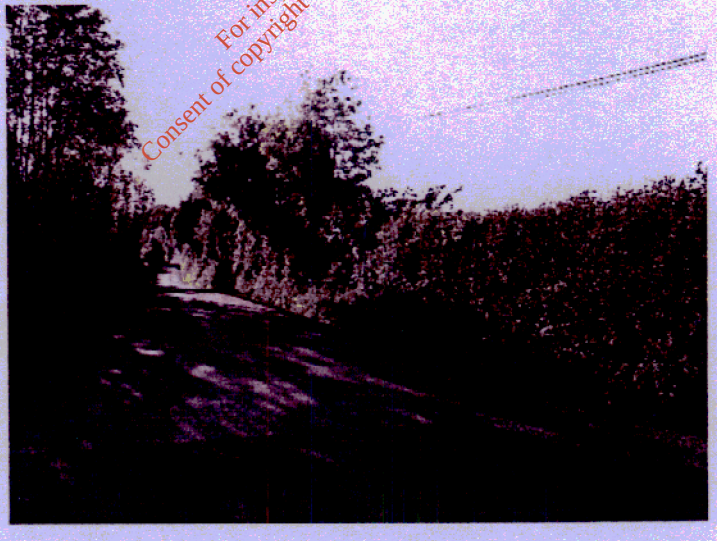
Figure 6.11 Viewpoint Photographs

Viewpoint 1: Carrickroe

Viewpoint 2: Crossroads at Derrykinnigh More

Viewpoint 3: Knocknagrave



Viewpoint 4 Crossroads on Eastern Approach Road to the Site

7.0 Traffic

[redacted]troduction

A traffic impad assessment to identify the impad of construction and operational generated traffic on traffic levels on the surrounding road network was carried out by South Western Environmental Services. The traffic impact assessment of the proposed biomass plant involved a desktop study, traffic counts *and* meetings with the Monaghan County Engineer, Roads Engineer and Area Engineer for the Emyvale Region.

The traffic impact assessment used the following road design guidelines RT.180 'Geometric Design Guidelines', RT.201'Expansion Factors for Short Period Traffic Counts' and RT.580 'National Roads and Traffic Flow 1999(2001)' published by the Environmental Research Unit.

7.2 Road Infrastructure

The development stte Is located on a minor third class mad (LSO 5142) at the *south* side of the site, as outlined in Figure 7.1. The road is a single carriageway road with a typical carriageway width of approximately 5m. It extends from a minor third dass mad (LPO 1151) south-east of the site to a third dass road (LPO 1133) north-west of the site which joins the regional route R186 to the south west of the site. The N2, approximately 4 km east of the site, is connected to the third class road passing the site through a series of other minor third class roads (LPO 1150, LPO 1160).

The road network around the site consists of narrow third dass roads which are already used by a considerable amount of heavy goods vehicles (HGVs). The nearest main route is the R186 at a distance of approximately 3 km. The surface of some sections of the third class roads Is good due to recent resurfacing but *other* sections ant poor. The National Roads Authority (NRA) programme includes a plan to by-pass Emyvale. The proposed route is locatedwest of Emyvale passingwithin 3 km of the *site.*

The 1999 Monaghan *County* Development Plan outlines Monaghan County Councils proposed works in relation to road improvements. In relation to the third class roads connecting the site to the R I M and N2, their resurfacing programme includes the third dass road passing the site which is due tu be resurfaced in 2007 and the road connecting to the R186 which is due for resurfacing in 2003. The mads connecting the site to the N2 *are* not presently in the resurfacing programme. The County Development Plan does not contain *any* of the third dass roads to the *site* in its programme for upgrading the mad status to accommodate an increase in traffic volumes.

Figure 7.1 Traffic Access Route to the Site

Existing Traffic

SWS Environmental Services carried out traffic surveys at the proposed site and at the R186 to assess the existing traffic in the area. The traffic counts were carried out from 8.00 to 9.00 am and 5.00 to 6.00 pm. The two-way peak hour traffic flows are summarised in Table 7.1 below. All traffic flows are expressed in terms of passenger car units (PCU's), 1 HGV = 3 PCU's.

Table 7.1 Existing Traffic Flows

Road	8.00 – 9.00 am	5.00 – 6.00 pm
Third Class Road at Site	29	23
Junction at R186	108	75

Peak hour traffic on the third class road at the proposed site was 29 pcu/hour. The percentage of HGVs was approximately 20% during the morning peak hour and 20% during the evening peak hour.

