Köln.Assekuranz Agentur
Ein Unternehmen der ERGO

K.A.R.L.®-PRO REPORT

NATURAL HAZARD AND RISK ANALYSIS

TASK

Task-ID: Tokyo Skytree, Japan

Analysis of location dated: 15.09.2025 11:08:23

by: KA Köln.Assekuranz Agentur GmbH

Version: 5.1.0.4

LOCATION UNDER SURVEY

Tokyo Skytree, Japan

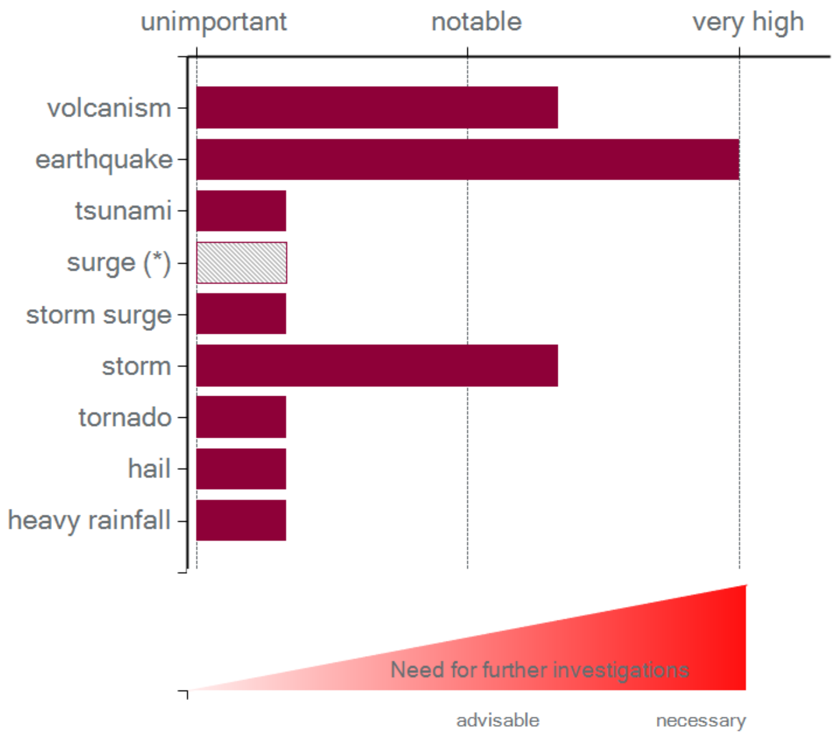
GEOGRAPHICAL SITUATION

Latitude / Longitude (decimal):	35,7100452 139,810695
Estimated Elevation (m above sea level):	7,00
Elevation from Digital Elevation Model (m above sea level):	7,00
Type of Landscape:	lowlands
Lowest Elevation within 1 km (m above sea level):	3,00
Highest Elevation within 1 km (m above sea level):	9,15
Approximate Distance to Coast (km):	2,6

This data was transferred partly automatically from a global digital elevation model, which is based on radar survey. Deviations from the real elevation are possible at places where the radar signal has been reflected by roofs or trees. (Source: NASA, SRTM V4)

The specified distance from the coast corresponds to the straight line to the nearest point of the elevation model, which has not been defined as mainland. Therefore, under certain circumstances also estuaries or large river mouths can be interpreted as marine areas.

SUMMARY OF THE RISK ANALYSIS



(*) There might be a risk of surge resulting from heavy rainfall (see Chapters 4 and 5)!

Location: Tokyo Skytree, Japan

When calculating the storm surge risk we assumed that in the area in question there are no technical installations against storm surge that have any impact on the location. We recommend verification at the location.

VULNERABILITIES AND VALUES AT RISK

Values at Risk

TOTAL (%):	100

This risk analysis concerns the following goods / facilities / buildings:

Büroimmobilie oder Geschosswohnungsbau, über 7 Etagen

RISK FIGURES

PERIL RISK as % p.a.

Volcanism:	0,4467 (increased)
Earthquake:	1,3337 (very high)
Tsunami:	0,0021 (very low)
Surge / River Flood:	0,0000 (-)
Storm Surge:	0,0104 (very low)
Storm:	0,4622 (increased)
Tornado:	0,0109 (very low)
Hail:	0,0014 (very low)
SUM (without Heavy Rainfall):	2,2675 (very high)

Heavy Rainfall:	0,0142 (very low)

The risk analysis has been calculated considering the vulnerabilities (sensivity of the goods / facilities / buildings that could be threatened by the examined natural hazards) defined by the user mentioned below.

The risks detected by K.A.R.L.® are calculated by numerical modelling. First of all the potential losses are calculated for statistical return periods of between 1 and max. 10.000 years. From this a mean annual loss is deduced as a significant figure for the Risk at the location.

Example (simplified): Should a total loss of 1 Mio. EUR be expected due to flooding only once a century then the mean annual loss (= RISK) is 10.000 EUR p.a.. The identical risk would result from the occurrence of e.g. 4 single events causing damage of 0,1 Mio., 0,3 Mio., 0,4 Mio. and 0,2 Mio. EUR collectively. The average then is also 10.000 EUR p.a..

Regardless of the object's value the risk can be expressed as a yearly percentage which would be, in the above example, 1 % of the total value of the object per year (i.e. RELATIVE RISK).

It is possible that singular claims may significantly exceed the calculated risks. Therefore they are separately listed below together with the corresponding statistical return periods. The CALCULATED MAXIMUM LOSS states the highest possible single loss for each model calculated. For this figure no statistical return period will be given.

