

## Appendix

## Appendix

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## 1. Member List of the Study Team

|    | Title                                                                   | Name                       | Organization                                                                         |
|----|-------------------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------|
| -  | Team Leader                                                             | Mr. Hiroyuki UEDA          | Senior Advisor for Transport Sector<br>JICA                                          |
| -  | Program Management                                                      | Mr. Takashi OOKUBO         | Transportation and ICT Group<br>Infrastructure and Peacebuilding<br>Department, JICA |
| 1  | Chief Consultant/Airport Planner1                                       | Mr. Teruo HANADA           | Japan Airport Consultants, Inc<br>(JAC)                                              |
| 2  | Chief Consultant/Airport Planner2/ATC<br>Equipment Planner              | Mr. Katsuya<br>TERABAYASHI | Oriental Consultants Global. Co.,<br>Ltd. (OCG)                                      |
| 3  | Airport Civil Designer 1                                                | Mr. Hayato NAGASAWA        | OCG                                                                                  |
| 4  | Airport Civil Designer 2                                                | Mr. Kazuo HAYASHI          | OCG                                                                                  |
| 5  | Airport Architecture                                                    | Mr. Dai TSUKAMOTO          | JAC                                                                                  |
| 6  | Architectural Structure                                                 | Mr. Yuutaro NISHINA        | JAC                                                                                  |
| 7  | Prombing Engineer                                                       | Mr. Zhang Chuichi          | JAC                                                                                  |
| 8  | Electrical Facility Designer                                            | Mr. YoshihiroURABE         | OCG                                                                                  |
| 9  | Aeronautical Ground Lighting Designer                                   | Mr. Shigenori MIURA        | JAC                                                                                  |
| 10 | Construction and Procurement Planner /<br>Cost Estimator (Civil Work) 1 | Ms. Miharuru TSUKAHARA     | OCG                                                                                  |
| 11 | Construction and Procurement Planner /<br>Cost Estimator (Civil Work) 2 | Mr. Akihiko MATSUMURA      | OCG                                                                                  |
| 12 | Construction and Procurement Planner /<br>Cost Estimator (Architect )   | Mr. Rugo TAKEUCHI          | JAC                                                                                  |
| 13 | Natural Condition Surveyor                                              | Mr. Riedi Arisca.          | OCG                                                                                  |
| 14 | Social and Environmental Planner                                        | Mr. Keiko ANDO             | OCG                                                                                  |
| 15 | Airport Maintenance and Operation                                       | Mr. Hiroshi MIYAKAWA       | JAC                                                                                  |
| 16 | Aviation Demand Forecaster                                              | Mr. Azuma FURUSE           | JAC                                                                                  |

## 2. Study Schedule

### 2-1. First Field Survey

| No | Month/<br>Day | Date | Team leader<br>(JICA)                                                   | Planning<br>(JICA) | 1<br>Chief<br>consultant/Ai<br>rport planner<br>1                                         | 2<br>Deputy chief<br>consultant/Ai<br>rport planner<br>2/ATC<br>equipment<br>design cost<br>estimator | 3<br>Airport civil<br>engineering<br>design | 4<br>Airport<br>architectural<br>design                                                  | 5<br>Architect<br>structural<br>design | 6<br>Architect<br>mechanical<br>and building<br>equipment<br>design | 7<br>Electrical<br>facility<br>designer | 8<br>Aeronautical<br>ground lighting<br>design and<br>cost estimator | 9<br>Construction/<br>procurement/<br>plan/cost<br>estimator<br>(Civil) | 10<br>Construction/<br>procurement/<br>plan/cost<br>estimator<br>(Architect) | 11<br>Narutal<br>conditions<br>survey            | 12<br>Environmental<br>and social<br>consideration | 13<br>Airport<br>operation and<br>maintenance     |                                   |                                   |
|----|---------------|------|-------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------|---------------------------------------------------|-----------------------------------|-----------------------------------|
|    |               |      |                                                                         |                    | Mr. Teruo<br>Hanada                                                                       | Mr. Katsuya<br>Terabayashi                                                                            | Mr. Hayato<br>Nagasawa                      | Mr. Dai<br>Tsukamoto                                                                     | Mr. Yuutaro<br>Nishina                 | Mr. Zongyi<br>Zhang                                                 | Mr. Yoshihiro<br>Urabe                  | Mr. Shigenori<br>Mura                                                | Mr. Mharu<br>Tsukahara                                                  | Mr. Ryuugo<br>Takeuchi                                                       | Mr. Ried<br>Arisca                               | Mr. Keigo<br>Ando                                  | Mr. Hiroshi<br>Miyakawa                           |                                   |                                   |
| 1  | 31-Mar        | Sat  |                                                                         |                    | NRT-DPS                                                                                   |                                                                                                       |                                             | NRT-DPS                                                                                  |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 2  | 1-Apr         | Sun  |                                                                         |                    | DPS-DIL                                                                                   |                                                                                                       |                                             | DPS-DIL                                                                                  |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 3  | 2-Apr         | Mon  |                                                                         |                    | 09:30 Courtesy call to ANATL<br>13:30 Meeting with JICA office<br>14:30 Meeting with EOJ  |                                                                                                       |                                             | 09:30 Courtesy call to ANATL<br>13:30 Meeting with JICA office<br>14:30 Meeting with EOJ |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   | CGK-DPS                           |                                   |
| 4  | 3-Apr         | Tue  |                                                                         |                    | 09:00: Associated Session with<br>related organizations                                   |                                                                                                       |                                             | 09:00: Associated Session with related organizations                                     |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   | DPS-DIL                           |
| 5  | 4-Apr         | Wed  |                                                                         |                    | Site survey, Confirmation of<br>project background                                        |                                                                                                       |                                             | Site Survey                                                                              |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   | Environmental<br>and social study |
| 6  | 5-Apr         | Thr  |                                                                         |                    | Site survey, Confirmation of<br>project background                                        |                                                                                                       |                                             | Site Survey                                                                              |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   | Environmental<br>and social study |
| 7  | 6-Apr         | Fri  | HND-SIN                                                                 |                    | Site survey                                                                               |                                                                                                       | POM-DIA                                     | Site Survey                                                                              |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              | Gender study                                     |                                                    |                                                   |                                   |                                   |
| 8  | 7-Apr         | Sat  | SIN-DIL                                                                 |                    | Internal Meeting                                                                          |                                                                                                       | DIA-DIL                                     | Internal Meeting                                                                         |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 9  | 8-Apr         | Sun  | Document arrangement                                                    |                    |                                                                                           |                                                                                                       |                                             |                                                                                          |                                        |                                                                     | DPS-DIL                                 |                                                                      | DPS-DIL                                                                 | Ditto with 1                                                                 | DPS-DIL                                          |                                                    |                                                   |                                   |                                   |
| 10 | 9-Apr         | Mon  | 8:00: Courtesy call to Mr. Inacio vice minister (MODIR)                 |                    |                                                                                           |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 11 | 10-Apr        | Tue  | Explanation and discussion on Inception report with ANATL,<br>MODIR     |                    |                                                                                           |                                                                                                       |                                             | Site Survey                                                                              |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   | Environmental<br>and social study | Ditto with 3                      |
| 12 | 11-Apr        | Wed  | Confirmation of project background, project implementation<br>framework |                    |                                                                                           |                                                                                                       |                                             | Site survey                                                                              |                                        |                                                                     |                                         | Procurement condition<br>survey                                      |                                                                         | Natural Conditions<br>survey                                                 | Visit National<br>Directorate for<br>Environment | Information<br>collection<br>(Tourism)             |                                                   |                                   |                                   |
| 13 | 12-Apr        | Thr  | Discussion on the draft Minutes of Discussions                          |                    |                                                                                           |                                                                                                       |                                             | Site survey                                                                              |                                        |                                                                     |                                         | Procurement condition<br>survey                                      |                                                                         | Natural Conditions<br>survey                                                 | Visit National<br>Directorate for<br>Environment | Information<br>collection<br>(Airlines)            |                                                   |                                   |                                   |
| 14 | 13-Apr        | Fri  | Sign of Minites oDiscussions<br>16:00:Report to EOJ                     |                    |                                                                                           |                                                                                                       |                                             | Site survey                                                                              |                                        |                                                                     |                                         | Procurement condition<br>survey                                      |                                                                         | Meeting with<br>Subcontractor                                                | Environmental<br>and social study                | Information<br>collection<br>(GSE company)         |                                                   |                                   |                                   |
| 15 | 14-Apr        | Sat  | DIL-DPS                                                                 |                    |                                                                                           |                                                                                                       | Internal Meeting                            |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 16 | 15-Apr        | Sun  | at CGK                                                                  | at NRT             | Document arrangement                                                                      |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 17 | 16-Apr        | Mon  |                                                                         |                    | Study project components                                                                  |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      | Procurement condition survey<br>Visit construction companies            |                                                                              | Natural Conditions<br>survey                     | Environmental<br>and social study                  | Study operation<br>and<br>maintenance<br>capacity |                                   |                                   |
| 18 | 17-Apr        | Tue  |                                                                         |                    | Study project components                                                                  |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      | Procurement condition survey<br>Visit construction companies            |                                                                              | Natural Conditions<br>survey                     | Environmental<br>and social study                  | Study operation<br>and<br>maintenance<br>capacity |                                   |                                   |
| 19 | 18-Apr        | Wed  |                                                                         |                    | Study project components                                                                  |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      | Procurement condition survey<br>Visit suppliers                         |                                                                              | Natural Conditions<br>survey                     | Environmental<br>and social study                  | Study operation<br>and<br>maintenance<br>capacity |                                   |                                   |
| 20 | 19-Apr        | Thr  |                                                                         |                    | Study project components                                                                  |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      | Procurement condition survey<br>Visit suppliers                         |                                                                              | Natural Conditions<br>survey                     | Environmental<br>and social study                  | Study operation<br>and<br>maintenance<br>capacity |                                   |                                   |
| 21 | 20-Apr        | Fri  |                                                                         |                    | Study project components                                                                  |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      | Procurement condition survey<br>Visit suppliers                         |                                                                              | Natural Conditions<br>survey                     | Environmental<br>and social study                  | Study operation<br>and<br>maintenance<br>capacity |                                   |                                   |
| 23 | 21-Apr        | Sat  |                                                                         |                    | Internal Meeting                                                                          |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 23 | 22-Apr        | Sun  |                                                                         |                    | Document arrangement                                                                      |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 24 | 23-Apr        | Mon  |                                                                         |                    | Study project components, study cost of the Project                                       |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              | Natural Conditions<br>survey                     | Environmental<br>and social study                  | Study operation<br>and<br>maintenance plan        |                                   |                                   |
| 25 | 24-Apr        | Tue  |                                                                         |                    | Study project components, study cost of the Project                                       |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              | Natural Conditions<br>survey                     | Environmental<br>and social study                  | Study operation<br>and<br>maintenance plan        |                                   |                                   |
| 26 | 25-Apr        | Wed  |                                                                         |                    | Study project components, study obligations and components borne by the recipient country |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              | Natural Conditions<br>survey                     | Environmental<br>and social study                  | Study operation<br>and<br>maintenance plan        |                                   |                                   |
| 27 | 26-Apr        | Thr  |                                                                         |                    | Study project components, study obligations and components borne by the recipient country |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 28 | 27-Apr        | Fri  |                                                                         |                    | Study project components, study project evaluation indicators                             |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 29 | 28-Apr        | Sat  |                                                                         |                    | Internal Meeting                                                                          |                                                                                                       |                                             |                                                                                          | DIL-DPS                                |                                                                     |                                         |                                                                      | Internal meeting                                                        |                                                                              | Natural Conditions<br>survey                     | DIL-DPS                                            | Ditto with 1                                      |                                   |                                   |
| 30 | 29-Apr        | Sun  |                                                                         |                    | Document arrangement                                                                      |                                                                                                       |                                             |                                                                                          | DPS-NRT                                |                                                                     |                                         |                                                                      | DIL-DPS                                                                 |                                                                              | Natural Conditions<br>survey                     | DPS-NRT                                            | DIL-DPS                                           |                                   |                                   |
| 31 | 30-Apr        | Mon  |                                                                         |                    | Study project components                                                                  |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         | DPS-NRT                                                              |                                                                         | Natural Conditions<br>survey                                                 |                                                  |                                                    |                                                   |                                   |                                   |
| 32 | 1-May         | Tue  |                                                                         |                    | Preparation of technical memorandum                                                       |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         | Natural Conditions<br>survey                                         |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 33 | 2-May         | Wed  |                                                                         |                    | Discussion on technical memorandum                                                        |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         | Natural Conditions<br>survey                                         |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 34 | 3-May         | Thr  |                                                                         |                    | Signing of technical memorandum                                                           |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         | Natural Conditions<br>survey                                         |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 35 | 4-May         | Fri  |                                                                         |                    | Report to JICA office, EOJ                                                                |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         | Natural Conditions<br>survey                                         |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 36 | 5-May         | Sat  |                                                                         |                    | Document arrangement                                                                      |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      | DIL-DPS                                                                 |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 37 | 6-May         | Sun  |                                                                         |                    | Document<br>arrangement                                                                   | DIL-DPS                                                                                               | DIL-DIA                                     | DIL-DPS                                                                                  |                                        |                                                                     |                                         |                                                                      | DPS-BDO                                                                 |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 38 | 7-May         | Mon  |                                                                         |                    | DIL-DPS                                                                                   | DPS-NRT                                                                                               | DIA-POM                                     | DPS-NRT                                                                                  |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |
| 39 | 8-May         | Tue  |                                                                         |                    | DPS-NRT                                                                                   |                                                                                                       |                                             |                                                                                          |                                        |                                                                     |                                         |                                                                      |                                                                         |                                                                              |                                                  |                                                    |                                                   |                                   |                                   |

## 2-2. Second Field Survey

| No | Month/Day | Date | Team leader<br>(JICA)                                                            | Planning<br>(JICA) | Chief<br>consultant/<br>Airport planner 1 | Deputy chief<br>consultant/ Airport<br>planner 2/ ATC<br>equipment design<br>cost estimator | Airport<br>architectural<br>design | Construction/<br>procurement plan/<br>cost estimator<br>(Civil) |
|----|-----------|------|----------------------------------------------------------------------------------|--------------------|-------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------------|
| 1  | 2019/2/1  | 金    | HND-SIN                                                                          |                    | NRT-SIN                                   | HND-SIN                                                                                     | NRT-SIN                            | HND-SIN                                                         |
| 2  | 2019/2/2  | 土    | SIN-DIL                                                                          |                    |                                           |                                                                                             |                                    |                                                                 |
| 3  | 2019/2/3  | 日    | Meeting with JICA office                                                         |                    |                                           |                                                                                             |                                    |                                                                 |
| 4  | 2019/2/4  | 月    | Meeting with JICA office, Meeting with EOJ, Meeting with MODIR, Meeting with MOF |                    |                                           |                                                                                             |                                    |                                                                 |
| 5  | 2019/2/5  | 火    | Meeting with ADB, Discussing on the draft Minutes of Discussions                 |                    |                                           |                                                                                             |                                    |                                                                 |
| 6  | 2019/2/6  | 水    | Stakeholder meeting, Explanation to Prime Minister                               |                    |                                           |                                                                                             |                                    |                                                                 |
| 7  | 2019/2/7  | 木    | Explanation to MODIR and committee of National infrastructure, Meeting with MOFA |                    |                                           |                                                                                             |                                    |                                                                 |
| 8  | 2019/2/8  | 金    | Report to EOJ                                                                    |                    |                                           |                                                                                             |                                    |                                                                 |
| 9  | 2019/2/9  | 土    | DIL-SIN                                                                          |                    |                                           |                                                                                             |                                    |                                                                 |
| 10 | 2019/2/10 | 日    | SIN-HND                                                                          |                    | SIN-NRT                                   | SIN-HND                                                                                     | SIN-NRT                            | SIN-HND                                                         |

### 3. List of Parties concerned in the Recipient Country

#### **Ministry of Development and Institutional Reform**

|                                  |                                                                                                  |
|----------------------------------|--------------------------------------------------------------------------------------------------|
| Inacio Freitas Moreira           | Vice Minister for Transport and Communications, Ministry of Development and Institutional Reform |
| Joanico Gonçalves                | Director General Transport and communications                                                    |
| Octavio Pereira Monteiro Marques | Head, Department of Projects                                                                     |

#### **ANATL, E. P.**

|                                         |                                                     |
|-----------------------------------------|-----------------------------------------------------|
| Eng. Romulado A. S. Da Silva            | President of Board of ANATL                         |
| Fernando S. R. S. C. Ribeiro, Se        | Member Board I Air Traffic Services & Navigation    |
| Eusebio Da Costa Lopes, Lic. Eco. M. M. | Member Board II Aerodrome & Airport Services        |
| Verismo Nai Sia, Lic. Eco. M. A.        | Member Board III Adm, Finance, Log. Commercial & HR |
| Luis Caldeira Alveslic. Dir. M. H.      | Member Board IV Labor                               |

#### AIR TRAFFIC SERVICES AND NAVIGATION DIVISION

|                                |                                                 |
|--------------------------------|-------------------------------------------------|
| Jose Luis Da Costa, Lic. Dir.  | Director of Air Traffic Services and Navigation |
| Filomena Maria Da Costa Soares | Chief Department of Air Traffic Controller(ATC) |
| Elias Marcal Do Rego, B, Ett   | Supervisor of ATC                               |
| Delfin Gusmao                  | Chief Department of ARO-NOTAM                   |
| Jose Nelson Machado Gama       | Chief Department of Telecommunica               |

#### AERODROME & AIRPORT SERVICES DIVISION

|                                       |                                                  |
|---------------------------------------|--------------------------------------------------|
| Jose Carlos Da Silva Pereira, L. A. P | Director of Aerodrome & Airport Services         |
| Carmo Maria Soares                    | Chief Department of Aerodrome & Aiport Operation |
| Eduardo Soares Da Cruz                | Chief Department of Rescue and Fire Fighting     |
| Filipe Guterres Moniz Da Silva        | Supervisor I RFF                                 |
| Joaquim A. F. C. Guterres             | Supervisor II RFF                                |
| Adelino Da Silva Mira                 | Supervisor III RFF                               |
| Mario Gomes De Jesus. Lic. CG         | Chief Department of Aviation Security            |
| Inocencio De Jesus Alves              | Supervisor I AVSEC                               |
| Atanasio De Jesus Maia Fernandes      | Supervisor II AVSEC                              |
| Gaspar De Araujo                      | Chief Department of Maintenance                  |

#### PLANNING & DEVELOPMENT OF AIRPORT UNIT

|                                         |                     |
|-----------------------------------------|---------------------|
| Antonia Talodaci Corte Real De Oliveira | Civil Engineer      |
| Juliano A. X. Carlos. ST.               | Mechanical Engineer |
| Marito Gomes. Lic. Dir.                 | Civil Engineer      |

|                   |                    |
|-------------------|--------------------|
| Antonio Vieira    | Civil Engineer     |
| Gilberto Da Costa | Architect Engineer |

PROCUREMENT, ADMINISTRATION, FINANCE, LOGISTIC, COMMERCIAL AND HUMAN  
RESOURCES

|                                      |                                                      |
|--------------------------------------|------------------------------------------------------|
| Jose Antonio Sancehs, ST             | Director of Procurement                              |
| Celestina Conceicao Araujo, L. CG    | Director of Adm, Finances, Logistic, Commercial & HR |
| Monica Rosalia De Araujo             | Chief Department of HR                               |
| Rafael Dos Anjos Marques, Lec. M. M. | Chief Department of Commercial                       |
| Antonio Afonso Nunes, SE             | Department Chief of Logistic                         |
| ANISIO M. J. V. Da Costa, ST         | Chief Department of Procurements                     |

LEGAL UNIT

|                                     |                         |
|-------------------------------------|-------------------------|
| Heddye R. A. J. Fernandes, Lic. Dir | Assistant og Legal Unit |
|-------------------------------------|-------------------------|

CHIEF OF REGIONAL AIRPORT

|                                          |                                  |
|------------------------------------------|----------------------------------|
| Isolino Dos Santos S. Saramento, SST, ST | Chief of Regional Airport BAUCAU |
| Jose De Oliveira Leong, Lic. Dir.        | Chief of Regional Airport SUAI   |

**AACTL**

|                  |                    |
|------------------|--------------------|
| Sabino Henriques | President of AACTL |
|------------------|--------------------|

**Ministry of Foreign Affairs and Cooperation**

|                      |                                                        |
|----------------------|--------------------------------------------------------|
| Vicky Fun Ha Tachong | Director General for Multilateral and Regional Affairs |
|----------------------|--------------------------------------------------------|

**Ministry of Finance, Development Partnership Management Unit**

|                          |              |
|--------------------------|--------------|
| Arlindo Da Cruz Monteiro | Head of DPMU |
|--------------------------|--------------|

**National Directorate of Pollution control and Environment Impact**

|                    |          |
|--------------------|----------|
| American Fernandes | Director |
|--------------------|----------|

**EDTL**

|                                      |                                 |
|--------------------------------------|---------------------------------|
| Eng. Segismundo Antonio Liberato, MT | General Manager of Distribution |
|--------------------------------------|---------------------------------|

**Timor Telecom**

|                          |                                         |
|--------------------------|-----------------------------------------|
| Francisco de Jesus Leite | General Manager of Techincal Department |
|--------------------------|-----------------------------------------|

**Embassy of Japan**

Mr. Hiroshi MINAMI

Ambassador Extraordinary and Plenipotentiary

Ms. Mizuho FUJIMURA

Second Secretary

Mr. Youhei HIGUCHI

Researcher/advisor

**JICA Timor-Leste office**

Mr. Masashi NAGAISHI

Residential Representative

Mr. Hideaki MATSUMOTO

Assistant Representative

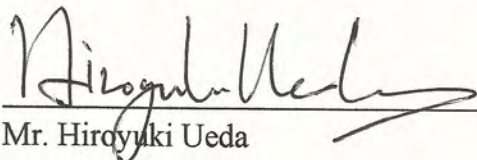
#### **4. Minutes of Discussions**

**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Improvement of Presidente Nicolau Lobato International Airport**

Based on the several preliminary discussions between the Government of the Democratic Republic of Timor-Leste (hereinafter referred to as "Timor-Leste") 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 Improvement of Presidente Nicolau Lobato International Airport (hereinafter referred to as "the Project") to Timor-Leste.

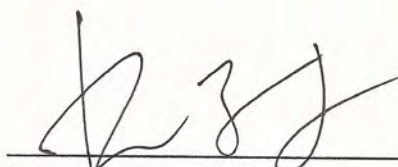
The Team held a series of discussions with the officials of the Government of Timor-Leste and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Dili, April 16, 2018

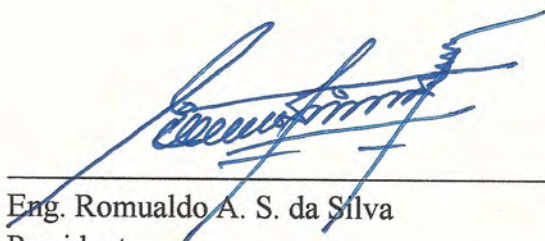


Mr. Hirouki Ueda  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan

(Witnessed by)

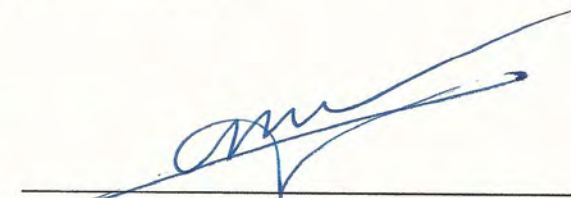


Mr. Masafumi Nagaishi  
Chief Representative  
Japan International Cooperation Agency  
Timor-Leste Office  
Japan



Eng. Romualdo A. S. da Silva  
President  
The Airport Administration and Air  
Navigation of Timor-Leste  
The Democratic Republic of Timor-Leste

(Witnessed by)



Eng. Inácio Freitas Moreira  
Vice Minister for Transport and  
Communications  
Ministry of Development and Institutional  
Reform  
The Democratic Republic of Timor-Leste

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to cope with future growth of air traffic demands and to upgrade convenience and safety of air transport users at Presidente Nicolau Lobato International Airport through the improvement of airport facilities and equipment, thereby contributing to socio-economic development of Timor-Leste.

### 2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Improvement of Presidente Nicolau Lobato International Airport”.

### 3. Project Site

Both sides confirmed that the site of the Project is Presidente Nicolau Lobato International Airport, which is shown in Annex 1.

### 4. Responsible Authorities for the Project

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

- 4-1. The Airport Administration and Air Navigation of Timor-Leste (ANATL) 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 chart of ANATL is shown in Annex 2.

- 4-2. The line ministry of the Executing Agency is Ministry of Development and Institutional Reform (hereinafter referred to as “MDIR”). The MDIR shall be responsible for supervising the Executing Agency on behalf of the Government of Timor-Leste.

### 5. Items requested by the Government of Timor-Leste

- 5-1. As a result of discussions, both sides confirmed that the following items were requested by the Government of Timor-Leste:

| Scope of the Project                                                                |
|-------------------------------------------------------------------------------------|
| 1. Construction of a new international passenger terminal building (with equipment) |
| 2. Construction of a new international air cargo terminal building (with equipment) |
| 3. Construction of a new terminal apron (A320/B737: 4 aircraft stands)              |
| 4. Construction of new taxiways                                                     |



|                                                                                                     |
|-----------------------------------------------------------------------------------------------------|
| 5. Installation of aeronautical ground lights for new apron and taxiways                            |
| 6. Construction of roads and car park for new terminal facilities                                   |
| 7. Construction of a new air traffic control tower building (with equipment)                        |
| 8. Construction of electric power substation with emergency generator (for new terminal facilities) |

- 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 Timor-Leste shall submit an official request of the Project to the Government of Japan through a diplomatic channel by the end of September 2018.

## 6. Procedures and Basic Principles of Japanese Grant

- 6-1. The Timor-Leste side agreed that the procedures and basic principles of Japanese Grant as described in Annex 3 shall be applied to the Project.
- 6-2. The Timor-Leste side agreed to take the necessary measures, as described in Annex 4, for smooth implementation of the Project. The contents of the Annex 4 will be elaborated and refined during the Preparatory Survey and agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report. The contents of Annex 4 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement (hereinafter referred to as "G/A").
- 6-3. As for the monitoring of the implementation of the Project, JICA requires Timor-Leste side to submit the Project Monitoring Report, the form of which is attached as Annex 5.

## 7. Schedule of the Survey

- 7-1. The Team will proceed with further survey in Timor-Leste until May 7th, 2018.
- 7-2. An official request to the Government of Japan will be submitted by the end of September 2018.
- 7-3. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Timor-Leste in order to explain its contents around middle of November 2018.
- 7-4. If the contents of the draft Preparatory Survey Report are accepted and the undertakings for the Project are fully agreed by the Timor-Leste side, JICA will finalize the Preparatory Survey Report and send it to Timor-Leste around late March 2019.
- 7-5. The above schedule is tentative and subject to change.

## 8. Phased Development of Terminal Facilities

- 8-1. The both side agreed on the phased development of terminal facilities to be implemented as in the following phases:

Phase 0 Project: Preparatory works to be undertaken by the Timor-Leste side before the announcement of the tender of the Japanese Grant Project around September 2019.

Phase 1 Project: Construction of new terminal facilities under the Japanese Grant, and new VIP terminal by the Timor-Leste side.

Phase 2 Project: Further extension plan of the terminal facilities by the Timor-Leste side when operations of large jet aircraft are anticipated.

- 8-2. Phase 0 Project:

Phase 0 Project is the preparatory works to be undertaken by the Timor-Leste side before the announcement of the tender of the Project around September 2019, which includes the following works:

| Phase 0 Project                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) Relocation of Existing Facilities (The existing structures should be demolished and the sites should be cleared for new construction works.) <ul style="list-style-type: none"><li>a) ANATL Head Office Building (relocation to temporary office at existing Police Dormitory)</li><li>b) ANATL ATC Simulator Building (relocation to temporary office at existing Police Dormitory)</li><li>c) ANATL Procurement Department Office Building (relocation to temporary office at existing Police Dormitory)</li><li>d) ANATL Maintenance Workshop Building (relocation to West Relocation Area)</li><li>e) ANATL Vehicle Maintenance Workshop Building (relocation to West Relocation Area)</li><li>f) ANATL Storage (relocation to West Relocation Area)</li><li>g) TLK Office (relocation to West Relocation Area)</li><li>h) ETO Aviation Fuel Facility (relocation to East Relocation Area)</li><li>i) Boarder Police Office Building (relocation to West Relocation Area)</li></ul> |
| (2) Construction of New Power Supply System <ul style="list-style-type: none"><li>a) New High Voltage Distribution Station (SS-0)</li><li>b) Electric Power Substations with Emergency Generators<ul style="list-style-type: none"><li>- Substation for Existing Terminal Facilities and Central Relocation Area (SS-1)</li><li>- Substation for Aeronautical Ground Lights and VOR/DME (SS-2)</li><li>- Substation for West Relocation Area (SS-3)</li></ul></li><li>c) Electric Power Cables for Existing Facilities connected with New Substations</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| (3) Felling and Grubbing of Trees in the Phase 1 Project site                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

The layout plan of the Phase 0 Project is indicated in Annex 6-1.

### 8-3. Phase 1 Project:

Phase 1 Project will be designed to accommodate air traffic demand anticipated in 2027, five year after completion of the Phase 1 construction works in 2022. The list of the facilities to be constructed with the Japanese Grant and those to be undertaken by the Timor-Leste side are as follows:

| <b>Phase 1 Project</b>                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) New facilities to be constructed with Japanese Grant     | <ul style="list-style-type: none"> <li>a) International Passenger Terminal Building (with equipment)</li> <li>b) International Cargo Building (with equipment)</li> <li>c) Terminal Apron (A320/B737 (code C): 4 aircraft stands)</li> <li>d) Taxiways</li> <li>e) Aeronautical Ground Lights for Apron and Taxiways</li> <li>f) Roads and Car Park for New Terminal Facilities</li> <li>g) Air Traffic Control Tower (with equipment)</li> <li>h) Electric Power Substation with Emergency Generator for New Terminal Facilities (SS-4)</li> </ul> |
| (2) Existing Facilities to be demolished with Japanese Grant | <ul style="list-style-type: none"> <li>a) Control Tower</li> <li>b) ANATL Power House</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (3) New facilities to be constructed by the Timor-Leste side | <ul style="list-style-type: none"> <li>a) VIP Terminal Building</li> <li>b) VIP Airside Road</li> <li>c) VIP Landside Road</li> <li>d) ANATL Head Office Building (including Procurement Department) at Central Relocation Area</li> <li>e) ANATL ATC Simulator Building at Central Relocation Area</li> </ul>                                                                                                                                                                                                                                      |

The layout plan of the Phase 1 Project is indicated in Annex 6-2.

The new international passenger terminal building will employ one-level concept, where departing passengers and arriving passengers will be processed at the ground level, since B737/A320 class aircraft (code C) can be efficiently handled with this concept.

In the Phase 1 Project, the existing facilities listed below will not be affected by the construction works, and will be continuously used during the Phase 1 period.

| <b>Phase 1 Project (Existing Facilities Not affected by the Construction Works)</b>                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>a) Existing Terminal Apron (to be used as domestic apron after completion of new terminal facilities)</li> </ul> |

- b) Existing Passenger Terminal Building (to be used as domestic passenger terminal after completion of new terminal facilities)
- c) Existing VIP Terminal Building (to be used until new VIP terminal is completed)
- d) Existing International Cargo Terminal Building (to be used until new cargo terminal is completed)
- e) Commercial Complex Building
- f) Customs Office Building
- g) Immigration Office Building
- h) Quarantine Office Building
- i) Pertamina Aviation Fuel Facility
- j) SDV Ground Handling Garage
- k) STAT Ground Handling Garage
- l) MAF Hangar
- m) ANATL NDB Building

#### 8-4. Phase 2 Project

Phase 2 Project is further extension of the terminal facilities by the Timor-Leste side when large jet aircraft such as B787/B777 (code E) are operated after extension of the runway up to 2,500m. The Phase 2 Project will include the following works:

##### **Phase 2 Project**

##### **(1) Demolition and Relocation of Existing Facilities**

- n) Old Passenger Terminal (demolition)
- o) Old VIP Terminal Building (demolition)
- p) Commercial Building (demolition)
- q) Cargo Terminal (demolition)
- r) Customs Office (relocation to Central Relocation Area)
- s) Pertamina Aviation Fuel Facility (relocation to East Relocation Area)
- t) SDV Ground Handling Garage (relocation to West Relocation Area))
- u) STAT Ground Handling Garage (relocation to West Relocation Area)
- v) MAF Hangar (relocation to West Apron)

##### **(2) Expansion of Terminal Facilities**

- i) Expansion of International Passenger Terminal Building
- j) New Domestic Passenger Terminal Building (to replace existing passenger terminal)
- k) Expansion of International Cargo Building
- l) Expansion of Terminal Apron for domestic aircraft (code B aircraft)
- m) Expansion of Terminal Apron for international aircraft (code E aircraft)
- n) Additional Taxiway for Apron
- o) Aeronautical Ground Lights for Expanded Apron and Taxiway
- p) Expansion of Roads and Car Park

The layout plan of the Phase 2 Project is indicated in Annex 6 - 3.

In the Phase 2 Project, the international passenger terminal building will be expanded with one and a half level concept where waiting area for departing passengers will be located in the second floor with access to aircraft via passenger loading bridges. The new international passenger terminal building in the Phase 1 Project will be designed with due consideration on expandability for the Phase 2 Project.

- 8-5. Both sides confirmed that the preliminary layout plan of new terminal facilities and the undertaking with the Japanese Grant and the Timor-Leste side may be adjusted with further analysis in the Preparatory Survey.

9. Equipment and Furniture to be prepared by the Timor-Leste Side

The both side confirmed that the following equipment and furniture will not be covered by the Japanese Grant, and should be prepared by the Timor-Leste side.

- a) Furniture and office equipment for offices
- b) Passport control equipment used by immigration office
- c) Baggage/cargo screening equipment used by customs office
- d) Airside and landside surveillance system
- e) Surveillance equipment for National Operation Center (NOC)
- f) Check-in system used by airline companies
- g) Ground support equipment used by ground handling companies

10. Runway Extension Project

The Timor-Leste side explained to the Team that Runway Extension Project is in progress, in which existing runway will be extended to the west by 50m and to the east by 250m. This Runway Extension Project will include installation of runways lights and PAPI. Estimated starting construction of the Runway Extension Project will be August 2018.

11. Environmental and Social Considerations

- 11-1. The Timor-Leste 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).

- 11-2. The Project is categorized as "B" from the following considerations:

The project is not considered to be a large-scale airport 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 significant adverse impacts on the environment.

The Timor-Leste side agreed to conduct the necessary procedures concerning the



environmental assessment (including stakeholder meetings, Initial Environmental Examination (IEE) etc.) and submit required environmental report of the Project to MDIR. The period required from the request of approval till the obtainment of approval will be further examined, and the Timor-Leste side agreed to obtain the approval from MDIR and submit it to JICA Timor-Leste Office preferably before the Cabinet approval of the Project by the Government of Japan, which is scheduled around February 2019.

## 12. Technical Assistance

The Timor-Leste side requested Technical Assistance to capacity development of ANATL in the following subjects for effective operation and maintenance of the requested facility/equipment.

- Airport Operation
- Maintenance of Airport Facilities
- Commercial Management
- Airport Security Operations
- Air Traffic Control Services
- Aeronautical Information Services
- Maintenance of Air Navigation Systems
- Rescue and Fire Fighting Operations

JICA took note, and will evaluate the necessity and effects in the Survey.

## 13. Other Relevant Issues

13-1. The Timor-Leste side shall, at its own expense, provide the Team with the following items in cooperation with ANATL and other organizations concerned:

- (1) Data and information related to the Preparatory Survey;
- (2) Counterpart personnel;
- (3) Suitable office space with necessary equipment and services;
- (4) Credentials or identification cards;
- (5) Entry permits necessary for the Team members to conduct field surveys;
- (6) Support in obtaining other privileges and benefits, if necessary;
- (7) Security-related information as well as measures to ensure the safety of the Team;
- (8) Information as well as support in obtaining medical service.

13-2. The Timor-Leste side agreed that ANATL shall bear the cost, which is equivalent to the customs duties, internal taxes and other fiscal levies which may be imposed in Timor-Leste, instead of tax exemption system.

13-3. The Timor-Leste side understood the principle of the Japan's Development Cooperation Charter, which stresses that ODA must not be utilized for military



purpose or promoting international conflicts, and agreed to ensure that the facilities and equipment to be procured in the Project will never be used for any military purposes.

- 13-4. The Timor-Leste side agreed that new facilities to be constructed in the Project which will be designed considering the universal design concept and gender equality issues.
- 13-5. Both sides agreed that the contents of the Preparatory Survey Report excluding cost estimation of the Project will be disclosed to the public after completion of the Preparatory Survey. All the contents of the Preparatory Survey Report including cost estimation of the Project will be disclosed to the public after the contract for construction/supply of the Project facilities/equipment is concluded. Nevertheless of the above, both can discuss the parts of the Preparatory Report that should not be disclosed to the public from security aspect, and exclude those parts from disclosure before the Preparatory Report is published.
- 13-6. To avoid accidents on site during the implementation of the Project, the Timor-Leste side agreed to cause the consultant and the contractor to enforce safety measures such as setting safety assurance to the site, providing information for security control to public, and deploying adequate security personnel, based on the JICA Guidance for the Management of Safety for Construction Works in Japanese ODA Projects (September 2014), which has been published on JICA's website shown below.
- [https://www.jica.go.jp/english/our\\_work/types\\_of\\_assistance/c8h0vm00008zx0m8-att/guidance\\_en.pdf](https://www.jica.go.jp/english/our_work/types_of_assistance/c8h0vm00008zx0m8-att/guidance_en.pdf)
- 13-7. The Timor-Leste side shall provide security measures for all concerned Japanese nationals working for the Project, if deemed necessary.

Annex 1: Project Site

Annex 2: Organization Chart of ANATL

Annex 3: Japanese Grant

Annex 4: Major Undertakings to be taken by the Government of Timor-Leste

Annex 5: Project Monitoring Report (template)

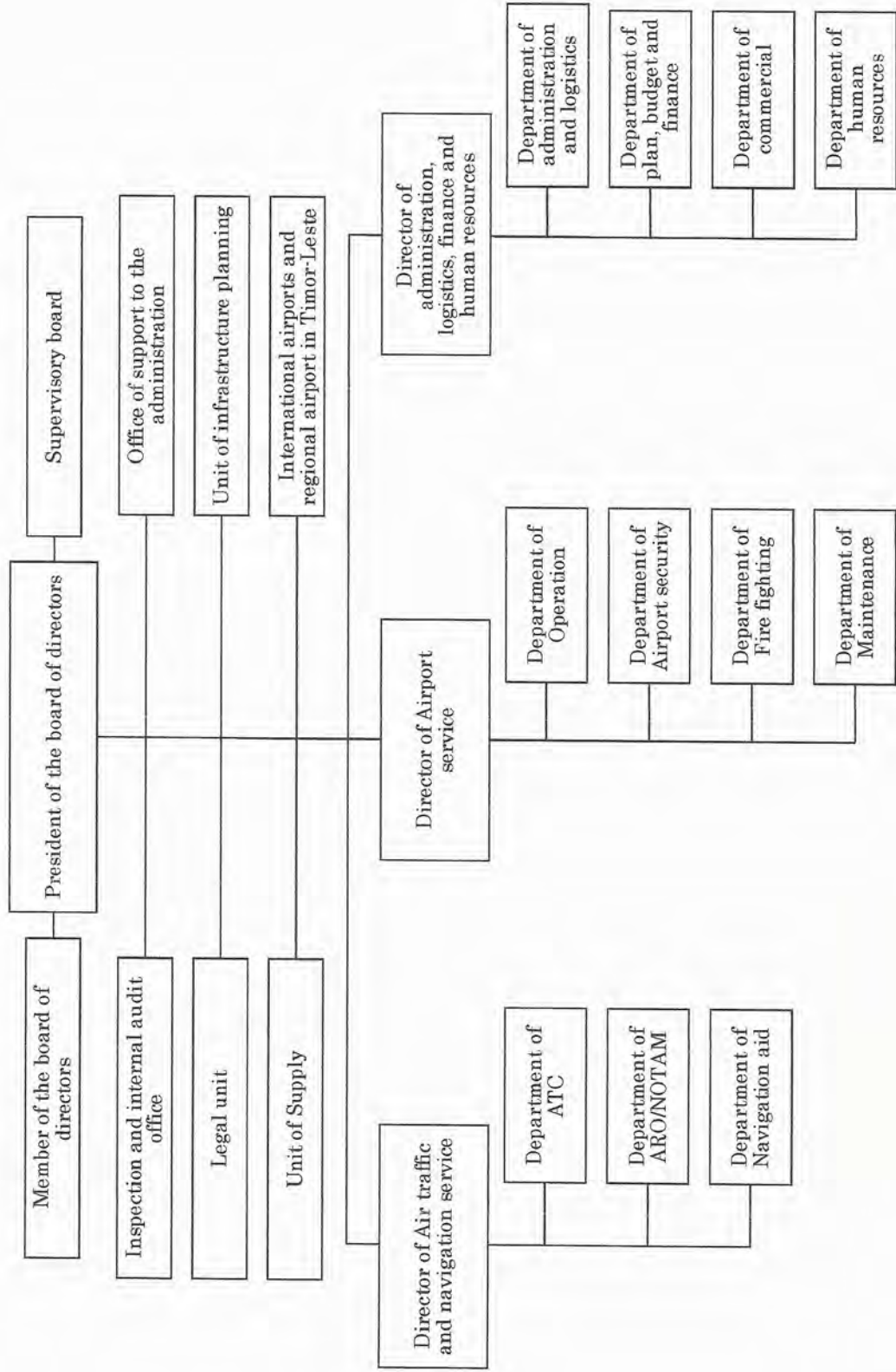
Annex 6: Preliminary Layout Plan of New Terminal Facilities (Phases 0, 1 and 2)

PROJECT SITE



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# **ORGANIZATION CHART OF ANATL**



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## 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 “Attachment-1: 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 "Attachment 2: 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.

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**PROCEDURES OF JAPANESE GRANT**

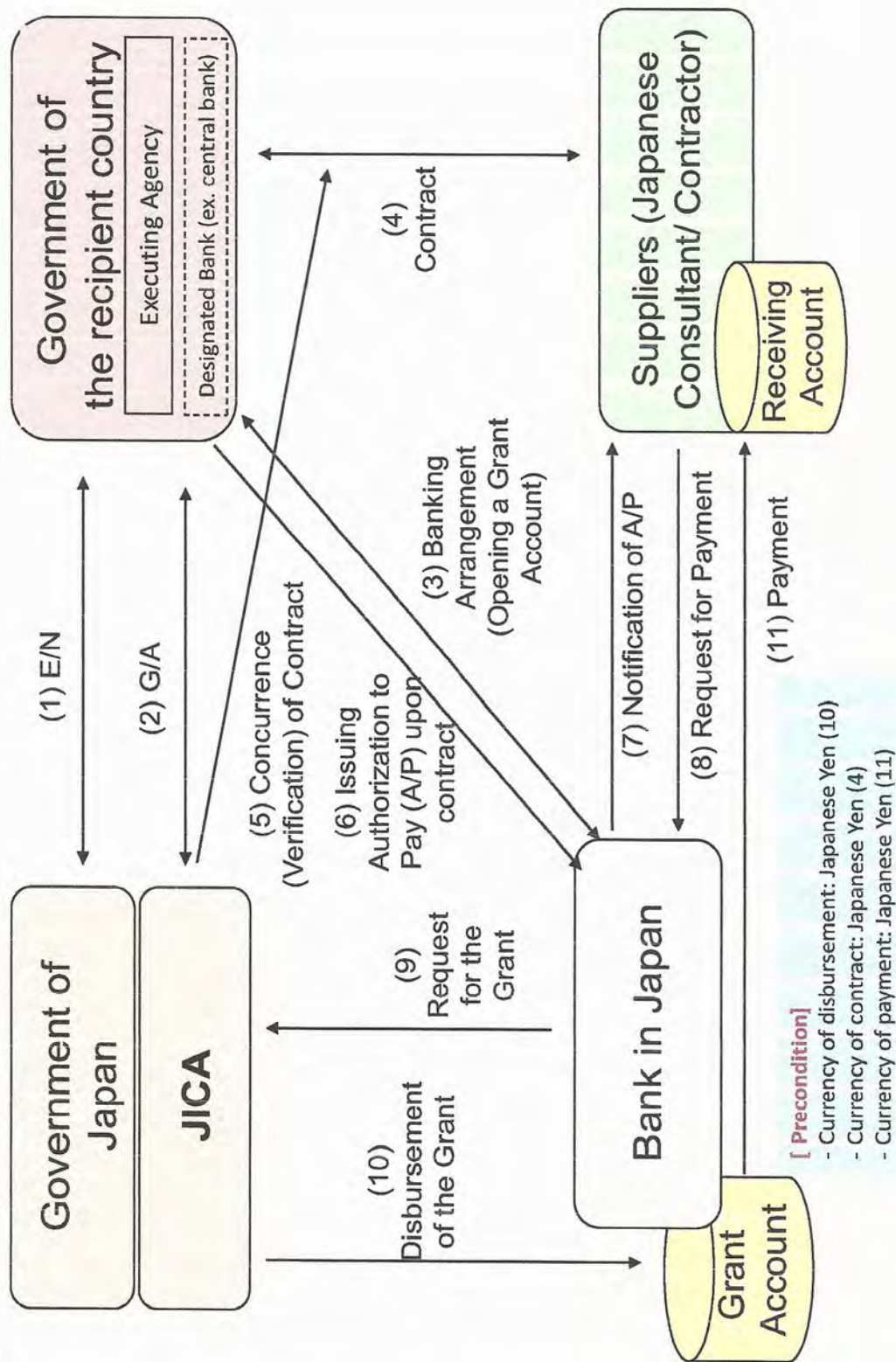
| Stage                              | Procedures                                                                                                 | Remarks                                                                                                                                        | Recipient 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<br>Preparation of outline design and cost estimate                                  |                                                                                                                                                | x                    |                     | x       | x           |             |            |
| 2. Appraisal                       | (2) Preparatory Survey<br>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.

FINANCIAL FLOW OF JAPANESE GRANT (A/P TYPE)



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**MAJOR UNDERTAKINGS TO BE TAKEN BY  
THE GOVERNMENT OF TIMOR-LESTE**

**1. Specific obligations of the Government of Timor-Leste which will not be funded with the Grant**

**(1) Before the Tender**

| No | Items                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Deadline                                             | In charge | Estimated Cost | Ref. |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------|----------------|------|
| 1  | To approve IEE/EIA                                                                                                                                                                                                                                                                                                                                                                                                                                                       | before the Project approval by Japanese Cabinet      | ANATL     |                |      |
| 2  | (1) To secure the lots of land necessary for the Project including land for site office, plant yards (asphalt, concrete, crusher etc), material storage yard, motor pool, temporary construction yard, and waste disposal site with good access to the Project sites;<br>(2) To relocate existing utilities and buildings within the Project sites;<br>(3) To obtain or arrange for license, permission and other necessary procedures for the Project.                  | Before G/A signing                                   | ANATL     |                |      |
| 3  | To open Bank Account (Banking Arrangement (B/A))                                                                                                                                                                                                                                                                                                                                                                                                                         | within 1 month after the signing of the G/A          | MOPF      |                |      |
| 4  | To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant                                                                                                                                                                                                                                                                                                                                                                                       | within 1 month after the signing of the contract     | MOPF      |                |      |
| 5  | To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report                                                                                                                                                                                                                                                                                                  | till land acquisition and resettlement complete      | ANATL     |                |      |
| 6  | To submit Project Monitoring Report (with the result of Detail Design)                                                                                                                                                                                                                                                                                                                                                                                                   | before preparation of bidding document(s)            | ANATL     |                |      |
| 7  | To relocate the following facilities, to demolish the existing structures and to clear the Phase 1 Project site for new construction works<br>a) ANATL Head Office Building<br>b) ANATL ATC Simulator Building<br>c) ANATL Procurement Department Office Building<br>d) ANATL Maintenance Workshop Building<br>e) ANATL Vehicle Maintenance Workshop Building<br>f) ANATL Storage<br>g) TLK Office<br>h) ETO Aviation Fuel Facility<br>i) Boarder Police Office Building | before the announcement of the tender of the Project | ANATL     |                |      |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                      |       |  |  |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------|--|--|
| 8 | To construct the following facilities:<br>a) New High Voltage Distribution Station<br>b) Electric Power Substations with Emergency Generators<br>- Substation for Existing Terminal Facilities and Central Relocated Facilities<br>- Substation for Aeronautical Ground Lights and VOR/DME<br>- Substation for West Relocated Facilities<br>c) Electric Power Cables for Existing Facilities connected with New Substations | before the announcement of the tender of the Project | ANATL |  |  |
| 9 | To fell and grub of trees in the Phase 1 Project site                                                                                                                                                                                                                                                                                                                                                                       | before the announcement of the tender of the Project | ANATL |  |  |

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable), (MOPF: Ministry of Planning and Finance, MODS: Ministry of Defense and Security, MOFAC: Ministry of Foreign Affairs and Cooperation)

## (2) During the Project Implementation

| No | Items                                                                                                                                                                                                                                                                                                          | Deadline                                                                               | In charge   | Estimated Cost | Ref. |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------|----------------|------|
| 1  | To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)                                                                                                                                                                                                                            | within 1 month after the signing of the contract(s)                                    | MOPF        |                |      |
| 2  | To bear the following commissions to a bank of Japan 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) with Contractor(s) and Supplier(s) | ANATL       |                |      |
|    | 2) Payment commission for A/P                                                                                                                                                                                                                                                                                  | every payment for Consultant, Contractor(s) and Supplier(s)                            | ANATL       |                |      |
| 3  | To issue the Working Visa for workers                                                                                                                                                                                                                                                                          | before commencement of the Project                                                     | MODS, MOFAC |                |      |
| 4  | To enable provision of electric power supply for the equipment                                                                                                                                                                                                                                                 | 1 month before installation of each equipment                                          | ANATL       |                |      |
| 5  | To take necessary measure for safety of construction and installation                                                                                                                                                                                                                                          | during the the Project                                                                 | ANATL       |                |      |
| 6  | To ensure prompt unloading and customs clearance at ports of disembarkation in recipient country and to assist the Contractor(s) and/or Supplier(s) with internal transportation therein                                                                                                                       | during the the Project                                                                 | ANATL       |                |      |
| 7  | To accord Japanese nationals 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 the Project                                                                 | ANATL       |                |      |

|    |                                                                                                                                                                                                                                       |                                                                                                 |       |  |  |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------|--|--|
| 8  | 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 borne by ANATL without using the Grant | during the the Project                                                                          | ANATL |  |  |
| 9  | To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project                                                                                                                      | during the the Project                                                                          | ANATL |  |  |
| 10 | 1) To submit Project Monitoring Report                                                                                                                                                                                                | every month                                                                                     | ANATL |  |  |
|    | 2) To submit Project Monitoring Report (final)                                                                                                                                                                                        | within one month after signing of Certificate of Completion for the works under the contract(s) | ANATL |  |  |
|    | To submit a report concerning completion of the Project                                                                                                                                                                               | within 6 months after completion of the Project                                                 | ANATL |  |  |
| 11 | To construct the following facilities:<br>a) VIP Terminal Building<br>b) VIP Airside Road<br>c) VIP Landside Road                                                                                                                     | by the completion of works under Japanese Grant                                                 | ANATL |  |  |

(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<br>1) Allocation of maintenance cost<br>2) Operation and maintenance structure<br>3) Routine check/Periodic inspection                                                                                                | After completion of the construction | ANATL     |                |      |
| 2  | To implement EMP and EMoP                                                                                                                                                                                                                                                                                                                | for a period based on EMP and EMoP   | ANATL     |                |      |
| 3  | To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually<br>- 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 ANATL and JICA. | for three years after the Project    | ANATL     |                |      |

## 2. Major Undertakings to be covered by the Grant Aid

| No | Items                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Deadline               | Amount<br>(Million Japanese Yen)* |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------|
| 1  | To construct and/or install the following facilities and equipment<br>a) International Passenger Terminal Building (with equipment)<br>b) International Cargo Building (with equipment)<br>c) Terminal Apron<br>d) Taxiways<br>e) Aeronautical Ground Lights for Apron and Taxiways<br>f) Roads and Car Park for New Terminal Facilities<br>g) Air Traffic Control Tower (with equipment)<br>h) Electric Power Substation with Emergency Generator (for New Terminal Facilities) | before end of contract |                                   |
|    | To demolish the following Facilities with Japanese Grant<br>a) Existing Control Tower<br>b) Existing ANATL Power House                                                                                                                                                                                                                                                                                                                                                           |                        |                                   |
|    | 2 To implement detailed design, bidding support and construction supervision (Consulting Service)                                                                                                                                                                                                                                                                                                                                                                                |                        |                                   |
|    | Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                        | XXX                               |

|                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><u>Project Monitoring Report</u></b><br/> <b>on</b><br/> <b><u>Project Name</u></b><br/> <b><u>Grant Agreement No. XXXXXXXX</u></b><br/>         20XX, Month</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Organizational Information**

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

**General Information:**

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

## 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

|  |
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|  |
|--|

### 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<br>(proposed in the outline design) | Actual |
|------------|----------------------------------------------|--------|
| 1.         |                                              |        |

### 2-2 Scope of the work

| Components | Original*<br>(proposed in the outline design) | Actual* |
|------------|-----------------------------------------------|---------|
| 1.         |                                               |         |
|            |                                               |         |
|            |                                               |         |
|            |                                               |         |

Reasons for modification of scope (if any).

|       |
|-------|
| (PMR) |
|-------|

*[Handwritten signatures]*

## 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)

|  |
|--|
|  |
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## 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<br>(Million Yen)                                         |        |
|------------|----------------------------------------------|-----------------------------------------|---------------------------------------------------------------|--------|
|            | Original<br>(proposed in the outline design) | Actual<br>(in case of any modification) | Original <sup>1),2)</sup><br>(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<br>(1,000 Taka)                                          |        |
|------------|----------------------------------------------|-----------------------------------------|---------------------------------------------------------------|--------|
|            | Original<br>(proposed in the outline design) | Actual<br>(in case of any modification) | Original <sup>1),2)</sup><br>(proposed in the outline design) | Actual |
|            | 1.                                           |                                         |                                                               |        |
|            |                                              |                                         |                                                               |        |
|            |                                              |                                         |                                                               |        |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

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<br>A | Initial Unit<br>Price (¥)<br>B | Initial total<br>Price<br>C=A×B | 1% of Contract<br>Price<br>D | Condition of payment       |                            |
|---|------------------------------|---------------------|--------------------------------|---------------------------------|------------------------------|----------------------------|----------------------------|
|   |                              |                     |                                |                                 |                              | Price (Decreased)<br>E=C-D | Price (Increased)<br>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<br>month, 2015 | 2nd<br>month, 2015 | 3rd<br>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)

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-

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*Handwritten signature and date*

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

|                             | Domestic Procurement<br>(Recipient Country)<br>A | Foreign Procurement<br>(Japan)<br>B | Foreign Procurement<br>(Third Countries)<br>C | Total<br>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%)                                        |            |

for *[Signature]* - 14.

Phase 0 Project: The preparatory works to be undertaken by the Timor-Leste side



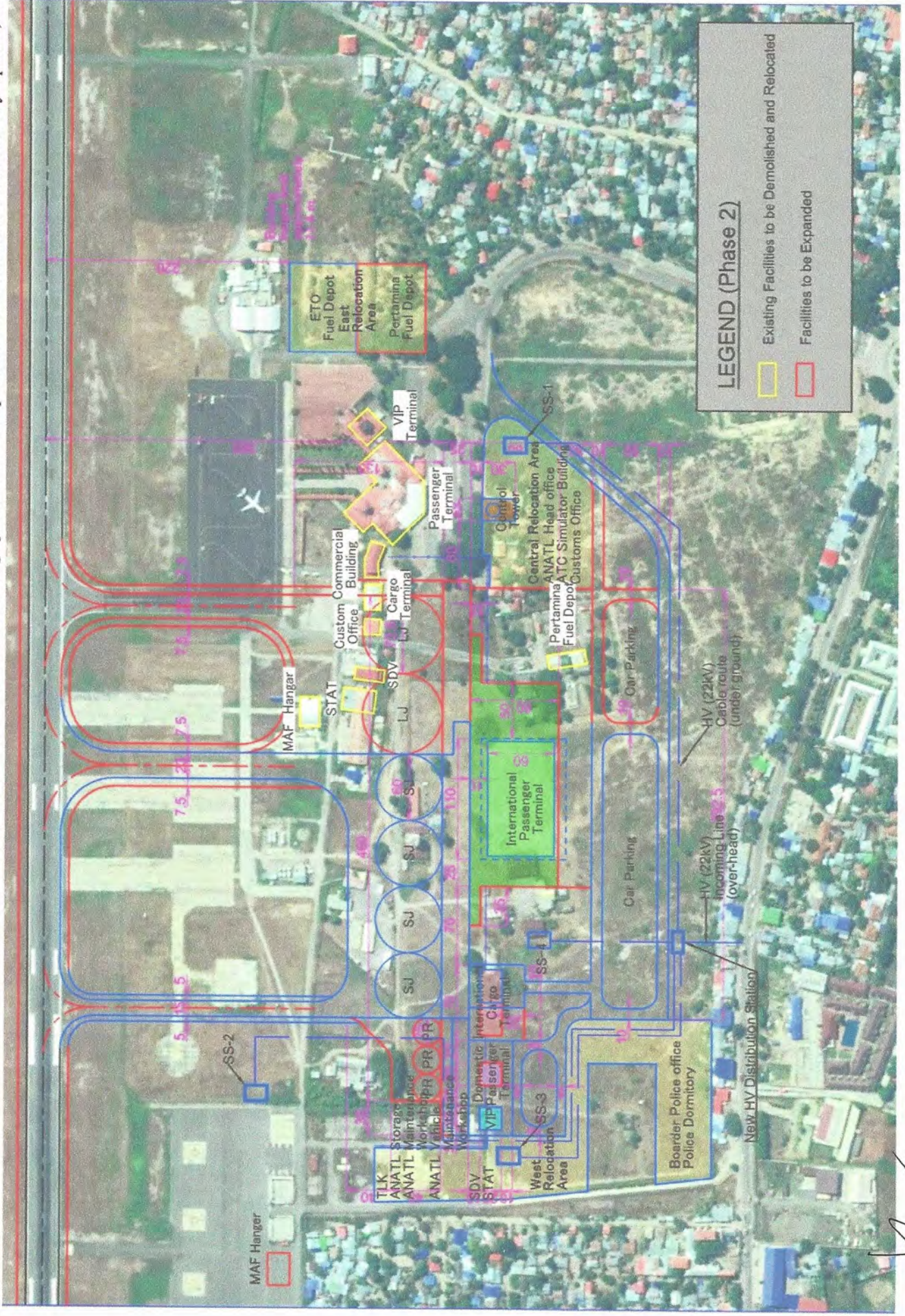
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Phase 1 Project: Construction of new terminal facilities under the Japanese Grant, and new VIP terminal by the Timor-Leste side



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Phase 2 Project: Further extension of the terminal facilities by the Timor-Leste side when large jet aircraft are operated after extension of the runway up to 2,500m



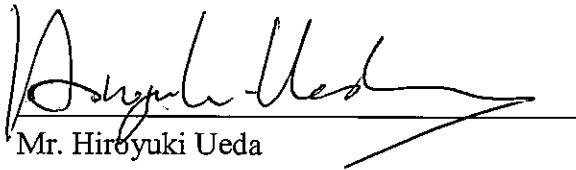
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**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Improvement of Presidente Nicolau Lobato International Airport**  
**(Explanation on Draft Preparatory Survey Report)**

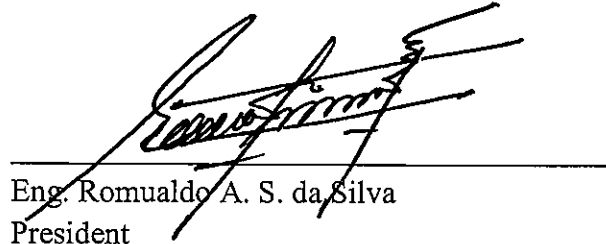
With reference to the minutes of discussions signed between the Airport Administration and Air Navigation of Timor-Leste (hereinafter referred to as "ANATL") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 16<sup>th</sup> April, 2018 and in response to the request from the Government of the Democratic Republic of Timor-Leste (hereinafter referred to as "Timor-Leste") dated 30<sup>th</sup> October, 2018, 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 Improvement of Presidente Nicolau Lobato International Airport (hereinafter referred to as "the Project").

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

Dili, 11<sup>th</sup> February 2019

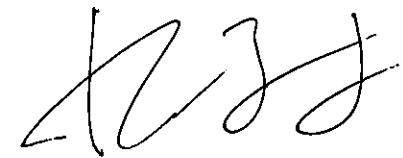


Mr. Hiroyuki Ueda  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan



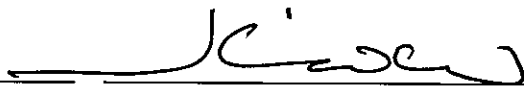
Eng. Romualdo A. S. da Silva  
President  
The Airport Administration and Air  
Navigation of Timor-Leste  
The Democratic Republic of Timor-Leste

(Witnessed by)



Mr. Masafumi Nagaishi  
Chief Representative  
Japan International Cooperation Agency  
Timor-Leste Office  
Japan

(Witnessed by)



Mr. José Agostinho da Silva  
Minister of Transport and Communications  
The Democratic Republic of Timor-Leste

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to cope with future growth of air traffic demands and to upgrade convenience and safety of air transport users at Presidente Nicolau Lobato International Airport through the improvement of airport facilities and equipment, thereby contributing to socio-economic development of Timor-Leste.

### 2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Improvement of Presidente Nicolau Lobato International Airport”.

### 3. Project Site

Both sides confirmed that the site of the Project is Presidente Nicolau Lobato International Airport, as shown in Annex 1.

### 4. Responsible Authorities for the Project

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

4-1. The Airport Administration and Air Navigation of Timor-Leste (ANATL) 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 taken care by relevant authorities properly and on time. The organization chart of ANATL is shown in Annex 2.

4-2. The line ministry of the Executing Agency is Ministry of Transport and Communications (hereinafter referred to as “MTC”). The MTC shall be responsible for supervising the Executing Agency on behalf of the Government of Timor-Leste.

### 5. Contents of the Draft Report

After the explanation of the contents of the Draft Survey Report by the Team, the Timor-Leste side agreed to its contents.

### 6. Project Component and Cost Estimate

6-1. Both sides confirmed that Project Components and the rough estimate of the Project are as described in Annex 3.

- 6-2. The Team explained that following items, which were originally requested by Timor-Leste side, have been modified due to budget limitation of the Japanese Grant Aid.

| no. | Scope of the Project in the request from the Government of Timor-Leste on 30 <sup>th</sup> October | Modified Scope of the Project under the Grant Aid                                                                                                                   |
|-----|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Construction of a new international passenger terminal building (with equipment)                   | Construction of a new international passenger terminal building (with equipment)                                                                                    |
| 2   | Construction of a new international cargo terminal building (with equipment)                       | (Excluded)                                                                                                                                                          |
| 3   | Construction of a new terminal apron (A320/B737: 4 aircraft stands)                                | Construction of a new terminal apron (A320/B737: 3 aircraft stands)                                                                                                 |
| 4   | Construction of new taxiways                                                                       | Construction of new taxiway (1 number)                                                                                                                              |
| 5   | Installation of aeronautical ground lights for new apron and taxiways                              | (Excluded)                                                                                                                                                          |
| 6   | Construction of roads and car park for new terminal facilities                                     | Construction of roads for new terminal facilities<br>(Earthwork is included for car park. Pavement work for car park should be undertaken by the Timor-Leste side.) |
| 7   | Construction of a new air traffic control tower building (with equipment)                          | Construction of a new air traffic control tower building (with equipment)                                                                                           |
| 8   | Construction of electric power substation with emergency generator (for new terminal facilities)   | Construction of electric power substation with emergency generator (for new terminal facilities)                                                                    |

Timor-Leste side agreed to the modifications of the scope of the Project in the above.

- 6-3. Both side also confirmed that the Project Component and the Cost Estimate including the contingencies shown in Annex 3 explained by the Team is provisional, and will be examined further for the approval of the Government of Japan. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, changes of economic/market conditions, etc.
- 6-4. The Team explained to the Timor-Leste side that in case final estimated Project cost borne by the Grant Aid, which will be finalized at the middle of February 2019, exceeds the budget limit set by the Japanese Government, some of components or items under the Grant Aid may be excluded from the Grant Aid portion in accordance with the order shown below:
- (1) Asphalt surface course of the shoulders of the taxiway (to be replaced with turfing)
  - (2) X-ray Screening Equipment at general baggage inspection area after the main entrance of new international passenger terminal building

The Timor-Leste side understood and agreed to it.

- 6-5. Both sides confirmed that the following equipment and furniture will not be covered by the Japanese Grant, and should be prepared by the Timor-Leste side.

- a) Furniture and office equipment for offices
- b) Passport control equipment used by immigration office
- c) Baggage/cargo screening equipment used by customs office
- d) Airside and landside surveillance system
- e) Surveillance equipment for National Operation Center (NOC)
- f) Check-in system used by airline companies
- g) Ground support equipment used by ground handling companies

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 Timor-Leste side agreed that the procedures and basic principles of Japanese Grant as described in Annex 4 shall be applied to the Project. In addition, the Timor-Leste side agreed to take necessary measures according to the procedures.

9. Timeline for the Project implementation

The Team explained to the Timor-Leste side that the expected timeline for the project implementation is as attached in Annex 5.

10. Expected Outcomes and Indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Timor-Leste side will be responsible for the achievement of agreed key indicators targeted in year 2025 and shall monitor the progress based on those indicators.

[Quantitative Effects]

| Indicator                                                          | Baseline (2017) | Target Figure (2025) |
|--------------------------------------------------------------------|-----------------|----------------------|
| Number of International Passengers                                 | 216,400         | 330,000              |
| Number of Foreign Visitors                                         | 65,642          | 100,000              |
| Passenger Processing Time for Inbound Immigration for One Aircraft | 30 minutes*     | 20 minutes           |

Note\*: Processing time for inbound immigration check for passengers from one aircraft (150 seats with load factor of 75%) measured by the Survey Team.

[Quantitative Effects]

- (1) Safety, convenience and comfort of air passengers are improved by the construction of new international passenger terminal building.

- (2) Safety of aircraft operation is improved since parked aircraft on the apron does not infringe the obstacle limitation surface by the relocation of international terminal facilities.
- (3) Improvement in safety, convenience, comfort of the airport facilities will contribute to promote tourism and generate economic development.

#### 11. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 6. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in 1. (2) 7 of Annex 6, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by ANATL during the implementation stage of the Project.

The Timor-Leste side assured to take the necessary measures and coordination including allocation of the necessary budget, which are preconditions of implementation of the Project. The Japanese side explained that starting of the tender process would require undertakings by the Timor-Leste side in 1. (1) of Annex 6 be completed before the tender. The Timor-Leste side understood this requirement.

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 6 will be used as an attachment of G/A.

#### 12. 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 7. The timing of submission of the PMR is described in Annex 6.

#### 13. Project Completion

Both sides confirmed that the Project completes when all the facilities constructed and equipment procured by the grant are in operation. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

#### 14. 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, and Sustainability). The result of the evaluation will be publicized. The Timor-Leste side is required to provide necessary support for the data collection.

## 15. Schedule of the Study

JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Timor-Leste side around May 2019.

## 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 airport project, is not located in a sensitive area, and has none of the sensitive characteristics under the Guidelines, it is not likely to have significant adverse impacts 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 Timor-Leste side shall submit the modified version to JICA in a timely manner.

### 16-2. Environmental Issues

#### 16-2-1 Environmental Impact Statement

The Timor-Leste side agreed to obtain an approval for Simplified Environmental Impact Statement (SEIS) and Environmental Management Plan (EMP) from National Directorate of Pollution Control and Environmental Impact by April 2019.

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

Both sides confirmed EMP and Environmental Monitoring Plan (EMoP) of the Project is as Annex 9 and Annex 10 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.

### 16-3. Environmental and Social Monitoring

#### 16-3-1 Environmental Monitoring

Both sides agreed that the Timor-Leste side will submit results of environmental monitoring to JICA by using the monitoring form attached as Annex 11. The timing of submission of the monitoring form is described in Annex 6.

#### 16-3-2 Information Disclosure of Monitoring Results

Both sides confirmed that the Timor-Leste side will disclose results of environmental and

social monitoring to local stakeholders through their website/in their field offices.

The Timor-Leste side agreed JICA will disclose results of environmental and social monitoring submitted by the Timor-Leste side as the monitoring forms attached as Annex 11 on its website.

17. Operation and Maintenance of Facilities and Equipment of the Project

Both sides confirmed that ANATL is responsible for operation and maintenance of the facilities and equipment of the Project.

The Team explained that it estimated additional staff and cost shown below would be necessary to operate and maintain new facilities and equipment under the Project properly and effectively.

(1) Increase of Staff

- Department of Operation: 8 staff (8 to 16)
- Department of Airport Security: 10 staff (20 to 30)
- Department of Maintenance: 7 staff (18 to 25)

(2) Incremental Cost per year

- Labor Cost for increased staff: USD 138,000
- Maintenance Cost for facilities and equipment: USD 350,000
- Maintenance Cost for Pavement of Airside: USD 195,000
- Total: USD 683,000

The Timor-Leste side understood the background and basis of the estimation written in Draft Survey Report and agreed to secure additional staff and budget for operation and maintenance of facilities and equipment of the Project by referring to the above estimation.

18. Capacity Development of ANATL Staff for Operation Maintenance of New Passenger Terminal Facilities

The Timor-Leste side requested the capacity development of ANATL staff for operation and maintenance of new passenger terminal facilities. The Japanese side took note for consideration of a Technical Cooperation Project.

19. Height of the Control Tower

The eye-level height of the control tower is decided to be 20.1m above ground based on the assessment and explanation of the Team that it has sufficient visibility for the future runway extension up to 3,000m by satisfying the minimum sight angle as indicated in Annex 12. It is also confirmed that ANATL should remove trees on the southern side of the runway to comply with ICAO Safety Standards requirements and to secure clear view of airside movement areas for air traffic controllers on the control tower.

20. Architectural Design of the International Passenger Terminal Building

Both sides confirmed that architectural features of the outline design for the international passenger terminal building will be reviewed in the detailed design stage within the available budget, by reflecting Timor-Leste culture or both Timor-Leste and Japanese cultures.

## 21. Other Relevant Issues

### 21-1. Disclosure of Information

Both sides agreed on the disclosure of the Preparatory Survey Report to the public as follows:

- (1) The Preparatory Survey Report without cost estimation of the Project will be disclosed to the public after the completion of the Preparatory Survey.
- (2) The Preparatory Survey Report including cost estimation of the Project will be disclosed to the public after all the contracts under the Project are concluded.
- (3) Nevertheless of the above, both sides can designate the parts of the Preparatory Survey Report that should not be disclosed to the public from security aspect, and exclude those parts from disclosure before the Preparatory Survey Report is published.

21-2. The Timor-Leste side agreed that ANATL shall bear the cost, which is equivalent to the customs duties, internal taxes and other fiscal levies which may be imposed in Timor-Leste, instead of tax exemption system.

21-3. The Timor-Leste side understood the principle of the Japan's Development Cooperation Charter, which stresses that ODA must not be utilized for military purpose or promoting international conflicts, and agreed to ensure that the facilities and equipment to be procured in the Project will never be used for any military purposes.

### 21-4. Promoting Universal Design and Gender Mainstreaming in the Project

The Timor-Leste side agreed that, given the nature of the public transportation infrastructure, it will take following actions into account during implementing the Project.

- (1) Constructing facilities under the Project in accordance with universal design to provide safe and reliable public transport infrastructure and services to all, particularly women as well as children, elderly, and disabled.
- (2) Securing the "Spaces for mothers and babies" in the international terminal building, such as cot for changing baby's dress, space for breastfeeding, etc.
- (3) Giving special consideration for female construction workers under the Project by introducing equal employment opportunity and equal pay for equal work between male and female workers, by establishing facilities for female workers such as washroom, dressing room, etc.