Based on the above traffic count for the third class road, the estimated Annual Average Daily Traffic (AADT) from National Roads Authority RT201 Expansion Factors for Short Period Traffic Counts can be calculated as:

AADT = (*MPV Count) (Expansion factor) with 68% confidence limits of '±%'
= (23) (21.13) from Table 3B
= 532 ± 45%

*MPV, Mechanically Propelled Vehicles, refers to the total vehicle count

Peak hour traffic on the R186 at the proposed site was 108 pcu/hour. The percentage of HGV's was approximately 23% during the morning peak hour and 16% during the evening peak hwr.

Based on the above traffic count for the R186, the estimated AADT can be calculated as:

AADT = (MPV Count) (Expansion Factor) with 68% confidence limits of '±%'
= (108) (21.13) from Table 3B
= 2,282 ± 45%

The AADT for the N2 at Emyvale was 5423 according to the 1999 National Roads Authority survey, 23% of the AADT consisted of HGVs.

7.4 Traffic Capacity

The design capacity dthe R186 is in the range as 600 to 1000passenger car units (PCU's) per hour in two directions at level of service C (LOS *C)* and 1075 to 1250 pcus/hour two-way at Level of Service D (LOS D) based on the design capacities for undivided rural roads in the ERU design guideline RT 180. The measured traffic on the R186 from the traffic survey by SWS Environmental Services was approximately 18% of the LOS *C* design capacity given in RT 180.

The third *class* mads linking the plant with the R186 and the N2 are not suitable for HCVs due to the poor surface quality of the roads and the narrow carriageway width, which ranges from 3-5m. The National Road Restoration Program dines the Councils proposed works in relation to road improvements up to the year 2006. The following points should be *noted.*

- There is currently no upgrade program for the roads between the R186 and the site (Roads referenced LPO 1133; LSO 5142) and the roads between Emyvale and the proposed *site* at Killycarran (Road References LPO 1151, LPO 1150, LPO 1160).
- The road fronting the site referenced LSO 5142 and the LPO 1133 connecting the site with the Regional Road R 188 are due for resurfacing (in the year 2003 and *2007* respectively) as part ofthe National Road RestorationProgram.
- 4 The road referenced LPO1150 forming part of the route between the development and the town of Emyvale (located on the National Road N2) is also scheduled for resurfacing.
- The third class roads referenced LPO 1160 and LPO 1151, which form the remaining road sections of the route between Emyvale and the proposed development *at* Killycarran, *are* not contained in the restoration program.

7.5 Construction Impacts and Mitigation

7.6.1 Construction traffic

Peak construction traffic is expected to be approximately 50 passenger *cars.* As the majority of construction employees will work from *8.00* am to 6.00 pm, the predicted two-way peak traffic flows generated by construction employees will occur before the morning and after the evening peak hour.

Construction HGVs are expected to be in the order 15 HGVs per day, or 45 pcus, with a total two way peak of 12 pars.

Assuming a 60:40 *east* west distribution for construction employees (based on population centres around the site) and a 30:70 east west distribution for construction HGVs (based on the assumption that the majority of HCVs will travel via the better approach road from the R186 direction), this results in a peak hourly flow of 30 pus for personnel and 4 pcus for HCVs. This represents an increase of 34 pcus or 117% increase over the surveyed traffic flows of 29 pcus.

7.5.2 Mitigation Measures

The following measures will be adopted to mitigate the impact of construction traffic:

- A traffic management plan will be implemented during the construction phase to minimise traffic impacts occurring as a result of during construction. These will include the following:
  - Provision of buses from population centres (Monaghan and Emyvale) for *site* workers. All employees during Ute construction period wilt be encouraged to travel to the site on buses to minimise the number of vehicles travelling to the site. This will reduce the number of vehicles travelling to the site significantly. It is anticipated that no more than 2-3 buses will be required to transport the employees from Emyvale and Monaghan to the site via the N2 approach.
- A temporary car park will be constructed on-site for the duration of the construction period
- The impact of construction traffic will be confined to a short-term duration i.e. construction period.

7.6 Operational Impacts and Mitigation

7.6.1 Operational Traffic

The proposed development will employ up to 25 people when fully operational. Traffic will be generated as a result of employees commuting to work and various operational activities on site in addition to the delivery of SMC and poultry litter.

(1) SMC and Poultry Litter deliveries:
353,000 tonnes per annum @
50 weeks per annum/6 day week/10 hour day
= 5-6 HGVs/hour (20 tonne HGV capacity)

(2) Ash Removal
54,000 tonnes per annum @
50 weeks per annum/6 day week
= 8-9 HGVs per day (20 tonne HGV capacity)

(3) Other Deliveries and Visitors to Plan
2-3 pcus per day
1-2 HGVs per day

(4) Employees
25 staff including plant personnel and office personnel
= 25 PCU's per day (maximum 20 during daytime)

A summary dthe predicted two-way traffic volumes generated by the proposed development during daily operational period and peak hour period is summarised in Tables 7.2 and 7.3.

