

## 資料

- 資料 1： 調査団員・氏名
- 資料 2： 調査行程
- 資料 3： 関係者（面会者）リスト
- 資料 4-1： 協議議事録（M/D）概略設計現地調査時
- 資料 4-2： 協議議事録（M/D）協力準備調査報告書（案）説明時
- 資料 5-1： 建築概略設計図面
- 資料 5-2： 土木概略設計図面
- 資料 6： 自然条件調査結果概要
- 資料 7-1： 環境社会モニタリングフォーム
- 資料 7-2： 環境チェックリスト
- 資料 8： その他の資料・情報



## 資料 1：調査団員・氏名

① 概略設計現地調査時：2021年10月17日～2022年1月6日

(1) JICA 団員

氏名	担当分野	所属	現地期間
松下 雄一	総括	JICA 経済開発部 農業・農村開発 第二グループ第五チーム	2021/10/17～2021/10/24

(2) コンサルタント団員

氏名	担当分野	所属	現地期間
根岸 将也	業務主任者/施設運営計画 ／灌漑施設計画・設計 1	NTC インターナショナル(株)	2021/10/17～2022/1/6
中村 謙仁	副業務主任者/施工計画 1 ／積算 1(土木)	NTC インターナショナル(株)	2021/11/4～2021/12/5
井上 透	灌漑施設計画・設計 2/ 自然条件調査	NTC インターナショナル(株)	—
佐藤 総成	灌漑施設計画・設計 3/ 自然条件調査 2	NTC インターナショナル(株)	2021/10/17～2021/11/21
小松 大記	建築設計	八千代エンジニアリング(株)	2021/10/31～2021/12/5
田辺 修	機材・調達計画/積算	(財)日本国際協力システム	2021/11/13～2021/12/5
増田 一郎	施工計画 2/ 積算 2(建築)	八千代エンジニアリング(株)	2021/11/20～2021/12/5
河原 佑希子	環境社会配慮/ ジェンダー配慮	NTC インターナショナル(株)	2021/10/17～2021/11/24

② 協力準備調査報告書（案）説明時：2022年7月11日～2022年7月24日

(1) JICA 団員

氏名	担当分野	所属	現地期間
松村 元博	総括	JICA ザンビア事務所	2022/7/18～2022/7/21
伊藤 淳一	協力企画	JICA 経済開発部 農業・農村開発 第二グループ第五チーム	2022/7/16～2022/7/24

(2) コンサルタント団員

氏名	担当分野	所属	現地期間
根岸 将也	業務主任者/施設運営計画 ／灌漑施設計画・設計 1	NTC インターナショナル(株)	2022/7/11～2022/7/24
中村 謙仁	副業務主任者/施工計画 1 ／積算 1(土木)	NTC インターナショナル(株)	2022/7/11～2022/7/24



## 資料 2 : 調査行程

### ① 概略設計現地調査時 : 2021 年 10 月 17 日 ~ 2022 年 1 月 6 日

年月日	活動内容
2021 年	
10 月 17 日 (日)	松下・根岸・佐藤・河原・移動(成田ーアディアスベバ)
10 月 18 日 (月)	松下・根岸・佐藤・河原・移動(アディアスベバールサカ)
10 月 19 日 (火)	JICA ザンビア事務所打合せ、農業省表敬訪問、技プロチーム打合せ、ZARI マウント・マクル訪問
10 月 20 日 (水)	MM 協議: ZARI マウント・マクル
10 月 21 日 (木)	財務省表敬訪問、MM 協議: ZARI マウント・マクル
10 月 22 日 (金)	MM 署名式@農業省、在ザンビア日本大使館表敬訪問
10 月 23 日 (土)	松下: 移動(ルサカーアディアスベバ) 資料整理
10 月 24 日 (日)	松下: 移動(アディアスベバー成田) 資料整理
10 月 25 日 (月)	(ザンビア祝日)現地調査事務所整備
10 月 26 日 (火)	ZARI 所長打合せ、C/P 打合せ(根岸・佐藤)
10 月 27 日 (水)	自然条件調査再委託準備(佐藤)、ZEMA 訪問・聞き取り(河原)
10 月 28 日 (木)	気象・土壌データ収集(佐藤)、C/P 打合せ(河原)
10 月 29 日 (金)	ZARI 所長打合せ(根岸)、自然条件調査再委託入札(佐藤)
10 月 30 日 (土)	資料整理
10 月 31 日 (日)	小松: 移動(成田ーアディアスベバ) 資料整理
11 月 1 日 (月)	小松: 移動(アディアスベバールサカ) 自然条件調査再委託交渉(佐藤)
11 月 2 日 (火)	C/P 打合せ: ZARI(団員、自然条件調査再委託業者顔合わせ)、EIA 再委託業者調達作業(河原)
11 月 3 日 (水)	中村: 移動 C/P 打合せ: ZARI(小松・河原)、自然条件調査監督(佐藤)、 (ハルツームーアディアスベバ) ZARI Kabwe 研究所訪問(根岸)
11 月 4 日 (木)	中村: 移動 C/P 打合せ: ZARI・水供給施設調査(小松)、自然条件調査監督(佐藤)、 (アディアスベバールサカ) EIA 再委託業者調達作業(河原)
11 月 5 日 (金)	技プロチーム打合せ(根岸、中村、小松)、自然条件調査監督(佐藤)、市場調査(中村)
11 月 6 日 (土)	社内ミーティング
11 月 7 日 (日)	資料整理
11 月 8 日 (月)	ZARI 所長/技プロチーム打合せ(根岸)、自然条件調査監督(佐藤)、データ収集(中村・小松)、EIA 再委託入札・選定(河原)
11 月 9 日 (火)	ZARI 所長/SCCI 打合せ(根岸・中村・小松)、自然条件調査監督(佐藤)、EIA 再委託業者選定作業(河原)
11 月 10 日 (水)	資料整理(根岸・中村・小松)、自然条件調査監督(佐藤)、EIA 再委託業者交渉(河原)
11 月 11 日 (木)	調査計画(根岸)、C/P 打合せ(中村・佐藤・小松)、EIA 再委託契約・C/P 顔合わせ(河原)
11 月 12 日 (金)	調査計画(根岸)、資料整理(中村・佐藤・小松・河原)
11 月 13 日 (土)	田辺: 移動(成田ードーハ) 資料整理
11 月 14 日 (日)	田辺: 移動(ドーハ乗継) 資料整理
11 月 15 日 (月)	田辺: 移動(ドーハールサカ) ほ場整備関連作業(根岸)、技プロチーム打合せ資料準備(中村)、 自然条件調査進捗報告書(佐藤)、ZARI 土壌調査担当打合せ(小松)
11 月 16 日 (火)	技プロチーム打合せ(根岸、中村、小松、田辺、河原)、自然条件調査監督(佐藤)
11 月 17 日 (水)	水文分析作業(根岸)、研修計画(中村)、自然条件調査監督(佐藤)、関係省庁打合せ(小松)、 業者(SARO/CAMCO)訪問(中村・田辺)、EIA 再委託業者打合せ(河原)
11 月 18 日 (木)	技プロチーム打合せ(根岸・中村・小松・田辺)、気象局打合せ(中村)、基本計画作業(小松) 自然条件調査監督(佐藤)、業者訪問(田辺)、ステークホルダー協議準備(河原)
11 月 19 日 (金)	佐藤: 移動(ルサカードーハ) JICA ザンビア事務所打合せ(根岸・中村・田辺)、基本計画作業(小松)、 調達担当者打合せ(田辺)、ステークホルダー協議(河原)
11 月 20 日 (土)	佐藤: 移動(ドーハ乗継)増田: 移動(成田ードーハ) 資料整理
11 月 21 日 (日)	佐藤: 移動(ドーハー成田)増田: 移動(ドーハ乗継) 資料整理
11 月 22 日 (月)	増田: 移動(ドーハールサカ) 研究ほ場計画(根岸)、業務調整(中村)、ZARI 打合せ・建築資材調査(小松)、農業省 河原: 移動(ルサカードーハ) 打合せ・業者訪問(田辺)
11 月 23 日 (火)	河原: 移動(ドーハ乗継) WARMA 打合せ(根岸)技プロチーム打合せ(根岸・田辺)、 インフラ省打合せ(中村)、建築条件調査(小松・増田)、サイト調査(増田)
11 月 24 日 (水)	河原: 移動(ドーハー成田) JICA ザンビア/ZARI 打合せ(ALL)、ZRA 打合せ(中村・田辺)
11 月 25 日 (木)	灌漑施設計画(根岸)、モニタリング支援(中村)、基本計画作業(小松)、 種子業者(ZAMSEED)訪問(田辺)、JICA 打合せ(増田)
11 月 26 日 (金)	JICA ザンビア打合せ(ALL)
11 月 27 日 (土)	資料整理
11 月 28 日 (日)	資料整理
11 月 29 日 (月)	テクニカルノート(案)作成(ALL)
11 月 30 日 (火)	テクニカル協議: ZARI(ALL)
12 月 1 日 (水)	灌漑施設計画(根岸)、JICA ザンビア打合せ(中村)、テクニカルノート修正(小松・増田・田辺)
12 月 2 日 (木)	テクニカル協議: ZARI(ALL)、業者訪問(中村)
12 月 3 日 (金)	中村・小松・田辺・増田: 移動(ルサカーナイロビ) ルサカーマンサ移動(根岸)
12 月 4 日 (土)	中村・小松・田辺・増田: 移動(ナイロビドーハ) 資料整理
12 月 5 日 (日)	中村・小松・田辺・増田: 移動(ドーハー成田) 資料整理
12 月 6 日 (月)	社内ウェブ会議、ZARI マンサ打合せ、サイト調査
12 月 7 日 (火)	サイト調査
12 月 8 日 (水)	社内ウェブ会議、ZARI マンサ打合せ、サイト調査
12 月 9 日 (木)	灌漑施設計画
12 月 10 日 (金)	ZARI マンサ打合せ(オンライン)、サイト調査
12 月 11 日 (土)	サイト調査
12 月 12 日 (日)	資料整理
12 月 13 日 (月)	社内ウェブ会議、サイト調査
12 月 14 日 (火)	ZARI マンサ打合せ、サイト調査

年月日	活動内容
12月15日(水)	マンサールサカ移動
12月16日(木)	テクニカルノート作成
12月17日(金)	テクニカル協議:ZARI
12月18日(土)	資料整理
12月19日(日)	資料整理
12月20日(月)	テクニカルノート署名取付:ZARI
12月21日(火)	資料整理(現地一時隔離)
12月22日(水)	資料整理(現地一時隔離)
12月23日(木)	資料整理(現地一時隔離)
12月24日(金)	資料整理(現地一時隔離)
12月25日(土)	資料整理(現地一時隔離)
12月26日(日)	資料整理(現地一時隔離)
12月27日(月)	資料整理(現地一時隔離)
12月28日(火)	資料整理(現地一時隔離)
12月29日(水)	資料整理(現地一時隔離)
12月30日(木)	資料整理(現地一時隔離)
12月31日(金)	資料整理(現地一時隔離)
2022年	
1月1日(土)	資料整理(現地一時隔離)
1月2日(日)	資料整理(現地一時隔離)
1月3日(月)	資料整理(現地一時隔離)
1月4日(火)	資料整理(現地一時隔離)
1月5日(水)	根岸:移動(ルサカーナイロピードーハ)
1月6日(木)	根岸:移動(ドーハー成田)

② 協力準備調査報告書(案)説明時:2022年7月11日~2022年7月24日

年月日	活動内容
2022年	
7月11日(月)	根岸・中村:移動(成田ードバイ)
7月12日(火)	根岸・中村:移動(ドバイールサカ)
7月13日(水)	ZARI 打合せ、MD 及び ANNEX 修正
7月14日(木)	MD 及び ANNEX 修正
7月15日(金)	対処方針会議、JICA ザンビア事務所打合せ、MOReDeP 打合せ、ZARI/MoA との協議、MD 及び ANNEX 修正
7月16日(土)	資料整理
7月17日(日)	資料整理
7月18日(月)	ZARI との協議、MD 及び ANNEX 修正
7月19日(火)	JICA 本部との協議、MD 及び ANNEX 修正
7月20日(水)	ZARI との協議、MD 及び ANNEX 最終化、MD 署名式
7月21日(木)	在ザンビア日本大使館表敬訪問、JICA ザンビア事務所調査結果報告、SeedCo ヒアリング
7月22日(金)	現地調達調査、根岸・中村:移動(ルサカードバイ)
7月23日(土)	根岸・中村:トランジット(ドバイ)
7月24日(日)	根岸・中村:移動(ドバイー成田)

### 資料3：関係者（面会者）リスト

① 概略設計現地調査時：2021年10月17日～2022年1月6日

#### 1. 在ザンビア日本大使館

水内 龍太 特命全権大使  
佐伯 保則 二等書記官

#### 2. JICA ザンビア事務所

徳橋 和彦 所長  
松村 元博 次長  
松井 駿 所員

#### 3. MOREDeP

後藤 明生 専門家 (チーフアドバイザー／稲作研修)  
小松原 崇 専門家 (稲作研究)  
松本 俊輔 専門家 (業務調整／人材育成計画)  
佐藤 収 専門家 (業務調整／人材育成計画)  
酒井 樹里 専門家 (業務調整／普及)

#### 4. 農業省

Ms. Cecilia Mulindeti Kamanga Acting Permanent Secretary  
Mr. Stanislaus M.Chisakuta Deputy Director  
Mr. Andrew Songiso Principal Agricultural Specialist, Irrigation Department

#### 5. ザンビア農業研究機構

Mr. Ivor Mukuka Director, ZARI Mt. Makulu  
Mr. Mukanga Mweshi Deputy Director, Technical Services  
Dr. Dickson Ng'ungi Deputy Director, Research Services  
Mr. Chitambi Musika Program Manager  
Mr. Batischeba Tembo Principal Agricultural Research Officer  
Ms. Brenda Mwamba Acting Principal Agricultural Research Officer  
Mr. Wilson Phiri Purchasing and Supplies Assistant / Procurement  
Mr. Alex D.Chilala Chief Agricultural Research Officer  
Mr. Stalin Sichinga Principal Agricultural Research Officer

#### 6. 種子検査認証機構

Dr. Francisco Miti Acting Director  
Mr. Nathan Phiri Chief Seeds Office Seed Systems and Inspection Section  
Mr. Richard Chanda Principal Seeds Officer Variety Testing Registrtion and  
Protection Section  
Mr. Sichilima Issac Senior Seeds Officer

## 7. 財務省

Mr. Musokotwane Sichizuwe      Assistant Director  
Mr. Joseph Chifulo                  Economist  
Ms. Monalisa Malilwe              Economist

## 8. 税務局

Mr. Sikopo Mutukwa                Domestic Taxes Officer  
Mrs. Kabamba                        Custom Duties Officer

## 9. 住宅インフラ開発省ルサカ州

Mr. Joseph C. Chungu                Provincial Infrastructure Officer, Department of Public  
Infrastructure, Lusaka Province

## 10. 気象局

Mr. M.C. Mutau                      Senior Engineer

## 11. ザンビア環境管理機構

Ms. Juliana Kasonde                Senior Inspector

② 協力準備調査報告書（案）説明時：2022年7月11日～2022年7月24日

### 1. 在ザンビア日本大使館

水内 龍太 特命全権大使  
富田 真 一等書記官  
佐伯 保則 二等書記官

### 2. JICA ザンビア事務所

米林 徳人 所長  
松村 元博 次長  
松井 駿 所員

### 3. MOREDeP

野坂 治朗 専門家      (シニアアドバイザー)  
小松原 崇 専門家      (稲作研究)

### 4. 農業省

Mr. Green Mbozi                      Permanent Secretary  
Mr. Chunga Chilufya                 Economist, Policy and Planning Department

### 5. ザンビア農業研究機構

Mr. Ivor Mukuka                      Director, ZARI Mt. Makulu  
Mr. Mukanga Mweshi                Deputy Director, Technical Services  
Dr. Dickson Ng'ungi                 Deputy Director, Research Services  
Mr. Chitambi Musika                 Program Manager

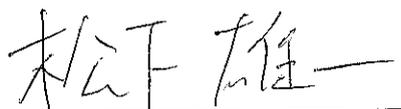
**資料 4-1：協議議事録（M/D） 概略設計現地調査時**



**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Development of Seed Production Field and Training Facilities**  
**in the Republic of Zambia**

Based on the several preliminary discussions between the Government of the Republic of Zambia (hereinafter referred to as “Zambia”) and Japan International Cooperation Agency (hereinafter referred to as “JICA”), JICA dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as “the Team”) of the Project for Development of Seed Production Field and Training Facilities in the Republic of Zambia (hereinafter referred to as “the Project”) to Zambia. The Team held a series of discussions with the officials of the Government of Zambia and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Lusaka, 22<sup>nd</sup> October, 2021



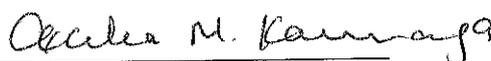
MATSUSHITA Yuichi

Leader

Preparatory Survey Team

Japan International Cooperation Agency

Japan



Cecilia Kamanga

Acting Permanent Secretary

Ministry of Agriculture

The Republic of Zambia

Witnessed by



Ivor Mukuka

Director

Zambia Agriculture Research Institute

Ministry of Agriculture

The Republic of Zambia

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to contribute to the increase of rice production in the country by strengthening the system for dissemination of rice cultivation technology and the capacity for production of quality seeds through construction of facilities and procurement of equipment for dissemination of rice cultivation technology, and paddy fields and irrigation facilities for production of quality seeds at the Mount Makulu Research Station and the Mansa Research Station of the Zambia Agriculture Research Institute (ZARI).

### 2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Development Seed Production Field and Training Facilities in the Republic of Zambia”.

### 3. Project site

Both sides confirmed that the sites of the Project are in Mount Makulu Research Station and Mansa Research Station which are shown in Annex 1.

### 4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

The Ministry of Agriculture (MoA) will be the responsible authority for the Project. The ZARI will be the executing agency for the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

### 5. Items requested by the Government of Zambia

5-1. As a result of discussions, both sides confirmed that the items requested by the Government of Zambia are as shown in Annex 3.

5-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

5-3. The Government of Zambia shall submit an official request to the Government of

Japan through a diplomatic channel before the appraisal of the Project, which is scheduled in April, 2022.

## 6. Procedures and Basic Principles of Japanese Grant

6-1. The Zambian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as “the Grant”) as described in Annex 4 shall be applied to the Project. As for the monitoring of the implementation of the Project, JICA requires Zambian side to submit the Project Monitoring Report, the form of which is attached as Annex 5.

6-2. The Zambian side agreed to take the necessary measures, as described in Annex 6, for smooth implementation of the Project. The contents of the Annex 6 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of Annex 6 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

## 7. Schedule of the Survey

7-1. The Team will proceed with further survey in Zambia until May 2022.

7-2. An official request to the Government of Japan will be submitted before April, 2022.

7-3. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Zambia in order to explain its contents around May 2022.

7-4. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Zambian side, JICA will finalize the Preparatory Survey Report and send it to Zambia around August 2022.

7-5. The above schedule is tentative and subject to change.

## 8. Environmental and Social Considerations

8-1. The Zambian side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

8-2. The Project is categorized as “B” from the following considerations:

Not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

The Zambian side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment(EIA) /Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA by June, 2022.

- 8-3. For the Project that will result in involuntary resettlement, the Zambian side confirmed to prepare a Resettlement Action Plan (RAP)/Abbreviated Resettlement Action Plan (ARAP) and make it available to the public. In addition, the Zambian side confirmed to provide the affected people with sufficient compensation and/or support in accordance with RAP/ARAP, which is based on JICA Guidelines for Environmental and Social Considerations (April, 2010), in a timely manner.

## 9. Other Relevant Issues

### 9-1. Taxes and duties

Both sides noted that treatment of taxes and duties for the Project shall be in accordance with the agreement between the Government of Zambia and the Government of Japan. MoA shall take necessary measures according to the agreement.

### 9-2. Safety measures

Both sides confirmed that ZARI shall take necessary measures to ensure and maintain the security of the Project site and the persons related to the implementation of the Project, in cooperation with relevant authorities during the Project period. Such security measures shall reasonably reflect needs of the Consultant/the Contractor engaging in the Project, as shown in Annex 6.

Both sides agreed that in case the additional security cost would be necessary for the implementation of the Project, such cost shall be borne by the Recipient without using the Grant.

### 9-3. Gender Mainstreaming

Both sides confirmed that following gender elements shall be duly reflected in the scope of Preparatory Survey.

- (a) Collection of information and gender disaggregated data for assessment of gender needs.
- (b) Examination of gender-responsive measures based on the assessment.

### 9-4. Assignment of C/P

ZARI shall assign counterpart personnel to each study team member based on the request from Japanese side.

9-5. Questionnaire

ZARI shall answer to the Questionnaire submitted by the Team in English with relevant documents by 29 October, 2021.

Annex 1 Project Site

Annex 2 Organization Chart

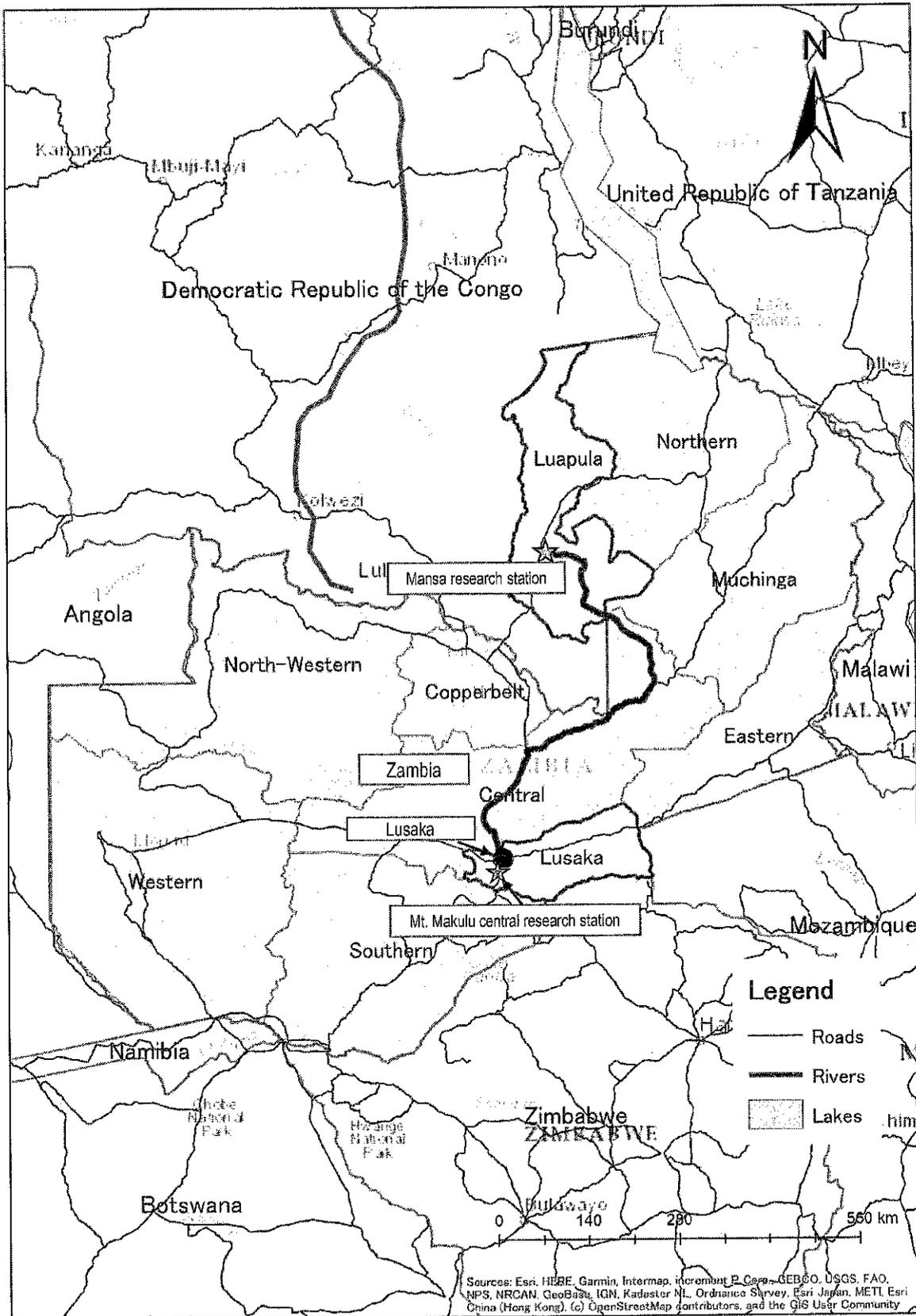
Annex 3 Items requested by the Government of Zambia

Annex 4 Japanese Grant

Annex 5 Project Monitoring Report (template)

Annex 6 Major Undertakings to be taken by the Government of Zambia

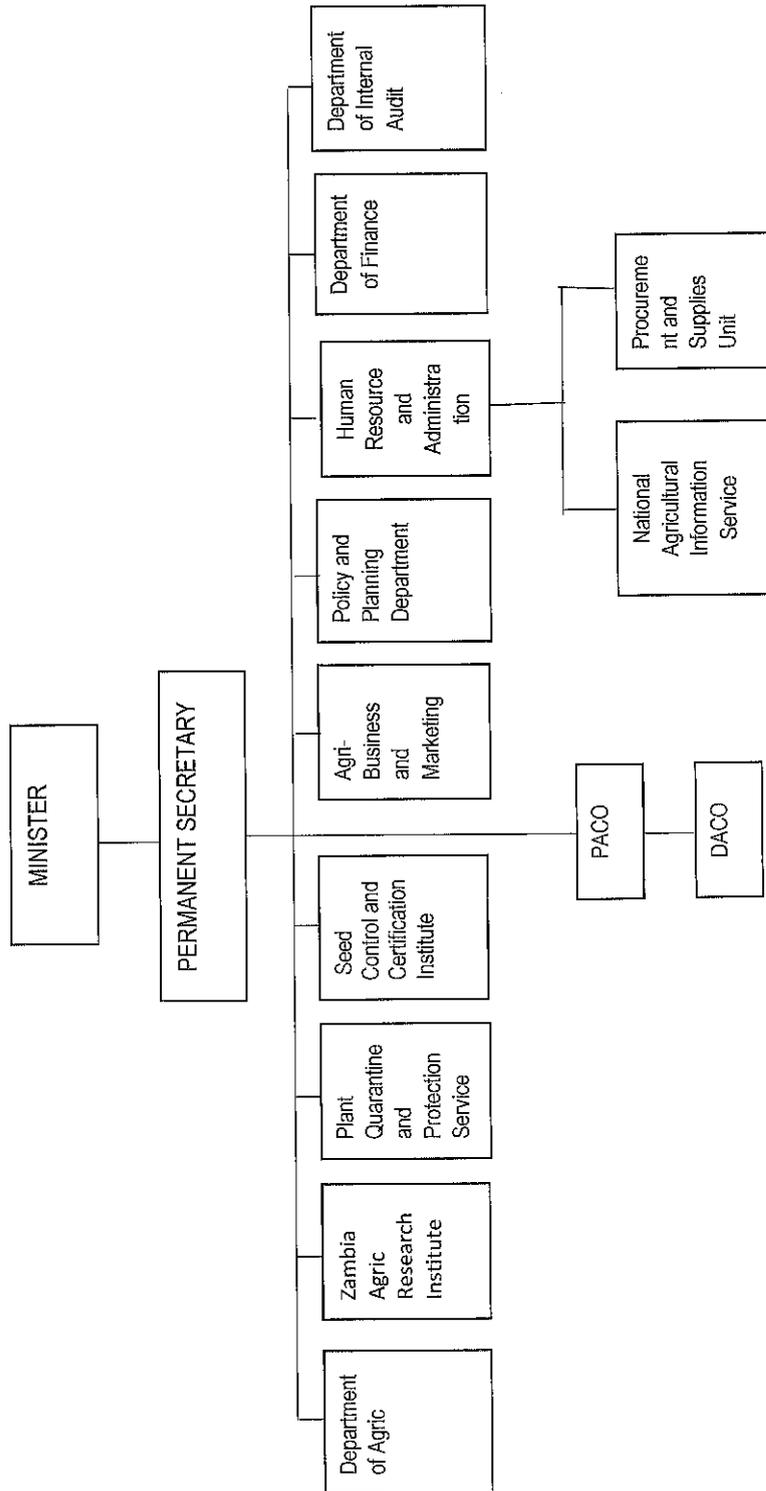
*lv*



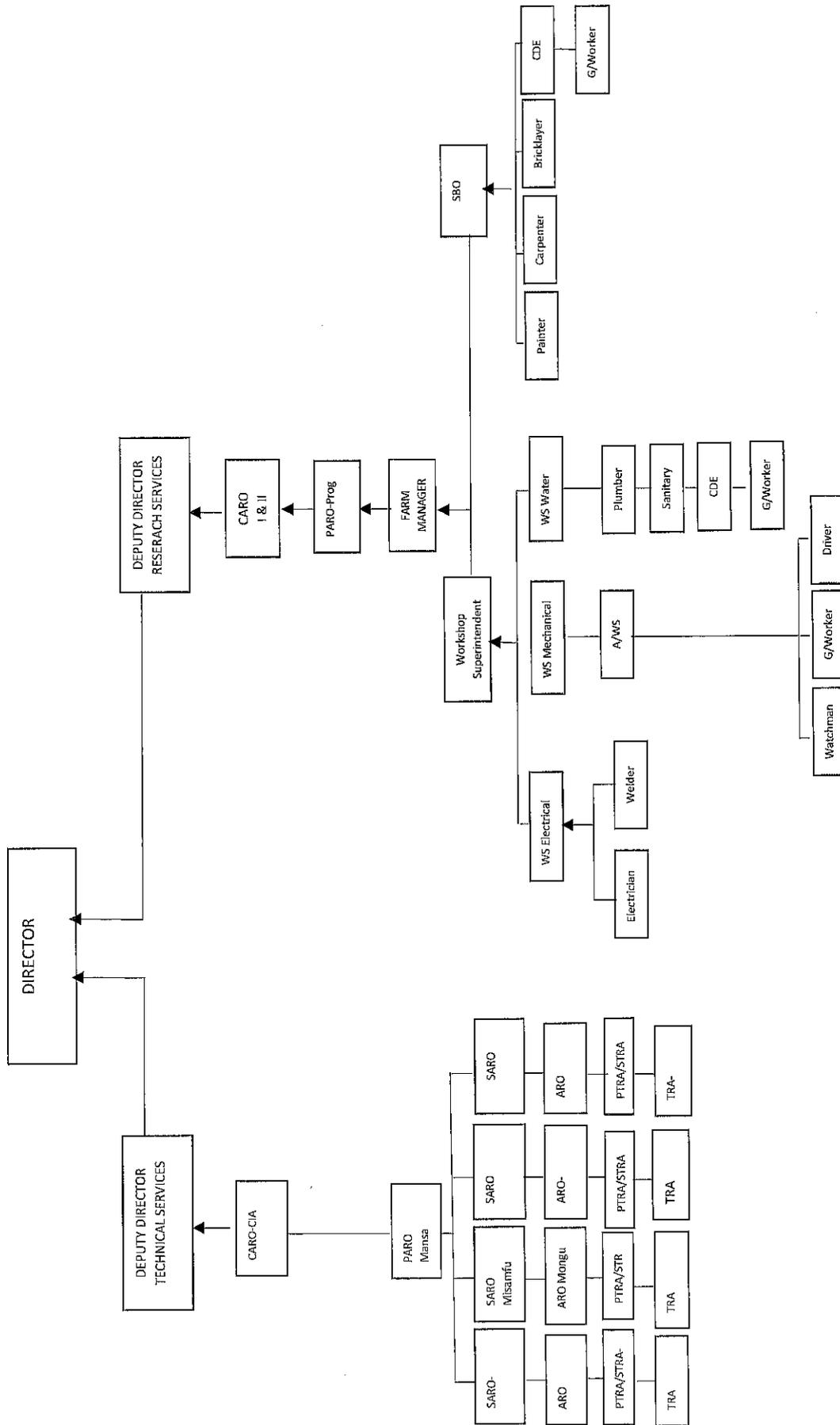
Location Map

cr

### MINISTRY OF AGRICULTURE STRUCTURE



# MOUNT MAKULU RESEARCH STATION STRUCTURE



IM

curk



## Items Requested by the Government of Zambia

## 1. Facilities

## &lt;Mt. Makulu Research Station&gt;

Facility	Target Facility & Specification (Approx. Floor Area)	Remarks
Agricultural Machinery Garage	140 m <sup>2</sup>	
Machine Maintenance Building	140 m <sup>2</sup>	Space for preparation Room will be considered in this survey.
Seed Drying/Rice Milling Building	300 m <sup>2</sup>	
Drying Yard	132 m <sup>2</sup>	

## &lt;Mansa Research Station&gt;

Facility	Target Facility & Specification (Approx. Floor Area)	Remarks
Training Facilities	700 m <sup>2</sup>	
Agricultural Machinery Garage	280 m <sup>2</sup>	
Machine Maintenance Building	280 m <sup>2</sup>	
Drying Yard	264 m <sup>2</sup>	
Storage	324 m <sup>2</sup>	
Seed Drying/Rice Milling Building	600 m <sup>2</sup>	
Management Office for Seed Production Field	20 m <sup>2</sup> , 2 Rooms	
Seed Production Field	4 to 6 ha	Land consolidation and improvement of irrigation canal and farm ditch
Irrigation and Drainage Facilities	Irrigation Pond, Drainage etc.	Scope of work shall be considered in the Study

## 2. Equipment

## &lt;Mt. Makulu Research Station&gt;

Usage	Name of Machinery	Quantity	Note
For training	4 Wheel Tractor and Implements	2 units	
	Reaper	1 unit	
	Thresher	1 unit	
For Seed Production	Paddy Dryer	1 set	
	Seed Processing Machine	1 set	
	Testing Equipment	1 set	
	Maintenance Equipment	1 set	

## &lt;Mansa Research Station&gt;

Usage	Name of Machinery	Quantity	Note
For training	Reaper	3 units	
	Thresher	3 units	
	Paddy Drier	1 unit	

	Rice Milling Plant	1 set	
	Maintenance Equipment	1 set	
	Testing Equipment	1 set	
For Seed	4 Wheel Tractor and Implements	1 unit	
Production	Combine Harvester	1 unit	
	Paddy Drier	1 set	
	Seed Processing Plant	1 set	
	Maintenance Equipment	1 set	

### 3. Consulting Service

- Detail Design (D/D), support for bidding procedure, supervision of the Project.

### 4. Soft Component

- Strengthening the start-up of the operation and maintenance plan for equipment

*Handwritten signature*

## JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

### 1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as “the G/A”)

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as “the B/A”)

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

### 2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of

relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

#### (2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

#### (3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

### 3. Basic Principles of Project Grants

#### (1) Implementation Stage

##### 1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as “the E/N”) will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the “General Terms and Conditions for Japanese Grant (January 2016).”

2) Banking Arrangements (B/A) (See “Financial Flow of Japanese Grant (A/P Type)” for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the “Meeting”) will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the

Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

### (2) Ex-post Monitoring and Evaluation Stage

- 1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.
- 2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

### (3) Others

#### 1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

#### 2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

#### 3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.



1/A

cmk

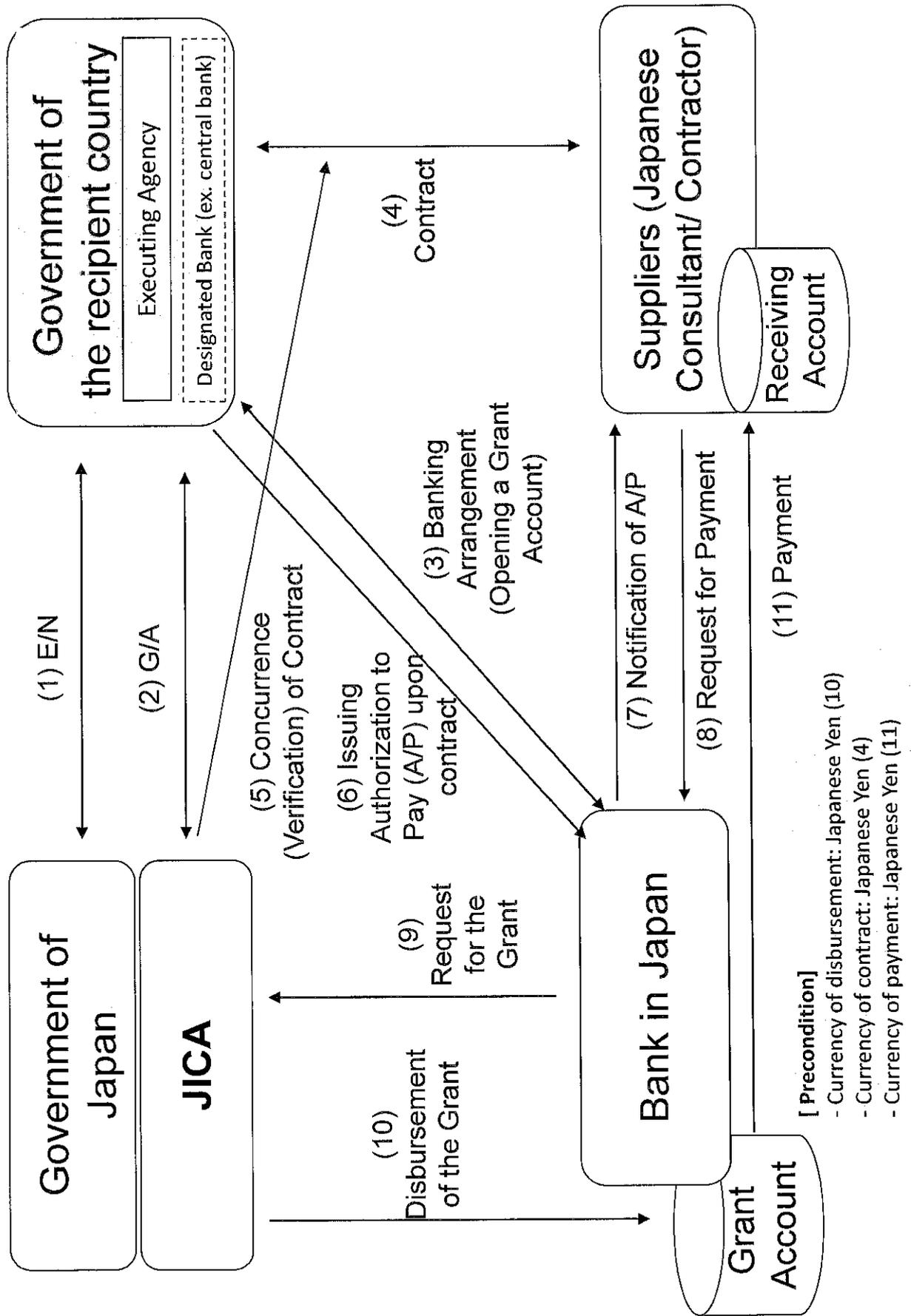
PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2) Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
4. Ex-post monitoring & evaluation	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

# Financial Flow of Japanese Grant (A/P Type)



**Project Monitoring Report**  
on  
**Project Name**  
**Grant Agreement No. XXXXXXXX**  
20XX, Month

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	_____ Person in Charge (Designation) _____ _____ Contacts _____ Address: _____ Phone/FAX: _____ Email: _____
<b>Executing Agency</b>	_____ Person in Charge (Designation) _____ _____ Contacts _____ Address: _____ Phone/FAX: _____ Email: _____
<b>Line Ministry</b>	_____ Person in Charge (Designation) _____ _____ Contacts _____ Address: _____ Phone/FAX: _____ Email: _____

**General Information:**

<b>Project Title</b>	
<b>E/N</b>	Signed date: _____ Duration: _____
<b>G/A</b>	Signed date: _____ Duration: _____
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

*ln*

**1: Project Description**

**1-1 Project Objective**

--

**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

--

**1-3 Indicators for measurement of "Effectiveness"**

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr )	Target (Yr )
Qualitative indicators to measure the attainment of project objectives		

**2: Details of the Project**

**2-1 Location**

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)
-------

IM

Chank

**2-3 Implementation Schedule**

Items	Original		Actual
	(proposed in the outline design)	(at the time of signing the Grant Agreement)	

Reasons for any changes of the schedule, and their effects on the project (if any)

--

**2-4 Obligations by the Recipient**

**2-4-1 Progress of Specific Obligations**

See Attachment 2.

**2-4-2 Activities**

See Attachment 3.

**2-4-3 Report on RD**

See Attachment 11.

**2-5 Project Cost**

**2-5-1 Cost borne by the Grant(Confidential until the Bidding)**

Components			Cost (Million Yen)	
	Original (proposed in the outline design)	Actual (in case of any modification)	Original <sup>1)2)</sup> (proposed in the outline design)	Actual
	1.			
	Total			

Note: 1) Date of estimation:  
 2) Exchange rate: 1 US Dollar = Yen

**2-5-2 Cost borne by the Recipient**

Components			Cost (1,000 Taka)	
	Original (proposed in the outline design)	Actual (in case of any modification)	Original <sup>1)2)</sup> (proposed in the outline design)	Actual
	1.			

*hr*

*IM*

*Curk*

- Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

### 2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

**Original** (at the time of outline design)

name:

role:

financial situation:

institutional and organizational arrangement (organogram):

human resources (number and ability of staff):

**Actual** (PMR)

### 2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

## 3: Operation and Maintenance (O&M)

### 3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

**Original** (at the time of outline design)

**Actual** (PMR)

### 3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

**Original** (at the time of outline design)

Actual (PMR)

#### 4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

##### Assessment of Potential Risks (at the time of outline design)

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
<b>Actual Situation and Countermeasures</b>	
(PMR)	

**5: Evaluation and Monitoring Plan (after the work completion)**

**5-1 Overall evaluation**

Please describe your overall evaluation on the project.

--

**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

--

**5-3 Monitoring Plan of the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

--

Attachment

1. Project Location Map
  2. Specific obligations of the Recipient which will not be funded with the Grant
  3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
  5. Environmental Monitoring Form / Social Monitoring Form
  6. Monitoring sheet on price of specified materials (Quarterly)
  7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
  8. Pictures (by JPEG style by CD-R) (PMR (final) only)
  9. Equipment List (PMR (final) only)
  10. Drawing (PMR (final) only)
  11. Report on RD (After project)

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials		Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment Price (Decreased) E=C-D	Condition of payment Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials		1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
1	Item 1	●	●	●			
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

IM

Caric

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

IM

Cont

## Major Undertakings to be taken by the Government of Zambia

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

## (1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A			
2	To issue Authorization to Pay (A/P) to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)			
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)			
	2) Payment commission for A/P	every payment			
4	To secure and clear the lands for implementation of the Project.	before notice of the bidding documents			
5	To obtain the planning, zoning, building permit	before notice of the bidding documents			
6	To clear, level and reclaim the sites for implementation of the Project.	before notice of the bidding documents			
7	To secure supply of utilities necessary for the implementation of the Project including electricity and water supply to the facilities.	before notice of the bidding documents			
8	To coordinate with relevant local authorities and stakeholders for smooth implementation of the Project.				
9	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents			

## (2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
----	-------	----------	-----------	----------------	------

1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)			
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)			
	2) Payment commission for A/P	every payment			
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in the country of the Recipient	during the Project			
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project			
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted or be borne by its designated authority without using the Grant	during the Project			
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project			
7	To submit Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation and operational training	within 1 month after completion of each work			
	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)			
8	To submit a report concerning completion of the Project	within 6 months after completion of the Project			
9	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)				

(3) After the Project

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

## 2. Other obligations of the Government of Zambia funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To be discussed and confirms as adequate.		
2			
	Total		

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

*hr*

*IM*

*cmk*



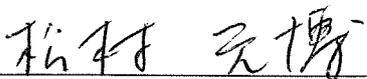


**Minutes of Discussions  
on the Preparatory Survey for  
the Project for Development of Rice Seed Production Field and Training Facilities  
in the Republic of Zambia  
(Explanation on Draft Preparatory Survey Report)**

With reference to the minutes of discussions signed between Ministry of Agriculture and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 22 October, 2021 and in response to the request from the Government of Zambia (hereinafter referred to as "Zambia") dated 30 June, 2022. JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Development of Rice Seed Production Field and Training Facilities in the Republic of Zambia (hereinafter referred to as "the Project").

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

Lusaka, 20 July, 2022



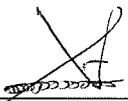
MATSUMURA Motohiro

Leader

Preparatory Survey Team

Japan International Cooperation Agency

Japan



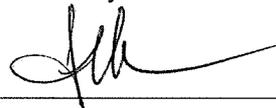
Green Mbozi

Permanent Secretary

Ministry of Agriculture

The Republic of Zambia

Witnessed by



Ivor Mukuka

Director

Zambia Agriculture Reserch Institute

Ministry of Agriculture

The Republic of Zambia

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to contribute to the increase of rice production in the country by strengthening the system for disseminating rice cultivation technology and the capacity for production of quality seeds through construction of facilities and procurement of equipment for dissemination of rice cultivation technology, and paddy fields and irrigation facilities for production of quality seeds at the Mount Makulu Research Station and the Mansa Research Station of the Zambia Agriculture Research Institute (ZARI).

### 2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Development of Rice Seed Production Field and Training Facilities in the Republic of Zambia”.

### 3. Project site

Both sides confirmed that the sites of the Project are in Mount Makulu Research Station in Chilanga district, Lusaka province and Mansa Research Station in Mansa district, Luapula province, which are shown in Annex 1.

### 4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

4-1. The ZARI will be the executing agency for the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and the undertakings for the Project shall be taken care by relevant authorities properly and on time. The organization charts are shown in Annex 2.

4-2. The line ministry of the Executing Agency is the Ministry of Agriculture. The Ministry of Agriculture shall be responsible for supervising the Executing Agency on behalf of the Government of Zambia.

### 5. Contents of the Draft Report

After the explanation of the contents of the Draft Report by the Team, the Zambia

side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Zambia side around October, 2022.

6. Cost estimate

Both sides confirmed that the cost estimate including the contingency explained by the Team is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

7. Confidentiality of the cost estimate and technical specifications

Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8. Procedures and Basic Principles of Japanese Grant

The Zambia side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as “the Grant”) as described in Annex 3 shall be applied to the Project. In addition, the Zambia side agreed to take necessary measures according to the procedures.

9. Timeline for the project implementation

The Team explained to the Zambia side that the expected timeline for the project implementation is as attached in Annex 4.

10. Expected outputs and indicators

Both sides agreed that key indicators for expected outputs are as follows. The Zambia side will be responsible for the achievement of agreed key indicators targeted in year 2027/28 and shall monitor the progress for Ex-post Evaluation based on those indicators.

[Quantitative indicators]

Indicator	Baseline value (actual value in 2020/21)	Target value (2027/28) [3 years after project completion]
Total number of persons who have completed the training in the two stations (persons/year)	78	1,800
Among whom, the total number of lead farmers who have completed the training (persons/year)	0	160
Basic seed production in Mansa Research Station (t/year)	0	3.4
Certified seed production in Mansa Research Station (t/year)	6	12

[Qualitative indicators]

- ✓ Training skills of counterparts will be improved through the activities with the Japanese technical cooperation project and enhancing of training content and efficiency of training through demonstrations utilizing facilities and equipment provided under the Grant Aid.
- ✓ The capacity of the stakeholders related to the rice sector will be enhanced, and so as to increase rice production in Zambia.
- ✓ The production and supply of high-quality rice seeds by the seed growers shall be increased. Furthermore, it will contribute to the quality of rice production and income generation of farmers.
- ✓ Irrigation facilities provided by the Project will be one of the models of irrigation and drainage development project in Zambia, furthermore, these facilities may be replicated and developed in other irrigation schemes implemented by the other partners.

11. Ex-post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Zambia side will be required to provide necessary support for the data collection.

12. Undertakings of the Project

*m*

*cm*

Both sides confirmed the undertakings of the Project as described in Annex 5. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in “(2) During the Project Implementation, No.5” of Annex 5, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by the Executing Agency during the implementation stage of the Project.

The Zambia side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 5 will be used as an attachment of G/A.

### 13. Monitoring during the implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 6. The timing of submission of the PMR is described in Annex 5.

### 14. Project completion

Both sides confirmed that the project will be complete when all the facilities constructed and equipment procured by the Grant and the Executing Agency are in operation. The completion of the Project will be reported to JICA as soon as all the facilities constructed and equipment procured by the Grant and the Executing Agency are put in place and ready for full operation.

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

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as described in Annex 7.

### 16. Environmental and Social Considerations

#### 16-1. General Issues

##### 16-1-1. Environmental Guidelines and Environmental Category

The Team explained that ‘JICA Guidelines for Environmental and Social Considerations (April 2010)’ (hereinafter referred to as “the Guidelines”) is applicable for the Project. The Project is categorized as B because the Project is not considered to be a large-scale agriculture project, is not located in a sensitive area, and has none of the sensitive characteristics under the JICA guidelines for

environmental and social considerations (April 2010), it is not likely to have a significant adverse impact on the environment.

#### 16-1-2. Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 8. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, the Zambia side shall submit the modified version to JICA in a timely manner.

#### 16-2. Environmental Issues

##### 16-2-1. Environmental Project Brief (EPB)

Both sides confirmed the EPB (Environmental Project Brief) report will be approved by Zambia Environmental Management Agency (ZEMA) in the end of August, 2022.

##### 16-2-2. Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project is as Annex 9, respectively. Both side agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the Detailed Design stage.

##### 16-2-3. Budget allocation for implementation for EMP and EMoP

The Executing Agency secures the necessary budget for implementation for EMP and EMoP within one month after the signing of the G/A.

#### 16-3. Social Issues

##### 16-3-1. Land Acquisition and Resettlement

Both sides confirmed that the project sites in Mount Makulu Research Station and Mansa Research Station are on national leasehold land and resettlement are not expected since there are no residential structures at the planned construction sites in both Chilanga and Mansa. Mount Makulu Research Station obtained a certification letter for the land that was issued by the Ministry of Land on 12th February 2019, while Mansa Research Station has renewed this certification and an offer letter was issued on 18th January 2022.

In addition both sides confirmed that neither temporary or permanent land acquisition

is expected because construction roads, borrow pit candidate sites, temporary yards for construction, and material storage can be secured within the Executing Agency premises.

#### 16-3-2. Other specific social issues which need to be confirmed/agreed between the parties

Both sides confirmed that in the case of the renovation of the existing dam body at the reservoir in Mansa Research Station being implemented, the increased water level may affect crop land and existing fish ponds. The expected project affected persons (hereinafter referred to as “the PAPs”) are four households who cultivate land and one cooperative that owns fish ponds around the reservoir. The cooperative has 50 members composed of 30 males and 20 females, and four members of them are the heads of the affected households. Although the PAPs are utilize land of Mansa Research Station without formal rights, both sides confirmed that Mansa Research Station shall provide replacement farmland to PAPs and fishpond to the cooperative and support livelihood restoration for the PAPs and the cooperative. In addition, both sides confirmed to involve vulnerable members to the resettlement committee in order to avoid them being left behind in terms of decision-making and information access.

#### 16-4. Environmental and Social Monitoring

##### 16-4-1. Environmental Monitoring

Both sides agreed that the Zambia side will submit results of environmental monitoring to JICA with PMR by using the monitoring form attached as Annex 10. The timing of submission of the monitoring form is described in Annex 5.

##### 16-4-2. Social Monitoring

Both sides confirmed that the Zambia side will implement social monitoring about land acquisition and resettlement plan proposed in the RAP. The Zambia side and the Team agreed that the Executing Agency will submit results of social monitoring to JICA with PMR by using the monitoring form attached as Annex 10.

##### 16-4-3. Information Disclosure of Monitoring Results

Both sides confirmed that the Zambia side will disclose results of environmental and social monitoring to local stakeholders through their website / in their field offices. The Zambia side agreed JICA will disclose results of environmental and social monitoring submitted by the Zambia side as the monitoring forms attached as Annex

10 on its website.

## 17. Other Relevant Issues

### 17-1. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

### 17-2. Gender Mainstreaming and considerations to Persons Who are Differently-abled

Both sides confirmed that gender mainstreaming should be duly practiced for the project implementation as the project is categorized as GEP (Gender Equality Project or Project Targeting Women), or GIP (Gender Integrated Project). In particular, Both sides agreed on the following gender elements to be integrated into the Project.

