

Appendix A11.4

Surface Water Environment
Baseline Conditions



Table of contents

Chapter	Pages
1. Introduction	1
1.2. Aims and Objectives	1
2. Baseline Conditions	1
2.1. Rainfall	1
2.2. Surface Water Flow Patterns	24
2.3. Standing Water	28
2.4. Surface Water Quality	29
2.5. Water Supplies, Abstractions and Discharges	34
3. References	41

Tables

Table A2.1: Description of Watercourses within the Proposed Scheme Study Area	3
Table A2.2: Estimated Watercourse Flow Values	25
Table A2.3: Current Water Framework Directive Status of Surface Waters, 2016	29
Table A2.4: Surface Water Quality Sensitivity Summary	31
Table A2.5: Surface Water Fed Private Water Supplies	35
Table A2.6: CAR Licensed Activities within 1km of the Proposed Scheme and Surface Water Abstractions up to 5km Downstream	37
Table A2.7: Discharges to Surface Water within 1km of the Proposed Scheme	39

1. Introduction

- 1.1.1. This report is a technical appendix to the A9 Dualling Tomatin to Moy – DMRB Stage 3 Environmental Statement, Chapter 11: Road Drainage and the Water Environment.
- 1.1.2. This document documents baseline conditions of the surface water environment within the Proposed Scheme study area assessed in Chapter 11.

1.2. Aims and Objectives

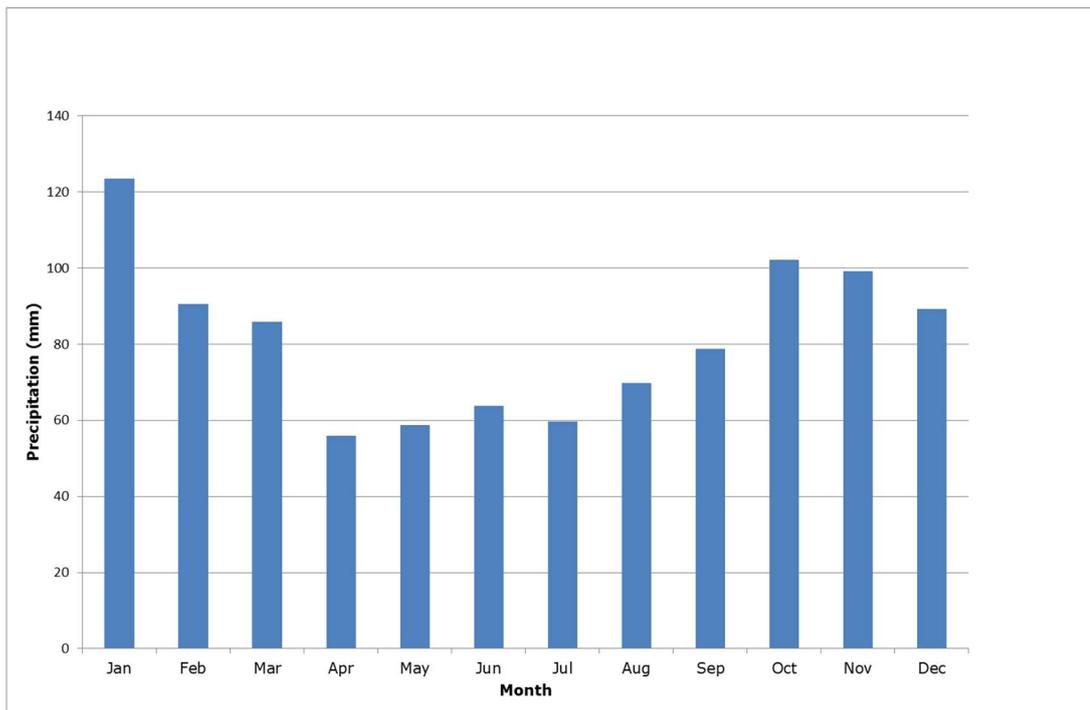
- 1.2.1. This document provides baseline information regarding surface water body receptors within the Proposed Scheme study area. Specifically, information on the following topics are provided within this document:
 - rainfall
 - surface water catchment and channel descriptions
 - surface water flows
 - standing waters
 - water quality
 - water supplies, abstractions and discharges, including:
 - public water supplies
 - private water supplies
 - SEPA CAR registered abstractions and discharges
 - existing road drainage discharges
- 1.2.2. Baseline information on the hydromorphology and flood risk of the watercourses within the study area is documented in Technical Appendices A11.1 and A11.2, respectively.

2. Baseline Conditions

2.1. Rainfall

- 2.1.1. The Meteorological (Met.) Office regional climate information locates the Proposed Scheme within the Northern Scotland regional climatic areaⁱ. Rainfall across this region varies from over 4000mm per annum near Fort William to less than 700mm per annum along the Moray Firth coast.
- 2.1.2. Data from the Met. Office monitoring station at Aviemore for the 1981–2010 period is provided as Chart 2.1 below, providing monthly rainfall data. The Aviemore station is located at NGR NH 897 143, approximately 16km to the southeast of Tomatin, at an altitude of 228m AOD, with a standard annual average rainfall (SAAR) of 977mm.
- 2.1.3. Using the Flood Estimation Handbookⁱⁱ data for the Funtack Burn which drains the centre of the study area, the SAAR value for the Proposed Scheme has been estimated as 1053mm.

Chart 2.1: Average Monthly Rainfall Data (mm) for Aviemore Met Office Monitoring Station, 1981-2010



- 2.1.4. The greater rainfall value, relative to Aviemore, is due to the location of the Proposed Scheme on higher ground (between 270-320m AOD) to the northwest, with prevailing winds from the southwest delivering more precipitation across this higher ground. Monthly rainfall trends would be expected to be similar to that recorded at Aviemore.
- 2.1.5. The UK Climate Projections Reportⁱⁱⁱ provides an indication of regional climate trends across the UK taking account of climate change. Within this document probabilistic projections of climate change suggest that Northern Scotland will experience slightly increased temperatures in both summer and winter. This may result in a reduction in summer precipitation and an increase during winter.
- 2.1.6. If climate change leads to drier summers, low river flows and water shortages may become more frequent and prolonged in sustained periods of dry weather. Increase in winter precipitation could increase the risk of and extent of flooding. Climate change rainfall factors are accordingly included within peak flows and the flood risk assessment.

Surface Water Catchment and Channel Descriptions

- 2.1.7. The Proposed Scheme is located within the catchment and associated sub catchments of the River Findhorn. Within the study area there are several major tributaries of the River Findhorn, including the Allt na Frithe, Allt Dubhag, Funtack Burn (with Dalmagarry Burn tributary) and Moy Burn (with tributaries; Allt na Loinne Mor, Allt na Slanaich and Allt Creag Bheithin). The interaction and proximity between the Proposed Scheme and these watercourses is illustrated on Figures 11.1a-k, with watercourse photograph locations provided in the following sections.
- 2.1.8. Individual watercourses are discussed below, which includes summary hydromorphology baseline descriptions for those screened in to the hydromorphology assessment; further hydromorphology details are available in Appendix A11.1 Hydromorphology Assessment.

Table A2.1: Description of Watercourses within the Proposed Scheme Study Area

River Description	Photo
<p>Allt Cosach</p> <p>Allt Cosach is a small tributary of the River Findhorn with a catchment area of 3.8km² and is located within 100m of the Proposed Scheme at the proposed Tomatin South Junction. A small headwater drain rises adjacent to the existing A9, is crossed by the Highland Main Line (HML), and joins the main headwater approximately 350m downstream. The Allt Cosach flows northwest, roughly parallel with the existing A9 for approximately 400m and converges with the River Findhorn approximately 3km downstream at NGR NH 806 287.</p>	
<p>Allt Cosach Trib 1</p> <p>The Allt Cosach Trib 1 is a small drainage channel with a catchment area of <0.1km², located between the HML and the A9 carriageway, originating approximately 1.2km northwest of Slochd Summit. It flows northwest between the road and railway and is then crossed by the existing side road rail bridge before it converges with the Allt Cosach at NGR NH 823 262.</p> <p>This watercourse is likely to be affected by existing road/rail discharges.</p>	

River Description	Photo
<p>River Findhorn</p> <p>The River Findhorn is one of the longest rivers in Scotland, with headwaters rising in the Monadhliath Mountains at 940m AOD (above Ordnance Datum), approximately 30km southwest of Tomatin, flowing generally northeast to the Moray Firth. The catchment drains a total area of 786km² (based on catchments derived from the Flood Estimation Handbook), with the Proposed Scheme lying entirely within the upper catchment.</p> <p>The upper reaches of this catchment drains land characterised by upland landscapes such as open moorland and conifer plantation forestry, with channel morphology often of steep gradient and typically flashy. There are a number of tributaries of the River Findhorn which interact directly with the Proposed Scheme, these are described in the subsections below.</p> <p>The River Findhorn is crossed by the existing A9 dual carriageway at NGR NH 808 290, approximately 200m downstream of the Findhorn Viaduct HML crossing. At this location, the channel width is approximately 20m and the watercourse is characterised by a meandering, moderate gradient channel, wide floodplain, cobble, gravel and boulder bed, and pool and riffle sequences.</p> <p>This location marks the transition between two SEPA Water Framework Directive (WFD) classified water bodies with the upstream reach (Tomatin to Garbole) classed as Good Overall status and the downstream reach (Tomatin to Dorback Burn) classed as Moderate Overall status.</p>	 <p>River Findhorn, view downstream from NGR NH 797 301, at the confluence with the Allt na Frithe</p>
<p>River Findhorn Trib 1</p> <p>River Findhorn Trib 1 is a small watercourse and part of a network of field drains flowing generally north to discharge to the River Findhorn at NGR NH 799 301. It drains relatively flat areas of woodland and open grassland.</p> <p>It is crossed by the existing A9 carriageway at NGR NH 800 297; at this location the watercourse had little flow at the time of visit, with wide pooling at the culvert outlet and the channel narrowing downstream. The catchment area measured from this location is approximately 0.6km².</p> <p>This watercourse is potentially impacted by existing road discharges.</p>	 <p>View downstream River Findhorn Trib 1 from NGR NH 800 297</p>

