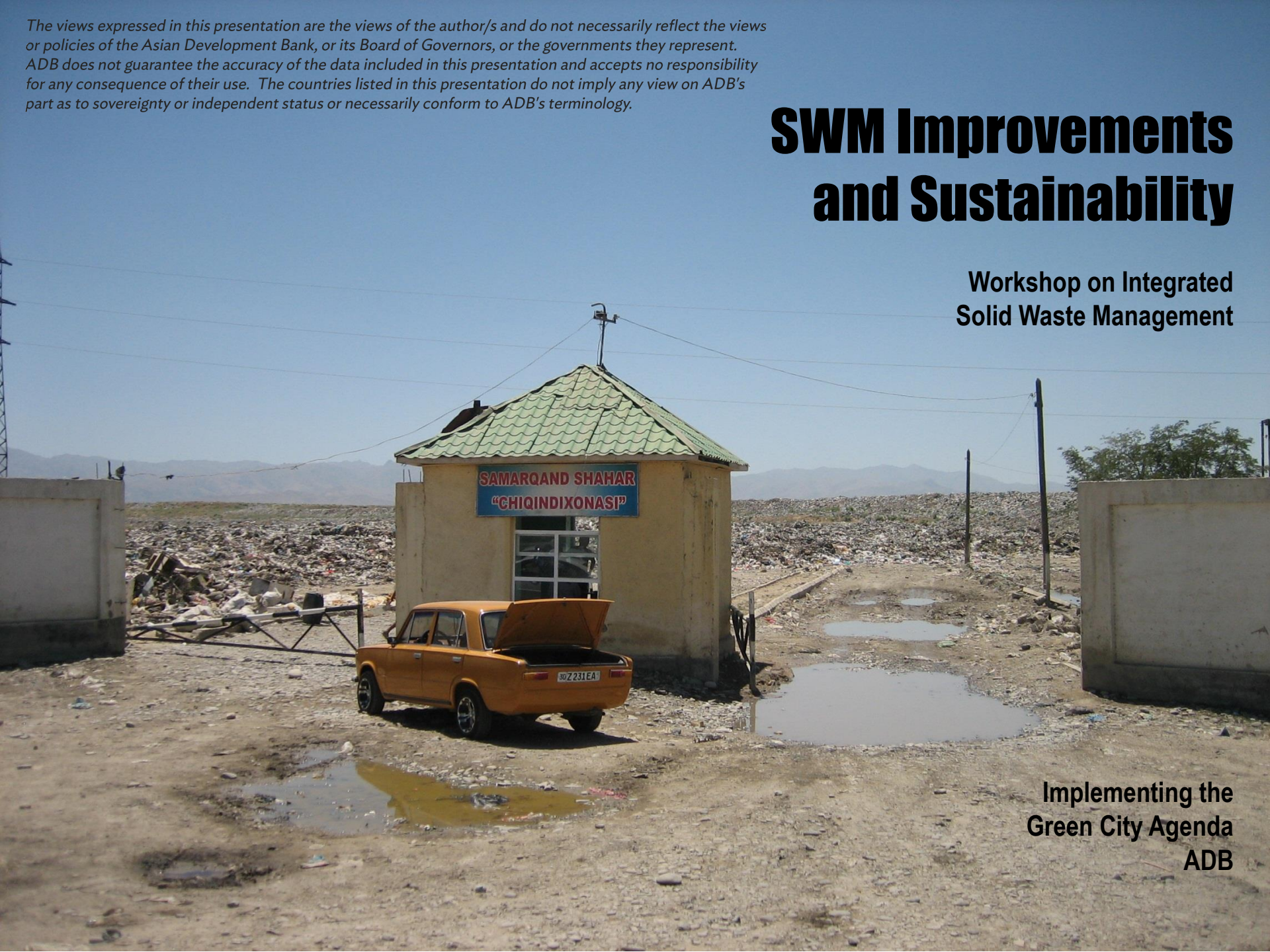
SWM Improvements and Sustainability

Workshop on Integrated Solid Waste Management

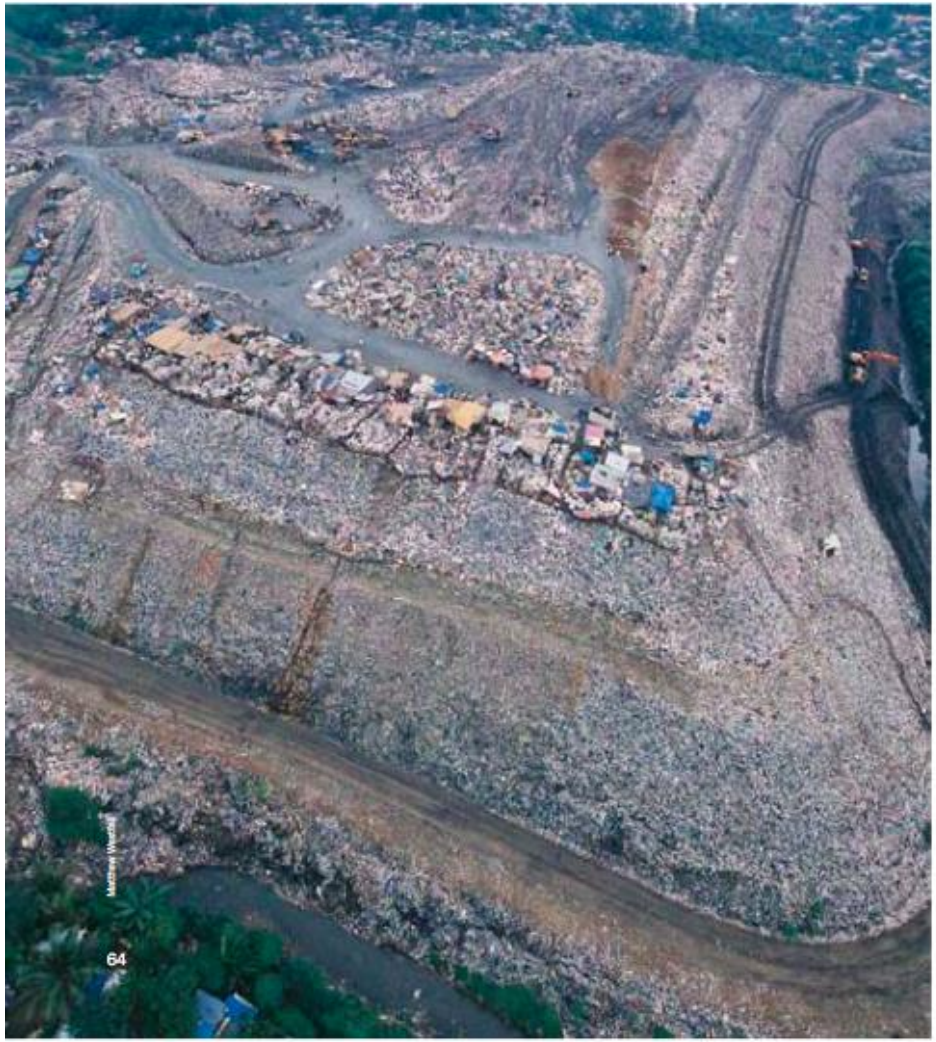


Implementing the Green City Agenda

ADB

PAYATAS, SEPTEMBER 2003

For the past **30 years,** the Payatas dump site has most likely been **releasing leachate** into groundwater and river systems...
...an amount currently estimated at 2 liters per second or **63 million liters** each year...
...a rate that would fill **one 18-wheeled tractor trailer tanker** truck every 5 hours.



Ram Cabrera

Ram Cabrera

In July 2000, after a weekend of heavy rain, a mountain of garbage collapsed, burying hundreds of homes.

The severity of Metro Manila's garbage crisis is illustrated by the Payatas dump site tragedy. In July 2000, after a weekend of heavy rain, a mountain of garbage collapsed, burying hundreds of homes. Later, due to a dangerous mix of methane gas and downed electrical utility poles, fires spread across the dump site. The bodies of 205 people were recovered and, reportedly, hundreds more remain missing.

In December 2000, the site was "permanently closed," with plans to fast-track a new sanitary landfill project. A crisis in collection ensued, with mountains of garbage left uncollected throughout the metropolis. Over time, without any alternatives in place, dumping at Payatas has resumed.

