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**Clonmel Wastewater Treatment
Plant**

Sludge Drying Facility

**Volume 1 – Non-Technical
Summary**

Environmental Impact Statement





Clonmel Sludge Waste Water Treatment Plant – Sludge Drying Facility

Environmental Impact Statement Volume 1 - Non-Technical Summary

May 2002

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Environmental Impact Statement

Volume 1 - Non-Technical Summary

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CHAPTER 1 - INTRODUCTION

The Brief

- 1.1 Atkins McCarthy (now Atkins) was appointed in June 2000 by Clonmel Corporation (now Clonmel Borough Council) to undertake an Environmental Impact Assessment for the installation of a Sludge Drier and sludge treatment facilities at Clonmel Waste Water Treatment Works (WWTW).

Nature of the Proposed Development

- 1.2 Clonmel Borough Council is planning to expand its facility by installing a Sludge Drier for sludge treatment at Clonmel WWTW. Ancillary work is also proposed for the acceptance of imported liquid and cake municipal sludge from other WWTW's in South Tipperary (formerly Tipperary South Riding) because Clonmel WWTW has been recommended as the hub centre for municipal sludge treatment in the *Sludge Management Plan for Tipperary SR* ⁽¹³⁾.

Evaluation

- 1.3 An assessment of the environmental impacts of the proposed development was undertaken and mitigation measures were recommended in accordance with *EPA Guidelines* ⁽¹⁰⁾.

CHAPTER 2 - DESCRIPTION OF THE PROPOSED SCHEME AND ALTERNATIVES

Background

Location

- 2.1 Clonmel town is within the southern boundary of South Tipperary [formerly Tipperary South Riding] (Figure 2.1). It is the county's administrative centre and is the major economic centre for South Tipperary and Northwest Waterford.
- 2.2 Clonmel Wastewater Treatment Works (WWTW) is located approximately 1.70km east of Clonmel town centre. The area of the site is 6.50 hectares and in general, is bounded on the north side by Davis Road and on the south side by the River Suir (Figure 2.2).

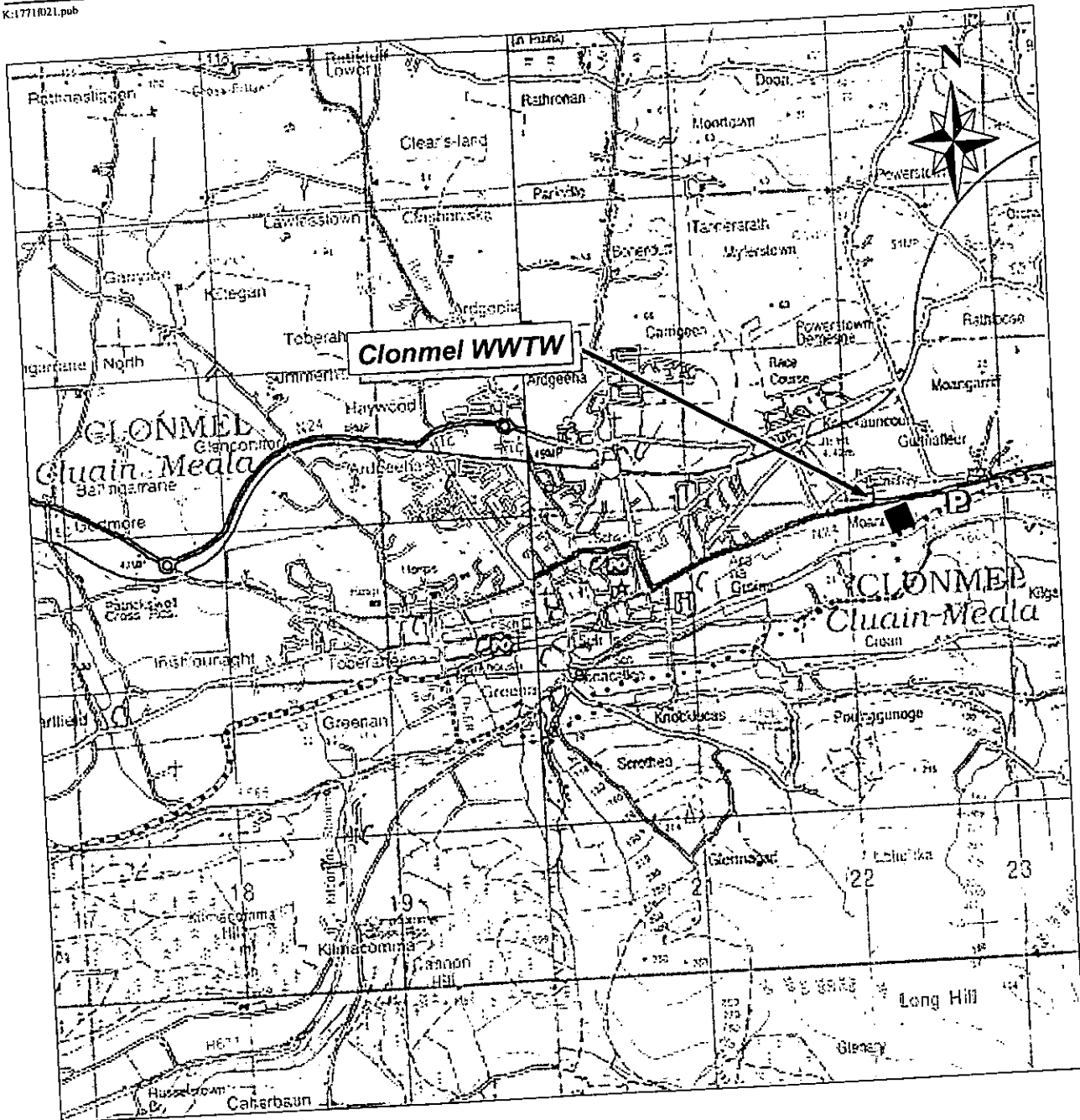
Population

- 2.3 The Clonmel Borough Area comprises of approximately 1,087 hectares (2,684 acres). Annual growth for Clonmel Borough has been estimated at 1.0%, based on 1996 Census data with an estimated population of 20,200 for the year 2,000 and 24,000 for the year 2018.

Legal Requirements

- 2.4 Clonmel Borough Council is required to produce an Environmental Impact Statement for the Sludge Drier. This is pursuant to Section 175 of the Planning and Development Act 2000 and Part 10, Article 120(i) of the Planning and Development Regulations 2001-2002.

