KP 370.2 Lasnaya 1 River

The Lasnaya 1 River crossing is protected by Reno mattings and a gabion wall on the north bank (Photo 1). The south bank consists of natural river gravel deposits on top of Reno matting. The RoW on both sides is densely vegetated (some tree saplings are appearing that need to be removed). An armoured drainage ditch within the gabion wall appears to be functioning well (Photo 3).

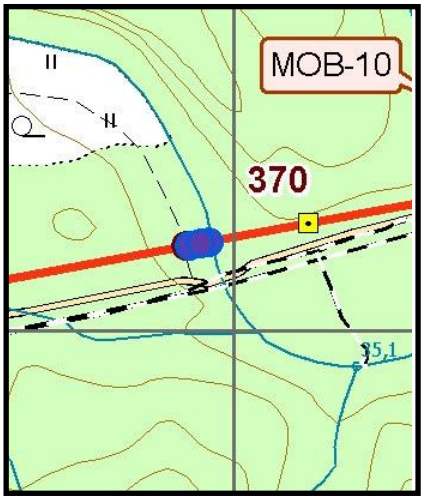
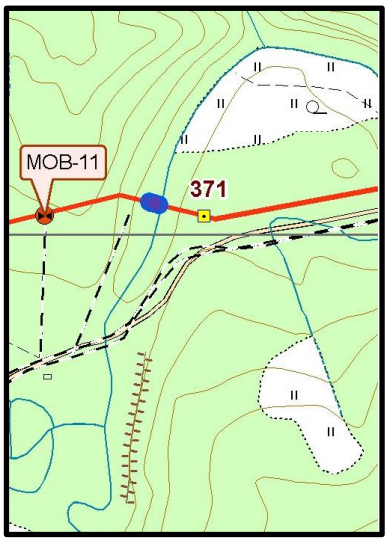


Photo 1 – View of northern bank gabion walls. Also note the dense vegetation.

Photo 2 – View of dense vegetation on southern bank.

Photo 3 – View of Drainage ditch with northern bank gabion wall.

KP 370.2 Lasnaya 2 River



The Lasnaya 2 River crossing is protected by Reno mattings and a gabion wall on both banks (Photos 1 and 2). Some erosion and damage to the gabion wall was visible at either end of the northern bank gabion wall (Photo 3).

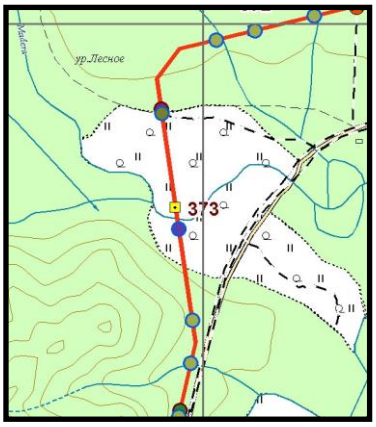
Good vegetation was visible on the RoW on both sides (Photos 1 and 2), although tree saplings are appearing that need to be removed. Geojute-protected slope breakers on the southern were found to be in good condition.

Photo 1 – View of northern bank gabion walls.

Photo 2 – View of southern bank gabion walls.

Photo 3 – Erosion and gabion damage on the northern bank

KP 373 Madera River



The river crossing is protected by gabions on the south bank and Reno matting on the north bank (Photo 1). The placement of the reno matting on the northern bank has noticeably narrowed the river compared to the river width up- and down-stream (Photo 1), and this is leading to some under-cutting of the matting. Erosion of the upstream southern bank has occurred but this is protected by good size riprap at present (Photo 2).

The RoW on each side of the river is densely vegetated (Photos 3 and 4).

Photo 1 – View downstream showing Reno matting on the north bank and gabions on the south bank. Visible narrowing of the river is seen on the northern bank.

Photo 2 – View downstream showing Reno matting on the north and gabions on the south.

Photo 3 – View of RoW to south with good re-vegetation.

Photo 4 – View north showing well vegetated RoW.

KP 376 Zhelezhnyak River

The Zhelezhnyak River crossing was damaged during the 2009 Typhoon season and was since then repaired. The banks are protected by gabion walls and Reno matting and appear in to be good condition (Photos 1 and 2).

The RoW slope south of the crossing held well and the RoW on both sides the crossing is very well vegetated.