Ram Cabrera

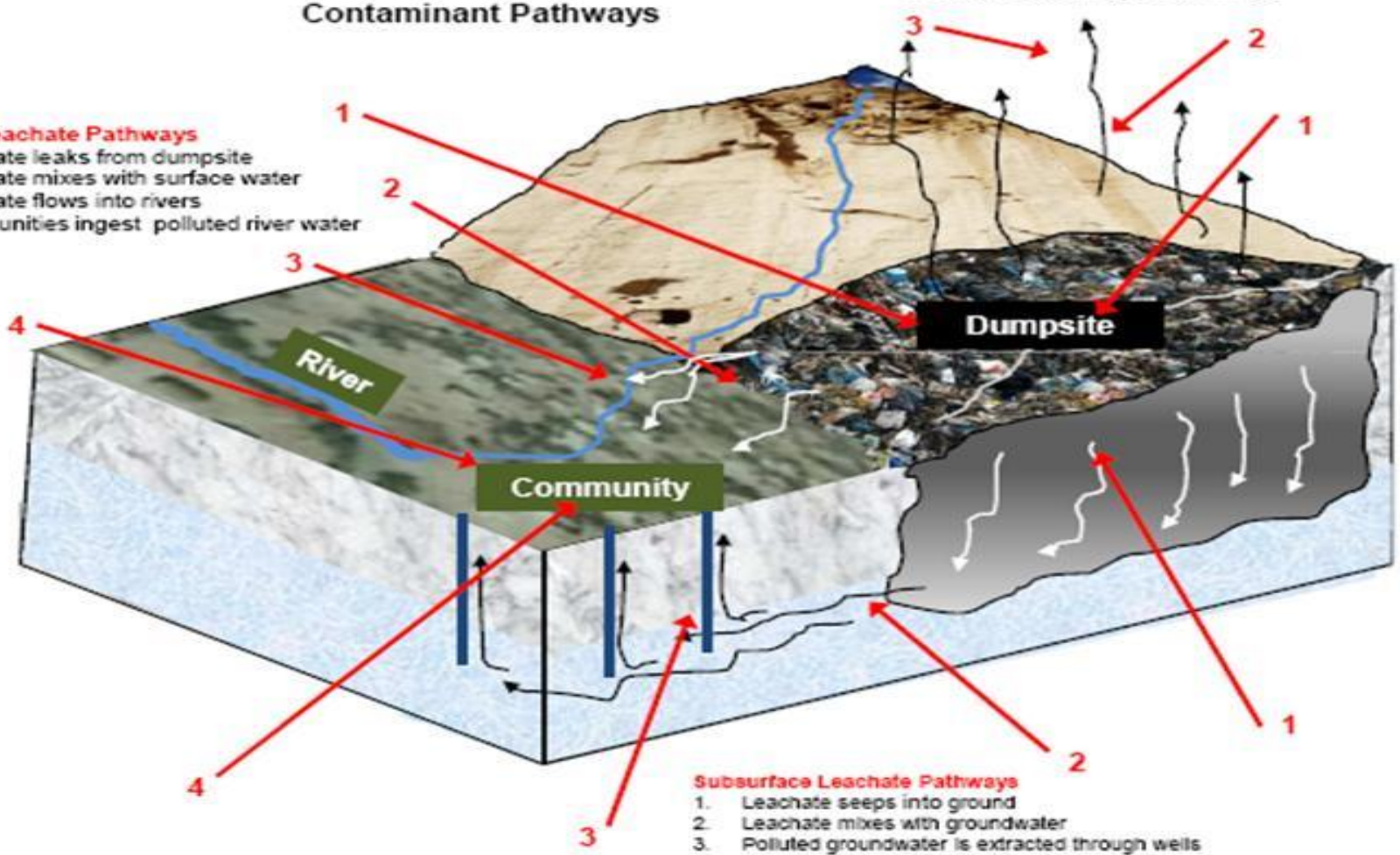
Contaminant Pathways

Gas Pathways

1. Gases are generated inside waste mass
2. Gases escape from dumpsite
3. Gas pollutes the surrounding atmosphere and contributes to global warming

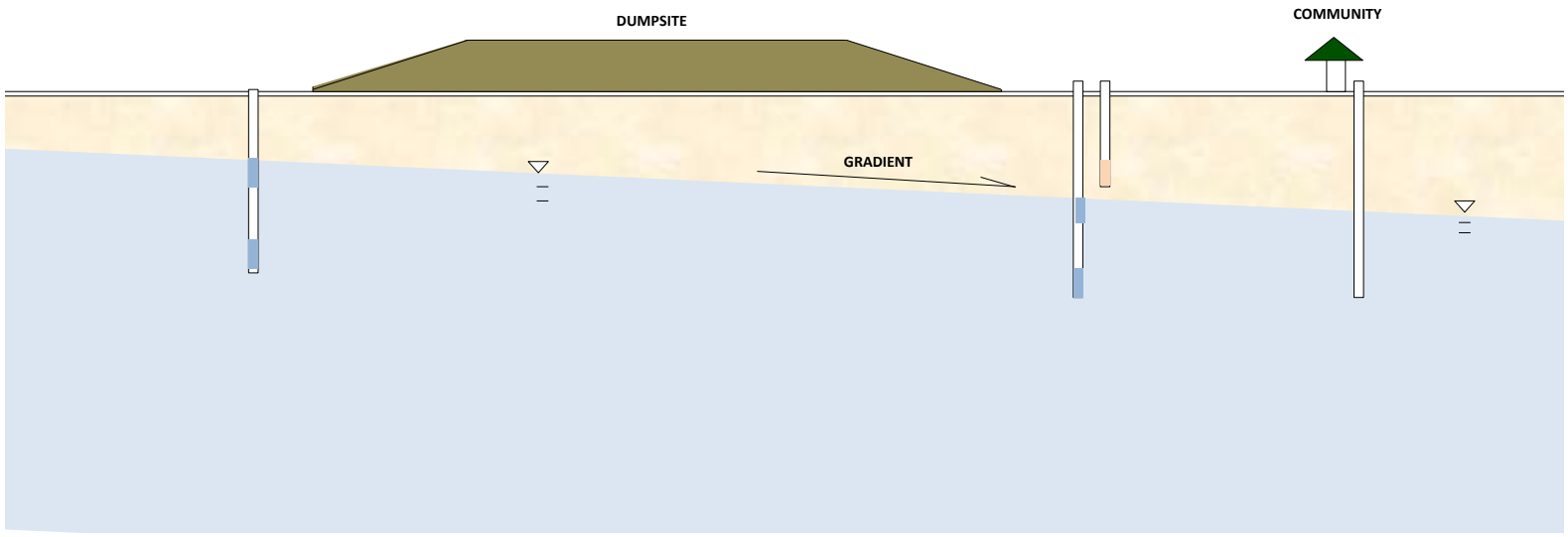
Surface Leachate Pathways

1. Leachate leaks from dumpsite
2. Leachate mixes with surface water
3. Leachate flows into rivers
4. Communities ingest polluted river water



Subsurface Leachate Pathways

1. Leachate seeps into ground
2. Leachate mixes with groundwater
3. Polluted groundwater is extracted through wells
4. Communities ingest polluted groundwater


DUMPSITE
COMMUNITY
GRADIENT


1. SWM sustainability:
…what are we after?
2. The big issue
…siting disposal sites

SWM Sustainability:
…what are we after?

Waste minimization and recycling

- Programs to minimize waste generation; incentives, taxes, regulations, other
- An educated and involved public, able to segregate waste, store residuals, improve community health conditions and contribute to SWM system costs
- Maximized private sector recycling, working in safe and healthy conditions
- For the Asia Pacific region: front end recycling (household, curbside)
- Reintegration of dumpsite waste workers into upstream recycling system

SWM Sustainability:
…what are we after?

Waste collection and transfer

- Virtual 100 percent collection efficiency: safe and regular
- Highly organized primary collection, with clean secondary storage points
- Efficient, regular collection and transfer system
- Where needed, highly efficient transfer stations, operated with minimal impacts

SWM Sustainability:
…what are we after?

