

**The Republic of Belarus:  
Forestry Development Project**

**Environmental Impact Assessment and Environmental and Social Management Plan**

**Introduction**

Forests are an important natural and unique renewable resource of Belarus. Forests cover 45.4% of the country's territory. The total area of forest land was 9.5 million hectares in 2013. 8.1 million hectares or 85.6% of forest land are administered by the Ministry of Forestry. Over the last five years the forest stock administered by the Ministry of Forestry demonstrates positive dynamics. The forested area has increased by 2.1% and totals 7035.2 thousand hectares; percentage of forest land is 39.1%. The stock of standing wood has increased by 87.9 million m<sup>3</sup> (2.2%) and totals 1450.8 million m<sup>3</sup> (including mature and over mature trees - by 34.7 million m<sup>3</sup> (21.7%) and totals 194.9 million m<sup>3</sup>). Improvement of the age structure of forests administered by the Ministry of Forestry allowed to ensure the growth of prescribed cut volumes. Since 1988 the share of mature forests being the key base for logging rose from 2.4% to 11%, the prescribed cut in the country rose from 5398 thousand m<sup>3</sup> in 1994 to 10 thousand m<sup>3</sup> in 2011.

The forestry sector contributed USD 575.0 million to the economy in 2011, which is approximately 1.1% of the country's GDP. 113,000 people were directly employed by the forestry sector as of 2011 (FAO). All forests in Belarus are state-owned. Forests under the jurisdiction of the Ministry of Forestry (Minleshoz) cover 86% of the forest fund. The remaining forests are managed by the Administration of the President (8%), Ministry of Emergency Situations (2%), Ministry of Defense (1%), municipalities (1%), and other ministries in a small share. The principles of sustainable forest management are mainstreamed in forest and environmental protection legislation. In accordance with the Forest Code of the Republic of Belarus, forest management is based on the principles of consistent, environmentally sustainable forest use, conservation and multi-purpose use of natural and resource potential of forests.

The Forest Code of the Republic of Belarus sets out that forest management should be based entirely on the special silviculture plans which are subject to environmental expertise. The legislation defines the annual timber logging norm securing environmental sustainability of forest use.

However, there are issues which still have to be addressed, such as:

- the need to even out the age structure of stands (low share of mature stands);
- improvement of composition of tree species;
- underuse of the prescribed cut due to limited access (absence of forest roads with all-year access);
- small fleet of machinery for logging, transportation and chopping of firewood, logging residues and woodworking waste to be used as fuel for heat/power generation;
- insufficiency of modern machinery for forest reproduction, timber logging and regeneration felling;
- low/ inadequate technical capacity (at the level of SFEs) to protect forests from fires.

The above issues can be addressed through the Forestry Development Project which will (a) optimize forest interventions (in accordance with the volumes specified in the silviculture plans), (b) increase productivity of operations ensuring timely cutting and utilization of damaged stands through introduction of multiple-function machinery, (c) improve quality of young forest stands through introduction of a technology of production of container-grown seedlings.

## **Project Description**

The Project will be implemented at the territory of 87 state-owned<sup>1</sup> SFEs across the country in Brest, Vitebsk, Gomel, Grodno, Minsk, and Mogilev oblasts.

This Project has three components:

**Component 1:** Improving silviculture and the sustainability of forest management.

***Sub-component 1.1:*** *Increasing the intensity of silviculture through thinning of young and middle-aged stands*

67% of the forested land in the forest fund is currently young or middle aged and requires thinning. The operations on thinning of young stands are necessary, and economically justified by the improvement in the quality of the residual stand (through silvicultural selection), and the increase in the residual stand growth and value of later thinnings. Regular and timely thinning also helps maintain stand stability to wind and snow events, and improves the benefits for wildlife by increasing the light hitting the forest floor thereby encouraging an understory which will provide both habitat and food. The machinery required for thinning young stands with smaller size stems is specialized and not currently commonly used in Belarus. The thinning material generated is likely to be used for either increasing the production of woody biomass, firewood, or pulpwood. Much of this production is currently lost as deadwood within the stands.

To undertake the silviculturally necessary early and middle aged thinnings, and to increase the efficiency and productivity, the project will finance modern thinning machinery for young and middle aged stands in terms of harvesters (a cutting head that can fell, trim and cross cut trees, which is mounted on an articulated boom on a low impact tractor) and forwarders (low impact machines which pick up and carry the felled production to a site where it can be either stacked or loaded onto a truck). To thin younger aged forests smaller, more manoeuvrable machines are required than the heavy bigger machines required for final thinnings and selective fellings which are traditionally used in Belarus. Use of this machinery will increase the productivity and, at the same time, will be less damaging to forest ecosystems (less impact on the ground/vegetation cover, trees etc.), and will also improve safety of forest workers.

The project will pilot within one of the region's participating forest enterprise's forest the development of a methodology for management practices to enhance biodiversity and also resilience to climate change. Actions could include, for example: identifying areas of

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<sup>1</sup> The total number of SFEs in Belarus is 95. All SFEs are state-owned.

enhanced conservation value within the areas of main felling and developing appropriate management plans for these areas; widening of rides, tracks and roads with scalloped edges; ; increasing the number of mature and over mature trees left during harvesting operations; increasing the species and age diversity during selective thinning operations; development of reduced impact buffer zones; and managing the forest to optimize the ratio of coniferous to broadleaf species. The potential for the development of recreational and tourism use of the forests will be investigated.

***Sub-component 1.2: Developing the use of woody biomass from logging residues***

Currently most of the logging residues (i.e. the tops and branches) from fellings are simply left in the forest. This creates both a fire hazard and is also wasteful of the calorific value which could be used for energetic purposes. In Scandinavian countries, the logging residue is frequently left for a year, so that the nutrient rich needles fall from the branches and the woody parts dry and are then chipped for use in furnaces. In Belarus there is currently increasing demand for woody biomass to supply combined heat and power and heat only district heating systems and in industrial and agricultural enterprises round the country. To meet this increasing demand for woody biomass, Belarus needs to maximize all sources of woody biomass.

It is proposed to introduce advanced logging technologies to increase the use of logging residues and to introduce the use of modern measuring devices and equipment to enhance productivity and the sustainability of forest management to strengthen their economic and ecological role, and to develop and replicate technologies new to Belarus. This will optimize and rationalize the use of the forest resources and increase the sector's contribution to the increasing demand for woody biomass. There will be a broader application of selection fellings and in some instances increasing of the final felling age. By utilizing production that is currently wasted, and by investing in new machinery and processes, there are both carbon benefits and an increase in rural economic activity.

To create the enabling environment, regulatory, legal and technical standards will be developed based on the best international practices. These standards will also address environmental aspects of the use of forests as a sustainable source of energy.

