

DSM – Applications and Requirements

from the perspective of the
Vienna City Administration

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objective verification
for sensitive
building projects

protection of World
Heritage Sites

newspaper
10.12.2004



photo-composition
based on image taken on 20.12.2004

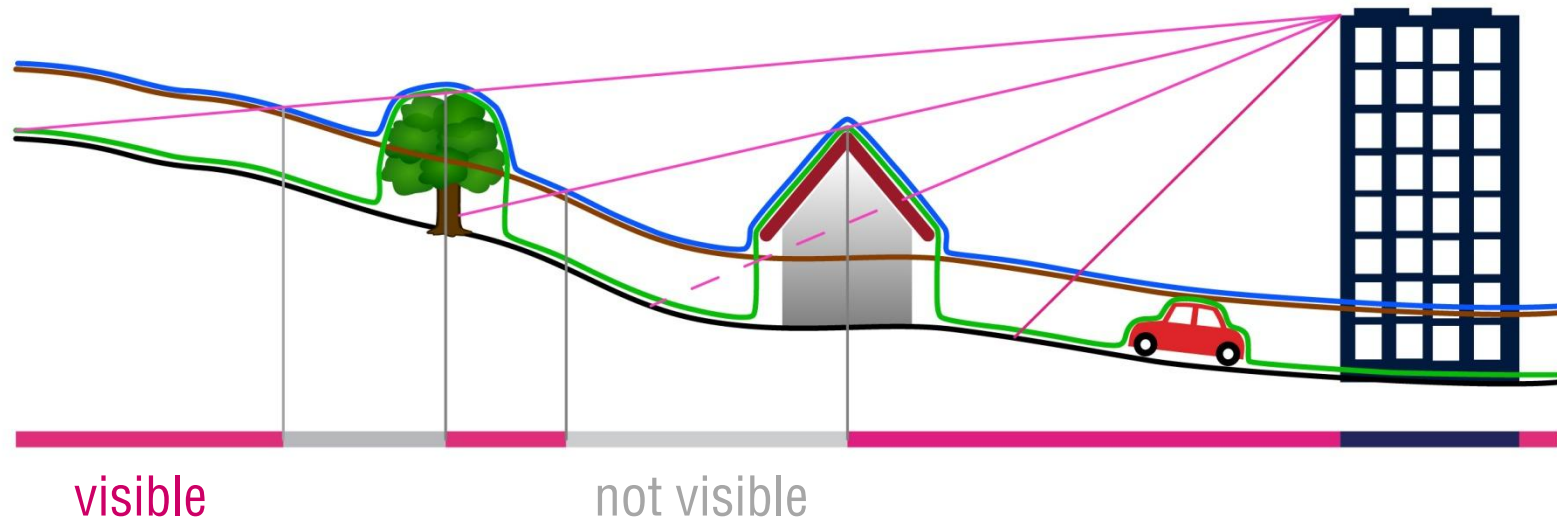


DTM

DSM

DTM raised to eye level

Combined model for visibility studies



Visibility studies

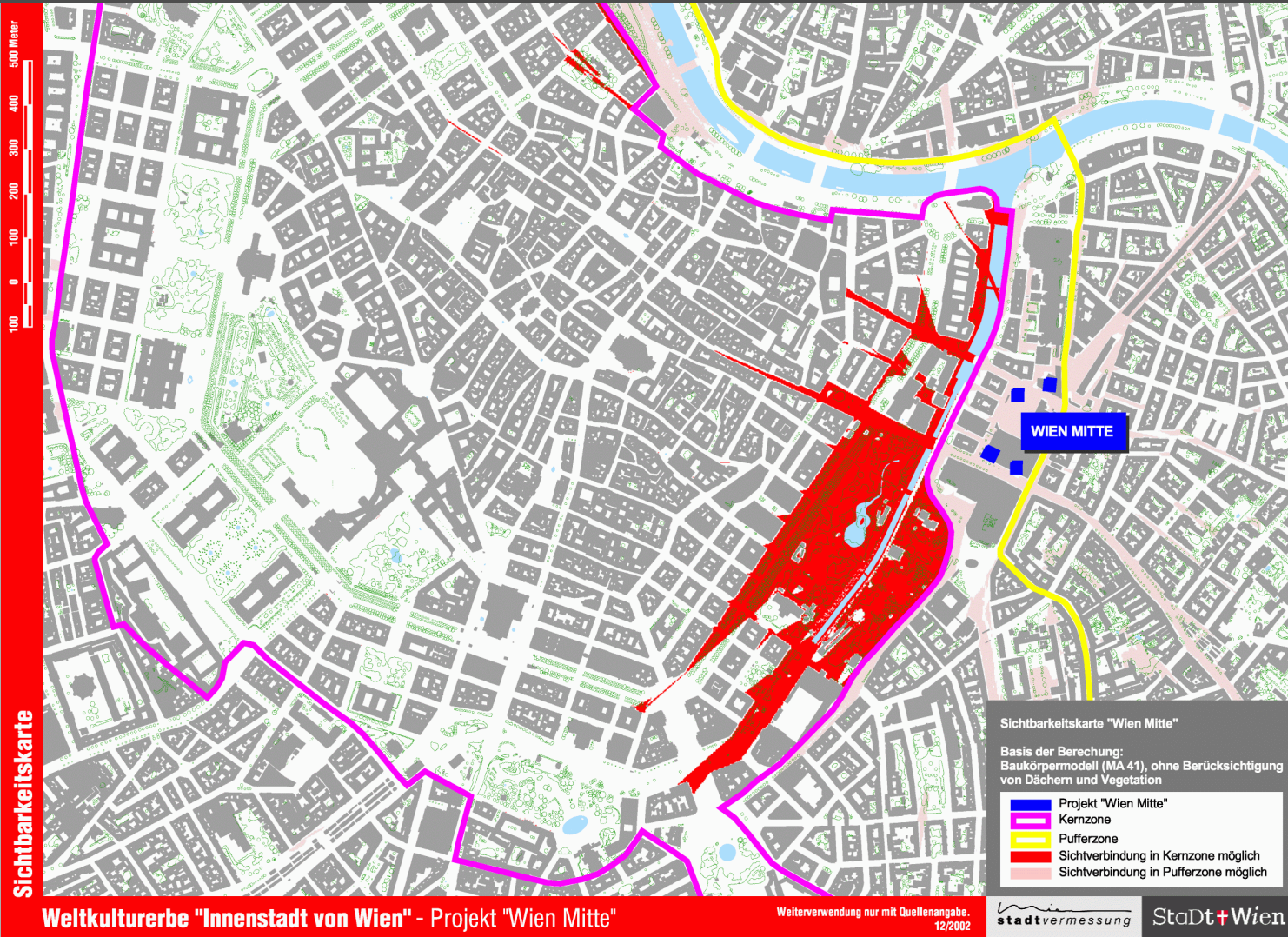
Historic Centre of Vienna