Waste treatment and disposal

- Sanitary landfill, waste-to-energy or other technology as soon as possible
- Controlled dumpsites in the interim
  - Maintained to appropriate standards to minimize impacts
  - Prohibition of unauthorized access
  - Rehabilitation of sites as soon as is possible

SWM Sustainability:
…what are we after?

Regulatory framework

- An effective and achievable framework, appropriate for development level
- Measurable and accountable regulatory enforcement with external oversight

SWM Sustainability:
…what are we after?

Institutions and PPP

- Highly organized and efficient utilities, able to fully sustain themselves
- Trained personnel in SWM planning, management, technics, recycling, regulation, financing and cost recovery, PPP, and media and public awareness
- Maximized transparent, incentivized PPP, including recycling (largely informal private sector), collection and transfer (operation contracts), SLF/WTE commercial structures (operation contacts, through to long term DBFO modalities)

SWM Sustainability:
…what are we after?

Cost recovery

- Full financial accountability and disclosure
- Equitable SWM funding in relation to other sectors
- Progression towards user pay tariffs; initially covering operations, moving towards full cost recovery

…..when the public knows you operate these…

Disposal: Siting one of these….

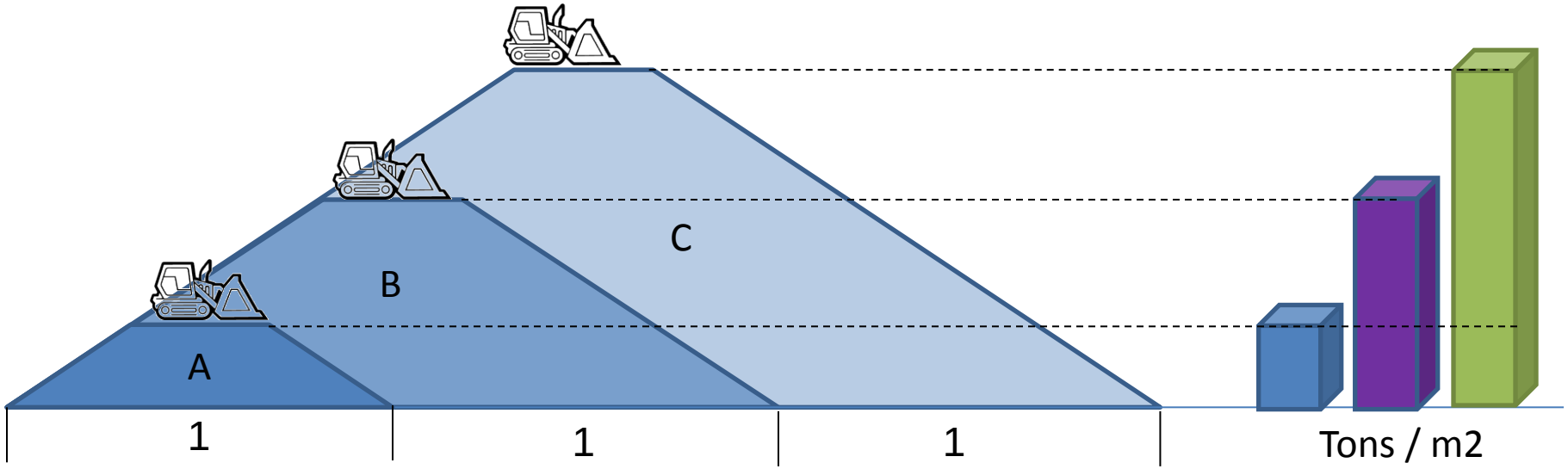
Tashkent
Disposal Site: Requirements and Constraints

- Minimum 50-year life
- Land requirement 150 hectares minimum (>)
- Optimal land requirement 250 hectares (>100-year life)

- Limited land availability near Tashkent: irrigated agricultural land
- Agricultural land-use changes require ministerial approvals
- Only suitable land (250 ha) is in Tashkent corridor 200 km southeast

