

Land Management & Land Registration in the Tsunami Recovery Program

**Aceh Jaya, Indonesia
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Presentation Outline

- Province of Aceh, Indonesia
- Lands Affected By the Tsunami
- Property Boundary Recovery
 - Community Participation
 - Demarcation
 - Adjudication
 - Public Display
- Community Planning



Province of Aceh, Indonesia

- Indonesia's Western-most province
- Area 57,000 km²
- Provincial Capital – Banda Aceh





Acehnese Population

- 4 million devout Moslems
- Fishing, shrimp-farming, rice cultivation
- Fiercely independent history





Tsunami Area

- Earthquake 9.2 Richter
- Tsunami 30 mins later
- 150 kms off Aceh Jaya
- Three surges: 30 m high





Post Tsunami

- Dead or missing: 167,000
- Homeless: 505,000





Banda Aceh Before



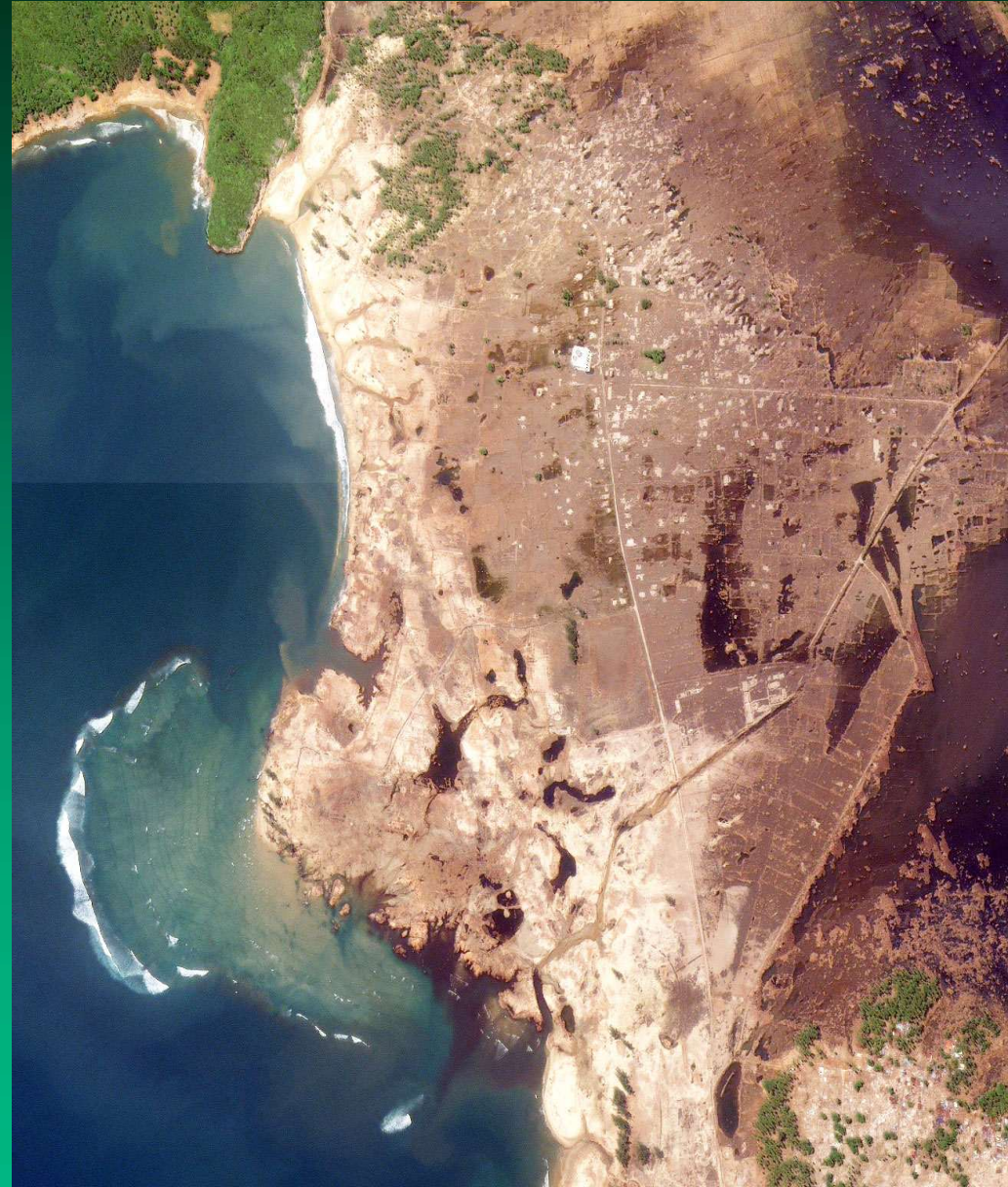


Banda Aceh After





Coastal Community Before and After





Where Do You Start Re-building the Cadastral Boundaries





Tsunami Impact: Housing





Road Alignments, Building Foundations





Complete Destruction





Tsunami Impact: Infrastructure



Community Participation and Document Presentation



- Community driven adjudication (mitigating wrongful or illegal land grabbing)
- Systematic land registration of whole village



Property Corners



- Adjacent land holders “agree” and place boundary markers.
- Village Head confirms accuracy of boundary markers.



