

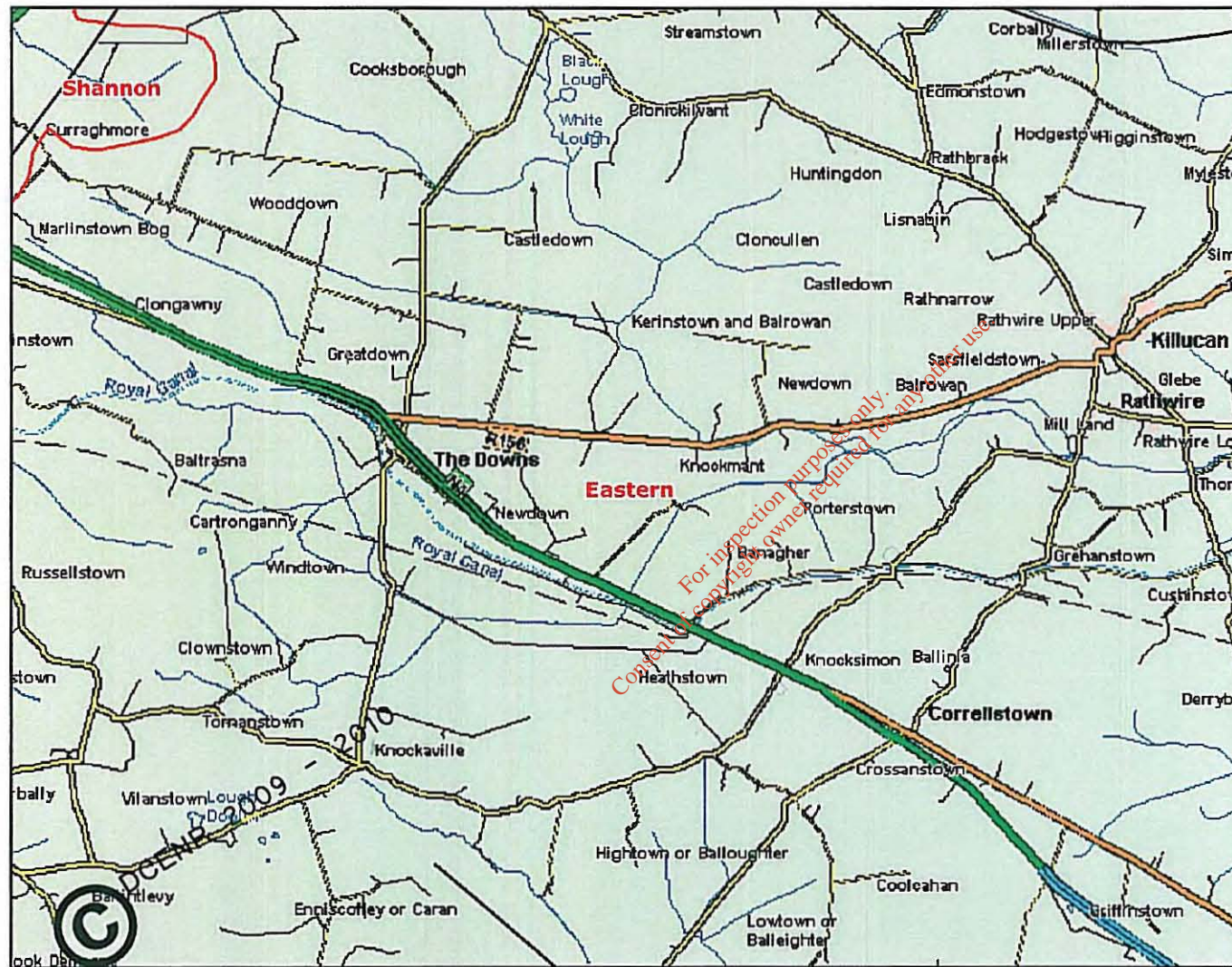
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## Appendix E

Bedrock Faults 100k  
National Draft Generalised Bedrock (DPUL)  
Nation Draft Gravel Aquifer Map  
Teagasc Subsoils (Peat)  
Bedrock1:1 Million Solid Geology  
Groundwater Well Data  
Source Protection Area  
Eastern Interim Vulnerability  
National Draft Bedrock Aquifer map  
Karst Features  
Soils Map  
Sub Soils Map  
River Catchment  
Hydrometric Area  
River Basin District  
Trial Pit Locations