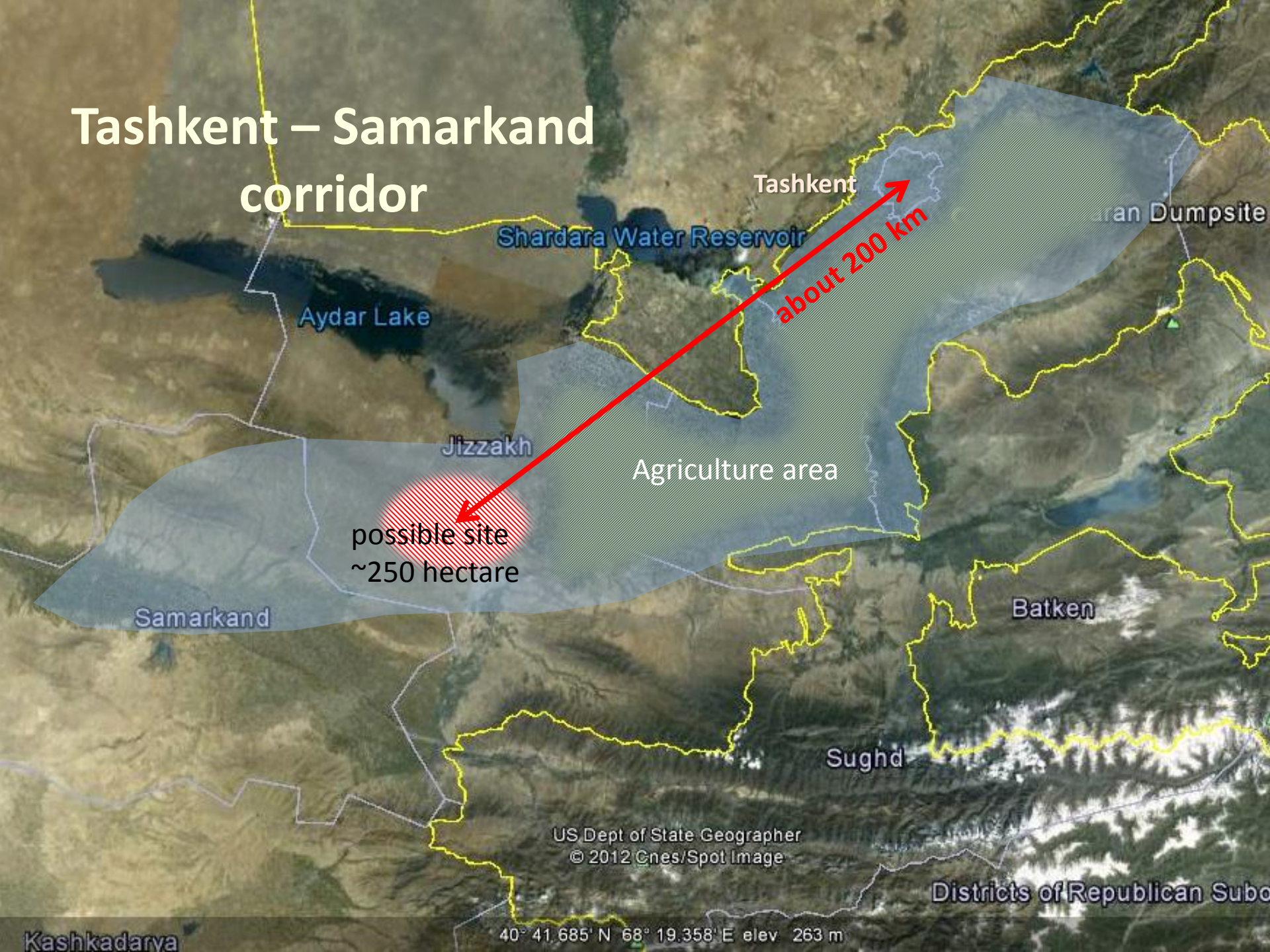
ECONOMICS of SCALE

At a Sanitary Landfill -- utilization per m2 landfill



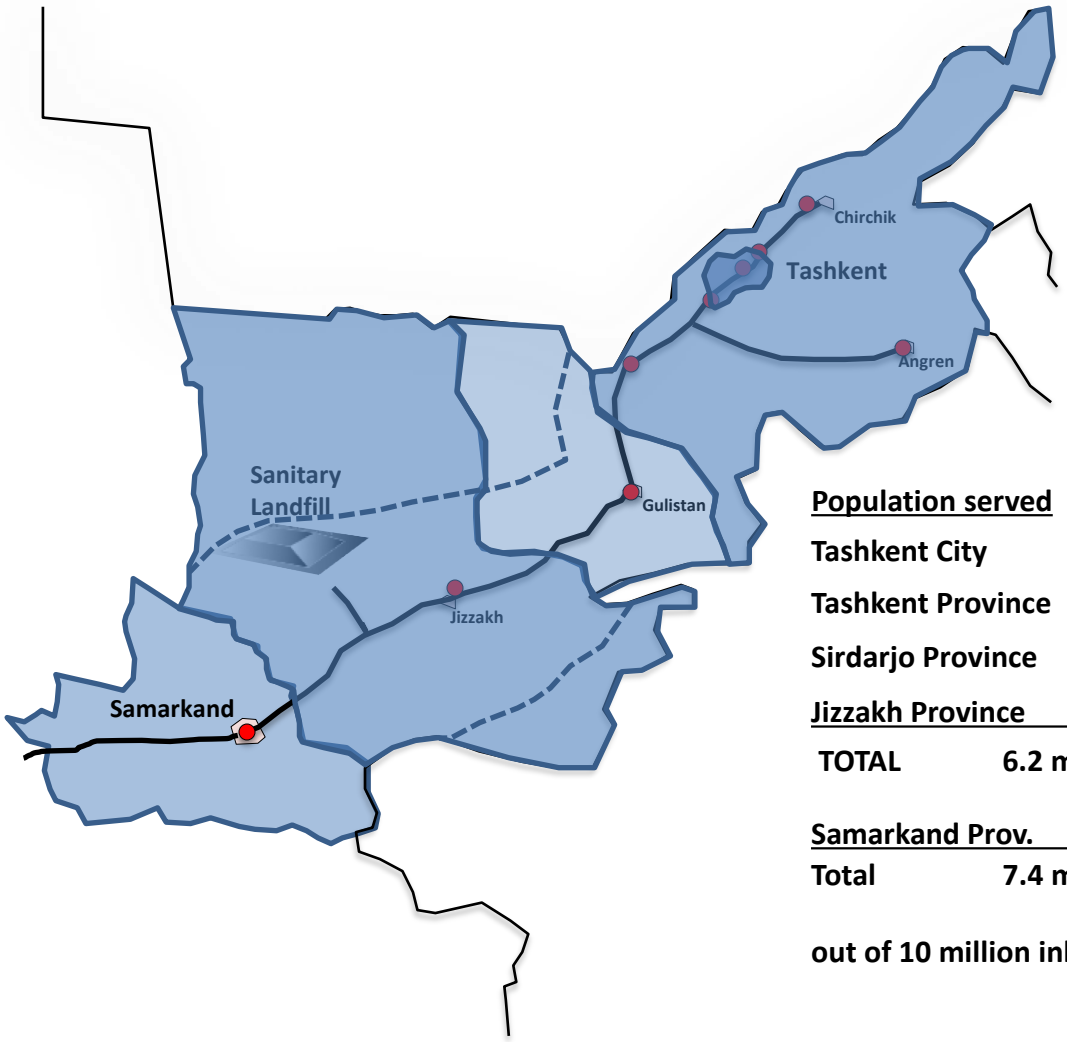
Tipping fee share on the cost of 1m2 Landfill

