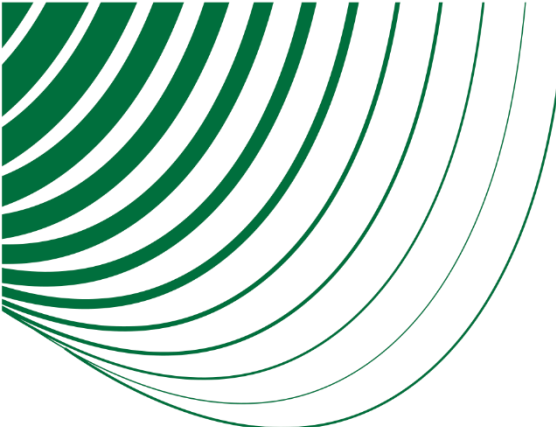




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ACOUSTIC STUDY

**Construction and Operation of SMR ETE –
Stationary Noise Sources**

Acoustic Study for EIA

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1. Assignment:

The Customer for the acoustic study, Jacobs Clean Energy s.r.o., requires an assessment of the future acoustic situation at the Temelín site caused by the operation of the New SMR Power Plant at the Temelín site (SMR ETE), in combination with the operation of the existing part of the Temelín Nuclear Power Plant site (ETE1,2) and the future operation of New NPP ETE (ETE3,4).

For the operation of stationary noise sources, it will be assessed whether noise in the nearest protected outdoor areas of buildings and in protected outdoor areas will exceed the public-health noise limits for daytime and night-time pursuant to Government Regulation No. 272/2011 Coll., on the protection of health against the adverse effects of noise and vibration, as amended.

The subject of the Project is the construction of the New SMR Power Plant at the Temelín site (SMR ETE). The acoustic study has been prepared for the stage of documentation on the Project's environmental impacts (EIA).

For the purposes of the acoustic study, a calculation-based assessment and comparison of the following operating conditions has been carried out:

- EXISTING CONDITION

Verification of whether the existing noise propagating from the current Temelín Nuclear Power Plant site (ETE1,2) exceeds, in protected outdoor areas of buildings and in protected outdoor areas in the nearest surrounding municipalities, the public-health noise limits for daytime and night-time pursuant to Government Regulation No. 272/2011 Coll., on the protection of health against the adverse effects of noise and vibration, as amended.

- FUTURE CONDITION

Verification of whether noise from the future operation of stationary noise sources at the Temelín site will exceed, in protected outdoor areas of buildings and protected outdoor areas in the nearest surrounding municipalities, the public-health noise limits for daytime and night-time pursuant to Government Regulation No. 272/2011 Coll., on the protection of health against the adverse effects of noise and vibration, as amended.

For the purposes of this acoustic assessment, there are two future conditions:

- year 2034 – operation of SMR ETE, including operation of the existing part of the Temelín Nuclear Power Plant site (ETE1,2),
- year 2042 – this is the target condition at the Temelín site and will include the operation of SMR ETE in combination with the operation of the existing part of the Temelín Nuclear Power Plant site (ETE1,2) and the future operation of New NPP ETE.

With regard to the current state of project preparation for SMR ETE, the noise parameters of the individual SMR technologies are not yet precisely known; the individual calculations are therefore performed using input values that are the maximum permissible values for the given noise source or technological unit.

2. Source Documents:

- [1] Act No. 258/2000 Coll., on the protection of public health and on the amendment of certain related acts, as amended.
- [2] Government Regulation No. 272/2011 Coll., on the protection of health against the adverse effects of noise and vibration, as amended.
- [3] ČSN ISO 9613-1 Acoustics – Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere.

- [4] ČSN ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation.
- [5] ČSN ISO 1996-1 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures.
- [6] ČSN ISO 1996-2 Acoustics – Description, measurement and assessment of environmental noise. Part 2: Determination of sound pressure levels.
- [7] ČSN EN ISO 3740 Acoustics – Determination of sound power levels of noise sources – Guidelines for the use of basic standards.
- [8] ČSN EN ISO 3744 Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane.
- [9] Drawing documentation with technical description.
- [10] Noise measurement outside the nearest surrounding residential development, Z230163-01, Greif-akustika, s.r.o., 01/2024.
- [11] EIA Acoustic Study, New NPP ETE, Z080664-03-R02, Greif-akustika, s.r.o., 08/2009.
- [12] EIA Acoustic Study, SMR at the ETE site, Z230163-02, Greif-akustika, s.r.o., 02/2024.
- [13] Methodological Guideline for the Measurement and Assessment of Noise in the Non-Occupational Environment, Ministry of Health of the Czech Republic, Journal, Issue 14, Year 2023.
- [14] Consultations with the Customer's staff.

3. Public-Health Noise Limits:

3.1 Outdoor Noise:

Public-health noise limits are laid down pursuant to [2], Section 12, “Public-health noise limits in protected outdoor areas of buildings and in protected outdoor areas”.

For noise from the operation of stationary sources, the public-health limits for the protected outdoor areas of other buildings and other protected outdoor areas are set out in the following table.

Table 1 – Public-health limit for noise from the operation of stationary sources

Protected outdoor areas of other buildings and other protected outdoor areas	$L_{Aeq,T}$ [dB]
Daytime	50
Night-time – protected outdoor areas	50
Night-time – protected outdoor areas of buildings	40
Additional correction of -12 dB shall be added for a high-impulse noise. In the case of noise with tonal components, an additional correction of -5 dB is applied.	

Tonal and informational character of sound – definition:

Noise with tonal components means noise in whose frequency spectrum the sound pressure level in a one-third-octave band, or also in two immediately adjacent one-third-octave bands, is more than 5 dB higher than the sound pressure levels in both adjacent one-third-octave bands, and, in the frequency band f_t 10 Hz to 160 Hz, the equivalent sound pressure level $L_{Aeq,T}$ in that one-third-octave band is higher than the hearing threshold level L_{PS} determined for that frequency band according to the following table. Music or singing is always considered noise with tonal components.

f_t [Hz]	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
L_{PS} [dB]	92	87	83	74	64	56	49	43	42	40	38	36	34

Tonal components are assessed for audible noise in the one-third-octave band from 16 Hz to 20 kHz.

