

Mixed Use Development at Chadwicks, Santry Avenue, Dublin 9.

Construction and Environmental Management Plan

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INFRASTRUCTURE



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Contents

1	Introduction.....	4
2	Proposed Development.....	5
3	Compound Facilities / Parking	8
4	Traffic Management & Access	9
4.1	Reductive / Mitigation Measures	11
5	Road Cleaning / Wheel Washing.....	12
6	Working Hours	13
7	Construction Methodology	14
7.1	Demolition	14
7.2	Protection of Adjacent Areas	14
7.3	Site Clearance, Excavation and Rock Breaking	14
7.4	Material Hoisting.....	15
7.5	Waste Management Plan.....	15
8	Noise & Vibration.....	16
9	Sediment and Water Pollution Control Plan.....	19
10	Biodiversity Protection Measures	21
11	Drainage Works	22
12	Dust Control.....	24
12.1	Site Management	24
12.2	Dust Control Measures.....	25
13	Conclusion.....	27



1 Introduction

This Construction & Environmental Management Plan (CEMP) is for the proposed works associated with the construction of a mixed-use development at Santry Avenue, Dublin 9. The brownfield site is currently Chadwicks Building Suppliers.

This CEMP addresses noise and vibration, traffic management, working hours, pollution control, dust control, road cleaning, compound / public health facilities and staff parking, all associated with the construction works.

The final formal CEMP will be issued by the contractor to the local authority for review and approval prior to commencement of construction. This CEMP is considered to be a preliminary CEMP.

The final CEMP, to be submitted and approved by the local authority prior to the commencement of construction. It will make provision for and ensure adherence to any and all Covid regulations and guidelines as is relevant at the time of submission.



2 Proposed Development

Dwyer Nolan Developments Ltd. intend to apply to An Bord Pleanála for permission for a strategic housing development on a site measuring c. 1.5 hectares located at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The development site is bounded to the north by Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (granted under Dublin City Council Ref's. 2713/17 & 2737/19), and to the west by the Santry Avenue Industrial Estate.

The proposed development provides for 350 no. apartments, comprised of 113 no. 1 bed, 218 no. 2 bed, & 19 no. 3 bed dwellings, in 4 no. seven to fourteen storey buildings, over basement level, with 4 no. retail / commercial units, a medical suite / GP Practice unit and a community use unit located at ground floor level facing onto Santry Avenue and Swords Road. A one storey residential amenity unit, facing onto Santry Avenue, is also provided for between Blocks A & D.

The development will consist of the following

- (1) Demolition of the existing building on site i.e. the existing Chadwicks Builders Merchants (c. 4,196.8m²).
- (2) Construction of 350 no. 1, 2, & 3 bed apartments, retail / commercial and community uses in 4 no. buildings that are subdivided into Blocks A-G as follows:
 - Block A is a 7 to 14 storey block consisting of 59 no. apartments with 2 no. commercial/retail units located on the ground floor. Adjoining same is Block B, which is a 7 storey block consisting of 38 no. apartments with 1 no. commercial/retail unit and 1 no. medical suite / GP practice unit and refuse storage areas provided for at ground floor level.
 - Block C is a 7 storey block consisting of 55 no. apartments with refuse storage areas provided for at ground floor level. Adjoining same is Block D which is a 7 to 10 storey block consisting of 51 no. apartments with 1 no. commercial unit / café located on the ground floor. A refuse storage area is also provided for at ground floor level.
 - Block E is a 7 to 10 storey block consisting of 58 no. apartments with 1 no. community use unit located on the ground floor. A refuse storage area, substation, & switchroom are also provided for at ground floor level. Adjoining same is Block F which is a 7 storey block consisting of 55 no. apartments. A refuse storage area & bicycle storage area are also provided for at ground floor level.



