

SPATIAL DATA INFRASTRUCTURE AS TOOLS IN ENVIRONMENT AND GEOHAZARD MANAGEMENT. Examples from Norway

Kari Strande, International Director,
Norwegian Mapping Authority

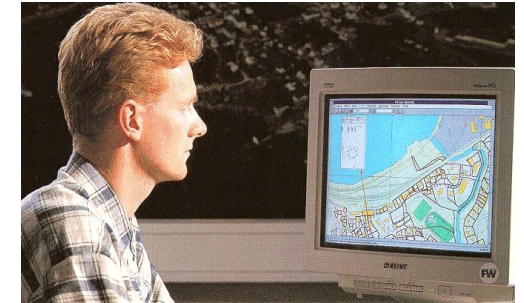
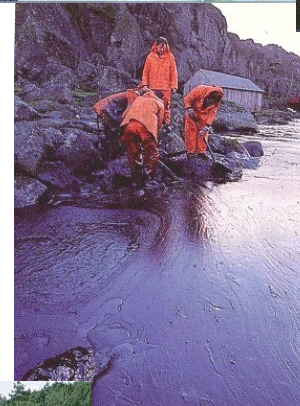
7th FIG Regional Conference
Hanoi, Vietnam, 19-22 October 2009

– *value for* ***Society***

Extensive value for the society

Within :

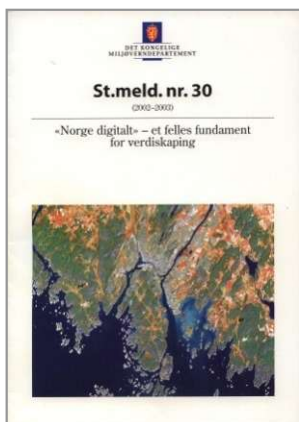
- **Municipal administration**
- **Transport**
- **Shipping and Fishery**
- **Agriculture and Forestry**
- **Telecommunications and Energy**
- **Defence**
- **Emergency management**
- **Imagery**
- **Environmental and Area resource management**
- **Property management**
- **Education**
- **Media**
- **Leisure**
- **Map production**
- **eGovernment**



– value for *Society*



NORWEGIAN MAPPING
AUTHORITY



Political background

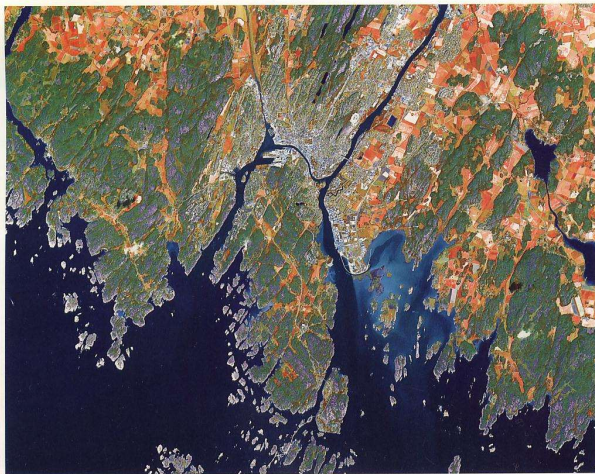
- **Parliamentary White Paper (2002-2003)
Norway Digital** (The Ministry of the Environment)
- **eNorway 2009**
(The Ministry of Government Administration and Reform)
- **Parliamentary White Paper (2006-2007)
on ICT policies**
(The Ministry of Government Administration and Reform)



St.meld. nr. 30

(2002–2003)

«Norge digitalt» – et felles fundament
for verdiskaping



«Norge digitalt» - et felles fundament
for verdiskaping

«Norway Digital» - a common
fundament for value adding services

The Parliamentary White Paper
presented by the Norwegian
government and accepted by the
Parliament on June 18, 2003

The major concept in the White Paper is the establishment of national
geospatial infrastructure in support of eGovernment

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INSPIRE

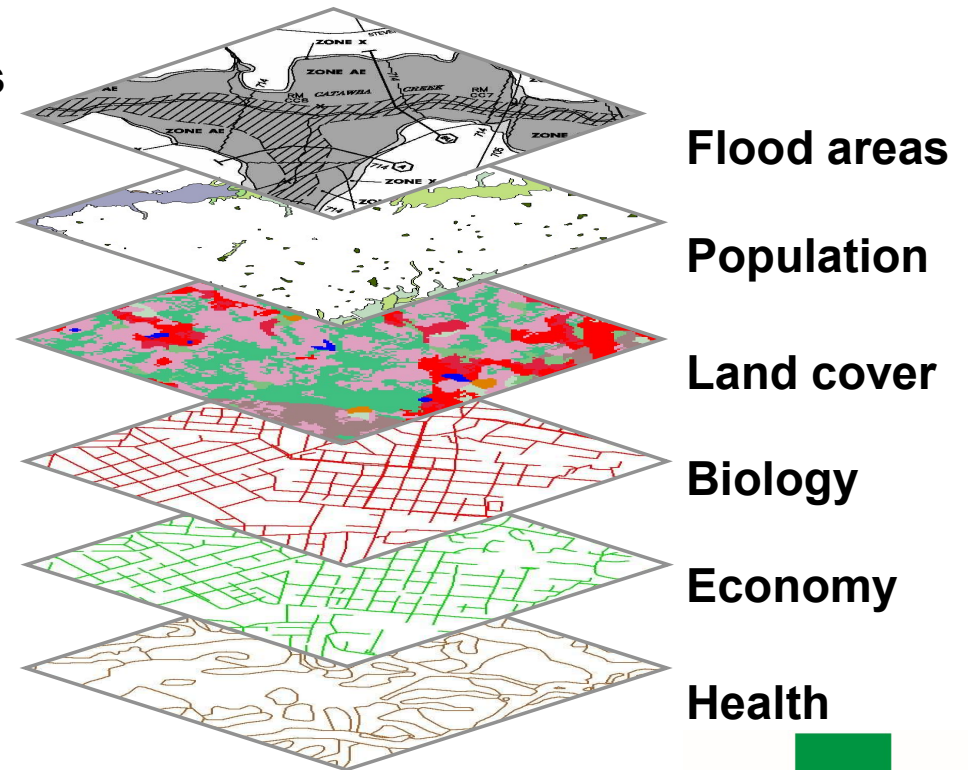
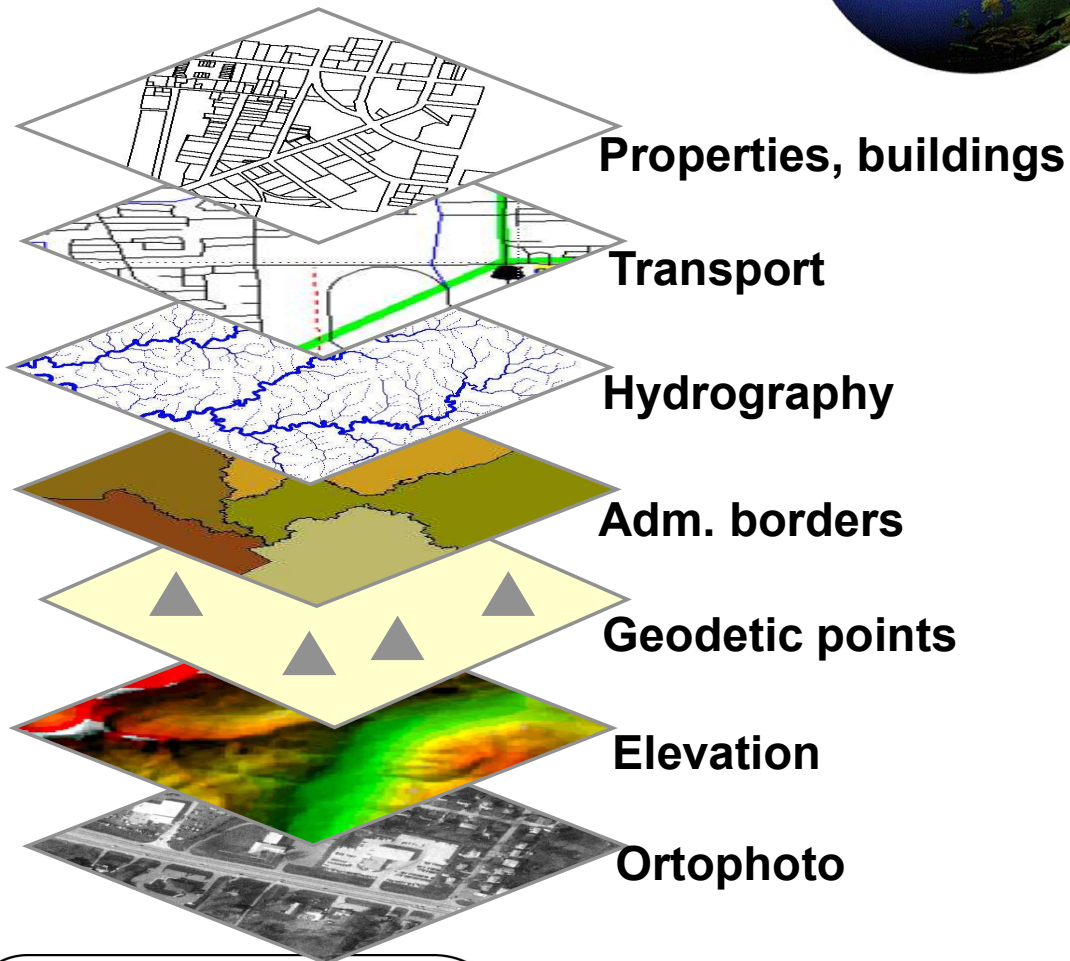
- **IN**frastructure for **S**patial **I**nfo**R**mation in Europe
 - <http://www.ec-gis.org/inspire>
 - Initiated by DG Environment, Statistics and Research
- **INSPIRE** principles; data should be
 - Stored, made available and maintained at the most appropriate level
 - Possible to combine from different sources
 - Possible to share between users and applications
 - Easy to discover, evaluate and find conditions for use
 - Available on conditions that do not restrict their extensive use

The NSDI

Basic geodata



Thematic geodata



– value for *Society*



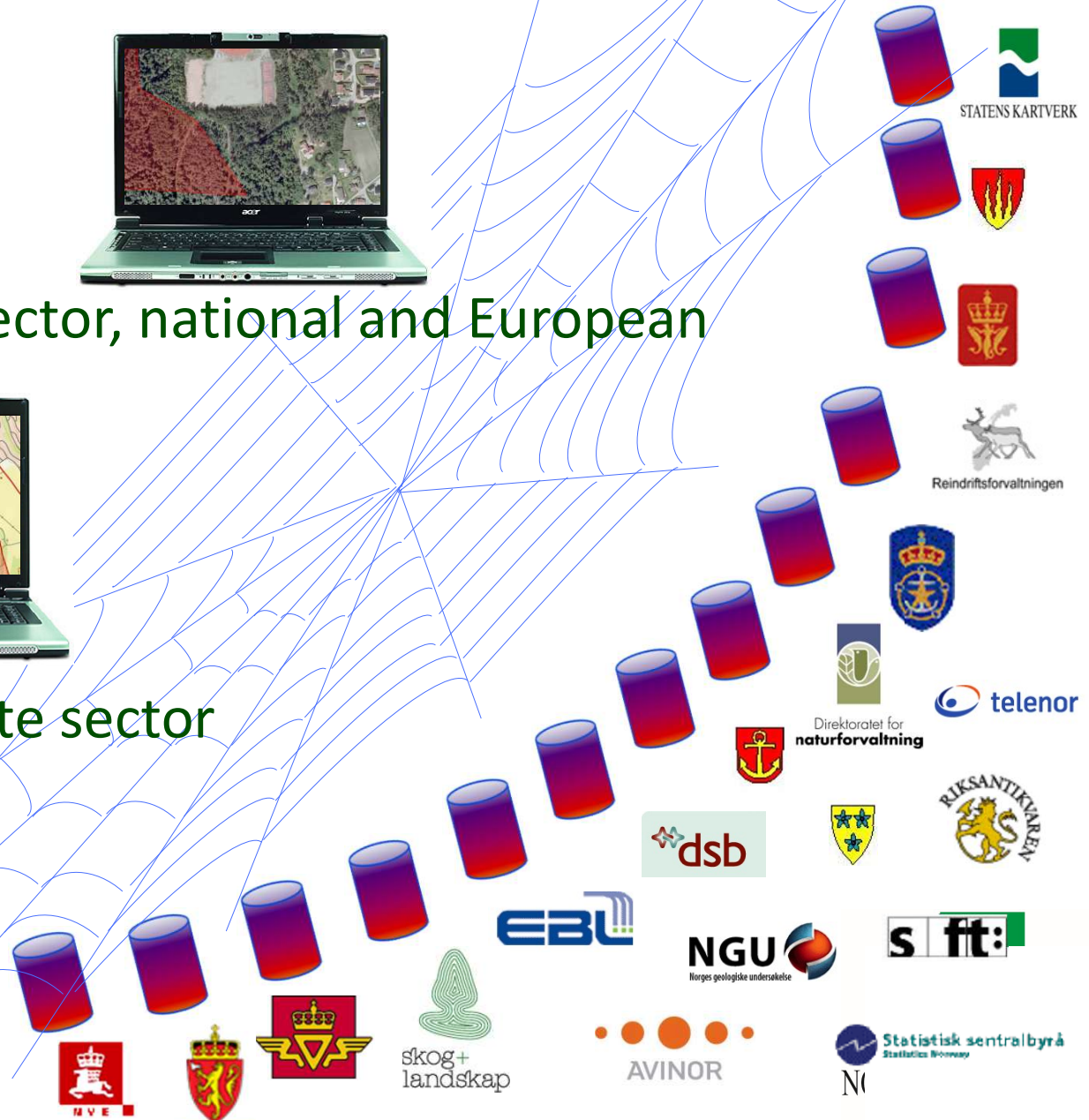
NORWEGIAN MAPPING
AUTHORITY

Service based infrastructure:

- metadata
- view services
- download services

Public sector, national and European

Citizens and private sector



– value for Society

«Norway digital»

620 partners in close co-operation



Delivery services

- Distributed infrastructure
- Unifying reference data and thematic data
- Partnership and joint venture funding
- Covers local, regional and national authorities
- Establishes a public limited company to provide delivery services to non-partners
 - commercial
 - non-commercial

– value for Society

eNorway 2009

An Information Society for All

Through the White Paper on ICT-policy “An Information Society for All” in 2006, the Government presented a new strategy for ICT-development. eNorway-initiatives have been integrated in this new strategy.

Making everyday life more easy for the citizens

Knowledge society with participation from all

Contribute to value adding services

The needs of the citizens and the industry as driving force

Cross sector initiatives

Focusing

- The citizens in the Norwegian digital environment*
- Innovation and growth in the private industry*
- A co-ordinated and user approached public sector*



eNorway 2009 goals relevant for SDI

- *All Geodata authorities shall be part of Norway Digital*
- *Moderne electronic charts will be available for all Norwegian Coastal water*
- *All agreements for reuse of public data shall be assessed for adaption to the PSI directive*
- *Interactive public services shall be available through the citizens portal*
My Page
- *All new ICT systems in public sector shall be based on open source standards*
- *All public institutions shall use eID and eSignature for all relevant services*

Services on MyPage

The illustration below presents the different types of services available on MyPage.

The screenshot shows the MyPage website interface. The top navigation bar includes links for 'About MyPage', 'Contact MyPage', 'Edit MyPage', 'Security', and 'Frequently asked questions'. The left sidebar contains a search bar and a list of service categories: Consumer rights, Education, Employment, Health, Housing and property, Norwegian Armed Forces, Recreation, culture and the environment, Social security, Taxes, and Travel and transport. The main content area displays a 'Frontpage' section with a welcome message and a list of services. Three green callout boxes are overlaid on the page:

- Register services** provide citizens with personal data stored in public registers.
- Notification services** allow SPs* to correspond with citizens.
- Calendar services** help citizens keep track of important dates and events.

The right sidebar features a 'Log off' button, a 'My messages' section, and a calendar for July 2007. The bottom of the page shows a status bar with the text '4 av 13'.

MyPage

Min Side - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print Folders

Address http://www.norge.no/minside/framside.asp

Links Forsvarnett HW-06 Stab Intranett for Statens kartverk geoNorge.no - WMS Google Norge Digital Portal TEST Norge Digital Portal DRIFT geonorge.no MOD - Regulativ for reiser innenlands for statens



Mitt vær
([met.no](#))



Lokal temp
([met.no](#))



Min snø
([met.no](#))



Min e-post



Min kart-info
([symbolbibliotek](#))

Min side: Morten Andreas Meyer
[Hjem](#) | [Min profil](#) | [Spør oss](#) | [Info](#) | [Logg ut](#)

Personopplysninger:

Fødselsnr: 201059 12345
Navn: Morten Andreas Meyer
Adresse: Morkelvege 17
Postnr: 7340
Poststed: Oppdal

Husk:

- Opptak til musikkskulen i Oppdal
- EU kontroll av VJ 34563 innen 04.10.2005
- Tid for å fornye passet utløpsdato: 14.11.2005

Kontaktinfo:

- Oppdal kommune
- Min fastlege: Jon Olsen (bytte) tlf. 12344567 e-post
- Spør legen om råd på nett
- Oppdal likningskontor
- Oppdal trygdekontor
- Oppdal trafikkstasjon
- Norge.no: tlf 800 30 300
- Nettprat SMS

>> Flere kontaktsteder...