For the purposes of the acoustic study, the basic public-health limit was selected, without consideration of a tonal component. The presence of a tonal component was not demonstrated in previous acoustic studies

for New NPP ETE or during actual measurements around the Temelín Nuclear Power Plant and the Kočín substation. At the same time, the technical source documents for SMR ETE do not precisely define the spectral characteristics of specific suppliers that would confirm the presence of a tonal component. At this stage of the project documentation, everything is considered without the presence of a tonal component.

4. Situation:

4.1 Site Description:

The existing Temelín Nuclear Power Plant (ETE1,2) is located in the South Bohemian Region near the municipality of Temelín. Other surrounding municipalities are also located near the power plant, namely Litoradlice, Kočín, Malešice, Zvěrkovice, and Sedlec. A larger residential agglomeration is located at a distance of approximately 5 km, in the town of Týn nad Vltavou.

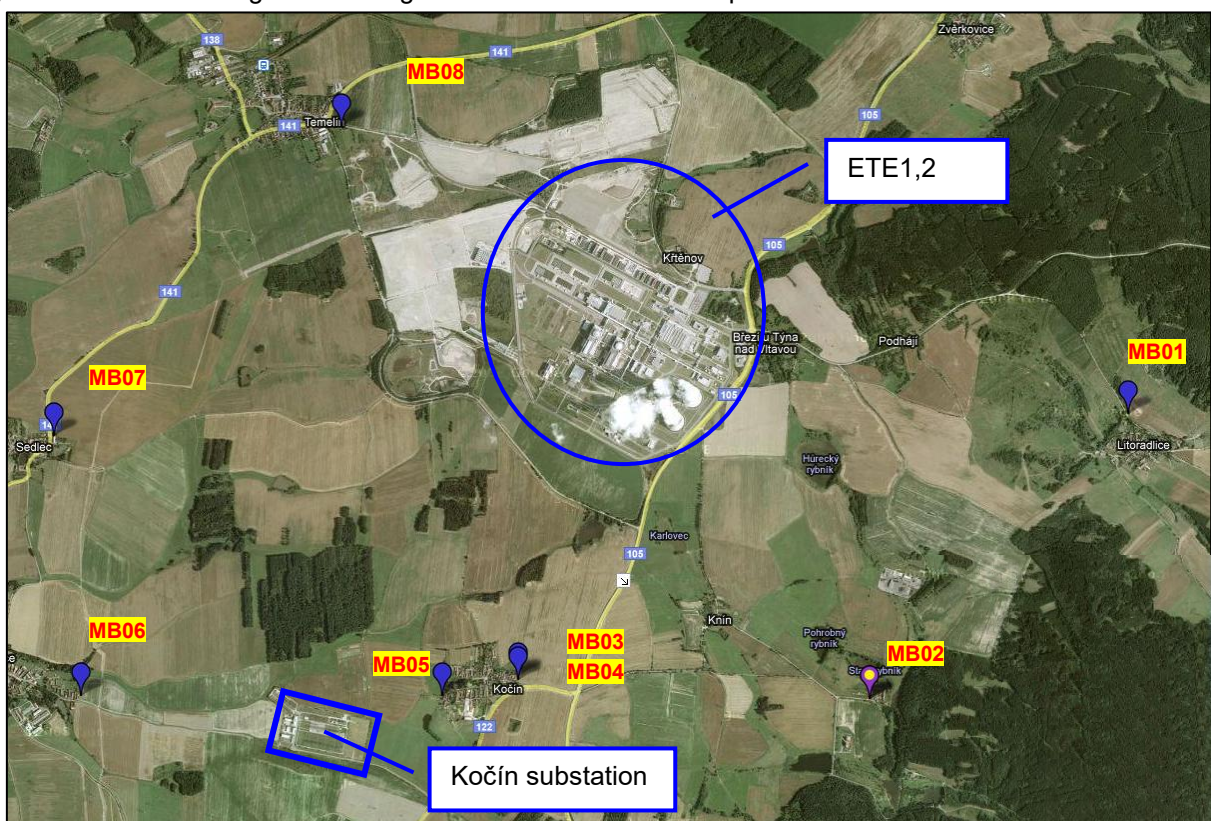
4.2 Nearest Protected Areas:

The nearest residential development in the vicinity of the Temelín Nuclear Power Plant (including in the case of the future New NPP ETE) and the Kočín substation is located in the municipalities of Litoradlice, the former municipality of Knín (control point), Kočín, Malešice, Sedlec, and Temelín, which are distributed in all cardinal directions around the power plant. The above-listed municipalities are also the locations where the effect of noise from the existing operation of the Temelín Nuclear Power Plant and the Kočín substation, including their service operations, was monitored.

A more detailed representation of the overall situation at the site, with the measurement locations marked, which are subsequently identical to the calculation points, is provided in Figures 1 and 2. Figure 2 shows the measurement and calculation locations in the municipality of Kočín in detail.

The calculation points considered in this acoustic study are identical to the measurement points.

Figure 1 – Indicative diagram showing the location of calculation points



Map source: www.google.cz/maps/

Figure 2 – Detail showing the location of calculation points in the municipality of Kočín



Map source: www.google.cz/maps/

The following Table 2 provides an overview of the nearest protected outdoor areas of buildings. The listed buildings are the most exposed for the given municipality in terms of noise from the operation of the Temelín Nuclear Power Plant. The location of the monitored points in the overall situation is shown in Figure 1. The monitored points are assessed as protected outdoor areas of buildings. The height of the control points is considered in the calculations as 3 m and 6 m above ground level.