Table 7.2 Predicted Two-Way Traffic Volumes

	Hourly Operational {two-way)	Peak Hour (two-way)
Cars and Vans	1-2	20
HCVs	12-14	12-14
Total (pcus)	37-44	56-62

It is anticipated that 70% of the HGVs will travel to and from the plant via the N2, i.e. from the east. The remaining 30% will travel to and from the site via the R186, i.e. from the west. Table 1.3 shows the increase in numbers of pcus travelling on the roads connecting the site to the R186 h the west and the N2 I1 the east.

Table 7.3 Predicted Two-Way Traffic Volumes Travelling on Third Class Roads

	West of Site to R186 (LPO 1133, LSO 5142)		East of Site to N2 (LSO5142, LPO 1151, LPO 1160)	
Normal (pcus/hr)	12	(3-4 HCVs/hr)	26	(8-10 HCVs/hr)
Peak Hour (pcus/hr)	15	(3-4 HCVs/hr)	33	(8-10 HCVs/hr)

7.6.2 Impact of Operational Traffic on Road Network

Section 7.4 outlines the traffic volume capacities of the mads connecting the site to surrounding areas. In their present capacity the third class mads connecting the site to the R186 in the west and the N2 in the east are not suitable for the increased volume of traffic that would be generated by the proposed development. The volume of traffic generated by

the development would result in a 110 – 120% increase of existing traffic levels on these roads at peak hour.

Further to discussions with Monaghan County Council it is envisaged that these roads would have to be upgraded, probably to that of regional road Standard (Appendix 6). This upgrade would involve the widening of the carriageway width to a uniform width suitable for two-way HCV traffic.

There will be a single access point to the site from the third class road beside the site. The critical traffic movement at this junction will be the right turning traffic into the site from eastern approach route. A right turn lane will be required for this traffic to ensure that it will not affect existing traffic flows.

Traffic generated by the development will have a negligible impact on traffic levels in the N2 primary route. It will operata within capacity at a LOS C with or without the development in place.

The peak hour traffic on the R186 will result in a maximum of a 15% increase in traffic volume. In Section 7.4 the existing traffic volume is 18% of the LOS C design capacity therefore the increase in the volume of traffic on the R186 due to the development of the biomass plant will not be significant.

7.6.3 Mitigation Measures for Operational Traffic

The following measures will be adopted to mitigate the impacts of operational traffic associated with the development.

- The primary mitigation measure will be the upgrade of the minor roads connecting the site to the N2 and R186 to a standard that will prevent disruption of the existing traffic flow. The upgrading of the roads will include the widening of the carriageway width and improvement of the road surface quality.
- The delivery of SMC and poultry litter will be restricted to 10 hours per day, 6 days a week.
- Haulage of the SMC and poultry litter will be by way of articulated lorry and trailer. The trailers will have a capacity of 20-24 tonnes and will be fully covered.
- A traffic management plan will be implemented to ensure that the lorries will only use the upgraded routes when delivering waste to the plant and on the return journey. This will provide the minimum disruption to the surrounding area.

7.7 Conclusion

Having examined the likely impact of the proposed development on the road network in the area it is concluded that significant upgrade of the existing third dass roads connecting the site to the N2 and R186 will be required to prevent an adverse impad on the road network. This level of upgrade will be determined in conjunction with Monaghan County Council. The construction of a properly designed access junction will also be determined in conjunction with the Council.

8 0 Geology Soils and Groundwater Quality

8. Introduction

This section examines the potential impacts of the development on the geology, soils and hydrogeology of the site. KT. Cullen and Co. Ltd. were requested by South Western Environmental Services to undertake a baseline geological assessment of the proposed site in order to determine the baseline geology and groundwater potential of the area. Groundwater quality was assessed to determine the baseline quality prior to any development. A copy of the Kt Cullen report is available in Appendix 8. A trial well was also installed In order to determine the potential for groundwater development at the site and a report outlining its development is also included in Appendix 8. The potential impacts of the development during the construction and operational phases are assessed with respect to the geology and hydrogeology. Mitigation measures are outlined in order to minimise any significant impacts . A soil and herbage baseline assessment was also carried out within a 5km radius of the proposed development site and details outlining the scope of work and monitoring results far baseline heavy metal concentrations, dioxins/furans, pesticides, PAH's end PCB's cations and anions are outlined In Appendix 8. This monitoring was carried aut in order to establish baseline environmental conditions with which any future monitoring can be assessed against (see Figure 8.1).

