

Uganda Programme for Sustainable and Inclusive Development of the Economy (UPSIDE)



Northern Uganda Resilience Initiative (NURI)

Rural Infrastructure Manual

**Government of Uganda
Danida**

Version no.

4

28/11/2019

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List of Acronyms

| Abb. | Full text |
|-------------|---|
| BOQ | Bill of Quantity |
| CAO | Chief Administrative Officer |
| CAR | Community Access Road |
| CF | NURI Coordination Function |
| CfW | Cash-for-Work |
| CRRF | Comprehensive Refugee Response Framework |
| CSA | Climate Smart Agriculture |
| Danida | Danish International Development Assistance |
| DAR3 | Development Assistance to Refugee Hosting Areas, Phase III |
| DKK | Danish Kroner |
| DLG | District Local Government |
| DRC | Danish Refugee Council |
| DSA | Daily Subsistence Allowance |
| DTPC | District Technical Planning Committee |
| FG | Farmer Groups |
| FPO | Focal Point Officer (for NURI in the District Local Governments) |
| IA | Infrastructure Assistant |
| IP | Implementing Partner |
| LC1/3/5 | Local Council 1/3/5 |
| M&E | Monitoring and Evaluation |
| MOW | Ministry of Works |
| NURI | Northern Uganda Resilience Initiative |
| OPM | Office of the Prime Minister |
| PDP | Parish Development Plan |
| PMC | Project Management Committee |
| PRDP | Peace Recovery and Development Plan for Northern Uganda |
| RALNUC3 | Restoration of Agricultural Livelihoods in Northern Uganda, Phase III |
| RDE | Royal Danish Embassy |
| RDNUC | Recovery and Development of Northern Uganda Component of U-Growth II |
| RWC | Refugee Welfare Council |
| SDP | Sub-county Development Plan |
| SRHR | Sexual and Reproductive Health and Rights |
| UNHCR | United Nations High Commissioner For Refugees |
| UPSIDE | Uganda Programme for Sustainable Inclusive Development |
| Ushs | Ugandan Shillings |
| VSLA | Village Savings and Loan Association |
| WRM | Water Resource Management |

Chapter 1: Introduction

1.1 Background

NURI (Northern Uganda Resilience Initiative) is one of eight development engagements under the Denmark-Uganda Country Programme 2018 – 2022. The Country Programme aims to contribute to poverty reduction through inclusive and sustainable economic growth, promoting democracy, good governance and human rights and support Uganda's stabilizing role in the region.

The Country Program is divided into two Thematic Objectives; UPSIDE (Uganda Programme for Sustainable and Inclusive Development of the Economy) and UPGRADE (Uganda Programme for Governance, Rights, Accountability and Democracy)

NURI is one of the three Development Engagements under UPSIDE and contributes to the objective of sustainable and inclusive economic growth.

The objective of NURI at outcome level is enhanced resilience and equitable economic development in supported areas of Northern Uganda, including for refugees and refugee-hosting communities. NURI will pursue this objective by supporting activities in climate smart agriculture, rural infrastructure, and water resources management. Activities in support of agriculture focus on improving farmers' knowledge on climate-smart production methods, as well as their understanding of and ability to engage with markets and services. Support to rural infrastructure and water resource management are in those areas that contribute to agriculture sector outcomes, particularly access to markets and improving water resource management within the landscape.

In order to support Uganda's progressive refugee policy and the nexus between development and humanitarian action, refugees and their host communities will be among the beneficiaries in those NURI districts hosting refugee settlements.

To engage some of the major challenges facing Uganda's economy today including the impacts of climate change, rapid population growth, gender inequality and youth unemployment, NURI will strategically focus on Climate Smart Agriculture (CSA), Rural Infrastructure (RI) and Water Resource Management (WRM) as well as participation and empowerment of women and youth, and improving access to and information on Sexual and Reproductive Health and Rights (SRHR) services.

1.2 Purpose and scope of the manual

The purpose of this manual is to provide guidelines for the implementation of the strategic intervention for Rural Infrastructure in participating districts, host communities and refugee settlements.

These guidelines are aimed at staff of implementing partner, DRC, and the participating District Local Governments, OPM and UNHCR. It is based on the Management Manual, which contains the general guidelines used for implementation of NURI.

Other manuals of relevance for this intervention are:

- M&E Manual
- DRC Operational Handbook
- Refugee Management Policy guidelines and documents

Other reference materials are:

- MOW - District Road Works Manuals Vol. 1-5 (a total of 20 manuals)
- MOW - Community Access Planning Manual
- ILO – Manual for Supervision of Labour Based Road Rehabilitation Works
- Comprehensive Refugee Response Framework (CRRF)
- Resilience Design Manuals and resources.

1.3 Content of the manual

In Chapter 2 the various involved stakeholders are presented and their main tasks and responsibilities described.

In Chapter 3 the implementation strategies for the infrastructure projects are described.

Chapters 4, 5, 6 and 7 contain Infrastructure Investment Planning process, infrastructure implementation plan, infrastructure construction, and the infrastructure maintenance plans.

Chapter 8 describes monitoring and quality assurance, while Chapter 9 describes record keeping.

Some of the standard designs, forms and formats used are shown in the annexes and they are all available in soft copies.

1.4 Distribution and maintenance of the manual

This manual is distributed to the stakeholders mentioned in Section 2. A complete distribution list is maintained by DRC.

DRC is responsible for updating the manual, which will be reviewed by NURI-CF and approved by the Royal Danish Embassy (RDE).

Chapter 2: Stakeholders

The Infrastructure component of NURI is based on small scale community based rural infrastructures that can be created by labour intensive approach and maintained through mobilization of host community and refugees. While closely following the needs of these communities during selecting the types of infrastructure and their usefulness, it is also important to ensure that the created assets are part of Parish, Sub-county and District plans to ensure the sustainability and ownership of the infrastructures. The projects selected should follow the standards set by the District and national government for the rural infrastructure project. To ensure this, the following stakeholders will have key role in the project, and the roles of each stakeholder are described below.

2.1 The NURI Coordination Function

The NURI Coordination Function oversees and coordinates the implementation of NURI. The CF is headed by the Program Management Advisor. The CF has M&E Coordinator, who is based in Kampala, will coordinate M&E activities in NURI. The CF's first point of contact are the NURI Regional Coordinators, who are based in Arua, Moyo and Kitgum. The Coordination Function has the power to approve adjustments in annual work plans and budgets. The Coordination Function carries out continuous monitoring and chairs coordination between implementing partners of the wider program.

2.2 Danish Refugee Council (DRC)

The implementing agency, Danish Refugee Council, will directly implement the Rural infrastructure component and Water Resource Management of NURI interventions. The Danish Refugee Council has its Country Office in Kampala and Regional Offices located in Arua, Adjumani and Kitgum.

The staff who are directly involved in the implementation of the infrastructure projects are:

- Project Manager
- Project Engineer
- Project Water Engineer

- Finance and Administration Coordinator
- Regional Managers/Project Manager-Project Support
- Supervising Engineers/Shelter and Infrastructure Officer
- Finance Officers
- Supply Chain Officers
- Infrastructure Supervisors/Team Leader-Shelter and Infrastructure
- Engineering Assistants/Shelter and Infrastructure Assistants-Engineering
- Infrastructure Assistants/Shelter and Infrastructure Assistants-Public Works
- Assistant Hydrologists (Wash Assistant)
- HR and Administrative Officers
- Finance Assistants
- Supply Chain Assistants
- Environment/Forest Assistants
- MEAL Officer
- MEAL-Assistants

The main tasks for DRC are:

- Assist the host community and refugees, and the DLG with selection of public works projects from the parish / sub county development plans
- Cost the infrastructure projects and prepare a list of proposed projects for the DTPC's, OPM and UNHCR approval
- Prepare agreements for the approved projects and ensure plans for maintenance are included in project plans
- Organise training for Project Management Committees and later project user committees
- Establish the need for tools and materials for procurement
- Procure and issue tools and materials to the projects
- Pay cash to those who have completed the work cycles
- Prepare Bill of Quantities for infrastructure projects
- Construct simple culvert installations
- Run tenders for required services for infrastructure projects
- Supervise the public works and infrastructure projects (together with the District Technical Team) and ensure training of local contractors
- Provide allowances and fuel for DLG/OPM/RWC'S quarterly monitoring and supervision of public works and infrastructure projects
- Prepare progress reports
- Organise the commissioning and hand over of the projects
- Follow up and Monitor maintenance of created assets

2.4 District Local Government

The District Council and the District Executive Committee have the overall responsibility for supervising NURI in the districts where the programmes are being implemented. Also to ensure that created assets are maintained with some taken up by DLG. The District Local Governments and OPM are responsible for quarterly monitoring visits as further specified in section 10 of the Management Manual.

The District Technical Planning Committee (DTPC)

The District Technical Planning Committee (DTPC) and OPM (in the case of settlement-based activities) shall function as a District Steering Committee for NURI for the infrastructure projects. The DTPC and OPM will:

- Review NURI investment plans and budgets and ensure that they are integrated with and included in the district development plans.
- Review progress reports
- Approve the investment plans (selected infrastructure projects)

In each district, the CAO shall assign a Focal Point Officer of NURI. For NURI in the Refugee settlement. The roles of the Focal Point Officers are described in section 3.4 of the Management Manual.

The District Technical Departments

The District Technical Departments of each District (Engineering, Forestry, Water, Environment, and Production as applicable) will also support the implementation of the program with the following roles:

- Oversee identification of infrastructure projects
- Technical screening of infrastructure projects
- Support preparation of the project cost and presentation to DTPC for approval
- Provide resource persons to train PMCs
- Supervision and quality assurance of the infrastructure projects
- Provide technical backstopping to IP
- Support training of local contractors on labour-based methods
- Train road and water user committees in maintenance of CARs, protected springs and water-ponds
- Participate in commissioning and hand over of projects
- Design review of complex structures identified during screening together with DRC engineering team

The Office of the Prime Minister (OPM)

- Oversee identification of Infrastructure projects in refugee settlements

- Participate in the approval of Investment plan
- Participate in conflict resolutions in the settlement and host community in liaison with local councils.
- Participate in Joint quarterly monitoring of the projects
- Participate in commissioning and hand over of projects

The Sub-County Local Government

The program will also be monitored by the lower local Government, which in line with decentralization policy shall:

- Promote the smooth implementation of the program through facilitating community entry and project site land access
- Linking DRC with existing community groups eligible to take part in cash-for-work
- Be key actors in identification and selection of infrastructure projects
- Participate in monitoring & supervision of the projects
- Mediate any issues arising over implementation in communities
- Own and lead maintenance of infrastructure projects commissioned to the District and Sub-County

Refugee Welfare Council (RWC)

The program will also be monitored by the RWC in the refugee settlement jointly with sub county authorities, which is in line with decentralization policy shall:

- Promote the smooth implementation of the project through facilitating community entry and project site land access in the refugee settlement
- Linking DRC with existing refugee groups eligible to take part in cash-for-work
- Be key actors in identification and selection of infrastructure in the refugee settlements
- Participate in monitoring of the projects
- Mediate any issues arising over implementation in refugee settlements. Issues related to land will be addressed by OPM as lead.

2.5 Project Management Committees

For each infrastructure project or sub-project, a Project Management Committee (PMC) is formed. It has 4 members who are elected among the group members. At least 2 of the PMC members should be women.

The members of the PMC serve as work foremen for the members who are working on a project. Before the project starts the PMC will receive training in the technical work and the administrative procedures.

The main tasks for the PMC are:

- Prepare detailed plan for the project
- Receive and handle tools and materials
- Organise and supervise work
- Maintain attendance register
- Support the payment of cash to the members of the community groups
- Hand over tools to the Project User committee at end of project in the presence of lower local government and/or RWC.
- Ensure compliance with law related to cash for work (refer to DRC SOP on cash for work)

2.6 Host Community and Refugee Groups

Host Community and refugees living in the project areas in West-Nile and Acholi region shall be formed to constitute the target groups of NURI rural infrastructure project implementation. The program will also encourage eligible existing host community and refugee groups to enrol in the implementation of the labour-intensive infrastructure. The main tasks of the community groups in relation to rural infrastructure implementation are:

- Establish leadership to mobilise farmers and coordinate activities
- Work on rural infrastructure projects to earn cash
- Demonstrate commitment to carry out maintenance on created/renovated infrastructure

Chapter 3: Implementation Strategy

A well-functioning rural infrastructure is important for facilitating and supporting increased agricultural production and marketing. Off-farm employment is also necessary for increasing the resilience of farming communities. The aim of the strategic intervention for rural infrastructure is therefore *to improve the agriculturally related rural infrastructure using a labour-intensive approach*.

The employment effect is expected to be approximately One Million and Eighty Thousand (792,000) work days for members of the local host community and refugees.

The intervention is divided into two outputs:

1. Prioritised infrastructure investment plans approved
2. Approved infrastructure projects implemented

The budget ceilings for rural infrastructure and expected no. of work days in the all the districts (The budget for Terego is within the mother district of Arua, Rhino camp and Imvepi Refugee Settlements) are:

| District | Budget (mill. UGX) | Workdays |
|----------------------------|-----------------------|----------------|
| Districts | | |
| Agago | 1,854,882,682 | 64,830 |
| Kitgum | 1,380,721,057 | 48,257 |
| Lamwo | 1,915,232,110 | 66,938 |
| Nebbi | 1,435,639,752 | 50,176 |
| Pakwach | 1,110,656,881 | 38,819 |
| Zombo | 1,428,359,732 | 49,922 |
| Arua | 5,160,009,269 | 180,344 |
| Moyo | 931,497,326 | 32,556 |
| Obongi | 325,138,088 | 11,364 |
| Adjumani | 1,162,600,949 | 40,633 |
| Koboko | 2,158,705,077 | 65,837 |
| Sub-total | 18,863,442,923 | 649,676 |
| Refugee Settlements | | |
| Palabek | 686,029,708 | 23,977 |
| Rhino Camp | 2,757,086,805 | 96,361 |
| Palorinya | 3,222,571,338 | 112,630 |
| Adjumani | 1,317,763,927 | 46,056 |
| Imvepi | 1,846,984,412 | 29,930 |
| Subtotal | 9,830,436,190 | 308,954 |

Total **28,693,879,113** **958,630**

The budget allocations per district is only for actual investments costs which include:

- Participants payments (cash for work)
- Training of PMCs
- Tools and Equipment
- Materials
- Watering and Compaction
- Structures (culverts, VIP latrines, etc.)
- The DLG technical supervision
- OPM/RWC monitoring for refugees

The budgets are tentative as they can be affected both positive and negative by changes in the exchange rate between DKK and UGX.

In this chapter the guiding principles and strategies for the implementation of the intervention is described.

3.1 Agricultural related rural infrastructure

The infrastructure that is targeted in this intervention should be located in the rural areas and directly supporting or enabling agricultural production and marketing. Also taking into consideration that the infrastructure should be constructed and maintained using a labour intensive approach the following types of infrastructure can be included under this intervention:

- Community access roads
- Market places
- Water ponds for animals
- Protected springs
- Food Forests

Other types of infrastructure can still be considered but a special justification has to be prepared and the project should fulfil the selection criteria listed in Section 3.2. However, large infrastructure projects cannot be funded (e.g. trunk roads, large bridges, private investments etc.).

Community Access Roads

Community Access Roads (CAR) is the lowest level of roads in a district and although important to the communities they have for economic reasons to be quite basic in their construction.

NURI can construct new CARs and renovate CARs, which includes clearing and shaping the road. Additionally, NURI will have some selected road links gravelled and also have some district roads going through the settlements rehabilitated. Bottlenecks that require simple culverts can also be handled. More complex structure like drifts or box culverts can only be included in exceptional cases.

For more detailed descriptions of CARs see Annexes 1, 2 and 3.

Market Places

NURI will mainly be involved in Rehabilitation of existing market places and can only support grade C. Grade D markets have been phased out however Grade D markets in 2020 approved investment plans can be implemented. The Rehabilitation can include construction of a VIP latrine and gate houses funds allowing.

For more detailed descriptions of market places see Annexes 4 and 5.

Water Ponds for Animals

NURI may also construct water ponds for watering animals. For more details of water ponds see Annex 6.

Protected springs

NURI can also undertake protection of water springs as part of agricultural related rural infrastructure. These are described in detail in Annex 7

Food Forests

Although Food Forests are not infrastructure as such they can also be supported where the DLG/OPM/RWC has a special interest in that. They are described in Annex 8.

3.2 Rural infrastructure projects

Construction or rehabilitation of rural infrastructure (see section 3.1) constitutes a rural infrastructure project.

Here are some examples of projects:

Construction projects

1. Construction of a 7 km community access road where there was only a track before. The necessary culvert installations are part of the project. As part of the project the involved communities will be sensitised about maintenance and the traditional organisation of maintenance supported.
2. Construction of a protected spring and establishing and training a user committee that will be responsible for its maintenance.

Rehabilitation projects

1. Rehabilitation of a market place that was established 5 years ago. The project includes construction of a fence and building of a VIP latrine.
2. Rehabilitation of a 4 km community access road that was constructed 5 years ago. The road will be reshaped and culverts that are broken down will be repaired and new relief culverts constructed. As part of the project the involved communities will be sensitised about maintenance and the traditional organisation of maintenance strengthened.
3. An 8 km community access road that was constructed two years ago is partly overgrown and some culverts are clogged with mud. The vegetation on the road will be cleared and where necessary the road will be reshaped. The culverts will be cleaned. As part of the project the involved communities will be sensitised about maintenance and the traditional organisation of maintenance strengthened.

Only Food Forests will have support for maintenance in the second season. For other types of infrastructure, the involved communities will be sensitised about maintenance and plans for future maintenance will be organised with the necessary training provided.

For administrative purposes a project may be broken down in sub-projects, which are each managed by its own project management committee.

3.3 Preparation of investment plans

The preparation of infrastructure investment plans per district is phased:

| Schedule of Preparation of Investment Plans | | | | |
|--|---|---------------------|---------------------|---------------------|
| SN | District | 2019 | 2020 | 2021 |
| 1 | Arua, Terego, Imvepi & Rhino camp Settlements | 1/6/2019-30/11/2019 | 1/7/2020-30/09/2020 | 1/7/2021-30/09/2021 |
| 2 | Madi Okollo & Rhino camp Settlement | 1/6/2019-30/11/2019 | 1/7/2020-30/09/2020 | |
| 3 | Nebbi | 1/6/2019-30/11/2019 | 1/7/2020-30/09/2020 | |
| 4 | Zombo | | 1/1/2020-30/06- | |

| | | | | |
|----|---------------------------------------|---------------------|-------------------------|---------------------|
| | | | 09/2020 | |
| 5 | Pakwach | | 1/1/2020-30/06-09/2020 | 1/7/2021-30/09/2021 |
| 6 | Adjumani & Settlements | 1/6/2019-30/11/2019 | 1/7/2020-30/09/2020 | 1/7/2021-30/09/2021 |
| 7 | Obongi & Palorinya refugee settlement | | 1/1/2020-30/06-09/2020 | 1/7/2021-30/09/2021 |
| 8 | Moyo | | 1/1/2020-30/06-09/2020 | |
| 9 | Kitgum | 1/6/2019-30/11/19 | 1/7/2020-30/09/2020 | 1/7/2021-30/09/2021 |
| 10 | Lamwo and Settlements | 1/6/2019-30/11/2019 | 1/7/2020-30/09/2020 | 1/7/2021-30/06/2021 |
| 11 | Agago | | 1/1/2020-30/06-09/2020 | |
| 12 | Koboko | | 1/06/2020-30/06-09/2020 | 1/7/2021-30/06/2021 |

The main activities in preparation of infrastructure investment plans are:

1. Review and update PDPs and SDPs
2. Screen projects based on selection criteria
3. Cost projects
4. Prioritise projects and compile investment plan
5. Present the plan for approval to the DTPC/OPM/UNHCR

These activities are described in detail in Chapter 4.

The selection criteria used in activity 2 are:

- The projects should be included in the parish or sub-county development plans.
- The selected projects should include maintenance aspects, functionality and sustainability of the selected infrastructure.
- The projects should be implemented using labour intensive methods in order to create employment for the farming communities, host community and refugees.
- The projects should target providing employment to the youth, women and to the extent possible, the other vulnerable groups in the host community and refugees settlements.
- The majority of the projects should support agricultural development e.g. open up community access roads so that the farmers can transport their produce to the market.
- The projects should be fairly spread over the district/refugee settlements but based on needs.
- The projects should be able to involve users of the project who live nearby, e.g. along a road.

- The projects should be feasible (e.g. there should not be too many bottlenecks on a community access road as there are limited funds for this purpose)
- The land/site where the project will be implemented should be free of encumbrances e.g. land dispute / conflict. This should be one of the issues that should be confirmed during project screening / site visits.
- The target community should reaffirm their interest in the project and confirm that the project is their idea/priority.
- The selection criteria should ensure compliance with environmental and social safeguards. Where environmental and social issues are identified, adequate mitigation measures within the scope/mandate of the project may be considered

Costing of the projects should be based on the following principles:

1. The participants from the host community and refugees should be paid UGX 6,000 per day.
2. The standard costs for PMC training, tools, materials, compaction and structures included in the annexes should be used. Modifications to plans and budget should be done at this stage if it can already be established that the structures require extra materials and works. If these adjustments are not made at this initial stage, there will be risk of cost overruns that makes it impossible to implement the investment plan.
3. Include standard cost for maintenance sensitisation and training (see section 3.6)

When it comes to prioritization and compilation of the plan the total district cost for DLG/ OPM facilitation 1.5% and a contingency of 5% should be included. In case the buffer is not used additional projects can be selected later

The investment plans should be reviewed annually and revised if necessary.

3.4 Preparation of Implementation Plans

The implementation of infrastructure projects in the districts is phased:

| Schedule of Infrastructure Implementation Plans | | | | |
|---|---|---------------------|---------------------|---------------------|
| SN | District | 2020 | 2021 | 2022 |
| 1 | Arua, Tergo, Imvepi & Rhino camp Settlement | 1/1/2020-30/12/2020 | 1/1/2021-30/12/2021 | 1/1/2022-30/12/2022 |
| 2 | Madi Okollo & Rhino camp Settlement | 1/1/2020-30/12/2020 | 1/1/2021-30/12/2021 | |
| 3 | Nebbi | 1/1/2020-30/12/2020 | 1/1/2021-30/12/2021 | |
| 4 | Zombo | 1/7/2020-30/12/2020 | 1/1/2021-30/12/2021 | |
| 5 | Pakwach | 1/7/2020-30/12/2020 | 1/1/2021-30/12/2021 | 1/6/2022-30/06/2022 |
| 6 | Adjumani & | 1/1/2020-30/12/2020 | 1/1/2021-30/12/2021 | 1/1/2022-30/12/2022 |

| | Settlements | | | |
|----|--|---------------------|---------------------|---------------------|
| 7 | Obongi & Palorinya refugee settlement | 1/7/2020-30/12/2020 | 1/1/2021-30/12/2021 | 1/1/2022-30/12/2022 |
| 8 | Moyo | 1/7/2020-30/12/2020 | 1/1/2021-30/12/2021 | |
| 9 | Kitgum | 1/1/2020-30/12/2020 | 1/1/2021-30/12/2021 | 1/1/2022-30/12/2022 |
| 10 | Lamwo & Palabek Settlement | 1/1/2020-30/12/2020 | 1/1/2021-30/12/2021 | |
| 11 | Agago | 1/7/2020-30/12/2020 | 1/1/2021-30/12/2021 | |
| 12 | Koboko | 1/9/2020-30/12/2020 | 1/1/2021-30/12/2021 | 1/6/2022-30/06/2022 |

The main activities in preparation of infrastructure implementation plans are:

1. Prepare detailed design and BOQs where standard design and BOQs cannot be used
2. Select the host community and refugee participants (in order to be sure that the necessary number of participants are available)
3. Prepare time schedule for implementation of the projects
4. Approval of implementation plan

These activities are described in detail in Chapter 5.

3.5 Construction and Rehabilitation

The construction and Rehabilitation of rural infrastructure include the following activities:

1. Sensitise nationals, host community and refugees
2. Group formation that comprises of nationals only, mixture of host community and refugees encouraged for refugee settlements and groups comprising of only refugees can be considered if there are no host community members
3. Train project management committees
4. Hold site dialogue meetings
5. Hire local masons and contractors
6. Procure tools and materials
7. Distribute tools and materials
8. Supervise construction work (together with technical teams)
9. Monitor construction works together with DLG/OPM/RWCs
10. Pay masons and contractors
11. Pay host community and refugees

These activities are described in detail in Chapters 6.

Most infrastructure structures on CARS will be constructed by DRC directly using labour contracts to qualified technicians. In exceptional cases, DRC will fully contract out complex structures identified during screening on CARS. VIP latrine construction (and gate houses at market places), and hardware installations for protected springs will be contracted out through DRC's procurement process. Supervision by DRC engineers is done in close cooperation with the DLG Engineering Departments.

Procurement of tools and materials shall be done in accordance with DRC's procurement guidelines.

The frequency of payment of host community and refugees will depend on the nature of the projects but normally payment will only be made once per season (every six months of the calendar year)

3.6 Maintenance

Maintenance of rural infrastructure is a major challenge as the DLGs have little funding for maintenance of community access roads and other infrastructure.

To best handle the maintenance of infrastructures, NURI has addressed the maintenance challenges in the following ways:

1. Maintenance is considered under project selection
2. Traditional ways of organising maintenance are supported e.g. Chief of hoe system in Acholi region for maintenance of roads.
3. Where relevant user committees are established and trained
4. Infrastructure projects are commissioned and handed over

These maintenance approaches are described in Chapter 7.

Traditionally simple maintenance of roads has been organized by special appointed person who in Acholi Sub-region are called Rwot Kweri (Chief of the Hoe), who on specific days will ask people who use the roads to do maintenance work or contribute financially. Similarly, in West Nile region the project will encourage the 'Salongo' (community works) system. Since this is a well-known practice it should be supported and strengthened.

For other types of infrastructure like market places and protected spring there is a long tradition of having user committees and of the users paying for their use of the facilities. These practices should be supported and strengthened.

Commissioning and other ways of handing over completed projects are very important milestones and make it clear for the communities that the responsibility of maintenance is now theirs.

3.7 Monitoring and quality assurance

The guidelines for monitoring are described in the M&E Manual.

DRC's role in monitoring is described in detail in chapter 8.

The DLGs and OPM role in monitoring is described in the NURI Management Manual.

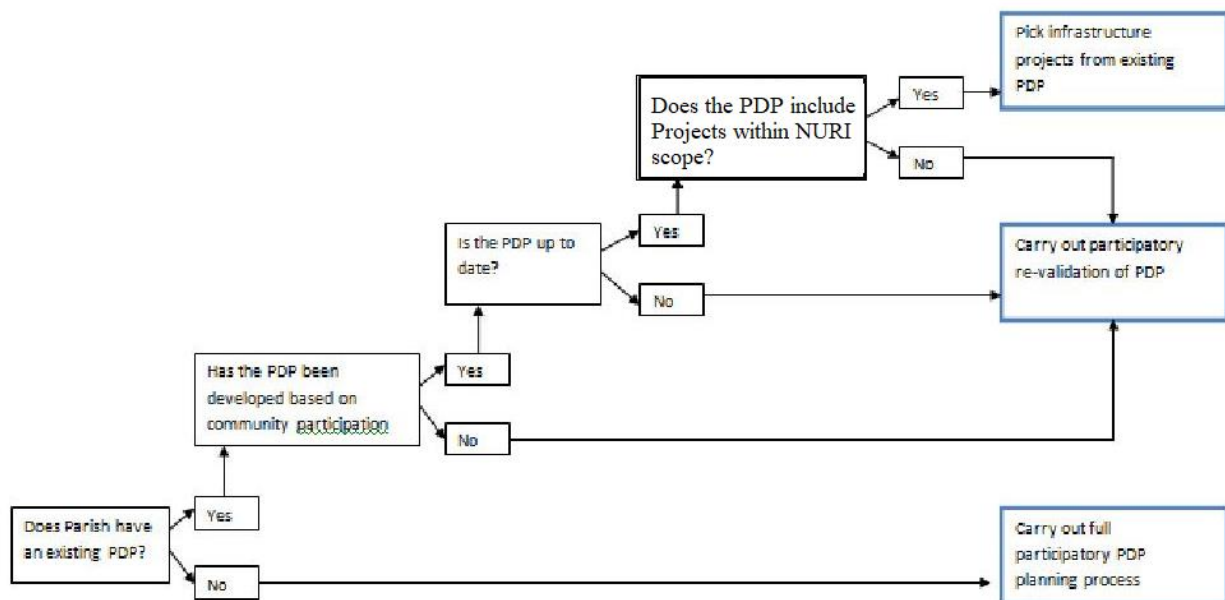
Quality assurance activities undertaken by DRC are described in chapter 8.

Chapter 4: Preparation of Investment Plans

This chapter explains the process of developing the investment plans for the implementation of the infrastructure project. The detail explanation of developing infrastructure investment plans, getting approval, implementation, annual review, and maintenance is provided in the below sections.

4.1 Review and updating PDPs and SCDPs

DRC will collaborate with the authorities at District, OPM, Sub-County level and RWCs, where necessary, to undertake an assessment of the availability and quality of existing development plans. This assessment will undertake a review of the planning period, coverage (e.g. if there have been changes in administrative unit since) and how inclusive and participatory the process of developing the plan has been. The review process comprises the following assessment of Parish Development Plans:



This assessment will inform which of three possible planning processes a given Parish will undergo; picking projects from existing PDPs, community-based re-validation of plans or a full participatory planning process. In Parishes that will undergo re-validation or development of new development plans DRC staff together with Local authorities will lead the process.

4.2 Screen projects based on selection criteria

The starting point for selection of infrastructure projects is the Parish Development Plans and Sub-County Development Plans (existing, re-validated or newly developed versions as specified above).

At sub-county level, the sub county technical planning committees select and recommend projects that are included in the Parish Development Plans and fulfil the selection criteria listed in section 3.3

This is done in consultation with the DRC staff to ensure that the projects are as evenly divided as possible over parishes and sub-counties. In order not to raise unrealistic expectations only 3-5 projects should be pre-selected per parish depending on the size (cost) of the projects.

The DRC staff will ensure that projects are identified and described in format shown in Annex 10.

4.3 Cost projects

All projects should be assessed, which will include a site visit. After assessment the following costs elements should be estimated and the total costs calculated.

1. Payment to participants
2. Fee for payments
3. PMC training
4. General tools
5. Special tools
6. Materials and equipment
7. Compaction of roads
8. Structures
9. Maintenance sensitization, training and support

The standard cost in the annexes can be used where relevant but if there are special conditions the extra cost involved should be estimated and included.

In addition to the costs in the annexes the following unit costs are used:

1. Training of one PMC costs Ushs. 260,000
2. Maintenance training costs Ushs. 1,000,000 per road link.
3. Training of one water user committee costs Ushs. 1,000,000

The costs of a project should be documented in the format shown in annex 10.

4.4 Prioritise projects and compile investment plan

As the total costs of the screened projects most likely will exceed the total infrastructure budget, the district prioritisation of projects will be done using the following criteria:

- The total cost of projects plus the costs for commissioning and DLG/OPM supervision should stay within the total budget for the district, which should cater for a 5% buffer (contingency).
- For each sub-county the total cost of projects should be within the budget per sub-county. The budget per sub-county is decided by the DLG based on the sub county population.
- Total number of workdays should be as close as possible to the target workdays for the district.

This will be done in a consultative process first between DRC staff and sub-county officials and then between DRC and authorities at district level.

DRC in collaboration with District Engineering Department prepares the investment plan. The investment plan consists of the overview (annex 11) and the project descriptions of the selected projects (annex 10).

4.5 Present the plan for approval by the DTPC/OPM

The DTPC and OPM jointly reviews the Investment Plan and is responsible for approval of final project selection, design and costing. The DTPC/OPM are expected to complete the review and approval of Investment Plans within a timeline of 3 weeks upon submission of the plan to the CAO. Upon approval, tripartite Infrastructure Project Agreements will be made between DRC, the Sub-County, RWCs and host community/refugee Project Management Committee. The DTPC may then take the plan forward for final approval by the DEC according to District procedures. This agreement should form the basis for agreed implementation of the infrastructure project.

Chapter 5: Preparation of Implementation Plans

The infrastructure projects will be implemented in accordance with the investment plans described in the previous chapter. But before implementation can start implementation plans have to be prepared.

5.1 Prepare detailed designs and BOQs

The technical designs of infrastructure will follow the government standards. Where variations are required owing to peculiarity of the sites, the DRC Engineering team, the District Technical Officer and NURI CF will agree before changing the designs. See annexes for details of standard for various types of infrastructure.

Where the standard BOQs cannot be used a detailed costing of the infrastructure projects will be prepared. DRC Technical Team will be responsible for preparing the BOQs.

5.2 Select Host community and Refugees

Together with local authorities DRC will identify host community and refugees who will benefit from the infrastructure projects and who are willing to participate in the construction and rehabilitation and will commit themselves to future maintenance of the infrastructure.

Household/Beneficiary Selection and Targeting

- The following criteria will be used for selection and targeting of public works participants.
 - Members will be within walking distance to the project site
 - 50% of the participants will be female
 - 60% of the participants will be 18 to 28 years
 - For refugee areas 50% of the group members should be refugees and 50% nationals
- A Household should send only one person to the group.

The reason for having many youths under public works is to create temporary employment for young people such that they can earn money for engaging in productive activities for instance buying seeds, garden tools, purchasing livestock or start a business.

- The executive members of the Parish Development Committee (PDC) comprising of 9 members in the areas of nationals and 18 members in refugee hosting parishes, Parish chiefs, RWC1 and RWC2 will be responsible for selection of public works participants. After selection of participants, the names will be forwarded to RWC3 and Sub County Community Development Officer (CDO) for verification and submission to DRC. After receiving the lists of participants from the sub counties, DRC will issue smart saver cards to the group members for identification.

The selection of community groups should be the documented in the project files and a list of all groups compiled.

5.3 Prepare time schedule

A time schedule that shows when the different projects will be implemented should be prepared.

5.4 Approval of implementation plan

The implementation plan should be reviewed and approved by the DLG Engineering Department.

Chapter 6: Construction and Rehabilitation

6.1 Sensitisation

Host Community and Refugee information meetings will be held on project activities and participation selection criteria in liaison with LC-Is, LC-IIIs and RWCs as an entry point to the target population. These meetings will be carried out according to the following agenda:

- Welcome and introduction
- Brief presentation of the NURI Project including synergy between the various outputs; Agriculture, rural infrastructure, and if relevant, water.
- Presentation of projects to be carried out in local area and Refugee settlement
- Cash-for-work modality
- Selection criteria for participation in cash-for-work (incl. no. of group members for various project types)
- Role of PMCs and local authorities/RWCs
- Host community and Refugee Maintenance Structure: Traditional organisation / user committees
- Project feedback and complaints mechanism
- Announcement of date for group formation and registration of beneficiaries
- Questions and answers

6.2 Group formation and election of project management committees

This will be followed by a participatory beneficiary selection and group registration. DRC will welcome inclusion of existing host community groups, mixed groups and refugee only groups that fulfil project selection criteria as a means to promote local sustainability, trust and cooperation within the groups, and to strengthen the component on savings and investment at group level where existing structures are an enabling factor. Newly formed groups will be assisted by DRC in development of by-laws and selection of group leaders.

While the communities and their leaders decide who participates in NURI, it has to be ensured that the selection criteria in section 5.2 are adhered to.

Groups of 30 members for CARs, Food Forests, Water ponds, Markets and 15 members for Protected Springs are formed and a Project Management Committee of 4 members

is elected. The PMC is to have members with specific duties, i.e. Chairperson, Treasurer and Secretary. There should be 50% women in leadership positions. Additional members are ordinary members.

6.3 Train project management committees

Project Management Committees will be provided with training to have adequate skills to manage the project implementation. This responsibility rests with the relevant District Technical Officers and DRC.

The PMCs will receive two-day training in:

- the technical specifications of the particular infrastructure project they are to manage
- the technical methods to apply and demonstrations of how to use tools safely
- The conditions under which tools are provided, and how they should be managed in the project period
- project cycle management and inter-personal supervision skills
- record-keeping of attendance
- thorough briefing on the work norms and conditions for payment in line with national policy on cash for work
- Basic training in how to use the first aid kit, which is provided to the group

The groups will agree on a modality of verifying attendance records on a weekly basis before they are forwarded to the payment register on a monthly basis. Group members will also be provided with a demonstration on use of relevant construction tools /equipment in order to ensure both effective technical utilization and the safety of the users. At the end of the Project Management Committee training, the Infrastructure Officers will facilitate a post-training verification to ensure that the members' technical skills are at a level that qualifies them to supervise works, which is further elaborated in chapter 8.

The first task of the Project Management Committee will be to undertake consultation with the community, the host community and where relevant, refugee members that have been selected, to develop work schedules according to the project implementation plan.

6.4 Site dialogue meetings

DRC project staff will proactively engage in conflict mitigation in relation to access to land for project sites. This will be done through Site Dialogue Meetings, which will be carried out before project works is commenced. The meeting is to take place at the site of the implementation and include the following stakeholders:

- Sub-County Chief/RWCs3/Settlement Commandant
- Landlords and LCI of the project site
- Members of the target / proximate community
- Project Management Committee
- DRC Infrastructure supervisor (Team Leader-Shelter and Infrastructure)

The purpose of the meeting is to ensure that all stakeholders have full information about the details of the construction, and that safe access to the project site is agreed upon.

The meeting is carried out with the following agenda:

1. Welcome and introduction (Sub-County Chief/Settlement commandant/RWCs)
2. Brief presentation of the NURI project (DRC)
3. Roles and responsibilities of different stakeholders (DRC)
4. Presentation of cash-for-work modality (DRC and PMC)
5. Technical design and location of project (DRC and District Technical Officer)
6. Feedback and Complaints mechanism (DRC)
7. Community hand-over and maintenance process (Sub-County Chief /RWCs and DRC)
8. Questions and answers
9. Signing agreement on project site access with land owners by local authorities.

For all investments from 2021 onwards, site dialogue shall be done immediately after approval of investment plans without the Project Management Committee

6.5 Hire of local technicians (masons) and contractors

The Rural Infrastructure output comprises projects that primarily are implemented using labour-intensive methods through cash for work. However, some hardware installations will be beyond the capacity of community workers to carry out. Where necessary DRC will directly implement infrastructure structures of this type. This will be managed by DRC's Engineering Team and carried out by technicians/masons employed as casual workers, this is basically because of the technicality in terms of DRC HR recruitment rules and rates as well as the procurement procedures that will not be matched with the nature of this particular engagement where by the technicians shall be paid according to the rates of the RI manual and BOQs developed during implementation. Engineering team shall develop the TOR for the technicians, activity designs and advertise for the selection of the technicians, interviewing them, generating the list of the successfully selected technicians and orient them as well as Supply chain to put them as vendors in dynamics and later for deployment. The payment mode shall be basically through bank,

the technicians must have their TIN and bank accounts subject to any statutory deduction. DRC's template contracts for casual labour will be utilized for local masons.

Bi-annual procurement plans will be developed by Supervising Engineers (Shelter and Infrastructure Officer) after the final detailed project designs have been approved by the District Engineering Departments, and the detailed BOQs have been prepared for each project. The procurement department and the Regional Managers (Project Manager-Project Support) will be responsible for this. The procurement process will follow DRC's Procurement Guideline (DRC Operations Handbook Chapter 3), which is compliant to DANIDA's standard procurement procedures. This will involve public announcement of contract notices and a competitive value-for-money evaluation.

VIP latrine construction (and gate houses at market places), and hardware installations for protected springs will be contracted out through DRC's procurement process as specified in DRC's operational Handbook Chapter 3. The construction works contracts will have a clause committing contractors to carry out the works with local masons from the area, and making contractors aware that their works are bound by DRC's complaints mechanism.

6.6 Procure tools and materials

Based on the Infrastructure Investment Plan and the annual work plan for implementation per district, a bi-annual procurement plan will be developed in collaboration between the Infrastructure Teams and the Supply Chain Department of DRC. The procurement plans will stipulate clear milestones and deadlines for delivery of tools and materials. DRC's procurement procedures will be used for procurements.

6.7 Distribute tools and materials

| Description | Responsibility |
|--|---|
| The tools and materials to be delivered to a project are given in the project agreement. Based on this the Project Materials Issuing Form is filled in triplicate. | Infrastructure Assistants (IA)(Shelter and Infrastructure Assistant-Public works) |
| The items are taken out of the store and the stock cards are updated with date, number on issuing form and quantity taken. | Supply Chain Assistant (SCA) |
| The SCA hands over the tools and materials to the IA who | SCA / IA |

| | |
|---|-------------------------|
| signs for them on a copy of the Issuing Form. | |
| The IA brings the tools and the materials to the PMC, where the IA signs as the one delivering and the PMC Chairperson signs as the one receiving on two copies of the issuing forms. The PMC chairperson keeps the original. | IA / PMC Chairperson |
| When the IA returns he hands over the duplicate of the issuing form to the SCA who files in the project folder. | IA / SCA |

6.8 Supervise and Monitor construction work (together with District Technical team)

DRC will carry out monitoring visits to project sites on a weekly basis (or more frequently if needed) while activities are on-going. Supervision activities are coordinated through the group work schedules that PMCs submit to the Infrastructure Assistants. For each type of infrastructure, District and DRC's Engineers will develop a quality assurance checklist designed to rely on observations, recommendations and simple onsite tests. These observations and recommendation and simple onsite tests will be recorded in the real-time monitoring system for effective monitoring and management of quality issues

| Description | Responsibility |
|--|--|
| The Infrastructure Assistant/Engineering Assistant is responsible for the day to day supervision of the infrastructure activities. S/he will involve the relevant sector specialists of the DLG in the training of the PMCs. S/he will also involve the relevant sector specialists in the district to provide guidance at the beginning of each stage of infrastructure works activities so that the recommended guidelines are followed. | Infrastructure Assistant/Engineering Assistant |
| In the course of implementation, the Supervising Engineer (Shelter and Infrastructure Officer) will identify & document gaps which need technical guidance from the sector specialist of the DTPC. The Project Engineer will prepare a work plan within its budget for infrastructure and liaise with the relevant sector specialist of the DTPC to validate and document the identified gaps. | Infrastructure Supervisor (Team Leader-Shelter and Infrastructure), The Supervising Engineer (Shelter and Infrastructure Officer), Project Manager-Project Support(Regional Managers) and the Project Engineer |
| The sector specialist will prepare a report on the identified gaps | Infrastructure |

| | |
|---|---|
| and share this with the key stakeholders (i.e. the DEC, the DTPC, OPM the CF, and the infrastructure assistant) | Supervisor (Team Leader-Shelter and Infrastructure), District Technical Team , Project Manager-Project Support (Regional Managers)and Project Engineer |
| There will be quarterly monitoring by the District Executive Committee, OPM, Lower Local Government (LLG), RWCs and DRC team during which they will provide general guidance and support. The monitoring officers will produce their monitoring reports and share with DRC, other IPs and the relevant sector specialists through the CAO | Infrastructure Supervisor (Team Leader-Shelter and Infrastructure), District Technical Team, Project Manager-Project Support (Regional Managers), Project Engineer and Project Manager |

These quality assurance and supervision procedures apply to the labour-intensive as well as contracted works, which, however, will follow separate modalities of payments as specified below.

6.9 Pay technicians (masons)/contractors

Upon evaluation of the contracted works and issuance of certificate of completion, DRC will provide payments to technicians/masons and contractors following payment procedures as specified in the NURI Management Handbook and DRC Operation Handbook. Payments will be carried out in compliance with requirements for thresholds for cash/bank transfers less statutory deductions (withholding tax-6% for payments above one million) and requirements for companies to provide official business bank accounts.

6.10 Pay local communities

In NURI the participants will be paid in cash which should, ideally, be used to procure agricultural inputs. This payment should be seen as the programme’s contribution (in addition to tools and materials), which makes it possible for the farming community, host community and refugees to realise the projects they have selected during the local planning process and create synergy with the Climate Smart Agriculture output of the NURI programme

When interacting with the local communities the DRC staff should encourage them to establish and use savings and credit associations like VSLA. They should also explain that it is the goal of NURI to increase the agricultural production so the money they earn should be invested in agriculture.

It is important to understand the programme does NOT employ the participants to do a specific job at a given task rate but instead provides a fixed amount as an assistance to the host community and Refugees so that they can implement their own projects.

A single cash payment will be made to the groups on completion of the infrastructure works. Before making cash payments, the following steps should be followed;

- DRC will validate attendance sheets for participants engaged in Infrastructure Project. This will be through compiling attendance records from the PMCs on a monthly basis.
- Display attendance list to all the group members to confirm the number of days they have worked and the amount of money they expect
- DRC will then prepare and make payment to the beneficiaries

Chapter 7: Maintenance of Infrastructure

The maintenance of the created assets relies heavily on the willingness and involvement of the host community and refugees involved in the project, and the willingness of the DLG/LLG to include these projects in their plans. Hence the project puts a lot of effort on ensuring that the DLG and the Parish/Sub county authorities/RWCs are involved in each step of the project planning and implementation. This chapter describes the steps to be taken towards ensuring maintenance of the infrastructure assets created.

7.1 Maintenance is considered under project selection

While selecting the project, possibility of longer-term maintenance, both from the host community and Refugee and as part of the parish, sub-county, and district maintenance plans should be considered, and priority should be given to a project that has a distinct possibility of this.

7.2 Traditional ways of organising maintenance are supported

NURI will consider the traditional methods of maintenance of the infrastructure developed. Traditionally simple maintenance of roads has been organized by special appointed person who in Acholi Sub-region are called Rwot Kweri (Chief of the Hoe), who on specific days will ask people who use the roads to do maintenance work or contribute financially. Similarly, in West Nile region the project will encourage the Salongo (community works) system. Since this is a well-known practice, it will be supported and strengthened.

The support to these traditional methods will include sensitisation of the host community, Refugees and training of key stakeholders like LC1 and LC3 Chairpersons, Sub-county and Parish Chiefs, Clan leaders, Opinion leaders, RWCs and "Chiefs of the Hoes".

These traditional methods are for roads only.

7.3 Where relevant user committees are established and trained

For water projects like protected springs and water ponds it is normal practise to establish and train user committees on how to collect user fees and undertake regular maintenance and repairs of the water sources. This will be done together with DLG staff.

Market places are normally tendered out to individuals who will collect fees and undertake maintenance according to agreed guidelines. Because of this incentive it is not considered necessary to provide any maintenance sensitisation or training for these projects.

Food Forests are handed over to the institutions like schools and the involved staff will be trained by DRC staff in maintenance of Food Forests. DRC will also ensure the buy in of the school authorities at District level, so that sustainability is not dependant on individuals.

7.4 The Project User Committee (PUCs)

Project user committees (PUCs) are a non –statutory management structure (committee) either selected or nominated by the members of the user’s groups provided with the roles and initiate and promote development activities with the involvement of the community members.

They are a highly voluntary, non-political and through the political support at that level, do render delegated tasks related to the initiation and implementation of development programs/projects. The PUC is responsible for resource mobilization, operation and maintenance of the created assets.

Criteria for selection of PUCs

- A person who is Self-driven and willing to serve as a volunteer,
- A person of proven integrity within his/her community,
- A person around or along the project area
- A good mobilizer and a communicator
- Must be 18 years of age.
- The chairperson and secretary should be able to read and write
- A person who is Resident within the village and parish and conversant with the needs and problems of that area,
- A person who is Knowledgeable in the local issues of the area and resourceful,
- A person who is a good communicator

Composition of PUCs

- Positions include chairperson, Vice chairperson, secretary, treasure and five other members
- 9 member PUC per 1km road, 9 members for a water pond and protected spring.
- 1/3 should be women

PUCs Selection process

- The village meeting will be organized by parish chief/LC II after creation of the assets. SOP from ministry of health should strictly observed during meetings.
- Presentation of the criteria for selection of PUC members.
- Nominations for PUC members are done during the meeting using the criteria.
- List of PUCs selected will be compiled and submitted to DRC.