RTK GPS Corner Survey



- Land owner completes statement of ownership
- Adjacent owners witness statement
- Village Chief witnesses statement.



McElhanney's Assignment

Parcel Mapping & Infrastructure for 19 Villages in Aceh Jaya District

- Satellite Image Mapping
- Photogrammetric Mapping
- Topographic Surveying
- Parcel Surveying & Ownership Adjudication
- Geotechnical Investigation (Golder Assoc)
- Environmental Assessment (Hatfield Consultants)
- Village Planning
- Water, Sewer & Drainage Assessments
- Parcel Posting



Quickbird Imagery

- Highest Resolution satellite data currently available to the public.
- 60cm/pixel resolution
- Can be used in place of aerial photography at appropriate scales.





Red bar = 20m in both images.

- Left Image - QuickBird, 60cm/pixel
- Right Image – Orthophoto, 50cm/pixel



Quickbird Imagery





Quickbird Imagery for Defining Boundaries





What Are The Limitations Of The Imagery?

Scale of Use

- Images can be viewed at 1:2000 but scale of use is determined by accuracy of ground control points.



How Do We Go From Unprocessed Data To Finished Maps?

- Step 6. Blend Image Overlaps To Remove Clouds And Shadows.



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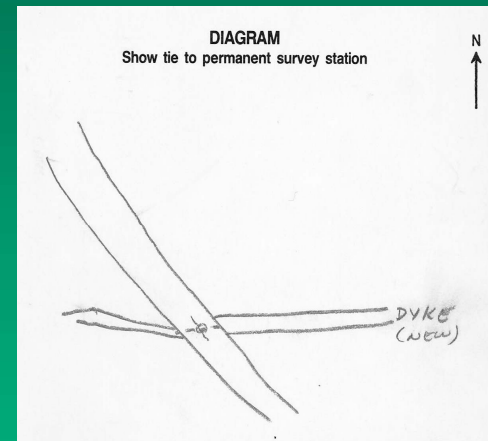


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How Do We Go From Unprocessed Data To Finished Maps?

