

## Technical Note

**HaskoningDHV UK Ltd.  
Maritime & Waterways**

To: James Barrie  
From: RHDHV  
Date: 04 August 2015  
Copy:  
Our reference: PB1586 - N014 - Rev 2  
Classification: Project related

**Subject: Constructability Issues in response to the DCO – SABIC UK Limited**

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### 1.0 Introduction

The York Potash Harbour Facilities Project is currently at a stage whereby formal consultation has been undertaken with the Consultees including Landowners and Third Party Asset Owners as part of the Development Consent Order (DCO) application process. This process has raised a number of issues and concerns. These generally fall into two categories; firstly, there are points associated with legal matters such as concerns over Compulsory Acquisition, etc. Secondly there are concerns associated with constructability issues including the interface with existing assets and infrastructure throughout the construction period of the project and ongoing operational phase.

The purpose of this document is to address the constructability issues raised by SABIC UK Petrochemicals Limited (SABIC UK), a Consultee in the DCO process, with regards to the overland conveyor. As such this document is one of a series of similar documents which each address the particular constructability issues raised by an individual Consultee. These issues will need to be addressed prior to and reviewed throughout the construction period of the project.

Below summarises our understanding of the main constructability issues raised by SABIC UK and consideration as to how they could be addressed by the Principal Contractor, appointed for the construction of the overland conveyor and the harbour facility. It is not exhaustive but will assist in future discussions and development with the Consultee. This information will be provided to the Principal Contractor as part of the pre-construction information which they will be contractually obliged to comply with.

### 2.0 Wording from the DCO

The relevant wording provided in the SABIC UK response to the DCO with regards to constructability issues is as follows; *'SABIC UK is also concerned about engineering issues associated with the proposed conveyor and the effect of the scheme and the powers being sought on its infrastructure and business operations.'*

### 3.0 Known SABIC UK assets within the Order Limits

SABIC UK have between 7 to 14 existing above ground pipelines (up to 10 hazardous) at various locations along the proposed conveyor route. It is also known that SABIC UK have rights to construct 1 new pipeline.

These assets/ pipelines are all located within an infrastructure corridor operated by SembCorp, and are in the vicinity of the overland conveyor route.

#### 4.0 Understanding of the Issues

SABIC UK are concerned that the construction of the overland conveyor works could damage or compromise SABIC UK's ability to maintain and operate their pipeline assets in the infrastructure corridor.

We have provided comments in the following sections on:-

- Safe System of Work
- Control of traffic near linklines
- Inspection, repair, replacement and maintenance of pipelines by the Consultee
- Lifting activities near or over linklines
- Working activities near to linklines
- Roads
- Site Security

#### 5.0 Safe System of Work

The construction project will be notifiable and carried out in accordance with 'The Construction (Design and Management) Regulations 2015'.

The Principal Contractor is to conduct site inductions for all of his staff and sub-contractors. It is also his duty to appoint and engage contractors and workers and provide the right management and supervision whilst also monitoring the hazards on site.

For 95% of its route, the overland conveyor is in an existing infrastructure corridor, operated by SembCorp. All work within this corridor is controlled by SembCorp under their Safe System of Work (SSoW) as detailed in SembCorp Management Procedure "Safe Systems of Work and Risk Assessment – 1301". This is a permit to work based system. Historically, SembCorp have always insisted on the application of this process to **ALL** works within the infrastructure corridor regardless of whether it be a small maintenance task or a major capital project such as this. The SSoW is quite onerous, but given the highly hazardous nature of the assets in the area it is appropriate. The Principal Contractor appointed for the overland conveyor and the harbour facility will need to adhere to the SSoW and its requirements for works and operations within the infrastructure corridor, including access.

Identified below are the SembCorp Management Procedures which will be applied to the management of the construction activities under SembCorp's SSoW:

- Control of ignition sources and fire permits - 1303
- Lifting Activities Management and Control - 1448
- Construction operation maintenance and modification of link and vein lines - 1342
- Entry into Confined Spaces - 1304
- Lone and Isolated Workers - 1404
- Safe Systems of Work and Risk Assessment - 1301
- Management of Roads including Mobile Cranes and Abnormal Loads - 1309
- Control of Modifications - 1601

- Use of Work Control Permits - 1360
- Linkline Emergencies - 1215
- Management of Site Drainage and Effluent Systems – 1701
- Avoidance of Danger near Overhead Power Lines – 1452
- Excavations – 1308
- Review of Risk Assessments and Method Statements – 1320
- Control of Ionising Radiation for Industrial Radiography – 1424
- Prevention of River Pollution – 1217
- Prevention of Contamination of Soil and Groundwater – 1703
- Disposal of Waste Materials – 1702
- Environmental Control and Compliances with The Environmental Permitting (England and Wales) Regulations – 1746
- Management of Work Covered by the Construction regulations – 1426

There are more Procedures within SembCorp's full suite of Management Procedures, but those listed above are the ones which are most likely to be applicable to the York Potash Harbour Facilities Project.

The Consultees will be given the opportunity to review the design of the overland conveyor and, if required, have a watching brief on site when construction occurs adjacent to or over their asset.

SABIC UK's assets are all above ground pipelines, these pipelines run on existing common infrastructure generally known as "linklines". The pipelines on these linklines are owned by several different companies and carry a mix of hydrocarbon products, industrial gases, and industrial effluents.

The route of the overland conveyor runs through an area which is intended for use as an infrastructure corridor, as such there are many assets running through the area that the project will need to take due cognisance of.

## **6.0 Control of traffic near linklines**

A major concern working near or over these assets will be how to protect the linklines from accidental damage from construction traffic and during lifting activities. Lifting activities are discussed separately below.

As mentioned previously, the Construction (Design and Management) Regulations will be applicable to the project and will therefore require the production of a detailed traffic management plan. This will be developed by the Principal Contractor at the pre-construction phase of the project.

## **7.0 Inspection, repair, replacement and general maintenance of pipelines by the Consultee**

For all above ground pipelines, access will be provided to enable inspection, repair, replacement and general maintenance by the Consultee throughout the construction phase of the overland conveyor. We are aware that when the SABIC Olefins 6 plant at Wilton has its outage, a large number of these pipelines become available for assurance, and as such, this is a particularly busy period and will need close coordination during the construction phase of the overland conveyor. This can be controlled and managed through routine and regular dialogue with SembCorp as the operators of the infrastructure

corridor. This process will be managed by the Principal Contractor by ongoing dialogue, meetings with SembCorp and by creating working windows for tasks at specific pinch points along the project.

## 8.0 Lifting activities near or over linklines

A major concern is the protection of the assets should a load be dropped, giving rise to the potential for damage to the assets. A lifting study will be developed looking at the issues of protecting assets above the ground (i.e. crane platforms, double stropping, etc.) and determining the envisaged loads expected during the construction of the overland conveyor. The following methodology has been developed at this stage and will be considered when carrying out the lifting study.

All large lifts will be pre-planned in detail, the size of crane would be selected to allow additional spare capacity for all lifts and any tandem lifts would have a 50% down-rating in capacity rather than the normal 25% required in codes of practice.

Suitable foundations will be designed so that they are capable of supporting the crane outriggers or track loads. Lifting gear would also have a greater than normal factor of safety and the use of double stropping would be followed. It is likely that the Principal Contractor will subcontract all major lifts and these will be carried out under the "CPA Contract Lifting Services Agreement" where the crane supplier supervises and takes responsibility for the lift.

The lifting of loads will be carefully planned to eliminate any possibility of the load swinging into or over the linklines or expansion loops. Where necessary temporary protective steel barrier frames would be placed next to exposed pipelines and gantries to prevent loads striking the asset.

Any construction works above the linklines will require the protection of the linklines. This could be achieved by a temporary platform made with steel crane mats, these would typically be supported on steel sections fabricated to form a grillage packed up on bearers, spaced sufficiently wide apart to spread the load to the ground. Additional timber mats could be provided on top of the steel crane mats to cushion impacts. However, this has to be balanced by the risk that erection and removal of the protective measures may themselves introduce. Construction plant will either work from similar platforms or be positioned sufficiently distant from the linklines to avoid loads being imparted onto the linklines.

Reusable temporary works, specially designed for the purpose, could be fabricated both to safely support the overland conveyor support legs and the overhead conveyor structure during erection. Hydraulically operated cross heads could be used to prevent any part of the conveyor from falling from height in the unlikely event of a lifting equipment failure.

Access across the linklines will be planned and marked with barriers and signage. The crossings will be made with steel bridges and approach ramps specifically designed to span and protect the linklines. Crash barriers at the sides of the linklines and approaches will prevent plant falling onto the pipelines.

As an absolute minimum, "Lifting Operations and Lifting Equipment Regulations 1998 (LOLER): Approved Code of Practice and Guidance" will need to be followed at all times with regards to the extensive lifting activities which will be associated with the overhead conveyor construction activities. SembCorp Management Procedure "Lifting Activities Management and Control – 1448" will also need to be considered in the control of lifting activities, although it is worth noting that this document is based on the LOLER Approved code of practice.

## 9.0 Working activities near to linklines

Construction plant, materials and equipment will be positioned sufficiently far away from the linklines, at a pre agreed distance to minimise the risk of an unplanned load being imparted onto the linklines and/or the linklines being struck. Temporary barriers will protect the linklines and denote traffic and pedestrian routes.

Protection of linklines from the crane jib and slung loads will be accomplished by the careful siting and positioning of the crane. Cranes will be positioned in pre-determined locations and a lift plan developed at the planning stage to reduce the possibility of a boom/jibs falling across linklines in the event of hydraulic or rope failure.

Should there be a need to carry out any excavations within 3m or less of the linklines, the asset owner/operator should have a representative present or available on site. We would also recommend that design checks are performed prior to any excavating, to determine the zones of influence on the existing linklines foundations, as this may identify the need for additional protection (i.e. temporary propping). Any additional protection will be subject to the approval of asset owners/operator.

In conjunction with the guidance notes, SembCorp procedure “Excavations – 1308” will need to be followed for all excavations. Excavations are defined as “any work involving breaking ground”.

## 10.0 Roads

There are a number of roads (surfaced and unsurfaced) within the infrastructure corridor. The Principal Contractor will be required to interface with the owners and provide access for the asset owners during the construction works.

Any roads requiring temporary closure to enable construction of the overland conveyor will be planned well in advance and coordinated with the owner and asset owners. No 2 Tunnel at Bran Sands requires 24 hour unfettered access for emergency services; this requirement will be maintained throughout the construction of the overland conveyor.

A number of the roads in and around the infrastructure area are in poor condition and are not suited to large volumes of construction traffic which a project of this nature will require. The roads will be assessed by the Principal Contractor and if necessary will be upgraded in advance of the construction works. At the end of the construction works remediation works may be necessary. Development of the traffic management plan will address these issues.

SembCorp procedure “Management of Roads including Mobile Cranes and Abnormal Loads – 1309” will be adhered to, to ensure that crossing over culverts and road bridges are controlled appropriately.

## 11.0 Site Security

There are a number of existing fences and gates associated with providing security and control of access onto the Wilton Site, and especially the infrastructure corridor. Keeping the construction site secure will be the responsibility of the Principal Contractor during the works, and will need careful consideration. A security review will be undertaken prior to the construction works to help prevent unauthorised access and theft of equipment and materials from the construction area. The current security of the Wilton site is

the responsibility of Falck, who have a wealth of experience in security in and around the Teesside Industrial Complexes and their assistance may be sought with the security review.

## **12.0 Conclusion**

This technical note provides a formal response to SABIC UK's concerns as raised in the DCO with regards to the overland conveyor works. The information contained within this and other technical notes on constructability will be provided to the Principal Contractor as part of the pre-construction information, which they will be contractually obliged to comply with. The Principal Contractor appointed for the overland conveyor and the harbour facility will be incentivised to comply with SembCorp's requirements and those in this technical note; by their need for ongoing cooperation and contractual obligations imposed by York Potash Limited. This technical note is intended to form the basis of future discussions and be developed with SABIC UK's input to address their concerns. We understand that it is imperative that SABIC UK is consulted throughout the life of the project.

## Technical Note

**HaskoningDHV UK Ltd.  
Maritime & Waterways**

To: James Barrie  
From: RHDHV  
Date: 04 August 2015  
Copy:  
Our reference: PB1586 - N015 - Rev 2  
Classification: Project related

**Subject: Constructability Issues in response to the DCO – Huntsman Polyurethanes UK Limited**

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### 1.0 Introduction

The York Potash Harbour Facilities Project is currently at a stage whereby formal consultation has been undertaken with the Consultees including Landowners and Third Party Asset Owners as part of the Development Consent Order (DCO) application process. This process has raised a number of issues and concerns. These generally fall into two categories; firstly, there are points associated with legal matters such as concerns over Compulsory Acquisition, etc. Secondly there are concerns associated with constructability issues including the interface with existing assets and infrastructure throughout the construction period of the project and ongoing operational phase.

The purpose of this document is to address the constructability issues raised by Huntsman Polyurethanes UK Limited (Huntsman), a Consultee in the DCO process, with regards to the overland conveyor. As such this document is one of a series of similar documents which each address the particular constructability issues raised by an individual Consultee. These issues will need to be addressed prior to and reviewed throughout the construction period of the project.

Below summarises our understanding of the main constructability issues raised by SABIC UK and consideration as to how they could be addressed by the Principal Contractor, appointed for the construction of the overland conveyor and the harbour facility. It is not exhaustive but will assist in future discussions and development with the Consultee. This information will be provided to the Principal Contractor as part of the pre-construction information which they will be contractually obliged to comply with.

### 2.0 Wording from the DCO

The relevant wording provided in the Huntsman Polyurethanes UK Limited response to the DCO with regards to constructability issues is as follows; *'Huntsman are also concerned about engineering issues associated with the proposed conveyor and the effect of the scheme and the powers being sought on its infrastructure and business operations.'*

### 3.0 Known Huntsman assets within the Order Limits

Huntsman have 2 existing above ground pipelines. These assets/ pipelines are all located within an infrastructure corridor operated by SembCorp, and are in the vicinity of the overland conveyor route.

## 4.0 Understanding of the Issues

Huntsman are concerned that the construction of the overland conveyor works could damage or compromise Huntsman's ability to maintain and operate their pipeline assets in the infrastructure corridor.

We have provided comments in the following sections on:-

- Safe System of Work
- Control of traffic near linklines
- Inspection, repair, replacement and maintenance of pipelines by the Consultee
- Lifting activities near or over linklines
- Working activities near to linklines
- Roads
- Site Security

## 5.0 Safe System of Work

The construction project will be notifiable and carried out in accordance with 'The Construction (Design and Management) Regulations 2015'.

The Principal Contractor is to conduct site inductions for all of his staff and sub-contractors. It is also his duty to appoint and engage contractors and workers and provide the right management and supervision whilst also monitoring the hazards on site.

For 95% of its route, the overland conveyor is in an existing infrastructure corridor, operated by SembCorp. All work within this corridor is controlled by SembCorp under their Safe System of Work (SSoW) as detailed in SembCorp Management Procedure "Safe Systems of Work and Risk Assessment – 1301". This is a permit to work based system. Historically, SembCorp have always insisted on the application of this process to **ALL** works within the infrastructure corridor regardless of whether it be a small maintenance task or a major capital project such as this. The SSoW is quite onerous, but given the highly hazardous nature of the assets in the area it is appropriate. The Principal Contractor appointed for the overland conveyor and the harbour facility will need to adhere to the SSoW and its requirements for works and operations within the infrastructure corridor, including access.

Identified below are the SembCorp Management Procedures which will be applied to the management of the construction activities under SembCorp's SSoW:

- Control of ignition sources and fire permits - 1303
- Lifting Activities Management and Control - 1448
- Construction operation maintenance and modification of link and vein lines - 1342
- Entry into Confined Spaces - 1304
- Lone and Isolated Workers - 1404
- Safe Systems of Work and Risk Assessment - 1301
- Management of Roads including Mobile Cranes and Abnormal Loads - 1309
- Control of Modifications - 1601
- Use of Work Control Permits - 1360
- Linkline Emergencies - 1215
- Management of Site Drainage and Effluent Systems – 1701



- Avoidance of Danger near Overhead Power Lines – 1452
- Excavations – 1308
- Review of Risk Assessments and Method Statements – 1320
- Control of Ionising Radiation for Industrial Radiography – 1424
- Prevention of River Pollution – 1217
- Prevention of Contamination of Soil and Groundwater – 1703
- Disposal of Waste Materials – 1702
- Environmental Control and Compliances with The Environmental Permitting (England and Wales) Regulations – 1746
- Management of Work Covered by the Construction regulations – 1426

There are more Procedures within SembCorp's full suite of Management Procedures, but those listed above are the ones which are most likely to be applicable to the York Potash Harbour Facilities Project.

