1.3. Manual Part C – Methodology of the assessment of water management projects on the environment - EIA

Introduction

Water is the basis of life. Therefore, the main objective is to ensure a sufficient quantity of good quality water for all inhabitants of this planet, while preserving the hydrological, biological and chemical functions of ecosystems, adapting human activities to the capacity possibilities of nature and the constant fight against diseases whose incidence is linked to water. There is a need for new advanced technologies, including the improvement of indigenous peoples' traditional technologies in order to use limited water resources and ensuring their protection against pollution in the best way (*Agenda 21*).
One of the effective tools for water resources protection and ensuring sufficient quantity and quality of water for the population is the *Environmental Impact Assessment*, hereinafter referred to as "EIA".

Assessment of the effects of projects on the environment in the European Union is currently legislated by:

a) The Directive of European Parliament and Council 2011/92/EU of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (Codification Wording)

b) The Directive of European Parliament and Council 2014/52/EU of 16 April 2014 amending the Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

hereinafter referred to as "EIA Directive".

I. General part

Environmental Impact Assessment is a process performed before granting a project development consent for a project within the direct and indirect significant effects of the project on the environment, including a comparison with existing environmental conditions in the place where the project and in its range of expected impacts are identified, described and assessed in an appropriate manner and in each individual case.

A part of the assessment process is:

- Elaboration of an assessment report
- Examination of the information stated in the assessment report, the additional information submitted by the developer and information obtained through consultation with the concerned authorities
- Consultation with the concerned authorities and departmental authorities
- Consultations with the public
- Drawing up conclusions from the EIA process and their inclusion in the decision concerning the project development consent.

Environmental impact assessment can be amended by an individual legal regulation or integrated into the existing procedures for projects permissions in the relevant State.

During the Environmental Impact Assessment, the presumed impacts of a project will be assessed particularly in the following areas:
a) Population and human health;
b) Biodiversity with a special emphasis on species and biotopes protected according to special regulations;
c) The main environmental elements - soil, water, air, climate;
d) Land;
e) Tangible assets and cultural heritage;
f) The interaction between the individual factors.

Basic definitions

a) **Environmental impact** - any direct or indirect impact of the project on the environment, including the impact on health, flora, fauna, biodiversity, soil, climate, air, land, natural sites, protected areas, tangible assets, cultural heritage and interconnection among these factors;

b) **Environmental Impact Assessment** – a comprehensive discovery, description and evaluation of presumed impacts of the project on the environment within its range (including the cross-border impact), comparison with the existing state of the environment in the project's implementation site and its development in the event that the project will not be implemented (the zero option), review of the project's possible options, including drawing up the assessment report, review of the information contained in the assessment report, accomplishment of the consultations with the concerned authorities, as well as the justification for the well-founded conclusions of the competent authority towards the project implementation;

c) **Zero option** - a state that would occur if the project and its presumed development will not be implemented;

d) **Project** – means the construction, operation, installation or other intervention to the environment;

e) **Development consent** – the decision of the competent authority which authorizes the project implementation;

Participants of the assessment process

The following bodies are particularly involved in the impact assessment process for the project on the environment:

a) **Developer** – the developer for the project development consent (natural person, legal person or public administration authority);

b) **Competent authority** – authority or authorities responsible for carrying out the EIA process under national legislation;

c) **Permission authority** – state administration authority competent for issuing a decision on the project development consent;

d) **Affected authority** – public administration authority (including any environmental and health protection authorities), whose binding judgment, consent, opinion or statement issued under special regulations are subject to the project development consent;

e) **Departmental authority** – central state administration authority having jurisdiction over the project, which is subject to the EIA;

f) **Public** – one or more natural or legal persons and in accordance with national legislation or the practice of their associations, organizations or groups;

g) **Public concerned** – the public concerned or likely to be concerned due to the project, or having an interest in environmental decision-making procedures (including non-governmental organizations);

h) **Municipality concerned –** municipality in whose territory the project is supposed to be implemented and the municipality whose territory is or may be affected due to the project;

i) **Party of origin –** means the State in whose territory it is proposed to implement the project, which may have a significant adverse cross-border impact;

j) **Party concerned** – a State which may be affected by the significantly adverse impact of the project beyond national boundaries.

Part of the EIA Directive is a list of projects always subject to Environmental Impact Assessment (Annex No. I of the EIA Directive) and the list of projects subject to assessment after the so-called screening (Annex No. II of the EIA Directive).

It is necessary to establish timeframes by means of legislation for the implementation of the individual steps of the assessment. The timeframes for consultations with the public concerned regarding Environmental Impact Assessment report shall be not less than 30 days.

II. Special part

Based on years of experience in implementing water projects it can be concluded that the environmental impacts are significant, and they often create a serious ecological imbalance on the land. For this reason, water management projects are classified on the list of projects for which it is necessary prior to a decision on their permission, to perform a comprehensive expert and public assessment in terms of their presumed impacts on the environment.
The Environmental Impact Assessment's objective is not only to identify and assess the direct and indirect impacts of water management projects on the environment, but especially to establish effective measures to prevent or reduce pollution and environmental damage. Another objective is also to clarify and compare the advantages and disadvantages of a particular project including its alternatives, even in comparison with the current situation (zero option) and its further development, i.e. with the state if the project is not implemented.

1. Projects subject to a mandatory Environmental Impact Assessment

The list of water management projects, which, according to the EIA Directive are always subject to Environmental Impact Assessment before project development consent, is stated in the Table No.1.

Table No. 1: List of water management projects subject to mandatory Environmental Impact Assessment

Project name
Inland highways and ports for inland-highway transport permitting the passage of vessels of over 1350 tons.
Trading ports, piers for loading and unloading, which are connected to land and outside port (excluding piers for ferries) which can anchor the vessels of over 1350 tonnes.
Facilities for the collection or artificial groundwater recharge, if the annual volume of collected water or artificially recharged water exceeds 10 million m^3.
Water pumping devices of water between river basins where this transfer aims at preventing possible shortages of water and where the amount of pumped water exceeds 100 million m^3/year. The pumping of drinking water through pipelines is excluded.
Water pumping devices of water between river basins where the multiannual average flow of the separating basin exceeds 2000 million m^3/year and where the amount of pumped water exceeds 5% of this flow. The pumping of drinking water through pipelines is excluded.
Facilities for the processing of wastewater (sewage treatment plant) with a capacity exceeding 150,000 population equivalent as defined in Article 2, Point 6 of Directive 91/271/EEC of 21 May 1991 concerning urban wastewater.
Dams and other facilities designed for the retention or accumulation of water, where a new or additional amount of retained water exceeding 10 million m^3.
Any change or extension of projects referred to in the preceding paragraphs, where such a change or extension in itself meets the thresholds, or stated in those points.