A.	1m2= 100$	100$ / 10 t = 10 $/t
B.	1m2= 100$	100$ / 25 t = 4 $/t
C.	1m2= 100$	100$ / 40 t = 2.5 $/t


Tashkent – Samarkand corridor
Tashkent
Shardara Water Reservoir
Aydar Lake
about 200 km
Jizzakh
Agriculture area
possible site
~250 hectare
Samarkand
Batken
Sughd
US Dept of State Geographer
© 2012 Cnes/Spot Image
Districts of Republican Subo
Kashkadarya
40° 41.685' N 68° 19.358' E elev 263 m


Toshkent Shahar
Tashkent
Tashkent
Akhangharan Dumpsite
Angren
Almalyk
Jizzakh
Sirdarya site 2400ha
Yangiyer site 1300ha
Hovos site 1000ha
Khujand
Bekobod
Gallaorol 2 site 3500 ha
Jizzakh
Ulyanovo site 2400ha
Batken
Google earth

3. TASHKENT



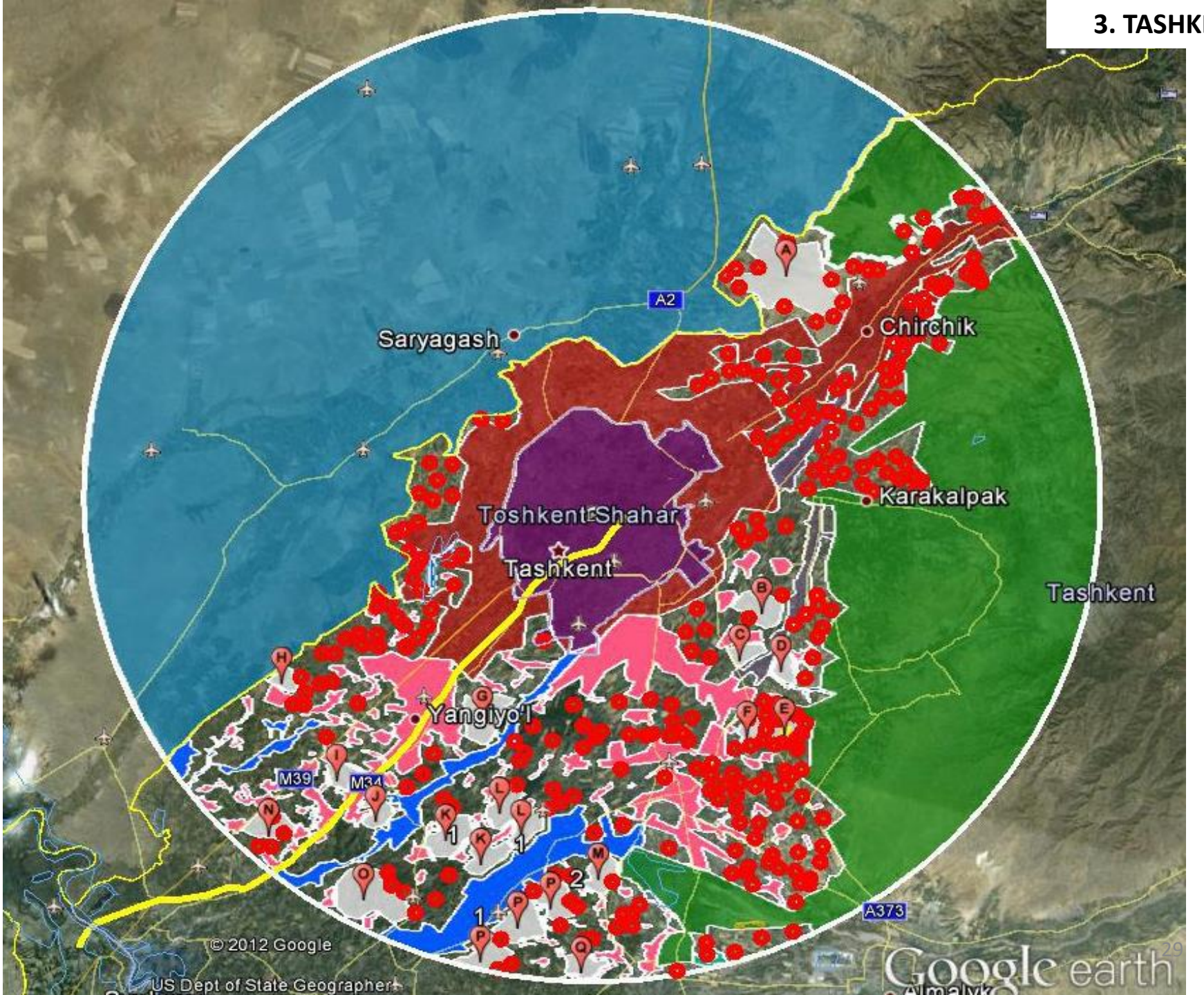
Population served

Tashkent City	2.2 million inhabitants
Tashkent Province	2.6 million inhabitants
Sirdarjo Province	0.6 million inhabitants
Jizzakh Province	0.8 million inhabitants
TOTAL	6.2 million inhabitants
Samarkand Prov.	1.2 million inhabitants
Total	7.4 million inhabitants

out of 10 million inhabitants of the area

Site Selection Criteria

- Area capacity and availability
- Hauling distance and time
- Proximity to sensitive groundwater resources
- Proximity to perennial surface water
- Proximity to sensitive land users
- Occurrence of flooding
- Local ecological conditions
- Current and future land use
- Seismic conditions
- Geological conditions
- Soil / land conditions
- Topography
- Proximity to airports
- Resettlement issues
- Social acceptability