The impact of the proposed development on the geology and groundwater quality were assessed based on the following:

- Rock type and permeability
- Overburden type and permeability
- Importance of groundwater as a resource
- Groundwater vulnerability

8.2 Existing Environment - Bedrock Geology, Soils, Overburden and Hydrogeology

8.2.1 Bedrock Geology

The area is underlain by Carboniferous aged rocks, comprising various limestones, sandstones, siltstones and mudstones. The general Carboniferous succession is outlined in Table 8.1 below:

Table 8.1:Generalised Carboniferous Succession

Formation	Lithological Description
Meenymore Formation (ME)	Shale, Carbonate, Evaporate
Dartry Limestone (DA)	Cherty Limestone
Benbulben Shale Formation (BB)	Calcareous Shale
Bundoran Shale Formation (BN)	Dark Shale, Fine Limestone
Carrickaness Sandstone Formation(CS)	Sandstone, Siltstone, Mudstone
Maydown Formation (MA)	Argillaceous Limestone and Siltstone

The site is underlain by the Maydown Limestone Formation which is in faulted contact with the rest of the younger Carboniferous rocks of the area. The fault dividing the Carboniferous rocks runs north-west south east. A synclinal structure runs through the Maydown Formation which has at its core a deposit ofthe younger Carrickaness Sandstone (CS). Drilling carried out on the site indicated the presence of grey black limestone bedrock

8.2.2 Overburden Geology and Soils

The overburden geology consists predominantly of drumlin boulder clays – these are brown – grey silty heavy clayey till with sand and gravel lenses found interspersed in the clay. A total of 7 soil profiles were taken across the site to depths of 1m tu determine soil characteristics. Till deposits are characterised by their lack of stratification with large boulders and mall hand sized cobbles being equally distributed throughout the height of the deposits. These allow some water movement through the otherwise low permeable clay material. Drilling on the site has shown that the overburden deposits are quite thick, in the order of twenty four to thirty metres, and are composed predominantly of clays. Twenty six metres of days are seen to overlie four and a half metres of gravels on top of the bedrock, at the trial well location (TW 1). 24.08 metres of day are seen to overlie the bedrock at the monitoringwell location.

The thickness of the overburden material is advantageous in that the bacteriological quality of water from bedrock should be good as the thick layer of overlying deposits filters out any contaminants. The thick impermeable overburden layer a b limits the amount of recharge (rainfall) reaching the bedrock aquifer.

A visual walk over survey of the site resulted in no physical evidence of contamination. This was substantiated through extensive physical and chemical sampling. Soil chemical sampling at a total of 5 locations on site was carried out for heavy metals, Polychlorinated Biphenyls

(PCB's), Volatile Organic Carbons (VOC's), Poly Aromatic Hydrocarbons (PAH's), dioxins and pesticides and results compared with Dutch Maximum Admissable n (MAC) Guidelines for soils. In addition, the provisions of the *Sewage* Sludge Directive were used as threshold or Indicator values. Soil samples were collected from a total of 26 sampling locations at distances of 0.5;1;3 and 5 kms from the proposed development *site* and sent to Alcontrol Geochem for analysis (as outlined in Appendix 8).

Overview of Soil Site Sampling Results

With the exception of one copper sample result which exceeded the Dutch S Value of 36mg/kg, all heavy metal results were within Dutch S Values for metals. No exceedences in PAH's PCB's VOC's, organochlorine and organophosphorous pesticides were recorded are were typical of normal uncontaminated soil. Background levels of dioxins/furans were established at the site with ranges from 0.53 – 2.2ng/kg TEQ. *As* domestic and agricultural operations such as grass or hay burning, cigarette smoking create ambient dioxins, and dioxins am known to bind strongly with soil and are persistent in the environment these levels were considered against "typical" background levels and are as expected for rural environmental conditions.

Overview of Off site Soil %nd Herbage Sampling Results

As is expected, results for soil and herbage varied across the 5km sampling locations. While the bedrock plays a large influence on soil type, differences in the land use. (farmed, idle land, arable, landspreading, addition of herbicides and fertilisers) will all influence soil and herbage chemical composition. Full details of all soil and herbage results are included in Appendix 14 and these baseline environmental *conditions* can be used as a reference against which any future monitoring can be measured.