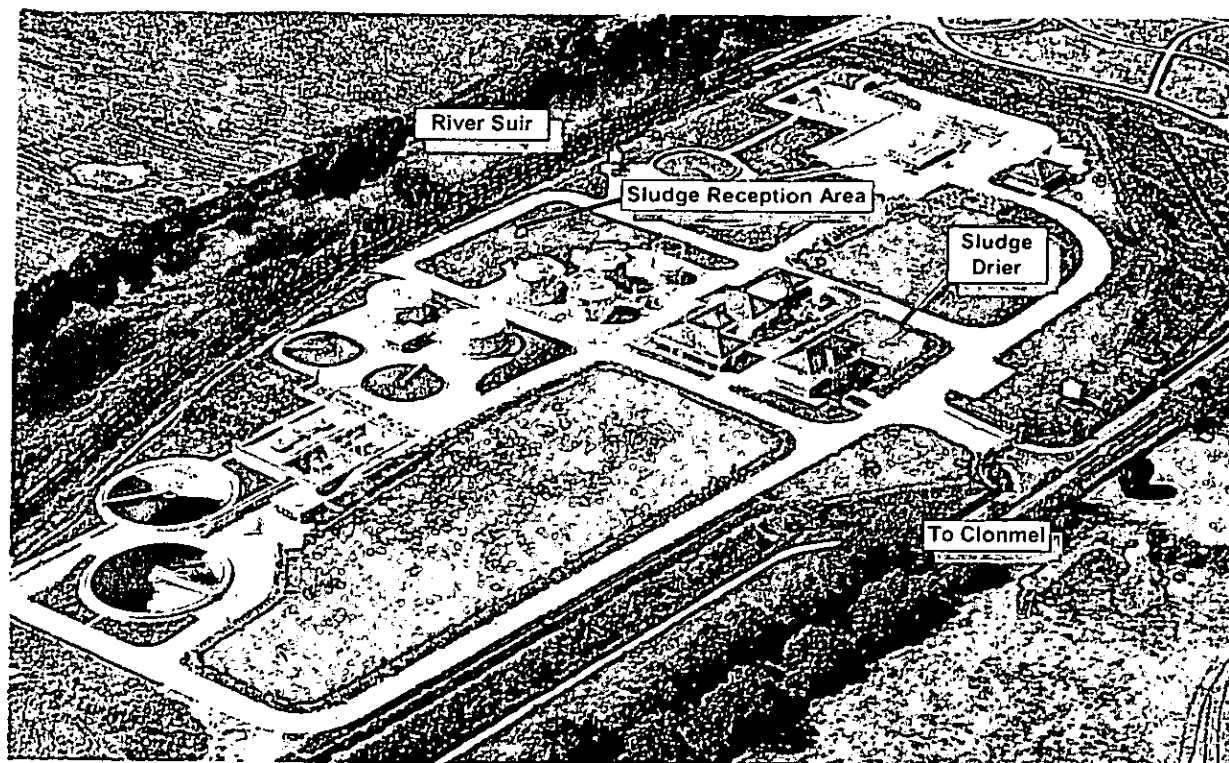
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LOCATION OF CLONMEL, TIPPERARY S.R WWTW.

FIGURE 2.1

WS/A/kins



LOCATION OF PROPOSED SLUDGE DRIER AND
SLUDGE RECEPTION AREA

FIGURE 2.2

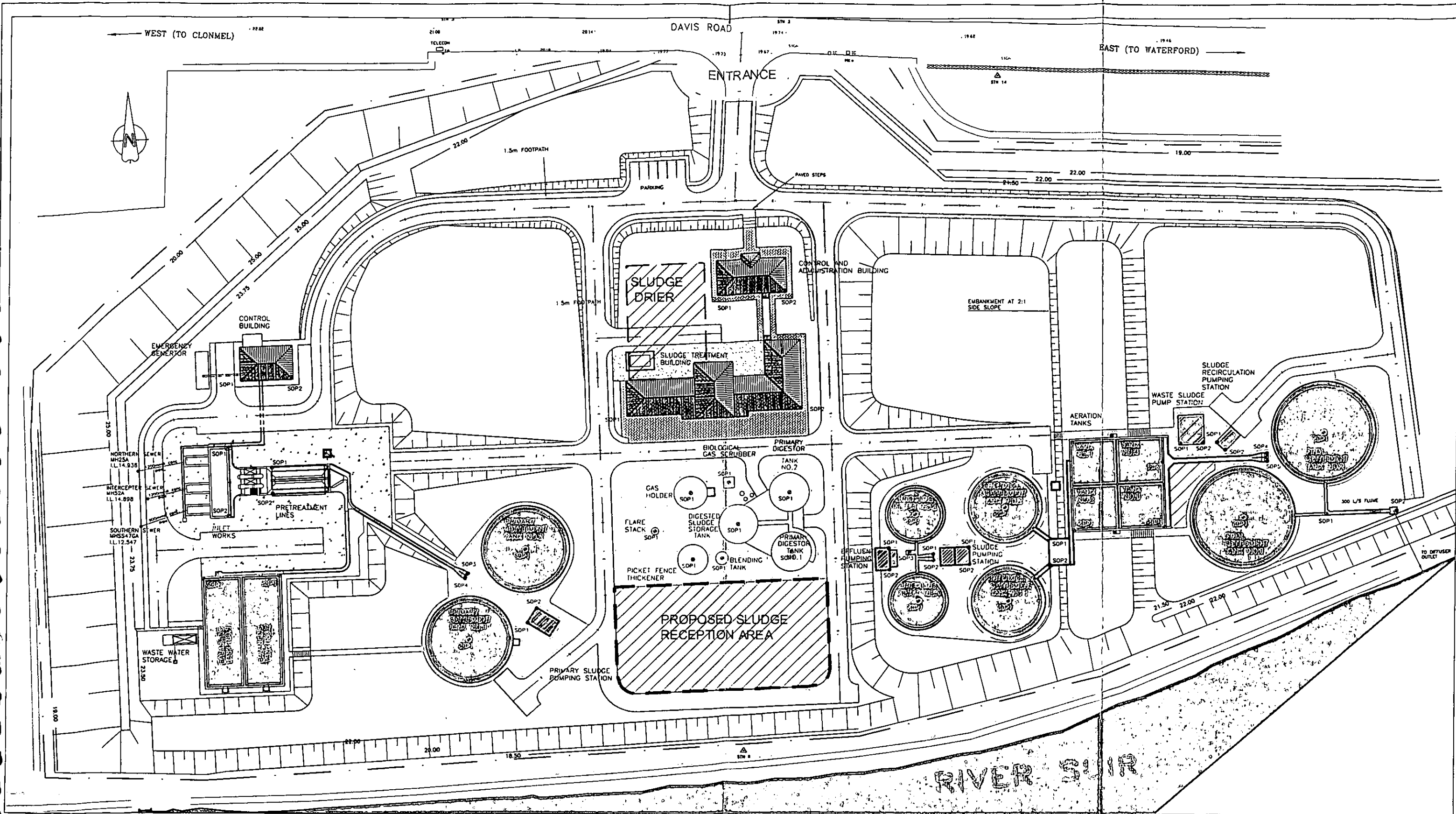
Current Situation

- 2.5 Clonmel Wastewater Treatment Works (WWTW) (Figure 2.1 and Figure 2.2) has been designed to serve the population of Clonmel and the associated trade industry in the area. The WWTW utilises conventional biological treatment processes and incorporates an area for sludge treatment and de-watering. At present, pressed digested sludge is pressed, de-watered and mixed with lime to pasteurise and stabilise it. Lime-stabilised sludge is temporarily stored prior to removal off-site by a biosolids disposal contractor for land spreading. The existing sludge treatment facility at the Clonmel WWTW was designed to service the requirements of the WWTW itself and sludges are not imported and treated on site at present. The lime stabilisation process reduces the sludge water content from 82% to 70-75%.

