

CLIMATE AND DISASTER RISK ASSESSMENT

PROVINCE OF BATANGAS
CITY OF TANAUAN

Climate and Disaster Risk Assessment of City of Tanauan

Annex to the Comprehensive Land Use Plan
Planning period 2025-2031
Generated 24 September 2026

SAMPLE DATA - NOT FOR SUBMISSION

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This document contains seeded sample data (adaptive_capacity, cbms, costs, facilities, land_use). It is for testing o

1. Introduction

This Climate and Disaster Risk Assessment covers the 48 barangays of the City of Tanauan, Province of Batangas (PSGC 0401031000). It is prepared as an annex to the Comprehensive Land Use Plan in accordance with the Department of Human Settlements and Urban Development Supplemental Guidelines (DHSUD-2025.1), and follows the eight-table scoring sequence those guidelines set out.

Every figure in this document is traceable to a named source and a dated request. The source register in the final section lists each dataset, the agency that publishes it, the service endpoint it was retrieved from, and what it was used for. Nothing here is entered by hand except the datasets the local government supplied, and those are identified as such.

1.1 Status of this assessment

Table A. Completeness of this assessment at the time of generation

Measure	Value
Hazards applicable to this city	7
Hazards with computed exposure	1
Datasets still outstanding	11
Stage reached	Partial exposure
Risk assessment	Scored
Ready for submission	No

This is a working draft. It is not submittable until the LGU datasets are loaded, risk is scored, and the MPDO has signed off.

2. The City

Table B. Profile of the city

Attribute	Value
City	City of Tanauan
Classification	City (component)
Province	Batangas
Region	Region IV-A (CALABARZON)
PSGC code	0401031000
Barangays	48
Has a coastline	No
Land area, GIS extent	11,249.2 ha

Attribute	Value
Boundary source	faeldon/philippines-json-maps PSGC 2023-12-31 (PSA/NAMRIA via faeldon, MIT)

2.1 Barangays

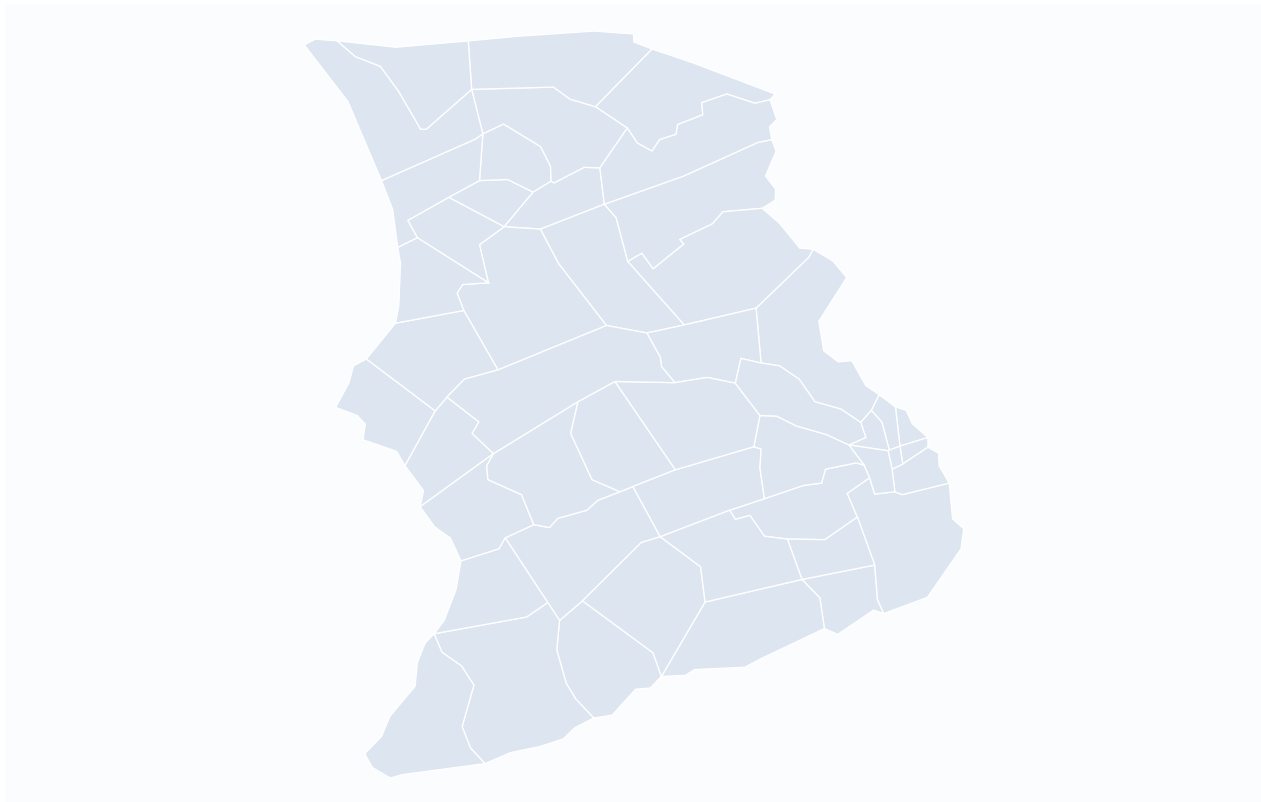
Table C. Barangays, land area and population

