4 Disruption Due to Construction

4.1 Introduction

This Chapter describes the effect of construction of the Scheme on the built and natural environment, occurring between the start of the pre-construction works and the end of the contract maintenance period. Disruption due to construction need not be as a result of work directly on the road scheme itself, but can also arise from advance works on utilities, which may extend well beyond the highway construction site. The construction effects are of course temporary, but on some schemes or if not correctly mitigated, they may prove to be significant. Typical construction impacts might include a localised increase in noise, vibration, dust and dirt, and a loss of amenity due to the presence of heavy construction traffic.

Those affected can include people in their homes or places of work, people visiting community facilities, and pedestrians, cyclists or vehicle travellers. Other environmental disciplines are covered elsewhere in this ES, as follows:

- Chapter 3 – Cultural Heritage;
- Chapter 5 – Ecology and Nature Conservation;
- Chapter 6 – Landscape and Visual Effects;
- Chapter 7 – Land Use;
- Chapter 8 – Water Resources.

The potential temporary construction impacts upon these different environmental receptors are assessed in the individual chapters, and not within this chapter. This chapter therefore focuses on the disruption due to construction, and the potential impacts upon people in the Threapland area.

4.2 Construction information

The construction period will include construction of the works, which is estimated to be around eight months, utility diversions, which could be up to three months prior to the construction of the works, and a one-year contract maintenance period, wherein any construction faults that are found will be repaired. Thus the total period will be approximately 23 months, but with the peak period of construction activity lasting approximately four months.

The construction of the works is expected to be undertaken via a traditional 'Employer's Design' engineering contract with the works being won in competitive tender and constructed by the successful contractor to Transport Scotland's specification. The programme and method of construction of the works and the plant and equipment needed for construction will be determined by the Contractor, subject to any contractual requirements placed upon the Contractor regarding, for example, restrictions on working hours.

The arrangements for any utility diversions will be agreed with the appropriate utility companies and it is likely that some diversion works will be undertaken in advance of the main works. The

Contractor is responsible for liaison with utility companies during utility diversions. It is normal for the Contractor to carry out the civil engineering part of the utility diversion works, such as duct laying and chamber construction. It is anticipated that diversion works will be restricted to the immediate vicinity of the A96 carriageways and that associated disruption to services, disruption to traffic and noise effects will be kept to a minimum in accordance with normal procedures for works in and around the public road network and will be for a short time only. Any diversions undertaken within the main works period will be relatively small in scale in comparison with the main construction works.

In the expectation that the works are undertaken in accordance with the specification, any defective works that might arise after completion of the works will be relatively small scale. The tendency is to undertake any such remedial works at the end of the 1-year maintenance period and these will be for a short time only.

4.3 Approach and Methodology

Disruption due to construction is assessed in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 3. Effects of operation of the scheme are not considered in this Chapter, which deals only with construction effects, and as noted above other environmental disciplines are covered elsewhere in this ES.

The assessment criteria used in this chapter is outlined in section 1.4 of this ES. This assessment includes sections on consultations, baseline information, environmental effects (including construction activities and predicted effects of construction), mitigation, residual impacts and summary. The significance of environmental effects is the same as those outlined in section 1.4 of this ES.

Although the construction contract will include requirements and restraints to minimise construction impacts, some adverse effects are unavoidable. Assessment of these effects is not precise because their extent, severity and duration will depend on the Contractor's programme, methods of working and external factors such as weather conditions that cannot be predicted with certainty and commercial factors, such as sources of material that limit the Contractor's choice of supply.

Construction impacts in terms of dust, noise and construction traffic have been dealt with qualitatively, based on experience from previous projects, with the focus on mitigation measures.

As noted in Section 1.3 of this ES, the operational air quality and noise and vibration impacts have been scoped out. However, this chapter considers these issues during the construction period.

Sources of information used in this chapter were obtained through desktop studies primarily using OS mapping sources and interactive online agency maps, and through site visits and surveys. The various information sources are referenced in Appendix 2.

4.4 Consultations

None of the consultee responses received in response to the Scoping Report had comments specific to the potential impacts that could arise as disruption due to construction, as they are all specific to other chapters within the ES. However, the consultation response from ScotWays did highlight the presence of a right of way, GM65 on the National Catalogue of Rights of Way, just beyond the very western extent of the Scheme. The consultation responses are shown in Appendix 3.

However, there will have to be further detailed consultation between the Contractor and the local planning authority, Moray Council, in advance of the construction works starting.

