



Work package 3, Deliverable D 304 and 307

**Deliverable 304: Report Construction of the
SBR-WWT&R system and SBR on- site –WWT&R
Systems**

And

**Deliverable 307: Remote control systems for
WWT&R units to detect and inform maintenance
Personnel about system failure and
preventive information**

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DELIVERABLE 304: CONSTRUCTION OF THE TREATMENT SYSTEMS

This report presents the description of the construction of the Sequencing Batch Reactors erected on site in the framework of the SMART II Project.

The construction of this treatment system is the responsibility of ATB Umwelttechnologien GmbH whereas the company WES from Amman, Jordan executes the local work.

The report discusses the main steps and requirements of the construction. Photos and technical drawings were added to illustrate the different steps and elements of the work realised. Potential onsite difficulties and modifications are also presented.

When done, the commissioning and operation of the systems are described.

In the beginning of the SMART II projects it was planned to erect 3 small and one bigger (community, > 250 PT) SBR systems. But we had to adapt to the possible and suitable sites and wanted to show the water reuse with irrigation facilities as total coordinated and functioning systems. All this had to fulfil the economical frame. That's why all participants (ATB, NAW/WES, BAU, UFZ) agreed to reduce the number of units to two small systems and one bigger (100 PT) system.

1 CONSTRUCTION OF THE SMALL SCALE SEQUENCING BATCH REACTORS

Due to administrative delays with the customs administration and with the signature of the contract with the community site for the SBR at the Nursing Home, the SBR treatment units (AQUAmax[®] classic and Professional XL) have been available on site much later than scheduled before.

The construction of the infrastructure at the sites and the installation of all three SBR units have been executed. The commissioning of the systems at Fakhri Hassan and Nursing Home have been realised.

Thus this chapter concerns only the construction of the infrastructure required for the treatment systems (tank, power supply and irrigation system).

1.1 SEQUENCING BATCH REACTOR – MR FAKHRI HASSAN

1.1.1 PRESENTATION OF THE CONSTRUCTION PROCESS

1) Planning and tasks.

The construction started on the 29th of March 2012 and was finished on the 6th of June 2012 (about 2.5 month). The construction took a little longer than originally estimated due to onsite conditions, to limited site access and to the delay in the delivery of some construction materials (Sulfate Resisting Cement, etc.). This extended the construction time by about one month.

The main construction stages are presented below and are briefly discussed:

- Excavation of the tanks and collectors:

Access to the site for mechanical equipment was not possible at all. Excavation and construction works were done manually by labourers. The top soil layers were removed easily but once deeper it took some efforts to dig in the bed rock. The site was also presenting a high pitched slope and precautions had to be taken during the construction to avoid landslides. The sewer line servicing the existing cesspit was conserved as back up but bypassed to reach the septic tank.

- Installation of the formwork and reinforcing steel:

Considering the fact that the wastewater treatment system had to be installed on a sloped site, concrete blocks have been used for the formwork of the structure. Once the excavation completed, planks were installed as internal formworks. The concrete reinforcement was done using reinforcing steel bars.

- Pouring of the concrete:

This operation was done in 3 stages. First the floor concrete slab, then the external and internal walls and finally the roof concrete slab with the openings/block-outs for manholes and covers.

- Curing time:

Curing time took a couple of days for the walls and about two weeks for the roof in order to ensure the strength of the structure.

- Site work:

Upon removal of the internal formwork, it was necessary to finalize the connections to the sewer lines then to install a staircase to access the lower garden and install a guardrail as a safety precaution to prevent people from falling from the roof of the concrete tank (it has been made to be used as a terrace). Of course cast iron manhole access covers have also been installed and the site was cleaned from trace of construction rubbles.

- Installation of the electrical connections and irrigation pump:

The power cables for the SBR and the irrigation pumps have been connected to the main power distribution board in the building. A control box was installed nearby the treatment system to facilitate operation and maintenance

- Installation of the pipework and irrigation fields:

Again, due to the extreme topography of the site, all excavation work for the trenches has been done by labourers. The work was rendered even more difficult by the fact that the soil was very rocky in the lower garden. Also as subsurface irrigation was implemented, it has been necessary to lay the irrigation lines perfectly level and to have the same pipe cover above the lines. As such and due to the difficult site topography, it was necessary to level the ground along and around each irrigation line. The use of a 6-port indexing valve on this site required the levelling of 6 irrigation platforms. After the installation and testing of the irrigation lines, the trenches were filled back with the previously excavated soil.

- Installation of the SBR unit:

The installation of the SBR unit happened on the 14th and 15th of May and required a crew of two technicians from ATB in addition to the four workers (worker, plumber, electrician, and supervisor). The installation took about 2 days and went without trouble as the necessary infrastructure (piping and electrical cables) had been installed previously in order to optimise the working schedule of the technicians from ATB.

- Installation of the remote control:

In the course of the installation of the electrical and machinery equipment also the already in the control cabinet pre-installed GSM module has been activated. Messages will be sent to the mobile phone of Mr. Nabil Wakileh, NAW/WES. [Deliverable 307]

- Garden reinstallation:

In order to give the site back in good condition, efforts were made to clean the site and to reconfigure the garden as it was before the construction.

2) Labour requirements:

Table 1: Labour requirement for the construction of Mr Hassan's treatment system.

Type of labour	Number
Construction worker	5
Electrician	1
Plumber	1
Supervisor	1

3) Construction difficulties:

The site had a difficult topography that made impossible to reach the tank and irrigation fields with mechanical equipment. All of the construction work, from the excavation work to the transport of the construction materials till the pouring of the concrete was thus done manually by labourers.

It also proved difficult to secure the supply of sulfate resisting cement in 50 kg bags. This caused a delay in the construction work.

1.1.2 COMMISSIONING

The commissioning of the system happened on the 15th of May 2013. The delay between the end of the construction activities and the commissioning is due to administrative delay at the customs. However, to avoid excessive delays, the infrastructure (tanks and irrigation lines) had been water tested upon completion. The SBR treatment system was tested and started directly upon completion of the installation on the 15th of May 2013.

The system works properly and fulfils the requirements of the Jordan standard and guidelines for the reuse of treated wastewater (MWI 2006), category C. This has been shown by the first samplings of the BAU.

1.1.3 BILL OF QUANTITIES (BOQ)

Table 2: Bill of Quantities for the construction of Mr Hassan's treatment system.

Tanks' Construction Works

Item Description	Unit	Qty.
Sulfate Resisting Reinforced Concrete	m3	28
Reinforcing Steel	Ton	2.8
Water Stop	LM	30

Item Description	Unit	Qty.
Excavation	m3	80
Backfilling	m3	10
Block walls	m2	50

Site General Requirements

Item Description	Unit	Qty.
Stairs	LS	1
Hand Rails	LS	1

Sewer Lines & Accessories

Item Description	Unit	Qty.
Sewer Lines	LM	15
Sewer Manholes	No.	2

Item Description	Unit	Qty.
M/H C.I. Cover	No.	6

Subsurface Irrigation System

Item Description	Unit	Qty.
Drip Irrigation Lines	LM	360
Irrigation Mains	LM	140
Indexing Valves	No.	1
Flushing Valves	No.	12

Item Description	Unit	Qty.
Valve Box	No.	12
Manhole PVC Cover	No.	1
Pump	No.	1
Irrigation Tanks	No.	1

Mechanical Works

Item Description	Unit	Qty.
SBR Unit	LS	1

Electrical Works

Item Description	Unit	Qty.
Electric Power Main Cable 4×2.5mm2	LM	25
Electric Board	No.	1

1.1.4 CONSTRUCTION PHOTOS

Below are the photos taken during the construction to illustrate the main steps of the work realised.



Figure 1: Excavation of the pit for the installation of the SBR tank.



Figure 2: Pouring of the bottom concrete slab of the SBR tank.



Figure 3: The SBR tank and the stairs after the end of the concrete work.



Figure 4: The SBR tank - the Terrace - after completion.



Figure 5: Excavation of the irrigation trench in the upper garden.



Figure 6: Installation of the subsurface irrigation lines in the upper garden.

