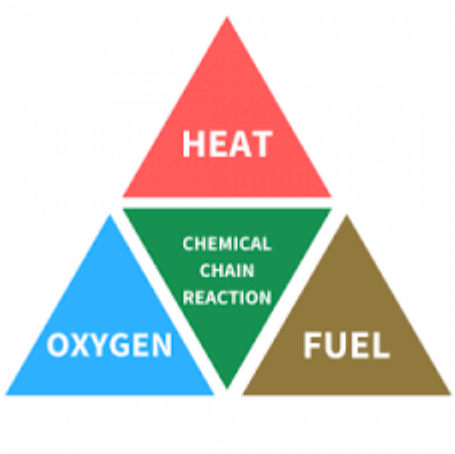
CAERPHILLY SKIP HIRE (CWS) LTD

FIRE PREVENTION AND MITIGATION PLAN (FPMP)



Operator: CWS Ltd
Facility: WASTE TRANSFER STATION
Site Address: The Granary Graddfa Industrial Estate, Llanbradach, Caerphilly CF83 3QS

Permit reference:
Waste returns reference:

Version	Date	Author	Checked	Revision
Permit Variation	November 2019	Geotechnology	CWS	1
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1 INTRODUCTION

This document is intended to detail the overall approach developed by Caerphilly Skips (CWS) Limited to mitigate the risk of fire during day-to-day operation of the site and to provide a single source of reference during a fire emergency.

1.1 Background

There have been many waste fires in Wales over recent years. This has led to increased scrutiny and new guidance from NRW titled *Fire Prevention and mitigation Plan Guidance - Waste Management* (Guidance Note 16 or GN16). During and following a fire, waste companies are required to pay the cost of clean-up. These costs can be very high as any remaining burnt waste will need to be removed and disposed of, potentially as hazardous waste. There is also reputational damage, potential criminal charges and increased insurance premiums.

As CWS is a waste operator, the waste regulator Natural Resources Wales (NRW), requires CWS to have a Fire Prevention and Mitigation Plan (FPMP) in place which is subject to regular update and review.

This FPMP details the methods CWS will use to initially prevent and control fire of combustible materials at their waste transfer station at Llanbradach, Southeast Wales.

This FPMP should be considered a working document subject to internal and external review. Copies of this document should be stored electronically and in hard copy on and off-site. A hard copy will be stored in a grab-pack located in an Emergency Services Box attached to the external site wall. This box will be secured with a combination padlock that will be locked using a code provided to the FRS and NRW. All personnel and contractors should be familiar with this document and its location. Fire prevention measures will be included in Induction Training.

Plans of the site showing its location and key infrastructure are provided in Figures 1 to 4. Section 5 includes a summary of key site details and waste types potentially present.

CWS will aim to ensure that fire prevention is a day to day activity that is delivered through good housekeeping and simple but effective control measures.

This plan will be reviewed and updated as necessary, and at least annually and following a fire.

2 APPLICABILITY OF NRW GUIDANCE

Guidance Note 16 (GN16) provided by NRW applies to operators that store combustible waste materials. An evaluation of the operation at CWS against wastes typically found to be combustible (according to GN16) is provided in Table 2-1.

Based on the review of combustible wastes in Table 2-1 it is evident that GN16 is directly applicable to the CWS operation. The FPMP is focussed on these potentially combustible wastes.

Table 2-1 Identification of Combustible Wastes

Potentially combustible wastes covered by GN16	Applicability to CWS operation	Included in Fire Plan	Site storage area (See Figure 3)
Paper or cardboard	Separated from skips and placed into dedicated RORO skip for off-site recovery. No processing. Plasterboard stored in a sealed container.	Y	D
Plastics	Separated from skips and placed into dedicated RORO skip for off-site recovery. No processing.	Y	D
Rubber (natural or synthetic, including whole tyres, baled tyres, tyre shred, crumb and fibre)	Not a permitted waste but loose tyres occasionally separated from skips	Y	D
Wood & wood composites (planks, boards, pallets, crates, sawdust, shavings & chips)	Separated from skips and placed into dedicated RORO skip for off-site recovery. Some wood shredded to wood chip.	Y	G and K
Fragmentiser waste (from processing end of life vehicles (ELV's), plastics and metal wastes from materials recovery facilities)	No fragmentised waste accepted or generated	N	None
Rags and textiles	Included in skip waste and included in light fraction waste and fines from trommel	Y	D
Scrap metals including ELV's	No ELVs accepted but scrap metal recovered from skips	Y	D
Waste fuels – including residual combustible waste, RDF and SRF	No waste fuels accepted.	N	None
Waste electrical and electronic equipment (WEEE) such as fridges, computers and televisions containing combustible materials such as plastic	Small electrical items will be separated from skips and stored in dedicated RORO.	Y	D
Batteries within ELV's	No ELVs accepted. Batteries are non-permitted wastes but occasionally found in skips and placed into secure quarantine storage.	Y	Shed by office
Compost and plant material	As delivered green waste accepted in skips and separated into dedicated RORO skip. No processing.	Y	D
Biomass facilities	No biomass facilities at the site	N	None

CWS also accept other wastes that are not combustible. These comprise inert wastes such as soil, stone and concrete and also double bagged asbestos.

3 FPMP CONTENTS

Guidance Note 16 (GN16) sets out the information to be included in a FPMP. These requirements are summarised in Table 3-1 along with an indication of where the information is presented in this FPMP.

Table 3-1 Minimum requirements of FPMP for combustible wastes

Requirement	Summary position and section of report with detail
Type of waste accepted	General waste in skips as described in Section 5.
Amount of waste received daily	Typically, 70 skips / day as indicated in Section 5
Form of waste accepted	Loose waste in skips (Section 5)
Waste storage arrangement	Most wastes quickly separated and sorted without processing into RORO skips for off-site transport as shown in Sections 5 and Figure 3.
Waste storage time	Combustible waste stored for very short durations (typically <1 week) as summarised in Section 5
How waste is managed	Rapid and efficient sorting into dedicated RORO skips as described in Section 5
Plan of waste storage areas including clear area around site perimeter	Access around site perimeter not feasible but all waste storage containers accessible from at least one side as shown in Figure 3.
Size of waste piles (max dimensions)	Max stockpile ~105 m^3
Fire breaks between and around waste	Most combustible waste in skips as shown in Figure 3 and discussed in Section 9
Fire prevention techniques used	Isolating waste into steel RORO skips as discussed in Sections 9 and 11
Techniques for minimising fire spread	Isolating waste into RORO skips as discussed in Sections 9 and 11 and Figure 3
Actions in response to fire	Place hot / burning wastes into RORO skip and isolate from other wastes / buildings. See Section 14
Management of potential fire impact	Place hot / burning wastes into RORO skip and isolate from other wastes / buildings. This will reduce fire water demand. See Sections 16 and 18
Contact details for key receptors	See Table 18-3.
Maintaining safe access	Access always required for operation of site

3.1 Communication of Plan

All staff will be trained on the relevant sections of this FPMP during their induction training and this training will be refreshed annually or after any amendment to the FPMP whichever occurs soonest. Training will be recorded in each individual employees training records.

All contractors will be made aware of the key elements of the FPMP. This will be recorded in the Site Induction Training file.

All training on the FPMP will focus on the actions necessary to:

1. Prevent a fire occurring; and
2. During a fire if one breaks out.

4 SITE SETTING

4.1 Site Location

As shown on Figure 1, the operation is located directly north of Llanbradach, which is itself north of Caerphilly, South Wales. The thin linear site measures approximately 400m by 25m and is orientated approximately north-south.

The site is located near the base of the valley floor with the valley side steeply rising immediately west.

Directly to the north are industrial units, some of which are used for waste activities and some for vehicle maintenance. Directly to the east is a railway line. Beyond the railway line is a Medical Centre, Community Centre, disused works and residential properties. Towards the south, the site is naturally squeezed between the railway line to the east and access road running alongside the western site boundary at an elevated position. Further south is forestry and residential properties.

Many of these features are identified on Figure 5. The closest properties are located to the west and separated from the site by dense woodland.

4.2 Access

During operation, a circular traffic management scheme is implemented. This involves entering the site at its northernmost point off Colliery Road, which runs above the site to the west, and exiting via the southernmost point of the site. The access route is shown on Figures 2, 3 and 6. This can easily be used by the FRS.

During an out-of-hours emergency, the site could be accessed from either the north or south with both access routes always being clear and 3.7m wide. This will either require the FRS to break open the padlocks or CWS managers to open the gates. Such managers live within 10 minutes of the site.

4.3 Environmental Setting

The site is located in an area where there are no protected ecological sites within 500m. Beyond this distance there is a SSSI 813m south. This was designated for geological reasons. There are no other protected sites within 2km apart from Ancient Woodland directly west of the site.

Groundwater below the site is not part of a Source Protection Zone. The groundwater is however designated as a secondary A aquifer in the superficial deposits and underlying bedrock. These are very likely to be overlain by made ground associated with historical land uses.

There are no surface water bodies close to the site apart from springs to the west issuing from higher ground and these are culverted beneath the site.

The site is close to residential properties, as shown on Figure 1 and 5.

Wind direction at the site typically moves from the south to the north of the yard, as experienced by the site operator and in general accordance with the prevailing south-westerly wind directions experienced in the South Wales valleys.

5 WASTE OPERATION

5.1 Waste Types

The company's success relies upon the rapid sorting of skip waste. In the most part, the waste is brought to site by the CWS skip wagon fleet which includes 6 wagons and a stock of approximately 400 skips.

Waste types and quantities are restricted to those listed in the site Permit. The site typically accepts:

- mixed non-hazardous skip waste
- inert waste
- mixed construction, demolition and excavation waste (CDEW) including wood.

Double bagged asbestos waste is also accepted for storage and transfer. No treatment of asbestos is undertaken.

Small items of WEEE are also separated from skips.

5.2 Waste Acceptance

All vehicles using the facility will be pre-booked and will mainly be vehicles operated by CWS. The Yard manager will visually inspect each load prior to, during and following tipping or placement into storage. The yard manager will be conversant with the requirements of the licence and will be responsible for ensuring materials are tipped in a proper and safe manner. Particular attention is given to identifying non-permitted wastes.

The operation typically processes 70 skips each day.

5.3 Site Layout

The long narrow site is naturally split into two areas referred to as top yard (at a higher elevation) and lower yard (at a lower elevation). All waste acceptance and sorting is undertaken in the top yard. The bottom yard is used for short term temporary storage of empty skips and secure containers. Both areas are shown below with each area identified on Figure 2. Drainage from the top yard is prevented from flowing to the bottom yard as the top yard is contained behind a sleeping policeman and push wall with drainage falling under gravity to an interceptor. This is shown in Figure 4.

Plate 5-1 View South over concrete in part of Top Yard

Plate 5-2 Skip storage area in Bottom Yard

Following acceptance at the site, the waste is tipped in the top yard. The top yard benefits from impermeable surfacing and sealed drainage that passes through an interceptor. In this area, waste is rapidly inspected and sorted using manual and mechanical means including an excavator with a selector grab, a riddle bucket and a front loading shovel. Some of the waste is also passed through a trommel for further separation. The trommel is located within a building. Alongside the trommel is a crusher. This is used to crush oversize materials such as concrete. Fixed position atomiser sprays and sprinklers are to be installed in the building

housing the trommel and crusher. Screening of soil / stone and shredding of wood is sometimes undertaken externally. Approximately 70 skips / day are processed in the top yard.

Separated materials are immediately placed into dedicated reversed parked RORO skips for temporary storage prior to off-site recovery and disposal.

Alongside the skip transfer operation, double bagged asbestos is also accepted. This is placed into sealed secure storage prior to off-site transport and disposal.

Once a skip is full it is typically directly removed from the top yard. If there is a delay in the off-take the skip is transferred to the bottom yard. This part of the site is also used to store empty skips.

Non-permitted wastes are identified during acceptance and placed into quarantine if they cannot be immediately returned to the customer.

5.4 Waste Sorting in Top Yard

All waste sorting is undertaken in the top yard. Typically, 70 skips each day are processed.

5.4.1 Manual sorting

Initial sorting of tipped skip waste is carried out in Area A by trained operatives. Protective equipment will be provided for and used by operatives at all times.

Inert materials and non-recyclables are identified and handled manually or by machine and stored in AREAS B and C on the site plan.

Material for off-site recovery will be separated from the tipped waste and placed directly into reverse parked RORO skips in AREAS D or G.

Once a skip is full it is typically directly moved off-site from the top yard on the same day. The skip is then replaced with a new empty skip typically stored in AREA F to allow the sorting operation to continue. If the off-take arrangement does not occur immediately then the full skip may be moved to lower yard from where it would be removed, typically within 24-48 hours.

5.4.2 Mechanical screening

Mechanical screening is undertaken to facilitate the effective transport of material for final recovery elsewhere using a trommel inside the building in Area I. The trommel is followed by a picking line and crusher.

Plate 5-3 Trommel and Picking Line in Building

5.4.3 Screening

Mixed rubble and soils generated by the sorting process or delivered in skips may need to be passed through a screen. The screen is positioned in AREA H on Figure 3. During the process, an over band magnet may be used to remove ferrous metals and an eddy current separator to selectively remove non-ferrous components.

5.4.4 Crushing

Inert construction and demolition waste, such as soil and stone, concrete and bricks are crushed in the existing building directly adjacent to the trommel. This enables materials to be directed by conveyor from the trommel directly to the crusher in AREA I. This crushing operation is undertaken using a mobile slow speed electric jaw crusher fitted with spray bars enabling oversize material to be size reduced and sorted whilst dust and noise release is minimised within the building. The building is also to be fitted with dust suppression equipment to include fixed position and mobile high pressure, low volume water sprays (atomiser sprays) and sprinklers.

Crushing is undertaken irregularly for short periods.

5.4.5 Shredding

Shredding of waste wood is sometimes undertaken externally using a slow speed shredder. During the shredding, mobile atomiser units would be placed around the plant to prevent the release of airborne particulates. This activity would be undertaken infrequently, for short periods. The shredded wood is placed directly into a RORO skip for off-site recovery. Shredding is undertaken in AREA K.

Shredding is undertaken irregularly for short periods.

5.4.6 Asbestos Bulking

Small quantities of double bagged asbestos are accepted for temporary secure storage and bulking prior to off-site disposal. There is no treatment of asbestos.

All asbestos is stored in a secure container in AREA J.

5.4.7 Non -Permitted Wastes

Non-permitted wastes identified during waste acceptance are managed to reduce their risk to health and the environment.

Orphan cylinders would be placed into a dedicated external covered cage and batteries into a secure covered box in a covered storage shed with concrete floor, as shown on Figure 3.

5.5 Temporary Storage in Lower Yard

In the lower yard, secure containers (skips) are stored for short periods (<2 days) ahead of off-site transport. All skips are stored on impermeable concrete and covered to prevent litter, water ingress or pests as required. This enables the top yard to be kept clear of full secure containers and improves traffic management and health and safety as the wagons collecting the full skips can proceed directly to the lower yard without interrupting the waste treatment operation in the top yard.

5.6 Plant

Plant used in the handling of the waste include:

- 1 no. Loading shovel
- 2 no. 14 tonnes excavators with material grabs
- 1 no. 14 tonnes excavator with bucket for loading screen
- 1 no. 8 tonnes excavator loading trommel

These items would be available to assist in a fire incident as they are fitted with heat protected hydraulic systems and enclosed cab.