Where quantities of material are sourced off-site from borrow pits, consultation with the planning authority will be required. The locations of borrow pits and disposal sites have not yet been determined. It may be the case that material is sourced from established quarries with planning permission. For this contract it is anticipated that approximately 31% of all material excavated on site will be used on site in areas of fill, so arrangements and consultations for off-site disposal of the remaining 69% of 'cut' material will be required. It is envisaged that material excavated during construction will be used for landscape works associated with the Scheme, such as raising of the carriageway profile at Loch Oire road junction.

To control the potential nuisance associated with construction noise and vibration, the Contract will include restrictions on noise and vibration levels and working hours where applicable. These restrictions will be agreed with the local planning authority and monitored throughout the construction period.

Similarly, the Contract will include restrictions on disruption to traffic flows. These will include, for example, the availability of traffic lanes on the A96 and acceptable periods for temporary traffic signals. Consultations with the respective roads authorities for the A96 (Transport Scotland) and the side roads (Moray Council) will be required.

4.5 Baseline

The proposed construction works will cover an area centred on the existing A96 carriageway in the vicinity of Threapland and approximately 500m to the east of Lhanbryde. It is a predominantly rural area, with the dominant land uses being areas of agricultural land and plantation woodland, and with Loch Oire located approximately 30m to the south of the A96 carriageway.

4.5.1 Residential and Commercial

However, there are a number of residential properties that are in close proximity to the Scheme, which could be impacted during the construction period. The potential receptors that could be disrupted during the construction period are shown in Figure 4.1. These include the properties of Pomona at Threapland Garden Centre, and the Woodlands property set further back from the A96 carriageway behind the Garden Centre. Tilhill and Dumella are both immediately north of the existing Threapland junction and the A96 carriageway. The residential properties at Birchbank and Evanton are located where the southern leg of Threapland junction

joins Loch Oire road. Larchfield is a residential property located between Loch Oire and Loch Oire road, slightly further south and away from the A96 carriageway than Birchbank and Evanton.

The only commercial organisation within the study area is Threapland Garden Centre, immediately adjacent to the A96 carriageway at the western end of the Scheme, in close proximity to the Pomona and Woodlands residential properties. Access to the Garden Centre is gained directly from the A96 carriageway.

There are currently no bus stops along the A96 carriageway within the boundary for the Scheme construction activity.

4.5.2 Recreation and Amenity

Along the length of the proposed Scheme there is no adjacent pavement or footpath provision for pedestrians, with grass verges bordering the carriageway. However, the consultation response from ScotWays did highlight the presence of a Right of Way, GM65 on the National Catalogue of Rights of Way, just beyond the very western extent of the Scheme. This starts at the A96 carriageway and follows a route northwards towards the cemetery on the eastern edge of Lhanbryde.

Although the A96 carriageway is currently 'cycleable', there is no specific provision for cyclists and they have to share the carriageway with motorised vehicles. National Cycle Network Route 1 (NCN 1) links Garmouth with Elgin, and passes approximately 3km to the north of Threapland. Furthermore, there is a proposal for a future NCN cycle route section between Garmouth and Fochabers via Mosstodloch, which will be approximately 4km to the east of the Scheme.

There are no riding centres for equestrians or bridleways located within a 500m radius of the Scheme, and so this issue is not considered further within the ES.

The Threapland and Loch Oire area is used for informal recreation or amenity purposes by local residents and other local visitors. In the past Loch Oire was used for fishing but this activity is longer permitted. The loch is adjacent to a roadside lay-by on Loch Oire road, and whilst access to the shore of the loch is feasible there is no formal footpath provision. The site is well known to birdwatchers that are able to view wildfowl on the loch from the lay-by or the nearby shore. However, no formal recreation or visitor surveys or analysis have been undertaken as the area is not a recognised tourist or visitor area or attraction, and is used more on an ad hoc basis by local people.

4.5.3 Summary

Table 4.1 below outlines the main receptors located within 100m of the Scheme, and the corridor in which construction disruption may be experienced is outlined in Figure 4.1. The receptors located within this 100m corridor are shown in this figure.

Table 4.1 – Main receptors located within 100m of the Scheme

Receptor	Issues
Residential properties (and distance from the A96 carriageway, which is the main focus of construction activity) **Tilhill** (40m) **Dumella** (80m) **Pomona** (10m) **Woodlands** (100m) **Larchfield** (220m) **Evanton** (140m) **Birchbank** (140m)	Impacts relating to localised air quality, noise and vibration, mud on roads, and dust intrusion during construction. Potential impacts relating to property access diversions, the number of construction vehicles on local side-roads, both leading to temporary increase in journey times.
Commercial properties	Potential disruption / disturbance to Threapland Garden Centre.
Vehicle travellers	Disruptions to journey times for vehicle travellers using the A96 and side roads affected by the scheme.
Pedestrians, cyclists, and equestrians	Potential impacts on movements and activities along the A96 and within the wider Threapland area.