8.2.3 Hydrogeology

Groundwater is an important resource in Monaghan, supplying approximately 16% of drinking water in the county. Groundwater on site Is flowing in a south-easterly direction at a gradient of 0.016. The site is situated *on* the northern slope of a drumlin feature which has an elevation of greater than 122 metres. This is an elongated feature which runs in a north-south direction. Regionally, the groundwater is likely to be flowing in a radial fashion from apex of this structure with a chief component of flow towards the Mountain Water River

i)Current Water Usage

Groundwater is used locally for domestic supply at McCarrons property (the site owners); all other houses are supplied by a group *scheme* which obtains its supply from Lough More,

located some 5.4 km to the north-west of Derrygola. The total water capacity of this scheme is approximately 757m^3/d. Current water usage is on average 530m^3/d.

ii)Aquifer Classification

The Geological Survey of Ireland (GSI) has provisionally provided an aquifer classification for the Maydown Formation of Rf (regionally important fissured bedrock aquifer), based on the current understanding on the hydrogeology of the area and on existing hydrogeological data.

Annual average rainfall for the rainfall station at Emyvale is 966 mm. A proportion of this will go to recharge the aquifer. The volume of recharge in this area. however will likely be significantly lower than average as a result of the presence of a large thickness of low permeability *days* overlying the bedrock.

iii)Aquifer Vulnerability and Classification

Drilling has *shown that* there am in the region of 18 to 24 metres of clays *on* the site overlying 6 metres of gravel at the location of the trial well and bedrock at the location of the monitoring well. The site is classified as having a bw vulnerability rating according with >10m of low permeability days overlying the site. Any contaminants that may enter the subsurface will be adsorbed onto these clays, thereby affording the underlying groundwater protection from pollution. The groundwater in the area is confined under significant thickness of *clays,* and as such, the recharge area may be *quite* a distance from the *site.*

8.3 Groundwater Development Evaluation

It *is* proposed to abstract groundwater on the site for use in the proposed development. A trial well was drilled and pump tested in September 2001 to determine groundwater potential at the site. A 72-hour pump test was carried out and this data is tabulated and graphed in Appendix 8. This well was shown to be capable *of* yielding *at* least 650 m^3/day. Driller's estimates placed the potential yield at 1091 m^3/d but a full assessment of the yield was limited by the diameter of the trial hole. The fact that the testing ofthe well was carried aut in September indicates that these yields am sustainable and that the potential for groundwater development at the site is good.

Groundwater sampling was carried out *on* the trial well at the end ofthe 72 hour pump test for bacteriological and chemical analysis In order to determine the suitability of the groundwater

for process and potable use. Samples were analysed for chemical organic and bacteriological composition.

Groundwater sampling was also carried out on the property owners well, located 40m from the site (Figure 8.1). This well was analysed for metals and standard elemental analysis, volatile organic compounds, polyaromatic hydrocarbons, polychlorinated bi-phenyls and pesticides in order to establish baseline groundwater concentrations around the site.

8.4 Groundwater Quality

8.41 Overview of Groundwater Quality Results

Groundwater from both the trial well and adjacent property developers well were sampled in order to establish groundwater quality within the area and assess the suitability of the trail well for site water requirements.

TW1 – Site Well

The chemical quality of the groundwater is indicative of the bedrock geology of the area. The high sulphate, sodium and chloride concentrations are associated with the presence of gypsum layers in the Meenymore Formation which forms shallow outcrops to the west of the site. The presence of gypsum layers in the Meenymore formation accounts for the relatively high conductivity (1400µS/cm) in the groundwater. The water is moderately hard with a pH typical of an alkaline parent rock. Total ammonia is also higher than its MAC of 0.3mg/l and appears to be naturally occurring due to anaerobic conditions in the aquifer. Without the presence of associate indicators of swage contamination such as potasslum, nitrite and coliforms the high ammonia levels are not harmful to health. Bacteriological qualii is excellent with no faecal or total coliforms present. This is due to the fact that the vulnerability of the site is very low as a result of the thick overburden deposits.

There Is no evidence of organic pollution with all results below the laboratory detection limit. Analytical results were compared with Irish Drinking Water Standards (SI 81 1988) and also with Dutch MAC Guidelines for Groundwater (Appendix 3). Sampling results are summarised below and full details included In Appendix 8.

8.4.1.1 Volatile Organic Carbon Results

Volatile Organic Carbons are relatively light (molecularly) volatile organic compounds. VOC results were analysed as per US EPA 624/8260 Method list and compared with relevant

Dutch MAC S and I values. All results were found to be less than the laboratory detection limit of 1µg/l.

8.4.1.2 Polyaromatic Hydrocarbons

None of the results were detected at levels above the laboratory detection limit of 0.01 µg/l.

