

ENVIRONMENTAL STATEMENT – (VOLUME III)

Appendix 11.2 Coal Mining Risk Assessment

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 –
Regulations 5(2)(a)

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1. INTRODUCTION

- 1.1.1. It should be noted that this technical appendix was produced during the development of the Preliminary Design of the DCO Proposed Development. Therefore, the design information presented herein is indicative, and may be different to the final Preliminary Design (including the pipeline alignments and other construction layers) which is described in **Chapter 3 – Description of the DCO Proposed Development (Volume II)**. It should also be noted that the terminology may not align with that presented in the **Glossary (Document reference: D.1.7)**.
- 1.1.2. However, this technical appendix remains applicable to informing the Environmental Impact Assessment and any associated limitation or assumptions are discussed in **Chapter 11- Land and Soils (Volume II)**.

LBA CCS TRANSPORT AND STORAGE PROJECT



ONSHORE PIPELINES

Coal Mining Risk Assessment

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REVISION LIST



REV 01	Typographical errors addressed; Changed Wepre Brook to Alltami Brook to conform to other documentation
REV 02	Update to executive summary

HOLD RECORD



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Executive Summary

Point of Ayr

Historical there has been coal mining in the location of the Point of Ayr Laydown Area. Coal mining and the colliery closed in 1996 and the shafts present were filled and sealed.

This area is considered low risk from historic coal mining activity and potential shafts / adits being present that are not recorded due to the recent closure of the site.

36" Pipeline


The 36" pipeline is not subject to any coal mining history on the eastern side of the route which is north of the River Dee.

To the south of the River Dee there is a history of historic coal mining in certain areas. In some cases the shafts / adits present near the pipeline corridor have been remediated but for other locations there are no records available. The pipeline corridor has, where possible, been adjusted to avoid known shafts/adits.

The Alltami Brook area has significant historic coal mining with two recorded mines. Two shafts/adit accesses area known in the area. A partial geophysical survey investigation has been performed in the Alltami Brook area, there were no features shown from the geophysical results along the chosen pipeline route, however some geophysical observations are recorded near to one adit entrance to the north. With the historic data available and the history of the area there is considered to be considerable risk of encountering historic workings with depth from the records available to the north and south of the chosen pipeline corridor. Within the pipeline corridor there will remain a risk with depth as well as due to the age of the historic mines and accuracy of records.

Additional historic workings have been recorded near to Deeside and Mancot Lane / Colliery Lane area. There is potential to encounter historic working through this area, however the workings run parallel or across Colliery Lane and so it is possible these have been previously backfilled as there was no noticeable evidence of historic coal workings in the area which is well developed through the wider area.

An historic opencast is also present to the west of Gladstone Way and a surface hazard was remediated in 2003. There is potential for more localised historic workings in this area although they may have been infilled by the remediated opencast site.

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1.0 INTRODUCTION

Eni's Liverpool Bay Carbon Capture Scheme Transport & Storage Project (Liverpool Bay CCS) is being developed in parallel with and as a key part of the HyNet Northwest full-chain hydrogen and CCS industrial decarbonisation project (the HyNet Project), which is designed to transform a region of the UK into the world's first low carbon industrial cluster by 2030.

The HyNet Project was conceived in 2016 with the objective of decarbonising the entire industrial cluster to Net Zero. While industrial decarbonisation is the anchor, the HyNet Project builds the infrastructure backbone for a full regional hydrogen economy and leverages the opportunity to repurpose for future CCS service the existing oil and gas facilities at Point of Ayr and offshore in Liverpool Bay. CO₂ storage is provided in depleted and well known gas fields that are owned and operated by Eni UK. The HyNet Project's CCS network will provide the infrastructure to transport and store the CO₂ produced as a by-product of the hydrogen production process and CO₂ from a number of the UK's largest industrial emitters, including Stanlow Refinery, Ince Fertiliser plant and Padeswood Cement plant located in this cluster.

The HyNet Project is designed for an initial capacity of 3MTPA of CO₂ but is engineered for later expansion to 10MTPA. The long term vision scenario of the HyNet Project is depicted in Figure 1-1.

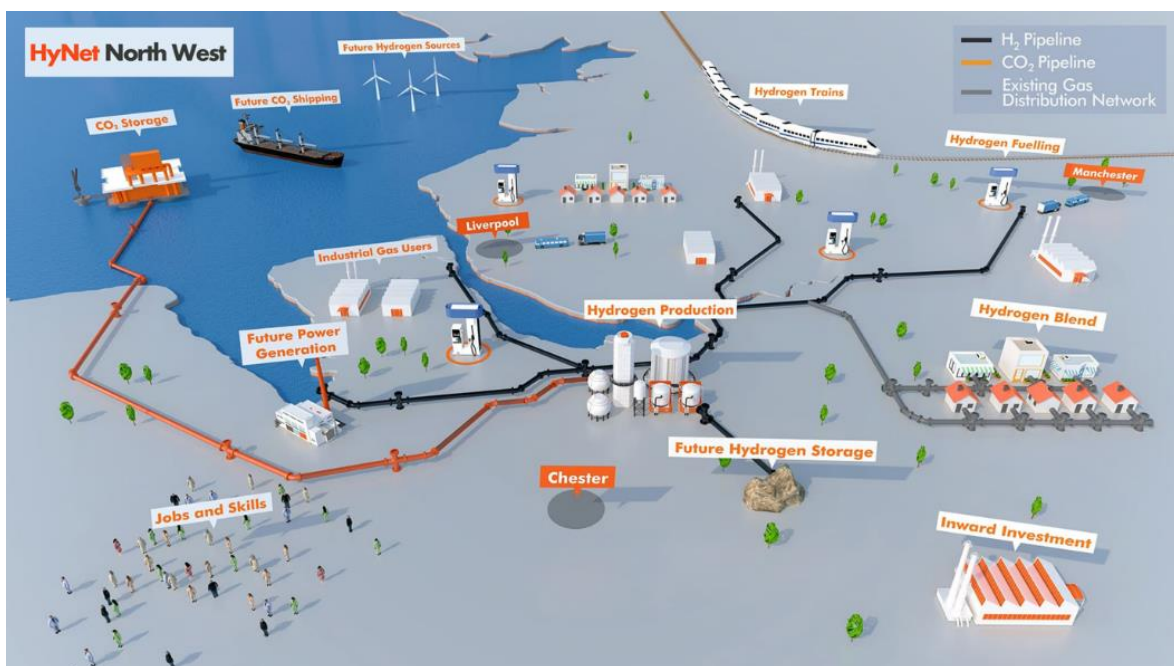



Figure 1-1 Facilities Location

Eni's Liverpool Bay CCS Transport & Storage (T&S) Project scope (Figure 1-2) includes:

- A new onshore pipeline (36" dia. and approximately 33km long) to transport CO₂ from the emitters at Stanlow to Flint where it will join an existing pipeline to Point of Ayr (PoA). There is also a short 20" dia. section of pipe north east of Stanlow connecting from CF Fertilisers to Stanlow.
- Repurposing of the existing onshore 24" dia. Point of Ayr (PoA) to CQY natural gas line to carry CO₂ in the opposite direction. During later expansion this pipeline will be replaced or have its capacity expanded by a second pipeline to reach the 10MTPA capacity.
- Development of the onshore assets at PoA to provide onshore compression, which will be expanded in later phases.
- Repurposing of existing sub-sea natural gas pipelines for CO₂ service. In later years pipelines will be replaced as required for expansion.