Snarveier:

- Mine kjøretøy
- Min skatteoversikt
- Mine eiendommer

Mine persondata er innhentet av:

27.07 Creditinform AS
17.06 Fylkesmannen i Sør-Trøndelag

Data hentet fra [folkeregisteret](#) >> Alle mine data

Mitt arkiv:

25.07 Endring i reguleringsplan for Hansmovangen hyttefelt. Avsender: Tynset kommune

15.06 Skatteoppgjør 2004. Avsender: Oppdal likningskontor

15.06 50% Plass i Nøtteskogen barnehage. Avsender: Oppdal kommune

01.05 Søknad om barnehageplass. Avsender: Morten Andreas Meyer

01.04 Nytt skattekort. Avsender: Oppdal likningskontor

>> Alle mine dokument

Stedsnavn



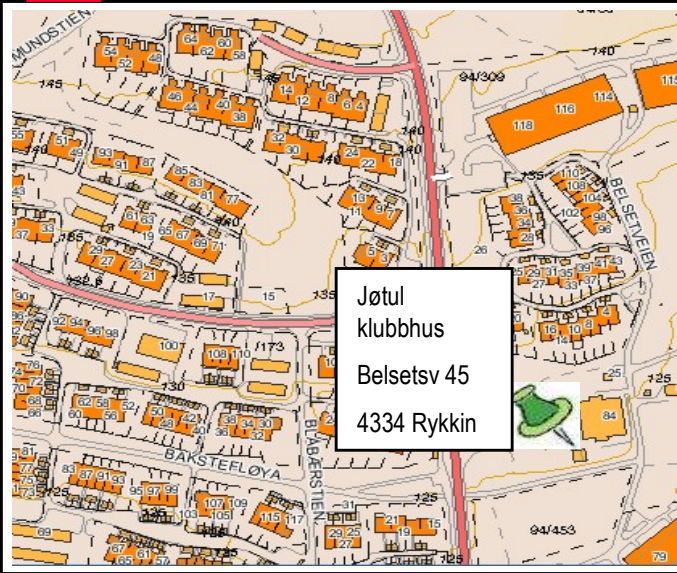
Mine steder
([webservice](#))

Min eiendom
([webservice](#))

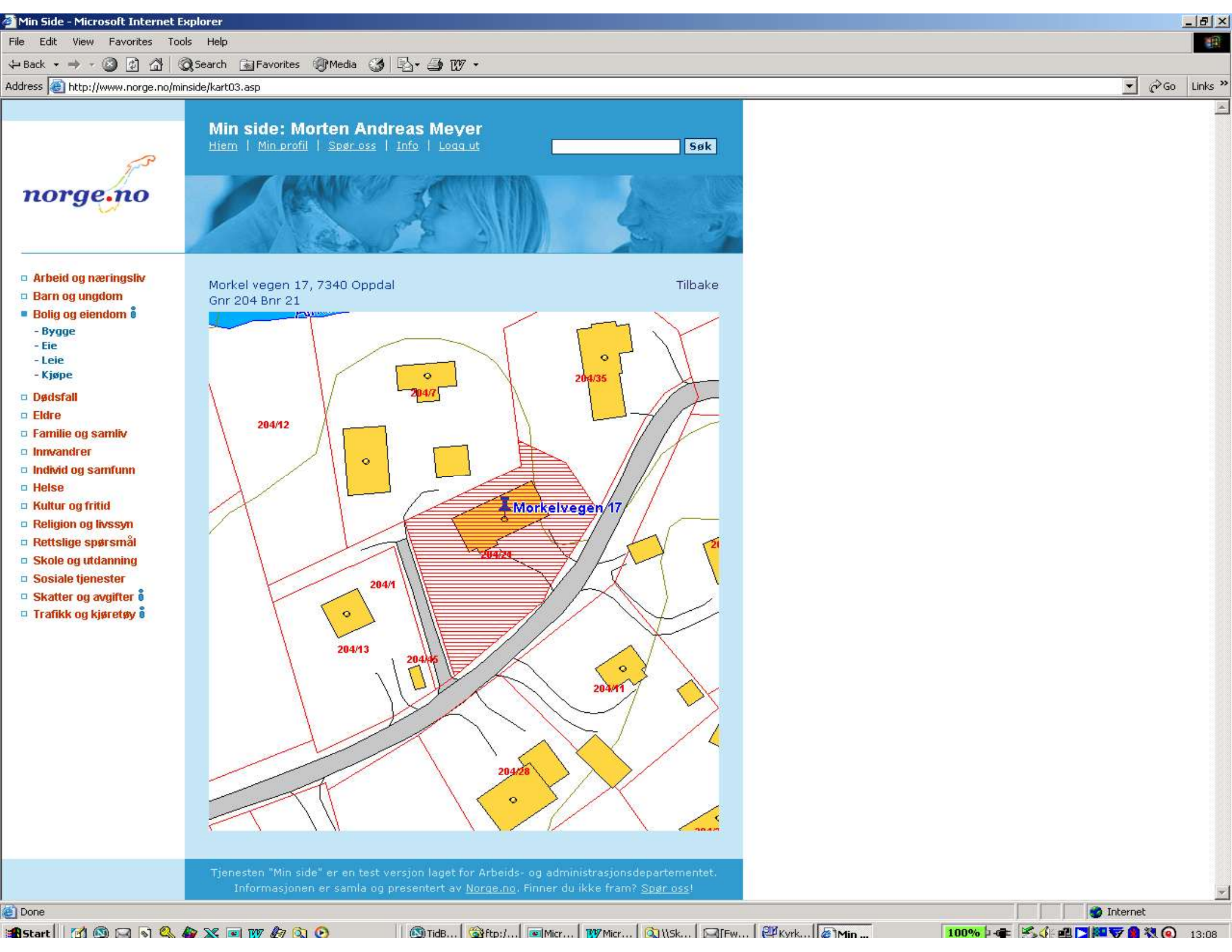
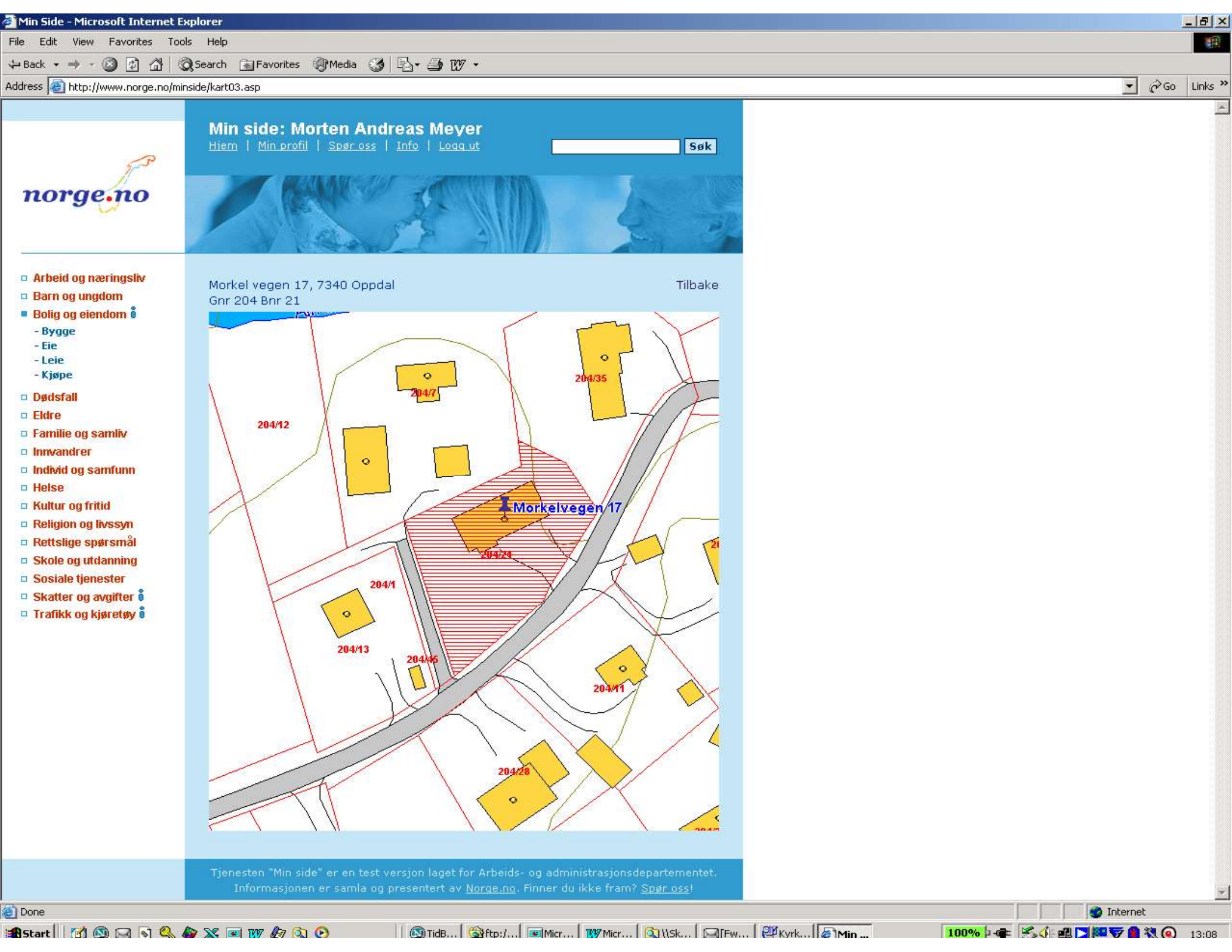
Mine adresser
([webservice](#))

Adressegata

Mitt kart
(WMS)



Jøtul klubbhus
Belsetsv 45
4334 Rykkin

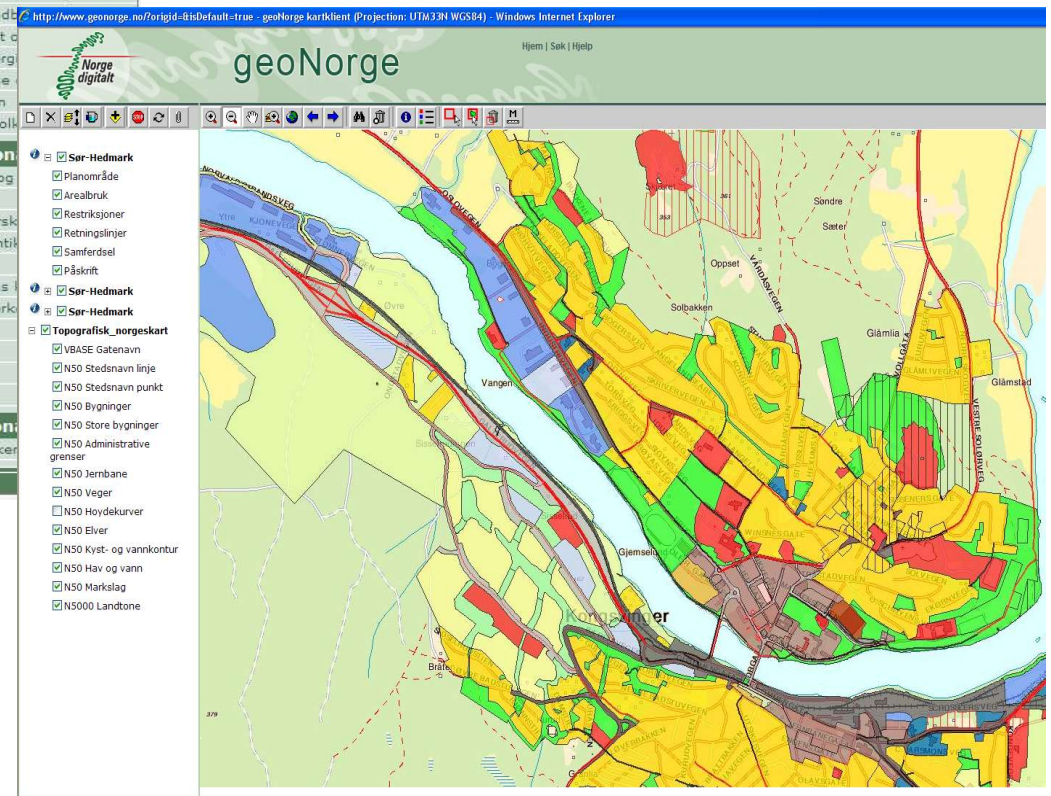


Norway digital geoportal



The screenshot shows the geoNorge homepage with the following elements:

- Header:** "Norge digitalt" logo and "geoNorge Nasjonal geografisk portal". Navigation links: "Om geoNorge", "Kontakt", "Hjelp", "FAQ".
- Min geoNorge:** A sidebar with links to "Hjem", "Start kartklient", "Avansert søk", "Stedsnavnsøk", "Logg inn", and a login section with fields for "Brukernavn" and "Passord", a "Logg inn" button, and links for "Registrer ny bruker!" and "Glemt passord?".
- Hjem:** A search bar with a "Søk" button and "Avansert søk" link. A welcome message: "Velkommen til geoNorge" followed by a description of the portal and a link to "Les mer om geoportalen og våre samarbeidsparter i Norge digitalt." Below this is a section "Aktuelle kart og tjenester" with two thumbnails: "Til norgeskartet" and "Spennende kart og tjenester".
- Fagområder:** A list of thematic areas: "Basisdata", "Eiendom og grenser", "Natur og miljø", "Geologi", "Vann, vær og klima", "Landbruk", "Kyst og hav", "Energi", "Kriser", "Plan", "Befolkning".
- Nasjon:** A list of national datasets: "Skog og skogbruk", "NGU", "Havforskning", "Riksanntallet", "NINA", "Statens kartverk", "Kystverket", "NVE", "SFT", "DN", "NIVA".
- Region:** A link to "Fylker".



