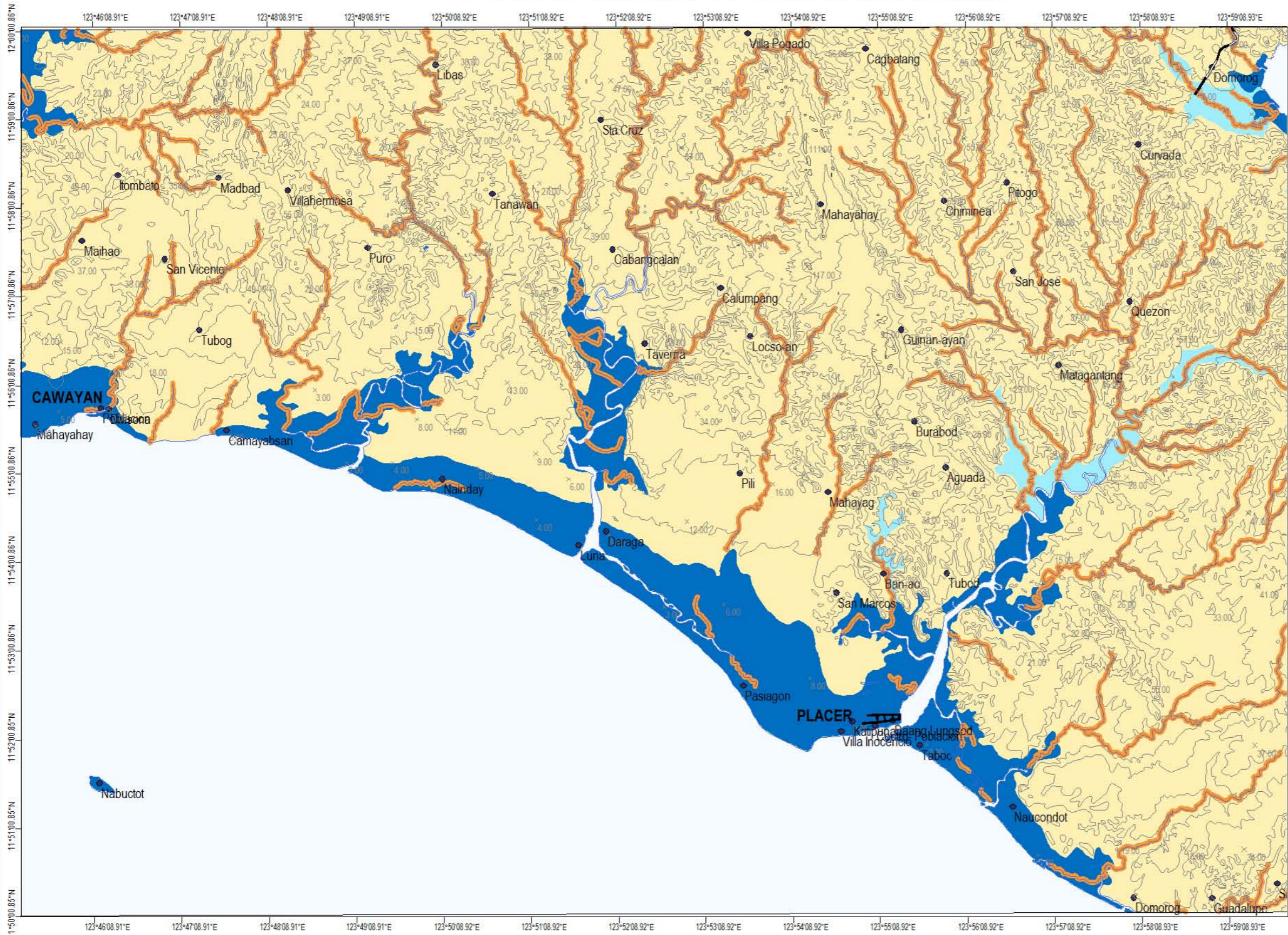


FLOOD HAZARD MAP OF PLACER QUADRANGLE



MAP LEGEND

Flood Hazard Zones

- Regularly to Frequently Flooded Areas
- Occasionally to Rarely Flooded Areas
- Non Flood Prone Areas
- Areas Prone to Riverbank Erosion

— river
— road
— contour

EXPLANATIONS:

Flood hazard susceptibility zones were derived based on the geomorphological analysis of landforms and the fluvial system. Information on flood occurrences, flood depths, duration of inundation as well as topographic information supported the geomorphologically-based flood hazard mapping.