Barangay	Class	Area (ha)	Population	Households
Altura Bata	Urban	81.6	535	116
Altura Matanda	Urban	123.1	1,305	284
Altura-South	Urban	126.7	1,856	403
Ambulong	Urban	194.3	1,721	374
Bagbag	Rural	276.8	3,570	776
Bagumbayan	Rural	208.6	1,482	322
Balele	Rural	359.9	4,013	872
Banadero	Rural	175.5	2,667	580
Banjo East	Rural	120.0	1,128	245
Banjo Laurel	Rural	333.8	4,489	976
Bilog-bilog	Rural	450.7	3,449	750
Boot	Rural	526.7	6,162	1,340
Cale	Rural	316.0	4,975	1,082
Darasa	Rural	357.8	3,560	774
Gonzales	Rural	225.2	3,151	685
Hidalgo	Rural	111.6	915	199
Janopol	Rural	288.2	3,529	767
Janopol Oriental	Rural	249.2	4,059	882
Laurel	Rural	290.7	3,051	663
Luyos	Rural	142.1	2,066	449
Mabini	Rural	332.9	2,912	633
Malaking Pulo	Rural	295.5	3,780	822
Maria Paz	Rural	328.6	2,299	500
Maugat	Rural	273.9	3,025	658
Montaña	Rural	176.9	2,669	580
Natatas	Rural	249.6	2,319	504
Pagaspas	Rural	358.9	4,787	1,041
Pantay Bata	Rural	368.6	2,781	605
Pantay Matanda	Rural	440.8	5,108	1,110
Poblacion Barangay 1	Rural	22.5	352	77

Barangay	Class	Area (ha)	Population	Households
Poblacion Barangay 2	Rural	14.4	300	65
Poblacion Barangay 3	Rural	61.3	850	185
Poblacion Barangay 4	Rural	29.6	300	65
Poblacion Barangay 5	Rural	8.2	300	65
Poblacion Barangay 6	Rural	29.3	474	103
Poblacion Barangay 7	Rural	44.6	463	101
Sala	Rural	211.4	3,051	663
Sambat	Rural	188.4	1,627	354
San Jose	Rural	165.1	2,093	455
Santol	Rural	349.5	2,407	523
Santor	Rural	318.4	3,481	757
Sulpoc	Rural	347.5	5,204	1,131
Suplang	Rural	221.8	2,037	443
Talaga	Rural	471.3	6,234	1,355
Tinurik	Rural	267.1	1,985	432
Trapiche	Rural	180.4	2,071	450
Ulango	Rural	325.0	5,045	1,097
Wawa	Rural	210.8	2,051	446

Source: Barangay outlines and areas from the national administrative boundary dataset; population and households as supplied by the local government.