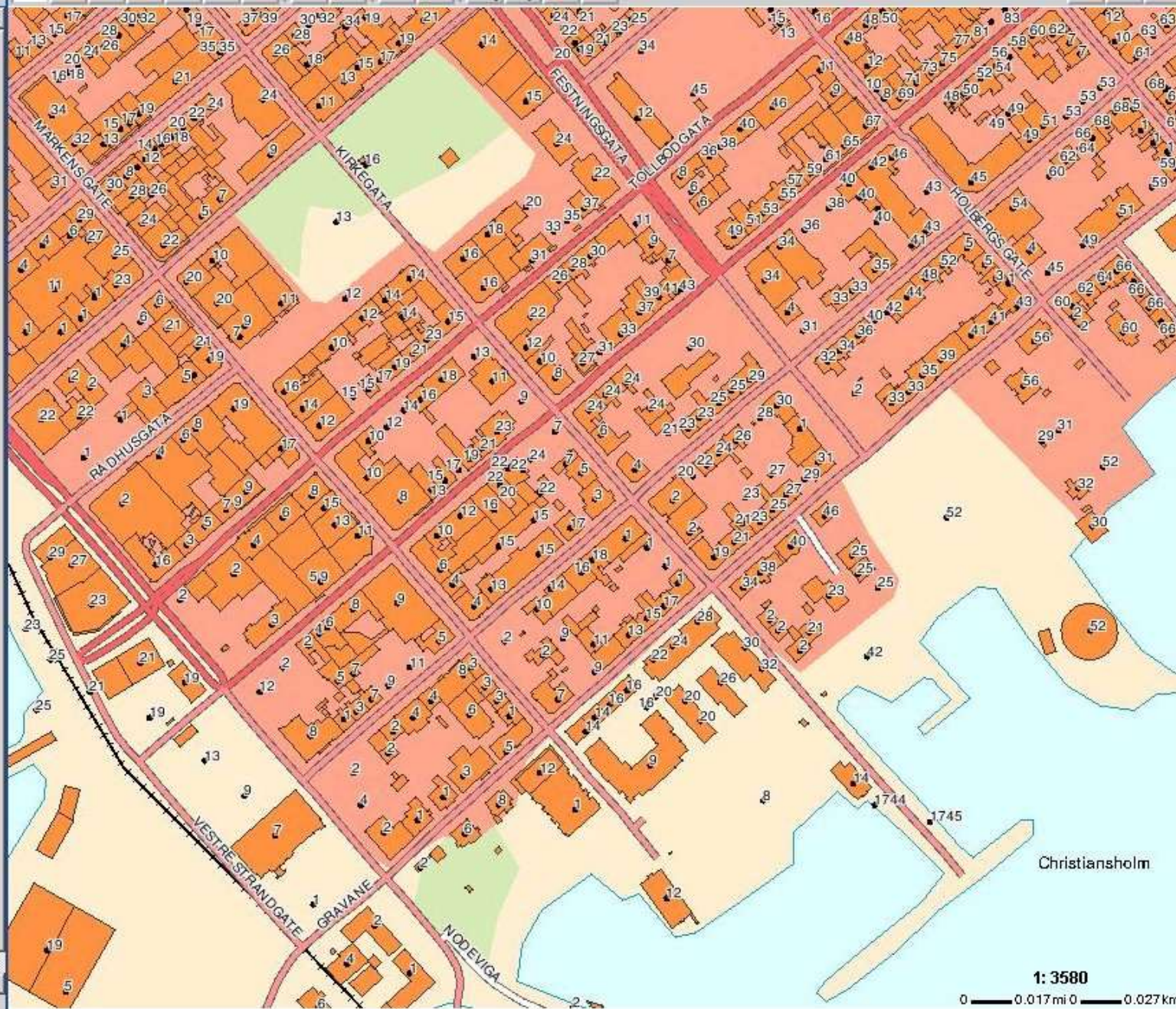
www.geonorge.no

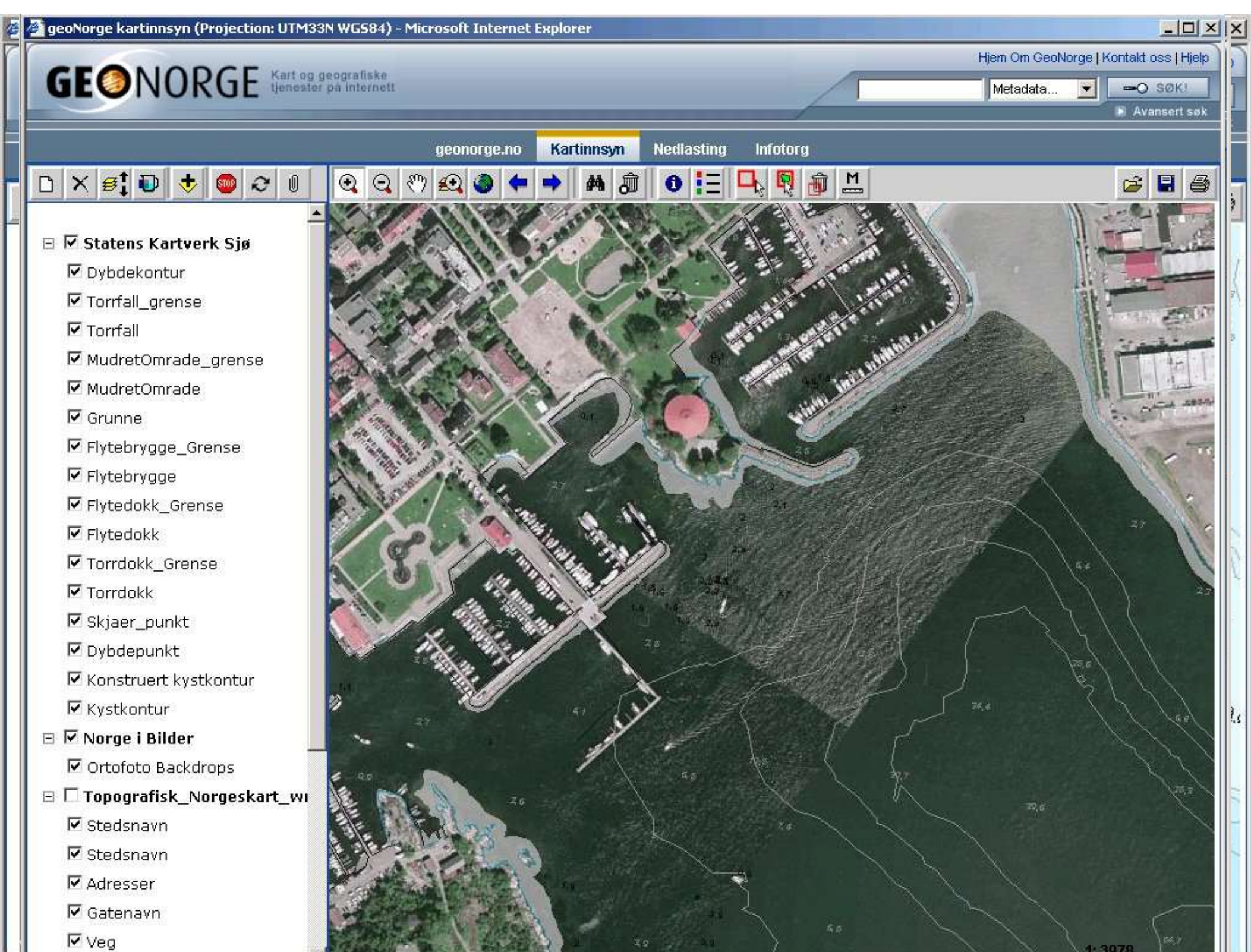
– value for Society



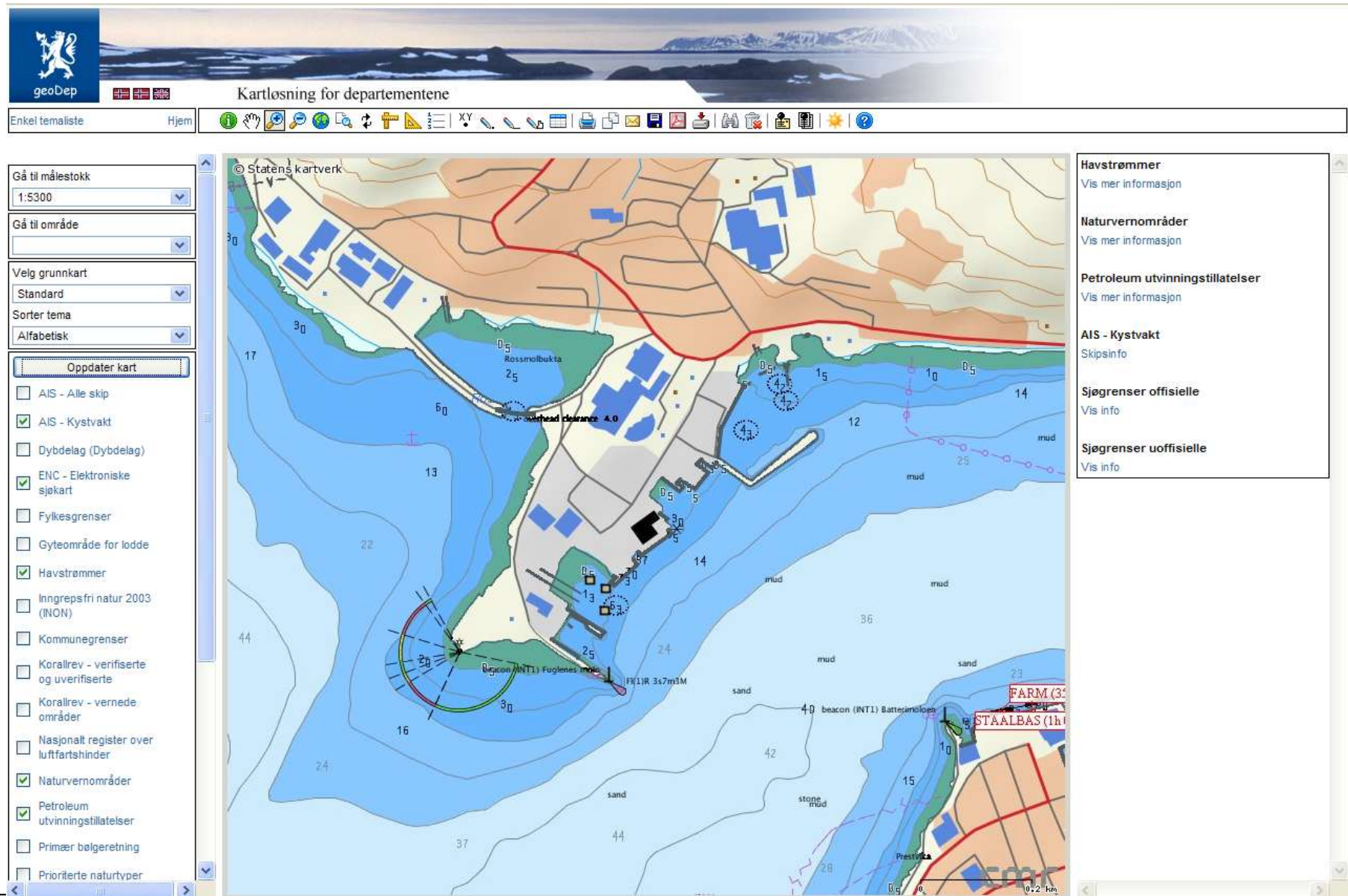
☐ ☒ Topografisk_Norgeskart_wi

- ☒ Stedsnavn
- ☒ Stedsnavn
- ☒ Adresser
- ☒ Gatenavn
- ☒ Veg
- ☒ Bygninger_grunnriss
- ☐ Høydekurver
- ☒ Stedsnavn
- ☒ Kommunegrenser
- ☒ Jernbane
- ☒ Elv
- ☒ Vannkontur
- ☒ Vann
- ☒ Markslag
- ☒ Landtone





geoDep – for the Ministries



– value for *Society*

Gå til målestokk

1:1800

Gå til område

Velg grunnkart

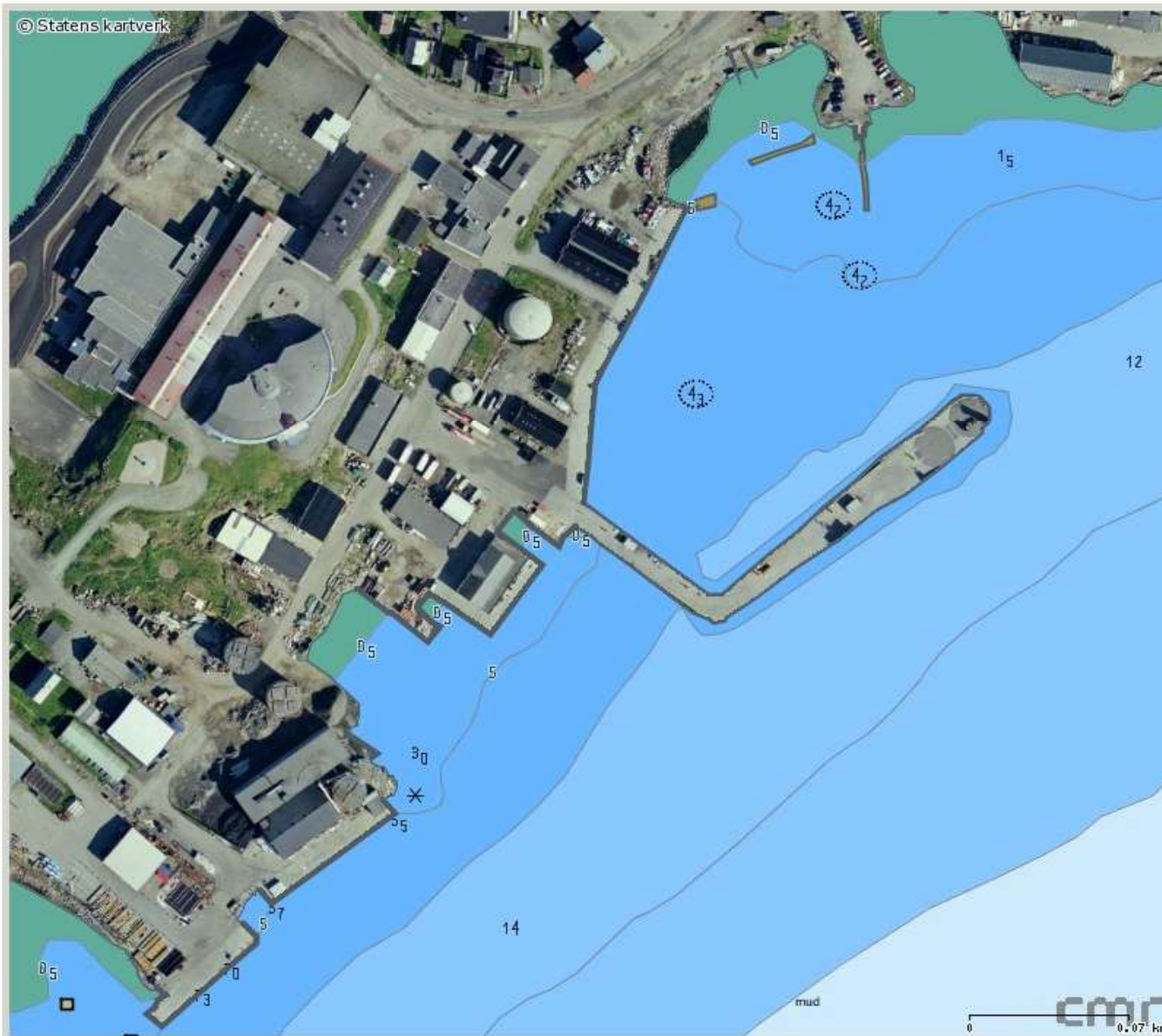
Norge i bilder

Sorter tema

Alfabetisk

Oppdater kart

- ☐ AIS - Alle skip
- ☒ AIS - Kystvakt
- ☐ Dybdelag (Dybdelag)
- ☒ ENC - Elektroniske sjøkart
- ☐ Fylkesgrenser
- ☐ Gyteområde for lodde
- ☒ Havstrømmer
- ☐ Inngrepsfri natur 2003 (INON)
- ☐ Kommunegrenser
- ☐ Korallrev - verifiserte og uverifiserte
- ☐ Korallrev - vernede områder
- ☐ Nasjonalt register over luftfartshinder
- ☒ Naturvernområder
- ☒ Petroleum utvinningstillatelser
- ☐ Primær bølgeretning
- ☐ Prioriterte naturtyper



Havstrømmer

Vis mer informasjon

Naturvernområder

Vis mer informasjon

Petroleum utvinningstillatelser

Vis mer informasjon

AIS - Kystvakt

Skipsinfo

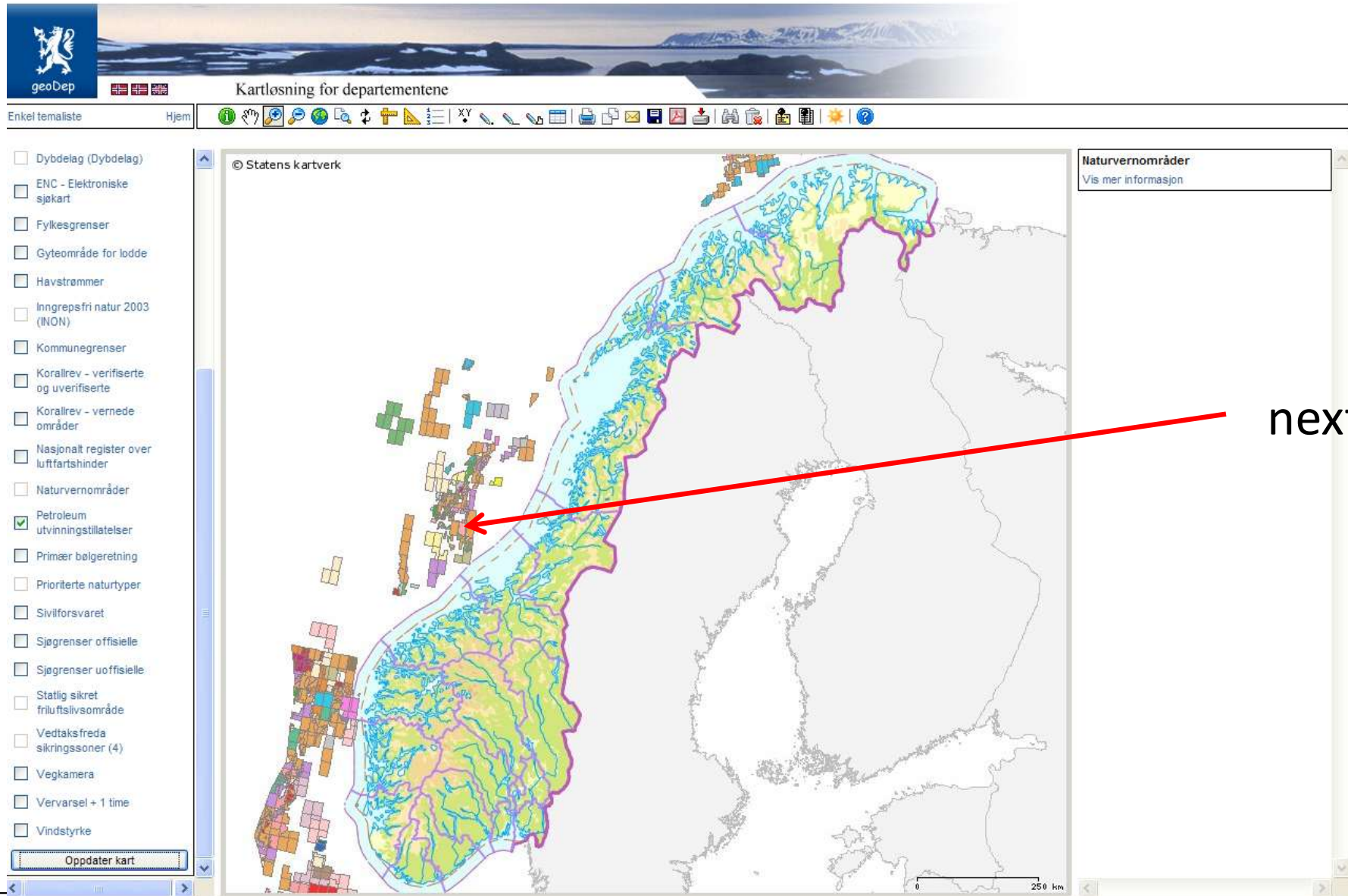
Sjøgrenser offisielle

Vis info

Sjøgrenser uoffisielle

Vis info

Petroleum fields



– value for Society



Production licence: 449

General information

NPDID production licence: 4238846
Licence status: ACTIVE
Licensing activity: TFO2006
Date granted: 15.06.2007
Date valid to: 15.06.2013
Original area: 676.063 km²
Current area: 676.063 km²