The Consultees will be given the opportunity to review the design of the overland conveyor and, if required, have a watching brief on site when construction occurs adjacent to or over their asset.

Huntsman's assets are all above ground pipelines, these pipelines run on existing common infrastructure generally known as "linklines". The pipelines on these linklines are owned by several different companies and carry a mix of hydrocarbon products, industrial gases, and industrial effluents.

The route of the overland conveyor runs through an area which is intended for use as an infrastructure corridor, as such there are many assets running through the area that the project will need to take due cognisance of.

## **6.0 Control of traffic near linklines**

A major concern working near or over these assets will be how to protect the linklines from accidental damage from construction traffic and during lifting activities. Lifting activities are discussed separately below.

As mentioned previously, the Construction (Design and Management) Regulations will be applicable to the project and will therefore require the production of a detailed traffic management plan. This will be developed by the Principal Contractor at the pre-construction phase of the project.

## **7.0 Inspection, repair, replacement and general maintenance of pipelines by the Consultee**

For all above ground pipelines, access will be provided to enable inspection, repair, replacement and general maintenance by the Consultee throughout the construction phase of the overland conveyor. This will be controlled and managed through routine and regular dialogue with SembCorp as the operators of the infrastructure corridor. This process will be managed by the Principal Contractor by ongoing dialogue, meetings with SembCorp and by creating working windows for tasks at specific pinch points along the project.

## 8.0 Lifting activities near or over linklines

A major concern is the protection of the assets should a load be dropped, giving rise to the potential for damage to the assets. A lifting study will be developed looking at the issues of protecting assets above the ground (i.e. crane platforms, double stropping, etc.) and determining the envisaged loads expected during the construction of the overland conveyor. The following methodology has been developed at this stage and will be considered when carrying out the lifting study.

All large lifts will be pre-planned in detail, the size of crane would be selected to allow additional spare capacity for all lifts and any tandem lifts would have a 50% down-rating in capacity rather than the normal 25% required in codes of practice.

Suitable foundations will be designed so that they are capable of supporting the crane outriggers or track loads. Lifting gear would also have a greater than normal factor of safety and the use of double stropping would be followed. It is likely that the Principal Contractor will subcontract all major lifts and these will be carried out under the “CPA Contract Lifting Services Agreement” where the crane supplier supervises and takes responsibility for the lift.

The lifting of loads will be carefully planned to eliminate any possibility of the load swinging into or over the linklines or expansion loops. Where necessary temporary protective steel barrier frames would be placed next to exposed pipelines and gantries to prevent loads striking the asset.

Any construction works above the linklines will require the protection of the linklines. This could be achieved by a temporary platform made with steel crane mats, these would typically be supported on steel sections fabricated to form a grillage packed up on bearers, spaced sufficiently wide apart to spread the load to the ground. Additional timber mats could be provided on top of the steel crane mats to cushion impacts. However, this has to be balanced by the risk that erection and removal of the protective measures may themselves introduce. Construction plant will either work from similar platforms or be positioned sufficiently distant from the linklines to avoid loads being imparted onto the linklines.

Reusable temporary works, specially designed for the purpose, could be fabricated both to safely support the overland conveyor support legs and the overhead conveyor structure during erection. Hydraulically operated cross heads could be used to prevent any part of the conveyor from falling from height in the unlikely event of a lifting equipment failure.

Access across the linklines will be planned and marked with barriers and signage. The crossings will be made with steel bridges and approach ramps specifically designed to span and protect the linklines. Crash barriers at the sides of the linklines and approaches will prevent plant falling onto the pipelines.

As an absolute minimum, “Lifting Operations and Lifting Equipment Regulations 1998 (LOLER): Approved Code of Practice and Guidance” will need to be followed at all times with regards to the extensive lifting activities which will be associated with the overhead conveyor construction activities. SembCorp Management Procedure “Lifting Activities Management and Control – 1448” will also need to be considered in the control of lifting activities, although it is worth noting that this document is based on the LOLER Approved code of practice.

## 9.0 Working activities near to linklines

Construction plant, materials and equipment will be positioned sufficiently far away from the linklines, at a pre agreed distance to minimise the risk of an unplanned load being imparted onto the linklines and/or the linklines being struck. Temporary barriers will protect the linklines and denote traffic and pedestrian routes.

Protection of linklines from the crane jib and slung loads will be accomplished by the careful siting and positioning of the crane. Cranes will be positioned in pre-determined locations and a lift plan developed at the planning stage to reduce the possibility of a boom/jibs falling across linklines in the event of hydraulic or rope failure.

Should there be a need to carry out any excavations within 3m or less of the linklines, the asset owner/operator should have a representative present or available on site. We would also recommend that design checks are performed prior to any excavating, to determine the zones of influence on the existing linklines foundations, as this may identify the need for additional protection (i.e. temporary propping). Any additional protection will be subject to the approval of asset owners/operator.

In conjunction with the guidance notes, SembCorp procedure “Excavations – 1308” will need to be followed for all excavations. Excavations are defined as “any work involving breaking ground”.

## 10.0 Roads

There are a number of roads (surfaced and unsurfaced) within the infrastructure corridor. The Principal Contractor will be required to interface with the owners and provide access for the asset owners during the construction works.

Any roads requiring temporary closure to enable construction of the overland conveyor will be planned well in advance and coordinated with the owner and asset owners. No 2 Tunnel at Bran Sands requires 24 hour unfettered access for emergency services; this requirement will be maintained throughout the construction of the overland conveyor.

A number of the roads in and around the infrastructure area are in poor condition and are not suited to large volumes of construction traffic which a project of this nature will require. The roads will be assessed by the Principal Contractor and if necessary will be upgraded in advance of the construction works. At the end of the construction works remediation works may be necessary. Development of the traffic management plan will address these issues.

SembCorp procedure “Management of Roads including Mobile Cranes and Abnormal Loads – 1309” will be adhered to, to ensure that crossing over culverts and road bridges are controlled appropriately.

## 11.0 Site Security

There are a number of existing fences and gates associated with providing security and control of access onto the Wilton Site, and especially the infrastructure corridor. Keeping the construction site secure will be the responsibility of the Principal Contractor during the works, and will need careful consideration. A security review will be undertaken prior to the construction works to help prevent unauthorised access and theft of equipment and materials from the construction area. The current security of the Wilton site is the responsibility of Falck, who have a wealth of experience in security in and around the Teesside Industrial Complexes and their assistance may be sought with the security review.

## 12.0 Conclusion

This technical note provides a formal response to Huntsman's concerns as raised in the DCO with regards to the overland conveyor works. The information contained within this and other technical notes on constructability will be provided to the Principal Contractor as part of the pre-construction information, which they will be contractually obliged to comply with. The Principal Contractor appointed for the overland conveyor and the harbour facility will be incentivised to comply with SembCorp's requirements and those in this technical note; by their need for ongoing cooperation and contractual obligations imposed by York Potash Limited. This technical note is intended to form the basis of future discussions and be developed with Huntsman input to address their concerns. We understand that it is imperative that Huntsman is consulted throughout the life of the project.

## Technical Note

**HaskoningDHV UK Ltd.  
Maritime & Waterways**

To: James Barrie  
From: RHDHV  
Date: 04 August 2015  
Copy:  
Our reference: PB1586 - N016 - Rev 2  
Classification: Project related

**Subject: Constructability Issues in response to the DCO – DEA UK SNS Limited**

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### 1.0 Introduction

The York Potash Harbour Facilities Project is currently at a stage whereby formal consultation has been undertaken with the Consultees including Landowners and Third Party Asset Owners as part of the Development Consent Order (DCO) application process. This process has raised a number of issues and concerns. These generally fall into two categories; firstly, there are points associated with legal matters such as concerns over Compulsory Acquisition, etc. Secondly there are concerns associated with constructability issues including the interface with existing assets and infrastructure throughout the construction period of the project and ongoing operational phase.

The purpose of this document is to address the constructability issues raised by DEA UK SNS Limited (DEA), a Consultee in the DCO process, with regards to the overland conveyor. As such this document is one of a series of similar documents which each address the particular constructability issues raised by an individual Consultee. These issues will need to be addressed prior to and reviewed throughout the construction period of the project.

Below summarises our understanding of the main constructability issues raised by DEA and consideration as to how they could be addressed by the Principal Contractor, appointed for the construction of the overland conveyor and the harbour facility. It is not exhaustive but will assist in future discussions and development with the Consultee. This information will be provided to the Principal Contractor as part of the pre-construction information which they will be contractually obliged to comply with.

### 2.0 Wording from the DCO

The relevant wording provided in the DEA response to the DCO with regards to constructability issues is as follows; *'DEA/Sterling is also concerned about engineering issues associated with the proposed conveyor and the effect of the scheme and the powers being sought on its infrastructure and business operations.'*

### 3.0 Known DEA assets within the Order Limits

DEA have a 20 inch high pressure carbon steel gas major accident hazard pipeline (mostly underground) a 3 inch MEG pipeline and two 3 inch plastic ducts containing optical fibre, with rights to construct more.

These assets (pipelines and ducts) are all located within an infrastructure corridor operated by SembCorp, and are in the vicinity of the overland conveyor route.

## 4.0 Understanding of the Issues

DEA are concerned that the construction of the overland conveyor works could damage or compromise DEA's ability to maintain and operate their pipeline assets in the infrastructure corridor.

We have provided comments in the following sections on:-

- Safe System of Work
- Control of traffic near linklines, near and over easements
- Inspection, repair, replacement and general maintenance of pipelines by the Consultee
- Working over buried assets i.e. over the DEA Easement
- Excavating and Piling in the proximity of the buried assets
- Roads
- Site Security

## 5.0 Safe System of Work

The construction project will be notifiable and carried out in accordance with 'The Construction (Design and Management) Regulations 2015'.

The Principal Contractor is to conduct site inductions for all of his staff and sub-contractors. It is also his duty to appoint and engage contractors and workers and provide the right management and supervision whilst also monitoring the hazards on site.

For 95% of its route, the overland conveyor is in an existing infrastructure corridor, operated by SembCorp. All work within this corridor is controlled by SembCorp under their Safe System of Work (SSoW) as detailed in SembCorp Management Procedure "Safe Systems of Work and Risk Assessment – 1301". This is a permit to work based system. Historically, SembCorp have always insisted on the application of this process to **ALL** works within the infrastructure corridor regardless of whether it be a small maintenance task or a major capital project such as this. The SSoW is quite onerous, but given the highly hazardous nature of the assets in the area it is appropriate. The Principal Contractor appointed for the overland conveyor and the harbour facility will need to adhere to the SSoW and its requirements for works and operations within the infrastructure corridor, including access.

Identified below are the SembCorp Management Procedures which will be applied to the management of the construction activities under SembCorp's SSoW:

- Control of ignition sources and fire permits - 1303
- Lifting Activities Management and Control - 1448
- Construction operation maintenance and modification of link and vein lines - 1342
- Entry into Confined Spaces - 1304
- Lone and Isolated Workers - 1404
- Safe Systems of Work and Risk Assessment - 1301
- Management of Roads including Mobile Cranes and Abnormal Loads - 1309
- Control of Modifications - 1601
- Use of Work Control Permits - 1360
- Linkline Emergencies - 1215
- Management of Site Drainage and Effluent Systems – 1701
- Avoidance of Danger near Overhead Power Lines – 1452

- Excavations – 1308
- Review of Risk Assessments and Method Statements – 1320
- Control of Ionising Radiation for Industrial Radiography – 1424
- Prevention of River Pollution – 1217
- Prevention of Contamination of Soil and Groundwater – 1703
- Disposal of Waste Materials – 1702
- Environmental Control and Compliances with The Environmental Permitting (England and Wales) Regulations – 1746
- Management of Work Covered by the Construction regulations – 1426

There are more Procedures within SembCorp's full suite of Management Procedures, but those listed above are the ones which are most likely to be applicable to the York Potash Harbour Facilities Project.

The Consultees will be given the opportunity to review the design of the overland conveyor and, if required, have a watching brief on site when construction occurs adjacent to or over their asset.

DEA's assets run below ground except for two short lengths in Papa section of the infrastructure corridor. DEA's assets and associated easement runs in general close proximity to the above ground pipelines which run on existing common infrastructure, these above ground pipelines generally being known as "linklines". The pipelines on these linklines are owned by several different companies and carry a mix of hydrocarbon products, industrial gases, and industrial effluents.

The route of the overland conveyor runs through an area which is intended for use as an infrastructure corridor, as such there are many assets running through the area that the project will need to take due cognisance of.

## **6.0 Control of traffic near linklines, near and over easements**

A major concern working near or over these assets will be how to protect the linklines and below ground pipelines from accidental damage from construction traffic and during lifting activities. Lifting activities are discussed separately below.

As mentioned previously, the Construction (Design and Management) Regulations will be applicable to the project and will therefore require the production of a detailed traffic management plan. This will be developed by the Principal Contractor at the pre-construction phase of the project.

Several guidance notes exist within the pipelines and gas industries which detail steps that should be taken to protect pipelines from damage associated with traffic movement; these should be referenced to in the detailed traffic management plan:

- International Institution of Gas Engineers and Managers – IGE/SR/18 Edition 2 – Safe working practices to ensure the integrity of gas pipelines and associated installations.
- Linewatch – Special Requirements for Safe Working in close proximity to high pressure pipelines.
- Northern Gas Networks – Safe working in the vicinity of high pressure gas pipelines and associated installations.

All contain similar advice and guidance on the protection of pipeline easements from traffic and construction activities, namely the following steps:

- The easements of each buried pipeline will be pegged out well in advance to clearly delineate the easement.
- Where practical the easements will be fenced off with nominated crossing points open and clearly signed and identified.
- Protective measures such as load plates or bog mats should be placed across the easement at the crossing points. However, load plates or bog mats would only be considered following design checks to determine that the loading on the pipeline is within acceptable limits, these limits will be determined in consultation with the asset owner/ operator.
- Where heavy loads or high volumes of traffic are to cross the easement of the buried pipelines, protective measures such a reinforced concrete slab or steel platforms bridging over the easement should be constructed at the crossing location. Similar to that mentioned above, this would only be considered following design checks to determine the loading on the pipeline is within acceptable limits, these limits will be determined in consultation with the asset owner/ operator.

DEA may have their own design standards or may require an industry design standard to be followed in dealing with protection of their asset; these standards will be sought prior to undertaking the design checks.

## **7.0 Inspection, repair, replacement and general maintenance of pipelines by the Consultee**

For all pipelines, access will be provided to enable inspection, repair, replacement and general maintenance by the Consultee throughout the construction phase of the overland conveyor. This will be controlled and managed through routine and regular dialogue with SembCorp as the operators of the infrastructure corridor. This process will be managed by the Principal Contractor by ongoing dialogue, meetings with SembCorp and by creating working windows for tasks at specific pinch points along the project.

## **8.0 Working over buried assets i.e. over the DEA Easement**

A major concern is the protection of the buried assets should a load be dropped giving rise to the potential for damage to the assets. A lifting study will be developed looking at the issues of protecting assets below the ground (i.e. crane platforms, double stropping, etc.) and determining the envisaged loads expected during the construction of the overland conveyor. The following methodology has been developed at this stage and will be considered when carrying out the lifting study.

All large lifts will be pre-planned in detail, the size of crane would be selected to allow additional spare capacity for all lifts and any tandem lifts would have a 50% down-rating in capacity rather than the normal 25% required in the codes of practice.

Suitable foundations will be designed so that they are capable of supporting the crane outriggers or track loads, positioned outside of the easement. Lifting gear would also have a greater than normal factor of safety and the use of double stropping would be followed. It is likely that the Principal Contractor will subcontract all major lifts and these will be carried out under the “CPA Contract Lifting Services Agreement” where the crane supplier supervises and takes responsibility for the lift.



The lifting of loads will be carefully planned to eliminate any possibility of the load swinging over the easement. As mentioned in section 6.0 the easement will be pegged out well and where practical fenced off, in advance, to clearly delineate the easement.

Any construction works above the buried pipelines will require the protection of the pipelines. This could be achieved by a temporary platform made with steel crane mats, these would typically be supported on steel sections fabricated to form a grillage packed up on bearers, spaced sufficiently wide apart to spread the load to the ground outside of the easement. The load applied to the ground will be calculated and within the limits agreed with the asset owner. Additional timber mats or fill material could be provided on top of the steel crane mats to cushion impacts. However, the construction of the temporary platform has to be balanced by the risk that erection and removal of the protective measures may themselves introduce. Construction plant will either work from similar platforms or be positioned sufficiently distant from the easements to avoid loads being imparted onto the pipeline in agreement with the asset owner.