Total population across the barangays with figures supplied is 127,688 in 27,759 households.



Barangay boundary

Figure 1. Barangay boundaries of the city.

3. Methodology

The assessment follows the DHSUD scoring sequence. Each barangay is scored for exposure to each hazard, for sensitivity and adaptive capacity, and those combine into a vulnerability score. Exposure and vulnerability give the severity of consequence, and severity multiplied by the likelihood of the hazard gives the risk score, which falls into one of four land-use control categories. The tables reproduced below are the published DHSUD thresholds, not this system's own.

severity of consequence = (exposure + vulnerability) / 2. risk score = likelihood x severity of consequence. Adaptive capacity is inverted: A is the strongest and scores 1. The severity table published by DHSUD is reproduced exactly by the formula above at all sixteen cells, which the test suite asserts cell by cell.

3.1 Likelihood of occurrence

Table 1. Indicative likelihood of occurrence (temporal probability) scores

Score	Rating	Return period	Probability in 50 years	Description
4	Likely	1-25 years	87%-100%	This event has occurred several times in your lifetime; it is expected to occur again within a short span.
3	Possible	25-100 years	40%-86%	The event may have occurred once or twice in your lifetime; it is possible to occur within a generation.
2	Unlikely	10-30 years	22.1%-39%	The event is unlikely to be experienced within a lifetime, but records show it has occurred before.

Score	Rating	Return period	Probability in 50 years	Description
1	Rare	30-100 years	2%-22%	The event is possible but not expected to occur except under exceptional circumstances.

Source: DHSUD

3.2 Exposure

Table 2. Exposure scores by share of the unit affected

Score	Rating	Area or population affected	Nominal
4	Very high	>15% affected	Yes
3	High	11-15% affected	-
2	Moderate	6-10% affected	-
1	Low	0-5% affected	No

Source: DHSUD

Table 3. Exposure thresholds by exposure unit

Exposure unit	Parameter	Score	Threshold
Population	Affected population	4	>20%
Population	Affected population	3	10.01-20%
Population	Affected population	2	5.01-10%
Population	Affected population	1	<=5%
Critical Point Facilities	Affected facility	4	100% (yes)
Critical Point Facilities	Affected facility	1	0% (no)
Lifeline Utilities	Affected area	4	>40%
Lifeline Utilities	Affected area	3	20.01-40%
Lifeline Utilities	Affected area	2	10.01-20%
Lifeline Utilities	Affected area	1	<=10%
Urban Use Areas	Affected area	4	>40%
Urban Use Areas	Affected area	3	20.01-40%
Urban Use Areas	Affected area	2	10.01-20%
Urban Use Areas	Affected area	1	<=10%
Natural Resource-based Production	Affected area	4	>40%
Natural Resource-based Production	Affected area	3	20.01-40%
Natural Resource-based Production	Affected area	2	10.01-20%
Natural Resource-based Production	Affected area	1	<=10%

Source: DHSUD

3.3 Sensitivity and adaptive capacity

Table 4. Sensitivity scores

Score	Rating	Share of the unit that is sensitive
4	Very high	>15% sensitive
3	High	11-15% sensitive
2	Moderate	6-10% sensitive
1	Low	0-5% sensitive

Source: DHSUD

Table 5. Adaptive capacity scores

Code	Score	Rating	Descriptive criterion
A	1	Very high	Local government is implementing existing regulations on hazard mitigation and structural design and monitors compliance thereof
B	2	High	Local government is implementing existing regulations on hazard mitigation and structural design
C	3	Moderate	Local government has existing regulations on hazard mitigation and structural design
D	4	Low	Local government has no regulations on hazard mitigation and structural design

Source: DHSUD. Note the inversion: code A is the strongest capacity and scores 1, because the score feeds a vulnerability index in which a higher number is worse.