Table 2 – Overview of the nearest protected outdoor areas of buildings

Control point designation	Description	Calculation point height	Distance from the boundary of the ETE1,2 site
MB01	Edge of the municipality of Litoradlice	3 and 6 m	2,500 m
MB02	Near the former farmstead beyond the former municipality of Knín	3 and 6 m	2,000 m
MB03	North-eastern edge of the municipality of Kočín	3 and 6 m	1,500 m
MB04	North-eastern edge of the municipality of Kočín	3 and 6 m	1,550 m from ETE1,2 and 950 m from the substation
MB05	South-western edge of the municipality of Kočín	3 and 6 m	1,800 m from ETE1,2 and 480 m from the substation
MB06	Edge of the municipality of Malešice	3 and 6 m	3,400 m from ETE1,2 and 1,200 m from the substation
MB07	Edge of the municipality of Sedlec	3 and 6 m	2,900 m
MB08	Edge of the municipality of Temelín	3 and 6 m	1,300 m

For the purposes of this acoustic study, protected outdoor areas (plot boundaries) are also considered as protected outdoor areas of buildings. Everything is then assessed according to the stricter criterion, i.e., as protected outdoor areas of buildings.

Pursuant to [1], a protected outdoor area of buildings means the area up to a distance of 2 m in front of the part of their external envelope that is relevant in terms of the penetration of noise from outside into the protected indoor space of apartment buildings, family houses, buildings for preschool and school education, buildings for healthcare and social purposes, as well as functionally similar buildings. The area relevant in terms of noise penetration is the area in front of the infill of an opening in the external envelope of the building that provides direct natural ventilation, behind which the protected indoor space of the building is located, if this protected space cannot be directly ventilated otherwise.

Pursuant to [1], a protected outdoor area means undeveloped land used for recreation, spa medical rehabilitation care and education, excluding forest and agricultural land and outdoor workplaces. Recreation also includes the use of land on the basis of ownership, tenancy, or subtenancy rights associated with the ownership of an apartment building or family house, or the tenancy or subtenancy of an apartment in such buildings.

5. Description of the ETE_{1,2} Site – Existing Condition:

The existing operation and site of the Temelín Nuclear Power Plant can be divided into several operational sections.

One of these is the so-called “generation section”, which includes the technology directly associated with the generation of electricity. This comprises the reactor section together with the turbine building, the substation, and the heat exchanger station. A total of two reactor units are located on the site, each unit having its own “generation section”, while the other operations are shared.

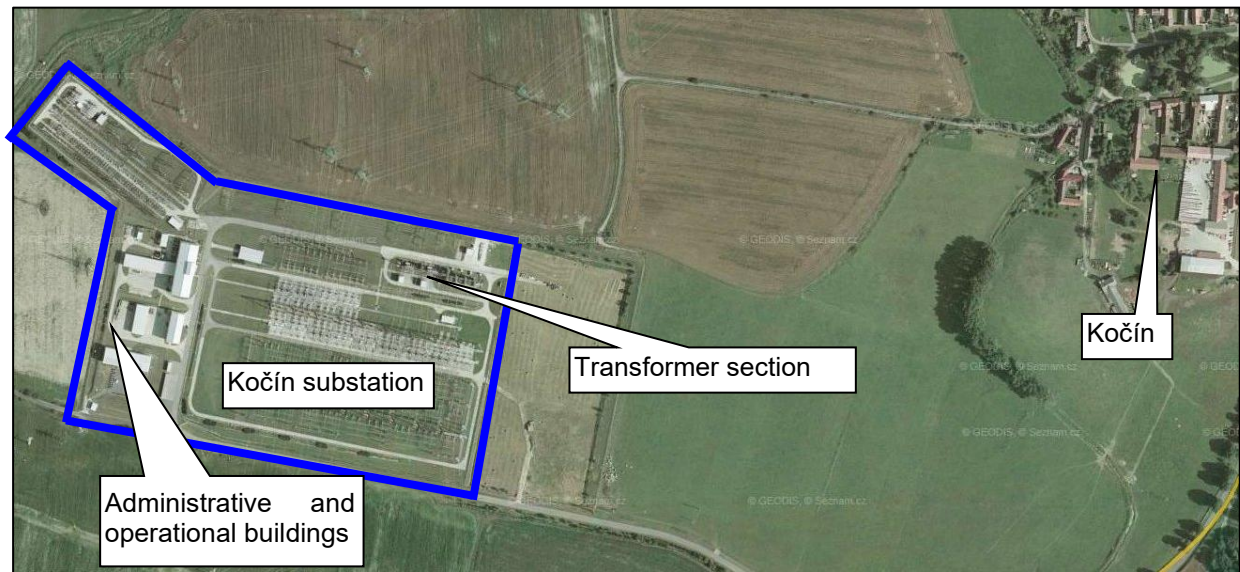
The second operational section consists of operations involving cooling technology, i.e., in particular 4 cooling towers (two for each reactor unit), cooling water pumping stations, spray ponds, demineralisation, decarbonisation, and a water reservoir.

The third operational section consists of service and auxiliary operations for the “generation section”, in particular the auxiliary service building, spent fuel storage facility, diesel generator, compressor and pumping stations, and heat removal machinery halls.

The other structures on the site are technical and administrative support facilities. These consist mainly of workshops, warehouses, operational buildings, and administrative buildings.

Also associated with the operation of the Temelín Nuclear Power Plant is the Kočín substation, which is owned by ČEPS. The substation is used for the evacuation of the plant’s electrical output to the transmission system.

Figure 3 – Schematic layout of equipment within the Kočín substation site



The output of the Temelín Nuclear Power Plant is currently $2 \times 1,083$ MWe. All calculations and measurements for the existing condition are considered for maximum operating output, i.e., also for the maximum simultaneous operation of technological equipment within the power plant site.

The operation of the Temelín Nuclear Power Plant and the Kočín substation is continuous and identical during daytime and night-time.

