4.1 Site Description

4.1.1 General

The proposed development comprises a composting facility at Pass of Kilbride, Milltownpass, Co. Westmeath. The site is located in a generally flat, rural area comprising mainly arable and pastoral agriculture and areas of peat extraction. The site lies on a third class road which runs from the N6 Primary Route at Pass of Kilbride to the east of Milltownpass, Co. Westmeath to Correllstown on the N4 between Mullingar and Kinnegad, Co. Westmeath, as shown in Figure 1.1.

The site occupies an area of approximately 17.5ha and was previously used for tillage based agriculture.

A small stream flows along the northern boundary of the site. This stream collects water from deep (up to 2m) drains around the site and joins a tributary of the Kinnegad River approximately 1.5km southeast of the site. The tributary joins the Kinnegad River, which discharges to the River Boyne between Clonard and Longwood, Co. Meath.

4.1.2 Topography

The terrain is generally flat with local hillocks and a gentle slope falling to the north east and east. The existing site has a maximum elevation of approximately 91m AOD, but the site generally lies between 85.5m and 90.0m AOD. A single track/laneway runs along the southwestern boundary of the site.

4.1.3 Site History and Uses

The land was owned by a local farmer, before being acquired by the developer. Historical maps indicate a dwelling in the west of the facility area near BH2 (cf. Figure 2.1) and boundary ditches dividing the site into a number of smaller fields. The ditches have been removed, but have left discernable traces. A ruined dwelling lies on the south side of the laneway along the southwestern boundary.

The site is used for agricultural purposes and was most recently used for tillage crop production.

4.2 Site Environs

The area surrounding the site is characterised by generally flat terrain. Extensive peat bogs lie to the south of the site, including a Natural Heritage Area. The land to the immediate west of the site has evidence of peat extraction using traditional methods, while further west, forestry has been planted on shallow peat. To the northwest of the site, a raised bank of undisturbed peat remains. To the north and east the land is used for agriculture and is generally set to pasture.

There are a number of dwellings in the vicinity, the nearest of which lies approximately 510m northeast of the proposed site boundary and 640m from the proposed facility. The nearest dwellings to the site that could be affected by the development will be described within the relevant technical studies throughout the EIS.

4.3 Description of the Development

The development will comprise the construction and operation of a composting station to treat organic wastes and to produce a quality marketable compost product.

The composting facility will be developed as a fully engineered waste management facility that incorporates techniques for the management of leachate and surface water and careful control of other environmental issues such as odour, visual impact, noise and vermin. The site operations will be carried out using methods that minimise the potential impact of the proposed development on the environment both locally and globally.

Figures 2.1, 4.1 and 4.2 show the site location plan, site layout plan and facility layout plan, respectively. Other elements of the proposed development are illustrated in Figures 4.3 - 4.6.

4.4 Facility Design

The composting facility will consist of waste reception, mixing and handling areas, tunnel composting plant, aerated static pile composting pads, compost storage areas, loading bays, ancillary service buildings and offices.

The construction of the composting facility will be subject to Construction Quality Assurance (CQA). The site will also need to be approved and regulated by the Environment Protection Agency (EPA), as part of their statutory duty under the provisions of the Waste Management Act. A separate application for a Waste Licence will be prepared for submission to the EPA for the development and operation of the site. It is a requirement of a Waste Licence that an Environmental Management Programme for the management of operations at the site is prepared and adhered to.

4.4.1 Design Principles

The main objectives for the proposed facility at Enniscoffey are:

- the provision of a composting station to meet the needs to treat waste diverted from landfill in accordance with the EU Landfill Directive (1999/31/EC);
- the design, construction and operation of the facility to the *most appropriate standards to ensure protection of the local environment*;
- the promotion of *environmental awareness* of waste management using composting to minimise the quantity of waste ultimately landfilled;
- *comprehensive control* of composting related issues, incorporating effective measures for the demonstrable control and management of leachate, odours and surface water runoff;
- *security and safety* of the public and site personnel at all times.

The Government's Waste Management Strategy for Ireland, which follows EU requirements based on principles of sustainable development, defines a waste hierarchy comprising waste reduction, reuse and recovery prior to ultimate disposal. Composting represents the Best Practical Environmental Option (BPEO) and Best Available Technique (BAT) for certain organic wastes, by precluding disposal of these wastes to landfill and providing a beneficial product of waste treatment operations. The design of the proposed development at Enniscoffey recognises these objectives.

The facility will be designed to comply with current relevant standards and guidelines. At present, Government guidance on composting is provided in the Draft EPA BAT Guidance Note for the Waste Sector: Waste Treatment Activities (EPA 2003). Other statutory requirements are defined in the Waste Management Licensing Act. There is considerable research at present assessing compost design and operation, and Thorntons Recycling will ensure that the facility will be constructed and operated using best practice.

The approach to the design adopted a site-specific risk assessment of operations-related issues. The overriding principle is that the facility design, construction and operation should be a holistic and interactive process appropriate to the type of waste, the site location and characteristics, the composting methods and potential consequences. This process together with principles as set out in the EPA guidance documents will ensure that the resulting development will be appropriate for its local setting.

The facility will generate leachate, bioaerosols and odours. Leachate will arise from washings of the process floor and from rainwater coming into contact with compost on the aeration pads. Bioaerosols and odours will result from the biodegradation of the waste material and will vary with waste composition and the composting process stage. The uncontrolled migration of leachate, bioaerosols and odours can have adverse effects on the environment. It is, therefore, essential that appropriate measures are incorporated in the design for their control, management and monitoring.

The site will be designed to control leachate and reduce the migration of bioaerosols and odours to acceptable levels. This involves the provision of an engineered containment system to collect all leachate arising at the facility and pressure based control of air used in the tunnels and aerated pads to trap and collect for treatment bioaerosols and odours as they are produced within the waste.

4.4.2 Design Development

General site parameters are summarised in Table 4.1.

Table 4.1 Compost Facility Parameters

i) Planning application area	17.5 ha
ii) Area of proposed facility	4.8 ha
iii) Waste Capacity	90,000 tonnes
iv) Process Duration	Up to 12 weeks
v) Process Types	Tunnel Composting, Aerated Static Pile

In order to assess the suitability of the site for this operation, a site investigation entailing topographic surveying, groundwater level monitoring and surface water, groundwater and soil sampling and testing was undertaken.

The information collected from the site investigation was used in a Risk Assessment to determine the required parameters for the design of the facility. The risk assessment approach has formed the basis for the design and has:

- identified all potential environmental effects attributable to the development and for each potential effect the source, potential receptors or targets, and pathways have been identified, through site investigation;
- established the sensitivity of the various receptors, by consideration of background levels, statutory limits or policies, and;
- included a quantitative air risk assessment of the effect on key receptors, and its acceptability.

The design of the facility takes account of the results of the risk assessment and aspects of the facility were designed to inherently reduce or control environmental impacts.

The following criteria have been established for the design of the facility:

- the base formation will be a minimum of 1m above the maximum groundwater table;
- till will be used to augment lining materials for the surface water and leachate management areas;
- there will be a materials balance with minimisation of double handling and stockpiling;
- the concrete base of the facility will be formed to provide for surface water and leachate control and containment and firewater retention;
- the floors of the operational areas will be graded towards drainage channels to facilitate the removal of contaminated water (leachate or firewater) generated within each area;
- the visual impact of the facility will be reduced by minimising the height of the facility and by designing the facility to reflect the mainly agricultural setting of the area. In addition, the northern and eastern sides of the facility will be screened with 4m to 5m high earthen berms constructed of material removed during the site preparation works. The surrounding areas of the application site will be extensively planted with trees. These measures will reduce the visual and noise impacts of the development.

Before the facility can accept wastes it will be necessary to carry out a programme of preparation and engineering works. The initial preparation works for the site will be as follows:

- construction of the site access roads including construction of a new link road to the third class road adjoining the site;
- excavation and compaction of soils to form a suitable base profile;
- landscaping of excess soils around the facility and planting of the site with trees, to reduce the visual impact of the development;
- construction of the foundations and concrete pad, tunnel composting process area, green waste process area, aerated static pile pads, product storage areas and associated ancillary equipment;
- installation of the site infrastructure including site offices, weighbridge, wheel cleaner and collection and treatment systems for process air, leachate, and surface water;
- installation of environmental monitoring equipment. Additional environmental monitoring may be required during the construction work: this will be agreed with the EPA under the terms of the Waste Licence.

The landscaping requirements of the development have been considered in choosing a suitable formation level for the construction. The landscaping will include the construction of a 4m to 5m high perimeter berm around the facility. A 4m high berm with a slope of 1 in 2 would require approximately 19,300m^3 of material, while a 5m high berm with the same slope would require approximately 26,800m^3.

Using a formation level of 87.5mAOD, the amount of material requiring excavation would be of the order of 27,500m^3, while the fill requirements would be almost 11,900m^3, leaving a surplus of 15,600m^3 for constructing the berm. Lowering the formation level to 87.0mAOD would provide for 44,800m^3 of cut, 4,900m^3 of fill and a surplus of 39,900m^3 following the construction of the berm.

The site will be prepared with a formation level of 87.5mAOD. Additional clean soil and stones will be brought onto the site to complete the berm to between 4m and 5m in height.

The facility will be designed to a full engineering specification. Construction of the facility will be the subject of a rigorous sampling and testing programme in conjunction with third party Construction Quality Assurance (CQA), details of which will be agreed with the EPA as part of the Waste Licence working plan. Once the works are completed, and the plant has been commissioned, tested and approved to the satisfaction of the EPA in accordance with the Waste Licence, the facility will be available for the acceptance of waste.

4.5 Site Operations and Infrastructure

4.5.1 General

The site will be accessed from the third class road via a newly constructed entrance at the existing gate access to the site and will lead to the site facilities via the weighbridge (Figure 4.1). The junction of the access road with the public road will be suitably marked with site signs and other necessary traffic signs in accordance with Westmeath County Council specifications.

The facility is expected to be operational for the foreseeable future.

The proposed site facilities will comprise:

- weighbridge and weighbridge office;
- management offices;
- staff facilities (foul drainage from the site offices and mess facilities will be to proprietary treatment system);
- car parking;
- vehicle cleaning facilities;
- waste inspection area;
- waste quarantine area;
- maintenance buildings and bunded fuel tank;
- composting process areas;
- compost storage and loading area;
- leachate management compound;
- surface water management compound;
- services i.e. electricity and communications, water supplied by on-site borehole and;
- fire fighting equipment;
- fencing.

Plans and elevations of facilities are provided on Figures 4.6a-c. Infrastructural details, including fencing arrangements, wheel cleaner and weighbridge details are shown on Figure 4.7a-d.

4.5.2 Hours of operation

The following hours of operation are proposed:

Monday to Friday	0800 - 1800
Saturday	0800 - 1600
Sundays and Bank Holidays	Closed

All process and operational areas and access roads will be lit when necessary to provide a safe working environment. Lighting will be designed to minimise the effect of light spillage beyond the site boundaries.

4.5.3 Site Management and Staff

The site will operated with between 10 and 15 employees, including site operatives and administration staff. The employees will be trained to ensure the efficient operation of the treatment of the waste and carry out monitoring duties as specified in the Waste Licence.

4.5.4 Waste Acceptance

The design for the Enniscoffey facility is based on the types and quantities of the following feedstock materials:

- 20,000 tonnes/year of organic fines;
- 30,000 tonnes/year of source segregated catering (kitchen) wastes;
- 20,000 tonnes/year of shredded wood waste;
- 20,000 tonnes/year of green waste.