Proposed Development

Future Situation

- 2.6 Clonmel Borough Council is planning to install a Sludge Drier for sludge treatment at Clonmel WWTW (Figure 2.3). The project will also involve housing the dryer, modifying associated access roads and associated works to the existing works.
- 2.7 The use of thermal drying for sewage treatment is a relatively new sludge treatment process in Ireland. Prior to entering the Sludge Drier, sludge consists of 18% total dry solids (i.e. 82% water). The Sludge Drier involves reducing the water content of the sludge by evaporating water from sludge cake to produce a dried granulate material of up to 95% total dry solids (i.e. 5% water). This process takes place through the application of heat which evaporates water from the sludge. This water is condensed and is then collected and returned to the inlet works of the WWTW.
- 2.8 The Sludge Drier will play an important role in achieving standards set out in the Sludge Management Plan for Tipperary South Riding ⁽¹³⁾, such as achieving pasteurisation of the sludge resulting in the production of a Class A Biosolid.
- 2.9 The full design capacity of the current WWTW is 80,000 Population Equivalents. There is space at the Clonmel WWTW for expansion of the works to an ultimate design capacity of 160,000 PE.



						PROJECT TITLE			
						CLONMEL SLUDGE DRIER			
						EIS NON TECHNICAL SUMMARY			
						DRAWING TITLE			
						CLONMEL WWTW SITE LAYOUT			
						DRAWN	GH	CHECKED	PO'C
						APPROVED	MMCH	DATE	MARCH 2001
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Disposal of Thermally Dried Sludge

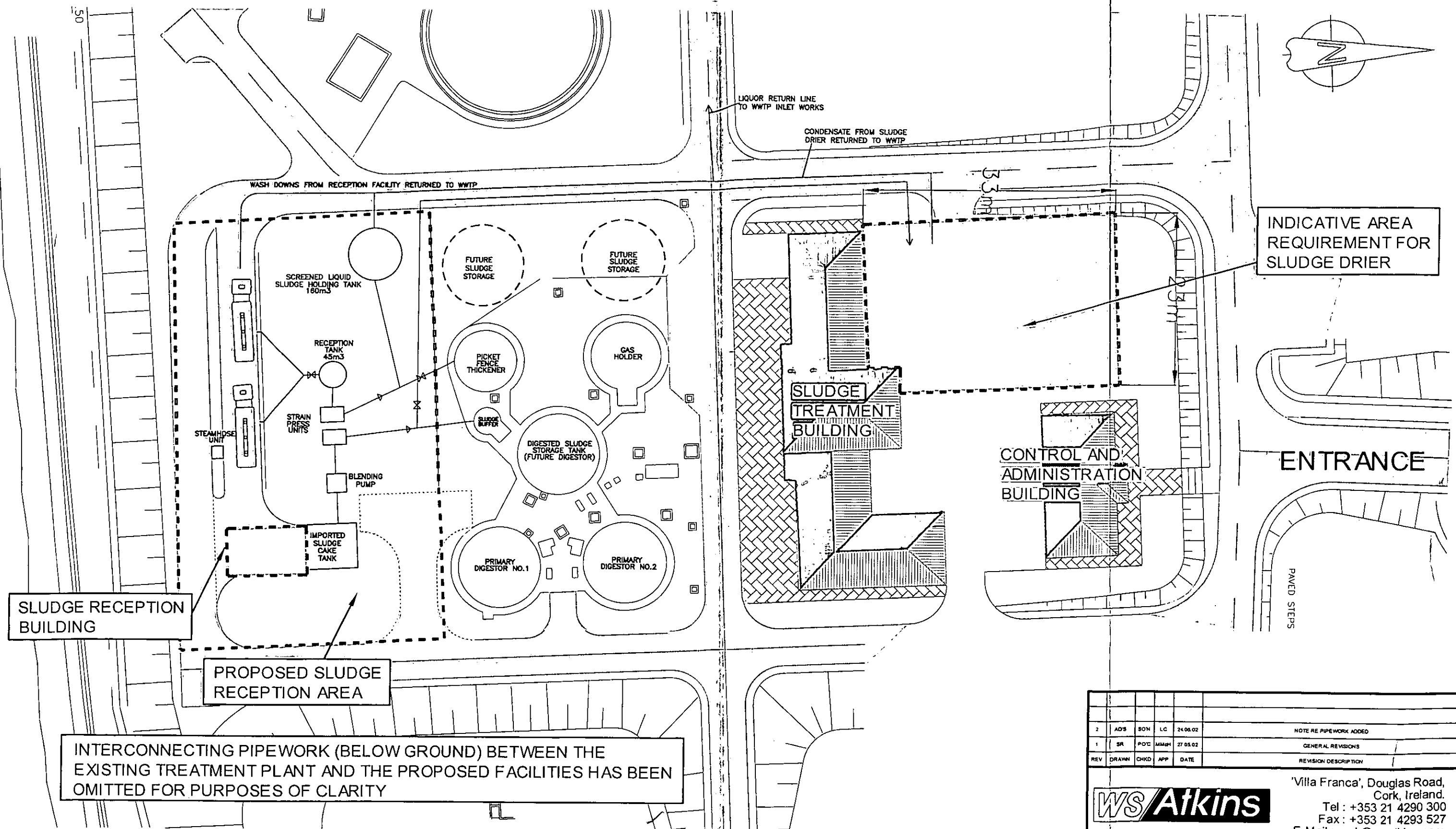
- 2.10 Thermally dried sludge is a comparable product to conventional artificial fertiliser as it can be bagged, stockpiled and distributed with ease. The *Sludge Management Plan for Tipperary SR* ⁽¹³⁾ states that thermally dried sewage sludge to be produced at Clonmel WWTW will be beneficially recycled in agriculture in accordance with the *Code of Good Practice for the Use of Biosolids in Agriculture* ⁽¹¹⁾.

Current & Future Sludge Volumes

- 2.11 A feasibility study carried out by Atkins McCarthy⁽¹⁾ in 1999 projected future volumes of industrial and municipal wastewater for Clonmel WWTW to be 1,468 TDS/yr by the year 2018, almost 1.5 times current volumes and substantially exceeding the capacity of the existing sludge digestion plant at Clonmel WWTW. This sludge is currently taken off-site for land-spreading. The installation of a Sludge Drier would enable the sludge to be further de-watered to a product which is in excess of 92% dry solids as opposed to 16% under current de-watering methods.

Proposed Sludge Reception Area

- 2.12 The proposed sludge reception area is to be located immediately to the south of the existing sludge digesters in the area previously set aside for sludge treatment purposes. The sludge reception and treatment facilities will accept, handle and treat sludge from municipal WWTW's in both cake and liquid form. This sludge will be transported to the site in completely sealed containers. Therefore, there will be no odour generated during transportation to the Sludge Reception Area from other parts of the county. The proposed sludge reception area incorporates good vehicular access hard-standing and wash-down facilities (Figure 2.4). The sludge reception building will be managed and controlled to prevent escape of odour. Vehicles transporting sludge to the site will enter the sludge reception building, the shutter/door will then close behind the vehicles before sludge is removed from the trailers.