The assessment procedure

If the project is subject to mandatory Environmental Impact Assessment, the following steps shall be taken:

a) The developer shall ensure the drawing up of an assessment report by skilled professionals providing sufficient information regarding to the project, the presumed effects of the project on the environment, measures to eliminate or mitigate identified impacts, monitoring proposal and post-project analysis (see Annex No. 1).

b) The developer shall submit the assessment report to the competent authority.

c) The competent authority shall inform the parties of the assessment process (affected authorities, municipality concerned, public concerned) about the assessment report either electronically, in writing or by other appropriate means (in the way customary) and provide them with information on the place and time of submitting the statements and comments as well as more opportunities for consultations, including public debate. Assuming a project impact beyond national borders, information shall be provided to the party concerned and then further procedure and schedule shall be agreed.

d) The competent authority, after studying the assessment report and after evaluation and taking into account the statements, observations, results of consultations including the results of the public debate shall issue the decision concerning possibility of project permission. Information that must at least be contained in the decision of the competent authority of the possibility of project permission, are listed in the Annex No. 4.

2. The projects subject to screening

The list of water management projects, which, according to the EIA Directive are always subject to Environmental Impact Assessment, if it arises from the investigation procedure, is stated in the Table No.2.

Table No. 2: The list of water management projects always subject to Environmental Impact Assessment, if it arises from a screening

Project name
Water management projects for agriculture, including irrigation and land drainage projects.
Deep drilling for water supplies.
Facilities for the production of hydroelectric energy (hydroelectric power).
Construction of roads, harbours and port facilities, including fishing harbours (projects not included in the Table No. 1).
Construction of inland water highways (projects not included in the Table No. 1), sewerage systems and flood-relief works of river reaches.
Dams and other facilities for the long-term retention of water (projects not included in the Table No. 1).
Remote water mains.
Coastal work determined to combat erosion and maritime works capable of altering the coast through their construction, such as dykes, moles, harbours and other sea defence works, excluding the maintenance and reconstruction of such works.
Facilities for the abstraction and recharge of groundwater and artificial waterways, which are not listed in the Table No.1.
Works for the water pumping between river basins not listed in the Table No.1.
Facilities of sewage treatment plants (projects not listed in the Table. 1).
Harbours for recreation cruise.
Any change or extension of projects listed in the Table No. 1 or in this table already approved, implemented or in the process of construction, which may have a significant adverse impact on the environment (change or extension not listed in the Table No. 1).

To determine whether the project stated in the Table 2 is subject to assessment is possible based on:

1. The separate examination of each project or
2. Determination of the thresholds or criteria.

To Point No.1

In the case of a separate investigation (i.e. screening), the developer shall submit the information stated in the Annex No.2.

The developer shall take into account the criteria for screening stated in the Annex No.3 when compiling the information for the screening.

The competent authority on the basis of information shall:

a) Decide that it is necessary to assess the environmental impact of the project – in this case, shall state the main reasons for the requirement of the assessment with reference to the criteria for the screening stated in the Annex No.3.
   In the case of a decision, it is necessary to assess the environmental impact of the project, followed by drawing up an assessment report in accordance with the Annex No. 1 and then the procedure as in the assessment of projects subject to mandatory Environmental Impact Assessment.

b) Decide that it is not necessary to assess the environmental impact of the project, presenting the main reasons for refraining from requiring assessment with reference to the relevant criteria stated in the Annex No.3, stating the characteristics of the project and/or recommended measures through which it should be avoided and prevented that the impacts of the project would not be serious, if the developer suggested such measures.

To Point No. 2

The State may set thresholds or criteria, whether the projects listed in the Table No. 2 are subject to Environmental Impact Assessment, taking into account the criteria stated in the Annex No. 3. The State may set thresholds or criteria for determining when projects do need to be subject to a separate investigation or Environmental Impact Assessment, and/or thresholds or criteria determining when projects are subject to an Environmental Impact Assessment in any case without being subject to a separate investigation.

The use of both procedures referred to in Paragraphs 1 and 2 is not excluded.

3. Public participation in the EIA process

The public is an indispensable and important participant in the Environmental Impact Assessment of projects.

The public is represented in the EIA process by:

- Natural and legal persons, or groups or associations,
- Non-governmental organizations
- Municipality concerned (as an intermediary between the public and other participants in the EIA process).

The public must be informed of all the steps and all the documents of the EIA process for those projects, which are subject to mandatory Environmental Impact Assessment or screening prior to their permission.

The public concerned shall be given early and effective opportunity to participate in decision-making processes relating to environment. For this purpose, the public is entitled to express comments and statements when all possibilities are still opened prior to the decision on the application to the project permission.

In order to ensure effective participation of the public concerned in decision-making procedures, the public must be electronically informed as well as by public notices or other appropriate means at an early stage of the decision-making process in environmental matters, as soon as the information can reasonably be provided on the following facts and documents:

a) Details of the arrangements for public participation, including time frames;
b) Information concerning place for sending comments or questions and details of the time schedule for sending comments or questions;
c) The possibilities, place and dates of consultation and the public debate on the assessment report;
d) The application of the project development consent;
e) Details of the competent authorities responsible for the EIA process;
f) Information about the authorities with which relevant information about the project can be obtained;
g) Decision of the competent authority that the project is/is not subject to an assessment;
h) Environmental Impact Assessment report;
i) The decision of the competent authority about the possibility of granting or refusing of the project;
j) Decision of the permission authority concerning the project permission.

Important information must be accessible to the public in electronic form at least through a central portal or through readily available access points at the relevant administrative level.

The timeframes for consultations with the public concerned on the Environmental Impact Assessment report shall not be less than 30 days.

The public must have access to appeals before a court or other independent and impartial body established by law with the objective of challenging the substantive or procedural legality of any decision, act or omission part of the Environmental Impact Assessment of the project.

Practical information on access to administrative and judicial review must be available to the public.

