Project Management Group, JSC “Rogun HPP”, DFZ

ROGUN HYDROPOWER PROJECT – UPDATED ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Volume I – Environmental & Social Impact Assessment –
Chapter 11 – Rapid Cumulative Impact Assessment

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WSP

4th Floor
6 Devonshire Square
London
EC2M 4YE

Phone: +44 20 7337 1700

DocFaxLabel

WSP.com

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Prepared by	Ritu Paliwal	Rhian Llewellyn	Rhian Llewellyn	Rhian Llewellyn	Di Scott	Rhian Llewellyn	Matt Goodwin
Checked by	Ed Taylor	Angela Boitsidis	Angela Boitsidis	Angela Boitsidis	Angela Boitsidis	Matt Goodwin	Ed Taylor
Authorised by	James McNally	Angela Boitsidis	Angela Boitsidis	James McNally	Angela Boitsidis	Angela Boitsidis	James McNally
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11 CUMULATIVE IMPACT ASSESSMENT (RAPID)

11.1 INTRODUCTION

11.1.1. Cumulative impacts are those that arise due to an impact from the Project interacting with an impact from another activity to create an additional impact. The Cumulative Impact Assessment (CIA) is an assessment of these impacts.

11.1.2. Environmental and social impacts arising from existing, planned and foreseeable future developments within the Project Area of Influence (AoI) might individually be insignificant, but when combined, could amount to a significant cumulative impact. Direct and indirect effects of the Project have been defined in **Volume 1, Chapter 8** of this ESIA.

11.1.3. The assessment of cumulative impacts is an integral part of the ESIA process to ensure that multiple effects on people, heritage and environmental receptors arising from the Project combined with impacts from other projects/activities have been identified and addressed.

11.1.4. The identification and appraisal of cumulative impacts in this chapter is restricted to a high-level qualitative assessment of existing, planned or reasonably defined developments. Accordingly, this is considered a Rapid Cumulative Impact Assessment. The final ESIA will include an expanded assessment.

11.2 INTERNATIONAL GUIDELINES

11.2.1. Several international guidelines have provided points of reference to the approach and method for assessing risk and impacts, including:

- International Finance Cooperation, Good Practice Handbook, Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets, 2013.
- Guidance for the Private Sector in Emerging Markets, The World Bank Group Environmental and Social Framework, 2017; and
- World Business Council for Sustainable Development, Guidelines for Environmental & Social Impact Assessment, 2016.

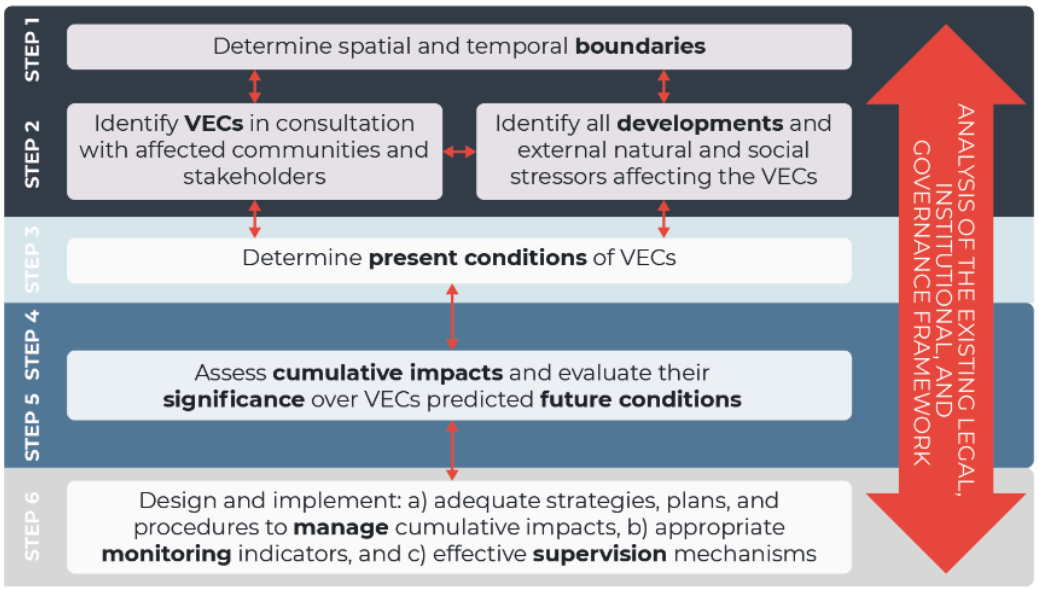
11.3 METHODOLOGY

11.3.1. A six step Rapid Cumulative Impact Assessment (RCIA) methodology has been followed, as summarised in Figure 11-1, aligned to the IFC (2013).

11.3.2. The focus of the cumulative impact assessment is limited to proposed developments and activities that have the potential to have a significant impact on sensitive human, heritage and environmental values and/or raise concerns from Affected Communities.

11.3.3. The IFC guidance states that Government and regional planners have ultimate responsibility for CIA and, accordingly, the rapid CIA may evolve into a more robust and comprehensive CIA. A most robust assessment will be completed and presented in the final ESIA.