History

Current licensee(s)

Period	Company	Interest [%]
16.06.2007 -	Sagex Petroleum Norge AS	20.000000
-	Discover Petroleum AS	30.000000
-	OMV (Norge) AS	50.000000

Current operator(s)

Period	Company
15.06.2007 -	OMV (Norge) AS

Current area(s)

Period	Nation	Block	Polygon	Area [km ²]
15.06.2007 -	NO	7121/3 1		323.030
-	NO	7122/1 2		323.030
-	NO	7122/2 3		30.003



Dynamic services

geoDep - Innsynsløsning for geografiske data fra Norge Digitalt - Mozilla Fire



Kartløsning for departementene

Hjem



Gå til målestokk
1:12200

Gå til område

Velg grunnkart
Detaljert kart

Sorter tema
Alfabetisk



Clicking, you can get the ship information

Ais Target : MASTRAFJORD		
Vessel Image from Ship Info		
	Feature name	
☒	MMSI	259216000
☐	Country	Norway
☐	Active	true
☐	Ship name	MASTRAFJORD
☐	Call sign	LIAT
☐	IMO number	9344760
☐	Ship type	Passenger ship
☐	Cargo	AllShips
☐	Destination	ARSVAAGEN/MORTAVIKA
☐	Lenght	129.0 m
☐	Breadth	19.0 m
☐	Maximum actual draught	4.8 m
☐	Positioning device	GPS
☐	Transponder	ClassA
☐	From Country	NORWAY
☒	From Port	STAVANGER
☐	Latitude	N 59°09.72'
☐	Longitude	E 005°30.41'
☐	Time stamp	2009-09-18T12:16:45Z
☐	Sun Altitude	31.9 °
☐	SOG	17.2 kn
☐	COG	292 °
☐	Heading	292 °
☐	Pos Accuracy	> 10m
☐	RAIM	Not in use
☐	Time sailed	11m 28s
☐	Source type	AIS
☐	Source name	Helcom
☐	ETA	is missing
☐	Ship info Direkte	Ship info Direkte()

Inngrepsfri natur 2003

Fullført

SP SHIPBASE
a detailed shipdatabase
merchant fleets - offshore - fishing vessels

Information presented on this page is from [SP ShipBase](#)
Samples of full presentation on [SP ShipBase](#)
For more information about access to SP ShipBase [click here!](#)



©Photo: [Harald M Valderhaug](#) Photo published: 06.03.2009

Mastrafjord

Type: Ferry

Imo no.: 9344760 Call sign: LIAT Flag: NOR Port of origin: STAVANGER

VESSEL DESCRIPTION:

BUILT:

Year: 2007 Month: 2 Yard: [STX Norway Offshore AS Soviknes](#) Yard no.: 149

SKIPSLISTENE
PORT SERVICES
SP Shipbase
[Bunker/Oil](#)
[Classification](#)
[Crew](#)
[Designers](#)
[Education](#)
[Finance](#)
[Paint and coating](#)
[Publisher](#)
[Safety](#)
[Ship chandler](#)
[Ship equipment](#)
[Ship Operation](#)
[Shipbroker](#)
[Shipyards](#)
[Ship Yard](#)
[New Vessels](#)

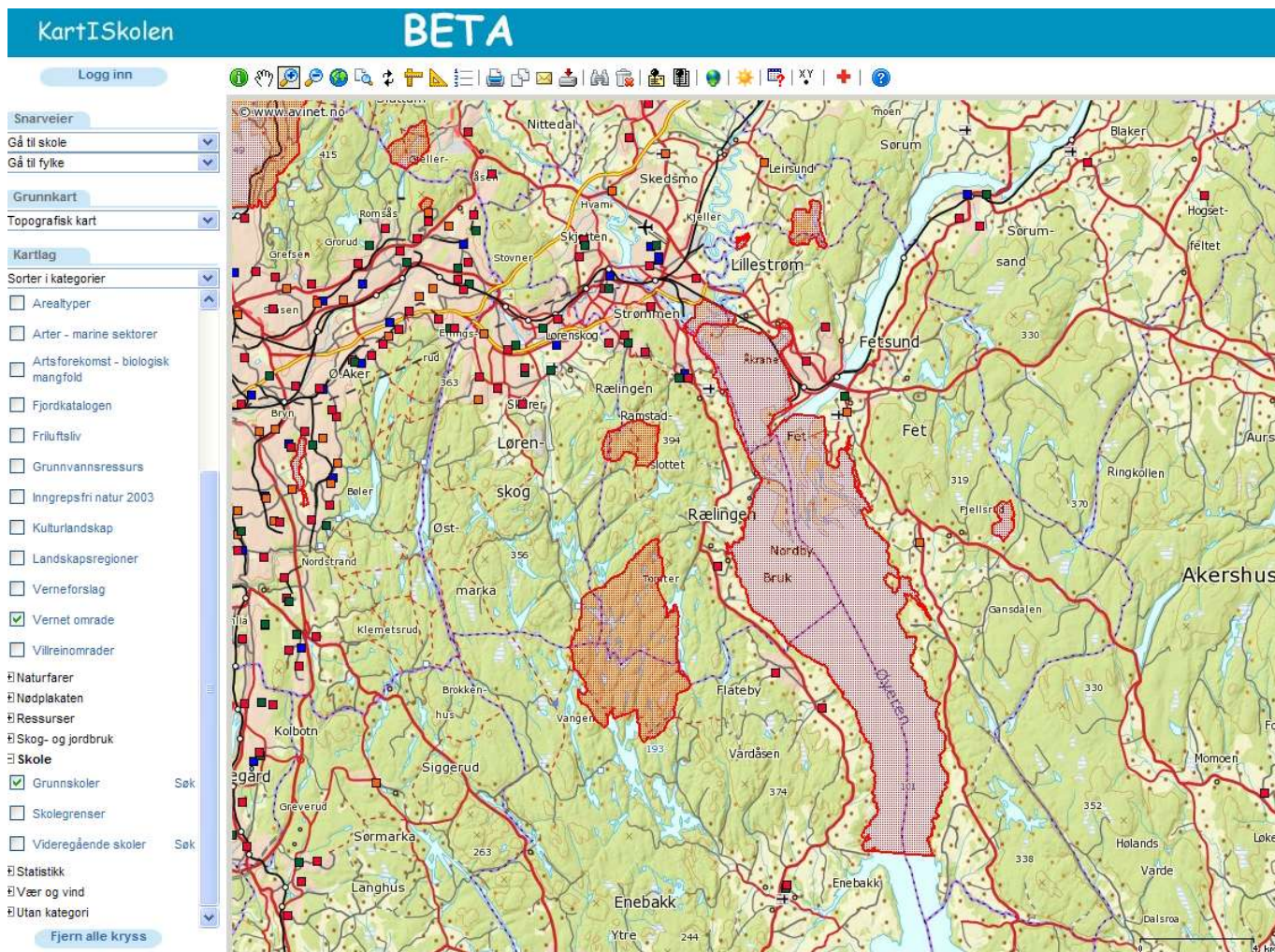
Clicking again, you can get a picture of the ship

g the browser 30 s later, "Mastrafjord" has moved here



MASTRAFJORD (17.2 kn)

Educational maps for the Directorate for Education



Access for all pupils

- user created information
- bidirectional

Here shown:

- schools
- protected areas

Statistics

2009 so far

Delivered through NMA services:

View services: 60 million wms-requests

Tiled wms services: 170 million tiles since April

Downloaded files: approx. 1 million

More than 200 different services with national coverage are available in the national SDI.

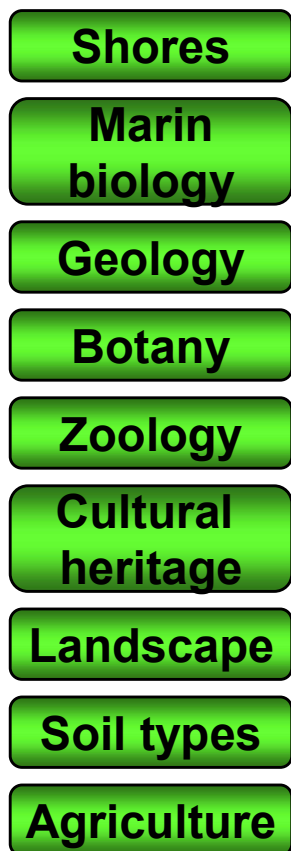


Environmental databases in all Norwegian Counties

- Supply relevant datasets to be used in local and regional planning
- Simplify existing detailed data and classification systems
- Mapping of new topics and land use assessment
- Identify valuable areas
- Ranking of areas according to biodiversity and other environmental values
- More sustainable land use - better management
- Affect communication between different sectors
- Reduce number and seriousness of land use conflicts

A National Area Resource Management Program as part of Norway Digital (AREALIS)

Thematic geographic info



20 thematic dataowners,
Most municipalities and counties

etc.



