Tung Chung New Town Extension

**BACKGROUND STUDY**

**ABOUT TUNG CHUNG NEW TOWN EXTENSION**

Tung Chung New Town Extension (TCNTE) covers the eastern and western sides of the currently existing Tung Chung New Town. Since the completion of the Tung Chung New Town in 2003, the government has been planning to expand the new town to accommodate more population and more commercial activities while ensuring adequate community facilities are provided.

The diagram shows the proposed outline zoning plan in the area.

**PROJECT TIMELINE**

- **2012Q1**: Planning and Engineering Design feasibility study was carried out in 2012. It was then followed by 3 stages public engagement activities from 2012-2014.
- **2017Q1**: APPROVAL OF OUTLINE ZONING PLAN
- **2017Q4**: The housing construction project is scheduled to begin in 2017Q4.
- **2023Q3**: The whole development project is expected to be completed in 2023Q3.
- **2030Q4**: COMPLETION

**SCOPE OF STUDY**

Two social impacts (demographic and traffic) and two environmental impacts (noise and ecological) of interest are selected for assessment. Each component is given a rating and weighting in the last section to determine whether the project is desirable or not.

**TRANSPORTATION AND LINKAGES**

Tung Chung is connected to the city centre through highway linkages, high speed railways, ferry lines and other transport infrastructures. Its proximity to the Airport also increases its accessibility to beyond the city.

**SCOPING AND HEREY DEVELOPMENT**

- Increase land supply for housing and development needs
- Enhance community facilities in Tung Chung
- Balance the needs of development and conservation
- Increase job opportunities

**PROJECT OBJECTIVES**

- Increase land supply for housing and development needs
- Enhance community facilities in Tung Chung
- Balance the needs of development and conservation
- Increase job opportunities

**LAND USE**

- Residential (Group A)
- Residential (Group B)
- Residential (Group C)
- Village Type Development
- Commercial
- Government, Institution or Community
- Other Specified Uses
- Open Space
- Coastal Protection Area
- Green Belt
- Conservation Area

**SITE STUDY & RESEARCH**

The draft Tung Chung Centre Area and Tung Chung Valley Outline Zoning Plan is approved and followed by a public inspection of the OZP.

**COMMENCEMENT OF CONSTRUCTION**

Reclamation & advance works would be completed by 2021Q4. The housing construction project would begin in 2017Q4.

**APPROVAL OF OUTLINE ZONING PLAN**

**POPULATION INTAKE**

**COMPLETION**

**INTERNA TIONAL AIRPORT HONG KONG**

**HONG KONG-ZHUHAI-MACAU BRIDGE**

**TUNG CHUNG MTR**

**CONSTRUCTION**

Demographic impact assessment examines the periodical projection of future population trends with the aid of estimating future births, deaths and migration patterns. Population projections in different scenarios allow further analysis on the demographic trends and the effects brought by the proposed development in TCNTE, laying down an important basis for other impact assessments.

**NOISE IMPACT ASSESSMENT**

Way noise impact assessment examines the noise impacts existed on current and future development in TCNTE. Construction noise and facade noise from road traffic are projected for two phases - Construction Phase and Operation Phase. This assessment aims to investigate how the society would be affected in different stages of development, and further suggest mitigation measures to enhance the living quality of the TCNTE.
**Demographic Impact Assessment**

**Methodology**
- Baseline Scenario: existing development in TCNTE
- Proposed Development: 2 Scenarios
  - Scenario 1: Business as Planned
  - Scenario 2: High Proportion of Young Working Class

**Cohort Component Model (5 years)**
- Projected Population = Initial Population + Birth - Death + Net Migration

**Demographic Impact Assessment**
- Remaining Planned Population:
  - Initial Population: 2016 Census
  - Projected Population: Initial Population + 80% Intake of Planned Population

**TCNTE Development Scenario and Population Pyramid**
- Scenario 1: Business as Planned
  - Baseline Scenario: Without TCNTE development
  - Scenario 2: High Proportion of Young Working Class
  - Scenario 3: 40% Intake of Planned Population

**Scenario Summary**
- Population Change +107%
- Population Change +86%
- Population Change +18.0%
**Tung Chung New Town Extension**

**Traffic Impact Assessment**

**Methodology**
- Baseline Projection: Uses regression analysis to predict the number of people working or residing in the Tung Chung area.
- Working Population & Job Creation: The predicted number of people working or residing in the Tung Chung area.
- Mode Choice Distribution: The number of people choosing different modes of transportation.