- (a) Establishment of gender-sensitive sanitation facilities for both male and female construction workers on construction sites.
- (b) The facility design that reflects gender-specific needs for male, female, and Persons Who are Differently-abled users.
- (c) Implementation of training related to raising awareness of gender equality, harassment, and violence prevention for construction workers.
- (d) The training plan should take into consideration gender equality, such as the ratio of male and female participants.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 Japanese Grant

Annex 4 Project Implementation Schedule

Annex 5 Major Undertakings to be taken by the Government of Zambia

Annex 6 Project Monitoring Report

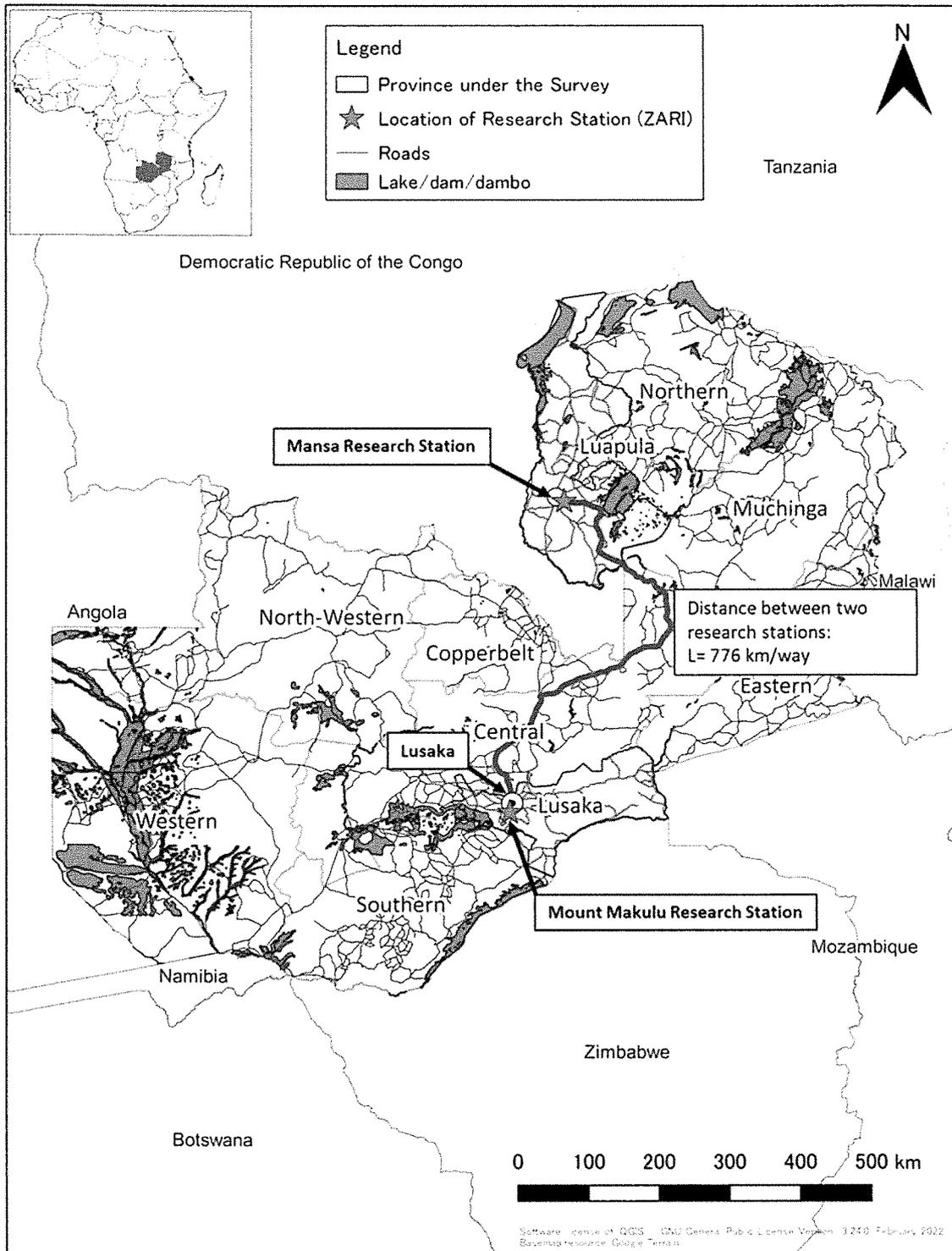
Annex 7 Issues to be Considered for Smooth Implementation of the Project

Annex 8 Environmental Check List

Annex 9 Environmental Management Plan/Environmental Monitoring Plan

Annex 10 Environmental and Social Monitoring Form

### Project Site

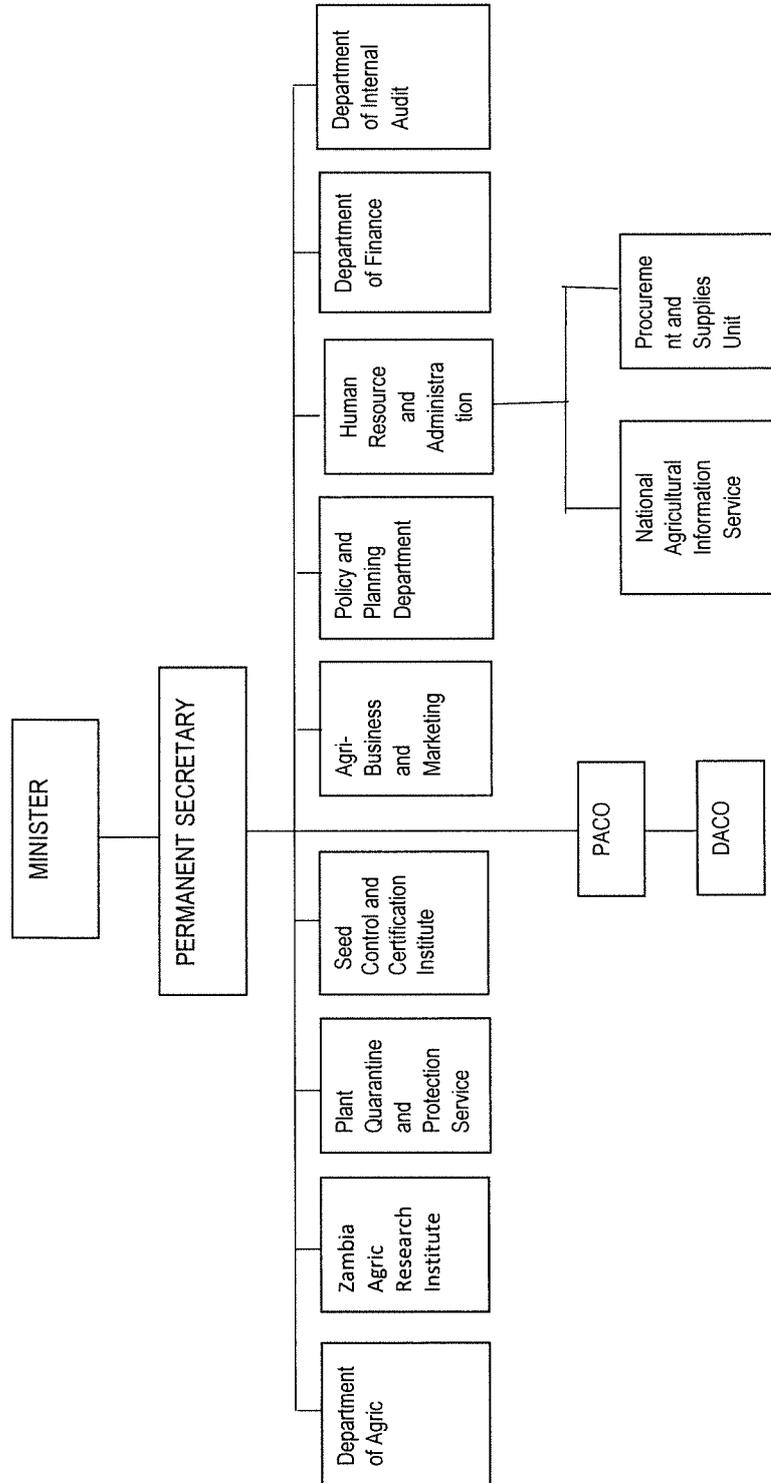


GIS data: data set available for the public domains of; geoBoundaries (<https://www.geoboundaries.org/index.html>), DIVA-GIS (<https://www.dva-gis.org/>), OpenAFRICA (<https://open.africa/>) were used.

*m*

*GM*

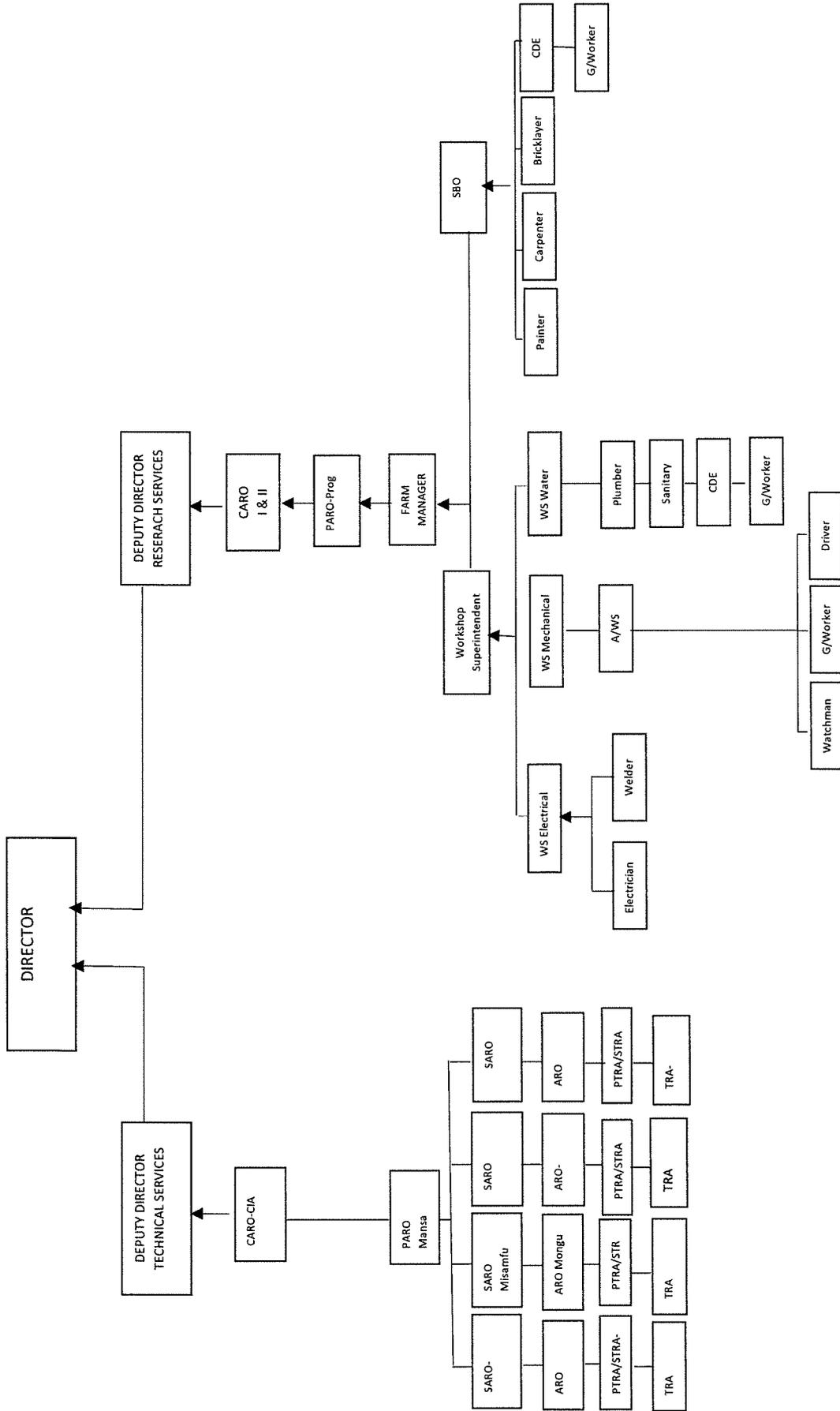
Organization Chart  
MINISTRY OF AGRICULTURE STRUCTURE



m

cm

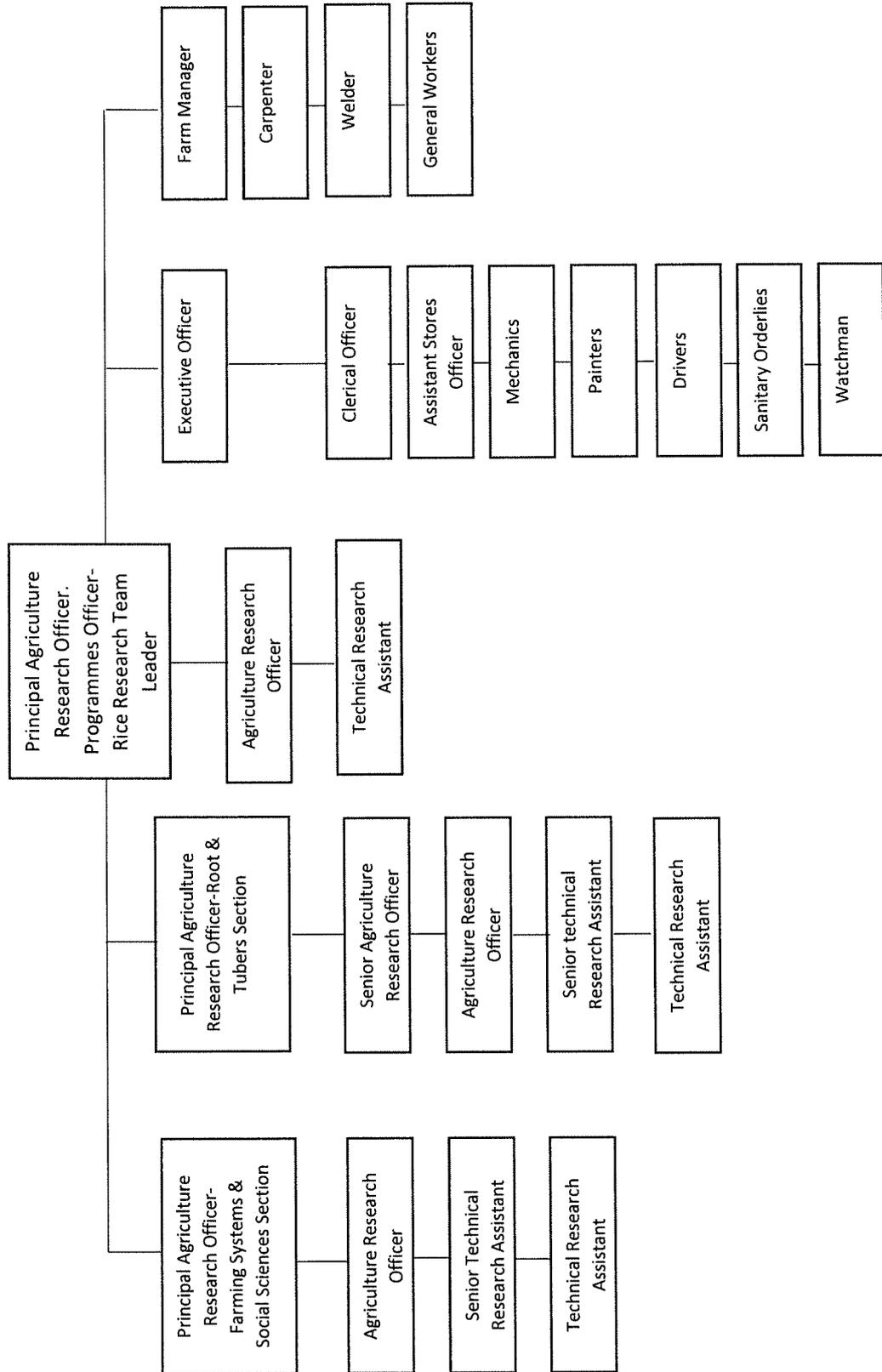
# MOUNT MAKULU RESEARCH STATION STRUCTURE



m

CM

MANSA RESEARCH STATION STRUCTURE



m

m

cm

## JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

### 1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

(2) Appraisal

- Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

- The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as “the G/A”)

- Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as “the B/A”)

- Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

- Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

- Monitoring and evaluation at post-implementation stage

### 2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.

*m*

*GM*

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

## (2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

## (3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

# 3. Basic Principles of Project Grants

## (1) Implementation Stage

### 1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as “the E/N”) will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the “General Terms and Conditions for Japanese Grant (January 2016).”

### 2) Banking Arrangements (B/A) (See “Financial Flow of Japanese Grant (A/P Type)” for details)

*m*

*IM*

*gm*

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

### 3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

### 4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

### 5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

### 6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

### 7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

### 8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

### 9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as



followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

## (2) Ex-post Monitoring and Evaluation Stage

- 1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.
- 2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

## (3) Others

### 1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

### 2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

### 3) Measures to ensure more efficient implementation of the Grant

- i) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.
- ii) In the event that the period, specified in the G/A, during which the grant is available expires before the completion

of the disbursement, the authorities concerned of the GOJ will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

iii) Regardless of the period mentioned in ii) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are concrete prospects for its completion.

#### 4) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

#### 5) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

m

m

GM

## PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2) Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

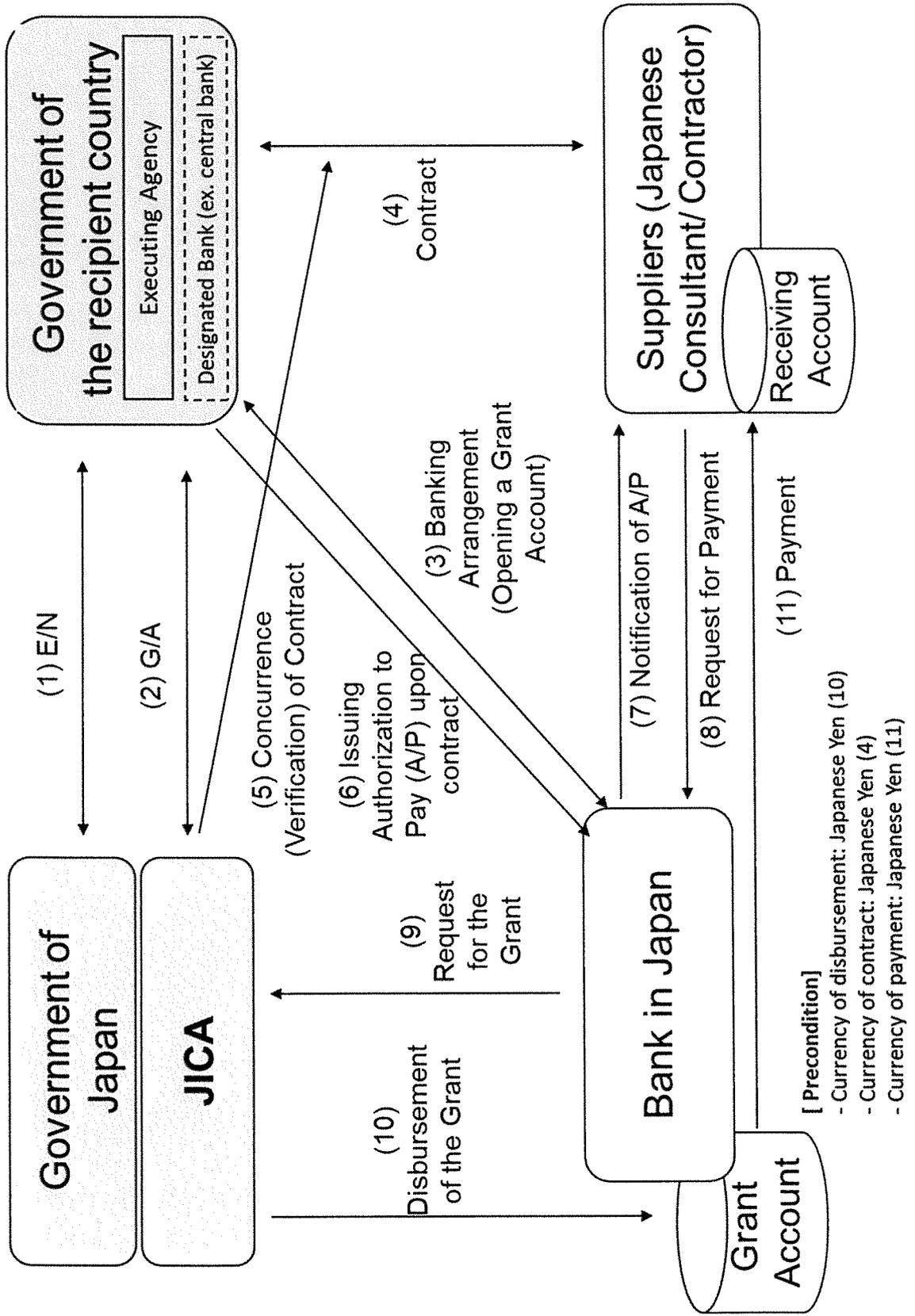
notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

m

GM

# Financial Flow of Japanese Grant (A/P Type)



*m*

*GM*



## Major Undertakings to be taken by the Government of Zambia

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

## (1) Before the bidding

NO	Items	Deadline	In charge	Estimated cost (1,000ZMW)	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MoFNP <sup>1</sup>	*1	-
2	To issue Authorization to Pay (A/P) to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MoFNP	*1	-
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MoFNP	*1	-
	2) Payment commission for A/P	every payment	MoFNP	*1	-
4	To approve EPB <sup>2</sup> for the construction works at Mount Makulu Research Station, and EPB including ARAP for the construction works at Mansa Research Station separately.  To secure the necessary budget for implementation for EMP and EMoP	August 2022  within 1 month after the signing of the G/A	ZARI <sup>3</sup>	26	DFR
5	To secure the necessary budget and implement resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with RAP	before notice of the bidding documents	ZARI	12	DFR
6	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	until land acquisition and resettlement complete	ZARI	-	-
7	To secure and clear the lands for implementation of the Project 1) Project sites for building facilities at Mount Makulu Research Station 2) Project sites for building facilities at Mansa Research Station 3) Borrow pit and disposal site near the Project area	before notice of the bidding documents	ZARI	-	-
8	To obtain the planning and building permit 1) Building facilities site at Mount Makulu Research Station 2) Building facilities site at Mansa Research Station 3) Commission of water rights	before notice of the bidding documents	ZARI	15 15 7	DFR
9	To clear the sites by cutting trees and bush, removing stumps and roots for implementation of the Project. 1) To clear the site for building facilities at Mount Makulu Research Station 2) To clear the site for building facilities site at Mansa Research Station 3) To clear the borrow pit	before notice of the bidding documents	ZARI	364 159 817	DFR
10	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	ZARI	-	-

\*1: Necessary expenses shall be covered by MoFNP

<sup>1</sup> Ministry of Finance and National Planning (MoFNP)

<sup>2</sup> Environmental Project Brief

<sup>3</sup> The Zambia Agriculture Research Institute

GM

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated cost (1,000ZMW)	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MoFNP	*1	-
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MoFNP	*1	-
	2) Payment commission for A/P	every payment	MoFNP	*1	-
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in the country of the Recipient	during the Project	ZARI/ MoFNP	-	-
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	MoA <sup>4</sup>	-	-
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted	during the Project	MoA/ MoFNP	-	-
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	MoA	-	-
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	ZARI	-	-
8	To allocate the necessary staff for "rice training unit" consists of four researchers and four technicians at Mount Makulu and Mansa research stations, and one engineer at Mansa Research Station.	before commencement of the construction	ZARI	-	-
9	To submit Project Monitoring Report	every month	ZARI	-	-
	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	ZARI	-	-
10	To submit a report concerning completion of the Project	within 6 months after completion of the Project	MoA	-	-
11	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)			n.a	
	Mount Makulu Research Station				
	1) Installation of transformer with 100 kVA	one month before completion of implementation	ZARI	267	DFR
	2) Water supply work (elevated water tank to sites)		ZARI	22	DFR
	3) Electricity work (connection of existing transformer to control panel)		ZARI	67	DFR
	4) Electricity works (connection of existing conference hall to standby power)		ZARI	35	DFR
	Mansa Research Station				

<sup>4</sup> The Ministry of Agriculture

	5) Installation of transformer with 100 kVA	one month before completion of implementation	ZARI	267	DFR
	6) Water supply work (elevated water tank to sites)		ZARI	22	DFR
	7) Electric work (connection of existing transformer to control panel)		ZARI	67	DFR
12	To ensure the safety of persons engaged in the implementation of the Project	during the Project	ZARI	-	-
13	To take necessary measures for security and safety of the Project site	during the construction	ZARI	-	-
14	To implement EMP and EMoP	during the construction	ZARI	-	-
15	To submit results of environmental and social monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	ZARI	-	-
16	To implement RAP (livelihood restoration program)	for a period based on livelihood restoration program	ZARI	-	-
17	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between ZARI and JICA.	- until the end of livelihood restoration program - for 2 years after resettlement complete	ZARI	-	-
18	Installation of security fencing and gate Mount Makulu Research Station Mansa Research Station	Within 3 months after handover facilities and equipment by the Grant	ZARI	1,758 968	DFR
19	Provision of general furniture (curtains, refrigerators, racks, etc.) Mount Makulu Research Station Mansa Research Station	Within 3 months after handover facilities and equipment by the Grant	ZARI	30 60	DFR

\*1: Necessary expenses shall be covered by MoFNP

GM

Am

(3) After the Project

NO	Items	Deadline	In charge	Estimated cost (1,000ZMW)	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	ZARI	-	-
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between ZARI and JICA.	for 3 years after the Project	ZARI	Included in item No (1) 4	-
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection  Mount Makulu Research Station Mansa Research Station	After completion of the construction	ZARI	USD3,000 USD8,000	DFR p.5-2

*Am*

*1/m*

*C/m*

**2. Other obligations of the Government of Zambia funded with the Grant**

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To construct facilities and to procure equipment (1) Equipment Equipment for training and seed production Equipment for research (2) Facilities: Building facilities Civil engineering facilities	August 2024	/
2	To implement detailed design, bidding support and construction supervision (Consulting Service)		
3	Contingencies		
	Total		[REDACTED]

\* The Amount is provisional. This is subject to the approval of the Government of Japan. The project cost should never be disclosed to any third parties until all the contracts under the Project are concluded.

*m*

*1m*

*am*

Date:

Ref. No.

JAPAN INTERNATIONAL COOPERATION AGENCY  
JICA Zambia OFFICE

*[Address specified in the Article 5 of the Grant Agreement]*

Attention: Chief Representative

Ladies and Gentlemen:

NOTICE CONCERNING PROGRESS OF PROJECT

Reference : Grant Agreement, dated (signed date of the G/A), for the Project for Development of Rice Seed Production Field and Training Facilities in the Republic of Zambia

In accordance to the Article 6 (3) of the Grant Agreement, we would like to report on the progress of the Project up to the following stages:

[Common]

- Preparation of bidding documents - result of detailed design  
 Completion of final works under construction/procurement contract

[Construction]

- Monthly progress [Month/Year]

[Procurement of Equipment]

- Shipping/delivery, hand-over (take over) of equipment  
 Installation works  
 Operational training

- Other \_\_\_\_\_

Please see the details as per attached Project Monitoring Report (PMR).

Very truly yours,

**[Signature]** \_\_\_\_\_

[Name of the signer]

[Title of the signer]

[Name of the executing agency]

*m*

*GM*

cc:

Director General

Financial Cooperation Implementation Department

Japan International Cooperation Agency

*[Address specified in the Article 5 of the Grant Agreement]*

m

GM

**Project Monitoring Report**  
**on**  
**Project Name**  
**Grant Agreement No. XXXXXXX**  
20XX, Month

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	_____ Person in Charge (Designation) _____  Contacts _____ Address: _____ Phone/FAX: _____ Email: _____
<b>Executing Agency</b>	_____ Person in Charge (Designation) _____  Contacts _____ Address: _____ Phone/FAX: _____ Email: _____
<b>Line Ministry</b>	_____ Person in Charge (Designation) _____  Contacts _____ Address: _____ Phone/FAX: _____ Email: _____

**General Information:**

<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

*m*

1 / M

*gm*

**1: Project Description**

**1-1 Project Objective**

--

**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

--

**1-3 Indicators for measurement of "Effectiveness"**

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr )	Target (Yr )
Qualitative indicators to measure the attainment of project objectives		

**2: Details of the Project**

**2-1 Location**

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)
-------

*m*

*IM*

*Gm*

**2-3 Implementation Schedule**

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

Reasons for any changes of the schedule, and their effects on the project (if any)

**2-4 Obligations by the Recipient**

**2-4-1 Progress of Specific Obligations**

See Attachment 2.

**2-4-2 Activities**

See Attachment 3.

**2-4-3 Report on RD**

See Attachment 11.

**2-5 Project Cost**

**2-5-1 Cost borne by the Grant(Confidential until the Bidding)**

Components			Cost (Million Yen)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>(1),(2)</sup> <i>(proposed in the outline design)</i>	Actual
1.				
Total				

Note: 1) Date of estimation:

2) Exchange rate: 1 US Dollar = Yen

**2-5-2 Cost borne by the Recipient**

Components			Cost (1,000 Taka)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>(1),(2)</sup> <i>(proposed in the outline design)</i>	Actual
1.				
Total				

- Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

**2-6 Executing Agency**

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

<b>Original</b> (at the time of outline design) name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
<b>Actual</b> (PMR)

**2-7 Environmental and Social Impacts**

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
  - The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
  - Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

**3: Operation and Maintenance (O&M)**

**3-1 Physical Arrangement**

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

<b>Original</b> (at the time of outline design)
<b>Actual</b> (PMR)

**3-2 Budgetary Arrangement**

- Required O&M cost and actual budget allocation for O&M

**Original** (at the time of outline design)

cm

mm

Actual (PMR)

**4: Potential Risks and Mitigation Measures**

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

**Assessment of Potential Risks (at the time of outline design)**

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

m

	Contingency Plan (if applicable):
<b>Actual Situation and Countermeasures</b>	
(PMR)	

**5: Evaluation and Monitoring Plan (after the work completion)**

**5-1 Overall evaluation**

Please describe your overall evaluation on the project.

**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

**5-3 Monitoring Plan of the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

em

m

Attachment

1. Project Location Map
  2. Specific obligations of the Recipient which will not be funded with the Grant
  3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
  5. Environmental Monitoring Form / Social Monitoring Form
  6. Monitoring sheet on price of specified materials (Quarterly)
  7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
  8. Pictures (by JPEG style by CD-R) (PMR (final) only)
  9. Equipment List (PMR (final) only)
  10. Drawing (PMR (final) only)
  11. Report on RD (After project)



Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
					Price (Decreased) E=C-D	Price (Increased) F=C+D
Item 1	●●t	●	●	●	●	●
Item 2	●●t	●	●	●		
Item 3						
Item 4						
Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
Item 1	●	●	●			
Item 2						
Item 3						
Item 4						
Item 5						

(3) Summary of Discussion with Contractor (if necessary)

.  
. .

Cm

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Am

## Issues to be considered for Smooth Implementation of the Project

Project implementation schedule described in Annex 4 and Major undertakings in Annex 5 indicate the undertakings by the Zambia side. These items, including the following, but not limited, needs to be implemented in a timely manner. Delays in implementation schedule and inadequate operation and maintenance system may cause unfavorable consequences to the project, including adjustment of the project scope.

1. Securing budget for the operation and maintenance
  - 1) The Ministry of Agriculture (MOA) will allocate the necessary budget to both Mount Makulu Research Station and Mansa Research Station of the Zambia Agriculture Research Institute (ZARI) (hereinafter referred to as “the Executing Agency”) for the expenses required for the operation and maintenance of facilities and equipment provided under the Grant Aid. To secure above budget for operation and maintenance of facilities and equipment, MOA will submit to MoFNP the budget plan for operation and maintenance starting operation in 2024 by August 2023.
2. Training implementation structure at Mount Makulu Research Station and Mansa Research Station
  - 1) In order to startup training and utilization of research/training facilities and equipment, the Executing Agency will set up "rice training unit" consisting of researchers (4 people) and technicians (4 people) in each research station by commencement of the construction works (September 2023). The Executing Agency is responsible for securing human resource four months before commencement of the construction works (May 2023) to ensure sustainability and quality of the planned training. Additional budget for human resource is not necessary because the staff are already on government pay roll.
  - 2) The Executing Agency confirmed that the personnel of the Crop Improvement and Agronomy (CIA) division and the Farming System and Social Science (FSSS) division, which are the counterparts of JICA's technical cooperation called MOREDeP project, will participate in the rice training unit.

EM

m

1M

- 3) The rice training unit, which will be set up within the national rice research team<sup>1</sup> by the Executing Agency, play a central role in preparation for the authorization of the specific training implementation policy and plan, implementation structure and budget for conducting trainings after the completion of the Project immediately. MoA will submit to MoFNP the budget plan for trainings which begin in 2024 by August 2023. For this timeline, the rice training unit will prepare the training budget by July 2023.
- 4) To conduct training at Mount Makulu Research Station, the Executing Agency will allocate one of the rooms in conference hall funded by the World Bank to the rice training unit.

JICA recommended that one of the rooms in conference hall funded by the World Bank should be allocated as an administration room of the rice training unit for smooth implementation of the training to achieve the project goals.

Zambia side proposed an alternative option that the Executing Agency will allocate a room inside the same building where offices of MOREDeP are located.

Both sides agreed to continue to discuss until an amicable solution is found.

### 3. Assignment of focal person(s) during the Project.

The Executing Agency will assign focal person(s) for coordination and management of the Project before the signing of the consultancy agreement.

The focal person(s) will be responsible for the following duties.

- 1) Logistics support for experts, such as administrative procedures for entry.
- 2) Coordination with the other relevant authorities, such as MoFNP, ZEMA, and other local authorities.
- 3) Participation of periodical meetings such as monthly meetings and Construction Quality Control (CQC) meetings.
- 4) Monitoring and reporting of EMR and PMR to JICA Zambia office.

---

<sup>1</sup> The national rice research team is consists of Principal Agricultural Research Officer (PARO) / program officer, senior agricultural research officers, agricultural research officers, and technicians in Western, Northern, Luapula, and Lusaka provinces. Main role of the national rice research team is breeding and agronomy of rice.

CM

m

4. Collecting revenue from basic seeds to be produced

- 1) Basic seeds produced at Mansa Research Station will be sold to private companies under the responsibility of the Executing Agency.
- 2) Revenue collected from basic seed sales which will be partially allocated by the MoFNP and annual budget of Executing Agency will contribute to the operation and maintenance of facilities and equipment provided under the Grant Aid.

5. Change of the title of the Project.

The title of the Project is changed for clarifying the target of the Project as below.

From

“The Project for Development of Seed Production Field and Training Facilities in the Republic of Zambia”

To

“The Project for Development of Rice Seed Production Field and Training Facilities in the Republic of Zambia”

*m*

## Environmental Checklist : (No.16 Agriculture, Irrigation, and Livestock)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	<p>(a) Have EIA reports been already prepared in official process?</p> <p>(b) Have EIA reports been approved by authorities of the host country's government?</p> <p>(c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?</p> <p>(d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?</p>	<p>(a) N</p> <p>(b) N</p> <p>(c) N</p> <p>(d) N</p>	<p>(a) EPB Report has been submitted to ZEMA which is the authoritative agency of approving EIA in this project in Zambia.</p> <p>(b) EPB Report will be reviewed by ZEMA and expected to be approved after the review.</p> <p>(c) Condition will be informed by ZEMA after review.</p> <p>(d) No particular other environmental permits are required.</p>
	(2) Explanation to local stakeholders	<p>(a) Have contents of the project and the potential impacts been adequately explained to the local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the local stakeholders?</p> <p>(b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?</p>	<p>(a) Y</p> <p>(b) Y</p>	<p>(a) Project information disclosure and consensus building were done through stakeholder meeting with local stakeholders. Understanding from the local stakeholders has been obtained.</p> <p>(b) The comment from the local residents obtained during above meetings has been reflected to the project design.</p>
	(3) Examination of alternatives	<p>(a) Have alternative plans of the project been examined with social and environmental considerations?</p>	<p>(a) Y</p>	<p>(a) Plural alternative plans (including the zero option) have been examined comprehensively with social and environmental considerations.</p>

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
2 Pollution Control	(1) Water Quality	<p>(a) Are considerations given to water pollution of the surrounding water bodies, such as rivers and groundwater by effluents or leachates from agricultural lands? Are adequate use/disposal standards for fertilizers, agrochemicals, and livestock wastes established? Is a framework established to increase awareness of the standards among farmers?</p> <p>(b) Is a monitoring framework established for water pollution of rivers and groundwater?</p>	<p>(a) Y</p> <p>(b) Y</p>	<p>(a) Existing water quality of the river and the groundwater is analyzed base on the baseline survey, and prevent measures towards the water pollution was established in the mitigation measures and the monitoring plan.</p> <p>(b) Monitoring items, frequency, implementation entity, and responsible organization will be indicated in the monitoring plan.</p>
	(2) Wastes	<p>(a) Are wastes properly treated and disposed of in accordance with the country's regulations?</p>	<p>(a) Y</p>	<p>(a) First of all, project will reuse excavated soil as refilling material as much as possible. Assumed wastes (other excavated soil, demolished bricks and concrete and garbage from construction site) will be processed according to the regulation of Zambia and the related local government.</p>
	(3) Soil Contamination	<p>(a) Is there a possibility that impacts in irrigated lands, such as salinization of soils will result?</p> <p>(b) Are adequate measures taken to prevent soil contamination of irrigated lands by agrochemicals, heavy metals, and other hazardous substances?</p> <p>(c) Are any agrochemicals management plans prepared? Are any usages or any implementation structures organized for proper use of the plans?</p>	<p>(a) N</p> <p>(b) Y</p> <p>(c) Y</p>	<p>(a) The source of salinization of soils has not been confirmed and it is not expected by the project implementation.</p> <p>(b) Soil contamination by the hazardous waste and heavy metals are not expected because the project doesn't have a plan to use them.</p> <p>(c) Soil contamination by the spilt oil from construction machines and vehicles during construction period is anticipated, but to be prevented by mitigation measures and monitoring.</p>

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(4) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a) N	(a) Subsidence is not expected because extraction of a large volume of ground water will not be done during the construction and operation period by the project.
	(5) Odor	(a) Are there any odor sources? Is there a possibility that odor problems will occur to the inhabitants?	(a) N	(a) Activities generate odor is not expected.
3 Natural Environment	(1) Protected Areas	(a) Is the project site or discharge area located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) Project site in Mansa is located 15 to 25km away from forest reserve. Discharge into these area by the project is not expected. Lusaka National Park is located 10km away from the project site in Chilanga, Lusaka. Chilanga town, Lusaka-Livingstone Road, and large scale farm have been already developed between the project site and the National Park.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site or discharge area encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) Is there a possibility that the project will result in the loss of breeding and feeding grounds for valuable wildlife? If they are lost, are there substitutes for the grounds near the original locations?	(a) N (b) N (c) N (d) N (e) Y	(a) Not encompass such sites (b) According to the EPB survey, no species listed in the IUCN Red List are confirmed (c) Since the project is rehabilitation of existing facilities, significant loss of breeding and feeding grounds is not expected. (d) Overgrazing is not planned. (e) Since the project mainly work for construction of training facility and rehabilitation of existing irrigation facilities, such overgrazing or significant impact is not expected.

M

CM

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>(d) Is there a possibility that overgrazing will cause ecological degradation, such as impacts on wildlife habitats and desertification?</p> <p>(e) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?</p>		
4 Social Environment	(1) Resettlement	<p>(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</p> <p>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p> <p>(d) Is the compensation going to be paid prior to the resettlement?</p> <p>(e) Is the compensation policies prepared in document?</p> <p>(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p> <p>(d) Y</p> <p>(e) Y</p> <p>(f) Y</p> <p>(g) Y</p> <p>(h) Y</p> <p>(i) Y</p> <p>(j) Y</p>	<p>(a) Small number of resettlement of agricultural farm and land acquisition are expected.</p> <p>(b) Community consultation meetings was held to explain about compensation and measures of livelihood restoration and to get agreement from the community people before project.</p> <p>(c) ARAP has been developed based on socio-economic studies as well as stakeholder meetings.</p> <p>(d) Compensation will be paid prior to the resettlement according to the both Zambia's laws and JICA guidelines.</p> <p>(e) Entitlement Matrix is included in ARAP report.</p> <p>(f) Vulnerable persons and/or his/her family will be assisted during the compensation process, and be given priority of job opportunity during the construction period if identified through socio-economic survey.</p> <p>(g) Agreements with the affected people will be obtained and compensation will be paid prior to resettlement.</p> <p>(h) RAP organization framework will be suggested according to related Zambia's laws and JICA guidelines</p>

m

CM

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>(g) Are agreements with the affected people obtained prior to resettlement?</p> <p>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>(i) Are any plans developed to monitor the impacts of resettlement?</p> <p>(j) Is the grievance redress mechanism established?</p>		<p>/WB OP 4.12 in the RAP. And also budget for preparation, implementation, and monitoring of ARAP is estimated and the schedule of compensation and resettlement is discussed and presented in the report.</p> <p>(i) Monitoring plan is included in ARAP report.</p> <p>(j) According to the Zambia's law, the grievance redress mechanism is proposed and will be established. Necessary cost for grievance redress mechanism is also calculated and presented in the ARAP.</p>
	(2) Living and Livelihood	<p>(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>(b) Is proper allotment made for rights to agricultural land use? Is there a possibility that the allotment will result in inequitable distribution or usurpation of land and available resources?</p> <p>(c) Are proper allotments, such as water rights allotment in the project area made? Is there a possibility that the allotments will result in inequitable distribution or usurpation of water rights and available resources?</p>	<p>(a) N</p> <p>(b) N</p> <p>(c) N</p> <p>(d) N</p> <p>(e) N</p>	<p>(a) The project will rehabilitate irrigation facility and improve efficiency of seed production. Some adverse impacts anticipated will be mitigated with compensation and livelihood restoration measures.</p> <p>(b) Not related because this project targets just rehabilitation of existing irrigation facilities of the research station.</p> <p>(c) Same as above</p> <p>(d) Impact on current water user in the downstream can be mitigated because the rehabilitation work will not require to stop water flow completely. The community in the downstream will be informed the rehabilitation schedule in advance.</p>

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>(d) Is there a possibility that the amount of water used (surface water, groundwater) by the project will adversely affect the downstream fisheries and water uses?</p> <p>(e) Is there a possibility that water-borne or water-related diseases (e.g., schistosomiasis, malaria, filariasis) will be introduced? Is adequate consideration given to public health education, if necessary?</p>		<p>(e) Since the project will rehabilitate the existing irrigation facilities, it is not anticipated to increase water-related diseases. ZARI will work together with other agencies like Ministry of Health to sensitize community and provide necessary services like mosquito net etc., as necessary.</p>
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) No such facilities are identified in the project area.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) Impact on landscape is not anticipated; rather it will be improved through the rehabilitation of existing facilities.
	(5) Ethnic Minorities and Indigenous Peoples	<p>(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?</p> <p>(b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?</p>	<p>(a) N</p> <p>(b) N</p>	<p>(a) Not confirmed in the Project area.</p> <p>(b) Same as above.</p>

CFM

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?</p> <p>(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?</p> <p>(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?</p> <p>(d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p> <p>(d) Y</p>	<p>(a) Securing of working condition is implemented according to the related Zambia's laws and international rules.</p> <p>(b) Measures to prevent industrial accidents are secured by mitigation measures such as obligation of wearing safety boots and a helmet during the construction work and the monitoring, which includes countermeasures for the accidents.</p> <p>(c) Safety education through measures such as a morning gathering, a toolbox meeting, a motto, or signboard will be given to construction workers. Construction contractor will prepare a safety and sanitation plan.</p> <p>(d) Setting of the reputation to promote an invasion prevention fence and danger around the construction area is set up. Construction plan and schedule will be informed to the community through signboard or direct announcement in advance. It is assumed that a guard worker for the purpose of prevention of ensuring safety and theft is to be placed.</p>
5 Others	(1) Impacts during Construction	<p>(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?</p> <p>(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p>	<p>(a) Noise, dust, water pollution are assumed. Mitigation measures and monitoring plan are established through EPB Study.</p> <p>(b) Vegetation loss is assumed. Mitigation measures and monitoring plan are established through EPB study..</p> <p>(c) Land acquisition, resettlement, are assumed. Mitigation measures and monitoring plan are</p>

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)  established through EPB and ARAP.
		<p>(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p>		
	(2) Monitoring	<p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?                      (b) What are the items, methods, and frequencies of the monitoring program?                      (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?                      (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?</p>	<p>(a) Y                      (b) -                      (c) Y                      (d) Y</p>	<p>(a) Monitoring plan has been made in the EPB process.                      (b) The monitoring items were decided considering the present condition survey results and impact evaluation. Monitoring methods were decided considering implementation practicability of Zambian government and securing accuracy. Frequency was decided considering types of work, local situation, and health damage.                      (c) Monitoring framework shall be suggested in the monitoring plan of both EPB and ARAP. This framework has to be adapted reflecting the present condition of Zambia as possible. ZARI will designate one staff who will specifically work for the liaison with other organizations and a core actor of supervising the monitoring.                      (d) Monitoring report on ARAP shall be submitted by ZARI in pre/post construction stage while Environmental Monitoring Report shall be prepared by Contractor and ZARI during the construction period.</p>

m

M

GM

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
6 Note	Reference to Checklist of Other Sectors	<p>(a) Where necessary, pertinent items described in the Forestry checklist should also be checked.</p> <p>(b) For the projects including construction of large-scale weirs, reservoirs, and dams, where necessary, pertinent items described in the Hydropower, Dams, and Reservoirs checklist should also be checked.</p>	<p>(a) N</p> <p>(b) N</p>	<p>(a) Forest checklist is out of the project object.</p> <p>(b) Construction of large-scale weirs, reservoirs, and dams are not targeted in the project.</p>
	Note on Using Environmental Checklist	<p>(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).</p>	<p>(a) Y</p>	<p>(a) It is anticipated that the rehabilitation of existing irrigation facilities will enhance the resilience against flood and heavy rain to be happened due to climate change in future.</p>

**Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP)****1. Environmental Management Plan**

Table 1 below shows the Environmental Management Plan for the project.

**Table 1 Environmental Management Plan**

Impact item	Mitigation measures	Implementation	Responsibility	Budget	
Pre-construction/ Construction phase					
0	General	• Management of complaint and grievances	Contractor	ZARI	RAP budget
1	Air pollution	• Regularly spray water at the construction site • Distribute appropriate PPE to workers • Limit speed of construction vehicles • Regular maintenance of construction machinery	Contractor	ZARI	Include BOQ
2	Water pollution	• Discharge muddy water through cofferdam/sedimentation pond • Use of drip tray when oil leakage may occur during work	Contractor	ZARI	Include BOQ
3	Solid waste	• Reuse excavated soil as much as possible • Solid waste generated from destroying existing structures to be disposed of at designated disposal sites • Educate workers on solid waste management	Contractor	ZARI	Include BOQ
4	Soil contamination	• Use of drip tray when oil leakage may occur during work • Regular maintenance of construction machinery	Contractor	ZARI	Include BOQ
5	Noise and vibration	• Regular maintenance of construction vehicles and machinery to avoid abnormal noise and vibration • Provision of PPE for workers • Announcement of construction schedule	Contractor	ZARI	Include BOQ
10	Ecosystem	• Do not cut down trees or do levelling more than necessary	ZARI	ZARI	ZARI budget
13	Land acquisition, Involuntary resettlement	• Implementation of compensation/assistance in accordance with ARAP	ZARI Mansa	ZARI	RAP budget
17	Land use and utilization of local resources	• Do not excavate more than necessary and rebury as much as possible	Contractor	ZARI	Include BOQ
25	Gender	• Provide job opportunities for local women as much as possible • Sensitize construction workers on gender based violence	Contractor	ZARI	Include BOQ
26	Children's right	• Do not employ children and youths under the age of 16	Contractor	ZARI	Include BOQ
27	Hazardous	• Appropriate prevention measures such as wearing masks, use of alcohol sanitizer, checking of body temperatures	Contractor	ZARI	Include

Impact item		Mitigation measures	Implementation	Responsibility	Budget
	infectious diseases such as HIV/AIDS	<ul style="list-style-type: none"> <li>Sensitize workers on prevention of HIV/AIDS and malaria</li> </ul>			BOQ
28	Working conditions, occupation safety	<ul style="list-style-type: none"> <li>Distribute appropriate PPE to workers</li> <li>Educate/train workers on occupational safety and health (prevention of infectious diseases, use of fire extinguishers, first aid)</li> <li>Place fire extinguishers and first aid equipment</li> </ul>	Contractor	ZARI	Include BOQ
29	Accident	<ul style="list-style-type: none"> <li>Regular maintenance of construction vehicles and machinery</li> <li>Set up fencing or signboards, and station security guards to keep locals out of construction sites</li> <li>Limit speed of construction vehicles</li> </ul>	Contractor	ZARI	Include BOQ
30	Border-crossing impact, Climate change	<ul style="list-style-type: none"> <li>Prevention of unnecessary idling</li> </ul>	Contractor	ZARI	Include BOQ
Operation phase					
2	Water pollution	<ul style="list-style-type: none"> <li>Do not use fertilizer more than necessary</li> <li>Do not use prohibited agro-chemicals</li> </ul>	ZARI Mansa	ZARI	ZARI budget
3	Solid waste	<ul style="list-style-type: none"> <li>Reuse plant waste such as paddy waste generated from rice milling as compost</li> </ul>	ZARI	ZARI	ZARI budget
4	Soil contamination	<ul style="list-style-type: none"> <li>Regular maintenance of agricultural machinery</li> </ul>	ZARI Mansa	ZARI	ZARI budget
5	Noise and vibration	<ul style="list-style-type: none"> <li>Announcement of schedule of facility use</li> </ul>	ZARI	ZARI	ZARI budget
29	Accident	<ul style="list-style-type: none"> <li>Follow the instructions for agricultural machinery</li> </ul>	ZARI	ZARI	ZARI budget

## 2. Environmental Monitoring Plan

Table 2 below shows the Environmental Monitoring Plan for the project. See Annex 10 for the Environmental and Social Monitoring Form.

**Table 2 Environmental Monitoring Plan**

Environmental item	Monitoring item	Frequency	Criteria/Indicator	Location	Implement	
Pre-construction/ Construction phase						
0	General	Management of complaint and grievances	Weekly	Record of grievance management	Project site	Contractor
1	Air pollution	Water spraying construction site	Monthly	Water spraying at least twice a day	Project site	Contractor
		PPE	Monthly	Distribution and use of PPE	Project site	Contractor
		Sensitization on speed limits	Monthly	Whether or not to sensitize workers	Project site	Contractor
		Maintenance of vehicles and machinery	Daily check/ Regular maintenance	Record of daily check and regular maintenance	Project site	Contractor

Environmental item		Monitoring item	Frequency	Criteria/Indicator	Location	Implement
2	Water pollution	Use of drip tray	Monthly	Record of drip tray use	Project site	Contractor
		Water quality (pH, EC, TSS)	Monthly	Zambia's discharge limit	Mansa	Contractor
3	Solid waste	Reuse of excavated soil	Monthly	Reuse of excavated soil	Project site	Contractor
		Management/disposal of solid waste	Monthly	Appropriate disposal	Project site	Contractor
		Education for workers	Monthly	Whether or not to educate workers	Project site	Contractor
4	Soil contamination	Use of drip tray	See 2. Water pollution			
		Maintenance of vehicles and machinery	See 1. Air pollution			
5	Noise and vibration	Maintenance of vehicles and machinery	See 1. Air pollution			
		PPE	See 1. Air pollution			
		Announcement of work schedule	Monthly	Whether or not to announce to neighbours Record of grievances	Project site	Contractor
10	Ecosystem	Confirmation of land clearance	Monthly	Confirmation of unnecessary clearance	Project site	ZARI
13	Land acquisition, Involuntary resettlement	RAP implementation	Monthly	Progress of RAP	Mansa	Resettlement committee
17	Land use and utilization of local resources	Confirmation of burrow pit	Monthly	Confirmation of rebury burrow pit	Burrow pit Mansa	Contractor
25	Gender	Confirmation of worker's list	Monthly	Presence of women in employee list	Project site	Contractor
		Sensitization activities	Monthly	Whether or not to sensitize workers	Project site	Contractor
26	Children's right	Confirmation of worker's list	Monthly	Presence of employees aged under 16	Project site	Contractor
27	Hazardous infectious diseases, such as HIV/AIDS	Prevention measures for COVID-19 (as required)	Monthly	Whether or not to wear masks/ use of hand sanitizer Record of body temperature checks	Project site	Contractor
		Sensitization activity	Monthly	Whether or not to sensitize workers	Project site	Contractor
28	Working conditions, occupation safety	PPE	See 1. Air pollution			
		Worker's education and training	Monthly	Whether or not to educate workers	Project site	Contractor
		Signage for fire extinguishers/ first aid equipment	Monthly	Confirmation of equipment	Project site	Contractor
29	Accident	Maintenance of vehicles and machinery	See 1. Air pollution			
		Set up fencing/ signboards	Monthly	Confirmation of fencing/ signboards	Project site	Contractor
		Sensitization on speed limits	See 1. Air pollution			
		Accident cases	Monthly	Record of accident cases	Project site	Contractor
30	Boarder crossing impact, Climate change	Sensitization activities for prevention of idling	Monthly	Whether or not to sensitize workers	Project site	Contractor
Operation phase						
2	Water pollution	Use of fertilizer and agro chemicals	Biannually	Record of fertilizer and agro chemical use	ZARI Mansa	ZARI Mansa
3	Solid waste	Recycling of plant waste	Biannually	Amount of recycled waste	Training facility	ZARI

Environmental item	Monitoring item	Frequency	Criteria/Indicator	Location	Implement
	Sensitization activities for trainees	Biannually	Whether or not to sensitize trainees	Training facility	ZARI
4	Soil contamination	Biannually	Record of maintenance	Training facility	ZARI
5	Noise and vibration	Biannually	Whether or not to announce the schedule Record of grievance management	Training facility	ZARI
29	Accident	Biannually	Record of accident cases	Training facility	ZARI

The figure below describes the implementation and reporting flow for environmental management and monitoring during the construction and operation stages.

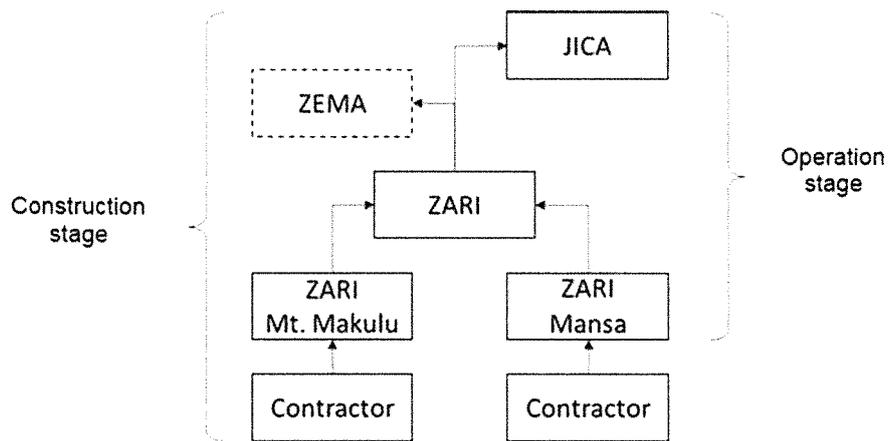


Figure 1 EMP/EMoP reporting flow

*M*

*/M*

*cm*

**Monthly Environmental and Social Monitoring Form**

**Site Environmental Compliance Inspection and Monitoring Form**

**Form-1 for Pre-Construction Phase**

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. ZARI submits this monitoring form to DD/SV consultant and JICA monthly and quarterly respectively.

**Project Name** : Project for Development of Rice Seed Production Field and Implementing Agency : ZARI  
**Training Facilities in the Republic of Zambia**

**Location** :  Chilanga District **Monitoring Agency** : N/A  
 Mansa District **Enforcement Agency** : ZARI/MOA

**Date Reported** : DD/MM/YYYY  
**Reporting Period** : XX Quarter of YYYY

**(Monthly)**

**1. Project Proponent**

ZARI's Environmental Awareness	Yes/No	Actions required
ZARI aware of mitigation requirements?		
ZARI has a copy of EMP?		

2. Land Acquisition and Compensation (Mansa)

Resettlement Activities	Planned Total	Unit	Progress in Quantity		Expected date of completion	Responsible organization
			Progress as of	Issues if any		
1. Set up of RAP Implementation Structure						
1-1 Formation of Resettlement Committee (RC)		Times				ZARI
1-2 Appointment of social environmental officer from ZARI		Times				ZARI
1-3 Key stakeholders such as Municipality, Wards, Chiefs, RC are informed about RAP schedule		Times				ZARI
1-4 Kick-off meeting with ZARI and RC		Times				ZARI
2. Update PAPs list and Final Asset Valuation						
2-1 Identification of final PAU and PAH		PAPs				ZARI
2-2 Announcement to affected people		times				ZARI
2-3 Final Asset Valuation		times				ZARI
2-4 Consultation meeting		times				ZARI
2-5 Revise ARAP and signing compensation agreement based on the feedback at the consultation meeting		set				ZARI
3. Progress of compensation/ Assistance						
3-1 Provision of alternative crop land		PAH				ZARI
3-2 Provision of livelihood restoration assistance		PAH				ZARI
4. Progress of evacuation from the site						
4-1 PAU (fish ponds)		PAU				ZARI
4-2 PAH (crop land)		PAH				ZARI
5. Construction of alternative facilities						
5-1 Fish pond		set				ZARI
6. Complain and Grievance Redress						
6-1 No. of solved cases by committee	N/A	Cases				ZARI
6-2 No. of unsolved cases by committee	N/A	Cases				ZARI

**3. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from PAPs	Solution / Result / Any actions to be taken
1			
2			
3			
4			

**4. Notes;**

Inspected by: \_\_\_\_\_

Date: \_\_\_\_\_

*M*

*M*

*SM*

**Monthly Environmental and Social Monitoring Form (ZARI Mt. Makulu)**

**Form-2 for Construction Phase**

**Site Environmental Compliance Inspection and Monitoring Form**

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. Contractor submits this monitoring form to DD/SV consultant and JICA monthly and quarterly respectively.