Basic geographic info

Base map data:
- Ortophoto
- Digital map data
- Road data, etc

- Properties
- Adresses
- Buildings
- Dig. property maps
- Deed information

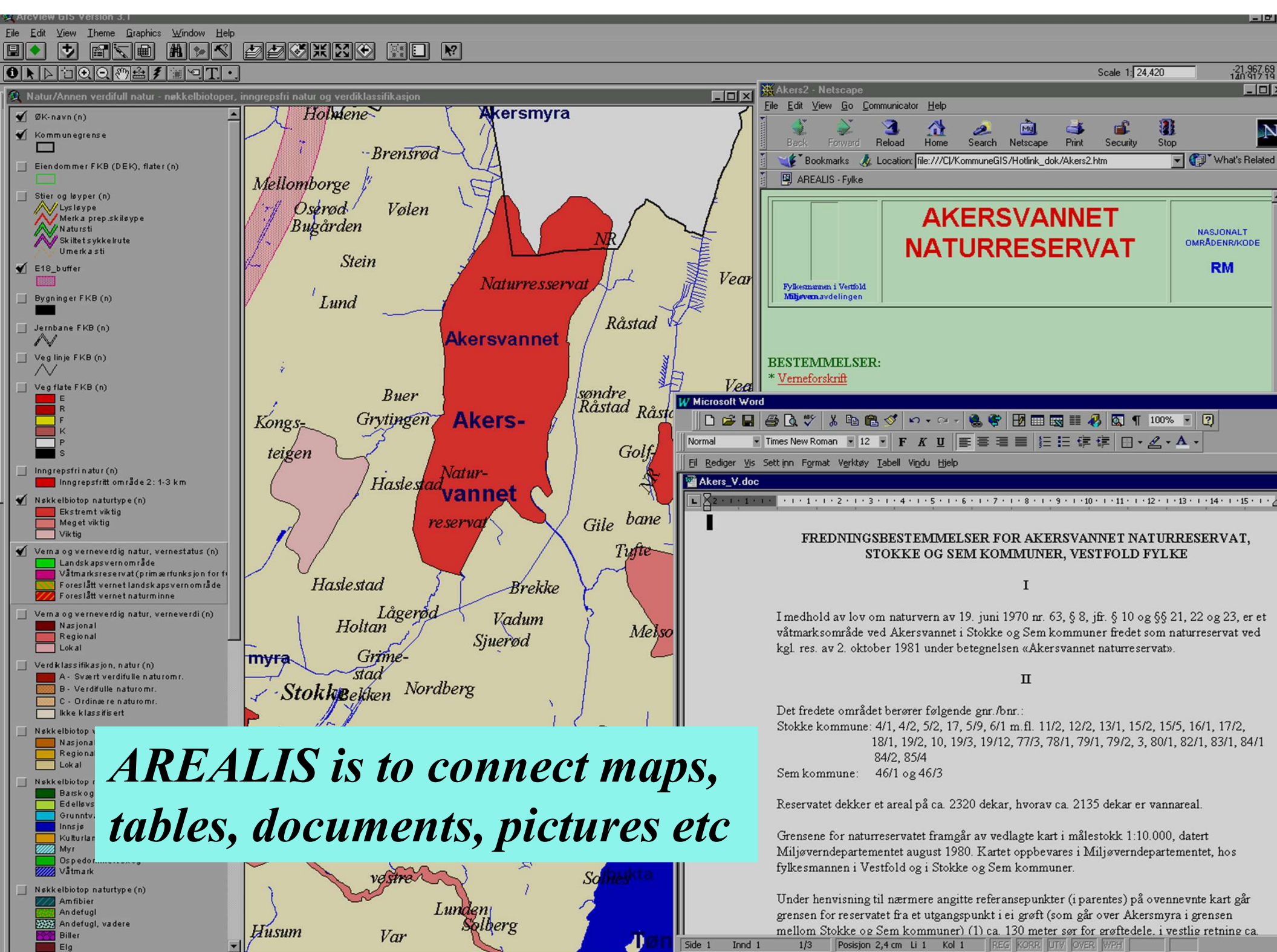
Location based data

NMA as the driving force

– value for *Society*



NORWEGIAN MAPPING
AUTHORITY

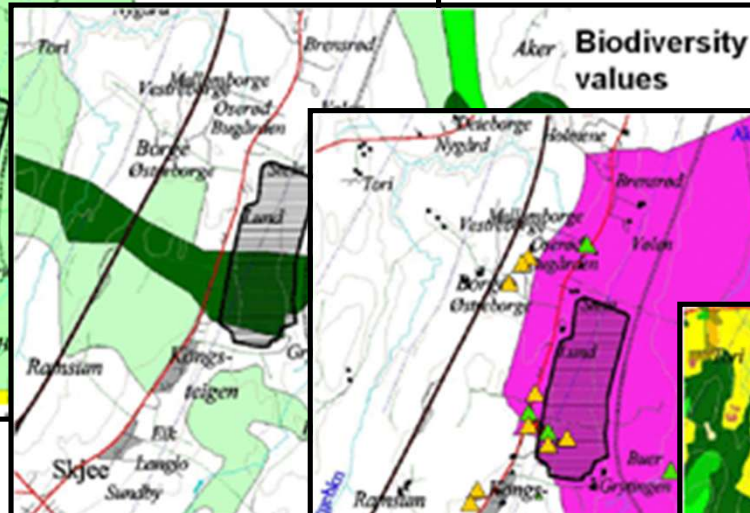


Connecting different sectors- Land use planning, impact assessment

Action area

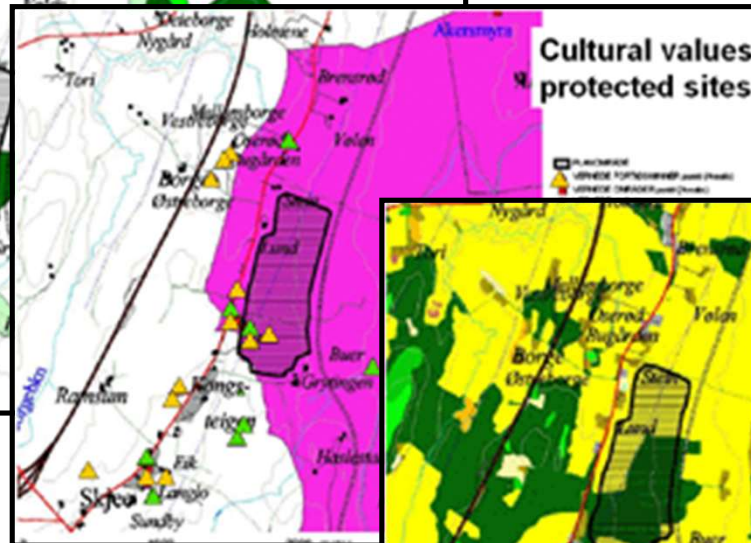


Land use plan

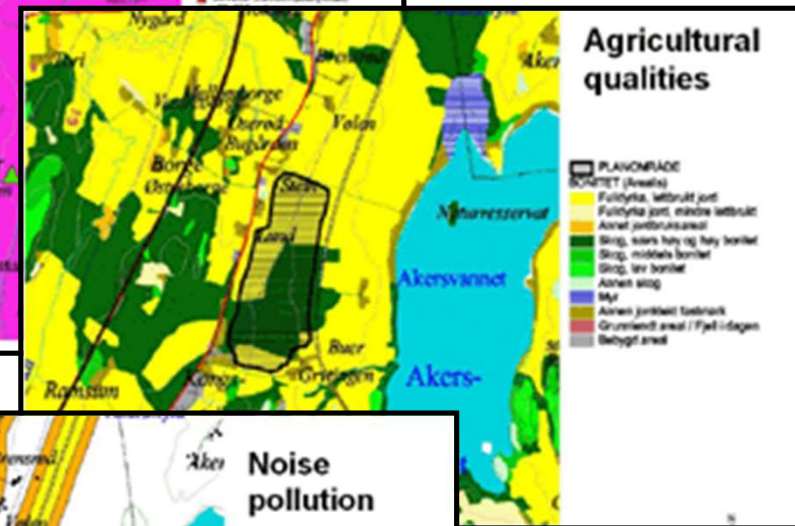


Biodiversity values

Cultural values
protected sites



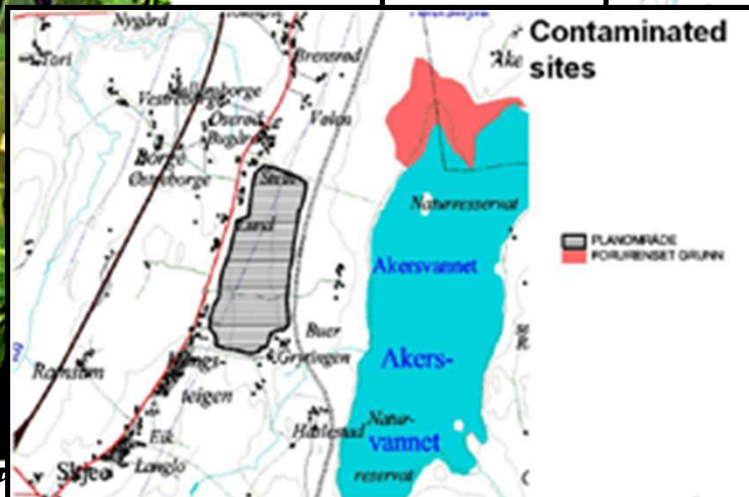
Agricultural
qualities



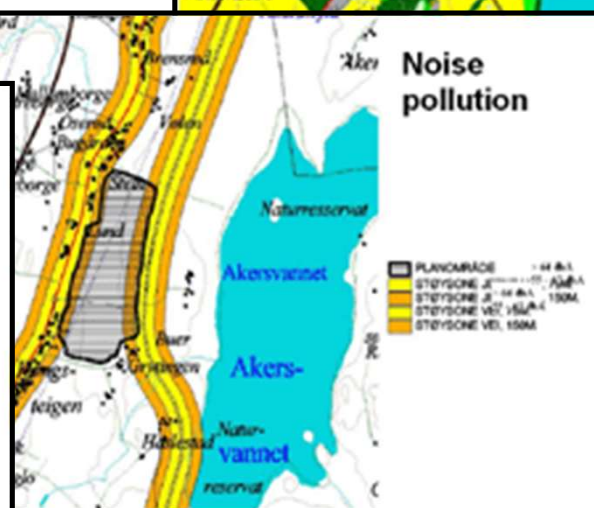
Ortophoto



Contaminated
sites

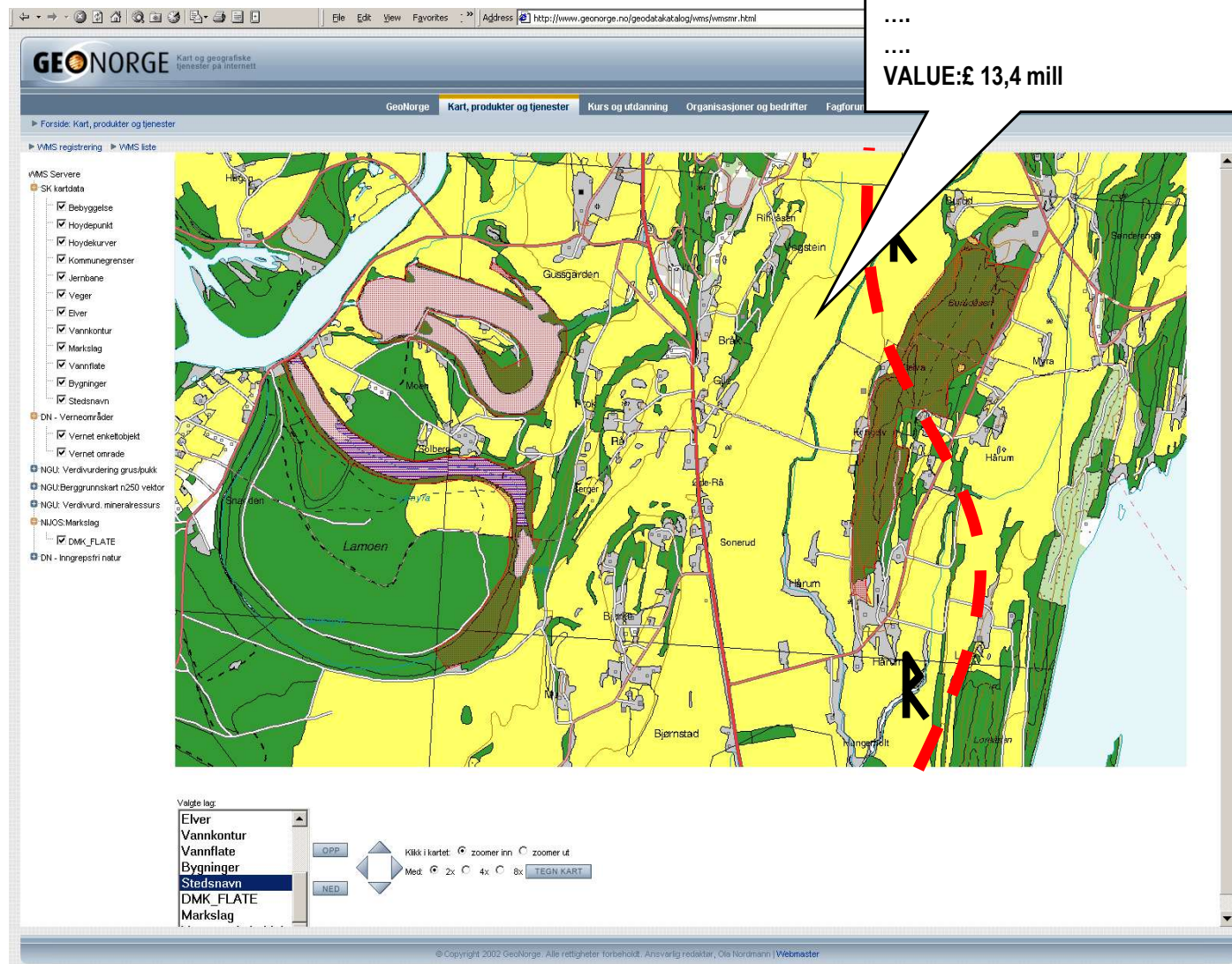


Noise
pollution



Scenario – planning for a new main road

Examples



We start with a base map ...

... Potential road line

... What about cultural heritage ?

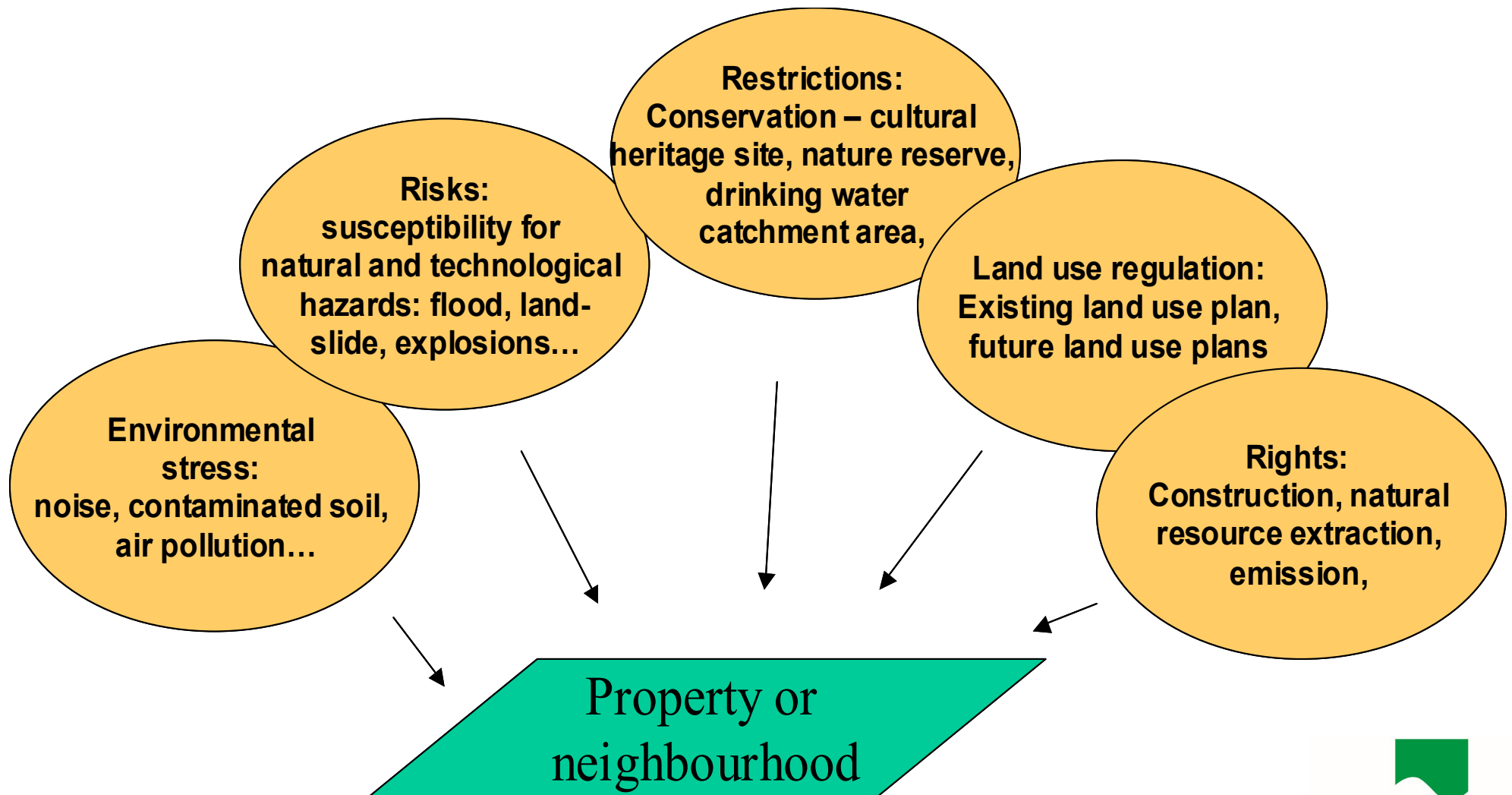
... Protected areas ? ...

... Farm land ?...

... Properties to be purchased ?

All this info only a couple of key - strokes away !!

Focus on implementation needs - actions at local level



Digital Planning Dialogue

Vestfold - Microsoft Internet Explorer

Adresse: <http://kart.tonsberg.kommune.no/webinnsyn/Content/Main.asp?layout=vestfold&vnr=asv>

Tønsberg kommune

Verktøy:
Plandialog
Kommune:
Tønsberg

Planinformasjon
Reguleringsplan
Kaldnes industriområde
Status i saksbehandling:
Offentlig ettersyn
Frist for uttalelser
10.12.2006
[Reg. bestemmelser](#)
[Plankart \(PDF\)](#)
[Illustrasjoner](#)
[Saksframlegg](#)

Andre Saksdokumenter
Innkommne uttalelser
Nabo 1
Statens vegvesen
Vestfold fylkeskommune
Tidligere saksdokumenter

Plan med temakart
Kulturminner
Nedtoning av plan
0% 100%
Send uttalelse

Tønsberg kommune - Microsoft Internet Explorer

Navn:
Ola Nordmann

Postadresse:
Olastien 4, 3100 Tønsberg

E-postadresse:
Ola.nordmann@hotmail.com

Emne:
Uttalelse til 1.gangs høringsutkast reguleringsplan Kaldnes industriområde

Innspill:

Vedlegg:
Bla.. **Send til kommunen**

Kopi til:

Symfoni InfoPortal - Produced by Ementor Norge AS - Internet

Varsel - planstart
07/06/2006

1.gangs behandling
10/11/2006

2. gangs behandling
10/12/2006

Planvedtak

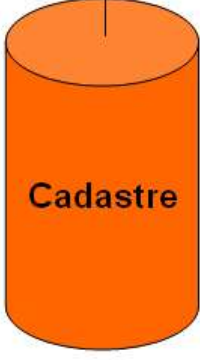
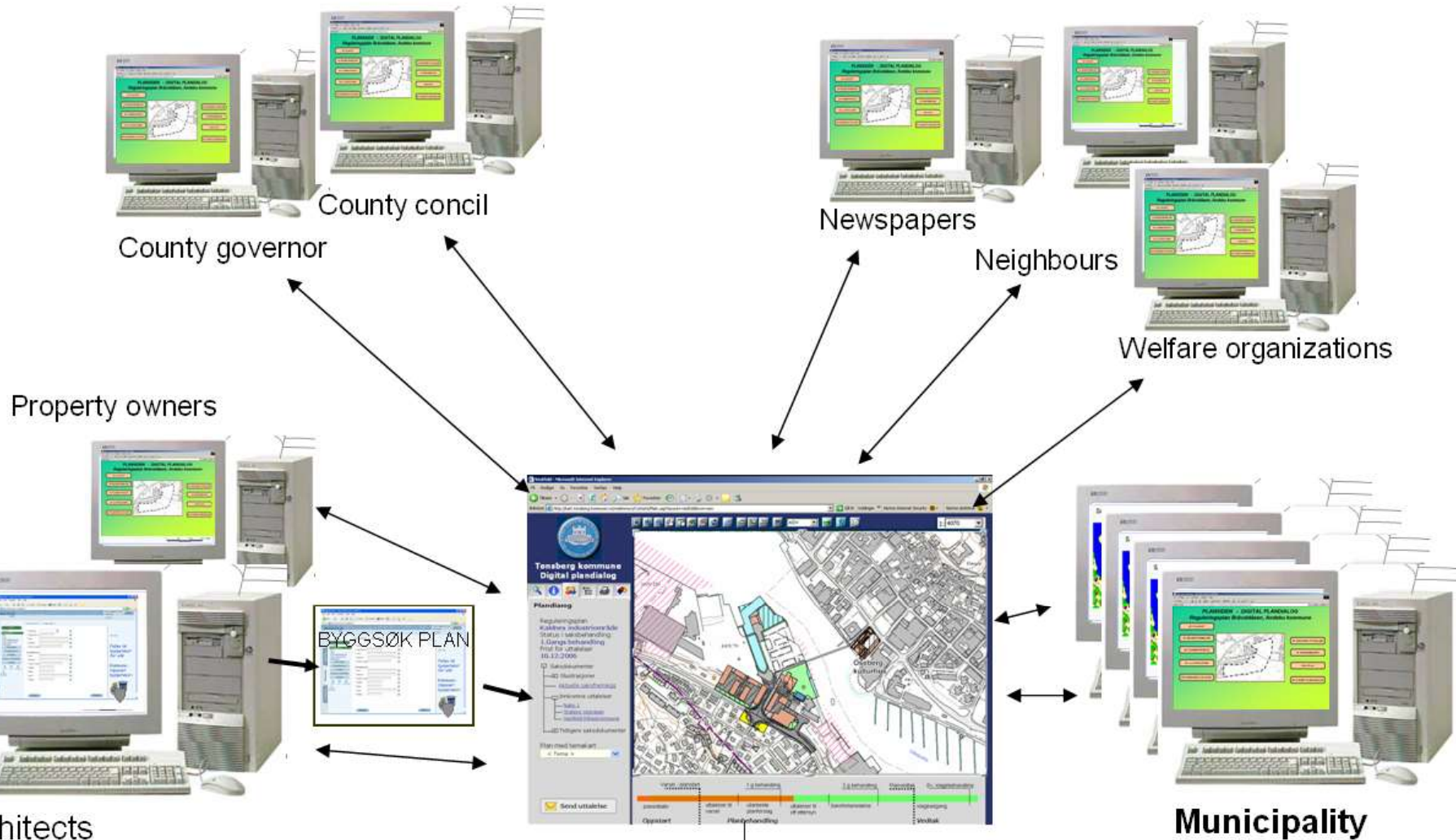
Ev. klagebehandling