The roles of project user committee (PUC)

PUC is a group elected by the community of a particular water point. They are responsible for;

- Mobilise community members to carry out periodic maintenance.
- Leading the process of formulating bi-laws and submission for approval by local council.
- Mobilise resources for maintenance of the created assets.
- Report to the local authorities any problem in regard to the Infrastructures in place.
- Be accountable to the local authorities and the community. - Use the by-laws set by the community.
- Prepare maintenance work plan.
- Keep attendance of community members for maintenance of created assets.
- Be accountable to the community members for the resources mobilised for asset maintenance
- Receive, keep custody and records of tools handed to them.
- Liaise with other stake holders for effective maintenance of the created assets e.g. sub county officials
- Organise meetings concerning operation and maintenance of the created asset.

The roles of Local Authorities

The local authorities are the very responsible people in the community. They are responsible for the followings;

- Supervision of the PUC
- Advise the PUC where necessary.
- Help the PUC lobby for more money for the maintenance of the RI Projects
- Link the PUC and the community
- Mobilize the community for the maintenance of the water point
- Help the community to set and implement by-laws.

Preparation of bi-laws

- A community meeting will be organised for drafting of bi-laws by the chairperson of the PUC
- Follow the local government procedure to have the bi-laws approved
- Keep a copy of the bi-laws after approval by the sub county council and sensitize the community about the bi-laws.

7.5 Handing over of infrastructure projects and tools

After the projects in a sub county are completed, a hand-over meeting will be organised at the sub county after visiting some project sites. At this event the following will take place:

- The infrastructure will be released for use by the community members and ownership handed over to the parish authorities.
- Responsibility for maintenance will be clarified for the different types of projects:
 - For roads the **user committees** are responsible and will involve the host community and refugee
 - For water projects the **water user committees** are responsible for maintenance
 - For market places the **selected bidder** is responsible and is supervised by the sub county authorities
 - For Food Forests, the **institution** is responsible or individual in refugee settlements
- A certificate of completion will be issued by the District to the host community and refugees

The tools that have been used by the local communities will be handed over in the presence of the sub-county authorities, Settlement Commandant and RWCs as follows:

- For roads the tools will be handed over to those responsible for maintenance e.g. the "Chief of Hoes".
- For water projects the tools will be handed over to the user committees
- For market places the tools will be handed over to the sub-county authorities
- For Food Forests the tools will be handed over to the institutions.

7.6 Commissioning of infrastructure

NURI aims at supporting Local Authorities and target host community and Refugee in construction of rural infrastructure. After completion of projects, DRC and District Technical Officials will carry out a joint completion inspection and issue a certificate of completion to the community group or contractor. When all certificates of completion have been issued in a year of implementation, DRC together with the District and Sub-County Authorities and RWCs carry out a commissioning ceremony for all completed projects in the District. The commissioning marks the hand-over of ownership of the infrastructure assets to the District/OPM and/or Sub-County, RWCs who subsequently are in charge of ensuring that maintenance activities are carried out.

Chapter 8: Monitoring and Quality Assurance

The general guidelines for monitoring are described in the M&E Manual.

8.1 DLG/OPM Monitoring and Facilitation of DLG/OPM Staff

The DLGs/OPM role in monitoring and supervision are described in sections 2.4 and 6.8 and in other sections where it is relevant.

The general guidelines for facilitation of DLG/OPM staff are described in Chapter 10 in the Management Manual.

Local government/OPM officials (technical staff and political leaders) involved in the monitoring and supervision of rural infrastructure projects will be paid safari day allowance based on approved Local Government rates. The technical staff invited as resource persons will also be paid training allowances when these are organised. The allowances will be paid by DRC in line with their approved work plan. The implementing partners will inform the local government/OPM officials about their approved work plans. Rates for allowances and fuel shall not exceed those stipulated in the Local Development Partners Group's schedule of rates.

Safari day allowance of Ushs (20,000/=) per day will be considered for the following activities and officials if conducted for more than 6 hours and lunch is not provided:

| Activity | Officials |
|--|---|
| District Routine Supervision of Infrastructure Projects | District Engineer NURI- Focal Engineer District Water Officer District Forest /Environment Officer |
| Field screening of projects selected from the Parish Development Plans | District Engineer NURI- Focal Engineer District Water Officer District Forest /Environment Officer Parish Chiefs/RWCs |
| BoQ Approval | District Engineer |
| Project Commissioning | District/OPM Officials Sub County Officials, |

| | |
|---|---|
| | RWCs |
| Training of Project Management Committees/Project User Committees. The First Aid training will be done by the District Nursing Officer. | District Engineer NURI- Focal Engineer District Water Officer District Forest Officer District Nursing Officer Community Development Officers Parish Chiefs RWCs |

When they are involved the drivers of district officials will be considered for safari day allowance of Ushs (20,000/=) per day.

Training allowance

A facilitation allowance of Ushs 80,000/= per day will be paid to technical staff engaged in training project management committees (PMC). Normally the District Engineer, the District Forest Officer and the District Water Officer would be the ones invited to train the PMCs.

How the allowances will be paid?

For routine supervision, technical support and training by LG staff (i.e. routine supervision, field screening of projects, BOQ preparation, PMC training), DRC will pay direct to the concerned district staff after s/he has produced the necessary supporting documents and has followed all the required accountability procedures.

For activities whose report will be prepared by the implementing partner such as field screening of selected projects and project commissioning, the implementing partners will pay direct to the participating district, OPM staff, and sub-county and RWCs officials.

Facilitation for Monitoring and Supervision

Fuel and SDA for technical supervision shall be paid according to approved work plan and mileage.

Quarterly monitoring by DEC and LLG. Maximum of 3 district cars will be fuelled 20 litres each car.

8.2 DRC Monitoring

DRCs role in monitoring is described in the M&E manual and in sections 2.3 and other sections of this manual where relevant.

DRC will establish a data base for capturing data and information in each field office.

8.3 DRC Quality Assurance

DRCs role in quality assurance is described in their Technical Proposal from where the table below has been copied.

| Quality management activity | Purpose | Method | Timing | Standards for Quality Assurance/control | Responsibility |
|---|--|--|---|---|---|
| Internal review of engineering Designs, drawings, BOQs | To ensure very high standard of technical screening of projects designs before joint screening with district | Desk review of drawings, designs and project manuals | During preparation of each investment plan. | Rural Infrastructure Manuals; District and community access road manuals. | DRC Project Engineers and Project water engineers |
| Conducting community resource planning meetings | To promote social accountability, stakeholder engagement and mitigate potential conflict | Meetings at the district, sub counties and refugee settlements | During preparation of investment plans and implementation | Common Humanitarian Standards (CHS) | DRC staff, CF and District staff |
| Joint screening with the district technical team and compile Investment Plans for approval by the District Technical Planning Committees (DTPC) | To ensure very high standard of technical screening of projects | Meeting at district | Within 4-6 months from the start date of preparation of each investment plan. | Rural Infrastructure Manuals, District and community access road manuals | DRC Engineering staff in co-operation with District Engineers |
| Development of procurement plans and procurement trackers | To ensure timely and effective delivery of project inputs that conform to the highest | Bilateral discussion between supply chain team and | Immediately after approval of investment plans | Rural Infrastructure Manuals, District and community access road | DRC's supply chain team, and project managers |

| Quality management activity | Purpose | Method | Timing | Standards for Quality Assurance/control | Responsibility |
|---|---|--|---|--|--|
| | quality standards | the programs team | | manuals | |
| Developing project risk register and continuously updating risk matrix | To monitor and track projects risks and take proactive measures to mitigate them | Quarterly review meetings | Done on a quarterly review | Operational handbook; Danida's anti-corruption code of conduct and the principles of the UN Global Compact | DRC project managers, Finance manager & Engineers |
| Undertake comprehensive training for all DRC engineering staff | To ensure staff are performing their roles effectively as per their ToR. | In house training with project engineer and water engineer | Once a year | Rural Infrastructure Manuals, District and community access road manuals | Project engineer and water engineer |
| Undertake identification and training of competent contractors and masons/technicians | To achieve high quality structures in the project operational areas | Theoretical and practical training sessions delivered on specific topics of interest | Before or at start of implementation | Rural Infrastructure Manuals, District and community access road manuals | DRC project engineers and project managers |
| Inception meetings in all districts implementing NURI project | To sensitize stakeholders on the project objectives, activities and beneficiaries | Meetings at the district, sub counties and refugee settlements | Within 2 months from the start date of the project | Common Humanitarian Standards (CHS) | DRC Staff, CF and district staff |
| Revalidation of Parish Development Plans | Identification of projects | Meetings at the parish and sub counties | Within the first six months at the start of the project | Constitution of the Republic of Uganda (Chapter 11, Article 176(1)) and elaborated in the Local Government Act (Cap. 243). | DRC staff, sub county and district officials |
| Technical screening of identified projects | To assess feasibility and costing of identified infrastructure and structures | Physical assessment at project sites | Once a year | Rural Infrastructure Manuals, District and community access road manuals | DRC Engineering staff in cooperation with District Engineers |
| Approval of Investment Plans | Stakeholders scrutinise the proposed projects and costs | Meeting at the district headquarters | Once a year | Scope of service/DED | District Technical Planning Committee, CF, OPM, |

| Quality management activity | Purpose | Method | Timing | Standards for Quality Assurance/control | Responsibility |
|--|--|--|--|--|---|
| | | | | | UNHCR and DRC |
| Production of annual Work plans | For CF and the Embassy to release funds | Document prepared and sent to CF | Annual | Scope of service/DED | DRC, CF and RDE |
| Group Formation | Inclusion of all the target beneficiaries, refugees and host communities, youth and women | At the project sites | After approval of the Investment Plans | Common Humanitarian Standards (CHS) | DRC staff and local leaders for both refugees and the host communities |
| Quality assurance of PMC's technical skills after completed training | To ensure functional technical skills of community project leaders | Post-training assessment | At completion of each PMC training | Rural Infrastructure Manuals, District and community access road manuals | DRC (Project) Officers |
| Site dialogue meetings and conflict sensitivity and safety assessments | To resolve any land issues and ensure safety of staff and community participants | Meetings at the project sites | After group formation | Common Humanitarian Standards (CHS) | DRC staff and sub county authorities |
| Sensitisation of the beneficiaries and stakeholders on DRC Complaints mechanism | Get feedback from the beneficiaries and local authorities on the performance of DRC staff, contractors and masons and quality of infrastructure and structures | Radio talk shows, meetings and the project sites and distribution of the templates | Throughout the project life span | Common Humanitarian Standards (CHS) | DRC staff, beneficiaries, local authorities and refugees |
| Quality assurance of structure/infrastructure projects (inc. review of quality assurance plan requested from selected contractors) | To ensure that quality standards are met for each project as design | Supervision visits by DRC and District and sub county staff | Monthly and quarterly by DEC members | Quality assurance plan/standards | DRC Country Director, Head of Programs, Project Manager, Regional Project Managers, Engineers and Infrastructure Assistants |
| Site progress meeting/visit | To ensure that quality standards | Supervision visits by DRC | Monthly and quarterly by | Quality assurance plan/standards | Head of Programs, |

| Quality management activity | Purpose | Method | Timing | Standards for Quality Assurance/control | Responsibility |
|---|---|---|---|--|--|
| | are met as per the design and approved quality assurance plans (from DRC and contractors) or all the structures constructed by the project | and District, sub county staff. | DEC members and district technical staff | | Project Manager, Regional Project Managers, Engineers and Infrastructure Assistants. |
| Formation of Project User Committees E.g. Water User Committees and Road Committees | To ensure that created assets are maintained | Meetings conducted at the project sites | Before cash payments of the project participants | CHS | DRC Infrastructure team and district and sub county staff |
| Formation of maintenance plans and bye laws by the village councils (community level) | To ensure that maintenance activities are aligned with government structures and policies | Meetings at the project sites | Before completion of the projects | Local Government Act CAP 243, 2015 (page 44) | DRC Infrastructure team, district and sub county staff and the village councils |
| Technical evaluation of community and Local Government maintenance plans | To ensure that community user groups and Local Government maintenance plans are in place and meet requirements for feasible maintenance | Review of maintenance plans | During development of maintenance plans | Quality assurance plan/standards | DRC Engineers and Infrastructure staff in cooperation with District Engineering department |
| Tracking of implementation of maintenance plans | To monitor degree of implementation of schedules maintenance activities | Monitoring visits | In the year following completion of community infrastructure projects | Rural Infrastructure Manuals | DRC Infrastructure (Team) |
| Commissioning of completed projects | As part of maintenance all completed projects will be officially handed over to the communities and local authorities capture positive and negative | At the project sites | Annually after completion of the projects | Rural Infrastructure Manuals | DRC Project Officers, district and sub county authorities |

| Quality management activity | Purpose | Method | Timing | Standards for Quality Assurance/control | Responsibility |
|---|---|--------------------------------------|---|--|---|
| | feedback from host community members, Refugees and other stakeholders | | | | |
| Undertake an independent infrastructure quality review/evaluation | To provide independent feedback to the Steering Committee on issues pertaining to management of the project and quality management methodologies, as well as processes that are being used and whether stakeholders' interests are being appropriately represented and managed. | External Consultancy | Annually after completion of the projects | International (EN ISO 9000) and national standards | External consultant, Coordination Function in close coordination with DRC |
| Conduct Project Evaluation and Reviews | A review of project performance against the defined project target, output, processes used to produce the outputs; and document Lessons learnt from the project | Evaluation and review workshop | at the end of every project phase | M&E Manual | DRC project staff, M&E |
| Conducting Mini Surveys | To inform implementation strategies and provide beneficiaries feedback on quality, utilization and benefits of the project outputs | Assessment | On Needs basis | M&E Manual | Coordination Function in close coordination with DRC |
| Conducting Monitoring and verification of project outputs | To ensure project deliverables conforms to the highest quality standards, and to inform implementation | Routine data collection and analysis | Monthly basis | Scope of service/DED | MEAL team, DRC Engineering Officers |

| Quality management activity | Purpose | Method | Timing | Standards for Quality Assurance/control | Responsibility |
|-----------------------------|----------|--------|--------|---|----------------|
| | strategy | | | | |

Chapter 9: Record Keeping

9.1 Project file

DRC will keep a file for each project with the following content:

- a. Project description (and cost estimate)
- b. Detailed design and BOQs (if they have been prepared)
- c. Information about involved community groups
- d. Agreements with community groups
- e. Receipt for tools and materials delivered
- f. Records from visits to the project
- g. Attendance registers
- h. Completion certificate

9.2 Contract file

DRC will keep a file for each contract signed with technicians/masons and contractors with the following content:

- a. Contract
- b. Engineers estimate (where relevant)
- c. Notes from site inspections
- d. Variations
- e. Payment certificates

- f. Completion report
- g. Completion certificate

ANNEXES

Technical designs and corresponding BOQs are in indicative prices as they stood at the time of developing this manual. Specific designs and corresponding BOQs shall be done in the implementation process for special conditions encountered. The designs and prices will change depending on each location, availability of materials, and the local market prices. Hence these prices should be used as guides only and a comprehensive costing of each infrastructure project should be done during investment planning and implementation planning.

Annex 1: Technical Design - Community Access Road (CAR)

a. Standard design

The recommended standard design from Ministry of Works is shown below. The standard specification for the CAR shall be as follows: Bush clearing 8m, Ditch 0.4m wide x 0.3m deep each side, back and side slopes 0.8m each side and carriageway of 4m wide. Templates such as camber boards; ditch boards shall be fabricated out of timbers/Steel to ensure that quality required is achieved. Ditches sizes may be depending on hydrological assessment to determine how much water is expected at the ditch location.

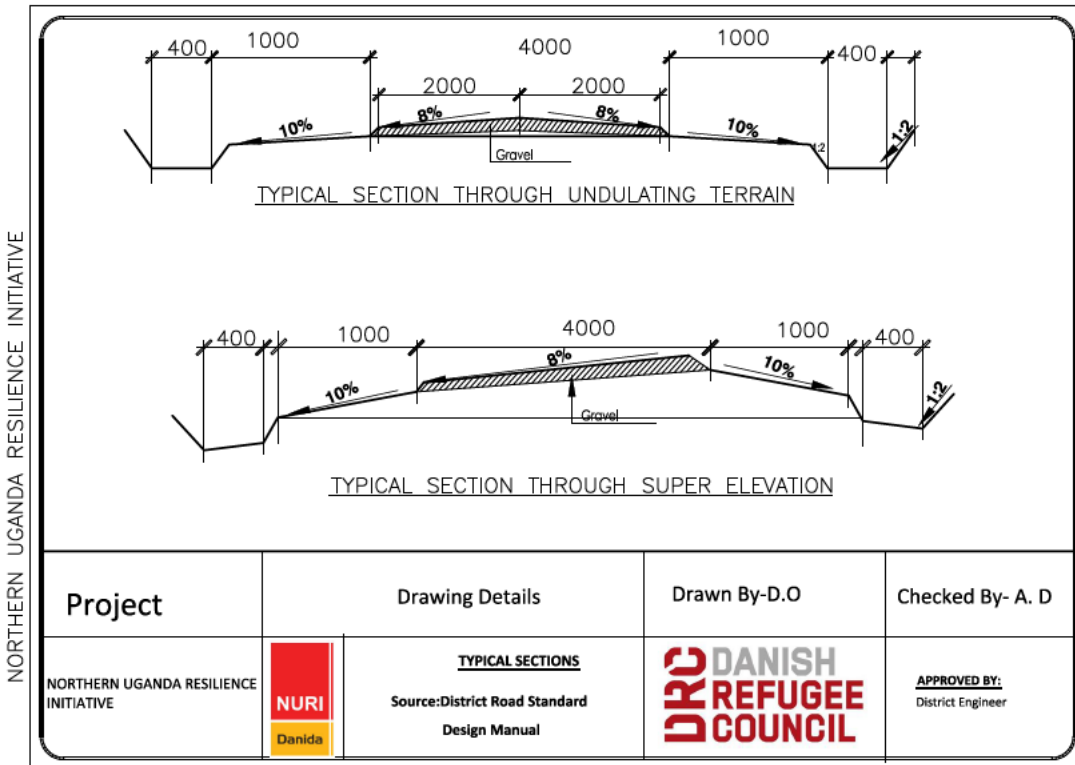
A table showing the quantity of water expected in different regions with respect to catchment size, runoff coefficients and mean annual rainfall depth per 1km of the road is shown below:

| Catchment area (ha) | Design rainfall (mm yr-1) | | | | | | | | |
|---------------------|---------------------------|---------|---------|--------------------|---------|---------|--------------------|---------|-----------|
| | 350 mm | | | 500 mm | | | 700 mm | | |
| | Runoff coefficient | | | Runoff coefficient | | | Runoff coefficient | | |
| | 10% | 20% | 30% | 10% | 20% | 30% | 10% | 20% | 30% |
| 10 | 3,500 | 7,000 | 10,500 | 5,000 | 10,000 | 15,000 | 7,000 | 14,000 | 21,000 |
| 15 | 5,250 | 10,500 | 15,750 | 7,500 | 15,000 | 22,500 | 10,500 | 21,000 | 31,500 |
| 20 | 7,000 | 14,000 | 21,000 | 10,000 | 20,000 | 30,000 | 14,000 | 28,000 | 42,000 |
| 30 | 10,500 | 21,000 | 31,500 | 15,000 | 30,000 | 45,000 | 21,000 | 42,000 | 63,000 |
| 50 | 17,500 | 35,000 | 52,500 | 25,000 | 50,000 | 75,000 | 35,000 | 70,000 | 105,000 |
| 100 | 35,000 | 70,000 | 105,000 | 50,000 | 100,000 | 150,000 | 70,000 | 140,000 | 210,000 |
| 500 | 175,000 | 350,000 | 525,000 | 250,000 | 500,000 | 750,000 | 350,000 | 700,000 | 1,050,000 |

Tree planting will be done along CARs in settlements in staggered pattern with a spacing of 6 meters in areas where individuals with farm lands agree to maintain. In bushy areas, tree planting may not be done but existing trees may be managed using farmer managed natural regeneration (FMNR).

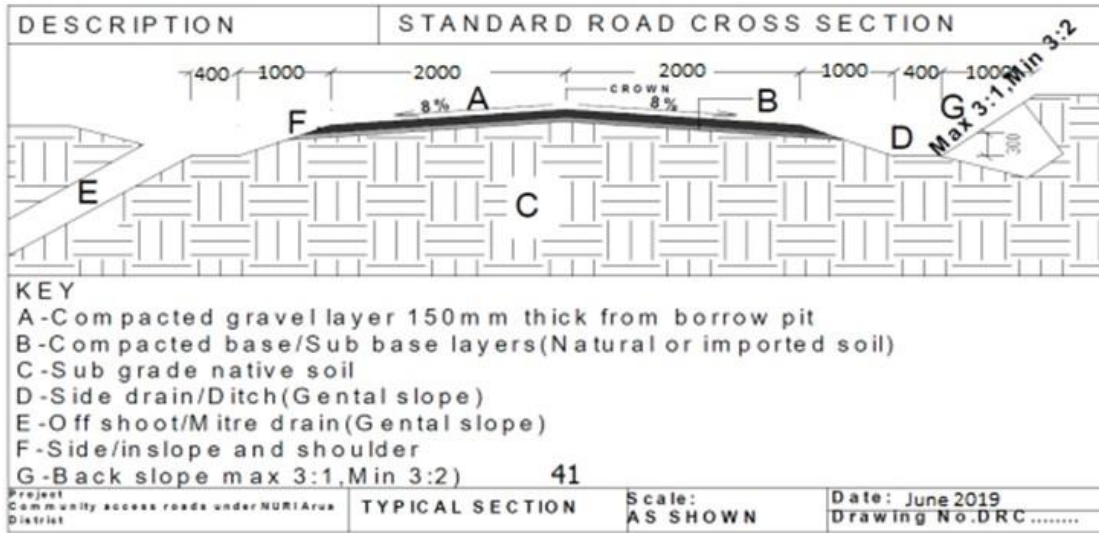
If the slope is steep, pits are recommended. A ditch is designed with similar dimensions, and blocked after 2m length, leaving 0.5-1m of original soil level in

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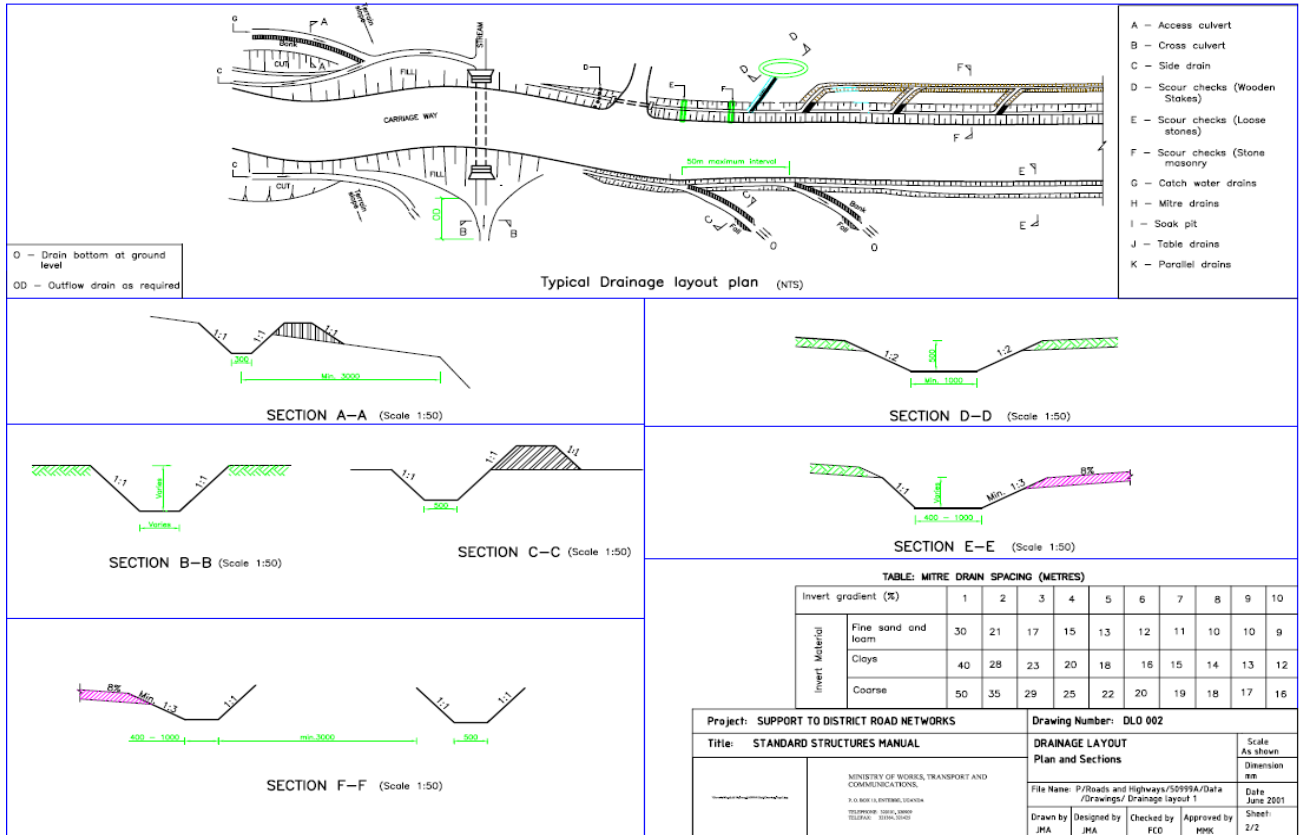


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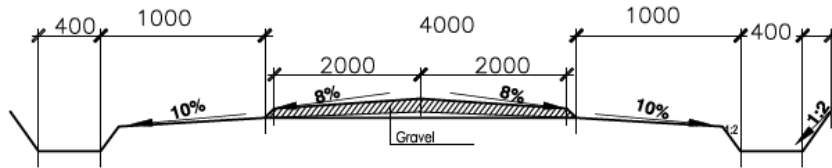
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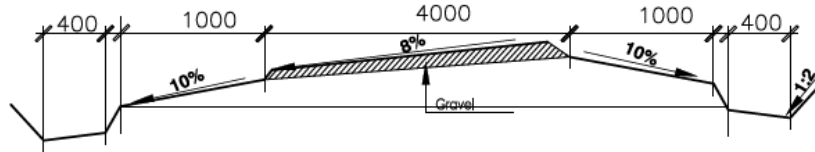
TYPICAL DRAINAGE LAYOUT





Source: MOW - District Road Works Manuals Vol.4A



TYPICAL SECTION THROUGH UNDULATING TERRAIN



TYPICAL SECTION THROUGH SUPER ELEVATION

| | | | |
|---------------------------------------|---|--|--|
| Project | Drawing Details | Drawn By-D.O | Checked By- A. D |
| NORTHERN UGANDA RESILIENCE INITIATIVE |  <p>TYPICAL SECTIONS Source: District Road Standard Design Manual</p> |  | <p>APPROVED BY: District Engineer</p> |

c. Tasks for CAR

The construction (opening) of a CAR involves the following tasks for the project group:

1. Setting out the road (pegging)
2. Bush clearing
3. Stripping and grubbing
4. Removal of trees, stumps, boulders and anthills
5. Levelling (excavation to level)
6. Ditching
7. Back sloping
8. In sloping
9. Camber formation
10. Opening mitre drains and scour check construction
11. Gravel spreading using labour intensive method
12. Scarification of hardened formed road sections to achieve proper compaction

Where a community select a rehabilitation project, a group will do 2km of CAR for light rehabilitation as a project, where the scope of rehabilitation is intensive 1km shall be a project, rehabilitation of drainage structures will be done by technicians/masons selected through the DRC supply chain process.

SUMMARY SPACING FOR MITRE DRAINS, CROSS DRAINAGE STRUCTURES AND SCOUR CHECKS

| Longitudinal road gradient | Maximum mitre drain interval | Recommended interval between cross drainage structures | Scour check spacing |
|----------------------------|------------------------------|--|---------------------|
| 1% ~ 2% | 50m | 200m | not required |
| 3% | 200m | 150m | |
| 4% | 200m | 150m | |
| 5% | 180m | 135m | 20m |
| 6% | 160m | 120m | 15m |
| 7% | 120m | 100m | 10m |
| 8% | 120m | 100m | 7.5m |
| 9% | 80m | 80m | 6m |
| 10% | 80m | 80m | 5m |
| 11% | 40m | 60m | 4m |
| 12% | 40m | 60m | 4m |
| above 12% | 40m | 60m | line with masonry |

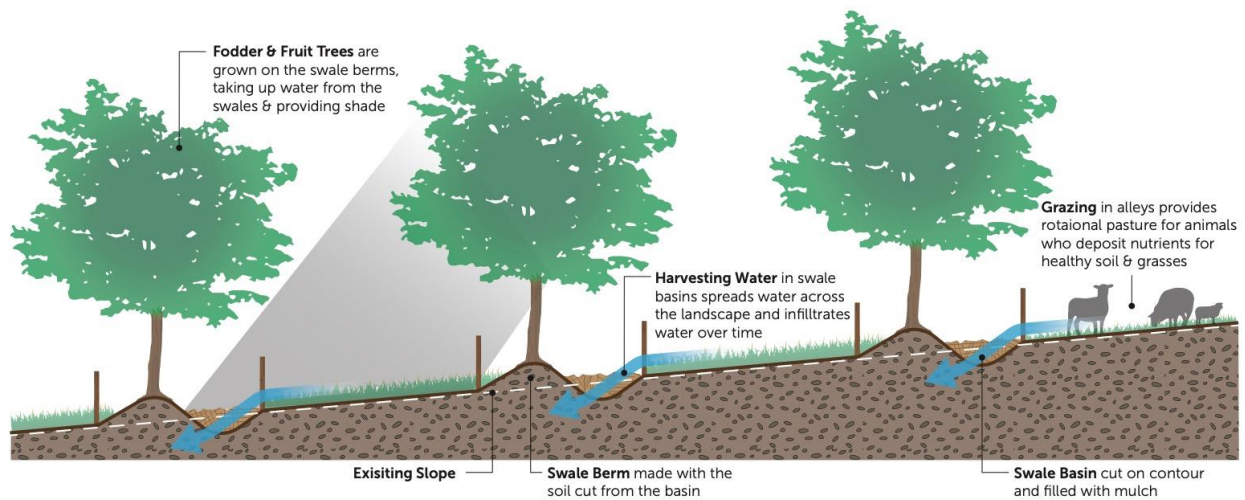
Source: MOW - District Road Works Manuals Vol.4A

Mitre drains will terminate into systems of ponds for livestock and/or bio swales for crop productions. Run on water may be slowed, spread and infiltrated into the upslope

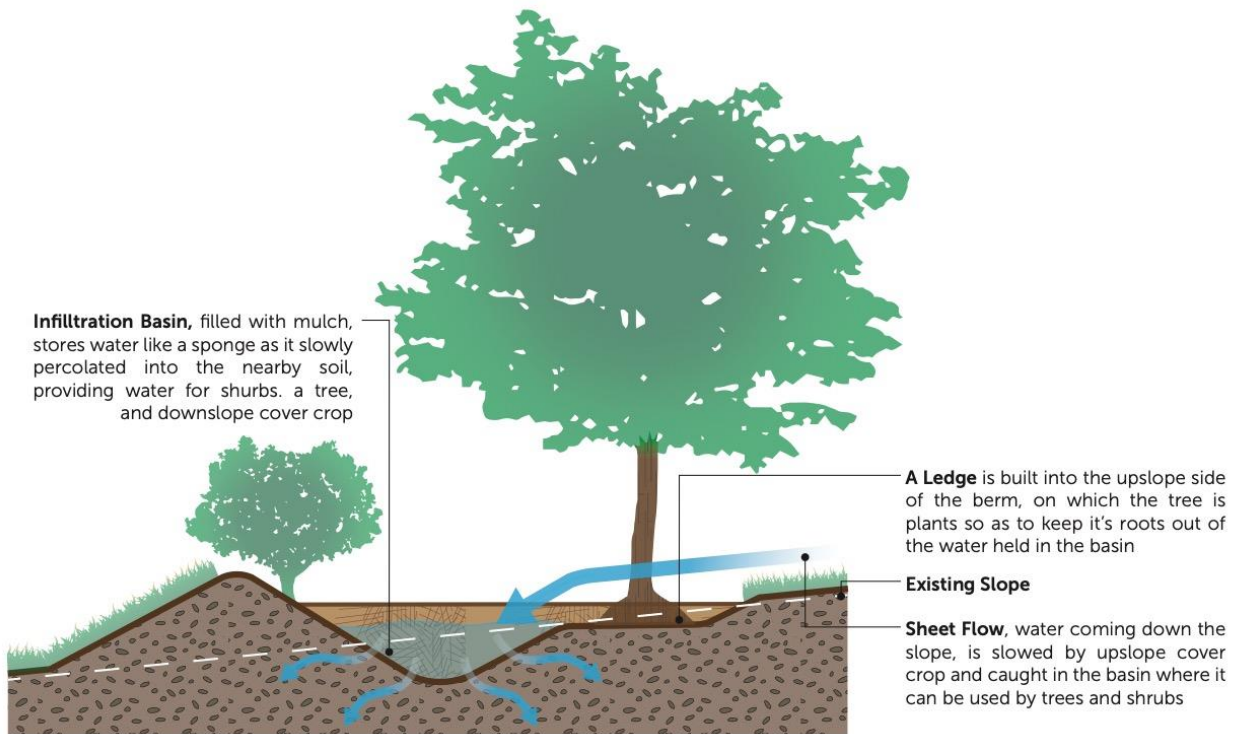
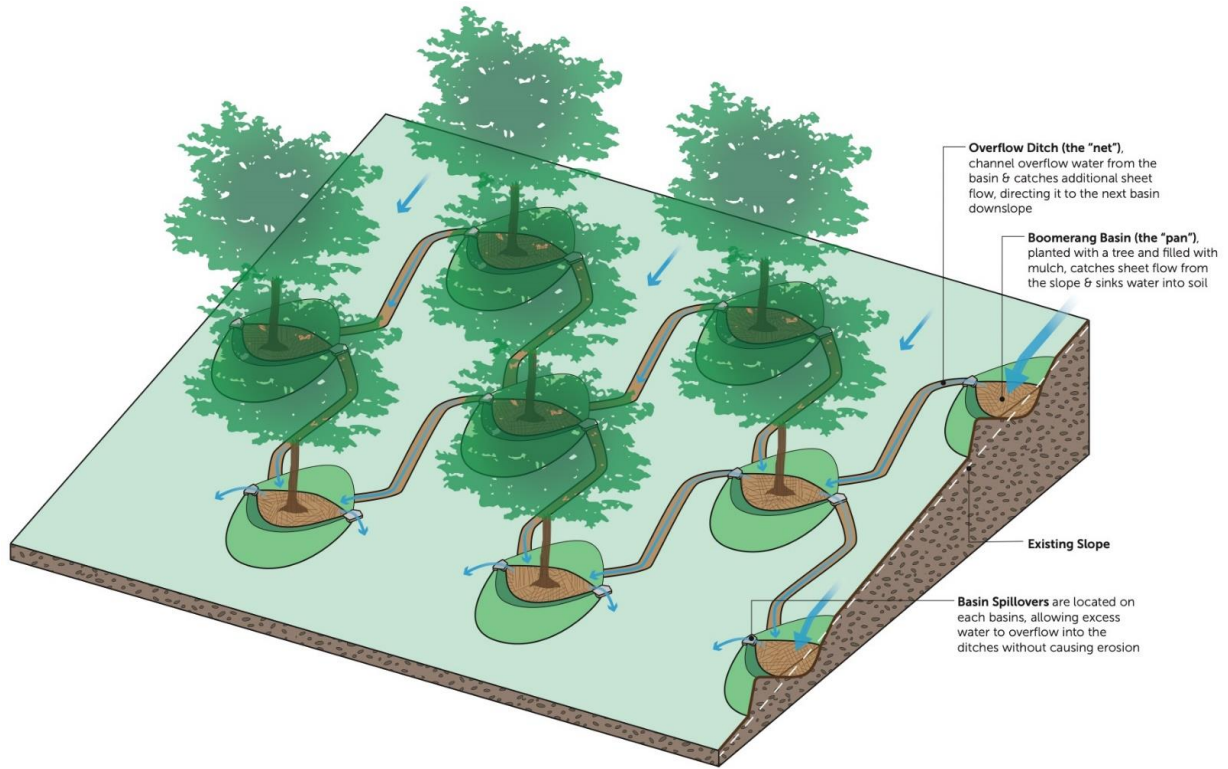
agricultural systems using multiple strategies including bioswales, small one-rock check dams, infiltration pits and ponds, net and pan systems of smile berms, etc. or be controlled by Catch water drains which will be introduced on the uphill side of the road to prevent floods based on sites context. This will be done by machines and/or labour intensive approach where land owners allow.

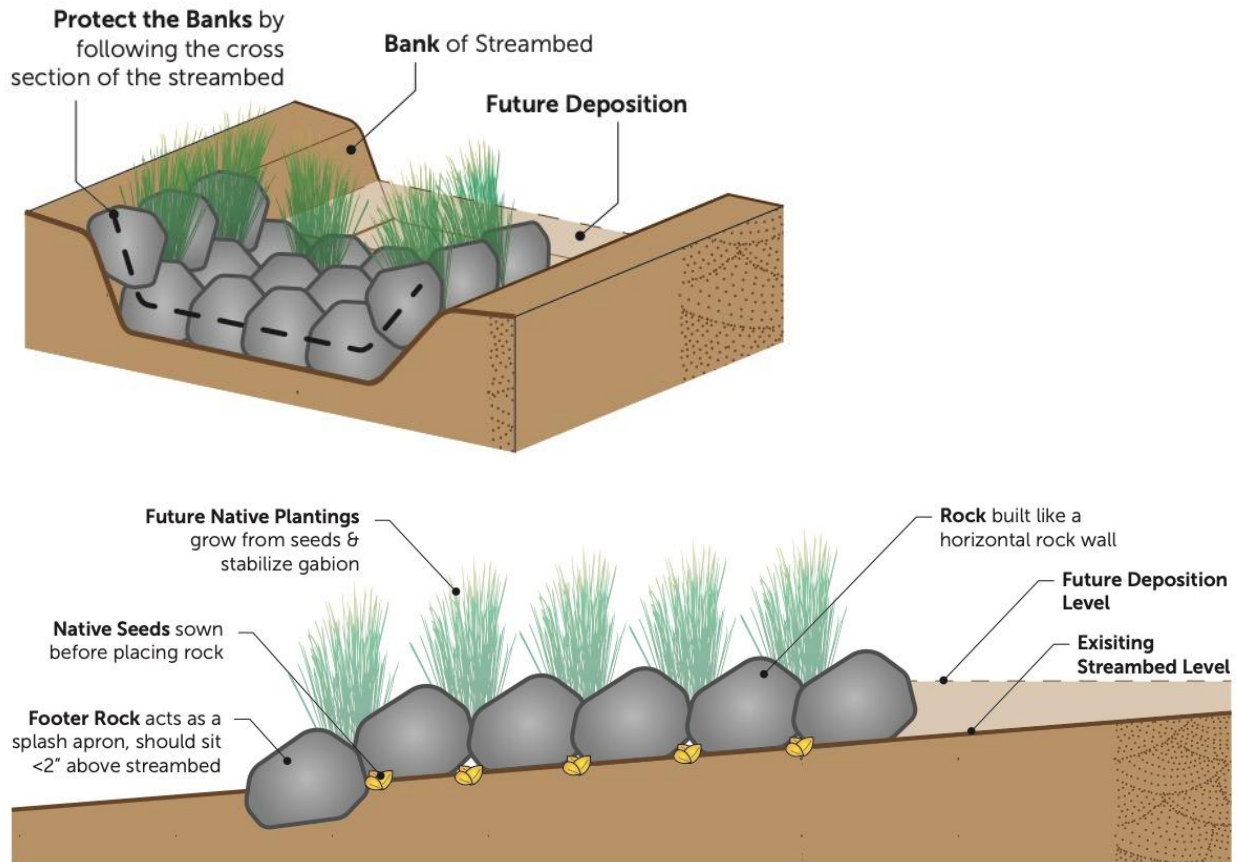
The communities and the roadside farmers must be central to the design and implementation of the mitre drains and where best to distribute that concentrated water into their agroecosystems for best benefit. Discussions must be conducted between the community and the roadside farmers to determine how better the water from the mitre drains can be useful to them. These drains are very suitable to be extended into deep trenches in farmland where the water then could be slowed, spread and infiltrated using a variety of rainwater harvesting techniques: - improving water availability and soil moisture in the farm, and reducing water hazard nearby the road.

Bio-swales can be connected to the drains off the road. A bioswale is a broad trench on contour with gentle slopes (not angular 90 degree edges) leading from the upslope side and out of the downslope side that utilize the material from the digging to create a downslope bund that helps to mitigate the erosive flows of water and to slow it down to increase infiltration. On the inside edges and all around the berm trees and plants can be planted, and on the bunds you can plant grasses and trees for stabilization and can be readily combined with terraces in sloping terrain.

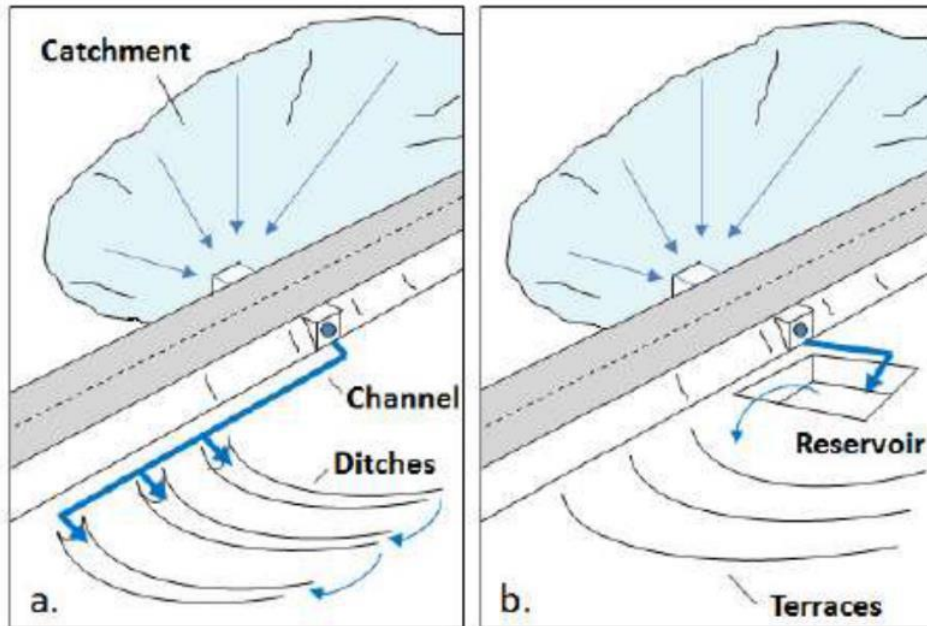


On upstream buffering of water flowing down. It is advantageous that infiltration pits/bio-swales and net and pan systems of planting trees with smile berms and then utilizing the spaces in between the smile berms for growing crops and fodder should be put in place. In case of stone rich areas, low stone bunds anchored in the soil can be implemented too. In all cases it is best to combine with vegetation. Grasses can help a lot in holding the soil together and stabilize the area from erosion.





Water from culvert outlets is large in volume compared to the one from mitre drains. Therefore, it can be managed and be more impactful where it ends up into. It can be collected into reservoirs/ponds for animal drinking, irrigation in farms, through equal spreaders or made to move through terraces across the farm contours. The final use of this water from culverts must be decided upon on mutual discussions with the intended farmers. Some of the uses and water management options are shown below:



The activities 1-4 should be done in the dry season while the other activities are done after the rains have started.

For Minor Rehabilitation of CAR, the following tasks are normally involved:

1. Removal of vegetation (grass)
2. Repairing ditches
3. Re-shaping the road
4. Repairing mitre drains
5. De-silting of culverts
6. Installation of culverts
7. Gravelling (Spot or Entire section)

These activities should be done before the rain starts

For Major Rehabilitation of CAR, the road has been abandoned because a major structure made the road inaccessible for a very long period of time and road has been reduced to a footpath and completely lost shape and the following tasks are normally involved:

1. Re-Setting out the road (pegging)
2. Bush clearing
3. Stripping and grubbing
4. Removal of trees, stumps, boulders and anthills
5. Levelling (excavation to level)
6. Ditching
7. Back sloping
8. In sloping

9. Camber formation
10. Opening mitre drains and scour check construction
11. Gravel spreading using labour intensive method
12. Scarification of hardened formed road sections to achieve proper compaction

d. Tools

The standard tool kits that will be provided for opening 1 km of CAR are and other additional tools can also be procured if included in the investments and also unforeseen circumstances warrant:

| Tool | No. | Price | Total |
|---|------------|--------------|------------------|
| Measuring tape 100 m | 1 | 45,000 | 45,000 |
| Measuring tape 7.5 m | 2 | 10,000 | 20,000 |
| Nylon strings 100 m | 2 | 15,000 | 30,000 |
| Jerry can | 2 | 10,000 | 20,000 |
| Drinking cup | 10 | 1,000 | 10,000 |
| Hoe incl. Handles | 10 | 13,000 | 130,000 |
| Slasher | 2 | 6,000 | 12,000 |
| Panga | 5 | 8,000 | 40,000 |
| Axe incl. handles 5kg | 4 | 15,000 | 60,000 |
| Pick-axe incl. handles | 6 | 22,000 | 132,000 |
| Spade with metallic handles | 5 | 20,000 | 100,000 |
| Rake incl. Handle(Need to get locally made type with metallic handle) | 6 | 10,000 | 60,000 |
| Claw hammer, metallic handles | 2 | 15,000 | 30,000 |
| Wheelbarrow (Reliance) | 1 | 150,000 | 150,000 |
| Spirit level | 1 | 20,000 | 20,000 |
| Ditch Slope template | 1 | 80,000 | 80,000 |
| Camber board 8% | 1 | 42,000 | 42,000 |
| Boning rod B | 5 | 25,000.00 | 125,000 |
| | | | |
| Total | | | 1,106,000 |
| Add VAT | | | 199,080 |
| Grand Total | | | 1,305,080 |

There are 3 cardinal tools, hoes, pickaxe and spades in labour based road construction. Depending on the various site conditions, 5% of the total quantities of

tools in a specific Location (District) will be added to cater for unforeseen challenges in the implementation.

Where conditions require it the following special tools can be provided:

| Special Tool | No. | Price | Amo |
|----------------------------|------------|--------------|----------------|
| Crow Bar | 1 | 42,000 | 42,000 |
| Sledge Hammer 20Ibs | 1 | 100,000 | 100,000 |
| Sub Total | | | 142,000 |
| VAT | | | 25,560 |
| Total Special Tools | | | 167,560 |

e. Materials

| Materials | No. | Price | Total |
|-------------------------------|------------|--------------|----------------|
| Anti-termite chemical-1 Litre | 1 | 60,0 | 60,000 |
| First aid kit | 1 | 80,000 | 80,000 |
| Bow Saw with blade | 1 | 45,000 | 45,000 |
| Total | | | 185,000 |
| VAT | | | 33,300 |
| Total Materials | | | 218,300 |

f. Gravelling

Selected existing CAR/ District roads will be gravelled according to Sections F 2.8 to F2.9, Volume IV of the district road manual. Gravel of satisfactory quality shall be supplied, spread, watered and compacted to a minimum thickness of 100mm layers. Spot gravelling will be done on sections with problem soils and points of culverts installations. In case of extensive problem soils, the entire road link will be gravelled.

Spreading of gravels will be done using equipment and labour based approaches. During gravelling; shorter length <2000m will be gravelled using labour based approach, greater lengths >2000m will be gravelled using equipment. Due to high costs of watering, most compaction works will be done during rainy season, however; whenever necessary water bowsers will be engaged.

While screening, soil investigations (test pits) for preliminary observation may be undertaken to ascertain the nature of the soils if necessary.

The rates of the equipment hire needed shall be determined at the time of hire using DRC procurement procedures in case the District Equipment are not made available for use for the Project or the District does not own the equipment.

Gravel materials shall be procured by either of the two methods below;

1. Gravel supply will be tendered to local contractors at an average cost of 140,000/= per trip (3.0m³) within a radius of 20km from site location, for more distant locations beyond 20km, additional payments will be considered based on valid justification for extra kilometres covered and additional kilometres covered, a reasonable sum will then be topped up but will in no case exceed UGX3,000/= per km

of 3.0m³. This will be delivered at spacing of 3-meter c/c to site, and spread by technicians hired at 6,000 per trip.