**Project Name** : Project for Development of Rice Seed Production : **ZARI**  
**Field and Training Facilities in the Republic of Zambia**  
**Location** : **Chilanga District** : **Monitoring Agency** : **NA**  
**Date Reported** : **DD/MM/YYYY** : **Enforcement Agency** : **Contractor(s)**  
**Reporting Period** : **XX Month of YYYY** : **Contractor(s)** : **XXXX Co., Ltd.**

**(Monthly)**

**1. Mitigation Compliance Inspection**

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Mitigation Effective? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any remarks
- Community is aware of contact address of complain and grievance redress mechanism					
- Community is aware of construction schedule					

*CM*

ANNEX 10  
Environmental and Social Monitoring Form

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Mitigation Effective? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any remarks
- A sign of vehicle/ machine trouble (abnormal noise, vibration, white/dark smoke, etc.) are not observed					
- Water is sprinkled before on the dirt / unpaved road against dust					
- Vehicles adhere to speed limit and avoid unnecessary idling					
- Drip trays are used when refuelling or maintenance					
- Enlightenment to workers not to dispose waste around construction site					
- Solid waste are disposed at designated dumping site					
- Reuse excavated material as much as possible					
- Education and sensitization for Occupational Safety and Health was held for workers					
- Personal Protective Equipment (helmet, goggle, glove, etc.) is provided to workers					
- Necessary prevention measures against COVID-19 is implemented (such as wearing masks, put sanitizers, etc.)					
- Fire extinguisher and First-aid kits are available at all construction sites and yard					
- Access to hazardous area (e.g. borehole, reservoir) is restricted					
- Workers younger persons under the age of 16 years are not employed					
- Women are employed as much as possible					
- Workers are sensitized the risk of HIV/AIDS and GBV associated with alcohol consumption					

m

CM

**2. Natural Environment**

Item	Monitoring Result			Action Required (Yes/No) Describe if Yes:	Any remarks
	Date	Mitigations Implemented? Yes/No	If yes, describe in details		
Vegetation is not cleared more than necessary					

**3. Record of accidents**

No	Date	Case of accident	Solution / Result / Any actions to be taken
1			
2			
3			

**4. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from Communities / stakeholders	Solution / Result / Any actions to be taken
1			
2			
3			

**5. Notes;**

Inspected by: \_\_\_\_\_

Date: \_\_\_\_\_

m

GM

**Monthly Environmental and Social Monitoring Form (ZARI Mansa)**

**Form-2 for Construction Phase**

**Site Environmental Compliance Inspection and Monitoring Form**

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. Contractor submits this monitoring form to DD/SV consultant and JICA monthly and quarterly respectively.

**Project Name** : Project for Development of Rice Seed Production Field and Training Facilities in the Republic of Zambia  
**Implementing Agency** : ZARI

**Location** : Mansa District  
**Monitoring Agency** : NA

**Date Reported** : DD/MM/YYYY  
**Enforcement Agency** : Contractor(s)

**Reporting Period** : XX Month of YYYY  
**Contractor(s)** : XXXX Co., Ltd.

**(Monthly)**

**1. Mitigation Compliance Inspection**

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Mitigation Effective? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any remarks
- Community is aware of contact address of complain and grievance redress mechanism					
- Community is aware of construction schedule					

GM

ANNEX 10  
Environmental and Social Monitoring Form

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Mitigation Effective? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any remarks
- A sign of vehicle/ machine trouble (abnormal noise, vibration, white/dark smoke, etc.) are not observed					
- Water is sprinkled before on the dirt / unpaved road against dust					
- Vehicles adhere to speed limit and avoid unnecessary idling					
- Drip trays are used when refuelling or maintenance					
- Enlightenment to workers not to dispose waste around construction site					
- Solid waste are disposed at designated dumping site					
- Reuse excavated material as much as possible					
- Education and sensitization for Occupational Safety and Health was held for workers					
- Personal Protective Equipment (helmet, goggle, glove, etc.) is provided to workers					
- Necessary prevention measures against COVID-19 is implemented (such as wearing masks, put sanitizers, etc.)					
- Fire extinguisher and First-aid kits are available at all construction sites and yard					
- Access to hazardous area (e.g. borehole, reservoir) is restricted					
- Workers younger persons under the age of 16 years are not employed					
- Women are employed as much as possible					
- Workers are sensitized the risk of HIV/AIDS and GBV associated with alcohol consumption					

M

GM

**2. Water Quality at Outlet of Discharge from Construction Site and Irrigation Site**

Item	Unit	Baseline Data (*1)			Monitoring Result			Standards max. Limits (*2)	Action Required (Yes/No) Describe if Yes:	Any remarks
		Date	Location	Amount measured	Date	Location	Amount measured			
pH	-	Mar 2022	Point 1 Reservoir	6.52			6.0-9.0			
EC	µs/cm			52			4300			
TSS	mg/l			<1.0			100			
pH	-	Mar 2022	Point 2 Drainage channel	6.50			6.0-9.0			
EC	µs/cm			60			4300			
TSS	mg/l			<1.0			100			
pH	-	Mar 2022	Point 3 Down stream	6.52			6.0-9.0			
EC	µs/cm			58			4300			
TSS	mg/l			<1.0			100			

\*1: Baseline survey in March 2022 for Reservoir, drainage and down stream

\*2: LIMIT FOR EFFLUENT AND WASTE WATER (THIRD SCHEDULE, Regulation 7 (2), The Environmental Management Act (Act No. 12 of 2011), The Environmental Management (Licensing) Regulations, 2013

**3. Natural Environment**

Item	Monitoring Result			Action Required (Yes/No) Describe if Yes:	Any remarks
	Date	Mitigations Implemented? Yes/No	If yes, describe in details		
Vegetation is not cleared more than necessary					
Rebury borrow pit as much as possible					

**4. Record of accidents**

No	Date	Case of accident	Solution / Result / Any actions to be taken
1			
2			
3			

GM

**5. Livelihood Restoration Assistance**

Livelihood Restoration Assistance		Monitoring Result	Observation	Action Required (Yes/No) Describe if Yes:	Responsible organization
1	ZARI provides information on aquaculture training to PAU	Times			ZARI
2	PAU's fish farming activity is restored as same or improved compared to that before relocation	PAU			ZARI
3	PAH's crop farming activity is restored as same or improved compared to that before relocation	PAH			ZARI

**6. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from Communities / stakeholders	Solution / Result / Any actions to be taken
1			
2			
3			

**7. Notes;**

Inspected by: \_\_\_\_\_

Date: \_\_\_\_\_

*CM*

Am

**Biannual Environmental and Social Monitoring Form (ZARI Mt. Makulu)**

**Site Environmental Compliance Inspection and Monitoring Form**

**Form-3 for Operation Phase**

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. ZARI submits this monitoring form to JICA biannually.

**Project Name** : Project for Development of Rice Seed Production  
 Implementing Agency : ZARI  
 Field and Training Facilities in the Republic of  
 Zambia

**Location** : Chilanga District  
**Monitoring Agency** : NA

**Date Reported** : DD/MM/YYYY  
**Enforcement Agency** : ZARI/MOA

**Reporting Period** : X<sup>th</sup> Report in YYYY  
**Contractor(s)** : NA

**(Biannual)**

**1. Mitigation Compliance Inspection**

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any Comment
- Community is aware of schedule of training facilities				
- Reuse vegetable waste as much as possible				
- Enlightenment to trainees not to dispose waste around facilities				

CM

-	A sign of machine trouble (abnormal noise, vibration, white/dark smoke, etc.) are not observed in agricultural machinery		
---	--	--	--

**2. Record of accidents in agricultural machinery use**

No	Date	Case of accident	Solution / Result / Any actions to be taken
1			
2			
3			

**3. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from Communities / stakeholders	Solution / Result / Any actions to be taken
1			
2			
3			

**4. Notes;**

Inspection Completed by: \_\_\_\_\_

Date: \_\_\_\_\_

*m*

*EM*

**Biannual Environmental and Social Monitoring Form (ZARI Mansa)**

**Form-3 for Operation Phase**

**Site Environmental Compliance Inspection and Monitoring Form**

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. ZARI submits this monitoring form to JICA biannually.

**Project Name** : Project for Development of Rice Seed Production : ZARI  
 Field and Training Facilities in the Republic of Zambia

**Location** : Mansa District : NA  
**Monitoring Agency** : NA

**Date Reported** : DD/MM/YYYY : ZARI/MOA  
**Enforcement Agency** : ZARI/MOA

**Reporting Period** : X<sup>th</sup> Report in YYYY : NA  
**Contractor(s)** : NA

**(Biannual)**

**1. Mitigation Compliance Inspection**

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any Comment
- Community is aware of schedule of training facilities				
- Excessive pesticides and fertilizer are not used in rice field				
- Reuse vegetable waste as much as possible				
- Enlightenment to trainees not to dispose waste around facilities				

CM

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any Comment
- A sign of machine trouble (abnormal noise, vibration, white/dark smoke, etc.) are not observed in agricultural machinery				

**2. Record of accidents in agricultural machinery use**

No	Date	Case of accident	Solution / Result / Any actions to be taken
1			
2			
3			

**3. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from Communities / stakeholders	Solution / Result / Any actions to be taken
1			
2			
3			

**4. Notes;**

Inspection Completed by: \_\_\_\_\_

Date: \_\_\_\_\_

*m*

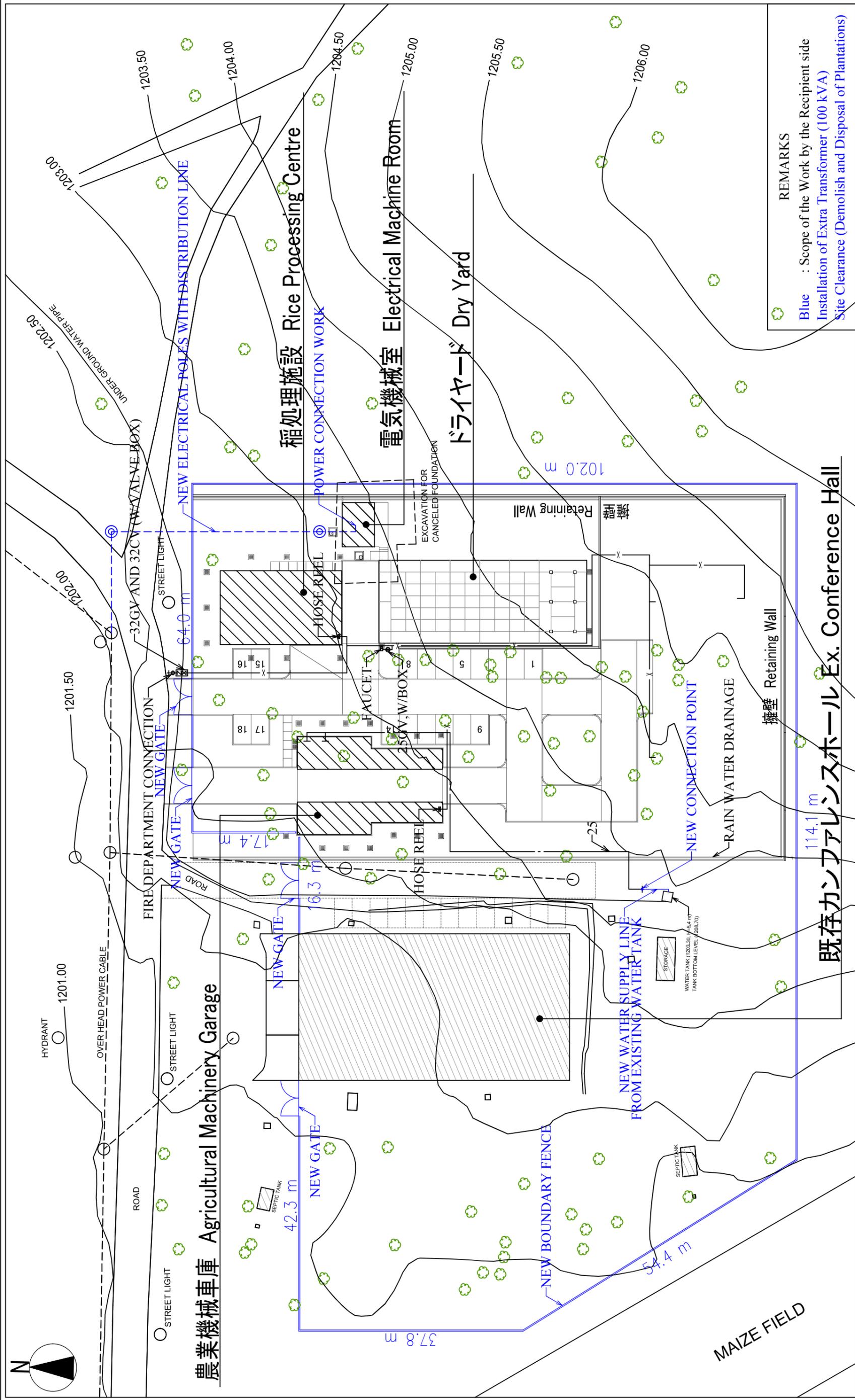
*em*

資料 5-1 : 建築概略設計図面

建築施設 図面目録

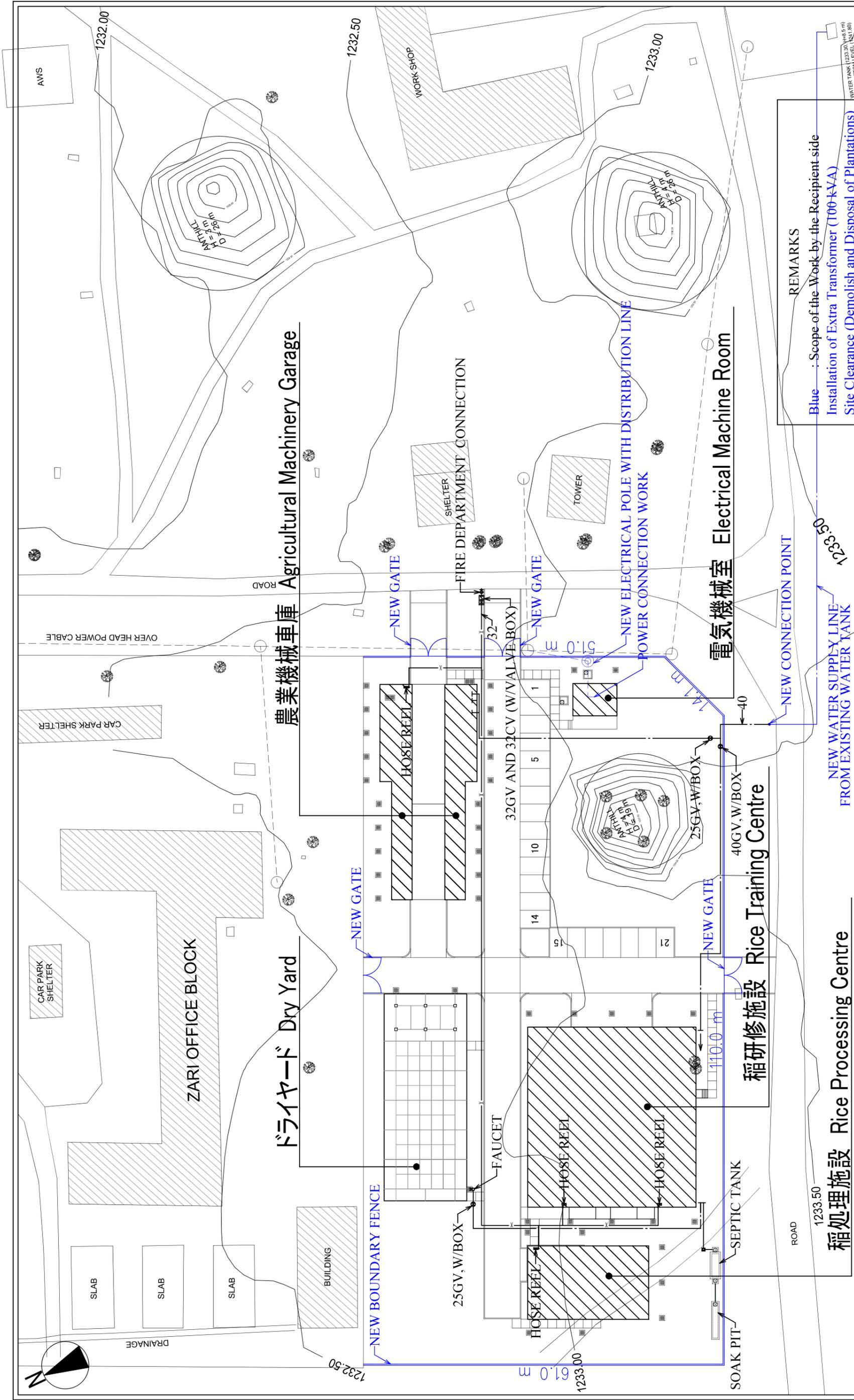
No	図面名称
1-1	マウント・マクル 建築施設配置図
1-2	マンサ 建築施設配置図
1-3	マンサ ほ場研修倉庫配置図
2-1	稲研修施設(マンサ) 平面図
2-2	稲研修施設(マンサ) 立面図1
2-3	稲研修施設(マンサ) 立面図2
2-4	稲研修施設(マンサ) 断面図
3-1	稲処理施設(マウント・マクル及びマンサ) 平面図
3-2	稲処理施設(マウント・マクル及びマンサ) 立面図1
3-3	稲処理施設(マウント・マクル及びマンサ) 立面図2
3-4	稲処理施設(マウント・マクル及びマンサ) 断面図
4-1-1	農業機械車庫(マウント・マクル) 平面図
4-1-2	農業機械車庫(マウント・マクル) 立面図1
4-1-3	農業機械車庫(マウント・マクル) 立面図2
4-1-4	農業機械車庫(マウント・マクル) 断面図1
4-1-5	農業機械車庫(マウント・マクル) 断面図2
4-2-1	農業機械車庫(マンサ) 平面図
4-2-2	農業機械車庫(マンサ) 立面図1
4-2-3	農業機械車庫(マンサ) 立面図2
4-2-4	農業機械車庫(マンサ) 断面図1
4-2-5	農業機械車庫(マンサ) 断面図2
5	ドライヤード(マウント・マクル及びマンサ) 立面図及び断面図
6-1	電気機械室(マウント・マクル及びマンサ) 平面図
6-2	電気機械室(マウント・マクル及びマンサ) 断面図
7-1	ほ場研修倉庫(マンサ) 平面図
7-2	ほ場研修倉庫(マンサ) 断面図





**REMARKS**  
 Blue : Scope of the Work by the Recipient side  
 Installation of Extra Transformer (100 kVA)  
 Site Clearance (Demolish and Disposal of Plantations)

PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	マウント・マクル 建築施設配置図 Mt. Makulu - Building Layout Plan -	DRG NO :	1-1
LOCATION	Lusaka, ZAMBIA	APPROVED BY :	M.NEGISHI	CHECKED BY :	K.ODA	DESIGNED BY :	H.KOMATSU
						DRAWN BY :	H.KOMATSU
						DATE :	July 2022
						SCALE :	1/600 for A3 paper



PROJECT	LOCATION	CONSULTANTS	TITLE	DRG NO :
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Mansa, ZAMBIA	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	Mansa - Building Layout Plan -	1-2
			マンサ 建築施設配置図	
			APPROVED BY : M.NEGISHI	DESIGNED BY : H.KOMATSU
			CHECKED BY : K.ODA	DRAWN BY : H.KOMATSU
				DATE : July 2022
				SCALE : 1/600 for A3 paper

REMARKS  
 Blue : Scope of the Work by the Recipient side  
 Installation of Extra Transformer (100 kVA)  
 Site Clearance (Demolish and Disposal of Plantations)

NEW WATER SUPPLY LINE  
 FROM EXISTING WATER TANK  
 NEW CONNECTION POINT

NEW ELECTRICAL POLE WITH DISTRIBUTION LINE  
 POWER CONNECTION WORK

NEW BOUNDARY FENCE

農業機械車庫 Agricultural Machinery Garage

ドライヤード Dry Yard

ZARI OFFICE BLOCK

稲研修施設 Rice Training Centre

電気機械室 Electrical Machine Room

32GV AND 32CV (W/V ALVE BOX)

25GV, W/BOX

40GV, W/BOX

NEW GATE

NEW GATE

NEW GATE

NEW CONNECTION POINT

25GV, W/BOX

HOSE REEL

HOSE REEL

HOSE REEL

FAUCET

SEPTIC TANK

SOAK PIT

FIRE DEPARTMENT CONNECTION

TOWER

SHELTER

WORKSHOP

AWS

CAR PARK SHELTER

CAR PARK SHELTER

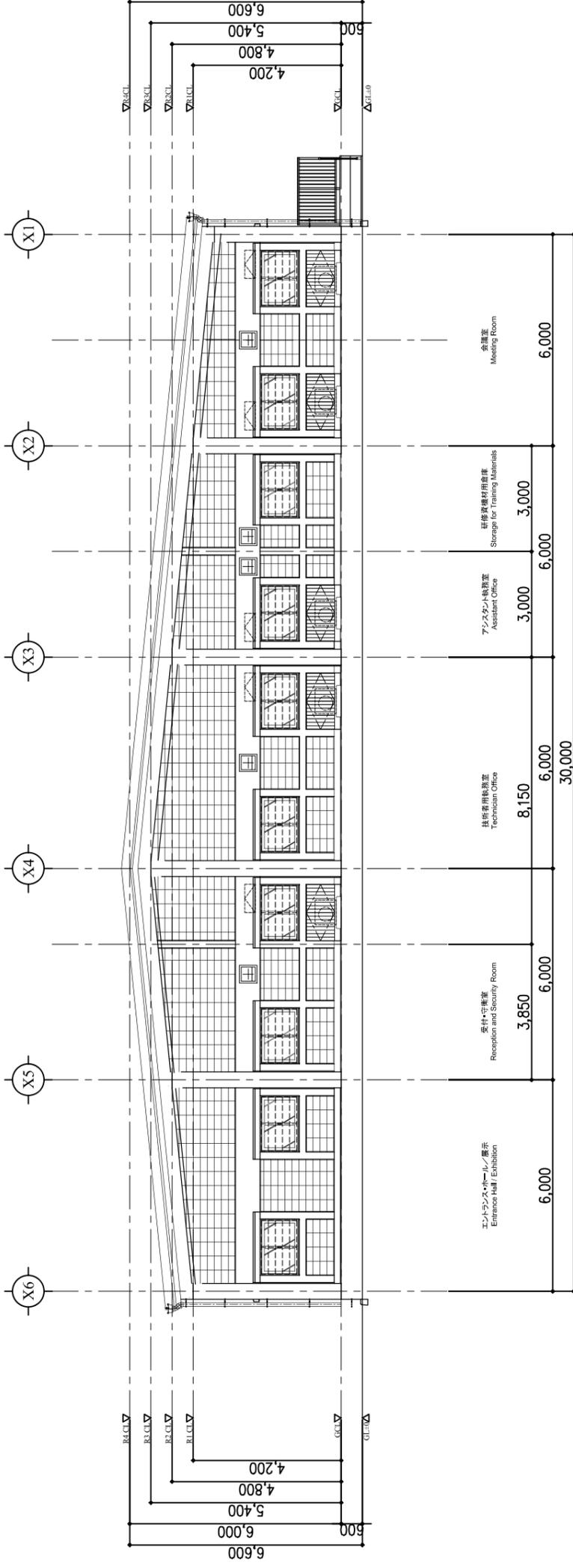
DRAINAGE

OVER HEAD POWER CABLE

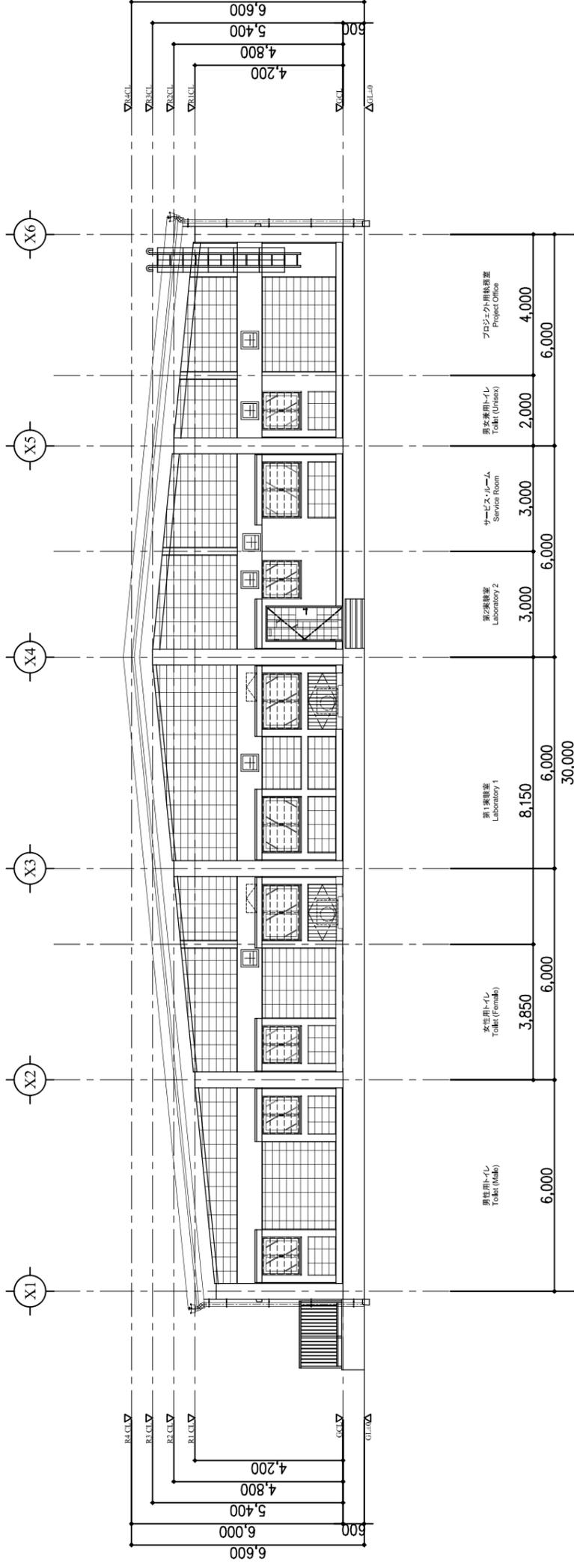
WATER TANK (1233.00) (4.5 m)  
TANK BOTTOM LEVEL (1241.80)





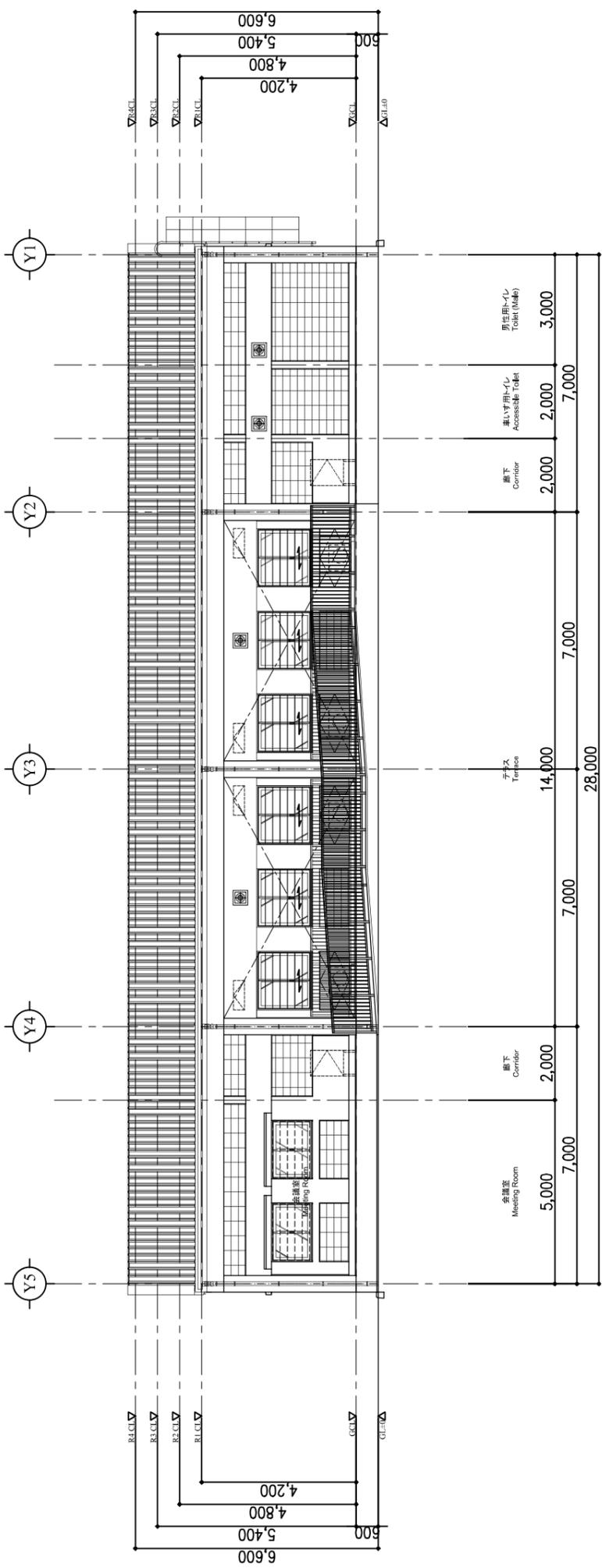


North Elevation

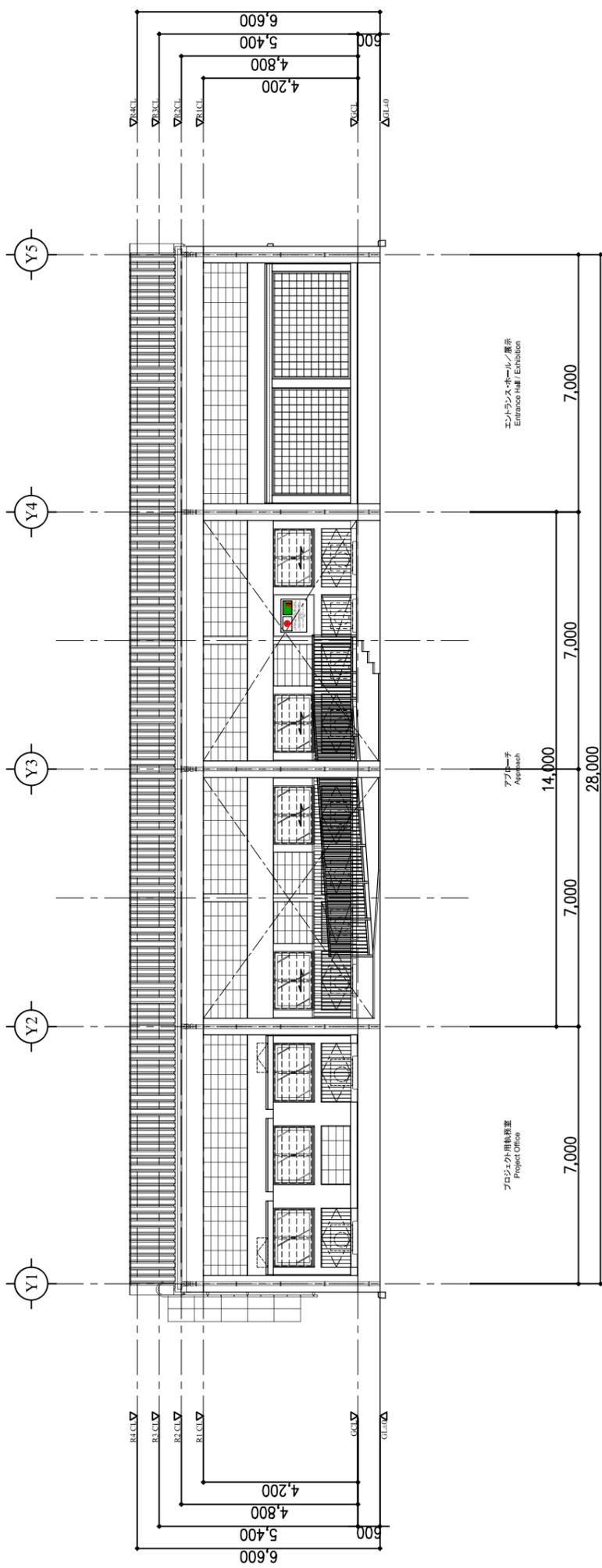


South Elevation

PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM			TITLE	稲研修施設(マンサ) 立面図1 Rice Training Centre (Mansa) - Elevation 1 -			DRG NO :	2-2
	LOCATION	Mansa, ZAMBIA	APPROVED BY :	M.NEGISHI	CHECKED BY :	K.ODA	DESIGNED BY :	H.KOMATSU	DRAWN BY :	H.KOMATSU	DATE :	July 2022
SCALE : 1/150 for A3 paper												

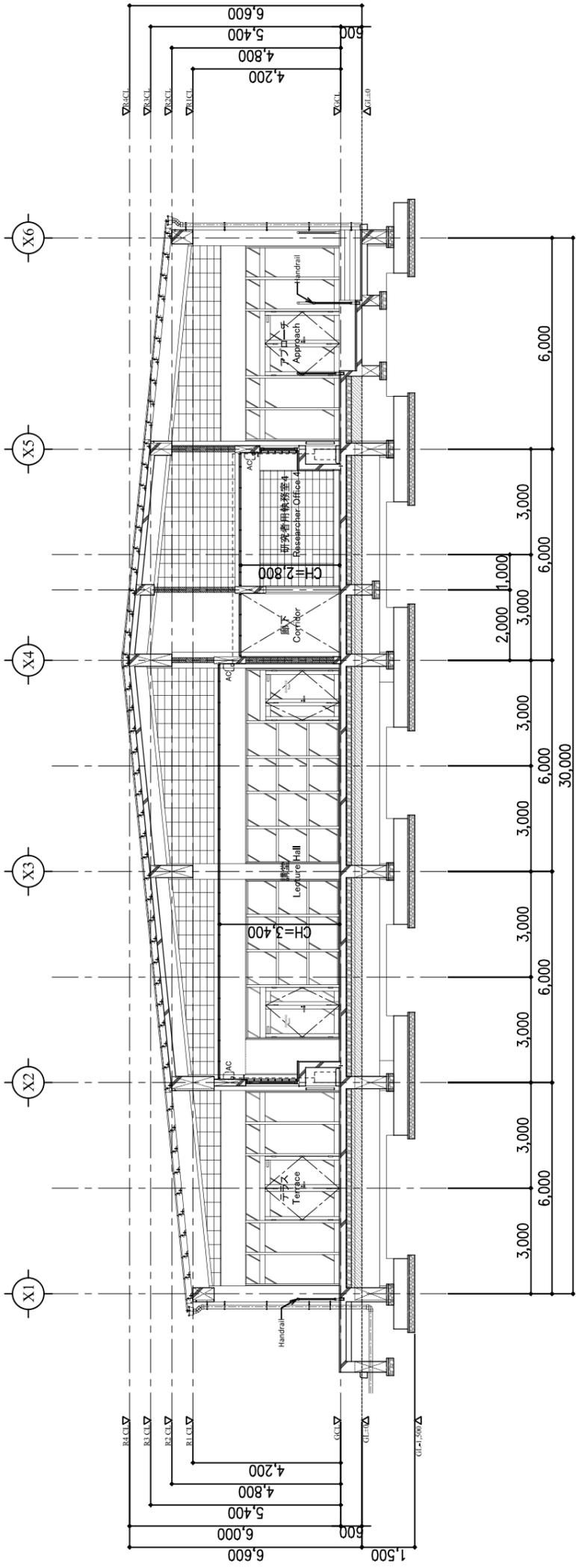


West Elevation

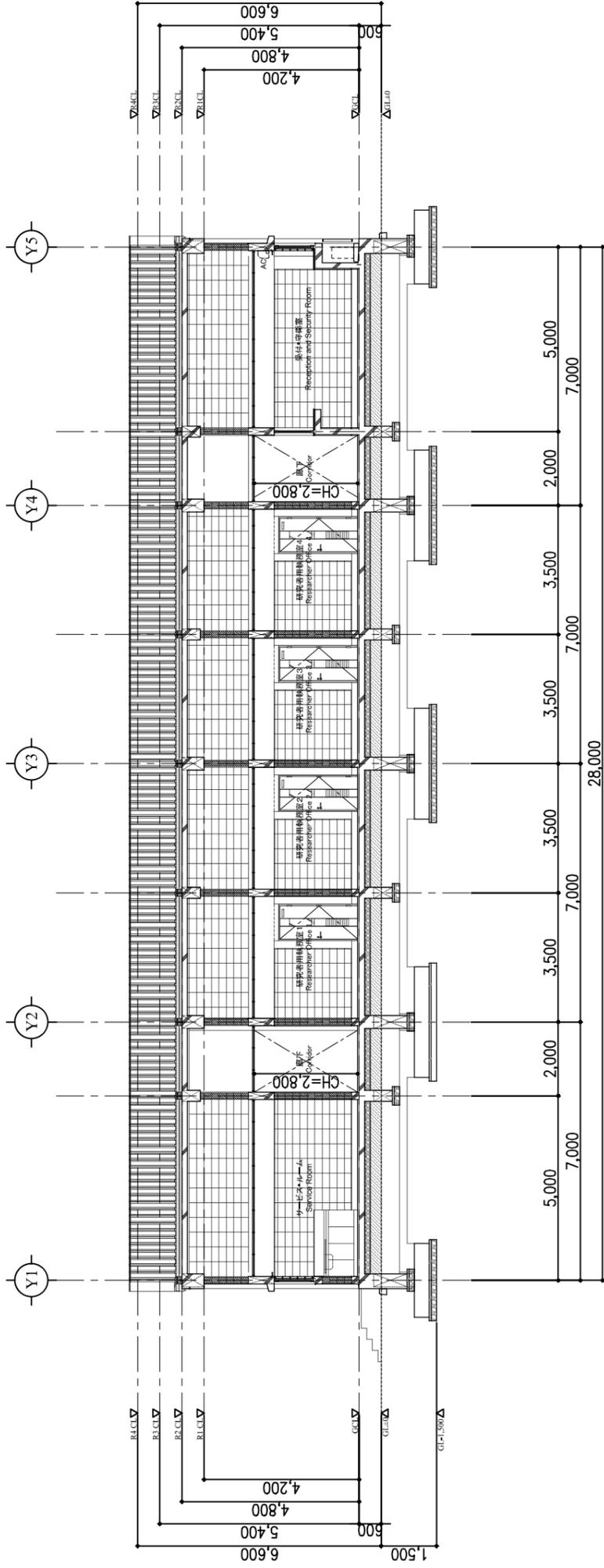


East Elevation

PROJECT	LOCATION	CONSULTANTS	TITLE				DRG NO :	
			Rice Training Centre (Mansa) - Elevation 2 -				2-3	
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		JOINT VENTURE: NTC INTERNATIONAL CO., L.TD. YACHIYO ENGINEERING CO., L.TD. JAPAN INTERNATIONAL COOPERATION SYSTEM		APPROVED BY :	CHECKED BY :	DESIGNED BY :	DRAWN BY :	DATE :
Mansa, ZAMBIA		M.NEGISHI		K.ODA	H.KOMATSU	H.KOMATSU	H.KOMATSU	July 2022
								SCALE : 1/150 for A3 paper



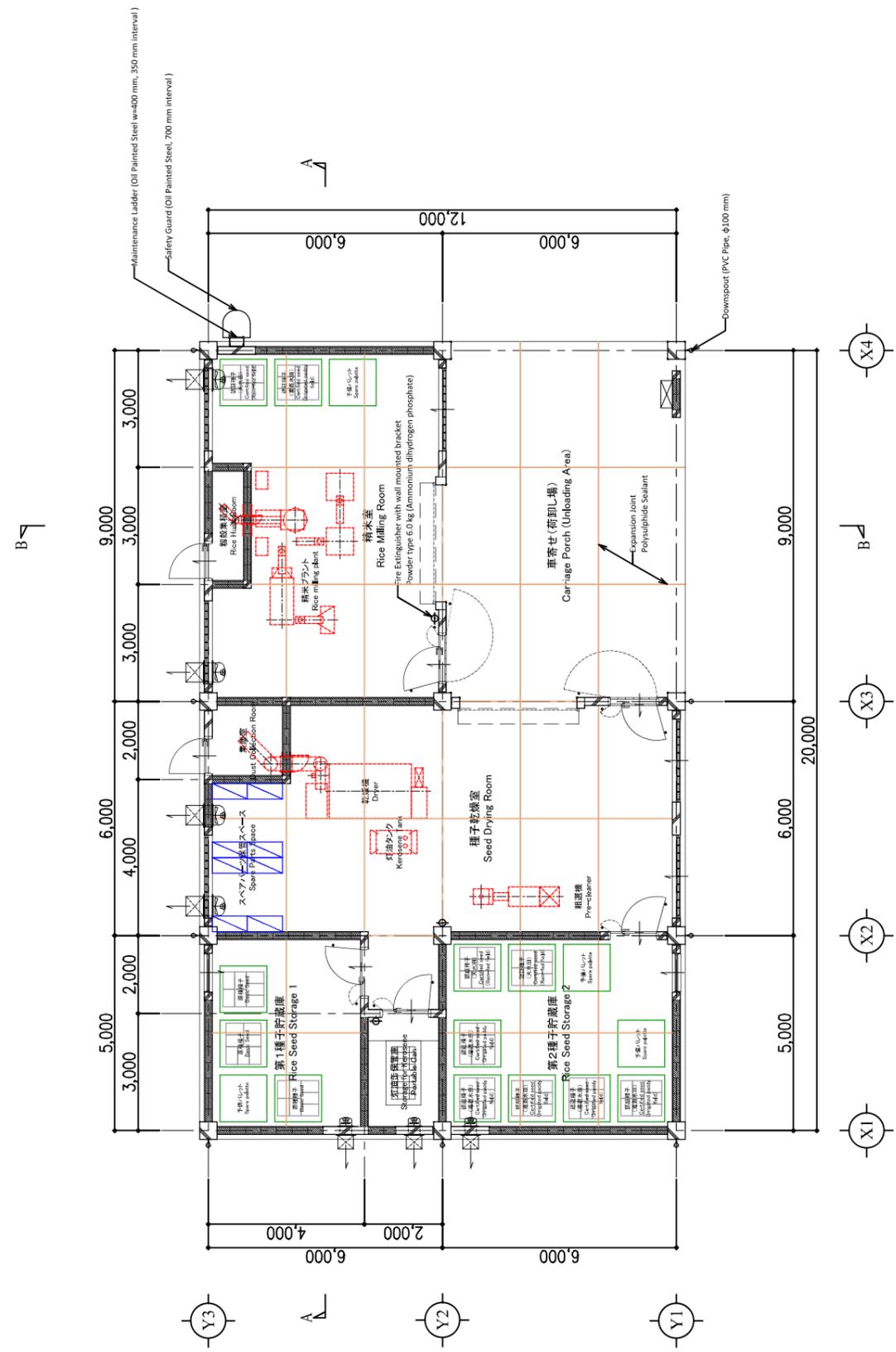
SECTION A-A



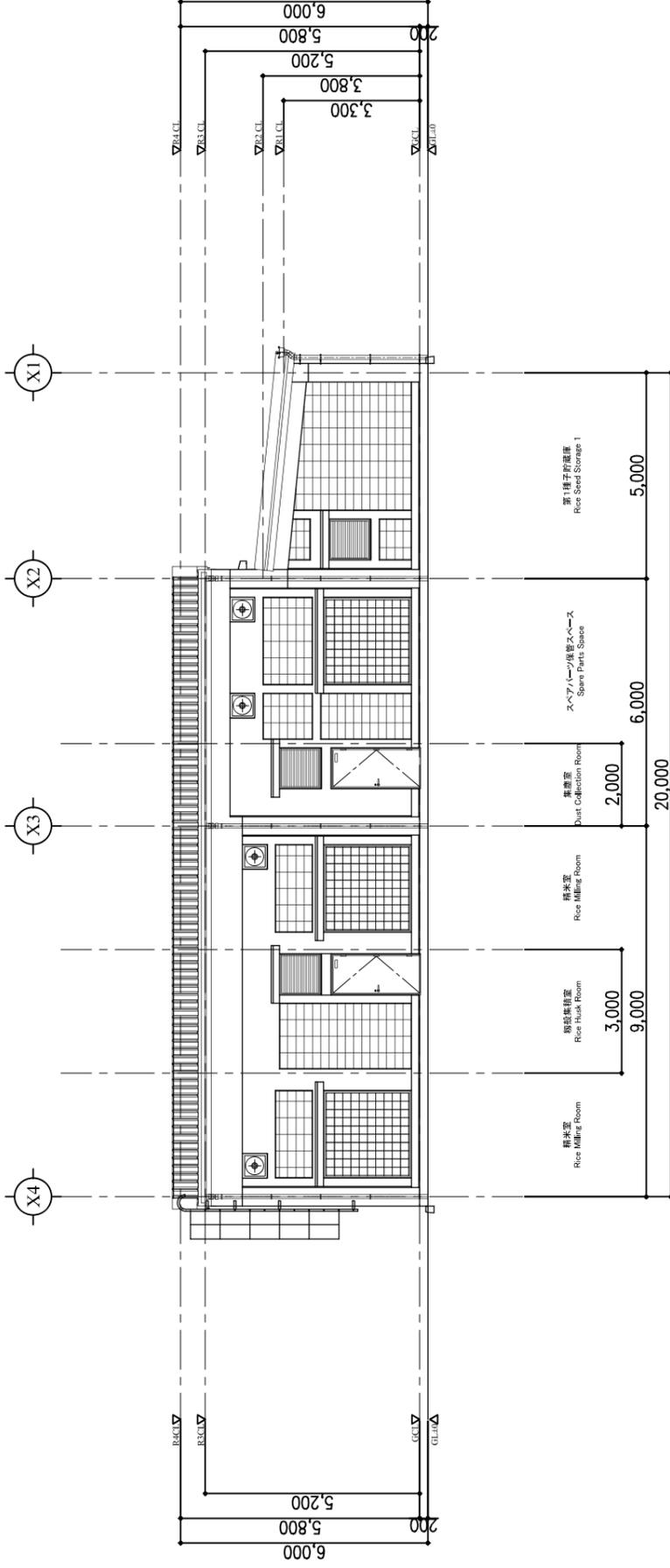
SECTION B-B

PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	稲研修施設(マンサ) 断面図		DRG NO :	2-4
	LOCATION	Mansa, ZAMBIA	APPROVED BY :	M.NEGISHI	CHECKED BY :	K.ODA	DESIGNED BY :	H.KOMATSU
							DATE :	July 2022
							DRAWN BY :	H.KOMATSU
							SCALE :	1/150 for A3 paper

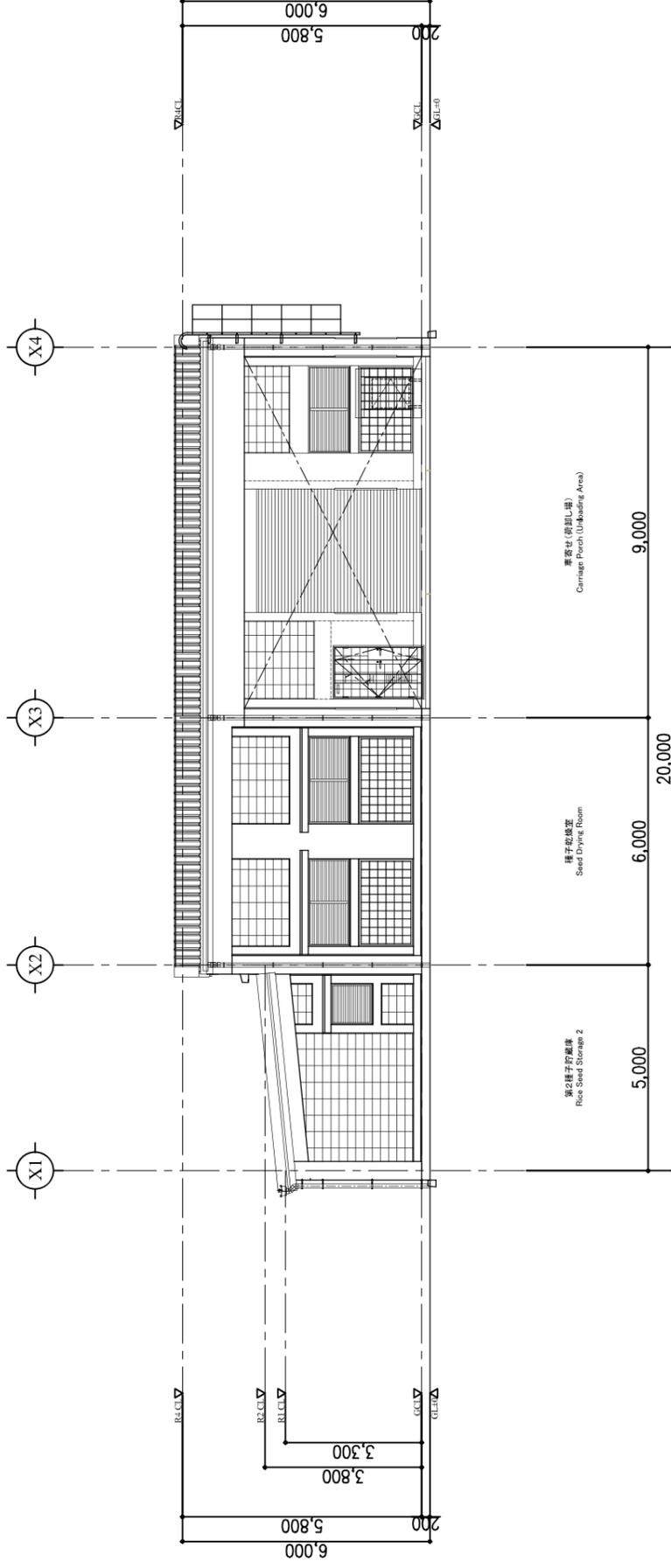
REMARKS  
 Green : Scope of the Recipient side  
 Red : Scope of the Equipment Work by the Japanese side  
 Blue : Scope of the Equipment Work by the Japanese side



PROJECT	LOCATION	CONSULTANTS	TITLE		DRG NO :	
			稲処理施設(マウント・マクル及びマンサ) 平面図			3-1
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Lusaka, ZAMBIA Mansa, ZAMBIA	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	APPROVED BY :	DESIGNED BY :	DRAWN BY :	DATE :
			M.NEGISHI	K.ODA	H.KOMATSU	H.KOMATSU

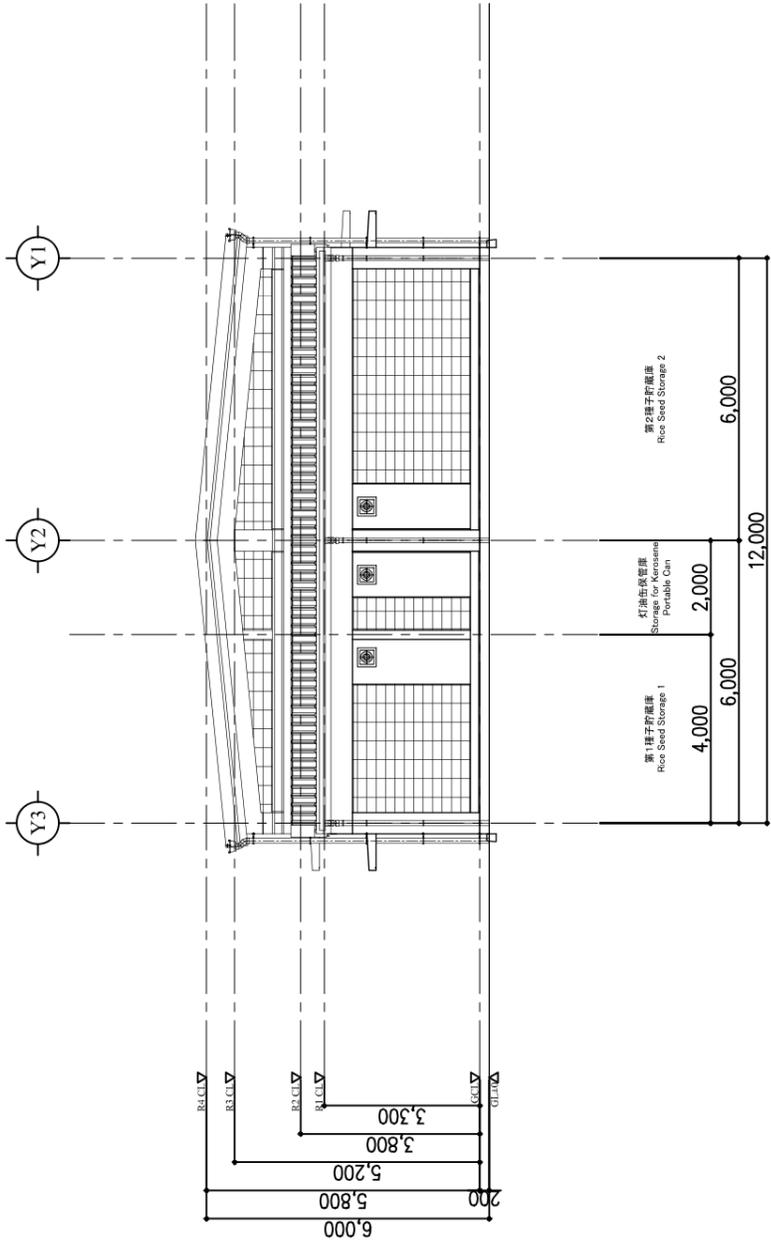


East Elevation

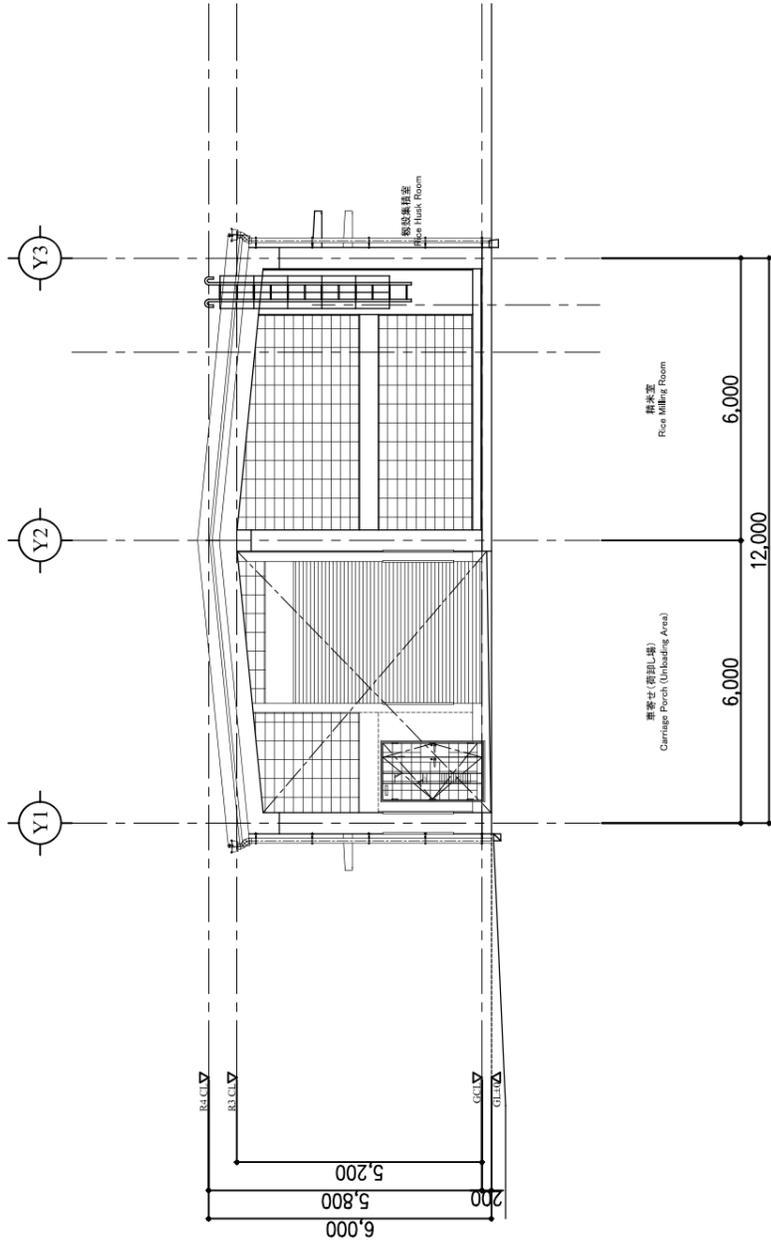


West Elevation

PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM		TITLE	稲処理施設(マウント・マクル及びマンサ) 立面図1 Rice Processing Centre (Mt. Makulu & Mansa) - Elevation 1 -			DRG NO :	3-2	
	LOCATION	Lusaka, ZAMBIA Mansa, ZAMBIA		APPROVED BY :	M.NEGISHI	CHECKED BY :	K.ODA	DESIGNED BY :	H.KOMATSU	DRAWN BY :	H.KOMATSU	DATE :
SCALE : 1/150 for A3 paper												