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- Development of the Douglas, Hamilton Main, Hamilton North and Lennox platforms, in an incremental manner for CO₂ sequestration service.
- Development of the Hamilton Main, Hamilton North and Lennox reservoirs for CO₂ storage

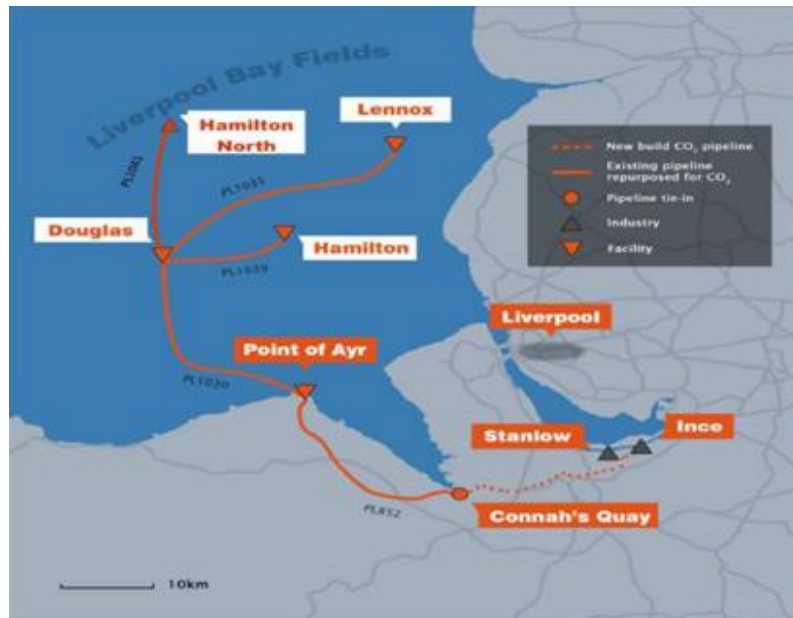


Figure 1-2 Eni's Liverpool Bay CCS T&S Project Scope


1.1 Document objective and overview

As described in Section 1.0 the onshore route consists of three sections:

- Existing 24" pipeline (shown in blue on western side in Figure 1-3 below)
- Proposed new 36" pipeline (shown in green in centre of Figure 1-3 below)
- Proposed new 20" pipeline (shown in magenta at eastern edge in image below)

The nominal burial depth for the pipelines is 1.1m however this may be deeper for sections of the route, for example crossing railways and highways or other structures such as the River Dee or the Shropshire Union Canal.

The burial depth of the pipeline across the route is currently being refined.

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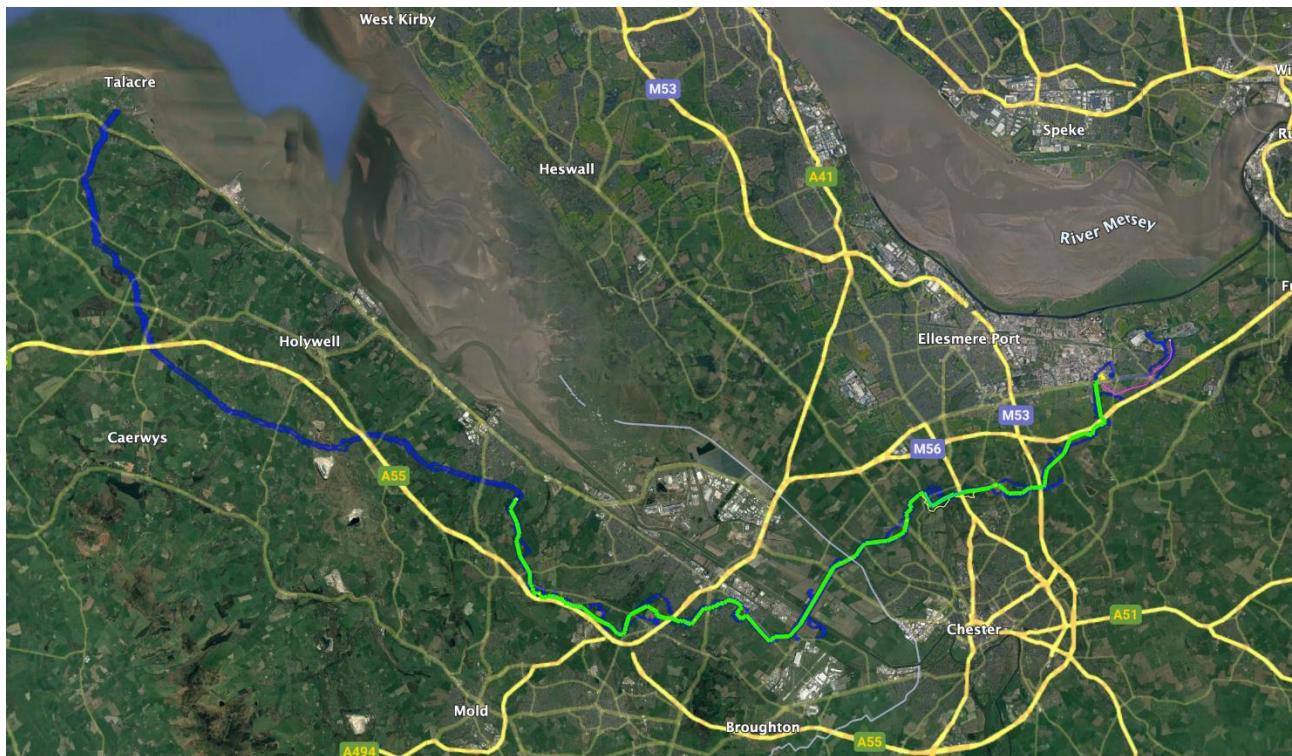


Figure 1-3. Onshore Pipeline Route Sections

As part of the project geological assessment a Coal Mining Risk Assessment is required. The purpose of the Coal Mining Risk Assessment is to collate available geological, mining and historical data in order to assess the potential for the site to be affected by underground mining. This report has been drafted in accordance with the Coal Authority (CA) Coal Mining Risk Assessment.



Both the British Geological Survey online documents were reviewed and the Coal Authority Website to better understand the known locations of historic coal mining activities.

The existing pipeline is not covered in this report as a full study was carried out at the time of the construction of pipeline however a small area at the Point of Ayr gas terminal outside of the plant is reviewed as this is proposed as a laydown area during construction. (Purple area on Figure 1-4 below.)

The 20" pipeline to the east is not covered within this report as there is no coal mining risk for this area following a review of the Coal Authority website and geological review.

The 36" pipeline crosses through coal measures areas on the western side of the River Dee which are covered by this report. (Green area on Figure 1-4 below). There are no coal workings to the east of the River Dee following a review of the Coal Authority website and the geological review.

So in summary the western end of the 36" pipeline has been reviewed and an area at Point of Ayr is reviewed within this report. All other locations are either pre-existing infrastructure or not within areas of potential / historic coal mining.

