

REACH

An initiative of
IMPACT Initiatives,
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SHELTER DAMAGE ATLAS

Falluja City

Republic of Iraq



United Nations Institute for Training and Research

unitar



UNOSAT



Shelter Damage Reference Maps

July 2021

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Iraq Shelter Damage Atlas: Satellite Detected Damage, Falluja City

Overview:

Falluja city, the capital of Falluja district is located in Anbar governorate, 69 kilometers west of Baghdad. It was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014¹. Over the course of the conflict, the city sustained significant damage, including to shelter and basic infrastructure. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 2,648 structures into three damage levels (destroyed, severely damaged, moderately damaged) for all 19 neighborhoods of Falluja city. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 4,278 impacted sites being rehabilitated, reconstructed or constructed.

This atlas therefore presents the scale of damage immediately following the end of military interventions in Falluja with comparisons based on levels of reconstruction/rehabilitation from 2019.

Methodology:

The shelter damage atlas is developed based on satellite imagery from the Operational Satellite Applications Programme (UNOSAT) and UNITAR². Using the satellite imagery REACH detects and classifies structures in urban areas into three damage levels (destroyed, severely damaged, moderately damaged)^{3,4}. The intensity of damage to areas is calculated using a weighted kernel density technique on identified shelters within the affected areas, in which totally destroyed shelter is given a higher score than one that is only moderately damaged. The definition of damage level and applied weights are given in the following table:

Damage level	Definition	Weight
Destroyed	All or most of the building structure is collapsed (76% - 100% of structure destroyed).	.5
Severely damaged	A significant part of the building structure is collapsed (31%-75% of structure destroyed).	.3
Moderately damaged	Limited damage observed to the building structure (5%-30% of structure damaged).	.2

Then the data is compared with historical imagery, on damage and destruction (immediately following conflict) in order to assess the levels of reconstruction and rehabilitation over time⁵. Rehabilitation status at a neighbourhood level is further classified into three levels (in progress, under construction, reconstruction). The comparison of levels of destruction/damage and levels of rehabilitation/reconstruction are then mapped for a visual analysis of the status of housing infrastructure at a neighbourhood level.

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

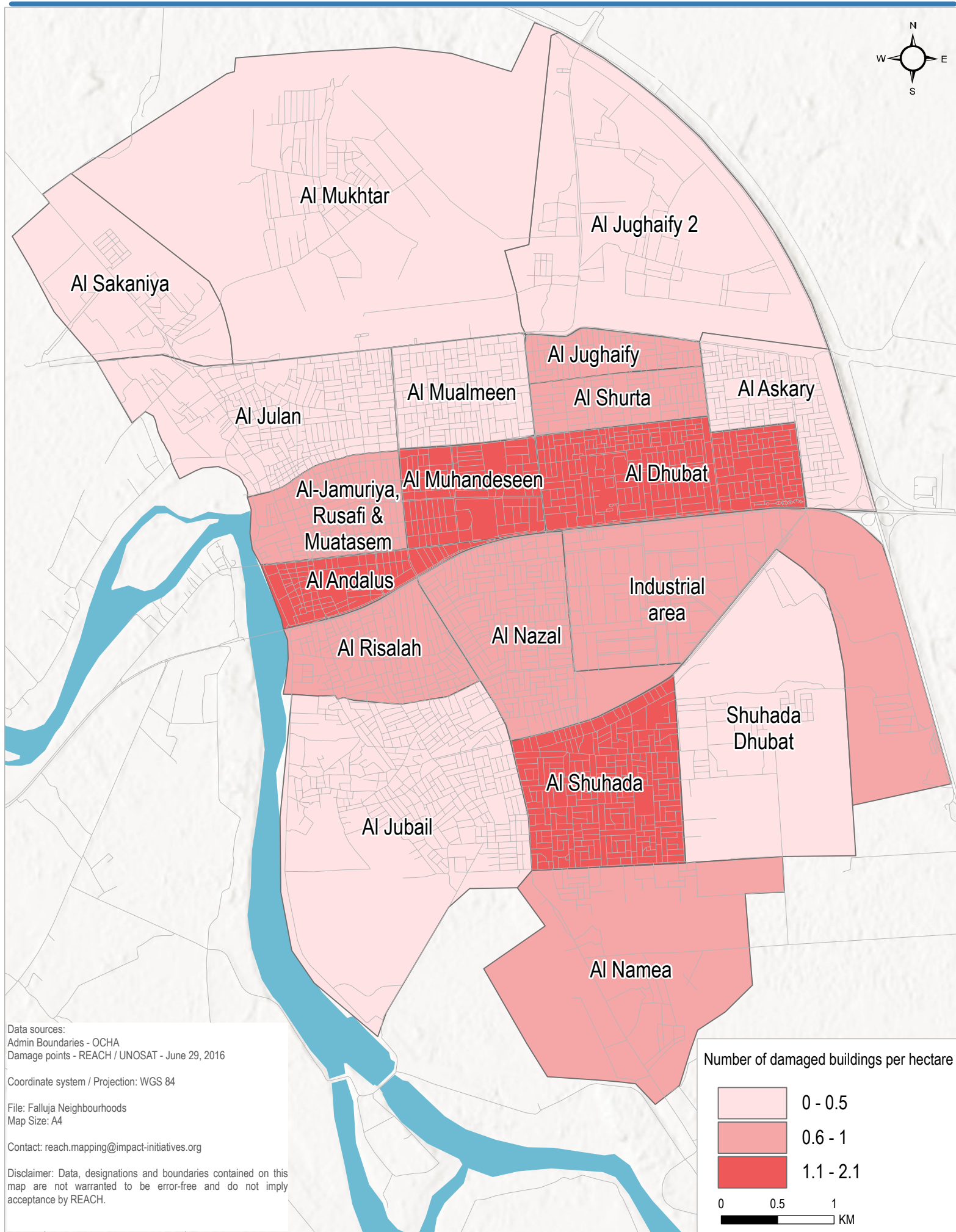
1 - REACH Initiative - Fallujah City Area - Based Assessment (November 2018 - January 2019). Link available [here](#).

2 - Historical data is generally publicly available. Up-to-date data on the status of infrastructure can be purchased for between 10 and 17 United States dollars (USD) per square kilometer depending on source / sensor.

3 - WorldView-2 from 29 June 2016. Copyright: ©2016, DigitalGlobe

4 - GeoEye from 30 November 2014, Pleiades from 16 June 2019. Copyright: CNES

5 - WorldView-3 from 04 November 2019. Copyright: ©2019 DigitalGlobe



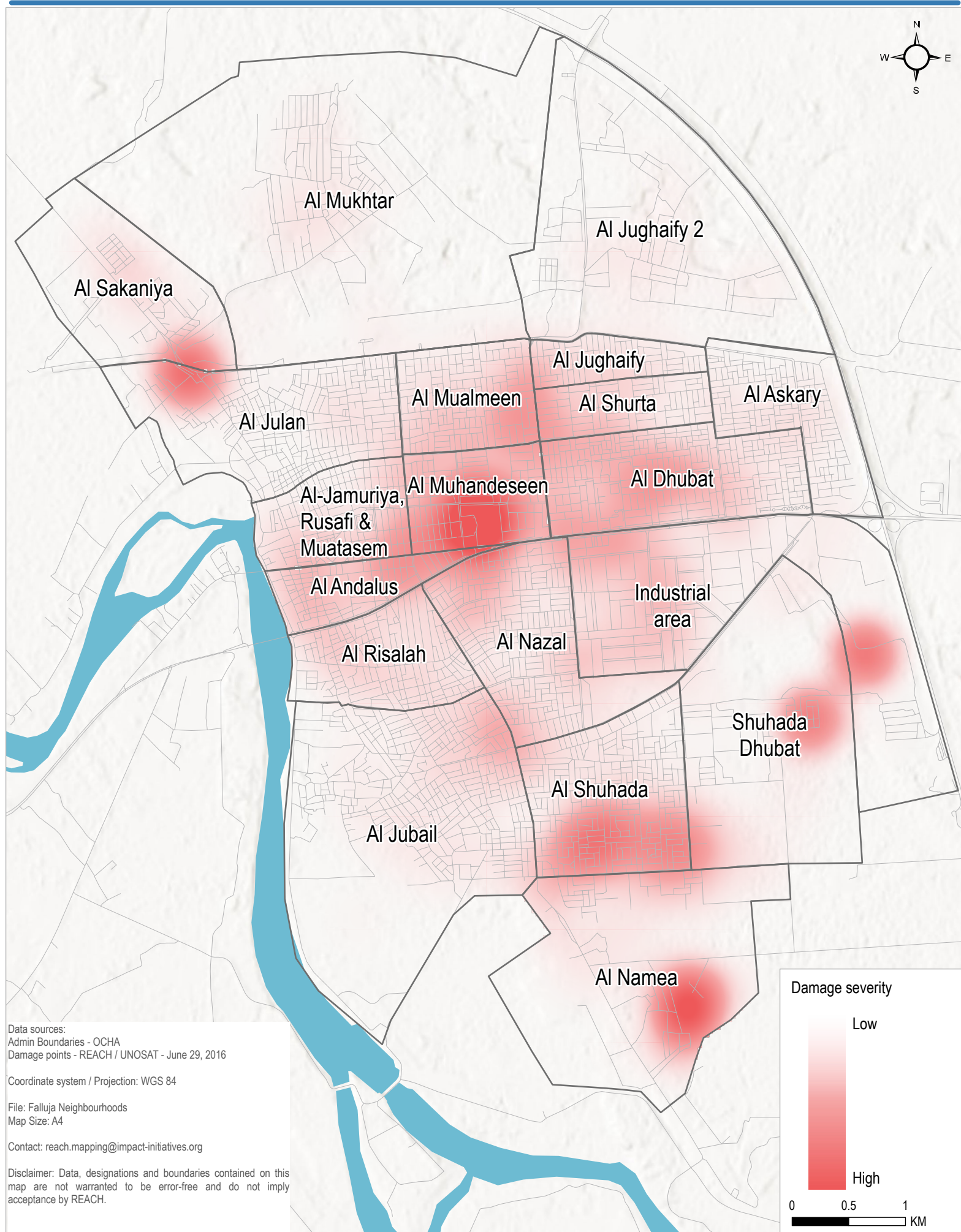
Data sources:
Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016

Coordinate system / Projection: WGS 84

File: Falluja Neighbourhoods
Map Size: A4

Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error-free and do not imply acceptance by REACH.



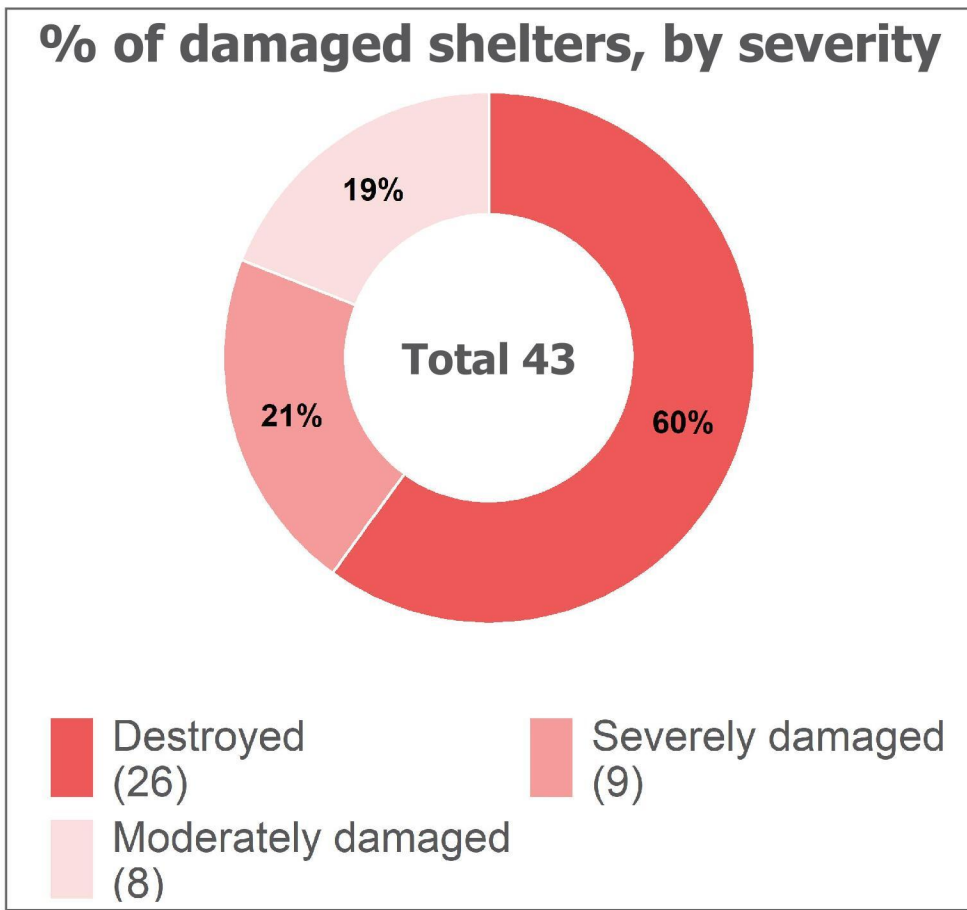
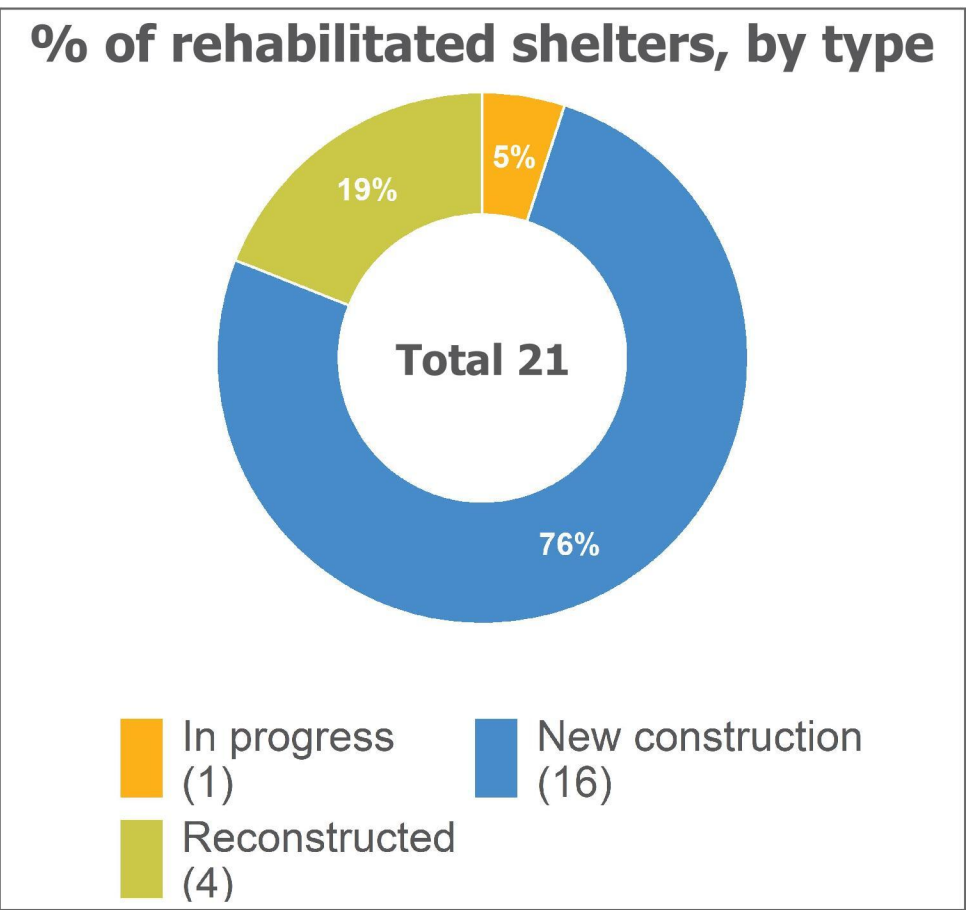
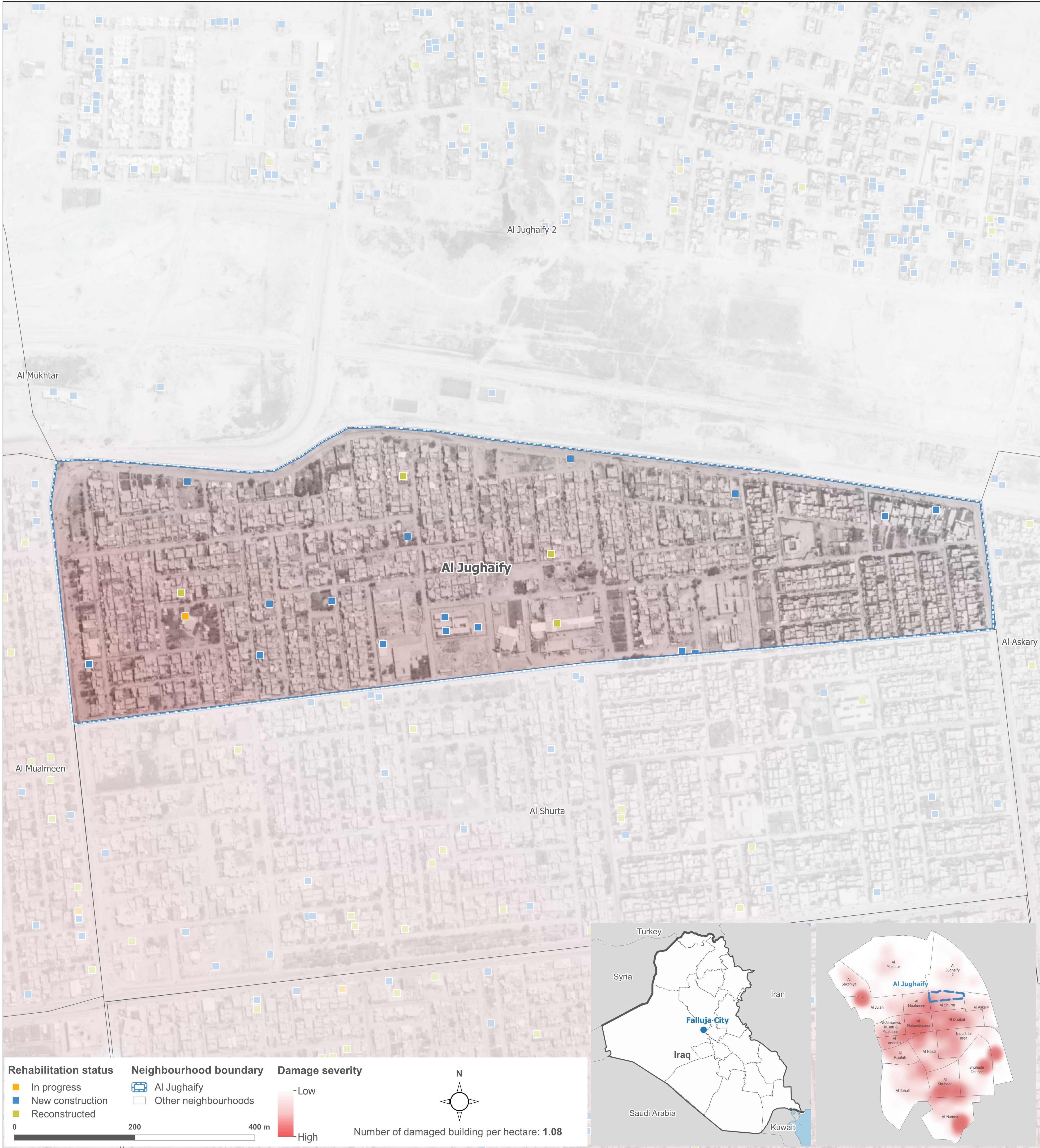
Data sources:
Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016

Coordinate system / Projection: WGS 84

File: Falluja Neighbourhoods
Map Size: A4

Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error-free and do not imply acceptance by REACH.



Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Jughaify neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 43 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Jughaify neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 21 impacted sites being rehabilitated, reconstructed or constructed within the Al Jughaify neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016
Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

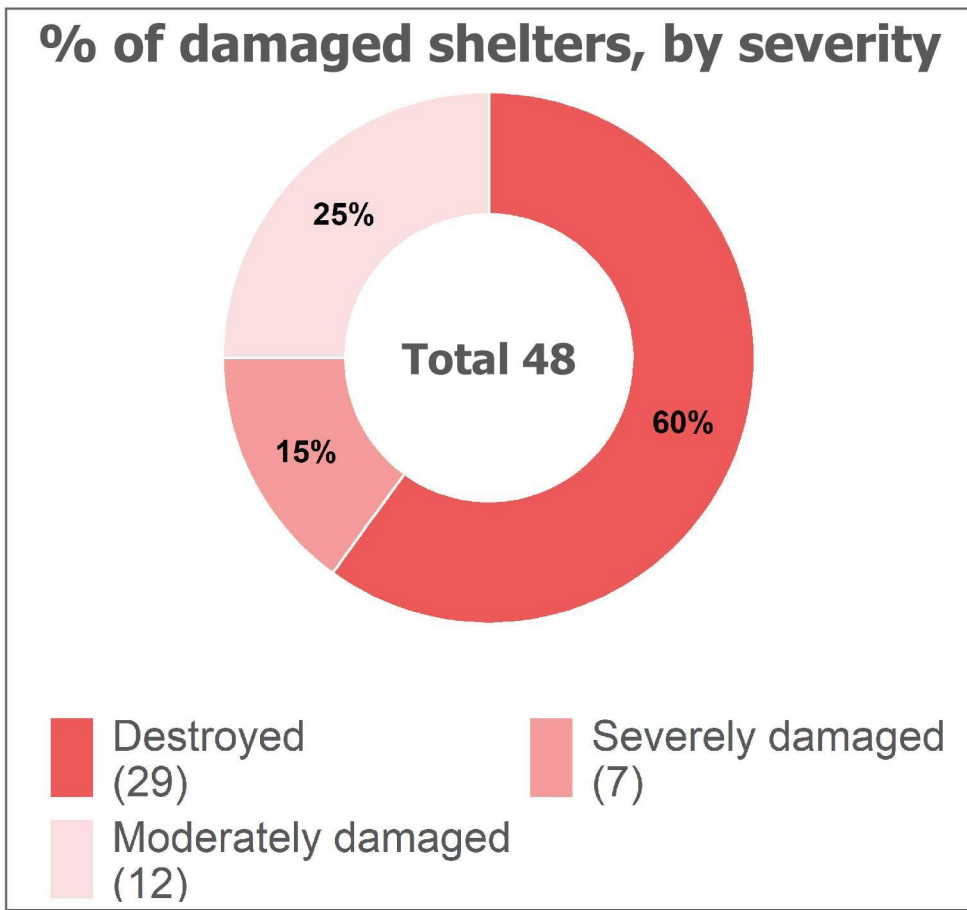
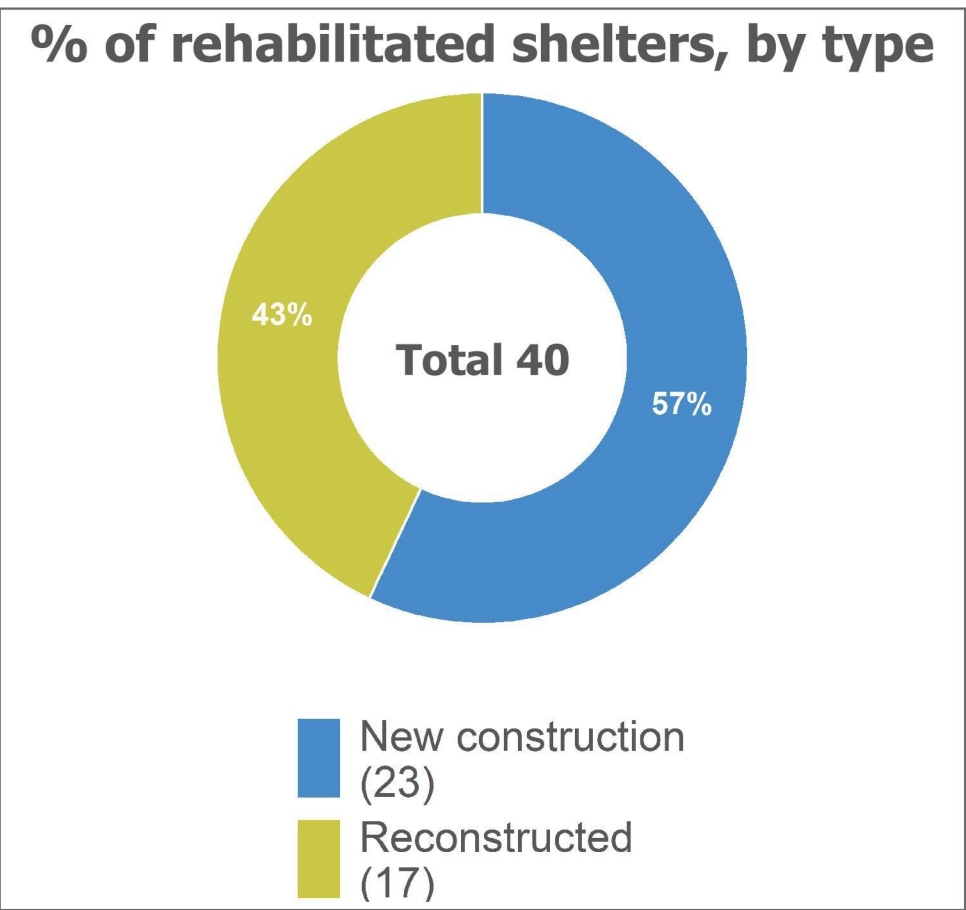
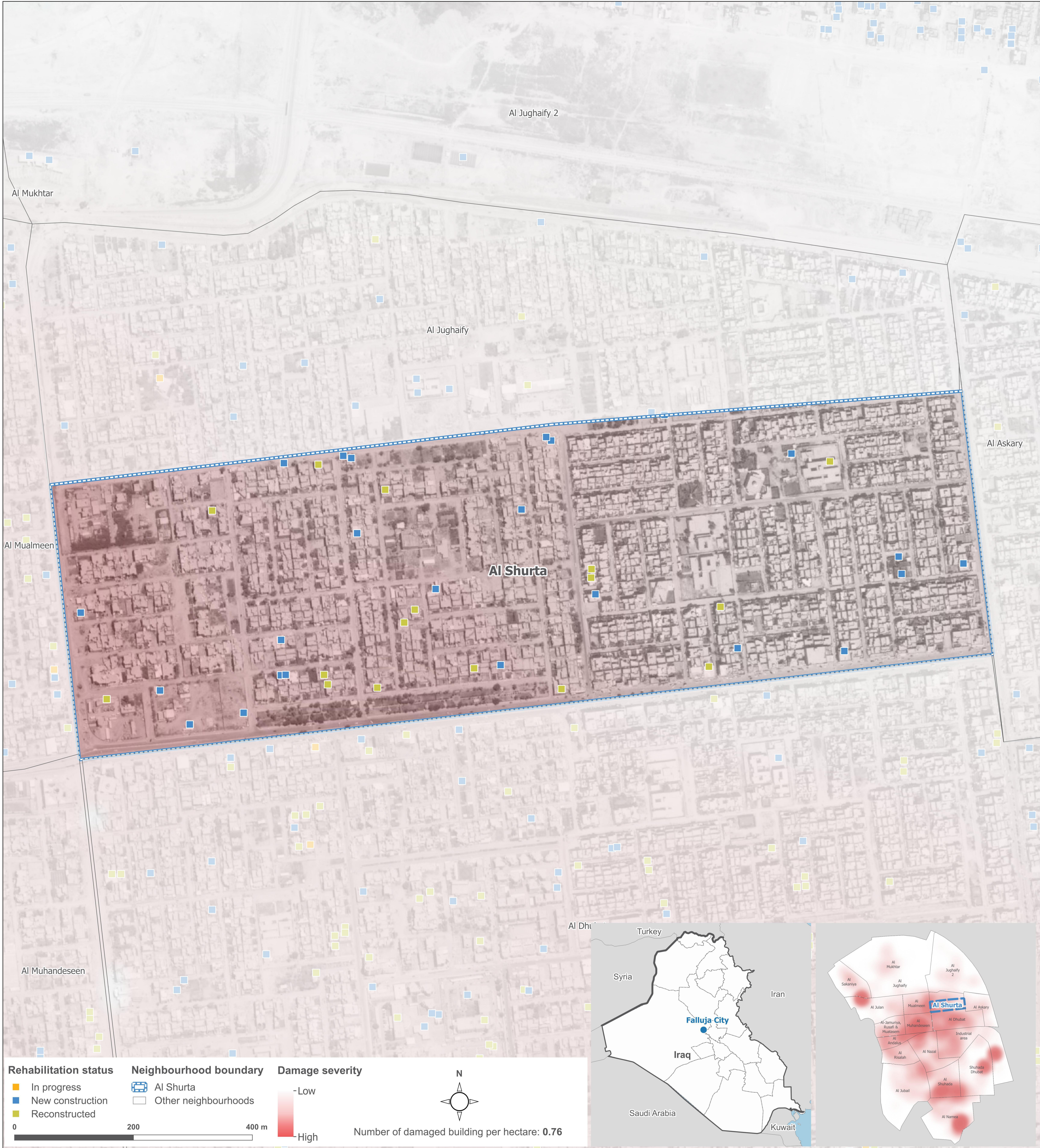
File: Al Jughaify
Map Size: A1

Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

Funded by:





Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Shurta neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 48 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Shurta neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 40 impacted sites being rehabilitated, reconstructed or constructed within the Al Shurta neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016
Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

File: Al Shurta
Map Size: A1

Contact: reach.mapping@impact-initiatives.org

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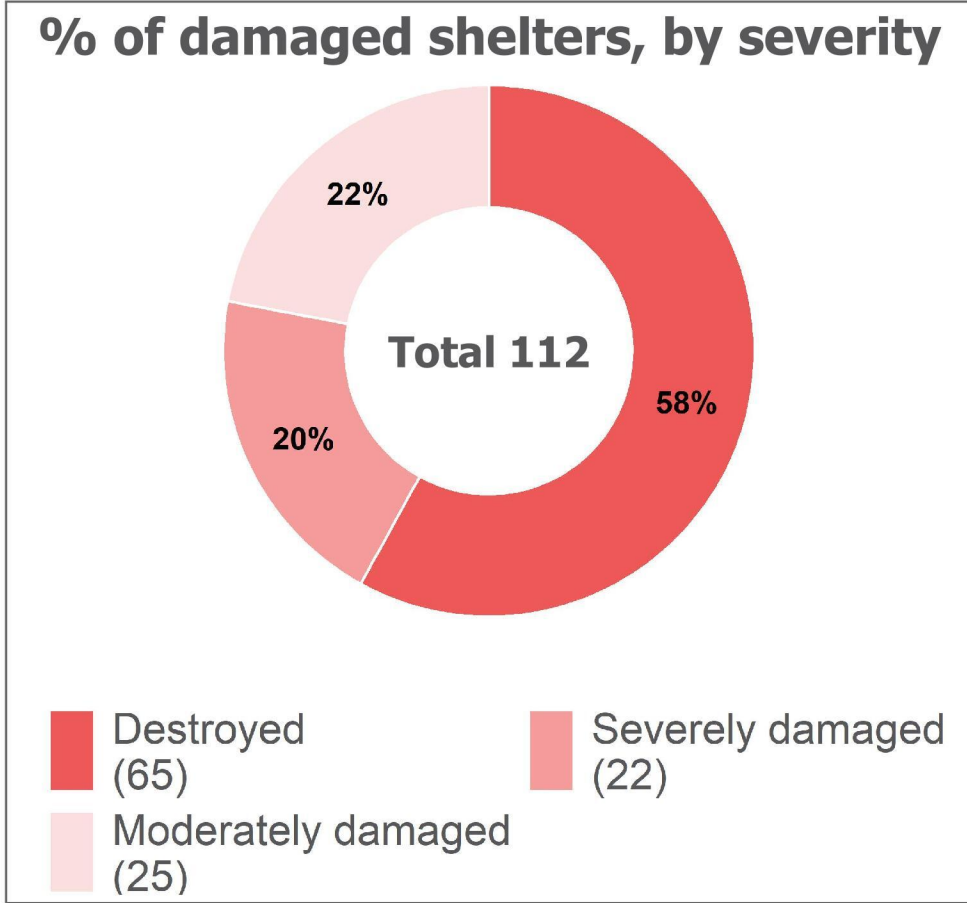
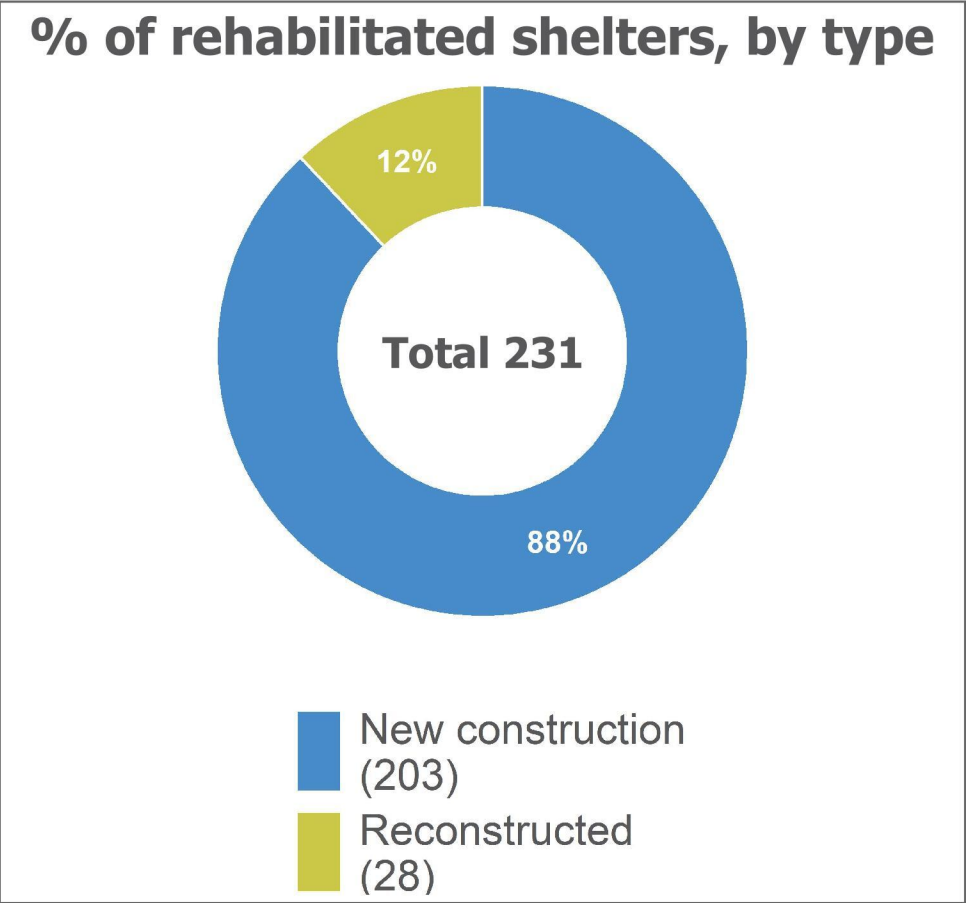
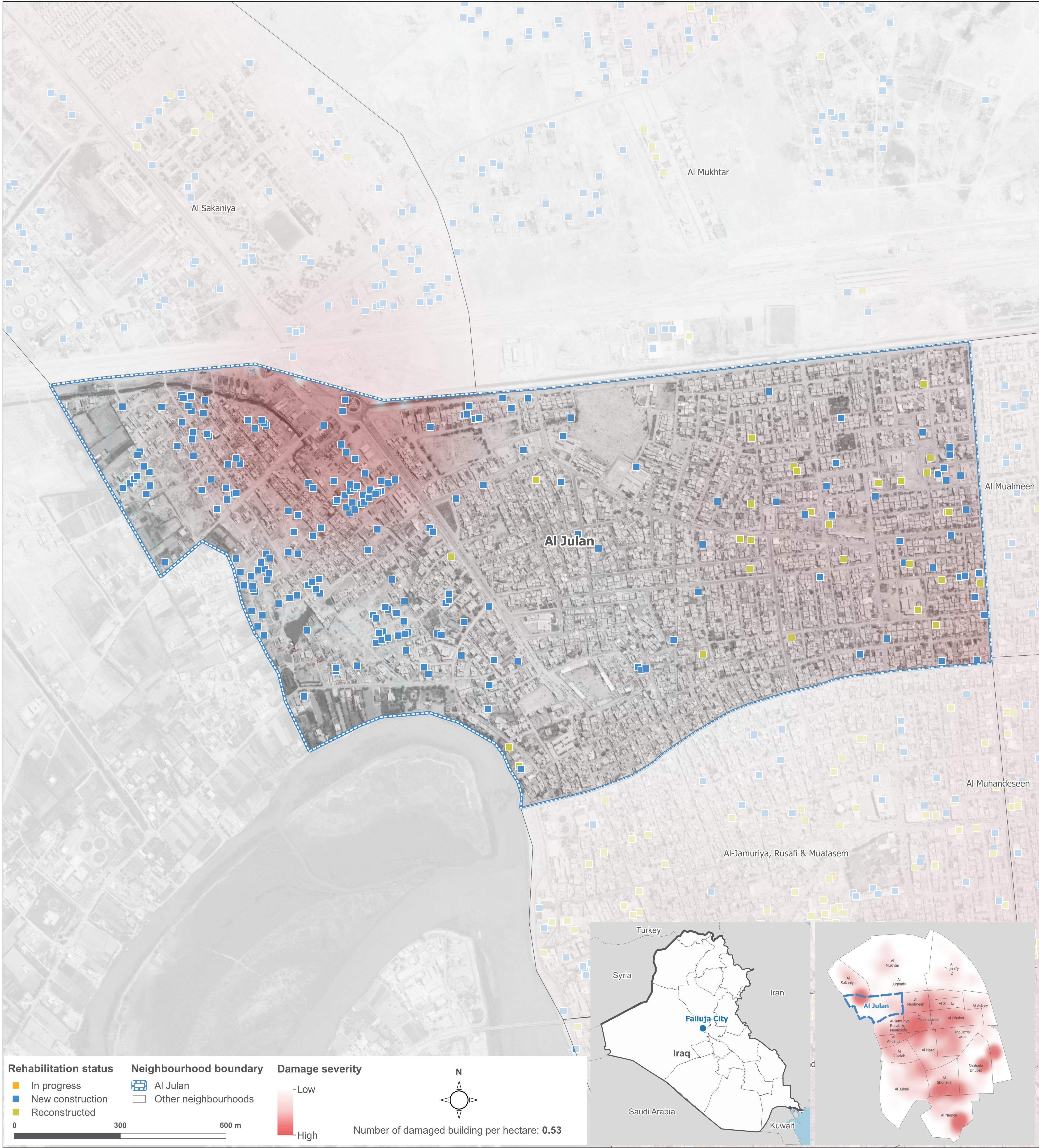
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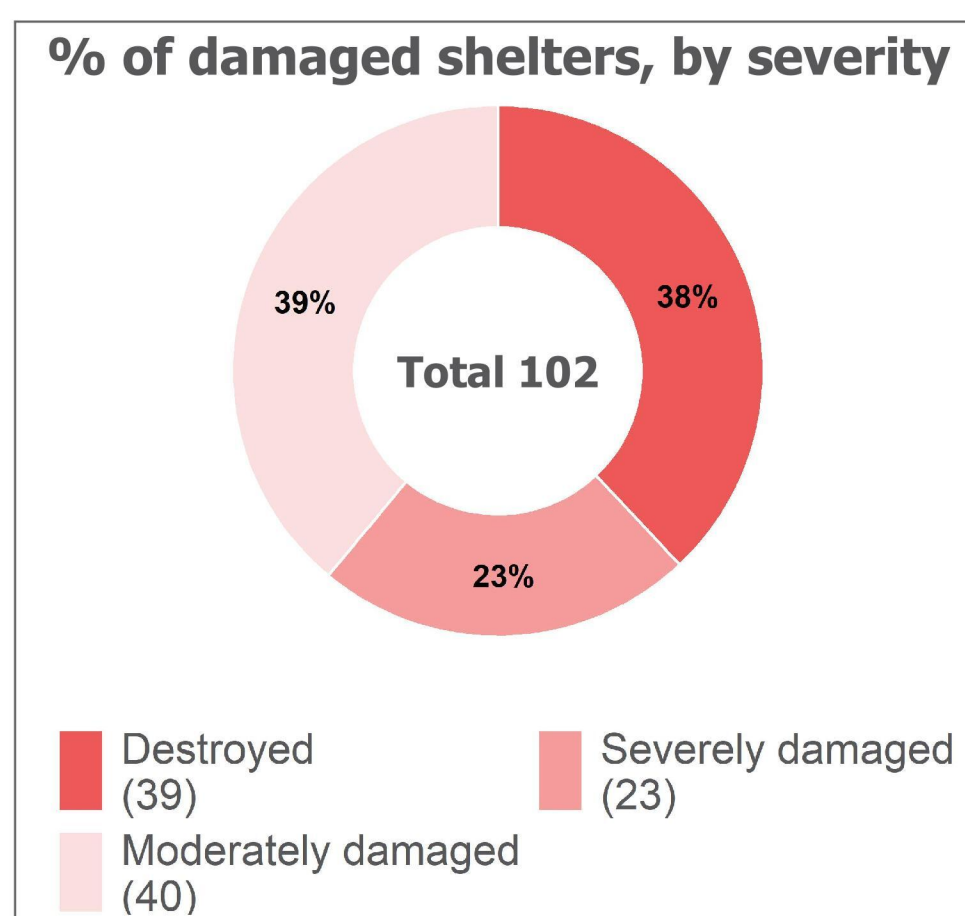
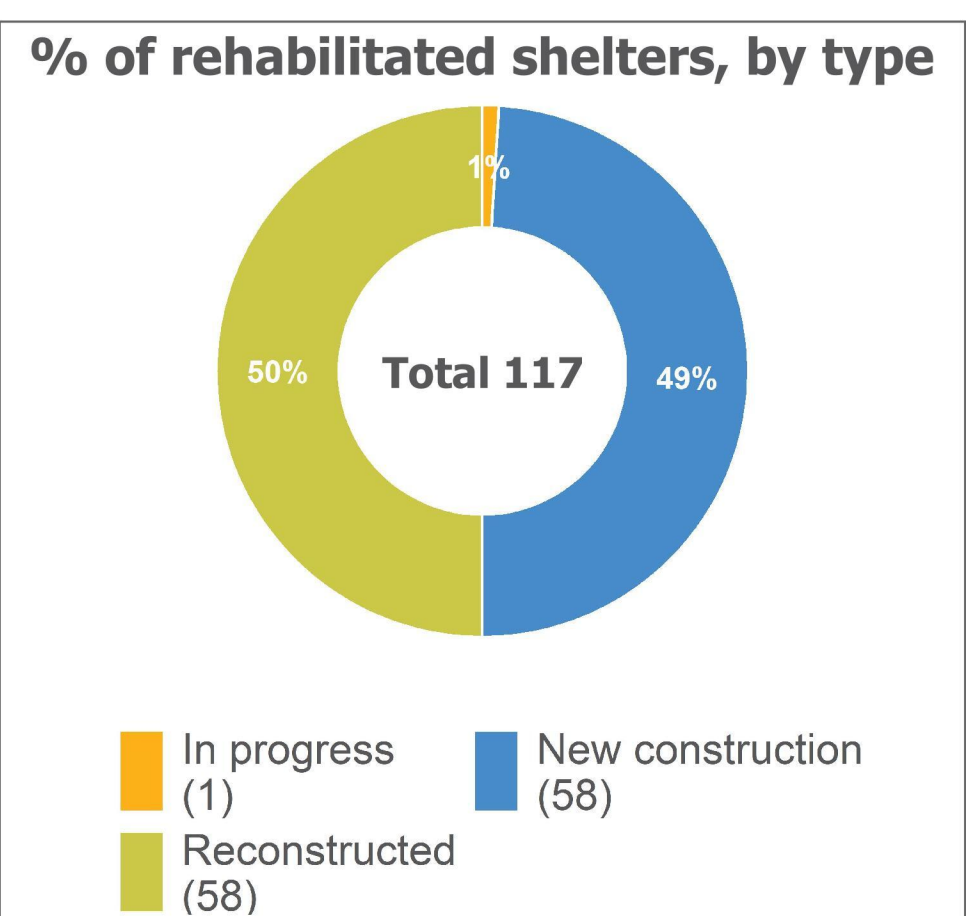
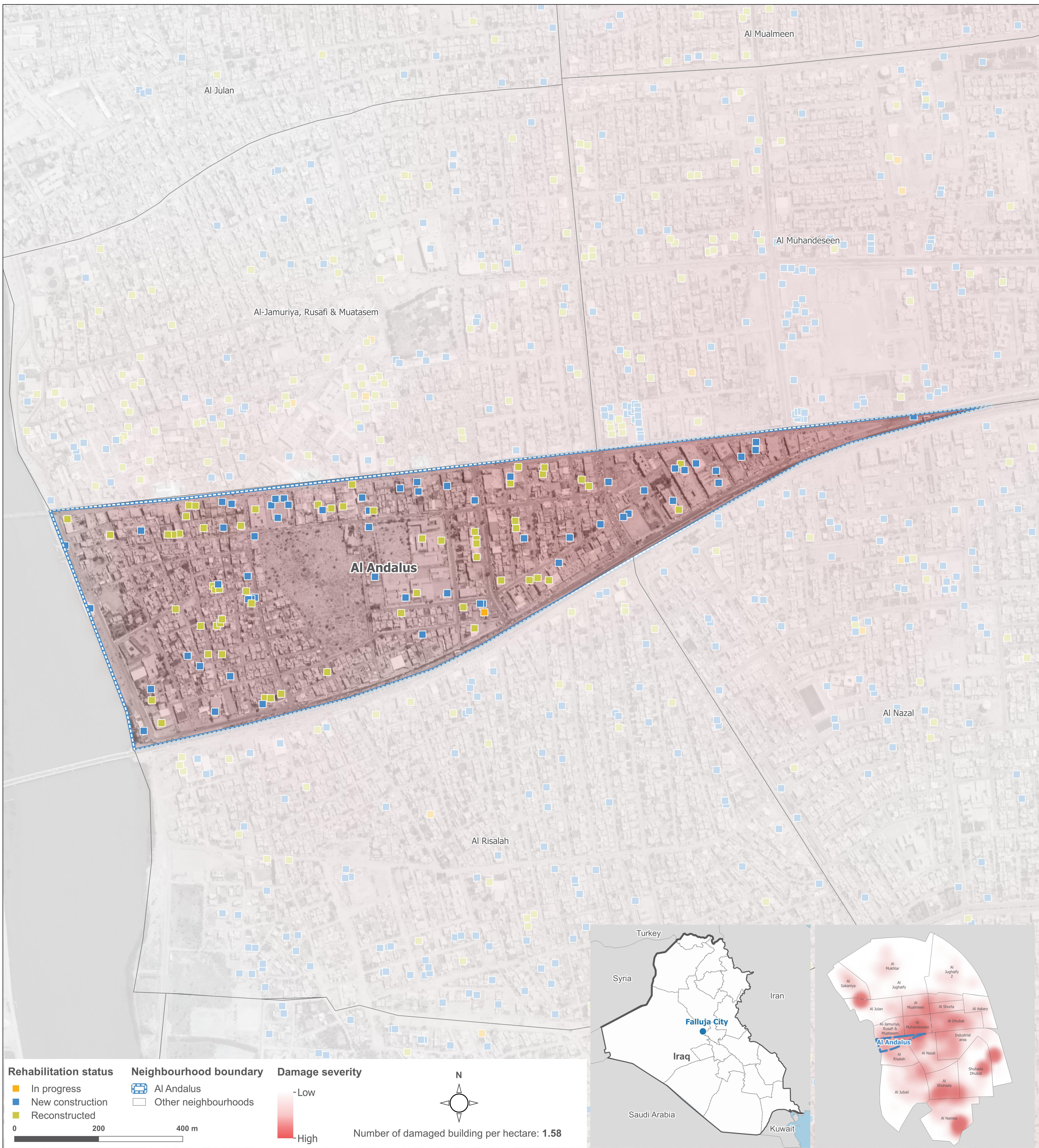


Rehabilitation and Damage Mapping

Falluja City, Iraq

Al Andalus

For Humanitarian Purpose Only
Production Date: 2021-07-08



Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Andalus neighbourhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 102 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Andalus neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 117 impacted sites being rehabilitated, reconstructed or constructed within the Al Andalus neighbourhood of Falluja city.