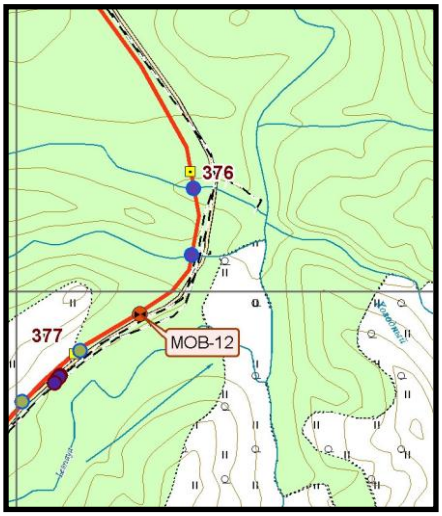
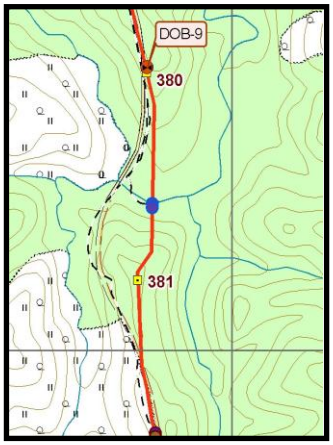


Photo 1 – View upstream of the river crossing showing Reno matting and gabion walls.

Photo 2 View downstream of the river crossing showing Reno matting and gabion walls.

KP 380.6 Lasnaya 3 River



The Lasnaya 3 River crossing is well protected on both banks with Reno matting on the north and Reno matting and gabion wall on the south (Photo 1).

The RoW on the north side of the crossing has good vegetation cover (Photo 2). The south slope is also well vegetated but with partially bare side cuts (Photo 3). The silt fencing on the south side is damage and in need of repair (Photo 3).

Photo 1 – View to the upstream of the river crossing showing Reno matting and gabion wall.

Photo 2 – View of the RoW north of the crossing with dense vegetation cover.

Photo 3 – View south showing the south slope with generally good vegetation cover, but bare side slopes and silt fencing in need of repair.

KP 382 Landslide on RoW

Recent landslide at KP 382 on the west side of the RoW has been repaired since 2011. The project was classified as Category 3 repair work and is executed directly by Sakhalin Energy. The works included stabilization of the side slope using gabion walls and geotextile and construction of a drainage system (Photos 1 to 2) and at the time of the site visit appeared in good condition.

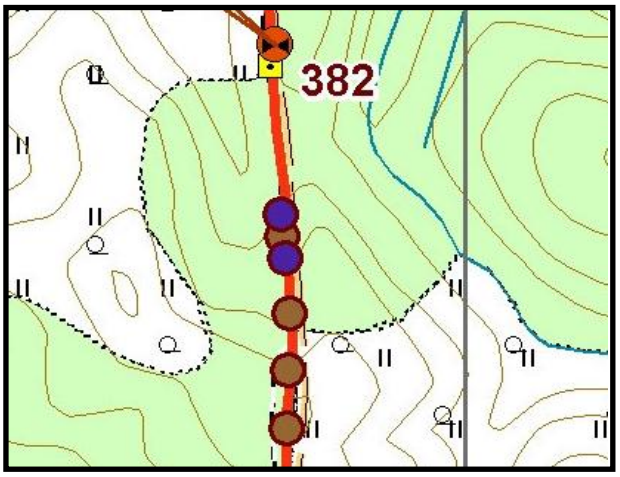
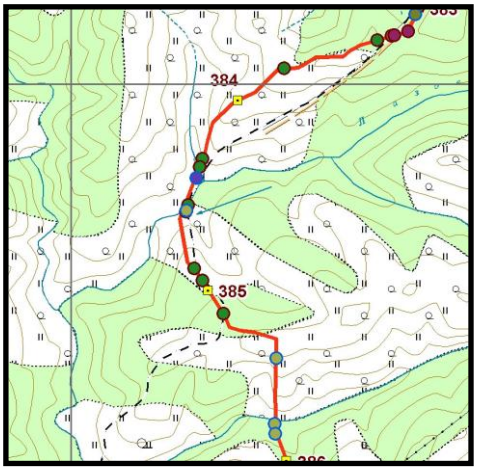


Photo 1 – View of drainage channels.

Photo 2 – View of gabion wall

KP 384.5 Lazovaya River



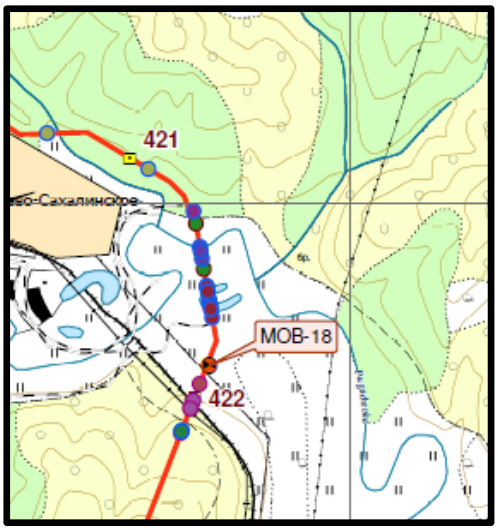
The Lazovaya River crossing is well protected with Reno matting and gabion walls on both banks (Photo 1). The bridge on the access road has good permanent sediment control. The slopes on both sides of the river have dense vegetation cover (Photos 1 and 2).