This gives a total of 90,000 tonnes/year of compostable feedstock materials. The composition of the feedstock will vary over time. More source segregated waste will become available and less organic fines will be abstracted from mixed municipal waste. As the waste collection system improves, the amount of organic fines accepted will reduce to zero and the amount of source segregated kitchen wastes will increase to 50,000 tonnes per annum.

Thorntons Recycling will have waste acceptance and rejection procedures in place. All waste vehicles entering and leaving the site will be required to stop at the reception office/weighbridge. All incoming waste vehicles will be weighed. The docket number, weight and Waste Collection Permit number covering the load will be entered into the computerised transaction recording system and each load will be visually inspected. The weighbridge will meet all the necessary legal requirements to enable charging against the recorded weights.

Loads that do not comply with the licensed waste types will be turned away and details of these rejected loads will be recorded.

Once the incoming waste has been accepted as being within the Waste Licence conditions for the site, the vehicle will be directed to the unloading area for catering wastes, organic fines, timber or green waste, as appropriate.

Wastes will be visually checked as the load is discharged from the vehicle. A quarantine area will be provided for any materials that cannot be treated at the facility, but which have been unloaded at the facility. The area will be constructed of a low reinforced concrete walls with water bars at all joints in the walls and in the wall footings to prevent leakage. The area will contain a dedicated fully sealable skip at all times.

Any waste which is suspected not to comply with the Waste Licence will be shovelled from the bay where it was unloaded and placed in the skip in the quarantine area. Once the material has been collected, the skip will be sealed and the EPA will be informed. This waste will be stored in the quarantine area until arrangements are made for its removal to a suitable disposal or treatment facility. The municipal fines and bio-waste streams will be accepted at the facility subject to the results of analysis for metals on a client by client basis.

After unloading, the vehicle will be re-weighed on its way out and the weight will be recorded.

4.5.5 Waste Treatment

It is proposed that the facility will accept a range of wastes comprising catering wastes, organic fines, timber and green waste. No hazardous wastes will be treated at the site.

Based on the types of materials to be composted by the facility, two types of compost will be produced:

- high grade, high value compost produced from green waste and catering wastes;
- low grade, low value compost produced from mixed organic waste fines and wood waste.

Two forms of composting will be carried out at the facility, viz.:

- Aerated static pile (ASP) composting of pre-segregated "green" garden wastes to produce the high grade compost. The proposed facility will be designed to manage up to 20,000 tonnes per year of this material. Quantities of input material are expected to vary on a seasonal basis, although the site will operate throughout the year.
- Tunnel composting of organic fines, catering wastes and complementary, bulky, higher-carbon wastes, such as chipped wood and bark from the green wood shredding process and oversized material from the ASPs. The tunnels will treat 70,000 tonnes of waste per year. The product of the tunnel composting process will be further treated by ASP composting. This process is capable of producing both and high and low grade compost, depending on the quality of the feedstock.

These processes are described in greater detail in the following subsections.

4.5.6 Green Waste Composting - Aerated Static Pile

Process Area Description

A concreted area of approximately 9,000m^2 (0.9 hectares) will be prepared on which to carry out the green waste ASP composting process, i.e. waste preparation (shredding), composting and storage. This area and associated access roads, turning areas etc. will be supported by a reinforced concrete slab.

The green waste will be composted separately from the other feedstocks using an outdoor ASP method to create a high value Class I compost product with unrestricted use.

Feedstock Preparation

Green waste materials will be tipped outside in the designated green waste reception area. The green waste will be shredded to provide a green composting stream and a bulking stream for the catering wastes and organic fines. The green waste will typically be mixed 2 parts incoming waste to 1 part oversized material from the green waste ASPs. Water will be added to this mix to achieve the optimum moisture content for composting.

The prepared green waste will then be taken to the ASP composting area, while the bulking stream will be fed by conveyor to the mixed waste reception hall for preparation of the mixed waste composting stream, as detailed below.

ASP Composting

The prepared material will be placed in one of two three-walled bays constructed of reinforced concrete. Water bars will be located at all joints in the walls and in the wall footings to prevent leakage from the bays. The floors of these bays will be fitted with an array of pipes through which air will be sucked from the compost. The collected air will either be re-circulated in the tunnels (cf. the following sub-section) or drawn through a biofilter prior to discharge to the atmosphere. The air movement through the compost will maintain aerobic conditions within the pile, providing suitable conditions for decomposition of the waste.

The ASP composting process will employ a negative aeration system that would pull process air through the piles so that it can be forced through a biofilter for odour control. The ASP system will be divided into six pads comprising two primary pads, two secondary pads and two tertiary pads.

Construction of an Aerated Floor

The primary pad will be filled every ten days. The waste will remain on the primary pad for twenty days after which it will be moved to the secondary pad. Fresh waste will then be put on the primary pad and the process will begin again. It is anticipated that the waste will undergo a volume reduction of about 20% while on the primary pad.

The waste will remain on the secondary pad for twenty days before being moved to the tertiary pad. A 10% volume reduction of waste is expected over the secondary phase. The waste will remain on the tertiary pads for twenty days before being ready for final processing prior to removal to the market.

This plug flow process will continue as described above with material moving from the primary to the secondary to the tertiary pads until mature material is moved to the screening area. At this stage the material will have had an average retention time of sixty days under vacuum aeration followed by a minimum of four weeks of storage prior to distribution. At loadings below full capacity, longer retention times can be applied if required.

Temperatures on the pad will be automatically monitored on a daily basis so that the aeration system can be adjusted by increasing or decreasing the speed of the blowers and by adjusting the valve positions for each pad. If materials have dried out significantly, water will be added as materials are transferred from one pad to the next. There will be a provision to dampen the surface of the compost to preclude the generation of dust.

The ASPs will typically be 3.5m high and the area of the bays will vary depending on stage of the process (primary, secondary or tertiary). However, depending on the exact nature of wastes received, the ASPs may be taller for drier, woody wastes but lower for wetter wastes. The finished compost will be stored to a height of 4.5m.

A portion of the green waste may be composted in two dedicated green waste tunnels prior to the ASP process. This process change would be agreed with the EPA prior to its introduction.

Screening

After almost nine weeks of ASP composting the materials will be ready for screening. The screen will cater for producing fine, high quality product for use as a soil amendment, as an ingredient in the production of topsoil or potting mixes, or as a mulch product.

After screening, the products would be stored for up to three months. During this time, the batches will be tested and the product will cool and fully mature. The overs from the green waste screening will be reused in the green waste composting process during summer months when some structural bulking materials may be needed, or as a structural bulking material for the catering wastes and organic fines. Depending on the quality of the incoming green waste and whether the few contaminants are manually removed from the discharge conveyor of the screen, the overs may be sold as a mulch product.

Aerated Static Piles

4.5.7 Municipal Fines Composting - Tunnel Composting followed by Aerated Static Pile

Process Area Description

The reception and preparation area for the catering waste and organic fines waste stream covers approximately 4,300m². The area will be built upon a reinforced concrete base and will have reinforced concrete walls supporting a steel framed structure clad with insulated panel sheeting. The unloading area will be sloped up to the unloading bays, to facilitate the unloading of waste onto the reception hall floor.

The catering wastes and organic fines may contain animal by-products. This requires in-vessel or enclosed processing to meet time and temperature requirements as set out in the EU Animal By-Products Regulations. The process comprises two weeks of in-vessel processing followed by six weeks of outdoor ASP composting and curing.

The composting tunnels each have a capacity of 700m³. Ten tunnels will be of reinforced concrete construction and will be housed in a process building which will be built upon a reinforced concrete base. The tunnels will require power, air fans, water or suitable re-circulated leachate, associated control and monitoring equipment and a process air treatment plant. The tunnel emptying area and technical corridor (containing plant associated with the control of air emissions from the tunnels) will also be built upon a reinforced concrete base. The area of the tunnels and the associated plant and access will be approximately 6,300m².

The catering waste/organic fines waste ASPs will be constructed on a reinforced concrete slab and will be approximately 5,500m² in area.

Feedstock Preparation

The catering waste and organic fines will be delivered to the composting facility and tipped in the enclosed tipping area. The reception and preparation area includes bays for each waste type accepted at the facility (organic fines, catering wastes, timber or bulking material, green waste, screen overflow) and a quarantine area for unlicensed wastes deposited at the unloading area. The waste is off-loaded into the separate bays from the outside of the facility, through a raised opening.

Material will be composted in two batch types:

- Catering waste mixed with bulking materials
- Organic fines mixed with bulking materials

The organic fines/catering wastes will be mixed in a stationary auger mixer with structural bulking materials such as overs from the screening process and/or shredded wood waste from the green waste reception area. The proportions of wastes in the mixture will be designed to optimise the composting process. The incoming waste will typically be mixed 5 parts municipal fines to 2 parts wood and oversize material. This mixture will be wetted as necessary to achieve the optimum moisture content of 60-65% moisture, before it is introduced to the tunnels. Due to seasonal variations in the moisture content of the incoming fines, water will likely be added only during the summer months.

From the auger mixer, materials would be loaded into the tunnels with the use of a front end loader or a slewing telescopic loading conveyor.

The mixing process is critical to creating the ideal composting conditions and it is at this stage that the balance of nutrients, moisture and porosity is set to carry out the entire composting process. Achieving this balance will reduce odour and assure even heat distribution throughout the composting mass for thorough pathogen reduction within the tunnels.

Organic fines will produce low grade compost. Catering wastes should produce high grade compost, unless there is significant contamination of the feedstock. The two batches will be kept in different tunnels and placed in different areas on the ASPs.

Tunnel Composting

Each tunnel accepts approximately 700m³ and will accommodate one day's raw material. Materials will be composted for two weeks in the tunnels. Temperature, oxygen and humidity conditions in the tunnels are controlled to achieve rapid composting of the waste.

The tunnels will utilise a push-pull system of aeration where oxygen rich air is fed into the bottom of the tunnels and pushed through the composting piles. Another blower will be used to pull air out of the top of the tunnels and force the process air through biofilters for odour control purposes. Aeration will be controlled via a computerised process control system based on a temperature and oxygen feedback system with the capacity to reverse and re-circulate the airflow.

Where composting temperatures are too high, aeration will be used to bring temperatures down to within the ideal composting range between 55°C and 65°C. The process control system is programmable so that a temperature of 70°C can be reached for an hour to meet the EU Animal By-Products Regulations if required. Such high temperatures are counter productive to the composting process by killing many of the beneficial composting bacteria, which in turn reduces the efficiency of the composting process. It is likely that the alternative approach of maintaining temperatures exceeding 60°C for two days will be sufficient for pathogen reduction. The precise nature of pathogen treatment will be agreed with the EPA and the Department of Agriculture prior to commencement of the process.

All air and water emissions will be collected for treatment and reuse respectively, reducing adverse impacts associated with odours and bio-aerosols.

ASP Composting and Curing

After two weeks in the tunnels, the volume of the composting materials is expected to reduce by 20%. The material will be removed by a front-end loader and will be placed in one of three primary ASP pads, where it will be aerated for three weeks. Because the materials will still be relatively fresh and very active, a negative aeration system will be used so that all process air can be collected and forced through a biofilter.

One primary pad is filled each week with the waste from five tunnels. After three weeks on the primary pad, material will be transferred to one of three smaller secondary ASPs, and material from the next five tunnels will be placed on the primary pad. The material on the secondary pad will be composted for a further three weeks. The compost will then be screened as described below.

Three pads are provided for each ASP stage to allow the material on each pad to remain undisturbed for a full three week period. A volume reduction of 10% is expected during the primary pad process and a further 5% reduction over the secondary pads.