3.4 Vulnerability, severity and risk

Table 6. Vulnerability index converted to a vulnerability score

Index	Score	Rating
up to 0.50	0.25	Very low vulnerability
up to 1.00	0.50	Low vulnerability
up to 2.00	0.75	Moderate vulnerability
up to 4.00	1.00	High vulnerability

Source: DHSUD

Table 7. Severity of consequence, by exposure and vulnerability score

	Vulnerability 4	Vulnerability 3	Vulnerability 2	Vulnerability 1
Exposure 4	4.00	3.50	3.00	2.50
Exposure 3	3.50	3.00	2.50	2.00
Exposure 2	3.00	2.50	2.00	1.50
Exposure 1	2.50	2.00	1.50	1.00

Source: DHSUD

Table 8. Risk categories and the corresponding land-use control

Risk score	Category	Land-use control
12.00 - 16.00	Very High-Risk Areas	Prohibited
7.00 - 11.99	High Risk Areas	Discretionary
3.00 - 6.99	Moderate Risk Areas	Conditional
1.00 - 2.99	Low Risk Areas	Permitted

Source: DHSUD

4. Hazards

Every hazard applicable to this city appears below, whether or not its exposure could be computed. A hazard omitted because its data could not be retrieved would be indistinguishable from a hazard that does not occur here, and those are opposite conclusions.

Table D. Hazards assessed, their sources and their status

Hazard	Group	Publishing agency	Status	Coverage
Flood	hydrometeorological	DENR-MGB	Manual	-
Rain-induced Landslide	hydrometeorological	DENR-MGB	Manual	-
Drought	hydrometeorological	DAAGASA	Pending	-
Ground Shaking	geological	PHIVOLCS	Manual	-
Liquefaction	geological	PHIVOLCS	Computed	4 of 48 barangays
Earthquake-induced Landslide	geological	PHIVOLCS	Manual	-
Ground Rupture	geological	PHIVOLCS	Pending	-

4.1 Flood

The publishing agency will not serve this layer for computation, so susceptibility has to be entered per barangay by the planner.

4.2 Rain-induced Landslide

The publishing agency will not serve this layer for computation, so susceptibility has to be entered per barangay by the planner.

4.3 Drought

No automated source is wired up for this hazard yet.

4.4 Ground Shaking

The publishing agency will not serve this layer for computation, so susceptibility has to be entered per barangay by the planner.

4.5 Liquefaction

Susceptibility polygons published by PHIVOLCS were clipped to each barangay and the share of the barangay in each susceptibility class measured. 4 of the 48 barangays carry at least one susceptibility class. The measurement used 1 features retrieved on 2026-09-24 from the lccode field.