2. Gravel materials will be procured directly from the local land owners, excavated, loaded and delivered to site by selected suppliers. This is most preferred because it is cheaper, ensures right quality and quantity and hence value for money will be realized.

A borrow pit will be established in some sub counties along one of the CARs being constructed by DRC where possible. Borrow pits provide the source material for the construction of road embankments, which depending on the local area are: gravel/aggregates, silica sands, laterite sands and calcite. These borrow pits will become major assets in local water security. Thus, as soon as the pits are no longer used for the mining of building materials, the excavated structure can become an important and valuable water supply source if the land lords allow. More specifically for rainwater harvesting irrigation management, rather than backfilling the pits or leaving them unattended, borrow pits can be systematically converted into sources of off-season small-scale irrigation

During wet periods, borrow pits can store rainwater and runoff from roads, and/or act as a recharge pond everywhere. In addition, in areas with high levels of shallow groundwater, borrow pits may also serve as a seepage pond, which are constantly recharged with seeping shallow groundwater from adjacent areas. Either way, borrow pits may serve as source of stock water, irrigation, fishery and with proper treatment even drinking water.

However, borrow pits for rainwater harvesting and off-season small-scale irrigation are currently used without planning. As a result of this, some borrow pits are unsafe and/or not reusable and/or sources of contaminated water. Due to this, there is a need to systematically approach the 'second life' of borrow pits as road water harvesting ponds for off-season small-scale irrigation. This requires to look at the following 4 factors: Siting of borrow pits; Shaping of borrow pits; Special protection measures and Management of borrow pits.

Therefore, for a 1km gravelling, an excavator will be hired for 5 days and 8 trucks of 3.0 cubic meter will also be hired for 5 days to haul gravel (a minimum of 10 trips per day depending on nature of road/distance) at estimated cost below.

| SNo. | Item description | Unit | Qty | Rate | Amounts |
|--------------|--|-------------|------------|-------------|-------------------|
| 1 | Procurement of borrow pits | No. | 1 | 1,500,000 | 1,500,000 |
| 2 | Mobilization & demobilization of excavator-Lowbed hire | route | 2 | 2,500,000 | 5,000,000 |
| 3 | Hire of excavators | days | 5 | 1,600,000 | 8,000,000 |
| 4 | Fuel for excavator | Litres | 500 | 4,300 | 2,150,000 |
| 5 | Hire of tipper trucks | days | 40 | 350,000 | 14,000,000 |
| 6 | Fuel for tipper trucks | Litres | 2000 | 4,300 | 8,600,000 |
| Total | | | | | 39,250,000 |

Similarly, where there is available man power, for a 1km gravelling, 30 persons will be hired for 20 days to excavate and load gravel and 8 trucks of 3.0 cubic meter will also be hired for 5 days to haul gravel at estimated cost below.

| SNo. | Item description | Unit | Qty | Rate | Amounts |
|--------------|----------------------------|-------------|------------|-------------|-------------------|
| 1 | Procurement of borrow pits | No. | 1 | 1,500,000 | 1,500,000 |
| 2 | Labour | Workdays | 600 | 6,000 | 3,600,000 |
| 5 | Hire of tipper trucks | days | 40 | 350,000 | 14,000,000 |
| 6 | Fuel for tipper trucks | Litres | 2000 | 4,300 | 8,600,000 |
| Total | | | | | 27,700,000 |

The rate of the hire of equipment and trucks may vary from the above rates depending on the market rate after DRC procurements are concluded.

Gravel supply for spot gravelling which is less done 1km shall be pro-rated accordingly by the engineering team.

An additional 5 days will be added to a group that will be working along a road where a borrow pit is converted into a pond to finish working on the pond at the cost below.

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount total |
|----------------|----------------------------|-----------------------------|-------------------------------|-----------------------|---------------------|
| Construction | 30 | 5 | 150 | 6,000 | 900,000 |

In difficult terrains with hills, valleys and swamps where roads are susceptible to destruction by floods, the run off and run on will be directed from the roads and catchment areas into bio swales and water ponds that can be used for production. The waters pond constructed in such a scenario will be regarded as a project to be implemented both using machines and community groups. This will be piloted in a few sub counties in each district in 2020 and rolled out in the rest of the project in 2021 and 2022.

In principle NURI does not support District roads, however, where there are very specific cases which link to other NURI activities and investments, these may be considered on a case-by-case basis.

Spreading: The material from one truck is off loaded and spread within a “box” marked out by pegs and strings. The pegs are set at the Centre line and edges of the box with the aid of camber board and spirit level to ensure satisfactory cross fall (of 8%) and the longitudinal gradient checked using boning rods.

The width of the box is equal to the carriage way width (4m) and 0.8m of shoulders on either side to be graveled and its length can be calculated according to the Truck capacity to ensure that material is spread to the correct loose thickness. See formula below.

$$\text{Length of box} = \frac{\text{Trailer/Truck capacity}}{\text{Road gravelled width} \times \text{layer thicknesses}}$$

Extra Gravel spreading:

All extra gravel shall be delivered by Local private contractors or DRC hired trucks and spreading will be done by the technicians at a rate of 6000/= per group member for one trip of gravel (3.0m³) delivered to site

In cases where a grader is hired for gravelling, the estimated dry rate shall be not more than 2,500,000 per day(8Hrs) and a maximum of 120 litres of fuel shall be issued.

h. compaction

Compaction shall be carried out with a vibrating roller of approved total weight and dimension.

CARs will be compacted immediately after the road has been shaped. However, compaction can only be done when the soil is moist. Normally the compaction will be done in the early part of the rainy season. In case, compaction is not done immediately, scarification will be done before compaction provided the cost of compaction will be within the budgeted amount in the investment plan. In any case compaction is delayed due to unforeseen circumstances, the road will be scarified and compacted.

Gravel compaction; The gravel is laid evenly and the surface smoothness longitudinal and transverse checked watered (to achieve approximate optimum moisture content) using towed bowsers fitted with a sprinkler bar from service provider or by labour using watering cans and small truck fitted with tanks of minimum 1000 litres hired at 350,000 per day at for 5 days of compaction of formed road 200m per day. In case a 3-ton pedestrian roller is hired, a dry rate of 350,000 is estimated. The number of days required for watering and compaction for spot gravelling shall be based on 200m length per day and number of days for compaction around the culverts shall be estimated by engineers depending on the scope of works along the road project. The rate of hire of the towed bowsers and rollers shall be finally determined by the market rate at the time of DRC procurement.

A minimum number (to be specified by the Engineer) of passes of compaction shall be applied or until no roller imprint on the surface can be recognised. It shall be noted that the standard specification as per the contract data be achieved regardless of the number of roller passes. Each gravel layers to be compacted should normally not exceed 200 mm loose. The camber of the compacted formation will be checked to ensure it does not exceed a cross fall of 8% or that specified by the design.

Preferably 2 pedestrian rollers (3ton) shall be procured per district/location and compaction shall be done directly by DRC. The operator shall be hired and paid at a rate of 35,300/= per day or employed for a short period of implementation as a casual labourer hired by DRC Procedures. At the end of a day's business, the pedestrian roller shall be kept at a nearby safe place e.g Police post, sub county headquarters, LC 1 executive home, PMC member whichever is near.

Government rates for paying operators and assistants will be used for paying District operators/drivers and assistants.

Casual labour rates of 15,000 per day will be paid for guards and Local Government Council Representatives where the machines are kept during implementation and as machines are awaiting to be demobilised. 3 people shall be paid for a day- 2 guards and 1 local government council representative.

i. Cash

The amount in cash to be paid for 1 km of CAR without RD approach

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount total |
|----------------|----------------------------|-----------------------------|-------------------------------|-----------------------|---------------------|
| Construction | 30 | 20 | 600 | 6,000 | 3,600,000 |

The amount in cash to be paid for 1 km of CAR with RD approach

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount total |
|----------------|----------------------------|-----------------------------|-------------------------------|-----------------------|---------------------|
| Construction | 30 | 25 | 750 | 6,000 | 4,500,000 |

The amount in cash to be paid for 1 km of minor rehabilitation of CAR without RD approach

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount total |
|-----------------|----------------------------|-----------------------------|-------------------------------|-----------------------|---------------------|
| Rehabilitations | 30 | 10 | 300 | 6,000 | 1,800,000 |

The amount in cash to be paid for 1 km of minor rehabilitation of CAR with RD

approach

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount total |
|-----------------|----------------------------|-----------------------------|-------------------------------|-----------------------|---------------------|
| Rehabilitations | 30 | 13 | 390 | 6,000 | 2,340,000 |

The work days and cash for major rehabilitations will be the same as for opening new CARs.

2 Kilometres of a road will be considered as a project for rehabilitation.

j. Obstacles for Road Construction

Where there are many obstacles like, trees and anthills they should be counted and the number of workdays to remove them should be calculated.

Depending on the total number of workdays, Nature and amount of the obstacles to be removed by a particular project group, the length of the road section for that group can be reduced from 1 km to 750m or 500 meters or additional 10 days will be added for the group members to complete the 1km road link.

k. Calculation of work days (WD)to remove obstacles

| Obstacle | Size | Unit | WDs | No. of trees | Total WDs |
|--------------------|------------------|-------------|------------|---------------------|------------------|
| Tree | 30-64 cm | girth | 0.5 | | |
| Tree | 65 – 125 cm | girth | 1 | | |
| Tree | 126 – 200 cm | girth | 2 | | |
| Tree | 201cm - | girth | 4 | | |
| Anthill | 5 – 10 meters | girth | 2 | | |
| Anthill | 11 – 20 meters | girth | 4 | | |
| Rock out Crops | 200cm-400cm | girth | 2 | | |
| Rock out Crops | 401cm- 600cm | girth | 4 | | |
| Heavy Cut and Fill | 2 m ³ | Volume | 1 | | |
| Grand Total | | | | | |

The “No.” column is filled in with the actual no. of trees and anthills and the total no. of work days

The girth is the circumference of the object. For trees it is measured at one meter’s height and for anthills at the ground and for rock out crops at the ETL level.

Trees with a girth of less than 30 cm and anthills with a girth of less than 5 meter are assumed to be part of the general bush clearing. Heavy volume of cut and fill will be considered after exceeding cutting of 30cm, otherwise a cut of upto 30cm is considered normal ETL.

NB: At screening level, the technical persons at the sites shall try to avoid the obstacles as much as possible.

I. Calculation of Extra days for removing obstacles

In 2022 projects an estimate of obstacles shall be done during screening and re assessed during implementations for un foreseen obstacles.

While in 2021, after site clearance and during implementation all the obstacles will be established and calculated before payments to establish the days earned for obstacle removal.

| Total WDs for removing obstacles | WDs to be earned for removing obstacle days |
|---|--|
| 0 - 30 | 0 |
| 31-60 | 30 |
| 61 - 90 | 60 |
| 91-120 | 90 |
| 121-150 | 120 |
| 151-180 | 150 |

A maximum of 150 earned obstacle work days shall be paid during the implementation. Work days earned shall be recorded and certified by the DRC team.

It is assumed that the first 30 work days for removing obstacles are included in the 750 work days that 1 km should require.

Annex 2: Technical Design - Culvert Crossing

The designs of different types of culvert structures are described in District Road Works Manuals, Vol. 4B, and Standard Design Manual.

a. Activities/Specifications:

- Site clearance of shrubs, herbs and trees
- Setting out of the culvert lines
- Excavation of the culvert line to the required length, width and depth, bed slope of 3% - 5%
- Stabilisation/densification of the natural or fill sub-grade
- (Re)alignment of the culvert rings fitting male and female parts
- Sealing of the joints with 1:2 mortar mix

- Back fill with well graded granular material containing a small amount of silt or clay in order to achieve dense, stable fill and fill material must be free from deleterious materials, rocks and hard earth clods larger than 75 mm in size. It must not contain any sod, cinders or earth containing organic matter and compact in 150mm - 200mm thick layers to at least 90% Standard Proctor Density (AASHTO T99). Minimum cover required is $\frac{3}{4}$ of internal diameter of Culvert specified.
- Where the stream bed is weak for considerable depth, 150-200mm approved hard core is placed, compacted and levelled before placing stable Layer.
- Construct Head and Wing walls in 1:3 mortar mix as per the designs including aprons with 400mm x 150mm cut-off mass concrete wall to prevent under cutting and water ponding.
- Excavate discharge ditch to safely discharge water from the culverts.
- Excavate side and mitre drains at approaches to dispose excess running water
- Construct scour checks where flow velocity in side drains is too high.
- Provide adequate culvert rump to maximum of 5% slope on both sides

The most commonly used culvert rings are of cement and with a diameter of 600 or 900 mm. A culvert installation can have one or multiple lines. In any case a bigger diameter culvert is required to be installed, designs and bills of quantities shall be done for the specific sites.

Other types of culvert installations are:

- ARMCO (Corrugated steel pipes)
- Arch culverts
- Box culverts

b. Standard Costs

The Table below shows the Standard costs for different culvert installations with 6 Culvert rings per line and with head and wing walls. Labour cost for culvert installation being 25 % of the Total materials cost and average transport costs may also be included. All access culverts shall have 7-8 culverts to enable long trucks to negotiate safely for all installations for projects implemented from season B 2020. 8 lines

| Summary cost of culvert Installation | | |
|---|-------------------------------|-------------|
| No. of lines | Diameter of rings (mm) | NURI |
| 1 | 600 | 5,323,250 |
| 2 | 600 | 8,239,750 |
| 3 | 600 | 11,507,375 |
| 1 | 900 | 7,128,625 |
| 2 | 900 | 11,095,645 |

| | | |
|---|-----|------------|
| 3 | 900 | 15,895,370 |
|---|-----|------------|

| Summary cost of Encased culvert Installation | | |
|---|-------------------------------|-------------|
| No. of lines | Diameter of rings (mm) | NURI |
| 1 | 600 | 6,707,560 |
| 2 | 600 | 12,937,225 |
| 3 | 600 | 15,505,200 |
| 1 | 900 | 10,032,950 |
| 2 | 900 | 18,334,250 |
| 3 | 900 | 26,170,925 |

The engineers will determine whether the culverts should be encased or not depending anticipated traffic loads and conditions of soil. In most parts of refugee settlements where there is heavy traffic and in rift valley belts where the soils are weak will require the culverts to be encased with concrete.

c. Standard BOQs for Installation of various sizes of culverts

(One trip = 3.0m³)

| A | 600mm Single Line | | | NURI | |
|------------|---------------------------|--------------------|------------|-------------------|------------------|
| no. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 600mm culvert pieces | No | 6 | 180,000 | 1,080,000 |
| 2 | Cements | Bags | 10 | 33,000 | 330,000 |
| 3 | Hardcore | Trip | 1 | 50,000 | 50,000 |
| 4 | Fine aggregates | Trip | 1 | 45,000 | 45,000 |
| 5 | Coarse aggregates (Black) | Trip | 1 | 250,000 | 250,000 |
| 6 | Marram | Trip | 15 | 40,000 | 600,000 |
| 7 | Sawn form work 300x25x4m | Pcs | 4 | 25,000 | 100,000 |
| 8 | Water | 20 Litres jericans | 20 | 500 | 10,000 |
| | Sub-Total | | | | 2,465,000 |
| 9 | Labour | | | 25% | 616,250 |
| 10 | Transportation | | | | 1,900,000 |
| | Total | | | | 4,981,250 |

| | | | | | |
|--|--------------------|--|--|--|------------------|
| | Add 18% VAT | | | | 342,000 |
| | GRAND TOTAL | | | | 5,323,250 |

| B | 900mm Single line | | | NURI | |
|------------|-----------------------------|-----------------------|------------|-------------------|------------------|
| no. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 900mm culvert pieces | No | 6 | 250,000 | 1,500,000 |
| 2 | Cements | Bags | 15 | 33,000 | 495,000 |
| 3 | Hardcore | Trip | 2 | 50,000 | 100,000 |
| 4 | Fine aggregates | Trip | 2 | 45,000 | 90,000 |
| 5 | Coarse aggregates (Black) | Trip | 1 | 250,000 | 250,000 |
| 6 | Marram | Trip | 20 | 40,000 | 800,000 |
| 7 | Sawn form work 300x25x4m | pcs | 4 | 25,000 | 100,000 |
| 8 | Water | 20 litres jericans | 25 | 500 | 12,500 |
| | Sub total | | | | 3,347,500 |
| 9 | Labour | | | 25% | 836,875 |
| 10 | Transportation | | | | 2,600,000 |
| | Total | | | | 6,784,375 |
| | Add 18% VAT | | | | 602,550 |
| | GRAND TOTAL | | | | 7,386,925 |

| C | 600mm Two lines | | | NURI | |
|------------|--------------------------|-----------------------|------------|-------------------|------------------|
| No. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 600mm Culvert pieces | Pieces | 12 | 180,000 | 2,160,000 |
| 2 | Cements | Bags | 16 | 33,000 | 528,000 |
| 3 | Hardcore | Trips | 2 | 50,000 | 100,000 |
| 4 | Fine Aggregates | Trips | 2 | 45,000 | 90,000 |
| 5 | Coarse Aggregates | Trips | 1 | 250,000 | 250,000 |
| 6 | Marram | Trips | 20 | 40,000 | 800,000 |
| 7 | Sawn form work 300x25x4m | Pcs | 4 | 25,000 | 100,000 |
| 8 | Water | 20 Litres jericans | 30 | 500 | 15,000 |
| | Sub-Total | | | | 4,043,000 |
| 9 | Labour | | | 25% | 1,010,750 |

| | | | | | |
|----|--------------------|--|--|--|------------------|
| 10 | Transportation | | | | 2,700,000 |
| | Sub Total | | | | 7,753,750 |
| | Add 18% VAT | | | | 486,000 |
| | GRAND TOTAL | | | | 8,239,750 |

| D | 900mm Two line | | | NURI | |
|----------|--------------------------|-----------------------|-----|-------------|-------------------|
| No. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 900mm Culvert pieces | Pieces | 12 | 250,000 | 3,000,000 |
| 2 | Cements | Bags | 18 | 33,000 | 594,000 |
| 3 | Hardcore | Trips | 3 | 50,000 | 150,000 |
| 4 | Fine Aggregates | Trips | 2 | 45,000 | 90,000 |
| 5 | Coarse Aggregates | Trips | 2 | 250,000 | 500,000 |
| 6 | Marram | Trips | 25 | 40,000 | 1,000,000 |
| 7 | Sawn form work 300x25x4m | Pcs | 4 | 25,000 | 100,000 |
| 8 | Water | 20 Litres jericans | 35 | 500 | 17,500 |
| | Sub-Total | | | | 5,451,500 |
| 9 | Labour | | | 25% | 1,362,875 |
| 10 | Transportation | | | | 3,300,000 |
| | Sub Total | | | | 10,114,375 |
| | Add 18% VAT | | | | 981,270 |
| | GRAND TOTAL | | | | 11,095,645 |

| E | 600mm Three lines | | | NURI | |
|----------|-----------------------------|-----------------------|-----|-------------|-----------|
| No. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 600mm Culvert pieces | Pieces | 18 | 180,000 | 3,240,000 |
| 2 | Cements | Bags | 20 | 33,000 | 660,000 |
| 3 | Hardcore | Trips | 4 | 50,000 | 200,000 |
| 4 | Fine Aggregates | Trips | 2 | 45,000 | 90,000 |
| 5 | Coarse Aggregates | Trips | 2 | 250,000 | 500,000 |
| 6 | Marram | Trips | 25 | 40,000 | 1,000,000 |
| 7 | Sawn form work 300x25x4m | Pcs | 4 | 25,000 | 100,000 |
| 8 | Water | 20 Litres jericans | 35 | 500 | 17,500 |

| | | | | | |
|----|--------------------|--|--|-----|-------------------|
| | Sub-Total | | | | 5,807,500 |
| 9 | Labour | | | 25% | 1,451,875 |
| 10 | Transportation | | | | 3,600,000 |
| | Sub Total | | | | 10,859,375 |
| | Add 18% VAT | | | | 648,000 |
| | GRAND TOTAL | | | | 11,507,375 |

| F | 900mm Three lines | | | NURI | |
|------------|------------------------------|-----------------------|------------|-------------------|-------------------|
| No. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 900mm Culvert pieces | Pieces | 18 | 250,000 | 4,500,000 |
| 2 | Cements | Bags | 23 | 33,000 | 759,000 |
| 3 | Hardcore | Trips | 6 | 50,000 | 300,000 |
| 4 | Fine Aggregates (River sand) | Trips | 4 | 45,000 | 180,000 |
| 5 | Coarse Aggregates | Trips | 2 | 250,000 | 500,000 |
| 6 | Marram | Trips | 35 | 40,000 | 1,400,000 |
| 7 | Sawn form work 300x25x4m | Pcs | 4 | 25,000 | 100,000 |
| 8 | Water | 20 Litres jericans | 40 | 500 | 20,000 |
| | Sub-Total | | | | 7,759,000 |
| 9 | Labour | | | 25% | 1,939,750 |
| 10 | Transportation | | | | 4,800,000 |
| | Sub Total | | | | 14,498,750 |
| | Add 18% VAT | | | | 1,396,620 |
| | GRAND TOTAL | | | | 15,895,370 |

d. Standard BOQs for Installation of various sizes of culverts (One trip minimum = 3.0m³)

| A | 600mm Single Line Encased | | | NURI | |
|------------|---|-------------|------------|-------------------|---------------|
| no. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 600mm diam.X 1.0m long Concrete culvert pipe rings 80mm thick and manufactured with Concrete C25 and BRCA142 mesh | No | 6 | 180,000 | 1,080,000 |

| | | | | | |
|----|--|----------------|----|---------|------------------|
| 2 | Portland Pozzolana Cement in packs of 50kg net weight | Bags | 16 | 33,000 | 528,000 |
| 3 | Hardcore of igneous stones in 3 Cubic metre trip | Trip | 1 | 50,000 | 50,000 |
| 4 | Fine aggregates (lake/river sand) in 3 cubic metre trip | Trip | 2 | 45,000 | 90,000 |
| 5 | Coarse aggregates (Black igneous stones) in a 3 cubic metre trip | Trip | 1 | 250,000 | 250,000 |
| 6 | Marram | Trip | 20 | 40,000 | 800,000 |
| 7 | Sawn form work 300x25x4m | Pcs | 16 | 25,000 | 400,000 |
| 8 | Sawn form work 100x50x4m | Pcs | 2 | 9,000 | 18,000 |
| 9 | Assorted wire nails | Kg | 8 | 7,000 | 56,000 |
| 10 | Water for works | 20 Litre j.can | 40 | 500 | 20,000 |
| | Sub-Total 1 | | | | 3,292,000 |
| | Add 25% labour | | | | 823,000 |
| | Transportation | | | | 2,000,000 |
| | Sub Total 2 | | | | 6,115,000 |
| | Add 18% VAT | | | | 592,560 |
| | GRAND TOTAL | | | | 6,707,560 |

| B | 600mm Two Lines Encased | | | NURI | |
|------------|---|-------------|------------|-------------------|---------------|
| no. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 600mm diam.X 1.0m long Concrete culvert pipe rings 80mm thick and manufactured with Concrete C25 and BRCA142 mesh | No | 12 | 180000 | 2160000 |
| 2 | Portland Pozzolana Cement in packs of 50kg net weight | Bags | 45 | 33,000 | 1485000 |
| 3 | Hardcore of igneous stones in 3 Cubic metre trip | Trip | 2 | 50,000 | 100,000 |
| 4 | Fine aggregates (lake/river sand) in 3 cubic metre trip | Trip | 4 | 45,000 | 180,000 |
| 5 | Coarse aggregates (Black igneous stones) in a 3 cubic metre trip | Trip | 2 | 250,000 | 500,000 |
| 6 | Marram | Trip | 25 | 40,000 | 1,000,000 |

| | | | | | |
|----|--------------------------|-------------------|----|--------|-------------------|
| 7 | Sawn form work 300x25x4m | Pcs | 20 | 25,000 | 500,000 |
| 8 | Sawn form work 100x50x4m | Pcs | 4 | 9,000 | 36,000 |
| 9 | Assorted wire nails | Kg | 10 | 7,000 | 70,000 |
| 10 | Water for works | 20 Litre j.can | 40 | 500 | 20,000 |
| | Sub-Total 1 | | | | 6,051,000 |
| | Add 25% labour | | | | 1,512,750 |
| | Transportation | | | | 3,400,000 |
| | Sub Total 2 | | | | 10,963,750 |
| | Add 18% VAT | | | | 1,973,475 |
| | GRAND TOTAL | | | | 12,937,225 |

| C | 600mm Triple Line Encased | | | NURI | |
|------------|---|-------------------|------------|-------------------|------------------|
| no. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 600mm diam.X 1.0m long Concrete culvert pipe rings 80mm thick and manufactured with Concrete C25 and BRCA142 mesh | No | 18 | 180,000 | 3240000 |
| 2 | Portland Pozzolana Cement in packs of 50kg net weight | Bags | 58 | 33,000 | 1914000 |
| 3 | Hardcore of igneous stones in 3 Cubic metre trip | Trip | 2 | 50,000 | 100000 |
| 4 | Fine aggregates (lake/river sand) in 3 cubic metre trip | Trip | 4 | 45,000 | 180000 |
| 5 | Coarse aggregates (Black igneous stones) in a 3 cubic metre trip | Trip | 2 | 250,000 | 500000 |
| 6 | Marram | Trip | 30 | 40,000 | 1200000 |
| 7 | Sawn form work 300x25x4m | Pcs | 20 | 25,000 | 500000 |
| 8 | Sawn form work 100x50x4m | Pcs | 6 | 9,000 | 54,000 |
| 9 | Assorted wire nails | Kg | 12 | 7,000 | 84000 |
| 10 | Water for works | 20 Litre j.can | 40 | 500 | 20000 |
| | Sub-Total 1 | | | | 7,792,000 |

| | | | | | |
|--|----------------|--|--|--|-------------------|
| | Add 25% labour | | | | 1,948,000 |
| | Transportation | | | | 3,400,000 |
| | Sub Total 2 | | | | 13,140,000 |
| | Add 18% VAT | | | | 2,365,200 |
| | GRAND TOTAL | | | | 15,505,200 |

| A | 900mm Single Line Encased | | | NURI | |
|------------|---|----------------|------------|-------------------|-------------------|
| no. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 600mm diam.X 1.0m long Concrete culvert pipe rings 80mm thick and manufactured with Concrete C25 and BRCA142 mesh | No | 6 | 250,000 | 1,500,000 |
| 2 | Portland Pozzolana Cement in packs of 50kg net weight | Bags | 27 | 33,000 | 891,000 |
| 3 | Hardcore of igneous stones in 3 Cubic metre trip | Trip | 2 | 50,000 | 100,000 |
| 4 | Fine aggregates (lake/river sand) in 3 cubic metre trip | Trip | 3 | 45,000 | 135,000 |
| 5 | Coarse aggregates (Black igneous stones) in a 3 cubic metre trip | Trip | 2 | 250,000 | 500,000 |
| 6 | Marram | Trip | 25 | 40,000 | 1,000,000 |
| 7 | Sawn form work 300x25x4m | Pcs | 12 | 25,000 | 300,000 |
| 8 | Sawn form work 100x50x4m | Pcs | 4 | 9,000 | 36,000 |
| 9 | Assorted wire nails | Kg | 10 | 7,000 | 70,000 |
| 10 | Water for works | 20 Litre j.can | 60 | 500 | 30,000 |
| | Sub-Total 1 | | | | 4,562,000 |
| | Add 25% labour | | | | 1,140,500 |
| | Transportation | | | | 2,800,000 |
| | Sub Total 2 | | | | 8,502,500 |
| | Add 18% VAT | | | | 1,530,450 |
| | GRAND TOTAL | | | | 10,032,950 |

| A | 900mm Double Line Encased | | | NURI | |
|------------|--|----------------|------------|-------------------|-------------------|
| no. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 600mm diam. X 1.0m long Concrete culvert pipe rings 80mm thick and manufactured with Concrete C25 and BRCA142 mesh | No | 12 | 250,000 | 3,000,000 |
| 2 | Portland Pozzolana Cement in packs of 50kg net weight | Bags | 73 | 33,000 | 2,409,000 |
| 3 | Hardcore of igneous stones in 3 Cubic metre trip | Trip | 5 | 50,000 | 250,000 |
| 4 | Fine aggregates (lake/river sand) in 3 cubic metre trip | Trip | 6 | 45,000 | 270,000 |
| 5 | Coarse aggregates (Black igneous stones) in a 3 cubic metre trip | Trip | 7 | 250,000 | 1,750,000 |
| 6 | Marram | Trip | 30 | 40,000 | 1,200,000 |
| 7 | Sawn form work 300x25x4m | Pcs | 16 | 25,000 | 400,000 |
| 8 | Sawn form work 100x50x4m | Pcs | 6 | 9,000 | 54,000 |
| 9 | Assorted wire nails | Kg | 11 | 7,000 | 77,000 |
| 10 | Water for works | 20 Litre j.can | 120 | 500 | 60,000 |
| | Sub-Total 1 | | | | 9,470,000 |
| | Add 25% labour | | | | 2,367,500 |
| | Transportation | | | | 3,700,000 |
| | Sub Total 2 | | | | 15,537,500 |
| | Add 18% VAT | | | | 2,796,750 |
| | GRAND TOTAL | | | | 18,334,250 |

| A | 900mm Triple Line Encased | | | NURI | |
|------------|---|-------------|------------|-------------------|---------------|
| no. | Item description | Unit | Qty | Unit price | Amount |
| 1 | 600mm diam.X 1.0m long Concrete culvert pipe rings 80mm thick and manufactured with Concrete C25 and BRCA142 mesh | No | 18 | 250,000 | 4,500,000 |
| 2 | Portland Pozzolana Cement in packs of 50kg net weight | Bags | 95 | 33,000 | 3,135,000 |

| | | | | | |
|----|--|----------------|-----|---------|-------------------|
| 3 | Hardcore of igneous stones in 3 Cubic metre trip | Trip | 8 | 50,000 | 400,000 |
| 4 | Fine aggregates (lake/river sand) in 3 cubic metre trip | Trip | 7 | 45,000 | 315,000 |
| 5 | Coarse aggregates (Black igneous stones) in a 3 cubic metre trip | Trip | 9 | 250,000 | 2,250,000 |
| 6 | Marram | Trip | 40 | 40,000 | 1,600,000 |
| 7 | Sawn form work 300x25x4m | Pcs | 20 | 25,000 | 500,000 |
| 8 | Sawn form work 100x50x4m | Pcs | 8 | 9,000 | 72,000 |
| 9 | Assorted wire nails | Kg | 13 | 7,000 | 91,000 |
| 10 | Water for works | 20 Litre j.can | 160 | 500 | 80,000 |
| | Sub-Total 1 | | | | 12,943,000 |
| | Add 25% labour | | | | 3,235,750 |
| | Transportation | | | | 6,000,000 |
| | Sub Total 2 | | | | 22,178,750 |
| | Add 18% VAT | | | | 3,992,175 |
| | GRAND TOTAL | | | | 26,170,925 |

Standard designs

Design drawings showing

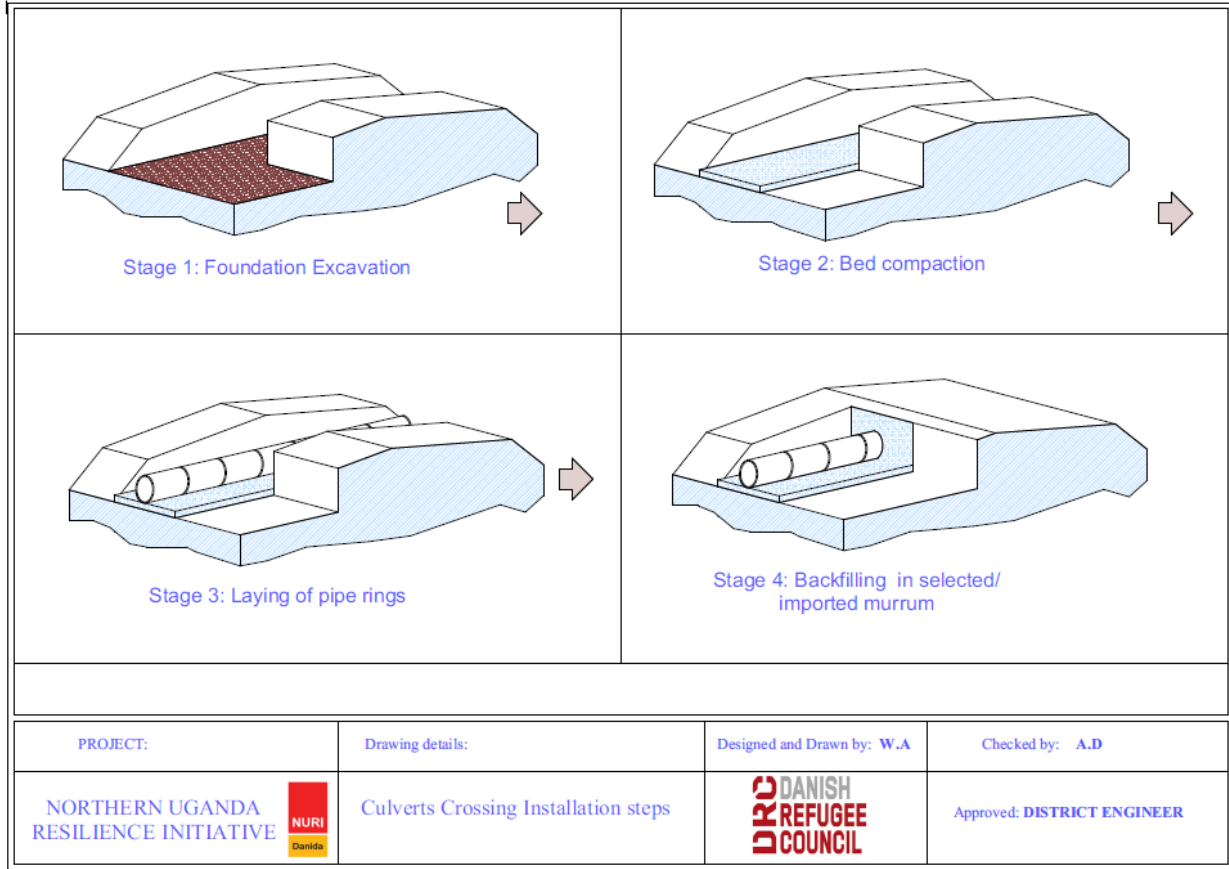
- Apron
- Plan
- Wing walls
- Front

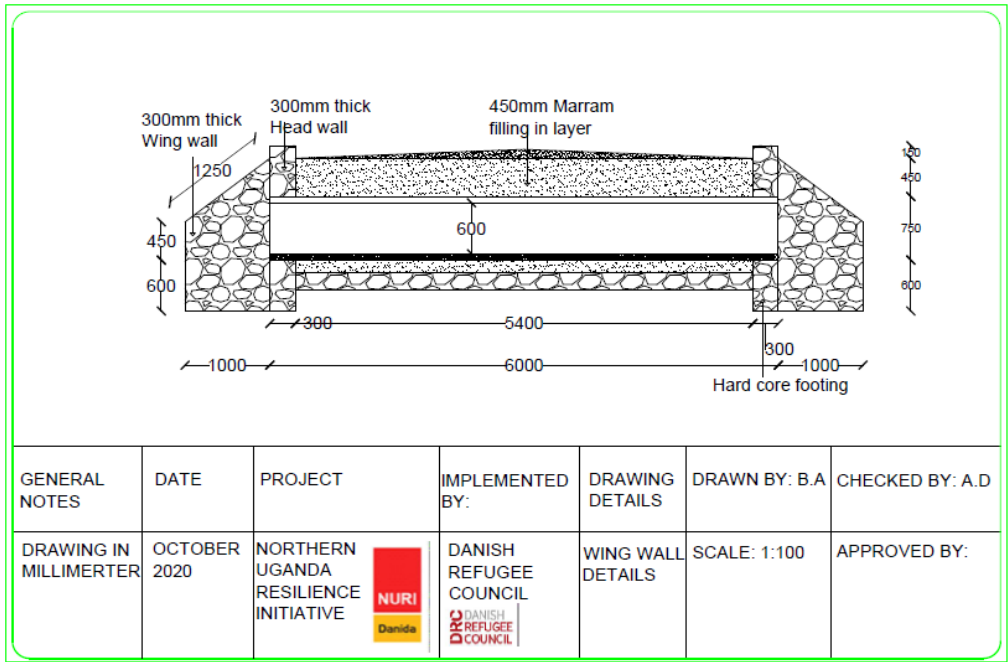
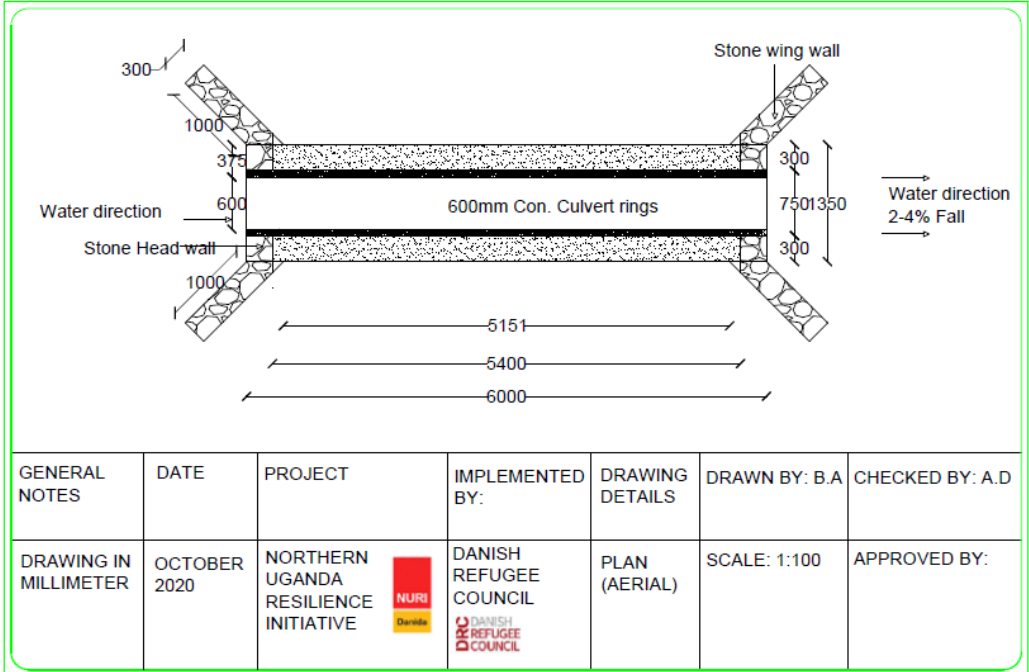
are available for each of the following culvert types

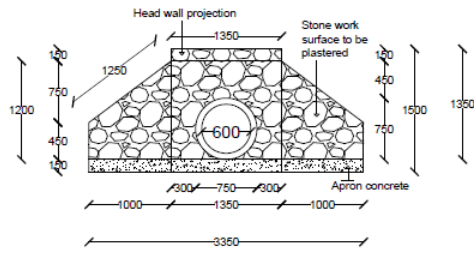
- 1 line, 600 mm
- 2 lines, 600 mm
- 3 lines, 600 mm
- 1 line, 900 mm
- 2 lines, 900 mm
- 3 lines, 900 mm



Relief structures.

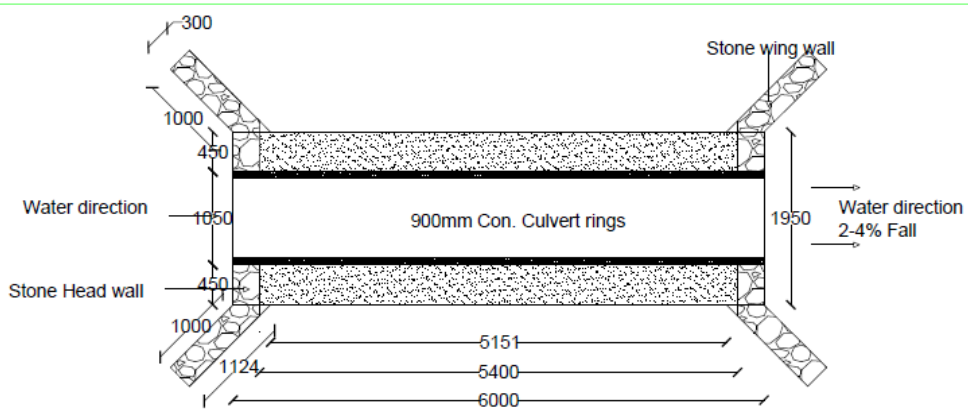
Drop Inlets shall be constructed for relief culverts as described in District Road Works Manuals, Vol. 4B, and Standard Design Manual.





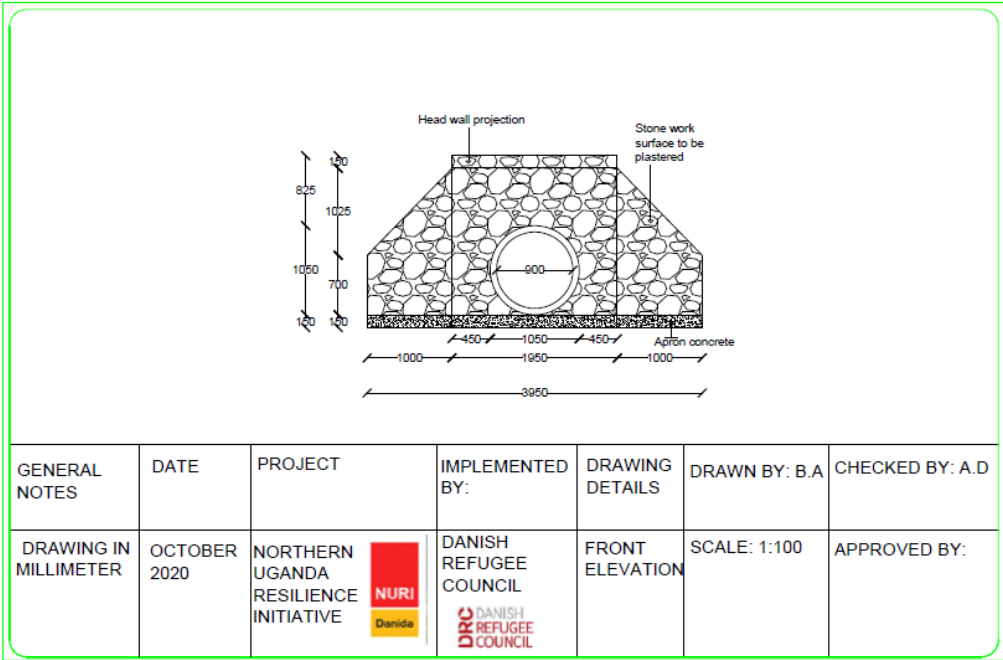
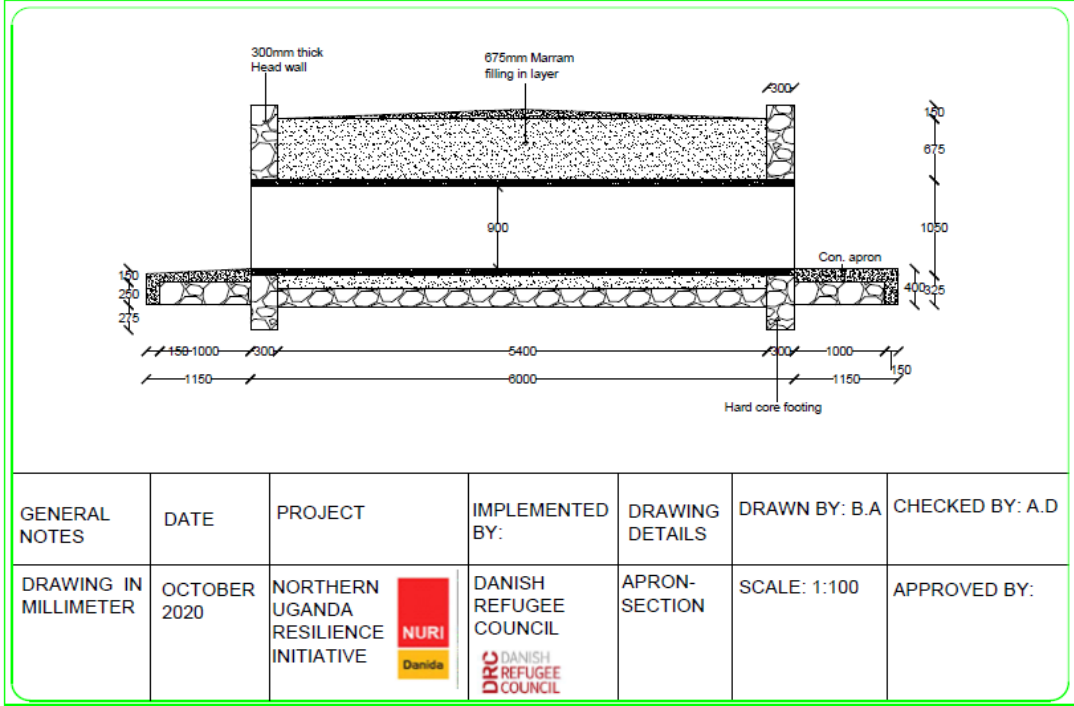


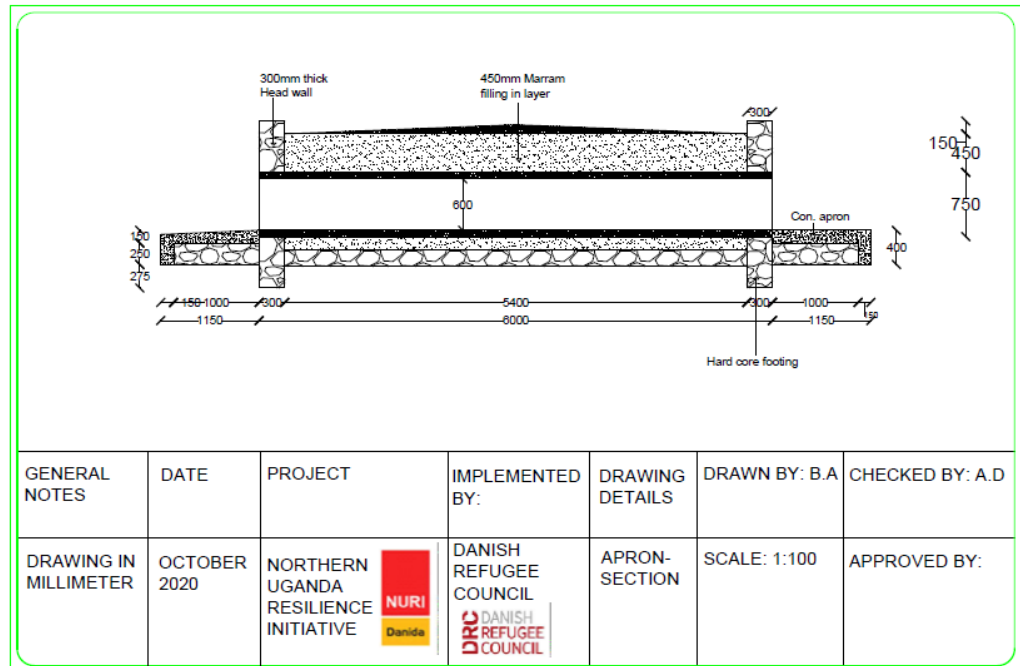
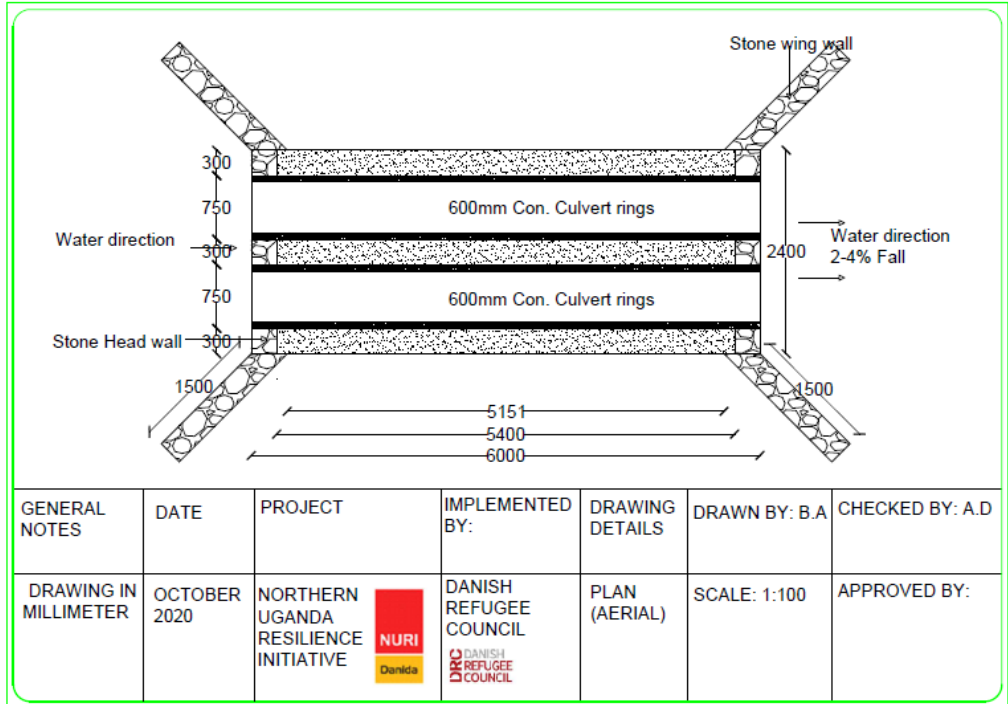