Public debate

The public debate is an important step in the assessment process. The interests of the well-informed developer and less informed citizen who is protecting their personal interests stand against each other here. When the proposed activity is in the interest of most of the residents, a public debate can have a conflict-free course. In cases where citizens' interests are not consistent with the developer's interests, it is very important to prepare particularly thoroughly to the public debate and if possible to require an independent moderator to conduct the public debate of (e.g. an expert in sociology or psychology) with a good understanding of the project.

The form and manner of public consultation is usually provided and ensured by the municipality concerned in cooperation with the developer.

The assessment of the objectivity of the conclusions which are stated in the assessment report, are also an objective of the public debate on the assessment report. The efficiency of the public debate is directly proportional to the quality of the previous dialogue of the public and developer or state administration authorities. It follows that the public debate does not serve to resolve outstanding disputes over substantial impact assessment. It is rather a kind of partial conclusions on the assessment process, whose aim is to express the views of the public on the implementation of the assessed project.

A public debate is open to all citizens, civic initiatives and civil society organizations as well as representatives of non-governmental organizations and interest groups. All questions of the present public, as well as representatives of interest groups, or unions, environmental

movement and citizens' initiatives or civil partnership must be clearly and unequivocally replied either orally or in writing.

Apart from the public debate on the assessment report, the developer does not exclude the possibility of using additional forms of cooperation with the public (e.g. expert lectures, exhibitions, special meetings with individuals or groups, the mass media and so on).

Public debate should encourage the exchange of ideas between the public and relevant state administration authorities about requirements for the assessment of individual parts of the assessment report. The objective of this measure is to assess the existence and seriousness of the impacts or other factors not taken into account in the preparation of the assessment report.

The obligations of the municipality concerned, in cooperation with the developer, are to make a *record of the public debate*. The municipality concerned shall submit a record signed by a representative of the municipality concerned and the developer's representative to the competent authority. A part of the record must also be an attendance list stating the time and place of the public debate, or even audio or video recording during the public debate. In order for this record to be exhaustive and precise, it is suitable that the municipality concerned, together with the developer during the public debate, use various forms of recording statements, comments, questions and comments posed by participants of the public debate for example written recording, audio recording using stable or mobile microphone.

A so-called referendum can be carried out within the assessment process (public vote), the main impact of the project on the environment if such a possibility is provided in the generally binding legal regulations of the State.

4. Impacts of selected water management projects on the environment

It is well known that no waterworks can be built without affecting the original nature, without land grabbing and impacts on the hydrosphere. Therefore, it is justified to require that during the construction of water projects and after their completion a new environmental balance without creating irreparable harm is ensured, which could have local, regional or global importance. Permitting the construction should therefore be the result of a thorough assessment of the benefits as well as presumed positive and negative impacts on the environment.

Impacts of water reservoirs on the environment

Water reservoirs are primarily used as sources of surface water for retaining and accumulated drinking and service water for supplying the population, agriculture, power engineering and service water industry as well as for reducing the flow during floods. They create conditions for the use of the hydropower potential of navigable waterways, but also to improve the environment for recreation and fish farming. Without creating additional new reservoirs, water flow away without benefit from a territory by causing damage at higher water levels.

Each water reservoir affects their environment, while its impact on the watercourse, the surrounding territory, economic activity and life of residents of adjacent areas are proportional to the size and functions of the reservoir.

Water reservoirs do not affect only the concerned environment in terms of environmental quality, but also affect the proportions of social, medical and aesthetic. Their influence can be positive as well as negative. Negative impacts can be eliminated or minimized by selecting the most plausible alternatives and by the proposition and implementation of effective measures.

Impacts of water reservoirs and their systems on the environment can be divided into

- local –reflected in the area directly affected by the construction of water reservoirs;
- synergic - the impacts of the system of water reservoirs on one watercourse, which are manifested in changing the character of the entire watercourse.

Changes in the hydrological mode and flooding large areas cause also changes in the hydrochemical and hydrobiological mode. On the inlet to the reservoirs, the waters are saturated with mineral and organic substances from the tributaries and can settle at low flow rates, thus impoverishing drain. The sediments reduce the useful volume of the reservoirs and may, for example, create operational difficulties for a hydroelectric power plant if it is a part of them. Sediment removal is particularly problematic because sediments often contain various environmentally non-acceptable substances (e.g. toxins, heavy metals, etc.).

A change of the land, regimen disruptions and changing groundwater levels in the area, changing bank vegetation, flora and fauna, may be considered as the most important impacts of large water reservoirs on local conditions.

At the core of many disputes in the impact assessment process of water reservoirs is the absolute requirement to preserve the original nature. On the other hand, there are very serious reservations about ecological illiteracy, the absolutizing of technocratic approaches to ecological ignorance and incompetence. Sometimes they are deliberately caused by non-expert discussions on technical issues often in order to artificially abuse and falsely create public opinion.

Table No. 3: Presumed impacts of dams on the environment and their measures to mitigate or eliminate

Positive impacts	**Negative impacts**	**Measures to mitigate / eliminate the negative impacts**
• Water retention in the land, • Retention of erosion flushing • Change of microclimatic conditions (humidity, temperature, wind conditions), • Increase of underground water, • Optimization of groundwater levels, • Ensuring composure of water flows in the watercourses, • Flood protection area, • Improving the conditions for hydrophilous and moisture loving flora and fauna – increase biodiversity, • Increase the ecological stability the territory concerned, • The possibility of fish farming, • Improving the appearance of the landscape, • Increasing recreational potential, • Ensuring sufficient amount of surface water for the population, agriculture, industry, fire protection, • The possibility of electric energy production,	• Damage to the rocks and the possibility of its contamination during construction, • Impacts during construction (dust, vibration, noise, distortion slope stability...), • Activation of landslides and other geodynamic phenomena, • Abrasive effects on the slopes within reach of waves and during surface fluctuations, • Change of microclimatic conditions (humidity, temperature, wind conditions – change the disperse mode, fog, frost), • Problems with bottom sediments – the need for reservoirs cleaning, • Permanent and temporary scopes of agricultural land and forest land, • Worsening of water-physical properties of soil, • Soil contamination, • The possibility of waterlogging of adjacent	• Selection of a suitable location, • Strict observance of technical and technological solutions of the project, • Strict observance of work discipline during construction, • Maintaining an access road in a dust-free condition, • Keeping construction traffic outside of populated areas if possible, • Implementation of measures for the reduction of water and wind erosion in the adjacent area, • Implementation of flood protection measures during construction, • Limitation of surface run-off, • Construction and operation of spare biocorridors (fishpasses), • Creation of conditions for the creation of new biotopes as a substitute for biotopes that will be destroyed or adversely affected due to the construction of water