RECOMMENDATIONS AND FURTHER STEPS

Some risks have been identified as notable or above. Further investigations are necessary. Due to this it's recommended to clarify the following issues:

LOCAL ELEVATION:

Try to find out the exact elevation of your site (m above sea level) and carry out the risk analysis again. The best references are official maps with a scale of 1:5000 to 1:25000, where elevations are given. Construction or site plans also contain relevant elevation data. If necessary a surveying office must be consulted. ATTENTION: Elevation data from mobile GPS devices or smartphones are not precise enough for this purpose.

VOLCANISM:

More information is available from a K.A.R.L.® Expert Analysis which you can commission at KA. Contact also local institutions such as local emergency services, local authorities or geoscientific institutes of nearby universities to gain further details concerning volcanism.

EARTHQUAKE:

Ask for information about the earthquake resistance of buildings concerned. These should be able to resist earthquakes with an MM-intensity of more than IX. Possible information sources: National building regulations, foundation ground expertise, documents concerning structural analysis.

STORM AND/OR TORNADO:

Check if there are objects and /or building parts which can be torn down or blown about by storm and cause damage at site or its neighbourhood. Check further if the construction of the roof, doors, windows and gates can withstand a high wind pressure. If necessary experts must be contacted for further investigation. Clarify if there are any emergency and evacuation plans in case of catastrophy.

Last but not least there is a danger that, due to the regional climate conditions, drainage systems can become blocked by ice after a hailstorm and cause local flooding.

NOTES FOR INTERPRETATION

The calculated results by K.A.R.L.® and the statements in this report are to be considered as a guide only. They only INDICATE which perils can cause specific risks and where further action might be necessary. Their purpose is to prioritize further research and installation of protective devices. In no way can they replace a detailed and scientific analysis of the location itself by an expert.

Please note further: Is a risk identified and named, there is always an endangerment which, under certain circumstances, might cause severe damage. The classification of a risk as "VERY LOW" or "LOW" therefore only means, that such an extreme event occurs very seldom and not that it is impossible. Whether further protection is necessary even in a low risk situation depends on the value and the vulnerability of the goods at the location. Are the risks classified as "NOTABLE" to "VERY HIGH", further investigation of the situation is always advisable in order to define the level of risk more precisely.

Such an investigation can be conducted by a detailed analysis of the location (K.A.R.L.®-EXPERT) by our own experts if requested.

This risk analysis was generated automatically. It was not checked for plausibility by an expert. Certain facts only visible in maps, air or satellite reconnaissance pictures, which might have influenced the risk evaluation, could not be taken into account.

Please do not hesitate to contact us if you have any questions:

Team K.A.R.L.® (team.karl@koeln-assekuranz.com)

CLIMATIC CONDITIONS

Mean Annual Temperature:	16,4 °C
Coldest Month:	Jan. with 1,2 °C
Warmest Month:	Aug. with 31,5 °C
Number of days per year >= 20°C: (mean temperature)	138
Mean Elevation of Frost Line above sea level:	2602 m
Annual Precipitation:	1422 mm
Quarter with Maximum Precipitation:	A-S-O with 502 mm
Quarter with Minimum Precipitation:	D-J-F with 165 mm

The climate data given here are dynamically adapted to the respective current year on the basis of a climate model (NCAR Community Climate System Model (CCSM), Scenario A1b).

Theoretical Availability of Water:	631 mm p.a.

Explanation: The availability of water is calculated as the difference between the annual precipitation and the evaporation. Theoretically, this amount of water is available as surface water or replenishes the groundwater storage. At the location under survey the amount exceeds 200 mm p.a.. A water shortage is therefore not to be expected, except in extremely hot and dry years.

Index of Severe Weather:	significantly increased (2,65)

Explanation: Köln.Assekuranz has calculated the index of severe weather using various climatic parameters. With this index the frequency and degree of severe weather can be compared to the conditions in Western Europe. The following Indices of severe weather are characteristic for certain regions: Stockholm: 0,6 London: 0,7 Cologne: 1,0 Munich: 1,3 Milan: 1,5 Osaka: 2,3 Hong-Kong: 4,2 Cayenne (French.Guayana): 5,1 West-Columbia: 11,7 Mumbay: 12,7

Flash Frequency (Occurrences per sq. km p.a.): 4,1

Explanation: NASA satellites observe the flash frequency globally. The following flash frequencies (number p.a. and km2) are typical for certain regions: Stockholm: 0,4 London: 1,0 Cayenne (French Guayana): 1,6 Cologne: 2,0 Munich: 2,0 Osaka: 4,7 Mumbay: 6,0 Milano: 12,0 Hong-Kong: 15,0 West-Colombia: 25,0

Only about 10 % of all registered flashes actually hit the ground.

Calculated maximum Snow Load (kg/m2): 44

Classification: Low snow loads are to be expected. The local climate conditions are similar to those in Istanbul (Turkey), Madrid (Spanien) or Shanghai (China).

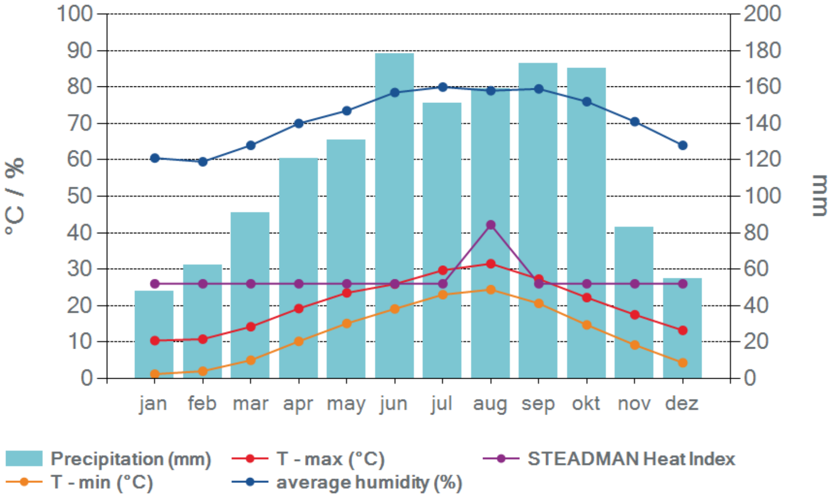
With 95 percent probability a lower limit load of 19 kg/m2 can be exceeded.