2002

DSM = DTM +
building polygons
and building
heights

vegetation not
represented

see Stadtpark



Visibility studies

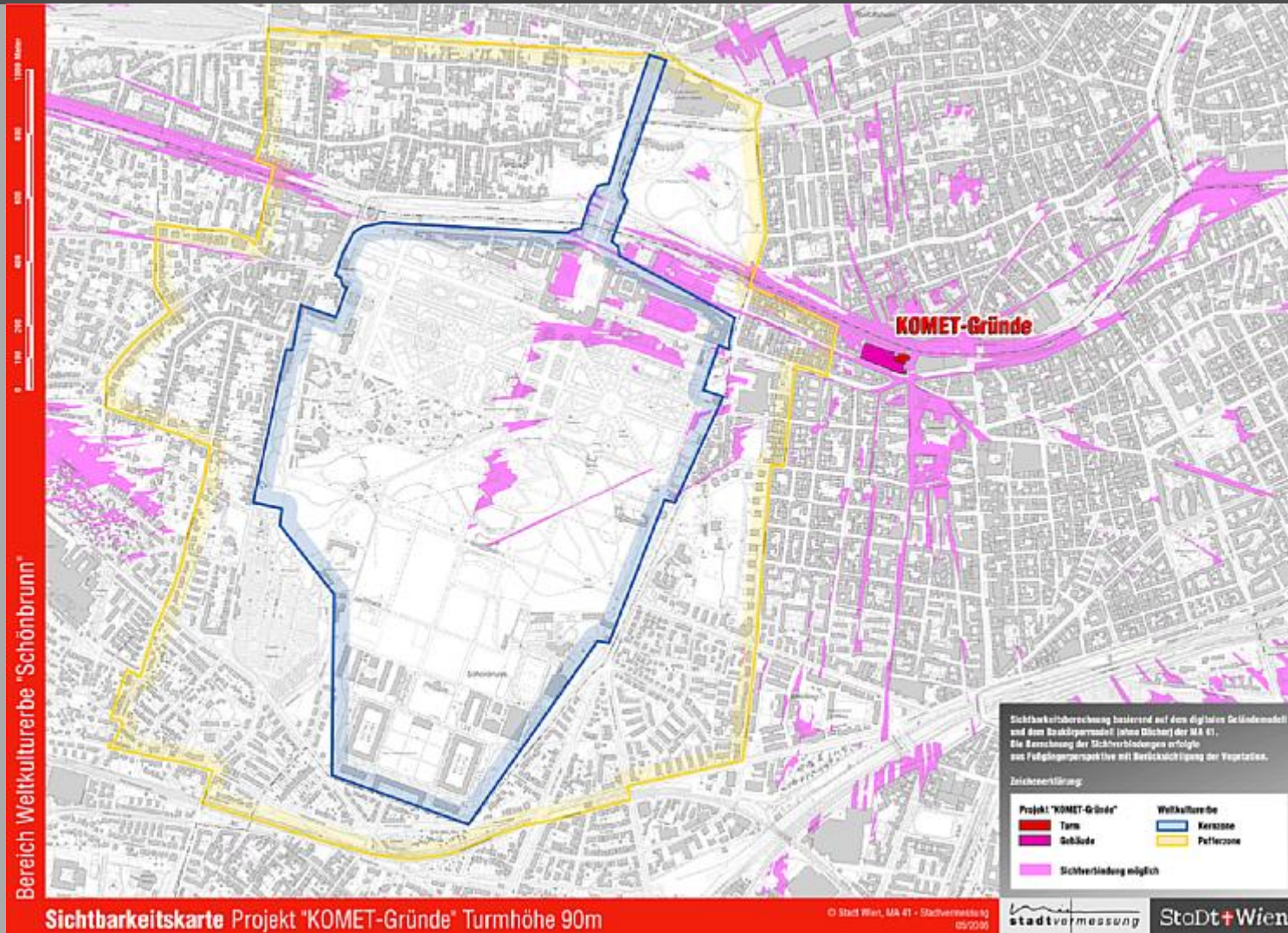
Schönbrunn

2007

ALS based DSM

vegetation is represented

height of the project: **90 meters**



Visibility studies

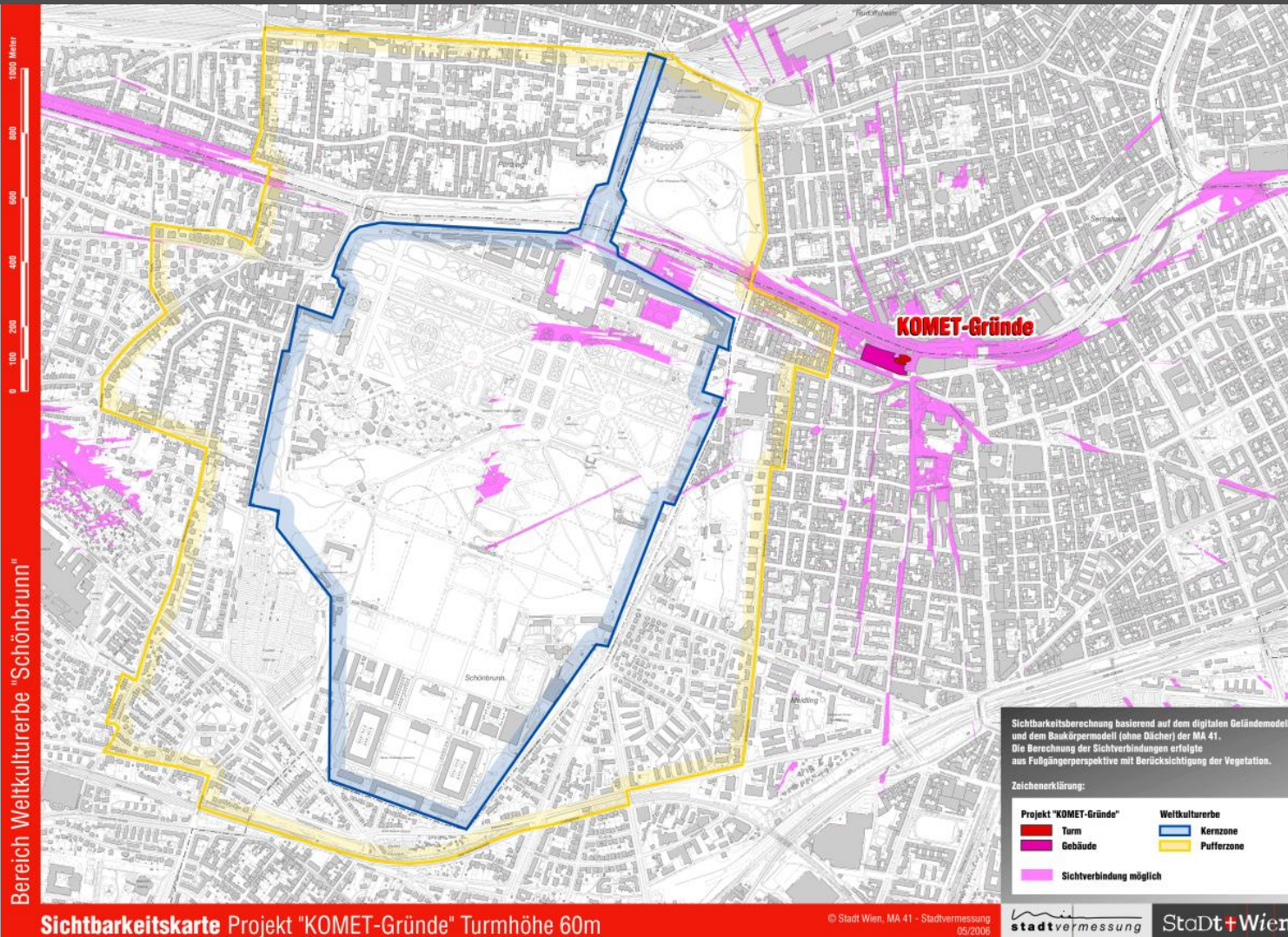
Schönbrunn

2007

ALS based DSM

vegetation is represented

height of the project: **60 meters**

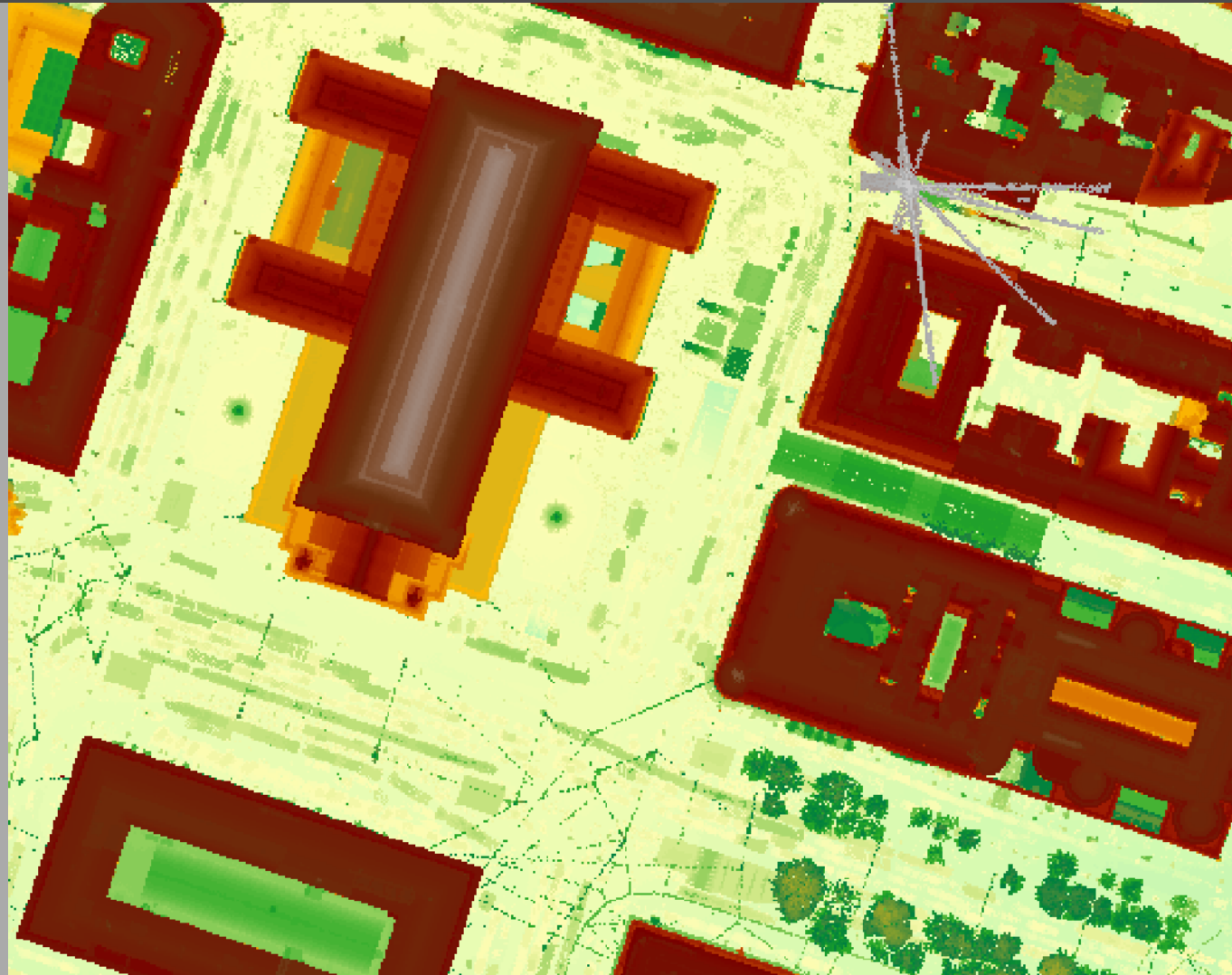
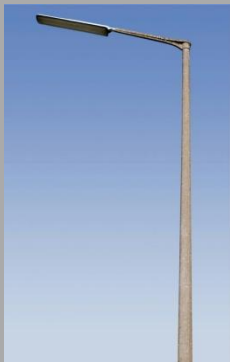


