APPENDIX J – IMPACT TABLES

Construction phase description

Little construction work is to take place, the site is already developed as an industrial site and existing buildings and facilities will be used. Upgrades and maintenance will be done to the building as and when required. Construction of the storage area, gas installations and other civils will be required.

The installation of the machinery (commissioning) inside the existing building will take place during the "construction phase".

Operational phase description

The site will be home to an Extruded Polystyrene (XPS) process. Polystyrene (PS) raw material will be stored in a covered outdoor storage area and received into the main factory building where an XPS extrusion machine will be installed.

Resin (made up of Polystyrene (94% of the resin), New-cleating, flame retardant material, Colour and Process Aid) will be combined with blowing agents (CO_2, Dimethyl Ether (DME), R152a and Ethanol (Etoh)) in a specific combination to produce the XPS end product.

Decommissioning phase description

Unlikely. Similar to construction phase. Removal of dangerous goods storage tanks.

GEOGRAPHICAL AND PHYSICAL

1. GEOLOGY

Alternative 1 and 2	**Geographical and Physical Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential impact and risk:	**Construction activities can affect the underlying geological layers on site to some extent during excavation activities.**
Nature of impact:	**Disturbance to subsurface geological layers**
Extent and duration of impact:	**Extent 1 (footprint) & Duration 2 (two to five years)**
Consequence of impact or risk:	**Construction and excavation activities can affect the underlying geological layers on site to some extent.**
Probability of occurrence:	**2 (Improbable: some possibility, but low likelihood)**
Degree to which the impact may cause irreplaceable loss of resources:	**1- Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Disturbance to surrounding subsurface geological layers**
Cumulative impact prior to mitigation:	**It is not anticipated that the impact will be high as the affected substrata is deep and the integrity of the underlying ground structures will not be sacrificed.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 - Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2- Partly mitigatable (PM)**
Proposed mitigation:	**Demarcation and work within demarcated areas only.**
Residual impacts:	**It is not anticipated that the impact will be high as the affected substrata is deep and the integrity of the underlying ground structures will not be sacrificed.**
Cumulative impact post mitigation:	**It is not anticipated that the impact will be high as the affected substrata is deep and the integrity of the underlying ground structures will not be sacrificed.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 - Low**
OPERATIONAL PHASE	
Potential impact and risk:	**Maintenance activities can affect the underlying geological layers on site to some extent – underground storage tanks.**
Nature of impact:	**Disturbance to subsurface geological layers**
Extent and duration of impact:	**Extent 1 (footprint) & Duration 2 (two to five years)**
Consequence of impact or risk:	**Construction and excavation activities can affect the underlying geological layers on site to some extent.**
Probability of occurrence:	**2 (Improbable: some possibility, but low likelihood)**
Degree to which the impact may cause irreplaceable loss of resources:	**1-Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Disturbance to surrounding subsurface geological layers**
Cumulative impact prior to mitigation:	**It is not anticipated that the impact will be high as the affected substrata is deep and the integrity of the underlying ground structures will not be sacrificed.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 - Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Demarcation and work within demarcated areas only.**
Residual impacts:	**It is not anticipated that the impact will be high as the affected substrata is deep and the integrity of the underlying ground structures will not be sacrificed.**
Cumulative impact post mitigation:	**It is not anticipated that the impact will be high as the affected substrata is deep and the integrity of the underlying ground structures will not be sacrificed.**

Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 - Low**
DECOMMISSIONING AND CLOSURE PHASE	
Potential impact and risk:	**Decommissioning activities can affect the underlying geological layers on site to some extent – removal of underground storage tanks.**
Nature of impact:	**Disturbance to subsurface geological layers**
Extent and duration of impact:	**Extent 1 (footprint) & Duration 2 (two to five years)**
Consequence of impact or risk:	**Construction and excavation activities can affect the underlying geological layers on site to some extent.**
Probability of occurrence:	**2 (Improbable: some possibility, but low likelihood)**
Degree to which the impact may cause irreplaceable loss of resources:	**1-Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Disturbance to surrounding subsurface geological layers**
Cumulative impact prior to mitigation:	**It is not anticipated that the impact will be high as the affected substrata is deep and the integrity of the underlying ground structures will not be sacrificed.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 - Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Demarcation and work within demarcated areas only.**
Residual impacts:	**It is not anticipated that the impact will be high as the affected substrata is deep and the integrity of the underlying ground structures will not be sacrificed.**
Cumulative impact post mitigation:	**It is not anticipated that the impact will be high as the affected substrata is deep and the integrity of the underlying ground structures will not be sacrificed.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 - Low**

