14. Air Quality

14.1. Introduction

This section assesses the potential impacts of the construction and operation of the proposed rail link and the relocation of the airport fuel tank farm on local air quality and climate change.

All construction activities in urban areas have the potential to cause some degree of disturbance to neighbours, depending on the scale of activity and proximity to sensitive receptors. Therefore, control and mitigation measures must be adopted through the use of statutory powers and contractual requirements.

Operational effects will relate to changes in the mode of passenger travel to the airport from road to rail. Rail transport, being electrically powered will generate no local emissions to atmosphere with the potential to impact on local air quality. However, the generation of electrical power, remote from the rail line, will contribute to regional emissions including greenhouse gases.

It is predicted that airport passengers that would normally approach the airport along the M8 from the east of the city and its conurbation, will be able to utilise public transport to Glasgow Central, and thence the new rail link to the airport. The modal shift from road to rail will have the potential to reduce the number of road-based journeys, with consequent impacts on local air quality along the major trunk roads between the airport and the conurbation to the east.

The air quality impact of the proposed development is likely to be associated with dust nuisance and construction vehicle emissions during the construction phases, and the changes in local and overall transport emissions as a result of the as-built post construction phase of the development.

As a result of the scoping and consultation exercise, the air quality assessment of the effects of the construction and operational phases of the proposed development has focused on the following:

- Existing air quality along the proposed alignment
- The sensitivity of the proposed alignment in terms of its existing air quality
- Assessment of the potential impacts of the construction phases of the alignment
- Assessment of the potential impacts of the operational phase of the proposed alignment and airport approach roads
- Evaluation and mitigation of the effects of construction and as built operations
- Residual impact of construction and as built operations.
- Impact on the local road network as a result of passenger modal shift.

14.2. Methods

14.2.1. Legislation

14.2.1.1 National Air Quality Strategy

The Air Quality Strategy was published in April 2000 and was updated with an addendum in February 2003. It was adopted as the Air Quality Regulations 2000 and the Air Quality (Scotland) Amendment Regulations 2002. The Strategy sets out a framework by which air quality policy will be moved forward and sets out the roles the Government, its agencies (SEPA, local authorities) businesses and individuals have in improving air quality.

The Strategy sets health based standards and objectives for nine pollutants, with deadlines for their achievement. The pollutants include benzene, 1,3 butadiene, carbon monoxide, lead, nitrogen dioxide, ozone, fine particulates, sulphur dioxide and polycyclic aromatic hydrocarbons. The standards and objectives are presented in Appendix 14.

14.2.1.2 Local Air Quality Management

The Scottish Executive has recently provided revised guidance to assist local authorities to deal with their air quality management duties. The guidance is provided in Local Air Quality Management - Revised Policy Guidance. February 2003 LAQM.PG(S)(03) under Part IV of The Environment Act 1995. The guidance sets out:

- The statutory background and the legislative framework within which local authorities have to work;
- The principles behind reviews and assessments of air quality up to 2010 and the recommended steps that local authorities should take;

- How local authorities should handle the designation of air quality management areas and the drawing up and implementation of action plans;
- Suggestions for taking forward the development of local air quality strategies;
- Suggestions on how local authorities should consult and liase with others;
- The role of transport-related measures in improving air quality: and
- The general principles behind air quality and land use planning

14.2.1.3 Land Use Planning

The land use planning system has been an integral part in improving air quality and guidance has been prepared to assist local authorities incorporate air quality considerations into planning decisions. The guidance describes the contribution that local planning policy can make to long-term improvements in air quality through strategic and development control planning employing existing planning policy guidance such as:

- Planning Advice Note (PAN) 51: Planning and Environmental Protection.
- NPPG 17: Transport and Planning

14.3. Assessment

14.3.1. General

The scope of the assessment was determined following:

- Consultation with officers of the Environmental Heath Department of Renfrewshire Council.
- A review of existing air quality data along the alignment and its surroundings
- Site visits to confirm location of sensitive receptors and potential sources of pollutants

Consultation determined that:

- Glasgow Central Station is within the Glasgow City Centres Air Quality Management Area
- Much of the rail alignment, either within Glasgow City or Renfrewshire is not within an Air Quality Management Area.
- Glasgow Airport and its surroundings have not been designated an Air Quality Management Area
- Major approach roads to the airport in Renfrewshire have not been designated Air Quality Management Areas
- The alignment is not in close proximity to or impacted on by local industrial sources of pollution with the potential for significant air quality impact