A number of other receptors, potentially impacted during the construction period, have been assessed elsewhere within the ES. These include Loch Oire Site of Special Scientific Interest (SSSI) and its outfall burn, Sleepieshill Wood, cultural heritage receptors such as the AA sentry box and an unscheduled cropmark, the local landscape, agricultural land and other land uses.

4.6 Environmental Effects

4.6.1 Construction Activities

The main construction activities that will be required are:

- Site clearance and enablement;
- Provision of temporary site compound(s);
- Topsoil strip and storage;
- Tree felling and removal;
- Bulk earthworks, especially the embankment construction to remove the carriageway sag at Loch Oire road junction;
- Roadworks e.g. carriageway widening and surfacing;
- Drainage, new Loch Oire outfall culvert construction under the A96 carriageway and construction of retention pond to the north of the carriageway;
- Landscape planting.

Site clearance will be required over approximately 4.28ha. It will be situated in largely agricultural land, both arable and grassland grazing, with some trees and scrub removed adjacent to the road.

At least one construction site compound will be required. The location of the compound will be for the Contractor to determine with the agreement of the owners, though it will require discussions with the local planning and roads authorities on planning issues and safety of access to the public road network.

It is anticipated that around 7100m^3 of topsoil could be stripped from the site and will be returned to landscaped areas. Bulk earthworks will be a major construction activity as sections of the proposed Scheme are to be built on embankments. The carriageway will be widened and a temporary diversion will be implemented to assist with the removal of the sag. The estimated cut volume of scheme is 21240m^3 (69%) and the volume of fill is 9587m^3 (31%).

Finally, on completion of the Scheme, areas of the works will require tree and shrub planting works.

4.6.2 Effects of Construction

Residential Properties

Temporary site compounds have the potential to cause localised and temporary impacts upon local receptors, specifically at Threapland, the local residents of the residential properties. There will be significant site construction traffic associated with the construction compound, and plant associated with the construction activity across the site. This is likely to give rise to a noticeable increase in noise for the duration of the peak construction activity, currently estimated to be approximately four months. However, this will be limited to normal construction site working hours, and this noise impact will therefore cease at the end of the working day and evenings. There will be limited vibration from the movements and work undertaken by plant. However, so significant vibration impacts are expected, as there will be no construction of any structures such as bridges, that would require piling or other intrusive construction techniques.

Due to the existing good air quality on site at present, the rural location, and the limited extent of construction activity, air quality is expected to remain high on site during and post-construction.

Depending on the prevailing weather conditions throughout the period of construction, a number of impacts could potentially arise. Particularly dry weather conditions could lead to the production of noticeable levels of dust, either in the air or on the ground and roads. Wet conditions could lead to noticeable levels of mud on the A96 carriageway and the side roads within the scheme construction area.

The presence of the site construction compound can also lead to other limited impacts such as litter.

The magnitude of the impacts will depend on a number of key factors. It is likely that the peak of construction activity and impacts such as noise and dust will occur during the major earthworks and construction of the embankment to remove the sag in the carriageway. This likely to have the greatest impact upon the properties at Pomona and Tilhill, as they are within

50m of the carriageway. The impacts are likely to be reduced for the other residential properties within the Scheme area, as they disruption due to construction impacts will be reduced with the greater distance from the focus of construction activity.

The potential for surface water run off into local watercourses and leaching of chemical stores has been assessed as part of both the Ecology and Nature Conservation (Chapter 5) and Water Resources (Chapter 8) sections of this ES, and appropriate mitigation measures have been proposed.

Although the location of the site construction compound has yet to be confirmed, it is likely to give rise to a 'moderate' impact (a moderate change to the environment) in the absence of any mitigation. The receptors are assessed as of being 'high' sensitivity, as they are residential properties in close proximity to the construction activity.

Commercial Properties

The impacts outlined above for residential properties will also apply to the one commercial property within the Scheme area, Threapland Garden Centre. It will be subject to the same levels of noise, vibration, dust and mud as both Pomona and Tilhill properties, due to the close proximity to the A96 carriageway and associated construction activity.