2. SOIL AND GROUND WATER POLLUTION

Alternative 1 and 2	**Geographical and Physical Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential impact and risk:	**Impact of construction activities on soil and ground water pollution largely in relation to the sinking of underground storage tanks.**
Nature of impact:	**Regional groundwater as a whole is vulnerable to contamination. Contaminants and pollutants from both point and diffuse sources would quickly enter the regional groundwater system.**
Extent and duration of impact:	**Extent 3 (Within a 20 km radius of the centre of the site) & Duration 3 (5 – 15 years)**
Consequence of impact or risk:	**Possible pollution of soil and ground water where excavation takes place.**
Probability of occurrence:	**2 - Improbable (I)**
Degree to which the impact may cause irreplaceable loss of resources:	**2-Resource may be partly destroyed (PR)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Pollution of soil and ground water resources.**
Cumulative impact prior to mitigation:	**Spills affecting soil and ground water quality.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**28 – Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Mitigation measures included in EMP, attached as Appendix H, shall be adhered to.**

Residual impacts:	**It is not anticipated that the impact will be high if the mitigation measures are adhered to.**
Cumulative impact post mitigation:	**Spills affecting ground and ground water quality.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**24 – Low**
OPERATIONAL PHASE	
Potential impact and risk:	**Impact of operational activities on soil and underground water. The underground storage tanks may cause pollution.**
Nature of impact:	**Leaks from the underground storage tanks would lead to soil and ground water pollution.**
Extent and duration of impact:	**Extent 3 (Within a 20 km radius of the centre of the site) & Duration 3 (5 – 15 years)**
Consequence of impact or risk:	**Possible pollution of soil and ground water.**
Probability of occurrence:	**1 - Very improbable (VP)**
Degree to which the impact may cause irreplaceable loss of resources:	**2-Resource may be partly destroyed (PR)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Pollution of water resources**
Cumulative impact prior to mitigation:	**Spill resulting in soil and ground water quality impacts.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**14 – Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Mitigation measures included in EMP, attached as Appendix H, shall be adhered to.**
Residual impacts:	**It is not anticipated that the impact will be high if the mitigation measures are adhered to.**
Cumulative impact post mitigation:	**Spills affecting soil and ground water quality.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**12 – Low**
DECOMMISSIONING AND CLOSURE PHASE	
Potential impact and risk:	**Decommissioning of underground storage tanks impact on soil and underground water pollution.**
Nature of impact:	**Decommissioning of underground storage tanks impacts on soil and ground water.**
Extent and duration of impact:	**Extent 3 (Within a 20 km radius of the centre of the site) & Duration 3 (5 – 15 years)**
Consequence of impact or risk:	**Possible pollution of soil and ground water.**
Probability of occurrence:	**2 - Improbable (I)**
Degree to which the impact may cause irreplaceable loss of resources:	**2-Resource may be partly destroyed (PR)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Pollution of water resources**
Cumulative impact prior to mitigation:	**Spills affecting soil and ground water quality.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**28 - Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Mitigation measures included in EMP, attached as Appendix H, shall be adhered to.**
Residual impacts:	**It is not anticipated that the impact will be high if the mitigation measures are adhered to.**
Cumulative impact post mitigation:	**Spills affecting soil and ground water quality.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**24 – Low**

