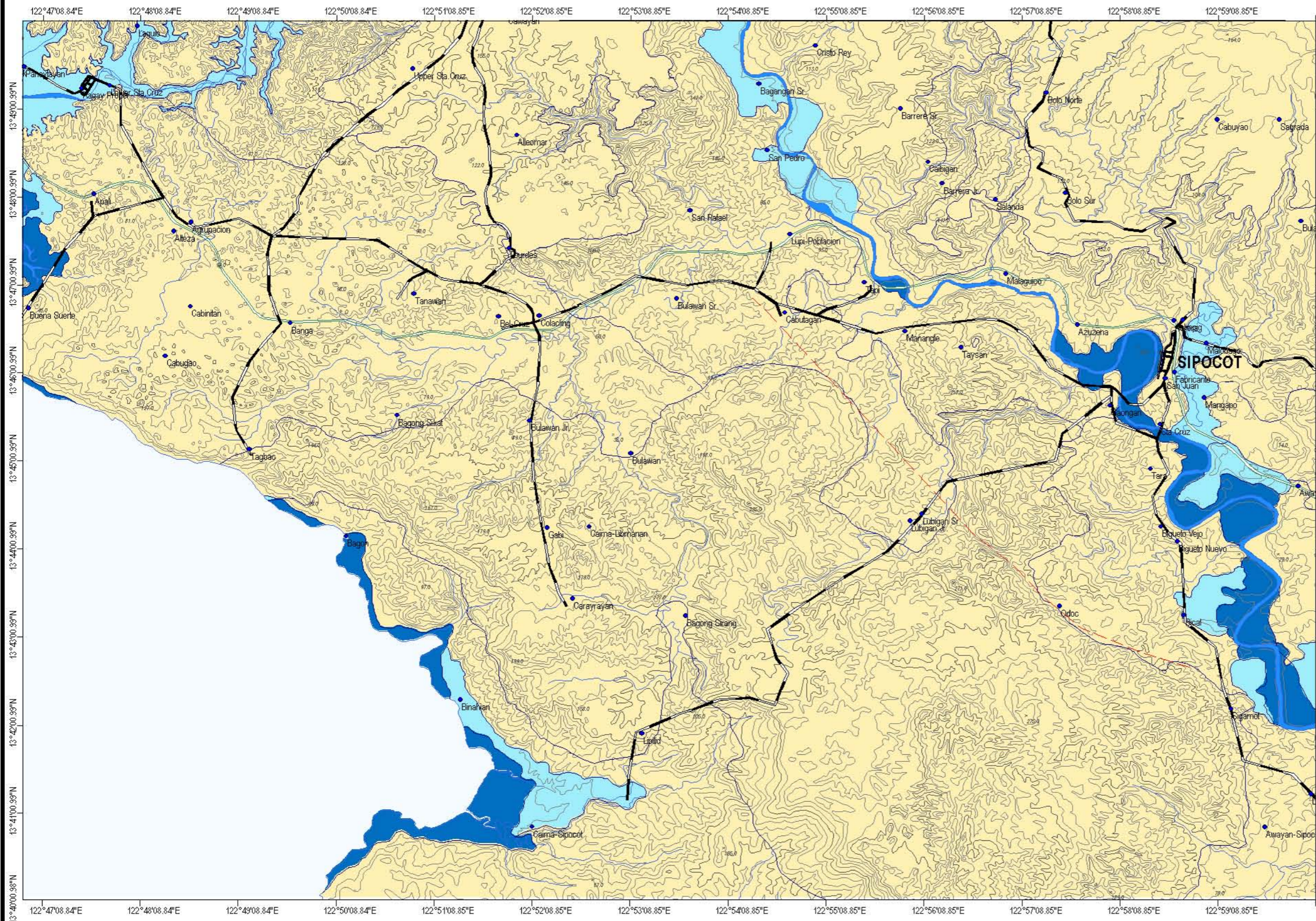


# FLOOD HAZARD MAP OF SIPOCOT QUADRANGLE



**MAP LEGEND:**  
**Flood Hazard Zones:**

- Regularly to frequently flooded areas
- Occasionally to rarely flooded areas
- Non flood prone areas
- Areas prone to riverbank erosion

road  
 railroad  
 river  
 contour

**EXPLANATION:**

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 to 2 days could bring about flooding in these areas. Moderate to strong typhoons could submerge these areas 0.5 to 2.0 m. in flood waters for a few days to a few weeks. Development of urban settlements in these areas is not recommended.