Figure 11-1 - IFC's Six Step Approach to Rapid CIA (RCIA) (IFC, 2013)



11.3.4. Cumulative impacts consider what impacts the Project will have on valued environmental and social components (VCs) in terms of existing or future developments and how to avoid or minimise these impacts to the greater extent possible.

11.3.5. Cumulative impact assessment can be challenging, particularly in emerging markets. The RCIA process entails a desk review that, in consultation with the affected communities and other stakeholders, enables the developer to determine whether its activities are likely to significantly affect the viability or sustainability of identified receptors. This approach recognises the many challenges associated with managing a good cumulative impact assessment process in emerging markets, such as limited baseline data, uncertainty associated with anticipated developments, limited government capacity, and absence of strategic regional, sectoral, or integrated resource planning schemes.

11.3.6. The initial screening results of the RCIA can identify several potential scenarios provided in Table 11-1.

Table 11-1 - Potential RCIA screening scenarios

Significant Risk for Cumulative Impacts, with Significant Leverage	Significant Risk for Cumulative Impacts, with Limited Leverage	Limited to No Contribution to Cumulative Impacts
The Project under consideration represents a significant contributor to the expected	The Project under consideration is immersed in an environment where the cumulative impacts are	The RCIA determines that even though there are clear cumulative impacts, the Project's contribution

Significant Risk for Cumulative Impacts, with Significant Leverage	Significant Risk for Cumulative Impacts, with Limited Leverage	Limited to No Contribution to Cumulative Impacts
cumulative impacts or will be the first of several future reasonably anticipated developments that will use the same resource and/or potentially affect the same receptors.	evident, but the issues are complex, many actors are already involved, and the solution is clearly beyond any individual Project sponsor.	to the cumulative impacts over the affected receptors are negligible or nil.
Through consultation with stakeholders, the RCIA will help assess potential cumulative impacts that could be expected over time and guide the developer in defining the required mitigation measures.	The RCIA will help developers to: ■ Determine the significance of the overall cumulative impacts and its contribution to these cumulative impacts; and ■ Design environmental and social management plans and procedures to appropriately mitigate hose contributions.	No measures other than the ones resulting from the ESIA process are necessary.
A developer could design a strategy to appropriately manage cumulative impacts and provide advice to the government on the appropriate governance structure to ensure other developers will follow suit. This is an ideal case, where the developer can capitalise on the ESIA process, and the RCIA may organically evolve into a more robust CIA process and contribute to leveraging governments by outlining a strategic approach to managing cumulative impacts.	Developers should be accountable only for the design and implementation of mitigation measures commensurate with the magnitude and significance of its contribution to the cumulative impacts. They should also use best efforts to engage other developers, governments, and other stakeholders in acknowledging the cumulative impacts and risks and in designing coherent management strategies to mitigate them.	Note: If there are cumulative impacts from other sources that are not being addressed, developers may consider it pertinent to draw this to the attention of the government or other stakeholders and assess whether its Project may be at risk from the unmanaged cumulative effect.

11.3.7. It is noteworthy that the Rogun project cannot be placed entirely into a single column, as various aspects and potential impacts of Rogun could fall into any one of the categories or subcategories.

11.4 Stage 1: Spatial and Temporal Boundaries

Spatial Boundaries

11.4.1. The spatial boundaries of the RCIA have been defined by reference to the Project characteristics (see Volume I, Chapter 3). The AoI for each topic area are presented in the relevant topic annexes

(Volume II, Annexes A01-A14) and are summarised in **Volume 1, Chapter 7** of this ESIA. They correspond to the assessment area for the defined Valued Environmental and Social Components (VCs) for the CIA.

11.4.2. While this scope has been used to identify potential interactions with any VCs present, it does not necessarily equate to the extent of the VCs being affected. A flexible approach has been maintained, with the geographical boundaries of the RCIA varying depending on the characteristics of the potentially impacted VC. In some cases (e.g., mobile fauna), an interaction may occur in one area, but cumulative impacts may occur across the extent of the VC. In these cases, the cumulative assessment has evaluated any across the extent of the VC.

Temporal Boundaries

11.4.3. The cumulative impact assessment temporal boundary covers the construction and operation phases of the Project. It should be noted that the further into the future the assessment looks, the greater the level of uncertainty around other potential developments. A decommissioning phase has not been considered in the RCIA as the Project has an expected life of 115 years, dependent on sediment inflow.

11.4.4. For the purpose of this RCIA, it is assumed that the construction phase of the Rogun HPP project will be completed by 2029.

11.5 Stage 2: Identify Receptors and Other Developments

Valued Environmental and Social Components

11.5.1. VCs are those prevailing environmental and social attributes within areas that are potentially impacted by the Project (during the construction and operation phases). VCs have been identified through the ESIA process, including through relevant stakeholder engagement (as detailed Volume I, Chapter 6: Stakeholder Engagement) and through reviews and assessments undertaken by relevant specialists as part of the ESIA process.

11.5.2. The VCs for which the Project itself is assessed to have a significant (Moderate or Major) adverse or positive effects will be considered as part of this RCIA. A summary of the VC residual effects defined for the Rogun HPP Project are presented in Table 11-2, and only includes in-scope VCs that may be cumulatively impacted by the Project.