8.4.1.3 Polychlorinated Biphenyls

PCB's are an extensive and complex group of chemicals to analyse for and are usually subdivided for analytical purposes based on molecular structure and constituent elemental ratios into Aroclors. Seven PCB's were analysed. PCB levels were not detected at levels above the laboratory detection limit of 0.1µg/l.

8.4.1.4 Agricides - Organochlorine and Organophosphorous Pesticides

Agricides are a complex and extensive group and are usually subdivided according to molecular structure and elemental constituents. In order to choose the analytical package likely to be appropriate to the groundwater samples selected the potential (or suspected) sources of agricide contamination in groundwater were identified where possible. Organophosphorous compounds are generally more toxic to insects than to mammals and have a much-shorted half-IC than organochlorines. They are labelled as 'safe' insecticides and in many insecticide applications are replacing organochlorines. Organochlorine pesticides were also selected for evaluation because they am persistent in the environment (2- to 5-year life), less water soluble, and less biodegradable than most *other* pesticides. Results were not found above the laboratory detection limit.

8.4.1.5 Major Anions, Cations Heavy Metals, pH and Conductivity

Results were compared to Dutch intervention and guideline values as well a5 drinking water qualii standards. *AH* results were found to be within drinking water quality standards with the exception of nitrite and ammonia levels w h i i were found to be *elevated.* Levels of 0.59mg/l NO_2- were detected and levels of 1.5 mg/l NH_4. Nitrite normally exists in very low concentrations as it is an intermediate in the oxidisation of ammonia to nitrate. The significance of nitrite is mainly as an indicator of pollution. The source of these elevated reading is most probably from runoff from the waste material on the farm which percolated down into the groundwater.

A comparison of the two sets of chemical results from the trail and developers well indicates that the geology is influencing water chemistry locally with no correlating high conductivity, sodium, sulphate and chloride values indicated between the trail and farm well. This farm well is shallower (circa 60m deep) and may be in a different geological formation. Ammonia was below the potable MAC value (1.5 mg/l NH_4 vs. 0.3 mg/l) and the correspondingly high nitrite which *may* indicate *organic* contamination. All other results were within potable drinking water requirements. No exceedences in PCB, PAHs or VOCs were noted.

Additional sampling and analysis of groundwater from the trial well and developers well will be carried out to determine if the water is suitable as potable drinking water for the development. If required, a connection may be made to Group Water Scheme for a supply of potable water for the plant.

All sampling results are reported in Appendix 8.

In a development such as this, the main potential impacts are as follows:

- Removal of overburden cover and bedrock
- Leaking sewers and accidental oil spills
- Erosion and sediment controls
- Abstraction from and discharges to groundwater
- Impact on the hydrological regime of Natural Heritage Areas
- Reduction of recharge areas

8.5 Impacts of the Developmer Constructi

i)Removal of Overburden Cover and Bedrock

It is *not* proposed that any significant volume of overburden or bedrock will be removed from the *site.* During the construction phase, exposed soil can be dampened to avoid erosion of soil and generation *of* dust.

As there is no significant removal of overburden material from the *site* and no quarrying of bedrock there are no remedial measures necessary.

ii) Accidental spills

It is possible that accidental oil spills may occur from tanks or vehicles. There is potential for diesel leaks/ spills to impact on groundwater quality. Oil will be delivered to site by tanker. Any

chemicals or diesel used on site will be stored in a suitable tank (steel/ plastic). Storage tanks will be bunded to 110% of the tank capacity. Any leaks or spills will therefore be contained and will be disposed of with a suitable hazardous waste contractor. Drainage from bunded areas will be diverted for collection and safe disposal.

iii)Erosion and Sediment Controls

Vegetation and topsoil will be stockpiled on the site for later use and it is anticipated that soil excavated during site development will be utilised elsewhere on site. Good construction practice and care will be taken to minimise any impacts. If necessary a temporary sediment stormwater retention pond will be designed to minimise sedimentation during construction.

iV)Natural Heritage Areas and Special Areas of Conservation

There are no Natural Heritage Areas or Special Areas of Conservation within 5 km of the site. No impacts are predicted and no mitigation is considered necessary

Water Usages and Water Discharges

It is proposed that portable toilets will be used for construction personnel. Waste effluent will either be treated on site via a sewage effluent treatment plant or else removed by an appropriate waste contractor.

8.6 Plant Operation

8.6.1 Facility Water Requirements

The plant will use groundwater from the trial well for operation of the facility. Water usage will include:

- Process water use
- Potable Water use (drinking water, sinks, toilets, showers)
- Boiler water and boiler water make up use

Under average conditions the total water requirement far the plant will be 3.75m^3/hr and under abnormal conditions this figure is anticipated to be 7-10m^3/hr.

i) Abstractions and Discharges

It is intended to abstract groundwater on the site for use as process water in the proposed development The trial well has been shown to be capable of yielding in the order of 650

m^3/day, . Water levels were recorded during the course of the pump test in the unused well in the farmyard, some 170 metres to the south of the trial well. The maximum drawdown recorded in TW1 during the pump test was 8.8 metres. There is one domestic well in use close to the site, owned by the site owner, (see Figure 8.1).

