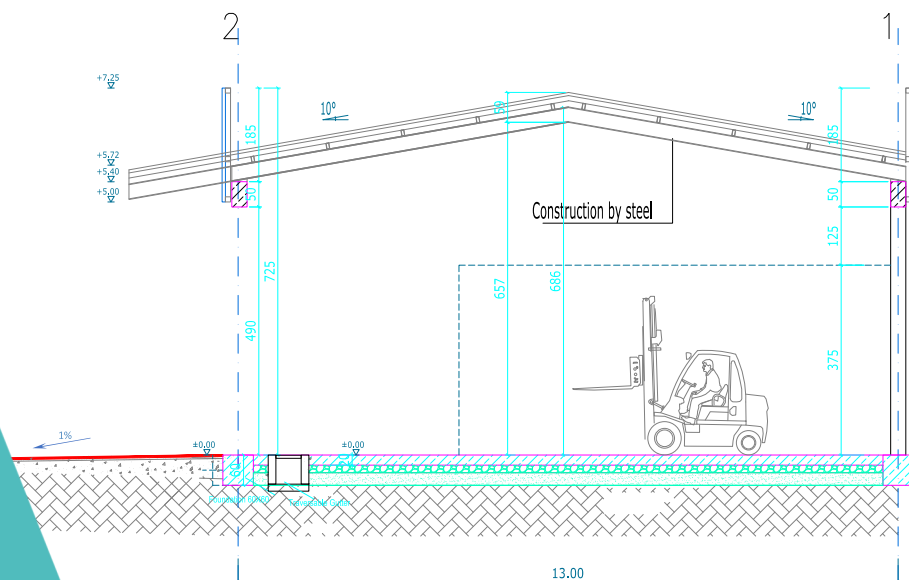


November 2020

Reduction of UPOPs emissions by improving waste management practices at landfills

Tender specifications to support the design upgrade for 3 hazardous waste storage facilities

Antigua & Barbuda



Resources & Waste
Advisory Group^{SCE}

Reference number: BCRC#5558_2019_002



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List of Acronyms

ADR	The European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR for short)
ANU	Antigua and Barbuda
a.s.l.	Above Sea Level
BCRC-Caribbean	Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean
BFR	Brominated Flame Retardant
BM	Brian McCarthy (Team Leader)
CRT	Cathode-ray Tube
DG	Diana Gheorghiu (Deputy Team Leader)
EC	Electrical conductivity
GEF	Global Environment Facility
GHS	UN Globally Harmonized System of Classification and Labelling of Chemicals
HWISF	Hazardous Waste Interim Storage Facility
HZW	Hazardous waste
IPE	Metal "I beam" with I = I-section beam, P = parallel flanges, E = European (UNI 5398).
kW	kilo Watt
NSWMA	National Solid Waste Management Authority (Antigua and Barbuda)
O&M	Operation and Maintenance
PBB	Polybrominated biphenyls
PBDE	Polybrominated diphenyl ethers
PCB	Polychlorinated biphenyls
PCT	Polychlorinated terphenyls
POPs	Persistent Organic Pollutants
PVC	Polyvinyl Chloride (plastic polymer)
RV	Raymond Victory (Regional Engineer)
RWA	Resources and Waste Advisory Group (consultants)
TDG	UN Transport of Dangerous Goods Model Regulations
UN	United Nations
UPOPs	Unintentionally produced Persistent Organic Pollutants
WEEE	Waste Electrical and Electronic Equipment
WR	Wolfgang Robrecht (Key International Expert)

Background and Introduction

The RWA Group team along with representative of BCRC-Caribbean, conducted an in-country fact finding assignment in Antigua and Barbuda during the week of 8th to 11th October 2019. This report presents the findings related to project Component C “Assess existing hazardous waste facilities in three (3) countries (Antigua & Barbuda, Barbados and Saint Lucia)”. This report presents the findings, building upon and referencing the findings presented in Antigua and Barbuda Baseline Assessment and Training Needs Analysis report, the Assessment Report on the existing hazardous waste storage facility, and the Design Upgrade Report for the HWISF.