21-5. To avoid accidents on site during the implementation of the Project, the Timor-Leste side

agreed to cause the consultant and the contractor to enforce safety measures such as setting safety assurance to the site, providing information for security control to public, and deploying adequate security personnel, based on the JICA Guidance for the Management of Safety for Construction Works in Japanese ODA Projects (September 2014), which has been published on JICA's website shown below.

[https://www.jica.go.jp/english/our\\_work/types\\_of\\_assistance/c8h0vm00008zx0m8-att/guidance\\_en.pdf](https://www.jica.go.jp/english/our_work/types_of_assistance/c8h0vm00008zx0m8-att/guidance_en.pdf)

21-6. The Timor-Leste side shall provide security measures for all concerned Japanese nationals working for the Project, if deemed necessary.

Annex 1: Project Site

Annex 2: Organization Chart of ANATL

Annex 3: Project Component and Cost Estimate

Annex 4: Japanese Grant

Annex 5: Expected Timeline of the Project Implementation

Annex 6: Major Undertakings to be taken by the Government of Timor-Leste

Annex 7: Project Monitoring Report (template)

Annex 8: Environmental Checklist

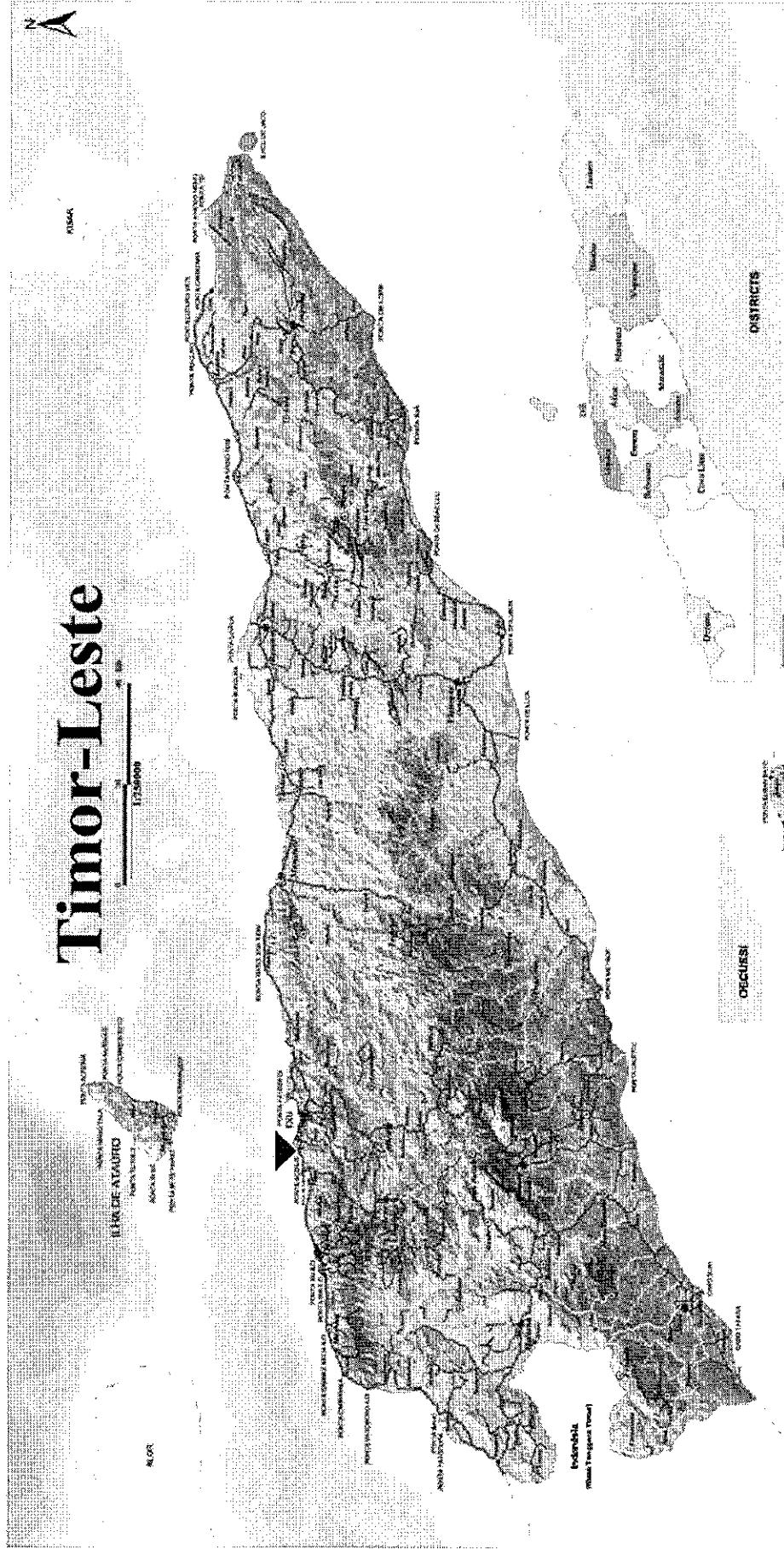
Annex 9: Environmental Management Plan (EMP)

Annex 10: Environmental Monitoring Plan (EMoP)

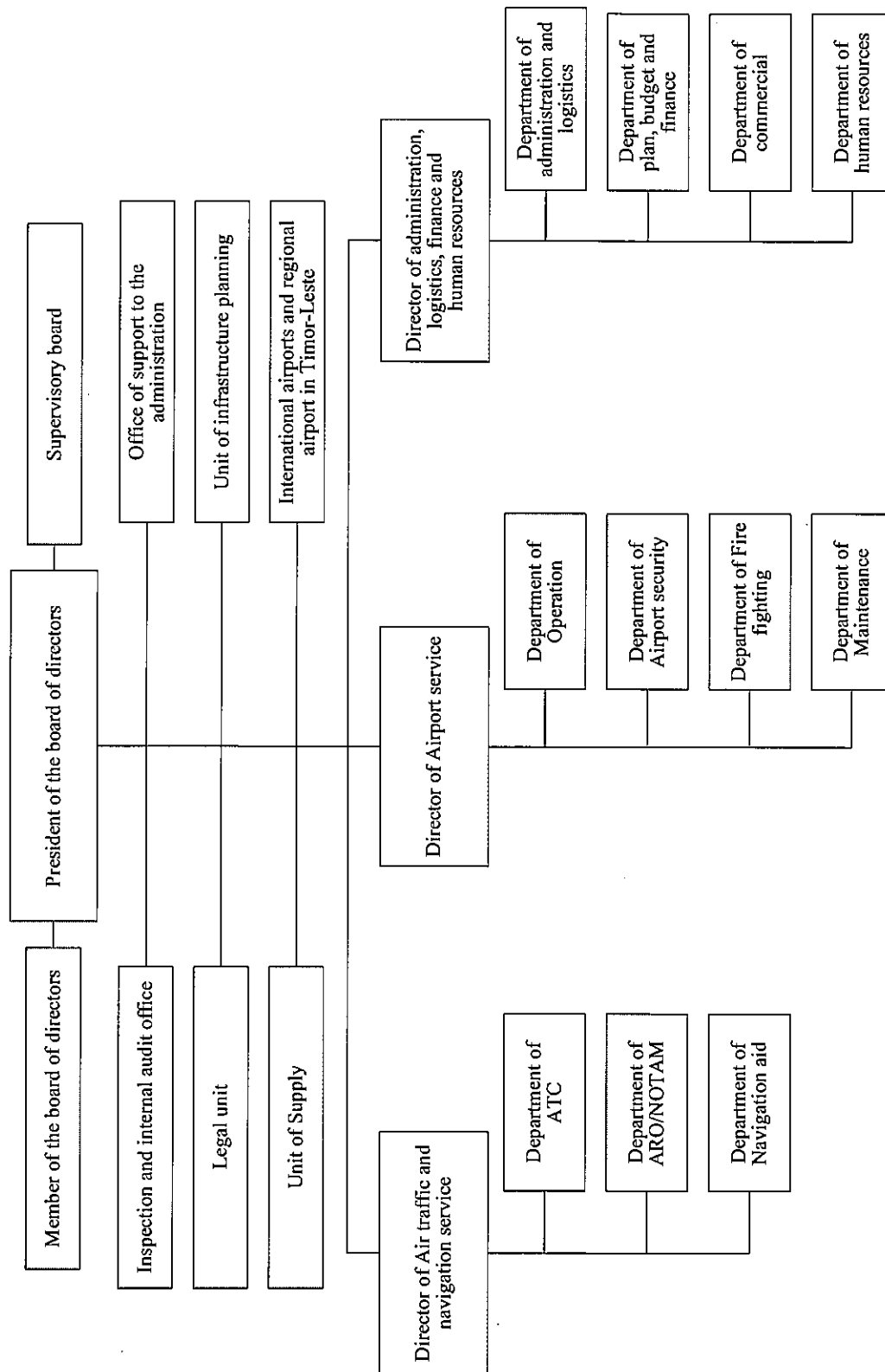
Annex 11: Environmental and Social Monitoring Form

Annex 12: Height of the Control Tower meeting Sight Angle Requirement for the Future Runway Extension

PROJECT SITE



# ORGANIZATION CHART OF ANATL



**PROJECT COMPONENTS AND COST ESTIMATE****1. Project Components and Cost Estimate borne by the Government of Japan**

Confidential until verification of construction contract.

**2. Project Component and Cost Estimate borne by the Government of Timor-Leste**

| No | Items                                                                                                                                                                                  |  |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 1  | Removal of existing facilities, and felling and grubbing of trees in the Project site (Existing structures should be demolished and site should be cleared for new construction works) |  |
| 2  | Construction of new power supply system                                                                                                                                                |  |
| 3  | Construction of car park                                                                                                                                                               |  |
| 4  | Customs duties and other fiscal levies to be borne by ANATL                                                                                                                            |  |
| 5  | Banking commission                                                                                                                                                                     |  |
|    | Total                                                                                                                                                                                  |  |

**Note:****1) Conditions of Cost Estimate**

- Timing of Estimation: May 2018
- Exchange Rate: USD 1.00 = JPY 108.13

**2) Others**

The Project will be implemented in accordance with the system of Japanese Grant. The above cost estimation does not assure the ceiling cost on the E/N and will be reviewed by the Government of Japan before the conclusion of E/N between the two governments.

Cost estimate borne by the Government of Timor-Leste in the above is provisional, and requires review for implementation.

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## **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 “Attachment-1: 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 “Attachment 2: 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.

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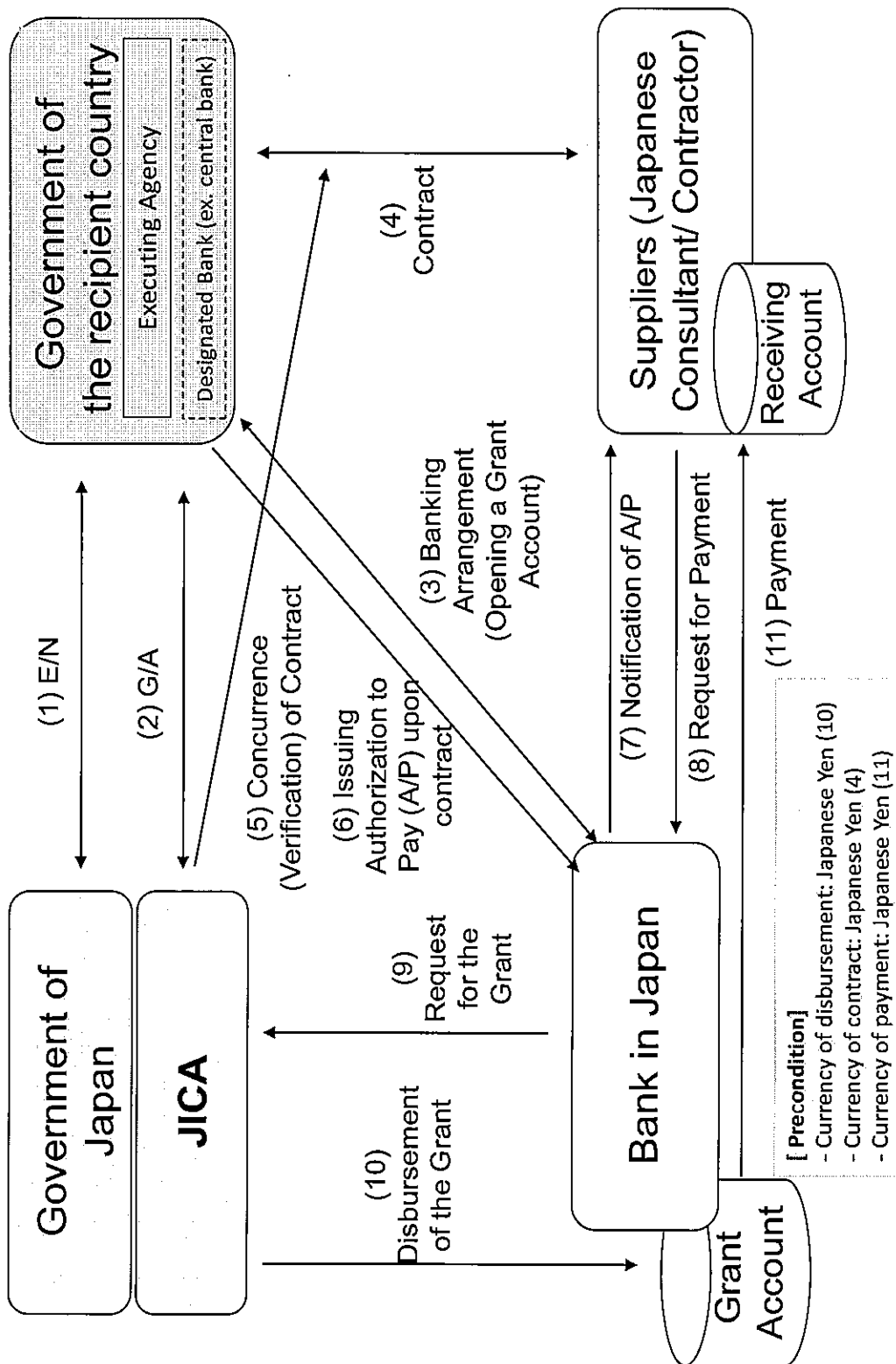
**PROCEDURES OF JAPANESE GRANT**

| 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<br>Preparation of outline design and cost estimate                                  |                                                                                                                                                | x                    |                     | x       | x           |             |            |
| 2. Appraisal                       | (2) Preparatory Survey<br>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.

FINANCIAL FLOW OF JAPANESE GRANT (A/P TYPE)



**EXPECTED TIMELINE OF THE PROJECT IMPLEMENTATION**

Estimated timeline of the Project implementation is as follows;

- Exchange of Note (E/N) and Grant Aid Agreement (G/A): May, 2019
- Detailed Design, and Procurement of the Contractor: June 2019 – February 2020
- Construction Works: March 2020 – December 2021
- Defect Liability Inspection: December 2022

**MAJOR UNDERTAKINGS TO BE TAKEN BY**  
**THE GOVERNMENT OF TIMOR-LESTE**

**1. Specific obligations of the Government of Timor-Leste which will not be funded with the Grant**

**(1) Before the Tender**

| No. | Items                                                                                                                                                                                                                                                                                                                                                                                                                         | Deadline                                                             | In charge | Estimated Cost | Ref. |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-----------|----------------|------|
| 1   | To obtain an approval of Simplified Environmental Impact Statement (SEIS) and Environmental Management Plan (EMP)                                                                                                                                                                                                                                                                                                             | before the Project approval by Japanese Cabinet (April 2019)         | ANATL     |                |      |
| 2   | To open Bank Account (Banking Arrangement (B/A))                                                                                                                                                                                                                                                                                                                                                                              | within 1 month after the signing of the G/A                          | MOF       |                |      |
| 3   | To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant                                                                                                                                                                                                                                                                                                                                            | within 1 month after the signing of the contract                     | MOF       |                |      |
| 4   | To submit Project Monitoring Report (with the result of Detail Design)                                                                                                                                                                                                                                                                                                                                                        | before preparation of bidding document(s)                            | ANATL     |                |      |
| 5   | To secure the lots of land necessary for the Project including land for site office, plant yards, material storage yard, motor pool, temporary construction yard, and waste disposal site with good access to the Project sites;                                                                                                                                                                                              | before the announcement of the tender of the Project (November 2019) | ANATL     |                |      |
| 6   | To obtain or arrange for license, permission and other necessary procedures for the Project.                                                                                                                                                                                                                                                                                                                                  | before the announcement of the tender of the Project (November 2019) | ANATL     |                |      |
| 7   | To relocate the following facilities, to demolish the existing structures and to clear the Project site for new construction works<br>a) ANATL Head Office Building<br>b) ANATL Procurement Department Office Building<br>c) ANATL Maintenance Workshop Building<br>d) ANATL Vehicle Maintenance Workshop Building<br>e) ANATL Storage<br>f) TLK Office<br>g) ETO Aviation Fuel Facility<br>h) Boarder Police Office Building | before the announcement of the tender of the Project (November 2019) | ANATL     | USD 267,000    |      |
| 8   | To conduct felling and grubbing of trees in the Project site                                                                                                                                                                                                                                                                                                                                                                  | before the announcement                                              | ANATL     |                |      |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |       |                  |  |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------|------------------|--|
|   |                                                                                                                                                                                                                                                                                                                                                                                                                             | of the tender<br>of the Project<br>(November<br>2019)                               |       |                  |  |
| 9 | To construct the following facilities:<br>a) New High Voltage Distribution Station<br>b) Electric Power Substations with Emergency Generators<br>- Substation for Existing Terminal Facilities and Central Relocated Facilities<br>- Substation for Aeronautical Ground Lights and VOR/DME<br>- Substation for West Relocated Facilities<br>c) Electric Power Cables for Existing Facilities connected with New Substations | before the<br>announcement<br>of the tender<br>of the Project<br>(November<br>2019) | ANATL | USD<br>1,457,000 |  |

B/A: Banking Arrangement

A/P: Authorization to Pay

MOF: Ministry of Finance

## (2) During the Project Implementation

| No | Items                                                                                                                                                                                                                                                                                                          | Deadline                                                                                               | In charge     | Estimated Cost | Ref. |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------|----------------|------|
| 1  | To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Constructor (s) and/or Supplier(s)                                                                                                                                                                                                     | within 1 month<br>after the<br>signing of the<br>contract(s)                                           | MOF           |                |      |
| 2  | To bear the following commissions to a bank of Japan for the banking services based upon the B/A                                                                                                                                                                                                               |                                                                                                        |               |                |      |
|    | 1) Advising commission of A/P                                                                                                                                                                                                                                                                                  | within 1 month<br>after the<br>signing of the<br>contract(s) with<br>Constructor(s)<br>and Supplier(s) | ANATL         | USD<br>46,000  |      |
|    | 2) Payment commission for A/P                                                                                                                                                                                                                                                                                  | every payment<br>for Consultant,<br>Constructor (s)<br>and Supplier(s)                                 | ANATL         |                |      |
| 3  | To accord Japanese nationals 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<br>Project                                                                                  | MOI,<br>MOFAC |                |      |
| 4  | To take necessary measures for safety of construction works                                                                                                                                                                                                                                                    | during the<br>Project                                                                                  | ANATL         |                |      |
| 5  | To take necessary measures for safety of aircraft operation with respect to airside construction works including issuance of NOTAM                                                                                                                                                                             | during the<br>Project                                                                                  | ANATL         |                |      |
| 6  | To ensure prompt unloading and customs clearance at ports of disembarkation in recipient country and to assist the Contractor(s) and/or Supplier(s) with internal transportation therein                                                                                                                       | during the<br>Project                                                                                  | ANATL         |                |      |
| 7  | 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 borne by ANATL without using the Grant                                                              | during the<br>Project                                                                                  | ANATL         | USD<br>232,000 |      |

|    |                                                                                                                                                                                                                               |                                                                                                 |       |               |  |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------|---------------|--|
| 8  | To construct car park for new terminal facilities                                                                                                                                                                             | by the completion of works under Japanese Grant                                                 | ANATL | USD 1,110,000 |  |
| 9  | To relocate the following equipment to the new control tower building<br>1) VOR/DME monitoring equipment<br>2) NDB monitoring equipment<br>3) Router for remote controlled air/ground communication sites<br>4) ATC simulator | Immediately after the completion of new ATC tower building                                      | ANATL |               |  |
| 10 | Felling of trees that will be obstacles to view from the new control tower                                                                                                                                                    | Immediately after the completion of new ATC tower building                                      | ANATL |               |  |
| 11 | To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project                                                                                                              | during the Project                                                                              | ANATL |               |  |
| 12 | 1) To submit Project Monitoring Report                                                                                                                                                                                        | every month                                                                                     | ANATL |               |  |
|    | 2) To submit Project Monitoring Report (final)                                                                                                                                                                                | within one month after signing of Certificate of Completion for the works under the contract(s) | ANATL |               |  |
|    | To submit a report concerning completion of the Project                                                                                                                                                                       | within 6 months after completion of the Project                                                 | ANATL |               |  |
| 13 | To implement EMP and EMoP                                                                                                                                                                                                     | during the construction                                                                         | ANATL |               |  |
| 14 | To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report                                                                              | during the construction                                                                         | ANATL |               |  |

B/A: Banking Arrangement

A/P: Authorization to Pay

MOF: Ministry of Finance

MOI: Ministry of Interior

MOFAC: Ministry of Foreign Affairs and Cooperation

(3) After the Project

| No | Items                                                                                                                                                                                                                                                                                                                                | Deadline                             | In charge | Estimated Cost | Ref. |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------|----------------|------|
| 1  | To operate and maintain properly and effectively the facilities constructed and equipment provided under the Grant Aid<br>1) Operation and maintenance structure<br>2) Allocation of operation and maintenance cost<br>3) Routine check/periodical inspection                                                                        | After completion of the construction | ANATL     |                |      |
| 2  | To implement EMP and EMoP                                                                                                                                                                                                                                                                                                            | for a period based on EMP and EMoP   | ANATL     |                |      |
| 3  | 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 ANATL and JICA. | for three years after the Project    | ANATL     |                |      |

2. Obligations of the Government of Timor-Leste which will be funded with the Grant

| No | Items                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Deadline                                                                                                                                                | Amount (Million Japanese Yen) |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1  | To construct and/or install the following facilities and equipment<br>1. New international passenger terminal building (with equipment)<br>2. New terminal apron (A320/B737: 3 aircraft stands)<br>3. New taxiway (1 number)<br>4. Construction of roads for new terminal facilities (Earthwork is included for car park. Pavement work for car park should be undertaken by the Timor-Leste side.)<br>5. New air traffic control tower building (with equipment)<br>6. Electric power substation with emergency generator (for new terminal facilities)<br>To demolish the following facilities<br>1. Existing control tower<br>2. Existing ANATL power house | December 2021<br>(Planned completion of the construction works in the case where all undertakings of by the Timor-Leste side are accomplished in time.) |                               |
| 2  | Implementation of detailed design, bidding support, and construction/procurement supervision (Consulting Service)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                         |                               |
| 3  | Contingencies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                         |                               |
|    | Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                         | Confidential                  |

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

**Organizational Information**

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

**General Information:**

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

|                               |  |
|-------------------------------|--|
| <b>1: Project Description</b> |  |
|-------------------------------|--|

**1-1 Project Objective**

|  |
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**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

|  |
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**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  |                |              |
|                                                                         |                |              |

|                                  |
|----------------------------------|
| <b>2: Details of the Project</b> |
|----------------------------------|

**2-1 Location**

| Components | Original<br>(proposed in the outline design) | Actual |
|------------|----------------------------------------------|--------|
| 1.         |                                              |        |

**2-2 Scope of the work**

| Components | Original*<br>(proposed in the outline design) | Actual* |
|------------|-----------------------------------------------|---------|
| 1.         |                                               |         |
|            |                                               |         |
|            |                                               |         |
|            |                                               |         |

Reasons for modification of scope (if any).

hr



(PMR)

## 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<br>(Million Yen)                                               |        |
|------------|-----------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------|--------|
|            | Original<br><i>(proposed in the outline design)</i> | Actual<br><i>(in case of any modification)</i> | Original <sup>1)2)</sup><br><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<br>(1,000 Taka)                                                |        |
|------------|-----------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------|--------|
|            | Original<br><i>(proposed in the outline design)</i> | Actual<br><i>(in case of any modification)</i> | Original <sup>1)2)</sup><br><i>(proposed in the outline design)</i> | Actual |
|            | 1.                                                  |                                                |                                                                     |        |

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|--|--|--|--|--|
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|  |  |  |  |  |
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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):                |
| Actual Situation and Countermeasures<br>(PMR) |                                                  |

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

### 5-1 Overall evaluation

Please describe your overall evaluation on the project.

|  |
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|  |
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### 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.

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### 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.

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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<br>A | Initial Unit<br>Price (¥)<br>B | Initial total<br>Price<br>C=A×B | 1% of Contract<br>Price<br>D | Condition of payment          |                               |
|---|------------------------------|---------------------|--------------------------------|---------------------------------|------------------------------|-------------------------------|-------------------------------|
|   |                              |                     |                                |                                 |                              | Price<br>(Decreased)<br>E=C-D | Price<br>(Increased)<br>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<br>month, 2015 | 2nd<br>month, 2015 | 3rd<br>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)

-  
-  
-

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

|                             | Domestic Procurement<br>(Recipient Country)<br>A | Foreign Procurement<br>(Japan)<br>B | Foreign Procurement<br>(Third Countries)<br>C | Total<br>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%)                                        |            |

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## ENVIRONMENTAL CHECKLIST

| Category                  | Environmental Item                        | Main Check Items                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes: Y<br>No: N                      | Confirmation of Environmental Considerations<br>(Reasons, Mitigation Measures)                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Permits and Explanation | (1) EIA and Environmental Permits         | (a) Have EIA reports been already prepared in official process?<br>(b) Have EIA reports been approved by authorities of the host country's government?<br>(c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?<br>(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? | (a) N<br>(b) N<br>(c) Unknown<br>(d) | (a) Under preparation<br>(b) In the process<br>(c) Under preparation<br>(d) Unnecessary                                                                                                                                                                                                                                                                                                                                 |
|                           | (2) Explanation to the 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?<br>(b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?                                                                                                                                 | (a) Y<br>(b) Y                       | (a) The project contents have already been informed by the interview survey for local residents. But Public consultation is going to be held for all community members.<br>(b) As local people expect employment generation by the project, the employment should be implemented fairly.                                                                                                                                |
|                           | (3) Examination of Alternatives           | (a) Have alternative plans of the project been examined with social and environmental considerations?                                                                                                                                                                                                                                                                                                                                                                                  | (a) Y                                | (a) Since the original plan has a possibility of impact on a store in the project site by the construction of aviation control tower, an alternative was considered in order to avoid the impact.                                                                                                                                                                                                                       |
| 2 Pollution Control       | (1) Air Quality                           | (a) Is there a possibility that air pollutants emitted from the project related sources, such as airplanes will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken?                                                                                                                                                                                                                               | (a) N                                | (a) As future flight number will not be increased rapidly on the operation phase, atmospheric ambient will not be deteriorated. There is no environmental standard for air quality in Timor-Leste.                                                                                                                                                                                                                      |
|                           |                                           | (b) Where industrial areas already exist near the airport, is there a possibility that the project will make air pollution worse?                                                                                                                                                                                                                                                                                                                                                      | (b) N                                | (b) During the construction, atmospheric ambient will be deteriorated periodically by operating heavy machines and dump trucks. Therefore, some mitigation measures should be introduced such as implementation of maintenance for heavy machines and dump trucks, water sprinkling during crushing activity. On the other hand, any activities which cause air pollution will not be scheduled on the operation phase. |

|                       |                         |                                                                                                                                                                                                                                                                                                                                                |                      |                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 Natural Environment | (2) Water Quality       | (a) Do pollutants, such as Suspended Solids (SS), and oils contained in effluents comply with the country's effluent standards (BOD, COD etc.)? Is there a possibility that the effluents from the project will cause areas not to comply with the country's ambient water quality standards?                                                  | (a) Unknown          | (a) Although there is no standard for effluents in Timor-Leste, all of the measured values were satisfied with the Indonesian standard. But the waste water will be discharged after appropriate treatment such as installment of septic tank.                                                                                                                                                      |
|                       | (3) Wastes              | (a) Are wastes generated from the airports and other project facilities properly treated and disposed of in accordance with the country's regulations?                                                                                                                                                                                         | (a) Y                | (a) As most of generated soil by the project will be reused in the airport area, the waste amount will not be large. Additionally, generated waste by the project such as debris can be treated appropriately because Tibar landfill site still has an enough collection capacity.                                                                                                                  |
|                       | (4) Soil contamination  | (a) Has the soil in the project site been contaminated in the past? Are adequate measures taken to prevent soil contamination by leakage of fuels?                                                                                                                                                                                             | (a) Y                | (a) Because the project site has been an undeveloped field so far, there is no case of soil contamination in the field. And an appropriate countermeasure for oil leakage should be implemented.                                                                                                                                                                                                    |
|                       | (5) Noise and vibration | (a) Does noise from aircraft comply with the country's standards?<br>(b) Is there a possibility that noise and vibrations from various sources, such as airport users' vehicles and vehicles for airport operations will adversely affect ambient noise levels? If impacts are anticipated, are adequate noise mitigation measures considered? | (a) Unknown<br>(b) N | (a) As future flight number will not be increased rapidly on the operation phase, noise ambient will not be deteriorated. There is no environmental standard for noise level in Timor-Leste.<br>(b) Since the number of airport transfer vehicles accompanied by the future flight number will not be increased suddenly, slight deterioration of noise and vibration environment will be occurred. |
|                       | (6) Ground 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) There is no primary factor which affects on ground water, because no activities which pump up a lot of ground water will be planned.                                                                                                                                                                                                                                                            |
|                       | (7) Offensive Odor      | (a) Are there any odor sources? Are adequate odor control measures taken?                                                                                                                                                                                                                                                                      | (a) N                | (a) There is no odor emission source by the project.                                                                                                                                                                                                                                                                                                                                                |
|                       | (1) Conservation Area   | (a) Is the project site 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) Although the Tasitolu protected Area is located at south west area, there is little impact on the protected area because the distance from the project site is approx. 1.0km.                                                                                                                                                                                                                   |
|                       | (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                | (a) There is no sensitive area for ecosystem in and around the project site.                                                                                                                                                                                                                                                                                                                        |
|                       |                         | (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?                                                                                                                                                                                   | (b) N                | (b) There is no sensitive area for rare species in and around the project site.                                                                                                                                                                                                                                                                                                                     |
|                       |                         | (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?                                                                                                                                                                                                          | (c) Y                | (c) There is limited impact on the ecosystem around the project site because the project site is an undeveloped field now.                                                                                                                                                                                                                                                                          |
|                       |                         | (d) Is there a possibility that the amount of water (e.g., surface water, groundwater) used by the project will adversely affect                                                                                                                                                                                                               | (d) N                | (d) Although there is no hydrological environment such as river at downstream side of the project site, Impact on Coastal and sea area is                                                                                                                                                                                                                                                           |

*Handwritten signature/initials*

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|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     | concerned. Therefore, Installment of septic tank will be introduced as a countermeasure for discharged waste water. It can be said that it is a minor impact on Ecosystem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| (3) Hydrology              | <p>(a) Is there any possibility that alteration of drainage system due to the constructions of airports and related facilities will adversely affect surface water and groundwater flows?</p> <p>(b) Do the facilities affect adversely flow regimes, waves, tides, currents of rivers and etc. if the project facilities are constructed on/by the seas?</p>                                                                                                                                                                                                                                                 | <p>(a) N</p> <p>(b) N</p>                           | <p>(a) Surface water and groundwater flows will not be affected because the project site is located at inland area.</p> <p>(b) Any buildings will not be constructed on/by the sea.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| (4) Topography and Geology | <p>(a) Does the project require the large scale change of topographic/geographic features?</p> <p>(b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides?</p> <p>(c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?</p> <p>(d) In the case of offshore projects, is there any possibility that the project will erode natural beaches?</p> | <p>(a) N</p> <p>(b) N</p> <p>(c) Y</p> <p>(d) N</p> | <p>(a) Excavation and landfill works are not needed on a large scale because of flatland.</p> <p>(b) Although topographical alteration such as banking and cutting will be implemented, there is no construction activity on a large scale which impacts on the stabilization of natural ground.</p> <p>(c) There is no possibility of soil runoff because the project will be implemented on a small scale and at inland area even if topographical alteration such as banking and cutting will be executed. Additionally, construction generated soil will be treated in the project site appropriately.</p> <p>(d) Any buildings will not be constructed on/by the sea.</p> |
| (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) Are the compensations going to be paid prior to the resettlement?</p>           | <p>(a) N</p> <p>(b)</p> <p>(c)</p> <p>(d)</p>       | <p>(a) Involuntary resettlement won't be generated because the entire project land owned by ANATL.</p> <p>(b)</p> <p>(c)</p> <p>(d)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4 Social Environment       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                   |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                      |                                                               |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
|  | <p>(e) Are 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>(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>(e)</p> <p>(f)</p> <p>(g)</p> <p>(h)</p> <p>(i)</p> <p>(j)</p> | <p>(e) An employment opportunity generated by the Project might be positive impact for the local people.</p> <p>(b) Since the project site is on a plain and undeveloped field owned by ANATL at the present moment, there is no land for special and specific use. Additionally, as there is no residential house downstream side from the project site, there is no impact on water use for livelihood of local people.</p> <p>(c) It is possible that any infectious diseases spread to local people by construction workers. Therefore, Necessary training for construction workers will be imparted for the AIDs and HIV.</p> <p>(d) Since existing road will be utilized as access road for construction, the existing infrastructure will not be needed to improve.</p> <p>(e) Since the airports and other project structures will not cause a sun shading and radio interference because these structures are proposed as 1st story's structure except aviation control tower. Although the tower is proposed with height of approx. 30m, there is no negative impact such as a sun shading because there is no residential house at southern side from the tower.</p> | <p>(e)</p> <p>(f)</p> <p>(g)</p> <p>(h)</p> <p>(i)</p> <p>(j)</p> | <p>(a) N, Y</p> <p>(b) N</p> <p>(c) Y</p> <p>(d) Y</p> <p>(e) N</p> | <p>(a) Is there any 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 there any possibility that the project causes the change of land uses in the neighboring areas to affect adversely livelihood of local people?</p> <p>(c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?</p> <p>(d) Is sufficient infrastructure (e.g., roads) available for the project implementation? If the existing infrastructure is insufficient, is a plan developed to construct new infrastructure or improve the existing infrastructure?</p> <p>(e) Is there any possibility that the airports and other project structures will cause a sun shading and radio interference?</p> | <p>(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?</p> | <p>(2) Living and Livelihood</p> <p>(3) Cultural Heritage</p> |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|

|                                              |                                                                                                                                                                                                                                                 |            |                                                                                                                                                                                                                      |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (4) Landscape                                | (a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?                                                                                                                            | (a) N      | (a) There is also no negative impact for scenic spots such as Betotasi beach because the proposed location is over 1 km away from there.                                                                             |
| (5) Ethnic Minorities and Indigenous Peoples | (a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?<br>(b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?  | (a)<br>(b) | (a) There are not any indigenous and ethnic people around the project site and its surrounding.<br>(b)                                                                                                               |
| (6) Working Conditions                       | (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?                                                             | (a) Y      | (a) Labor environment should conform to stipulated labor law in Timor-Leste; Law No. 4/2012 on Labor.                                                                                                                |
|                                              | (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?                               | (b) Y      | (b) Appropriate measures should be taken as tangible safety considerations based on the Labor law in Timor-Leste.                                                                                                    |
|                                              | (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.? | (c) Y      | (c) Appropriate measures should be planned and implemented as intangible safety considerations based on the Labor law in Timor-Leste.                                                                                |
|                                              | (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?                                                                              | (d) Y      | (d) Appropriate measures should be planned and implemented not to infringe on the safety for local people and the person involved in the project by executing necessary training for security guards of the project. |
| (1) Impacts during construction              | (a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?                                                                                            | (a) Y      | (a) Environmental Management Plan including mitigation measures should be prepared.                                                                                                                                  |
|                                              | (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?                                                                                                        | (b) N      | (b) There is limited impact on the ecosystem around the project site because the project site is an undeveloped field now and rare species were not identified.                                                      |
|                                              | (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?                                                                                                                     | (c) N      | (c) An employment opportunity generated by the Project might be positive impact for the local people                                                                                                                 |
| (2) Monitoring                               | (a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?                                                                                                      | (a) Y      | (a) Monitoring program for the environmental items should be developed because there is some impact on environmental pollution surrounding the project site due to heavy machines and dump trucks etc.               |
|                                              | (b) What are the items, methods and frequencies of the monitoring program?                                                                                                                                                                      | (b)        | (b) The monitoring program should be determined throughout detailed discussions with related authorities considering technical level and development status for environmental equipment in Timor-Leste.              |
|                                              | (c) Does the proponent establish an adequate monitoring                                                                                                                                                                                         | (c) Y      | (c) The personnel for preparing an adequate monitoring framework                                                                                                                                                     |
| 5 Others                                     |                                                                                                                                                                                                                                                 |            |                                                                                                                                                                                                                      |

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|                                         |                                                                                                                                                                                                                                                                                                      |       |                                                                                                                                                                                                        |                                                                                                                            |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|                                         | framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?<br>(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? |       |                                                                                                                                                                                                        | should be required for implementation body.<br>(d) Regulatory requirements will be stipulated for each environmental item. |
| Reference to Checklist of Other Sectors | (a) Where necessary, pertinent items described in the Roads, Railways, and Bridges checklist should also be checked (e.g., projects including large areas of deforestation).                                                                                                                         | (a) N | (a) Not applicable                                                                                                                                                                                     |                                                                                                                            |
|                                         | (b) If the airport is constructed on the sea, pertinent items described in the Ports and Harbors checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).                                                       | (b) N | (b) Any airport facilities will not be constructed on/by the sea.                                                                                                                                      |                                                                                                                            |
|                                         | (c) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).                                                                                                                                    | (c) N | (c) The project does not include large areas of deforestation but cutting some trees in the project site by expansion of new terminal.                                                                 |                                                                                                                            |
| Note on Using Environmental Checklist   | (a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (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).                                 | (a) N | (a) There are hardly any impacts in regards to global warming in this project because large scale of CO2 emission by heavy machines and dump trucks which causes climate change will not be estimated. |                                                                                                                            |

- 6 Note
- 1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.  
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
- 2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

**ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

| N<br>o | Item                 | Mitigation measure                                                                                                                                                                                                                           | Location                                  | Imple-<br>mentation<br>Phase | Imple-<br>mentation<br>Body | Supervi-<br>sing Body | Cost                                                          |
|--------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|------------------------------|-----------------------------|-----------------------|---------------------------------------------------------------|
| 1      | Coastal and sea area | Liquid waste from the construction workers will be processed at temporary toilets. Used oil waste and other waste categorized as toxic hazardous materials to be submitted to the third party already obtained a permit from the government. | Project site                              | Constructi<br>on             | Contractor                  | ANATL                 | Included in constructi<br>on cost                             |
|        |                      | Creating Sewage Treatment Plants to be used at operational stage which is then managed for the Liquid Waste Disposal                                                                                                                         | Project site                              | Operation                    | Contractor                  | ANATL                 | USD7,000<br>-<br>/unit(inclu<br>ded in constructi<br>on cost) |
| 2      | Air Quality          | Introduction of low-emission heavy machine to reduce air pollution                                                                                                                                                                           | Project site                              | Constructi<br>on             | Contractor                  | ANATL                 | Included in constructi<br>on cost                             |
|        |                      | Around the work area is fenced as high as 2-2.5 m                                                                                                                                                                                            | Project site                              | Constructi<br>on             | Contractor                  | ANATL                 | USD120-<br>/m<br>(included in constructi<br>on cost)          |
|        |                      | Not piling basic/waste materials in the work area openly, and/or the excavated land pile must always be kept wet to prevent from pollution into the air.                                                                                     | Project site                              | Constructi<br>on             | Contractor                  | ANATL                 | Included in constructi<br>on cost                             |
|        |                      | The schedule arrangement and speed limit for project vehicle carrying materials by installing traffic signs and bumps                                                                                                                        | Project site and transportat<br>ion route | Constructi<br>on             | Contractor                  | ANATL                 | Included in constructi<br>on cost                             |
|        |                      | Sprinkle water on the road surface to prevent dust emission at the entrance of project site                                                                                                                                                  | Project site and transportat<br>ion route | Constructi<br>on             | Contractor                  | ANATL                 | Included in constructi<br>on cost                             |
|        |                      | Planting and maintaining park/green space                                                                                                                                                                                                    | Project site                              | Constructi<br>on             | Contractor                  | ANATL                 | Included in constructi<br>on cost                             |

|   |                                |                                                                                                                                                                                      |                                       |              |            |       |                                                 |
|---|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------|------------|-------|-------------------------------------------------|
|   |                                | Set and enforce speed limits on the access road for airport transfer vehicles by installing traffic signs and bumps                                                                  | Project site                          | Operation    | ANATL      | MTC   | Paid by ANATL                                   |
| 3 | Water Quality<br>Water Quality | Liquid waste from the construction workers will be processed at temporary toilets.                                                                                                   | Project site                          | Construction | Contractor | ANATL | Included in construction cost                   |
|   |                                | Used oil waste and other waste categorized as toxic hazardous materials to be submitted to the third party already obtained a permit from the government                             | Project site                          | Construction | Contractor | ANATL | Included in construction cost                   |
|   |                                | Creating Sewage Treatment Plants to be used at operational stage which is then managed for the Liquid Waste Disposal                                                                 | Project site                          | Construction | Contractor | ANATL | USD7,000 - /unit(included in construction cost) |
| 4 | Noise and Vibration            | All construction vehicles/ equipment will have mufflers and they will be properly maintained                                                                                         | Project site                          | Construction | Contractor | ANATL | Included in construction cost                   |
|   |                                | Inform people of the possible vibration before using vibrating equipment used due the construction activity                                                                          | Project site                          | Construction | Contractor | ANATL | Included in construction cost                   |
|   |                                | Around the work area is fenced as high as 2-2.5 m                                                                                                                                    | Project site                          | Construction | Contractor | ANATL | USD120- /m (included in construction cost)      |
|   |                                | The schedule arrangement and speed limit for project vehicle carrying materials by installing traffic signs and bumps                                                                | Project site and transportation route | Construction | Contractor | ANATL | Included in construction cost                   |
|   |                                | Set and enforce speed limits on the access road for airport transfer vehicles by installing traffic signs and bumps                                                                  | Project site                          | Operation    | ANATL      | MTC   | Paid by ANATL                                   |
| 5 | Soil contamination             | To perform inspection and maintenance for heavy machines and dump trucks periodically. In case of being found defects or troubles, to fix them and exchange some parts without delay | Project site                          | Construction | Contractor | ANATL | Included in construction cost                   |

|    |                                     |                                                                                                                                                                                                                              |                                      |              |            |       |                                                 |
|----|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------|------------|-------|-------------------------------------------------|
| 6  | Solid Waste                         | Residual and hazardous wastes shall be disposed in designated disposal sites                                                                                                                                                 | Project site and Final disposal site | Construction | Contractor | ANATL | Included in construction cost                   |
|    |                                     | Segregation system of wastes shall be introduced. Recyclables shall be recovered and sold to recyclers. Organic (biodegradables) shall be collected and disposed of on site by composting (no burning on site), if possible. | Project site                         | Operation    | ANATL      | MTC   | Paid by ANATL                                   |
| 7  | Bottom sediment                     | Liquid waste from the construction workers will be processed at temporary toilets.                                                                                                                                           | Project site                         | Construction | Contractor | ANATL | Included in construction cost                   |
|    |                                     | Used oil waste and other waste categorized as toxic hazardous materials to be submitted to the third party already obtained a permit from the government                                                                     | Project site                         | Construction | Contractor | ANATL | Included in construction cost                   |
|    |                                     | Creating Sewage Treatment Plants to be used at operational stage which is then managed for the Liquid Waste Disposal                                                                                                         | Project site                         | Construction | Contractor | ANATL | USD7,000 - /unit(included in construction cost) |
| 8  | Offensive odor                      | Creating Sewage Treatment Plants to be used at operational stage which is then managed for the Liquid Waste Disposal                                                                                                         | Project site                         | Construction | Contractor | ANATL | USD7,000 - /unit(included in construction cost) |
| 9  | Local conflict of interest          | Public consultation should be implemented for nearby communities gathered around their village mayor in order to avoid local conflict                                                                                        | Project site                         | Construction | Contractor | ANATL | Included in construction cost                   |
| 10 | Gender                              | To set the percentage of female for employment of unskilled workers (Ex. 50%), and their equal salary.                                                                                                                       | Project site                         | Construction | Contractor | ANATL | Included in construction cost                   |
| 11 | Children's rights                   | The contract clause of FIDIC; "6.21 Child labor" should be obeyed by ANATL and contractors.                                                                                                                                  | Project site                         | Construction | Contractor | ANATL | -                                               |
| 12 | Health (Infectious diseases such as | Necessary training will be imparted for the AIDs and HIV                                                                                                                                                                     | Project site                         | Construction | Contractor | ANATL | Included in construction cost                   |

|    |                   |                                                                                                                                                 |              |              |            |       |                               |
|----|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|------------|-------|-------------------------------|
|    | HIV/AIDS, etc.)   |                                                                                                                                                 |              |              |            |       |                               |
| 13 | Labor environment | To educate and lecture safety driving for the workers.<br>A roll call before and after the work, installment of rest room and first-aid office. | Project site | Construction | Contractor | ANATL | Included in construction cost |
| 14 | Accident          | To educate and lecture safety driving for the workers.<br>A roll call before and after the work, installment of rest room and first-aid office. | Project site | Construction | Contractor | ANATL | Included in construction cost |
|    |                   | Set and enforce speed limits on the access road for airport transfer vehicles by installing traffic signs and bumps                             | Project site | Operation    | ANATL      | MTC   | Paid by ANATL                 |

## ENVIRONMENTAL MONITORING PLAN (EMoP)

### A. Construction Phase

| Environmental item                            | Details                                                                                               | Monitoring method                | Location                      | Period /Frequency                                                                       | Supervisor/ Implementation body | Cost                          |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------|-----------------------------------------------------------------------------------------|---------------------------------|-------------------------------|
| Pollution Control                             |                                                                                                       |                                  |                               |                                                                                         |                                 |                               |
| Air Quality                                   | Dust                                                                                                  | Sampling and analysis            | Project site                  | When construction commences, once a month during construction and when works completed. | ANATL/ Contractor               | USD1,400-/ point              |
|                                               | Condition of air quality and dust regarding;<br>- Water sprinkling<br>- Seat covering<br>- Dump truck | Visual observation               |                               | Daily                                                                                   |                                 |                               |
| Water Quality                                 | Water quality ※(TSS, pH, T-N, T-P, COD, Oil and grease)                                               | Sampling and laboratory analysis | Deep well in the project site | Monthly                                                                                 |                                 | USD350-/ point                |
| Noise and Vibration                           | Noise level : L <sub>Amax</sub> , L <sub>Aeq</sub><br>Vibration: L <sub>10</sub>                      | Measuring equipment              | Boundary of the project site  | Monthly (However daily during piling works)                                             |                                 | USD1,200-/ point              |
|                                               | Maintenance of heavy machines and dump trucks                                                         | Visual observation               | Project site                  | Monthly                                                                                 |                                 |                               |
| Soil contamination                            | Oil leak                                                                                              | Visual observation               | Project site                  | In refueling                                                                            |                                 |                               |
| Solid Waste                                   | Contents and amount of waste                                                                          | Visual observation               | Project site                  | Daily                                                                                   |                                 |                               |
| Social Environment                            |                                                                                                       |                                  |                               |                                                                                         |                                 |                               |
| Local conflict of interest                    | Monitoring for the communities                                                                        | Monthly report                   | Project site                  | Monthly                                                                                 | ANATL/ Contractor               | Included in construction cost |
| Gender                                        | Employment situation for workers                                                                      | Monthly report                   | Project site                  | Monthly                                                                                 |                                 |                               |
| Children's rights                             | Confirmation of child labor                                                                           | Roll call/ Monthly report        | Project site                  | Daily                                                                                   |                                 |                               |
| Health (Infectious diseases such as HIV/AIDS) | Management for safety and sanitation                                                                  | Monthly report                   | Project site                  | Monthly                                                                                 |                                 |                               |

|                   |                                          |                              |                                   |                         |  |  |
|-------------------|------------------------------------------|------------------------------|-----------------------------------|-------------------------|--|--|
| etc.)             |                                          |                              |                                   |                         |  |  |
| Labor Environment | Health condition/<br>gymnastic exercises | Roll call/<br>Monthly report | Project site                      | Daily                   |  |  |
|                   | Safety education                         | Training                     |                                   | Every recruiting period |  |  |
| Accident          | Driving accident<br>Traffic accident     | Monthly report               | Project site and its surroundings | Daily                   |  |  |

## B. Operation Phase

| Environmental Item  | Details                                                | Monitoring method                | Location                          | Period /Frequency | Supervisor/ Implementation body | Cost            |
|---------------------|--------------------------------------------------------|----------------------------------|-----------------------------------|-------------------|---------------------------------|-----------------|
| Air Quality         | Traffic condition                                      | Visual observation               | Project site and its surroundings | Daily             | MTC /ANATL                      | USD1,400-/point |
| Noise and Vibration |                                                        |                                  |                                   |                   |                                 | USD1,200-/point |
| Accident            |                                                        |                                  |                                   |                   |                                 |                 |
| Water quality       | Water quality (TSS, pH, T-N, T-P, COD, Oil and grease) | Sampling and laboratory analysis | Deep well in the project site     | Monthly           |                                 | USD350-/point   |
| Solid Waste         | Contents and amount of waste                           | Visual observation               | Project site                      | Daily             |                                 |                 |

## ENVIRONMENTAL AND SOCIAL MONITORING FORM

### A. Construction Phase

#### a) Air Quality (Measured value for exhaust gas and surrounding atmospheric ambient)

| Item | Average measured value | Max measured value | Local standard | International Standard | Remarks (Location, Frequency, Method etc.) |
|------|------------------------|--------------------|----------------|------------------------|--------------------------------------------|
| Dust |                        |                    | -              | IFC                    | (Boundary of the project site, Monthly)    |

| Monitoring item                                                                                       | Condition during reporting period |
|-------------------------------------------------------------------------------------------------------|-----------------------------------|
| Condition of air quality and dust regarding;<br>- Water sprinkling<br>- Seat covering<br>- Dump truck |                                   |

#### b) Water Quality (Measured value for exhaust gas and surrounding atmospheric ambient)

| Item           | Average measured value | Max measured value | Local standard | International Standard | Remarks (Location, Frequency, Method etc.)                      |
|----------------|------------------------|--------------------|----------------|------------------------|-----------------------------------------------------------------|
| TSS            |                        |                    | -              | IFC                    | (Deep well in the project site, Monthly, Sampling and analysis) |
| pH             |                        |                    |                |                        |                                                                 |
| T-N            |                        |                    |                |                        |                                                                 |
| T-P            |                        |                    |                |                        |                                                                 |
| COD            |                        |                    |                |                        |                                                                 |
| Oil and Grease |                        |                    |                |                        |                                                                 |
| Temperature    |                        |                    | -              | -                      |                                                                 |

#### c) Noise and vibration

| Item            | Average measured value                        | Max measured value | Local standard | International Standard | Remarks (Location, Frequency, Method etc.)                                  |
|-----------------|-----------------------------------------------|--------------------|----------------|------------------------|-----------------------------------------------------------------------------|
| Noise level     | Maximum noise level: L <sub>max</sub>         |                    | -              | Japan                  | (Boundary of the project site, Monthly (However daily during piling works)) |
|                 | Equivalent noise level: L <sub>Aeq</sub>      |                    |                |                        |                                                                             |
| Vibration level | Upper end value of 80% range: L <sub>10</sub> |                    |                |                        |                                                                             |

d) Soil contamination

| Impacted item      | Details                | Condition during reporting period | Remarks<br>(Location, Frequency, Method etc.) |
|--------------------|------------------------|-----------------------------------|-----------------------------------------------|
| Soil contamination | Leaked oil by machines |                                   | Oil leak, in refueling                        |

e) Solid waste

| Monitoring item                                  | Condition during reporting period |
|--------------------------------------------------|-----------------------------------|
| Contents and amount of waste (Soil, debris etc.) |                                   |

f) Local conflict of interest

| Monitoring item | Condition during reporting period |
|-----------------|-----------------------------------|
| Communities     |                                   |

g) Gender

| Monitoring item                  | Condition during reporting period |
|----------------------------------|-----------------------------------|
| Employment situation for workers |                                   |

h) Children's right

| Monitoring item             | Condition during reporting period |
|-----------------------------|-----------------------------------|
| Confirmation of child labor |                                   |

i) Health (Infectious diseases such as HIV/AIDS, etc.)

| Monitoring item                      | Condition during reporting period |
|--------------------------------------|-----------------------------------|
| Management for safety and sanitation |                                   |

j) Labor environment

| Monitoring item                                           | Condition during reporting period |
|-----------------------------------------------------------|-----------------------------------|
| Health condition/ gymnastic exercises<br>Safety education |                                   |

k) Accident

| Impacted item | Details                            | Condition during reporting period | Remarks<br>(Location, Frequency, Method etc.) |
|---------------|------------------------------------|-----------------------------------|-----------------------------------------------|
| Accident      | Driving accident, Traffic accident |                                   |                                               |

**B. Operation Phase**

a) Air quality/ Noise and vibration/ Accident

| Monitoring item   | Condition during reporting period |
|-------------------|-----------------------------------|
| Traffic condition |                                   |

b) Water quality

th

th

| Item           | Average measured value | Max measured value | Local standard | International Standard | Remarks (Location, Frequency, Method etc.)                      |
|----------------|------------------------|--------------------|----------------|------------------------|-----------------------------------------------------------------|
| TSS            |                        |                    | -              | IFC                    | (Deep well in the project site, Monthly, Sampling and analysis) |
| pH             |                        |                    |                |                        |                                                                 |
| T-N            |                        |                    |                |                        |                                                                 |
| T-P            |                        |                    |                |                        |                                                                 |
| COD            |                        |                    |                |                        |                                                                 |
| Oil and Grease |                        |                    |                |                        |                                                                 |
| Temperature    |                        |                    | -              | -                      |                                                                 |

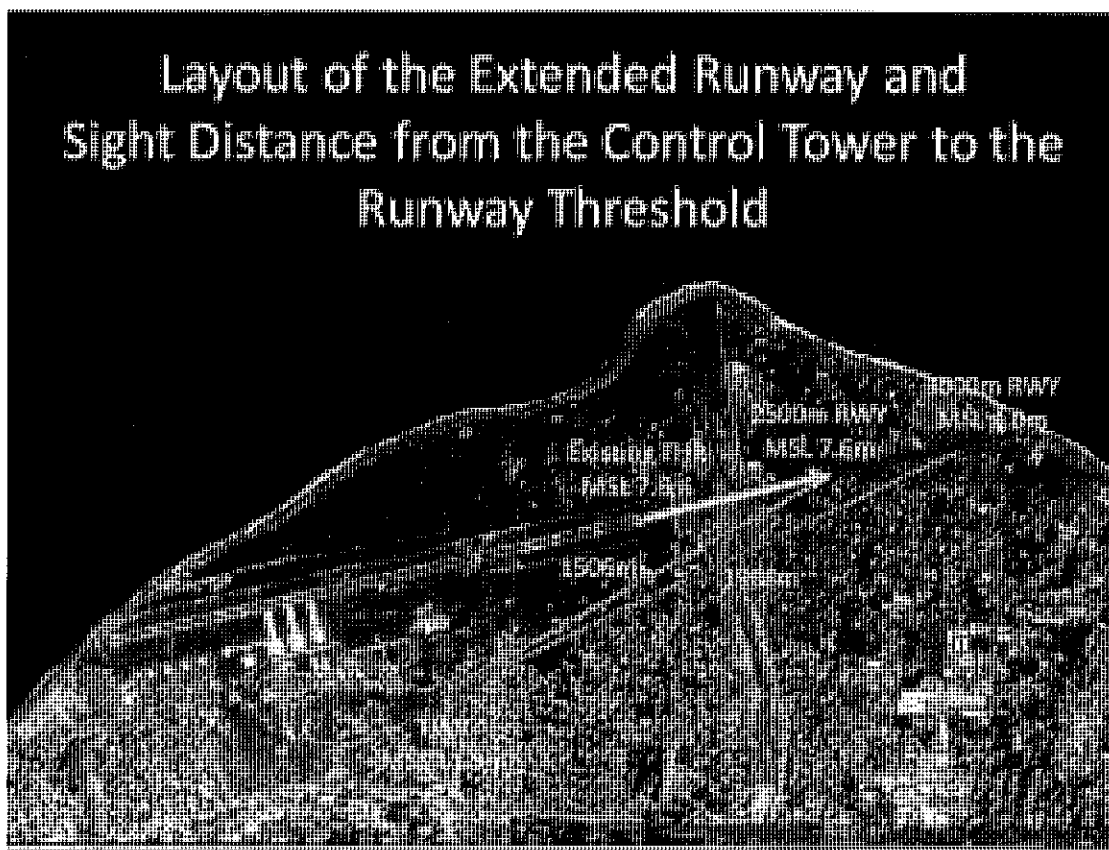
c) Solid waste

| Monitoring item                                  | Condition during reporting period |
|--------------------------------------------------|-----------------------------------|
| Contents and amount of waste (Soil, debris etc.) |                                   |

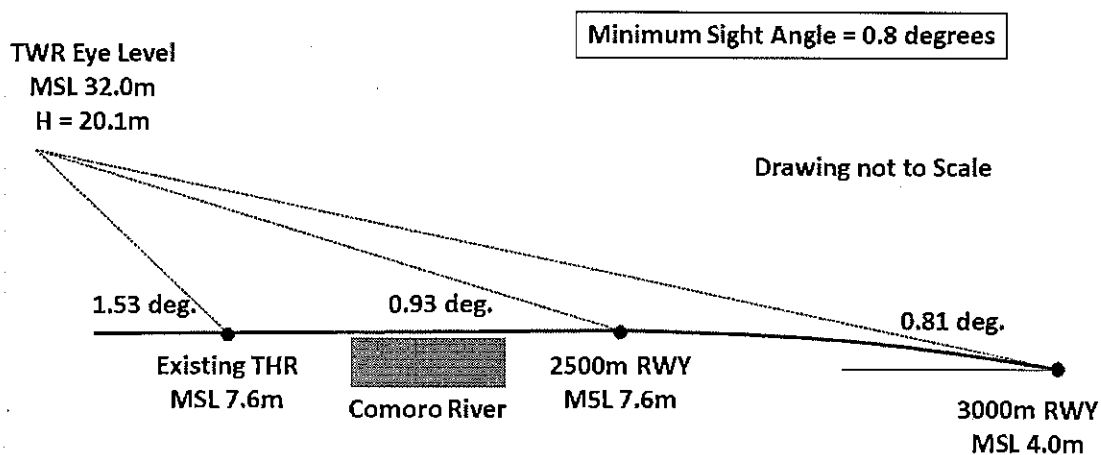
for



**HEIGHT OF THE CONTROL TOWER MEETING SIGHT ANGLE REQUIREMENT  
FOR THE FUTURE RUNWAY EXTENSION**



**Profile of the Extended Runway and  
Sight Angle of the Runway Threshold**



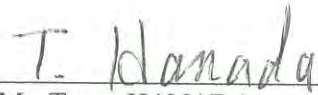
## 5. Technical Memorandum

**Technical of Memorandum  
on the Preparatory Survey for  
the Project for Improvement of Presidente Nicolau Lobato International Airport  
in the Democratic Republic of Timor-Leste**

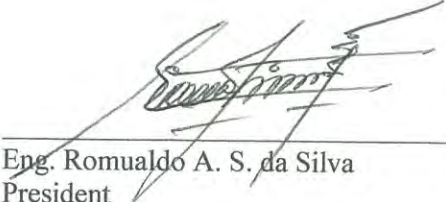
The Preparatory Survey Team for the Outline Design (hereinafter referred to as “the JICA Survey team”) of the Preparatory Survey for the Project for Improvement of Presidente Nicolau Lobato International Airport in the Democratic Republic of Timor-Leste (hereinafter referred to as “the Project”), headed by Mr. Teruo HANADA, Chief Consultant of the JICA Survey team, conducted the survey between 1<sup>st</sup> April to 7<sup>th</sup> May, 2018. The Study team held a series of discussions with the officials of the Government of the Democratic Republic of Timor-Leste on the technical results of the survey. In the course of the discussions, both sides have agreed and confirmed the main items described in this Technical Memorandum.

Dili, 7<sup>th</sup> May, 2018

Prepared and submitted by:

  
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**JICA SURVEY TEAM**  
**(JV of Japan Airport Consultants, Inc. and Oriental Consultants Global Co., Ltd.)**

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## **Chapter 1 Introduction**

This Technical memorandum has been prepared to establish mutual understandings between JICA Survey team and Implementation agency and other relevant organizations in the Democratic Republic of Timor-Leste (hereinafter referred to as “Timor-Leste side”) on the technical and engineering aspects for the Project. This memorandum was prepared by JICA Survey team based on the results of the first field survey and discussions with the Timor-Leste side.

It is also noted that all the information as described in this technical memorandum will be decided after further studies, analysis and discussions in Japan with JICA, JICA Survey team and relevant organizations of the Government of Japan. JICA will submit the draft final report, which describes the final component of the Project to Timor-Leste side in November 2018 as stated in the Minutes of Discussions (M/D) signed by both parties on 16<sup>th</sup> April, 2018.

## Chapter 2 Present Situation of the Project

### 2-1 Present conditions and issues of civil aviation sector

Since the Democratic Republic of Timor-Leste is an island country, air transport plays an important role for passenger and cargo transport in the international traffic as well as domestic traffic. There are in total 9 airports of which three are international airports and one, Oecussi, will soon be upgraded to international airport. All the airports in Timor-Leste are administrated by Air Navigation Administration of Timor-Leste (hereinafter referred to as “ANATL”), which was established as a public company by DECREE-LAW.

**Table 2-1.1 Airport in Timor-Leste**

| No | Airport                                         | Category      | Remarks                                                                                                                                                                                                              |
|----|-------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Presidente Nicolau Lobato International Airport | International | The airport in the capital city. Necessity of improvement is mentioned in National Strategic Development plan 2011-2030 and other sector plans. Priority is high among other infrastructure projects in Timor-Leste. |
| 2  | BAUCAU Airport                                  | International | International airport with 2500m-long runway                                                                                                                                                                         |
| 3  | SUAI Airport                                    | International | Substantial improvement was recently completed                                                                                                                                                                       |
| 4  | OECUSSI Airport                                 | Domestic      | Improvement project is underway to be completed by 2019                                                                                                                                                              |
| 5  | FUILORO Airport                                 | Domestic      | No regular flight                                                                                                                                                                                                    |
| 6  | VIQUEQUE Airport                                | Domestic      | No regular flight                                                                                                                                                                                                    |
| 7  | SAME Airport                                    | Domestic      | No regular flight                                                                                                                                                                                                    |
| 8  | MALIANA Airport                                 | Domestic      | No regular flight                                                                                                                                                                                                    |
| 9  | ATAURO Airport                                  | Domestic      | No regular flight                                                                                                                                                                                                    |

### 2-2 Present conditions and issues of Presidente Nicolau Lobato International Airport

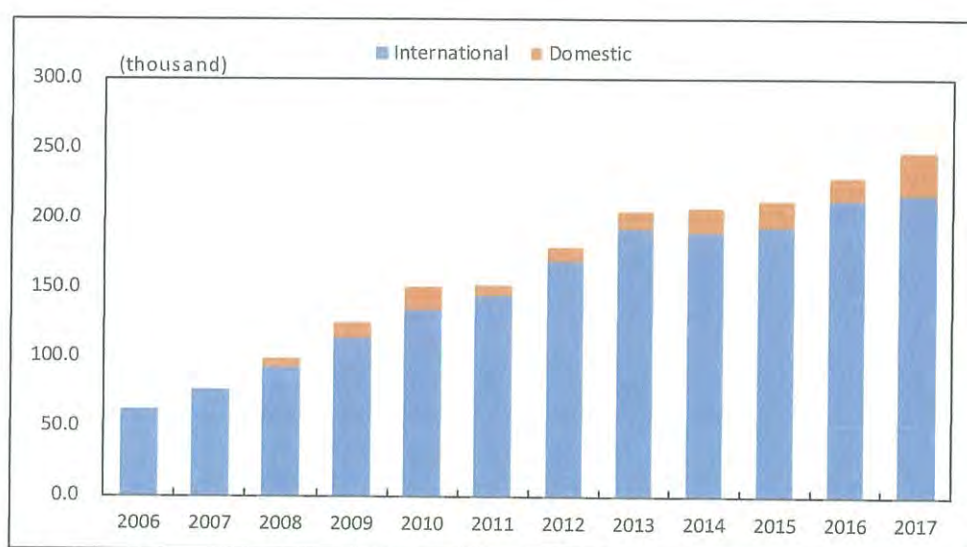
At present international flights are operated from Presidente Nicolau Lobato International Airport (hereinafter referred to as “Dili International Airport”) to 3 destinations, namely Singapore, Denpasar in Indonesia and Darwin in Australia. The following table shows the number of passengers and aircraft movements in the last 12 years. The number of passengers is steadily increasing and reached 246.7 thousand in 2017, while the volume of cargo shows a significant decrease between 2013 and 2014, then is recovering.

**Table 2-2.1 Record between 2006 and 2017**

| CY   | Aircraft Movements (times) |        |          |        |        |        | Passengers (thousand persons) |        |          |        |        |        | Cargoes (tons) |        |
|------|----------------------------|--------|----------|--------|--------|--------|-------------------------------|--------|----------|--------|--------|--------|----------------|--------|
|      | International              |        | Domestic |        | Total  |        | International                 |        | Domestic |        | Total  |        | International  |        |
|      | Number                     | Change | Number   | Change | Number | Change | Number                        | Change | Number   | Change | Number | Change | Number         | Change |
| 2006 | 2,902                      |        |          |        | 2,902  |        | 62.7                          |        |          |        | 62.7   |        | 276.4          |        |
| 2007 | 2,538                      | -12.5% |          |        | 2,538  | -12.5% | 76.5                          | 22.2%  |          |        | 76.5   | 22.2%  | 267.2          | -3.3%  |
| 2008 | 2,366                      | -6.8%  | 962      |        | 3,328  | 31.1%  | 91.5                          | 19.5%  | 6.3      |        | 97.8   | 27.8%  | 326.4          | 22.1%  |
| 2009 | 2,356                      | -0.4%  | 1,700    | 76.7%  | 4,056  | 21.9%  | 113.3                         | 23.8%  | 10.4     | 64.7%  | 123.7  | 26.5%  | 391.6          | 20.0%  |
| 2010 | 2,566                      | 8.9%   | 2,414    | 42.0%  | 4,980  | 22.8%  | 133.2                         | 17.6%  | 16.7     | 60.5%  | 150.0  | 21.2%  | 415.7          | 6.2%   |
| 2011 | 2,306                      | -10.1% | 1,912    | -20.8% | 4,218  | -15.3% | 143.7                         | 7.8%   | 7.8      | -53.1% | 151.5  | 1.0%   | 426.0          | 2.5%   |
| 2012 | 2,834                      | 22.9%  | 2,460    | 28.7%  | 5,294  | 25.5%  | 168.7                         | 17.4%  | 10.1     | 29.0%  | 178.8  | 18.0%  | 471.5          | 10.7%  |
| 2013 | 2,680                      | -5.4%  | 2,702    | 9.8%   | 5,382  | 1.7%   | 192.0                         | 13.8%  | 12.9     | 27.2%  | 204.9  | 14.6%  | 239.6          | -49.2% |
| 2014 | 2,896                      | 8.1%   | 3,302    | 22.2%  | 6,198  | 15.2%  | 189.5                         | -1.3%  | 17.4     | 35.0%  | 206.8  | 0.9%   | 171.0          | -28.6% |
| 2015 | 2,982                      | 3.0%   | 3,266    | -1.1%  | 6,248  | 0.8%   | 193.0                         | 1.8%   | 19.0     | 9.4%   | 212.0  | 2.5%   | 246.6          | 44.2%  |
| 2016 | 3,232                      | 8.4%   | 2,712    | -17.0% | 5,944  | -4.9%  | 212.7                         | 10.2%  | 16.4     | -13.6% | 229.2  | 8.1%   | 284.0          | 15.2%  |
| 2017 | 2,698                      | -16.5% | 3,674    | 35.5%  | 6,372  | 7.2%   | 216.4                         | 1.7%   | 30.3     | 84.7%  | 246.7  | 7.7%   | 326.1          | 14.8%  |

source: Airport Operation Department and General Directorate of Statistics

The following figure shows the history transition of the number of passengers from between 2006 to 2017. The international passenger movements account for more than 90% of the total passengers.



**Figure 2-2.1 Transition of number of passenger**

The following figure shows the past record of the volume of cargo between 2006 and 2017. There is a significant drop in 2013 due to the suspension of flight by Merpati Nusantara Airlines and withdrawal of the United Nations Integrated Mission in Timor-Leste (UNMIT) in 2012.

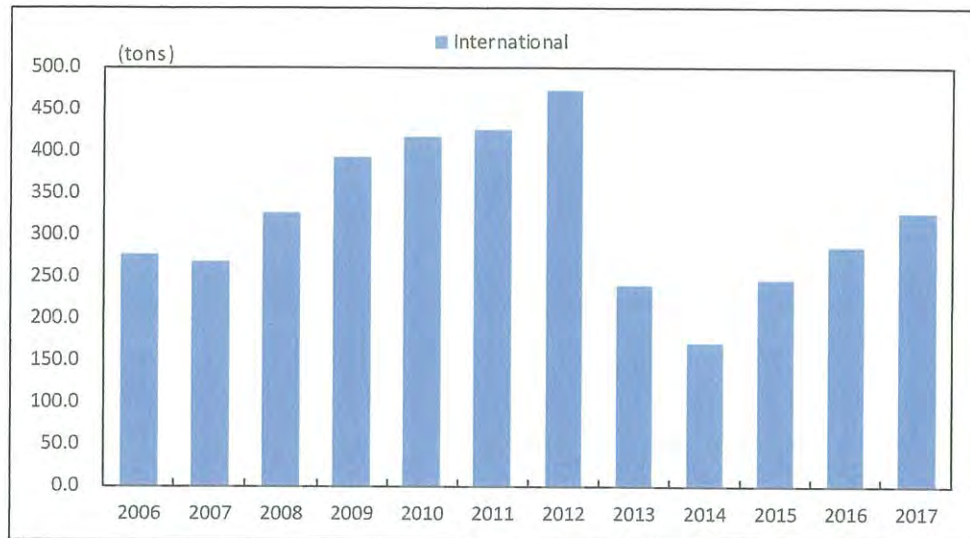


Figure 2-2.2 Transition of volume of cargo

The following table shows the past record of the number of flight in each destination. While Denpasar shows a steady increase in the number of passengers, Singapore and Darwin are flat or show gradual decrease.