11.5.3. Because of the importance of the water resource, this has also been scoped in, although as discussed in Chapter 8 the impacts of Rogun HPP are considered to be minor or negligible, largely due to the presence of Nurek downstream of Rogun.

Table 11-2 - Summary of Rogun HPP Project Major, Moderate or Positive Residual Effects

Aspect/ ESIA Chapter	VC(s)	Impact	Construction Phase	Operation Phase	Residual Significance
Social	Community assets and infrastructure	Loss of current community assets and infrastructure. New resettlement	✔	✔	Positive

Aspect/ ESIA Chapter	VC(s)	Impact	Construction Phase	Operation Phase	Residual Significance
		to provide improved infrastructure			
Water	River flow (biodiversity and downstream users)	Conversion of 80+km of river to reservoir. Reduced flow in 17km—no users affected each. No impact beyond Nurek HPP.	✔	✔	Biodiversity: Minor to Moderate River flow: Minor to Negligible

Other Projects and Developments

11.5.4. A summary of other projects identified as part of the RCIA are provided in

11.5.5. Table 11-3. The location of these projects in relation to the Rogun HPP Project AoI is provided in Figure 11-2. These developments have been screened to identify those with the potential to result in cumulative impacts when the spatial and temporal scope of the Project is considered.

11.5.6. Although details concerning impacts of existing developments are beyond the scope of this ESIA and RCIA, those impacts are recognized in broad terms in this RCIA, and to some extents have been taken into consideration in the assessment of significance of Rogun impacts (e.g., from the presence of Nurek having interrupted fish migration). Planned developments have been assessed subject to the availability of relevant ESIA reports and other readily available information. Where information is incomplete or unknown, these developments are deemed as having 'Deficient Data' and have been identified in assigned as such in Table 11-4.

11.5.7. The Human Health survey (refer to Volume I**, Chapter 6; Stakeholder Engagement**) identified the following projects as having affected stakeholders and these projects have been considered in the RCIA screening process:

- International Highway (Vakhdat – Jirgital); and
- Central Asia–China gas pipeline, Line D (identified in the questionnaire as Turkmenistan-China Natural Gas Pipeline Project).

Multiple displacement impacts are assessed in detail under the 2017-2025 RAP 2 and LRP 2 (see **Volume I, Chapter 3: Project Description**, Section 3.10 for details).

Table 11-3 – Other Projects

Project Name [industry/sector]	Status	Location	Description	Screened In / Screened Out
Nurek Hydropower Rehabilitation Project [Hydro Electric Power Plant]	Operational HPP is under rehabilitation	Located 70 km downstream from the Rogun HPP	At present, Nurek HPP is the farthest hydropower project upstream in the Vakhsh watershed, a position which will be taken by Rogun. Nurek is currently the largest hydroelectric power plant in Tajikistan and supplies more than 70 % of all the electricity generated in the country at present. The HPP was put into full operation in 1979 and is part of the Vakhsh HPP Cascade (refer to Table 3-1 in Volume I, Chapter 3: Project Description). The HPP installed capacity is 3,000 MW. Nurek HPP Is currently under rehabilitation, which is being carried out in 2 phases: Phase 1 includes rehabilitation of three generating units, key infrastructure components of the plant, and replacement of six autotransformers; and enhancement of dam safety Phase 2 covers the finalisation of the Nurek HPP rehabilitation and involves the replacement of six turbines and five transformers as well as the rehabilitation of Nurek bridge, the powerhouse, and other buildings/structures. Completion of the Nurek dam in the 1960s and 1970s had a significant effect on the Vakhsh River and the Amu Darya (see the 2014 Rogun ESIA for more details—Pöyry 2014). In summary, the dam interrupted migration of fish and other aquatic species. It also resulted in significant changes in seasonal flows downstream in the Vakhsh and Amu Darya, and this in turn has allowed significant agricultural and economic development in riparian countries.	**Screened In** – temporal overlap

Project Name [industry/sector]	Status	Location	Description	Screened In / Screened Out
Baipaza HPP [Hydro Electric Power Plant]	Operational	71 km downstream of Rogun HPP	Baipaza HPP is part of the Vakhsh HPP Cascade (refer to Table 3-1 in Volume I, Chapter 3: Project Description) and has been in operation since 1986.	**Screened Out** - operation has been captured within the baseline data for this Project. All are effectively run-of-river operations with little or no downstream effect. No effect of Rogun on these projects, nor of these projects on Rogun.
Sangtuda 1 HPP [Hydro Electric Power Plant]	Operational	93 km downstream of Rogun HPP	Sangtuda 1 HPP is part of the Vakhsh HPP Cascade (refer to Table 3-1 in Volume I, Chapter 3: Project Description) and has been in operation since 2009.	
Sangtuda 2 HPP [Hydro Electric Power Plant]	Operational	101 km downstream of Rogun HPP	Sangtuda 2 HPP is part of the Vakhsh HPP Cascade (refer to Table 3-1 in Volume I, Chapter 3: Project Description) and has been in operation since 2011.	
Golovnaya 240-Megawatt Hydropower Plant Rehabilitation Project [Hydro Electric Power Plant]	Operational HPP is under rehabilitation	114 km downstream of Rogun HPP	Golovnaya Dams are part of the Vakhsh HPP Cascade (refer to Table 3-1 in Volume I, Chapter 3: Project Description) and have been in operation since 1963. The Rehabilitation Project will comprise a refurbish of electric and mechanical equipment for power generation at Golovnaya Hydropower Plant (HPP) in Tajikistan. The Project will increase the generation capacity and operational efficiency of the power plant.	
Shurob HPP Project [Hydro Electric Power Plant]	Planned	Proposed location between	Shurob is a proposed Run-On-River HPP of about 850 MW, to be built between Rogun and Nurek. Dam would be at the upper end of	**Screened in** –potential temporal