Regularly to Frequently Flooded Areas:
Areas that are frequently flooded. Mere heavy rains of 1-2 days could bring about flooding in these areas. Moderate to strong typhoons could submerge these areas 0.5 to 3.0 m. in flood waters for a few days to a few weeks. Housing development in these areas is not recommended.

Occasionally to Rarely Flooded Areas:
Areas become inundated during moderate to strong typhoons. Flood depths vary from a few centimeters to 1 m. Floods last from a few hours to a few days.

Non Flood Prone Areas:
Areas with no reported flood occurrences except along low lying areas adjoining rivers or creeks.

Areas Prone to Riverbank Erosion:
Areas 0 to 50 m. from river banks that are prone to scouring and erosion.

Field data collection by: A. E. Dayao, JM. S. Laud, E.T. Avila, E. G. Basilan, MN. L. Miraballes, J. N. Malto
 Geomorphological interpretation by: A. E. Dayao, E. G. Basilan
 Digital cartographic processing by: E. G. Basilan, D. G. Zepeda
 GIS processing by: A. E. Dayao, E. G. Basilan
 Checked by: R.A. Juan
 Approved by: R.A. Juan

Other sources of information:
 1:50,000 NAMRIA Topographic Map

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GEOLOGIC MAP OF PLACER QUADRANGLE

LEGEND:

- Geologic Units**
- Bugui Pt. Limestone
 - Cawayan Clastics
 - ?
 - Quaternary Alluvium

MAP SYMBOLS:

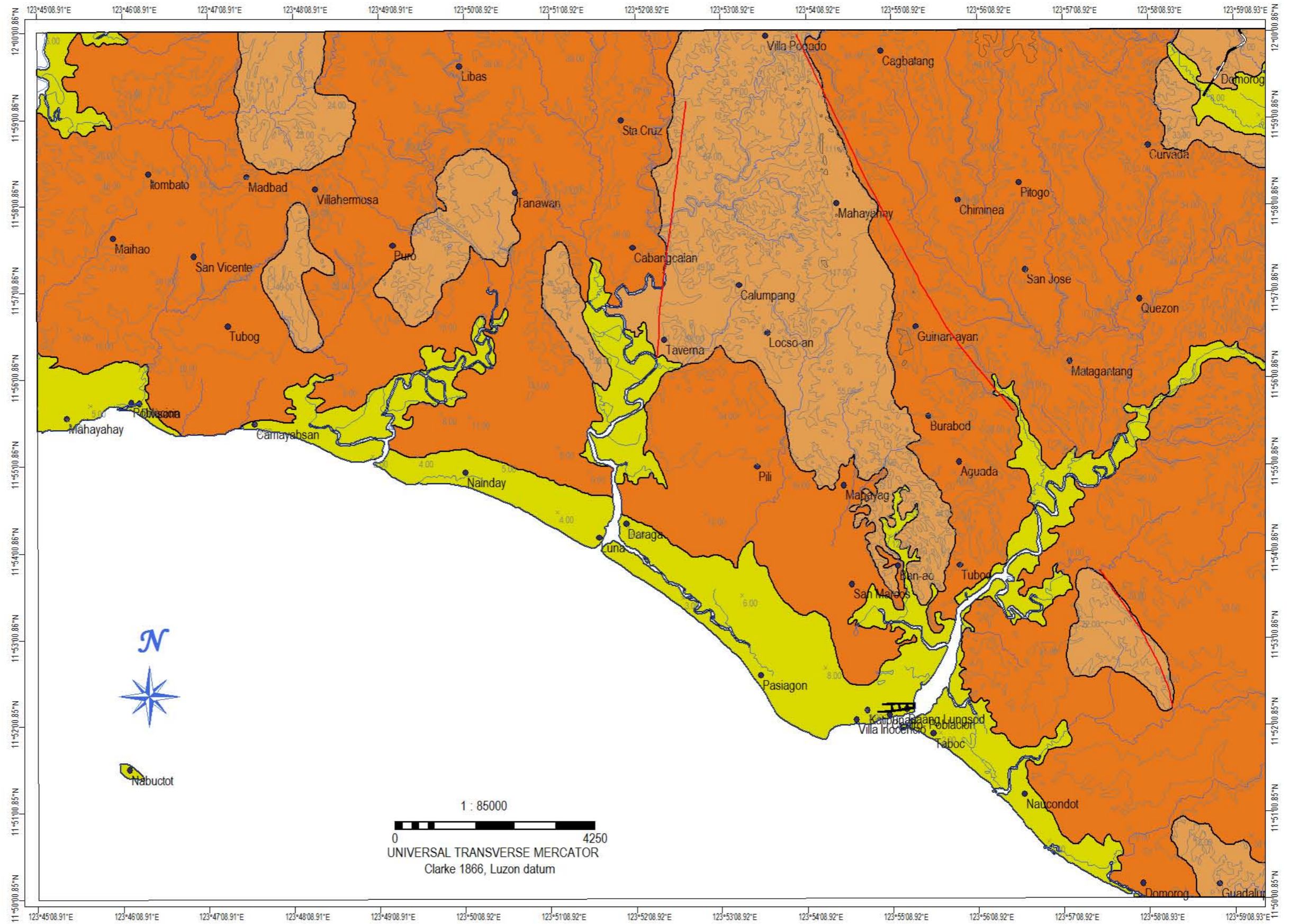
- Road
- River
- Contour
- Fault



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Alluvium

Alluvial deposits consisting of fluvial deposits, beach sands and coral and shell fragments and other unconsolidated sediments. These sediments have mostly been deposited by floods, slope wash processes, swash and backwash of tides and storm surges.




GEOMORPHOLOGIC MAP OF PLACER QUADRANGLE

LEGEND:

Geomorphologic Units

-  Alluvial Plain
-  Coastal Plain
-  Karstic Plateau
-  Lake
-  Lowlands underlain by Cawayan Clastics
-  Moderately Dissected Karstic Hills
-  Moderately Dissected Plateau-like Terrain
-  Moderately Dissected Plateau-like Terrain
-  Plateau Scarp
-  Sand Bar
-  Sea
-  Slightly Dissected Plateau-like Terrain
-  Very low Karstic Hills w/ Convex Slope
-  Young Tidal Flat

MAP SYMBOLS:

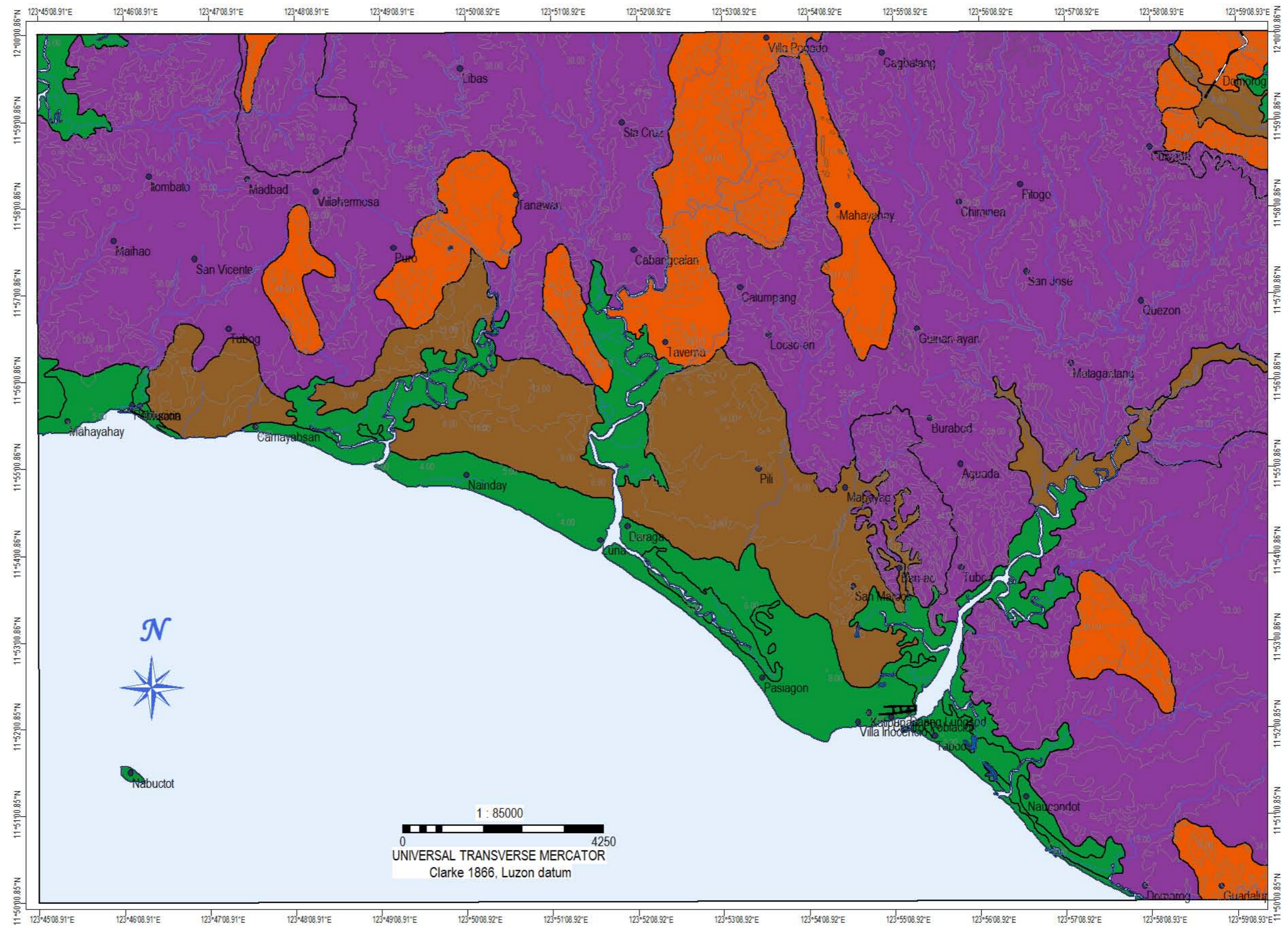
- Road 
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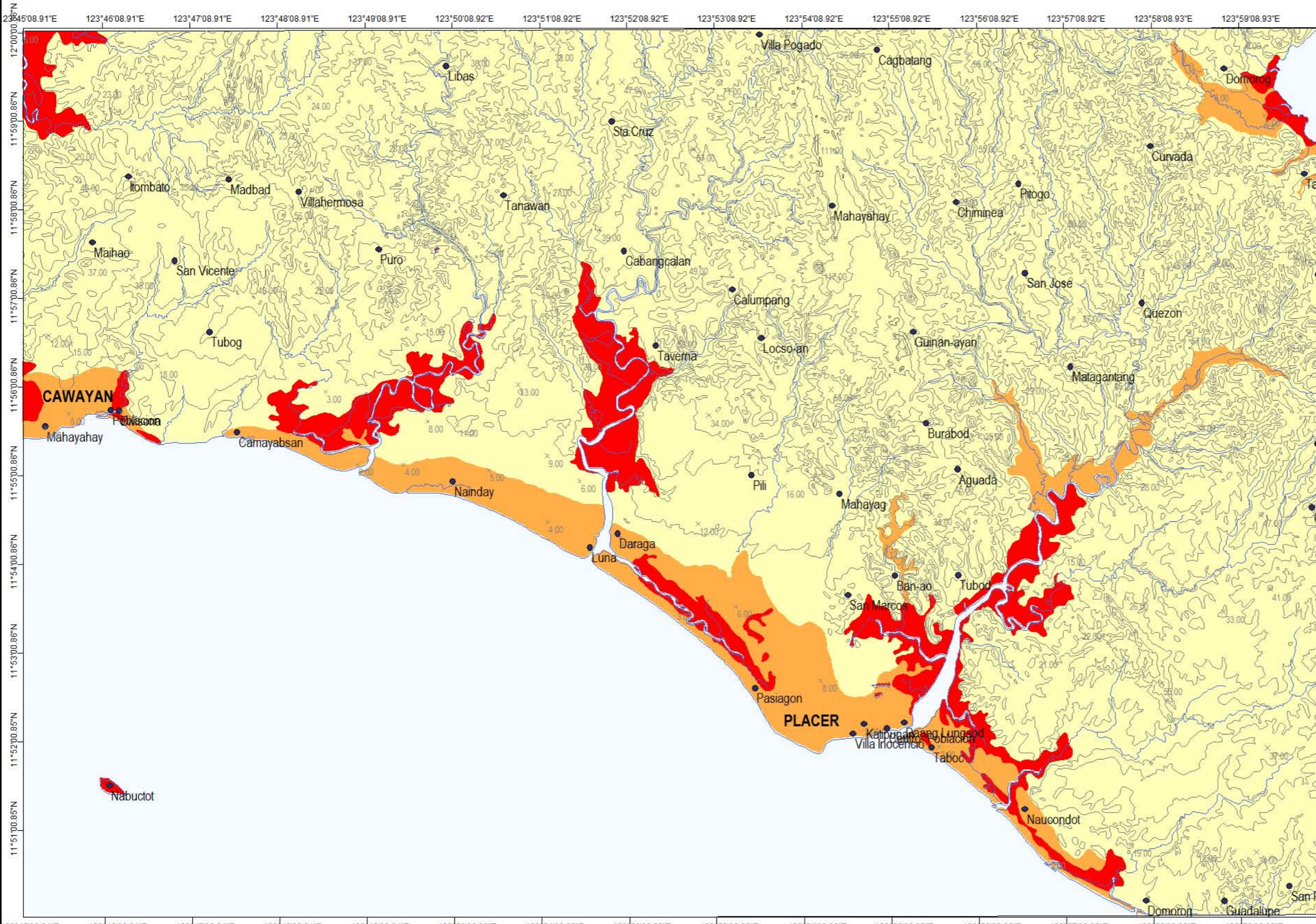