Visibility studies

challenges:

cranes
open wires of trams
street lamps

⇒ act as
nontransparent
curtains



Potential for Roof Greening (MA22 - Environmental Protection)

<http://www.wien.gv.at/umweltgut/public/>

2011

ALS based DSM

⇒ inclination of roof surfaces

⇒ classified for the potential for roof greening

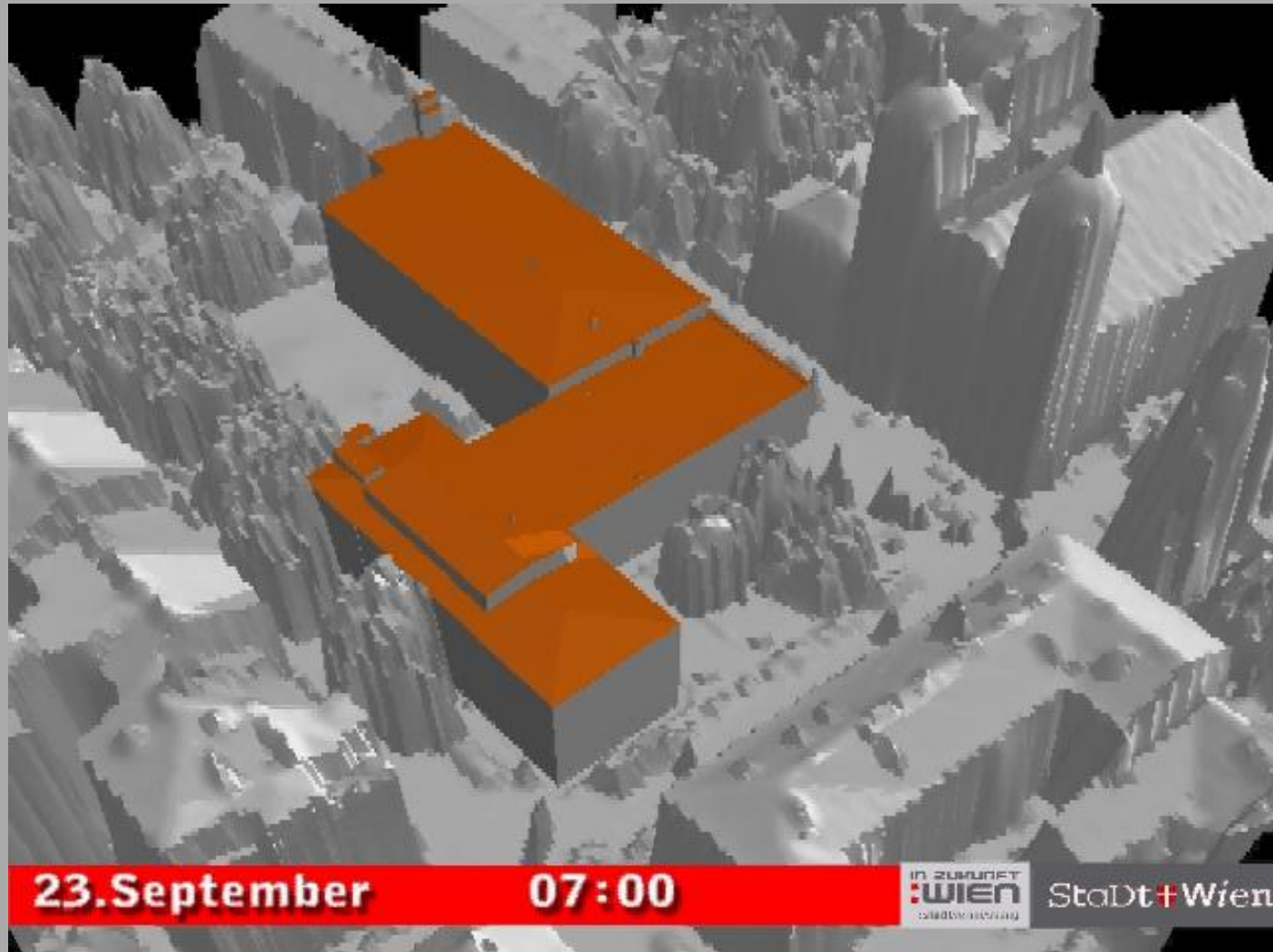
The screenshot displays the 'Wien Umweltgut' web application interface. At the top, there are navigation tabs for 'Themen', 'Virtuelles Amt', 'Stadtplan', 'wien.at TV', and 'Mein Bezirk'. Below these are sub-tabs for 'Stadtplan', 'Kulturgut', 'Umweltgut', 'Flächenwidmung', and 'Daten & Nutzung ViennaGIS'. The main content area shows a search for 'Marktgasse 31' with a search bar and a 'erweiterte Suche' link. The 'Karteninhalt' section is expanded to show 'Dächer nutzen' (Use of Roofs) with a checked box for 'Gründachpotenzialkataster' (Green Roof Potential Catalogue). This catalogue is further divided into 'Eignung der Dachfläche' (Suitability of Roof Area) with two categories: 'intensive und extensive Begrünung' (intensive and extensive greening) shown in green and yellow, and 'extensive Begrünung' (extensive greening) shown in yellow. Other categories include 'Gebäude' (Buildings), 'Solarpotenzialkataster' (Solar Potential Catalogue), and 'Nachhaltige Entwicklung' (Sustainable Development). The map itself shows a street grid with buildings colored according to the greening potential. A scale bar indicates 100 meters and the map scale is approximately 1:2830. The bottom right corner features the 'Wien! voraus' logo and the 'StadT Wien' logo.

Shadow Analysis

2010

ALS based DSM

building model of
a school building

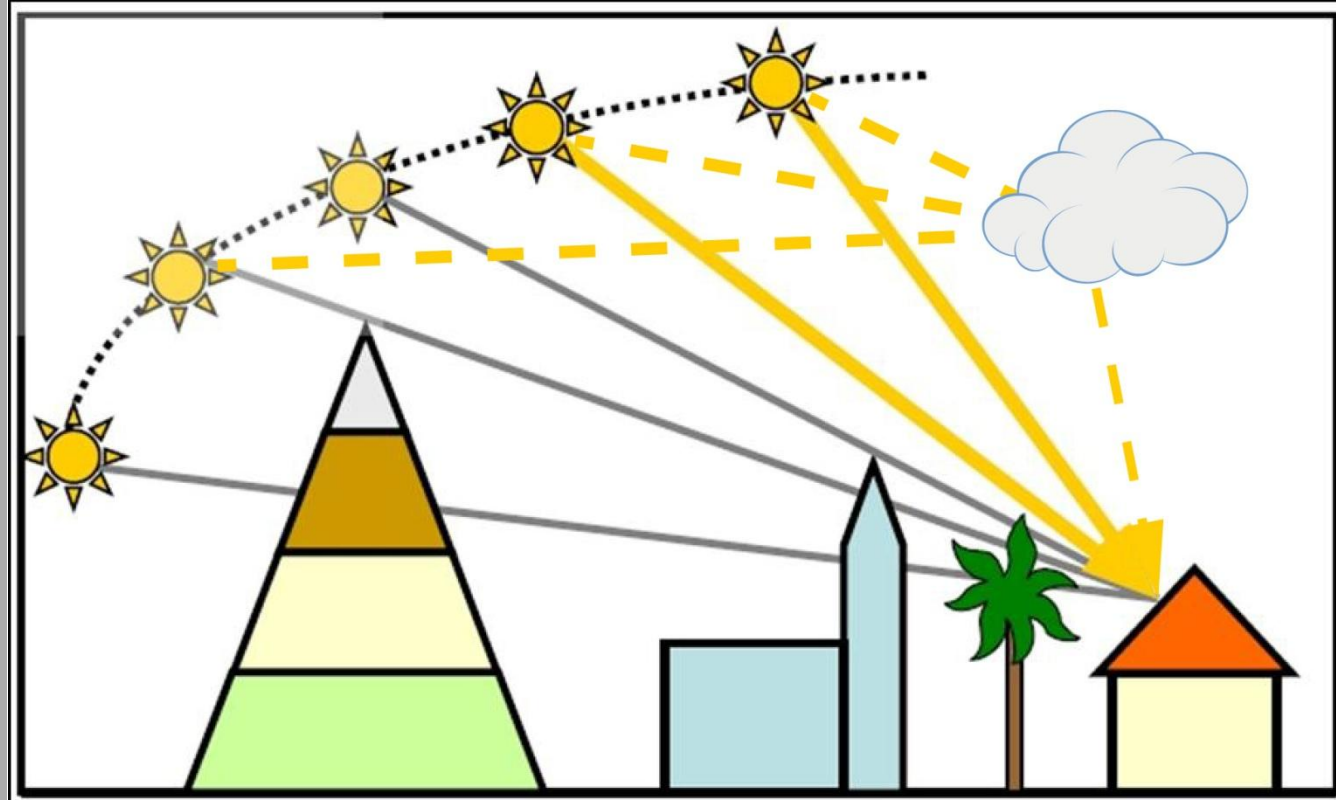


Potential for photovoltaic and solar heat

Principle

modelling of solar radiation
(direct and scattered)