Reusable temporary works, specially designed for the purpose, could be fabricated both to safely support the overland conveyor support legs and the overhead conveyor structure during erection. Hydraulically operated cross heads could be used to prevent any part of the conveyor from falling from height in the unlikely event of a lifting equipment failure.

As an absolute minimum, “Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) : Approved Code of Practice and Guidance” will need to be followed at all times with regards to the extensive lifting activities which will be associated with the overhead conveyor construction activities. SembCorp Management Procedure “Lifting Activities Management and Control – 1448” will also need to be considered in the control of lifting activities, although it is worth noting that this document is based on the LOLER Approved code of practice.

## **9.0 Excavating and Piling in proximity of the buried assets**

Where there are buried assets, there is a concern over any activity that breaks the ground surface. We envisage that there will be no piling or excavations work within the easement. Any proposed piling operations or excavations within 1.5m of the asset, will require the asset to be physically exposed by hand digging so its location can be confirmed. The assets initial location will be positioned by referring to the asset owner’s drawings and any other means on site e.g. markers posts. It may be necessary to install some form of physical separation between the asset and pile/ excavations during construction, such as a driven sheet pile between the pile and the buried asset. The means and need for separation will be agreed with the asset owner prior to the start of the construction activities.

The guidance notes referred to in section 6.0 suggest that the proximity of piling activities to pipelines of this nature does vary, but all state that piling can be carried out near to the pipeline, provided that an assessment of the vibration levels at the pipeline is carried out. It is the intention that bored of CFA (Continuous Flight Auger) piling will be used where necessary to minimise vibration. The guidance notes suggest that the peak particle velocity at the pipeline should be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50mm/sec, the ground vibration shall be monitored using a typical monitoring device such as the Vibrock V801 seismograph and tri-axial geophone sensor. Where ground conditions are of submerged granular deposits of silt/sand, an assessment of the effect of any vibration on settlement and liquefaction at the pipeline be carried out. A trial piling study will be carried out to measure the vibration from various types of piling in these ground conditions. Research into maximum allowable peak particle velocity values for various assets will be undertaken and agreed with the asset owners. This method of monitoring vibrations will also be adopted

should there be a need to use impact breakers to remove areas of hard standing over the piles or at pile caps locations. If the limits are exceeded other methods of removing hard material will then be used, such as high pressure water jetting or concrete coring using diamond drills or diamond sawing.

In terms of excavations for pile caps near buried assets, the guidance documentation referred to in section 6.0 suggests that when excavating within 3m or less of the pipeline asset, the asset owner/operator should have a representative present or available on site. This will be changed to 1.5m and the procedure followed as set out for piling i.e. the asset to be physically exposed by hand digging so its location can be confirmed. We would also recommend that design checks are performed prior to any excavating, to determine the zones of influence on the buried asset, as this may identify the need for additional protection (i.e. temporary propping). Any additional protection will be subject to the approval of asset owners/operator.

When working near ducts the main concern will be cable strikes when breaking ground. SembCorp's excavation permit system incorporates a cable search as part of the application process. SembCorp MP "Excavations – 1308" will need to be adhered to in order to control this.

In conjunction with the guidance notes, SembCorp procedure "Excavations – 1308" will need to be followed for all excavations. Excavations are defined as "any work involving breaking ground".

## 10.0 Roads

There are a number of roads (surfaced and unsurfaced) within the infrastructure corridor. The Principal Contractor will be required to interface with the owners and provide access for the asset owners during the construction works.

Any roads requiring temporary closure to enable construction of the overland conveyor will be planned well in advance and coordinated with the owner and asset owners. No 2 Tunnel at Bran Sands requires 24 hour unfettered access for emergency services; this requirement will be maintained throughout the construction of the overland conveyor.

A number of the roads in and around the infrastructure area are in poor condition and are not suited to large volumes of construction traffic which a project of this nature will require. The roads will be assessed by the Principal Contractor and if necessary will be upgraded in advance of the construction works. At the end of the construction works remediation works may be necessary. Development of the traffic management plan will address these issues.

SembCorp procedure "Management of Roads including Mobile Cranes and Abnormal Loads – 1309" will be adhered to, to ensure that crossing over culverts and road bridges are controlled appropriately.

## 11.0 Site Security

There are a number of existing fences and gates associated with providing security and control of access onto the Wilton Site, and especially the infrastructure corridor. Keeping the construction site secure will be the responsibility of the Principal Contractor during the works, and will need careful consideration. A security review will be undertaken prior to the construction works to help prevent unauthorised access and theft of equipment and materials from the construction area. The current security of the Wilton site is the responsibility of Falck, who have a wealth of experience in security in and around the Teesside Industrial Complexes and their assistance may be sought with the security review.

## 12.0 Conclusion

This technical note provides a formal response to DEA's concerns as raised in the DCO with regards to the overland conveyor works. The information contained within this and other technical notes on constructability will be provided to the Principal Contractor as part of the pre-construction information, which they will be contractually obliged to comply with. The Principal Contractor appointed for the overland conveyor and the harbour facility will be incentivised to comply with SembCorp's requirements and those in this technical note; by their need for ongoing cooperation and contractual obligations imposed by York Potash Limited. This technical note is intended to form the basis of future discussions and be developed with DEA's input to address their concerns. We understand that it is imperative that DEA is consulted throughout the life of the project.

## Technical Note

**HaskoningDHV UK Ltd.  
Maritime & Waterways**

To: James Barrie  
From: RHDHV  
Date: 27 August 2015  
Copy:  
Our reference: PB1586 - N020 - Rev 3  
Classification: Project related

**Subject: Constructability Issues in respect of BP CATS**

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### 1.0 Introduction

The York Potash Harbour Facilities Project is currently at a stage whereby formal consultation has been undertaken with the Consultees including Landowners and Third Party Asset Owners as part of the Development Consent Order (DCO) application process. A number of Consultees have raised similar issues and concerns. These generally fall into two categories; firstly, there are points associated with legal matters such as concerns over Compulsory Acquisition, etc. Secondly there are concerns associated with constructability issues including the interface with existing assets and infrastructure throughout the construction period of the project and ongoing operational phase.

Although BP CATS (Central Area Transmission System) have not raised any issues directly in response to the DCO process, the purpose of this document is to address the constructability issues we believe BP CATS, a Consultee in the DCO process, may have with regards to the overland conveyor. These issues will need to be addressed prior to and reviewed throughout the construction period of the project.

Below summarises our understanding of the main constructability issues as raised by a number of Consultees and consideration as to how they could be addressed by the Principal Contractor, appointed for the construction of the overland conveyor and the harbour facility. It is not exhaustive but will assist in future discussions and development with the Consultee. This information will be provided to the Principal Contractor as part of the pre-construction information which they will be contractually obliged to comply with.

### 2.0 Known BP CATS assets within the Order Limits

BP CATS have a 36 inch high pressure gas major accident hazard pipeline, referred to as the BP CATS Pipeline. As well as the CATS Tunnel for the River Tees crossing.

The BP CATS pipeline is located underground, within an infrastructure corridor operated by SembCorp, and is in the vicinity of the overland conveyor route.

### 3.0 Understanding of the Issues

A number of Consultees are concerned that the construction of the overland conveyor works could damage or compromise their ability to maintain and operate their pipeline assets in the infrastructure corridor.

We have provided comments in the following sections on:-

- Safe System of Work
- Control of traffic near linklines, near and over easements
- Inspection, repair, replacement and general maintenance of pipelines by the Consultee
- Working over buried assets i.e. over the BP CATS Easement
- Excavating and Piling in the proximity of the buried assets
- Roads
- Site Security

#### 4.0 Safe System of Work

The construction project will be notifiable and carried out in accordance with 'The Construction (Design and Management) Regulations 2015'.

The Principal Contractor is to conduct site inductions for all of his staff and sub-contractors. It is also his duty to appoint and engage contractors and workers and provide the right management and supervision whilst also monitoring the hazards on site.

For 95% of its route, the overland conveyor is in an existing infrastructure corridor, operated by SembCorp. All work within this corridor is controlled by SembCorp under their Safe System of Work (SSoW) as detailed in SembCorp Management Procedure "Safe Systems of Work and Risk Assessment – 1301". This is a permit to work based system. Historically, SembCorp have always insisted on the application of this process to **ALL** works within the infrastructure corridor regardless of whether it be a small maintenance task or a major capital project such as this. The SSoW is quite onerous, but given the highly hazardous nature of the assets in the area it is appropriate. The Principal Contractor appointed for the overland conveyor and the harbour facility will need to adhere to the SSoW and its requirements for works and operations within the infrastructure corridor, including access.

Identified below are the SembCorp Management Procedures which will be applied to the management of the construction activities under SembCorp's SSoW:

- Control of ignition sources and fire permits - 1303
- Lifting Activities Management and Control - 1448
- Construction operation maintenance and modification of link and vein lines - 1342
- Entry into Confined Spaces - 1304
- Lone and Isolated Workers - 1404
- Safe Systems of Work and Risk Assessment - 1301
- Management of Roads including Mobile Cranes and Abnormal Loads - 1309
- Control of Modifications - 1601
- Use of Work Control Permits - 1360
- Linkline Emergencies - 1215
- Management of Site Drainage and Effluent Systems – 1701
- Avoidance of Danger near Overhead Power Lines – 1452
- Excavations – 1308
- Review of Risk Assessments and Method Statements – 1320
- Control of Ionising Radiation for Industrial Radiography – 1424
- Prevention of River Pollution – 1217
- Prevention of Contamination of Soil and Groundwater – 1703

- Disposal of Waste Materials – 1702
- Environmental Control and Compliances with The Environmental Permitting (England and Wales) Regulations – 1746
- Management of Work Covered by the Construction regulations – 1426

There are more Procedures within SembCorp's full suite of Management Procedures, but those listed above are the ones which are most likely to be applicable to the York Potash Harbour Facilities Project.

The Consultees will be given the opportunity to review the design of the overland conveyor and, if required, have a watching brief on site when construction occurs adjacent to or over their asset.

BP CATS assets run below ground in general close proximity to the above ground pipelines which run on existing common infrastructure, these above ground pipelines generally being known as "linklines". The pipelines on these linklines are owned by several different companies and carry a mix of hydrocarbon products, industrial gases, and industrial effluents.

The route of the overland conveyor runs through an area which is intended for use as an infrastructure corridor, as such there are many assets running through the area that the project will need to take due cognisance of.

As part of the Statutory Consultation undertaken by York Potash Limited, the Health and Safety Executive have confirmed that the overland conveyor and the harbour facility does not fall within the 'Consultation Zone of Major Accident Hazard Pipelines'.

## **5.0 Control of traffic near linklines, near and over easements**

A major concern working near or over these assets will be how to protect the linklines and below ground pipelines from accidental damage from construction traffic and during lifting activities. Lifting activities are discussed separately below.

As mentioned previously, the Construction (Design and Management) Regulations will be applicable to the project and will therefore require the production of a detailed traffic management plan. This will be developed by the Principal Contractor at the pre-construction phase of the project.

Several guidance notes exist within the pipelines and gas industries which detail steps that should be taken to protect pipelines from damage associated with traffic movement; these should be referenced to in the detailed traffic management plan:

- International Institution of Gas Engineers and Managers – IGE/SR/18 Edition 2 – Safe working practices to ensure the integrity of gas pipelines and associated installations.
- Linewatch – Special Requirements for Safe Working in close proximity to high pressure pipelines.
- Northern Gas Networks – Safe working in the vicinity of high pressure gas pipelines and associated installations.

All contain similar advice and guidance on the protection of pipeline easements from traffic and construction activities, namely the following steps:

- The easements of each buried pipeline will be pegged out well in advance to clearly delineate the easement.

- Where practical the easements will be fenced off with nominated crossing points open and clearly signed and identified.
- Protective measures such as load plates or bog mats should be placed across the easement at the crossing points. However, load plates or bog mats would only be considered following design checks to determine that the loading on the pipeline is within acceptable limits, these limits will be determined in consultation with the asset owner/ operator.
- Where heavy loads or high volumes of traffic are to cross the easement of the buried pipelines, protective measures such a reinforced concrete slab or steel platforms bridging over the easement should be constructed at the crossing location. Similar to that mentioned above, this would only be considered following design checks to determine the loading on the pipeline is within acceptable limits, these limits will be determined in consultation with the asset owner/ operator.

BP CATS may have their own design standards or may require an industry design standard to be followed in dealing with protection of their asset; these standards will be sought prior to undertaking the design checks.

## **6.0 Inspection, repair, replacement and general maintenance of pipelines by the Consultee**

For all pipelines, access will be provided to enable inspection, repair, replacement and general maintenance by the Consultee throughout the construction phase of the overland conveyor. This will be controlled and managed through routine and regular dialogue with SembCorp as the operators of the infrastructure corridor. This process will be managed by the Principal Contractor by ongoing dialogue, meetings with SembCorp and by creating working windows for tasks at specific pinch points along the project.

## **7.0 Working over buried assets i.e. over the BP CATS Easement**

A major concern is the protection of the buried assets should a load be dropped giving rise to the potential for damage to the assets. A lifting study will be developed looking at the issues of protecting assets below the ground (i.e. crane platforms, double stropping, etc.) and determining the envisaged loads expected during the construction of the overland conveyor. The following methodology has been developed at this stage and will be considered when carrying out the lifting study.

All large lifts will be pre-planned in detail, the size of crane would be selected to allow additional spare capacity for all lifts and any tandem lifts would have a 50% down-rating in capacity rather than the normal 25% required in the codes of practice.

Suitable foundations will be designed so that they are capable of supporting the crane outriggers or track loads, positioned outside of the easement. Lifting gear would also have a greater than normal factor of safety and the use of double stropping would be followed. It is likely that the Principal Contractor will subcontract all major lifts and these will be carried out under the “CPA Contract Lifting Services Agreement” where the crane supplier supervises and takes responsibility for the lift.

The lifting of loads will be carefully planned to eliminate any possibility of the load swinging over the easement. As mentioned in section 6.0 the easement will be pegged out well and where practical fenced off, in advance, to clearly delineate the easement.

Any construction works above the buried pipeline will require the protection of the pipeline. This could be achieved by a temporary platform made with steel crane mats, these would typically be supported on steel sections fabricated to form a grillage packed up on bearers, spaced sufficiently wide apart to spread the load to the ground outside of the easement. The load applied to the ground will be calculated and within the limits agreed with the asset owner. Additional timber mats or fill material could be provided on top of the steel crane mats to cushion impacts. However, the construction of the temporary platform has to be balanced by the risk that erection and removal of the protective measures may themselves introduce. Construction plant will either work from similar platforms or be positioned sufficiently distant from the easements to avoid loads being imparted onto the pipeline in agreement with the asset owner.

Reusable temporary works, specially designed for the purpose, could be fabricated both to safely support the overland conveyor support legs and the overhead conveyor structure during erection. Hydraulically operated cross heads could be used to prevent any part of the conveyor from falling from height in the unlikely event of a lifting equipment failure.

During the operational phase any maintenance works to the conveyor above the buried pipeline, will require the protection of the pipeline from falling objects. This would be over the full width of the easement under the section of conveyor being worked upon. A dropped object study will be developed looking at the issues of protecting assets below the ground (i.e. protection mats etc.) and determining the envisaged loads expected during the operational phase of the overland conveyor. This information will be contained within the Operation and Maintenance Manual (O&M Manual). This manual will be prepared by the Principal Contractor, appointed for the construction of the overland conveyor and the harbour facility.

As an absolute minimum, “Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) : Approved Code of Practice and Guidance” will need to be followed at all times with regards to the extensive lifting activities which will be associated with the overhead conveyor construction activities. SembCorp Management Procedure “Lifting Activities Management and Control – 1448” will also need to be considered in the control of lifting activities, although it is worth noting that this document is based on the LOLER Approved code of practice.

## **8.0 Excavating and Piling in proximity of the buried assets**

Where there are buried assets, there is a concern over any activity that breaks the ground surface. We envisage that there will be no piling or excavations work within the easement. Any proposed piling operations or excavations within 1.5m of the asset, will require the asset to be physically exposed by hand digging so its location can be confirmed. The assets initial location will be positioned by referring to the asset owner’s drawings and any other means on site e.g. markers posts. It may be necessary to install some form of physical separation between the asset and pile/ excavations during construction, such as a driven sheet pile between the pile and the buried asset. The means and need for separation will be agreed with the asset owner prior to the start of the construction activities.