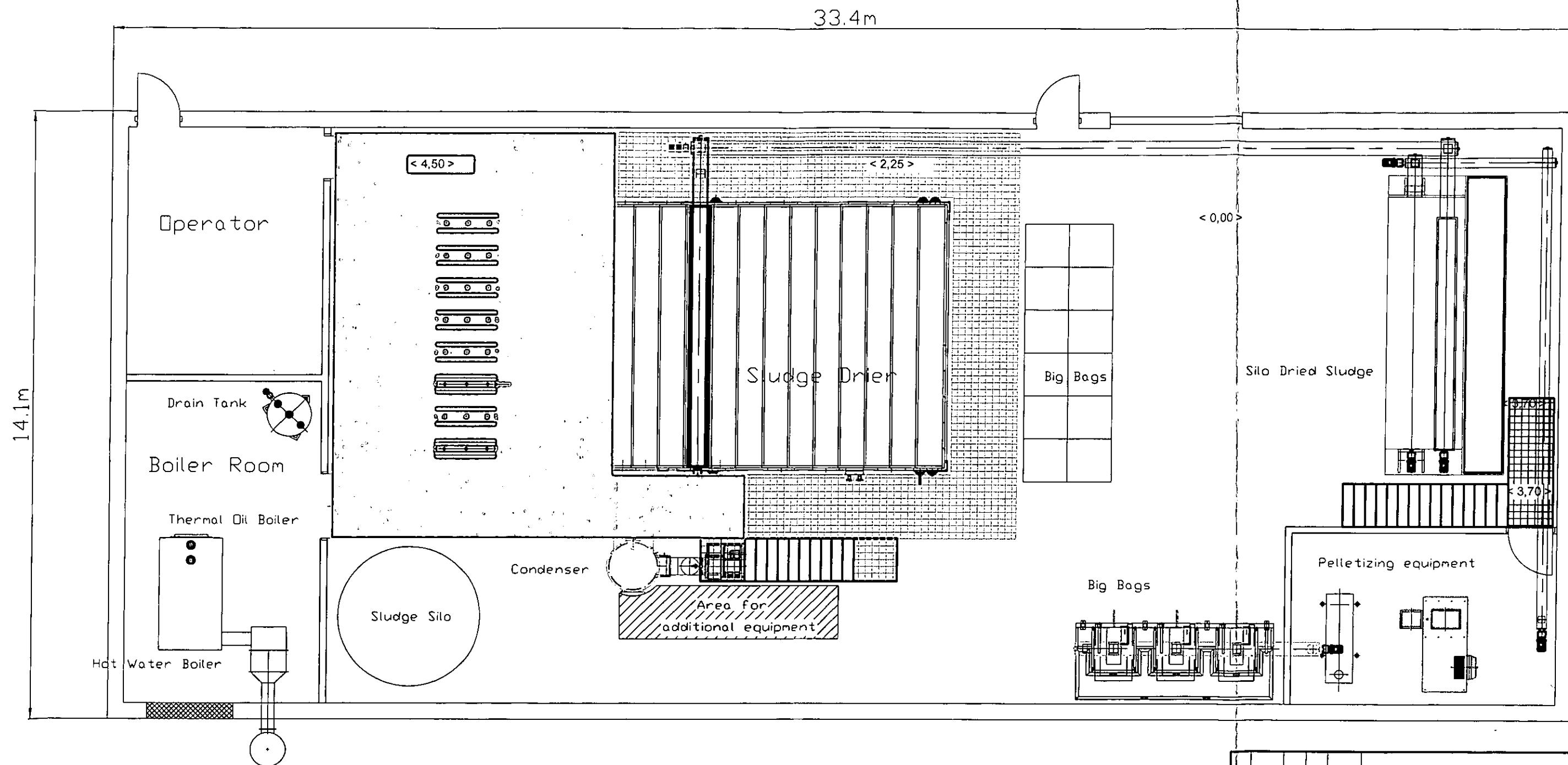
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<div> <div>WS Atkins</div> <div> 'Villa Franca', Douglas Road, Cork, Ireland. Tel : +353 21 4290 300 Fax : +353 21 4293 527 E-Mail : cork@wsatkins.com </div> </div>					
PROJECT TITLE CLONMEL SLUDGE DRIER EIS NON TECHNICAL SUMMARY					
DRAWING TITLE PROPOSED LAYOUT OF SLUDGE DRIER AND ASSOCIATED PLANT					
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Proposed Sludge Drier

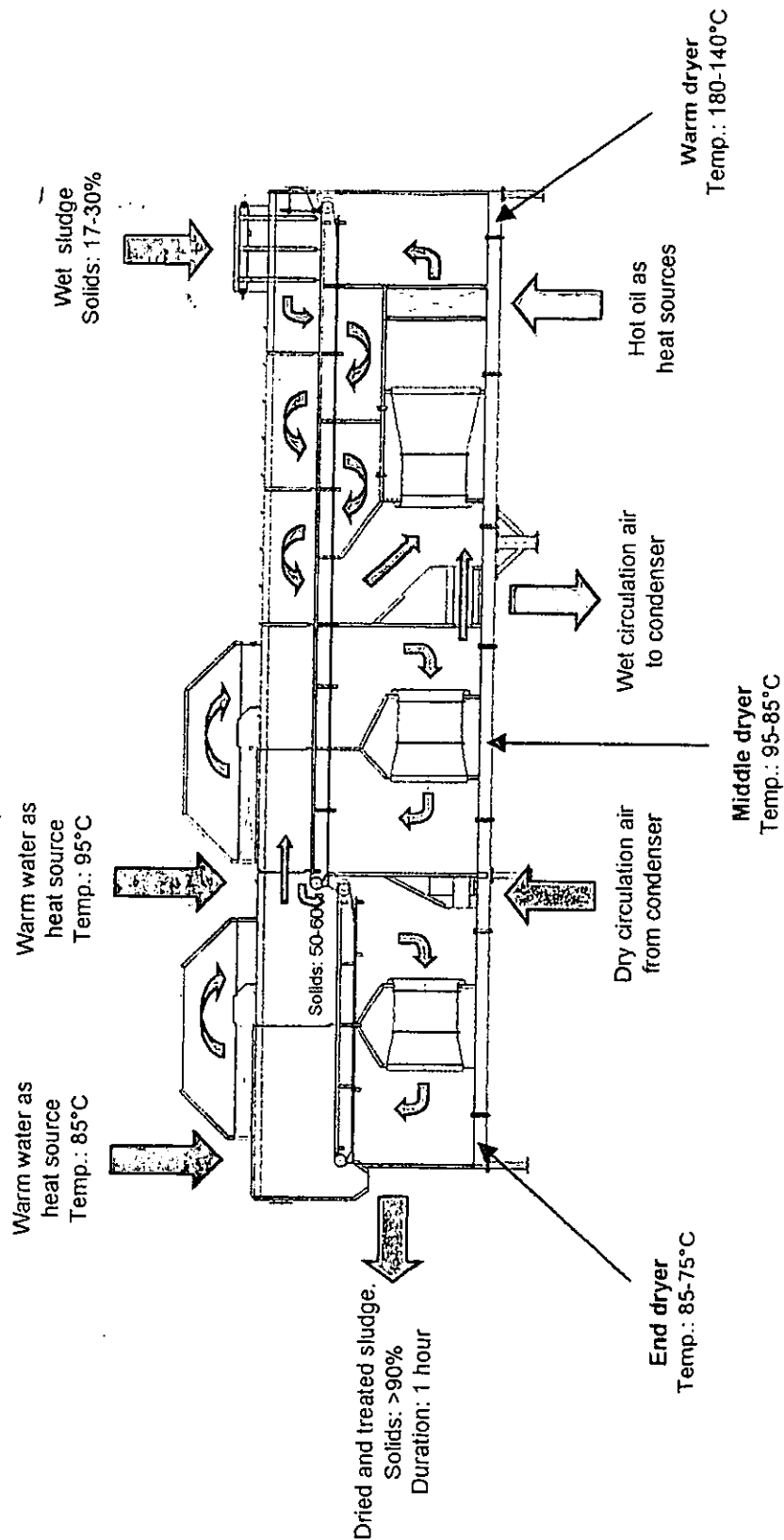
- 2.13 Manufacturers available for thermal drying of sludge include among others, Bio-Con (Belt dryers'), Seghers (Fluidised bed dryers) and Swiss Combi (Drum Dryers). The proposed Sludge Drier will be situated immediately west of the existing control and administration building.
- 2.14 Thermal drying is frequently operated in conjunction with an anaerobic digester and the biogas produced from the anaerobic digester is then used as a heat supply to the dryer. Sludge drying is a unit operation that involves reducing the water content of the sludge by evaporation.
- 2.15 Figure 2.5 shows the typical layout and size of a possible drying system for Clonmel WWTW, based on the future sludge estimations for the Works. Figure 2.6 highlights the methodology and process involved with a belt drying system. These figures are included for the purposes of illustration only and are without prejudice to the type of system that will be selected following public tender. Only those systems that comply with strict operating performance criteria, including those criteria set down in this EIS, will be considered for the final dryer installation that will be provided at the works.