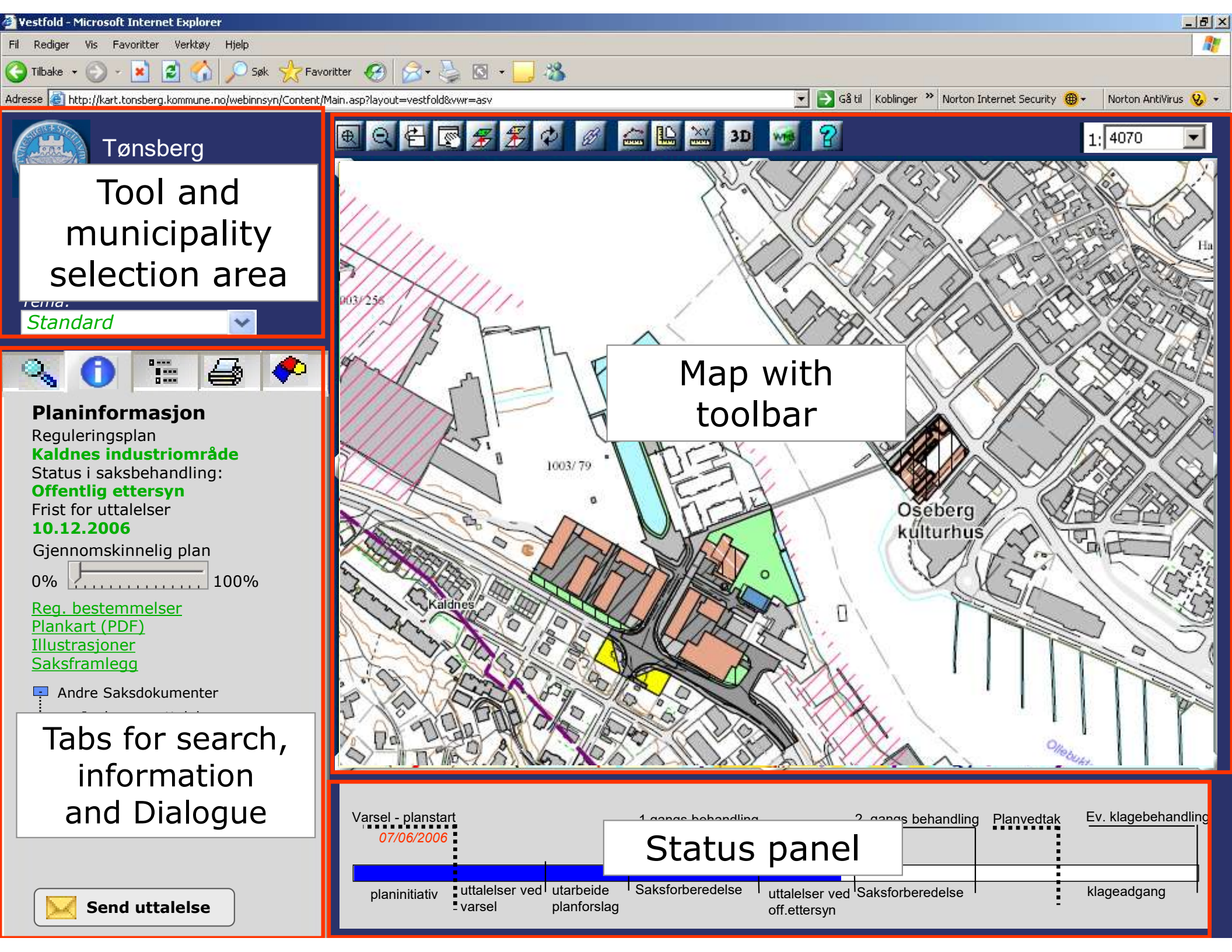
planinitiativ | uttalelser til varsel | utarbeide planforslag | Saksforsberedelse | uttalelser til off. ettersyn | Saksforsberedelse | Planvedtak | Ev. klagebehandling

– value for Society



NORWEGIAN MAPPING
AUTHORITY





Tool and municipality selection area

Map with toolbar

Tabs for search, information and Dialogue

Status panel



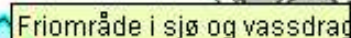
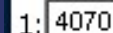
3D-modell

10.12.2006

0%  100%

Saksframlegg

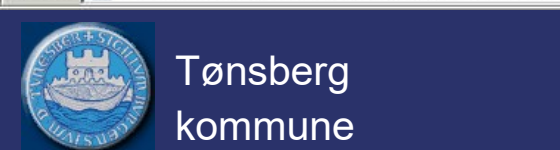
.. Tidligere saksdokumenter



Oseberg
kulturhus

klageadgang

planforslag



Tønsberg
kommune

Verktøy:

[Arealplaner](#)

Kommune

[Tønsberg](#)

Tema:

[Kulturminner](#)



Planinformasjon

Reguleringsplan

Kaldnes industriområde

Status i saksbehandling:

Offentlig ettersyn

Frist for uttalelser

10.12.2006

Gjennomskinnelig plan

0% 100%

[Reg. bestemmelser](#)

[Plankart \(PDF\)](#)

[Illustrasjoner](#)

[Saksframlegg](#)

Andre Saksdokumenter

Innkommne uttalelser

[Nabo 1](#)
[Statens vegvesen](#)
[Fylkesmannen](#)

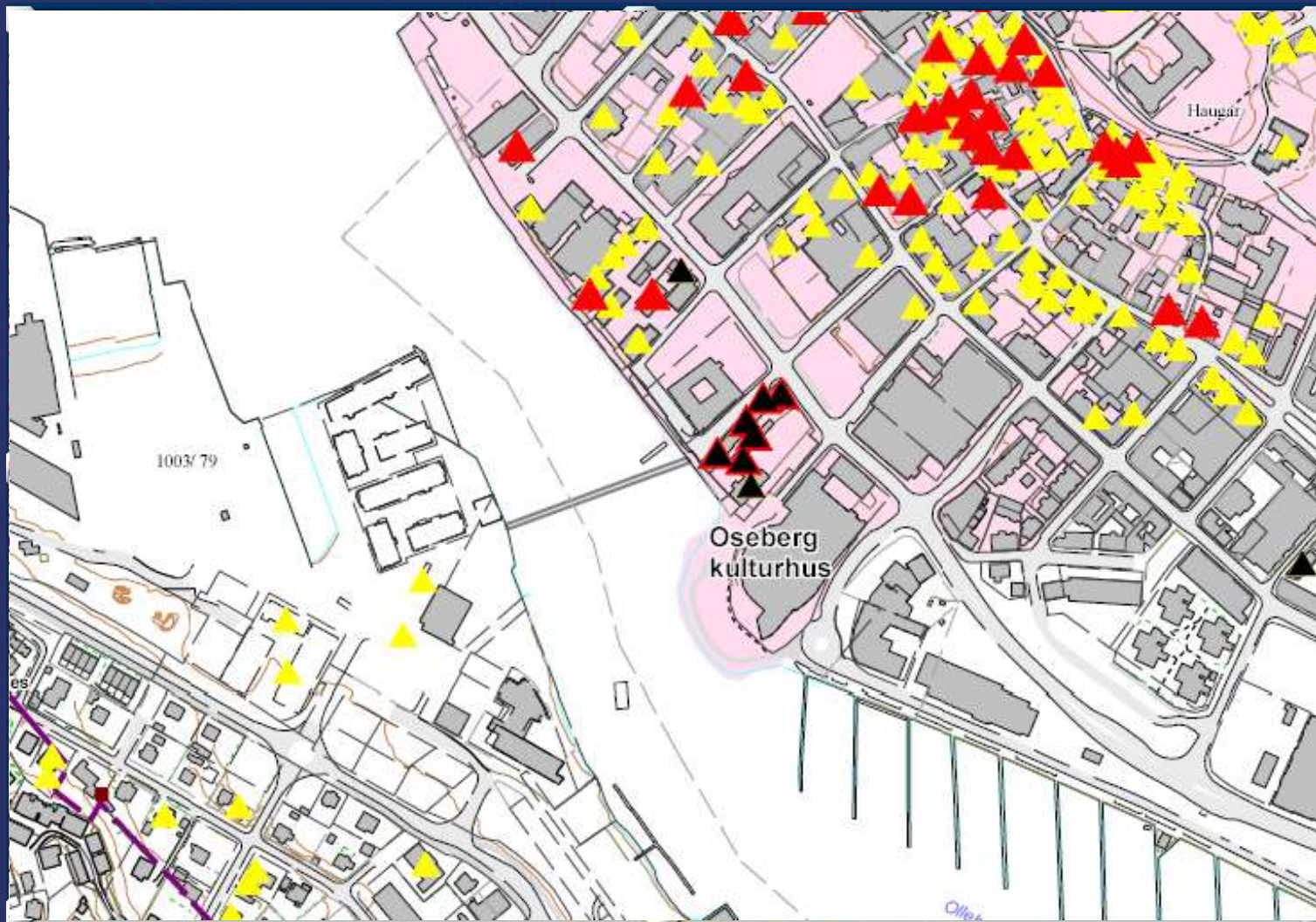
Tidligere saksdokumenter



Send uttalelse



1: 4070



Varsel - planstart

07/06/2006

1.gangs behandling

10/11/2006

2. gangs behandling

10/12/2006

Planvedtak

Ev. klagebehandling

planinitiativ

uttalelser ved
varsel

utarbeide
planforslag

Saksforberedelse

uttalelser ved
off. ettersyn

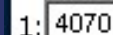
Saksforberedelse

klageadgang

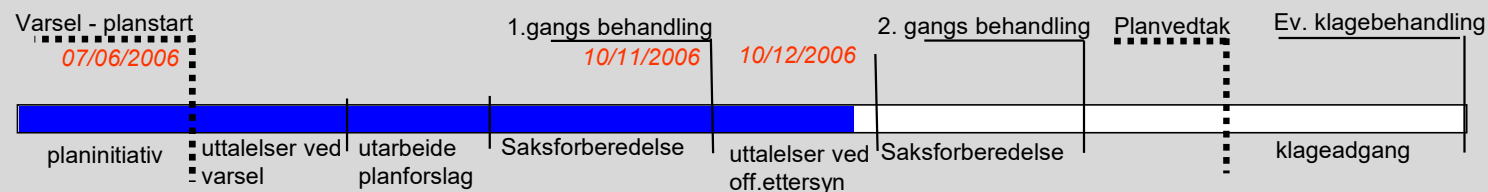


Saksframlegg

- Send uttalelse**



Send til kommunen

 Internet

Gains

More efficient executive work

Faster processes in case handling of plans and building applications

Better action data

Strengthened information services

Transparency in the planning process (e-democracy)

Increased contact and more predictable processes for Land owners and other business

increased citizen influence on municipal planning.

Increased accessibility of information from municipal planning

Realise gains from ICT- investments

Web-based handling and filing system

Geodata cooperation on Geodata

Web-based GIS tools

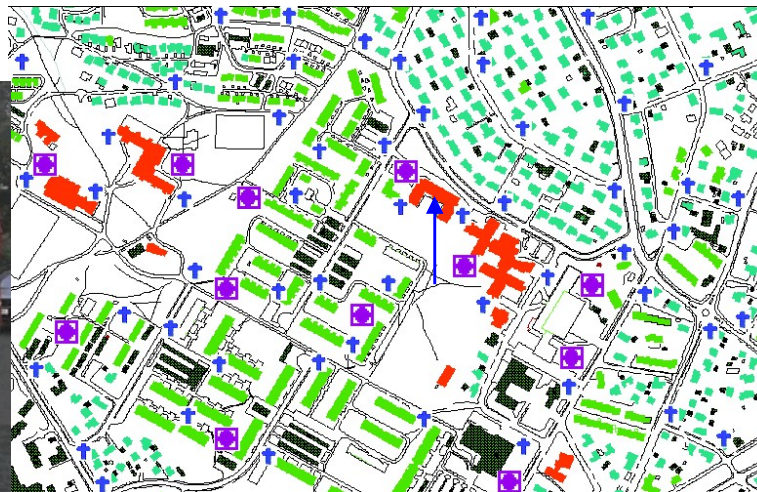


Better municipal planning and awareness by using the properties, addresses and buildings register together with digital property maps (New matrikkel)

School planning



Fire emergency



Risk management

Norway is exposed for natural disasters like landslide, stoneslide, snowslide, underwaterslide and slide as a cause of flood or tsunami

2000 killed by natural disasters the last 150 years

It is expected 10 bigger slides in the coming 50 – 100 years, each with 10 – 100 persons dead

– value for *Society*



NORWEGIAN MAPPING
AUTHORITY

Society security – slide risk

Municipalities – responsibility in build up areas



Risk
management
and actions

Planning/
construction

Actions

Watch,
warning,
preparedness

– value for *Society*

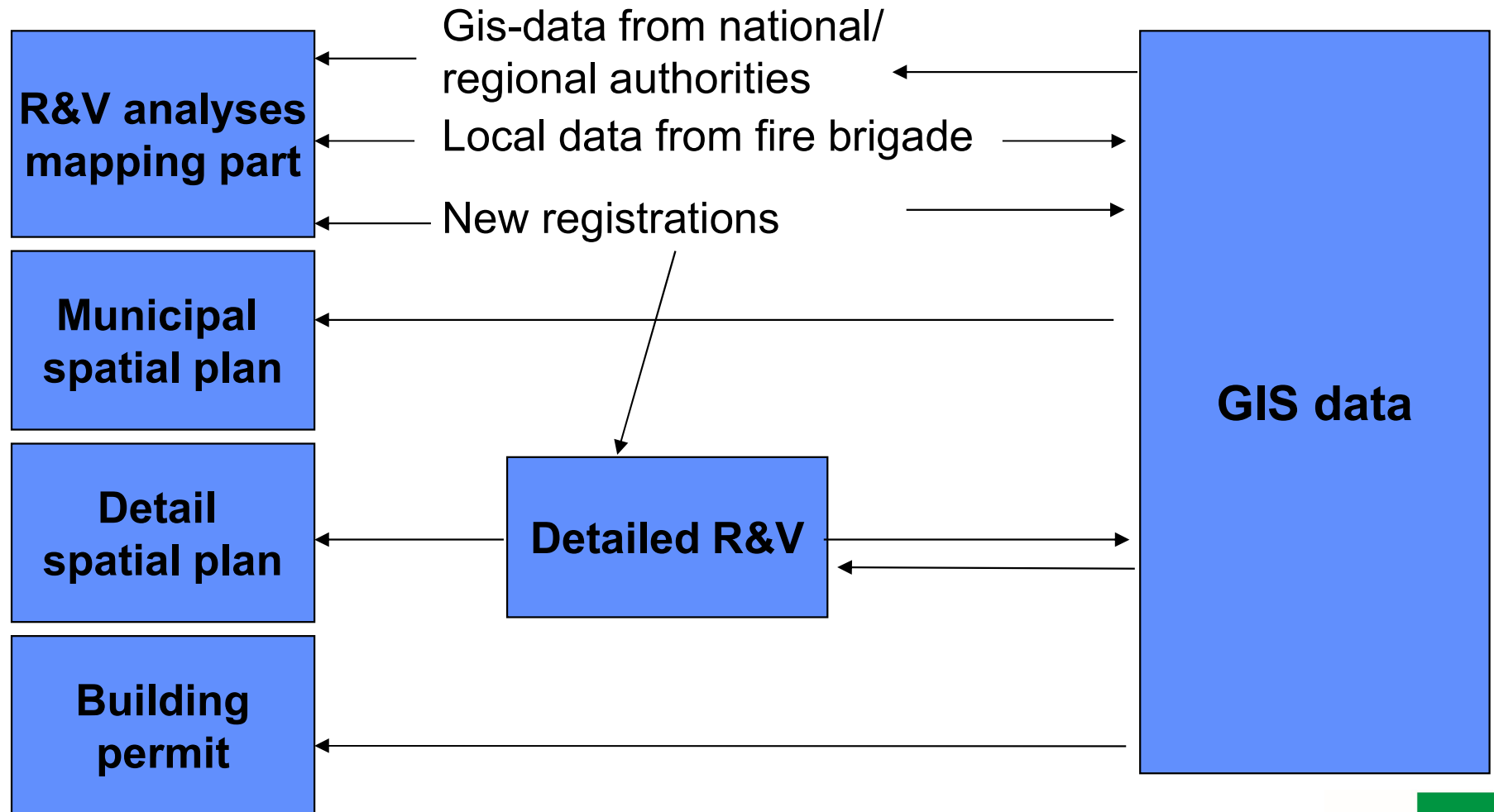
Quick Clay slide, Namsos 12.03.2009



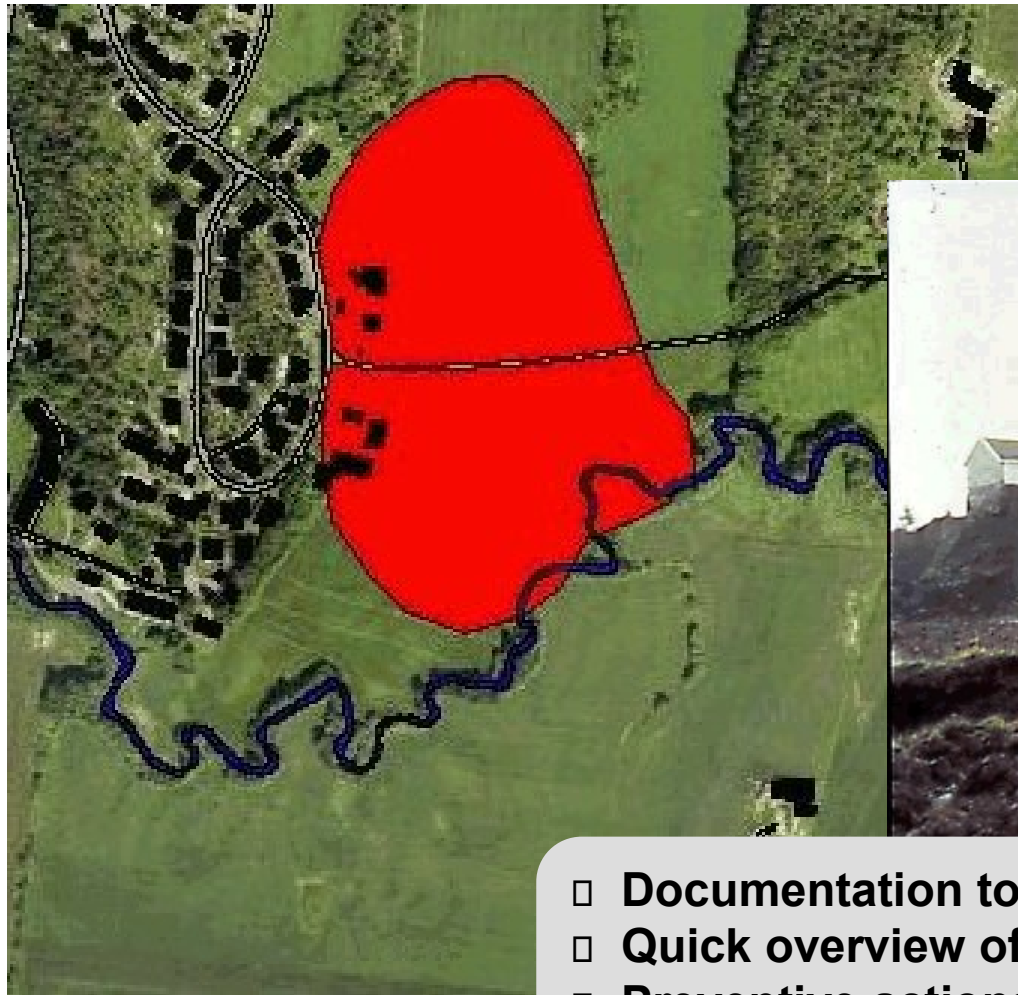
Can we reduce the risk

- What can be done to reduce the impact of natural hazards
- How can we be prepared for situations
- Modeling potential scenarios, and risk assessment for localization of high exposed risk areas
- Risk reducing actions, including warning systems
- Decisions made today will influence the future vulnerability of the society