All CWS vehicles used to deliver skips are parked outside of permit boundary in adjacent yard. Maintenance of these vehicles is also undertaken outside of the permitted area. These areas are separated from the waste storage areas. All plant is subject to a planned preventative maintenance programme.

5.7 Personnel Involved

Whenever the site is open to receive waste it will be supervised by at least one member of Management staff.

There are typically 32 operatives working on site. Operatives clock-in and clock-out as part of their daily signing on process.

5.8 Hours of Operation

There are no planning restrictions but working hours are typically:

7.00am - 6:30pm Monday to Friday
7.00am - 2:00pm Saturday
9.00am - 11:00am Sunday (as required)

Bank holidays are typically not worked.

5.9 Pollution Control Measures

The site has a designated impermeable pavement with suitable kerbing. All runoff in the waste acceptance and sorting area drains to the drainage system. The drainage system is connected to an interceptor. This ultimately discharges to land drains.

Site drainage is illustrated on Figure 4.

5.10 Security

Entrance to the site is normally at the northern end of the site off Colliery road. This entrance is through steel gates and barrier which are locked when the site is not operational. The site can also be accessed on road from the south, but this exit is also locked when the site is not operational. The western boundary of the site rises steeply up to Collier Road and there are no formal access routes. The eastern boundary runs alongside the railway line. The site cannot therefore be easily accessed out of hours.

The northern perimeter of the site is partly fenced and partly directly against adjacent buildings. The westerly side is fenced and has a near vertical embankment. As the site narrows to the south there is another steel face. The whole of the eastern embankment lies directly adjacent to a railway line.

The sorting and arrival area benefits from a CCTV system accessible 24/7 via telemetry.

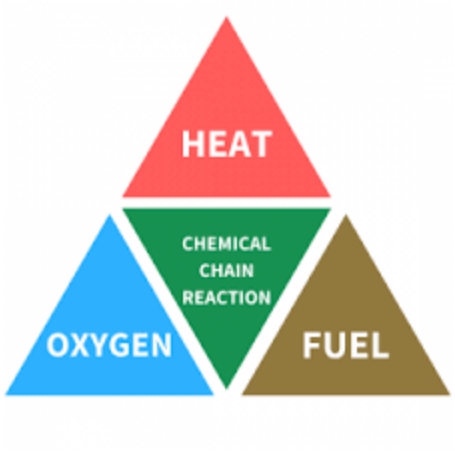
The security of the site and perimeter fences is subject to weekly inspections.

6 COMMON CAUSES OF FIRE

Fire requires 3 components:

1. Fuel e.g. wood, plastic, cardboard
2. Source of ignition e.g. hot exhaust, spark from metal bucket, chemical reaction
3. Oxygen supply

These 3 components are known as the fire triangle with fuel, heat and oxygen being the 3 corners of the triangle



If one of the parts of the fire triangle is missing a fire cannot start. CWS will take preventative measures to avoid the three parts coming together as this will reduce the opportunity for fire.

Fires in the waste industry can be caused by many factors. Potential causes are identified Table 6-1. The likelihood of each cause occurring is ranked as either low, medium or high. The ranking takes into consideration the preventative actions CWS will take during day-to-day operation to limit the possibility of fire occurring.

In addition to the actions identified in the following sections, CWS will also ensure that:

- All potential ignition sources are kept at least 6m away from combustible and flammable waste
- Combustible wastes are stored in the dedicated storage areas
- All personnel are aware of the risks of fires developing and are encouraged to actively identify and report fire risks or sources
- Inspections of all wastes and machinery will be made at the start, middle and end of each shift to check for heat or smoke
- All site personnel are trained in fire prevention and fire management
- Emergency procedures are in place
- An independent audit of fire risks is undertaken

Potential causes of fire at the site are evaluated in Table 6-1. Where relevant, control measures are also identified.

Table 6-1 Potential causes of fires and control measures to be adopted

Potential Cause of Fire	Likelihood of Risk	Control Measures
Arson or Vandalism	Low Risk	Secure site boundary out of hours Site fitted with twenty 24/7 CCTV cameras with telemetry to senior management who can access cameras remotely at any time of day Routine inspection programme to ensure no breaches of site boundary Bagged asbestos in sealed skips
Visitors and Contractors	Low risk	Ensure all visitors and contractors are signed-in and familiar with site rules Brief all visitors with key health and safety information including fire prevention procedures Ensure relevant contractors provide method statement that include fire prevention
Ignition Sources	Medium risk	Waste visually inspected prior to and during sorting for items that could pose a fire risk e.g. batteries which would be placed into dedicated separate storage Open burning not permitted anywhere on the site Smoking only permitted in dedicated area adjacent to office and away from combustible waste Space heaters, furnaces, incinerators, heating pipes and naked flames not permitted/ not used on site. Hot metal not generated during waste processing All potential ignition sources (see other causes of fire) will be kept at least 6m away from combustible waste Banksman present when waste is being scraped along floor in processing area All plant and vehicles to be parked away from waste storage areas when not in use Electrical supply to site is in a sealed box in brick building separate from waste storage area Slow speed shredder to be used to process wood to reduce risk of sparks All plant regularly cleaned and maintained
Self-combustion	Low Risk	Waste will be stored in large sizes and wood would only be size reduced to smaller pieces close to the time of off-site transport (if needed) to reduce storage time of smaller pieces All waste will be stored for much less than 3 months in separate skips Robust waste acceptance procedures will ensure that waste does not represent any increased self-ignition risk Daily visual check of site to identify smoke/steam
Plant or Equipment Failure	Low risk	All plant and equipment to be serviced and maintained as per manufacturers' requirements Preventative maintenance programme to be implemented Daily plant and machinery inspections carried out by trained plant operatives. All defects reported by end of the working day All plant to be parked 6 metres from combustible waste where possible
Discarded Smoking Materials	Low risk	Smoking only permitted in dedicated area Cigarette disposal bins provided in smoking area
Hot Works e.g. cutting and welding	Low risk	No hot works to be undertaken as routine in Permitted area If hot works are necessary, they must be carried out (>6m) away from waste storage areas All hot works must be carried out under separate RAMS Firefighting equipment will be available at all times during hot works Following all hot work, a fire watch will be maintained in relevant areas until end of shift to ensure there is no residual ignition source or smouldering fire
Industrial Heaters	Low risk	The site does not use industrial heating of any kind apart from electrical fan heaters in the office Office is separate from all waste storage areas
Poor Housekeeping	Low risk	Daily inspections of working area to identify need for cleaning Daily dry brushing of any loose combustible waste, dust and fluff in all areas Immediate clean-up of leaks and spills with spill kits
Hot Exhausts	Low risk	Most wastes stored in skips Upward pointing exhausts used where possible
Damaged/ exposed electrical cables	Low risk	All relevant electrical items will be regularly PAT tested Mobile power tools and power supplies will only be used for temporary maintenance tasks Firefighting equipment will be available on site at all times (powder and foam extinguishers)
Hot loads deposited at site	Low risk	No hot loads are accepted at the site under normal conditions Any hot loads would be rejected or placed into quarantine and NRW informed

Table 6-1 Continued

Potential Cause of Fire	Likelihood of Risk	Control Measures and Comments
Build-up of loose combustible waste, dust and fluff	Low risk	Good housekeeping maintained each day Trommel subject to routine inspection and preventative maintenance
Tramp metal in machinery	Low risk	Trommel and slow speed shredder routinely cleaned, serviced and maintained
Batteries in waste	Low risk	All waste inspected at reception. Inspection aimed at identifying non-permitted prohibited waste stowed away including lithium batteries
Batteries in ELVs		No ELVs accepted
Leaks and spillages of oils and fuels	Low risk	No oils or fuels stored in Permitted area Prevent leaks by using appropriate containers Prevent leaks by not over-filling appropriate containers Prevent spillages by using funnels etc. to fill appropriate containers Prevent spillages by using drip trays Ensure materials used to absorb combustible liquids are correctly stored before disposal as hazardous waste Have spill kits available on waste acceptance and treatment area
Poor Waste Acceptance Inspections/ Non-permitted problematic waste stowed away	Medium risk	Visual inspection of all waste accepted will include assessment of potentially hot wastes and non-permitted waste with increased fire risk such as lithium batteries and orphan gas cylinders Quarantine skips to be maintained for non-permitted waste and problematic loads
Open Burning	Low risk	No burning of wastes is allowed anywhere on the site
Sparks from Loading Buckets	Low risk	Dragging/pushing of buckets along concrete floor should be kept to a minimum All operatives to look out for sparking and to inform management immediately
Neighbouring Site Activities	Low risk	CWS vigilant of activities at adjacent yards Establish good communications between all parties and understand processes /risks
Reactions between wastes	Low risk	Understand risk of lithium batteries entering site during pre-waste acceptance checks – this is because damaged lithium batteries can cause fires Inspect waste deliveries for non-permitted wastes such as orphan gas cylinders Ensure rapid turnover of all wastes to minimise potential build-up of heat due to chemical oxidation Maintain quarantine area and skips for problematic wastes
Cylinder storage	Low risk	Ensure orphan cylinders are carefully handled and stored in dedicated cage Specialist contractor to be used to collect cylinders for off-site recovery / disposal
Leaks of fuel and oils	Low risk	Readily spotted by personnel on site Sill kits used
Cooking	Low risk	No cooking facilities (apart from microwave) provided No naked flames used in welfare area Smoking in dedicated areas away from combustible waste

7 STORAGE TIMES AND SELF-COMBUSTION

According to GN16, many materials can self-combust under certain conditions and the risk generally increases when materials are stored for prolonged periods, whether internally or externally. In general, the smaller the particle size the higher the risk.

7.1 Waste Storage Duration

Storage time limits presented in GN16 are reproduced in Table 7-1 alongside the predicted storage duration at CWS. The GN16 timeframes are considered as starting points for the consideration of storage and self-combustion and used to inform stock management and rotation requirements. All of the waste at CWS is to be in storage for very short duration and the implications for site management are identified in the last column of Table 7-1. This includes non-permitted waste that may be in quarantine.

The analysis indicates that there is no need for additional stock management or rotation as all wastes are to be stored for short duration and in skips.

Double bagged asbestos in the secure container is not at risk of self-combustion.

Table 7-1 Evaluation of maximum storage time of combustible wastes

Waste Type	Max storage according to GN16	Waste storage time at CWS under normal conditions	Implications for site management
As delivered skip waste	6 month	<1 week – 1 month for most wastes (see below)	Skip waste rapidly sorted and components rapidly removed from site under normal conditions
Sorted non-shredded or similarly treated wastes (that is wastes whose particle size has not been reduced)	6 month	Wood - <1 week	Very short duration storage time indicates additional stock management, rotation and monitoring not beneficial.
		Shredded wood - <1 month	
		Mixed general waste - <1 week	
		Scrap metal - <1 month	
		Plastics - <1 month	
		Green waste - <1 month	
		Cardboard / paper - <1 month	
		Plasterboard - < 1 month	
		Trommel fines - <2 weeks	
		WEEE - < 2 months	
Non-permitted wastes e.g. batteries, tyres and gas cylinders	6 month	Batteries- <2 months	Stored in secure box in covered storage shed
		Whole tyres - <1 month	Stored in RORO in AREA D
		Orphan gas cylinders - <6 months	Stored in external covered cage
Baled and compacted wastes	6 month	No baler used on site	None
Shredded and similarly treated wastes (that is wastes whose particle size has been reduced)	3 month	Wood chip - < 1 month	Very short duration storage time indicates additional stock management, rotation and monitoring not beneficial.
Combustible fines/dusts & very small particle size wastes	1 month	No combustible fines on site	None

7.2 Self-combustion Management

According to GN16, some materials are at risk of self-combustion if stored for more than 3 months. An evaluation of these wastes against the CWS operation is provided in Table 7-2.

This indicates that the planned storage times fall well below the timeframes for potential self-combustion i.e. self-combustion could occur after ~90 days (3 months) but CWS only plan on storing most combustible wastes (either permitted or non-permitted) for <30 days. This suggests that self-combustion is not likely which has significant implications for site management and fire detection. These implications are detailed in Table 7-2 and 7-3.

The analysis indicates that additional stock management is not required.

Double bagged asbestos in the secure container is not at risk of self-combustion.

Table 7-2 Evaluation of materials at risk of self-combustion

Waste	Typical timeframe for risk of combustion according to GN16	Storage time at CWS under normal conditions	Implications for site management
Scrap metal	>3 months	<1 month	Very short duration storage time indicates additional stock management, rotation and monitoring not beneficial.
Green material	>3 months	<1 month	
Compost	>3 months	Not stored at site	
Wood	>3 months	<1 month	
Wood products (shredded)	>3 months	<1 month	
Cardboard	>3 months	<1 month	
Plasterboard	>3 months	<1 month	
General / mixed waste including light fraction	>3 months	<1 month	
Plastics	Not at risk	<1 month	
Non-permitted tyres (whole)	>3 months	<1 month	
Tyres (processed)	>3 months	Not stored at site	
Trommel fines	>3 months	<2 weeks	
WEEE	-	<2 months	
Smaller size or graded materials either stored or mixed	>3 months	<1 month	
Material that has not had potential hazards removed before stacking e.g. rust which can generate heat	>3 months	Such materials not stored at site	
Treated materials which are not cold before storage e.g. treatment can generate heat	>3 months	Such materials not stored at site	
Presence of non-permitted lithium batteries	Not mentioned under self-combustion but such batteries can combust if damaged causing metal fire	Placed into quarantine and taken off site within 1 month	

Table 7-3 Evaluation of measures to reduce self-combustion

Fire prevention principle in GN16	Applicability at CWS	Implications for operation
Reduce risk factors	No heat generated during treatment. No fines accepted and trommel fines retained on site for less than 2 weeks.	No need for stock rotation or formal hot spot monitoring.
Minimise stack sizes	Waste is sorted immediately to reduce stockpile size. All separated wastes stored in dedicated skips to reduce volumes.	Maximum general waste stack size likely to be conical shaped with a radius of ~5m and a height of ~4m (~105 m^3 volume). Maximum (RORO) skip volume ~37m^3.
Control moisture	Waste delivered at additional moisture content in skip.	Moisture control not considered necessary due to short-term storage.
Good stock rotation and monitoring	Waste is sorted immediately to reduce stockpile size. All separated wastes placed into dedicated skips.	Routine stock rotation, formal hot spot monitoring and temperature readings not considered necessary due to short-term storage.
Store material in largest form	Only wood to be size reduced.	Shredded wood to be in storage <1 month.
Monitor stack temperature	Separated wastes stored in skips. Stockpile of general waste to be present for <1 week.	Temperature and moisture content monitoring not considered necessary due to nature of waste and short-term storage.
Regularly turn stacks	Separated wastes stored in skips for <1 month. Stockpile of general waste to be present for <1 week.	Routine turning of stacks not considered necessary given short-term storage.
Detect and control hotspots	Separated wastes stored in skips for <1 month. Stockpile of general waste to be present for <1 week.	Temperature monitoring not considered practical or necessary due to nature of waste and short-term storage. Visual observation, such as presence of steam, will be used as good indicator of hotspot during daylight hours.
Define maximum storage times	Under normal conditions waste will be stored for less than the timeframes indicated in Table 7-2.	CWS to monitor stock volumes and off-take arrangements to ensure stockpiling does not occur.
Minimise external heating	Separated wastes stored in skips for <1 month Stockpile of general waste to be present for <1 week.	No additional shading from sunlight considered necessary at this stage given short-term storage times.

