Road Development Corporation Limited
Republic of Maldives

Terms of Reference for
CONSULTANCY SERVICES FOR HA. IHAVANDHOO ROAD DEVELOPMENT PROJECT

1. BACKGROUND

Road Development Corporation Limited, an incorporated limited liability company operating under the registration number C10482019 and having its registered office at MSL Buildings, First Floor, Malé, Republic of Maldives (herein after called and referred to as "the Employer"), wishes to receive bids for the consultancy services for

- Preparation of Environmental Impact Assessment (EIA) for HA. Ihavandhoo Road Development project,
- Detailed surveying of HA. Ihavandhoo, and
- Designing of storm water management system in HA. Ihavandhoo.

2. SCOPE OF WORK

The Consultant will provide consultancy services for the preparation of EIA for HA. Ihavandhoo Road Development project, undertake the detailed surveying of HA. Ihavandhoo and design the storm water management system based on the surveying results and guidelines set by the Employer. The scope of individual works is specified as follows.

A. Consultancy services for preparation of EIA

The Consultant will have to provide consultancy services for preparation of EIA for HA. Ihavandhoo Road Development project, including the submission fees and all relevant data collection.

After the contract has been awarded and accepted, the scope of the EIA document and relevant data will be provided in the Environmental Protection Agency (EPA) Scoping meeting. This meeting will discuss the following topics.

- Project area
- Baseline studies
- Project details
- Description of the environment (impacts on the natural environment and impact assessment with proposed stormwater management system design)
- Removal and relocation of vegetation

- Legislative and regulatory considerations
- Potential impacts (Impact on traffic flow, environmental, socio-economic and socio-cultural impacts, etc…)
- Construction related hazards and risks
- Mitigation and management of negative impacts
- Alternatives to proposed project and areas
- Development of monitoring place
- Major stakeholder consultation
- Borrowing area for sand
- Potential sand bed jetty area for off-loading materials if required

B. Detailed surveys

The Consultant will undertake the detailed surveying of HA. Ihavandhoo.

Detailed surveys include geotechnical survey and hydrological survey required for the detailed design of the proposed roads and storm water management system. The surveys must be carried out as described below. The Consultant must include a detailed activity log of all site investigations.

Geotechnical survey

Geotechnical investigation must be done to determine the physical and mechanical properties of the soil using the tests detailed below.

1) Physical properties of soil
    a) Sieve analysis
2) Mechanical properties of soil
    a) Standard Compact test
    b) California Bearing Ratio test

The tests should be carried out following the guidelines described below.

Physical properties of soil

Sieve tests must be done to determine grain size of soil in an area. At least one sample must be taken from each road proposed for construction and depending on road length, multiple samples should be taken such that distance between the sampling points is not more than 200m. For every sieve test, the gradation curve must be plotted, and Coefficient Curvature (Cc) and Coefficient of Uniformity (Cu) must be determined. Well graded soils should show Cc in the range 1 to 3 and Cu higher than 6. All sieve analysis tests can be performed on disturbed samples and soil sample must be taken100mm below the ground surface. If D60 of soil sample is more than 5mm, then the subgrade sand in that area must be sieved to remove all large soil particles, and the area backfilled with sieved sand.

Mechanical properties of soil

Standard Compaction tests and California Bearing Ratio tests must be conducted on soil samples taken from each road proposed for construction and depending on road length, multiple samples should be taken such that distance between the sampling points is not more than 200m. Standard Compaction Tests must be conducted to determine Maximum Dry Density (MDD) of soil and Optimum Moisture Content (OMC) of soil. These tests can be done in the laboratory on disturbed soil samples taken from 100mm below ground surface.

California Bearing Ratio (CBR) tests must be done to determine the stiffness of the subgrade soil. These tests must be done on undisturbed samples on actual ground. CBR tests should be done on every road proposed for construction and depending on road length, multiple samples should be taken such that distance between the sampling points is not more than 200m. The top 100mm soil must be removed prior to performing this test. If the CBR obtained is less than 20%, then a 2nd test must be performed 3m away from the initially tested location. If the 2nd CBR is still less than 20%, then the soil must be considered too soft for pavement construction and a subgrade stabilization method must be proposed. Most common subgrade stabilization method is to remove the soft soil and backfill with a well graded sand.

Hydrological Survey

For the hydrological survey, the Consultant shall:

- undertake literature review of existing studies undertaken for HA. Ihavandhoo inclusive of historical and current rainfall data for the region, any historical and current data on flooding associated with storm surges, any existing hydrological surveys,
- carry out studies to determine soil percolation rate and infiltration rate,
- develop flood risk maps for HA. Ihavandhoo based on the survey data, and
- carry out the assessment of the current groundwater conditions including level and quality of the ground water.

C. Designing of storm water management system in HA. Ihavandhoo

The Consultant shall design the storm water management system as per Employer's proposed method. The Employer has proposed the following storm water management method.

The proposed stormwater system consists of catchpits interconnected with each other by gravity storm water **200 mm and 300 mm UPVC pipelines** as seen in Figure 1. The water will flow from the catch pits via gravity storm water lines to the pump well where the storm water will be pumped out to the sea via an HDPE outfall line. The pump well will be equipped with two pumps with the panel board. Furthermore, a trench is proposed to be installed between the existing island and reclaimed land.