***Sub-component 1.3: Development of improved forest nurseries for afforestation and reforestation***

In Belarus wherever possible, restocking of selectively felled areas is done through the use of natural regeneration. However in some cases this is not the most appropriate approach as sometimes the areas need to be restocked with different native species of local provenance (due to climate change), there is a need to restock damaged areas (wind falls, snow, fire, drying spruce and ash stands etc.), and in some areas natural regeneration may not be successful. There is therefore continuing need for production of good quality seedlings from selected plus trees of known origin of the correct mixture of species.

To improve the survival rates and increase the efficiency of seedling production it is proposed to modernize four forest nurseries, to produce container grown seedlings of improved quality. It is proposed to increase the proportion of container grown seedlings from currently

less than 1% of seedling production to 11% by 2017. Increasing the nursery production will also increase skilled and semi-skilled employment opportunities, for both men and women again in rural poor areas.

At the same time the legal and regulatory framework will be updated and an equal opportunity training program will be implemented to ensure technical and nursery staff can operate the new equipment.

As part of this component the instruments will be introduced which will include considerations of gender and other vulnerable groups, to engage beneficiaries and civil society participation in policy formulation and in monitoring the implementation of the project, thus contributing to enhancing transparency of the MOF and improving responsiveness of SFEs to the needs of beneficiaries.

### **Component 2:** *Improving forest fire prevention, monitoring, detection and suppression*

To reduce the incidence, extent and severity of forest fires three main interventions are proposed:

- Prevention of forest fires through increasing public awareness and education, improving fire danger and hazard ratings and informing the public through work with mass media, and prevention activities through creation of mineralized strips and clearing logging residue and other fire hazards within compartments and cleaning compartment boundaries and road edges;
- Improving fire detection and monitoring through establishment of video surveillance with specialized software, improving communications;
- Improving suppression activities through provision of forest fire-fighting equipment and training, and improving the network of water points.

Local authorities and CSOs will be involved in the information dissemination and awareness activities as well as in the monitoring of the fire protection measures at the local level. The awareness and information campaigns will also have a specific gender focus.

As part of this component the study of the best technologies and methods of detecting and extinguishing forest fires in EU countries will be undertaken. At the same time draft legislation will be developed to support implementation of the new fire-fighting technology and approach in the Republic of Belarus.

### **Component 3:** Forest management information system and capacity building

**Sub-component:** *improvement of the forest management information system and forest management planning capacity.*

Under this sub-component software tools, application of modern metering devices and equipment in the process of forest surveying and inventory operations will be developed. This will contribute to improving the accuracy of the data collected and will hence improve information on the availability of timber resources in the country. This sub-component will include the development of a web-based interface to allow for sharing of information at

different levels (through password protection where necessary) and will increase transparency and access to data for different stakeholders. This sub-component will develop and integrate a geo-information system-based map and database of potential forestry carbon objects/projects based on the National Forest Geo-information System and Forest Cadastre. This will also include development of the capacity to monitor and report on the greenhouse gas accounting of the forestry sector. As part of this sub-component, a methodology will be developed which will determine how forest management plans can be adapted to address the issues and consequences of climate change.

***Sub-component 3.1: development of and training in the use of advanced technologies***

Training of forestry specialists in the advanced forest management technologies provides a basis for their successful implementation in forest management practice in the Republic of Belarus. This component will include development of the training and production facilities at the State Institution for Further Adult Education “Republican Centre of Competence for Forestry Managers and Specialists”. All training undertaken will be equally available to both men and women.

***Sub-component 3.2: developing the rational use of radioactively contaminated forest***

This component will include the development and maintenance of a decision support system “Radioactive Contamination of Forests. RadFor”, to be performed by the State Institution “Bellesozaschita” in partnership with SFEs, as well as improvement of the system of protective measures and optimization of radiological monitoring activities in the forest fund. The objective of this sub-component would be to monitor the area to see the extent and level of radioactive contamination, and then to prepare an appropriate plan, which would then look to how the forest can be managed in the future.

**Environmental Category of the Project and Safeguard Policies Triggered**

The Project triggers OP 4.01 Environmental Assessment and is assigned environmental Category B (Low B). The Project will not have significant and/or irreversible adverse environmental impacts. Overall, project implementation will have positive environmental effects and will outweigh negative environmental impacts.

The Project will trigger the Operational Policy 4.36 Forests because the Project activities involve transformations in the systems of the use of natural forests or artificial forests (plantations).

Project activities will not be implemented at the territory of protected areas or high value natural habitats and OP 4.04 Natural Habitats is not triggered. The pilots under Component 1 will develop methodology for identification of the areas of enhanced biodiversity within the areas of main felling and developing appropriate management plans for these areas.

The project will not affect any physical cultural resources or historic sites. OP 4.12 Physical Cultural Resources is not triggered.

The project will not finance activities which entail application of pesticides. OP 4.09 will not be triggered.

### **Potential Environmental Impacts**

The potential physical environmental impacts from project activities under **sub-components 1.1 and 1.2** will include impacts associated with the use of multiple-function machinery during felling operations, including mechanical damage of trees and vegetation and operation of other machinery (e.g. wood chippers, chip trucks, rigs for slash removal). However, these impacts are standard for forestry operations and generally will be less damaging in comparison with impacts caused by outdated machinery that is being used today. Application of multiple-function machinery (harvesters and forwarders) will allow use forest resources more efficiently and shift to more environmentally sustainable forest use, including wider application of selective timber cutting, while producing the same volumes of tree harvest.

For the purposes of modernization of forest nurseries at 30 SFEs under **sub-component 1.3** the project will procure equipment for planting seeds, green-houses, refrigeration equipment for storage of seedlings and watering systems. SFEs may select specific equipment they need, for example Kobrinsky and Luninetsky SFEs (SFEs) will get greenhouses and watering systems, while Rechitsky and Borisovsky SFEs will receive refrigeration equipment for storage of seedlings. Typically, nurseries and greenhouses are located at the footprint of utility space (i.e. administration building, storages, garage, guesthouse, canteen, etc.) of the SFEs. In case the expansion of the nurseries will be needed, this will take place within the utility space. The potential environmental impacts may include small-scale civil works on re-arrangement and preparation of space for new equipment and/or greenhouses.

Also, under **Component 1** twenty (20) trucks for wardens will be provided to 6 SFE. The trucks will be kept and maintained at the designated parking space of SFEs. Impacts are expected to be minimal.

Under **Component 2** thirty (30) fire-fighting trucks will be procured and supplied to 30 SFEs. Impacts are expected to be minimal.