Use of GIS including R&V analysis



Land slide disposed areas



- Documentation to predict future slides
- Quick overview of the situation
- Preventive actions
- Lives and properties saved

– value for *Society*



NORWEGIAN MAPPING
AUTHORITY

Knowhow and actors

Risk-
knowledge

Vulnerability
and Risk
mapping

Relevant
data
geology,
geotechnich
historical
data

Slide-
research

• Basic data

- NMCA, Norway Digital
- NGU, rock and soil
- Road Authority, Railroad Authority and others.
- Geotechnich information

Slide occurences

Slide by road and railroad (VV og JV)

Slide accidents, historical arcives (NGU)

Overview map of potential slide exposed areas

- NGI
- Defence
- NGU

Detailed risk assesments

NGI – NVE

Consultants

NGU

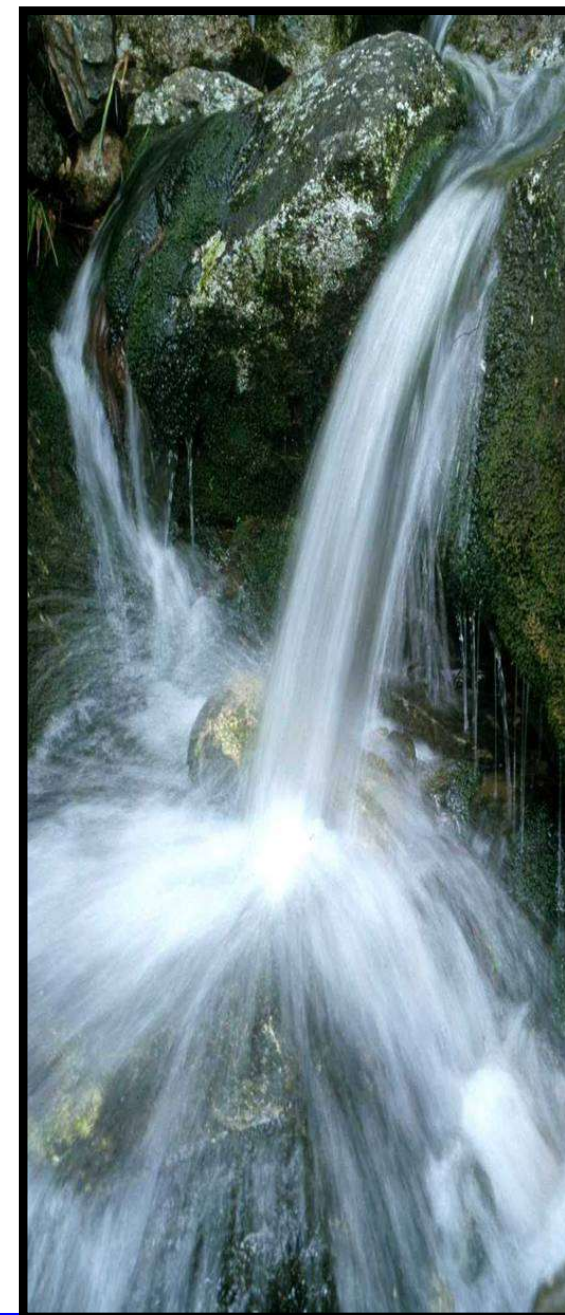
– value for *Society*



NORWEGIAN MAPPING
AUTHORITY

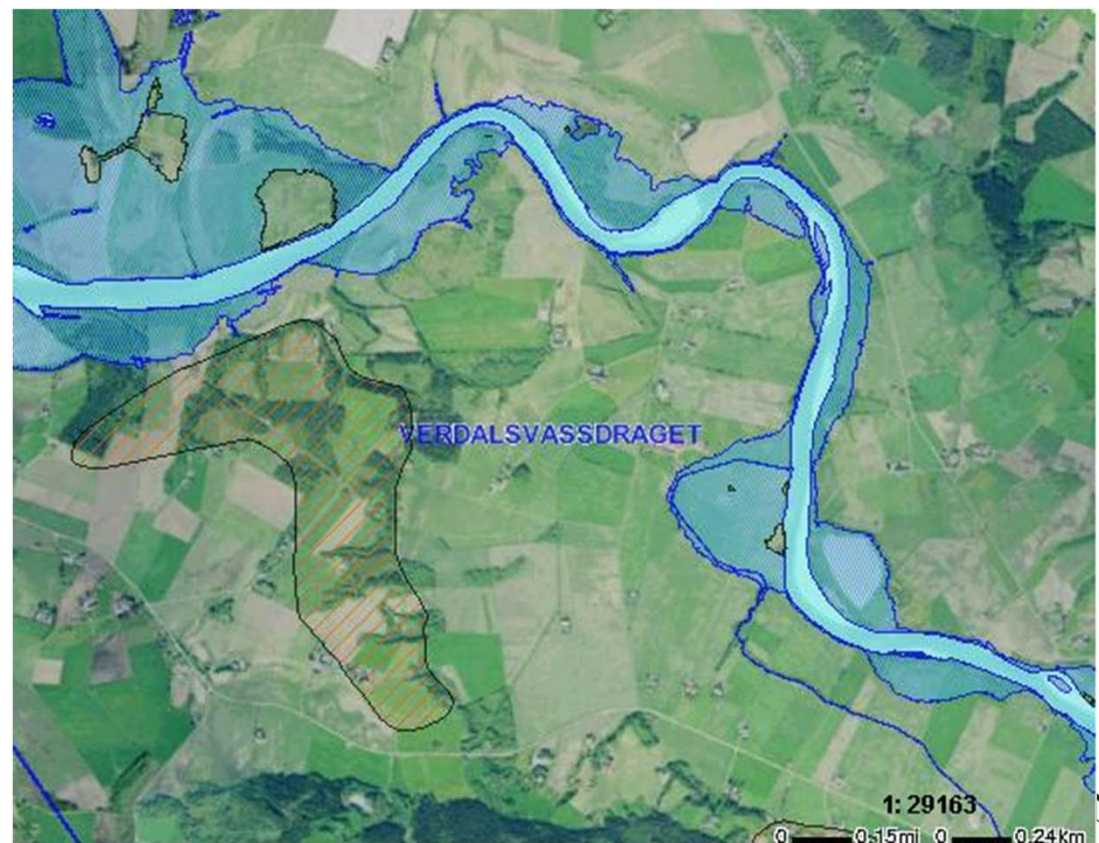
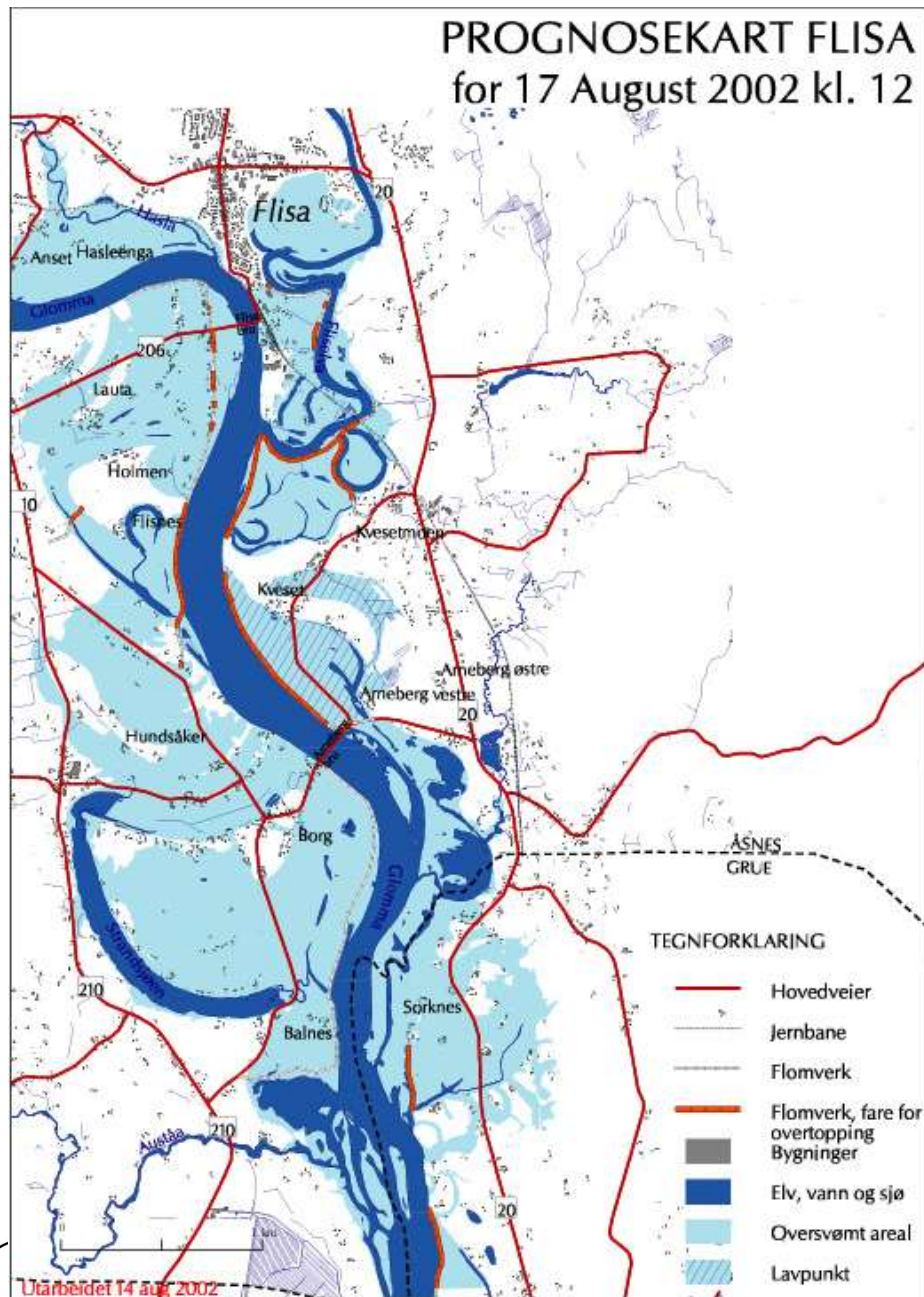
NVE Data Bases

- Catchments DB (REGINE)
- Lake DB
- River Network DB (ELVIS)
- Water Power Production DB
- Hydrological Gauging Stations
- Annual Water Runoff
- Protected River Systems
- Flood Inundation Map
- Bathymetric Maps of Lakes
- Wind Power Plants
- Mini/Micro Water Power Stations
- Thematic Maps



GIS-analysis at NVE

■ Dynamic Flood Inundation Warning Map...