River Description	Photo
<p>River Findhorn Trib 1.1</p> <p>A small drain shown on OS 1:25,000 mapping, which appears to be associated with existing A9 pre-earthworks drainage adjacent to the southbound side of the A9 and then flows east along an adjacent field boundary before it joins the River Findhorn at NGR NH 797 302. The drain was not located during the field surveys. The catchment area measured from this location is <math><0.1\text{km}^2</math>.</p> <p>This drain is potentially impacted by existing road discharges.</p>	<p>No photo available</p>
<p>The Allt na Frithe</p> <p>This watercourse has headwaters rising on the steep open moorland slopes of Carn Caochan Ghuibhais, Carn a' Bhothain Duibh, Carn Bad an Daimh and Carn Ruighe Bhric.</p> <p>It flows northeast, immediately adjacent to Tomatin Distillery at NGR NH 790 293, and is crossed by a HML viaduct, an unnamed side road, and the existing A9 carriageway before its confluence with the River Findhorn at NGR NH 797 301.</p> <p>At the location of the existing A9 crossing, the channel width ranges between approximately 0.5m, within the existing culvert under the A9, to 2m wide in the natural channel. It has a fairly steep gradient with a moderate-fast flow observed during surveys in July 2015. The catchment area measured from this location is approximately 5.8km².</p> <p>This watercourse exhibits a good range of morphological features and active fluvial processes, with a diverse and dynamic range of flows. The features, observed during site surveys in September/October 2015, suggest potential for large sediment movements through the system. However, it has been modified/constrained by the adjacent land use and existing road and rail crossings.</p> <p>There are three known licenced discharges, including cooling water and sewage effluent from Tomatin distillery impacting this watercourse with potential diffuse rural pollution and road/rail discharges.</p>	 <p>View upstream of the Allt na Frithe on the northbound side of the existing A9 crossing at NGR NH 797 300</p>

River Description

River Findhorn Trib 2

The River Findhorn Trib 2 is a small watercourse flowing northeast to discharge to the River Findhorn at NGR NH 797 304. It drains woodland on gently sloping ground and is crossed by the existing A9 carriageway at NGR NH 794 303. At this location the channel is fairly straight with a silty bed and is well vegetated with grass and moss, with low flows observed at the time of visit in July 2015. The catchment area measured from this location is approximately 0.2km².

This watercourse is potentially impacted by existing road discharges.

Photo



View downstream River Findhorn Trib 2 from NGR NH 794 303

Allt Dubhag

The Allt Dubhag originates on the upper northeast slope of Carn a' Bohthain Duibh, an area of open moorland. It flows generally northeast, and is crossed by a bridge carrying the HML, an unnamed side road and the existing A9 carriageway before its confluence with the River Findhorn at NGR NH 796 307, near the Tigh An Allt property. The catchment area measured from the crossing location is approximately 2.6km².

At the location of the existing A9 crossing, the channel appears to have been straightened and is approximately 1m-2m wide with a gentle sloping gradient, a moderate flow was observed during a site visit in July 2015. The flows were uniform, despite some discrete areas of step-pools. This watercourse is extensively modified with bed and bank protection and a long culvert at the existing A9 crossing location.

This watercourse is potentially impacted by existing road discharges and small domestic sewage discharges.



View upstream of the Allt Dubhag on the northbound side of the existing A9 crossing at NGR NH 794 305

River Description	Photo
<p>River Findhorn Trib 3</p> <p>The River Findhorn Trib 3 is a small ephemeral drain flowing northeast and is crossed by the existing A9 carriageway at NGR NH 794 306. It drains wooded areas on either side of the carriageway and appears on OS 1:10,000 mapping to discontinue before reaching the Tigh an Allt property to the east of the carriageway. At the crossing location the channel is approximately 0.5m wide, fairly straight and confined to the steep sided ditch. It has a silty bed and is well vegetated with grass and moss, with low flows observed at the time of visit in July 2015. The catchment area measured from this location is <0.1km².</p> <p>This watercourse is potentially impacted by existing road discharges.</p>	 <p>View of River Findhorn Trib 3 crossing on northbound side at NGR NH 794 306</p>
<p>Funtack Burn Trib 1</p> <p>The Funtack Burn Trib 1 is a small drainage ditch flowing from a small culvert outlet at NGR NH 794 308 on the southbound embankment of the existing A9 carriageway and flows northeast to the pond within the Tigh an Allt land parcel. The drain is lined with concrete slabs and the bed is silt, with macrophytes present in the channel. The flow was moderate at the time of survey (July 2015) with foaming on the surface noted. There was no culvert inlet located for this drain on the northbound side of the carriageway. The catchment area measured from this location is <0.1km².</p> <p>This watercourse is possibly an existing road drainage outfall.</p>	 <p>View downstream of the Funtack Burn Trib 1 from NGR NH 794 308</p>

River Description	Photo
<p>Dalmagarry Burn Trib 1</p> <p>The Dalmagarry Burn Trib 1 is a small watercourse flowing northeast and is crossed by the existing A9 carriageway at NGR NH 794 314. At this location it is approximately 1m wide with steep banks and a fast flow was noted at the time of survey in December 2016. The existing culvert is long with the outlet located approximately 300m downstream, to the northeast of the inlet location. The catchment area measured from this location is approximately 0.8km².</p> <p>This watercourse is potentially impacted by existing road/rail discharges.</p>	 <p>View downstream Dalmagarry Burn Trib 1 from NGR NH 794 313</p>
<p>Dalmagarry Burn Trib 2</p> <p>The Dalmagarry Burn Trib 2 is a small watercourse flowing northeast, draining open moorland on the northeast hill slopes to the south. The watercourse is crossed by the HML at NGR NH 790 319 before then being crossed immediately after by the existing A9 carriageway. The catchment area measured from this location is approximately 0.3km².</p> <p>This watercourse is potentially impacted by existing road/rail discharges.</p>	 <p>View upstream Dalmagarry Burn Trib 2 from NGR NH 790 319</p>

River Description	Photo
<p>Dalmagarry Burn Trib 3</p> <p>A dry drainage ditch running adjacent to the HML was noted with no evidence of a natural watercourse. A dry drainage culvert was located at NGR NH 789 320 under the railway and has been included for flood risk assessment purposes. There was no corresponding crossing found under the existing A9 carriageway. The catchment area measured from this location is <math><0.1\text{km}^2</math>.</p> <p>This drain is potentially impacted by existing road/rail discharges.</p>	 <p>Dry drainage culvert at NGR NH 789 320</p>
<p>Dalmagarry Burn Trib 4</p> <p>A small watercourse with a narrow channel, cobble bed and a steep gradient flows north through agricultural land and is crossed by an existing access track before it converges with the Dalmagarry Burn at NGR NH 786 322. The catchment area measured from this location is approximately <math><0.1\text{km}^2</math>.</p>	 <p>View downstream of the Dalmagarry Burn Trib 4 from the existing access track crossing location at NGR NH 786 321</p>

River Description

Dalmagarry Burn Trib 5

A small field drain that flows northwest is crossed by an existing access track before it diverts north and drains to the Dalmagarry Burn closely downstream to the Dalmagarry Burn Trib 4. The catchment area measured from this location is approximately $<0.1\text{km}^2$.

Photo



View downstream of the Dalmagarry Burn Trib 5 from the existing access track crossing location at NGR NH 786 321

Funtack Burn

The Funtack Burn originates as the outflow stream from Loch Moy, with the Moy Burn being the primary inflow to the loch. The Funtack Burn has a total catchment area of approximately 57.5km^2 , representing a major tributary of the River Findhorn. It flows south, then east to join the River Findhorn northeast of Invereen at NGR NH 796 319, approximately 30m downstream of its confluence with the Dalmagarry Burn, and is approximately 3.5km in length. The majority of the channel length has been straightened and the channel is fairly deep with steep banks and a slow steady flow along the flat valley floor. The channel measures approximately 9m wide at the location, pictured.

There is potential for diffuse rural pollution impacts on this watercourse.

This watercourse is classified by SEPA as having a Good Overall WFD status.