Data sources:
 Admin Boundaries - OCHA
 Damage points - REACH / UNOSAT - June 29, 2016
 Rehabilitation Points - REACH / UNOSAT - November 4, 2019
 Coordinate System / Projection: WGS 84

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:



Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

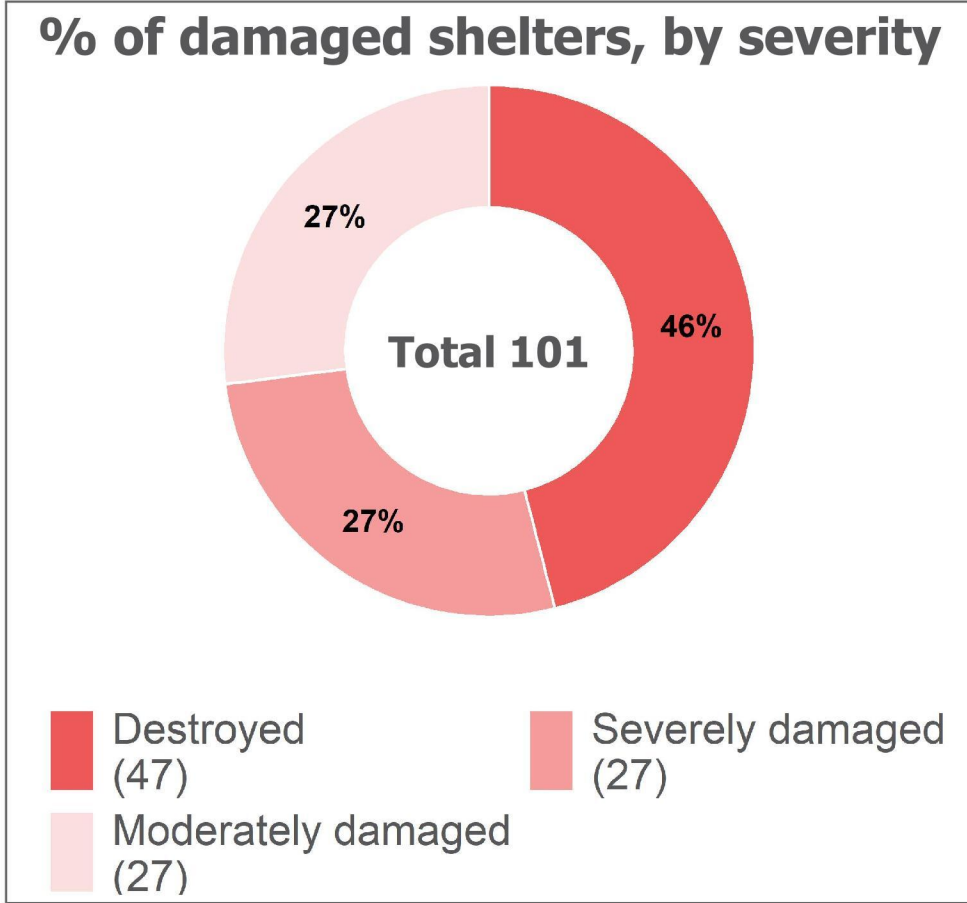
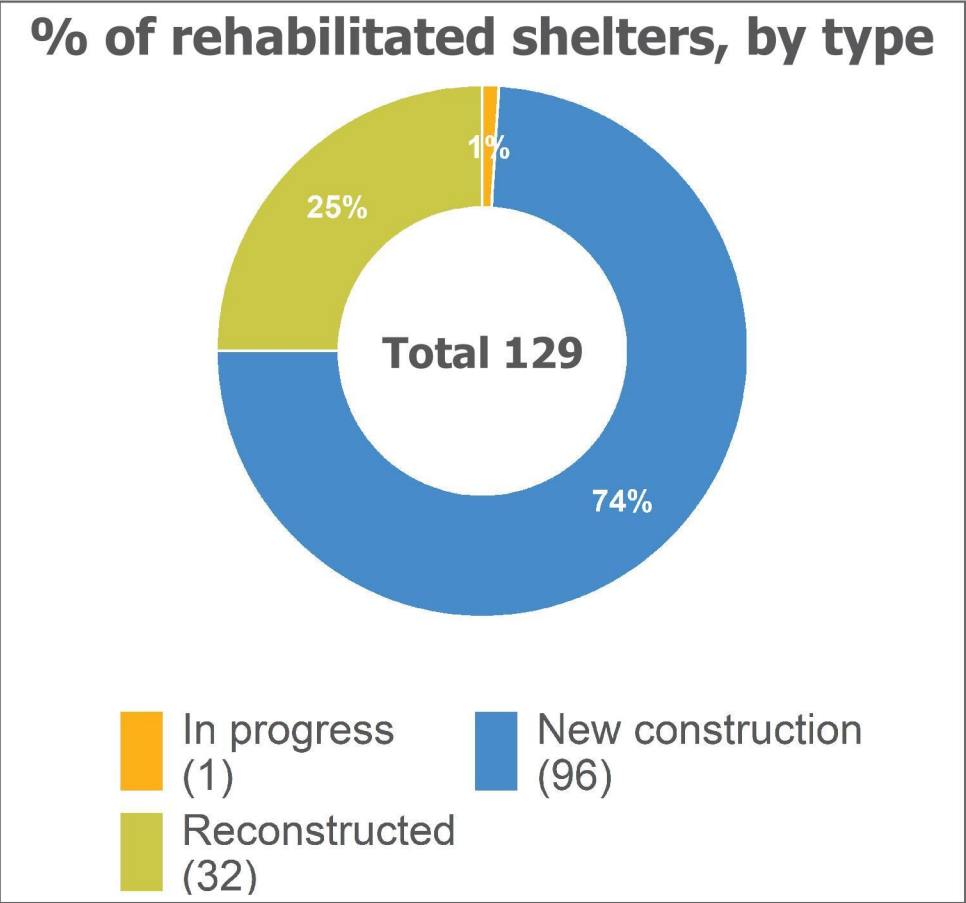
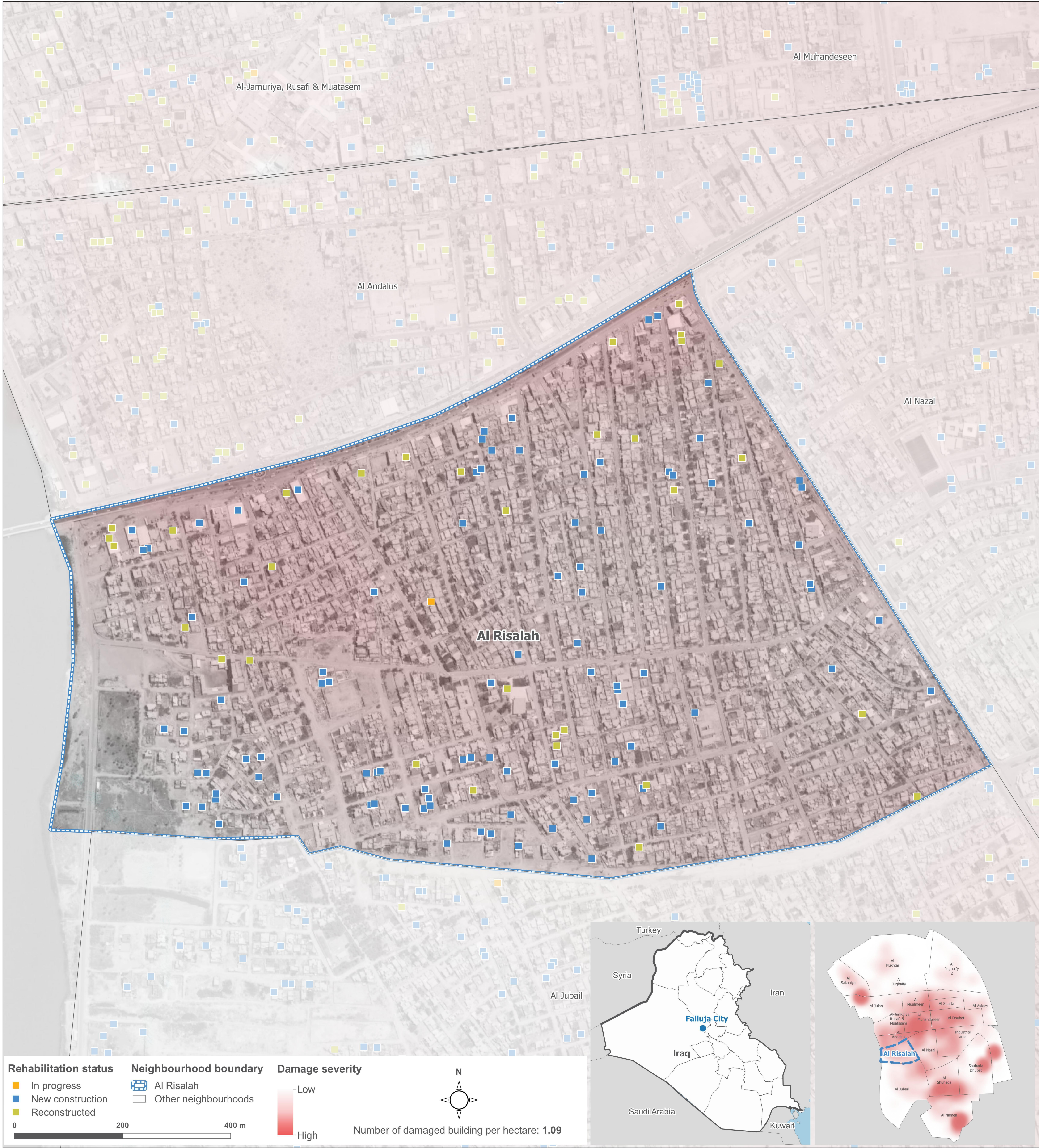
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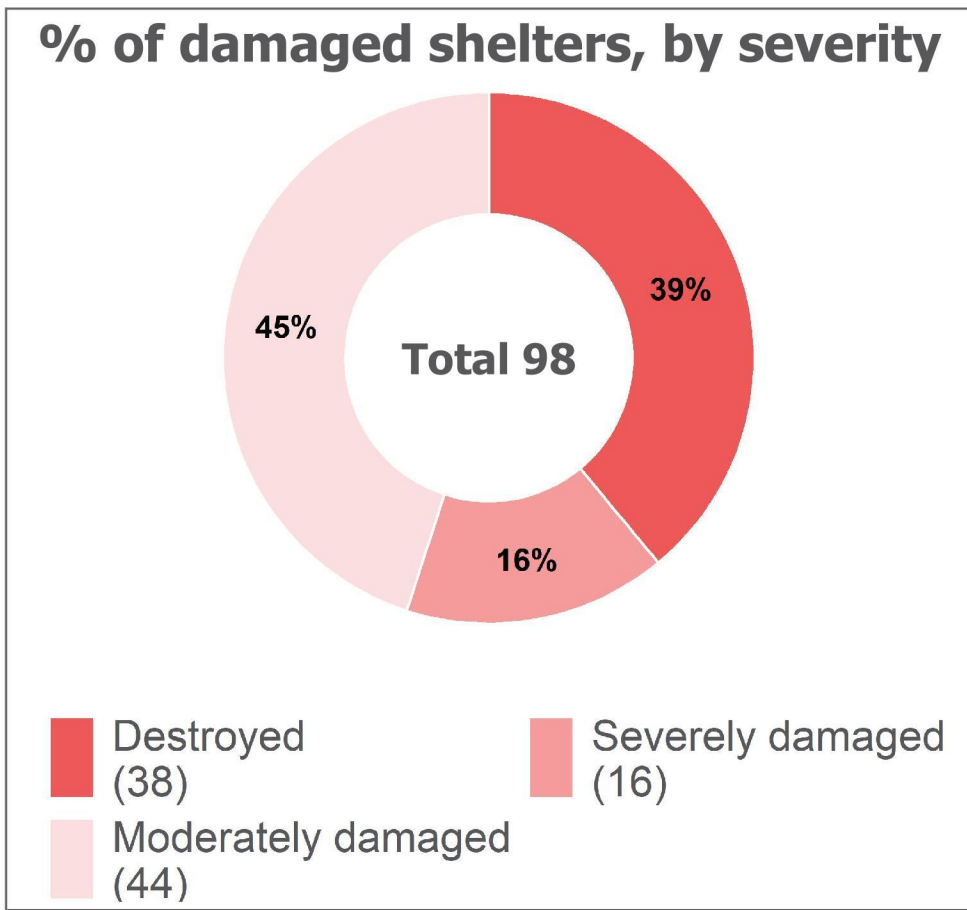
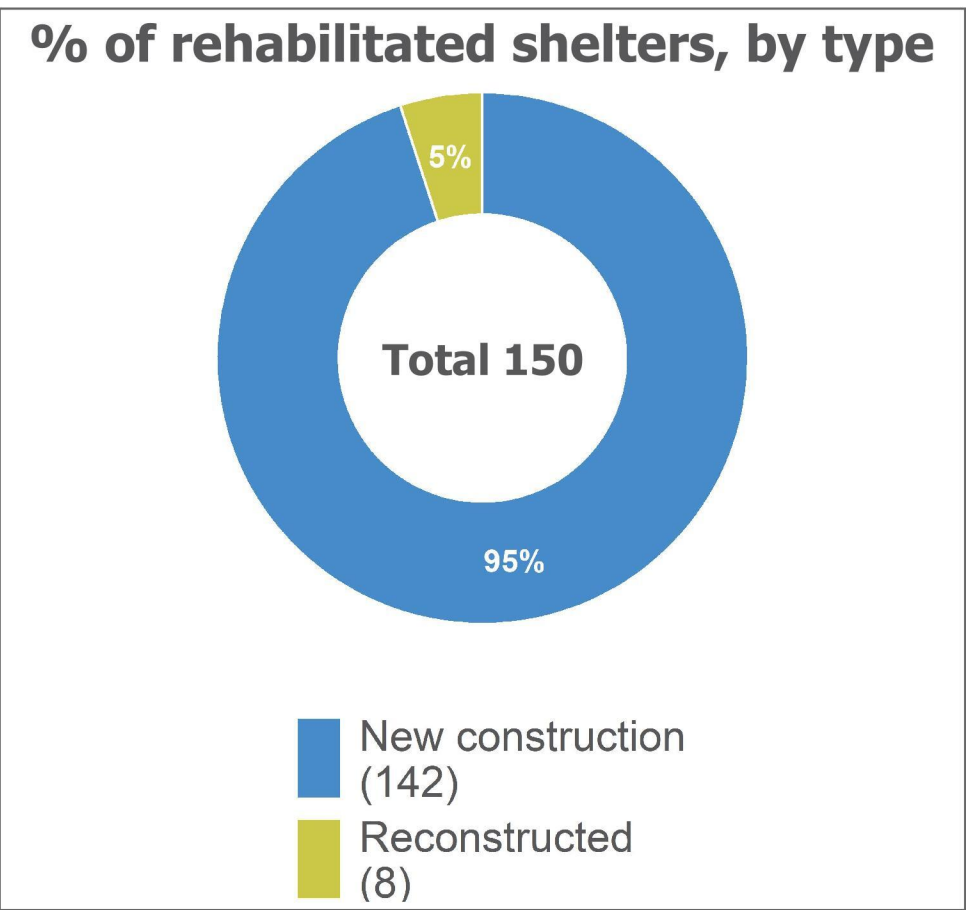
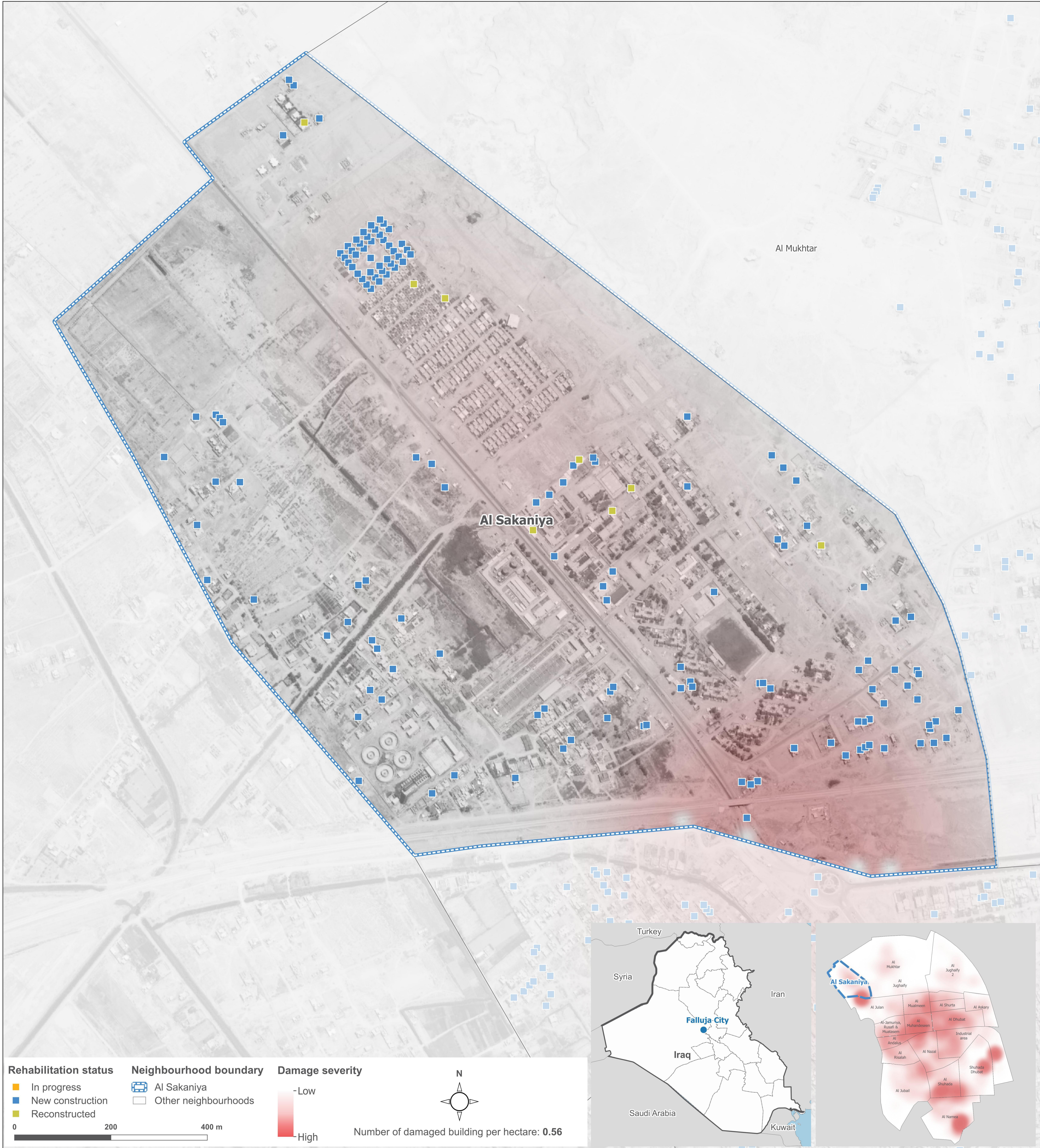
Funded by:

  **unitar**
United Nations Institute
for Training and Research

Funded by:







Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Sakaniya neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 98 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Sakaniya neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 150 impacted sites being rehabilitated, reconstructed or constructed within the Al Sakaniya neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

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Data sources:

- Admin Boundaries - OCHA
- Damage points - REACH / UNOSAT - June 29, 2016
- Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

File: Al Sakaniya
Map Size: A1

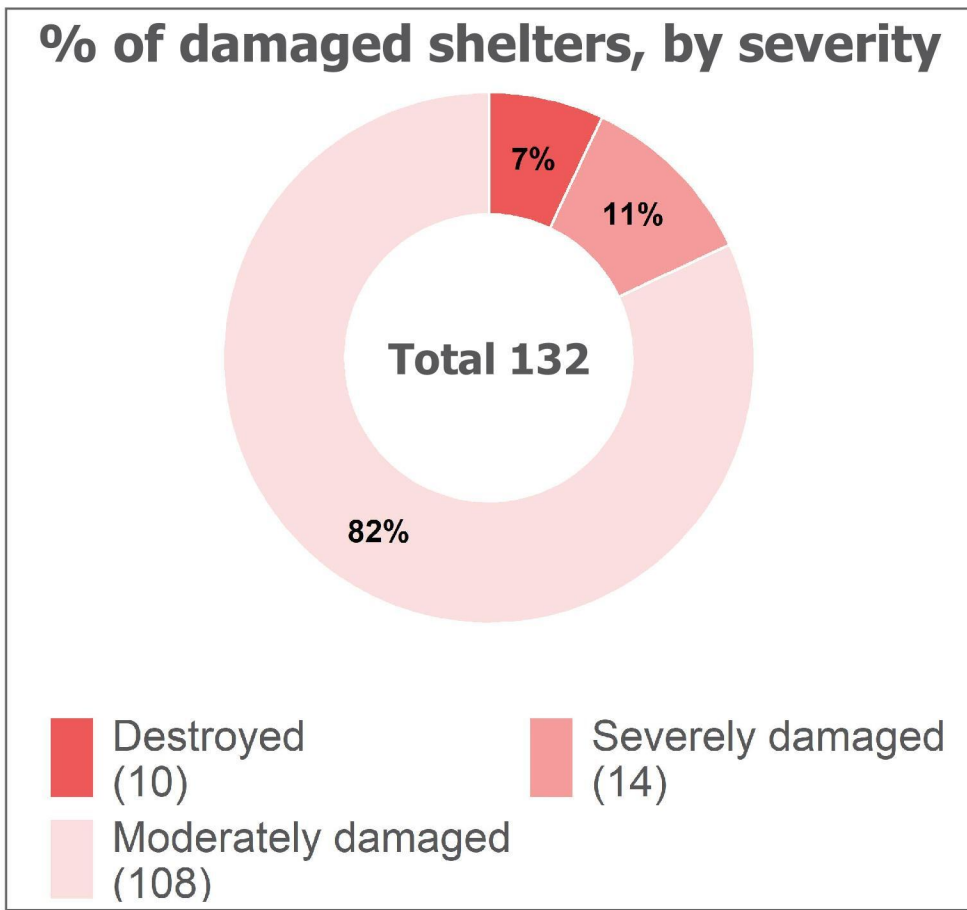
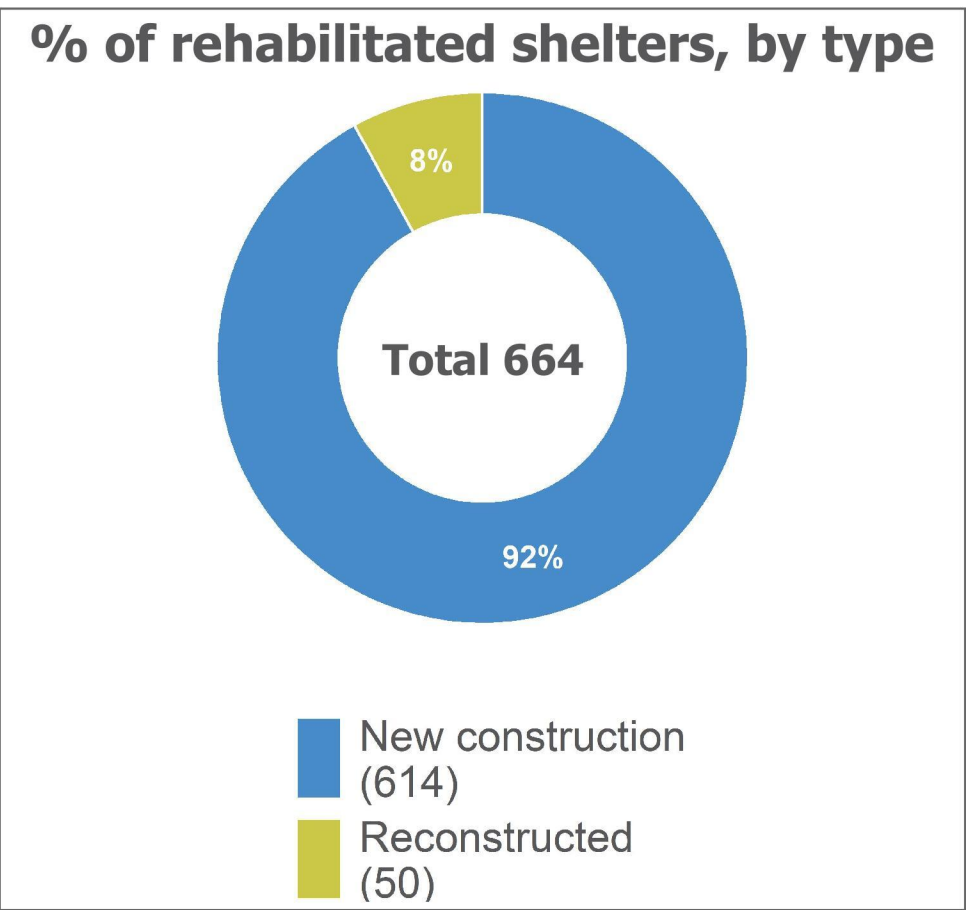
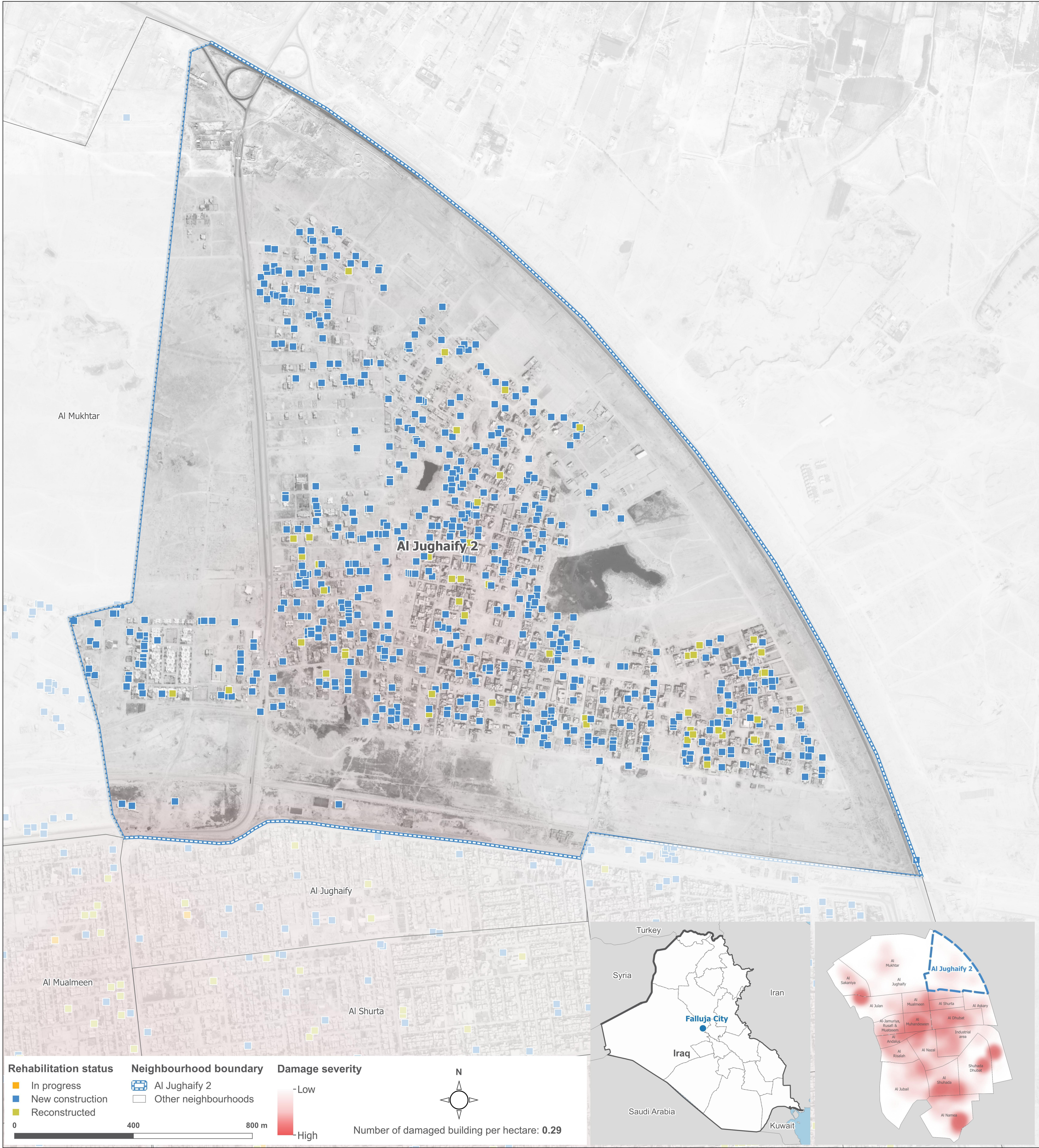
Contact: reach.mapping@impact-initiatives.org