7.3 Stack Monitoring

CWS recognises that the early identification and separation of hotspots can be critical in reducing the severity and spread of fire.

To avoid self-combustion CWS will ensure a high turnover of stock and storage time will not approach 3 months for those wastes at risk of self-combustion. As the site is small, waste needs to be quickly processed and sent off site for recovery/disposal. This is the only way that the operation is economically viable and so there is an underlying financial incentive for rapid waste turnover. Stock management is therefore a critical part of the business with rapid turnover crucial to the success of the site. The 'first-in-first-out' principle is implemented at the site by ensuring that all new waste is processed within hours of delivery and separated components taken off site for recovery / disposal within a month. The yard is often clear of waste at the end of each day with all wastes in skips.

The use of temperature and moisture probes is not considered to be practical for the nature of the waste, the way it is stored in skips and necessary for the short storage durations.

7.4 Waste Rotation

The rapid turnover of waste ensures very short storage periods. For this reason, there is no formal stock management procedure other than ensuring all stock is rapidly treated and appropriately segregated.

7.5 Waste Acceptance Measures

Robust waste acceptance procedures are included in the EMS. These are aimed at preventing non-permitted waste that could increase the fire risk.

7.6 Alternative waste management options

The site typically accommodates approximately 10 RORO skips on the top yard which are filled and replaced with empty skips every few days. The site does, however, have capacity for holding some 40 full RORO skips on impermeable concrete. A further 20 full RORO skips could also be stored on hardstanding in the southern part of the site. In this context, the effective maximum storage capacity is approximately 70 full RORO skips. The working maximum number is, however, much less than this and is set at 20 full RORO skips on impermeable concrete. When this number of skips is reached CWS will implement contingency measures.

This may require the site to stop accepting wastes and an assessment of any bottlenecks. If necessary, skips would be diverted to local competitors as CWS has developed good reciprocal working relationship within the local trade.

7.6.1 Contingency

The success of the operation requires rapid processing and throughput of the wastes to be treated. This is reliant upon (1) rapid processing at site under the control of CWS and (2) rapid off-take of separated components. This latter aspect is partly under CWS control but is also influenced by the price of recyclates and the capacity of customers accepting the recyclates.

To ensure that the former aspect does not constrain operations, CWS operates a planned preventative maintenance programme aimed at minimising plant downtime and maintaining a large and flexibly employed workforce. To ensure the latter aspect is not a constraint, CWS has off-take arrangements with several large customers in South Wales. From an economic perspective, this enables sales at the highest price to be achieved but also provides several options for quickly clearing the site should this be needed during an emergency. Should such turnover not be achieved, CWS has off-site recovery and disposal contracts with other waste management companies that would be used to ensure the site does not stockpile either unprocessed or processed waste.

8 MANAGING WASTE STACKS AND SEPARATION DISTANCES

8.1 Applicable Reference Graphs

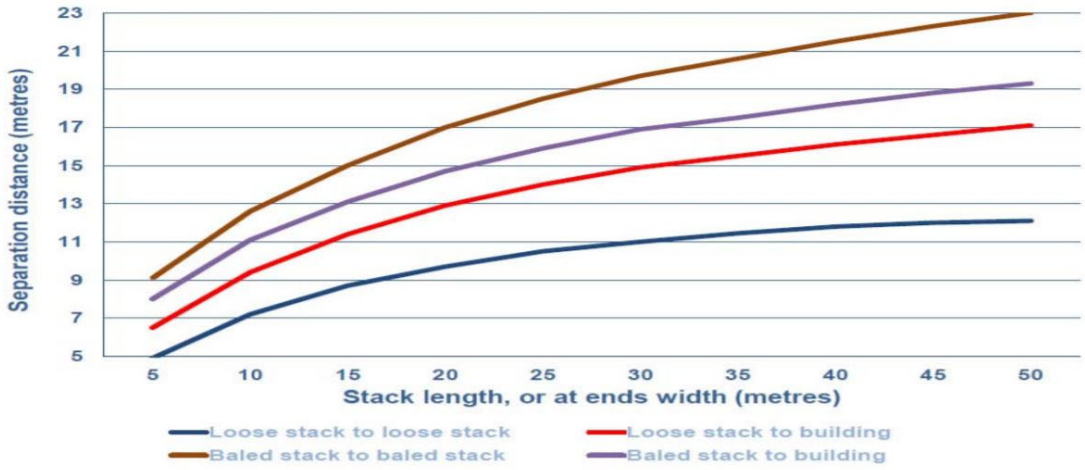
Guidance Note 16 was prepared in response to a series of burn tests carried out by WISH (Waste Industry Safety and Health Forum). These tests aimed at replicating, as closely as practical, 'real life' waste fires. The tests were conducted on a variety of wastes including cardboard, plastic, RDF and SRF, tyre crumb, wood, paper and card, loose frag fluff (plastics, foams etc. from dismantling ELV) and shredded tyre. Based on the results of these burn tests, guidance on maximum stack sizes and fire break/separation distances were developed and set out in a code of practice titled Reducing Fire Risk at Waste Management Sites.

One of the key aspects of GN16 is the approach recommended to limiting the size of waste stacks and ensuring sufficient separation distances between stacks. In GN16 this is achieved through the use of look-up tables and graphs. Two approaches are provided in GN16 for to different types of waste:

- Graph 1 – to be used for determining stack lengths and separation distances for external storage of waste with typical maximum burn temperature of 950°C. This is waste such as general wastes such as RDF, SRF (Refuse Derived Fuel and Solid Recovered Fuel), wood and paper.
- Graph 2 - to be used for determining stack lengths and separation distances for external storage of waste with typical maximum burn temperature of 1200°C. This is waste such as plastics and rubber.

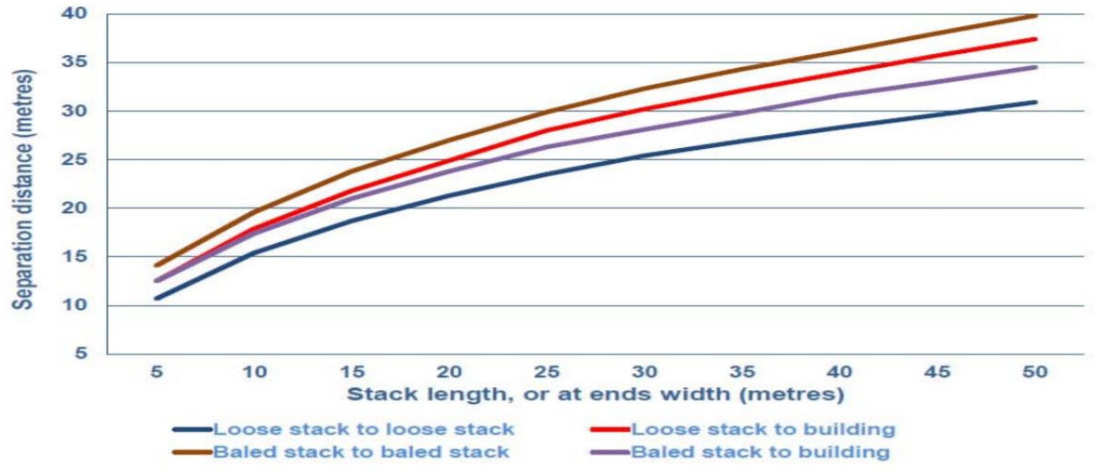
Stacks of tyres, comprising rubber, should be evaluated in accordance with Graph 2 and so this is also reproduced below:

Graph 1. Stack lengths and separation distances general wastes (typical max burn 950 °C)



To determine your separation distance, mark your stack length on the horizontal axis of the graph and draw a line up to the relevant graph line (stack to stack, to buildings etc.). Then draw a horizontal line across to the vertical axis and read-off separation distance. This can also be done in reverse. For example, at your site separation distance may be constrained by site size. Therefore this distance can be marked on the vertical axis and maximum stack length read-off on the horizontal axis

Graph 2. Stack lengths and separation distances plastic/rubber wastes (typical max burn 1,200 °C)



To determine your separation distance, mark your stack length on the horizontal axis of the graph and draw a line up to the relevant graph line (stack to stack, to buildings etc.). Then draw a horizontal line across to the vertical axis and read-off separation distance. This can also be done in reverse. For example, at your site separation distance may be constrained by site size. Therefore this distance can be marked on the vertical axis and maximum stack length read-off on the horizontal axis.

As can be seen by the colour coded legend on each graph, these graphs are intended to assist operators who manage wastes in loose stacks or bales. As no waste is baled at CWS it is only the loose stack information which is directly applicable and this is only applicable to the loose stack of general waste, which is typically only in storage for less than 1 week. This is because all other wastes are stored in containers (skips) which means the separation distances referred to in the graphs are not directly applicable.

8.2 ELV Storage

GN16 provides specific guidance on the storage of ELVs but these are not accepted at CWS.

8.3 Underpinning Assumptions

The GN16 graphs are underpinned by several assumptions. Evaluation of the main assumptions underpinning the graphs used to generate separation distances against the CWS operation is presented in Table 8-1.

Table 8-1 Evaluation of assumptions underpinning separation distance

Assumption in GN16	Applicability at CWS operation
Max stack height of 4m or 4 bales.	General waste stack to be stockpiled no higher than 4m. Other waste to be in RORO skips.
Max stack width of 10 – 20m (providing access is available on both sides).	General waste stack to be conical with a maximum diameter of 10m. Stack to be placed within a bay with a push wall. Other waste to be in RORO skips.
Free air separation to other stacks.	Only one stack of combustible waste. Other waste to be in RORO skips with ~1m gap between each skip to facilitate safe handling.
Free air separation to buildings.	General waste stack to be 7m from nearest building and separated by heavy waste (mainly soil and stone) and concrete push wall. Other waste to be in RORO skips with ~1m gap between each skip to facilitate safe handling.
Dividing wall height, freeboard and structure.	The general waste is enclosed by concrete push walls. These are not intended to provide fire breaks but to aid handling and storage.
Max width of bunkers 10m.	Bunker 10m wide with walls 1.5m high push walls used to facilitate handling of general waste stack.

8.4 Baled Waste Storage

No baled waste is stored at the site.

8.5 Use of Bays and Walls

The general waste stack in AREA A is enclosed on 3 sides by push walls designed to facilitate waste handling and storage. This bay constrains the general mixed waste pile to being 7m away from the building housing the trommel and crusher (AREA I). Between the general waste pile and the building is a push wall and 7m of inert waste in AREA B, typically comprising sand and stone.

8.6 Waste Stored in Containers in a Building

The only buildings within the permitted boundary are Area I, housing the trommel, picking line and crusher. A small storage shed is used to store batteries in a secure container.

8.6.1 Oils and Fuels

Oils and fuels are not stored in the permitted area.

8.6.2 Batteries

Small quantities of non-permitted batteries separated from the waste stream are placed into dedicated sealed containers in a small building below the office.

8.6.3 Cylinders

Orphan gas cylinders are stored externally in a covered cage, as shown in Figure 3. This ensures the gas cylinders are in an external storage area with free air flow.

8.7 Waste Stored in Containers Externally

Apart from soil and stone, the bulk of separated combustible waste components will be quickly separated and placed directly into steel 40 yard RORO skips ready for off-site transport. Such skips typically have dimensions of approximately:

Dimensions: L 6.07m (20 ft) W 2.23m (7.31 ft) H 2.8m (9.2 ft)

They typically have an empty volume capacity of ~37,000 litres ($37m^3$)

These are primarily used on the top yard for the temporary storage of separated wastes. There is also temporary overflow capacity in the lower yard where empty skips are also stored (see Figure 2).

In accordance with GN16, separation distances are not specifically required for this type of skip but each one must be accessible so any fire inside it can be extinguished. This is why each skip used to temporarily store wastes are reversed parked into position with a 1m gap between each skip. In an emergency, this allows each skip to be directly and safely accessed and quickly moved if necessary, by any site plant. This configuration is used each day as it facilitates operation of the site and rapid waste turnover.

8.8 Utilities

The office is provided with electricity and a phone line. There is no mains gas at the site.

A mobile phone telephone mast is located towards the southern end of the site (see Figure 2).

The site is underlain by several land drains and culverts diverting spring water from the high ground to the west. This water flows continuously.

There are no overhead cables at the site.

The site is immediately adjacent a railway line.

8.9 Requirements of Third Parties

CWS insurers have not placed any specific demands on the company in terms of site layout and fire prevention.

9 SITE CONFIGURATION

9.1 Site Layout and Waste Storage

Taking the separation distance from Table 8-1 into account, the site layout outlined in Figure 3 and summarised in Table 9-1 is to be implemented in the top yard. In the bottom yard, small numbers (typically <5 no.) of skips would be stored on the impermeable concrete. If this configuration is found to be inefficient / does not meet operational requirements then the plan would be updated. The plan would also be updated if consultation with NRW / FRS indicated a more suitable arrangement would be appropriate.

Due to the size and orientation of the site, maintaining 3.7m access around the perimeter of the site (either internally or externally) is not feasible. Safe access 3.7m wide is, however, always available through the centre of the site as this is main traffic management route where RORO skips are manoeuvred. This ensures direct easy access to the building, high asset value items and all waste skips / stockpiles.

Empty skips for use as emergency quarantine are always available in the top yard. In the event of an emergency fire, skips would be deployed to the area designated AREA E on Figure 3, or placed closer to the burning material as necessary.

Using empty RORO skips as emergency quarantine will mean that there is always separation between the burning waste and other waste / buildings. Use of a RORO would also ensure that the waste is at least 6m directly away from any other combustible material. Once the additional concrete is in place the quarantine area would be moved to the north, in AREA F1, where there is even more open space.

Given that each empty skip has a capacity of ~37m^3, using one or two skips will ensure that there is always emergency quarantine capacity to accommodate at least 50% of the largest stockpile which is ~ 55m^3 i.e. 50% of 105m^3.

9.2 Stack Sizes

The waste typically held in storage at any one time is summarised in Table 9-1. This includes any non-permitted wastes that may be in quarantine.

The maximum waste stockpile will have a volume of ~105m^3.

Table 9-1 Typical Storage Arrangements

Waste type and form	Maximum volume / quantity	Maximum waste storage time	Storage location	Separation distance	Applicable GN16 guidance
Mixed general waste as tipped from skip (~70 skips processed each day)	<105m^3 loose tipped stockpile (conical with 5m radius and <4m height)	< 1 week	AREA A	7m to Area I building and separated by inert soil and stone	6m to building
Loose wood	1 no. 37m^3 RORO	< 1 week	AREA G	1m separation between skips	Guidance requires containers to be safely accessible
Shredded wood	1 no. 37m^3 RORO	< 1 month	AREA K		
Loose scrap metal	1 no. 37m^3 RORO	< 1 month	AREA D		
Loose plastic	1 no. 37m^3 RORO	< 1 month	AREA D		
As delivered green waste	1 no. 37m^3 RORO	< 1 month	AREA D		
Cardboard	1 no. 37m^3 RORO	< 1 month	AREA D		
Loose Plasterboard	1 no. 37m^3 RORO (sealed)	< 1 month	AREA D		
Loose trommel Fines	1 no. 37m^3 RORO	< 2 weeks	AREA D		
Whole tyres	1 no. 37m^3 RORO	< 1 month	AREA D		
Loose general mixed waste	1 no. 37m^3 RORO	<1 week	AREA C		
Small items of WEEE	1 no. 37m^3 RORO	<2 month	AREA D		
Bagged asbestos	1 no. 37m^3 RORO		AREA J		
Orphan gas cylinders	<20	< 6 months	External cage	Separate from other wastes	Not covered in GN16
Individual batteries	<200 batteries	<1 month	Storage shed	Dedicated covered container	Not covered in GN16

9.3 Emergency Escape Routes and Assembly

Emergency escape routes are shown on Figure 7 along with the external assembly point and emergency grab box.