The proposed development has the potential to impact on local air quality during construction and as-built phases as dust nuisance and air quality. Dust emissions are the major pollutant with the potential to impact at nearby residential, recreational, commercial and industrial properties and the local environment during construction. Although the duration of each phase of the alignments construction phase will be limited, such emissions need to be carefully controlled to minimise impacts on local sensitive receptors, amenity, vegetation and surface waters. Exhaust emissions from construction equipment/vehicles, traffic management during construction as well as changes in traffic movements following the opening of the rail link also have the potential to impact on local air quality.

14.3.2. Dust

The potential for dust formation during construction activities is difficult to quantify and is dependent on a number of factors. These include the type of activity to be undertaken, site clearance methodology, materials treatment/recycling, soil and substrata type, the number of preceding dry days, wind speeds and proximity and location of sensitive receptors.

Dust impacts may be found up to 500m from active construction sites (Bate, 1990) and may include visual impacts (e.g. reduced visibility), the coating and soiling of surfaces i.e. cars, windows etc., (in addition to physical and/or chemical contamination and corrosion of artefacts), coating of vegetation, contamination of soils and surface waters, and most importantly health effects due to inhalation and deposition on the skin. Dust levels upwind of construction site activities are likely to represent the ambient levels, whereas downwind of construction site activities, the level of dust may be 2 to 3 times higher (Millington, 1981).

Due to the technical difficulties in quantifying meaningful dust emission levels, emphasis is generally placed upon identifying those particular activities that give rise to the greatest dust emissions and formulating suitable control strategies. Premises and occupants within 100 m of a construction site are generally considered to experience the most significant impacts from construction dust (HA ,1995, USEPA, 1985).

There are no UK or EU regulatory standards for deposited dust, therefore the perception of nuisance is determined by officers of the local authority under the Environmental Protection Act 1990. International guidance and standards are presented in Appendix 14. Further information on the potential sensitivity of receptors to nuisance dust is provided in the DoE guidance document: "The Environmental Effects of Dust From Surface Mineral Workings (DoE, 1995)".

Indoor air quality impacts arising from construction dust will vary depending on the use of the buildings affected. Local residential premises may experience increased, albeit slight, indoor airborne particulates caused by the exchange of indoor and outdoor air (dependent on the individual method of building ventilation and the frequency of access to those premises). Local residential amenity impact, in terms of surface soiling of windows, garden furniture, washing and cars and a deterioration of local air quality during the construction period, is possible. The principal construction activities giving rise to dust emissions are likely to be as follows:

- Site preparation;
- Excavations, ground breaking and site levelling
- Windborne dust from stockpiled materials, unpaved working areas and areas with no vegetative cover;
- Material transfers to and from trucks/lorries;
- Vehicle/plant movements on unpaved roads and over construction sites;
- Particulate emissions from construction vehicles;
- Concrete batching and finishing.

Likely contributors to existing sources of dust in the area will be local traffic, industrial and commercial operations and normal residential activities. Information provided from East Renfrewshire Council indicates that no dust or PM_{10} particulate monitoring has been carried out in proximity to the site. However, existing air quality is predicted to meet all standards and objectives – Updating and Screening Assessment (USA) reported in June 2003.

The following classification system was adopted for the assessment of potential air quality impacts arising from dust generated by construction activities associated with the proposed development.

- Major — Area affected is less than 10m from an active construction site
- Moderate — Area affected is within 100 m of a major active construction site
- Minor — Area affected is between 100 m and 200 m from major active construction site or up to 10 m from a minor active construction site, demolition site or construction compound
- Negligible — Area affected is 100 m from any minor construction activity or 200m from any major construction activity.

14.3.3. Air Quality

Impacts other than dust with the potential to impact on local air quality during site preparation and construction will include exhaust emissions from construction vehicles and fixed plant. These sources would include site vehicles and mechanical plant, vehicles carrying materials to and from the construction sites, site visits, worker journeys etc.