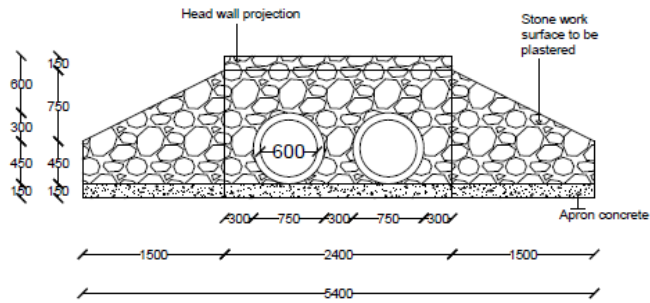
| | | | | | | |
|-----------------------|--------------|--|---|-----------------|---------------|-----------------|
| GENERAL NOTES | DATE | PROJECT | IMPLEMENTED BY: | DRAWING DETAILS | DRAWN BY: B.A | CHECKED BY: A.D |
| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE  | DANISH REFUGEE COUNCIL  | FRONT ELEVATION | SCALE: 1:100 | APPROVED BY: |






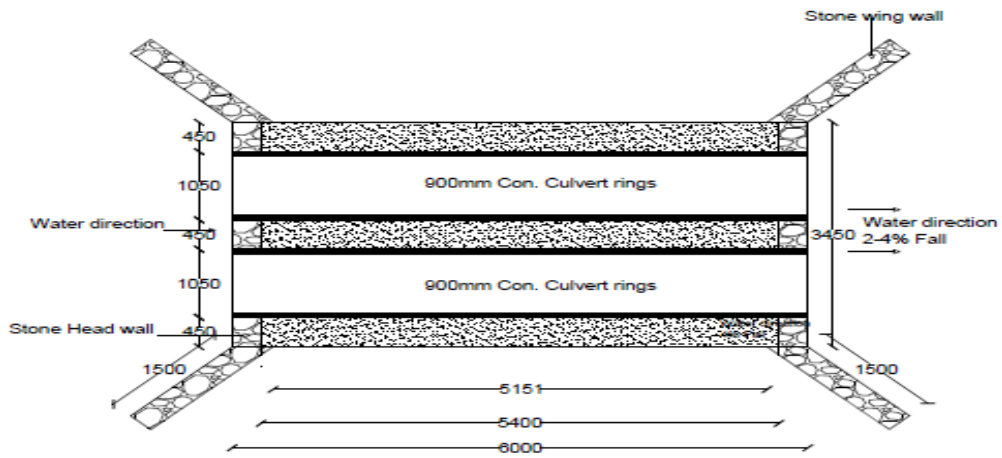
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| GENERAL NOTES | DATE | PROJECT | IMPLEMENTED BY: | DRAWING DETAILS | DRAWN BY: B.A | CHECKED BY: A.D |
| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE  | DANISH REFUGEE COUNCIL  | PLAN (AERIAL) | SCALE: 1:100 | APPROVED BY: |






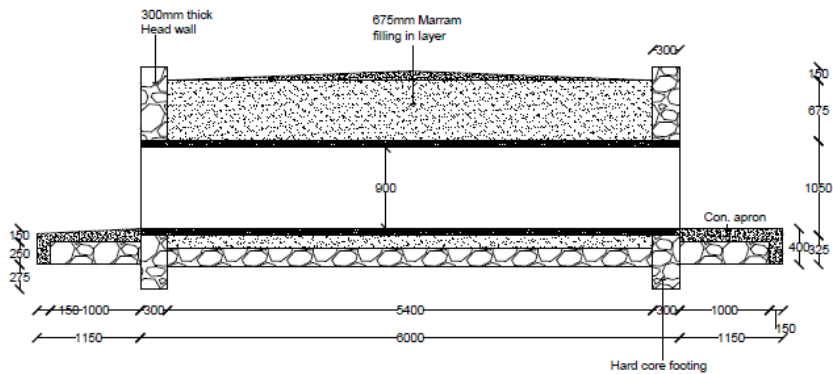







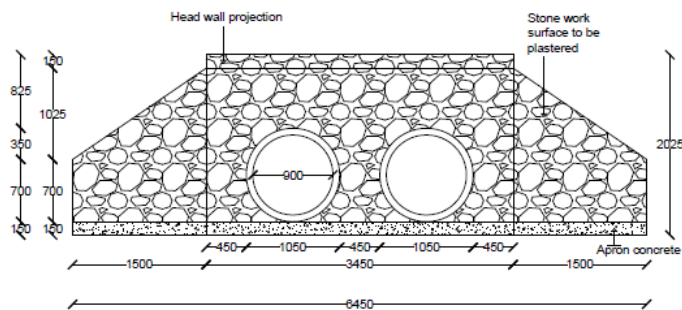
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| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE   | DANISH REFUGEE COUNCIL  | FRONT ELEVATION | SCALE: 1:100 | APPROVED BY: |






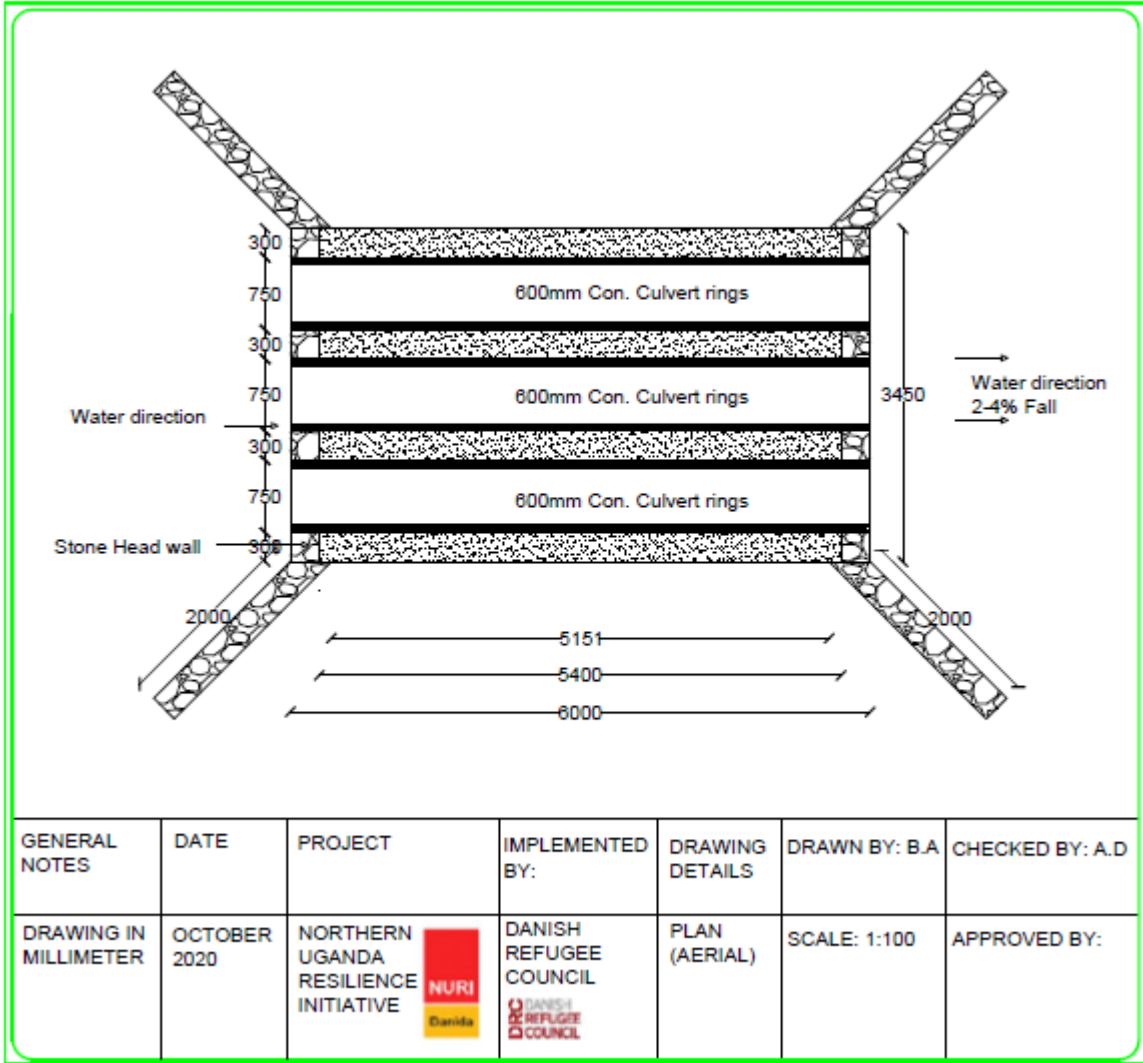
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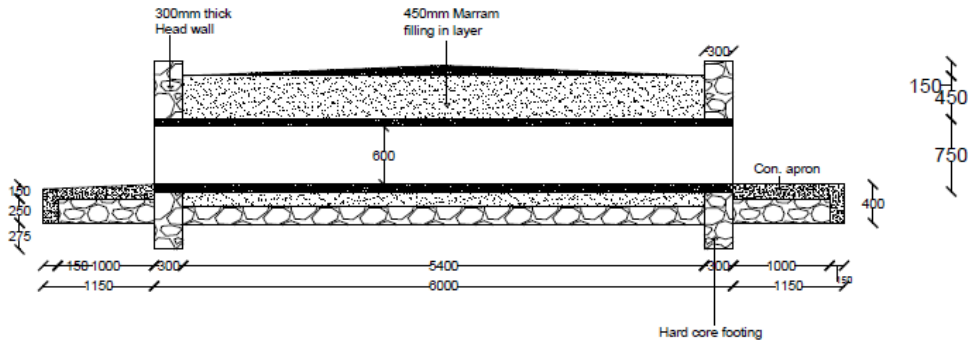


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| GENERAL NOTES | DATE | PROJECT | IMPLEMENTED BY: | DRAWING DETAILS | DRAWN BY: B.A | CHECKED BY: A.D |
| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE   | DANISH REFUGEE COUNCIL  | APRON-SECTION | SCALE: 1:100 | APPROVED BY: |

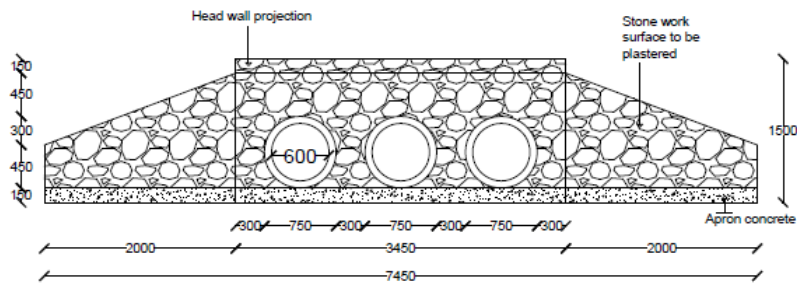



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| GENERAL NOTES | DATE | PROJECT | IMPLEMENTED BY: | DRAWING DETAILS | DRAWN BY: B.A | CHECKED BY: A.D |
| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE   | DANISH REFUGEE COUNCIL  | FRONT ELEVATION | SCALE: 1:100 | APPROVED BY: |

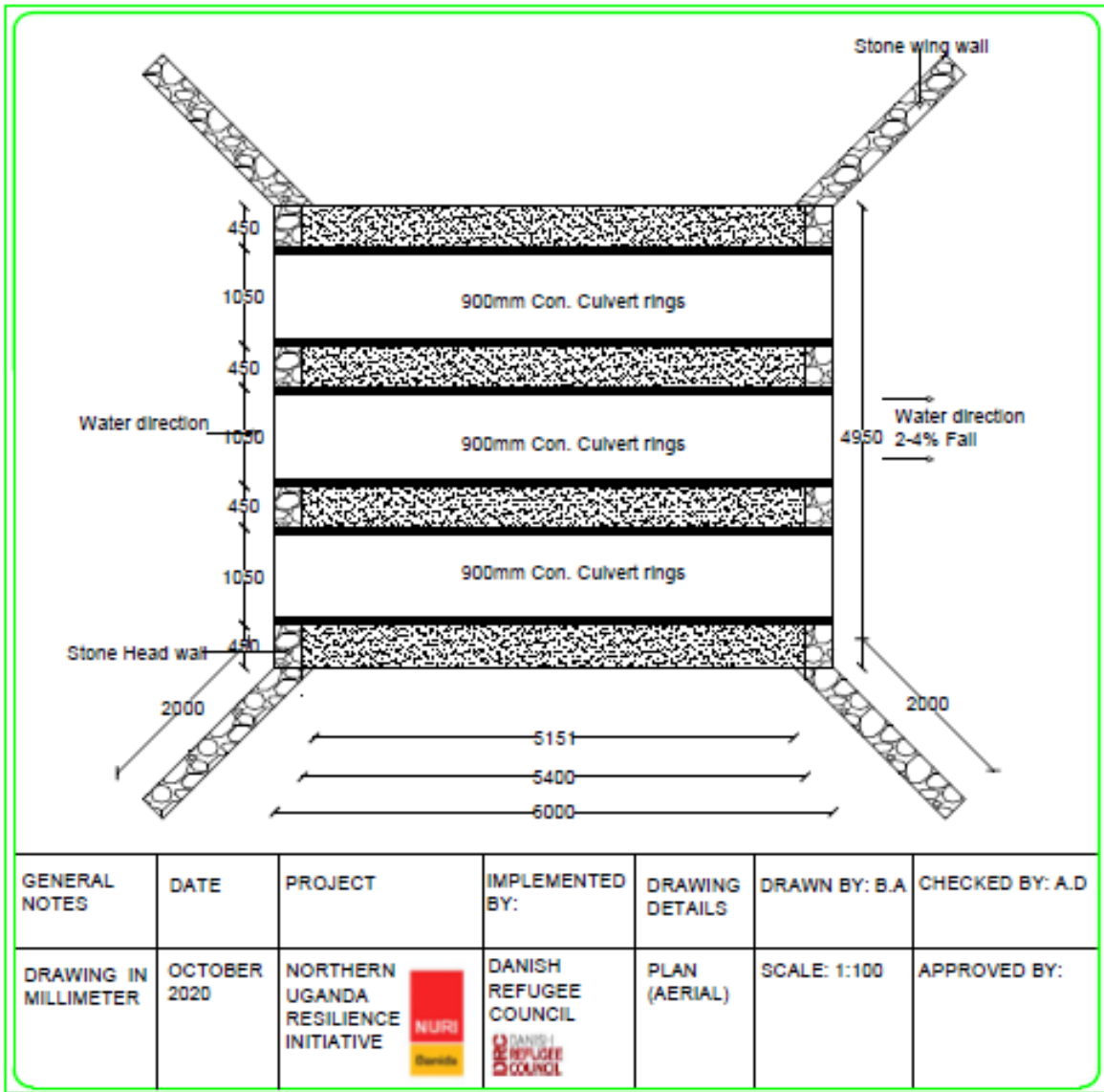


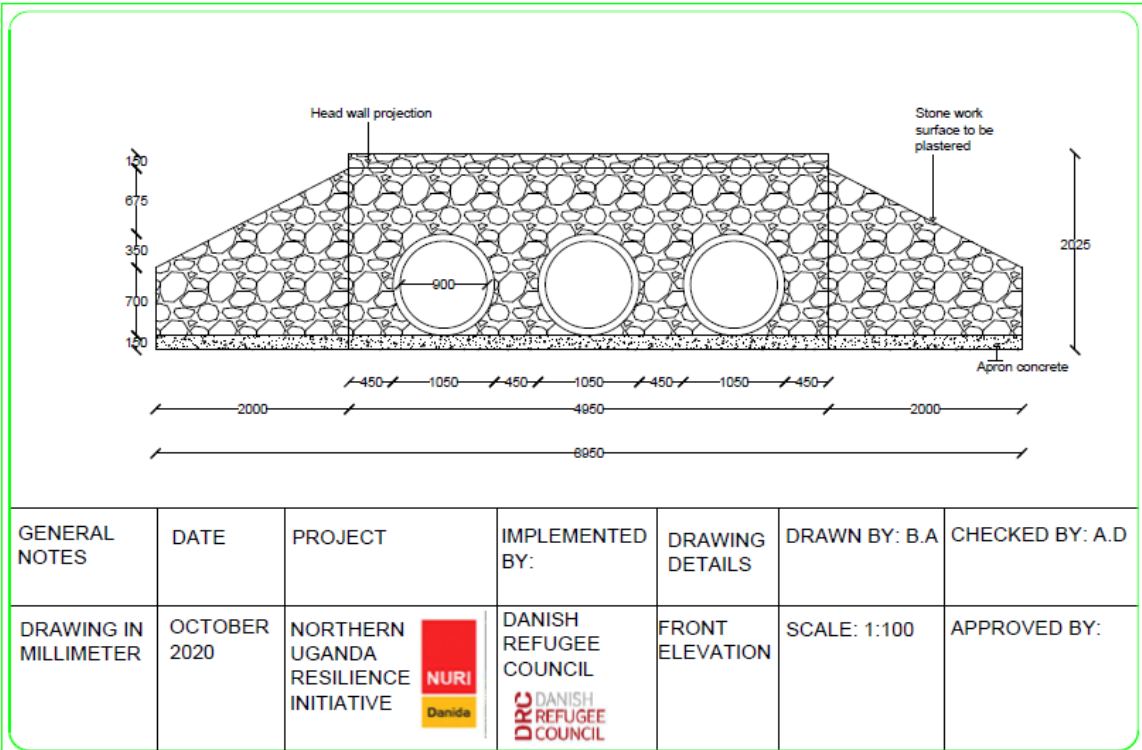
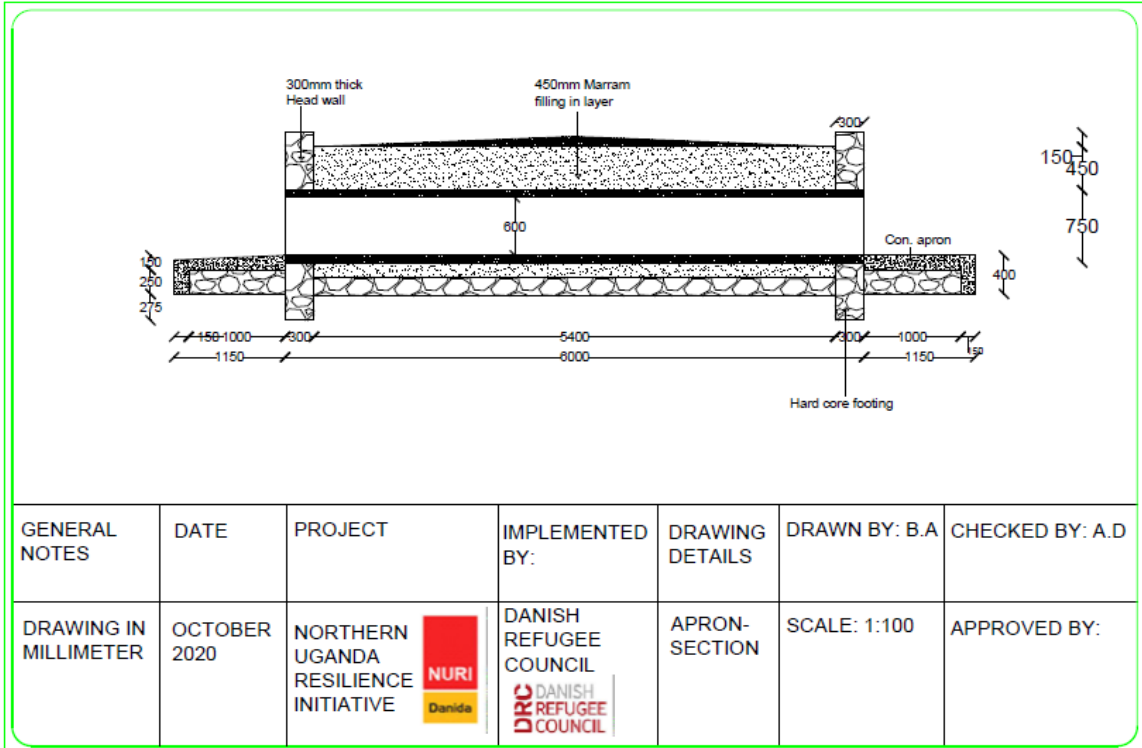


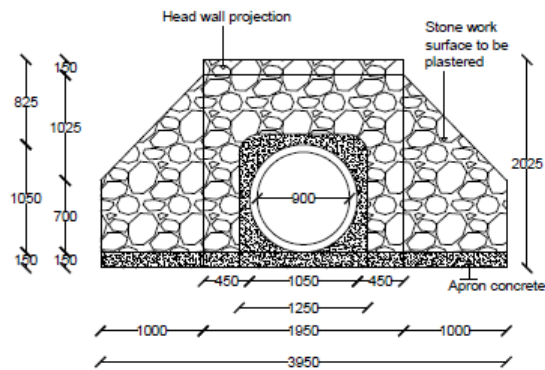
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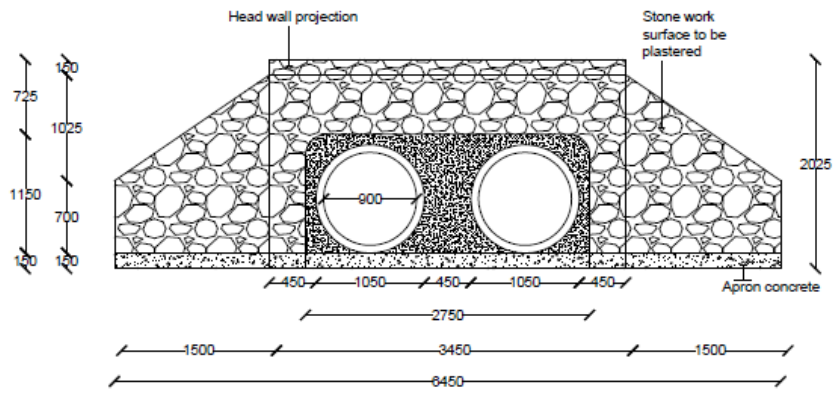
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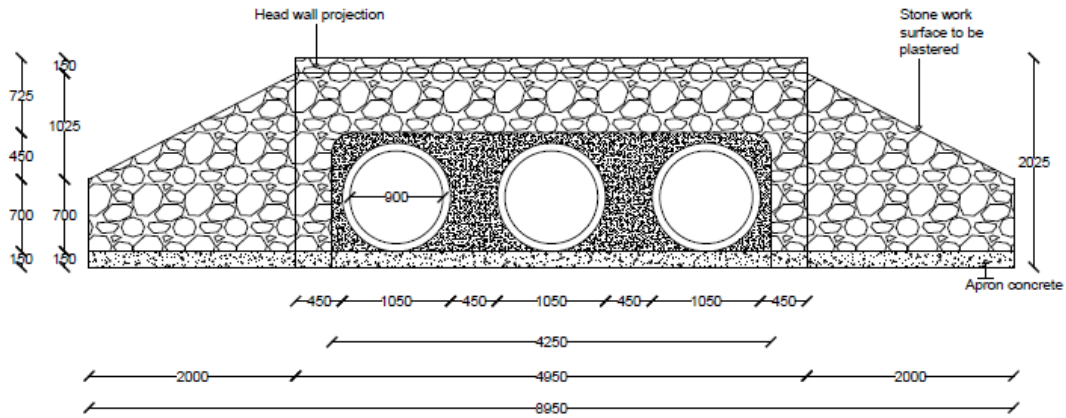






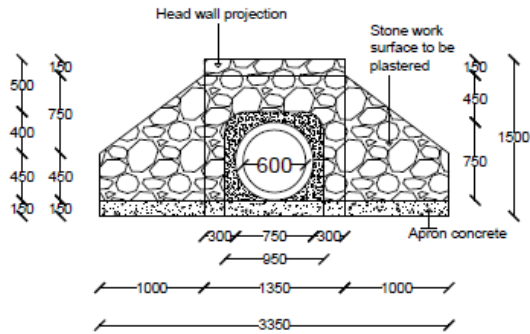
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| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE  | DANISH REFUGEE COUNCIL  | FRONT ELEVATION ENCASED | SCALE: 1:100 | APPROVED BY: |







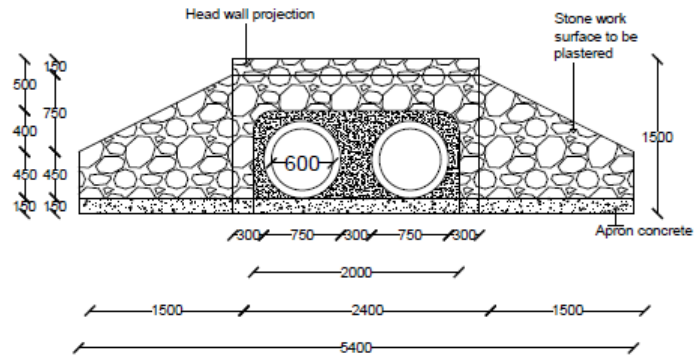
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



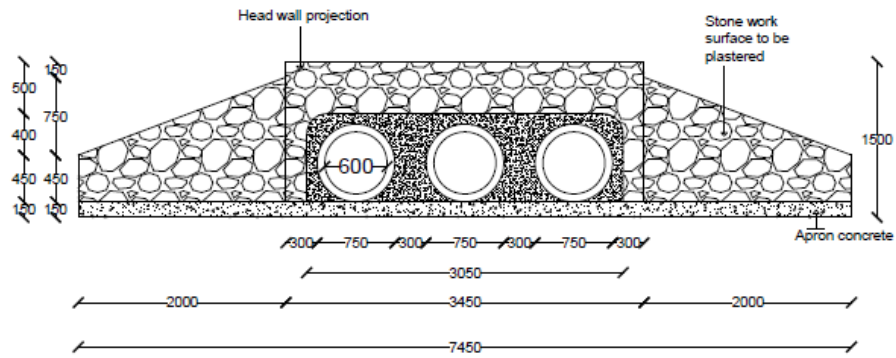
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| GENERAL NOTES | DATE | PROJECT | IMPLEMENTED BY: | DRAWING DETAILS | DRAWN BY: B.A | CHECKED BY: A.D |
| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE  | DANISH REFUGEE COUNCIL  | FRONT ELEVATION ENCASED | SCALE: 1:100 | APPROVED BY: |



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| GENERAL NOTES | DATE | PROJECT | IMPLEMENTED BY: | DRAWING DETAILS | DRAWN BY: B.A | CHECKED BY: A.D |
| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE   | DANISH REFUGEE COUNCIL   | FRONT ELEVATION ENCASED | SCALE: 1:100 | APPROVED BY: |



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| GENERAL NOTES | DATE | PROJECT | IMPLEMENTED BY: | DRAWING DETAILS | DRAWN BY: B.A | CHECKED BY: A.D |
| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE   | DANISH REFUGEE COUNCIL  | FRONT ELEVATION ENCASED | SCALE: 1:100 | APPROVED BY: |







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| GENERAL NOTES | DATE | PROJECT | IMPLEMENTED BY: | DRAWING DETAILS | DRAWN BY: B.A | CHECKED BY: A.D |
| DRAWING IN MILLIMETER | OCTOBER 2020 | NORTHERN UGANDA RESILIENCE INITIATIVE  | DANISH REFUGEE COUNCIL  | FRONT ELEVATION ENCASED | SCALE: 1:100 | APPROVED BY: |

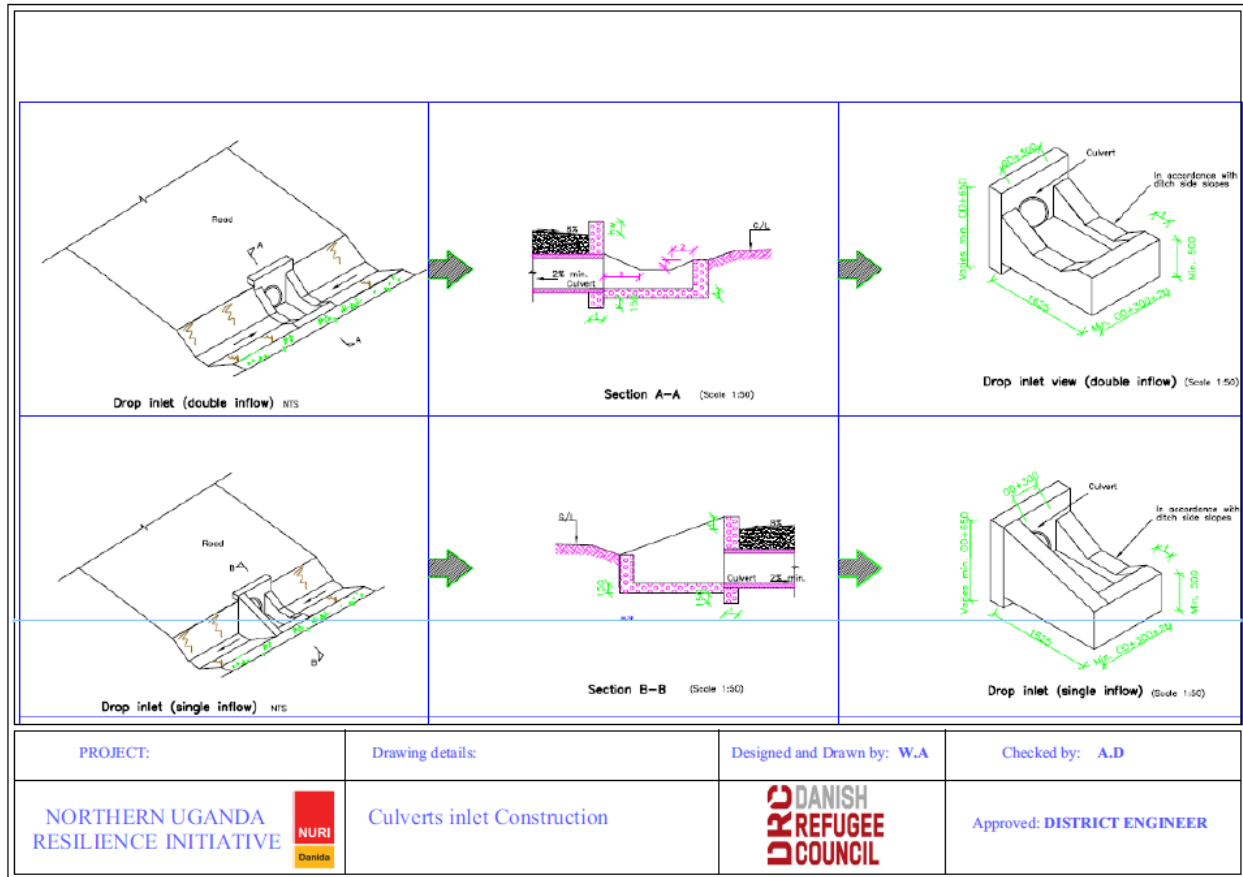
Table for Head and Wing Wall thicknesses

| S/N | Culvert Diam. (mm) | Excavation Width, B (mm) | Concrete End Structures | Concrete Block End Structures | Stone Masonry Block End Structures |
|-----|--------------------|--------------------------|-------------------------|-------------------------------|------------------------------------|
| 1 | 600 | 2,900 | 200 | 230 | 300 |
| 2 | 900 | 3,200 | 200 | 230 | 300 |
| 3 | 1000 | 3,300 | 200 | 230 | 300 |
| 4 | 1200 | 3,500 | 200 | 230 | 300 |
| 6 | 1500 | 3,800 | 200 | 230 | 300 |

Table for Earthworks for various Culvert sizes

| S/N | Culvert diameter, O.D (mm) | Excavation Width, B (mm) | Excavation depth, D (mm) | Spacing between multiple Culverts min. (S) (mm) | Minimum fill cover; H (mm) | Bedding material |
|-----|----------------------------|--------------------------|--------------------------|---|----------------------------|-------------------------------|
| 1 | 600 | 0. D+600 | Varies | 300 | 400 | Gravel or Class lean concrete |
| 2 | 900 | 0. D+600 | Varies | 450 | 500 | Gravel or Class lean concrete |
| 3 | 1000 | 0. D+600 | Varies | 600 | 600 | Gravel or Class lean concrete |
| 4 | 1200 | 0. D+600 | Varies | 600 | 700 | Gravel or Class lean concrete |
| 6 | 1500 | 0. D+600 | Varies | 600 | 800 | Gravel or Class lean concrete |

| | | | |
|--|---|---|------------------------------------|
| PROJECT: | Drawing details: | Designed and Drawn by: W.A | Checked by: A.D |
| NORTHERN UGANDA RESILIENCE INITIATIVE |  Tables for Earth Works and Head and Wing Wall Thicknesses |  | Approved: DISTRICT ENGINEER |



The drawings can be obtained from DRC's Country Office in pdf format.

The drawings given above are for Drop Inlets which are culvert end structures meant for Relief culverts. Drop Inlet structures enhance the performance of relief culverts by trapping and directing excessive amount of water running in the side drains into the culvert for safe disposal to avoid scouring of side drains/road pavement.

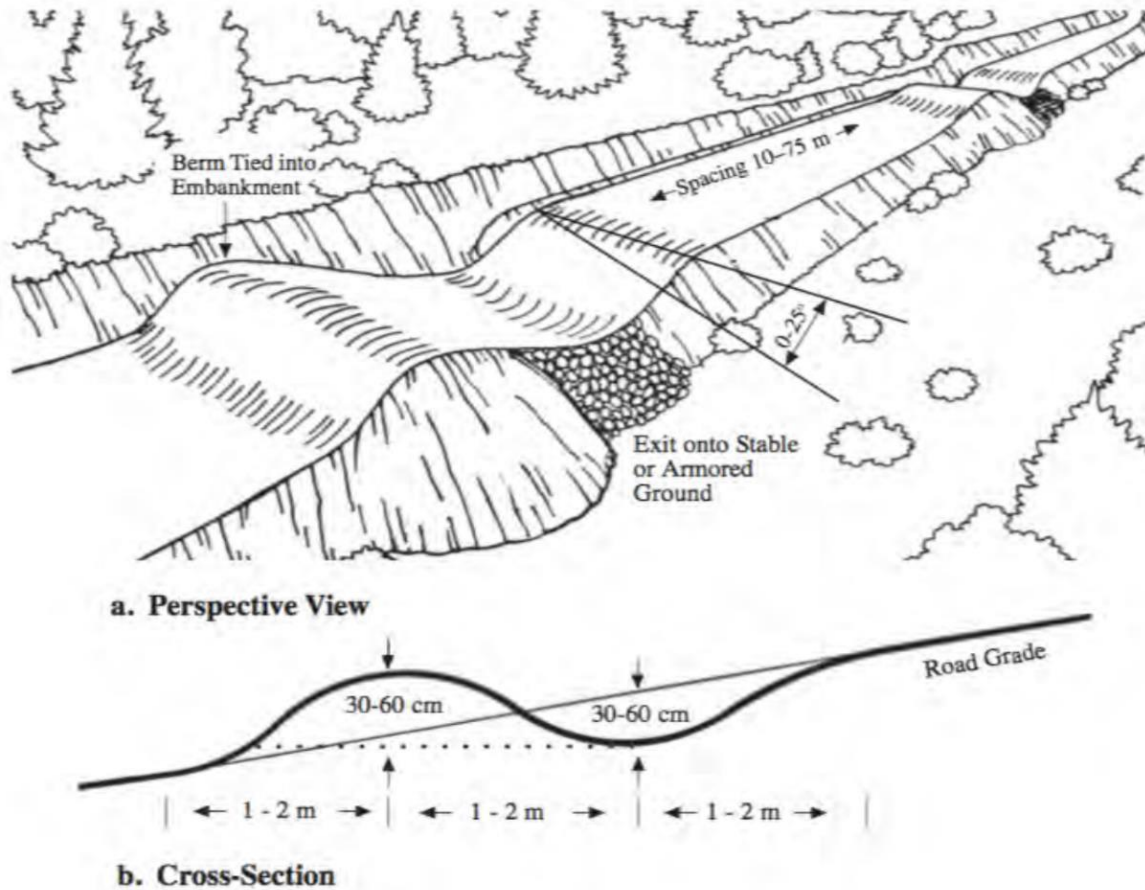
We have mostly been constructing culvert inlets with ordinary wing walls at 45° on relief culverts which do not trap, collect and direct well the running water from the side drains into the relief culverts for proper disposal hence these culverts have not been functioning effectively as intended.

Further to that, in rolling and mountainous terrain, where culvert installation depths are more, the inlets need to be protected to avoid scouring and premature failure of the culvert line.

Drop Inlets should therefore be adopted for Relief culvert structures for better performance.

The drawings can be obtained from DRC's Country Office in pdf format.

In some stretches along the road, rolling dip/ water bars may be employed to cater for unforeseen extra needs for culverts. This is a type of gentle bump, constructed diagonally across the road. Aimed to direct water from one side of the road to the other, similar to a cross-culvert but cheaper. Its design and the diagrammatic view is shown below:



Care must be taken on the placing and frequency determination of the culverts. This is because often people living near the road are very weary when a culvert is to be constructed with an outlet to their farmland, they fear erosion of their land. Since culverts are expensive and therefore their frequency is reduced, and they are concentrated in few sites which increases the amount of water collected through these culverts and diverted to roadside farmers' farmlands. It is recommended to opt for smaller culverts and increase their frequency as a first step and thereby put structures in place upstream which buffer the water flow, and downstream which spread the water over a wider area.

Elements of Resilience Design Approach in Culvert Installations

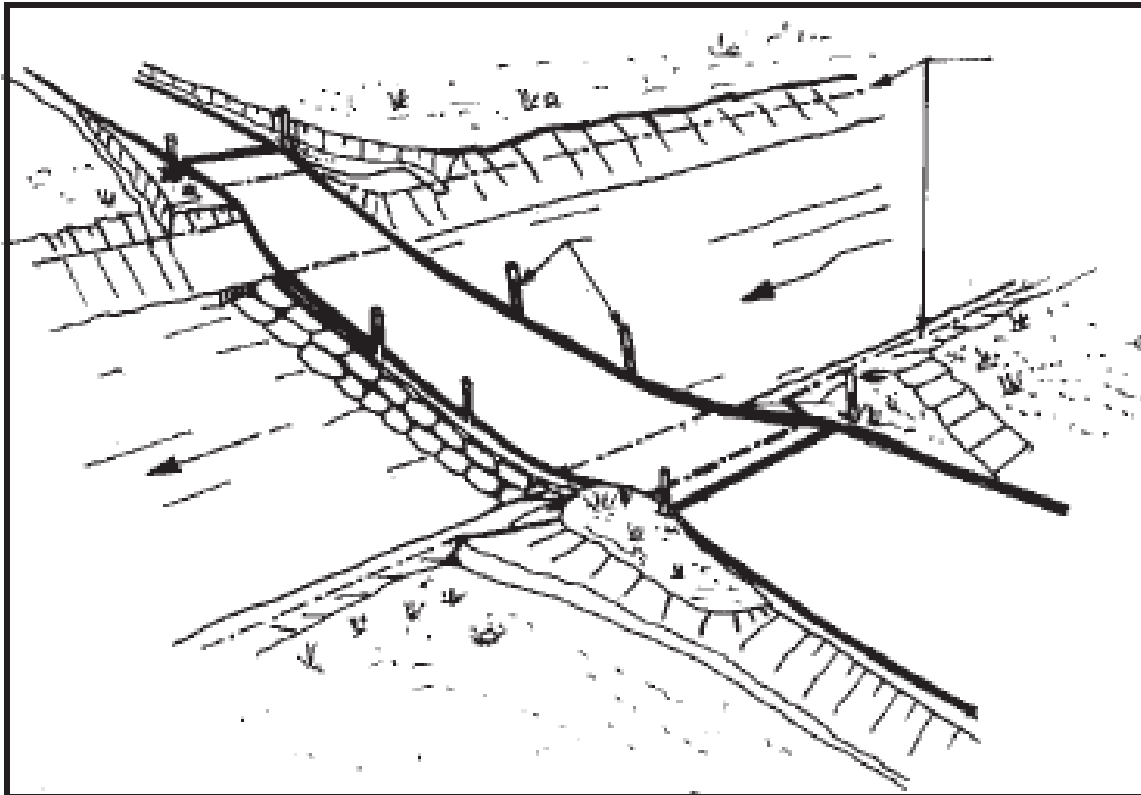
1. Vegetating around the culvert masonry and leading into it with ground spreading type plants, will help to prevent erosion around the structure and will help deter other plants that could potentially block the flows of water and cause more damage or for the system not to function properly.
2. Using bio swales or shallow drains (2-3% grade to move the water away from the road) to extend the water out into the landscape to slow, spread and infiltrate it into the ground.
3. Each culvert should have a landscape integration plan that is developed with farmer's/community member's need for water in the area

4. Water from culverts is to be drained out further into the landscape from the road, both for hydrological purposes and to protect the road so that we can also make the best use of the water
5. Utilizing stone and vegetation check dams on the upslope part of the catchment before it enters a culvert, can reduce pressures of water and silt loads before getting to the culvert.
6. Vegetating the side walls with spreading ground covers will help the drains maintain their structure
7. It would be good to mention that where the marram is harvested, if it is well sighted and situated in the landscape, it could potentially become a livestock pond, especially when associated with rainwater catchment from the road and from bio swales
8. Using direct seeding or seed balls encased in clay and compost, can help with post construction dust issues ensuing from wind erosion which creates adverse air quality long after construction is completed. It seems imperative that NURI protects people's health in this way.

Annex 3: Technical Design - Drift

A drift, also sometimes called a splash, is a low level structure constructed to allow water from the drains and/or natural water course to safely cross over the road at bed level.

FIGURE 3-A3: DRIFT



Drifts are surface structures, and thus, easy to maintain. The volume of excavation required is minimal and drift efficiency is directly related to drift invert slope and cross sectional area.

Due to the discomfort of driving over drifts, too many of them will cause significant delays in journey time due to forced slowing down.

Drifts are likely to cause less erosion than culverts from their discharge.

Drifts should be used where the following conditions apply:

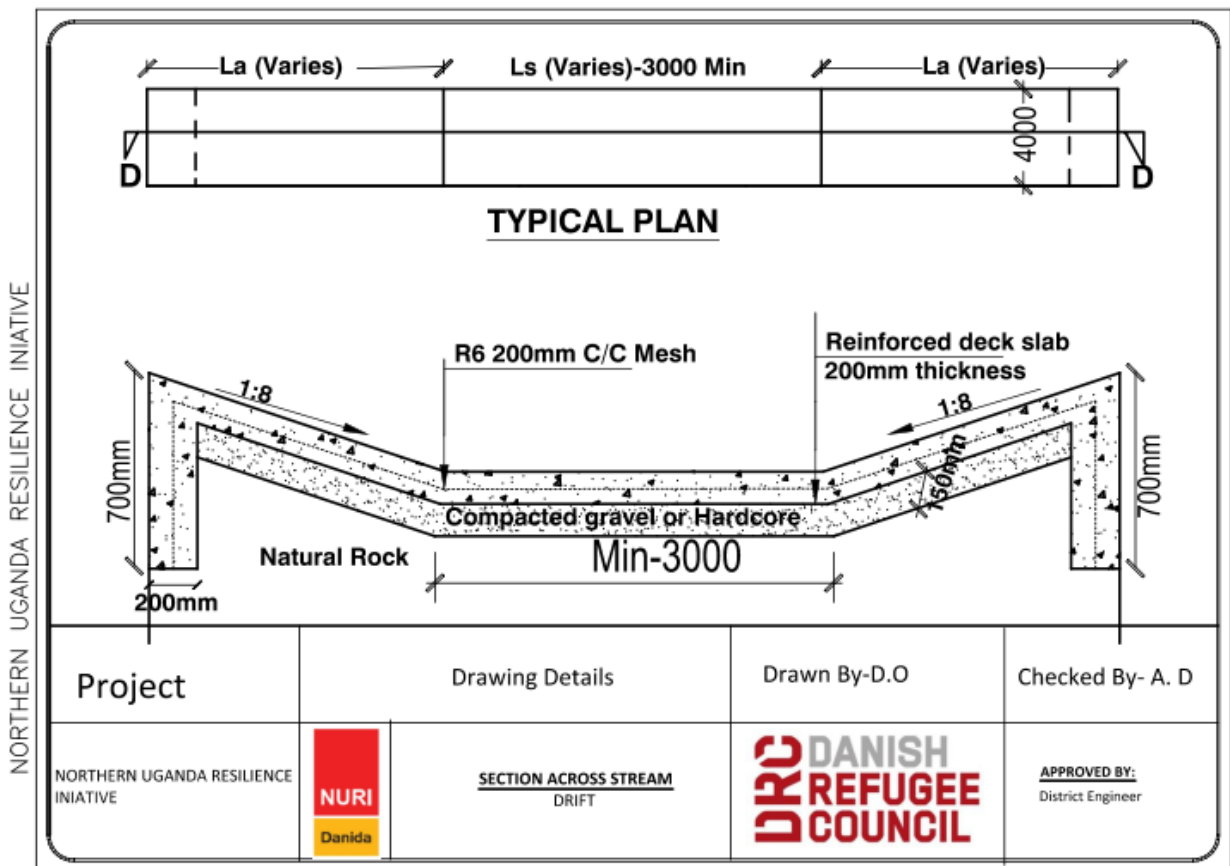
- The difference in elevation between the invert of the side drain and/or natural watercourse and the roadway shoulder break point is not greater than 300mm.
- Where the water level is estimated to exceed 200mm, the approaches must be lengthened to accommodate high water level.

- The sub-grade material is rocky and difficult to excavate
- There is evidence that the natural soils of the side drain and/or watercourse are silt and could lead to the rapid blocking of culverts.
- Where discharge occurs into a farmer’s field.
- Where the cost of a culvert of similar capacity is significantly higher than the cost of a drift.

Where possible, drifts should be located to simultaneously discharge water from the side drains and allow water in natural watercourses to safely cross over the roadway.

Standard Design and Costs

As drifts have different sizes and designs, standard designs and costs will be based on the size of the drift to be constructed. The standard designs from MoWT will be adopted.



Vented Drift

Vented drifts are constructed in areas of bottle necks where various culvert sizes alone cannot handle the volume of water flow or flooding along a road.