Screening

Screening of the composted wastes from the ASPs will remove oversized fractions from the final product and will grade the compost into different sized products as demanded by the market. The oversize material will be returned to the waste reception hall for bulking up the incoming waste. The graded products will be stored separately for loading in a storage area with one month's storage capacity.

Approximately 40% by weight of all incoming material, will end up as compost and approximately 60% of the material will comprise moisture and decomposition losses and overs. Air classifiers will be used to separate wood from overs materials such as film plastics, glass, ceramics, stones, metal, batteries and hard plastics. The reclaimed wood chip will be reused in new batches of mixed waste fines, while the remaining overs fraction will be disposed of off site. The proportions of the compost product, the recovered wood chip and the overs for disposal will change throughout the year because of the effect of seasonality on waste generation.

Compost Screening

4.5.8 Plant and Machinery

It is envisaged that the following machinery will be used:

- 4 no. front loading shovels (1 no. dedicated to the pre-process materials mixing, 1 no. dedicated to the post tunnel composting operations and 2 no. dedicated to the green waste composting operations);
- 10 no. tunnel composters;
- 12 no. aerated pads (6 no. for green waste stream and 6 no. for municipal waste stream);
- 2 no. trommel screens (one for each waste stream);
- 1 no. auger mixer;
- 1 no. shredders;
- 2 no. air classifiers (one for each waste stream);
- biofilter system;
- process air blowers for tunnel composters and aerated pads, biofilters, process water pumps and leachate collection and transfer pumps;
- leachate storage tanks and treatment plant;
- 2 no. conveyors;
- 1 no grab.

Front Loader

4.5.9 Site Access, Traffic Management and Security

Figure 9.10 shows the layout of the proposed facility access junction superimposed on topographic mapping of existing county road on the eastern boundary of the site. A priority tee-intersection is proposed with 1:10 tapers on the access approach and 15 metre curve radii.

All site access roads will be designed in accordance with the National Roads Authority (NRA) "Manual of Contract Documents for Roadworks" and will be paved to highway standard, with the provision of passing points. The road construction will comprise sub-base, road base, base course and wearing course. Road drainage will be provided as described in Chapter 10.

Signs, speed ramps and barriers will be used to control vehicle speed and access in and around the facility. Any traffic management and traffic calming measures will be prepared in consultation with Westmeath County Council Roads Department and the NRA.

The site will be secured by a combination of fencing types around the site. A steel palisade style fence will be erected in the vicinity of the weighbridges. This will lead to coated steel paladin fencing which will follow the boundary of the facility and provide security in parts of the boundary without facility walls.

Two bar timber fencing will be erected along the southern boundary and western boundary. This fence will be augmented with 100mm wire mesh (sheep wire).

Along the road in the east and the stream in the north there will be a simple post and wire fence, with sheep wire along the lower part and two strands of barbed wire along the upper part.

The entrance at the county road in the east will be secured by two agricultural field gates to prevent vehicle access to the site outside of normal operating hours.

4.5.10 Firewater Retention

In the event of a fire, firewater will be collected by either the leachate or surface water collection system, depending on the area in which the firewater arises. All process and non-process areas will be bunded by kerbs which will contain firewater within those areas.

Chapter 11 provides details of the firewater management on the site. Emergency procedures will be developed and documented for use in the event of a fire or a spillage of fuel on-site.

4.6 Resource Usage

The composting processes will require a three phase power supply which will be supplied by a mains connection to the ESB national grid. A standby diesel generator will be available for emergency use on site. The generator will be housed in the maintenance building.

Water for the offices and processes will be supplied from a borehole located in the northeast of the site. The borehole will be designed to deliver in excess of the site's water requirements. The water supply will be metered.

Energy and water usage will be reported to the EPA in accordance with the conditions of the Waste Licence.

4.7 Environmental Impacts

4.7.1 Construction Phase

Dust

The construction of the site will generate dusts which could have an adverse impact on the surrounding air quality and may constitute a nuisance.

The duration of the construction phase will be relatively short, probably six months, compared with the proposed life of the facility. Dust will most likely be emitted from where it gathers on internal access routes and storage areas and will be disturbed by the movement of heavy vehicles.

It is expected that on many days during the year rainfall will sufficiently dampen the ground and provide a significant degree of dust suppression. Where periods of extended dry weather occur during the construction phase, a water bowser will be available for the routine damping of access routes to suppress the release of dust. Early paving of the access roads and the construction of the concrete base will reduce the amount of loose material that would give rise to dust during traffic movement.

Noise

The construction of the proposed facility will generate noise which could create a nuisance for the nearest sensitive receptors, although the nearest houses are approximately 500m from the development. Construction will only take place during the day. Trees planted around the site will provide some acoustic attenuation. Plant and machinery will be maintained in good condition and noise damping will be used if appropriate. Efforts will be made to meet nuisance limits and Occupational Exposure Limits (OEL). Where OELs cannot reasonably be met, hearing protection will be mandatory.

Traffic

The construction phase of the proposal will generate traffic to and from the site comprising delivery vehicles for construction plant deliveries, ready mixed concrete, building materials, process plant deliveries and vehicles associated with construction, installation and commissioning personnel. Construction plant movements around the site will likely include front loading shovel, hydraulic excavators, dumpers, scrapers, and rollers.

The following hours of operation during the construction phase are proposed:

Monday to Friday	0800 - 2000
Saturday	0800 - 1800
Sundays and Bank Holidays	Closed

The hours of operation of the site during construction will limit noise and dust nuisance associated with the works.

4.7.2 Operational Phase

Aerated Static Pile Composting

The main environmental impacts arising from ASP composting of wastes are:

- Vehicle movements on site;
- Vehicle trips to and from the site. It is predicted that the facility will generate up to 3 inbound and 3 outbound HGV trips per hour from 2005 onwards (see Chapter 9 - Traffic).
- Odour, which will be controlled by collecting the air in the composting materials through the negative pressure (suction) system on the ASPs and passing this air through a biofilter (cf. Section 4.11);
- Dust, which can be controlled by spraying water on the ASPs if the material becomes too dry (cf. Section 4.11). Compost will be moved from the tunnels to the primary ASPs, to the further stage ASPs and then to the storage areas during each process cycle. Each movement of compost and each screening could give rise to large amounts of dust. Significant dust emissions occur where the compost dries due to the heat of decomposition or due to the air being sucked through the tunnels and aerated pads. Sufficiently high moisture content (~ 45%) will reduce the amount of dust released and a procedure will be put in place to ensure that this moisture content will be maintained in the compost on the aeration pads and in the storage areas by adding water as necessary.
- Bioaerosols, the migration of which can also be controlled by dampening the compost and by the negative pressure/biofilter system (cf. Section 4.11). The biofilters and ASPs will produce negligible amounts of bioaerosols during normal operations. When the biofilters or ASPs are disturbed, there will be an increase of bioaerosols released. The screening process will be the greatest source of bioaerosols. Operational measures to limit the release of bioaerosols will include maintaining adequate moisture content in the compost and avoiding operations such as green waste shredding

and green compost screening on very windy days (cf. Chapter 6.9). Screening operations on the catering waste and organic fines derived compost will be carried out indoors and will therefore not be weather sensitive.

- Leachate, which arises from rainfall runoff from the aerated pads. The floor of the process area will be impervious to leachate or rainwater and the leachate will be collected for recirculation or treatment prior to discharge from the site (cf. Section 4.8).
- Noise from pumps, fans, delivery vehicles and operations machinery. Stationary plant will be housed in acoustic enclosures, if required, to reduce the noise levels from the plant to below licensed limits. Site operations will only take place during the day, precluding night-time noise nuisance associated with vehicle movements on site and to and from the site.

Due to the location of the Aerated Static Pile Composting operation and its distance from sensitive receptors, its impacts are considered to be sufficiently controlled so as not to be significant.

Tunnel Composting

The main environmental impacts arising from tunnel composting of green and other organic wastes will be:

- Vehicle movements;
- Vehicle trips to and from the site, as described in the preceding subsection;
- Odour, which will be controlled through containment and the use of a biofilters where necessary (cf. Section 4.11). All wastes delivered to the site will be mixed and introduced to the tunnels within two days, to reduce the uncontrolled degradation of the waste in the reception hall. The reception bays for odorous wastes will have a ventilated hood to collect odours from the waste before it is treated in the tunnels. This air stream will pass through a dedicated biofilter before the air is discharged to atmosphere;
- Leachate, which will be collected for recirculation in the process (cf. Section 4.8);
- Noise, as described above.

In view of the following operational and design features, it is considered that the impact of the tunnel composting will not be significant:

- dust and bioaerosols will not be formed by this process, as the waste will be wetted indoors during the mixing process;
- the operation is fully contained;
- the plant will be 740m from the nearest sensitive receptor.

Pests

Waste for composting has the potential to cause nuisance from flies and rodents. Both could be attracted to composting facilities by the presence of organic waste materials. These materials are degraded during the tunnel composting phase of treatment. It will be the untreated stored waste that presents the greatest attraction for pests.

Mixing and tunnelling of waste as early as possible following its acceptance onto the site will avoid or reduce this potential nuisance. If additional controls are required then specialist pest control companies will be employed to remedy the problem.

Birds

Birds are not expected to become a nuisance at the proposed facility. The waste reception area will be indoors and odour controls will reduce the attraction of the site to birds. The tunnel composting phase will reduce the appeal of the waste for the birds and is not expected to attract birds in numbers that would give rise to nuisance.

4.8 Leachate Management

4.8.1 Leachate Production

Composted wastes have the ability to absorb water. The wastes absorb water until a point is reached where the waste becomes saturated. Any further addition of water results in the generation of free, contaminated water known as leachate which drains to the base of the composted wastes.

If it is not properly controlled, leachate can have adverse effects on the quality of groundwater and surface water. It is therefore necessary to design the facility to minimise the volume of leachate generated and to provide measures for the protection of groundwater and surface water. The proposed leachate collection system for the site is shown on Figure 4.4.

The facility will be designed so that any generated leachate will be contained by the concrete base of the facility. There will be a system for the collection and treatment of any leachate generated.

The effective control and collection of leachate from the process areas will be provided by the design of the concrete base of the facility. The integrity of the construction will be delivered through a comprehensive scheme of Construction Quality Assurance (CQA) which will be applied throughout the installation. This will be completed by a competent, independent and suitably experienced company.

The floors of all process areas will be graded to encourage flow to collection drains, which will be constructed to fall to sumps located at a low point in each process area. Leachate accumulating at the low point will be pumped as necessary to a leachate collection tank, where it will be held for re-circulation back into the composting process or for treatment.

Wheel cleaning will be carried out on the return from the waste delivery area. A shaker bar system will be installed over which vehicles will run. The system will be fitted with a power and water supply and a sump to enable washing and draining from the system when required. A schematic of the wheel cleaning system is shown on Figure 4.7a.

The leachate arising from washings in the municipal fines waste reception and blending area and the drainage from the tunnels may be contaminated with pathogens. This water will be collected and held separately from other contaminated water arising at the facility and will be used to raise the moisture content of the mixed municipal fines waste to the optimum level prior to placing the waste in the tunnels.

The tunnel composting process effectively eliminates pathogens from the waste stream. Leachate collected from the ASPs and associated access roads will be collected and used to maintain the moisture content of the compost at its optimum level during the tunnel composting process. Surplus leachate from these areas will be used for maintaining the moisture content in the ASPs.

4.8.2 Leachate Treatment

Contaminated water in excess of the process water requirements will be treated by the leachate treatment system. This system will be designed specifically for leachate arising at the facility and will likely be based on proven aeration sequencing batch reactor principles, followed by a horizontal subsurface-flow reed bed polishing system. Treated effluent from the reed bed will be discharged to the stream flowing along the northern boundary under licensed discharge limits.