Project Name [industry/sector]	Status	Location	Description	Screened In / Screened Out
		Rogun HPP and Nurek HPP	Nurek reservoir and the Shurob reservoir would extend nearly to the toe of Rogun dam. The Shurob HPP Project cannot be built without Rogun in place, since its small reservoir would be filled in a very short time (Pöyry Energy AG 2014). The project has not progressed beyond feasibility studies since it was announced in 2012. The project remains in the preliminary planning stage, with no formal decision to proceed or any prospective date. If it is constructed, it would not begin until Rogun construction is complete.	overlap with Rogun operation
International Highway (Vakhdat – Jirgital) [Road & Transport]	Packages ½ in Operation. Package 3 in Construction.	6 km – 40 km	The main road from Dushanbe to Obi Garm (M41) branches shortly before reaching Obi Garm to access the Rogun HPP site. Shortly after Obi Garm, short stretches of this road will be submerged in Stage 1 of the reservoir filling while, at later stages of impoundment, longer distances including the only bridge suitable for heavy traffic crossing the river, will disappear. This road is an important international and national road and has been replaced and, where required, road and bridge access to villages lying at higher elevations which will not be relocated have been provided. Two major new roads were planned for the area surrounding the reservoir. One along the left bank of the lower part of the reservoir, from the dam to the main bridge which will cross the reservoir, the other on the right bank, upper part of the reservoir, between the	**Screened in (Associated Facility—see Volume I, Chapter 3)**

Project Name [industry/sector]	Status	Location	Description	Screened In / Screened Out
			bridge and the village of Gharm, located approximately 50 km to the north-east. The new alignment of the M41, relocated the connection between Obi-Garm and Nurobod in three Packages of construction. Package 1: Obi-Garm – Tagikamar: Two tunnels, (Kandak and Karagch), 4 new bridge constructions and 2 bridge rehabilitations and approximately 30km of local access roads. Package 2: Tagikimar – Nurobod: Tunnel 3 (Tagikamar), 6 new bridge constructions, 1 bridge rehabilitation approximately 40km of local access roads. Package 3: Long Bridge at Darband: The permanent bridge is approximately 760m long, crossing the Surkhob River. This project is considered an associated facility to the Rogun HPP, and it has been subject to a separate ESIA process. The EIA for the 'Central Asia Regional Economic Cooperation Corridors 2, 3, and 5 (Obigarm–Nurobod) Road Project' (Ministry of Transport for the Asian Development Bank 2019) notes that construction for all packages will have been completed by November 2025. Road works for the project have substantially been completed as of late 2023.	
Transmission Line (High Voltage) [Electrical Infrastructure]	Planned	0 km	Rogun HPP will significantly enhance supply security in Tajikistan by producing an average of 30% of domestic electricity demand between 2020 and 2050.	**Screened Out** - operation has been captured within the

Project Name [industry/sector]	Status	Location	Description	Screened In / Screened Out
			The electricity generated by the Rogun HPP is planned for evacuation through 500kV high-voltage transmission lines to the power grid of the Republic of Tajikistan. The surplus power generated from the hydroelectric facility is proposed for export to Afghanistan and Pakistan through the CASA-1000 (Central Asia-South Asia) cross-border Ultra-High-Voltage (UHV) transmission line.	baseline data for this Project.
Central Asia–China gas pipeline, Line D [Energy]	Construction	33 km*	The fourth gas pipeline of this system will have a capacity of 30 bcm/year and will run 966km from the Galkynysh gas field in Turkmenistan to western China through Uzbekistan, Tajikistan, and Kyrgyzstan. The first three pipelines are in operation and do not pass through Tajikistan. The pipeline owner and operator are Trans-Tajik Gas Pipeline Company Ltd. Construction commenced in Tajikistan in 2018 and has been intermittent since this time. No project completion date has yet been announced by the stakeholders and little information is available due to security and commercial considerations.	**Screened in**
Qosh Tepa Canal, Afghanistan [Irrigation]	Construction	Circa. 225 km downstream of Rogun HPP	This 285 km canal project is located in northern provides of Afghanistan. It proposes to divert water from the Amu Darya River to allow 550,000 hectares to be used for agriculture. The proposed location of intake from the river near Khoshtepa (Afghan/Tajik border).	**Screened In**

Project Name [industry/sector]	Status	Location	Description	Screened In / Screened Out
			Phase 1 construction commenced in 2022 and has been completed. Phase 2 has commenced. There is no formal timeline for completion of the project, but it is understood to be of high national priority. The project was initiated by the former Government of Afghanistan and USAID. The Khush Tepa Irrigation and Power Generation Feasibility Study was carried out between 2018-2021. Arial imagery from 2023 indicates that phase 2 construction has been rapid under the current leadership regime in Afghanistan and that: ■ construction methods used may be basic, ■ industry best practice engineering design may not have been use. For example, no lining of the canal or reinforcement of banks. As of late 2023, Afghanistan is not party to the water management agreement for the Amu Darya basin.	