Table 2-2.2 Transition of flight number in each destination

| CY                        | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| South-Eastern Asia        | 696   | 830   | 922   | 936   | 835   | 854   | 1,024 | 1,563 | 2,020 | 2,793 |
| CGK : Soekarno-Hatta      |       |       |       |       | 12    | 4     |       |       |       |       |
| DPS : Denpasar Bali       | 626   | 626   | 626   | 626   | 436   | 464   | 730   | 1,263 | 1,734 | 2,583 |
| SIN : Singapore           | 70    | 204   | 296   | 310   | 387   | 386   | 294   | 300   | 286   | 210   |
| Australia and New Zealand | 962   | 821   | 682   | 834   | 857   | 904   | 952   | 966   | 856   | 814   |
| DRW : Darwin              | 962   | 821   | 682   | 834   | 857   | 904   | 952   | 966   | 856   | 814   |
| Total                     | 1,658 | 1,651 | 1,604 | 1,770 | 1,692 | 1,758 | 1,976 | 2,529 | 2,876 | 3,607 |

source: OAG Schedule Analyzer

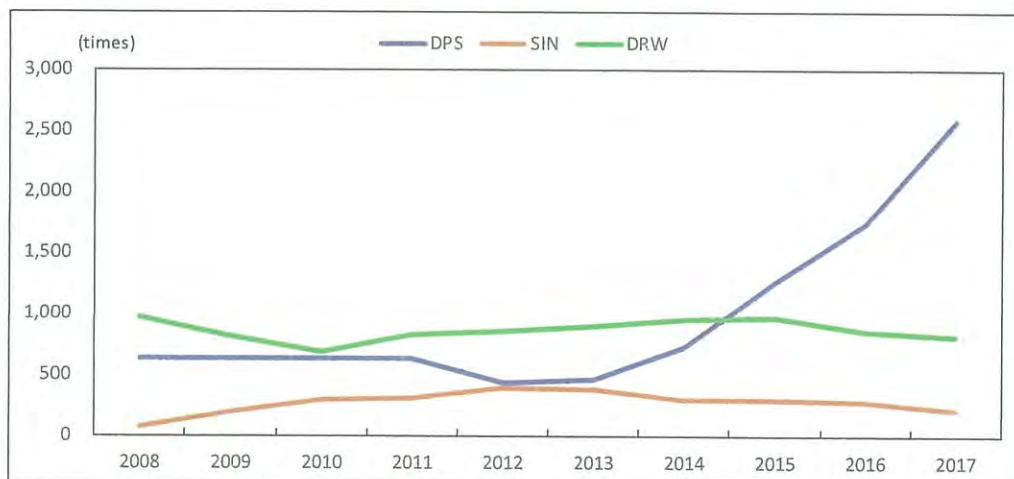


Figure 2-2.3 Transition of flight number in each destination

The following table shows the weekly schedule of Dili International Airport. Flights are concentrated between 12:00 and 15:00 because all the flights depart the origin airport in the morning time

Technical memorandum for preparatory survey for the Project for Improvement of Presidente Nicolau Lobato International Airport in the Democratic Republic of Timor Leste

convenient for the passengers and return after passenger disembarkation/embarkation. No more flights are possible because Dili International airport does not permit night time operation.

Table 2-2.3 Weekly schedule in Dili International Airport

|      | 00 | 01 | 02 | 03 | 04 | 05 | 06  | 07     | 08 | 09  | 10  | 11     | 12      | 13      | 14  | 15      | 16 | 17  | 18     | 19 | 20  | 21 | 22 | 23 |  |
|------|----|----|----|----|----|----|-----|--------|----|-----|-----|--------|---------|---------|-----|---------|----|-----|--------|----|-----|----|----|----|--|
| Mon. |    |    |    |    |    |    | DRW | TL ERJ |    | DRW |     |        |         |         | SIN | MI A320 |    | SIN |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    | DRW | TL ERJ |    | DRW |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | QG A320 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    |         | SJ B738 |     | DPS     |    |     |        |    |     |    |    |    |  |
| Tue. |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | QG A320 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    |         | SJ B738 |     | DPS     |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     |        |         |         |     |         |    |     |        |    |     |    |    |    |  |
| Wed. |    |    |    |    |    |    | DRW | TL ERJ |    | DRW | DRW | TL ERJ |         | DRW     |     |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | QG A320 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    |         | SJ B738 |     | DPS     |    |     |        |    |     |    |    |    |  |
| Thu. |    |    |    |    |    |    | DRW | TL ERJ |    | DRW |     |        |         |         |     |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | QG A320 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    |         | SJ B738 |     | DPS     |    |     |        |    |     |    |    |    |  |
| Fri. |    |    |    |    |    |    | DRW | TL ERJ |    | DRW |     |        |         |         |     |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | QG A320 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    |         | SJ B738 |     | DPS     |    |     |        |    |     |    |    |    |  |
| Sat. |    |    |    |    |    |    | DRW | TL ERJ |    | DRW |     |        |         |         | SIN | MI A320 |    | SIN |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | QG A320 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    |         | SJ B738 |     | DPS     |    |     |        |    |     |    |    |    |  |
| Sun. |    |    |    |    |    |    |     |        |    |     |     |        |         |         |     |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    | DRW | TL ERJ |    | DRW |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | IN B735 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    | QG A320 |         | DPS |         |    |     |        |    |     |    |    |    |  |
|      |    |    |    |    |    |    |     |        |    |     |     | DPS    |         | SJ B738 |     | DPS     |    |     |        |    |     |    |    |    |  |
|      | 00 | 01 | 02 | 03 | 04 | 05 | 06  | 07     | 08 | 09  | 10  | 11     | 12      | 13      | 14  | 15      | 16 | 17  | 18     | 19 | 20  | 21 | 22 | 23 |  |

Dili International Airport is in poor condition and requires substantial improvement and development to meet increasing passenger numbers and to operate safely. Passenger terminal building was built more than 35 years ago and is already deteriorated. The passenger handling capacity was originally designed to accommodate 100,000 passengers per year, while to the current number of passengers reached 246,700, resulting in significant congestion. The number of passengers is expected to increase steadily in the future. The government of Timor-Leste plans to develop tourism for socio-economic development of the country and regard the present international passenger terminal as bottleneck due to its incapacity to handle passengers. Therefore, the government of Timor-Leste has put high priority on development of new passenger terminal among other infrastructure development program.

### 2-3 Request by the Government of Timor-Leste

The government of Timor-Leste requested Japanese Grant Aid Project with the following components.

**Table 2-3.1 Requested Components of the Project**

|   | Requested Components of the Project                                                              | Status                                                                                                                                                                                      |
|---|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Construction of a new international passenger terminal building (with equipment)                 | Agreed in M/D                                                                                                                                                                               |
| 2 | Construction of a new international air cargo terminal building (with equipment)                 |                                                                                                                                                                                             |
| 3 | Construction of a new terminal apron (A320/B737: 4 aircraft stands)                              |                                                                                                                                                                                             |
| 4 | Construction of new taxiways                                                                     |                                                                                                                                                                                             |
| 5 | Installation of aeronautical ground lights for new apron and taxiways                            |                                                                                                                                                                                             |
| 6 | Construction of roads and car park for new terminal facilities                                   |                                                                                                                                                                                             |
| 7 | Construction of a new air traffic control tower building (with equipment)                        |                                                                                                                                                                                             |
| 8 | Construction of electric power substation with emergency generator (for new terminal facilities) |                                                                                                                                                                                             |
| 9 | Construction of VVIP building                                                                    | It was confirmed that the new VVIP building is constructed by the Timor-Leste side, while the Project prepared VIP room in CIP lounge in the new international passenger terminal building. |

## Chapter 3 Basic Concept of the Project

### 3-1 Aviation Demand Forecast

According to the study of JICA survey team, the future aviation demand in Dili International Airport is expected to grow as shown in Table 3-1.1 The target year of the Project is set in 2027 in 5 years after the expected completion date of the Project.

**Table 3-1.1 Aviation Demand Forecast**

|          | CY   | GDP (million USD)<br>(2010 constant prices) |        | Air Passengers (thousand persons) |        |          |        |        |        | Air Cargoes (tons) |        |
|----------|------|---------------------------------------------|--------|-----------------------------------|--------|----------|--------|--------|--------|--------------------|--------|
|          |      | Value                                       | Change | International                     |        | Domestic |        | Total  |        | International      |        |
|          |      |                                             |        | Number                            | Change | Number   | Change | Number | Change | Volume             | Change |
| Actual   | 2010 | 894                                         | 10.1%  | 133.2                             | 17.6%  | 16.7     | 60.5%  | 150.0  | 21.2%  | 415.7              | 6.2%   |
|          | 2011 | 965                                         | 7.9%   | 143.7                             | 7.8%   | 7.8      | -53.1% | 151.5  | 1.0%   | 426.0              | 2.5%   |
|          | 2012 | 1,014                                       | 5.0%   | 168.7                             | 17.4%  | 10.1     | 29.0%  | 178.8  | 18.0%  | 471.5              | 10.7%  |
|          | 2013 | 1,041                                       | 2.6%   | 192.0                             | 13.8%  | 12.9     | 27.2%  | 204.9  | 14.6%  | 239.6              | -49.2% |
|          | 2014 | 1,083                                       | 4.1%   | 189.5                             | -1.3%  | 17.4     | 35.0%  | 206.8  | 0.9%   | 171.0              | -28.6% |
|          | 2015 | 1,127                                       | 4.0%   | 193.0                             | 1.8%   | 19.0     | 9.4%   | 212.0  | 2.5%   | 246.6              | 44.2%  |
|          | 2016 | 1,186                                       | 5.3%   | 212.7                             | 10.2%  | 16.4     | -13.6% | 229.2  | 8.1%   | 284.0              | 15.2%  |
| Forecast | 2017 | 1,165                                       | -1.8%  | 216.4                             | 1.7%   | 30.3     | 84.7%  | 246.7  | 7.7%   | 326.1              | 14.8%  |
|          | 2018 | 1,191                                       | 2.2%   | 222.9                             | 3.0%   | 31.2     | 2.9%   | 254.1  | 3.0%   | 340.1              | 4.3%   |
|          | 2019 | 1,241                                       | 4.2%   | 235.6                             | 5.7%   | 32.9     | 5.5%   | 268.5  | 5.7%   | 367.4              | 8.0%   |
|          | 2020 | 1,303                                       | 5.0%   | 251.3                             | 6.7%   | 35.0     | 6.4%   | 286.3  | 6.6%   | 401.2              | 9.2%   |
|          | 2021 | 1,368                                       | 5.0%   | 267.8                             | 6.6%   | 37.3     | 6.3%   | 305.1  | 6.5%   | 436.8              | 8.9%   |
|          | 2022 | 1,433                                       | 4.8%   | 284.5                             | 6.2%   | 39.5     | 6.0%   | 324.0  | 6.2%   | 472.6              | 8.2%   |
|          | 2023 | 1,502                                       | 4.8%   | 301.9                             | 6.1%   | 41.8     | 5.9%   | 343.8  | 6.1%   | 510.2              | 7.9%   |
|          | 2024 | 1,571                                       | 4.6%   | 319.5                             | 5.8%   | 44.2     | 5.6%   | 363.7  | 5.8%   | 547.9              | 7.4%   |
|          | 2025 | 1,643                                       | 4.6%   | 337.8                             | 5.7%   | 46.7     | 5.6%   | 384.5  | 5.7%   | 587.3              | 7.2%   |
|          | 2026 | 1,716                                       | 4.4%   | 356.1                             | 5.4%   | 49.1     | 5.3%   | 405.3  | 5.4%   | 626.8              | 6.7%   |
|          | 2027 | 1,791                                       | 4.4%   | 375.3                             | 5.4%   | 51.7     | 5.2%   | 427.0  | 5.4%   | 668.0              | 6.6%   |
|          | 2028 | 1,867                                       | 4.2%   | 394.4                             | 5.1%   | 54.3     | 5.0%   | 448.6  | 5.1%   | 709.1              | 6.1%   |
|          | 2029 | 1,945                                       | 4.2%   | 414.2                             | 5.0%   | 57.0     | 4.9%   | 471.2  | 5.0%   | 751.8              | 6.0%   |
|          | 2030 | 2,023                                       | 4.0%   | 434.0                             | 4.8%   | 59.6     | 4.7%   | 493.6  | 4.8%   | 794.3              | 5.6%   |
|          | 2031 | 2,104                                       | 4.0%   | 454.5                             | 4.7%   | 62.4     | 4.6%   | 516.9  | 4.7%   | 838.5              | 5.6%   |
|          | 2032 | 2,188                                       | 4.0%   | 475.8                             | 4.7%   | 65.3     | 4.6%   | 541.1  | 4.7%   | 884.4              | 5.5%   |
|          | 2033 | 2,275                                       | 4.0%   | 498.0                             | 4.7%   | 68.3     | 4.6%   | 566.3  | 4.7%   | 932.2              | 5.4%   |
|          | 2034 | 2,366                                       | 4.0%   | 521.1                             | 4.6%   | 71.4     | 4.6%   | 592.5  | 4.6%   | 981.8              | 5.3%   |
|          | 2035 | 2,461                                       | 4.0%   | 545.1                             | 4.6%   | 74.6     | 4.5%   | 619.7  | 4.6%   | 1,033.5            | 5.3%   |
|          | 2036 | 2,559                                       | 4.0%   | 570.1                             | 4.6%   | 78.0     | 4.5%   | 648.0  | 4.6%   | 1,087.2            | 5.2%   |
|          | 2037 | 2,662                                       | 4.0%   | 596.0                             | 4.6%   | 81.5     | 4.5%   | 677.5  | 4.5%   | 1,143.1            | 5.1%   |
|          | 2038 | 2,768                                       | 4.0%   | 623.0                             | 4.5%   | 85.1     | 4.5%   | 708.1  | 4.5%   | 1,201.2            | 5.1%   |
|          | 2039 | 2,879                                       | 4.0%   | 651.1                             | 4.5%   | 88.9     | 4.4%   | 740.0  | 4.5%   | 1,261.6            | 5.0%   |
|          | 2040 | 2,994                                       | 4.0%   | 680.3                             | 4.5%   | 92.8     | 4.4%   | 773.1  | 4.5%   | 1,324.5            | 5.0%   |

The planning parameters hour for the passenger and cargo terminals as well as the new apron are summarized in Table 3-1.2.

**Table 3-1.2 Planning figure Summary**

|                             | Phase 1 (CY 2027)                                          |
|-----------------------------|------------------------------------------------------------|
| Passenger Terminal Building | 340 passengers/peak-hour (for each of arrival & departure) |
| Cargo Terminal Building     | 2.5 tons/ peak-day (total of loading & unloading)          |
| Aircraft Parking Stands     | S-J (code C) x 4 (including one reserve stand)             |

### 3-2 Priority of component

Because of the limited budget available for the Project, not all of the components may be included in the scope of the Project and components may need to be screened based on their priority to achieve the target of the Project. JICA survey team explained that the main component of the Project is the construction of the International Passenger terminal building that is recognized as a national priority in the infrastructure development in the Democratic Republic of Timor-Leste. The inappropriate capacity and inconvenience becomes the bottle neck to the development of tourism and social economic development of the country.

The components of the Project have been prioritized as shown below taking into account of the following descriptions.

**Table 3-2.1 Priority of the Project Components**

| Components                                    | Priority |
|-----------------------------------------------|----------|
| New International Passenger terminal building | 1        |
| New International aircraft parking apron      | 1        |
| New Taxiways                                  | 1        |
| Substation                                    | 1        |
| ATC tower and ATC equipment                   | 1        |
| Access Road and Parking                       | 2        |
| Apron floodlights                             | 3        |
| Aeronautical ground Lighting system           | 4        |
| International Cargo Terminal Building         | 5        |

Priority 1 components are those essential for the international passenger terminal building.

The international aircraft apron and new taxiways are definitely necessary for operation of the International passenger terminal building. Priorities of those are considered to be high. Substation is also an essential component since the current power house needs to be demolished for construction of the new international terminal facilities.

ATC tower and ATC equipment is also the first priority. The existing ATC tower building must be demolished since the area is utilized as the new international aircraft parking apron. The airport is under operation, having an aerodrome control zone. Therefore new ATC tower must be built to continue to operate the airport before demolishing the existing ATC tower.

Access road and parking is also considered to be important for the operation of new international passenger terminal building. However the technical skills and costs for the construction is not high. Those could be built by the Timor-Leste side so that the priority is lowered.

Aeronautical ground lighting of the Project includes taxiway edge light and apron floodlighting. In

order to enable nighttime aircraft operations, ANATL is planning to install new runway lights as the existing lighting system is not functioning. However design therefor has not been conducted and the schedule of implementation is unclear. Installation of taxiway edge light only does not enable nighttime operations at the airport. Therefore the priority of the taxiway edge lights was given priority 4. Apron flood light was given priority 3 since it is technically difficult to install later after the apron pavement was completed.

Since International terminal area is moved to the west side of the current area, a new international cargo terminal building also needs to be built in the new area for convenience. However, since the building is an independent facility and cargo demand is not high, a lower priority of 5 has been given thereto.

### 3-3 Facility Layout Plan

JICA Survey team explained the preliminary layout plan of the Project components as the following figure.



Figure 3-3.1 Facility Layout Plan

Danndu

*[Handwritten signature]*

### 3-4 Basic Concept and Plan of each Component of the Project

#### 3-4-1 International Passenger Terminal Building

The International Passenger Terminal (PTB) is located to follow official Annex site plan (Figure 3-3.1) attached to meeting minutes on 13rd April 2017. It is one story flat building with 116m x 58m footprint. This covers 6700m<sup>2</sup> floor size. Combined with the other miscellaneous facilities 300m<sup>2</sup>, the total floor size remains under 7000m<sup>2</sup>.

6700m<sup>2</sup> includes 3 functional blocks. They are Departure (blue), Arrival (red), and Service (yellow). Departure, and Arrival blocks are located at both ends of building. This considers future expansion in west and east direction. They are designed with one-room concept, which simplifies passenger movement. Service block includes WC, departure baggage handling system (BHS), mechanical, and other functional rooms, and remains unchanged in future expansion.

Table 3-4-1.1 presents Facility Requirements, which meets peak hour passenger number 340 as per Table 3-1-2. Official meeting on 24<sup>th</sup> April 2017 discussed each functional unit numbers such as counters, and control units. All attended stakeholders agreed with these planned figures.

With regard to the hold baggage screening, we proposed to adopt an inline screening system. Nonetheless, we were requested by ANATL to install X-ray machines at the entrance of the terminal building because baggage containing unlawful goods and products such as drug and coral have been frequently found out and in such cases ANATL proposed system allows easy identification of a passenger who carries the baggage.

Baggage screening is to be conducted from two different viewpoints; aviation security and control of unlawful goods.

From the aviation security viewpoint, ICAO Annex 17 states “4.5.2 *Each Contracting State shall ensure that all hold baggage to be carried on a commercial aircraft is protected from unauthorized interference from the point it is screened or accepted into the care of the carrier, whichever is earlier, until departure of the aircraft on which it is to be carried. If the integrity of hold baggage is jeopardized, the hold baggage shall be re-screened before being placed on board an aircraft.*”

To comply with this international standard, installation and operation of the proposed inline screening system is imperative and higher priority should be given thereto than installation of X-ray machines at the entrance to the terminal building. ANATL should assign appropriately trained personnel to ensure that the baggage screening should be properly conducted in accordance with ICAO Annex 17 aviation security standard.

Hamattan

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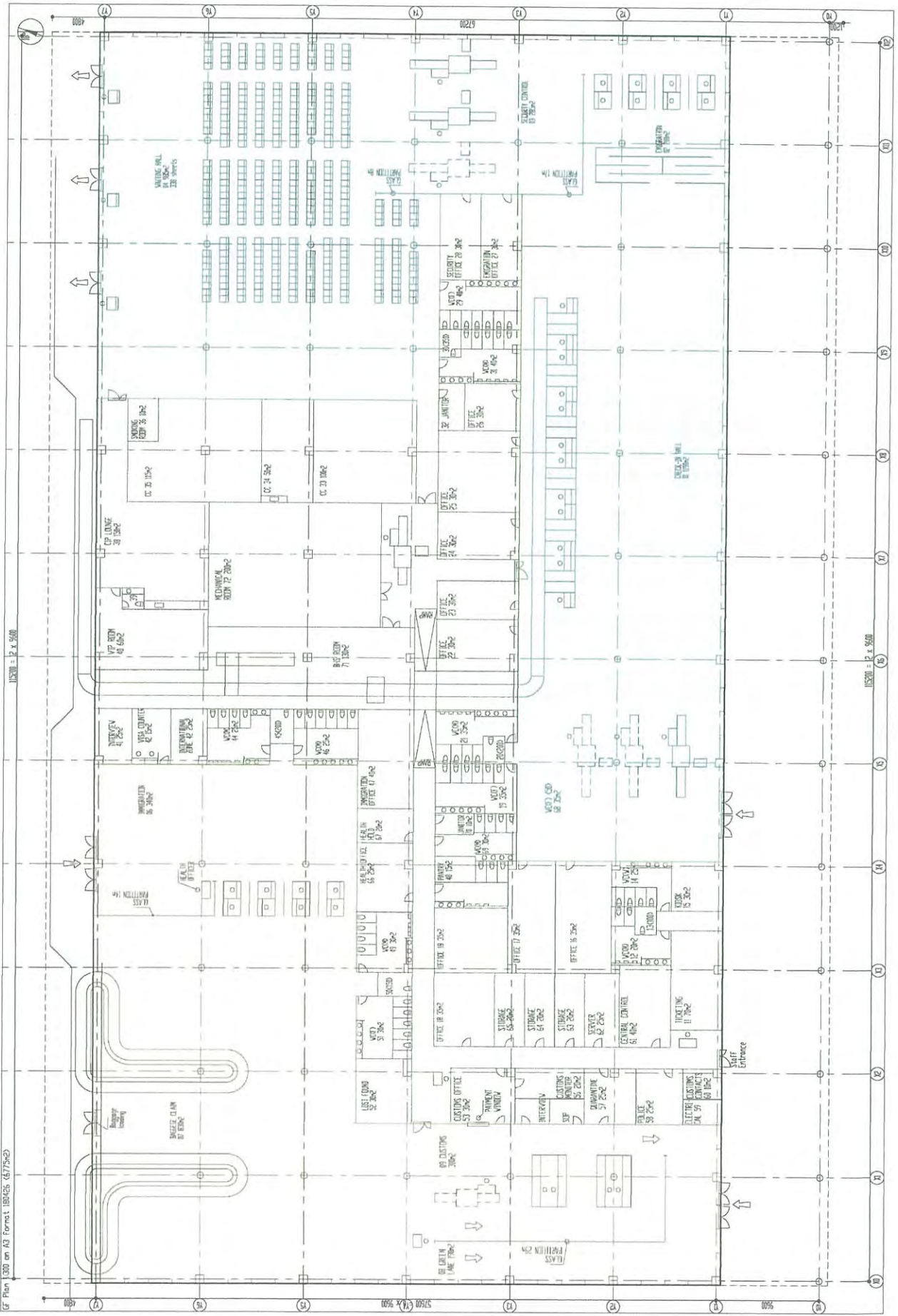


Figure 3-4-1.1 Draft Layout Plan for International Passenger Terminal Building

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**Table 3-4-1.1 Draft Facility Requirement of PTB**

| 1. Departure Passenger Terminal Facilities |                                                                                                                                                                                                                                                                                                                                                              |                                                                                  |                   | Planned Figure       |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------|----------------------|
| 1-b<br>(1)                                 | <b>Check-in Hall (check-in counters)</b><br><u>Formula</u> Position of units $NC = P*(t/60)*b$<br>Area $A = NC*SI$<br>SI : Space required per gate counter<br>P : Peak hour originating departing passengers<br>t : Average processing time per passenger<br>b : Contingency ratio (10%)                                                                     | <br><br>(    77 m2)<br>(    340 pax)<br>(    1.25 min)<br>(    1.1 )             | 8 units<br>600 m2 | 12 units<br>1,185 m2 |
| 1-c                                        | <b>Emigration (Passport Control Counters)</b><br><u>Formula</u> Number of desks $NPD = P*(t/60)*b+1$<br>Area $A = NPD*SD$<br>NPD : Number of passport control desks.<br>P : Peak hour originating departing passengers<br>t : Average processing time per passengers<br>b : Contingency ratio (0%)<br>SD : Space required per channel (incl. queuing space)  | <br><br>(    340 pax)<br>(    0.5 min)<br>(    1 )<br>(    50 m2)                | 4 units<br>192 m2 | 8 units<br>200 m2    |
| 1-d                                        | <b>Security Control</b><br><u>Formula</u> Number of security units $NS = P*t/60$<br>Area $A = NS*SS$<br>Ns : Number of security units<br>P : Peak hour departing passengers<br>t : Average processing time per passengers<br>SS : Space required per unit (incl. queuing space)                                                                              | <br><br>(    340 pax)<br>(    0.5 min)<br>(    120 m2)                           | 3 units<br>340 m2 | 2 units<br>285 m2    |
| 1-e                                        | <b>Waiting Hall</b><br><u>Formula</u> $(PP*(TP/60)+PT2*(TT/60))*a$<br>PP : Peak hour originating departing passengers.<br>PT : Peak hour number of departing transits<br>TP : Average occupancy time per passenger<br>TT : Average occupancy time per transits<br>a : Space required per parson.<br>*Including concession (shop, bar, restaurant, etc.) area | <br>(    340 pax)<br>(    0 pax)<br>(    60 min)<br>(    90 min)<br>(    2.5 m2) | 850 m2            | 985 m2               |
| <b>Sub-total (A)</b>                       |                                                                                                                                                                                                                                                                                                                                                              |                                                                                  | 1,996 m2          | 2,655 m2             |

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| 2. Arrival Passenger Terminal Facilities |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                           |                       |                   |
|------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|
| 2-a                                      | Immigration (Arrival Passport Control units) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                           |                       |                   |
|                                          | <u>Formula</u>                               | Number of units $NPA = P/0.7*(t/60)+1$<br>Area $A = NPA*SC$<br>NPA : Number of passport control units.<br>P : Peak hour terminating passenger.<br>t : Average processing time per passenger.<br>SC : Space required per channel.(incl. queuing space)                                                                                                                                                                                                                                                                                                                                                                                                                               | 6 units<br>360 m2                                                                                                         | 8 units<br>340 m2     |                   |
|                                          |                                              | ( 340 pax)<br>( 0.5 min)<br>( 60 m2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                           |                       |                   |
| 2-b                                      | Baggage Claim                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                           |                       |                   |
| (1)                                      | <u>Formula</u>                               | Number of Device $Bw+Bn$<br>Area $A = (NW*SDW+NN*SDN)$<br>NW : Number of units for wide-body aircraft $MFW*(tw/60)$<br>NN : Number of units for narrow-body aircraft $MFN*(tn/60)$<br>MFW : Peak hour arriving flights of wide-body aircraft<br>MFN : Peak hour arriving flights of narrow-body aircraft<br>tw : Average claim device occupancy time per wide-body aircraft<br>tn : Average claim device occupancy time per narrow-body aircraft<br>SDW : Space required per device of wide-body aircraft<br>SDN : Space required per device of narrow-body aircraft                                                                                                                | ( 0 units)<br>( 1 units)<br>( 0 flights)<br>( 3 flights)<br>( 45 min)<br>( 20 min)<br>( 900 m2)<br>( 600 m2)              | 1 units<br>600 m2     | 2 units<br>835 m2 |
| (2)                                      | <u>Formula</u>                               | (IATA Method)<br>Number of units $NW+NN$<br>Area $A = (SDW*NW+SDN*NN)$<br>NW : Number of units for wide-body aircraft $(P*fw)/NPW*(tw/60)$<br>NN : Number of units for narrow-body aircraft $(P*fn)/NPN*(tn/60)$<br>P : Peak hour arriving passengers<br>fw : Proportion of passengers arriving by wide-body aircraft<br>fn : Proportion of passengers arriving by narrow-body aircraft<br>tw : Average claim device occupancy time per wide-body aircraft<br>tnv : Average claim device occupancy time per narrow-body aircraft.<br>NPW : Number of passengers per wide-body aircraft at 80% load factor<br>NPN : Number of passengers per narrow-body aircraft at 80% load factor | ( 0 units)<br>( 1.416667 units)<br>( 340 pax)<br>( 0% )<br>( 100% )<br>( 45 min)<br>( 30 min)<br>( 350 pax)<br>( 120 pax) | 1.4 units<br>1,200 m2 | 2 units<br>m2     |
| 2-c                                      | Customs                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                           |                       |                   |
| (1)                                      | Custom X-ray Control for Non-declare         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                           |                       |                   |
|                                          | <u>Formula</u>                               | Number of units $NC = 1 \text{ (fixed)}$<br>Area $SCN*NCN$<br>SCN : Space required per counter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 units<br>120 m2                                                                                                         | 1 units<br>m2         |                   |
|                                          |                                              | ( 60 m2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                           |                       |                   |
| (2)                                      | Custom Control Area for Declare              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                           |                       |                   |
|                                          | <u>Formula</u>                               | Number of units $NCD = (NW+NN)*4$<br>Area $SC*NCD$<br>NW : Number of units for wide-body aircraft<br>NN : Number of units for narrow-body aircraft<br>SCD : Space required per counter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4 units<br>200 m2<br>( 0 units)<br>( 1 units)<br>( 50 m2)                                                                 | 4 units<br>500 m2     |                   |
| Sub-total (B)                            |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2,480 m2                                                                                                                  | 1,675 m2              |                   |

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| 3. Other Terminal Facilities |                                                                                                                                                                                                                           |                                        |                      |                      |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------|----------------------|
| 3-a                          | Business Lounge (WC, VIP Room included)<br><u>Formula</u>                                                                                                                                                                 |                                        |                      | 210 m <sup>2</sup>   |
| 3-b                          | Concessions<br><u>Formula</u> (Sub-total(A) + Sub-total(B))*0.3                                                                                                                                                           |                                        | 1,343 m <sup>2</sup> | 410 m <sup>2</sup>   |
| 3-c                          | Airline and Other Office<br><u>Formula</u> 100*NC<br>NC: Number of Check-in units                                                                                                                                         | ( 12 units)                            | 1,200 m <sup>2</sup> | 290 m <sup>2</sup>   |
| 3-d                          | CIQ Office<br><u>Formula</u> (NPD+NPA+NCD)*50<br>NPD: Number of departure passenger passport control units<br>NPA: Number of arrival passenger passport control units<br>NCD: Number of arrival customs units for declare | ( 8 units)<br>( 8 units)<br>( 2 units) | 900 m <sup>2</sup>   | 255 m <sup>2</sup>   |
| 3-e                          | Central Control (Server Room included)                                                                                                                                                                                    |                                        |                      | 65 m <sup>2</sup>    |
| 3-f                          | WC in 6 locations                                                                                                                                                                                                         |                                        |                      | 370 m <sup>2</sup>   |
| 3-g                          | BHS Room                                                                                                                                                                                                                  |                                        |                      | 180 m <sup>2</sup>   |
| 3-h                          | Mechanical / Electrical Room                                                                                                                                                                                              |                                        |                      | 210 m <sup>2</sup>   |
| 3-j                          | Storage                                                                                                                                                                                                                   |                                        |                      | 85 m <sup>2</sup>    |
| 3-k                          | Other (corridor, the other technical premises)<br><u>Formula</u> (Sub-total (A) + Sub-total (B) + Sub-total (C))*0.3                                                                                                      |                                        | 1,200 m <sup>2</sup> | 370 m <sup>2</sup>   |
| Sub-total (C)                |                                                                                                                                                                                                                           |                                        | 4,643 m <sup>2</sup> | 2,445 m <sup>2</sup> |
| Grand total (A+B+C)          |                                                                                                                                                                                                                           |                                        | 9,119 m <sup>2</sup> | 6,775 m <sup>2</sup> |

**Table 3-4-1.2 Draft Electrical and Mechanical Systems to be installed in the International PTB**

| Category          | Item                              | Qty                                                            |
|-------------------|-----------------------------------|----------------------------------------------------------------|
| Mechanical System | Water supply system               | 1 lot                                                          |
|                   | Sewage drainage system            | 1 lot                                                          |
|                   | Plumbing and sanitary system      | 1 lot                                                          |
|                   | Rain water drainage system        | 1 lot                                                          |
|                   | Air conditioning system           | 1 lot                                                          |
|                   | Mechanical ventilation systems    | 1 lot                                                          |
|                   | Internal fire hydrant system      | 1 lot                                                          |
|                   | Fire extinguishing system         | 1 lot                                                          |
| Electrical System | Lighting                          | 1 lot                                                          |
|                   | Telephone (PBX)                   | 1 lot                                                          |
|                   | CCTV                              | 1 lot                                                          |
|                   | Public address                    | 1 lot                                                          |
|                   | Fire alarm system                 | 1 lot                                                          |
|                   | Master antenna system             | 1 lot                                                          |
| Special equipment | Flight information display system | 1 lot                                                          |
|                   | Dual view X-ray system            | 1 set in-line<br>2 sets departure gate<br>1 set for standalone |
|                   | Single view X-ray system          | 1 for service loading                                          |

| Category | Item                    | Qty                           |
|----------|-------------------------|-------------------------------|
|          | Baggage handling system | 2 in arrival<br>1 in check-in |

### 3-4-2 International Air Cargo Terminal Building

The international cargo terminal building (CGO) is designed as single-storied building. Floor area size is 400m<sup>2</sup> to double existing 200m<sup>2</sup> Cargo Terminal. It has import and export storage areas Each of them has two entrances towards airside, and curbside. These 4 openings is cover with rolling shutter to meet loading with cargo track. Canopies are provided on both side as weather cover.

Main support system is RC. Roof and canopy has steel structure.

### 3-4-3 Construction of a New Terminal Apron

The new terminal apron is designed in front of the new international passenger terminal building. Four parking spots for small jet aircraft such as B737 and A320 are provided. The area of the apron is studied with the tracking of the aircraft and the separation distances set by ICAO regulations into consideration. The pavement of area by the concrete asphalt in the apron area is studied with taking cost, serviceability and ease of maintenance into account.

The new terminal apron is located and sized with the following criteria

- Apron edge line is determined parallel to the runway centerline at 360m to the South, to be consistent with Phase2 Apron for Code E aircraft such as B777-200 and A330-300, whose fuselage length is up to 68 m.
- Separation distances comply with proposed amendment of Annex 14.
- Aircraft stand configuration: self-maneuvering
- Design aircraft for geometry: B737-900ER with winglet
- Design aircraft for pavement: B737-900ER, full ramp load
- GSE road, staging area, and connection road to the existing Apron D are provided.

**Table 3-4-3.1 Separation Distances Criteria**

| Item                                     | Minimum | Remarks                        |
|------------------------------------------|---------|--------------------------------|
| Runway Width                             | 45 m    | for future Code 4D             |
| Runway Strip                             | 140 m   | for future precision approach  |
| Distance between RWY and parallel TWY    | 172.5 m | Phase 2 / future development   |
| Distance between two parallel Taxiways   | 76 m    | Phase 2 / future development   |
| Distance between parallel TWY and object | 43.5 m  | Phase 2 Code E aircraft stands |
|                                          | 26 m    | Phase 1 Code C aircraft stands |
| Clearance distances on aircraft stands   | 7.5 m   | Phase 2 Code E aircraft stands |
|                                          | 4.5 m   | Phase 1 Code C aircraft stands |

| Item                                     | Minimum | Remarks                 |
|------------------------------------------|---------|-------------------------|
| Taxiway width                            | 23m     | East taxiway for Code E |
|                                          | 15m     | West taxiway for Code C |
| Taxiway shoulder width including taxiway | 38 m    | Phase 2                 |
|                                          | 25m     | Phase 1                 |

Aircraft parking stand numbering has been proposed as “01”, “02”, “03” and “04”.

Name of the new international apron has been proposed as “West Apron”.

#### 3-4-4 Construction of New Taxiways

The new taxiways are designed at the both sides of the new terminal apron. The west side of taxiway is designed according to the design criteria of ICAO Aircraft Category of C and Code C aircraft with 15m width and 5m shoulder at one side. The east side of taxiway is designed for the design criteria of ICAO Aircraft Category of E for future expansion of the airport with no shoulder.

Design criteria for new taxiways are as follows.

- Code C for geometric design. Proposed amendment of Annex 14 is complied.
- B737-900ER, full taxi load for pavement design

Name of the new taxiways has been proposed as “B” at west side ,”C” at east side.

#### 3-4-5 Installation of Aeronautical Ground Lights (AGL) for New Apron and Taxiways

The following aeronautical ground lighting is installed in the Project

##### (1) Taxiway edge light

Taxiway edge light is installed according to ICAO standards with 1.5m from the edge of taxiway and apron.

##### (2) Taxiway guidance sign

Runway exit sign is provided at the same side of runway where taxiways are connected. Runway designation signs are provided at each side of runway holding position marking.

##### (3) Apron floodlighting

Apron floodlighting with 5 poles of 20m is installed. LED type of light is employed.

##### (4) Aerodrome beacon

Aerodrome beacon is installed at the top of the new tower.

(5) Power system

CCR is provided for taxiway edge light and taxiway guidance sign

(6) Control and monitoring system

Control and monitoring system is renewed by ANATL with the renewal of runway lighting system. AGL installed by the Project is connected to this system.

**3-4-6 Construction of Roads and Car Park for New Terminal Facilities**

Access road is designed from the roundabout close to the existing passenger terminal building to the new international passenger terminal building via south side of Pertamina petro company area with two-lane at one side in total 4 lanes. Road lighting system is provided.

Access and circular road, carpark are planned in the following concept.

- To preserve the existing entrance promenade from main roundabout
- Compact circular road and carpark, to reserve more land area for commercial development
- Layout to harmonize with and future expansibility.

Parking is designed with about 300 cars. Main carpark has centralized gate and internal pathway, to be ready for toll collection. Taxi pool is provided near to passenger terminal.



Access Road and Car Parking



Access Road and Car Parking (Alternative 1)

Figure 3-4-6.1 Conceptual Terminal Road Layout

### 3-4-7 Construction of a New Air Traffic Control Tower Building (with Equipment)

#### (1) Location of the new Air traffic tower

The location of the new air traffic tower was discussed with the following criteria

- The location and height considered the future extension of the runway to 2500m
- The location of the tower be equidistant from the runway ends as much as possible
- The height of the tower shall not infringe obstacle limitation surfaces with 150 runway strips on both sides taking the future introduction of instrument and precision approach runway into account
- The location will not be affected when the new terminal building is expanded in the future
- The height is determined based on the FAA standards of at least 0.8 degree angle of incidence
- The less construction work for access road and utility facilities

As the result of the above considerations, the location was agreed in the Central Relocation Area. The precise location to be determined after the plane survey under this Survey is completed.

The height of the new ATC tower is determined with the following criteria and calculations, considering the runway extension project up to 2500m.

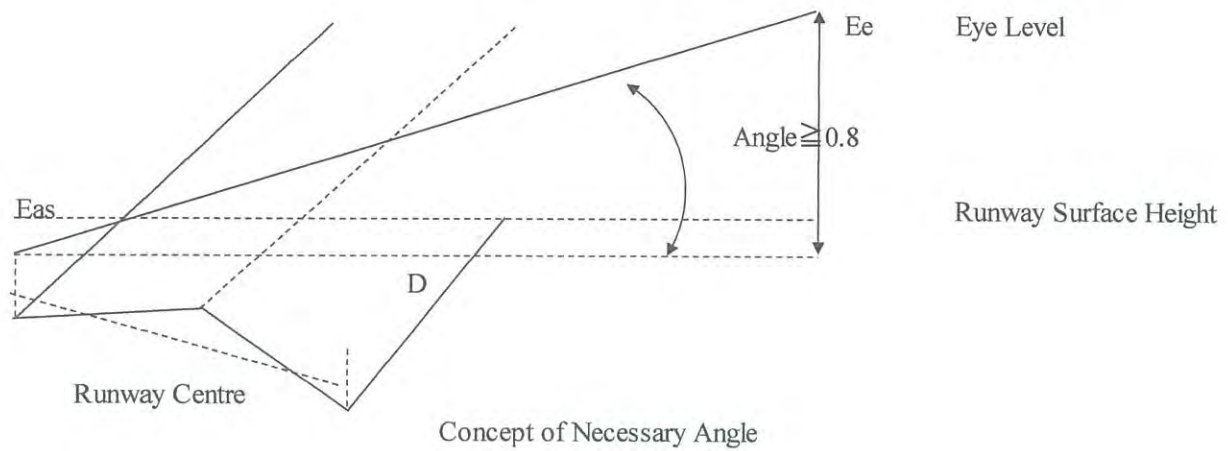
**Table 3-4-7.1 Calculation of ATC Tower Height**

| Item                                                                                    |              | Runway East side<br>Northern Part |
|-----------------------------------------------------------------------------------------|--------------|-----------------------------------|
| The Height of Runway Surface (MSL)                                                      | Eas          | 7.6 m                             |
| Distance with New Traffic Control Tower (m)                                             | D            | 1506 m                            |
| The Minimum Angle Necessary for Controller (Degree)                                     | $\theta$     | 0.8                               |
|                                                                                         | $\tan\theta$ | 0.0139635                         |
| Necessary Eye Level (MSL)                                                               | Ee           | 28.629031 m                       |
| Eye Level above Ground=Necessary Height above Ground (Ee-11.6m (MSL at Tower location)) | Ed           | 17.03 m                           |
| VFR Room Floor Height (Ed-1.2m)                                                         | Ef           | 15.83 m                           |
| ATC Tower Height (Ef+4.0m)                                                              | Er           | 19.83 m                           |
| Lightning rod and Antennas (Er+3m)                                                      | Ea           | 22.83 m                           |
| (Reference) Horizontal Surface                                                          |              | 45 m                              |
| (Reference) Transitional Surface ((400-140)/7)                                          |              | 37 m                              |

Meanwhile ANATL requested to build a tower of maximum allowable height (below the transitional surface) of 37m considering future development of the runway and environmental difficulty (preservation of trees, etc.), and ANATL will submit a request letter to JICA describing any basis of their request before departure of the Survey Team.

Technical memorandum for preparatory survey for the Project for Improvement of Presidente Nicolau Lobato International Airport in the Democratic Republic of Timor Leste

Note) MSL is from AIP East side of Runway 25ft (7.6m)  
Airport Reference Point 25ft (7.6m)



It was proposed that the height of eye level for the new ATC tower is at least 17m above ground level.

Draft design of the tower is proposed as follows.

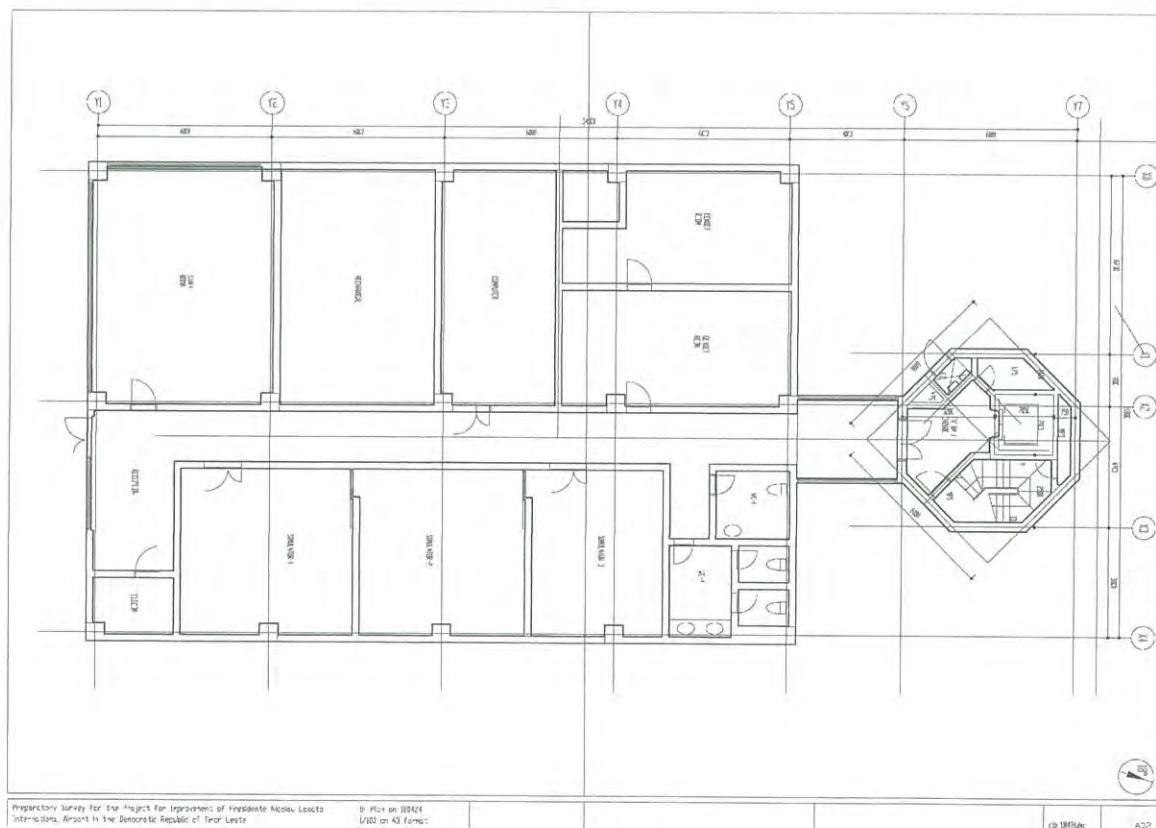


Figure 3-4-7.1 Draft design of ATC tower

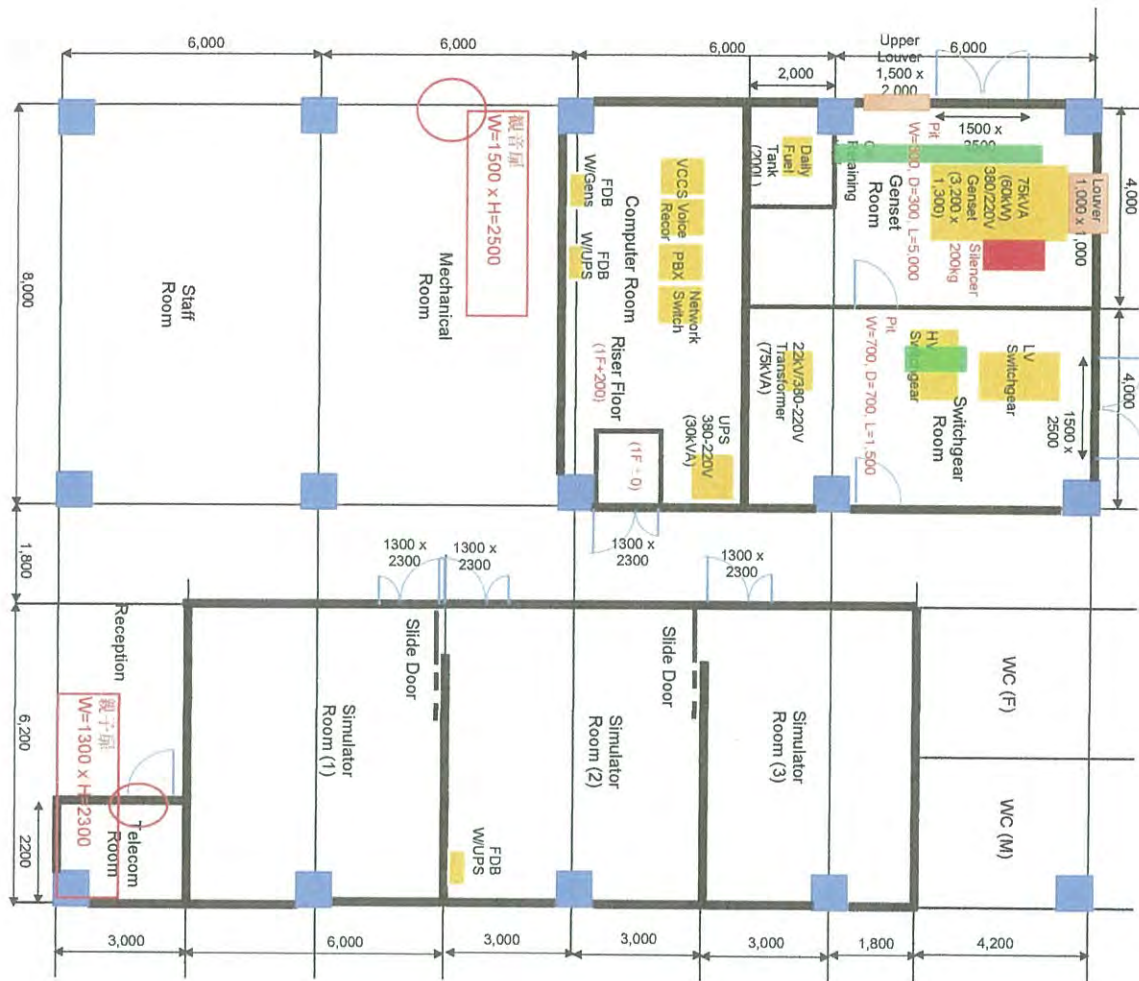
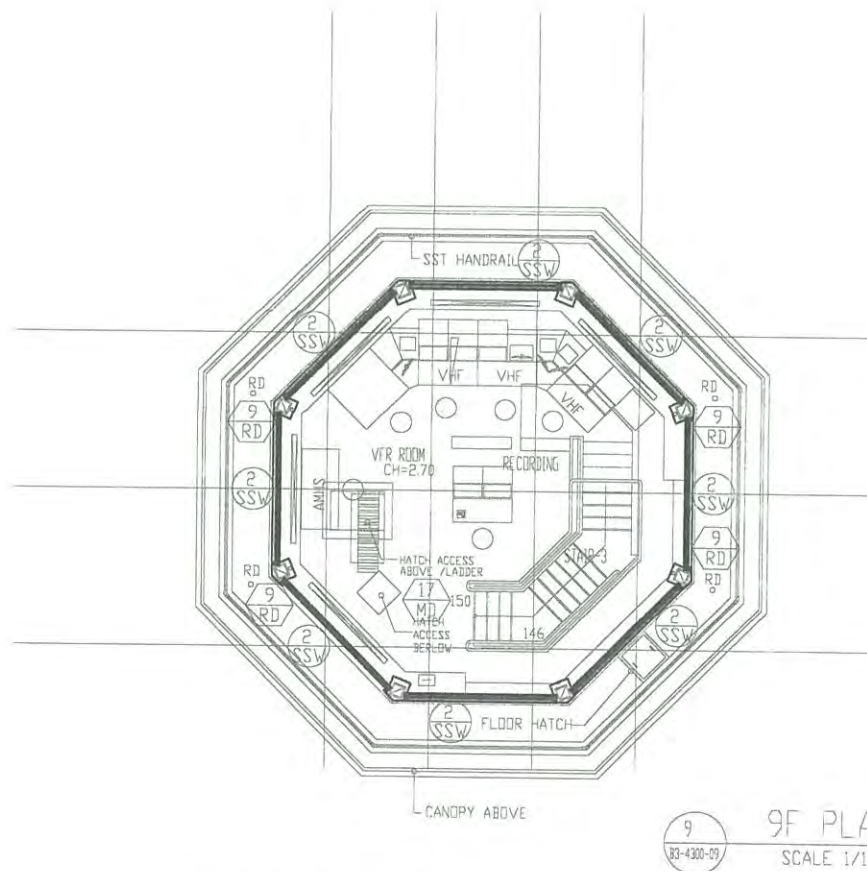
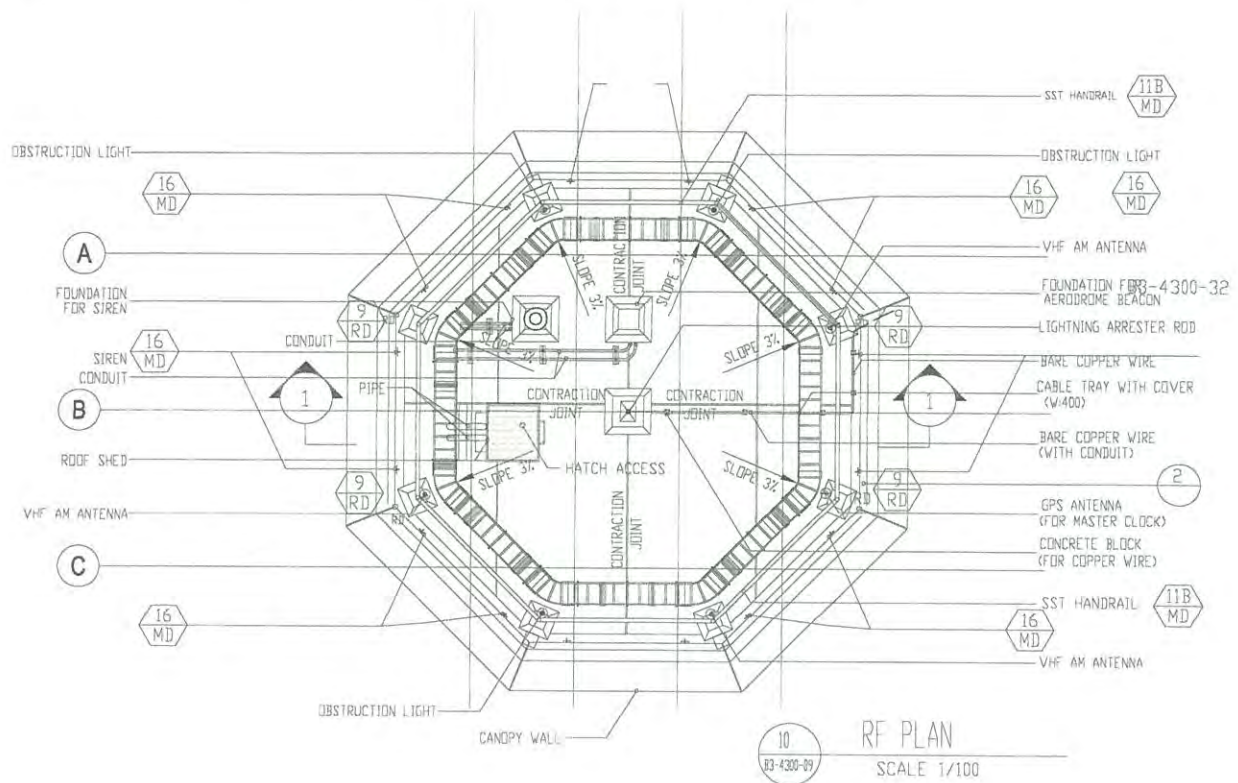


Figure 3-4-7.2 Draft layout plan of the ATC tower office building

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**Figure 3-4-7.3 Draft layout plan of ATC Room**

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**(2) ATC Equipment for the new ATC tower.**

Dili control tower currently provides aerodrome control and approach control services. Dili control tower also has terminal area control for broadcasting of the air traffic information. The equipment to be procured for the new ATC tower is based on this operational requirements. The following is the draft list of ATC equipment to be procured by the Project.

**Table 3-4-7.2 Draft list of ATC equipment**

| No. | Item                                                              | Qty    | Reuse of existing |
|-----|-------------------------------------------------------------------|--------|-------------------|
| 1   | Air Traffic Control Console                                       | 3 sets |                   |
| 1.1 | Head set                                                          | 3 sets |                   |
| 1.2 | Microphone                                                        | 3 sets |                   |
| 1.3 | Speaker                                                           | 3 Sets |                   |
| 1.4 | Foot switch                                                       | 3 sets |                   |
| 1.5 | Clock                                                             | 3 sets |                   |
| 1.6 | GPS receiver with antenna system                                  | 1 set  |                   |
| 1.7 | VCS touch panel                                                   | 3 sets |                   |
| 1.8 | Miscellaneous computer screen                                     | 6 sets |                   |
| 1.9 | Flight strip holder                                               | 3 sets |                   |
| 2   | VCS                                                               | 1 set  |                   |
| 2.1 | VCS Server                                                        | 1 Set  |                   |
| 2.2 | VCS Recorder                                                      | 1 set  |                   |
| 2.3 | Radio Server                                                      | 1 set  |                   |
| 2.4 | 19 inch Rack                                                      | 1 set  |                   |
| 3   | Light gun                                                         |        | 1 set             |
| 4   | Binocular                                                         |        | 1 set             |
| 5   | VOR/DME monitoring system                                         |        | 1 set             |
| 5.1 | VOR/DME monitoring computer                                       |        | 1 Set             |
| 5.2 | Modem                                                             |        | 1 set             |
| 5.3 | Antenna systems                                                   |        | 1 set             |
| 6   | NDB monitoring system                                             |        | 1 set             |
| 6.1 | NDB monitoring system                                             |        | 1 Set             |
| 6.2 | Antenna system                                                    |        | 1 set             |
| 7   | VHF Ground to Air communication system                            | 1 set  |                   |
| 7.1 | VHF transmitter (Aerodrome control , Approach control, Emergency) | 6 sets |                   |
| 7.2 | VHF receiver                                                      | 6 sets |                   |
| 7.3 | VHF antenna systems                                               | 6 sets |                   |
| 7.4 | 19 inch Rack                                                      | 2 sets |                   |
| 8   | VHF transceiver                                                   | 1 Set  |                   |
| 8.1 | VHF transceiver                                                   | 1 Set  |                   |
| 8.2 | VHF antenna systems                                               | 1 set  |                   |
| 9   | FM transceiver                                                    |        | 2 set             |
| 9.1 | FM transceiver                                                    |        | 2 set             |

| No.  | Item                                          | Qty    | Reuse of existing |
|------|-----------------------------------------------|--------|-------------------|
| 9.2  | FM antenna systems                            |        | 2 set             |
| 10   | Clash alert system                            | 1 set  |                   |
| 10.1 | Clash alert                                   | 1 set  |                   |
| 10.2 | Direct speech with fire station               | 1 set  |                   |
| 11   | Weather and aeronautical information Computer | 1 set  |                   |
| 12   | Telephone                                     | 4 sets |                   |
| 13   | Power system                                  | 1 set  |                   |
| 13.1 | Power distribution board                      | 1 set  |                   |
| 13.2 | UPS                                           | 1 set  |                   |
| 14   | Spear parts                                   | 1 Set  |                   |
| 15   | Consumable parts                              | 1 Set  |                   |

### 3-4-8 Construction of Electric Power Substation with Emergency Generator (for New Terminal Facilities)

Since the current Power house is demolished, Substation is constructed to provide power to International passenger terminal building, International cargo terminal building, Apron floodlighting, and road lighting. In order to maintain the level of services during the power cut, back-up generator of its capacity is 24 hours with 100 percentage loads is provided.

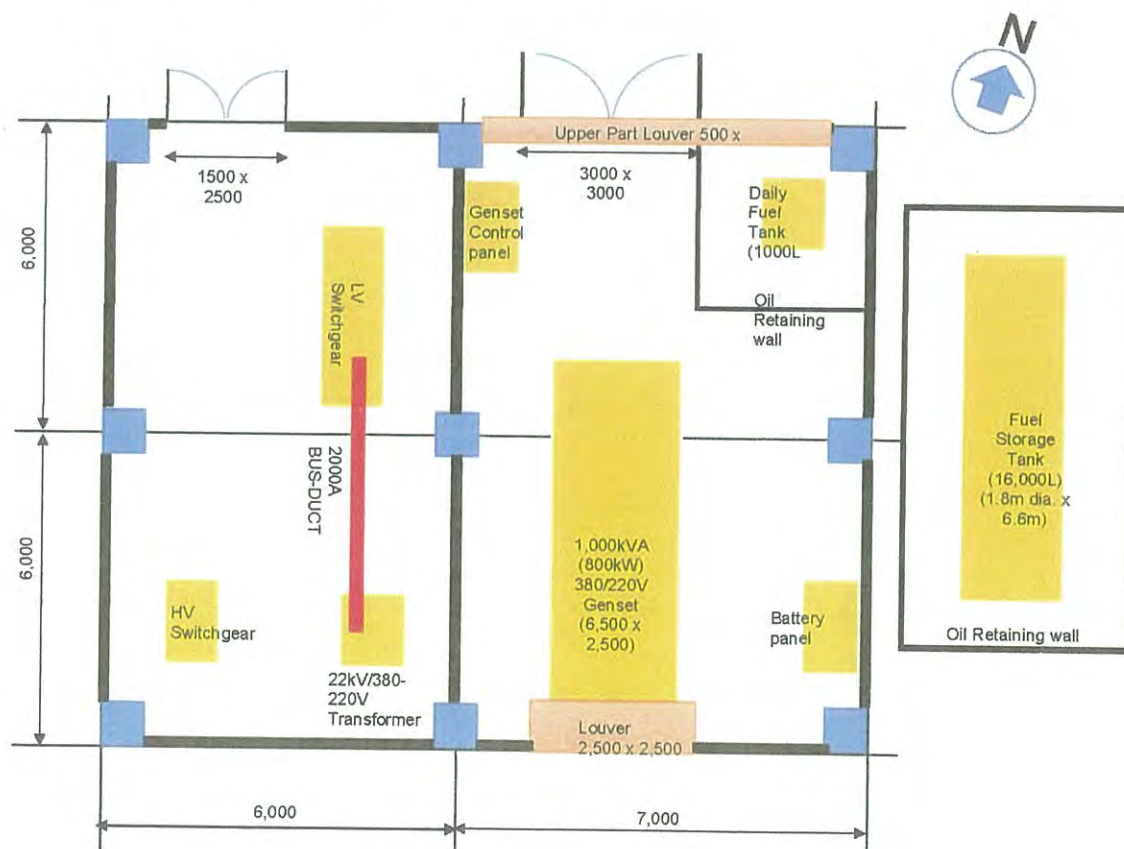


Figure 3-4-8.1 Draft layout of Substation

### 3-5 Project evaluation indicators

The success of the project is evaluated in 3 years after the completion of the Project. The evaluation indicator is used to measure the success of the Project. The number of international passenger, the volume of international cargo, the volume of air traffic and the number of foreign visitors are considered to be appropriate as the Project evaluation indicators of the Project.

### 3-6 Technical cooperation

ANATL and JICA survey team discussed about the needs of technical cooperation for effective operation and maintenance of the facilities provided by the Grant aid project. Among the requested items, following observations and discussions were made. In addition to the operation and maintenance capability, ANATL would like to develop a commercial capability.

**Table 3-6.1 Requested Items by ANATL**

|   | Items                             | observation and discussion                                                                                                                                                                                                                                                                   |
|---|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Airport operation                 | Though ANATL has manuals for the operations of the airport, the applications of those manuals are not effectively implemented. ANATL requested assistance on how those manuals are to be updated for the new terminal building and effectively implemented.                                  |
| 2 | Maintenance of airport facilities | Maintenance of basic facilities, mechanical and electrical equipment is not effectively executed. ANATL needs assistance for improvement of manuals and its implementation to the maintenance works of the facilities.                                                                       |
| 3 | Commercial management             | ANATL needs to make profits as a company. However, it lacks the knowledge and know-how on how to house shops and retailers in the terminal building and how to make a system to manage those retailers. ANATL needs assistance on improvement of commercial management.                      |
| 4 | Airport security operations       | ANATL needs to improve security manual and operations for new passenger terminal building and requested the assistance.                                                                                                                                                                      |
| 5 | Air traffic control services      | ANATL already sends their staff members for training of traffic controllers to Indonesia at basic and aerodrome control level. Future development of air traffic controller requires training in approach control, PBN implementation procedures and air traffic control development manual. |
| 6 | Aeronautical information services | This would be trained internally by ANATL. ANATL requires AIS management advance level training in Indonesia.                                                                                                                                                                                |
| 7 | Maintenance of Air                | Same with 2                                                                                                                                                                                                                                                                                  |

Technical memorandum for preparatory survey for the Project for Improvement of Presidente Nicolau Lobato International Airport in the Democratic Republic of Timor Leste

|   | Items                              | observation and discussion                                                          |
|---|------------------------------------|-------------------------------------------------------------------------------------|
|   | navigation systems                 |                                                                                     |
| 8 | Rescue and firefighting operations | ANATL already sends their staff members for training of fire fighters to Indonesia. |

According to ANATL, approximate cost to cover all the above mentioned areas, Table 3-6.1, is 500,000 US\$.

Nanuda

### 3-7 Implementation Schedule

Draft schedule of the implementation of the Project is shown in Figure 3-7.1

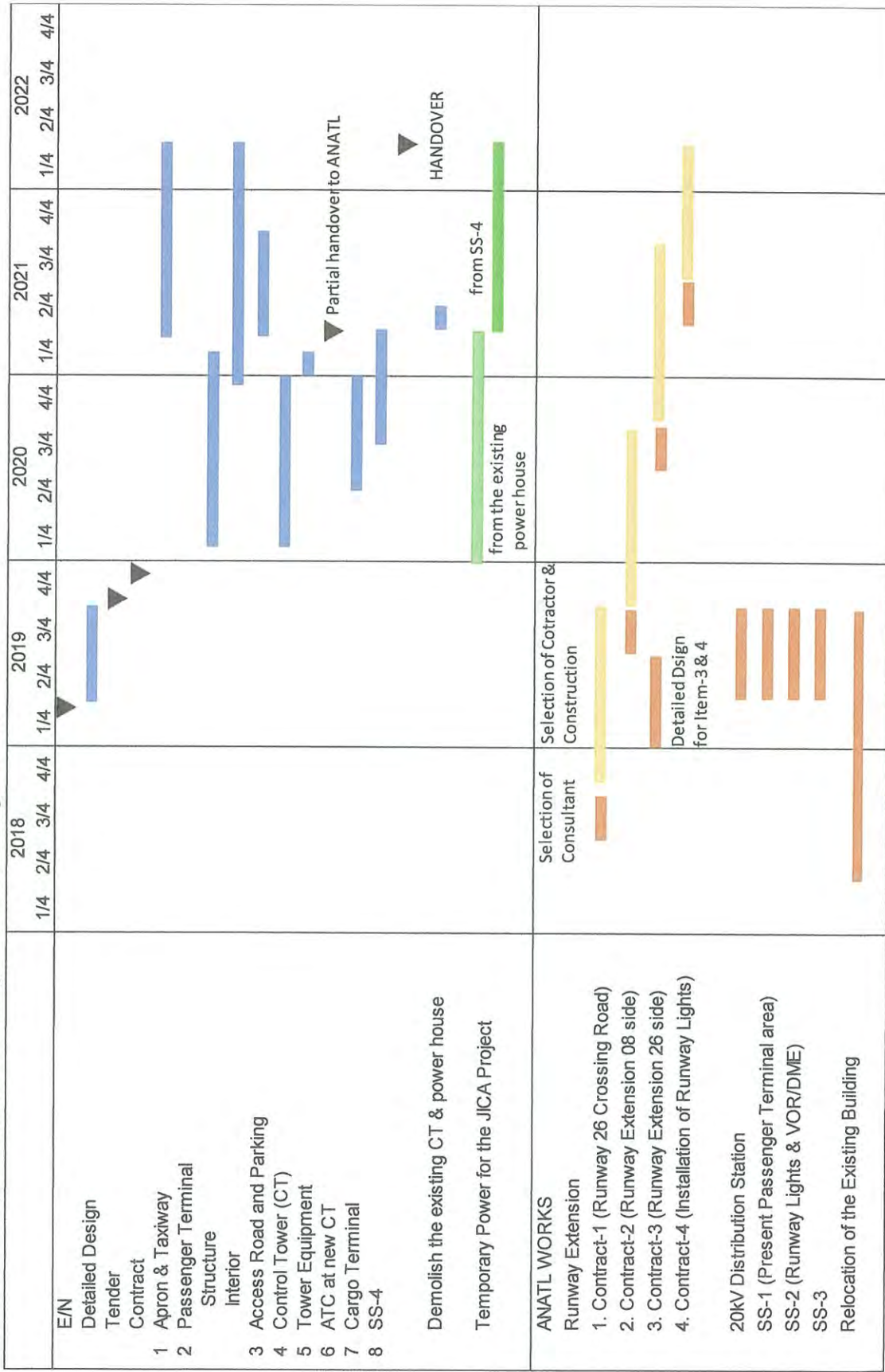


Figure 3-7.1 Tentative Schedule of the Project Implementation

### 3-8 Non-Military Use

The Timor-Leste side understood the principle of the Japan's Development Cooperation Charter, which stresses that ODA must not be utilized for military purpose or promoting international conflicts, and agreed to ensure that the facilities and equipment to be procured in the Project will never be used for any military purposes.

## **Chapter 4 Work Demarcation**

In addition to the items agreed in the M/D, the details of the items and additional items are discussed as the followings

### **4-1 Tax exemption**

ANATL needs to bear the cost, which is equivalent to the customs duties, internal taxes and other fiscal levies which may be imposed in Timor-Leste, instead of tax exemption system, without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

In the practices of Timor-Leste in the past, corporate tax and personal income tax for Japanese contractors, suppliers and consultants including their employees are exempted based on E/N and G/A, customs duties and other related fiscal charges with respect to the import of materials and equipment were born by the implementation agency. ANATL needs to take appropriate measures and bear those taxes on behalf of the contractors.

### **4-2 Demolition and Removal of the Site**

In addition to the demolition works agreed in the M/D signed on 16<sup>th</sup> April, ANATL also needs to remove other objects in the site such as containers, aircraft engines, fire engine, trees and other obstructive objects to clear the land for new construction works.

### **4-3 Construction of HV distribution station and Substation**

ANATL shall complete the construction of new power supply system before the announcement of the tender of the Project around September 2019. Draft diagram is shown in the following figure.

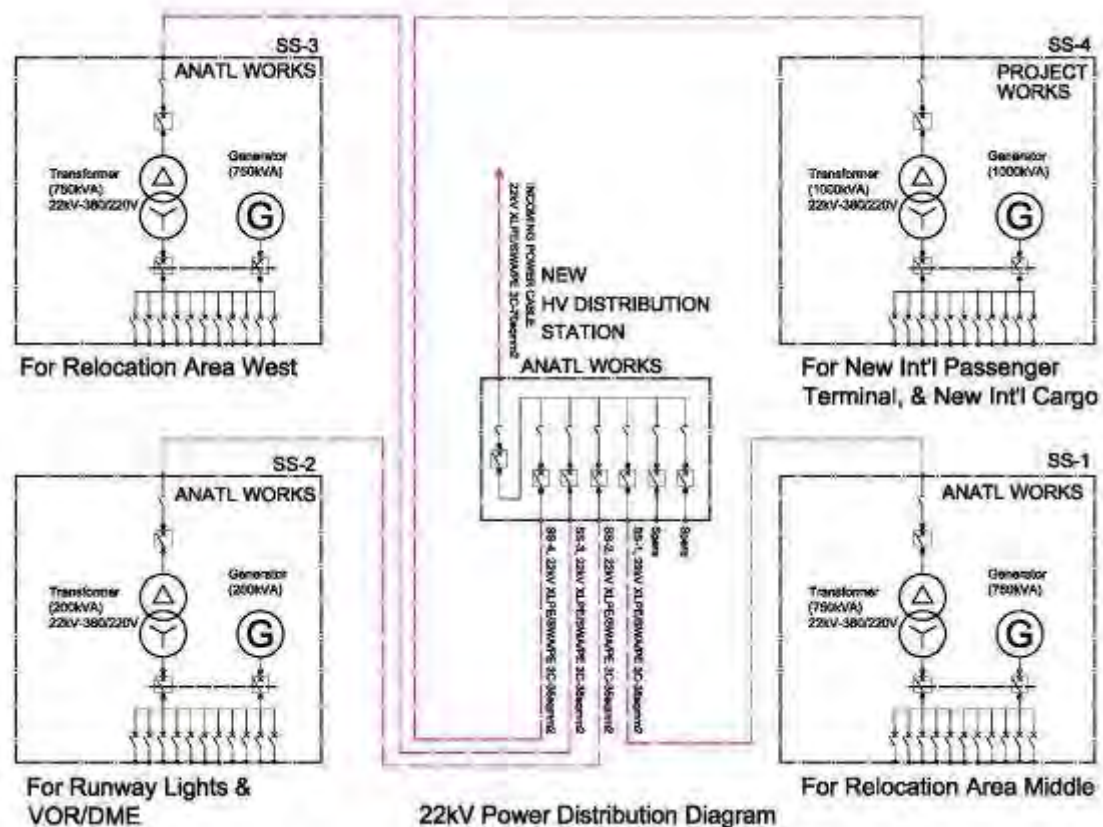


Figure 4-3.1 New Power Supply System

#### 4-4 Obtaining Environmental Approval of the Project

ANATL needs to inform the result of Project Documents submitted to National Directorate for Environment for screening to JICA survey team and the environmental category of the Project. And take further necessary measures to obtain environmental approval of the Project with assistance by JICA survey team. In case the category is identified as “B”, Simplified Environmental Impact Statement (SEIS), and Environmental Monitoring Plan shall be submitted for the technical assessment by December 2018 so that IEE/EIA approval is obtained before the Project approval by Japanese cabinet. In case the category is “A”, further discussion will need to be held with JICA survey team on how to proceed to the next steps.

#### 4-5 Transfer of ATC simulator, ATC equipment, Backup Generator

ANATL needs to transfer ATC simulator to the new ATC tower office building upon completion of the building immediately in order not to disrupt the construction schedule. And backup generators in the existing power house and ATC equipment in the existing ATC tower shall be transferred to an appropriate places before demolition of those buildings.

**4-6 Clear the site for the sight of the new air traffic control tower**

It was found that the trees in the south east side of the airport block the line of sight of the runway east side from the new ATC tower. ANATL needs to make arrangements to remove those obstructs to secure the line of sight to the east end of the runway.