The effluent from the reed bed will be a clear and odourless liquid of a quality consistent with discharge conditions required by the EPA and discharged to the stream via an outfall pipe. An area has been identified on the site (see Figure 4.4) for the installation of the leachate treatment plant.

4.9 Groundwater and Surface Water Management

The groundwater and surface water risk assessment has indicated that the proposed construction and leachate management procedures will be sufficient to ensure that leachate does not result in a significant deterioration in either surface water or groundwater quality. If any groundwater controls are required, Thorntons Recycling will agree the location and type of any control systems or procedures with the EPA.

Domestic effluent will be treated on site using a proprietary treatment system. This will be designed in accordance with the EPA Wastewater Treatment Manual: Treatment Systems for Single Houses (EPA, 2000) and as such is not expected to have a significant impact on the groundwater.

Surface water runoff from the access road leading to the site will be collected by a lined collection drain, which will discharge via a silt trap and oil/water separator to the drainage ditch along the eastern boundary under licensed conditions. This access road will be graded to promote surface water flow towards the collection drain.

Surface water runoff from the roofs and non-process paved areas of the facility will be intercepted and kept separate from the contaminated water arising in the process areas. The non-process paved areas will be graded to promote drainage to gullies, which will discharge to the surface water collection system.

The surface water from the non-process paved areas will pass through a silt trap and oil/water separator located near the facility prior to discharging to the stream along the northern boundary under licensed conditions. Runoff from the roofs will discharge directly to the surface water discharge point, downstream of the main silt trap and oil/water separator.

Flows in excess of the predicted annual peak flow from the site will be diverted after treatment in the silt and oil traps to a soakaway where it will infiltrate through the soil, thus reducing the risk of flooding in areas downstream of the site. The soakaway is described in greater detail in Chapter 10.

Figure 4.5 shows the details of the proposed surface water management system for the facility.

4.10 Management of Accidental Spills and Leaks

Small quantities of chemicals and hydraulic oils will be used on site and will be stored in a dedicated bunded storage area within the Maintenance Building. All servicing of mobile plant will take place in the Maintenance Building where practicable and the Maintenance Building floor will be kerbed to contain any spills within the building. Process pumps will also be bunded to contain accidental leaks and spills. The fuel storage tank and delivery bay will be contained within a bund.

Each bunded area will be provided with a sump which will be pumped to remove rainwater as required, so as to maintain adequate capacity within the bund. The pumped water will be sent for licensed disposal off-site or to the leachate treatment system, where appropriate.

All process areas will be based on concrete hardstanding (cf. Subsection 4.8 above). The surface of the concrete will be graded to encourage flow to leachate collection sumps. The access roads between each process area (Mixed Waste reception, Green ASPs, Mixed Waste ASPs, and Storage) will have small ramps at the process area boundaries to provide containment in the event of spills. Spills will flow to the leachate collection sumps in that area, where they will be held until they can be pumped to a suitable container for licensed disposal off-site, for recirculation into the process or for disposal to the leachate treatment system, as appropriate.

The design of the concrete pad will also provide for the collection of firewater in the event of a fire on the site. In the process areas, firewater will be conveyed to the leachate collection system where it will be held prior to testing. Firewater would either be treated in the leachate treatment system or tankered for off-site treatment. Firewater that enters the surface water collection system will be prevented from passing beyond the surface water treatment plant by an emergency stop valve. Again, the firewater will be tested to determine whether it should be treated in the on-site leachate treatment plant or tankered for off-site treatment.

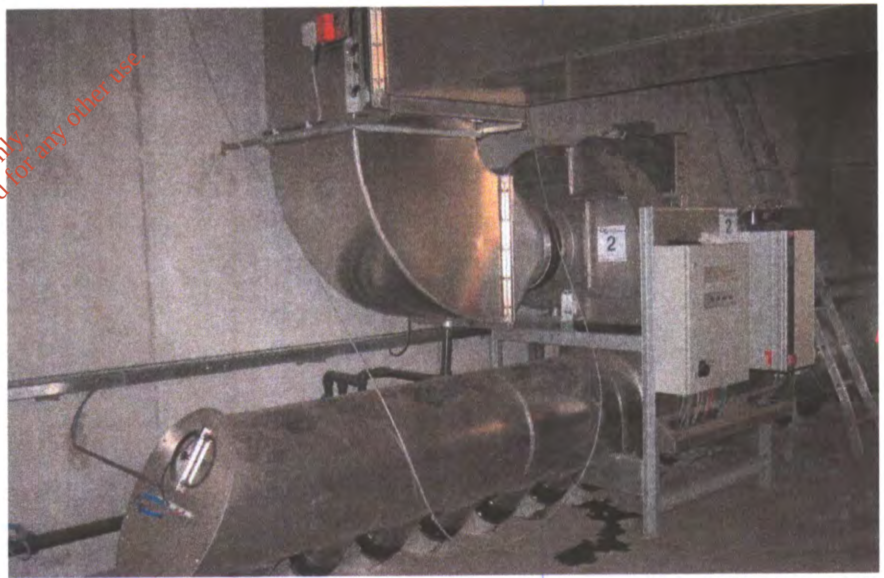
All storage tanks, bunds, sumps and concrete base joint seals will be subject to an integrity testing programme in accordance with the conditions of the Waste Licence.

4.11 Air Emissions Management

The composting process may result in the generation of a significant amount of dust, bioaerosols and odours, and to a lesser degree ammonia, which if not controlled, would lead to nuisance and adverse air quality in the vicinity of the site.

The proposed development will include the control and abatement of air emissions from the process. This will be achieved by an air extraction system, which will draw air from the tunnel composters, the aerated pads and the mixed waste storage area in the waste reception hall. Collecting the air from these areas will also result in collecting odours, bioaerosols and dust entrained in the air and waste, reducing the potential for adverse impacts associated with these parameters.

Where practicable, air from the aerated pads will be re-circulated to the tunnels, which will reduce the overall volume of process air to be treated.



Air Handling System for Tunnels

The collected air will be treated using biofilters prior to discharging to atmosphere. Biofilters generally comprise an organic medium through which the untreated air is blown. The medium may consist of wood, seaweed, shells or other organic matter. The material used must provide sufficient surface area on which bacteria and other organisms can develop and thrive. These organisms use odorous compounds, bioaerosols and other contaminants as their primary food source, thus removing these contaminants from the air, which is then discharged to atmosphere. The biofilters need to be damp at all times to sustain organism populations and provide high treatment efficiencies. This is usually achieved by spraying and wetting the medium at regular intervals, but moisture laden air can sometime provide sufficient moisture for the organisms to thrive.

An assessment of the potential impacts of the raw process air and the treated emissions are set out in Chapter 6.

Thorntons Recycling intends to control the process air as it is generated, and the proposed air management measures are illustrated in Figure 4.6. The main features of the air emissions management system can be summarised as:

- control by active suction from the bio-waste reception bay to a dedicated biofilter;
- control by active suction from the aerated pads to the composting tunnels for utilisation;
- control by active suction from the aerated pads to the biofilters for treatment;
- control by active suction from the composting tunnels to the biofilters for treatment;
- monitoring points in and around the site.

Therefore process air migration will be controlled by the extraction of air from the waste thus reducing air emissions from the surface of the wastes. The location of the biofilters is proposed to be near the process areas in which the emissions arise, as shown on Figure 4.6.

4.12 Environmental Monitoring of Emissions

The composting of waste has the potential to impact upon the environment in a number of ways unless strict environmental controls are implemented.

The construction of the concrete base under a comprehensive CQA scheme will provide protection of the soils, subsoils and groundwater beneath the site.

Detailed operational procedures will be followed throughout the life of the facility to control potential environmental impacts that may arise during the operation. A strict site management system will ensure that the environmental controls are maintained at all times. A site manager will be employed who has an appropriate qualification or experience, as required by the Waste Licence.

The following media will be monitored:

- Surface water monitoring will be carried out upstream and downstream of the proposed site;
- A groundwater monitoring system comprising a series of boreholes around the site will be routinely monitored to check the effectiveness of the environmental controls incorporated in the site design. Nine boreholes have already been installed at the site, and any additional installations will be provided in accordance with the Waste Licence;
- The contents of the leachate collection tank will be monitored to identify shock loads or unsuitable leachate quality prior to discharging the leachate to the treatment system and to assess the efficiency of the treatment system. Treated leachate will be monitored prior to discharge to the stream;
- Compost will be monitored as part of a quality control system to maintain high quality product throughout the life of the facility;
- Air monitoring of emissions from the biofilter will be carried out. Odour will be monitored at the site boundary to determine the presence of any strong odours as a result of the treatment process.

The precise details of the environmental monitoring programme will be agreed with the EPA as part of the Waste Licence application.

Thorntons Recycling will operate the site in accordance with the Waste Licence and the Environmental Management Programme (EMP). The company will undertake regular environmental audits of the facility. The audits will check compliance with all Waste Licence conditions and adherence to the Company's Environmental Policy.

4.13 Restoration and Aftercare

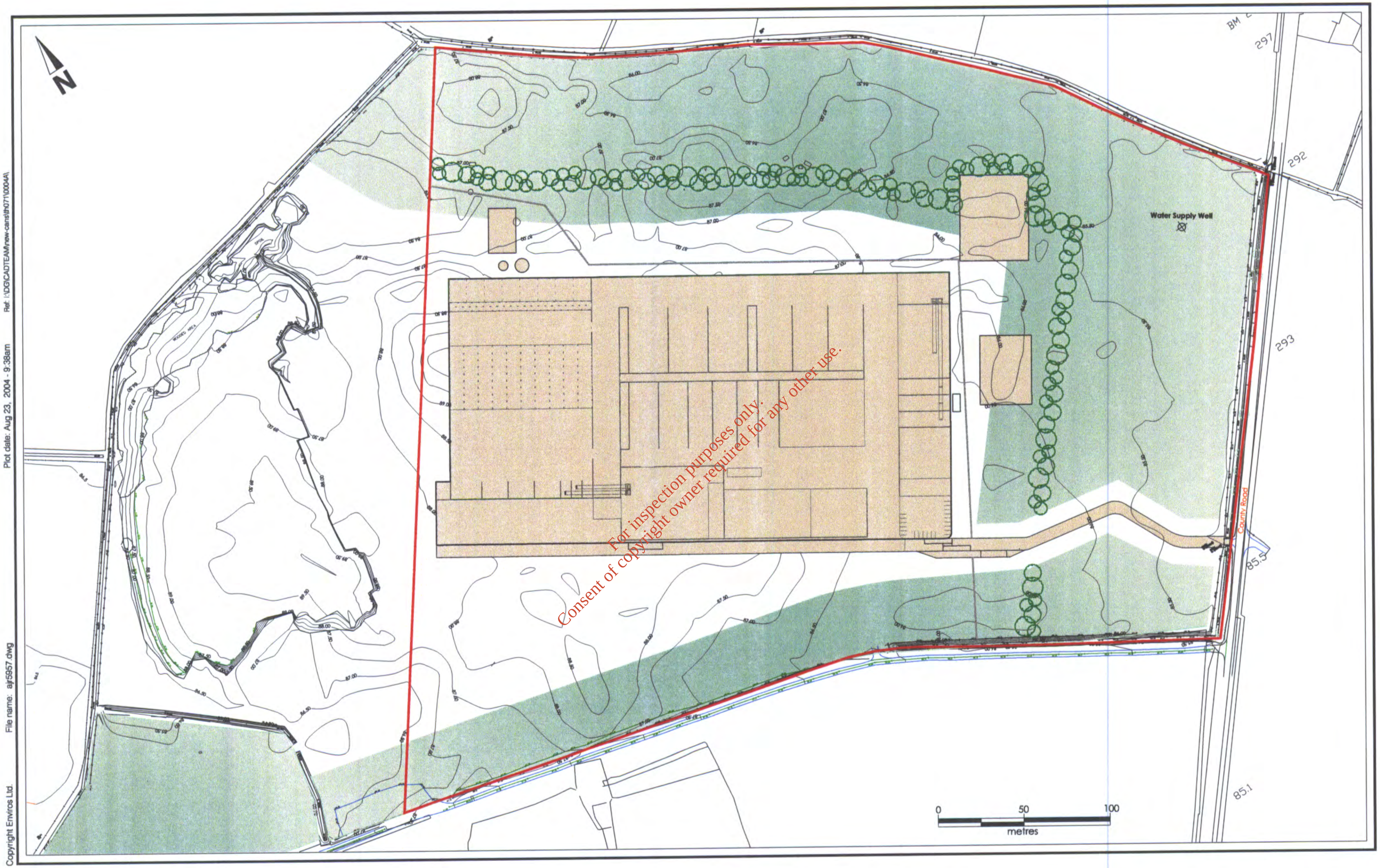
The proposed development is expected to be in operation for the foreseeable future and will provide an important ongoing route for wastes diverted from landfill in accordance with the EU Landfill Directive (1999/31/EC). However, in the event that the facility closes, a decommissioning and restoration plan for the site will be in place under the requirements of the EPA Waste Licence.