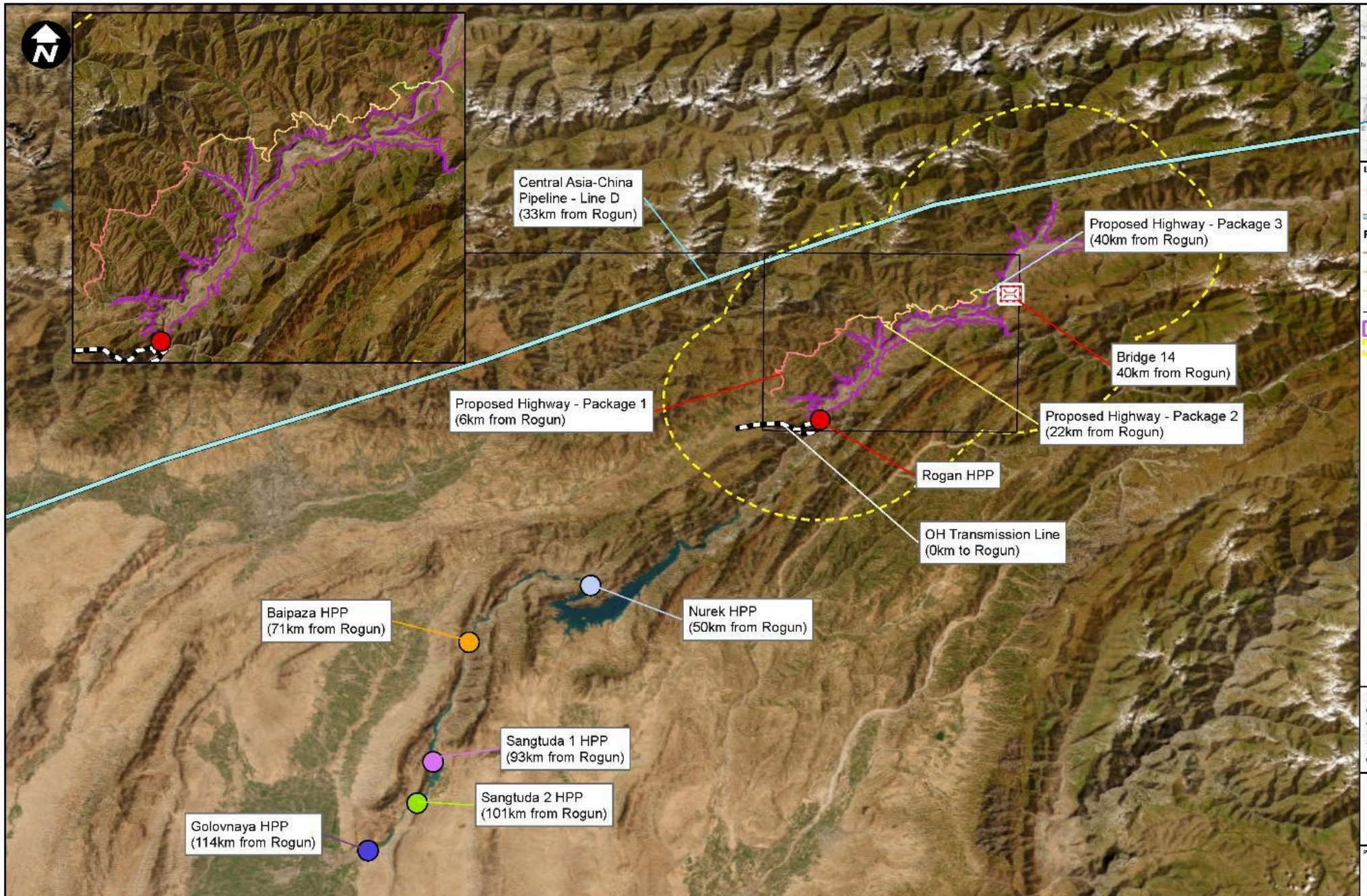

Central Asia-China Pipeline - Line D (33km from Rogun)
Proposed Highway - Package 3 (40km from Rogun)
Bridge 14 40km from Rogun)
Proposed Highway - Package 1 (6km from Rogun)
Proposed Highway - Package 2 (22km from Rogun)
Rogan HPP
OH Transmission Line (0km to Rogun)
Baipaza HPP (71km from Rogun)
Nurek HPP (50km from Rogun)
Sangtuda 1 HPP (93km from Rogun)
Sangtuda 2 HPP (101km from Rogun)
Golovnaya HPP (114km from Rogun)

Figure 11-2 – Location of Rogan HPP (including Project AoI) and other projects

Table 11-4 - Scoping of Other Projects for Consideration in Cumulative Impact Assessment