[END]



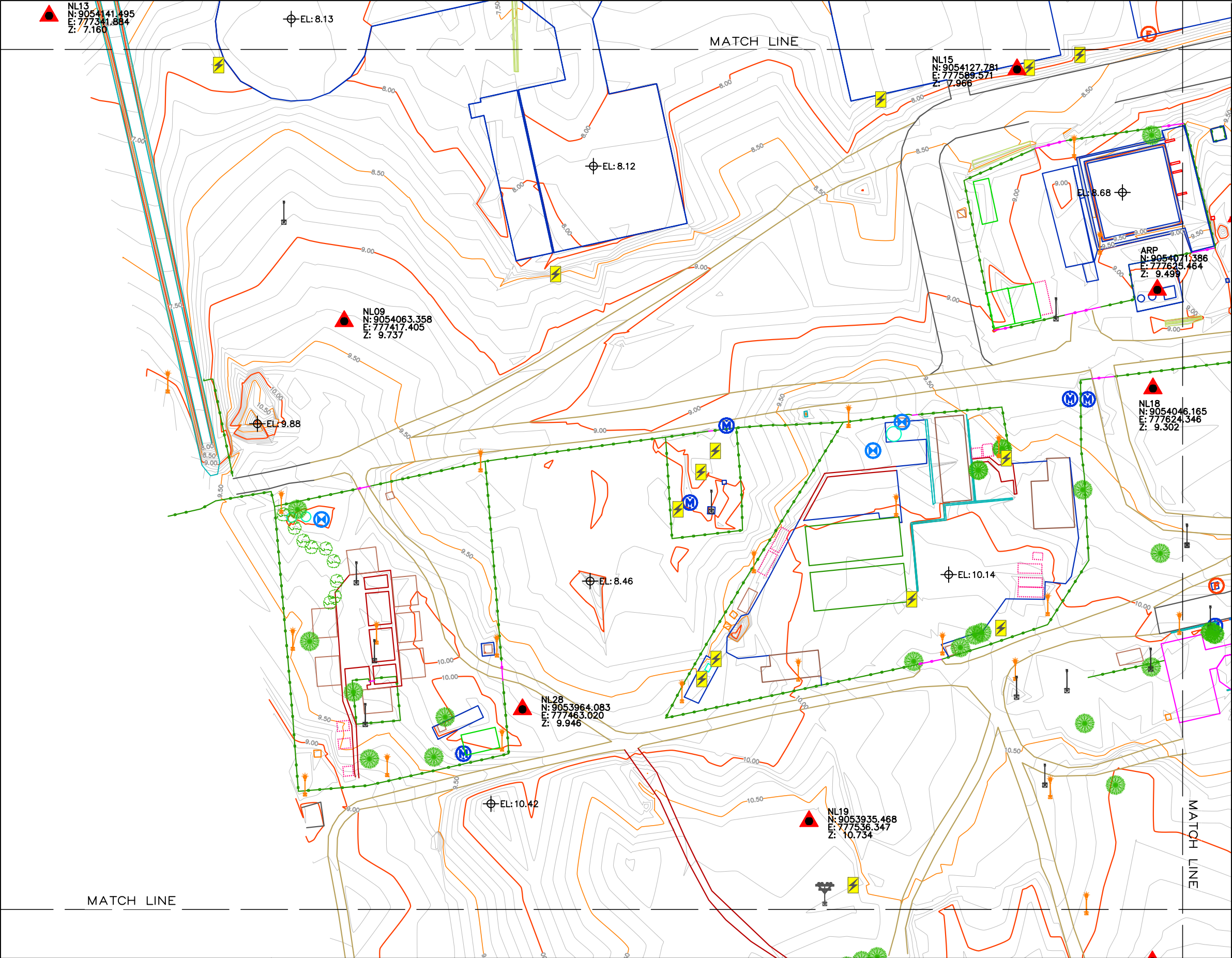
## 6. Natural Conditions Survey

### 6-1 Plane Survey





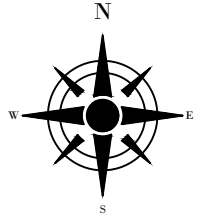
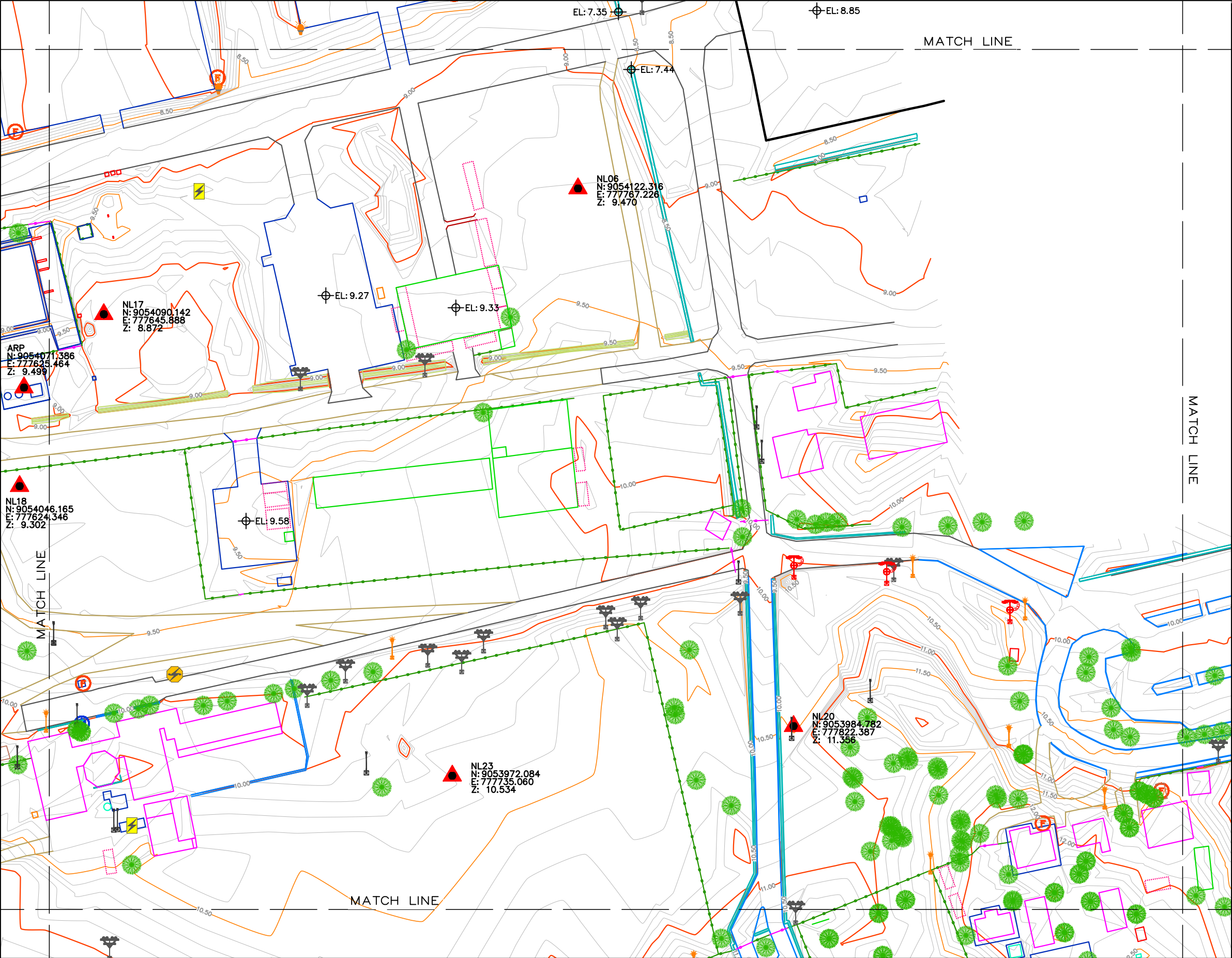




### LEGEND

- Major Contour
- Minor Contour
- Supplementary Contour
- Control Point
- Electric Box
- Electric Manhole
- Manhole
- Fire Point
- Runway Light
- Water Valve
- Tree
- Bush
- Electric Post
- Telephone Post
- Lamp Post
- Post
- Concrete Building
- Wooden Building
- Concrete Structure
- Steel Structure
- Container Van
- Wooden Structure
- Gas Tank
- Water Tank
- Septic Tank
- Transformer
- Runway
- Paved Road
- Dirt Road
- Footpath
- Gutter / Sidewalk
- Edge of Pavement
- Concrete Ditch
- Earth Ditch
- Steel Fence
- Gate
- Gas Pipe

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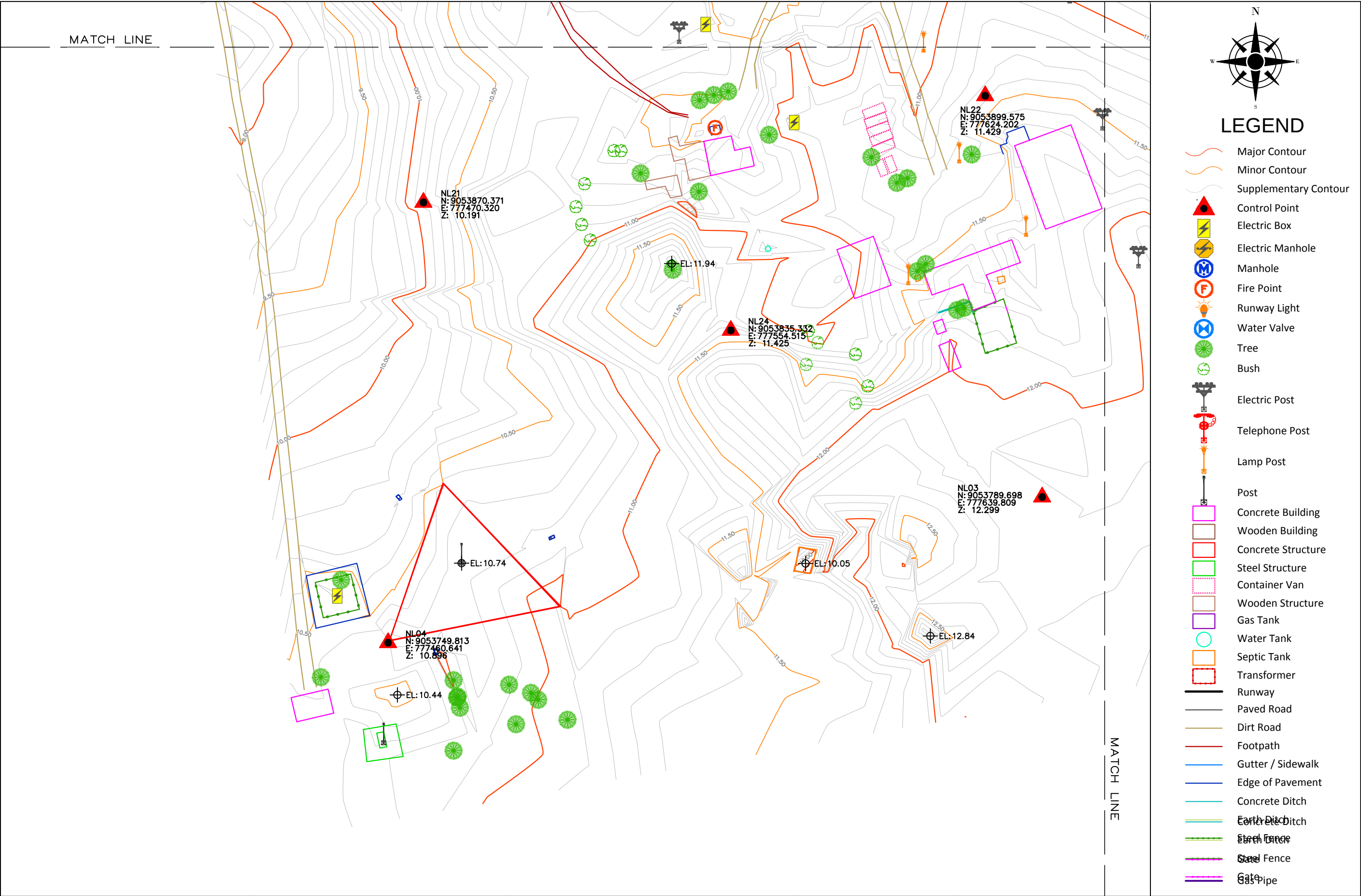


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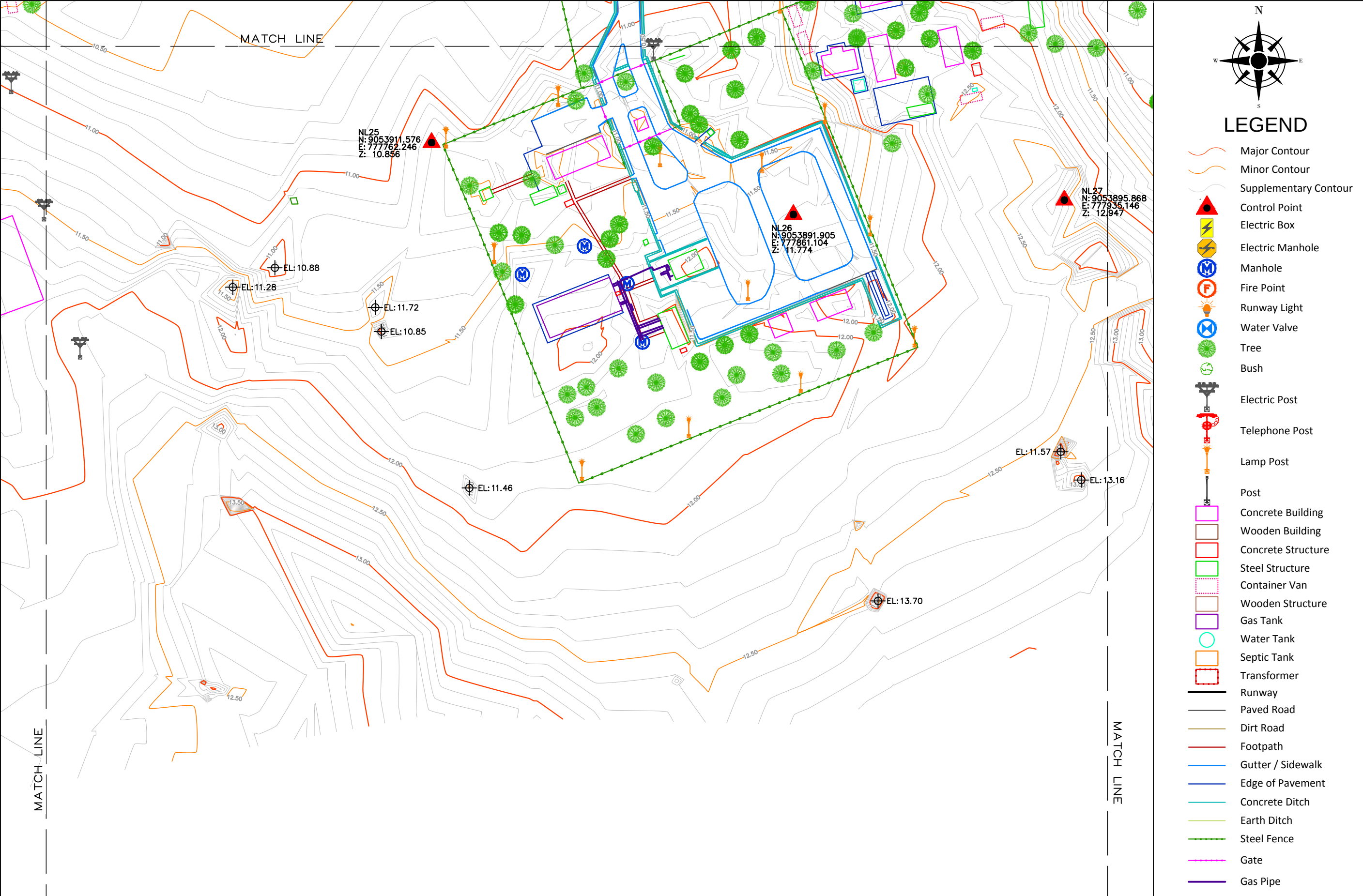
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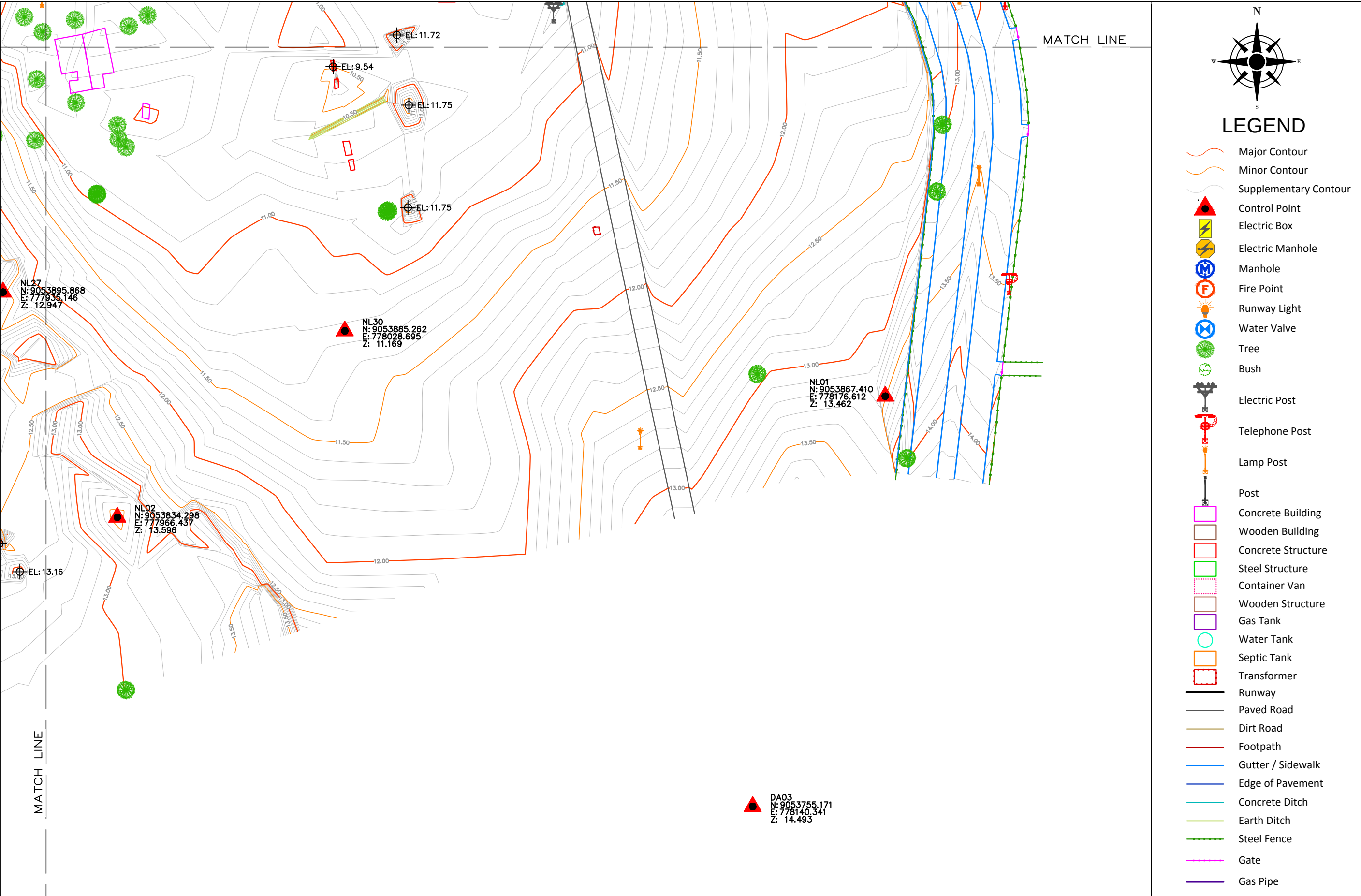




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|                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                            |                                                                                                                                                                                |                                                                                                                                                   |            |             |      | REV. NO.                   |                                |
|                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                            |                                                                                                                                                                                |                                                                                                                                                   |            |             |      |                            |                                |



| CONTRACTOR | GRAPHIC SCALE:<br>1:1000<br><div>02550<br/>Meters</div> | PROJECT NAME:<br>PREPARATORY SURVEY FOR THE PROJECT FOR<br>IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO<br>INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC<br>REPUBLIC OF TIMOR LESTE | CLIENT:<br><div> JAPAN INTERNATIONAL<br/>COOPERATION AGENCY</div> <div> CONSORTIUM OF JAPAN<br/>AIRPORT CONSULTANTS INC.</div> <div> ORIENTAL CONSULTANTS<br/>GLOBAL CO., LTD.,</div> | REVISIONS: |             |      | SRDP<br>Project / Dwg. No. | 2018-05_DIII_TopographicSurvey |
|------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|------|----------------------------|--------------------------------|
|            |                                                         |                                                                                                                                                                                   |                                                                                                                                                                                       | ITEM       | DESCRIPTION | DATE | SCALE                      | 1:1000                         |
|            |                                                         |                                                                                                                                                                                   |                                                                                                                                                                                       |            |             |      | SHEET NO.                  | T-1H                           |
|            |                                                         |                                                                                                                                                                                   |                                                                                                                                                                                       |            |             |      | DRAWING FORMAT             |                                |
|            |                                                         |                                                                                                                                                                                   |                                                                                                                                                                                       |            |             |      | REV. NO.                   |                                |

**SRDP**  
CONSULTANTS INC.

No. 40 Langka St. Brgy. Quirino 2-C  
Project 2, Quezon City, 1102  
Tel.No. (632) 433-3086 / 745-4088  
Website: [www.srdp.com.ph](http://www.srdp.com.ph)  
Email: [support@srdp.com.ph](mailto:support@srdp.com.ph)  
Integrated Mapping, GIS, & Engineering

COORDINATE SYSTEM:  
ELLIPSOID .....WORLD GEODETIC SYSTEM  
ZONE .....UTM ZONE 51S  
VERTICAL DATUM.....ORTHOMETRIC HEIGHT  
HORIZONTAL DATUM.....WORLD GEODETIC SYSTEM 1984

TOPOGRAPHIC MAP

## 6-2 Soil Investigation



| TEST POINT | GEOTECHNICAL INVESTIGATION WORK ITEM | EASTING   | NORTHING   |
|------------|--------------------------------------|-----------|------------|
| TP-1       | Test Pits Points -1                  | 777503.55 | 9054203.00 |
| TP-2       | Test Pits Points -2                  | 777544.62 | 9054054.16 |
| TP-3       | Test Pits Points -3                  | 777629.38 | 9053995.06 |
| TP-4       | Test Pits Points -4                  | 777690.49 | 9053769.00 |

# **Test-pit Logs Plates 3 to 6**



Report No. GET 18-8002

**TEST PIT LOG**

| Client: Oriental Consultants Global Co., Ltd.,                                                                                    |         |                                                                             |        | TEST PIT LOG: TP # 1<br>(STA: 9054203.00S , 777503.55E ) |                                            |                            |                                    |
|-----------------------------------------------------------------------------------------------------------------------------------|---------|-----------------------------------------------------------------------------|--------|----------------------------------------------------------|--------------------------------------------|----------------------------|------------------------------------|
| Location: GEOTECHNICAL INVESTIGATION AT IMPROVEMENT OF<br>PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT,<br>TIMOR LESTE |         |                                                                             |        | DATE OF EXCAVATION TP:<br>26-09-2018                     |                                            |                            |                                    |
| SIZE: 1.0X2.0X1.1 m                                                                                                               |         |                                                                             |        | SHEET: 1 OF 1                                            |                                            |                            |                                    |
| SAMPLING METHOD: Hand Excavation                                                                                                  |         |                                                                             |        | WATER DEPTH : - Dry                                      |                                            |                            |                                    |
| DEPTH (m)                                                                                                                         | SAMPLES | DESCRIPTION                                                                 | SYMBOL | -0.075 (%)                                               | Moisture Content (%)<br>[Specific Gravity] | FDT% (MDD) (g/cc)<br>{OMC} | Liquid Limit<br>[Plastic Limit]    |
| 0.5                                                                                                                               |         | Brownish brown <b>SILT</b> with fine Sand ( <b>ML</b> ) with low plasticity |        | 82.8                                                     | 7.4<br>[2.34]                              | 1539<br>(1715)<br>{17.2}   | LL=29.4<br>PL=24.6<br>PI=4.8<br>ML |
| 1.0                                                                                                                               |         |                                                                             |        |                                                          |                                            |                            |                                    |
| 1.5                                                                                                                               |         |                                                                             |        |                                                          |                                            |                            |                                    |
| 2.0                                                                                                                               |         |                                                                             |        |                                                          |                                            |                            |                                    |



Report No. GET 18-8002

## TEST PIT LOG

| Client: Oriental Consultants Global Co., Ltd.,                                                                                    |         |                                                        |        | TEST PIT LOG: TP # 2<br>(STA: 9054054.16S , 777544.62E ) |                                            |                            |                                     |
|-----------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------------------------------------|--------|----------------------------------------------------------|--------------------------------------------|----------------------------|-------------------------------------|
| Location: GEOTECHNICAL INVESTIGATION AT IMPROVEMENT OF<br>PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT,<br>TIMOR LESTE |         |                                                        |        | DATE OF EXCAVATION TP:<br>26-09-2018                     |                                            |                            |                                     |
| SIZE: 1.0X2.0X1.15 m                                                                                                              |         |                                                        |        | SHEET: 1 OF 1                                            |                                            |                            |                                     |
| SAMPLING METHOD: Hand Excavation                                                                                                  |         |                                                        |        | WATER DEPTH : - Dry                                      |                                            |                            |                                     |
| DEPTH (m)                                                                                                                         | SAMPLES | DESCRIPTION                                            | SYMBOL | -0.075 (%)                                               | Moisture Content (%)<br>[Specific Gravity] | FDT% (MDD) (g/cc)<br>{OMC} | Liquid Limit<br>[Plastic Limit]     |
| 0.5                                                                                                                               |         | Light brown SILT (ML) with low plasticity              |        | 93.9                                                     | 2.3<br>[2.32]                              | 1573<br>(1670)<br>{19.5}   | LL=40.1<br>PL=27.5<br>PI=12.6<br>ML |
| 1.0                                                                                                                               |         | Light greyish Silty, Gravelly fine to coarse SAND (SM) |        | 22.3                                                     | 1.3<br>[2.61]                              |                            | Non-Plastic                         |
| 1.5                                                                                                                               |         |                                                        |        |                                                          |                                            |                            |                                     |
| 2.0                                                                                                                               |         |                                                        |        |                                                          |                                            |                            |                                     |

[illegible]



Report No. GET 18-8002

**TEST PIT LOG**

| Client: Oriental Consultants Global Co., Ltd.,                                                                                    |         |                                                                                     |        |            | TEST PIT LOG: TP # 4<br>(STA: 9053769.00S , 777690.49E ) |                            |                                     |
|-----------------------------------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------|--------|------------|----------------------------------------------------------|----------------------------|-------------------------------------|
| Location: GEOTECHNICAL INVESTIGATION AT IMPROVEMENT OF<br>PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT,<br>TIMOR LESTE |         |                                                                                     |        |            | DATE OF EXCAVATION TP:<br>25-09-2018                     |                            |                                     |
| SIZE: 1.0X2.0X1.1 m                                                                                                               |         |                                                                                     |        |            | SHEET: 1 OF 1                                            |                            |                                     |
| SAMPLING METHOD: Hand Excavation                                                                                                  |         |                                                                                     |        |            | WATER DEPTH : - Dry                                      |                            |                                     |
| DEPTH (m)                                                                                                                         | SAMPLES | DESCRIPTION                                                                         | SYMBOL | -0.075 (%) | Moisture Content (%)<br>[Specific Gravity]               | FDT% (MDD) (g/cc)<br>{OMC} | Liquid Limit<br>[Plastic Limit]     |
| 0.5                                                                                                                               |         | Light brown <b>SILT</b> with little Sand & Gravel ( <b>ML</b> ) with low plasticity |        | 84.1       | 4.1<br>[2.25]                                            | 1648<br>(1745)<br>{11.8}   | LL=40.6<br>PL=30.2<br>PI=10.4<br>ML |
| 1.0                                                                                                                               |         |                                                                                     |        |            |                                                          |                            |                                     |
| 1.5                                                                                                                               |         |                                                                                     |        |            |                                                          |                            |                                     |
| 2.0                                                                                                                               |         |                                                                                     |        |            |                                                          |                            |                                     |

1.10 m

# **Symbols and Terms Used**

## **Plate 7**



MATERIALS TESTING CENTRE

P.O. Box 110, Espirito Santo, Timor-Leste  
 Office Tel: +654 2 313452, Fax:  
 Email: fopee@mtcsl.com.s  
 Web Site: www.mtcsl.com

## SYMBOLS AND TERMS USED ON BORING LOGS

| SOIL AND ROCK TYPES<br>(SHOWN IN SYMBOL COLUMN) |            |      |      |        |           |           |              |          |          | SAMPLER TYPES<br>(SHOWN IN SAMPLES COLUMN) |             |  |  |
|-------------------------------------------------|------------|------|------|--------|-----------|-----------|--------------|----------|----------|--------------------------------------------|-------------|--|--|
|                                                 |            |      |      |        |           |           |              |          |          |                                            |             |  |  |
| Sand                                            | Silty Sand | Silt | Clay | Gravel | Limestone | Sandstone | Conglomerate | Backfill | Concrete | Split Barrel                               | Core Barrel |  |  |
| Predominant type shown heavy                    |            |      |      |        |           |           |              |          |          |                                            |             |  |  |

| TERMS DESCRIBING DENSITY CONDITION FOR CONSISTENCY                                                                                                                                                               |               |                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------|
| The condition of coarse grained soils may be obtained by performing sampler penetration tests or cone penetrometer tests. Approximate correlation between these tests and the density condition are given below: |               |                          |
| DENSITY CONDITION                                                                                                                                                                                                | SPT VALUES, N | CONE TIP RESISTANCE, MPa |
| Very loose                                                                                                                                                                                                       | < 4           | < 2                      |
| Loose                                                                                                                                                                                                            | 4 to 10       | 2 to 4                   |
| Medium dense                                                                                                                                                                                                     | 10 to 30      | 4 to 12                  |
| Dense                                                                                                                                                                                                            | 30 to 50      | 12 to 20                 |
| Very dense                                                                                                                                                                                                       | > 50          | 20                       |

Density versus SPT value relationship is after Terzaghi and Peck, 1968. See Lacroix and Horn, 1973 if non-standard samplers are used. Density versus cone tip resistance relationship given above, after Meyerhof 1965; is a function of depth also; see Schmertmann, 1978.

The consistencies of cohesive soils may be obtained by performing undrained shear strength tests. Degrees of consistency are given below:

| CONSISTENCY | UNDRAINED SHEAR STRENGTH, kPa |
|-------------|-------------------------------|
| Very soft   | < 12                          |
| Soft        | 12 to 25                      |
| Firm        | 25 to 50                      |
| Stiff       | 50 to 100                     |
| Very stiff  | 100 to 200                    |
| Hard        | > 200                         |

| TERMS CHARACTERIZING SOIL STRUCTURE |                                                                                                        |
|-------------------------------------|--------------------------------------------------------------------------------------------------------|
| Parting                             | - horizontal inclusion of different soil type less than 3-mm thick                                     |
| Seam                                | - horizontal inclusion of different soil type 3 to 75-mm thick                                         |
| Layer                               | - horizontal inclusion of different soil type greater than 75-mm thick                                 |
| Pocket                              | - inclusion of different soil type that is smaller than the diameter of the soil sample                |
| Fissured                            | - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical |
| Interbedded                         | - composed of alternate layers of different soil types                                                 |
| Silty                               | - containing 12 to 50 percent silt size particles                                                      |
| Calcareous                          | - containing 12 to 50 percent carbonates                                                               |
| Carbonate                           | - containing more than 50 percent carbonates                                                           |

Terms used in this report for describing soils according to their texture or grain size distribution are in accordance with ASTM D 2487-90 and D 2488-90

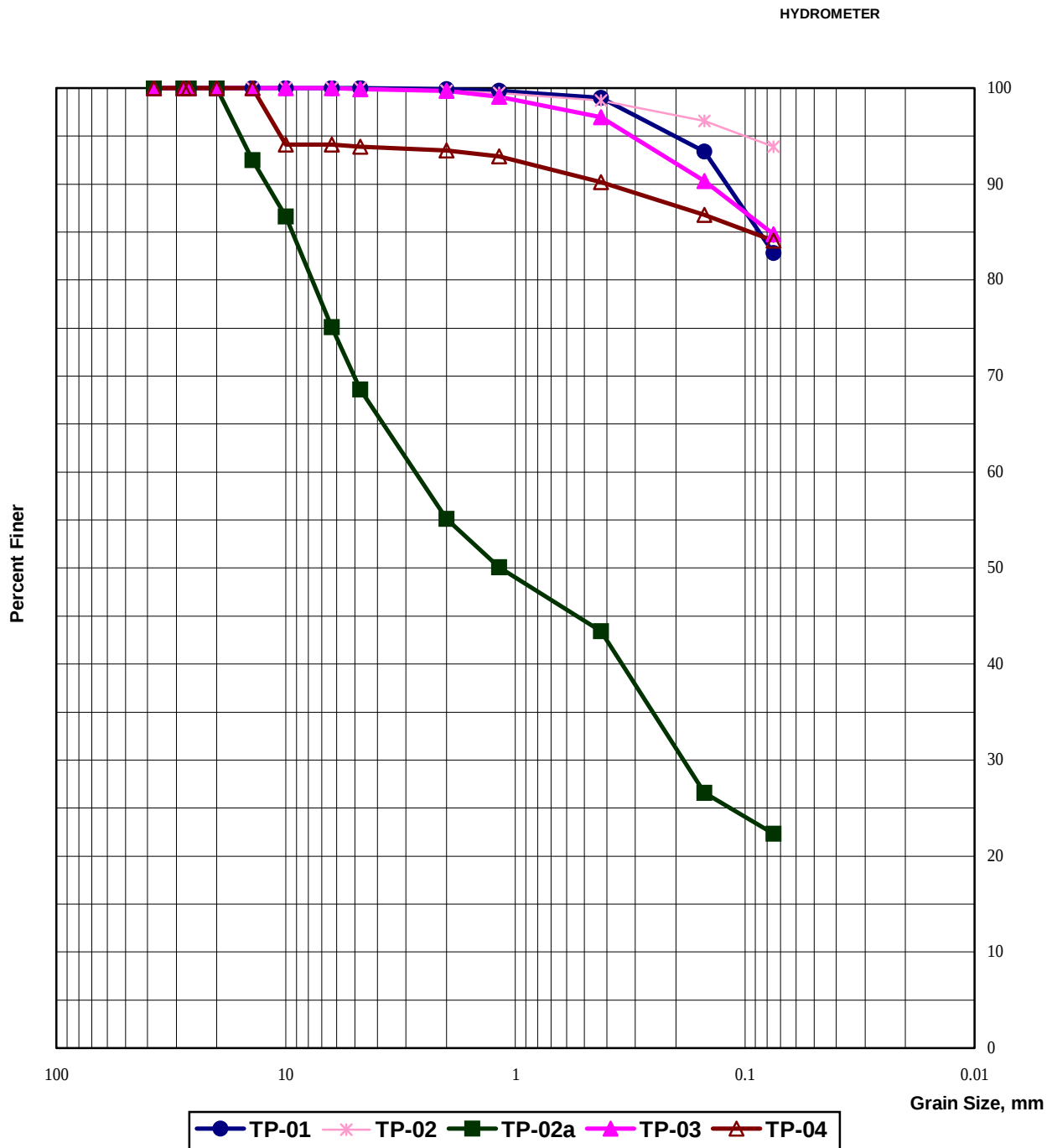
## Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport Project, Timor Leste

# Grain Size Curves

## Plate 8

# GRAIN SIZE ANALYSIS

Report No. GET 18-8002B



| GRAVEL / KANKAR |      | SAND   |        |      | SILT / CLAY |
|-----------------|------|--------|--------|------|-------------|
| COARSE          | FINE | COARSE | MEDIUM | FINE |             |

| Specimen Identification |          | Classification                                          | -0.075 |
|-------------------------|----------|---------------------------------------------------------|--------|
| ●                       | TP # 01  | SILT with fine Sand (ML) with low plasticity            | 82.8   |
| ↔                       | TP # 02  | SILT (ML) with low plasticity                           | 93.9   |
| ■                       | TP # 02a | Silty, Gravelly fine to coarse SAND (SM)                | 22.3   |
| ▲                       | TP # 03  | SILT with fine Sand (ML) with low plasticity            | 84.8   |
| △                       | TP # 04  | SILT with little Sand & Gravel (ML) with low plasticity | 84.1   |

# **Field CBR Test Results**

## **Plates 9 to 12**

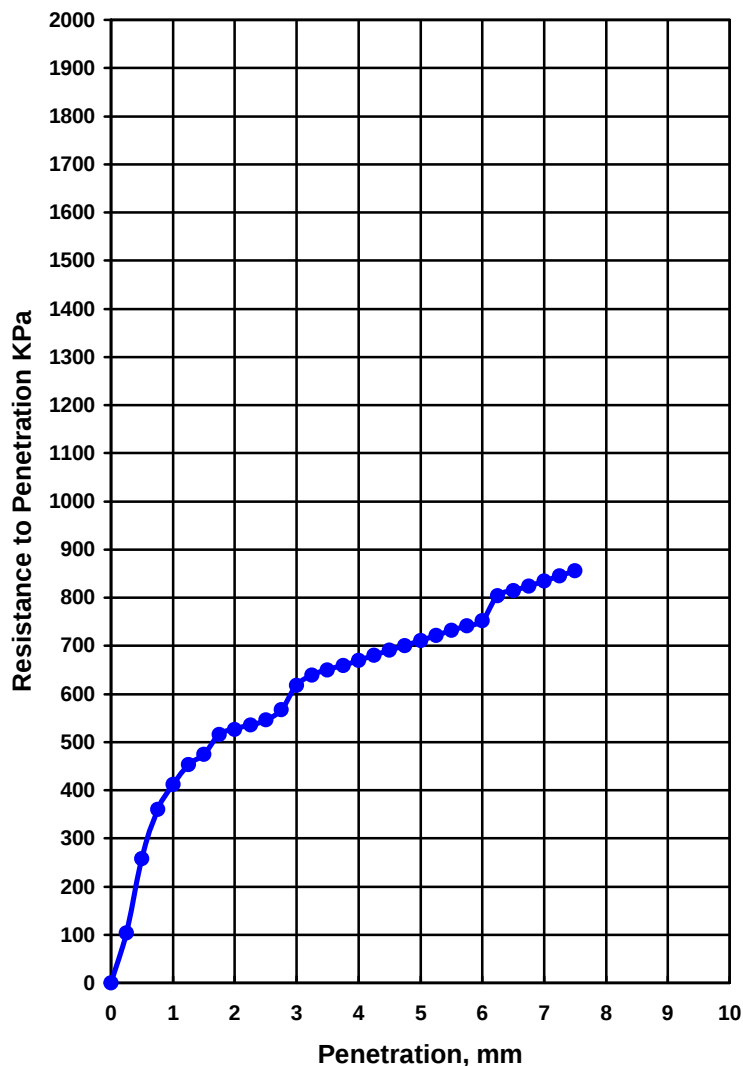


**RMS Engineering & Construction Unipessoal Lda**

## FIELD CBR Test Results (ASTM-D4429)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Field CBR</b>                                                                                                     |
| <b>PROJECT</b> : <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 1</b><br><b>Depth: 1.1 meter</b><br><b>(STA: 9054054.16S ,777544.62E)</b><br><b>Date: 26.09.2018</b> |



—●— Field CBR

| Moisture Content (%) | CBR at |         |
|----------------------|--------|---------|
|                      | 2.5 mm | 5.08 mm |
| 8.1                  | 7.92   | 6.90    |

**C.B.R. TEST RESULTS**  
**Geotechnical Investigation**

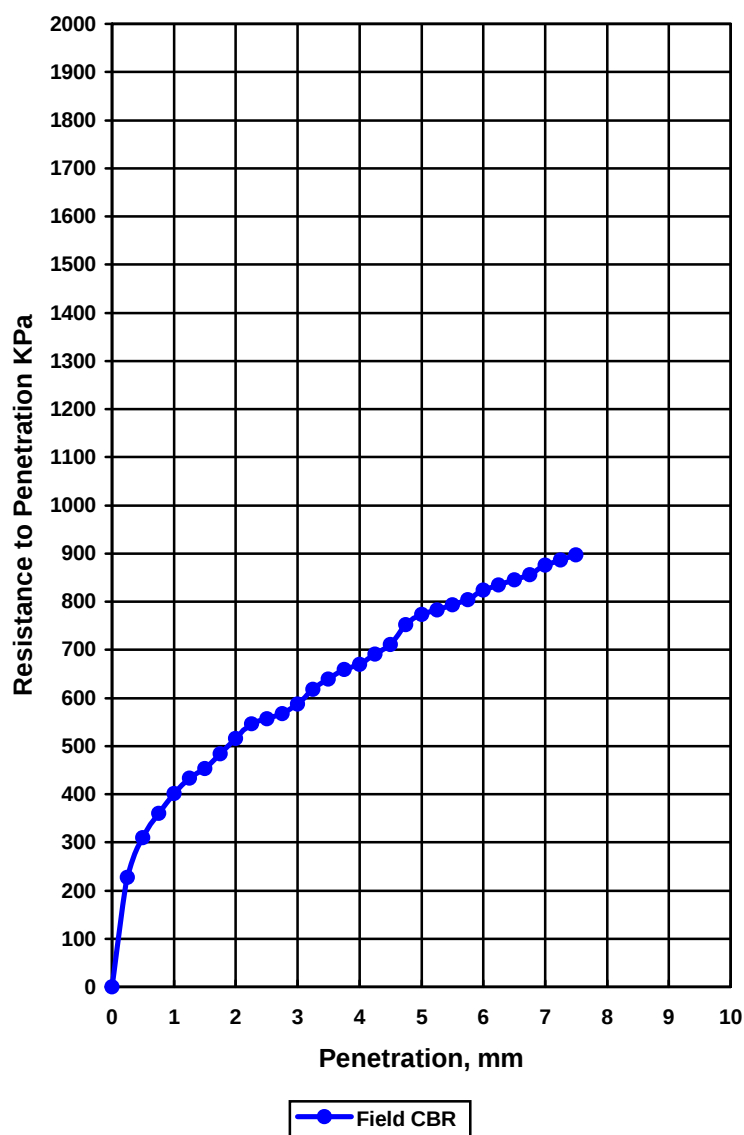


# RMS Engineering & Construction Unipessoal Lda

## FIELD CBR Test Results (ASTM-D4429)

Report No. GET 18-8002B

|                                                                                                                                          |                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| CLIENT: JICA STUDY TEAM                                                                                                                  | Field CBR                                                                                 |
| PROJECT : Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste | Test Pit No. 2<br>Depth: 1.15 meter<br>(STA: 9054054.16S ,777544.62E)<br>Date: 26.09.2018 |



| Moisture Content (%) | CBR at |         |
|----------------------|--------|---------|
|                      | 2.5 mm | 5.08 mm |
| 2.0                  | 8.06   | 7.50    |

**C.B.R. TEST RESULTS**  
Geotechnical Investigation

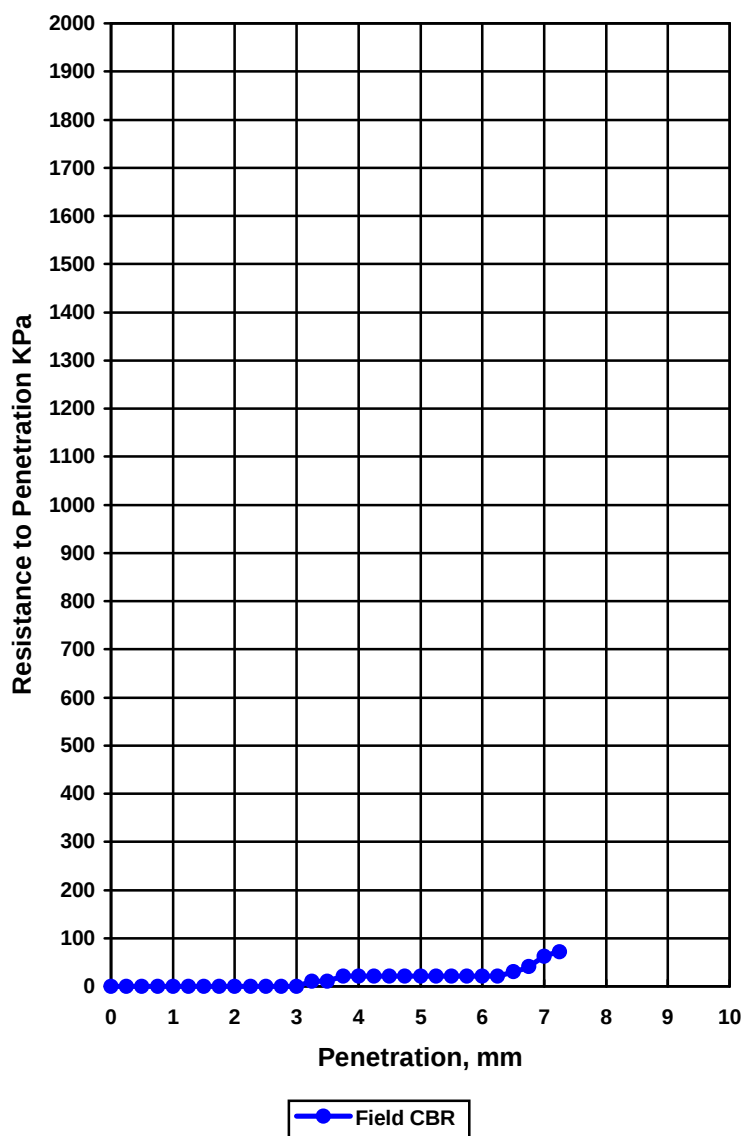


# RMS Engineering & Construction Unipessoal Lda

## FIELD CBR Test Results (ASTM-D4429)

Report No. GET 18-8002B

|                                                                                                                                                 |                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>CLIENT:</b> JICA STUDY TEAM                                                                                                                  | <b>Field CBR</b>                                                                           |
| <b>PROJECT</b> : Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste | Test Pit No. 3<br>Depth: 1.15 meter<br>(STA: 9053995.06S , 777629.38E)<br>Date: 24.09.2018 |



| Moisture Content (%) | CBR at |         |
|----------------------|--------|---------|
|                      | 2.5 mm | 5.08 mm |
| 12.5                 | 0.30   | -       |

**C.B.R. TEST RESULTS**  
Geotechnical Investigation

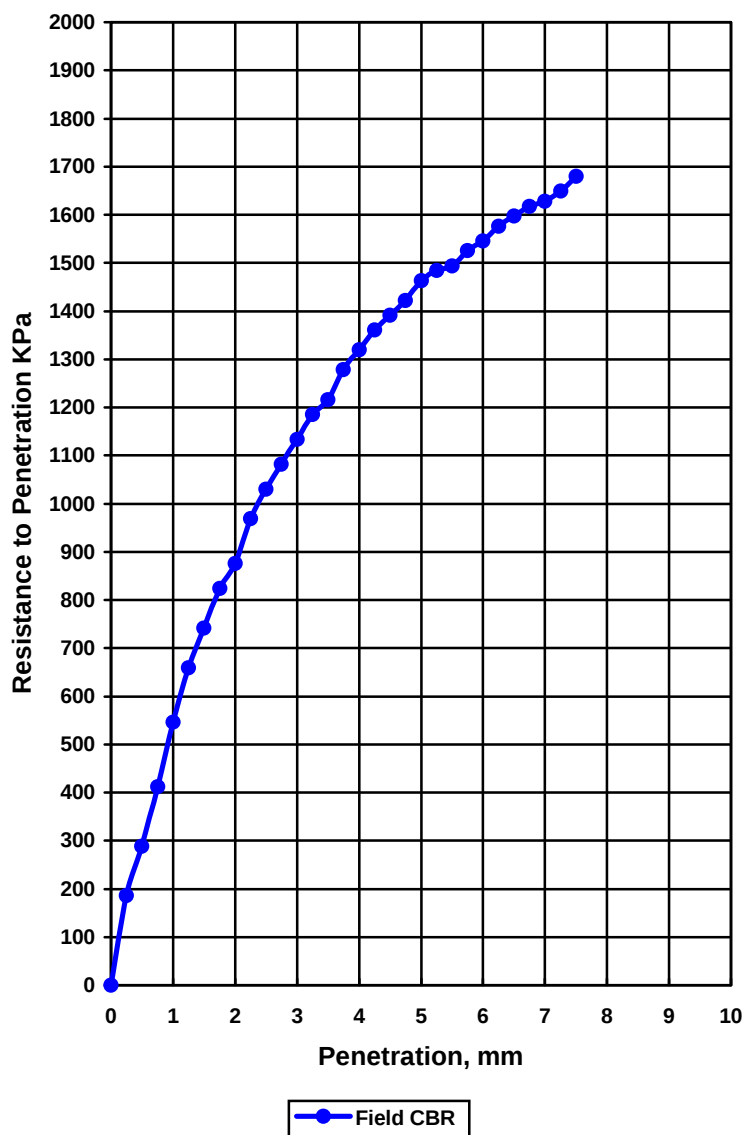


# RMS Engineering & Construction Unipessoal Lda

## FIELD CBR Test Results (ASTM-D4429)

Report No. GET 18-8002B

|                                                                                                                                          |                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| CLIENT: JICA STUDY TEAM                                                                                                                  | Field CBR                                                                                  |
| PROJECT : Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste | Test Pit No. 4<br>Depth: 1.1 meter<br>(STA: 9053769.00S , 777690.49E )<br>Date: 25.09.2018 |



| Moisture Content (%) | CBR at |         |
|----------------------|--------|---------|
|                      | 2.5 mm | 5.08 mm |
| 3.1                  | 7.92   | 8.00    |

**C.B.R. TEST RESULTS**  
Geotechnical Investigation

Field CBR – TP 4

# **Multiple Point Compaction Test Results Plates 13 to 16**



# RMS Engineering & Construction Unipessoal Lda

## COMPACTION TEST ( Dry Density/Moisture Content Relationship)

Report No. GET 18-8002b

|                                                                                                                                          |         |                                                     |         |
|------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------------------------------------------|---------|
| <b>CLIENT:</b> JICA STUDY TEAM                                                                                                           |         | <b>DATE:</b> 28/9/2018                              |         |
| <b>PROJECT:</b> GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, DILI, TIMOR LESTE |         | <b>LAB NO. :</b> GET-18-8002b                       |         |
|                                                                                                                                          |         | <b>TESTING METHOD:</b> AASHTO T-180D                |         |
| <b>LOCATION :</b> TP # 01 (STA: 9054203.00S , 777503.55E )                                                                               |         |                                                     |         |
| RETAINED % ON 20MM/37.5MM SIEVE.                                                                                                         |         |                                                     |         |
| <b>MASS OF MOULD ( m<sub>1</sub> )</b> 5161.20 g                                                                                         |         | <b>VOLUME OF MOULD ( V ) :</b> 2117 cm <sup>3</sup> |         |
| <b>Test Number</b>                                                                                                                       | 1       | 2                                                   | 3       |
| Mass of Mould + Soil ( m <sub>2</sub> )                                                                                                  | 8758.5  | 9129.5                                              | 9271.4  |
| Mass of Soil ( m <sub>2</sub> - m <sub>1</sub> ) g                                                                                       | 3597.3  | 3968.3                                              | 4110.2  |
| Bulk Density P = $\frac{m_2 - m_1}{V}$ KG/m <sup>3</sup>                                                                                 | 1699.24 | 1874.49                                             | 1941.52 |
| Moisture Content, Container No.                                                                                                          | A-5     | A-6                                                 | A-7     |
| Mass of Wet Soil + Container ( A ) g                                                                                                     | 230.4   | 201.9                                               | 191.3   |
| Mass of Dry Soil + Container ( B ) g                                                                                                     | 215.6   | 185.8                                               | 174.5   |
| Mass of Container ( C ) g                                                                                                                | 59.0    | 60.9                                                | 58.3    |
| Mass of Moisture ( D = A - B ) g                                                                                                         | 14.8    | 16.1                                                | 16.8    |
| Mass of Dry Soil ( E = B - C ) g                                                                                                         | 156.6   | 124.9                                               | 116.2   |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$ %                                                                           | 9.5     | 12.9                                                | 14.5    |
| Dry Density Pd = $\frac{100 P}{100 + W}$ kg/m <sup>3</sup>                                                                               | 1553    | 1660                                                | 1696    |

**Moisture Content (%)**

|                          |              |
|--------------------------|--------------|
| Maximum Dry Density      | <b>1715</b>  |
| Optimum Moisture Content | <b>17.2%</b> |
| Remarks:                 |              |



# RMS Engineering & Construction Unipessoal Lda

## COMPACTION TEST ( Dry Density/Moisture Content Relationship)

Report No. GET 18-8002b

|                                                                                                                                          |                           |                                      |                                |         |                            |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------------------|--------------------------------|---------|----------------------------|
| <b>CLIENT:</b> JICA STUDY TEAM                                                                                                           |                           | <b>DATE:</b> 28/9/2018               |                                |         |                            |
| <b>PROJECT:</b> GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, DILI, TIMOR LESTE |                           | <b>LAB NO. :</b> GET-18-8002b        |                                |         |                            |
|                                                                                                                                          |                           | <b>TESTING METHOD:</b> AASHTO T-180D |                                |         |                            |
| <b>LOCATION :</b> TP # 02 (STA: 9054054.16S , 777544.62E )                                                                               |                           |                                      |                                |         |                            |
| RETAINED % ON 20MM/37.5MM SIEVE.                                                                                                         |                           |                                      |                                |         |                            |
| <b>MASS OF MOULD ( m<sub>1</sub> )</b>                                                                                                   | 5161.20                   | <b>g</b>                             | <b>VOLUME OF MOULD ( V ) :</b> |         | 2117 <b>cm<sup>3</sup></b> |
| <b>Test Number</b>                                                                                                                       | 1                         | 2                                    | 3                              | 4       | 5                          |
| Mass of Mould + Soil ( m <sub>2</sub> )                                                                                                  | 8733.6                    | 8987.6                               | 9396.6                         | 9189.7  |                            |
| Mass of Soil ( m <sub>2</sub> - m <sub>1</sub> )                                                                                         | g 3572.4                  | 3826.4                               | 4235.4                         | 4028.5  |                            |
| Bulk Density P = $\frac{m_2 - m_1}{V}$                                                                                                   | KG/m <sup>3</sup> 1687.48 | 1807.46                              | 2000.66                        | 1902.93 |                            |
| Moisture Content, Container No.                                                                                                          | A-1                       | A-2                                  | A-3                            | A-4     |                            |
| Mass of Wet Soil + Container ( A )                                                                                                       | g 230.4                   | 163.0                                | 252.1                          | 316.2   |                            |
| Mass of Dry Soil + Container ( B )                                                                                                       | g 212.7                   | 149.8                                | 220.6                          | 264.7   |                            |
| Mass of Container ( C )                                                                                                                  | g 62.5                    | 58.5                                 | 62.2                           | 59.9    |                            |
| Mass of Moisture ( D = A - B )                                                                                                           | g 17.7                    | 13.2                                 | 31.5                           | 51.5    |                            |
| Mass of Dry Soil ( E = B - C )                                                                                                           | g 150.2                   | 91.3                                 | 158.4                          | 204.8   |                            |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$                                                                             | % 11.8                    | 14.5                                 | 19.9                           | 25.1    |                            |
| Dry Density Pd = $\frac{100 P}{100 + W}$                                                                                                 | kg/m <sup>3</sup> 1510    | 1579                                 | 1669                           | 1521    |                            |

**Moisture Content (%)**

**Maximum Dry Density** 1670

**Optimum Moisture Content** 19.5%

Remarks:



# RMS Engineering & Construction Unipessoal Lda

## COMPACTION TEST ( Dry Density/Moisture Content Relationship)

Report No. GET 18-8002b

|                                                                                                                                          |         |                                                     |         |
|------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------------------------------------------|---------|
| <b>CLIENT:</b> JICA STUDY TEAM                                                                                                           |         | <b>DATE:</b> 28/9/2018                              |         |
| <b>PROJECT:</b> GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, DILI, TIMOR LESTE |         | <b>LAB NO. :</b> GET-18-8002b                       |         |
|                                                                                                                                          |         | <b>TESTING METHOD:</b> AASHTO T-180D                |         |
| <b>LOCATION :</b> TP # 03 (STA: 9053995.06S , 777629.38E )                                                                               |         |                                                     |         |
| RETAINED % ON 20MM/37.5MM SIEVE.                                                                                                         |         |                                                     |         |
| <b>MASS OF MOULD ( m<sub>1</sub> )</b> 5161.20 g                                                                                         |         | <b>VOLUME OF MOULD ( V ) :</b> 2117 cm <sup>3</sup> |         |
| <b>Test Number</b>                                                                                                                       | 1       | 2                                                   | 3       |
| Mass of Mould + Soil ( m <sub>2</sub> )                                                                                                  | 8332.9  | 8423.3                                              | 8589.3  |
| Mass of Soil ( m <sub>2</sub> - m <sub>1</sub> ) g                                                                                       | 3171.7  | 3262.1                                              | 3428.1  |
| Bulk Density P = $\frac{m_2 - m_1}{V}$ KG/m <sup>3</sup>                                                                                 | 1498.21 | 1540.91                                             | 1619.32 |
| Moisture Content, Container No.                                                                                                          | D-2     | D-3                                                 | D-4     |
| Mass of Wet Soil + Container ( A ) g                                                                                                     | 166.9   | 221.5                                               | 223.7   |
| Mass of Dry Soil + Container ( B ) g                                                                                                     | 158.6   | 206.3                                               | 203.9   |
| Mass of Container ( C ) g                                                                                                                | 64.5    | 65.8                                                | 61.2    |
| Mass of Moisture ( D = A - B ) g                                                                                                         | 8.3     | 15.2                                                | 19.8    |
| Mass of Dry Soil ( E = B - C ) g                                                                                                         | 94.1    | 140.5                                               | 142.7   |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$ %                                                                           | 8.8     | 10.8                                                | 13.9    |
| Dry Density Pd = $\frac{100 P}{100 + W}$ kg/m <sup>3</sup>                                                                               | 1377    | 1390                                                | 1422    |

|  |                                       |
|--|---------------------------------------|
|  | <b>Maximum Dry Density</b> 1554       |
|  | <b>Optimum Moisture Content</b> 19.0% |
|  | <b>Remarks:</b>                       |



# RMS Engineering & Construction Unipessoal Lda

## COMPACTION TEST ( Dry Density/Moisture Content Relationship)

Report No. GET 18-8002b

|                                                                                                                                          |                   |                                      |         |                                                     |         |         |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------|---------|-----------------------------------------------------|---------|---------|
| <b>CLIENT:</b> JICA STUDY TEAM                                                                                                           |                   | <b>DATE:</b> 28/9/2018               |         |                                                     |         |         |
| <b>PROJECT:</b> GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, DILI, TIMOR LESTE |                   | <b>LAB NO. :</b> GET-18-8002b        |         |                                                     |         |         |
|                                                                                                                                          |                   | <b>TESTING METHOD:</b> AASHTO T-180D |         |                                                     |         |         |
| <b>LOCATION :</b> TP # 04a (STA: 9053769.00S , 777690.49E )                                                                              |                   |                                      |         |                                                     |         |         |
| RETAINED % ON 20MM/37.5MM SIEVE.                                                                                                         |                   |                                      |         |                                                     |         |         |
| <b>MASS OF MOULD ( m<sub>1</sub> )</b> 5161.20                                                                                           |                   | <b>g</b>                             |         | <b>VOLUME OF MOULD ( V ) :</b> 2117 cm <sup>3</sup> |         |         |
| <b>Test Number</b>                                                                                                                       |                   | 1                                    | 2       | 3                                                   | 4       | 5       |
| Mass of Mould + Soil ( m <sub>2</sub> )                                                                                                  |                   | 8834.2                               | 8974.1  | 9251.4                                              | 9352.2  | 9397.2  |
| Mass of Soil ( m <sub>2</sub> - m <sub>1</sub> )                                                                                         | g                 | 3673.0                               | 3812.9  | 4090.2                                              | 4191.0  | 4236.0  |
| Bulk Density P = $\frac{m_2 - m_1}{V}$                                                                                                   | KG/m <sup>3</sup> | 1735.00                              | 1801.09 | 1932.07                                             | 1979.69 | 2000.94 |
| Moisture Content, Container No.                                                                                                          |                   | C-4                                  | C-5     | C-6                                                 | C-7     | C-8     |
| Mass of Wet Soil + Container ( A )                                                                                                       | g                 | 235.8                                | 230.4   | 162.0                                               | 206.0   | 185.8   |
| Mass of Dry Soil + Container ( B )                                                                                                       | g                 | 222.4                                | 215.1   | 149.6                                               | 184.3   | 163.0   |
| Mass of Container ( C )                                                                                                                  | g                 | 40.6                                 | 41.7    | 37.3                                                | 33.2    | 33.3    |
| Mass of Moisture ( D = A - B )                                                                                                           | g                 | 13.4                                 | 15.3    | 12.4                                                | 21.7    | 22.8    |
| Mass of Dry Soil ( E = B - C )                                                                                                           | g                 | 181.8                                | 173.4   | 112.3                                               | 151.1   | 129.7   |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$                                                                             | %                 | 7.4                                  | 8.8     | 11.0                                                | 14.4    | 17.6    |
| Dry Density Pd = $\frac{100 P}{100 + W}$                                                                                                 | kg/m <sup>3</sup> | 1616                                 | 1655    | 1740                                                | 1731    | 1702    |

**Moisture Content (%)**

**Maximum Dry Density** 1745

**Optimum Moisture Content** 11.8%

**Remarks:**

# **Soaked and Un-Soaked Laboratory CBR Plates 17 to 32**


**RMS Engineering & Construction Unipessoal Lda**
**CALIFORNIA BEARING RATIO TEST REPORT**

Report No. GET 18-8002B

**CLIENT:** JICA STUDY TEAM

**PROJECT:** GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 1

Sample No. S-1

**Location:** TP # 1 , S-1

Layer Depth 1.10 (m)

**Sampling Procedure:** JIS1211

Station. -

**Prooving Ring** KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

**Area of Pistion** 1940.785 mm<sup>2</sup>

Date of Testing: 02.09.2018

| Density Determination                 | 17 Blows | 42 Blows | 92 Blows |
|---------------------------------------|----------|----------|----------|
| Mould No.                             | A-1      | A-2      | A-3      |
| Wt. of sample + mold (gms)            | 10244.1  | 10417.7  | 10585.5  |
| Wt. of mold (gms)                     | 6376.8   | 6438.5   | 6318.5   |
| Wt. of Sample (gm/cm <sup>3</sup> )   | 3867.3   | 3979.2   | 4267     |
| <b>Wet Density (Kg/m<sup>3</sup>)</b> | 1836     | 1889     | 2026     |
| <b>Dry density (kg/m<sup>3</sup>)</b> | 1566     | 1622     | 1744     |
| <b>% Compaction</b>                   | 91.31%   | 94.60%   | 101.69%  |

| Moisture Determination        | Before Compaction | Before Compaction | Before Compaction |
|-------------------------------|-------------------|-------------------|-------------------|
| Can No.                       | C-9               | C-10              | C-11              |
| Wet Soil + can (gms)          | 260.6             | 208.6             | 237.3             |
| Dry soil + can (gms)          | 232.0             | 187.5             | 212.4             |
| Wt. of moisture (gms)         | 28.6              | 21.1              | 24.9              |
| Wt. of can (gms)              | 66.2              | 59.2              | 58.4              |
| Wt. of dry soil (gms)         | 165.8             | 128.3             | 154               |
| <b>Moisture content ( % )</b> | <b>17.2</b>       | <b>16.4</b>       | <b>16.2</b>       |

| SWELL                         | 17 Blows     | 42 Blows     | 92 Blows     |
|-------------------------------|--------------|--------------|--------------|
| Reading before Soaking (25mm) | 0            | 0            | 0            |
| Reading after Soaking (25mm)  | 416          | 307          | 265          |
| <b>Swell (%)</b>              | <b>3.58%</b> | <b>2.64%</b> | <b>2.28%</b> |

| Penetration (mm) | Dial Reading |    |    | Resistance to Penetration, KPa |       |       |
|------------------|--------------|----|----|--------------------------------|-------|-------|
|                  | Blows        |    |    | Blows                          |       |       |
|                  | 17           | 42 | 92 | 17                             | 42    | 92    |
| 0.64             | 4            | 5  | 6  | 41.2                           | 51.5  | 61.8  |
| 1.27             | 5            | 7  | 11 | 51.5                           | 72.1  | 113.4 |
| 1.91             | 6            | 9  | 14 | 61.8                           | 92.7  | 144.3 |
| 2.54             | 6            | 12 | 20 | 61.8                           | 123.7 | 206.1 |
| 3.17             | 7            | 16 | 23 | 72.1                           | 164.9 | 237.0 |
| 3.80             | 8            | 21 | 29 | 82.4                           | 216.4 | 298.8 |
| 5.08             | 9            | 25 | 37 | 92.7                           | 257.6 | 381.3 |
| 6.35             | 10           | 31 | 49 | 103.1                          | 319.5 | 505.0 |
| 7.62             | 11           | 35 | 59 | 113.4                          | 360.7 | 608.0 |
| 8.90             | 12           | 38 | 67 | 123.7                          | 391.6 | 690.4 |
| 10.16            | 13           | 41 | 76 | 134.0                          | 422.5 | 783.2 |

| CBR (%) |      |      |      |
|---------|------|------|------|
| Blows   | 17   | 42   | 92   |
| 2.54mm  | 0.90 | 1.79 | 2.99 |
| 5.08mm  | 0.90 | 2.50 | 3.70 |

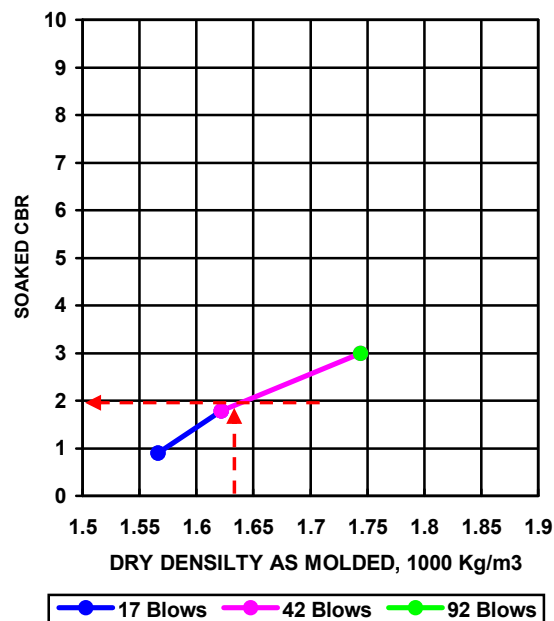
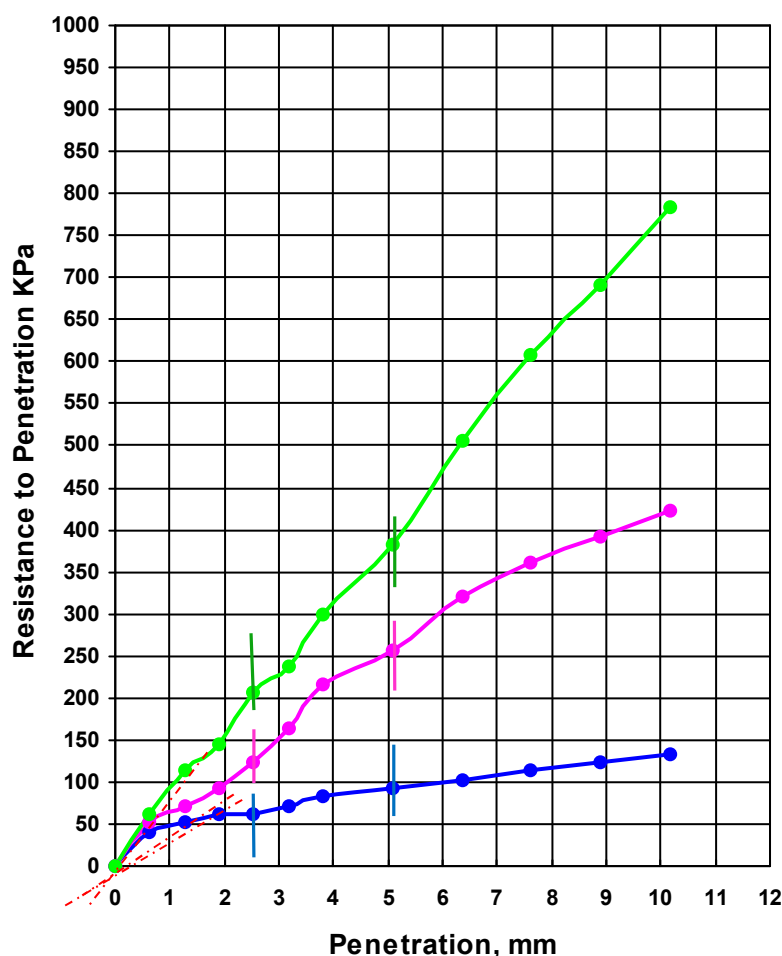


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Soaked(JIS1211)</b>                                                                  |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 1</b><br>(STA: 9054203.00S ,<br>777503.55E )<br><b>Date: 10.10.2018</b> |



The CBR at 95 percent of the maximum dry density:

- 95 percent of 1715 kg/m<sup>3</sup> = 1629 kg/m<sup>3</sup>.
- At 1629 kg/m<sup>3</sup>, the CBR is 1.9 %.

| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 17                                  | 1566                  | 91                                       | 0.90   | 0.90    | 3.58     |
| 42                                  | 1622                  | 95                                       | 1.79   | 2.50    | 2.64     |
| 92                                  | 1744                  | 102                                      | 2.99   | 3.70    | 2.28     |

**C.B.R. TEST RESULTS**  
**Geotechnical Investigation**

**PLATE – TP-1/SOAKED**



RMS Engineering & Construction Unipessoal Lda

## CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF  
PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT  
PROJECT, DILI, TIMOR LESTE

Test no. TP# 2

Sample No. S-1

Location: TP # 2

Layer Depth 1.15 (m)

Sampling Procedure: JIS1211

Station. -

Proving Ring KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

Area of Piston 1940.785 mm<sup>2</sup>

Date of Testing: 03.09.2018

| Density Determination               | 17 Blows | 42 Blows | 92 Blows |
|-------------------------------------|----------|----------|----------|
| Mould No.                           | A-4      | A-5      | A-6      |
| Wt. of sample + mold (gms)          | 11460.6  | 11793.3  | 11709.7  |
| Wt. of mold (gms)                   | 7752.7   | 7835.1   | 7492.0   |
| Wt. of Sample (gm/cm <sup>3</sup> ) | 3707.9   | 3958.2   | 4217.7   |
| Wet Density (Kg/m <sup>3</sup> )    | 1760     | 1879     | 2003     |
| Dry density (kg/m <sup>3</sup> )    | 1480     | 1588     | 1678     |
| % Compaction                        | 88.61%   | 95.10%   | 100.50%  |

| Moisture Determination | Before Compaction | Before Compaction | Before Compaction |
|------------------------|-------------------|-------------------|-------------------|
| Can No.                | C-15              | C-16              | C-17              |
| Wet Soil + can (gms)   | 193.2             | 201.9             | 191.7             |
| Dry soil + can (gms)   | 168.9             | 176.1             | 166.4             |
| Wt. of moisture (gms)  | 24.3              | 25.8              | 25.3              |
| Wt. of can (gms)       | 40.8              | 35.4              | 35.4              |
| Wt. of dry soil (gms)  | 128.1             | 140.7             | 131               |
| Moisture content ( % ) | 19.0              | 18.3              | 19.3              |

| SWELL                         | 17 Blows | 42 Blows | 92 Blows |
|-------------------------------|----------|----------|----------|
| Reading before Soaking (25mm) | 0        | 0        | 0        |
| Reading after Soaking (25mm)  | 593      | 433      | 385      |
| Swell (%)                     | 5.10%    | 3.72%    | 3.31%    |

| Penetration (mm) | Dial Reading |    |    | Resistance to Penetration, KPa |       |       |
|------------------|--------------|----|----|--------------------------------|-------|-------|
|                  | Blows        |    |    | Blows                          |       |       |
|                  | 17           | 42 | 92 | 17                             | 42    | 92    |
| 0.64             | 2            | 4  | 5  | 20.6                           | 41.2  | 51.5  |
| 1.27             | 3            | 5  | 7  | 30.9                           | 51.5  | 72.1  |
| 1.91             | 4            | 7  | 10 | 41.2                           | 72.1  | 103.1 |
| 2.54             | 5            | 9  | 12 | 51.5                           | 92.7  | 123.7 |
| 3.17             | 6            | 11 | 15 | 61.8                           | 113.4 | 154.6 |
| 3.80             | 6            | 13 | 17 | 61.8                           | 134.0 | 175.2 |
| 5.08             | 8            | 16 | 23 | 82.4                           | 164.9 | 237.0 |
| 6.35             | 9            | 19 | 27 | 92.7                           | 195.8 | 278.2 |
| 7.62             | 11           | 21 | 31 | 113.4                          | 216.4 | 319.5 |
| 8.90             | 12           | 24 | 35 | 123.7                          | 247.3 | 360.7 |
| 10.16            | 14           | 26 | 38 | 144.3                          | 267.9 | 391.6 |

| CBR (%) |      |      |      |
|---------|------|------|------|
| Blows   | 17   | 42   | 92   |
| 2.54mm  | 0.75 | 1.34 | 1.79 |
| 5.08mm  | 0.80 | 1.60 | 2.30 |