View upstream of the Funtack Burn from NGR NH 796 320, approximately 30m upstream of the confluence of the Dalmagarry Burn and the Funtack Burn

River Description

Dalmagarry Burn

The Dalmagarry Burn has a total catchment area of approximately 8.6km² with headwaters Allt a' Chuil and Allt na h-Airigh Samhraich rising on open moorland between the hills of Carn na Loinne, Carn nam Bo-airigh, Carn Moraig and Carn Dubh-chromagach. It flows east and is crossed by a railway bridge, a disused old A9 bridge and an existing A9 bridge structure, before its confluence with the Funtack Burn at NGR NH 797 320. At the confluence with the Funtack Burn, there is a reduction in channel gradient and flow.

At the location of the existing A9 crossing the channel is approximately 4m wide with moderate flow observed during a site visit in July 2015. The catchment area measured from this location is approximately 8.1km².

This watercourse has historically been realigned and the existing channel is constrained by embankments and crossed several times. There were, however, some very active sediment transport processes occurring, with step-pool sequences and large gravel bars around the existing A9 crossing. Although constrained by the embankment and road, the channel has sufficient space to adjust laterally and vertically.

This watercourse is potentially impacted by existing road/rail discharges.

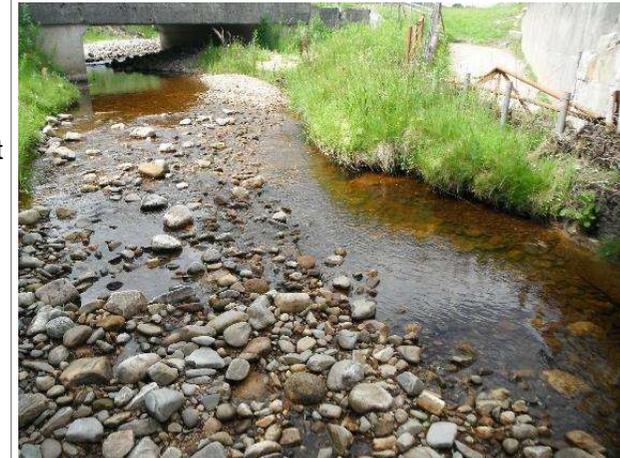
Funtack Burn Trib 2

The Funtack Burn Trib 2 is a field drain flowing northeast, draining agricultural grassland on either side of the existing A9 carriageway. It is crossed by the carriageway at NGR NH 785 324. At this location the channel was heavily vegetated with no flow at the time of survey in July 2015. The catchment area measured from this location is approximately <0.1km².

A small footbridge is located adjacent to the carriageway on the southbound side. Downstream of this location the field ditch extends in a straight line northeast across a field with cobbles exposed on the bed and grassy banks. The field drain converges with the Funtack Burn at NGR NH 788 328.

This field drain is potentially impacted by existing road/rail discharges and diffuse rural pollution.

Photo



View upstream of the Dalmagarry Burn on the northbound side of the existing A9 crossing at NGR NH 788 322, featuring the disused old A9 bridge structure in the background



View downstream Funtack Burn Trib 2 from NGR NH 785 325

River Description	Photo
<p>Funtack Burn Trib 3</p> <p>The Funtack Burn Trib 3 is a field drain flowing northeast, draining a steep wooded slope to the west and agricultural grassland to the east. It is crossed by the existing A9 carriageway at NGR NH 784 326. At this location the channel was heavily vegetated with no flow at the time of survey exposing a gravel and cobble bed with an accumulation of finer sediments on the downstream side. The catchment area measured from this location is approximately 0.4km².</p> <p>This drain is potentially impacted by existing road/rail discharges and diffuse rural pollution.</p>	 <p>View upstream Funtack Burn Trib 3 from NGR NH 785 324</p>
<p>Funtack Burn Trib 4</p> <p>The Funtack Burn Trib 4 is a small watercourse flowing northeast, draining wooded areas and open grassland. It is crossed by the existing A9 carriageway at NGR NH 782 329 at which point the channel is artificially engineered with stone bed and banks, with the bed also featuring cobbles and gravel. Little flow was noted during the time of survey in July 2015. The catchment area measured from this location is approximately 0.2km².</p> <p>The channel is also crossed by the B9154 approximately 30m downstream of the A9 crossing. From there the watercourse proceeds into the adjacent field to the west and converges with other smaller tributaries before converging with the Funtack Burn at NGR NH 786 331.</p> <p>This drain is potentially impacted by existing road/rail discharges and diffuse rural pollution.</p>	 <p>View downstream Funtack Burn Trib 4 from NGR NH 782 329</p>

River Description	Photo
<p>Funtack Burn Trib 5</p> <p>The Funtack Burn Trib 5 is a small watercourse visible on OS 1:10,000 and 1:25,000 mapping. It is known to be crossed by the HML nearby the A9 Moy Rail Bridge; however, it was not possible to visit this location during the surveys due to access limitations associated with Network Rail land. The catchment area measured from this location is approximately 0.3km².</p> <p>OS 1:10,000 mapping indicates that the channel flows generally east and converges with Funtack Burn 4 at NGR NH 785 332, draining agricultural grassland. However, during the time of visit no defined channel was identified in this area, with a wide flush area, approximately 10m wide on the gently sloping ground. This drain is potentially impacted by existing road/rail discharges and diffuse rural pollution.</p>	<p>No photo available</p>
<p>Funtack Burn Trib 6</p> <p>The Funtack Burn Trib 6 is a small drainage channel which is crossed by the existing A9 carriageway at NGR NH 777 335, which drains a very steep rock face on the northbound side and flows via a narrow channel down a steep wooded slope on the southbound side. The bed is predominantly gravel with some silt accumulation at the culvert outlet. The catchment area measured from this location is approximately <0.1km².</p> <p>This drain is potentially impacted by existing road/rail discharges and diffuse rural pollution.</p>	 <p>View downstream Funtack Burn Trib 6 from NGR NH 777 334</p>

River Description	Photo
<p>Funtack Burn Trib 7</p> <p>The Funtack Burn Trib 7 is a small drainage channel which is crossed by the existing A9 carriageway at NGR NH 776 336. It drains a steep slope on the northbound side and flows via a narrow channel, less than 0.5m wide, through forestry on the southbound side. Low flow was observed at the time of survey (July 2015) with macrophytes noted in channel. An orange staining was also noted on the channel bed. The catchment area measured from this location is approximately <math><0.1\text{km}^2</math>.</p> <p>This drain is potentially impacted by diffuse rural pollution, small domestic sewage discharges and existing road/rail discharges.</p>	 <p data-bbox="1402 743 2085 802">View downstream Funtack Burn Trib 7 from NGR NH 776 335</p>
<p>Funtack Burn Trib 8</p> <p>The Funtack Burn Trib 8 is a small drainage channel which is crossed by the existing A9 carriageway at NGR NH 775 337 and flows through conifer plantation on either side. The channel is narrow at the crossing location, approximately 0.3m wide with gravels, cobbles and boulders present on the bed, and low flows observed at the time of survey in July 2015. The catchment area measured from this location is approximately 0.1km². The watercourse continues to flow northeast and is indicated on OS 1:10,000 mapping to discharge to Loch Moy at NGR NH 777 339.</p> <p>This drain is potentially impacted by existing road/rail discharges and diffuse rural pollution.</p>	 <p data-bbox="1402 1286 2085 1345">View downstream Funtack Burn Trib 8 from NGR NH 775 336</p>

River Description	Photo
<p>Funtack Burn Trib 9</p> <p>The Funtack Burn Trib 9 is a small drainage channel which is crossed by the existing A9 carriageway at NGR NH 774 337 and drains conifer plantation. At the crossing location the bed material is gravels and cobbles with grass and moss in channel and a sluggish flow noted during time of survey in July 2015. The catchment area measured from this location is approximately <math><0.1\text{km}^2</math>.</p> <p>Downstream the channel is confined within a deeply cut ditch exposing loose bank material. This drain is potentially impacted by existing road/rail discharges and diffuse rural pollution.</p>	 <p>View downstream Funtack Burn Trib 9 from NGR NH 774 337</p>
<p>Funtack Burn Trib 10</p> <p>The Funtack Burn Trib 10 is a small drain originating between the two ponds at Lynebeg and the HML. It is crossed by the railway and then the B9154 at NGR NH 770 341. The catchment area measured from this location is approximately <math><0.1\text{km}^2</math>.</p> <p>From this point it flows northeast, joined by several smaller tributaries, towards Loch Moy. OS 1:10,000 mapping indicates that the channel disperses on the western shore of Loch Moy at NGR NH 773 342. This drain is potentially impacted by existing road/rail discharges and small domestic sewage discharges.</p>	 <p>View upstream Funtack Burn Trib 10 from NGR NH 770 341</p>