The Garden Centre may also suffer temporary impacts to the frontage and parking areas of the property, when the shared footpath and cyclepath are constructed alongside the A96 carriageway. It is also possible that some vehicle travellers will avoid this section of the A96 carriageway due to the potential disruption caused by construction activity, which could have implications for visitor numbers.

The Garden Centre is assessed as a 'high' sensitivity receptor and the impacts are also assessed as 'moderate' impact in the absence of mitigation.

Vehicle Travellers

The majority of works are required to make changes to the existing A96, primarily removal of the sub-standard sag, the stopping-up of existing junctions, the addition of hardstrips and ghost islands.

There will be potentially locally significant additional construction traffic to the adjacent road network. In addition there is the potential for delays for traffic travelling on the A96 carriageway, as there will be traffic management in place for the majority of the peak construction period, which is due to last eight months. Delays are likely to be most significant when embankment construction results in a temporary road diversion to the north of the carriageway in the adjacent arable field.

There will also be disruption to local journeys for residents north and south of Threapland junction. There will be temporary diversion of the A96 access to Loch Oire and the residential properties south of the junction during construction of the new south leg of the Threapland junction.

There will be permanent diversion of the A96 access to and from Loch Oire junction created by the access stop-up. However, alternative vehicular access from the A96 will be possible via the south leg of Threapland junction – with only minor extended local journey impacts.

There will be temporary property access and vehicular journey disruption for the Threaplands Garden Centre and residents Pomona and Woodlands residential properties due to vertical geometry and junction improvement works on this section of carriageway.

Typical annual average daily traffic flows on the A96 at Threapland are approximately between 14,000 to 17,000 vehicles per day, and any traffic lights or other traffic management could cause delays to a high number of vehicles. It is considered that the magnitude of impact will be moderate and the sensitivity is medium, therefore the significance will be minor adverse.

Pedestrians, cyclists and equestrians

There will be temporary journey disruption for cyclists using the A96, which will occur due to the junction improvement works. Cyclists will generally experience impacts similar to those expected for vehicular travellers, in that they could expect to experience periods during construction where local access diversions are imposed, or there were short delays as a result of the traffic management plan. However, given the limited numbers of cyclists that are currently thought to use the A96 carriageway in this location, and considering that there are no significant pedestrian or equestrian users of the A96 in the Threapland area, then the magnitude of impacts is assessed as 'slight' adverse to a 'medium' sensitivity receptor.

4.7 Mitigation

The following mitigation measures relate directly to disruption due to construction impacts, and further mitigation measures are given in relevant chapters elsewhere in the ES.

Noise and Vibration – specific measures

To control the potential nuisance associated with construction noise and vibration, the Contract will include restrictions on noise and vibration levels and working hours where applicable. These restrictions will be agreed with the local planning authority and monitored throughout the construction period. These measures are detailed in BS5228 (1997), Noise and Vibration Control on Construction and Open Sites and should form the basis of control and limiting of potential impact to noise sensitive locations. These measures should include:

- Positioning of static plant as far as possible from residential properties, and utilising available screening by temporary structures, stock piles, etc;
- Use of well maintained plant, and where possible new plant manufactured under more strict EC guidelines for manufacturers;
- Substitution of unsuitable plant;
- Temporary screening using sandbags, 20mm plywood sheeting or similar dense boarding may be required to reduce impact of static machinery or extensive works close to noise sensitive locations. Such measures can be best assessed during the contract by monitoring;

- Maintenance of silencers and moving components.

General / Residential Properties

The location and operation of site compounds will be subject to the approval of the relevant planning and roads authorities, and it must be managed in a sympathetic manner to local residents and in accordance with best practice.

The Contractor will be expected to comply with good practice dust suppression requirements, such as the provision of water bowsers to damp down dust. There will be a requirement on the Contractor to take measures to minimise the amount of dust. Such measures might include, for example, dampening haul roads and stockpiles, keeping roads clean and using covers to minimise dust blow from lorries, and monitoring the impacts upon the downwind residential properties throughout construction. Instructions will be included within contract documents to require the Contractor to install appropriate measures to avoid the deposit of mud on the road as far as is reasonably possible and to remove any deposits that do occasionally arise.

Effects on soil resources will be mitigated by employing high standards of soil handling and management during the construction and by avoiding the creation of bare areas of permanently exposed soil that would be vulnerable to erosion. The contractor will be required to undertake pollution control measures to deal with any contaminated land encountered during the site operations.