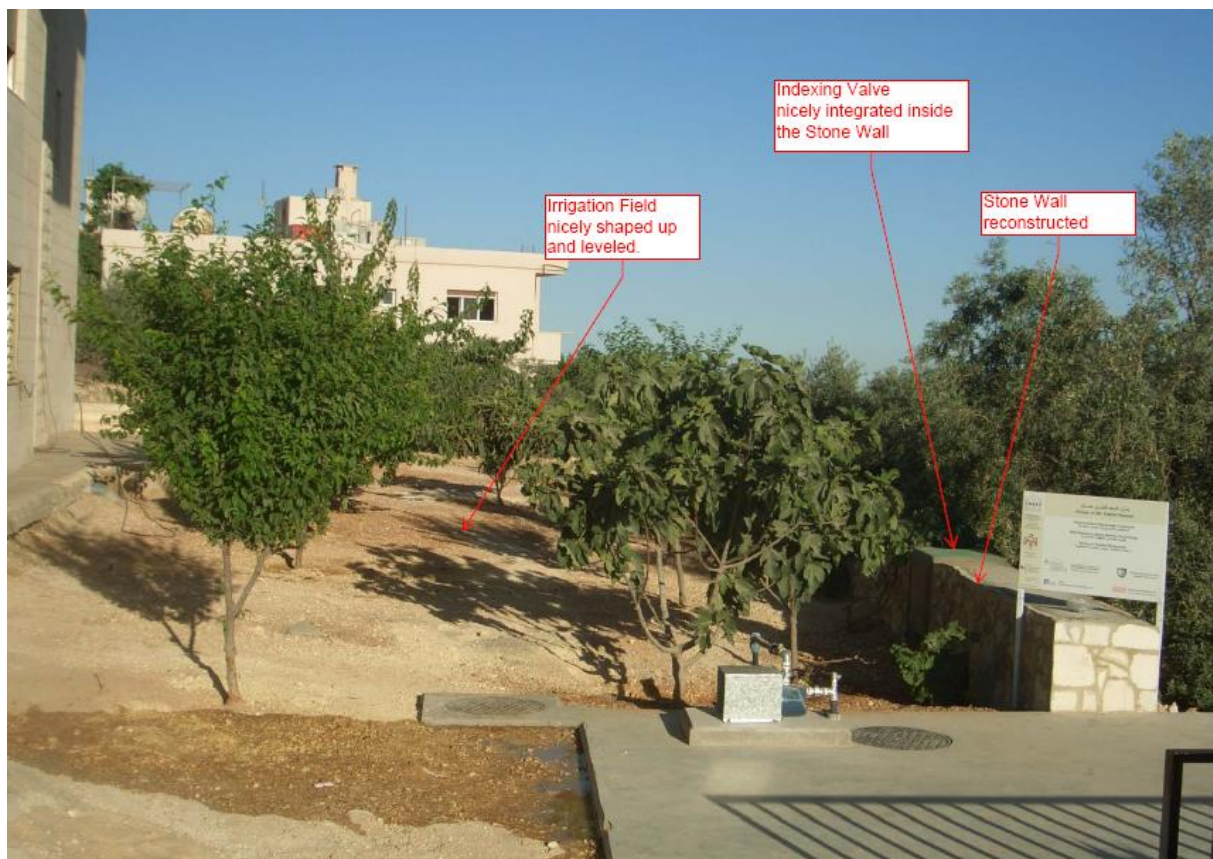


Figure 7: Mr Hassan's upper garden after installation of the irrigation lines.

1.1.5 AS BUILT DRAWINGS

Below are presented the as-built drawings of the infrastructure installed at Mr Hassan's house.

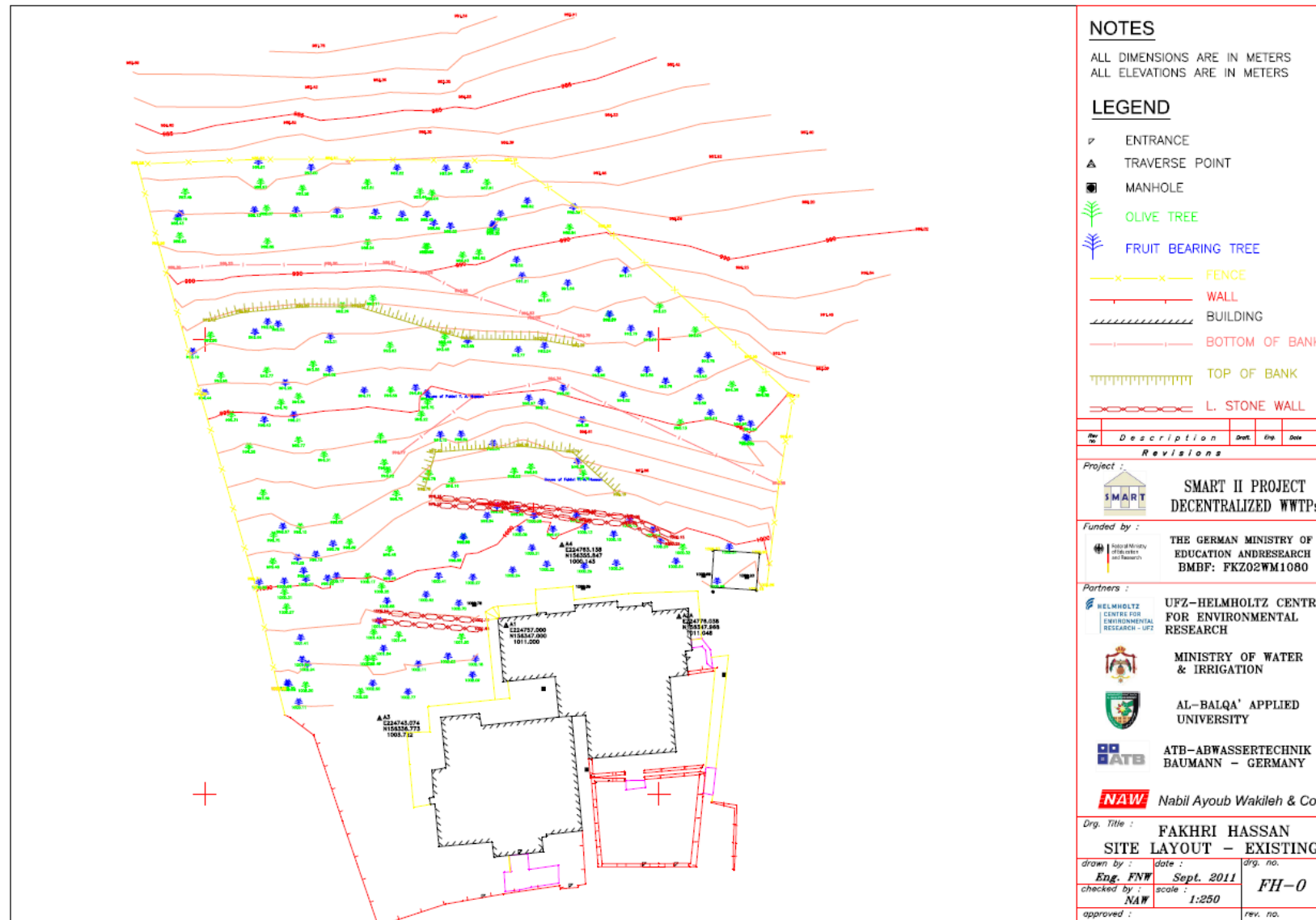
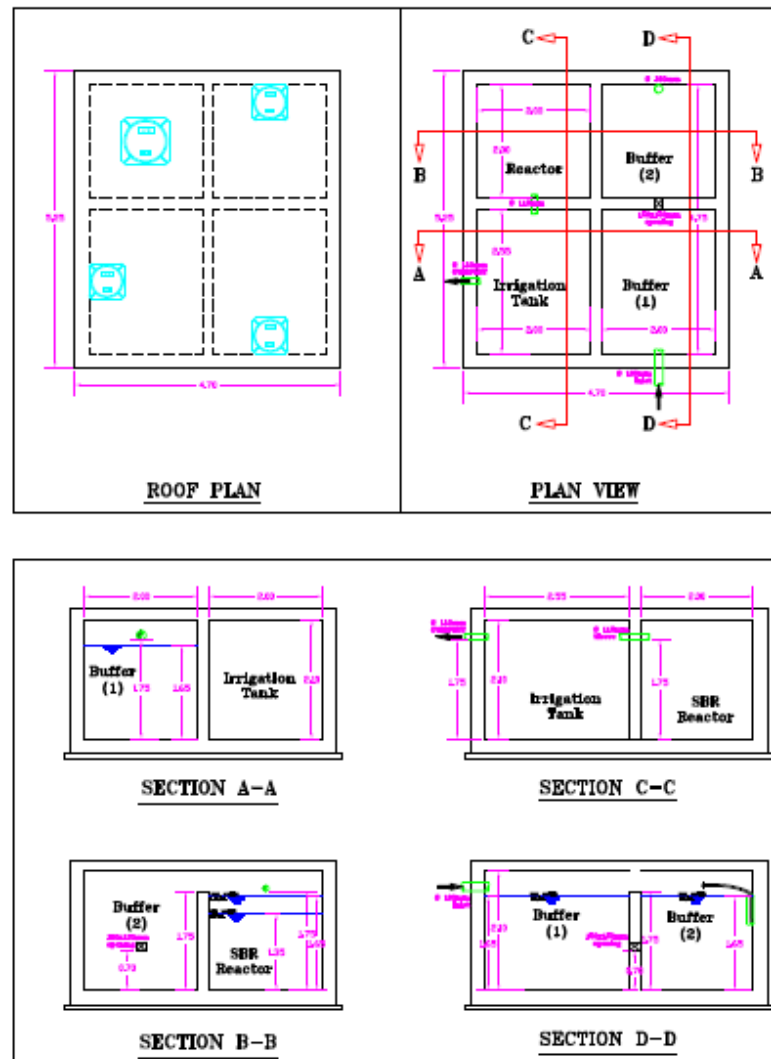


Figure 8: Mr Hassan's site layout before construction.