• The possibility of water sports, • Improving waterway transport, • Creation of new job offers.	land, residential and commercial facilities within reach, • Increased risk of eutrophication, • Changes in the velocity of water flow, loss of natural jet sections, • Reduction in self-cleaning ability of the flow and also in the reservoir, • Stratification of chemism in the reservoir, • Change in groundwater levels - waterlogging, decline in the area of deepening under level • Changes in the biodiversity, • Penetration of synanthropic species (rats, mice) and their ectoparasites, • Overpopulation of pioneer animal species (mites, daddy longlegs, spiders, ants), • Disturbance of natural ecosystem of the flow and its ichtyofauna - disruption in the flow continuity for migrating fish species, • A change in representation of species diversity and of population density of fish stocks due to changes in the character of the flow from flowing to the stagnant, • Changes in grain distribution of bottom substrate - increased mud packing, reducing the food base, • Disruption of migration routes and increase in the possibility of nesting birds, • Disruption of migration corridors of animals and small animals, flooding of valuable biotopes, • The effects of the so-called “hungry water” under water reservoir, water free from suspended sediment erodes, i.e. it saturates through the suspended sediments, the process is accompanied by harmful deepening of the riverbed and adverse effect on the drying up of bank vegetation, riparian forests and adjacent alluvial floodplain,	reservoirs, • Planting and restoration of bank vegetation, • Periodic cleaning of reservoirs, • Ensuring water tightness of reservoirs, • Protection of soil and structures against waterlogging, • Implementation of technical measures for preserving groundwater levels, • Recultivation of temporary space in usage, • Ensuring comprehensive monitoring before construction, during construction and during operation.

	• Problems with ice and large water throughput, • The possibility of spreading certain harmful species tied to water and wetland biotope (mosquitoes, parasites, etc.) • Damage/destruction, disruption of coastal biotopes and ecosystems, • Disruption of social well-being and quality of life of the concerned citizens (the need for transshipment of settlements and road network, building enclosure, social and demographic stagnation of community of municipalities, municipality's loss of contact with the river and other municipalities), • Psychological burden of concerned population - the stress of a possible breakage of the dam, • Arising the conflicts of interest and disputes over the distribution of water (rate of flow, the height of the level) to a particular purpose, • The possibility of endangering cultural and historical monuments, archaeological and paleontological sites, • Endangering and interventions into infrastructure (telecommunications distribution systems, oil pipelines, gas pipelines, sewerage systems, etc.), • Problem of workload of risk landfills on construction site of water reservoirs and build new ones; • Temporary landfills of construction materials and excavated soil.	

Impacts of the projects for the adjustment of water flows and damming the torrents

Adjusting the water flows must be addressed comprehensively, i.e. in conjunction or subsequently with interventions in the river basin, which must result in an increase in the retention effect of the soil, slowing and settlement runoff of river basin and reducing the erosion effects of water. Adjusting the flow is one of the possibilities of controlling drainage conditions, which is carried out mainly for the following purposes:

- Protection of the built-up area of villages and towns, farmland, communications and valuable structures from flooding, waterlogging and drying out (by affecting the groundwater levels);
- Stabilization of the river bed, preventing the erosional expression of the flow;
- Adjustment of the river bed routes in order to remove critical locations in the possibility of endangering structures or territory;
- Concentration of rate of flows in the river bed to improve sanitary, hydro-geological, aesthetic or nautical conditions;
- Creating optimal conditions for the supply of drinking and service water;
- Enabling cruises on the flow, use of water power.

Biological, biotechnical, hygienic, aesthetic, ecological criteria and criteria of overall usefulness are used to assess the results of incorporating flow adjustment into the land.

Table No. 4: The presumed impacts of the adjustment of water flows on the environment and measures to their mitigation or possible elimination

Positive impacts	**Negative impacts**	**Measures to mitigate / eliminate the negative impacts**
• Improving the stability of banks, • Anti-deflation function of riparian vegetation - the reduction of erosion intensity, • Protection against wash away (from the neighbouring land-soil particles, biocides and the like), • Optimization of groundwater levels, • Enabling of tributary mouthing, drainage and sewerage systems, • Increasing of ecological stability - the planting of riparian vegetation, creation of new biocorridors, • Increasing the aesthetic effect - improving the appearance of the landscape, • Protection against floods, • The possibility of using water power, • Enabling the navigability of the flow, • Stabilization of the river bed, • Removal of bank gullies and directional flow stabilization, • Enabling recreational and sports activities of the flow - access to water.	• Change and shortened the route of watercourse, • Increasing of longitudinal inclination and nivelet alignment - quick drainage of water from the river basin (drying up of area - greater volatility of the rate of flows) • Removal of meanders, oxbow lakes formation • Loss of morphological complexity of the flow's river bed, • Changes in the intensity of erosion processes - increasing erosion activities (mainly river one) • An increase in the movement of weir sediments, • Change in the level and quality of groundwater, • The prevention of "communication" of groundwater with river bed (with waterproof treatment) - changes in the mode of filtering groundwater flow into the river bed and vice versa, • Inappropriate fortification of river bed, • Increase of glaring the banks and water levels, larger fluctuations in water temperature, reducing the oxygen content, • Reducing the self-cleaning ability of flow,	• Properly dimension the adjustments, • Recultivate concerned land after adjustment, • Do not dimension the deep river beds, • Restrict the design and implementation of waterproofing technologies, • Heed the purity of water flow, • Plant and restore riparian vegetation - prioritize vegetation and semi-vegetative adjustments • Building thresholds, roughened slides and so on, • Replant slopes or planting the shrubs • Observe protection zones of the flows, • Propose a parabolic (bowl-shaped) profile, • Combine modified with non-modified sections, • Minimize or possibly not perform any flow adjustments in protected areas.