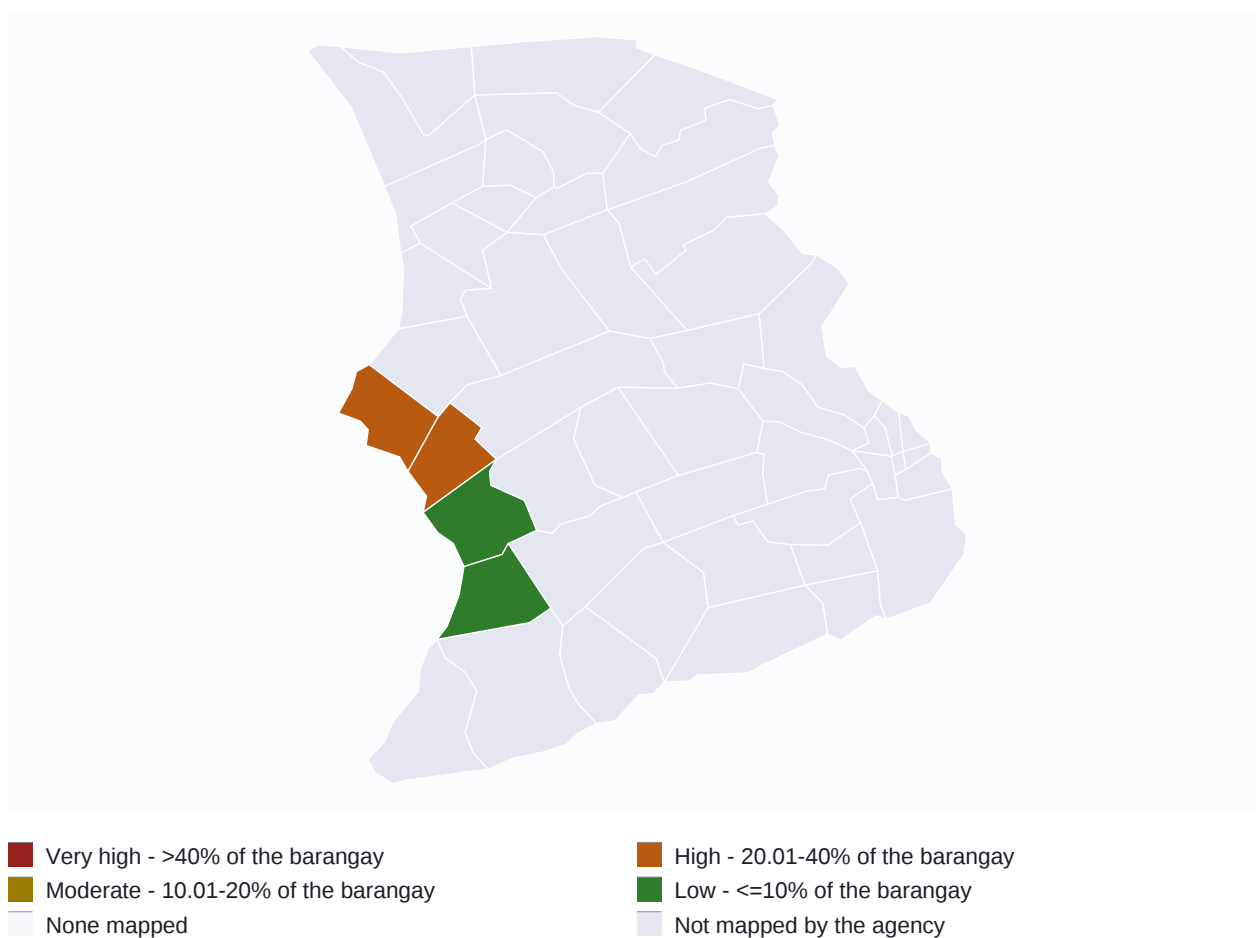


Figure 2. Liquefaction susceptibility by barangay, banded to the DHSUD exposure scores.

Table 4.5. Liquefaction: susceptible share by barangay

Barangay	Area (ha)	Susceptible share	Worst class	Exposure score
Ambulong	194.3	31.5%	Least Susceptible	3
Banadero	175.5	23.0%	Least Susceptible	3
Gonzales	225.2	9.7%	Least Susceptible	1
Wawa	210.8	5.4%	Least Susceptible	1

Source: DOST-PHIVOLCS (as of July 2018)

4.6 Earthquake-induced Landslide

The publishing agency will not serve this layer for computation, so susceptibility has to be entered per barangay by the planner.

4.7 Ground Rupture

No automated source is wired up for this hazard yet.

5. Exposure Database

The exposure database is the barangay-by-hazard matrix the rest of the assessment is built on. A dash means the agency publishes no polygon covering that barangay for that hazard; it does not mean the barangay is not susceptible.

