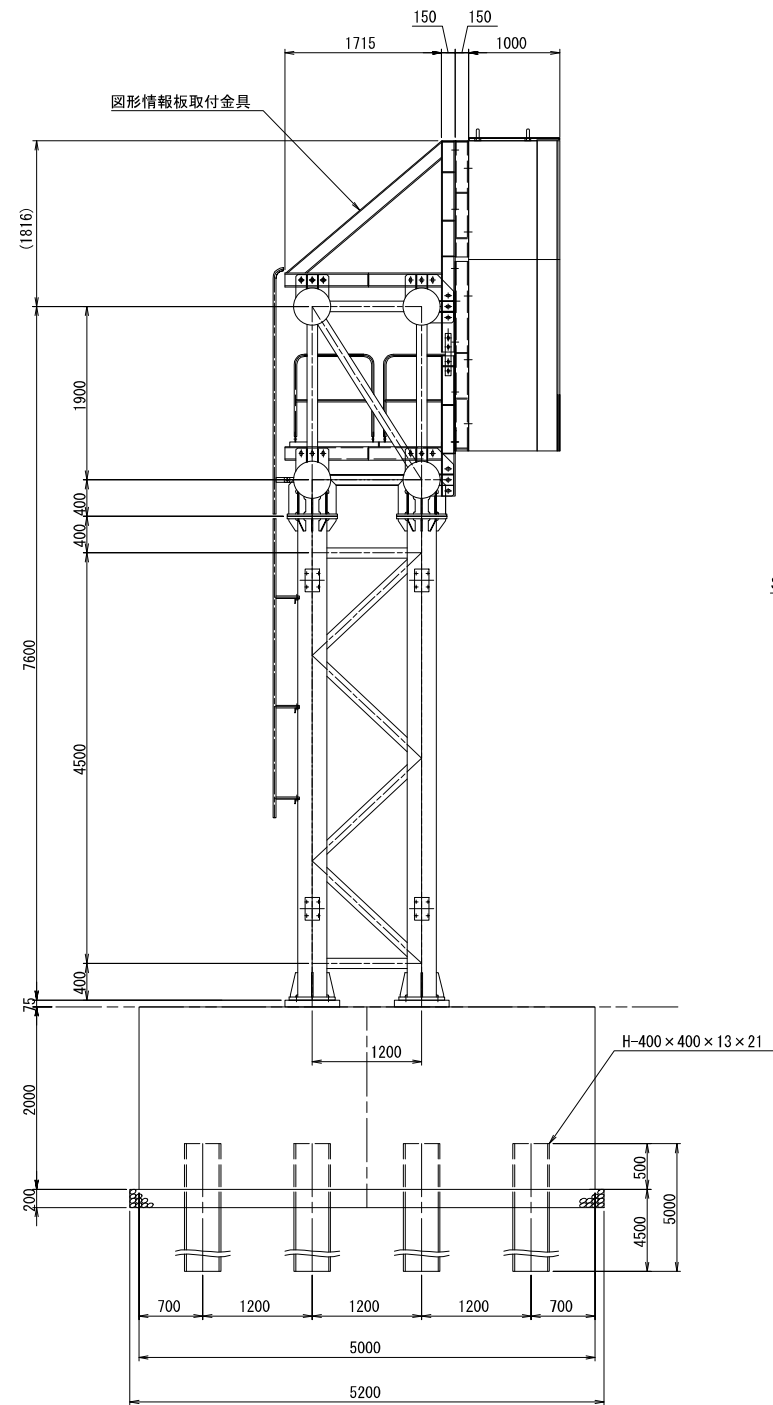
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THE PREPARATORY SURVEY FOR THE
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TITLE
Typical drawing of VMS (I-Type)

Drawing No.	T-5
SCALE	S=1/80 S=1/40
DATE	

SCALE = 1:80



SCALE = 1:40



COUNTY GOVERNMENT OF
MOMBASA REPUBLIC OF KENYA

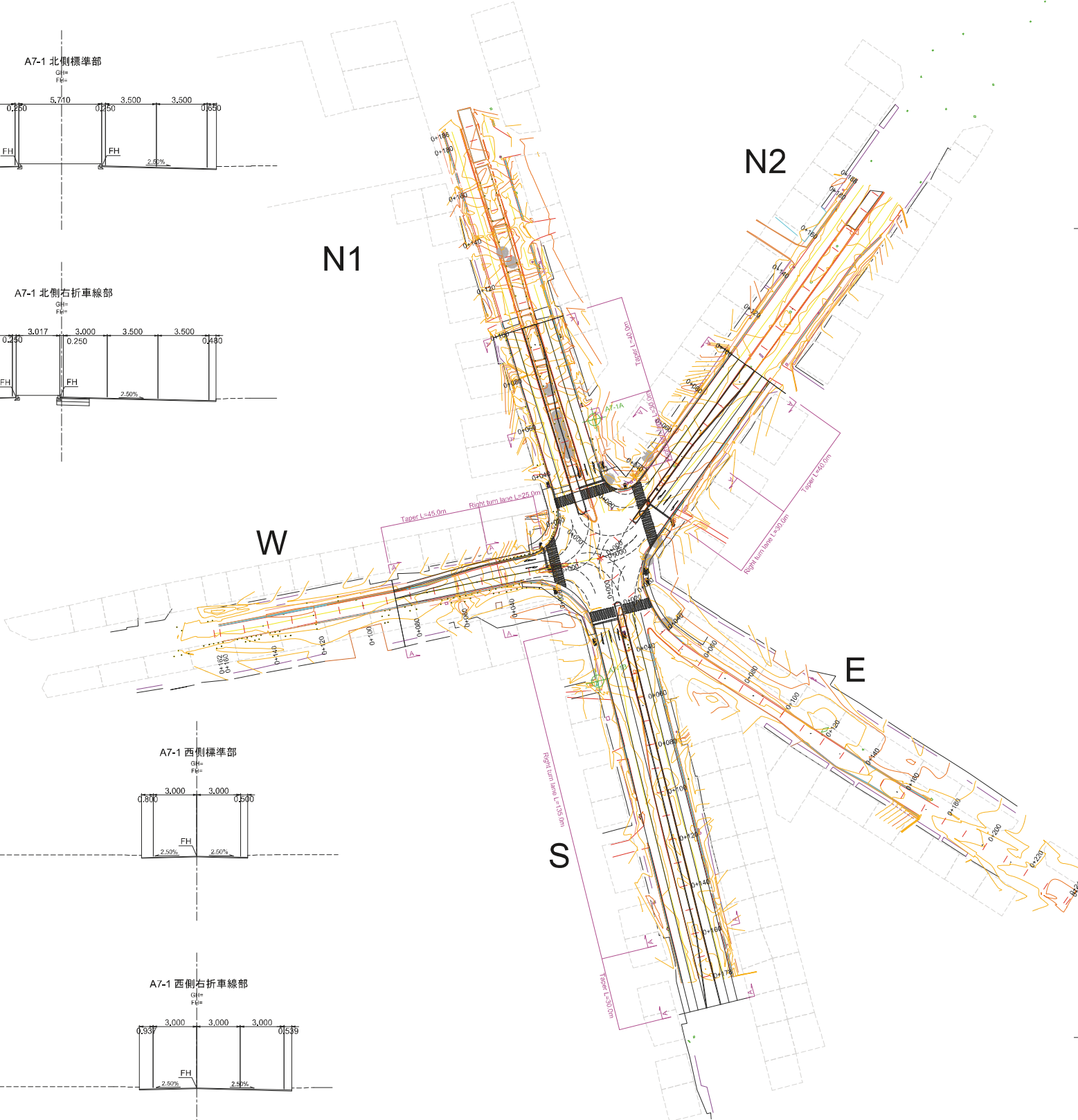
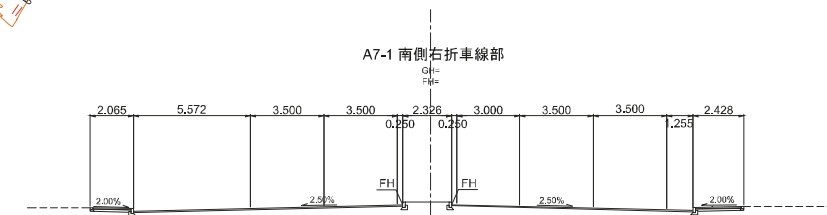
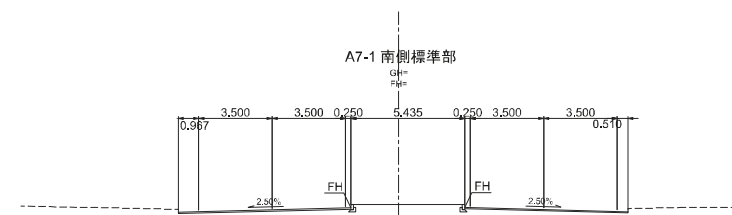
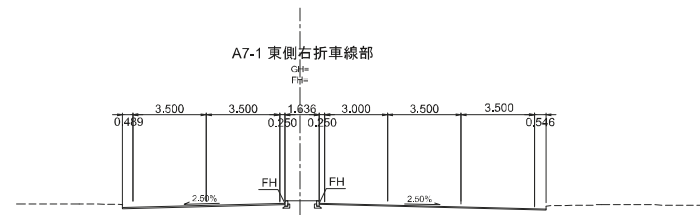
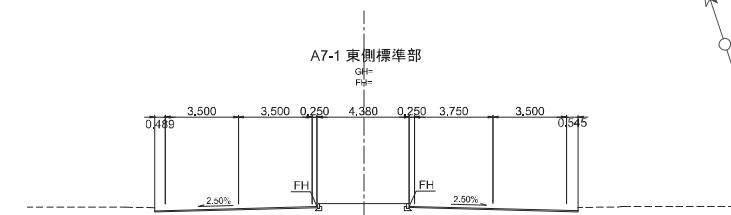
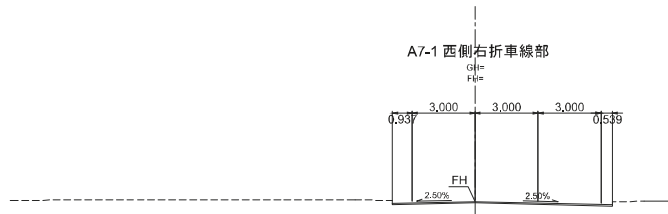
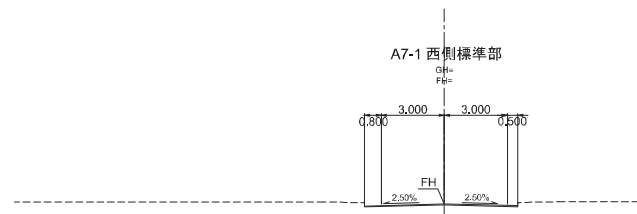
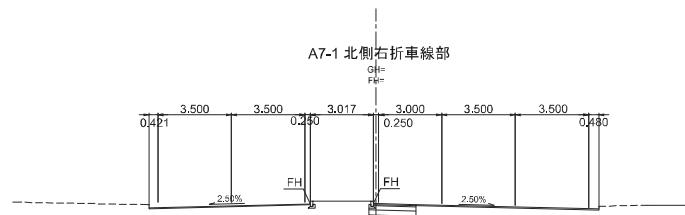
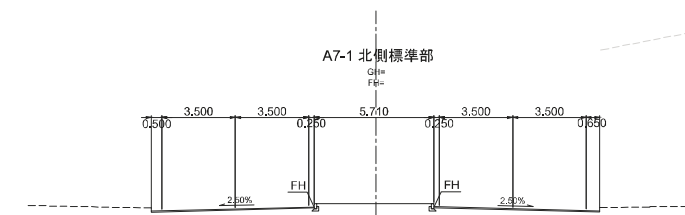


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INGEROSEC CORPORATION

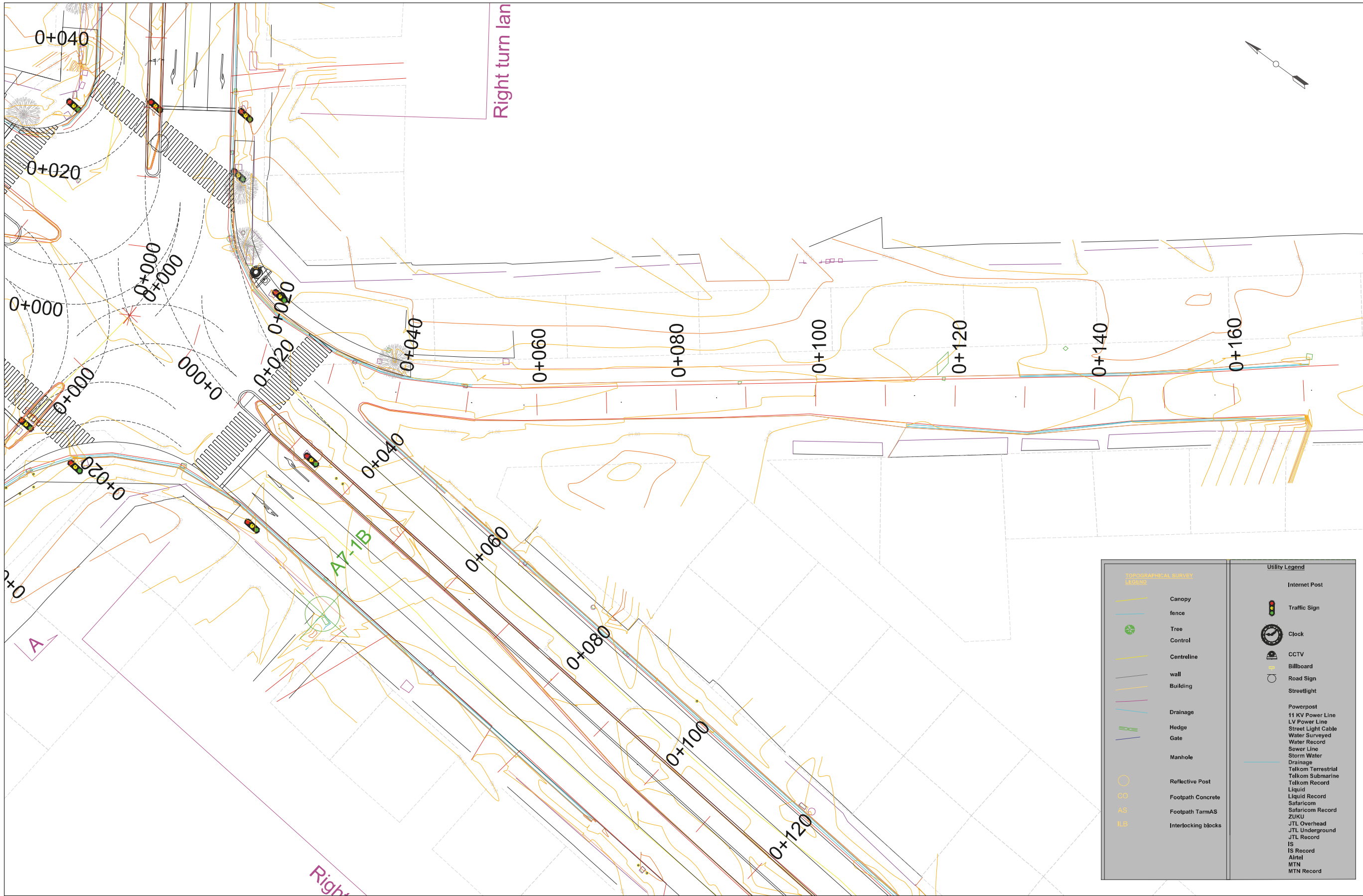
THE PREPARATORY SURVEY FOR THE
PROJECT FOR
IMPLEMENTATION OF INTELLIGENT
TRANSPORT SYSTEM IN MOMBASA REGION

TITLE
Typical drawing of VMS (F-Type)