# 111\_001\_Bedrock Faults 100k



**Legend**

- Bedrock Faults 100k
- RBD Boundaries

Scale: 1:60,000



Map center: 252399, 250530

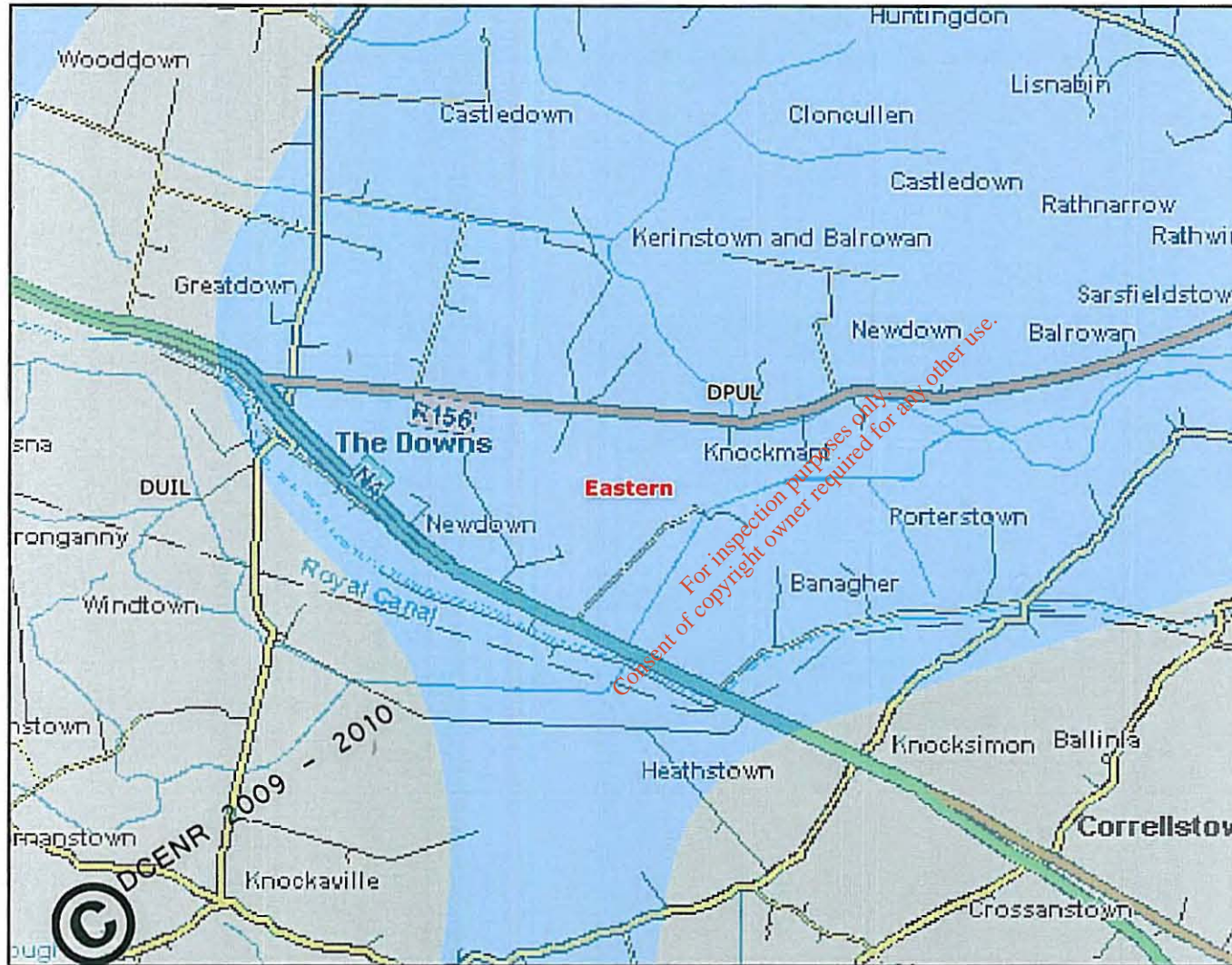


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Snapshot Date: 16-Mar-2011



# 111\_001\_National Draft Generalised Bedrock (DPUL)



**Legend**  
National Draft Generalised Bedrock Map

- BV - Basalts and other Volcanic rocks
- CM - Cambrian Metasediments
- DDL - Dinantian Dolomitic Limestones
- DESSL - Dinantian early Sandstones, Shales and Limestones
- DKS - Devonian Kiltoran type Sandstones
- DLIL - Dinantian Lower Impure Limestones
- DMSC - Dinantian Mudstones and Sandstones Cork Group
- MSSL - Dinantian Mixed Sandstones, Shales and Limestones
- DORS - Devonian Old Red Sandstones
- DPBL - Dinantian Pure Bedded Limestones
- DPUL - Dinantian Pure Unbedded Limestones
- DS - Dinantian Sandstones
- DSL - Dinantian Shales and Limestones
- DUIL - Dinantian Upper Impure Limestones
- GI - Granites and other Igneous Intrusive rocks
- NSA - Namurian Sandstones
- NSH - Namurian Shales
- NU - Namurian Undifferentiated
- OM - Ordovician Metasediments
- OV - Ordovician Volcanics
- PM - Precambrian Marbles
- PQGS - Precambrian Quartzites, Gneisses and Schists
- PTMG - Permo Triassic Mudstones and Gypsum
- PTS - Permo Triassic Sandstones
- SMV - Silurian Metasediments and Volcanics
- WSA - Westphalian Sandstones
- WSH - Westphalian Shales