- Block G is a 7 storey block consisting of 34 no. apartments with a refuse storage area & bicycle storage area provided for at ground floor level.
- (3) Construction of a 1 storey residential amenity unit located between Blocks A & D.
 - (4) Construction of basement level car parking accommodating 173 no. car parking spaces & 719 no. bicycle parking spaces. Internal access to the basement level is provided from the cores of Blocks A, B, C, D, E, & F. External vehicular access to the basement level is from the south, between Blocks B & C. 36 no. car parking spaces & 58 no. bicycle parking spaces are also provided for within the site at surface level.
 - (5) Public open space is provided for between Blocks C, D, E, & F. Communal open space is provided for between (i) Blocks E, F, & G, (ii) Blocks A, B, C, & D, and (iii) in the form of roof gardens located on Blocks A, C, & F and the proposed residential amenity use unit. The development includes for hard and soft landscaping & boundary treatments. Private open spaces are provided as terraces at ground floor level of each block and balconies at all upper levels.
 - (6) Vehicular access to the development will be via 2 no. existing / permitted access points: (i) on Santry Avenue in the north-west of the site (ii) off Swords Road in the south-east of the site, as permitted under the adjoining Santry Place development (Ref. 2713/17).
 - (7) The development includes for all associated site development works above and below ground, bin & bicycle storage, plant (M&E), sub-stations, public lighting, servicing, signage, surface water attenuation facilities etc.



Figure 2.1 - Site Location, Santry Avenue, Dublin 9 (Extract Google Maps)



3 Compound Facilities / Parking

The compound shall be entirely within the site boundaries. Site accommodation to be provided will include suitable washing / dry room facilities for construction staff, canteen, sanitary facilities, first aid room, office accommodation etc. Access to the compound will be security controlled and all site visitors will be required to sign in on arrival and sign out on departure.

The compound shall be constructed using a clean permeable stone finish and will be enclosed with security fencing. A permeable hardstanding area will be provided for staff parking and this area will be separate from designated machinery / plant parking.

A material storage zone will also be provided in the compound area. This storage zone will include material recycling areas and facilities.

A series of 'way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas.

On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works.

The proposed site compound arrangement and layout is subject to further review and approval following main contractor appointment. The contractor will implement specific measures including appointing a staff member to monitor those arriving to site and where they park their vehicles.



4 Traffic Management & Access

As part of Construction Stage Safety Plan for the works, prior to commencement of development and following receipt of a grant of planning permission, a Traffic Management Plan (TMP) will be prepared in accordance with the principles outlined below and shall comply at all times with the requirements of:

- Chapter 8 of the Department of the Environment Traffic Signs Manual, current edition, published by The Stationery Office, and available from the Government Publications Office, Sun Alliance House, Molesworth Street, Dublin 2;
- Guidance for the Control and Management of Traffic at Road Works (June 2010) prepared by the Local Government Management Services Board;
- Any additional requirements detailed in the Design Manual for Roads and Bridges & Design Manual for Urban Roads & Streets (DMURS)

The site will be accessed from the existing site entrance on Santry Avenue to the northwest of the site, this is the current access to neighbouring development site (Planning Ref: 2713/17 & 2737/19) to the south. Traffic volumes are not anticipated to be significant and turning movements into the site shall be accommodated without delay. Warning signage will be provided for pedestrians and other road users on all approaches in accordance with Chapter 8 of the Traffic Signs Manual and the Contractor's Traffic Management Plan.

All construction activities will be governed by a Construction Traffic Management Plan (CTMP), the final details of which will be agreed with Dublin City Council prior to the commencement of construction activities on site. The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction phase upon the public (off-site), visitors to the subject site (on-site) and internal (on-site) workers environments, are fully considered and proactively managed/programmed thereby ensuring that safety is maintained at all times, disruption is minimised and undertaken within a controlled hazard free/minimised environment. Please see Construction Traffic Management plan completed by CHM under a separate heading EN 6000-000-001 for full details.

During the general excavation of the foundations and basement there will be additional HGV movements to and from the site. All suitable material will be used for construction and fill activities where possible and appropriate. All spoil material will be removed to a registered landfill site.