A2
Saryagash
Chirchik
Karakalpak
Toshkent Shahar
Tashkent
Tashkent
Yangiyo'l
M39
M34
A373
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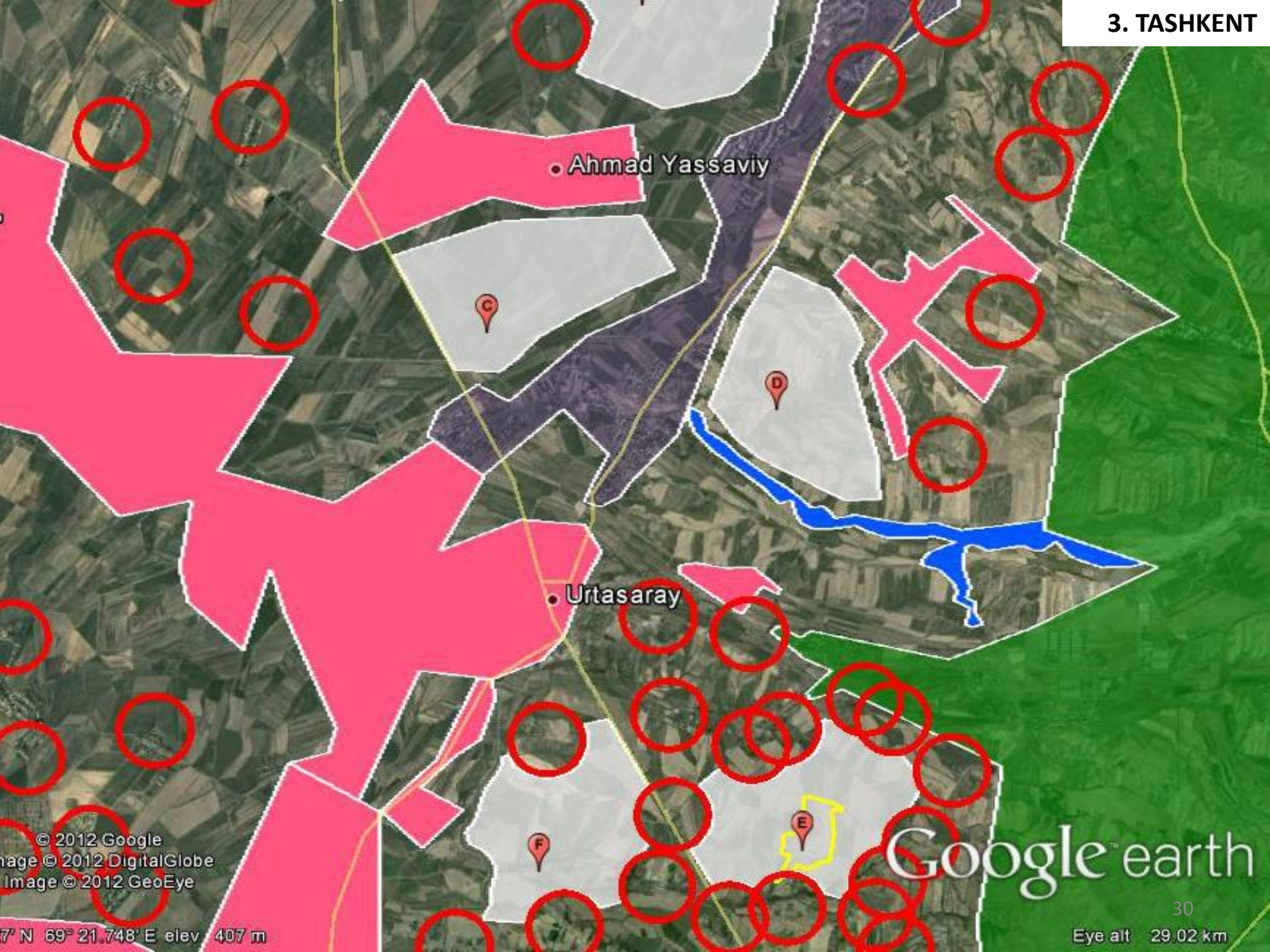
US Dept of State Geographer
Google earth