In this context, this document presents the outcomes of the following project tasks:

- Assistance and provision of support to Waste Management Authorities with the technical specification needed for the preparation of tender for the upgrade of the facilities.
- Elaboration of the design requirements for the hazardous waste storage facilities at the landfills.

With this report the base for tendering the design build of the proposed HWISF is established.

1 Description of Works

1.1 HWISF purpose and background

As detailed in previous reports, particularly *Baseline Assessment and Training Needs Analysis for Antigua and Barbuda, RWA, December 2019*, and *HWISF Design Upgrade Report for Antigua and Barbuda, RWA, October 2020*, Antigua and Barbuda does not have heavy chemical activities or industrial activities. Major hazardous waste groups of interest were assessed to be a relatively targeted and include:

- Reactive and inorganic chemicals, organic solvents arising from laboratories;
- Acids;
- Used oil sludge and oily wastes (rags, filters, contaminated absorbent material, etc - with regards to used oil filters the oil will have to be removed by crushing and metal housing recycled or disposed to landfill);
- Plastic (PVC, BFR) housings of electronic wastes;
- Cathode Ray Tubes (CRT);
- Mercury and mercury lamps
- Packaging containers for pesticides and hazardous chemicals

An estimation of the current hazardous waste generated and quantities likely to be generated during the period 2020 to 2024, using a growth of 2 % in quantities, was carried out within the Baseline study for this project. Results are shown in the following table:

Table 1: Hazardous wastes estimated to be generated annually for the period 2020 to 2024

Hazardous waste	Description	Source	Annual amount generated in kilogramme or litres					
			2019	2020	2021	2022	2023	2024
Chemical wastes/ pesticides residues in empty containers *	Inorganic wastes, wastes organic solvents (may contain halogenated solvents) - Solutions containing heavy metals	School laboratories, chemical laboratories, farmers and users of pesticides	20 000	20 400	20 808	21 224	21 648	22 080
Used oil Sludge	Organic solid	Power plant	340 000	346 800	353 736	360 810	368 000	375 360
Sulphuric acid	Inorganic liquid	batteries	18 000	18 360	18727	19 100	19 482	19 871
Used oil filters	Organic liquid	Oil filters	19 000	19 482	19871	20 269	20 674	21 087
E wastes **	Inorganic and organic solid components of the e wastes	Individual, Institutional and Commercial	110 000	112 200	114444	116 733	119 067	121 448

*assuming that 90% is in the solid state

**assuming that the hazardous constituents are only 10 % of the total E wastes generated – NOTE that E-waste has been descope from inclusion within this HWISF as detailed in the ANU HWISF Design Upgrade Report, RWA, October 2020.

Source: Reduction of UPOPs emissions by improving waste management practices at landfills - Baseline Assessment and Training Needs Analysis, RWA, December 2019

Based on international experience, it is deemed unlikely that the amount generated will all be captured. Furthermore, some other treatment outlets may be found during the period of the construction and operation of a storage facility. Based on international experience and likely percentage capture, it was assumed that in the initial years only 25 % of the hazardous wastes generated will be captured and this will increase incrementally subject to aggressive awareness campaigns and enforcement. It is thus assumed that for 2020 and 2021 the capture rate will be 25 %, whereas in 2022 onwards there will be an annual increase of 5 % to reach a capture of 40 % in 2024.

In order to treat and dispose/incinerate the hazardous wastes according to international standards, the Hazardous Waste Interim Storage Facility (HWISF) is designed with the purpose to receive and temporarily store hazardous waste in a safe manner prior to shipment of said waste to an approved facility for treatment, recovery or disposal.

As a Hazardous Waste Interim Storage Facility, the emphasis is on packaging and storing the material first so that it is safe in storage, but also so that it is ready for transportation and shipment to overseas treatment facility. Therefore, the emphasis is on packaging and short-term storage ready for shipment, not long-term storage in place. Key tasks are therefore identifying, consolidating, packaging, labelling and administrating hazardous wastes in order that they are suitable for uninterrupted shipment in compliance with applicable local and international laws, regulations, conventions, and best practice guidance. Key documents to consider for compliance include:

- National Solid Waste Management Authority [NSWMA] Act (as amended)
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (the “Basel Convention”)
- Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
- UN Recommendations on the Transport of Dangerous Goods Model Regulations (TDG)

1.2 Location

In order to optimize the construction and operation of the proposed hazardous waste storage and to achieve synergy effects it was decided to place the HWISF at Cooks landfill. Reception building, staffing rooms, changing rooms, hygiene units as well as a weighbridge and other infrastructure like access roads, power- and water supply are available at the landfill already. In addition, it is not necessary to hire a complete set of staff.