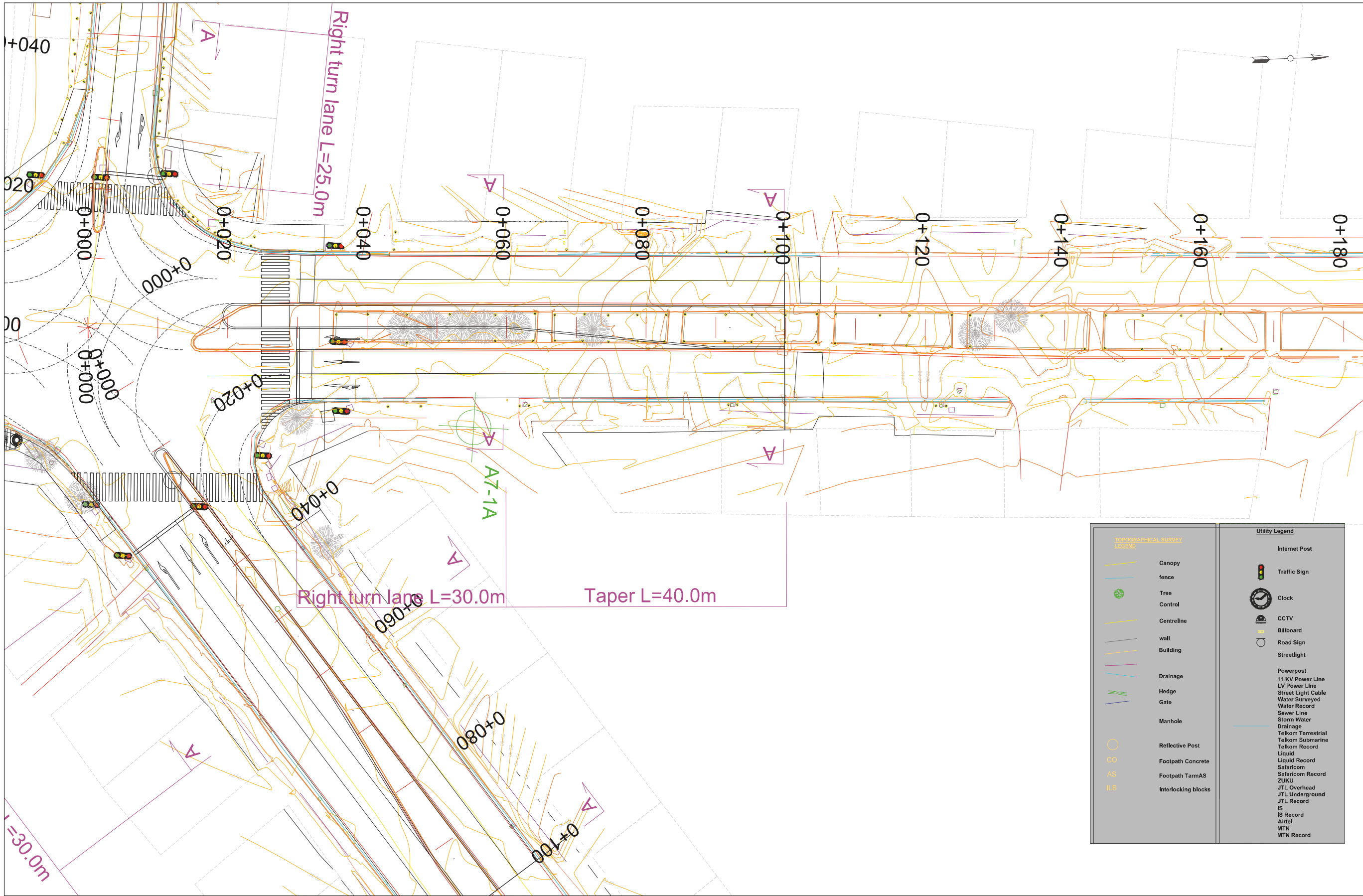
Drawing No.	T-6
SCALE	S=1/80 S=1/40
DATE	



COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7-1	Drawing No.	PL-A7-1
				SCALE	S=1/2000
				DATE	

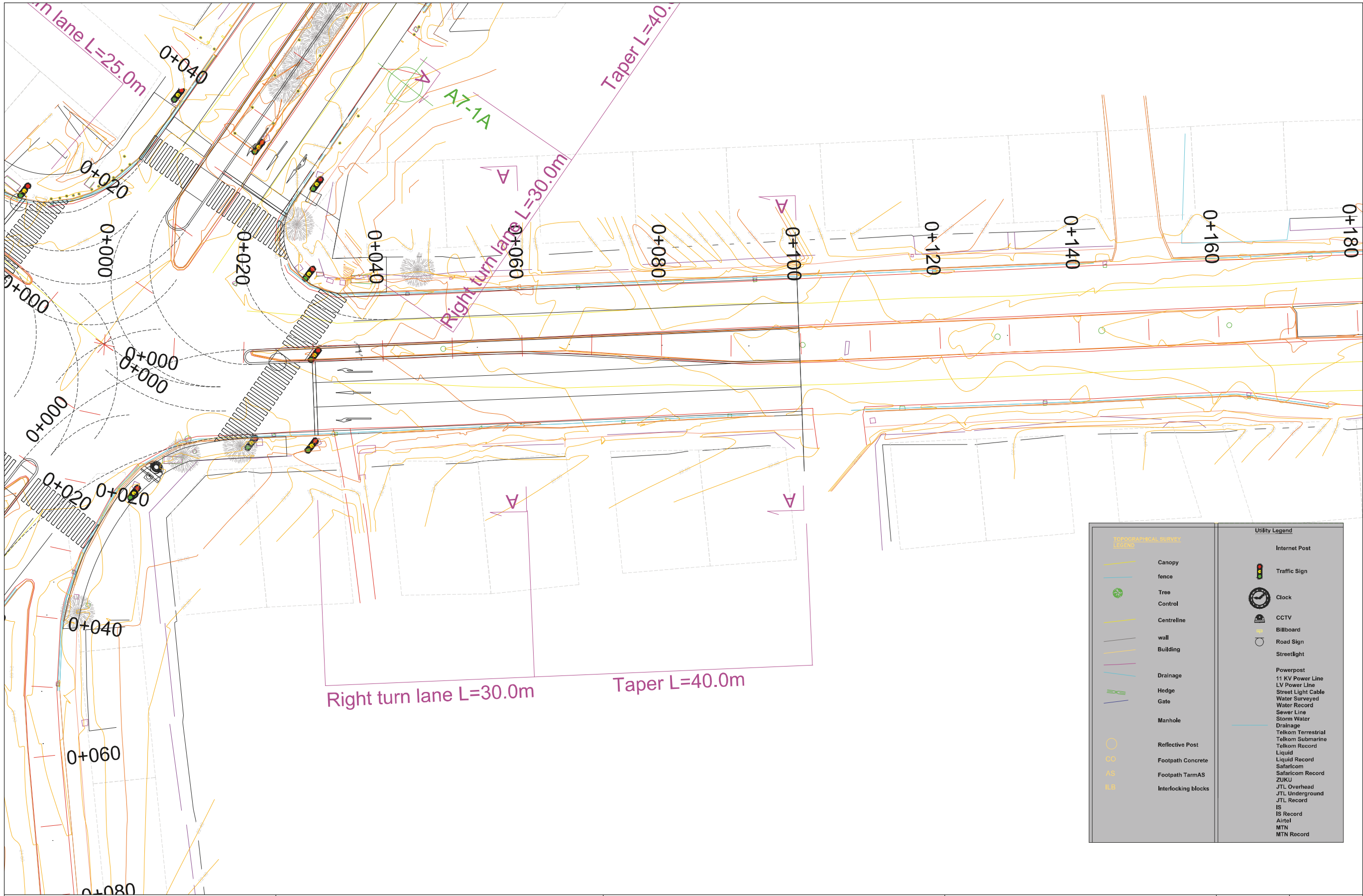


COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7-1E	Drawing No.	PL-A7-1E
				SCALE	S=1/500
				DATE	

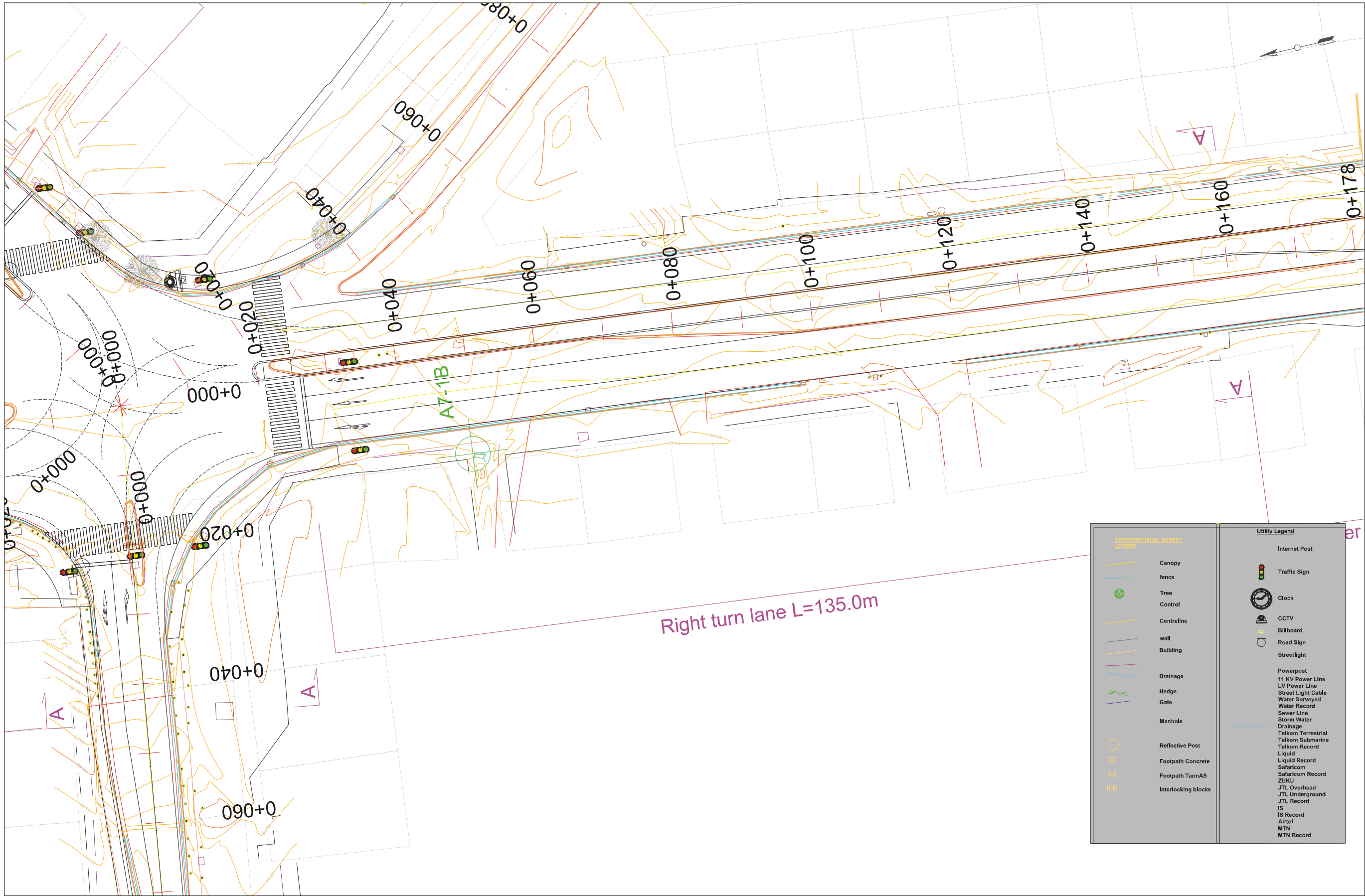


TOPOGRAHICAL SURVEY LEGEND		Utility Legend	
	Canopy		Internet Post
	fence		Traffic Sign
	Tree		Clock
	Control		CCTV
	Centreline		Billboard
	wall		Road Sign
	Building		Streetlight
	Drainage		Powerpost
	Hedge		11 KV Power Line
	Gate		LV Power Line
	Manhole		Street Light Cable
	Reflective Post		Water Surveyed
	Footpath Concrete		Water Record
	Footpath TarmAS		Sewer Line
	Interlocking blocks		Storm Water
			Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid Record
			Safaricom
			Safaricom Record
			ZUKU
			JTL Overhead
			JTL Underground
			IS
			IS Record
			Airtel
			MTN
			MTN Record

COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7-1N1	Drawing No.	PL-A7-1N1
				SCALE	S=1/500
				DATE	

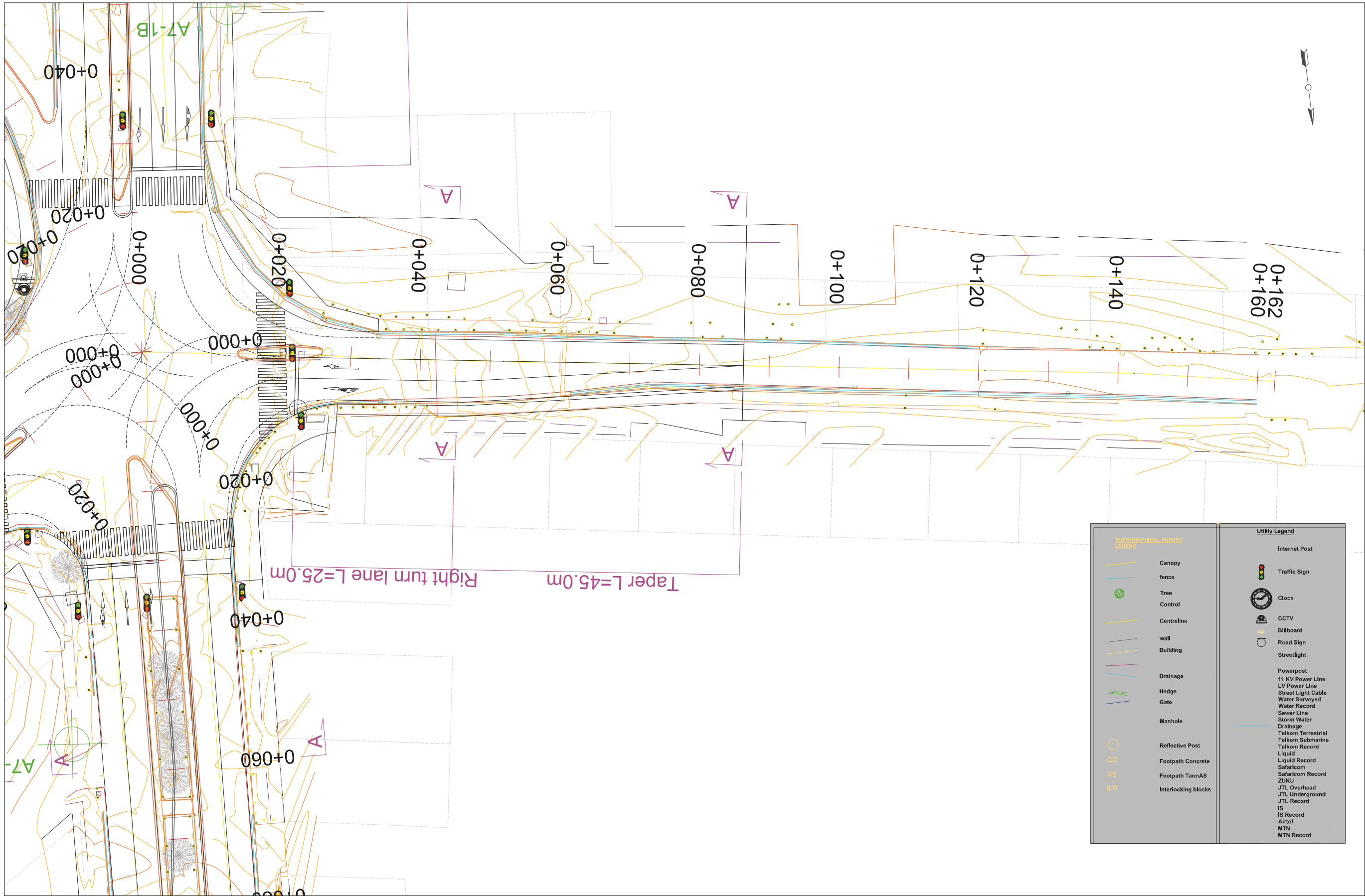


COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7-1N2	Drawing No.	PL-A7-1N2
				SCALE	S=1/500
				DATE	