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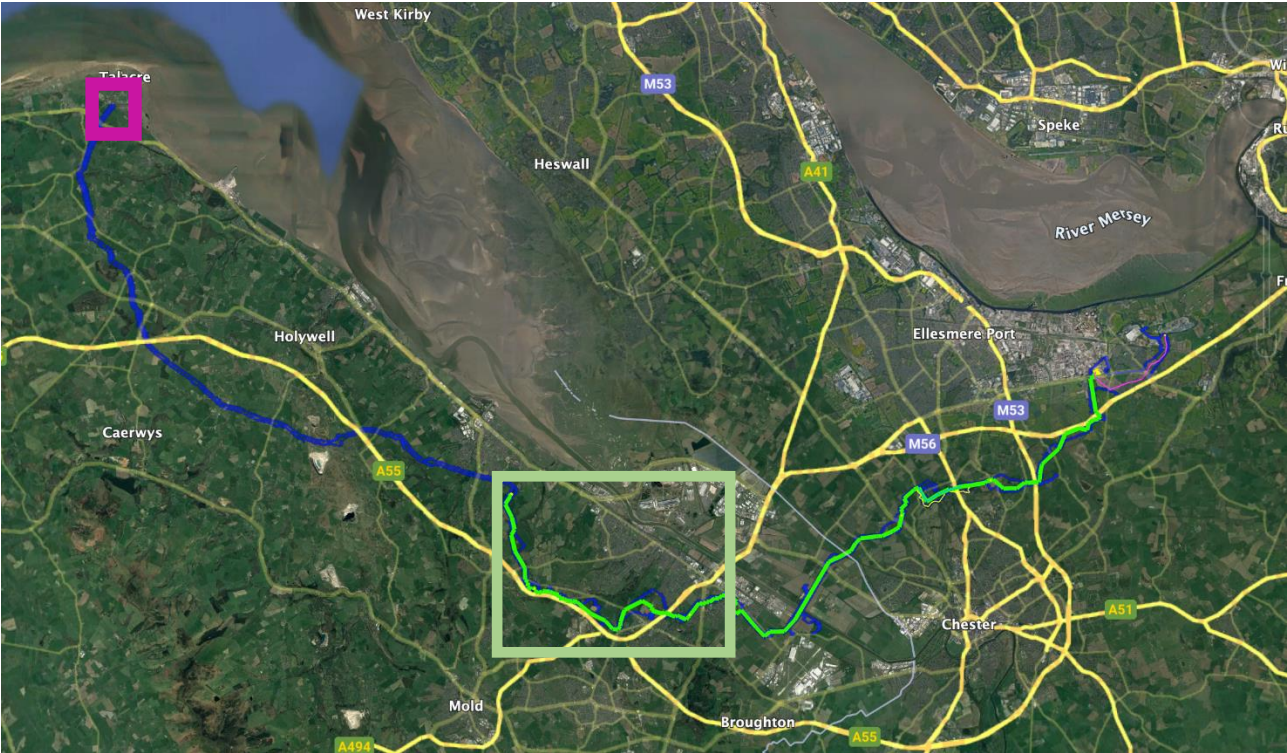





Figure 1-4. Areas reviewed for Coal Mining Risk Assessment

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2.0 DEFINITION AND ABBREVIATION

2.1 Abbreviations

BGS	British Geological Survey
CA	Coal Authority
LBCCS	Liverpool Bay Carbon Capture Scheme
PoA	Point of Ayr

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3.0 GEOLOGY

The British Geological Survey online 1:50,000 maps were reviewed and downloaded from the online viewer. The superficial, bedrock and coal measures geology of the 36" pipeline and Point of Ayr is shown in Appendix A. For the 36" pipeline only the section from the River Dee to Flint Geology is shown. For PoA the black dot indicates the northern area of the plant.

36" Pipeline

Superficial Geology

To the east and the west of the River Dee the area is predominately covered in Till with occasional Glaciofluvial deposits. In the central area of the route covering the River Dee are Tidal Flat Deposits.

Bedrock Geology

To the east of the River Dee the main formations are sandstones from the Chester Formation and the Kinnerton Sandstone Formation. Crossing over the River Dee the geology changes to the Etruria Formation and then into the Penine Middle Coal Measures and the Penine Lower Coal Measures indispersed with Gwespvr Sandstone.

Coal Measures

The coal measures information from the BGS indicates potential primary and secondary opencast coal resources together with buried coal resources greater than 50m depth across the western area relating to the Penine Coal Measures

Point of Ayr

Superficial Geology


The area of Point of Ayr is dominated by Tidal Flat Deposits and Blown Sand deposits.

Bedrock Geology

The bedrock geology consists of the Penine Lower Coal Measures and the Penine Middle Coal Measures formations together with the Gwespvr Sandstone

Coal Measures

The coal measures information from the BGS indicates potential primary and secondary opencast coal resources relating to the Penine Coal Measures.

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4.0 COAL MINING

Having identified that significant coal resources were present across the western end of the 36" pipeline and at PoA the Coal Authority Website was reviewed.

Utilising the Coal Authority's interactive map () the location of coal mining activities along the proposed route were identified and the Consultants Coal Mining Reports were obtained covering the relevant sections. These reports are included in Appendix B.

4.1 36" Route

Two different areas were identified from the Coal Authority website as requiring more detail. Once identified then the detail was obtained and is presented below.

4.1.1 Area 1 – Mancot Lane to Lower Aston Hall Lane

The first area covers Mancot Lane (Chainage 20000) to Lower Aston Hall Lane (Chainage 22000) and is covered in Coal Report Reference 51002513967001 and is included in Appendix B. Figure 4-1 below shows the area in more detail.

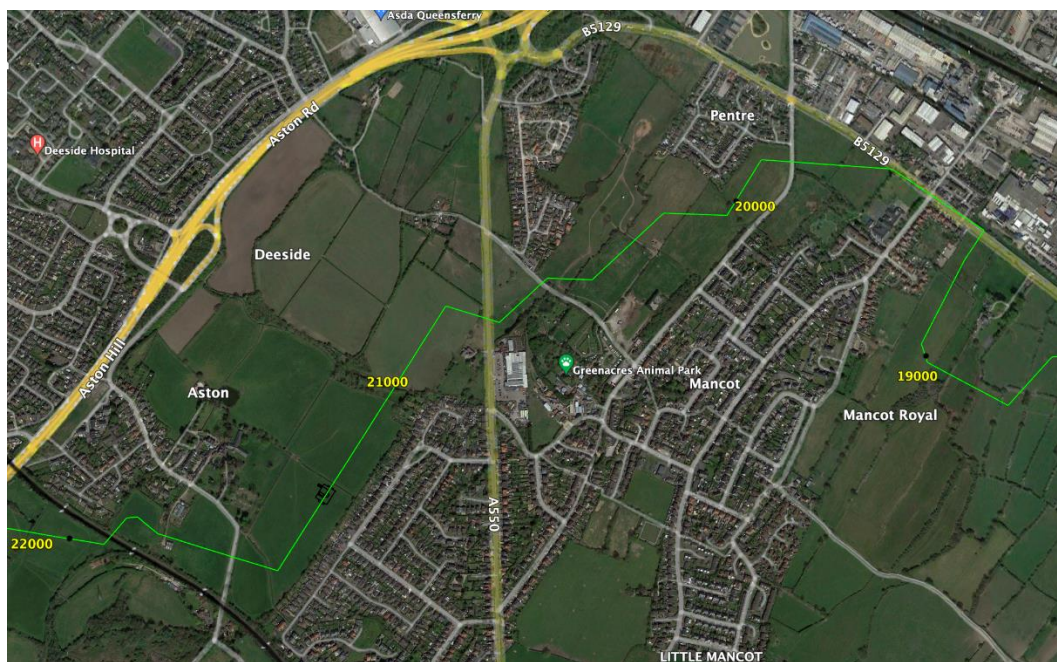




Figure 4-1. Area 1 in more detail

4.1.1.1 Coal Outcrops

Two outcrops are identified across the route, one proven and one conjectured. Brassey Coal and Main Coal which cross Gladstone Way Road and Colliery Lane. Both seams intersect with the road crossings where the pipeline is proposed to cross.