Alluvial Plain
 Flat terrain found at the interface of the inactive debris flow plan and the coastal plain.

Coastal Plain
 Flat terrain behind the beach. Formed by marine processes.

Young Tidal Flat
 Areas affected by tidal fluctuations where nipa grove thrive.

LIQUEFACTION POTENTIAL MAP OF PLACER QUADRANGLE



MAP LEGEND
Liquefaction Potential Zones:

- Areas where Liquefaction is Likely
- Areas where Liquefaction is Possible
- Areas where Liquefaction is not Likely

— river
 — road
 — contour

EXPLANATIONS:

There are no reported liquefaction occurrences in the mapped area based on several field interviews. However, zones of different liquefaction potential were derived based on the geomorphological analysis of the study area following previous studies made by Iwasaki and Yasuda.

Areas where Liquefaction is Likely:
 Areas where liquefaction is likely include active/young tidal flats with nipa and mangrove, beach ridge and swale complex and spit. These areas are unsuitable for urban development. Multi-storey building should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

Areas where Liquefaction is Possible:
 Coastal plains and the alluvial plains are areas where liquefaction is possible. Buildings having 5 storeys or more should be required a full geotechnical study.

Areas where Liquefaction is not Likely:
 Areas where the likelihood of liquefaction is unlikely.