The guidance notes referred to in section 6.0 suggest that the proximity of piling activities to pipelines of this nature does vary, but all state that piling can be carried out near to the pipeline, provided that an assessment of the vibration levels at the pipeline is carried out. It is the intention that bored of CFA (Continuous Flight Auger) piling will be used where necessary to minimise vibration. The guidance notes suggest that the peak particle velocity at the pipeline should be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50mm/sec, the ground vibration shall be monitored using a typical monitoring device such as the Vibrock V801 seismograph and tri-axial



geophone sensor. Where ground conditions are of submerged granular deposits of silt/sand, an assessment of the effect of any vibration on settlement and liquefaction at the pipeline be carried out. A trial piling study will be carried out to measure the vibration from various types of piling in these ground conditions. Research into maximum allowable peak particle velocity values for various assets will be undertaken and agreed with the asset owners. This method of monitoring vibrations will also be adopted should there be a need to use impact breakers to remove areas of hard standing over the piles or at pile caps locations. If the limits are exceeded other methods of removing hard material will then be used, such as high pressure water jetting or concrete coring using diamond drills or diamond sawing.

In terms of excavations for pile caps near buried assets, the guidance documentation referred to in section 6.0 suggests that when excavating within 3m or less of the pipeline asset, the asset owner/operator should have a representative present or available on site. This will be changed to 1.5m and the procedure followed as set out for piling i.e. the asset to be physically exposed by hand digging so its location can be confirmed. We would also recommend that design checks are performed prior to any excavating, to determine the zones of influence on the buried asset, as this may identify the need for additional protection (i.e. temporary propping). Any additional protection will be subject to the approval of asset owners/operator.

When working near ducts the main concern will be cable strikes when breaking ground. SembCorp's excavation permit system incorporates a cable search as part of the application process. SembCorp MP "Excavations – 1308" will need to be adhered to in order to control this.

In conjunction with the guidance notes, SembCorp procedure "Excavations – 1308" will need to be followed for all excavations. Excavations are defined as "any work involving breaking ground".

## 9.0 Roads

There are a number of roads (surfaced and unsurfaced) within the infrastructure corridor. The Principal Contractor will be required to interface with the owners and provide access for the asset owners during the construction works.

Any roads requiring temporary closure to enable construction of the overland conveyor will be planned well in advance and coordinated with the owner and asset owners. No 2 Tunnel at Bran Sands requires 24 hour unfettered access for emergency services; this requirement will be maintained throughout the construction of the overland conveyor.

A number of the roads in and around the infrastructure area are in poor condition and are not suited to large volumes of construction traffic which a project of this nature will require. The roads will be assessed by the Principal Contractor and if necessary will be upgraded in advance of the construction works. At the end of the construction works remediation works may be necessary. Development of the traffic management plan will address these issues.

SembCorp procedure "Management of Roads including Mobile Cranes and Abnormal Loads – 1309" will be adhered to, to ensure that crossing over culverts and road bridges are controlled appropriately.

## 10.0 Site Security

There are a number of existing fences and gates associated with providing security and control of access onto the Wilton Site, and especially the infrastructure corridor. Keeping the construction site secure will

be the responsibility of the Principal Contractor during the works, and will need careful consideration. A security review will be undertaken prior to the construction works to help prevent unauthorised access and theft of equipment and materials from the construction area. The current security of the Wilton site is the responsibility of Falck, who have a wealth of experience in security in and around the Teesside Industrial Complexes and their assistance may be sought with the security review.

## **11.0 Conclusion**

This technical note provides BP CATS with guidance on how constructability and operational issues will be managed and controlled with regards to the overland conveyor works. The information contained within this and other technical notes on constructability will be provided to the Principal Contractor as part of the pre-construction information, which they will be contractually obliged to comply with. The Principal Contractor appointed for the overland conveyor and the harbour facility will be incentivised to comply with SembCorp's requirements and those in this technical note; by their need for ongoing cooperation and contractual obligations imposed by York Potash Limited. This technical note is intended to form the basis of future discussions and be developed with BP CATS input to address their concerns. We understand that it is imperative that BP CATS is consulted throughout the life of the project.

## Technical Note

**HaskoningDHV UK Ltd.  
Maritime & Waterways**

To: James Barrie  
From: RHDHV  
Date: 13 August 2015  
Copy:  
Our reference: PB1586 - N021 - Rev 2  
Classification: Project related

**Subject: Constructability Issues in response to the DCO – NWL**

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### 1.0 Introduction

The York Potash Harbour Facilities Project is currently at a stage whereby formal consultation has been undertaken with the Consultees including Landowners and Third Party Asset Owners as part of the Development Consent Order (DCO) application process. This process has raised a number of issues and concerns. These generally fall into two categories; firstly, there are points associated with legal matters such as concerns over Compulsory Acquisition, etc. Secondly there are concerns associated with constructability issues including the interface with existing assets and infrastructure throughout the construction period of the project and ongoing operational phase.

The purpose of this document is to address the constructability and ongoing operational issues raised by NWL (Northumbrian Water Limited), a Consultee in the DCO process, regarding the overland conveyor. As such this document is one of a series of similar documents which each address the particular constructability issues raised. These issues will need to be addressed prior to and reviewed throughout the construction period of the project.

Below summarises our understanding of the main constructability issues raised by NWL and consideration as to how they could be addressed by the Principal Contractor, appointed for the construction of the overland conveyor and the harbour facility. It is not exhaustive but will assist in future discussions and development with NWL. This information will be provided to the Principal Contractor as part of the pre-construction information which they will be contractually obliged to comply with.

Issues raised by NWL in relation to other assets such as the access road bridge are not considered in this document and will be considered separately elsewhere.

This document is not exhaustive but will assist in future discussions and development with NWL. This information will be provided to the Principal Contractor as part of the pre-construction information which they will be contractually obliged to comply with.

### 2.0 Wording from the DCO

The relevant wording provided in the NWL response to the DCO with regards to constructability issues is as follows; *'We seek certainty that all of our assets remain accessible and protected at all times specifically the jetty, pumping station and the pipe work that runs through Dabholm Gut SSSI to the Bran Sands facility.'*

*The proposal for the southern conveyor could affect our access road bridge especially if it passes over the bridge. We will require full clearance for traffic in this location. The southern route could also affect our outfall pipework where access will need to be retained for maintenance etc. The route proposed would be parallel to effluent pipelines coming to Bran Sands via the tunnel No 2 under the River Tees and services to our jetty. Access for our jetty will be required for maintenance and inspection.*

*It should be noted that the Northern route as it turns north around Bran Sands may impact existing pipelines coming into the site'*

### **3.0 Known NWL assets within the Order Limits**

NWL have a number of pipelines (e.g. carrying raw water, portable water), cables and outfall pipework; these assets are located both underground and above ground. NWL also have an access bridge over the infrastructure corridor to Bran Sands Effluent Treatment Site, Jetty and Jetty Tank Farm.

Some of NWL's assets are located within an infrastructure corridor operated by SembCorp, and are in the vicinity of the overland conveyor route. There are a number of NWL assets that are under NWL's operational control, these being; Bran Sands Effluent Treatment Site including the access road bridge, the pipeline corridor which runs from Bran Sands to the Jetty Tank Farm. The northern most pipeline corridor from Bran Sands to the Jetty only carries NWL assets and as such is operated and controlled by NWL.

### **4.0 Understanding of the Issues**

NWL are concerned that the construction of the overland conveyor works could damage or compromise NWL's ability to maintain and operate their pipeline assets in the infrastructure corridor.

We have provided comments in the following sections on:-

- Safe System of Work
- Control of traffic near linklines, above ground pipelines, near and over easements
- Inspection, repair, replacement and general maintenance of assets owned by NWL
- Lifting activities near or over above ground pipelines
- Working activities near to above ground pipeline
- Working over buried assets i.e. over the NWL Easement
- Excavating and Piling in the proximity of the buried assets
- Roads
- Site Security

### **5.0 Safe System of Work**

The construction project will be notifiable and carried out in accordance with 'The Construction (Design and Management) Regulations 2015'.

The Principal Contractor is to conduct site inductions for all of his staff and sub-contractors. It is also his duty to appoint and engage contractors and workers and provide the right management and supervision whilst also monitoring the hazards on site.

For 95% of its route, the overland conveyor is in an existing infrastructure corridor, operated by SembCorp. All work within this corridor is controlled by SembCorp under their Safe System of Work (SSoW) as detailed in SembCorp Management Procedure "Safe Systems of Work and Risk Assessment – 1301". This is a permit to work based system. Historically, SembCorp have always insisted on the application of this process to **ALL** works within the infrastructure corridor regardless of whether it be a small maintenance task or a major capital project such as this. The SSoW is quite onerous, but given the highly hazardous nature of the assets in the area it is appropriate. The Principal Contractor appointed for the overland conveyor and the harbour facility will need to adhere to the SSoW and its requirements for works and operations within the infrastructure corridor, including access.

Identified below are the SembCorp Management Procedures which will be applied to the management of the construction activities under SembCorp's SSoW:

- Control of ignition sources and fire permits - 1303
- Lifting Activities Management and Control - 1448
- Construction operation maintenance and modification of link and vein lines - 1342
- Entry into Confined Spaces - 1304
- Lone and Isolated Workers - 1404
- Safe Systems of Work and Risk Assessment - 1301
- Management of Roads including Mobile Cranes and Abnormal Loads - 1309
- Control of Modifications - 1601
- Use of Work Control Permits - 1360
- Linkline Emergencies - 1215
- Management of Site Drainage and Effluent Systems – 1701
- Avoidance of Danger near Overhead Power Lines – 1452
- Excavations – 1308
- Review of Risk Assessments and Method Statements – 1320
- Control of Ionising Radiation for Industrial Radiography – 1424
- Prevention of River Pollution – 1217
- Prevention of Contamination of Soil and Groundwater – 1703
- Disposal of Waste Materials – 1702
- Environmental Control and Compliances with The Environmental Permitting (England and Wales) Regulations – 1746
- Management of Work Covered by the Construction regulations – 1426

There are more Procedures within SembCorp's full suite of Management Procedures, but those listed above are the ones which are most likely to be applicable to the York Potash Harbour Facilities Project. For work within NWL operational area which is controlled by NWL, the respective NWL Safe System of Work will be applied and adhered to.

NWL will be given the opportunity to review the design of the overland conveyor and, if required, have a watching brief on site when construction occurs adjacent to or over their asset.

NWL's assets run below ground and above ground. NWL's assets and associated easement runs in general close proximity to the above ground pipelines which run on existing common infrastructure, these above ground pipelines generally being known as "linklines". The pipelines on these linklines are owned by several different companies and carry a mix of hydrocarbon products, industrial gases, and industrial effluents.

The route of the overland conveyor runs through an area which is intended for use as an infrastructure corridor, as such there are many assets running through the area that the project will need to take due cognisance of.

## **6.0 Control of traffic near linklines, above ground pipelines, near and over easements**

A major concern working near or over these assets will be how to protect the linklines and below ground pipelines from accidental damage from construction traffic and during lifting activities. Lifting activities are discussed separately below.

As mentioned previously, the Construction (Design and Management) Regulations will be applicable to the project and will therefore require the production of a detailed traffic management plan. This will be developed by the Principal Contractor at the pre-construction phase of the project.

Several guidance notes exist within the pipelines and gas industries which detail steps that should be taken to protect pipelines from damage associated with traffic movement; these should be referenced to in the detailed traffic management plan:

- International Institution of Gas Engineers and Managers – IGE/SR/18 Edition 2 – Safe working practices to ensure the integrity of gas pipelines and associated installations.
- Linewatch – Special Requirements for Safe Working in close proximity to high pressure pipelines.
- Northern Gas Networks – Safe working in the vicinity of high pressure gas pipelines and associated installations.

All contain similar advice and guidance on the protection of pipeline easements from traffic and construction activities, namely the following steps:

- The easements of each buried pipeline will be pegged out well in advance to clearly delineate the easement.
- Where practical the easements will be fenced off with nominated crossing points open and clearly signed and identified.
- Protective measures such as load plates or bog mats should be placed across the easement at the crossing points. However, load plates or bog mats would only be considered following design checks to determine that the loading on the pipeline is within acceptable limits, these limits will be determined in consultation with the asset owner/ operator.
- Where heavy loads or high volumes of traffic are to cross the easement of the buried pipelines, protective measures such as a reinforced concrete slab or steel platforms bridging over the easement should be constructed at the crossing location. Similar to that mentioned above, this would only be considered following design checks to determine the loading on the pipeline is within acceptable limits, these limits will be determined in consultation with the asset owner/ operator.

NWL may have their own design standards or may require an industry design standard to be followed in dealing with protection of their asset; these standards will be sought prior to undertaking the design checks.

## **7.0 Inspection, repair, replacement and general maintenance of assets owned by NWL**

For all NWL assets, access will be provided to enable inspection, repair, replacement and general maintenance by NWL throughout the construction phase of the overland conveyor. This will be controlled and managed through routine and regular dialogue with SembCorp as the operators of the infrastructure corridor. This process will be managed by the Principal Contractor by ongoing dialogue, meetings with SembCorp and by creating working windows for tasks at specific pinch points along the project.

## **8.0 Lifting activities near or over above ground pipelines**

A major concern is the protection of the assets should a load be dropped, giving rise to the potential for damage to the assets. A lifting study will be developed looking at the issues of protecting assets above the ground (i.e. crane platforms, double stropping, etc.) and determining the envisaged loads expected during the construction of the overland conveyor. The following methodology has been developed at this stage and will be considered when carrying out the lifting study.

All large lifts will be pre-planned in detail, the size of crane would be selected to allow additional spare capacity for all lifts and any tandem lifts would have a 50% down-rating in capacity rather than the normal 25% required in codes of practice.

Suitable foundations will be designed so that they are capable of supporting the crane outriggers or track loads, positioned outside of any known easement. Lifting gear would also have a greater than normal factor of safety and the use of double stropping would be followed. It is likely that the Principal Contractor will subcontract all major lifts and these will be carried out under the “CPA Contract Lifting Services Agreement” where the crane supplier supervises and takes responsibility for the lift.

The lifting of loads will be carefully planned to eliminate any possibility of the load swinging into or over the linklines, pipelines or expansion loops. Where necessary temporary protective steel barrier frames would be placed next to exposed pipelines and gantries to prevent loads striking the asset.

Any construction works above the linklines will require the protection of the above ground pipelines. This could be achieved by a temporary platform made with steel crane mats, these would typically be supported on steel sections fabricated to form a grillage packed up on bearers, spaced sufficiently wide apart to spread the load to the ground. Additional timber mats could be provided on top of the steel crane mats to cushion impacts. However, this has to be balanced by the risk that erection and removal of the protective measures may themselves introduce. Construction plant will either work from similar platforms or be positioned sufficiently distant from the linklines to avoid loads being imparted onto the linklines.

Reusable temporary works, specially designed for the purpose, could be fabricated both to safely support the overland conveyor support legs and the overhead conveyor structure during erection. Hydraulically operated cross heads could be used to prevent any part of the conveyor from falling from height in the unlikely event of a lifting equipment failure.

Access across the linklines will be planned and marked with barriers and signage. The crossings will be made with steel bridges and approach ramps specifically designed to span and protect the linklines. Crash barriers at the sides of the linklines and approaches will prevent plant falling onto the pipelines.

As an absolute minimum, “Lifting Operations and Lifting Equipment Regulations 1998 (LOLER): Approved Code of Practice and Guidance” will need to be followed at all times regarding the extensive lifting activities which will be associated with the overhead conveyor construction activities. SembCorp Management Procedure “Lifting Activities Management and Control – 1448” will also need to be considered in the control of lifting activities, although it is worth noting that this document is based on the LOLER Approved code of practice.

## **9.0 Working activities near to above ground pipeline**

Construction plant, materials and equipment will be positioned sufficiently far away from the linklines, at a pre agreed distance to minimise the risk of an unplanned load being imparted onto the linklines and/or the linklines being struck. Temporary barriers will protect the linklines and denote traffic and pedestrian routes.

Protection of linklines from the crane jib and slung loads will be accomplished by the careful siting and positioning of the crane. Cranes will be positioned in pre-determined locations and a lift plan developed at the planning stage to reduce the possibility of a boom/jibs falling across linklines in the event of hydraulic or rope failure.

In terms of excavations for pile caps near the linklines, the guidance documentation referred to in section 6.0 suggests that when excavating within 3m or less of the pipeline asset, the asset owner/operator should have a representative present or available on site. We would also advise that design checks be performed prior to any excavating to determine the zones of influence on the existing foundation, as this may identify the need for additional protection (i.e. temporary propping) subject to approval of asset owners/operator.