Changes in ambient air quality may be compared with National Air Quality Strategy objectives as defined in the UK Air Quality Strategy and as amended by the Air Quality Limit Values (Scotland) Regulations 2001, and The Air Quality (Scotland) Amendment Regulations 2002 (Appendix 14).

The following classification system was adopted for the assessment of potential ambient air quality impacts arising from the proposed development.

- Major — a significant change which involves a variation in predicted concentrations of more than 25% of the air quality criterion, and exceeds that criterion
- Moderate — a noticeable change which involves a variation in predicted concentrations of up to 10% of the air quality criterion, and exceeds that criterion
- Minor — a perceptible change which involves a variation in predicted concentrations of up to 10% of the air quality criterion, but does not exceed that criterion
- Negligible — an imperceptible change which involves a variation in predicted concentrations of less than 10% of the air quality criterion, and remains below that criterion.

The main impact on local air quality is likely to arise as a result of changes in traffic management associated with staff and materials moving to and from the construction sites and vehicle movements associated with site activities post construction.

14.4. Baseline Situation

14.4.1. Proposed Alignment

The route alignment is illustrated in Figures 4.1 to 4.5. The new track starts in Glasgow Central Station. A new platform will be constructed in the area that now serves as a drop-off car parking facility. The new track will exit the station and travel to Paisley St James Station along and within the existing rail alignment. Just prior to Paisley St James station the new line will exit the existing alignment northwards, crossing Murray Street, Clark Street, McFarlane Street and the A726 on an elevated structure, before crossing St James' Park and the M8 on a viaduct, before entering the Airport, to the west of Greenock Road. The rail alignment and its associated infrastructure will require the relocation of the existing aviation fuel tank farm. A like-for-like replacement will be constructed to the west of St Andrew's Crescent as illustrated in Figure 2.1.

Much of the existing and proposed alignment is within a highly urbanised area, being a mixture of residential, commercial and industrial facilities. The new alignment will exit the existing alignment and traverse a commercial/industrial area until it crosses the A726, where it then bisects the St James' Park recreational area. The new alignment then crosses the M8 and enters the Airport, crossing the area currently occupied by the Fuel Farm and terminating at the south of Car Park N^{o}2 alongside St Andrews Drive.

Local air quality all along the existing and proposed alignment will be dominated by road traffic emissions. Glasgow City Council and Renfrewshire Council estimate that a large proportion of local NOx and PM_{10} emissions are attributed to road traffic. There are few industrial sources along the alignments that will impact on local air quality. Both the existing and proposed rail alignments passenger carriage sets are electrically driven. It is our understanding that freight traffic along the existing alignment will use diesel sets.

14.4.2. Receptors

In order to determine the potential impact of the proposed development on local air quality it is necessary not only to identify potential pollutants, but also those groups that are most likely to be affected by them. Emphasis in the Review and Assessment guidance is placed on non-occupational, near ground level outdoor locations where the public might be exposed for a substantial part of the day. Local Air Quality Management Technical Guidance Document TG(03) describes locations where consideration should be given to pollutant concentrations and impacts. Generally the guidance indicates areas 'where members of the public are regularly present'. The type of locations where people may be exposed to pollutant concentrations include:

- Residential properties;
- Shopping areas;
- Recreational facilities; and
- Schools and medical centres.

This proposal seeks a modal shift in airport passenger movements from roads to rail. The provision of the Glasgow City Centre to Airport rail link could divert local passenger movements from Paisley, along the alignment to rail, and also those passengers to the north south and east of the city and its suburbs who will be able to divert to Glasgow Central by public transport and then make the remaining journey to and from the Airport by rail instead of either by public or private transport along exiting major trunk roads.

The scheme will have the greatest potential to impact in the short term during construction. A significant redesign and reconstruction of the platform facilities at Glasgow Central will be required. This will have the potential to affect rail passengers, local residents, hotels and commercial operations. Construction activities will be undertaken along the existing alignment that will require the provision of a number of construction compounds. These compounds will be within the existing rail alignment, on land owned by Network Rail and/or SPT. One site will be located just off Gallowhill Road where the former Arkleston Branch. Other compounds will be located on St James' Park, and in proximity to the re-located Fuel Farm (see Chapter 2 for a full list of construction compounds).