Reportedly, the bridge is now scheduled to stay as a permanent access point.

Photo 1 – View to the downstream showing gabion walls and Reno matting. Good re-vegetation on RoW.

Photo 2 – View to the north showing slope with good vegetation cover.

KP 421 Pugachevka River and wetlands



The Pugachevka River is surrounded by flat RoW on either side, with the area to the south classified as wetlands. The riverbanks are protected by reno matting on the southern bank (Photo 1) and riprap on the north bank (Photo 2), all of which appears to be in good condition. The river divides within the width of the RoW and the riverbanks at the divide appear in good condition (Photo 3). Spawning salmon were seen in the river at the time of the inspection.

The wetland was well vegetated, but the soils were found to be dry and no evidence of wetland were found either on the RoW or in adjacent areas. A slight depression over the FOC was evident.

Photo 1 – Reno matting on southern bank

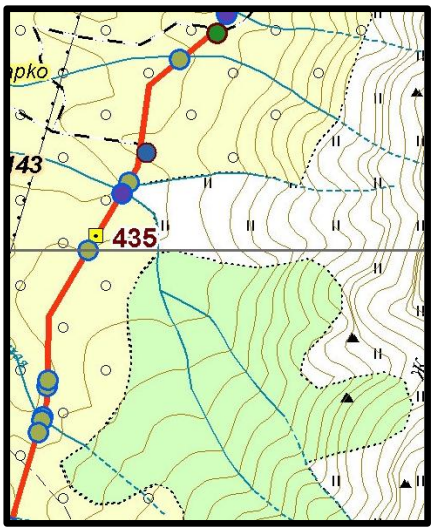
Photo 2 – Riprap on northern riverbank.

Photo 3 – River divide at edge of RoW

Photo 4 – River divide at edge of RoW

Photo 5 – Dry soils in area classified as 'wetlands' 	

KP 435 Travyanaya River



The RoW crosses a minor tributary (to the north) and the main channel (to the south) of the Travyanaya River. The minor channel is protected by reno matting, through which a good level of vegetation has grown through (Photo 1).

The main channel is protected on both banks by reno matting, but the positioning of these have resulted in a noticeable narrowing of the channel (Photo 2) and this had also resulted in some under-cutting of the reno matts themselves. Also 'steps' in the river bed were evidence at the crossing (Photo 4).

The drainage channel on the eastern side of the south slope to the main channel was partially washed-out and minor collapse of the side cut was evident (Photo 3). This was resulting is minor sediment flow into the river.

Hard engineering of ephemeral drainage channels to the north of the Travyanaya were seen to be in good condition (Photo 5).

Photo 1 – Reno matting and vegetation on northern tributary

Photo 2 – Reno matting on the main stream leading to narrowing of the channel.

Photo 3 – Erosion of side cut on eastern side of south slope to main channel

Photo 4 – 'Steps' in the bed of the main channel

Photo 5 – Hard engineering of ephemeral drainage channel

KP 444.3 Tikhaya River

The Tikhaya River flows adjacent to the railroad and both were crossed using a horizontal thrust boring method. This resulted in undisturbed river banks which can be seen in their natural state in Photos 1. The river valley was disturbed by the excavation for the thrust boring and pipe trenches but it is graded and mostly well vegetated. As Photo 2 shows, the vegetation on the slope to the south is limited.

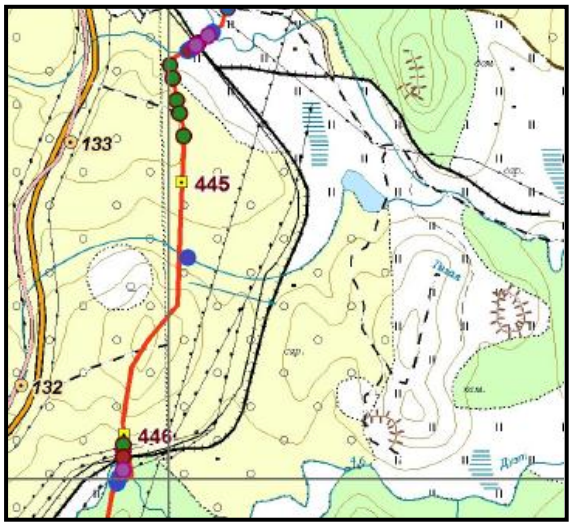


Photo 1 – View of riverbanks

Photo 2 – View south across the river and railroad (limited vegetation of slope)

KP 449.5 Duet 3 River

The Duet 3 River crossing is situated at the southern edge of valley, and the river flows along the RoW to the Duet 2 crossing. The river banks are protected with Reno mats and are well vegetated (Photo 1).

A temporary bridge is still in place (Photo 2) despite previous reports that it would be taken out, and the marks of the running track are visible to the south (Photo 3).