In addition to the traffic generated by the movement of subsoil to and from the site, there will be traffic generated from deliveries of construction materials and equipment. It should be pointed out that construction traffic generated during the development works tends to be during off-peak hours. Such trips would generally be spread out over the full working day and are unlikely to be higher than the peak hour predicted for the operational stage.

Construction traffic will consist of the following categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff. On-site employees will generally arrive before 07:30, thus avoiding the morning peak hour traffic. These employees will generally depart after 18:00. It should be noted that a large proportion of construction workers would arrive in shared transport. The site is readily accessible by public transport with Dublin Bus route 171 serving Santry Avenue and Dublin Bus routes 16, 16D, 33,41,41B,41C and 41D serving Swords Road within walking distance.
- Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

Deliveries would arrive at a steady rate during the course of the day. It is estimated that peak delivery rates would be in the region of 1 - 2 deliveries per hour throughout the day.

In the absence of a final construction programme it is difficult to assess the exact impact during the construction period. Nevertheless; the following estimates have been made in respect of the construction period impacts:

- Appropriate on-site and compounding will be provided to prevent overflow onto the local network. Parking in nearby residential estates shall be strictly prohibited.
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential.
- During the period of excavation and disposal off site, it is likely that up to 2-3 no. truck trips per hour (on average) will be generated by vehicles removing unsuitable spoil from the site to allow for the construction of the development and for the removal of demolition waste.



- The site offices and compound will be located within the site boundary.

4.1 Reductive / Mitigation Measures

Traffic Management during Construction: -

A Traffic Management Plan will be prepared prior to the commencement of construction work on site. This plan will be prepared in consultation with Dublin City Council in order to agree on traffic management and monitoring. Measures are outlined below:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.
- The surrounding road network will be signed to define the access and egress routes for the development.
- The traffic generated by the construction phase of the development will be strictly controlled in order to minimise the impact of this traffic on the surrounding road network.
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.
- All employees and visitor's vehicle parking demands will be accommodated on-site.
- A programme of street cleaning of Santry Avenue will be implemented.
- With the exception of large concrete pours, deliveries will be avoided where possible during peak school hours i.e. 8.30am – 9.00am, 1.15pm – 1.45pm and 2.45pm – 3.15pm.

Please see Construction Traffic Management plan completed by CHM under a separate heading EN 6000-000-001 for full details.



5 Road Cleaning / Wheel Washing

Provision will be made for cleaning by road sweeper etc. of all access routes to and from the site during the course of the works. Road cleaning shall be undertaken as required during the completion of the works.

A wheel wash facility will also be provided on site to clean site traffic leaving the site when conditions require. Wastewater generated at this washing facility will be suitably treated on site and all settled silts disposed offsite to licensed landfill.

All road sweeping vacuum vehicles will be emptied off site at a suitably licensed facility.



6 Working Hours

For the duration of the proposed infrastructure works it is envisaged that the maximum working hours shall be 07:00 to 19:30 Monday to Friday (excluding bank holidays) and 08:00 to 14:00 Saturdays, subject to the restrictions imposed by the local authorities. No working will be allowed on Sundays and Public Holidays, unless express permission is obtained from the Local Authority.



7 Construction Methodology

7.1 Demolition

The brownfield site is currently Chadwicks Building Suppliers. The existing buildings on the site will be demolished as part of the planning application. Demolition will be completed by the appointed contractor in accordance with the relevant standards and guidelines. Contaminated materials used in the existing buildings will be identified and disposed of by a specialised contractor. Details of the proposed demolition plan will be confirmed prior to commencement of development upon receipt of a grant of permission.

7.2 Protection of Adjacent Areas

Work areas will be segregated from the adjacent public areas for the extent of the project by means of a suitable hoarding fence. All hoardings will be designed by a competent Structural Engineer to resist wind loads.

All materials being hoisted by crane or other means will be controlled using guide ropes where possible.