In conjunction with the guidance notes, SembCorp procedure “Excavations – 1308” will need to be followed for all excavations. Excavations are defined as “any work involving breaking ground”.

## **10.0 Working over buried assets i.e. over the NWL Easement**

Similar to working over pipelines, a major concern is the protection of the buried assets should a load be dropped giving rise to the potential for damage to the assets. A lifting study will be developed looking at the issues of protecting assets below the ground (i.e. crane platforms, double stropping, etc.) and determining the envisaged loads expected during the construction of the overland conveyor. The same methodology as described in section 8.0 will be followed.

All large lifts will be pre-planned in detail, the size of crane would be selected to allow additional spare capacity for all lifts and any tandem lifts would have at 50% down-rating in capacity rather than the normal 25% required in the codes of practice.

Suitable foundations will be designed so that they are capable of supporting the crane outriggers or track loads, positioned outside of the easement. Lifting gear would also have a greater than normal factor of safety and the use of double stropping would be followed. It is likely that the Principal Contractor will subcontract all major lifts and these will be carried out under the “CPA Contract Lifting Services Agreement” where the crane supplier supervises and takes responsibility for the lift.



The lifting of loads will be carefully planned to eliminate any possibility of the load swinging over the easement. As mentioned in section 6.0 the easement will be pegged out well and where practical fenced off, in advance, to clearly delineate the easement.

Any construction works above the buried pipelines will require the protection of the pipelines. This could be achieved by a temporary platform made with steel crane mats, these would typically be supported on steel sections fabricated to form a grillage packed up on bearers, spaced sufficiently wide apart to spread the load to the ground outside of the easement. The load applied to the ground will be calculated and within the limits agreed with the asset owner. Additional timber mats or fill material could be provided on top of the steel crane mats to cushion impacts. However, the construction of the temporary platform has to be balanced by the risk erection and removal of the protective measures may themselves introduce. Construction plant will either work from similar platforms or be positioned sufficiently distant from the easements to avoid loads being imparted onto the pipeline in agreement with the asset owner.

Reusable temporary works, specially designed for the purpose, could be fabricated both to safely support the overland conveyor support legs and the overhead conveyor structure during erection. Hydraulically operated cross heads could be used to prevent any part of the conveyor from falling from height in the unlikely event of a lifting equipment failure.

As an absolute minimum, “Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) : Approved Code of Practice and Guidance” will need to be followed at all times with regards to the extensive lifting activities which will be associated with the overhead conveyor construction activities. SembCorp Management Procedure “Lifting Activities Management and Control – 1448” will also need to be considered in the control of lifting activities, although it is worth noting that this document is based on the LOLER Approved code of practice.

## **11.0 Excavating and Piling in proximity of the buried assets**

Where there are buried assets, there is a concern over any activity that breaks the ground surface. We envisage that there will be no piling or excavations work within the easement. Any proposed piling operations or excavations within 1.5m of the asset, will require the asset to be physically exposed by hand digging so its location can be confirmed. The assets initial location will be positioned by referring to the asset owner’s drawings and any other means on site e.g. markers posts. It may be necessary to install some form of physical separation between the asset and pile/ excavations during construction, such as a driven sheet pile between the pile and the buried asset. The means and need for separation will be agreed with the asset owner prior to the start of the construction activities.

The guidance notes referred to in section 6.0 suggest that the proximity of piling activities to pipelines of this nature does vary, but all state that piling can be carried out near to the pipeline, provided that an assessment of the vibration levels at the pipeline is carried out. It is the intention that bored of CFA (Continuous Flight Auger) piling will be used where necessary to minimise vibration. The guidance notes suggest that the peak particle velocity at the pipeline should be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50mm/sec, the ground vibration shall be monitored using a typical monitoring device such as the Vibrock V801 seismograph and tri-axial geophone sensor. Where ground conditions are of submerged granular deposits of silt/sand, an assessment of the effect of any vibration on settlement and liquefaction at the pipeline be carried out. A trial piling study will be carried out to measure the vibration from various types of piling in these ground conditions. Research into maximum allowable peak particle velocity values for various assets will be undertaken and agreed with the asset owners. This method of monitoring vibrations will also be adopted

should there be a need to use impact breakers to remove areas of hard standing over the piles or at pile caps locations. If the limits are exceeded other methods of removing hard material will then be used, such as high pressure water jetting or concrete coring using diamond drills or diamond sawing.

In terms of excavations for pile caps near buried assets, the guidance documentation referred to in section 6.0 suggests that when excavating within 3m or less of the pipeline asset, the asset owner/operator should have a representative present or available on site. This will be changed to 1.5m and the procedure followed as set out for piling i.e. the asset to be physically exposed by hand digging so its location can be confirmed. We would also recommend that design checks are performed prior to any excavating, to determine the zones of influence on the buried asset, as this may identify the need for additional protection (i.e. temporary propping). Any additional protection will be subject to the approval of asset owners/operator.

When working near ducts the main concern will be cable strikes when breaking ground. SembCorp's excavation permit system incorporates a cable search as part of the application process. SembCorp MP "Excavations – 1308" will need to be adhered to in order to control this.

In conjunction with the guidance notes, SembCorp procedure "Excavations – 1308" will need to be followed for all excavations. Excavations are defined as "any work involving breaking ground".

## 12.0 Roads

There are a number of roads (surfaced and unsurfaced) within the infrastructure corridor. The Principal Contractor will be required to interface with the owners and provide access for the asset owners during the construction works.

Any roads requiring temporary closure to enable construction of the overland conveyor will be planned well in advance and coordinated with the owner and asset owners. No 2 Tunnel at Bran Sands requires 24 hour unfettered access for emergency services; this requirement will be maintained throughout the construction of the overland conveyor.

A number of the roads in and around the infrastructure area are in poor condition and are not suited to large volumes of construction traffic which a project of this nature will require. The roads will be assessed by the Principal Contractor and if necessary will be upgraded in advance of the construction works. At the end of the construction works remediation works may be necessary. Development of the traffic management plan will address these issues.

SembCorp procedure "Management of Roads including Mobile Cranes and Abnormal Loads – 1309" will be adhered to, to ensure that crossing over culverts and road bridges are controlled appropriately.

## 13.0 Site Security

There are a number of existing fences and gates associated with providing security and control of access onto the Wilton Site, and especially the infrastructure corridor. Keeping the construction site secure will be the responsibility of the Principal Contractor during the works, and will need careful consideration. A security review will be undertaken prior to the construction works to help prevent unauthorised access and theft of equipment and materials from the construction area. The current security of the Wilton site is the responsibility of Falck, who have a wealth of experience in security in and around the Teesside

Industrial Complexes and their assistance may be sought with the security review. Advice will also be sought from NWL security with regards to matters associated with their site security issues.

## **14.0 Conclusion**

This technical note provides a formal response to NWL's concerns as raised in the DCO regarding the interface between the overland conveyor works. The information contained within this and other technical notes on constructability will be reflected in the design and provided to the Principal Contractor as part of the pre-construction information, with which they will be contractually obliged to comply. The Principal Contractor appointed for the overland conveyor and the harbour facility will be required to comply with, as a minimum SembCorp and NWL operating requirements and those in this technical note. This technical note is intended to form the basis of future discussion and be developed with NWL to address their concerns. NWL will be consulted throughout the life of the project.

## Technical Note

**HaskoningDHV UK Ltd.  
Maritime & Waterways**

To: James Barrie  
From: RHDHV  
Date: 20 August 2015  
Copy:  
Our reference: PB1586 - N022 - Rev 3  
Classification: Project related

**Subject: Constructability Issues in response to the DCO – TATA Steel UK Limited – Hot Metal Railway**

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*This Technical Note was updated to Rev 3 on the 20<sup>th</sup> August 2015 following a meeting with TATA and SSI. The meeting was held at Tata Steel, Steel House, Redcar on the 13<sup>th</sup> August 2015. In attendance were Clive Donaldson (TATA), Bill Black (SSI), Sean Gleeson (PX Group) and Bill Andrew (RHDHV). The purpose of the meeting was to discuss this Technical Note (Rev 2), to understand the issues raised in the Development Consent Order (DCO) in more detail and to continue dialogue with the asset owners as the project progresses. Minutes from the meeting are available, RHDHV reference PB1586 – M001 – Rev 1, dated 13<sup>th</sup> August 2015. Clarification and additional information from the meeting has been incorporated into this Technical Note.*

### 1.0 Introduction

The York Potash Harbour Facilities Project is currently at a stage whereby formal consultation has been undertaken with the Consultees including Landowners and Third Party Asset Owners as part of the Development Consent Order (DCO) application process. This process has raised a number of issues and concerns. These generally fall into two categories; firstly, there are points associated with legal matters such as concerns over Compulsory Acquisition, etc. Secondly there are concerns associated with constructability issues including the interface with existing assets and infrastructure throughout the construction period of the project and ongoing operational phase.

The purpose of this document is to address the constructability issues raised by TATA Steel UK Limited (TATA), a Consultee in the DCO process, regarding the overland conveyor. As such this document is one of a series of similar documents which each addresses the particular constructability issues raised. These issues will need to be addressed prior to and reviewed throughout the construction period of the project.

Below are the main constructability issues raised by TATA in relation to the Hot Metal Railway operated by TATA and considerations on how these issues could be addressed by the Principal Contractor, appointed for the construction of the overland conveyor and harbour facility. Issues raised by TATA in relation to other assets such as the access road used by TATA to transport oversized equipment are not considered in this document and will be considered separately elsewhere. This document is not exhaustive but will assist in future discussions and development with TATA. This information will be provided to the Principal Contractor as part of the pre-construction information which they will be contractually obliged to comply with.

## 2.0 Wording from the DCO

The relevant wording provided in the TATA response to the DCO in relation to constructability issues surrounding the Hot Metal Railway is as follows;

1) Access

*The proposed conveyor route crosses over road and rail infrastructure used by TATA Steel.*

2) Safety

*The conveyor system will cross over both the A1085 and the hot metal rail route at a maximum height of 25m at the top of the conveyor. The hot metal rail route transfers hot metal from the blast furnace to the steel plant via Torpedo Ladles Cars (Torpedoes). Efficient co-ordination of the Torpedo Ladles is of paramount importance to the steel making process.*

*The submitted Environmental Statement identifies a risk of damage to above ground infrastructure assets during the construction phase. Any damage to the hot rail route (which is utilised by both Tata Steel and Sahaviriya Steel Industries (SSI)) would severely disrupt production at Tata Steel's plant and any breakout of molten metal may result in a large explosion. Further, there is potential for a Torpedo to derail at any time, and at any point, along the hot metal rail route. If a derailment were to occur underneath the overhead conveyor, the extreme heat emitted from the Torpedo may pose a risk to the raised conveyor structure. It is considered that the proposals have not yet adequately addressed the operational and safety implications of crossing the hot rail route.'*

## 3.0 Understanding of the Issues

TATA are concerned that the flow of 'Torpedo' Ladle Cars, 'torpedoes' along the Hot Metal Railway should not be impeded by the construction, operation and maintenance of the overland conveyor. Molten iron is transferred from Redcar to Lackenby by the Hot Metal Railway in trains consisting of a locomotive and two torpedo wagons. Damage to the route or delays in its operation could affect production. TATA also raise safety concerns that are specific to the conveyance of hot metal in the torpedoes. In particular:

- there is a risk of breakouts of molten metal causing explosions
- there is a risk of the torpedoes derailing at any time
- were a torpedo to be derailed or breakout to occur under the conveyor the extreme heat from the torpedo or released molten metal might damage or critically weaken the conveyor support structure.

In addition, as identified during consultation with TATA on 25<sup>th</sup> November 2014, large crane access is required in the vicinity of the railway in case emergency access is required to reinstate rail vehicles in the event of a derailment. TATA/ SSI consider that the overland conveyor would hamper the recovery operation in the event of a derailment underneath it.

The overland conveyor will cross over the Hot Metal Railway at the intersection designated MC3 on the route plans (See drawing PB1586-SK-1042). An indicative cross section is shown on drawing PB1586-SK1053 and will provide at least 7.85m headroom above the railway trackbed. This is equal to the current limiting headroom above the railway which is understood to be 7.65m above rail level at an existing pipe crossing. The intersection is at a point where the Hot Metal Railway is itself on the northern span of a multi span underline bridge. Buried and passing beneath this span is the major Breagh gas pipeline operated by DEA (identified as the RWE gas pipeline on earlier drawings). The piled foundations for the trestle supports to the conveyor bridge will straddle the Breagh gas pipeline. An above ground pipeline corridor known as the 'Linklines' passes through the adjacent span to the south on the underline bridge.

As with other underline bridges on the Hot Metal Railway, train height metal screens have been provided for the full length of the parapets on each side of the bridge. It is not clear whether these are to reduce the risk of wind causing derailments or to contain the effects of any breakouts of molten metal.

Existing road access for plant to the areas around the intersection point is limited by the headroom at the Lord McGowan Bridge under the A1085 Trunk Road, an elevated pipeline and the Hot Metal Railway bridge itself. For construction of the overland conveyor a new temporary access route may therefore be created from the western spur off the A1085 'Steel House' roundabout some 200m to the northeast. On completion the temporary access route would be decommissioned but could be partially retained so that it could be readily re-instated should an incident occur on the Hot Metal Railway which required access by large plant into the area.

The available adjacent area for setting up plant and cranes is very limited and restricted to the north side of the above ground 'Linklines' pipeline corridor. The routing of heavy plant and the siting of crane outriggers will be further restricted by the presence of the buried Breagh gas pipeline.

Our comments on the above issues are provided in the following sections on:-

- Safe System of Work
- Compatibility with Railway Possessions
- Lifting activities near or over the Hot Metal Railway
- Excavating and Piling in proximity of the Hot Metal Railway
- Other Working activities on or near the Hot Metal Railway
- Inspection, repair, replacement and general maintenance of the Hot Metal Railway by TATA
- Recovery of Derailed Trains on the Hot Metal Railway by TATA
- Risks and Issues due to Hot Metal
- Lineside and Site Security

#### 4.0 Safe System of Work

The construction project will be notifiable and carried out in accordance with 'The Construction (Design and Management) Regulations 2015'.

The Principal Contractor is to conduct site inductions for all of his staff and sub-contractors. It is also his duty to appoint and engage contractors and workers and provide the right management and supervision whilst also monitoring the hazards on site.

For 95% of its route, the overland conveyor is in an existing infrastructure corridor, operated by SembCorp. All work within this corridor is controlled by SembCorp under their Safe System of Work (SSoW) as detailed in SembCorp Management Procedure "Safe Systems of Work and Risk Assessment – 1301". This is a permit to work based system. Historically, SembCorp have always insisted on the application of this process to **ALL** works within the infrastructure corridor regardless of whether it be a small maintenance task or a major capital project such as this. The SSoW is quite onerous, but given the high hazard nature of the assets in the area it is appropriate. The Principal Contractor appointed for the overland conveyor and the harbour facility will need to adhere to the SSoW and its requirements for works and operations within the infrastructure corridor, including access.

Identified below are the SembCorp Management Procedures which will be applied to the management of the construction activities under SembCorp's SSoW:

- Control of ignition sources and fire permits - 1303
- Lifting Activities Management and Control - 1448
- Construction operation maintenance and modification of link and vein lines - 1342
- Entry into Confined Spaces - 1304
- Lone and Isolated Workers - 1404
- Safe Systems of Work and Risk Assessment - 1301
- Management of Roads including Mobile Cranes and Abnormal Loads - 1309
- Control of Modifications - 1601
- Use of Work Control Permits - 1360
- Linkline Emergencies - 1215
- Management of Site Drainage and Effluent Systems – 1701
- Avoidance of Danger near Overhead Power Lines – 1452
- Excavations – 1308
- Review of Risk Assessments and Method Statements – 1320
- Control of Ionising Radiation for Industrial Radiography – 1424
- Prevention of River Pollution – 1217
- Prevention of Contamination of Soil and Groundwater – 1703
- Disposal of Waste Materials – 1702
- Environmental Control and Compliances with The Environmental Permitting (England and Wales) Regulations – 1746
- Management of Work Covered by the Construction regulations – 1426

There are more Procedures within SembCorp's full suite of Management Procedures, but those listed above are the ones which are most likely to be applicable to the York Potash Harbour Facilities Project.

TATA will be given the opportunity to review the design of the overland conveyor and, if required, have a watching brief on site when construction occurs adjacent to or over their asset.

The Principal Contractor must therefore be geared up for extensive liaison and coordination with asset owners and users and for construction in a potentially hazardous environment controlled by safe systems of work that incorporate permits to work.