- Step 4. Using Surveyors Information, Add Ground Control Points To Image



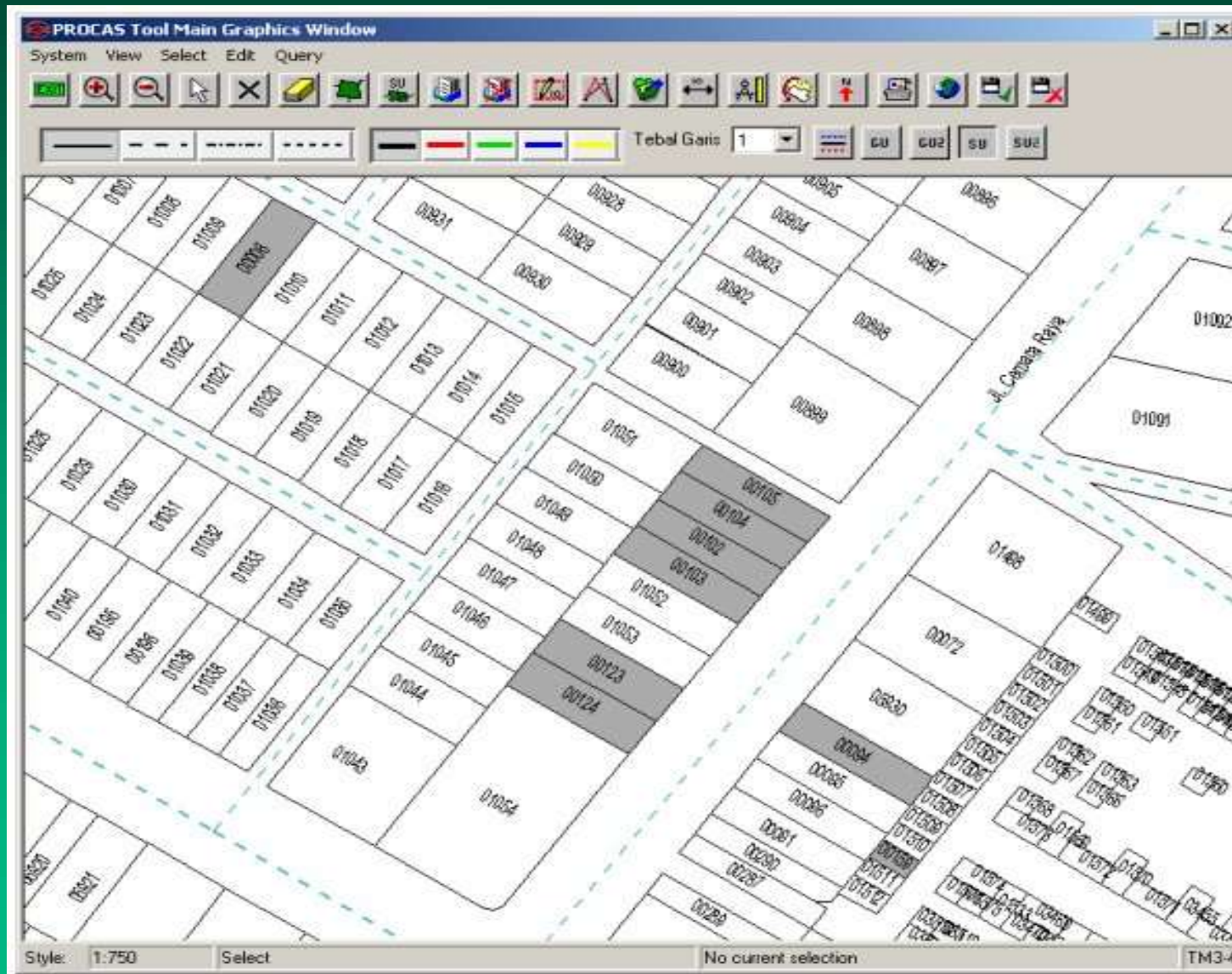


Why Are We Using QuickBird Imagery?

- Lack of Suitable Aerial Photo Coverage in Project Area. Available coverage is outdated.
- Cheaper and faster than acquiring and processing new aerial photos
- Product delivery was < 2 months.