### **Implementation of the requirements of OP 4.36 Forests**

It is important to highlight that the ultimate **objective of the project is to improve silviculture and enhance sustainability of forest management**. The requirements of OP 4.36 for this project should be discussed in a broader context of legislation, national standards and forestry sector-specific policy/strategy and plans, as well as forest certification in Belarus. Generally, the forests of Belarus are well stocked and growing (in both standing volume and area), they are professionally and well managed, and illegal harvesting is practically non-existent (estimated at 0.07 to 0.1% of the total harvest). The responsibilities of the state, in terms of forest inventory, forest management planning and monitoring, forest pathology, forest fire prevention management and control etc. are undertaken to a high standard to the extent possible within the resources available. Currently Belarus is in the process of reviewing the implementation of the first and comprehensive Forestry Strategic Plan (to 2015) and is now developing the second plan to cover the period up to the year 2030.

*Forest Certification.* Belarus has developed a package of standards and a Code of Technical Practice (CTP) for the national forest certification system subject to requirements of international conventions, regulations of the sustainable forest governance and the *Biodiversity Conservation National Strategy and Action Plan*. In general, the forest certification system may be characterized as the system being already in place. Accreditation of the national forest certification system in the Program for the Endorsement of Forest Certification (PEFC) should be recognized as an obvious success in this activity. As of today, all State Forest Enterprises (SFEs) participating in the Project were certified to PEFC standards<sup>2</sup>. Additionally, 70 SFEs have Forest Stewardship Council (FSC) forest management and chain of custody certificates (as of September 25, 2014).

Currently forests in Belarus are established at high initial planting density and are only lightly thinned throughout the felling cycle. Decreasing the initial establishment density can significantly reduce the establishment (and maintenance) costs of plantations, and reduce the age of commercially viable first thinnings. Increasing the intensity of thinning at subsequent ages is likely to increase the availability of lower value products, i.e. fuelwood and pulpwood from the younger stands, reduce the amount of deadwood in the forest, while increasing the value of future and later thinnings and improving the resistance to catastrophic damage (e.g. wind and fire). Increasing the thinning intensity is also likely to improve the biodiversity benefits of the forest.

*National Standard "Sustainable Forest Management and Forest Use".* This Standard СТБ 1708 (2006) establishes the following set of sustainable forest management and forest use criteria:

- Criterion 1. Developing forest resources, improving productivity of forests and their contribution to global carbon cycle;
- Criterion 2. Ensuring proper sanitary condition of forests and viability of forest ecosystems;
- Criterion 3. Sustaining and strengthening protective functions of forests;
- Criterion 4. Conserving and rehabilitating biological diversity of forest ecosystems;
- Criterion 5. Supporting and developing socioeconomic functions of forests and sustainability of social functions of forestry;
- Criterion 6. Ensuring environmentally safe containment of radioactively contaminated forest ecosystems.

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<sup>2</sup> Obtaining PEFC Sustainable Forest Management certification demonstrates that management practices meet requirements for best practice in sustainable forest management, including:

- **Biodiversity** of forest ecosystems is maintained or enhanced
- The range of **ecosystem services** that forests provide is sustained
  - they provide food, fibre, biomass and wood
  - they are a key part of the water cycle, act as sinks capturing and storing carbon, and prevent soil erosion
  - they provide habitats and shelter for people and wildlife; and
  - they offer spiritual and recreational benefits
- Chemicals are substituted by **natural alternatives** or their use is minimized
- **Workers' rights** and welfare are protected
- **Local employment** is encouraged
- **Indigenous peoples' rights** are respected
- Operations are undertaken within the **legal framework** and following best practices

The information on sustainable forest management and forest use criteria is provided in Annex 1.

The referred criteria are observed in accordance with the forest management requirements ensuring high productivity and sustainability of forest ecosystems, improvement of biological diversity, minimization or prevention of adverse environmental impacts associated with forestry works, sustainability of forest resource use, economic efficiency of forest production and its social focus and are set out in CTБ 1342, CTБ 1358 - CTБ 1361, CTБ 1582 and other technical regulations on forest management.

### **Mitigation Measures and Environmental Management Plan (EMP)**

In parallel with implementation of good practices in sustainable forest management to meet the requirements of OP 4.36 Forests and criteria of sustainable forest management according to national standards, the project will implement mitigation measures to prevent and minimize potential negative environmental impacts associated with project activities. Specifically, the mitigation measures would cover the following aspects:

- Operation of multi-functional machinery during logging operations, including operation of wood chopping machines and chop trucks;
- Activities on modernization of forest nurseries;
- Forest fire-fighting equipment environmentally sound storage and maintenance.

*Use of multi-functional equipment and machinery.* In order to prevent environmental impacts associated with the use of logging machinery, damage of stands left for growing, reduction of the area of technological corridors in compartments, the current technical normative legal acts provide for the use of technology of “cutting area” (limited area/space) treatment by a harvester and forwarder with arrangement of the interim corridors for operating a harvester. The impact on soil is mitigated through putting of residue branches of trees on a run. Damage of trees left on the boundaries of technological corridors is prevented through installing protective pales or leaving “fender” trees out of trees to be cut which are cut the last. To reduce damage of stands at the age of second half of thinning, tree cutting and sawing is made within a cutting area. Driving out of trees in the areas with reliable undergrowth, second layer of trees and highly productive berry bushes is not allowed. Same approach applies to operation of wood chopping machines and chop trucks. A targeted training for machinery operators and truck drivers will be organized. All machinery will undergo regular maintenance and checks according to technical standards.

For the final felling sites where felling waste in addition to timber has been harvested – an assessment and monitoring of soil nutrient levels, soil carbon and biodiversity. This will be done on pilot sites with annual monitoring and writing up of results over the lifetime of the project. Depending on the results of this monitoring recommendations regarding felling waste volumes to be harvested will be prepared and implemented by SFEs.

The project will supply twenty (20) trucks for wardens of six SFEs. These trucks will be kept at designated parking space and garages of these SFEs. No special measures in addition to regular good housekeeping/maintenance practices are needed.



*Modernization of forest nurseries.* The potential environmental impacts under this activity will be minimal. It is expected that physical works will be small-scale and – in some cases – will not require mitigation measures (for installation of equipment, Category C activity). At the same time, for small works (on construction of green-houses or rehabilitation of space for installation of planting or refrigeration equipment), it is proposed to use an EMP checklist on as needed basis. The checklist for specific project site (SFE) will be prepared by PIU in collaboration with the respective staff of the participating SFE. General information on container-grown technology for forest tree species is provided in Annex 2. EMP checklist format is provided in Annex 3.

*Forest fire prevention, monitoring, detection and suppression.* Implementation of this component involves: (a) installation of video equipment at existing observation towers (no environmental impacts expected), and (b) deployment of 30 fire-fighting trucks at 30 SFEs. These fire-fighting trucks will be placed at designated parking lots or existing garages/sheds. No special requirements (in addition to regular good housekeeping, standard environmental safety requirements<sup>3</sup> and common sense) are needed.