Depending upon the location of the fire, any personnel on site would evacuate either via the northern or southern entrances to the off-site Assembly Point for roll-call and further information from Senior Management.

9.4 Fire Rescue Service Access

A minimum width of 3.7m and clearance height of 3.7m will be maintained at all times to the site. This is required for efficient operation of the site during day-to-day operations and will provide good access for the FRS. Site access will always be kept clear.

9.5 Quarantine

In the case of a fire outbreak or identification of hot materials, the waste will be moved into RORO skips by site plant. In the top yard, the designated quarantine area is Area E on Figure 3 but the emergency quarantine skips could first be deployed closer to the fire as needed, wherever safe to do so, so that the burning waste could be quickly isolated. The fire quarantine area will always be on impermeable concrete in the top yard.

In the bottom yard, all waste will already be in a skip on impermeable concrete.

9.6 Ignition Sources

As noted in Table 6-1, there are few potential ignition sources. This is primarily because most of the waste processing is manual and there are no naked flames or hot works. Smoking is also limited to dedicated areas away from waste storage and processing.

During operational hours, there are many personnel working at the site and so there is limited opportunity for an ignition source to be missed. The trommel also includes a picking line providing opportunity for identifying ignition sources and potentially hot materials such as batteries.

All plant and waste processing equipment is subject to preventative maintenance programmes and regular cleaning. A slow speed shredder is to be used to shred wood, as required, as this has a lower chance of generating sparks than some high speed shredders.

All personnel will be trained to identify potential ignition sources.

9.7 Occupied Buildings

The trommel, picking line and crusher is housed within an open sided building. There are typically 3 – 5 personnel working in and around this area.

The offices are the only other occupied building in the permitted area. There are typically 3 – 5 personnel in the office.

9.8 High Asset Value Equipment and Plant

Skip vehicles are parked overnight in a yard adjacent to the site entrance, as shown on Figure 2. This is outside the permitted site. During the day, most skip vehicles are working off-site and sometimes parked in the southern part of the site.

Overnight, all plant is parked at least 6m away from combustible waste. Typically, the loading shovel is parked in a building on the western side of the site and the excavators near to the site offices.

The trommel, picking line and crusher (high asset value items) are located in AREA I, the shredder is in AREA K and screen in AREA H.

9.9 Flammable and Hazardous Substances

9.9.1 Fuel and Oil

No fuels and oils are stored within the permitted area. These are stored in the maintenance sheds to the west of the site, as shown on Figure 2.

9.9.2 Asbestos

Double bagged asbestos will be stored in a sealed skip in Area J of Figure 3.

9.9.3 Waste Electrical and Electronic Items

Small items of WEEE are separated from skip waste. These are stored in a dedicated RORO skip in AREA D.

9.9.4 Cylinders

Orphaned cylinders will be placed into covered external storage cages located in the area shown on Figure 3. This location is away from the main working area and site traffic.

Rules that will apply to the storage of cylinders:

- Keep the number of stored cylinders as low as possible, ensuring that the storage cage safe capacity is not exceeded. Regular disposal will be undertaken
- Store cylinders of similar content together for easier collection
- Store cylinders upright with seals and protection caps in place, where provided
- Safeguard damaged and narrow-based cylinders against the risk of falling by fitting securing chains in the enclosure
- Other materials should not be stored with gases, especially if flammable or corrosive e.g. oils, fuel and batteries

Cylinders will also be safely handled as followed:

- Always ensure that the valve is closed and no gas is escaping
- Never lift a cylinder by its valve equipment or valve guard – always use the cylinder handling ring, if provided
- When moving cylinders any distance, use a suitable cylinder trolley
- Never lift a cylinder with a magnet or chain sling. If ropes or lifting straps are used, only lift one cylinder at a time
- Never roll cylinders along the ground as this damages identification marks and valves
- Never subject cylinders to impact

9.10 Site Traffic Movements

Under normal operating conditions, traffic normally flows from the north to the south through the site entrance and past the site office. Most skip deliveries are under the control of CWS and so all personnel involved are aware of traffic movements.

9.11 Off-Site Emergency Grab Pack

As shown in Figure 7, adjacent to the both the northern and southern site entrances, a wall mounted secure box will contain a copy of this fire plan and summary information. This secure box will be coded with NRW and FRS informed of the code.

9.12 Protective Clothing and Pollution Control Equipment

Adjacent to the site office, within the site boundary, CWS is to locate an emergency pollution control box and pollution control equipment. The pollution control fire box will be covered from the elements but will not be locked to ensure it is accessible at all times. The box will contain:

- Fire marshal high viz vest
- Spare PPE - (nitrile gloves, PVC gauntlets, overalls, overshoes, safety goggles)
- Additional fire extinguishers
- Spill kits with absorbents (granules) and small booms
- First Aid Kit
- Copy of FPMP
- Disposal bags
- Cable ties
- Duct tape
- Spare drip trays
- Emergency signage
- Sand bags
- Spare fire hose and spray nozzle for use by CWS / FRS
- Submersible pump and appropriate lay flat hose
- Tool box with appropriate tools required to operate pump and hose

Numerous skips will be available at the site to be used for additional quarantine or quenching wastes.

9.13 Source of Fire Water

The main (initial) source of water will be a dedicated new on-site tank holding 25,000 litres ($25m^3$). This is to be located on a new concrete pad adjacent to the northeastern site boundary where the vehicles are parked overnight (see Figure 8). This will be connected to a fire hose on a reel to enable water to be rapidly made available on the top yard, where all the waste processing occurs.

9.14 Infrastructure within Influence

There are no power lines or major roads in close proximity to the site but there is a railway line running along the eastern site boundary. There is also a telecommunication mast at the southernmost point of the site.

9.15 Third Party Infrastructure

There is no third party infrastructure in close proximity to the area used to process and store combustible waste.

9.16 Prevailing Wind

The prevailing wind is typically from the southwest but can be from the northeast, particularly during autumn. This means that for the majority of the time, the prevailing wind would take any smoke away from the residential areas to the east and south.

10 SEASONALITY AND STACK MANAGEMENT

10.1 Seasonality

The demand for skips is slightly higher during the summer months, where there is typically more construction/development occurring and when there tends to be more green material arising. This variation is not significant and not always noticeable. For this reason, there is no significant seasonality to the waste throughput which is why summer and winter operating hours are the same.

10.2 Suitability of Materials

Variations in demand for recyclates does vary in accordance with market conditions and price but CWS has never had difficulty in finding appropriate outlets. This is because there are several options within South Wales and CWS has a long track record of producing high quality recyclate feedstocks. The company has operated for several decades and during this time the recyclates produced have always been accepted for recovery at other suitably permitted sites. This is why there are no stockpiles of unacceptable waste at the site and the yard is, very often, clear of waste each day. This is why such short storage times are indicated in this fire plan. This situation is not expected to change.

10.3 Supply Chain Resilience

As a producer of quality recyclates, CWS is a trusted supplier to several outlets in South Wales. Equally, CWS has developed very good working relationships with other local skip suppliers. On this basis, CWS has demonstrated confidence in both ends of the supply chain i.e. in the event of a fire companies such as Atlantic Recycling, Bryn Recycling and ACD Skips could be used to either accept untreated skip wastes or to accept separated wastes. In the event of a fire, these relationships would enable CWS to maintain an accessible site to allow the emergency services to fight a fire.

10.4 Stack Management

The business is relatively stable, which is why the rapid turnover of waste in recent years has been sustained. All combustible wastes are rapidly sorted and separated into RORO skips which are subsequently rapidly removed from site for recovery. As this process typically takes a few days, and this is not predicted to change, no additional stack management measures are considered to be required.

11 MONITORING AND TURNING STACKS

11.1 Hot spot and Fire Monitoring

CWS recognises that the early identification and separation of hotspots can be critical in reducing the severity and spread of fire. However, no formal hotspot monitoring is considered to be necessary to overcome potential problems of hot spots developing due to the short-term storage planned. All combustible wastes are stored in steel RORO skips that provide separation between waste types and are rapidly removed from site. Combustible waste is only in storage for very short durations and so additional measures are not considered necessary.

11.2 Stack Rotation

Rapid stack removal is the underlying principle of the CWS waste operation. All combustible waste is treated from the moment it is discharged into the working area and so additional stock rotation is not required. As summarised in Table XX, combustible wastes are only stored for very short durations and so additional stock rotation and management is not considered necessary.

12 FIRE DETECTION

12.1 Valuable Assets

Skip vehicles are parked overnight in a yard adjacent to the site entrance, as shown on Figure 2. This is outside the permitted site. During the day, most skip vehicles are working off-site and sometimes parked in the southern part of the site.

Overnight, all plant is parked at least 6m away from combustible waste. Typically, the loading shovel is parked in a building on the western side of the site and the excavators near to the site offices.

The trommel, picking line and crusher (high asset value items) are located in AREA I, the shredder is in AREA K and screen in AREA H.

12.2 Early Fire Detection

GN16 requires operators to give consideration to adequate procedures to detect a fire in its early stages so that its impact can be potentially reduced.

12.2.1 Active Control Measures

There are few ignition sources at the site (and even fewer overnight) that could initiate a fire. Further, small piles of combustible waste is stored in separate dedicated RORO skips. For this reason, the chance of an ignition source starting a fire is low and if a fire were to occur it would be small and unlikely to spread.

In this context, the site has not been fitted with remote fire detection systems (such as visual flame detection systems, spark/infrared or ultraviolet detection) but has been fitted with 24 hr CCTV accessible from any mobile device via telemetry.

12.2.2 Passive Control

All personnel are to be inducted in the day-to-day application of this FPMP. As part of this process, particular focus will be given to ensuring personnel are familiar with fire prevention, fire identification and safe evacuation and assembly location.

12.3 CWS approach to Fire Detection

12.3.1 During Operations

The site is relatively narrow and compact with many parts immediately visible due to its linear nature. In this context, visual inspection of the site and stored waste will be undertaken daily during operations. This is considered to be proportionate to the type and volume of wastes in storage and the way combustible wastes are stored in separate skips.

The aim of these inspections will be to identify obvious evidence of fire or potential fire. Steam is a good indicator during daylight.

Any risks will prompt immediate action and will also be recorded on the daily inspection sheet. At the end of each shift all site areas will be inspected with the inspection aimed at identifying potential hotspots. The inspection will aim to identify such areas by odour, the presence of steam, heat, fire glow / smouldering and smoke.

Any signs of fire/potential fire will trigger an emergency response and a 999 phone call to the Fire Rescue Service.

12.3.2 Out of Hours

CWS recognise that fires can start at night when no personnel are present.

At the end of each shift AREA A is typically free from waste with all waste sorted into ROROs. This is because the rapid turnover of waste and daily clearance of the site is key to economic success. On rare occasions a small amount of waste may be left in AREA A overnight. If this were to occur, and the material caught fire, the fire would be small and isolated in AREA A. In these circumstances, only a very small isolated fire would need to be dealt with. This would be done in accordance with the fire plan and would involve either the waste being placed into a RORO following personnel arrival or being extinguished by water from the on-site tank, FRS tender or hydrant (depending upon circumstances and timing of arrival of CWS personnel and FRS). All other combustible waste would already be isolated in a RORO.

13 FIRE SUPPRESSION AND FIGHTING

CWS acknowledges that the FRS may not be able to or will choose not to enter a building during a fire and sometimes will allow waste to burn out. It is understood that such decisions are often made by the FRS based on dynamic risk assessments informed by the timing of the incident and the risks to human life, the environment and high value assets. For this reason, the underlying principle of the CWS approach is to operate and layout the site to minimise the risks of fire starting in the first instance and to limit the possibility of fire spread. This reduces the need for FRS to enter buildings and provides opportunity for a controlled burn which could reduce the amount of fire water generated.

13.1 Waste in a Building

According to GN16, if an operator stores waste in in a building, they should seek competent advice on the potential installation of a fire suppression system. This system should be proportionate to the nature and scale of waste management activities carried out and the associated risks.

At CWS, no waste is stored in a building. As shown in Figure 6, the isolated building housing the trommel, picking line and crusher is open sided and not connected to other buildings. The main waste type recovered through the trommel is inert concrete and brick and small quantities of plastic, wood and mixed waste. These latter combustible wastes drop out of the bottom of the picking line and are rapidly scooped up by the front loading shovel into their respective RORO skips.

In this context, there is easy access to the open sided building and limited need for the FRS to enter any building at the site during a fire. On this basis, CWS does not consider a suppression system to be beneficial. This is because the chance of ignition is low and the quantity of combustible waste present very low. CWS does not, therefore, consider there to be a need for fire suppression systems such as sprinklers, manual open deluge system, deluge/water spray systems, mobile foam trolley or water monitors/cannons/ curtains. CWS is however to install sprinklers and atomisers within the building but these are primarily designed to suppress dust.

14 FIREFIGHTING STRATEGY

14.1 Overall Philosophy

CWS recognises that waste fires can be difficult to extinguish, needing a lot of resources for long periods, and can have serious effects on public health, the environment and pose a risk to firefighters and local communities. Impacts may be short term or long term, including:

- Public health impacts on responders and communities
- The public being evacuated or sheltering in place
- Environmental impacts
- Pollution of surface and groundwater
- Road closures
- High demand on fire and rescue services and other agency resources
- Large-scale financial losses and disruption

When dealing with anything other than hotspots or small fires, CWS expects the FRS incident commander responding to have the ultimate say in how the incident will be managed and the strategy that will be used to bring the incident to a satisfactory conclusion.

During an incident, CWS recognises that there are often a number of conflicting views, pressures or powers from interested parties such as the public, environmental regulators and local authorities. These conflicting views can be difficult to manage alongside the views of the site operator and can place the incident commander under considerable pressure to find a solution that fits the differing priorities from different organisations. For this reason, CWS will provide the FRS with all the resources it requires and is keen for this FPMP to be developed through consultation with relevant parties.

As noted in GN16, fires in stacks can be particularly difficult to extinguish using conventional firefighting approaches. This is particularly the case at sites storing treated wastes such as tyre crumb, wood chip or compost, because of the small particle size of the waste and the density of the stack. Direct application of water, with or without firefighting additives such as foams, to burning stacks is often ineffective and may generate large volumes of polluted fire water and/or increase the hazard from the smoke plume, due to lower combustion temperatures.

At the CWS site, there are no large open stacks of high density calorific wastes with all recyclates stored in separate RORO skips. On this basis, any fires should be small and contained with the FRS able to be tackle them using relatively conventional means. Each fire is, however, unique and so the precise approach adopted by the FRS will be dependent upon a number of inter-related factors and ultimately their decision.