Project Aspect	VC(s)	Potential Cumulative Impact	Project Phase		Deve Defin
			Cons tructi on	Oper ation	Nu rek HP P Op era tio n
Soils & Geology	Loss of Soil	Erosion and sedimentation in permanent and temporary Rogun inundation zone	✔	-	X
Soils & Geology	Loss of Soil	Change in Land Capability in the Rogun inundation zone	✔	✔	X
Soils & Geology	Loss of Soil	Loss of arable soils in the seasonal inundation (drawdown) zone	-	✔	X

Project Aspect	VC(s)	Potential Cumulative Impact	Project Phase		Deve Defin
			Cons tructi on	Oper ation	Nu rek HP P Op era tio n
Minimum Environmental Flows	Floodplain habitats	Changes in flow/circulation in natural water bodies (Vakhsh River) due to seasonality	-	✔	✔
Minimum Environmental Flows	Floodplain habitats	Dewatering of watercourses (Rogun to Nurek)	-	✔	X
Minimum Environmental Flows	Aquatic Ecology	Dewatering of watercourses (Rogun to Nurek)	-	✔	X
Minimum Environmental Flows	Floodplain habitats	Modification of the characteristics of the channels downstream of Rogun	-	✔	✔

Project Aspect	VC(s)	Potential Cumulative Impact	Project Phase		Deve Defin
			Cons tructi on	Oper ation	Nu rek HP P Op era tio n
Minimum Environmental Flows	Aquatic Ecology	Modification of the characteristics of the channels downstream of Rogun	-	✔	✔
Minimum Environmental Flows	Floodplain habitats	Habitat loss and degradation downstream of Rogun	-	✔	✔
Minimum Environmental Flows	Aquatic Ecology	Habitat loss and degradation downstream of Rogun	-	✔	✔
Biodiversity	Floodplain habitat	Loss/degradation of habitat from flooding of Rogun reservoir	-	✔	X
Biodiversity	Juniper woodland	Loss/degradation of habitat from flooding of Rogun reservoir	-	✔	X

Project Aspect	VC(s)	Potential Cumulative Impact	Project Phase		Deve Defin
			Cons tructi on	Oper ation	Nu rek HP P Op era tio n
Biodiversity	Aquatic Ecology	Loss/degradation of existing lotic (river) habitat in the Rogun flooding zone as a result of flooding.	-	✔	X
Biodiversity	Aquatic Biodiversity	Increased human pressures in flooding zone	-	✔	X
Biodiversity	Notable mammal species	Change in habitat composition leading to better foraging habitat and increased freshwater availability for otters (Rogun reservoir)	-	✔	X
Biodiversity	Migratory Birds	Change in habitat composition leading to significantly increased freshwater resource in the landscape that is beneficial to aquatic/semi-aquatic birds (Rogun reservoir).	-	✔	X
Biodiversity	Aquatic Biodiversity	Change in habitat composition (Rogun reservoir and downstream to Nurek)	-	✔	X

Project Aspect	VC(s)	Potential Cumulative Impact	Project Phase		Deve Defin
			Cons tructi on	Oper ation	Nu rek HP P Op era tio n
Biodiversity	Aquatic Ecology (Fish)	Loss of tributaries and short-range migration in Rogun inundation zone. Some fish species could be adversely impacted by loss of refugee and spawning habitat.	-	✔	X
Ecosystem Services	Trees used for memorials and shrines	Loss of trees due to land and vegetation clearance within the Rogun flooding zone.	✔	-	X
Ecosystem Services	Trees associated with local stories and taboo	Loss of VC due to land and vegetation clearance within the Rogun flooding zone.	✔	-	X
Ecosystem Services	Trees used for memorials and shrines	Loss of valued trees in Rogun flooding zone	-	✔	X

Project Aspect	VC(s)	Potential Cumulative Impact	Project Phase		Deve Defin
			Cons tructi on	Oper ation	Nu rek HP P Op era tio n
Ecosystem Services	Trees associated with local stories and taboo	Loss of valued trees in Rogun flooding zone	-	✔	X
Social	Local economy & employment	Increase in local income due to employment expenditure	-	✔	X
Social	Community assets and infrastructure	Loss of current community assets and infrastructure. New resettlement to provide improved infrastructure.	✔	✔	X
Social	Community health, safety, and security	Potential noise and air pollution and reduced safety and security of local families and construction workers.	✔	-	X

Project Aspect	VC(s)	Potential Cumulative Impact	Project Phase		Deve Defin
			Cons tructi on	Oper ation	Nu rek HP P Op era tio n
Landscape and Visual	Visual Amenity: Residences on the North Bank edges	Views will be improved in construction areas once construction ceases, and inundation takes place.	-	✔	X
Landscape and Visual	Visual Amenity: Residences on the South Bank edges	Views will be improved in construction areas once construction ceases, and inundation takes place.	-	✔	X
Landscape and Visual	Visual Amenity: Users of the highways	Views will be improved in construction areas once construction ceases, and inundation takes place.	-	✔	X

DD = Deficient Data

X = No overlap in spatial/temporal scope, no potential for cumulative impacts

✔ = Potential for cumulative impacts

- = Not applicable

Nurek HPP

11.5.8. As noted above, Nurek HPP is currently the farthest upstream hydropower project in the Vakhsh watershed, a position which will be taken by Rogun. Nurek is currently the largest hydroelectric power plant in Tajikistan (3,000MW, with some units currently under rehabilitation) and supplies more than 70 % of all the electricity generated in the country. The HPP was put into full operation in 1979 and is part of the Vakhsh HPP Cascade (refer to Table 3-1 in Volume I, Chapter 3: Project Description).