RBD Boundaries

Scale: 1:40,000



Map center: 252399, 250530

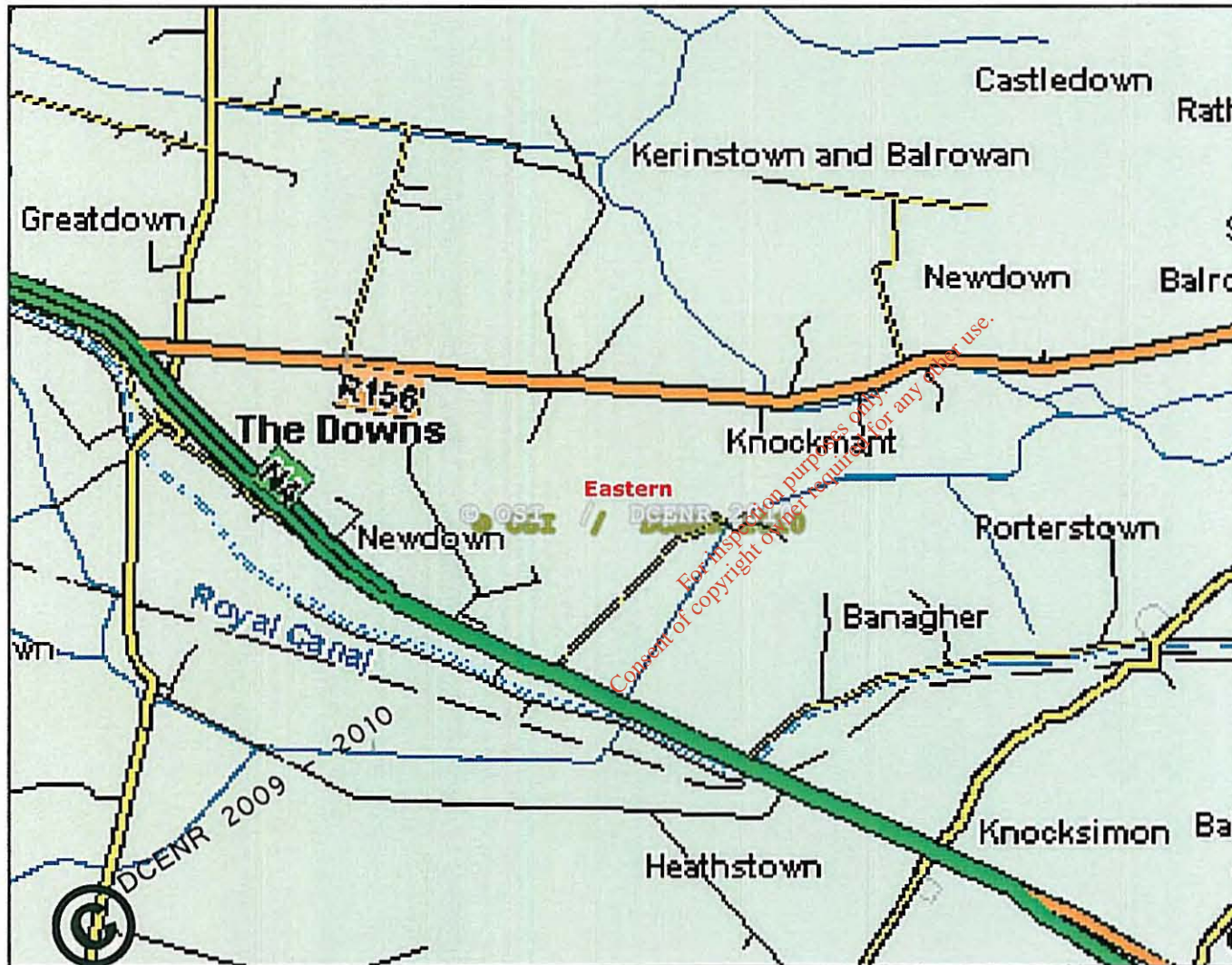


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Snapshot Date: 16-Mar-2011



# 111\_001\_National Draft Gravel Aquifer Map



**Legend**  
National Draft Gravel Aquifer Map

- █ Rg - Regionally Important, extensive sand/gravels aquifers
- █ Lg - Locally important, sand/gravel aquifers
- No gravels present
- Not Mapped
- RBD Boundaries
- █ Watermark



Map center: 252399, 250530

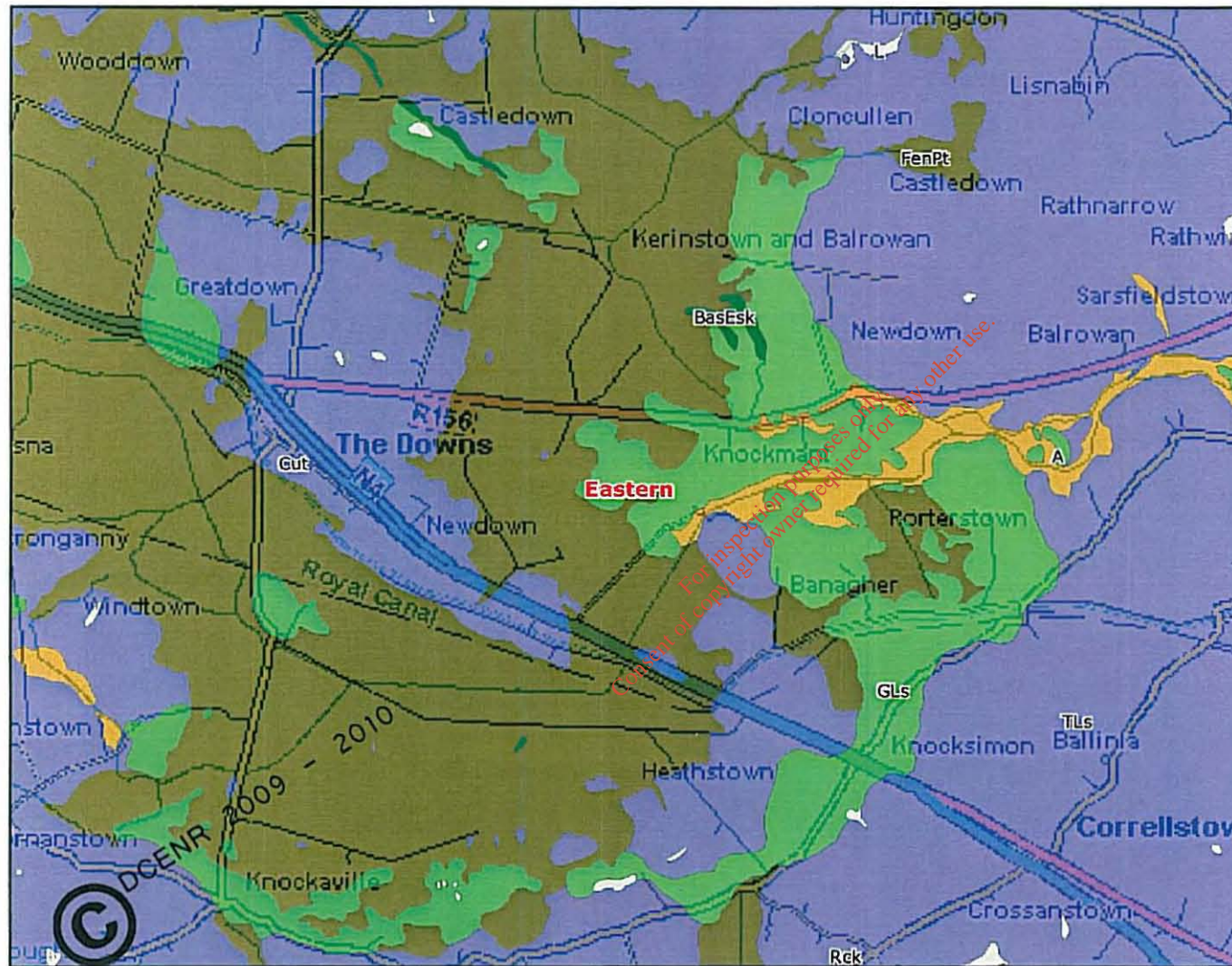
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Snapshot Date: 16-Mar-2011



# 111\_001\_Teagasc Subsoils (Peat)



- ### Legend
- RBD Subsoils**
- Alluvium
  - Beach sands and gravels
  - Bedrock outcrop and subcrop
  - Esker sands and gravels
  - Glaciofluvial sands and gravels
  - Lake sediments
  - Made ground
  - Marine/estuarine silts and clays
  - Marsh
  - Peat
  - Scree
  - Till derived chiefly from Devonian sandstones
  - Till derived chiefly from Lower Palaeozoic rocks
  - Till derived chiefly from Namurian rocks
  - Till derived chiefly from granites
  - Till derived chiefly from limestone
  - Till derived chiefly from metamorphic rocks
  - Till derived from metamorphic rocks
  - Till derived from mixed Devonian and Carboniferous rocks
  - Water
  - Windblown sands
  - RBD Boundaries

0 1000 2000 3000 m.