**Work Trip Generation**

**Impact on Mass Transit Railway**

**Internal Traffic**

The desirable AADT for selected roads are around 68,200 (p.c.u.). The TCNTE project will significantly increase traffic flow within the district, potentially causing traffic congestions in Yu Tung Road, where the AADT exceeds the desirable value.

**External Traffic**

The new Tuen Mun-Chek Lap Kok Link, which is expected to be completed by 2021, will divert around 32-35% of traffic from North Lantau Highway and Lantau Link.

**Junction Usage**

A GIS analysis is conducted to find the shortest route from different blocks to highway/links, thus determining people's preferences on interchange usage.

**Mitigation Measures**

1. **New Railway connecting North Lantau to Hong Kong Island**
   - The new railway provides a shorter and faster way of reaching North Lantau and Hong Kong Island. Over 2,000 workers are expected to make use of the new highway in the peak hour.

2. **New Highway connecting Tung Chung to Hong Kong Island**
   - The new highway will divert around 37% of car trips into different transport categories. They are then converted to passenger car units (p.c.u.).

3. **Adjusted Toll Rates**
   - The current toll rate for Lantau Link is $15 for private vehicles. To increase the drivers' incentive of using the Tuen Mun-Chek Lap Kok Link, the government should consider setting a lower toll rate for the Tuen Mun Link, for example, at $5. Another approach is to raise the toll rate for the Lantau Link during peak hours.

4. **Expanding Current Roads**
   - The new Tuen Mun-Chek Lap Kok Link provides a shorter and faster way of reaching North Lantau and Hong Kong Island, expected to make use of the greening area to expand Tung Road (Carrying capacity: 2,000 vehicles/hr) is expected to double. Making use of the greening area to expand lanes 3 to 4 can prevent foreseeable congestions as the AADT exceeds the desirable value.

5. **3 Adjusted Toll Rates**
   - The current toll rate for Lantau Link is $15 for private vehicles. To increase the drivers' incentive of using the Tuen Mun-Chek Lap Kok Link, the government should consider setting a lower toll rate for the Tuen Mun Link, for example, at $5. Another approach is to raise the toll rate for the Lantau Link during peak hours.

6. **Expanding Current Roads**
   - The new Tuen Mun-Chek Lap Kok Link provides a shorter and faster way of reaching North Lantau and Hong Kong Island, expected to make use of the greening area to expand Tung Road (Carrying capacity: 2,000 vehicles/hr) is expected to double. Making use of the greening area to expand lanes 3 to 4 can prevent foreseeable congestions as the AADT exceeds the desirable value.
NOISE IMPACT ASSESSMENT

Tung Chung New Town Extension

**METHODOLOGY**

- **Research**
  Identification of Noise Sensitive Receivers (NSRs) based on government documents

- **Results**
  Examination of the noise received at the NSRs with the EPD Standard

- **Study**
  Identification of potential noise sources and influencing factors

- **Analysis**
  Prediction of noise impacts from 2 major influencing factors with the use of ArcGIS

**CALCULATION OF NOISE LEVELS**

1. **Construction Noise Calculation**
   Maximum Noise Produced in Construction Site - Distance Attenuation
   \[ 124 - (20 \times \log_{10}(D + 8)) \]

2. **Road Traffic Noise Calculation**
   \[ 10 \times \log_{10}(q) + 33 \times \log_{10}(V + 40) + 3.5 \times \log_{10}(V + 80) + 10 \times \log_{10}(D - 8) + 2.1 \]
   Total Road Traffic Noise Impact = \[ 1 + 2 \]