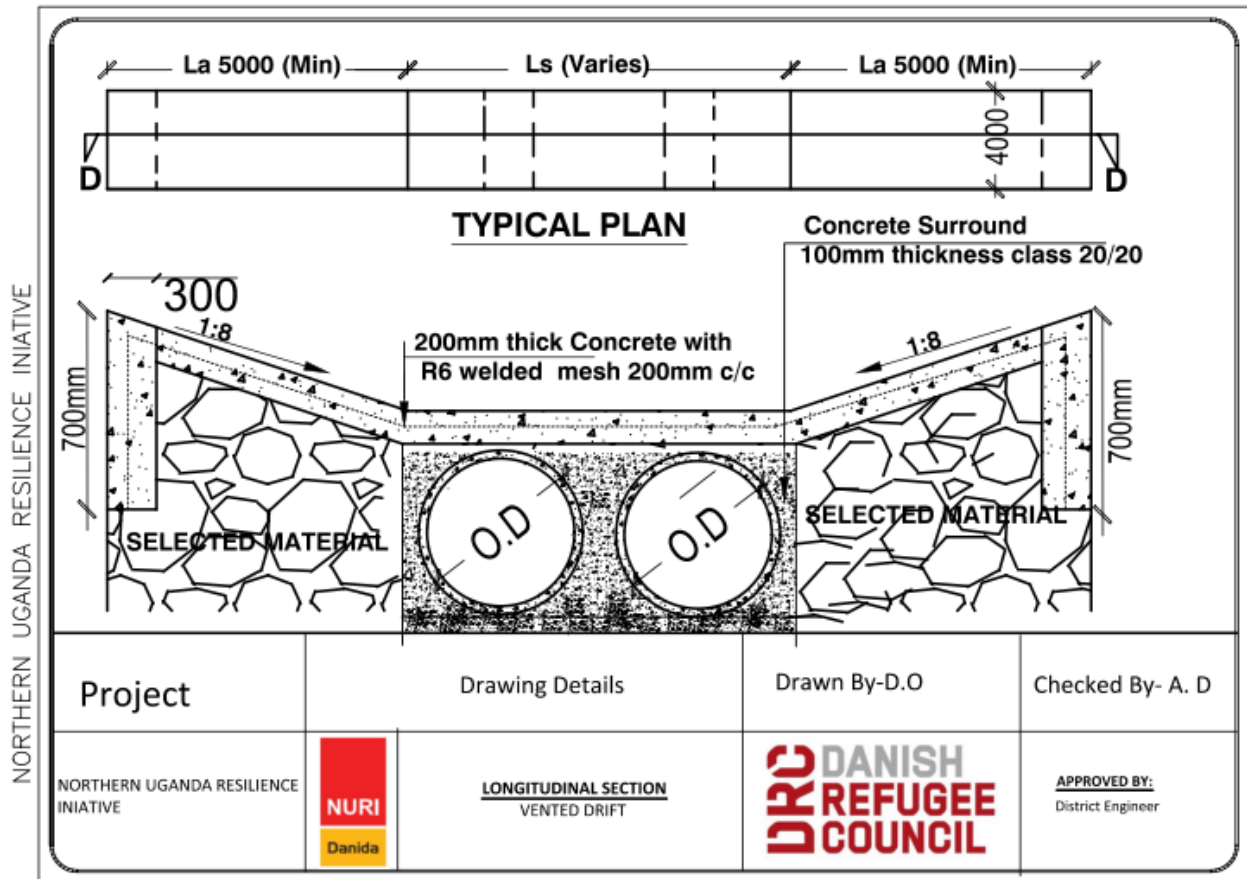
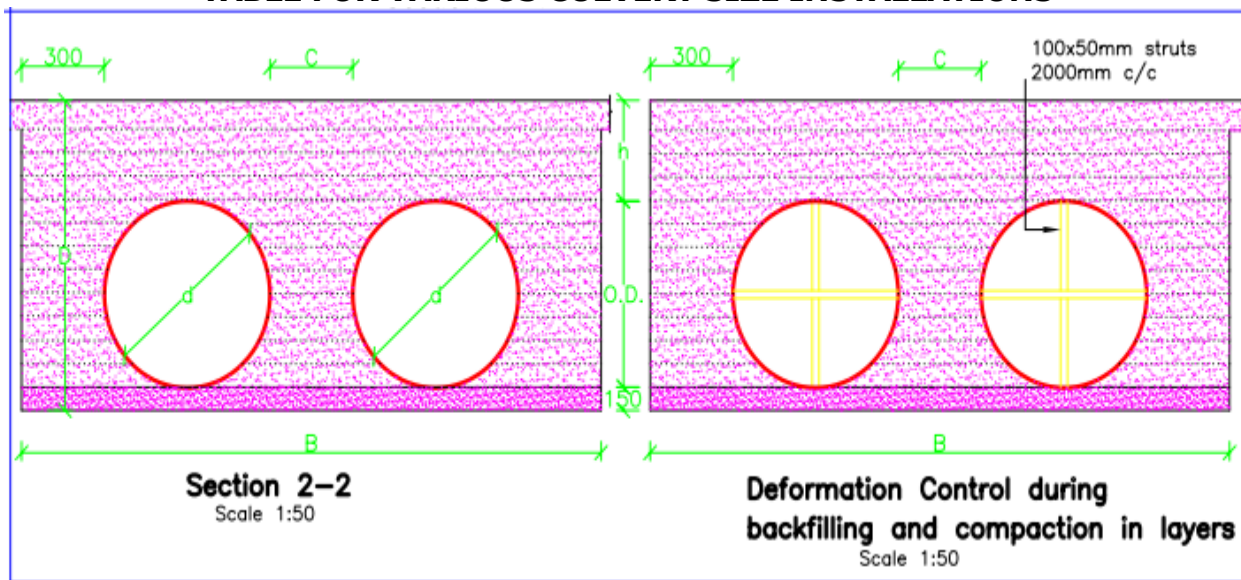


TABLE FOR VARIOUS CULVERT SIZE INSTALLATIONS



| S/N | Culvert diameter, d (mm) | Excavation Width, B (m) | Excavation Depth, D (mm) | Space between Culverts, C Min. (mm) | Minimum fill Cover, H (mm) | Carriageway width, W (mm) | Shoulders (mm) | Deformation Control | Bedding Material |
|-----|--------------------------|-------------------------|--------------------------|-------------------------------------|----------------------------|---------------------------|----------------|---------------------|--------------------------------------|
| 1 | 600 | $0.6+(nxOD)+0.3(n-1)$ | Varies | 300 | 300 | Varies | Varies | No | Gravel, Sand, or Class lean concrete |
| 2 | 900 | $0.6+(nxOD)+0.3(n-1)$ | Varies | 300 | 450 | Varies | Varies | No | Gravel, Sand, or Class lean concrete |
| 3 | 1000 | $0.6+(nxOD)+0.3(n-1)$ | Varies | 300 | 500 | Varies | Varies | Yes | Gravel, Sand, or Class lean concrete |
| 4 | 1200 | $0.6+(nxOD)+0.3(n-1)$ | Varies | 300 | 600 | Varies | Varies | Yes | Gravel, Sand, or Class lean concrete |
| 5 | 1500 | $0.6+(nxOD)+0.3(n-1)$ | Varies | 300 | 750 | Varies | Varies | Yes | Gravel, Sand, or Class lean concrete |

n = Number of lines

Table for Various culvert sizes

Drifts will have site specific designs and will be contracted to either the local masons or contractors

Annex 4: Technical Design - Market Place

Only Grade C markets will be constructed. Grade D and Improved Grade D markets that are already in the approved investment plans of 2020 shall only be constructed and thereafter be discontinued.

Markets shall be constructed in lands owned by the sub counties; with the ownerships clearly documented. Where an individual donates land, a voluntary land donation form must be signed between the sub county and the land owner.

Grade C markets shall range from a minimum area of 4,800 square metres (60m x80m) to a maximum area of 10,000 square metres (100m x100m) with 4 stance VIP latrines, gate house, Waste bin and it shall be fenced with Chain link using concrete poles. The available land within the area limits shall be fenced.

30 community group members will work on a Grade C market for 20 days at 6000/= per day and 30 community group members will work on a Grade D and Improved Grade D market for 15 days with the following facilities;

Labour intensive components shall consist of:

- Spreading gravel on the compound if planned
- Excavating the latrine pit
- Excavating the rubbish pits (one for biodegradable matter (Waste Dust bin) and one for non-biodegradable matter)
- Barbed wire fencing for Grade D in 2020.
- Planting trees within the market place, Live fence (preferably Kei-apple) shall be planted along the market perimeter and
- Creating drainage structures round the market structure mainly Bio-swales if any.

Fence (Chain link fencing using concrete poles) as per the drawings shall be done using hired local technicians/masons or contracted to local contractors together with the latrines and gate houses

Design and orientation of market should be considered in terms of users and any area for selling vegetables or dairy or meat or other such perishables should be protected from afternoon sun as much as possible. Also, if there is any "Jua Kali" area where people are doing labor or working under the sun, this place should have a lot of shade but ventilation, so tall trees with thick canopies like Neem, palms, others.

There should also be a pit latrine, gate house and gate but they will be done as an infrastructure project. Please see Section 5.3.

Design of the market into the unique context of the location is imperative. Considering slope, prevalent wind direction, path of the sun, and access points are the key to an ecologically integrated market design. Pit latrines, animal systems should ideally be on the downwind side of market; plantings of trees on the west side of the market to reduce sun exposure and trees within the market system. All tree systems have a water harvesting structure associated with them and are protected from damage by people and animals. Toilets should utilize green septic design if possible and be associated with appropriate plantings. Waste areas should be designated of possible for fruit, veggie and animal waste to be cycled into composting, animal feed or other nutrient cycling strategies

a. Tasks

1. Bush clearing (Removal of trees, ant hills etc)
2. Fencing (Excavation for post, Concrete footing and for column bases)
3. Pits will be dug with a diameter of 3.4m and to a depth of 2.5m. The mulch basin will be connected to washing hand facilities using

pipes.



4. Digging the pit for the VIP latrine (6.450 mx2.45mx3m). Plantings should be associated with each latrine to help process the high nutrient waste material and to ensure it does not go anaerobic if possible.
5. Planting shade trees (Average 50 No.) and live fence (1,400 No.) for Grade C and Planting shade trees (Average 40 No.) and live fence (Minimum 8,00 No.) for Grade D improved. Each individual tree to be planted using water harvesting structures such as "Smile Berms," on contour for passive water harvesting for each individual tree. These are also called Boomerang Berms. Each berm is measured for contour using A Frame, Bunyip Water Level, Laser Level or other. The pattern for planting is in an offset "fish scale" pattern which is also called Net and Pan or Pit and Pan patterning. This allows the runoff water from one smile berm to overflow in to the lower smile berm and so on. A focus of planting more intensively on the west side of the market and/or on specific stalls to ensure the intense afternoon sun is mitigated

6. Levelling and gravelling in the market area etc

b. Tools

| Tool | No. | Price | Total |
|---|------------|--------------|----------------|
| Measuring tape (50m) | 1 | 35,000 | 35,000 |
| Nylon strings 100 m | 2 | 15,000 | 30,000 |
| Jerry can | 2 | 10,000 | 20,000 |
| Drinking cup | 10 | 1,000 | 10,000 |
| Hoe incl. handle | 5 | 13,000 | 65,000 |
| Axe incl. handle 5Kg | 2 | 15,000 | 30,000 |
| Panga | 2 | 8,000 | 16,000 |
| Slasher | 4 | 6,000 | 24,000 |
| Pick-axe incl. handles | 2 | 22,000 | 44,000 |
| Rake incl. Handle(Need to get locally made type with metallic handle) | 2 | 15,000 | 30,000 |
| Spade with metallic handles | 3 | 20,000 | 60,000 |
| Claw hammer, metallic handles | 2 | 15,000 | 30,000 |
| Pliers | 2 | 10,000 | 20,000 |
| Wheelbarrow | 1 | 160,000 | 160,000 |
| First aid kit | 1 | 80,000 | 80,000 |
| Sub Total | | | 654,000 |
| VAT | | | 117,720 |
| Total tools | | | 771,720 |

c. Cash

The amount in cash to be paid for a market place (livestock) –Grade C (80x60m) is

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount |
|----------------|----------------------------|-----------------------------|-------------------------------|-----------------------|---------------|
| Rehabilitation | 30 | 20 | 600 | 6,000 | 3,600,000 |

The amount in cash to be paid for a market place Grade D and Grade D 'Improved'(50x30m) is

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount |
|----------------|----------------------------|-----------------------------|-------------------------------|-----------------------|---------------|
| Rehabilitation | 30 | 15 | 450 | 6,000 | 2,700,000 |

The amount in cash to be paid for a market place Grade D (50x 30m) rehabilitation with any existing Latrine is

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount |
|----------------|----------------------------|-----------------------------|-------------------------------|-----------------------|---------------|
| Rehabilitation | 30 | 10 | 300 | 6,000 | 1,800,000 |

d. Materials grade D

| MATERIALS FOR FENCING OF RURAL GRADE D MARKET UNDER NURI 2019 (MINIMUM AREA=1500 SM) | | | | | |
|--|-------------------------------|-------------|------------|-----------------------|-------------------------|
| S/N | DESCRIPTION | UNIT | QTY | RATE (UGX) | AMOUNT (UGX) |
| 1 | Barbed wire roll of 600m | Rolls | 2 | 160,000 | 320,000 |
| 2 | U-nails kg | Kgs | 4 | 7,000 | 28,000 |
| 3 | Treated poles | No. | 80 | 15,000 | 1,200,000 |
| 4 | Assorted wire nails kg | Kg | 4 | 7,000 | 28,000 |
| 5 | Live Fence | No. | 800 | 500 | 400,000 |
| 6 | Shade Trees | No. | 40 | 1,000 | 40,000 |
| 7 | Cement | No. | 15 | 33,000 | 495,000 |
| 8 | Aggregates-granite aggregates | No. | 1 | 410,000 | 410,000 |
| 9 | Sand | No. | 1 | 180,000 | 180,000 |
| | Total | | | | 3,101,000 |
| | VAT | | | | 558,180 |
| | Total materials | | | | 3,659,180 |

| MATERIALS FOR FENCING OF RURAL GRADE D MARKET UNDER NURI 2019 (MINIMUM AREA=1500 SM) | | | | | |
|--|------------------------|-------------|------------|-----------------------|-------------------------|
| S/N | DESCRIPTION | UNIT | QTY | RATE (UGX) | AMOUNT (UGX) |
| 1 | Shade Trees | No. | 160 | 1,000 | 160,000 |
| | Total | | | | 160,000 |
| | VAT | | | | 28,800 |
| | Total materials | | | | 188,800 |

Materials needed for Resilience Design Approach shall be sourced as per the needs.

| STANDARD BILL OF QUANTITIES FOR FENCING OF RURAL GRADE D MARKET IMPROVED UNDER NURI 2019 (MINIMUM AREA=1500 SM) | | | | | |
|---|--|-------------|------------|-------------|-------------------|
| Item | Description | Unit | Qty | Rate | Amount |
| Bill No. | GRAND SUMMARY | | | | |
| 1 | Preliminaries and General Items (For all the | | | | 250,000 |
| | Measured works | | | | |
| 2 | Construction of Chain-link Fence for Rural Grade D Market. | | | | 23,331,920 |

| | | | | | |
|--|---|----------------|-----------|------------|-------------------|
| | Sub Total | | | | 23,581,920 |
| | Add 5% contingencies (Excluding Preliminaries and General items) | | 0% | N/A | 0 |
| | Total inclusive of contingencies | | | | 23,581,920 |
| | Percentage Discount Offered (As per Bid submission sheet) | | | 0% | 0 |
| | Sub Total VAT Exclusive | | | | 23,581,920 |
| | Add 18% VAT | | | | 4,244,746 |
| | Grand Total for Lot | | | | 27,826,666 |
| BILL NO. 1: Preliminaries and General Items (For Chain-link Fencing) | | | | | |
| 1.1 | Mobilization | LS | 1 | 250,000 | 250,000 |
| Total to be carried to Grand Summary No. 1>>>> | | | | | 250,000 |
| BILL NO. 2: MEASURED WORKS - Construction of Chain-link fencing for grade D and C markets | | | | | |
| 2.1 | Bill No. 1: General | | | | |
| | Chain link fencing (to BS 1722 Part 1 table 1 and 2 on steel posts or as per engineer's instruction) at 3m c/c and struts of 600mm below ground and surrounded in 450x450mm plain concrete grade 20 on and including back filling and disposal spoil size of the entire compound. | | | | |
| 2.2.01 | Provide 3m long 100x100 thick ready-made concrete posts with 2 No. Struts for intermediate at every fifth spot and corner posts | No | 66 | 45,000 | 2,970,000 |
| 2.2.02 | Ditto but without struts | No | 32 | 35,000 | 1,120,000 |
| 2.2.03 | Cast concrete 1:3:6/20 to the base of the posts spaced at 2.5 m c/c | m ³ | 9.40 8 | 350,000 | 3,292,800 |
| 2.2.04 | 2.1m high chain link fence of gauge 10 tensioned & securely fastened to rigidly set posts and tension wire as required | M | 156 | 50,000 | 7,800,000 |
| 2.2.05 | Approved gauge preferably 6mm tension wire in 4 lines including wire to fasten the chain link | M | 624 | 700 | 436,800 |
| 2.2.06 | Approved gauge 400m long heavy | M | 468 | 600 | 280,800 |

| | | | | | |
|--------|--|----------------|-------|-----------|-------------------|
| | duty barbed wire in 3 lines at top | | | | |
| 2.2.07 | Cast the bottom of chain link into the concrete mix (1:3:6) along the entire meter run (276m x 0.15m x 0.2m) including form works, nails, props, etc, plaster the entire surface of the concrete wall; wood floated using 1:4 mortar mix including fixing of the 3" PVC pipes as weep holes as directed by the engineer to discharge storm water to exterior side of the fence | m ³ | 4.68 | 350,000 | 1,638,000 |
| | Subtotal 2 carried to collection | | | | 17,788,400 |
| 2.3 | Bill No.3: Gates and Columns | | | | |
| 2.3.01 | Provide, fix 4m x2.5m grilled gate fabricated using standard steel hollow sections as major and minor members. double swing, complete with heavy duty hinges Pad bolt and one coat of red oxide applied, anchored into concrete | No | 1 | 1,500,000 | 1,500,000 |
| | Ditto but 1.0mx2.0m | No | 1 | 800,000 | 800,000 |
| | Columns-300mmx300mm for main Gate | | | | |
| 2.3.02 | Excavate pad foundation pits 0.9mx 0.9m wide, depth n.e 1.5m | m ³ | 4.86 | 7,000 | 17,010 |
| 2.3.03 | Cast 300mm thick reinforced concrete to pad in 1:2:4 mix | m ³ | 1 | 480,000 | 480,000 |
| 2.3.04 | Ditto but for the column | m ³ | 1.3 | 480,000 | 302,400 |
| 2.3.05 | T 12-150 cc bars to base | Kgs | 42.72 | 6,500 | 559,000 |
| 2.3.06 | 6- T16 bars for column | Kgs | 159 | 6,500 | 1,033,500 |
| 2.3.07 | R8 mm as links | Kgs | 18 | 6,500 | 117,000 |
| 2.3.08 | 15mm thick rendering in 1:3 mix to columns | m ² | 16 | 15,000 | 240,000 |

| | | | | | |
|--------|--|----------------|----|-------|-------------------|
| 2.3.09 | Prepare, apply prime coat and other three coats of weather guard paints to rendered surfaces | m ² | 12 | 6,500 | 78,000 |
| 2.3.10 | Ditto but gloss paintings to gates | m ² | 25 | 6,500 | 78,000 |
| | Subtotal 3 carried to collection | | | | 5,543,520 |
| | Bill Summary | | | | |
| 1 | General | | | | 0 |
| 2 | Concrete fence posts and chain-link | | | | 17,788,400 |
| 3 | Gates and columns | | | | 5,543,520 |
| | Grand total | | | | 23,331,920 |

| STANDARD BILL OF QUANTITIES FOR FENCING RURAL GRADE C (MINIMUM AREA=4800 SM) | | | | | |
|--|--|-------------|------------|-------------|-------------------|
| Item | Description | Unit | Qty | Rate | Amount |
| Bill No. | GRAND SUMMARY | | | | |
| 1 | Preliminaries and General Items (For all the | | | | 250,000 |
| | Measured works | | | | |
| 2 | Construction of Chain-link Fence for Rural Grade C Market. | | | | 35,988,710 |
| | Sub Total | | | | 36,238,710 |
| | Add 5% contingencies (Excluding Preliminaries and General items) | | 0% | N/A | 0 |
| | Total inclusive of contingencies | | | | 36,238,710 |
| | Percentage Discount Offered (As per Bid submission sheet) | | | 0% | 0 |
| | Sub Total VAT Exclusive | | | | 36,238,710 |
| | Add 18% VAT | | | | 6,522,968 |
| | Grand Total for Lot | | | | 42,761,678 |

| STANDARD BILL OF QUANTITIES FOR FENCING RURAL GRADE C (MAXIMUM AREA AREA=10,000 SM) | | | | | |
|--|---|-------------|------------|-------------|--------------------|
| Item | Description | Unit | Qty | Rate | Amount |
| Bill No. | GRAND SUMMARY | | | | |
| 1 | Preliminaries and General Items (For all the | | | | 250,000 |
| | Measured works | | | | |
| 2 | Construction of Chain-link Fence for Rural Grade C Market. | | | | 49,734,740 |
| | Sub Total | | | | 49,984,740 |
| | Add 5% contingencies (Excluding Preliminaries and General items) | | 0% | N/A | 0 |
| | Total inclusive of contingencies | | | | 49,984,740 |
| | Percentage Discount Offered (As per Bid submission sheet) | | | 0% | 0 |
| | Sub Total VAT Exclusive | | | | 49,984,740 |
| | Add 18% VAT | | | | 8,997,253.2 |
| | Grand Total for Lot | | | | 58,981,993 |
| BILL NO. 1: Preliminaries and General Items (For Chain-link Fencing) | | | | | |
| 1.1 | Mobilization | LS | 1 | 250,000 | 250,000 |
| Total to be carried to Grand Summary No. 1>>>> | | | | | 250,000 |
| BILL NO. 2: MEASURED WORKS - Construction of Chain-link fencing for grade D and C markets | | | | | |
| 2.1 | Bill No. 1: General | | | | |
| | Chain link fencing (to BS 1722 Part 1 table 1 and 2 on steel posts or as per engineer's instruction) at 3m c/c and struts of 600mm below ground and surrounded in 450x450mm plain concrete grade 20 on and including back filling and disposal spoil size of the entire compound. | | | | |

| | | | | | |
|--------|--|----------------|------------|---------------|-------------------|
| 2.1.01 | 1000 mm wide site clearance and removal of existing trees for alignment | M | 160 | N/A | 0 |
| 2.1.02 | Excavate 450x450mm pad n.e 700mm deep | No | 63 | N/A | 0 |
| | Subtotal 1 carried to collection | | | | 0 |
| 2 | Bill No. 2: Concrete Fence Post and chain-link | | | | |
| 2.2.01 | Provide 3m long 100x100 thick readymade concrete posts with 2 No. Struts for intermediate at every fifth spot and corner posts | No | 160 | 45,000 | 7,200,000 |
| 2.2.02 | Ditto but without struts | No | 72 | 35,000 | 2,520,000 |
| 2.2.03 | Cast concrete 1:3:6/20 to the base of the posts spaced at 2.5 m c/c | m ³ | 22.2 72 | 350,000 | 7,795,200 |
| 2.2.04 | 2.1m high chain link fence of gauge 10 tensioned & securely fastened to rigidly set posts and tension wire as required | M | 392 | 50,000 | 19,600,000 |
| 2.2.05 | Approved gauge preferably 6mm tension wire in 4 lines including wire to fasten the chain link | M | 1568 | 700 | 1,097,600 |
| 2.2.06 | Approved gauge 400m long heavy duty barbed wire in 3 lines at top | M | 1176 | 600 | 705,600 |
| 2.2.07 | Cast the bottom of chain link into the concrete mix (1:3:6) along the entire meter run (276m x 0.15m x 0.2m) including form works, nails, props, etc, plaster the entire surface of the concrete wall; wood floated using 1:4 mortar mix including fixing of the 3" PVC pipes as weep holes as directed by the engineer to discharge storm water to exterior side of the fence | m ³ | 11.7 6 | 350,000 | 4,116,000 |
| | Subtotal 2 carried to collection | | | | 43,284,400 |
| 2.3 | Bill No.3: Gates and Columns | | | | |
| 2.3.01 | Provide, fix 4m x2.5m grilled gate fabricated using standard steel hollow sections as major and minor members. double swing, complete with heavy duty hinges Pad bolt and | No | 2 | 1,500,00 0 | 3,000,000 |

| | | | | | |
|--------|--|----------------|-----------|---------|-------------------|
| | one coat of red oxide applied, anchored into concrete | | | | |
| | Columns-300mmx300mm for main Gate | | | | |
| 2.3.02 | Excavate pad foundation pits 0.9mx 0.9m wide, depth n.e 1.5m | m ³ | 4.86 | 7,000 | 34,020 |
| 2.3.03 | Cast 300mm thick reinforced concrete to pad in 1:2:4 mix | m ³ | 0.97 2 | 480,000 | 466,560 |
| 2.3.04 | Ditto but for the column | m ³ | 1.26 | 480,000 | 604,800 |
| 2.3.05 | T 12-150 cc bars to base | Kgs | 85.4 4 | 6,500 | 555,360 |
| 2.3.06 | 6- T16 bars for column | Kgs | 158. 4 | 6,500 | 1,029,600 |
| 2.3.07 | R8 mm as links | Kgs | 18 | 6,500 | 117,000 |
| 2.3.08 | 15mm thick rendering in 1:3 mix to columns | m ² | 16 | 15,000 | 240,000 |
| 2.3.09 | Prepare, apply prime coat and other three coats of weather guard paints to rendered surfaces | m ² | 12 | 6,500 | 78,000 |
| 2.3.10 | Ditto but gloss paintings to gates | m ² | 50 | 6,500 | 325,000 |
| | Subtotal 3 carried to collection | | | | 6,450,340 |
| | Bill Summary | | | | |
| 1 | General | | | | 0 |
| 2 | Concrete fence posts and chain-link | | | | 43,284,400 |
| 3 | Gates and columns | | | | 6,450,340 |
| | Grand total | | | | 49,734,740 |

| STANDARD BOQ FOR GATE HOUSE FOR A RURAL MARKET NURI | | | | | |
|---|--|--------------|------------|-------------|-------------------|
| Item | Description | Unit | Qty | Rate | Amount |
| Bill No. | GRAND SUMMARY | | | | |
| 1 | Preliminaries and General Items (For all the | | | | 800,000 |
| | Measured works | | | | |
| 2 | Construction of one block of one gate house | | | | 12,423,286 |
| | Sub Total | | | | 13,223,286 |
| | Add 5% contingencies (Excluding Preliminaries and General items) | | 0% | N/A | 0 |
| | Total exclusive of contingencies | | | | 0 |
| | Percentage Discount Offered (As per Bid submission sheet) | | 0% | | 0 |
| | Sub Total VAT Exclusive | | | | 13,223,286 |
| | Add 18% VAT | | 18% | | 2,380,191 |
| | Grand Total for Lot | | | | 15,603,477 |
| BILL NO. 1 Preliminaries and General Items | | | | | |
| 1.1 | Mobilization | LS | 1 | 450,000 | 450,000 |
| 1.2 | Insurance | LS | 1 | - | N/A |
| 1.3 | Performance bond | LS | 1 | - | N/A |
| 1.4 | Visibility | No | 1 | 350,000 | 350,000 |
| 1.5 | Preparation of final report | LS | 1 | - | N/A |
| Total to be carried to Grand Summary No. 1>>>> | | | | | 800,000 |
| BILL NO. 2 MEASURED WORKS - Construction Gate House | | | | | |
| | Descriptions | Units | Qty | Rate | Amount |
| | ELEMENT NO. 1: SUBSTRUCTURE (All provisional) | | | | |
| | Excavations and Earthworks | | | | |

| | | | | | |
|--------|---|----------------|-------------|---------|-----------|
| 2.1.01 | Excavate for over site to remove topsoil average 150mm deep and stock pile near site for tree planting around the market | m ² | 25 | 2,000 | 50,000 |
| 2.1.02 | Excavate to reduce level & remove from site(provisional) | m ³ | 1.2 | 7,500 | 9,000 |
| 2.1.07 | Excavate trenches for wall foundations: commencing from reduced levels: not exceeding 1.5m deep. | m ³ | 7.2 | 7,500 | 54,000 |
| 2.1.08 | Treat surface of subsoil or fillings and surroundings with approved chemical anti-termite solution: provide ten-year guarantee. | m ² | 47.2 | 2,000 | 94,400 |
| | Disposal of excavated material | | | | |
| 2.1.09 | Selected excavated material in filling to foundation trenches: around walling: placed in 200mm layers: watered and compacted to Engineer's satisfaction | m ³ | 4.8 | 10,000 | 48,000 |
| | In situ concrete class 20/20mm aggregates as in: | | | | |
| 2.1.10 | Foundation trench 150mm thick with mix 1:3:6/20mm | m ³ | 1.8 | 400,000 | 720,000 |
| 2.1.11 | 100mm floor slab with provisions of drop holes and vent pipe mix 1:2:4 | m ³ | 4 | 480,000 | 1,920,000 |
| | High yield steel bar including working and fixing | | | | |
| 2.1.13 | Mesh reinforcement Ref No. A98 size 200 x 200 mm weighing 1.54 kg per square meter: in floor slab: | m ² | 10.24 | 15,000 | 153,600 |
| | Sawn formwork as described to: | | | | |
| 2.1.14 | Edge of Slab 100mm high | m | 8 | 8,000 | 64,000 |
| 2.1.16 | Reinforced concrete (1:2:4/20mm aggregate) in Columns, ring Beam | m ³ | 2 | 480,000 | 960,000 |
| | High yield steel bar including working and fixing | | | | |
| 2.1.17 | T12 | Kg | 340.99 2 | 6,500 | 2,216,448 |

| | | | | | |
|--------|---|----------------|--------|---------|------------------|
| 2.1.18 | R8 | Kg | 13.035 | 6,500 | 84,728 |
| | Plinth Wall; | | | | |
| 2.1.19 | Selected burnt clay bricks bedded and jointed in 1:4 mortar one and half brick thick (350mm), with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses | m ² | 8 | 47,000 | 376,000 |
| | Splash Apron: | | | | |
| 2.1.20 | Excavation for foundation trench not exceeding 1.0m | m ³ | 2.304 | 7,500 | 17,280 |
| 2.1.21 | Return fill and ram selected excavated material around foundation | m ³ | 1.536 | 7,500 | 11,520 |
| 2.1.22 | 150mm thick bed of imported hard core fill in and rolled ready to receive concrete 20/20 | m ³ | 1.152 | 400,000 | 460,800 |
| 2.1.23 | 75mm thick plain concrete 20/20mm aggregate | m ³ | 0.576 | 400,000 | 230,400 |
| 2.1.24 | 150mm thick walling in cement sand (1:4) | m ² | 9.6 | 30,000 | 288,000 |
| 2.1.25 | 15mm Thick cement and sand plaster to plinth walls with wood float finish. | m ² | 9.6 | 15,000 | 144,000 |
| 2.1.26 | 30mm cement and sand screed trawled (1:3mix) | m ² | 7.68 | 17,500 | 134,400 |
| | Substructure Sub-total to summary. | | | | 8,036,576 |
| | ELEMENT NO. 2: SUPERSTRUCTURE. | | | | |
| | Ring beam construction | | | | |
| 2.2.01 | Reinforced concrete grade 20/19mm aggregate in ring Beam | m ³ | 0.32 | 480,000 | 153,600 |
| | High yield steel bar including working and fixing | | | | 0 |
| 2.2.02 | T12 | Kg | 35.52 | 6,500 | 230,880 |
| 2.2.03 | R8 | Kg | 11.85 | 6,500 | 77,025 |
| 2.2.04 | Sawn formwork as described to: Sides and soffits of beams | m ² | 4.8 | 25,000 | 120,000 |
| | Walling | | | | 0 |

| | | | | | |
|--------|--|----------------|-------|--------|------------------|
| 2.2.05 | 150m wide Damp proof course laid and bedded in cement and sand mortar 1:3 with 300mm laps | m | 8 | 1,500 | 12,000 |
| 2.2.06 | Selected burnt clay bricks bedded and jointed in 1:4 mortar one and half brick thick (350mm), with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses 150mm thick, with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses | m ² | 24 | 30,000 | 720,000 |
| 2.07 | 900X150 mm high well burnt clay vent bricks in cement sand mortar (1:4) including any other equal. | No | 2 | 10,000 | 20,000 |
| | Superstructure Sub-totals to summary. | | | | 1,333,505 |
| 3 | ELEMENT NO. 3: ROOF AND COVERINGS | | | | |
| | Roof structure: (Sawn treated softwood) | | | | |
| 2.3.01 | 75x100m wall plate | m | 8 | 8,000 | 64,000 |
| 2.3.02 | 50x100mm rafter/struts/tie beam | m | 20 | 7,500 | 150,000 |
| 2.3.03 | 50x100mm purlins | m | 102.4 | 7,500 | 768,000 |
| 2.3.04 | 25x230 fascia board in planed cypress. | m | 12.8 | 10,000 | 128,000 |
| 2.3.05 | Knot, prime, stop and apply three coats of gloss oil paint to wood fascia 200-300mm girth. On fascia board | m | 12.8 | 6,500 | 83,200 |
| | Covering: | | | | 0 |
| 2.3.06 | 28 Gauge pre-painted roofing sheets including side laps filler blocks and; fixed with approved capped roofing nails or screws to Engineer's specification and manufacturer's instructions. | m ² | 16 | 35,000 | 560,000 |
| | Roofing Sub-totals to summary. | | | | 1,576,700 |
| | ELEMENT NO. 4: DOORS WINDOWS | | | | |
| | Metallic frames including hoisting and fixing in position | | | | |

| | | | | | |
|--------|---|----------------|------|---------|----------------|
| 2.4.01 | Supply and fix Purpose made steel casement door complete with frames, louvres; size 900x2400 high, including shutters of 2.2mm thick MS plate welded to 40x20RHS 1.5mm thick, with 300mm long pad bolt with padlock as directed by the engineer, with Burglars and glazing of 900mm x600mm high | No | 1 | 300,000 | 300,000 |
| | purpose made steel casement window complete with frames, louvres; size 900x900mm high in top hung, including shutters of 1.2mm thick MS plate welded to 40x20RHS 1.2mm thick, with 300mm long tower bolts bolt double stays as directed by the engineer, with Burglars. | No | 1 | 150,000 | 150,000 |
| | Painting use sadolin paints or equivalent: | | | | |
| 2.4.08 | Prepare and apply one under coat and two finishing coats of gloss paint on general surface of doors. | m ² | 2.97 | 6,500 | 19,305 |
| | Doors Sub -totals to summary. | | | | 469,305 |
| 5 | ELEMENT NO. 5: INTERNAL FINISHES | | | | |
| 2.5.01 | 12mm cement and sand (1:4) mortar to walls and beam steel trowelled hard and smooth on walls including 100mmx10mm thick skirting internally . | m ² | 25.6 | 12,000 | 307,200 |
| 2.5.02 | Prepare, prime and apply one under coat and 3 coats of emulsion paint on plastered walls internally. | m ² | 25.6 | 6,500 | 166,400 |
| 2.5.03 | 25mm cement and sand (1:3) screed finished smooth. | m ² | 4 | 15,000 | 60,000 |
| | Internal Finishes Sub -totals to summary. | | | | 533,600 |
| | ELEMENT NO. 6: EXTERNAL FINISHES | | | | |
| 2.6.01 | 12mm cement and sand render to wall with wood float finish including 200x10mm high skirting. | m ² | 25.6 | 12,000 | 307,200 |
| 2.6.02 | Cement and sand roughcast finish on rendered wall. | m ² | 12 | 6,500 | 78,000 |

| | | | | | |
|--------|--|----------------|------|-------|-------------------|
| 2.6.03 | Prepare, prime and apply one under coat and 3 coats of emulsion paint on plastered walls externally. | m ² | 13.6 | 6,500 | 88,400 |
| | External Finishes Sub -totals to summary. | | | | 473,600 |
| | Description | | | | |
| | SUMMARY | | | | |
| 1 | Substructure | | | | 8,036,576 |
| 2 | Superstructure | | | | 1,333,505 |
| 3 | Roof construction and coverings | | | | 1,576,700 |
| 4 | Doors | | | | 469,305 |
| 5 | Internal Finishes | | | | 533,600 |
| 6 | External Finishes | | | | 473,600 |
| | Total for one Gate house | | | | 12,423,286 |

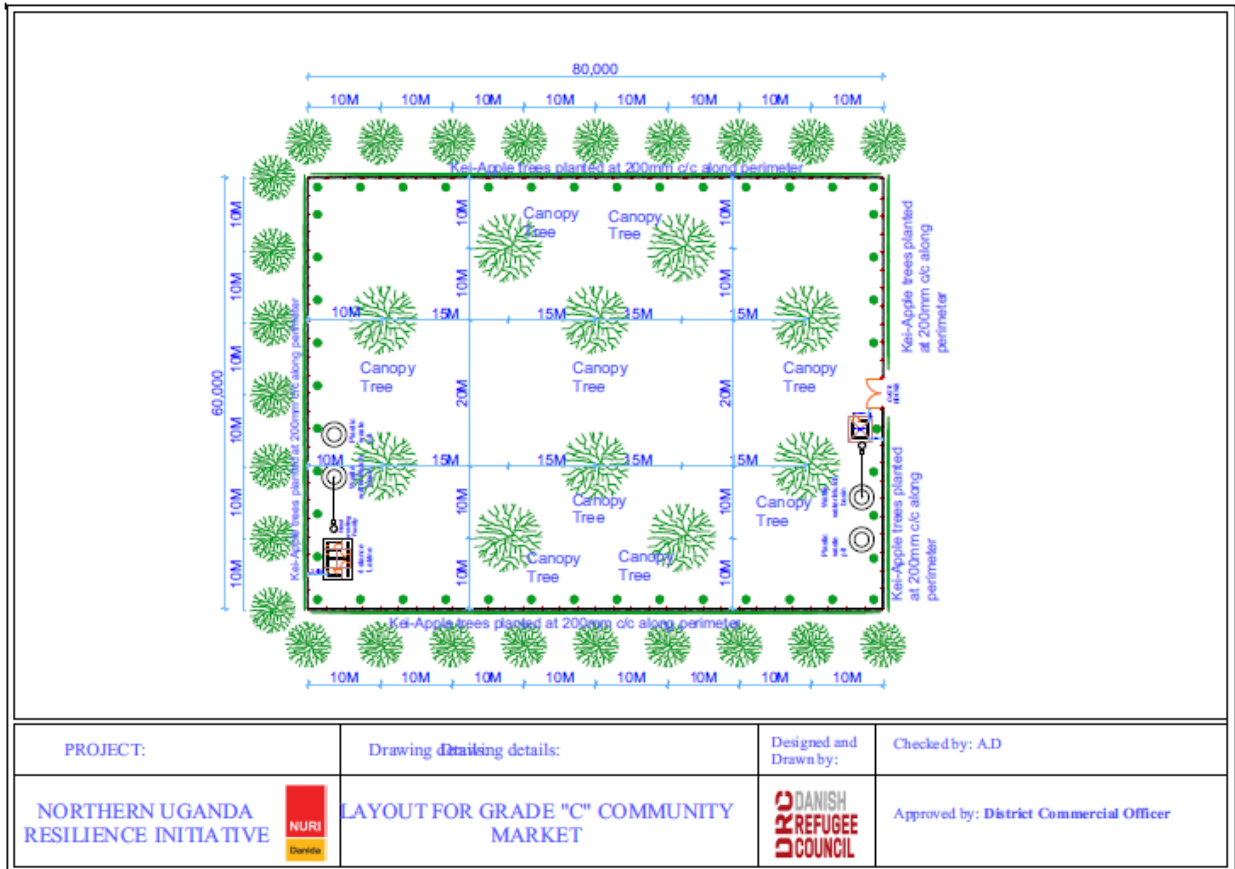
| BILL OF QUANTITY FOR CONSTRUCTION OF WASTEN DUST BIN | | | | | |
|---|--|----------------|------------|-------------|----------------|
| S/N | DESCRIPTIONS | UNIT S | QTY | RATE | AMOUNT |
| BILL NO. 1 Preliminaries and General Items | | | | | |
| 1.1 | Mobilization | Ls | 1 | 200,000 | 200,000 |
| | Total to be carried to Grand Summary No. 1 | | | | 200,000 |
| BILL NO. 2 MEASURED WORKS - Construction of dust bin | | | | | |
| | ELEMENT NO. 2: SUBSTRUCTURE (All provisional) | | | | |
| | Excavations and Earthworks | | | | |
| 2.1 | Excavate for over site to remove topsoil average 150mm deep and stock pile near site for tree planting around the market | m ² | 20 | 2,000 | 40,000 |
| 2.2 | Excavate to reduce level & remove from site(provisional) | m ³ | 1.2 | 7,500 | 9,000 |
| 2.3 | Excavate trenches for wall foundations: commencing from reduced levels: not exceeding 1.5m deep. | m ³ | 5.3 | 7,500 | 39,750 |

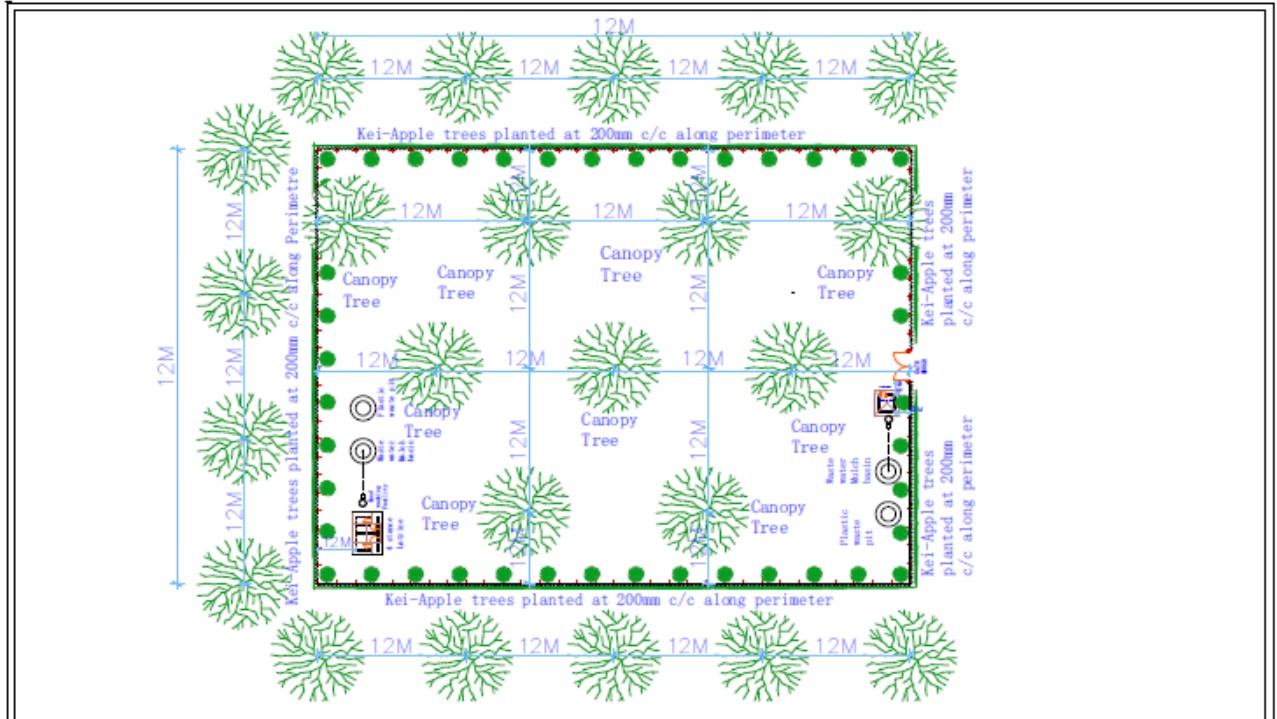
| | | | | | |
|------|---|----------------|-----|---------|------------------|
| 2.4 | Treat surface of subsoil or fillings and surroundings with approved chemical anti-termite solution: provide ten-year guarantee. | m2 | 20 | 2,000 | 40,000 |
| | Disposal of excavated material | | | | |
| 2.5 | Selected excavated material in filling to foundation trenches: around walling: placed in 200mm layers: watered and compacted to Engineer's satisfaction Sawn form work 100x50x4m | m3 | 3.5 | 10,000 | 35,000 |
| | In situ concrete class 20/20mm aggregates as in: | | | | |
| 2.6 | Foundation trench 150mm thick with mix 1:3:6/20mm | m3 | 1.5 | 400,000 | 600,000 |
| 2.7 | 100mm floor slab with provisions of drop holes and vent pipe mix 1:2:4 | m3 | 1.2 | 480,000 | 576,000 |
| | Sawn formwork as described to: | | | | |
| 2.8 | Edge of Slab 100mm high | m2 | 14 | 8,000 | 112,000 |
| | Plinth Wall; | | | | |
| 2.9 | Selected burnt clay bricks bedded and jointed in 1:4 mortar one and half brick thick (350mm), with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses | m2 | 7.7 | 47,000 | 361,900 |
| 2.10 | 150mm thick bed of imported hard core fill in and rolled ready to receive concrete 20/20 | m ³ | 1.8 | 400,000 | 720,000 |
| 2.11 | Marram filling to hard core to reduce voids | m ⁴ | 0.6 | 48,000 | 28,800 |
| 2.12 | 15mm Thick cement and sand plaster to plinth walls with wood float finish. | m ² | 7.7 | 15,000 | 115,500 |
| 2.13 | 30mm cement and sand screed trowled (1:3mix) | m ² | 10 | 17,500 | 175,000 |
| | Substructure Sub-total to summary. | | | | 2,852,950 |
| | ELEMENT NO. 3: SUPERSTRUCTURE. | | | | |
| | Walling | | | | |

| | | | | | |
|-----|--|----------------|----|--------|------------------|
| 3.1 | 150m wide Damp proof course laid and bedded in cement and sand mortar 1:3 with 300mm laps | m | 10 | 1,500 | 15,000 |
| 3.2 | Selected burnt clay bricks bedded and jointed in 1:4 mortar one and half brick thick (350mm), with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses 230mm thick, with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses | m ² | 18 | 47,000 | 846,000 |
| 3.3 | 20mm upvc pipe for drainage | m | 2 | 6,000 | 12,000 |
| 3.4 | 15mm Thick cement and sand plaster to walls with wood float finish. | m ² | 36 | 15,000 | 540,000 |
| | Superstructure Sub-totals to summary. | | | | 1,413,000 |
| | Summary | | | | |
| | BILL NO. 1 Preliminaries and General Items | | | | 200,000 |
| | ELEMENT NO. 2: Substructure | | | | 2,852,950 |
| | ELEMENT NO. 3: Superstructure. | | | | 1,413,000 |
| | Total for one dust bin | | | | 4,465,950 |

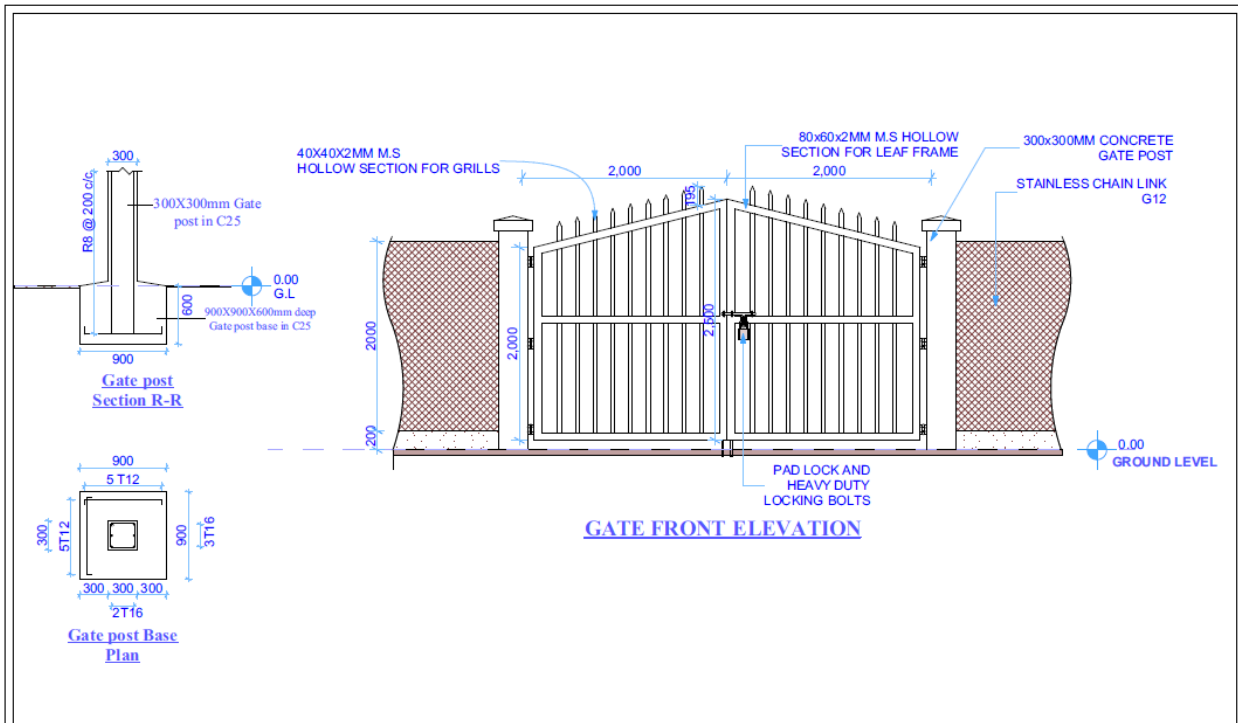
e. Standard Layout

DRAWINGS FOR MARKET GRADE "C"