Map center: 252399, 250530

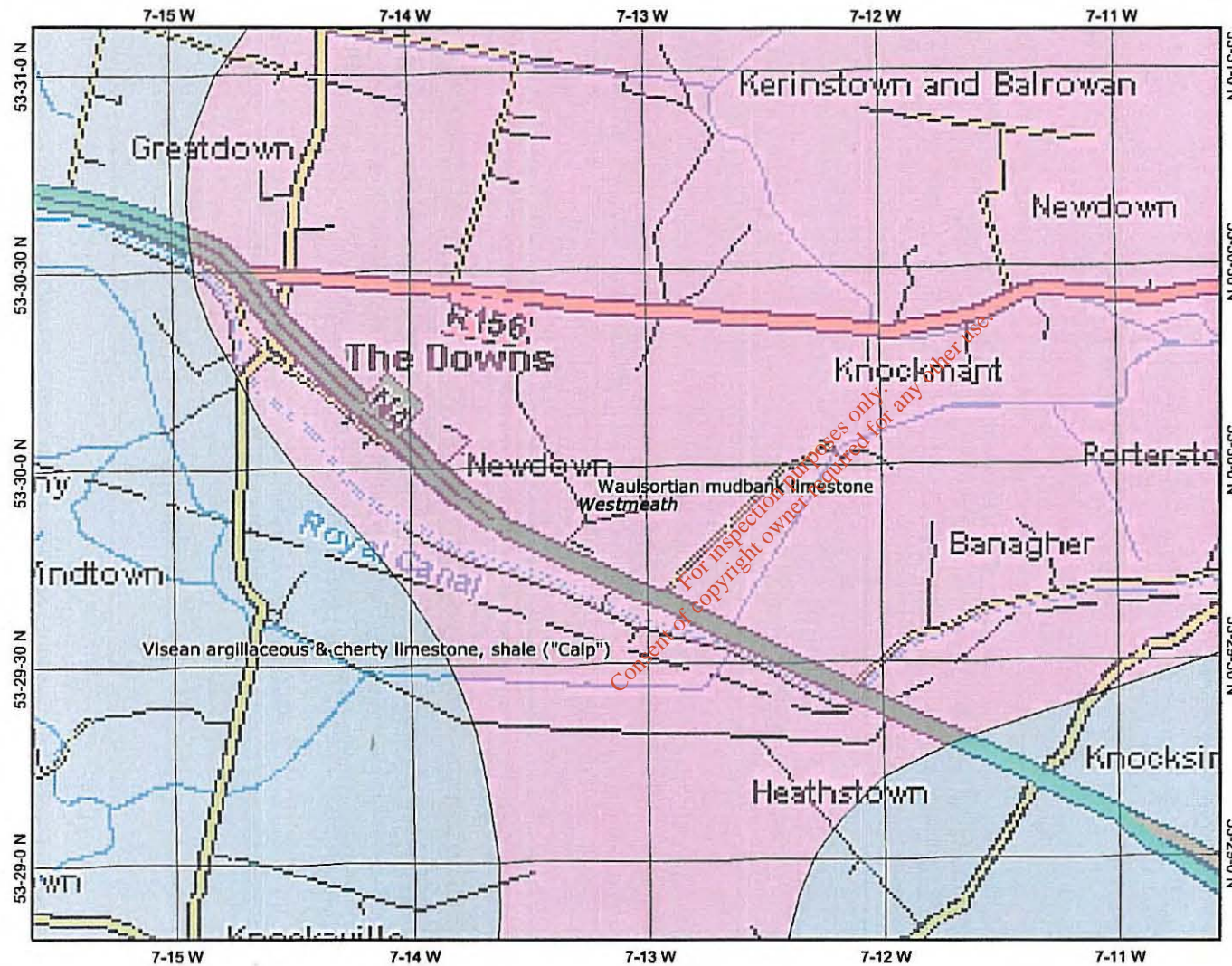


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Snapshot Date: 16-Mar-2011

# 111\_001\_Bedrock\_1\_1 Million Solid Geology



## Legend

### Bedrock Geology 1:1 Million

- Appin Group, Dalradian, schist, marble, quartzite
- Argyll Group, Dalradian, schist, marble, quartzite, amphibolite
- Cambrian greywacke, slate, quartzite
- Carboniferous volcanic rocks
- Cretaceous chalk, flint, glauconitic sandstone
- Devonian volcanic rocks
- Grampian Group, Dalradian, schist
- Jurassic mudstone & limestone
- Lower-Middle Ordovician slate, sandstone, greywacke, conglomerate
- Lower-Middle Ordovician volcanic rocks
- Mesoproterozoic gneiss
- Meta-dolerite, meta-gabbro
- Mid. Devonian ORS, sandstone, siltstone & mudstone
- Middle-Upper Ordovician slate, sandstone, greywacke, conglomerate
- Middle-Upper Ordovician volcanic rocks
- Moffat Shale - facies shale & greywacke (Ordovician-Silurian)
- Namurian shale, sandstone, siltstone & coal
- Neoproterozoic schist and gneiss
- Oligocene clay, sand & lignite
- Ordovician granitic rocks
- Ordovician metagabbro & orthogneiss suite (Coni.....)
- Palaeocene columnar tholeiitic basalt lava
- Palaeocene laterite, bauxite & lithomarge
- Palaeocene olivine basalt lava (Lower Basalt Fm.)
- Palaeocene olivine basalt lava (Upper Basalt Fm.)