**ACCEPTABLE NOISE LEVEL**

<table>
<thead>
<tr>
<th>Types of NOIs</th>
<th>Acceptable Noise Level (Construction Activities)</th>
<th>Acceptable Noise Level (Road Traffic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Domestic Premises, Hotels &amp; Offices</td>
<td>75 dB</td>
<td>65 dB</td>
</tr>
<tr>
<td>Educational Institutions &amp; Places of Worship</td>
<td>75 dB</td>
<td>65 dB</td>
</tr>
<tr>
<td>Hospitals &amp; Clinics</td>
<td>70 dB</td>
<td>55 dB</td>
</tr>
</tbody>
</table>

**DISTRIBUTION OF NSRs AND IF in 2019 [PREVAILING STAGE]**

At the current stage, North Lantau Highway serves more than 2,900 vehicles per hour during peak hours. Yet, there are no adverse noise impacts emitted from the traffic flow at the prevailing stage.

**CONSTRUCTION NOISE IN 2025 (CONSTRUCTION STAGE)**

Corrected Construction Noise Value [dB(A)]

- 87.1
- 70
- 65
- 55
- 50
- 45
- 40
- 35
- 30
- 25
- 20
- 15
- 10
- 5
- 0

**ROAD TRAFFIC NOISE IN 2025 (OPERATION STAGE)**

Corrected Road Traffic Noise Value [dB(A)]

- 87.1
- 70
- 65
- 55
- 50
- 45
- 40
- 35
- 30
- 25
- 20
- 15
- 10
- 5
- 0

**MAJOR FINDINGS**

- NSRs’ Results
  - NSRs passed
  - NSRs failed

- Distribution in 2025
  - NSRs in Construction Stage
  - NSRs in Operation Stage

**MITIGATION MEASURES**

1. **Utilization of temporary and movable noise barriers**
   Sound noise could be defected with the usage of additional noise-reducing equipment. Temporary and movable noise barriers with internal absorptive coating could be placed close to the mechanical equipment to reduce direct ground borne noise effect.
   - 2 dB(A) noise generated during construction could be reduced

2. **Proper Scheduling on usage of powered equipment**
   While usage of powered construction equipment is somewhat inevitable during the construction period, a proper schedule should be adopted in hopes of preventing multiple usage of several powered equipment at the same time which might create strong resultant noise.
   - 20% of overall construction noise reduction

3. **Installation of absorbent ground cover for road paving**
   A large extent of noise could be reduced with the installation of absorbent ground cover for road paving especially on the major road which create significant noise impacts, i.e. North Lantau Highway, etc.
   - 2.5 dB(A) road traffic noise could be reduced

**LOCATION & TYPES OF NSRs**

- Domestic Premises
- Places of Worship
- Education Institution
- Hospitals / Clinics

**NSR Results**

- Satisfactory NSR: Major Source of Road traffic noise
- Insatisfactory NSR: NSRs failed

**NSR Passed & Failed**

- 87% passed
- 13% failed

**Legends**

- NSRs’ Performance by Road Use
- NSRs’ Performance by Land Use

**NSR Performance**

- Construction Phase
  - 87% passed
  - 13% failed

- Operation Phase
  - 87% passed
  - 13% failed

**NSR Results Distribution in 2031**

- NSRs in 2031
  - NSRs passed
  - NSRs failed

**Examination of the noise received at the NSRs with the EPD Standard**

**Identification of Noise Sensitive Receivers (NSRs) based on government documents**

**Research Methodology**

- Identification of potential noise sources and influencing factors

**Presentation of noise impacts from 2 major influencing factors with the use of ArcGIS**

**Identification of potential noise sources and influencing factors**

**Study**

- Identification of potential noise sources and influencing factors

**Results**

- Examination of the noise received at the NSRs with the EPD Standard
**Methodology**