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Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Jughaify 2 neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 132 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Jughaify 2 neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 664 impacted sites being rehabilitated, reconstructed or constructed within the Al Jughaify 2 neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

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Data sources:

Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016
Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

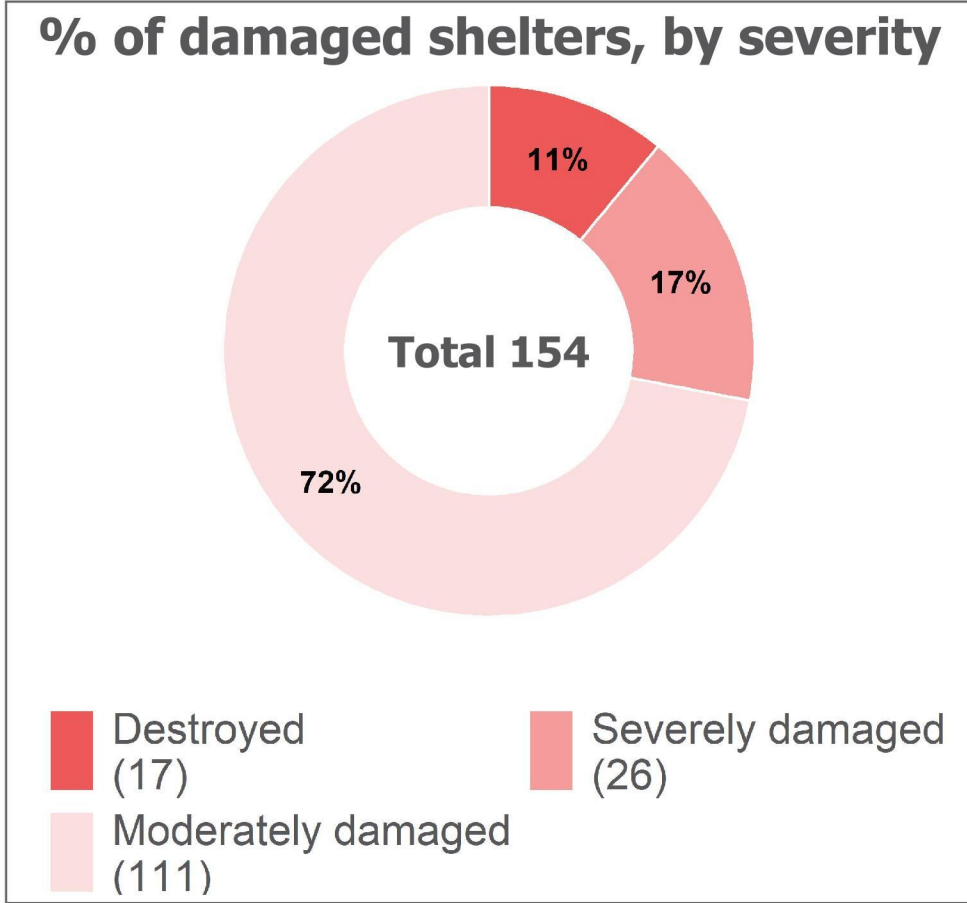
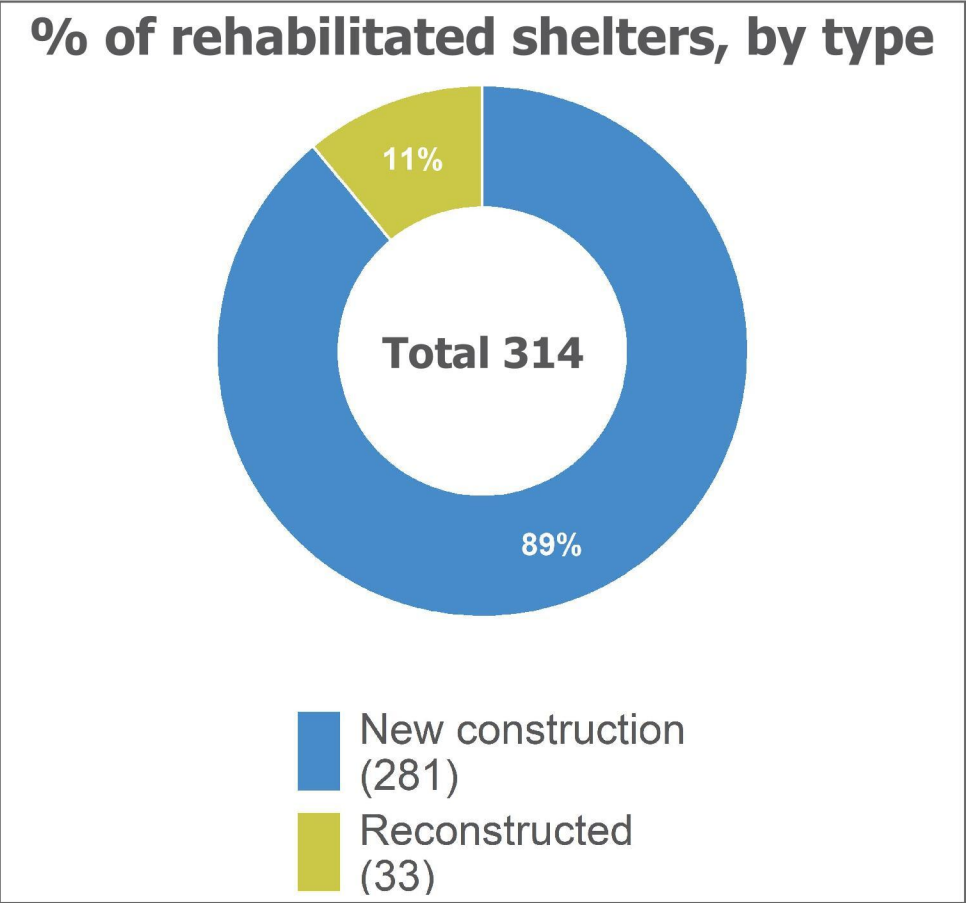
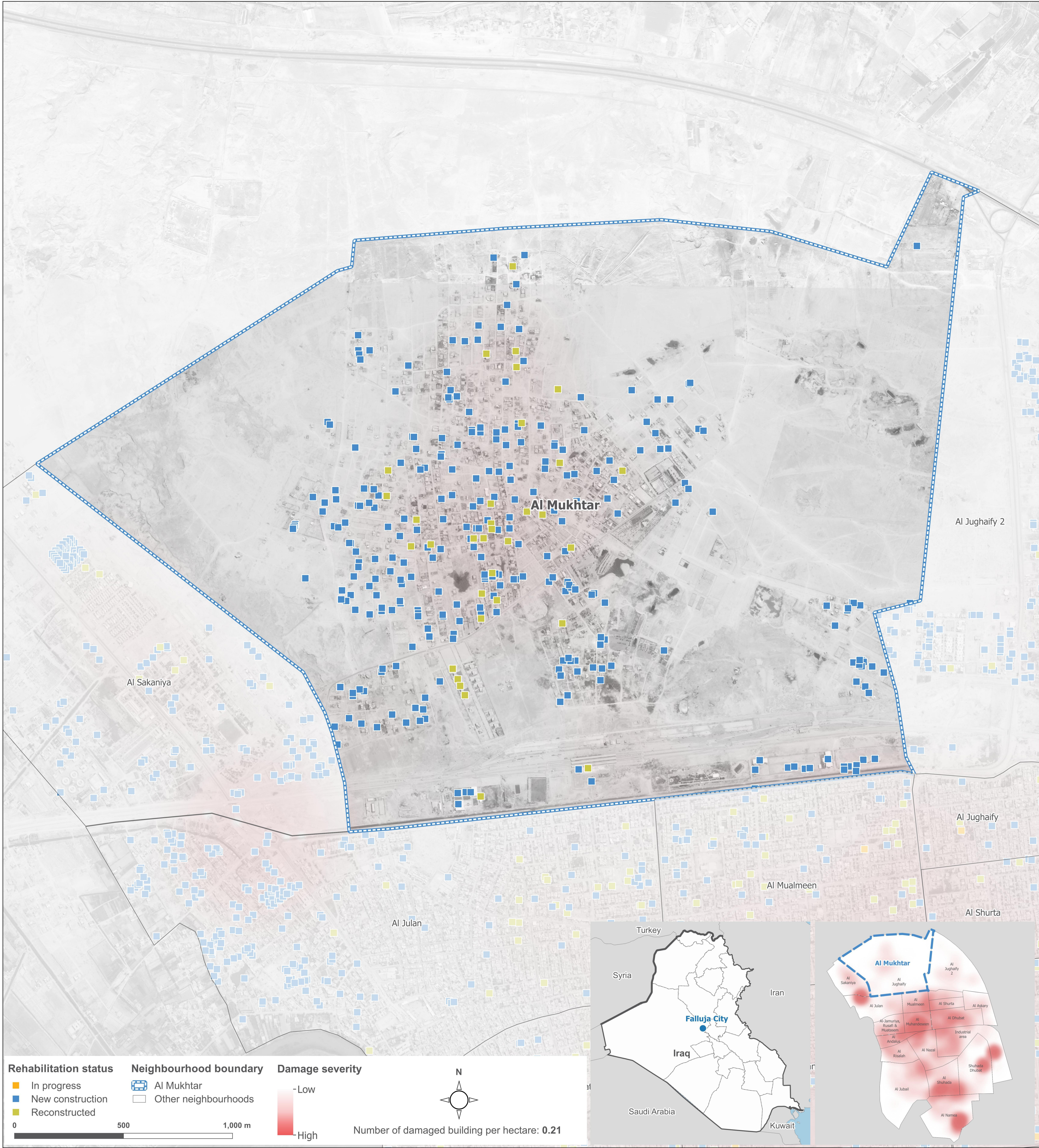
File: Al Jughaify 2
Map Size: A1

Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

Funded by:





Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Mukhtar neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 154 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Mukhtar neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 314 impacted sites being rehabilitated, reconstructed or constructed within the Al Mukhtar neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

- Admin Boundaries - OCHA
- Damage points - REACH / UNOSAT - June 29, 2016
- Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

File: Al Mukhtar
Map Size: A1

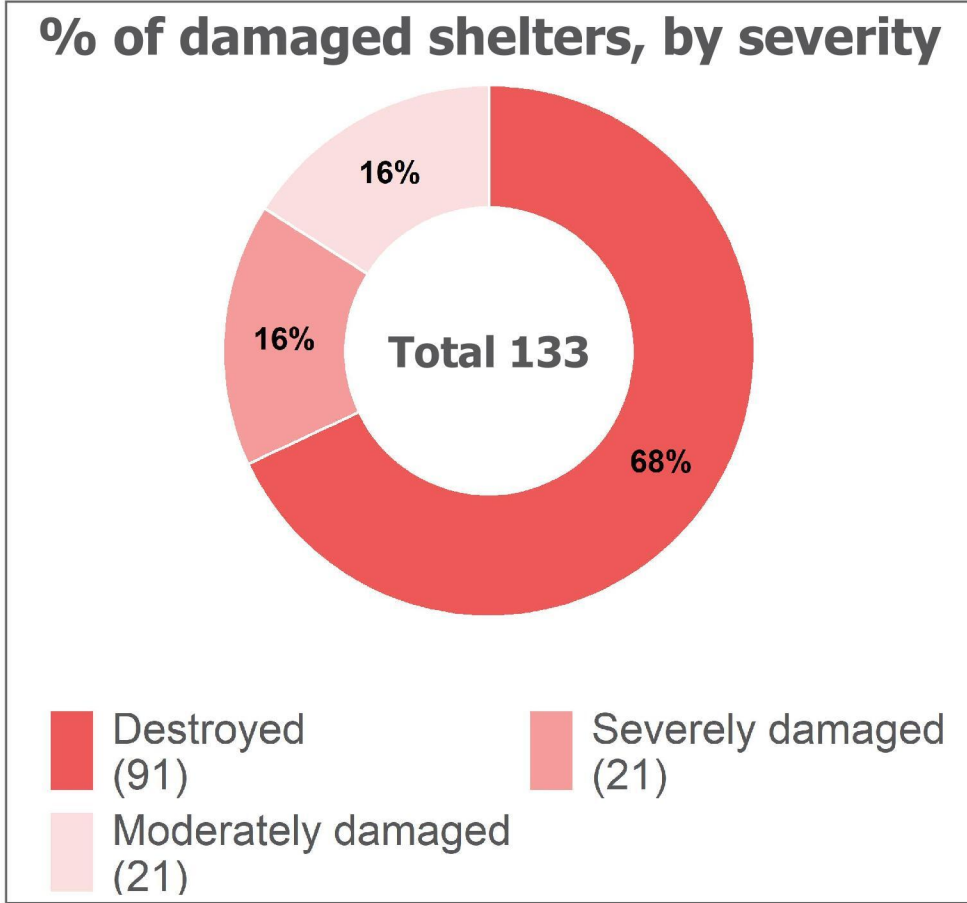
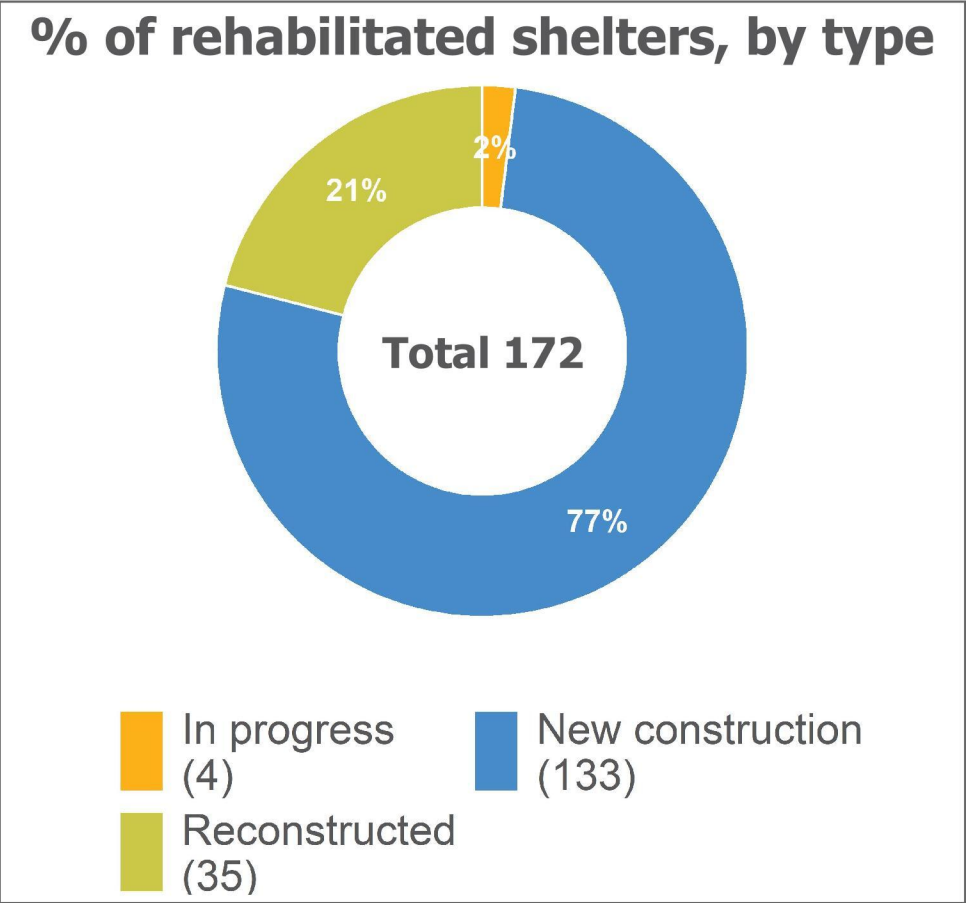
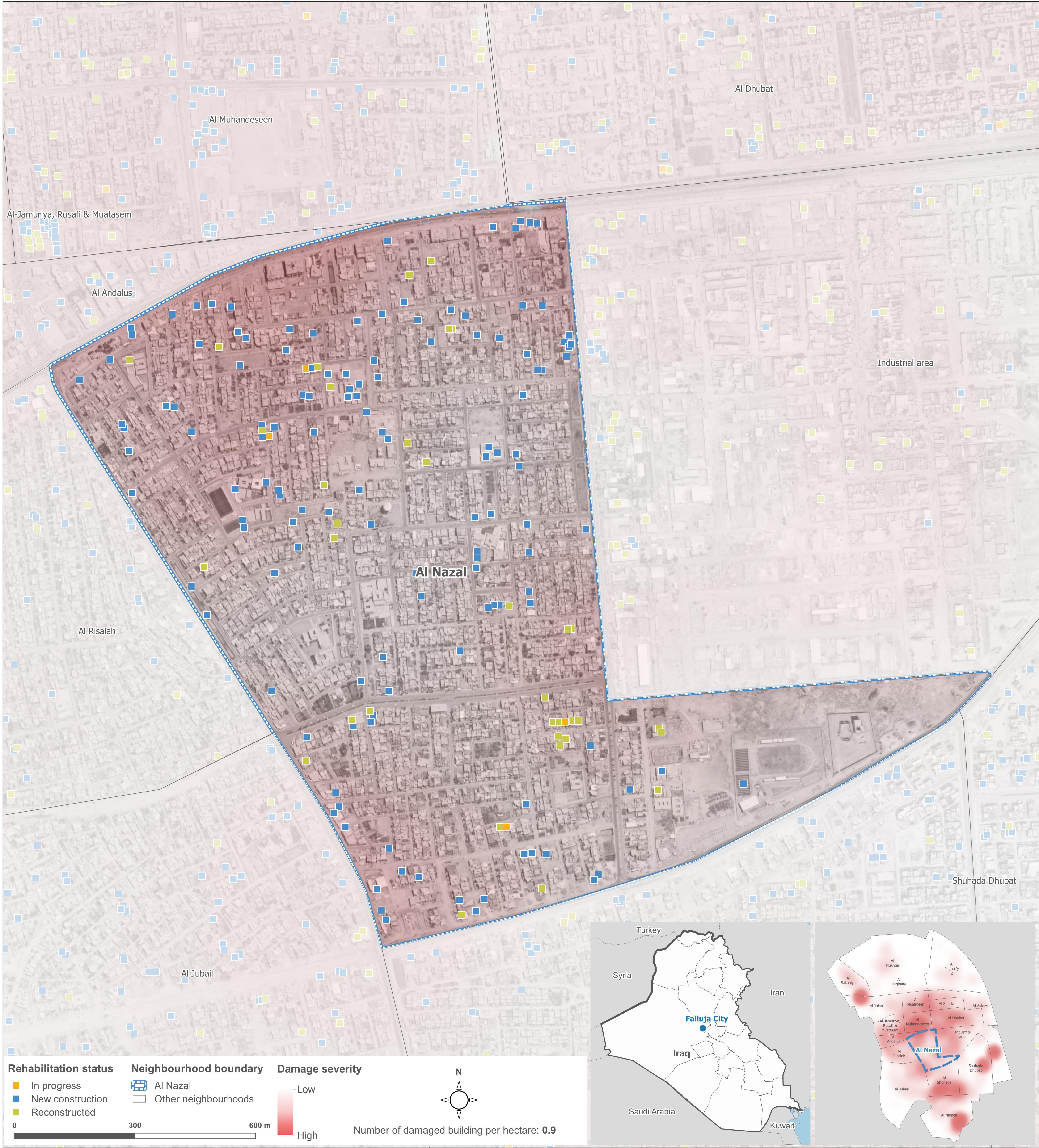
Contact: reach.mapping@impact-initiatives.org