Two geological faults are also shown on the northern edge of the pipeline corridor near to Pentre.

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4.1.1.2 Historic Mining

A number of coal seams have been worked across the area between 1870 and 1913 with depths ranging from 41m to 138m and a seam thickness of between 120-200cm.

A area of site investigation was also undertaken to the south east but no coal is recorded as having been excavated around chainage 21500.

4.1.1.3 Probable unrecorded shallow workings

There is potential for unrecorded shallow workings within the area specifiically related to the the remediated area.

4.1.1.4 Spine Roadways

There are no spine roadways recorded at shallow depth.

4.1.1.5 Mine Entries

There are mine entries recorded which border the scoping boundary for the pipeline route (around chainage 20800) with some located in the area of the Wyldcrest Mobile Living Caravan Park which has been developed over a number of years.

There are also a number of shafts within an area shown as an unlicenced opencast site. These shafts are therefore recorded as likely removed during the opencast operation and the land has been returned to agricultural production. For further detail refer to the coal mining reports in Appendix B which contains coordinates and locations of the known shafts.

4.1.1.6 Opencast Sites

The pipeline route passes the edge of an historic unlicenced opencast site which has been remediated.



4.1.1.7 CA Managed Tips

There are no CA managed tips within 500m of the site boundary.

4.1.1.8 Remediated Sites

The CA has indicates that the pipeline route passes through a remediated site area. A Surface Hazards Incident Report was obtained from the CA dated August 2003 which relates to the remediated site (Report H3790 in Appendix B) and indicates that a localised collapse had taken place. An excavation of the area 2m x 3.5m was performed and at 2.5m depth an area of weak ground was observed, possibly related to a filled roadway from the historic shallow mine workings although this could not be 100% confirmed but timbers and possible shotwire were recovered. The area was made good and infilled.

No more surface hazards related to this area have been recorded since this report in 2003.

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4.1.1.9 Development Area

The CA Interactive Viewer indicates that the route passes through two areas considered 'Development High Risk Areas'. (Chainage 21000). The two areas are the remediated site and the area around Colliery Lane where outcrops are recorded.

There is an area of Past Shallow Coal Workings also indicated directly on Colliery Lane itself.

'Probably Shallow Coal Workings' are also shown to cover the area between Colliery Lane and Gladstone Way together with a second area between Gladstone Way (Chainage 20800) and Lower Aston Hall Lane (Chainage 21600)

4.1.1.10 Mine Gas & Water Treatment Schemes

The CA has no reported mine gas enquiries or water treatment schemes within 500m of the boundary of the site.

4.1.1.11 Other items

The CA have no records with respect to:

- Future underground mining
- Coal mining licenses within 200m of the site boundary
- Section 46 notices regarding land risk from mining subsidence
- Withdrawal of support notices
- Payments to owners of former copyhold land

4.1.1.12 Site History

Historic plans dating back to 1869 have been reviewed. The relevant plans have been attached in Appendix C.


- Historic shafts and a Colliery are shown within what is now Willow Residential park in 1869 bordering the site and another colliery to the west at the intersection of Mancot Road and Coal Pit Lane. Some of these are located on a railway. A brick works is shown by Queensferry Road to the west.
- In 1898 the collieries and shafts are now show as Old Collieries and Old Shafts. The railway is now labelled as Aston Hall Colliery Railway line and extends southwestwards.
- No significant changes in 1938. The brick works are slightly larger
- In 1948 the colliery railway has been removed
- Brickworks are no longer shown in 1949

4.1.2 **Area 2 – Old Aston Hill Road to Northop Hall**

The second area covers Old Aston Hill Road to Northand is covered in Coal Report Reference 51002524473001 and is included in Appendix B. Figure 4-2 below provides an overview of the route area.

The section between Area 1 and Area 2 (Old Aston Hill Road and Lower Aston Hall Lane) is an area locally known as 'Sand Hills' and has extensive sand deposits (>10m) which has no history of coal mining and so no data was collected for this section.

A second small area was also reviewed to the west of Northop Hall, (around chainage 27500) and this is included in the Coal Report Reference 51002987213001 as due site walkovers this was understood to be an historic colliery. Following the review of this report there is historic coal workings but they are located over

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100m away from the pipeline scoping corridor and start at a depth of 57m and so are not considered to be concern, the report has been included for completeness.

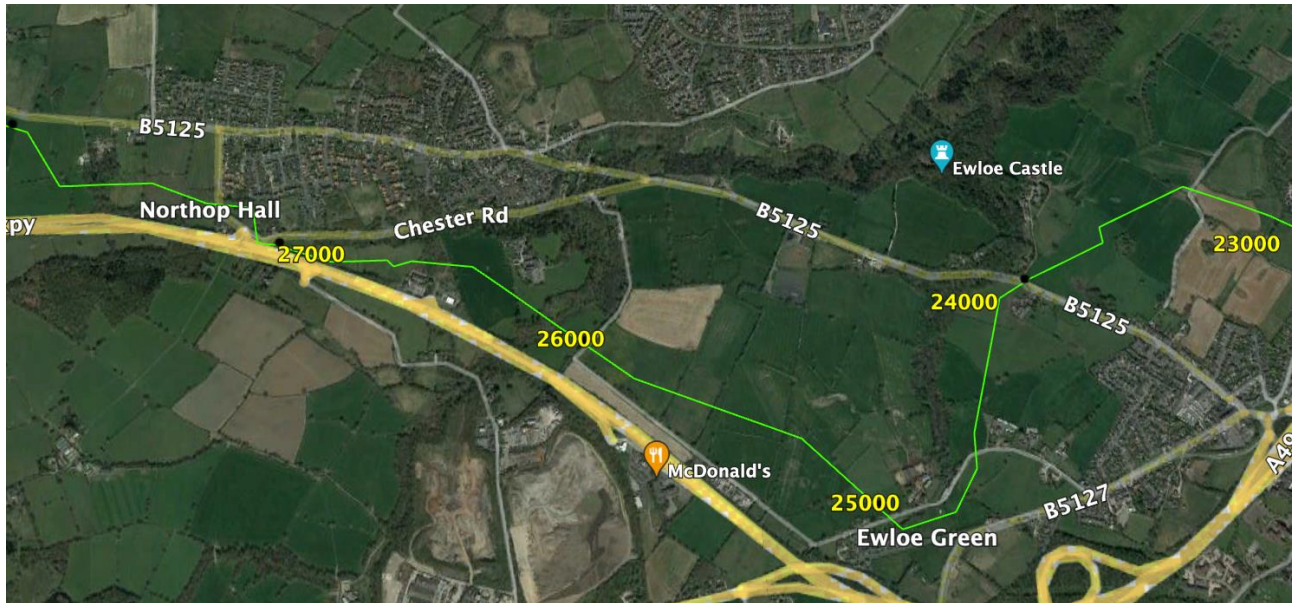


Figure 4-2. Area 2 in more detail

4.1.2.1 Coal Outcrops

There are several coal seams indicated on the Coal Authority Findings Map that cross the pipeline development. There is only one outcrop recorded which is Main Coal which is located off Green Lane and at the edge of the proposed pipeline corridor.