shadows



Potential for photovoltaic and solar heat

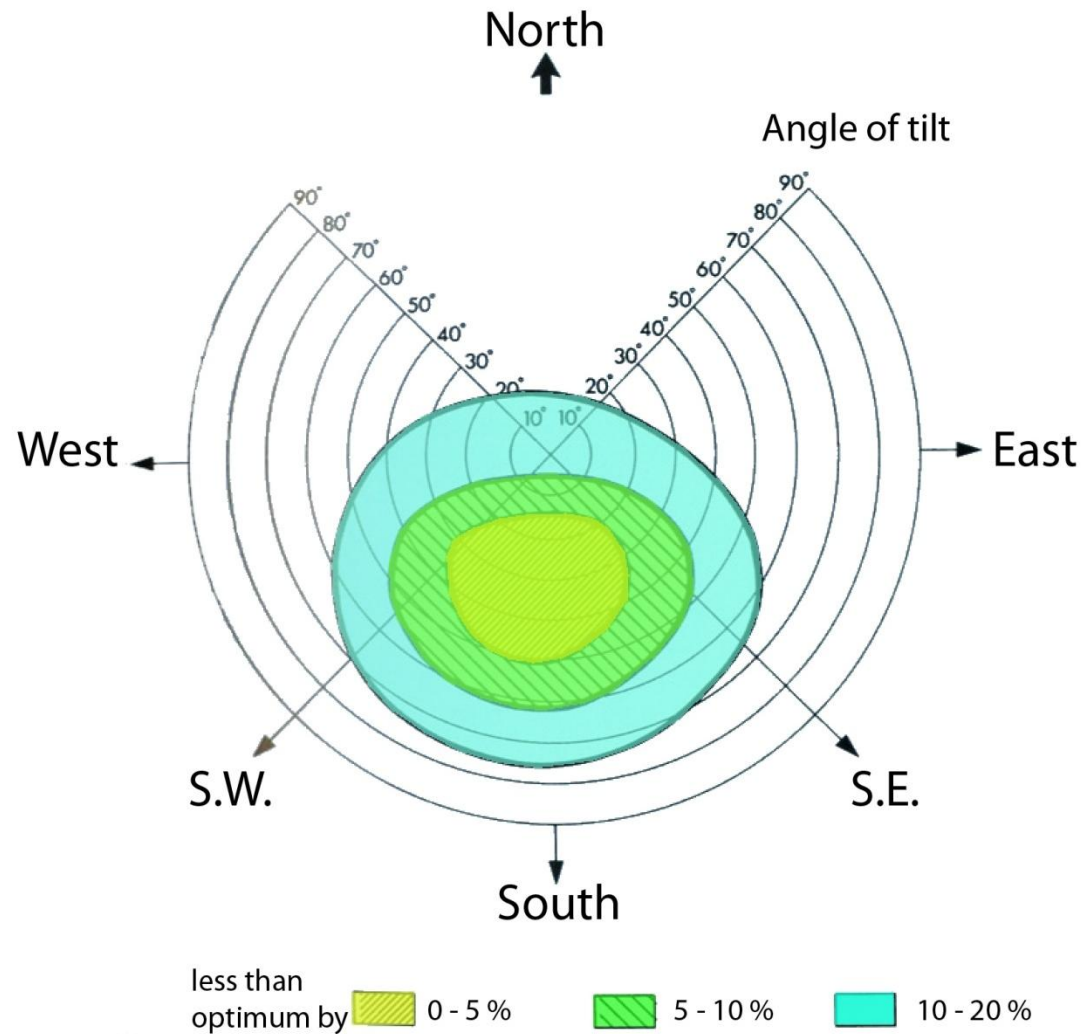
Principle

modelling of solar radiation
(direct and scattered)

shadows

orientation

inclination

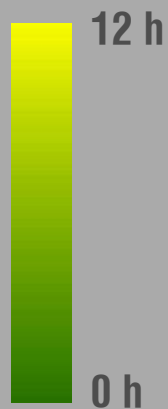


Potential for photovoltaic and solar heat

2010

ALS based DSM

calculation of
average daily
sunshine per year



Potential for photovoltaic and solar heat

<http://www.wien.gv.at/stadtentwicklung/stadtvermessung/geodaten/solar/index.html>

2010

ALS based DSM

calculation of
solar potential

english | bosanski | hrvatski | srpski | türkçe | LL leicht lesen | ögs

Themen | Virtuelles Amt | Stadtplan | wien.at TV | Mein Bezirk

Kontakte zur Stadt | Notrufe & Hotlines

Stadtplan | Kulturgut | Umweltgut | Flächenwidmung | Daten & Nutzung ViennaGIS

Wien Umweltgut

Marktgasse 31

erweiterte Suche

Karteninhalt

- Naturschutz – Schutzgebiete, Schutzobjekte
- Tiere, Pflanzen und ihre Lebensräume
- Baumkataster (Wiener Stadtgärten)
- Dächer nutzen
 - Gründachpotenzialkataster
 - Eignung der Dachfläche
 - intensive und extensive Begrünung
 - extensive Begrünung
 - Gebäude
 - Dachfläche
 - Schutzbereiche Bau
 - Schutzgebiete Natur
 - Existierende Gründächer
 - Solarpotenzialkataster
 - Eignung der Dachfläche
 - sehr gut
 - gut
 - Gebäude
 - Dachfläche
 - Schutzbereiche Bau
 - Schutzgebiete Natur
- Nachhaltige Entwicklung
- Saubere Stadt