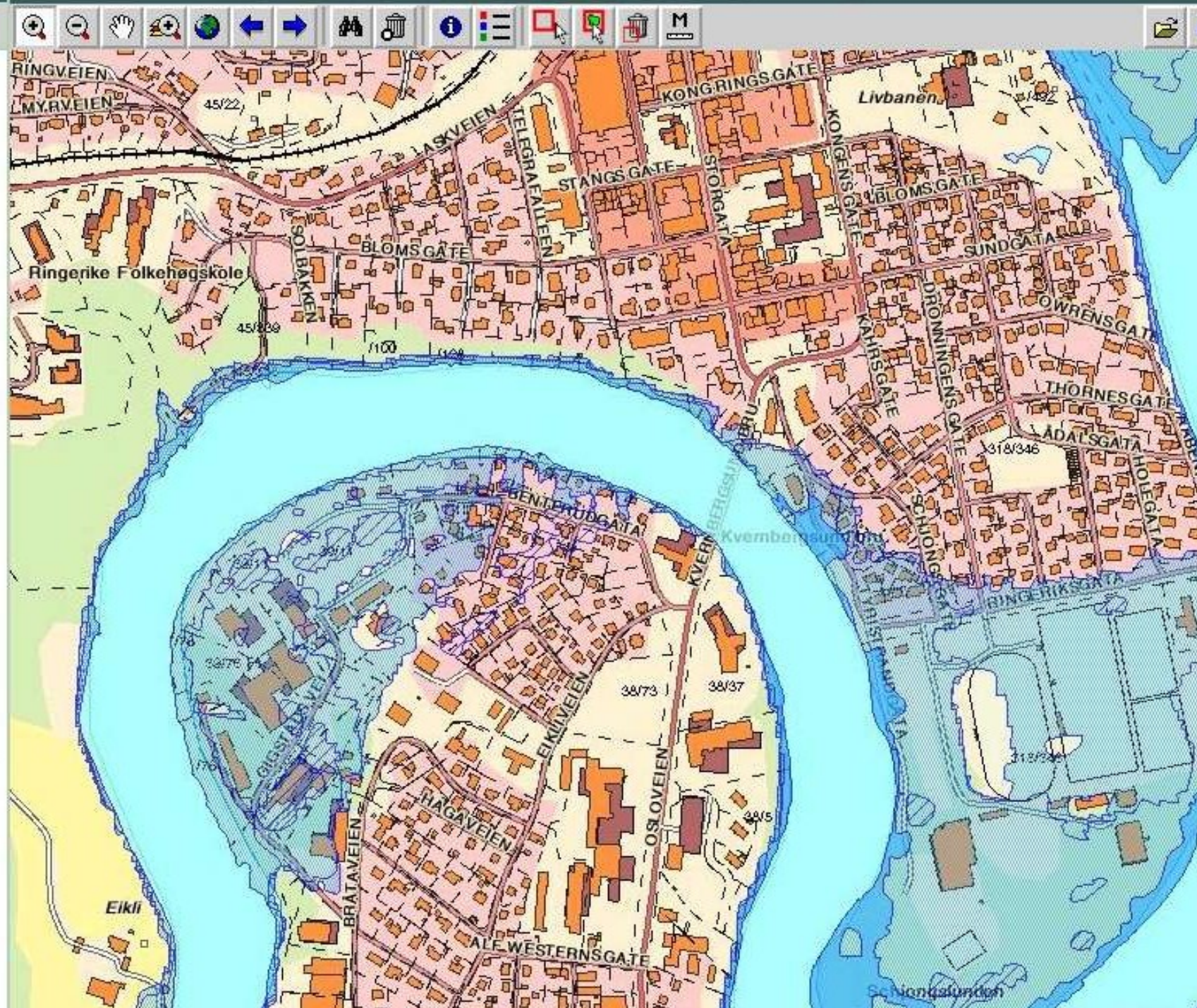


Web Map Service flomsoner

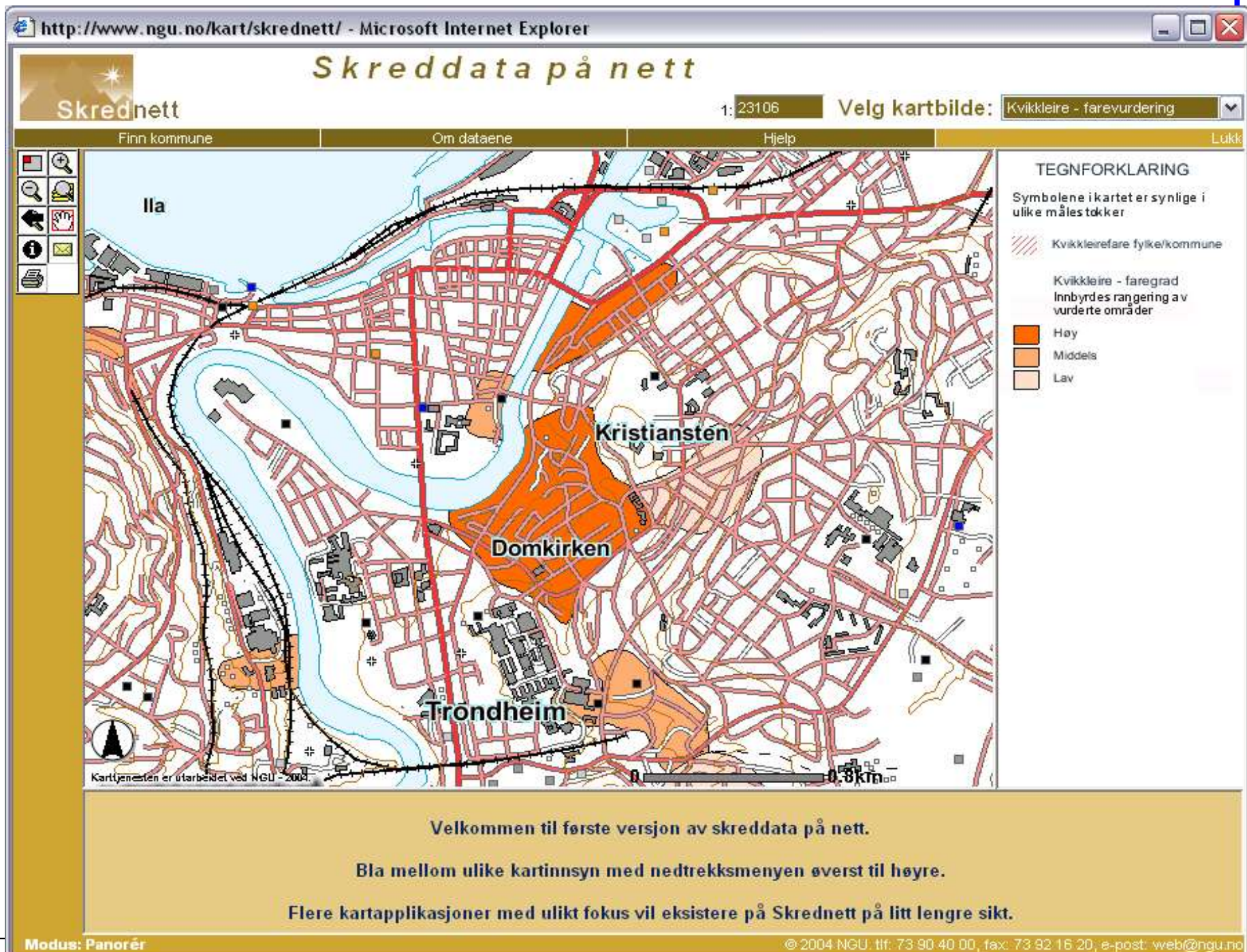
- ☒ Flomsoner 10
- ☒ Flomsoner 20
- ☒ Flomsoner 50
- ☒ Flomsoner 100
- ☒ Flomsoner 200
- ☒ Flomsoner 500

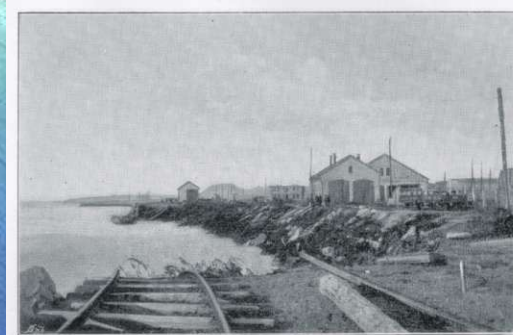
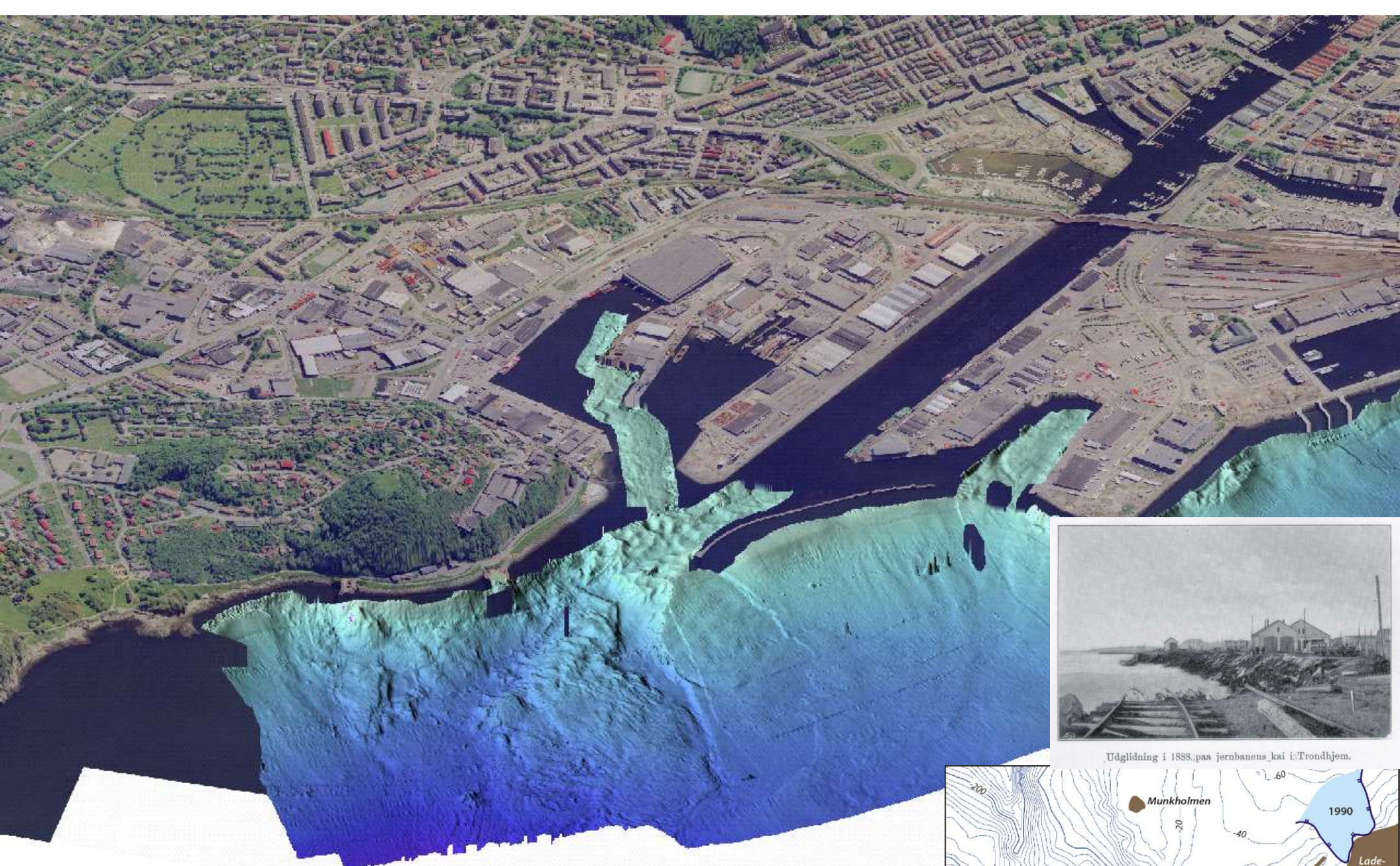
topografisk_norgeskart

- ☒ VBASE Gatnavn
- ☒ FKB Stedsnavn linje
- ☒ FKB Stedsnavn punkt
- ☒ N50 Stedsnavn linje
- ☒ N50 Stedsnavn punkt
- ☒ FKB Eiendom_linje
- ☒ FKB Bygninger
- ☒ N50 Bygninger
- ☒ N50 Store bygninger
- ☒ N50 Administrative grenser
- ☒ N50 Jernbane
- ☒ VBASE Veger
- ☒ FKB Hoydekurver
- ☒ N50 Elver
- ☒ N50 Kyst- og vannkontur
- ☒ N50 Hav og vann









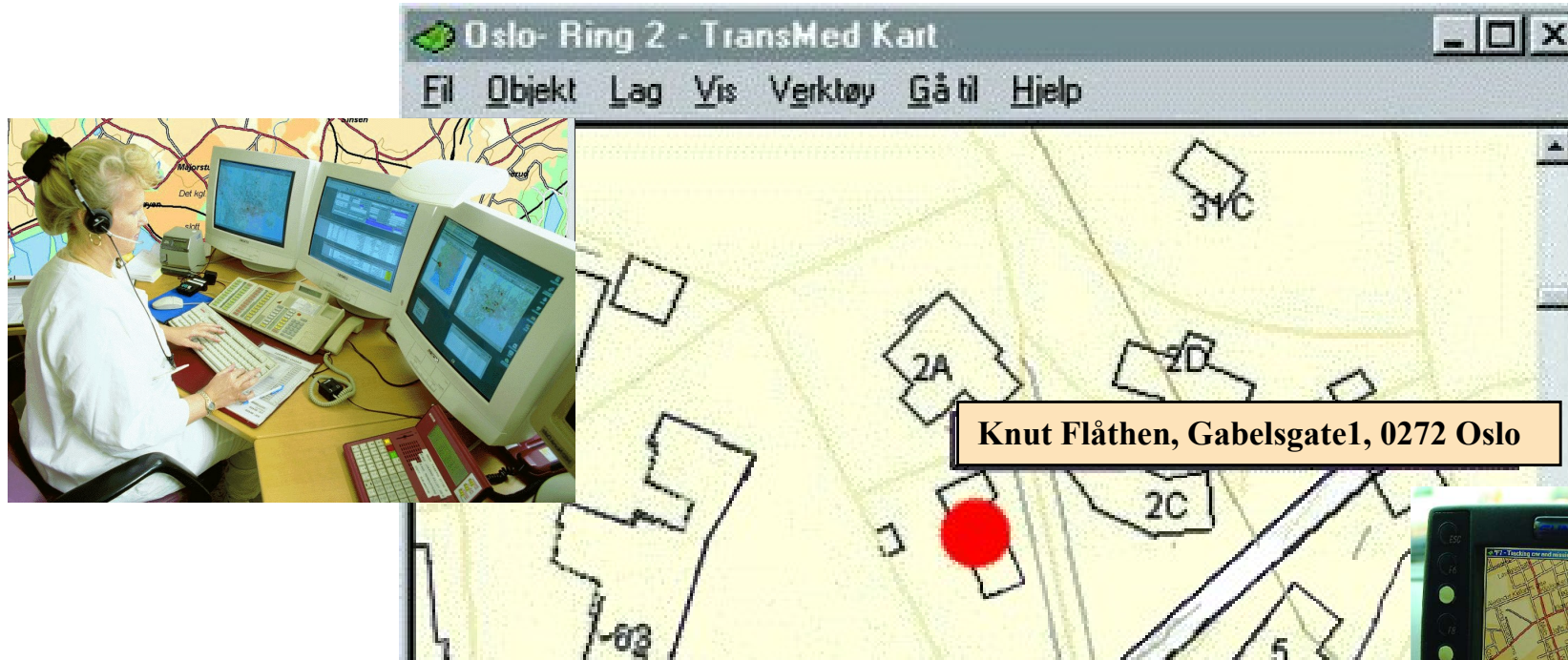
Udglidning i 1888, paa jernbanens kai i Trondhjem.



Submarine slides off Trondheim harbour

(– value for Society)

More efficient ambulance services



- ❑ Position of all ambulances are displayed
- ❑ Position of adresse to patient is displayed
- ❑ Navigation system in ambulance
- ❑ Fastest route presented on screen
- ❑ Lives are saved



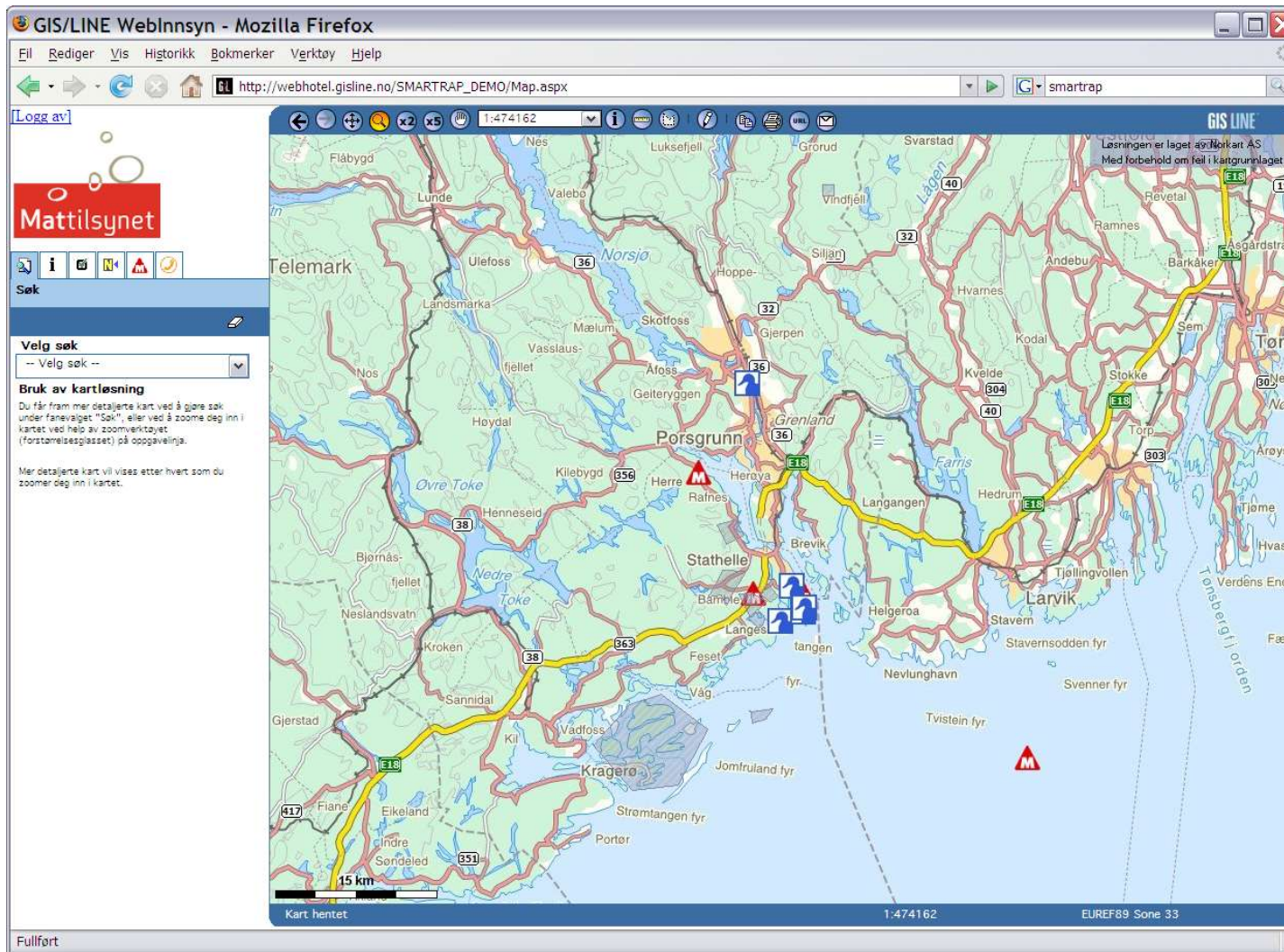
– value for *Society*



NORWEGIAN MAPPING
AUTHORITY

Pandemics and crisis management

for the Norwegian Food Safety Authority



SmartRap
(smart reporting):

- Registring incidents
- Warning
- Situation overview

– value for *Society*

A need for

Commitment across sectors and authorities

Corporate data easily accessible

Efficient management at each relevant authority

Avoid duplication of data

Core development and advisory forums

Guidelines, standards, logistics and user support

**Involvement of private sector – adapting standards,
interfaces and development**

SUCCESS CRITERIA

Political support

Inclusion and interaction

data sharing and distribution

equal opportunities

broad and inclusive participation

enthusiastic organisation

clear strategy

easy access to internet

open, standard based technology

distributed sources

SUMMING UP

Long term standardisation in practice

Long term collaboration

Joint SDI organisation structure at national and local levels

Respect each others core activities

Joint funding of data/ management

Technology interest

Research and seed funding

Clear governmental policies

Positive attitude