Figure 4 – Schematic layout of the individual operations within the ETE1,2 power plant site





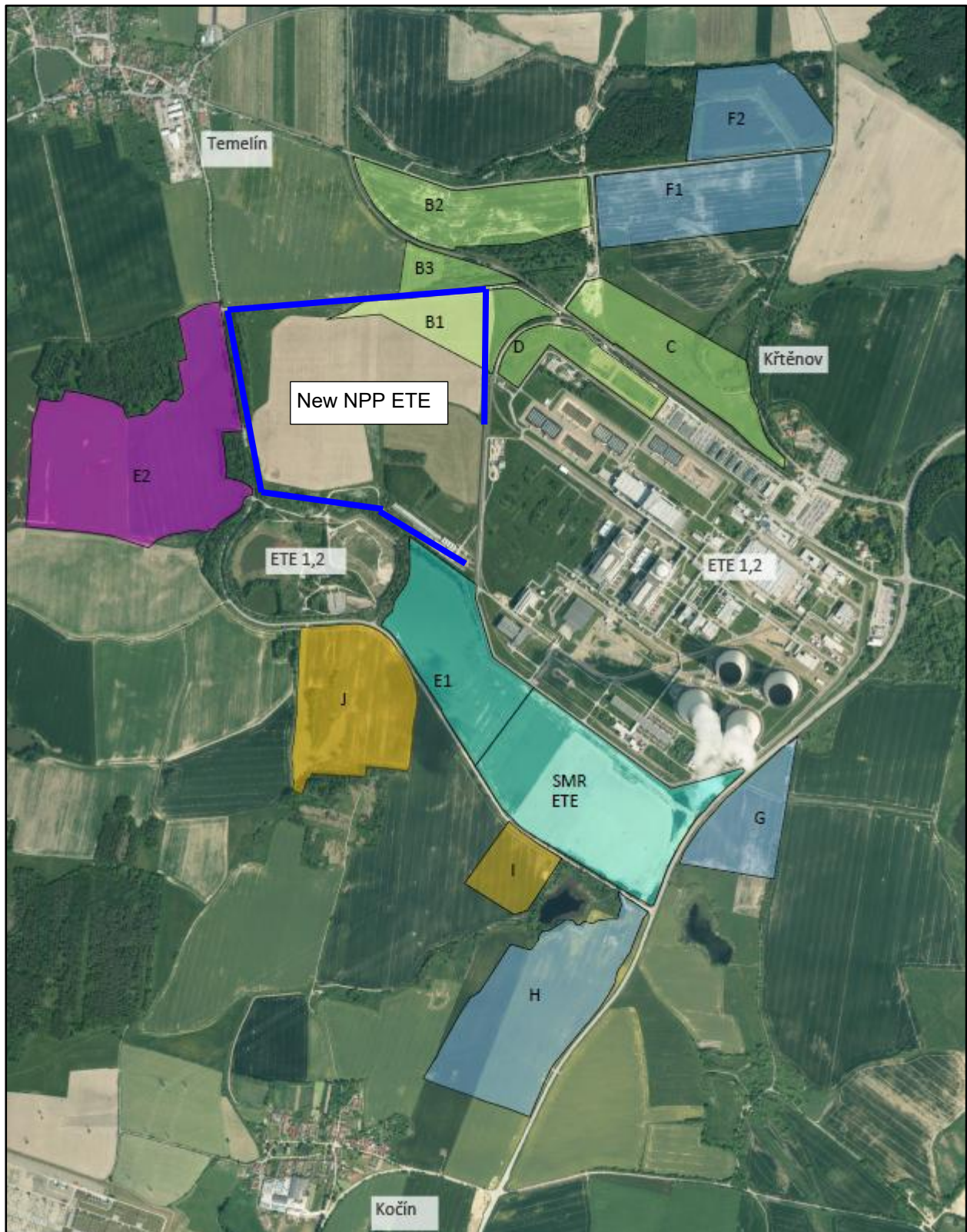
6. Description of the Temelín Site – Future Condition:

The future form of the site is based on expanding the existing arrangement by adding a small modular reactor (SMR ETE). This means that new structures associated with the operation of the SMR small modular reactor will be located next to the existing power plant site. These structures will form part of a separate site in the direction of the municipality of Kočín (part of the municipality of Temelín). The operation of SMR ETE is assessed with a cooling system using fan-assisted cooling towers. Based on the calculated results, this acoustic study will also recommend limit sound pressure levels for the individual noise sources considered within the SMR ETE site.

The second part of the expansion of the existing form of the site envisages the installation of New NPP ETE (two units). This therefore involves the addition of two reactor units with the installation of four new cooling towers (as was conservatively applied in the EIA documentation for New NPP ETE) and, of course, other service technologies associated with the operation of the new units. The entire expansion is planned adjacent to ETE1,2 in the direction of the municipality of Temelín.

The overall situation, showing the areas for New NPP ETE and the construction of the new modular reactor, is shown in the following Figure 5.

Figure 5 – Illustration of the areas for the operation of SMR ETE and New NPP ETE



Legend:

- ETE1,2 existing Temelín Nuclear Power Plant site,
- SMR ETE New SMR Power Plant at the Temelín site,
- New NPP ETE New Nuclear Power Plant at the Temelín site – expansion of the existing operation of the Temelín Nuclear Power Plant by two new units.

The current assumptions for the development of the site capacity can be divided into the following implementation steps:

- **Existing condition** – operation of the existing Temelín Nuclear Power Plant (ETE1,2).
- **Future condition, year 2034** – commissioning of SMR ETE – small modular reactor. Concurrent operation with the existing operation of the Temelín Nuclear Power Plant (ETE1,2).
- **Target condition, year 2042** – commissioning of New NPP ETE, i.e., expansion of the existing site by two nuclear units. Operation in this target condition will be ETE1,2 + SMR ETE + New NPP ETE.

7. Outdoor Noise – Description of Calculation Conditions:

Based on the description of the existing and future conditions in the preceding chapters, calculation models have been created for the purposes of the acoustic study, taking into account the operation of existing sources + the operation of new sources. From the above implementation steps, where the operation of existing and new sources overlaps, the calculation conditions (models) assessed are summarised at the beginning of this chapter.