However, the Consultant can propose an alternative to the aforementioned method, given that the design of the storm water management system will be in compliance with the guidelines set by Ministry of National Planning, Housing and Infrastructure (attached to the TOR) and within the Employer's allocated budget.

Construction cost of the proposed storm water management system should not exceed the Employer's allocated budget for the storm water management component of the project. The winning party will be informed of the budget.

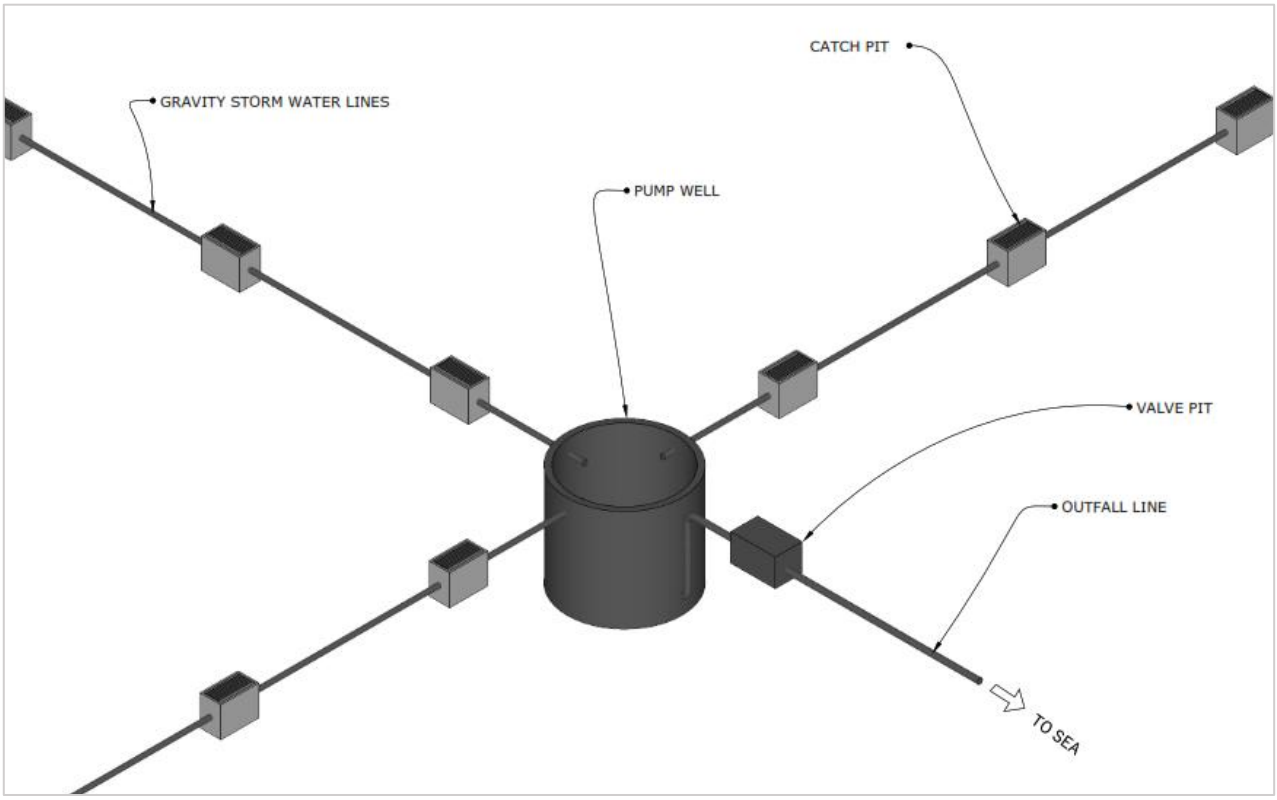


Figure 1: Employer's proposed storm water system

The Consultant shall design stormwater management system for the roads of HA. Ihavandhoo listed in Table 1. For the map of HA. Ihavandhoo and the proposed roads for developed, refer to the map attached to the TOR. The overall responsibility and scope of work of the design consultant shall include, but are not limited to:

- Detailed design of the storm water management system of HA. Ihavandhoo
- Technical coordination of project activities related to the design of storm water management system in HA. Ihavandhoo
- Manage, monitor and evaluate works related to the design
- Act as the representative of the Employer within the specified scope
- Review and verify that correct engineering practices were used in the design while ensuring the designs meet the needs and standards as per the attached design guideline for storm water drainage systems

- Review all available data to facilitate proper engineering designs such as topographic survey, geotechnical survey, hydrological survey, environmental impact assessment report, etc…, required for the design of the storm water management system
- Preparation of final design reports which includes
    - Relevant technical information
    - specifications
    - calculations and analysis reports
    - material cost of the Consultant's proposed storm water management system and
    - drawings including but not limited to
        - construction drawings (storm water plans and all structural components with calculations)
        - cross-sectional elevations such as catchpit invert levels, pipe inverts, distance between catch pits (refer to sample drawing attached)
    - construction methodologies
    - Maintenance manual for stormwater management system

  for the purposes of execution of the works.