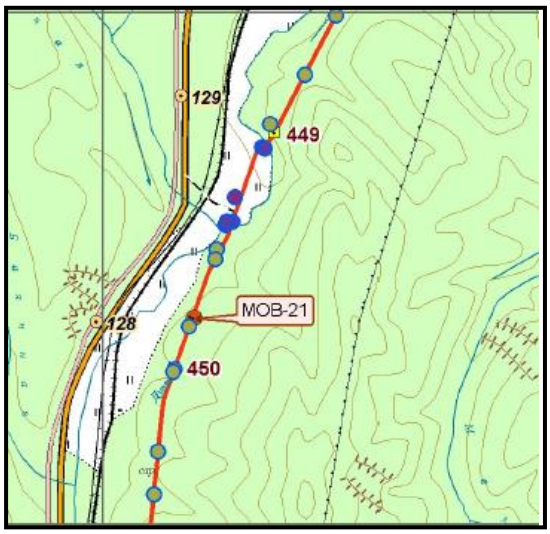


Photo 1 – View of re-vegetation of banks

Photo 2 – View of temporary bridge

Photo 3 – View across the river at RoW with running track leading to BVS

KP 460 Manui River and wetlands

The Manui River is approached from the south through a wetland area. Re-vegetation of the wetland area was of mixed quality, with bare soil visible over much of both pipelines and the FOC (Photo 1). Closer inspection also revealed: the presence of imported material (soils/gravels), especially on the old running track (Photo 2); significant areas of pooling due to depression between the pipeline (Photo 1 and Photo 3); and, where re-vegetation was occurring plant species remain significantly different from those evident outside of the RoW. Recovery was generally found to be most advanced nearer the river, and we note that this is the location of the monitoring transect (which therefore may provide a generally optimistic picture of the overall recovery of the wetland area).

The river itself was found to be in generally good condition, with reno matting on the south bank (Photo 4) and a gabion wall on the north bank, although some minor slumping of the gabion was identified (Photo 5).

Photo 1 – View wetland. Bare soils over pipelines and FOC and depression between pipelines visible

Photo 2 – Imported material visible on RoW

Photo 3 – Pooling on RoW

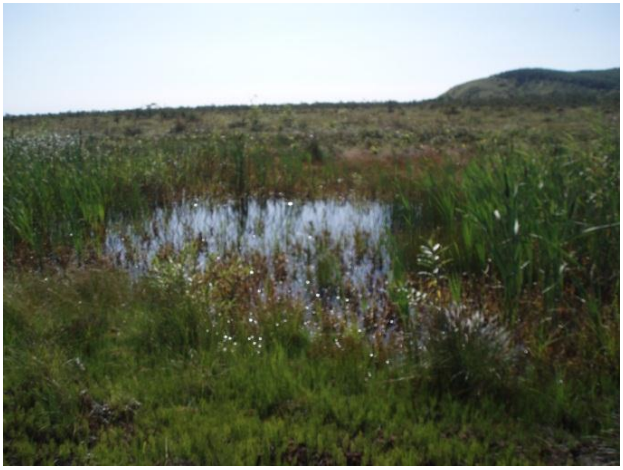
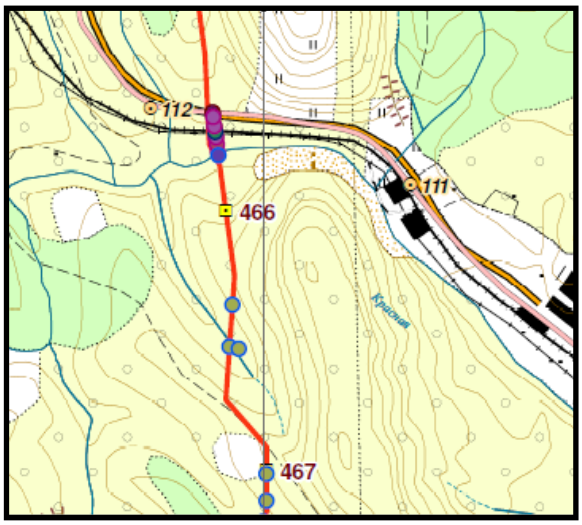


Photo 4 – Reno matting on southern bank

Photo 5 – Gabion on north slope with minor slumping 	

KP 466 Krasnaya River



The Krasnaya River crossing has a long steep slope which is protected by slope breakers on the south side and Reno matting protection on the banks. At the time of the visit, the slope appeared to be well vegetated and intact (Photo 1). The RoW on the north side of the river and north of the railroad and federal highway is also well vegetated (Photo 2).

The riverbanks are protected with reno matting through which good vegetation has grown (Photo 3). Some minor damage was evident to reno matting on the western bank in the downstream direction (Photo 4), which is likely to be due to is being placed too far into the channel.