4.1.2.2 Historic Mining

A number of coal seams have been worked across the area between 1800 to 1949 with depths ranging from 6m to 302m and a seam thickness of between 50-250cm.

The shallow coal workings have taken place near to Alltami Brook and the workings are Premier Coal; Queen Coal and Half Yard Coal which have been worked in a similar area up to 68m depth. This area is discussed further within this report.


The other coal seams Hollin; Main and Yard have all been worked at depths greater than 58m depth.

4.1.2.3 Probable unrecorded shallow workings

There is considered unlikely to be unrecorded shallow workings within the area.

4.1.2.4 Spine Roadways

There are no spine roadways recorded at shallow depth.

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4.1.2.5 Mine Entries

There are several mine entries recorded along or near to the proposed route. Some of the shafts and adits have records of being infilled whilst others have no data available. For further detail refer to the coal mining reports in Appendix B which contains coordinates and locations of the known shafts.

During site walkovers there was no immediate evidence of historic shafts along the chosen pipeline route present as a feature at ground level within the pipeline corridor. The pipeline routing boundary shows some of these shafts may be present within the pipeline corridor with often no data as to the remediation of these shafts.

A geophysical survey was also conducted near to Alltami Brook to determine if there were any voids near to the surface and none were observed from the data recovered.

4.1.2.6 Opencast Sites

This section of the pipeline route does not pass near to any historic opencast sites.

4.1.2.7 CA Managed Tips

There are no CA managed tips within 500m of the site boundary.

4.1.2.8 Remediated Sites

The CA has indicates there are no remediated sites within 500m of the proposed development.

4.1.2.9 Development Area

The CA Interactive Viewer indicates that the route passes several areas considered 'Development High Risk Areas'. The majority of these are where historic mine shafts that do not have a record of being filled/capped are present.

There is also shallow historic coal workings in the Alltami Brook / Magazine Lane area. These are discussed in more detail in section 5.

No notice of Coal Mining Subsidence across the area has been recorded.



4.1.2.10 Mine Gas & Water Treatment Schemes

The CA has no reported mine gas enquiries or water treatment schemes within 500m of the boundary of the site.

4.1.2.11 Other items

The CA have no records with respect to:

- Future underground mining
- Coal mining licenses within 200m of the site boundary
- Section 46 notices regarding land risk from mining subsidence
- The area was subject to a notice to withdraw support in 1944. However subject to the Coal Industry Act 1994 this was subsequently cancelled.
- Payments to owners of former copyhold land

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4.1.2.12 Site History

Historic plans dating back to 1869 have been reviewed. The relevant plans have been attached in Appendix C.

- In 1869 the area is shown as mostly field. To the west of Alltami Brook a railway crosses the route north-south which appears to be servicing several brick works along its route.
- In 1898 several collieries are shown in Northop Hall itself but not extending on to the route. The railway appears to be still operational.
- No significant changes in 1909 – the reservoir is now shown on Old Aston Hill Lane
- No significant changes in 1938; 1948 or 1963.
- In 1970 the railway is now shown as disused. Some houses have been built along Holywell Road and other houses along Old Aston Hill Road. A chimney is labelled on Magazine Lane (just to the south of the route corridor)
- In 1978 the second reservoir is shown at Old Aston Hill.
- In 1991 two shafts are now shown disused by Alltami Brook (also known as Wepre Brook dependent on map age)
- in 2001 Alltami Brook (Wepre Brook) is shown to be much straighter than previous

The coal workings highlighted above do not show in any detail on the historic maps, possibly because they were quite small enterprises or because the mining took place in between periods of coal extraction.

4.2 Point of Ayr

Point of Ayr is the existing gas terminal that will be redeveloped to facilitate transportation of CO₂ offshore. A laydown area is required in Point of Ayr to enable decommissioning and then commissioning of the new plant. The laydown area is covered by Coal Report Reference 51002948750001 and is included in Appendix B.

4.2.1.1 Coal Outcrops

Two are no coal outcrops.

4.2.1.2 Historic Mining


No recorded coal seams have been worked.

4.2.1.3 Probable unrecorded shallow workings

There are no shallow workings within the area.

4.2.1.4 Spine Roadways

There are no spine roadways recorded at shallow depth.

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4.2.1.5 Mine Entries

There is one mine entry and one adit. Both of which have full records of having been sealed by RJB Mining in 1997. For further detail refer to the coal mining reports in Appendix B which contains coordinates and locations of the known shafts.

4.2.1.6 Opencast Sites

There are no opencast sites.

4.2.1.7 CA Managed Tips

There are no CA managed tips within 500m of the site boundary.

4.2.1.8 Remediated Sites

There are no remediated sites within 50m of the site.

4.2.1.9 Development Area

The CA Interactive Viewer was reviewed and the site is not within a Development High Risk Area

4.2.1.10 Mine Gas & Water Treatment Schemes

The CA has no reported mine gas enquiries or water treatment schemes within 500m of the boundary of the site.

4.2.1.11 Other items


The CA have no records with respect to:

- Future underground mining
- Coal mining licenses within 200m of the site boundary
- Section 46 notices regarding land risk from mining subsidence
- Withdrawal of support notices
- Payments to owners of former copyhold land
- There is the potential for Underground Coal Gasification in the future 170m to the east.

4.2.1.12 Site History

Historic plans dating back to 1869 have been reviewed. The relevant plans have been attached in Appendix C.

- In 1872 the area is shown as fields and marshland. A railway is shown to the south.
- In 1899 Point of Ayr Colliery is shown to the south east corner. A marker for Rocket Apparatus is also shown within the site boundary
- In 1912 a tramway to support the colliery is shown
- In 1960 there are now several sidings and buildings that have been constructed for the colliery which lead to the railway. A water treatment works for the colliery is also shown
- Up to 1994 there is continued development of the mine area with an increase in buildings present
- In 1995 the Gas Terminal is now shown in the north

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5.0 ALLTAMI BROOK

5.1 Historic Mining

Although Alltami Brook (sometimes referred to Wepre Brook dependent on map age) does not show up in the Historic Maps the area is recorded within the Coal Authority Report. Additional information was therefore sought for this area and is shown in Appendix D.

From the maps obtained there are two collieries shown. One along Pinfold Lane that extends to the north and second colliery that is along Magazine Lane.