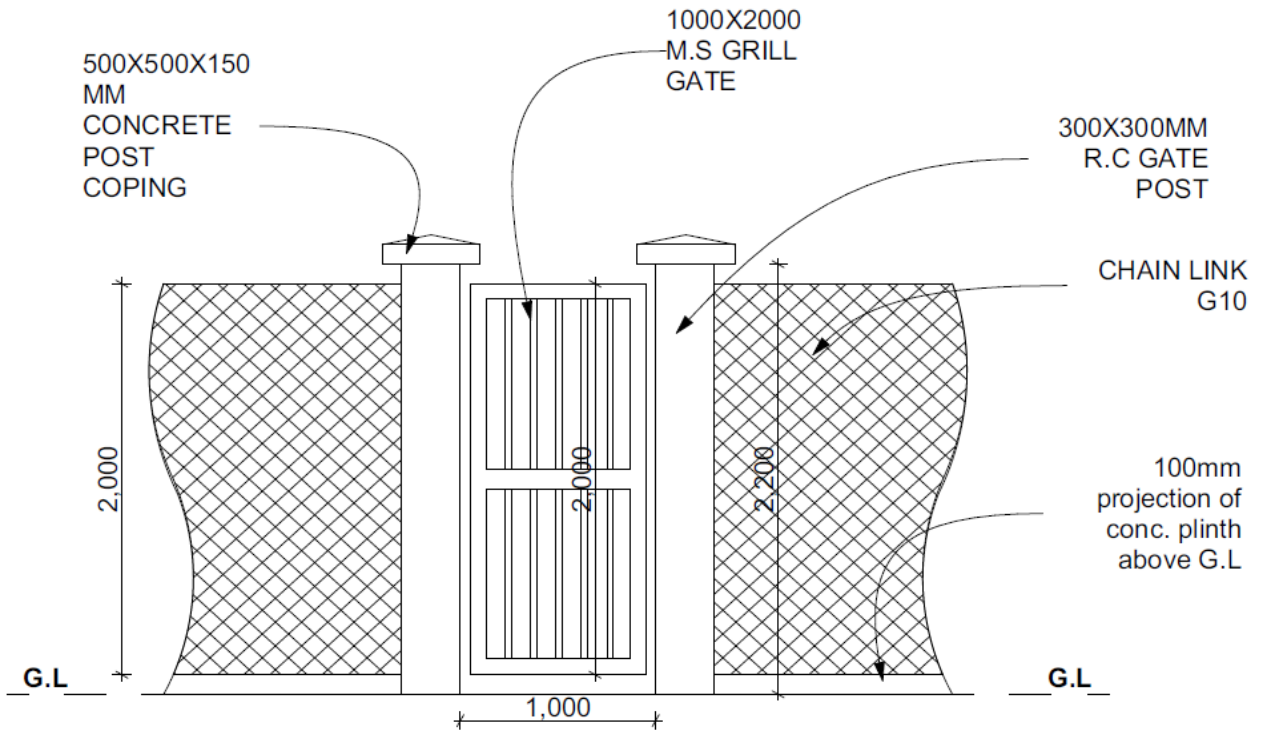




| | | | |
|--|--|--|--|
| PROJECT: | Drawing details: | Designed and Drawn by: | Checked by: A.D |
| NORTHERN UGANDA RESILIENCE INITIATIVE |  LAYOUT FOR GRADE "D" IMPROVED COMMUNITY MARKET |  DANISH REFUGEE COUNCIL | Approved by: District Commercial Officer |

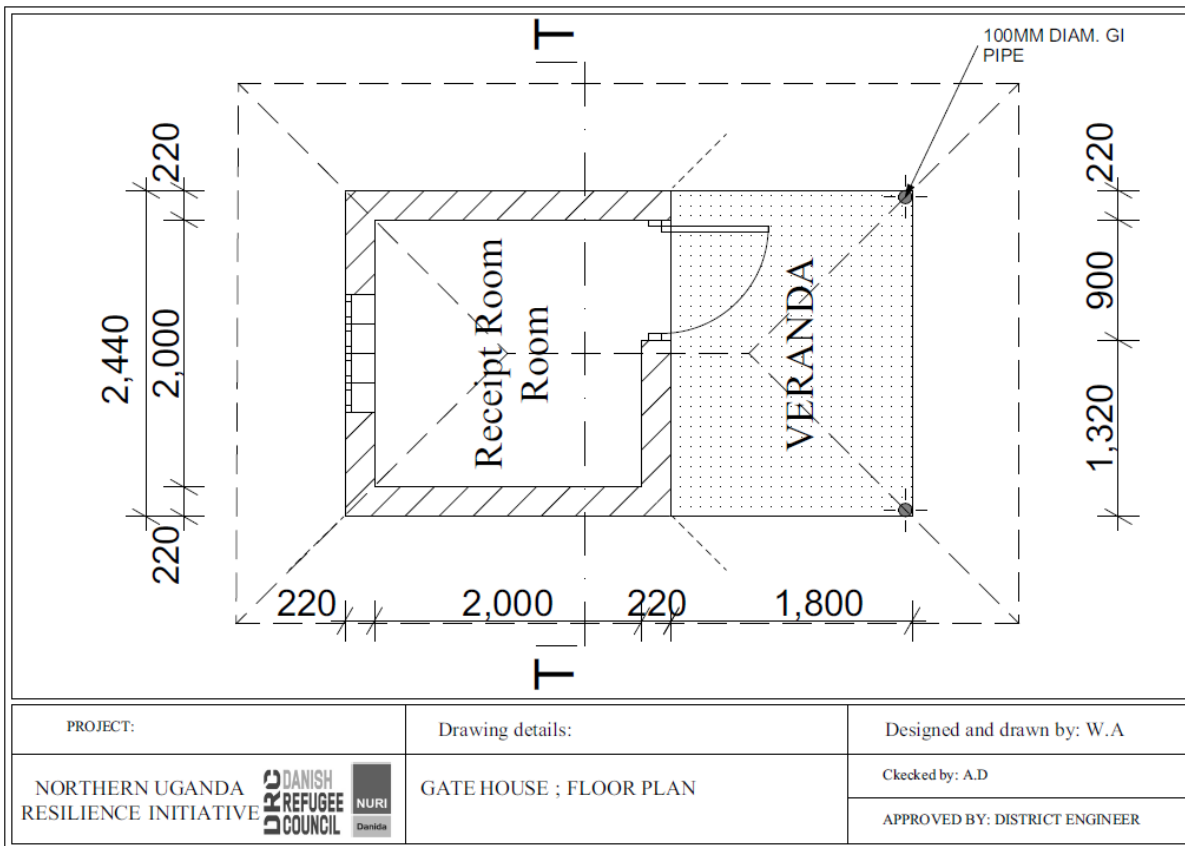


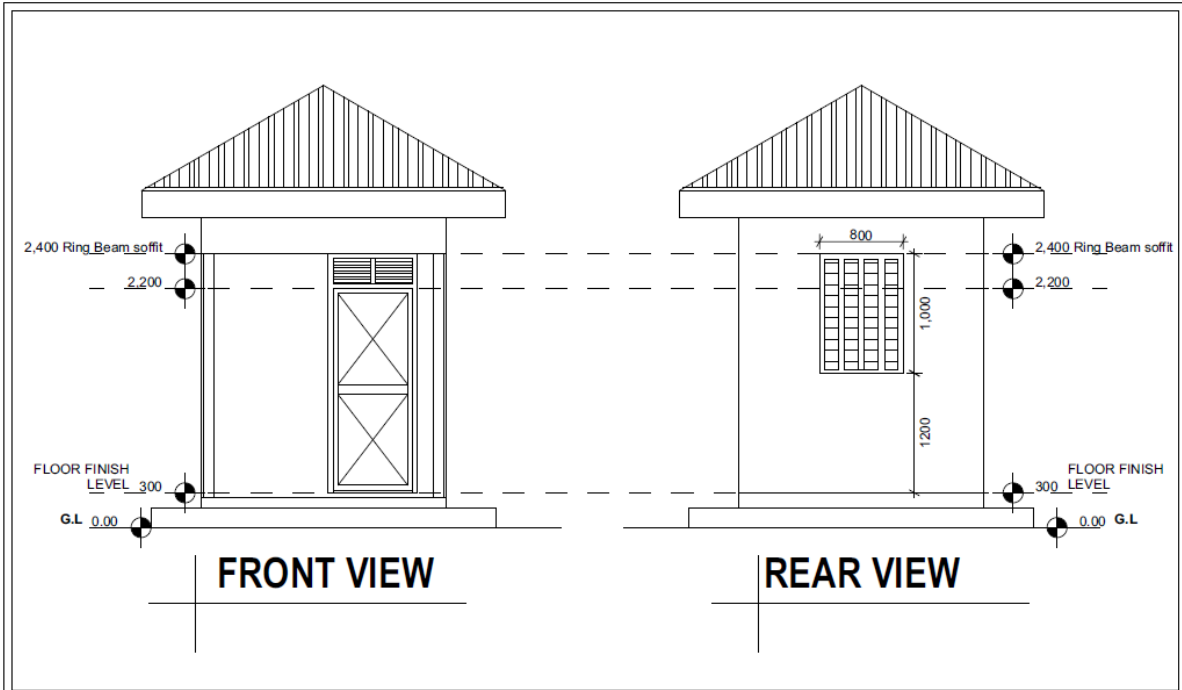
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| PROJECT: | Drawing details: | Designed and Drawn by: W.A | Checked by: A.D |
| NORTHERN UGANDA RESILIENCE INITIATIVE | Community Market : Metallic Gate Details | DANISH REFUGEE COUNCIL | Approved: DISTRICT COMMERCIAL OFFICER |




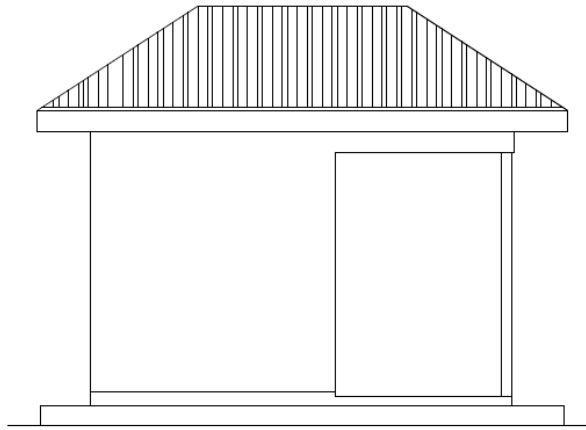
SMALL GATE DRAWING

DRAWINGS FOR MARKET GATES HOUSE




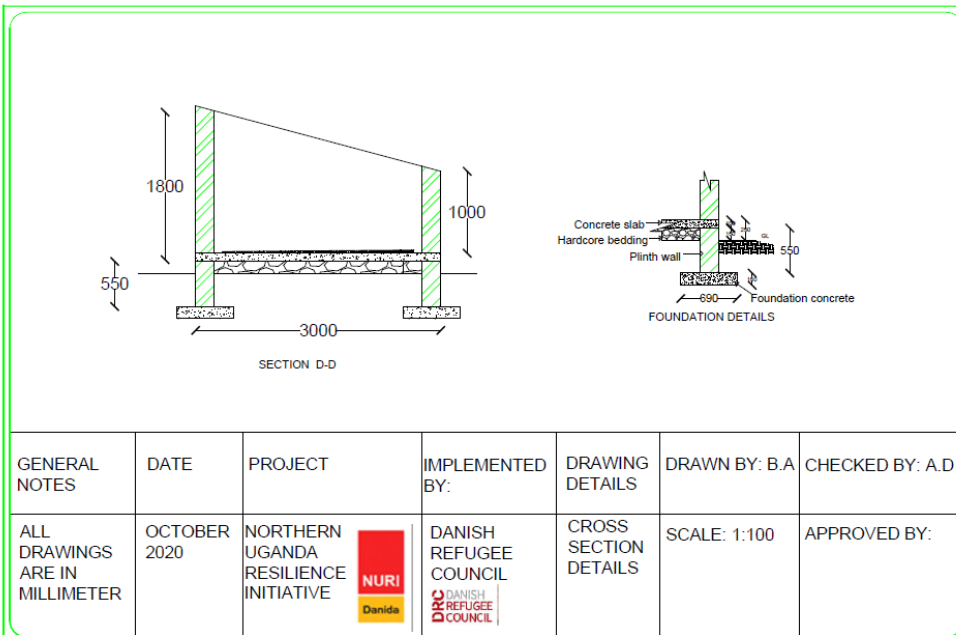
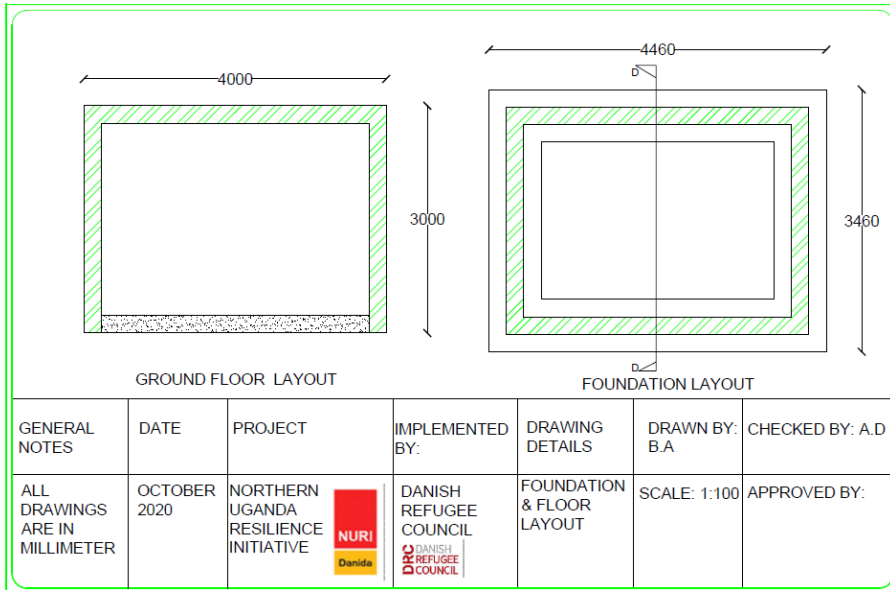


| | | |
|--|---|--|
| PROJECT: | Drawing details: | |
| NORTHERN UGANDA RESILIENCE INITIATIVE  | X-SECTION THROUGH ONE AND TWO LINE CULVERTS | ADOPTED FROM UGANDA ROADWORKS MANUAL VOL.4 APPROVED BY: DISTRICT ENGINEER |



TYPICAL SIDE VIEW

| | | |
|---|------------------------------------|---|
| PROJECT: | Drawing details: | |
| NORTHERN UGANDA RESILIENCE INITIATIVE  | GATE HOUSE: TYPICAL SIDE ELEVATION | ADOPTED FROM UGANDA ROADWORKS MANUAL VOL.4 APPROVED BY: DISTRICT ENGINEER |



Annex 5: Technical Design - VIP Latrine

a. Standard Cost

The standard cost for 4 Stances and 2 stances drainable attached with Urinals latrine including hand washing facilities is UGX **39,322,798** and **13,006,550** respectively.

b. Standard BOQ for VIP

Please note that excavation of the pit is done as part of the public works project and is not included in the BOQ.

| Standard BoQ for 4-Stances VIP Drainable Latrine attached with Urinals for a Rural Market NURI | | | |
|---|---|-------------|-------------------|
| Item | Description | Rate | Amount |
| Bill No. | GRAND SUMMARY | | |
| 1 | Preliminaries and General Items (For all the | | 800,000 |
| | Measured works | | |
| 2 | Construction of one block of 4-stance drainable VIP Latrine with urinal | | 32,524,405 |
| | Sub Total | | 33,324,405 |
| | Add 5% contingencies (Excluding Preliminaries and General items) | 0% | N/A |
| | Total exclusive of contingencies | | 33,324,405 |
| | Percentage Discount Offered (As per Bid submission sheet) | | 0% |
| | Sub Total VAT Exclusive | | 33,324,405 |

| | | | | | |
|--|--|----|------------|-------------|-------------------|
| | Add 18% VAT | | 18% | | 5,998,393 |
| | Grand Total for Lot | | | | 39,322,798 |
| BILL NO. 1 Preliminaries and General Items (For all the 05 latrines) | | | | | |
| 1.1 | Mobilization | | 1 | 450,000 | 450,000 |
| 1.2 | Insurance | | 1 | - | N/A |
| 1.3 | Performance bond | | 1 | - | N/A |
| 1.4 | Visibility | | 1 | 350,000 | 350,000 |
| 1.5 | Preparation of final report | | 1 | - | N/A |
| Total to be carried to Grand Summary No. 1>>>> | | | | | 800,000 |
| BILL NO. 2 MEASURED WORKS - Construction of 02 Stance Pit Latrine with urinal | | | | | |
| | Descriptions | | Qty | Rate | Amount |
| | ELEMENT NO. 1: SUBSTRUCTURE (All provisional) | | | | |
| | Excavations and Earthworks | | | | |
| 2.1.01 | Excavate for over site to remove topsoil average 150mm deep and remove from site | SM | 28 | 2,000 | 56,000 |
| 2.1.02 | Excavate to reduce level & remove from site(provisional) | CM | 6 | 7,500 | 45,000 |
| 2.1.03 | Excavate pit (6.45x2.2x3.2m) including all earth work support and keeping excavations free from general waters and mud. Include removal of excess materials from site. | CM | N/A | N/A | N/A |
| 2.1.04 | Allow for lining of pit with 230mm thick walls reinforced with hoop iron every alternate course (provisional item) | SM | 46 | 40,000 | 1,840,000 |

| | | | | | |
|--------|--|----------------|------|---------|-----------|
| 2.1.05 | 150mm thick concrete base mix 1:2:4 (provisional item) | CM | 2 | 480,000 | 960,000 |
| 2.1.06 | 15mm Thick cement and sand plaster to walls with smooth steel float finish. (Provisional item) | SM | 92 | 15,000 | 1,380,000 |
| 2.1.07 | Excavate trenches for wall foundations: commencing from reduced levels: not exceeding 1.5m deep. | CM | 7 | 7,500 | 52,500 |
| 2.1.08 | Treat surface of subsoil or fillings and surroundings with approved chemical anti-termite solution: provide ten year guarantee. | SM | 28 | 2,000 | 56,000 |
| | Disposal of excavated material | | | | 0 |
| 2.1.09 | Selected excavated material in filling to foundation trenches : around walling : placed in 200mm layers : watered and compacted to Engineer's satisfaction | CM | 19.5 | 10,000 | 195,000 |
| | In situ concrete class 20/20mm aggregates as in: | | | | 0 |
| 2.1.10 | Foundation trench 150mm thick with mix 1:3:6/20mm | CM | 1 | 400,000 | 400,000 |
| 2.1.11 | 100mm floor slab with provisions of drop holes and vent pipe mix 1:2:4 | SM | 20 | 48,000 | 960,000 |
| 2.1.12 | Column bases, Columns and beams including concrete benching mix 1:2:4 | m ³ | 3 | 480,000 | 1,440,000 |
| | High yield steel bar including working and fixing | | | | 0 |
| 2.1.13 | T12 | Kg | 131 | 6,500 | 851,500 |
| 2.1.14 | Mesh reinforcement Ref No. A98 size 200 x 200 mm weighing 1.54 kg per square meter: in floor slab: | SM | 11 | 15,000 | 165,000 |

| | | | | | |
|--------|---|----------------|------|---------|-----------|
| | Sawn formwork as described to: | | | | 0 |
| 2.1.15 | Edge of Slab 100mm high | LM | 15.2 | 8,000 | 121,600 |
| 2.1.16 | Soffits of suspended slab | SM | 9 | 25,000 | 225,000 |
| | Sides and soffits of column and beams | m ² | 36 | 8,000 | 288,000 |
| 2.1.17 | Reinforced concrete (1:2:4/20mm aggregate) in Columns, ring Beam | CM | 2 | 480,000 | 960,000 |
| | High yield steel bar including working and fixing | | | | 0 |
| 2.1.18 | T12 | Kg | 470 | 6,500 | 3,054,480 |
| 2.1.19 | R8 | Kg | 317 | 6,500 | 2,059,200 |
| | Ditto to columns and beams | | | | 0 |
| 2.1.20 | T16 | Kg | 115 | 8,000 | 920,000 |
| 2.1.21 | R8 | Kg | 175 | 6,500 | 1,137,500 |
| | Plinth Wall; | | | | 0 |
| 2.1.22 | Selected burnt clay bricks bedded and jointed in 1:4 mortar one and half brick thick (350mm), with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses | SM | 9 | 47,000 | 423,000 |
| | Splash Apron: | | | | 0 |
| 2.1.23 | Excavation for foundation trench not exceeding 1.0m | CM | 12 | 7,500 | 90,000 |
| 2.1.24 | Return fill and ram selected excavated material around foundation | CM | 8 | 7,500 | 60,000 |
| 2.1.25 | 150mm thick bed of imported hardcore fill in and rolled ready to receive concrete 20/20 | SM | 25 | 40,000 | 1,000,000 |
| 2.1.26 | 75mm thick plain concrete 20/20mm aggregate | SM | 25 | 40,000 | 1,000,000 |

| | | | | | |
|--------|---|----|------|---------|-------------------|
| 2.1.27 | 150mm thick walling in cement sand (1:4) | SM | 14.1 | 30,000 | 423,000 |
| 2.1.28 | 15mm Thick cement and sand plaster to plinth walls with wood float finish. | SM | 14.1 | 15,000 | 211,500 |
| 2.1.29 | 30mm cement and sand screed trowled (1:3mix) | SM | 16 | 17,500 | 280,000 |
| | Substructure Sub-total to summary. | | | | 20,654,280 |
| | ELEMENT NO. 2: SUPERSTRUCTURE. | | | | |
| | Ring beam construction | | | | |
| 2.2.01 | Reinforced concrete grade 20/19mm aggregate in ring Beam | CM | 0.8 | 480,000 | 384,000 |
| | High yield steel bar including working and fixing | | | | 0 |
| 2.2.02 | T12 | Kg | 71.8 | 6,500 | 466,375 |
| 2.2.03 | R8 | Kg | 34 | 6,500 | 221,000 |
| 2.2.04 | Sawn formwork as described to: Sides and soffits of beams | SM | 8 | 25,000 | 200,000 |
| | Walling | | | | 0 |
| 2.2.05 | 150m wide Damp proof course laid and bedded in cement and sand mortar 1:3 with 300mm laps | LM | 23 | 1,500 | 34,500 |

| | | | | | |
|--------|--|----|----|--------|------------------|
| 2.2.06 | Selected burnt clay bricks bedded and jointed in 1:4 mortar one and half brick thick (350mm), with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses 150mm thick, with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses | SM | 58 | 30,000 | 1,740,000 |
| 2.07 | 460X150 mm high well burnt clay vent bricks in cement sand mortar (1:4) including any other equal. | SM | 7 | 10,000 | 70,000 |
| | Superstructure Sub-totals to summary. | | | | 3,115,875 |
| 3 | ELEMENT NO. 3: ROOF CONSTRUCTION AND COVERINGS | | | | |
| | Roof structure: (Sawn treated softwood) | | | | |
| 2.3.01 | 75x100m wall plate | LM | 19 | 8,000 | 152,000 |
| 2.3.02 | 50x100mm rafter/struts/tie beam | LM | 64 | 7,500 | 480,000 |
| 2.3.03 | 50x100mm purlins | LM | 44 | 7,500 | 330,000 |
| 2.3.04 | 25x230 fascia board in planed cypress. | LM | 26 | 10,000 | 260,000 |
| 2.3.05 | Knot, prime, stop and apply three coats of gloss oil paint to wood fascia 200-300mm girth. On fascia board | LM | 26 | 6,500 | 169,000 |
| | Covering: | | | | 0 |
| 2.3.06 | 28 Gauge pre-painted roofing sheets including side laps filler blocks and; fixed with approved capped roofing nails or screws to Engineer's specification and manufacturer's instructions. | SM | 20 | 35,000 | 700,000 |

| | | | | | |
|--------|--|----|----|---------|------------------|
| 2.3.07 | 100 mm uPVC vent pipe complete with vent cap | No | 4 | 15,000 | 60,000 |
| | Roofing Sub-totals to summary. | | | | 2,151,000 |
| | ELEMENT NO. 4: DOORS | | | | |
| | Purpose Made Metallic Doors complete with 150mmx1.5mm frame, 1.2mm MS plate shutter with 40x20x1.2mm framing and Iron mongery including pad locks fixed in position | | | | |
| 2.4.01 | 900x2400 high doors | No | 2 | 320,000 | 640,000 |
| 2.4.02 | 1000x2400mm high. | No | 2 | 320,000 | 640,000 |
| 2.4.05 | Metallic grill gates made of 20x20x1.2mm hollow sections and 40x20x1.2mm framing at entrance to the passage complete with pad locks | No | 2 | 250,000 | 500,000 |
| | Iron mongery | | | | 0 |
| | supply and fix the following iron mongery with matching screws | | | | 0 |
| 2.4.06 | 100mm butt hinges | Pr | 6 | 15,000 | 90,000 |
| 2.4.07 | 300mm long galvanized pad bolt and lock | Pr | 6 | 15,000 | 90,000 |
| | Painting use sadolin paints or equivalent: | | | | 0 |
| 2.4.08 | Prepare and apply one under coat and two finishing coats of gloss paint on general surface of doors. | SM | 27 | 6,500 | 175,500 |
| | Doors Sub -totals to summary. | | | | 2,135,500 |

| | | | | | |
|--------|--|----|------|---------|------------------|
| 5 | ELEMENT NO.5: INTERNAL FINISHES | | | | |
| 2.5.01 | 12mm cement and sand (1:4) mortar to walls and beam steel troweled hard and smooth on walls internally. | SM | 58.5 | 12,000 | 702,000 |
| 2.5.02 | Prepare, prime and apply one under coat and 3 coats of emulsion paint on plastered walls internally. | SM | 58.5 | 6,500 | 380,250 |
| 2.5.03 | 25mm cement and sand (1:3) screed finished smooth. | SM | 19 | 15,000 | 285,000 |
| 2.5.04 | Provide and fix a 50mm hand rail for PWD embedded into the wall as instructed by the Engineer | SM | 2 | 180,000 | 360,000 |
| | Internal Finishes Sub -totals to summary. | | | | 1,727,250 |
| | ELEMENT NO. 6: EXTERNAL FINISHES | | | | |
| 2.6.01 | 12mm cement and sand render to wall with wood float finish. | SM | 37 | 12,000 | 444,000 |
| 2.6.02 | Cement and sand roughcast finish on rendered wall. | SM | 24 | 6,500 | 156,000 |
| 2.6.03 | Prepare, prime and apply one under coat and 3 coats of emulsion paint on plastered walls externally. | SM | 37 | 6,500 | 240,500 |
| | Water Supply | | | | 0 |
| 2.6.04 | 250 litre PVC tank placed on ground concrete base (measured separately) ,complete with all accessories to be supplied by the contractor | SM | 1 | 500,000 | 500,000 |
| 2.6.05 | Supply and fix rain water gutters and down pour pipes to the tank including all accessories to satisfaction of engineer. | SM | 1 | 300,000 | 300,000 |

| | | | | | |
|--------|--|----|---|---------|-------------------|
| 2.6.06 | 1.0m high ground concrete water tank base made in masonry brickwork, well compacted with 150mm thick slab on top as shown in drawing for the above water tanks complete | SM | 1 | 300,000 | 300,000 |
| 2.6.07 | Secure tank with a metallic cage fixed into the concrete slab. | SM | 1 | 300,000 | 300,000 |
| | Soak away Pit/Waste Water Mulch Basins | | | | 0 |
| 2.6.08 | 1200mm dia. Soak away pit excavated to a depth of 2m filled with laterite stones/Mulch, connected to the urinal by 100mm dia. PVC pipe and covered with polythene sheet before backfill with ordinary soil | No | 1 | 500,000 | 500,000 |
| | External Finishes Sub -totals to summary. | | | | 2,740,500 |
| | Description | | | | |
| | SUMMARY | | | | |
| 1 | Substructure | | | | 20,654,280 |
| 2 | Superstructure | | | | 3,115,875 |
| 3 | Roof construction and coverings | | | | 2,151,000 |
| 4 | Doors | | | | 2,135,500 |
| 5 | Internal Finishes | | | | 1,727,250 |
| 6 | External Finishes | | | | 2,740,500 |
| | Total for one unit of 4 stances | | | | 32,524,405 |

| Item | Description | Unit | Qty | Rate | Amount |
|--|---|--------------|------------|-------------|-------------------|
| Bill No. | GRAND SUMMARY | | | | |
| 1 | Preliminaries and General Items | | | | 800,000 |
| | Measured works | | | | |
| 2 | Construction of one block of 2-stance drainable VIP Latrine with urinal | | | | 10,222,500 |
| | Sub Total | | | | 11,022,500 |
| | Add 5% contingencies (Excluding Preliminaries and General items) | | 0% | N/A | - |
| | Total inclusive of contingencies | | | | 11,022,500 |
| | Percentage Discount Offered (As per Bid submission sheet) | | 0% | | - |
| | Sub Total VAT Exclusive | | | | 11,022,500 |
| | Add 18% VAT | | 18% | | 1,984,050 |
| | Grand Total for Lot | | | | 13,006,550 |
| BILL NO. 1 Preliminaries and General Items | | | | | |
| 1.1 | Mobilization | LS | 1 | 450,000 | 450,000 |
| 1.2 | Insurance | LS | 1 | - | N/A |
| 1.3 | Performance bond | LS | 1 | - | N/A |
| 1.4 | Visibility | No | 1 | 350,000 | 350,000 |
| 1.5 | Preparation of final report | LS | 1 | - | N/A |
| Total to be carried to Grand Summary No. 1>>>> | | | | | 800,000 |
| BILL NO. 2 MEASURED WORKS - Construction of 02 Stance Pit Latrine with urinal | | | | | |
| | Descriptions | Units | Qty | Rate | Amount |
| | ELEMENT NO. 1: SUBSTRUCTURE (All provisional) | | | | |
| | Excavations and Earthworks | | | | |
| 2.1.01 | Excavate for oversite to remove topsoil average 150mm deep and remove from site | sm. | 16 | 2,000 | 32,000 |

| | | | | | |
|--------|--|----------------|-----|---------|---------|
| 2.1.02 | Excavate to reduce level & remove from site(provisional) | cu m | 1 | 7,500 | 7,500 |
| 2.1.03 | Excavate pit (4.5x2.2m) including all earth work support and keeping excavations free from general waters and mud.include removal of excess materials from site. | Ite m | N/A | N/A | |
| 2.1.04 | Allow for lining of pit with 230mm thick walls reinforced with hoop iron every alternate course (provisional item) | sm | 21 | 40,000 | 840,000 |
| 2.1.05 | 100mm thick concrete base mix 1:2:4 (provisional item) | cm | 0.5 | 400,000 | 200,000 |
| 2.1.06 | 15mm Thick cement and sand plaster to walls with smooth steel float finish. (Provisional item) | sm | 21 | 15,000 | 315,000 |
| 2.1.07 | Excavate trenches for wall foundations: commencing from reduced levels: not exceeding 1.5mm deep. | cu m | 9 | 7,500 | 67,500 |
| 2.1.08 | Treat surface of subsoil or fillings and surroundings with approved chemical anti-termite solution: provide ten year guarantee. | m ² | 16 | 2,000 | 32,000 |
| | Disposal of excavated material | | | | |
| 2.1.09 | Selected excavated material in filling to foundation trenches : around walling : placed in 200mm layers : watered and compacted to Engineer's satisfaction | cu m | 3 | 10,000 | 30,000 |
| | In situ concrete class 20/20mm aggregates as in: | | | | |
| 2.1.10 | Foundation trench 100mm thick with mix 1:3:6/20mm | cu m | 1 | 400,000 | 400,000 |
| 2.1.11 | 100mm floor slab with provisions of drop holes and vent pipe mix 1:2:4 | cu m | 0.8 | 480,000 | 384,000 |
| | High yield steel bar including working and fixing | | | | |
| 2.1.12 | Y12 | kgs | 28 | 6,500 | 182,000 |
| 2.1.13 | Mesh reinforcement Ref No. A98 size 200 x 200 mm weighing 1.54 kg per square metre: in floor slab: | sm | 8 | 15,000 | 120,000 |

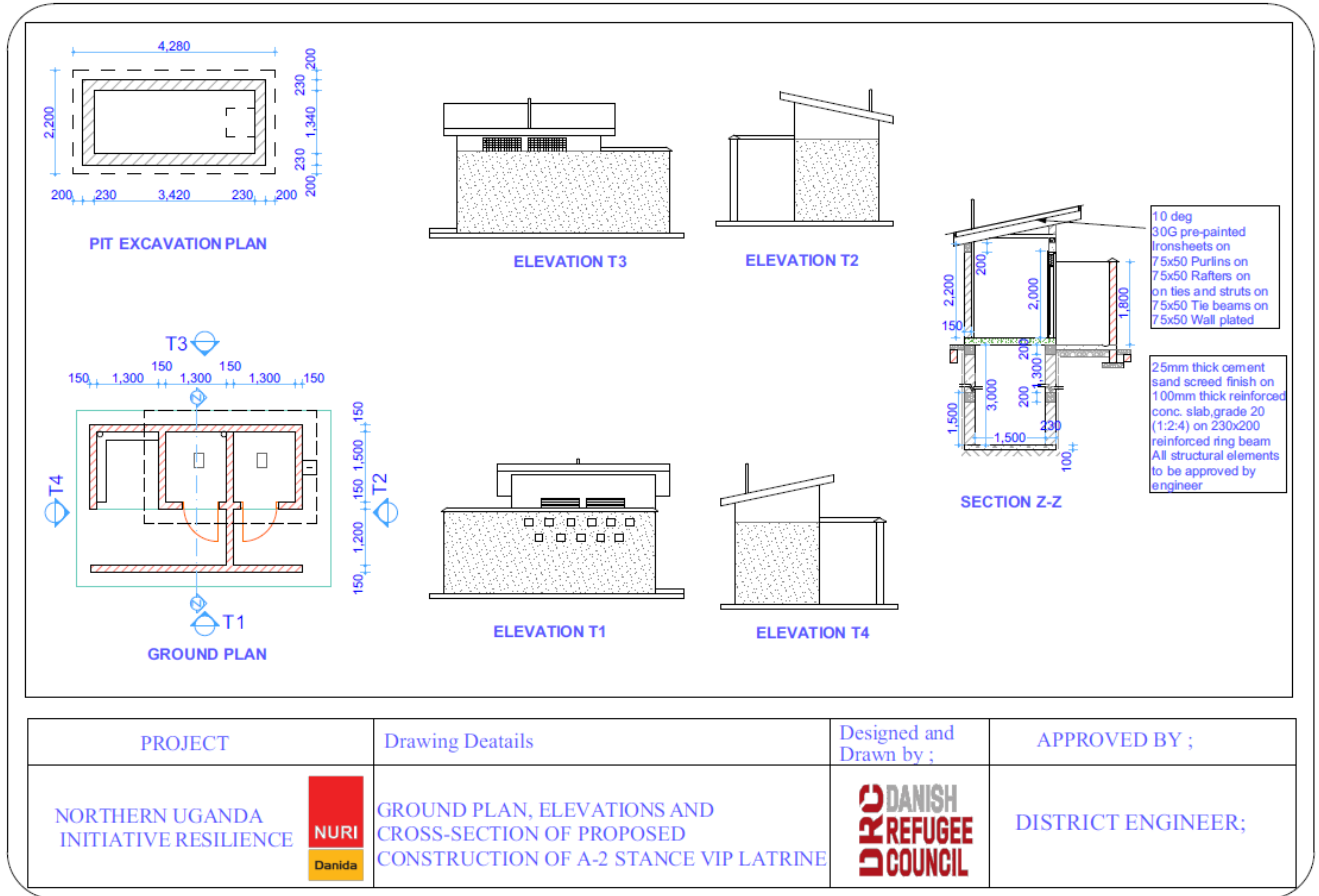
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|--------|---|---------|-----|---------|------------------|
| | Sawn formwork as described to: | | | | |
| 2.1.14 | Edge of Slab 100mm high | m | 10 | 8,000 | 80,000 |
| 2.1.15 | Soffites of suspended slab | sm. | 3 | 15,000 | 45,000 |
| 2.1.16 | Reinforced concrete (1:2:4/20mm aggregate) in Columns, ring Beam | cu m | 0.6 | 480,000 | 288,000 |
| | High yield steel bar including working and fixing | | | | - |
| 2.1.17 | Y12 | kg | 54 | 6,500 | 351,000 |
| 2.1.18 | R08 | kg | 24 | 6,500 | 156,000 |
| | Plinth Wall; | | | | |
| 2.1.19 | Selected burnt clay bricks bedded and jointed in 1:4 mortar one and half brick thick (350mm), with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses | sm. | 7 | 47,000 | 329,000 |
| | Splash Apron: | | | | |
| 2.1.20 | Excavation for foundation trench not exceeding 1.0m | cu m | 3 | 7,500 | 22,500 |
| 2.1.21 | Return fill and ram selected excavated material around foundation | cu m | 2 | 7,500 | 15,000 |
| | 150mm thick bed of imported hardcore fill in and rolled ready to receive concrete 20/20 | cu m | 0.3 | 400,000 | 120,000 |
| 2.1.22 | 75mm thick plain concrete 20/20mm aggregate | cu m | 0.3 | 400,000 | 120,000 |
| 2.1.23 | 150mm thick walling in cement sand (1:4) | sm | 3 | 30,000 | 90,000 |
| 2.1.24 | 15mm Thick cement and sand plaster to plinth walls with wood float finish. | sm | 3 | 15,000 | 45,000 |
| 2.1.25 | 30mm cement and sand screed trawled (1:3mix) | sm. | 4 | 17,500 | 70,000 |
| | Substructure Sub-total to summary. | | | | 4,341,500 |
| | ELEMENT NO. 2: SUPERSTRUCTURE. | | | | |
| | Ring beam construction | | | | |
| 2.2.01 | Reinforced concrete grade 25/19mm aggregate in ring Beam | cu m | 0.5 | 480,000 | 240,000 |
| | High yield steel bar including working and fixing | | | | |

| | | | | | |
|--------|--|-----|----|--------|------------------|
| 2.2.02 | Y12 | kg | 24 | 6,500 | 156,000 |
| 2.2.03 | R8 | kg | 14 | 6,500 | 91,000 |
| 2.2.04 | Sawn formwork as described to: Sides and soffits of beams | sm | 5 | 15,000 | 75,000 |
| | Walling | | | | |
| 2.2.05 | 150m wide Damp proof course laid and bedded in cement and sand mortar 1:3 with 300mm laps | m | 13 | 1,500 | 19,500 |
| 2.2.06 | Selected burnt clay bricks bedded and jointed in 1:4 mortar one and half brick thick (350mm), with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses 150mm thick, with and including 25x3 mm hoop iron strips laid horizontally every alternate 2 courses | sm. | 26 | 30,000 | 780,000 |
| 2.07 | 460X150 mm high well burnt clay vent bricks in cement sand mortar (1:4) including any other equal. | No | 2 | 10,000 | 20,000 |
| | Superstructure Sub-totals to summary. | | | | 1,381,500 |
| 3 | ELEMENT NO. 3: ROOF CONSTRUCTION AND COVERINGS | | | | |
| | Roof structure:(Sawn treated softwood) | | | | |
| 2.3.01 | 75x100m wall plate | m | 5 | 8,000 | 40,000 |
| 2.3.02 | 50x100mm rafter | m | 10 | 7,500 | 75,000 |
| 2.3.03 | 50x100mm purlins | m | 12 | 7,500 | 90,000 |
| 2.3.04 | 25x230 fascia board in planed cypress. | m | 13 | 10,000 | 130,000 |
| 2.3.05 | Knot, prime, stop and apply three coats of gloss oil paint to wood fascia 200-300mm girth. On fascia board | m | 13 | 6,500 | 84,500 |
| | Covering: | | | | |
| 2.3.06 | 28 Gauge pre-painted roofing sheets including side laps filler blocks and; fixed with approved capped roofing nails or screws to Engineer's specification and manufacturer's instructions. | sm. | 8 | 35,000 | 280,000 |
| 2.3.07 | 100 mm uPVC vent pipe complete with vent cap | m | 6 | 15,000 | 90,000 |

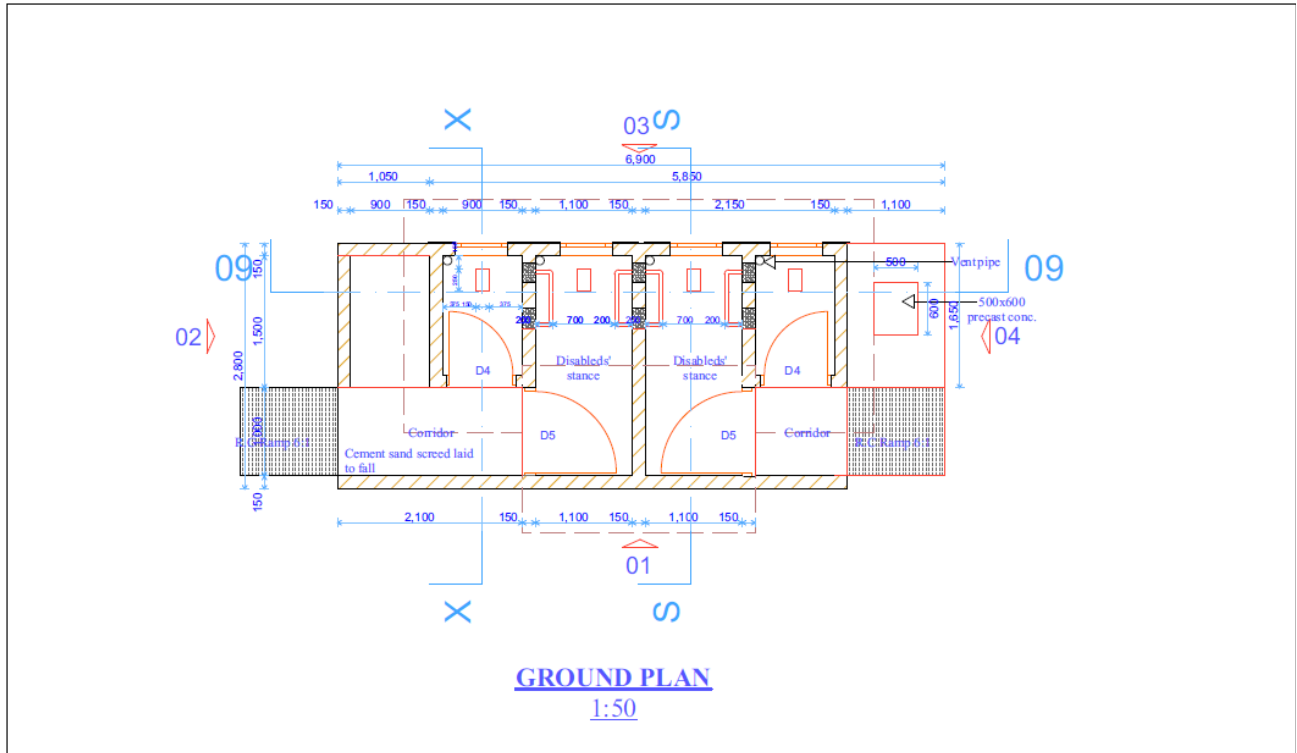
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|--------|--|--------|----|---------|------------------|
| | Roofing Sub-totals to summary. | | | | 789,500 |
| | ELEMENT NO. 4: DOORS | | | | |
| | Metallic frames including hoisting and fixing in position | | | | |
| 2.4.01 | Frames with louvres; size 900x2400 high. | No | 2 | 180,000 | 360,000 |
| 2.4.02 | Ditto but 850x2100 shutters complete with pad locks | No | 2 | 180,000 | 360,000 |
| | Metallic gate at entrance to the passage complete with pad locks | No | 2 | 150,000 | 300,000 |
| | Iron mongery | | | | |
| | supply and fix the following iron mongery with matching screws | | | | |
| 2.4.03 | 100mm butt hinges | pair s | 3 | 15,000 | 45,000 |
| 2.4.04 | 300mm long galvanised pud bolt and lock | No | 4 | 15,000 | 60,000 |
| | Painting use sadolin paints or equivalent: | | | | |
| 2.4.05 | Prepare and apply one under coat and two finishing coats of gloss paint on general surface of doors. | sm | 8 | 6,500 | 52,000 |
| | Doors Sub -totals to summary. | | | | 1,177,000 |
| 5 | ELEMENT NO. 5: INTERNAL FINISHES | | | | |
| 2.5.01 | 12mm cement and sand (1:4) mortar to walls and beam steel trowelled hard and smooth on walls internally. | sm. | 22 | 12,000 | 264,000 |
| 2.5.02 | Prepare, prime and apply one under coat and 3 coats of emulsion paint on plastered walls internally. | sm. | 22 | 6,500 | 143,000 |
| 2.5.03 | 25mm cement and sand (1:3) screed finished smooth. | sm | 10 | 15,000 | 150,000 |
| | Internal Finishes Sub -totals to summary. | | | | 557,000 |
| | ELEMENT NO. 6: EXTERNAL FINISHES | | | | |
| 2.6.01 | 12mm cement and sand render to wall with wood float finish. | sm. | 22 | 12,000 | 264,000 |

| | | | | | |
|--|--|------|----|---------|-------------------|
| 2.6.02 | Cement and sand roughcast finish on rendered wall. | sm. | 24 | 6,500 | 156,000 |
| 2.6.03 | Prepare, prime and apply one under coat and 3 coats of emulsion paint on plastered walls externally. | sm. | 24 | 6,500 | 156,000 |
| Water Supply | | | | | |
| 2.6.04 | 250 litre PVC tank placed on ground concrete base (measured separately) ,complete with all accessories to be supplied by the contractor | No | 1 | 300,000 | 300,000 |
| 2.6.05 | Supply and fix rain water gutters and down pour pipes to the tank including all accessories to satisfaction of engineer. | item | 1 | 200,000 | 200,000 |
| 2.6.06 | 1.0m high ground concrete water tank base made in masonry brickwork, well compacted with 150mm thick slab on top as shown in drawing for the above water tanks complete | item | 1 | 300,000 | 300,000 |
| 2.6.07 | Secure tank with a metallic cage fixed into the concrete slab. | item | 1 | 300,000 | 300,000 |
| Soak away Pit | | | | | |
| 2.6.08 | 1200mm dia. Soak away pit excavated to a depth of 2m filled with laterite stones, connected to the urinal by 100mm dia. PVC pipe and covered with polythene sheet before backfill with ordinary soil | no | 1 | 300,000 | 300,000 |
| External Finishes Sub -totals to summary. | | | | | 1,976,000 |
| Description | | | | | |
| SUMMARY | | | | | |
| 1 | Substructure | | | | 4,341,500 |
| 2 | Superstructure | | | | 1,381,500 |
| 3 | Roof construction and coverings | | | | 789,500 |
| 4 | Doors | | | | 1,177,000 |
| 5 | Internal Finishes | | | | 557,000 |
| 6 | External Finishes | | | | 1,976,000 |
| Total for one unit of two stances | | | | | 10,222,500 |