The operating conditions considered for noise sources at the Temelín site, with regard to the gradual commissioning of new sources and their impact on noise exposure in the vicinity of the ETE1,2 site at the specified time levels, are as follows:

- **Existing condition** – operation of the existing Temelín Nuclear Power Plant (ETE1,2), baseline condition.
- **Future condition, year 2034** – commissioning of SMR ETE – small modular reactor. Concurrent operation with the existing operation of the Temelín Nuclear Power Plant (ETE1,2).
- **Target condition, year 2042** – commissioning of New NPP ETE, i.e., expansion of the existing site by two nuclear units. Operation in this target condition will be ETE1,2 + SMR ETE + New NPP ETE.

7.1 Noise Modelling in the SoundPLAN Calculation Software:

The calculation of outdoor noise exposure at the given site for the existing condition was carried out on the basis of the previously prepared acoustic study for New NPP ETE, for the EIA documentation stage, and on the basis of control noise measurements at the site, source documents [10], [11], and [12]. The SoundPLAN calculation software was used for outdoor noise modelling; this software is designed for modelling extensive territorial units with a large number of noise sources.

This acoustic study maps the main noise sources, as well as individual production operations, technologies and other smaller noise sources for the existing operating condition of the ETE1,2 site. In addition to the existing operation of the ETE1,2 site, a prediction has also been prepared of future operating conditions for the future SMR ETE and New NPP ETE sites, taking into account the currently considered use of the Temelín site.

The calculation models for both existing and future operation consider the noisiest possible scenario involving simultaneous operation of all noise sources. A maximum operating condition and concurrent operation of the individual noise sources is therefore assumed.

For the calculation of the effect of individual stationary noise sources on the nearest protected outdoor areas of buildings and protected outdoor areas, the following procedure was used:

1. The existing condition was acoustically modelled and assessed on the basis of the previously prepared EIA acoustic study, New NPP at the ETE site, Z080664-03-R02, Greif-akustika, s.r.o., and on the basis

- of control noise measurements outside the nearest surrounding residential development, Z230163-01, Greif-akustika, s.r.o., source documents [10], [11] and [12].
2. For future noise sources for the 2034 condition, operation of SMR ETE, the noise parameters of the technology are not precisely known at this stage of the project documentation. The noise parameters are defined by the customer for the acoustic study on the basis of standard small modular reactor designs and the anticipated implementation at the Temelín site.
 3. For future noise sources for the target condition in 2042, the future operation of the Temelín Nuclear Power Plant (ETE1,2 + New NPP ETE) is taken from source document [11], the prepared EIA acoustic study, New NPP at the ETE site, Z080664-03-R02, Greif-akustika, s.r.o.
 4. All noise sources considered are modelled in the calculation models in the SoundPLAN calculation software. The calculation software models the specified noise situation pursuant to the ČSN ISO 9613 standard, Acoustics – Attenuation of sound during propagation outdoors. This standard specifies an engineering method for calculating the attenuation of sound during propagation outdoors, with the aim of predicting environmental noise levels at a certain distance from individual sources. The method predicts the equivalent A-weighted sound pressure level under meteorological conditions favourable to propagation from sources of known sound emission.
 5. At the selected calculation points – protected outdoor areas of buildings – a contribution analysis was carried out, i.e., an overview of the contributions of the individual specified sources to the total noise level at the control point (archived by the processor).

Non-standard operating modes of existing and new noise sources are not considered for the purposes of the calculation.

7.2 Noise Modelling in the SoundPLAN Calculation Software

The calculation software models the specified noise situation pursuant to the ČSN ISO 9613 standard, Acoustics – Attenuation of sound during propagation outdoors. This standard specifies an engineering method for calculating the attenuation of sound during propagation outdoors, with the aim of predicting environmental noise levels at a certain distance from individual sources. The method predicts the equivalent A-weighted sound pressure level under meteorological conditions favourable to propagation from sources of known sound emission.

The sound attenuation calculations are described by algorithms for octave bands (with centre frequencies from 63 Hz to 8 kHz) generated by a point source or a set of point sources. The sources may be moving or stationary.

The calculation algorithms include mathematical expressions taking into account the following physical phenomena:

- Geometrical divergence
- Atmospheric absorption
- Ground effect
- Reflections from various surfaces
- Screening by obstacles

Standards used for the calculation – SoundPLAN 7.4 – Standards:

- Industry – ISO 9613-2:1996

7.3 Accuracy of Calculated Noise Levels:

The accuracy of calculated noise levels depends on many aspects, such as the available input data, the complexity of the modelled situation, the dominant noise transmission path, and the relevant frequency



range. A distinction must be made between the accuracy of the source input data and the accuracy of the noise transmission calculation.

Pursuant to point 8 of Annex G to the Methodological Guideline for the Measurement and Assessment of Noise in the Non-Occupational Environment, Ministry of Health of the Czech Republic, Journal, Issue 14, Year 2023, source document [13], calculation uncertainty is not applied when assessing calculated values.

8. Source Documents for the Noise Calculation Model – Input Data:

8.1 Existing Stationary Noise Sources:

Maps and drawing documentation were used as source documents for the noise calculation model, from which a calculation model with the terrain elevation profile was compiled. In view of the facts stated above, the real situation is modelled in the calculation software. The actual dimensions of buildings, noise sources, terrain contours, reflectivity of surrounding surfaces, etc., are therefore taken into account in a manner corresponding to the current reality and the assumptions stated above.

The EIA acoustic study, New NPP at the ETE site, Z080664-03-R02, Greif-akustika, s.r.o., and the control noise measurements in front of the nearest surrounding residential development, Z230163-01, Greif-akustika, s.r.o., source documents [10], [11] and [12], serve as further source documents for the calculation and calibration of the noise calculation model.

8.2 SMR ETE – New SMR Power Plant at the Temelín site:

For SMR ETE, the use of a generation III+ light-water reactor (LWR) with a high degree of passive safety features is assumed. The total net electrical output will be up to 500 MWe.