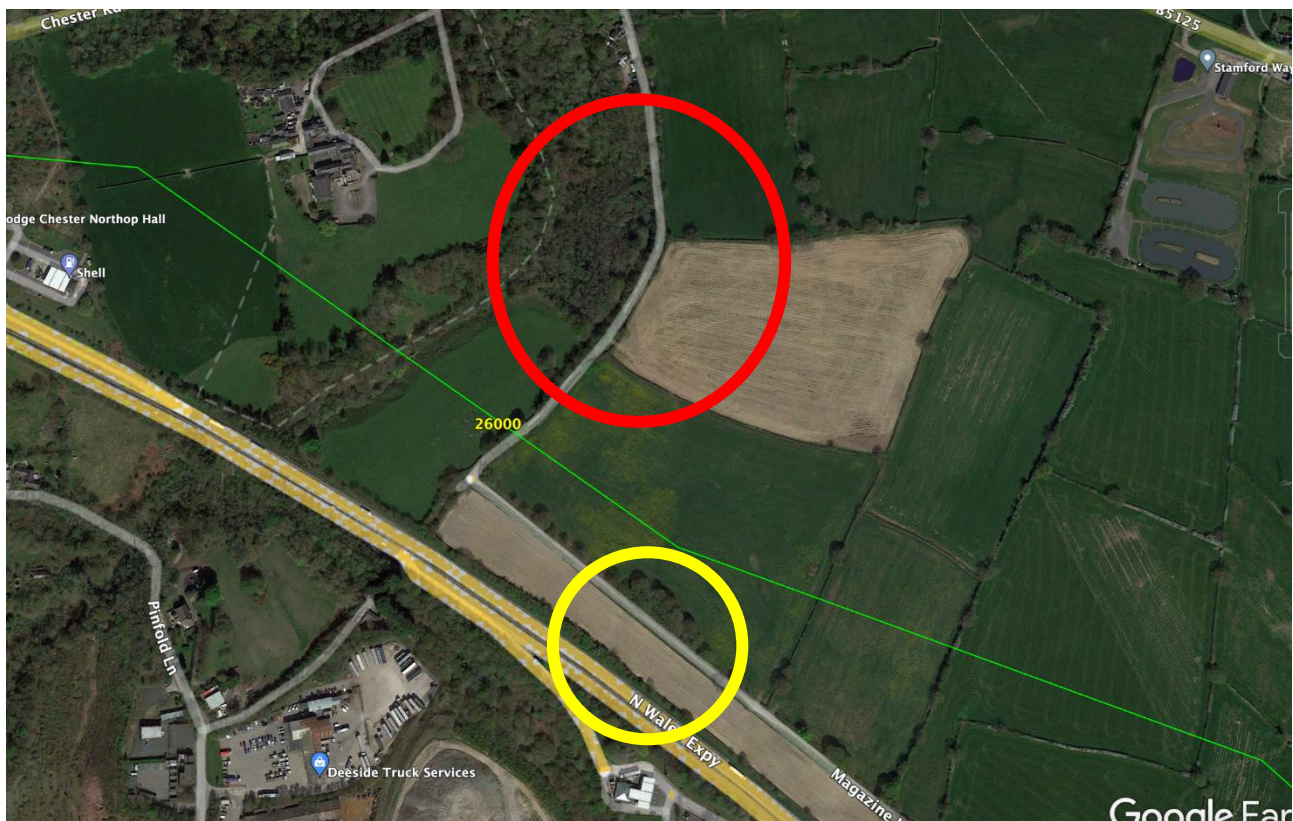


Figure 5-1. Historic Coal Mines (Area 1 Red – Area 2 Yellow)



Pinfold Lane Area (Area 1 (red) on Figure 5-1)

The mine plans indicate development of the area in the 1930's and show the entrance adit just north of the route corridor. The adit extends northwards targeting coal at several depths. Several boreholes are shown across the site with the coal depths indicated. Both Queens Coal and Premier Coal.

Magazine Lane Area (Area 2 (yellow) on Figure 5-1)

The Magazine Lane Colliery indicates an adit access parallel to Magazine Lane and running northeastwards. The majority of this mine extends out under Magazine Lane towards where the A55 is now located. Mining of this area is in the late 1940's and indicates that Premier Coal was the main target with the adit intersecting the coal at 24ft depth.

Newspaper Article

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A newspaper article from 1947 records that work was being done in The Park Hill Colliery located initially next to Pinfold Lane and later next to Magazine Lane at depth of 150ft.

BGS Website

Borehole records were also reviewed on the BGS website and indicate that two collieries were present in this area at different times. Sycamore Colliery is shown next to Alltami Brook to the west of Pinfold Lane. The Park Hill Colliery is shown to the east and west of Pinfold Lane and along Magazine Lane.

5.2 Geophysical Data



Geophysics was performed in the field between Pinfold Lane and Alltami Brook. The geophysics was performed to understand if there was evidence of historic adits / shafts across this area following the review of the BGS website and the other information from above.

The geophysical data is contained with Appendix E.

The results of the geophysics provide no indication of voids across the area although there is a potential void located in the north eastern corner of the field where two trees are present and that was unable to be geophysically assessed due to physical constraints of access.

If the two trees do mark the access point of an adit/shaft this will correspond with the historic mine plans referred to in 5.1. and the direction of access is to the north east, away from the development route.

Potential surface debris leading away from the two trees also indicate the possible access to the mine area as well.

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6.0 COAL MINING RISK ASSESSMENT

6.1 Scope & Aims of Coal Mining Risk Assessment

The objectives of a coal mining risk assessment is to gather all the data available to provide a desk based geological assessment of the risk associated with historic, present and future coal mining for a given site. This information will be gathered from a range of sources as historic coal mining may be from adhoc data sources although until the 1870's coal mining abandonment plans were not a legal requirement, and were then not rigously legally enforced until the 19th century.

As part of this risk assessment, considering the nature of the development potential mitigation measures (if any) are presented, including any remedial works.

6.2 Limitations.

As stated above mining prior to 1870 may not be recorded and the early ordnance survey plans frequently did not include historic workings. The review of this site has highlighted mine workings into the 19th Century that are not included on ordnance survey plans as the mining seemingly took place inbetween survey periods.

It is always possible that mine workings are present in areas that there is no knoweldge about.

6.3 Coal Mining Risks

There are several risks associated with coal mining:

- Collapse of historic workings either during construction or post construction resulting in damage to buildings and infrastructure
- Migration of mine gases from historic mine workings or mine entries resulting in the potential release of harmful gases in confined areas
- Consolidation of relict workings and the overlying strata resulting in potential structural defects in buildings and infrastructure
- Failure of mine entries/shafts causing loss of ground beneath buildings or infrastructure
- Spontaneous combustion of historic workings

6.4 Summary of Risk



The review is split into two sections. One covering the 36" pipeline and one for Point of Ayr.

6.4.1 Point of Ayr Summary


- There are no shallow coal workings at Point of Ayr
- The historic coal mining infrastructure was for deep coal workings
- The mine shafts were fully sealed in accordance with designs in 1997
- The site remains a derelict site area but it has been completely cleared
- There is not foreseen to be any risk with this area being used as a temporary laydown area

6.4.2 36" Pipeline

The 36" pipeline was reviewed in two sections but the data has been considered together to provide details across the site area.