With 5 percent probability an upper limit load of 97 kg/m2 can be exceeded.

Explanation: The snow loads given here were calculated on the basis of globally available climate data. The modeling process used for this purpose has been calibrated on the basis of numerous specific local building codes and recommendations that come from different climate zones and topographical altitudes around the world. The calculated figures should therefore be understood only as a guide. They are not suitable as a basis for the structural design of buildings.

FOR THE STRUCTURAL DESIGN OF BUILDINGS ONLY SNOW LOADS ARE ALLOWED WHICH ARE PUBLISHED BY THE LOCAL AUTHORITIES. CONTACT YOUR MUNICIPAL BUILDING DEPARTMENT.

Climate Diagram



Explanation: The STEADMAN heat index reflects the perceived temperature in the higher temperature range. The long-term average values of real temperatures and humidity are included in his calculation. Its normal value, considered to be uncritical to health, which is 26 ° C, is temporarily exceeded at the investigated location with a value of 42,2 ° C. This means that the following health problems can occur in the months in question:

Heat Index from 27 to 32 °C: Attention – Exhaustion can occur after longer physical activity.

Heat Index from 32 to 41 °C: Beware – Possibility of damage to health like sunstroke, heat convulsion and heat collapse.

Heat Index from 41 to 54 °C: Danger – Sunstroke, heat convulsion and heat collapse are likely; heat stroke is possible.

Heat Index above 54 °C: Imminent danger – Sunstroke and heat stroke are very likely.

HAZARD AND RISK ANALYSIS

The following HAZARDS are recalculated by K.A.R.L.® for each individual evaluation on the basis of scientific data. Existing hazard maps (see section Data Sources) are only used for control and comparison purposes. The RISKS derived from the hazards also depend on local factors (terrain height, existing protective measures, building quality, etc.) and the vulnerabilities predefined by the user specified below (specific sensitivities of the potentially affected goods / plants / buildings to the natural hazards investigated).

1. Volcanism

The site is located in a region with a minor hazard.

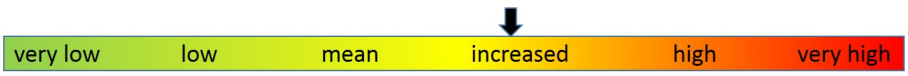
Within a radius of 200 km from the location under survey 20 possible active volcanoes were found.

These also include Strato- and Somma-Volcanoes, which can give sudden and explosive eruptions. Hence, the risk is significantly higher.

Last eruptions have occurred since 1999.

Vulnerability Volcanism

Volcanic eruptions are characterized by different phenomena such as volcanic bombs, streams of lava and ashfall. Hence, the vulnerability is defined as a loss percentage depending on the distance from the crater. It refers to "Büroimmobilie oder Geschosswohnungsbau, über 7 Etagen" and has been used to calculate the following risk figures.



Active risk relevant volcanoes within a radius of 200 km

Distance (km)	Name	Country	Type	Last Eruption	RP-VEI3	Risk (% p.a.)
115,6	Oshima	Izu Is-Japan	Stratovolcano	in the course of the 20th century	100*	0,2105
105,3	Fuji	Honshu-Japan	Stratovolcano	in the course of the 18th century	350*	0,0657
182,2	Miyake-jima	Izu Is-Japan	Stratovolcano	after 1999 to recent	200*	0,0538
138,7	Asama	Honshu-Japan	Complex volcano	after 1999 to recent	90*	0,0404
145,1	Hiuchi	Honshu-Japan	Stratovolcano	between 1500 and 1700	1000	0,0155
152,5	Kusatsu-Shirane	Honshu-Japan	Stratovolcanoes	in the course of the 20th century	1000*	0,0143
156,8	Nasu	Honshu-Japan	Stratovolcanoes	in the course of the 20th century	1200*	0,0115
118,9	Haruna	Honshu-Japan	Stratovolcano	between 0 and 1500	2000	0,0102
142,9	Kita Yatsuga-take	Honshu-Japan	Stratovolcanoes	between 0 and 1500	2000	0,0080
88,9	Hakone	Honshu-Japan	Complex volcano	between 0 and 1500	2000	0,0056
110,5	Izu-Tobu	Honshu-Japan	Pyroclastic cones	in the course of the 20th century	2500*	0,0028
131,3	Takahara	Honshu-Japan	Stratovolcano	prehistoric, less than 10.000 years	10000	0,0018
140,4	To-shima	Izu Is-Japan	Stratovolcano	prehistoric, less than 10.000 years	10000	0,0016
153,6	Nii-jima	Izu Is-Japan	Lava domes	between 0 and 1500	2000	0,0012
175,7	Kozu-shima	Izu Is-Japan	Lava domes	between 0 and 1500	2000	0,0009
199,9	Myoko	Honshu-Japan	Stratovolcano	prehistoric, less than 10.000 years	10000	0,0009
108,8	Akagi	Honshu-Japan	Stratovolcano	unsure	30000	0,0007
119,8	Nantai	Honshu-Japan	Stratovolcano	unsure	30000	0,0007
122,7	Omanago Group	Honshu-Japan	Lava domes	prehistoric, less than 10.000 years	10000	0,0005
158,6	Shiga	Honshu-Japan	Shield volcanoes	unsure	30000	0,0000

RP-VEI3 = Estimated Return Period (RP) of a large eruption of the intensity 3 and higher (VEI = Volcanic Eruption Index). For strato-, somma- and submarine volcanoes the risk has been increased or decreased according to a modification of the distance. * = RP-VEI3 was determined by KA from the Eruption History.