Additional requirements arising from working alongside or above railways including both Network Rail main lines and the Hot Metal Railway will be incorporated into the Principal Contractors safe systems of work. These might include fenced exclusion zones where access for plant and personnel would be controlled by a permit system designed to mitigate the particular risks arising from operation of the Hot Metal Railway. Measures are discussed in more detail below. They would also include TATA and SSI's safe Systems of Work as appropriate.

## **5.0 Compatibility with Railway Possessions**

Working on or around railways is widely recognised as a hazard that requires careful management. In the UK where construction or maintenance work poses a risk to normal train services or visa versa then such work is generally undertaken in 'Possessions'. These are periods when normal trains do not run because the timetable has allowed time for such possessions (rules of the route possessions) or normal timetabled trains are suspended whilst the work is undertaken (abnormal possessions). In addition

certain types of work can be undertaken 'between trains' with the co-operation of signalling staff. Possessions can range from perhaps 60 minutes between trains to 4 to 8 hours for rules of the route possessions which are usually at night and often at weekends to perhaps 36 hour possessions for major engineering work in abnormal possessions. On Network Rail infrastructure the latter are seldom granted for outside parties work such as erection of the overland conveyor unless Network Rail need an abnormal possession themselves.

The concept for the overland conveyor lends itself to being erected in relatively short 'possessions'. Thus depending on the possession length available, one or more trestles would be erected on either side of the railway and secured and then the main span would be lifted on. The main span would already be clad when lifted in, allowing fit out of the conveyor to proceed safely from within the conveyor envelope. This is the approach that is envisaged where the overland conveyor crosses both the Network Rail and the Hot Metal Routes. The trestle foundations are located outside the railway boundary and can be constructed without possessions. It is envisaged that the supporting trestles and span over the hot metal railway would be erected in one 6 to 8 hour possession. The trestles supporting the main span will be designed to provide stability and restraint with or without adjacent spans being erected. The weight of the conveyor span when lifted in is expected to be up to 60 tonnes.

A similar approach has already been given 'Approval in Principle' by Network Rail for the section where the overland conveyor crosses the Darlington to Saltburn railway.

From an initial consultation with TATA on 25<sup>th</sup> November 2014 it is understood that only short term 'outages' of 6 to 12 hours duration, each year, may be available for railway 'possessions'. The timing of these outages for 2017 was not known so ongoing dialogue will be required in order to programme the available possessions into the construction work. Additional information on planned outages was obtained at the meeting on the 13<sup>th</sup> August 2015. There are usually two planned outages per year when the blast furnace stops production and torpedo trains do not need to run, 1) A spring outage of one day (24 hours) 2) A autumn outage of three days (72 hours). Notifications of the proposed spring outage are known approximately 2.5 months in advance, and confirmed 1.5 months in advance. More notice is usually provided for the 72 hour outage. Operational train movements are every 20minutes in each direction and are dictated by production. Train movements lag behind breaks in blast furnace production by about 6 hours.

Generic controls to ensure that lifting plant and lifted loads do not affect the rail infrastructure or pose a risk to the operational railway have also been well developed on Network Rail. These are discussed in more detail in Section 6.0. Other work on or adjacent to the railway is discussed in Sections 7.0 and 8.0.

## **6.0 Lifting activities near or over the Hot Metal Railway**

A major concern is the protection of the assets should a load be dropped, giving rise to the potential for damage to the Hot Metal Railway assets. A lifting study will be developed looking at the issues of protecting assets above the ground (i.e. crane platforms, double stropping, etc.) and determining the envisaged loads expected during the construction of the overland conveyor. The following methodology has been developed at this stage and will be considered when carrying out the lifting study.

All large lifts will be pre-planned in detail. The size of crane would be selected to allow additional spare capacity for all lifts. On Network Rail projects cranes are limited to 75% of capacity when lifting over or around railway tracks and any tandem lifts would have a 50% down-rating in capacity rather than the



normal 25% required in codes of practice. The same protocol would be followed for the Hot Metal Railway.

Cranes being erected or making lifts outside possessions would be sited and slew restricted so that no part of the crane or suspended load could fall onto the tracks or supporting structures.

Suitable foundations will be designed so that they are capable of supporting the crane outriggers or track loads, positioned outside of any known easement. Lifting gear would also have a greater than normal factor of safety and the use of double stropping would be followed. It is likely that the Principal Contractor will subcontract all major lifts and these will be carried out under the “CPA Contract Lifting Services Agreement” where the crane supplier supervises and takes responsibility for the lift.

Reusable temporary works, specially designed for the purpose, could be fabricated both to safely support the overland conveyor support legs and the overhead conveyor structure during erection. Hydraulically operated cross heads could be used to prevent any part of the conveyor from falling from height in the unlikely event of a lifting equipment failure.

As an absolute minimum, “Lifting Operations and Lifting Equipment Regulations 1998 (LOLER): Approved Code of Practice and Guidance” will need to be followed at all times regarding the extensive lifting activities which will be associated with the overhead conveyor construction activities. SembCorp Management Procedure “Lifting Activities Management and Control – 1448” will also need to be considered in the control of lifting activities as it is highly likely that cranes will need to be situated on SembCorp land, although it is worth noting that this document is based on the LOLER Approved code of practice.

## **7.0 Excavating and Piling in proximity of the Hot Metal Railway**

The following section describes how excavation and piling associated with the construction of the overland conveyor will be controlled and managed. It is included to demonstrate the care that will need to be taken with these activities in general due to the sensitivity and vulnerability of adjacent assets such as pilelines.

In the vicinity of the overland conveyor, the Hot Metal Railway is on an underline bridge or embankment. Due to the ground conditions it is anticipated that the existing bridge structure including wing walls will have piled foundations. These will not be sensitive to the low vibration techniques proposed for pile installation and relatively shallow excavations for the pile caps and foundations. Similarly the embankment will not be affected. The foundations for the conveyor bridge will be sited some 5m from the bridge span, the closest TATA asset will be the bridge wing walls. However due to the risk and consequence of a derailment on the Hot Metal Railway, the bridge structure and level and alignment of the track at the conveyor bridge site will be surveyed before during and after the execution of the adjacent conveyor works. Suitable call off arrangements will also be made for corrective maintenance of the track alignment should this be required.

Where there are buried assets, there is a concern over any activity that breaks the ground surface. It is envisaged that there will be no piling or excavations work within the railway boundary.

In general any proposed piling operations or excavations within 1.5m of an asset, will require the asset to be physically exposed by hand digging so its location can be confirmed. The assets initial location will be positioned by referring to the asset owner’s drawings and any other means on site e.g. markers posts. It

may be necessary to install some form of physical separation between the asset and pile/ excavations during construction, such as a driven sheet pile between the pile and the buried asset. The means and need for separation will be agreed with the asset owner prior to the start of the construction activities.

It is the intention that bored or CFA piling will be used to minimise vibration around pipelines. The guidance notes suggest that the peak particle velocity at the pipeline should be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50mm/sec, the ground vibration shall be monitored using a typical monitoring device such as the Vibrock V801 seismograph and tri-axial geophone sensor. Where ground conditions are of submerged granular deposits of silt/sand, an assessment of the effect of any vibration on settlement and liquefaction at the pipeline be carried out. A trial piling study will be carried out to measure the vibration from various types of piling in these ground conditions. Research into maximum allowable peak particle velocity values for various assets will be undertaken and agreed with the asset owners. This method of monitoring vibrations will also be adopted should there be a need to use impact breakers to remove areas of hard standing over the piles or at pile caps locations. If the limits are exceeded other methods of removing hard material will then be used, such as high pressure water jetting or concrete coring using diamond drills or diamond sawing.

With reference to the Safe Systems of work SembCorp procedure “Excavations – 1308” will need to be followed for all excavations as excavations associated with the conveyor crossing of the Hot Metal Railway are likely to be on SembCorp land. Excavations are defined as “any work involving breaking ground”.

## **8.0 Other Working activities on or near the Hot Metal Railway**

Again as the Hot Metal Railway is on an underline bridge or embankment where it passes through the conveyor construction site it will be naturally demarcated and protected from uncontrolled access and the majority of construction activities.

It is anticipated that construction plant or personnel will only need to access the railway trackbed for survey monitoring and inspection activities and possibly installing protective measures. Such access will need permission from and coordination with TATA/ SSI and be identified in the Safe System of Work procedures for the project. TATA/ SSI's procedures for accessing the trackbed would be followed. The Hot Metal Railway is not currently fenced off within the SSI /TATA estate, an exclusion zone for personnel and equipment of 3m from the nearest rail is enforced in line with Network Rail practice. Access within this 3m zone and onto the track can be arranged through SSI, along with a trackside safety induction course which is currently being developed by SSI.

Network Rail guidance will be followed for the control of plant and activities with the potential to damage or obstruct the railway. For instance plant will be slew restricted and jibbed plant such as piling rigs sited and restrained or limited in height so that no part can fall to within 3.0m of the nearest rail.

The use of cranes is discussed separately.

Goal Posts or similar will be erected on either side of the bridge span to protect it from over height construction traffic.

## 9.0 Inspection, repair, replacement and general maintenance of the Hot Metal Railway by TATA

As the Hot Metal Railway is elevated on an underline bridge and embankment it is largely self contained and segregated from the overland conveyor. However some aspects of the inspection, maintenance and repair of the Hot Metal Railway will require co-ordination or be affected by the overland conveyor either during its construction or subsequently during its operating life.

During construction of the overland conveyor the Hot Metal Railway trackbed will be 'outside' the construction site so TATA's activities will be able to continue without hindrance. The Safe System of Work will be designed to ensure that conveyor construction activities do not pose a hazard to activities on the trackbed. Coordination will however be required during 'possessions' when it is planned to lift in the conveyor structure at the railway. This may restrict the activities that TATA could otherwise carry out in the vicinity of the conveyor and constrain the passage of works (maintenance) trains. External access to the bridge and embankment and through the bridge span would also be through or within the conveyor construction site and therefore under the control of the Principal Contractor. This would require planning and coordination and may be constrained by construction activities. TATA's personnel would require induction and or supervision by the Principal Contractor when accessing areas within the construction site.

Once the overland conveyor is installed and in operation, due to the proposed headroom of the overland conveyor of circa 7.65m above the Hot Metal Railway and generous side clearances, conventional railway inspection, repair, replacement and general maintenance activities by or on behalf of TATA will generally be unaffected. The conveyor will however introduce a short constraint to the otherwise 'free' use of rail mounted cranes and jibbed plant if used for tasks such track renewals. However working around such a constraint is no different to working around say a short road overbridge and therefore commonly managed.

The conveyor will however constrain methods for major works to and replacement of the underline bridge span in several ways:

- The conveyor bridge span will hamper the use of cranes to lift out or in sections of bridge deck.
- The conveyor trestles will partially obstruct access under the span and could preclude the use or Heavilift bogies to roll out and roll in bridge deck sections.

## 10.0 Recovery of Derailed Trains on the Hot Metal Railway by TATA

Last year (2014) TATA/ SSI had 12 derailments, 5 of which were with laden torpedo wagons. The number of derailments had reduced significantly from previous years following the fitment of lubricators on the curved section of track. The cause of the derailments was typically during loading and unloading operations and on the curved section of the railway. The torpedo wagons have a low centre of gravity, so the derailments of torpedo wagons to date have always remained 'upright'.

Due to the weight of the torpedo wagons, derailment and recovery can cause extensive damage to track. If derailment occurs over a switch/ points the switch/ points will need to be replaced. Running rails are sometimes unclipped and shifted across to assist with the re-railing. The priority following a derailment of a laden torpedo wagon is to get the torpedo wagon to a point where the molten metal can be discharged, before it cools and solidifies in the torpedo. There is a window of up to 48 hours before the metal

becomes semi solid. The torpedo may require 'charging' with coke to generate heat or other measures to slow the rate of cooling.

Each derailment is different but TATA/ SSI current procedure for dealing with them is as follows:-

1. Jack back onto rails.
2. Pull back onto rails.
3. Lift back onto rails using cranes.

However, TATA/ SSI consider that jacking is not possible on the underbridge structure (i.e. on the TATA/ SSI railway bridge that the overland conveyor crosses) or where the track is badly disrupted. The combination of the deck construction, orientation of the derailment and adjacent obstructions such as the linklines to the south may preclude pulling the wagon back onto the rails. It was therefore considered by TATA/ SSI at the meeting on the 13<sup>th</sup> August 2015, that the only option would be craneage. Two cranes may be required to lift the loaded torpedo wagon due to the weight and current restriction within the infrastructure corridor. The torpedo wagons weigh up to 750 tonnes each when laden and have a 46 Tonne axle loads. This is significantly more than the 25 Tonne maximum axle loads permitted axle on Network Rail infrastructure. The loss of a laden torpedo wagon is considered to be in the order of £8.0M. TATA had been developing plans for recovering of a derailment along each section of the railway prior to selling the blast furnace operations to SSI in 2011. It was agreed that SSI would provide proposals from this work (if available) and details for the bridge as an action from the meeting on the 13<sup>th</sup> August 2015.

The overland conveyor crosses the Hot Metal Railway where the latter is on a straight alignment and is plain track without switches and crossing and hence the risk of derailment is reduced. Track condition and any uncorrected track 'twist' associated with differential settlement at the transition between the bridge and embankment would therefore be the most likely triggers for a derailment in the vicinity of the conveyor. The track is maintained within Network Rail's standard for comparable low speed lines and sidings. There is no signalling so trains operate using 'line of sight' at low speed (circa 10mph) with radio communication. The need for track and structure condition monitoring during construction of the overhead conveyor is discussed under section 7.0

Access for plant to the land adjacent to the Hot Metal Railway at the overland conveyor crossing point is already highly constrained by over ground and buried pipelines. However, the alignment of the conveyor over the Breagh gas pipeline and its clearance height of circa 12m above general ground level means that in practice the conveyor will not sterilise access or siting positions for recovery plant and equipment such as cranes to any significant extent on the east side of the railway. Whilst the trestles supports to the conveyor might impede access for large plant and equipment under the bridge span to the west side of the railway the combination of the bridge wing walls, Breagh gas pipeline and overland pipelines already preclude the siting of large plant on this side of the railway.

The overland conveyor may however restrict the otherwise free movement of crane jibs in the area and lifts centred directly under the conveyor.

## 11.0 Risks and Issues due to Hot Metal

In their response to the DCO TATA raised specific risks and issues associated with Hot Metal as a material. These were:

- The risk of breakouts from the torpedo wagons which may result in explosions.

- The quantity of heat released from the torpedo wagons and its potential effect on the conveyor structure particularly if stationary underneath the conveyor for a period.

Breakouts occur when the ceramic lining of the torpedo wagons is worn or eaten away allowing the molten steel to melt its way through the outside wall of the wagon. This usually occurs at the top level of the molten iron. In consequence the quantity of molten iron escaping is typically no more than a tonne. There have been 3 known breakouts since SSI started operations in 2011. Derailment of the torpedo wagons has not resulted in the breakout or escape of molten metal.

Explosions are caused if the escaping metal comes into contact with confined moisture. This generates superheated steam which causes explosions throwing up molten metal and debris potentially 300m into the air if it cannot escape quickly. In practice explosions would result if molten metal landed on moist clay or silty (cohesive) soils but not on damp free draining granular material as this would allow the steam to escape.

The effect of heat released will be considered during detailed design of the conveyor structure but the design will include insulation to the soffit and sides of the conveyor support structure and intumescent paint may also be used.

The underbridges are lined with ceramic tiles across the deck and to a height of 250mm up the sides in order to contain any spillages of molten metal and direct it off the bridge. The bridges also have solid metal screens extending the parapet height in order to contain splatter from any breakouts and mitigate the risk to assets and personnel underneath the bridge. The sections of track over bridges are defined as 'Red Zones'. Operating instructions require that if a breakout develops, trains continue and do not stop until they are clear of the Red Zone.

## **12.0 Lineside and Site Security**

There are a number of existing fences and gates associated with providing security and control of access onto the Wilton Site, and especially the infrastructure corridor. Keeping the construction site secure will be the responsibility of the Principal Contractor during the works, and will need careful consideration. A security review will be undertaken prior to the construction works to help prevent unauthorised access and theft of equipment and materials from the construction area. The current security of the Wilton site is the responsibility of Falck, who have a wealth of experience in security in and around the Teesside Industrial Complexes and their assistance may be sought in assisting with the security review. Consultation and liaison will of course be required with the TATA and SSI security staff as part of this review and on an ongoing basis during construction.