Suche: Ergebnis

Grundstückssuche

Feedback | Link/Einbetten | Druckversion (PDF) | Druckversion (HTML) | Hilfe

Karte vergrößern | Karte | Karte s/w | Luftbild | Adressen

100 m | Maßstab ca. 1:2830 | © ViennaGIS

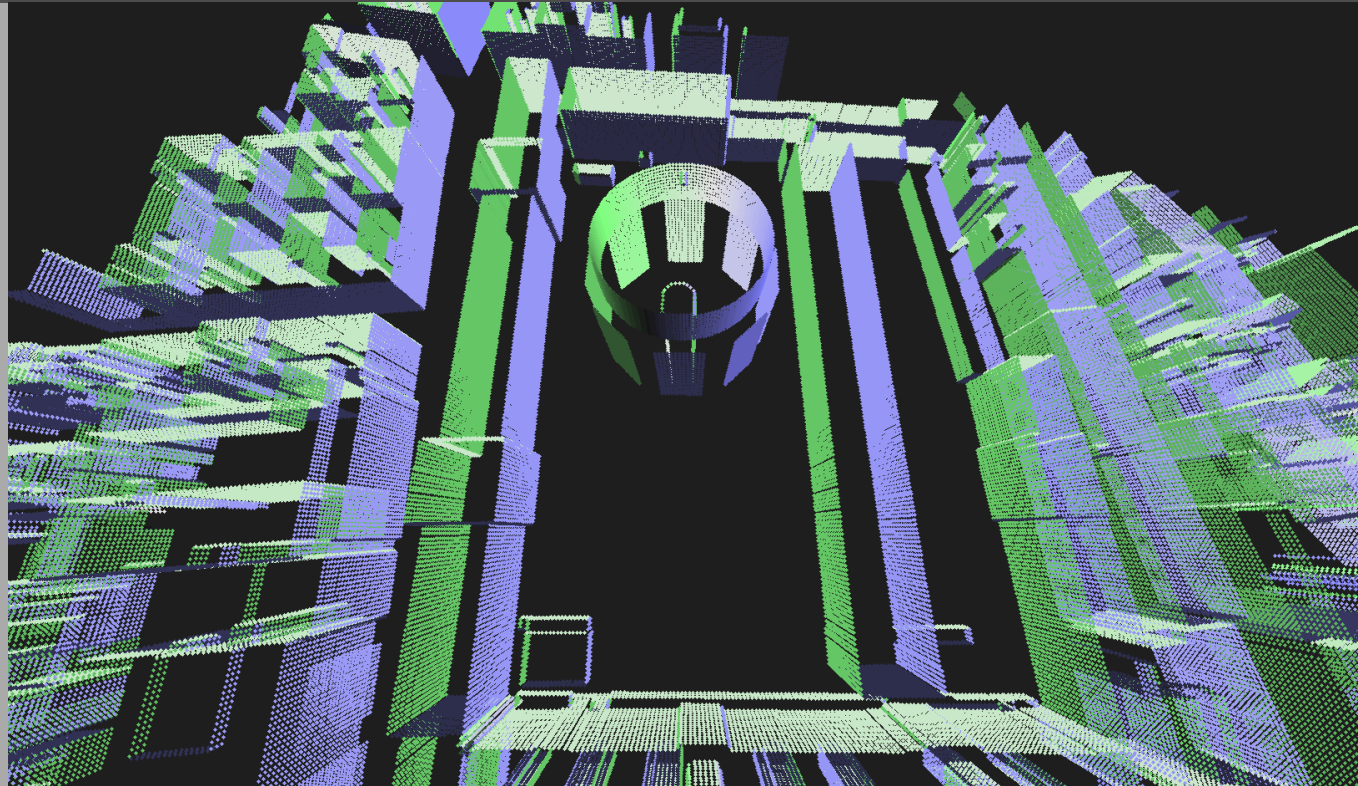
Wien! voraus
Stadtvermessung

Stadt Wien

Potential for photovoltaic and solar heat

3D

orientation of the
building facades



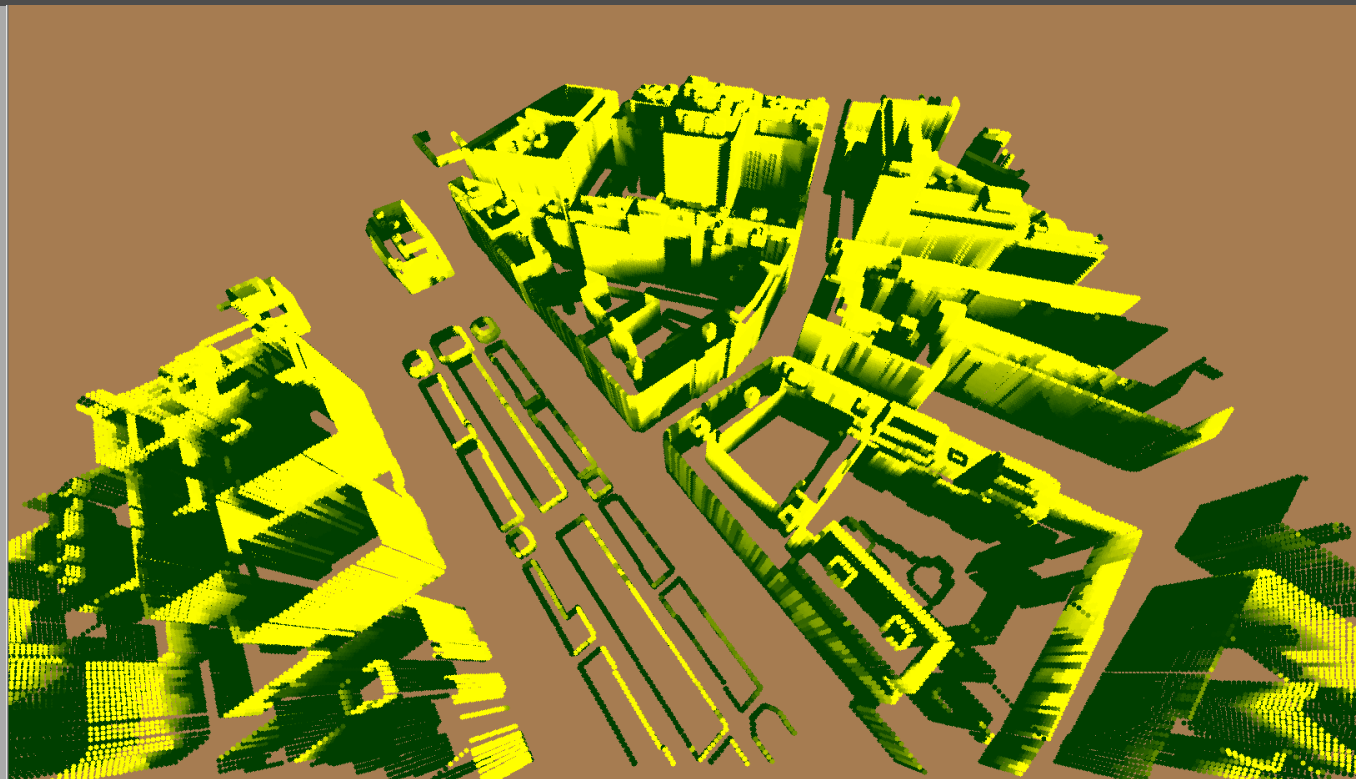
Potential for photovoltaic and solar heat

3D

2010

ALS DSM

average hours of
sunshine per day



0

hours of sunshine per day

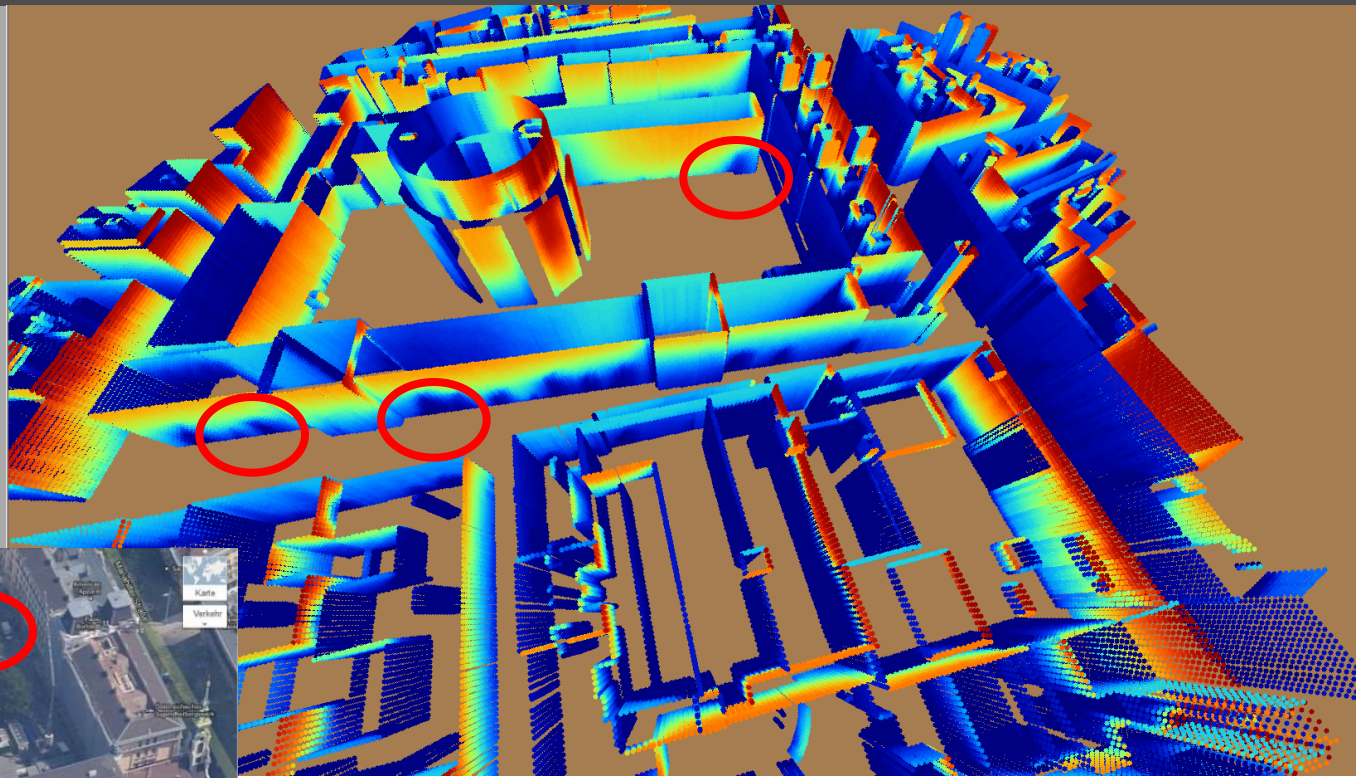
12

Potential for photovoltaic and solar heat

3D

Solar potential per day [kWh/m²]

shadows caused by trees



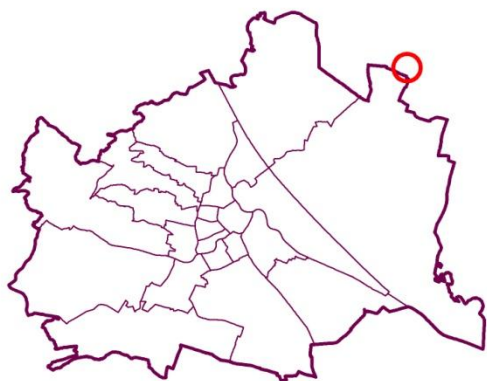
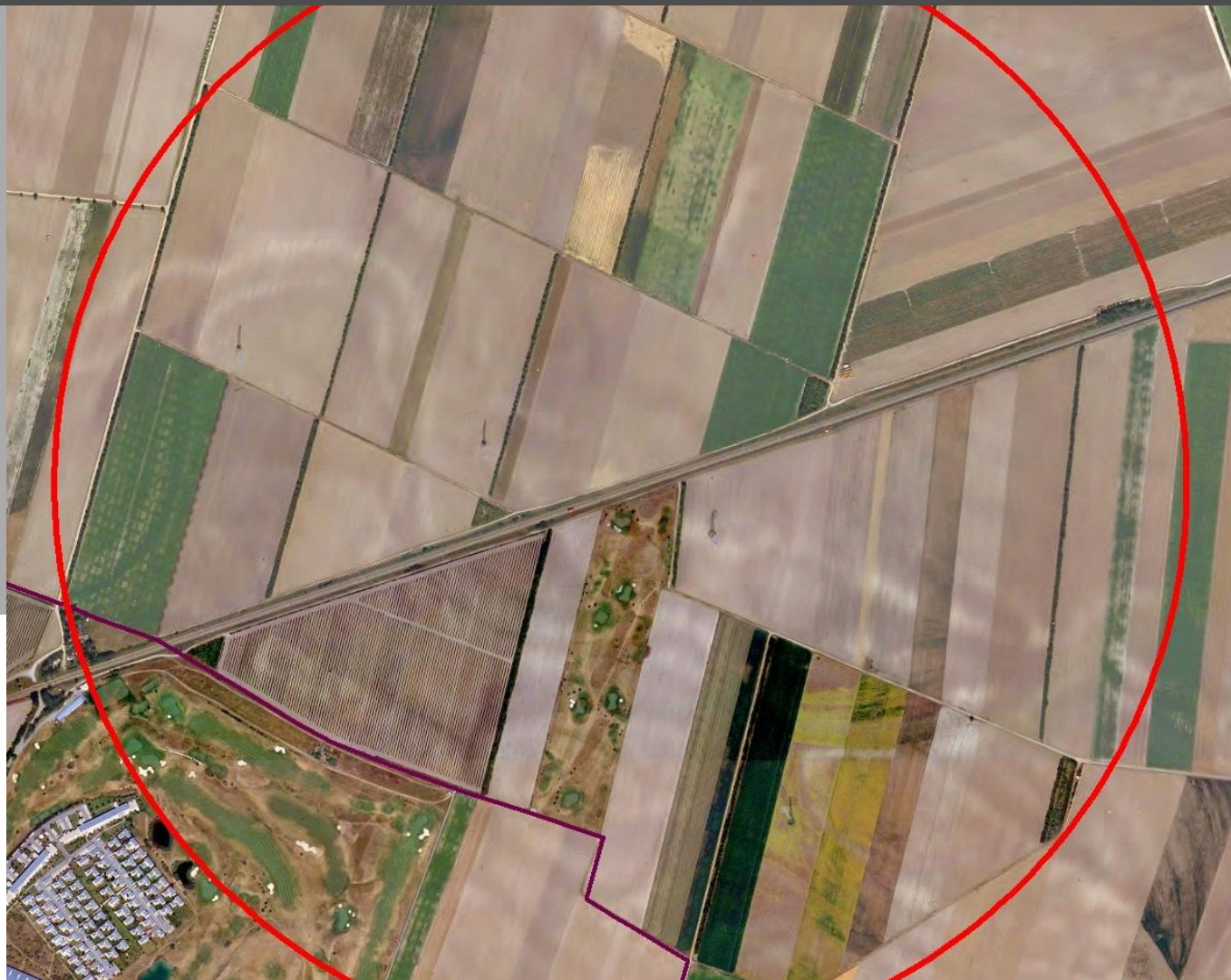
0