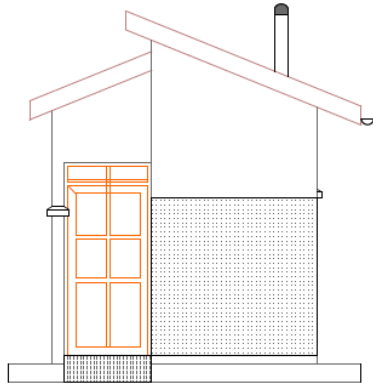
DRAWINGS FOR 2 STANCE LATRINE



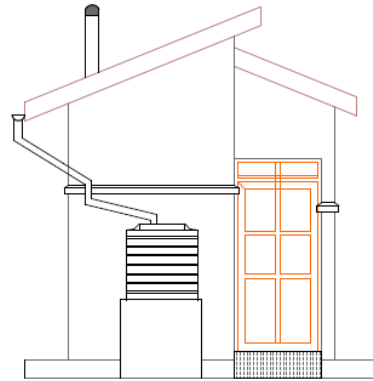
DRAWINGS FOR 4-STANCE LATRINE





| | | | |
|--|-----------------------------------|-----------------------|--|
| PROJECT: | Drawing details: | Designed & Drawn by : | |
| NORTHERN UGANDA RESILIENCE INITIATIVE <div style="display: inline-block; vertical-align: middle; text-align: center;"> NURI </div> | MARKET LATRINE: FLOOR PLAN | | APPROVED BY: DISTRICT COMMERCIAL OFFICER |

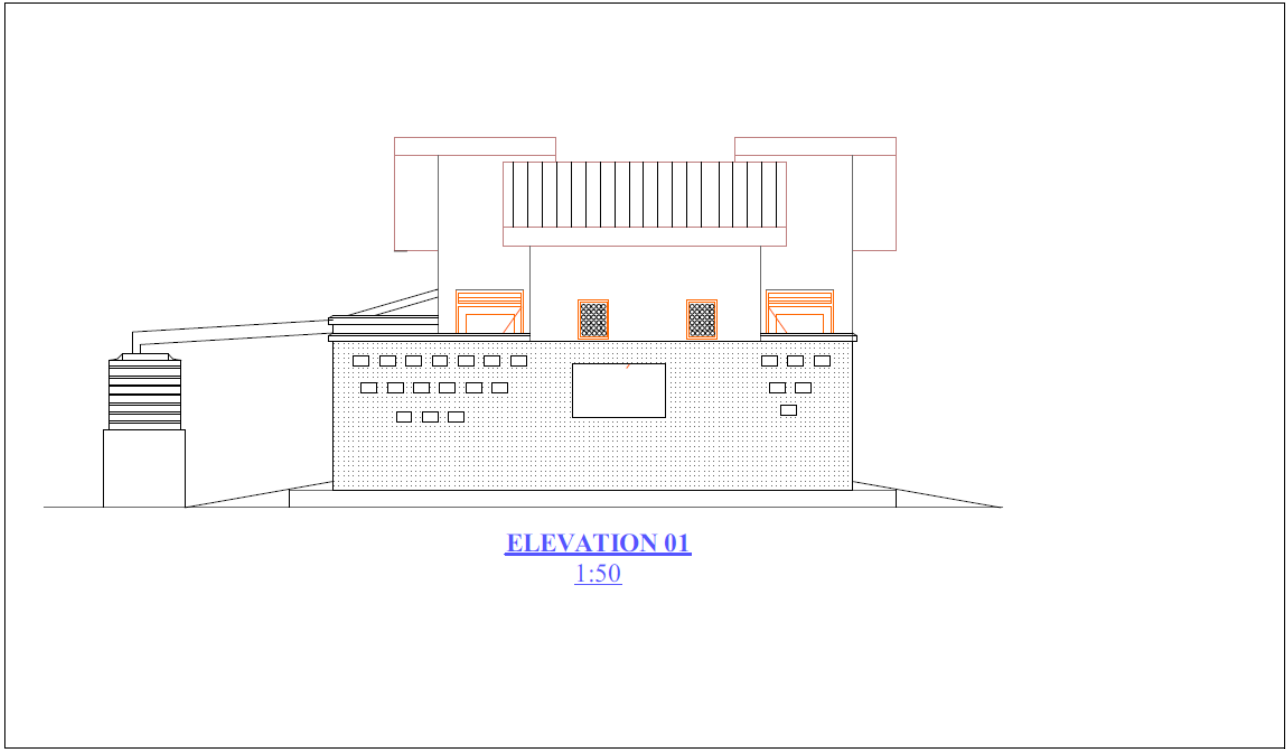


ELEVATION 04
1:50



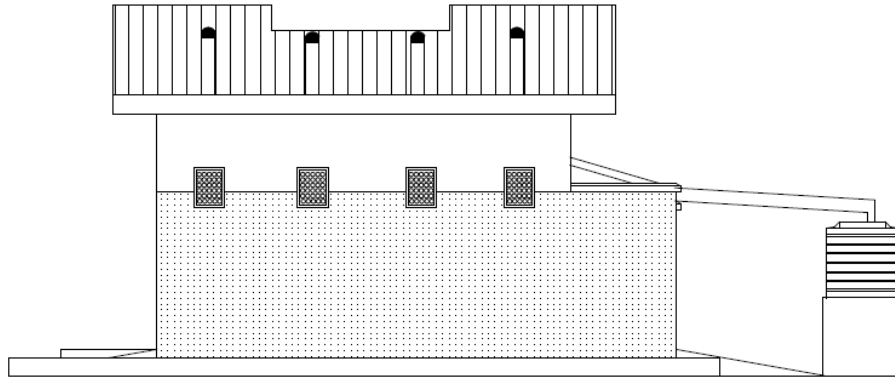
ELEVATION 02
1:50

| | | | |
|--|--|--|---|
| <p>PROJECT:</p> | <p>Drawing details:</p> | <p>Designed & Drawn by :</p> | |
| <p>NORTHERN UGANDA RESILIENCE INITIATIVE</p>  | <p>MARKET LATRINE: SIDE ELEVATIONS</p> |  | <p>APPROVED BY: DISTRICT COMMERCIAL OFFICER</p> |





ELEVATION 01
1:50

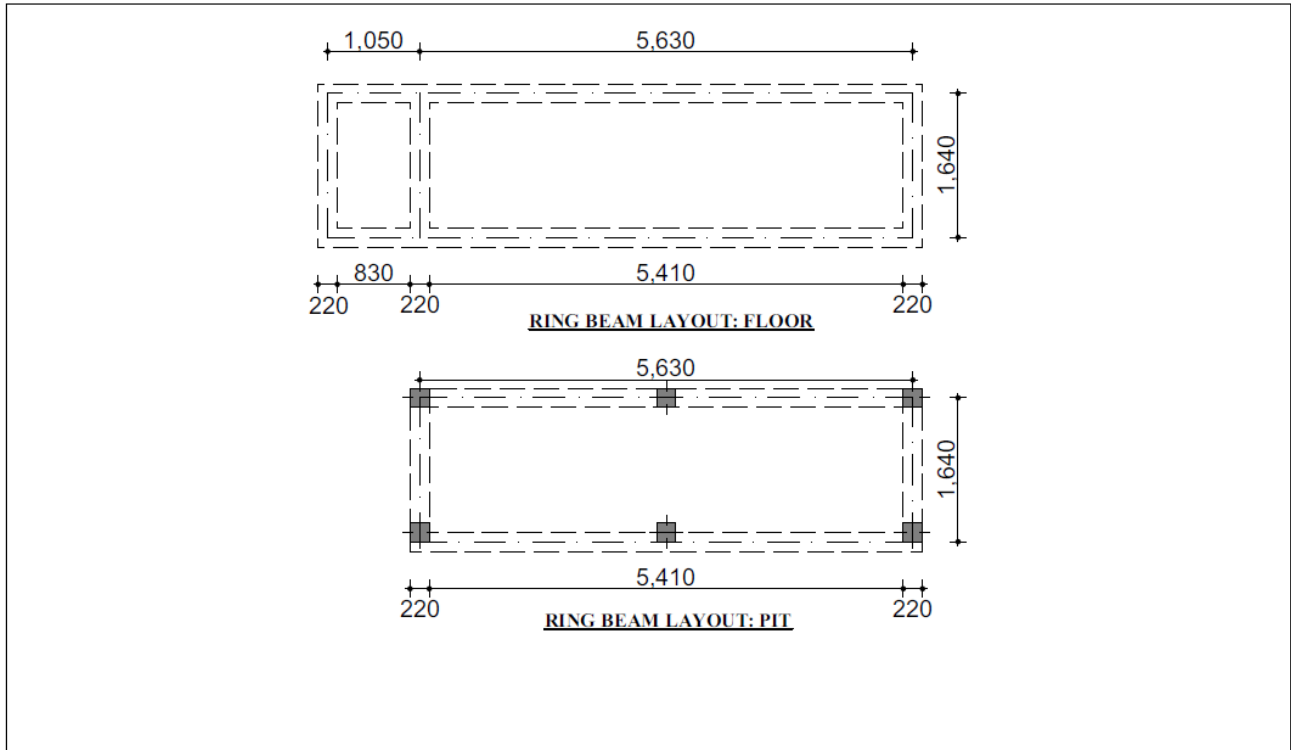
| | | | |
|--|--|--|---|
| <p>PROJECT:</p> | <p>Drawing details:</p> | <p>Designed & Drawn by :</p> | |
| <p>NORTHERN UGANDA RESILIENCE INITIATIVE</p>  | <p>MARKET LATRINE: FRONT ELEVATION</p> |  | <p>APPROVED BY: DISTRICT COMMERCIAL OFFICER</p> |





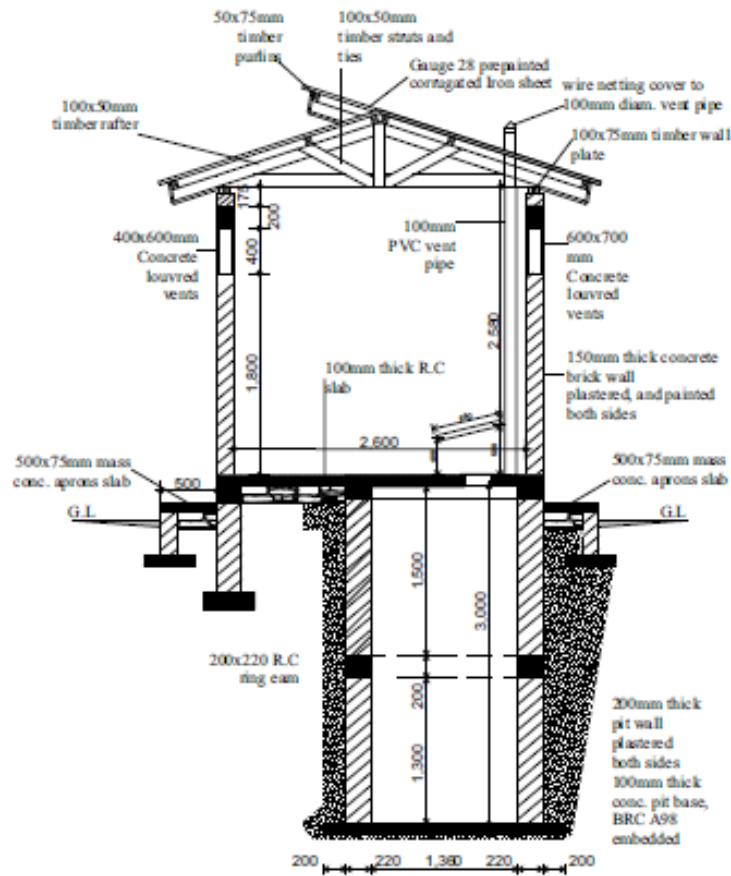
ELEVATION 03

1:50



| | | | |
|---|---------------------------------------|--|--|
| PROJECT: | Drawing details: | Designed & Drawn by : | |
| NORTHERN UGANDA RESILIENCE INITIATIVE  | MARKET LATRINE: REAR ELEVATION |  | APPROVED BY: DISTRICT COMMERCIAL OFFICER |

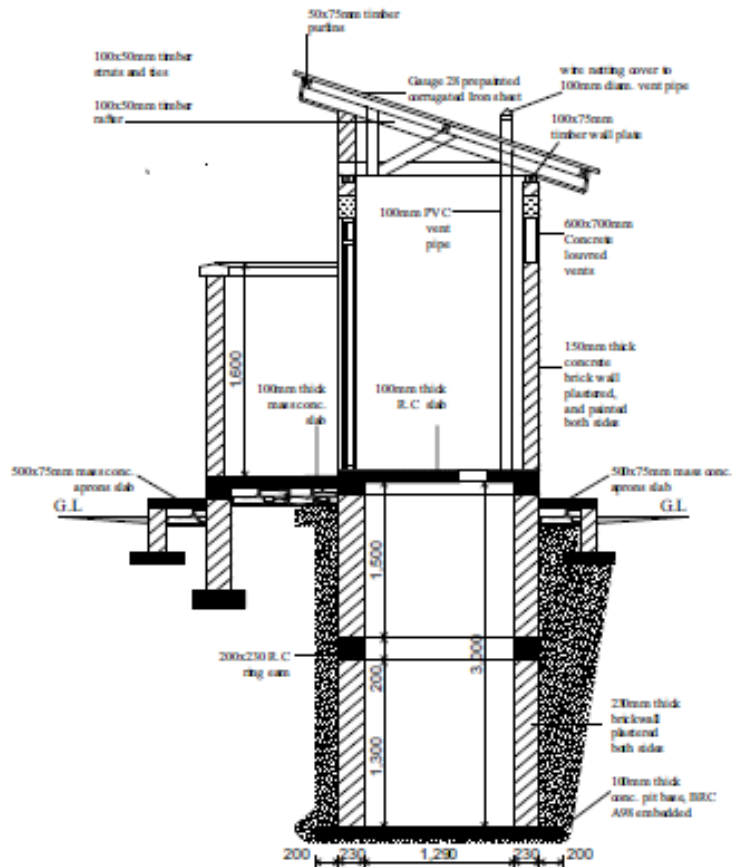


| | | | |
|--|---|--|--|
| PROJECT: | Drawing details: | Designed & Drawn by : | |
| NORTHERN UGANDA RESILIENCE INITIATIVE  | MARKET LATRINE: RING BEAMS LAYOUTS |  | APPROVED BY: DISTRICT COMMERCIAL OFFICER |





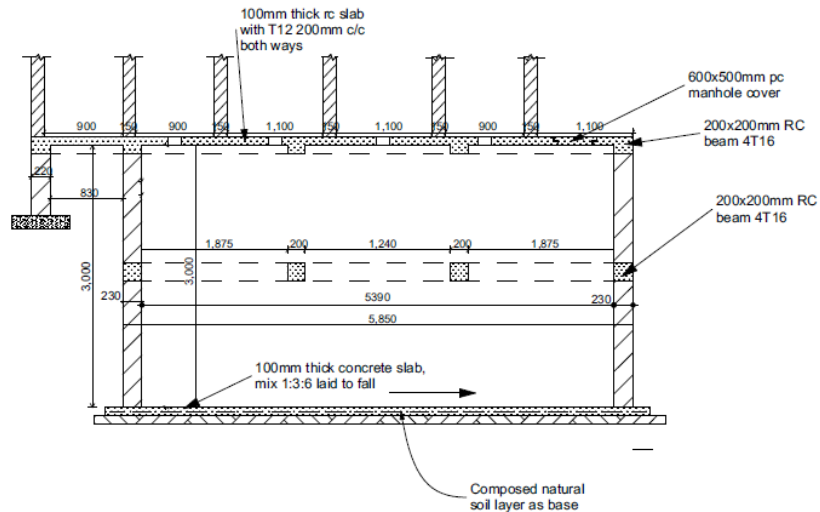
SECTION S-S
1:50

| | | | |
|---|---------------------------------------|--|--------------------------------|
| PROJECT: | Drawing details : | Designed Drawn by | APPROVED BY : |
| NORTHERN UGANDA RESILIENCE INITIATIVE  | MARKET LATRINE: FLOOR BEAM |  | DISTRICT COMMERCIAL OFFICER |





SECTION T-T
1:50

| | | | |
|---|---------------------------------------|--|--------------------------------|
| PROJECT: | Drawing details : | Designed Drawn by | APPROVED BY : |
| NORTHERN UGANDA RESILIENCE INITIATIVE  | MARKET LATRINE: FLOOR BEAM |  | DISTRICT COMMERCIAL OFFICER |



SECTION 09-09 (PIT)
1:50

| | | | |
|--|--|--|--|
| PROJECT: | Drawing details: | Designed & Drawn by : | |
| NORTHERN UGANDA RESILIENCE INITIATIVE  | MARKET LATRINE: FLOOR BEAM PIT PLAN |  | APPROVED BY: DISTRICT COMMERCIAL OFFICER |

Annex 6: Technical Design -Farm pond/valley tank

A water Pond is a dug out structure with any shape and size having properly sized inlet and outlet structures, for collecting the surface runoff flowing from the farm area or catchment. A water pond should be sited in location that is out of direct water flows that could be destructive in times of intense rainfall. This can be accomplished by pairing bioswales with the pond where it can increase its catchment and draw water from wetter areas to be able to place a pond in a drier more protected area to ensure its longevity.

Water ponds are used for irrigation, livestock watering and upon treatment for domestic uses as well as for biodiversity regeneration by directing water in to swales on contour to passively hydrate land and soils. It can also be used for recharging ground water, catchment protection (i.e. soil erosion control), ecosystem/biodiversity conservation and rehabilitation, livelihoods from aquaculture, poultry systems (ducks), water crops and recreation and landscape beautification. Other than this farm pond could serve as wild fishing pond, wildlife watering and fire protection. A water pond should always have an overflow spillway that is adequately sized and located away from any pond wall to keep it from washing out. Locating spillways on a connected bio swale is the best way to ensure the pond wall is not damaged in times of flooding

a. Land for pond construction & planning of farm pond

Voluntary Land agreements will be signed between the sub county and land owners for pond construction sites. Ponds may also be constructed to hold the water drained from the roads for productive uses.

General Key points in planning are:

- Adequacy of the drainage area or the catchment
- Water quality and adequacy of volume of storage
- Intended purposes, objectives.

For construction of farm pond, the soils must have low hydraulic conductivity with minimum seepage and percolation so that water can be retained for longer time in a farm pond. Soils with a low infiltration rate are most suitable for construction of pond.

The black soils have good potential for rain water harvesting without lining as the seepage losses are minimum. Such sites shall be **preferred**. The seepage losses are more in sandy soils and their mixed textures and they require lining or natural methods such as plant decomposition for organic sealing for storing water for more time. Sites with Sandy soils will be considered **unsuitable** for water storage but can be suitable for water soakage for land hydration and groundwater recharge for biodiversity and drought proofing landscapes.

The soils having outcrops and stones must be avoided for digging farm ponds. **The soil profile depth** must be investigated before digging the pond. However, stones can be piled high in the center of ponds for bird outcrops and fish microclimates under the

water. Stones and large rocks on the pond edges create microclimate and habitat for micro-fauna and wildlife to enhance the natural biological systems and biological filtration of water.

The soils having good depth of >1m, free of stones, low PH, Electrical Conductivity (EC) and ground water level **will be considered very highly suitable** and may be chosen for site selection for farm pond.

Peat soils have special problems, since they are usually very acidic in nature and need sufficient liming. Soils rich in limestone create special problems of precipitating phosphate and iron. **Such soils will thus be avoided.**

Soil depth is also important factor where rain water harvesting systems are proposed. Deep soils have the capacity to store harvested water for longer duration. Soils having more than 1m are ideal for construction of farm ponds. More the depth of soil, then more will be the depth of farm pond and reduces the evaporation losses.

Multi-criteria evaluation technique shall be used to appraise proposed sites for pond excavation. The following points may be considered for site selection within farm area.

1. Selection of the site for farm pond depends on local soil condition, topography of area, drainage capacity, infiltration, rainfall pattern and distribution.
2. In natural depressions where rainwater/runoff either flows or accumulates during the rainy season. A good pond site contains **a)** along contour that provides for economical construction, **b)** soil with sufficient clay to hold water, and **c)** an adequate water supply;
3. Deep clay soils are best for lining ponds because they minimize leakage. Because a pond is simply a depression for holding water, the side and bottom must be composed of soil which minimizes seepage.
4. Coarse textured sandy soils should be avoided as these are highly permeable and water will drain through them. If seepage is believed to be high, they can be plastered with clayey soil and compacted using compactors made of tree trunks.
5. Sites with underlying strata of sand, gravel, limestone, shale or fractured rock at a shallow depth may also result in high leakage and seepage losses, and should be avoided, unless they are sealed with clayey soil.
6. Topographically, locate a farm pond where there is enough catchment that runoff can be generated, collected and directed with gravity. A farm pond must be located within a farm drawing the maximum runoff possible in a given rainfall event. Proper observation of the average slope direction in the farm area in which farm pond is to be planned for construction is essential.
7. Ideally, it is good if an excavated pond be located near to a natural waterway, which carries water during and after rainfalls, as this water can easily be diverted into the pond.
8. Runoff: Provisions shall be made for a pipe and emergency spillway if necessary. Runoff flow patterns shall be considered when locating the pond/pit and placing the spoil.

A suitable provision should be made for the loss in storage capacity due to silting, evaporation and seepage. This is generally kept as 25-30 percent. Water Lilies, Azola and other compatible water plants will be introducing on ponds to limit evaporation.

b. Depth and side slope of farm ponds

A depth of 2.5 to 3.5 m may be suitable in general for the ponds. When pond construction is done with labour, any increase in depth beyond 3.5 to 4.0 meters becomes uneconomical.

The side slope of the pond is decided based on the angle of repose of the material being excavated and this angle of repose varies with type of soil.

| Soil type | Slope(Horizontal: vertical) |
|------------------|------------------------------------|
| Clay | 1:1 to 2:1 |
| Clay loam | 1.5:1 to 2:1 |
| Sandy loam | 2:1 to 2.5:1 |
| sandy | 3:1 |
| | |

c. Pond shape:

Excavated farm ponds may normally be of natural form based on the natural shape of the land.

Under NURI, where applicable, irregular shapes may be adopted.

d. Excavated material:

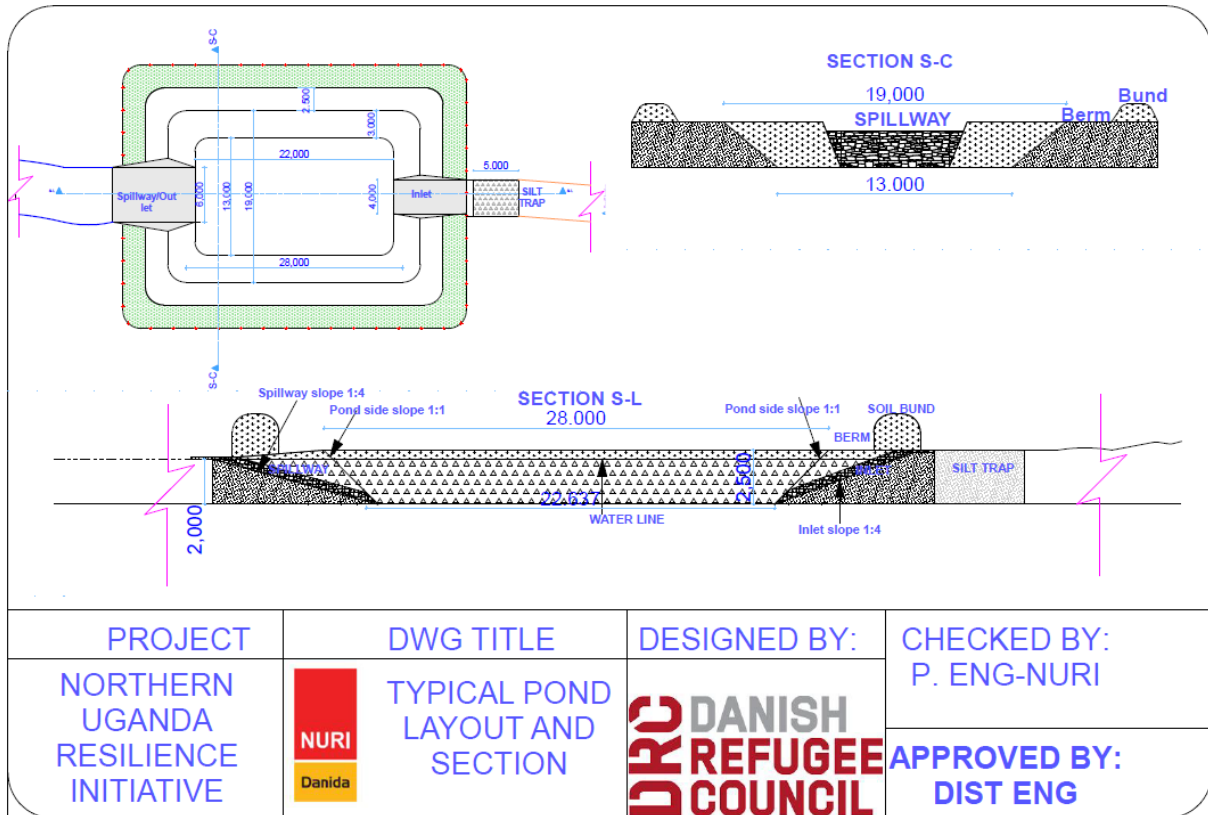
The material excavated from the pond shall be placed so that its weight will not endanger the stability of the pond side slopes and so that it will not be washed back into the pond by rainfall. It shall be disposed of in one of the following ways:

1. Uniformly spread to a height that does not exceed 1m, with the top graded to a continuous slope away from the pond. That is runoff should not enter the pond from the embankment.
2. Uniformly placed or shaped reasonably well, with side slopes assuming a natural angle of repose. The excavated material will be placed at a distance equal to the depth of the pond but not less than 3.6m from the edge of the pond.
3. Shaped to a designed form that blends visually with the landscape.
4. Used for low embankment and levelling.
5. Hauled away

After excavating of the earth, compaction of the sub grade and banks should be done thoroughly for proper establishment of the structure and then covered with reserved top soil which was set aside earlier, and then immediately planted (within one day) using indigenous seeds of grasses to immediately lock in soils and protect the banks and avoid erosion.

e. Standard Design / Layout

The lay out below may not be used in our implementation but we shall encourage design of a pond of a minimum volume of 2000m³ to be done during implementation depending on the topography of the area where it is located.



f.Tasks

- Clear road to water pond site
- Clear bush around the water pond site
- Excavate the water pond
- Fence the water pond area with live fence
- Plant trees around the water pond area
- Plant star grass or paspalum around the water pond area
- Maintain the water pond Area

g. Tools

| Tools | No. | Price | Total |
|---|------------|--------------|------------------|
| Measuring tape (50m) | 1 | 35,000 | 35,000 |
| Nylon strings 100 m | 2 | 15,000 | 30,000 |
| Ropes (one big nylon rope) | 1 | 50,000 | 50,000 |
| Buckets | 4 | 15,000 | 60,000 |
| Jerry can | 2 | 10,000 | 20,000 |
| Drinking cup | 10 | 1,000 | 10,000 |
| Hoe incl. Handle | 10 | 13,000 | 130,000 |
| Axe incl. Handle | 2 | 15,000 | 30,000 |
| Pick-axe incl. Handle | 2 | 22,000 | 44,000 |
| Panga | 2 | 8,000 | 16,000 |
| Slasher | 4 | 6,000 | 24,000 |
| Rake incl. Handle(Need to get locally made type with metallic handle) | 2 | 15,000 | 30,000 |
| Spade with metallic handles | 5 | 20,000 | 100,000 |
| Claw hammer, metallic handles | 2 | 15,000 | 30,000 |
| Wheelbarrow | 2 | 160,000 | 320,000 |
| First Aid Kit | 1 | 80,000 | 80,000 |
| Total | | | 1,009,000 |
| VAT | | | 181,620 |
| Total Tools | | | 1,190,620 |

| Special Tool | No. | Price | Total |
|---------------------------|------------|--------------|----------------|
| Water pump etc. | 1 | 600,000 | 600,000 |
| Total | | | 600,000 |
| VAT | | | 108,000 |
| Total special tool | | | 708,000 |

h. Bills of Materials and Equipment for a minimum of 2,000m³ pond with Resilience Design Approach

| SN | ITEM DESCRIPTION | UNIT | QTY | RATE (UGX) | AMOUNT (UGX) |
|----|--|----------|------|------------|-------------------|
| 1 | Provision of natural euphorbia fence planted at 0.5m spacing in double row and maintained throughout the construction period | No | 1500 | 500 | 750,000 |
| 2 | Supply tree seedlings | NO | 450 | 1000 | 450,000 |
| 3 | Supply of hard core for masonry 3.0m ³ tipper trucks for spillways and rock check dams | trips | 12 | 150,000 | 1,800,000 |
| 4 | Supply of culverts-900mm for foot paths | No. | 4 | 250,000 | 1,000,000 |
| 5 | Hire of excavator @1,500,000/Day | Day | 6 | 1,500,000 | 9,000,000 |
| 6 | Hire of Bull dozer for 1 days@1,500,000 | Day | 6 | 1,500,000 | 9,000,000 |
| 7 | Fuel for Bull dozer, 150L/Day @4000/L | Day | 6 | 600,000 | 3,600,000 |
| 8 | Hire of Low bed for Bulldozer@4,500,000 | Lump sum | 1 | 4,500,000 | 4,500,000 |
| 9 | Hire of Low bed for Excavator@4,500,000 | Lump sum | 1 | 4,500,000 | 4,500,000 |
| 10 | Fuel for excavator, 150L/Day @4000/L | Day | 6 | 600.000 | 3,600,000 |
| | TOTAL | | | | 38,200,000 |

The cost of the actual materials and tools shall depend on the finalised DRC Procurement rates at the time of implementation.

i. Cash for pond with Resilience Design Approach

The amount in cash to be paid for one pond of about 2,000 cubic metre is:

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount |
|--------------|---------------------|----------------------|------------------------|----------------|------------------|
| Construction | 15 | 20 | 300 | 6,000 | 1,800,000 |

Annex 7: Technical Design - Protected Spring

a. Standard Design

One group of 15 people will be involved in the construction of a protected spring. The springs will be made bigger and sustainable by providing for reservoirs for medium size springs as shall be advised by the District Water Departments and designs, drawings and bills of quantities shall be generated in assessment. Screening shall be done during wet seasons and revalidated in dry seasons before constructions.

Depending on the needs during assessments, the over flow can be constructed for ponds and same principle for ponds in annex 6 shall be adopted and the designs shall be adopted appropriately during screening.

Guard rails shall be provided along the gentle steps to the spring. The eye of the spring shall be fenced and planted with ever green hedges (K-apples) and a series of species of perennial trees will be planted along the spring line as well as swales to enable recharging. The trees will be planted up to an area of 5000m² were land is available.

The structures of the spring will be done by a contractor or the technicians/ masons. If technicians/masons are used, material schedules shall be generated from the BOQs and bought by DRC and 25% of the material cost shall be used for paying the technicians.

b. Tasks

- Clear road to spring site
- Clear bush around the spring site.
- Excavate the reservoir
- Excavate the water collection box
- Excavate the drainage
- Fence the spring area
- Plant trees around the spring area.
- Bioswales on contour planted to harvest and recharge springs where land is available

Bio swales can be utilized up slope from the springs to help recharge the spring lines. Ensure that there is no erosion patterns leading into the spring area. If they

are, utilize the best combination of rainwater harvesting interventions to ensure the water is slowed, spread out, and infiltrated into the area of the spring to ensure recharge.

- Plant the well area with star grass or paspalum.
- Maintain the spring area.

a. Materials

| Tool | No. | Price | Total |
|---|------------|--------------|----------------|
| Measuring tape (50m) | 1 | 35,000 | 35,000 |
| Nylon strings 100 m | 2 | 15,000 | 30,000 |
| Jerry can | 2 | 10,000 | 20,000 |
| Drinking cup | 10 | 1,000 | 10,000 |
| Hoe incl. handle | 5 | 13,000 | 65,000 |
| Axe incl. handle 5Kg | 2 | 15,000 | 30,000 |
| Panga | 2 | 8,000 | 16,000 |
| Slasher | 4 | 6,000 | 24,000 |
| Pick-axe incl. handle | 2 | 22,000 | 44,000 |
| Rake incl. Handle(Need to get locally made type with metallic handle) | 2 | 15,000 | 30,000 |
| Spade with metallic handles | 3 | 20,000 | 60,000 |
| Claw hammer, metallic handles | 2 | 15,000 | 30,000 |
| Wheelbarrow | 1 | 160,000 | 160,000 |
| | | | |
| Sub Total | | | 554,000 |
| VAT | | | 99,720 |
| Total tools | | | 653,720 |

b. Materials

| Materials | No. | Price | Total |
|--------------------------|------------|--------------|----------------|
| Barbed wire roll of 600m | 1 | 160,000 | 160,000 |
| U-nails kg | 1 | 8,000 | 8,000 |
| Assorted nails | 2 | 7,000 | 14,000 |
| Buckets | 2 | 15,000 | 30,000 |
| Tree seedlings | 500 | 1000 | 500,000 |
| First aid kit | 1 | 80,000 | 80,000 |
| Total | | | 792,000 |
| VAT | | | 142,560 |
| Total materials | | | 934,560 |

c. Cash

The amount in cash to be paid for one pond is:

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount |
|--------------|---------------------|----------------------|------------------------|----------------|-----------|
| Construction | 15 | 20 | 300 | 6,000 | 1,800,000 |

d. Standard BOQ for contractor constructing a protected spring

| Item | Description | Unit | Qty | Rate | Amount |
|---|---|----------------|-----------|-----------|------------------|
| Bill No. | GRAND SUMMARY | | | | |
| 1 | Preliminaries and General Items | | | | 750,000 |
| | Measured works | | | | |
| 2 | Construction of one protected spring | | | | 5,413,000 |
| | Sub Total | | | | 6,163,000 |
| | Add 5% contingencies (Excluding Preliminaries and General items) | | 0% | | - |
| | Total inclusive of contingencies | | | | 6,163,000 |
| | Percentage Discount Offered (As per Bid submission sheet) | | | 0% | - |
| | Stone slate One peace | | | | 50,000 |
| | Sub Total VAT Exclusive | | | | 6,213,000 |
| | Add 18% VAT | | 18% | | 1,118,340 |
| | Grand Total for Lot | | | | 7,331,340 |
| BILL NO. 1 Preliminaries and General Items | | | | | |
| 1.01 | Removal shrubs, trees and grass | m ² | N/A | | 0 |
| 1.02 | Remove top soil average 150mm and keep for re-use | m ² | N/A | | 0 |
| 1.03 | Excavate from striped level not exceeding 3m for collection reservoir | m ³ | N/A | | 0 |
| 1.04 | Ditto but for water collection box and stair case | m ³ | N/A | | 0 |
| 1.05 | Ditto but for wings | m ³ | N/A | | 0 |
| 1.06 | Back fill selected materials to side of excavations | m ³ | N/A | | 0 |
| 1.07 | Remove surplus excavated material from site | m ³ | N/A | | 0 |

| | | | | | |
|---|--|----------------|------------|-------------|------------------|
| 1.08 | Excavate from striped level to open eye not less than 3m | m ³ | N/A | | 0 |
| 1.09 | Excavate to open drain channel not less than 10m from the box and back fill | m ³ | N/A | | 0 |
| 1.10 | Mobilize for tools and labour | ITEM | 1 | 400,000 | 400,000 |
| 1.11 | Visibility such as Bill boards | ITEM | 1 | 350,000 | 350,000 |
| Total to be carried to Grand Summary No. 1 | | | | | 750,000 |
| BILL NO. 2 MEASURED WORKS - Construction of one protected spring | | | | | |
| | Descriptions | Unit | Qty | Rate | Amount |
| | ELEMENT 2. CONCRETE | | | | |
| 2.10 | 150mm reinforced concrete 1:2:4 in | m ³ | 2 | 400,000 | 800,000 |
| a | Reservoir base | | | | 0 |
| b | Collection box base | m ³ | 0.5 | 400,000 | 200,000 |
| c | Top of reservoir | m ³ | 1 | 400,000 | 400,000 |
| d | Stair case | m ³ | 1 | 400,000 | 400,000 |
| e | Drainage slab | m ³ | 0.5 | 400,000 | 200,000 |
| 2.11 | Formwork to soffit and edge | m ² | 31 | 12,000 | 372,000 |
| | TOTAL CONCRETE | | | | 2,372,000 |
| | ELEMENT 3. WALLS | | | | |
| 3.1 | 250mm reinforced concrete Retaining wall | m ³ | 4 | 400,000 | 1,600,000 |
| 3.2 | 250mm stone masonry wall for eye channel in well-seasoned clay mortar | m ² | 1 | 40,000 | 40,000 |
| | TOTAL WALLS | | | | 1,640,000 |
| | ELEMENT 4. FINISHES | | | | |
| 4.1 | Plaster 1:2 cement : sand mortar to the surface of stone masonry wall | m ² | 24 | 14,000 | 336,000 |
| 4.2 | 30mm screed 1:2 to floor surface of reservoir and internal wall surface of reservoir and box | m ² | 17 | 20,000 | 340,000 |
| 4.3 | 30mm screed 1:2 to top surface of reservoir and wood float | m ² | 7 | 20,000 | 140,000 |
| | TOTAL FINISHES | | | | 816,000 |
| | ELEMENT 5. EYE CHANNEL | | | | |
| 5.1 | Hardcore filling to bring to level sides and bottom excavation of eye | m ³ | 2 | 50,000 | 100,000 |

| | | | | | |
|----------------------------|---|----------------|---|--------|------------------|
| 5.2 | 150mm clay packing to the surface of hard core | m ³ | 1 | 40,000 | 40,000 |
| 5.3 | 150mm nontoxic gravel packing to filter water from the eye | m ² | 1 | 80,000 | 80,000 |
| 5.4 | 150mm clay packing to the surface of gravel packing and Hard core | m ³ | 1 | 40,000 | 40,000 |
| TOTAL EYE CHANNEL | | | | | 260,000 |
| ELEMENT 6. FITTINGS | | | | | |
| 6.1 | 50mm PVC cased in 75mm GI spout 3m long and 1m long respectively | No | 1 | 80,000 | 80,000 |
| 6.2 | 25mm GI taps | No | 3 | 20,000 | 60,000 |
| 6.3 | 100mm GI pipe wash out | No | 1 | 55,000 | 55,000 |
| 6.4 | 25mm GI over flow | No | 1 | 20,000 | 20,000 |
| 6.5 | 100mm GI pipe for vent | No | 2 | 55,000 | 110,000 |
| TOTAL FITTINGS | | | | | 325,000 |
| SUMMARY | | | | | |
| CONCRETE WORKS | | | | | 2,372,000 |
| WALLS | | | | | 1,640,000 |
| FINISHES | | | | | 816,000 |
| EYE CHANNELING | | | | | 260,000 |
| FITTINGS | | | | | 325,000 |
| TOTAL | | | | | 5,413,000 |

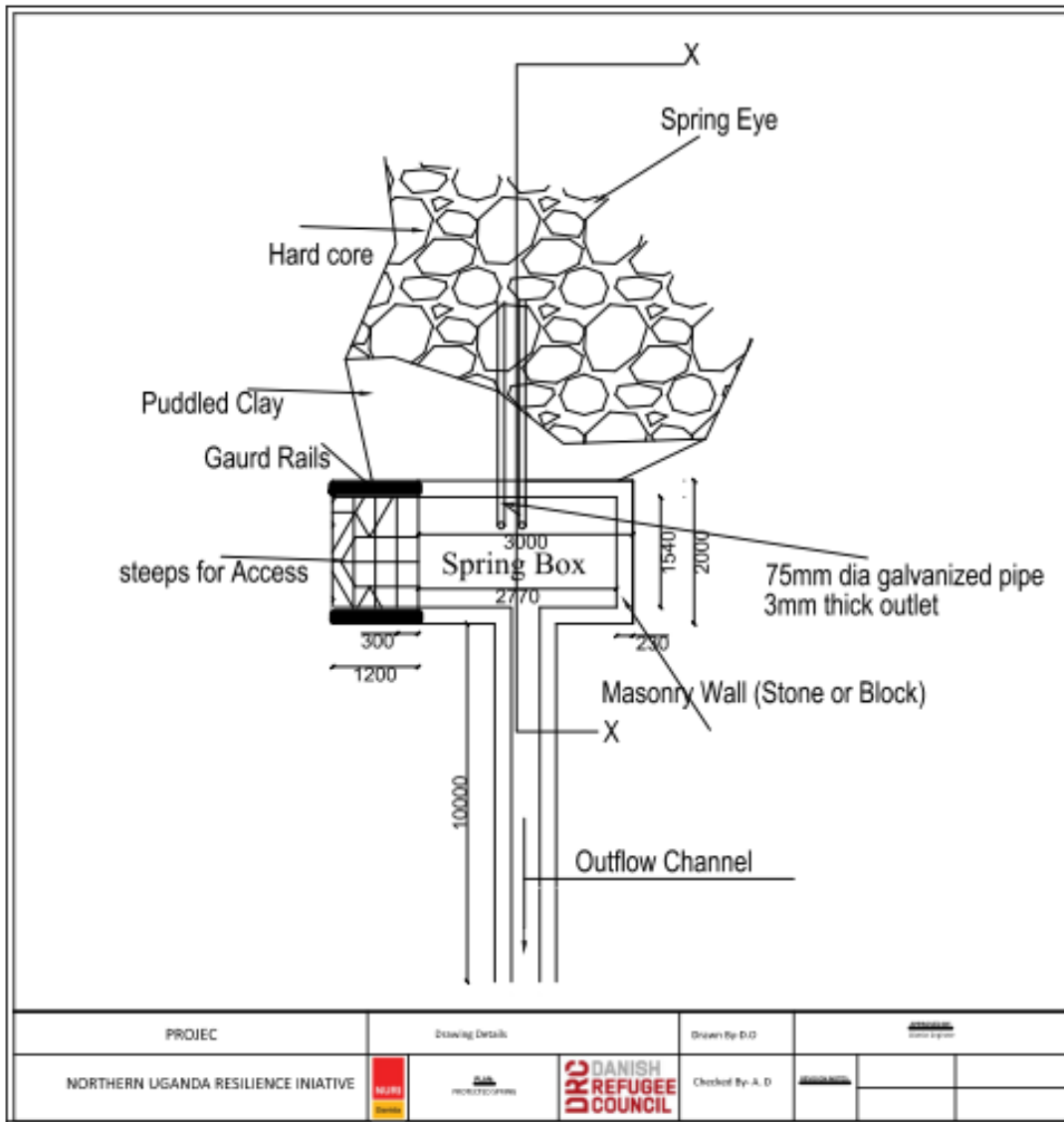
Standard BOQ for contractor constructing a protected Low Yield spring

| Item | Description | Unit | Qty | Rate | Amount |
|-----------------|--|------|-----|-----------|-------------------|
| Bill No. | GRAND SUMMARY | | | | |
| 1 | Preliminaries and General Items | | | | 750,000 |
| | Measured works | | | | |
| 2 | Construction of one protected Normal spring | | | | 9,876,000 |
| | Sub Total | | | | 10,626,000 |
| | Add 5% contingencies (Excluding Preliminaries and General items) | | | 0% | - |
| | Total inclusive of contingencies | | | | 10,626,000 |
| | Percentage Discount Offered (As per Bid submission sheet) | | | 0% | - |
| | Stone slate One peace | | | | 50,000 |

| | | | | | |
|---|---|----------------|------------|-------------|-------------------|
| | Sub Total VAT Exclusive | | | | |
| | | | | | 10,676,000 |
| | Add 18% VAT | | 18% | | 1,921,680 |
| | Grand Total for Lot | | | | 12,597,680 |
| BILL NO. 1 Preliminaries and General Items | | | | | |
| 1.01 | Removal shrubs, trees and grass | m ² | N/A | | 0 |
| 1.02 | Remove top soil average 150mm and keep for re-use | m ² | N/A | | 0 |
| 1.03 | Excavate from striped level not exceeding 3m for collection reservoir | m ³ | N/A | | 0 |
| 1.04 | Ditto but for water collection box and stair case | m ³ | N/A | | 0 |
| 1.05 | Ditto but for wings | m ³ | N/A | | 0 |
| 1.06 | Back fill selected materials to side of excavations | m ³ | N/A | | 0 |
| 1.07 | Remove surplus excavated material from site | m ³ | N/A | | 0 |
| 1.08 | Excavate from striped level to open eye not less than 3m | m ³ | N/A | | 0 |
| 1.09 | Excavate to open drain channel not less than 10m from the box and back fill | m ³ | N/A | | 0 |
| 1.1 | Mobilize for tools and labour | ITEM | 1 | 400,000 | 400,000 |
| 1.11 | Visibility such as Bill boards | ITEM | 1 | 350,000 | 350,000 |
| Total to be carried to Grand Summary No. 1 | | | | | 750,000 |
| BILL NO. 2 MEASURED WORKS - Construction of one protected spring | | | | | |
| | Descriptions | Unit | Qty | Rate | Amount |
| | ELEMENT 2. CONCRETE | | | | |
| 2.1 | <i>150mm reinforced concrete 1:2:4 in</i> | | | | |
| a | Reservoir base | m ³ | 2 | 480,000 | 960,000 |
| b | Collection box base | m ³ | 1.5 | 480,000 | 720,000 |
| c | Top of reservoir | m ³ | 1 | 480,000 | 480,000 |
| d | Stair case | m ³ | 1 | 480,000 | 480,000 |