The location of the hazardous storage facility is proposed to be within the area of Cooks landfill as indicated in Figures 1 and 2 with the location having the following GPS co-ordinates:

17° 06' 33.05" N

61° 52' 05.80" W

The area is located 9-10m a.s.l.

The distance from the proposed facility location to the access road of the landfill is around 15m. The distance to the sea is around 825m in a west direction.

The exact location of the HWISF is not yet fixed. As the area is currently used as temporary storage for used car tyres, a full area topographical survey is not possible. However, it can be assumed that the area for the HWISF is flat and no additional earthworks for modelling the area is required,



Figure 1: Proposed location of the Hazardous Waste Interim Storage Facility

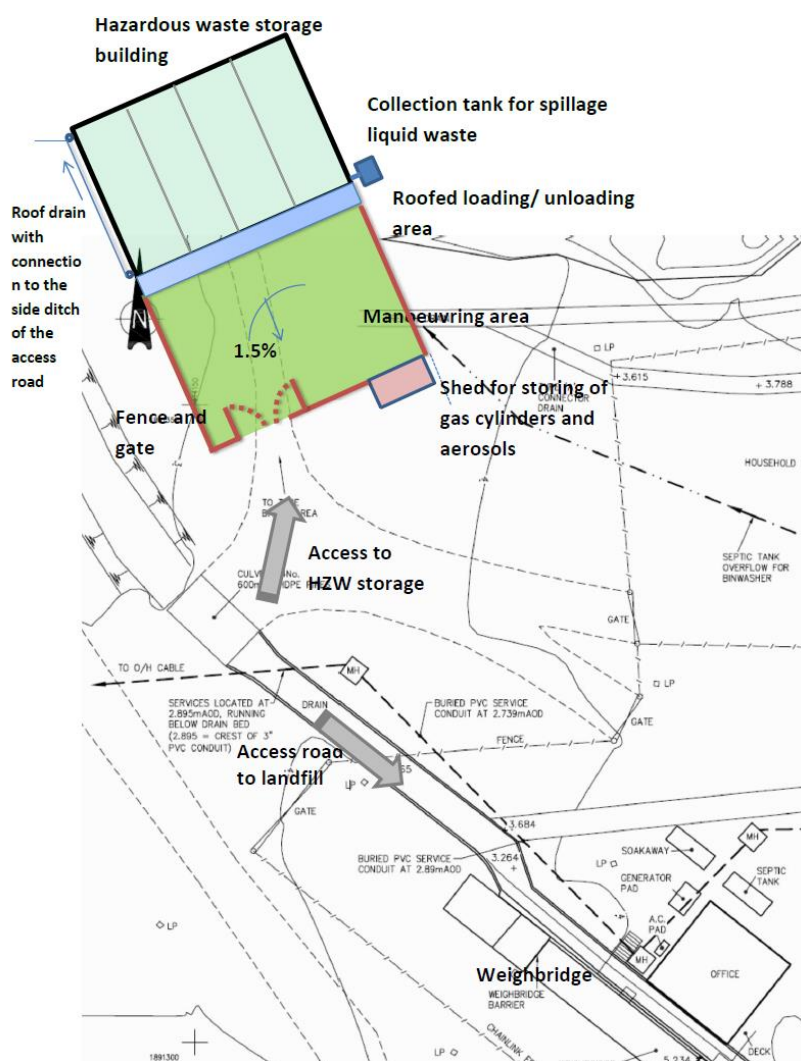


Figure 2: Proposed location of the Hazardous Waste Interim Storage Facility based on a drawing prepared in the context of the landfill construction

2 Scope of works

The works for the HWISF will comprise the following main elements:

1. All required supply lines (water supply, power and telephone) including connections, necessary valves, meters and shafts within the site boundary.
2. Clearing of the site area out from vegetation and waste
3. Preparation of the terrain for construction of the hazardous waste facility.
4. Construction of the hazardous waste storage building
5. Electrical installation including inside and outside light
6. Construction of a shed for gas cylinders
7. Construction of the fence, the perimeter embankment and surface water drainage around the HWISF area
8. Construction of a collection and storage system for spillage
9. Supply of fixed and mobile equipment for HWISF storage operation

In the technical specifications, enclosed as Annex 1 of this report, the technical requirements are specified including the preparation of site installation during the construction time, health and safety issues and general activities that are not related to any specific unit price of the Bill of Quantities (BoQ) which is enclosed as Annex 3 of this report.

The Bill of quantities requires to be filled out by the prospective bidders for the works contract. The bidders are advised to consider the “Preamble” included as Annex 2 with additional information regarding the BoQ.

3 Conceptual Design Drawings

Conceptual design drawings are enclosed as Annex 4 and include all drawings listed in Table 1. These are conceptual and are intended to guide the successful design build contractor in their preparations of final design as specified in Annex 1, technical specifications.

Table 2: List of conceptual design drawings included as Annex 4 of this report

Drawing N°	Title	Scale
Antigua-HZB-00 / 29471iEE/WP/1	Working Plan / Site layout plan	1:2,000
Antigua-HZB-01	Ground Floor Plan	1:50
Antigua-HZB-02	Elevations and Sections	1:50
Antigua-HZB-03	Elevations	1:50
Antigua-HZB-04	Foundation Layout	1:50
Antigua-HZB-05	Column Layout and Details Plan	1:50
Antigua-HZB-06	Roof Plan	1:50
Antigua-HZB-07	Structural Roof Plan	1:50
Antigua-HZB-08	Safety Shower Piping Plan	1:50
Antigua-HZB-09	Electrical Plan	1:50
Antigua-HZB-10	Fire Detection System Single Line Wiring Diagram	1:50
Antigua-HZB-11	Electrical Single Wiring Diagram	N/A
Antigua-HZB-12	Layout of separate shed for gas cylinders	1:16.67
Antigua-HZB-13	Views of separate shed for gas cylinders	1:16.67

4 Supplementary Information

The area of the HWSIF is currently covered with used car tyres which will be removed by the Client. It is not part of the technical specifications here. Hence an actual and exact topographical survey is not available under the given circumstances.

As an alternative, a layout plan prepared in the context of the landfill construction of 2007 is used for the design. A pdf is enclosed to the set of drawings.