### **Social accountability and dissemination of information to stakeholders**

In accordance with the National Standard СТБ 1708-2006 “Sustainable forest management and forest use”, a legal entity involved in forestry business should prepare a summary of the silviculture plan describing the forest area, scope, timing and location of silvicultural operations, scale, forest use technologies, as well as an implementation analysis. The obligations of this legal entity with regard to sustainable forest management and use should be formalized and documented as part of a dedicated plan. The plan should be accessible for the staff of the entity, suppliers, customers and other interested stakeholders. The silviculture plan on sustainable forest management and use will include basic information about the project and its effects on local communities and other stakeholders.

According to the Standard, civil society organizations (CSOs), representatives of local communities and other stakeholders should be involved in the preparation and discussion of the entities’ forest management and use plans, and in all decisions that affect forest use by local communities. CSOs and citizens should also be engaged in helping identify and protect historical and culturally significant sites, and habitats of endangered wildlife and plant species. Local residents should be informed about sustainable forest management and use principles and practices and regarding the role of forest certification in these processes. Understandable materials on forest certification, its goals and tasks should be available in SFEs and their units. The information about the respective activities of SFEs should be published in local media.

### **Gender analysis**

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<sup>3</sup> Safe storage of fuel, lubricants and other substances or devices (e.g. spare batteries) and periodic check-up of safe containment of the above items.

Women account for about 17% of all Belarus' forest sector employees. Almost 11% of them have attained the retirement age. More than 62% of the staff of non-SFE forest sector institutions are women, but women's employment in SFEs is much lower.

Personnel statistics is not available in a gender disaggregated format which complicates the analysis of the reasons of lower employment of women in SFEs (particularly in the Brest Oblast (14%) and the Grodno Oblast (14%)) though vacancies at different levels are available all the time. It may be expected that new machinery and broader training opportunities that will become available as part of the project will improve the working conditions in SFEs and generate better employment opportunities for women in the Belarusian forest sector.

### **Disclosure of information and public participation**

This EIA/ESMP document will be disclosed through the website of the Ministry of Forestry and will be made physically available in 87 participating SFEs in all project regions. Public hearings/consultations will be held at least 60 days before the beginning of works in each project site. All consultations will be organized based on guidelines developed by the Ministry of Forestry and pursuant to a template that it will distribute.

As part of the consultations, SFEs will inform participants regarding planned activities as part of the project, and open the floor for questions and discussion. Detailed protocols of the consultations will be provided to the World Bank, summarizing the main issues that were discussed, participants' questions or concerns, and SFEs' responses.

### **Summary of Conclusions**

Implementation of the Project will bring to higher standard sustainability of forest management and operation of forest sector broadly. Thinning operations with application of multi-function machinery and wood chopping equipment will allow to improve quality of stands, use the resources more efficiently and better manage the cutting areas (i.e. clean up the harvesting residue). The project will not result in significant or irreversible environmental impacts.

The use of multiple-function machinery for other felling types will increase productivity ensuring timely cutting and utilization of damaged timber and prevention of massive spread of forest pests thus improving environmental situation in forests. Expedient clearing of residue in forest pest hot spots will result in:

- Containment of the most aggressive species of stem pests and deceases which can result in massive tree losses at large areas;
- Reducing losses of timber due to pests and deceases;
- Rehabilitation of plantations and improvement of their biological resistance, which would improve environmental conditions in forests broadly.

Adoption of container grown seedlings technology will help to improve the composition of forest species, health of young and growing stands and reduce seedling maintenance operations.

The National Standard СТБ 1708-2006 sets out the required regulatory framework for establishing the instruments of informing and engaging civil society in forest management and forest use planning and monitoring. Compliance with the requirements of the referred standard is ensured through information dissemination and feedback mechanisms available to local communities and other stakeholders and their participation in decision making affecting forest management and forest use practices.

## **Regulatory Framework of the Republic of Belarus on Timber Logging and Sustainability of Forest Management**

The key principles of timber logging are set out in the Forest Code of the Republic of Belarus. The legal mechanism of standing wood sale to forest users, timber logging and obligations of forest users in the process of using forest sites are regulated by the Rules of standing wood sale and logging in the forests of the Republic of Belarus approved by the Edict of the President of the Republic of Belarus of 7 May 2007 № 214 “On some measures to improve activity in the forest sector”.

The Technical Regulations setting out requirements for preparation and valuation of forest sites intended for felling, the norms of different felling depending on the groups and categories of forest protection, forest and vegetation conditions, silvicultural and environmental requirements for plantations, requirements for clearing and inspection of felling areas, reforestation of felling areas are approved by the following Codes of Existing Practice of the Ministry of Forestry of the Republic of Belarus adopted upon agreement with all stakeholders:

The Rules of allotment and valuation of compartments in forests of the Republic of Belarus;

The Rules of forest felling in the Republic of Belarus;

The Rules of inspection of felling areas, harvesting of resin and secondary forest resources and associated forest uses.

The Ministry of Forestry has developed recommendations on organizing and conducting felling operations in forests of the Republic of Belarus which, in addition to technical requirements, include environmental requirements for technological processes of thinning, also with the use of multiple-function machinery.

### **General requirements for logging, including logging systems using multi-function machines**

The main tasks formulated and implemented by the Ministry of Forestry in the performance of various types of logging operations are as follows:

- Optimization of the age and species composition of forests. It is a long process based on the relevant scientific developments on the basis of the potential of forest soils, the structure of consumption of wood raw material, environmental functions of forests, etc.;
- Enhancement of the productivity and sustainability of forests.

In this system, it is important to avoid excessive exploitation pressure on forests and implement a package of forest management activities in a timely manner, including reforestation, forest protection and conservation activities.

Forest tending activities are performed annually in accordance with forest management plans. In 2013, silvicultural measures for forest tending (silvicultural thinnings) were implemented in an area of 132.3 thousand hectares. The conducted forest management activities result in avoiding undesirable change of tree species and introducing commercially valuable species to the forested area.

Thinnings are carried out for the purpose of establishing sustainable stands with a high level of biodiversity, which is typical of natural forests, ensuring the continuous

existence of the forest environment and forest cover, and maintaining the ecological functions of forests.

The State Program for the Development of Forestry in the Republic of Belarus for 2011-2015 provides for increasing the volumes of merchantable wood from intermediate fellings up to 5.1 million m<sup>3</sup>. According to the estimates of national experts, properly conducted thinnings can increase forest productivity by 30-40%. It is therefore important to carry out thinnings in a most effective manner to get the maximum amount of higher-value timber per 1 ha over the entire period of forest cultivation.

In order to increase the volume of harvested timber, the Ministry of Forestry is engaged in phased retrofitting of logging operations and large-scale introduction of multifunction timber harvesting machines. Intensification of thinnings and selective fellings is attributed primarily to the need to stabilize the environmental situation in the Republic of Belarus and in the neighboring European countries, as well as to the development of demand for undersized, low-quality wood from such fellings, which is utilized primarily to produce wood fuel.