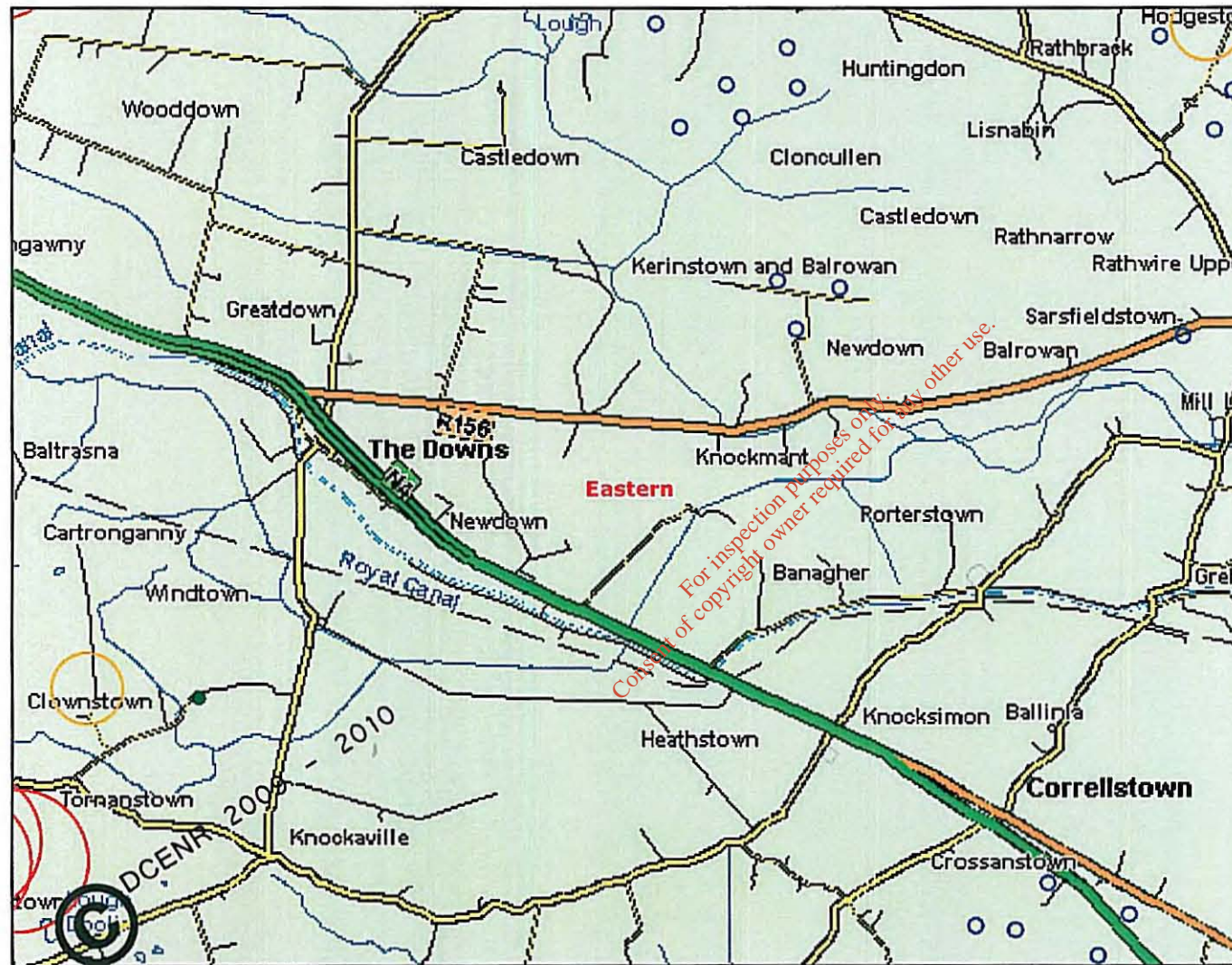
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# 111\_001\_Groundwater Well Data



**Legend**

- Wells Accuracy within 10m to 50m
- Wells Accuracy within 100m
- Wells Accuracy within 200m
- Wells Accuracy within 500m
- Wells Accuracy within 1km
- RBD Boundaries