Table 1: Proposed roads to be developed under HA. Ihavandhoo Road Development project

No.	Road Name	Length (m)
1	Ameenee Magu	236.04
2	Ameenee Magu	472.07
3	Orchid Magu	547.00
4	Ahmadhee Aabaadhu	161.00
5	Sosun Magu	450.60
6	Zamaanee Hingun	547.18
7	Jubulee Goalhi	96.56
8	Fenumeeru Hingun	96.00
9	Nooraanee Magu	531.00
10	Hussain Adam Hingun	209.20
11	Badharu Magu	482.80

3. EVALUATION CRITERIA

The submitted responsive bids will be evaluated under the following criteria.

Educational Qualification certificates along with Project Completion Certificates must be submitted for validation.

#	Criteria	Weightage %
1	Price	30%
2	Experience & Qualification	70%

The evaluation will be conducted in two stages, which are Technical Evaluation stage and Financial Evaluation stage. The details of the evaluation of the two stages are as follows.

Stage 1: Technical Evaluation – Experience & Qualification requirements for Consultancy (70%)

The objective of this stage is to evaluate the technical qualification of the bidders in terms of experience & qualification.

#	Criteria for Technical Evaluation	Weightage (%) for the total score
1	Education qualification	35%
2	Experience	35%

Bidders who achieve 45% and higher out of 70% in this stage, will be qualified for the Financial Evaluation stage. Any bidder who does not achieve minimum 45% in this stage, those bids will not be considered for further evaluation. The evaluation for this stage will be done by awarding points based on following categories.

To provide the top-level performance of the assigned task(s), the Consultant shall utilise qualified staff (key personnel as well as support staff) and shall contribute to the preparation, testing, and amendments till the reports are approved from all relevant authorities.

All specialists shall be certified professionals in their respective fields and will have to submit their certificates and CVs for validation. Furthermore, the bidder/staff involved in the design of storm water management system must have approved storm water management system designs in their engineering portfolio.

Completion letters for similar nature projects will be accepted for both Company and for the individual key expert. **Maximum three project completion letters will be considered from**

each previous private sector client of the Company/Individual key expert. All government project completion letters will be considered. Completion letters for similar nature projects will have to be addressed either to the Company or the individual key expert stating the nature of works undertaken, contract value **(minimum MVR 150,000)**, duration/time period the project was completed.

The Consultant should utilize the following personnel.

Consultants	Qualification & Experience Requirements	No.	Educational Qualification	Project Experience
			35%	35%
			Master's Degree (7 marks) Bachelor's Degree (4 marks)	Completed similar nature projects (Each project 1 mark, max. 5 projects)
Key Experts			**35 Marks**	**25 Marks**
Team Leader / Project Manager	• 3 years of experience in subject field • Degree/Master's Degree in Construction Management/Project Management/Civil Engineering related profession.	1		
Structural engineer	• 3 years of experience in subject field • Degree/Master's degree in civil/Structural engineering • Familiar with the design of drainage structures • MNHPI Licensed Engineer	1		
Geotechnical engineer	• 3 years of experience in subject field. • Degree/Master's in Civil Engineering/ Geotechnical Engineering	1		
Environmental / Hydrological specialist	• 3 years of experience in subject field • Must be an EPA registered consultant	1		
	• 3 years of experience in subject field	1		

Urban drainage specialist / engineer	• Degree/Master's degree in civil/water/environmental engineering • Familiar with the design of drainage structures			
Non-key Experts			**NA**	**10 Marks**
Draftsperson	• 3 years of experience in subject field • Diploma in Architecture • Considerable knowledge of AutoCAD	1		
Surveyors, Surveying assistants	• 3 years of experience in subject field	1		
TOTAL MARKS			**70 Marks**	

Stage 2: Financial Evaluation (30%)

The objective of this stage is to evaluate and compare the proposed bid prices of the bidders. Only those bidders who achieved 45% points and higher out of points in the technical evaluation stage will be considered for evaluation under this stage.

In calculating the score under this criterion, the party quoting the lowest Price will get the maximum points allocated under this criterion and the points for the remaining bidders will be distributed on a pro rata basis in descending order.

The formula thus used for the computation of the score is as follows:

$$\text{Price Score} = \frac{\text{Lowest proposed total price from among the bids received}}{\text{Particular Bidder's proposed total price}} \times (30\%)$$

4. EMPLOYER'S CONTRIBUTION

The Employer will grant access to all available materials which may be required by the Consultant to perform their services such as the following materials.

- Topography survey report of HA. Ihavandhoo
- Design levels of the roads to be developed under this project

5. DURATION OF THE ASSIGNMENT

Expected duration of the consultant assignment is **45 days**.

6. CONSULTANT'S REPORTING OBLIGATIONS

The Consultant shall submit the following reports for approval. Every report should be up to industry standards and should be accompanied by softcopies of all raw files such as AutoCAD files, storm water models, high resolution pictures, etc…, in a CD.

All survey reports should include Title Page, Table of Contents, Executive Summary, Background and Objectives, Methodology, Results, Conclusion and Recommendations, and Appendices.