Major construction will be required along the new alignment sections described above. This area is essentially industrial with few sensitive residential receptors. Local sensitive receptors in proximity to the alignment were identified from site visits and include residential properties on Greenock Street as it approaches the M8, and those in proximity to the new alignment on Clark Street, Greenhill Road and Murray Street. In addition, the Paisley Moss LNR and the local playing fields may also be sensitive receptors as they have a recreational function as defined in TG(03) above. These receptors are shown on Figure 12.1.

14.4.3. Existing Air Quality

14.4.3.1 Dust

As stated above, dust impacts in urban areas tend to be locally generated. Environmental Health and Planning departments may require careful control and monitoring of dust to preclude significant impacts during the development. Site visits did not reveal significant local sources of dust, other than those associated with existing minor constructional activities, road traffic or domestic activities.

14.4.3.2 Air Quality

All local authorities are required to review air quality in their area and to assess present and likely future air quality against set objectives under the terms of Part IV of the Environment Act 1995. If an area is identified as being unlikely to achieve the Air Quality Strategy (AQS) objectives, the local authority is required to designate an Air Quality Management Area (AQMA) and to develop an action plan to improve air quality.

No air quality monitoring was carried out at the proposed development. However both Renfrewshire Council and Glasgow City Council have undertaken a varying degree of monitoring in proximity to Glasgow Central, in proximity to the airport and its access routes in the urban areas containing the rail alignment.

14.4.3.3 Renfrewshire

Renfrewshire Council reported in 1999 that there was no need for the designation of an air quality management area in Renfrewshire. An 'Updating and Screening Assessment (USA)' was issued in August 2003 following guidance and new Air Quality Regulations issued by the Scottish Executive which amended air quality objectives The report concludes that *'a more detailed assessment is required for nitrogen dioxide, sulphur dioxide and PM_{10} objective'*. This assessment is currently underway. The source of sulphur dioxide and some particulate emissions was described as solid fuel use in residential properties. Nitrogen dioxide and PM_{10} particulates were associated with roadside locations

Information on existing background air quality is based on the published and ratified data of the DEFRA Automatic Monitoring Network. Background ambient air concentrations for the area containing the proposed development site were established from the NETCEN website (www.airquality.co.uk). Predicted future background concentrations were derived 2005 and 2010, taking into account changes in emissions, using the information provided on the DEFRA websites and the UK NETCEN Year Adjustment Calculator (version 1.1a). The data provided along the route of the new alignment (247500, 664500) is presented in Table 14.1.

Table 14.1 Background Air quality (247500, 664500)

	2005 μgm^{-3}	2010 μgm^{-3}
Nitrogen oxides (NO_x) (μgm^{-3})	36.5	29.5
Nitrogen dioxide (NO_2) (μgm^{-3}) annual mean	23.0	19.8
Particles (PM_{10}) (μgm^{-3}) annual mean	15.6	14.9
Carbon Monoxide (CO) (mgm^{-3}) annual mean	0.20	0.14
Benzene (μgm^{-3}) annual mean	0.41	0.35
1,3 Butadiene (μgm^{-3}) annual mean	0.14	0.10

The above data indicate that background concentrations of all AQS pollutants to be well below their relevant standards and objectives (see Appendix 14) and are likely to fall in the future. Though no continuous monitoring for oxides of nitrogen has been carried out by Renfrewshire Council, monitoring for NO_2 has been undertaken at 31 locations using diffusion tubes. A summary of the monitoring data from sites in proximity to the alignment is presented in Table 14.2 below.

Table 14.2 NO_2 diffusion tube monitoring

	Nitrogen dioxide (μgm^{-3})		
Locations	Mean 2001	Mean 2002	Predicted 2005
St Andrews Crescent	18	22	20
Kirklandneuk Road	14	16	15
Greenock Road	19	22	20
Regent Street	14	18	16
Montgomery Road	25	32	30

Source: Renfrewshire Council. 3rd Stage Review and Assessment

Renfrewshire Councils `Air Quality Updating and Screening Assessment published in 2003 indicates that following diffusion tube measurements real time NO_2 monitoring analysers will be located on Central Road, Paisley, a roadside location and in proximity to the Airport. Renfrewshire Council has carried out PM_{10} particulates monitoring at Kirklandneuk Primary School some 1300m east for the airport runway.