**NOTES**

ALL DIMENSIONS ARE IN METERS
ALL ELEVATIONS ARE IN METERS

LEGEND

Rev	Description	Rev	Rev	Date
Revisions				
Project :				
SMART II PROJECT DECENTRALIZED WWTPs				
Funded by :				
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UFZ-HELMHOLTZ CENTRE FOR ENVIRONMENTAL RESEARCH				
MINISTRY OF WATER & IRRIGATION				
AL-BALQA' APPLIED UNIVERSITY				
ATB-ABWASSERTECHNIK BAUMANN - GERMANY				
Nabil Ayoub Wakileh & Co.				
Orig. Title :				
FAKHRI HASSAN TANKS				
drawn by :	date :	orig. no.		
Eng. FHW	SEP. 2011			
checked by :	scale :			
SAW	1:50			
approved :		rev. no.		

Figure 9: Technical drawings of the SBR tank at Mr Hassan

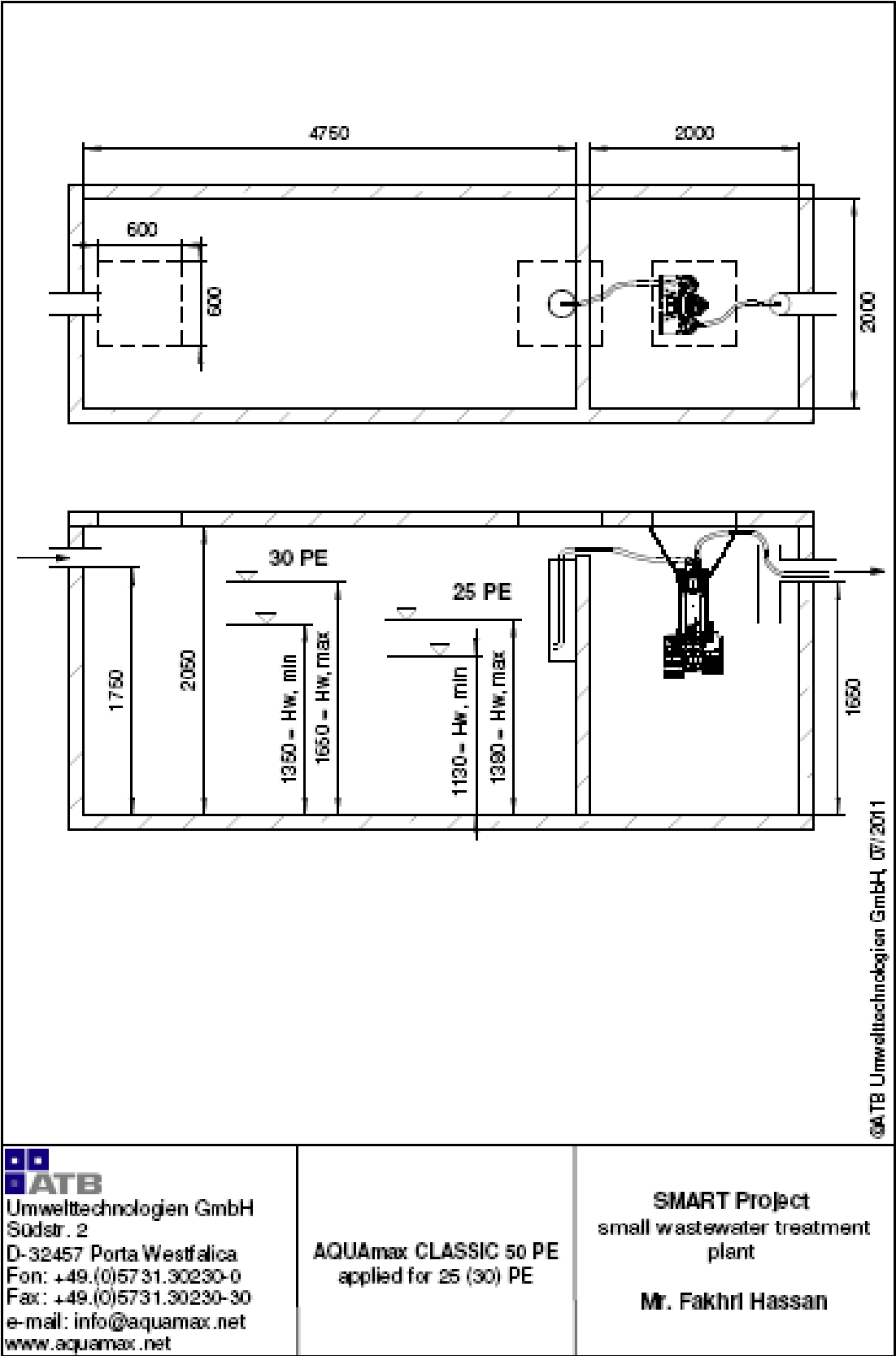


Figure 10: Schematics of the tank housing the SBR unit.

1.2 SEQUENCING BATCH REACTOR – AHMAD AL AWAMLEH

1.2.1 PRESENTATION OF THE CONSTRUCTION PROCESS

1) Planning and tasks.

The construction started on the 1st of April 2013 and was finished on the 15th of May 2013 (about 1.5 month). The construction was a bit more difficult than originally estimated due to the need to level out the reuse area for the installation of the subsurface irrigation system (harder to dig than expected).

The main construction stages are presented below and are briefly discussed:

- Excavation of the tanks and collectors:

Access to the site for mechanical equipment was not possible. Excavation and construction works were done manually by labourers. The work was facilitated by the fact that the location selected for the SBR tank was on a terrace, lowering the amount of excavation required. The top soil layers were removed easily but once deeper it took some efforts to dig some parts into the bed rock. Precautions had to be taken during the construction to avoid landslides. The sewer line servicing the existing cesspit was conserved as back up but bypassed (plus an emergency overflow) to reach the SBR tank. A new manhole was installed to replace the old collector.

- Installation of the formwork and reinforcing steel:

Considering the fact that the wastewater treatment system had to be installed on a sloped site, concrete blocks have been used for the 2.5 outer sides of the formwork of the structure. Once the excavation completed, planks were installed as internal formworks. The concrete reinforcement was done using reinforcing steel bars.

- Pouring of the concrete:

This operation was done in 3 stages. First the floor concrete slab, then the external and internal walls and finally the roof concrete slab with the openings/block-outs for manholes and covers.

- Curing time:

Curing time took a couple of days for the walls and about two weeks for the roof in order to ensure the strength of the structure.

- Site work:

Upon removal of the internal formwork, it was necessary to finalize the connections to the sewer lines then to install a retaining wall between the SBR tank and the garden. Cast iron manhole access covers have been installed and the site was cleaned from trace of construction rubbles.

- Installation of the electrical connections and irrigation pump:

The power cables for the SBR and the irrigation pumps have been connected to the main power distribution board in the building. A control box for the irrigation pump has been installed in the nearby building. The control box for the SBR was installed nearby the treatment system to facilitate operation and maintenance.

- Installation of the pipework and irrigation fields:

Due to the topography of the site, all levelling and excavation work for the trenches has been done by labourers. As subsurface irrigation was implemented, it has been necessary to lay the irrigation lines perfectly level. The use of a 4-port indexing valve on this site required the levelling of 4 irrigation platforms of 2 lines. After the installation and testing of the irrigation lines, the trenches were filled back with the previously excavated soil.

- Installation of the SBR unit:

The installation of the SBR unit happened on the 16th of May and required a crew of two technicians from ATB in addition to the four workers (construction, plumber, electrician, and supervisor). The installation took about 2 days and went without trouble as the necessary infrastructure (piping and electrical cables) had been installed previously in order to optimise the working schedule of the technicians from ATB.