Table E. Susceptible share and exposure score, by barangay and hazard

Barangay	Liquefaction
Altura Bata	-
Altura Matanda	-
Altura-South	-
Ambulong	31.5% (3)
Bagbag	-
Bagumbayan	-
Balele	-
Banadero	23.0% (3)
Banjo East	-
Banjo Laurel	-
Bilog-bilog	-
Boot	-
Cale	-
Darasa	-
Gonzales	9.7% (1)
Hidalgo	-
Janopol	-
Janopol Oriental	-
Laurel	-
Luyos	-
Mabini	-
Malaking Pulo	-
Maria Paz	-
Maugat	-
Montaña	-
Natatas	-
Pagaspas	-

Barangay	Liquefaction
Pantay Bata	-
Pantay Matanda	-
Poblacion Barangay 1	-
Poblacion Barangay 2	-
Poblacion Barangay 3	-
Poblacion Barangay 4	-
Poblacion Barangay 5	-
Poblacion Barangay 6	-
Poblacion Barangay 7	-
Sala	-
Sambat	-
San Jose	-
Santol	-
Santor	-
Sulpoc	-
Suplang	-
Talaga	-
Tinurik	-
Trapiche	-
Ulango	-
Wawa	5.4% (1)

Source: Computed from the agency hazard polygons clipped to the barangay outlines. The figure in brackets is the DHSUD exposure score that share earns.

6. Risk Assessment

Population and land-use exposure apply the barangay's susceptible AREA share to its population and its built-up area, because no source publishes where within a barangay people live. That is the standard simplification and the published CDRA makes it too, but it is an assumption rather than a measurement. Critical-facility exposure is the exception: those have coordinates, so it is a real point-in-polygon test.