solar potential per year

900

Updating DTM

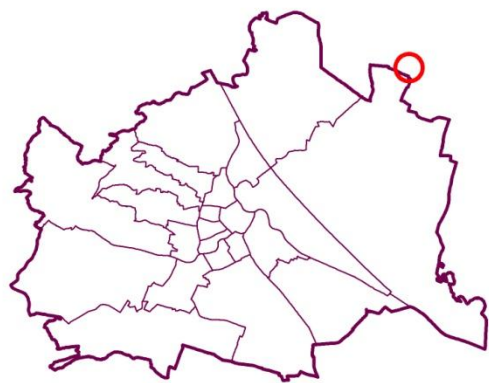
Orthophoto 2003



Updating DTM

Orthophoto 2003

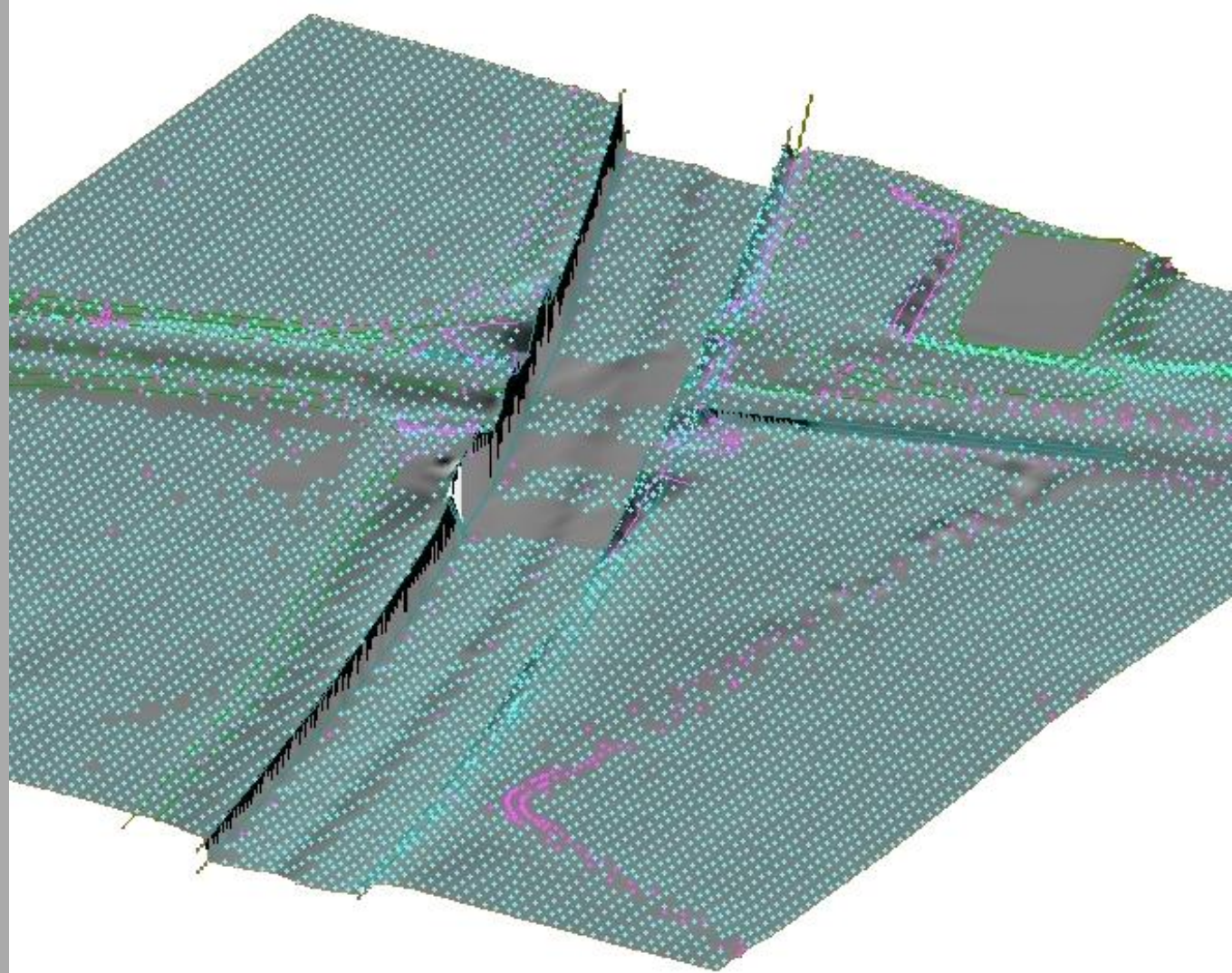
Orthophoto 2012



Updating DTM

2013

image based DSM



Updating DTM

2013

image based DSM



Orthorectification

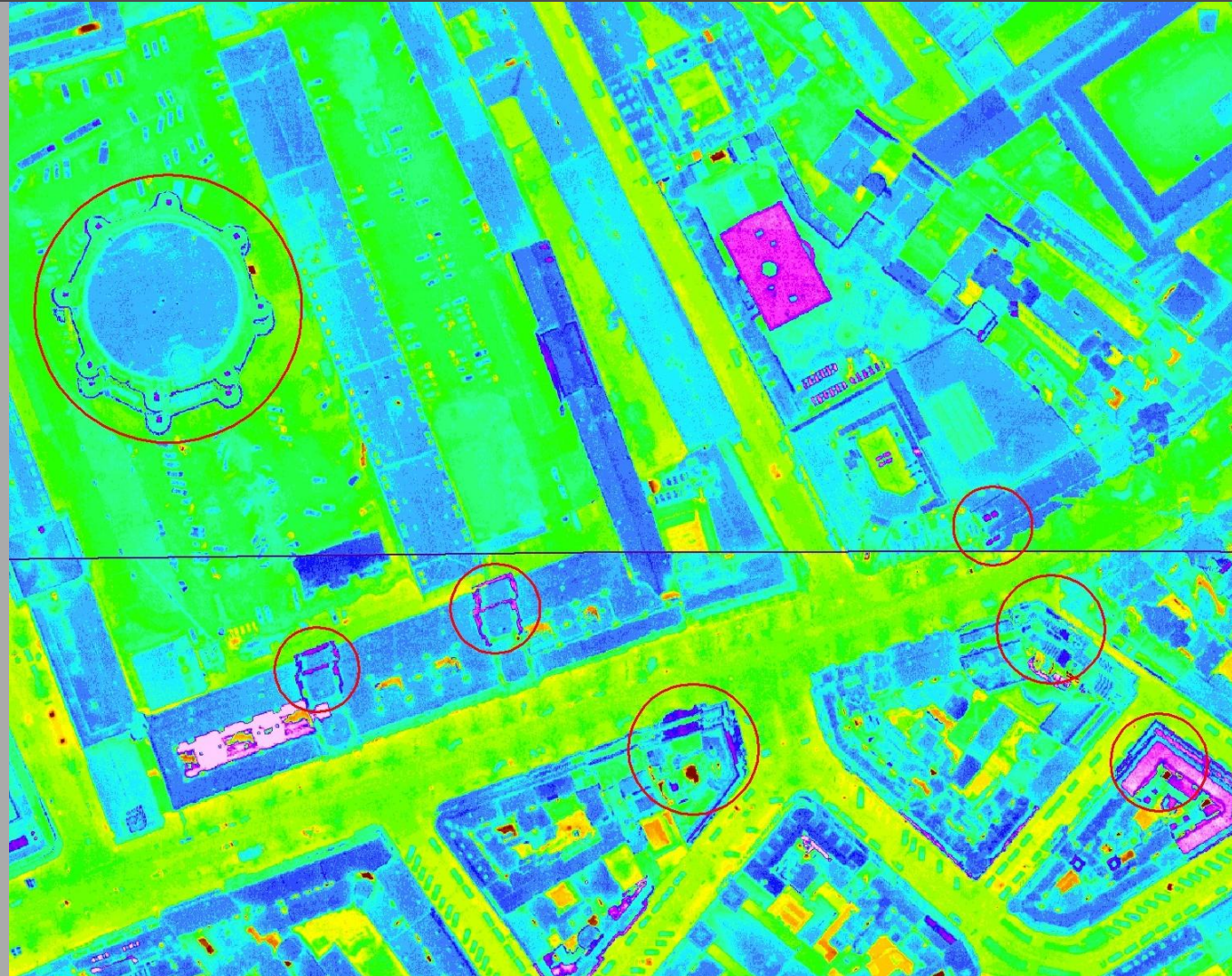
Thermal Image Campaign

2012

ALS based DSM

no line of sight
analysis

⇒ roof artefacts next
to the buildings

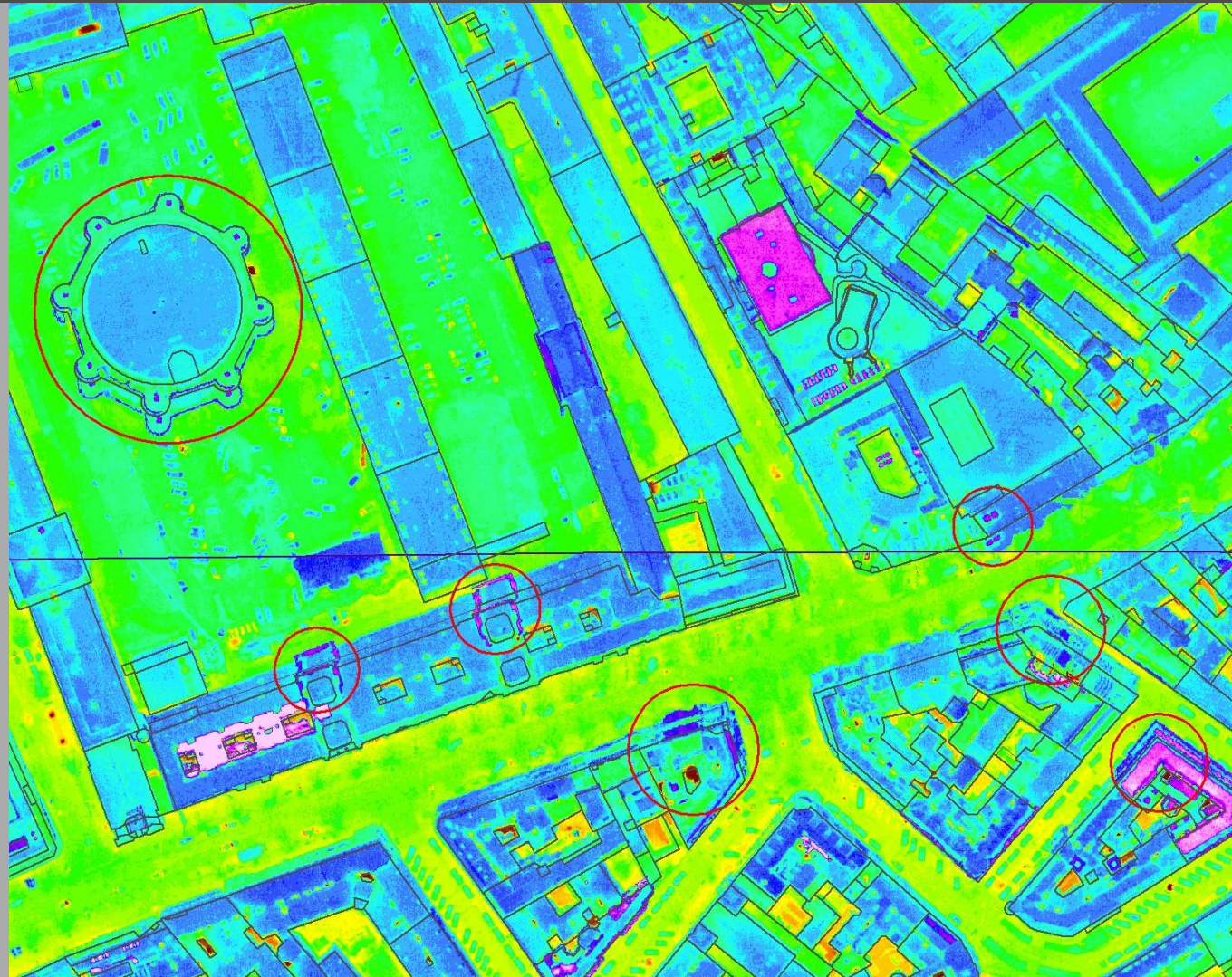


Orthorectification