The plan will provide for the removal of all wastes, composts, finished product, fuels and ancillary materials from the site for reuse, recycling or disposal at other facilities, to be agreed under the conditions of the Waste Licence. All tanks, pipelines, pumps and sumps will be drained and their contents will be removed in accordance with the Licence. Pipelines will be broken from pumps and other plant, and all plant will be dismantled and removed from the site.

Biofilter media will be disposed of to a suitably licensed facility. The reedbed system will be removed for disposal to a licensed facility to be agreed with the EPA.

Following the completion of the decommissioning plan and audit, the site will be returned to agricultural use or forestry, as appropriate, based on an assessment of the impacts associated with restoring the site to its original use.

Environmental monitoring of air emissions and odours will cease once the process areas have been decommissioned. Groundwater and surface water will continue to be monitored until such time that the Agency is satisfied that no further risks to these receptors are posed by the site.



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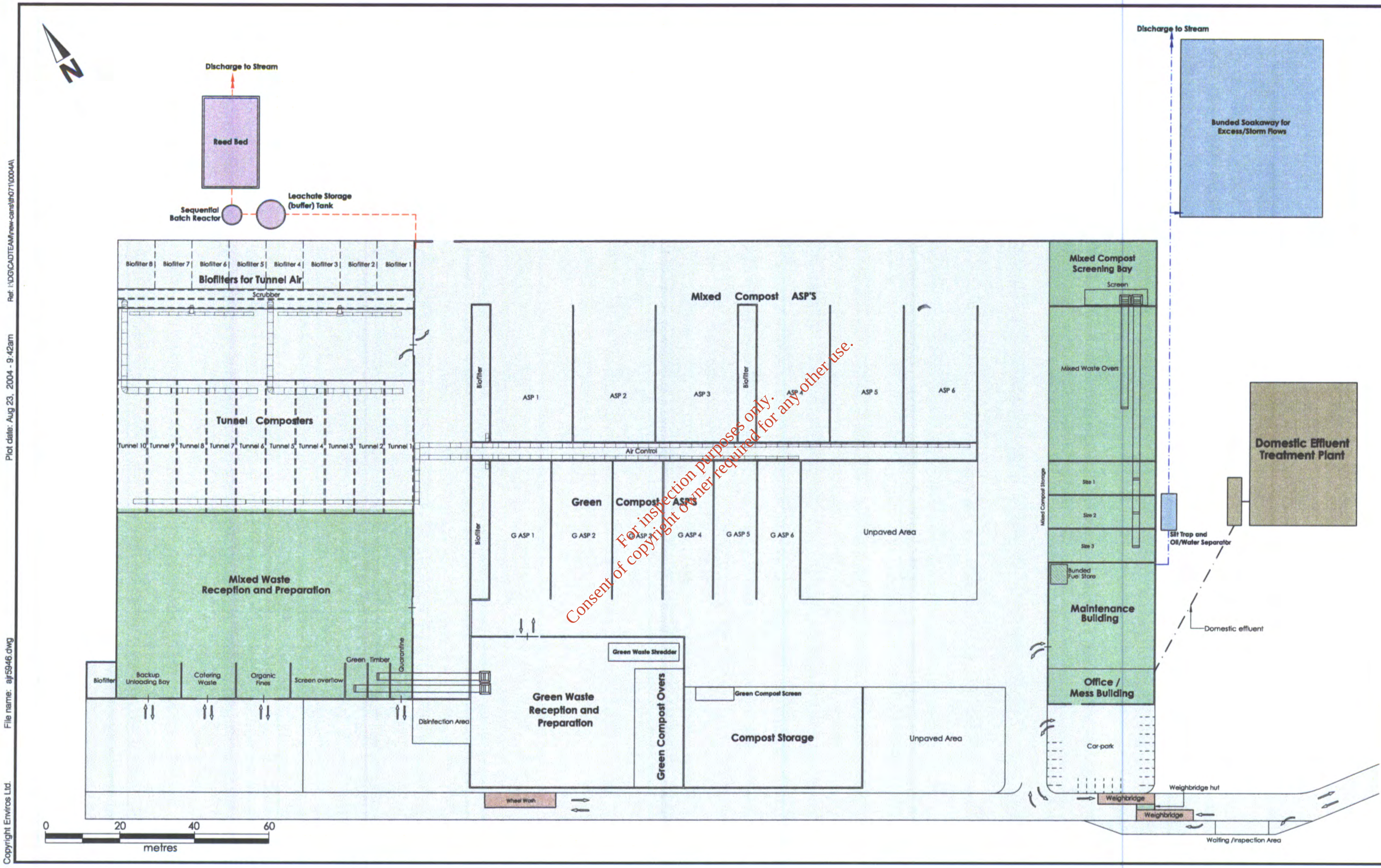
Thorntons recycling

FIGURE 4.1
SITE LAYOUT PLAN

NOTES:

KEY:
- Planning boundary
- Existing plantation
- Proposed screening belt
- 4m High bund



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Thorntons recycling

FIGURE 4.2
FACILITY PLANT LAYOUT

NOTES:
1. Based on Drawing 0404.R1, provided by Celtic Composting Sytems LTD , April 2004

KEY:
Roofed areas

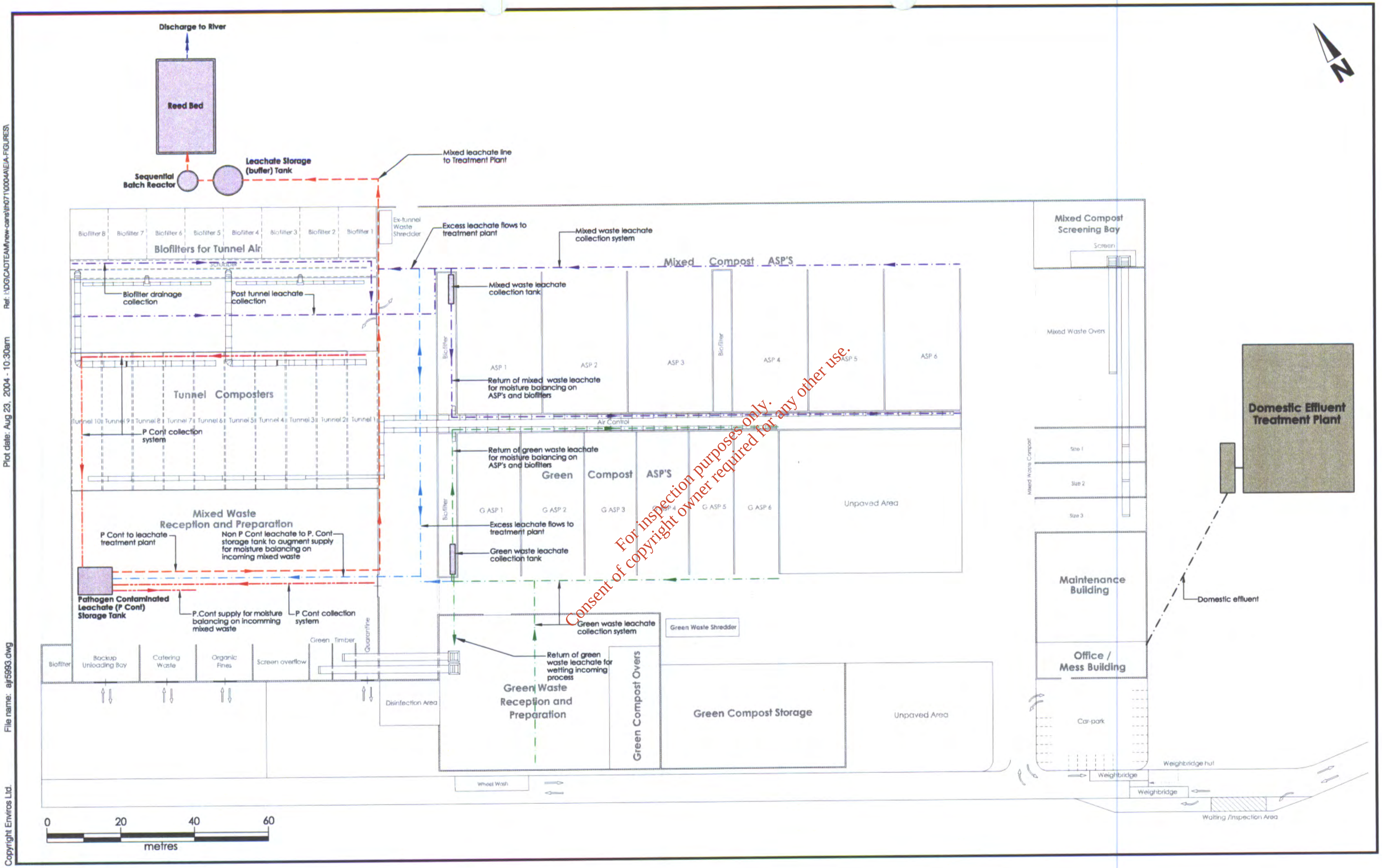

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FIGURE 4.3
LEACHATE MANAGEMENT SYSTEM

NOTES:

1. Based on Drawing 0404.R1, provided by Celtic Composting Sytems LTD , April 2004

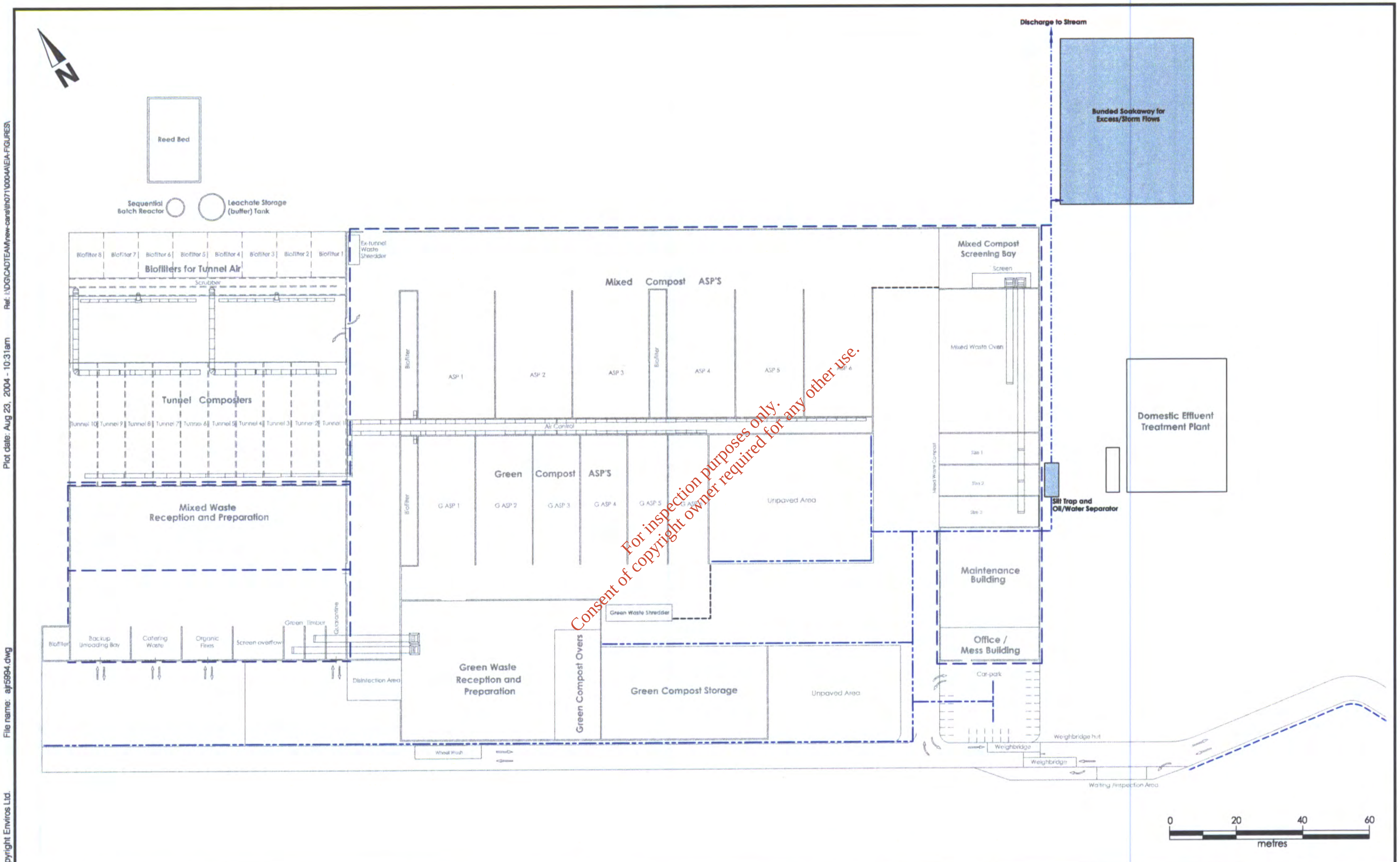

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FIGURE 4.4
SURFACE WATER MANAGEMENT SYSTEM

NOTES:

1. Based on Drawing 0404.R1, provided by Celtic Composting Sytems LTD , April 2004

- Surface water collection
- Roof water collection
- Discharge pipeline
- Collection of road run-off
- Surface water control ramps

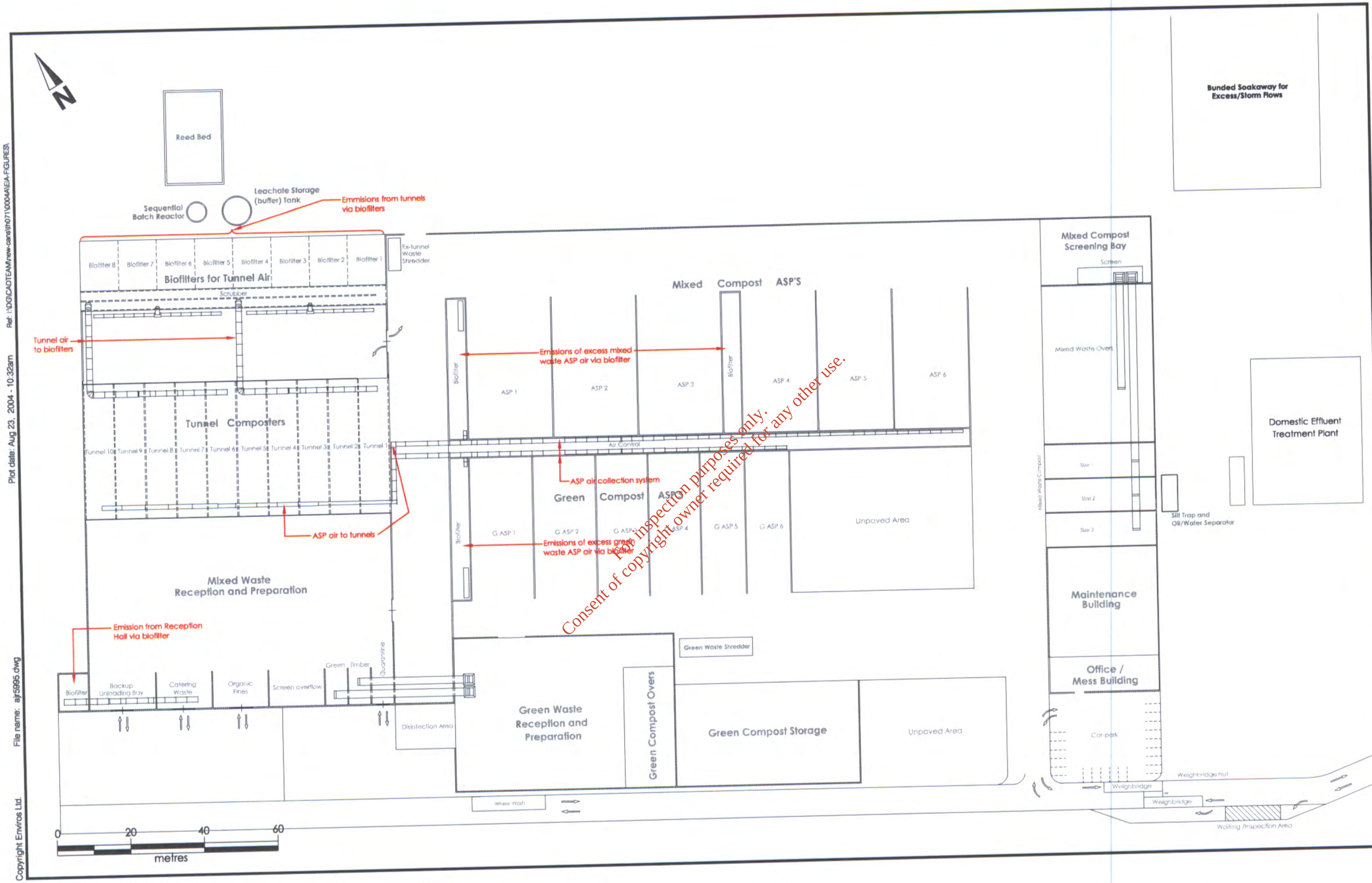

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FIGURE 4.5
AIR EMISSIONS MANGEMENT SYSTEM

NOTES:

1. Based on Drawing 0404.R1, provided by Celtic Composting Sytems LTD , April 2004

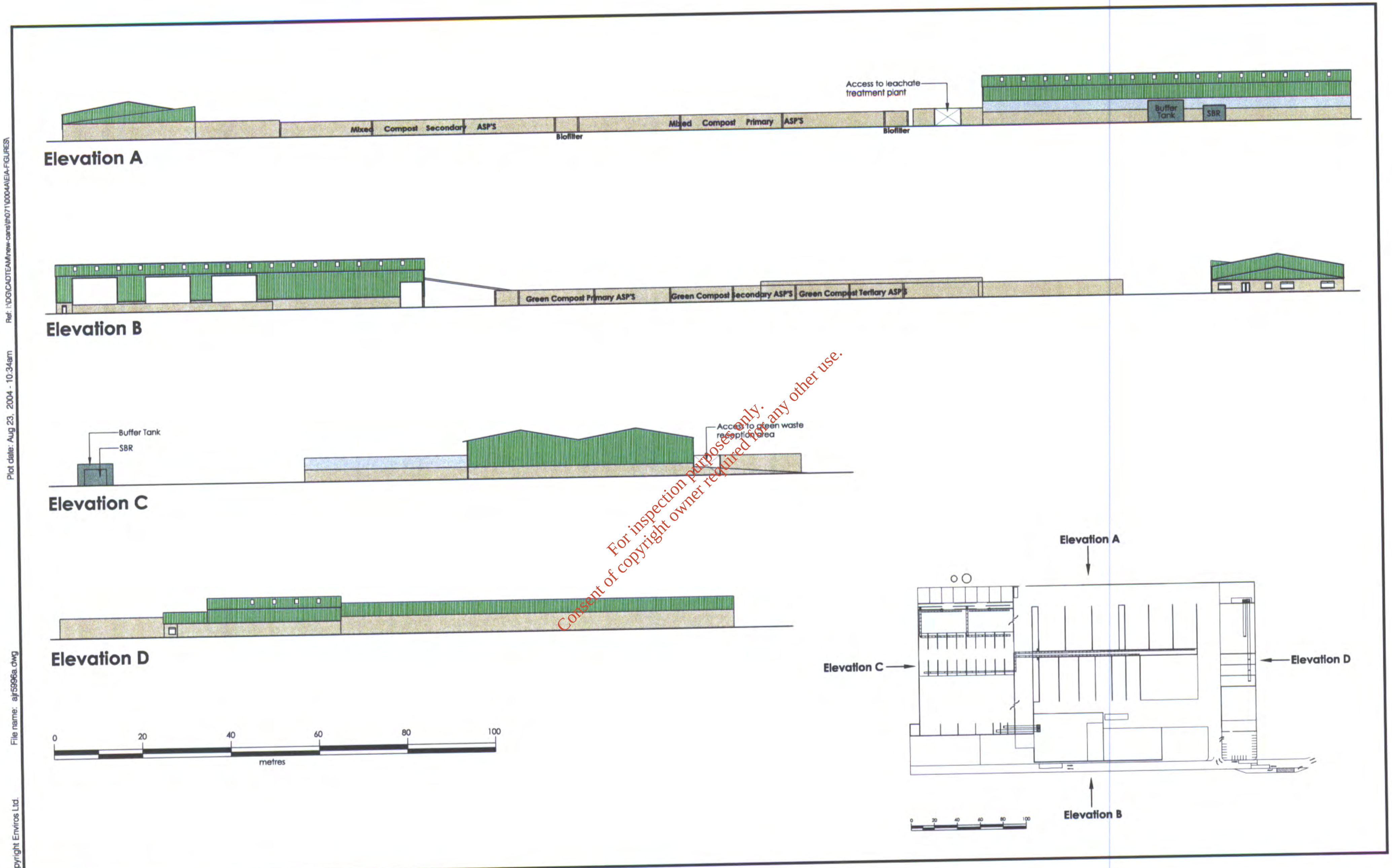

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FIGURE 4.6a
ELEVATIONS

NOTES:
Based on Drawing 0404.R1, provided by Celtic Composting Sytems LTD , April 2004