There are not likely to be any direct discharges to groundwater. A wastewater treatment system will be installed at the site which will discharge treated effluent to the ground at the northern boundary of the site or through percolation pending site conditions. This will be subject to discharge standards set by Monaghan County Council. From here the groundwater will discharge into the drain. There are no groundwater abstractions within the immediate vicinity of the Site. Any wash down water used in plant cleaning would be collected in a sedimentation sump prior to discharge to surface wader drain and would therefore not impact on groundwater quality.

Groundwater abstraction on the site wilt impad upon the domestic well at the developers property as the pumping test showed an impact of 8metres. It would be advisable to monitor the water levels in the observation well and the unused well at the farm on an ongoing basis, to build up a database. The maximum required yield at the site is only 10 m^3/hr (sustainable yield of 27 m^3/hr) and the test was carried out during the time of lowest water table levels. It is unlikely that normal pumping at the required rate will significantly impad local groundwater levels. AU other residences in the area are supplied by a group scheme with a surface water source. Consequently, any groundwater abstraction will have no real impact in the area.

The wastewater and sewage will be treated by passing through a Bioclear Treatment System which will provide a high level of treatment. The resultant effluent will be further attenuated as it passes through the subsoil deposits and into the drain. The drilling of an observation well near the area of discharge shows the presence of 24.08 metres of tight day. This will prevent any of the discharges from reaching the groundwater.

ii) Accidental Spills – Plant Operation

Fuel supplies will be handled and stored within enclosed buildings constructed with an impervious concrete floor. Thus no outdoor storage of fuel can occur which could come into direct contact with rainfall and seep into local groundwater resources. Any solid spillages would be to hard surface areas and would be swept up and returned if possible to the fuel storage bin There are therefore no potential impacts to existing groundwater resources or water supplies that could affect public health and safety

The volume of surface water and storm water run off from the site will be a function of rainfall, with maximum occurring in winter. The site drains towards a small stream to the N of the development. Standard surface water drains will be installed on the site. To mitigate for any accidental spillages of oil or car leaks, an oil interceptor will be placed at the outlet of the surface water drains. This interceptor would allow any oil to be separated out from the water, thus ensuring that the discharged water is free from hydrocarbons. In the unlikely event of a leakage to groundwater, the low vulnerability of the overburden will act as an impermeable barrier to flow.

Oil tanks on the site will be bunded with 110% capacity of the oil tank in order to reduce the risk of spills occurring. Any chemicals used on site will be stored within marked appropriate containment areas and in accordance with good health and safety practices. Electrical components on site which are oil cooled will be housed on concrete pads. Filling and draw off points will be located within the bunded areas. Drainage from bunded areas will be diverted for safe collection and disposal.

The site is approximately 0.033km^2 in area in total. The total amount of hardstanding, which consists of asphalt paving and concrete paving, is 0.00732km2; this will add protection to the underlying aquifer. This is approximately 22% of the site area.

iii) Stormwater management – Operation

As previously indicated fuel will be delivered in covered trucks and processed within enclosed building structures. Therefore, fuel will not be exposed to direct contact with rainfall or runoff and will not represent a potential source of nutrient loading in stormwater discharges from the site. Furthermore, the site will be properly maintained and good site housekeeping practices will be implemented to keep all mad surfaces clean, reducing solids loading in stormwater runoff. Landscaped areas adjacent to buildings and natural vegetation buffer strips along the perimeter of the site which have low runoff potential will provide further treatment of runoff by filtering out nutrients and suspended solids. In addition to the stormwater management provision described above, management practices will also include storage of chemicals within appropriate containment areas, good rite housekeeping practices and proper disposal of any waste materials. As a result, stormwater runoff from the facility is not expected to adversely affect the water quality in downstream receiving waters.

iv)Natural Heritage Areas and Special Areas of Conservation

There are no Natural Heritage Areas or Special Areas of Conservation within 5 km of the site. No mitigation is considered necessary. Areas designated for conservation purposes are shown in Figure 11.2, in the Flora and Fauna Chapter of this Document.

8.7 Predicted Residual Impacts of the Development

The proposed development is not expected to have any negative impact on groundwater quality. Baseline water quality samples were taken at the time of drilling of the supply well and adjacent property developers private well. These can be used to compare any future changes in water quality.