Sludge Collection from Satellite/Hub-Centre

- 2.16 In *Sludge Management Plans: A Guide to their Preparation and Implementation* ⁽¹²⁾ it is recommended that the counties be divided into sub-groups with a nominated 'Satellite' WWTW in each sub-group to act as a handling and storage centre for sludge in that area. Sludge from each of these satellite works will subsequently be transported to the hub-centre for the region for further treatment. In the *Sludge Management Plan for Tipperary SR* ⁽¹²⁾ there are five such sub-groups with Clonmel WWTW nominated as the hub centre (Figure 2.7).

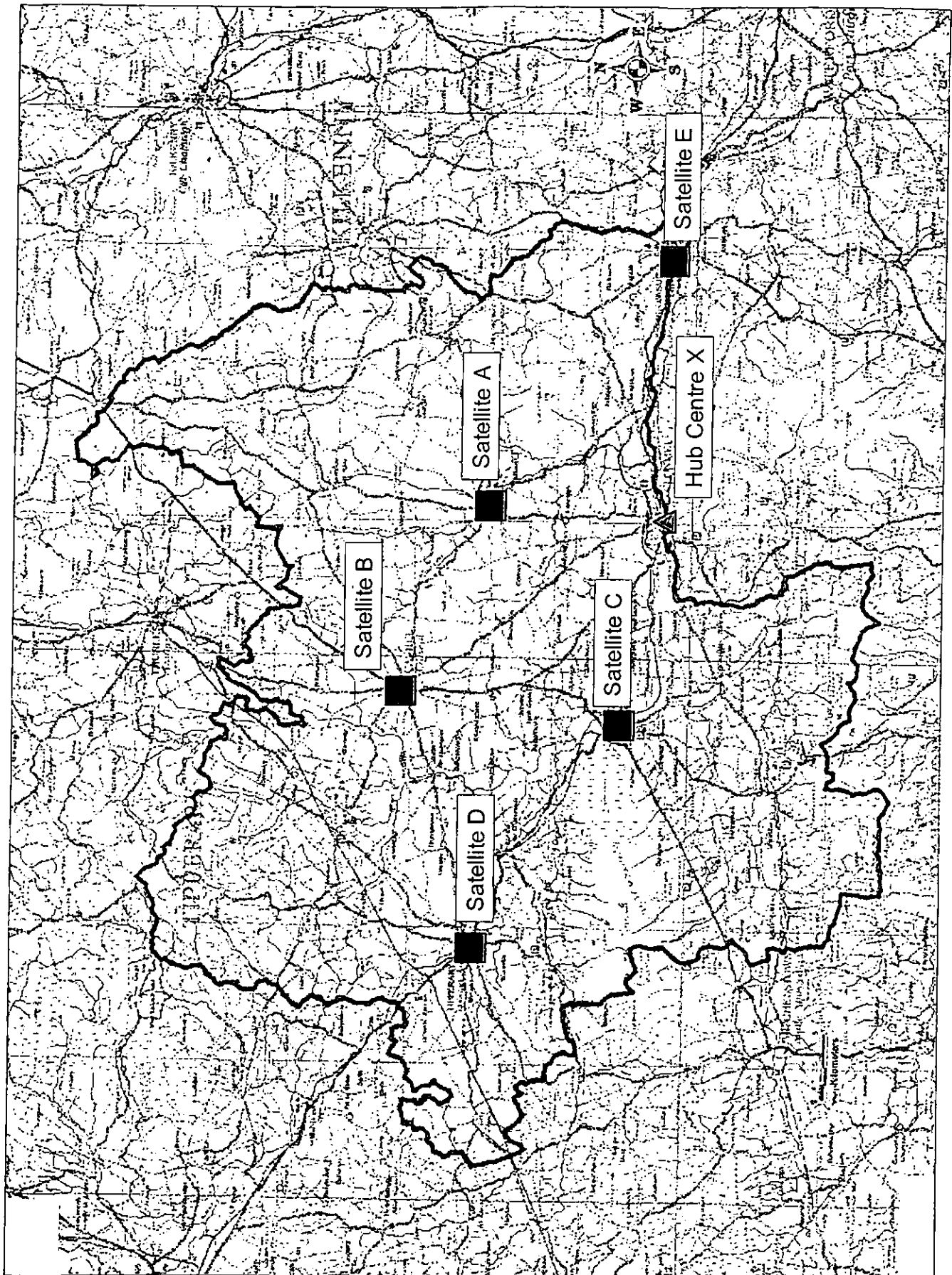


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						WS Atkins 'Villa Franca', Douglas Road, Cork, Ireland. Tel : +353 21 4290 300 Fax : +353 21 4293 527 E-Mail : cork@wsatkins.com	
PROJECT TITLE						CLONMEL SLUDGE DRIER EIS NON TECHNICAL SUMMARY	
DRAWING TITLE						PROPOSED LAYOUT OF SLUDGE DRIER (BELT DRYER)	
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- Low valuable heat sources - flexible combinations
- Indirect heating of the drying air
- Low drying temperatures - minimum odour development
- Low pressure in the dryer - no pass out
- Recirculation of the drying air - no odour pass out to the surroundings

BELT DRYER FIGURE 2.6



LOCATIONS OF SATELLITES AND HUB CENTRE

FIGURE 2.7

2.17 Clonmel WWTW sludge treatment centre will develop in three phases:

- Phase 1. Existing load at Clonmel WWTW plus existing sludge loading from satellites;
- Phase 2. 5-year design loading at Clonmel WWTW plus 5-year design loadings from satellites;
- Phase 3. Full 20-year design loading from all WWTW's in South Tipperary.

Alternative Treatment Processes for Agricultural use of Biosolids

2.18 Other alternatives considered in the Sludge Management Plan included:

- Thermophilic aerobic digestion;
- Composting;
- Alkaline stabilisation.

2.19 Thermal drying was identified to be the most suitable Biosolids treatment process for South Tipperary because of the high volume reduction (90%), as a form of sustainable fertiliser and because it can be easily integrated with anaerobic digestion currently undertaken at the WWTW.

Location of Hub-Centre

2.20 Clonmel was considered the most suitable location for a hub-centre in South Tipperary in the *Sludge Management Plan for Tipperary SR*⁽¹³⁾.

CHAPTER 3 -

EXISTING ENVIRONMENT, IMPACTS AND MITIGATION

- 3.1 A summary of environmental impacts and mitigation measures is presented in Table 3.1.