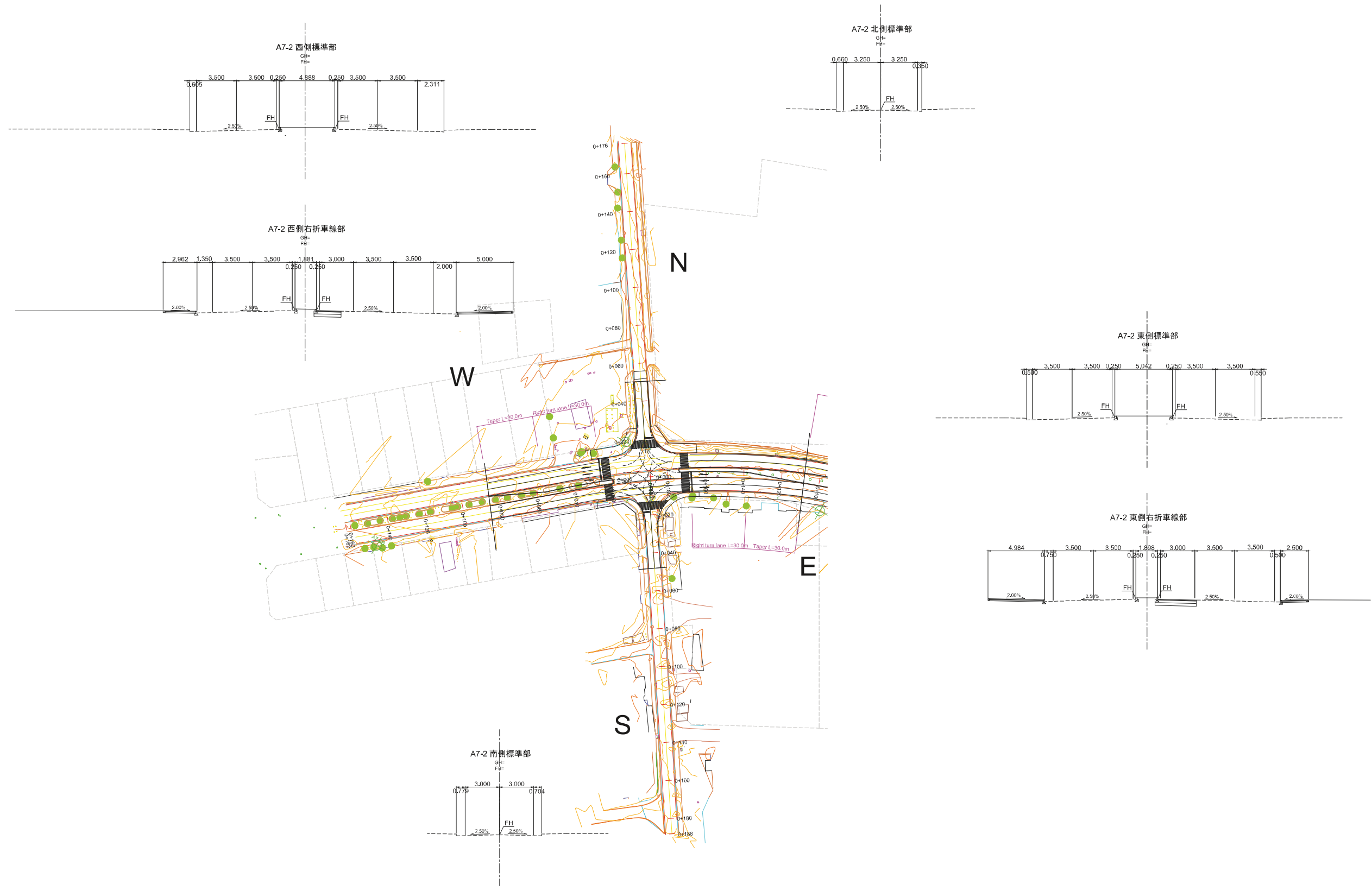
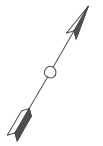
Topographical Support Legend		Utility Legend	
	Canopy		Traffic Sign
	fence		Clock
	Tree		CCTV
	Control		Billboard
	Centreline		Road Sign
	wall		Streetlight
	Building		Powerpost
	Drainage		11 KV Power Line
	Hedge		LV Power Line
	Gate		Street Light Cable
	Manhole		Water Surveyed
	Reflective Post		Water Record
	Footpath Concrete		Sewer Line
	Footpath TarmAS		Storm Water
	Interlocking blocks		Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid Record
			Safaricom
			Safaricom Record
			ZUKU
			JTL Overhead
			JTL Underground
			IS
			IS Record
			Airtel
			MTN
			MTN Record

COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7-1S	Drawing No.	PL-A7-1S
				SCALE	S=1/500
				DATE	

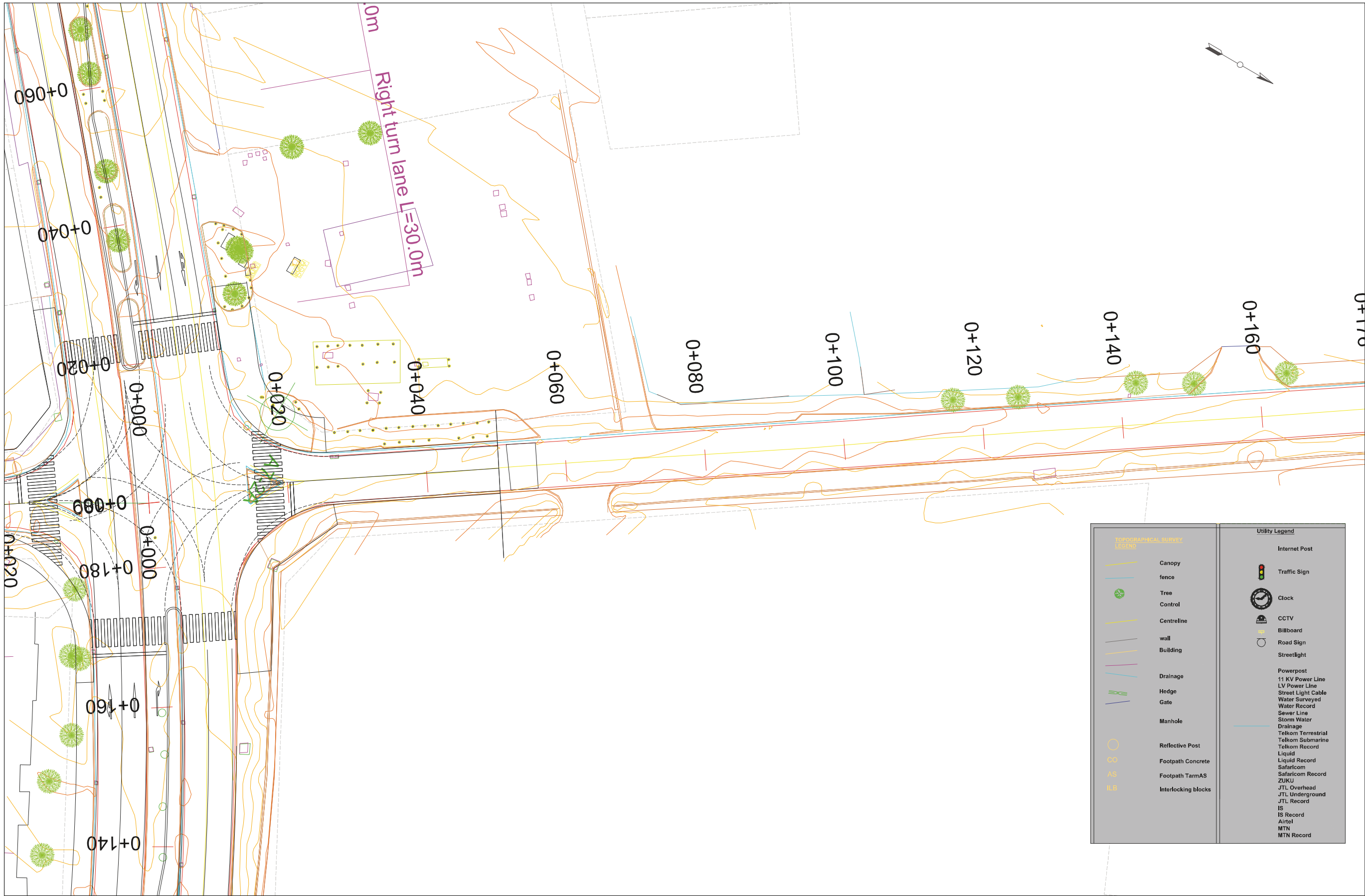


TOPOGRAPHICAL SURVEY LEGEND		Utility Legend	
	Canopy		Internet Post
	fence		Traffic Sign
	Tree		Clock
	Control		CCTV
	Centreline		Billboard
	wall		Road Sign
	Building		Streetlight
	Drainage		Powerpost
	Hedge		11 KV Power Line
	Gate		LV Power Line
	Manhole		Street Light Cable
	Reflective Post		Water Surveyed
	Footpath Concrete		Water Record
	Footpath TarmAS		Sewer Line
	Interlocking blocks		Storm Water
			Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid Record
			Safaricom
			Safaricom Record
			ZUKU
			JTL Overhead
			JTL Underground
			IS
			IS Record
			Airtel
			MTN
			MTN Record

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				SCALE	S=1/500
				DATE	



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				SCALE	1/2000
				DATE	



TOPOGRAHICAL SURVEY LEGEND		Utility Legend	
	Canopy		Internet Post
	fence		Traffic Sign
	Tree		Clock
	Control		CCTV
	Centreline		Billboard
	wall		Road Sign
	Building		Streetlight
	Drainage		Powerpost
	Hedge		11 KV Power Line
	Gate		LV Power Line
	Manhole		Street Light Cable
	Reflective Post		Water Surveyed
	Footpath Concrete		Water Record
	Footpath TarmAS		Sewer Line
	Interlocking blocks		Storm Water
			Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid
			Liquid Record
			Safaricom
			Safaricom Record
			ZUKU
			JTL Overhead
			JTL Underground
			IS
			IS Record
			Airtel
			MTN
			MTN Record

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				SCALE	1/500
				DATE	



TOPOGRAPHICAL SURVEY LEGEND		Utility Legend	
	Canopy		Internet Post
	fence		Traffic Sign
	Tree		Clock
	Control		CCTV
	Centreline		Billboard
	wall		Road Sign
	Building		Streetlight
	Drainage		Powerpost
	Hedge		11 KV Power Line
	Gate		LV Power Line
	Manhole		Street Light Cable
	Reflective Post		Water Surveyed
	Footpath Concrete		Water Record
	Footpath TarmAS		Sewer Line
	Interlocking blocks		Storm Water
			Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid
			Liquid Record
			Safaricom
			Safaricom Record
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			IS Record
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			MTN
			MTN Record

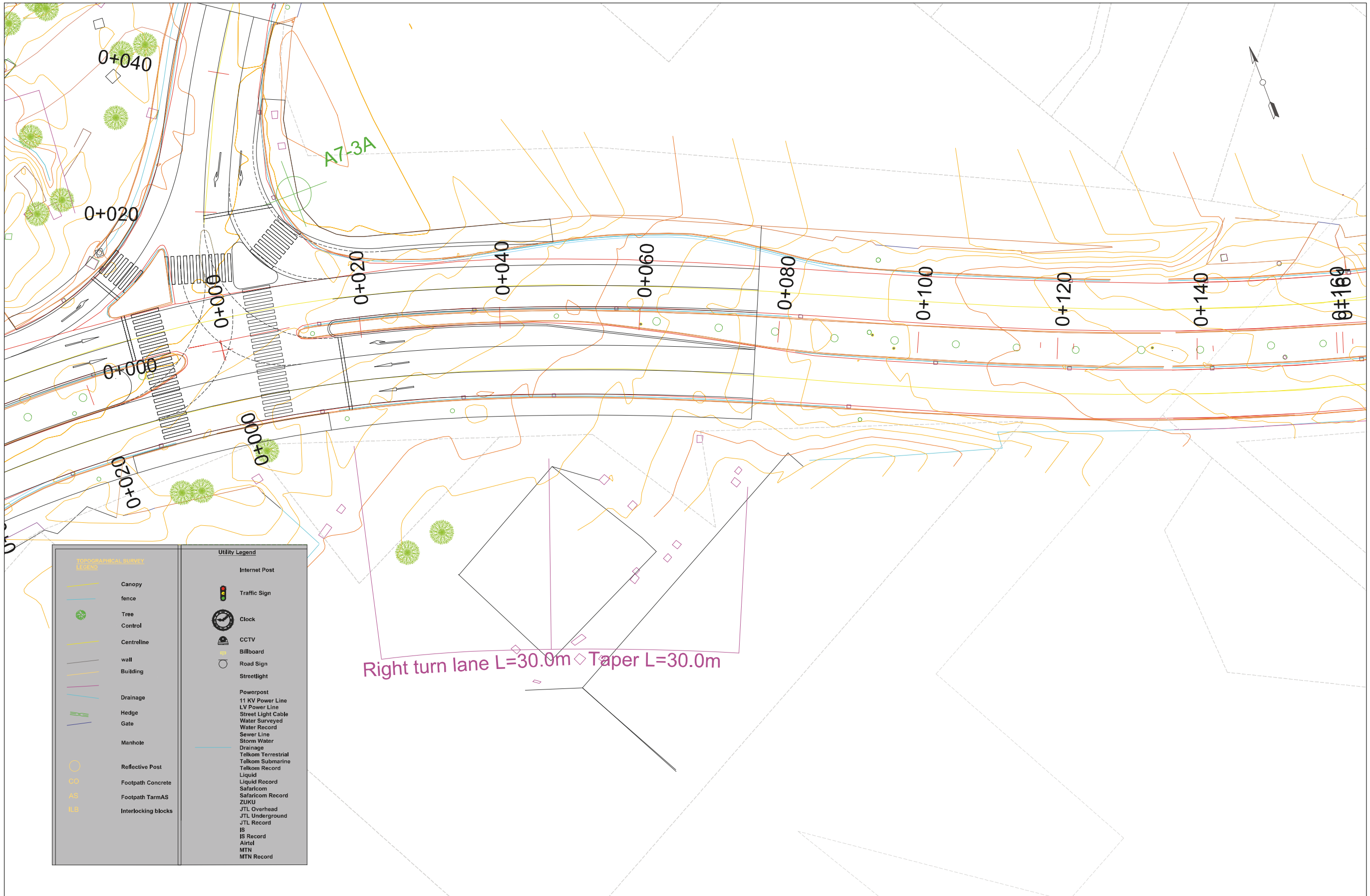
COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PL A7-2S	Drawing No.	PL-A7-2S
				SCALE	1/500
				DATE	



COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PL A7-2W	Drawing No.	PL-A7-2W
				SCALE	1/500
				DATE	



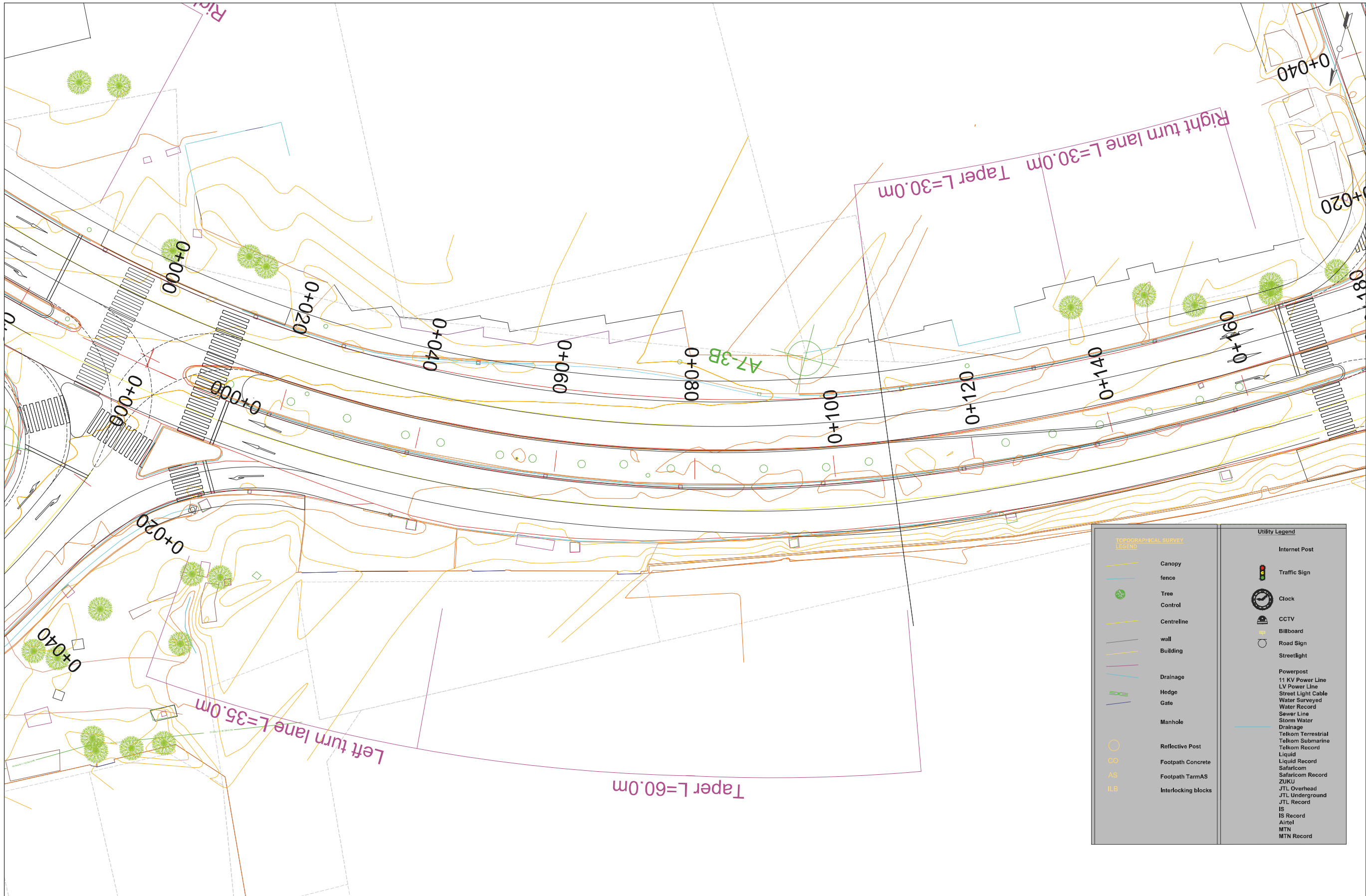
COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7-3	Drawing No.	PL-A7-3
				SCALE	1/2000
				DATE	