Groundwater abstraction on the site will result in the development of a cone of depression around the well. This is not likely to haw any significant impact as there is only one domestic well in use close-by, which is owned by the developers.

There is not expected to be any impact on the bedrock or overburden geology or areas of conservation.

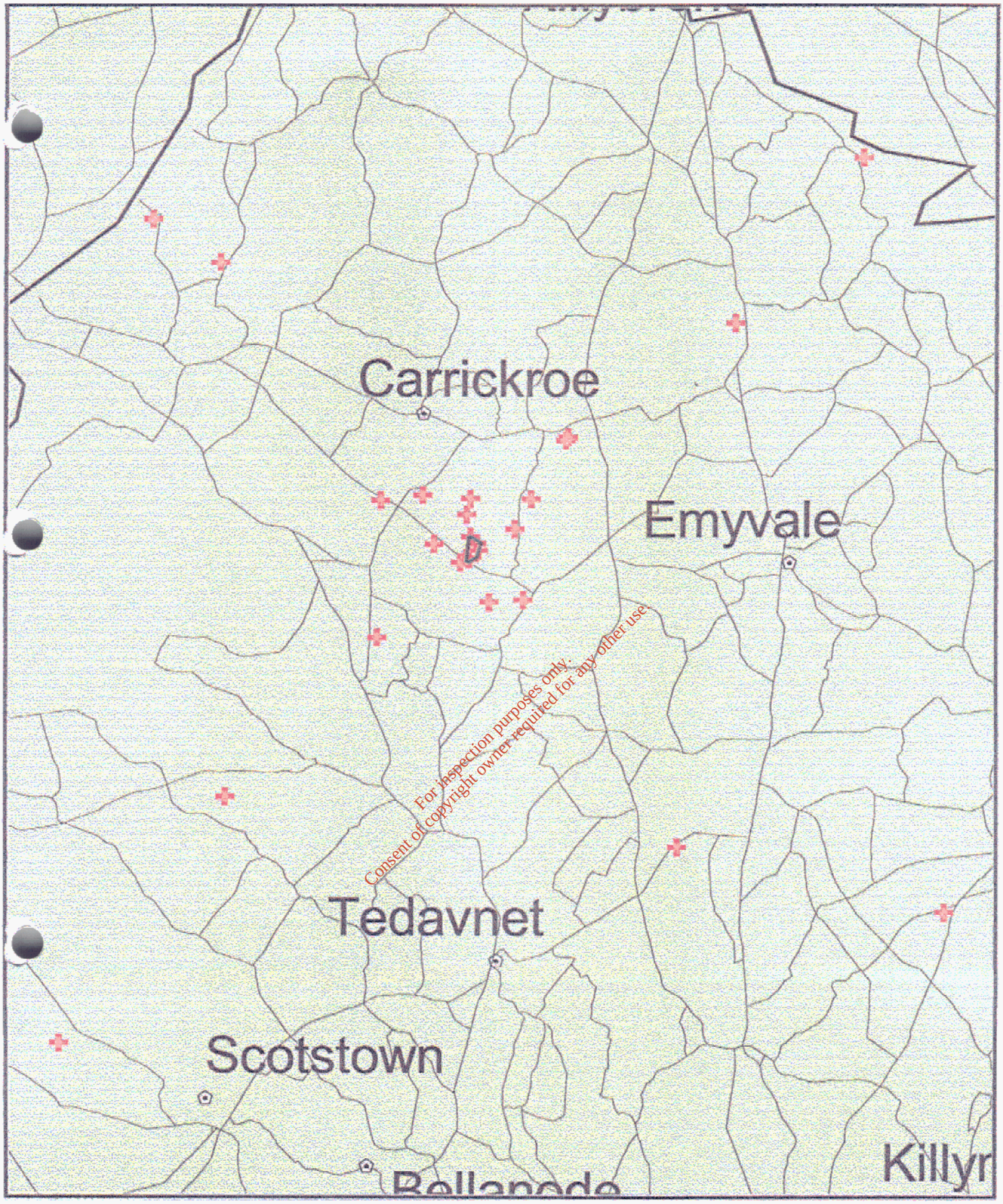


Figure 8.2: Soil & Herbage Sampling Locations

- Boundary of Biomass CHP Plant
- Soil & Herbage Sampling Locations
- Roads
- Towns and villages
- Ireland

N
W E
S

0 1 2 3 4 Kilometers

RENEWtech

South Western Environmental Services

Project: CHP Biomass Plant
Client: Renewtech Ltd.
Date: December 2001
Prepared by: KO'D
Approved by: SH/DW