**Occasionally to Rarely Flooded Areas:**  
 Areas that 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 weeks.

**Non Flood Prone Areas:**  
 Areas with no reported flood occurrences except along low lying areas adjoining rivers and 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: M.R.M.Rint  
 Geomorphological Interpretation by: M.R.M.Rint  
 GIS processing by: M.R.M.Rint  
 Checked by: A.E.Dayao  
 Approved by: R.A.Juan

Other Information:  
 1:50,000 NAMRIA Topographic Map  
 1951 B/W Aerial Photos



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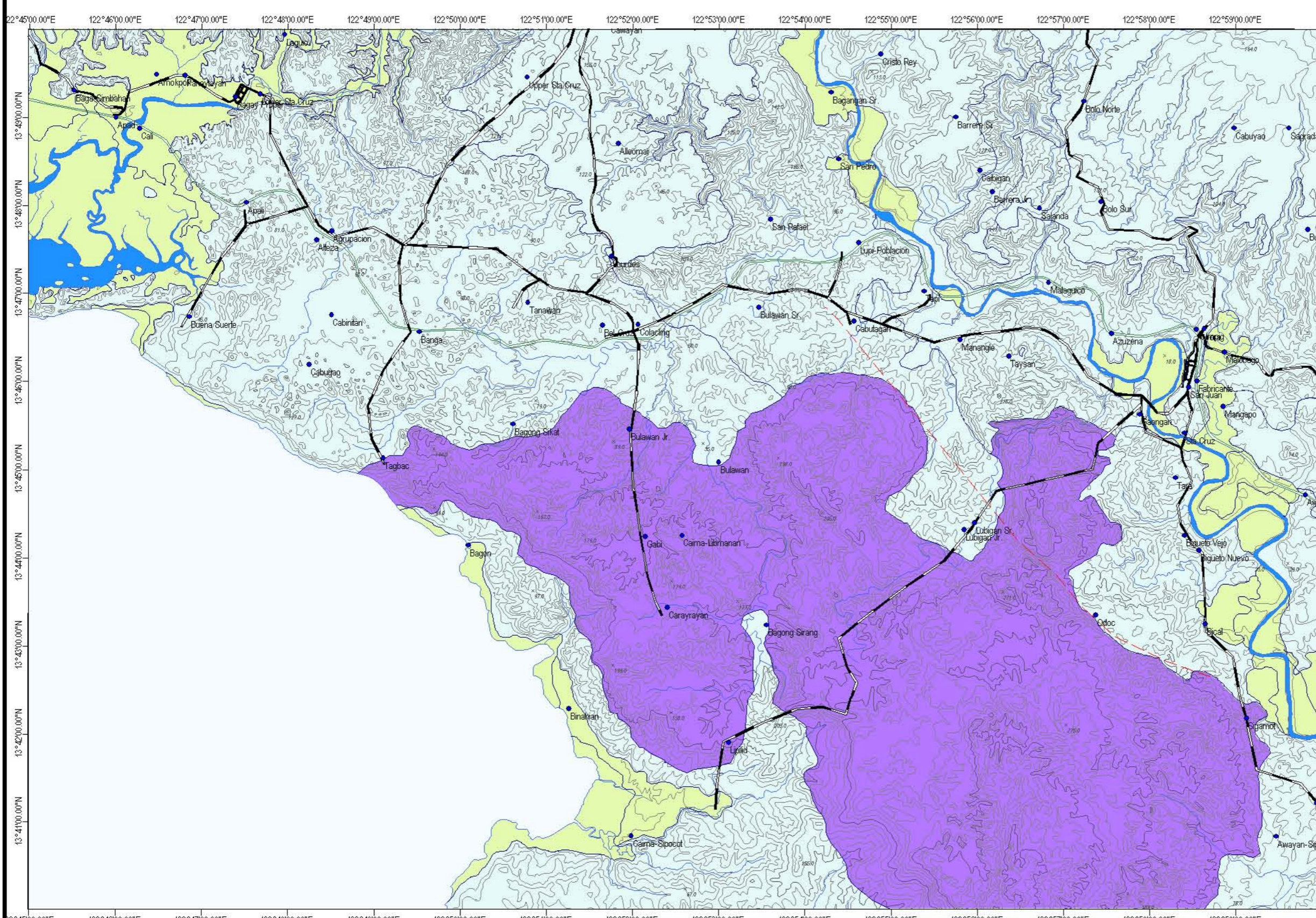