Map center: 252399, 250530

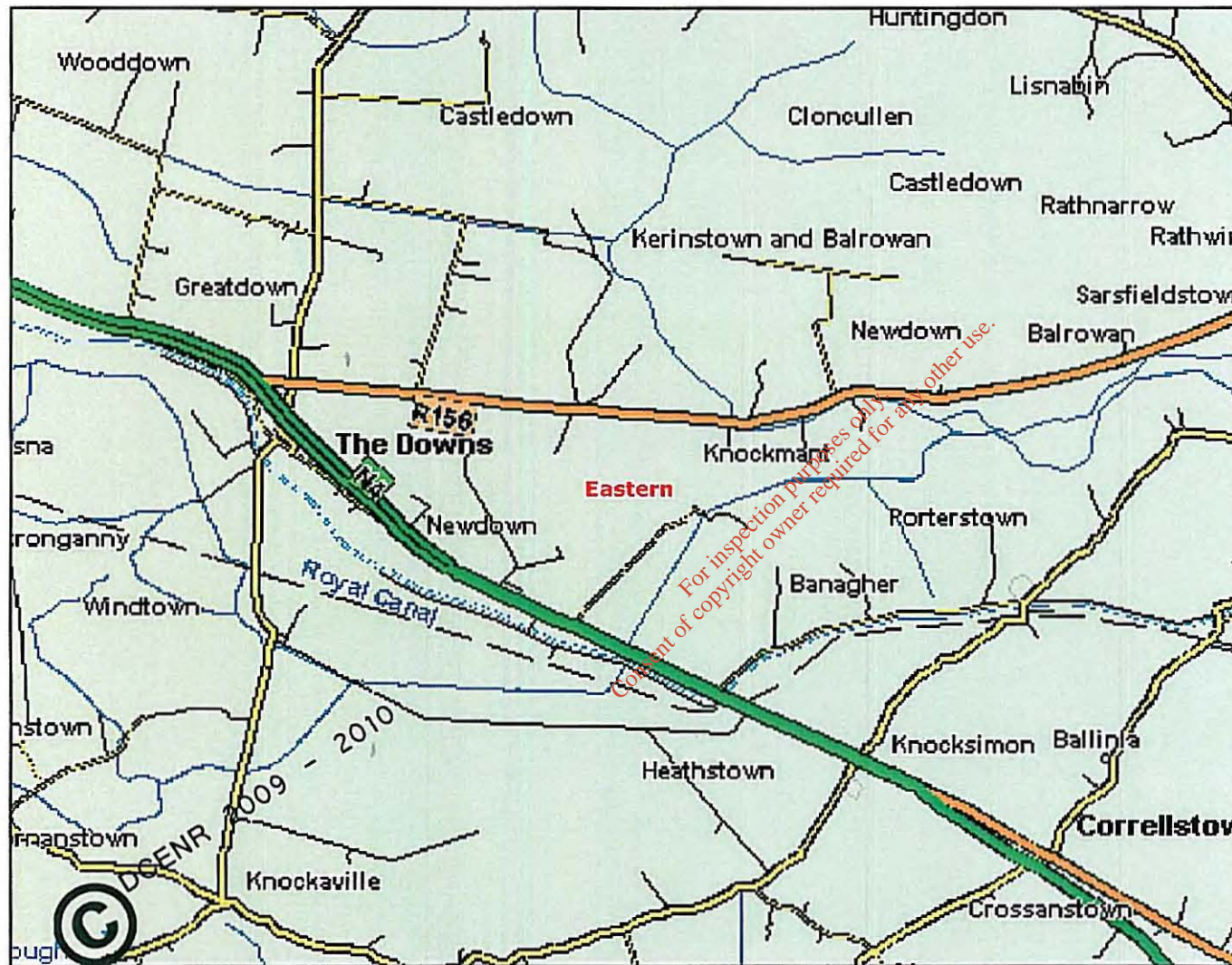
Scale: 1:45,000

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Snapshot Date: 16-Mar-2011



# 111\_001\_Source Protection Area



**Legend**

- Source Protection Area
- SI - Inner Protection Area
- SO - Outer Protection Area
- RBD Boundaries

Scale: 1:40,000

0 1000 2000 3000 m.

Map center: 252399, 250530

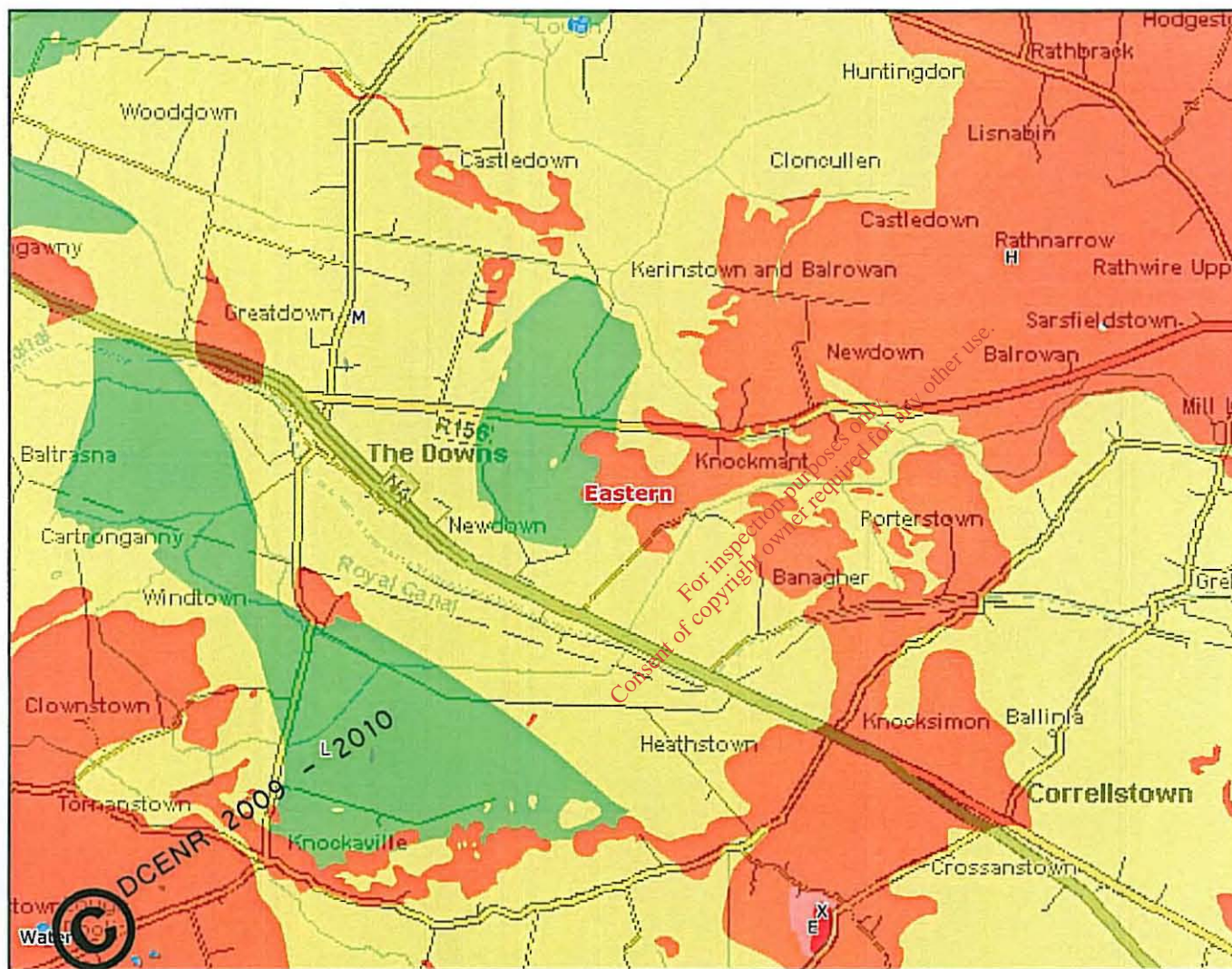
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Snapshot Date: 16-Mar-2011