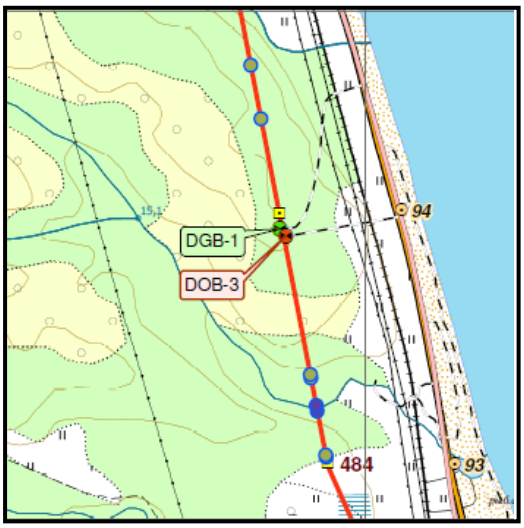
Photo 1 – View to the south showing well vegetated slope and river crossing

Photo 2 – View to the north showing well vegetated RoW.

Photo 3 – View of the river banks

Photo 4 – Minor damage to reno matting

KP 483.7 Slavnaya River



The Slavnya River is protected with Reno mats and significant re-vegetation has occurred on the matting (Photo 1).

On the northern approach to the river, vegetation growth is mixed, with some areas of good growth, some areas of significant tree growth that needs to be removed (Photo 2), and other areas of bare soil (especially on the previous running track where imported material was still visible – Photo 3). A side cut on to the south of the river is bare and while geojute is in place it offers no protection (Photo 4).

The temporary bridge on the crossing previously seen during the 2010 site visit has been removed.

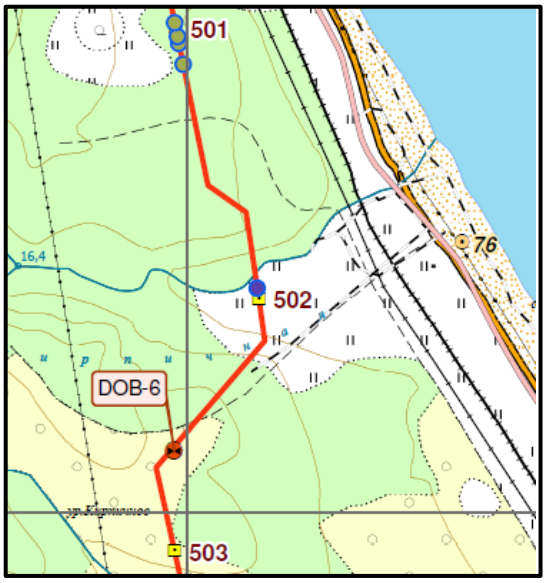
Photo 1 – Re-vegetation on riverbanks through reno matting

Photo 2 – Vegetation with tree growth on northern approach

Photo 3 – Imported material and bare soil on old running track 	**Photo 4** – Side cut on south side of river 

KP 502 Kirpichniya River

The Kirpichniya River crossing is located in the northern boundary of the river valley. The river banks at the crossing are well protected with Reno mats and thick vegetation (Photo 1 and 2). The river on the downstream side of the RoW bends sharply to the north (and cuts) into the RoW on the Oil Pipe side. It was not possible to see the side of the RoW at the bend during the visit and it is recommended that it will continue to be monitored (Photo 3).



The valley floor is densely vegetated throughout (Photos 3 and 4) and the slope to the south is well protected with vegetation and slope breakers (Photo 4).

Photo 1 – View to the downstream showing well vegetated river banks

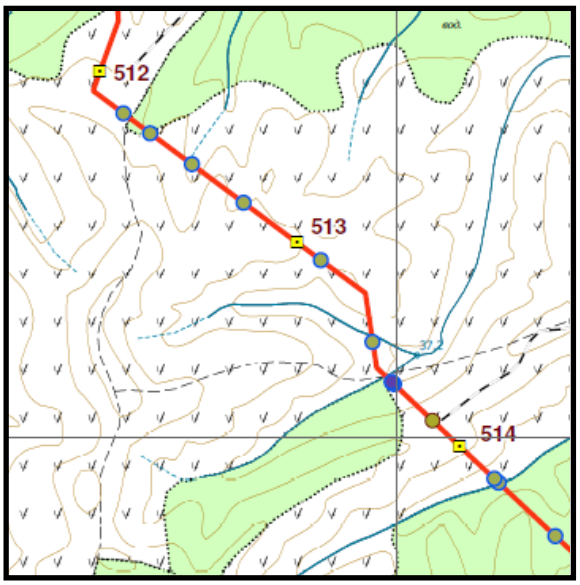
Photo 2 – View to the upstream showing well vegetated river banks.

Photo 3 – View to the north across the river showing good ground cover. Also note the river bend on the right side of the slope (see text)

Photo 4 – View of the river valley to the south with a slope in the background showing very good ground cover and good slope protection.