Table 14.3 PM_{10} Monitoring in Renfrewshire

PM_{10} Data	**2001**	**2002**	**2010**
			Annual mean concentrations (µg/m^3)
Kirklandneuk Primary	13.5	13.8	13.1
			Number of days exceeding 50 µg/m^3 objective
Kirklandneuk Primary	4	6	-

Source: Renfrewshire Council.3rd Stage Review and Assessment

14.4.3.4 Glasgow

Glasgow City Council Stage 3 Air Quality Review and Assessment report indicates that the Objectives for hourly levels and annual mean levels of nitrogen dioxide will be breached at several locations within Glasgow City centre. The main source of nitrogen dioxide in the City centre is noted as being road traffic. An Air Quality Management Area has been declared to cover the centre of Glasgow as indicated in Figure 4.4.

Following the declaration the City Council has begun the task of investigating methods to reduce nitrogen dioxide levels. With road traffic the prominent source of air pollutants in the City centre, local transport and development plans that influence air quality are being examined for their air quality implications.

No air quality monitoring was carried out along the alignment as part of this assessment. However, two monitoring stations, operated by Glasgow City Council and the DETR Automatic Urban and Rural (AURN) network, are within 500m of Glasgow Central should provide a good indicator of air quality in proximity to the Station. The statistics for 1999 to 2002 are shown in Table 14.4 below.

Table 14.4 Air Quality Data for Glasgow 1999- 2002

PM_{10} Data	**1999**	**2000**	**2001**	**2002**
				Annual mean concentrations (µg/m^3)
City Centre (St Enoch)	23	28	22	20
Kerbside (Hope St)	28	27	31	30
				Number of days exceeding 50 µg/m^3 objective
City Centre (St Enoch Square)	9	27	13	8
Kerbside (Hope St)	43	23	36	32

NO_2 data	**1999**	**2000**	**2001**	**2002**
				Annual mean concentrations (µg/m^3)
City Centre (St Enoch Square)	38	36	34	32
Kerbside (Hope St)	69	72	71	74
				Number of times exceeding hourly mean of 200 µg/m^3 objective
City Centre (St Enoch Square)	3	2	0	18
Kerbside (Hope St)	36	17	51	38

Source NETCEN. Glasgow Centre - St Enoch Square. Operating since July 1996. Glasgow Kerbside – Hope Street Operating since 1998

Air quality monitoring indicates that the annual average PM_{10}, and NO_2 and CO concentrations are declining. Annual mean background and kerbside PM_{10} particulates concentrations were below current standards, and approaching the stringent objectives set for Scotland of 18 µg.m^{-3} for 2010. The number of

days exceeding 50 µg/m^3 were below existing standards but above the 2010 objectives. Ambient carbon monoxide concentrations at all sites were well below standards and objectives. Ambient background concentrations of NO_2 were at or below air quality standards and objectives. However, kerbside monitoring indicated exceedences of both annual mean objectives and the number of allowable short-term exceedences.

14.5. Construction Effects

14.5.1. Potential Impacts

The potential for dust nuisance impact at the proposed site is most likely to arise from any site clearance, excavations and site grading activities, particularly during prolonged periods of dry weather. Sensitivity to the impact of construction will be dependent on the proximity of potentially sensitive receptors to the development, perception of the need for the development by the local community and the scale and duration of the development construction. The proposed construction will be phased over approximately 26 months. It is likely that there will be an intensive periods of site demolition and clearance, followed by phased construction.

14.5.1.1 Glasgow Central

Major refurbishment, demolition and platform construction will be required within the Station complex. These activities will have the potential to impact on rail passengers and local residents and businesses around Argyle Street. Indoor air quality impacts arising from construction dust are likely to vary depending on the use of the buildings affected. Local commercial premises are likely to be the worst affected and may experience increased levels, albeit slight, of indoor airborne particulates caused by the exchange of indoor and outdoor air from regular patronage by the public. Exposure of the occupants of local office premises will be less significant and will depend on the individual method of building ventilation and the frequency of access to the premises. Local residential properties tend to be apartments with no individual outside amenities. However, potential impact in terms of building access, surface soiling of windows, and deterioration of local air quality during the construction period is possible.