One of the ways to preserve and increase forest resources is through reducing the volume of clear fellings with simultaneous compensation of the foregone amount of wood raw material with the wood from selective cuts, especially forest thinnings. Wide application of such logging systems allows for improving the conditions for forest growth and reducing clearcut-logged areas. In these types of fellings, CTL logging technology and appropriate equipment proved effective.

Currently, intermediate fellings are almost never performed manually. There are three levels of mechanization of intermediate fellings. The first level is characterized by mechanization of individual processes, most often those of tree felling, while the rest of the operations are performed manually. The second level is characterized by complex mechanization of the entire felling process or of the main operations. However, the share of manual labor remains significant. The third and highest level of intermediate fellings involves using multifunction machines that almost completely replace manual labor. This level requires a high technological capacity of SFEs. It means that procurement of multifunction machines will solve such an important problem as the lack of manpower to carry out forest management activities and exemption of the State Forest Guard personnel from performing non-core functions, as provided by the Forest Code of the Republic of Belarus, which will have a positive impact on the quality of forest fire protection. While a single feller can harvest from 3 to 5 m<sup>3</sup> of timber per shift, application of multifunction machines allows for harvesting up to 100-120 m<sup>3</sup> of timber per shift. In addition to replacing at least 20 people, a machine also eliminates the risk of dangerous injuries for loggers. In this regard, increasing the level of mechanization of felling operations is of great interest.

The Republic of Belarus has embarked on the path of extensive application of multifunction machines, such as harvesters: the State Program for the Development of Forestry in the Republic of Belarus for 2011-2015 envisages that by 2015 70% of the timber will be harvested using this machinery. Use of multifunction forest machines for thinning operations allows for taking into account both economic and environmental indicators of the conducted activities.

Use of multifunction harvesters (feller-delimber-bunchers) and forwarders (short log trucks) for forest tending operations ensures high labor productivity subject to compliance with silvicultural and environmental requirements. Performance of forest thinnings using these machines has the following specific features:

- increased intensity of removal of the stock;

- increased interval between thinnings;
- mechanization of all operations in the logging process;
- cut-to-length logging;
- felling trees without pre-selection and marking;
- limited use of harvesters and forwarders in the categories of forest, where only thinning and salvage logging is allowed.

In Belarus there are two most common intermediate felling technologies: the first technology involves logging, skidding and hauling of timber assortments (CTL method); the second one involves logging, skidding and whole stem hauling (tree-length method). The tree-length technology is associated with significant damage to the residual stands in the process of skidding.

Application of the CTL method results in a more rational use of forest resources; however, unsustainable use of the felling-area resources (about 20-30% of the original timber stock is left in the clear cut-logged areas) leads to significant cluttering of the logged areas, underutilization of merchantable wood stock, continuous inclusion of additional forest sites in the logging operations, and a drastic increase of fire hazards and incidence of forest fires.

The logging standards used in the forestry sector of the Republic of Belarus are oriented at the classical logging model based on the CTL method. Operation of multifunction machines is based on the same model.

In order to improve the regulatory framework for the state forest administration and forest use in 2011-2013, a significant amount of work was done to amend and supplement the Regulations on the Allocation and Inventory of Felling Areas, the Logging Regulations, the Regulations on Inspection of Sites Used for Logging, Resin Tapping, Harvesting of Minor Forest Resources and Secondary Forest Use and the Sanitary Regulations. However, it does not mean that the improvement of the regulatory framework is completed: this is a continuous process.

Inventory of felling areas is a major step in the standing timber inventory process in accordance with applicable law. Due to the increasing volume of timber harvesting using multifunction machinery, the Ministry of Forestry is improving the respective technical regulatory framework. Surveys of felling areas during thinning operations can be performed based on forest management materials. For instance, inventory of the standing timber by the amount of harvested timber (use of forest management materials, establishment of sample plots) is used during release cuts, cleaning and thinning, increment cuts, conversation cuts associated with logging low-value stands, and other types of cuts.

The procedure for allocation of technological corridors (skidding trails) has been simplified. The amount of wood cut in the skidding trails, where inventory of the timber in the felling areas is performed by the amount of harvested timber, can be determined by establishing sample plots or based on forest management materials. The amount of timber harvested in a sample plot is determined taking into account the volume of harvested timber, including separately stated amount of wood cut in the skidding trails.

When allocating logging sites for thinning operations, where timber harvesting will be performed using multifunction machines, skidding trails are not outlined, and the technological chart includes an approximate layout of the process network depending on the specifications of the applied multifunction machines.

In order to minimize costs, a simplified procedure for restriction of felling areas is used in the process of their allocation. Specifically, allocation of felling areas is not carried out for removing seed trees and seed-tree blocks that have fulfilled their purpose; felling

individual trees as part of thinning operations in areas with distinct natural boundaries of a forest plot, if it is fully assigned for cutting; selective sanitary fellings and clearing debris-strewn forest, etc. Plotting of felling areas in the process of their allocation can be performed using global navigation systems, such as GPS, GLONASS, etc.

### **Criteria of Sustainable Forest Management and Forest Use**

The National Standard СТБ 1708 (2006) «Sustainable forest management and forest use. Main provisions» establishes the following set of sustainable forest management and forest use criteria:

- Criterion 1. Developing forest resources, improving productivity of forests and their contribution to global carbon cycle;
- Criterion 2. Ensuring proper sanitary condition of forests and viability of forest ecosystems;
- Criterion 3. Sustaining and strengthening protective functions of forests;
- Criterion 4. Conserving and rehabilitating biological diversity of forest ecosystems;
- Criterion 5. Supporting and developing socioeconomic functions of forests and sustainability of social functions of forestry;
- Criterion 6. Ensuring ecological containment of radioactively contaminated forest ecosystems.

#### **Criterion 1. Developing forest resources, improving productivity of forests and their contribution to global carbon cycle**

##### **1.1 Key objectives:**

- verifying the rights of legal entities involved in forestry business and individuals to use lands and forests in strict compliance with the Belarusian legislation;
- conserving forest resources and sustaining their phytomass, supporting global functions of forests related to regulation of composition of air and greenhouse gases through sustaining a balance between the total volume of felled timber and stand growth by stock;
- improving forest growth and productivity, rational use of forest resources;
- ensuring consistent and inexhaustible forest use;
- increasing the stock of non-wood resources;
- improving the system of forest monitoring and forest cadastre, ensuring accuracy of forest accounting in accordance with the norms;
- sustaining and supporting contribution of Belarus' forests to global carbon cycle and regulation of climate change;
- developing forest management information system.