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# GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF SIPOCOT QUADRANGLE



**MAP LEGEND:**  
**Ground Settlement and Ground Subsidence Susceptibility Zones:**

- Areas susceptible to ground settlement
- Areas susceptible to ground subsidence
- Areas not susceptible to settlement/subsidence

— river  
 — road  
 — contour

**EXPLANATION:**

Susceptibility map for ground subsidence due to karst or solution processes was primarily derived from the lithologic map of the study area. Field observation 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 fluvialite and fluvio-marine sands, silts and clays coupled with shallow ground water table are sites 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.

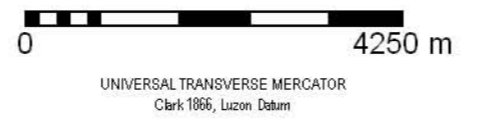
**Areas not Prone to Ground Settlement/Subsidence:**  
 Areas where the possibility of ground settlement or ground subsidence is unlikely.

Field data collection by: M.R.M.Rint  
 Geomorphological Interpretation by: M.R.M.Rint  
 GIS processing by: M.R.M.Rint  
 Checked by: A.E.Dayao  
 Approved by: R.A.Juan

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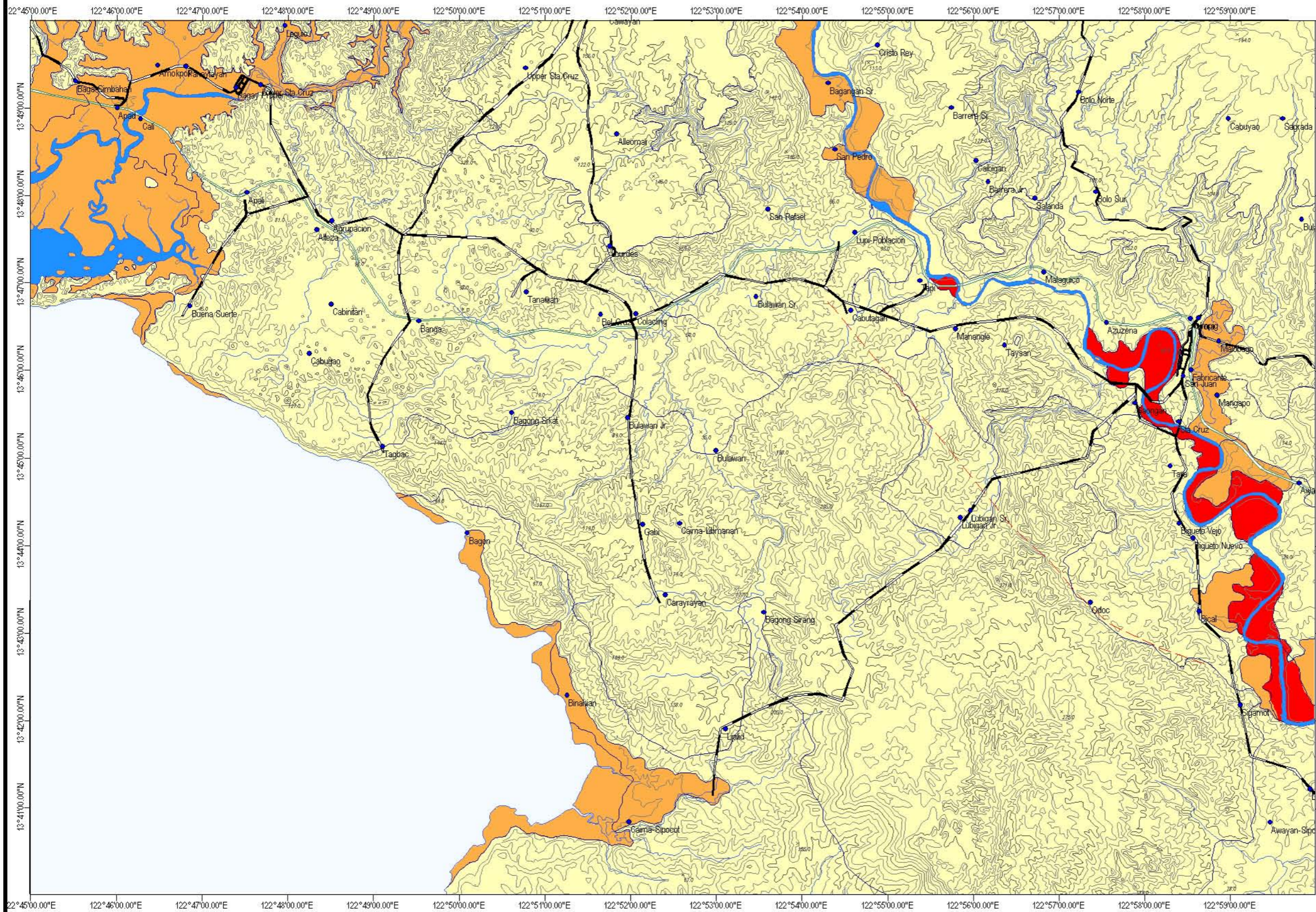


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# LIQUEFACTION POTENTIAL MAP OF SIPOCOT QUADRANGLE



**MAP LEGEND:**  
**Liquefaction Potential Zones:**

- Areas where liquefaction is likely
- Areas where liquefaction is possible
- Areas where liquefaction is not likely

— river  
 — road  
 — contour

**EXPLANATION:**

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 river beds and the river terraces situated along the Sipocot River. These areas are unsuitable for urban development. Multi-storey buildings should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

**Areas where Liquefaction is Possible:**  
 The floodplains and channel bars along Sipocot River and the active tidal flats w/ mangroves are areas where liquefaction is possible. Buildings having 5 storeys or more should be required a full geotechnical study.

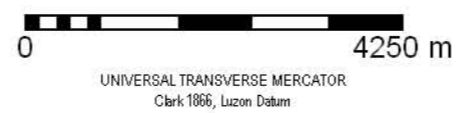
**Areas where Liquefaction is not Likely:**  
 Areas where liquefaction occurrence is unlikely to happen.