Ahmad Yassaviy
C
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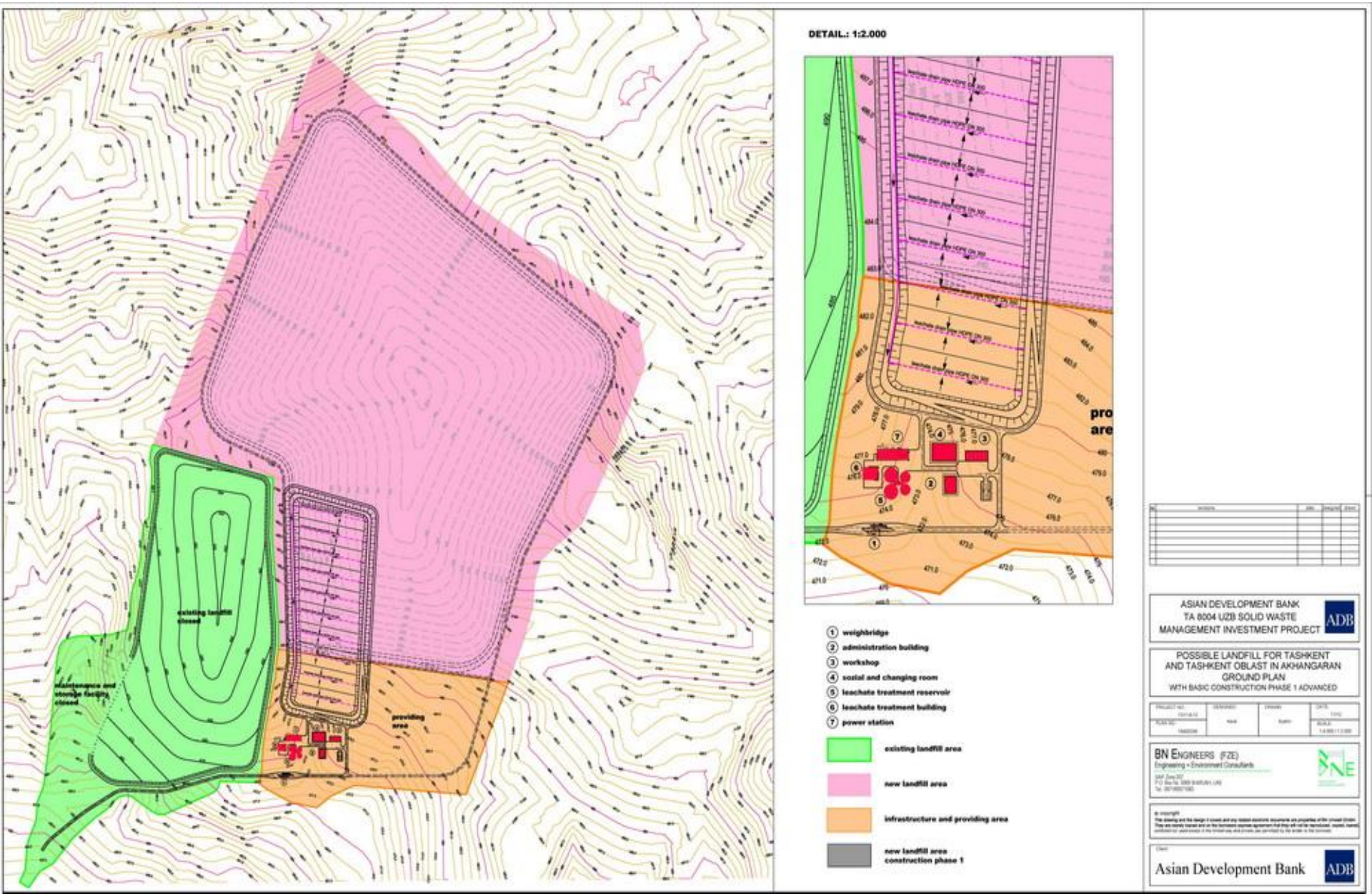
Google earth
7' N 69° 21.748' E elev 407 m
Eye alt 29.02 km


existing landfill closed
providing area
DETAIL.: 1:2.000
1 weighbridge
2 administration building
3 workshop
4 sozial and changing room
5 leachate treatment reservoir
6 leachate treatment building
7 power station
existing landfill area
new landfill area
infrastructure and providing area
new landfill area construction phase 1
ASIAN DEVELOPMENT BANK
TA 8004 UZB SOLID WASTE MANAGEMENT INVESTMENT PROJECT
ADB
POSSIBLE LANDFILL FOR TASHKENT AND TASHKENT OBLAST IN AKHANGARAN
GROUND PLAN
WITH BASIC CONSTRUCTION PHASE 1 ADVANCED
BN ENGINEERS (FZE)
Engineering + Environment Consultants
Asian Development Bank
ADB


CHENNAI
Purungudi Dumpsite


Purungudi Dumpsite

Purungudi Dumpsite

Kodungaiyur Dumpsite


Kodungaiyur Dumpsite

Surface/subsurface contamination

Extraction well

Overall Strategic Approach

1. **Phase I: Short Term Remediation Program**

- Collection system expansion
- Immediate remediation of dumpsites, creation of additional 5-year capacity while forming profiles for closure works
- Formulate and implement city-wide waste minimization and recycling program
- Engage the public, involve communities in strategy going forward

1. **Phase I: Benefits**

- Alleviate pressure by remediating acute environmental issues and creating disposal capacity
- Build Corporation SWM capacity
- Gain public confidence
- Integrate new areas into the system
- Get going with recycling program to achieve 20 percent recycling efficiency by 2018

1. **Phase II: Long Term Disposal System Development**

- Detailed needs assessment
- SWM Strategy development
- Detailed siting assessment with public consultation/involvement
- Develop long term (50-100 year) transfer and disposal solution

1. **Phase II: Benefits**

- Assured of long term, least cost transfer and disposal solution
- Ability to incorporate hazardous and medical waste disposal capacity
- Have strategic plan which provides for activities and investment needs to 2030 and beyond

REG-7450: SWM Sector Review and Investment Development
PROJECT SCHEDULE: Disposal Facility Siting and Development