3. STORM WATER POLLUTION

Alternative 1 and 2	**Geographical and Physical Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential impact and risk:	**Impact of construction activities causing storm water pollution**
Nature of impact:	**Only storm water should enter the storm water drain / system and there is a risk of storm water contamination during construction.**
Extent and duration of impact:	**Extent 3 (Within a 20 km radius of the centre of the site) & Duration 1 (0-1 years)**
Consequence of impact or risk:	**Possible pollution of surface water.**
Probability of occurrence:	**4 (most likely)**
Degree to which the impact may cause irreplaceable loss of resources:	**2-Resource may be partly destroyed (PR)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Pollution of water resources**
Cumulative impact prior to mitigation:	**Spills affecting water quality.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**48 – Medium**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Mitigation measures included in EMP, attached as Appendix H, shall be adhered to.**
Residual impacts:	**It is not anticipated that the impact will be high if the mitigation measures are adhered to.**
Cumulative impact post mitigation:	**Spills affecting surface water quality.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**24 – Low**
OPERATIONAL PHASE	
Potential impact and risk:	**The storage of dangerous goods and chemicals on site poses a risk of storm water contamination.**
Nature of impact:	**Only storm water should enter the storm water drain / system and there is a risk of storm water contamination during operation (storage and handling of dangerous goods/chemicals).**
Extent and duration of impact:	**Extent 3 (Within a 20 km radius of the centre of the site) & Duration 3 (5 – 15 years)**
Consequence of impact or risk:	**Possible pollution of surface water.**
Probability of occurrence:	**2 (Improbable (I))**
Degree to which the impact may cause irreplaceable loss of resources:	**2-Resource may be partly destroyed (PR)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Pollution of water resources**
Cumulative impact prior to mitigation:	**Spills affecting surface water quality.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**28 – Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Mitigation measures included in EMP, attached as Appendix H, shall be adhered to.**
Residual impacts:	**It is not anticipated that the impact will be high if the mitigation measures are adhered to.**
Cumulative impact post mitigation:	**Spills affecting ground and surface water quality.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**14 – Low**
DECOMMISSIONING AND CLOSURE PHASE	

Potential impact and risk:	**The decommissioning of storage of dangerous goods and chemicals on site poses a risk of storm water contamination.**
Nature of impact:	**Only storm water should enter the storm water drain / system and there is a risk of storm water contamination during decommission of the chemical storage.**
Extent and duration of impact:	**Extent 3 (Within a 20 km radius of the centre of the site) & Duration 1 (0-1 years)**
Consequence of impact or risk:	**Possible pollution of surface water.**
Probability of occurrence:	**4 (most likely)**
Degree to which the impact may cause irreplaceable loss of resources:	**2-Resource may be partly destroyed (PR)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Pollution of water resources**
Cumulative impact prior to mitigation:	**Spills affecting surface water quality.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**48 – Medium**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Mitigation measures included in EMP, attached as Appendix H, shall be adhered to.**
Residual impacts:	**It is not anticipated that the impact will be high if the mitigation measures are adhered to.**
Cumulative impact post mitigation:	**Spills affecting surface water quality.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**24 – Low**

4. EMISSIONS AND AIR QUALITY

Alternative 1 and 2	**Geographical and Physical Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential impact and risk:	**Emissions and impact on air quality**
Nature of impact:	**Not applicable to the planning, design and development phase.**
OPERATIONAL PHASE	
Potential impact and risk:	**Emissions and impact on air quality**
Nature of impact:	**According to DDA Environmental Engineers (appointed Air Quality Specialists who compiled the AEL application) -** ***"The potential volatile organic compounds (VOCs) emissions are minimal/negligible, and there will be no stacks or vents required to be installed at the facility. However, it is recommended to conduct once-off ambient air quality monitoring (ambient VOCs concentrations) at 3 selected locations within the building where extrusion takes place. This investigation will serve to verify that the possible emissions from the process are negligible."***
Extent and duration of impact:	**Extent 3 (local) & Duration 5 (permanent)**
Consequence of impact or risk:	**Air pollution**
Probability of occurrence:	**4 (Highly probable (HP))**
Degree to which the impact may cause irreplaceable loss of resources:	**1- Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**Air pollution can cause a variety of environmental effects, such us acid rain, eutrophication, effects on wildlife, ozone depletion, crop and forest damages, global climate change tec. However, the emissions from the proposed development will be negligible on a global scale.**
Cumulative impact prior to mitigation:	**Negative impact on surrounding air quality.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**48 – Medium**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	• **Local exhaust ventilation system with extraction.** • **Once-off ambient air quality monitoring (ambient VOCs concentrations) at 3 selected locations within the building where extrusion takes place**
Residual impacts:	**It is not anticipated that the impact will be high if the mitigation measures are adhered to.**
Cumulative impact post mitigation:	**It is not anticipated that the impact will be high if the mitigation measures are adhered to.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**28 - Low**
DECOMMISSIONING AND CLOSURE PHASE	
Potential impact and risk:	**Emissions and impact on air quality**
Nature of impact:	**Not applicable to the planning, design and development phase.**