- Installation of the remote control:

In the course of the installation of the electrical and machinery equipment also the already in the control cabinet pre-installed GSM module has been programmed. Messages will be sent to the mobile phone of Mr. Nabil Wakileh, NAW/WES. The module has not been activated because the commissioning didn't happen until now (please see below)[Deliverable 307]

- Garden reinstallation:

In order to give the site back in good condition, efforts were made to clean the site and to reconfigure the garden as it was before the construction.

2) Labour requirements:

Table 3: Labour requirement for the construction of Mr Hassan's treatment system.

Type of labour	Number
Construction worker	5
Electrician	1
Plumber	1
Supervisor	1

3) Construction difficulties:

The site was not too difficult to work with as an access road was located not too far of the construction point. This enabled the delivery of equipment and material close to the construction point even if due to the difference of levels between the access road and the location of the SBR, most of the construction activities were done manually by labourers.

1.2.2 COMMISSIONING

The commissioning of the system has not been realised yet due to some issues with the home-owner. However, the system is ready to be put in operation as the tanks, irrigation lines and SBR unit have already been water tested.

1.2.3 BILL OF QUANTITIES (BOQ)

Table 4: Bill of Quantities for the construction of Mr Awamleh's treatment system.

Tanks' Construction Works

Item Description	Unit	Qty.
Lean Concrete & Rubble Concrete	m ³	9
Sulfate Resisting Reinforced Concrete	m ³	17
Reinforcing Steel	Ton	1.7
M/H C.I. Cover	No.	4

Item Description	Unit	Qty.
Excavation	m ³	50
Block walls	m ²	31
Water Stop	LM	17

Site General Requirements

Item Description	Unit	Qty.
General Site Levelling	LS	400

Sewer Lines & Accessories

Item Description	Unit	Qty.
Sewer Manholes	No.	1
M/H C.I. Cover	No.	1

Item Description	Unit	Qty.
Dia. 110 mm Pipes	LM	12

Subsurface Irrigation System

Item Description	Unit	Qty.
Irrigation Mains	LM	66
Subsurface irrigation lines	LM	240
Indexing Valves	No.	1
Flushing Valves	No.	8

Item Description	Unit	Qty.
Valve Box	No.	8
Valve Chamber	No.	1
Manhole PVC Cover	No.	1
Irrigation Pump	Set	1

Mechanical Works

Item Description	Unit	Qty.
SBR Unit	LS	1

Item Description	Unit	Qty.
Control Panel for SBR	No.	1

Electrical Works

Item Description	Unit	Qty.
Electric Power Main Cable size 3×2.5mm ²	LM	30

Item Description	Unit	Qty.
Electric Board	No.	1

1.2.4 CONSTRUCTION PHOTOS

Below are the photos taken during the construction to illustrate the main steps of the work realised.



Figure 12: Excavation of the pit for the installation of the SBR tank.



Figure 13: Construction of the steel frame of the SBR tank.



Figure 14: The SBR tank after the end of the concrete work.



Figure 15: Installation of the subsurface irrigation lines in the garden.



Figure 16: Mr Al Awamleh's garden after installation of the irrigation lines.



Figure 17: Installation of the SBR unit.

1.2.5 AS BUILT DRAWINGS

Below are presented the as-built drawings of the infrastructure installed at Mr Al Awamleh's house.

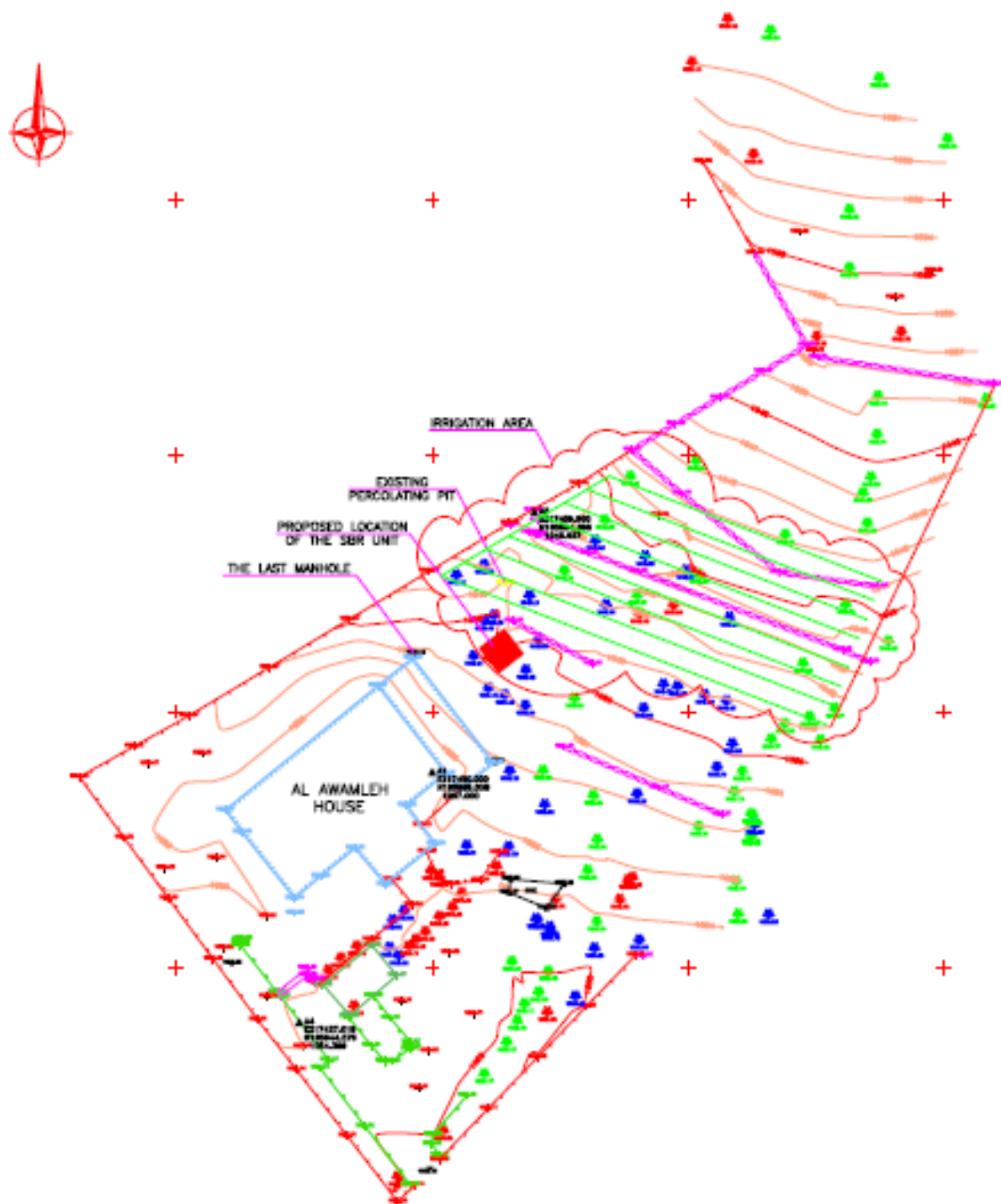


Figure 18: Mr Al Awamleh's site layout before construction.