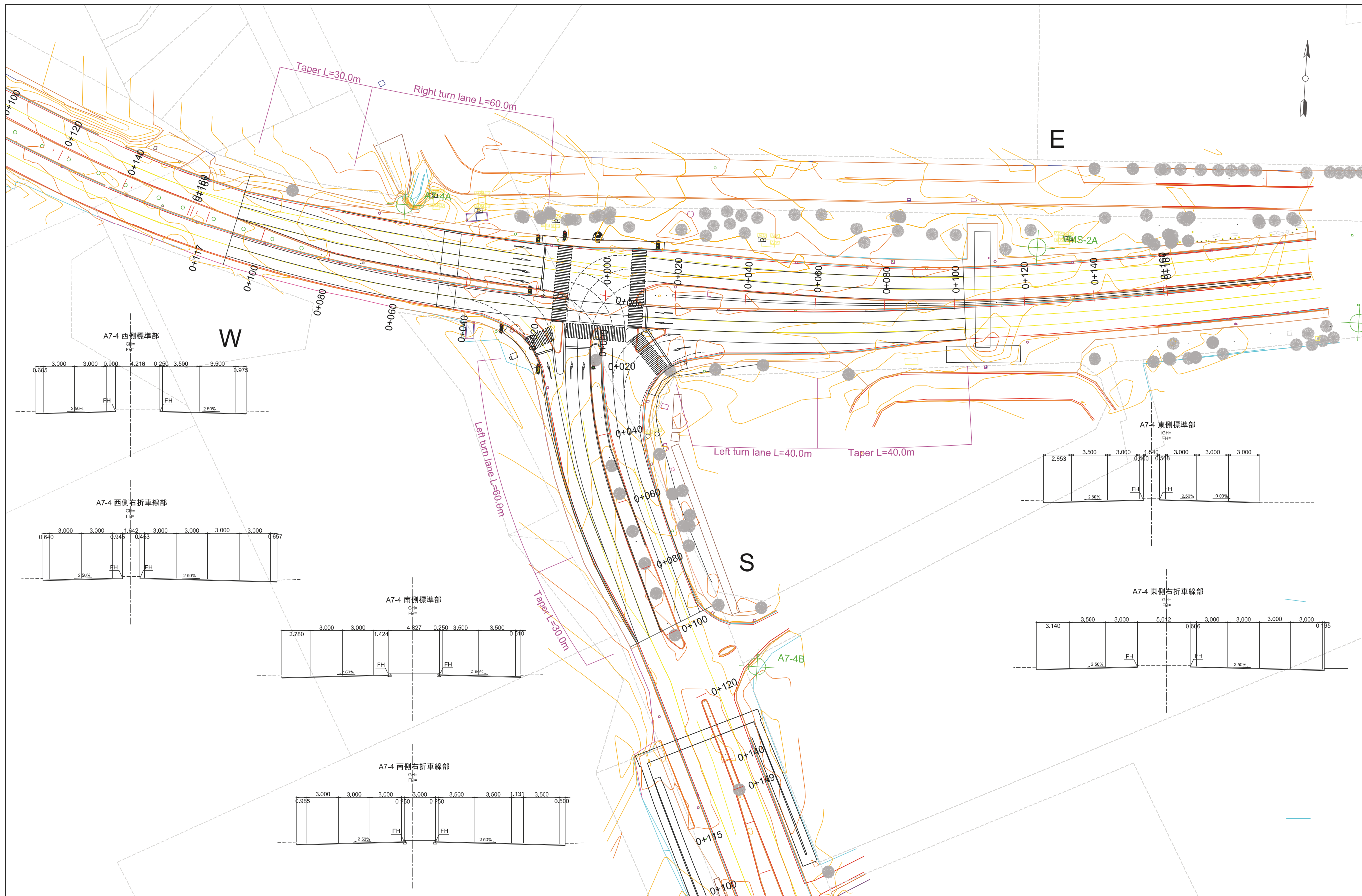
COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PL A7-3N	Drawing No.	PL-A7-3N
				SCALE	1/500
				DATE	



COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PL A7-3N	Drawing No.	PL-A7-3N
				SCALE	1/500
				DATE	



COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PL A7-3N	Drawing No.	PL-A7-3N
				SCALE	1/500
				DATE	



COUNTY GOVERNMENT OF MOMBASA
REPUBLIC OF KENYA

JAPAN INTERNATIONAL COOPERATION AGENCY
NIPPON KOEI CO.,LTD.
KATAHIRA & ENGINEERS INTERNATIONAL
INGEROSEC CORPORATION

THE PREPARATORY SURVEY
FOR THE PROJECT
FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT
SYSTEM IN MOMBASA REGION

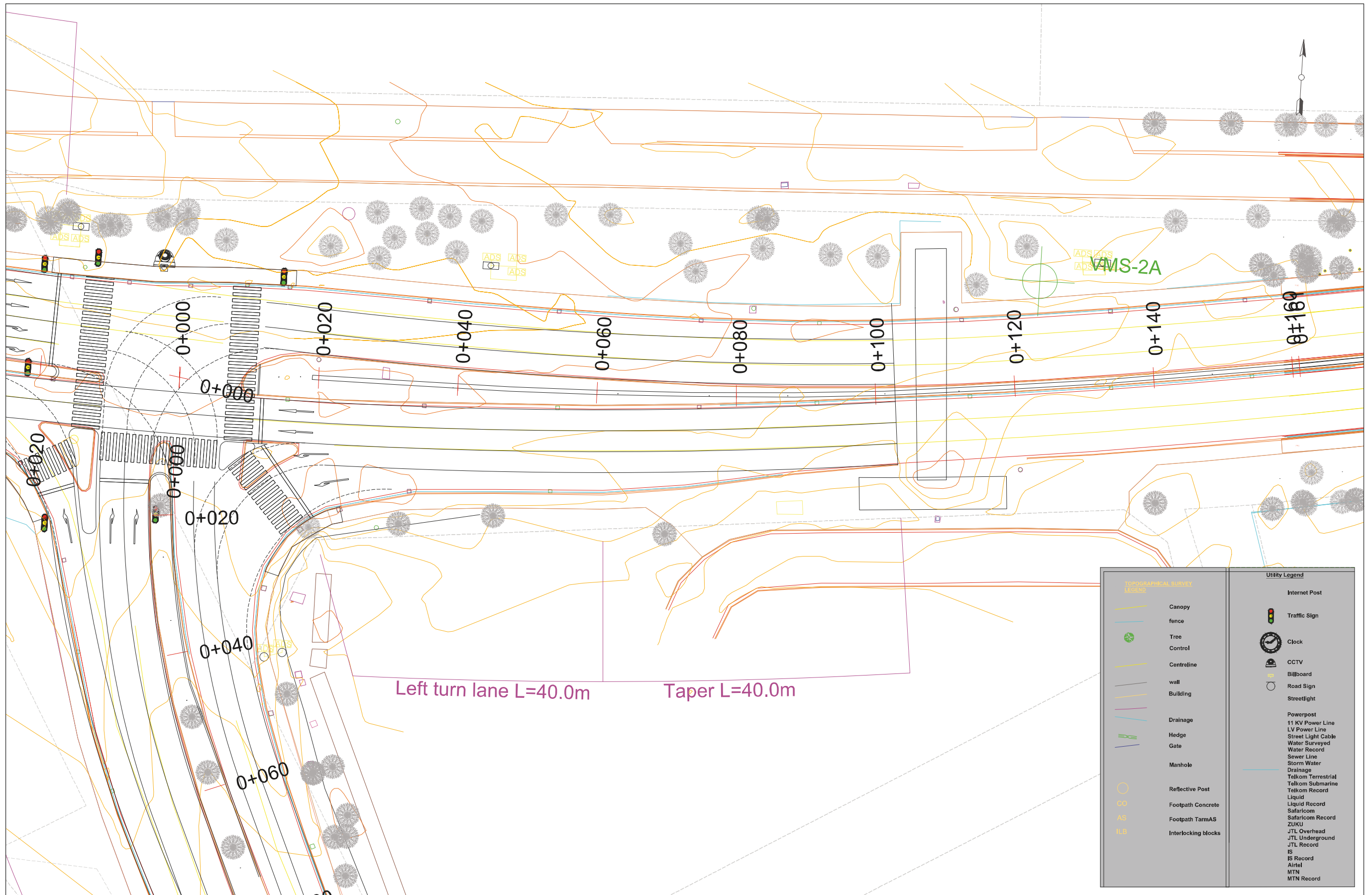
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PLAN A7-4

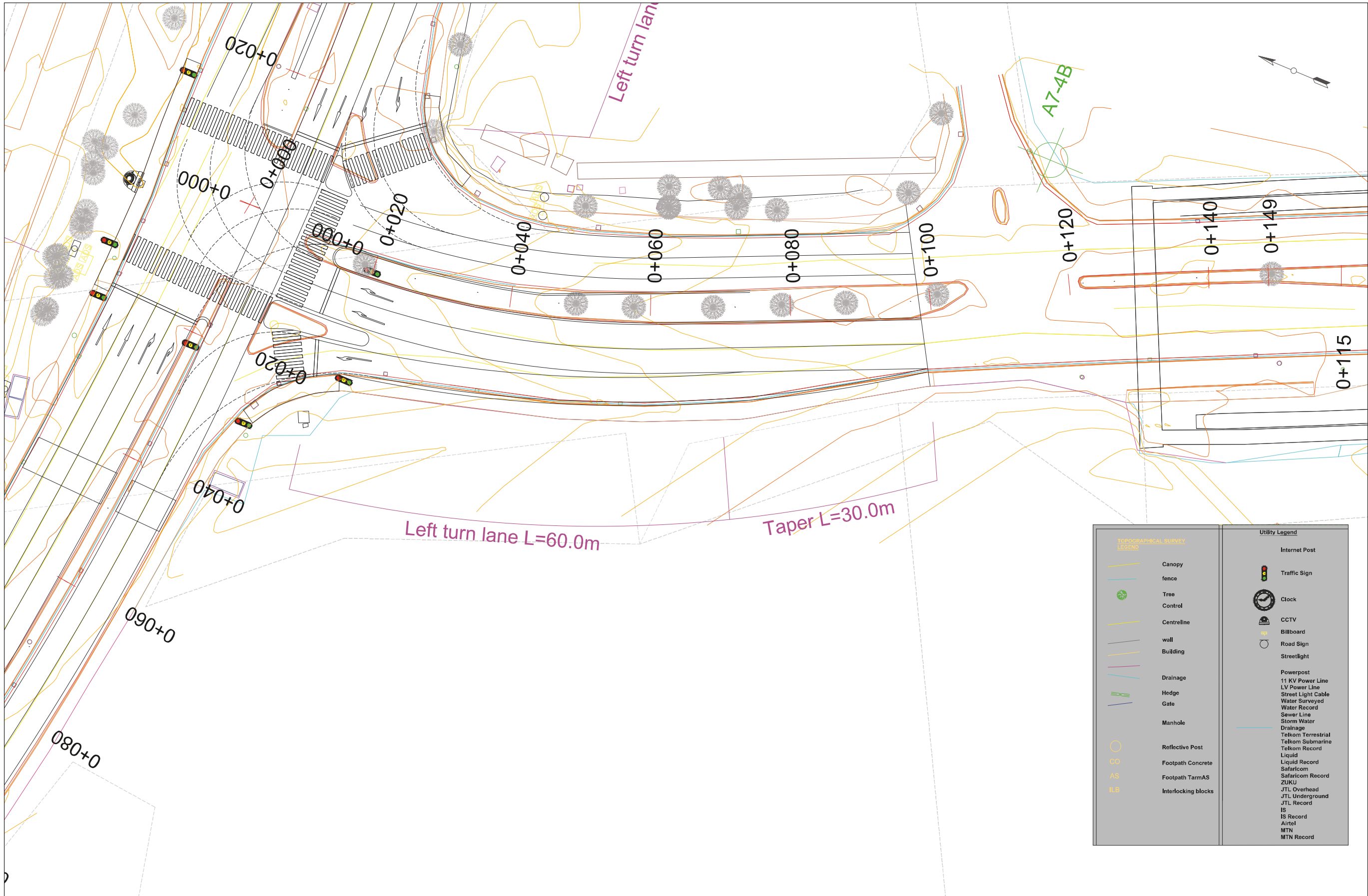
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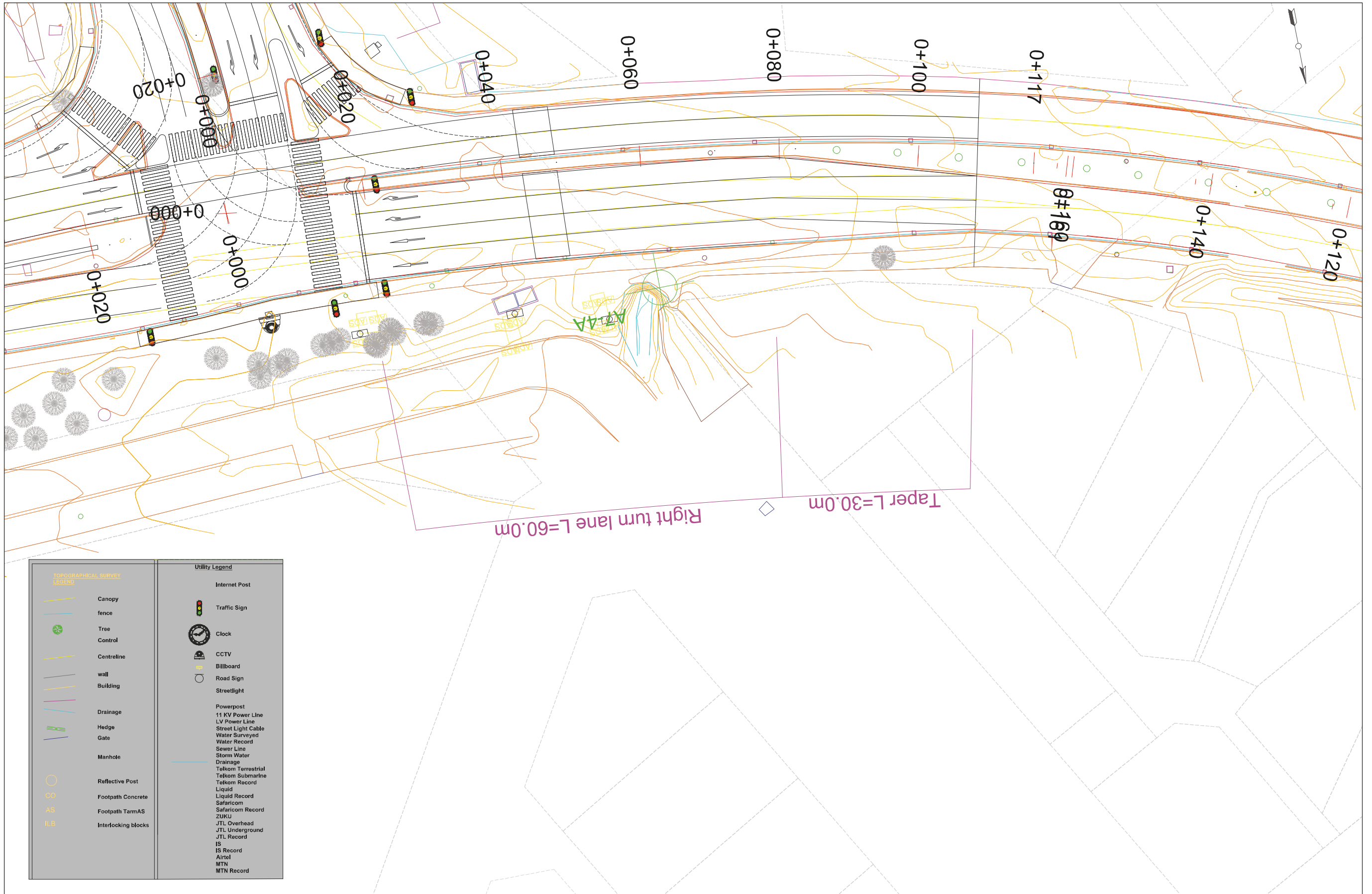


COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PL A7-4E	Drawing No.	PL-A7-4E
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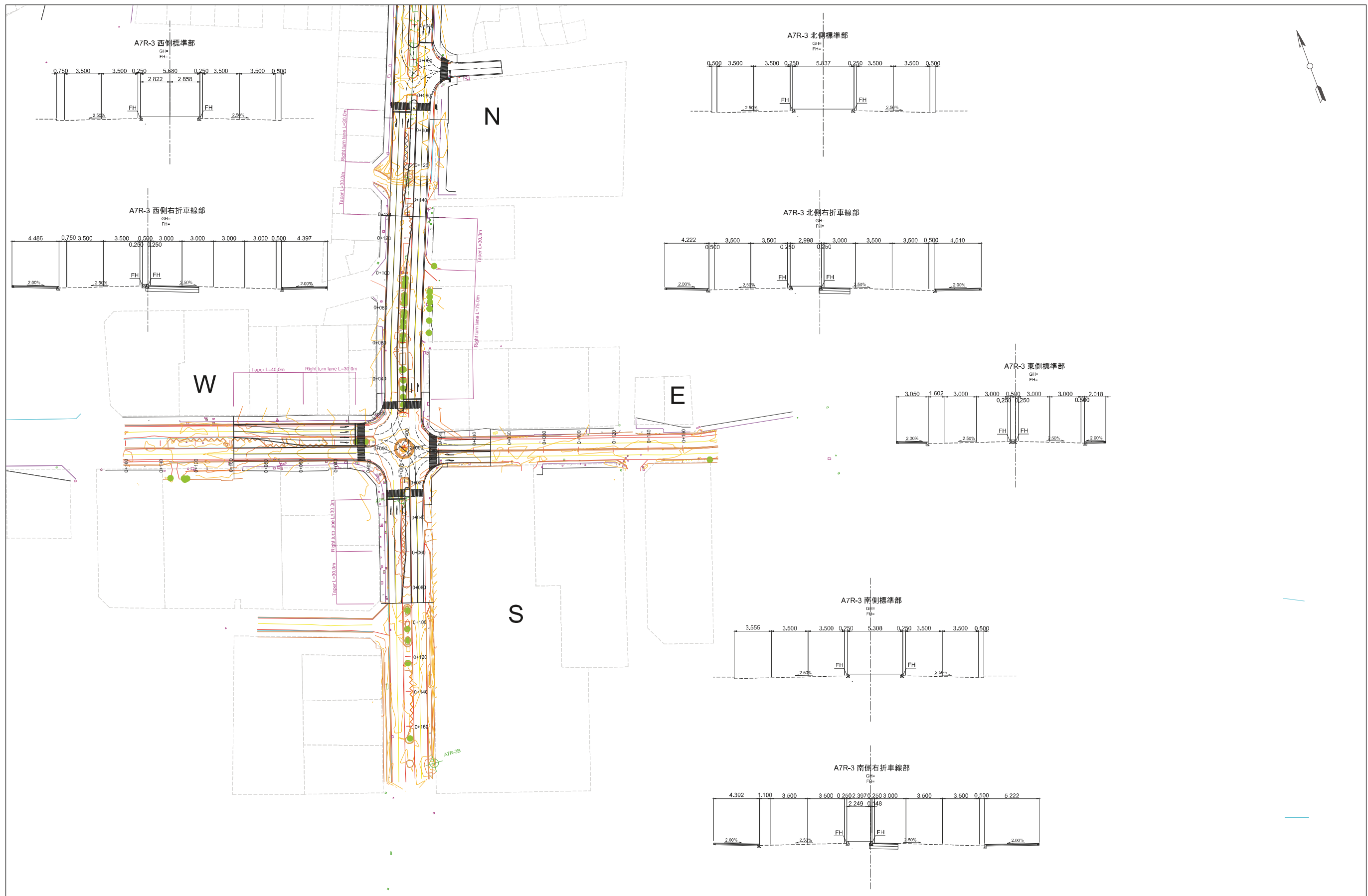


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	Canopy		Internet Post
	fence		Traffic Sign
	Tree		Clock
	Control		CCTV
	Centreline		Billboard
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	Building		Streetlight
	Drainage		Powerpost
	Hedge		11 KV Power Line
	Gate		LV Power Line
	Manhole		Street Light Cable
	Reflective Post		Water Surveyed
	Footpath Concrete		Water Record
	Footpath TarmAS		Sewer Line
	Interlocking blocks		Storm Water
			Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid Record
			Safaricom
			Safaricom Record
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			JTL Underground
			IS
			IS Record
			Airtel
			MTN
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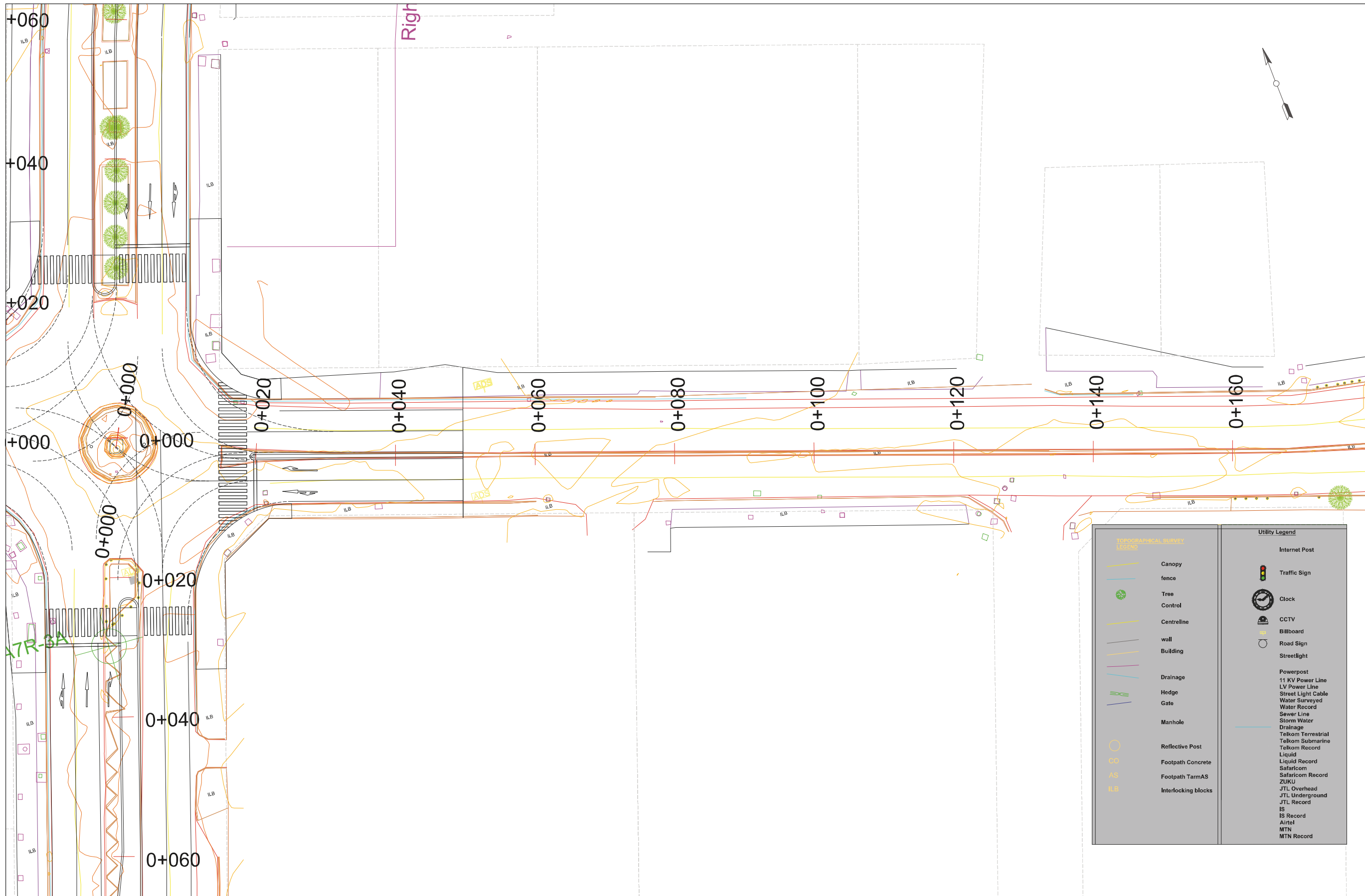
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				SCALE	1/500
				DATE	



COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PL A7-4W	Drawing No.	PL-A7-4W
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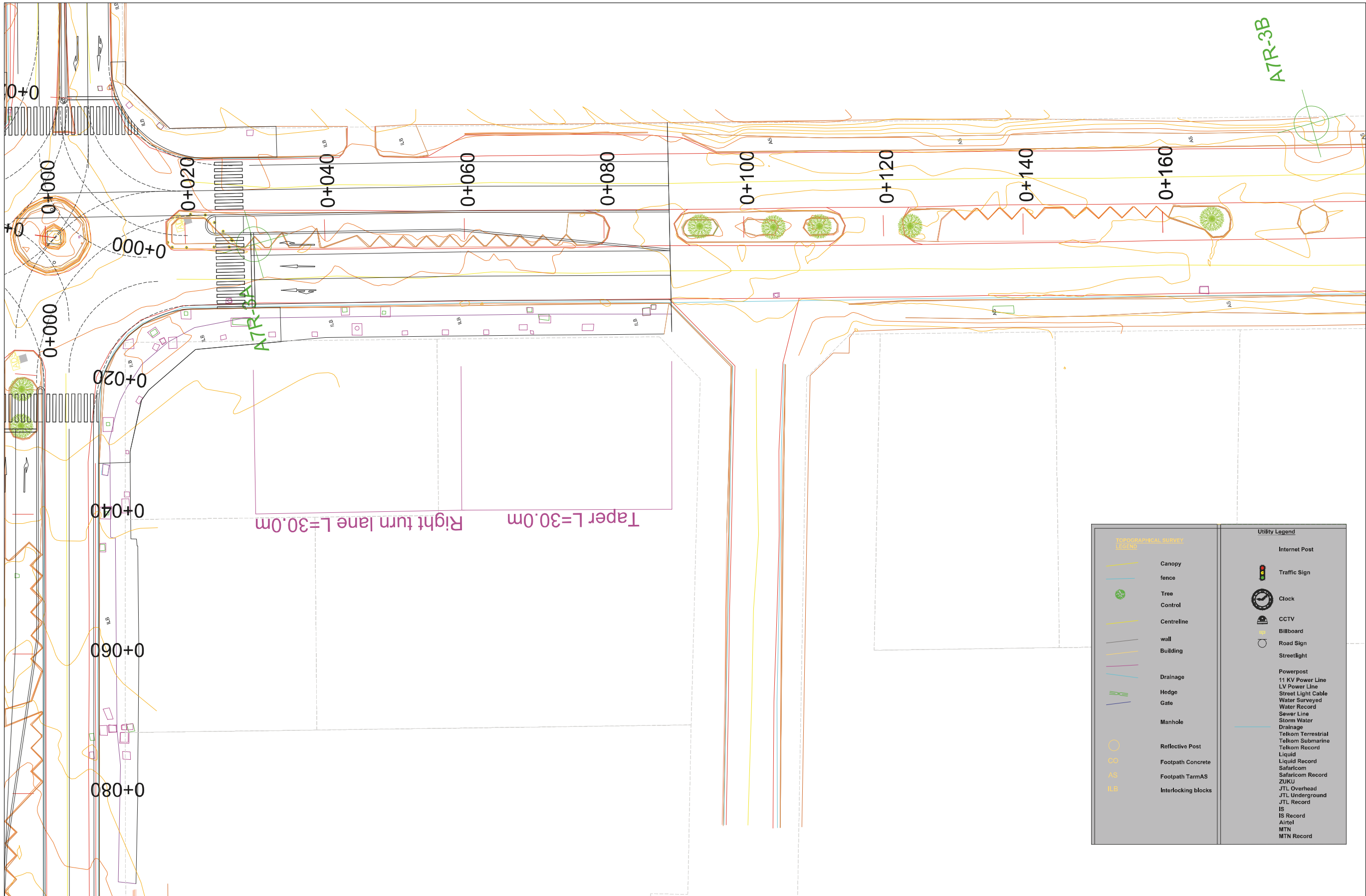
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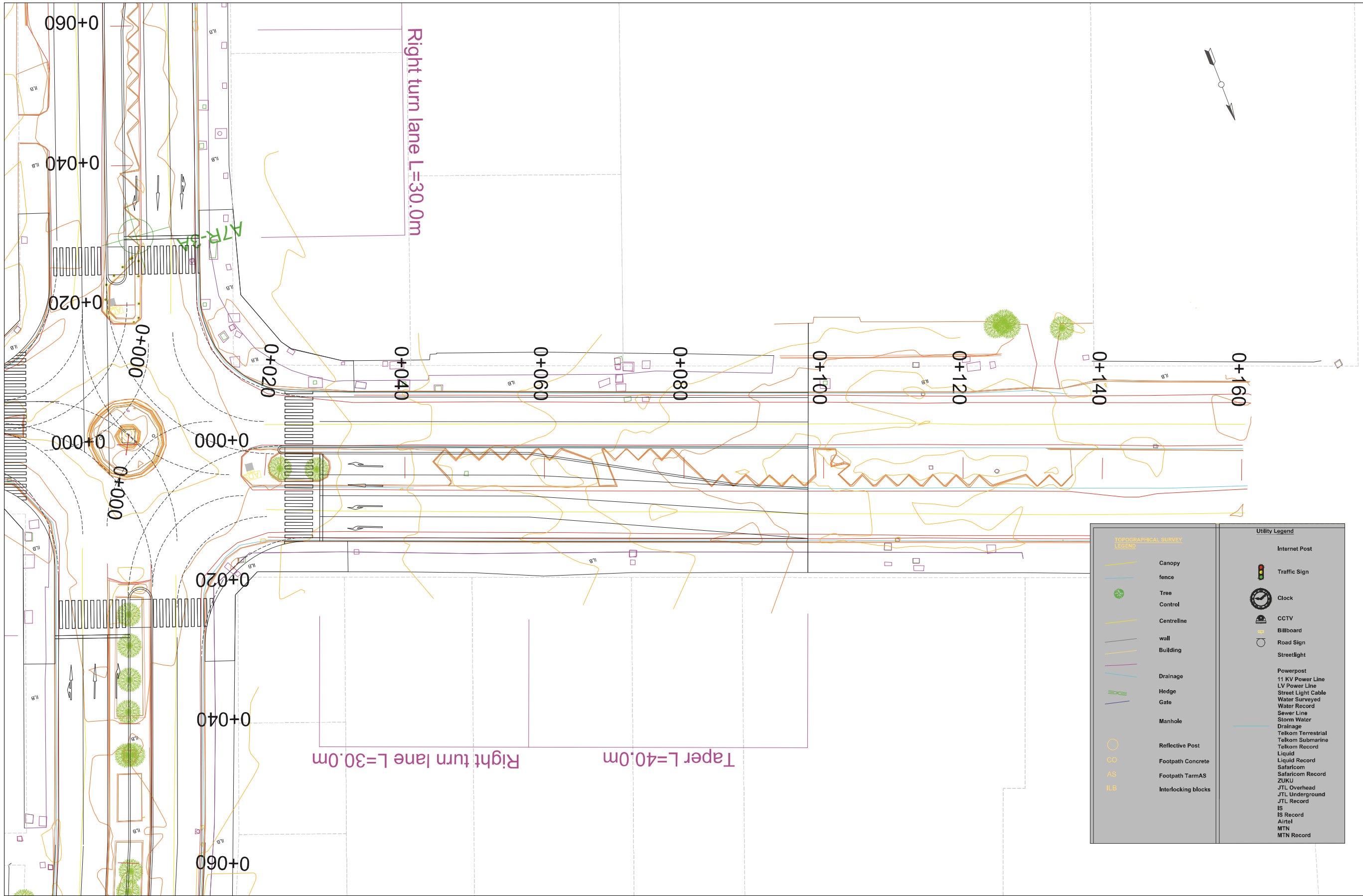
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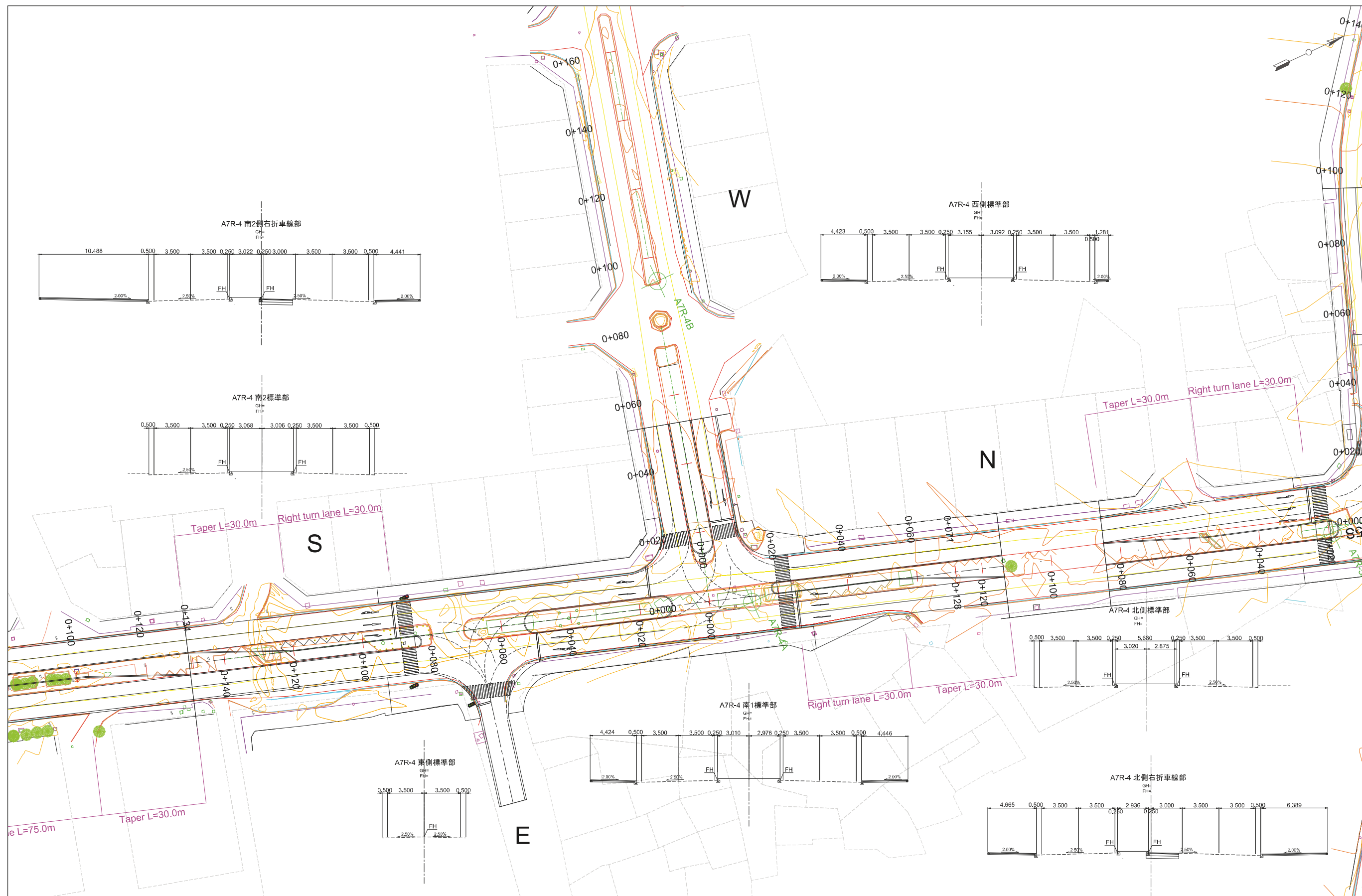
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				DATE	