Risk Figures Volcanism

Calculated Max. Loss (%):	23
Relative Risk (%/year):	0,4467

For further explanations see section RISK FIGURES.

Under these conditions the risk of volcanism is to be classified as increased.

Further explanations:

Basically all volcanoes that have erupted within the last 20.000 year are considered as potentially active. In special cases such as e.g. the Yellowstone Volcanoe (USA) longer periods of time have been considered.

2. Earthquake

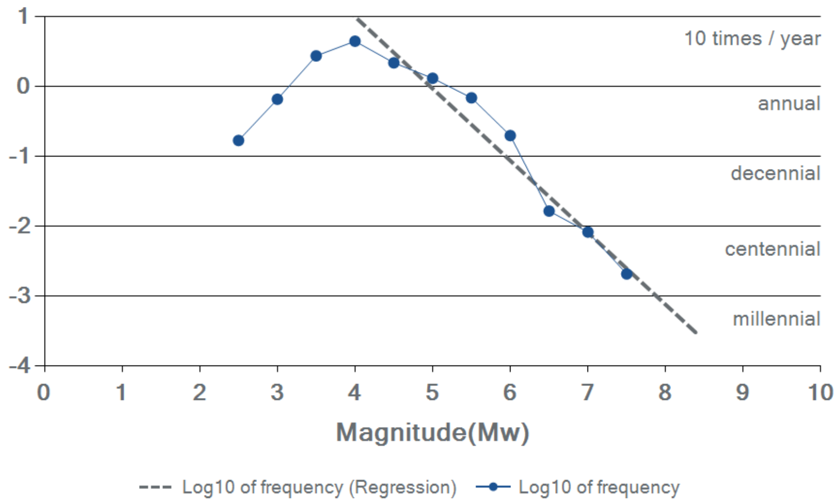
The site is located in an area where a very high earthquake hazard is to be expected.

There have been a total of 653 earthquakes since the year 1615 within a radius of 50 km from the location under survey. Their hypocentres were comparably close to the surface at a depth of less than 100 km. The mean depth of the hypocentres was 78 km.

This data was evaluated statistically leading to the following results:

Frequency of Earthquakes

The sample of earthquakes has been categorized according to their magnitudes and occurrence probabilities. The latter have been normed to a reference area of 7854 km2 (R = 50 km). The Gutenberg-Richter-relation (see diagram below) shows the occurrence probabilities (Y) for different magnitudes (X).



The strongest earthquake registered so far occurred on 20.6.1894 at a distance of 9 km from the location under survey. Its magnitude was Ms = 7,5.

The classification of the earthquake hazard is usually done with a 475 year event taken from statistical frequency analysis. In this case this would mean a magnitude of Mw = 7,6 and an MM-Intensity of IX (violent, very heavy damage at buildings, collapse of load bearing constructions) at the location under survey. When determining the intensity of the earthquake normal soil conditions were presumed (e.g. subsoil from sediments with a mean to a high degree of compactness and only a moderate degree of moisture). We recommend verification of this presumption at the location.

Expected MM-Intensities at the location

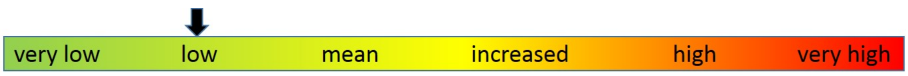
Return Period 10 years:	V-VI
Return Period 20 years:	VI
Return Period 50 years:	VII
Return Period 100 years:	VII-VIII
Return Period 200 years:	VIII-IX
Return Period 475 years:	IX
Return Period 1000 years:	IX-X
Return Period 2000 years:	X

MM-Intensities (Modified Mercalli Scale)

I. Instrumental	Not felt by many people unless in favourable conditions.
II. Weak	Felt only by a few people at best, especially on the upper floors of buildings. Delicately suspended objects may swing.
III. Slight	Felt quite noticeably by people indoors, especially on the upper floors of buildings. Many do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.
IV. Moderate	Felt indoors by many people, outdoors by few people during the day. At night some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rock noticeably. Dishes and windows rattle alarmingly.
V. Rather Strong	Felt outside by most, may not be felt by some outside in non-favourable conditions. Dishes and windows may break and large bells will ring. Vibrations like large train passing close to house.
VI. Strong	Felt by all; many frightened and run outdoors, walk unsteadily. Windows, dishes, glassware broken; books fall off shelves; some heavy moved or overturned; a few instances off fallen plaster. Damage slight.
VII. Very Strong	Difficult to stand; furniture broken; damage negligible in building of good design and construction; slight to moderate in well built ordinary structures; considerable damage in poorly built badly designed structures; some chimneys broken. Noticed by people driving motor cars.
VIII. Destructive	Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture moved.
IX. Violent	General panic; damage considerable in specially designed structures, well designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X. Intense	Some well built wooden structures destroyed; most masonry and frame structures destroyed with foundation. Rails bent.
XI. Extreme	Few, if any masonry structures remain standing. Bridges destroyed. Rails bent greatly.
XII. Cataclysmic	Total destruction - Everything is destroyed. Lines of sight an level distorted. Objects thrown into the air. The ground moves in waves or ripples. Large amounts of rock move positions. Landscape altered, or levelled by several meters. In some cases, even the routs of rivers are changed.

Vulnerability Earthquake

The vulnerability has been defined as loss percentage depending on the MM-Intensity at the location under investigation and refers to "Büroimmobilie oder Geschosswohnungsbau, über 7 Etagen". It has been used to calculate the following risk figures.