14.5.1.2 Existing Alignment Construction

Construction activities along the existing alignment are expected to be started in 2007 and will continue throughout the development phases. The main impact of these relatively minor constructional activities is likely to be short-term nuisance caused by the deposition of dust settling on properties, vehicles, street furniture and vegetation. It is not expected that these activities will interfere with other transport infrastructure along this route, being part of and within the existing alignment. Much of the alignment is relatively remote from sensitive receptors and so the constructional activities will not impact significantly on indoor air quality, or local amenity.

Construction vehicle and plant exhaust emissions have the potential to impact on air quality. These sources would include: site preparation vehicles and equipment, vehicles carrying materials to and from the construction sites; mobilisation of plant; site visits; worker journeys, etc. However, the numbers of vehicles accessing the alignment and its associated construction compounds will be relatively low.

14.5.1.3 New Alignment Construction

The enabling, site clearance and construction of this phase of the development is expected to be started in 2007 and will continue throughout the development phases. The alignment will be a combination of raised embankment from the existing rail link, and as it crosses Murray Street and then viaduct from Clark Street to the A726/McFarlane Street. The track will be carried across St James' Park and the M8 on a raised viaduct.

The main potential impact of this, the major construction activity, is likely to be short-term nuisance caused by the deposition of dust settling on properties, vehicles and street furniture associated with the construction of the raised embankment. Some residential properties are located within these areas on Greenhill Road, Clarke Street and Murray Street, being located 100m, 50m and 40 from the proposed alignment route respectively. These areas will be subject to major demolition and site clearance operations. Though unlikely to be sensitive to additional constructional activities, they must be considered as such in the design of constructional activities and operations.

It would be expected that this major long-term construction phase of the development will have the greatest potential for dust generation, unless properly managed. Scheme design has provided for the delivery of a high proportion of construction materials and staff by rail. Construction road traffic will access those areas not accessible by rail from the M8. The number of vehicles used during this phase of the construction will vary over time.

Properties along Greenock Road will be approximately 100-150m from the proposed raised concrete viaduct as it crosses St James' Park. Given effective site management, it is not considered that

construction will impact significantly on these properties. However, construction will have the potential to have a major impact on amenity of those using St James' Park. The movement of site preparation and construction vehicles will be restricted and carefully controlled to avoid unnecessary nuisance impacts to local sensitive receptors. HGV movements off site will be carefully managed. The majority of vehicles accessing the site will be staff and visitor vehicles. The main period of HGV access to site will be during demolition and construction operations when building materials and fill will need to be delivered or removed. However, the majority of vehicle accessing the site will essentially be light vehicles and vans.

Guidance on Multi-modal studies (DEFRA 2000) indicates that a change in vehicle flow of 10% is required to bring about significant changes in air quality. Consequently, options resulting in changes in traffic flows of less than 10% can usually be neglected unless there are particular sensitivities such as traffic queuing.

Estimates of traffic movements associated with construction based on likely volumes of material imports required over the construction period indicate there to be less than 50 vehicle movements per day on any of the approach roads (See Appendix 2). Given that construction road traffic movements would be on major local trunk routes, with existing traffic flows exceeding 10,000 vehicles per day, we can say that increases in local traffic during construction phases will be negligible given that the impact on air quality associated with such changes would be well below the 10% deemed as significant in the Guidance on Multi-modal Studies.

14.5.1.4 Fuel Farm

The scheme requires the relocation of the existing Fuel Farm. The proposed new site is some 300 metres to the west of the existing fuel farm, and is an area of unoccupied ground. The site is located immediately adjacent to the airside boundary of the airport at its northern limit. The new facility will be a like-for-like replacement for the existing fuel farm. This new location is some 15m from the Paisley Moss Local Nature Reserve (LNR) and a cycleway that runs close to the southern and western boundaries of the new site.

The fuel farm comprises fuel storage tanks, containment facilities, pumping facilities and tanker loading/unloading facilities. The new facility will be constructed prior to the decommissioning of the existing facility .The construction will require minor site clearance and utilities installation, and the delivery and installation of prefabricated above ground utilities. The site is remote from local human sensitive receptors. However, the proposed site adjoins the Paisley Moss LNR. As such construction activities will need to be carefully controlled to minimise any potential impact of dust deposition on sensitive habitats within the Reserve.