##### **1.2 Key requirements for forestry planning and management ensuring compliance with the criterion:**

- sustaining and increasing the stock of forest resources, improving their quality, enhancing economic, ecological and protective value of forests;
- inventory and mapping of forests;
- ensuring that forest management and/or forest use is based on the entity's action plan and forest management plan developed in line with sustainable forest management and

forest use criteria taking into account economic, environmental and social impacts of the intended forestry interventions which are regularly updated in accordance with the stipulated procedure;

- monitoring of forests, analysis and evaluation of forestry interventions efficiency and economic, environmental and social impacts;
- sustaining forest capacity for production of a broad range of wood and non-wood products on the basis of continuous and consistent forest use;
- achieving the maximum economic efficiency under the existing natural and economic conditions;
- multi-purpose use of forests;
- sustaining productive capacity of forests, preventing soil depletion during felling operations;
- increasing total and medium stock of stands to the level determined by forest and vegetation conditions;
- afforestation of lands transferred to the forest stock from other uses.

## **Criterion 2. Ensuring proper sanitary condition of forests and viability of forest ecosystems**

### **2.1 Key objectives:**

- enhancing forests' resilience to adverse man-made and natural factors;
- monitoring the situation in forests and sustaining viability of forest ecosystems;
- reducing adverse impacts associated with industrial and other pollutants on sanitary condition and viability of forests.

**2.2 Key requirements for forestry planning and management ensuring compliance with the criterion:**

- sustaining health and viability of forest systems, rehabilitating damaged and disturbed forest ecosystems;
- conducting forest pathology monitoring for timely detection of emerging pest and disease locuses, qualitative and quantitative assessment of their condition, identification of forest sites in poor sanitary condition caused by natural and man-made factors, generation of indicators for the forecast and timely planning of effective forest protection interventions;
- using tools and methods of silvicultural operations producing a minimum adverse impact on forest ecosystems;
- ensuring forest sustainability, viability and resilience to adverse impacts through supporting natural mechanisms of regulation, conserving genetic, species and structural diversity of forest ecosystems;
- taking into account local conditions and designation of forests using seedlings and planting stock of local origin with improved hereditary quality for reforestation and afforestation;
- using for silvicultural operations of technologies and machinery producing a minimum adverse impact on soil, undergrowth and stands left for growing and general forest environment;
- justified and documented use of the registered pesticides and substances permitted for application in Belarus;
- undertaking prevention interventions to sustain proper sanitary condition of forests and viability of forest ecosystems;
- justified and strictly controlled use of mineral fertilizers.



### **Criterion 3. Sustaining and strengthening protective functions of forests**

#### **3.1 Key objectives:**

- conserving forest soils, preventing erosion, fertility reduction and disturbance of topsoil;
- conserving and, where feasible, increasing percentage of forest land in watersheds in the process of silvicultural operations;
- conserving forests adjacent to agricultural lands, protective forest strips along railways and roads;
- rehabilitating poorly drained forest lands, eroded and disturbed lands;
- sustaining water regime of forest wetlands and protecting water habitats of wildlife and plants in forest areas.

#### **3.2 Key requirements for forestry planning and management ensuring compliance with the criterion:**

- sustaining and enhancing protective functions of forests, conducting forestry operations with an account for special regime of water and soil protection forests;
- inventory and mapping of forests having water protection, soil protection and other protective functions;
- preventing adverse impact on water and soil regime of ecosystems associated with water and other erosions through the use of technologies and machinery contributing to sustaining and enhancing protective role of forests;
- conserving small river beds, streams and other natural and artificial watercourses, maintaining natural level and functioning ability of water bodies and water courses, natural condition of soil;
- preventing intake of pesticides or other chemicals affecting water quality;
- minimizing soil damage and avoiding its ingress in waterways, maintaining natural level of water sources regime in the process of establishment of technological network, construction of forestry roads and other engineering facilities.

### **Criterion 4. Conserving and rehabilitating biological diversity of forest ecosystems**

#### **4.1 Key objectives:**

- conserving endangered plant and wildlife species, species for hunting and harvesting and their habitats, species and genetic diversity of forest ecosystems;
- sustaining the optimal composition and structure of forests ensuring their sustainability and biological diversity at the eco-system level;
- supporting sustainability and biological productivity of forests, ecological and protective functions of forests;
- introduction of environment friendly logging technologies and machines to ensure conservation of biological diversity of plants and microorganisms.

#### **4.2 Key requirements for forestry planning and management ensuring compliance with the criterion:**

- conserving and sustaining genetic, species and structural diversity of forest ecosystems;
- allocating forestry lands intended for conserving and sustaining genetic diversity, protected natural areas, key biotopes and other valuable forest areas such as habitats of protected wildlife and plant species, black grouse leks etc.;

- reforestation mainly in a natural way if forest is restored with seeds of economically valuable species corresponding to the plantation conditions with an account for bearing of wood species;
- reforestation and afforestation with an account for plantation conditions and designation using seedlings and planting stock of local origin;
- conserving natural wetlands and rehabilitating disturbed wetlands;
- avoiding the use of aliens and genetically modified organisms in cases when there is no evidence that they do not affect forest ecosystems and genetic purity of local species and there is a probability of adverse impacts;
- using felling methods, technologies and machinery contributing to reforestation, conservation, rehabilitation and increase of biodiversity, enhancement of protective role of forests and their productivity;
- using modern efficient and environment friendly methods and technologies preventing or minimizing adverse impact on forest ecosystems and the environment;
- undertaking a set of measures for protection of rare and endangered species, species for hunting and harvesting, their habitats depending on the method and intensity of silviculture and uniqueness of resources engaged in economic activity;
- undertaking a set of measures to support the numbers of wild animals within the limits sustaining biodiversity and stability of the ecosystem, a balance between the number of wild animals and fodder crops available in the forest;
- using forestry methods to create conditions for growth and habitation of the maximum number of indigenous wildlife and plant species typical for a concrete region, conservation and rehabilitation of lost biodiversity;
- leaving, in the process of felling operations, of individual oldest trees and trees with hollows suitable for habitation of various species of forest fauna, dead standing trees with a diameter above the average diameter of stands in sufficient quantity for biodiversity conservation.

**Criterion 5. Supporting and developing socioeconomic functions of forests and sustainability of social functions of forestry**

**5.1 Key objectives:**

- ensuring economically efficient forestry based on rational forest management;
- ensuring rational use of forest resources;
- developing social functions of forests and their multi-purpose use;
- ensuring financial soundness of forestry;
- regulating consistent and inexhaustible forest use, expanding reforestation;
- establishing occupational safety management systems in the forest sector entities in accordance with the National Standard СТБ 18001.

**5.2 Key requirements for forestry planning and management ensuring compliance with the criterion:**

- improving economic efficiency of the forest sector in GDP generation;
- attracting investments in the forest sector;
- ensuring employment opportunities;
- ensuring social protection of the forest sector employees;
- ensuring occupational safety of the forest sector employees;
- training in safe working methods, providing instructions and testing knowledge on occupational safety issues;

- providing individual protection devices to employees;
- ensuring that the forest sector employees have the required professional knowledge;
- taking into account the interests of local residents related to the use (in accordance with the stipulated procedure) of timber, traditional recreational areas, areas for harvesting mushrooms, berries and etc.;
- securing the rights of people to free harvesting of wild fruits, nuts, mushrooms, berries and etc. in accordance with the stipulated procedure of the general use of forest and vegetation resources;
- creating conditions for recreation, cultural, recuperative and sport events;
- providing research support and adopting scientific and technological achievements in the forestry sector;
- engaging non-governmental organizations, local community representatives and other stakeholders in planning of sustainable forest management and forest use practices;
- ensuring economic security of the Republic of Belarus;
- providing financial resources and regulating forest use, reproduction and protection.