River Description	Photo
<p>Caochan na h-Eaglais</p> <p>Caochan na h-Eaglais is a minor watercourse within the Funtack Burn catchment. It flows northeast and is crossed by the existing A9 carriageway at NGR NH 771 339, then the HML, followed by the B9154. At the A9 crossing location the channel ranges 1-2m wide and has a cobble and boulder bed. There are concrete aprons lining the bed at both the culvert inlet and outlet. The channel is incised with steep banks showing signs of instability. The catchment area measured from this location is approximately 0.8km².</p> <p>It predominantly drains large areas of plantation forestry and discharges directly into Loch Moy at NGR NH 774 341.</p> <p>This watercourse shows some dynamic fluvial features (step-pools, gravel bars) encouraging diverse flows. It has been extensively modified immediately upstream and downstream of the existing A9 crossing.</p> <p>This watercourse is potentially impacted by existing road/rail discharges and diffuse rural pollution.</p>	 <p>View downstream Caochan na h-Eaglais from NGR NH 771 339</p>
<p>Moy Burn Trib 1</p> <p>The Moy Burn Trib 1 originates to the southwest of Lynemore and flows northeast draining both forestry and open moorland. It flows north past the small settlement at Lynebeg and is crossed by the existing A9 carriageway at NGR NH 766 342. At this location, the channel is up to 1m wide with cobbles, boulders and gravel bed. The upstream side is steeply sloped with the downstream side, more gently sloped. Flows were noted as being low during the time of visit in July 2015. The catchment area measured from this location is approximately 0.8km². The watercourse continues to flow generally northeast through both forestry and grassland.</p>	 <p>View downstream Moy Burn Trib 1 from NGR NH 766 342</p>

River Description	Photo
<p>Allt na Loine Mor</p> <p>The Allt na Loine Mor drains the hills of Carn na h-Easgainn and Carn na Loinne, characterised by open moorland and forestry. It flows northeast and is crossed by the existing A9 carriageway and the B9154 before its confluence with the Moy Burn at NGR NH 769 346.</p> <p>At the location of the existing A9 crossing, the channel width ranges from approximately 1m to 2m, with a cobble, gravel and boulder bed. The channel exhibited moderate flow conditions during the site visit in July 2015; however, trash lines were noted at approximately 1m above the levels observed. The catchment area measured from this location is approximately 2.9km².</p> <p>This watercourse exhibits highly dynamic gravel bed features in the upstream section. It has been historically affected by a now derelict reservoir, however is showing signs of recovery.</p> <p>This watercourse is potentially impacted by existing road/rail discharges and small domestic sewage discharges.</p>	 <p>View upstream of the Allt na Loinne Mor on the northbound side of the existing A9 crossing at NGR NH 764 343</p>
<p>Moy Burn Trib 2</p> <p>Moy Burn Trib 2 is a small drain, overgrown with vegetation with a low to moderate flow noted at the time of survey in July 2015. The drain is crossed by the existing A9 carriageway at NGR NH 759 345. At this location there are boulder revetments in place and the bed is mainly vegetated over cobbles. The catchment area measured from this location is approximately 0.2km².</p> <p>The channel drains into an area of open grassland on the southbound side of the carriageway.</p> <p>This drain is potentially impacted by existing road discharges.</p>	 <p>View downstream Moy Burn Trib 2 from NGR NH 758 345</p>

River Description	Photo
<p>Moy Burn Trib 3</p> <p>Moy Burn Trib 3 is a small drain, overgrown with macrophytes and a stagnant flow noted at the time of survey in July 2015. The drain is crossed by the existing A9 carriageway at NGR NH 758 345. At this location there are boulder revetments in place. The catchment area measured from this location is approximately 0.1km².</p> <p>The channel drains into an area of open grassland on the southbound side of the carriageway, where there is a low slope gradient and no visible flow.</p> <p>This drain is potentially impacted by existing road discharges.</p>	 <p>View downstream Moy Burn Trib 3 from NGR NH 758 345</p>
<p>Allt Creag Bheithin Trib 1</p> <p>The Allt Creag Bheithin Trib 1 is a small watercourse flowing northeast, with a sluggish flow noted during the time of survey. It is crossed by the existing A9 carriageway at NGR NH 755 347. At this location there are large boulder revetments on the upstream banks and the bed is mainly cobbles on the upstream side and silty downstream. The catchment area measured from this location is approximately 0.9km².</p> <p>Downstream of the culvert, there appeared to be no flow with standing water, with an incised channel visible further downstream. The watercourse converges with the Allt Creag Bheithin at NGR NH 758 350.</p> <p>This watercourse is potentially impacted by existing road discharges.</p>	 <p>View downstream Allt Creag Bheithin Trib 1 from NGR NH 755 346</p>

River Description	Photo
<p>Allt Creag Bheithin Trib 2</p> <p>The Allt Creag Bheithin Trib 2 is a small watercourse flowing northeast and is crossed by the existing A9 carriageway at NGR NH 753 347. At this location the channel bed was silty and was overgrown with low flows noted at the time of survey in July 2015. There was no distinct channel further downstream. The catchment area measured from this location is approximately <math><0.1\text{km}^2</math>.</p> <p>This watercourse is potentially impacted by existing road discharges.</p>	 <p>Culvert outlet of Allt Creag Bheithin Trib 2 at NGR NH 753 347</p>
<p>Allt na Slanaich</p> <p>The Allt na Slanaich drains the area of Beinn nan Cailleach and Carn na h-Easgainn, characterised by open moorland, then flowing northeast through dense plantation forestry. It is crossed by the existing A9 carriageway before its confluence with Allt Creag Beithin at NGR NH 751 349 where the channel gradient decreases. At the location of the existing A9 crossing the channel is approximately 2m wide and has a cobble, boulder gravel bed on the upstream side with extensive fine sediments deposits on the downstream side. The catchment area measured from this location is approximately 2.4km².</p> <p>This watercourse displays a wide range of morphological features and dynamic fluvial processes. It has been historically modified due to existing crossing structures.</p> <p>This watercourse is potentially impacted by existing road discharges.</p>	 <p>View upstream of the Allt na Slanaich on the northbound side of the existing A9 crossing at NGR NH 750 347</p>

River Description	Photo
<p>Moy Burn</p> <p>The Moy Burn has a catchment area of approximately 36.0km² and drains the hills of Carn an Uillt Bhric and Carn na Tri-tighearnan, which are characterised by open moorland, northeast of Moy. It flows in a generally south direction through flat agricultural land at a gentle gradient into Loch Moy at NGR NH 771 346. There are several unnamed tributaries of the Moy Burn that have been extensively modified in the vicinity of the existing A9 carriageway.</p> <p>There is potentially existing diffuse rural pollution impacts on this watercourse.</p> <p>This watercourse has been classified by SEPA as having Good Overall WFD status.</p>	 <p>View downstream of the Moy Burn at NGR NH 761 351, approximately 150m upstream of the confluence of the Allt Creag Bheithin and the Moy Burn</p>
<p>Allt Creag Bheithin</p> <p>The Allt Creag Bheithin has a total catchment area of approximately 7.2km² and drains Beinn nan Cailleach and Meall Mòr, characterised by open moorland with forestry plantation on the lower slopes. It is crossed twice by the existing A9 carriageway before it reaches its confluence with Allt na Slanaich at NGR NH 751 349, and then the Moy Burn at NGR NH 762 350. The catchment area measured from the downstream crossing location is approximately 2.7km².</p> <p>Upstream survey of this watercourse was limited by access limitations; however, downstream locations displayed a range of flows and morphological features, with large gravel bars. There were some sections of uniform flows and straightened planform.</p> <p>This watercourse is potentially impacted by existing road discharges and diffuse rural pollution.</p>	 <p>View upstream of the Allt Creag Bheithin on the northbound side of the existing A9 crossing at NGR NH 749 347</p>

River Description	Photo
<p>Allt Creag Bheithin Trib 3</p> <p>The Allt Creag Bheithin Trib 3 is a small watercourse draining forestry plantation, that flows roughly south and is crossed by the existing A9 carriageway at NGR NH 742 347. The catchment area measured from this location is approximately 0.4km². At this location the channel bed and banks are reinforced with stone revetments. The upstream natural channel is approximately 0.5m wide with a step pool formation and a cobble and gravel bed.</p> <p>On the downstream side the channel banks are exposed peat up to approximately 1m depth and there are signs of scour as the channel diverts approximately 90 degrees, approximately 3m downstream of the culvert outlet. The bed at this point is also cobbles and gravel.</p> <p>This watercourse is potentially impacted by existing road discharges.</p>	 <p>View downstream of Allt Creag Bheithin Trib 3 at NGR NH 742 347</p>
<p>Allt Creag Bheithin Trib 4</p> <p>The Allt Creag Bheithin Trib 4 is a forest drain that flows roughly south and is crossed by the existing A9 carriageway at NGR NH 740 347. The catchment area measured from this location is approximately 0.2km². At this location there are channel revetments on the upstream banks with the base of the channel overgrown with very little flow observed during the time of survey in July 2015. The downstream channel was also overgrown with sluggish flow and further downstream flow appeared to be diffuse through felled forestry plantation.</p> <p>This watercourse is potentially impacted by existing road discharges.</p>	 <p>View downstream of Allt Creag Bheithin Trib 4 at NGR NH 740 347</p>