For cooling the entire system, the use of a system of wet forced-draught towers (fan-assisted towers) is assumed. At this stage of the project, the total number of cells required to achieve the necessary cooling capacity is assumed to be 26. These comprise two rows of 13 cells each. The dimensions of one cooling cell are 16 × 16 m, meaning that the total dimensions of the cooling noise source are 32 × 208 m, with a height of 14.5 m.

In the SMR ETE Project, the dominant structure is the reactor building, or containment building. The height will depend on the technology selected; however, a height of more than 60 m is not being considered.

Other structures significant in terms of height:

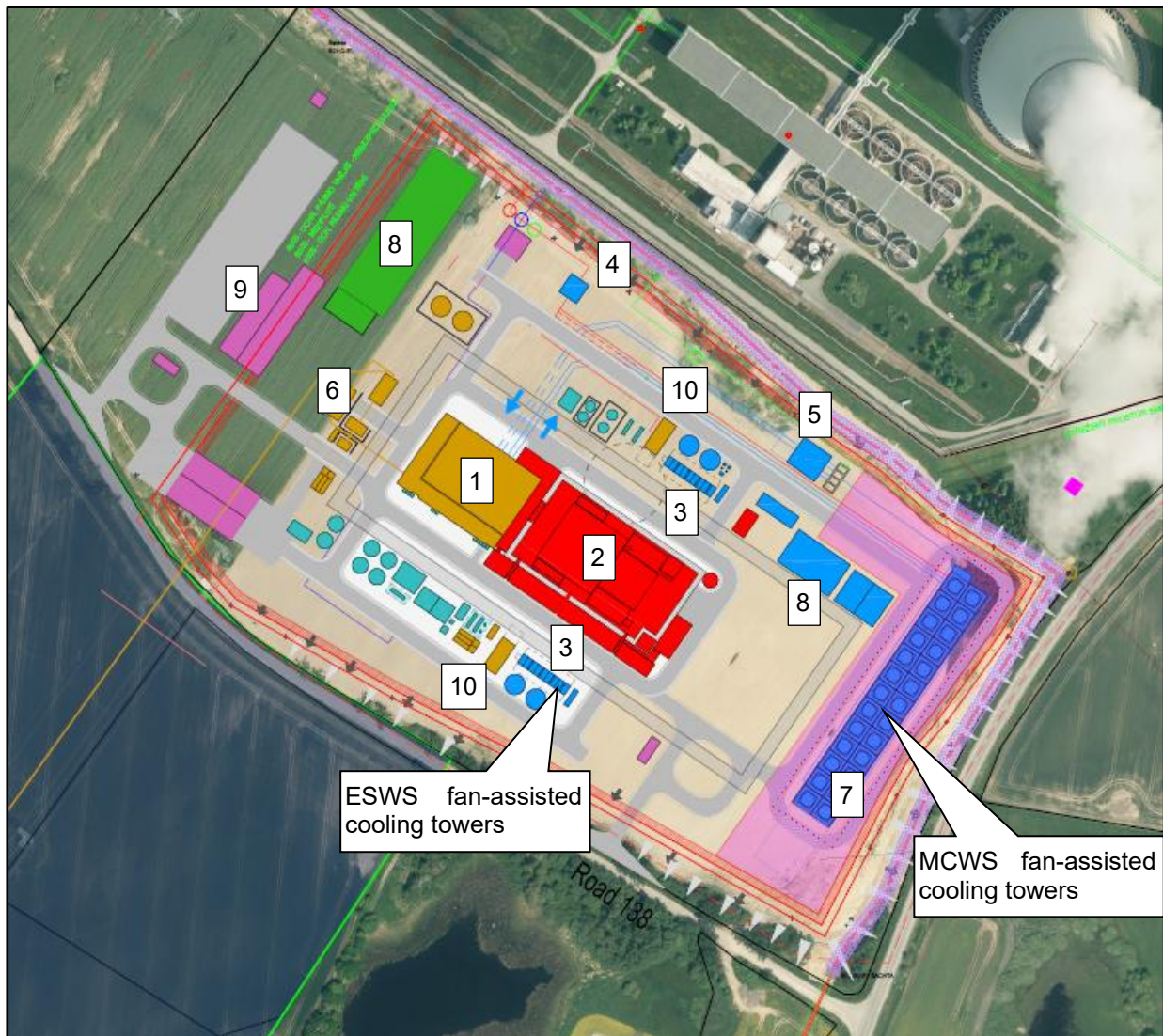
- turbine generator hall – assumed up to 45 m (in all cases, the TG hall is lower than the containment building),
- forced-draught cooling towers – assumed height 14.5 m,
- transformer – assumed height 5 m; a U-shaped concrete barrier, 8 m high, will be installed in the direction of the village of Kočín,
- other auxiliary structures – assumed height from 10 to 20 m.

The earliest commissioning date is 2034.

Power evacuation via a 400 kV overhead line or underground line to the Kočín substation.

The overall situation of the SMR ETE site, with the individual main structures indicated, is shown in more detail in Figure 6.

Figure 6 – Overall situation of the SMR ETE site with individual structures indicated



Legend:

- 1 Turbine building
- 2 Reactor building
- 3 System of smaller ESW fan-assisted cooling towers (ESWS)
- 4 Wastewater pumping station
- 5 Cooling water pumping station
- 6 Unit transformer
- 7 System of main MCWS fan-assisted cooling towers
- 8 Warehouses
- 9 Administrative building
- 10 Backup diesel generators

Unmarked structures are other auxiliary structures that are insignificant in terms of noise.



Table 3 lists the considered sound pressure levels at a distance of 1 m from the equipment. These are the dominant noise sources for the calculation. The acoustic parameters of these noise sources will be part of continuous operation and are therefore identical for daytime and night-time.