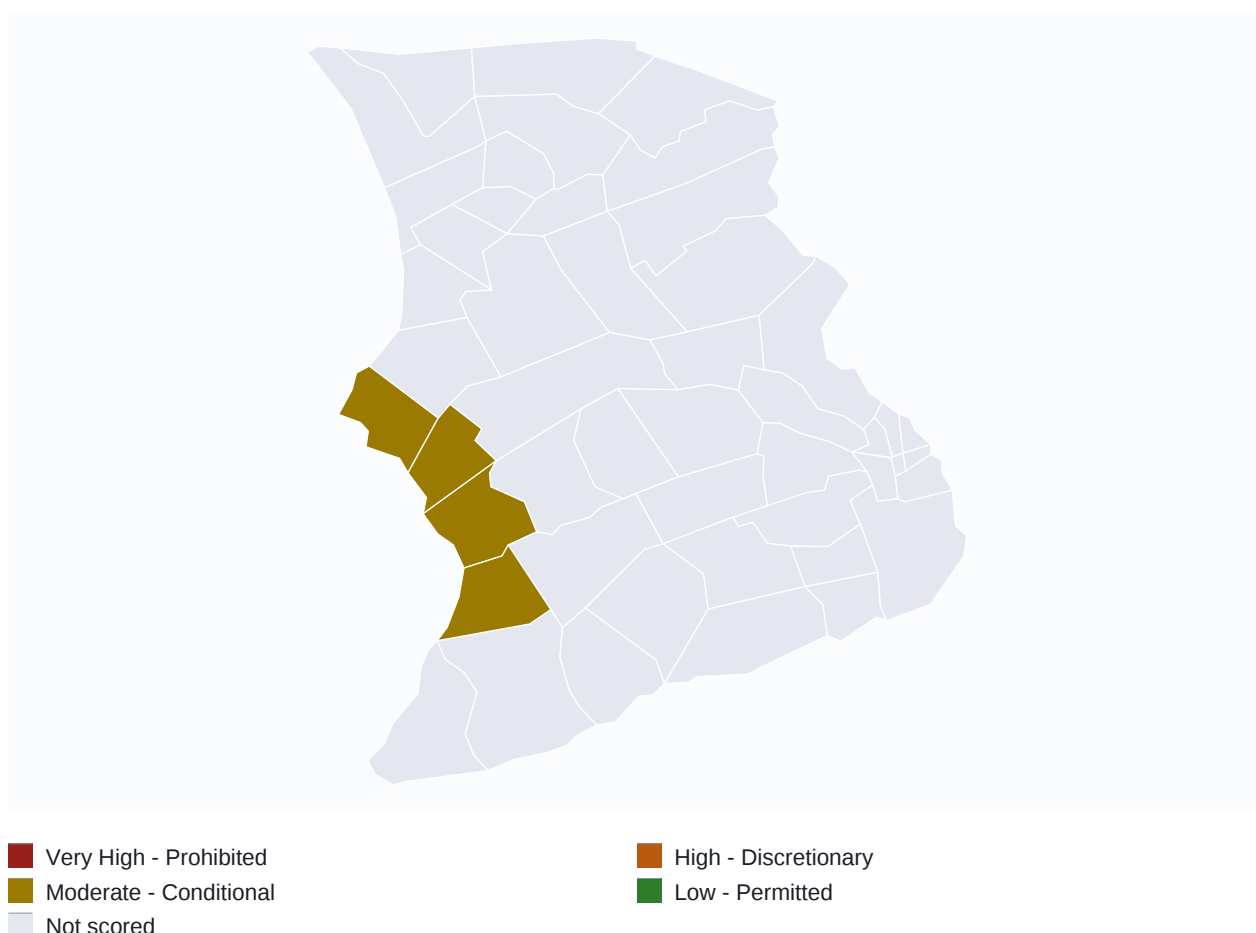


Figure R. Highest risk category reached in each barangay, across all hazards and exposure units.

Table F. Risk scores by barangay, hazard and exposure unit

Barangay	Hazard	Unit	E	S	AC	V	L	Sev	Risk	Category
Ambulong	Liquefaction	Population	1	4	3	0.75	3	2.00	6.00	Moderate
Ambulong	Liquefaction	Urban Use Areas	1	2	3	0.50	3	1.50	4.50	Moderate
Banadero	Liquefaction	Population	1	4	3	0.75	3	2.00	6.00	Moderate
Banadero	Liquefaction	Urban Use Areas	1	3	3	0.50	3	1.50	4.50	Moderate
Gonzales	Liquefaction	Population	1	4	3	0.75	3	2.00	6.00	Moderate
Gonzales	Liquefaction	Urban Use Areas	1	2	3	0.50	3	1.50	4.50	Moderate
Wawa	Liquefaction	Population	1	4	3	0.75	3	2.00	6.00	Moderate
Wawa	Liquefaction	Urban Use Areas	1	3	3	0.50	3	1.50	4.50	Moderate

Source: E exposure, S sensitivity, AC adaptive capacity, V vulnerability, L likelihood, Sev severity of consequence. Computed by this system from the agency hazard data and the datasets the local government supplied.

6.1 Critical point facilities

Facility exposure is a point-in-polygon test against the hazard polygons, not a share applied to an area, so it is a measurement rather than an assumption.

Table G. Critical point facilities and their risk

Facility	Barangay	Hazard	Susceptibility	Risk	Category
Central Elementary School	Altura Bata	Liquefaction	-	-	-
Fire Station	Altura Bata	Liquefaction	-	-	-
Municipal Hall	Altura Bata	Liquefaction	-	-	-
Municipal Health Centre	Altura Bata	Liquefaction	-	-	-
Police Station	Altura Bata	Liquefaction	-	-	-
Public Market	Altura Matanda	Liquefaction	-	-	-
Covered Court Evacuation Centre	Altura Matanda	Liquefaction	-	-	-
District High School	Altura-South	Liquefaction	-	-	-
Barangay Health Station	Ambulong	Liquefaction	-	-	-
Water Pumping Station	Bagbag	Liquefaction	-	-	-

Source: Point-in-polygon test against the agency hazard polygons.

7. What Is Still Needed

This section is deliberately prominent. An incomplete assessment that reads as complete is the failure with the worst consequences, because it gets submitted. Each row names the dataset that is missing, why it is missing, and which part of the assessment it blocks.