River Description	Photo
<p>Allt Creag Bheithin Trib 5</p> <p>The Allt Creag Bheithin Trib 5 is a small watercourse draining forestry and moorland to the south of the northbound A9 carriageway. It flows northeast and is crossed by a forestry access track at NGR NH 734 344. The catchment area measured from this location is approximately 0.5km². At this location the channel was approximately 0.6m wide on the upstream side and 1.5m on the downstream with the bed material being a mix of gravel, cobbles and sand, with silt on the downstream side. The flow was noted as moderate at the time of survey in February 2017. The channel converges with the Allt Creag Bheithin at NGR NH 736 346.</p>	 <p>View downstream of Allt Creag Bheithin Trib 5 at NGR NH 734 344</p>
<p>Midlairgs Burn</p> <p>The Midlairgs Burn flows roughly north towards the existing A9 carriageway, draining areas of forestry and open moorland. It is crossed by a forestry access track at NGR NH 730 346. The catchment area measured from this location is approximately 0.5km². At this location, the channel is approximately 1m wide on the upstream side and the bed is mainly cobbles and gravel. There was moderate to fast flow noted during the time of survey in February 2017. At the downstream side of the crossing there was a deep wide pool, approximately 2m across and the bed comprised sand, gravel and cobbles.</p>	 <p>View upstream Midlairgs Burn at NGR NH 729 346</p>

River Description	Photo
<p>Midlairgs Burn Trib 1</p> <p>The Midlairgs Burn Trib 1 is a small watercourse that flows southwest, draining forestry and moorland, and is crossed by the existing A9 carriageway at NGR NH 727 350. The catchment area measured from this location is approximately 0.2km².</p> <p>At this location, the channel is narrow, approximately 0.6m wide with a cobble, gravel and fine sediment bed on the upstream side. There is a steep gradient and a moderate flow was noted during the time of survey. On the downstream side of the crossing there was a deep, wide pool with gravel and sediment deposits infilled more than half way up the height of the culvert.</p> <p>This watercourse is potentially impacted by existing road discharges.</p>	 <p>View downstream Midlairgs Burn Trib 1 at NGR NH 727 350</p>
<p>Midlairgs Burn Trib 2</p> <p>The Midlairgs Burn Trib 2 is an artificial drain which intercepts part of the flow from the Midlairgs Burn Trib 1, flows southwest and is crossed by the existing A9 carriageway at NGR NH 727 350. The catchment area measured from this location is approximately 0.2km².</p> <p>This watercourse is potentially impacted by existing road discharges.</p>	<p>No photo available</p>

2.2. Surface Water Flow Patterns

- 2.2.1. Surface water drainage patterns in the study area include a number of small artificial drainage channels and minor natural watercourses which drain to larger watercourses, including the main channel of the River Findhorn. Watercourse flow values vary depending on the size of watercourse catchment, seasonality and due to characteristics within each catchment, such as rainfall, and underlying soils and geology.
- 2.2.2. For watercourses crossed by the Proposed Scheme, theoretical runoff rates have been estimated based on catchments delineated from crossing locations. These were produced for the purpose of modelling to advise culvert selection based on their hydraulic capacity. Runoff rates for watercourses that did not require modelling, have been estimated for the full extent of a defined stretch of catchment, i.e. for the flow of the Funtack Burn upstream of meeting the River Findhorn and for the River Findhorn at a defined location downstream at Shenachie.
- 2.2.3. Peak flows have been estimated using the Flood Estimation Handbook. Catchment characteristics have been used with the 'FEH Rainfall-Runoff' method to derive a range of peak flow return periods. Low flow and mean flow measurements have been determined by the 'Low Flow' method and are quoted as Q_{95} (i.e. the flow exceeded 95% of the time) and Q_{mean} (mean flow). This data is shown in Table A2.2 below.

Table A2.2: Estimated Watercourse Flow Values

Watercourse	Approx. Catchment Area (km ²)	Mean Flow Q _{mean} (m ³ /s)	Low Flow Q ₉₅ (m ³ /s)	Peak Flow (m ³ /s) Return Periods (yrs)						
				5	10	25	50	100	200	200 +CC
River Findhorn at Shenachie, approx. 4km d/s	416	14.06*	2.058*	256	304	376	441	517	606	728
Allt Cosach	3.8	0.07	0.010	4.4	5.2	6.5	7.7	8.8	10.2	12.2
Allt Cosach Trib 1	<0.1	<0.001**	<0.001**							
River Findhorn Trib 1	0.6	0.011	0.002	0.99	1.20	1.50	1.80	2.10	2.46	2.95
River Findhorn Trib 1.1	<0.1	<0.001**	<0.001**							
Allt na Frithe	5.8	0.137	0.023	7.26	8.64	10.99	12.94	14.86	17.14	20.57
River Findhorn Trib 2	0.2	0.003	0.001	0.38	0.46	0.58	0.69	0.81	0.95	1.14
Allt Dubhag	2.6	0.059	0.01	3.19	3.81	4.83	5.73	6.60	7.65	9.18
River Findhorn Trib 3	<0.1	0.001	<0.001	0.10	0.12	0.15	0.17	0.21	0.24	0.29
Funtack Burn Trib 1	<0.1	0.002	<0.001	0.21	0.26	0.32	0.38	0.45	0.53	0.63
Dalmagarry Burn Trib 1	0.8	0.017	0.002	1.30	1.56	1.95	2.34	2.73	3.20	3.84
Dalmagarry Burn Trib 2	0.3	0.006	0.001	0.75	0.91	1.14	1.35	1.58	1.85	2.22
Dalmagarry Burn Trib 3	<0.1	0.002	<0.001	0.27	0.33	0.42	0.49	0.57	0.68	0.81
Dalmagarry Burn Trib 4	<0.1	<0.001**	<0.001**							
Dalmagarry Burn Trib 5	<0.1	<0.001**	<0.001**							
Funtack Burn	47.3	1.074	0.183	38.7	45.4	56.8	67.6	80.2	95.2	114
Dalmagarry Burn	8.1	0.199	0.038	8.31	10.37	13.6	16.60	20.23	24.64	29.56

Watercourse	Approx. Catchment Area (km ²)	Mean Flow Q _{mean} (m ³ /s)	Low Flow Q ₉₅ (m ³ /s)	Peak Flow (m ³ /s) Return Periods (yrs)						
				5	10	25	50	100	200	200 +CC
Funtack Burn Trib 2	<0.1	0.002	<0.001	0.28	0.34	0.44	0.51	0.6	0.71	0.85
Funtack Burn Trib 3	0.4	0.008	0.001	1.02	1.24	1.57	1.85	2.17	2.55	3.06
Funtack Burn Trib 4	0.2	0.004	<0.001	0.37	0.45	0.57	0.67	0.79	0.93	1.11
Funtack Burn Trib 5	0.3	0.006	0.001	0.64	0.78	0.98	1.15	1.35	1.59	1.91
Funtack Burn Trib 6	<0.1	0.002	<0.001	0.09	0.11	0.13	0.16	0.18	0.22	0.26
Funtack Burn Trib 7	<0.1	0.001	<0.001							
Funtack Burn Trib 8	0.1	0.002	<0.001	0.40	0.49	0.62	0.72	0.85	1.00	1.20
Funtack Burn Trib 9	<0.1	0.001	<0.001	0.11	0.14	0.17	0.2	0.24	0.28	0.33
Funtack Burn Trib 10	<0.1	<0.001**	<0.001**							
Caochan na h-Eaglais	0.8	0.018	0.002	1.46	1.76	2.2	2.62	3.06	3.57	4.28
Moy Burn Trib 1	0.8	0.018	0.002	1.32	1.59	1.99	2.37	2.76	3.23	3.82
Allt na Loinne Moire	2.9	0.074	0.012	4.05	4.84	6.12	7.24	8.34	9.65	11.6
Moy Burn Trib 2	0.2	0.004	0.001							
Moy Burn Trib 3	0.1	0.001	<0.001							
Allt Creag Bheithin Trib 1	0.9	0.022	0.004	1.72	2.07	2.6	3.09	3.6	4.2	5.04
Allt Creag Bheithin Trib 2	<0.1	0.002	<0.001	0.14	0.17	0.21	0.25	0.3	0.35	0.42
Allt na Slanaich	2.4	0.061	0.01	3.76	4.51	5.66	6.73	7.77	9.02	10.82
Moy Burn	36.0	0.85	0.14	30.5	35.8	44.8	53.4	63.5	75.5	90.6
Allt Creag Bheithin (d/s)	2.7	0.061	0.011	4.70	5.66	7.05	8.41	9.76	11.38	13.65
Allt Creag Bheithin Trib 3	0.4	0.008	0.001	0.71	0.86	1.07	1.27	1.48	1.73	2.08

Watercourse	Approx. Catchment Area (km ²)	Mean Flow Q _{mean} (m ³ /s)	Low Flow Q ₉₅ (m ³ /s)	Peak Flow (m ³ /s) Return Periods (yrs)						
				5	10	25	50	100	200	200 +CC
Allt Creag Bheithin Trib 4	0.2	0.004	0.001	0.33	0.4	0.51	0.6	0.7	0.82	0.98
Allt Creag Bheithin (u/s)	0.3	0.005	0.001	0.49	0.59	0.74	0.87	1.02	1.2	1.43
Allt Creag Bheithin Trib 5	0.5	0.011	0.002							
Allt Creag Bheithin (m/s)	1.0	0.022	0.004	2.34	2.85	3.60	4.25	4.94	5.83	7.00
Midlairgs Burn	0.5	0.011	0.002	1.14	1.37	1.72	2.04	2.37	2.77	3.32
Midlairgs Burn Trib 1	0.2	0.004	0.001	0.45	0.54	0.69	0.81	0.94	1.11	1.33
Midlairgs Burn Trib 2	0.2	0.004	0.001	0.41	0.49	0.62	0.73	0.86	1.01	1.21