14.5.1.5 Construction Compounds

A number of small construction compounds will be located alongside the existing alignment. There will be used to secure materials and equipment. Vehicles will access these compound regularly throughout the construction period. However, these compounds will not hold large quantities of constructional materials and will be provided with appropriate facilities and equipment so as to minimise the potential for dust generation.

14.5.2. Mitigation

Construction methodology will be discussed with the Statutory Agencies, Renfrewshire Council, Glasgow City Council and the developer to provide a Construction Code of Practice which will seek to ensure that the potential impact of all constructional phases and activities including remote construction compounds will be minimised by using best practice techniques and methodologies.

A draft construction programme has been prepared and the draft construction strategy is included in Appendix to Chapter 2 of the ES. The number of vehicles accessing construction sites and compounds will be carefully controlled. On site parking will be provided for site operations staff. All site staff and visitors will be required to use the vehicle parking areas provided. No unnecessary vehicle movements either to or from or on site will be permitted.

All potential dust generating activities and locations will be identified prior to commencement of work. Dust will be controlled at source by the use of appropriate plant handling techniques, good maintenance and housekeeping, and will be minimised. Dust control will be effected by the following:

- Site enclosure. The major construction, excavation and demolition activities in close proximity to sensitive receptors will be enclosed prior to commencement.
- Restricted access A single construction site access will be provided. This access will be provided with wheel wash facilities to ensure that the transfer of materials off site is minimised.
- vehicle movements on unmade roads will be restricted
- Restriction of site vehicle speeds. All vehicles will be required to adhere to site speed limits that will be designated to minimise on site dust generation.

- Materials recycling will reduce the extent of off-site disposal and the use of fresh materials. Suitable materials will be crushed on site using mobile equipment which will comply with the requirements of Process Guidance Note 3/16 in terms of dust generation, by enclosure and wetting of materials and processes.
- Minimisation of dust generation from the loading of trucks. The potential for dust generation associated with the transfer of materials onto vehicles will be controlled by the enclosure of materials transfer equipment, the wetting of small materials and the minimisation of drop heights.
- Control of dust emissions from vehicles leaving the site. All vehicles carrying materials with the potential to generate dust entering or leaving the site will be sheeted
- Minimisation of on-site storage. Storage of materials with the potential for dust generation will be minimised.
- Where necessary, materials stored on site will be wetted and profiled to minimise dust generation by wind-blow. Storage areas will be located away from potentially sensitive receptors where practicable
- Stationary equipment with the potential for dust generation will be sited away from sensitive receptors where practicable. Where operations are in proximity to sensitive receptors, enclosures will be provided
- Access roads will be swept periodically to remove dust from hard surfaces
- Unsurfaced working areas will be watered when necessary to maintain moisture content and hence reduce dust generation
- Re-vegetation of open areas to minimise wind blown dust.

Daily visual site inspections will be carried out by responsible staff to ensure that the build up of materials with the potential to generate dust on site is prevented. Control of dust will be effected by strict supervision and staff empowerment to curtail operations at any time that dust cannot be satisfactorily controlled. Activities identified as generating dust will be stopped until that dust has been controlled. Materials with the potential for dust generation will either be removed from site or stored in such a manner to reduce dust generation potential.

Planning conditions will ensure that dust concentrations are reduced to acceptable levels at local sensitive receptors. In addition, local residents, neighbours and businesses will be informed in advance of the intention to commence work and the projected duration of the work.

14.5.3. Residual Effects

Residual impacts along the existing alignment are predicted to be negligible given the minor constructional activities, and distances to potentially sensitive receptors.

The potential for dust nuisance impacts along the raised embankment construction site exists. However, this area is essentially commercial/industrial with a recent history of major demolition, site clearance and construction. However, the area does containing a few residential receptors. The potential impact on these residential properties will be ‘moderate’ as defined by the assessment criteria described above. However, given effective management and implementation of mitigation measures as described above, impact would be expected to be negligible.

Given the existing air quality, site sensitivity and existing traffic infrastructure, impact of construction on local air quality are likely to be negligible. Increases in local traffic levels associated with construction activities are predicted at less than 50 vehicle movements per day on all roads. Guidance from the Scottish Executive suggests that changes of less than 10% will be insignificant.