Human Beings

- 3.2 The nearest dwelling is located on Davis Road, 207 m from the nearest part of the site for the proposed Sludge Drier. The proposed Sludge Drier will have a positive long term social impact by facilitating future domestic and commercial activity and the provision of necessary sludge treatment capacity. The proposed development will comply with Building Regulations and appropriate standards in relation to the design of the works. Health and safety will be ensured through training of personnel and provision of hygiene facilities. Occupational noise exposure is within levels recommended under the *EC Noise at Work Directive* ⁽³⁾. Atmospheric emissions of gas or aerosols (i.e. metals, nitrogen oxides) will not impact on people in the area and are not a health risk. Amenity impacts could arise from adverse visual or aesthetic impact. These amenity impacts will be mitigated at the dryer site by architectural design and landscaping / boundary treatment. No other mitigation measures are required with respect to noise or health and safety impacts.

Flora and Fauna

- 3.3 The proposed site is not within any natural designations under Irish or EU legislation. No sensitive or rare species of plant or animal life occur within the vicinity. The Sludge Drier will be installed within the grounds of the Clonmel WWTW in an area, which was set aside in the original works layout. This installation will have no direct or indirect impact on the existing flora or fauna. Therefore no mitigation measures are required.

Soils and Geology

- 3.4 Construction of the new Sludge Drier and sludge reception facilities which will be built within the existing WWTW boundaries will not have a direct impact upon the local soils and geology. Thus no mitigation measures are required.

- 3.5 The resulting Biosolids produced from the drying process will be spread on agricultural land within the region in accordance with the *Code of Good Practice for Use of Biosolids in Agriculture* ⁽¹¹⁾. This will have a long-term positive impact on soils and no mitigation measures are envisaged. Reuse of biosolid on land will be continuously monitored by the Sanitary Authority to ensure compliance with the above code.

Water

- 3.6 The river in the vicinity of Clonmel is characterised as slightly polluted according to EPA water quality criteria (*Doris et al.* ⁽⁸⁾). The River Suir supports both trout and salmon. It is not a designated salmonid water under the *EC Freshwater Fish Directive* ⁽⁴⁾.
- 3.7 The Sludge Drier and sludge reception facilities will not discharge wastewater into either groundwater or surface waters. There is a slight possibility of indirect impacts on watercourses after spreading of Biosolids on agricultural land. However, once the *Code of Good Practice for the Use of Biosolids in Agriculture* ⁽¹¹⁾ is followed the impacts of water quality should be neutral.

Cultural Heritage

- 3.8 The Sludge Drier will not have an impact on the existing cultural environment, and there is no significant historical association with the site. Thus no mitigation measures are required.

Air

Air Emissions

- 3.9 Air emissions produced by the thermal drying process will not have a significant impact on the environment or on human health as they will be within the EPA's *Integrated Pollution Control Guidelines* ⁽⁹⁾ which follow BATNEEC principles.

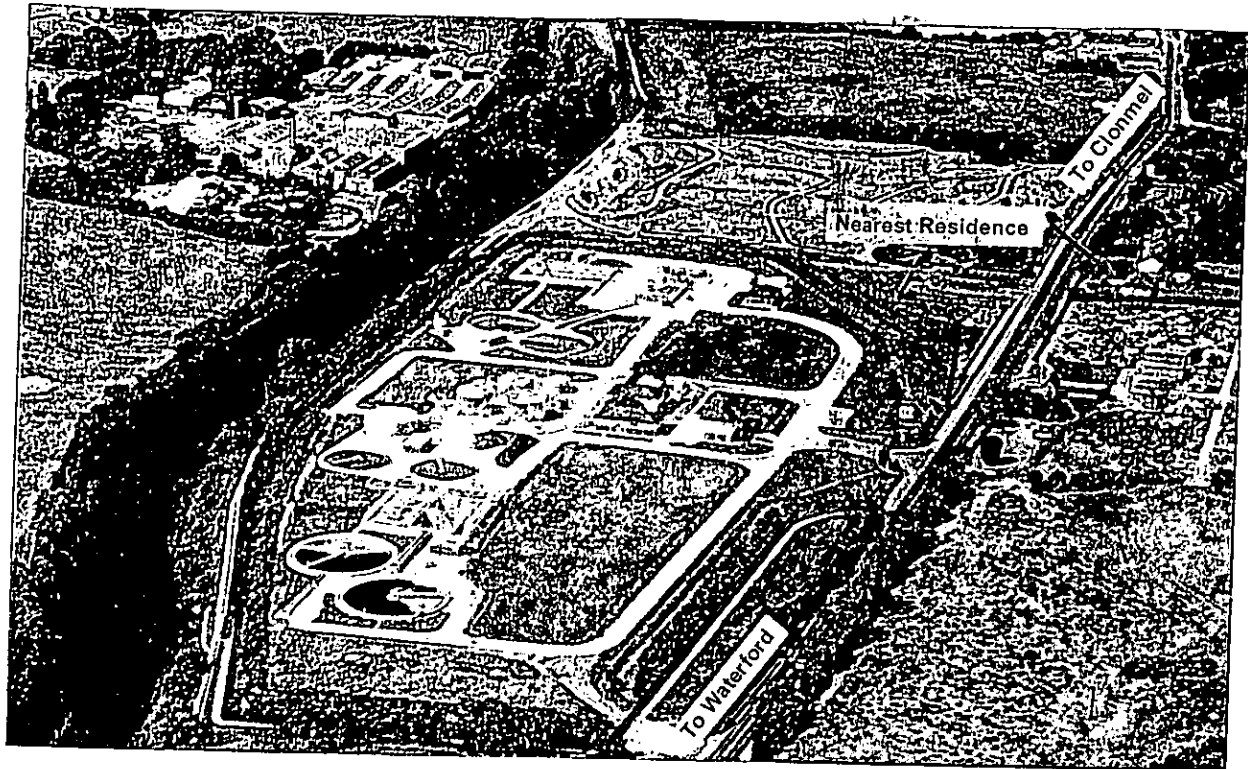
Noise

- 3.10 Background noise levels at the site currently exceed World Health Organisation recommended criteria (i.e. they are above 30 dB indoors at night time). The predicted noise contribution from the Sludge Drier at the nearest, and potentially worst affected, noise sensitive property is extremely low, with a maximum value of 9 dB L_{Aeq}. A

zero noise impact is expected. Also, according to WHO criteria it is noted that the existing, as well as the total noise level, at night outside the dwelling is, and would continue to be, in excess of the WHO night-time noise criterion. This is entirely due to existing noise sources, and does not indicate that the Sludge Drier would in itself result in an unacceptable noise climate. The housing design for the Sludge Drier would require that the maximum noise level will be 40dB (A) approximately 5m from the building to ensure no significant impact. This can be achieved by a combination of equipment design and good insulation properties of the external wall design of the building. No further mitigation measures are required, as the proposed scheme does not significantly impact on background noise levels. (Figure 3.1 shows the nearest residence to the entrance to Clonmel WWTW).