ECOLOGICAL AND BIOLOGICAL

None

SOCIO-ECONOMIC

5. INCREASE IN JOBS

Alternative 1 and 2	**Socio-Economic Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential impact and risk:	**Increased jobs**
Nature of impact:	**Temporary construction jobs will be created. The locals may not have sufficient skills to utilize the employment opportunities and "others (work force and job seekers)" may be employed from outside the community.**
Extent and duration of impact:	**Extent 2 (On site or within 100 m of the site) & Duration 1 (0 – 1 years)**
Consequence of impact or risk:	**Influx of contract workers due to lack of skills.** **Influx of job seekers due to jobs created.** **Littering.**
Probability of occurrence:	**4 (most likely)**
Degree to which the impact may cause irreplaceable loss of resources:	**NA – Positive**
Degree to which the impact can be reversed:	**NA – Positive**
Indirect impacts:	**NA – Positive**
Cumulative impact prior to mitigation:	**NA – Positive**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 – Low (positive)**
Degree to which the impact can be avoided:	**NA – Positive**
Degree to which the impact can be managed:	**NA – Positive**
Degree to which the impact can be mitigated:	**NA – Positive**
Proposed mitigation:	**Local contractors, employing or seeking to employ local (historically disadvantaged individuals (HDIs) from the region who are suitably qualified, should get preference.**
Residual impacts:	**NA – Positive**
Cumulative impact post mitigation:	**NA – Positive**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 – Low (positive)**
OPERATIONAL PHASE	
Potential impact and risk:	**Increased jobs**
Nature of impact:	**Jobs will be created. The locals may not have sufficient skills to utilize the employment opportunities and "others (work force and job seekers)" may be employed from outside the community.**
Extent and duration of impact:	**Extent 2 (On site or within 100 m of the site) & Duration 1 (0 – 1 years)**
Consequence of impact or risk:	**Influx of job seekers due to jobs created.**
Probability of occurrence:	**4 (most likely)**
Degree to which the impact may cause irreplaceable loss of resources:	**NA – Positive**
Degree to which the impact can be reversed:	**NA – Positive**
Indirect impacts:	**NA – Positive**
Cumulative impact prior to mitigation:	**NA – Positive**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 – Low (positive)**
Degree to which the impact can be avoided:	**NA – Positive**
Degree to which the impact can be managed:	**NA – Positive**
Degree to which the impact can be mitigated:	**NA – Positive**
Proposed mitigation:	**None.**
Residual impacts:	**NA – Positive**
Cumulative impact post mitigation:	**NA – Positive**

Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 – Low (positive)**
DECOMMISSIONING AND CLOSURE PHASE	
Potential impact and risk:	**Increased jobs**
Nature of impact:	**Temporary construction jobs will be created. The locals may not have sufficient skills to utilize the employment opportunities and "others (work force and job seekers)" may be employed from outside the community.**
Extent and duration of impact:	**Extent 2 (On site or within 100 m of the site) & Duration 1 (0 – 1 years)**
Consequence of impact or risk:	**Influx of contract workers due to lack of skills. Influx of job seekers due to jobs created. Littering.**
Probability of occurrence:	**4 (most likely)**
Degree to which the impact may cause irreplaceable loss of resources:	**NA – Positive**
Degree to which the impact can be reversed:	**NA – Positive**
Indirect impacts:	**NA – Positive**
Cumulative impact prior to mitigation:	**NA – Positive**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 – Low (positive)**
Degree to which the impact can be avoided:	**NA – Positive**
Degree to which the impact can be managed:	**NA – Positive**
Degree to which the impact can be mitigated:	**NA – Positive**
Proposed mitigation:	**Local contractors, employing or seeking to employ local (historically disadvantaged individuals (HDIs) from the region who are suitably qualified, should get preference.**
Residual impacts:	**NA – Positive**
Cumulative impact post mitigation:	**NA – Positive**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 – Low (positive)**