Typical firefighting methods for burning solid waste may include smothering the waste, separating burning material from other waste, quenching and controlled burn. Controlled burning is a defensive operational tactic to prohibit or restrict the use of extinguishing media on fires to allow the combustion process to continue uninhibited. This is sometimes used as UK law does not require the FRS to extinguish fires. A controlled burning strategy may warrant consideration in certain circumstances, including protecting the environment, where the benefit from offensive firefighting does not outweigh the risks, or where available resources and media are insufficient to successfully resolve the incident. The decision of FRS to adopt a controlled burn strategy, as with smothering or quenching, would likely be made following consultation with relevant parties.

At CWS, all combustible separated wastes are stored in RORO skips and at any one time there is only a relatively small (<105m3) stockpile of loose mixed waste awaiting sorting. There is also an abundance of empty RORO skips available, plant to enable their handling and stockpiles of non-combustible soil and stone. This configuration means that if there is a waste fires in a skip it is not likely to spread, it could be readily quenched within the skip and the skip can be moved. Similarly, any hot or burning material can be quickly moved into a skip. This setup provides several opportunities for reducing potential fire spread, the need to tackle fires in the first instance and the amount of fire water required.

14.2 Strategy

In arriving at the firefighting strategy CWS has considered:

- the layout of the site – ignition sources, scale & nature of the environmental hazards and activities that take place
- risks posed to people
- risk posed to the environment
- risks posed to property
- type of materials stored on site
- availability of fire water
- availability of firewater containment facilities
- local topography, weather conditions and fire scenarios that could reasonably be expected on site

The site layout has been designed to allow for active firefighting to allow a fire to be extinguished within the shortest time possible. This includes ensuring good access for FRS at all times, small waste piles and an on-site supply of fire water.

14.3 Heavy Plant and Equipment

If a fire were to occur, and it is safe to do so, CWS will make available all relevantly trained personnel and heavy plant resources, as required. The plant and equipment that would be immediately available would include a front loading shovel, excavator and empty skips.

The plant would be used by trained personnel to separate potentially hot/burning wastes during the early stages of a fire incident and to place this material into an empty skip. This would immediately contain the fire.

14.4 Trained Personnel

Training of on-site personnel in firefighting techniques, fire prevention, response and the fire protection aspects of the site will be provided by established professionals on an annual basis. The FPMP will form the basis of the training programme. Personnel will be informed of the use and limitations of firefighting equipment available onsite and undertake practical exercises. Records of this training will be included in the operating record for the facility.

Six CWS personnel are qualified and trained to operate the heavy plant at the site. These personnel will be available at all times during an incident with three living within 15 minutes.

14.5 Specialist Support

Egan waste Services based in Pontypridd operates a fleet of vacuum tankers. These would be used by CWS, if required, during an emergency event. Their main role would be to remove fire water, if required.

14.6 Fire Extinguishers

Fire extinguishers are red with a coloured label to indicate its type. Different types of fire extinguishers are intended for use on specific classes of fire. This is summarised in Table 14-1 with Table 14-2 providing a summary of the extinguishers to be available on site. The location of fire extinguishers is shown on Figure 8.

Table 14-1 Suitability of Fire Extinguishers

Type	Label colour	Suitable for	NOT suitable for
Water Extinguisher	Red	Wood, paper, textiles	Electrical fire, cooking oil
Foam extinguisher	Cream	Wood, paper, textiles Petrol, diesel	Electrical fire, cooking oil
Carbon dioxide gas extinguisher	Black	Electrical Petrol, paint	Cooking oil Confined spaces
Dry powder extinguisher	Blue	Most fires including electrical	(Depends on type of powder) Cooking oil Confined spaces
Wet chemical extinguishers	Yellow	Cooking oil	Petrol, spirit, mineral oils
Domestic Fire blanket	-	Small kitchen fires	

Table 14-2 Fire Extinguishers to be Available

Extinguisher Type	Fire Class						Location at CWS
	Class A – paper, wood, textile	Class B – Petrol, oil, paint	Class C – butane and propane gases	Class D – Metals e.g. Lithium, magnesium	Electrical	Cooking oil	
Water	Y						
FoCWS	Y	Y					
CO2 Gas		Y					
ABC Dry Powder	Y	Y	Y		Y		Area I Area J Offices
Dry special Powder				Y			
Wet chemical	Y					Y	
Note: Adapted from Wendy Bithray							

The facility will be equipped with hand-held fire extinguishers for tackling small fires. Each fire extinguisher will be fully charged and ready for use at all times. These will be located in the building processing area (Area I, in Area J and site offices) and on each item of plant.

14.7 Available Water Supply

14.7.1 On-site Fire Tank

CWS is to install and maintain a 25,000 litre water tank for use in a fire. This is replenished by a feeder pipe able to supply approximately 25litres / minute.

The aim of the fire tank is to provide a supply of water for the FRS to use whilst they are establishing connection to the nearest fire hydrants, if required. The water would also be used by CWS to fight a small fire, either on the top or bottom yard, where safe to do so, prior to arrival of FRS.

14.7.2 Fire Hydrant

CWS has liaised with personnel from the Caerphilly Fire Station during the preparation of this FPMP. They have confirmed that the nearest appropriate hydrant to the site is located on the corner of Tan y Graig road and Station Road. The hydrant is located at National Grid Reference 314755 190203.

Following on from this response, the details of the hydrant were verified with Welsh Water, including a site visit. They have confirmed that the hydrant outside 33 Tyn y Graig Road is redundant. Welsh Water indicates that there is, however, a hydrant at National Grid Reference 314754 190215. This is at 3 bar pressure and reported to be in good working order by Welsh Water. This is also on Tyn y Graig road. Welsh Water has confirmed that all DCWW hydrants are the same standard size of 80mm flanged. Based on the available information, this hydrant will provide a potential volumetric flow rate of fire water of ~2000 l/sec. The location of the hydrant is shown on Figure 5.

14.7.3 Fire Appliance Water

Caerphilly FRS has indicted to CWS that two appliances would attend site in response to an incident given the nature of the business. According to the FRS, each appliance would typically be carrying some 1800 litres and 150m of fire hose.

14.7.4 Rain Water

One of the chambers of the on-site interceptor holds approximately 6000 litres of water. Prior to the arrival of the FRS, CWS could use this water to tackle a small fire if safe to do so. This would be done using a submersible pipe and lay-flat hosing.

14.7.5 Spring Water

Along the western boundary of the site are several small sumps where clear spring water continuously pools before passing into culverts beneath the site. During an incident, these could also be potentially accessed. These appear to run throughout the year at a flow rate of approximately 20-50 litres / minute.

14.7.6 Sprinklers

Sprinklers and atomisers (fixed and mobile) are to be installed in the building. These are primarily intended for dust suppression.

14.7.7 Water Monitors/Cannons/Portable Bowser

CWS does not consider there to be a need for water monitors as the risk of fire is low and there is 6,000 litres of readily accessible water in the interceptor tanks that could be used and 25,000 litres in the fire water tank.

14.7.8 Water Curtains

CWS does not consider there to be a need for water curtains as waste is contained within skips and waste volumes are low.

14.8 Recycling Fire Water

The firefighting strategy is centred on placing hot / burning waste into empty skips thereby immediately separating it from other waste and infrastructure. Fire water demand will be reduced with fire water primarily being retained within the skip. On this basis, it is anticipated that there will not be significant quantities of potentially dirty fire water running across the site surface. On this basis, there is unlikely to be any fire water to recycle, apart from that contained in skips, but this is likely to be too dirty to pump. On the top yard, such run-off could be readily captured and impounded by closure of the drainage valve to the interceptor and sleeping policeman.

14.9 Fire Rescue Service

The nearest fire station is at Caerphilly which is approximately 10 minutes from the site.

14.10 Additional Financial Resources

Additional finance will be readily available for additional resources and site clean-up as required.

The Managing Director lives within 15 minutes of the site and would make all plant and additional financial resources immediately available during an incident. All staff members can be contacted 24/7 and most live within 30 minutes of the site.

14.11 Fire Suffocation

According to GN16 soil, sand, crushed brick and/or gravel can potentially be used if smoke is threatening local communities to help suppress the fire, although this can only be used when:

- groundwater vulnerability is low
- agreed as a part of a firefighting strategy by the FRS and supported by NRW
- contaminated material is removed and legally disposed of as soon as it is safe to do so

Soil and stone are readily available at the site and could be used by the FRS if agreed with NRW.

14.12 CWS Approach

CWS is only prepared to tackle small fires on the top or bottom yard prior to the arrival of the FRS. This would involve the use of fire extinguishers and placing any hot / burning waste into an empty quarantine skip. Water would also be used from the on-site fire water tank.

14.13 Fire Limitation

Fires can spread between stacks and between stacks and buildings/plant via various mechanisms.

For externally stored waste the most significant potential fire spread mechanisms include:

1. flying/blown 'brands' i.e. burning detritus blown from one site, stack, skip or building to another. This mechanism is unpredictable and depends on factors such as wind strength and direction, and active fire management can reduce the risk, such as by tackling any flying brands with hoses or similar. Flying brands do pose a risk of fire spread but their impact is largely unpredictable.
2. Stack collapse. The collapse of a stack on fire resulting in burning wastes falling, rolling and coming into contact with a second stack. How far wastes can roll or fall as the result of a collapse varies dependent on the nature of the stack and the wastes, and waste configuration.
3. Thermal energy transfer: Heat produced by a stack which is on fire resulting in the temperature of a nearby stack (or building etc.) being raised to its ignition point and setting on fire. This could be via radiation or convection.

For fully enclosed areas the following processes can also occur:

4. Convective hot air - leading to accumulation of hot air and smoke at high points in the room/building.
5. Flashover – this occurs where the temperature of a high level hot gas layer causes all combustible materials in the room/building to give off flammable gases. The near simultaneous ignition of all fuels and gases can then potentially occur.
6. Backdraught – this can occur if air suddenly enters a non-ventilated room/building causing explosive re-ignition of any remaining ignition sources e.g. embers.

The mechanisms relating to externally stored wastes are applicable at CWS as there are no fully enclosed buildings used for waste activities, only a small portacabin office near the site entrance.

14.13.1 Fire in a Skip

To minimise fire spread, separate external waste storage areas are defined in the top yard (see Figure 3). Separate skips are also sometimes stored on the lower yard. Within each waste storage area, waste is contained in RORO skips. Each skip can hold approximately 37m^3 of waste and once full is typically removed from site within a few days. This configuration minimises the risk of self-combustion and fire spread. If a fire occurs in a skip in the top yard it would be left in-situ if there was no prospect of it spreading or dragged to the quarantine area if safe to do so. On the bottom yard the skip would be dragged away from any other skips containing waste. If safe to do so, the fire would be initially tackled by CWS using water from the on-site fire water tank before the FRS take control.

14.13.2 Fire in a Stack

The first priority, after ensuring all human life is safe, is separation of unburned material from the fire using mobile plant to restrict the extent of spread. If it is safe to do so, burning or smouldering material would be removed from the stack and placed into an empty RORO skip

in the quarantine area. If safe to do so, the fire would be initially tackled by CWS using water from the on-site fire water tank before the FRS take control.

14.13.3 Fire on Plant

If a fire occurs on a vehicle or piece of equipment, the equipment operator will bring the vehicle or equipment to a safe stop. If safety of personnel will allow, the vehicle will be parked away from loose wastes and other vehicles. The engine will be shut off and the brake engaged to prevent movement of the vehicle or piece of equipment. The fire would be tackled with a fire extinguisher if safe to do so until the FRS arrive.

On arrival, the FRS would take control of the incident with the full support of CWS.

14.14 Fire Response and Evacuation

The sequence of these steps may vary according to the nature and circumstances of the fire emergency, but priority must always be given to the safety of staff and visitors, followed by the prevention of impact on identified local human or environmental receptors. CWS will follow the instructions of the FRS and provide plant and personnel as required.

The following procedures are to be followed on the discovery of fire or smoke. The steps are numbered sequentially but in reality, they will likely be implemented in parallel by different members of staff.

Raise Alarm

1. Upon discovering smoke or fire, personnel will raise the alarm by shouting to each other as the site is small. The air horn would also be sounded. Evacuation would be via either the northern or southern entrances depending upon the location of the fire and personnel.
2. The person discovering a fire should inform the Site Manager immediately and provide an assessment of the situation. The Site Manager must immediately go to the vicinity of the fire (if considered safe to do so) to assess the situation and decide upon a course of action.

Evacuate and Call 999

3. The person discovering a fire should then call the fire brigade on ‘’999” providing details of the fire’s location and scale.
4. All non-essential persons should be instructed to leave the area and report to the designated assembly point on Figure 7. Persons evacuating must obey Site Managers instructions, ensure other workers also evaluate, assist any person who needs help (if safe to do so), not stop to collect any personal belongings, proceed directly to the Assembly Point and remain there until officially instructed otherwise.
5. The Site Manager and other trained personnel should access the Fire Box and don the high viz Fire Marshall jackets and grab fire extinguishers, pump and hose depending upon nature and location of fire.
6. The hose connected to the fire water tank would be used if safe to do so.
7. The personnel trained to drive the heavy plant would be assembled ready for operation of plant.

Trained personnel tackle fire or stop its spread

8. If safe to do so, trained personnel should seal off the area and fight the fire with extinguishers provided. Persons with no specific training are not expected to fight a fire.
9. Operatives trained to use heavy plant in an emergency would separate burning wastes into quarantine skips and create additional separation distances and quarantine by moving RORO skips as required.
10. Where possible, machine operators are to move their machines to a safe area only returning to assist in the separation of waste to the quarantine area (to limit fire spread) at the direction of the senior fire officer or Site Manager.

Roll call

11. The Site Manager will collect the roll call list and confirm the presence of staff and visitors at the assembly point.
12. If it is safe to do so, a search of all work areas of the site will be undertaken by the Site Manager to ensure that everybody has evacuated the site.

Environmental Protection

13. The Site Manager is to ensure the fire water management measures are implemented at the earliest opportunity to prevent fire water from overtopping the impermeable areas of the yard and sealed drainage system. This will involve closing the valve to the interceptor.

Update FRS upon arrival

14. Upon arrival, the Site Manager will issue the Emergency services with a copy of this document. The Emergency services will assume control of the situation and all instructions/advice given by them will be followed. A copy of this FPMP will also be available in a safe box fitted with a combination padlock on the external wall of the site. The FRS will open this box having previously been given the combination code.
15. The Site Manager/Supervisor is to advise the Officer in Charge of the emergency services if someone is missing.

Contact off-site affected parties

16. After all occupants are evacuated and visitors and staff are accounted for, the Site Manager will be responsible for contacting relevant businesses/residents, starting with those immediately downwind of the fire to advise them of any particular measures required while the fire is being brought under control (e.g. the evacuation of nearby premises, closing of windows, etc.). An SMS will be sent by the site manager to the closest parties using the appropriate contact details.
17. After all occupants are evacuated and visitors and staff are accounted for, wait for the 'all-clear' from the FRS before returning staff to any affected area.

Post Incident Investigation

18. The Site Manager is responsible for ensuring the conditions that led to the fire are investigated (in association with the FRS, NRW and Police as appropriate). The Manager is also responsible for ensuring plant is safely recommissioned, accident plans and management systems documents are reviewed and improved, training requirements for

staff personnel are reviewed and that any remedial measures (including further fire reduction measures and new procedures) are implemented. The FPMP would be updated following a fire incident.

15 WATER SUPPLIES

15.1 Fire Water Requirements

According to GN16, a 300m^3 stack of combustible material would normally require an average water supply of at least 2000 litres/minute for a minimum of 3 hours. This is equivalent to ~7 litres/minute/m^3 of waste. These figures are understood to be based on the water requirement of tackling a loose waste stockpile rather than waste in a container. A comparison of the volume of water required to tackle an equivalent fire in a container is not detailed in GN16.