	• Deterioration in the quality of surface water, • Interruption of ecological linkages between water flow, bank and surrounding landscape, • Increased supply of by washing soil particles of agrochemicals etc. into to flow • Shallow depth of flowing water, • Aggravating of water drawn, • Aggravating the outlet of drainage and sewerage systems, • Greater water salinity, • Removal of concomitant vegetation of water flows (riparian vegetation), • Reduction in species diversity in water flow and in nearby surroundings, • Removal of natural shelters for animals, loss of habitat for wildlife animals, • Deterioration or liquidation of hygrophilous ecosystems, • Reduction (qualitative and quantitative) of stocking the ichtyofauna • Damage to biotopes for hygrophilous and water loving fauna, • Formation of trophic imbalance, • Reduction of ecological stability (liquidation of riparian vegetation, possible bio-corridors), • Possibility of biotope damage, • Restriction or disabling sand and gravel mining from the riverbed, • Restriction of recreation, • Reduction of flood protection, • Exclusion of inundation area from the runoff process, • Change in the nature of flood situations, • Reducing landscaping function of water flow, • Improper flow integration into the surrounding landscape (aesthetics) –	

	worsening appearance. • Fragmentation of flows and their separation from the surrounding area.	

The impacts of melioration projects (irrigation, drainage)

Properly designed, constructed and exploited melioration devices ensure constant or long-term improvement of soil fertility, eliminate the intensity of erosion, provide protection of the territory against foreign waters - floods, optimizes water mode of soils, etc., thus improving living conditions in the region and globally positive impacts on the environment outweigh the negatives incurred. It follows also that, when assessing individual melioration measures on environmental issues, the same intervention may have a positive, but also a negative approach.

Virtually all melioration interventions affect the environment not technically, but also significantly affect the social, health, cultural and aesthetic conditions.

Almost all types of land meliorations lead to construction and technical interventions in the natural environment, while in many cases it brings environmental drawbacks. When designing the implementations and exploitations of melioration interventions, environmental criteria were not always sufficiently taken into account. There often prevailed a technocratic approach to a solution, disrupting the ecological balance and ecological stability of the land. In some cases, this distortion may be of a larger scale so that it is not possible to rely solely on natural forces and people must be involved in the removal of this damage.

A significant part of constructed melioration facilities is not used through the course of time and are abandoned. These broken facilities seriously harm the environment at overwhelming odds e.g. clogged small water reservoirs, small rivers, dysfunctional drainage and so on.

The land's water regimen is substantially influenced by draining the soil, while the range of influence depends on the extent and intensity of drainage. The water regimen regulation and both by irrigation or drainage, or a combination thereof, is also regulated by other regimens such as air, biological, nutrient and others. If such ameliorative interventions are performed over large areas, they influence the regimens in entire regions.

Irrigation is an important anthropogenic intervention to the biophysical environment, as it has a large impact on the system soil - water - plant - atmosphere in which, the basic resources of the biosphere are implemented, but especially sunlight, soil, water, air (abiotic resources) and flora and fauna (biotic resources). Improperly designed, constructed or operated irrigation (irrigation systems) may have an adverse effect on the environment.

Table No. 5: The presumed impacts of melioration projects on the environment and measures to their mitigation or elimination

Positive impacts	Negative impacts	Measures to mitigate / eliminate the negative impacts
Drainage		
• Aeration and thus the possibility of weathering (pedochemical and pedobiological activities), • The possibility of drainage of harmful compounds, • Improvement (optimization) soil water mode, • Washout of pollutants, • Improving the thermal regimen, • A change in the quality of	• Soil overdrying, • Violation of the soil filtering capacity (soil salinisation and acidification...) • Changes in the hydrological balance (runoff increase, reduction of evaporation), • Washing away nutrients, • Undesirable reduction of groundwater levels,	• Comply with technical standards of drainage, • Land overfertilization, • Restrict large-scale drainage, • environmentally friendly use of biocides • Preserve important wetlands, • Preserve and protect the elements of the territorial system of ecological stability, • Planting substitutional greenery.

humus, • Improvement of microbial activity, • Improvement of the aerial regimen, • Improvement of soil structure, • Enrichment by organic remnants, • Improvement of the cleaning capacity of the soil, • Reduction of the probability of fog formation, • Improvement of groundwater quality, • Improvement of living conditions for cultivated plants, • Improvement food availability for xerophilous fauna, • Protection of buildings and other technical works against waterlogging, • Reduction of hazardous incidence of diseases linked to the aquatic environment, • Increase self-sufficiency in food production, • Increase the standard of living and job opportunities, • Increase in social and cultural levels, • The possibility of building transport network, • Increase the recreational potential of land drainage (reduction of mosquito infections, improving agrodesign)	• Reducing water yield of groundwater resources, • Damage to the quality of surface waters (biocides, ferric compounds, and the like), • Flow rate volatility in the recipients, • Deterioration in living conditions for water loving vegetation (impoverishing biodiversity, destruction of woody vegetation (mainly riparian vegetation when building the mouthing of the drainage) wetlands liquidation, • The change in original vegetation, scattered greenery liquidation, • Worsening conditions for hygrophilous fauna - impoverishment of animal ecosystems, • Deterioration of landscape appearance, • Reduction of ecological stability, • Liquidation of protected hygrophilous species (damage of biotopes) • Uneven subsidence of soil drainage under engineering works	
Irrigation		
• Greater intensity of weathering of parent rock, • Greater intensity of soil formation, • Higher probability of washing out hazardous compounds from the rock environment, • Optimization of the water mode of soil, • The possibility of supplying nutrients to the soil, • The possibility of supplying biocides, • Washing out pollutants from the soil profile, • Improvement of soil microbial activity, • Improving the quality of	• Bringing harmful compounds into the rock environment, • Salinisation of the rock environment, • Erosion flush (irrigation erosion), • Soil weltering, • Bringing contaminants into the soil, • Bringing pathogenic microorganisms into the soil, • Deterioration of soil structure, • The possibility of salting the soil profile, • Worsening of the thermal	• strict observance of quality of irrigation water, • compliance with the size of irrigation doses, • compliance with the intensity of irrigations, • increasing the humus content in the soil, • observance of the prescribed temperature of irrigation water, • soil aeration and further improvements in soil structure, • preservation and protection of elements of the regional system of ecologic stability, planting substitutional