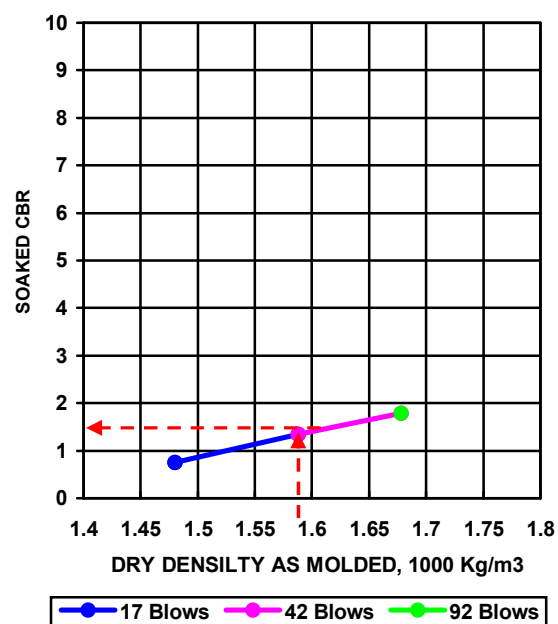
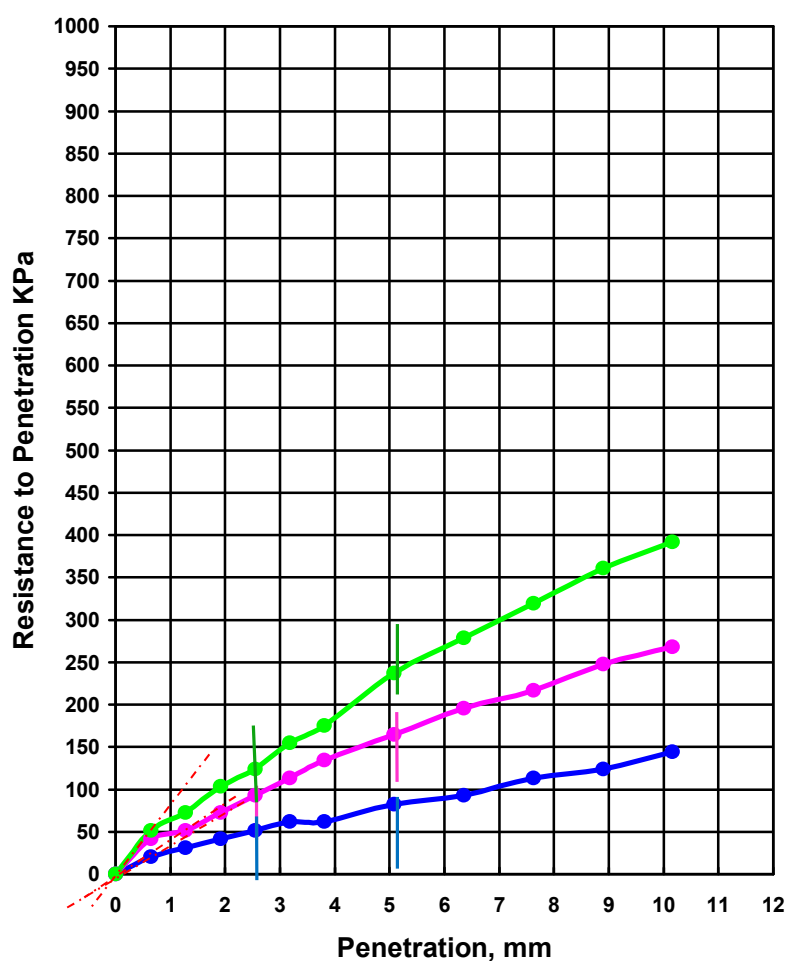


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Soaked/JIS1211</b>                                                                   |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 2</b><br>(STA: 9054054.16S ,<br>777544.62E )<br><b>Date: 16.10.2018</b> |



The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1670 kg/m<sup>3</sup> = 1587 kg/m<sup>3</sup>.
2. At 1587 kg/m<sup>3</sup>, the CBR is 1.3 %.

| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 17                                  | 1480                  | 89                                       | 0.75   | 0.80    | 5.10     |
| 42                                  | 1588                  | 95                                       | 1.34   | 1.60    | 3.72     |
| 92                                  | 1678                  | 101                                      | 1.79   | 2.30    | 3.31     |

**C.B.R. TEST RESULTS**  
**Geotechnical Investigation**

**PLATE – TP-2/SOAKED**



RMS Engineering & Construction Unipessoal Lda

## CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF  
PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT  
PROJECT, DILI, TIMOR LESTE

Test no. TP# 3

Sample No. S-1

Location: TP # 3

Layer Depth 1.15 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

Area of Piston 1940.785 mm2

Date of Testing: 03.09.2018

| Density Determination               | 17 Blows | 42 Blows | 92 Blows |
|-------------------------------------|----------|----------|----------|
| Mould No.                           | B-1      | B-2      | B-3      |
| Wt. of sample + mold (gms)          | 12000.2  | 10210.9  | 10561.6  |
| Wt. of mold (gms)                   | 8400     | 6495.0   | 6601.0   |
| Wt. of Sample (gm/cm <sup>3</sup> ) | 3600.2   | 3715.9   | 3960.6   |
| Wet Density (Kg/m <sup>3</sup> )    | 1709     | 1764     | 1880     |
| Dry density (kg/m <sup>3</sup> )    | 1449     | 1492     | 1590     |
| % Compaction                        | 93.26%   | 96.01%   | 102.29%  |

| Moisture Determination | Before Compaction | Before Compaction | Before Compaction |
|------------------------|-------------------|-------------------|-------------------|
| Can No.                | D-2               | D-3               | D-4               |
| Wet Soil + can (gms)   | 220.9             | 227.8             | 217               |
| Dry soil + can (gms)   | 197.1             | 202.8             | 192.9             |
| Wt. of moisture (gms)  | 23.8              | 25                | 24.1              |
| Wt. of can (gms)       | 64.5              | 65.8              | 61.2              |
| Wt. of dry soil (gms)  | 132.6             | 137               | 131.7             |
| Moisture content ( %)  | 17.9              | 18.2              | 18.3              |

| SWELL                         | 17 Blows | 42 Blows | 92 Blows |
|-------------------------------|----------|----------|----------|
| Reading before Soaking (25mm) | 0        | 0        | 0        |
| Reading after Soaking (25mm)  | 449      | 357      | 301      |
| Swell (%)                     | 3.86%    | 3.07%    | 2.59%    |

| Penetration (mm) | Dial Reading |    |    | Resistance to Penetration, KPa |       |       |
|------------------|--------------|----|----|--------------------------------|-------|-------|
|                  | Blows        |    |    | Blows                          |       |       |
|                  | 17           | 42 | 92 | 17                             | 42    | 92    |
| 0.64             | 4            | 6  | 7  | 41.2                           | 61.8  | 72.1  |
| 1.27             | 6            | 10 | 11 | 61.8                           | 103.1 | 113.4 |
| 1.91             | 8            | 13 | 16 | 82.4                           | 134.0 | 164.9 |
| 2.54             | 9            | 15 | 20 | 92.7                           | 154.6 | 206.1 |
| 3.17             | 11           | 17 | 29 | 113.4                          | 175.2 | 298.8 |
| 3.80             | 13           | 20 | 39 | 134.0                          | 206.1 | 401.9 |
| 5.08             | 19           | 24 | 52 | 195.8                          | 247.3 | 535.9 |
| 6.35             | 23           | 29 | 61 | 237.0                          | 298.8 | 628.6 |
| 7.62             | 27           | 35 | 72 | 278.2                          | 360.7 | 742.0 |
| 8.90             | 31           | 41 | 74 | 319.5                          | 422.5 | 762.6 |
| 10.16            | 37           | 46 | 76 | 381.3                          | 474.0 | 783.2 |

| CBR (%) |      |      |      |
|---------|------|------|------|
| Blows   | 17   | 42   | 92   |
| 2.54mm  | 1.34 | 2.24 | 2.99 |
| 5.08mm  | 1.90 | 2.40 | 5.20 |

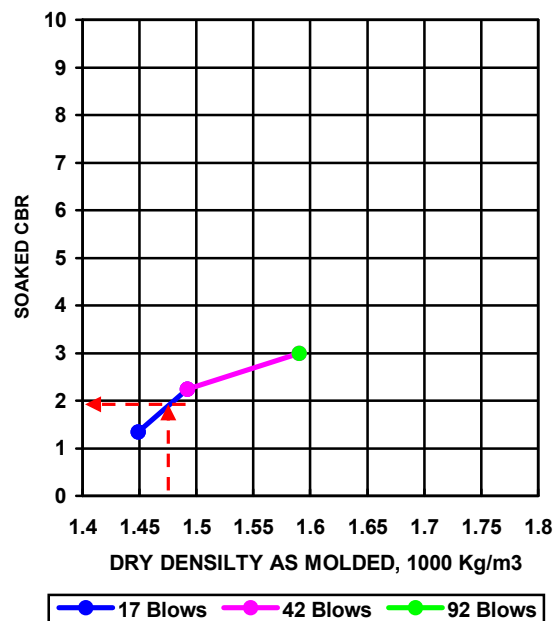
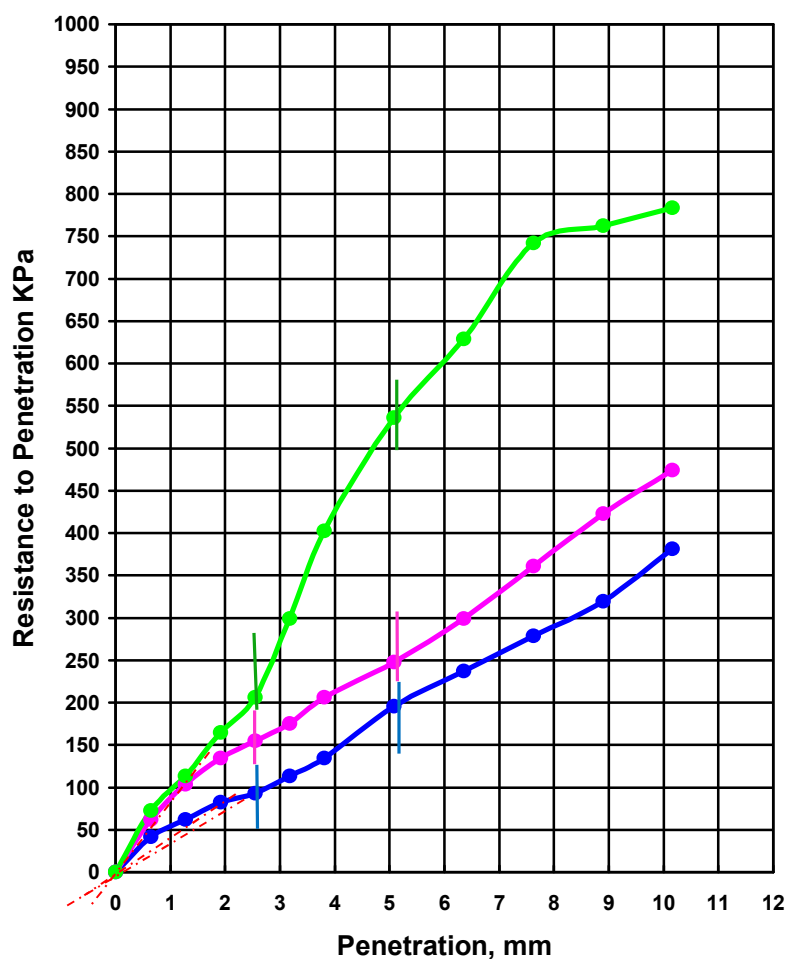


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Soaked/JIS1211</b>                                                                   |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 3</b><br>(STA: 9053995.06S ,<br>777629.38E )<br><b>Date: 17.09.2018</b> |



The CBR at 95 percent of the maximum dry density:

- 95 percent of 1554 kg/m<sup>3</sup> = 1476 kg/m<sup>3</sup>.
- At 1476 kg/m<sup>3</sup>, the CBR is 1.9 %.

| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 17                                  | 1449                  | 93                                       | 1.34   | 1.90    | 3.86     |
| 42                                  | 1492                  | 96                                       | 2.24   | 2.40    | 3.07     |
| 92                                  | 1590                  | 102                                      | 2.99   | 5.20    | 2.59     |

**C.B.R. TEST RESULTS**  
Geotechnical Investigation

**PLATE – TP-3/SOAKED**



**RMS Engineering & Construction Unipessoal Lda**

## CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

**CLIENT:** JICA STUDY TEAM

**PROJECT:** GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF  
PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT  
PROJECT, DILI, TIMOR LESTE

Test no. TP# 4

Sample No. S-1

**Location:** TP # 4

Layer Depth 1.10 (m)

**Sampling Procedure:** JIS1211

Station. -

**Prooving Ring** KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

**Area of Pistion** 1940.785 mm<sup>2</sup>

Date of Testing: 03.09.2018

| Density Determination                 | 17 Blows | 42 Blows | 92 Blows |
|---------------------------------------|----------|----------|----------|
| Mould No.                             | A-7      | A-8      | A-9      |
| Wt. of sample + mold (gms)            | 11146.1  | 11487.5  | 11628.5  |
| Wt. of mold (gms)                     | 7423.2   | 7563.4   | 7498.6   |
| Wt. of Sample (gm/cm <sup>3</sup> )   | 3722.9   | 3924.1   | 4129.9   |
| <b>Wet Density (Kg/m<sup>3</sup>)</b> | 1768     | 1863     | 1961     |
| <b>Dry density (kg/m<sup>3</sup>)</b> | 1590     | 1673     | 1767     |
| <b>% Compaction</b>                   | 91.13%   | 95.86%   | 101.27%  |

| Moisture Determination       | Before Compaction | Before Compaction | Before Compaction |
|------------------------------|-------------------|-------------------|-------------------|
| Can No.                      | C-4               | C-5               | C-6               |
| Wet Soil + can (gms)         | 160.2             | 179.7             | 190.2             |
| Dry soil + can (gms)         | 148.2             | 165.6             | 175.1             |
| Wt. of moisture (gms)        | 12                | 14.1              | 15.1              |
| Wt. of can (gms)             | 40.6              | 41.7              | 37.3              |
| Wt. of dry soil (gms)        | 107.6             | 123.9             | 137.8             |
| <b>Moisture content ( %)</b> | <b>11.2</b>       | <b>11.4</b>       | <b>11.0</b>       |

| SWELL                         | 17 Blows     | 42 Blows     | 92 Blows     |
|-------------------------------|--------------|--------------|--------------|
| Reading before Soaking (25mm) | 0            | 0            | 0            |
| Reading after Soaking (25mm)  | 441          | 345          | 336          |
| <b>Swell (%)</b>              | <b>3.79%</b> | <b>2.97%</b> | <b>2.89%</b> |

| Penetration (mm) | Dial Reading |    |    | Resistance to Penetration, KPa |       |       |
|------------------|--------------|----|----|--------------------------------|-------|-------|
|                  | Blows        |    |    | Blows                          |       |       |
|                  | 17           | 42 | 92 | 17                             | 42    | 92    |
| 0.64             | 3            | 4  | 5  | 30.9                           | 41.2  | 51.5  |
| 1.27             | 4            | 5  | 6  | 41.2                           | 51.5  | 61.8  |
| 1.91             | 5            | 6  | 7  | 51.5                           | 61.8  | 72.1  |
| 2.54             | 6            | 7  | 9  | 61.8                           | 72.1  | 92.7  |
| 3.17             | 8            | 9  | 11 | 82.4                           | 92.7  | 113.4 |
| 3.80             | 9            | 11 | 14 | 92.7                           | 113.4 | 144.3 |
| 5.08             | 11           | 13 | 19 | 113.4                          | 134.0 | 195.8 |
| 6.35             | 14           | 16 | 24 | 144.3                          | 164.9 | 247.3 |
| 7.62             | 17           | 18 | 31 | 175.2                          | 185.5 | 319.5 |
| 8.90             | 21           | 23 | 37 | 216.4                          | 237.0 | 381.3 |
| 10.16            | 24           | 25 | 42 | 247.3                          | 257.6 | 432.8 |

| CBR (%) |      |      |      |
|---------|------|------|------|
| Blows   | 17   | 42   | 92   |
| 2.54mm  | 0.90 | 1.05 | 1.34 |
| 5.08mm  | 1.10 | 1.30 | 1.90 |

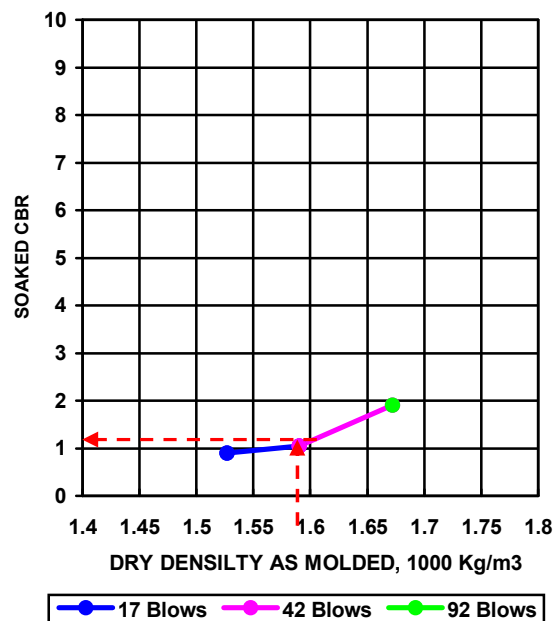
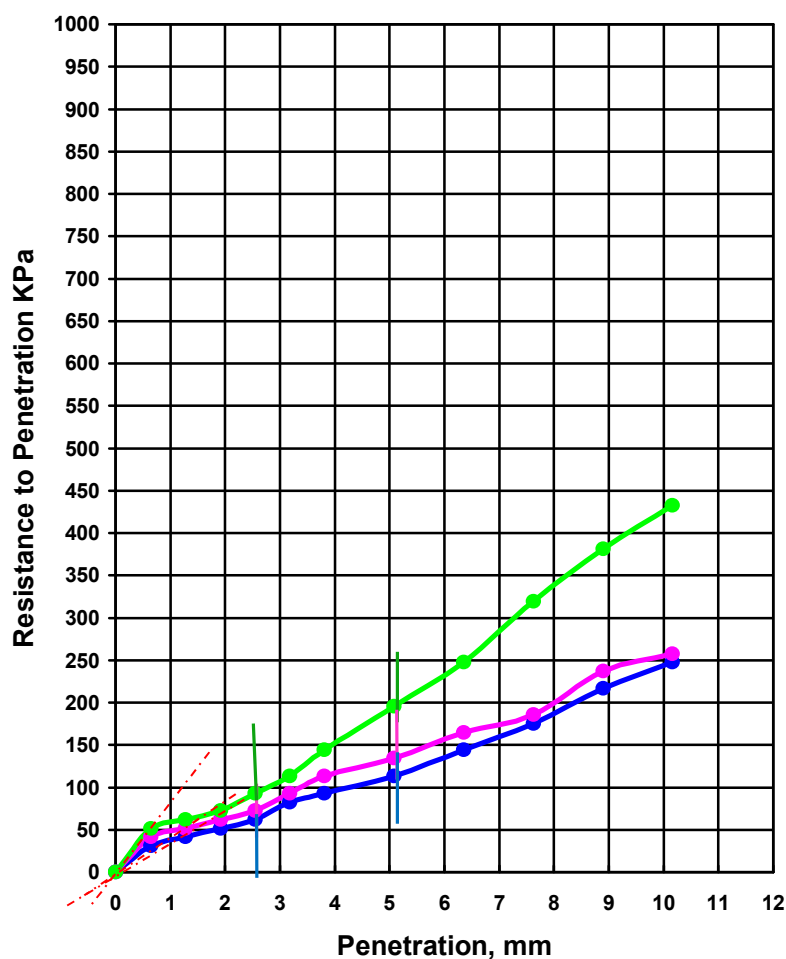


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Soaked/JIS1211</b>                                                                   |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 4</b><br>(STA: 9053769.00S ,<br>777690.49E )<br><b>Date: 17.10.2018</b> |



The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1745 kg/m<sup>3</sup> = 1658 kg/m<sup>3</sup>.
2. At 1658 kg/m<sup>3</sup>, the CBR is 1.1 %.

| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 17                                  | 1590                  | 91                                       | 0.90   | 1.10    | 3.79     |
| 42                                  | 1673                  | 96                                       | 1.05   | 1.30    | 2.97     |
| 92                                  | 1767                  | 101                                      | 1.34   | 1.90    | 2.89     |

**C.B.R. TEST RESULTS**  
Geotechnical Investigation



**RMS Engineering & Construction Unipessoal Lda**

**CALIFORNIA BEARING RATIO TEST REPORT**

Report No. GET 18-8002B

**CLIENT:** JICA STUDY TEAM

**PROJECT:** GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 1

Sample No. S-1

**Location:** TP # 1

Layer Depth 1.10 (m)

**Sampling Procedure:** JIS1211

Station. -

**Prooving Ring** KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

**Area of Pistion** 1940.785 mm<sup>2</sup>

Date of Testing: 09.10.2018

| Density Determination                 | 17 Blows | 42 Blows | 92 Blows |
|---------------------------------------|----------|----------|----------|
| Mould No.                             | A-10     | A-11     | A-12     |
| Wt. of sample + mold (gms)            | 11366.8  | 11662.3  | 12019.0  |
| Wt. of mold (gms)                     | 7554.1   | 7597.6   | 7805.0   |
| Wt. of Sample (gm/cm <sup>3</sup> )   | 3812.7   | 4064.7   | 4214     |
| <b>Wet Density (Kg/m<sup>3</sup>)</b> | 1810     | 1930     | 2001     |
| <b>Dry density (kg/m<sup>3</sup>)</b> | 1554     | 1657     | 1722     |
| <b>% Compaction</b>                   | 90.59%   | 96.64%   | 100.42%  |

| Moisture Determination        | Before Compaction | Before Compaction | Before Compaction |
|-------------------------------|-------------------|-------------------|-------------------|
| Can No.                       | D-5               | C-10              | C-11              |
| Wet Soil + can (gms)          | 227.6             | 208.6             | 237.3             |
| Dry soil + can (gms)          | 203.5             | 187.5             | 212.4             |
| Wt. of moisture (gms)         | 24.1              | 21.1              | 24.9              |
| Wt. of can (gms)              | 57.6              | 59.2              | 58.4              |
| Wt. of dry soil (gms)         | 145.9             | 128.3             | 154               |
| <b>Moisture content ( % )</b> | <b>16.5</b>       | <b>16.4</b>       | <b>16.2</b>       |

| SWELL                         | 17 Blows     | 42 Blows     | 92 Blows     |
|-------------------------------|--------------|--------------|--------------|
| Reading before Soaking (25mm) | 0            | 0            | 0            |
| Reading after Soaking (25mm)  | 0            | 0            | 0            |
| <b>Swell (%)</b>              | <b>0.00%</b> | <b>0.00%</b> | <b>0.00%</b> |

| Penetration (mm) | Dial Reading |     |     | Resistance to Penetration, KPa |        |        |
|------------------|--------------|-----|-----|--------------------------------|--------|--------|
|                  | Blows        |     |     | Blows                          |        |        |
|                  | 17           | 42  | 92  | 17                             | 42     | 92     |
| 0.64             | 13           | 22  | 37  | 134.0                          | 226.7  | 381.3  |
| 1.27             | 42           | 49  | 66  | 432.8                          | 505.0  | 680.1  |
| 1.91             | 60           | 75  | 90  | 618.3                          | 772.9  | 927.5  |
| 2.54             | 68           | 91  | 112 | 700.7                          | 937.8  | 1154.2 |
| 3.17             | 81           | 110 | 137 | 834.7                          | 1133.6 | 1411.8 |
| 3.80             | 91           | 124 | 156 | 937.8                          | 1277.8 | 1607.6 |
| 5.08             | 102          | 150 | 196 | 1051.1                         | 1545.8 | 2019.8 |
| 6.35             | 111          | 177 | 240 | 1143.9                         | 1824.0 | 2473.2 |
| 7.62             | 117          | 191 | 254 | 1205.7                         | 1968.3 | 2617.5 |
| 8.90             | 126          | 214 | 262 | 1298.4                         | 2205.3 | 2699.9 |
| 10.16            | 132          | 232 | 278 | 1360.3                         | 2390.8 | 2864.8 |

| CBR (%) |       |       |       |
|---------|-------|-------|-------|
| Blows   | 17    | 42    | 92    |
| 2.54mm  | 10.16 | 13.59 | 16.73 |
| 5.08mm  | 10.21 | 15.01 | 19.61 |

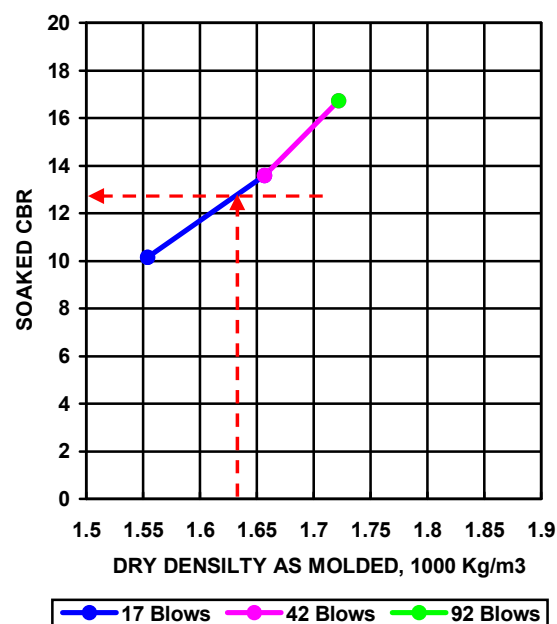
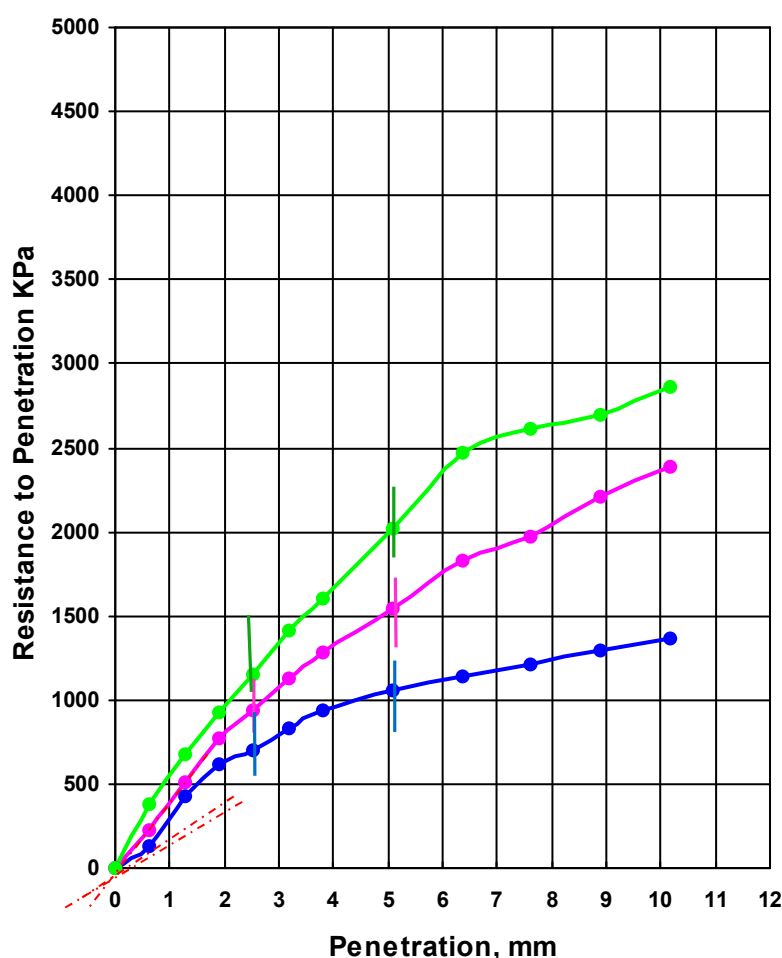


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Un-soaked/JIS1211</b>                                                                |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 1</b><br>(STA: 9054203.00S ,<br>777503.55E )<br><b>Date: 12.10.2018</b> |



The CBR at 95 percent of the maximum dry density:

- 95 percent of 1715 kg/m<sup>3</sup> = 1629 kg/m<sup>3</sup>.
- At 1629 kg/m<sup>3</sup>, the CBR is 12.8 %.

| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |
| 17                                  | 1554                  | 91                                       | 10.16  | 10.21   |
| 42                                  | 1657                  | 97                                       | 13.59  | 15.01   |
| 92                                  | 1722                  | 100                                      | 16.73  | 19.61   |

**C.B.R. TEST RESULTS**  
**Geotechnical Investigation**

**PLATE – TP-1/UN-SOAKED**



RMS Engineering & Construction Unipessoal Lda

## CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF  
PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT  
PROJECT, DILI, TIMOR LESTE

Test no. TP# 2

Sample No. S-1

Location: TP # 2

Layer Depth 1.15 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

Area of Piston 1940.785 mm2

Date of Testing: 03.09.2018

| Density Determination               | 17 Blows | 42 Blows | 92 Blows |
|-------------------------------------|----------|----------|----------|
| Mould No.                           | A-10     | A-11     | A-12     |
| Wt. of sample + mold (gms)          | 11429    | 11621.0  | 12019.0  |
| Wt. of mold (gms)                   | 7554.1   | 7597.6   | 7805.0   |
| Wt. of Sample (gm/cm <sup>3</sup> ) | 3874.9   | 4023.4   | 4214     |
| Wet Density (Kg/m <sup>3</sup> )    | 1840     | 1910     | 2001     |
| Dry density (kg/m <sup>3</sup> )    | 1549     | 1620     | 1688     |
| % Compaction                        | 92.77%   | 97.03%   | 101.07%  |

| Moisture Determination | Before Compaction | Before Compaction | Before Compaction |
|------------------------|-------------------|-------------------|-------------------|
| Can No.                | A-3               | A-4               | A-5               |
| Wet Soil + can (gms)   | 274.8             | 235.4             | 280.5             |
| Dry soil + can (gms)   | 241.3             | 208.8             | 245.9             |
| Wt. of moisture (gms)  | 33.5              | 26.6              | 34.6              |
| Wt. of can (gms)       | 62.6              | 60.1              | 59.3              |
| Wt. of dry soil (gms)  | 178.7             | 148.7             | 186.6             |
| Moisture content ( % ) | 18.7              | 17.9              | 18.5              |

| SWELL                         | 17 Blows | 42 Blows | 92 Blows |
|-------------------------------|----------|----------|----------|
| Reading before Soaking (25mm) | 0        | 0        | 0        |
| Reading after Soaking (25mm)  | 0        | 0        | 0        |
| Swell (%)                     | 0.00%    | 0.00%    | 0.00%    |

| Penetration (mm) | Dial Reading |     |     | Resistance to Penetration, KPa |        |        |
|------------------|--------------|-----|-----|--------------------------------|--------|--------|
|                  | Blows        |     |     | Blows                          |        |        |
|                  | 17           | 42  | 92  | 17                             | 42     | 92     |
| 0.64             | 10           | 14  | 19  | 103.1                          | 144.3  | 195.8  |
| 1.27             | 21           | 29  | 32  | 216.4                          | 298.8  | 329.8  |
| 1.91             | 29           | 40  | 44  | 298.8                          | 412.2  | 453.4  |
| 2.54             | 39           | 52  | 59  | 401.9                          | 535.9  | 608.0  |
| 3.17             | 55           | 75  | 84  | 566.8                          | 772.9  | 865.6  |
| 3.80             | 70           | 86  | 103 | 721.4                          | 886.2  | 1061.4 |
| 5.08             | 82           | 106 | 128 | 845.0                          | 1092.3 | 1319.1 |
| 6.35             | 96           | 125 | 145 | 989.3                          | 1288.1 | 1494.2 |
| 7.62             | 108          | 139 | 169 | 1113.0                         | 1432.4 | 1741.6 |
| 8.90             | 120          | 156 | 188 | 1236.6                         | 1607.6 | 1937.4 |
| 10.16            | 128          | 165 | 202 | 1319.1                         | 1700.3 | 2081.6 |

| CBR (%) |      |       |       |
|---------|------|-------|-------|
| Blows   | 17   | 42    | 92    |
| 2.54mm  | 5.82 | 7.77  | 8.81  |
| 5.08mm  | 8.20 | 10.61 | 12.81 |

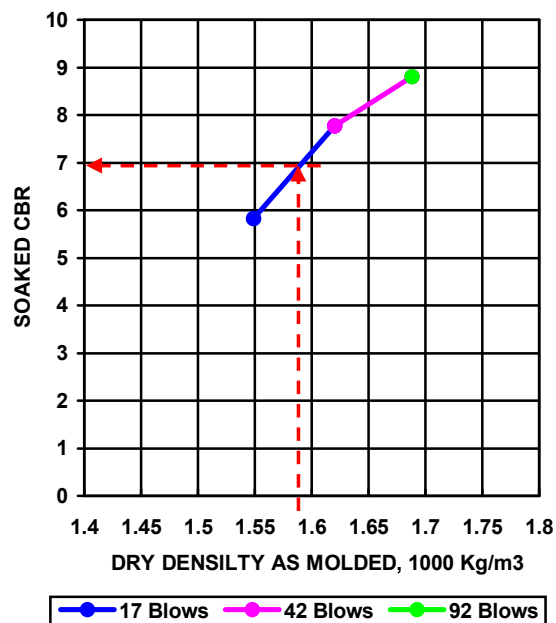
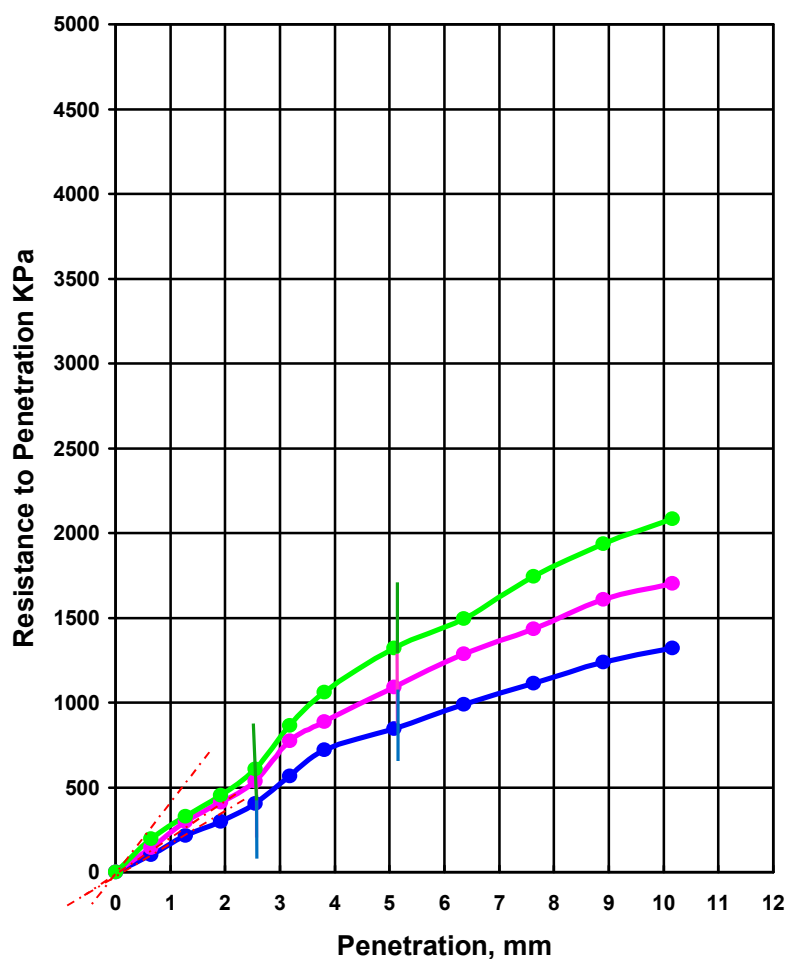


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Un-Soaked/JIS1211</b>                                                                |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 2</b><br>(STA: 9054054.16S ,<br>777544.62E )<br><b>Date: 16.09.2018</b> |



The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1670 kg/m<sup>3</sup> = 1587 kg/m<sup>3</sup>.
2. At 1587 kg/m<sup>3</sup>, the CBR is 7.0 %.

| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |
| 17                                  | 1549                  | 93                                       | 5.82   | 8.20    |
| 42                                  | 1620                  | 97                                       | 7.77   | 10.61   |
| 92                                  | 1688                  | 101                                      | 8.81   | 12.81   |

**C.B.R. TEST RESULTS**  
**Geotechnical Investigation**



**RMS Engineering & Construction Unipessoal Lda**

**CALIFORNIA BEARING RATIO TEST REPORT**

Report No. GET 18-8002B

**CLIENT:** JICA STUDY TEAM

**PROJECT:** GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 3

Sample No. S-1

**Location:** TP # 3

Layer Depth 1.15 (m)

**Sampling Procedure:** JIS1211

Station. -

**Prooving Ring** KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

**Area of Piston** 1940.785 mm2

Date of Testing: 03.09.2018

| Density Determination                 | 17 Blows | 42 Blows | 92 Blows |
|---------------------------------------|----------|----------|----------|
| Mould No.                             | A-4      | A-5      | A-6      |
| Wt. of sample + mold (gms)            | 11262.0  | 11537.0  | 11366.0  |
| Wt. of mold (gms)                     | 7752.7   | 7835.1   | 7492.0   |
| Wt. of Sample (gm/cm <sup>3</sup> )   | 3509.3   | 3701.9   | 3874     |
| <b>Wet Density (Kg/m<sup>3</sup>)</b> | 1666     | 1758     | 1839     |
| <b>Dry density (kg/m<sup>3</sup>)</b> | 1402     | 1483     | 1560     |
| <b>% Compaction</b>                   | 90.25%   | 95.44%   | 100.42%  |

| Moisture Determination       | Before Compaction | Before Compaction | Before Compaction |
|------------------------------|-------------------|-------------------|-------------------|
| Can No.                      | C-4               | C-5               | C-6               |
| Wet Soil + can (gms)         | 171.3             | 191.9             | 218.6             |
| Dry soil + can (gms)         | 150.6             | 169.4             | 191.1             |
| Wt. of moisture (gms)        | 20.7              | 22.5              | 27.5              |
| Wt. of can (gms)             | 40.5              | 47.8              | 37.2              |
| Wt. of dry soil (gms)        | 110.1             | 121.6             | 153.9             |
| <b>Moisture content ( %)</b> | <b>18.8</b>       | <b>18.5</b>       | <b>17.9</b>       |

| SWELL                         | 17 Blows     | 42 Blows     | 92 Blows     |
|-------------------------------|--------------|--------------|--------------|
| Reading before Soaking (25mm) | 0            | 0            | 0            |
| Reading after Soaking (25mm)  | 0            | 0            | 0            |
| <b>Swell (%)</b>              | <b>0.00%</b> | <b>0.00%</b> | <b>0.00%</b> |

| Penetration (mm) | Dial Reading |     |     | Resistance to Penetration, KPa |        |        |
|------------------|--------------|-----|-----|--------------------------------|--------|--------|
|                  | Blows        |     |     | Blows                          |        |        |
|                  | 17           | 42  | 92  | 17                             | 42     | 92     |
| 0.64             | 9            | 12  | 15  | 92.7                           | 123.7  | 154.6  |
| 1.27             | 16           | 24  | 32  | 164.9                          | 247.3  | 329.8  |
| 1.91             | 23           | 37  | 55  | 237.0                          | 381.3  | 566.8  |
| 2.54             | 32           | 51  | 84  | 329.8                          | 525.6  | 865.6  |
| 3.17             | 40           | 64  | 106 | 412.2                          | 659.5  | 1092.3 |
| 3.80             | 49           | 78  | 130 | 505.0                          | 803.8  | 1339.7 |
| 5.08             | 58           | 90  | 152 | 597.7                          | 927.5  | 1566.4 |
| 6.35             | 66           | 103 | 170 | 680.1                          | 1061.4 | 1751.9 |
| 7.62             | 74           | 116 | 188 | 762.6                          | 1195.4 | 1937.4 |
| 8.90             | 80           | 129 | 206 | 824.4                          | 1329.4 | 2122.9 |
| 10.16            | 84           | 140 | 222 | 865.6                          | 1442.7 | 2287.7 |

| CBR (%) |      |      |       |
|---------|------|------|-------|
| Blows   | 17   | 42   | 92    |
| 2.54mm  | 4.78 | 7.62 | 12.55 |
| 5.08mm  | 5.80 | 9.00 | 15.21 |

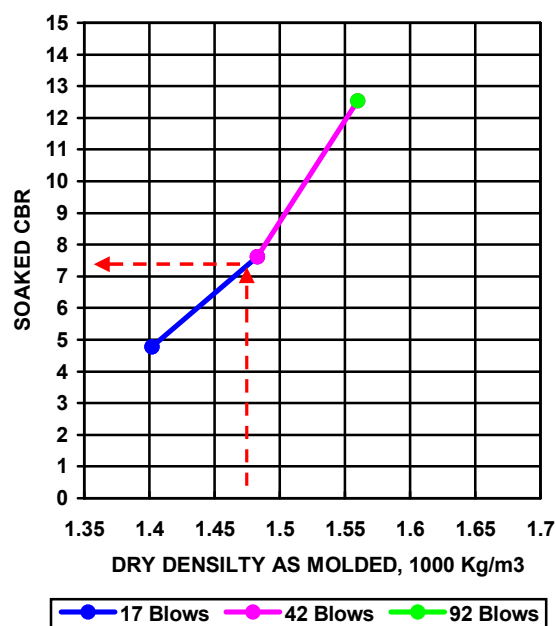
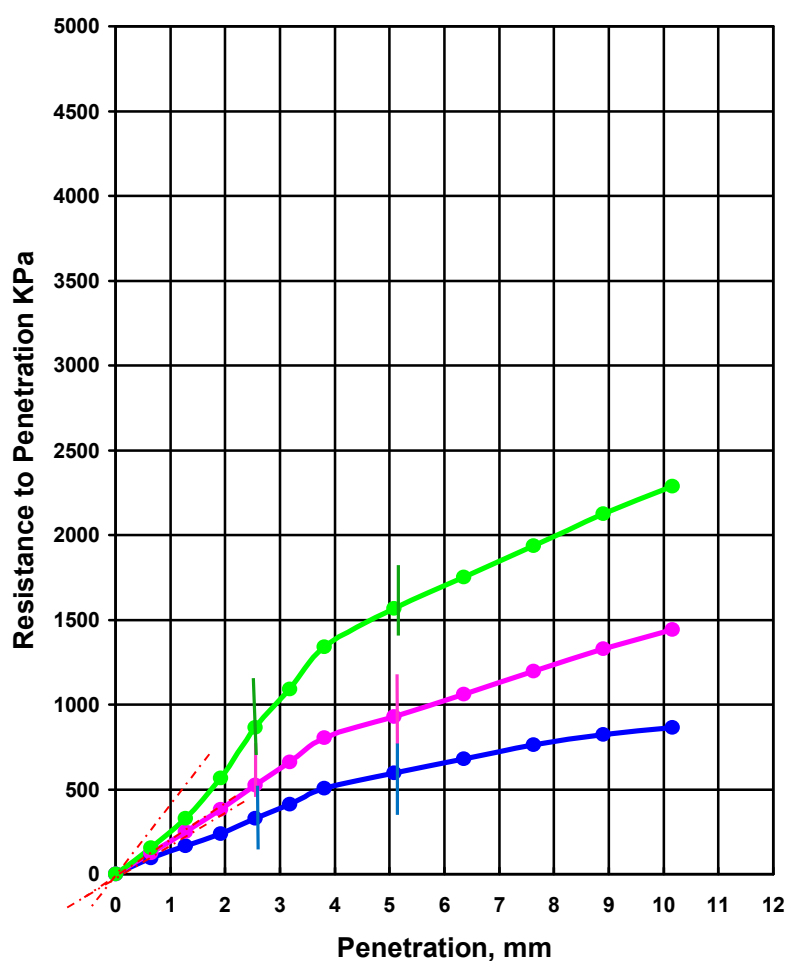


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (ASTM D-1883)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Un-Soaked/JIS1211</b>                         |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 3</b><br><b>Date: 17.10.2018</b> |



The CBR at 95 percent of the maximum dry density:

- 95 percent of 1554 kg/m<sup>3</sup> = 1476 kg/m<sup>3</sup>.
- At 1476 kg/m<sup>3</sup>, the CBR is 7.2 %.

| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |
| 17                                  | 1402                  | 90                                       | 4.78   | 5.80    |
| 42                                  | 1483                  | 95                                       | 7.62   | 9.00    |
| 92                                  | 1560                  | 100                                      | 12.55  | 15.21   |

**C.B.R. TEST RESULTS**  
**Geotechnical Investigation**

**PLATE – TP-3/UN-SOAKED**

**CALIFORNIA BEARING RATIO TEST REPORT**

Report No. GET 18-8002B

**CLIENT:** JICA STUDY TEAM
**PROJECT:** GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF  
PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT  
PROJECT, DILI, TIMOR LESTE

Test no. TP# 4

Sample No. S-1

**Location:** TP # 4

Layer Depth 1.10 (m)

**Sampling Procedure:** JIS1211

Station. -

**Prooving Ring** KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

**Area of Piston** 1940.785 mm<sup>2</sup>

Date of Testing: 03.09.2018

| Density Determination         |  | 17 Blows          |     | 42 Blows          |                                | 92 Blows          |        |
|-------------------------------|--|-------------------|-----|-------------------|--------------------------------|-------------------|--------|
| Mould No.                     |  | A-1               |     | A-2               |                                | A-3               |        |
| Wt. of sample + mold (gms)    |  | 10120.4           |     | 10389.5           |                                | 10455.3           |        |
| Wt. of mold (gms)             |  | 6376.8            |     | 6438.5            |                                | 6318.5            |        |
| Wt. of Sample (gm/cm³)        |  | 3743.6            |     | 3951              |                                | 4136.8            |        |
| Wet Density (Kg/m³)           |  | 1777              |     | 1876              |                                | 1964              |        |
| Dry density (kg/m³)           |  | 1610              |     | 1684              |                                | 1760              |        |
| % Compaction                  |  | 92.27%            |     | 96.49%            |                                | 100.89%           |        |
| Moisture Determination        |  | Before Compaction |     | Before Compaction |                                | Before Compaction |        |
| Can No.                       |  | C-8               |     | C-9               |                                | C-10              |        |
| Wet Soil + can (gms)          |  | 203.2             |     | 198.3             |                                | 232.6             |        |
| Dry soil + can (gms)          |  | 187.2             |     | 182.1             |                                | 212.6             |        |
| Wt. of moisture (gms)         |  | 16                |     | 16.2              |                                | 20                |        |
| Wt. of can (gms)              |  | 33.3              |     | 40.1              |                                | 39.7              |        |
| Wt. of dry soil (gms)         |  | 153.9             |     | 142               |                                | 172.9             |        |
| Moisture content ( %)         |  | 10.4              |     | 11.4              |                                | 11.6              |        |
|                               |  |                   |     |                   |                                |                   |        |
| SWELL                         |  | 17 Blows          |     | 42 Blows          |                                | 92 Blows          |        |
| Reading before Soaking (25mm) |  | 0                 |     | 0                 |                                | 0                 |        |
| Reading after Soaking (25mm)  |  | 0                 |     | 0                 |                                | 0                 |        |
| Swell (%)                     |  | 0.00%             |     | 0.00%             |                                | 0.00%             |        |
|                               |  |                   |     |                   |                                |                   |        |
| Penetration (mm)              |  | Dial Reading      |     |                   | Resistance to Penetration, KPa |                   |        |
|                               |  | Blows             |     |                   | Blows                          |                   |        |
|                               |  | 17                | 42  | 92                | 17                             | 42                | 92     |
| 0.64                          |  | 10                | 13  | 35                | 103.1                          | 134.0             | 360.7  |
| 1.27                          |  | 25                | 41  | 65                | 257.6                          | 422.5             | 669.8  |
| 1.91                          |  | 44                | 62  | 98                | 453.4                          | 638.9             | 1009.9 |
| 2.54                          |  | 65                | 99  | 122               | 669.8                          | 1020.2            | 1257.2 |
| 3.17                          |  | 83                | 126 | 143               | 855.3                          | 1298.4            | 1473.6 |
| 3.80                          |  | 100               | 148 | 169               | 1030.5                         | 1525.2            | 1741.6 |
| 5.08                          |  | 116               | 170 | 191               | 1195.4                         | 1751.9            | 1968.3 |
| 6.35                          |  | 130               | 192 | 207               | 1339.7                         | 1978.6            | 2133.2 |
| 7.62                          |  | 140               | 214 | 226               | 1442.7                         | 2205.3            | 2329.0 |
| 8.90                          |  | 148               | 231 | 246               | 1525.2                         | 2380.5            | 2535.1 |
| 10.16                         |  | 155               | 247 | 254               | 1597.3                         | 2545.4            | 2617.5 |

| CBR (%) |       |       |       |
|---------|-------|-------|-------|
| Blows   | 17    | 42    | 92    |
| 2.54mm  | 9.71  | 14.79 | 18.22 |
| 5.08mm  | 11.61 | 17.01 | 19.11 |

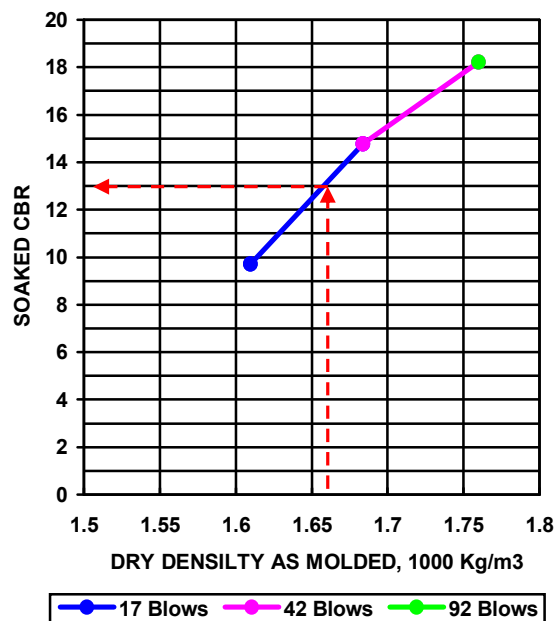
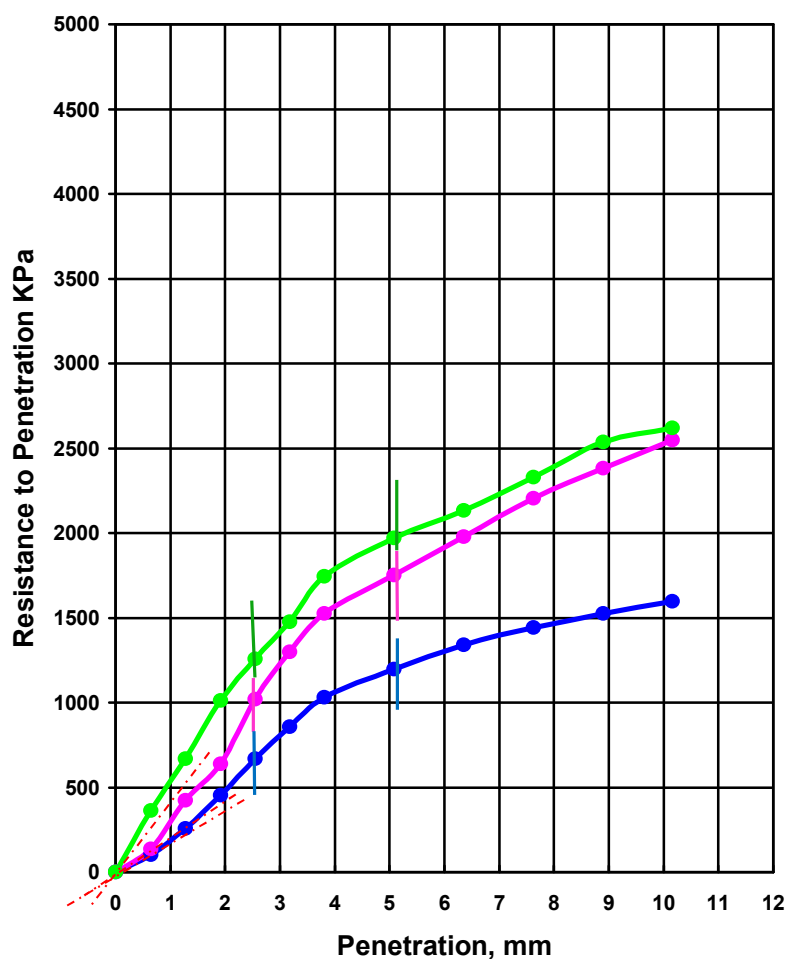


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (ASTM D-1883)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Un-Soaked/JIS1211</b>                         |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 4</b><br><b>Date: 18.09.2018</b> |



The CBR at 95 percent of the maximum dry density:

- 95 percent of 1745 kg/m<sup>3</sup> = 1658 kg/m<sup>3</sup>.
- At 1658 kg/m<sup>3</sup>, the CBR is 13.0 %.

| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 17                                  | 1610                  | 92                                       | 9.71   | 11.61   | 3.79     |
| 42                                  | 1684                  | 96                                       | 14.79  | 17.01   | 2.97     |
| 92                                  | 1760                  | 101                                      | 18.22  | 19.11   | 2.89     |

**C.B.R. TEST RESULTS**  
**Geotechnical Investigation**

**PLATE – TP-4/UN-SOAKED**

# **Laboratory Undisturbed CBR Soaked and Un-Soaked Plates 33 to 40**



**RMS Engineering & Construction Unipessoal Lda**

## CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

**CLIENT:** JICA STUDY TEAM

**PROJECT:** GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 1

Sample No. S-1

Location: TP # 1 , S-1

Layer Depth 1.10 (m)

**Sampling Procedure:** JIS1211

Station. -

**Prooving Ring** KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

**Area of Pistion** 1940.785 mm<sup>2</sup>

Date of Testing: 01.10.2018

| Density Determination                 | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|---------------------------------------|-----------------------|--|--------------------|
| Mould No.                             |                       |  |                    |
| Wt. of sample + mold (gms)            | 5353.1                |  | 5387.8             |
| Wt. of mold (gms)                     | 2103.2                |  | 2178.4             |
| Wt. of Sample (gm/cm <sup>3</sup> )   | 3249.9                |  | 3209.4             |
| <b>Wet Density (Kg/m<sup>3</sup>)</b> | 1497                  |  | 1447               |
| <b>Dry density (kg/m<sup>3</sup>)</b> | 1425                  |  | 1371               |
| <b>% Compaction</b>                   | 83.10%                |  | 79.95%             |

| Moisture Determination       | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|------------------------------|-----------------------|--|--------------------|
| Can No.                      | K-8                   |  | K-2                |
| Wet Soil + can (gms)         | 281.2                 |  | 380.1              |
| Dry soil + can (gms)         | 272.8                 |  | 365.3              |
| Wt. of moisture (gms)        | 8.4                   |  | 14.8               |
| Wt. of can (gms)             | 107.0                 |  | 99.1               |
| Wt. of dry soil (gms)        | 165.8                 |  | 266.2              |
| <b>Moisture content ( %)</b> | <b>5.1</b>            |  | <b>5.6</b>         |

| SWELL                         | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|-------------------------------|-----------------------|--|--------------------|
| Reading before Soaking (25mm) | 0                     |  | 0                  |
| Reading after Soaking (25mm)  | 0                     |  | 11                 |
| <b>Swell (%)</b>              | 0.00%                 |  | 0.09%              |

| Penetration (mm) | Dial Reading          |  | Resistance to Penetration, KPa |                       |  |                    |
|------------------|-----------------------|--|--------------------------------|-----------------------|--|--------------------|
|                  | UNDISTURBED UN-SOAKED |  | UNDISTURBED UN-SOAKED          | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
| 0.64             | 7                     |  | 1                              | 72.1                  |  | 10.3               |
| 1.27             | 11                    |  | 2                              | 113.4                 |  | 20.6               |
| 1.91             | 15                    |  | 2                              | 154.6                 |  | 20.6               |
| 2.54             | 17                    |  | 3                              | 175.2                 |  | 30.9               |
| 3.17             | 23                    |  | 4                              | 237.0                 |  | 41.2               |
| 3.80             | 26                    |  | 4                              | 267.9                 |  | 41.2               |
| 5.08             | 32                    |  | 5                              | 329.8                 |  | 51.5               |
| 6.35             | 39                    |  | 5                              | 401.9                 |  | 51.5               |
| 7.62             | 43                    |  | 6                              | 443.1                 |  | 61.8               |
| 8.90             | 47                    |  | 6                              | 484.3                 |  | 61.8               |
| 10.16            | 53                    |  | 7                              | 546.2                 |  | 72.1               |

| CBR (%) |                           |                        |
|---------|---------------------------|------------------------|
|         | Undisturbed Un-Soaked CBR | Undisturbed Soaked CBR |
| 2.54mm  | 2.54                      | 0.45                   |
| 5.08mm  | 3.20                      | 0.50                   |

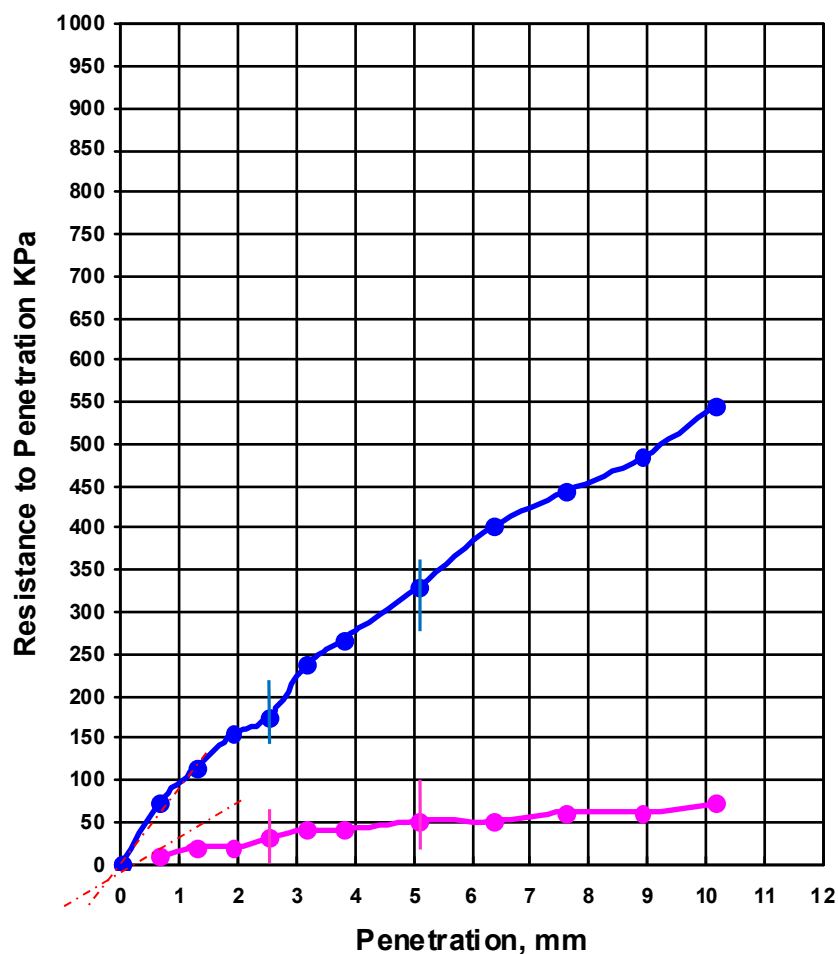


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## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Soaked(JIS1211)</b>                                                                  |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>Test Pit No. 1</b><br>(STA: 9054203.00S ,<br>777503.55E )<br><b>Date: 10.10.2018</b> |



|                                                             |                                                             |
|-------------------------------------------------------------|-------------------------------------------------------------|
| <span style="color: blue;">—●—</span> UNDISTURBED UN-SOAKED | <span style="color: magenta;">—●—</span> UNDISTURBED SOAKED |
|-------------------------------------------------------------|-------------------------------------------------------------|

| Laboratory CBR Test   | Dry Density<br>(kg/cu,m) | CBR at |         | Swell, % |
|-----------------------|--------------------------|--------|---------|----------|
|                       |                          | 2.5 mm | 5.08 mm |          |
| Undisturbed Un-Soaked | 1425                     | 2.54   | 3.20    | 0.00     |
| Undisturbed Soaked    | 1371                     | 0.45   | 0.50    | 2.28     |

**C.B.R. TEST RESULTS**  
Geotechnical Investigation

PLATE – TP-1/ Undisturbed Un-Soaked & Undisturbed Soaked


**RMS Engineering & Construction Unipessoal Lda**
**CALIFORNIA BEARING RATIO TEST REPORT**

Report No. GET 18-8002B

**CLIENT:** JICA STUDY TEAM

**PROJECT:** GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 2

Sample No. S-1

Location: TP # 2 , S-1

Layer Depth 1.15 (m)

**Sampling Procedure:** JIS1211

Station. -

**Prooving Ring** KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

**Area of Pistion** 1940.785 mm<sup>2</sup>

Date of Testing: 01.10.2018

| Density Determination                 | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|---------------------------------------|-----------------------|--|--------------------|
| Mould No.                             |                       |  |                    |
| Wt. of sample + mold (gms)            | 5519.4                |  | 5585.9             |
| Wt. of mold (gms)                     | 2102.1                |  | 2129.8             |
| Wt. of Sample (gm/cm <sup>3</sup> )   | 3417.3                |  | 3456.1             |
| <b>Wet Density (Kg/m<sup>3</sup>)</b> | 1575                  |  | 1559               |
| <b>Dry density (kg/m<sup>3</sup>)</b> | 1553                  |  | 1528               |
| <b>% Compaction</b>                   | 92.97%                |  | 91.48%             |

| Moisture Determination       | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|------------------------------|-----------------------|--|--------------------|
| Can No.                      | K-5                   |  | K-3                |
| Wet Soil + can (gms)         | 320.6                 |  | 450.8              |
| Dry soil + can (gms)         | 317.5                 |  | 443.9              |
| Wt. of moisture (gms)        | 3.1                   |  | 6.9                |
| Wt. of can (gms)             | 98.0                  |  | 102.8              |
| Wt. of dry soil (gms)        | 219.5                 |  | 341.1              |
| <b>Moisture content ( %)</b> | <b>1.4</b>            |  | <b>2.0</b>         |

| SWELL                         | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|-------------------------------|-----------------------|--|--------------------|
| Reading before Soaking (25mm) | 0                     |  | 0                  |
| Reading after Soaking (25mm)  | 0                     |  | 191                |
| <b>Swell (%)</b>              | 0.00%                 |  | 1.61%              |

| Penetration (mm) | Dial Reading          |  | Resistance to Penetration, KPa |                       |  |                    |
|------------------|-----------------------|--|--------------------------------|-----------------------|--|--------------------|
|                  | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED             | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
| 0.64             | 13                    |  | 1                              | 134.0                 |  | 10.3               |
| 1.27             | 14                    |  | 2                              | 144.3                 |  | 20.6               |
| 1.91             | 14                    |  | 3                              | 144.3                 |  | 30.9               |
| 2.54             | 15                    |  | 3                              | 154.6                 |  | 30.9               |
| 3.17             | 15                    |  | 4                              | 154.6                 |  | 41.2               |
| 3.80             | 15                    |  | 5                              | 154.6                 |  | 51.5               |
| 5.08             | 15                    |  | 6                              | 154.6                 |  | 61.8               |
| 6.35             | 15                    |  | 7                              | 154.6                 |  | 72.1               |
| 7.62             | 15                    |  | 8                              | 154.6                 |  | 82.4               |
| 8.90             | 16                    |  | 10                             | 164.9                 |  | 103.1              |
| 10.16            | 17                    |  | 12                             | 175.2                 |  | 123.7              |

| CBR (%) |                           |                        |
|---------|---------------------------|------------------------|
|         | Undisturbed Un-Soaked CBR | Undisturbed Soaked CBR |
| 2.54mm  | 2.24                      | 0.45                   |
| 5.08mm  | 1.50                      | 0.60                   |

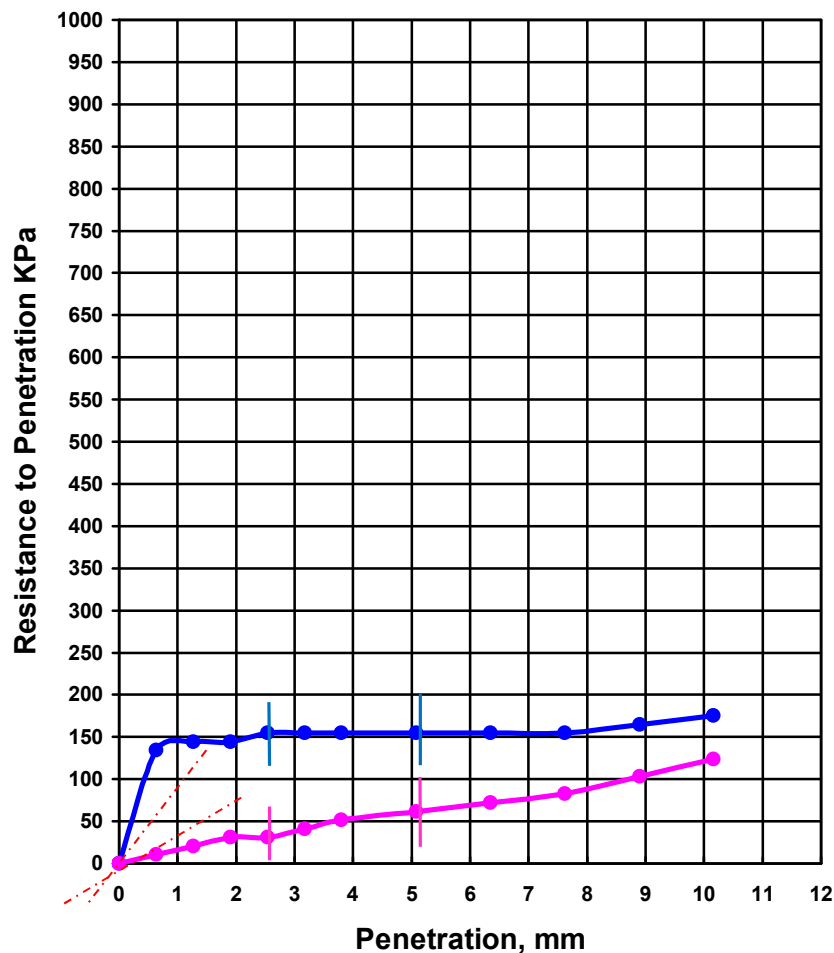


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## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Soaked(JIS1211)</b>                                                                 |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>TEST PIT LOG:</b> TP # 2<br>(STA: 9054054.16S ,<br>777544.62E )<br>Date: 10.10.2018 |



|                         |                      |
|-------------------------|----------------------|
| ● UNDISTURBED UN-SOAKED | ● UNDISTURBED SOAKED |
|-------------------------|----------------------|

| Laboratory CBR Test   | Dry Density<br>(kg/cu,m) | CBR at |         | Swell, % |
|-----------------------|--------------------------|--------|---------|----------|
|                       |                          | 2.5 mm | 5.08 mm |          |
| Undisturbed Un-Soaked | 1553                     | 2.24   | 1.50    | 0.00     |
| Undisturbed Soaked    | 1528                     | 0.45   | 0.60    | 1.61     |

**C.B.R. TEST RESULTS**  
Geotechnical Investigation

PLATE – TP-2/ Undisturbed Un-Soaked & Undisturbed Soaked



RMS Engineering & Construction Unipessoal Lda

## CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF  
PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT  
PROJECT, DILI, TIMOR LESTE

Test no. TP# 3

Sample No. S-1

Location: TP # 3 , S-1

Layer Depth 1.15 (m)

Sampling Procedure: JIS1211

Station. -

Proving Ring KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 24.09.2018

Area of Pistion 1940.785 mm<sup>2</sup>

Date of Testing: 30.09.2018

| Density Determination               | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|-------------------------------------|-----------------------|--|--------------------|
| Mould No.                           |                       |  |                    |
| Wt. of sample + mold (gms)          | 5298.1                |  | 5517.9             |
| Wt. of mold (gms)                   | 1921.5                |  | 2084.2             |
| Wt. of Sample (gm/cm <sup>3</sup> ) | 3376.6                |  | 3433.7             |
| Wet Density (Kg/m <sup>3</sup> )    | 1532                  |  | 1548               |
| Dry density (kg/m <sup>3</sup> )    | 1329                  |  | 1342               |
| % Compaction                        | 85.52%                |  | 86.33%             |

| Moisture Determination | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|------------------------|-----------------------|--|--------------------|
| Can No.                | K-3                   |  | K-11               |
| Wet Soil + can (gms)   | 286.7                 |  | 347.1              |
| Dry soil + can (gms)   | 262.3                 |  | 313.6              |
| Wt. of moisture (gms)  | 24.4                  |  | 33.5               |
| Wt. of can (gms)       | 102.8                 |  | 96.4               |
| Wt. of dry soil (gms)  | 159.5                 |  | 217.2              |
| Moisture content ( %)  | 15.3                  |  | 15.4               |

| SWELL                         | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|-------------------------------|-----------------------|--|--------------------|
| Reading before Soaking (25mm) | 0                     |  | 0                  |
| Reading after Soaking (25mm)  | 0                     |  | 159                |
| Swell (%)                     | 0.00%                 |  | 1.34%              |

| Penetration (mm) | Dial Reading          |  | Resistance to Penetration, KPa |                       |                    |
|------------------|-----------------------|--|--------------------------------|-----------------------|--------------------|
|                  | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED             | UNDISTURBED UN-SOAKED | UNDISTURBED SOAKED |
| 0.64             | 1                     |  | 0                              | 10.3                  | 0.0                |
| 1.27             | 1                     |  | 0                              | 10.3                  | 0.0                |
| 1.91             | 2                     |  | 0                              | 20.6                  | 0.0                |
| 2.54             | 2                     |  | 0                              | 20.6                  | 0.0                |
| 3.17             | 3                     |  | 0                              | 30.9                  | 0.0                |
| 3.80             | 3                     |  | 0                              | 30.9                  | 0.0                |
| 5.08             | 4                     |  | 0                              | 41.2                  | 0.0                |
| 6.35             | 4                     |  | 0                              | 41.2                  | 0.0                |
| 7.62             | 5                     |  | 0                              | 51.5                  | 0.0                |
| 8.90             | 5                     |  | 0                              | 51.5                  | 0.0                |
| 10.16            | 5                     |  | 0                              | 51.5                  | 0.0                |

| CBR (%) |                           |                        |
|---------|---------------------------|------------------------|
|         | Undisturbed Un-Soaked CBR | Undisturbed Soaked CBR |
| 2.54mm  | 0.30                      | 0.00                   |
| 5.08mm  | 0.40                      | 0.00                   |