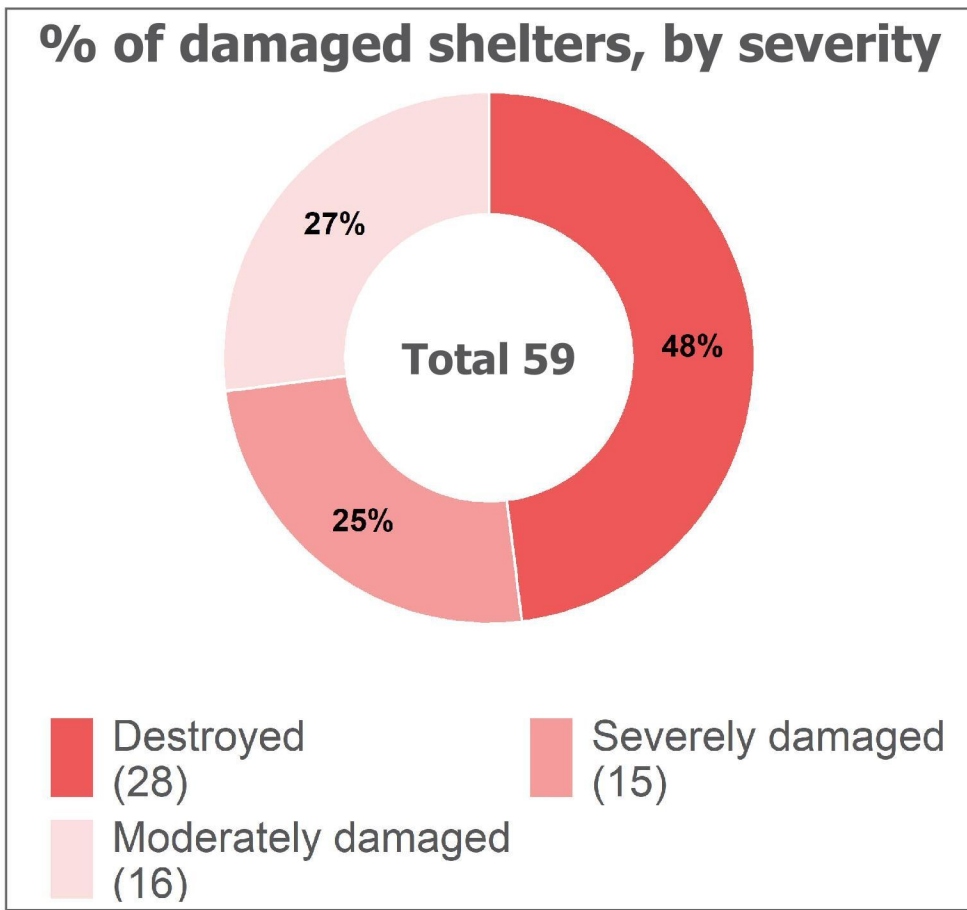
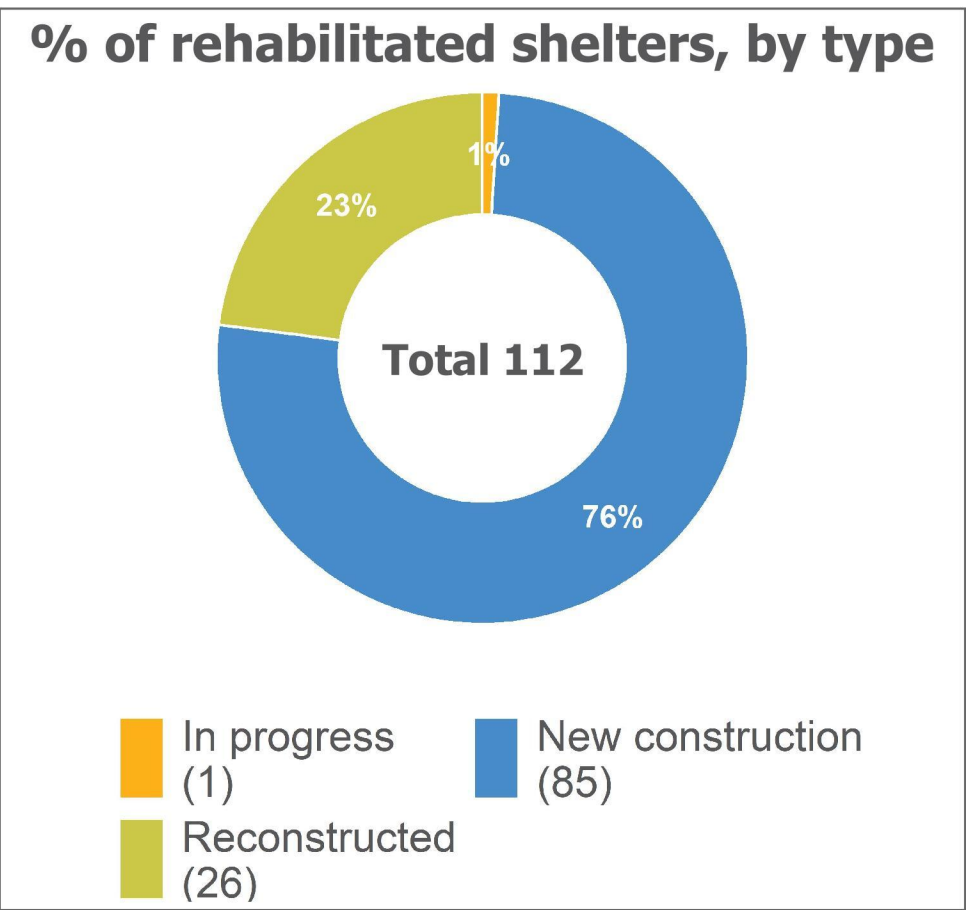
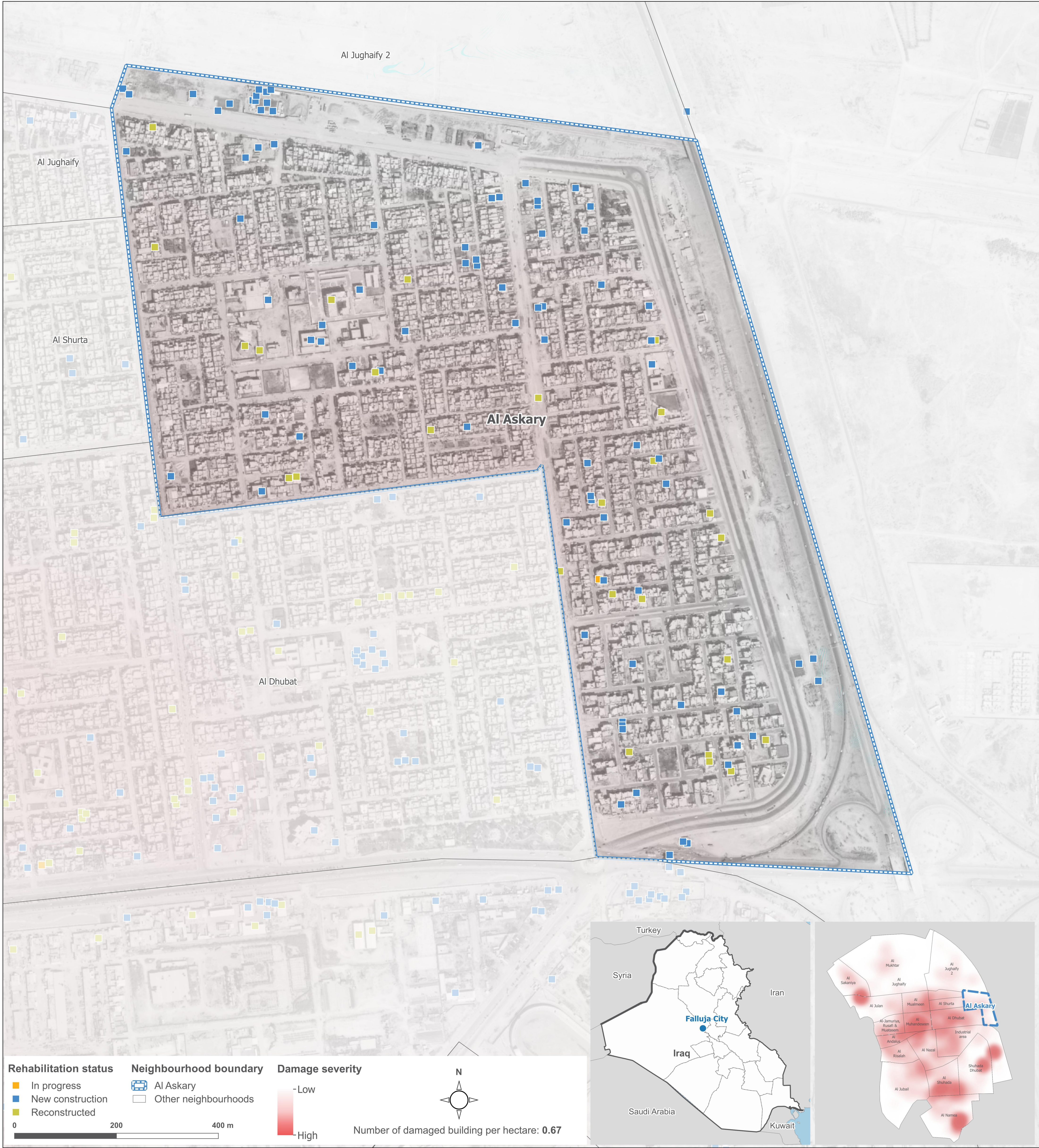
Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

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Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Askary neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 59 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Askary neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 112 impacted sites being rehabilitated, reconstructed or constructed within the Al Askary neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

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Data sources:

Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016
Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

File: Al Askary
Map Size: A1

Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

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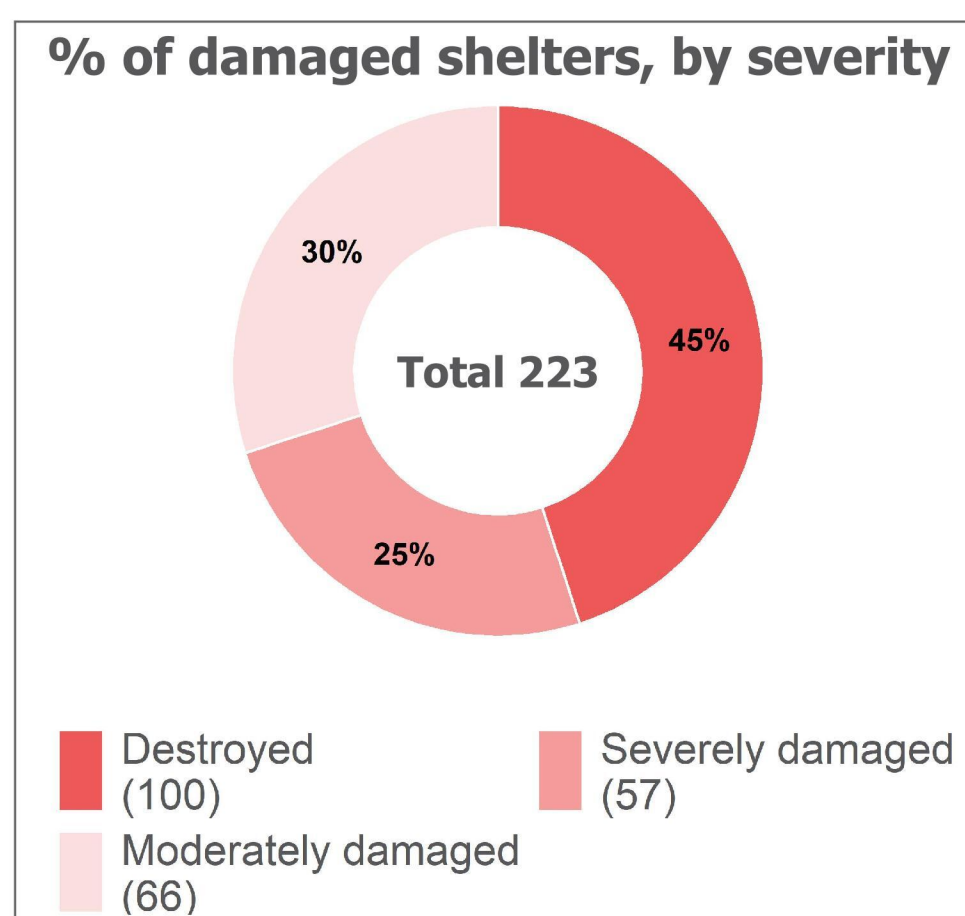
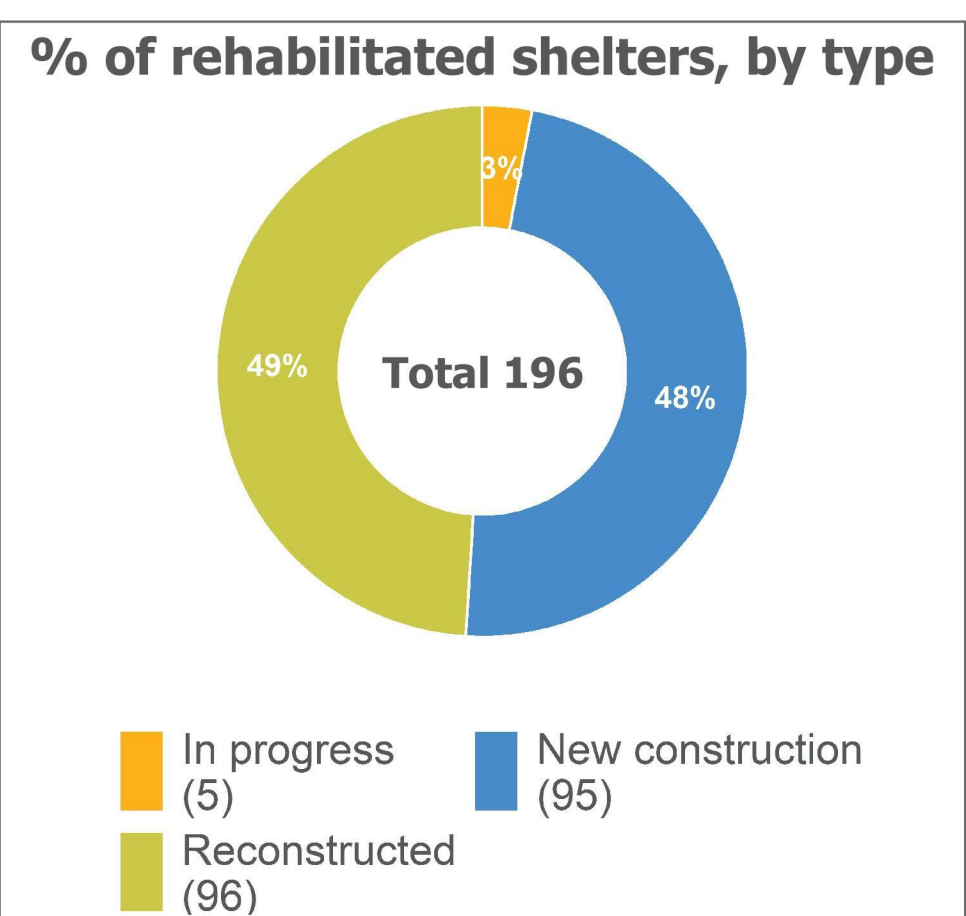
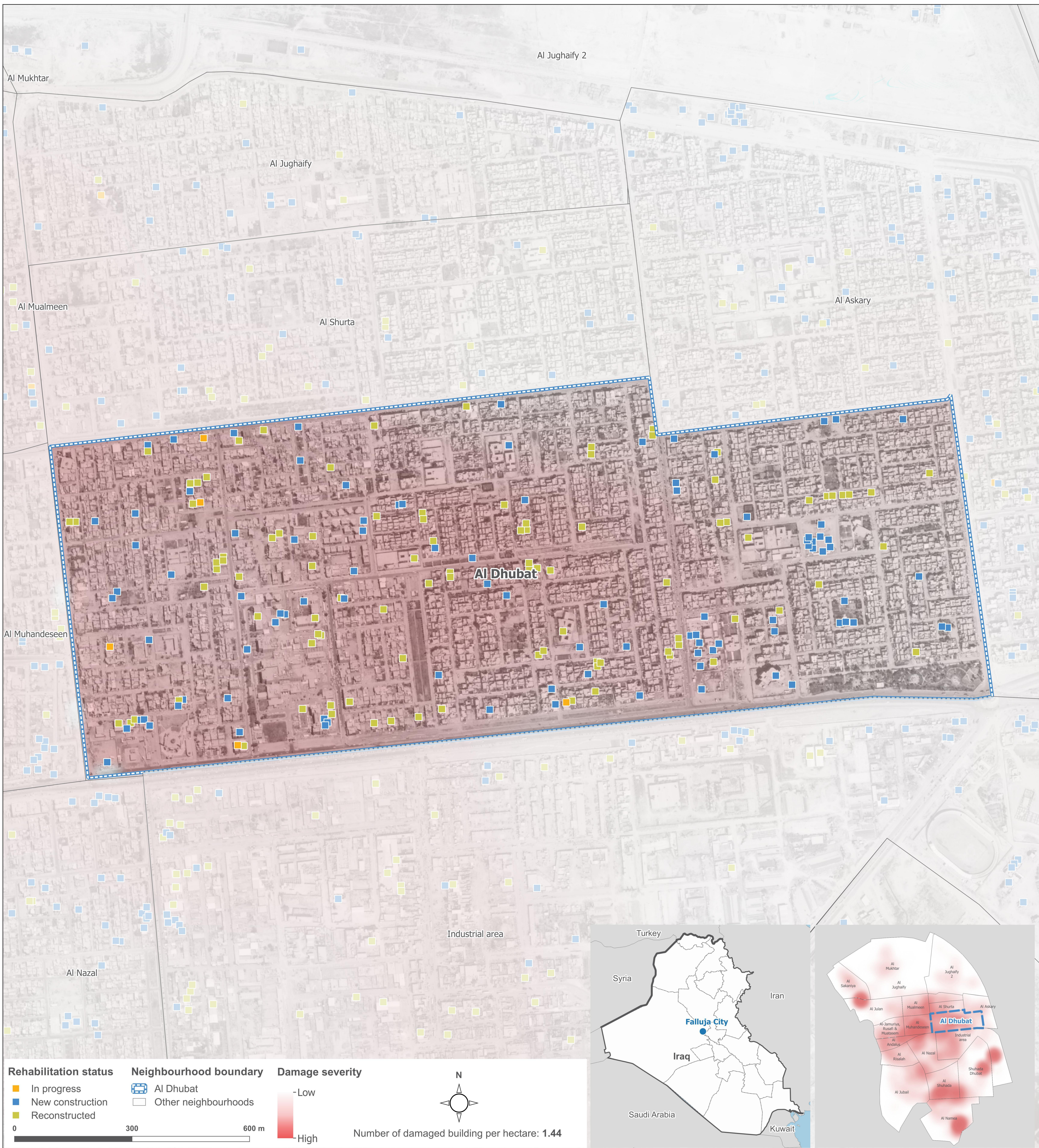


Rehabilitation and Damage Mapping

Falluja City, Iraq

Al Dhubat

For Humanitarian Purpose Only
Production Date: 2021-07-08



Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Dhuhair neighbourhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application programme, detected and classified 223 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Dhuhair neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 196 impacted sites being rehabilitated, reconstructed or constructed within the Al Dhuhair neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

Data sources:
Admin Boundaries - OCHA
Damage points - REACH / UNOSAT -
June 29, 2016
Rehabilitation Points - REACH / UNOSAT -
November 4, 2019

n Coordinate System / Projection: WGS 84

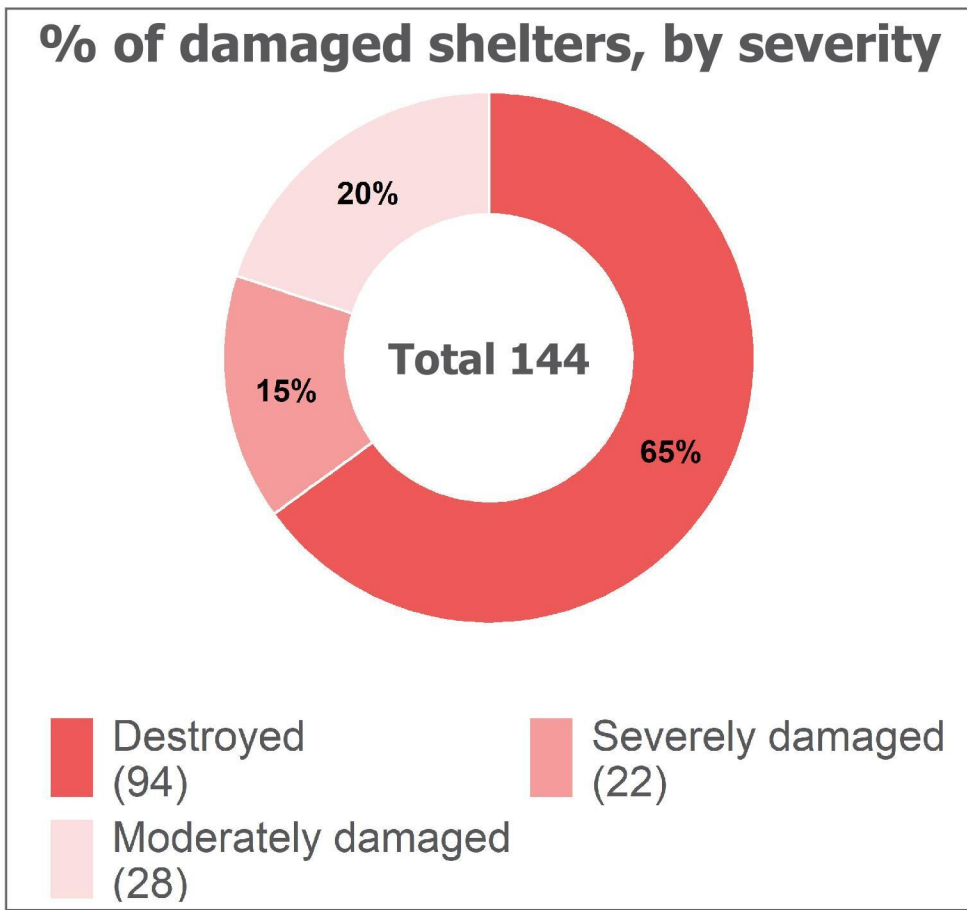
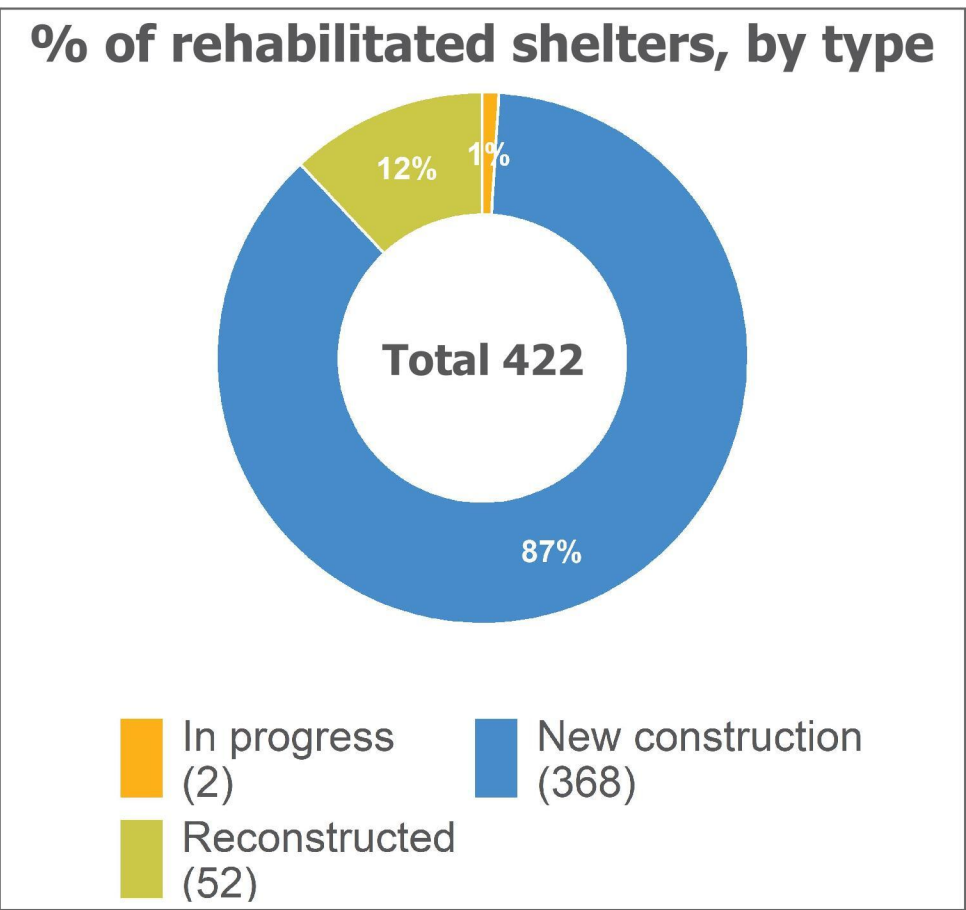
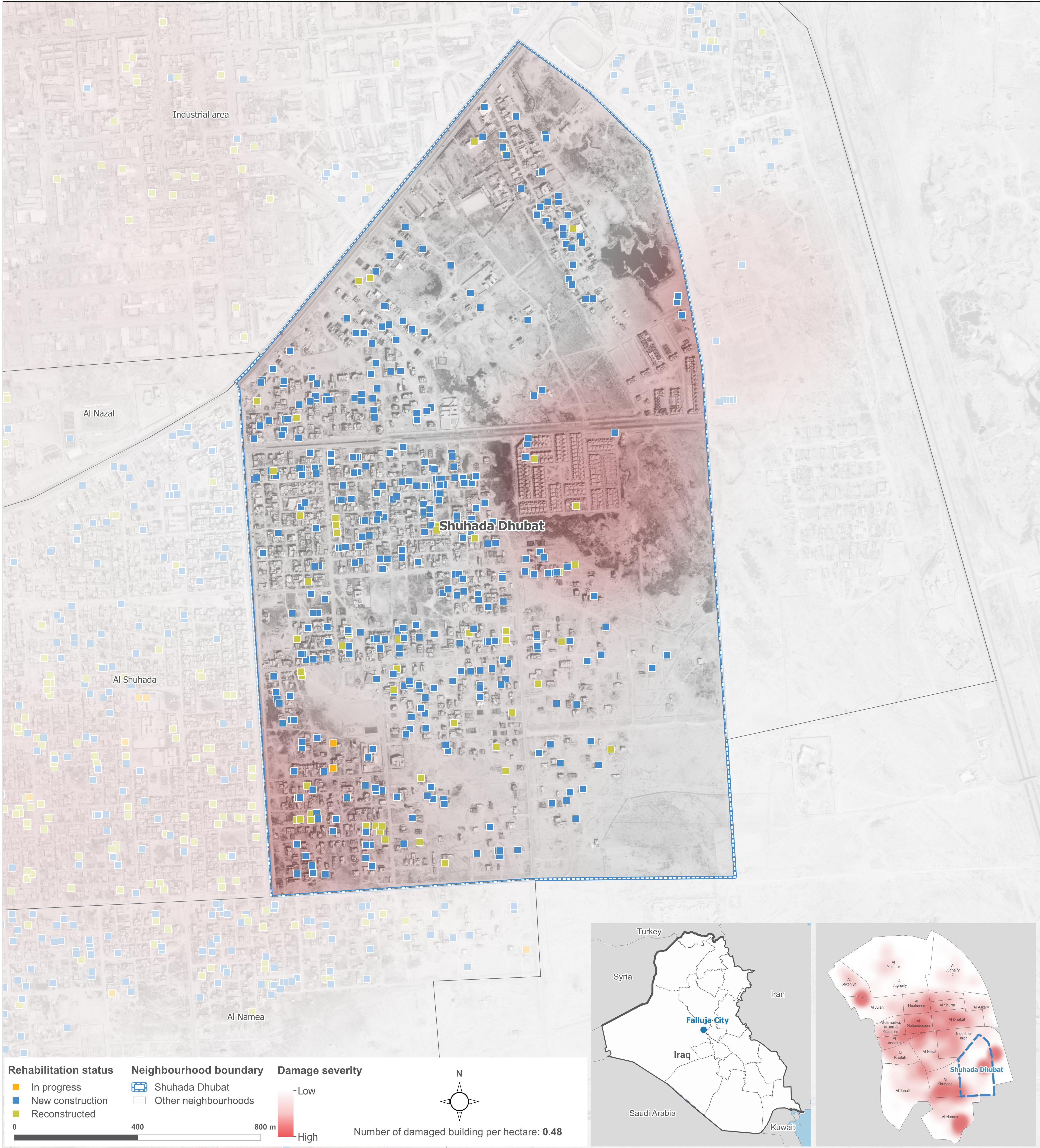
File: Al Dhubat
Map Size: A1

Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

Funded by:





Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Shuhada Dhubat neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 144 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Shuhada Dhubat neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 422 impacted sites being rehabilitated, reconstructed or constructed within the Shuhada Dhubat neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016
Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

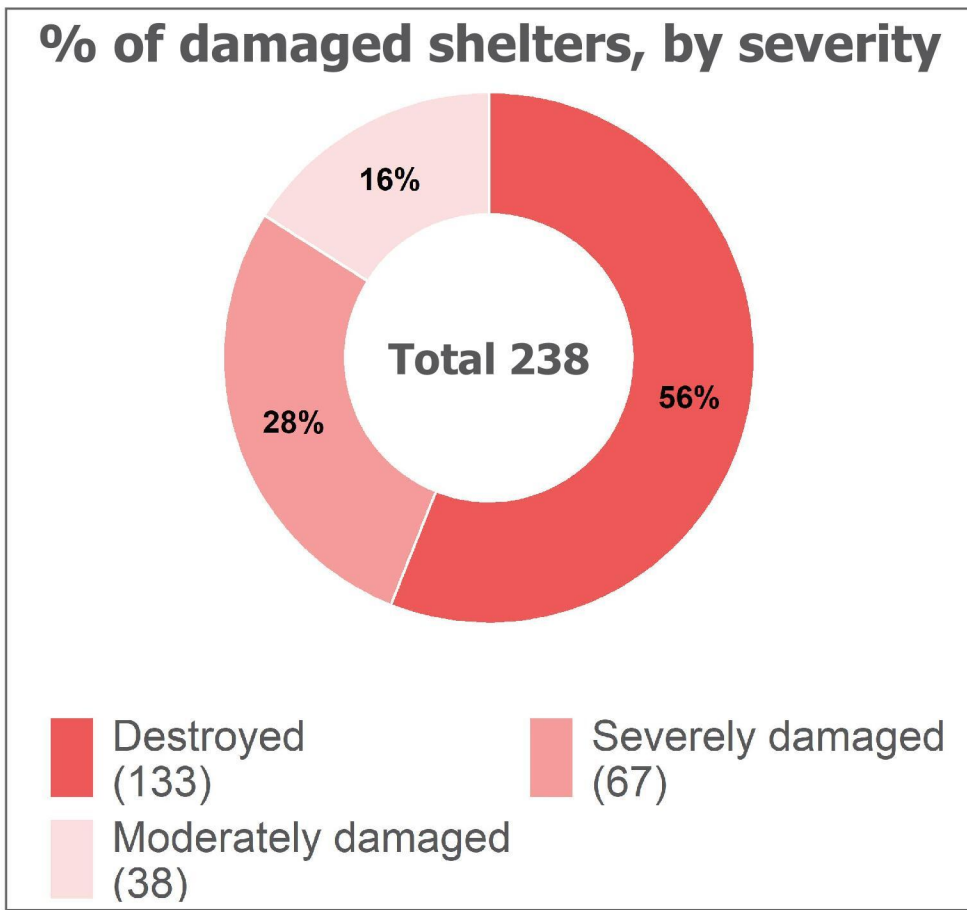
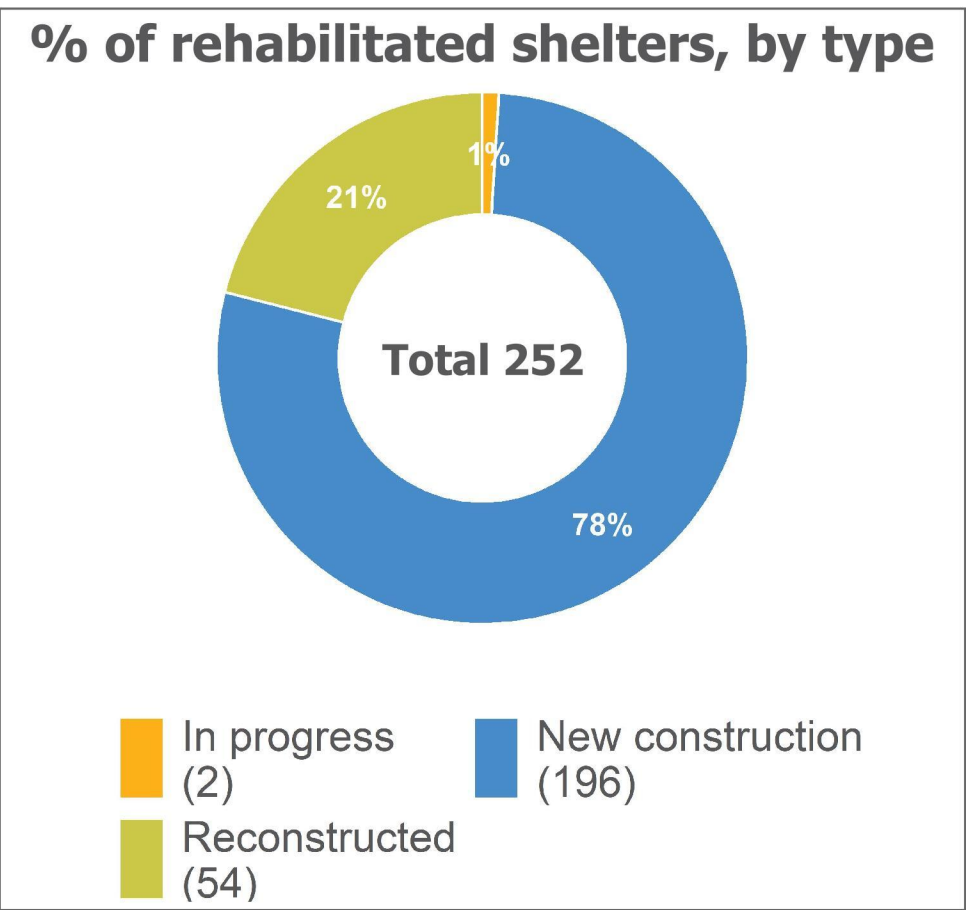
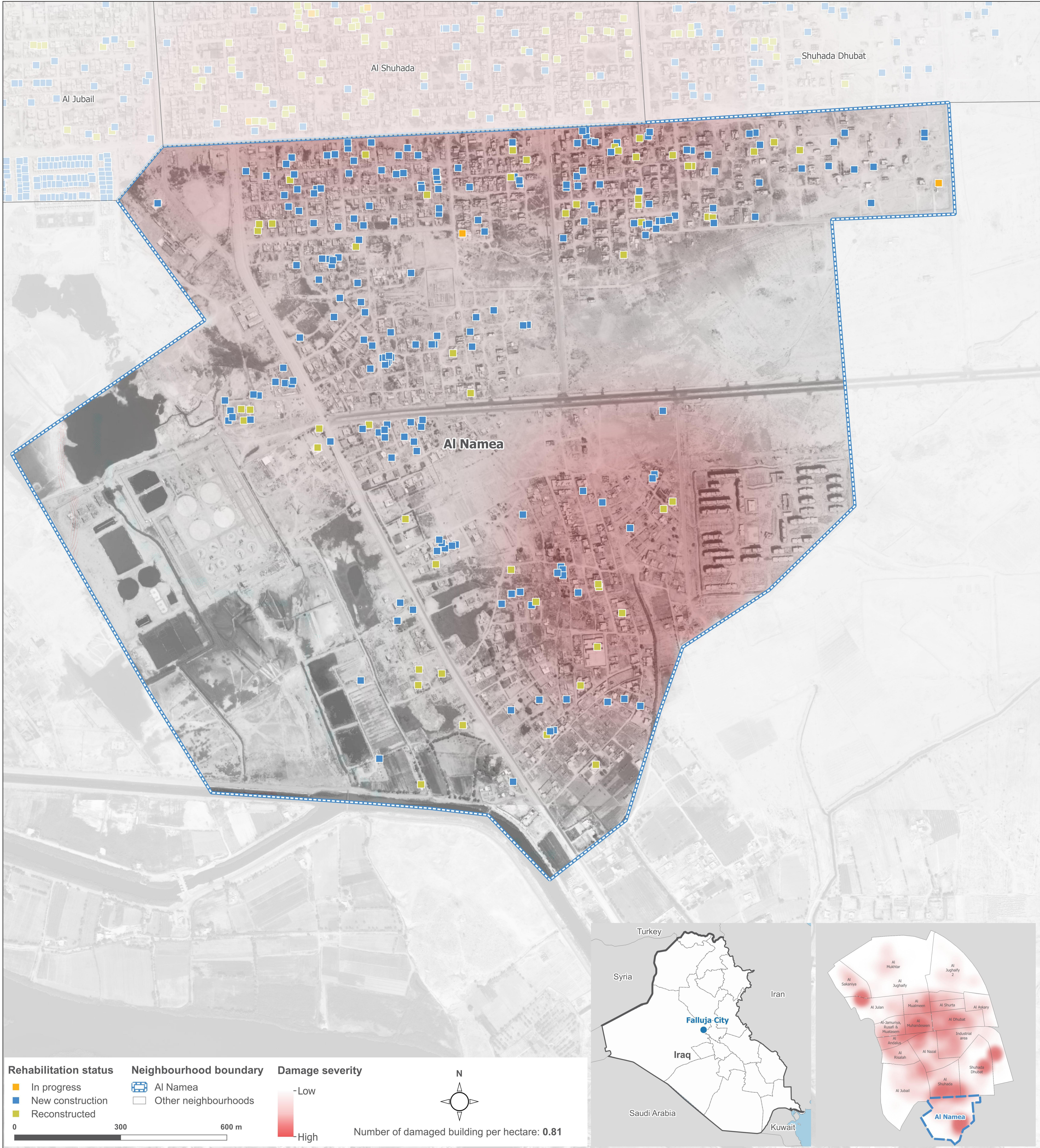
File: Shuhada Dhubat
Map Size: A1

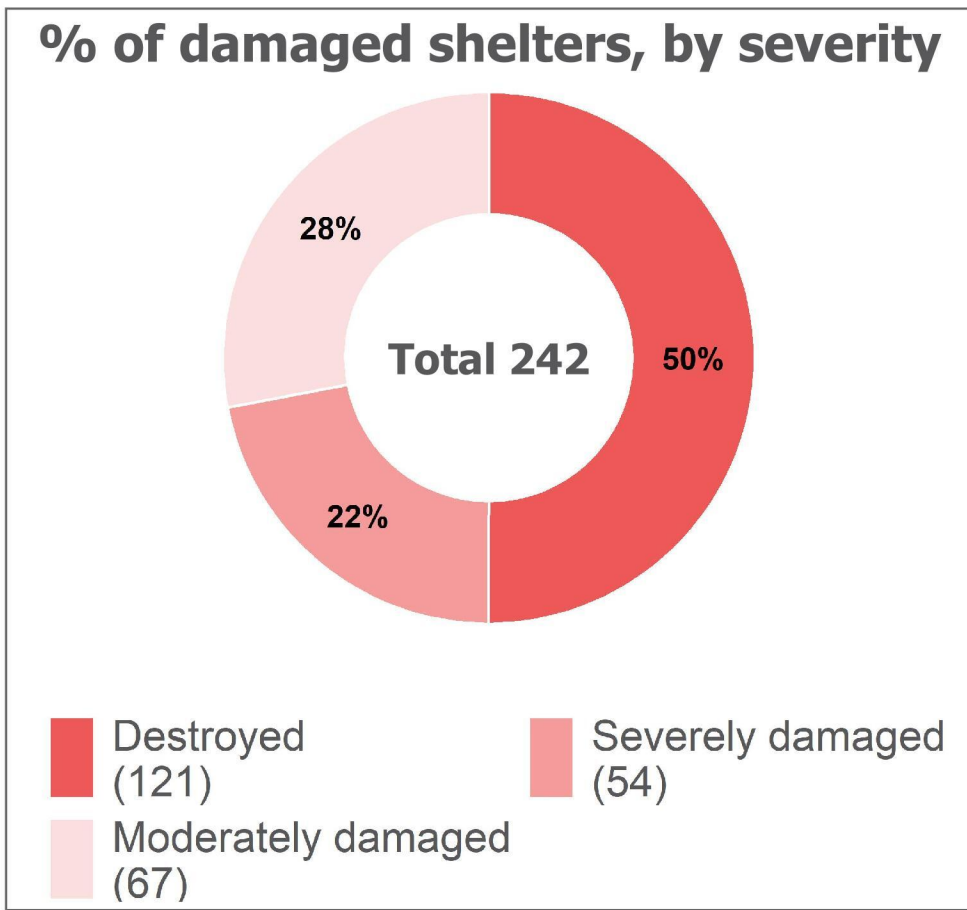
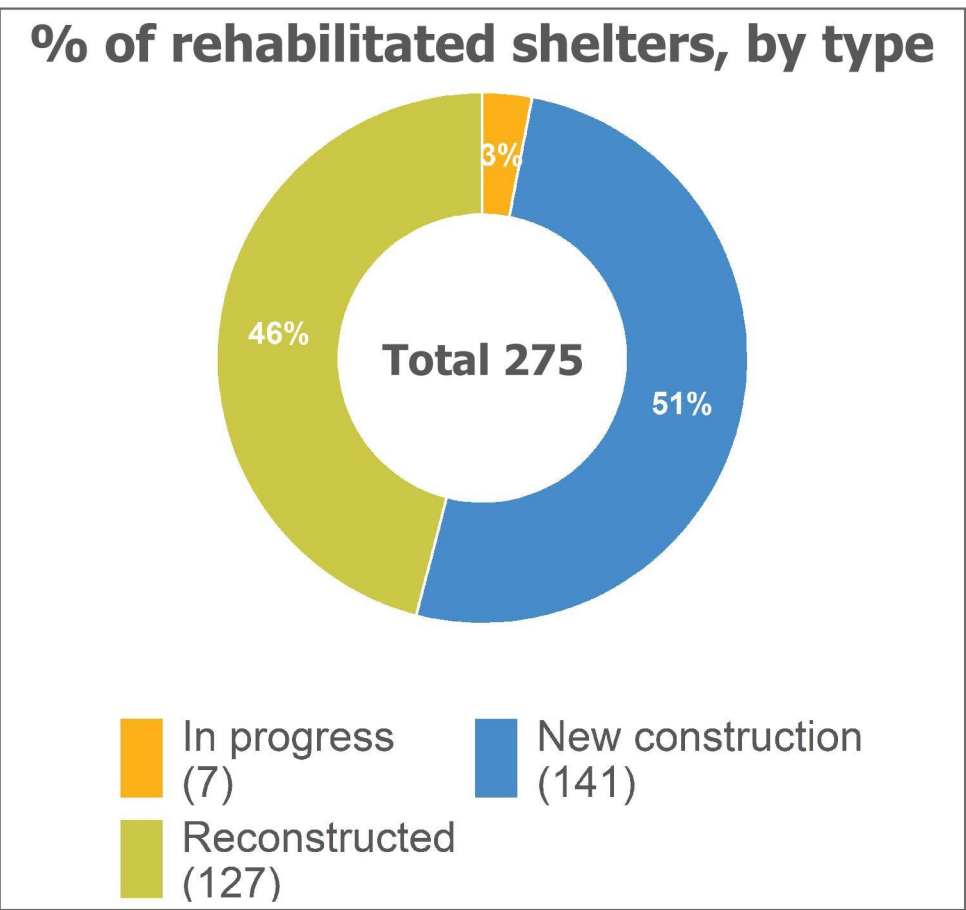
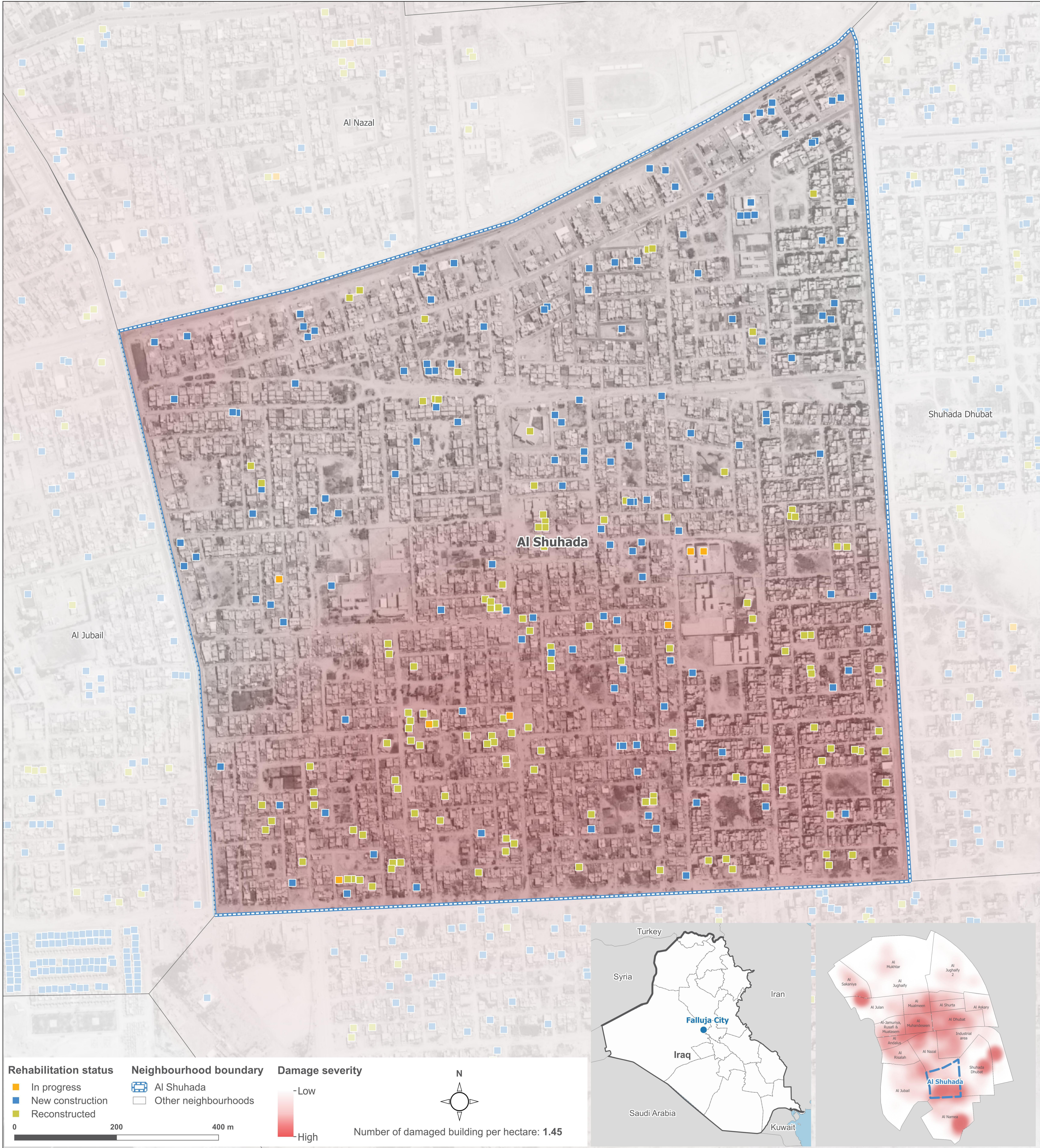
Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

Funded by:







Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Shuhada neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 242 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Shuhada neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 275 impacted sites being rehabilitated, reconstructed or constructed within the Al Shuhada neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

- Admin Boundaries - OCHA
- Damage points - REACH / UNOSAT - June 29, 2016
- Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