7.3 Site Clearance, Excavation and Rock Breaking

A full site investigation will be carried out prior to construction commencing.

A specialist ground works contractor will be appointed to carry out the excavation and any rock breaking works that may be required. The appointed specialist contractor will carry out a full risk assessment prior to the commencement of work.

A ground works operation will be carried out in order to ensure that material removed from the ground is taken away at regular intervals in order to reduce the amount of material that will be stored on site. Excavated material will be reused on site where possible subject to the WAC analysis.

Refer to Hydrological Impact Assessment completed by AWN consulting under a separate cover outlining the impact on the existing water regime during and post construction of the basement within the proposed development.

Refer to Chapter 6 of the Environmental Impact Assessment Report (EIAR) - Land, Soils and Geology for further details. This can be found under a separate heading.



7.4 Material Hoisting

It is envisaged that tower cranes will be erected to hoist materials on site in the construction of apartments and/or commercial units. The cranes will be erected within the building envelope. The cranes will be designed by a specialist to free stand full height without the need to be connected to another structure.

The crane will be founded on a concrete base foundation. The size of the base will be dependent on the ground conditions encountered. It is intended that the tower crane will be erected and dismantled by a mobile crane from within the site boundary.

Careful consideration will be given to the recruitment of suitably qualified crane drivers and banksmen.

7.5 Waste Management Plan

A detailed waste management plan will be agreed with Dublin City Council, prior to commencement of development upon receipt of a grant of permission and put in place in order to improve waste management on site, increase segregation and minimise construction waste costs. Waste arising from the site will be considered in relation to the waste management hierarchy of prevention, reduce, reuse, recycle, energy recovery and disposal.



8 Noise & Vibration

The construction of the project will involve the use of noise generating construction plant. There will also be an increase in noise relating to delivery of materials to site. It is intended that noise from the construction phase of the development will be kept to a minimum in accordance with:

- “BS 5228: Noise Control on Construction on Open Sites”.
- Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA, 2014).
- Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 5 - Noise and Vibration.

The proposed development shall comply with these documents during all phases of construction. Unless absolutely necessary, construction work will be performed within the hours indicated in the relevant planning permission and any works outside this time frame shall be agreed with Dublin City Council in advance.

The noise limits to be applied for the duration of the infrastructure works are those specified in the B Category of BS 5228. BS5228-1:2009+A1:2014 gives several examples of acceptable limits for construction or demolition noise, the most simplistic being based upon the exceedance of fixed noise limits.

The following noise limits will be applied:

- Daytime (07:00 – 19:00hrs): 70dB(A) for residential properties
- Evening (19:00 – 23:00hrs): 60dB(A) for residential properties

All works on site shall comply with BS 5228-2009 which gives detailed guidance on the control of noise and vibration from construction activities. In general, the contractor shall implement the following mitigation measures during the proposed infrastructure works:

- Avoid unnecessary revving of engines and switch off equipment when not required.
- Keep internal haul roads well maintained and avoid steep gradients.
- Minimise drop height of materials.
- Start-up plant sequentially rather than all together

More specifically the Contractor shall ensure that:



- Regular and effective maintenance by trained personnel is carried out to reduce noise and / or vibration from plant and machinery.
- The selection of construction plant with low potential for generating noise.
- The siting of noisy construction plant as far from neighbouring properties as possible.
- The erection of temporary barriers around items such as generators or compressors if required.
- Any and all ancillary plant shall be positioned so as to cause minimal noise disturbance.
- Where construction activities are required in close proximity to neighbouring noise sensitive properties, a solid hoarding of approximately 2.5m in height should be erected to provide a degree of acoustic screening to the lower storeys.
- An acoustically screened area should be provided on the site specifically for noisy operations such as grinding and cutting metal.
- A site representative responsible for matters relating to noise and vibration will be appointed prior to construction on site.
- Hours are limited during which site activities likely to create high levels of noise and vibration are carried out.