KP 513-511 Sandy Slopes RoW

The sandy slopes between KP513 to the Ai River show some improved levels of vegetation over previous years (Photo 1), including some areas where seeding effects are evident (Photo 2). However, overall re-vegetation of these sandy slopes remains limited with some areas still showing very limited or no vegetation at all (Photo 3). The slope breakers which were installed along the sandy area mostly function well but in places need increased in frequency. The sandy area will need surface preparation and re-seeding for improved bio-restoration.



The river itself could not be inspected closely due to the presence of poachers, but from a distance the riverbanks appeared to be well vegetated and in good condition (Photo 4).

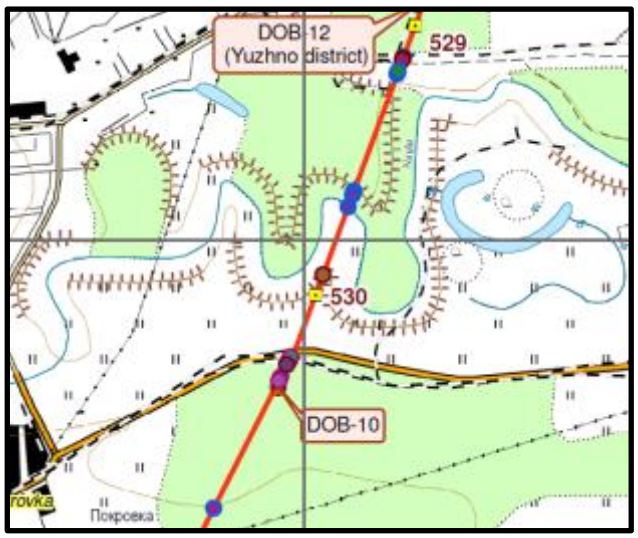
Photo 1 – View to the north along the RoW

Photo 2 – Recently seeded area

Photo 3 – Poor re-vegetation of sandy slopes

Photo 4 – View of the River

KP 530 Dolinsk Wetlands



The RoW crosses the Dolinsk Wetlands from north to south approximately 2 km west of Dolinsk. During the site visit, access to the wetlands was gained via the federal road close to DOB-10. The section to the north of the federal road was inspected, included the monitoring transect location.

Overall, re-vegetation on the RoW is extensive (Photo 1), although:

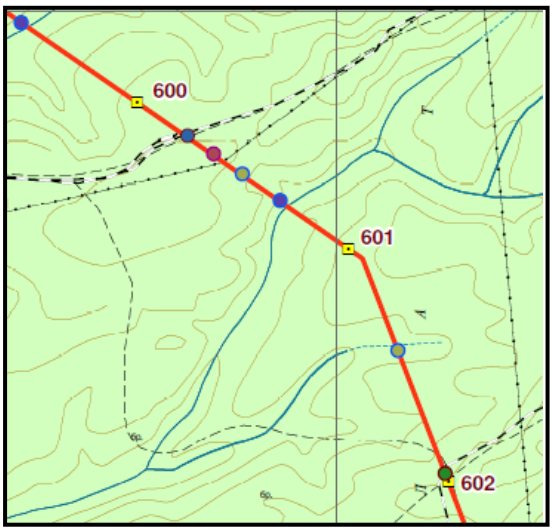
- In some areas over the pipelines and removed running track re-vegetation is sparser and dominated by pioneer species (Photo 2).
- Significant tree growth was evident (Photo 3) but at the time of the site visit a tree-control maintenance crew was working at this location on the RoW.
- The vegetation on the RoW still shows distinct difference from adjacent area immediately outside of the RoW (some locations off the side of the RoW also appeared to be more marshy than was evident on the RoW itself).

Photo 1 - View to the south along the RoW

Photo 2 – Areas of sparse re-vegetation on RoW

Photo 3 – Tree growth on RoW 	

KP 600.6 Pultovka River and RoW



The slopes to the river are steep to both the north and south. The slopes are protected slope breakers that were seen to be in reasonable condition (Photo 3). Re-vegetation on the slopes immediately adjacent to the river has improved significantly over the last 2 years (Photo 1), although some patches of weak re-vegetation remain.

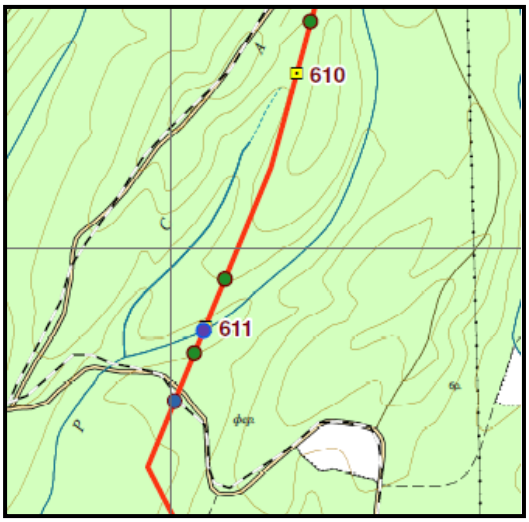
The riverbanks are protected by reno matting which appeared to be good condition and vegetation through the matting is occurring (Photo 2).