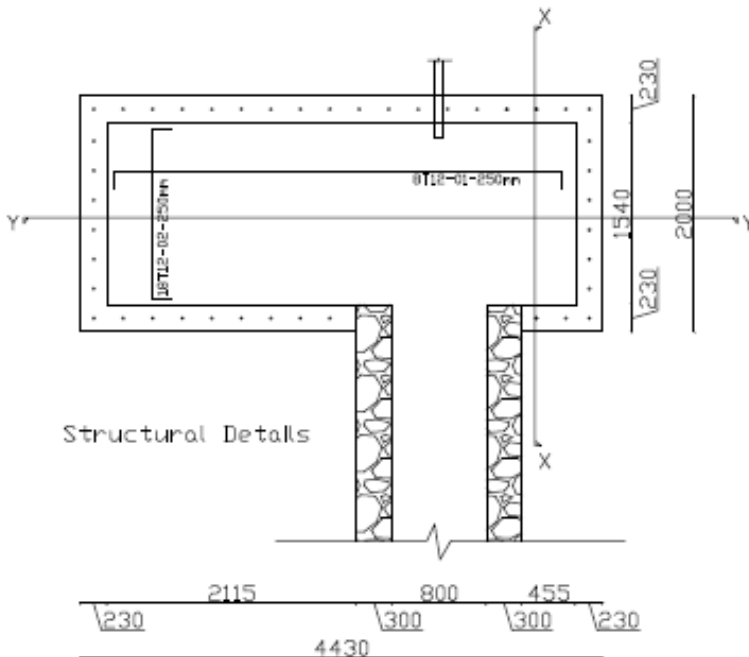
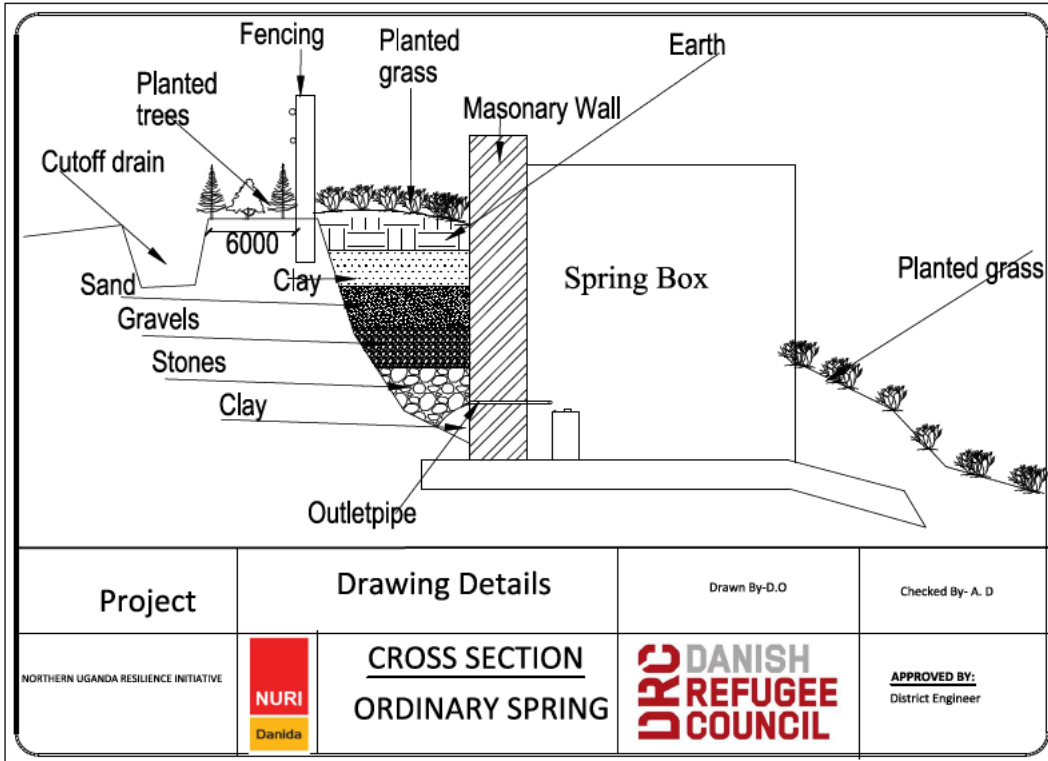
| | | | | | |
|-------|--|----------------|-----|---------|------------------|
| e | Drainage slab | m ³ | 0.5 | 480,000 | 240,000 |
| 2.11a | Formwork to soffit and edge | m ² | 31 | 25,000 | 775,000 |
| b | Nails | Kg | 10 | 7000 | 70000 |
| | TOTAL CONCRETE | | | | 3,725,000 |
| | ELEMENT 3. WALLS | | | | |
| 3.1 | 230mm reinforced concrete Retaining wall | m ³ | 4 | 480,000 | 1,920,000 |
| 3.2 | 230mm stone masonry wall for eye channel in well-seasoned clay mortar | m ² | 1 | 80,000 | 80,000 |
| 3.3 | T12- re bars fixed and tied in position | Kg | 360 | 6,500 | 2,340,000 |
| | TOTAL WALLS | | | | 4,340,000 |
| | ELEMENT 4. FINISHES | | | | |
| 4.1 | Plaster 1:2 cement : sand mortar to the surface of stone masonry wall | m ² | 24 | 14,000 | 336,000 |
| 4.2 | 30mm screed 1:2 to floor surface of reservoir and internal wall surface of reservoir and box | m ² | 20 | 20,000 | 400,000 |
| 4.3 | 30mm screed 1:2 to top surface of reservoir and wood float | m ² | 7 | 20,000 | 140,000 |
| | TOTAL FINISHES | | | | 876,000 |
| | ELEMENT 5. EYE CHANNEL | | | | |
| 5.1 | Hard core filling to bring to level sides and bottom excavation of eye | m ³ | 5 | 50,000 | 250,000 |
| 5.2 | 150mm clay packing to the surface of hard core | m ³ | 3 | 40,000 | 120,000 |
| 5.3 | 150mm nontoxic gravel packing to filter water from the eye | m ² | 1 | 80,000 | 80,000 |
| | TOTAL EYE CHANNEL | | | | 450,000 |
| | ELEMENT 6. FITTINGS | | | | |
| 6.1 | 50mm PVC cased in 75mm GI spout 6m long and 3m long respectively | No | 1 | 160,000 | 100,000 |
| 6.2 | 25mm GI taps | No | 3 | 20,000 | 60,000 |
| 6.3 | 100mm GI pipe wash out | No | 1 | 55,000 | 55,000 |

| | | | | | |
|-----|--|----|----|--------|------------------|
| 6.4 | 25mm GI over flow | No | 1 | 20,000 | 20,000 |
| 6.5 | 100mm GI pipe for vent | No | 2 | 55,000 | 110,000 |
| 6.2 | Install welded round hollow metallic guardrails of diameter 32mm thickness 3mm imbedded in concrete to the sides of the stairs | M | 12 | 20,000 | 240,000 |
| | TOTAL FITTINGS | | | | 485,000 |
| | SUMMARY | | | | |
| | CONCRETE WORKS | | | | 3,725,000 |
| | WALLS | | | | 4,340,000 |
| | FINISHES | | | | 876,000 |
| | EYE CHANNELING | | | | 450,000 |
| | FITTINGS | | | | 485,000 |
| | TOTAL | | | | 9,876,000 |

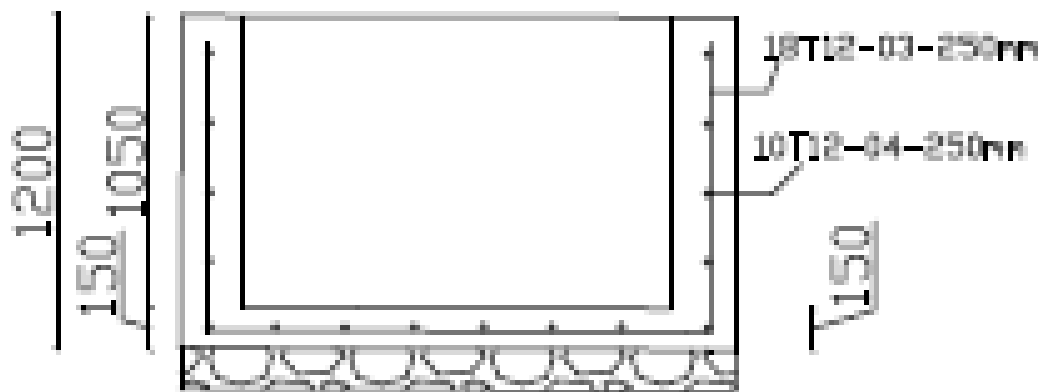


Plan-Protected Springs

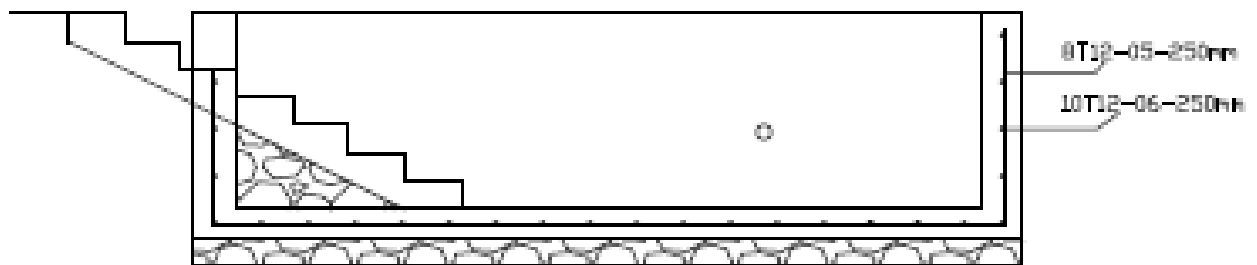
NORTHERN UGANDA RESILIENCE INITIATIVE



Structural Details for Spring Box

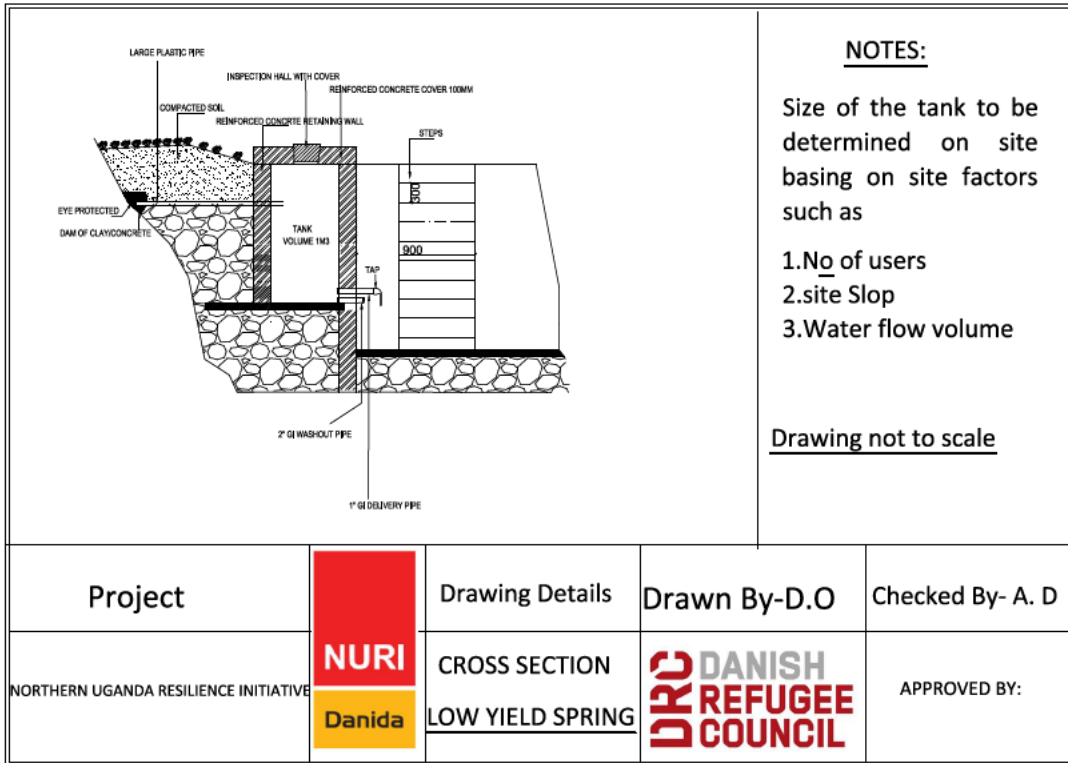


Section X-X



Section Y-Y

- 150mm thick hardcore at the bottom
- Wall height depends on site condition but should vary between 0.75m to 1.8m
- Length of drain channel should be atleast 3m



Annex 8: Technical Design – Food Forest

a. Guidance for Food Forest-Forestry Systems, Design and Species

Food Forests and planting areas should be planted with a diversity of species and layers, anchored primarily by indigenous species. Exotic species must be RESPONSIBLE exotics such as common fruit trees, etc that carry no threat of invasiveness and ecological harm. Invasive exotic species such as eucalyptus are discouraged to be planted. This carries major reputation, legal risk since eucalyptus is ecologically harmful, contributes to soil erosion and chemically precludes growth of other species. Trees such as Grevillea or Pine are more acceptable, but the priority is to identify local options that have the same purpose and ensure proper planting, soil conservation and fertility as well as forest and tree management to boost tree health, growth, and companion planting relationships. **Local varieties of bamboo** which will not become

invasive if introduced in camps and settlements should be prioritized as a high value and multi-use plant, especially integrated with grey water systems.

Diversity and Creating 3-Dimensional Agroforestry Systems will be encouraged. Each forestry system (Food Forest) should stack functions to enhance the number of livelihoods opportunities. For example, we can have tall timber trees interplant with fruit trees, then shade loving trees such as coffee beneath, and even climbers such as passion fruits or high value vanilla as well as using the unique microclimate that will be created in interstitial spaces between the tree plantings for fodder grasses and/or cropping. The agroforestry systems should major in perennial/permanent plants but can also be interspersed with annual plants including vegetable and grain crops planted by the groups that are maintaining the Food Forest.

Typical seven layers in a forest with examples of appropriate types of trees and plants:

| Layer | Examples |
|---------------------------------------|---|
| Canopy Layer | Ficus (Multi-purpose), Mvule (Fiber), Shear Nut (Multi-purpose), Afzelia Africana- Mahogany (Fiber), Teak – (Fiber including paper pulp), Neem (multi-purpose), Jackfruit (food), Macamia Ritea, Dates, Jacaranda, Papaya, Tamelina, Acacia, Mizopsis, Mulberry, Tall palms |
| Fruit trees (Small tree Layer) | Shorter Palms, Bananas/Matoke, Bamboo, Moringa, Oranges, Lemons, Coliandera, Sesbania, Lucaena, Guava, Tree Tomato, Apples, Tamarind, Prosopis |
| Shrub Layer | Black Berry, Lantana, Pigeon Pea, Jinga, Sisal, Aloe Vera, Hibiscus, Acacia Senegalensis (gums and resins) Cactus |
| Herbaceous Layer | Cow Peas, Jiribi, Mint, Chillies, Red/Sweet Peppers, Elephant Grass, Poison Ivy, Stinging Nettle, Black Jack, Eggplant, Green Gram, Osobi, Kalobi, Dodo |
| Soil/groundcover cover layer | Pumpkin, Sweet Potato, Melons, Irish Potatoes, Desmodium, Gourds, Lucerne |
| Rhizome layer (Tubers, Rhizomes, etc) | Ginger, Carrots, Onions, Tumeric, Sweet potato, Cassava, Yams, Garlic |
| Vining /climbing layers | Passion Fruit, Gourds, Vanilla, Perennial Beans, Climbing Yams, Climbing Nuts |

Tree species in the Food Forests shall aim to include the following functions in addition to and ANCHORED by indigenous long term trees which should be left intact. Biodiversity regeneration is about keeping the landscape woven together through permanent tree species that secure the soils, carbon and hydrological cycles. In addition to these PERMANENT trees which are not to be cut down, we integrate trees from the following categories:

1. **Food:** Fruit, seeds, nuts, leaves, oils, berries
2. **Fodder:** Livestock and Pollinators (flowering trees)
3. **Fiber:** Building timbers, weaving timbers, textiles, crafts, roofing materials, paper pulp, biomass, mulch
4. **Fuel:** Sustainable charcoal, biogas, fuel wood, biofuel
5. **Fertility:** Nitrogen fixation, soil conditioning, beneficial soil relationships
6. **Pharmaceuticals:** Medicinal properties, healing properties, antibiotic, antiseptic, antifungal, antimicrobial, traditional medicine, pest and disease management in plants.

b. Standard Layout

One farmer group of 30 members will establish and maintain 1 food forest of 2 acres. In 2020, one farmer group of 30 members will establish and maintain 1 forest forest of 2-3 acres. Up to 12 acres will be planted where land is available.

In a refugee setting where land is limited, a minimum of 1 acre shall be considered as a project to be worked on by 15 group members

Willing institutions, communities, Registered CBO's, Faith based organizations to benefit from the Food Forest establishments. Due to management constraints in Health centres and Sub counties, food forest establishments will not be considered for such institutions from 2021.

Nursery bed establishment will not be supported but encourage farmers to do their own with full certification from the District Forestry Department because it is not economically viable and also cumbersome. If Certified, DRC will buy from them.

The seedlings will be planted with a minimum spacing of 3 metres (dependent on the tree species and purposes) in a staggered pattern with boomerangs (Half-moon/Smile berms). Indigenous spices should not be destroyed while planting /establishment of Food Forest.

There should be a 4-meter-wide fire-line around the plot, which should be kept clear

If the type of trees is at risk from domestic animals the Food Forest-forest system should be fenced with barbed wire (6 lines) and there should be a spacing of 2 metres between the poles. Mix of dry poles and sprouting poles should be installed alternately for fencing. Dry poles to be nailed immediately and sprouting poles should be nailed after sprouts have developed and roots fully established to protect from potential animal destruction. Live fence (kei apple) shall be planted to specifically deter shoats and act as a permanent security. Though not in the costed, groups should be encouraged for long term viability of the fence, the barbwire line should be more heavily planted than every other pole so that it can become a productive and living fence with multi-functionality including fertility, food, protection (thorns), fodder, etc.

Increased acreage is allowed for issues of economic viability from 1 ha to 5 ha (2.0-12.0 acres), in refugee settlements, a minimum of an acre will be considered for Food Forest project to address the issue of degrading biomass.

Where applicable, different parcels of land in refugee settlements will be aggregated for the Food Forests to attain the minimum acreage of 2 acres.

Food Forest establishment to be done within 6 months of Season A and 6 months to be used for maintenance. The paid days for maintenance will be 10.

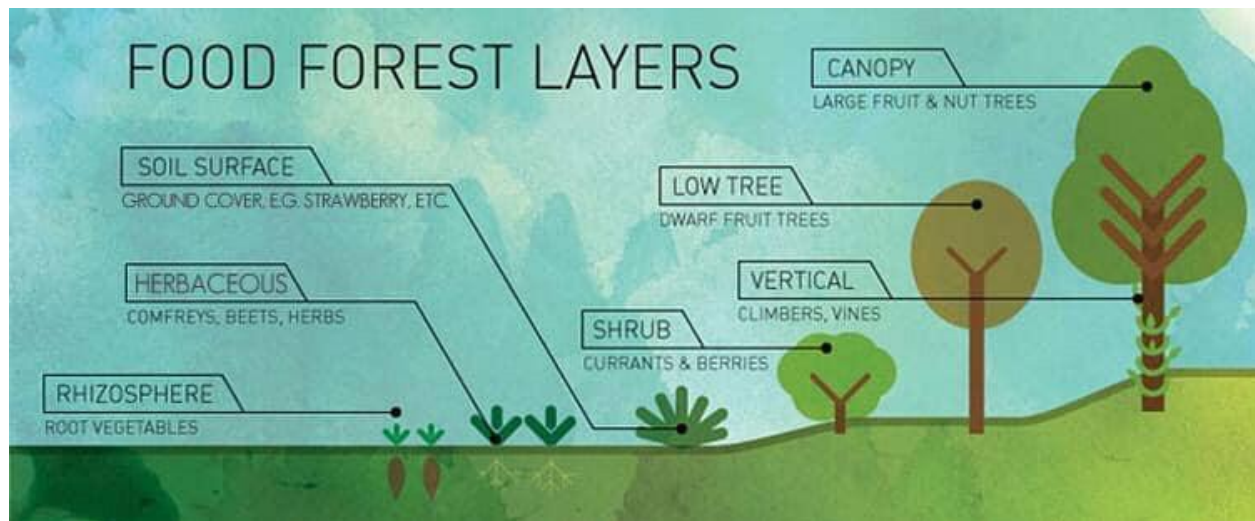
To ensure sustainability and ownership, the community members /individuals should be engaged right from group formation so that the owners can be trained to maintain the Food Forest. Involvement of education department, school, SMC, pupils, teacher's, PTA (stakeholders) in the group formation should be considered and in schools, teachers who are in charge of agriculture/environment to make up part of the group.

Post project management plan shall be developed for each Food Forest. This will capture, maintenance issues, how it will benefit the community in addition to the faith members.

Another definition of a project is looking at the number of trees planted. This will be considered especially if planting trees is to be done along existing roads.

Food Forests rehabilitation is to be considered so long as it exists in the parish development plan (PDP) and prioritized sub county.

The project will plant 3 layers Canopy layers, short trees and shrubs and the beneficiary communities are encouraged to plant the remaining 4 layers.



Typical Layers in a Food Forest-Food Forest

c. Tasks

Key Guidelines for Tree Planting:

1. No land clearance by chopping trees, shrubs. Animals such as cows, pigs, goats and chickens can be leveraged to "clear" land by eating vegetation, mechanically imprinting the land with their hoof traction, and manure. Chickens in particular can be brought in after the larger livestock in order to eat the maggot larvae breeding in the large livestock manure.
2. Thinning of land- instead of clearing land, vegetation can be heavily thinned with pruning and Farmer Managed Natural Regeneration (FMNR) to do "chop and drop," whereby branches, sticks, twigs and leaves are heavily cut from trees, leaving 2-3 primary trunk/branches. The remaining biomass should be dropped to the ground and chopped in to smaller pieces and left to decompose and naturally build the forest floor and soil health. This will immediately become the food for beneficial insects such as termites who prioritize dried/brown organic matter. Only if there is no dead carbon/organic matter will termites then turn to eat live plant material.
3. NO pesticides, insecticides, fungicides or herbicides will be used in the Food Forests-food forests or otherwise since they are extremely harmful and

hazardous poisons. Integrated Pest Management (IPM) and Integrated Disease Management (IDM) methods will be used to resolve plant health.

4. Each individual tree to be planted using water harvesting structures such as "Smile Berms," on contour for passive water harvesting for each individual tree. These are also called Boomerang Berms. Each berm is measured for contour using A Frame, Bunyip Water Level, Laser Level or other. The pattern for planting is in an offset "fish scale" pattern which is also called Net and Pan or Pit and Pan patterning. This allows the runoff water from one smile berm to overflow in to the lower smile berm and so on.
5. Tree Spacing will be different based on the aim of the forest. Ensure that NITROGEN FIXING TREES are planted in between every 4-5 trees to naturally feed the soil and surrounding trees.
 - a. For Food Forest: Minimum spacing, 3 meters between trees.

The planting of a Food Forest (season 1) involves the following tasks for the project group:

1. Thinning of land through "chop and drop"- branches, sticks, leaves to be placed on the ground to build soil and soil health and fertility for trees.
2. Fencing
3. Marking and pegging
4. Pitting including smile berms
5. Planting with natural inputs including animal manures, charcoal dust, etc.
6. Ring weeding
7. Keeping fire line clean
8. Watering (if needed)
9. Mulching
10. Placement of protective baskets if available?

The first 5 activities should be done before the rains start, while the other activities will take place in the rainy season.

For maintenance (season 2) of a Food Forest the following tasks are involved:

1. Gap filling
2. Ring weeding
3. Slashing/Chop and Drop of organic matter/biomass for soil building
4. Keeping fire line clean
5. Organic pest and disease control only in extreme cases
6. Watering (if needed)
7. Mulching

d. Tools

The standard set of tools that will be provided for preparing and planting 2 acres of Food Forest is:

e. Tools

| Tool | No. | Price | Total |
|---|------------|--------------|----------------|
| Measuring tape (100m) | 1 | 45,000 | 45,000 |
| Nylon strings 100 m | 2 | 15,000 | 30,000 |
| Jerry can | 2 | 10,000 | 20,000 |
| Drinking cup | 10 | 1,000 | 10,000 |
| Hoe incl. handle | 10 | 13,000 | 130,000 |
| Axe incl. handle | 2 | 15,000 | 30,000 |
| Panga | 3 | 8,000 | 24,000 |
| Slasher | 4 | 6,000 | 24,000 |
| Spade with metallic handle | 5 | 20,000 | 100,000 |
| Pick-axe incl. handle | 5 | 22,000 | 110,000 |
| Rake incl. Handle(Need to get locally made type with metallic handle) | 4 | 8,000 | 32,000 |
| Claw hammer. Metallic handle | 3 | 15,000 | 45,000 |
| Pliers | 2 | 10,000 | 20,000 |
| Pruning clippers | 2 | 15,000 | 30,000 |
| Watering can | 4 | 10,000 | 40,000 |
| Basin | 6 | 6,000 | 36,000 |
| Total | | | 726,000 |
| VAT | | | 130,680 |
| Total tools | | | 856,680 |

| Special Tool | No. | Price | Total |
|--|------------|--------------|----------------|
| Spray pump, overall, gum boots, goggles, gloves etc. | 1 | 250,000 | 250,000 |
| Total | | | 250,000 |
| VAT | | | 45,000 |
| Total special tool | | | 295,000 |

f. Materials

Materials (1. Season)

The materials needed for planting 2 acres of Food Forests with RD approach are:

| Materials | No. | Price | Total |
|----------------------------|------------|--------------|--------------|
| Seedlings (1) | 1,500 | 1000 | 1,500,000 |
| Barbed wire (roll of 600m) | 6 | 160,000 | 960,000 |

| | | | |
|-------------------------|------|--------|------------------|
| Live Fence (Kei apple) | 1805 | 500 | 902,500 |
| U-nails (kg) | 9 | 8,000 | 72,000 |
| Assorted wire nails | 5 | 7,000 | 35,000 |
| Mulching Materials | 1 | 50,000 | 50,000 |
| First aid kit | 1 | 80,000 | 80,000 |
| Total | | | 3,599,500 |
| VAT | | | 647,910 |
| Total materials | | | 4,247,410 |

For the approved 2020 investment plans where the acreage considered is between 2-3, the requests for the material will be increased proportionately.

In exceptional cases, when communities fail to supply poles and the PMCs acknowledge in writing, the below optional materials shall be procured

Optional Materials

| Materials | No. | Price | Total |
|------------------------|------------|--------------|------------------|
| Sprouting poles-2.0m | 200 | 4000 | 800,000 |
| Dry Fence poles-2.0m | 200 | 4000 | 800,000 |
| Total | | | 1,600,000 |
| VAT | | | 288,000 |
| Total materials | | | 1,888,000 |

Materials (2. Season)

The materials needed for planting 2 acres of Food Forests are:

| Materials | No. | Price | Total |
|---------------------------|------------|--------------|----------------|
| Seedlings for gap filling | 150 | 1000 | 150,000 |
| Mulching | 2 | 50,000 | 100,000 |
| Total | | | 250,000 |
| VAT | | | 45,000 |
| Total materials | | | 295,000 |

In case of very dry weather where the growth has been stunted it can be considered to boost the growth by using liquid fertilizer. The costs will be 150,000 (1 litre of Ushs. each 25,000)

g. Cash with Resilient Design Approach

The amount in cash to be paid for planting and maintaining 2 acres of Food Forest from 2021 is as follows

| Project | No. of participants | Days per participant | Total no. of work days | Amount per day | Amount |
|------------------------|---------------------|----------------------|------------------------|----------------|------------------|
| Planting (Season A) | 30 | 22 | 660 | 6,000 | 3,960,000 |
| Maintenance (Season B) | 30 | 10 | 300 | 6,000 | 1,800,000 |
| Total | 60 | 32 | 960 | 6,000 | 5,400,000 |

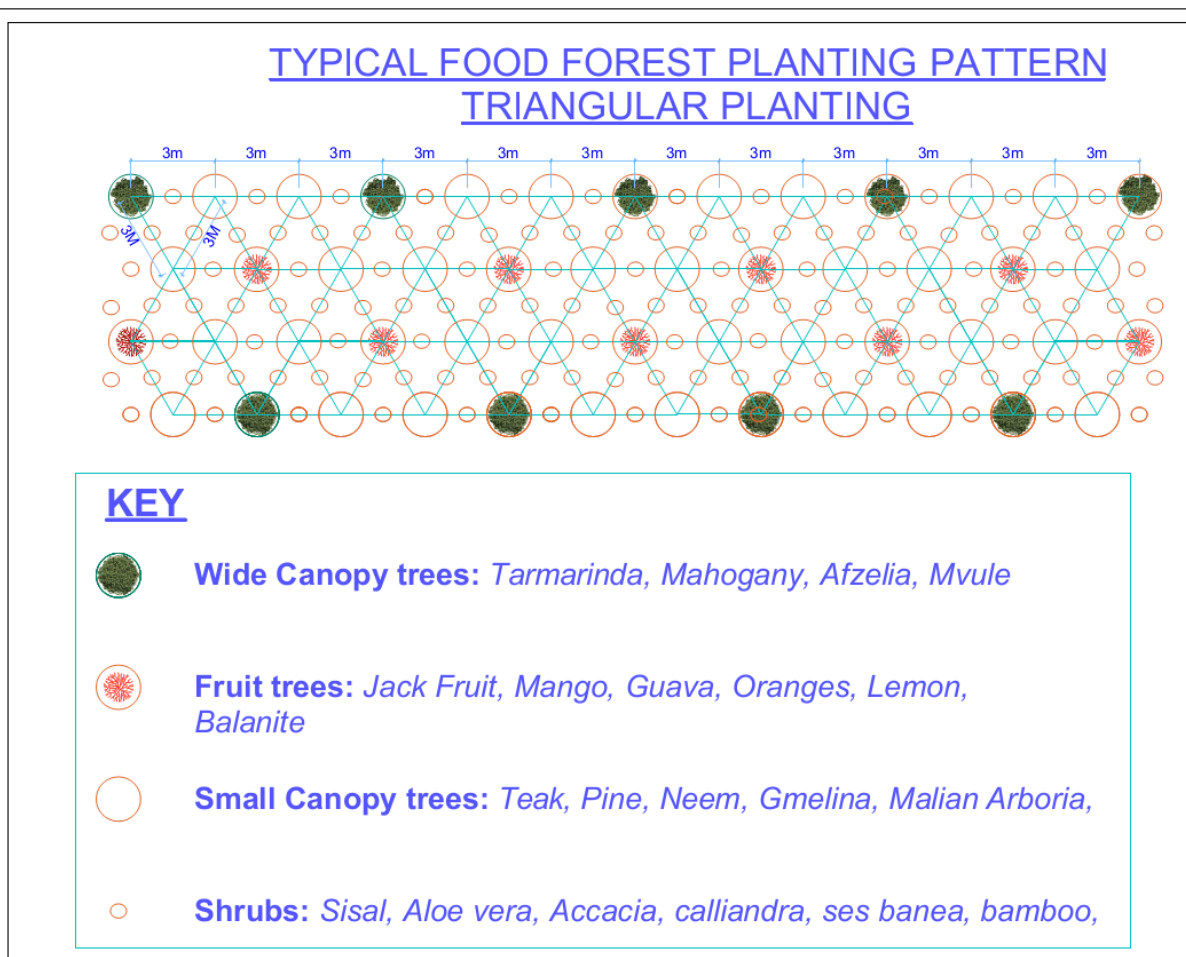


Figure 1: proposed Food Forest- forest lot layout

Annex 9: Format for Project Description

| PROJECT DESCRIPTION - RURAL INFRASTRUCTURE | | | | | |
|---|-----------------------|----------|------------|------------|--------------------------------------|
| Project Name | XXXXXX | | | | |
| Project number | P000X-XXXX | | | District | XXXXX |
| Project type | New Construction | | | Sub-county | XXXX |
| Infrastructure Type | CAR | | | Parish | XXXX |
| Length of road (Kms) | 7.2 | | | Village | XXXX |
| Number of Groups | 7 | | | Location | XXXX |
| Number of participants | 210 | | | | |
| Number of work days | 5,250 | | | | |
| DESCRIPTION | | | | | |
| When this road is constructed it will connect the community to health centers XXXXX and Markets XXXX. Over XXXX people will directly benefit from the road. | | | | | |
| | | | | | |
| PROJECT COSTS | | | | | |
| Specification | Unit | Quantity | Unit Cost | Amount | Comment |
| Participants from local communities | Day | 3,600 | 6,000 | 21,600,000 | |
| Fee for payment to participants | Part. | 180 | 6,500 | 1,170,000 | |
| Training of PMC | PMC | 6 | 260,000 | 1,560,000 | |
| General Tools | Set | 6 | 1,723,980 | 10,343,880 | |
| Special tools | Set | 1 | 167,560 | 167,560 | |
| Materials | Set | 6 | 236,000 | 1,416,000 | |
| Compaction for road formation | Km | 5.6 | 1,750,000 | 9,800,000 | 5days of hire/ Km @350,000/= per day |
| Compaction of gravel on Culverts and spots gravelling | Day | 2.00 | 350,000 | 700,000 | |
| Spreading for spots gravelling | 3m ³ Truck | 172 | 6,000 | 1,032,000 | |
| Tree seedlings | No. | 1,201 | 1,000 | 1,201,000 | |
| Structures | | | | | |
| Single line 600mm dia | Nr. | 6 | 7,375,000 | 44,250,000 | |
| Tripple line 900mm | Nr. | 1 | 29,693,225 | 29,693,225 | |

| | | | | | |
|-----------------------------------|-----------------------|-----|-----------|--------------------|---|
| dia. | | | | | |
| Vented drift | Nr. | 1 | 0 | 0 | |
| Solid drift | Nr. | 1 | 0 | 0 | |
| Spot gravelling and swamp raising | 3m ³ Truck | 172 | 175,000 | 30,100,000 | 200m ² ponding on the road surface |
| Maintenance training | Lump | 1 | 1,000,000 | 1,000,000 | |
| Total | | | | 184,453,265 | |
| Estimate prepared by: | | | | | |
| Title | | | | | |
| Estimate Reviewed by: 1 | | | | | |
| Title | | | | | |
| Estimate Reviewed by: 2 | | | | | |
| Title | | | | | |

Annex 10: Format for Investment Plan Overview

| NURI- RURAL INFRASTRUCTURE INVESTMENT PLAN FOR XXX DISTRICT-20XX/ 20XX | | | | | | | | | | |
|--|------------------|--------------|-----------|--------|-------------|------------|-----------------|------------|--------|--------------------|
| P-no. | I-type | Project Name | Size | P-type | Budget | Part. | No. of Projects | Work Days | Parish | Location / Comment |
| XXXXX Sub-county | | | | | | | | | | |
| Protected Spring | | | | | | | | | | |
| XXX | Protected Spring | XXX | 1.0 | XXX | XXX | XXX | xx | XXX | XXX | XXX |
| Food Forest | | | | | | | | | | |
| XXX | Food Forest | XXX | 1.0 | XX | XXX | XXX | xx | XXX | XXX | XXX |
| Water Pond | | | | | | | | | | |
| XXXX | Water pond | XXX | XXX | XX | XXX | XXX | | XXX | XXX | XXX |
| Total for XXX Sub-county | | | XX | | XXXX | 105 | xxx | XXX | | |
| XXX Sub-county | | | | | | | | | | |
| CAR | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| | | | | | | | | | | |
|--------------------------------------|--|-----|----|----|------------|------------|------------|------------|-----|-----|
| Total for XX Sub-county | XXX | XXX | XX | XX | XXX | XXX | xx | XXX | XXX | XXX |
| | | | | | | | | | | |
| SUBTOTAL - ALL SUBCOUNTIES | XXX | XXX | XX | XX | XXX | XXX | xxx | XXX | XXX | XXX |
| | <i>DLG Facilitation covers all facilitation to DLG for monitoring, supervision and commissioning as calculated</i> | | | | | | | | | |
| | <i>Contingency should be 5% of the district budget for rural infrastructure</i> | | | | | | | | | |
| Total for xxx District - 2017 | | | | | XXX | XXX | xxx | XXX | | |

| Summary | | | | |
|--------------|--------------|--------|----------|---------------------|
| Sub County | Roads(Km) | Market | Pond | Food Forest (Acres) |
| XXXX | 3.00 | 0 | 0 | 9 |
| XXXX | 5.00 | 0 | 0 | 11 |
| XXXX | 5.00 | 0 | 0 | 5 |
| XXXX | 5.00 | 1 | 1 | 6 |
| Total | 18.00 | | 2 | 10 |

Annex 11: Materials supply Tracking Forms

NON-WAREHOUSE ITEM DELIVERY SHEET FOR DRC

**Contract
Title:
Contract Ref:
Road Name:**

**Contractor:
District:
Road
length:**

| Date | Name of a supplier | Truck Reg. No. | Vol. of Truck | Location of delivery/ Chain age | Materials | Qty | No. of trips | Signature of Supplier | Signature of Witnessing officer | Driver's signature |
|-------------|---------------------------|-----------------------|----------------------|--|------------------|------------|---------------------|------------------------------|--|---------------------------|
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| | | |
|-------------|--------------|--|
| Prepare by: | Verified by: | |
| Name: | Name : | |
| Signature: | Signature: | |
| Date: | Date: | |

**DANISH REFUGEE COUNCIL
COMMUNITY INFRASTRUCTURE DEVELOPMENT
TALLY SHEET FOR DELIVERY OF GRAVEL FROM BORROW PITS TO ROAD SPOTS/SECTIONS**

DATE: FROM.....
TO.....

BORROW PIT OWNER'S DETAILS

NAME..... Signature.....
VILLAGE.....PARISH.....SUBCOUNTY.....

DETAILS OF LOCATIONS ALONG THE ROAD

ROAD NAME.....

NAME OF SUPPLIER:

SPOTS/SECTIONS DUMPED WITH THE GRAVEL ALONG THE ROAD

| NO | Chainage | Total No. Trips | QTY (m ³) | PUC's Rep | Sign | DRC's Rep | Title | Sign |
|--------------|----------|-----------------|-----------------------|-----------|------|-----------|-------|------|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| TOTAL | | | | | | | | |

| TALLIES | | | | | | | | |
|---------------|-----------------|----------|----------------|-----------|---------------|------|---------------|------|
| Date s | Vehicle Numbers | | | | Certification | | | |
| | Chainage | Reg. No. | Vol. of a Trip | No. Trips | Owner's Name | Sign | DRC' Rep Name | Sign |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Totals | | | | | | | | |

Annex 11: Estimated Unit Cost of Projects

a. Community Access Road (Construction)

| PROJECT DESCRIPTION - RURAL INFRASTRUCTURE | | | | | |
|---|----------|----------|-----------|----------------------|--------------------------------------|
| Project Name | | | | | |
| Project number | PXXX-XXX | | | District | XXXXX |
| Project type | XXXXX | | | Sub-county | XXXX |
| Infrastructure Type | CAR | | | Parish | XXXX |
| Length of road (Kms) | 1 | | | Village | XXXX |
| Number of Groups | 1 | | | location | XXXX |
| Number of participants | 30 | | | | |
| Number of work days | 750 | | | | |
| DESCRIPTION | | | | | |
| | | | | | |
| PROJECT COSTS | | | | | |
| Specification | Unit | Quantity | Unit Cost | Amount | Comment |
| Participants from local communities | Day | 750 | 6,000 | 4,500,000 | |
| Fee for payment to participants | Part. | 30 | 6,500 | 195,000 | |
| Training of PMC | PMC | 1 | 260,000 | 260,000 | |
| General Tools | Set | 1 | 1,305,080 | 1,305,080 | |
| Special tools | Set | 1 | 167,560 | 167,560 | |
| Materials | Set | 1 | 177,000 | 177,000 | |
| Compaction for road formation | Km | 1.0 | 1,750,000 | 1,750,000 | 5days of hire/ Km @350,000/= per day |
| Compaction of gravel on Culverts and spots gravelling | Day | 2.00 | 350,000 | 700,000 | |
| Structures | | | | | |
| Single line 900mm dia | Nr. | 2 | 7,128,625 | 14,257,250 | |
| Maintenance training | Lump | 1 | 1,000,000 | 1,000,000 | |
| Total | | | | 24,311,890.00 | |

b. Community Access Road (Rehabilitation)

| PROJECT DESCRIPTION - RURAL INFRASTRUCTURE | | | | | |
|---|--------------------|----------|-----------|----------------------|---|
| Project Name | | | | | |
| Project number | PXXX-XXX | | | District | XXXXX |
| Project type | XXXXX | | | Sub-county | XXXX |
| Infrastructure Type | CAR-REHABILITATION | | | Parish | XXXX |
| Length of road (Kms) | 1 | | | Village | XXXX |
| Number of Groups | 1 | | | location | XXXX |
| Number of participants | 30 | | | | |
| Number of work days | 690 | | | | |
| DESCRIPTION | | | | | |
| | | | | | |
| PROJECT COSTS | | | | | |
| Specification | Unit | Quantity | Unit Cost | Amount | Comment |
| Participants from local communities | Day | 690 | 6,000 | 4,140,000 | |
| Fee for payment to participants | Part. | 30 | 6,500 | 195,000 | |
| Training of PMC | PMC | 1 | 260,000 | 260,000 | |
| General Tools | Set | 1 | 1,305,080 | 1,305,080 | |
| Special tools | Set | 1 | 167,560 | 167,560 | |
| Materials | Set | 1 | 177,000 | 177,000 | |
| Compaction for road formation | Km | 1.0 | 1,750,000 | 1,750,000 | 5days of hire/ Km @350,000/= per day |
| Compaction of gravel on Culverts and spots gravelling | Day | 1.00 | 350,000 | 350,000 | |
| Structures | | | | | |
| Single line 900mm dia | Nr. | 1 | 7,128,625 | 7,128,625 | |
| Maintenance training | Lump | 1 | 1,000,000 | 1,000,000 | |
| Total | | | | 16,473,265.00 | |

c. Protected Spring

| PROJECT DESCRIPTION - RURAL INFRASTRUCTURE | | | | | |
|--|-------------------|----------|-----------|-------------------|-------------------------|
| Project Name | Aserini spring | | | | |
| Project number | P0008-RUA | | | District | Arua |
| Project type | Construction | | | Sub-county | Oluko |
| Infrastructure Type | Spring Protection | | | Parish | Ombokoro |
| Number | 1 | | | Village | Ajucheni |
| Number of participants | 15 | | | Location | Aserini spring |
| Number of work days | 300 | | | | |
| DESCRIPTION | | | | | |
| It isa the only substantial water source in Ajucheni village and could be a good project | | | | | |
| PROJECT COSTS | | | | | |
| Specification | Unit | Quantity | Unit Cost | Amount | Comment |
| Participants from local communities | Day | 300 | 6,000 | 1,800,000 | |
| Fee for payment to participants | Part. | 15 | 6,500 | 97,500 | |
| Training of PMC | PMC | 1 | 260,000 | 260,000 | |
| Tools | Set | 1 | 653,720 | 653,720 | |
| Materials | Set | 1 | 958,160 | 958,160 | |
| Structures | | | | 7,331,340 | See specification below |
| Maintenance training | Lump | 1 | 1,000,000 | 1,000,000 | |
| Total | | | | 12,100,720 | |
| | | | | | m |
| STRUCTURES | | | | | |
| Specification | Location | Quantity | Unit Cost | Amount | Comment |
| Constructing a protected spring | | 1 | 7,331,340 | 7,331,340 | |
| Total | | | | 7,331,340 | |

d. Water Pond

| PROJECT DESCRIPTION - RURAL INFRASTRUCTURE | | | | | |
|---|--------------|----------|-----------|-------------------|---------|
| Project Name | XXX | | | | |
| Project number | PXXX-XX | | | District | XXX |
| Project type | Construction | | | Sub-county | XXX |
| Infrastructure Type | Water Pond | | | 5100000 | XXX |
| Number | 1 | | | Village | XXX |
| Number of participants | 30 | | | Location | XXX |
| Number of work days | 300 | | | | |
| DESCRIPTION | | | | | |
| | | | | | |
| PROJECT COSTS | | | | | |
| Specification | Unit | Quantity | Unit Cost | Amount | Comment |
| Participants from local communities | Day | 300 | 6,000 | 1,800,000 | |
| Fee for payment to participants | Part. | 30 | 6,500 | 195,000 | |
| Training of PMC | PMC | 1 | 260,000 | 260,000 | |
| Tools | Set | 1 | 1,096,220 | 1,096,220 | |
| Special Tools | Lump sum | 1 | 708,000 | 708,000 | |
| Materials | Lump sum | 1 | 4,000,000 | 4,000,000 | |
| Hire of excavator @1,500,000/Day | Day | 6 | 1500000 | 9,000,000 | |
| Hire of Bull dozer for 1 days@1,500,000 | Day | 6 | 1500000 | 9,000,000 | |
| Fuel for Bull dozer, 150L/Day @4000/L | Day | 6 | 600000 | 3,600,000 | |
| Hire of Low bed for Bulldozer@4,500,000 | Lump sum | 1 | 4500000 | 4,500,000 | |
| Hire of Low bed for Excavator@4,500,000 | Lump sum | 1 | 4500000 | 4,500,000 | |
| Fuel for excavator, 150L/Day @4000/L | Day | 6 | 600000 | 3,600,000 | |
| | | | | | |
| Total | | | | 42,259,220 | |

e. Food Forest

| PROJECT DESCRIPTION - RURAL INFRASTRUCTURE | | | | | |
|---|--------------|----------|-----------|-------------------|---------|
| Project Name | XXXX | 2000 | | | |
| Project number | PXXX-XX | | | District | XXXX |
| Project type | New Planting | | | Sub-county | XXXX |
| Infrastructure Type | Woodlot | | | Parish | XXXX |
| Land size (Acres) | 2.5 | | | Village | |
| Number of Groups | 1 | | | location | XXXX |
| Number of participants | 30 | | | | |
| Number of work days | 660 | | | | |
| DESCRIPTION | | | | | |
| The school has adequate land which is owned by them are willing to maintain the woodlot project | | | | | |
| PROJECT COSTS | | | | | |
| Specification | Unit | Quantity | Unit Cost | Amount | Comment |
| Season 1(Planting) | | | | | |
| Participants from local communities | Day | 660 | 6,000 | 3,960,000 | |
| Fee for payment to participants | Part. | 30 | 6,500 | 195,000 | |
| Training of PMC | PMC | 1 | 260,000 | 260,000 | |
| Tools | Set | 1 | 856,680 | 856,680 | |
| Special tools | Set | 1 | 295,000 | 295,000 | |
| Materials | Set | 1 | 4,271,010 | 4,271,010 | |
| Maintenance training | Lump | 1 | 1,000,000 | 1,000,000 | |
| Season 2 (maintanance) | | | | | |
| Participants from local communities | Day | 300 | 6,000 | 1,800,000 | |
| Materials | Set | 1 | 295,000 | 295,000 | |
| Fee for payment to participants | Part. | 30 | 6,500 | 195,000 | |
| TOTAL | | | | 13,127,690 | |

f. Market Grade C (Sanitation and Chain-link Fencing)

| PROJECT DESCRIPTION - RURAL INFRASTRUCTURE | | | | | |
|---|----------------------------|----------|------------|-------------------|-------------------------|
| Project Name | XXX | | | | |
| Project number | PXXX-XXX | | | District | XXX |
| Project type | Construction | | | Sub-county | XXX |
| Infrastructure Type | Market, grade C(4,800 SM) | | | Parish | XXX |
| Number | 1 | | | Village | XXX |
| Number of participants | 30 | | | Location | XXX |
| Number of work days | 600 | | | | |
| DESCRIPTION | | | | | |
| Market is large and half of it is fenced but some part of it which is highly used is not fenced | | | | | |
| PROJECT COSTS | | | | | |
| Specification | Unit | Quantity | Unit Cost | Amount | Comment |
| Participants from local communities | Day | 600 | 6,000 | 3,600,000 | |
| Fee for payment to participants | Part. | 30 | 6,500 | 195,000 | |
| Training of PMC | PMC | 1 | 260,000 | 260,000 | |
| Tools | Set | 1 | 771,720 | 771,720 | |
| Materials | Set | 1 | 188,800 | 188,800 | |
| Structures | | | | 82,084,476 | See specification below |
| Total | | | | 87,099,996 | |
| STRUCTURES | | | | | |
| Specification | Location | Quantity | Unit Cost | Amount | Comment |
| Construction of 4 stance lined VIP latrine | | 1 | 39,322,798 | 39,322,798 | |
| Chainlink Fencing | | 1 | 42,761,678 | 42,761,678 | |
| Gate House | | 1 | 15,603,477 | 15,603,477 | |
| Total | | | | 82,084,476 | |

| SUMMARY OF CULVERT INSTALLATIONS LABOUR COSTS AND RESILIENCE DESIGN ACTIVITIES AND MATERIALS | | | | | | | | | | | |
|---|--------------|-------------|-----------------|-----------|-------|---------|---------------------------------|-----------------|---------|---------|-------------------|
| Size(mm) | No. of lines | Labour cost | Water for Works | Work days | Rate | Amount | Minimum Infiltration Pit Volume | Hardcore Volume | Rate | Amount | Paspalam Material |
| 600 | Single | 616,250 | 10,000 | 30 | 6,000 | 180,000 | 2 | 1 | 140,000 | 50,000 | 30,000 |
| | Double | 977,750 | 15,000 | 120 | 6,000 | 720,000 | 8 | 2 | 140,000 | 95,000 | 40,000 |
| | Tripple | 1,451,875 | 17,500 | 150 | 6,000 | 900,000 | 10 | 3 | 140,000 | 140,000 | 50,000 |
| | Quardrapple | | | | | | | | 140,000 | | |
| 900 | Single | 812,125 | 12,500 | 30 | 6,000 | 180,000 | 2 | 1 | 140,000 | 50,000 | 30,000 |
| | Double | 1,325,625 | 17,500 | 120 | 6,000 | 720,000 | 8 | 2 | 140,000 | 95,000 | 40,000 |
| | Tripple | 1,940,000 | 20,000 | 150 | 6,000 | 900,000 | 10 | 3 | 140,000 | 140,000 | 50,000 |
| Encased installations | | | | | | | | | | | |
| 600 | Single | 755,500 | 20,000 | 30 | 6,000 | 180,000 | 2 | 1 | 140,000 | 50,000 | 30,000 |
| | Double | 1,415,000 | 20,000 | 120 | 6,000 | 720,000 | 8 | 2 | 140,000 | 95,000 | 40,000 |
| | Tripple | 1,865,000 | 20,000 | 150 | 6,000 | 900,000 | 10 | 3 | 140,000 | 140,000 | 50,000 |
| | Quardrapple | | | | | | | | | | |
| 900 | Single | 1,065,250 | 30,000 | 45 | 6,000 | 270,000 | 2 | 1 | 140,000 | 50,000 | 30,000 |
| | Double | 1,977,375 | 60,000 | 120 | 6,000 | 720,000 | 8 | 2 | 140,000 | 95,000 | 40,000 |
| | Tripple | 2,989,875 | 80,000 | 150 | 6,000 | 900,000 | 10 | 3 | 140,000 | 140,000 | 50,000 |