**Criterion 6. Ensuring ecological containment of radioactively contaminated forest ecosystems**

**6.1 Key objectives:**

- containing the spread of radioactive substances;
- protecting households, forest sector employees and consumers of forest products from adverse impacts of ionizing irradiation;
- enhancing ecological resilience of radioactively contaminated forests;
- conducting radiation monitoring in forests.

**6.2 Key requirements for forestry planning and management ensuring compliance with the criterion:**

- zoning of forest areas by the level of radioactive contamination;
- taking into account the level of radioactive contamination during silvicultural operations and forest use;
- conducting compulsory radioactive control in forests and forestry sites located in the radioactively contaminated areas.

### General information on the cultivation of container-grown planting stock

Different countries of the world have conducted decades-long experiments in this area, which yielded both positive and negative results. Scandinavian foresters were one of the first to engage in the cultivation and use of container-grown forest planting stock for production purposes; in the late 1960s they launched works on the cultivation of root-balled plants in peat pots.

The practice of cultivating container-grown planting stock was introduced in foreign countries with different degrees of intensity and was characterized by soil- and climate-related specific features typical of particular regions. For instance, the experience of Polish foresters was initially based on the development of technologies of cultivation of container-grown planting stock until they introduced more advanced equipment for its production on the basis of permanent nurseries without seeding lines and cold storage facilities for finished products. This approach provided for professional training of nursery specialists that enable them to work in an environment where modern equipment is used to intensify the production of container-grown planting stock.

To date, in different countries across the world significant areas of forest plantations are established using container-grown planting stock. In Finland, the share of such plantings reaches 86% from the total area of new planted forest, in British Columbia it amounts to 76%, in Sweden – 67%, in Canada – more than 50%, in Norway – 48%, in Poland – more than 20%, in the Northwest Pacific region of the United States – 20%, in Russia – about 3%, and in Lithuania – 1%.

In the future, many forest abundant countries will increase the volumes of establishment of new man-made forest using container-grown planting stock, and their performance in this area will approach the level reached by the countries using intensive forest management practices.

Cultivation of container-grown planting stock is one of the most common and advanced technologies.

Application of container-grown planting stock in the forestry sector has a number of significant advantages over the currently used technologies. Thanks to the precision seeding, the consumption of seeds is reduced 2.5-3 times vs. the conventional technologies. This is particularly important nowadays, when SFEs switch to harvesting seeds with improved hereditary properties from 1<sup>st</sup> - and 2<sup>nd</sup>- generation seed orchards. Such seeds are valuable in terms of selection breeding and have a relatively high cost. Planting of forest stands, establishment of seed orchards and other silvicultural facilities using container-grown planting stock can be carried out during the entire vegetation season. This is highly relevant for addition of forest crops. The survival rate of man-made plantations created using container-grown planting stock is at a maximum possible level and reaches almost 100%. Transplantation of container-grown seedlings to the planting area takes place without damaging the root, which ensures good development of the plants during the initial growth period, in particular, due to the additional nutrition in the early years, especially on lean soils.

The traditional methodology of planting forest crops using bare-root planting stock implies conducting reinforcement planting in the fall to replace the failed seedlings. The technology to be introduced will eliminate the need to conduct costly reinforcement planting activities due to the fact that the survival rate of container-grown planting stock is close to 100%.

Even though the technology of growing planting stock is generally known, there are significant regional particularities and challenges. The basis for the cultivation of high-quality container-grown seedlings is the substrate, the main component of which are highbog peat with optimal physical and chemical properties and fertilizing compositions that provide balanced nutrition for young plants. Currently Belarus has 25 peat extraction companies. It is necessary to evaluate the quality of peat (botanical composition, degree of decomposition, ash content, acidity, nutrient content, etc.) produced by these enterprises in order to select prospective suppliers. It is also important to select the ratio of major nutrients and micronutrients complex for the main application to the substrate. To ensure good development and intensive growth of planting stock, it is necessary to develop a system of extra nutrition based on using modern complex agents, as well as a technology for applying effective growth regulators capable of performing protective functions in addition to intensification of growth processes.

Cultivation of container-grown planting stock allows for reducing many processes in the nursery as compared to growing planting stock using conventional methods.

Peat-based substrate, which is used to produce container-grown planting stock, contains all the necessary ingredients for successful development of the plants. Thanks to this substrate, the probability of infection of the planting stock with pests and diseases is virtually eliminated, and therefore there is no need to apply additional chemicals to suppress pests and diseases, which helps to reduce the adverse impact on the soil and hydrological conditions. Mineral nutrients, which are present in the peat ball, as well as those introduced with irrigation water, almost never leak out into the open soil of nurseries and, as a consequence, into the groundwater. It means that this solution completely covers the entire surface area of the plastic cassettes with substrate, thereby providing maximum nutrition to a single plant.

## **Environmental Management Plan (EMP) Checklist for Rehabilitation Activities**

### General Guidelines for use of EMP checklist:

For low-risk civil works, such as minor rehabilitation works or small-scale construction, the ECA (Europe and Central Asia) safeguards team developed an alternative EMP (environmental management plan) format to provide an opportunity for a more streamlined approach to mainstreaming the World Bank's environmental safeguards requirements into projects which (a) have a low potential environmental impact by scale or nature, (b) are located in countries with well functioning national environmental protection systems. The checklist-type format has been designed to be user friendly and compatible with the World Bank's safeguards requirements.

The EMP checklist-type format attempts to cover typical key mitigation measures to civil works contracts with small, localized impacts or of a simple, low risk nature. This format provides the key elements of an Environmental Management Plan (EMP) to meet the minimum World Bank Environmental Assessment requirements for Category B projects under OP 4.01. The intention of this checklist is that it offers practical, concrete and implementable guidance to Contractors and supervising Engineers for simple civil works contracts. It should receive final approval and, either freestanding or in combination with any environmental documentation produced under national law (e.g. EIA reports), should constitute an integral part of the bidding documents and the rehabilitation works contracts. The EMP checklist has the following sections:

Part 1 (up to two pages long) includes a descriptive part that characterizes the project, specifies institutional and regulatory aspects, describes technical project content, outlines any potential need for capacity building and briefly characterizes the public consultation process. Attachments for additional information may be supplemented as needed.