North Elevation



South Elevation

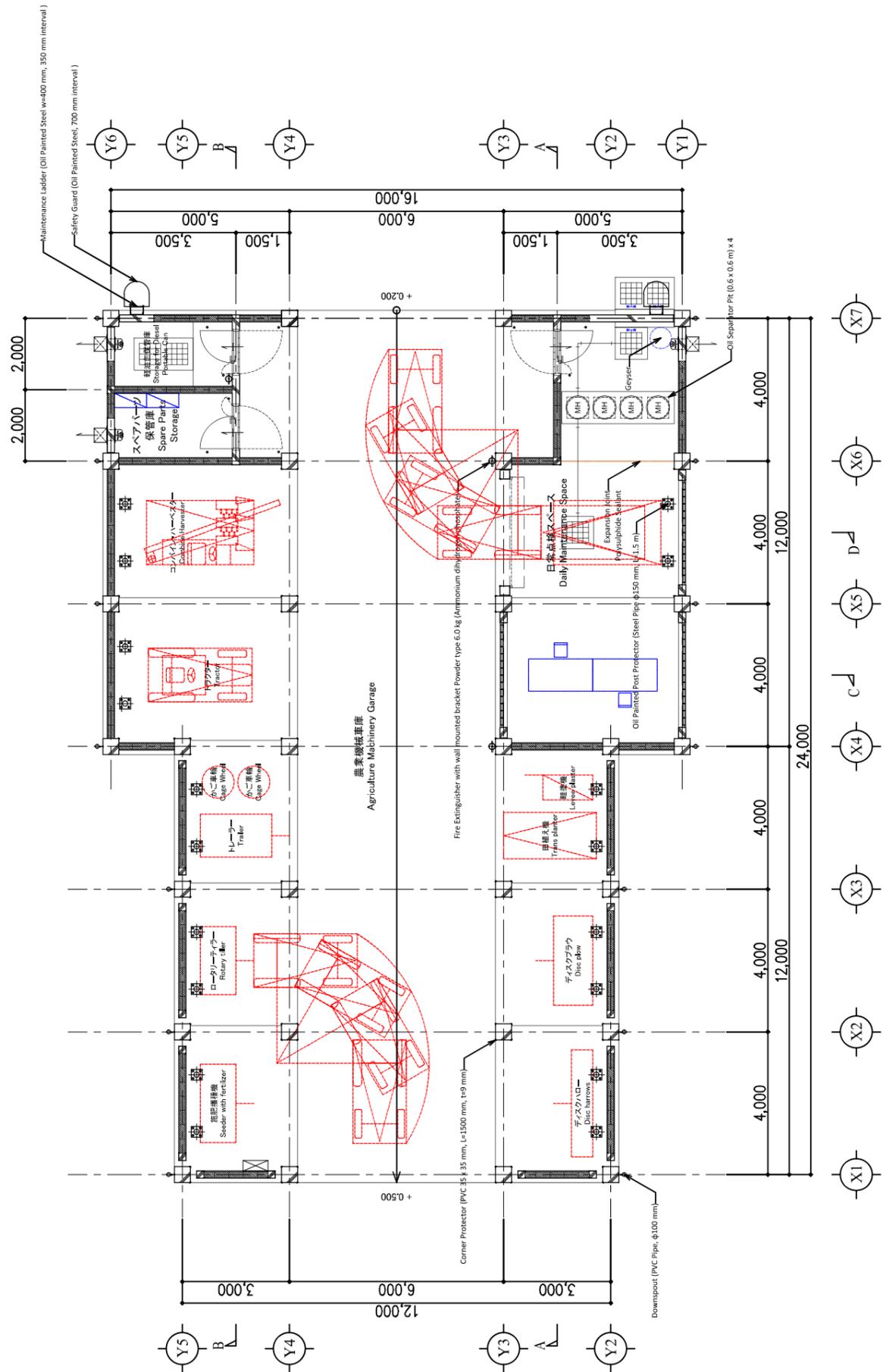
PROJECT	LOCATION	CONSULTANTS	TITLE	DRG NO :
	Lusaka, ZAMBIA Mansa, ZAMBIA	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	稲処理施設 (マウント・マクル及びマンサ) 立面図2 Rice Processing Centre (Mt. Makulu & Mansa) - Elevation 2 -	3-3
			APPROVED BY : M.NEGISHI	DESIGNED BY : H.KOMATSU
			CHECKED BY : K.ODA	DRAWN BY : H.KOMATSU
				DATE : July 2022
				SCALE : 1/150 for A3 paper



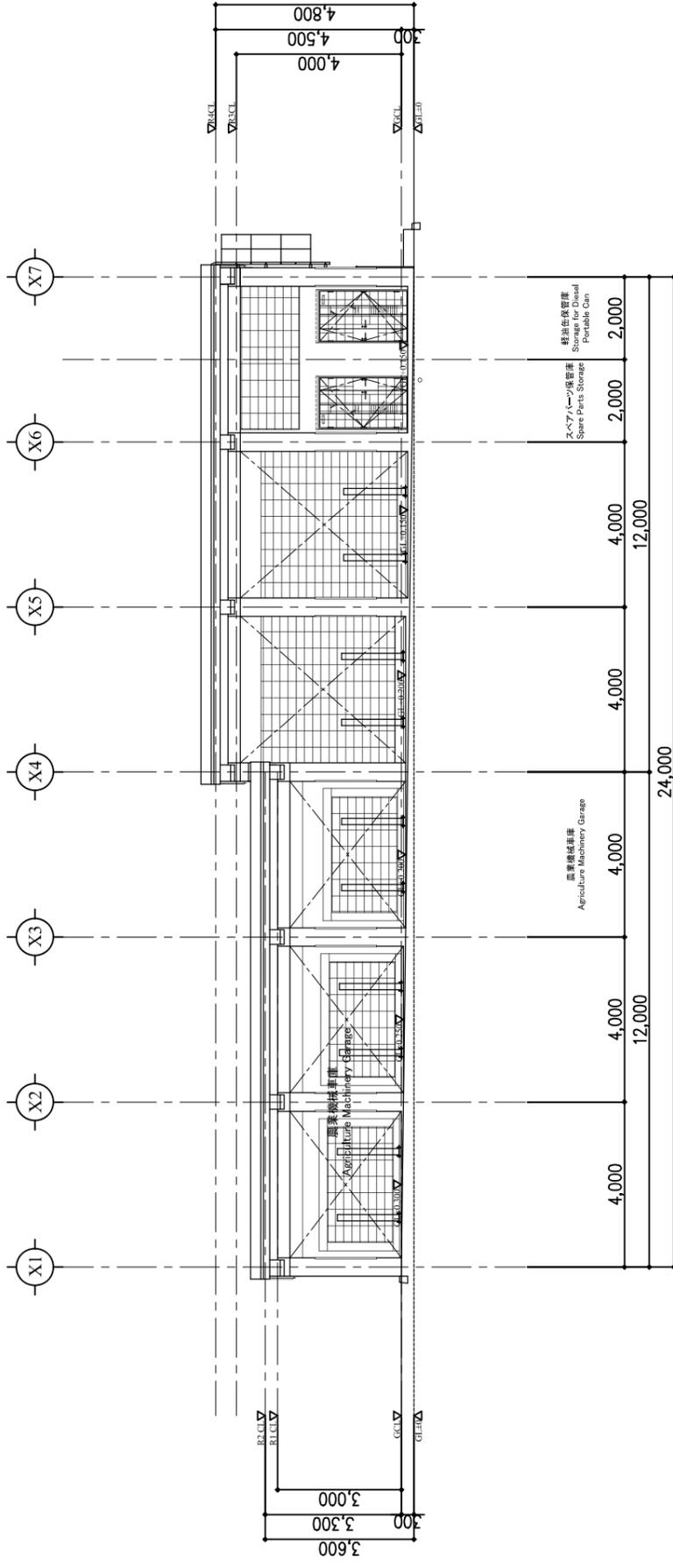
REMARKS  
 Green : Scope of the Recipient side  
 Red : Scope of the Equipment Work by the Japanese side  
 Blue : Scope of the Equipment Work by the Japanese side



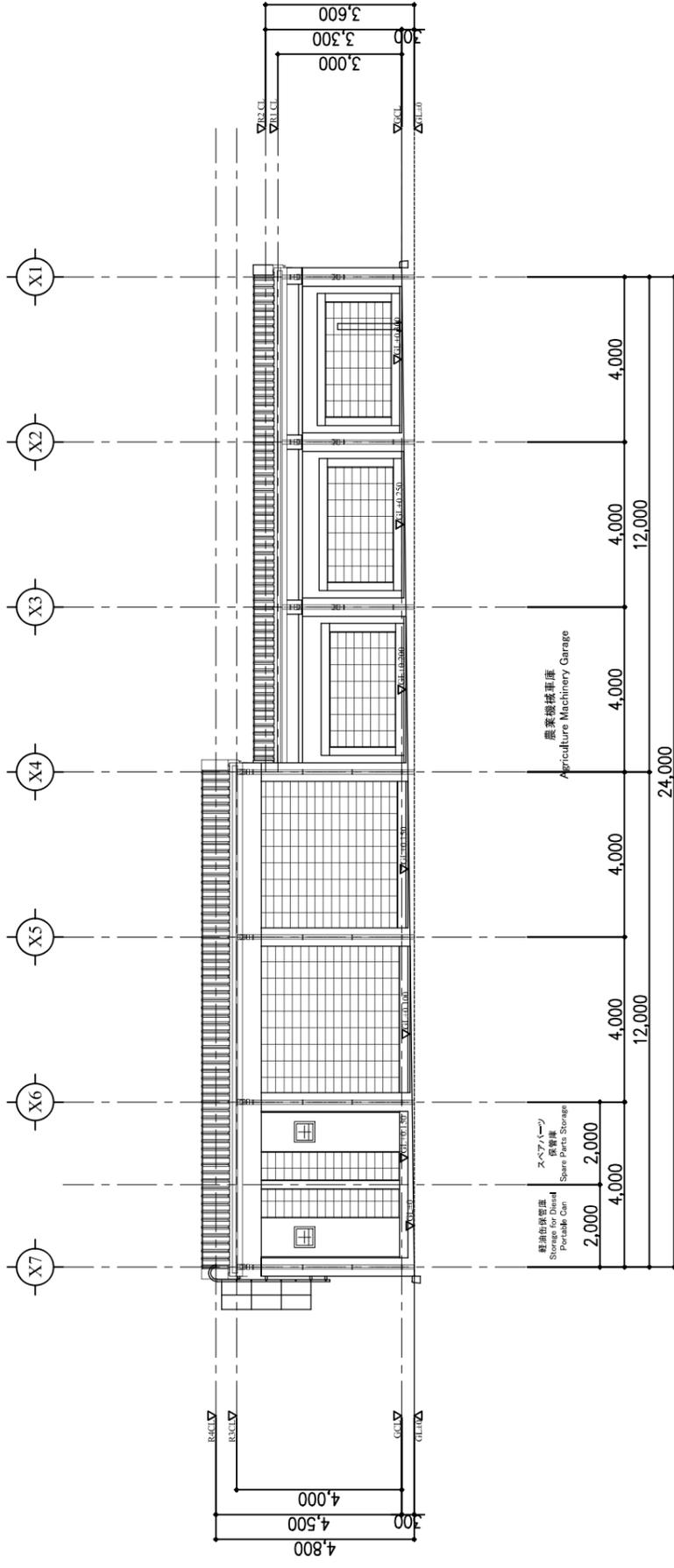
C7 D7



PROJECT	LOCATION	CONSULTANTS	TITLE	DRG NO :
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Lusaka, ZAMBIA	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	農業機械車庫 (マウント・マクル) 平面図	4-1-1
			Agricultural Machinery Garage (Mt. Makulu) - Plan -	SCALE : 1/150 for A3 paper
			APPROVED BY : M.NEGISHI	DATE : July 2022
			CHECKED BY : K.ODA	
			DESIGNED BY : H.KOMATSU	
			DRAWN BY : H.KOMATSU	

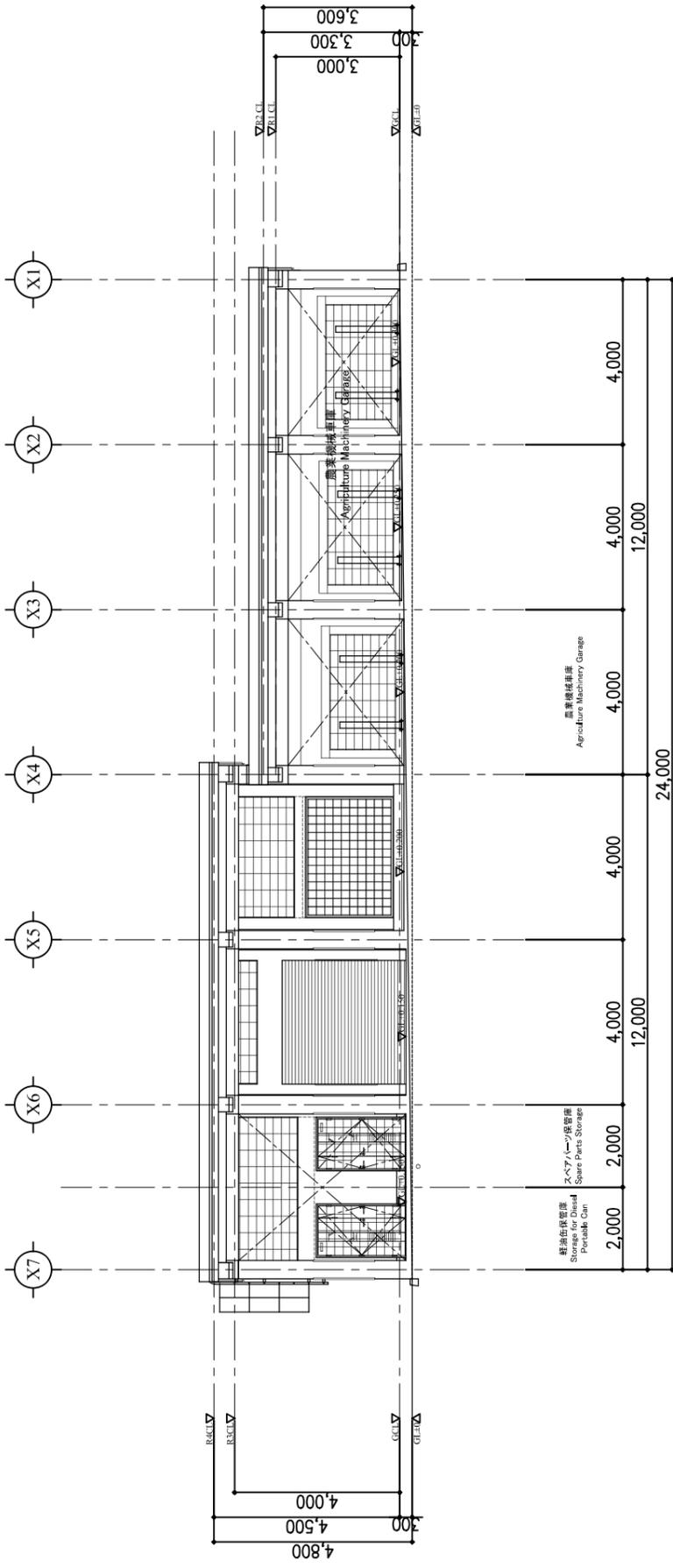


East Elevation

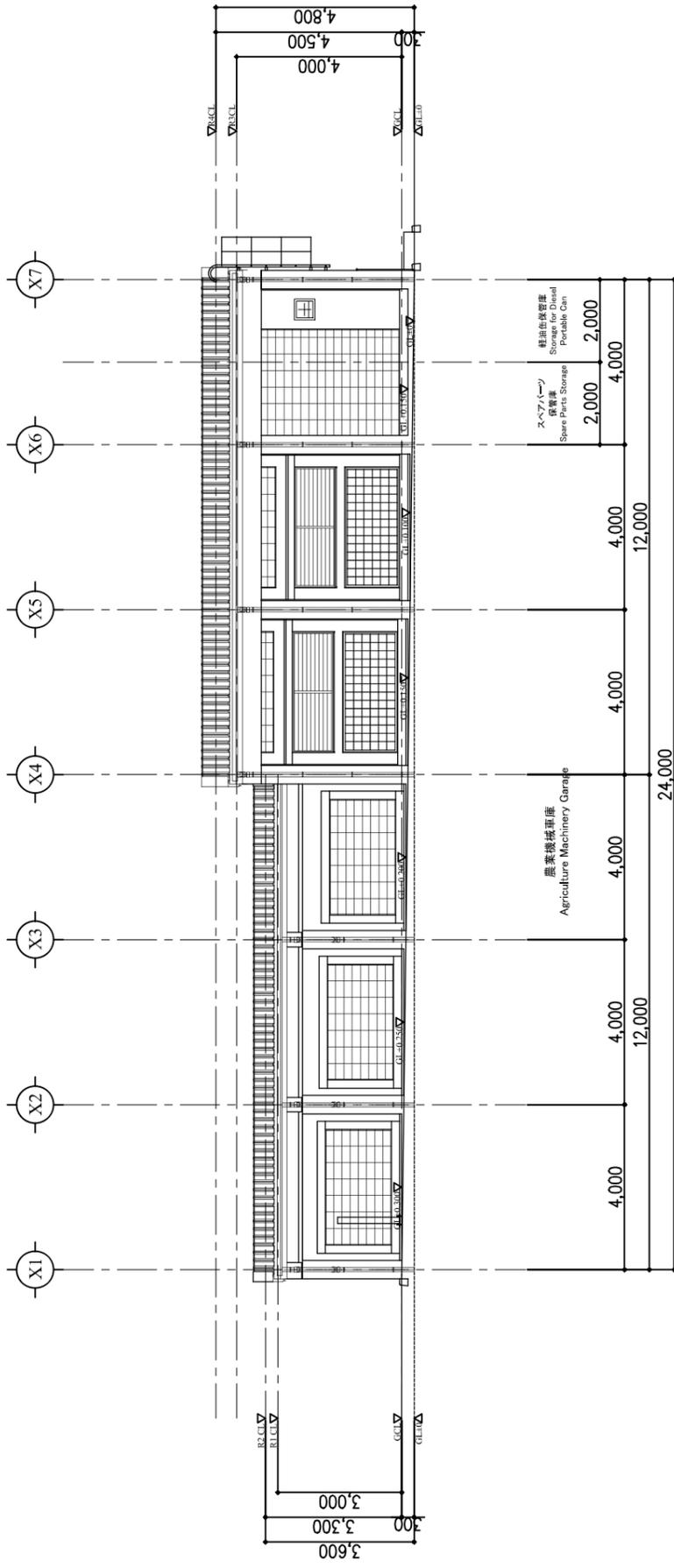


West Elevation

PROJECT	LOCATION	CONSULTANTS			TITLE	DRG NO :	
	<b>Lusaka, ZAMBIA</b>	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM			<b>農業機械庫 (マウント・マクル) 立面図1</b> Agricultural Machinery Garage (Mt. Makulu) - Elevation 1 -	<b>4-1-2</b>	
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		APPROVED BY :	CHECKED BY :	DESIGNED BY :	DRAWN BY :	DATE :	SCALE :
		M.NEGISHI	K.ODA	H.KOMATSU	H.KOMATSU	July 2022	1/150 for A3 paper

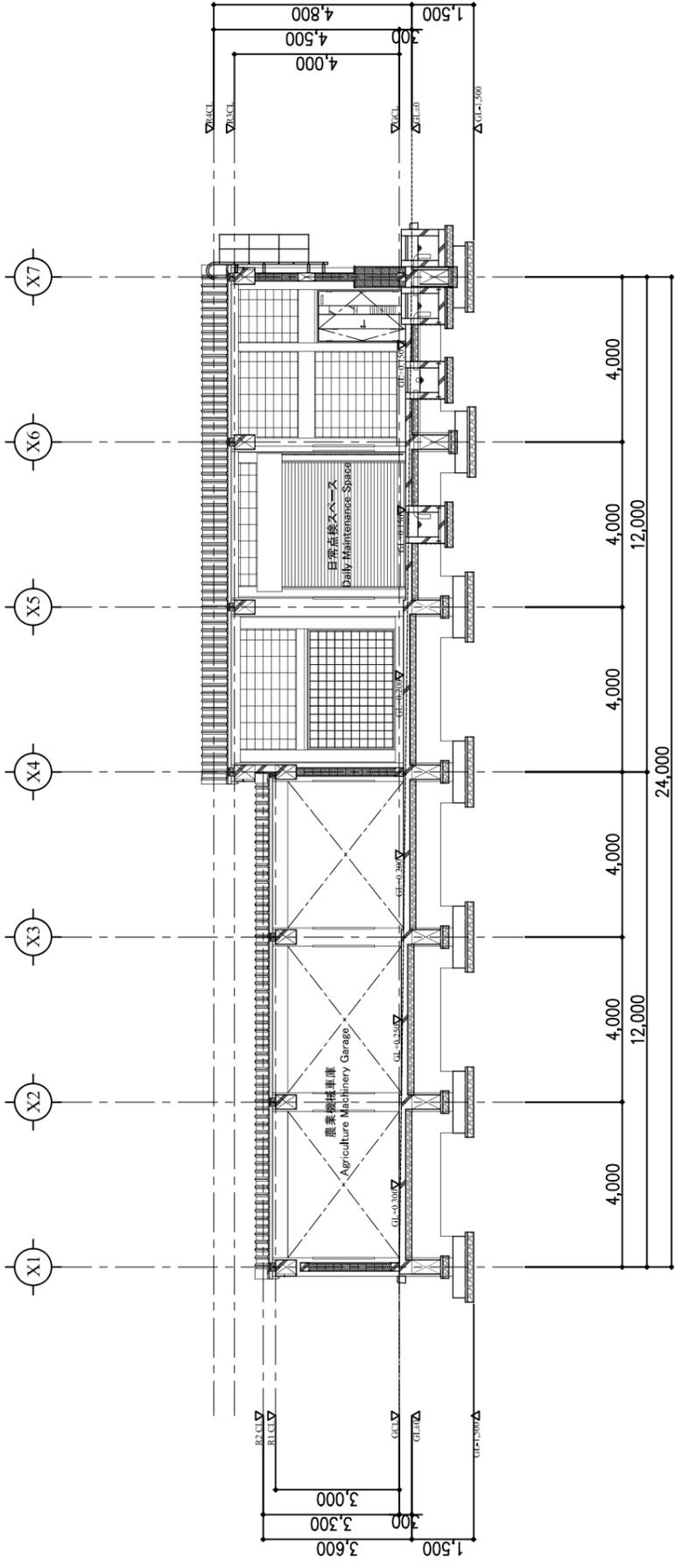


West Elevation

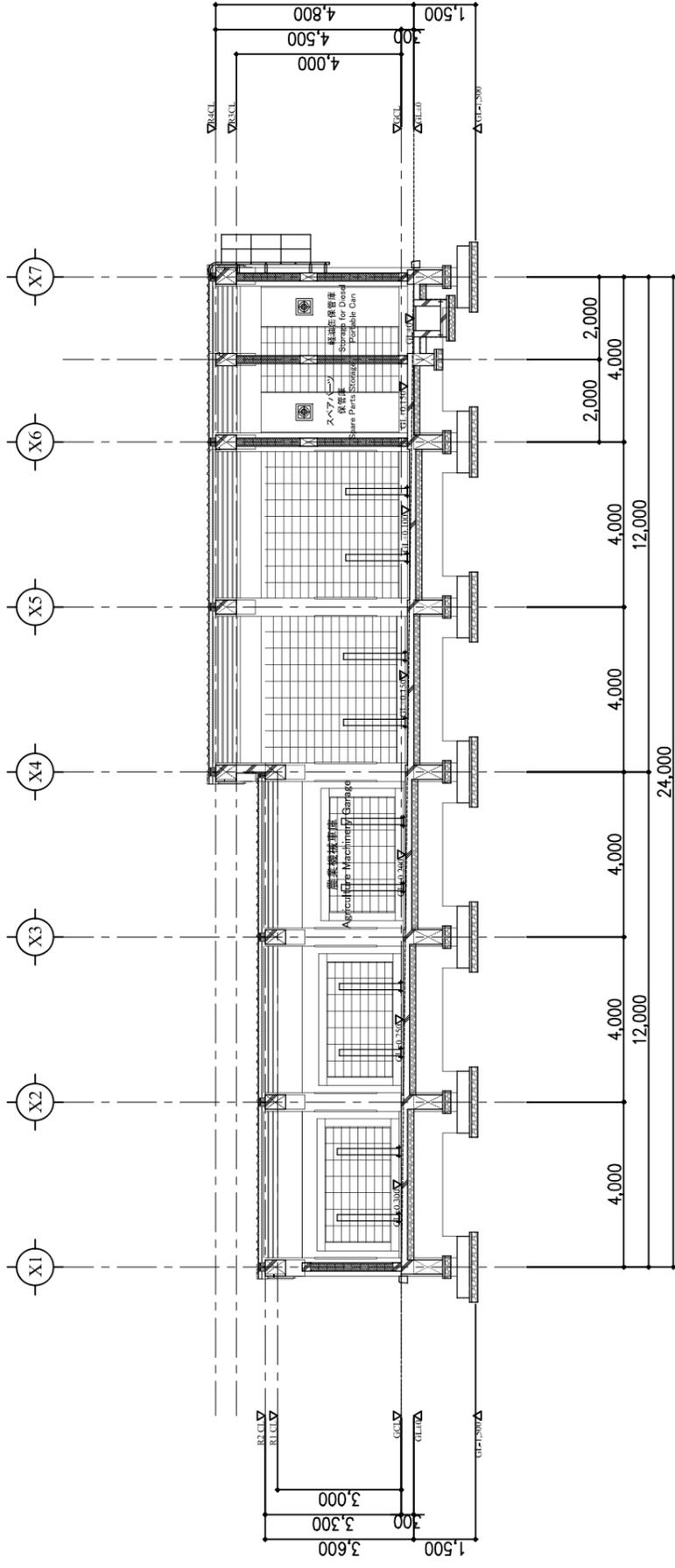


East Elevation

PROJECT	LOCATION	CONSULTANTS	TITLE			DRG NO :
			Agricultural Machinery Garage (Mt. Makulu) - Elevation 2 -			4-1-3
<b>THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA</b>			APPROVED BY :	DESIGNED BY :	DRAWN BY :	DATE :
			M.NEGISHI	K.ODA	H.KOMATSU	H.KOMATSU
			農業機械車庫 (マウント・マクル) 立面図2 Agricultural Machinery Garage (Mt. Makulu) - Elevation 2 -			SCALE :
						1/150 for A3 paper

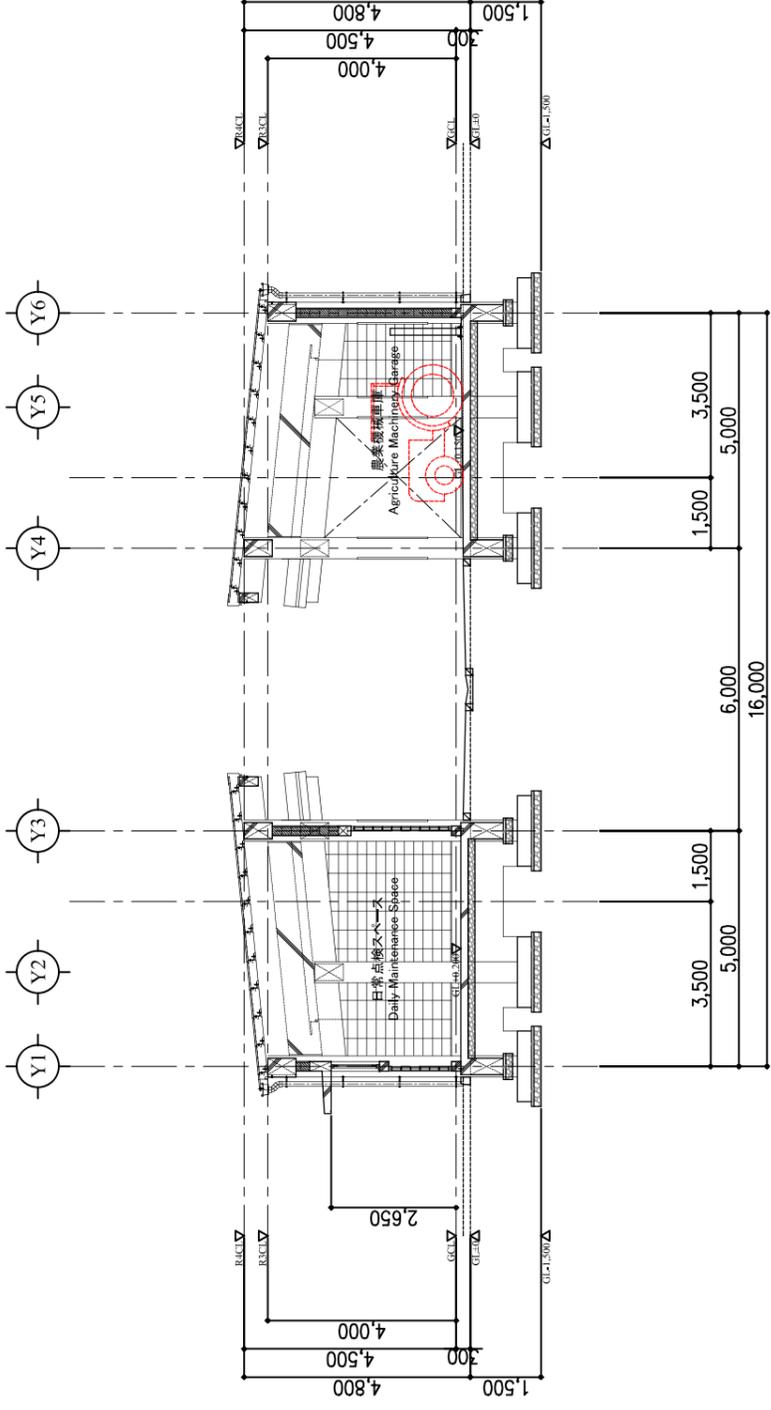


SECTION A-A

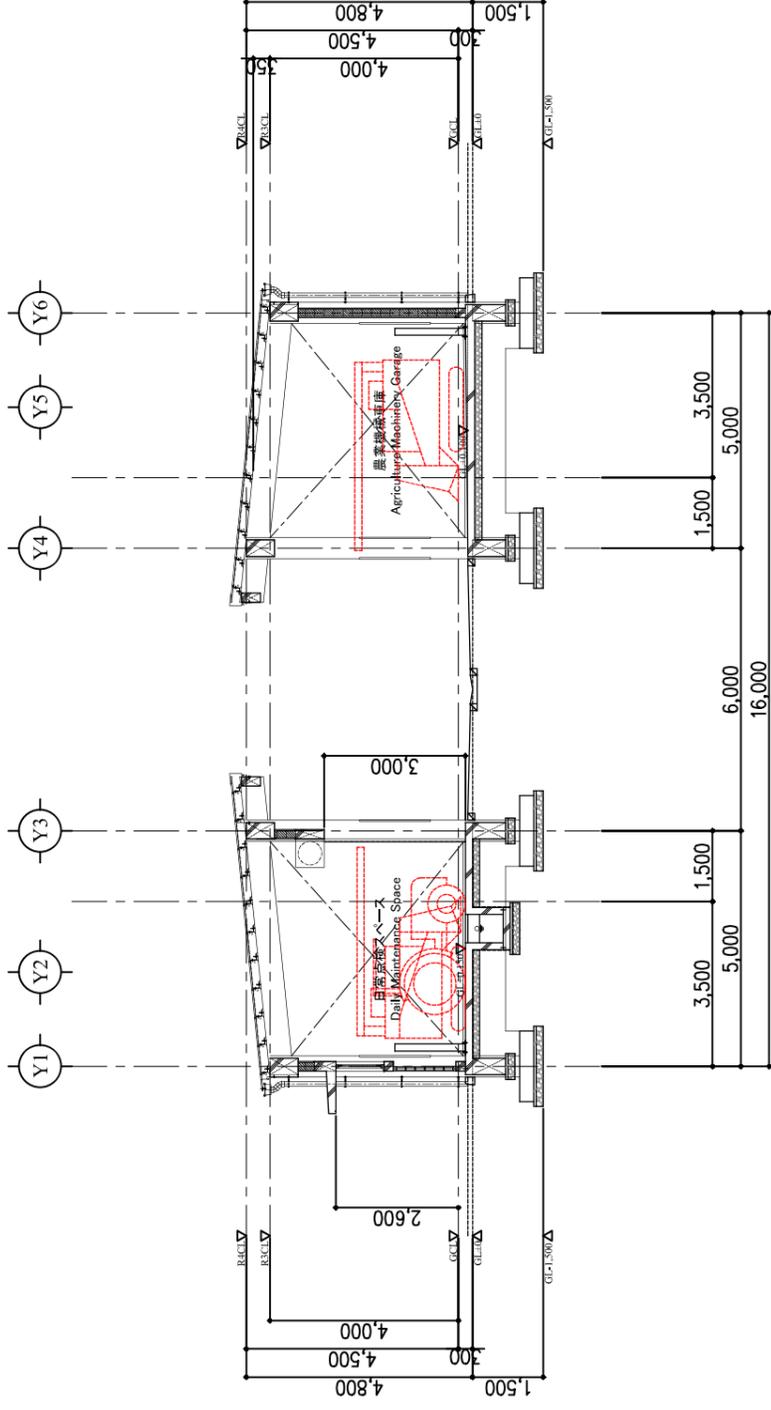


SECTION B-B

PROJECT	LOCATION	CONSULTANTS	TITLE				DRG NO :
			農業機械庫 (マウント・マクル) 断面図1 Agricultural Machinery Garage (Mt. Makulu) - Section 1 -				4-1-4
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Lusaka, ZAMBIA	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	APPROVED BY :	CHECKED BY :	DESIGNED BY :	DRAWN BY :	DATE :
			M.NEGISHI	K.ODA	H.KOMATSU	H.KOMATSU	July 2022
						SCALE :	1/150 for A3 paper



SECTION C-C



SECTION D-D

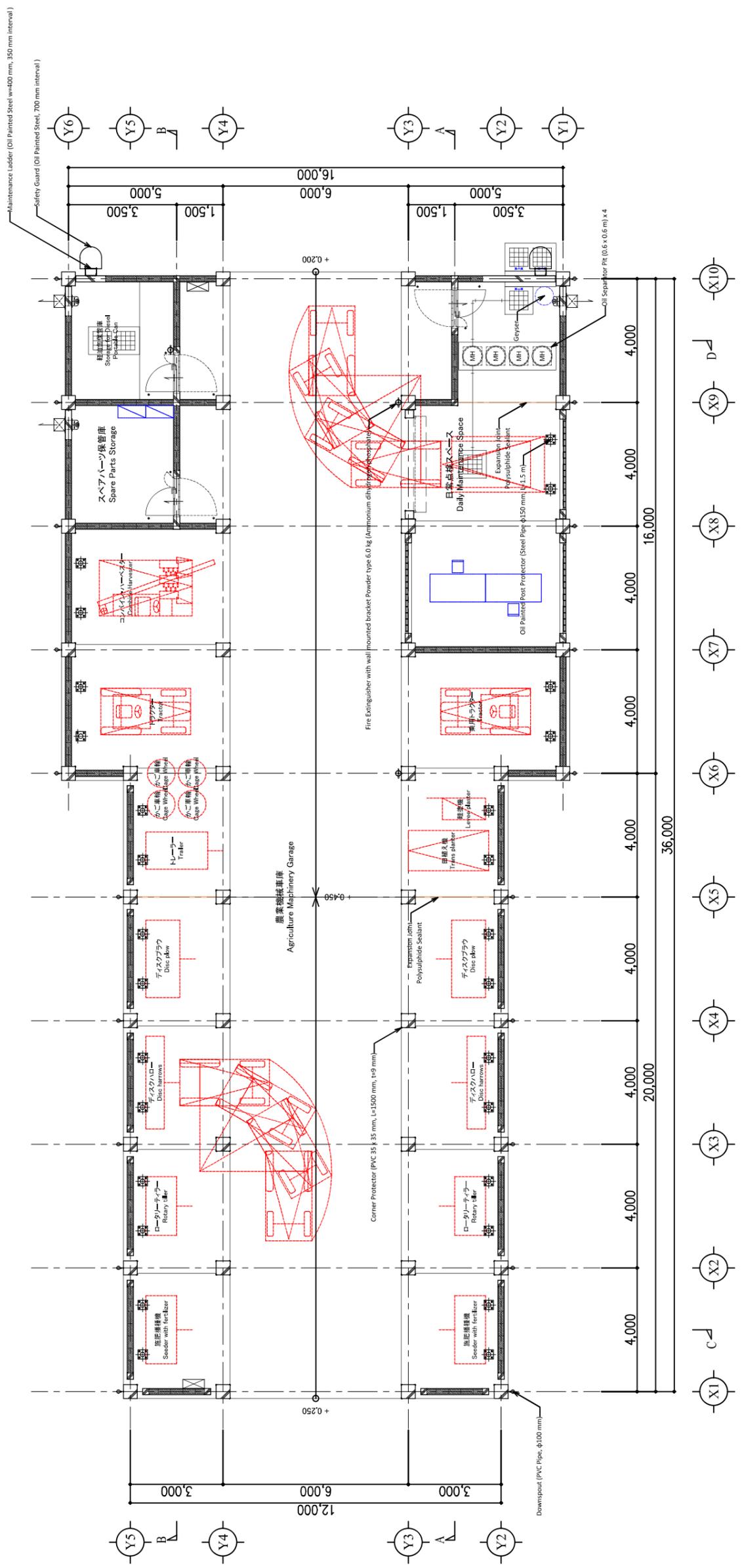
PROJECT	LOCATION	CONSULTANTS	TITLE				DRG NO :
			Agricultural Machinery Garage (Mt. Makulu) - Section 2 -				4-1-5
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA			APPROVED BY :	CHECKED BY :	DESIGNED BY :	DRAWN BY :	DATE :
			M.NEGISHI	K.ODA	H.KOMATSU	H.KOMATSU	July 2022
			JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM				SCALE :
							1/150 for A3 paper

REMARKS  
 Green : Scope of the Recipient side  
 Red : Scope of the Equipment Work by the Japanese side  
 Blue : Scope of the Equipment Work by the Japanese side

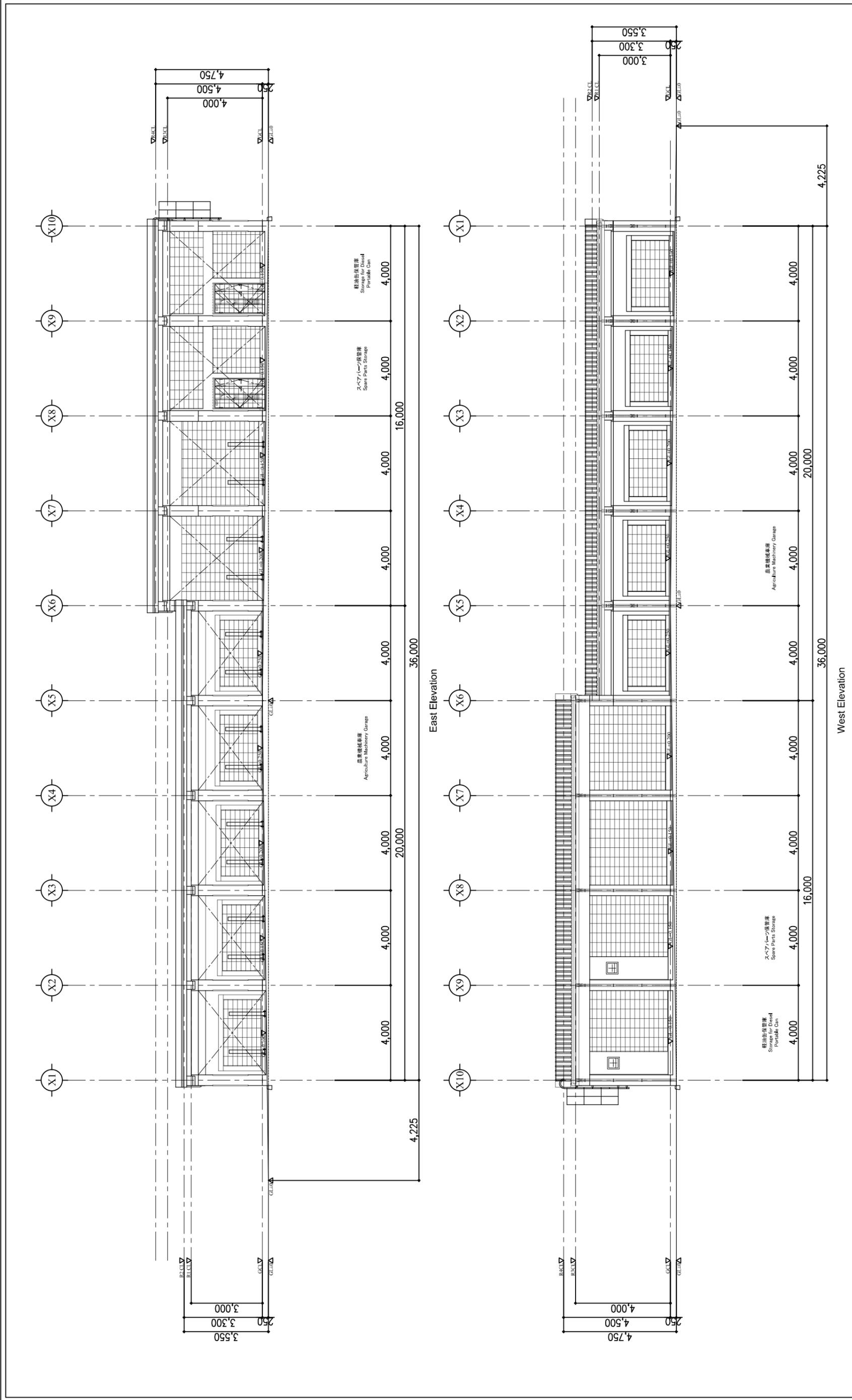


C7

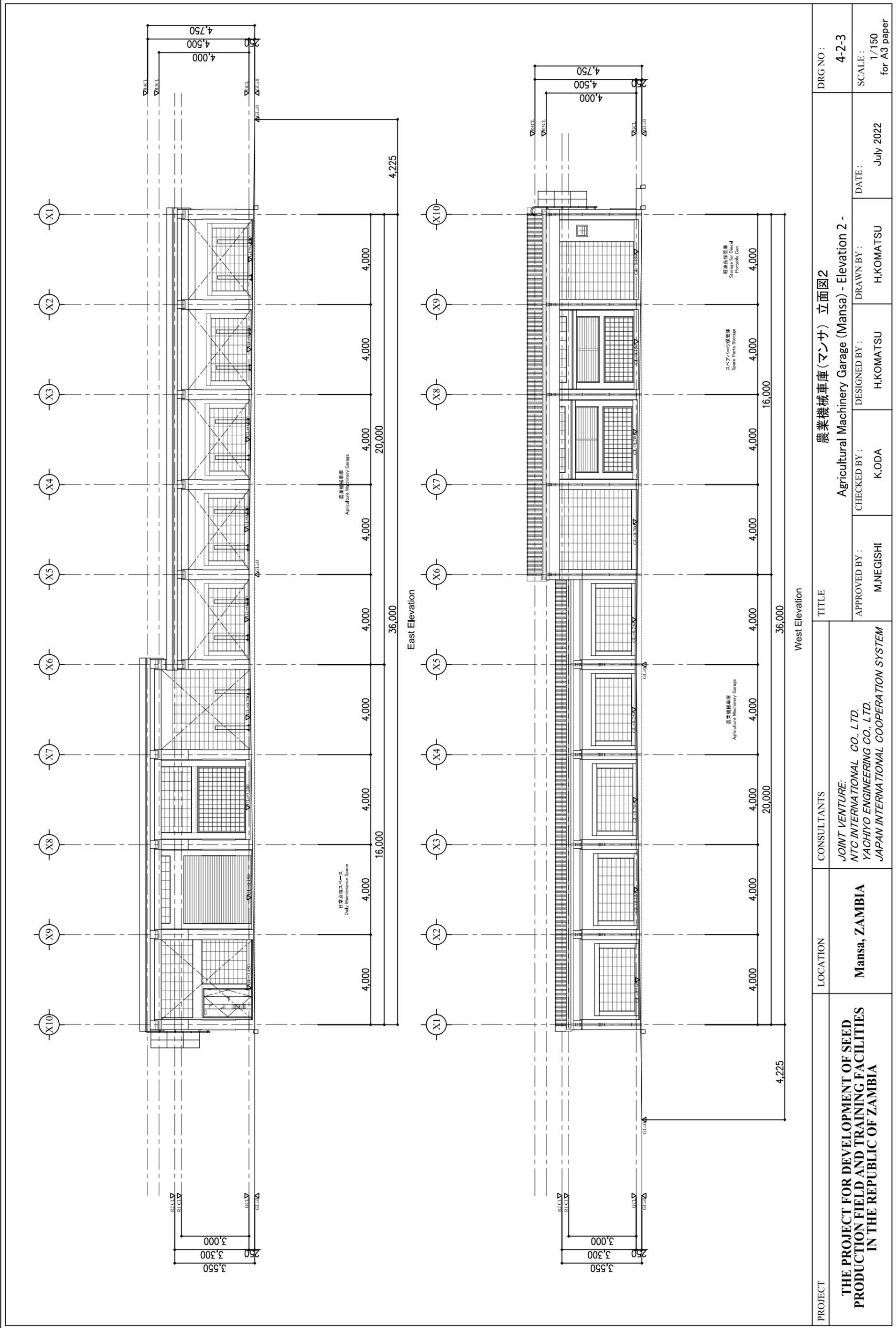
D7



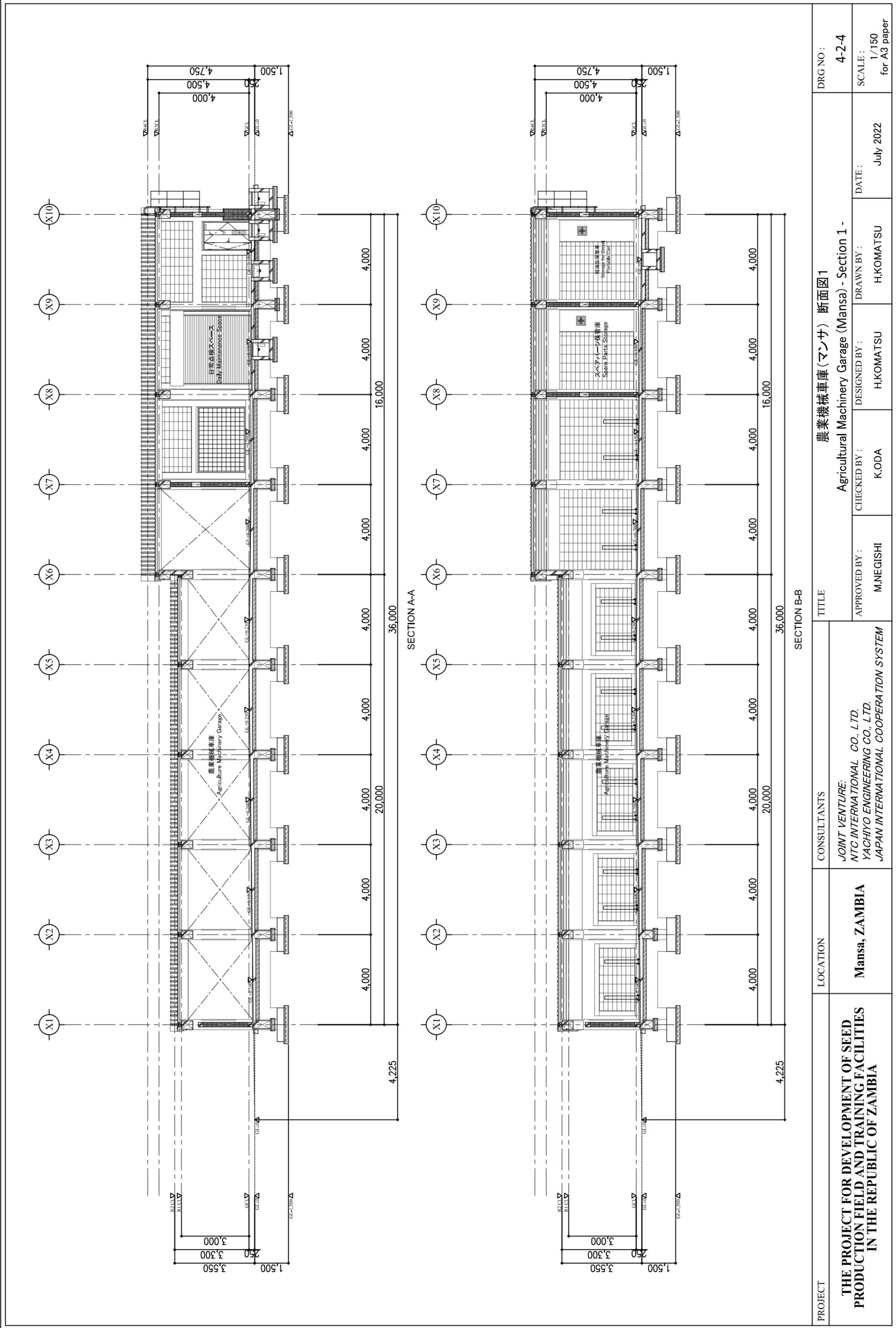
PROJECT	LOCATION	TITLE			DRG NO :
	Mansa, ZAMBIA	Agricultural Machinery Garage (Mansa) - Plan -			4-2-1
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		CONSULTANTS	APPROVED BY :	DESIGNED BY :	DATE :
		JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	M.NEGISHI	K.ODA H.KOMATSU H.KOMATSU	July 2022
			CHECKED BY :	DRAWN BY :	SCALE :
					1/150 for A3 paper



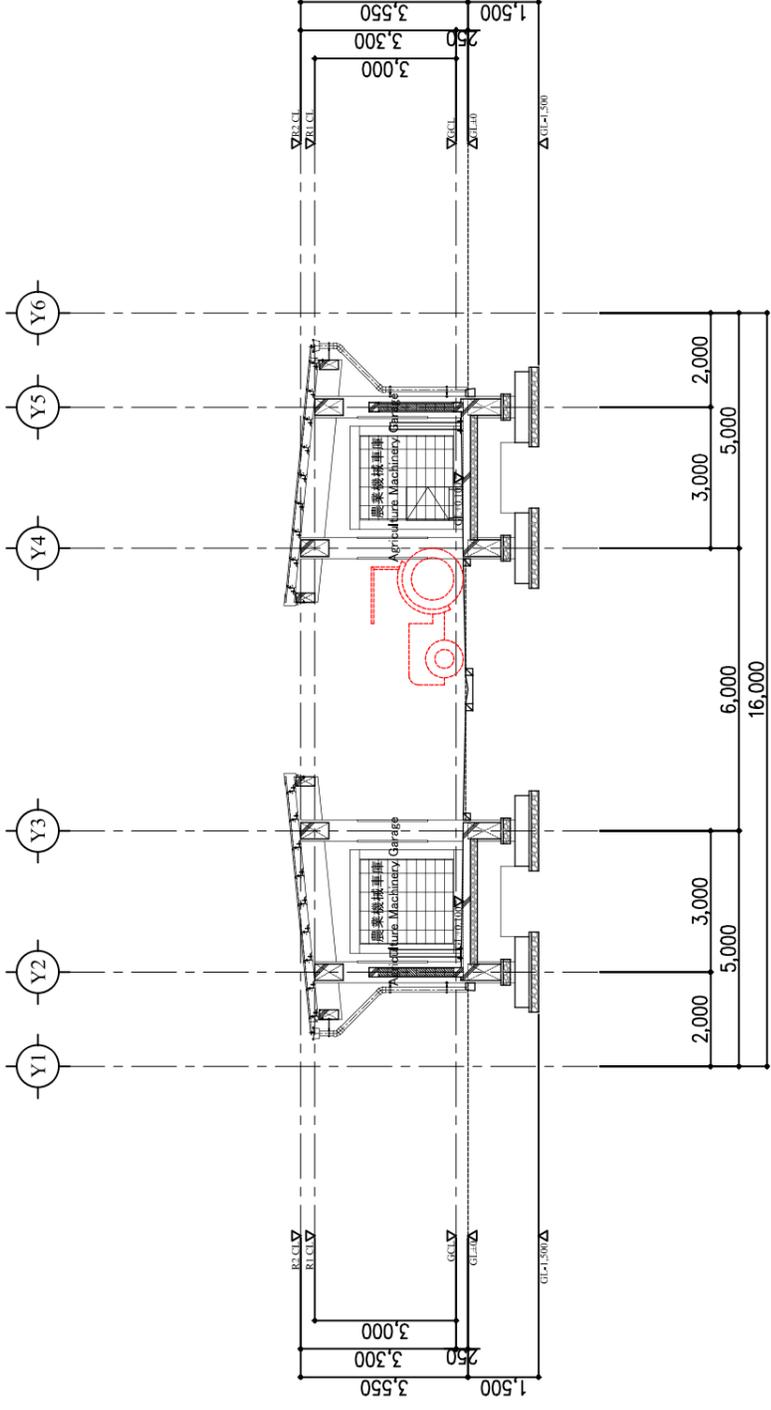
PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM			TITLE	農業機械車庫 (マンサ) 立面図1 Agricultural Machinery Garage (Mansa) - Elevation 1 -			DRG NO :	4-2-2	
	LOCATION	Mansa, ZAMBIA		APPROVED BY :	M.NEGISHI	CHECKED BY :		K.ODA	DESIGNED BY :	H.KOMATSU		DRAWN BY :	H.KOMATSU
												SCALE :	1/150 for A3 paper