Photo 1 – View of river showing significantly improved vegetation of the slopes

Photo 2 – Reno matting on the riverbanks with vegetation growth through.

Photo 3 – Showing slopes with slope breakers but some areas of patchy re-vegetation

KP 611 RoW and R. Vodopyanovka



The R. Vodopyanovka banks are protected by reno matting which appeared to be good condition and vegetation through the matting is occurring (Photo 1). The slopes on the RoW on both sides of the river have only moderate re-vegetation (Photo 2), although this is nonetheless improved over conditions seen during the last visit to this river in 2010. Slopes breakers are installed on the slopes and were found to be in good condition.

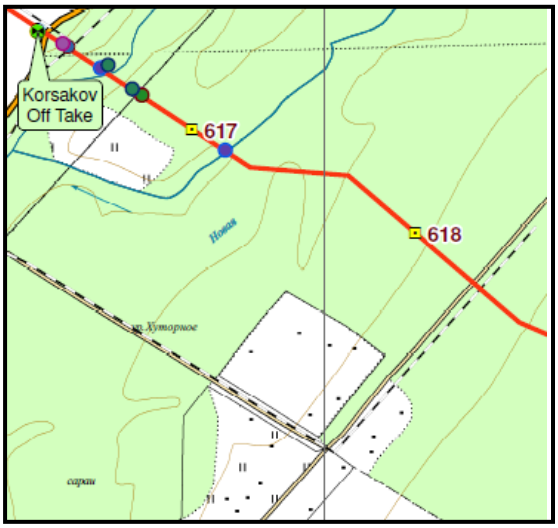
A side cut on western side of the northern slope, close the river has only weak re-vegetation and may be prone erosion in future.

Photo 1 – Showing Reno matting and re-vegetation of the riverbank

Photo 2 – Northern slope with moderate grass cover

Photo 3 – Side cut on western side of the northern slope

KP 617 Korsakovka River and slopes



The Korsakov River was crossed using horizontal thrust bore which left the river banks largely un-impacted (Photo 1).

The lower river valley has good vegetation cover (Photo 2) but the slope leading to the river from the north has very poor vegetation and shows strong erosion (Photos 2 and 3). This slope is need of additional and more effective slope breakers and full bio-restoration.

Water pooling over the pipeline was visible at the location where a pit had been installed for the thrust boring equipment during construction (Photo 4). This requires technical survey by Sakhalin Energy.

Photo 1 – View of banks with natural vegetation

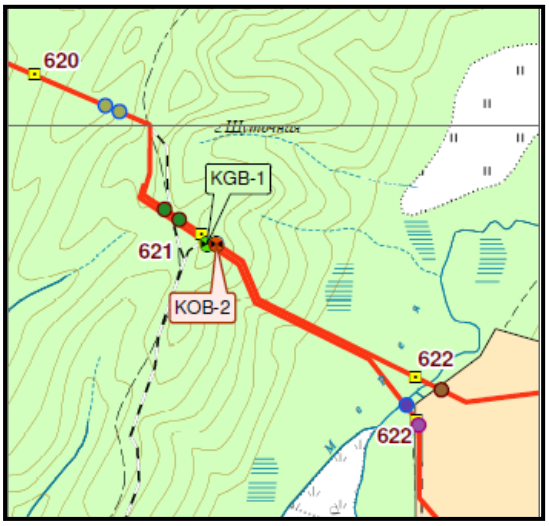
Photo 2 – View north showing river valley with good vegetation but slope without vegetation.

Photo 3 – View of erosional rill development and lack of grass cover.

Photo 4 – Water pooling over pipeline at location where the bore pit had been installed

KP 621 Block Valve Station above Mereya River

The hill to the north of the river crossing was also inspected. The southern slopes of the hill overlooking the R. Mereya had moderate levels of re-vegetation and the slope was protected by geojute armoured slope breakers which were found to be in good condition (Photo 1). The slopes on the north side of the hill showed generally weaker re-vegetation (photo 2), although it was noted that the soils in the area have a low erosion potential and also there is no stream at the bottom of the slope (hence reducing the environmental significance of any run off).



The site visit was undertaken on still day and the operation of the LNG plant audible from the hilltop.

Photo 1 – South slope on hill overlooking R. Mereya

Photo 2 – North slope on hill overlooking R. Mereya

KP 622 Mereya River and Slopes

The Mereya River is crossed with two separated RoWs, one for the oil pipe (Photos 1 and 2) and one for the gas pipe (Photos 3 and 4). Both crossings are protected with Reno matting which has begun to disintegrate but have been nonetheless stabilised by good levels of re-vegetation (photos 1 and 3).