## **13.0 Conclusion**

This Technical Note provides a formal response to TATA's concerns as raised in the DCO regarding the interface between the overland conveyor works and the Hot Metal Railway and includes information obtained from the meeting with TATA/ SSI on the 13<sup>th</sup> August 2015. The information contained within this and other Technical Notes on constructability will be reflected in the design and provided to the Principal Contractor as part of the pre-construction information, with which they will be contractually obliged to comply. The Principal Contractor appointed for the overland conveyor and the harbour facility will be required to comply with, as a minimum, SembCorp's operating requirements and those in this technical note. This technical note will form the basis of future discussion and development with TATA to address their concerns. TATA will be consulted throughout the life of the project.

## Technical Note

**HaskoningDHV UK Ltd.  
Maritime & Waterways**

To: James Barrie  
From: RHDHV  
Date: 20 August 2015  
Copy:  
Our reference: PB1586 - N023- Rev 3  
Classification: Project related

**Subject: Constructability Issues in response to the DCO – TATA Steel UK Limited – SSI Access Road (SSI Road)**

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*This Technical Note was updated to Rev 3 on the 20<sup>th</sup> August 2015 following a meeting with TATA and SSI. The meeting was held at Tata Steel, Steel House, Redcar on the 13<sup>th</sup> August 2015. In attendance were Clive Donaldson (TATA), Bill Black (SSI), Sean Gleeson (PX Group) and Bill Andrew (RHDHV). The purpose of the meeting was to discuss this Technical Note (Rev 2), to understand the issues raised in the Development Consent Order (DCO) in more detail and to continue dialogue with the asset owners as the project progresses. Minutes from the meeting are available, RHDHV reference PB1586 – M001 – Rev 1, dated 13<sup>th</sup> August 2015. Clarification and additional information from the meeting has been incorporated into this Technical Note.*

### 1.0 Introduction

The York Potash Harbour Facilities Project is currently at a stage whereby formal consultation has been undertaken with the Consultees including Landowners and Third Party Asset Owners as part of the DCO application process. This process has raised a number of issues and concerns. These generally fall into two categories; firstly, there are points associated with legal matters such as concerns over Compulsory Acquisition, etc. Secondly there are concerns associated with constructability issues including the interface with existing assets and infrastructure throughout the construction period of the project and ongoing operational phase.

The purpose of this document is to address the constructability and ongoing operational issues raised by TATA Steel UK Limited (TATA), a Consultee in the DCO process, regarding the overland conveyor. As such this document is one of a series of similar documents which each addresses the particular constructability issues raised. These issues will need to be addressed prior to and reviewed throughout the construction period of the project.

Below are the constructability issues raised by TATA in relation to the TATA / SSI Access Road (SSI road) used to transport oversized equipment and considerations on how these issues could be addressed by the Principal Contractor, appointed for the construction of the overland conveyor and also in future operation. For consistency with the DCO submission, the TATA / SSI Access Road will be referred to as the 'SSI road' throughout this document.

Issues raised by TATA in relation to other assets such as the Hot Metal Railway are not considered in this document and will be considered separately elsewhere.

This document is not exhaustive but will assist in future discussions and development with TATA. This information will be provided to the Principal Contractor as part of the pre-construction information which they will be contractually obliged to comply with.

## 2.0 Wording from the DCO

The relevant wording provided in the TATA response to the DCO with regards to constructability issues is as follows;

### 1) Access

*The proposed conveyor route crosses over road and rail infrastructure used by TATA Steel. TATA Steel has a requirement to transport oversized equipment (e.g. cranes) via an access road from the Redcar Site Entrance Roundabout to the Universal Beam Mill. No alternative access points are capable of accommodating the vehicles transporting this equipment. It is imperative that the overhead conveyor does not impede the use of this route by oversized vehicles. It is considered that the proposals have not adequately addressed this matter.”*

## 3.0 Understanding of the Issues

TATA are concerned that the transport of oversized equipment along the access road known as the ‘SSI road’, ‘Blue Main Route’ or ‘Blue Heavy Hall Route’. The access road will be referred to as the SSI road throughout this document. The SSI road should not be impeded by the construction, operation and maintenance of the overland conveyor.

The SSI road links the Lackenby site operated by TATA where steel products are made from molten steel, with the Redcar site operated by Sahaviviriya Steel Industries (SSI) where the steel is made. In doing so it also provides a private route from TATA’s Lackenby site to the waterfrontage at the Redcar Bulk Terminal which is jointly operated by TATA and SSI. It not only provides a private road link between the Lackenby and Redcar sites but also a potential route unrestricted in height from PD Ports, through the Lackenby site, across the Hot Metal Railway via a mothballed level crossing to the Steel House roundabout on the A1085 and thence to the Wilton site, which was formerly owned by ICI. The molten steel is however conveyed from the Redcar site to the Lackenby site by the Hot Metal Railway which is the subject of a separate Technical Note (N022).

Besides the transport of oversized equipment along the SSI road, it is primarily used as a heavy haul route to convey:-

- Coal from the Bulk Terminal to the coking plant
- Coke from the Coking plant to the Redcar Blast Furnace
- And occasional slag products by Hanson/ Tarmac

The coking operations run 24 hours a day, 7 days a week with between 4 and 30 trucks on turnaround. The trucks are quarry type dump trucks and special articulated lorries which are too big and or unlicensed to run on public roads. The vehicles also need to pass the weighbridge on the Redcar site which is accessed via the SSI road.

For much of its length there is also a single railway track at the same level and immediately on the western side of the SSI road. This shares embankments and underbridge structures with the SSI road. This track provides a private rail link between sidings on the Lackenby site and sidings in the Redcar Ore

Terminal avoiding the use of Network Rail controlled tacks. At its southern end this railway track forms the northern headshunt to the Lackenby 'Grid' Sidings.

The overland conveyor will cross over the SSI road at the intersection designated MC6 on the route plans (See drawing PB1586-SK-1043). The intersection is at a point where the SSI road is on an embankment approximately 6.0 metres high and approximately 35m north of the northern abutment of a multispan bridge over a series of access roads and surface pipelines. On the west side a short way a way is a separate parallel but lower embankment belonging to Network Rail which carries the tracks of their Darlington to Saltburn railway.

An indicative cross section is shown on drawing PB1586-SK1056. Whilst the overland conveyor will provide at least 8.24m headroom there is currently no limiting headroom above the SSI road. This compares to a minimum required headroom on UK Trunk Roads of 5.7m for new structures such as the conveyor on normal routes or 6.45m on high load routes (DMRB TD27/05 Table 6.1).

Comments on the above issues are provided in the following sections on:-

- Safe System of Work
- Available Headroom
- Compatibility with Railway Possessions
- Lifting activities
- Inspection, repair, replacement and general maintenance by TATA
- Site Security

#### 4.0 Safe System of Work

The construction project will be notifiable and carried out in accordance with 'The Construction (Design and Management) Regulations 2015'.

The Principal Contractor is to conduct site inductions for all of his staff and sub-contractors. It is also his duty to appoint and engage contractors and workers and provide the right management and supervision whilst also monitoring the hazards on site.

For 95% of its route, the overland conveyor is in an existing infrastructure corridor, operated by SembCorp. All work within this corridor is controlled by SembCorp under their Safe System of Work (SSoW) as detailed in SembCorp Management Procedure "Safe Systems of Work and Risk Assessment – 1301". This is a permit to work based system. Historically, SembCorp have always insisted on the application of this process to **ALL** works within the infrastructure corridor regardless of whether it be a small maintenance task or a major capital project such as this. The SSoW is quite onerous, but given the high hazard nature of the assets in the area it is appropriate. The Principal Contractor appointed for the overland conveyor and the harbour facility will need to adhere to the SSoW and its requirements for works and operations within the infrastructure corridor, including access.

Identified below are the SembCorp Management Procedures which will be applied to the management of the construction activities under SembCorp's SSoW:

- Control of ignition sources and fire permits - 1303
- Lifting Activities Management and Control - 1448
- Construction operation maintenance and modification of link and vein lines - 1342



- Entry into Confined Spaces - 1304
- Lone and Isolated Workers - 1404
- Safe Systems of Work and Risk Assessment - 1301
- Management of Roads including Mobile Cranes and Abnormal Loads - 1309
- Control of Modifications - 1601
- Use of Work Control Permits - 1360
- Linkline Emergencies - 1215
- Management of Site Drainage and Effluent Systems – 1701
- Avoidance of Danger near Overhead Power Lines – 1452
- Excavations – 1308
- Review of Risk Assessments and Method Statements – 1320
- Control of Ionising Radiation for Industrial Radiography – 1424
- Prevention of River Pollution – 1217
- Prevention of Contamination of Soil and Groundwater – 1703
- Disposal of Waste Materials – 1702
- Environmental Control and Compliances with The Environmental Permitting (England and Wales) Regulations – 1746
- Management of Work Covered by the Construction regulations – 1426

There are more Procedures within SembCorp's full suite of Management Procedures, but those listed above are the ones which are most likely to be applicable to the York Potash Harbour Facilities Project. For work on TATA / SSI owned and operated areas, the respective TATA / SSI Safe System of Work will be applied and adhered to.

TATA will be given the opportunity to review the design of the overland conveyor and, if required, have a watching brief on site when construction occurs adjacent to or over their asset.

The Principal Contractor must therefore be geared up for extensive liaison and coordination with asset owners and users and for construction in a potentially hazardous environment controlled by safe systems of work that incorporate permits to work.

Additional requirements arising from working alongside or above other infrastructure including Network Rail main lines, the Hot Metal Railway and the SSI road will be incorporated into the Principal Contractors safe systems of work. These might include fenced exclusion zones where access for plant and personnel would be controlled by a permit system designed to mitigate the particular risks arising from the infrastructure.

## **5.0 Available Headroom**

Whilst a headroom of 8.24m would be significantly more than the 5.7m minimum normally provided for similar new structures on national trunk roads it is recognised that it will be a restriction when compared to the current unrestricted height situation. It has been at least 5 years since the last high load passed along this route. However, in the recent weeks the possibility of a 6.74m high load from PD Ports to Wilton is being discussed. Such abnormal load movements are arranged on an ad-hoc basis and can be accommodated between trains using the Hot Metal Railway.

The maximum height of the conveyor and its enclosure is constrained by the required electrical clearance when passing under nearby National Grid power lines. The current enclosure proposed for the conveyor has an elliptical cross section and a depth from top to soffit of 6.0m. A rectangular cross

section would allow the depth of the enclosure to be reduced. This would allow the headroom above the SSI road to be increased to 9.4m.

Consideration will therefore be given to increasing the headroom available if possible.

## **6.0 Compatibility with Railway Possessions**

As noted there is a railway track which runs parallel to the SSI road under the overland conveyor. The railway track connects the Lackenby Site with those at the Redcar Bulk Terminal, both of which have an independent connection to Network Rail. This railway track is not in regular use (3-4 train movements a year), but is retained as an alternative in the event of a blockage of the connection to Network Rail. There is no signalling on this line other than at the level crossings.

The section of track under the conveyor is not normally needed as a headshunt for the Lackenby Grid sidings as shunting is usually undertaken from the other end of the sidings and there is sufficient length for a locomotive headshunt before the conveyor. Therefore, during the construction phase of the overland conveyor, the track could be readily 'closed' for a period (possibly for a few days), by prior arrangement with TATA/ SSI for the conveyor span to be lifted into position. Therefore, minimising the need for a railway possession. However, the appropriate control and management permits will still be needed, to work on and around the track including lifting in the conveyor structure.

The system of railway possessions and provisions for working on or alongside railways with plant such as cranes is discussed in more detail in Note N022 on the Hot Metal Railway. Similar measure will be employed for the track alongside the SSI road where appropriate.

If the railway line cannot be 'closed' for a period of a couple of days, the concept for the overland conveyor still lends itself to being erected in relatively short 'possessions'. Thus, depending on the possession time available one or more trestles would be erected on either side of a railway and secured and then the main span would be lifted on. The main span would already be clad when lifted in allowing fit out of the conveyor to proceed safely from within the conveyor envelope. This is the approach that is envisaged where the overland conveyor crosses both the Network Rail and the Hot Metal Routes.

Such a methodology can also be followed for the SSI road in order to limit inconvenience to TATA and their operations.

At the SSI road crossing the trestle foundations for the conveyor are located beyond the foot of the SSI road embankment and can be constructed without possessions or road closure. The trestles supporting the main span over the SSI road will be designed to provide stability and restraint with or without adjacent spans being erected. The weight of the conveyor span when lifted in is expected to be up to 60 tonnes.

## **7.0 Lifting activities**

A major concern is the protection of the assets should a load be dropped, giving rise to the potential for damage to assets. The SSI road can be expected to be relatively robust compared to other assets. Nevertheless a lifting study will be developed looking at the issues of protecting assets above the ground at shallow depth or of particular sensitivity (i.e. crane platforms, double stropping, etc.) and determining the envisaged loads expected during the construction of the overland conveyor. The following methodology has been developed at this stage and will be considered when carrying out the lifting study.

All large lifts will be pre-planned in detail. The size of crane would be selected to allow additional spare capacity for all lifts. On Network Rail projects cranes are limited to 75% of capacity when lifting over or around railway tracks and any tandem lifts would have a 50% down-rating in capacity rather than the normal 25% required in codes of practice. The same protocol could be followed for the SSI road.

A temporary closure of the SSI road to vehicles will be required during the installation of the conveyor over the road. This would have an impact on the vehicles currently using the haul road to transport coal, coke and slag products between the sites. SSI and TATA have requested that prior to the temporary closure, sufficient notice be given and the timing of the lift agreed so that stockpile of coke and coal can be built up in advance. Road legal vehicles could be diverted via the public highway.

Cranes being erected or making lifts outside possessions would be sited and slew restricted so that no part of the crane or suspended load could fall onto the tracks or supporting structures.

Suitable foundations will be designed so that they are capable of supporting the crane outriggers or track loads, positioned outside of any known easement. Lifting gear would also have a greater than normal factor of safety and the use of double stropping would be followed. It is likely that the Principal Contractor will subcontract all major lifts and these will be carried out under the “CPA Contract Lifting Services Agreement” where the crane supplier supervises and takes responsibility for the lift.

Reusable temporary works, specially designed for the purpose, could be fabricated both to safely support the overland conveyor support legs and the overhead conveyor structure during erection. Hydraulically operated cross heads could be used to prevent any part of the conveyor from falling from height in the unlikely event of a lifting equipment failure.

As an absolute minimum, “Lifting Operations and Lifting Equipment Regulations 1998 (LOLER): Approved Code of Practice and Guidance” will need to be followed at all times regarding the extensive lifting activities which will be associated with the overhead conveyor construction activities. SembCorp Management Procedure “Lifting Activities Management and Control – 1448” will also need to be considered in the control of lifting activities, although it is worth noting that this document is based on the LOLER Approved code of practice.

## **8.0 Inspection, repair, replacement and general maintenance of the SSI Road by TATA**

Few aspects of the inspection maintenance and repair of the SSI road will require co-ordination or be affected by the overland conveyor either during its construction or subsequently during its operating life. Some restrictions will occur as follows but these will be mitigated by the planning and coordination work York Potash and its agents or contractors will undertake.

During construction of the overland conveyor the SSI road will be ‘outside’ the normal construction site so TATA’s activities will be able to continue without hindrance. The Safe System of Work will be designed to ensure that conveyor construction activities do not pose a hazard to TATA’s continued use of the SSI road. Coordination will however be required around periods when it is planned to lift in the conveyor structure adjacent to the SSI road. This will require a short term full closure of the SSI road and ‘possession’ of the adjacent rail track for a few hours. Temporary lane closures may also be required at other times as adjacent parts are erected and larger or pre-assembled parts are transported.

During operation of the conveyor, lane closures may be required as a precaution when carrying out external inspection and maintenance work on the conveyor span. These will be by planned and by prior arrangement.

Once the overland conveyor is installed and in operation, due to the proposed headroom of the overland conveyor of 8.24m or more above the SSI road and rail track and the generous side clearances, conventional road and railway inspection, repair, replacement and general maintenance activities by or on behalf of TATA will generally be unaffected. The conveyor will however introduce a short constraint to the otherwise 'free' use of cranes and jibbed plant if used for tasks such track renewals. However working around such a constraint is no different to working around say a short road overbridge and is therefore commonly managed.

## **9.0 Lineside and Site Security**

There are a number of existing fences and gates associated with providing security and control of access onto the Wilton Site, and especially the infrastructure corridor. Keeping the construction site secure will be the responsibility of the Principal Contractor during the works, and will need careful consideration. A security review will be undertaken prior to the construction works to help prevent unauthorised access and theft of equipment and materials from the construction area. The current security of the Wilton site is the responsibility of Falck, who have a wealth of experience in security in and around the Teesside Industrial Complexes and their assistance may be sought in assisting with the security review. Advice will also be sought from TATA / SSI security with regards to matters associated with their site security issues.