- Environmental Standards Regulation and Guideline
- Urban Growth Analysis
- Baseline Study
- Identification of Possible Impacts
- Mitigation Measures
- Impact - Habitat Fragmentation & Disturbance to Species
- Hotspot Analysis & Comparison
- Ecological Value Map
- Site of Conservation Importance
- Habitat Map
- Ecological Impact Assessment

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**Urban Growth Analysis**

**Environmental Standards Regulation and Guideline**

- Forests and Countryside Ordinance
- The Protection of Endangered Species of Animals and Plants Ordinance
- The Marine Parks Ordinance
- The Environmental Impact Assessment Ordinance
- The Country Parks Ordinance
- The Wild Animals Protection Ordinance

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**Baseline Study**

Existing information is collected through literature review and field and habitat surveys to develop baseline information database for the natural habitats.

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**Identification of Possible Impacts**

Possible ecological impacts are predicted, identified, and evaluated.

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**Mitigation Measures**

Appropriate mitigation measures have to be provided to reduce and alleviate the impacts from the projects on the habitats.

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**Impact - Habitat Fragmentation & Disturbance to Species**

The above map shows the location of terrestrial fauna of conservation importance recorded during field survey in Tung Chung West. Hotspot analysis is performed to identify the inhabitation hotspot of these species.

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**Ecological Impact Assessment**

- The Protection of Endangered Species of Animals and Plants Ordinance
- The Environmental Impact Assessment Ordinance
- The Country Parks Ordinance
- The Wild Animals Protection Ordinance
- The Forests and Countryside Ordinance

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**Site of Conservation Importance**

**Habitat Map**

- Bamboo Park
- Nature of Special Scientific Interest (NSSI)
- Marine park
- Priority site under new conservation policy
- Biologically important vegetation
- Development area (Tung Chung East)
- Development area (Tung Chung West)

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**Ecological Value Map**

- Young woodland
- Agricultural land (Abandoned, Dry)
- Agricultural land (Abandoned, Wet)
- Agricultural land (Active, Dry)
- Agricultural land (Active, Wet)
- Vegetation
- Shrubland/Grassland
- Fung Shui Wood
- Agricultural land (Orchard)
- Agricultural land (Abandoned, Wet)
- Agricultural land (Abandoned, Dry)
- Young woodland

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**Potential Movement Corridors**

**Mitigation Measures**

1. Capture and Translocation Exercise
2. Compensation Woodland Planting
3. Planting of Emergent Plants
4. Mitigation Measures for Marine Habitats

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**Importance of Fung Shui Wood**

- The above map shows the location of terrestrial fauna of conservation importance recorded during field survey in Tung Chung West. Hotspot analysis is performed to identify the inhabitation hotspot of these species.

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**Impact - Direct Habitat Loss**

- Proposed development area in TCE
- Proposed recalmation site in TCE
- Proposed development area in TCW
- Proposed recalmation site in TCW

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**Habitat Map**

- Proposed development area in TCE
- Proposed recalmation site in TCE
- Proposed development area in TCW
- Proposed recalmation site in TCW

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**Ecological Value of Terrestrial Habitat**

- Elevation
- Flora
- Fauna
- Amphibians
- Invertebrates
- Fish
- Bird
- Reptile
- Mammal
- Plantation
- Wetland
- Beaked
- Mangrove
- Seabed
- Coastal waters

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**Potential Movement Corridors**

- North Lantau Water
- Proposed development area in TCE
- Proposed recalmation site in TCE
- Development area (Tung Chung East)
- Development area (Tung Chung West)
- Country park
- Priority site under new conservation policy
- Site of Specific Scientific Interest (SSSI)

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**Mitigation Measures**

1. Capture and Translocation Exercise
2. Compensation Woodland Planting
3. Planting of Emergent Plant
4. Mitigation Measures for Marine Habitats
**PUTTING IT TOGETHER**

**ASSESSING THE PROJECT**
The overall favourability of the project is determined by adding up the weighted score of every component of the three impact assessments: traffic, noise, and ecological. Demographic, economic, and social impact assessment is not included because it aims to predict the population growth and demographic composition in different scenarios instead of acting as an assessment criteria of project viability.