6. INCREASE IN TRAFFIC

Alternative 1 and 2	**Socio-Economic Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential impact and risk:	**Traffic Impacts**
Nature of impact:	**The construction machinery will only have a traffic impact on delivery to, and collection from the site and are therefore regarded as negligible.**
Extent and duration of impact:	**Extent 2 (On site or within 100 m of the site) & Duration 2 (2 – 5 years)**
Consequence of impact or risk:	**The construction machinery will only have a traffic impact on delivery to, and collection from the site and are therefore regarded as negligible.**
Probability of occurrence:	**2 (some possibility, but low likelihood)**
Degree to which the impact may cause irreplaceable loss of resources:	**1-Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**The minor increase in traffic volumes at certain times of day will add to the existing traffic volumes. As the existing traffic volumes are relatively low, this cumulative impact is not significant.**
Cumulative impact prior to mitigation:	**The minor increase in traffic volumes at certain times of day will add to the existing traffic volumes. As the existing traffic volumes are relatively low, this cumulative impact is not significant.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**16 – Low**

Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Avoid peak traffic hours (07h00 – 08h00 and 17h00 – 18h00) as far as possible**
Residual impacts:	**The minor increase in traffic volumes at certain times of day will add to the existing traffic volumes. As the existing traffic volumes are relatively low, this cumulative impact is not significant.**
Cumulative impact post mitigation:	**The minor increase in traffic volumes at certain times of day will add to the existing traffic volumes. As the existing traffic volumes are relatively low, this cumulative impact is not significant.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 – Low**
OPERATIONAL PHASE	
Potential impact and risk:	**Traffic Impacts**
Nature of impact:	**Increased traffic due to the operation activities requiring various vehicles to come onto and leave the site.** **As the site is an existing industrial facility, traffic volumes are not anticipated to increase significantly. However, 24 m articulated trucks will be making trips to site.**
Extent and duration of impact:	**Extent 2 (On site or within 100 m of the site) & Duration 5 (Will not cease)**
Consequence of impact or risk:	**The increase in traffic volumes at certain times of day will add to the existing traffic volumes. This cumulative impact is not significant.**
Probability of occurrence:	**1 (some possibility, but low likelihood)**
Degree to which the impact may cause irreplaceable loss of resources:	**1-Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**The increase in traffic volumes at certain times of day will add to the existing traffic volumes. This cumulative impact is not significant.**
Cumulative impact prior to mitigation:	**The increase in traffic volumes at certain times of day will add to the existing traffic volumes. This cumulative impact is not significant.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**18 – Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**None**
Residual impacts:	**The increase in traffic volumes at certain times of day will add to the existing traffic volumes. This cumulative impact is not significant.**
Cumulative impact post mitigation:	**The increase in traffic volumes at certain times of day will add to the existing traffic volumes. This cumulative impact is not significant.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**18 – Low**
DECOMMISSIONING AND CLOSURE PHASE	
Potential impact and risk:	**Traffic Impacts**
Nature of impact:	**The decommissioning machinery will only have a traffic impact on delivery to, and collection from the site and are therefore regarded as negligible.**
Extent and duration of impact:	**Extent 2 (On site or within 100 m of the site) & Duration 2 (2 – 5 years)**
Consequence of impact or risk:	**The decommissioning machinery will only have a traffic impact on delivery to, and collection from the site and are therefore regarded as negligible.**
Probability of occurrence:	**2 (some possibility, but low likelihood)**