Thermal Image Campaign

+ automatic analysis
based on building
polygons is possible

- temporary objects
(cranes)



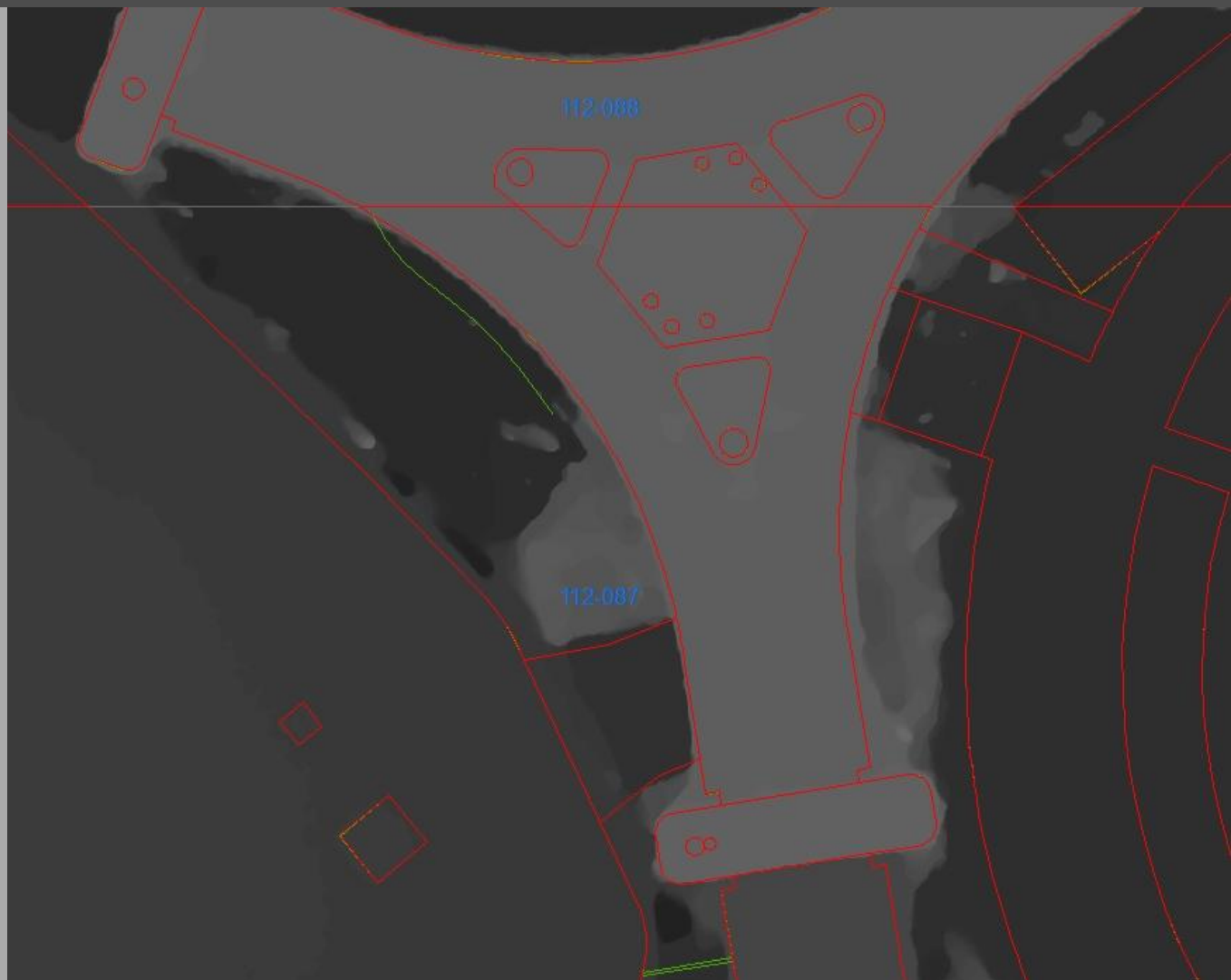
Orthorectification

True OP

2012

image based DSM

Uno City



Orthorectification

True OP

2012

image based DSM

Uno City



2012

image based DSM

City Centre



Orthorectification

True OP

2012

image based DSM

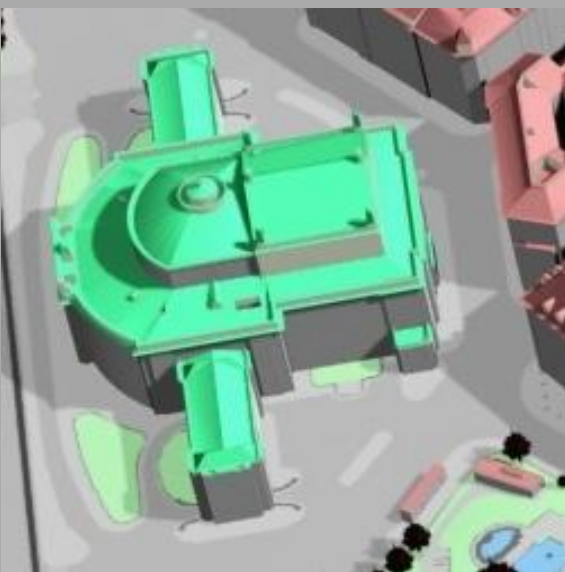
City Centre



3D building models

photogrammetric
models

city centre, important
buildings , ...