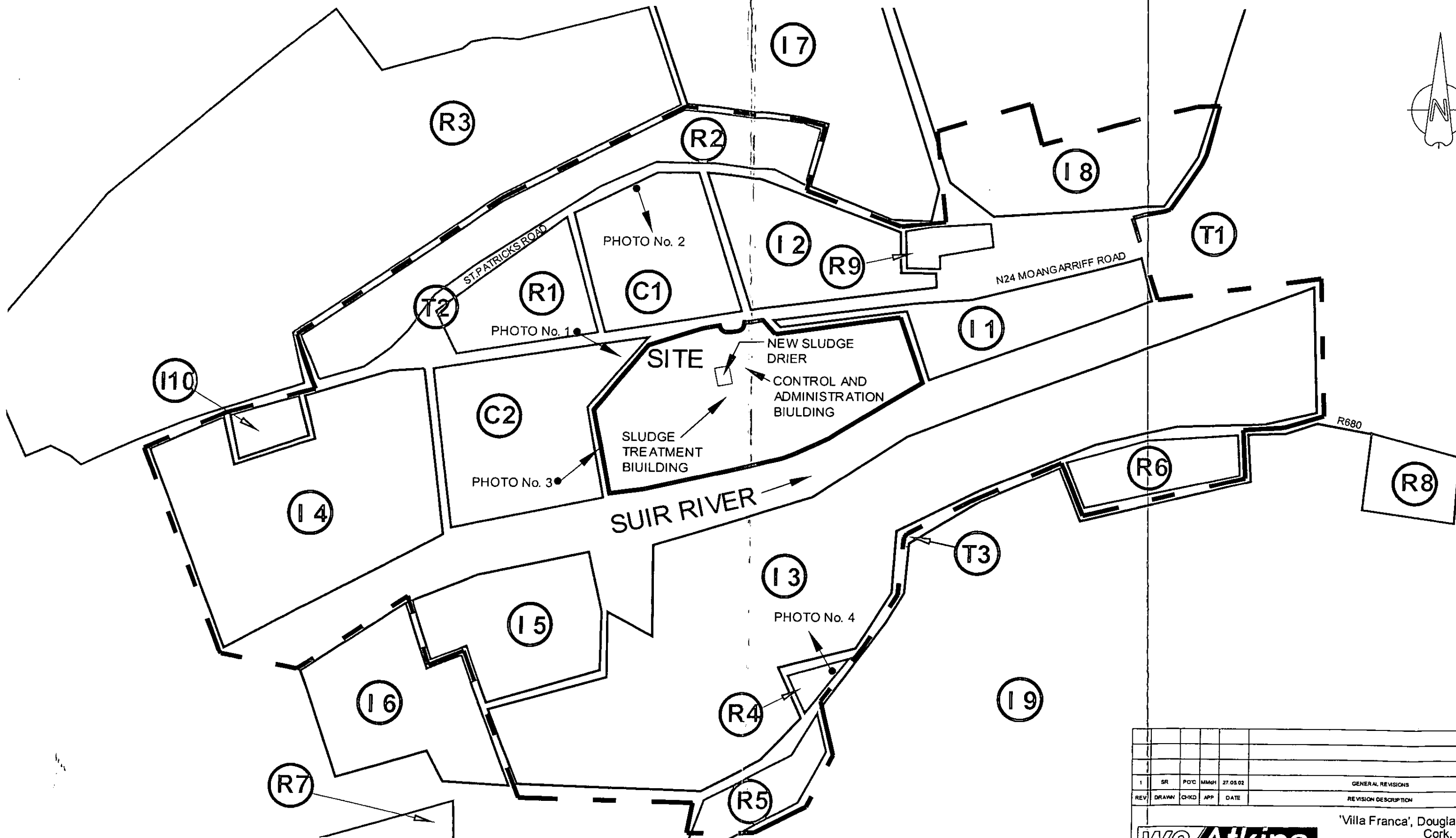
Odour

- 3.11 The dispersion of the exhaust gas from the Sludge Drier installation is influenced by the elevation of its discharge point (i.e. stack height), emission velocity and gas temperature. After mitigation measures are applied to odour, the model shows a very marginal extension of the odour detection boundary (i.e. 1 OU/m³ isoline) from the current situation. The predicted impacts are therefore negligible and the proposed installation will comply with the requirement of the original EIS at the site as approved by the Minister for the Environment. Mitigation measures are summarised in Table 3.1.
- 3.12 The sludge reception facility will be designed to include odour minimisation and handling including:
- Enclosure of odour producing sources, vented under negative pressure and the vented air treated in mechanical scrubbers;
 - Minimisation of splashing and surface agitation of all streams;
 - Pipework will be utilised in preference to open channels;
 - Inlets of open sumps will be below top water levels.
- 3.13 In addition, any contractor delivering sludge to Clonmel WWTW will be strictly audited to ensure that sludge transportation is in accordance with Part Four (Section 2) of the Code of Good Practice for the use of Biosolids in Agriculture. The Code states the requirement for sealed, clean and well-run vehicles and details the required approach to route planning, vehicle management and spillages.



VIEW FROM NORTHEAST CLONMEL WWTW AND RIVER SUIR

FIGURE 3.1



LEGEND TO CATEGORIES OF VISUALLY SENSITIVE RECIEVERS

C - COMMUNITY AND OPEN SPACE
 I - INDUSTRIAL, COMMERICAL AND AGRICULTURAL
 R - RESIDENTIAL
 T - TRANSPORT AND ROADS

--- VISUAL ENVELOPE (ie. BOUNDARY WITHIN WHICH SITE IS VISIBLE)
 ● PHOTO LOCATIONS

1	SR	PO'C	MMch	27.03.02	GENERAL REVISIONS
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					'Villa Franca', Douglas Road, Cork, Ireland. Tel : +353 21 4290 300 Fax : +353 21 4293 527 E-Mail : cork@wsatkins.com
PROJECT TITLE					CLONMEL SLUDGE DRIER EIS NON TECHNICAL SUMMARY
DRAWING TITLE					LOCATION OF VISUALLY SENSITIVE RECIEVERS AND PHOTO POINTS
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Climate

- 3.14 In terms of the impact on the general climate the proposed Sludge Drier and sludge treatment facilities will be negligible. Air pollutants produced by the Sludge Drier are well below EPA emission standards and therefore it is considered that the proposed scheme will not have significant effect on climate. No mitigation measures are required.

Landscape

- 3.15 The proposed development will be located within the site of the existing Clonmel WWTW. Mixed deciduous and coniferous trees and shrubs planted on a bund surrounding the works will be an effective screen for the existing development when the planting is mature in approximately 8-10 years (2011). The immediate environment around the site is suburban and relatively unspoilt in nature and of medium to high scenic value.
- 3.16 The location of visually sensitive receivers and the extent of the visual envelope are shown in Figure 3.2. Views are not generally available from the roads on the hillsides due to the presence of high hedgerows. As a result this visual envelope is relatively restricted.
- 3.17 In both the construction and operational phases, there will be a minor negative visual and landscape impact. These will be visible to the residential properties on Davis Road and Moangarriff Road located near to and overlooking the site.
- 3.18 In the 1991 Environmental Impact Statement (EIS) for Clonmel WWTW a height restriction of 9.5 metres was implemented which limits the height of all new structures and buildings within the grounds to 9.5m. The Sludge Drier could be housed within an indicative building envelope estimated at approximately 30.5m by 23m by 12m high. The ground would be excavated to accommodate the additional 2.5 meters depth. The Sludge Drier and associated stack will be manufactured to meet with the above envelope of building constraints.

- 3.19 Mitigation measures needed to reduce visual impacts are summarised in Table 3.1.
- 3.20 Part of the development may still be visible from residential properties overlooking the site particularly during the winter months. However, as the distance from the site increases, the visual impact upon properties, the countryside and farmland will reduce to an overall acceptable standard of 'neutral impact'. The Sludge Drier will comply with height restrictions.