It is not anticipated that the contract will require any construction works to take place outside normal hours, though some overnight paving work, for example, would ease traffic restrictions during the working day. However, there may be items of plant (e.g. dewatering pumps and similar) in use during nighttime hours. They should be chosen, sited and enclosed such that levels at the nearest properties do not exceed 45 dB LAeq. This level is based on the World Health Organisation criteria for undisturbed sleep, and assumes a resident may have a partially open window.

Monitoring measures will be implemented in the form of an Environmental Management Plan (EMP) in order to evaluate the impact of the construction works on the environment. The implementation of the EMP will be the responsibility of construction contractor.

Commercial Properties

The Threapland Garden Centre will be subject to the same mitigation measures as outlined above for noise and vibration, and residential properties. Also, as outlined below, access to the Garden Centre will be maintained throughout the construction period.

Vehicle Travellers

The Contract will include restrictions on disruption to traffic flows. These will include, for example, the availability of traffic lanes on the A96 and acceptable periods for temporary traffic signals. Instructions will also be included in the contract documents setting out the requirements for traffic lane availability. For example, it is likely to state that one lane in each direction should always be open on the A96 except at certain specified off-peak times.

The construction programme will ensure that at least one of the junctions (south leg of the Threapland junction / Loch Oire road junction) remains fully open to vehicular and non-vehicular traffic at all times during the construction programme

Measures will be taken to source material as close as possible to the site to minimise construction traffic, and it will be within the Contractor's financial interest to minimise costs.

The Contractor will produce a detailed Traffic Management Plan for the duration of the construction period, to outline how they will implement the traffic management required. Consultations with the respective roads authorities for the A96 (Transport Scotland) and the side roads (Moray Council) will be required.

Pedestrians, cyclists and equestrians

Appropriate temporary traffic control measures to maintain A96 vehicular and non-vehicular movements during the construction period will be implemented to prevent temporary severance of cycling access along the A96 during the scheme construction.

4.8 Residual Impacts

It will not be possible to construct the Scheme without temporary adverse impacts arising from construction activity. With the proposed mitigation measures, those adverse impacts will be reduced. The residual impacts will include:

- The provision of site compounds and associated site construction activity will cause localised and temporary dust, noise, and litter impacts. With the implementation of mitigation measures the magnitude of impact is reduced to slight, which results in a significance of 'minor adverse'.
- Threapland Garden Centre will be subject to similar disruption due to construction impacts as those impacting upon the residential property receptors. However, the business will also suffer from disruption to its areas of parking and frontage during construction. The impact is assessed as a magnitude of 'moderate' reduced to 'slight' with the implementation of mitigation, which results in a 'minor adverse' significance impact.
- However, it is important to note that post-construction the Garden Centre will have potentially improved access or visitor arrangements, with the provision a footpath / cyclepath accessing the site from Loch Oire road, and a pedestrian / cyclist crossing point to a footpath / cyclepath on the north side of the A96 carriageway.
- The disruption to traffic on the existing A96 carriageway and side roads will be minimised by the implementation of a detailed Traffic Management Plan and at least one lane of the A96 carriageway always remaining open to vehicular traffic. Although there may be very localised diversions for local residents accessing their properties, access will remain open to all properties throughout construction. The residual magnitude of impact upon vehicular travellers is therefore assessed as 'slight' adverse, which results in a significance of 'minor adverse'.
- The disruption to cyclists, equestrians and pedestrians, will be limited. It is also important to note that the Scheme will result in improved provision for pedestrians and cyclists post-

construction. There will be a footpath / cyclepath linking from the western extent of the Scheme to Loch Oire road, which will be blocked to vehicular access at the A96 junction.

4.9 Summary

The Scheme will result in a number of impacts as a result of construction activity.

The impacts will mainly relate to nearby residential properties, which will experience an increase in noise levels and possible dust during construction. Residential receptors will also be subjected to temporary diversions and may be subjected to utilising temporary property access and increased vehicle journey times due to the construction activity.

Other impacts will relate to the provision and operation of construction compounds during the entire construction period. There will be disruption to traffic on the A96 carriageway and affected side roads due to traffic management measures necessary to ensure the safety and operation of works on those roads. The construction of embankments, cuttings and roads will lead to noise intrusion and the potential risk of dust in the air and mud on the road will be present. There is potential for construction operations to cause damage to localised soils and water, if appropriate mitigation measures are not implemented.

However, measures can be put in place to minimise the impacts of construction activities and it is considered that with careful management the significance of these impacts can be reduced. To achieve this, discussions with the planning and roads authorities will be essential in order to ensure that environmental limits for construction activity are agreed and implemented. These will be enforced by requirements contained in the contract of construction practice.