14.6. As-Built Operational Effects

14.6.1. Potential Impacts

14.6.1.1 Local Air Quality

The proposal seeks to displace road traffic passenger movements to the airport by rail journeys. As such, and given that the rail link will be electrical, the as built rail alignment will not impact on local air quality along that link. The rail link will not interfere with existing traffic management either along the existing or new alignments, and as such will not impact on local air quality along the route.

Where the rail link will impact on local air quality will be in the reduction in road traffic movements approaching the Airport. It is expected that modal shift will be in the movement of passengers approaching the airport along the M8. Consequently there is expected to be a net benefit to air quality locally as local road journeys are reduced.

However, transport planners expect that this reduction in road trips will only offset predicted traffic growth to the airport. Consequently, traffic levels approaching the airport from the M8 are expected to stabilise rather than decrease.

Traffic data presented in Renfrewshire's USA 2003 predicts daily traffic flows along the M8 in proximity to the airport of 114,936 M8 J27-28 and 100,275 (J28-28a). Predicted modal shift to rail by airport passengers and staff as discussed in Chapter 12 of the ES will be 80% and 35% respectively which represents a major benefit. However, in terms of how this will reduce the overall number of road journeys along the M8 it is predicted that the reduction will be less than 1%.

This reduction in vehicle trips although very small will result in positive air quality benefits along the M8 corridor. The DMRB methodology predicts that ambient levels of carbon monoxide, nitrogen dioxide, benzene and suspended particulate matter at receptors within 50m of the M8 alignment will fall by up to 0.1%. The methodology states that there is unlikely to be any effect on air quality due to road traffic at properties beyond 200m from any roads, which experience a change in traffic flow.

14.6.1.2 Global Air Quality

It has been estimated that passenger numbers using GARL will be 1,388,000 in 2009 and 1,849,000 in 2030. If one assumes that an average road journey saved by the opening of the rail link as 16km, the net saving in CO_2 emissions in 2009 would be 1,860t CO_2 per annum.

This saving needs to be offset by the net remote emissions of power consumption of the rail network. CO_2 emissions associated with trains are neither clear-cut nor agreed. The literature suggests car to train emission per seat-km ranging from 1:1 to 6:1, dependent on loading, power source, distance to power source, train speeds etc. If one takes the middle range of a 3:1 ratio, net CO_2 savings would be of the order of 1400 tonnes CO_2 per annum in 2009, rising to over 1800 tonnes per annum in 2030.

However, the total savings made though beneficial will be negligible in comparison with the 61Mt equivalent CO_2 emissions for Scotland in 2000. Consequently, the scheme will have a negligible benefit in terms of total greenhouse gas emissions.

14.6.2. Mitigation

The change in pollutant concentrations at potentially sensitive receptors between the projected baselines and the `do-something' scenarios are considered beneficial and `negligible'. Consequently, no mitigation measures are required.

14.6.3. Residual Impacts

The main potential impact on local air quality from the proposed development would be expected to arise as a result of the transfer of passenger movements on approach roads to the airport resulting in a decrease in road traffic movements. A DMRB screening assessment for predicted traffic movements indicates the reduction of 0.5% in traffic levels on the M8 will result in a potential decrease in local pollutant concentrations of less than 0.1%. Consequently, the impact of the scheme on local air quality can be considered beneficial and 'negligible'.

Local air quality is predicted to improve with and without the proposed development, compared with that prevailing in the base year. Total pollutant emission for the area will decrease as road passengers switch to rail transport. There will be a negligible decrease in carbon dioxide emission associated with the scheme as a result of the transport modal shift.

Table 14.7 Environmental Impacts Dust and Air Quality Summary Table

Potential Impact	Significance	Mitigation	Residual Impact
Site clearance			
Exhaust emissions from plant and construction vehicles working on and accessing the alignment	Adverse, Negligible (short term)	Vehicle emission controls and minimisation of site visits	Adverse, Negligible (short term)
Construction			
Exhaust emissions from plant and construction vehicles working on and accessing the alignment	Adverse, Negligible (short term)	Vehicle emission controls and minimisation of site visits	Adverse, Negligible (short term)
Operation			
Exhaust emission from vehicles accessing the airport	Beneficial, Negligible (long term)	None	Beneficial, Negligible (long term)