Degree to which the impact may cause irreplaceable loss of resources:	**1-Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Partly reversible (PR)**
Indirect impacts:	**The minor increase in traffic volumes at certain times of day will add to the existing traffic volumes. This cumulative impact is not significant.**
Cumulative impact prior to mitigation:	**The minor increase in traffic volumes at certain times of day will add to the existing traffic volumes. This cumulative impact is not significant.**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**16 – Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2-Partly mitigatable (PM)**
Proposed mitigation:	**Avoid peak traffic hours (07h00 – 08h00 and 17h00 – 18h00) as far as possible**
Residual impacts:	**The minor increase in traffic volumes at certain times of day will add to the existing traffic volumes. This cumulative impact is not significant.**
Cumulative impact post mitigation:	**The minor increase in traffic volumes at certain times of day will add to the existing traffic volumes. This cumulative impact is not significant.**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**8 – Low**

7. NOISE

Alternative 1 and 2	**Socio-Economic Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential impact and risk:	**Noise due to construction machinery**
Nature of impact:	**Noise due to construction machinery during the construction/development phase. Construction machinery may cause noise disturbance to the directly adjacent land users/ owners. It is not anticipated that the noise will be considerable and will only be temporary. Noise due to construction activities is unlikely to cause a nuisance to adjacent residential areas (approximately 2.28km away).**
Extent and duration of impact:	**Extent 2 (On site or within 100 m of the site) & Duration 1 (0 – 1 years)**
Consequence of impact or risk:	**Nuisance**
Probability of occurrence:	**1 (Very improbable (VP))**
Degree to which the impact may cause irreplaceable loss of resources:	**1-Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Completely reversible (R) - This will not be a long-term impact nor will it have an impact on the natural processes. It is thus 100% reversible.**
Indirect impacts:	**Nuisance**
Cumulative impact prior to mitigation:	**Nuisance**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**9 – Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**1- Completely mitigatable (CM)**
Proposed mitigation:	**Machinery and vehicles should be regularly maintained to prevent excessive noise. All machinery and work activities must adhere to the requirements of the noise regulations.**
Residual impacts:	**Nuisance**
Cumulative impact post mitigation:	**Nuisance**

Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**7 - Low**
OPERATIONAL PHASE	
Potential impact and risk:	**Noise impacts**
Nature of impact:	**Noise due to industrial activities on site during operational phase (process equipment, trucks etc.). Noise due to operational activities is unlikely to cause a nuisance to adjacent residential areas (approximately 2.28km away). The site is surrounded by industrial sites some of which operate 24 hours a day.**
Extent and duration of impact:	**Extent 3 Local (Within a 20 km radius of the centre of the site) & Duration 5 Permanent (P) (Will not cease)**
Consequence of impact or risk:	**Nuisance**
Probability of occurrence:	**1 (Very improbable (VP))**
Degree to which the impact may cause irreplaceable loss of resources:	**1-Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Completely reversible (R)**
Indirect impacts:	**Nuisance**
Cumulative impact prior to mitigation:	**Nuisance**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**14 – Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**1- Completely mitigatable (CM)**
Proposed mitigation:	**Machinery and vehicles should be regularly maintained to prevent excessive noise. All machinery and work activities must adhere to the requirements of the noise regulations.**
Residual impacts:	**Nuisance**
Cumulative impact post mitigation:	**Nuisance**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**12 - Low**
DECOMMISSIONING AND CLOSURE PHASE	
Potential impact and risk:	**Noise due to decommissioning machinery**
Nature of impact:	**Noise due to decommissioning machinery during the decommissioning phase. Decommissioning machinery may cause noise disturbance to the directly adjacent land users/ owners. It is not anticipated that the noise will be considerable and will only be temporary. Noise due to decommissioning activities is unlikely to cause a nuisance to adjacent residential areas (approximately 2.28lm away.**
Extent and duration of impact:	**Extent 2 (On site or within 100 m of the site) & Duration 1 (0 – 1 years)**
Consequence of impact or risk:	**Nuisance**
Probability of occurrence:	**1 (Very improbable (VP))**
Degree to which the impact may cause irreplaceable loss of resources:	**1-Resource will not be lost (R)**
Degree to which the impact can be reversed:	**Completely reversible (R) - This will not be a long-term impact nor will it have an impact on the natural processes. It is thus 100% reversible.**
Indirect impacts:	**Nuisance**
Cumulative impact prior to mitigation:	**Nuisance**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**9 – Low**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**1- Completely mitigatable (CM)**
Proposed mitigation:	**Machinery and vehicles should be regularly maintained to prevent excessive noise. All machinery and work activities must adhere to the requirements of the noise regulations.**