Risk Figures Earthquake

Probable Maximum Loss, Return Period 50 years (%):	1,5
Probable Maximum Loss, Return Period 100 years (%):	5,3
Probable Maximum Loss, Return Period 200 years (%):	15
Probable Maximum Loss, Return Period 500 years (%):	44
Probable Maximum Loss, Return Period 1000 years (%):	61
Calculated Max. Loss (%):	89
Relative Risk (%/year):	1,3337

For further explanations see section RISK FIGURES.

According to these conditions the longterm statistical earthquake risk is classified as notable.

Remark: Due to special geotectonical conditions in this region seismologists expect a heavy earthquake with a probability of approximately 2,0 % per year within the coming years or decades. Hence, according to these conditions and the given vulnerability used to calculate this risk analysis the current earthquake risk must be classified as very high.

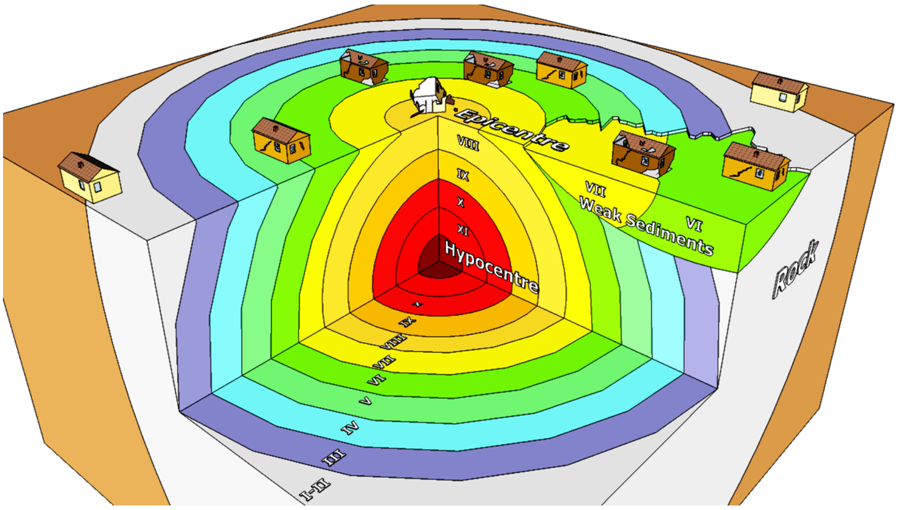
Further Explanations:

The MAGNITUDE is generally an index for the energy released during an earthquake at its hypocentre and could therefore also be given in Joule or Watt seconds. Various methods of measuring the magnitude of earthquakes are in use, leading to different scales of magnitudes (e.g. Mb, MS, Mw etc.). Nowadays, the moment magnitude (Mw) is commonly in use. The released energy can be best described by this method. We converted for our statistical evaluation as far as possible all the different magnitude figures into the Mw scale.

The INTENSITY on the other hand does not describe the force of an earthquake but its effects noticeable and visible on the surface. It is given in a scale of 12 steps, written in Roman figures. Alternatively it could be given as the ground acceleration at the location of observation. The intensity decreases strongly with the distance from the epicentre. Furthermore, the intensity very much depends on the local condition of the geological ground. Soft ground consisting of fine grained sediments and in addition water saturated can significantly increase the intensity of the earthquake, particularly in the case of artificially filled in ground.

Relationship between Magnitude and Intensity (schematic)

The MAGNITUDE is generally an index for the energy released during an earthquake at the hypocentre. The INTENSITY on the other hand describes its effects noticeable and visible on the surface. It is given in a scale of 12 steps, written in Roman figures.



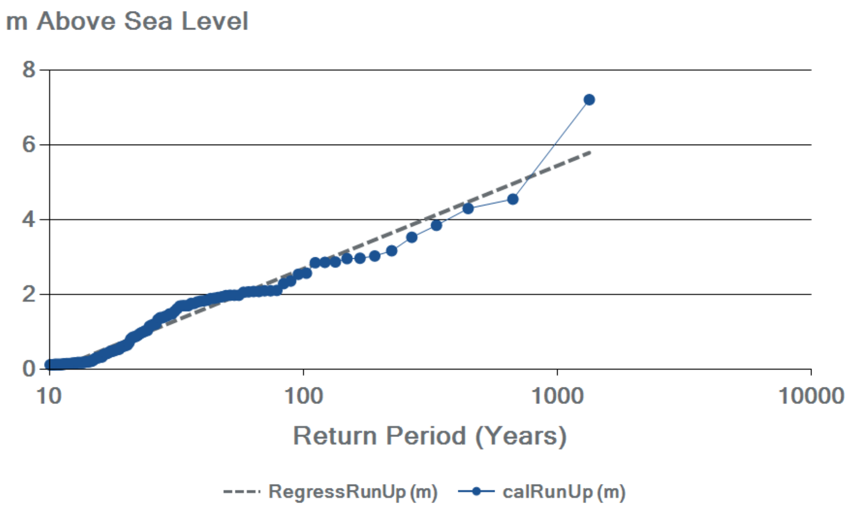
3. Tsunami

The location under survey is less than 30 km away from the coast line and at an elevation of 7,00 m above sea level. In principle, therefore, a latent tsunami hazard can be assumed.

Since the year 684 a total of 253 tsunami occurrences have been registered on the coast lines near the location. (For historical occurrences with no detailed information we assumed a wave height of between 2 and 3 m maximum for this evaluation). The highest wave reported in the wider environment was 10,5 meters. The analysable data was standardised for the location under survey and afterwards underwent a statistical frequency analysis.

Frequency of Tsunami Events

For the location under investigation the diagram below shows the runups (wave heights of tsunamis) corresponding to their return periods. The given heights relate to the mean sea level. The risk analysis is based on the regression line shown in the diagram.



Vulnerability Tsunami

The vulnerability has been defined as loss percentage under the impact of salt water depending on the possible flood height on top of the surface at the location under investigation and refers to "Büroimmobilie oder Geschosswohnungsbau, über 7 Etagen". It has been used to calculate the following risk figures.