**WRAP-UP**
The diagram summarises the seriously affected areas of traffic, noise, and ecological impacts in Tung Chung New Town with corresponding mitigation measures.

**SERIOUSLY AFFECTED AREAS**

<table>
<thead>
<tr>
<th>Traffic</th>
<th>Noise</th>
<th>Ecological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Red</td>
<td>Red</td>
</tr>
</tbody>
</table>

**Methodology**

- Identify the impacts of traffic, noise, and ecological aspects with possible mitigations.
- Establish the weighting criteria of the three impacts respectively.
- Rating on different components of impacts before and after mitigations.
- Determine the overall favourability of the project.

**Rating Method**

<table>
<thead>
<tr>
<th>Poor</th>
<th>Unsatisfactory</th>
<th>Neutral</th>
<th>Satisfactory</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
</tbody>
</table>

**WEIGHTING METHOD**

References are made according to the Stage 3 Public Engagement Report of the Tung Chung New Town Extension Project when determining the importance of different components. Issues on traffic, noise, and ecological aspects are identified in public submissions and the total number of comments are used to set the weighting of the three aspects.

**TRAFFIC IMPACT**

- Increase the frequency of public transport in Tung Chung, including trains and more ferries.
- Improve cycling tracks.
- Maximize the use of Airport Express through the new route in Tung Chung.
- Widen roads to increase their carrying capacity.
- Reduce the toll rate of Lantau Link.

**ASSESSMENT RESULTS**

Traffic Impact

- Underused: Ten Mun-Chek Lap Kok Link
  - Adjustment on Toll Rates

Noise Impact

- Heavy Traffic: on Yu Tung Rd
  - Widening from 2 lanes to 3 lanes

Ecological Impact

- Permanent terrestrial habitat loss
  - Adaptation of eco-shoreline designs

**ACHIEVING MAXIMUM LIVEABILITY**

- Unaffected by construction noise and traffic noise
- Little or no impact on habitat quality
- Protect species of high ecological importance and ensure biodiversity
- Maintain a balance between conservation and development

**MAXIMUM LIVEABILITY**

- Tranquility
- Eco-friendliness
- Accessibility

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**U R B S 4 0 0 1**

**ADVANCED URBAN STUDIES STUDIO I**

**TUNG CHUNG NEW TOWN EXTENSION**

**TRAFFIC IMPACT**

- MTR Usage
  - Occupancy Rate below 100%
    - Satisfactory +1
    - Excellent +2

- External Road Traffic
  - V/C Ratio lower than 1
    - Unsatisfactory -1
    - Satisfactory 0

- Internal Road Traffic
  - AADT lower than 68,200 (pcu)
    - Ununsatisfactory -1
    - Satisfactory 0

**NOISE IMPACT**

- Noise from Construction
  - Exceedance level of the NRAs
    - Unsatisfactory -1
    - Excellent +1

- Noise from Facade Road Traffic
  - Exceedance level of the NRAs
    - Unsatisfactory -1
    - Excellent +1

**ECOLOGICAL IMPACT**

- Impact on Habitat Quality
  - Size and Magnitude of Habitat Loss, Ecological Value, Reversibility
    - Poor -2
    - Ununsatisfactory -1

- Species Affected
  - Any species of Conservation Importance, Biodiversity, Reversibility
    - Poor -2
    - Ununsatisfactory -1

- Balance between Conservation and Development
  - Avoidance of Sensitive Receivers of Conservation Importance
    - Unsatisfactory -1
    - Neutral 0

**CONCLUSIONS**

- Achieving maximum liveability
- Unaffected by construction noise and traffic noise
- Little or no impact on habitat quality
- Protect species of high ecological importance and ensure biodiversity
- Maintain a balance between conservation and development.