Table 3 – Noise sources for the calculation

Structure	Noise source	Structure height [m]	Considered sound pressure level LpA at a distance of 1 m
1	Turbine building	45	60 dB
2	Reactor building	50	50 dB
3	System of smaller ESW fan-assisted cooling towers (ESWS)	14.5	75 dB
4	Wastewater pumping station	15	60 dB
5	Cooling water pumping station	15	60 dB
6	Unit transformer	5	87 dB
7	System of main MCWS fan-assisted cooling towers	14.5	75 dB

The stated sound pressure levels at a distance of 1 m are considered as a general parameter around the individual technological structures (sources). These are values modelled over the entire surface of the structures. For example, for the MCWS cooling towers, this parameter must be maintained over the entire area of this noise source, 32 × 208 × 14.5 m.

The stated sound pressure levels will be refined in the future with regard to the selection of a specific supplier and specific technology. However, at present, the considered values are assumed to be limit values, with regard to compliance with the public-health limits at all calculation points in the assessed site.

9. Assessment of Existing Operation:

Existing condition – operation of the existing Temelín Nuclear Power Plant (ETE1,2), baseline condition.

Table 4 shows the calculated noise levels during the existing operation of the Temelín Nuclear Power Plant site and the usual concurrent operation of all noise sources – this is the modelled condition of the existing situation. The calculated sound pressure levels are given for heights of 3 m and 6 m above ground level. These are the heights at which the surrounding residential development in the municipalities of Kočín, Temelín, and Zvěrkovice is most commonly located.

The results of modelling the existing noise situation at the assessed site are shown graphically in Annexes 1 to 8. The attached noise maps are calculated at two basic heights above ground level. These are always the heights at the monitored control points outside residential development, i.e., levels of 3 m and 6 m above ground level.

Table 4 – Calculated sound pressure levels in protected outdoor areas of buildings at the monitored points – existing condition

Calculation point	Structure	Height	L _{Aeq,T} (dB)	Public-health limit
			Daytime + Night-time	Day/Night
MB01	Edge of the municipality of Litoradlice	3 m	29.7	50/40
		6 m	30.2	
MB02	Near the former farmstead beyond the former municipality of Knín	3 m	31.3	50/40
		6 m	32.2	
MB03	North-eastern edge of the municipality of Kočín	3 m	38.4	50/40
		6 m	39.0	
MB04	North-eastern edge of the municipality of Kočín	3 m	38.8	50/40
		6 m	38.8	
MB05	South-western edge of the municipality of Kočín	3 m	36.1	50/40
		6 m	37.2	
MB06	Edge of the municipality of Malešice	3 m	30.5	50/40
		6 m	31.2	
MB07	Edge of the municipality of Sedlec	3 m	27.0	50/40
		6 m	27.6	
MB08	Edge of the municipality of Temelín	3 m	30.3	50/40
		6 m	30.6	

The public-health limit $L_{Aeq,8h} = 50$ dB for daytime and the public-health limit $L_{Aeq,1h} = 40$ dB for night-time are met at all calculation points and levels.

10. Assessment of Future Operation of SMR ETE + ETE1,2, Year 2034:

Future condition, year 2034 – commissioning of SMR ETE. Concurrent operation with the existing operation of the Temelín Nuclear Power Plant (ETE1,2).

Table 5 shows the calculated noise levels during future operation of SMR ETE + ETE1,2. This is the modelled condition of the future situation. The calculated sound pressure levels are given for heights of 3 m and 6 m above ground level. These are the heights at which the surrounding residential development in the municipalities of Kočín, Temelín, and Zvěrkovice is most commonly located.

Table 5 – Calculated sound pressure levels in protected outdoor areas of buildings at the monitored points – future condition SMR ETE + ETE1,2, year 2034

Calculation point	Structure	Height	L _{Aeq,T} (dB)	Public-health limit
			Daytime + Night-time	Day/Night
MB01	Edge of the municipality of Litoradlice	3 m	30.2	50/40
		6 m	30.6	
MB02	Near the former farmstead beyond the former municipality of Knín	3 m	32.0	50/40
		6 m	32.6	
MB03	North-eastern edge of the municipality of Kočín	3 m	37.8	50/40
		6 m	38.3	
MB04	North-eastern edge of the municipality of Kočín	3 m	38.1	50/40
		6 m	38.3	
MB05	South-western edge of the municipality of Kočín	3 m	36.2	50/40
		6 m	37.3	
MB06	Edge of the municipality of Malešice	3 m	30.8	50/40
		6 m	31.5	
MB07	Edge of the municipality of Sedlec	3 m	27.7	50/40
		6 m	28.4	
MB08	Edge of the municipality of Temelín	3 m	30.8	50/40
		6 m	31.1	

The public-health limit $L_{Aeq,8h} = 50$ dB for daytime and the public-health limit $L_{Aeq,1h} = 40$ dB for night-time are met at all calculation points and levels.

The results of modelling this future noise situation at the assessed site are shown graphically in Annexes 9 to 16. The attached noise maps are calculated at two basic heights above ground level. These are always the heights at the monitored control points outside residential development, i.e., levels of 3 m and 6 m above ground level.

In Table 5, the calculated values at calculation points MB03 and MB04 are slightly lower than in Table 4 (existing operation). This reduction is caused by the screening of existing noise sources within the ETE1,2 site due to the construction of new structures within the SMR ETE site. These new structures within the SMR ETE site reach heights of up to 60 m. This effect is also apparent in the graphic annexes, for example by comparing the noise map in Annex 7 with the noise map in Annex 15.

11. Assessment of Target Condition, Operation of ETE1,2 + SMR ETE + New NPP ETE, Year 2042:

Target condition, year 2042 – commissioning of New NPP ETE, i.e., expansion of the existing site by two nuclear units. Operation in this target condition will be ETE1,2 + SMR ETE + New NPP ETE.

The future operation of New NPP ETE is considered including the proposed noise mitigation measures pursuant to [11], i.e., measures around the cooling towers and the Kočín substation.

Table 7 shows the calculated noise levels during future operation of SMR ETE + ETE1,2 + New NPP ETE. This is the modelled condition of the future situation. The calculated sound pressure levels are given for heights of 3 m and 6 m above ground level. These are the heights at which the surrounding residential development in the municipalities of Kočín, Temelín, and Zvěrkovice is most commonly located.