Table I. Outstanding datasets

Area	What is needed	Why it is missing	What it blocks
Flood	Per-barangay susceptibility class, entered by the planner	The publishing agency will not serve this layer for computation, so susceptibility has to be entered per barangay by the planner.	Exposure, and therefore risk, for this hazard
Rain-induced Landslide	Per-barangay susceptibility class, entered by the planner	The publishing agency will not serve this layer for computation, so susceptibility has to be entered per barangay by the planner.	Exposure, and therefore risk, for this hazard
Drought	A hazard source	No automated source is wired up for this hazard yet.	Everything for this hazard
Ground Shaking	Per-barangay susceptibility class, entered by the planner	The publishing agency will not serve this layer for computation, so susceptibility has to be entered per barangay by the planner.	Exposure, and therefore risk, for this hazard

Area	What is needed	Why it is missing	What it blocks
Earthquake-induced Landslide	Per-barangay susceptibility class, entered by the planner	The publishing agency will not serve this layer for computation, so susceptibility has to be entered per barangay by the planner.	Exposure, and therefore risk, for this hazard
Ground Rupture	A hazard source	No automated source is wired up for this hazard yet.	Everything for this hazard
Land use by barangay	Area by land-use category per barangay	Awaiting the LGU data upload.	Urban-use and natural-resource exposure units
Sensitivity (CBMS)	Informal settlers, light-material dwellings, dependants	Awaiting the LGU data upload.	The sensitivity half of vulnerability
Adaptive capacity	The DHSUD questionnaire, per hazard	Awaiting the LGU data upload.	The adaptive-capacity half of vulnerability
Critical facilities	Facility list with coordinates	Awaiting the LGU data upload.	Critical-facility exposure
Replacement costs	Unit cost per land-use category	Awaiting the LGU data upload.	Damage estimates

8. Sources and Terms

Every figure in this assessment traces to one of the datasets below. The endpoint column records the service the data was retrieved from, so any figure can be checked against the publishing agency directly.

Table J. Source register

Dataset	Agency	Vintage or attribution	Retrieved	Used for
Administrative boundaries	faeldon/philippines-json-places	PSAPs 2023-12-31 (PSA/NAMRIA via faeldon, MIT)	-	City outline, barangay polygons, all area computations
Earthquake-induced Landslide	PHIVOLCS	DOST-PHIVOLCS	2026-09-24 09:06	Susceptibility class share per barangay
Liquefaction Susceptibility	PHIVOLCS	DOST-PHIVOLCS (as of July 2018)	2026-09-24 09:05	Susceptibility class share per barangay
Ground Shaking (Deterministic)	PHIVOLCS	DOST-PHIVOLCS	2026-09-24 09:05	Susceptibility class share per barangay
Rain-induced Landslide Susceptibility	DENR-MGB	DENR-Mines and Geosciences Bureau	2026-09-24 09:04	Susceptibility class share per barangay
Flood Susceptibility	DENR-MGB	DENR-Mines and Geosciences Bureau	2026-09-24 09:04	Susceptibility class share per barangay

8.1 Terms

Table K. Terms used in this assessment

Term	Meaning
Exposure	The share of a barangay's people, area or facilities that falls inside a hazard-susceptible polygon, scored 1 to 4.
Sensitivity	The share of the exposed unit that is more easily harmed - informal settlers, light-material dwellings, dependants - scored 1 to 4.
Adaptive capacity	The local government's regulatory and institutional capacity to reduce harm, coded A to D and scored 1 to 4, inverted so that A scores 1.
Vulnerability	Sensitivity and adaptive capacity combined through the DHSUD vulnerability index, scored 0.25 to 1.00.
Severity of consequence	Exposure and vulnerability combined: (exposure + vulnerability) / 2.
Likelihood	The temporal probability of the hazard, from its return period, scored 1 to 4.
Risk score	Likelihood multiplied by severity of consequence, from 1 to 16.