15.2 Reducing Water Requirements

Consideration has been given to reducing fire water demands.

15.2.1 Containerised Waste

At CWS, the business relies upon rapid processing of skip wastes with all combustibles separated into RORO skips. In an emergency, any hot or burning waste would be placed into an empty skip.

On this basis, the water supply requirements set out in the GN16 guidance are not considered to be directly applicable as they do not include the effect of waste submersion and quenching on fire water demand when waste is in a container. If a fire breaks out in a skip or if burning waste is placed into a skip the overall fire water requirement would be expected to be significantly reduced as some of the waste would become submerged and the fire would be contained in a fixed volume. As such processes do not occur to the same extent in a loose stockpile the fire water demined would be expected to be much lower.

Quantification of the reduction in fire water demand due to waste being in a container is difficult to accurately predict and outside the scope of GN16. This aspect is considered a little further below.

If a RORO skip was filled to the top with loose waste, such as plastic or wood, then the volume of fire water required to fully submerge the waste would be determined by the open pore space, assuming the waste is not porous or absorbent. In this context, the volume would be significantly less than 37m^3, the empty capacity of the skip, and determined by the porosity. If we assume the waste has a porosity of ~30%, this would mean that 11 m^3 of fire water would be required to fully submerge the waste in the skip. In this simplified example, the volume of fire water demand is significantly reduced compared to that required to tackle a loose stockpile of equivalent volume. The skips would allow the waste to be cooled and submerged and could also be used to quench waste under the direction the FRS e.g. part filled with water and used to quench hot or burning waste using the on-site mechanical excavator and grab. Again, this would significantly reduce fire water demand as the water in the skip could be re-used many times through repeated quenching, if needed.

15.2.2 Quarantine of Loose Waste

The largest loose stack is ~105m^3. In the event of a fire, 50% of this could be placed into one or two RORO skips as quarantine. This would enable the fire to be tackled in the same way as the containerised waste. This would significantly reduce the fire water demand.

15.2.3 Recycling Fire Water

As the aim is to compartmentalise fires into skips, significant sources of fire water on the surface of the yard are not anticipated. This water is not likely to be suitable for use by the FRS due to suspended solids but this decision will be made by FRS during an incident.

15.2.4 Separation

Separation of burning material from unburned material will be the underlying principle of the firefighting approach. This will immediately reduce the volume of fire water potentially required and the risk of fire spread.

15.3 Fire Water Supplies

In the context of the above, CWS is to provide 25,000litres of fire water on-site for the FRS to use in the event of a fire. This is aimed at providing an initial source of water whilst the FRS connect to the off-site fire hydrants, if required.

16 MANAGING WATER RUN OFF

This section details the fire water management measures to be implemented.

16.1 Surfacing

The top yard comprises impermeable surface with reinforced concrete. Surface water in this part of the site passes through an interceptor and can be impounded behind a sleeping policeman. The lower yard storage area also comprises concrete.

16.2 Flow Direction

Flow direction of surface run-off on the top yard is from the north to the south where it collects before passing through the interceptor.

16.3 Drainage Infrastructure

The drainage infrastructure comprises a Class 1 interceptor intended to treat the run-off from the waste storage area prior to gravity drainage to land drains. Surface run-ff is directed to the interceptor by the falls in the concrete. Water can be prevented from entering the interceptor by manually closing the inlet valve. After passing through the interceptor, the water passes through underground pipework to land drains.

16.4 Drainage Infrastructure - External

16.4.1 Primary Containment

The impermeable surface and sealed drainage to the interceptor provides primary containment. The area drained has a surface area of approximately 1300 m^2.

16.4.2 Secondary Containment

Secondary containment will be provided by blocking the drainage to the interceptor and allowing the yard to flood against the sleeping policeman and 100mm concrete upstands around the site. This would provide storage of ~130m^3. This is sufficient capacity to impound all fire water that is likely to be needed.

16.4.3 Tertiary Containment

Soil would be available to temporarily raise the level of overtopping from the impermeable surface if required. Soil could also be used to contain run-off from any skip, either on the top yard or bottom yard.

16.5 Drainage Infrastructure - Internal Areas

The open sided building has impermeable concrete floors that drain directly to the external top yard area.

17 DESIGNATED QUARANTINE AREA

In the case of a fire outbreak or identification of hot materials, the waste will be moved into a skip(s) in the quarantine AREA E wherever safe to do so to isolate it during an incident. The location of the fire quarantine area is shown on Figure 3, although in an emergency any vacant part of the site will be used. The fire quarantine area will always be on concrete with sealed drainage and utilise empty RORO skips as required.

18 DURING AND AFTER AN INCIDENT

18.1 Potential Impacts of Fire

Waste fires can cause significant direct and indirect harm to people, the environment, commercial activities and public resources. Impacts may include:

- Use of firefighting resources that cannot then tackle other emergencies (not related to waste)
- Release of airborne smoke and particulates. This can smother vegetation and cause risk to human health through inhalation
- Transport of potentially contaminated firefighting fluids to drainage systems and controlled water (surface water and groundwater) which can impact water quality and wildlife
- Explosions and falling debris may result in physical harm to humans and infrastructure
- Use of firefighting resources that cannot then tackle other emergencies (not related to waste)
- Heat and flames can directly harm people, infrastructure and the environment
- Loss of business

On-site and off-site impacts of a fire can be influenced by a number of environmental factors. These include wind direction and rainfall and also run-off and presence of surface and groundwater.

18.2 On-site Assets

The trommel and crusher is located in an open sided building (Area I on Figure 3) with all skip lorries parked overnight in an adjacent yard outside of the permitted boundary. The mobile shredder and screen are kept on the top yard.

Although the assets are of economic importance, CWS recognises that these items can be replaced and that, at no time, should CWS personnel or the FRS risk human life in their protection.

18.3 Business Continuity

The un-announced immediate closure of the CWS site would be initially disruptive to clients but there are other local waste outlets. CWS has close working relationships with several waste transfer stations that could be used for the temporary diversion of wastes and recyclates. In some cases, the skip could be left at source awaiting an alternate or later collection.

Once an incident has been dealt with to the satisfaction of all interested parties, and the site is re-opened, CWS would not anticipate a significant impact on long-term business.

18.4 Human and Infrastructure Receptors within 1km of site

Selected potentially sensitive human receptors within approximately 1km of the site are listed in Table 18-1. They are also shown on Figure 5. Others also exist. Selected key infrastructure is listed in Table 18-2.

The immediate neighbours will be contacted by the Managing Director of CWS as soon as possible following discovery of a fire incident. This would be achieved via a combination of telecommunication, direct face-to-face contact and announcements on social media. CWS would also inform the Councils Emergency Planning Department. Concerns raised by the neighbours and Council would be taken into consideration wherever possible. Depending upon the nature and timing of the incident there may be a need for neighbours to evacuate their properties or to close windows/doors etc.

Following the incident, the Managing Director will meet with the immediate neighbours to explain what has happened and the steps that will be taken to minimise fire risk in the future. The neighbours will also be encouraged to provide feedback that would be accommodated in the FPMP update.

Table 18-1 Selection of key human receptors

Receptor	Contact Information	Direction from site
Care Home – Partnership of Care	02920 866718	Immediately west on Colliery Road
Residential properties on Colliery road	Door-to-door contact	Immediately west on Colliery Road
Residential properties in Llanbradach	Door-to-door contact Social Media Council Emergency Dept.	Southeast and east of site on opposite side of railway line
Aber Medical Centre	02920 833300	Southeast of site on opposite side of railway line
Council Emergency Planning Department	01443 405011	

Table 18-2 Selection of critical infrastructure

Receptor	Direction from site
Valleys railway line	Directly east

Table 18-3 Emergency contact details

SITE DETAILS			
Location: CWS, The Granary, Graddfa Industrial Estate, Llanbradach, Caerphilly			
Postcode: CF83 3QS			
Site Access Grid Reference: 314792 190781			
SITE CONTACTS	Name	Office Hours (specify)	Out of hours
Owners	Alun Pitton	07980 710096	
	Mike Jones	07966 269604	
NEIGHBOURS			
Transport for Wales		0333 3211 202	
Network Rail		03457 11 41 41	03457 11 41 41
EMERGENCY SERVICES		Office Hours	Out of hours
Emergency		999	999
Police:		101	101
Fire:		0370 60 60 699	999
REGULATORS		Office Hours	Out of hours
Health and Safety Executive (HSE)		0345 300 9923	0151 922 9235
Local Authority:		Caerphilly Council 01443 815588	01443 875500
Natural Resources Wales (Local)		0300 065 3000	0300 065 3000
UTILITY/KEY SERVICES	Name	Office Hours	Out of hours
Water undertaker:	Welsh Water	0800 052 0145	
Sewerage undertaker:	Welsh Water	0800 052 0145	
Electricity supplier:	SWALEC	0843 770 5091	
Vacuum tank emptying:	Egan Waste	01443 841 833	

In the event of a fire, the site manager will send an SMS message to all potentially locally affected parties informing them of the situation. Where contact details are not held door-to-door contact will be made.

18.5 Environmental Receptors within 1km

Potential environmental receptors within approximately 2km of the site are listed in Table 18-4 and shown on Figure 5.

Table 18-4 Environmental Receptors within 1km of the site

Receptor	Direction from site
Ancient Woodland	Directly west and south
Secondary A aquifer	Below impermeable concrete
Geological Site of Special Scientific Interest (SSSI)	800m south

18.6 Fire Water Run Off

Due to the firefighting strategy compartmentalising waste into skips, CWS does not expect significant quantities of fire water run-off.

The site is not located on an important groundwater Source Protection Zone but is underlain by secondary aquifers. This means that uncontrolled run-off should be prevented as far as technically feasible and for this reason the site has several layers of control. Primary control is provided by an impermeable surface that drains to an interceptor and then land drains. Secondary containment will be provided by blocking this drainage and impounding the water on the impermeable surface. Mobile vacuum tankers could be used during an incident to remove fire water from site, if required. These would be provided by Egan Waste.

These controls will also limit the risks to surface water, although there are no immediate water bodies in very close proximity to the site. The site is underlain by several culverts diverting surface run-off from the high ground to the west.

The overall approach to fire-water control is to minimise generation and 'control at source'. The layout of the site is intended to minimise fire spread and the first actions to be taken when a fire is identified is to separate burning material from unburnt material. These actions are intended to minimise overall fire size and therefore the amount of potential fire water generated during its extinguishing.

Fire water run-off has the potential to contain harmful combustion by-products, fire-fighting chemicals or un-combusted waste materials washed from the site. The volume of water involved and the subsequent dilution of these compounds will vary based on the scale and nature of any fire. Minimising potential impacts to the environment and local infrastructure is a key consideration of this FPMP and has been integrated to the design of the facility.

During an incident, fire water will be minimised and can be prevented from escaping the impermeable surface.

18.7 Emissions to Air

Emissions to air during a fire can include:

- Black or white smoke (dependent on type of material burning) – smoke is harmful and potentially highly polluting to local air quality (especially black smoke which may contain harmful and toxic substances such as carbon monoxide, dioxins, cyanides, hydrocarbons, PAHs etc.).
- Steam (as water is applied) – steam may potentially obscure vision.
- Ash/airborne debris – risk of harm to amenity (potentially being deposited on cars/in homes).
- Hot embers – risk of fire spread.
- Pops/explosions – disturbance of nearby sensitive receptors and risk of harm due to projectiles.

Emissions to air could be potentially reduced by suffocating the waste. This could be achieved by using the soil and stone present at the site. This approach would first be agreed with NRW and FRS and will be based on their tactical approach.

18.8 Removal of Solid Fire Waste

Following any fire there is likely to be burnt or partially burnt waste and/or their materials requiring off-site waste management. This will prevent potential future emissions to land and/or water.

Each of these waste types will need to be classified in accordance with WM3 and appropriate Duty of Care implemented at all stages. This may require the waste to be sampled and tested.

Until the waste is fully classified, the waste will be monitored and assessed for residual/ smouldering fires in an area separate from other wastes e.g. quarantine. This will be achieved by turning the waste, if possible and safe. During this process the waste will be inspected for residual sources of heat and smoke. Where suitable, and agreed with NRW and FRS, waste that is still hot may be laid out into a thin layer using heavy plant and then quenched with cooling water.

18.9 Becoming Operational Again

The precise actions required following an incident will be dependent on the scale of any fire. Protection of the environment will be prioritised and the clean-up operation will be carried out in full consultation with NRW. Permitted activities will not re-commence without NRW approval.

Before the site becomes operational following a fire incident the site will be cleared of all fire wastes, fire waters and all relevant infrastructure will be inspected for damage that may have been caused. This will include structural assessments of all infrastructure and buildings. Drainage will be tested to ensure that the system is still operational and has not become blocked.

Following an internal review of the cause of the fire, the findings will be integrated to an updated FPMP. Such a review would also accommodate any observations made by NRW, FRS or other third parties.

18.10 Notification of Fires to NRW

Any fire related to waste management activities that cannot be extinguished within 10 minutes of discovery, will be reported to NRW.

The notification will include:

- Contacting by telephone as soon as possible, but no later than 4 hours following fire discovery, and
- Providing a written description of the cause and extent of the fire and the resulting fire response within 14 days of fire detection.

The facility will provide NRW with as much information as possible regarding the fire and fire-fighting efforts, as soon as possible after the fire occurs.

The fire prevention and fire control procedures for the facility will be revisited following the occurrence of a significant fire to determine if modifications are warranted.

19 REVIEW AND MONITORING

19.1 Routine Review

Each year this FPMP will be subject to review. This will be aimed at ensuring that the procedures implemented on site match those documented in the FPMP. This will also provide opportunity for improvements to be identified and managed within an Improvement Programme.

As part of this Improvement Programme, CWS will ensure that this FPMP is updated as requested by NRW.

19.2 Monitoring

The following Key Performance Indicators will be used to monitor the effectiveness of this FPMP:

- Number of fires recorded annually/number of fire related incidents.
- achieving set schedules and time frames (evacuation drills and building audits).
- Measuring the number of Fire Service call outs against cause.
- Number and nature of enforcement, alterations or prohibition notices from statutory authorities.
- Quarterly / six monthly/ annual premises inspection and meetings to ensure actions and progress are made.
- Annual audit of all fire systems by external party.

19.3 Audit

CWS recognises that it is important for the day-to-day activities to implement what is written in this FPMP in order to manage fire risk. Therefore, in addition to the pro-active monitoring programme, a planned programme of internal and external audit will be implemented. Internal audits will be undertaken quarterly and external audits annually and coupled to the annual review. The findings of all audits will be documented. During the audits the following aspects will be evaluated:

- Paperwork & Records – Maintenance schedules, daily fire checks, staff training, transfer notes, stock rotation, location and site plans.
- Procedures - Waste Treatment, waste acceptance, ignition sources, dust management, integrity of infrastructure.
- Prevention – check of stockpile sizes, detection systems, fire walls, suppression system and site security.
- Emergency Response - Containment, disposal of waste, firefighting equipment, water supply.

A compliance assessment may not be limited to these areas, but it gives a good indication of what an assessment may comprise. Specific items will be monitored in accordance with an audit schedule as indicated in Table 19-1.