# 111\_001\_Eastern Interim Vulnerability



**Legend**

Interim Vulnerability

- E (Rock near Surface or Karst)
- E - Extreme
- H - High
- M - Moderate
- L - Low
- HL - High to Low. Only an interim study took place.
- Water
- RBD Boundaries



Map center: 252399, 250530



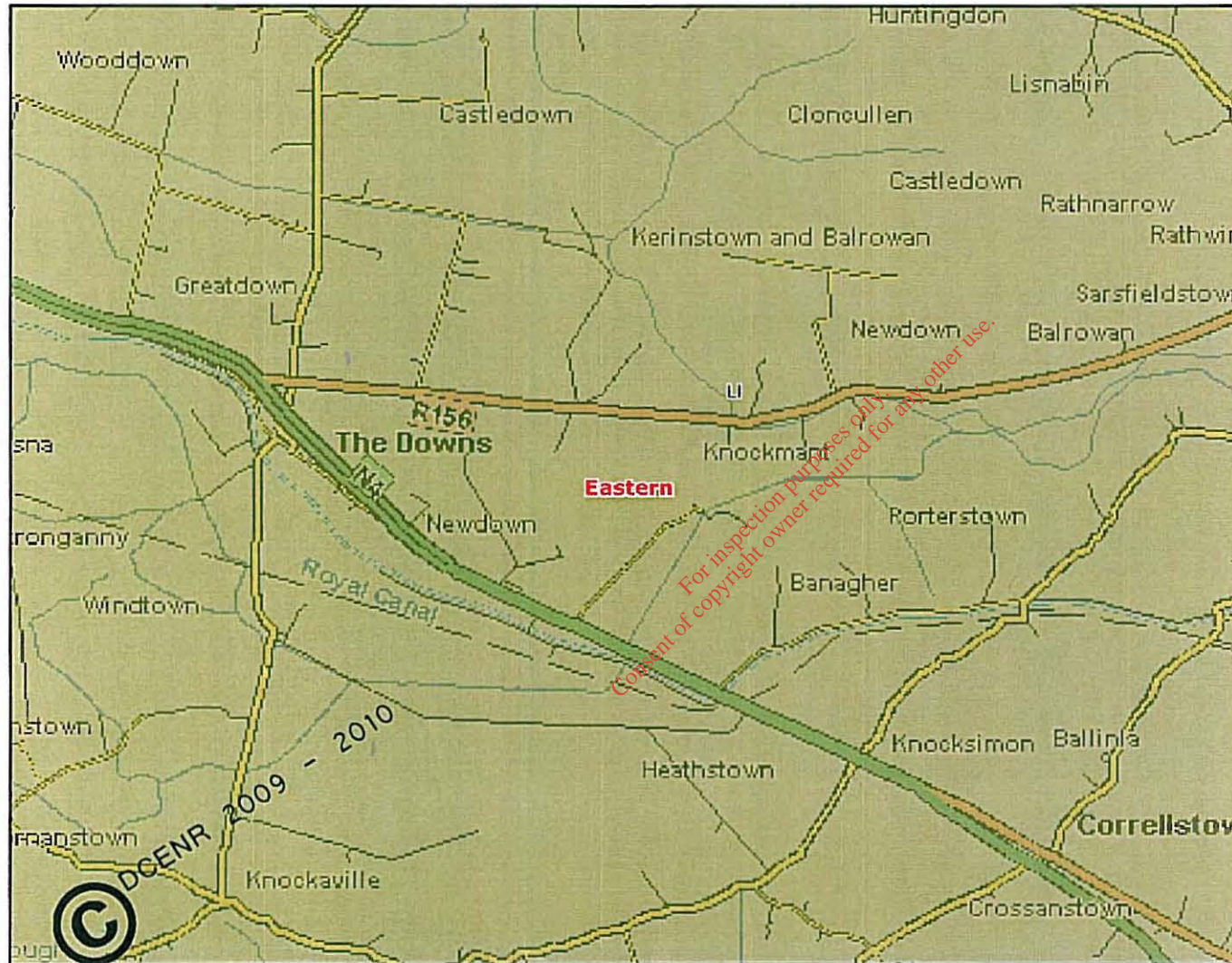
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Snapshot Date: 16-Mar-2011



# 111\_001\_National Draft Bedrock Aquifer Map (LI)



- Legend**
- National Draft Bedrock Aquifer Map
- Rf - Regionally Important Aquifer - Fractured bedrock
  - Rk - Regionally Important Aquifer - Karstified
  - Rkd - Regionally Important Aquifer - Karstified (diffuse)
  - Rkc - Regionally Important Aquifer - Karstified (conduit)
  - Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
  - Lk - Locally Important Aquifer - Karstified
  - LI - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
  - PI - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
  - Pu - Poor Aquifer - Bedrock which is Generally Unproductive
  - Unclassified
  - RBD Boundaries