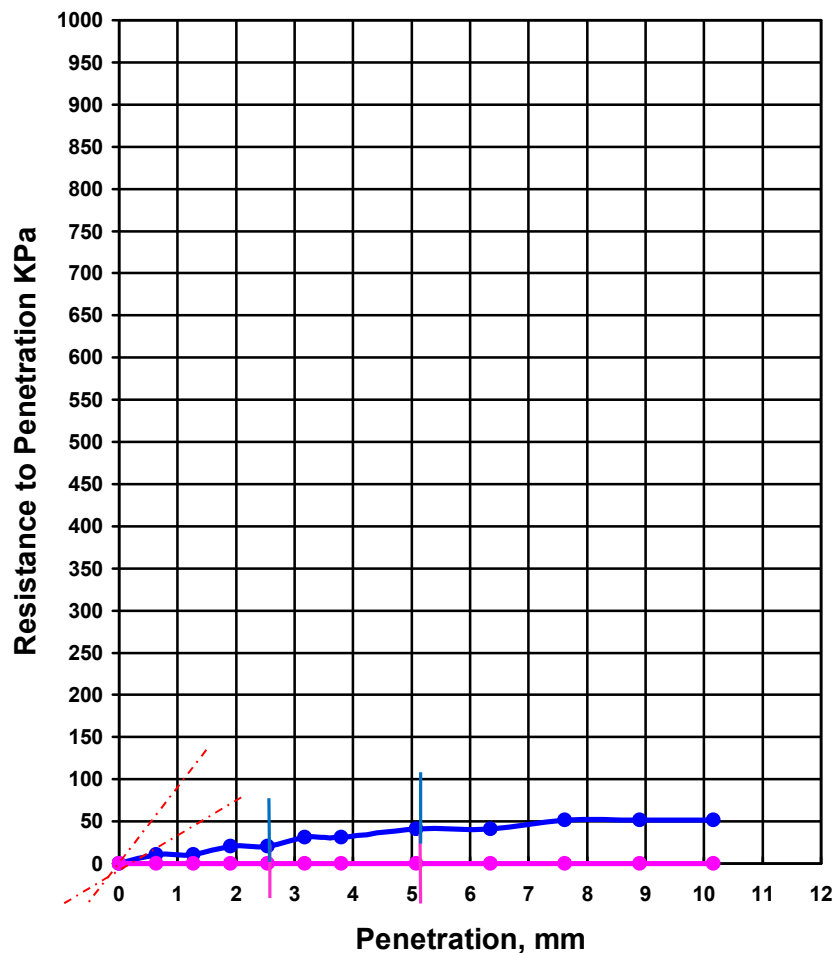


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Soaked(JIS1211)</b>                                                                 |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>TEST PIT LOG: TP # 3</b><br>(STA: 9053995.06S ,<br>777629.38E )<br>Date: 10.10.2018 |



|                         |                      |
|-------------------------|----------------------|
| ● UNDISTURBED UN-SOAKED | ● UNDISTURBED SOAKED |
|-------------------------|----------------------|

| Laboratory CBR Test   | Dry Density<br>(kg/cu,m) | CBR at |         | Swell, % |
|-----------------------|--------------------------|--------|---------|----------|
|                       |                          | 2.5 mm | 5.08 mm |          |
| Undisturbed Un-Soaked | 1329                     | 0.30   | 0.40    | 0.00     |
| Undisturbed Soaked    | 1342                     | 0.00   | 0.00    | 1.34     |

**C.B.R. TEST RESULTS**  
Geotechnical Investigation

PLATE – TP-3/ Undisturbed Un-Soaked & Undisturbed Soaked



**RMS Engineering & Construction Unipessoal Lda**

## CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

**CLIENT:** JICA STUDY TEAM

**PROJECT:** GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 4

Sample No. S-1

Location: TP # 4 , S-1

Layer Depth 1.10 (m)

**Sampling Procedure:** JIS1211

Station. -

**Prooving Ring** KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 25.09.2018

**Area of Pistion** 1940.785 mm2

Date of Testing: 29.09.2018

| Density Determination                 | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|---------------------------------------|-----------------------|--|--------------------|
| Mould No.                             |                       |  |                    |
| Wt. of sample + mold (gms)            | 5798.6                |  | 5817.9             |
| Wt. of mold (gms)                     | 2097.6                |  | 2084.2             |
| Wt. of Sample (gm/cm <sup>3</sup> )   | 3701                  |  | 3733.7             |
| <b>Wet Density (Kg/m<sup>3</sup>)</b> | 1698                  |  | 1684               |
| <b>Dry density (kg/m<sup>3</sup>)</b> | 1637                  |  | 1624               |
| <b>% Compaction</b>                   | 93.83%                |  | 93.07%             |

| Moisture Determination       | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|------------------------------|-----------------------|--|--------------------|
| Can No.                      | K-4                   |  | K-1                |
| Wet Soil + can (gms)         | 252.2                 |  | 323.6              |
| Dry soil + can (gms)         | 247.2                 |  | 315.8              |
| Wt. of moisture (gms)        | 5                     |  | 7.8                |
| Wt. of can (gms)             | 111.3                 |  | 103.9              |
| Wt. of dry soil (gms)        | 135.9                 |  | 211.9              |
| <b>Moisture content ( %)</b> | <b>3.7</b>            |  | <b>3.7</b>         |

| SWELL                         | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
|-------------------------------|-----------------------|--|--------------------|
| Reading before Soaking (25mm) | 0                     |  | 0                  |
| Reading after Soaking (25mm)  | 0                     |  | 109                |
| <b>Swell (%)</b>              | 0.00%                 |  | 0.92%              |

| Penetration (mm) | Dial Reading          |  | Resistance to Penetration, KPa |                       |  |                    |
|------------------|-----------------------|--|--------------------------------|-----------------------|--|--------------------|
|                  | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED             | UNDISTURBED UN-SOAKED |  | UNDISTURBED SOAKED |
| 0.64             | 11                    |  | 4                              | 113.4                 |  | 41.2               |
| 1.27             | 15                    |  | 4                              | 154.6                 |  | 41.2               |
| 1.91             | 19                    |  | 5                              | 195.8                 |  | 51.5               |
| 2.54             | 23                    |  | 5                              | 237.0                 |  | 51.5               |
| 3.17             | 25                    |  | 6                              | 257.6                 |  | 61.8               |
| 3.80             | 27                    |  | 6                              | 278.2                 |  | 61.8               |
| 5.08             | 29                    |  | 6                              | 298.8                 |  | 61.8               |
| 6.35             | 30                    |  | 7                              | 309.2                 |  | 72.1               |
| 7.62             | 32                    |  | 7                              | 329.8                 |  | 72.1               |
| 8.90             | 38                    |  | 8                              | 391.6                 |  | 82.4               |
| 10.16            | 39                    |  | 8                              | 401.9                 |  | 82.4               |

| CBR (%) |                           |                        |
|---------|---------------------------|------------------------|
|         | Undisturbed Un-Soaked CBR | Undisturbed Soaked CBR |
| 2.54mm  | 3.44                      | 0.75                   |
| 5.08mm  | 2.90                      | 0.60                   |

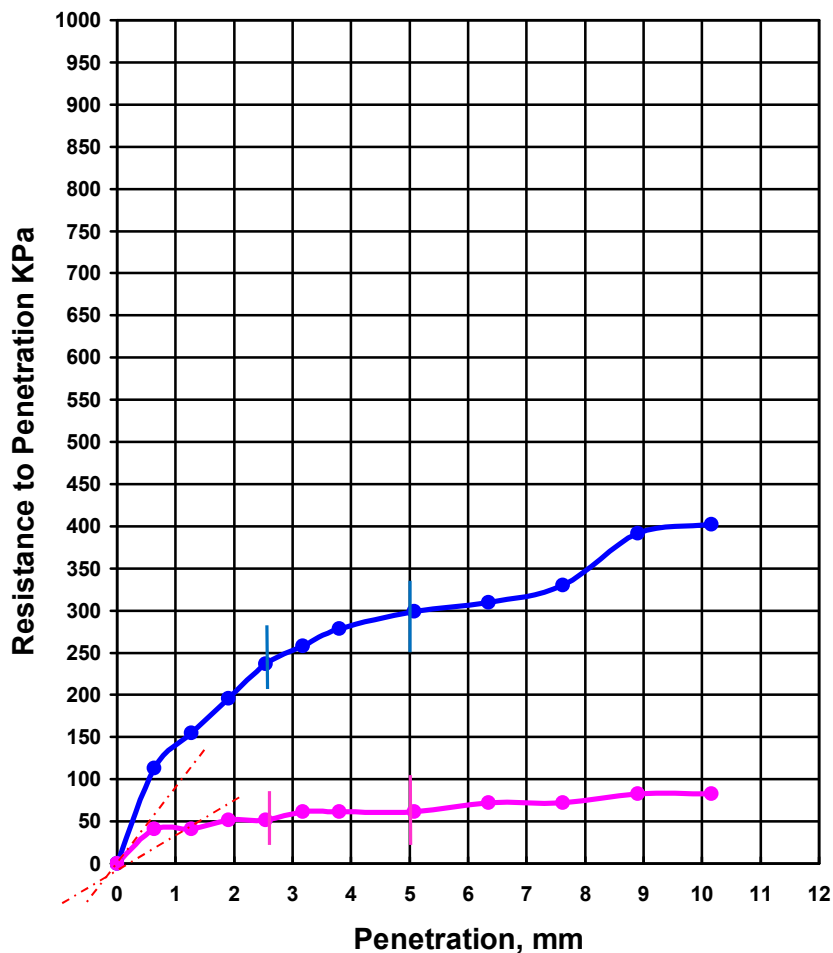


**RMS Engineering & Construction Unipessoal Lda**

## CBR Test Results (JIS1211)

Report No. GET 18-8002B

|                                                                                                                                                        |                        |                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------|
| <b>CLIENT:</b>                                                                                                                                         | <b>JICA STUDY TEAM</b> | <b>Soaked(JIS1211)</b>                                                                 |
| <b>PROJECT :</b> <i>Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste</i> |                        | <b>TEST PIT LOG:</b> TP # 4<br>(STA: 9053769.00S ,<br>777690.49E )<br>Date: 11.10.2018 |



|                         |                      |
|-------------------------|----------------------|
| ● UNDISTURBED UN-SOAKED | ● UNDISTURBED SOAKED |
|-------------------------|----------------------|

| Laboratory CBR Test   | Dry Density<br>(kg/cu,m) | CBR at |         | Swell, % |
|-----------------------|--------------------------|--------|---------|----------|
|                       |                          | 2.5 mm | 5.08 mm |          |
| Undisturbed Un-Soaked | 1637                     | 3.44   | 2.90    | 0.00     |
| Undisturbed Soaked    | 1624                     | 0.75   | 0.60    | 0.92     |

**C.B.R. TEST RESULTS**  
Geotechnical Investigation

PLATE – TP-4/ Undisturbed Un-Soaked & Undisturbed Soaked

**JICA STUDY TEAM**

Geotechnical Investigation at President Nicolau Lobato  
Int. Airport, in Democratic Republic of Timor Leste

**LOCATION MAP**

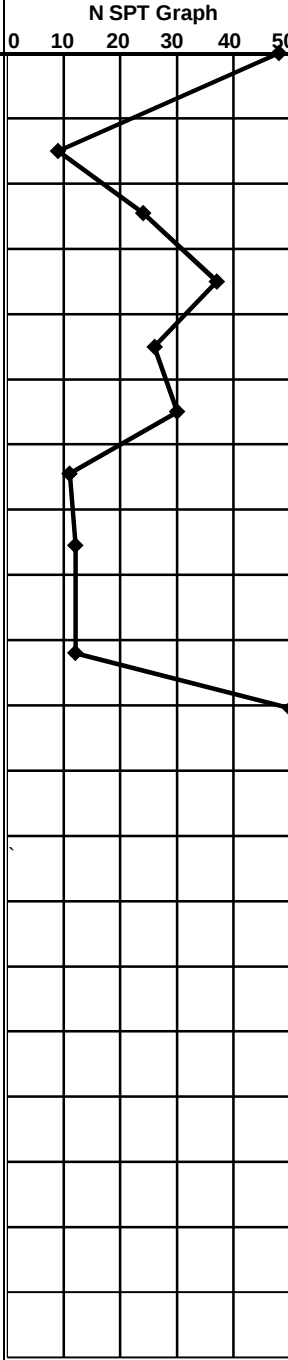
GEOTECHNICAL INVESTIGATION SITE

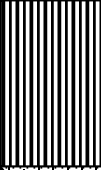
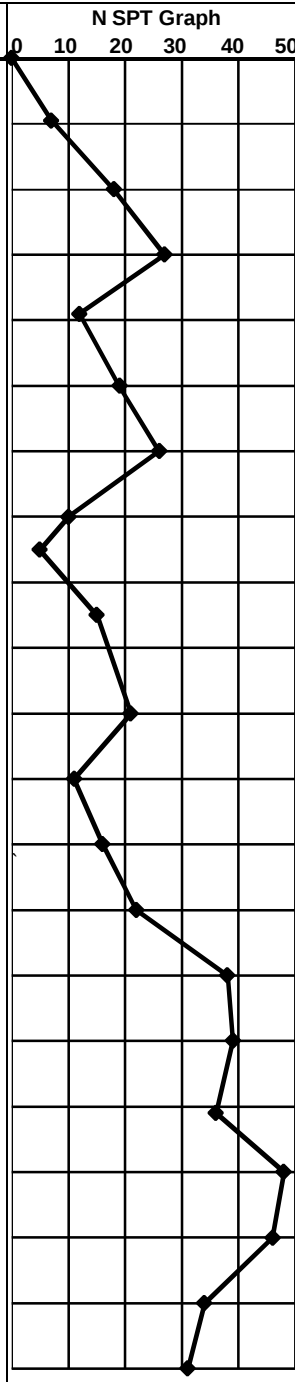
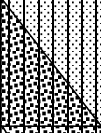
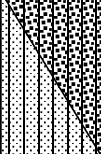
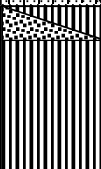
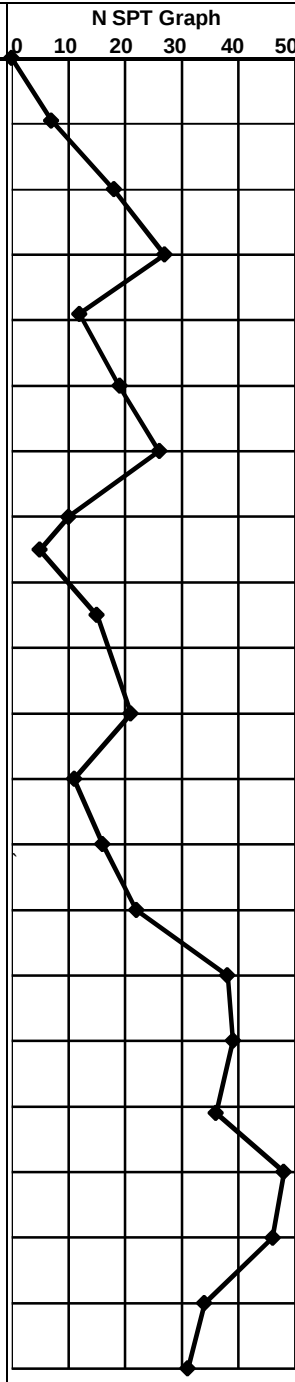
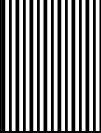
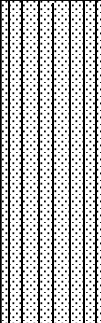
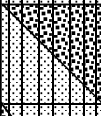
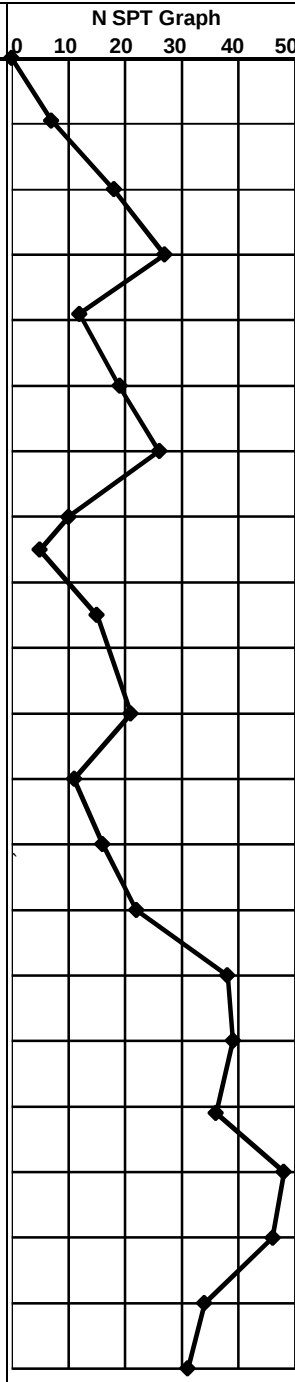
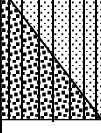


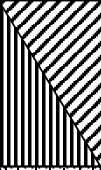
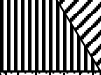
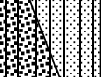
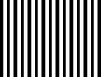
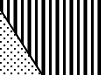
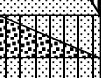
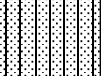
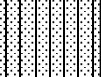
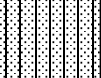
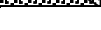


| TEST POINT | GEOTECHNICAL INVESTIGATION WORK ITEM | EASTING    | NORTHING    |
|------------|--------------------------------------|------------|-------------|
| BH-1       | Mechanical Boring Test Points -1     | 777638.145 | 9053909.973 |
| BH-2       | Mechanical Boring Test Points -2     | 777756.787 | 9053880.013 |
| BH-3       | Mechanical Boring Test Points -3     | 777744.372 | 9053932.685 |
| BH-4       | Mechanical Boring Test Points -4     | 777649.717 | 9053857.525 |
| BH-5       | Mechanical Boring Test Points -5     | 777950.315 | 9053973.767 |
| TP-1a      | Test Pits 1a & Plate Bearing Test    | 777689.628 | 9053981.51  |
| TP-2a      | Test Pits 2a & Plate Bearing Test    | 777511.710 | 9053950.189 |
| TP-3a      | Test Pits 3a & Plate Bearing Test    | 777600.208 | 9053970.018 |
| TP-1       | Test Pits Points -1                  | 777657.182 | 9054214.726 |
| TP-2       | Test Pits Points -2                  | 777450.25  | 9054126.991 |
| TP-3       | Test Pits Points -3                  | 778003.197 | 9053884.822 |
| TP-4       | Test Pits Points -4                  | 777779.283 | 9053835.273 |
| TP-5       | Test Pits Points -5                  | 777563.503 | 9053787.523 |

|  |           | <h1>BORING LOG</h1>                                                                                                                                                   |         |        |                                                                                                                                                                          | <div>BH - 1</div> <div>Depth : 30. m</div> |    |    |     |             |    |    |    |    |    |
|-----------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|----|----|-----|-------------|----|----|----|----|----|
| Project                                                                           |           | Geotechnical Investigation for Preparatory Survey on the<br>: Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |         |        |                                                                                                                                                                          | Date Started : April 25, 2018              |    |    |     |             |    |    |    |    |    |
| Location                                                                          |           | : Dili, Airport                                                                                                                                                       |         |        |                                                                                                                                                                          | Date Finished : April 30, 2018             |    |    |     |             |    |    |    |    |    |
| Client                                                                            |           | : JICA Study Team                                                                                                                                                     |         |        |                                                                                                                                                                          | Sheet : 1/2 PLATE-3                        |    |    |     |             |    |    |    |    |    |
| Boring Method                                                                     |           | : Rotary Drilling                                                                                                                                                     |         |        |                                                                                                                                                                          | Boring Machine : Gemco Tractor             |    |    |     |             |    |    |    |    |    |
| Bor Master                                                                        |           | : Mr. Zubair                                                                                                                                                          |         |        |                                                                                                                                                                          | Logged by : Mr. Mohsin                     |    |    |     |             |    |    |    |    |    |
|                                                                                   |           |                                                                                                                                                                       |         |        |                                                                                                                                                                          | Checked by : Mr. Syed Abbas                |    |    |     |             |    |    |    |    |    |
| E : 777657.182                                                                    |           | N : 9054214.726                                                                                                                                                       |         |        |                                                                                                                                                                          | Elevation : GWL : 6.40 m                   |    |    |     |             |    |    |    |    |    |
| DATE                                                                              | DEPTH (m) | GWL                                                                                                                                                                   | UDS/SPT | SYMBOL | SOIL DESCRIPTION                                                                                                                                                         | STANDARD PENETRATION TEST                  |    |    |     |             |    |    |    |    |    |
|                                                                                   |           |                                                                                                                                                                       |         |        |                                                                                                                                                                          | N1                                         | N2 | N3 | N   | N SPT Graph |    |    |    |    |    |
|                                                                                   |           |                                                                                                                                                                       |         |        |                                                                                                                                                                          | 15                                         | 15 | 15 |     | 0           | 10 | 20 | 30 | 40 | 50 |
| April 25, 2018                                                                    | 1         |                                                                                                                                                                       | SPT     |        | Loose to medium dense brown <b>SILT (ML)</b> with low Plasticity                                                                                                         | 3                                          | 4  | 5  | 9   |             |    |    |    |    |    |
|                                                                                   | 2         |                                                                                                                                                                       | SPT     |        | - loose to 1.50 m                                                                                                                                                        | 4                                          | 5  | 9  | 14  |             |    |    |    |    |    |
|                                                                                   | 3         |                                                                                                                                                                       | SPT     |        | - medium dense below 1.50 m                                                                                                                                              | 9                                          | 10 | 12 | 22  |             |    |    |    |    |    |
|                                                                                   | 4         |                                                                                                                                                                       |         |        | - with fine to medium Sand below 4.50 m                                                                                                                                  | 5                                          | 7  | 5  | 12  |             |    |    |    |    |    |
|                                                                                   | 5         |                                                                                                                                                                       | SPT     |        | - very loose greyish brown below 5.50 m                                                                                                                                  | 3                                          | 6  | 9  | 15  |             |    |    |    |    |    |
|                                                                                   | 6         |                                                                                                                                                                       | SPT     |        | 6.00 m                                                                                                                                                                   | 4                                          | 2  | 1  | 3   |             |    |    |    |    |    |
| April 26, 2018                                                                    | 7         |                                                                                                                                                                       | UD-1    |        | Medium dense to dense greyish brown Silty fine to coarse <b>SAND</b> with Gravel ( <b>SM</b> ), Gravels are Quartz, sub-angular to sub-rounded                           | 7                                          | 10 | 12 | 22  |             |    |    |    |    |    |
|                                                                                   | 8         |                                                                                                                                                                       | SPT     |        | - dark greyish brown, 6.30 to 7.00 m                                                                                                                                     | 21                                         | 13 | 14 | 27  |             |    |    |    |    |    |
|                                                                                   | 9         |                                                                                                                                                                       | SPT     |        | - medium dense to 10.00 m                                                                                                                                                | 13                                         | 12 | 14 | 26  |             |    |    |    |    |    |
|                                                                                   | 10        |                                                                                                                                                                       | SPT     |        | - reddish brownish grey, 7.45 to 8.45 m                                                                                                                                  | 4                                          | 4  | 7  | 11  |             |    |    |    |    |    |
|                                                                                   | 11        |                                                                                                                                                                       | SPT     |        | - dense, 10.00 to 10.95 m                                                                                                                                                | 6                                          | 10 | 13 | 23  |             |    |    |    |    |    |
|                                                                                   | 12        |                                                                                                                                                                       | SPT     |        | - light brown, 10.95 to 11.55 m                                                                                                                                          | 6                                          | 11 | 16 | 27  |             |    |    |    |    |    |
|                                                                                   | 13        |                                                                                                                                                                       | SPT     |        | - medium dense below 10.95 m                                                                                                                                             | 5                                          | 10 | 14 | 24  |             |    |    |    |    |    |
|                                                                                   | 14        |                                                                                                                                                                       | SPT     |        | - greyish below 13.00 m                                                                                                                                                  | 17                                         | 13 | 17 | 30  |             |    |    |    |    |    |
|                                                                                   | 15        |                                                                                                                                                                       | SPT     |        | 15.00 m                                                                                                                                                                  | 19                                         | 18 | 18 | 36  |             |    |    |    |    |    |
|                                                                                   | 16        |                                                                                                                                                                       | SPT     |        | Dense light brown Silty, Sandy well graded <b>GRAVEL (GM)</b> , Gravels are Quartz, sub-rounded                                                                          | 24                                         | 15 | 15 | 30  |             |    |    |    |    |    |
| April 27, 2018                                                                    | 17        |                                                                                                                                                                       | SPT     |        | - very dense below 16.00 m                                                                                                                                               | 24                                         | 18 | 20 | 38  |             |    |    |    |    |    |
|                                                                                   | 18        |                                                                                                                                                                       | SPT     |        | Dense light grey Silty, Gravelly fine to coarse <b>SAND (SM)</b>                                                                                                         | 23                                         | 19 | 20 | 39  |             |    |    |    |    |    |
|                                                                                   | 19        |                                                                                                                                                                       | SPT     |        | Dense to very dense light brown Silty fine to coarse <b>SAND</b> with Gravel ( <b>SM</b> ), Gravels are Quartz & Phyllite - flacky and platy, sub-angular to sub-rounded | 19                                         | 32 | 26 | >50 |             |    |    |    |    |    |
|                                                                                   | 20        |                                                                                                                                                                       | SPT     |        | - very dense brown to 18.50 m                                                                                                                                            | 19                                         | 20 | 19 | 39  |             |    |    |    |    |    |
|                                                                                   | 21        |                                                                                                                                                                       | SPT     |        | - dense below 18.50 m                                                                                                                                                    | 32                                         | 23 | 25 | 48  |             |    |    |    |    |    |

|  <h1 style="display: inline; margin-left: 10px;">BORING LOG</h1>                                                                                                                                                                                                                                                             |           |                               |         |                                       |                                                                                                     | <b>BH - 1</b><br>Depth : 30. m |          |          |     |                                                                                      |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------|---------|---------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------|----------|----------|-----|--------------------------------------------------------------------------------------|--|--|--|--|
| <div style="display: flex; justify-content: space-between;"> <div> <b>Project</b> : Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport Project, Timor Leste<br/> <b>Location</b> : Dili, Airport<br/> <b>Client</b> : JICA Study Team         </div> <div> <b>Date Started</b> : April 25, 2018<br/> <b>Date Finished</b> : April 30, 2018<br/> <b>Sheet</b> : 2/2 <b>Plate-3a</b> </div> </div> |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| <b>Boring Method</b> : Rotary Drilling                                                                                                                                                                                                                                                                                                                                                                                                        |           |                               |         | <b>Boring Machine</b> : Gemco Tractar |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| <b>Bor Master</b> : Mr. Zubair                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Logged by</b> : Mr. Mohsin |         | <b>Checked by</b> : Mr. Syed Abbas    |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| <b>E : 777657.182    N = 9054214.726</b>                                                                                                                                                                                                                                                                                                                                                                                                      |           |                               |         | <b>Elevation</b> : 0.000              |                                                                                                     | <b>GWL</b> : 6.40 m            |          |          |     |                                                                                      |  |  |  |  |
| DATE                                                                                                                                                                                                                                                                                                                                                                                                                                          | DEPTH (m) | GWL                           | UDS/SPT | SYMBOL                                | SOIL DESCRIPTION                                                                                    | STANDARD PENETRATION TEST      |          |          |     |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                               |         |                                       |                                                                                                     | N1<br>15                       | N2<br>15 | N3<br>15 | N   | N SPT Graph                                                                          |  |  |  |  |
| April 30, 2018                                                                                                                                                                                                                                                                                                                                                                                                                                | 21        |                               |         |                                       | Medium dense to dense light brown Silty fine to coarse <b>SAND (SM)</b> , with <b>CLAY</b> Partings | 32                             | 23       | 25       | 48  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 22        |                               | SPT     |                                       | - loose to 22.00 m                                                                                  | 3                              | 4        | 5        | 9   |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 23        |                               | SPT     |                                       | - with Gravel, Gravels are Quartz & Phyllite - flacky and platy, sub-angular to sub-rounded 23.00 m | 13                             | 10       | 14       | 24  |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 24        |                               | SPT     |                                       | - dense below 22.00 m                                                                               | 12                             | 18       | 19       | 37  |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 25        |                               | SPT     |                                       |                                                                                                     | 10                             | 12       | 14       | 26  |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 26        |                               | SPT     |                                       | 25.50 m                                                                                             | 24                             | 15       | 15       | 30  |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 27        |                               | SPT     |                                       | Medium dense dark gray <b>SILT</b> with fine Sand ( <b>ML</b> ) with low plasticity                 | 5                              | 3        | 8        | 11  |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 28        |                               | SPT     |                                       |                                                                                                     | 2                              | 4        | 8        | 12  |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 29        |                               | UD-2    |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30        |                               | SPT     |                                       | - fine to medium Sandy <b>SILT (ML)</b> below 28.75 m                                               | 3                              | 5        | 7        | 12  |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30.05 m   |                               | SPT     |                                       | 30.05 m                                                                                             | 23                             | 27       | 33       | >50 |                                                                                      |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               | 31        |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| 32                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| 33                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| 34                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| 35                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| 36                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| 37                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| 38                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| 39                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |
| 40                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                               |         |                                       |                                                                                                     |                                |          |          |     |                                                                                      |  |  |  |  |

|  |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          | <b>BH - 2</b>             |                      |    |    |                                                                                      |    |    |    |    |    |
|-----------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------|----|----|--------------------------------------------------------------------------------------|----|----|----|----|----|
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          | Depth : 20. m             |                      |    |    |                                                                                      |    |    |    |    |    |
| Geotechnical Investigation for Preparatory Survey on the                          |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
| <b>Project</b>                                                                    |           | : Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |         |                                                                                     | <b>Date Started</b>                                                                                                                                      |                           | : May 4, 2018        |    |    |                                                                                      |    |    |    |    |    |
| <b>Location</b>                                                                   |           | : Dili, Airport                                                                                           |         |                                                                                     | <b>Date Finished</b>                                                                                                                                     |                           | : May 7, 2018        |    |    |                                                                                      |    |    |    |    |    |
| <b>Client</b>                                                                     |           | : JICA Study Team                                                                                         |         |                                                                                     | <b>Sheet</b>                                                                                                                                             |                           | : 1/1 <b>PLATE-4</b> |    |    |                                                                                      |    |    |    |    |    |
| <b>Boring Method</b> : Rotary Drilling                                            |           |                                                                                                           |         | <b>Boring Machine</b> : Gemco                                                       |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
| <b>Bor Master</b> : M. Zubair                                                     |           | <b>Logged by</b> : Mohsin                                                                                 |         | <b>Checked by</b>                                                                   |                                                                                                                                                          | : Syed Abbas              |                      |    |    |                                                                                      |    |    |    |    |    |
| <b>E : 777450.250 N : 9054126.991</b>                                             |           |                                                                                                           |         | <b>Elevation</b>                                                                    |                                                                                                                                                          | : <b>GWL</b> : 5.50 m     |                      |    |    |                                                                                      |    |    |    |    |    |
| DATE                                                                              | DEPTH (m) | GWL                                                                                                       | UDS/SPT | SYMBOL                                                                              | SOIL DESCRIPTION                                                                                                                                         | STANDARD PENETRATION TEST |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          | N1                        | N2                   | N3 | N  | N SPT Graph                                                                          |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          | 15                        | 15                   | 15 | N  | 0                                                                                    | 10 | 20 | 30 | 40 | 50 |
| May 4, 2018                                                                       | 1         | -5.10 m (Rata - rata) ~ 11                                                                                | SPT     |    | Loose to medium dense brown <b>SILT (ML)</b> with low plasticity, with CLAY Partings                                                                     | 1                         | 2                    | 6  | 8  |  |    |    |    |    |    |
|                                                                                   | 2         |                                                                                                           | SPT     |                                                                                     | - loose to 1.55 m                                                                                                                                        | 5                         | 9                    | 9  | 18 |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         | - medium dense below 1.55 m                                                         |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   | 2.50 m    |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   | 3         |                                                                                                           | SPT     |   | Medium dense brown Silty, Gravelly fine to coarse <b>SAND (SM)</b> , Gravels are Quartz, Phyllite, sub-angular to sub-rounded                            | 5                         | 11                   | 16 | 27 |                                                                                      |    |    |    |    |    |
|                                                                                   | 4         |                                                                                                           | SPT     |                                                                                     | - loose below 6.05 m                                                                                                                                     | 7                         | 6                    | 6  | 12 |                                                                                      |    |    |    |    |    |
|                                                                                   | 2.50 m    |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   | 5         |                                                                                                           | SPT     |  | Medium dense greyish brown Silty, Sandy well graded <b>GRAVEL (GM)</b> , Gravels are Quartz, Phyllite, sub-angular to sub-rounded                        | 6                         | 7                    | 12 | 19 |                                                                                      |    |    |    |    |    |
|                                                                                   | 6         |                                                                                                           | SPT     |                                                                                     | - loose below 6.05 m                                                                                                                                     | 22                        | 14                   | 12 | 26 |                                                                                      |    |    |    |    |    |
|                                                                                   | 7         |                                                                                                           | SPT     |                                                                                     |                                                                                                                                                          | 6                         | 5                    | 5  | 10 |                                                                                      |    |    |    |    |    |
|                                                                                   | 2.50 m    |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
| May 6, 2018                                                                       | 8         | -5.10 m (Rata - rata) ~ 11                                                                                | SPT     |  | Loose to medium dense brownish grey <b>SILT</b> with Sand ( <b>ML</b> ) with low plasticity                                                              | 5                         | 3                    | 2  | 5  |  |    |    |    |    |    |
|                                                                                   | 9         |                                                                                                           | SPT     |                                                                                     | - loose Gravelly with Sand to 7.50 m                                                                                                                     | 7                         | 7                    | 8  | 15 |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         | - medium dense below 7.50 m                                                         |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   | 10        |                                                                                                           | SPT     |  | - yellowish brownish grey with little Sand below 9.10 m                                                                                                  | 10                        | 10                   | 11 | 21 |                                                                                      |    |    |    |    |    |
|                                                                                   | 11        |                                                                                                           | SPT     |                                                                                     | - dense below 13.60 m                                                                                                                                    | 4                         | 5                    | 6  | 11 |                                                                                      |    |    |    |    |    |
|                                                                                   | 11.50 m   |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   | 12        |                                                                                                           | SPT     |  | Medium dense to dense brownish grey Silty fine to coarse <b>SAND</b> with Gravel ( <b>SM</b> ), Gravels are Quartz, Phyllite, sub-angular to sub-rounded | 8                         | 8                    | 8  | 16 |                                                                                      |    |    |    |    |    |
|                                                                                   | 13        |                                                                                                           | SPT     |                                                                                     | - medium dense to 13.60 m                                                                                                                                | 7                         | 10                   | 12 | 22 |                                                                                      |    |    |    |    |    |
|                                                                                   | 14        |                                                                                                           | SPT     |                                                                                     | - dense below 13.60 m                                                                                                                                    | 12                        | 20                   | 18 | 38 |                                                                                      |    |    |    |    |    |
|                                                                                   | 15        |                                                                                                           | SPT     |                                                                                     |                                                                                                                                                          | 16                        | 18                   | 21 | 39 |                                                                                      |    |    |    |    |    |
|                                                                                   | 16        |                                                                                                           | SPT     |                                                                                     |                                                                                                                                                          | 17                        | 18                   | 18 | 36 |                                                                                      |    |    |    |    |    |
| 16.60 m                                                                           |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
| May 7, 2018                                                                       | 17        | -5.10 m (Rata - rata) ~ 11                                                                                | SPT     |  | Dense brown Silty well graded <b>GRAVEL</b> with Sand ( <b>GM</b> ), Gravels are Quartz, Phyllite- flaky & platy, sub-angular to sub-rounded             | 13                        | 21                   | 27 | 48 |  |    |    |    |    |    |
|                                                                                   | 18        |                                                                                                           | SPT     |                                                                                     | - brown below 19.05 m                                                                                                                                    | 13                        | 23                   | 23 | 46 |                                                                                      |    |    |    |    |    |
|                                                                                   | 18.00 m   |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   | 19        |                                                                                                           | SPT     |  | Dense brown grey Silty well graded <b>GRAVEL</b> with Sand ( <b>GM</b> ), Gravels are Quartz, Phyllite- flaky & platy, sub-angular to sub-rounded        | 17                        | 18                   | 16 | 34 |                                                                                      |    |    |    |    |    |
| 20                                                                                | SPT       | - brown below 19.05 m                                                                                     | 17      |                                                                                     | 15                                                                                                                                                       | 16                        | 31                   |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                          |                           |                      |    |    |                                                                                      |    |    |    |    |    |

|  |           |                                                                                                           |         |                                                                                     |                                                                                                                                                                     | <div>BH - 3</div> <div>Depth : 20. m</div> |    |    |     |             |    |                   |    |               |    |
|-----------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|----|----|-----|-------------|----|-------------------|----|---------------|----|
| Geotechnical Investigation for Preparatory Survey on the                          |           |                                                                                                           |         |                                                                                     |                                                                                                                                                                     |                                            |    |    |     |             |    |                   |    |               |    |
| Project                                                                           |           | : Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |         |                                                                                     |                                                                                                                                                                     |                                            |    |    |     |             |    | Date Started      |    | : May 2, 2018 |    |
| Location                                                                          |           | : Dili, Airport                                                                                           |         |                                                                                     |                                                                                                                                                                     |                                            |    |    |     |             |    | Date Finished     |    | : May 4, 2018 |    |
| Client                                                                            |           | : JICA Study Team                                                                                         |         |                                                                                     |                                                                                                                                                                     |                                            |    |    |     |             |    | Sheet             |    | : 1/1 PLATE-5 |    |
| Boring Method : Rotary Drilling                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                                     | Boring Machine                             |    |    |     |             |    | : Gemco Tractor   |    |               |    |
| Bor Master                                                                        |           | : M. Zubair                                                                                               |         |                                                                                     |                                                                                                                                                                     | Logged by : Mohsin                         |    |    |     | Checked by  |    | : Syed Abbas      |    |               |    |
| E : 778003.197    N = 9053884.822                                                 |           |                                                                                                           |         |                                                                                     |                                                                                                                                                                     | Elevation                                  |    |    |     |             |    | : GWL : 5.30    m |    |               |    |
| DATE                                                                              | DEPTH (m) | GWL                                                                                                       | UDS/SPT | SYMBOL                                                                              | SOIL DESCRIPTION                                                                                                                                                    | STANDARD PENETRATION TEST                  |    |    |     |             |    |                   |    |               |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                                     | N1                                         | N2 | N3 | N   | N SPT Graph |    |                   |    |               |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                                     | 15                                         | 15 | 15 |     | 0           | 10 | 20                | 30 | 40            | 50 |
| May 2, 2018                                                                       | 1         |                                                                                                           | SPT     |    | Firm to very stiff brown <b>Silty CLAY</b> with fine Sand (ML-CL) with low plasticity, with CLAY Partings                                                           | 2                                          | 3  | 3  | 6   |             |    |                   |    |               |    |
|                                                                                   | 2         |                                                                                                           | SPT     |    | - firm to 1.55 m                                                                                                                                                    | 4                                          | 8  | 12 | 20  |             |    |                   |    |               |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     | 2.45 m                                                                                                                                                              |                                            |    |    |     |             |    |                   |    |               |    |
|                                                                                   | 3         |                                                                                                           | SPT     |    | Medium dense brown Silty, Gravelly fine to coarse <b>SAND (SM)</b> , Gravels are Phyllie- flaky & platy, sub-angular to sub-rounded                                 | 14                                         | 10 | 9  | 19  |             |    |                   |    |               |    |
|                                                                                   | 4         |                                                                                                           | SPT     |   |                                                                                                                                                                     | 23                                         | 3  | 8  | 11  |             |    |                   |    |               |    |
|                                                                                   | 5         |                                                                                                           | SPT     |  | - greyish brown below 4.55 m                                                                                                                                        | 13                                         | 12 | 11 | 23  |             |    |                   |    |               |    |
|                                                                                   | 6         |                                                                                                           |         |  |                                                                                                                                                                     |                                            |    |    |     |             |    |                   |    |               |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     | 2.45 m                                                                                                                                                              |                                            |    |    |     |             |    |                   |    |               |    |
|                                                                                   | 7         |                                                                                                           | SPT     |  | Medium dense brownish grey <b>SILT</b> with little Sand & Gravel ( <b>ML</b> ) with low plasticity                                                                  | 52                                         |    |    | >50 |             |    |                   |    |               |    |
|                                                                                   | 8         |                                                                                                           | SPT     |  | - very dense Gravelly with Sand to 6.55 m                                                                                                                           | 6                                          | 4  | 7  | 11  |             |    |                   |    |               |    |
|                                                                                   | 9         |                                                                                                           | SPT     |  | - fine to coarse Sandy, 8.60 to 10.85 m                                                                                                                             | 4                                          | 4  | 7  | 11  |             |    |                   |    |               |    |
| May 3, 2018                                                                       | 10        |                                                                                                           | UD-1    |  | - brown below 9.65 m                                                                                                                                                |                                            |    |    |     |             |    |                   |    |               |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     | 10.85 m                                                                                                                                                             |                                            |    |    |     |             |    |                   |    |               |    |
|                                                                                   | 11        |                                                                                                           | SPT     |  |                                                                                                                                                                     | 10                                         | 10 | 16 | 26  |             |    |                   |    |               |    |
|                                                                                   | 12        |                                                                                                           | SPT     |  | Medium dense to dense brown grey Silty fine to coarse <b>SAND</b> with Gravel ( <b>SM</b> ), Gravels are Quartz, Phyllie- flaky & platy, sub-angular to sub-rounded | 10                                         | 13 | 14 | 27  |             |    |                   |    |               |    |
|                                                                                   | 13        |                                                                                                           | SPT     |  |                                                                                                                                                                     | 11                                         | 11 | 16 | 27  |             |    |                   |    |               |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                                     | 15                                         | 19 | 19 | 38  |             |    |                   |    |               |    |
|                                                                                   | 14        |                                                                                                           | SPT     |  | - Gravelly to 11.30 m                                                                                                                                               | 11                                         | 20 | 20 | 40  |             |    |                   |    |               |    |
|                                                                                   | 15        |                                                                                                           | SPT     |  | - medium dense to 12.55 m                                                                                                                                           |                                            |    |    |     |             |    |                   |    |               |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     | - dense, 12.55 to 18.00 m                                                                                                                                           | 25                                         | 23 | 18 | 41  |             |    |                   |    |               |    |
|                                                                                   | 16        |                                                                                                           | SPT     |  | - Gravelly, 14.50 to 16.95 m                                                                                                                                        | 19                                         | 24 | 26 | 50  |             |    |                   |    |               |    |
|                                                                                   | 17        |                                                                                                           | SPT     |  |                                                                                                                                                                     | 21                                         | 23 | 22 | 45  |             |    |                   |    |               |    |
| May 4, 2018                                                                       | 18        |                                                                                                           | SPT     |  | - medium dense, 18.00 to 18.90 m                                                                                                                                    | 14                                         | 17 | 15 | 32  |             |    |                   |    |               |    |
|                                                                                   | 19        |                                                                                                           | SPT     |  | - very dense brown Gravelly below 18.90 m                                                                                                                           | 13                                         | 14 | 14 | 28  |             |    |                   |    |               |    |
|                                                                                   | 20        |                                                                                                           | SPT     |  |                                                                                                                                                                     | 12                                         | 20 | 26 | 46  |             |    |                   |    |               |    |
|                                                                                   |           |                                                                                                           |         |                                                                                     |                                                                                                                                                                     | 20.05 m                                    |    |    |     |             |    |                   |    |               |    |



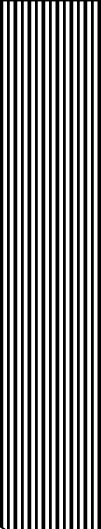
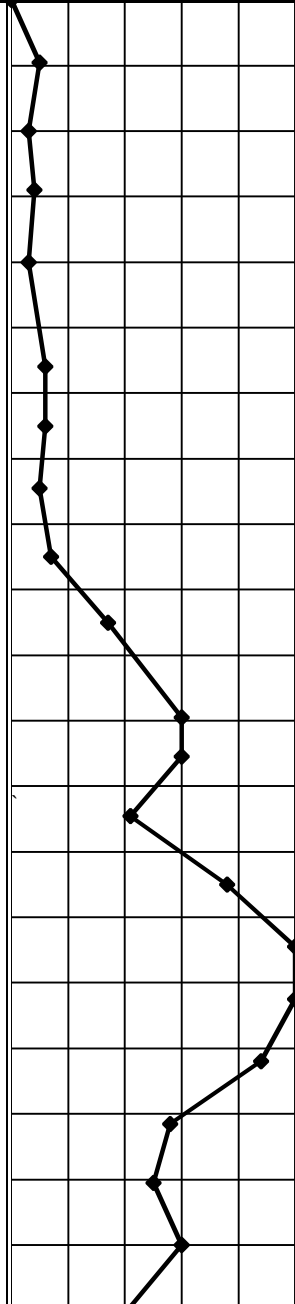
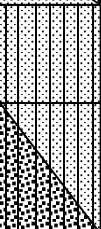
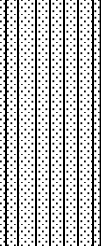
# BORING LOG

BH - 4

Depth : 10. m

|                                |                                                                                                           |                    |                |                |             |
|--------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------|----------------|----------------|-------------|
| Project                        | Geotechnical Investigation for Preparatory Survey on the                                                  |                    | Date Started   | May 13, 2018   |             |
|                                | : Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |                    |                |                |             |
| Location                       | : Dili, Airport                                                                                           |                    | Date Finished  | : May 13, 2018 |             |
| Client                         | : JICA Study Team                                                                                         |                    | Sheet          | : 1/1 PLATE-6  |             |
| Boring Method                  | : Rotary Drilling                                                                                         |                    | Boring Machine | : Gemco        |             |
| Bor Master                     | : M. Zubair                                                                                               | Logged by : Mohsin | Checked by     | : Syed Abbas   |             |
| E : 777779.283 N = 9053835.273 |                                                                                                           |                    | Elevation      | :              | GWL : DRY m |

| DATE         | DEPTH (m) | GWL | UDS/SPT | SYMBOL                                                                              | SOIL DESCRIPTION                                                                                                                                                   | STANDARD PENETRATION TEST |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|--------------|-----------|-----|---------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----|----|-----|---------------------------------------------------------------------------------------|----|----|----|----|----|--|--|--|--|--|
|              |           |     |         |                                                                                     |                                                                                                                                                                    | N1                        | N2 | N3 | N   | N SPT Graph                                                                           |    |    |    |    |    |  |  |  |  |  |
|              |           |     |         |                                                                                     |                                                                                                                                                                    | 15                        | 15 | 15 |     | 0                                                                                     | 10 | 20 | 30 | 40 | 50 |  |  |  |  |  |
| May 13, 2018 | 1         | DRY | SPT     |    | Loose to medium dense brown <b>SILT</b> with fine Sand ( <b>ML</b> ), low plasticity, with CLAY Partings                                                           | 4                         | 7  | 5  | 12  |    |    |    |    |    |    |  |  |  |  |  |
|              | 2         |     | SPT     |    | - medium dense to 0.90 m<br>- loose below 0.90 m                                                                                                                   | 2                         | 3  | 3  | 6   |    |    |    |    |    |    |  |  |  |  |  |
|              | 3         |     | SPT     |   |                                                                                                                                                                    | 2                         | 2  | 3  | 5   |   |    |    |    |    |    |  |  |  |  |  |
|              | 4         |     | SPT     |  |                                                                                                                                                                    | 13                        | 8  | 10 | 18  |  |    |    |    |    |    |  |  |  |  |  |
|              | 5         |     | SPT     |  | Medium dense brownish grey Silty fine to coarse <b>SAND</b> with Gravel ( <b>SM</b> ), Gravels are Quartz & Phyllite - flaky and platy, sub-angular to sub-rounded | 19                        | 14 | 13 | 27  |  |    |    |    |    |    |  |  |  |  |  |
|              | 6         |     | SPT     |  |                                                                                                                                                                    | 10                        | 11 | 12 | 23  |  |    |    |    |    |    |  |  |  |  |  |
|              | 7         |     | SPT     |  |                                                                                                                                                                    | 9                         | 12 | 11 | 23  |  |    |    |    |    |    |  |  |  |  |  |
|              | 8         |     | SPT     |  | Very dense greyish brown Sandy <b>SILT</b> with Gravel ( <b>ML</b> ), low plasticity                                                                               | 28                        | 28 | 26 | >50 |  |    |    |    |    |    |  |  |  |  |  |
|              | 9         |     | SPT     |  |                                                                                                                                                                    | 12                        | 10 | 8  | 18  |  |    |    |    |    |    |  |  |  |  |  |
|              | 10        |     | SPT     |  | Medium dense brownish grey Silty fine to coarse <b>SAND</b> with Gravel ( <b>SM</b> ), Gravels are Quartz & Phyllite - flaky and platy, sub-angular to sub-rounded | 7                         | 9  | 8  | 17  |  |    |    |    |    |    |  |  |  |  |  |
|              | 11        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|              | 12        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|              | 13        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|              | 14        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|              | 15        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|              | 16        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|              | 17        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|              | 18        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|              | 19        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |
|              | 20        |     |         |                                                                                     |                                                                                                                                                                    |                           |    |    |     |                                                                                       |    |    |    |    |    |  |  |  |  |  |

|  |           |                                                                                                           |                                         |                                                                                                                                                          |                                                                                                                                               | <h1>BORING LOG</h1>       |    |                 |     |                                                                                      |    | <div>BH - 5</div> <div>Depth : 20. m</div> |    |    |    |
|-----------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----|-----------------|-----|--------------------------------------------------------------------------------------|----|--------------------------------------------|----|----|----|
| Geotechnical Investigation for Preparatory Survey on the                          |           |                                                                                                           |                                         |                                                                                                                                                          |                                                                                                                                               |                           |    |                 |     |                                                                                      |    |                                            |    |    |    |
| Project                                                                           |           | : Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |                                         |                                                                                                                                                          |                                                                                                                                               |                           |    | Date Started    |     | : May 8, 2018                                                                        |    |                                            |    |    |    |
| Location                                                                          |           | : Dili, Airport                                                                                           |                                         |                                                                                                                                                          |                                                                                                                                               |                           |    | Date Finished   |     | : May 10, 2018                                                                       |    |                                            |    |    |    |
| Client                                                                            |           | : JICA Study Team                                                                                         |                                         |                                                                                                                                                          |                                                                                                                                               |                           |    | Sheet           |     | : 1/1 PLATE-7                                                                        |    |                                            |    |    |    |
| Boring Method : Rotary Drilling                                                   |           |                                                                                                           |                                         |                                                                                                                                                          |                                                                                                                                               | Boring Machine            |    | : Gemco Tractor |     |                                                                                      |    |                                            |    |    |    |
| Bor Master                                                                        |           | : M. Zubair                                                                                               |                                         | Logged by : Mohsin                                                                                                                                       |                                                                                                                                               | Checked by                |    | : Syed Abbas    |     |                                                                                      |    |                                            |    |    |    |
| E : 778025.704                                                                    |           |                                                                                                           |                                         |                                                                                                                                                          |                                                                                                                                               | N : 9053980.208           |    | Elevation       |     | : GWL : 4.60 m                                                                       |    |                                            |    |    |    |
| DATE                                                                              | DEPTH (m) | GWL                                                                                                       | UDS/SPT                                 | SYMBOL                                                                                                                                                   | SOIL DESCRIPTION                                                                                                                              | STANDARD PENETRATION TEST |    |                 |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   |           |                                                                                                           |                                         |                                                                                                                                                          |                                                                                                                                               | N1                        | N2 | N3              | N   | N SPT Graph                                                                          |    |                                            |    |    |    |
|                                                                                   |           |                                                                                                           |                                         |                                                                                                                                                          |                                                                                                                                               | 15                        | 15 | 15              |     | 0                                                                                    | 10 | 20                                         | 30 | 40 | 50 |
| May 8, 2018                                                                       | 1         |                                                                                                           | SPT                                     |                                                                        | Very loose to loose brown SILT with Sand (ML) with low plasticity                                                                             | 3                         | 2  | 3               | 5   |  |    |                                            |    |    |    |
|                                                                                   | 2         | SPT                                                                                                       | - loose light brown SILT (ML) to 0.95 m |                                                                                                                                                          | 1                                                                                                                                             | 2                         | 1  | 3               |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 3         | SPT                                                                                                       | - very loose, 0.95 to 5.15 m            |                                                                                                                                                          | 5                                                                                                                                             | 2                         | 2  | 4               |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 4         | SPT                                                                                                       |                                         |                                                                                                                                                          | 1                                                                                                                                             | 2                         | 1  | 3               |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 5         | UD-1                                                                                                      |                                         |                                                                                                                                                          |                                                                                                                                               |                           |    |                 |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 6         | SPT                                                                                                       | - loose below 5.15 m                    |                                                                                                                                                          | 1                                                                                                                                             | 2                         | 4  | 6               |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 7         | SPT                                                                                                       |                                         |                                                                                                                                                          | 3                                                                                                                                             | 2                         | 4  | 6               |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 8         | SPT                                                                                                       |                                         |                                                                                                                                                          | 1                                                                                                                                             | 2                         | 3  | 5               |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 9         | SPT                                                                                                       | - Sandy SILT (ML) below 8.05 m          |                                                                                                                                                          | 2                                                                                                                                             | 3                         | 4  | 7               |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   |           |                                                                                                           |                                         |                                                                                                                                                          | 9.05 m                                                                                                                                        |                           |    |                 |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 10        |                                                                                                           | SPT                                     |                                                                       | Medium dense brownish grey Silty fine to coarse SAND with Gravel (SM), Gravels are sub-angular to sub-rounded                                 | 8                         | 10 | 7               | 17  |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 11        |                                                                                                           | SPT                                     |                                                                                                                                                          | Medium dense brownish grey Silty, Gravelly fine to coarse SAND (SM), Gravels are Quartz, Phyllite - flaky & platy, sub-angular to sub-rounded | 15                        | 15 | 15              | 30  |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 12        |                                                                                                           | SPT                                     |                                                                                                                                                          |                                                                                                                                               | 16                        | 18 | 12              | 30  |                                                                                      |    |                                            |    |    |    |
| May 9, 2018                                                                       | 13        |                                                                                                           | SPT                                     |                                                                                                                                                          | 12.45 m                                                                                                                                       | 17                        | 10 | 11              | 21  |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 14        |                                                                                                           | SPT                                     | Medium dense to dense brownish grey Silty fine to coarse SAND with Gravel (SM), Gravels are Quartz, Phyllite - flaky & platy, sub-angular to sub-rounded | 14                                                                                                                                            | 20                        | 18 | 38              |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 15        |                                                                                                           | SPT                                     |                                                                                                                                                          | 27                                                                                                                                            | 30                        | 24 | >50             |     |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 16        |                                                                                                           | SPT                                     |                                                                                                                                                          | - dense to 16.20 m                                                                                                                            | 35                        | 43 | 16              | >50 |                                                                                      |    |                                            |    |    |    |
|                                                                                   |           | 17                                                                                                        |                                         | SPT                                                                                                                                                      | - medium dense below 16.20 m                                                                                                                  | 33                        | 26 | 18              | 44  |                                                                                      |    |                                            |    |    |    |
| May 10, 2018                                                                      | 18        |                                                                                                           | SPT                                     |                                                                       | - light brown, 15.25 to 16.20 m                                                                                                               | 15                        | 14 | 14              | 28  |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 19        |                                                                                                           | SPT                                     |                                                                                                                                                          | - greyish brown Silty fine to coarse SAND with little Gravel (SM) below 18.05 m                                                               | 5                         | 12 | 14              | 26  |                                                                                      |    |                                            |    |    |    |
|                                                                                   | 20        |                                                                                                           | SPT                                     |                                                                                                                                                          |                                                                                                                                               | 9                         | 12 | 18              | 30  |                                                                                      |    |                                            |    |    |    |
|                                                                                   |           |                                                                                                           |                                         |                                                                                                                                                          |                                                                                                                                               | 20.05 m                   | 6  | 5               | 15  | 20                                                                                   |    |                                            |    |    |    |

**WATER DEPTH : -** Dry

**SHEET-1**



Report No. GET 18-8002

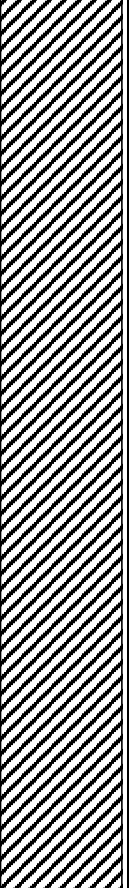
**TEST PIT LOG**

| Client: JICA STUDY TEAM                                                                                                                                                   |                  |                                                                        |        |            | TEST PIT LOG: TP # 1a (PLT)    |                            |                                    |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------|--------|------------|--------------------------------|----------------------------|------------------------------------|--|
| Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |                  |                                                                        |        |            | DATE OF EXCAVATION TP: 2-05-18 |                            |                                    |  |
| SIZE: 1.0X2.0X1.5 m                                                                                                                                                       |                  |                                                                        |        |            | SHEET: 1 OF 1                  |                            |                                    |  |
| SAMPLING METHOD: Hand Excavation                                                                                                                                          |                  |                                                                        |        |            | WATER DEPTH : - Dry            |                            |                                    |  |
| DEPTH (m)                                                                                                                                                                 | SAMPLES          | DESCRIPTION                                                            | SYMBOL | -0.075 (%) | Natural Moisture Content (%)   | FDT% (MDD) (g/cc)<br>{OMC} | Liquid Limit<br>[Plastic Limit]    |  |
| 0.5                                                                                                                                                                       |                  | Brownish light black Lean CLAY with fine Sand (CL) with Low plasticity |        | 75.0       | 5.2                            | SG = 2.28                  | LL=30.0<br>PL=22.3<br>PI=7.7<br>CL |  |
|                                                                                                                                                                           | UD-1(0.50-0.90m) |                                                                        |        |            |                                |                            |                                    |  |
|                                                                                                                                                                           | Sample-1         |                                                                        |        |            |                                |                            |                                    |  |
| 1.0                                                                                                                                                                       |                  |                                                                        |        |            |                                |                            |                                    |  |
|                                                                                                                                                                           |                  | UD-1(0.90-1.50m)                                                       |        |            |                                |                            |                                    |  |
| 1.5                                                                                                                                                                       |                  |                                                                        |        |            |                                |                            |                                    |  |
|                                                                                                                                                                           |                  |                                                                        |        |            |                                |                            |                                    |  |
| 2.0                                                                                                                                                                       |                  |                                                                        |        |            |                                |                            |                                    |  |



Report No. GET 18-8002

**TEST PIT LOG**

| Client: JICA STUDY TEAM                                                                                                                                                   |         |                  |                                                             |                                                                                    | TEST PIT LOG: TP # 2            |                              |                   |                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------|------------------------------|-------------------|------------------------------------|
| Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |         |                  |                                                             |                                                                                    | DATE OF EXCAVATION TP: 28-04-18 |                              |                   |                                    |
| SIZE: 1.0X2.0X1.5 m                                                                                                                                                       |         |                  |                                                             |                                                                                    | SHEET: 1 OF 1                   |                              |                   |                                    |
| SAMPLING METHOD: Hand Excavation                                                                                                                                          |         |                  |                                                             |                                                                                    | WATER DEPTH : - Dry             |                              |                   |                                    |
| DEPTH (m)                                                                                                                                                                 | SAMPLES | DESCRIPTION      |                                                             | SYMBOL                                                                             | -0.075 (%)                      | Natural Moisture Content (%) | FDT% (MDD) (g/cc) | Liquid Limit                       |
|                                                                                                                                                                           |         |                  |                                                             |                                                                                    |                                 |                              | {OMC}             | [Plastic Limit]                    |
| 0.5                                                                                                                                                                       |         | UD-1(0.50-0.90m) | Brownish grey fine Sandy Lean CLAY (CL) with Low plasticity |  | 65.3                            | 2,1                          | SG = 2.39         | LL=29.8<br>PL=22.2<br>PI=7.6<br>CL |
|                                                                                                                                                                           |         |                  |                                                             |                                                                                    |                                 |                              |                   |                                    |
| 1.0                                                                                                                                                                       |         | UD-2(1.00-1.40m) |                                                             |                                                                                    |                                 |                              |                   |                                    |
|                                                                                                                                                                           |         |                  |                                                             |                                                                                    |                                 |                              |                   |                                    |
| 1.5                                                                                                                                                                       |         | 1.50 m           |                                                             |                                                                                    |                                 |                              |                   |                                    |
| 2.0                                                                                                                                                                       |         |                  |                                                             |                                                                                    |                                 |                              |                   |                                    |



Report No. GET 18-8002

## TEST PIT LOG

| Client: JICA STUDY TEAM                                                                                                                                                   |                  |                                                                         |                     |            | TEST PIT LOG: TP # 2a (PLT)    |                   |                                     |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------|---------------------|------------|--------------------------------|-------------------|-------------------------------------|--|
| Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |                  |                                                                         |                     |            | DATE OF EXCAVATION TP: 3-05-18 |                   |                                     |  |
| SIZE: 1.0X2.0X1.5 m                                                                                                                                                       |                  |                                                                         |                     |            | SHEET: 1 OF 1                  |                   |                                     |  |
| SAMPLING METHOD: Hand Excavation                                                                                                                                          |                  |                                                                         | WATER DEPTH : - Dry |            |                                |                   |                                     |  |
| DEPTH (m)                                                                                                                                                                 | SAMPLES          | DESCRIPTION                                                             | SYMBOL              | -0.075 (%) | Natural Moisture Content (%)   | FDT% (MDD) (g/cc) | Liquid Limit                        |  |
|                                                                                                                                                                           |                  |                                                                         |                     |            |                                | {OMC}             | [Plastic Limit]                     |  |
| 0.5                                                                                                                                                                       |                  | Greyish light brown <b>SILT (ML)</b> with Low plasticity, CLAY Partings |                     | 96.3       | 8.1                            | SG = 2.17         | LL=49.4<br>PL=38.1<br>PI=11.0<br>ML |  |
|                                                                                                                                                                           | UD-1(0.50-0.90m) |                                                                         |                     |            |                                |                   |                                     |  |
| 1.0                                                                                                                                                                       |                  |                                                                         |                     |            |                                |                   |                                     |  |
|                                                                                                                                                                           | Sample-1         |                                                                         |                     |            |                                |                   |                                     |  |
| 1.5                                                                                                                                                                       |                  | Brownish grey <b>SILT (ML)</b> with Low plasticity                      |                     |            |                                |                   |                                     |  |
|                                                                                                                                                                           | UD-2(0.90-1.40m) |                                                                         |                     |            |                                |                   |                                     |  |
| 2.0                                                                                                                                                                       |                  |                                                                         |                     |            |                                |                   |                                     |  |



Report No. GET 18-8002

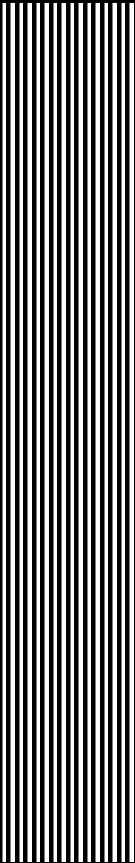
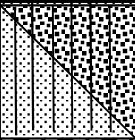
## TEST PIT LOG

| Client: Oriental Consultants Global Co., Ltd.,                                                                              |         |                  |                                                                                                           |        | TEST PIT LOG: TP # 3            |                              |                   |                                    |
|-----------------------------------------------------------------------------------------------------------------------------|---------|------------------|-----------------------------------------------------------------------------------------------------------|--------|---------------------------------|------------------------------|-------------------|------------------------------------|
| Location: GEOTECHNICAL INVESTIGATION AT IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, TIMOR LESTE |         |                  |                                                                                                           |        | DATE OF EXCAVATION TP: 30-04-18 |                              |                   |                                    |
| SIZE: 1.0X2.0X1.5 m                                                                                                         |         |                  |                                                                                                           |        | SHEET: 1 OF 1                   |                              |                   |                                    |
| SAMPLING METHOD: Hand Excavation                                                                                            |         |                  |                                                                                                           |        | WATER DEPTH : - Dry             |                              |                   |                                    |
| DEPTH (m)                                                                                                                   | SAMPLES | DESCRIPTION      |                                                                                                           | SYMBOL | -0.075 (%)                      | Natural Moisture Content (%) | FDT% (MDD) (g/cc) | Liquid Limit [Plastic Limit]       |
|                                                                                                                             |         |                  |                                                                                                           |        |                                 |                              | {OMC}             |                                    |
| 0.5                                                                                                                         |         |                  | Yellowish grey Silty, Sandy well graded <b>GRAVEL (GM)</b> Gravels are Quartz, sub-angular to sub-rounded |        |                                 |                              |                   |                                    |
| 1.0                                                                                                                         |         | UD-1(0.30-0.90m) | Yellowish grey <b>SILT</b> with fine Sand ( <b>ML</b> ) with Low plasticity, CLAY Partings                |        | 80.9                            | 1.8                          | SG = 2.27         | LL=29.0<br>PL=23.0<br>PI=6.0<br>ML |
| 1.5                                                                                                                         |         | UD-2(1.00-1.40m) |                                                                                                           |        |                                 |                              |                   |                                    |
| 2.0                                                                                                                         |         |                  |                                                                                                           |        |                                 |                              |                   |                                    |



Report No. GET 18-8002

## TEST PIT LOG

| Client: JICA STUDY TEAM                                                                                                                                                   |         |             |                                                                                                                             |                                                                                      | TEST PIT LOG: TP- 03A (PLT)       |                              |                   |                                    |
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| Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |         |             |                                                                                                                             |                                                                                      | DATE OF EXCAVATION TP: 05.05-2018 |                              |                   |                                    |
| SIZE: 1.0X2.0X1.5 m                                                                                                                                                       |         |             |                                                                                                                             |                                                                                      | SHEET: 1 OF 1                     |                              |                   |                                    |
| SAMPLING METHOD: Hand Excavation                                                                                                                                          |         |             |                                                                                                                             | WATER DEPTH : -                                                                      |                                   |                              |                   |                                    |
| DEPTH (m)                                                                                                                                                                 | SAMPLES | DESCRIPTION |                                                                                                                             | SYMBOL                                                                               | -0.075 (%)                        | Natural Moisture Content (%) | FDT% (MDD) (g/cc) | Liquid Limit [Plastic Limit]       |
|                                                                                                                                                                           |         |             |                                                                                                                             |                                                                                      |                                   |                              | {OMC}             |                                    |
| 0.5                                                                                                                                                                       |         | Sample-1    | Dark brown <b>SILT (ML)</b> with Low plasticity CLAY Partings                                                               |   | 92.0                              | 1.5                          | SG = 2.15         | LL=41.2<br>PL=32.0<br>PI=9.2<br>ML |
| 1.0                                                                                                                                                                       |         |             |                                                                                                                             |                                                                                      |                                   |                              |                   |                                    |
| 1.5                                                                                                                                                                       |         |             |                                                                                                                             |                                                                                      |                                   |                              |                   |                                    |
|                                                                                                                                                                           |         | Sample-2    | Greyish brown Silty, Sandy well graded <b>GRAVEL</b> with Sand ( <b>GM</b> ) Gravels are Quartz, sub-angular to sub-rounded |  | 26.3                              | 4.6                          | SG = 2.68         |                                    |
| 2.0                                                                                                                                                                       |         |             |                                                                                                                             |                                                                                      |                                   |                              |                   |                                    |



Report No. GET 18-8002

# TEST PIT LOG

| Client: JICA STUDY TEAM                                                                                                                                                   |         |                                  |                                                                                            |                     | TEST PIT LOG: TP # 4            |                              |                   |                                     |
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| Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |         |                                  |                                                                                            |                     | DATE OF EXCAVATION TP: 28-04-18 |                              |                   |                                     |
| SIZE: 1.0X2.0X1.5 m                                                                                                                                                       |         |                                  |                                                                                            |                     | SHEET: 1 OF 1                   |                              |                   |                                     |
| SAMPLING METHOD: Hand Excavation                                                                                                                                          |         |                                  |                                                                                            | WATER DEPTH : - Dry |                                 |                              |                   |                                     |
| DEPTH (m)                                                                                                                                                                 | SAMPLES | DESCRIPTION                      |                                                                                            | SYMBOL              | -0.075 (%)                      | Natural Moisture Content (%) | FDT% (MDD) (g/cc) | Liquid Limit<br><br>[Plastic Limit] |
|                                                                                                                                                                           |         |                                  |                                                                                            |                     |                                 |                              | {OMC}             |                                     |
| 0.5                                                                                                                                                                       |         |                                  | Greyish yellow <b>SILT</b> with Gravel ( <b>ML</b> ) with Low plasticity                   |                     |                                 |                              |                   |                                     |
| 1.0                                                                                                                                                                       |         | UD-1(0.50-0.90m)<br><br>Sample-1 | Greyish yellow <b>SILT</b> with fine Sand ( <b>ML</b> ) with Low plasticity, CLAY Partings |                     | 83.2                            | 9.5                          | SG = 2.31         | LL=28.9<br>PL=23.9<br>PI=5.0<br>ML  |
| 1.5                                                                                                                                                                       |         |                                  | Greyish yellow fine Sandy <b>SILT (ML)</b> with Low plasticity                             |                     |                                 |                              |                   |                                     |
| 2.0                                                                                                                                                                       |         |                                  |                                                                                            |                     |                                 |                              |                   |                                     |



Report No. GET 18-8002

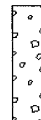
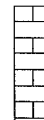
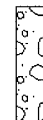
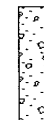
## TEST PIT LOG

| Client: JICA STUDY TEAM                                                                                                                                                   |         |                  |                                                                                             |        | TEST PIT LOG: TP # 5            |                              |                   |                                    |
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| Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste |         |                  |                                                                                             |        | DATE OF EXCAVATION TP: 27-04-18 |                              |                   |                                    |
| SIZE: 1.0X2.0X1.5 m                                                                                                                                                       |         |                  |                                                                                             |        | SHEET: 1 OF 1                   |                              |                   |                                    |
| SAMPLING METHOD: Hand Excavation                                                                                                                                          |         |                  |                                                                                             |        | WATER DEPTH : - Dry             |                              |                   |                                    |
| DEPTH (m)                                                                                                                                                                 | SAMPLES | DESCRIPTION      |                                                                                             | SYMBOL | -0.075 (%)                      | Natural Moisture Content (%) | FDT% (MDD) (g/cc) | Liquid Limit                       |
|                                                                                                                                                                           |         |                  |                                                                                             |        |                                 |                              | {OMC}             | [Plastic Limit]                    |
|                                                                                                                                                                           |         |                  | Greyish light brown <b>SILT</b> with fine Sand and Gravel ( <b>ML</b> ) with Low plasticity |        |                                 |                              |                   |                                    |
| 0.5                                                                                                                                                                       |         |                  | 0.50 m                                                                                      |        |                                 |                              |                   |                                    |
|                                                                                                                                                                           |         | UD-1(0.50-0.90m) | Greyish light brown <b>SILT (ML)</b> with Low plasticity, CLAY Partings                     |        | 95.1                            | 12.3                         | SG = 2.30         | LL=43.9<br>PL+35.0<br>PI=8.9<br>ML |
| 1.0                                                                                                                                                                       |         |                  | 1.00 m                                                                                      |        |                                 |                              |                   |                                    |
|                                                                                                                                                                           |         | UD-2(1.00-1.40m) | Greyish yellow <b>SILT</b> with fine Sand ( <b>ML</b> ) with Low plasticity                 |        |                                 |                              |                   |                                    |
| 1.5                                                                                                                                                                       |         |                  | 1.50 m                                                                                      |        |                                 |                              |                   |                                    |
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## SYMBOLS AND TERMS USED ON BORING LOGS

SOIL AND ROCK TYPES  
(SHOWN IN SYMBOL COLUMN)

SAMPLER TYPES  
(SHOWN IN SAMPLES COLUMN)

|                                                                                   |      |                                                                                   |            |                                                                                   |      |                                                                                   |      |                                                                                   |        |                                                                                   |           |                                                                                   |           |                                                                                   |              |                                                                                   |          |                                                                                     |          |                                                                                     |              |                                                                                     |             |
|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------|-------------|
|  | Sand |  | Silty Sand |  | Silt |  | Clay |  | Gravel |  | Limestone |  | Sandstone |  | Conglomerate |  | Backfill |  | Concrete |  | Split Barrel |  | Core Barrel |
| Predominant type shown heavy                                                      |      |                                                                                   |            |                                                                                   |      |                                                                                   |      |                                                                                   |        |                                                                                   |           |                                                                                   |           |                                                                                   |              |                                                                                   |          |                                                                                     |          |                                                                                     |              |                                                                                     |             |

TERMS DESCRIBING DENSITY CONDITION FOR CONSISTENCY

The condition of coarse grained soils may be obtained by performing sampler penetration tests or cone penetrometer tests. Approximate correlation between these tests and the density condition are given below:

| DENSITY CONDITION | SPT VALUES, N | CONE TIP RESISTANCE, MPa |
|-------------------|---------------|--------------------------|
| Very loose        | < 4           | < 2                      |
| Loose             | 4 to 10       | 2 to 4                   |
| Medium dense      | 10 to 30      | 4 to 12                  |
| Dense             | 30 to 50      | 12 to 20                 |
| Very dense        | > 50          | 20                       |

Density versus SPT value relationship is after Terzaghi and Peck, 1968. See Lacroix and Horn, 1973 if non-standard samplers are used. Density versus cone tip resistance relationship given above, after Meyerhof 1965; is a function of depth also; see Schmertmann, 1978.