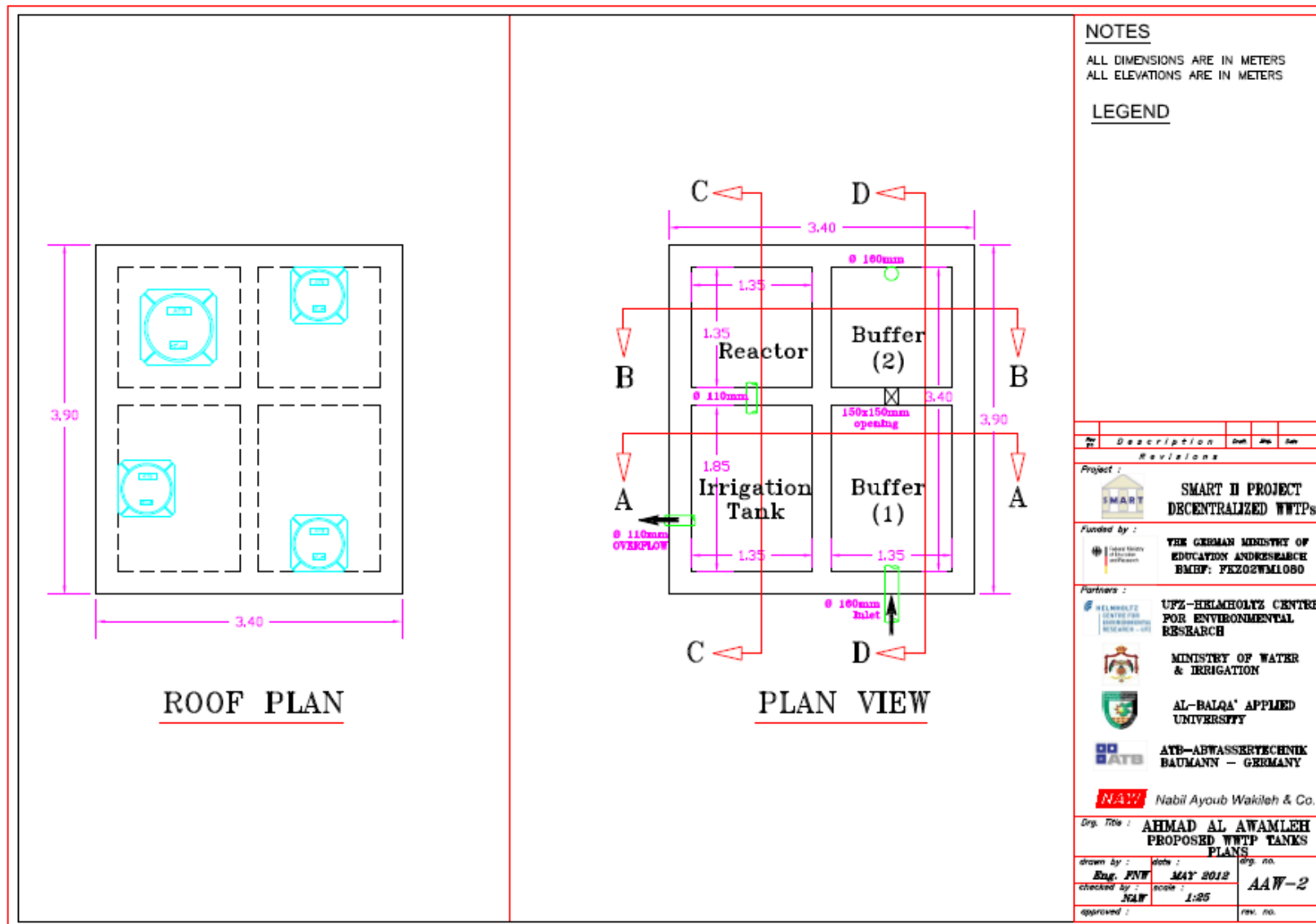


Figure 19: Technical drawings of the SBR Tank at Mr Al Awamleh's.

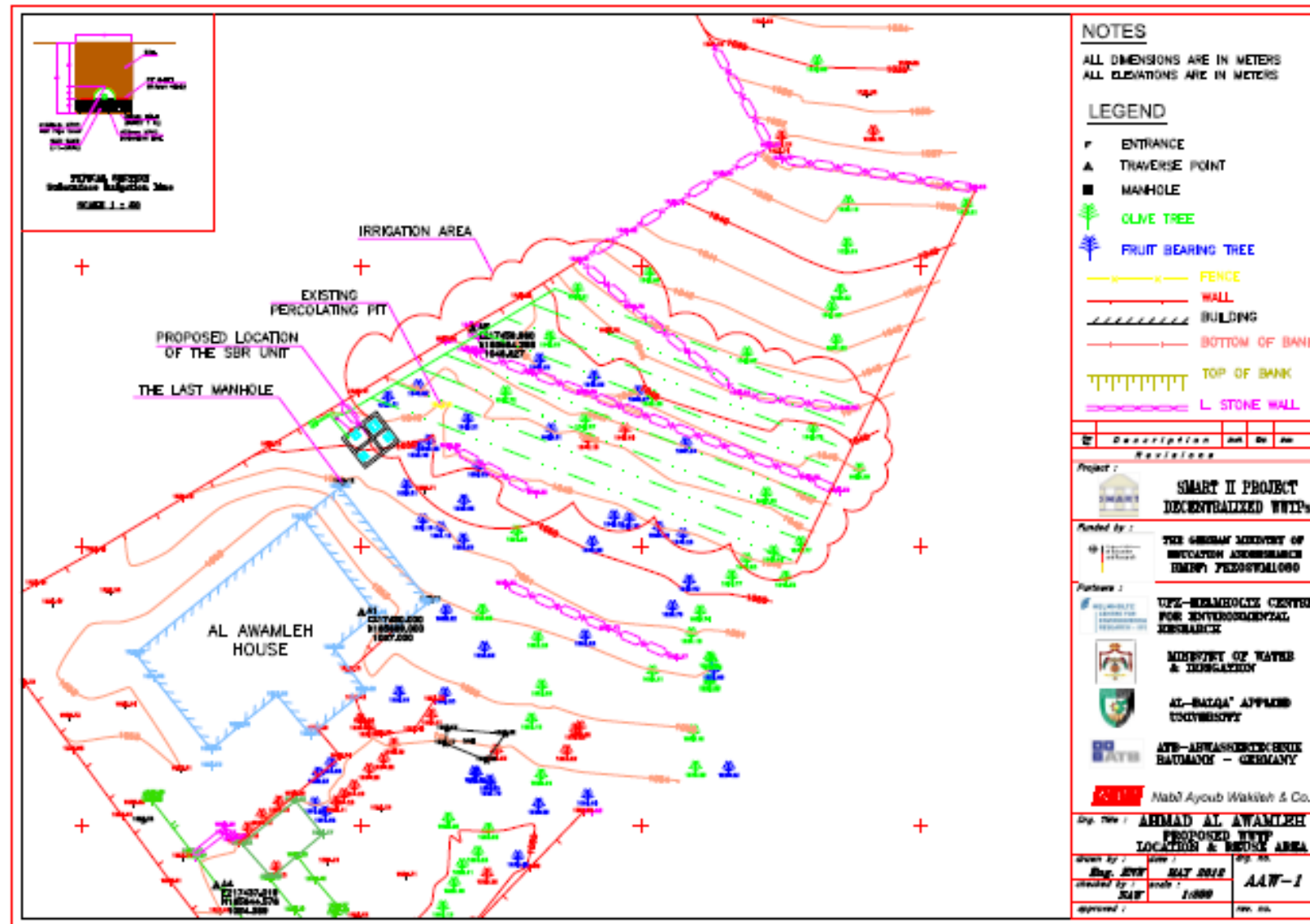


Figure 20: Mr Al Awamleh's site layout after construction.

2 CONSTRUCTION OF THE COMMUNITY SBR AT THE NURSING HOME

2.1 PRESENTATION OF THE CONSTRUCTION PROCESS

2.1.1 PLANNING AND TASKS.

The construction started on the 6^h of January 2013 and was finished on the 12th of April 2013 (about 3 month). The construction took a little longer than originally estimated due to weather conditions, and to the nature of the ground (filling material instead of bed rock). This extended the construction time by about one month.

The main construction stages are presented below and are briefly discussed:

- Excavation of the tanks and collectors:

Process tank: Access to the site for mechanical equipment was possible with great care. Excavation and construction works were done using partly with equipment and partly manually. The nature of the ground (filling material) created some difficulties (collapse of a wall). The nature of the existing collection tank (not water tight) also required special care during the excavation work.

Irrigation tower: excavation was realised to install concrete foundations.

- Installation of the formwork and reinforcing steel:

Process tank: Concrete blocks had to be used to reduce excavation dimensions (filling material, damage to the existing tiles and asphalt) for the outside formwork of the structure. Once the excavation completed, planks were installed as internal formworks. The concrete reinforcement was done using reinforcing steel bars.

Irrigation tower: Planks were used as internal and external formwork. The concrete reinforcement was done using reinforcing steel bars.

- Pouring of the concrete:

Process tank: This operation was done in 3 stages. First the floor concrete slab, then the external and internal walls and finally the roof concrete slab with the openings/block-outs for manholes and covers.

Irrigation tower: this operation was done in five stages. First the blinding concrete, then the foundations, then the pillars then the roof slab then the floor slab. Concrete block were installed to close the space between the pillars to create a storage room.

- Curing time:

Process tank: Curing time took a couple of days for the walls but about two weeks for the roof in order to ensure the strength of the structure.

Irrigation tower: curing time for the tower took overall 20 days: two day for the foundations, three days for the columns, 14 days for the roof and one day for the floor.

- Site work:

Process tank: upon removal of the internal formwork, it was necessary to finalize the connections to the existing storage/septic tank. Cast iron manhole access covers have been installed and the site was cleaned from trace of construction.

Irrigation tank: upon removal of the framework, the storage room between the pillars has been finished. The storage tank with all the piping to the irrigation fields has also been installed. Additionally, an access ladder with safety protection and a hand railing have been installed to ensure a safe use of the tower.