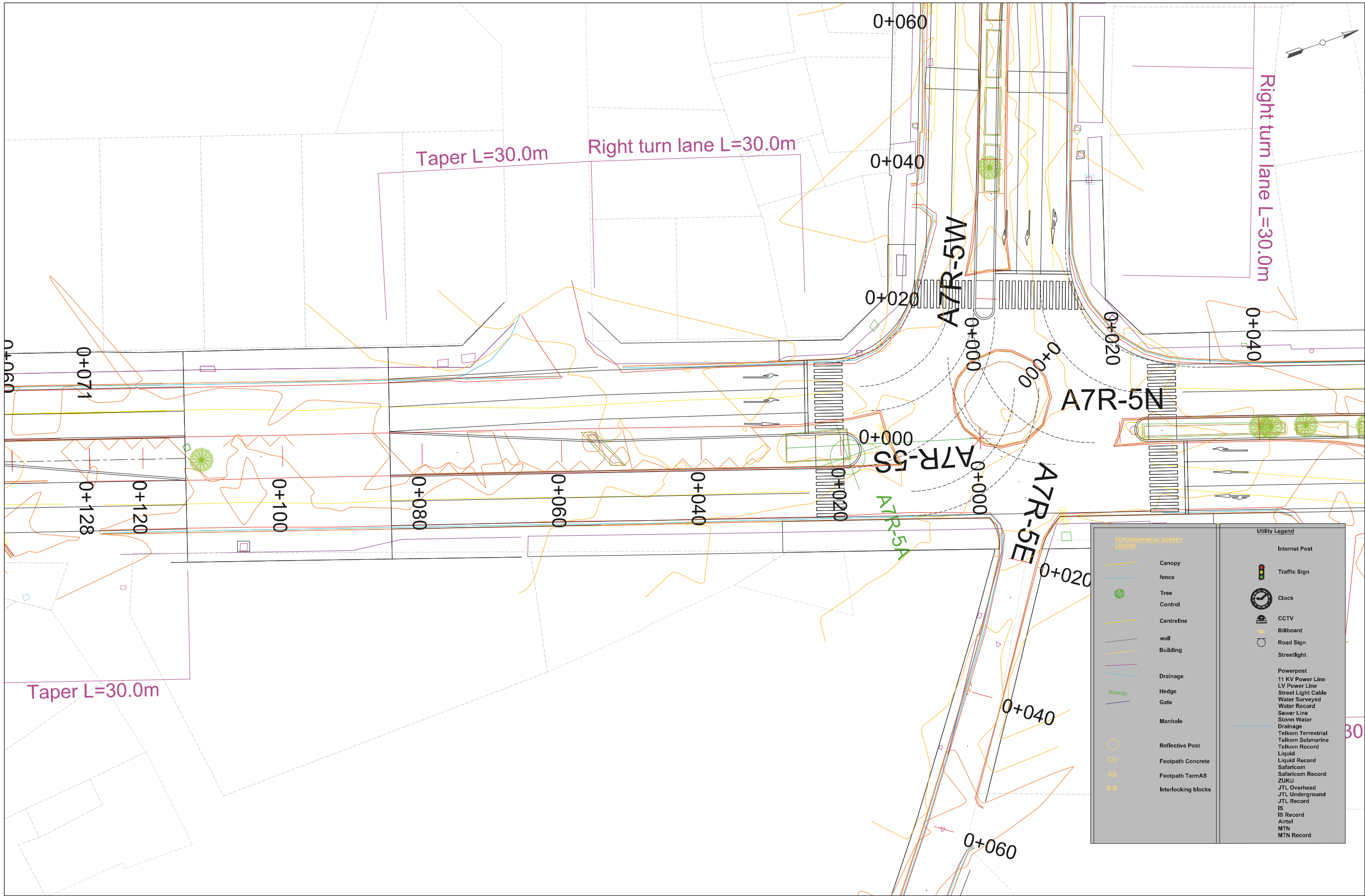
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				SCALE	S=1/500
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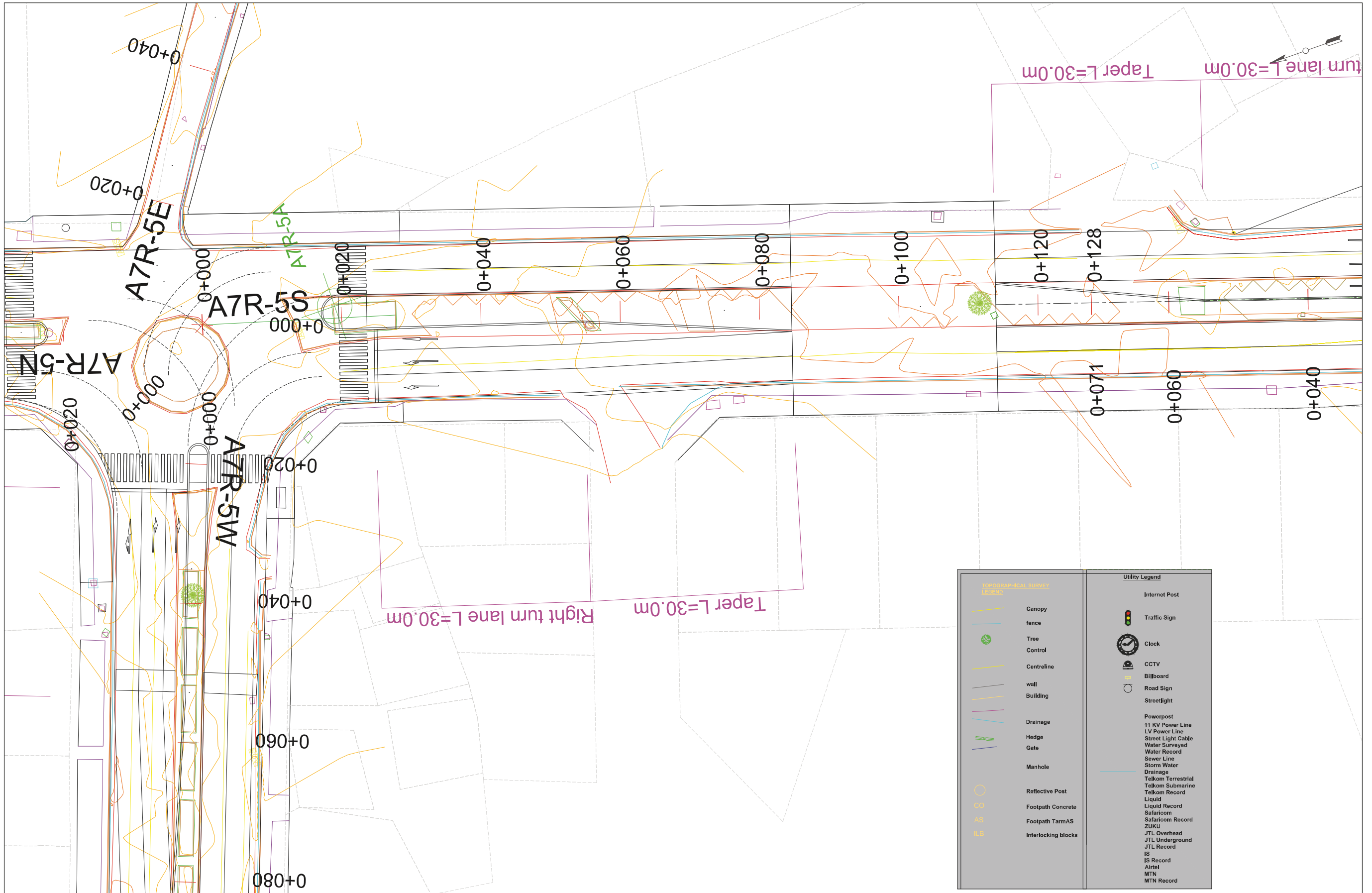
COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-3W	Drawing No.	PL-A7R-3W
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				DATE	



COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-4	Drawing No.	PL-A7R-4
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COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-4N	Drawing No.	PL-A7R-4N
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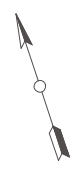
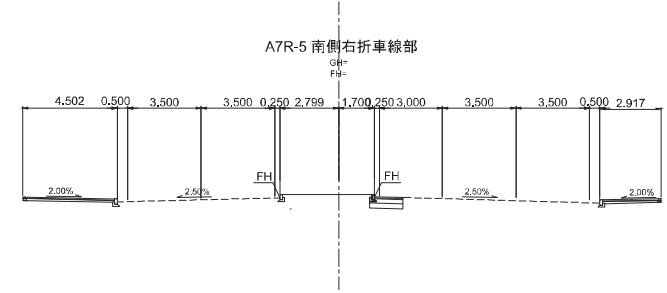
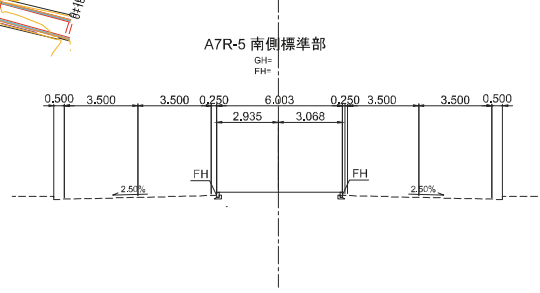
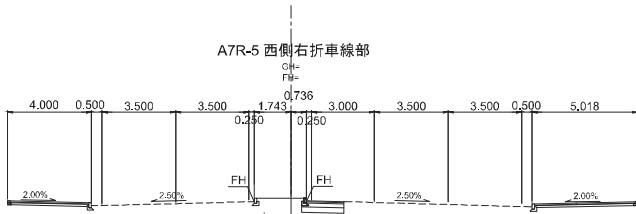
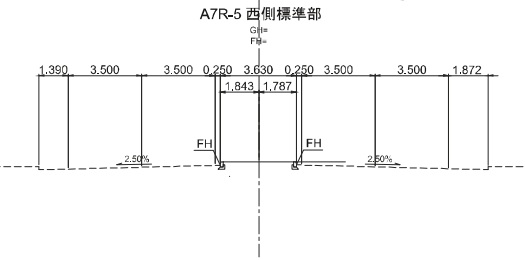
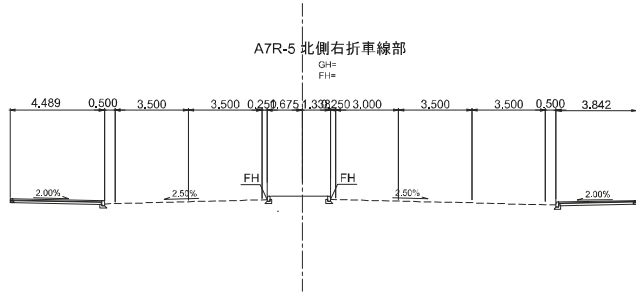
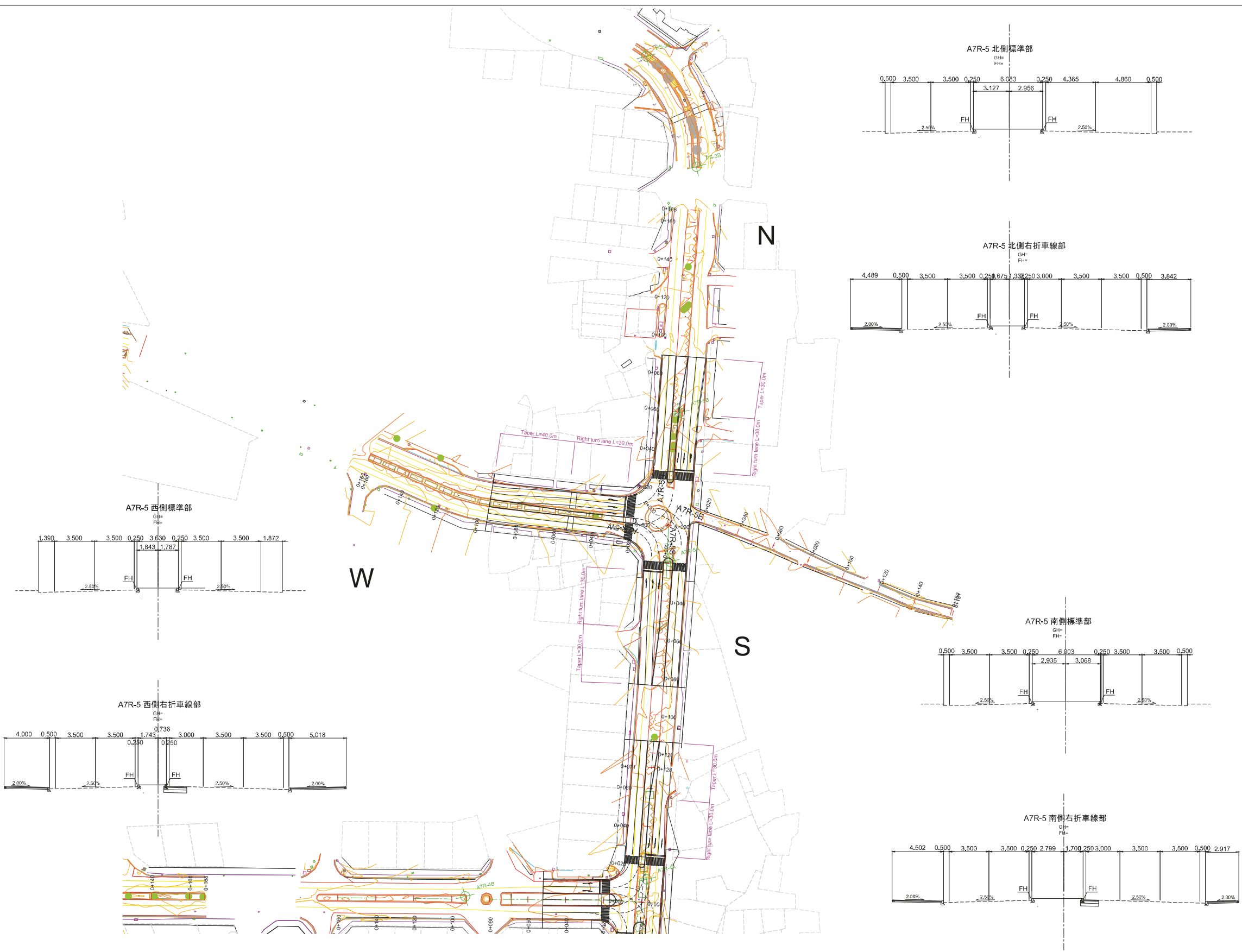


COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-4S	Drawing No.	PL-A7R-4S
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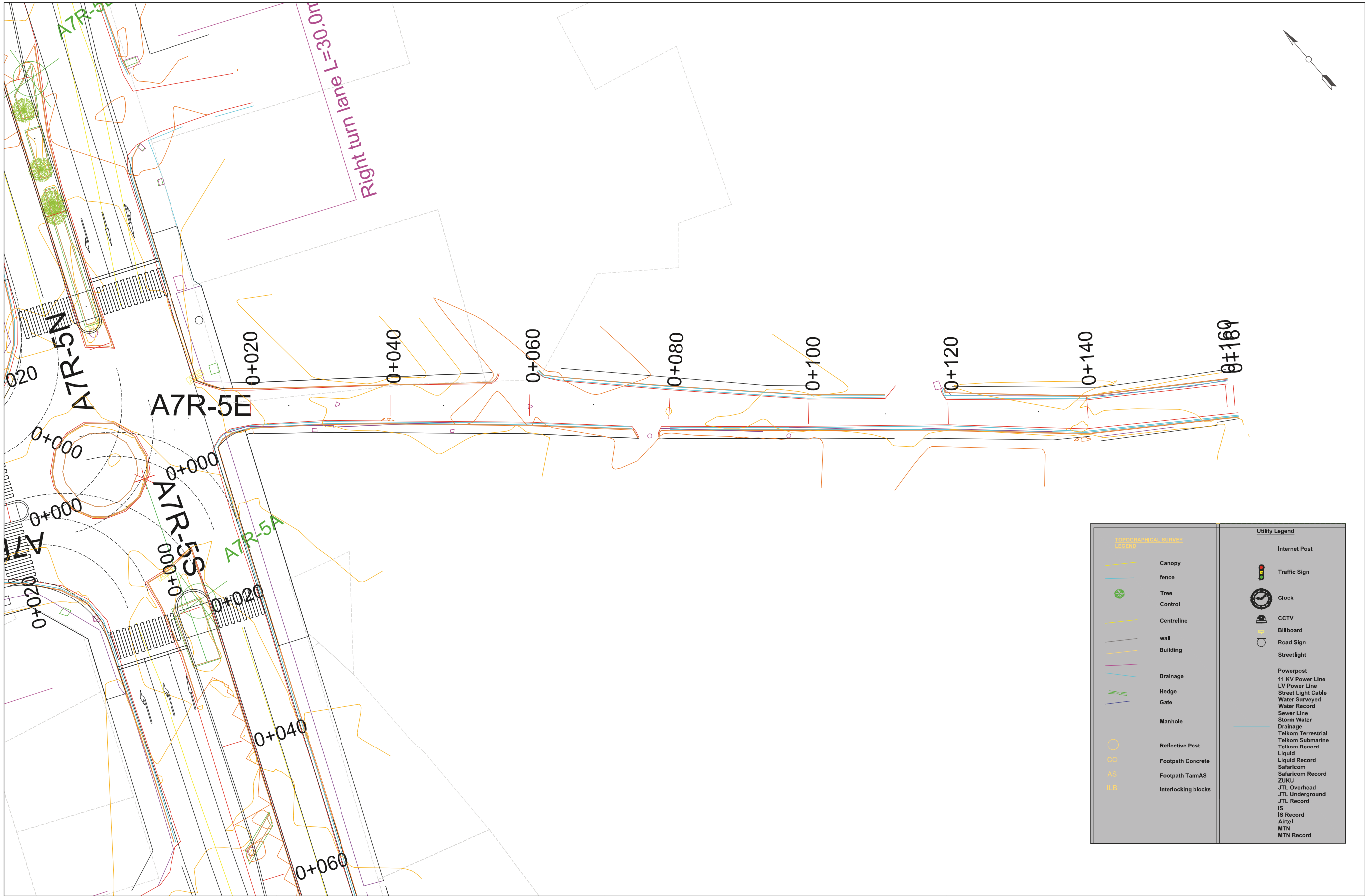


TOPOGRAPHICAL SUPPORT LEGEND		Utility Legend	
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	fence		Traffic Sign
	Tree		Clock
	Control		CCTV
	Centreline		Billboard
	wall		Road Sign
	Building		Streetlight
	Drainage		Powerpost
	Hedge		11 KV Power Line
	Gate		LV Power Line
	Manhole		Street Light Cable
	Reflective Post		Water Surveyed
	Footpath Concrete		Water Record
	Footpath TarmAS		Sewer Line
	Interlocking blocks		Storm Water
			Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid Record
			Safaricom
			Safaricom Record
			ZUKU
			JTL Overhead
			JTL Underground
			IS
			IS Record
			Airtel
			MTN
			MTN Record

COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-4W	Drawing No.	PL-A7R-4W
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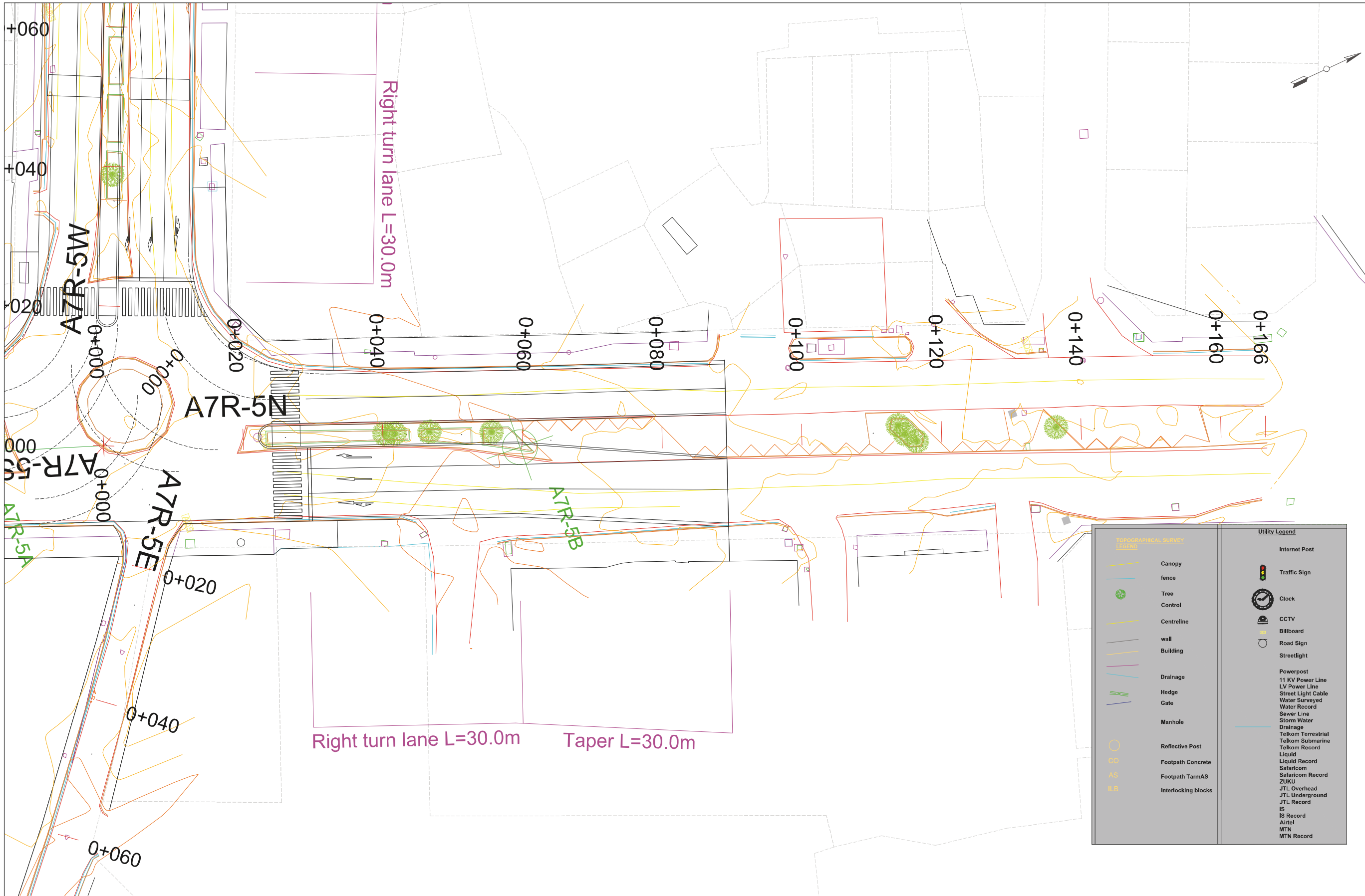


COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-5	Drawing No.	PL-A7R-5
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				DATE	



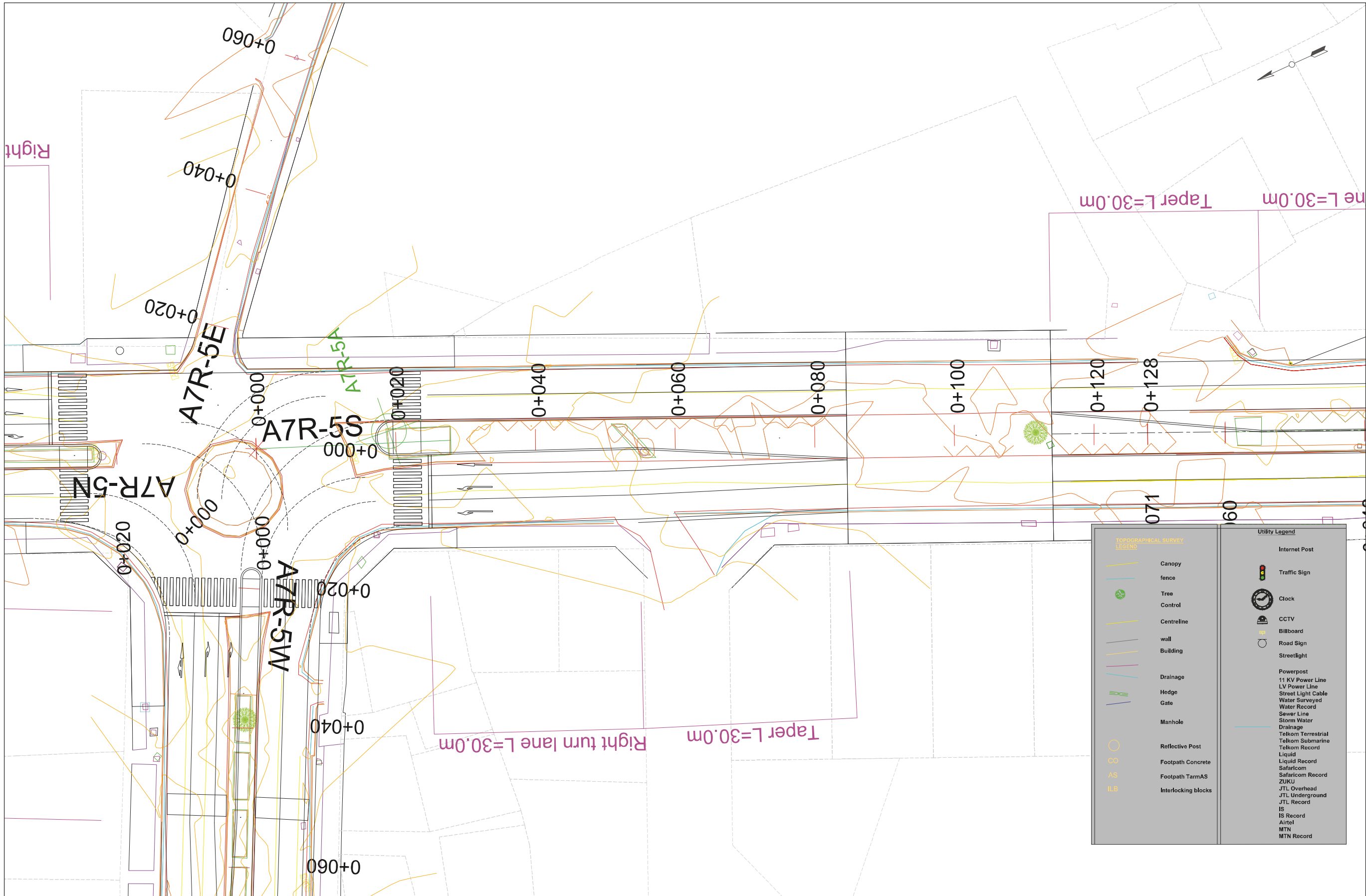
TOPOGRAHICAL SURVEY LEGEND		Utility Legend	
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	Tree		Clock
	Control		CCTV
	Centreline		Billboard
	wall		Road Sign
	Building		Streetlight
	Drainage		Powerpost
	Hedge		11 KV Power Line
	Gate		LV Power Line
	Manhole		Street Light Cable
	Reflective Post		Water Surveyed
	Footpath Concrete		Water Record
	Footpath TarmAS		Sewer Line
	Interlocking blocks		Storm Water
			Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid Record
			Safaricom
			Safaricom Record
			ZUKU
			JTL Overhead
			JTL Underground
			IS
			IS Record
			Airtel
			MTN
			MTN Record

COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-5E	Drawing No.	PL-A7R-5E
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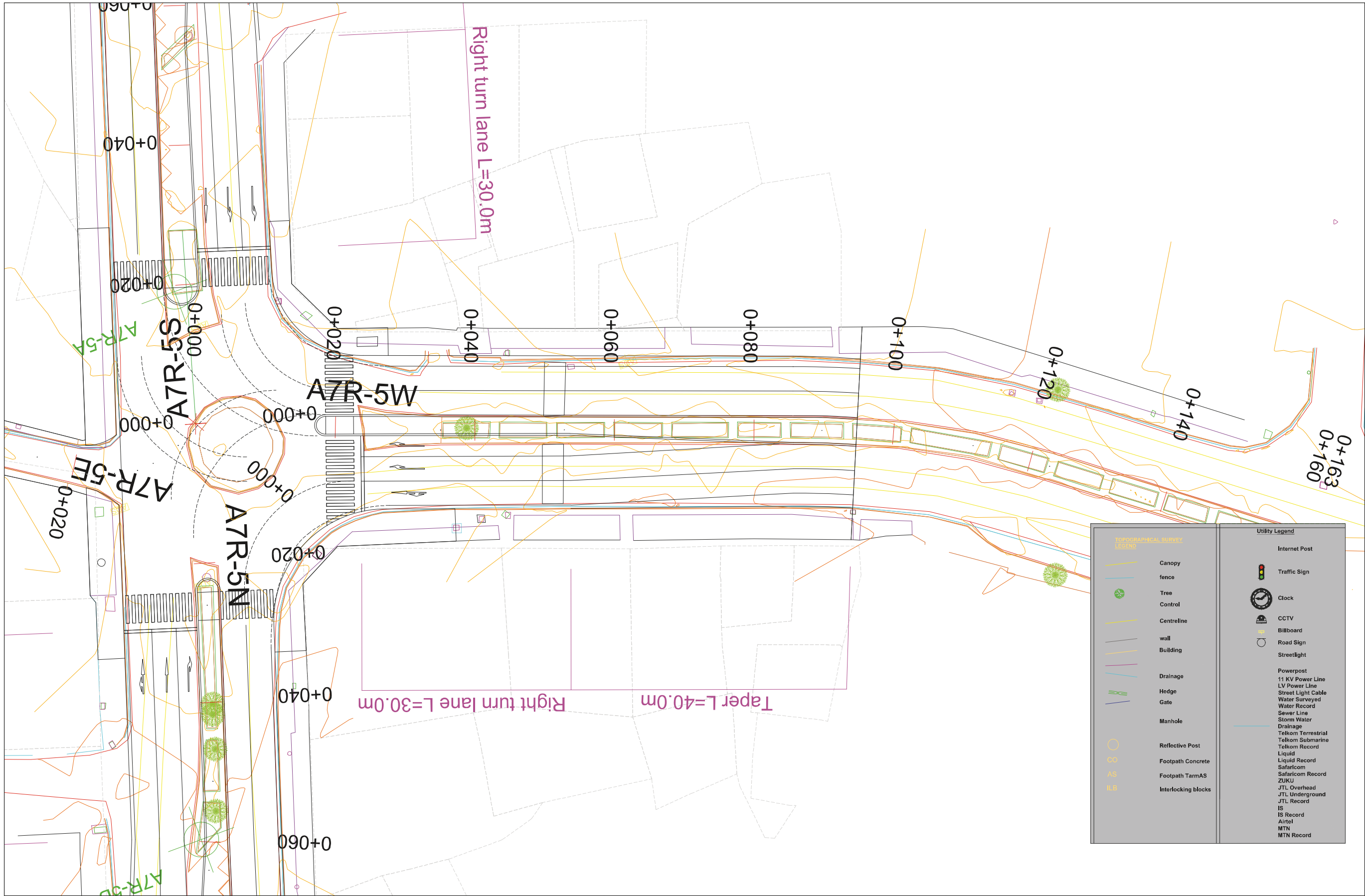