The RoW on adjacent to both river crossings is re-vegetating well (Photos 2 and 4), although some tree growth was identified that needs to be removed.

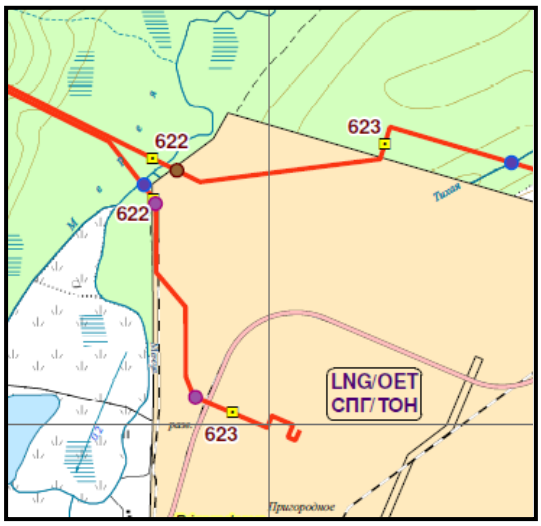


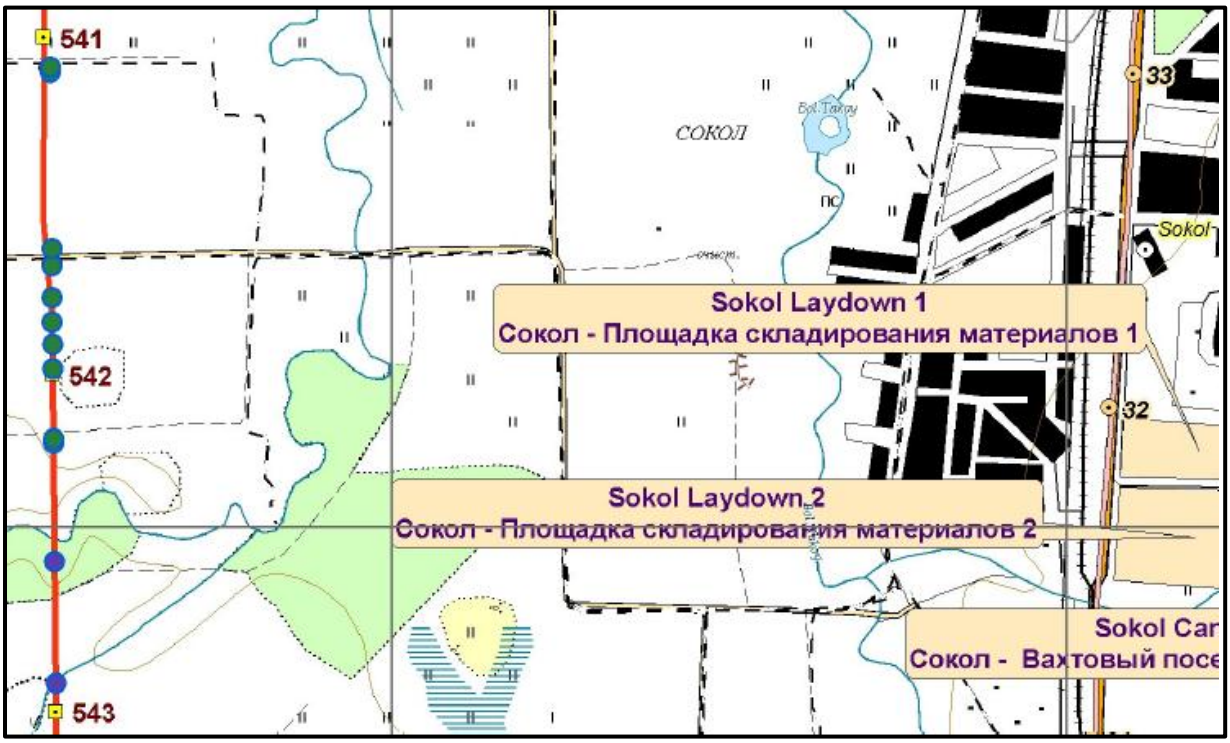
Photo 1 – View to north bank on oil pipe crossing

Photo 2 – View to the south from oil pipe crossing showing well vegetated RoW

Photo 3 – View to north bank on gas pipe

Photo 4 - View to the south from oil pipe crossing showing well vegetated RoW

Sokol Laydown Yard (Federal Highway, near pipeline KP542)



The Sokol laydown yard is adjacent to the former Sokol construction camp (south of the city of Sokol, 30 km north of Yuzhno-Sakhalinsk). It was decommissioned and the ground reinstated two years ago and is now used as an agricultural field by local entities. The site has a very good grassy vegetation cover.