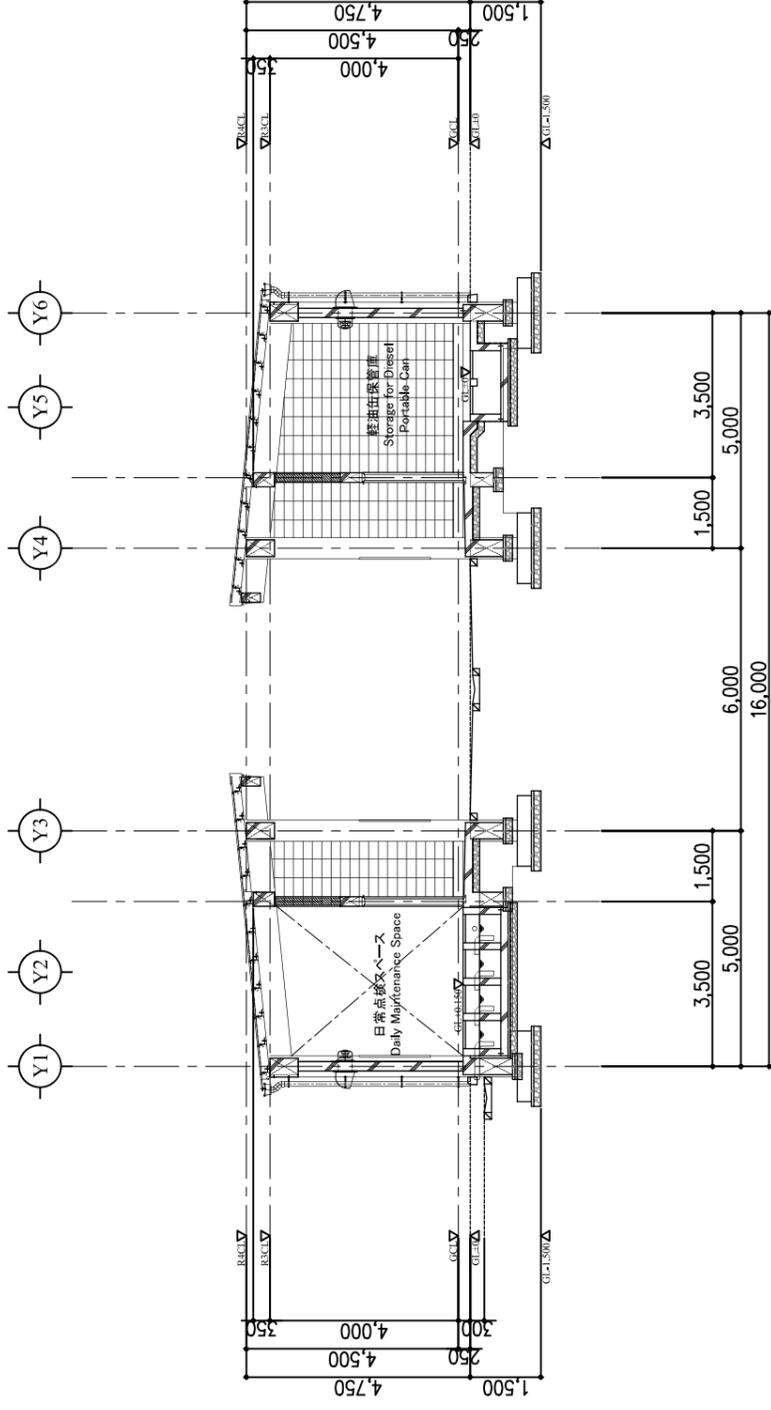
PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM			TITLE	農業機械車庫 (マンサ) 立面図2 Agricultural Machinery Garage (Mansa) - Elevation 2 -			DRG NO :	4-2-3
	LOCATION	Mansa, ZAMBIA	APPROVED BY :	M.NEGISHI	CHECKED BY :	K.ODA	DESIGNED BY :	H.KOMATSU	DRAWN BY :	H.KOMATSU	DATE :	July 2022
SCALE :												1/150 for A3 paper



PROJECT	LOCATION	CONSULTANTS	TITLE				DRG NO :
			<b>農業機械車庫 (マンサ) 断面図1</b> Agricultural Machinery Garage (Mansa) - Section 1 -				4-2-4
<b>THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA</b>		JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM		APPROVED BY :	DESIGNED BY :	DRAWN BY :	DATE :
		Manssa, ZAMBIA	M.NEGISHI	K.ODA	H.KOMATSU	H.KOMATSU	July 2022
							SCALE : 1/150 for A3 paper



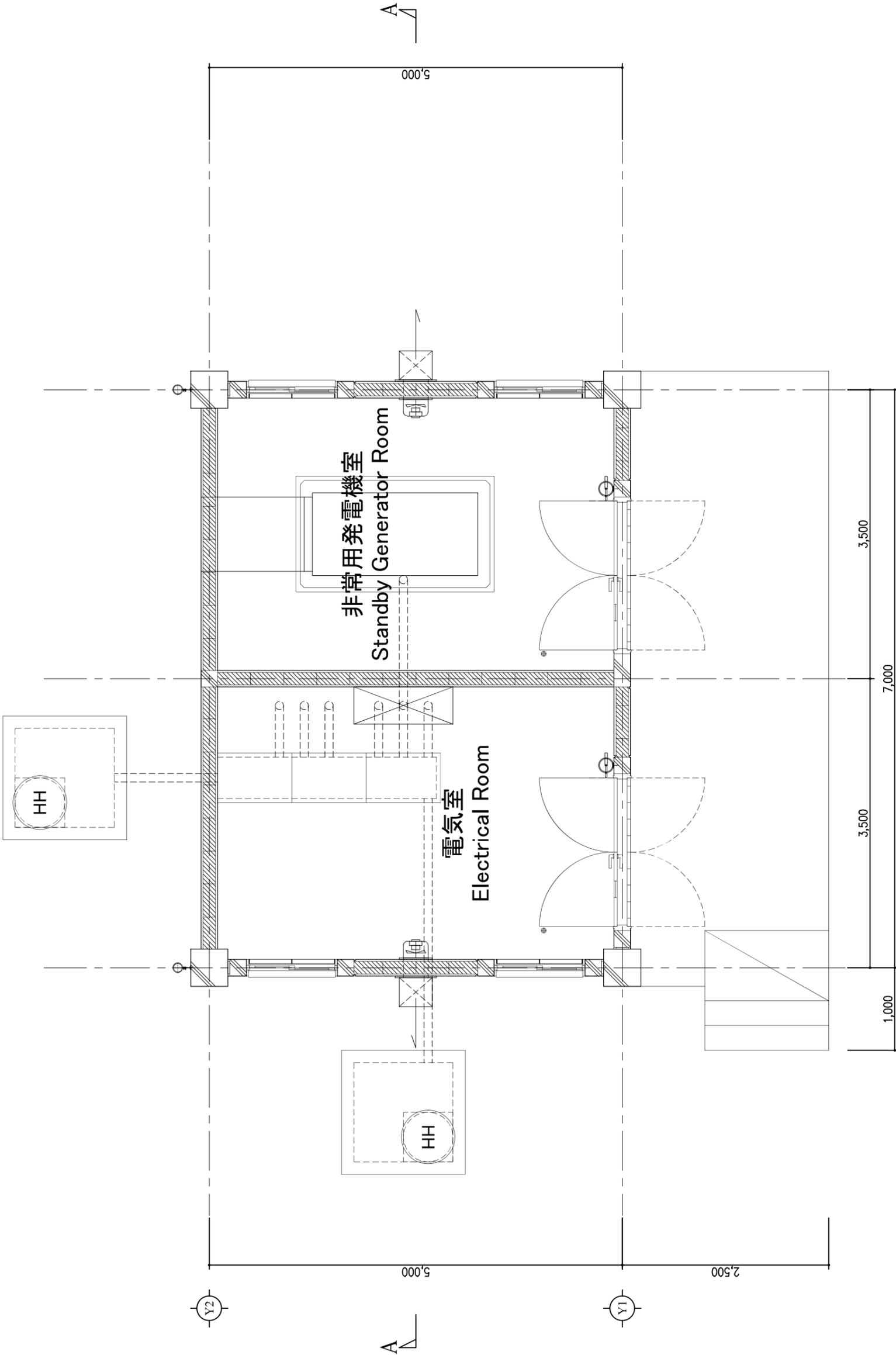
SECTION C-C



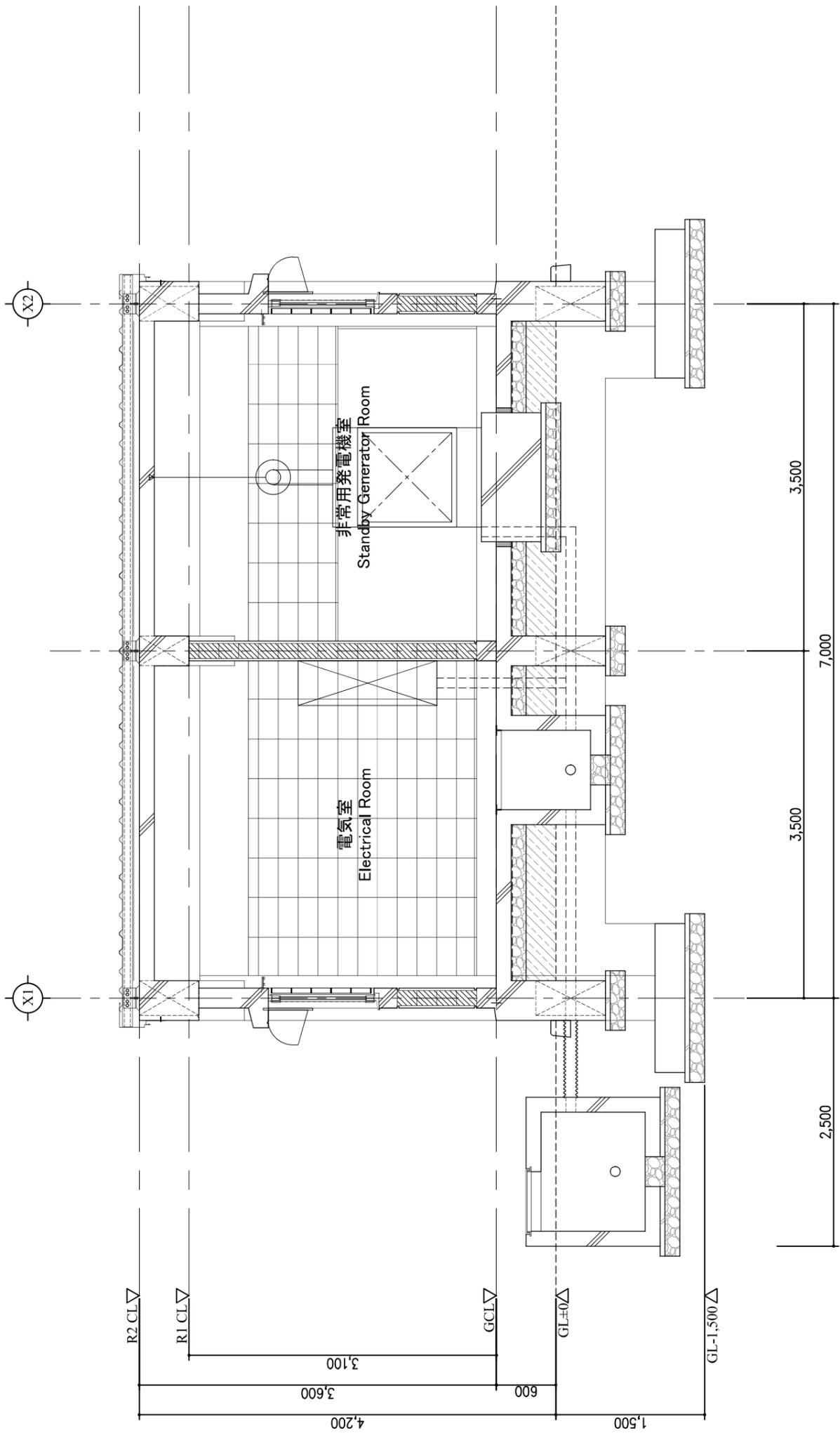
SECTION D-D

PROJECT	LOCATION	CONSULTANTS	TITLE				DRG NO :
			<b>農業機械庫 (マンサ) 断面図2</b> Agricultural Machinery Garage (Mansa) - Section 2 -				4-2-5
<b>THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA</b>		JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	APPROVED BY :	CHECKED BY :	DESIGNED BY :	DRAWN BY :	DATE :
			M.NEGISHI	K.ODA	H.KOMATSU	H.KOMATSU	July 2022
						SCALE :	for A3 paper
						1/150	



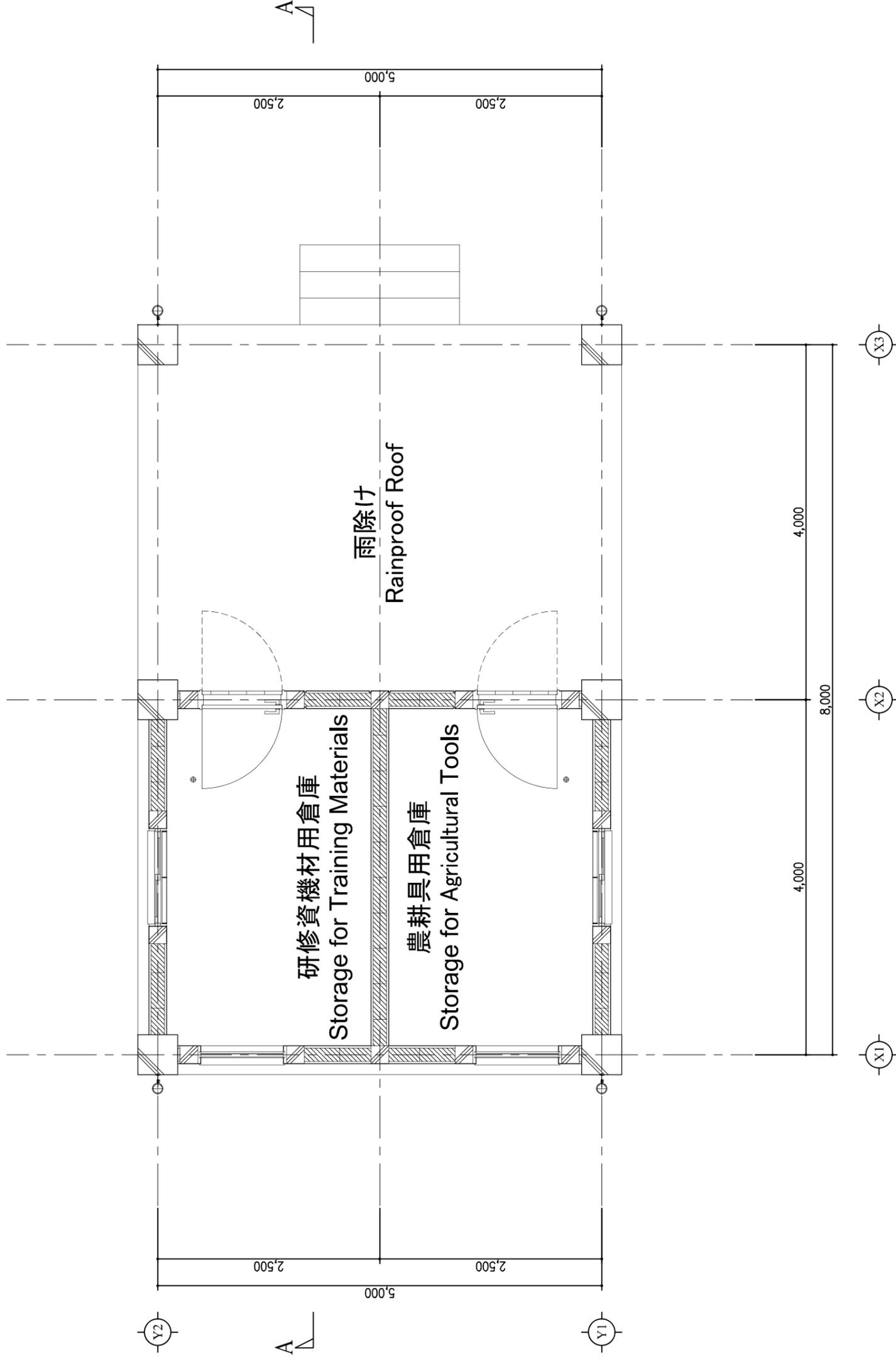


PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		LOCATION	Lusaka, ZAMBIA Mansa, ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	電気機械室 (マウント・マクル及びびマンサ) 平面図 Electrical Machine Room (Mt. Makulu & Mansa) - Plan -			DRG NO :	6-1					
							APPROVED BY :	M.NEGISHI	CHECKED BY :	K.ODA	DESIGNED BY :	H.KOMATSU	DRAWN BY :	H.KOMATSU	DATE :	July 2022	SCALE :

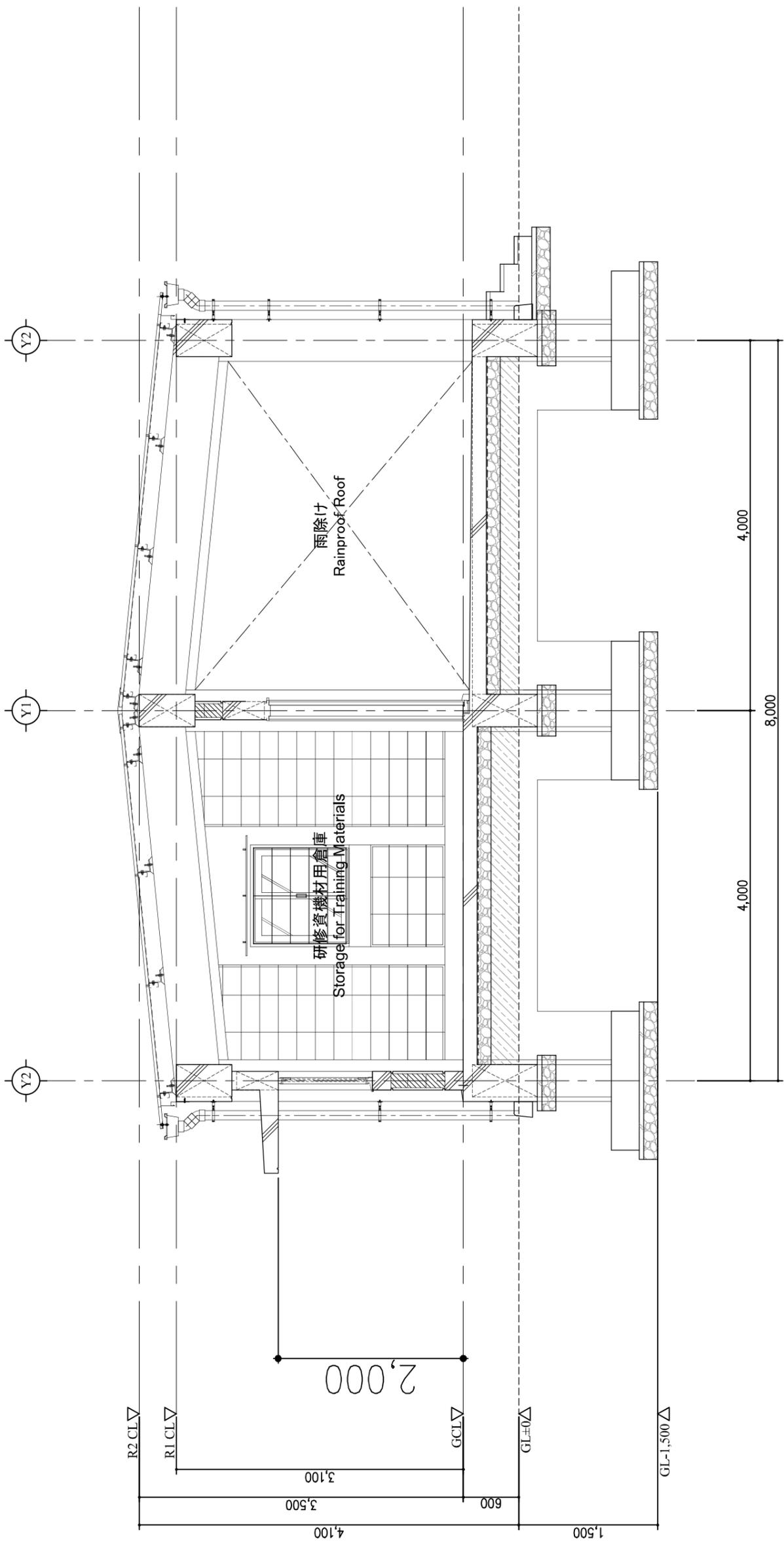


SECTION A-A

PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., L.TD. YACHIYO ENGINEERING CO., L.TD. JAPAN INTERNATIONAL COOPERATION SYSTEM		TITLE	電気機械室 (マウント・マクル及びマンサ) 断面図		DRG NO :	6-2				
	LOCATION	Lusaka, ZAMBIA Mansa, ZAMBIA		APPROVED BY :	M.NEGISHI		CHECKED BY :	K.ODA		DESIGNED BY :	H.KOMATSU	DRAWN BY :	H.KOMATSU	DATE :



PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM			TITLE	圃場研修倉庫(マンサ) 平面図			DRG NO :	7-1	
	LOCATION	Mansa, ZAMBIA		APPROVED BY :	M.NEGISHI	CHECKED BY :		K.ODA	DESIGNED BY :	H.KOMATSU	DRAWN BY :	H.KOMATSU	DATE :
												SCALE :	1/50 for A3 paper



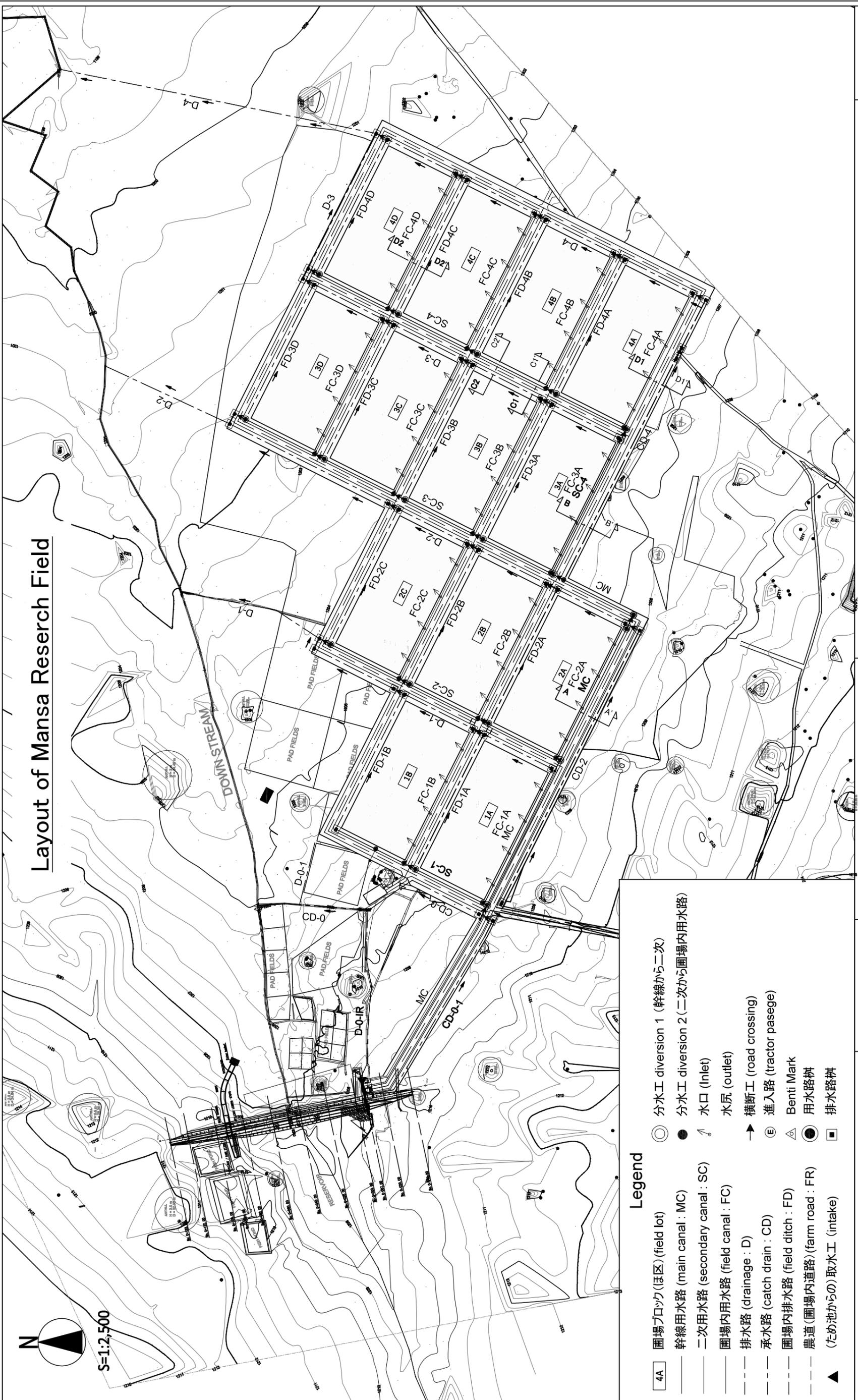
SECTION A-A

PROJECT	LOCATION	CONSULTANTS	TITLE				DRG NO :
			Rice Field Training Storage (Mansa) - Section -				7-2
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA			JOINT VENTURE: NTC INTERNATIONAL CO., L.TD. YACHIYO ENGINEERING CO., L.TD. JAPAN INTERNATIONAL COOPERATION SYSTEM		APPROVED BY :	DESIGNED BY :	DATE :
Mansa, ZAMBIA			M.NEGISHI		K.ODA	H.KOMATSU	July 2022
			M.NEGISHI		K.ODA	H.KOMATSU	SCALE : 1/50 for A3 paper

## 土木施設 図面目録

NO	図面名称
【ため池施設】	
101	マンサ研究所施設配置図
102	ため池一般計画平面図
103	ため池標準断面図
104	洪水吐構造図
105	取水工構造図
106	バルブハウス計画図
【ほ場整備】	
201	ほ場整備標準断面図
202	用水路計画平面図
203	排水路計画平面図
204	耕作道路計画平面図
205	灌漑施設・排水路 構造図
206	道路横断工構造図
207	進入路構造図
【アクセス道路】	
301	アクセス道路計画平面図
302	アクセス道路標準断面図



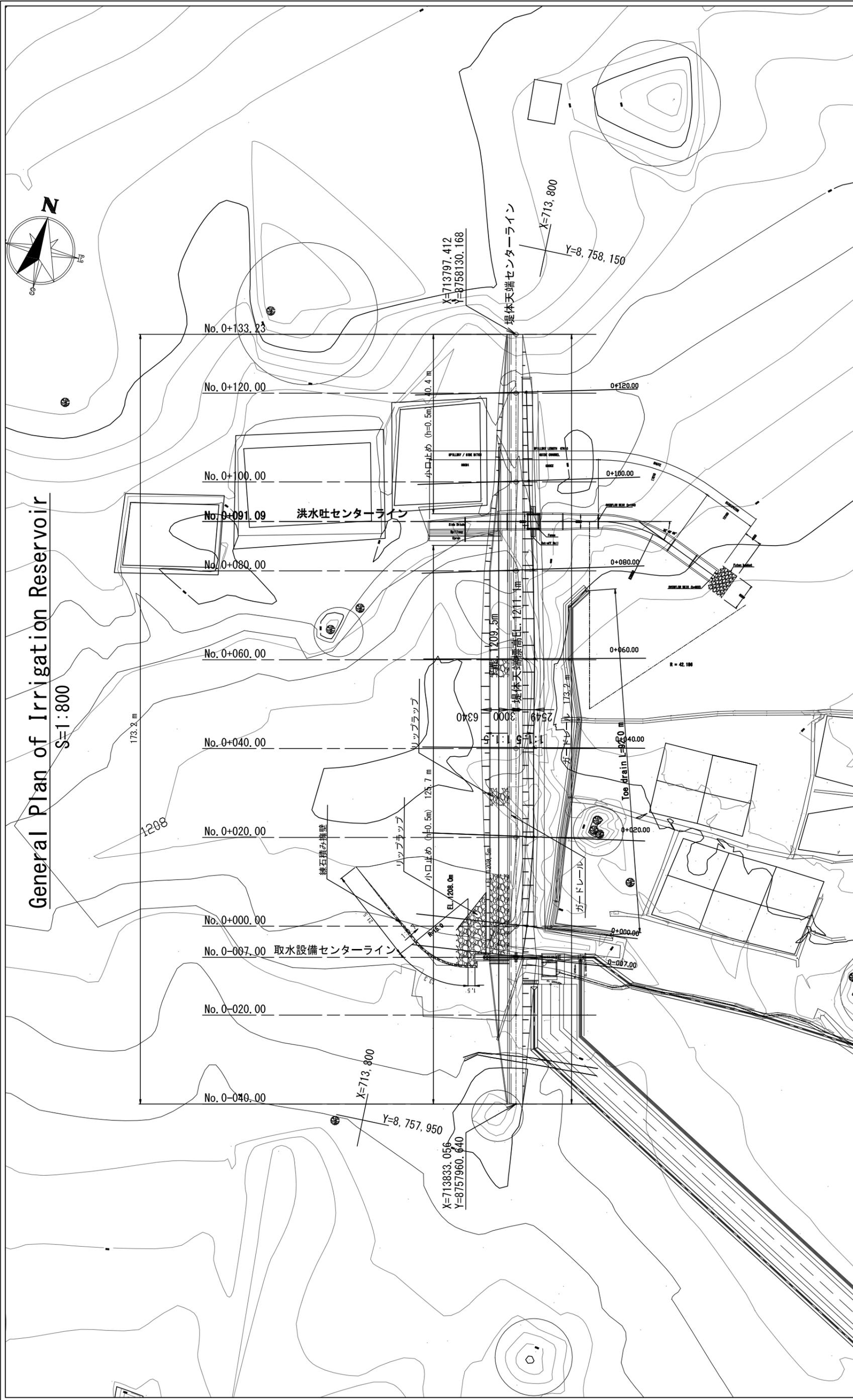


Layout of Mansa Research Field

S=1:2,500

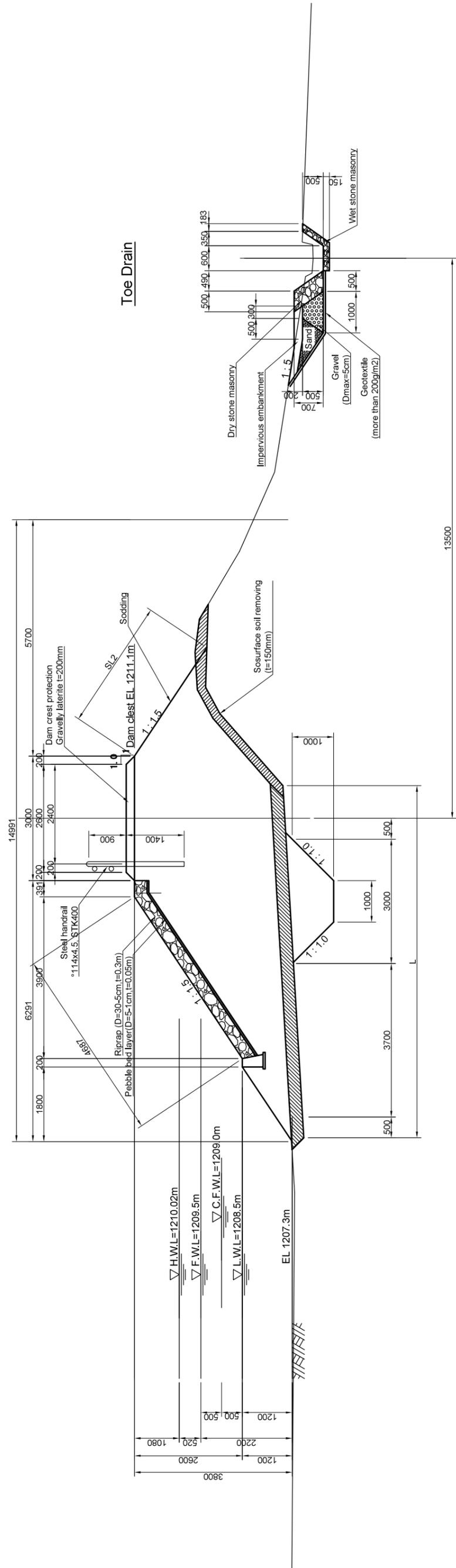
- Legend**
- 4A 圃場ブロック(ほ区) (field lot)
  - 幹線用水路 (main canal : MC)
  - 二次用水路 (secondary canal : SC)
  - 圃場内用水路 (field canal : FC)
  - - - 排水路 (drainage : D)
  - - - 承水路 (catch drain : CD)
  - - - 圃場内排水路 (field ditch : FD)
  - - - 農道(圃場内道路) (farm road : FR)
  - ▲ (ため池からの) 取水工 (intake)
  - 分水工 diversion 1 (幹線から二次)
  - 分水工 diversion 2 (二次から圃場内用水路)
  - ↑ 水口 (Inlet)
  - ▽ 水尻 (outlet)
  - 横断工 (road crossing)
  - ⊕ 進入路 (tractor passage)
  - △ Benti Mark
  - 用水路柵
  - 排水路柵

PROJECT	LOCATION	CONSULTANTS	TITLE	DRG NO :
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Mansa, ZAMBIA	NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	Layout of Mansa Research Field	C-101
			APPROVED BY :	SCALE : 1/2500 for A3 paper
			CHECKED BY :	
			DESIGNED BY :	
			DRAWN BY :	
			DATE :	



PROJECT	<b>THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA</b>	
	LOCATION	<b>Mansa, ZAMBIA</b>
CONSULTANTS	NTC INTERNATIONAL CO., LTD. YACHYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	
TITLE	<b>ため池一般計画平面図</b> General Plan of Irrigation Reservoir	
DRG NO.:	C-102	DATE:
SCALE:	1/800	DRAWN BY:
		CHECKED BY:
		DESIGNED BY:
		APPROVED BY:
		FOR A3 paper

# Typical Cross Section

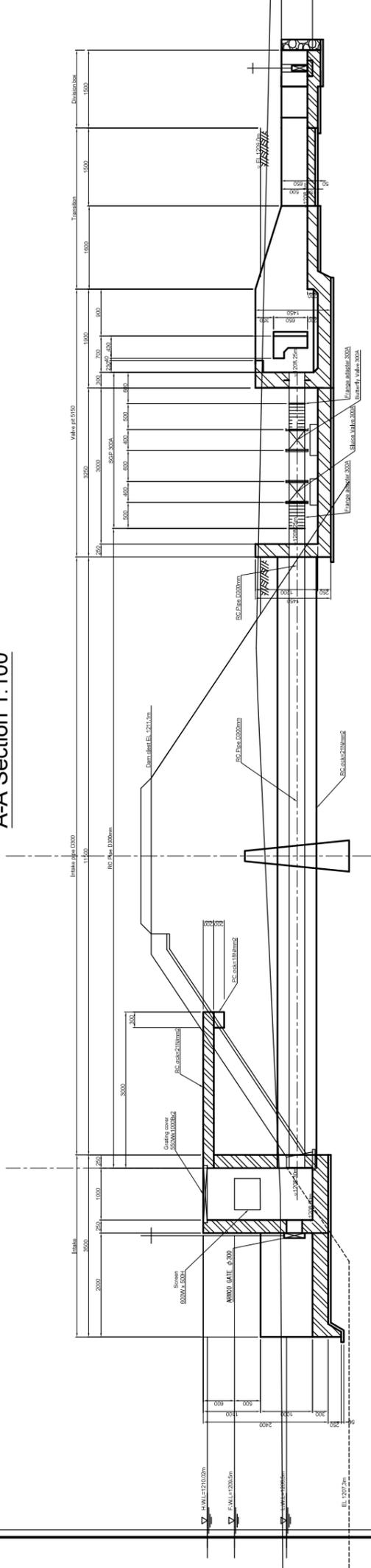


PROJECT	LOCATION	CONSULTANTS	TITLE	DRG NO:
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Mansa, ZAMBIA	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	ため池 標準断面図 Typical Cross Section of Irrigation Reservoir	C-103
			APPROVED BY: M.NEGISHI	SCALE: 1/100 for A3 paper
			CHECKED BY:	DATE: July 2022
			DESIGNED BY: M.NEGISHI	DRAWN BY: T.INOUE

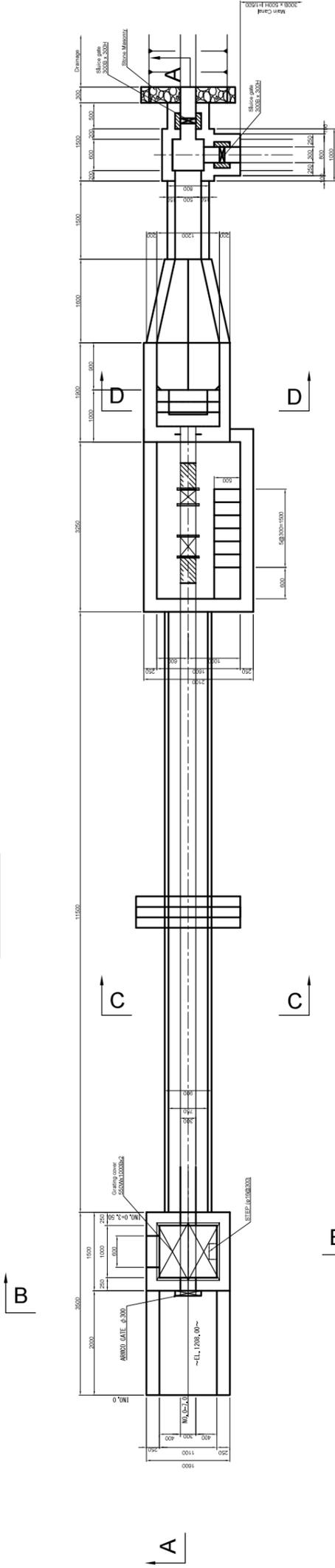


# Intake plan

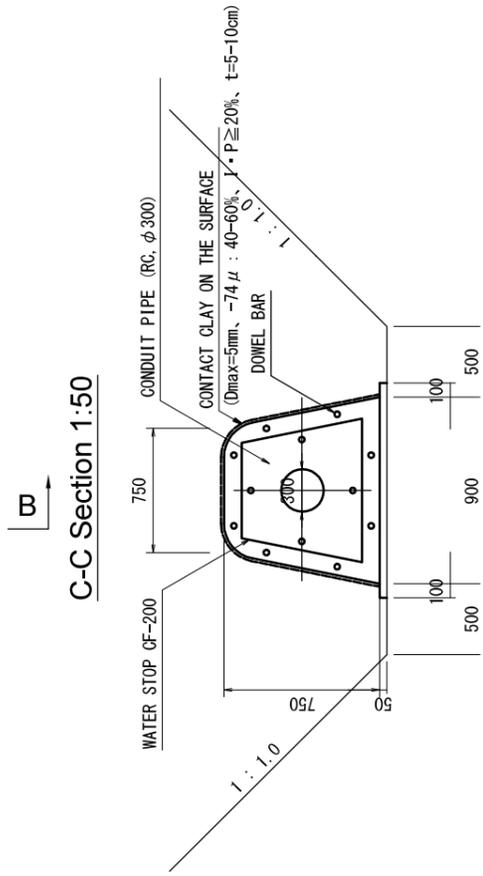
A-A Section 1:100



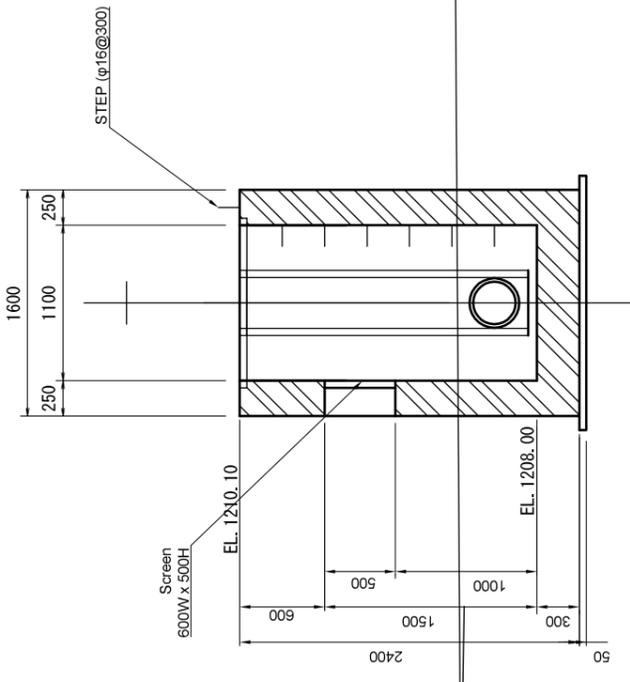
Plan 1:100



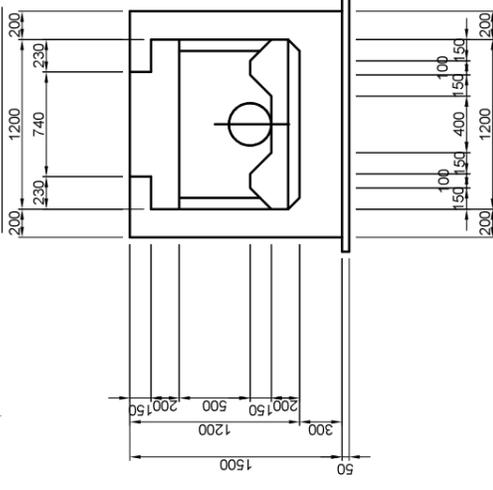
C-C Section 1:50



B-B Section 1:50

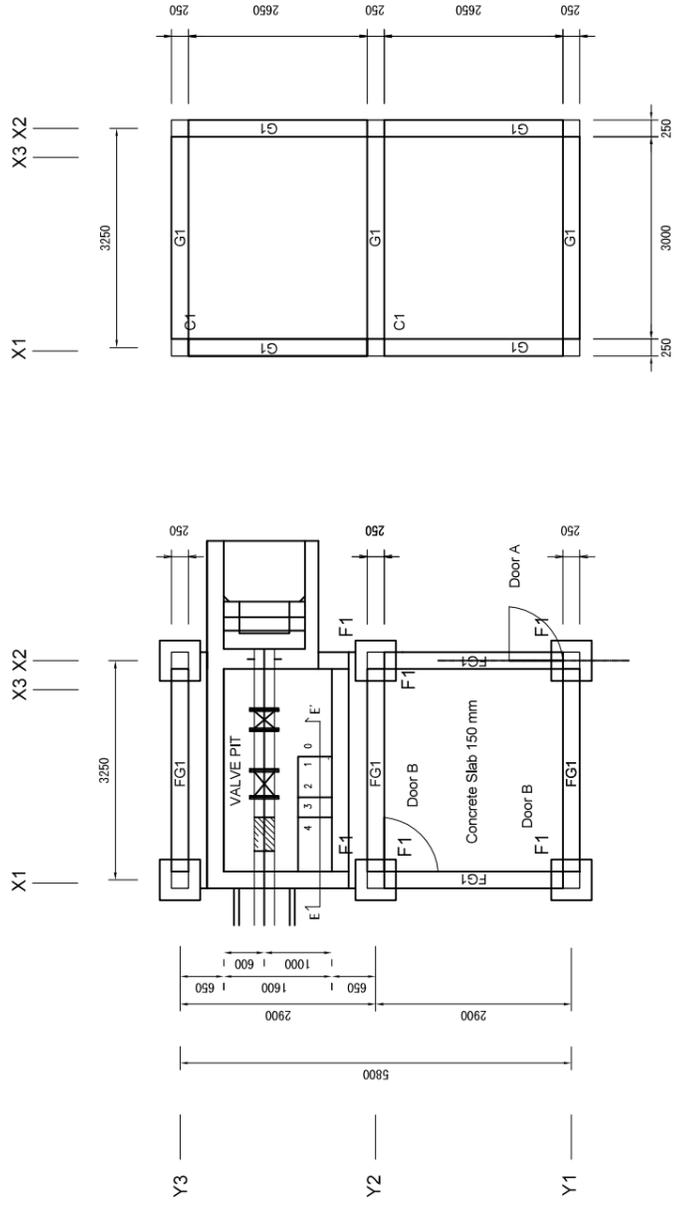


D-D Section 1:50

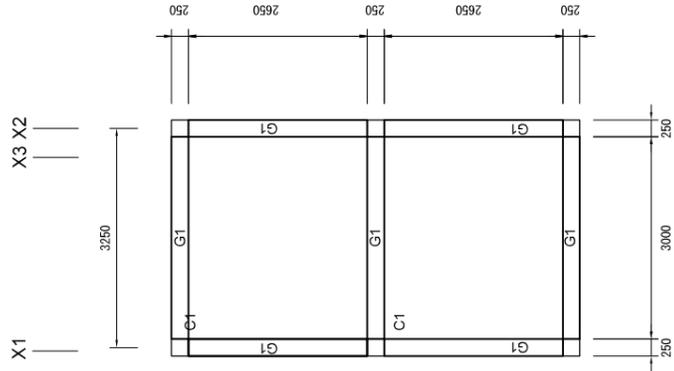


PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA			CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM			TITLE	取水工構造図 Plan of Intake			DRG NO.:	C-105		
	LOCATION	Mansa, ZAMBIA			CHECKED BY:	M.NEGISHI			APPROVED BY:	M.NEGISHI			DRAWN BY:		
													DATE:	July 2022	
													SCALE:	1/100, 1/50 for A3 paper	

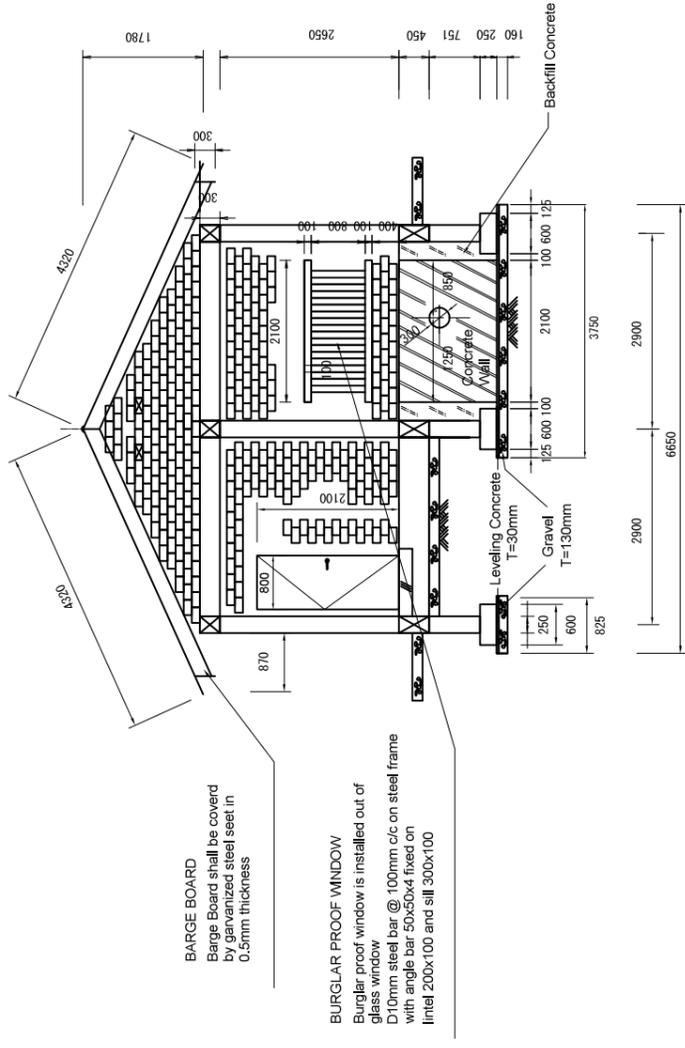
**Fundation (1F) Plan**



**Ceiling (RF) Plan**



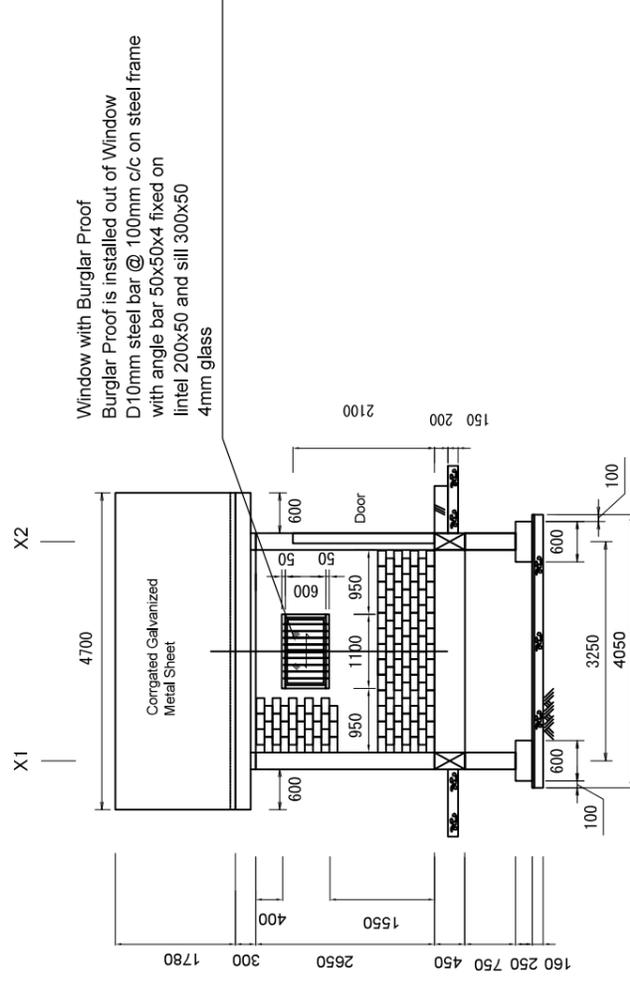
**X2 Section**



**BARGE BOARD**  
Barge Board shall be covered by galvanized steel sheet in 0.5mm thickness

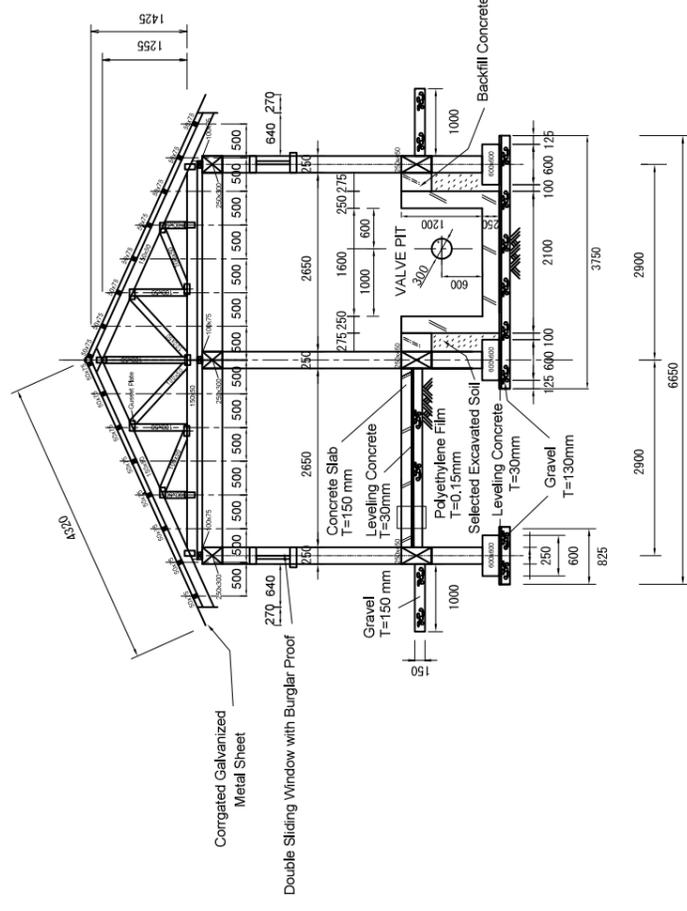
**BURGLAR PROOF WINDOW**  
Burglar proof window is installed out of glass window  
D10mm steel bar @ 100mm c/c on steel frame with angle bar 50x50x4 fixed on lintel 200x100 and sill 300x100

**Y1 Section**



**Window with Burglar Proof**  
Burglar Proof is installed out of Window  
D10mm steel bar @ 100mm c/c on steel frame with angle bar 50x50x4 fixed on lintel 200x50 and sill 300x50  
4mm glass

**X3 Section**



PROJECT

**THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA**

LOCATION

**Mansa, ZAMBIA**

CONSULTANTS

**JOINT VENTURE:  
NTC INTERNATIONAL CO., LTD.  
YACHIYO ENGINEERING CO., LTD.  
JAPAN INTERNATIONAL COOPERATION SYSTEM**

TITLE

**ため池 取水工 ハルブハウス 計画図・構造図  
STRUCTURAL DRAWING OF VALVE HOUSE**

APPROVED BY:

M.NEGISHI

CHECKED BY:

H. KURONUMA

DESIGNED BY:

H. KURONUMA

DRAWN BY:

H. KURONUMA

DATE:

July 2022

DRG NO.:

C-106

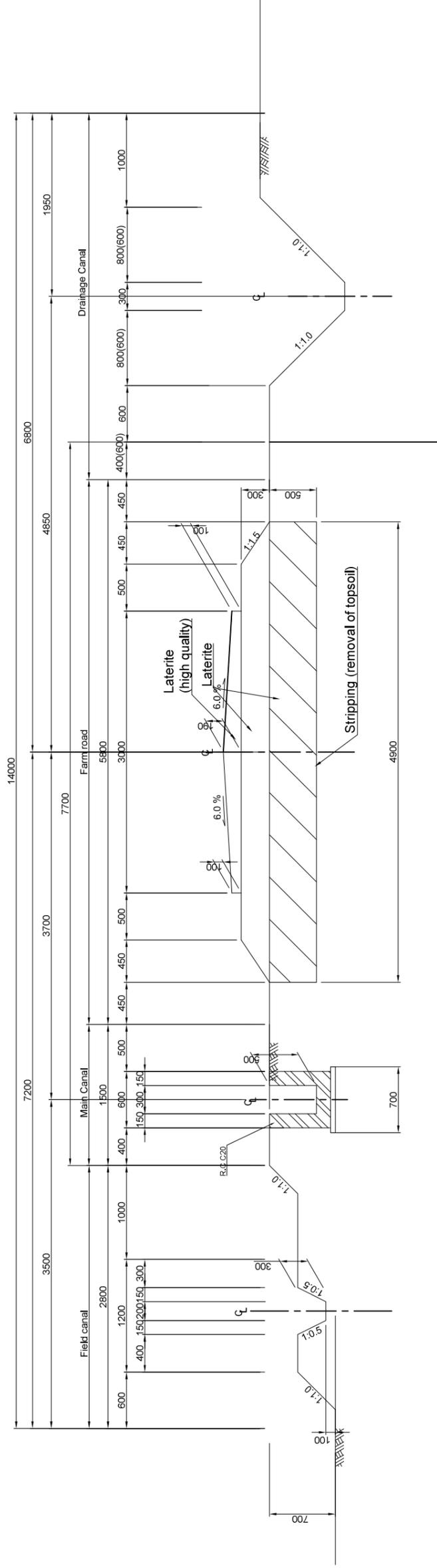
SCALE:

1/100  
for A3 paper

# Standard Cross Section of Farm Road and Irrigation Facilities (1/3)

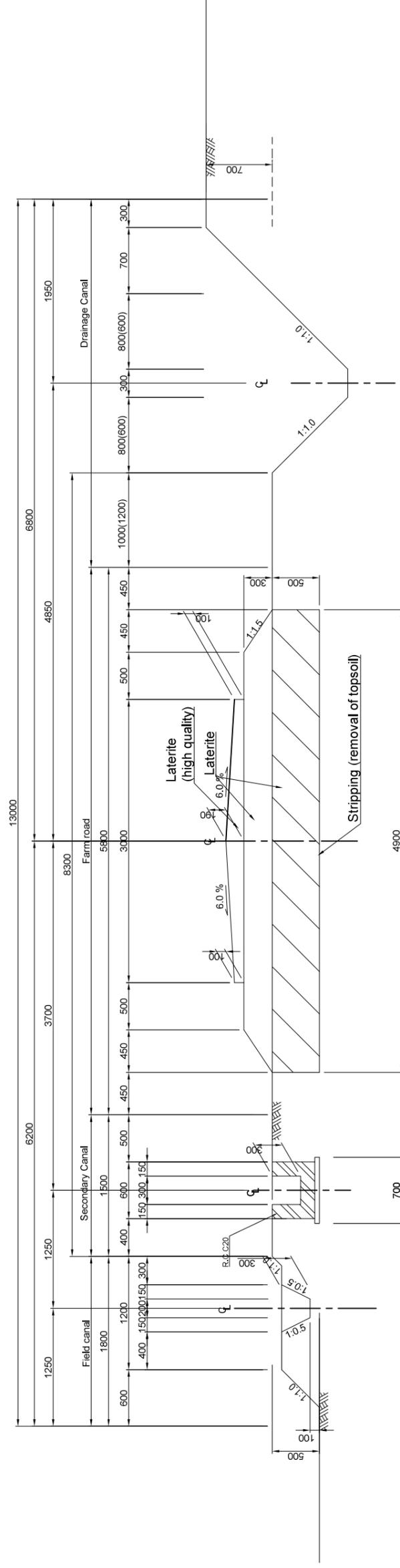
【FR-2A】

A - A'



【FR-3A】

B - B'



PROJECT

**THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA**

LOCATION

**Mansa, ZAMBIA**

CONSULTANTS

**NTC INTERNATIONAL CO., LTD.  
YACHIYO ENGINEERING CO., LTD.  
JAPAN INTERNATIONAL COOPERATION SYSTEM**

TITLE

**(Mansa) - Standard Cross Section of Farm Road and Irrigation Facilities - 圃場整備標準断面図 (1/3)**

DRG NO :

**C-201-1**

SCALE :

**1/50**  
for A3 paper

DESIGNED BY :

CHECKED BY :

APPROVED BY :

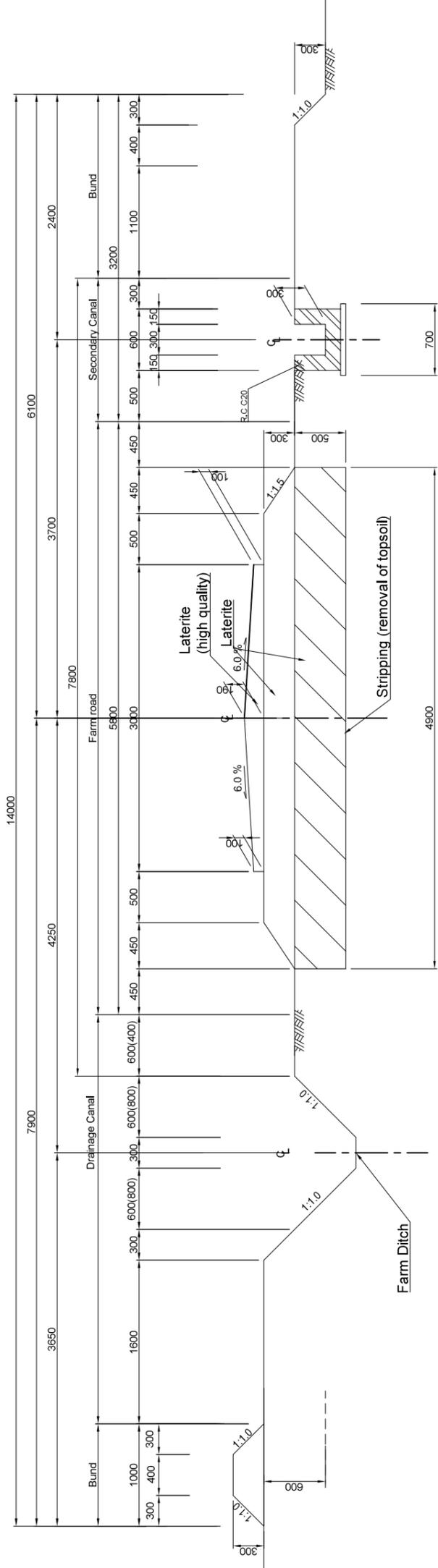
DATE :

DRAWN BY :

# Standard Cross Section of Farm Road and Irrigation Facilities (2/3)

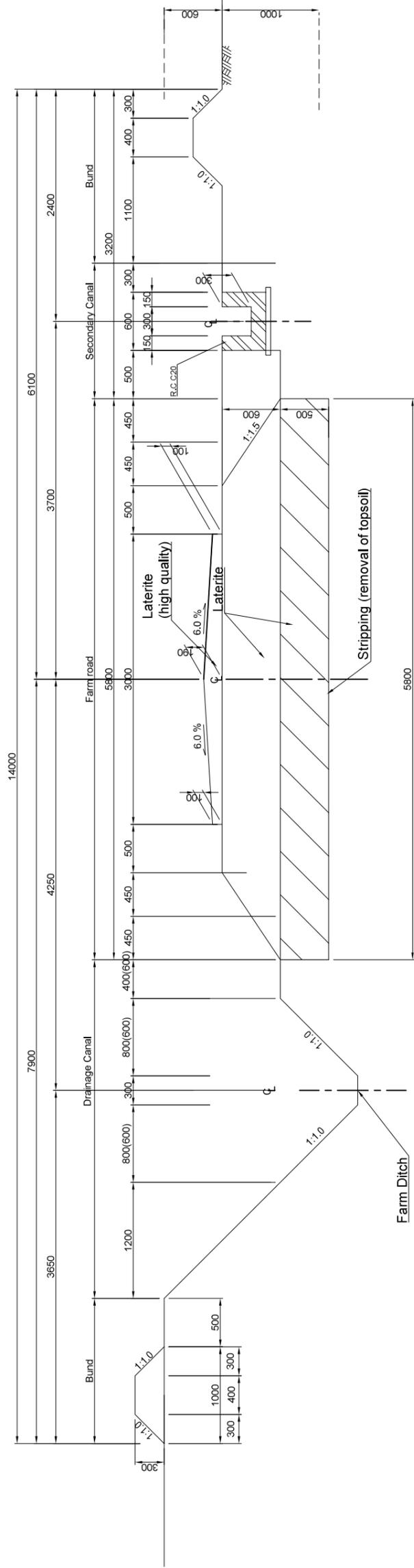
【FR-1, -2, -3, -4, -5】

C1 - C1'



【FR-1, -2, -3, -4, -5】

C2 - C2'

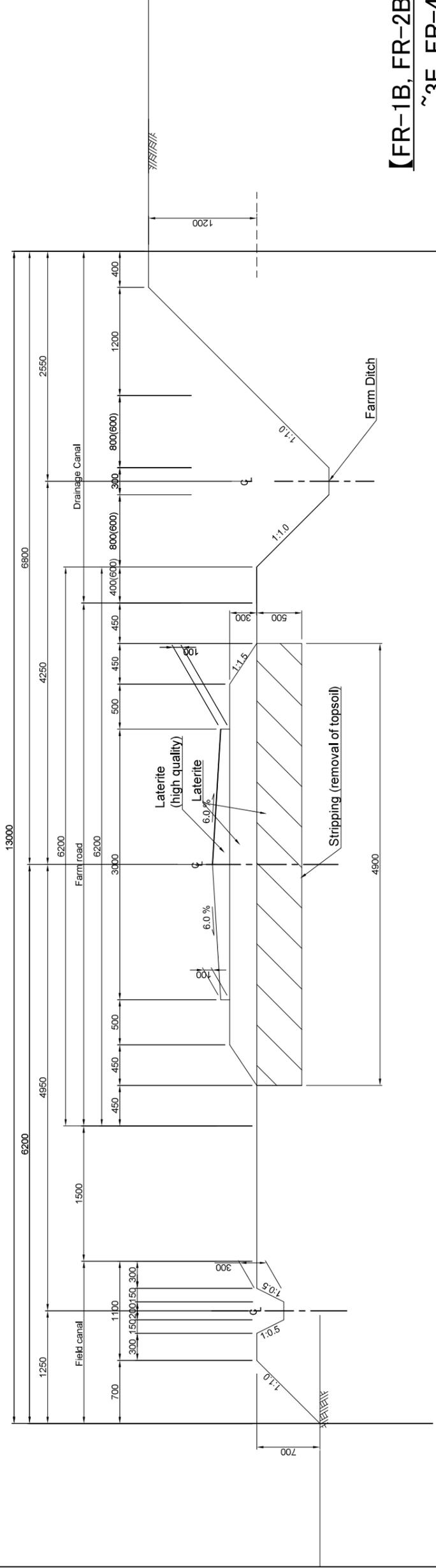


PROJECT	<b>THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA</b>		CONSULTANTS	NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	
LOCATION	<b>Mansa, ZAMBIA</b>		TITLE	<b>(Mansa) - Standard Cross Section of Farm Road and Irrigation Facilities - 圃場整備標準断面図 (2/3)</b>	
APPROVED BY:	CHECKED BY:	DESIGNED BY:	DRAWN BY:	DATE:	DRG NO: <b>C-201-2</b>
					SCALE: 1/50 for A3 paper

# Standard Cross Section of Farm Road and Irrigation Facilities (3/3)

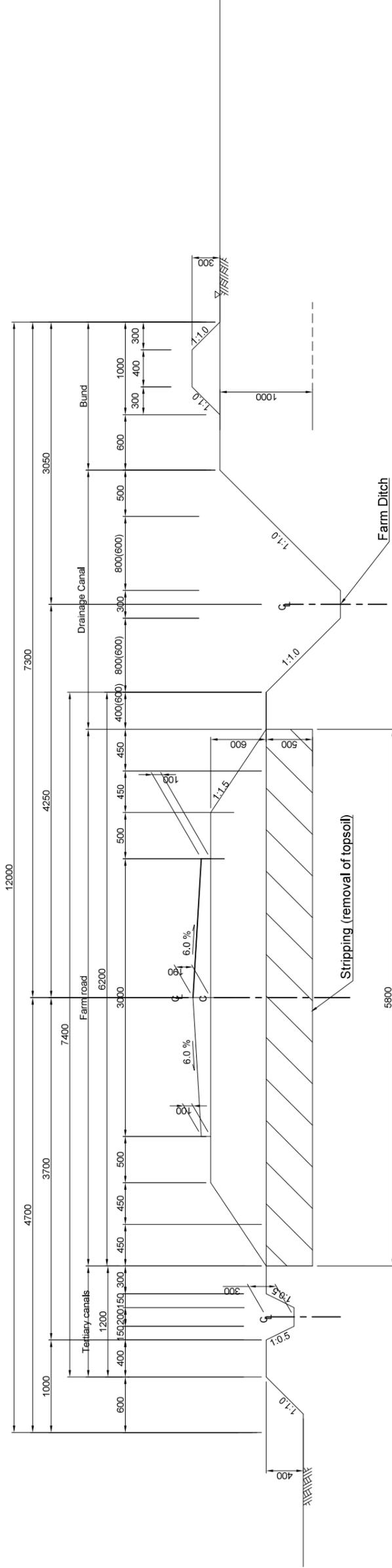
【FR-4A】

D1 - D1'



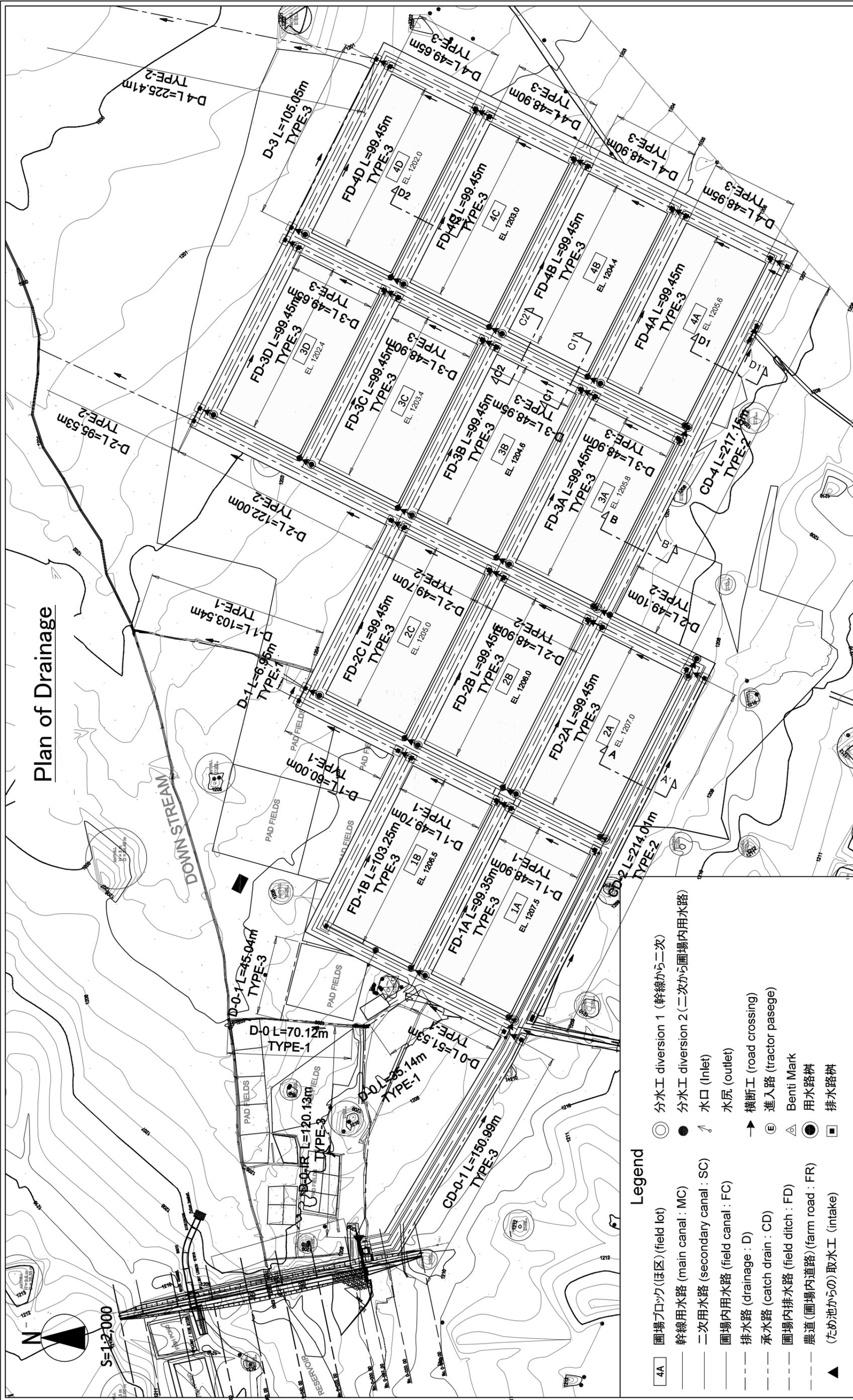
【FR-1B, FR-2B~2D, FR-3B  
~3E, FR-4B~4E】

D2 - D2'



PROJECT	<b>THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA</b>		CONSULTANTS	<b>NTC INTERNATIONAL CO., LTD. YACHYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM</b>	
LOCATION	<b>Mansa, ZAMBIA</b>		TITLE	<b>圃場整備標準断面図 (3/3) (Mansa) -Standard Cross Section of Farm Road and Irrigation Facilities -</b>	
APPROVED BY:	CHECKED BY:	DESIGNED BY:	DRAWN BY:	DATE:	DRG NO: <b>C-201-3</b>
					SCALE: <b>1/50</b> for A3 paper





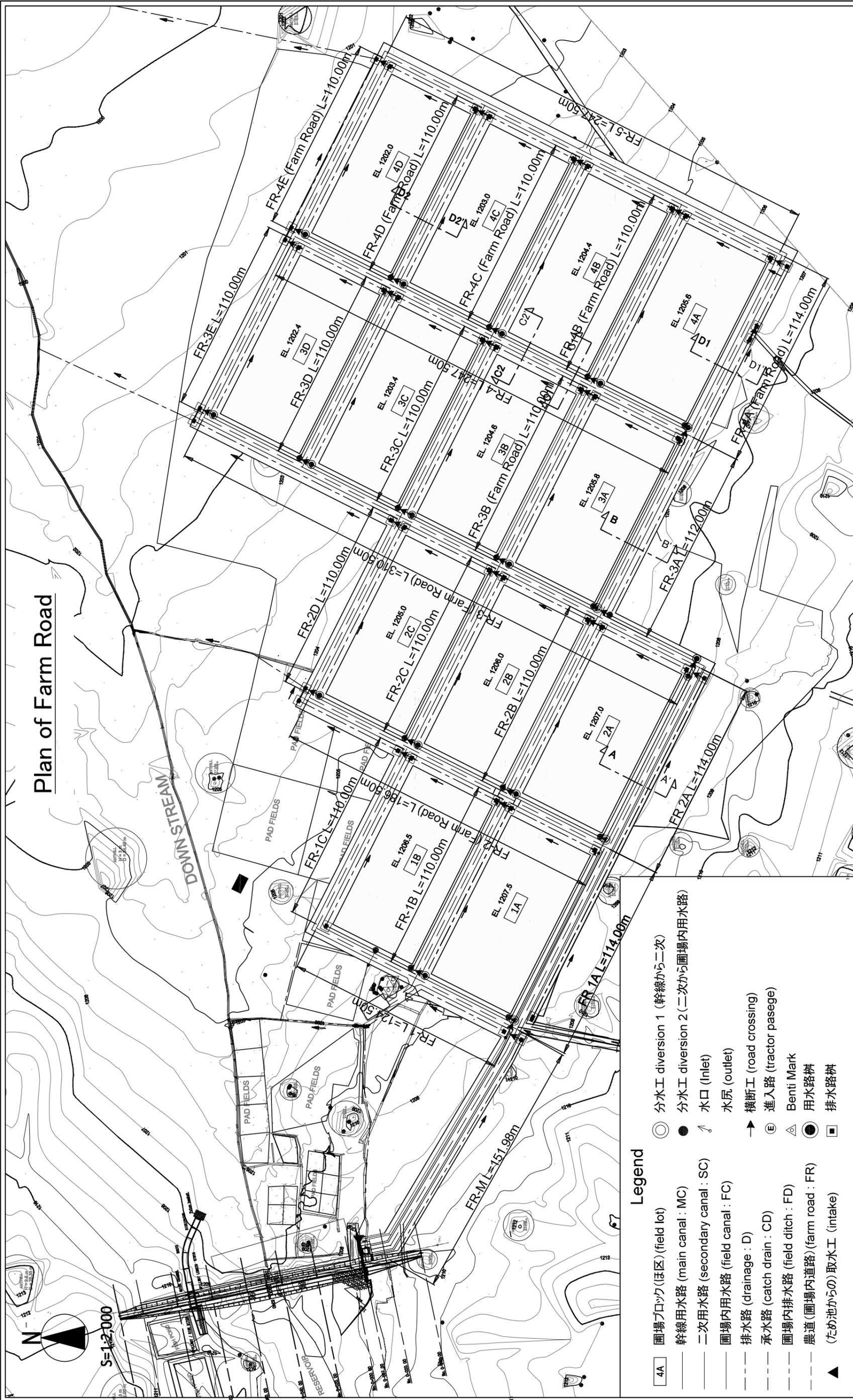
Plan of Drainage

S=1:2,000

DOWNSTREAM

- Legend**
- 4A 圃場ブロック(ほ区) (field lot)
  - 幹線用水路 (main canal : MC)
  - 二次用水路 (secondary canal : SC)
  - 圃場内用水路 (field canal : FC)
  - 排水路 (drainage : D)
  - 承水路 (catch drain : CD)
  - 圃場内排水路 (field ditch : FD)
  - 農道(圃場内道路) (farm road : FR)
  - ▲ (ため池からの) 取水工 (intake)
  - 分水工 diversion 1 (幹線から二次)
  - 分水工 diversion 2 (二次から圃場内用水路)
  - ↑ 水口 (inlet)
  - 水尻 (outlet)
  - 横断工 (road crossing)
  - ⊕ 進入路 (tractor passage)
  - △ Benti Mark
  - 用水路柵
  - 排水路柵

PROJECT	LOCATION	CONSULTANTS	TITLE	DRG NO :
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Mansa, ZAMBIA	NTC INTERNATIONAL CO., LTD. YACHYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	排水路計画平面図 Plant of Drainage	C-203
			APPROVED BY :	SCALE : 1/2000 for A3 paper
			CHECKED BY :	
			DESIGNED BY :	DATE :
			DRAWN BY :	



Plan of Farm Road

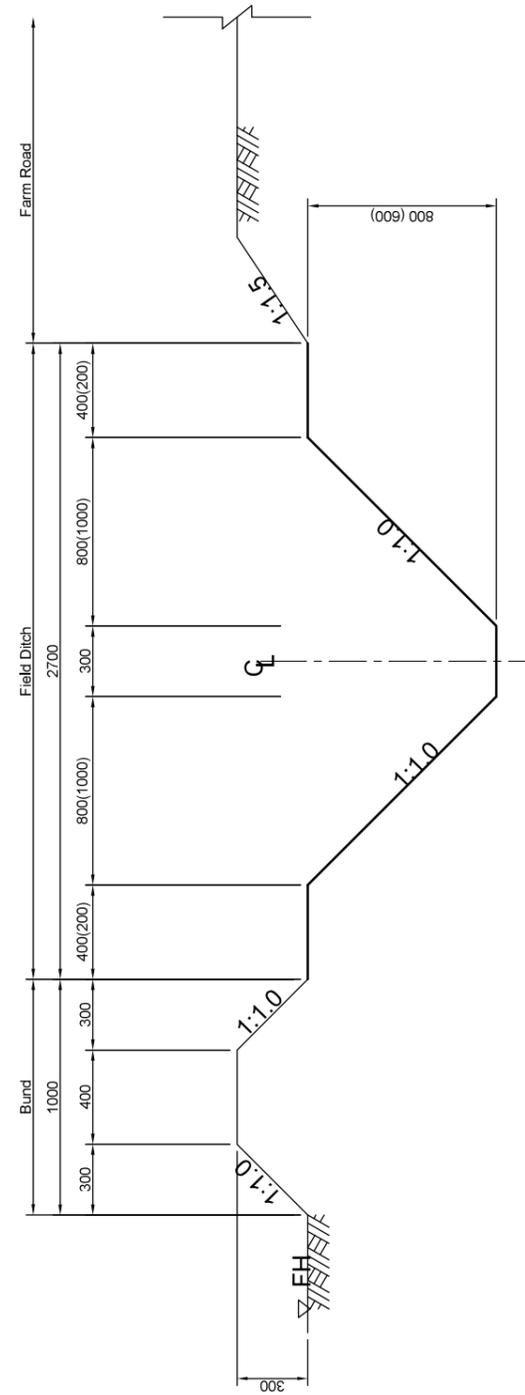
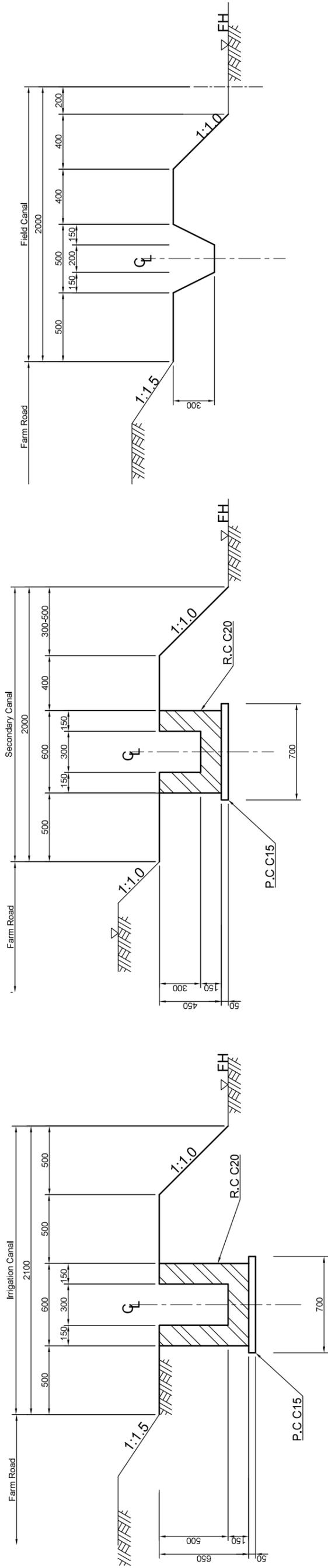
S=1:2,000

Legend

- 4A 圃場ブロック(ほ区) (field lot)
- 幹線用水路 (main canal : MC)
- 二次用水路 (secondary canal : SC)
- 圃場内用水路 (field canal : FC)
- - - 排水路 (drainage : D)
- - - 承水路 (catch drain : CD)
- - - 圃場内排水路 (field ditch : FD)
- - - 農道(圃場内道路) (farm road : FR)
- ▲ (ため池からの) 取水工 (intake)
- 分水工 diversion 1 (幹線から二次)
- 分水工 diversion 2 (二次から圃場内用水路)
- ↑ 水口 (Inlet)
- 水尻 (outlet)
- 横断工 (road crossing)
- ⊕ 進入路 (tractor passage)
- △ Benti Mark
- 用水路柵
- 排水路柵

PROJECT	LOCATION	CONSULTANTS	TITLE	DRG NO :
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Mansa, ZAMBIA	NTC INTERNATIONAL CO., LTD. YACHYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	Plan of Farm Road 耕作道路計画平面図	C-204
			APPROVED BY :	DATE :
			CHECKED BY :	DRAWN BY :
			DESIGNED BY :	SCALE :
				1/2000 for A3 paper

# Structure of Irrigation Canal (Typical Cross Section)



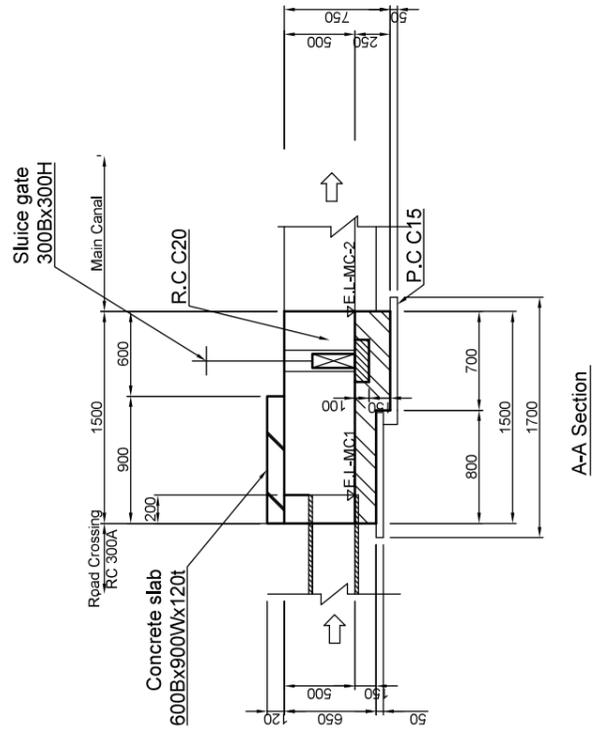
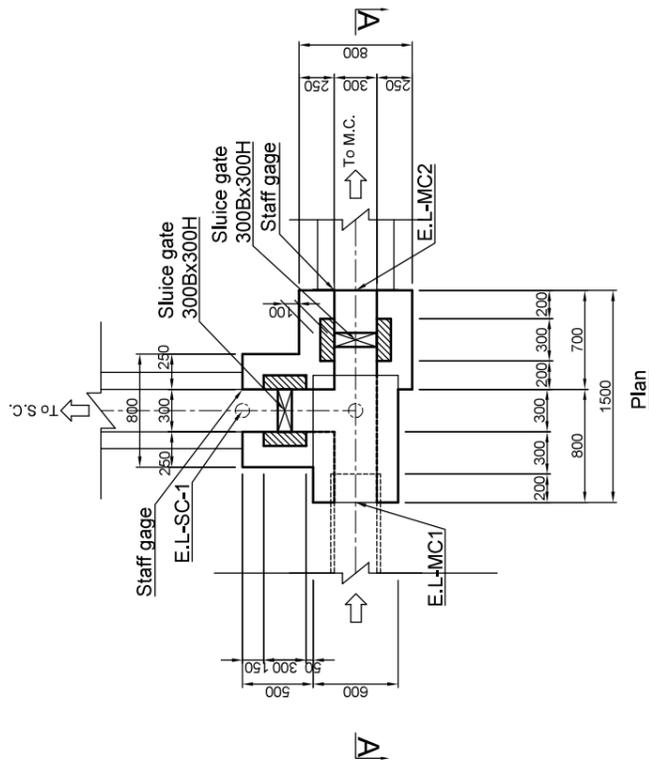
Typical Cross Section of Field Ditch

S=1:30

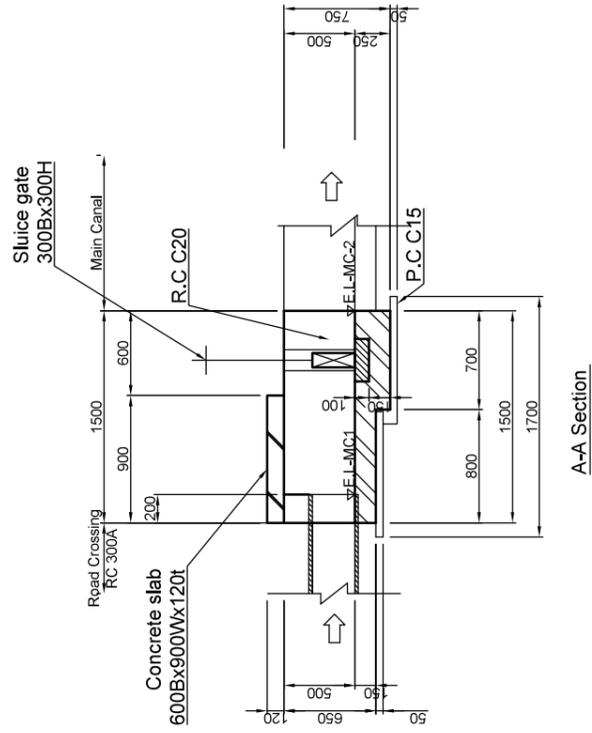
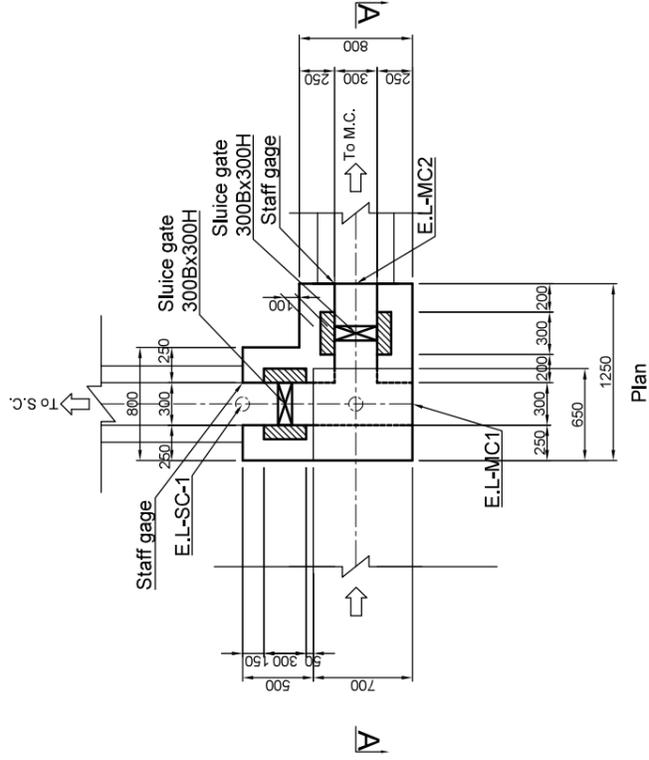
PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		LOCATION	Mansa, ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	種子生産圃場 水路工 Structures of Irrigation Canal (Typical Cross Section)	DRG NO.:	C-205-1
	APPROVED BY:	M.NEGISHI	CHECKED BY:	T.INOUE	DESIGNED BY:	M.NEGISHI	DRAWN BY:	T.INOUE	DATE:	July 2022
									SCALE:	1/30 for A3 paper

# Structure of Irrigation Canal (Diversion)

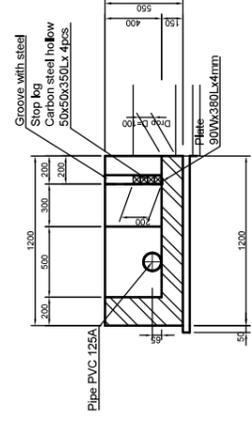
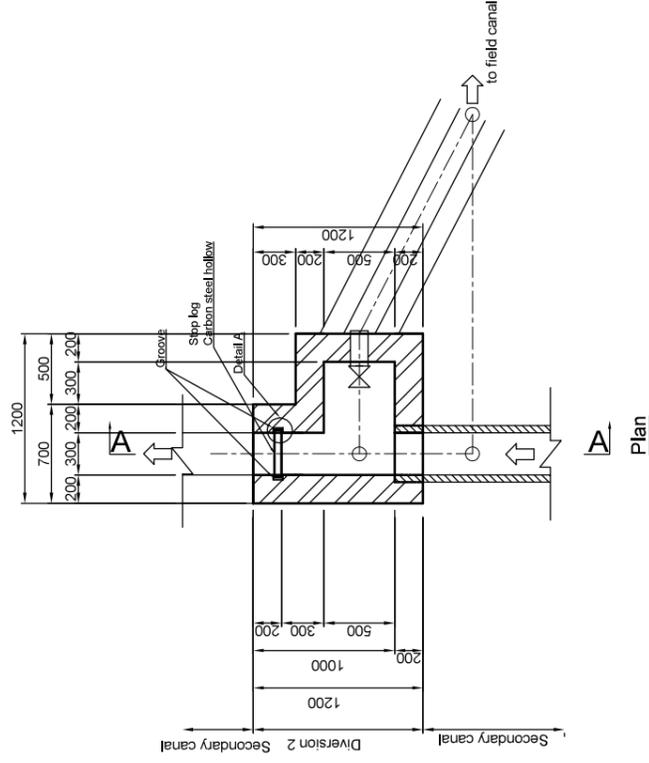
Structure of Diversion 1-1  
S=1:50



Structure of Diversion 1-2(3A)  
S=1:50



Structure of Diversion 2  
S=1:50

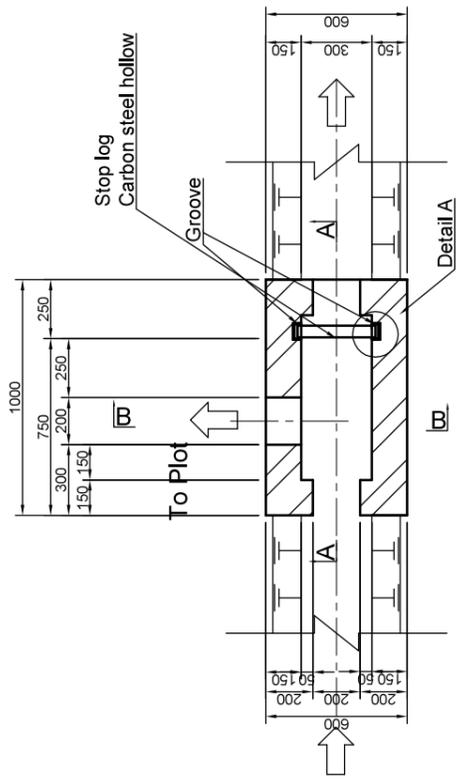


Note:  
Drop after diversion 2 is basically 10cm,  
otherwise noted in the plan

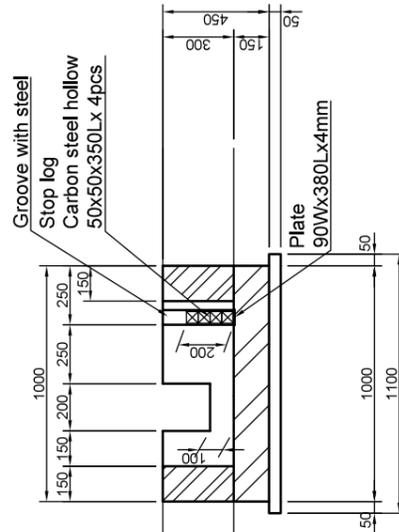
PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	Structures of Irrigation Canal (Diversion)	DESIGNED BY:	M.NEGISHI	CHECKED BY:	T.INOUE	APPROVED BY:	M.NEGISHI	DRAWN BY:	T.INOUE	DATE:	July 2022	SCALE:	1/50 for A3 paper	DRG NO.:	C-205-2
LOCATION	Mansa, ZAMBIA																		
種花生産圃場 水路工																			

# Structure of Irrigation Canal (Inlet and Outlet)

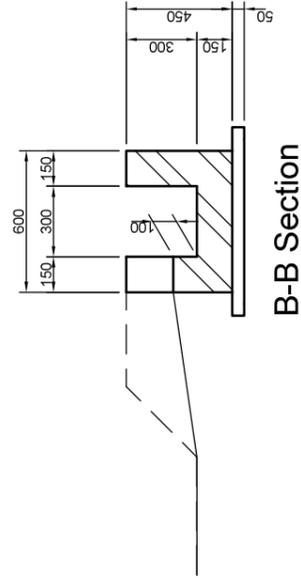
Structure of Inlet  
S=1:30



Plan

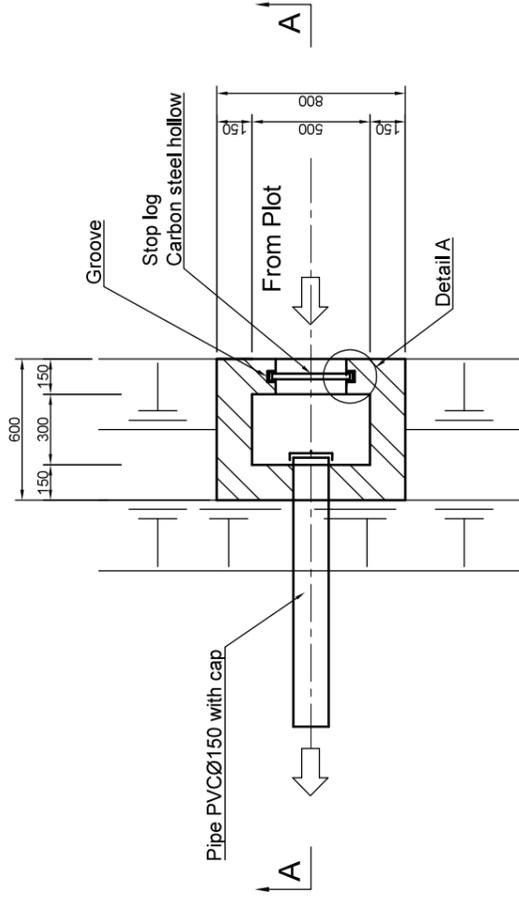


A-A Section

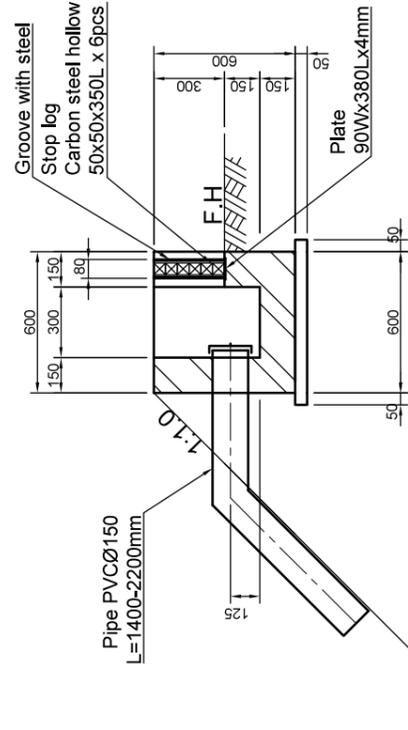


B-B Section

Structure of Outlet  
S=1:30

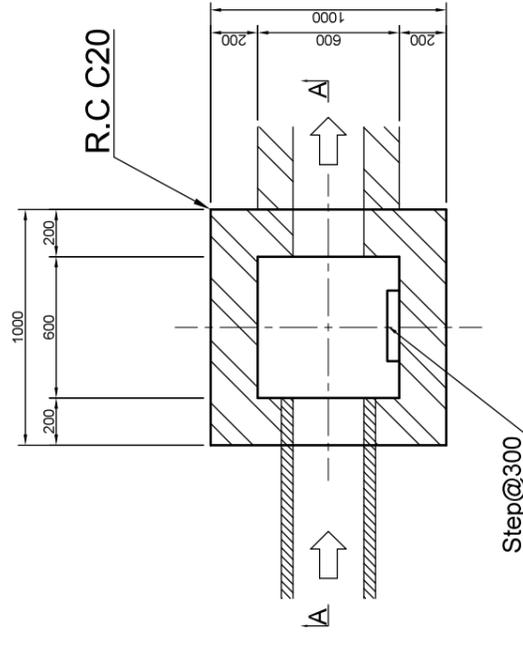


Plan

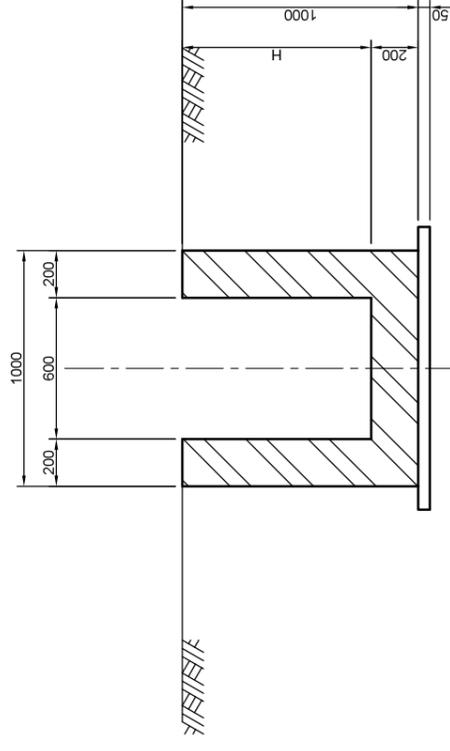


A-A Section

Structures of BOX 1 (600W)  
S=1:30



Plan

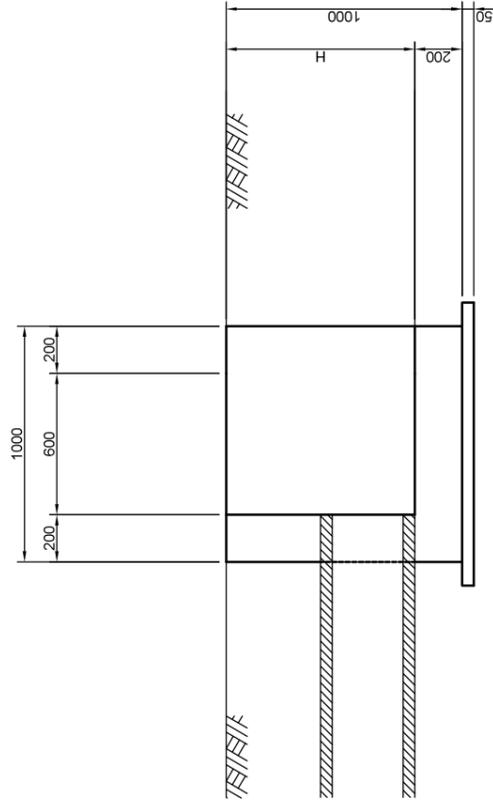
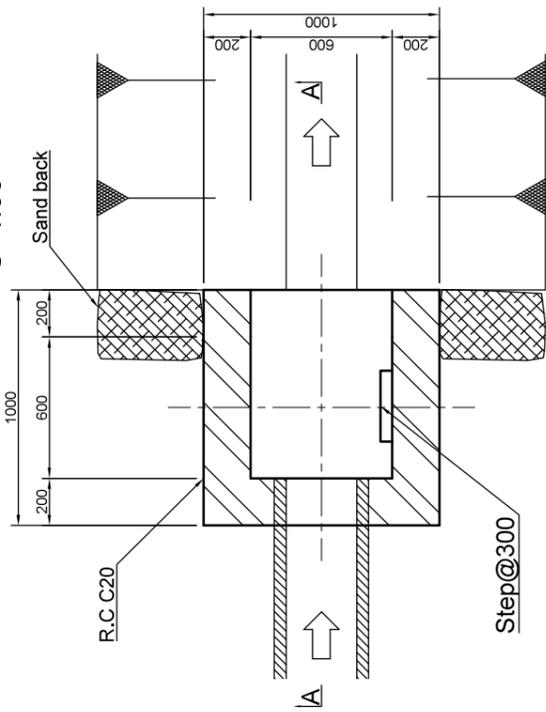


A-A Section

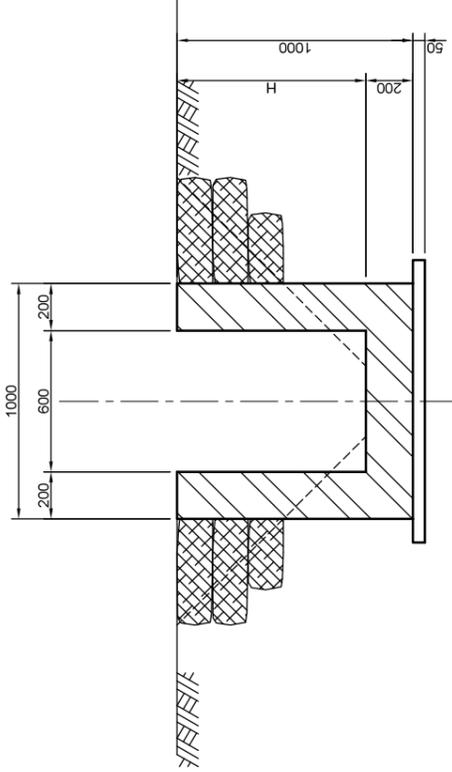
PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	Structures of irrigation canal (Inlet and Outlet)	DESIGNED BY:	M.NEGISHI	CHECKED BY:	T.INOUE	DRAWN BY:	T.INOUE	DATE:	July 2022	DRG NO.:	C-205-3
LOCATION	Mansa, ZAMBIA	APPROVED BY:	M.NEGISHI	DESIGNED BY:	M.NEGISHI	CHECKED BY:	T.INOUE	DRAWN BY:	T.INOUE	DATE:	July 2022	SCALE:	1/30 for A3 paper		

# Structure of Irrigation Canal (BOX)

Structures of BOX 1 (600W)  
S=1:30

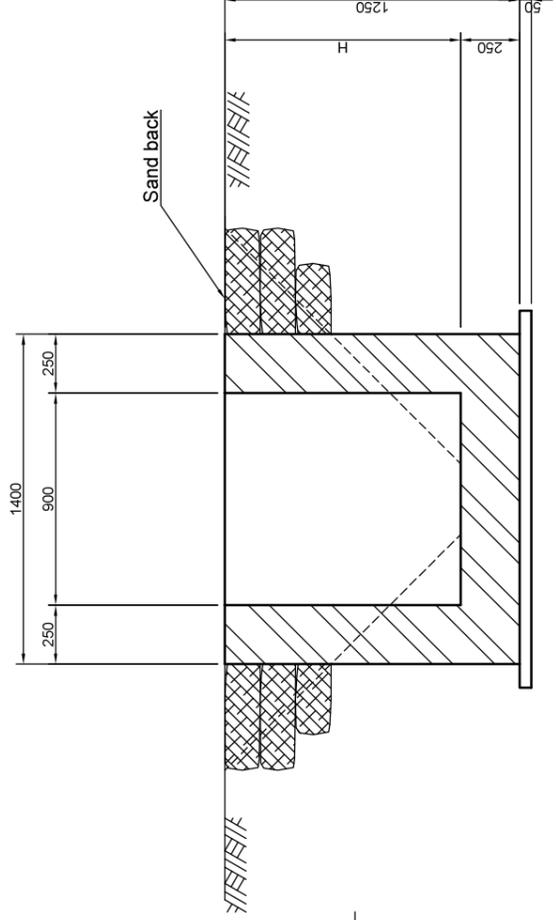
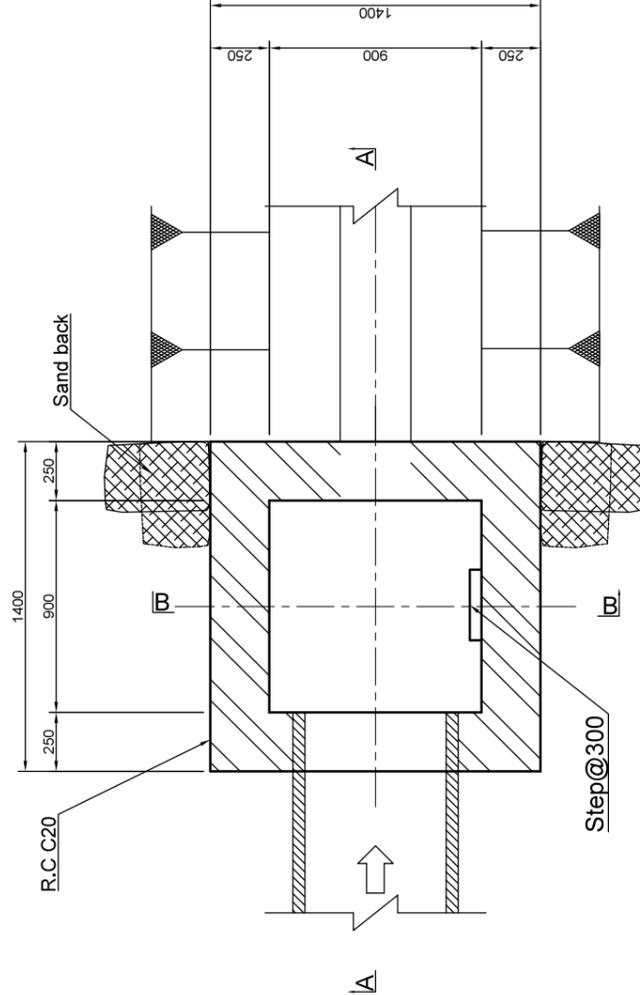


