Gaza Strip - Preliminary Debris Management Scenarios

Published: May 2024
Damage Assessment Analysis: 1 April 2024

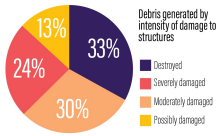
UN environment programme

This initial quantification of conflict generated debris in the Gaza Strip is derived from UNOSAT Comprehensive Damage Assessment from 1 April 2024, in conjunction with updated building footprint as of May 2023 based on the national statistical office data. Damaged building footprints were enriched through zonal statistics with an above surface height model, derived from the difference between a DTM (SRTM) and a DSM (ALOS World 3D) as provided by the European Commission in the GHS-Built H product.

For modelling purposes, minimum building height is considered to be 3m. Each built sq. meter is considered to have generated 1t of debris. Results are aggregated into an hexagonal grid where each cell is 250m wide.

Total debris quantity **41,755,800 t**

According to UNOSAT damage assessment, a total of 123,706 structures were damaged in the Gaza Strip as of 1 April 2024.

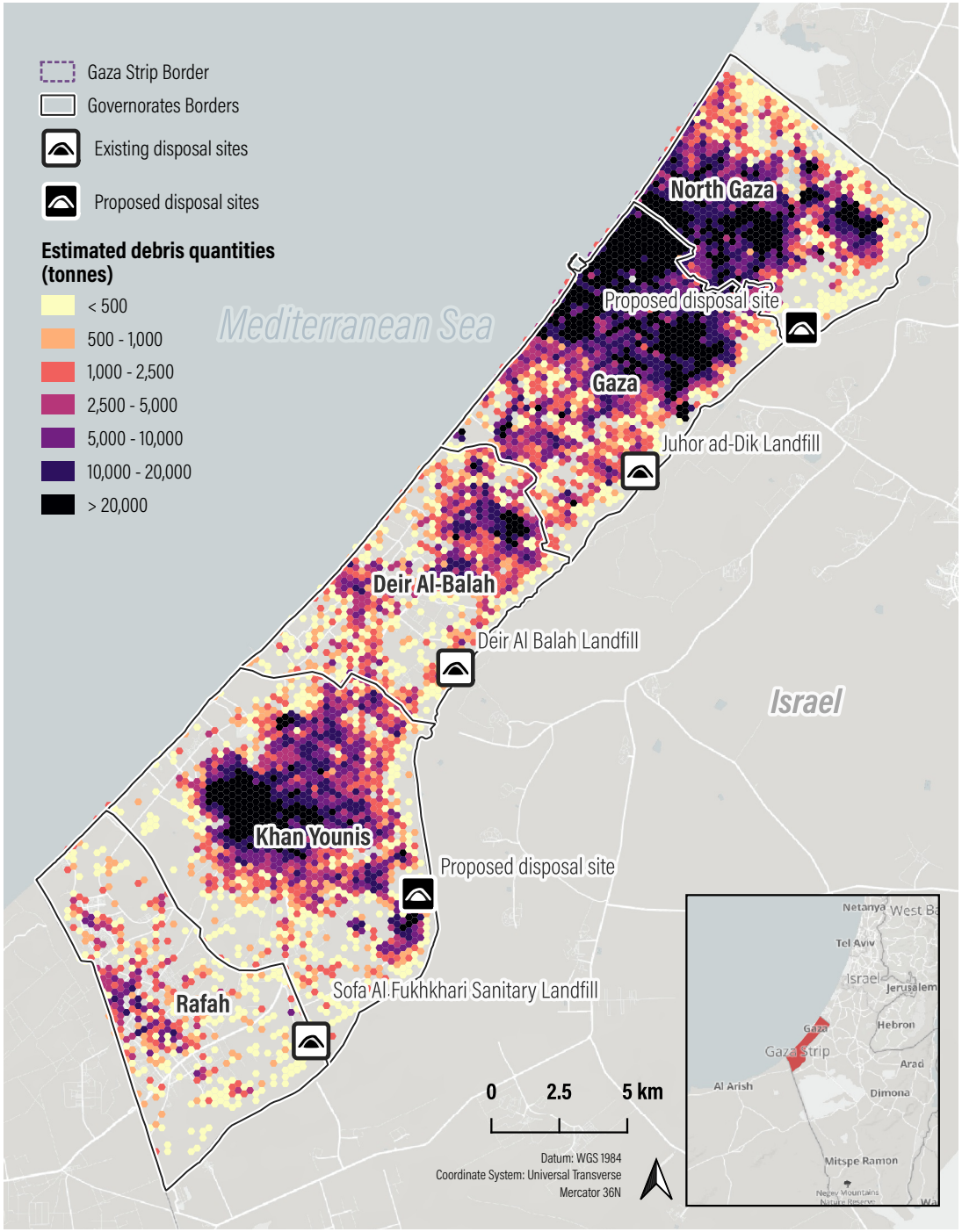


For the debris optioneering the following scenarios were developed and applied:

A. Disposal of all debris at a debris disposal site located centrally in each of the following zones: North Gaza, Gaza, Deir Al-Balah, Khan Younis and Rafah;

B. 50% disposal of the debris to locations as above scenario A, and 50% recycling of the debris at the following sites using 105 trucks: 1 centralised debris recycling in North Gaza, 1 centralised debris recycling in Gaza, 1 centralised debris recycling in Khan Younis that serves Deir Al-Balah, Khan Younis and Rafah.

Mine action/EOD costs are approximately 10% of debris management costs according to UNMAS.



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

SCENARIO 1 - ALL TO DISPOSAL
Debris Management Outputs

Time to clear with 105 trucks (years)	16
Time to recycle (years)	0
Total time to clear and recyle (years)	16
Total cost to clear (US$) Including project management	688,710,000
Revenue from recycling (US$)	0
Cost less revenue (US$)	**688,710,000**
UNMAS estimate for EOD support (US$)	68,871,000
Total distance covered (km)	21,748,000
CO2e from trucking (tCO2)	35,750
Cost of haulage (US$)	501,070,000
Material recovered for reconstruction (tonnes)	0
Material recovered for reconstruction (%)	0
Cost of processing of debris (US$)	0
Value of recovered material in market (US$)	0
Total cost of natural raw materials substituted (US$)	0
Material disposed	41,755,800 t (100%)
Total space required for disposal (ha/donum)	521 / 5,210
Value of land taken by disposal (US$/5 years)	2,610,000

SCENARIO 2 - 50% RECYCLING
Debris Management Outputs

Time to clear with 105 trucks (years)	16
Time to recycle (years)	48
Total time to clear and recyle (years)	48
Total cost to clear (US$) Including project management	860,040,000
Revenue from recycling (US$)	313,170,000
Cost less revenue (US$)	**546,870,000**
UNMAS estimate for EOD support (US$)	86,004,000
Total distance covered (km)	22,646,000
CO2e from trucking (tCO2)	37,230
Cost of haulage (US$)	501,070,000
Material recovered for reconstruction (tonnes)	20,878,000
Material recovered for reconstruction (%)	50
Cost of processing of debris (US$)	146,145,000
Value of recovered material in market (US$)	313,170,000
Total cost of natural raw materials substituted (US$)	709,850,000
Material disposed	20,877,800 t (50%)
Total space required for disposal (ha/donum)	261 / 2,610
Value of land taken by disposal (US$/5 years)	1,304,000