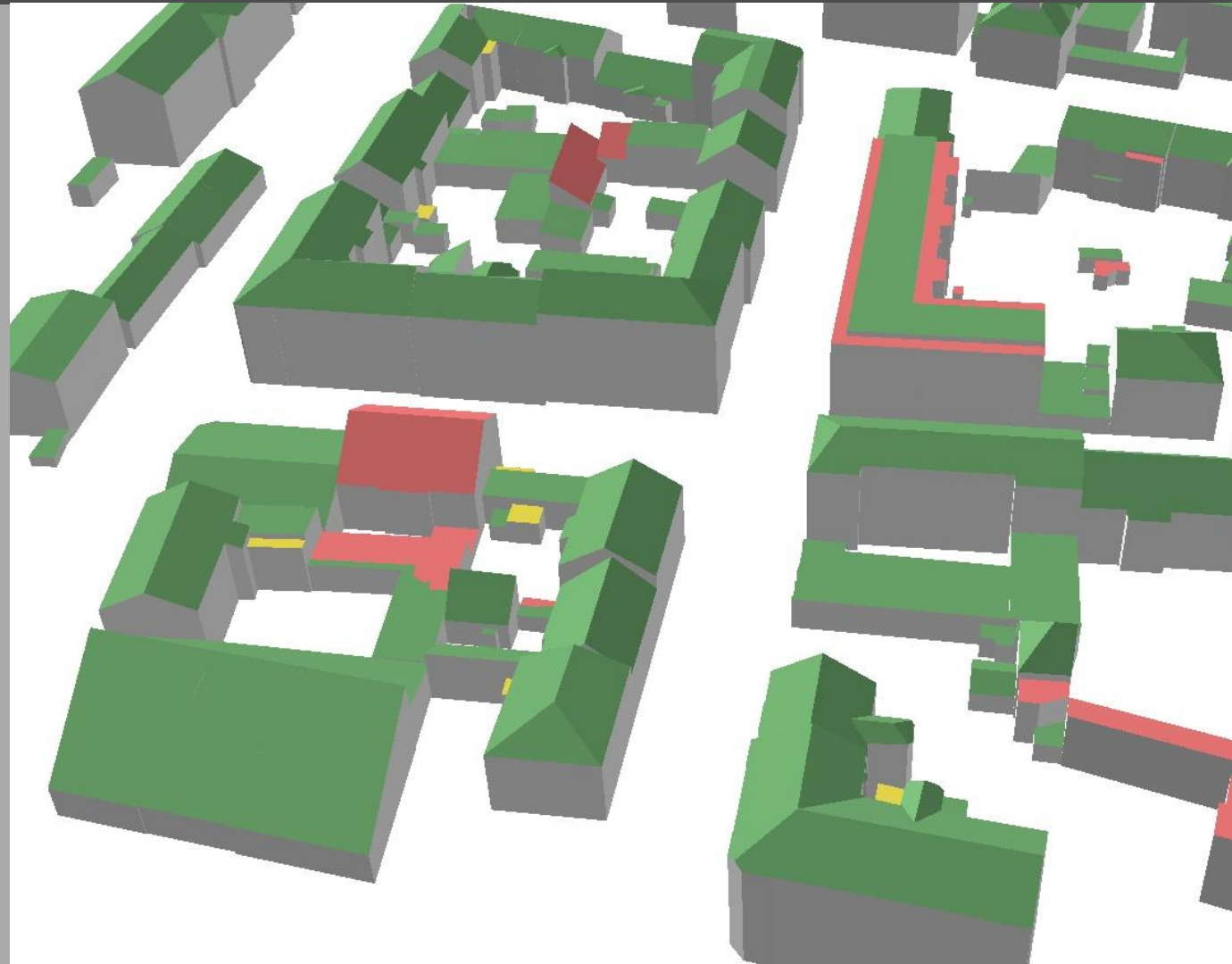


3D building models

2013

image matching DSM
+ building polygons

automatic estimation
of roof models



3D building models

2013

image matching DSM
+ building polygons

automatic estimation
of roof models



Outlook



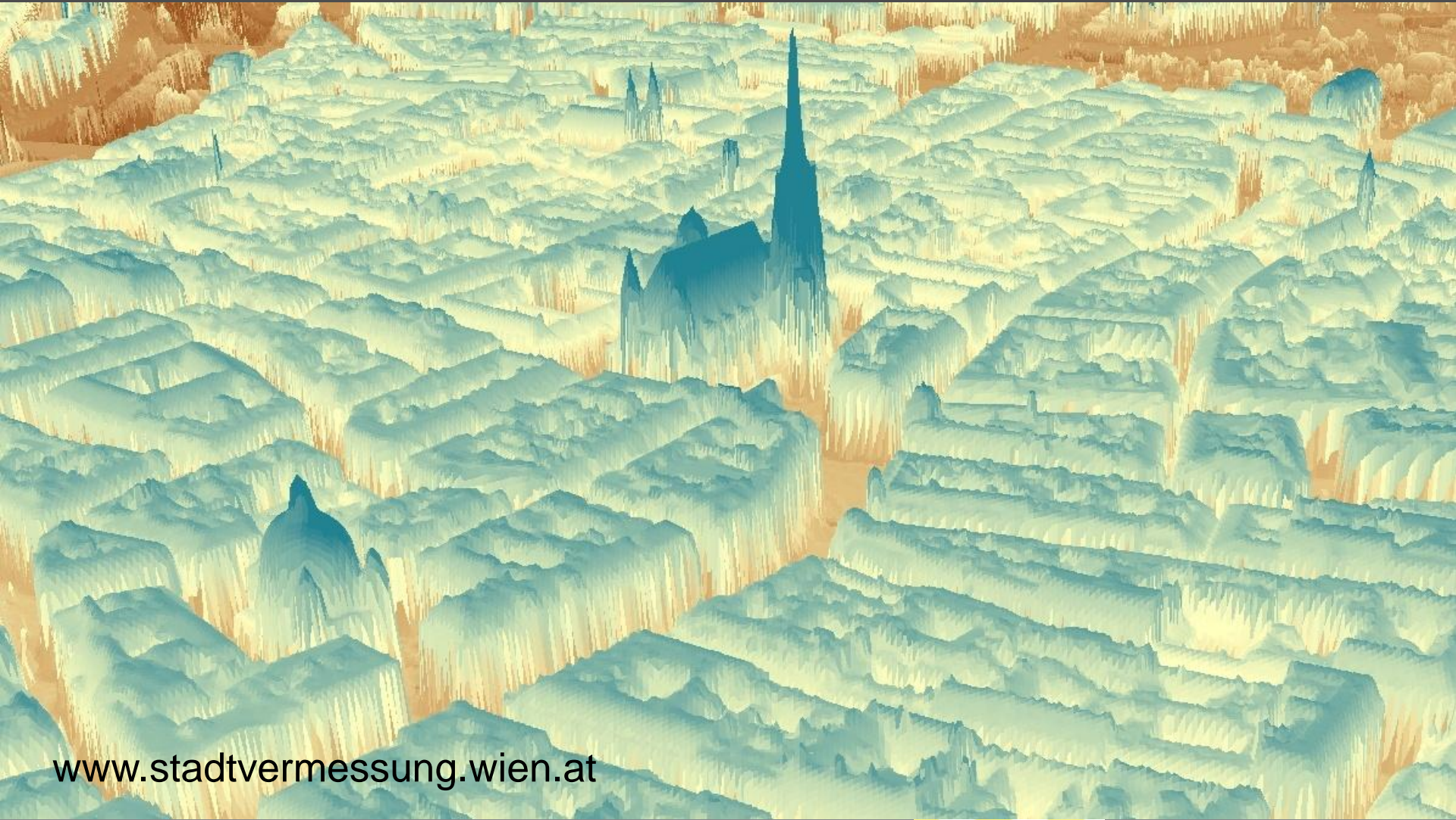
- change detection
 - currently photogrammetric update cycle for city map
 - based on height changes react faster on major changes
- surface classification (OBIA)
 - object heights (nDSM) enhance classification results

Conclusion



- vegetation
 - visibility maps
 - shadow analysis
 - analysis of solar potential
- quality measure for calculated height values
- correction procedure in processing workflow

Thank you very much for your attention!



www.stadtvermessung.wien.at

EuroSDR Workshop Vienna, 13.06.2013

Wien!
voraus
Stadtvermessung

StoDt+Wien