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- Historic shallow coal workings may be present across the route and near to Gladstone Way a potential historic adit was remediated in 2003.
- This same area was also opencast for a period of time and then remediated
- The area near to Greenacres Animal Park / Colliery Lane may have historic coal working present, the area of potential workings are either side of the road itself
- Several mine shafts are located along the route, some which have records of being infilled but several have no records.
- The area of Magazine Lane and Alltami Brook has had extensive shallow coal mining over the years where records have managed to be obtained
- Geophysics does not have any indication of shallow workings, however if the workings have been backfilled with the same material as the surface material then it may be difficult to differentiate between natural and made ground areas

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6.5 Recommendations

6.5.1 Point of Ayr

The area of Point of Ayr has been an historic coal mining area. The CA records indicate that the shafts that were present were sealed in 1997 in accordance with CA requirements.

Therefore the use of the area for laydown is suitable. Environmental samples will be required to establish the surface conditions across the site following the previous use of the site.

6.5.2 36" Pipeline

Historic mining has shown to be present across the western section for the pipeline route. There is potential for historic shallow workings along Colliery Lane, Deeside along the road and edges of the road itself.



To the west of Gladstone Way where a previous opencast was present, prior to this there were historic workings which may not have been completely intersected by the opencast with the surface hazard observed in 2003 and so care is required through this area for any potential additional shallow workings that could be encountered.

The area of Alltami Brook has significant historical mining for which records have been obtained, it is recommended that pipeline routing be performed to avoid these historic workings there is always the potential encounter unknown working across this area. Geophysics has been performed across part of the area and where the pipeline is being laid there were no features observed that could be possible mine shafts or adits, however if these have been backfilled with the same material from the surrounding area they may not be readily identifiable from geophysics.



There are other coal shafts recorded from the CA along the route, none have been observed during site walkovers and so it is not known how these have been capped and backfilled. These historic shafts should be avoided along the route but it is still possible to encounter other features during the development of this area.

Summary of recommendations

- Routing of the pipeline should be performed to avoid potential historic mine shafts or shallow workings from the data obtained
- There will still be a risk of potential shallow workings around Colliery Lane and Gladstone Way and these should be considered in any construction plan. A site investigation will be performed within this area but there will be restrictions on accessing this area due to the road and the zoo that is located in this area.
- Where potential historic mine shafts may be present within the construction corridor these areas should be cordoned off and careful excavation around these areas should be performed only if necessary for the pipeline installation. The zone of the potential shaft should be determined from the coordinates available within the coal authority report and these areas

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7.0 APPENDIX A – BGS GEOLOGICAL DATA

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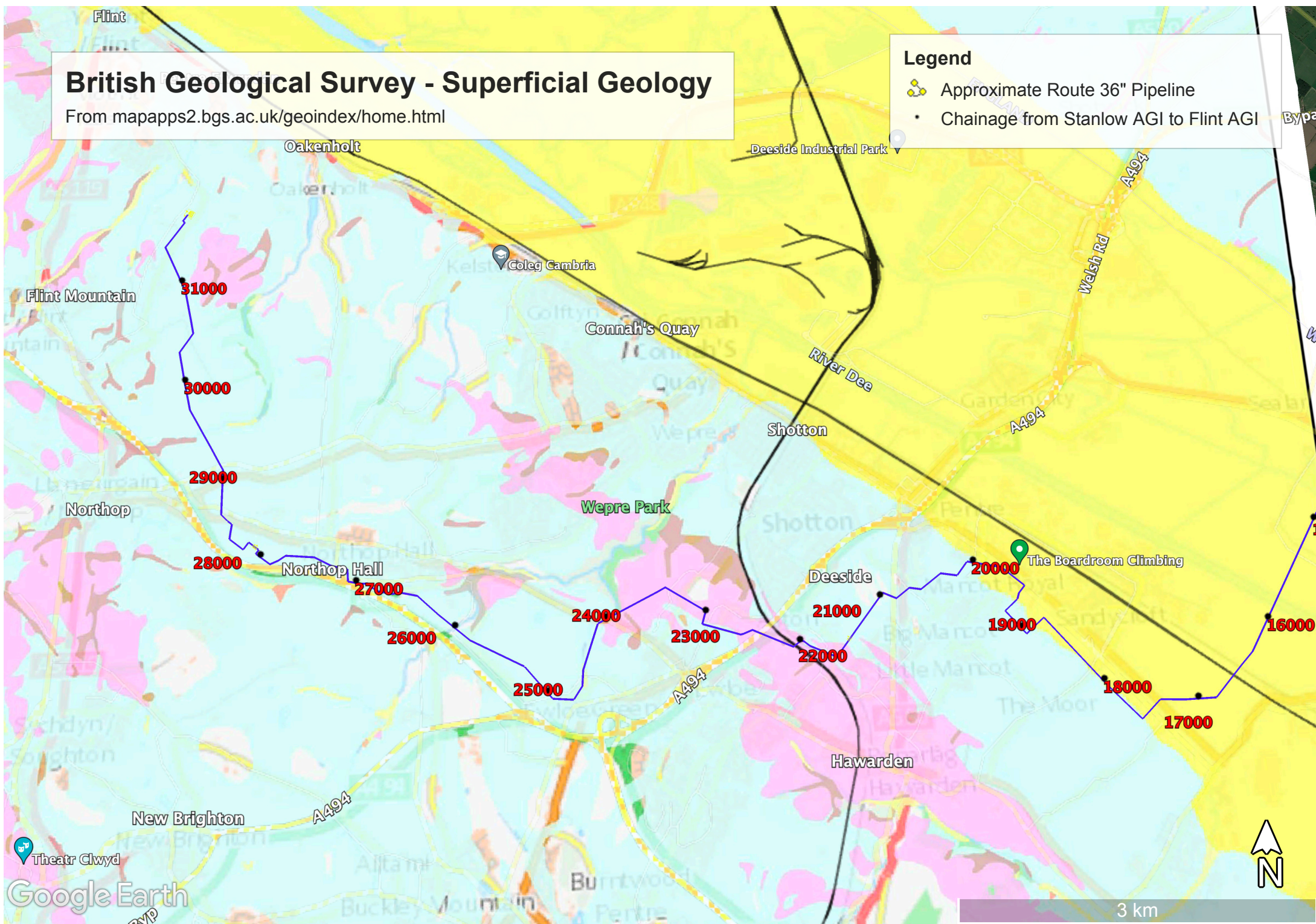
Geology – 36” Line Flintshire