A site representative responsible for matters relating to noise and vibration will be appointed prior to construction on site. The noise liaison officer should be appointed and charged with the responsibility of keeping people informed of progress and by setting down procedures for dealing with complaints.

A noise and vibration monitoring specialist will be appointed to periodically carry out independent monitoring of noise and vibration during random intervals and at sensitive locations for comparison with limits and background levels. It is proposed that noise and vibration levels be maintained below those outlined above as part of these infrastructure works.

All vehicles and mechanical plant used for the purpose of the Works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order. In addition, all diesel engine powered plant shall be fitted with effective air intake silencers. All compressors shall be “sound reduced” models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use. All ancillary pneumatic percussive tools shall be



fitted with mufflers or silencers of the type recommended by the manufacturers, and where commercially available, dampened tools and accessories shall be used.

All ancillary plant, such as generators and pumps, shall be positioned so as to cause minimum noise disturbance. If operating outside the normal working week acoustic enclosures shall be provided.

Local screening should be provided for stationary plant such as generators and compressors.

Notwithstanding the above, the developer shall comply with any requirements set out in the Codes of Practice from the Drainage Division, the Roads, Streets & Traffic Department and the Noise & Air Pollution Section.

Refer to Chapter 9 of the Environmental Impact Assessment Report (EIAR) found under a separate heading.



9 Sediment and Water Pollution Control Plan

All works carried out as part of these infrastructure works will comply with all Statutory Legislation including the Local Government (Water Pollution) acts, 1977 and 1990 and the contractor will cooperate in-full with the Environmental Section of Dublin City Council.

As part of the overall construction methodology, the following issues will be addressed and have been identified as being of particular risk and/or concern to pollution.

- Sediment & Erosion- Similar to the above, any sedimentation and erosion due to direct surface water runoff generated onsite during the construction phase needs to be prevented. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. A temporary positive drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff from the site during construction. This temporary surface water management facility will throttle runoff and allow suspended solids to be settled out and removed before being discharged in a controlled manner to the agreed outfall. By directing the surface water from the construction works through this temporary positive drainage system will ensure:
 - o Site disturbance is at a minimum.
 - o Sediment control is implemented
 - o Potential for erosion is minimised.
 - o Sediment-contaminated water leaving the site is prevented.

Such measures shall be agreed as part of the site's discharge licence.

- Discharge Licences – It will not be permitted to discharge into any newly constructed storm water systems without adhering to the conditions of the discharge licence and agreeing the same with the Site Manager and Local Authority Area Engineer.
- Over Ground Oil / Diesel Storage – Only an approved storage system for oil / diesel within the site will be permitted, (i.e. all oil / diesel storage to be located within a designated area placed contained within constructed bunded areas e.g. placed on 150mm concrete slab with the perimeter constructed with 225mm solid blockwork rendered internally). The bunded area will accommodate the relevant oil / diesel storage capacity in case of



accidental spillage. Any accidental spillages will be dealt with immediately on site however minor by containment /removal from site. Any significant storage of hydrocarbons is not envisaged as construction vehicles will be refuelled off site.

- Concrete Washout – The washing out of concrete trucks on site will not be permitted as they are a potential source of high alkalinity in waterbodies. Consequently, it is a requirement that all concrete truck washout takes place back in the ready-mix depot.
- Disposal of Wastewater off Site – The Site Management Team will maintain a record of all receipts for the removal of toilet or interceptor waste off site to ensure its disposal in a traceable manner. These will be available for inspection by the Environment Section of Dublin City Council at all times.
- Road Sweepers / Cleaning – The cleaning of public roads in and around the subject site will be undertaken to reduce environmental impacts.

Refer to Chapter 7 – Water, of the Environmental Impact Assessment Report (EIAR) under a separate heading.