humus, • Enriching the soil with organic remnants, • Improvement the microclimate (air humidity), • Higher probability of dew formation, • Increase the water yield of groundwater resources, • Improvement of living conditions, especially for cultivated plants, • Increased food availability for fauna, • Improvement of the landscape appearance • Increase of land stability, • Increase food production and their better quality, • Greater possibility of job opportunities, • Increase of environment, social and cultural level.	mode of the soil (cooling), • Washing out nutrients, • Worsening of aerial mode of soil, • Formation of soil crust, • Possibility of fog formation, • Deterioration of groundwater quality, • Change of surface water quality, • Reducing the flow rate during dry periods (level fluctuations), • The possibility of eutrophication, • Liquidation of woody vegetation (due to the use of irrigation machines) • Biodiversity change, change in original vegetation, • Deterioration in living conditions of fauna (disturbance, wetting, reduce the variety of food), • Deterioration of landscape appearance, • Decrease the land stability, • Increase of acreage (especially when using irrigation machines - the possibility of a greater erosion intensity), • The possibility of the liquidation of protected species (biotope change), • Deterioration of food quality (possibility of intoxication by means of irrigation water), • Greater possibility of occurrence of pathogenic microorganisms linked to humid environment, • Greater need for energy, • Restriction of transport (drenching, the possibility of the formation of fog and frost), • Reduction of recreational potential.	greenery, • combination of irrigated and non-irrigated area, • use of irrigation machines in accordance with natural barriers, • proper exploitation of irrigation.

The impact of selected infrastructure projects (sewage, wastewater treatment plant) on the environment

The basic function of sewerage infrastructure and wastewater treatment is to protect the environment and population health from the adverse effects of produced wastewater (municipal and industrial). Drainage and sewage treatment plants must respect the principles of sustainable development, environmental protection and comply with the requirements resulting from generally binding regulations and policy requirements of water management.

The status of settlements sewerage and wastewater treatment is generally insufficient. The development of sewerage and wastewater treatment often lags behind the development of providing drinking water through the public water supply. Facilities for drinking water supply (public water mains) are built without the fact that the wastewater has been drained through the public sewage system into adequate facilities for the treatment of wastewater (sewage treatment plant).

In those cases, even if the sewerage and sewage plant's capacity is built and the effectiveness of the cleaning is often inadequate, also waterproof sewer networks are insufficient, causing the inflow of ballast water (drained groundwater) into the system for the wastewater treatment plant, which unnecessarily increases the volume of the treated wastewater. Special problems during the operation are dissolving the sewage sludge as well as the rodent control and disinfection of sewer systems.

The development of public sewerage requires a combination of environmental, technical and economic aspects.

When planning the construction of sewerage projects, there must be all the determining requirements of optimum functionality, operational stability, adequate investment intensity, adequate operational performance, the impact of the entry site of the recipient, and more respected.

The functional requirements of sewer systems shall be designed in such a way, that when taking into account the total costs (capital and operating) drainage and effluent wastewater without serious adverse impacts on the environment, risks to public health or the operating personnel will be ensured. The impact of canalization on the recipient must comply with generally applicable legislation.

Table No. 6: The presumed impact of selected infrastructure projects on the environment and measures for their mitigation or possible elimination

Positive impacts	Negative impacts	Measures to mitigate / eliminate the negative impacts
• Ensuring adequate levels of drainage and wastewater treatment plant with nutrient removal from agglomerations with the production of organic pollutants, • Direct discharges of wastewater into surface water and groundwater • Protecting the public health of people.	• Discharges of inadequately treated wastewater into the recipient, • Ineffectiveness of wastewater treatment plant, • Inadequate disposal of sewage sludge, • Reduction of oxygen in the recipient, • Excessive nutrient enrichment of water bodies, particularly macronutrients N and P, • Discharges of pathogenic microorganisms of fecal origin. • Direct discharge of pollutants into the public	• Suitable location of treatment facility, • Consideration of the appropriateness of hydrological and hydrogeological conditions in the design of facility, • If possible apply the gravitational wastewater disposal system, • Correctly sized facility for the collection and treatment of wastewater, • Ensure the compliance of treatment plants with the limits for discharge into recipients, • Ensure wastewater treatment in full flow range in a rain-free period, or with the permitted

	sewer system and into recipients; • Loss of amenities of the population within range of the treatment plant's smell.	volume of rainwater, • Ensure that the periodicity of flooding and overloading of the facility meet the prescribed limit, • Ensure that the watertightness of the drains and sewers comply with the testing requirements • Prevent the clogging of sewers, • Prevent the occurrence of odour, toxicity, noise, • Ensure easy access for maintenance • Consider the possibility of future expansion or renovation of facilities, • Minimize waste from the operation of sewerage and treatment plants and create the possibility of their assessment.

x x x

The assessment of the impacts of projects on the environment and integration of results within the preparation and permitting of planned projects at the earliest possible stage of their preparation will not only minimize environmental impacts but mainly help in preventing the loss of time and increased costs, which may occur due to unforeseen environmental problems. The elimination of the consequences of environmental damage and the implementation of programs of additional environmental improvements are almost always much more expensive than the implementation of preventive measures.

Based on years of experience in performing the impact assessment process for projects on the environment prior to their permission and implementation in the Slovak Republic (over 20 years), it can be concluded that impact assessment is rightly considered one of the main tools for ensuring sustainable development.

The time-related and financial demands associated with the process of Environmental Impact Assessment are clearly highly balanced by the positive effects in the protection of environment and ensuring sustainable development.

Annex No. 1

Content and structure of the assessment report

The assessment report is the basic document on the process for the Environmental Impact Assessment. Its processing is ensured by the developer and it submits it to the competent authority.

The Environmental Impact Assessment report must include at least:

I. Basic information on the developer (e.g.: name/names, address, contact details of the developer's authorized representative, contact details of the person who can provide relevant information about the project).