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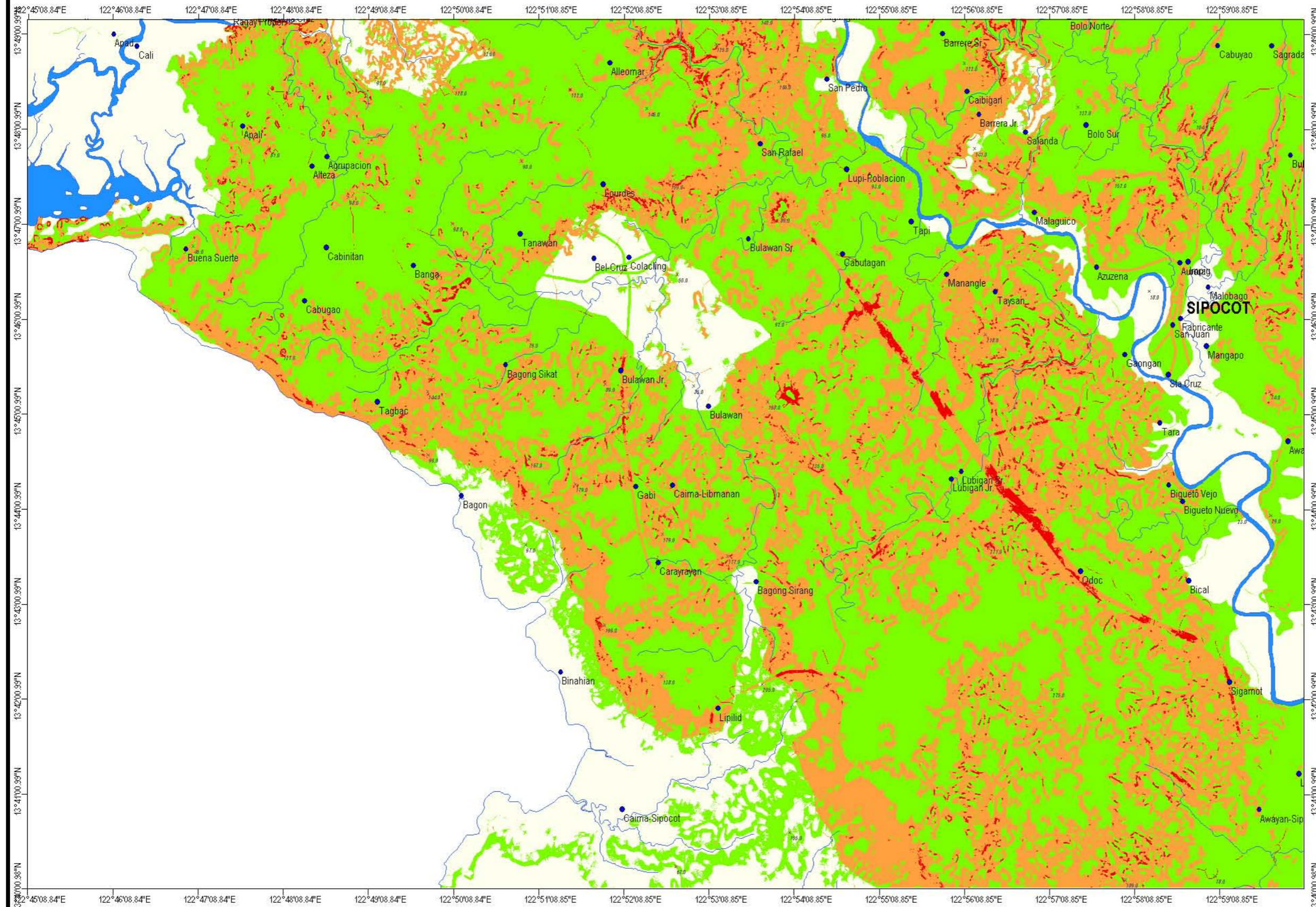


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# LANDSLIDE SUSCEPTIBILITY MAP OF SIPOCOT QUADRANGLE



**LEGEND:**  
**Landslide Susceptibility Zones:**

- Absent to low susceptibility
- Low susceptibility to landslides
- Moderate susceptibility to landslides
- High susceptibility to landslides

— road  
 — railroad  
 — river  
 — contour

**EXPLANATION:**

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

**Areas with High Susceptibility to Landslides:**  
 Areas with equally high probability of occurrence of mass movements particularly rock fall, debris, slides and slumps. Very steep to nearly vertical slopes and areas along fault lines are rated high susceptibility areas and are unsuitable for housing and human settlement. Detailed engineering geological and geohazard assessment is needed.

**Areas with Moderate Susceptibility to Landslides:**  
 Areas having moderate likelihood of occurrence of landslides and are recommended for more detailed engineering geological and geohazard assessment prior to 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: M.R.M.Rint  
 Geomorphological Interpretation by: M.R.M.Rint  
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