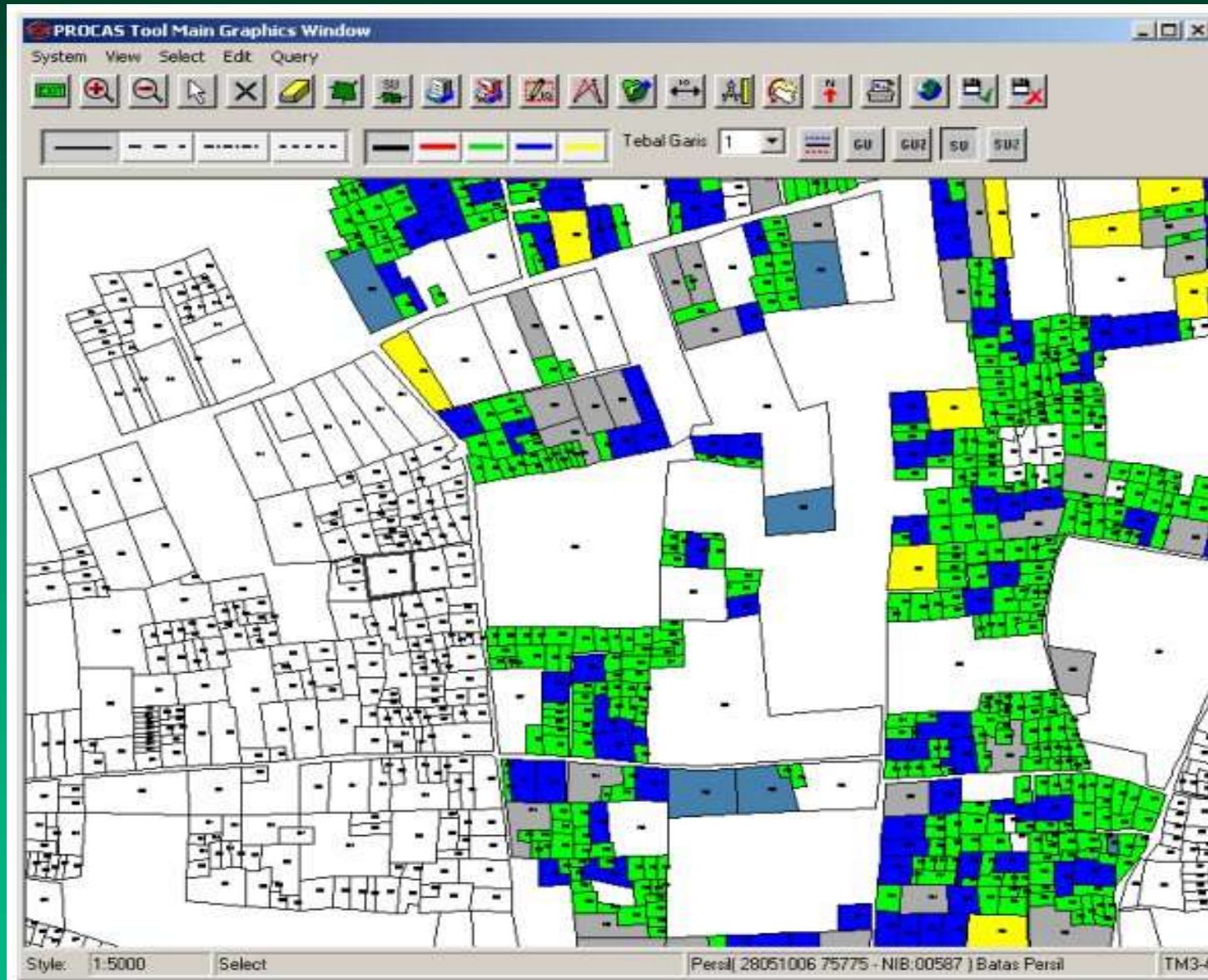


Village Layout



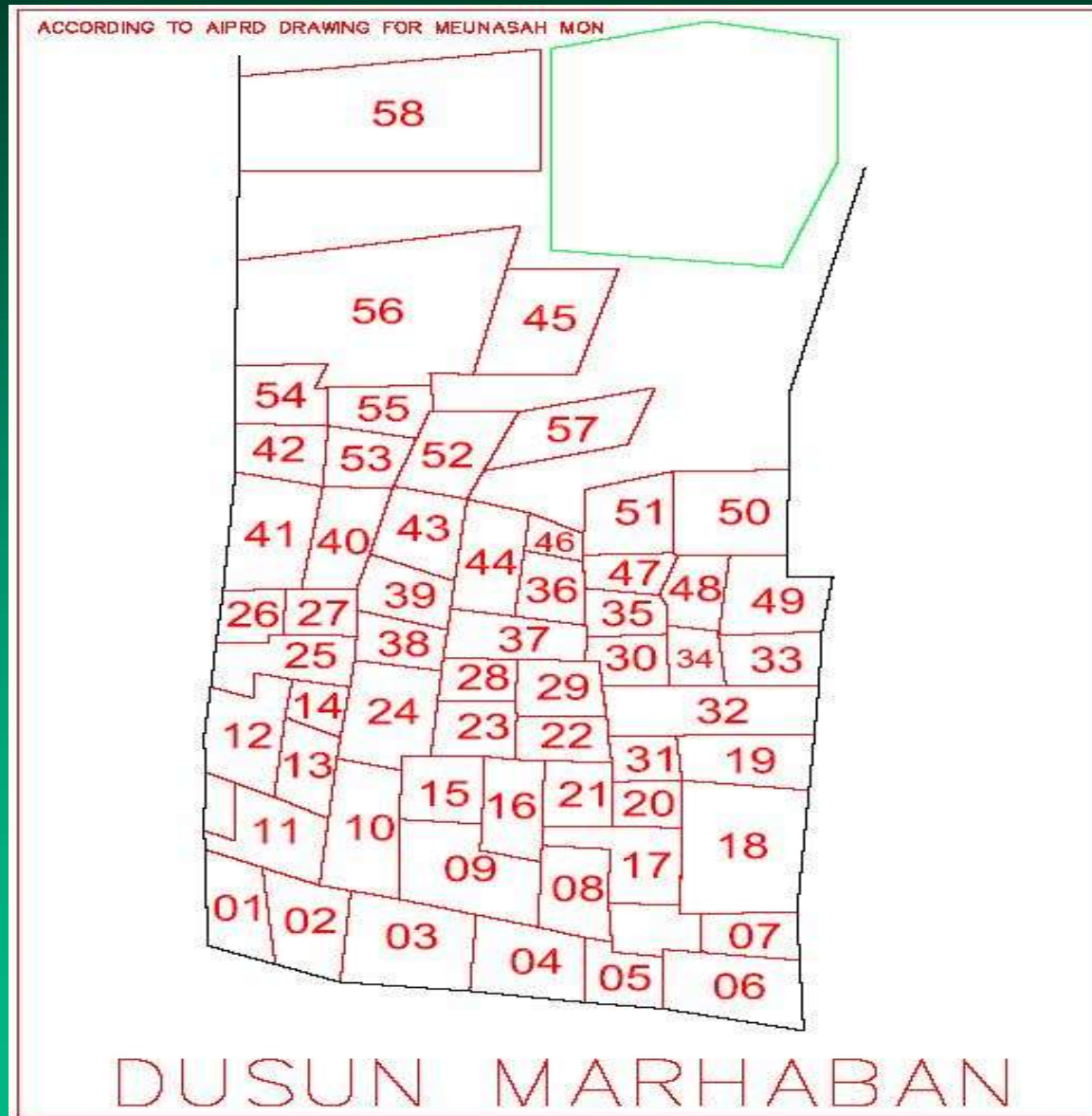


Rural Layout





Re-Building of Parcel Fabric





Public Display of Parcels with Beneficiary List





The Challenges of ownership claims and Identification

- Is land still in existence?
- Families totally lost, no surviving relative
- Families lost, relatives making claims
- One owner of a joint ownership lost
- Owner parents lost, children survivors
- Lost documentation



Case Study – Ujong Muloh

- Village population originally 850
- On coast road 2½ hrs south of Banda Aceh
- On peninsula, adjacent to river estuary





Ujong Muloh: Pre-Tsunami



- Fishing
- Rice farming
- Market gardens
- Daily market
- Boat dock
- Brick kilns
- School
- Clinic
- Mosque
- Community Hall
- Soccer Field



Ujong Muloh: Post -Tsunami



- No Bridge
- Innundated areas
- Vegetation razed
- House slabs remain
- Temporary housing



Ujong Muloh: Tsunami Impact

- 192 Women & 35 Men perished
- 100% of survivors lost their home
- 98% of survivors lost their income



- Parts of village not habitable
- Survivors in tents for 18 months
- Now in temporary housing