Deliverables	Submission Date	Language
Environmental Impact Assessment Report	Within **30** calendar days from the commencement date	English
Hydrological survey report	Within **30** calendar days from the commencement date	English
Geotechnical survey report	Within **30** calendar days from the commencement date	English
Storm water management system concept report, excluding calculations	Within **15** calendar days from the commencement date	English
Storm water management system final design report, including detailed calculations, (stormwater network, pumpstations, pumps, panel, all structural elements and any others that may be needed for the approval of the stormwater design report)	Within **15** calendar days from the approval of Hydrological and Geotechnical reports	English

DESIGN GUIDELINE FOR STORMWATER DRAINAGE SYSTEMS

VER 1.0

1ST FEBRUARY 2021

1. SCOPE

These guidelines cover aspects that need to be considered when planning and implementing stormwater drainage projects for existing residential areas and developing communities. A stormwater drainage system should be aimed at providing the following

1. Control the quantity of run-off by
    a. Supporting the management of flood risk
    b. Maintaining and protecting the natural water cycle
2. Manage the quality of runoff to prevent pollution
3. Create and sustain better places for people
4. Create and sustain better places for nature

The developed drainage system should consist of achieving the following targets

1. Use surface water runoff as a resource
2. Support the management of flood risk in the receiving catchment
3. Protect morphology and ecology in receiving surface waters
4. Preserve and protect hydrological systems on the site
5. Drain the site effectively
6. Manage on site flood risk
7. Prioritise infiltration as much as possible

The stormwater management system maybe constructed along with new road development projects or before a road development project.

2. GENERAL DESIGN PARAMETERS

2.1 Recurrence Interval

All storm water management systems should be designed for a recurrence interval of 1 in 5 years. If the site considered is extremely sensitive to flooding, an alternative recurrence interval maybe used after discussing with Client.

2.2 Extent of storm water management system

The storm water management system should be designed to cover all flood prone areas of an island. The flood prone locations should be confirmed by Topographical survey of the island and based on information provided by the Island Council.

2.3 Concept design

Once the flood prone areas are identified, a concept design must be made in accordance with guidelines given in Section 1. The concept design must consist of the following

a. Layout map of the island indicating the location of any mechanical pumping systems
b. Layout map of the island indicating flood prone areas verified by island council and topographic survey
c. Proposed discharge locations including sea outfall
d. Public buildings in the island including mosques, schools, health centers and council office
e. Short design report explaining the proposed stormwater management system

f. Sample details of catchpits, collection chambers and any other hard structures proposed for the stormwater management system
g. Same drawing of any pump stations proposed indicating the type of pump proposed

2.4 Detail Design

Detail design submission should consist of a design report, supporting drawings and calculations. All 3 components should be based on section 2.5 to 2.11 described below. The detail design report or drawings should not contain any sample drawings or sketches. All content reported should be for actual site conditions and should be prepared for a ready-for-construction state.

2.5 Design Storm

All design storm intensities and durations should be based on IFD curves produced for the event. The IFD curve should be developed from 20-year rainfall data obtained from weather data obtained from nearest weather station. Currently long-term weather data is available from Hanimaadhoo, Hulhule, Kaadehdhoo and Gan station.

2.6 Stormwater management by Infiltration

For design purposes, up to 30% of the total rainfall runoff can be assumed to be managed by infiltration to ground. The ground infiltration rate should be determined based on tests carried out as described in Section A of this report. In densely populated areas, ground infiltration should not be used as a means to remove run off water. In such areas, run off water should be removed through a conveyance network and pumped off by mechanical means.

2.7 Network design method

Commonly used stormwater design methods such as Rational Method, Modified Rational Method or other methods maybe used. The designer should explain why the particular method was used and should include a 1 page summary of how the method is applied to this project.

2.8 Drainage Catchments

A minimum of 2 catchments must be used to effectively remove stormwater runoff from flood prone areas of the island. Series of collection pits maybe used along the side of the road to collect runoff water and transport it to a common discharge point or pumping station (PS). UPVC pipes of minimum 200mm diameter maybe used to convey the collected runoff water to the discharge point or pumping station (PS) via gravity flow. All UPVC pipes used for stormwater conveyance should be Grey in colour and should have a minimum Nominal Stress grade of 4 MPa (SN4) and a maximum Standard Diameter Ratio of 41 (SDR41). Any pipes placed under road carriage way should have a minimum cover of 600mm. The pipes should be sloped to ensure a minimum self-cleansing velocity of 0.6 m/s. Maximum invert depth of gravity pipes should be 2.5m from Natural Ground level (NGL). Pipes used for gravity flow should be push fit connection type pipes and installation should be done to ensure there is no ground water infiltration into the pipes. All gravity pipe should be connected from chamber to chamber without any bends, so that jetting hose can be inserted easily for cleaning the pipe. All pipes must have a label based on the catchment they are located in. The catchments should be designed and sized such that most of the runoff water will be removed in 30 minutes after a storm.

2.9 Collection pits and chambers

All collection pits and chambers made from concrete should be reinforced. Concrete grade and cover to reinforcement should be selected based on design durability of the structures, but design life should not be less than 20 years. HDPE or UPVC chambers are also acceptable, provided that they are suitable for use in stormwater drainage projects. All covers used for chambers should have easy lifting mechanism and should not be made excessively heavy. Any chamber or pit placed in carriageway must have vehicle grade cover. All collection pits and chambers must have a label based on the catchment they are located in.