A-A Section



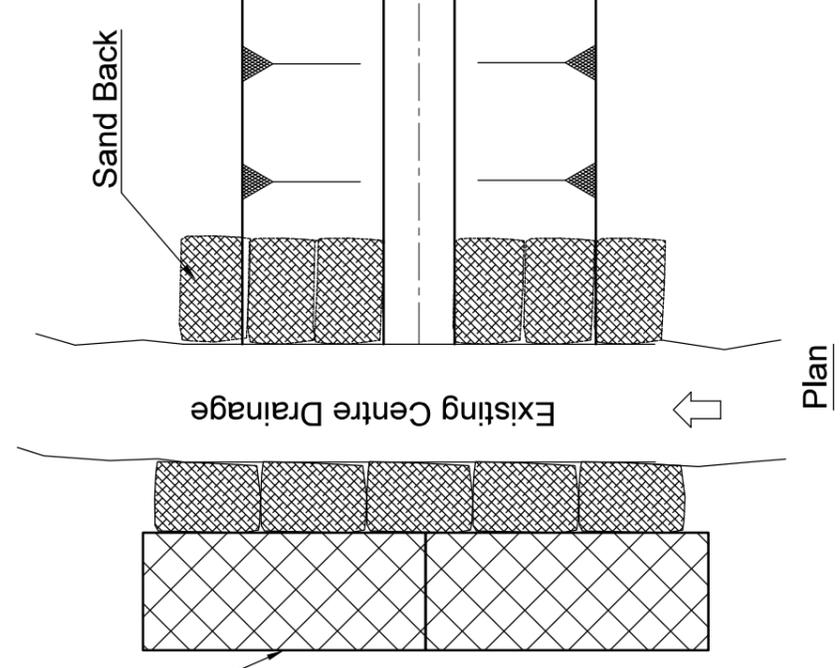
B-B Section

Structures of BOX 2 (900W)  
S=1:30

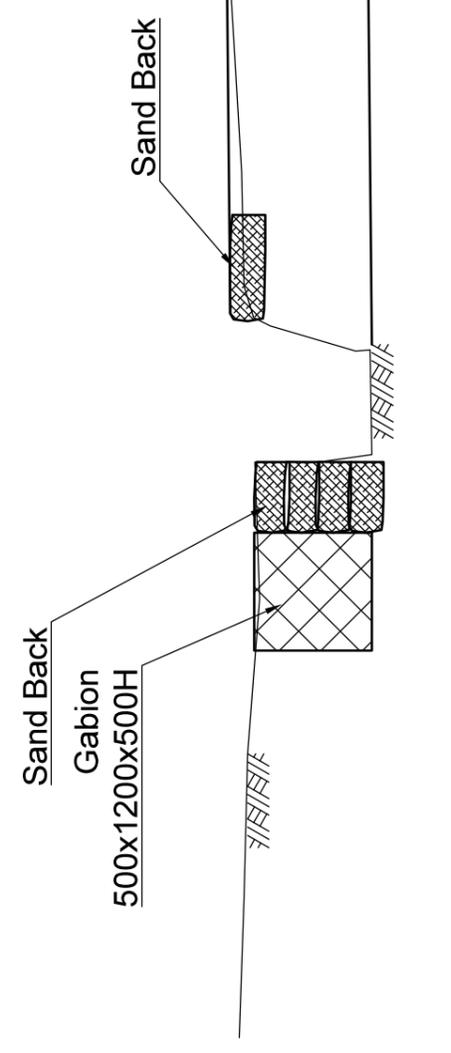


A-A Section

Structures of BOX 2 (900W)  
S=1:30



Plan

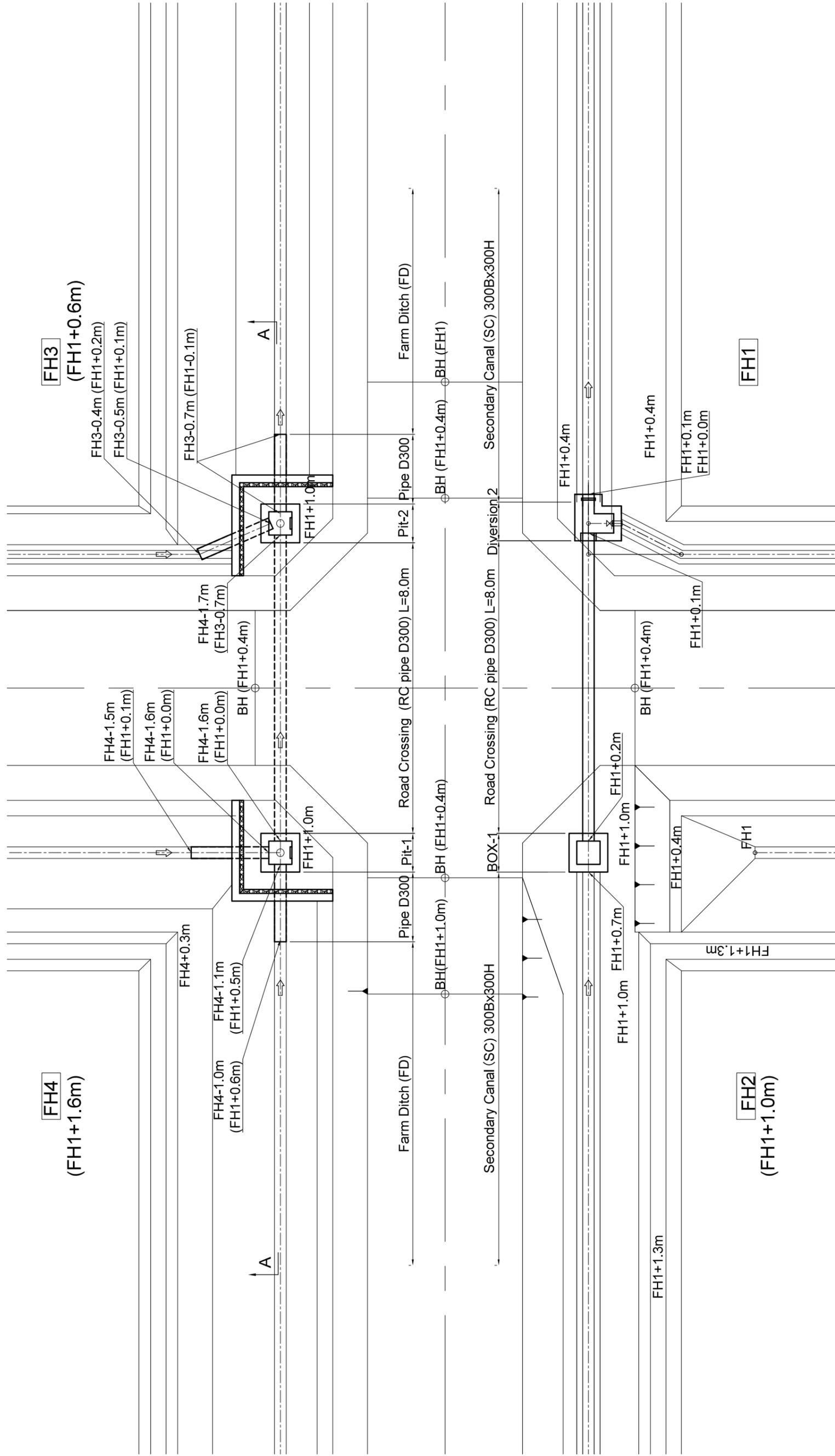


A-A Section

PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	LOCATION	Mansa, ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	種子生産圃場 水路工 Structures of Irrigation Canal (BOX)	DRG NO:	C-205-4
				APPROVED BY:	M.NEGISHI	CHECKED BY:	T.INOUE	DESIGNED BY:	M.NEGISHI
								DRAWN BY:	T.INOUE
								DATE:	July 2022
								SCALE:	1/30 for A3 paper

# Farm Road Crossing

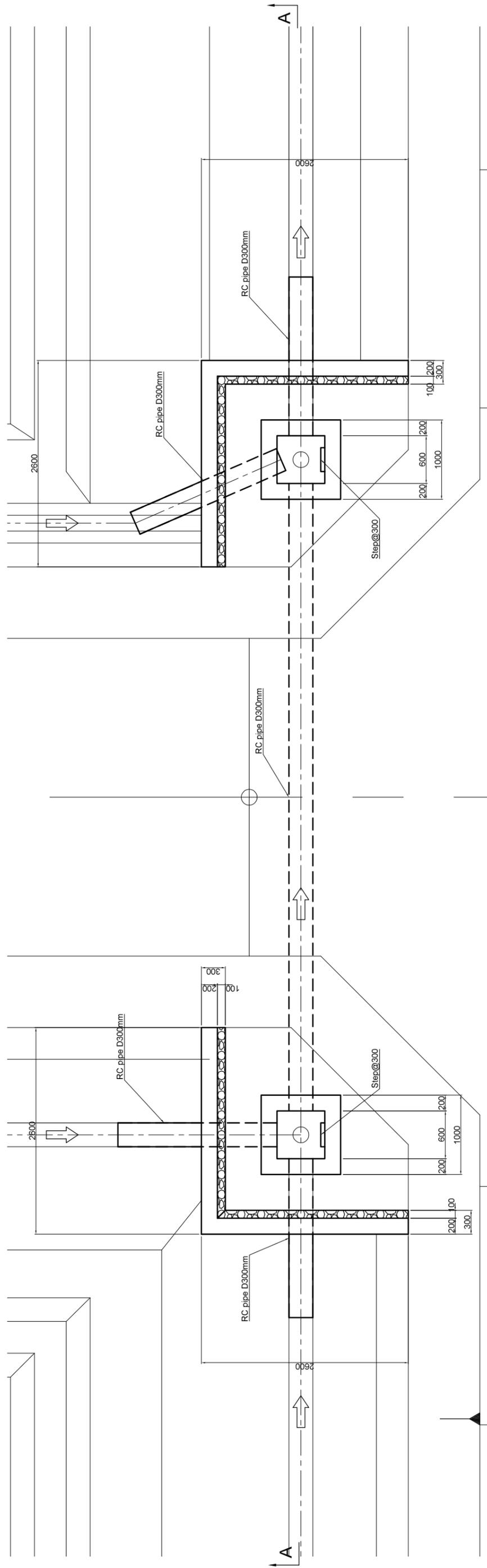
Plan of Farm Road Crossing 1:100



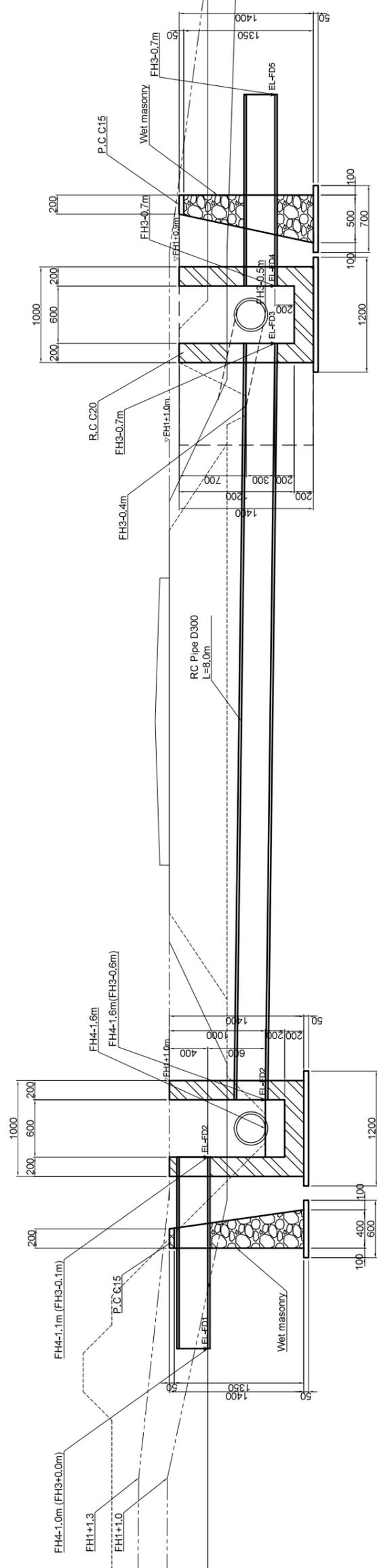
PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	LOCATION	Mansa, ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	種子生産圃場 道路横断工 Farm Road Crossing (1/3)	DRG NO:	C-206-1
APPROVED BY:	M.NEGISHI	CHECKED BY:		DESIGNED BY:	T.INOUE	DRAWN BY:	T.INOUE	DATE:	July 2022
								SCALE:	1/100 for A3 paper

# Farm Road Crossing

Plan of Drainage 1:50



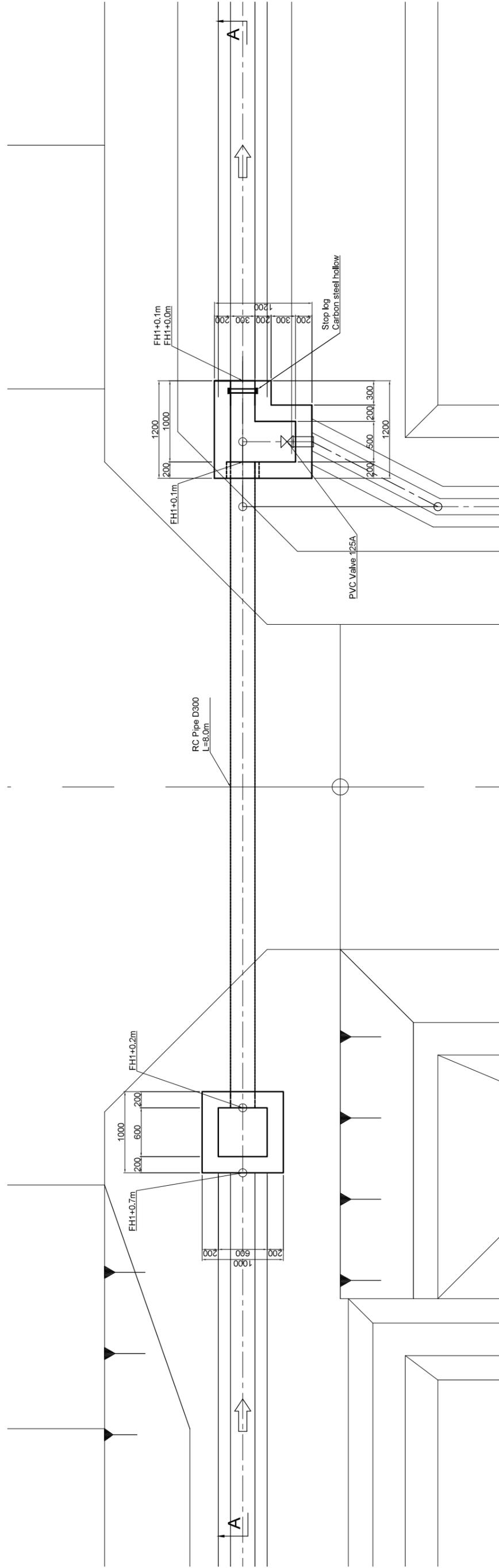
A-A Section 1:50



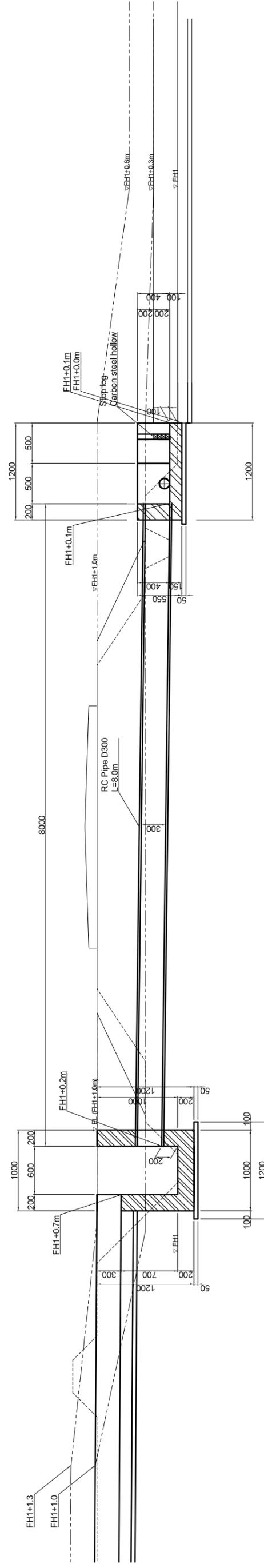
PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	種子生産圃場 道路横断工 Farm Road Crossing (2/3)	DRG NO.:	C-206-2
LOCATION	Mansa, ZAMBIA	APPROVED BY:	M.NEGISHI	CHECKED BY:	T.INOUE	DESIGNED BY:	T.INOUE
						DRAWN BY:	T.INOUE
						DATE:	July 2022
						SCALE:	1/50 for A3 paper

# Farm Road Crossing

Plan of Canal 1:50

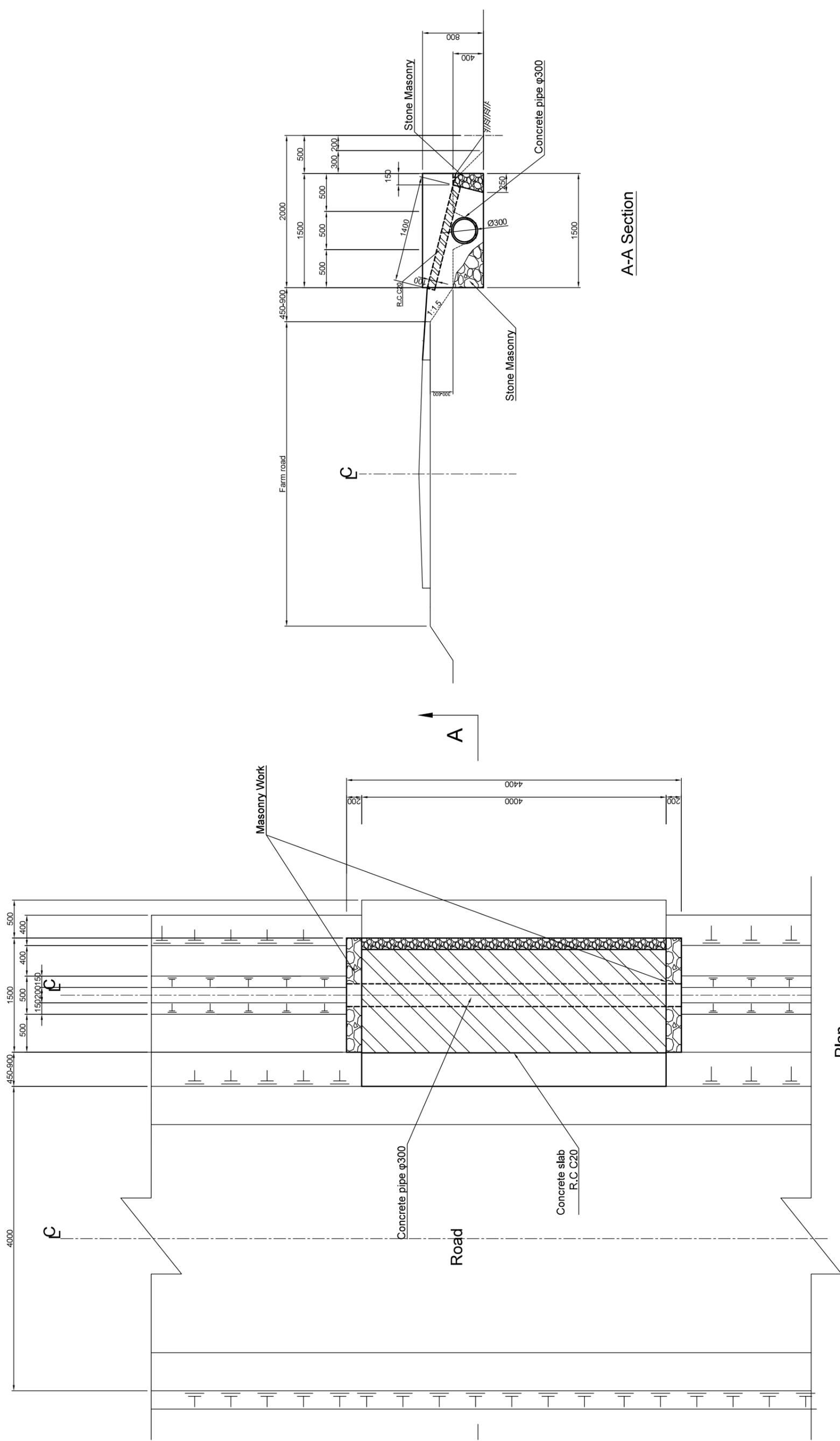


B-B Section 1:50



PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	TITLE	種子生産圃場 道路横断工 Farm Road Crossing (3/3)	DRG NO:	C-206-3
LOCATION	Mansa, ZAMBIA	CHECKED BY:	M.NEGISHI	DESIGNED BY:	T.INOUE	DRAWN BY:	T.INOUE
		APPROVED BY:				DATE:	July 2022
						SCALE:	1/50 for A3 paper

# Structures of Tractor Passage

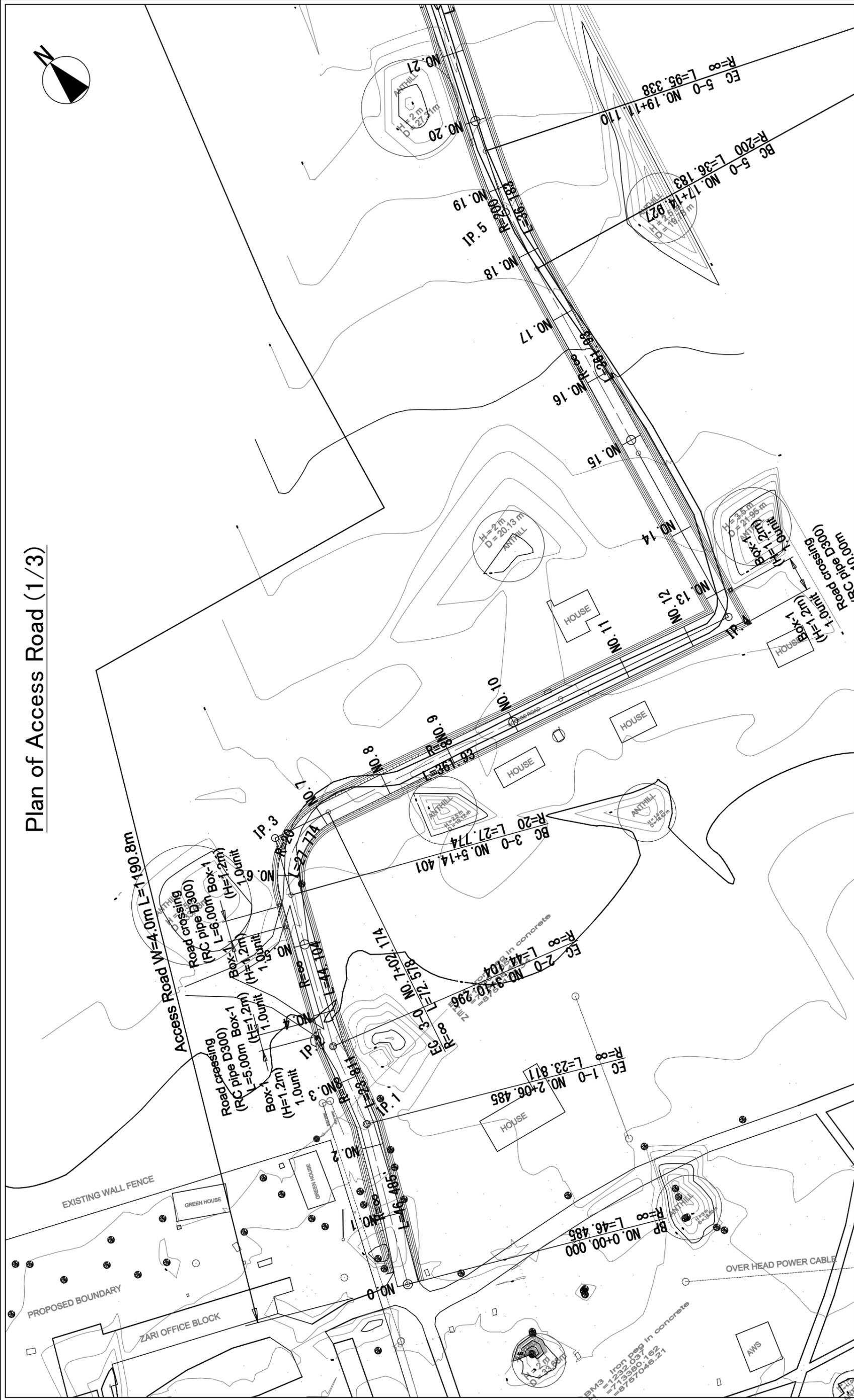


Plan

A-A Section

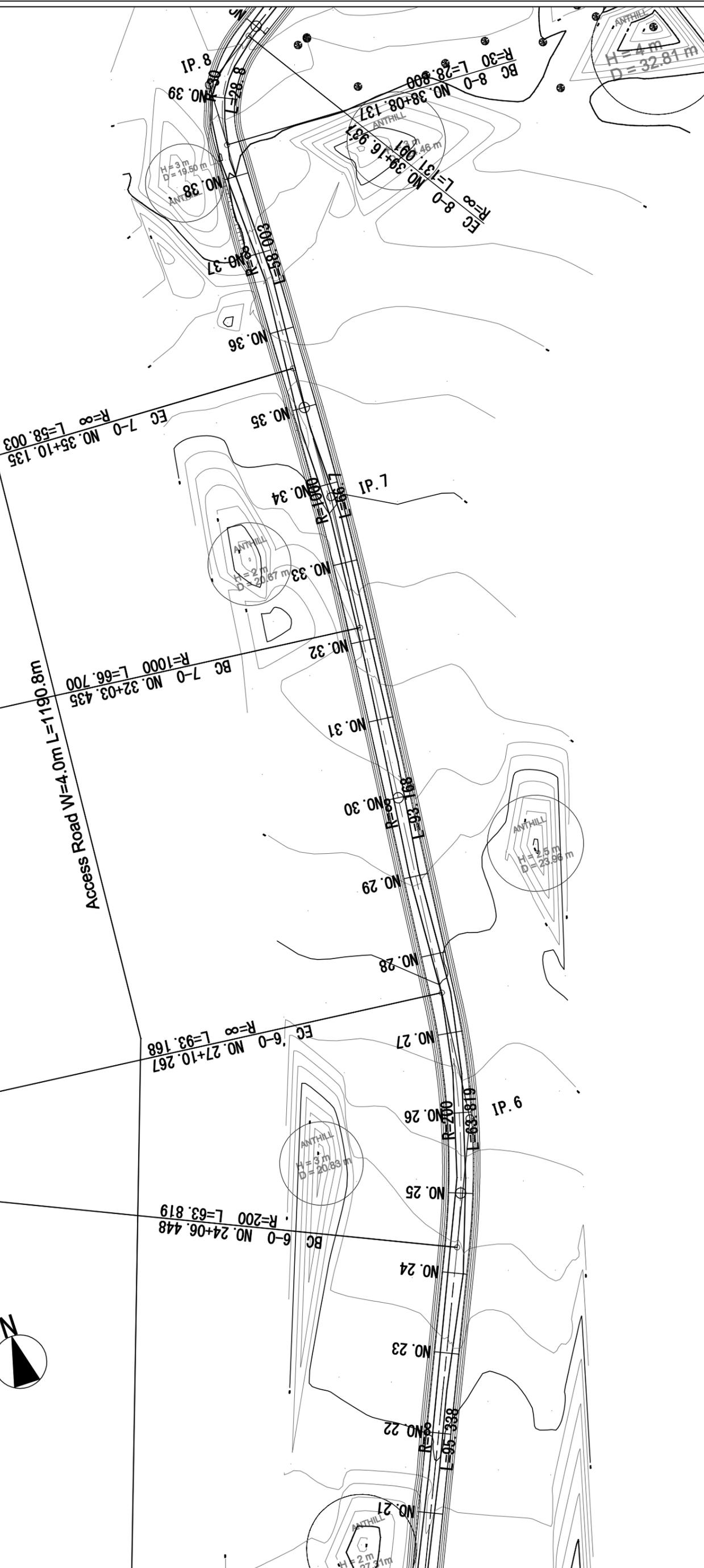
PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA			CONSULTANTS	JOINT VENTURE: NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM			TITLE	種子生産圃場 進入路工 構造図 Structures of tractor passage			DRG NO:	C-207	
LOCATION	Mansa, ZAMBIA			CHECKED BY:	M.NEGISHI			DESIGNED BY:	T.INOUE			APPROVED BY:	M.NEGISHI	
				DRAWN BY:	T.INOUE			DATE:	July 2022			SCALE:	1/50 for A3 paper	

# Plan of Access Road (1/3)



PROJECT	CONSULTANTS	TITLE	DRG NO :
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Mansa, ZAMBIA	アクセス道路計画断面図 (Mansa) - Plan of Access Road (1/3) -	C-301-1
			SCALE: 1/1000 for A3 paper
LOCATION	APPROVED BY :	DESIGNED BY :	DATE :

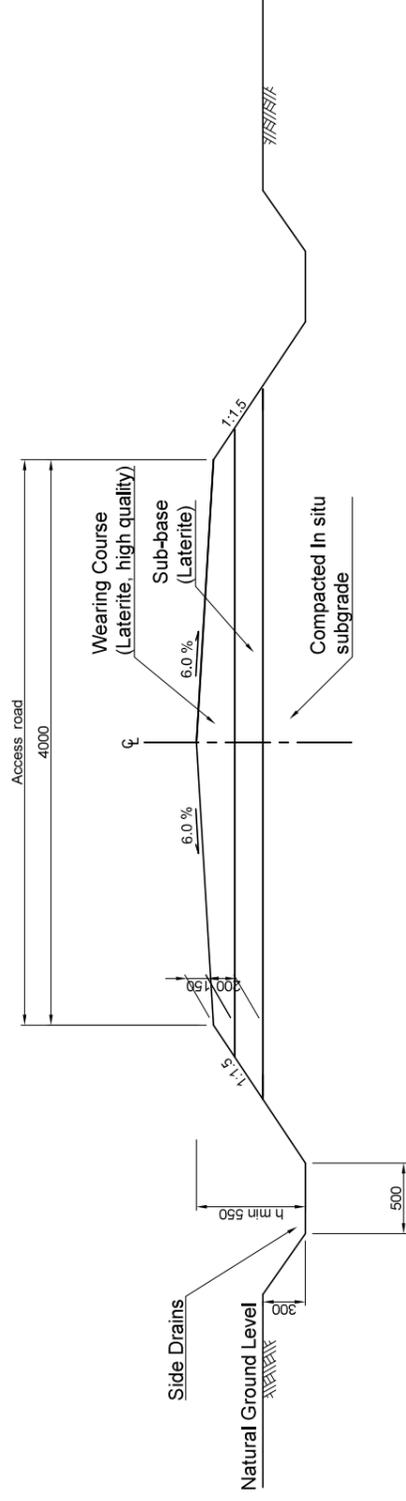
Plan of Access Road (2/3)



PROJECT	LOCATION	CONSULTANTS	TITLE	DRG NO.:
THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA	Mansa, ZAMBIA	NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM	アクセス道路計画断面図 (Mansa) - Plan of Access Road (2/3) -	C-301-2
			APPROVED BY:	SCALE: 1/1000 for A3 paper
			CHECKED BY:	
			DESIGNED BY:	
			DRAWN BY:	
			DATE:	



# Standard Cross Section of Access Road



PROJECT	THE PROJECT FOR DEVELOPMENT OF SEED PRODUCTION FIELD AND TRAINING FACILITIES IN THE REPUBLIC OF ZAMBIA		CONSULTANTS	NTC INTERNATIONAL CO., LTD. YACHIYO ENGINEERING CO., LTD. JAPAN INTERNATIONAL COOPERATION SYSTEM		TITLE	アクセス道路標準断面図 (Mansa) - Standard Cross Section of Access Road -			DRG NO :	C-302
	LOCATION	Mansa, ZAMBIA		APPROVED BY :	CHECKED BY :		DESIGNED BY :	DRAWN BY :	DATE :	SCALE :	1/50 for A3 paper

## 資料 6 : 自然条件調査結果の概要

現地の土質・地盤状況を把握するために実施した建設予定地のボーリング調査、室内土質試験、試掘調査、及び土取場候補地の試料の室内土質試験の概要を以下に示す。

表 -1-1 地質調査の調査項目と数量

工種	施設名称	数量	備考
マウント・マクル研究所			
ボーリング調査	建築建設予定地	3 地点、 30.0 m	深度 10 m×3 孔
試掘調査	建築建設予定地	6 カ所	
室内土質試験	建築建設予定地	3 カ所	含水比、粒度、密度、液性限界、塑性限界ほか
マンサ研究所			
ボーリング調査	建築建設予定地	9 地点、 90.0 m	深度 10 m×9 孔
ボーリング調査	既存堤体	4 地点、 25 m	標準貫入試験、土質試験、透水試験
試掘調査	建築建設予定地	11 カ所	
	ほ場計画地	10 カ所	
	アクセス道路	10 カ所	
室内土質試験	建築建設予定地	9 カ所	含水比、粒度、密度、液性限界、塑性限界ほか
	既存堤体	5 カ所	含水比、粒度、密度、液性限界
	ほ場計画地	10 カ所	含水比、粒度、密度、液性限界
	土取場(既存地区内)	5 カ所	含水比、粒度、密度、液性塑性限界、締固め試験、透水試験
	土取り場候補地	10 カ所	含水比、粒度、密度、液性塑性限界内、5 カ所で締固め試験、透水試験を実施
CBR 試験	アクセス道路	10 カ所	
	土取場候補地	5 カ所	

## (1)地質調査

### 1)マウント・マクル研究所

図-1-1 に建築施設の建設予定地周辺の地質調査位置図を示す。調査は、テストピット（図中■）による土壌断面の確認、ボーリング調査（図中■）とそのサンプルによる室内土質試験を行った。

建設予定地は世銀支援のカンファレンス・ホールの東側で、北から順に BH1, 2, 3 である。表土は有機質を含む 0.2~0.3 m の厚さで、その下に 3.0 m 程度までの深さで、粘性土（BH1）もしくは砂質土（BH2,3）が分布している。いずれも N 値 30 以上が確認されており、低層の建築物の基礎支持地盤としては十分な地耐力を有する。

表 -1-2 に標準貫入試験結果を、図 -1-2 にコアサンプル写真を示す。



図-1-1 建築施設建設予定地の地質調査位置図

表 -1-2 建築施設建設予定地のボーリング調査結果と N 値

地表面からの深さ	BH1		BH2		BH3	
	土性	N 値	土性	N 値	土性	N 値
0-1m	0.3m まで表土 粘性土(黄色系茶)	48	0.2m まで表土 礫質土(赤茶)	35	0.2m まで表土 シルト系砂質土(赤茶)	73
1-2m	粘性土(黄色系茶)	41	同上	50	礫質土(明茶)	52
2-3m	同上	54	礫質土(橙系茶)	45	礫質土(灰色系茶)	85
3-4m	粘性土(赤茶)	63	粘性土(黄色系茶)	63	粘土混じり玉石(黄)	100
4-5m	同上	53	同上	46	同上	100
5-6m	粘性土(黄色系赤茶)	59	同上	56	同上	75
6-7m	同上	67	シルト系砂質土(灰色系茶)	79	同上	96
7-8m	同上	58	同上	100	同上	100
8-9m	同上	62	同上	100	同上	100
9-10m	同上	62	同上	100	同上	100

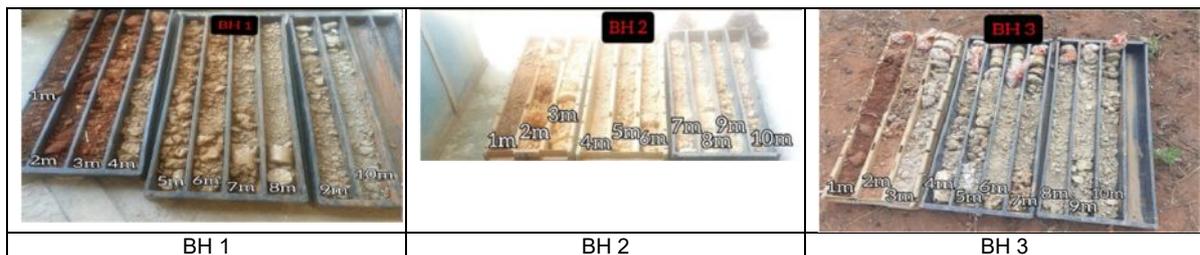


図 -1-2 マウント・マクル建築施設建設予定地のコアサンプル

下図にテストピット調査状況を示す。



図 -1-3 マウント・マクル建築施設建設予定地のテストピット状況

表 1-3 建築施設建設予定地の室内土質試験結果(物理試験)

試験箇所		土粒子の 密度試験	土の粒度試験	含水試験	土の液性限界・塑性限界試験		
BH No.	深さ (m)	密度 $\rho$ (g/cm <sup>3</sup> )	細粒分含有率 -0.075mm(%)	自然含水比 Wn(%)	液性限界 WL(%)	塑性限界 Wp(%)	塑性指数 Ip
BH-1	2	2.5	52.90	10.1	30.6	12.1	18.5
	4	2.5	80.30	15.1	29.0	10.5	18.5
	8	2.4	55.00	18.2	-	-	-
BH-2	2	2.4	75.10	11.8	32.9	15.4	17.5
	4	2.4	83.20	15.7	26.3	8.9	17.3
	8	2.4	85.90	19.8	-	-	-
BH-3	2	2.5	62.10	9.6	28.9	11.9	17.0
	4	2.5	54.10	12.7	24.0	4.8	19.1
	8	2.5	38.50	16.8	-	-	-

表 -1-4 建築施設建設予定地の室内土質試験結果(力学試験)

試験箇所		一軸圧縮試験	三軸圧縮試験(U-U)		圧密試験	
BH No.	深さ	Qu (kN/m <sup>2</sup> = 0.1t/m <sup>2</sup> )	C(Kpa= 0.1t/m <sup>2</sup> )	$\phi$ (°)	体積圧縮係数 mv	圧密係数 cv(m <sup>2</sup> /hr)
BH-1	2	-	25.3	0	$7.6 \times 10^{-5}$	0.041
	4	-	24.3	0	$6.2 \times 10^{-5}$	0.058
	8	-	28	0	$8.2 \times 10^{-5}$	0.045
BH-2	2	-	30.2	0	$7.7 \times 10^{-5}$	0.048
	4	-	31	0	$8.5 \times 10^{-5}$	0.051
	8	-	19.8	0	$8.6 \times 10^{-5}$	0.052
BH-3	2	-	32	0	$7.1 \times 10^{-5}$	0.045
	4	-	31.6	0	$7.9 \times 10^{-5}$	0.04
	8	-	32.5	0	$8.6 \times 10^{-5}$	0.052

## 2) マンサ研究所

建築施設建設予定地、ため池堤体の基礎部の地質状況を調べるためにボーリング調査と標準貫入試験及び各種室内土質試験を行った。また、アクセス道路沿道、種子生産ほ場でテストピットによる土壌断面の確認と室内土質試験、土取場候補地での室内土質試験を実施した。

図-1-4 にボーリング調査位置（図中●）を示す。



図 -1-4 ため池堤体(左)と建築施設建設予定地(右)のボーリング調査位置図

### a) 建築施設予定地

表-1-5に建築施設建設予定地のボーリング調査結果を示す。建設予定地は ZARI マンサ研究所の南側に位置し、表土は有機質を含み 0.2~0.4 m の厚さで、その下 10 m まで粘性土を主体に部分的に礫質土を挟む。地表面下 3 m 程度までは粘性土でも N 値 20 以上が確認されており、低層の建築物の基礎地盤として十分な地耐力を有する。それ以深も N 値 20 以上が確認され、基礎地盤として問題はない。なお、地下水位は、全ての調査箇所を確認されていない。

表-1-5 建築施設建設予定地のボーリング調査結果と N 値

地表面からの深さ	BH11		BH12		BH3	
	土性	N 値	土性	N 値	土性	N 値
0-1m	0.3m まで表土 粘性土(黄色系茶)	24	0.2m まで表土 粘性土(黄色系茶)	51	0.4m まで表土 粘性土(黄色系茶)	41
1-2m	粘性土(黄色系茶)	42	粘性土(赤茶)	26	礫質土(赤茶)	30
2-3m	同上	34	同上	22	同上	44
3-4m	礫質土(赤茶)	28	粘性土(黄色系茶)	17	粘性土(黄色系茶)	33
4-5m	粘性土(黄色系赤茶)	26	同上	26	同上	26
5-6m	同上	24	同上	27	粘性土(黄色系茶)	41
6-7m	粘性土(赤色系黄)	23	同上	24	同上	34
7-8m	同上	25	同上	33	同上	39
8-9m	同上	31	同上	33	同上	41
9-10m	同上	34	同上	37	同上	39



図 -1-5 マンサ建築建設予定地コアサンプル

表 -1-6 建築施設建設予定地の室内土質試験結果(物理試験)

試験箇所		土粒子の 密度試験	土の粒度試験	含水試験	土の液性限界・塑性限界試験		
BH No.	深さ (m)	密度 $\rho$ (g/cm <sup>3</sup> )	細粒分含有率 -0.075mm(%)	自然含水比 Wn(%)	液性限界 WL(%)	塑性限界 Wp(%)	塑性指数 Ip
BH-11	2	2.6	26.00	32.0	30.4	24.4	6.0
	6	2.6	38.00	34.8	27.7	21.3	6.4
	10	2.5	23.50	37.0	28.6	21.4	7.2
BH-12	2	2.6	18.50	29.3	30.8	25.0	5.8
	6	2.6	30.00	31.2	29.3	22.8	6.5
	10	2.6	4.30	33.9	31.8	26.1	5.7
BH-13	2	2.6	43.70	30.5	30.3	24.3	6.0
	6	2.5	50.30	32.8	31.4	23.4	8.0
	10	2.6	53.30	36.4	32.2	25.6	6.6

表 -1-7 建築施設建設予定地の室内土質試験結果(力学試験)

試験箇所		一軸圧縮試験	三軸圧縮試験(U-U)		圧密試験	
BH No.	深さ	Qu (kN/m <sup>2</sup> = 0.1t/m <sup>2</sup> )	C(Kpa= 0.1t/m <sup>2</sup> )	$\phi$ (°)	体積圧縮係数 mv	圧密係数 cv(m <sup>2</sup> /hr)
BH-11	2	78	25.3	0	$7.9 \times 10^{-5}$	0.050
	6	54	21	0	$7.2 \times 10^{-5}$	0.057
	10	39	24	0	$8.3 \times 10^{-5}$	0.044
BH-12	2	90	32	0	$7.7 \times 10^{-5}$	0.056
	6	92	33.2	0	$8.5 \times 10^{-5}$	0.053
	10	101	33.1	0	$8.6 \times 10^{-5}$	0.053
BH-13	2	125	27	0	$6.6 \times 10^{-5}$	-
	6	143	28.3	0	$6.0 \times 10^{-5}$	0.081
	10	130	29.4	0	$7.3 \times 10^{-5}$	0.070

b) ため池堤体

ボーリング調査は、図-1-4 に示す既存ため池の堤体上で 3 孔 (BH7, 8, 9)、右岸地山で 1 孔 (BH10) を実施した。調査結果を表 -1-8 に示す。

堤体中央 (BH8) の盛土部の N 値は 20 以上の締まった状態で、深度 3~4 m の築造前の基礎地盤も N 値 30~50 以上である。堤体左岸 (BH9) の調査孔では 4 m 以深に N 値 6~7 のやや軟弱な層が確認されているが、嵩上げしても堤高 4~5 m のフィルダムの基礎としては問題ないと考えられる。堤体右岸 (BH10) は、深度 3 m までは N 値 4~7 のやや軟弱な層があり、コンクリート構造物を造る際は留意が必要となる。

表 -1-8 ため池計画地のボーリング調査結果と N 値

地表面からの深さ	BH9		BH8		BH7		BH10	
	土性	N 値	土性	N 値	土性	N 値	土性	N 値
0-1m	砂質系粘性土(濃灰)	22	0.3m まで表土腐植土(濃灰)	23	0.3m まで表土腐植土(濃灰)	23	0.5m まで表土砂質系粘性土(薄灰)	4
1-2m	砂質系粘性土(淡灰)	12	同上	27	同上	26	同上	6
2-3m	同上	11	同上	37	同上	44	同上	7
3-4m	同上	6	砂質系粘性土(黄色がかった濃灰)	46	砂質系粘性土(黄色系灰)	58	砂質系粘性土(黄色系灰)	9
4-5m	同上	7	同上	53	同上	>50	砂質系粘性土(淡灰)	10
5-6m	-	-	同上	50	-	-	-	-
6-7m	-	-	同上	>50	-	-	-	-
7-8m	-	-	同上	>50	-	-	-	-
8-9m	-	-	同上	>50	-	-	-	-
9-10m	-	-	同上	>50	-	-	-	-



図 -1-6 マンサ既存ため池コアサンプル

表 -1-9 ため池計画地の室内土質試験結果(物理試験)

試験箇所		土粒子の密度試験	土の粒度試験	含水試験	土の液性限界・塑性限界試験		
BH No.	深さ (m)	密度 $\rho$ (g/cm <sup>3</sup> )	細粒分含有率 -0.075mm(%)	自然含水比 Wn(%)	液性限界 WL(%)	塑性限界 Wp(%)	塑性指数 Ip
BH-7	1	2.7	32.50	30.1	20.1	24.7	5.4
	5	2.6	20.30	31.1	28.4	22.1	6.3
BH-8	2	2.6	22.00	30.8	30.1	24.4	5.7
	6	2.7	36.40	35.1	29.6	23.3	6.3
	10	2.3	53.00	36.2	29.8	24.0	5.8
BH-9	1	2.6	18.00	31.7	29.7	24.2	5.5
	5	2.7	17.30	36.5	30.8	23.9	6.9
BH-10	1	2.4	10.80	33.9	30.4	24.3	6.1
	5	2.5	19.60	37.6	27.5	21.3	6.2

c) ほ場、アクセス道路

図-1-7 に示す既存ほ場 10 箇所、アクセス道路沿道の 10 箇所テストピットによる土質調査を実施した。既存ほ場では、全箇所とも地表面より 30 cm~50 cm の厚さで表土が確認された。既存ほ場のテストピットで確認された表土の厚さとアクセス道路沿道の CBR 試験結果を表-1-10、及び表 -1-11 に示す。

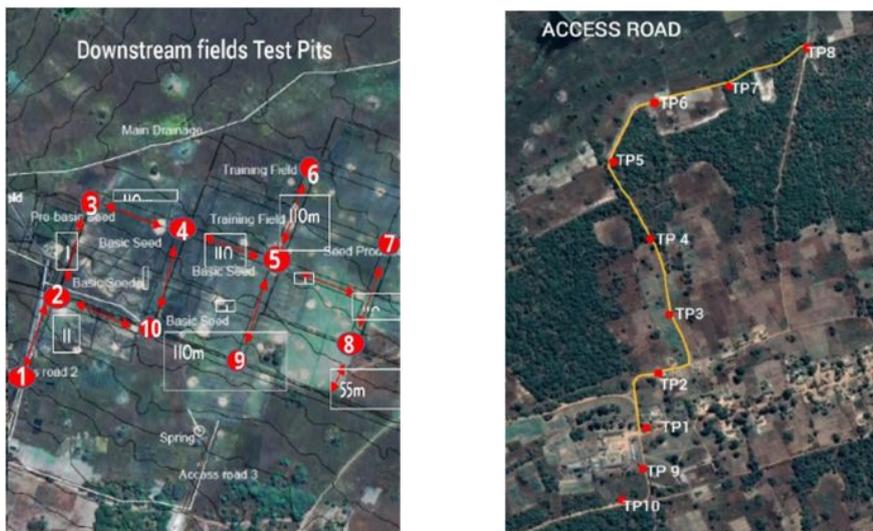


図 -1-7 テストピット位置図 (左)既存ほ場、(右)アクセス道路沿道



図 -1-8 既存ほ場のテストピット状況

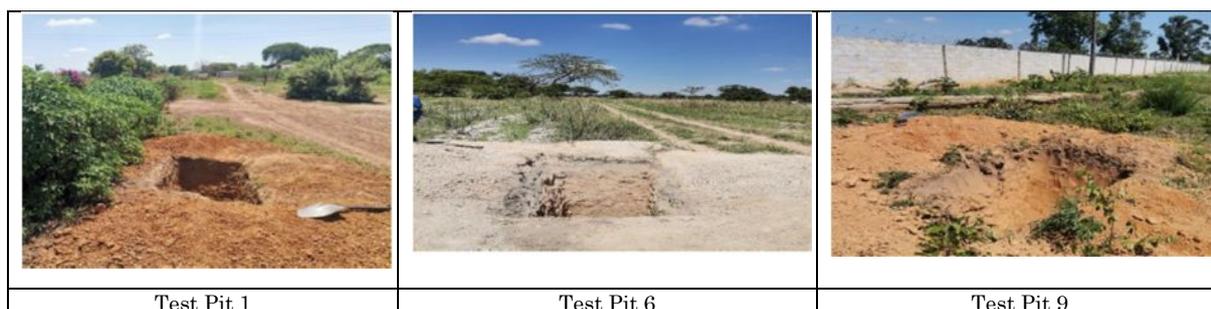


図 -1-9 マンサアクセス道路沿道におけるテストピット掘削写真

表 -1-10 既存ほ場のテストピットで確認された表土厚

試験箇所	表土厚 (cm)
TP1	40
TP2	31
TP3	33
TP4	36
TP5	30
TP6	50
TP7	38
TP8	28
TP9	25
TP10	38

表 -1-11 アクセス道路沿道の CBR 試験結果

試験番号	CBR試験結果 %	個数	最大値	最小値	標準偏差 ( $\sigma_{n-1}$ )	平均値	区間の CBR	設計CBR
TP 1 Access Rd	39	10	39	15	8.54	24.8	16.26	12
TP 2	37							
TP 3	28							
TP 4	19							
TP 5	19							
TP 6	15							
TP 7	15							
TP 8	17							
TP 9	31							
TP 10	28							

【設計CBR】

「アスファルト舗装要綱（社団法人 日本道路協会）」に記載されている方法で求めた。

- ・ 最大値の棄却確認

最大値=39 棄却せず

$$\gamma = (39-37)/(39-15) = 0.083 < 0.412 = \gamma(10)$$

- ・ 最小値の棄却確認

最小値=15 棄却せず

$$\gamma = (17-15)/(39-15) = 0.083 < 0.412 = \gamma(10)$$

- ・ 区間の CBR

= CBR の平均値 - CBR の標準偏差( $\sigma-1$ )

$$= 24.8 - 8.5 = 16.3$$

- ・ 設計 CBR

表-1-12 の区間の CBR と設計 CBR の関係から

設計 CBR=12

表-1-12 最大値・最小値の廃棄判定に用いる  $\gamma$

$n$	3	4	5	6	7	8
$\gamma(n, 0.05)$	0.941	0.765	0.642	0.560	0.507	0.468
$n$	9	10	11	12	13	14
$\gamma(n, 0.05)$	0.437	0.412	0.392	0.376	0.361	0.349
$n$	15	16	17	18	19	20
$\gamma(n, 0.05)$	0.338	0.329	0.320	0.313	0.306	0.300

表-1-13 区間の CBR と設計 CBR の関係

区間の CBR	設計 CBR
(2 以上 3 未満)	(2)
3 以上 4 未満	3
4 以上 6 未満	4
6 以上 8 未満	6
8 以上 12 未満	8
12 以上 20 未満	12
20 以上	20

## (2)土取場調査（マンサ研究所）

### 1) 既存土取場（道路用盛土材）

図 -2-1 にマンサ研究所の種子生産ほ場近傍の土取場位置を示す。既存の土取場は、EBP1 と EBP2 の 2 箇所で確認された。これらの土取場の現地踏査結果の概要を図 -2-2 及び図 -2-3 に示す。両サイトとも良質な礫質混じりのラテライトの採取可能であるが、EBP1 は既に道路用資材としてその多くが掘削され、残存量は多くはない。一方、EBP2 は概算で 6,000 m<sup>3</sup> 程度の良質な道路用路盤・舗装材料の入手が可能である。ただし、EBP2 から種子生産ほ場までは約 2.2 km の道のりがあり、途中に幹線道路 D94 の横断やコミュニティ道路を仮設道路として拡幅・改良するなどの対策が必要となる。

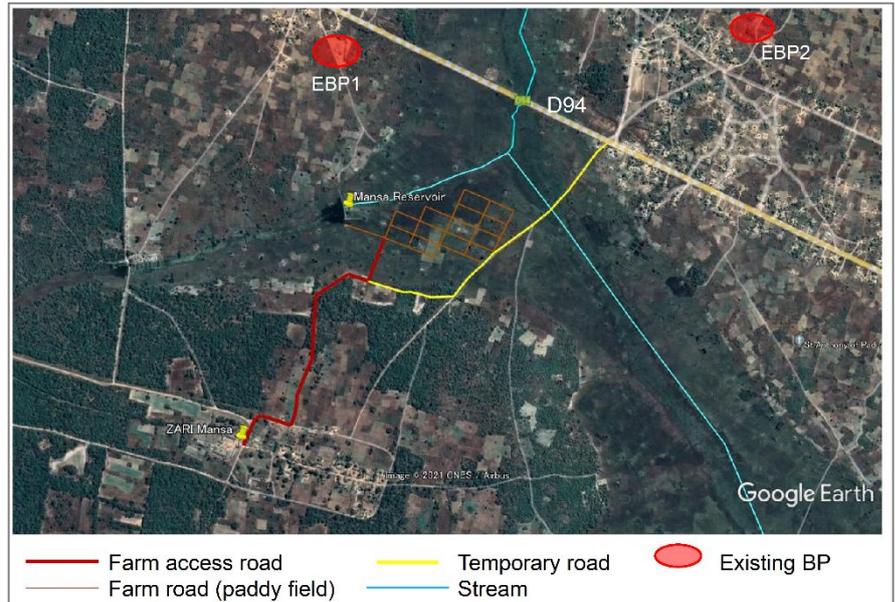
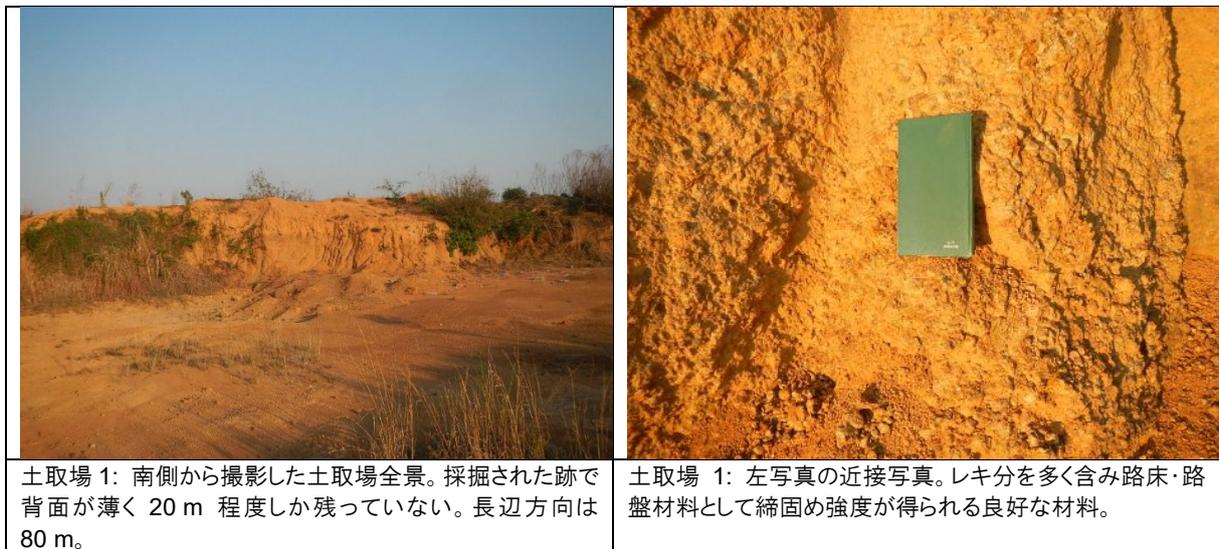


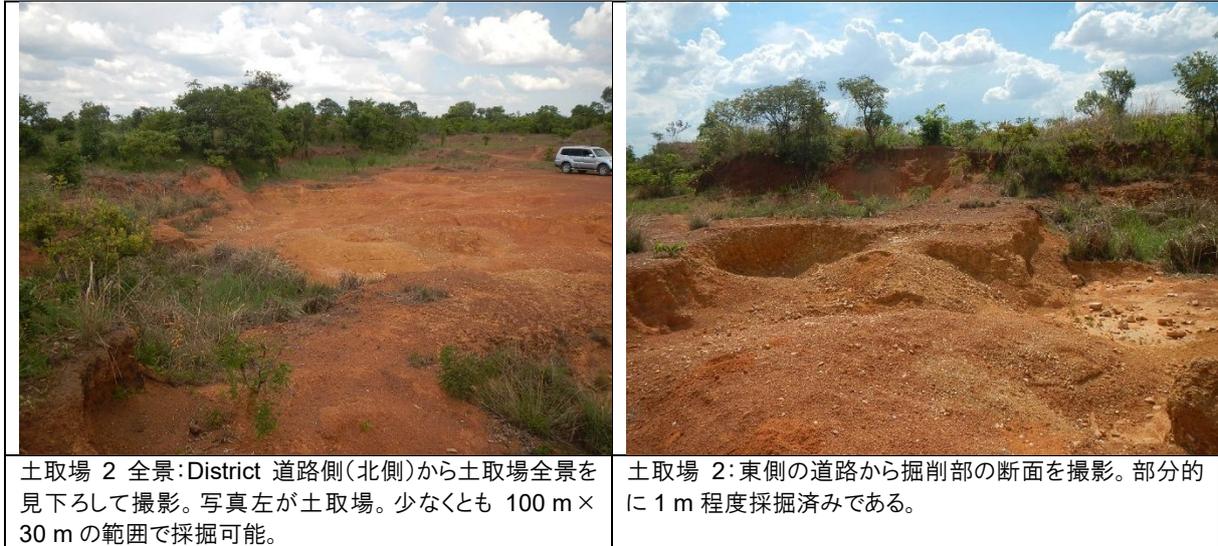
図 -2-1 種子生産ほ場と既存土取場の位置図



土取場 1: 南側から撮影した土取場全景。採掘された跡で背面が薄く 20 m 程度しか残っていない。長辺方向は 80 m。

土取場 1: 左写真の近接写真。レキ分を多く含む路床・路盤材料として締固め強度が得られる良好な材料。

図 -2-2 土取場 1 の現地状況



土取場 2 全景: District 道路側(北側)から土取場全景を見下ろして撮影。写真左が土取場。少なくとも 100 m × 30 m の範囲で採掘可能。

土取場 2: 東側の道路から掘削部の断面を撮影。部分的に 1 m 程度採掘済みである。

図 -2-3 土取場 2 の現地状況

表 -2-1 既存土取り場の室内土質試験結果(物理試験)