When calculating the risk we assumed that in the coastal area in question there must be dykes or protective walls with a height of at least 1,2 meters above sea level. As this is only an estimation by K.A.R.L.® we urgently recommend a verification of this matter at the location.

Risk Figures Tsunami

Probable Maximum Loss, Return Period 50 years (%):	0
Calculated Max. Loss (%):	10
Relative Risk (%/year):	0,0021

For further explanations see section RISK FIGURES.

According to these conditions the tsunami risk is classified as very low.

NB: The exact elevation was not given, but is most important for a correct classification of the tsunami risk. It is strongly recommended to find out the exact elevation and repeat this analysis.

4. Surge (River Flood, Flash Flood, Drainage Failure)

The hazard analysis based upon the digital elevation model came to the following conclusion:

The location under survey is in a plain with only a slight slope. Natural drainage is hardly influenced. Therefore, the POSSIBILITY of surge is low considering the local landscape. However, under certain circumstances heavy rainfall and/or blockage of the sewage system by mud or hailstones might lead to local flooding.

The location at an elevation of 7,00 m above sea level is 0,30 m higher than the maximum water level of 6,70 m above sea level calculated by K.A.R.L.® from the digital elevation model.

Under these conditions no immediate risk of surge can be identified from the given facts.

However, local floods can also be triggered by heavy rainfall events. The associated risk is discussed in the following section (Heavy Rainfall).

Apart from that due to the regional climate conditions there is a danger of hailstones or ice blocking the drainage systems and hereby causing local flooding.

NB: The exact elevation was not given, but is most important for a correct classification of the risk of surge. It is strongly recommended to find out the exact elevation and repeat this analysis.

5. Heavy Rainfall

Heavy rainfall is usually a relatively limited phenomenon and can also occur in flood-safe zones. Conversely, floods or flash floods can be caused by heavy rainfall events which occur far away from the investigated location, but do not hit it directly. The hazard locations of a heavy rainfall event and the associated flash flood are therefore not identical. Hence, K.A.R.L.® assesses flood and heavy rain risks separately, as these are independent risks.

Heavy rainfall can cause damage, which - unlike flooding - can occur under the influence of unfavorable conditions in the smallest possible space. In the first place, there is water inrush into cellars and underground garages as well as their entrances, inner courtyards closed on all sides, underpasses and small local depressions. All structures mentioned are often constructed and have only a small surface area. K.A.R.L.® is therefore unable to recognize them on the basis of the digital elevation models used. In addition, there is possible damage caused by the ingress of rainwater into buildings, vehicles and means of transport (wagons, containers, boxes, packaging foils, etc.) as well as impairments caused by washed out infrastructure systems.

Furthermore, the risk of being affected or damaged by heavy rain depends highly on the absorption capacity of the local sewage systems. Due to economic considerations, these are normally only designed for rainfall that occurs at statistical intervals of 3 to 10 years (design rainfall). A higher degree of protection is rare to find and is therefore not used in this context. If the design rainfall is exceeded, it results in overflow, the leakage of sewer water on the surface and the associated consequential damage.

A model developed by KA based on globally available climate data and calibrated on the basis of measured precipitation data from more than 1,700 weather stations worldwide is used to calculate the heavy rain hazard and the resulting risk. For each point on earth (except Antarctica), this model provides the approximate values of the maximum daily precipitation to be expected for return periods between 1 and 10,000 years.

Maximum Daily Precipitation (calculated by K.A.R.L.® model)

5-year (mm per day)	156
10-year (mm per day)	188
20-year (mm per day)	222
50-year (mm per day)	272
100-year (mm per day)	314
200-year (mm per day)	358
500-year (mm per day)	420
1000-year (mm per day)	471
MAX (mm per day)	659

There are no globally valid and comparable definitions of the terms design rain and heavy rain. What is perceived as heavy rain depends mainly on the regional climate. In addition, the local environmental conditions that make a heavy rainfall a damaging event can hardly be specified. Against this background, it is not possible to determine specific vulnerabilities on the one hand and, on the other hand, there is no global comprehensive information on the dimensioning of wastewater systems available. The following generalized assumptions are used in the present analysis:

1. The design rainfall is based on the local 5-yearly daily precipitation, to be stated as precipitation height in mm (from K.A.R.L.® rounded up or down to the nearest full 50 mm/day). The maximum design rainfall is assumed to be 250 mm/day. Furthermore, it is assumed that the design rainfall calculated by K.A.R.L.® is only included in the dimensioning of sewage systems with a probability of 25%. On the other hand, it is assumed with a probability of 75% that the design rainfall will hardly be higher than 100 mm/day.

2. Precipitation events below or at the level of the assumed design rainfall do not cause any damage.

3. Precipitation events exceeding the assumed design basis rainfall are regarded as heavy rainfall.

4. The factor by which a heavy rainfall of a given return period exceeds the assumed design rainfall is decisive for the potential degree of damage.

5. The highest possible damage is assumed by K.A.R.L.® if a heavy rainfall event produces 5 times the amount of precipitation of the assumed design rainfall. It is equated with the maximum damage which, according to the vulnerability used, applies to floods. Between the first exceedance of the design rainfall and the potential maximum value, an exponential increase in the loss potential is assumed.

On this basis, it is assumed in the present case that the local drainage systems at the investigated site are (or should be) designed for a design rainfall of 150 mm per day and that no damage from heavy rainfall is to be expected up to this precipitation level. Under the regional meteorological conditions, precipitation can only be classified as heavy rain if it exceeds this value.

This results in the following risk figures.