Part 2 includes a screening checklist of potential environmental and social impacts, where activities and potential environmental issues can be checked in a simple Yes/No format. If any given activity/issue is triggered by checking "yes", a reference to the appropriate section in the table in the subsequent Part C can be followed, which contains clearly formulated environmental and social management and mitigation measures.

Part 3 represents the environmental monitoring plan to follow up proper implementation of the measures triggered under Part B. It has the same format as required for MPs produced under standard safeguards requirements for Category B projects.

Part 4 contains a simple monitoring plan to enable both the Contractor as well as authorities and the World Bank specialists to monitor due implementation of environmental management and protection measures and detect deviations and shortcomings in a timely manner.

Part 2 and 3 have been structured in a way to provide concrete and enforceable environmental and social measures, which are understandable to non specialists (such as Contractor's site managers) and are easy to check and enforce. The EMP should be included in the bill of quantities and the implementation priced by the bidders. Part 4 has also been designed intentionally simple to enable monitoring of key parameters with simple means and non-specialist staff.

**CONTENTS**

**Part 1      General Project and Site Information**

**Part 2      Safeguards Information**

**Part 3      Mitigation Measures**

**Part 4      Monitoring Plan**



**PART 1: GENERAL PROJECT AND SITE INFORMATION**


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<b>INSTITUTIONAL &amp; ADMINISTRATIVE</b>				
Country				
Project title				
Scope of project and activity				
Institutional arrangements (Name and contacts)	WB (Project Team Leader)	Project Management	Local Counterpart and/or Recipient	
Implementation arrangements (Name and contacts)	Safeguard Supervision	Local Counterpart Supervision	Local Inspectorate Supervision	Contactor
<b>SITE DESCRIPTION</b>				
Name of site				
Site location	Attachment 1: Site Map [ ]Y [ ] N			
Who owns the land?				
Description of geographic, physical, biological, geological, hydrographic and socio-economic context				
Locations and distance for material sourcing, especially aggregates, water, stones?				
<b>LEGISLATION AND REGULATORY FRAMEWORK</b>				
Identify central & federal legislation & permits that apply to project activity				
<b>PUBLIC CONSULTATION</b>				
Identify when /				

where the public  
consultation process  
took place

**INSTITUTIONAL CAPACITY BUILDING**

Will there be any capacity building?  N or  Y if Yes, Attachment 2 includes the capacity building program

**PART 2: SCREENING AND SAFEGUARDS INFORMATION**

<b>ENVIRONMENTAL /SOCIAL SCREENING</b>			
	<b>Activity/Issue</b>	<b>Status</b>	<b>Triggered Actions</b>
Will the site activity include any of the following?	A. Building or road rehabilitation	<input type="checkbox"/> Yes <input type="checkbox"/> No	If "Yes", see Section A below
	B. Minor construction of new buildings or infrastructure	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	C. Impacts on surface drainage system	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	D. Historic buildings and districts	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	E. Acquisition of land <sup>4</sup>	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	F. Hazardous or toxic materials <sup>5</sup>	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	G. Impacts on forests and/or protected areas	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	H. Risk of unexploded ordinance (UXO)	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A
	I. Traffic and Pedestrian Safety	<input type="checkbox"/> Yes <input type="checkbox"/> No	N/A

<sup>4</sup> Land acquisitions includes displacement of people, change of livelihood encroachment on private property this is to land that is purchased/transferred and affects people who are living and/or squatters and/or operate a business (kiosks) on land that is being acquired.

<sup>5</sup> Toxic / hazardous material includes but is not limited to asbestos, toxic paints, noxious solvents, removal of lead paint, etc.

### PART 3: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
0. General Conditions	Notification and Worker Safety	<ul style="list-style-type: none"> <li>(a) The local construction and environment inspectorates and communities have been notified of upcoming activities</li> <li>(b) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works)</li> <li>(c) All legally required permits have been acquired for construction and/or rehabilitation</li> <li>(d) The Contractor formally agrees that all work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment.</li> <li>(e) Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots)</li> <li>(f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.</li> </ul>
A. General Rehabilitation and /or Construction Activities	Air Quality	<ul style="list-style-type: none"> <li>(a) During excavation works dust shall be suppressed for example by water spraying and soil moistening;</li> <li>(b) Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust;</li> <li>(c) During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site;</li> <li>(d) The surrounding environment (side walks, roads) shall be kept free of debris and chips to minimize dust;</li> <li>(e) There will be no open burning of construction waste/ general refuse at the site;</li> <li>(f) All machinery should meet the emission standards set out in the Polish legislation, be properly operated and maintained; there will be no excessive idling of construction vehicles at sites;</li> </ul>
	Noise	<ul style="list-style-type: none"> <li>(a) Construction noise will be limited to restricted times agreed to in the permit</li> <li>(b) During operations the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible</li> </ul>
	Water Quality	<ul style="list-style-type: none"> <li>(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay</li> </ul>

		bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
	Waste management	<ul style="list-style-type: none"><li>(a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities.</li><li>(b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers.</li><li>(c) Construction waste will be collected and disposed properly by licensed collectors</li><li>(d) The records of waste disposal will be maintained as proof for proper management as designed.</li><li>(e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)</li></ul>

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**PART 4: MONITORING PLAN (PROVIDE EXAMPLES, ADJUST IF NEEDED)**

<b>Phase</b>	<b>What</b> (Is the parameter to be monitored?)	<b>Where</b> (Is the parameter to be monitored?)	<b>How</b> (Is the parameter to be monitored?)	<b>When</b> (Define the frequency / or continuous?)	<b>Why</b> (Is the parameter monitored?)	<b>Cost</b> (if not included in the project budget)	<b>Who</b> (Who is responsible for monitoring?)
<b>During activity preparation</b>	Site access traffic management	On site	Check if design and project planning provide for expert examination	Before launch of construction	Safety measures for the population	Maximum, under the budget	Contractor, engineer
	Availability of waste disposal facilities	On site					
	Hazardous waste inventory (asbestos)	In site vicinity On site	Visual / analytical in case of doubts	Before start of rehabilitation works	General sanitation and hygiene standards, workplace safety practice and norms	Maximum, under the budget; (Shall the PIU prepare special cost estimates based on analysis?)	
	Construction material quality control (eg. paints / solvents)	Contractor's storage area	Visual / research in toxic materials databases	Before authorization to use materials			
<b>During activity supervision</b>	Dust	On site and in immediate neighborhood, close to potential impacted residents	Visual in consultation with local residents	Daily	Preclusion of disturbance	Maximum, under the budget	Contractor, engineer
	Noise Emissions			Daily			
	Solid and liquid waste types, quality and	At discharge	Visual, analytical if	Daily/ ongoing	Prevention of adverse impact on ground and		

	volumes Surface drainage soundness	points or in storage facilities	suspicious wastes are off construction site,  Check flow rates and runoff routes for wastewater	Daily/ ongoing	surface water  Measures for adequate waste collection and utilization		
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