* Actual measured values

** Estimated mean and low flow values, catchment too small to derive flow data from LowFlows.

- 2.2.4. The nearest SEPA gauging station to the Proposed Scheme is located on the River Findhorn at Shenachie (NGR NH 825 335), approximately 4km downstream from the Proposed Scheme and with a hydrological catchment area of 415km². This gauging station reports a mean flow of 14.0m³/s and a Q₉₅ low flow of 2.06m³/s^{iv}, as shown above. Theoretical flows derived using LowFlows 2 software for this location provide a Q_{mean} of 11.8m³/s and a Q₉₅ of 1.80m³/s, providing reasonable confidence in the theoretical flow outcomes for all systems presented in Table 2.2. It should be noted that several watercourses were too small to derive catchments using FEH software and likewise to derive subsequent flow values using LowFlows 2 software, as indicated above.
- 2.2.5. The Hydrology of Soil Types (HOST) is a hydrologically-based classification of soils on the basis of their physical properties and their effects on the storage and transmission of water. It makes use of the fact that the physical properties of soils have a major influence on the hydrological response of a catchment. Other parameters can then be derived from the HOST classification. For the purposes of hydrological assessment the Baseflow Index (BFI) and Standard Percentage Runoff (SPR) are the most useful parameters. BFI is the long-term ratio of baseflow to total stream flow, where baseflow represents the contribution to total flow from groundwater. BFI values range from 0.1 in relatively impermeable clay catchments to 0.99 in highly permeable chalk catchments. A very low BFI of 0.15 represents a flashy catchment with minimal storage, low BFI values (e.g. 0.3) indicate a catchment with little storage and active runoff, a BFI of 0.7 (or greater) indicates a significant contribution to flow from a major aquifer. SPR is the average percentage of rainfall that causes the short-term increase in flow seen at a catchment outflow following a storm event.
- 2.2.6. Using the Flood Estimation Handbookⁱⁱ, all the watercourses noted in Table 2.2 have BFI-HOST values ranging between 0.32 – 0.48, with the smaller watercourses generally exhibiting values at the lower end of this range. These outcomes indicate moderate contribution from stored water sources, such as underlying sands and gravels. Local watercourses will respond fairly quickly to rainfall events, with a moderate lag time between rainfall occurring and increased stream flow values.
- 2.2.7. The SPR value for the same watercourses range from 46 – 57%, indicating a moderately flashy response to rainfall, attenuated by local conditions, potentially including forestry cover. The smaller watercourses generally exhibit the greater SPR values, indicating the local geological conditions are less permeable (including underlying peatland) and are more likely to be affected by flash rainfall events. This is typical for smaller watercourses constituting the upper parts of upland catchments, which tend to have steeper channel gradients and demonstrate rapid response in flow conditions during and following heavy rainfall events (known as ‘flashy’).

2.3. Standing Water

- 2.3.1. Standing water bodies within 250m of the Proposed Scheme are shown on Figure 11.1a-k.
- 2.3.2. The dominant standing water body in the study area is Loch Moy, located east of Moy and 250m northeast of the Proposed Scheme at the nearest point, in the Funtack Burn catchment area. The Moy Burn and a number of smaller watercourses drain into this loch from the north, east and west, with the outflow stream being the Funtack Burn, which flows southeast to meet the River Findhorn. Loch Moy has a surface area of approximately 770,000m² (0.77km²).

- 2.3.3. There are also a number of small ponds adjacent to the existing A9 carriageway and close to the Proposed Scheme, with two small clusters located at Tigh an Allt, close to the confluence of the Allt Dubhag and River Findhorn, and between Lynebeg and Moy (River Findhorn and Funtack Burn catchments, respectively). These ponds are likely to be supplied via a combination of surface runoff, direct rainfall and also from groundwater/spring flows, with specific inputs determined by local conditions. The flow attenuation value of these ponds is currently unknown, but they may provide a drainage or flood relief function.
- 2.3.4. As part of the Ecological Impact Assessment (Chapter 12, Ecology and Nature Conservation), a National Pond Survey was carried out for five ponds identified during DMRB Stage 2 where standing water bodies within 150m of the Proposed Scheme met screening criteria as outlined in Appendix A12.3 Aquatic Ecology. All five ponds have been judged as having biodiversity value of Local level with all other ponds within 150m considered to be of Less than Local importance.

2.4. Surface Water Quality

- 2.4.1. The Water Framework Directive (WFD) is a risk-based classification system. This highlights such issues as stream morphology and existing artificial structures in addition to chemical water quality and ecological diversity. Heavily modified water bodies, which can no longer be considered to be natural, are classified on the basis of 'ecological potential'. The WFD applies to all surface waters, but for practical purposes, SEPA has defined a size threshold above which a river or loch qualifies automatically for characterisation. For lochs, the threshold is a surface area of 0.5km² and rivers must have a catchment area of 10km² or more. In addition to these larger water bodies, smaller waters have been characterised where there is justification by conservation interests and to meet the requirements of regulatory legislation such as for drinking water supplies. All surface water bodies have an objective to meet or exceed 'Good' overall status by 2027^v.
- 2.4.2. Two reaches of the River Findhorn within the study area have been characterised under WFD, with larger tributaries of the River Findhorn also characterised as outlined in Table A2.3 and shown in Figure 11.2. The WFD status of these water bodies is taken from the most recent data available on the SEPA website, year 2016. For water bodies that have not been classified, the normal convention is to assume a classification based on downstream or adjacent water bodies, unless there are specific indications to the contrary.

Table A2.3: Current Water Framework Directive Status of Surface Waters, 2016

Hydrological Catchment	River Findhorn System				
	River Findhorn – Tomatin to Garbole	River Findhorn – Tomatin to Dorback Burn	Funtack Burn	Moy Burn	Loch Moy
Water Body Type	River	River	River	River	Lake
Water Body ID	23012	23004	23008	23009	100160
Heavily Modified	No	No	No	No	No
Overall status (2016)	Good	Moderate	Good	Good	High
Overall ecology	Good	Moderate	Good	Good	High
Physico-chem	Not reported	High	High	Good	High

Hydrological Catchment	River Findhorn System					
	Water Body Name	River Findhorn – Tomatin to Garbole	River Findhorn – Tomatin to Dorback Burn	Funtack Burn	Moy Burn	Loch Moy
pH	Not reported	High	High	High	Good	Not reported
Dissolved Oxygen	Not reported	High	High	High	High	High
Biological elements	High	Moderate	High	High	Good	High
Fish	High	Moderate	High	High	High	Not reported
Fish ecology	Not reported	Good	Not reported	Not reported	Not reported	Not reported
Fish barrier	High	Moderate	High	High	High	High
Specific pollutants	Not reported	Pass	Pass	Pass	Pass	Not reported
Hydromorphology	Good	Good	Good	Good	Good	High
Morphology	Good	Good	Good	Good	Good	High
Overall Hydrology	High	High	High	High	High	High
Modelled Hydrology	High	High	High	High	High	Not reported

2.4.3. As shown in Table A2.3, the majority of the local water bodies have been classified as having at least 'Good' overall status, with the exception of the River Findhorn (downstream reach, from Tomatin to Dorback Burn), which has been classified as 'Moderate' due to barriers to fish migration

2.4.4. Table A2.4 summarises water quality sensitivities of watercourses based on the information provided above and site observations.

Table A2.4: Surface Water Quality Sensitivity Summary

Receptor	Comment	Sensitivity
Allt Cosach Trib 1	Not classified by SEPA, likely to be affected by existing road and rail discharges. A small headwater/existing A9 PED drain crossed by the Highland Main Line railway.	Low
River Findhorn (Garbole to Tomatin)	'Good' Overall WFD Status	High
River Findhorn (Tomatin to Dorback Burn)	'Moderate' Overall WFD Status, pressures relate to barriers to fish migration	Medium
River Findhorn Trib 1	Not classified by SEPA. Small drain/headwater watercourse draining woodland and grassland, crossed by the A9, with little flow observed at the time of survey. Potentially impacted by existing road discharges	Medium
Allt na Frithe	Not classified by SEPA. Large burn draining moorland, forestry and agricultural land, passes through Tomatin village. 3 licenced discharges, including cooling water and sewage effluent from Tomatin distillery. Potential diffuse rural pollution, and road and rail discharges.	Medium
River Findhorn Trib 1.1	Not classified by SEPA. Small drain draining woodland and grassland, channel likely to be associated with the existing A9 PED. Potentially impacted by existing road discharges.	Medium
River Findhorn Trib 2	Not classified by SEPA. A small watercourse draining forestry. Potentially impacted by existing road discharges.	Medium
Allt Dubhag	Not classified by SEPA. Small modified burn draining moorland and forestry. Potentially impacted by existing road discharges and small domestic sewage discharges	Medium
River Findhorn Trib 3	Not classified by SEPA. A small ephemeral drain associated with the existing A9 pre-earthworks. Potentially impacted by existing road discharges.	Medium
Funtack Burn Trib 1	Not classified by SEPA. Small drainage ditch emerging from existing small A9 culvert/drain. Possibly existing road drainage outfall.	Medium
Dalmagarry Burn Trib 1	Not classified by SEPA. A small watercourse draining open moorland. Potentially impacted by existing road and rail discharges.	Medium
Dalmagarry Burn Trib 2	Not classified by SEPA. A small watercourse draining open moorland, crossed by the existing A9 and HML. Potentially impacted by existing road and rail discharges.	Medium
Dalmagarry Burn Trib 3	Not classified by SEPA. A dry drainage ditch, draining open moorland and crossed by the HML and existing A9.	Medium
Dalmagarry Burn	Not classified by SEPA. Small river draining open moorland, crossed by the HML and existing A9. Potentially impacted by existing road and rail discharges.	Medium