Risk Figures Heavy Rainfall

Probable Maximum Loss, Return Period 50 years (%):	0
Probable Maximum Loss, Return Period 100 years (%):	0
Probable Maximum Loss, Return Period 200 years (%):	0
Probable Maximum Loss, Return Period 500 years (%):	2,1
Probable Maximum Loss, Return Period 1000 years (%):	3,9
Calculated Max. Loss (%):	10
Relative Risk (%/year):	0,0142

According to these conditions the risk of heavy rainfall is classified as very low.

6. Storm Surge

Due to the local elevation and / or relatively short distance to the coast line of less than 30 km, a latent storm surge hazard is generally to be assumed. This requires further investigation.

The calculation of the hazard of storm surge and the resulting risks is based upon the analyses of possible wind speeds at the coastal sea area, regional tidal currents and the shape of the coast line. From these facts maximum water levels or wave heights were derived which are to be expected to occur during storm surges with different return periods.

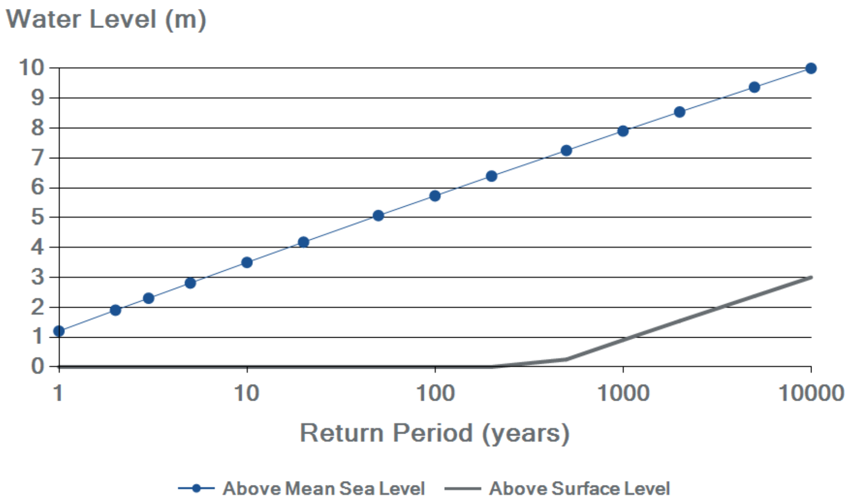
Hydrographical Figures (Offshore Waterlevels)

HW-10 (m above sea level)	3,50
HW-20 (m above sea level)	4,18
HW-50 (m above sea level)	5,07
HW-100 (m above sea level)	5,73
HW-200 (m above sea level)	6,39
HW-500 (m above sea level)	7,25
HW-1000 (m above sea level)	7,90
HW-MAX (m above sea level)	10,00

Due to the elevation of the site under investigation, it was assumed that any existing protective dams, dykes, protective walls or other technical installations in the region concerned would not have any impact on the area. It is recommended to review this situation on the spot and to acquire precise data concerning the local elevation level of the terrain and the maximum expected possible water levels.

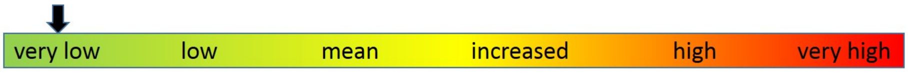
Frequency of Storm Surge Events

The following diagram shows the expected offshore waterlevels, which can occur during a storm surge, depending on its individual return period. These figures refer to the mean sea level. Additionally the corresponding possible flood heights at the location under investigation are given as meters above ground level.



Vulnerability Storm Surge

The vulnerability has been defined as loss percentage under the impact of salt water depending on the possible flood height on top of the surface at the location under investigation and refers to "Büroimmobilie oder Geschosswohnungsbau, über 7 Etagen". It has been used to calculate the following risk figures.



Risk Figures Storm Surge

Probable Maximum Loss, Return Period 50 years (%):	0
Probable Maximum Loss, Return Period 500 years (%):	2,4
Probable Maximum Loss, Return Period 1000 years (%):	4,8
Calculated Max. Loss (%):	10
Relative Risk (%/year):	0,0104

For further explanations see section RISK FIGURES.

According to these conditions the risk of storm surge is classified as very low.

NB: The exact elevation was not given, but is most important for a correct classification of the risk of storm surge. It is strongly recommended to find out the exact elevation and repeat this analysis.

7. Storm

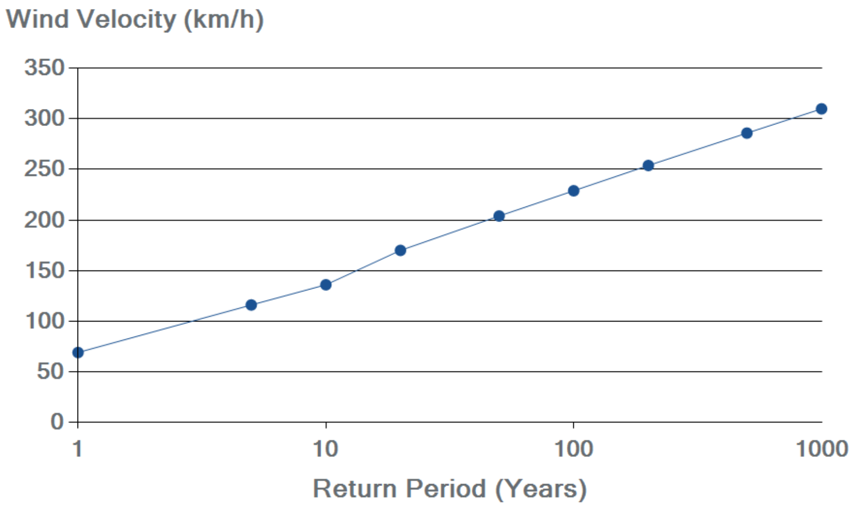
The site under investigation is located in a region where a high storm hazard can be assumed.