II. Basic information about the project

1. Project name.
2. Project location.
3. Project nature.
4. Project size (technical units).
5. Brief description of technical and technological solutions (according to suitable solution options).
6. Description of suitable solution options in terms of the developer, relevant to the proposed project with respect e.g. the location of the project, the technology, the size and scope of the project.
7. Requirements for inputs:
   a) Soil – occupation of soil in ha (permanent and temporary); types of soil (agricultural soil, forest soil, water surface...);
   b) Water – water consumption (in m^3 per unit of time: hrs., year), water supply (public water, own source of groundwater, surface sources), type (drinking, service);
   c) Materials – consumption (daily, annual), type, source and manner of acquisition;
   d) Energy demands – energy consumption (daily, yearly), type of energy (electricity, natural gas, thermal energy);
   e) Requirements for transportation and other infrastructure (e.g. water, sanitation ...);
   f) Labour requirements (during construction, during operation).
8. Information on outputs:
   a) Air – pollution sources (stationary, mobile), type and quantity of expected residues and emissions, treatment time (regular, temporary, random);
   b) Wastewater – amount, type (sewage, industrial, from surface runoff), manner of loading, place of discharge (recipient, public sewerage, wastewater treatment plants – communal, private, capacity, efficiency);
   c) Waste – amount, type and category, place of origin, method of waste treatment (recovery, disposal);
   d) Noise and vibration – source, intensity;
   e) Radiation and other physical fields (thermal, magnetic) – type, source, intensity;
   f) Odour and other outputs – source, intensity;
9. Other – e.g. landscaping, interventions into the landscape, removing trees and other essential characteristics of the project).

III. Description of the relevant aspects of the current state of the environment (zero option) and an outline of the likely development if the project is not implemented, if possible with a reasonable effort to assess the natural variations of the zero option on the basis of available information on the environment and on the basis of scientific knowledge.

IV. Description of the factors likely to be significantly affected as a result of the implementation and operation of the project

1. Population and human health;
2. Biodiversity (fauna, flora), with special emphasis on species and habitats protected under separate regulations;
3. The basic components of the environment - soil, water, air, climate;
4. Land (requirements for soil);
5. Tangible assets and cultural heritage.

V. Description of the likely significant effects of the project on the environment (during construction, operation, and where relevant also during demolition)

1. Impact on the population – number of population affected, health risks, social and economic consequences, loss of amenities and quality of life, acceptability of the affected municipalities (the result of a survey among residents of affected villages), and other;

2. Impact on geomorphological conditions, rocks, minerals, geodynamic phenomena;

3. Impact on climatic conditions (e.g. the nature and extent of greenhouse gas emissions) and project vulnerability against climate change;

4. Impact on air – amount and concentration of emissions and air pollution;

5. Impact on water conditions – on quality, regimen, drainage conditions, supplies, resources;

6. Impact on soil – fillings, contamination, erosion, compaction;

7. The impact on flora, fauna and their habitats (e.g. protected, rare and endangered species, animal migration corridors, the health status of animals and vegetation);

8. Impact on land – structure and land use, landscape view;

9. Impact on protected areas and their buffer zones;

10. Impacts on the urban system and land use;

11. Impact on cultural and historical monuments;

12. Impact on archaeological sites;

13. Impact on paleontological sites and important geological sites;

14. Impact on intangible cultural values (e.g. local traditions).

The description of the likely significant effects should cover direct impact and any indirect, secondary, cumulative, cross-border, short-term, medium-term and long-term, permanent and temporary, positive and negative impact of the project. This description should take into account the environmental protection objectives set at the level of the countries relevant to the project.

VI. Measures designed to prevent, eliminate, minimize and compensate for the impact of the project on the environment and health

1. Technical measures.
2. Technological measures.
3. Biological measures.
4. Organizational and operational measures.
5. Other measures.

The measures aimed at preventing, mitigating, minimizing or compensating the expected impact of the project, which may arise during its construction, operation (in standard and non-standard mode, i.e. during an accident as well). The measures relate to one or simultaneously more of the project impacts on the environment.

VII. Comparison of implemented project options and proposal for an optimal options

1. Creation of a set of criteria and determining their importance for the selection of the optimal option.
2. Selection of optimal option.
3. Justification for the proposal of the optimal option.

VIII. Proposed monitoring and post-project analysis

1. Proposed monitoring during construction, during operation and after operation.
2. Proposal for checking compliance with the set conditions.

IX. Description of the prognostic methods used to identify and assess significant environmental impact including details of disorders (e.g. technical deficiencies or lack of knowledge) in compiling the required information and main related uncertainties.

X. Non-technical summary of the information contained in Points I to IX.

XI. Reference list of the sources used for the description and assessment included in the assessment report.

XII. A list of investigators and entities involved in the preparation of the assessment report.

XIII. Place and date of the assessment report's processing.

XIV. Date and confirmation of the correctness and completeness of the data contained in the assessment report through the signature (stamp) of the authorized representative of the assessment report processor and the developer.

Annex No. 2

Information for screening

In case of screening whether the projects stated in Table 2 are subject to environmental impact assessment, the developer particularly submits the following information to the competent authority:

XV. Basic information on the developer (e.g.: name/names, address, contact details of the developer's authorized representative, contact details of the person who can provide relevant information about the project).

XVI. Basic information on the project:

10. Project name.
11. Project location.
12. Project character.
13. Project size (in technical units).
14. Brief description of technical and technological solutions.
15. Requirements for inputs.
16. Information on outputs.

XVII. Description of components and environmental factors, which may likely be seriously affected by the project results.

XVIII. Description of likely significant effects of the project on the environment (during construction, operation and, where relevant, also during demolition) the developer has available.

Annex No. 3

CRITERIA FOR SCREENING

During screening, whether the projects listed in the Table 2 are subject to an environmental impact assessment, the following criteria are taken into account:

I. PROJECT PROPERTIES

1. Nature, technical and technological solution and scope of the project (in technical units);
2. Accumulation with other existing and/or approved projects;
3. Requirements for inputs – in particular the occupation of land, the need for water, mineral resources, energy needs (electricity, gas, heat);
4. Data on outputs – particularly air pollution, waste production, waste water, noise, vibration, radiation, heat, odors and other;
5. Overall pollution and environmental degradation;
6. The risk of major accidents and/or natural disasters related to projects under assessment, including those caused by climate change, in line with current scientific knowledge;
7. Risks to human health (for example, due to contamination of water or air pollution) and impact on the well-being of life.

II. PROJECT LOCATION

The environmental sensitivity of the geographical area a project may likely affect must be considered, in particular with regards to:

1. The current state of the land use (the zero option);
2. The relative abundance, availability, quality and regenerative capacity of natural resources (including soil, mineral resources, land, water and biodiversity) in the given field and the subsoil;
3. The absorption capacity of the natural environment, paying particular regard to the following areas:
   3.1. Wetlands, riparian areas, estuaries;
   3.2. Coastal areas and the marine environment;
   3.3. Mountain and forest areas;
   3.4. Nature reserves and parks;
   3.5. Areas classified or protected by national legislation; Natura 2000 areas designated by Member States under Directive 92/43/EEC and 2009/147/EC;
   3.6. Areas in which the environmental quality standards laid down by law and relevant to the project were violated, or where the standards were deemed to be breached;
   3.7. Densely populated areas;
   3.8. Historically, culturally or archaeologically significant area and place.