Receptor	Comment	Sensitivity
Dalmagarry Burn Trib 4	Not classified by SEPA. Small watercourse draining open moorland.	Medium
Dalmagarry Burn Trib 5	Not classified by SEPA. Small watercourse draining open moorland.	Medium
Funtack Burn	'Good' Overall WFD Status. Small river flowing from Loch Moy draining open agricultural land. Potential diffuse rural pollution.	High
Funtack Burn Trib 2	Not classified by SEPA. A small field drainage ditch draining agricultural grassland. No flow observed at the time of survey. Potentially impacted by diffuse rural pollution and existing road and rail discharges.	Medium
Funtack Burn Trib 3	Not classified by SEPA. A small drain draining forestry and agricultural grassland. No flow observed at the time of survey. Potentially impacted by diffuse rural pollution and existing road and rail discharges.	Medium
Funtack Burn Trib 4	Not classified by SEPA. A small watercourse draining woodland and open grassland. Potentially impacted by diffuse rural pollution and existing road and rail discharges.	Medium
Funtack Burn Trib 5	Not classified by SEPA. A small watercourse draining woodland and open grassland. Potentially impacted by diffuse rural pollution and existing road and rail discharges.	Medium
Funtack Burn Trib 6	Not classified by SEPA. Very small, steep drain/stream draining forestry. Potentially impacted by diffuse rural pollution and existing road and rail discharges.	Medium
Funtack Burn Trib 7	Not classified by SEPA. Very small, steep drain/stream draining forestry. Potentially impacted by diffuse rural pollution, small domestic sewage discharges and road and rail discharges.	Medium
Funtack Burn Trib 8	Not classified by SEPA. Very small, drain/stream draining forestry. Potentially impacted by diffuse rural pollution and existing road and rail discharges.	Medium
Funtack Burn Trib 9	Not classified by SEPA. Very small, drain/stream draining forestry. Potentially impacted by diffuse rural pollution and existing road and rail discharges.	Medium
Caochan na h-Eaglais	Not classified by SEPA. Small burn draining forestry. Potentially impacted by diffuse rural pollution and existing road and rail discharges.	Medium
Funtack Burn Trib 10	Not classified by SEPA. A small drain originating between the two ponds at Lynebeg and the HML. Potentially impacted by small domestic sewage discharges and road and rail discharges.	Medium
Moy Burn Trib 1	Not classified by SEPA. A small burn draining forestry and open moorland. Supports 2 separate water supplies: PWS Lynebeg (serves five properties) and PWS Lynemore (serves one property), both sources located upstream of the Proposed Scheme.	Medium
Allt na Loinne Mor	Not classified by SEPA. A large burn open moorland. Potentially impacted by small domestic sewage discharge and existing road and rail discharges.	Medium

Receptor	Comment	Sensitivity
Moy Burn	'Good' Overall WFD Status. A small river draining open moorland and agricultural land. Potentially impacts by rural diffuse pollution.	High
Moy Burn Trib 2	Not classified by SEPA. A small drain draining open moorland and grassland. Potentially impacted by existing road discharges.	Medium
Moy Burn Trib 3	Not classified by SEPA. A small grassland drain, overgrown with macrophytes and a stagnant flow noted at the time of survey. Potentially impacted by existing road discharges.	Medium
Allt Creag Bheithin Trib 1	Not classified by SEPA. A small watercourse draining forestry plantation and grassland, with sluggish flow noted during survey. Potentially impacted by existing road discharges.	Medium
Allt Creag Bheithin Trib 2	Not classified by SEPA. A small watercourse draining forestry plantation and grassland, with sluggish flow noted during survey. Potentially impacted by existing road discharges.	Medium
Allt na Slanaich	Not classified by SEPA. A medium sized burn draining open moorland and dense plantation forestry. Potentially impacted by existing road discharges.	Medium
Allt Creag Bheithin	Not classified by SEPA. A medium sized burn draining open moorland and forestry plantation. Potentially impacted by existing road discharges and diffuse rural pollution	Medium
Allt Creag Bheithin Trib 3	Not classified by SEPA. A small burn draining forestry plantation. Potentially impacted by existing road discharges	Medium
Allt Creag Bheithin Trib 4	Not classified by SEPA. A small forestry drain. Potentially impacted by existing road discharges	Medium
Allt Creag Bheithin Trib 5	Not classified by SEPA. A small burn draining forestry and moorland.	Medium
Midlairs Burn	Not classified by SEPA. A medium sized burn draining areas of forestry and open moorland, crossed by a forestry access track.	Medium
Midlairs Burn Trib 1	Not classified by SEPA. A small watercourse draining forestry and moorland, crossed by the existing A9. Potentially impacted by existing road discharges	Medium
Midlairs Burn Trib 2	Not classified by SEPA. An artificial drain which intercepts part of the flow from the Midlairs Burn Trib 1. Potentially impacted by existing road discharges	Medium

- 2.4.5. There is no specific water quality data available for the local ponds found within the study area. However, Chapter 12 considers all the ponds surveyed to hold biodiversity value of up to Local level, therefore it is assumed that water quality is of a reasonable quality although anthropogenic pressures are likely.

2.5. Water Supplies, Abstractions and Discharges

Public Water Supplies

- 2.5.1. There are no Scottish Water surface water supply sources within the Study Area. There is, however, a groundwater fed public water supply located within the Study Area, which is considered in Chapter 10 (Geology, Soils and Groundwater).
- 2.5.2. There is also a distribution network for public supply to local properties in Tomatin and Moy. This is addressed in more detail within the Utilities section of the Stage 3 Engineering Assessment Report.

Private Water Supplies

- 2.5.3. Properties served by private water supplies have been identified within 1km of the Proposed Scheme, and up to 5km downstream in the case of surface water supplies. All of which are located within the River Findhorn catchment, including the Funtack Burn and Moy Burn sub-catchments.
- 2.5.4. A number of supplies have been confirmed as groundwater sources, with these considered further in Chapter 10. Details of the remaining supplies, are provided in Table A2.5.

Table A2.5: Surface Water Fed Private Water Supplies

Source Name and Location (NGR)	Water body receptor	WFD Catchment	Properties Supplied and Location (NGR)	Source Type	Sensitivity	River Catchment and Relative Location	Comment
PWS Lynebeg (NH 764 338)	Moy Burn Trib 1 (headwater tributary)	Funtack Burn	Five properties: 1, 2 and 4 Forestry Houses; Foresters House (NH 766 340) Moybeg Cottage (NH 769 341)	Surface Water (watercourse)	Water Quality: High Water Quantity: High	Located on a headwater tributary to Moy Burn Trib 1, which flows directly into Loch Moy 0.3km south and upstream of the Proposed Scheme	The supply is sourced from the small hillside watercourse to the southwest and uphill of the Proposed Scheme. Supply pipeline crosses the A9 and may therefore be disrupted by the Proposed Scheme.
PWS Lynemore (NH 763 339)	Moy Burn Trib 1 (headwater tributary)	Funtack Burn	Lynemore (NH 763 339)	Surface Water (watercourse)	Water Quality: Medium Water Quantity: Medium	Located on a headwater tributary to Moy Burn Trib 1, which flows directly into Loch Moy 0.4km south-southwest and upstream of the Proposed Scheme	The supply is sourced from the hillside stream to the south of the A9, uphill of the Proposed Scheme. Given the distance and the intervening topography, this source would be unaffected by the Proposed Scheme.
PWS Lynebeg Pond (NH 770 342)	Lynebeg Pond (National Pond Survey ID: P5)	Funtack Burn	Three Properties: Fearnach; Moybeg;	Surface Water (pond)	Water Quality: High Water Quantity: High	The Lynebeg Pond is immediately adjacent to, and encroached upon by the Proposed Scheme. The supply infrastructure is located downgradient of the Proposed Scheme footprint	The supply source is the southern of the two ponds at Lynebeg which is then piped to a small well approximately 50m to the north.



Source Name and Location (NGR)	Water body receptor	WFD Catchment	Properties Supplied and Location (NGR)	Source Type	Sensitivity	River Catchment and Relative Location	Comment
			Allt na Slanaichd (NH 770 342)			The Caochan na h-Eaglais is approximately 110m to the southeast of the PWS source location and the Funtack Burn Trib 10 is located 100m to the northeast. Both watercourses drain directly to Loch Moy	

- 2.5.5. As can be seen from Table A2.5, one surface water private water supply will not be affected by the Proposed Scheme, due to its location relative to the scheme and has been assigned sensitivity of Medium for both water quality and quantity.
- 2.5.6. The remaining two supplies are considered of high sensitivity for both water quality and quantity, as per the criteria provided in Section 11.2, due to the number of properties supplied by each source.