2.10 Pumping Station

Pump stations (PS) maybe used to discharge collected run-off water via pressure pipes. Pump stations maybe placed in the carriage way but emphasis should be given to keep them in empty plots located near the center of the catchment. Pump stations should not be placed near schools, mosques, health centers or other buildings where people may congregate or visit often. All pump stations must have minimum 2 pumps with 1 working and 1 duty pump, and they should alternate operation in successive cycles. Minimum 1m must be maintained from lowest invert level of inlet pipe to base of pumping station. The pump station could be made from reinforced concrete or a package type pump station could be used. If RC type pump station is used, all internal surfaces must be covered by a FRP coating of 125 microns. Maximum excavation depth of PS should be 3.7m from NGL.

The working volume of the PS should be adjusted such that pumps will not have more than 6 start – stop cycles per hour. Discharge rates of pumps should not be more than 40 l/s. Pumps must be controlled by float switches or ultrasonic level sensors and the controllers must be fixed in a panel board. Panel board should be kept under shed protected from direct sunlight or rain, and the shed should have a sufficient awning to cover the panel board even when the panel board door is open. Dry mount or submersible pumps maybe used in the PS but they should be explosion proof grade, to avoid damage by dry run. Where dry mount pumps are used, the pumps should be kept in sheltered space and made free from damage by vandalism. Where submersible pumps are used, the impeller blade should be cutter type and all components of the pump should be cast iron with fiber coating or SS 316 grade steel. Where pump weight exceeds 25kg, pump lifting stand with pulley arrangement must be provided. The lifting stand should have easy assembling and dissembling mechanism.

Discharge from the pumps must be controlled by valve chamber and each outlet pipe from the pump must have a gate valve and a swing check valve. All discharge pressure pipes must be HDPE black pipe and should have minimum nominal diameter (ND) of 90mm. Pipe should have a maximum SDR of 17 with minimum PE 100 and PN 10 rating. All pump station covers and valve chamber covers should have easy lifting mechanism and should not be excessively heavy. Flow velocity in the pipe should be in the range of 2m/s to 4m/s when flowing full bore. All pump station design and drawing should mention the duty point of the pumps used in the pump station.

Starting current of all pump motors should be controlled as Direct on-line (DOL), Star Delta or Variable Frequency Drive (VFD) based on the power demand. Single Line Diagram (SLD) and Control Wiring Diagram should be designed, stamped and attached to the Detail Design report. All utility service providers require a kWh meter to be installed in the panel board and so this should be included in the design and installed in the panel board accordingly.

2.11 Discharge outfalls

Where storm water is discharged to environmentally sensitive areas such as wetlands, care must be taken to reduce the possibility of discharging pollutants to the waterbody as much as possible. Suitable mechanisms should be incorporated to remove grease, oil and dirt from the water as much possible and also to reduce the velocity with which the pumped runoff water enters the waterbody. The outfall should be secured to the ground and well protected against any sort of vandalism.

Where stormwater is discharged into the sea, care must be taken to discharge them further away from the shoreline such that the discharged waste will not flow back to the shoreline. Minimum 160mm OD HDPE black pipe with a thickness ratio of 11 (SDR 11) and minimum PE 100 and PN16 rating must be used. The pipe should be secured by RC anchor blocks which should be designed as two halves fixed around the pipe and bolted together. OPC maybe used to cast these blocks and bitumen coating should be applied on all surfaces of the block. Bolts and nuts used to tighten the block should be SS 316 grade steel. Unless confirmed by site specific measurements, the outfall anchor blocks must be designed to independently withstand waves of Hs = 1.8m. The center to center spacing of these blocks should not exceed 3m.

Under all conditions, the discharge location of an outfall must be confirmed based on an EIA.

2.12 Drawings

All drawings submitted at detail design stage should be clearly presented and made self-explanatory. A layout map showing the full island, all catchments, pump stations and outfall must be presented in the beginning. Following the layout map, each catchment layout must be shown on a separate page. Details of the proposed drainage system can be presented thereafter. All drawings must be properly scaled and neatly presented to fit A3 size paper. As mentioned in Section 2.4, all drawings given in detail design stage must be reflect actual working drawings and not sample drawings.

2.13 Calculations

Hydraulic and Hydrologic software maybe used to perform the analysis and design of stormwater drainage system. Calculations for the first 100m on any selected catchment must be shown in detail to show how important design input parameters such as rainfall intensity (i), wetted tributary area (A), time of concentration (Tc), time of entry (Te) and time of flow (Tf) are selected. These calculations should also show how the pipe diameter, slope and invert levels allow to maintain the minimum cleansing velocity inside the pipe. The calculations should show how much water is flowing out as final discharge and show that all runoff water is removed in 30 minutes.

3. MAINTENANCE CONSIDERATIONS

The stormwater drainage network should be designed with full consideration for maintenance. As stormwater travels in the pipes, sediment deposition can take place over time which could

block the pipes and bring the system to a halt. Hence, adequate measures must be given in the design to enable cleaning of the pipes via a jetting hose.

SECTION A – GROUND INFILTRATION TEST

Infiltration test must be done at least on 3 locations in each catchment. The locations selected must give a good representation of the drainage characteristics of the soil in the catchment area. All locations selected to perform the infiltration test must be shown on a map and submitted with the detail design report. The infiltration test should be carried out as follows

1. Soak the area where the infiltration test is to be carried out until the sand is fully saturated.
2. Cut a 150mm long pipe section from a 100mm dia pvc pipe.
3. Provide a mark on the inside of the pipe at about 20mm below the top. This mark should be labelled as “A”
4. Provide a second mark 50mm below mark “A” and label this second mark as “B”.
5. Provide a third mark 50mm below mark “B” and label this third mark as “C”.
6. Place the pipe vertically up on the ground and tap on it using a wodden stick until the base of the pipe is firmly embedded in the ground. The arrangement should be as shown below.