- Installation of the electrical connections and irrigation pump:

An electrical distribution board was installed connected to the main power distribution board in the building. The electrical distribution board was connected to the SBR control panel. An external control panel has also been installed for the UV light, this panel takes its power from the SBR control board. Power is supplied to the SBR unit, to the multistage vertical irrigation pump (between the storage tank and the irrigation tower) and to the irrigation tower (250m cable) to operate a second UV disinfection unit.

The power distribution board and the SBR control panel have been installed in the mechanical room (15m from the treatment system). The main UV disinfection light is installed in the last compartment (UV tank) of the SBR tank, its control panel is also located in the mechanical room. An additional control panel for the small UV light for the recirculation of the storage irrigation tank and the circulating pump have been installed in the storage room under the tower. The water tower was fitted with power sockets and external and internal lights.

- Installation of the pipework and irrigation fields:

The irrigation fields were split in eight plots. The irrigation system was divided in three main sections according to the elevation. Each section was provided with main PE water supply pipes and with sub-mains water lines to the plots. Each sub-mains was fitted with isolation valves and a set of saddles (T points) that are connected to the drip lines. The drip lines were provided with drippers offering two different capacities depending on the pressure on each plot (smaller emitters in the lower plots where the pressure is higher). Each of the main lines was provided with isolation valve and automatic vent.

- Installation of the SBR unit:

The installation of the SBR unit happened between the 1st and the 4th of July 2013 and required a crew of two technicians from ATB in addition to the four workers (construction, plumber, electrician, and supervisor). The installation took about 4 days. Originally, it was planned to use the existing two-chamber septic tank as follow: the first chamber for sludge storage and primary settling, and second chamber as a buffer tank. During the installation of the SBR unit, it was necessary to pump empty the

existing septic tank in order to install the submersible pump inside the buffer tank. At this time, it was found out that the structure of the tank was not water tight: the dividing wall was showing multiple serious leaks at different heights. Special water-plug compounds were used to stop the leaks and to seal the wall. This activity took approximately 3 days. Meanwhile all other installation activities were running in parallel as originally planned.

- Installation of the remote control:

Together with the main control panel the GSM module has been pre-installed on a mounting plate. In the course of the installation of the electrical and machinery equipment also this pre-installed GSM module has been activated. Messages will be sent to the mobile phone of Mr. Nabil Wakileh, NAW/WES. In the beginning there were a lot of error messages sent out. Together with the GSM modem supplier/manufacture ATB detected the fault (which was caused by an English vocabulary). After the correction of the programme the system is working properly. [Deliverable 307]

- Garden reinstallation:

In order to give the site back in good condition, efforts were made to clean the site and to reconfigure the garden as it was before the construction. This required the replacement of tiles, asphalt and the rehabilitation of some of the walkways.

2.1.2 LABOUR REQUIREMENTS:

Table 5: Labour requirement for the construction of Mr Hassan's treatment system.

Type of labour	Number
Construction worker	5
Electrician	1
Plumber	1
Painters, plasterers and welders	0.5
Supervisor	1

2.1.3 CONSTRUCTION DIFFICULTIES:

A collapse during the excavation of the process tank required special efforts and care. The construction of the irrigation tower and the installation of irrigation systems in the garden, between the trees, also required special care. It was especially challenging to bring in earthmoving equipment (excavator).

2.2 COMMISSIONING

The SBR treatment system was tested and started directly upon completion of the installation on the 4th of July 2013. (Please see also 2.1.1 Installation of the remote control).

The system works properly and fulfils the requirements of the Jordan standard and guidelines for the reuse of treated wastewater (MWI 2006), category A. This has been shown by the first samplings of the BAU.

2.3 BILL OF QUANTITIES (BOQ)

Table 6: Bill of Quantities for the construction of the treatment plant at the Nursing Home.

Construction Works for the Process Tanks

Item Description	Unit	Qty.
Lean Concrete & Rubble Concrete	m ³	19
Sulfate Resisting Reinforced Concrete	M ³	15
Reinforcing Steel	Ton	1.5
Water Stop	LM	16
Excavation	m ³	75

Item Description	Unit	Qty.
Backfilling	m ³	11
Block walls	m ²	31
C.I. Cover	No.	2
Galv. Steel Cover	No.	1

Site General Requirements

Item Description	Unit	Qty.
Curb Stones	LM	12
40x40x4cm Tiles	m ²	55

Item Description	Unit	Qty.
Asphalt Hot Mix	m ²	32
Road Crossings	LM	45

Construction Works for the Elevated Irrigation Tank

Item Description	Unit	Qty.
Lean Concrete	m ³	1
Reinforced Concrete	m ³	10
Reinforcing Steel	Ton	1
20cm Block walls	m ²	35
Plaster	m ²	100
Paint	m ²	100
Roof Drain	Set	1

Item Description	Unit	Qty.
Excavation	m ³	27
Backfilling	m ³	20
Hand Rails	LM	9
Tower Ladder	LM	4.6
Steel Door	No.	1
Alum Window	No.	1
Burglar Steel	No.	1

Irrigation System (Mains)

Item Description	Unit	Qty.
12m3 PE Tank	No.	1
UV Disinfection System	No.	1
Vertical Pump	No.	1
Float Switch	No.	1
Float Switch cable	LM	20

Item Description	Unit	Qty.
Electric Power Cable	LM	255
Irrigation Mains (Pressurized)	LM	260
Pipe Sleeves	LM	40
Pipe & Cable Warning Tape	LM	500

Drip Irrigation System

Item Description	Unit	Qty.
Pipe 63 mm	m	275
Pipe 50 mm	m	225
Pipe 20 mm	m	3000
Emitter 8L/h	no.	500
Emitter 4L/h	no.	100
Valve 63 mm	no.	3

Item Description	Unit	Qty.
Elbow 63mm	no.	6
Elbow 50mm	no.	4
T 63*63*50	no.	5
Saddle 50mm*.5"	no.	60
Male adapter 20mm*.5"	no.	60
End line 50 mm	no.	8

Valve 50 mm	no.	8
Elbow 63 mm	no.	6

End line 20 mm	no.	60
Reducer 63/50	no.	3

Mechanical Works

Item Description	Unit	Qty.
SBR Unit	set	1

Item Description	Unit	Qty.
UV Unit	No.	1

Electrical Works

Item Description	Unit	Qty.
Cable Conduits	LM	35

Item Description	Unit	Qty.
Electric Board	No.	1

2.4 CONSTRUCTION PHOTOS

Below are the photos taken during the construction to illustrate the main steps of the work realised.



Figure 21: Excavation of the pit for the installation of the SBR tank.



Figure 22: Construction of the frame for the SBR tank.



Figure 23: Construction of the top of the SBR tank.



Figure 24: The SBR tank after completion.

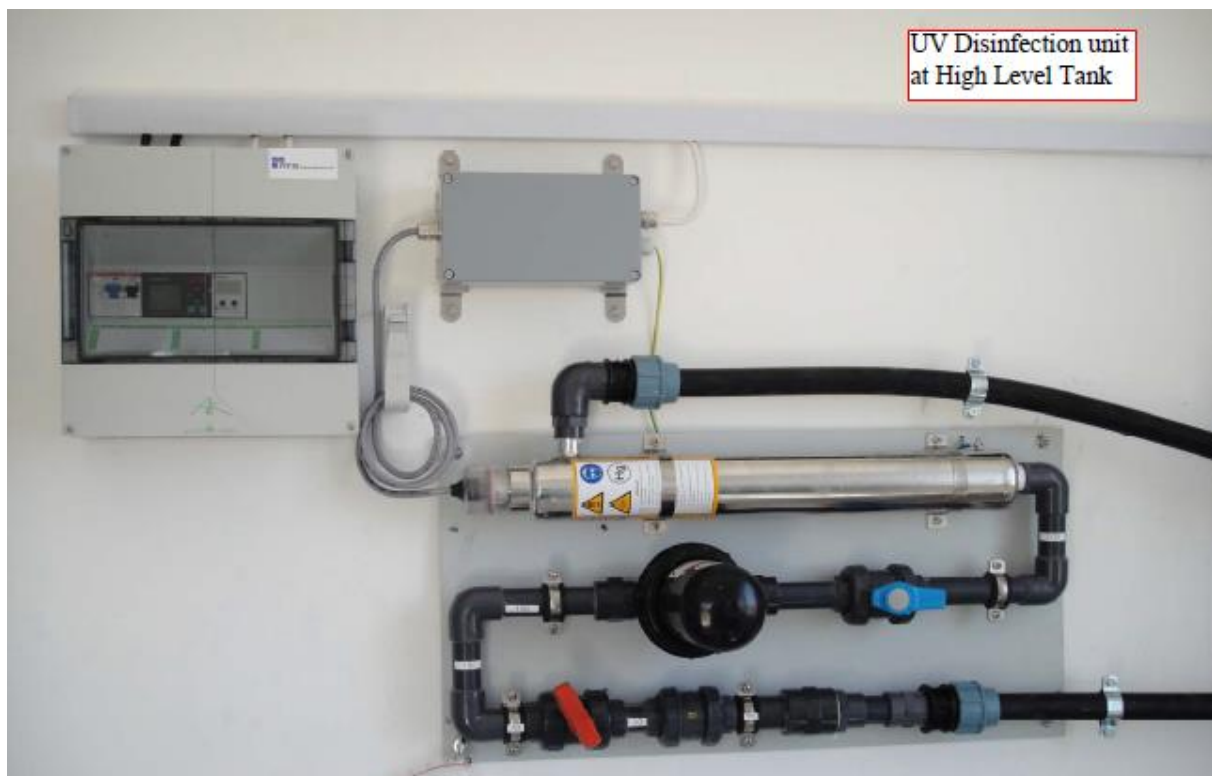


Figure 25: Installation of the UV unit for disinfection of the treated effluent.