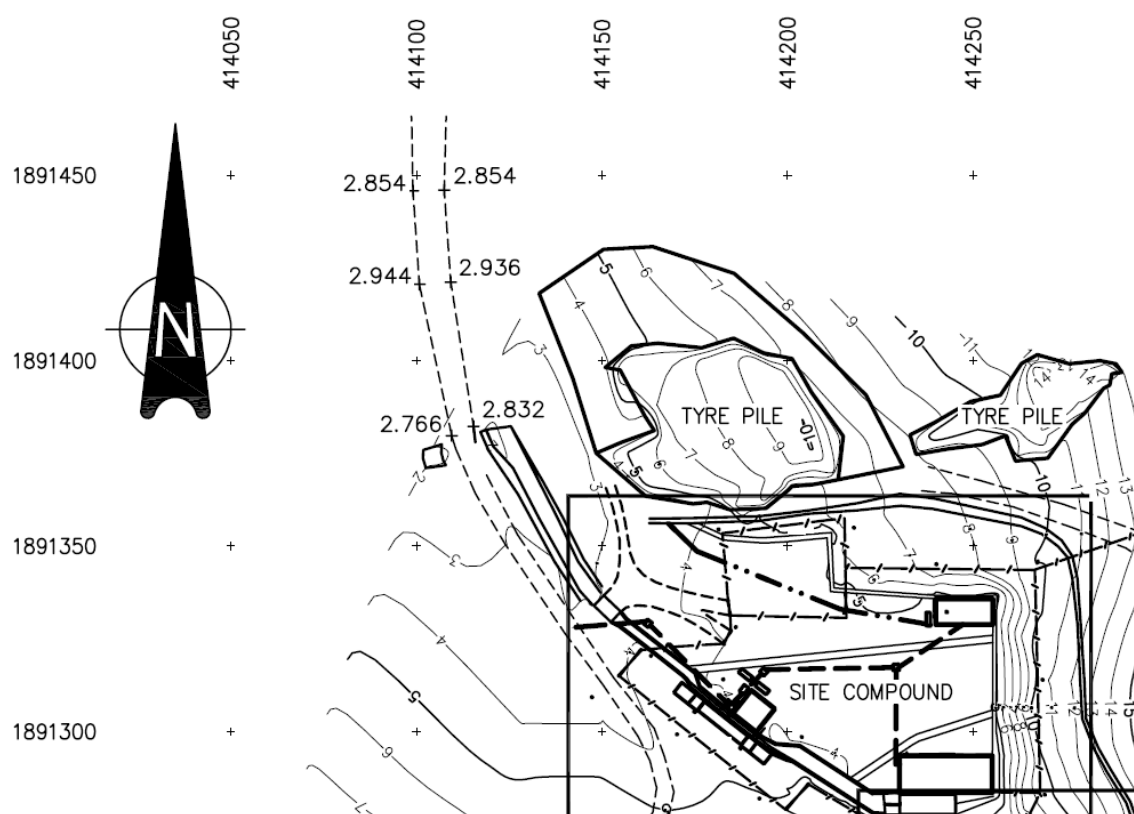


Figure 3: Available area layout plan prepared for the construction of Cooks Landfill in 2007

The design does not consider any road construction to the HWSIF besides the manoeuvring area in front of the HWSIF building. The connection road between the access road and the location of the HWSIF appears to be in a good condition, potential bidders shall clarify this and prepare their tender accordingly.

5 Qualifying requirements

Only qualified companies shall be invited to bid for the work. Minimum qualifications and requirements are detailed in the following sections.

5.1 General technical requirements

The bidders should be experienced in civil constructions of steel, concrete and earthworks.

5.2 Particular technical requirements

A minimum of 3 industrial or storage buildings realized in the last 5 years

The following construction equipment must be available:

Type of machine	Minimum Number
Wheel loader	1
Excavator	1
Crane	1
Soil compactor	1
Concrete mixer	1
Truck	1

5.3 Key personnel

The bidder shall have the following key personnel with the associated minimum qualification and experience for the execution of the work:

	Education	CV required	General experience	Particular experience
Technical representative	Engineer (Civil)	Yes	10	5
Project manager	Civil Engineer (with project management qualifications and experience)	Yes	5	2
General foreman	Technical education	Yes	5	2
H&S responsible	Engineer	Yes	5	2

6 Construction Supervision Engineer)

The client (Government of Antigua and Barbuda) will assign a qualified and designated professional (Civil engineer) construction supervision engineer as a counterpart for following, overseeing and controlling construction works. They will be in charge of the technical supervision and acceptance of the works and will be empowered to demand compliance with all the provisions deemed necessary or convenient in order to ensure the faithful application of the contract rules and the proper execution of the works. Against the inspection of the works and review of the as-built report and signing of the corresponding minutes, they will carry out the partial or total reception of the works, enabling the release of the corresponding payments. The Supervision Engineer will have the following qualifications and will be required to perform the following tasks.

6.1 Education of the Supervision Engineer

Civil Engineer with minimum 5 years general work experience

Minimum 2 years as supervisor

Minimum construction supervision of 2 administrative, industrial or storage buildings

6.2 Tasks of the Supervision Engineer

During the construction of the new HWISF for Antigua the construction supervision engineer shall provide the following services:

- Site inspection on daily basis considering progress of work
- Supervision of health and safety (H&S) activities of the Contractor as requested in the contract, the H&S plan and according to local standards
- Supervision of the Contractor regarding environmental issues (dust, potential water pollution and other emissions)
- Noting extraordinary activities in and outside of the construction site
- Photo documentation with date and additional explanation whenever necessary
- Weekly inspection reports based on the results from site inspections and in addition weather data, number of staff and machines on site, activities on site, supply of materials, work progress on site and any deviation from work and time schedules etc.
- Review of the Contractor's Health and Safety Plan and Environmental management plan and regularly inspection of its compliance
- Preparation of written site instructions in close co-operation with the Employer
- Collection of all certificates related to materials, staff and machines related to any work of the contractor.
- Preparation of own measurements regarding length, width and height (depth) of all constructions as cross-checking of contractor's measurements
- Review of the Contractor's interim payment certificate (IPC's) (survey of quantities) and clarification
- Follow-up of the contractors works and time schedules and regularly reporting to the supervision team
- Preparing, inviting and chairing of weekly meetings with the Contractor, preparation and follow –up of minutes of meeting
- Participation in all meetings with Employer and all authorities visiting the site if requested
- Quarterly site visits and preparation of reports during the defect liability phase (1 year)

7 Environmental Management Plan

3 weeks before start of construction the Contractor has to present an Environmental Management Plan which must consider the following main impacts during the construction of the HWISF as a minimum:

- Occupational health and safety
- Water resources and water quality
- Waste management
- Chemicals and hazardous (construction) materials
- Soil contamination
- Air quality
- Landscape and visual
- Noise and vibrations

Construction of the facility can directly affect pedestrian and vehicle traffic in the vicinity of the HWISF.

Unauthorized access to construction sites and character of construction works also increase risks of injuries.

To minimize the aforementioned impacts, the following mitigations measures shall be elaborated in detail in the Environmental management plan.

- Prepare a corresponding traffic management plan with minimized traffic impediments
- Provide timely information and clear instructions including traffic signs
- Build necessary barriers/ fences

- Install proper lightning wherever it is necessary
- Arrange transportation activities during the daytime
- Clean regularly access ways in the work sites vicinity and maintain the roads
- Prevent unauthorized access and provide security guards at the facility
- Provide storage area for construction material
- Hazardous (construction materials) have to be stored in a safe containment
- Mobile construction equipment has to be locked outside the construction time in order to prevent it from unauthorized use
- Package materials, surplus materials etc shall be collected and stored in adequate containments to avoid any littering

8 Health and Safety Plan

Construction of the HWISF can affect occupational health and safety (OHS), increasing related risks. Potential adverse OHS impacts and risks are related in particular to demolition and construction activities generating different kinds of emissions, noise pollution, and risks of injury and potentially requiring work with hazardous materials.

Occupational health and safety mitigation measures during the construction include:

- Provision of mandatory recruitment/assignment of the designated site Health and Safety engineer responsible for day-to-day compliance with OHS requirements
- Creation of safe on-site working conditions
- Conducting regular safety briefings and trainings with workers involved in demolition and construction works
- Provision of personal protective equipment and monitoring of their use
- Monitoring and control dangerous materials safety handling and its compliance with the OHS requirements
- Provision of an emergency plan including emergency phone numbers of hospitals, fire department etc.

3 weeks before start of construction works the Contractor has to present a detailed Health and Safety plan for review for approval by the Supervision Engineer.

9 As-built report

Within 2 weeks of completion of the works, the contractor must deliver an “as-built report” that shall include:

- Full set of as-built drawings
- Deviation from the design drawings
- Set of modification orders (if applicable)
- Complete set of the suppliers documents including operation and maintenance manuals
- Complete list of all delivered equipment
- Set of the daily log
- Set of all communication between the Employer, Supervisor and Contractor

10 Project Implementation Schedule

Figure 4 presents a proposed implementation schedule for the design, build and commissioning of the HWISF divided into three distinct phases:

1. Preparatory works
2. Construction works
3. Supply

Preparatory works includes the procurement process up until award and signing of the contract which is estimated to last 16 weeks. The construction time including the supply of equipment is estimated to be completed within 15 weeks of contract award. Total time for implementation is 31 weeks including overlapping activities.