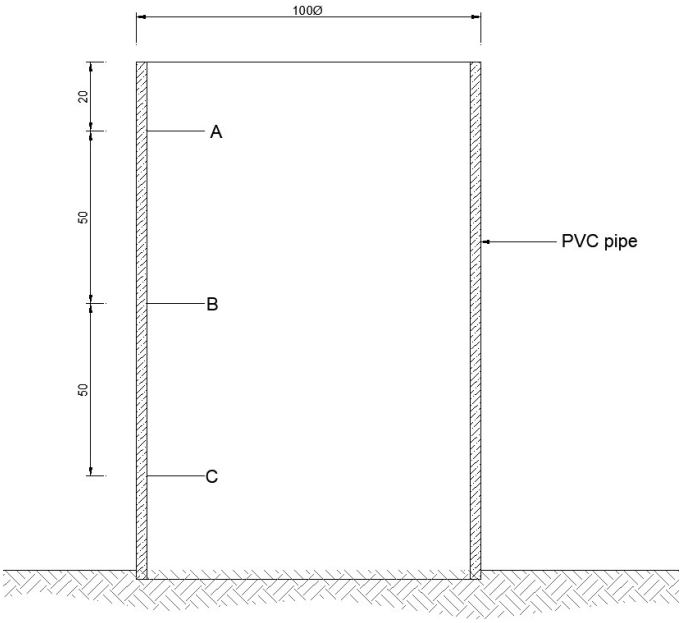
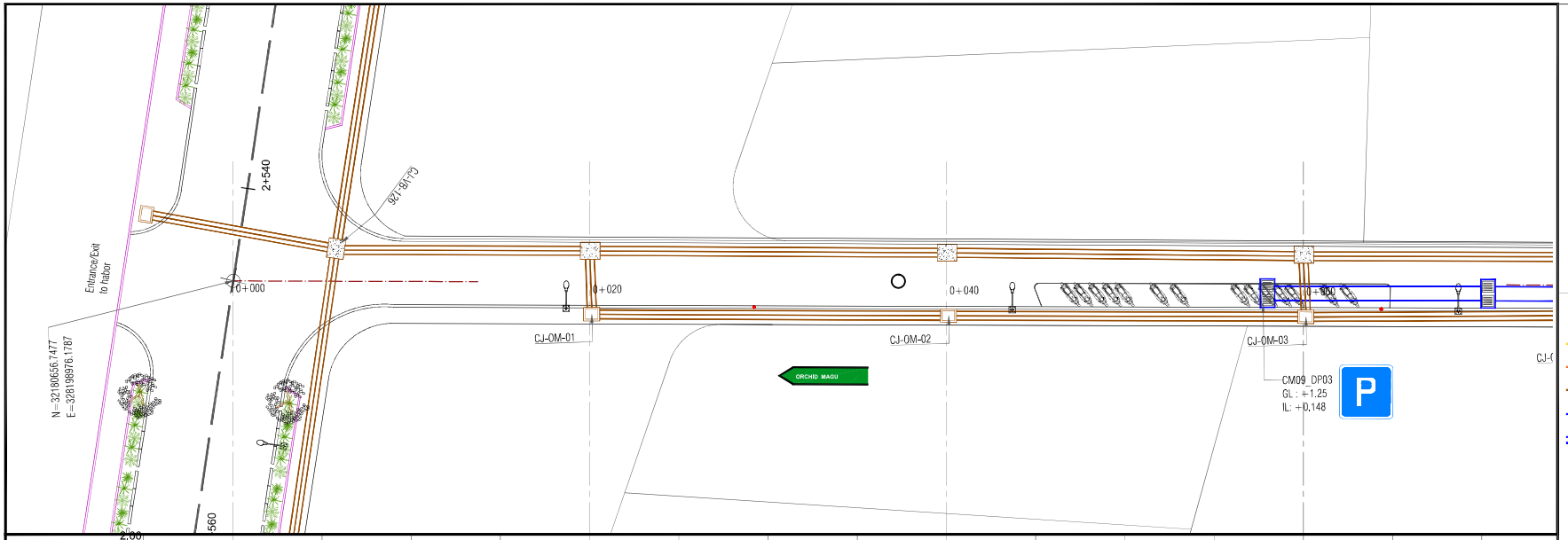
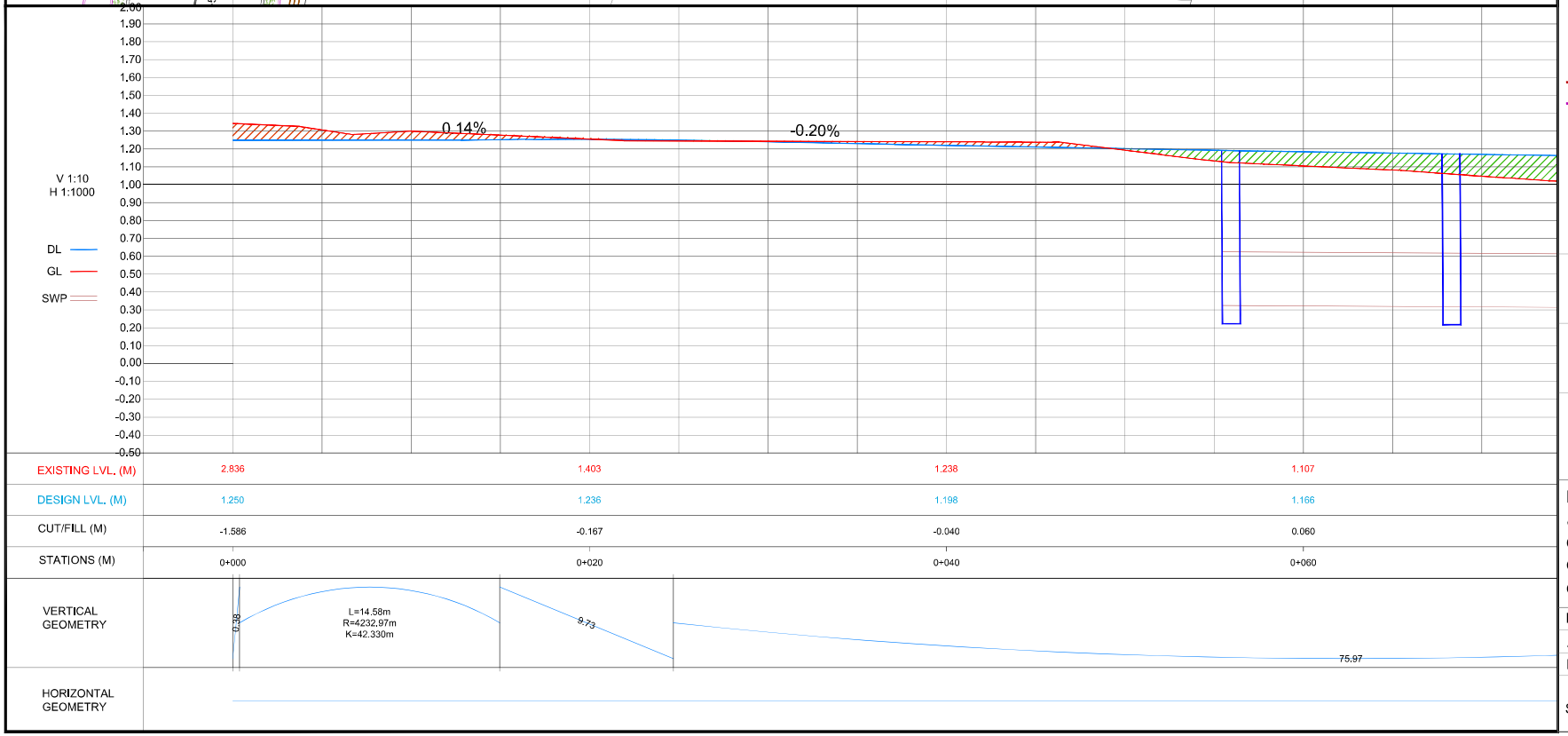