Residual impacts:	**Nuisance**
Cumulative impact post mitigation:	**Nuisance**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**7 - Low**

8. EMERGENCY INCIDENTS

Alternative 1	**Socio-Economic Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential impact and risk:	**The site is considered a Major Hazard Installation – not applicable in development phase.**
OPERATIONAL PHASE	
Potential impact and risk:	**The site is considered a Major Hazard Installation.**
Nature of impact:	**Jet fire, flash fire and vapour cloud explosion.** **The maximum number of fatalities which can occur from a single event occurring onsite is just over 120 people. This high number of fatalities was driven by the jet fire, flash fire and vapour cloud explosion events observed in the Consequence Analysis** **Jet fire, flash fire and vapour cloud explosion impact over New Era and Bokomo Foods. The result of these events might be initiation of loss of containment events at those sites, due to elevated thermal radiation and overpressure levels.**
Extent and duration of impact:	**Extent 3 Local (Within a 20 km radius of the centre of the site) & Duration 5 Permanent (P) (Will not cease)**
Consequence of impact or risk:	**Risk of death.**
Probability of occurrence:	**2 (Improbable)** **The associated frequency of this event is low, at approximately 1.2 x 10-8 / year. The infrequent nature of those events (such as catastrophic failure of equipment) drove the societal risk down and societal risk is assessed as Broadly Acceptable.**
Degree to which the impact may cause irreplaceable loss of resources:	**3**
Degree to which the impact can be reversed:	**Irreversible (R)**
Indirect impacts:	**Loss of income earners, loss of infrastructure**
Cumulative impact prior to mitigation:	**Destruction of surrounding area**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**32 – Medium**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2 - PM**
Proposed mitigation:	• **Carry out advertisement and notification as required by provision 2(1) of the MHI Regulations.** • **Involve notification of neighbours in the site's emergency procedures.** • **Compile an Emergency Response Plan for the site, in line with SANS standard 1514 for Emergency Response Plans for MHIs, and considering local by-laws.** • **Road tankers are designed to SANS 1518 and adequately maintained (confirm with suppliers);** • **Operator presence at all times during offloading;** • **Drained area for tanker offloading linked to a separator system;** • **Installation of Emergency Stop Buttons at various locations around the site;** • **Ensure inspections are performed on equipment carrying hazardous materials as per relevant SANS standards;** • **Consider physical barriers between tanks and pathways and other equipment to avoid collisions leading to losses of containment;**

	• **Ensure that clear routes for personnel and equipment movement are demarcated;** • **Ensure adequate training of personnel on the handling of hazardous materials;** • **Implement ignition source control within the raw materials, blowing agent and XPS storage areas;** • **Ensure adequate separation of XPS storage area from other flammable materials.** • **Ensure bunding and containment systems are designed per SANS standards, as appropriate;** • **Consider installation of gas detection, heat detection and other detection systems, as appropriate, within the blowing agent storage area;** • **Where appropriate, consider possible compartmentalisation of tanks to prevent complete loss of hazardous material in case of leaks.** • **Consider installation of measures to decrease consequence distances in case of fire, e.g. fire walls in the vicinity of blowing agent storage, however, taking into account the potential for further confinement as a result.** • **Ensure that the site's existing fire system is checked by a qualified Fire Engineer and if need be, upgraded.** • **Re-do the MHI Risk Assessment after 5 years, or re-do the assessment if details of the installations change significantly, or if a loss of containment event occurs.**
Residual impacts:	**Loss of income earners, loss of infrastructure**
Cumulative impact post mitigation:	**Destruction of surrounding area**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**16 - Low**
DECOMMISSIONING AND CLOSURE PHASE	
Potential impact and risk:	**The site is considered a Major Hazard Installation – not applicable in decommissioning phase.**