As part of this review the suitability of current lineside fencing and the provision of fenced or demarcated exclusion zones within the construction site will be considered. The review and measures implemented will take cognisance of the needs of TATA and others for access.

## **10.0 Conclusion**

This Technical Note provides a formal response to TATA's concerns as raised in the DCO regarding the interface between the overland conveyor works and the SSI road and includes information obtained from the meeting with TATA/ SSI on the 13<sup>th</sup> August 2015. The information contained within this and other Technical Notes on constructability will be reflected in the design and provided to the Principal Contractor as part of the pre-construction information, with which they will be contractually obliged to comply. The Principal Contractor appointed for the overland conveyor and the harbour facility will be required to comply with, as a minimum, SembCorp and TATA/ SSI operating requirements and those in this technical note. This technical note will form the basis of future discussion and development with TATA to address their concerns. TATA will be consulted throughout the life of the project.

## Technical Note

**HaskoningDHV UK Ltd.  
Maritime & Waterways**

To: James Barrie  
From: RHDHV  
Date: 24 August 2015  
Copy:  
Our reference: PB1586 - N024 - Rev 1  
Classification: Project related

**Subject: Constructability Issues in response to the DCO – NWL – Access Road Bridge**

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### 1.0 Introduction

The York Potash Harbour Facilities Project is currently at a stage whereby formal consultation has been undertaken with the Consultees including Landowners and Third Party Asset Owners as part of the Development Consent Order (DCO) application process. This process has raised a number of issues and concerns. These generally fall into two categories; firstly, there are points associated with legal matters such as concerns over Compulsory Acquisition, etc. Secondly there are concerns associated with constructability issues including the interface with existing assets and infrastructure throughout the construction period of the project and ongoing operational phase.

The purpose of this document is to address the constructability and ongoing operational issues raised by NWL (Northumbrian Water Limited), a Consultee in the DCO process, regarding the overland conveyor. As such this document is one of a series of similar documents which each addresses the particular constructability issues raised. These issues will need to be addressed prior to and reviewed throughout the construction period of the project.

Below summarises our understanding of the main constructability issues raised by NWL in relation to the Access Road Bridge and consideration as to how they could be addressed by the Principal Contractor, appointed for the construction of the overland conveyor and the harbour facility. Issues raised by NWL in relation to other assets such as the pipelines are not considered in this document and will be considered separately elsewhere. This document is not exhaustive but will assist in future discussions and development with NWL. This information will be provided to the Principal Contractor as part of the pre-construction information which they will be contractually obliged to comply with.

### 2.0 Wording from the DCO

The relevant wording provided in the NWL response to the DCO regarding constructability issues is as follows;

*'We seek certainty that all of our assets remain accessible and protected at all times specifically the jetty, pumping station and the pipe work that runs through Dabholm Gut SSSI to the Bran Sands facility.*

*The proposal for the southern conveyor could affect our access road bridge especially if it passes over the bridge. We will require full clearance for traffic in this location. The southern route could also affect our outfall pipework where access will need to be retained for maintenance etc. The route proposed would be parallel to effluent pipelines coming to Bran Sands via the tunnel No 2 under the River Tees and services to our jetty. Access for our jetty will be required for maintenance and inspection.*

*It should be noted that the Northern route as it turns north around Bran Sands may impact existing pipelines coming into the site'*

### 3.0 Understanding of the Issues

NWL are concerned that the construction of the overland conveyor for the southern route could affect their Access Road Bridge, restricting the headroom. The Access Road Bridge provides NWL with access to and from Bran Sands Effluent Treatment Works and Municipal Sewerage Treatment Plant. NWL's site should not be impeded by the construction, operation and maintenance of the overland conveyor. The road bridge provides access to and from the roundabouts at Tees Dock Road (A1053) and Kinkerdale Road.

The overland conveyor will cross over NWL's Access Road Bridge at the intersection designated MC8 on the route plans (see drawing PB1586-SK-1078). An indicative cross section is shown on drawing PB1586-SK1058 and will provide at least 7.3m headroom above the existing road bridge. This compares to a minimum required headroom on UK Trunk Roads of 5.7m for new structures such as the conveyor on normal routes or 6.45m on high load routes (DMRB TD27/05 Table 6.1).

Buried and passing beneath this intersection is the major Breagh gas pipeline operated by DEA (identified as the RWE gas pipeline on earlier drawings). The piled foundations for the trestle supports to the conveyor bridge begin to straddle the Breagh gas pipeline from this point onwards to the jetty. An above ground pipeline corridor known as the 'Linklines' passes through the span to the south of the road bridge.

Our comments on the above issues are provided in the following sections on:-

- Safe System of Work
- Road Closure
- Lifting activities near or over the Access Road Bridge
- Excavating and Piling in the proximity of the Access Road Bridge
- Other Working activities on or near the Access Road Bridge
- Inspection, repair, replacement and general maintenance of the Access Road Bridge
- Site Security

### 4.0 Safe System of Work

The construction project will be notifiable and carried out in accordance with 'The Construction (Design and Management) Regulations 2015'.

The Principal Contractor is to conduct site inductions for all of his staff and sub-contractors. It is also his duty to appoint and engage contractors and workers and provide the right management and supervision whilst also monitoring the hazards on site.

For 95% of its route, the overland conveyor is in an existing infrastructure corridor, operated by SembCorp. All work within this corridor is controlled by SembCorp under their Safe System of Work (SSoW) as detailed in SembCorp Management Procedure "Safe Systems of Work and Risk Assessment – 1301". This is a permit to work based system. Historically, SembCorp have always insisted on the application of this process to **ALL** works within the infrastructure corridor regardless of whether it be a

small maintenance task or a major capital project such as this. The SSoW is quite onerous, but given the highly hazardous nature of the assets in the area it is appropriate. The Principal Contractor appointed for the overland conveyor and the harbour facility will need to adhere to the SSoW and its requirements for works and operations within the infrastructure corridor, including access.

Identified below are the SembCorp Management Procedures which will be applied to the management of the construction activities under SembCorp's SSoW:

- Control of ignition sources and fire permits - 1303
- Lifting Activities Management and Control - 1448
- Construction operation maintenance and modification of link and vein lines - 1342
- Entry into Confined Spaces - 1304
- Lone and Isolated Workers - 1404
- Safe Systems of Work and Risk Assessment - 1301
- Management of Roads including Mobile Cranes and Abnormal Loads - 1309
- Control of Modifications - 1601
- Use of Work Control Permits - 1360
- Linkline Emergencies - 1215
- Management of Site Drainage and Effluent Systems – 1701
- Avoidance of Danger near Overhead Power Lines – 1452
- Excavations – 1308
- Review of Risk Assessments and Method Statements – 1320
- Control of Ionising Radiation for Industrial Radiography – 1424
- Prevention of River Pollution – 1217
- Prevention of Contamination of Soil and Groundwater – 1703
- Disposal of Waste Materials – 1702
- Environmental Control and Compliances with The Environmental Permitting (England and Wales) Regulations – 1746
- Management of Work Covered by the Construction regulations – 1426

There are more Procedures within SembCorp's full suite of Management Procedures, but those listed above are the ones which are most likely to be applicable to the York Potash Harbour Facilities Project. For work within NWL operational area which is controlled by NWL, the respective NWL Safe System of Work will be applied and adhered to.

NWL will be given the opportunity to review the design of the overland conveyor and, if required, have a watching brief on site when construction occurs adjacent to or over their asset.

The Principal Contractor will be geared up for liaison and coordination with asset owners and users and for construction in a potentially hazardous environment controlled by safe systems of work that incorporate permits to work.

Additional requirements arising from working alongside or above the highway will be incorporated into the Principal Contractor's safe systems of work.

## 5.0 Road Closure

Working on or around the highway is widely recognised as a hazard that requires careful planning and management. In the UK where construction or maintenance work poses a risk to the highway or vice versa then such work may be undertaken during a 'road closure'. The duration of the road closure will be fully dependant on NWL and their operational requirements. Any road closure will need to be fully discussed and planned with NWL and the emergency services. Alternative access through the Wilton site to the other site entrances may need to be used whilst the road closure is in place.

The concept for the overland conveyor lends itself to being erected in relatively short period. Thus depending on the highway closure available, one or more trestles would be erected on either side of the bridge and secured and then the main span would be lifted on. The main span would already be clad when lifted in, allowing fit out of the conveyor to proceed safely from within the conveyor envelope. This is the approach that is envisaged where the overland conveyor crosses the Network Rail Railway. The trestle foundations are located outside the highway boundary and can be constructed without the need for a road closure. It is envisaged that the span over the Access Road Bridge could be erected in one 6 to 8 hour road closure. The trestles supporting the main span will be designed to provide stability and restraint with or without adjacent spans being erected. The weight of the conveyor span when lifted in is expected to be up to 60 tonnes.

## 6.0 Lifting activities near or over the Access Road Bridge

A major concern is the protection of the assets should a load be dropped, giving rise to the potential for damage to the road bridge assets. A lifting study will be developed looking at the issues of protecting assets above the ground (i.e. crane platforms, double stropping, etc.) and determining the envisaged loads expected during the construction of the overland conveyor. The following methodology has been developed at this stage and will be considered when carrying out the lifting study.

A temporary closure of the Access Road Bridge to vehicles will be required during the installation of the conveyor over the road. This would have an impact on the vehicles currently using NWL's site. All large lifts will be pre-planned in detail. The size of crane would be selected to allow additional spare capacity for all lifts. When lifting over or around the road bridge the cranes will be limited to 75% of capacity and any tandem lifts would have a 50% down-rating in capacity rather than the normal 25% required in codes of practice.

Cranes being erected or making lifts outside of a road closure would be sited and slew restricted so that no part of the crane or suspended load could fall onto the roads or supporting structures.

Suitable foundations will be designed so that they are capable of supporting the crane outriggers or track loads, positioned outside of any known easement. Lifting gear would also have a greater than normal factor of safety and the use of double stropping would be followed. It is likely that the Principal Contractor will subcontract all major lifts and these will be carried out under the "CPA Contract Lifting Services Agreement" where the crane supplier supervises and takes responsibility for the lift.

Reusable temporary works, specially designed for the purpose, could be fabricated both to safely support the overland conveyor support legs and the overhead conveyor structure during erection. Hydraulically operated cross heads could be used to prevent any part of the conveyor from falling from height in the unlikely event of a lifting equipment failure.



As an absolute minimum, “Lifting Operations and Lifting Equipment Regulations 1998 (LOLER): Approved Code of Practice and Guidance” will need to be followed at all times regarding the extensive lifting activities which will be associated with the overhead conveyor construction activities. SembCorp Management Procedure “Lifting Activities Management and Control – 1448” will also need to be considered in the control of lifting activities as it is highly likely that the cranes will need to be situated on SembCorp land, although it is worth noting that this document is based on the LOLER Approved code of practice.

## **7.0 Excavating and Piling in proximity of the Access Road Bridge**

The following section describes how excavation and piling associated with the construction of the overland conveyor will be controlled and managed. It is included to demonstrate the care that will need to be taken with these activities in general due to the sensitivity and vulnerability of adjacent assets such as pipelines.

In the vicinity of the overland conveyor, the access road is on an over bridge or embankment. Due to the ground conditions it is anticipated that the existing bridge structure including abutments will have piled foundations. These will not be sensitive to the low vibration techniques proposed for pile installation and relatively shallow excavations for the pile caps and foundations. Similarly the embankment will not be affected. The foundations for the conveyor bridge will be sited some 5m from the bridge span, the closest NWL asset.

Where there are buried assets, there is a concern over any activity that breaks the ground surface. It is envisaged that there will be no piling or excavations work within the highway boundary.

In general any proposed piling operations or excavations within 1.5m of an asset, will require the asset to be physically exposed by hand digging so its location can be confirmed. The asset's initial location will be positioned by referring to the asset owner's drawings and any other means on site e.g. markers posts. It may be necessary to install some form of physical separation between the asset and pile/ excavations during construction, such as a driven sheet pile between the pile and the buried asset. The means and need for separation will be agreed with the asset owner prior to the start of the construction activities.

It is the intention that bored or CFA (Continuous Flight Auger) piling will be used where necessary to minimise vibration. The guidance notes for piling adjacent to pipelines will be adopted. These guidance notes suggest that the peak particle velocity at the pipeline should be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50mm/sec, the ground vibration shall be monitored using a typical monitoring device such as the Vibrock V801 seismograph and tri-axial geophone sensor. Where ground conditions are of submerged granular deposits of silt/sand, an assessment of the effect of any vibration on settlement and liquefaction at the pipeline be carried out. A trial piling study will be carried out to measure the vibration from various types of piling in these ground conditions. Research into maximum allowable peak particle velocity values for various assets will be undertaken and agreed with the asset owners. This method of monitoring vibrations will also be adopted should there be a need to use impact breakers to remove areas of hard standing over the piles or at pile caps locations. If the limits are exceeded other methods of removing hard material will then be used, such as high pressure water jetting or concrete coring using diamond drills or diamond sawing.

With reference to the Safe Systems of work SembCorp procedure “Excavations – 1308” will need to be followed for all excavations as excavations associated with the conveyor crossing of the Hot Metal

Railway are likely to be on SembCorp land. Excavations are defined as “any work involving breaking ground”.

## **8.0 Other Working activities on or near the Access Road Bridge**

Where the access bridge passes through the conveyor construction site it will be naturally demarcated and protected from uncontrolled access and the majority of construction activities.

It is anticipated that construction plant or personnel will only need to access the road bridge for survey monitoring and inspection activities and possibly installing protective measures. Such access will need permission from and coordination with NWL and be identified in the Safe System of Work procedures for the project. An exclusion zone for personnel and equipment of 3m from the road will be established. Access within this 3m zone and onto the road would be arranged through NWL.

The use of cranes is discussed separately.

Goal Posts or similar will be erected on either side of the bridge span to protect it from over height construction traffic.

## **9.0 Inspection, repair, replacement and general maintenance of the Access Road Bridge**

The Access Road Bridge and embankment it is largely self-contained and segregated from the overland conveyor. However some aspects of the inspection, maintenance and repair of the bridge will require coordination or be affected by the overland conveyor either during its construction or subsequently during its operating life. Some restrictions will occur as follows but these will be mitigated by the planning and coordination work York Potash and its agents or contractors will undertake.

During construction of the overland conveyor the access bridge will be ‘outside’ the construction site so NWL’s activities will be able to continue without hindrance. The Safe System of Work will be designed to ensure that conveyor construction activities do not pose a hazard to activities on the highway. Coordination will however be required during the ‘road closure’ when it is planned to lift in the conveyor structure above the bridge. This may restrict the activities that NWL could otherwise carry out in the vicinity of the conveyor and constrain the passage of vehicles. Therefore, an alternative access through the Wilton site to the other site entrances may need to be used whilst the road closure is in place. External access to the bridge and embankment and through the bridge span would also be through or within the conveyor construction site and therefore under the control of the Principal Contractor. This would require planning and coordination and may be constrained by construction activities. NWL’s personnel would require induction and or supervision by the Principal Contractor when accessing areas within the construction site.

During operation of the conveyor, lane closures may be required as a precaution when carrying out external inspection and maintenance work on the conveyor span. These will be by planned and by prior arrangement.

Once the overland conveyor is installed and in operation, due to the proposed headroom of the overland conveyor of circa 7.4m above the bridge, conventional highway and bridge inspections, repair, replacement and general maintenance activities by or on behalf of NWL will generally be unaffected.

## 10.0 Site Security

There are a number of existing fences and gates associated with providing security and control of access onto the Wilton Site, and especially the infrastructure corridor. Keeping the construction site secure will be the responsibility of the Principal Contractor during the works, and will need careful consideration. A security review will be undertaken prior to the construction works to help prevent unauthorised access and theft of equipment and materials from the construction area. The current security of the Wilton site is the responsibility of Falck, who have a wealth of experience in security in and around the Teesside Industrial Complexes and their assistance may be sought with the security review. Advice will also be sought from NWL security regarding matters associated with their site security issues.

## 11.0 Conclusion

This technical note provides a formal response to NWL's concerns as raised in the DCO regarding the interface between the overland conveyor works and Access Road Bridge. The information contained within this and other Technical Notes on constructability will be reflected in the design and provided to the Principal Contractor as part of the pre-construction information, with which they will be contractually obliged to comply. The Principal Contractor appointed for the overland conveyor and the harbour facility will be required to comply with, as a minimum SembCorp and NWL operating requirements and those in this technical note. This Technical Note is intended to form the basis of future discussion and be developed with NWL to address their concerns. NWL will be consulted throughout the life of the project.