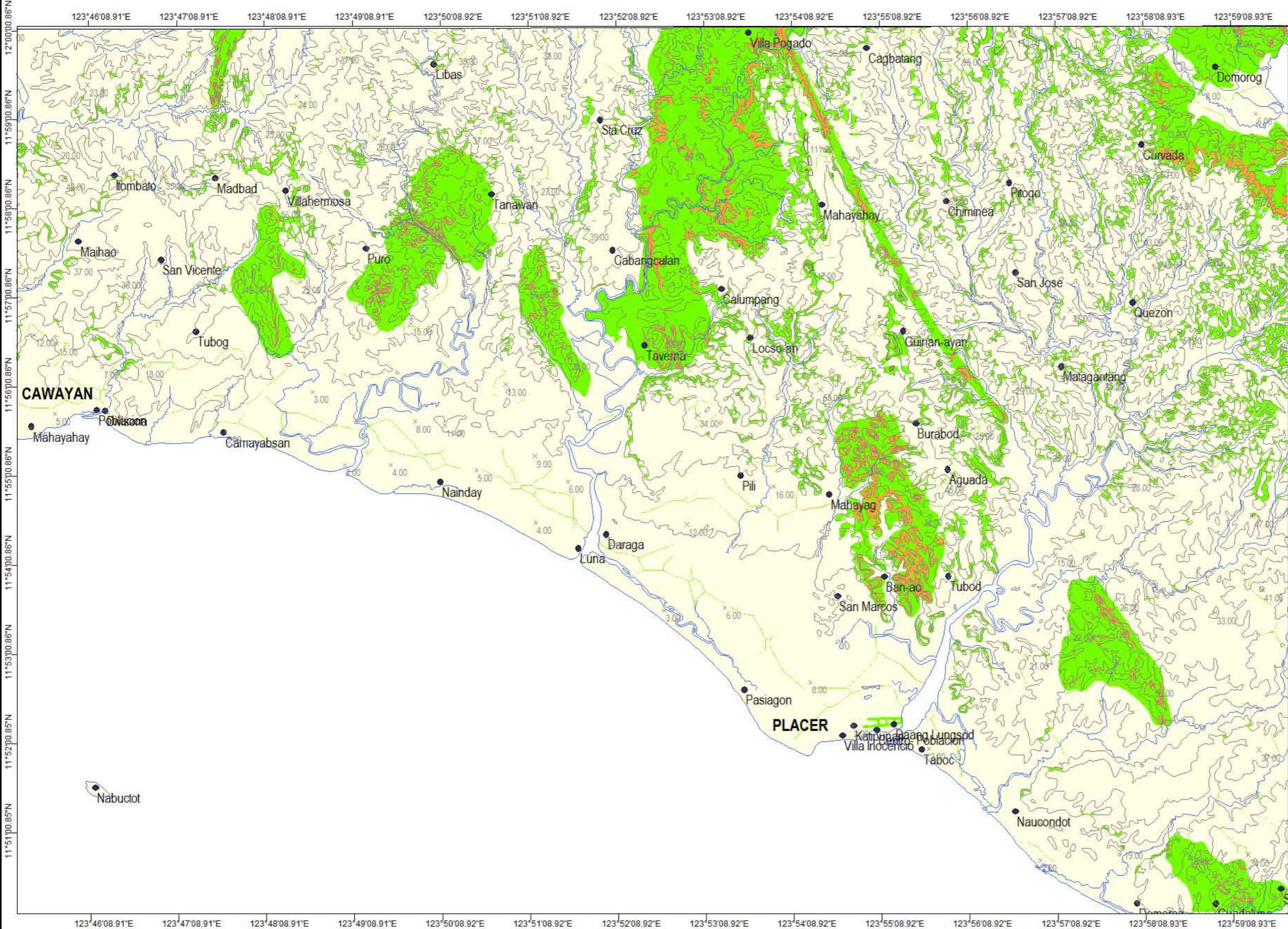
Field data collection by: A. E. Dayao, JM. S. Laud, E.T. Avila, E. G. Basilan, MN. L. Miraballes, J. N. Malto
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LANDSLIDE SUSCEPTIBILITY MAP OF PLACER QUADRANGLE



MAP LEGEND:

Landslide Susceptibility Zones:

- Absent
- Low to Absent
- Moderate susceptibility to landslides

fault
 river
 road

EXPLANATIONS:

Landslide hazard susceptibility zones were derived through qualitative map combination using lithology, geomorphology, slope gradient, road distance and fault distance. GIS was used in the map combination and subjective weights were assigned to each unit in the parameter map.

Areas with Moderate Susceptibility to Landslides:
 Areas having moderate likelihood of occurrence of landslides are recommended for more detailed engineering geological and geohazard assessment prior for housing development.

Areas with Absent or Low Susceptibility to Landslides:
 Areas where the likelihood of landslide occurrence is either absent or low.