10 Biodiversity Protection Measures

All site clearance and landscaping works will comply with current legislative requirements and best practice. All retained trees that are within or close to the proposed development will be protected in accordance with the requirements of British Standard BS5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations', with protective fencing being installed around all trees to be retained, prior to commencement of development. The planting plans and landscaping proposals will ensure that no invasive species are introduced, either deliberately or inadvertently, to the site.

Refer to Chapter 5 – Biodiversity, of the Environmental Impact Assessment Report (EIAR) under a separate heading.



11 Drainage Works

It is proposed to construct drainage infrastructure in accordance with the plans shown on DBFL drawings 200060-X-91-X-DTM-DR-DBFL-CE-1001_SurfaceWaterLayout and 200060-X-92-X-DTM-DR-DBFL-CE-1101_FoulWaterLayout.

The drainage infrastructure will be constructed and protected through the following measures:

- Hoarding or fencing to be provided to cordon-off completed infrastructure works: As is standard practice on construction sites, elements of works may be completed on a phased basis. As works are completed and handed over within each phase, this area will be enclosed with hoarding or fencing offset a safe distance from the line of the existing infrastructure and no further excavation works will be allowed within this area unless agreed with site management.
- Contractor to produce as-built construction records of drainage infrastructure: These records will be submitted to the engineer for approval in advance of handover. The as-built records will be reviewed and will need to be approved by the engineer before practical completion can be certified. The as-built records (drawings, manhole cards, material approvals, correspondence, etc.) will be used by site personnel as a working record of where drainage infrastructure is located and its status. The locations of these will be recorded on the as-built records and will be marked out on the ground in advance of any works commencing in later stages. This methodology will be formally incorporated into a method statement to be completed by the groundworks sub-contractor before excavations commence.
- Marker tape to be provided on top of sewers running through live areas of site: As part of the methodology laying of drainage pipes, drainage works will have marker tape placed at a depth of 300mm above the pipe to warn the excavator and banksman of the service below. It is noted that the placing of marker tape over drainage lines is not a standard construction detail. However, the vulnerability of live drainage infrastructure serving a previous phase of development is noted and these measures will form part of the works.
- Site personnel to be informed of works already completed: As part of the Safe System of Work Plan (SSWP), site personnel will be made aware of the drainage lines which are in operation. A site-specific method statement will be required in all cases where it is deemed that there is a risk of damaging such services. Those involved in direct management and



supervision of site-based excavations require relevant competencies to deliver safety standards on site. They will have health and safety training in order to design safe systems of work that are appropriate to specific site conditions. They will need to prepare clear and simple safety method statements that can be used and understood by site workers. Ongoing checks will be carried out to ensure that appropriate equipment has been provided and is being used correctly.

- Monitoring of excavation and prevention of undermining of infrastructure: Special care will be taken when digging above or close to the lines of services. The locations of these will be marked out on the ground in advance of any excavation being undertaken. In addition, careful consideration will be taken to ensure that any buildings and infrastructure serving areas outside the development site are not undermined by excavation works. The general principles outlined in the Health and Safety Authority document: 'Code of Practice for Avoiding Danger from Underground Services' will be followed to ensure the safety of workers and to minimise the risk of damage to any existing pipelines or buildings.
- Water quality control of discharges to drainage network: As detailed within the previous section, groundwater needs to be protected from sedimentation and erosion due to direct surface water runoff generated onsite during the construction phase. This includes preventing any sediment laden water from entering the surface water outfalls. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. Any manholes will need to be securely covered and gullies fitted with a geotextile filter to allow protection of the surface water within the pipe.
- Protection of services from breakage or crushing: Where drainage infrastructure serving areas outside of the development are located within the development site, the drainage infrastructure will have to be protected from breaking or crushing. Consideration will be given to areas where heavy plant is going to be tracked across the existing drainage infrastructure. This may require construction of temporary protective concrete slabs to bridge across the existing lines where haul roads are required.