III. TYPE AND PROPERTIES OF POTENTIAL IMPACT

The likely significant effects of projects on the environment must be considered in relation to criteria laid down in Chapter I and II, considering:

1. The size and spatial scope of the impact (e.g. geographical area and size of the population likely to be affected);
2. Nature of the impact;
3. Cross-border nature of impact;
4. Intensity and complexity of the impact;
5. Possibility of impact;
6. Expected start, duration, frequency and reversibility of the impact;
7. Accumulation of the impact with the impact of other existing and/or approved projects;
8. Possibility of effective impact mitigation.

Annex No. 4

Contents of the decision on the possibility of granting authorization
(EIA process result)

I. Basic information on the relevant authority, which issues the decision (name, location, stated provisions of the law under which it was decided)

II. Basic information on the developer (name, address, identification number), for whom a decision is issued.

III. Basic information on the project (name, location, nature, a brief description of the technical and technological solutions)

IV. Decision on granted permission

1. Approval/disapproval for the project authorization;

   in case of consent
2. Recommended option;
3. The measures and conditions for a period of preparation, implementation, operation, and where relevant also withdraw the project);
4. The draft program for the monitoring and scope of the post-project analysis (type of monitoring parameter and length of monitoring must be proportionate to the nature, location and size of the project as well as the significance of its environmental impact. In order to avoid duplicate monitoring, there may also be implemented monitoring measures provided by national law regulations).

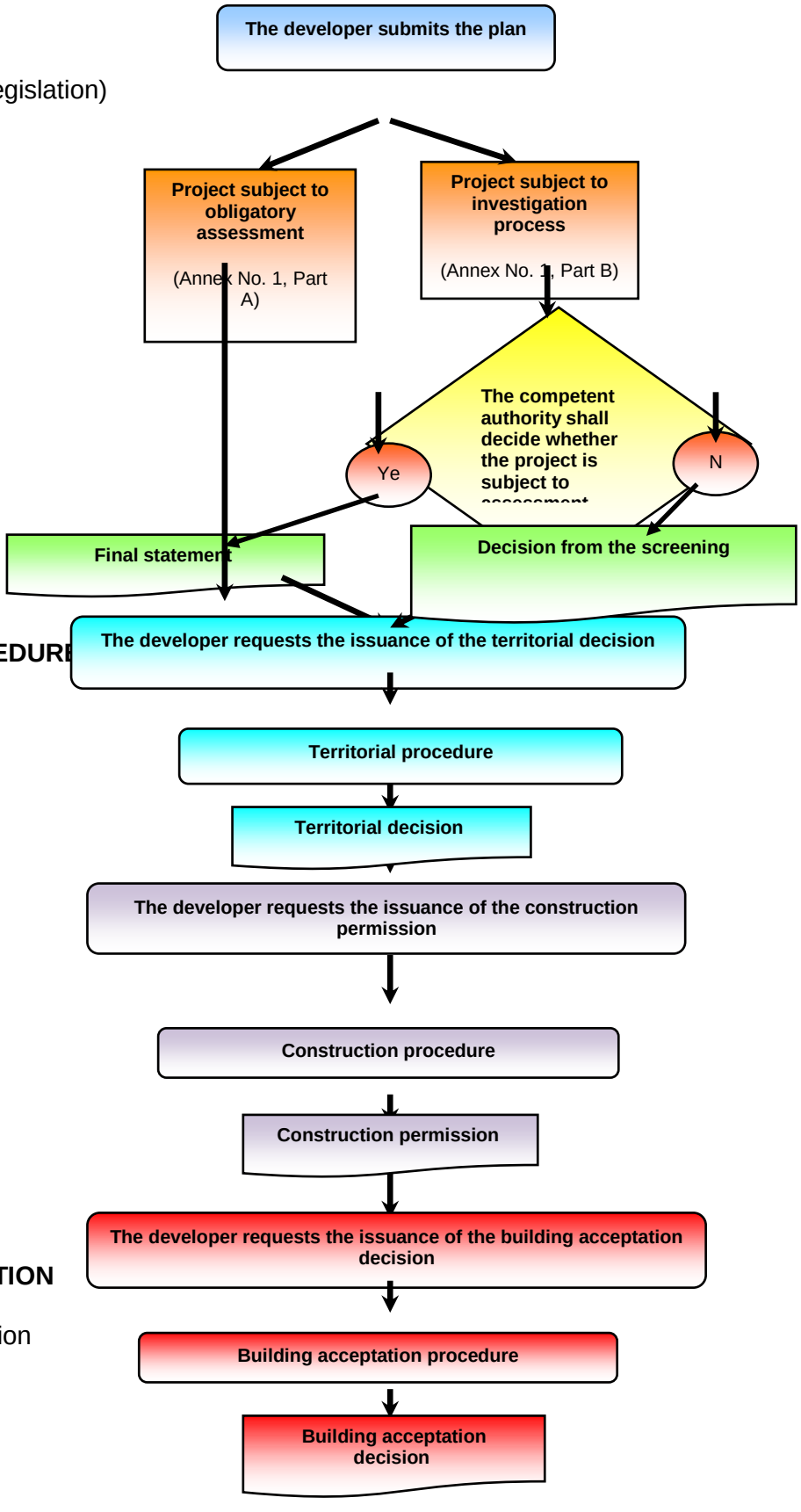
V. Justification for decision

1. A description of the course of assessment, including consultation and public hearing.
2. In the event of non-consent, the main reasons for the rejection.
3. Evaluation of opinions, comments and requests of entities on the assessment and justification process in the event of non-acceptance.

Annex No. 5

Diagram for the assessment process and project permissions in the Slovak Republic

FIRST STAGE OF THE EIA PROCESS
(according to the EIA legislation)



SECOND STAGE TERRITORIAL PROCEDURE
(according to the Building Code)

THIRD STAGE CONSTRUCTION PROCEDURE
(according to the Building Code)

FOURTH STAGE BUILDING ACCEPTATION PROCEDURE
(according to construction legislation)