Field data collection by: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Basilan, M.N.L. Miraballes, J.N. Malto
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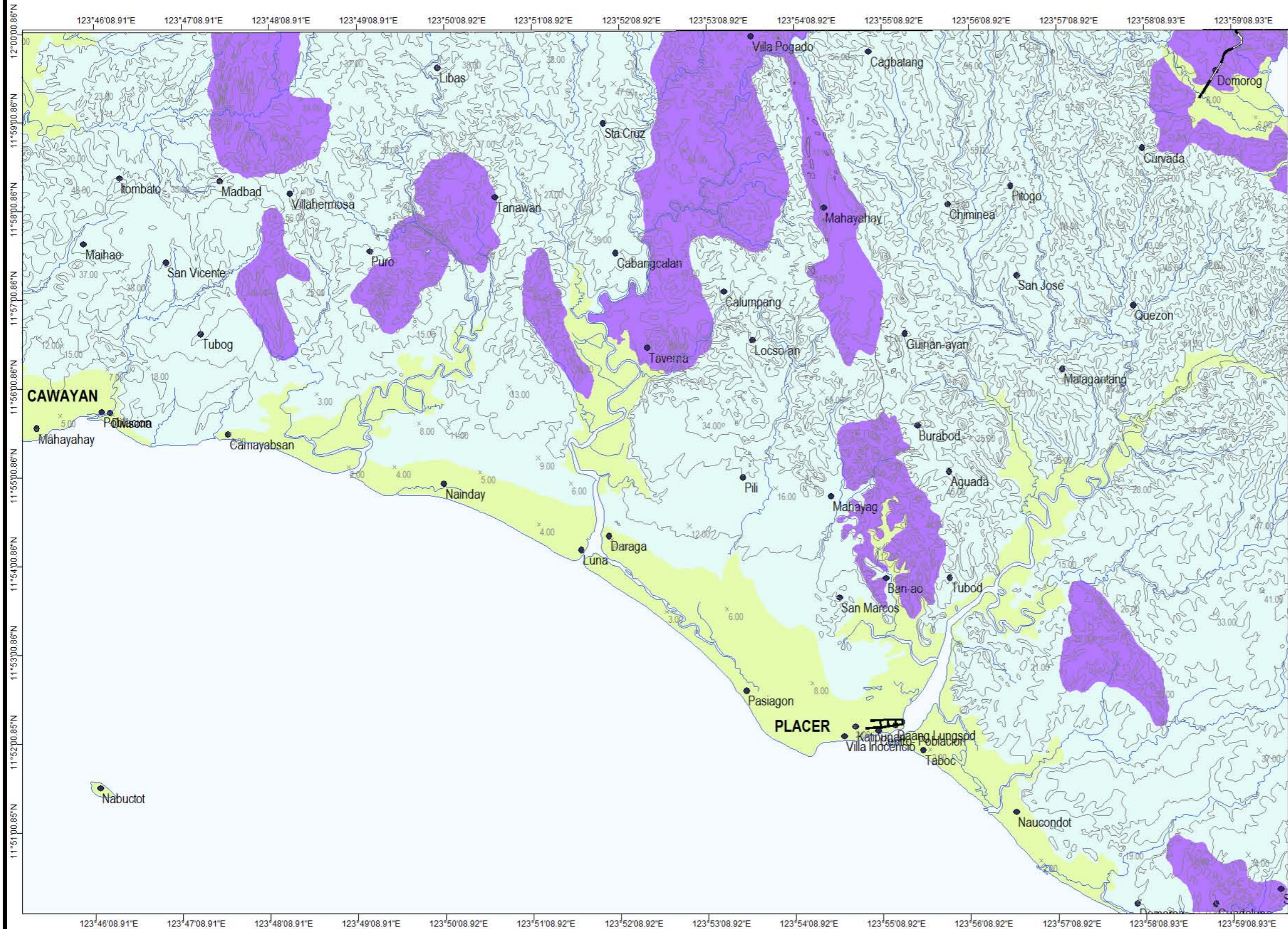
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GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF PLACER QUADRANGLE



MAP LEGEND:
Ground Subsidence and Ground Settlement Map

- Areas susceptible to ground subsidence
- Areas susceptible to ground settlement
- Areas not susceptible to ground subsidence/settlement
- road
- river
- contour

EXPLANATIONS:

Susceptibility map for ground subsidence due to karst or solution processes was primarily derived from the lithologic map of the study area. Field observations on sinkholes and ground subsidence observed on concrete roads and damaged houses supported the mapping. Areas of possible ground settlement were delineated through the analysis of the geomorphological lay of the study area, the sub-surface soils and the ground water levels.

Areas Susceptible to Ground Subsidence:
 Areas that are prone to ground cavitation, sinkhole formation and ground subsidence in areas underlain by limestone and calcareous siltstones and shales.

Areas Susceptible to Ground Settlement:
 Areas where fluvial sands, silts and clays coupled with shallow ground water tables are site of possible ground settlement. Ground settlement may be reduced through appropriate foundation design. Buildings having 3 storeys or more should be tested for settlement and/or consolidation. Buildings having 5 storeys or more should undergo detailed geotechnical studies.

Areas not Prone to Ground Settlement/Subsidence:
 Areas where the possibility of ground settlement or ground subsidence is low or absent.

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