試験箇所		土粒子の密度試験	土の粒度試験	含水試験	土の液性限界・塑性限界試験		
場所	Sample	密度 $\rho$ (g/cm <sup>3</sup> )	細粒分含有率 -0.075mm (%)	自然含水比 Wn (%)	液性限界 WL (%)	塑性限界 Wp (%)	塑性指数 Ip
土取場 1	A	2.6	24.00	14.6	25.2	20.9	4.3
	B	2.5	5.70	16.4	29.2	23.6	5.6
	A+B	2.7	-	16.0	28.1	22.3	5.8
	C	-	15.30	-	-	-	-
土取場 2	A	2.6	1.00	15.4	31.2	25.0	6.2
	B	2.6	7.30	15.8	29.6	25.0	4.6
	A+B	2.3	-	13.0	28.4	25.6	2.8
	C	-	18.20	-	-	-	-

表 -2-2 既存土取り場の室内土質試験結果(その他)

試験箇所		締固め試験 (4.5 kg ランマー)		透水試験
場所	Sample	$\gamma_{max}$ (g/cm <sup>3</sup> )	Wopt (%)	k (m/s)
土取場 1	A	2.037	9.2	1.2x10 <sup>-8</sup>
	B	2.050	8.3	1.2x10 <sup>-8</sup>
	A+B	-	-	1.2x10 <sup>-8</sup>
	C	2.052	8.5	-
土取場 2	A	2.073	7.5	1.2x10 <sup>-8</sup>
	B	2.056	8.2	1.3x10 <sup>-8</sup>
	A+B	-	-	1.3x10 <sup>-8</sup>
	C	2.055	8.5	-

## 2) 既存土取場（堤体盛土材）

現地では一般的に蟻塚跡のシルトを用い煉瓦の製作や人力施工による堤体盛土材料として利用している。図 -2-4 に堤体盛土材料の適否について検討した施工現場近傍の蟻塚跡の状況を示す



蟻塚 1: 建設予定地内にある規模の大きい蟻塚。  
高さ約 4.5 m、底面の直径約 9 m の蟻塚。

蟻塚 3: 高さ約 4 m、底面の直径 8~9 m。盛土材料の賦  
存量は 430 m<sup>3</sup> 程度と見積もる。

図 -2-4 蟻塚跡の現地踏査状況

表 -2-3 蟻塚の室内土質試験結果(物理試験)

試験箇所		土粒子の 密度試験	土の粒度試験	含水試験	土の液性限界・塑性限界試験		
場所	Sample	密度 $\rho$ (g/cm <sup>3</sup> )	細粒分含有率 -0.075mm (%)	自然含水比 Wn (%)	液性限界 WL (%)	塑性限界 Wp (%)	塑性指数 Ip
蟻塚 1	A	2.4	22.30	22.5	32.6	26.8	5.8
	B	2.7	33.30	23.1	32.7	26.2	6.5
	A+B	2.6	-	-	31.5	24.9	6.6
	C		49.00	21.2	-	-	-
蟻塚 2	A	2.5	42.00	22.6	33.3	27.7	5.6
	B	2.6	31.00	23.0	30.6	25.1	5.5
	A+B	2.6	-	-	30.0	24.4	5.6
	C		38.30	22.0	-	-	-
蟻塚 3	A	2.3	23.30	19.6	30.5	26.4	4.1
	B	2.6	32.80	19.5	33.3	29.0	4.3
	A+B	2.6	-	-	31.9	27.3	4.6
	C	-	36.00	21.3	-	-	-

表 -2-4 蟻塚の室内土質試験結果(その他)

試験箇所		締固め試験 (4.5 kg ランマー)		透水試験
場所	Sample	$\gamma_{max}$ (g/cm <sup>3</sup> )	Wopt (%)	k (m/s)
蟻塚 1	A	2.028	9.3	8.6x10 <sup>-9</sup>
	B	2.014	9.5	8.6x10 <sup>-9</sup>
	A+B	2.021	9.4	8.6x10 <sup>-9</sup>
蟻塚 2	A	2.026	10.2	8.7x10 <sup>-9</sup>
	B	2.280	10.4	8.7x10 <sup>-9</sup>
	A+B	2.025	9.2	8.6x10 <sup>-9</sup>
蟻塚 3	A	2.005	11.4	8.5x10 <sup>-7</sup>
	B	2.020	11.0	8.4x10 <sup>-9</sup>
	A+B	2.023	10.3	8.5x10 <sup>-7</sup>

### 3) ZARI 敷地内の土取場

前述のとおり、道路用盛土材料は既存土取場で良質の材料が得られるもののサイトまでの距離があること、堤体盛土材料として蟻塚のシルトを用いるのはその賦存量の算定など課題がある。このため、ZARI 敷地内の現地踏査による土取場の選定を実施した。現地踏査は、衛星画像から表層部にラテライトが賦存していると推測された疎開林の分布が多いエリアを中心に 10 箇所程度の現地踏査を行った後、試掘調査による土取場の選定を行った。

現地踏査結果、図-2-5 に示す 3 箇所を土取場候補とし、試掘調査を実施した。試掘結果、道路築堤材及びため池盛土材に適した材料を得られる箇所を概定し、室内土質試験を行った。次頁 図-2-6 に試掘調査結果を示す。

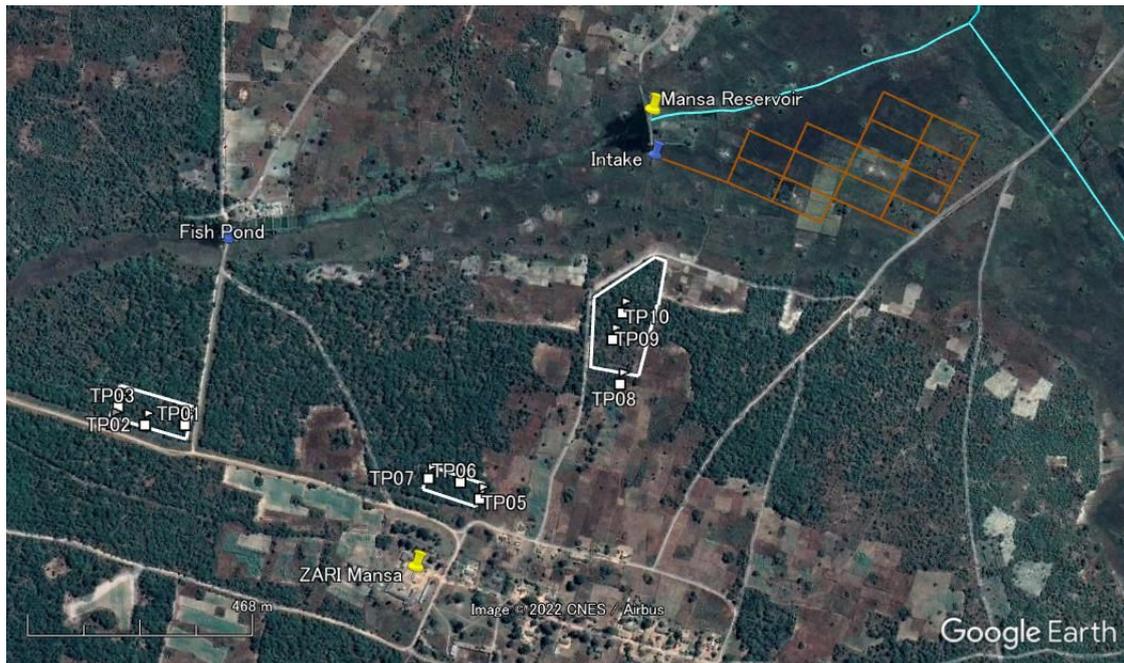


図 -2-5 土取場候補の試掘調査位置図



Borrow pit 1, Test pit 1:  
0-5cm: 表層、5-20cm:B 層、20-70 cm: レキ混じりのラテライト、70cm 以深: 固結したラテライト

Borrow pit 1, Test pit 1:  
20-70cm:レキを含むルーズなラテライト。良質のラテライト舗装材として使用可能

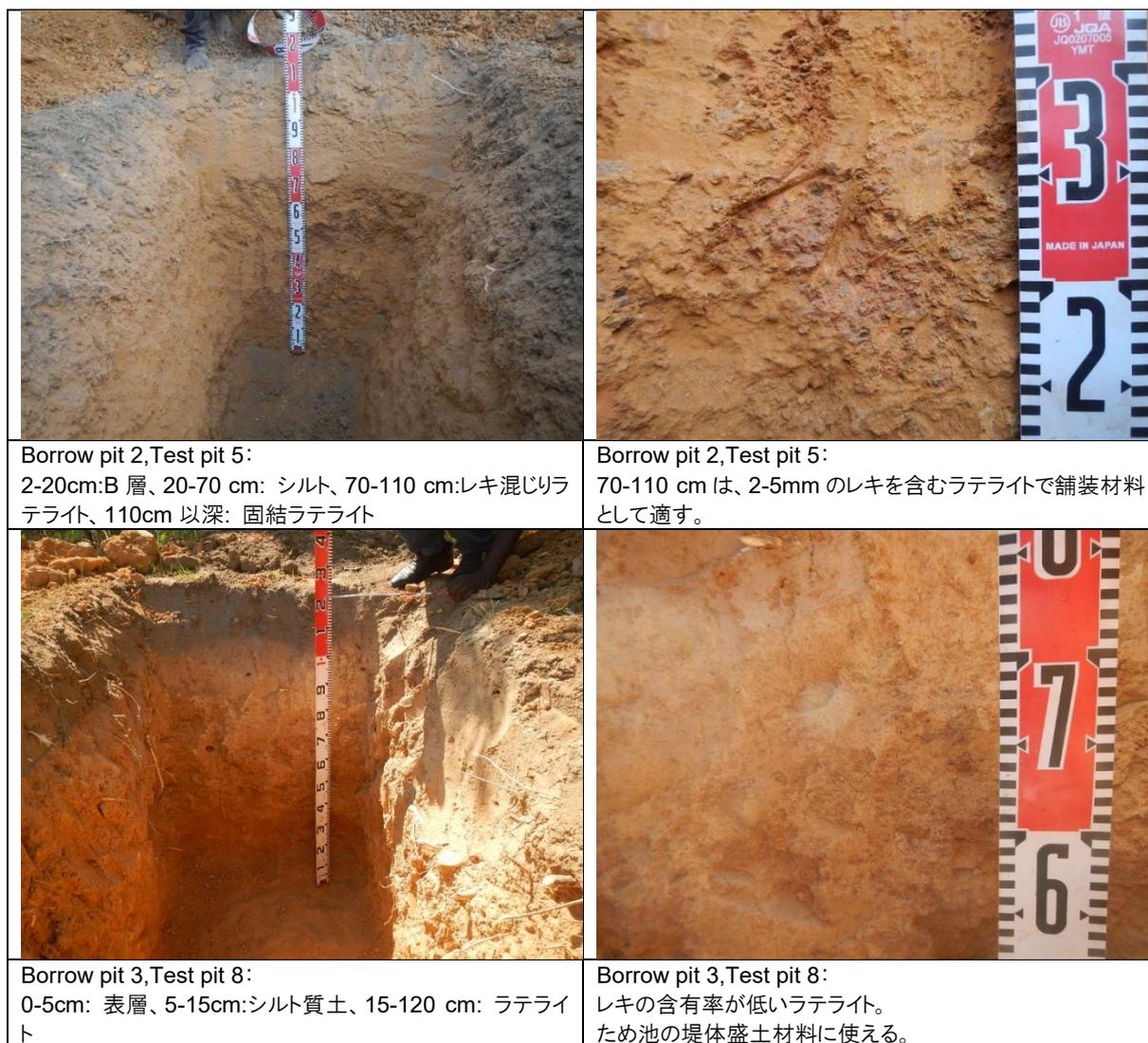


図 -2-6 土取場候補 3 箇所の試掘調査結果

表 -2-5 土取場候補 3 箇所の室内土質試験結果(物理試験)

試験箇所		土粒子の密度試験	土の粒度試験	含水試験	土の液性限界・塑性限界試験		
場所	Sample	密度 $\rho$ (g/cm <sup>3</sup> )	細粒分含有率 -0.075mm (%)	自然含水比 Wn (%)	液性限界 WL (%)	塑性限界 Wp (%)	塑性指数 Ip
土取場 1	TP 1	2.6	21.10	17.6	30.1	21.8	8.3
	TP 2	2.5	25.60	18.4	33.4	22.3	11.2
	TP 3	2.6	20.10	17.9	31.6	20.1	11.5
	TP 4	2.4	47.90	19.5	32.9	20.3	12.7
土取場 2	TP 5	2.7	22.70	18.3	30.7	19.3	11.4
	TP 6	2.7	24.10	17.5	29.0	18.0	10.9
	TP 7	2.4	55.50	19.7	31.6	19.5	12.1
土取場 3	TP 8	2.5	48.60	20.1	31.8	17.2	14.6
	TP 9	2.6	48.30	17.8	32.0	19.0	12.9
	TP 10	2.7	33.50	16.3	30.8	19.4	11.4

表 -2-6 土取場候補 3 箇所の室内土質試験結果(その他)

試験箇所		締固め試験 (4.5 kg ランマー)		透水試験	CBR 試験
場所	Sample	$\gamma_{max}$ (g/cm <sup>3</sup> )	Wopt(%)	k (m/s)	%
土取場 1	TP 1	2.054	9.6	$1.1 \times 10^{-8}$	44.2
	TP 2	-	-	-	57.6
	TP 3	-	-	-	40.0
	TP 4	1.912	8.9	$1.2 \times 10^{-8}$	26.2
土取場 2	TP 5	-	-	-	-
	TP 6	-	-	-	-
	TP 7	-	-	-	-
土取場 3	TP 8	1.899	9.1	$9.0 \times 10^{-9}$	-
	TP 9	1.953	8.5	$9.0 \times 10^{-9}$	-
	TP 10	2.010	9.6	$1.2 \times 10^{-8}$	-

試掘調査結果、道路盛土材料として適すると判断された土取場 1、堤体盛土材料として適すると判断された土取場 3、及び両者を補完する予備的な土取場 2 を土取場候補として、各テストピットからサンプリングし、室内土質試験を実施した。試掘調査結果及び室内土質試験結果から、各土取場を以下の方針で利用する計画とする。

表 -2-7 土取場の試掘調査結果と利用区分

	概定面積	用途	試掘結果
土取場 1	0.8 ha	道路用盛土材	土取場の東側(TP1,TP2)の地表面下 20cm 以深において、レキを含む固結していないラテライトの賦存が確認された。西側(TP3,TP4)ではレキを殆ど含まないラテライトを確認した。したがって、西側から掘削を開始し、路床及び路盤材料に利用し、東側の良質なラテライトを表層に利用することが考えられる。
土取場 2	1.2 ha	道路用盛土材と堤体盛土材の予備	土取場 2 の東側(TP5)ではレキの含有率が高いラテライト、西側(TP6、TP7)ではレキの含有率が小さいラテライトが確認されている。土取場 2 は、土取場 1、3 で盛土材料が不足した場合の予備的な土取場として準備することが考えられる。
土取場 3	1.6 ha	堤体盛土材	土取場南側(TP8)では、レキの含有率が低いラテライトが確認され、堤体盛土材料として適している。北側(dambo 側)に近づくにつれ、レキの含有率が高いラテライトが表層部に出現するのが確認できた。したがって、堤体盛土材料としては、土取場 3 の南側から掘削を開始し、堤体天端部の盛土材料には多少レキを含む北側の材料を利用することが考えられる。

以上の調査結果を踏まえ、ZARI 側と土取場としての土地利用を協議し、図 -2-7 を基に鉱山開発局（Mines Development Department）に申請し、開発許可を取得している。



図 -2-7 土地利用申請に用いた土取場位置

### (3)コーンペネトロメータ試験結果（マンサ研究所）

#### 1)種子生産ほ場

マンサ種子生産ほ場においてポータブルコーン貫入試験を実施し、1) 農業機械の走行性、2) 表土厚さ、3) 農道の置換え厚の検討を行った。測線は計画農道の南北方向に沿って概ね 50 m 間隔で測定した。測定したコーン指数を図-3-1 に示す。なお、測定時のほ場条件は、降雨前の乾燥した状態で、ディスクハローによる砕土が行われた状態であった。

#### (a) 農業機械の走行性

表層 10cm 以深でトラクターの走行に必要な  $200 \text{ kN/m}^2$  以上の強度が確保されており、機械化導入による地耐力は乾燥状態では問題ない。

#### (b) 表土厚さ

表層から 0-10 cm はコーン指数が小さく、10-20 cm はほぼ同じ値を示し、20 cm 以深でコーン指数が上昇する傾向を示している。これより、耕うんされ表土として扱われている厚さは 20 cm 程度と推測できる。

#### (c) 農道の置換え厚

ダンプトラックの走行に必要なコーン指数 ( $1200 \text{ kN/m}^2$ ) は、部分的に軟弱な箇所 (No.1、No.6、No.15) を除き、A-A 測線で 60 cm、B-B 測線では 40 cm~60 cm、C-C 測線では 40 cm、D-D 測線では 40 cm の深さで確認されている。これは、試掘調査で確認した砂層の深さ (平均 50 cm) と同程度である。これより深さ 50 cm の砂層まで置換えすることで農道のトラフィアビリティを確保できることが判る。

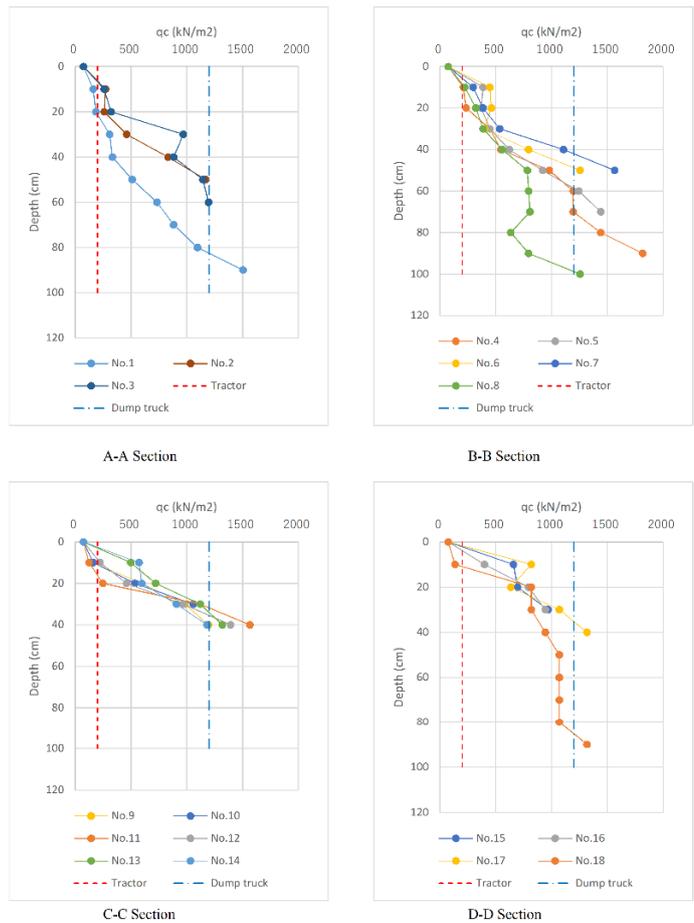


図 -3-1 コーンペネトロメータ測定結果(マンサほ場)

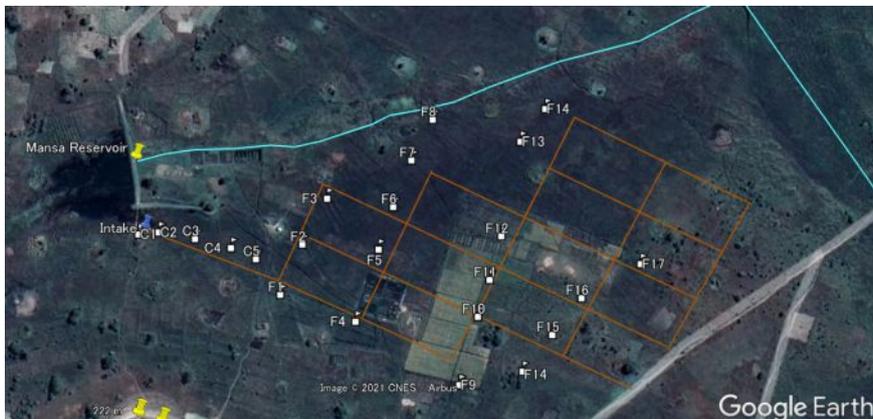


図 -3-2 コーンペネトロメータ測定位置図

## 2)ため池堤体

### (a) ため池中央部 (BNo.8 直近)

堤体頂部（地表面下 30 cm までは、 $q_c=1000 \text{ kN/m}^2$  程度と良く締固まっている。これは、築堤後 人の往来により使用され締固まったものと推測される。

表層から 30 cm~150 cm は、 $q_c=200 \sim 500 \text{ kN/m}^2$  (N 値換算で 2~8 程度) で柔らかい~中程度の締まり具合である。人力施工で盛立てた堤体の締固め度は低いことが判る。

堤体盛土部のボーリング柱状図 (BNO.8) は、N 値で 10~12 を示すが、人力施工で盛立てたこともあり、位置によってバラツキがあるものと推測される。

### (b) ため池右岸 (BH10)

地表面下 30 cm までは、 $q_c=400 \text{ kN/m}^2$  未満 (N 値換算で 4 未満程度) を示し、柔らかい~中位の表土である。

地表面下 30 cm~40 cm 付近で砂質土に変わり、地表面下 50cm 以深で  $q_c=1000 \text{ kN/m}^2$  (N 値換算で 15 程度) の非常に固い地盤となり、コーンペネトロメータでの計測範囲を超過する。

堤体右岸のボーリング柱状図 (BH10) は、N 値 3~5 程度の柔らかい層が 5 m 以深まで続く結果を示すが、コーンペネトロメータで近傍地点を数点確認した結果、70~90 cm 以深はコーンペネトロメータで計測範囲を超える非常に固い砂質系の層が確認された。

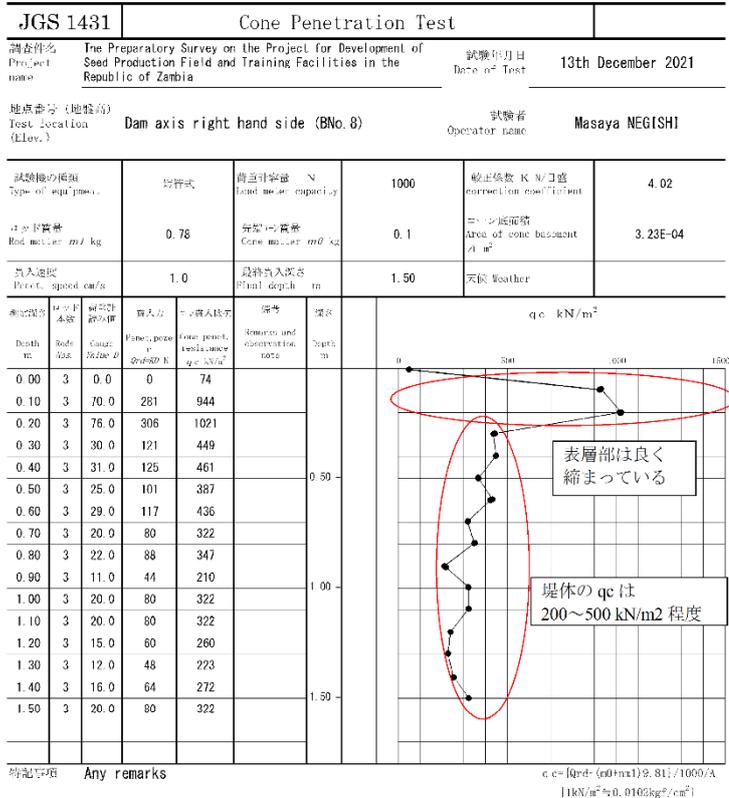


図 -3-3 ため池中央部の試験結果

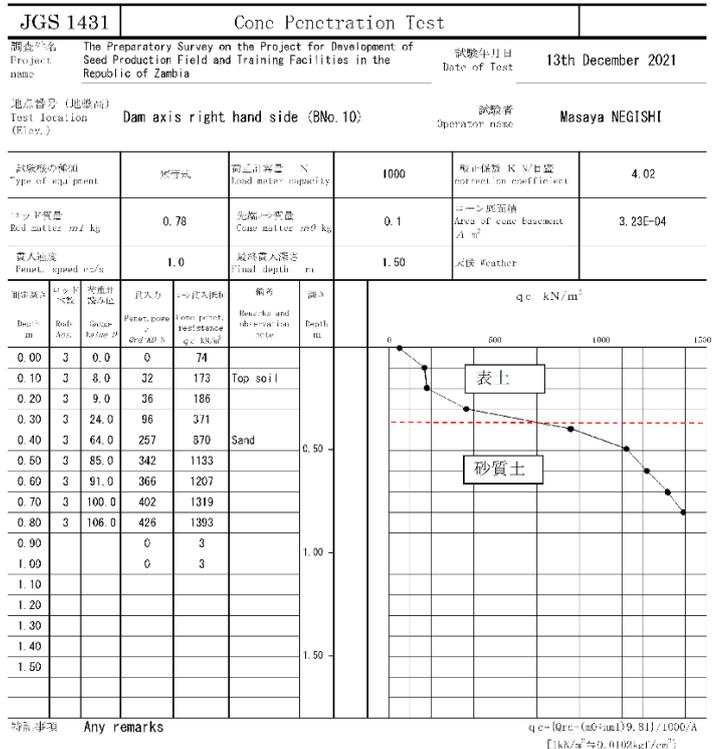


図 -3-4 ため池右岸の試験結果

(c) 建築施設建設予定地の基礎地盤

マンサ研究所の建築施設建設予定地が当初予定地から変更となったため、建設予定地の表土剥ぎに必要な表層厚と基礎地盤面の確認を補完するため、試掘調査とコーンペネトロメータ試験結果を実施した。調査位置は、図 -3-5 に示す TP B1～B9 の 9 箇所で行った。また、マンサ研究所のほ場管理人室の基礎地盤面の確認も併せて実施した。

調査結果を図 -3-6 に示す。試掘箇所を確認した表土の厚さは、ほとんどの箇所で地表面から 5 cm 以深に留まり、その下に 10～20 cm の厚さで砂質土もしくはシルト質土が分布し、その下部に固結したラテライトもしくはレキ混じりのラテライトが賦存している。建築基礎の床掘り深さを考慮すると、基礎面はラテライト層に設地することになるので直接基礎で全く問題がない。

図 -3-7 に参考まで試掘箇所近傍でコーンペネトロメータ試験を実施した結果を示す。表土 5 cm 以深でブルドーザーの走行に必要な地耐力  $qc$  500  $kN/m^2$  を上回っているので、建設予定地の表土 5 cm の剥ぎ取りで整地すれば工事にも支障はない。なお、ほ場管理人室の基礎地盤も同様の結果である。

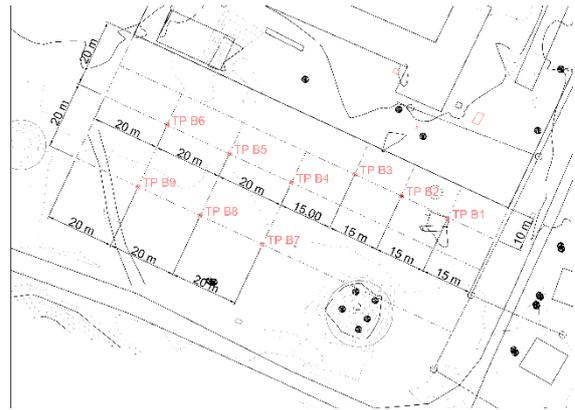


図 -3-5 建築施設建設予定地の試掘調査位置図

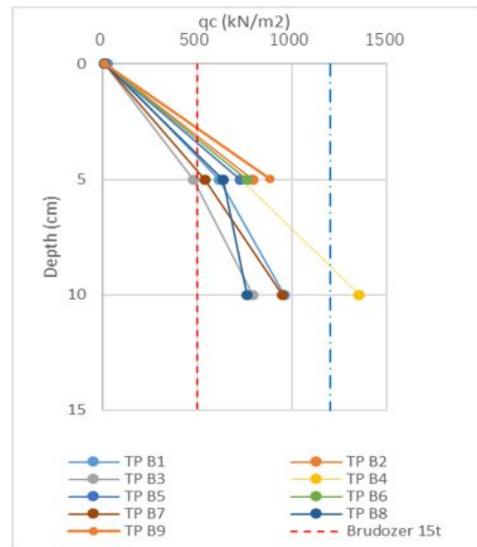


図 -3-6 コーンペネトロメータ試験結果

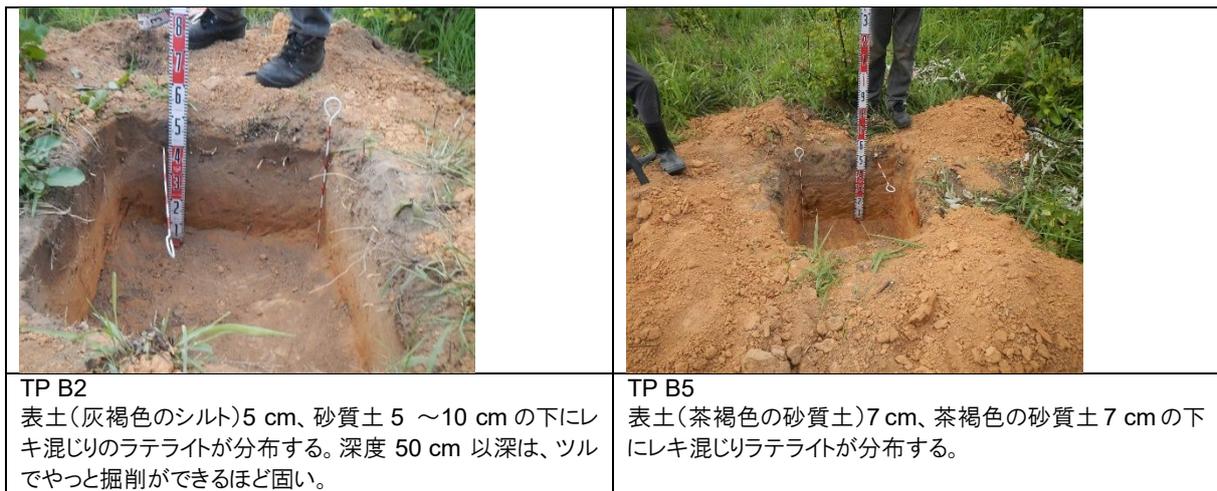


図 -3-7 建築施設建設予定地の試掘調査状況



資料 7-1 : 環境社会モニタリングフォーム



# Monthly Environmental and Social Monitoring Form

## Site Environmental Compliance Inspection and Monitoring Form

**Form-1 for Pre-Construction Phase**

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. ZARI submits this monitoring form to DD/SV consultant and JICA monthly and quarterly respectively.

**Project Name** : Project for Development of Rice Seed Production Field and Training Facilities in the Republic of Zambia  
**Implementing Agency** : ZARI

**Location** :  Chilanga District  
 Mansa District  
**Monitoring Agency** : N/A

**Date Reported** : DD/MM/YYYY  
**Enforcement Agency** : ZARI/MOA

**Reporting Period** : XX Quarter of YYYY  
(Monthly)

**1. Project Proponent**

ZARI's Environmental Awareness	Yes/No	Actions required
ZARI aware of mitigation requirements?		
ZARI has a copy of EMP?		

## 2. Land Acquisition and Compensation (Mansa)

Resettlement Activities	Planned Total	Unit	Progress in Quantity		Expected date of completion	Responsible organization
			Progress as of	Issues if any		
1.Set up of RAP Implementation Structure						
1-1 Formation of Resettlement Committee (RC)		Times				ZARI
1-2 Appointment of social environmental officer from ZARI		Times				ZARI
1-3 Key stakeholders such as Municipality, Wards, Chiefs, RC are informed about RAP schedule		Times				ZARI
1-4 Kick-off meeting with ZARI and RC		Times				ZARI
2.Update PAPs list and Final Asset Valuation						
2-1 Identification of final PAU and PAH		PAPs				ZARI
2-2 Announcement to affected people		times				ZARI
2-3 Final Asset Valuation		times				ZARI
2-4 Consultation meeting		times				ZARI
2-5 Revise ARAP and signing compensation agreement based on the feedback at the consultation meeting		set				ZARI
3.Progress of compensation/ Assistance						
3-1 Provision of alternative crop land		PAH				ZARI
3-2 Provision of livelihood restoration assistance		PAH				ZARI
4.Progress of evacuation from the site						
4-1 PAU (fish ponds)		PAU				ZARI
4-2 PAH (crop land)		PAH				ZARI
5. Construction of alternative facilities						
5-1 Fish pond		set				ZARI
6.Complain and Grievance Redress						
6-1 No. of solved cases by committee	N/A	Cases				ZARI
6-2 No. of unsolved cases by committee	N/A	Cases				ZARI

**3. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from PAPs	Solution / Result / Any actions to be taken
1			
2			
3			
4			

**4. Notes;**

Inspected by: \_\_\_\_\_

Date: \_\_\_\_\_

**Monthly Environmental and Social Monitoring Form (ZARI Mt. Makulu)**

**Site Environmental Compliance Inspection and Monitoring Form**

**Form-2 for Construction Phase**

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. Contractor submits this monitoring form to DD/SV consultant and JICA monthly and quarterly respectively.

**Project Name** : Project for Development of Rice Seed Production      **Implementing Agency** : ZARI  
 Field and Training Facilities in the Republic of Zambia

**Location** : Chilanga District      **Monitoring Agency** : NA

**Date Reported** : DD/MM/YYYY      **Enforcement Agency** : Contractor(s)

**Reporting Period** : XX Month of YYYY      **Contractor(s)** : XXXX Co., Ltd.

**(Monthly)**

**1. Mitigation Compliance Inspection**

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Mitigation Effective? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any remarks
- Community is aware of contact address of complain and grievance redress mechanism					
- Community is aware of construction schedule					

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Mitigation Effective? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any remarks
- A sign of vehicle/ machine trouble (abnormal noise, vibration, white/dark smoke, etc.) are not observed					
- Water is sprinkled before on the dirt / unpaved road against dust					
- Vehicles adhere to speed limit and avoid unnecessary idling					
- Drip trays are used when refuelling or maintenance					
- Enlightenment to workers not to dispose waste around construction site					
- Solid waste are disposed at designated dumping site					
- Reuse excavated material as much as possible					
- Education and sensitization for Occupational Safety and Health was held for workers					
- Personal Protective Equipment (helmet, goggle, glove, etc.) is provided to workers					
- Necessary prevention measures against COVID-19 is implemented (such as wearing masks, put sanitizers, etc.)					
- Fire extinguisher and First-aid kits are available at all construction sites and yard					
- Access to hazardous area (e.g. borehole, reservoir) is restricted					
- Workers younger persons under the age of 16 years are not employed					
- Women are employed as much as possible					
- Workers are sensitized the risk of HIV/AIDS and GBV associated with alcohol consumption					

**2. Natural Environment**

Item	Monitoring Result			Action Required (Yes/No) Describe if Yes:	Any remarks
	Date	Mitigations Implemented? Yes/No	If yes, describe in details		
Vegetation is not cleared more than necessary					

**3. Record of accidents**

No	Date	Case of accident	Solution / Result / Any actions to be taken
1			
2			
3			

**4. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from Communities / stakeholders	Solution / Result / Any actions to be taken
1			
2			
3			

**5. Notes;**

Inspected by: \_\_\_\_\_

Date: \_\_\_\_\_

## Monthly Environmental and Social Monitoring Form (ZARI Mansa)

**Form-2 for Construction Phase**

### Site Environmental Compliance Inspection and Monitoring Form

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. Contractor submits this monitoring form to DD/SV consultant and JICA monthly and quarterly respectively.

**Project Name** : Project for Development of Rice Seed Production Field and Training Facilities in the Republic of Zambia  
**Implementing Agency** : ZARI

**Location** : Mansa District  
**Monitoring Agency** : NA

**Date Reported** : DD/MM/YYYY  
**Enforcement Agency** : Contractor(s)

**Reporting Period** : XX Month of YYYY  
**Contractor(s)** : XXXX Co., Ltd.

#### 1. Mitigation Compliance Inspection

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Mitigation Effective? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any remarks
- Community is aware of contact address of complain and grievance redress mechanism					
- Community is aware of construction schedule					

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Mitigation Effective? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any remarks
- A sign of vehicle/ machine trouble (abnormal noise, vibration, white/dark smoke, etc.) are not observed					
- Water is sprinkled before on the dirt / unpaved road against dust					
- Vehicles adhere to speed limit and avoid unnecessary idling					
- Drip trays are used when refuelling or maintenance					
- Enlightenment to workers not to dispose waste around construction site					
- Solid waste are disposed at designated dumping site					
- Reuse excavated material as much as possible					
- Education and sensitization for Occupational Safety and Health was held for workers					
- Personal Protective Equipment (helmet, goggle, glove, etc.) is provided to workers					
- Necessary prevention measures against COVID-19 is implemented (such as wearing masks, put sanitizers, etc.)					
- Fire extinguisher and First-aid kits are available at all construction sites and yard					
- Access to hazardous area (e.g. borehole, reservoir) is restricted					
- Workers younger persons under the age of 16 years are not employed					
- Women are employed as much as possible					
- Workers are sensitized the risk of HIV/AIDS and GBV associated with alcohol consumption					

## 2. Water Quality at Outlet of Discharge from Construction Site and Irrigation Site

Item	Unit	Baseline Data (*1)			Monitoring Result			Standards max. Limits (*2)	Action Required (Yes/No) Describe if Yes:	Any remarks
		Date	Location	Amount measured	Date	Location	Amount measured			
pH	-	Mar 2022	Point 1 Reservoir	6.52			6.0-9.0			
EC	52			4300						
TSS	<1.0			100						
pH	-	Mar 2022	Point 2 Drainage channel	6.50			6.0-9.0			
EC	60			4300						
TSS	<1.0			100						
pH	-	Mar 2022	Point 3 Down stream	6.52			6.0-9.0			
EC	58			4300						
TSS	<1.0			100						

\*1: Baseline survey in March 2022 for Reservoir, drainage and down stream

\*2: LIMIT FOR EFFLUENT AND WASTE WATER (THIRD SCHEDULE, Regulation 7 (2), The Environmental Management Act (Act No. 12 of 2011), The Environmental Management (Licensing) Regulations, 2013

## 3. Natural Environment

Item	Monitoring Result		Action Required (Yes/No) Describe if Yes:	Any remarks
	Mitigations Implemented? Yes/No	If yes, describe in details		
Vegetation is not cleared more than necessary				
Rebury borrow pit as much as possible				

## 4. Record of accidents

No	Date	Case of accident	Solution / Result / Any actions to be taken
1			
2			
3			

**5. Livelihood Restoration Assistance**

Livelihood Restoration Assistance		Monitoring Result	Observation	Action Required (Yes/No) Describe if Yes:	Responsible organization
1	ZARI provides information on aquaculture training to PAU	Times			ZARI
2	PAU's fish farming activity is restored as same or improved compared to that before relocation	PAU			ZARI
3	PAH's crop farming activity is restored as same or improved compared to that before relocation	PAH			ZARI

**6. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from Communities / stakeholders	Solution / Result / Any actions to be taken
1			
2			
3			

**7. Notes;**

Inspected by: \_\_\_\_\_

Date: \_\_\_\_\_

## Biannual Environmental and Social Monitoring Form (ZARI Mt. Makulu)

### Site Environmental Compliance Inspection and Monitoring Form

Form-3 for Operation Phase

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. ZARI submits this monitoring form to JICA biannually.

**Project Name** : Project for Development of Rice Seed Production      **Implementing Agency** : ZARI  
 Field and Training Facilities in the Republic of Zambia

**Location** : Chilanga District      **Monitoring Agency** : NA

**Date Reported** : DD/MM/YYYY      **Enforcement Agency** : ZARI/MOA

**Reporting Period** : X th Report in YYYY      **Contractor(s)** : NA

**(Biannual)**

### 1. Mitigation Compliance Inspection

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any Comment
- Community is aware of schedule of training facilities				
- Reuse vegetable waste as much as possible				
- Enlightenment to trainees not to dispose waste around facilities				
- A sign of machine trouble (abnormal noise, vibration, white/dark smoke, etc.) are not observed in agricultural machinery				

**2. Record of accidents in agricultural machinery use**

No	Date	Case of accident	Solution / Result / Any actions to be taken
1			
2			
3			

**3. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from Communities / stakeholders	Solution / Result / Any actions to be taken
1			
2			
3			

**4. Notes;**

Inspection Completed by: \_\_\_\_\_

Date: \_\_\_\_\_

## Biannual Environmental and Social Monitoring Form (ZARI Mansa)

### Site Environmental Compliance Inspection and Monitoring Form

**Form-3 for Operation Phase**

Provided below is a sample form which may be utilized and adapted as needed to record the results of a compliance inspection or ambient monitoring at a project site. ZARI submits this monitoring form to JICA biannually.

**Project Name** : Project for Development of Rice Seed Production      **Implementing Agency** : ZARI  
 Field and Training Facilities in the Republic of Zambia

**Location** : Mansa District      **Monitoring Agency** : NA

**Date Reported** : DD/MM/YYYY      **Enforcement Agency** : ZARI/MOA

**Reporting Period** : X th Report in YYYY      **Contractor(s)** : NA

**(Biannual)**

**1. Mitigation Compliance Inspection**

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any Comment
- Community is aware of schedule of training facilities				
- Excessive pesticides and fertilizer are not used in rice field				
- Reuse vegetable waste as much as possible				
- Enlightenment to trainees not to dispose waste around facilities				

Impact / Mitigation Measures (From EMMP)	Mitigations Implemented? (Yes/No)	Impact Observed/ Location	Action Required? (Yes/No) Describe if Yes:	Any Comment
- A sign of machine trouble (abnormal noise, vibration, white/dark smoke, etc.) are not observed in agricultural machinery				

**2. Record of accidents in agricultural machinery use**

No	Date	Case of accident	Solution / Result / Any actions to be taken
1			
2			
3			

**3. Record of Complain and Grievance Management**

No	Date	Complain and Grievance from Communities / stakeholders	Solution / Result / Any actions to be taken
1			
2			
3			

**4. Notes;**

Inspection Completed by: \_\_\_\_\_

Date: \_\_\_\_\_





## Environmental Checklist : (No.16 Agriculture, Irrigation, and Livestock)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process?	(a) Y	<p>(a) EPB Report has been submitted to ZEMA which is the authoritative agency of approving EIA in this project in Zambia.</p> <p>(b) EPB Report has been reviewed by ZEMA.</p> <p>(c) Although conditions may be imposed when decision letter issued, it will be able to satisfy.</p> <p>(d) No particular other environmental permits are required.</p>
		(b) Have EIA reports been approved by authorities of the host country's government?	(b) Y	
		(c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?	(c) N	
		(d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(d) N	
	(2) Explanation to local stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the local stakeholders?	(a) Y	<p>(a) Project information disclosure and consensus building were done through stakeholder meeting with local stakeholders. Understanding from the local stakeholders has been obtained.</p> <p>(b) The comment from the local residents obtained during above meetings has been reflected to the project design.</p>
		(b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(b) Y	
		(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	
		(a) Are considerations given to water pollution of the surrounding water bodies, such as rivers and groundwater by effluents or leachates from agricultural lands? Are adequate use/disposal standards for fertilizers, agrochemicals, and livestock wastes established? Is a framework established to increase awareness of the standards among farmers?	(a) Y	
2 Pollution Control	(1) Water Quality	(b) Is a monitoring framework established for water pollution of rivers and groundwater?	(b) Y	<p>(a) Existing water quality of the river and the groundwater is analyzed base on the baseline survey, and prevent measures towards the water pollution was established in the mitigation measures and the monitoring plan.</p> <p>(b) Monitoring items, frequency, implementation entity, and responsible organization will be indicated in the monitoring plan.</p>
		(a) Are wastes properly treated and disposed of in accordance with the country's regulations?	(a) Y	
		(2) Wastes	(a) Y	
		(a) First of all, project will reuse excavated soil as refilling material as much as possible. Assumed wastes (other excavated soil, demolished bricks and concrete and garbage from construction site) will be processed according to the regulation of Zambia and the related local government.		

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(3) Soil Contamination	(a) Is there a possibility that impacts in irrigated lands, such as salinization of soils will result?	(a) N	The source of salinization of soils has not been confirmed and it is not expected by the project implementation.
		(b) Are adequate measures taken to prevent soil contamination of irrigated lands by agrochemicals, heavy metals, and other hazardous substances?	(b) Y	
		(c) Are any agrochemicals management plans prepared? Are any usages or any implementation structures organized for proper use of the plans?	(c) Y	
	(4) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a) N	Subsidence is not expected because extraction of a large volume of ground water will not be done during the construction and operation period by the project.
		(5) Odor	(a) N	Activities generate odor is not expected.
	(1) Protected Areas	(a) Is the project site or discharge area located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	Project site in Mansa is located 15 to 25km away from forest reserve. Discharge into these area by the project is not expected. Lusaka National Park is located 10km away from the project site in Chilanga, Lusaka. Chilanga town, Lusaka-Livingstone Road, and large scale farm have been already developed between the project site and the National Park.
		(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?	(a) N
	(b) Does the project site or discharge area encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?		(b) N	According to the EPB survey, no species listed in the IUCN Red List are confirmed
	(c) Is there a possibility that the project will result in the loss of breeding and feeding grounds for valuable wildlife? If they are lost, are there substitutes for the grounds near the original locations?		(c) N	Since the project is rehabilitation of existing facilities, significant loss of breeding and feeding grounds is not expected.
			(d) N	Overgrazing is not planned.
(e) Y			Since the project mainly work for construction of training facility and rehabilitation of existing irrigation facilities, such overgrazing or significant impact is not expected.	

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(e) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?		
		(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensation going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a) Y (b) Y (c) Y (d) Y (e) Y (f) Y (g) Y (h) Y (i) Y (j) Y	(a) Small number of resettlement of agricultural farm and land acquisition are expected. (b) Community consultation meetings was held to explain about compensation and measures of livelihood restoration and to get agreement from the community people before project. (c) ARAP has been developed based on socio-economic studies as well as stakeholder meetings. (d) Compensation will be paid prior to the resettlement according to the both Zambia's laws and JICA guidelines. (e) Entitlement Matrix is included in ARAP report. (f) Vulnerable persons and/or his/her family will be assisted during the compensation process, and be given priority of job opportunity during the construction period if identified through socio-economic survey. (g) Agreements with the affected people will be obtained and compensation will be paid prior to resettlement. (h) RAP organization framework will be suggested according to related Zambia's laws and JICA guidelines /WB OP 4.12 in the RAP. And also budget for preparation, implementation, and monitoring of ARAP is estimated and the schedule of compensation and resettlement is discussed and presented in the report. (i) Monitoring plan is included in ARAP report. (j) According to the Zambia's law, the grievance redress mechanism is proposed and will be established. Necessary cost for grievance redress mechanism is also calculated and presented in the ARAP.
4 Social Environment	(1) Resettlement  (2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?	(a) N (b) N (c) N	(a) The project will rehabilitate irrigation facility and improve efficiency of seed production. Some adverse impacts anticipated will be mitigated with compensation and livelihood restoration measures.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>(b) Is proper allotment made for rights to agricultural land use? Is there a possibility that the allotment will result in inequitable distribution or usurpation of land and available resources?</p> <p>(c) Are proper allotments, such as water rights allotment in the project area made? Is there a possibility that the allotments will result in inequitable distribution or usurpation of water rights and available resources?</p> <p>(d) Is there a possibility that the amount of water used (surface water, groundwater) by the project will adversely the downstream fisheries and water uses?</p> <p>(e) Is there a possibility that water-borne or water-related diseases (e.g., schistosomiasis, malaria, filariasis) will be introduced? Is adequate consideration given to public health education, if necessary?</p>	<p>(d) N</p> <p>(e) N</p>	<p>(b) Not related because this project targets just rehabilitation of existing irrigation facilities of the research station.</p> <p>(c) Same as above</p> <p>(d) Impact on current water user in the downstream can be mitigated because the rehabilitation work will not require to stop water flow completely. The community in the downstream will be informed the rehabilitation schedule in advance.</p> <p>(e) Since the project will rehabilitate the existing irrigation facilities, it is not anticipated to increase water-related diseases. ZARI will work together with other agencies like Ministry of Health to sensitize community and provide necessary services like mosquito net etc., as necessary.</p>
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) No such facilities are identified in the project area.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) Impact on landscape is not anticipated; rather it will be improved through the rehabilitation of existing facilities.
	(5) Ethnic Minorities and Indigenous Peoples	<p>(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?</p> <p>(b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?</p>	<p>(a) N</p> <p>(b) N</p>	<p>(a) Not confirmed in the Project area.</p> <p>(b) Same as above.</p>
	(6) Working Conditions	<p>(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?</p> <p>(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p> <p>(d) Y</p>	<p>(a) Securing of working condition is implemented according to the related Zambia's laws and international rules.</p> <p>(b) Measures to prevent industrial accidents are secured by mitigation measures such as obligation of wearing safety boots and a helmet during the construction work and the monitoring, which includes countermeasures for the accidents.</p> <p>(c) Safety education through measures such as a morning gathering, a toolbox</p>

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>management of hazardous materials?</p> <p>(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?</p> <p>(d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?</p>		<p>meeting, a motto, or signboard will be given to construction workers. Construction contractor will prepare a safety and sanitation plan.</p> <p>(d) Setting of the reputation to promote an invasion prevention fence and danger around the construction area is set up. Construction plan and schedule will be informed to the community through signboard or direct announcement in advance. It is assumed that a guard worker for the purpose of prevention of ensuring safety and theft is to be placed.</p>
	(1) Impacts during Construction	<p>(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?</p> <p>(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?</p> <p>(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p>	(a) Y (b) Y (c) Y	<p>(a) Noise, dust, water pollution are assumed. Mitigation measures and monitoring plan are established through EPB Study.</p> <p>(b) Vegetation loss is assumed. Mitigation measures and monitoring plan are established through EPB study..</p> <p>(c) Land acquisition, resettlement, are assumed. Mitigation measures and monitoring plan are established through EPB and ARAP.</p>
5 Others	(2) Monitoring	<p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>(b) What are the items, methods, and frequencies of the monitoring program?</p> <p>(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</p> <p>(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?</p>	(a) Y (b) - (c) Y (d) Y	<p>(a) Monitoring plan has been made in the EPB process.</p> <p>(b) The monitoring items were decided considering the present condition survey results and impact evaluation. Monitoring methods were decided considering implementation practicability of Zambian government and securing accuracy. Frequency was decided considering types of work, local situation, and health damage.</p> <p>(c) Monitoring framework shall be suggested in the monitoring plan of both EPB and ARAP. This framework has to be adapted reflecting the present condition of Zambia as possible. ZARI will designate one staff who will specifically work for the liaison with other organizations and a core actor of supervising the monitoring.</p> <p>(d) Monitoring report on ARAP shall be submitted by ZARI in pre/post construction stage while Environmental Monitoring Report shall be prepared by Contractor and ZARI during the construction period.</p>

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
6 Note	Reference to Checklist of Other Sectors	<p>(a) Where necessary, pertinent items described in the Forestry checklist should also be checked.</p> <p>(b) For the projects including construction of large-scale weirs, reservoirs, and dams, where necessary, pertinent items described in the Hydropower, Dams, and Reservoirs checklist should also be checked.</p>	<p>(a) N</p> <p>(b) N</p>	<p>(a) Forest checklist is out of the project object.</p> <p>(b) Construction of large-scale weirs, reservoirs, and dams are not targeted in the project.</p>
	Note on Using Environmental Checklist	<p>(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).</p>	<p>(a) Y</p>	<p>(a) It is anticipated that the rehabilitation of existing irrigation facilities will enhance the resilience against flood and heavy rain to be happened due to climate change in future.</p>

資料 8 : その他の資料・情報

現地入手資料一覧

分野	資料/データ名	備考(入手先等)
国家 政策	VISION 2030	2006, Government of Zambia
	7 National Development Plan 2017-2021, Vol. I	2017, Ministry of National Development Planning
農業 政策	Second National Agricultural Policy 2016	2016, Government of Zambia
	Second National Rice Development Strategy 2016-2020	2016, Ministry of Agriculture
	Roadmap for Rice Seed Sub-sector Development In Zambia	2017, Ministry of Agriculture and Livestock
種子	The Plant Variety and Seeds Regulations, 2018	2018, Government of Zambia
	Official Variety Register-2021	2021, SCCI/MoA
稲作 技術	実地ハンドブック「Practical Handbook Rice SHEP Ver. 1.0」、MOReDeP (May 2021)	MOReDeP
	技術ガイドライン「Technical Guideline MORiP Ver 1.0」、MOReDeP (Aug. 2021)	MOReDeP
	稲作ガイドライン「MeRiP Mechanized Rice Production, Ver.0」MOReDeP (July 2021)	MOReDeP
	稲作ガイドライン「GRiP Good Rice Practice Ver. 1.1」MOReDeP (Mar 2021)	MOReDeP
	パンフレット「Climate Adapted Farming Methods (CAFM) Project in Zambia」、AKTC (2019-2020 Farming Season)	MOReDeP
自然 条件	降水量データ (4 観測所、1990 年～2020 年)	気象局
	日最高気温データ (4 観測所、1990 年～2020 年)	気象局
	日最低気温データ (4 観測所、1990 年～2020 年)	気象局
	相対湿度データ (4 観測所、1990 年～2020 年)	気象局
	大気圧データ (4 観測所、1990 年～2021 年)	気象局、一部欠損年あり
	風速データ (4 観測所、1990 年～2021 年)	気象局、一部欠損年あり
	日照時間データ (4 観測所、1970 年～2006 年)	気象局、一部欠損年あり
	Detailed soil survey	1968, Luapula Regional Eesearch Station Mansa Zambia
建築	マウント・マクル計画地土地収用証明書	ZARI
	マンサ土地収用証明書	ZARI
土木	The rational formula from the runhydrograph	2006, Mohamed Parak and Geoffrey GS Pegram
	Development of a Groundwater Information & Management Program for the Lusaka Groundwater Systems	2012, Ministry of Energy and Water Development, Department of Water Affairs
	土取場許可書	Mines Development Department
	Manual on small earth dams - FAO Irrigation and Drainage Paper 64	2010, FAO
	Manual on Small Earth Dam Construction	2001, Kasisi Agricultural Training Centre, Zambia
環境	STEPS TO FOLLOW WHEN CONDUCTING EIA	ZEMA
	環境事業概要書(EPB)マウント・マクル	ZARI
	環境事業概要書(EPB)マンサ	ZARI
	簡易住民移転計画書(ARAP)マンサ	ZARI