12 Dust Control

It is probable that the construction activities on site will generate some dust emissions which would be in addition to any dust generated by the activities in the vicinity of the proposed development, including traffic flows. The extent of dust generation under construction activities being carried out is dependent on environmental factors such as rainfall, wind speed and wind direction.

The objective is to ensure that dust does not impact significantly at nearby receptors. Therefore, a dust management plan (DMP) will be formulated for the site upon receipt of planning permission which will address the following:

- Specify a site policy on dust
- Identify site management of dust
- Develop documented systems for managing site practices and implementing management controls
- Outline how the DMP can be assessed

Dust samples will be collected on a monthly basis as a minimum. Sampling data, results and limits (as outlined in the Environmental Protection Agency Guidelines, Environmental Management in Extractive Industry Non-Scheduled Minerals) are to be outlined and supplied to DBFL Consulting Engineers in a tabular format.

12.1 Site Management

The siting of construction activities and storage piles will consider the location of sensitive receptors and prevailing wind conditions to minimise the potential dust nuisance. Site management will include the ability to respond to adverse weather conditions by either restricting operations on site or using effective control measure in a timely manner before potential for nuisance occurs.

- During working hours, the site agent or another competent appointed member of staff shall monitor dust control methods;
- A register shall be kept on site logging all correspondence and telephone / verbal complaints regarding construction activities outlining remedial actions if any;



- A site representative responsible for matters relating to dust management will be appointed prior to construction on site. The site representative responsible for dust management shall ensure that dust management procedures are followed and ensure monitoring and assessment of same;

12.2 Dust Control Measures

- Apply a speed limit of at least 20km/hr for on-site vehicles.
- Provide water bowsers during periods of dry weather to ensure unpaved areas are kept moist. Spray exposed site haul roads during dry and / or windy weather.
- Ensure paved roads are kept clean and free of mud and other materials. Sweep hard surface roads, inside and outside the site, to ensure roads are kept clear of debris, soil or other material.
- Restrict un-surfaced roads to essential site traffic.
- Provide water bowsers during periods of high winds and dry weather conditions to ensure moisture content is high to increase the stability of the soil.
- During the proposed infrastructure works the following mitigation measures shall be implemented to minimise dust emissions:
 - Construction techniques shall minimise dust release into the air.
 - Protect overburden material from exposure to wind by storing the material in sheltered regions of the site.
 - Regular watering of stockpiles during dry and windy periods.
 - Locate any stockpiles away from sensitive receptors, (i.e. receptors sensitive to dust release).
 - Provide tarpaulins over all unacceptable excavated materials being carted off site.
- Control vehicle speeds and impose speed restrictions, (speed can mobilise dust). The wheels of all vehicles leaving the construction site will be washed to ensure that dirt and dust is not transferred onto the public roadway.
- During dry spells and if deemed necessary monitoring of dust levels shall be carried out using the Bergerhoff Method i.e. analysis of dust collecting jars left on-site (German Standard VDI 2119, 1972). Results will be compared to the TA Luft guidelines (TA Luft,



1972). Should an exceedance of the TA Luft limit occur, additional mitigation measures, for example more regular spraying of water, shall be implemented.

- The excavating machines will be cleaned on a daily basis to ensure no excess grease and dust is left on the machine. This will be carried out at low level below the height of the hoarding to prevent any mud coming in contact with the public.



13 Conclusion

This Construction and Environmental Management Plan addresses construction activities on site that may result in noise, air quality, water quality, biodiversity or waste management issues, should the plan not be put in place and implemented.

These include procedures for monitoring and tracking construction activities and ensuring construction personnel are trained and educated as necessary. The Construction & Environmental Management Plan should be reviewed as the construction phase progresses to accommodate any changes in activities on site.

This CEMP has been carried out prior to construction stage and as such will be reviewed again prior to works commencing on site and incorporated into the Contractor's Site Safety Plan and Construction Traffic Management Plan (CTMP). The contents of the Site Safety Plan and the CTMP should then be reviewed and updated as the construction phase progresses to accommodate any changes in activities on site.

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