Material Assets

- 3.21 The provision of the proposed Sludge Drier at Clonmel WWTW will not have any significant impact on material assets. With respect to traffic impacts, the proposed development will not have any significant adverse impact on traffic on the surrounding local road network. Davis Road will continue to operate well within capacity. No new Infrastructure works will be required to facilitate the provision of the Sludge Drier and the existing Davis Road/WWTW entrance junction will be retained. No mitigation measures are required.

Interaction of Environmental Impacts

- 3.22 There is some conflict between optimal mitigation measures for reduction of odour and mitigation measures for a reduction of visual impacts. To reduce odour to a neutral level, a minimum stack height of 9.5 m is advocated. However, in order to reduce visual impact, it was recommended to keep stack height below 9.5m. In order to optimise mitigation for both odour and visual landscape an exact stack height of 9.5m is recommended.
- 3.23 No further cumulative impacts were identified.

Table 3.1 – Appraisal Summary Table

Environmental Impacts		Impact During Construction Phase	Impact During Operation Phase	Mitigation Potential	Severity of Effect After Mitigation on Construction	Severity of Effect After Mitigation on Operation
Human Beings	• Social	Neutral	Long term positive	None required - training - follow standards	Positive	Positive
	• Health & Safety	Minor	Minor		Neutral	Neutral
Flora & Fauna		Neutral	Neutral	None required	Neutral	Neutral
Soils & Geology	• General	Neutral	Neutral	None required Spread on agricultural land following Code of Good Practice for the Use of Biosolids in Agriculture (1b)	Neutral	Neutral
	• Sludge Disposal	Neutral	Major positive OR negative		Positive	Positive
Water						
• General	• Sludge disposal	Neutral	Neutral	None required	Neutral	Neutral
		Neutral	Potential Major Negative	Follow Code of Good Practice for the Use of Biosolids in Agriculture (1b)	Neutral	Neutral
Cultural Heritage		Neutral	Neutral	None required	Neutral	Neutral
Air						
• Air Emissions		Neutral	Neutral	None required	Neutral	Neutral
		Neutral	Neutral	Operational Phase	Neutral	Neutral
• Noise				• House Sludge Drier in building to reduce noise		
				Mitigation Potential		
Environmental Impacts		Impact During Construction Phase	Impact During Operation Phase		Severity of Effect After Mitigation on Construction	Severity of Effect After Mitigation on Operation

Odour	Neutral	Major Negative	<p>Construction Phase</p> <p>Operation Phase</p> <ul style="list-style-type: none"> • Enclosure of odour producing sources • Treatment of odours, odour treatment unit • Complete sealing of the sludge digesters • Minimum stack height of 9.5m • Maximum stack odour emission rate of 1000 OU/s • Minimum stack emission velocity 15m/s • Minimum exhaust gas temperature 1000 OU/s 	Neutral	Neutral
Climate	Neutral	Neutral	None required	Neutral	Neutral
Landscape	Minor Negative	Minor Negative	<p>Construction phase</p> <ul style="list-style-type: none"> • Control of night time lighting. • Minimising height of temporary buildings. • Careful positioning of construction works. <p>Operational phase</p> <ul style="list-style-type: none"> • Lowering height of proposed building • Careful use of materials and colour • Additional planting along bund to front of site 	Neutral	Neutral
Material Assets Traffic	Neutral	Minor Negative	<p>Operational Phase</p> <ul style="list-style-type: none"> • Road improvement scheme for Davis Road will incorporate traffic calming measures, improved junctions, improved facilities for pedestrians and cyclists. • Entrance gateway located east of WWTW entrance, which will result in, reduced vehicle speed along Davis Road and improved facilities for all users. 	Neutral	Neutral

CHAPTER 4 - CONCLUSION

- 4.1 Clonmel Borough Council is planning to expand its facility by installing a Sludge Drier for sludge treatment at Clonmel WWTW. Ancillary work is also proposed for the acceptance of imported liquid and cake sludge from other municipal WWTW's in South Tipperary because Clonmel WWTW has been recommended as the proposed hub centre for sludge treatment in the *Tipperary (SR) Sludge Management Plan* ⁽¹³⁾.
- 4.2 Clonmel WWTW incorporates significant measures to minimise environmental impacts such as odour, noise, and visual impact. The implementation of the Sludge Drier and sludge reception facilities at the WWTW will allow for greater sludge volumes to be treated at the works, which will accommodate the growing population and commercial activity in the County and the stringent environmental requirements concerning Biosolid Reuse.
- 4.3 All environmental issues arising from the proposed Sludge Drier and sludge reception facilities were assessed. These were assessed under various headings including: human beings, flora and fauna, soils and geology, water, cultural heritage, air (noise & odour), climate, landscape and material assets. Impacts on the interaction of the combined impacts were also addressed.
- 4.4 Table 3.1 shows that the severity of significant environmental impacts becomes neutral after mitigation measures are applied to all potential impacts such as noise, odour, landscape and traffic.
- 4.5 Sludge treatment and handling is the most odorous part of the sewage treatment process and as a result the sludge treatment process will be designed to minimise the generation of odours.

- 4.6 Accordingly the reception area at the Clonmel WWTW will be designed to include odour minimisation for sludge treatment and handling areas including the enclosure of odour sources and scrubbing of the enclosed air in odour treatment units prior to release to the atmosphere. The incorporation of the recommended mitigation measures as set out in the Environmental Impact Statement in the procurement contract documents and the monitoring of the operation of the facility by the Sanitary Authority to ensure compliance with the specified criteria will result in the provision and operation of a facility which will have neutral environmental impacts.

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GLOSSARY

DS	Dry solids
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
Intermediate impact	Where impacts could occur which have adverse implications for factors which are of recognised regional importance or designation;
IPC	Integrated Pollution Control
Imperceptible impact	An impact capable of measurement but without noticeable consequences.
Long-term impact	Impact lasting twenty to fifty years.
Major impact	Where the potential effect or risk is likely to adversely affect a factor of recognised <i>national or international</i> importance, or adversely affect a recognised <i>national or international</i> guideline or stand, or to be of <i>major detriment to the character or content of the area</i> in which the feature or factor is located;
Medium-term impact	Impact lasting seven to twenty years.
Minor impact	Where impacts could occur which will have adverse effects on factors recognised as being of local importance or implication;
Negative impact	A change which reduces the quality of the environment (for example, by lessening species diversity and the reproductive capacity of the ecosystem, by damaging health, property or by causing nuisance).
Neutral impact	Where none of the above apply, that is, no observable impact in either direction
Occupational Noise Exposure	is the effect of noise generated by the Sludge Drier on staff within the building.
PE	Population equivalent
Permanent impact	Impact lasting over fifty years.

Positive Impact	A change which improves the quality of the environment (for example, by increasing species diversity and the reproductive capacity of the ecosystem, by removing nuisances or improving amenities).
Salmonid	salmonid waters are waters which support or become capable of supporting fish belonging to species such as salmon (<i>Salmo salar</i>), trout (<i>Salmo trutta</i>), grayling (<i>Thymallus thymallus</i>) and whitefish (<i>Coregonus</i>).
Short-term impact	Impact lasting one to seven years.
Significant impact	An impact which, by its magnitude, duration or intensity alters an important aspect of the environment.
Slight impact	An impact which causes changes in the character of the environment which are not significant or profound.
Temporary impact	Impact lasting for one year or less
WHO	World Health Organisation

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