File: Al Shuhada
Map Size: A1

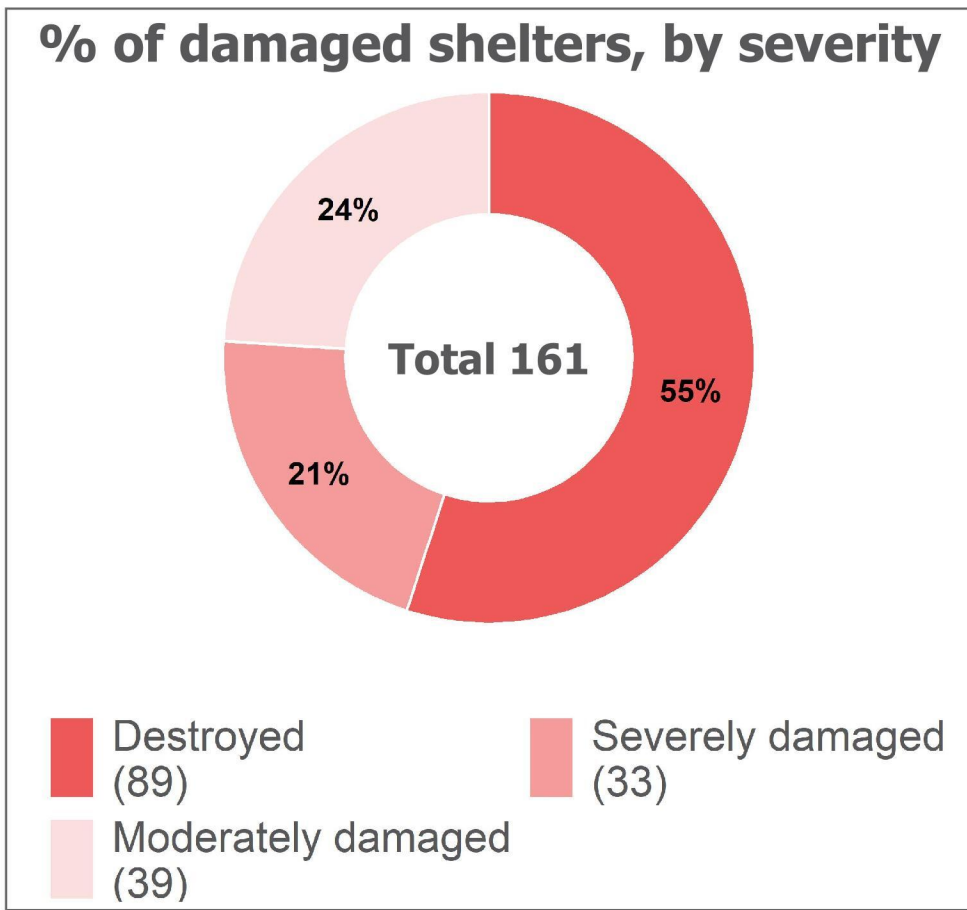
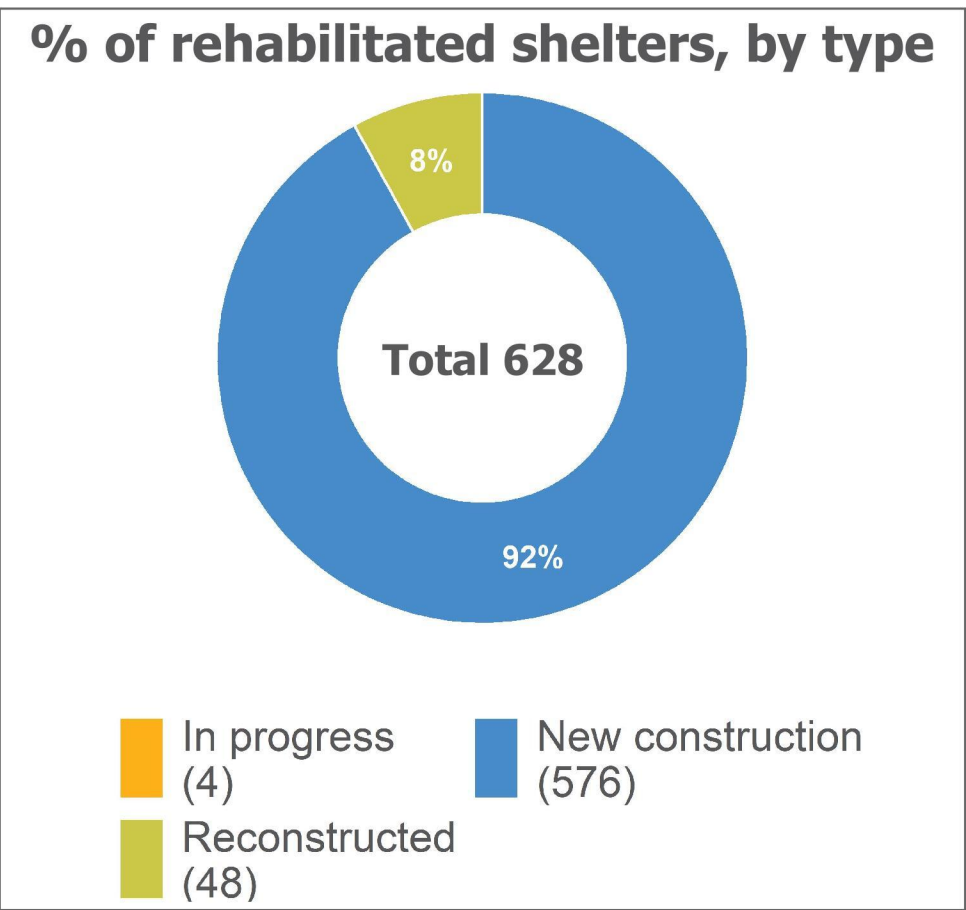
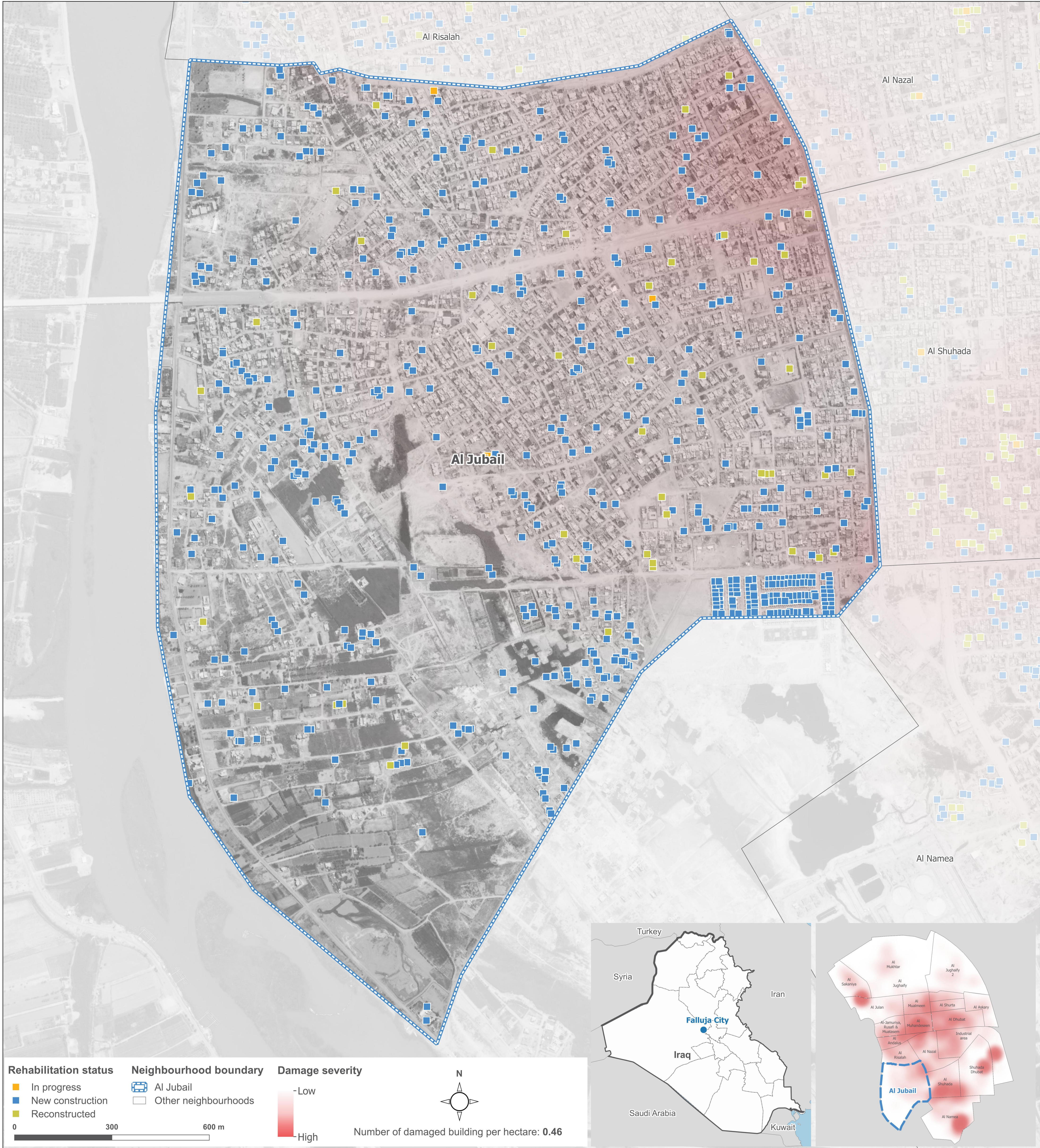
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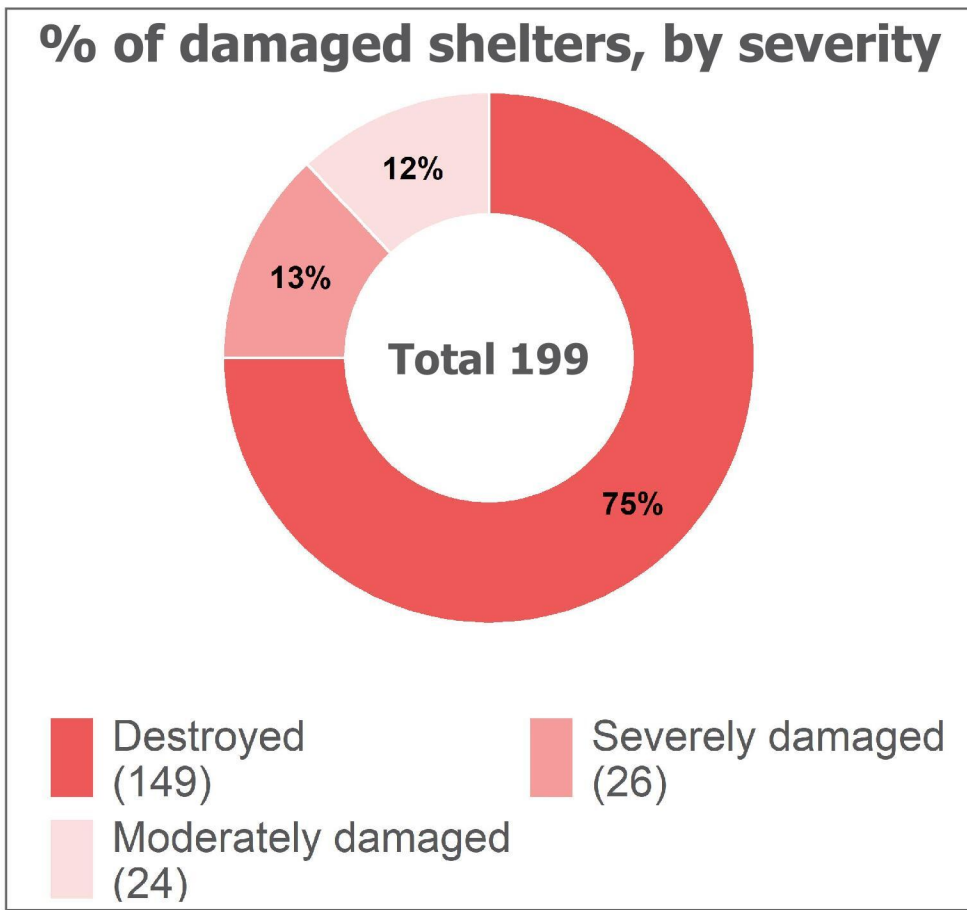
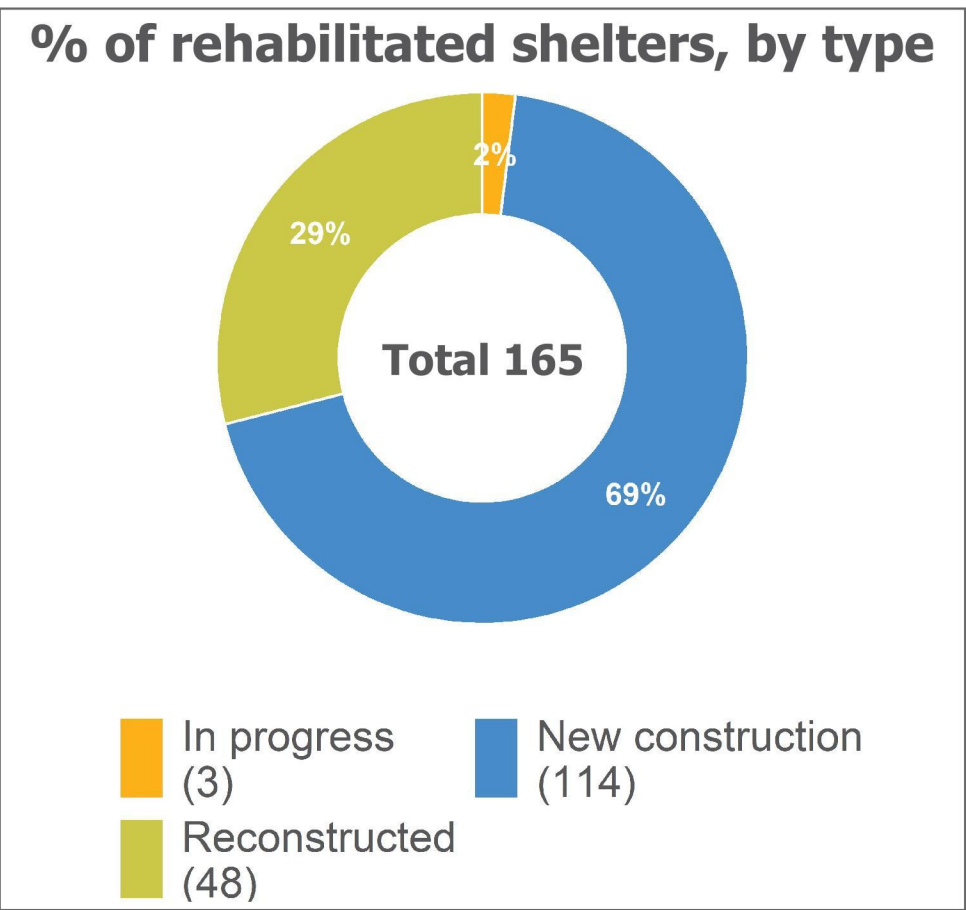
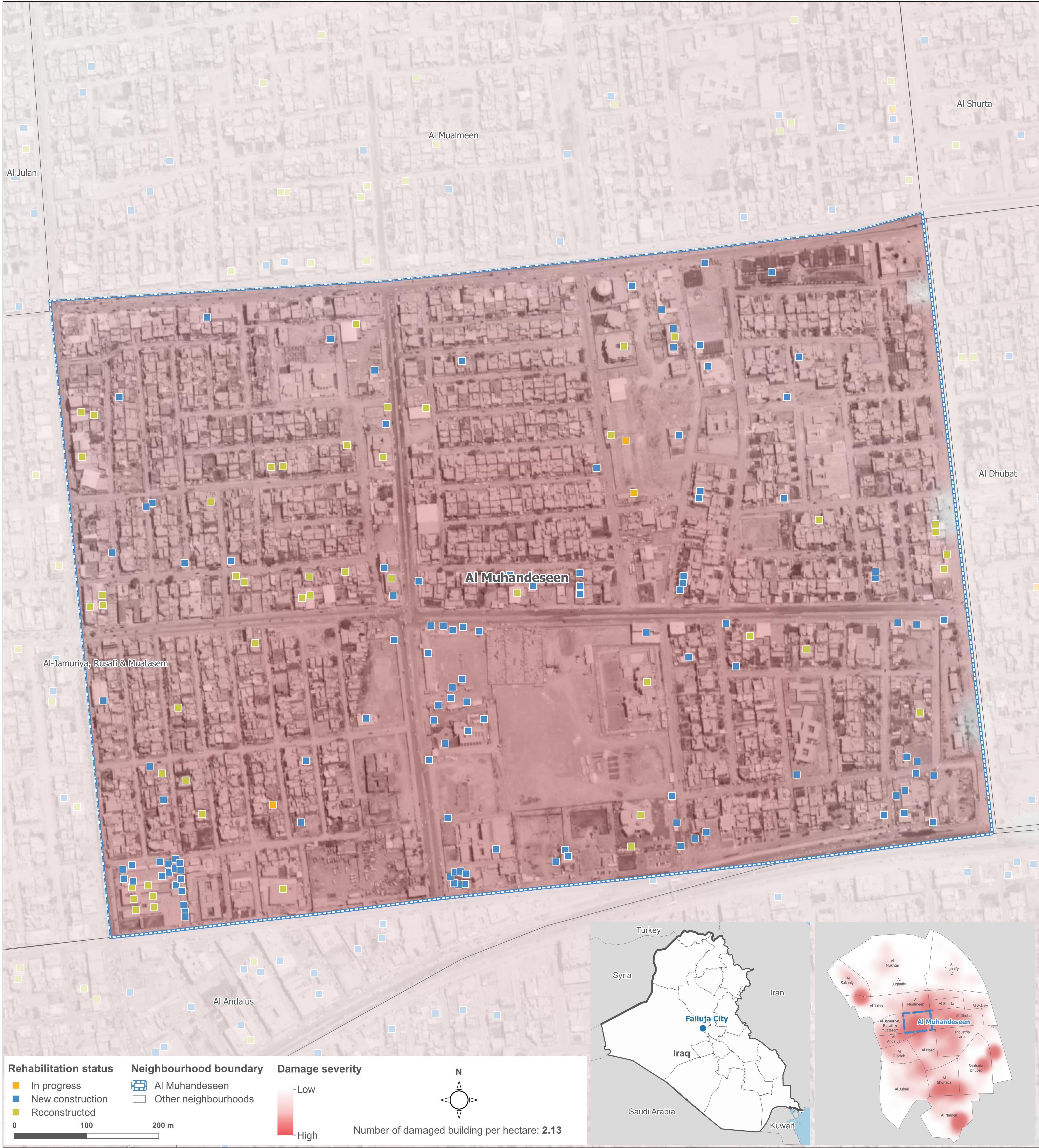
Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

Funded by:

United Nations Institute for Training and Research (UNITAR)

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Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Muhandeseen neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 199 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Muhandeseen neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 165 impacted sites being rehabilitated, reconstructed or constructed within the Al Muhandeseen neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016
Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

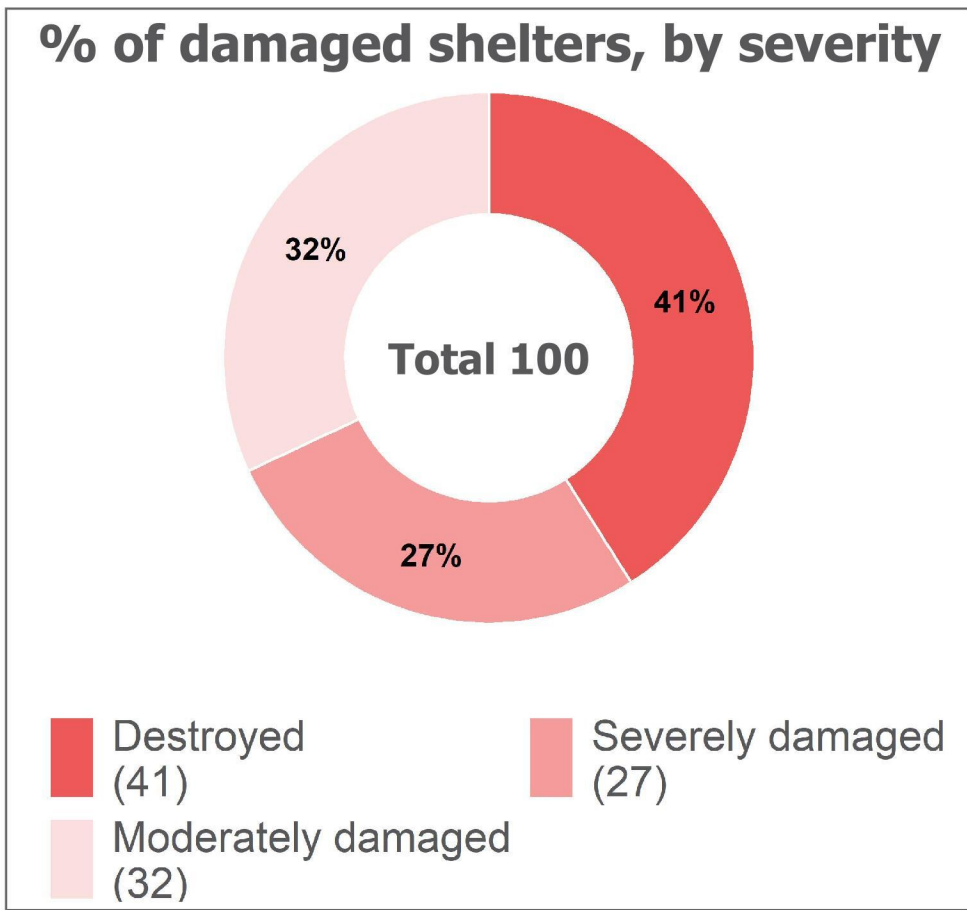
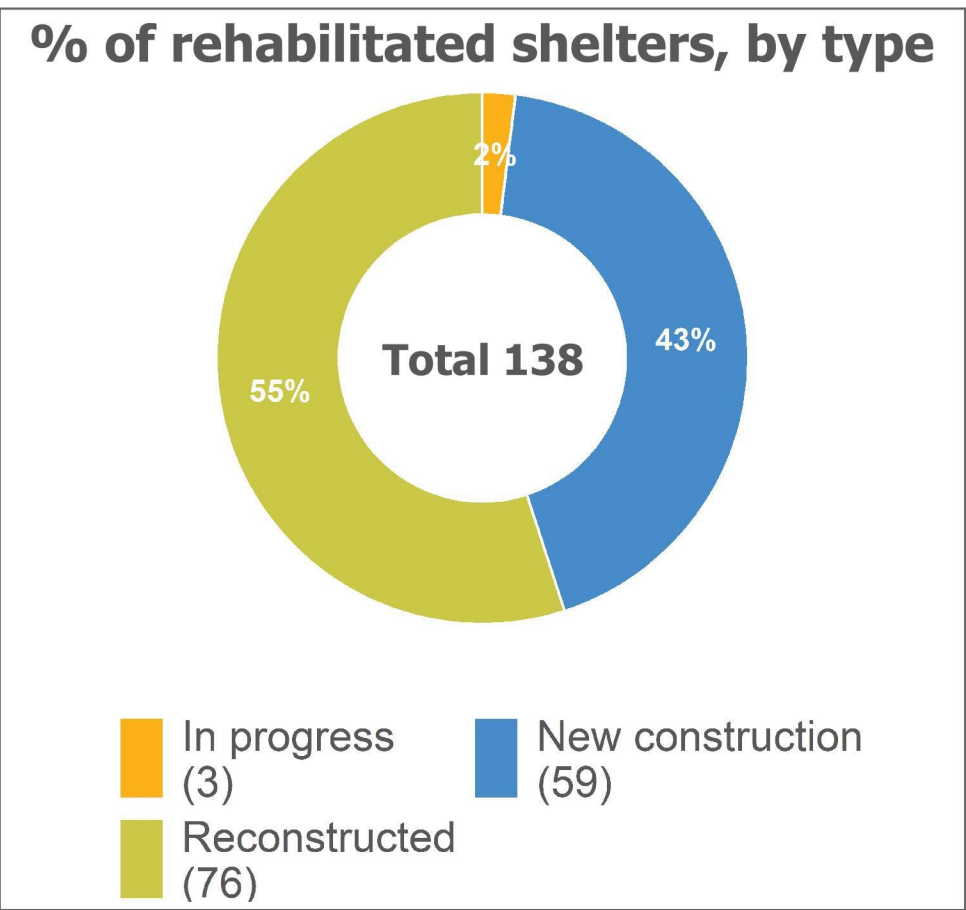
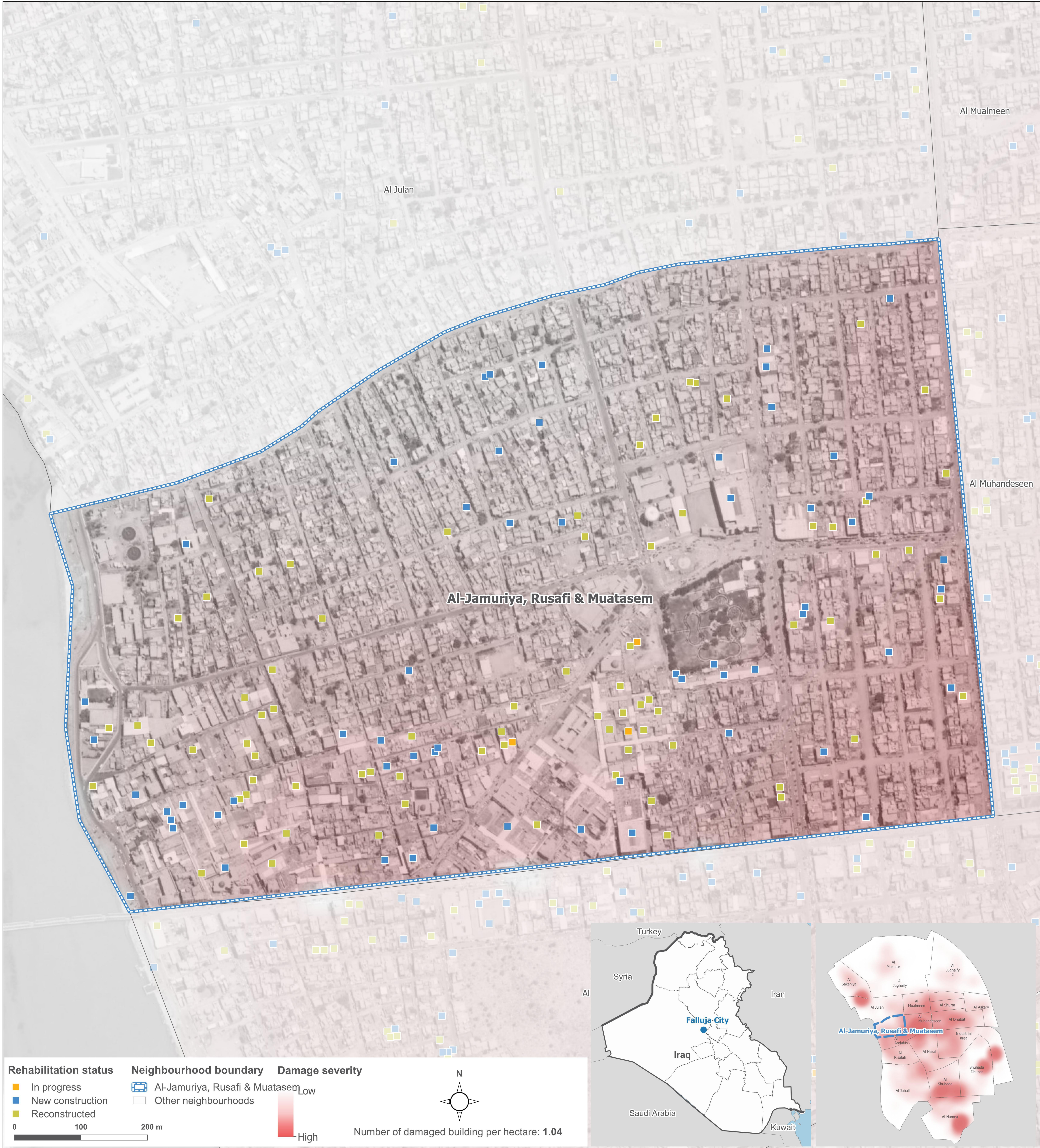
File: Al Muhandeseen
Map Size: A1

Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

Funded by:





Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al-Jamuriya, Rusafi & Muatasem neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 100 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al-Jamuriya, Rusafi & Muatasem neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 138 impacted sites being rehabilitated, reconstructed or constructed within the Al-Jamuriya, Rusafi & Muatasem neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

- Admin Boundaries - OCHA
- Damage points - REACH / UNOSAT - June 29, 2016
- Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

File: Al-Jamuriya, Rusafi & Muatasem

Map Size: A1

Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

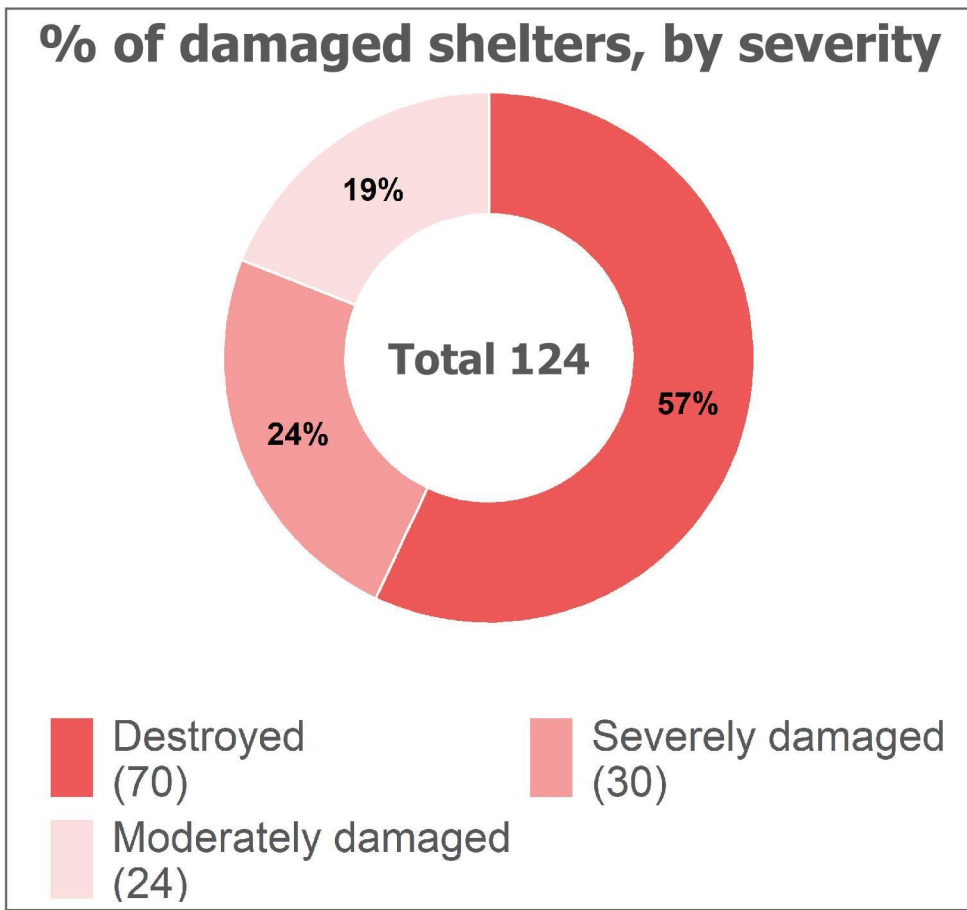
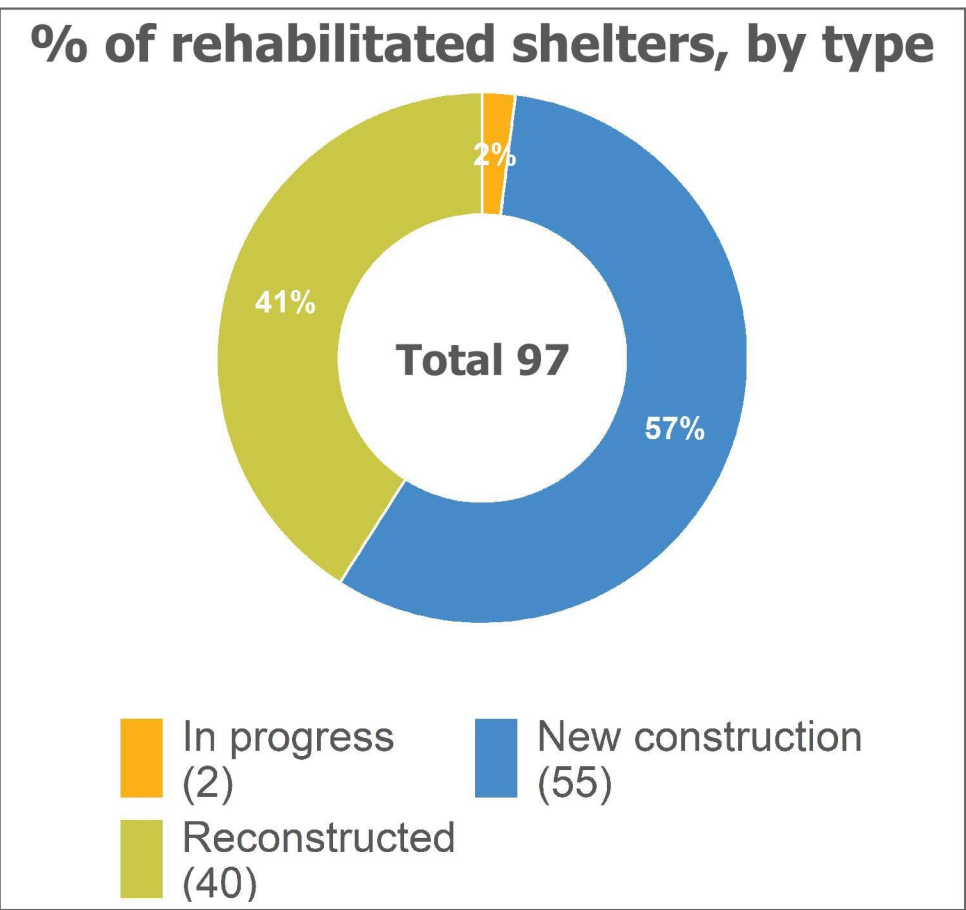
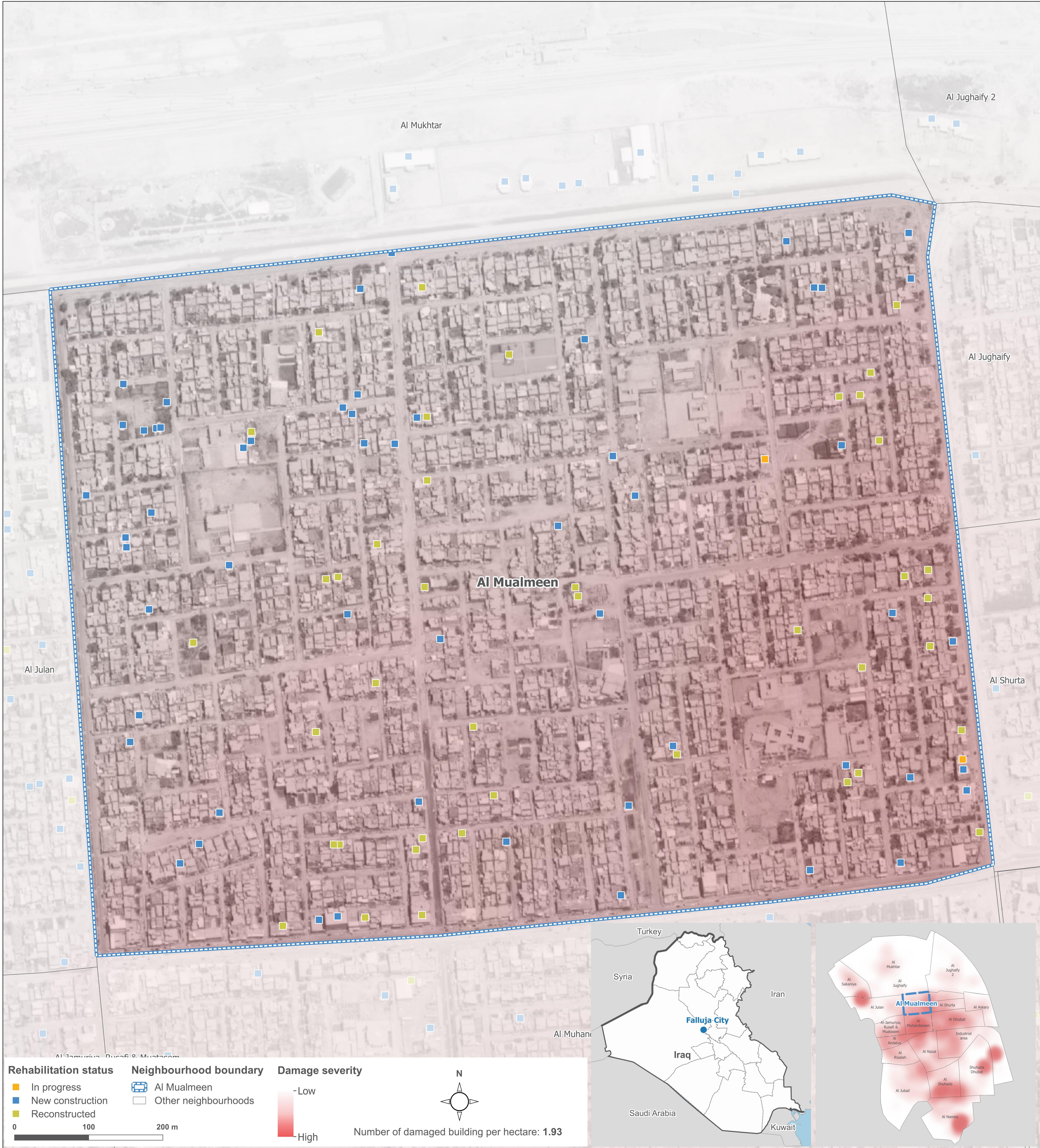
Funded by:

United Nations Institute for Training and Research

unitar

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Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Al Mualmeen neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 124 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Al Mualmeen neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 97 impacted sites being rehabilitated, reconstructed or constructed within the Al Mualmeen neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016
Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

File: Al Mualmeen
Map Size: A1

Contact: reach.mapping@impact-initiatives.org

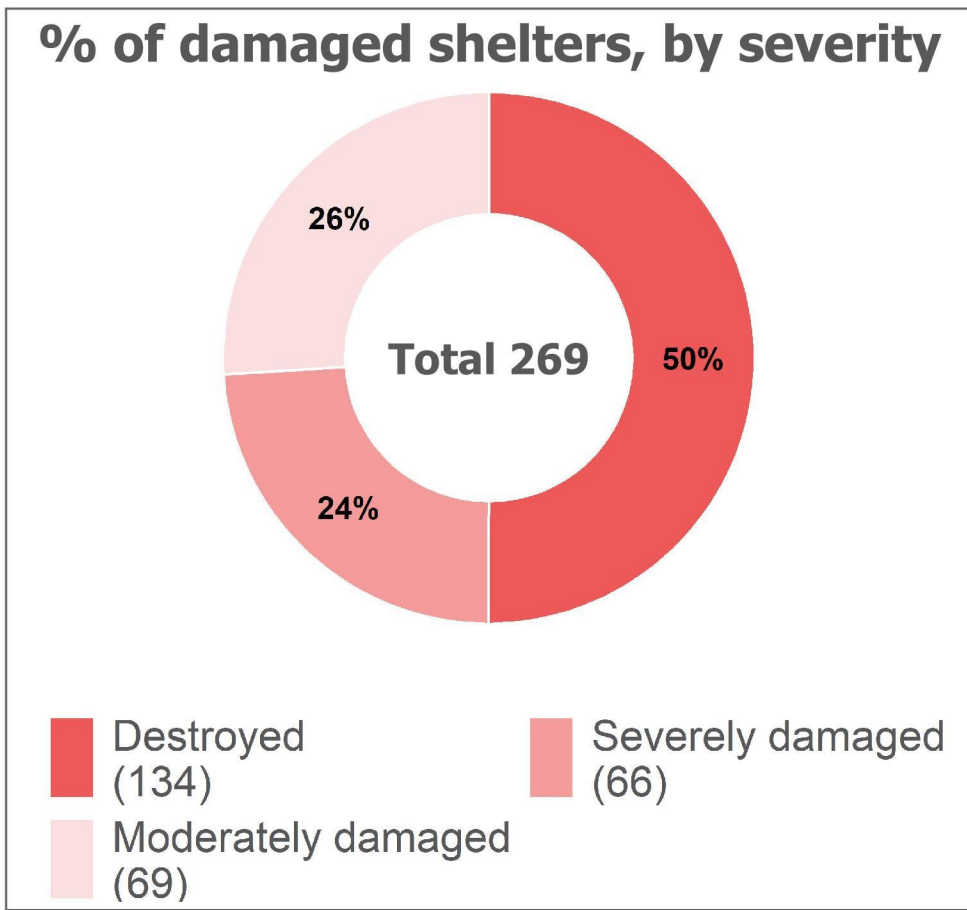
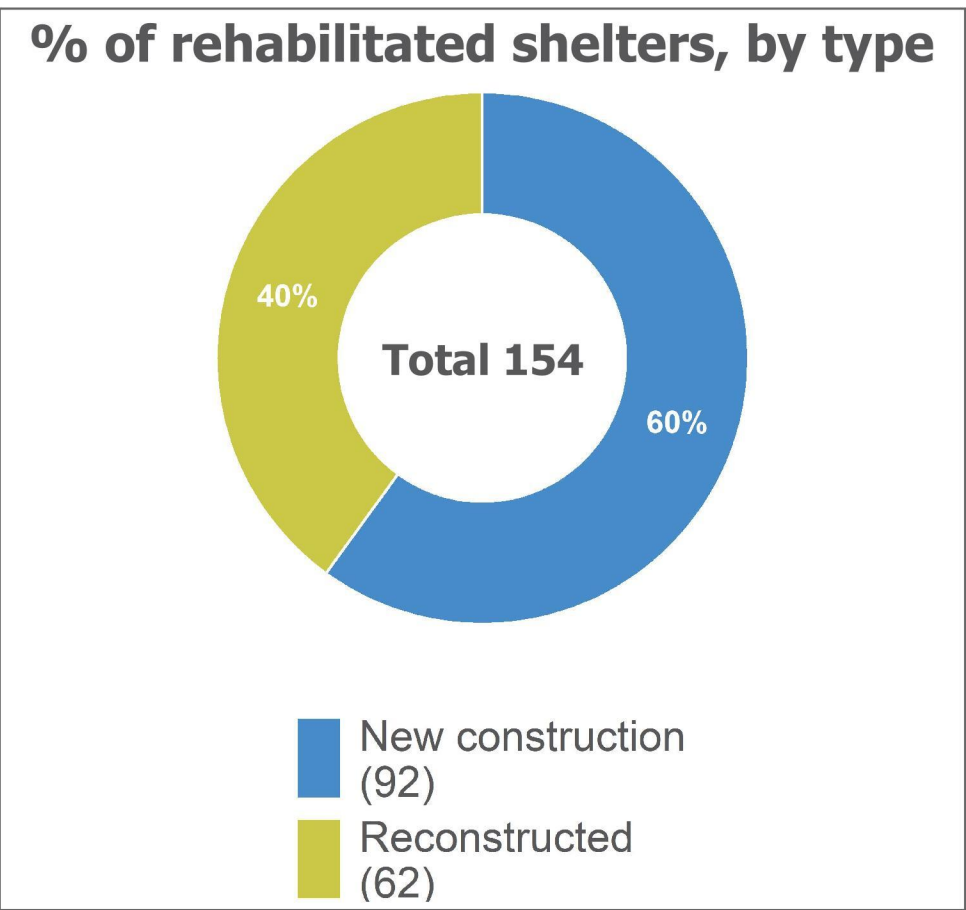
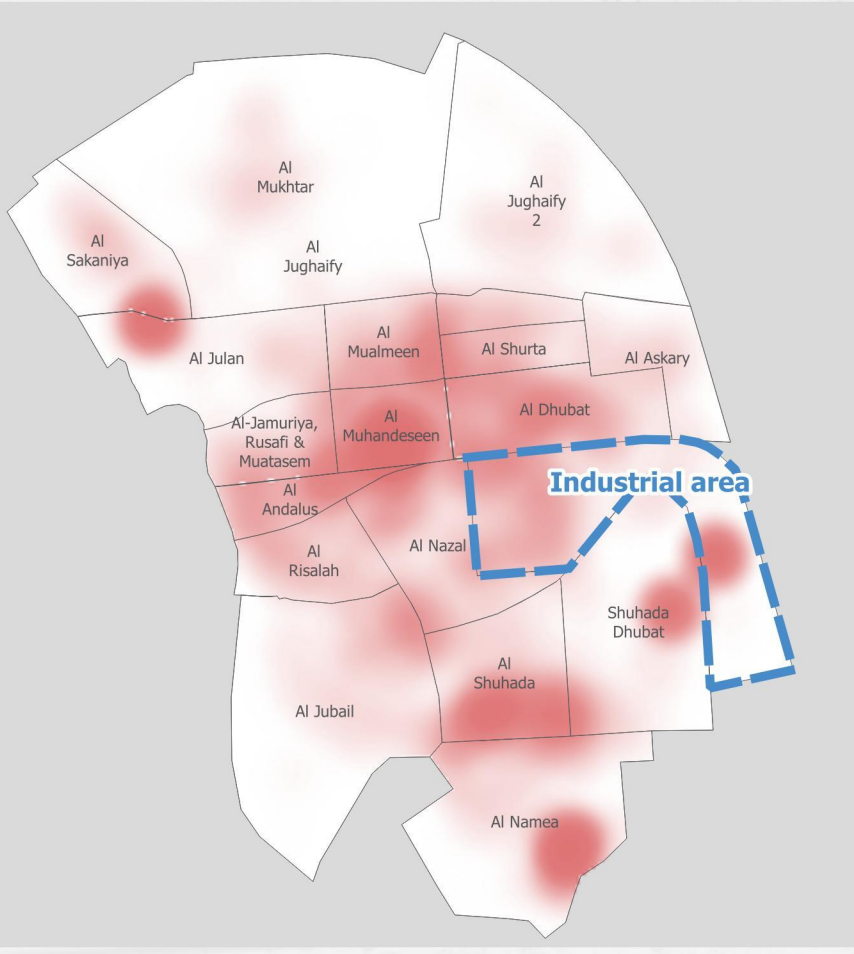
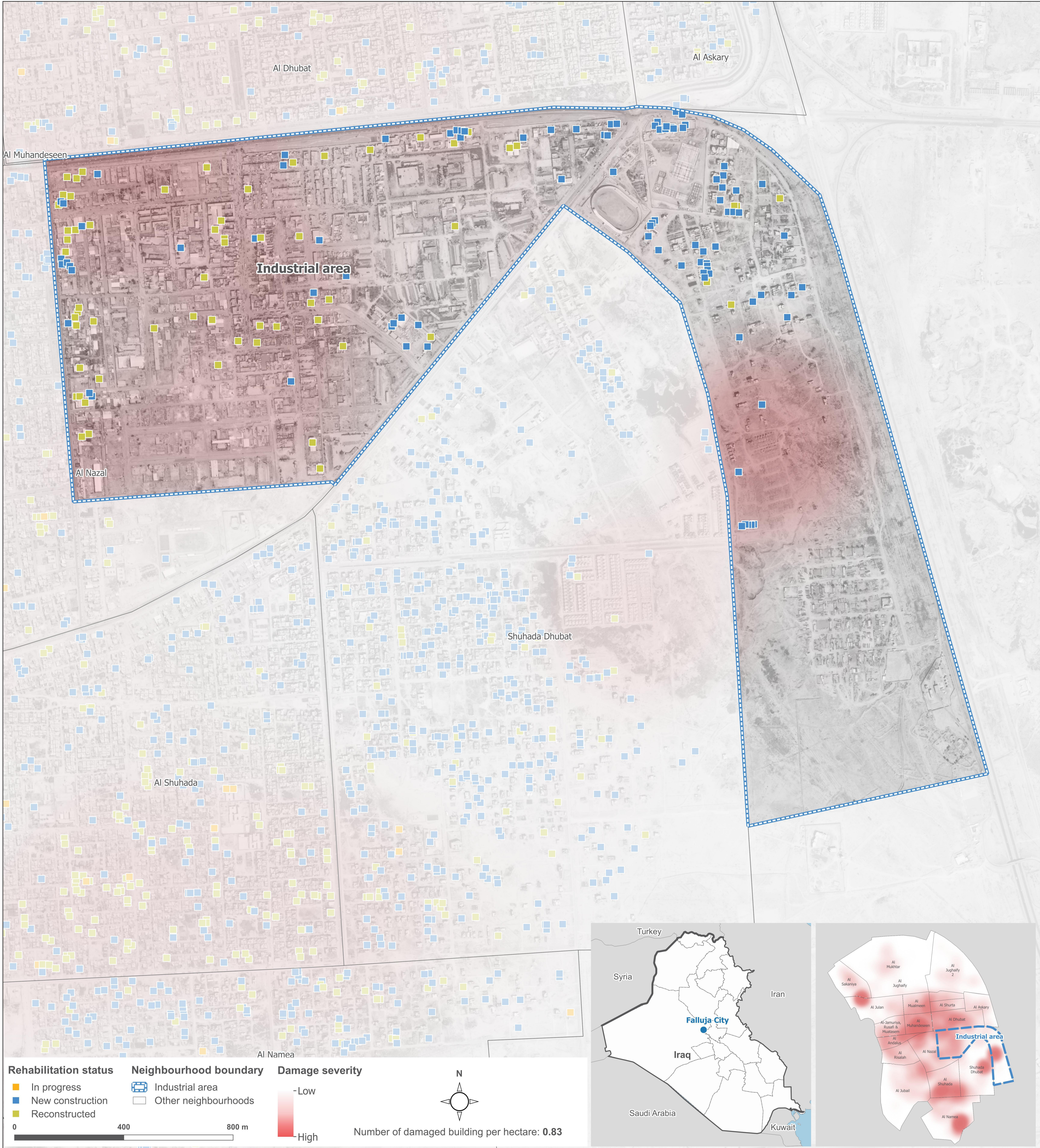
Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

Funded by:

United Nations Institute for Training and Research

unitar

United Nations Institute for Training and Research



Overview:

This map shows the percentage of damaged and rehabilitated shelters along with the damage intensity of Industrial area neighborhood of Falluja city. Falluja was the first city to fall under the control of the so-called Islamic State of Iraq and the Levant (ISIL) in 2014 and sustained significant damage during the presence of ISIL. After the city was recaptured in mid-2016, REACH Initiative, in partnership with the United Nations Institute for Training and Research's (UNITAR's) satellite application's programme, detected and classified 269 damage structures into three damage levels (destroyed, severely damaged, moderately damaged) of Industrial area neighbourhood. Using imagery from November 2019, REACH and UNITAR sought to assess levels of rehabilitation and identified around 154 impacted sites being rehabilitated, reconstructed or constructed within the Industrial area neighbourhood of Falluja city.

Methodology:

The intensity of damage to areas is calculated using a weighted kernel density technique on identified damaged shelters within the affected areas, in which a totally destroyed shelter is given a higher score than a one that is only moderately damaged. The following weights are applied for identifying the severity of a damaged area:

Damage level	Weight
Destroyed	.5
Severely damaged	.3
Moderately damaged	.2

Usage and limitations:

This atlas provides a general overview of the damage severity and levels of reconstruction and rehabilitation at a neighbourhood level. It is NOT made as a stand-alone tool for detailed site planning. However, it provides an indication of needs and potential vulnerabilities associated to access to housing which can inform broader analysis or planning. Atlas results need to be ground verified and decisions combined with specific on-site evaluation and appropriate technical expertise.

Data sources:

Admin Boundaries - OCHA
Damage points - REACH / UNOSAT - June 29, 2016
Rehabilitation Points - REACH / UNOSAT - November 4, 2019

Coordinate System / Projection: WGS 84

File: Industrial area
Map Size: A1

Contact: reach.mapping@impact-initiatives.org

Disclaimer: Data, designations and boundaries contained on this map are not warranted to be error free and do not imply acceptance by REACH.

Funded by:

United Nations Institute for Training and Research

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