Table 7 – Calculated sound pressure levels in protected outdoor areas of buildings at the monitored points – future condition SMR ETE + ETE1,2 + New NPP ETE, year 2042

Calculation point	Structure	Height	L _{Aeq,T} (dB)	Public-health limit
			Daytime + Night-time	Day/Night
MB01	Edge of the municipality of Litoradlice	3 m	30.7	50/40
		6 m	31.2	
MB02	Near the former farmstead beyond the former municipality of Knín	3 m	33.2	50/40
		6 m	33.9	
MB03	North-eastern edge of the municipality of Kočín	3 m	39.6	50/40
		6 m	39.9	
MB04	North-eastern edge of the municipality of Kočín	3 m	39.7	50/40
		6 m	39.7	
MB05	South-western edge of the municipality of Kočín	3 m	36.9	50/40
		6 m	37.8	
MB06	Edge of the municipality of Malešice	3 m	33.3	50/40
		6 m	33.9	
MB07	Edge of the municipality of Sedlec	3 m	32.4	50/40
		6 m	32.8	
MB08	Edge of the municipality of Temelín	3 m	37.4	50/40
		6 m	37.5	

The public-health limit $L_{Aeq,8h} = 50$ dB for daytime and the public-health limit $L_{Aeq,1h} = 40$ dB for night-time are met at all calculation points and levels.

The results of modelling this future noise situation at the assessed site are shown graphically in Annexes 17 to 24. The attached noise maps are calculated at two basic heights above ground level. These are always the heights at the monitored control points outside residential development, i.e., levels of 3 m and 6 m above ground level.

12. Conclusion:

The calculation found that the considered future operating conditions of the Temelín Nuclear Power Plant (ETE1,2, or ETE1,2 + New NPP ETE) and SMR ETE will not exceed, in the nearest protected outdoor areas of buildings, at all monitored points MB01 to MB08, the public-health noise limits for daytime and night-time pursuant to Government Regulation No. 272/2011 Coll., on the protection of health against the adverse effects of noise and vibration, as amended.



We recommend to implement this Project on the basis of the specified limit sound pressure levels from the individual considered noise sources within the SMR ETE site; see Table 3, Chapter 8.2.

13. Annexes:

List of attached noise maps for the existing operating condition of ETE1,2:

- Annex 1 – noise map at a height of 3 m above ground level, existing condition, overall assessed site, daytime + night-time
- Annex 2 – noise map at a height of 3 m above ground level, existing condition, illustration of DETAIL 1, daytime + night-time
- Annex 3 – noise map at a height of 3 m above ground level, existing condition, illustration of DETAIL 2, daytime + night-time
- Annex 4 – noise map at a height of 3 m above ground level, existing condition, illustration of DETAIL 3, daytime + night-time
- Annex 5 – noise map at a height of 6 m above ground level, existing condition, overall assessed site, daytime + night-time
- Annex 6 – noise map at a height of 6 m above ground level, existing condition, illustration of DETAIL 1, daytime + night-time
- Annex 7 – noise map at a height of 6 m above ground level, existing condition, illustration of DETAIL 2, daytime + night-time
- Annex 8 – noise map at a height of 6 m above ground level, existing condition, illustration of DETAIL 3, daytime + night-time

List of attached noise maps for the future condition, year 2034, operation of SMR ETE + ETE1,2:

- Annex 9 – noise map at a height of 3 m above ground level, future condition, year 2034, overall assessed site, daytime + night-time
- Annex 10 – noise map at a height of 3 m above ground level, future condition, year 2034, illustration of DETAIL 1, daytime + night-time
- Annex 11 – noise map at a height of 3 m above ground level, future condition, year 2034, illustration of DETAIL 2, daytime + night-time
- Annex 12 – noise map at a height of 3 m above ground level, future condition, year 2034, illustration of DETAIL 3, daytime + night-time
- Annex 13 – noise map at a height of 6 m above ground level, future condition, year 2034, overall assessed site, daytime + night-time
- Annex 14 – noise map at a height of 6 m above ground level, future condition, year 2034, illustration of DETAIL 1, daytime + night-time
- Annex 15 – noise map at a height of 6 m above ground level, future condition, year 2034, illustration of DETAIL 2, daytime + night-time
- Annex 16 – noise map at a height of 6 m above ground level, future condition, year 2034, illustration of DETAIL 3, daytime + night-time



List of attached noise maps for the future condition, year 2042, operation of SMR ETE + ETE1,2 and

New NPP ETE:

- Annex 17 – noise map at a height of 3 m above ground level, future condition, year 2040, overall assessed site, daytime + night-time
- Annex 18 – noise map at a height of 3 m above ground level, future condition, year 2040, illustration of DETAIL 1, daytime + night-time
- Annex 19 – noise map at a height of 3 m above ground level, future condition, year 2040, illustration of DETAIL 2, daytime + night-time
- Annex 20 – noise map at a height of 3 m above ground level, future condition, year 2040, illustration of DETAIL 3, daytime + night-time
- Annex 21 – noise map at a height of 6 m above ground level, future condition, year 2040, overall assessed site, daytime + night-time
- Annex 22 – noise map at a height of 6 m above ground level, future condition, year 2040, illustration of DETAIL 1, daytime + night-time
- Annex 23 – noise map at a height of 6 m above ground level, future condition, year 2040, illustration of DETAIL 2, daytime + night-time
- Annex 24 – noise map at a height of 6 m above ground level, future condition, year 2040, illustration of DETAIL 3, daytime + night-time

14. Abbreviations:

ČR	Czech Republic
ČSN	Czech Technical Standard
DP	partial performance
EIA	Environmental Impact Assessment
ETE	Temelín Power Plant
New NPP ETE	New Nuclear Power Plant at the Temelín site (Units 3,4)
SMR ETE	New SMR Power Plant at the Temelín site
SMR	small modular reactor
ISO	International Organization for Standardization
ESW	essential service water
KB	control point