The consistencies of cohesive soils may be obtained by performing undrained shear strength tests. Degrees of consistency are given below:

| CONSISTENCY | UNDRAINED SHEAR STRENGTH, kPa |
|-------------|-------------------------------|
| Very soft   | < 12                          |
| Soft        | 12 to 25                      |
| Firm        | 25 to 50                      |
| Stiff       | 50 to 100                     |
| Very stiff  | 100 to 200                    |
| Hard        | > 200                         |

TERMS CHARACTERIZING SOIL STRUCTURE

|             |                                                                                                        |
|-------------|--------------------------------------------------------------------------------------------------------|
| Parting     | - horizontal inclusion of different soil type less than 3-mm thick                                     |
| Seam        | - horizontal inclusion of different soil type 3 to 75-mm thick                                         |
| Layer       | - horizontal inclusion of different soil type greater than 75-mm thick                                 |
| Pocket      | - inclusion of different soil type that is smaller than the diameter of the soil sample                |
| Fissured    | - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical |
| Interbedded | - composed of alternate layers of different soil types                                                 |
| Silty       | - containing 12 to 50 percent silt size particles                                                      |
| Calcareous  | - containing 12 to 50 percent carbonates                                                               |
| Carbonate   | - containing more than 50 percent carbonates                                                           |

Terms used in this report for describing soils according to their texture or grain size distribution are in accordance with ASTM D 2487-90 and D 2488-90

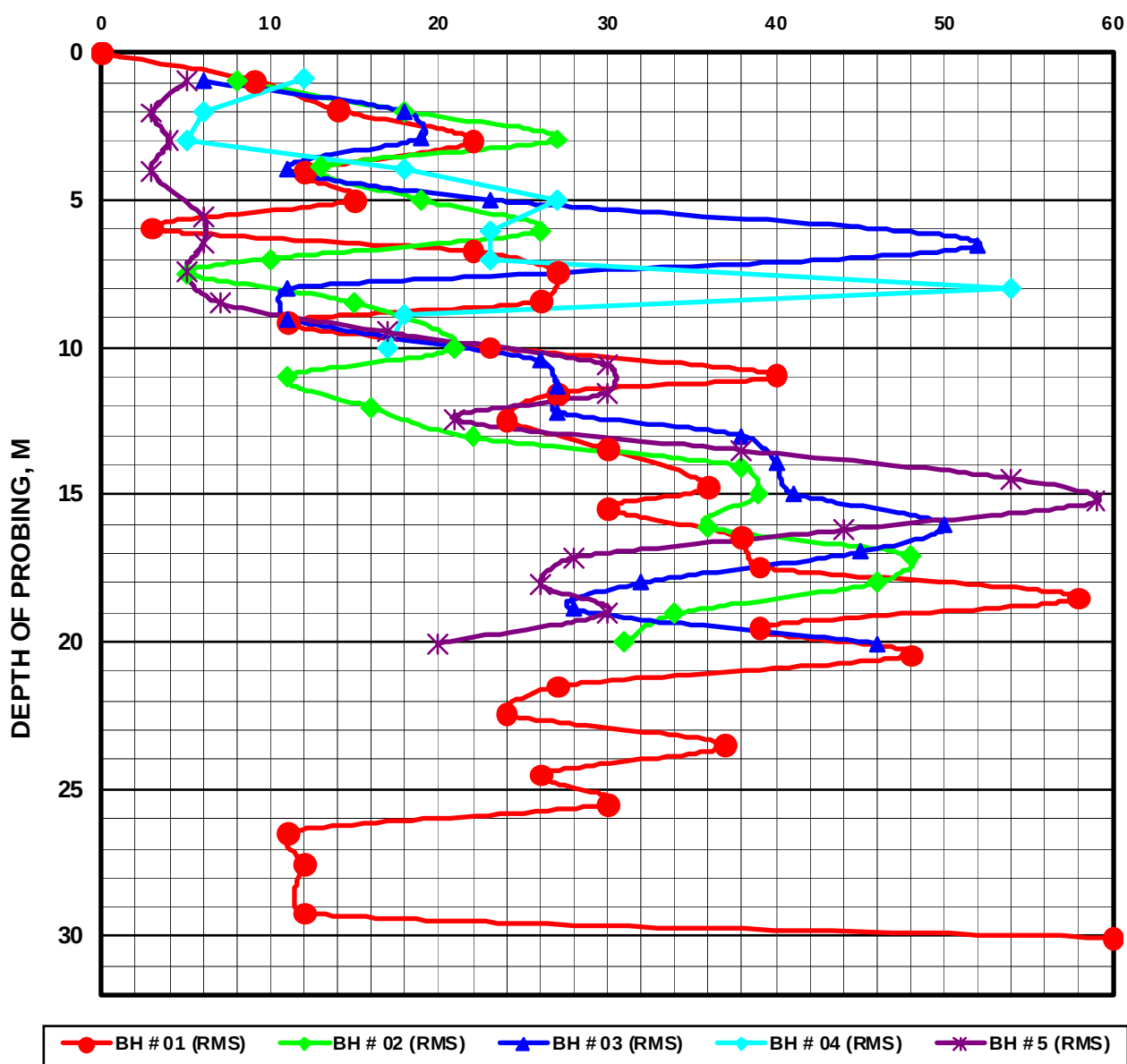


RMS ENGINEERING AND CONSTRUCTION

## STANDARD PENETRATION TEST SUMMARY READING

|                  |                                                                                                                                                                  |                     |                              |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------|
| CLIENT:          | JICA Study Team                                                                                                                                                  | TEST REPORT NO:     | PLT # 3A                     |
| PROJECT:         | Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | DATE OF REPORT:     | (refer to submission letter) |
| PROJECT REF. NO: | Not Applicable                                                                                                                                                   | DATE RECEIVED:      |                              |
| LOCATION:        | Presidente Nicolau Lobato International Airport Project, Timor Leste                                                                                             | DATE TEST STARTED:  | 25-04-2018                   |
| IDENTIFICATION:  | Boreholes 1, 2, 3, 4 & 5                                                                                                                                         | DATE TEST FINISHED: | 13-05-2018                   |
| ACTIVITY PERIOD: | 25 April to 13 May 2018                                                                                                                                          | TEST PERFORMED BY:  |                              |
| SUPERVISED BY:   |                                                                                                                                                                  | TEST METHOD:        | ASTM D1194                   |

## SPT READING OR "N" VALUE



## Remarks:

SPT procedure to ASTM D-1586: Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.

All N-Values are raw SPTs taken every meter of progressive depth using rotary drilling with mud circulation procedure.



RMS ENGINEERING AND CONSTRUCTION

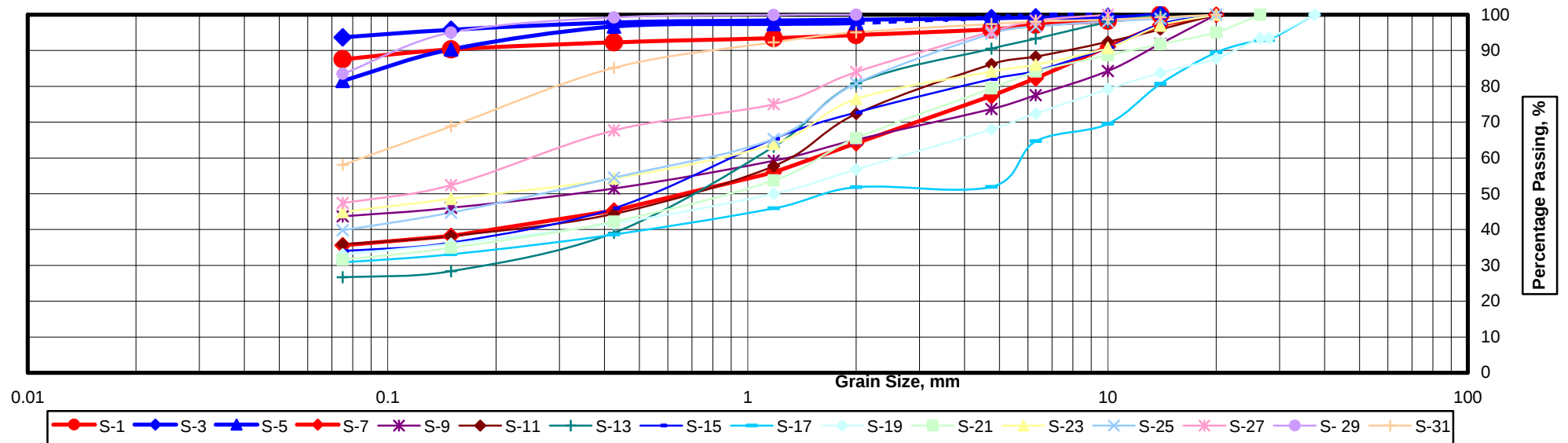
Client: JICA STUDY TEAM

Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-1

| Sieve Size, mm | BH # 01 S-1 | BH # 01 S-3 | BH # 01 S-5 | BH # 01 S-7 | BH # 01 S-9 | BH # 01 S-11 | BH # 01 S-13 | BH # 01 S-15 | BH # 01 S-17 | BH # 01 S-19 | BH # 01 S-21 | BH # 01 S-23 | BH # 01 S-25 | BH # 01 S-27 | BH # 01 S-29 | BH # 01 S-31 | Remarks |
|----------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| 37.5           |             |             |             |             |             |              |              |              | 100.0        | 100.0        |              |              |              |              |              |              |         |
| 28             |             |             |             |             |             |              |              |              | 92.9         | 93.4         |              |              |              |              |              |              |         |
| 26.5           |             |             |             |             |             |              |              |              | 92.9         | 93.4         | 100.0        |              |              |              |              |              |         |
| 20             |             |             |             | 100.0       | 100.0       | 100.0        |              | 100.0        | 89.5         | 87.8         | 95.1         | 100.0        | 100.0        |              |              | 100.0        |         |
| 14             | 100.0       | 100.0       |             | 97.2        | 91.9        | 95.9         | 100.0        | 97.4         | 80.7         | 83.8         | 91.8         | 97.0         | 98.9         |              |              | 99.3         |         |
| 10             | 98.3        | 99.2        | 100.0       | 91.1        | 84.3        | 92.4         | 97.9         | 90.8         | 69.5         | 79.2         | 88.7         | 90.7         | 98.1         | 100.0        |              | 98.7         |         |
| 6.3            | 97.2        | 99.2        | 99.8        | 82.2        | 77.5        | 88.3         | 93.3         | 84.3         | 64.7         | 72.4         | 84.1         | 86.0         | 96.7         | 98.4         |              | 98.1         |         |
| 4.75           | 95.9        | 99.0        | 99.2        | 77.3        | 73.7        | 86.2         | 90.5         | 82.0         | 51.9         | 68.0         | 79.4         | 84.1         | 94.7         | 95.3         |              | 97.4         |         |
| 2              | 94.3        | 98.6        | 97.7        | 64.1        | 65.1        | 72.3         | 80.8         | 72.7         | 51.8         | 56.8         | 65.5         | 76.5         | 80.8         | 84.0         | 100.0        | 95.1         |         |
| 1.18           | 93.5        | 98.4        | 97.4        | 56.0        | 59.2        | 57.7         | 63.1         | 65.3         | 45.9         | 50.0         | 53.7         | 63.9         | 65.3         | 75.0         | 99.9         | 92.3         |         |
| 0.425          | 92.3        | 97.8        | 96.7        | 45.3        | 51.5        | 44.4         | 39.1         | 45.9         | 38.6         | 41.7         | 42.2         | 54.3         | 54.5         | 67.7         | 99.2         | 85.2         |         |
| 0.15           | 90.3        | 95.8        | 90.3        | 38.2        | 46.1        | 38.2         | 28.4         | 36.4         | 33.1         | 36.0         | 34.9         | 48.6         | 44.7         | 52.4         | 95.0         | 68.8         |         |
| 0.075          | 87.6        | 93.7        | 81.5        | 35.6        | 43.7        | 35.9         | 26.7         | 34.0         | 30.8         | 33.1         | 31.6         | 44.9         | 39.8         | 47.4         | 83.5         | 58.1         |         |
|                |             |             |             |             |             |              |              |              |              |              |              |              |              |              |              |              |         |
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GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION





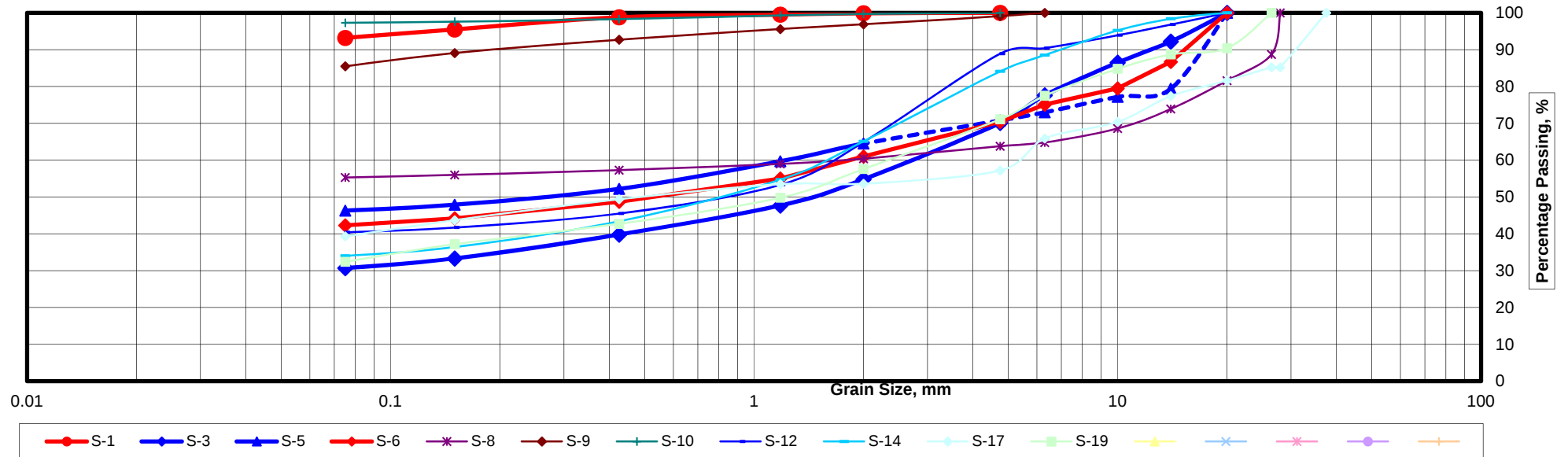
RMS ENGINEERING AND CONSTRUCTION

Client: JICA STUDY TEAM  
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-2

| Sieve Size, mm | BH # 02 S-1 | BH # 02 S-3 | BH # 02 S-5 | BH # 02 S-6 | BH # 02 S-8 | BH # 02 S-9 | BH # 02 S-10 | BH # 02 S-12 | BH # 02 S-14 | BH # 02 S-17 | BH # 02 S-19 | Remarks |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|---------|
| 37.5           |             |             |             |             |             |             |              |              |              | 100.0        |              |         |
| 28             |             |             |             |             | 100.0       |             |              |              |              | 85.2         |              |         |
| 26.5           |             |             |             |             | 88.7        |             |              |              |              | 85.2         | 100.0        |         |
| 20             |             | 100.0       | 100.0       | 100.0       | 81.6        |             |              | 100.0        | 100.0        | 81.6         | 90.4         |         |
| 14             |             | 92.2        | 79.4        | 86.7        | 73.9        |             |              | 96.8         | 98.4         | 77.4         | 88.7         |         |
| 10             |             | 86.5        | 77.2        | 79.5        | 68.6        |             |              | 93.9         | 95.2         | 70.4         | 84.8         |         |
| 6.3            |             | 77.6        | 73.0        | 75.1        | 64.8        | 100.0       |              | 90.4         | 88.5         | 65.9         | 77.5         |         |
| 4.75           | 100.0       | 70.1        | 70.8        | 70.4        | 63.8        | 99.1        | 100.0        | 88.9         | 84.1         | 57.2         | 71.1         |         |
| 2              | 99.9        | 54.8        | 64.5        | 61.0        | 60.4        | 96.9        | 99.7         | 64.9         | 65.1         | 53.6         | 57.6         |         |
| 1.18           | 99.5        | 47.7        | 59.7        | 55.0        | 59.0        | 95.6        | 99.3         | 53.3         | 54.7         | 53.5         | 49.8         |         |
| 0.425          | 98.8        | 39.8        | 52.2        | 48.7        | 57.3        | 92.7        | 98.3         | 45.5         | 43.4         | 49.4         | 42.7         |         |
| 0.15           | 95.5        | 33.3        | 47.9        | 44.2        | 56.0        | 89.1        | 97.6         | 41.7         | 36.4         | 43.7         | 37.2         |         |
| 0.075          | 93.2        | 30.7        | 46.3        | 42.3        | 55.3        | 85.5        | 97.3         | 40.4         | 34.0         | 39.3         | 32.4         |         |

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION





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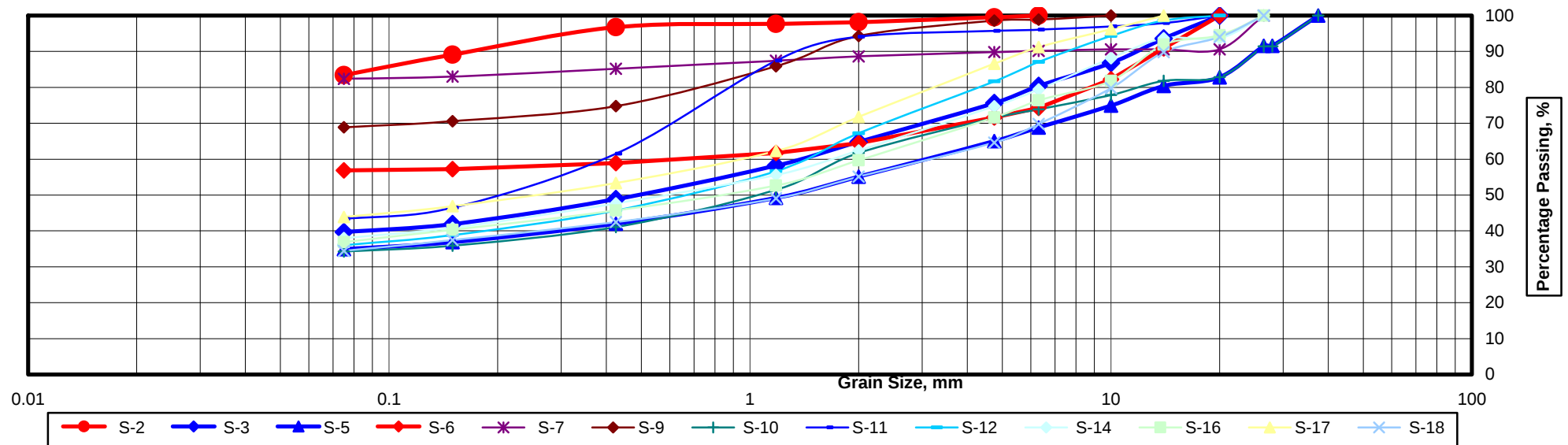
Client: JICA STUDY TEAM

Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-3

| Sieve Size, mm | BH # 03 S-2 | BH # 03 S-3 | BH # 03 S-5 | BH # 03 S-6 | BH # 03 S-7 | BH # 03 S-9 | BH # 03 S-10 | BH # 03 S-11 | BH # 03 S-12 | BH # 03 S-14 | BH # 03 S-16 | BH # 03 S-17 | BH # 03 S-18 | Remarks |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| 37.5           |             |             | 100.0       |             |             |             | 100.0        |              |              |              |              |              |              |         |
| 28             |             |             | 91.6        |             |             |             | 91.4         |              |              |              |              |              |              |         |
| 26.5           |             |             | 91.6        |             | 100.0       |             | 91.4         |              |              | 100.0        | 100.0        |              | 100.0        |         |
| 20             |             | 100.0       | 82.8        | 100.0       | 90.6        |             | 82.9         | 100.0        | 100.0        | 93.7         | 94.5         |              | 94.0         |         |
| 14             |             | 93.6        | 80.4        | 90.9        | 90.6        |             | 81.8         | 97.9         | 98.6         | 93.7         | 91.9         | 100.0        | 89.8         |         |
| 10             |             | 86.8        | 74.9        | 82.2        | 90.6        | 100.0       | 77.9         | 97.0         | 94.3         | 88.1         | 81.8         | 96.2         | 79.8         |         |
| 6.3            | 100.0       | 80.4        | 68.8        | 74.3        | 90.2        | 98.9        | 73.9         | 96.1         | 87.1         | 79.4         | 76.4         | 91.2         | 69.8         |         |
| 4.75           | 99.5        | 75.6        | 65.0        | 71.6        | 89.8        | 98.6        | 71.5         | 95.7         | 81.7         | 74.7         | 71.6         | 86.6         | 64.6         |         |
| 2              | 98.2        | 64.8        | 55.1        | 64.5        | 88.6        | 94.3        | 61.7         | 94.1         | 67.2         | 62.4         | 59.7         | 71.8         | 55.1         |         |
| 1.18           | 97.7        | 58.2        | 49.2        | 61.7        | 87.4        | 85.9        | 51.5         | 87.4         | 56.7         | 55.6         | 52.7         | 62.3         | 49.1         |         |
| 0.425          | 96.8        | 48.9        | 42.0        | 58.9        | 85.2        | 74.8        | 41.1         | 61.5         | 45.7         | 47.7         | 45.7         | 53.4         | 42.5         |         |
| 0.15           | 89.1        | 41.9        | 36.9        | 57.2        | 83.0        | 70.6        | 35.9         | 46.5         | 38.8         | 40.9         | 40.3         | 46.9         | 37.4         |         |
| 0.075          | 83.4        | 39.7        | 34.9        | 56.9        | 82.4        | 68.9        | 34.3         | 43.3         | 36.0         | 38.0         | 36.9         | 43.9         | 34.4         |         |

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION





RMS ENGINEERING AND CONSTRUCTION

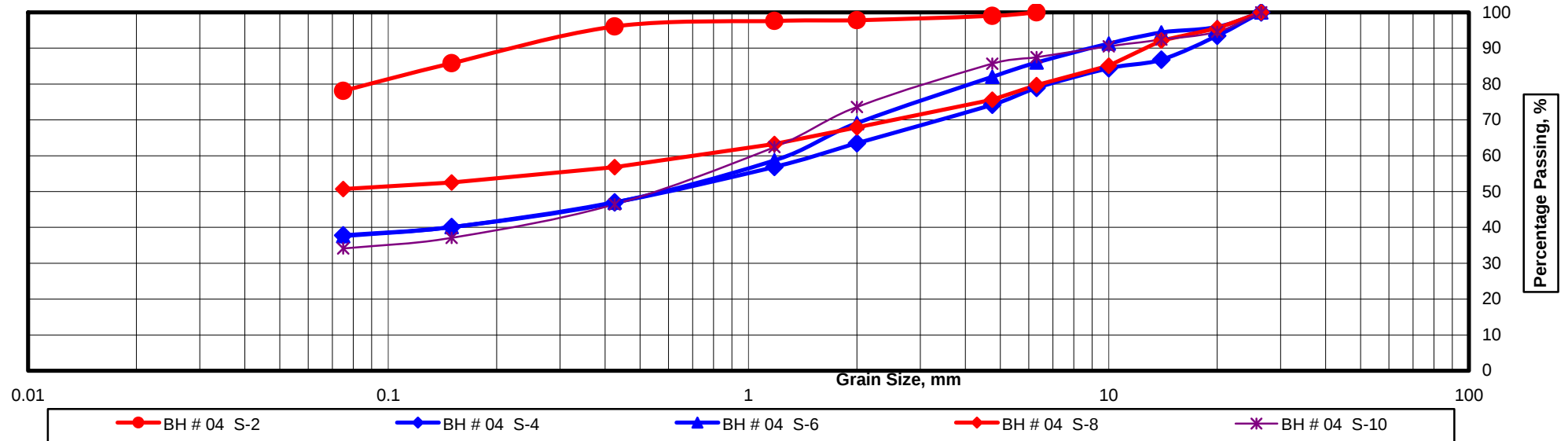
Client: JICA STUDY TEAM

Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-4

| Sieve Size, mm | BH # 04 S-2 | BH # 04 S-4 | BH # 04 S-6 | BH # 04 S-8 | BH # 04 S-10 | Remarks |
|----------------|-------------|-------------|-------------|-------------|--------------|---------|
| 37.5           |             |             |             |             |              |         |
| 28             |             |             |             |             |              |         |
| 26.5           |             | 100.0       | 100.0       | 100.0       | 100.0        |         |
| 20             |             | 93.5        | 95.9        | 95.6        | 94.6         |         |
| 14             |             | 86.8        | 94.4        | 92.1        | 92.4         |         |
| 10             |             | 84.4        | 91.3        | 85.1        | 90.5         |         |
| 6.3            | 100.0       | 78.9        | 86.0        | 79.7        | 87.5         |         |
| 4.75           | 99.0        | 74.2        | 82.0        | 75.6        | 85.7         |         |
| 2              | 97.8        | 63.5        | 69.1        | 67.9        | 73.6         |         |
| 1.18           | 97.6        | 56.9        | 58.7        | 63.3        | 62.4         |         |
| 0.425          | 96.1        | 47.0        | 46.9        | 56.8        | 46.4         |         |
| 0.15           | 85.8        | 40.1        | 40.1        | 52.5        | 37.1         |         |
| 0.075          | 78.1        | 37.8        | 37.6        | 50.7        | 34.1         |         |
|                |             |             |             |             |              |         |
|                |             |             |             |             |              |         |

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION





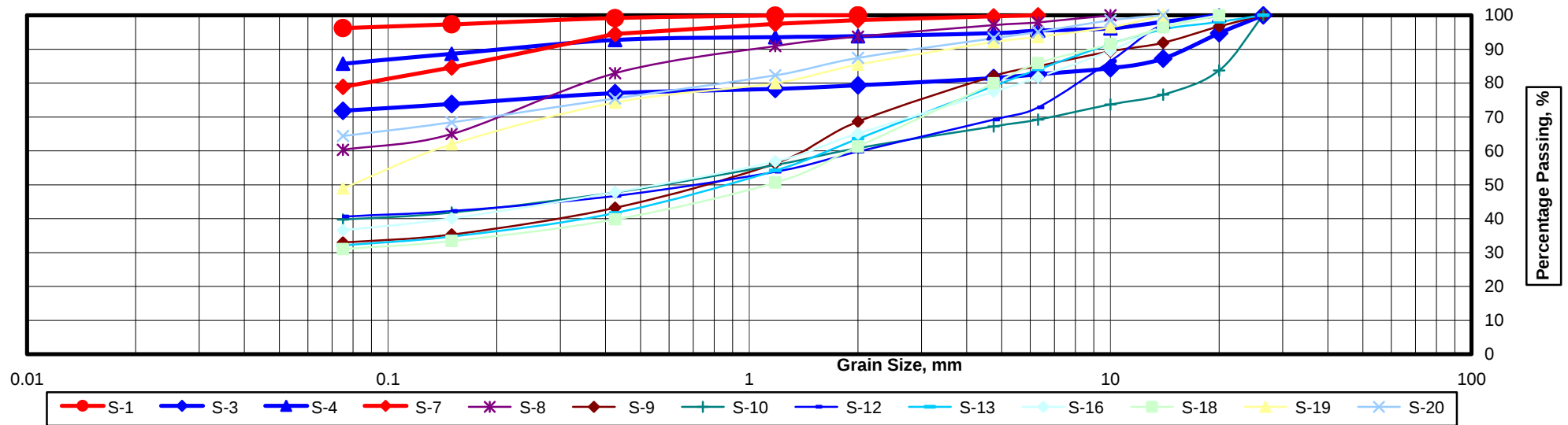
Client: JICA STUDY TEAM

Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-5

| Sieve Size, mm | BH # 05 S-1 | BH # 05 S-3 | BH # 05 S-4 | BH # 05 S-7 | BH # 05 S-8 | BH # 05 S-9 | BH # 05 S-10 | BH # 05 S-12 | BH # 05 S-13 | BH # 05 S-16 | BH # 05 S-18 | BH # 05 S-19 | BH # 05 S-20 | Remarks |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| 37.5           |             |             |             |             |             |             |              |              |              |              |              |              |              |         |
| 28             |             |             |             |             |             |             |              |              |              |              |              |              |              |         |
| 26.5           |             | 100.0       |             |             |             | 100.0       | 100.0        |              | 100.0        |              |              |              |              |         |
| 20             |             | 94.7        | 100.0       |             |             | 96.7        | 83.7         | 100.0        | 98.1         | 100.0        | 100.0        |              |              |         |
| 14             |             | 87.2        | 98.1        |             |             | 91.9        | 76.6         | 97.3         | 95.8         | 96.6         | 96.4         | 100.0        | 100.0        |         |
| 10             |             | 84.4        | 96.1        |             | 100.0       | 89.4        | 73.7         | 86.5         | 91.5         | 89.6         | 91.5         | 96.5         | 98.5         |         |
| 6.3            |             | 82.6        | 95.5        | 100.0       | 97.9        | 85.0        | 69.2         | 72.8         | 84.0         | 81.7         | 85.9         | 93.6         | 95.1         |         |
| 4.75           |             | 81.5        | 94.7        | 99.7        | 97.1        | 82.1        | 67.2         | 69.2         | 79.1         | 77.5         | 79.9         | 92.1         | 93.2         |         |
| 2              | 100.0       | 79.3        | 93.8        | 98.6        | 93.7        | 68.6        | 60.8         | 59.8         | 63.6         | 65.1         | 61.3         | 85.4         | 87.4         |         |
| 1.18           | 99.9        | 78.3        | 93.5        | 97.5        | 90.9        | 56.3        | 55.8         | 53.8         | 54.2         | 56.9         | 50.6         | 80.0         | 82.3         |         |
| 0.425          | 99.2        | 77.0        | 92.7        | 94.5        | 82.9        | 43.2        | 47.7         | 46.7         | 41.6         | 47.8         | 39.8         | 74.3         | 75.5         |         |
| 0.15           | 97.3        | 73.8        | 88.6        | 84.6        | 65.0        | 35.3        | 41.8         | 42.2         | 34.7         | 40.1         | 33.4         | 61.9         | 68.4         |         |
| 0.075          | 96.2        | 71.8        | 85.7        | 78.9        | 60.3        | 32.9        | 39.7         | 40.6         | 32.1         | 36.6         | 31.0         | 48.9         | 64.4         |         |
|                |             |             |             |             |             |             |              |              |              |              |              |              |              |         |
|                |             |             |             |             |             |             |              |              |              |              |              |              |              |         |

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION





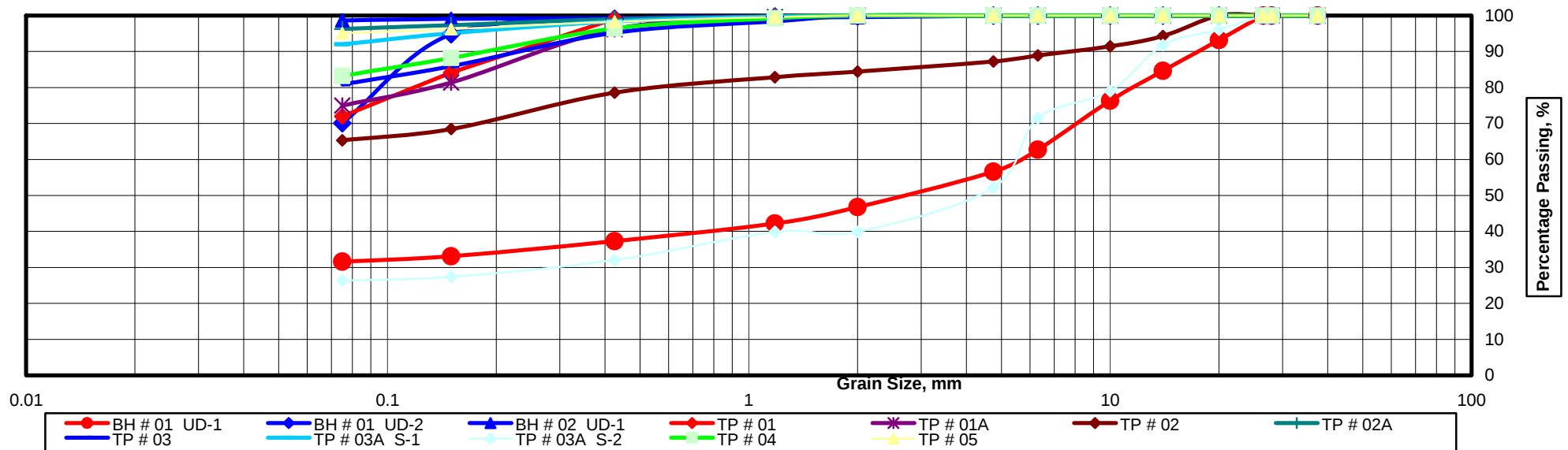
Client: JICA STUDY TEAM

Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, Test-Pit and Borehole UD

| Sieve Size, mm | BH # 01 UD-1 | BH # 01 UD-2 | BH # 02 UD-1 | TP # 01 | TP # 01A | TP # 02 | TP # 02A | TP # 03 | TP # 03A S-1 | TP # 03A S-2 | TP # 04 | TP # 05 |  | Remarks |
|----------------|--------------|--------------|--------------|---------|----------|---------|----------|---------|--------------|--------------|---------|---------|--|---------|
| 37.5           | 100.0        | 100.0        | 100.0        | 100.0   | 100.0    | 100.0   | 100.0    | 100.0   | 100.0        | 100.0        | 100.0   | 100.0   |  |         |
| 28             | 100.0        | 100.0        | 100.0        | 100.0   | 100.0    | 100.0   | 100.0    | 100.0   | 100.0        | 100.0        | 100.0   | 100.0   |  |         |
| 26.5           | 100.0        | 100.0        | 100.0        | 100.0   | 100.0    | 100.0   | 100.0    | 100.0   | 100.0        | 100.0        | 100.0   | 100.0   |  |         |
| 20             | 93.2         | 100.0        | 100.0        | 100.0   | 100.0    | 100.0   | 100.0    | 100.0   | 100.0        | 96.1         | 100.0   | 100.0   |  |         |
| 14             | 84.6         | 100.0        | 100.0        | 100.0   | 100.0    | 94.3    | 100.0    | 100.0   | 100.0        | 91.8         | 100.0   | 100.0   |  |         |
| 10             | 76.3         | 100.0        | 100.0        | 100.0   | 100.0    | 91.4    | 100.0    | 100.0   | 100.0        | 79.0         | 100.0   | 100.0   |  |         |
| 6.3            | 62.7         | 100.0        | 100.0        | 100.0   | 100.0    | 88.9    | 100.0    | 100.0   | 100.0        | 71.5         | 100.0   | 100.0   |  |         |
| 4.75           | 56.6         | 100.0        | 99.9         | 100.0   | 100.0    | 87.2    | 100.0    | 100.0   | 100.0        | 52.2         | 100.0   | 100.0   |  |         |
| 2              | 46.8         | 99.8         | 99.6         | 100.0   | 100.0    | 84.4    | 100.0    | 100.0   | 100.0        | 39.9         | 100.0   | 100.0   |  |         |
| 1.18           | 42.2         | 99.7         | 99.5         | 99.8    | 99.6     | 82.9    | 99.7     | 98.4    | 99.7         | 39.9         | 99.2    | 99.6    |  |         |
| 0.425          | 37.3         | 99.1         | 99.3         | 99.1    | 96.2     | 78.6    | 99.0     | 95.2    | 98.4         | 32.0         | 96.4    | 98.3    |  |         |
| 0.15           | 33.1         | 94.8         | 99.1         | 84.1    | 81.4     | 68.5    | 97.3     | 85.9    | 95.1         | 27.4         | 88.2    | 96.2    |  |         |
| 0.075          | 31.6         | 70.1         | 98.7         | 72.0    | 75.0     | 65.3    | 96.3     | 80.9    | 92.0         | 26.3         | 83.2    | 95.1    |  |         |
|                |              |              |              |         |          |         |          |         |              |              |         |         |  |         |
|                |              |              |              |         |          |         |          |         |              |              |         |         |  |         |

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION

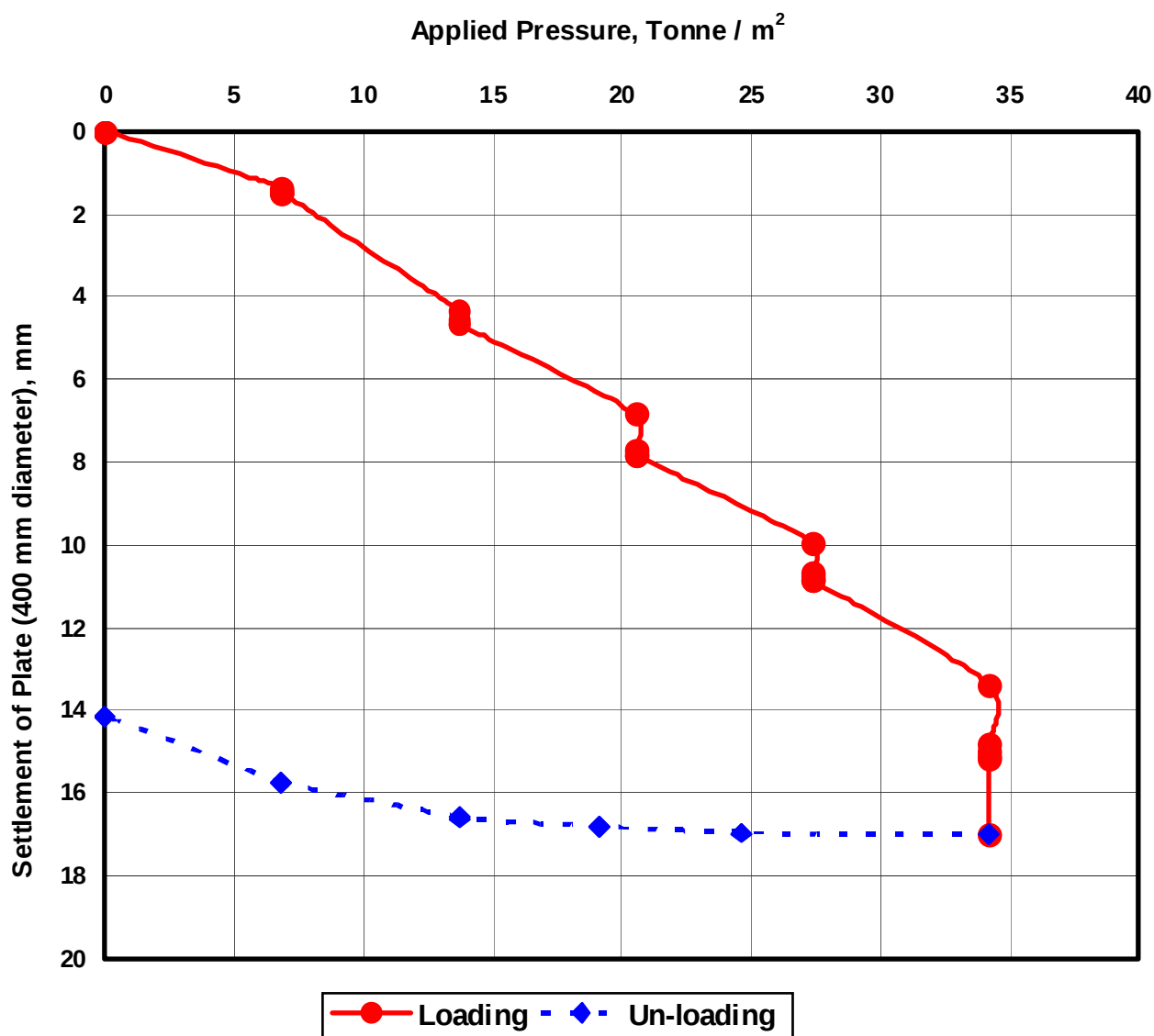




RMS ENGINEERING AND CONSTRUCTION

### PLATE LOAD TEST

|                  |                                                                                                                                                                  |                     |                              |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------|
| CLIENT:          | JICA STUDY TEAM                                                                                                                                                  | TEST REPORT NO:     | PLT # 1A                     |
| PROJECT:         | Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | DATE OF REPORT:     | (refer to submission letter) |
| PROJECT REF. NO: |                                                                                                                                                                  | DATE RECEIVED:      |                              |
| LOCATION:        | Presidente Nicolau Lobato International Airport Project, Timor Leste                                                                                             | DATE TEST STARTED:  | 03-05-2018                   |
| IDENTIFICATION:  | Plate Load Test                                                                                                                                                  | DATE TEST FINISHED: | 03-05-2018                   |
| ACTIVITY PERIOD: | 03-05-2018                                                                                                                                                       | TEST PERFORMED BY:  |                              |
| SUPERVISED BY:   |                                                                                                                                                                  | TEST METHOD:        | ASTM D1194                   |



**Note:**

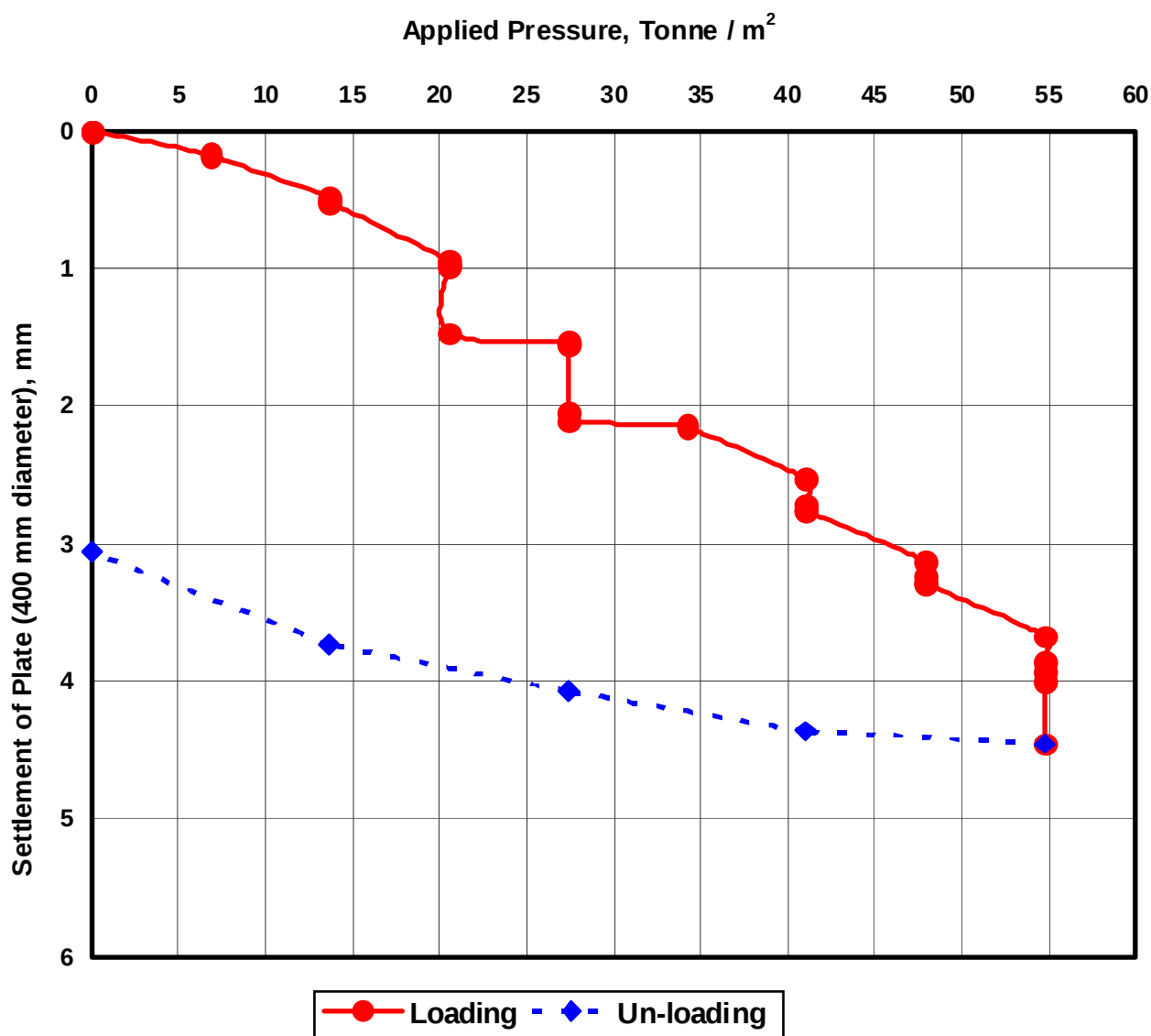
1. Test performed as per ASTM D1194,
2. CIRCULAR PLATE size of 305 mm diameter was in used.
3. Loading and Un-loading curves are presented above.



RMS ENGINEERING AND CONSTRUCTION

### PLATE LOAD TEST

|                  |                                                                                                                                                                  |                     |                              |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------|
| CLIENT:          | JICA Study Team                                                                                                                                                  | TEST REPORT NO:     | PLT # 2A                     |
| PROJECT:         | Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | DATE OF REPORT:     | (refer to submission letter) |
| PROJECT REF. NO: |                                                                                                                                                                  | DATE RECEIVED:      |                              |
| LOCATION:        | Presidente Nicolau Lobato International Airport Project, Timor Leste                                                                                             | DATE TEST STARTED:  | 03-05-2018                   |
| IDENTIFICATION:  | Plate Load Test                                                                                                                                                  | DATE TEST FINISHED: | 03-05-2018                   |
| ACTIVITY PERIOD: | 03-05-2018                                                                                                                                                       | TEST PERFORMED BY:  |                              |
| SUPERVISED BY:   |                                                                                                                                                                  | TEST METHOD:        | ASTM D1194                   |



**Note:**

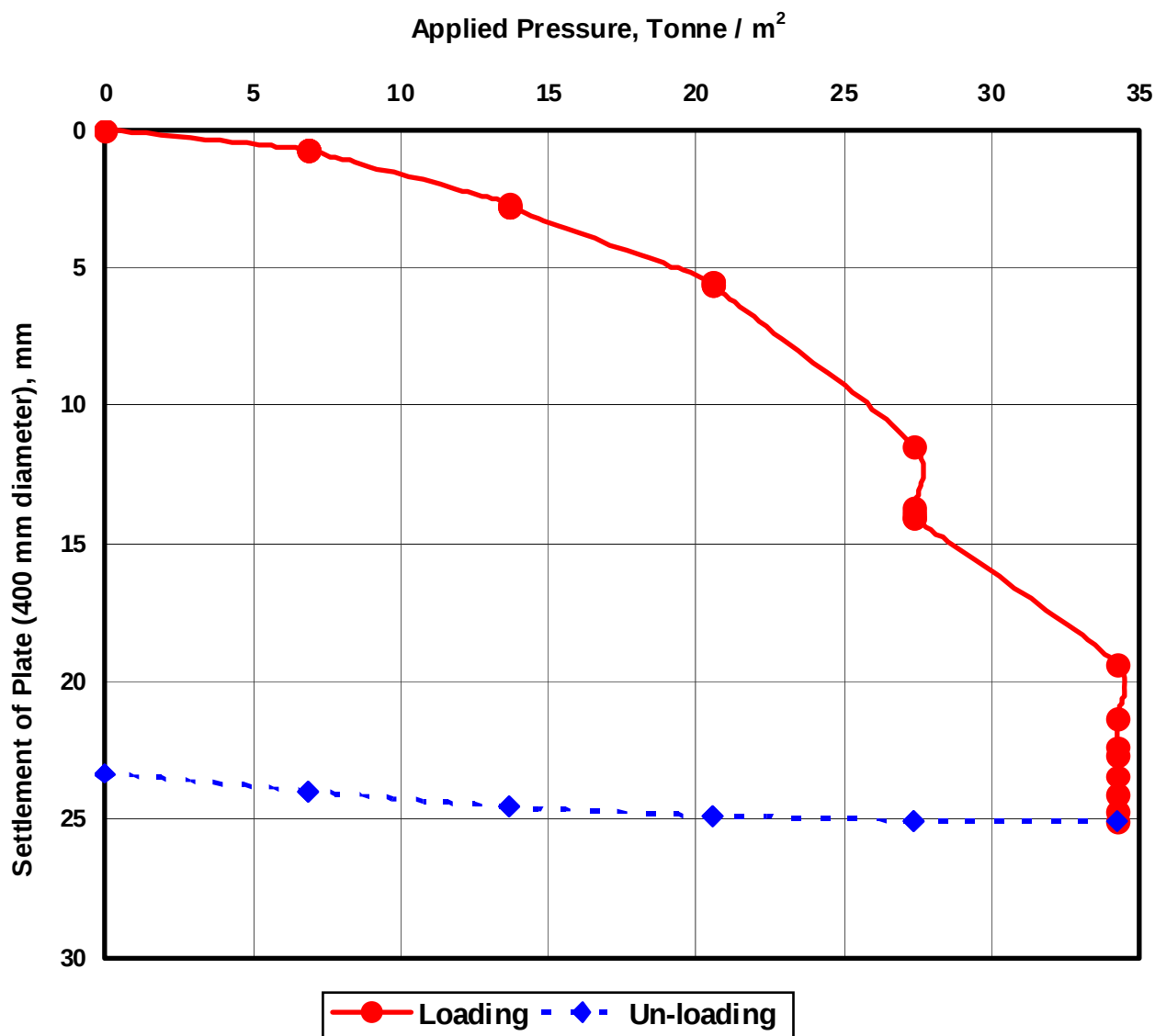
1. Test performed as per ASTM D1194,
2. CIRCULAR PLATE size of 305 mm diameter was in used.
3. Loading and Un-loading curves are presented above.



RMS ENGINEERING AND CONSTRUCTION

### PLATE LOAD TEST

|                  |                                                                                                                                                                  |                     |                              |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------|
| CLIENT:          | JICA Study Team                                                                                                                                                  | TEST REPORT NO:     | PLT # 3A                     |
| PROJECT:         | Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | DATE OF REPORT:     | (refer to submission letter) |
| PROJECT REF. NO: |                                                                                                                                                                  | DATE RECEIVED:      |                              |
| LOCATION:        | Presidente Nicolau Lobato International Airport Project, Timor Leste                                                                                             | DATE TEST STARTED:  | 04-05-2018                   |
| IDENTIFICATION:  | Plate Load Test                                                                                                                                                  | DATE TEST FINISHED: | 04-05-2018                   |
| ACTIVITY PERIOD: | 04-05-2018                                                                                                                                                       | TEST PERFORMED BY:  |                              |
| SUPERVISED BY:   |                                                                                                                                                                  | TEST METHOD:        | ASTM D1194                   |



**Note:**

1. Test performed as per ASTM D1194,
2. CIRCULAR PLATE size of 305 mm diameter was in used.
3. Loading and Un-loading curves are presented above.

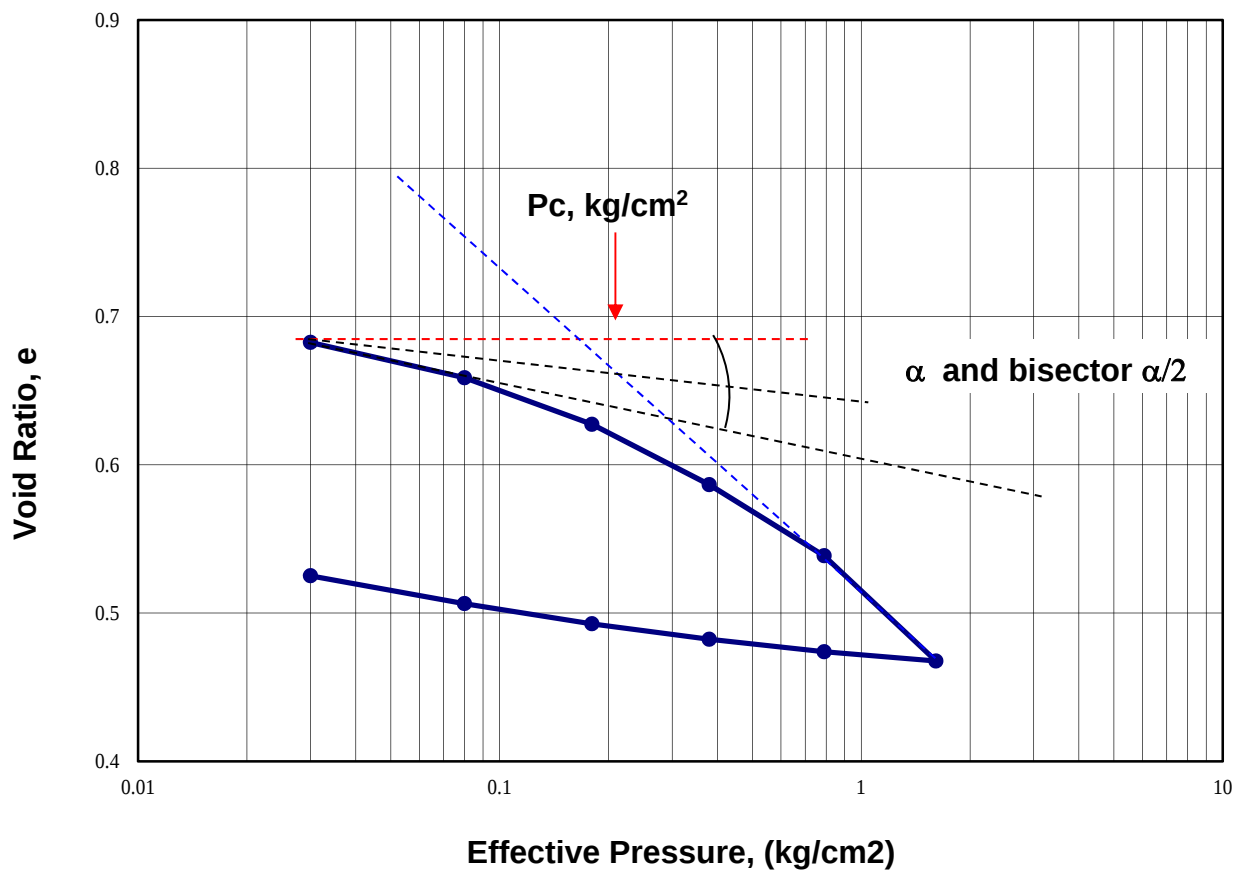


RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

### Void Ratio versus Effective Pressure Curve

Material: **Very loose greyish brown SILT (ML)**Depth : **27.65 to 28.25 m,**Borehole: **BH # 1, UD-2**Percentage of Fines (-0.075mm): **70.1 %**Liquid Limit: **39.9 %**Plastic Limit: **27.2 %**Plastic Index: **12.7 %**Natural Moisture Content: **39.6 %**Maximum Pre-consolidation Pressure ( $P_c$ ): **0.21 kg/cm<sup>2</sup>**



RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

**PROJECT:** Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

### CONSOLIDATION TEST RESULT DATA

Material: **Very loose greyish brown SILT (ML)**Depth : **27.65 to 28.25 m**, Borehole: **BH # 1, UD-2**

#### Loading Data:

| Applied Pressure (kg/cm <sup>2</sup> ) | $\delta H$ (mm) | Specimen Height (mm) | Void Ratio (e) | $t_{90}$ (minutes) | $C_c$ | $a_v$ (cm <sup>2</sup> /kg) | $m_v$ (cm <sup>2</sup> /kg) | $C_v$ (cm <sup>2</sup> /min) | $K = \frac{C_v}{m_v \gamma_w}$ (cm/min.) |
|----------------------------------------|-----------------|----------------------|----------------|--------------------|-------|-----------------------------|-----------------------------|------------------------------|------------------------------------------|
| 0.00 - 0.03                            | 0.23            | 16.17                | 0.6825         | -                  | -     | -                           | -                           |                              |                                          |
| 0.03 - 0.08                            | 0.51            | 15.89                | 0.6587         | 15                 | 0.856 | 9.495                       | 6.234                       | 3.316                        | 0.02067397                               |
| 0.08 - 0.18                            | 0.81            | 15.59                | 0.6273         | 30                 | 0.104 | 0.626                       | 0.411                       | 1.596                        | 0.00065633                               |
| 0.18 - 0.38                            | 1.20            | 15.20                | 0.5866         | 45                 | 0.135 | 0.407                       | 0.267                       | 1.011                        | 0.00027036                               |
| 0.38 - 0.79                            | 1.66            | 14.74                | 0.5386         | 60                 | 0.154 | 0.229                       | 0.150                       | 0.713                        | 0.0001071                                |
| 0.79 - 1.61                            | 2.34            | 14.06                | 0.4676         | 75                 | 0.249 | 0.187                       | 0.123                       | 0.519                        | 6.3685E-05                               |

#### Un-loading Data:

| Un-loading (kg/cm <sup>2</sup> ) | Void Ratio (e) |
|----------------------------------|----------------|
| 0.79                             | 0.4739         |
| 0.38                             | 0.4823         |
| 0.18                             | 0.4927         |
| 0.08                             | 0.5063         |
| 0.03                             | 0.5251         |
| 0                                | 0.5585         |

#### Legend:

|                         |                                       |                         |                                                                  |
|-------------------------|---------------------------------------|-------------------------|------------------------------------------------------------------|
| <b><math>C_c</math></b> | Compression Index                     | <b><math>C_v</math></b> | Coefficient of Consolidation                                     |
| <b><math>a_v</math></b> | Coefficient of Compression            | <b><math>P_c</math></b> | <b>0.21</b> Pre-consolidation Pressure, <b>kg/cm<sup>2</sup></b> |
| <b><math>m_v</math></b> | Coefficient of Volume Compressibility | <b>K</b>                | Coefficient of Permeability                                      |

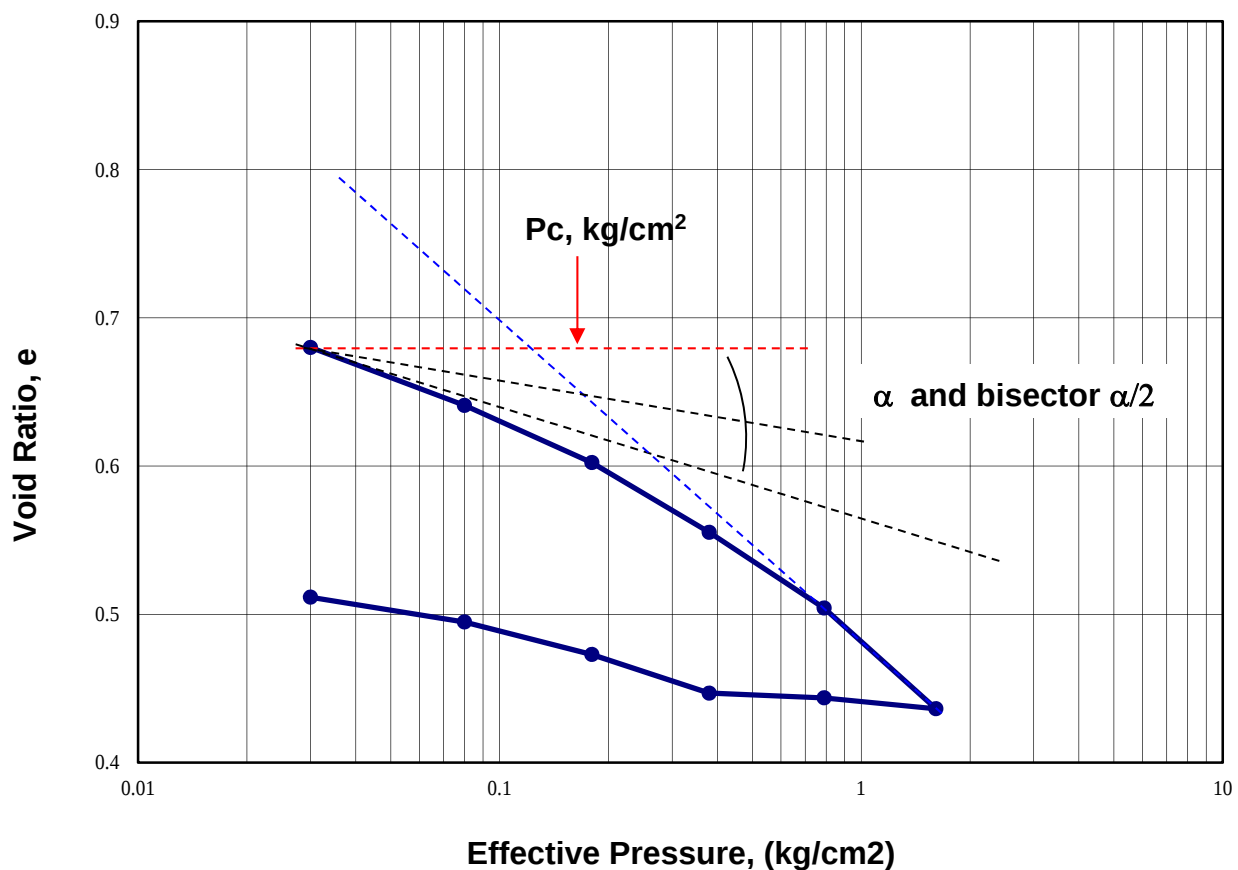


RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

### Void Ratio versus Effective Pressure Curve

Material: **Medium dense brownish grey SILT (ML)**Depth : **8.50 to 9.10 m,**Borehole: **BH # 2, UD-1**Percentage of Fines (-0.075mm): **98.7 %**Liquid Limit: **41.4 %**Plastic Limit: **34.5 %**Plastic Index: **6.9 %**Natural Moisture Content: **36.1.6 %**Maximum Pre-consolidation Pressure ( $P_c$ ): **0.16 kg/cm<sup>2</sup>**



RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

**PROJECT:** Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

## CONSOLIDATION TEST RESULT DATA

Material: Medium dense brownish grey SILT with Sand (ML)

Depth : 8.50to 9.10 m, Borehole: BH # 2, UD-1

### Loading Data:

| Applied Pressure (kg/cm <sup>2</sup> ) | $\delta H$ (mm) | Specimen Height (mm) | Void Ratio (e) | $t_{90}$ (minutes) | $C_c$ | $a_v$ (cm <sup>2</sup> /kg) | $m_v$ (cm <sup>2</sup> /kg) | $C_v$ (cm <sup>2</sup> /min) | $K = \frac{C_v}{m_v \gamma_w}$ (cm/min.) |
|----------------------------------------|-----------------|----------------------|----------------|--------------------|-------|-----------------------------|-----------------------------|------------------------------|------------------------------------------|
| 0.00 - 0.03                            | 0.29            | 16.01                | 0.6800         | -                  | -     | -                           | -                           |                              |                                          |
| 0.03 - 0.08                            | 0.58            | 15.72                | 0.6409         | 15                 | 0.630 | 6.983                       | 4.585                       | 3.245                        | 0.01488022                               |
| 0.08 - 0.18                            | 0.95            | 15.35                | 0.6023         | 30                 | 0.128 | 0.772                       | 0.507                       | 1.547                        | 0.00078474                               |
| 0.18 - 0.38                            | 1.40            | 14.90                | 0.5553         | 45                 | 0.156 | 0.470                       | 0.308                       | 0.972                        | 0.00029976                               |
| 0.38 - 0.79                            | 1.89            | 14.41                | 0.5042         | 60                 | 0.164 | 0.244                       | 0.160                       | 0.682                        | 0.00010903                               |
| 0.79 - 1.61                            | 2.54            | 13.76                | 0.4363         | 75                 | 0.238 | 0.179                       | 0.117                       | 0.497                        | 5.8305E-05                               |

### Un-loading Data:

| Un-loading (kg/cm <sup>2</sup> ) | Void Ratio (e) |
|----------------------------------|----------------|
| 0.79                             | 0.4436         |
| 0.38                             | 0.4468         |
| 0.18                             | 0.4729         |
| 0.08                             | 0.4948         |
| 0.03                             | 0.5115         |
| 0                                | 0.6065         |

### Legend:

|       |                                       |       |                                                     |
|-------|---------------------------------------|-------|-----------------------------------------------------|
| $C_c$ | Compression Index                     | $C_v$ | Coefficient of Consolidation                        |
| $a_v$ | Coefficient of Compression            | $P_c$ | 0.16 Pre-consolidation Pressure, kg/cm <sup>2</sup> |
| $m_v$ | Coefficient of Volume Compressibility | $K$   | Coefficient of Permeability                         |



RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Airport in Democratic Republic of Timor Leste

### Void Ratio Verses Effective Pressure Curve

Material: **Medium dense brownish grey Sandy SILT (ML)**

Depth : **9.05 to 9.85 m,**

Borehole: **BH # 3, UD-1**

Percentage of Fines (-0.075mm): **68.7 %**

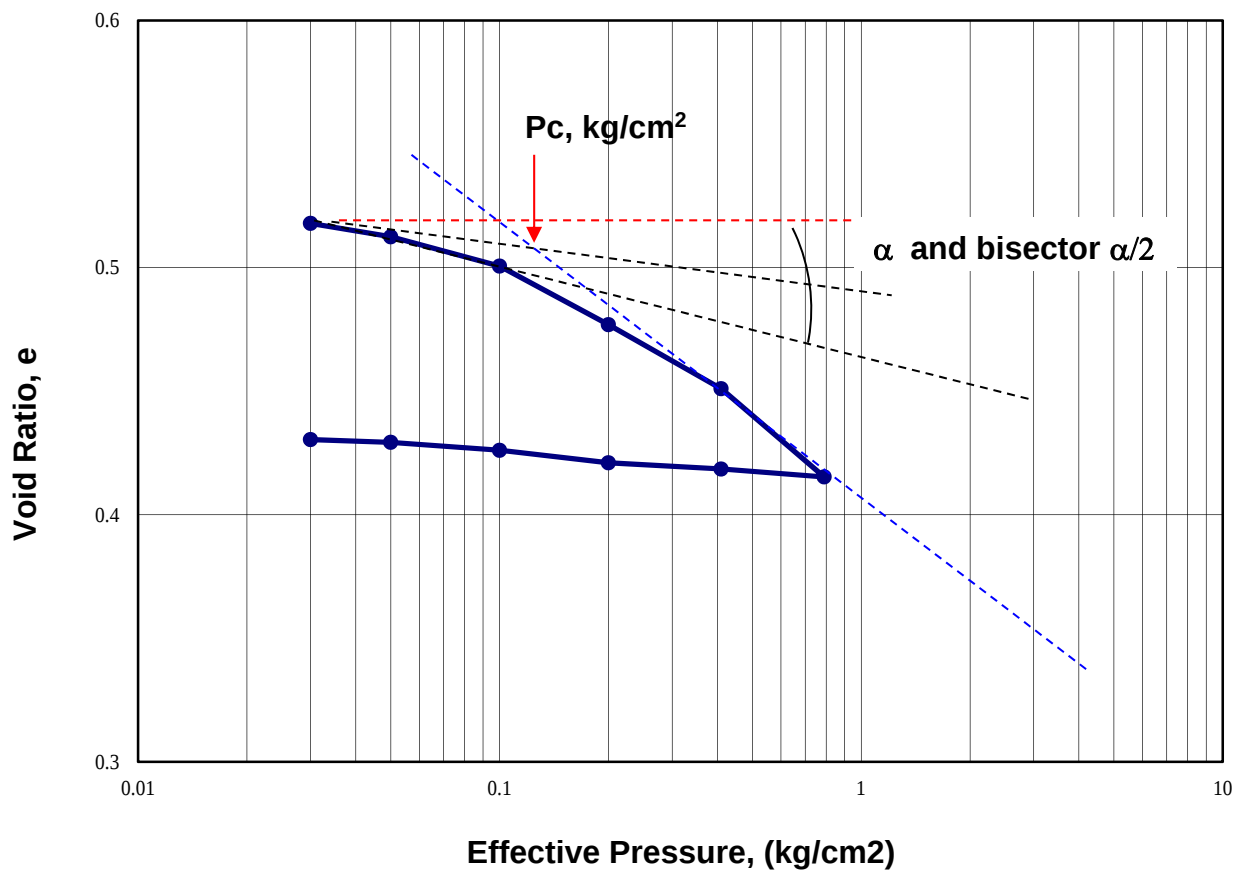
Liquid Limit: **40.3 %**

Plastic Limit: **29.5 %**

Plastic Index: **10.8 %**

Natural Moisture Content: **29.4 %**

Maximum Pre-consolidation Pressure ( $P_c$ ): **0.13 kg/cm<sup>2</sup>**





RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

**PROJECT:** Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

## CONSOLIDATION TEST RESULT DATA

Material: **Medium dense brownish grey Sandy SILT (ML)**Depth : **9.05 to 9.65 m**, Borehole: **BH # 3, UD-1**

### Loading Data:

| Applied Pressure (kg/cm <sup>2</sup> ) | $\delta H$ (mm) | Specimen Height (mm) | Void Ratio (e) | $t_{90}$ (minutes) | $C_c$ | $a_v$ (cm <sup>2</sup> /kg) | $m_v$ (cm <sup>2</sup> /kg) | $C_v$ (cm <sup>2</sup> /min) | $K = \frac{C_v}{m_v \gamma_w}$ (cm/min.) |
|----------------------------------------|-----------------|----------------------|----------------|--------------------|-------|-----------------------------|-----------------------------|------------------------------|------------------------------------------|
| 0.00 - 0.03                            | 0.05            | 14.05                | 0.5179         | -                  | -     | -                           | -                           |                              |                                          |
| 0.03 - 0.05                            | 0.10            | 14                   | 0.5125         | 15                 | 0.024 | 0.270                       | 0.177                       | 2.574                        | 0.00045651                               |
| 0.05 - 0.10                            | 0.21            | 13.89                | 0.5006         | 30                 | 0.039 | 0.238                       | 0.156                       | 1.267                        | 0.00019772                               |
| 0.10 - 0.20                            | 0.43            | 13.67                | 0.4769         | 45                 | 0.079 | 0.238                       | 0.156                       | 0.818                        | 0.00012767                               |
| 0.20 - 0.41                            | 0.67            | 13.43                | 0.4510         | 60                 | 0.083 | 0.123                       | 0.081                       | 0.592                        | 4.801E-05                                |
| 0.41 - 0.79                            | 1.00            | 13.1                 | 0.4153         | 75                 | 0.125 | 0.094                       | 0.062                       | 0.451                        | 2.7769E-05                               |

### Un-loading Data:

| Un-loading (kg/cm <sup>2</sup> ) | Void Ratio (e) |
|----------------------------------|----------------|
| 0.41                             | 0.4185         |
| 0.20                             | 0.4210         |
| 0.01                             | 0.4261         |
| 0.05                             | 0.4293         |
| 0.03                             | 0.4304         |
| 0.0                              | 0.4337         |

### Legend:

| $C_c$ | Compression Index                     | $C_v$ | Coefficient of Consolidation                                     |
|-------|---------------------------------------|-------|------------------------------------------------------------------|
| $a_v$ | Coefficient of Compression            | $P_c$ | <b>0.13</b> Pre-consolidation Pressure, <b>kg/cm<sup>2</sup></b> |
| $m_v$ | Coefficient of Volume Compressibility | $K$   | Coefficient of Permeability                                      |