The calculation of the storm hazard with K.A.R.L.® is based on KA's own analyzes of approximately 5000 weather stations worldwide. These stations provide relevant long term measurements of local wind speeds. In this context, no distinction is made between tropical cyclones and extratropical storms. Furthermore, we used the digital elevation model to examine whether the landscape morphology around the location might influence the maximum wind speed to be expected there.

Wind forces of >= 8 Bft (>=72 km/h) might occur about every 1 years according to the statistical analysis of the data. A 100 year storm event would mean a local maximum wind speed of 229 km/h.

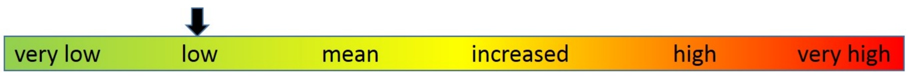
Frequency of Storms

The following diagram shows the wind speed of the maximum expected strong gusts depending on their individual return periods. Wind speeds are classified as follows : storms 89-102 km/h, severe storms 103-117 km/h, gales and tropical storms 118-177 km/h; severe tropical storms > 178 km/h



Vulnerability Storm

The vulnerability has been defined as loss percentage depending on the possible wind speed at the location under investigation and refers to "Büroimmobilie oder Geschosswohnungsbau, über 7 Etagen". It has been used to calculate the following risk figures.



Risk Figures Storm

Probable Maximum Loss, Return Period 50 years (%):	7,4
Probable Maximum Loss, Return Period 100 years (%):	11
Probable Maximum Loss, Return Period 200 years (%):	15
Probable Maximum Loss, Return Period 500 years (%):	20
Probable Maximum Loss, Return Period 1000 years (%):	25
Relative Risk (%/year):	0,4622

For further explanations see section RISK FIGURES.

According to these conditions the risk of storm is classified as increased.

8. Tornado

The site under investigation is located in a region where the tornado hazard is insignificant according to current knowledge.

The calculation of the hazard of tornados by K.A.R.L.® is based upon regional climatic parameters and geographical factors. Furthermore, within the model it was considered that large plains or slightly hilly landscapes would favour the occurrence of tornados. On the other hand, a strongly varied landscape prevents the formation of tornados or only permits tornados of a short duration. The model was calibrated using meteorological and climatic data from the USA. (Source: NOAA).

Therefore, in the region of the location under survey the statistical probability of 0,1089 severe tornados p.a. is to be reckoned with on a reference area of 10.000 square km as a worst case.

Furthermore, it was presumed that significant damage only occurs when the location is directly hit by a tornado. In this case total loss is to be expected. A tornado normally only has a width of 500 m and hence, even in an area with a high hazard of tornados a direct hit occurs seldom. Therefore, in comparison to other natural risks the calculated tornado risks are generally relatively low.

The definition of vulnerability regarding tornados is based on a maximum loss potential of 100 %.

Risk Figures Tornado

Calculated Max. Loss (%):	100
Relative Risk (%/year):	0,0109

For further explanations see section RISK FIGURES.

According to these conditions the risk of tornados is classified as very low.

9. Hail

The site under investigation is located in a region where an increased hazard of hail can be assumed.

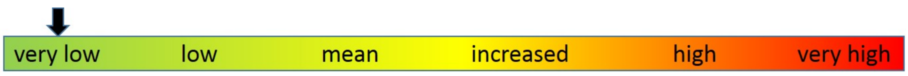
The calculation of the hazard of hail by K.A.R.L is based upon a model developed by KA. Regional climatic parameters were analysed whether they favour or hinder the formation of hail or how their effects might be mutually cancelled out. Furthermore, since hail is mostly coupled with thunderstorm, the frequency of flashes has been included in the model. The model was calibrated using meteorological and climatic data from the USA. (Source: NOAA).

Therefore, hailstones with an average diameter of < 1 cm have to be reckoned nearly every year, 1,7 ±0,8 cm with about every 10 years and hailstones with an average diameter of 3,3 ±0,9 cm have to be reckoned with about every 100 years.

No hail protection measures have been given. This information has been taken into consideration in the following risk analysis.

Vulnerability Hail

The vulnerability has been defined as loss percentage depending on the mean diameter of the hailstones and refers to "Büroimmobilie oder Geschosswohnungsbau, über 7 Etagen". It has been used to calculate the following risk figures.



Risk Figures Hail

Probable Maximum Loss, Return Period 50 years (%):	0
Probable Maximum Loss, Return Period 500 years (%):	0,25
Probable Maximum Loss, Return Period 1000 years (%):	0,45
Calculated Max. Loss (%):	2,0
Relative Risk (%/year):	0,0014

For further explanations see section RISK FIGURES.

According to these conditions the risk of hail is classified as very low.

METHODOLOGY

The risk and hazard classifications determined by K.A.R.L.® are based on globally available geological, geographic and meteorological data sets that are stored, continuously maintained, extended and specified at KA. The methods of calculation are constantly being improved and adapted to the state of knowledge. Hence, the results refer solely to the state of knowledge at the time of this report.

The calculation methods are not based upon past claim events, they are only verified by them. This guarantees that the modelling of risks follows scientific principles and is not influenced by a random and sometimes incomplete collection of claim data.

Any missing or incomplete data is supplemented in the best plausible way by special estimation procedures developed by KA. These procedures follow generally the WORST CASE PRINCIPLE. Therefore, risk evaluations with a large amount of estimated parameters may lead to higher risk results.

IMPORTANT NOTICE:

This risk analysis was generated automatically. It was not checked for plausibility by an expert. Certain facts only visible in maps, air or satellite reconnaissance pictures which might have influenced the risk evaluation, could not be taken into account.

SOURCES OF DATA

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Data from the given sources are only evaluated and interpreted by KA. No data is passed on to third parties.

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