British Geological Survey - Superficial Geology

From mapapps2.bgs.ac.uk/geoindex/home.html

Legend

-  Approximate Route 36" Pipeline
-  Chainage from Stanlow AGI to Flint AGI



Map Key

Superficial deposits 1:50,000 scale

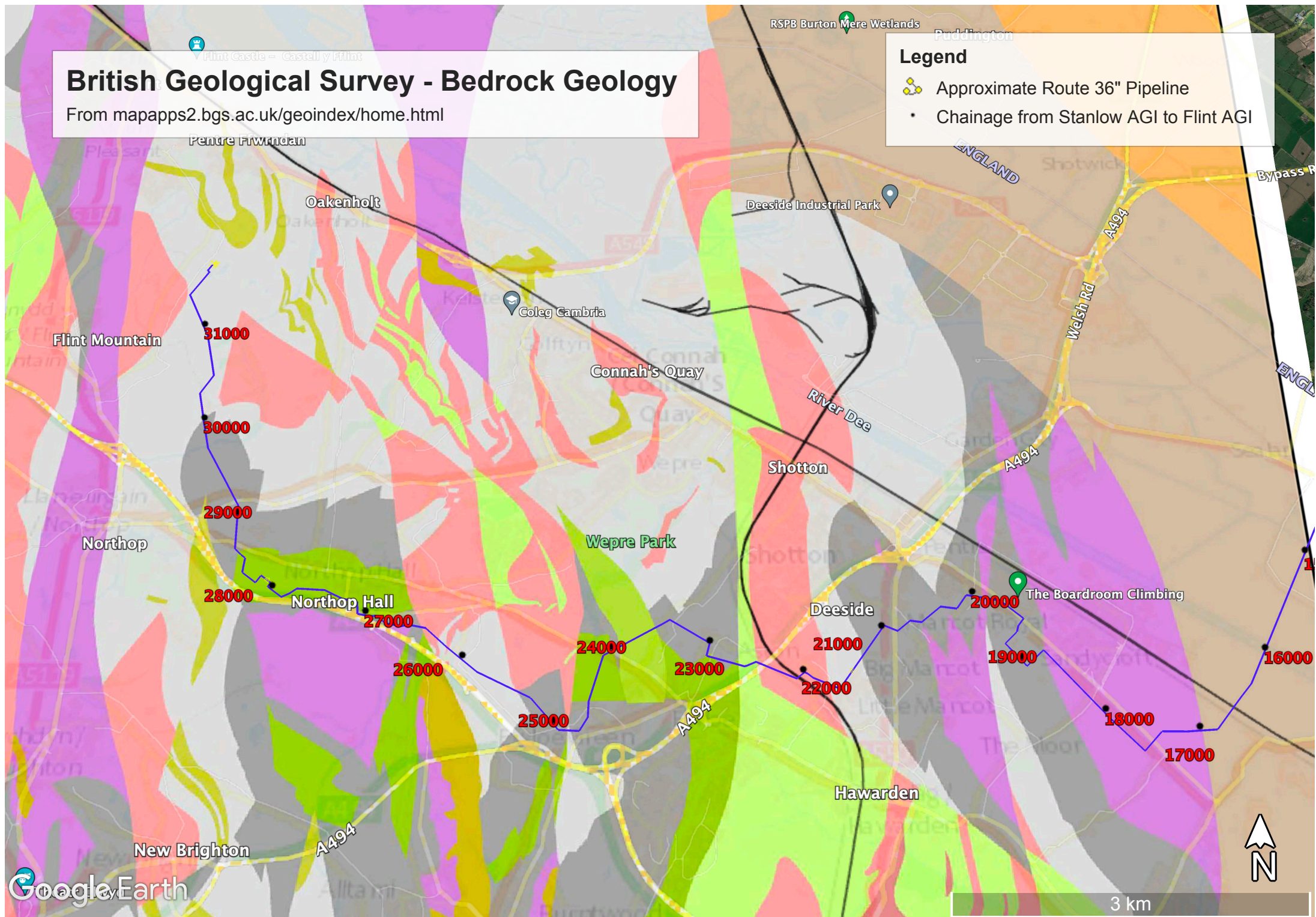
	<u>GLACIOFLUVIAL DEPOSITS, DEVENSIAN - SAND AND GRAVEL</u>
	<u>TILL, DEVENSIAN - CLAY, SANDY, GRAVELLY, COBBLY</u>
	<u>ALLUVIUM - CLAY, SILT AND SAND</u>
	<u>BLOWN SAND - SAND</u>
	<u>HEAD - CLAY, SILT, SAND AND GRAVEL</u>
	<u>RAISED STORM BEACH DEPOSITS - GRAVEL</u>
	<u>ALLUVIAL FAN DEPOSITS - CLAY, SILT, SAND AND GRAVEL</u>
	<u>LACUSTRINE DEPOSITS - CLAY AND SILT</u>
	<u>TIDAL FLAT DEPOSITS - SAND</u>
	<u>PEAT - PEAT</u>
	<u>SUPERFICIAL DEPOSITS - SEDIMENT</u>

From mapapps2.bgs.ac.uk/geoindex/home.html

From mapapps2.bgs.ac.uk/geoindex/home.html


- Approximate Route 36" Pipeline
 - Chainage from Stanlow AGI to Flint AGI

- Approximate Route 36" Pipeline
 - Chainage from Stanlow AGI to Flint AGI



Map Key

Bedrock geology 1:50,000 scale

	<u>CEFN MAWR LIMESTONE FORMATION - LIMESTONE AND [SUBEQUAL/SUBORDINATE] ARGILLACEOUS ROCKS, INTERBEDDED</u>
	<u>WILMSLOW SANDSTONE FORMATION - SANDSTONE</u>
	<u>PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE</u>
	<u>ETRURIA FORMATION - MUDSTONE, SANDSTONE AND CONGLOMERATE</u>
	<u>NEOGENE ROCKS (UNDIFFERENTIATED) - CLAY, SILT AND SAND</u>
	<u>MINERA FORMATION - LIMESTONE AND [SUBEQUAL/SUBORDINATE] SANDSTONE, INTERBEDDED</u>
	<u>BOWLAND SHALE FORMATION - SANDSTONE</u>
	<u>GWESPYR SANDSTONE - SANDSTONE AND [SUBEQUAL/SUBORDINATE] ARGILLACEOUS ROCKS, INTERBEDDED</u>
	<u>KINNERTON SANDSTONE FORMATION - SANDSTONE</u>
	<u>WARWICKSHIRE GROUP - MUDSTONE, SILTSTONE AND SANDSTONE</u>
	<u>PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE</u>
	<u>MINERA FORMATION - SANDSTONE</u>
	<u>GWESPYR SANDSTONE - MUDSTONE</u>
	<u>CEFN-Y-FEDW SANDSTONE FORMATION - SANDSTONE AND [SUBEQUAL/SUBORDINATE] ARGILLACEOUS ROCKS, INTERBEDDED</u>
	<u>BOWLAND SHALE FORMATION - MUDSTONE</u>
	<u>CHESTER FORMATION - SANDSTONE, PEBBLY (GRAVELLY)</u>
	<u>COLLYHURST SANDSTONE FORMATION - SANDSTONE</u>
	<u>CUMBRIAN COAST GROUP - MUDSTONE</u>
	<u>PENNINE LOWER COAL MEASURES FORMATION - SANDSTONE</u>
	<u>PENNINE MIDDLE COAL MEASURES FORMATION - SANDSTONE</u>
	<u>CHESTER FORMATION - CONGLOMERATE</u>
	<u>PENTRE CHERT FORMATION - CHERT</u>
	<u>ETRURIA FORMATION - SANDSTONE</u>
	<u>HOLLIN ROCK - SANDSTONE</u>