Figure 26: Installation of the control panel to operate the SBR.



Figure 27: Construction of the water tower in the garden.



Figure 28: The water tower, its storage room and the drip irrigation lines after completion.



Figure 29: The drip lines installed in the reuse area.

2.5 AS BUILT DRAWINGS

Below are presented the as-built drawings of the infrastructure installed at Mr Hassan's house.



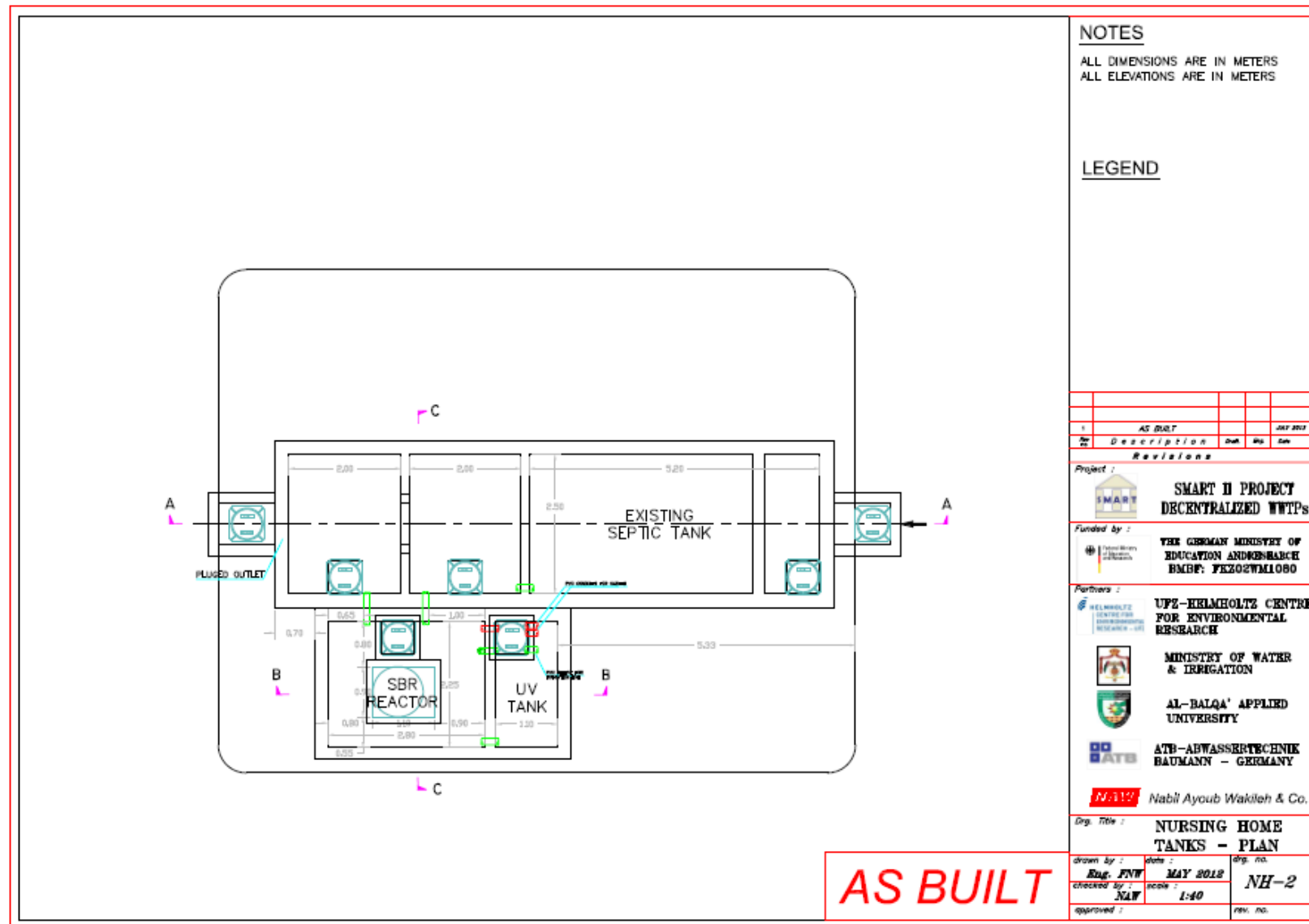


Figure 31: Technical drawings of the SBR tank (top view) at the Nursing Home.

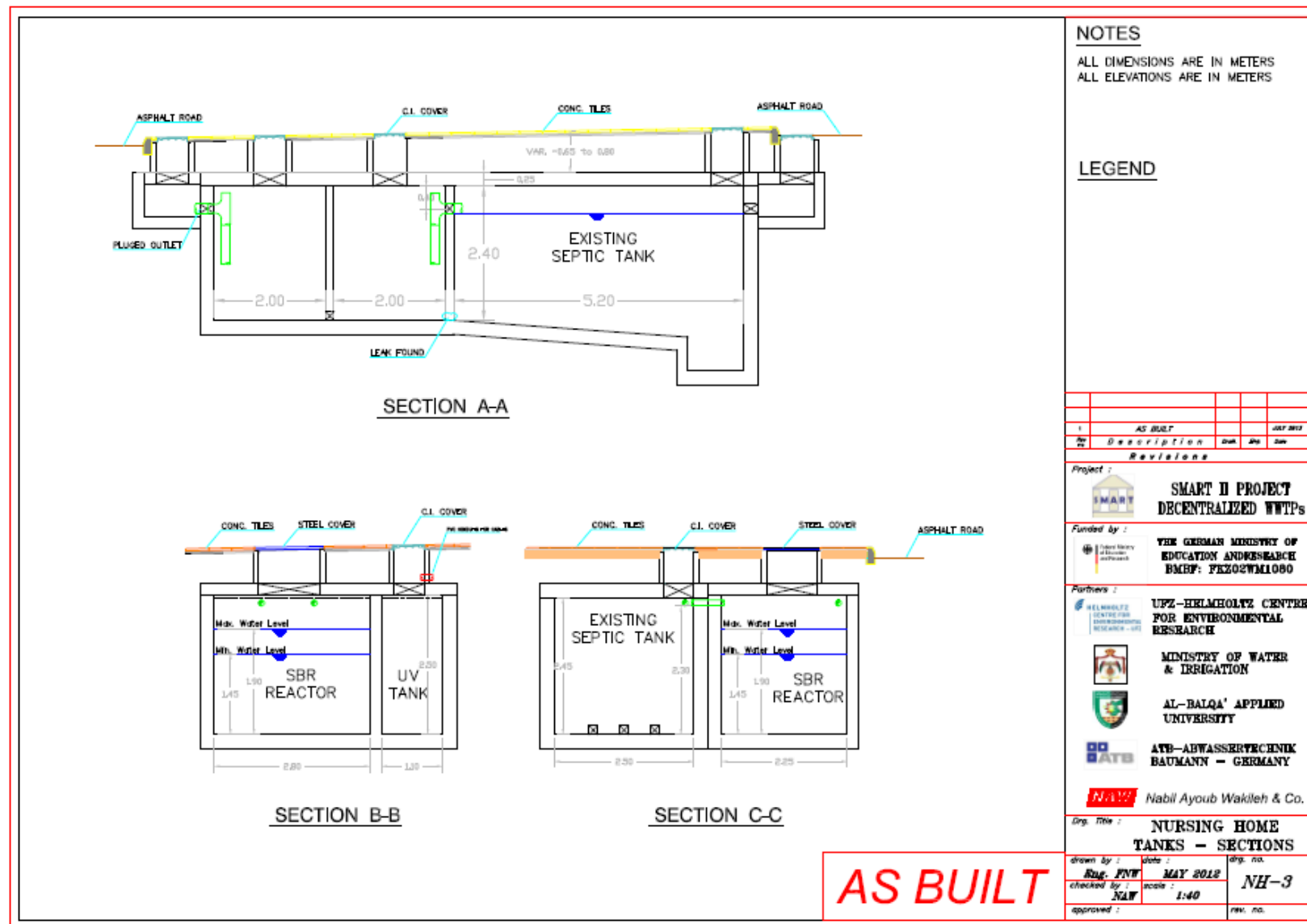


Figure 32: Technical drawings of the SBR tank (side view) at the Nursing Home.