11.5.9. Nurek has changed the seasonal flow of the Vakhsh and Amu Darya Rivers by reducing flows in summer and increasing flows in winter. To ensure that downstream riparian countries are not deprived of water during the critical summer growing season, annual water flows in the Amu Darya are allocated among Central Asian countries by the Basin Water Organization Amu Darya, which has been established by the Interstate Commission for Water Coordination of Central Asia (ICWC), which itself is an element of the International Fund for Saving the Aral Sea (IFAS). As noted in Chapter 4, water is allocated according to rules and procedures set forth in agreements among the Central Asian riparian Governments.

11.5.10. Nurek has had a major effect on the Vakhsh River. It flooded 70km of river, riparian, and terrestrial habitat, it interrupted fish migration, and it made significance changes in seasonal flows downstream of the dam. Besides reducing flood risks at certain time of the year, this in turn has affected riparian habitat for long distances downstream, including at least one protected area.

sHUROB HPP

11.5.11. As noted above, Shurob is a proposed 850MW run-of-river HPP that would be located at the upper end of Nurek reservoir and with the Shurob reservoir extending nearly to the toe of Rogun dam. It would occupy the Vakhsh River reach that would be affected by releases from Rogun HPP.

11.5.12. The project was announced in 2012 but has not progressed beyond early feasibility. The project remains in the preliminary planning stage, with no formal decision to proceed or any prospective date.

11.5.13. If Shurob is indeed constructed, construction would not begin until Rogun construction is complete.

International Highway (Vakhdat - Jirgital)

11.5.14. As noted in Table 11-3, roads have been or will be relocated so they lie outside the reservoir footprint or to provide access to village that lie above the reservoir but that will be cut off. These are Associated Facilities and are described in Chapter 3 and Chapter 8.

Central Asia–China gas pipeline, Line D

11.5.15. The Central Asia–China gas pipeline, Line D project is considered to be data deficient for the purposes of scoping for consideration in cumulative impact assessment (see Table 11-4) due to the limited publicly disclosed information being available for the project. From the information available, it is understood that the pipeline is being built in remote areas to the north of the Rogun HPP Project by a foreign labour workforce. Works carried out to data having included blasting in some areas of mountainous terrain along the pipeline route in Tajikistan although it is not clear where this has taken place. Regardless, it is not expected that the pipeline will be close enough to affect any of the natural resources or communities that would be affected by Rogun.

11.5.16. Considering the distance of the Rogun HPP to the closest mapped potential location of the pipeline route is over 30 km distant, there is considered to be very limited potential for cumulative impacts to human health due to noise or increased pollution from mobile (e.g. vehicles) and static (e.g. generators) plant sources.

11.5.17. Dust generated from construction works for Rogun HPP Project is generally large particle size and is understood to not travel far from the dust generation areas so is unlikely to result in a cumulative impact with the construction of a remote pipeline route over 30 km distant.

11.5.18. Consequently, there is considered to be very limited potential for cumulative impacts to human health from dust generation during Rogun HPP construction activities and third-party blasting and construction activities for the gas pipeline, should the projects interface during construction phases.

Qosh Tepa Irrigation Canal, Afghanistan.

11.5.19. The Qosh Tepa Irrigation Canal in Afghanistan has limited publicly available information, but for the purposes of scoping for consideration in cumulative impact assessment (see Table 11-4), the project has been scoped in due to transboundary concerns.

11.5.20. It is understood to be an irrigation canal project located in northern provides of Afghanistan, with the diversion of water from the Amu Darya River at the Tajik/Afghan border near Khoshtepa, Afghanistan. Upon completion, it is expected be 285 km long, ending in Faryab Providence, with a width of 152 meters and a depth of 8.5 meters. It is planned to irrigate around 550,000 hectares (5500 square kilometres) of desert into arable farmland.

11.5.21. The distance between Rogun HPP and the closest mapped potential location of the canal is circa. 225 kilometres. The canal is not located within the Rogun HPP's AoI, however; the canal is downstream of Rogun HPP on the Amu Darya River. In addition, to Tajikistan's international obligations under Protocol 566, with the average annual unused water allocation to fill the reservoir, and during operation, ensuring a minimum environmental flow. The flow regime in the Vakhsh River will only be significantly altered between Rogun and Nurek HPPs; therefore, there will be no impacts on the flow regime and water availability downstream of Nurek HPP, including on the Qosh Tepa Canal.

11.5.22. Currently, Afghanistan is not party to any water management agreements with the riparian countries to govern water allocations on the Amu Darya River. As a result, there could be adverse effects associated with changes in flow/circulation in natural water bodies due to seasonality or dewatering of Amu Darya downstream from the Qosh Tepa Canal, subject to Afghanistan's water-usage from the river. Therefore, downstream riparian countries such as Uzbekistan and Turkmenistan could be impacted, but not directly by Rogun HPP.