SEPA Registered Abstractions and Discharges

- 2.5.7. Given the location of the existing A9 carriageway and the HML, relative to the numerous watercourses within the Proposed Scheme Study Area, it is expected that many of the watercourses will have existing road and rail drainage discharges in place. In addition, diffuse pollution from rural sources is also considered likely due to the surrounding land use.
- 2.5.8. A number of licensed abstraction and discharge locations have been identified within 1km of the Proposed Scheme, and surface water abstractions up to 5km downstream, to focus on locations with potential hydrological linkage. These are licensed locations under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR)^{vi}, and The Waste Management Licensing (Scotland) Regulations 2011.
- 2.5.9. There are three levels of activity under the CAR, based on the type and scale of activity. These include:
- General Binding Rules – these are low risk activities which do not need to be notified to SEPA. Therefore, they are not included within the dataset below.
 - Registrations – these are medium risk activities where SEPA can monitor cumulative impacts and set additional conditions if required.
 - Licence (Simple and Complex) – these are high risk activities which contain site specific conditions and identification of a responsible person to ensure compliance of required conditions. ‘Simple’ and ‘Complex’ licences vary depending upon activity size and risk.
- 2.5.10. Within the SEPA dataset, licences are listed as ‘Simple Licence’ or ‘Licence’. Unless stated otherwise, any activity listed as ‘licence’ is considered to be a ‘Complex Licence’.
- 2.5.11. A total of 74 CAR licensed locations were identified as within 1km of the Proposed Scheme and surface water abstractions within 5km downstream. These include both domestic and industrial uses for both abstractions from, and discharges to, the water environment within the River Findhorn catchment. These are summarised in Table A2.6 by licence type and activity.

Table A2.6: CAR Licensed Activities within 1km of the Proposed Scheme and Surface Water Abstractions up to 5km Downstream

Regulatory Level	CAR Activity Type					Total
	Disposal to Land	Engineering	Point Source (sewage or other effluent discharge)	Water Resources	Unknown	
Licence (Complex)	0	0	6	2	0	8
Simple Licence	2	3	2	0	0	7

Regulatory Level	CAR Activity Type					
	Disposal to Land	Engineering	Point Source (sewage or other effluent discharge)	Water Resources	Unknown	Total
Registration	0	1	57	0	1	59
Total	2	4	65	2	1	74

2.5.12. With reference to Table A2.6 and Table A2.7, there are a number of types of activity:

- Disposal to Land – there are two simple licences associated with authorised locations for sheep dip disposal onto land. One licence is for Dalmagarry Farm and applies to three locations in its nearby vicinity; one being 190m downstream of the Proposed Scheme and the other two, 180m upstream. The other licence applies to two authorised locations at the far south of the study area, approximately 0.9km to the east-southeast of the Proposed Scheme at the proposed Tomatin South junction.
- Engineering Activities – there are three simple licences: Channel straightening and grey bank reinforcement on a tributary of the River Findhorn, approximately 1.5km to the northeast of Tomatin; a flow deflector on River Findhorn at Manse Pool, Tomatin, approximately 260m downstream of the Proposed Scheme; and a bridge on the River Findhorn at Invereen, approximately 730m east of the Proposed Scheme. There is one registration: A pipe/cable crossing on an unnamed tributary of Moy Burn 450m north of the Proposed Scheme on the B9154.
- Point Source Sewage Discharge – the majority of these are registrations for private properties. Three of the licensed activities relate to Scottish Water’s Tomatin Wastewater Treatment Plant, at the Findhorn Viaduct, approximately 240m upstream of the existing A9 River Findhorn crossing. Two licences are associated with Tomatin Distillery discharges, approximately 700m upstream of the Proposed Scheme, and the remaining licence is associated with the now demolished Freeburn Hotel, Tomatin, which was located 80m upstream of the existing A9. Licensed discharges within 1km of the Proposed Scheme are summarised in Table 2.7;
- Water Resources – there are two licences for authorised abstraction locations. One is a licensed abstraction point on the River Findhorn, approximately 80m downstream of the Proposed Scheme for Tomatin Distillery, for the purposes of non-evaporative cooling. The distillery has another supply for the whisky itself, located on the hill behind the distillery, it is upstream and some distance away from the scheme and outwith the study area. The other licence is associated with abstraction and return locations for the Altchosach Hydrostation, approximately 1.6km upstream of the existing River Findhorn A9 crossing at Tomatin and 2.5km downstream from the proposed Tomatin South Junction. Both abstractions are considered to have sensitivities of Medium for water quality and High for water quantity; and
- Unknown – there is one registration associated with unknown activity which refers to Per Roy Homes Ltd., No. 1 Forestry Cottages, Tomatin. This registration is anticipated to be associated with point source sewage discharge.

2.5.13. An additional four sites are registered as exempt under The Waste Management Licensing (Scotland) Regulations 2011. Two relate to spreading of distillery waste at Dalmagarry Farm and land treatment for agricultural improvement at Invereen Farm. The remaining two are associated with Corrybrough Estate, east of the River Findhorn, approximately 1km from the existing A9; however, exact activities have not been confirmed at this location.

Table A2.7: Discharges to Surface Water within 1km of the Proposed Scheme

Discharge Site Name and location (NGR)	Regulatory Level	Discharge Type	Relative Location	Receiving Water Body
Plot 1, Juniper Drive, Tomatin NH 800 286	Registration	Sewage (Private) Secondary	Not hydrologically connected to Proposed Scheme	Allt Neacrath
Tomatin WwTP (Final Effluent) NH 806 289	Licence	Sewage (Public) Secondary	3.3km upstream of road drainage outfall 1-A	River Findhorn
Tomatin WwTP (Emergency Overflow) NH 806 289	Licence	Sewage (Public) Emergency Overflow (EO)	3.3km upstream of road drainage outfall 1-A	
Tomatin WwTP (CSO), Balvraid Road NH 806 289	Licence	Sewage (Public) Combined Sewer Overflow (CSO)	3.3km upstream of road drainage outfall 1-A	
Burnside Cottage, Tomatin NH 815 289	Registration	Sewage (Private) Primary	Not hydrologically connected to Proposed Scheme	Allt a Choire Mhoir
Corrybrough Estate, Tomatin NH 814 293	Simple Licence	Sewage (Private) Tertiary	Not hydrologically connected to Proposed Scheme	
Tomatin Distillery, Tomatin NH 791 296	Licence	Other Effluent – Brewing Effluent	770m upstream of the Proposed Scheme	Allt na Frithe
Cooling Water Outlet at Tomatin Distillery NH 791 296	Licence	Other Effluent – Cooling Water	650m upstream of the Proposed Scheme	
8-13 Distillery Cottages, Tomatin Distillery NH 792 296	Registration	Sewage (Private) Secondary	650m upstream of the Proposed Scheme	
Freeburn Hotel, Tomatin NH 796 299	Licence	Sewage (Private) Tertiary	Property demolished	N/A
Glenkirk, Tomatin NH 790 302	Registration	Sewage (Private) Primary	590m upstream of the Proposed Scheme	Allt Dhubag
Glenan Lodge, Tomatin NH 790 302	Registration	Sewage (Private) Primary	590m upstream of the Proposed Scheme	



Discharge Site Name and location (NGR)	Regulatory Level	Discharge Type	Relative Location	Receiving Water Body
Burnside Cottage, Moy NH 765 345	Registration	Sewage (Private) Primary	150m downstream of the Proposed Scheme	Allt na Loinne Moire

Existing Road Drainage Discharges

- 2.5.14. The existing A9 is understood to discharge unattenuated and untreated runoff, generally via kerbs, gullies and carrier pipes. However the WS 2+1 section of road near Moy is drained via over the edge drainage into filter drains and thereby to the nearest watercourse. It has not been possible to identify the location of the existing outfalls due to a lack of complete as-built drawings. However it is anticipated that there are direct discharges into the majority of the local natural water bodies as well as indirectly via purpose built drainage ditches.

3. References

ⁱ Met. Office (2015); Northern Scotland: climate. Available at: <http://www.metoffice.gov.uk/climate/uk/ns/>. (Accessed 4 December 2015).

ⁱⁱ Centre for Ecology and Hydrology (CEH) (2009); Flood Estimation Handbook (FEH) CD ROM (V3).

ⁱⁱⁱ Met Office (2015); UK climate projections. Available at: <http://ukclimateprojections.metoffice.gov.uk/> (Accessed 4 December 2015).

^{iv} CEH (2015); National River Flow Archive. Available at: <https://www.ceh.ac.uk/our-science/projects/national-river-flow-archive> (Accessed June 2017).

^v SEPA (2010); Land Use Planning System SEPA guidance note 7; Guidance on the Water Framework Directive including river basin planning.

^{vi} Scottish Environment Protection Agency (SEPA) (2014); The Water Environmental (Controlled Activities) (Scotland) Regulations 2011 (as amended), A Practical Guide, Version 7.2. March 2015. Scottish Environment Protection Agency.