Figure 1: Infiltration test setup arrangement

7. Fill the pipe with water until the water just spills from the top.
8. Wait for the water level to drop to mark A and then start the stop watch. Record the time taken for water level to drop from mark A to B and then from B to C. The average of this time is the approximate ground infiltration rate in mm/minute of the soil in the tested area.
9. Use the value obtained in (8) to determine how much runoff water can be removed by ground infiltration. As mentioned in section 2.6, at most only 30% of the total runoff water should be considered as water removed by infiltration.





EXISTING LVL. (M)	2.836	1.403	1.238	1.107
DESIGN LVL. (M)	1.250	1.236	1.198	1.166
CUT/FILL (M)	-1.586	-0.167	-0.040	0.060
STATIONS (M)	0+000	0+020	0+040	0+060

VERTICAL GEOMETRY

HORIZONTAL GEOMETRY

ROAD DEVELOPMENT COOPORATION

ORCHID MAGU
MALE'

LEGENDS:

- Ø250MM HDPE PIPE
- Ø225MM HDPE PIPE
- Ø150MM PVC PIPE
- Ø315MM HDPE PIPE
- CULVERT
- CABLE JUNCTION
- STORMWATER CATCH PIT
- PUMP STATION
- EXISTING SEWER MANHOLES
- EXISTING WATER JUNCTIONS
- EXISTING D-BORDS
- CURBSTONES
- CONCRETE KEY
- SLOPED PAVEMENT
- PAVEMENT
- SPEED BREAKER
- GRASS BLOCK
- GREEN ZONES

PROJECT:

DESIGN & BUILD OF G.DH GADHDHOO MAJOR ROADS

CLIENT:

MINISTRY OF NATIONAL PLANNING, HOUSING & INFRASTRUCTURE

ORCHID MAGU

DRAWING TITLE:

PHASE:

- ○ CONCEPT DESIGN
- ○ DESIGN DEVELOPMENT
- ◉ FOR CONSTRUCTION
- ○ AS BUILD DRAWINGS

DRAWN BY	SHIYAZ
APPROVED BY	ALI ZAMEER
DATE: October 2018	PAGE NO:
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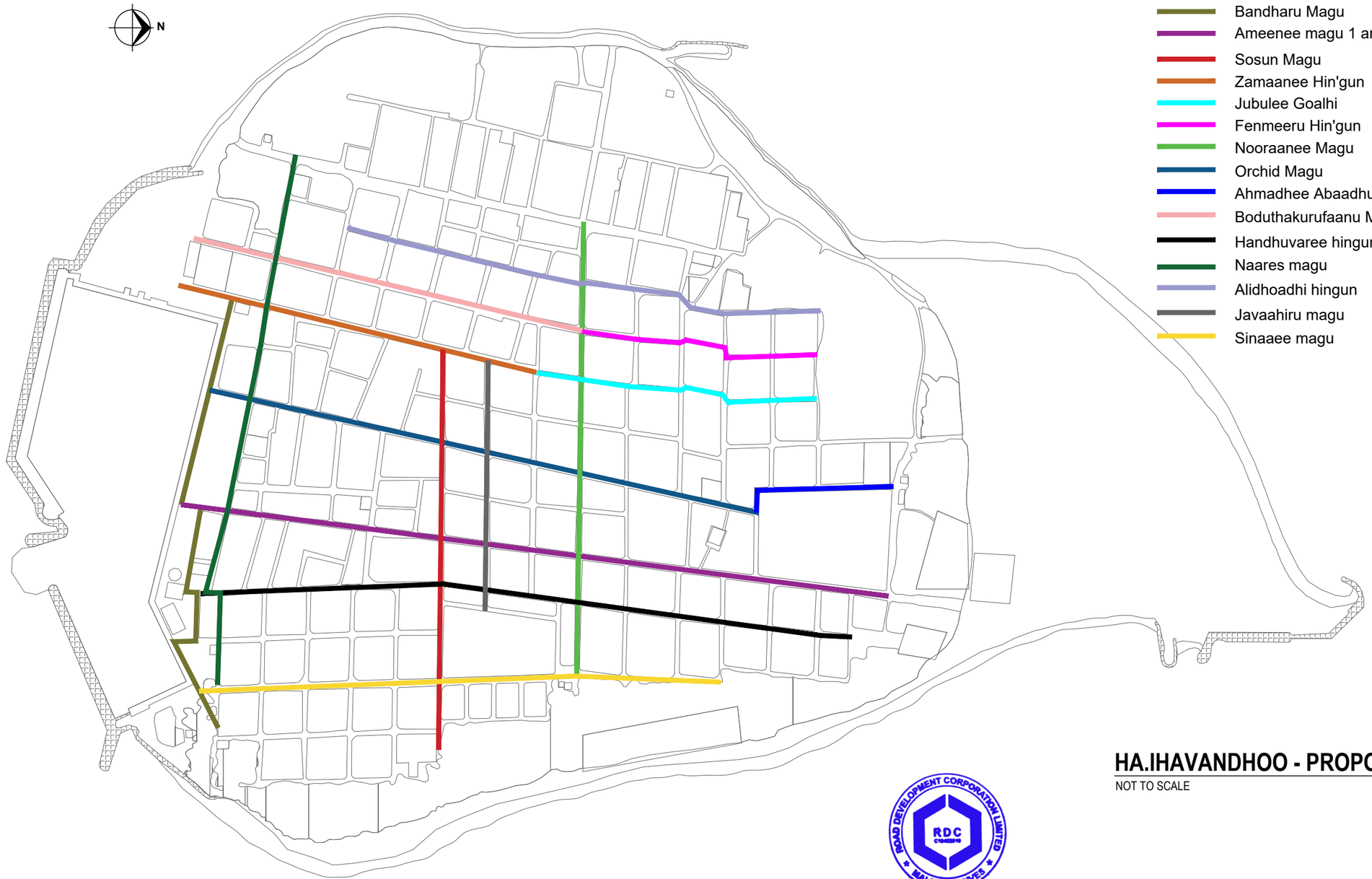

	Road Name	Road length (m)
	Bandharu Magu	535
	Ameenee magu 1 and 2	246 + 492
	Sosun Magu	421.70
	Zamaanee Hin'gun	387
	Jubulee Goalhi	307
	Fenmeeru Hin'gun	261
	Nooraanee Magu	474
	Orchid Magu	595
	Ahmadhee Abaadhu	173
	Boduthakurufaanu Magu	426
	Handhuvaree hingun	700
	Naares magu	586
	Alidhoadhi hingun	517
	Javaahiru magu	266
	Sinaaee magu	558

HA.IHAVANDHOO - PROPOSED ROADS

NOT TO SCALE

PROJECT: DESIGN & BUILD OF HA.IHAVANDHOO MAJOR ROADS

CLIENT:	**CONTRACTOR**:	**DRAWING TITLE:**		
MINISTRY OF NATIONAL PLANNING & INFRASTRUCTURE AMEENEE MAGU, MALE' REPUBLIC OF MALDIVES	ROAD DEVELOPMENT CORPORATION LTD. ORCHID MAGU, MAAFANNU, MALE' REPUBLIC OF MALDIVES	**PROPOSED ROADS**	RDC C 10482019	DRAWN BY: AHMED IRFAN APPROVED BY:ALI ZAMEER PROJECT NO: DRAWING NO: 01 SCALE: 1:100 DATE:DECEMBER 2022