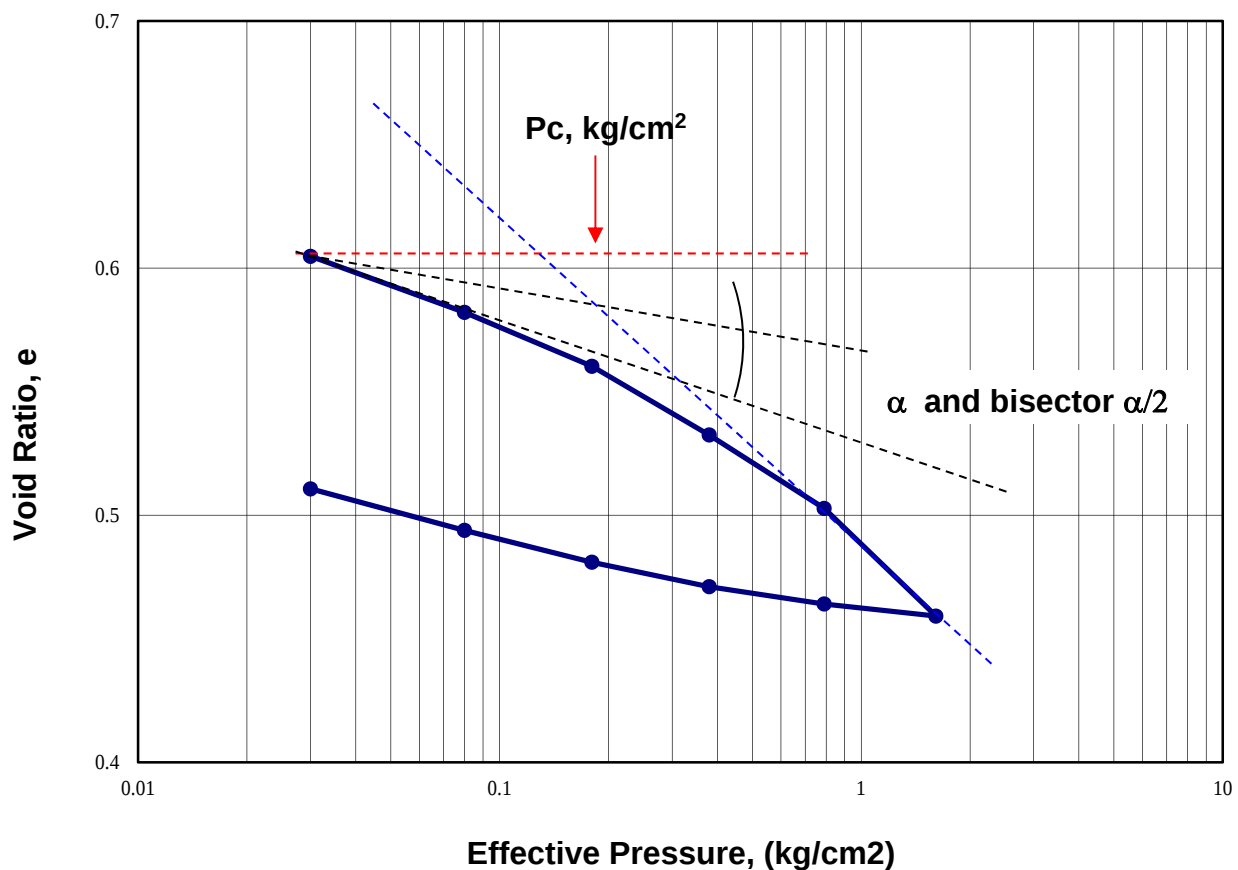


RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

### Void Ratio versus Effective Pressure Curve

Material: **Very loose brown SILT (ML)**Depth : **4.05 to 4.65 m,**Borehole: **BH # 5, UD-1**Percentage of Fines (-0.075mm): **95.4 %**Liquid Limit: **39.9 %**Plastic Limit: **27.2 %**Plastic Index: **12.7 %**Natural Moisture Content: **32.07 %**Maximum Pre-consolidation Pressure ( $P_c$ ): **0.19 kg/cm<sup>2</sup>**



RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

**PROJECT:** Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

### CONSOLIDATION TEST RESULT DATA

Material: **Very loose brown SILT (ML)**Depth : **4.05 to 4.65 m**, Borehole: **BH # 5, UD-1**

#### Loading Data:

| Applied Pressure (kg/cm <sup>2</sup> ) | $\delta H$ (mm) | Specimen Height (mm) | Void Ratio (e) | $t_{90}$ (minutes) | $C_c$ | $a_v$ (cm <sup>2</sup> /kg) | $m_v$ (cm <sup>2</sup> /kg) | $C_v$ (cm <sup>2</sup> /min) | $K = \frac{C_v m_v \gamma_w}{C_c}$ (cm/min.) |
|----------------------------------------|-----------------|----------------------|----------------|--------------------|-------|-----------------------------|-----------------------------|------------------------------|----------------------------------------------|
| 0.00 - 0.03                            | 0.24            | 16.31                | 0.6048         | -                  | -     | -                           | -                           |                              |                                              |
| 0.03 - 0.08                            | 0.44            | 15.96                | 0.5821         | 15                 | 0.157 | 1.738                       | 1.141                       | 3.345                        | 0.00381686                                   |
| 0.08 - 0.18                            | 0.66            | 15.74                | 0.5603         | 30                 | 0.072 | 0.436                       | 0.286                       | 1.627                        | 0.00046591                                   |
| 0.18 - 0.38                            | 0.94            | 15.46                | 0.5325         | 45                 | 0.092 | 0.278                       | 0.182                       | 1.046                        | 0.00019069                                   |
| 0.38 - 0.79                            | 1.24            | 15.16                | 0.5028         | 60                 | 0.095 | 0.142                       | 0.093                       | 0.755                        | 7.0163E-05                                   |
| 0.79 - 1.61                            | 1.68            | 14.72                | 0.4592         | 75                 | 0.153 | 0.115                       | 0.075                       | 0.569                        | 4.2893E-05                                   |

#### Un-loading Data:

| Un-loading (kg/cm <sup>2</sup> ) | Void Ratio (e) |
|----------------------------------|----------------|
| 0.79                             | 0.4641         |
| 0.38                             | 0.4711         |
| 0.18                             | 0.4810         |
| 0.08                             | 0.4939         |
| 0.03                             | 0.5107         |
| 0                                | 0.5464         |

#### Legend:

|       |                                       |       |                                                                  |
|-------|---------------------------------------|-------|------------------------------------------------------------------|
| $C_c$ | Compression Index                     | $C_v$ | Coefficient of Consolidation                                     |
| $a_v$ | Coefficient of Compression            | $P_c$ | <b>0.19</b> Pre-consolidation Pressure, <b>kg/cm<sup>2</sup></b> |
| $m_v$ | Coefficient of Volume Compressibility | $K$   | Coefficient of Permeability                                      |



RMS ENGINEERING AND CONSTRUCTION

### COMPACTION TEST ( Dry Density/Moisture Content Relationship)

|                                                                                                                                                                                  |                   |                         |          |                                       |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------|----------|---------------------------------------|----------|
| <b>CLIENT: JICA Study Team</b>                                                                                                                                                   |                   |                         |          | DATE: <b>21/05/2018</b>               |          |
| <b>PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste</b> |                   |                         |          | LAB NO. : <b>GET-18-8002</b>          |          |
|                                                                                                                                                                                  |                   |                         |          | TESTING METHOD: ASTM D-1557 METHOD-A  |          |
| LOCATION : <b>TP # 1 S-1</b>                                                                                                                                                     |                   |                         |          |                                       |          |
| RETAINED % ON 20MM/37.5MM SIEVE.                                                                                                                                                 |                   |                         |          |                                       |          |
| MASS OF MOULD ( $m_1$ )                                                                                                                                                          |                   | <b>5230.80</b>          |          | g                                     |          |
|                                                                                                                                                                                  |                   | VOLUME OF MOULD ( V ) : |          | <b>996</b>                            |          |
|                                                                                                                                                                                  |                   |                         |          | cm <sup>3</sup>                       |          |
| <b>Test Number</b>                                                                                                                                                               |                   | <b>1</b>                | <b>2</b> | <b>3</b>                              | <b>4</b> |
| Mass of Mould + Soil ( $m_2$ )                                                                                                                                                   | g                 | 7052.6                  | 7241.2   | 7250.0                                | 7208.3   |
| Mass of Soil ( $m_2 - m_1$ )                                                                                                                                                     | g                 | 1821.8                  | 2010.4   | 2019.2                                | 1977.5   |
| Bulk Density $P = \frac{m_2 - m_1}{V}$                                                                                                                                           | KG/m <sup>3</sup> | 1829.12                 | 2018.47  | 2027.31                               | 1985.44  |
| Moisture Content, Container No.                                                                                                                                                  |                   | A-1                     | A-2      | A-3                                   | A-4      |
| Mass of Wet Soil + Container ( A )                                                                                                                                               | g                 | 195.0                   | 201.0    | 240.9                                 | 253.5    |
| Mass of Dry Soil + Container ( B )                                                                                                                                               | g                 | 185.6                   | 184.2    | 216.0                                 | 221.1    |
| Mass of Container ( C )                                                                                                                                                          | g                 | 63.0                    | 58.9     | 62.6                                  | 60.1     |
| Mass of Moisture ( D = A - B )                                                                                                                                                   | g                 | 9.4                     | 16.8     | 24.9                                  | 32.4     |
| Mass of Dry Soil ( E = B - C )                                                                                                                                                   | g                 | 122.6                   | 125.3    | 153.4                                 | 161.0    |
| Moisture Content $W = \left[ \frac{D \times 100}{E} \right]$                                                                                                                     | %                 | 7.7                     | 13.4     | 16.2                                  | 20.1     |
| Dry Density $P_d = \frac{100 P}{100 + W}$                                                                                                                                        | kg/m <sup>3</sup> | 1699                    | 1780     | 1744                                  | 1653     |
|                                                                                                                                                                                  |                   |                         |          | Maximum Dry Density <b>1780</b>       |          |
|                                                                                                                                                                                  |                   |                         |          | Optimum Moisture Content <b>14.0%</b> |          |
|                                                                                                                                                                                  |                   |                         |          | Remarks:                              |          |
|                                                                                                                                                                                  |                   |                         |          |                                       |          |

| Test Number | Moisture Content (%) | Dry Density 1000 X (kg/m³) |
|-------------|----------------------|----------------------------|
| 1           | 7.7                  | 1699                       |
| 2           | 13.4                 | 1780                       |
| 3           | 16.2                 | 1744                       |
| 4           | 20.1                 | 1653                       |

Maximum Dry Density **1780**

Optimum Moisture Content **14.0%**

Remarks:



RMS ENGINEERING AND CONSTRUCTION

### COMPACTION TEST ( Dry Density/Moisture Content Relationship)

|                                                                                                                                                                                  |                           |                                                                      |                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------------|----------------------------|
| <b>CLIENT: JICA Study Team</b>                                                                                                                                                   |                           | DATE: <b>21/05/2018</b>                                              |                            |
| <b>PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste</b> |                           | LAB NO. : <b>GET-18-8002</b><br><br>TESTING METHOD: ASTM D-1557 METH |                            |
| LOCATION : <b>TP # 1a</b>                                                                                                                                                        |                           |                                                                      |                            |
| RETAINED % ON 20MM/37.5MM SIEVE.                                                                                                                                                 |                           |                                                                      |                            |
| MASS OF MOULD ( m <sub>1</sub> )                                                                                                                                                 | <b>5230.80</b>            | VOLUME OF MOULD ( V ) :                                              | <b>996</b> cm <sup>3</sup> |
| <b>Test Number</b>                                                                                                                                                               | <b>1</b>                  | <b>2</b>                                                             | <b>3</b>                   |
| Mass of Mould + Soil ( m <sub>2</sub> )                                                                                                                                          | g 7052.5                  | 7270.4                                                               | 7222.2                     |
| Mass of Soil ( m <sub>2</sub> - m <sub>1</sub> )                                                                                                                                 | g 1821.7                  | 2039.6                                                               | 1991.4                     |
| Bulk Density P = $\frac{m_2 - m_1}{V}$                                                                                                                                           | KG/m <sup>3</sup> 1829.02 | 2047.79                                                              | 1999.40                    |
| Moisture Content, Container No.                                                                                                                                                  | A-7                       | A-8                                                                  | A-9                        |
| Mass of Wet Soil + Container ( A )                                                                                                                                               | g 223.5                   | 242.2                                                                | 295.4                      |
| Mass of Dry Soil + Container ( B )                                                                                                                                               | g 211.7                   | 219.3                                                                | 259.7                      |
| Mass of Container ( C )                                                                                                                                                          | g 58.6                    | 62.3                                                                 | 62.6                       |
| Mass of Moisture ( D = A - B )                                                                                                                                                   | g 11.8                    | 22.9                                                                 | 35.7                       |
| Mass of Dry Soil ( E = B - C )                                                                                                                                                   | g 153.1                   | 157.0                                                                | 197.1                      |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$                                                                                                                     | % 7.7                     | 14.6                                                                 | 18.1                       |
| Dry Density Pd = $\frac{100 P}{100 + W}$                                                                                                                                         | kg/m <sup>3</sup> 1698    | 1787                                                                 | 1693                       |

**Moisture Content (%)**

Maximum Dry Density **1787**

Optimum Moisture Content **14.6%**

Remarks:



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**COMPACTION TEST ( Dry Density/Moisture Content Relationship)**

|                                                                                                                                                                                           |                   |                |                                             |                       |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|---------------------------------------------|-----------------------|----------|
| <b>CLIENT: JICA Study Team</b>                                                                                                                                                            |                   |                | <b>DATE: 21/05/2018</b>                     |                       |          |
| <b>PROJECT: Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste</b> |                   |                | <b>LAB NO. : GET-18-8002</b>                |                       |          |
|                                                                                                                                                                                           |                   |                | <b>TESTING METHOD: ASTM D-1557 Method-A</b> |                       |          |
| <b>LOCATION : TP # 2</b>                                                                                                                                                                  |                   |                |                                             |                       |          |
| <b>RETAINED % ON 20MM/37.5MM SIEVE.</b>                                                                                                                                                   |                   |                |                                             |                       |          |
| <b>MASS OF MOULD ( m<sub>1</sub> )</b>                                                                                                                                                    |                   | <b>5230.80</b> |                                             | <b>g</b>              |          |
| <b>VOLUME OF MOULD ( V ) :</b>                                                                                                                                                            |                   | <b>996</b>     |                                             | <b>cm<sup>3</sup></b> |          |
| <b>Test Number</b>                                                                                                                                                                        |                   | <b>1</b>       | <b>2</b>                                    | <b>3</b>              | <b>4</b> |
| Mass of Mould + Soil ( m <sub>2</sub> )                                                                                                                                                   | g                 | 6925.2         | 7072.6                                      | 7287.5                | 7211.6   |
| Mass of Soil ( m <sub>2</sub> - m <sub>1</sub> )                                                                                                                                          | g                 | 1694.4         | 1841.8                                      | 2056.7                | 1980.8   |
| Bulk Density P = $\frac{m_2 - m_1}{V}$                                                                                                                                                    | KG/m <sup>3</sup> | 1701.20        | 1849.20                                     | 2064.96               | 1988.76  |
| Moisture Content, Container No.                                                                                                                                                           |                   | A-12           | A-13                                        | A-14                  | A-11     |
| Mass of Wet Soil + Container ( A )                                                                                                                                                        | g                 | 237.6          | 222.2                                       | 222.1                 | 243.2    |
| Mass of Dry Soil + Container ( B )                                                                                                                                                        | g                 | 227.7          | 207.2                                       | 200.7                 | 216.0    |
| Mass of Container ( C )                                                                                                                                                                   | g                 | 65.9           | 62.2                                        | 59.0                  | 59.5     |
| Mass of Moisture ( D = A - B )                                                                                                                                                            | g                 | 9.9            | 15.0                                        | 21.4                  | 27.2     |
| Mass of Dry Soil ( E = B - C )                                                                                                                                                            | g                 | 161.8          | 145.0                                       | 141.7                 | 156.5    |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$                                                                                                                              | %                 | 6.1            | 10.3                                        | 15.1                  | 17.4     |
| Dry Density Pd = $\frac{100 P}{100 + W}$                                                                                                                                                  | kg/m <sup>3</sup> | 1603           | 1676                                        | 1794                  | 1694     |

**Moisture Content (%)**

**Maximum Dry Density** **1794**

**Optimum Moisture Content** **15.1%**

**Remarks:**



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**COMPACTION TEST ( Dry Density/Moisture Content Relationship)**

|                                                                                                                                                                                  |                   |          |                                                   |          |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------------------------------------------------|----------|----------|
| <b>CLIENT: JICA Study Team</b>                                                                                                                                                   |                   |          | <b>DATE: 21/05/2018</b>                           |          |          |
| <b>PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste</b> |                   |          | <b>LAB NO. : GET-18-8002</b>                      |          |          |
|                                                                                                                                                                                  |                   |          | <b>TESTING METHOD: ASTM D-1557 Method</b>         |          |          |
| <b>LOCATION : TP # 2a</b>                                                                                                                                                        |                   |          |                                                   |          |          |
| <b>RETAINED % ON 20MM/37.5MM SIEVE.</b>                                                                                                                                          |                   |          |                                                   |          |          |
| <b>MASS OF MOULD ( m<sub>1</sub> )</b>                                                                                                                                           | <b>5230.80</b>    | <b>g</b> | <b>VOLUME OF MOULD ( V ) : 996 cm<sup>3</sup></b> |          |          |
| <b>Test Number</b>                                                                                                                                                               |                   |          | <b>1</b>                                          | <b>2</b> | <b>3</b> |
| Mass of Mould + Soil ( m <sub>2</sub> )                                                                                                                                          | g                 | 6868.5   | 6985.5                                            | 7199.4   | 7099.4   |
| Mass of Soil ( m <sub>2</sub> - m <sub>1</sub> )                                                                                                                                 | g                 | 1637.7   | 1754.7                                            | 1968.6   | 1868.6   |
| Bulk Density P = $\frac{m_2 - m_1}{V}$                                                                                                                                           | KG/m <sup>3</sup> | 1644.28  | 1761.75                                           | 1976.51  | 1876.10  |
| Moisture Content, Container No.                                                                                                                                                  |                   | A-15     | A-16                                              | A-17     | A-18     |
| Mass of Wet Soil + Container ( A )                                                                                                                                               | g                 | 235.6    | 213.4                                             | 251.7    | 251.7    |
| Mass of Dry Soil + Container ( B )                                                                                                                                               | g                 | 223.1    | 198.8                                             | 229.0    | 224.0    |
| Mass of Container ( C )                                                                                                                                                          | g                 | 62.2     | 58.1                                              | 59.2     | 62.1     |
| Mass of Moisture ( D = A - B )                                                                                                                                                   | g                 | 12.5     | 14.6                                              | 22.7     | 27.7     |
| Mass of Dry Soil ( E = B - C )                                                                                                                                                   | g                 | 160.9    | 140.7                                             | 169.8    | 161.9    |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$                                                                                                                     | %                 | 7.8      | 10.4                                              | 13.4     | 17.1     |
| Dry Density Pd = $\frac{100 P}{100 + W}$                                                                                                                                         | kg/m <sup>3</sup> | 1526     | 1596                                              | 1743     | 1602     |

|  |                                 |              |
|--|---------------------------------|--------------|
|  | <b>Maximum Dry Density</b>      | <b>1743</b>  |
|  | <b>Optimum Moisture Content</b> | <b>13.4%</b> |
|  | <b>Remarks:</b>                 |              |



**COMPACTION TEST ( Dry Density/Moisture Content Relationship)**

|                                                                                                                                                                                           |                   |          |                                                                                      |          |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|--------------------------------------------------------------------------------------|----------|----------|
| <b>CLIENT: JICA Study Team</b>                                                                                                                                                            |                   |          | DATE: <b>30/05/2018</b>                                                              |          |          |
| <b>PROJECT: Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste</b> |                   |          | LAB NO. : <b>GET-18-8002</b>                                                         |          |          |
| LOCATION : <b>TP # 3</b>                                                                                                                                                                  |                   |          | TESTING METHOD: ASTM D-1557 METH                                                     |          |          |
| RETAINED % ON 20MM/37.5MM SIEVE.                                                                                                                                                          |                   |          |                                                                                      |          |          |
| MASS OF MOULD ( $m_1$ )                                                                                                                                                                   | <b>5230.80</b>    | g        | VOLUME OF MOULD ( V ) : <b>998</b> <span style="float: right;">cm<sup>3</sup></span> |          |          |
| <b>Test Number</b>                                                                                                                                                                        | <b>1</b>          | <b>2</b> | <b>3</b>                                                                             | <b>4</b> | <b>5</b> |
| Mass of Mould + Soil ( $m_2$ )                                                                                                                                                            | g                 | 6890.0   | 7136.6                                                                               | 7247.1   | 7287.4   |
| Mass of Soil ( $m_2 - m_1$ )                                                                                                                                                              | g                 | 1659.2   | 1905.8                                                                               | 2016.3   | 2056.6   |
| Bulk Density P = $\frac{m_2 - m_1}{V}$                                                                                                                                                    | KG/m <sup>3</sup> | 1662.53  | 1909.62                                                                              | 2020.34  | 2060.72  |
| Moisture Content, Container No.                                                                                                                                                           |                   | A-18     | A-19                                                                                 | A-20     | K-18     |
| Mass of Wet Soil + Container ( A )                                                                                                                                                        | g                 | 245.3    | 285.0                                                                                | 264.9    | 328.4    |
| Mass of Dry Soil + Container ( B )                                                                                                                                                        | g                 | 235.3    | 267.6                                                                                | 244.7    | 298.4    |
| Mass of Container ( C )                                                                                                                                                                   | g                 | 62.1     | 61.2                                                                                 | 57.1     | 83.8     |
| Mass of Moisture ( D = A - B )                                                                                                                                                            | g                 | 10.0     | 17.4                                                                                 | 20.2     | 30.0     |
| Mass of Dry Soil ( E = B - C )                                                                                                                                                            | g                 | 173.2    | 206.4                                                                                | 187.6    | 214.6    |
| Moisture Content W= $\left[ \frac{D \times 100}{E} \right]$                                                                                                                               | %                 | 5.8      | 8.4                                                                                  | 10.8     | 14.0     |
| Dry Density Pd = $\frac{100 P}{100 + W}$                                                                                                                                                  | kg/m <sup>3</sup> | 1572     | 1761                                                                                 | 1824     | 1808     |

**Dry Density 1000 X(kg/m<sup>3</sup>)**

**Moisture Content (%)**

Maximum Dry Density **1824**

Optimum Moisture Content **10.8%**

Remarks:



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### COMPACTION TEST ( Dry Density/Moisture Content Relationship)

|                                                                                                                                                                                  |                   |          |                                                                                      |          |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|--------------------------------------------------------------------------------------|----------|----------|
| <b>CLIENT: JICA Study Team</b>                                                                                                                                                   |                   |          | DATE: <b>30/05/2018</b>                                                              |          |          |
| <b>PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste</b> |                   |          | LAB NO. : <b>GET-18-8002</b><br><br>TESTING METHOD: ASTM D-1557 METH                 |          |          |
| LOCATION : <b>TP # 3a</b>                                                                                                                                                        |                   |          |                                                                                      |          |          |
| RETAINED % ON 20MM/37.5MM SIEVE.                                                                                                                                                 |                   |          |                                                                                      |          |          |
| MASS OF MOULD ( $m_1$ )                                                                                                                                                          | <b>5230.80</b>    | g        | VOLUME OF MOULD ( V ) : <b>998</b> <span style="float: right;">cm<sup>3</sup></span> |          |          |
| <b>Test Number</b>                                                                                                                                                               | <b>1</b>          | <b>2</b> | <b>3</b>                                                                             | <b>4</b> | <b>5</b> |
| Mass of Mould + Soil ( $m_2$ )                                                                                                                                                   | g                 | 6917.2   | 7267.7                                                                               | 7311.7   | 7305.0   |
| Mass of Soil ( $m_2 - m_1$ )                                                                                                                                                     | g                 | 1686.4   | 2036.9                                                                               | 2080.9   | 2074.2   |
| Bulk Density P = $\frac{m_2 - m_1}{V}$                                                                                                                                           | KG/m <sup>3</sup> | 1689.78  | 2040.98                                                                              | 2085.07  | 2078.36  |
| Moisture Content, Container No.                                                                                                                                                  |                   | A-26     | A-27                                                                                 | A-28     | H-6      |
| Mass of Wet Soil + Container ( A )                                                                                                                                               | g                 | 207.5    | 253.8                                                                                | 236.4    | 266.0    |
| Mass of Dry Soil + Container ( B )                                                                                                                                               | g                 | 199.4    | 233.4                                                                                | 213.9    | 236.8    |
| Mass of Container ( C )                                                                                                                                                          | g                 | 62.3     | 60.5                                                                                 | 62.2     | 84.5     |
| Mass of Moisture ( D = A - B )                                                                                                                                                   | g                 | 8.1      | 20.4                                                                                 | 22.5     | 29.2     |
| Mass of Dry Soil ( E = B - C )                                                                                                                                                   | g                 | 137.1    | 172.9                                                                                | 151.7    | 152.3    |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$                                                                                                                     | %                 | 5.9      | 11.8                                                                                 | 14.8     | 19.2     |
| Dry Density Pd = $\frac{100 P}{100 + W}$                                                                                                                                         | kg/m <sup>3</sup> | 1596     | 1826                                                                                 | 1816     | 1744     |

**Moisture Content (%)**

Maximum Dry Density **1840**

Optimum Moisture Content **12.8%**

Remarks:



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### COMPACTION TEST ( Dry Density/Moisture Content Relationship)

|                                                                                                                                                                                  |                   |          |                                                                                      |          |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|--------------------------------------------------------------------------------------|----------|----------|
| <b>CLIENT: JICA Study Team</b>                                                                                                                                                   |                   |          | DATE: <b>28/05/2018</b>                                                              |          |          |
| <b>PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste</b> |                   |          | LAB NO. : <b>GET-18-8014</b>                                                         |          |          |
| LOCATION : <b>TP#4</b>                                                                                                                                                           |                   |          | TESTING METHOD: ASTM D-1557 METH                                                     |          |          |
| RETAINED % ON 20MM/37.5MM SIEVE.                                                                                                                                                 |                   |          |                                                                                      |          |          |
| MASS OF MOULD ( $m_1$ )                                                                                                                                                          | <b>5231.50</b>    | g        | VOLUME OF MOULD ( V ) : <b>998</b> <span style="float: right;">cm<sup>3</sup></span> |          |          |
| <b>Test Number</b>                                                                                                                                                               | <b>1</b>          | <b>2</b> | <b>3</b>                                                                             | <b>4</b> | <b>5</b> |
| Mass of Mould + Soil ( $m_2$ )                                                                                                                                                   | g                 | 6963.9   | 7077.3                                                                               | 7230.6   | 7275.8   |
| Mass of Soil ( $m_2 - m_1$ )                                                                                                                                                     | g                 | 1732.4   | 1845.8                                                                               | 1999.1   | 2044.3   |
| Bulk Density P = $\frac{m_2 - m_1}{V}$                                                                                                                                           | KG/m <sup>3</sup> | 1735.87  | 1849.50                                                                              | 2003.11  | 2048.40  |
| Moisture Content, Container No.                                                                                                                                                  |                   | A-1      | A-2                                                                                  | A-3      | A-4      |
| Mass of Wet Soil + Container ( A )                                                                                                                                               | g                 | 215.2    | 198.3                                                                                | 297.8    | 253.4    |
| Mass of Dry Soil + Container ( B )                                                                                                                                               | g                 | 202.4    | 183.8                                                                                | 266.6    | 221.6    |
| Mass of Container ( C )                                                                                                                                                          | g                 | 63.0     | 58.9                                                                                 | 62.6     | 60.1     |
| Mass of Moisture ( D = A - B )                                                                                                                                                   | g                 | 12.8     | 14.5                                                                                 | 31.2     | 31.8     |
| Mass of Dry Soil ( E = B - C )                                                                                                                                                   | g                 | 139.4    | 124.9                                                                                | 204.0    | 161.5    |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$                                                                                                                     | %                 | 9.2      | 11.6                                                                                 | 15.3     | 19.7     |
| Dry Density Pd = $\frac{100 P}{100 + W}$                                                                                                                                         | kg/m <sup>3</sup> | 1590     | 1657                                                                                 | 1737     | 1711     |

**Moisture Content (%)**

Maximum Dry Density **1737**

Optimum Moisture Content **15.4%**

Remarks:



RMS ENGINEERING AND CONSTRUCTION

**COMPACTION TEST ( Dry Density/Moisture Content Relationship)**

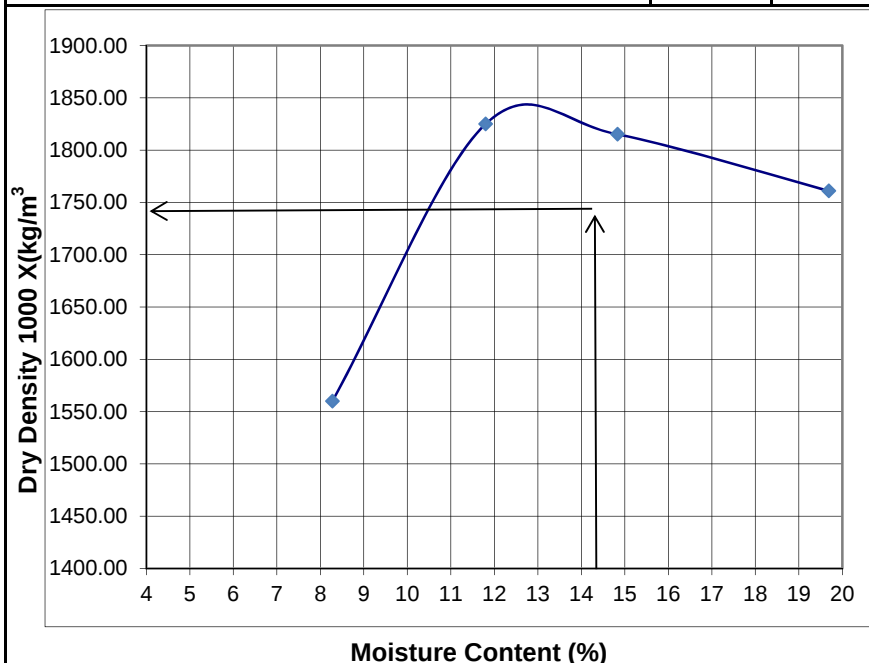
|                                                                                                                                                                                  |                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>CLIENT: JICA Study Team</b>                                                                                                                                                   | <b>DATE: 01/06/2018</b>                     |
| <b>PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste</b> | <b>LAB NO. : GET-18-8014</b>                |
|                                                                                                                                                                                  | <b>TESTING METHOD: ASTM D-1557 METHOD-A</b> |

**LOCATION : TP#5**

**RETAINED % ON 20MM/37.5MM SIEVE.**

**MASS OF MOULD ( m<sub>1</sub> ) 5231.50 g VOLUME OF MOULD ( V ) : 998 cm<sup>3</sup>**

| <b>Test Number</b>                                           | <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> |
|--------------------------------------------------------------|---------------------------|----------|----------|----------|----------|
| Mass of Mould + Soil ( m <sub>2</sub> )                      | g 6917.2                  | 7267.7   | 7311.7   | 7335.0   |          |
| Mass of Soil ( m <sub>2</sub> - m <sub>1</sub> )             | g 1685.7                  | 2036.2   | 2080.2   | 2103.5   |          |
| Bulk Density P = $\frac{m_2 - m_1}{V}$                       | KG/m <sup>3</sup> 1689.08 | 2040.28  | 2084.37  | 2107.72  |          |
| Moisture Content, Container No.                              | A-26                      | A-27     | A-28     | A-4      |          |
| Mass of Wet Soil + Container ( A )                           | g 207.5                   | 253.8    | 236.4    | 253.4    |          |
| Mass of Dry Soil + Container ( B )                           | g 196.4                   | 233.4    | 213.9    | 221.6    |          |
| Mass of Container ( C )                                      | g 62.3                    | 60.5     | 62.2     | 60.1     |          |
| Mass of Moisture ( D = A - B )                               | g 11.1                    | 20.4     | 22.5     | 31.8     |          |
| Mass of Dry Soil ( E = B - C )                               | g 134.1                   | 172.9    | 151.7    | 161.5    |          |
| Moisture Content W = $\left[ \frac{D \times 100}{E} \right]$ | % 8.3                     | 11.8     | 14.8     | 19.7     |          |
| Dry Density Pd = $\frac{100 P}{100 + W}$                     | kg/m <sup>3</sup> 1560    | 1825     | 1815     | 1761     |          |



**Maximum Dry Density 1842**

**Optimum Moisture Content 12.8%**

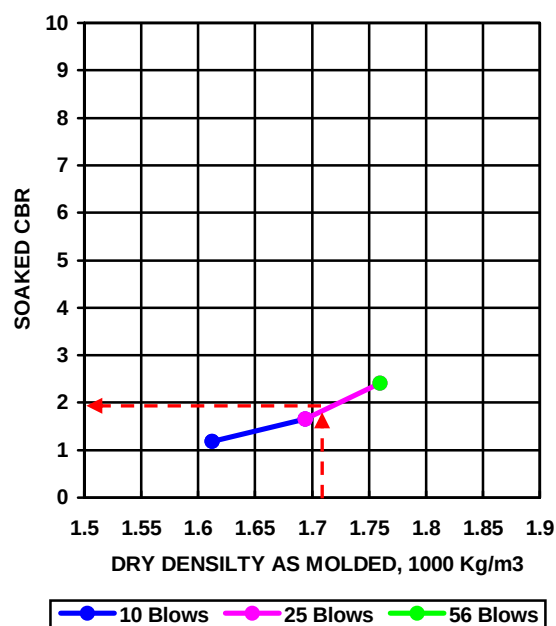
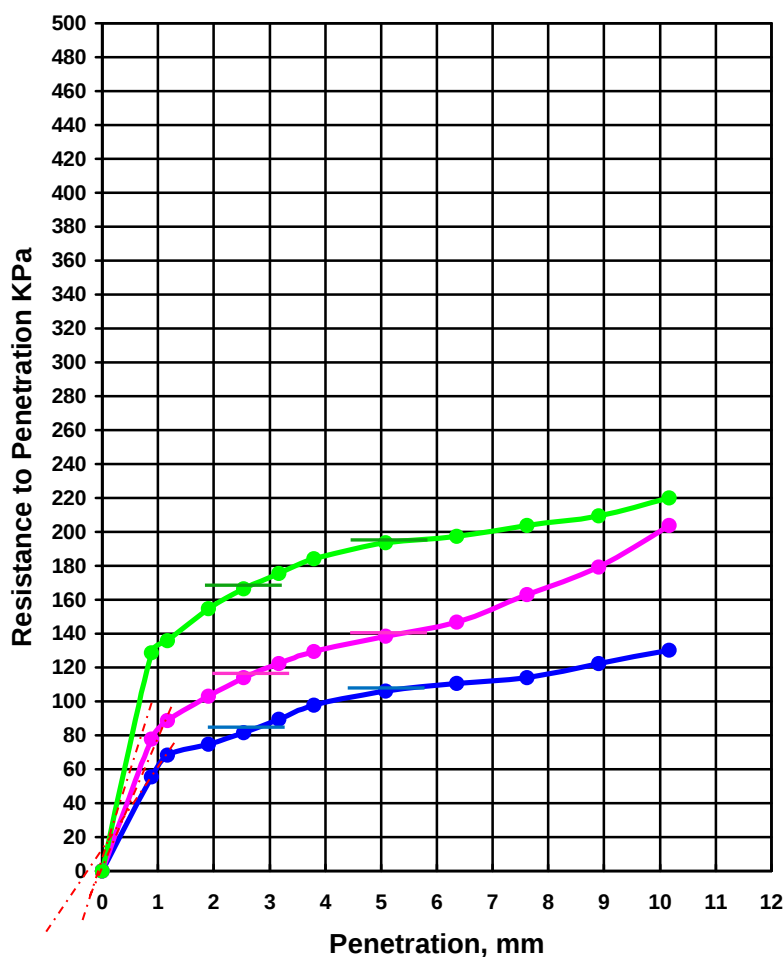
Remarks:



RMS ENGINEERING AND CONSTRUCTION

## CBR Test Results (ASTM D-1883)

|                                                                                                                                                                           |                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Client: JICA Study Team                                                                                                                                                   | Soaked                                  |
| PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | Test Pit No. 1 /S-1<br>Date: 30.05.2018 |



The CBR at 96 percent of the maximum dry density:

- 96 percent of 1780 kg/m<sup>3</sup> = 1709 kg/m<sup>3</sup>.
- At 1709 kg/m<sup>3</sup>, the CBR is 1.9 %.

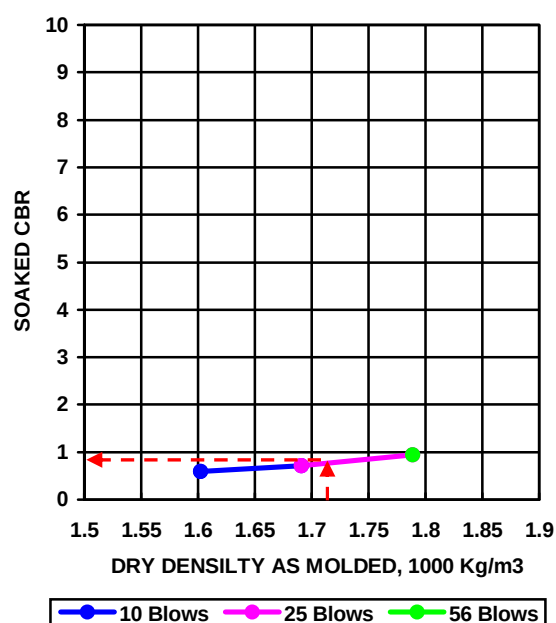
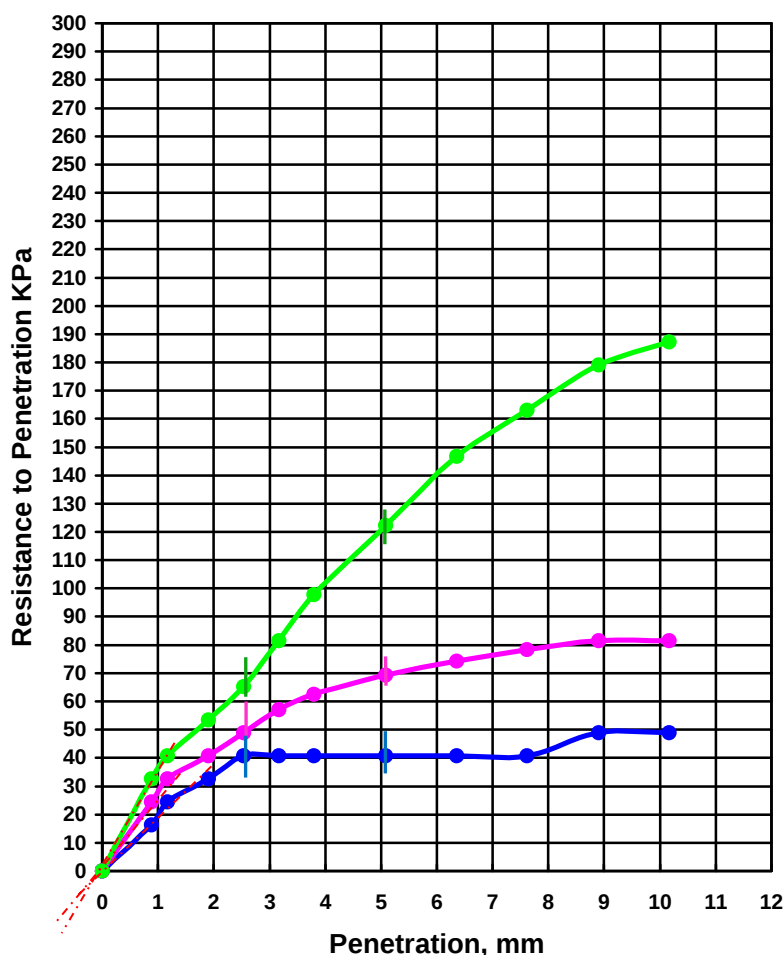
| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 10                                  | 1642                  | 91                                       | 1.18   | 1.03    | 5.1      |
| 25                                  | 1704                  | 95                                       | 1.65   | 1.34    | 4.0      |
| 56                                  | 1764                  | 99                                       | 2.41   | 1.88    | 3.4      |



RMS ENGINEERING AND CONSTRUCTION

## CBR Test Results (ASTM D-1883)

|                                                                                                                                                                           |                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| Client: JICA Study Team                                                                                                                                                   | Soaked                                      |
| PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | Test Pit No. 1a PLT/S-1<br>Date: 30.05.2018 |



The CBR at 96 percent of the maximum dry density:

- 96 percent of 1787 kg/m<sup>3</sup> = 1716 kg/m<sup>3</sup>.
- At 1716 kg/m<sup>3</sup>, the CBR is 0.9 %.

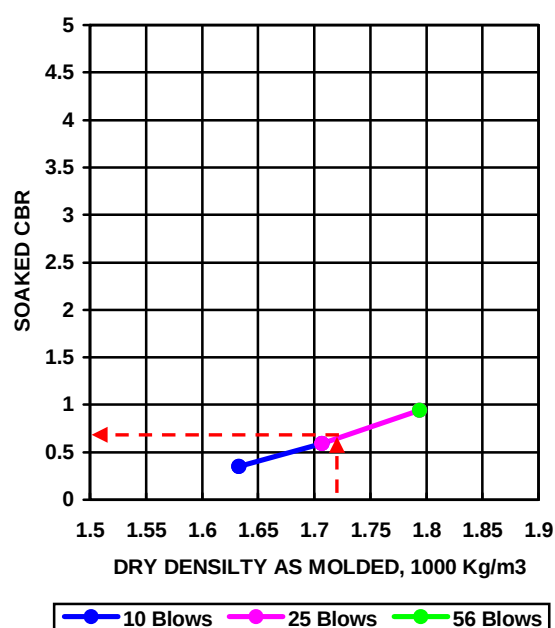
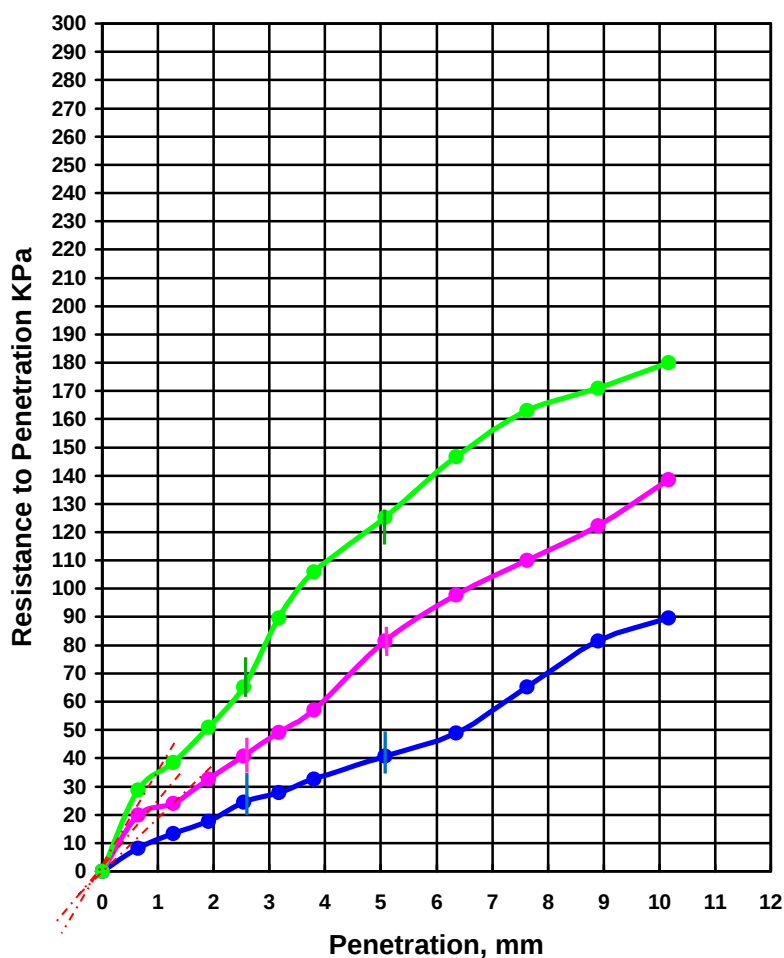
| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 10                                  | 1602                  | 90                                       | 0.59   | 0.40    | 7.9      |
| 25                                  | 1691                  | 95                                       | 0.71   | 0.67    | 7.0      |
| 56                                  | 1789                  | 100                                      | 0.94   | 1.19    | 6.2      |



RMS ENGINEERING AND CONSTRUCTION

## CBR Test Results (ASTM D-1883)

|                                                                                                                                                                           |                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Client: JICA Study Team                                                                                                                                                   | Soaked                                  |
| PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | Test Pit No. 2 /S-1<br>Date: 30.05.2018 |



The CBR at 96 percent of the maximum dry density:

1. 96 percent of 1794 kg/m³ = 1722 kg/m³.
2. At 1722 kg/m³, the CBR is 0.7 %.

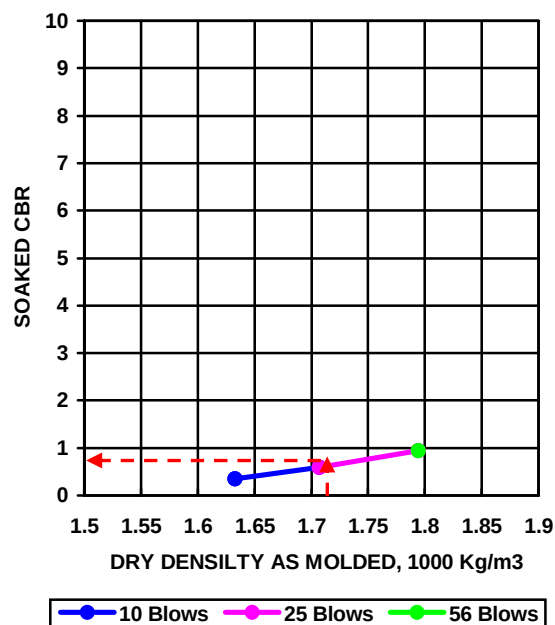
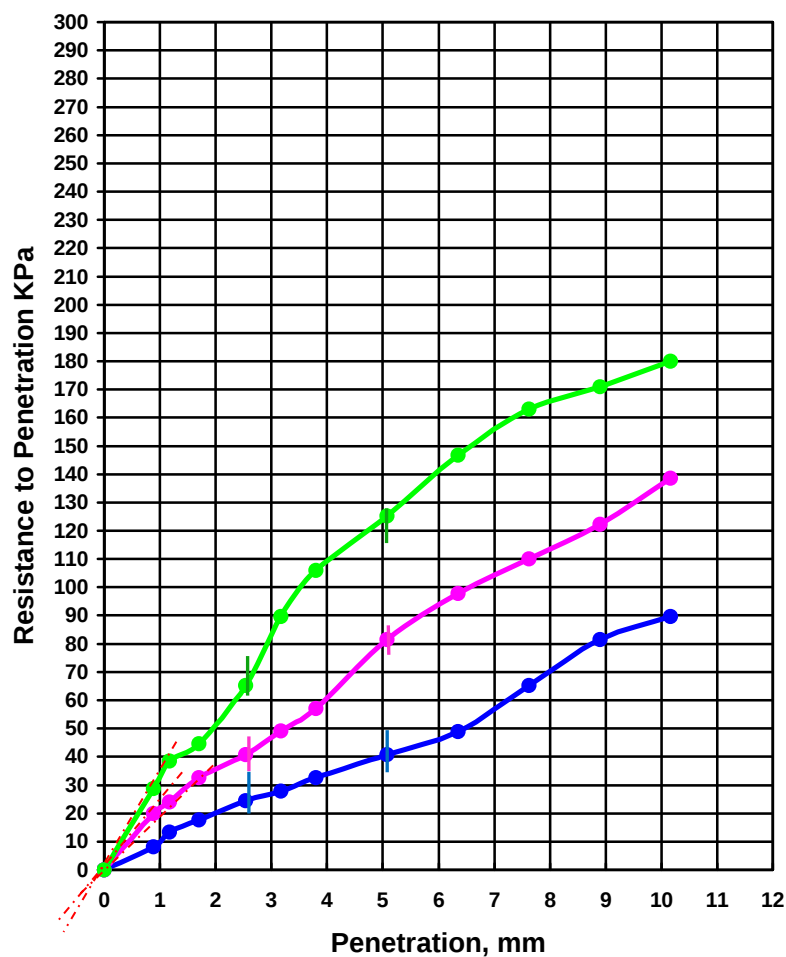
| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 10                                  | 1633                  | 91                                       | 0.35   | 0.40    | 4.8      |
| 25                                  | 1707                  | 95                                       | 0.59   | 0.79    | 3.5      |
| 56                                  | 1794                  | 100                                      | 0.94   | 1.22    | 3.2      |



RMS ENGINEERING AND CONSTRUCTION

## CBR Test Results (ASTM D-1883)

|                                                                                                                                                                           |                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Client: JICA Study Team                                                                                                                                                   | Soaked                                  |
| PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | Test Pit No. 2 /S-1<br>Date: 30.05.2018 |



The CBR at 96 percent of the maximum dry density:

1. 96 percent of 1794 kg/m<sup>3</sup> = 1722 kg/m<sup>3</sup>.
2. At 1722 kg/m<sup>3</sup>, the CBR is 0.8 %.

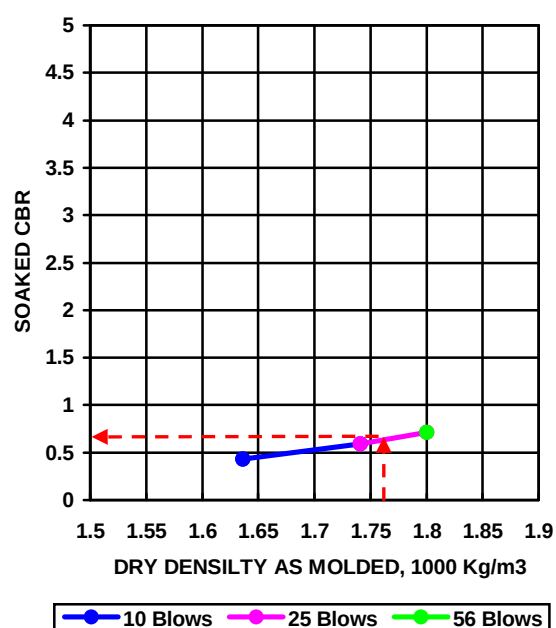
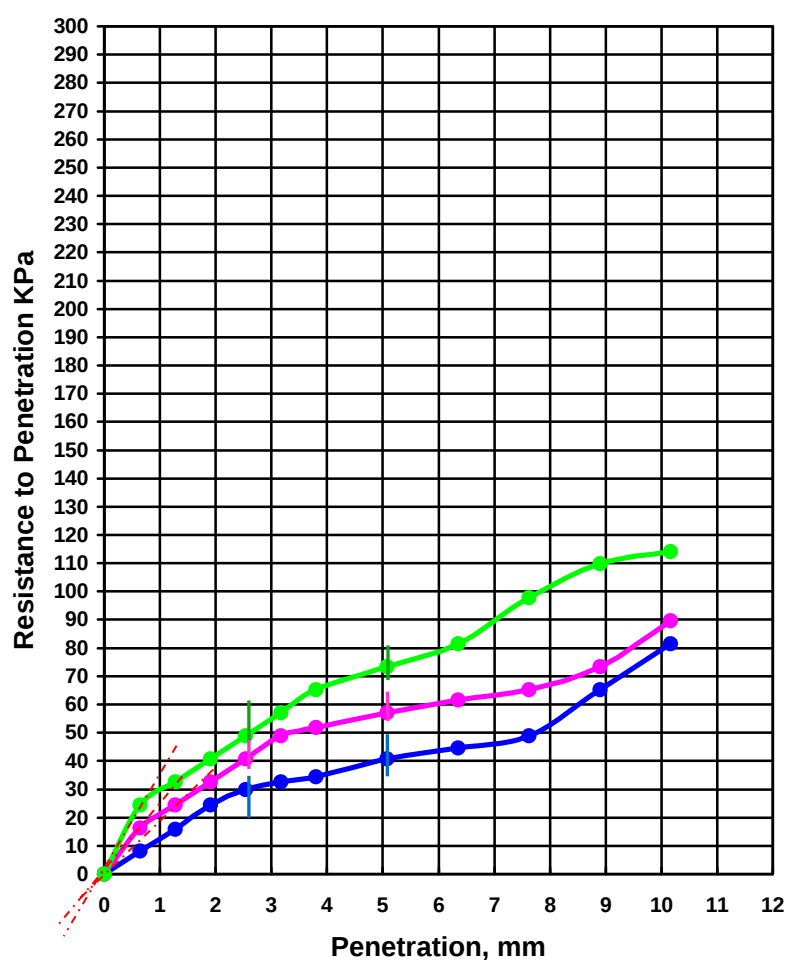
| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 10                                  | 1633                  | 91                                       | 0.35   | 0.40    | 4.8      |
| 25                                  | 1707                  | 95                                       | 0.59   | 0.79    | 3.5      |
| 56                                  | 1794                  | 100                                      | 0.94   | 1.19    | 3.2      |



RMS ENGINEERING AND CONSTRUCTION

## CBR Test Results (ASTM D-1883)

|                                                                                                                                                                           |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Client: JICA Study Team                                                                                                                                                   | Soaked                                |
| PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | Test Pit No. 3 /S-1<br>Date: 1.6.2018 |



The CBR at 96 percent of the maximum dry density:

- 96 percent of 1824 kg/m<sup>3</sup> = 1751 kg/m<sup>3</sup>.
- At 1751 kg/m<sup>3</sup>, the CBR is 0.6 %.

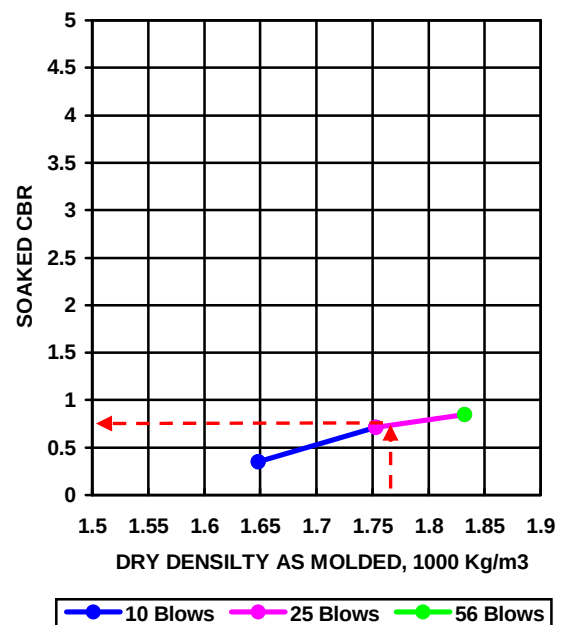
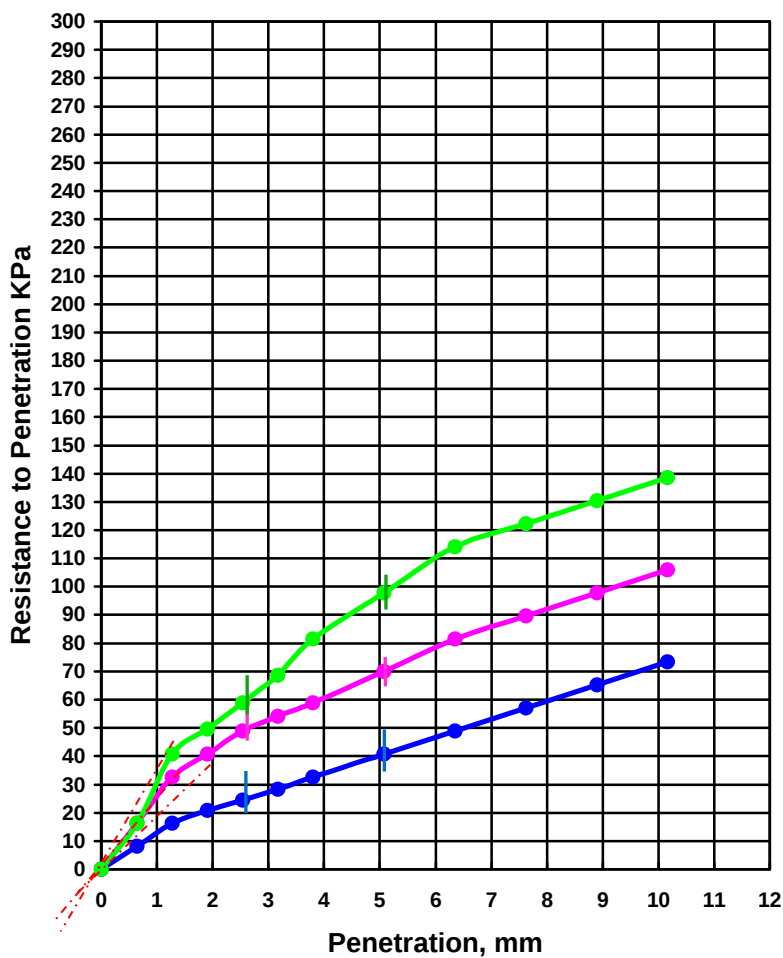
| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 10                                  | 1636                  | 90                                       | 0.43   | 0.40    | 5.9      |
| 25                                  | 1741                  | 95                                       | 0.59   | 0.55    | 4.9      |
| 56                                  | 1800                  | 99                                       | 0.71   | 0.71    | 4.1      |



RMS ENGINEERING AND CONSTRUCTION

## CBR Test Results (ASTM D-1883)

|                                                                                                                                                                           |                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Client: JICA Study Team                                                                                                                                                   | Soaked                                 |
| PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | Test Pit No. 3a /S-1<br>Date: 1.6.2018 |



The CBR at 96 percent of the maximum dry density:

1. 96 percent of 1824 kg/m<sup>3</sup> = 1766 kg/m<sup>3</sup>.
2. At 1766 kg/m<sup>3</sup>, the CBR is 0.7 %.

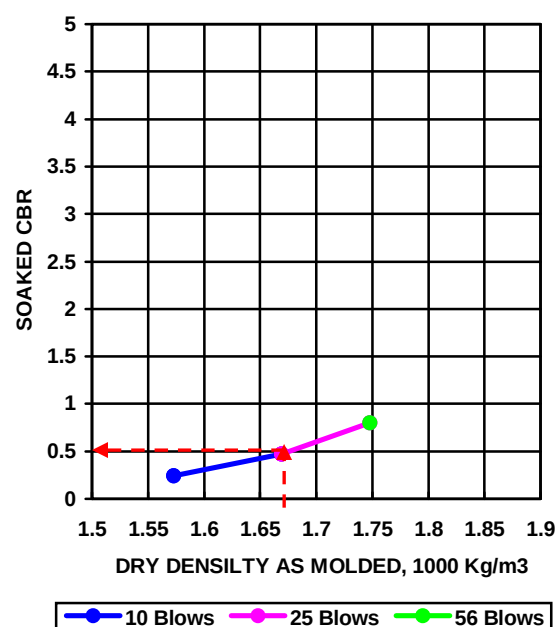
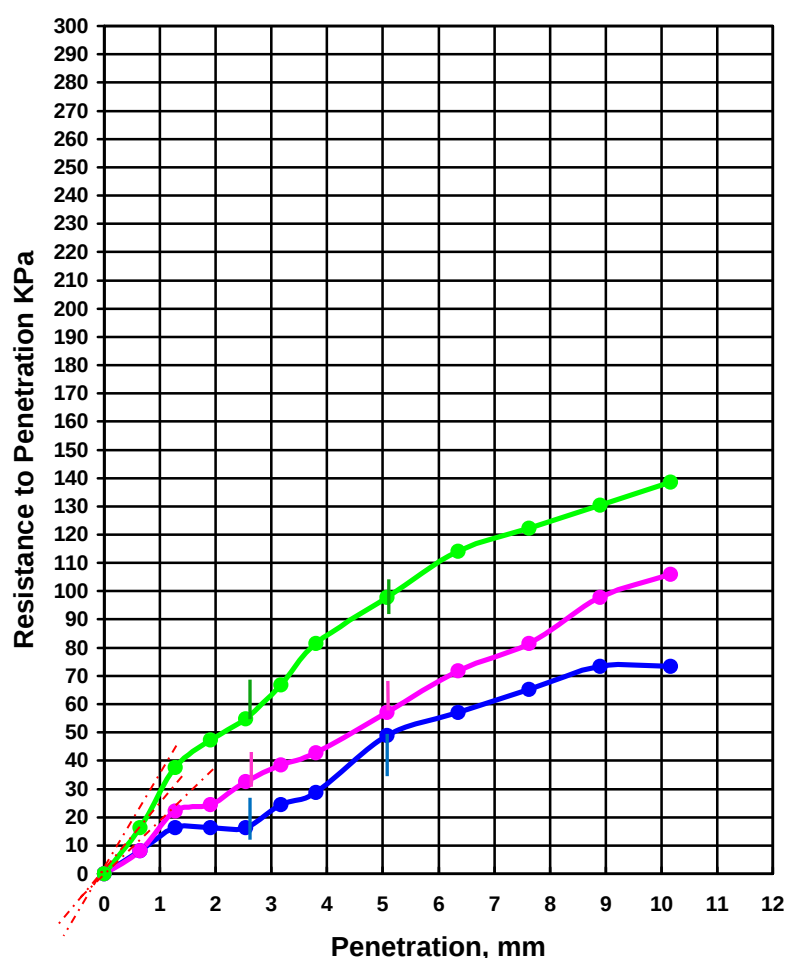
| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 10                                  | 1648                  | 90                                       | 0.35   | 0.40    | 9.4      |
| 25                                  | 1753                  | 95                                       | 0.71   | 0.68    | 8.4      |
| 56                                  | 1832                  | 100                                      | 0.85   | 0.95    | 5.3      |



RMS ENGINEERING AND CONSTRUCTION

## CBR Test Results (ASTM D-1883)

|                                                                                                                                                                           |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Client: JICA Study Team                                                                                                                                                   | Soaked                                |
| PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | Test Pit No. 4 /S-1<br>Date: 2.6.2018 |



The CBR at 96 percent of the maximum dry density:

1. 96 percent of 1737 kg/m<sup>3</sup> = 1668 kg/m<sup>3</sup>.
2. At 1668 kg/m<sup>3</sup>, the CBR is 0.5 %.

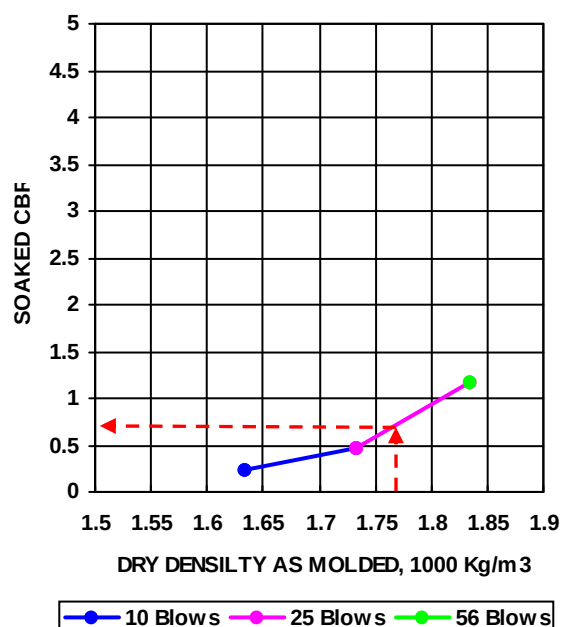
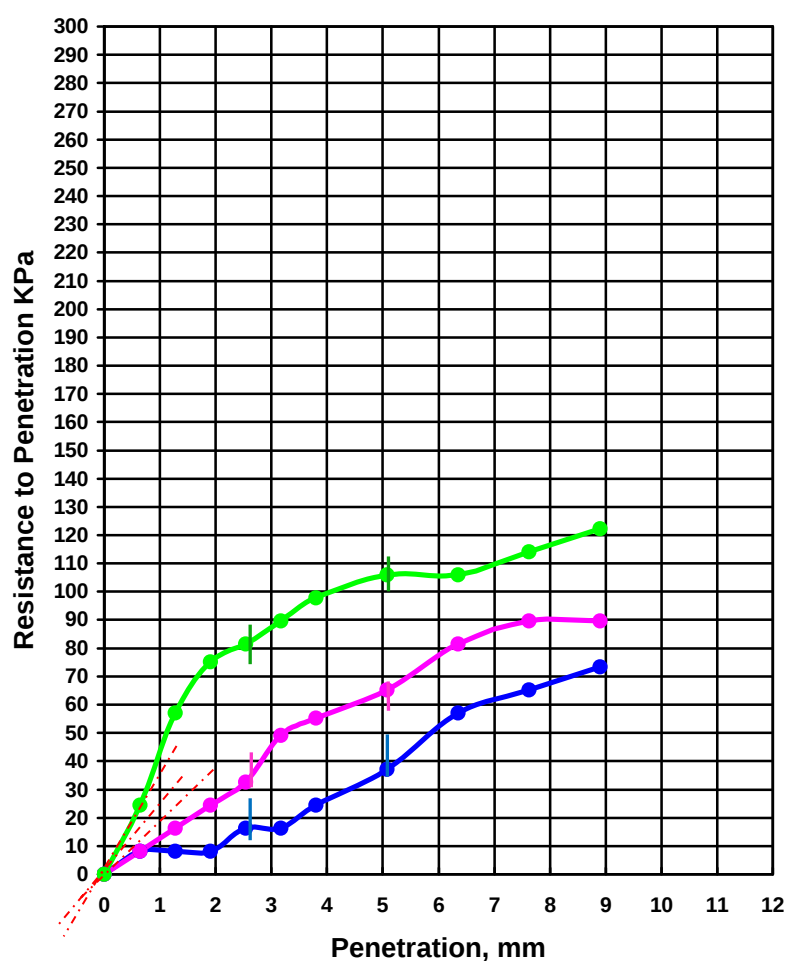
| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 10                                  | 1573                  | 91                                       | 0.24   | 0.47    | 11.6     |
| 25                                  | 1669                  | 96                                       | 0.47   | 0.55    | 8.2      |
| 56                                  | 1748                  | 101                                      | 0.80   | 0.95    | 4.6      |



RMS ENGINEERING AND CONSTRUCTION

## CBR Test Results (ASTM D-1883)

|                                                                                                                                                                           |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Client: JICA Study Team                                                                                                                                                   | Soaked                                |
| PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste | Test Pit No. 5 /S-1<br>Date: 5.6.2018 |



The CBR at 96 percent of the maximum dry density:

1. 96 percent of 1842 kg/m<sup>3</sup> = 1768 kg/m<sup>3</sup>.
2. At 1768 kg/m<sup>3</sup>, the CBR is 0.7 %.

| Compaction Effort (blows per layer) | Dry Density (kg/cu,m) | Compaction (Percent of Max. Dry Density) | CBR at |         | Swell, % |
|-------------------------------------|-----------------------|------------------------------------------|--------|---------|----------|
|                                     |                       |                                          | 2.5 mm | 5.08 mm |          |
| 10                                  | 1633                  | 89                                       | 0.24   | 0.36    | 10.4     |
| 25                                  | 1732                  | 94                                       | 0.47   | 0.63    | 7.3      |
| 56                                  | 1835                  | 100                                      | 1.18   | 1.03    | 4.3      |

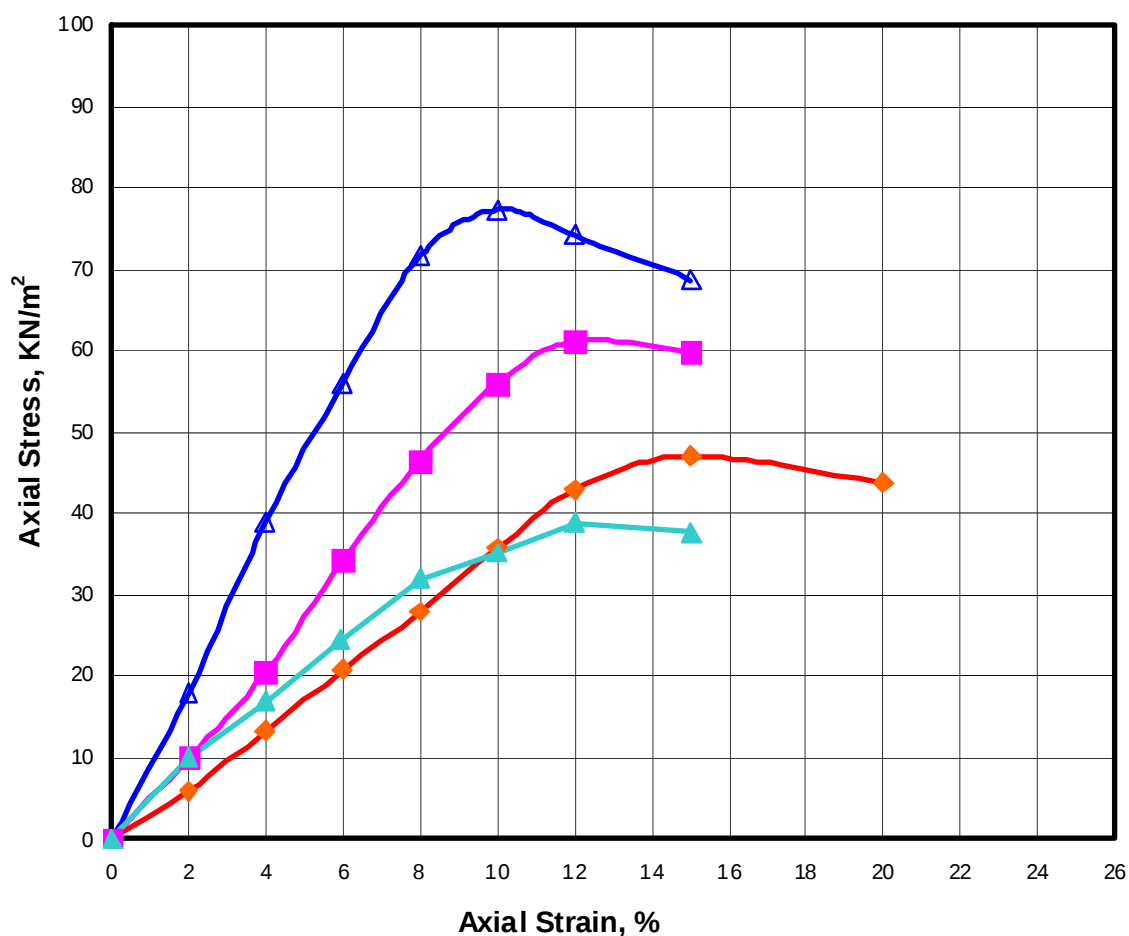


RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

## TRI-AXIAL UCS TEST RESULTS (ASTM D-2166)



—△— BH#1/UD-2

—◇— BH#2/UD-1

—■— BH#3/UD-1

—▲— BH#5/UD-1

| Borehole No. | Depth, m      | -200 | LL   | PL   | PI   | Natural Moisture, % | Specific Gravity | Shear Strength, Su, KN/m2 | Material                                                            |
|--------------|---------------|------|------|------|------|---------------------|------------------|---------------------------|---------------------------------------------------------------------|
| BH#1/UD-2    | 27.65 - 28.25 | 70.1 | 41.0 | 34.5 | 6.5  | 33.7                | 2.52             | 35.65                     | Medium dense dark gray SILT with fine Sand (ML) with low plasticity |
| BH#2/UD-1    | 8.50 - 9.10   | 98.7 | 41.4 | 34.5 | 6.9  | 36.1                | 2.25             | 23.55                     | Medium dense brownish grey SILT (ML)                                |
| BH#3/UD-1    | 9.05-9.65     | 68.7 | 40.3 | 29.5 | 10.8 | 29.4                | 2.48             | 30.6                      | Medium dense brownish grey Sandy SILT (ML) with low plasticity      |
| BH#5/UD-1    | 4.05 - 4.65   | 95.4 | 39.9 | 27.2 | 12.7 | 32.07               | 2.34             | 19.4                      | Very loose brown SILT (ML)                                          |