Ujong Muloh – Community Spirit

- Fishing
- School

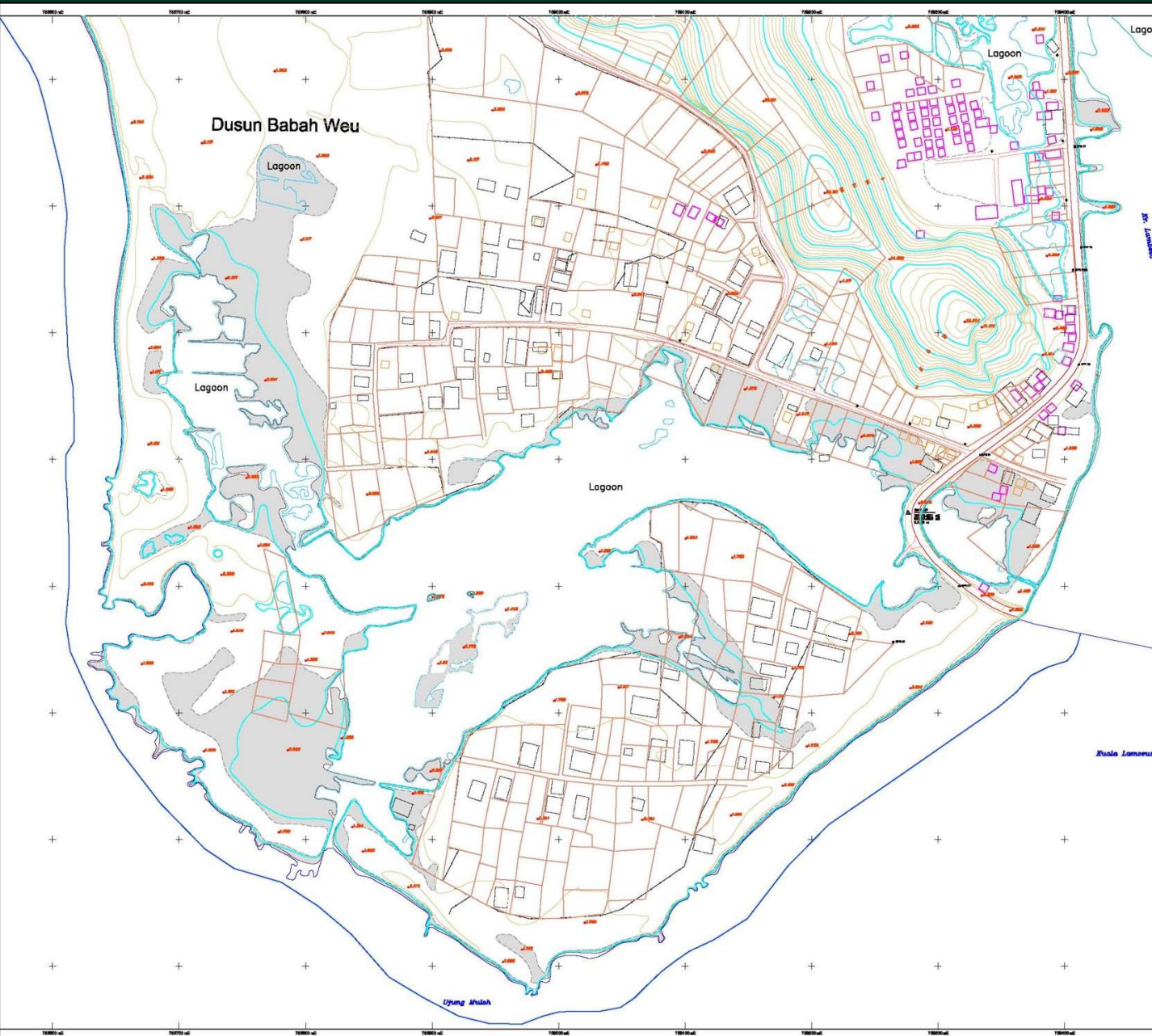


- Mosque
- Market





Ujong Muloh – Mapping



Sources:

- Satellite Imagery
- Airphoto Imagery
- Topographic Surveying



Ujong Muloh: Parcel Mapping

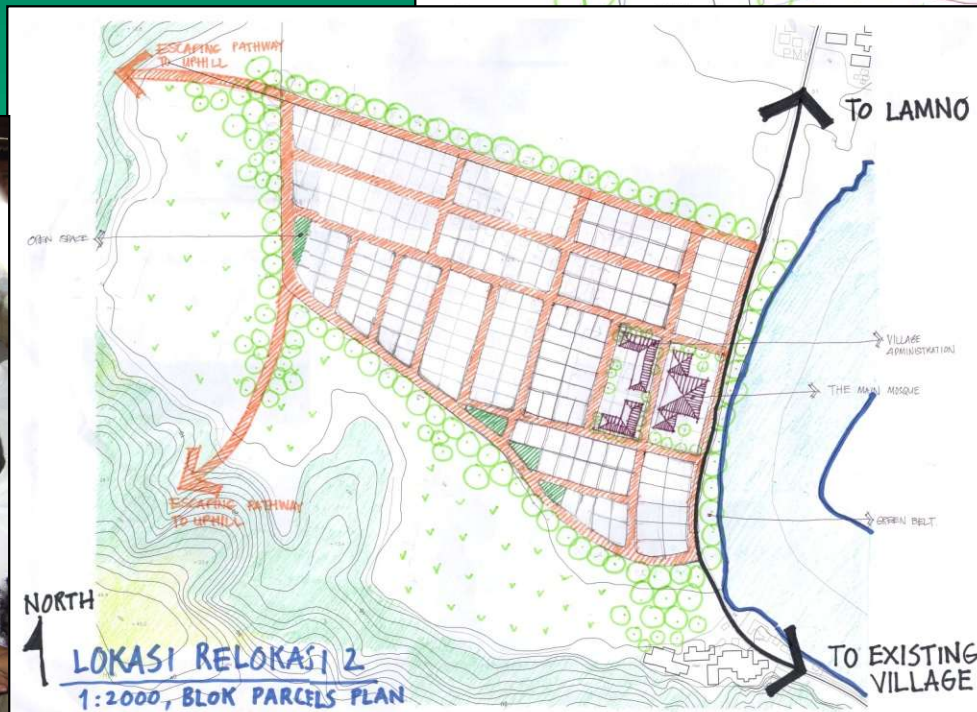
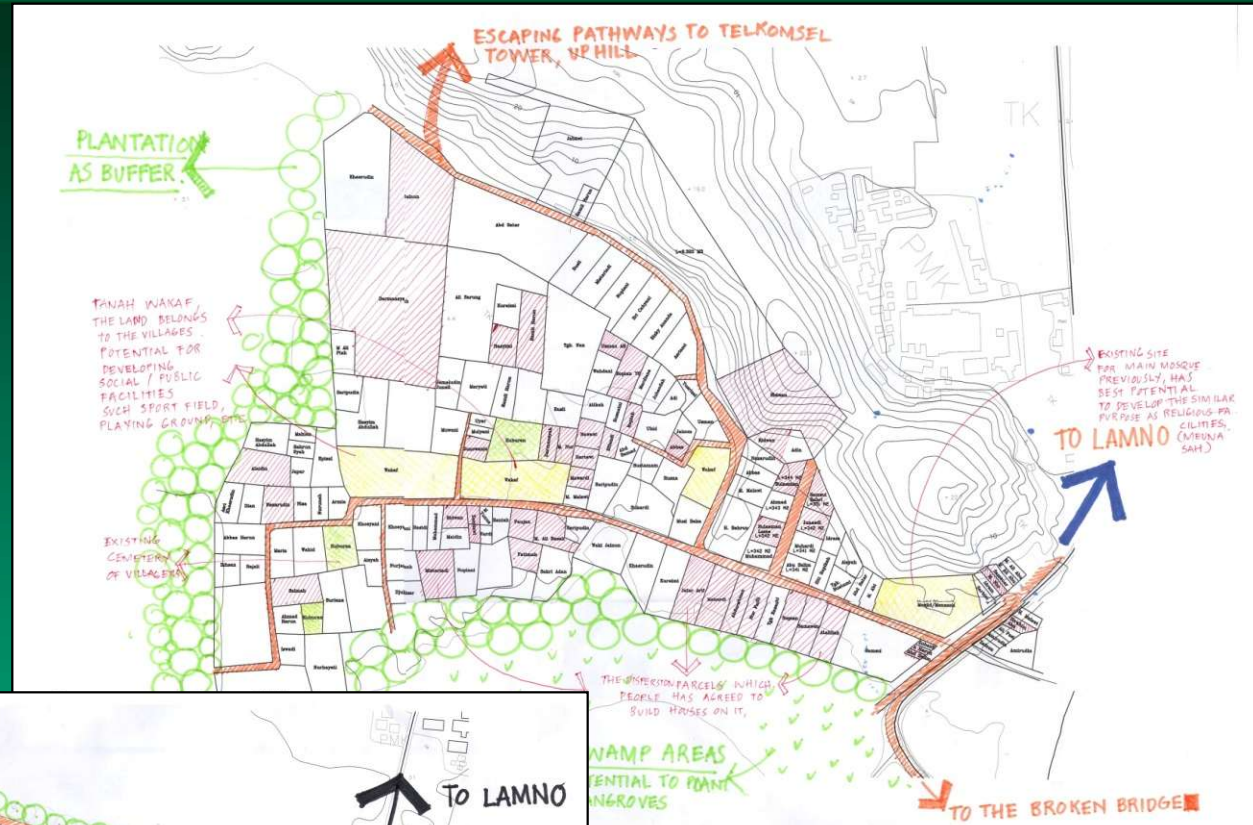


Combine:

- Parcel Surveys
- Pre-tsunami satellite image interpretation
- Ownership adjudication

Ujong Muloh – Village Planning

- Community Meetings
- Community facility layout
- Infrastructure assessment
- Spatial Plans





House Construction



- Floorplan 50 m²
- Concrete block walls, metal roof
- Indoor plumbing
- Canadian Red Cross goal:
6,000 houses





Canadian Red Cross.

- Approximately 4,000 land parcels recovered
- 5,500 homes built for tsunami survivors

Program Output.

- Approximately 600,000 parcels of land to be registered in Tsunami affected Area and surrounding land