KEY:
Olive Green Insulated Panel Sheeting
Reinforced Concrete Construction

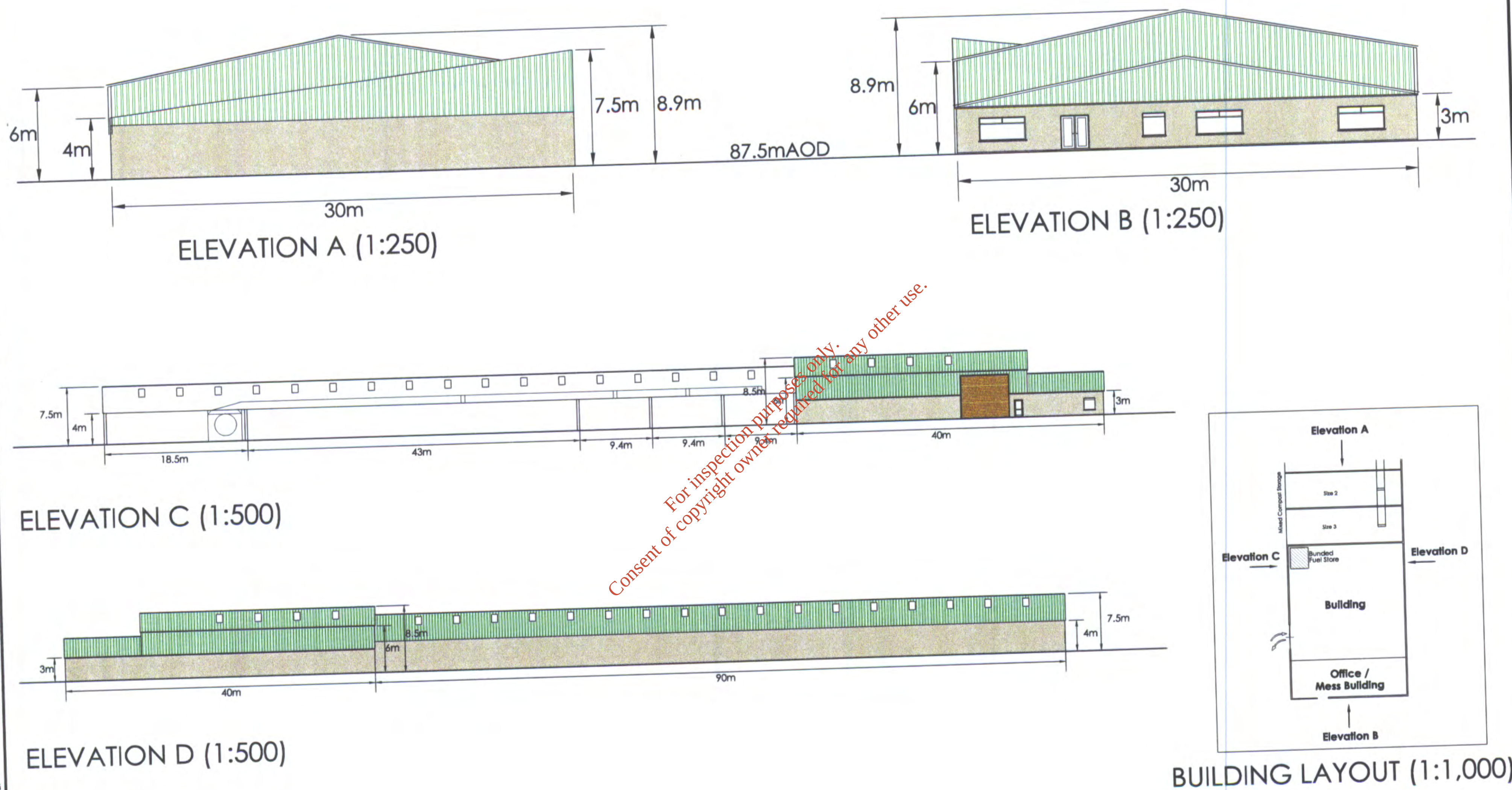

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FIGURE 4.6b
OFFICE AND MAINTENANCE
BUILDING DETAILS

NOTES:
Based on Drawing 0404.R1, provided by Celtic Composting Sytems LTD , April 2004

KEY:
- Olive Green Insulated Panel Sheeting
- Reinforced Concrete Construction

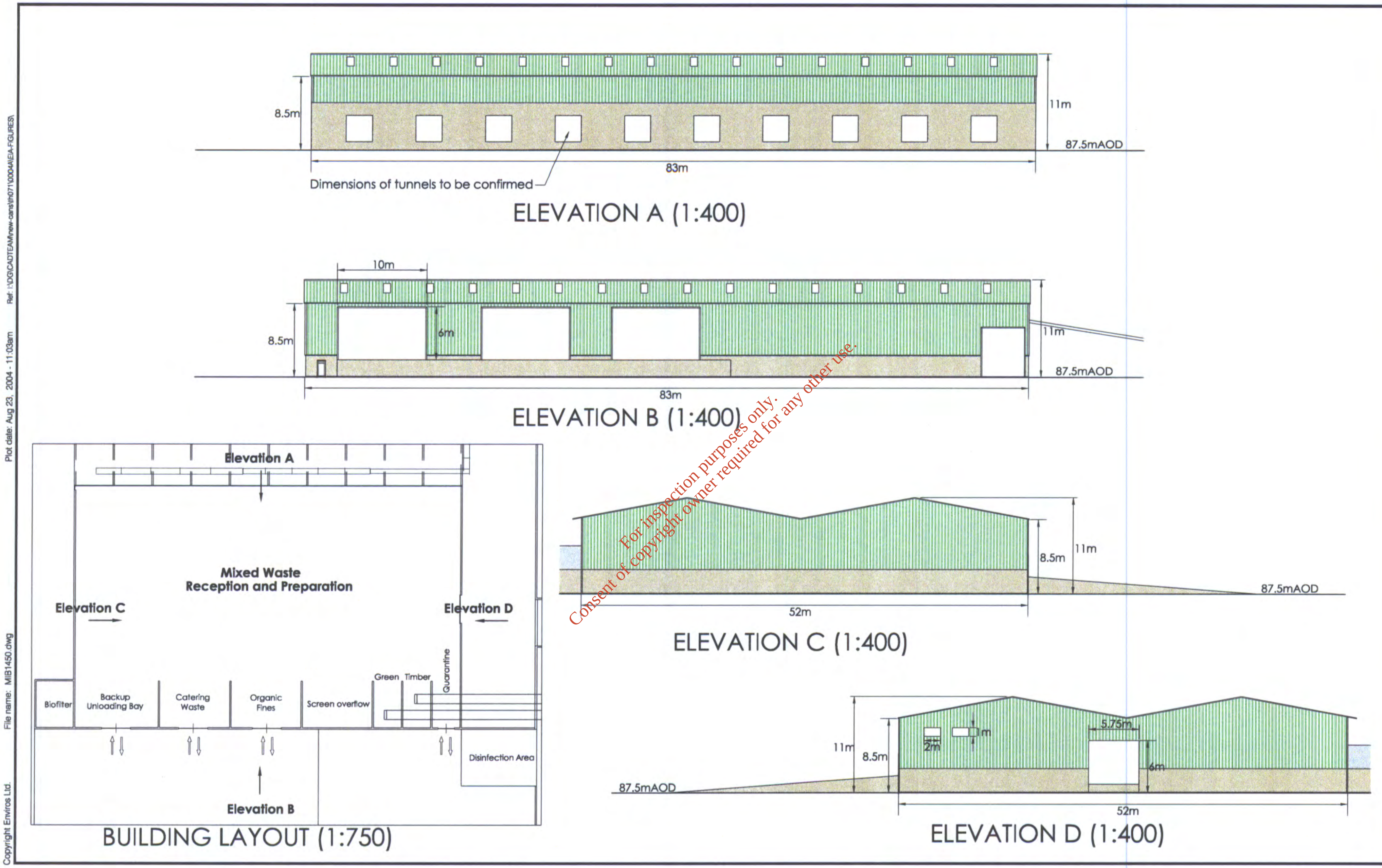

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FIGURE 4.6c
MIXED WASTE RECEPTION AND PREPARATION HALL BUILDING DETAILS

NOTES:
Based on Drawing 0404.R1, provided by Celtic Composting Sytems LTD , April 2004

KEY:
Olive Green Insulated Panel Sheeting
Reinforced Concrete Construction

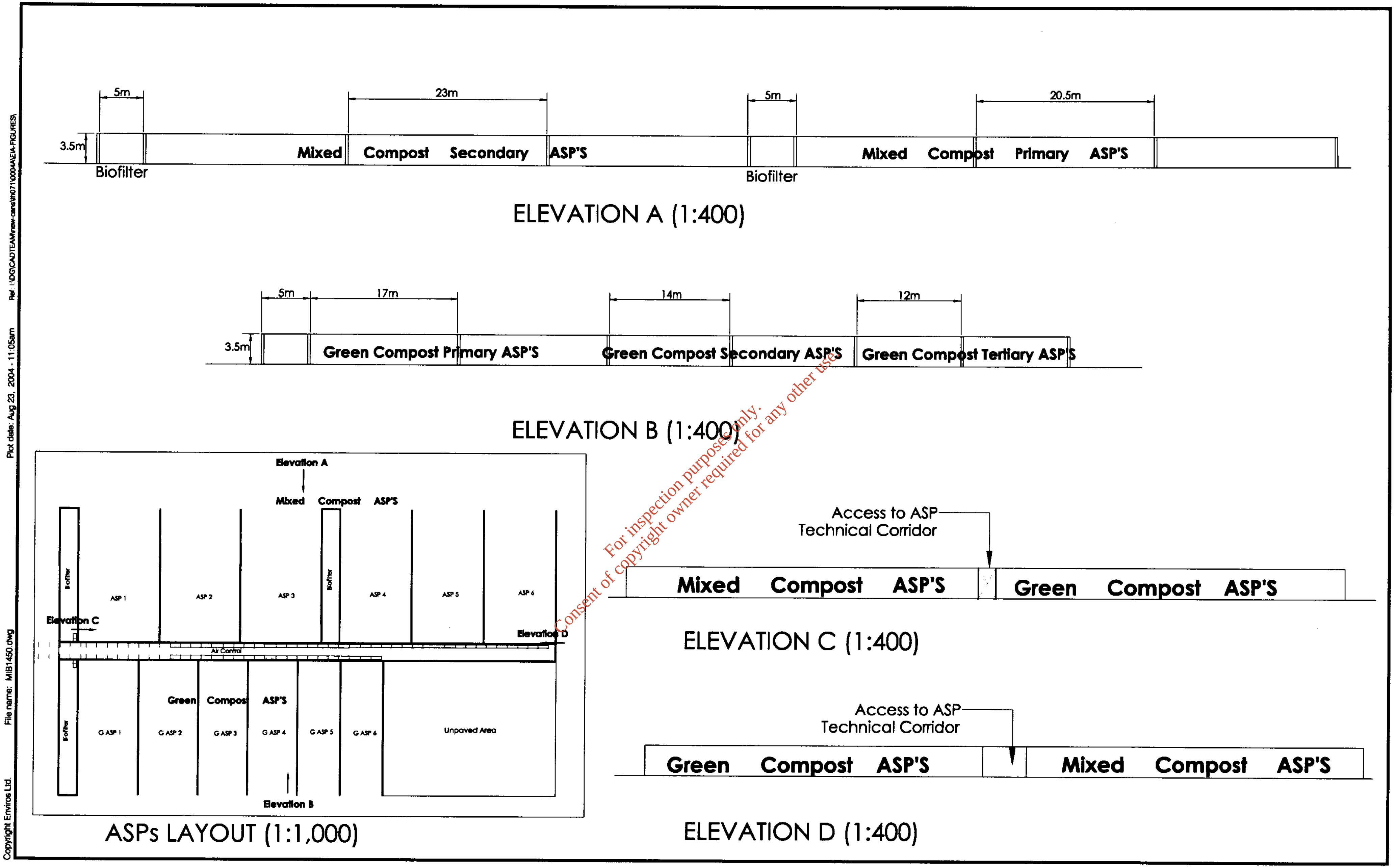

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FIGURE 4.6d
ASPs DETAILS

NOTES:
Based on Drawing 0404.R1, provided by Celtic Composting Sytems LTD , April 2004