Table 19-1 Indicative Summary Monitoring Timetable

Item	Frequency of checks	Detail of checks
Fire extinguishers	Monthly	Visual inspection to check for damage and accessibility
	Annually	Tested and serviced as required
Provision of lay flat hosing and pipework	Annually	Check all operational with no leaks
Concrete infrastructure and drainage	Six monthly	Visual check of condition and operation

19.4 Update following Incident

In addition to the regular review, monitoring and audit, this FPMP will be reviewed and updated where necessary following **any** fire incident. This could be following discovery of a hot spot, a minor fire where the FRS was not called or did not need to assist or following an incident where the FRS lead the fire-fighting.

A review would also be prompted if the activities at the site changed, if the waste types accepted changed, if waste volumes accepted increased or if new infrastructure (buildings or plant) was installed.

All aspects of the FPMP would be available for review during any update or review. Focussed attention would, however, be made to ensure that the document captures potential changes to the risk of fire occurring and additional preventative and management techniques required.

USEFUL RESOURCES

Waste Industry Safety and Health Forum (WISH) – WASTE 28 Reducing fire risk at waste management sites issue 2 – April 2017
https://wishforum.org.uk/wp-content/uploads/2017/05/WASTE-28.pdf

WISH - https://wishforum.org.uk/

Regulatory Reform (Fire Safety) Order 2005
http://www.legislation.gov.uk/uksi/2005/1541/pdfs/uksi_20051541_en.pdf

"Fire Safety Risk Assessment - Factories and Warehouses".
https://www.gov.uk/government/publications/fire-safety-risk-assessment-factories-and-warehouses

'Guidance for the storage and treatment of aerosol canisters and similar packaged wastes'
https://www.gov.uk/government/publications/sector-guidance-note-s506-recovery-anddisposal-of-hazardous-and-non-hazardous-waste

Health and Safety Executive (HSE) Guidance
http://www.hse.gov.uk/search/search-results.htm?q=hot%20works%20guidance%20-%20gsc.tab=0&gsc.q=hot%20works%20guidance&gsc.page=1#gsc.tab=0&gsc.q=hot%20works%20guidance%20-%20gsc.tab&gsc.page=1

Removal of LPG Tanks - Guidance
https://www.gov.uk/government/publications/removal-of-lpg-tanks-guidance

End of life vehicles (ELVs): guidance for waste sites
https://www.gov.uk/guidance/end-of-life-vehicles-elvs-guidance-for-waste-sites

Depolluting end-of-life vehicles: guidance for treatment facilities
https://www.gov.uk/government/publications/depolluting-end-of-life-vehicles-guidance-fortreatment-facilities

Containment systems for the prevention of pollution (C736)
http://www.ciria.org/Resources/Free_publications/c736.aspx

Figure 1 Site Location Plan

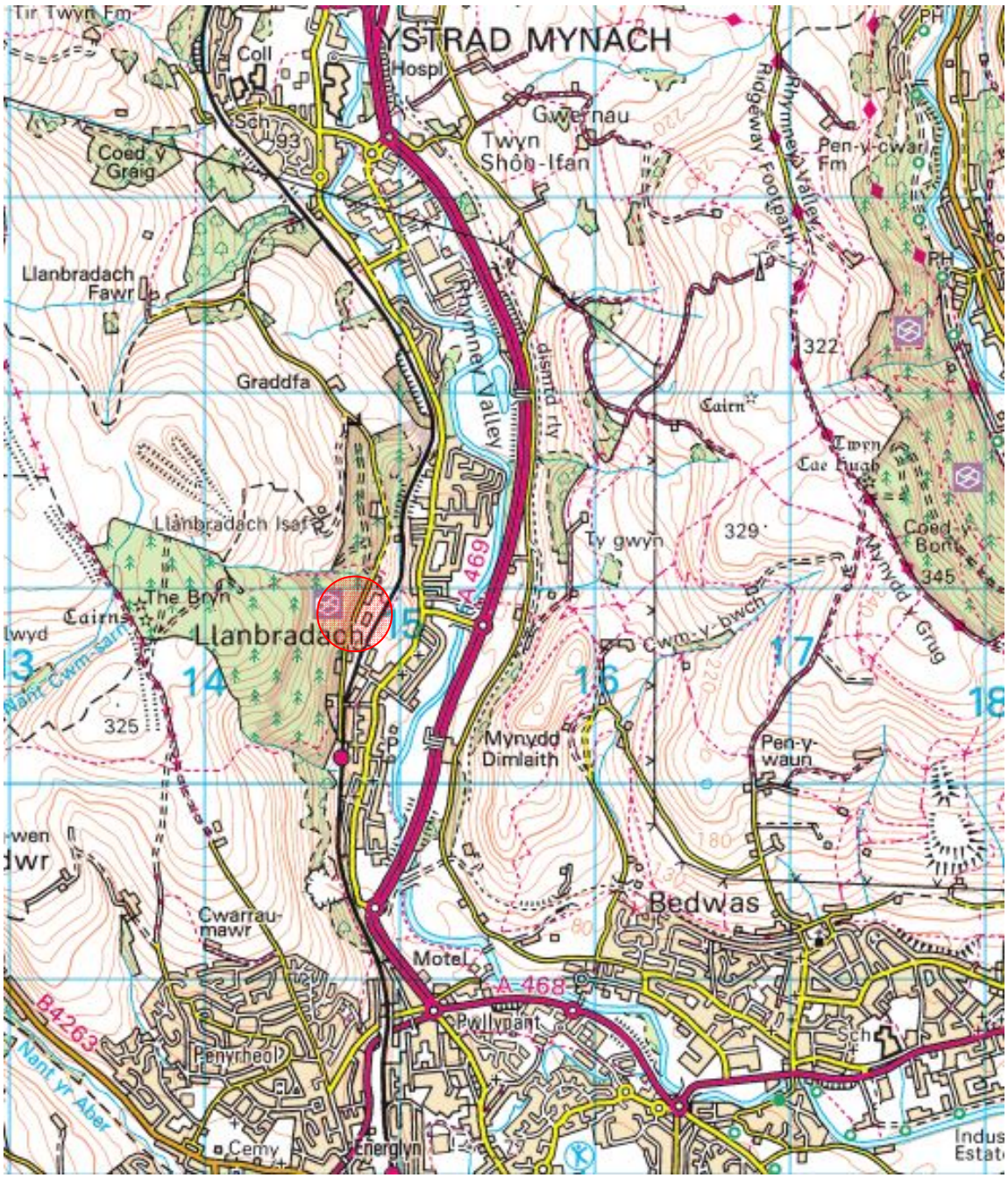
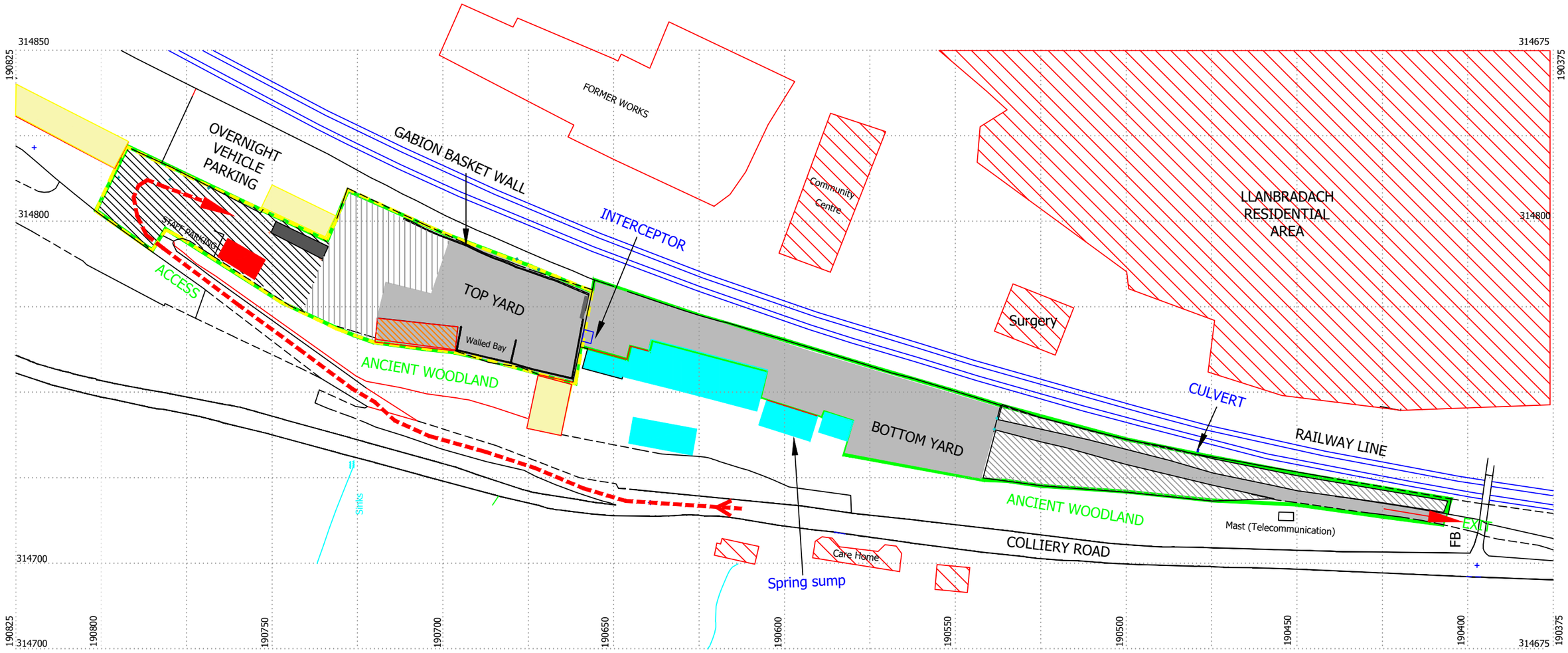


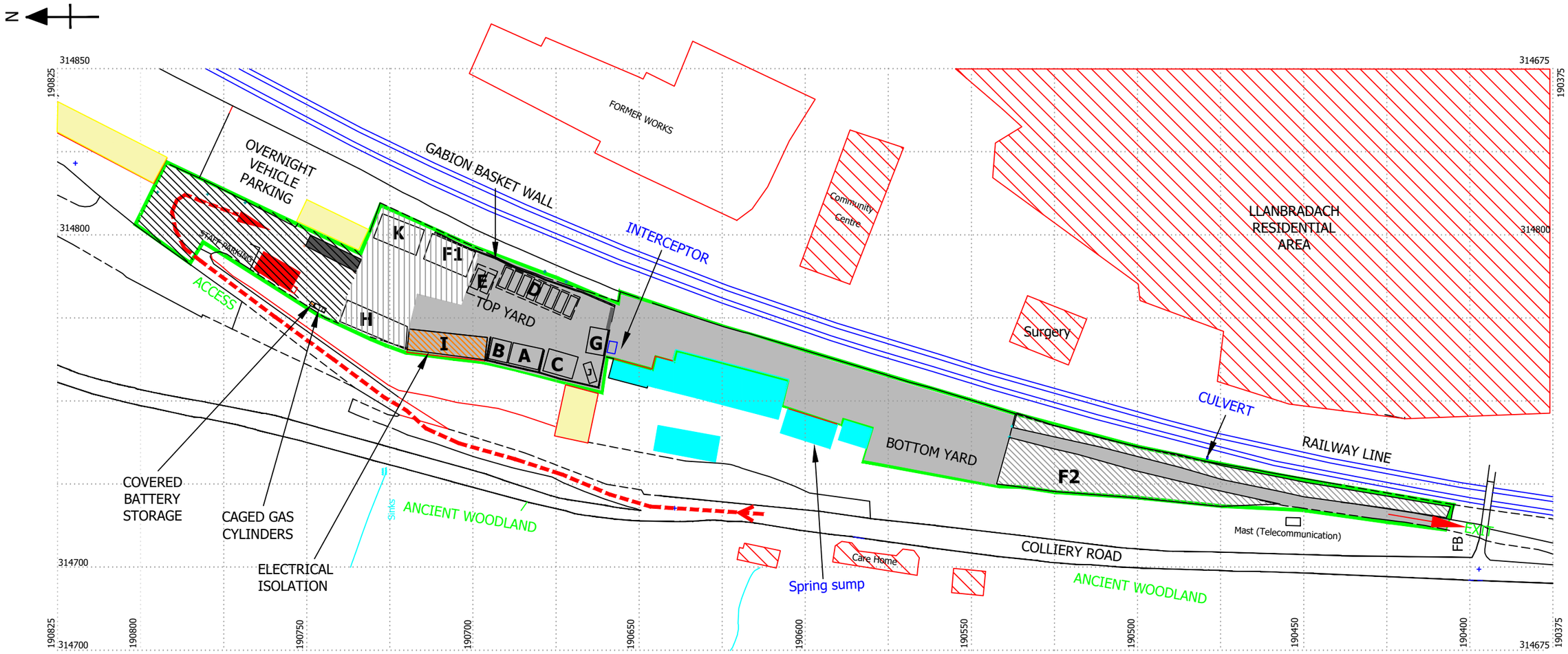
Figure 2 Site Plan



LEGEND

- Current Permit Boundary
- Proposed Permit Boundary
- Access Route
- Sleeping Policeman
- Concrete push wall
- Concrete
- Hardstanding
- Weighbridge
- Residential Areas and Facilities
- Waste Treatment Building
- Off Site Buildings
- Hardstand to be concreted
- Vehicle Maintenance Sheds
- Site Offices
- Prevalent Wind Direction