TOPOGRAPHICAL SUPPORT LEGEND		Utility Legend	
	Canopy		Internet Post
	fence		Traffic Sign
	Tree		Clock
	Control		CCTV
	Centreline		Billboard
	wall		Road Sign
	Building		Streetlight
	Drainage		Powerpost
	Hedge		11 KV Power Line
	Gate		LV Power Line
	Manhole		Street Light Cable
	Reflective Post		Water Surveyed
	Footpath Concrete		Water Record
	Footpath TarmAS		Sewer Line
	Interlocking blocks		Storm Water
			Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid Record
			Safaricom
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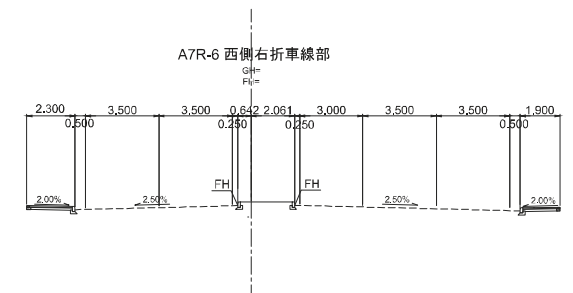
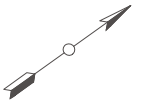
COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-5N	Drawing No.	PL-A7R-5N
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				DATE	



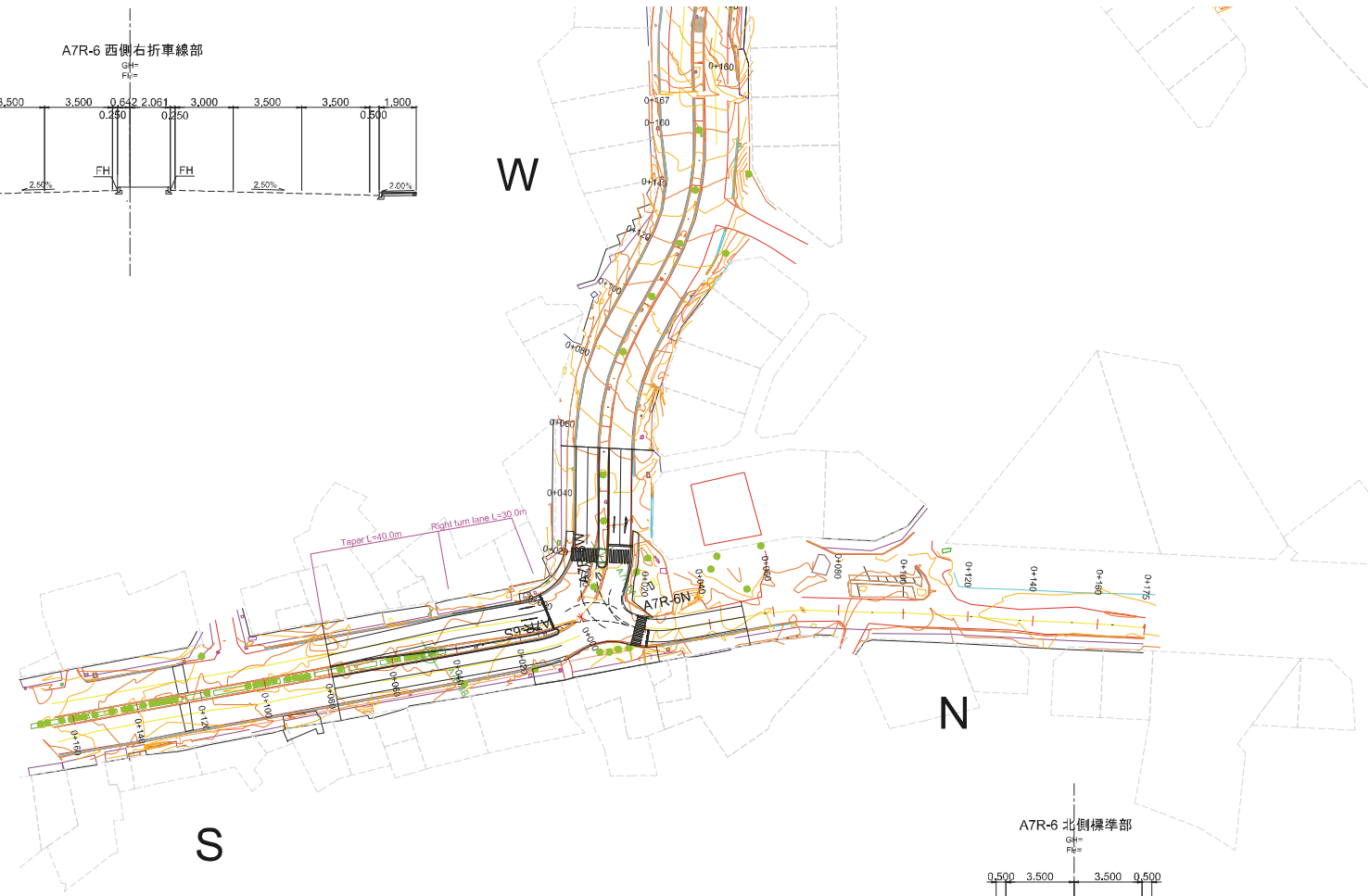
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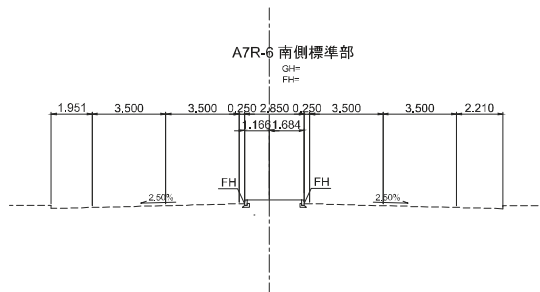
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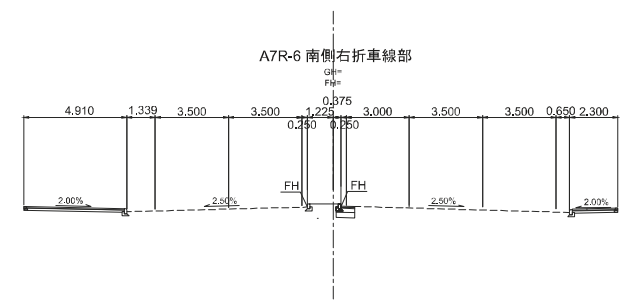
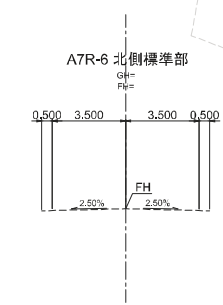
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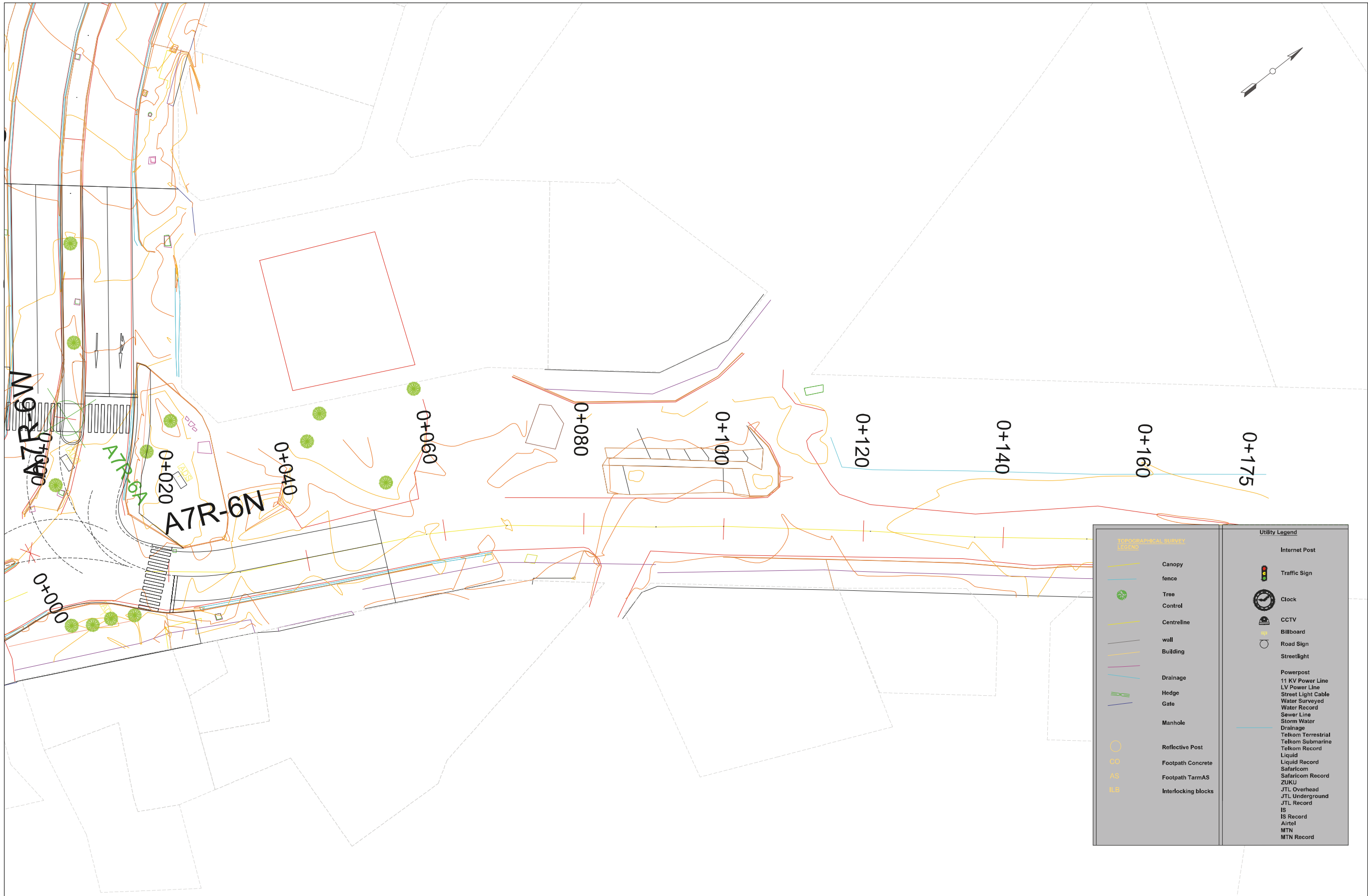
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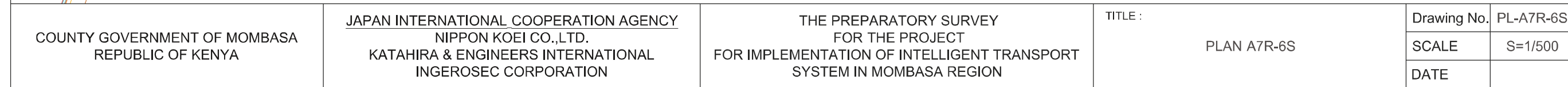


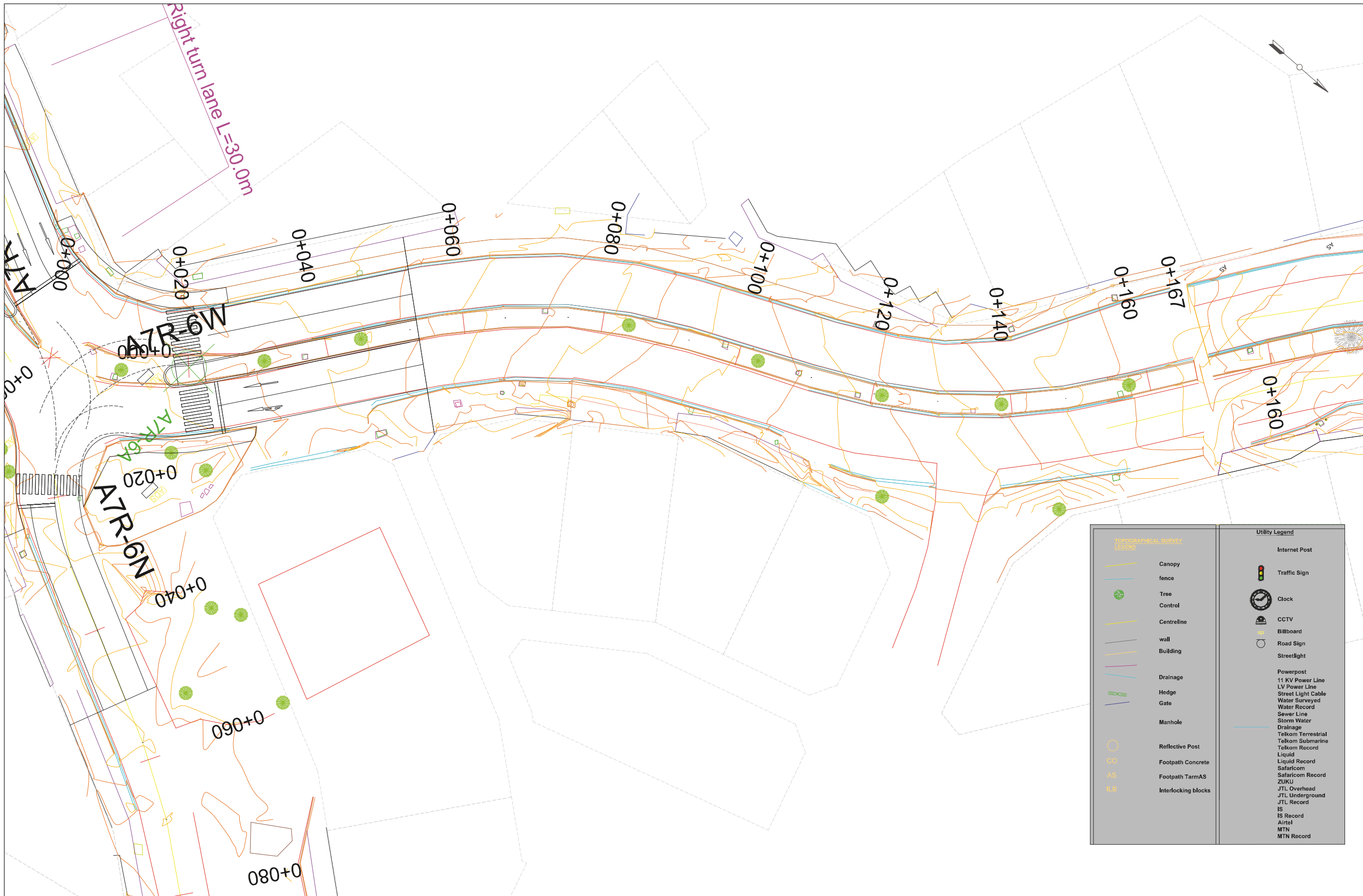
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				SCALE	S=1/2000
				DATE	



Topographical Survey Legend		Utility Legend	
	Canopy		Internet Post
	fence		Traffic Sign
	Tree		Clock
	Control		CCTV
	Centreline		Billboard
	wall		Road Sign
	Building		Streetlight
	Drainage		Powerpost
	Hedge		11 KV Power Line
	Gate		LV Power Line
	Manhole		Street Light Cable
	Reflective Post		Water Surveyed
	Footpath Concrete		Water Record
	Footpath TarmAS		Sewer Line
	Interlocking blocks		Storm Water
			Drainage
			Telkom Terrestrial
			Telkom Submarine
			Telkom Record
			Liquid Record
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			JTL Underground
			IS
			IS Record
			Airtel
			MTN
			MTN Record

COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-6E	Drawing No.	PL-A7R-6E
				SCALE	S=1/500
				DATE	





COUNTY GOVERNMENT OF MOMBASA REPUBLIC OF KENYA	JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI CO.,LTD. KATAHIRA & ENGINEERS INTERNATIONAL INGEROSEC CORPORATION	THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPLEMENTATION OF INTELLIGENT TRANSPORT SYSTEM IN MOMBASA REGION	TITLE : PLAN A7R-6W	Drawing No.	PL-A7R-6W
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