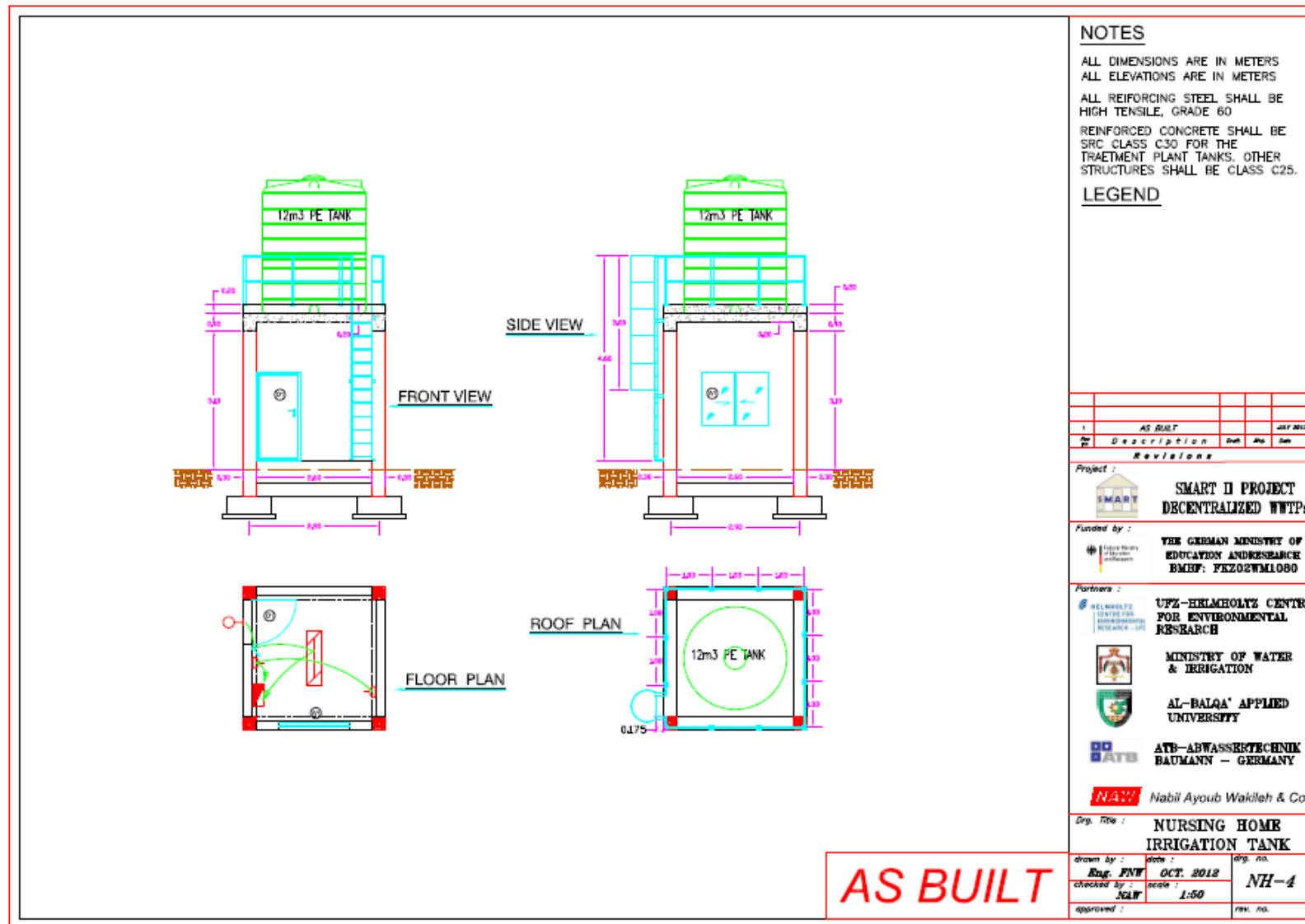


Figure 33: Technical drawings of the irrigation tower at the Nursing Home.

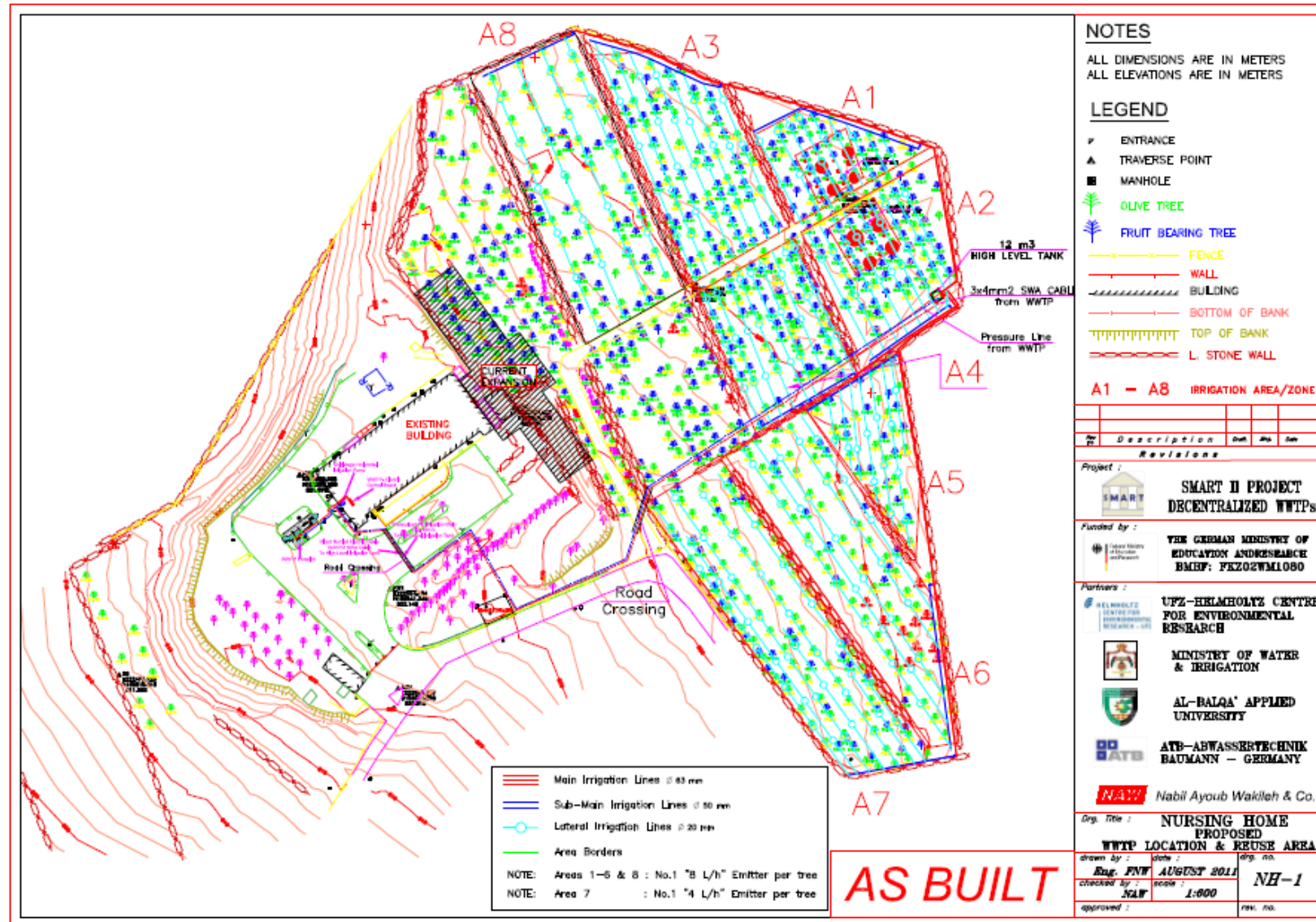


Figure 34: Site layout of the Nursing Home after construction.

DELIVERABLE 307:TESTED AND APPROVED REMOTE CONTROL SYSTEMS FOR SBR UNITS

Please see the sub chapters 1.1.1, 1.2.1, 2.1.1 " Planning and Tasks - Installation of the remote control" of Deliverable 304.

CONCLUSION