The bidder will be required to submit their specific implementation workplan with their proposal

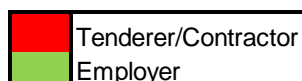
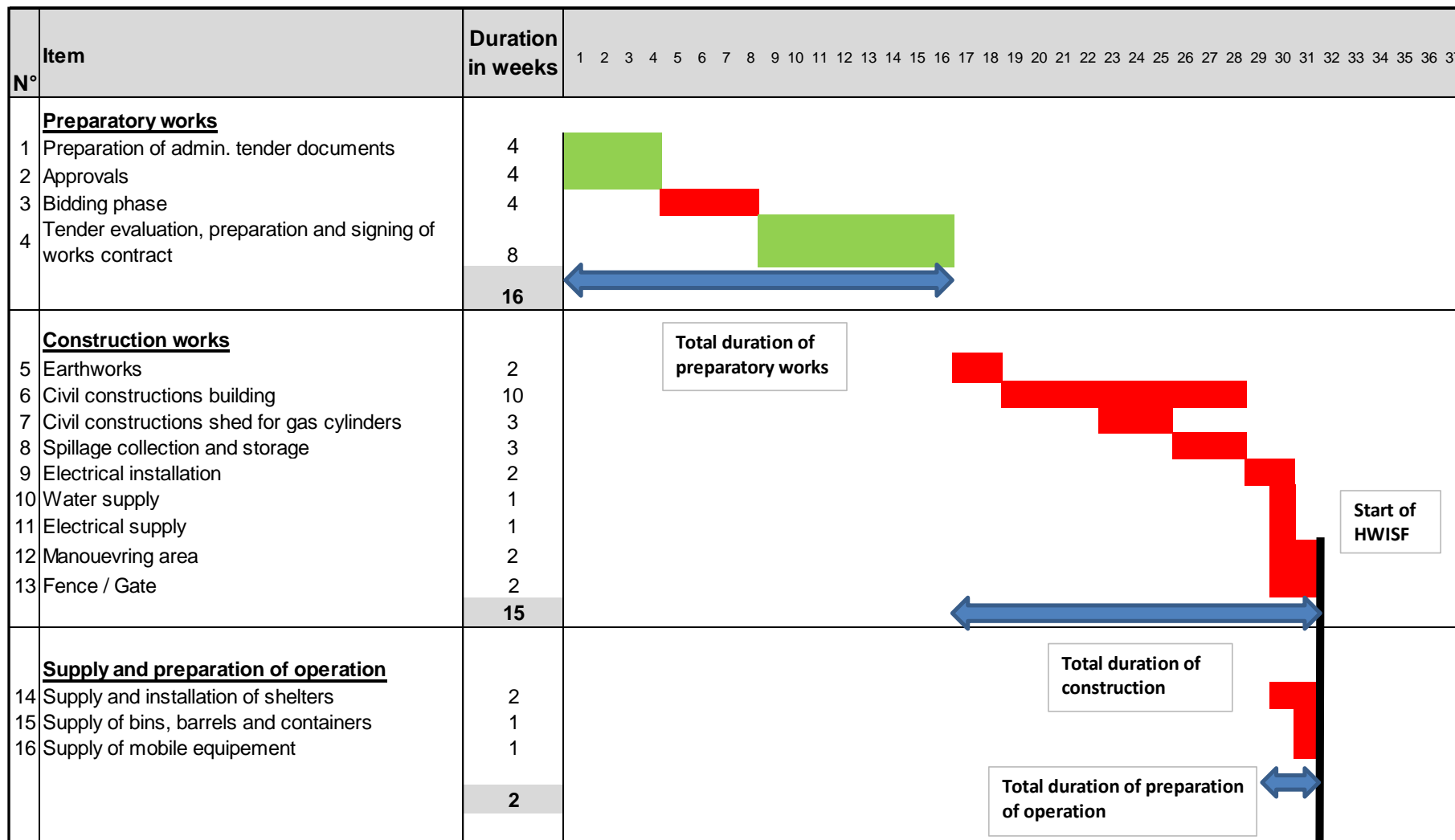


Figure 4: Proposed time schedule for design, build and commissioning of the HWISF

Annex 1 - Technical specifications

Annex 2 – Preamble to the Bill of quantity

Annex 3 – Bill of quantity

Annex 4 – Conceptual Drawings

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