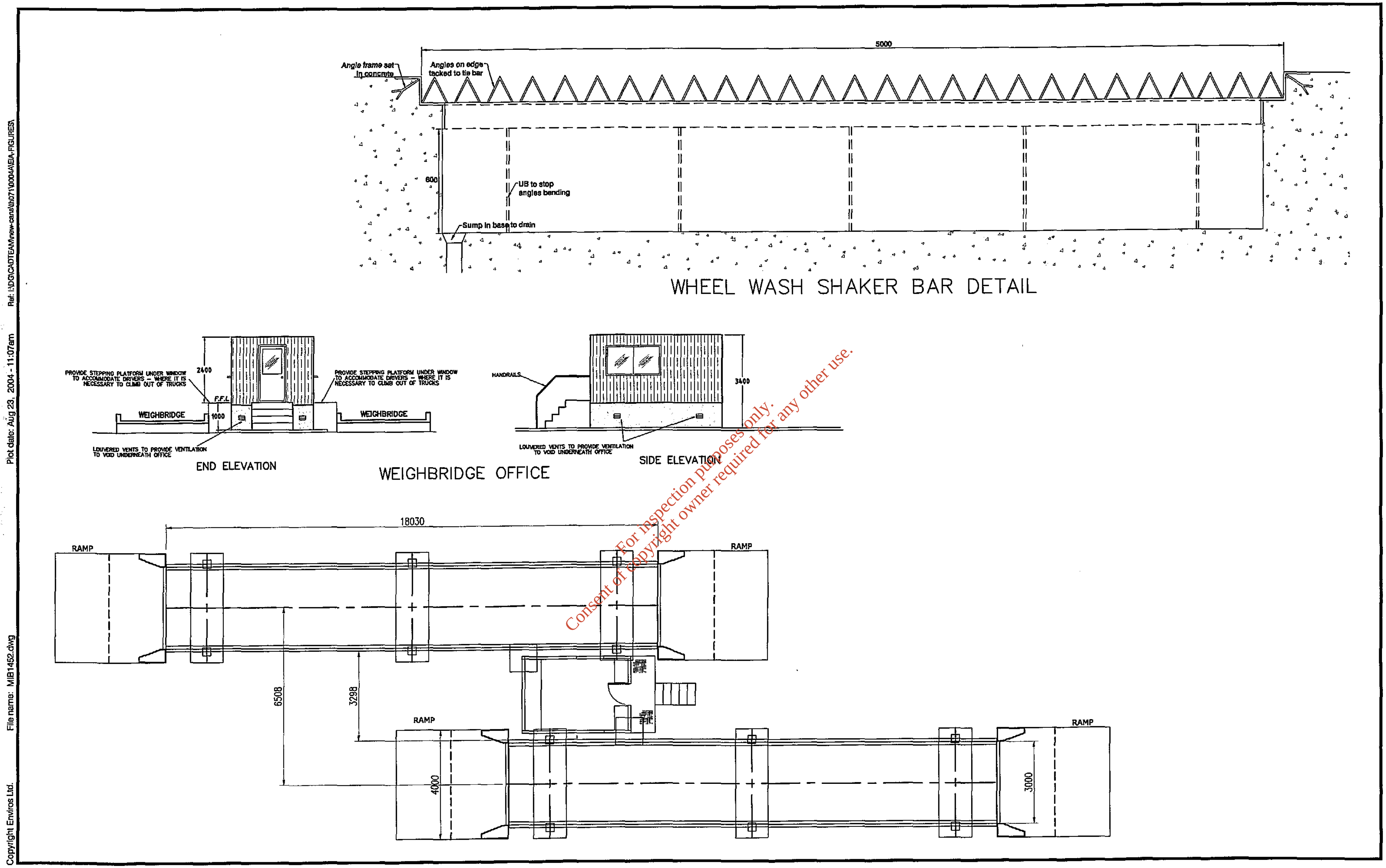
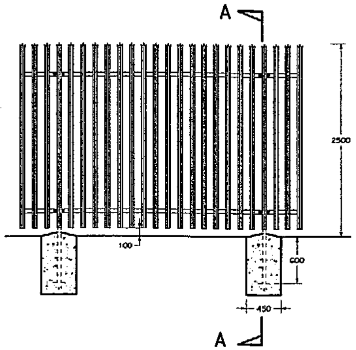
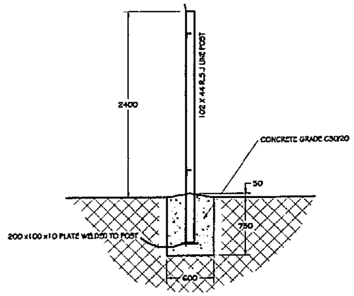


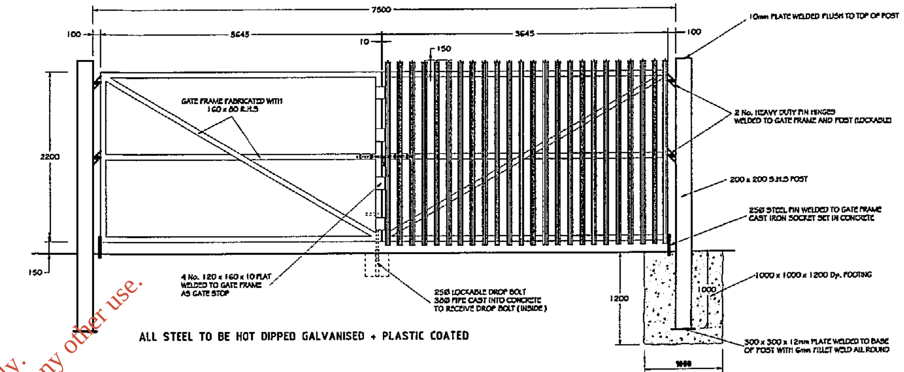
FIGURE 4.7a
WEIGHBRIDGE AND
WHEEL WASH DETAILS



FENCE ELEVATION

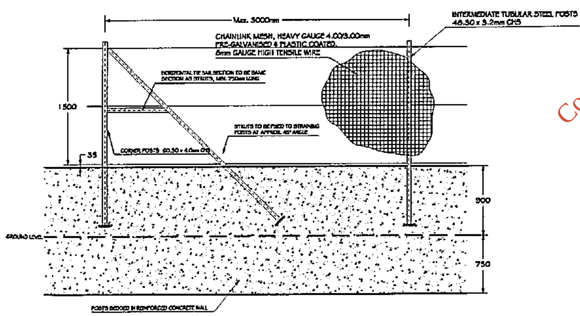


SECTION A – A

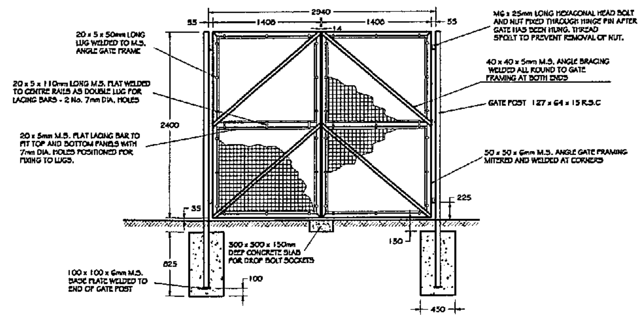


ENTRANCE GATE

PALISADE FENCING DETAILS



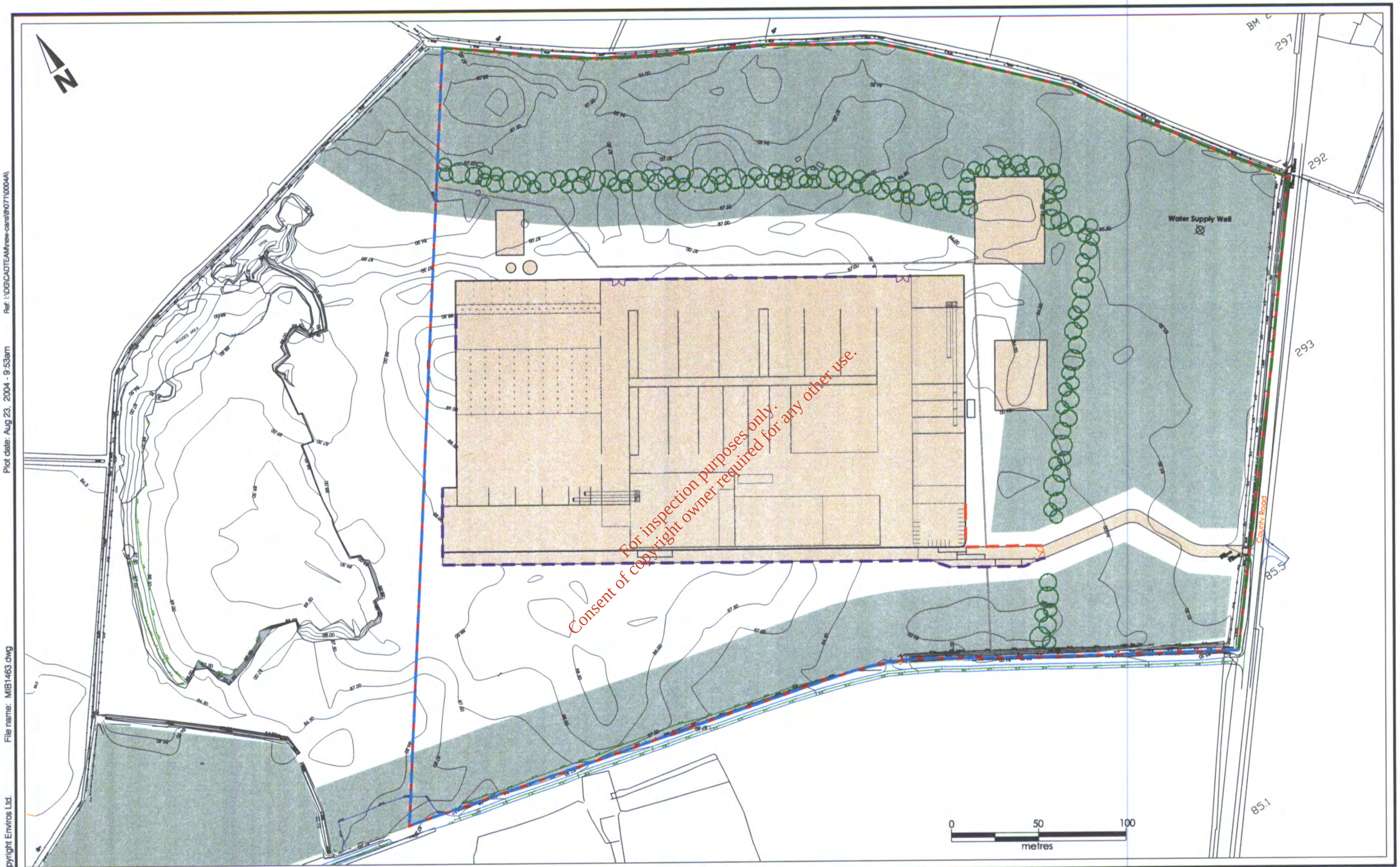
FENCE ELEVATION



TYPICAL DOUBLE GATE

PALADIN FENCING DETAILS

FIGURE 4.7b
FENCING DETAILS



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Thorntons recycling

FIGURE 4.7c
SITE FENCING PLAN

NOTES:

KEY:

- Planning boundary
- Existing plantation
- Proposed screening belt
- 4m High bund
- Pallisade Fencing
- Paladin Fencing
- Wooden Fencing
- Post and Wire Fencing