11.5.23. Therefore, the Project will not have an additional or cumulative effect. We recommend given the concerns raised by the Riparian countries and all of the new projects that monitoring of the outflows along the Vakhsh river is undertaken and specifically the following:

- Upstream on the two main tributary inflows to the Rogun Reservoir
- Outflows from the Rogun HPP dam
- Outflows from the Nurek Dam

- Outflows at the downstream end of the cascade; and
- At the border with Uzbekistan.

11.5.24. , We also recommend that a basin wide study is conducted for the Amu Darya. This would, however, sit outside of the Project remit.

11.6 Stage 3: Receptor Baseline

11.6.1. For the VCs that have been screened into the cumulative impact assessment, the baseline conditions are summarised in Table 11-5. For all VCs more detailed information on baseline conditions is provided Volume I, **Chapter 7: Environmental and Social Baseline** and in the various topic area annexes (Volume II: Annexes A01-A15).

Table 11-5 - VC Baseline Conditions

Aspect/ ESIA Chapter	VC(s)	Baseline Conditions
Social	Community assets and infrastructure	The main road M41 has been interrupted shortly after Obi Garm as part of the road realignment being carried out by the International Highway (Vakhdat-Jirgital) Project. Some local roads within the Project AoI are in poor condition.
Environmental (water)	Water resources (biodiversity, downstream users)	Flows downstream of Nurek have been substantially modified by Nurek since the 1980s. At the time Shurob is constructed (if indeed it is), the river reach will have modified flows due to seasonal and daily releases by Rogun HPP. Depending on the timing of Shurob, biodiversity and riparian habitat may have stabilized to some extent and will be flooded and changed to lotic habitat. Construction of the highway could contribute sediment to the current and future reservoir due to poor construction practices.

11.7 Stage 4 & 5: Assess Cumulative Impacts and Determine Effect Significance

Social

Community assets and infrastructure

11.7.1. The general poor quality of roads in the Rogun HPP Project AoI was raised as an adversity for local people in responses received to the Human Health survey. During the Operation Phase of Rogun HPP Project, communities within the Flooding Zone face the loss of existing facilities and infrastructure, including roads. However, new settlements are anticipated to provide improved infrastructure, and this may provide the opportunity to improve, or reduce reliance, on poor-quality existing roads in some areas for local people.

11.7.2. The completion of the International Highway (Vakhdat - Jirgital) Project, expected to be operational in 2025, will provide improved road infrastructure access to local communities, including an improved bridge at Long Bridge, Darband.

11.7.3. Minor adverse effects associated with road travel on existing poor-quality roads may be felt by local communities, including host communities, during the construction phases of both Rogun HPP Project and International Highway (Vakhdat - Jirgital) Project. However, effects are anticipated to be short term and are expected to be minimised by the phased resettlement of people.

11.7.4. Improved roads are considered beneficial to local communities during the operation phases of both Rogun HPP Project and International Highway (Vakhdat - Jirgital) Project. Effects are considered as Positive, and no mitigation is proposed.

11.7.5. Construction of Shurob could lead to employment of many workers who will no longer be needed for Rogun construction. This would reduce the adverse social and economic impacts of major retrenchments at Rogun at least for some years during the construction period.

Environmental

Water

11.7.6. Relocation of the International Highway could lead to erosion and sedimentation in the river upstream of the current reservoir and into the current reservoir. This would be relatively minor since the highway is at some distance from the river, reservoir, and its tributaries for most of its length, even if proper erosion controls are not implemented during construction.

11.7.7. As described in Chapter 3 and Chapter 8, Rogun HPP will not change the current operation of Nurek and thus river flows downstream of Nurek. Indeed, Rogun and Nurek will operate in tandem, with Nurek becoming a run-of-river operation and Rogun assuming the regulation function. Thus, as concluded in Chapter 8, Rogun will not have an effect on the downstream Vakhsh River, either in Tajikistan or in riparian countries. Rogun will provide some benefit by being able to withstand the Probable Maximum Flood, which Nurek and the other dams in the cascade are not designed to do.

11.7.8. If Shurob is constructed, the cumulative impact on habitat would be to extend the loss of riverine and riparian habitat by an additional 17km since the 17km river reach between Rogun dam and the upper end of the Nurek reservoir would be flooded by the Shurob reservoir. However, it is important to note that this reach will have already been affected by the changes in seasonal flow rates due to Rogun operation, as described in Chapter 8. Thus, the impact is considered minor.

11.8 Stage 6: Mitigation Measures

11.8.1. The purpose of the cumulative impact assessment is to identify and mitigate the Project's contributions to any potential significant cumulative impacts on VCs. As it is not expected there would be significant additional or synergistic effects in combination with impacts of Rogun, no additional mitigation is proposed beyond that set out in the technical annexes (Volume II).

11.8.2. It is noted that Community Liaison Officers for the Rogun HPP Project will be available for stakeholders to contact should they feel they are impacted by potential cumulative effects from the Rogun HPP Project and other project(s).

4th Floor
6 Devonshire Square
London
EC2M 4YE

wsp.com