Figure 3 Site Layout



LEGEND

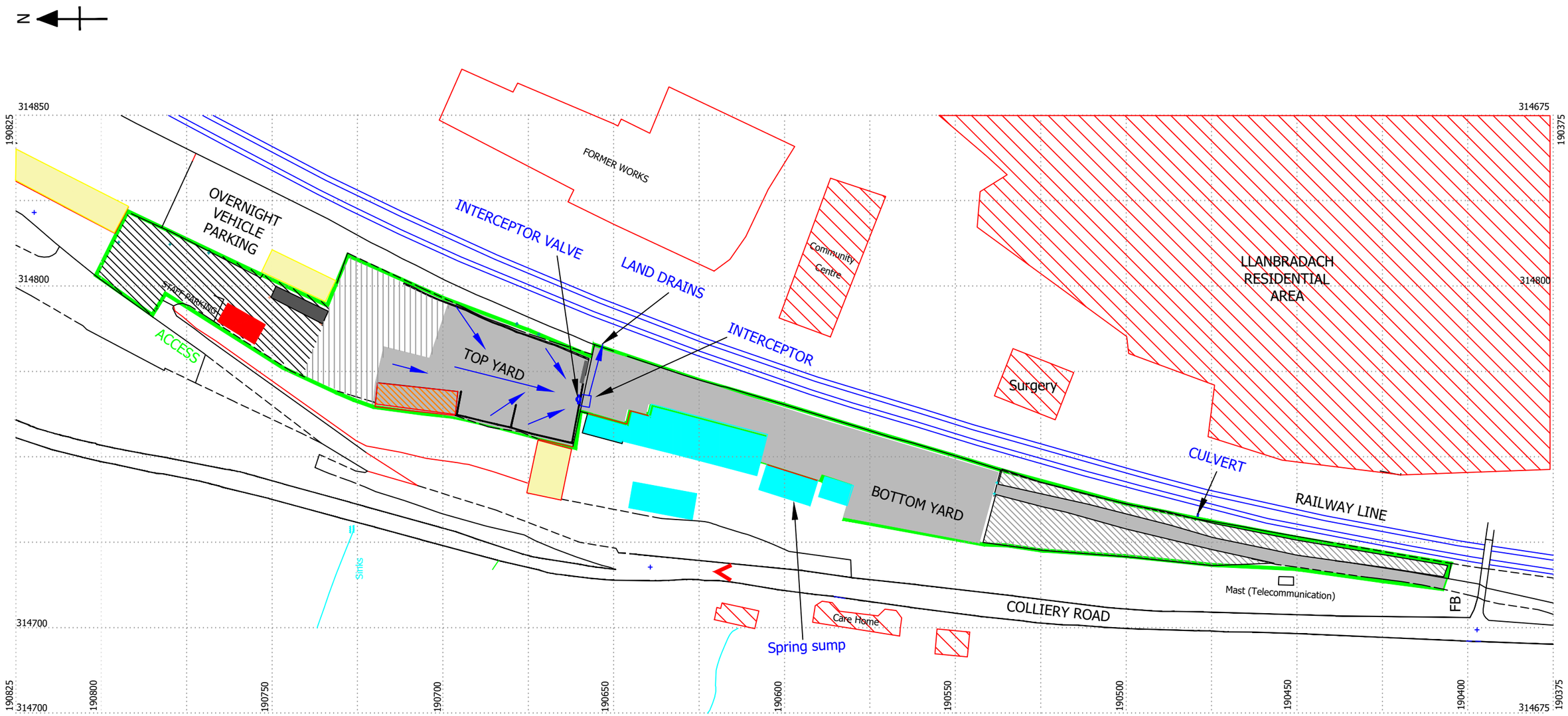
- Proposed Permit Boundary
- Access Route
- Concrete
- Hardstanding
- Weighbridge
- Emergency Pollution Box
- Sleeping Policeman
- Concrete push wall
- Residential Areas and Facilities
- Waste Treatment Building
- Off Site Buildings
- Hardstand to be concreted
- Vehicle Maintenance Sheds
- Site Offices
- Prevalent Wind Direction

A Sortng Area
B Inert Materials
C Non Recyclables
D Recyclates in ROROs
6m x 2.4m RORO skip (drawn to scale)

E Emergency Quarantine
F Empty Skip Storage
G Wood
H Soil and Stone Screening and Product Storage

I Trommel, Picking Line & Jaw Crusher
J Secure Asbestos Skip
K Wood Shredding and Product Storage

Figure 4 Site Drainage



LEGEND

- Proposed Permit Boundary
- Surface falls in concrete
- Interceptor Control Valve
- Sleeping Policeman
- Concrete push wall
- Concrete
- Hardstanding
- Weighbridge
- Residential Areas and Facilities
- Waste Treatment Building
- Off Site Buildings
- Hardstand to be concreted
- Vehicle Maintenance Sheds
- Site Offices

Figure 5 Key Features of Surrounding Area

N

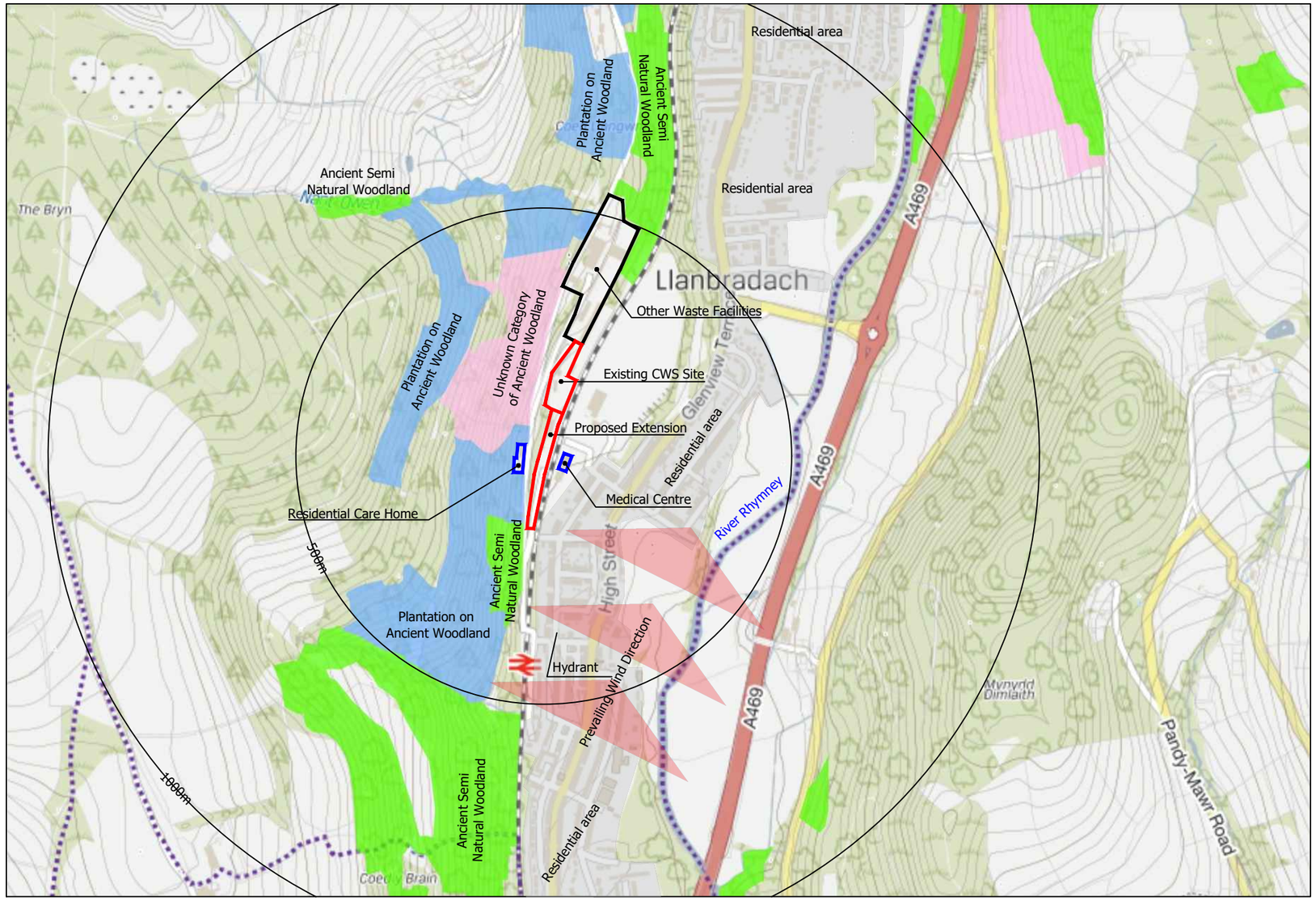
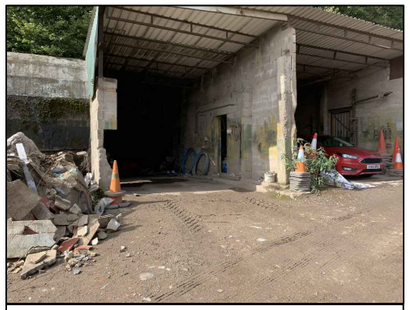


Figure 6 Photographs of Site

1888 - View South towards Entrance



1883 - Existing Buildings

0028 - ROROs in Top Yard

1871 - Bottom Yard Concrete

1868 - View North Over Railway Line

1867 - View North towards Site Exit onto Colliery Road

1885 - View towards Offices and Weighbridge

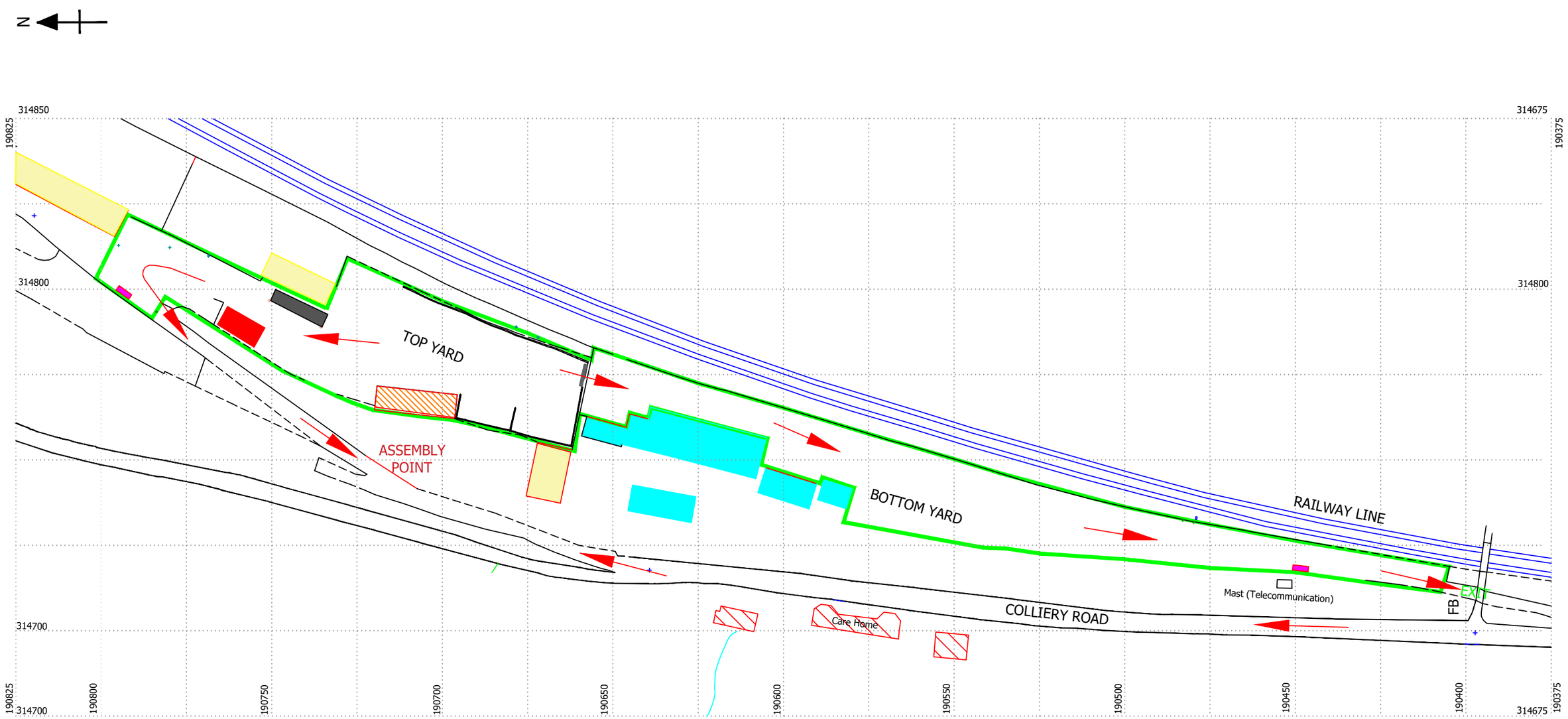
1881 - Soil and Stone

1878 - Trommel in Building

1870 - Empty Skip Storage Area

0033 - View South of exit route

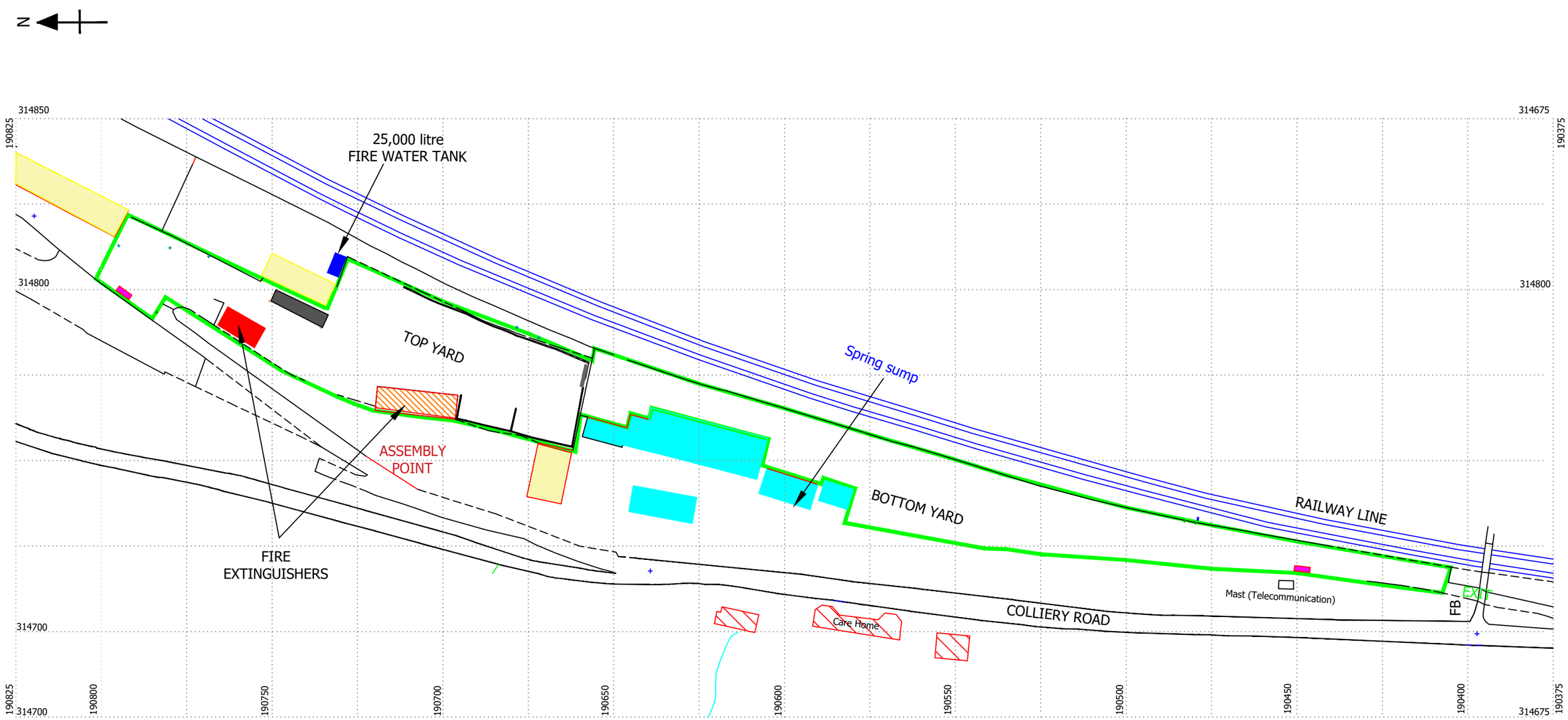
Figure 7 Emergency Escape Routes



LEGEND

- Escape Routes to Assembly Point
- Sleeping Policeman
- Concrete push wall
- Emergency Grab Boxes
- Weighbridge
- Residential Areas and Facilities
- Waste Treatment Building
- Off Site Buildings
- Site Offices
- Vehicle Maintenance Sheds

Figure 8 Fire Water and Extinguisher Locations



LEGEND

- Sleeping Policeman
- Concrete push wall
- Emergency Grab Boxes
- Weighbridge
- Residential Areas and Facilities
- Waste Treatment Building
- Off Site Buildings
- Site Offices
- Vehicle Maintenance Sheds

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