Alternative 2	**Socio-Economic Impacts**
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential impact and risk:	**The site is considered a Major Hazard Installation – not applicable in development phase.**
OPERATIONAL PHASE	
Potential impact and risk:	**The site is considered a Major Hazard Installation.**
Nature of impact:	**Jet fire, flash fire and vapour cloud explosion.** **The maximum number of fatalities which can occur from a single event occurring onsite is just over 120 people. This high number of fatalities was driven by the jet fire, flash fire and vapour cloud explosion events observed in the Consequence Analysis** **Jet fire, flash fire and vapour cloud explosion impact over New Era and Bokomo Foods. The result of these events might be initiation of loss of containment events at those sites, due to elevated thermal radiation and overpressure levels.**
Extent and duration of impact:	**Extent 3 Local (Within a 20 km radius of the centre of the site) & Duration 5 Permanent (P) (Will not cease)**
Consequence of impact or risk:	**Risk of death.**
Probability of occurrence:	**4** **The associated frequency of this event is low, at approximately 1.2 x 10-8 / year. The infrequent nature of those events (such as catastrophic failure of equipment) drove the societal risk down and societal risk is assessed as Broadly Acceptable.**
Degree to which the impact may cause irreplaceable loss of resources:	**3**
Degree to which the impact can be reversed:	**Irreversible (R)**

Indirect impacts:	**Loss of income earners, loss of infrastructure**
Cumulative impact prior to mitigation:	**Destruction of surrounding area**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**72 – High**
Degree to which the impact can be avoided:	**High**
Degree to which the impact can be managed:	**High**
Degree to which the impact can be mitigated:	**2 - PM**
Proposed mitigation:	• **Carry out advertisement and notification as required by provision 2(1) of the MHI Regulations.** • **Involve notification of neighbours in the site's emergency procedures.** • **Compile an Emergency Response Plan for the site, in line with SANS standard 1514 for Emergency Response Plans for MHIs, and considering local by-laws.** • **Road tankers are designed to SANS 1518 and adequately maintained (confirm with suppliers);** • **Operator presence at all times during offloading;** • **Drained area for tanker offloading linked to a separator system;** • **Installation of Emergency Stop Buttons at various locations around the site;** • **Ensure inspections are performed on equipment carrying hazardous materials as per relevant SANS standards;** • **Consider physical barriers between tanks and pathways and other equipment to avoid collisions leading to losses of containment;** • **Ensure that clear routes for personnel and equipment movement are demarcated;** • **Ensure adequate training of personnel on the handling of hazardous materials;** • **Implement ignition source control within the raw materials, blowing agent and XPS storage areas;** • **Ensure adequate separation of XPS storage area from other flammable materials.** • **Ensure bunding and containment systems are designed per SANS standards, as appropriate;** • **Consider installation of gas detection, heat detection and other detection systems, as appropriate, within the blowing agent storage area;** • **Where appropriate, consider possible compartmentalisation of tanks to prevent complete loss of hazardous material in case of leaks.** • **Consider installation of measures to decrease consequence distances in case of fire, e.g. fire walls in the vicinity of blowing agent storage, however, taking into account the potential for further confinement as a result.** • **Ensure that the site's existing fire system is checked by a qualified Fire Engineer and if need be, upgraded.** • **Re-do the MHI Risk Assessment after 5 years, or re-do the assessment if details of the installations change significantly, or if a loss of containment event occurs.**
Residual impacts:	**Loss of income earners, loss of infrastructure**
Cumulative impact post mitigation:	**Destruction of surrounding area**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**36 – Medium**
DECOMMISSIONING AND CLOSURE PHASE	
Potential impact and risk:	**The site is considered a Major Hazard Installation – not applicable in decommissioning phase.**