Map center: 252399, 250530



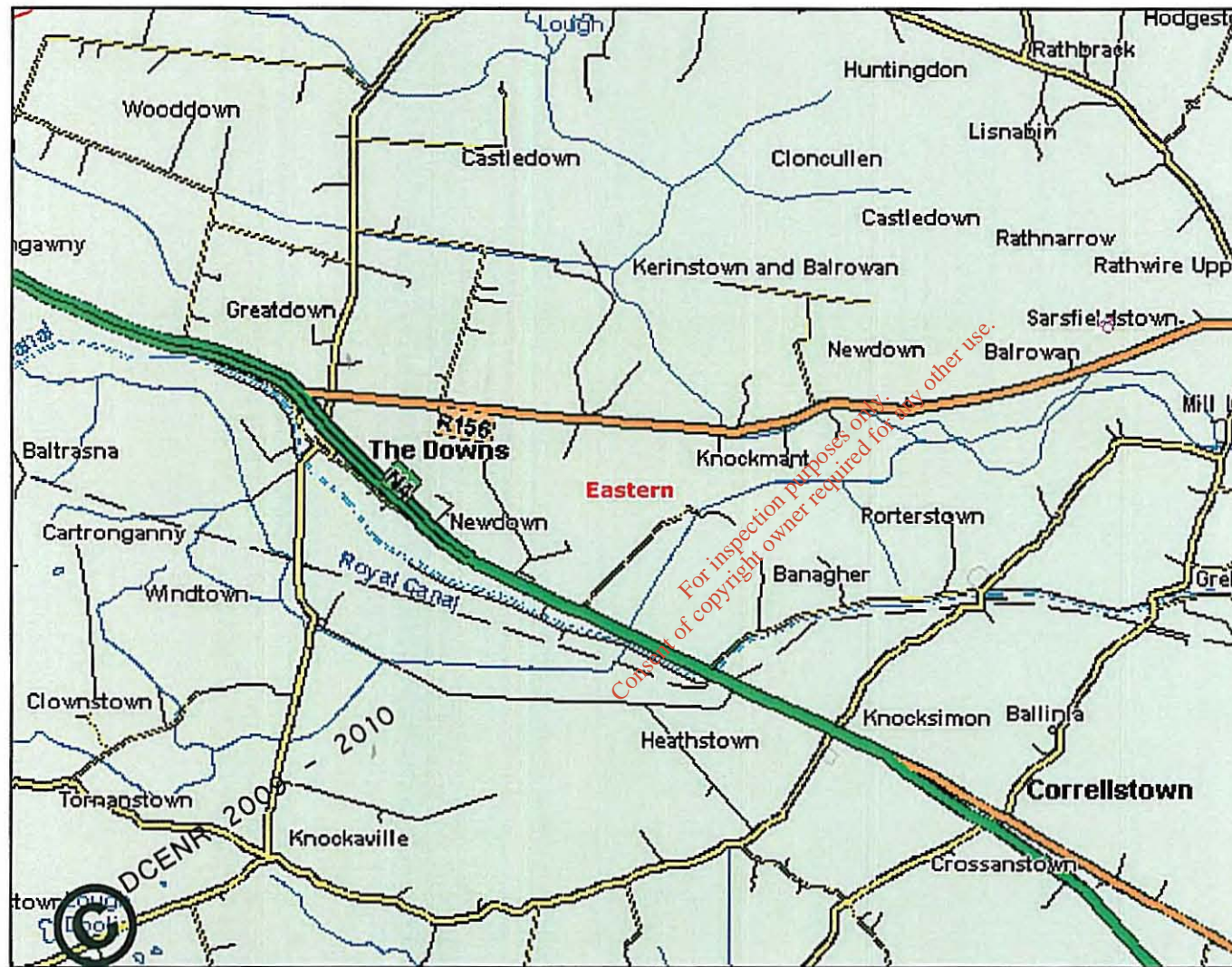
Scale: 1:40,000

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Snapshot Date: 16-Mar-2011



# 111\_001\_Karst Features



**Legend**

**Karst Features**

- Borehole
- Cave
- Dry Valley
- Enclosed Depression
- Estoville
- Spring
- Superficial Solution Features
- Swallow Hole
- Turlough
- RBD Boundaries

Scale: 1:45,000



Map center: 252399, 250530

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Snapshot Date: 16-Mar-2011

## SOILS MAP





## LEGEND

- BminDW - Grey Brown Podzolics  
Brown Earths, Basic**
  
- Cut - Raised Bog  
cutaway/cutover**

## SUB SOILS MAP



## LEGEND

-  **Cut - Cutover peat**
-  **TLs - Limestone till  
Carboniferous**

RIVER CATCHMENT



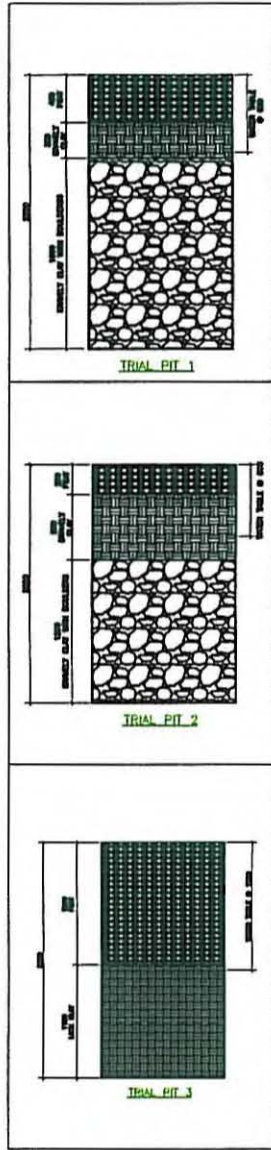
HYDROMETRIC AREA



RIVER BASIN DISTRICT

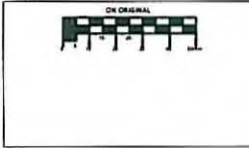






GROUNDWATER VULNERABILITY TRIAL PIT LOCATIONS

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			MOC	

CLIENT:	BIO AGRIGAS LTD		
PROJECT:	PROPOSED BIOENERGY FACILITY AT THE DOWNS, MULLINGAR CO. WESTMEATH		
TITLE:	TRIAL PIT LOCATIONS		
DRAWN:	CHECKED:	APPROVED:	DRAWING NO.:
MOC			111_001_802
DATE:	SCALE:		REV:
15/11/11			D1

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## Appendix F

Traffic Generation Information  
Junction Capacity  
Traffic Flow Diagrams  
Traffic Survey Information

Traffic Generation Data for Anerobic Digestion Power Generation Facility		
<b>Maximum 20,000 Tonnes of Organic Feedstock required per Annum</b>		
Assumptions based on information from Applicant		
<p>Delivery of Material Via 20 tonne Roll on Roll off Skip trucks.  Deliveries over a period of 5.5 days a week, 50 weeks a year (Maximum).  Operation of Facility to be over 24 hours a day, 365 days a year.  Facility to be operated by approximate 10 staff over three shifts.</p> <p>(10,000 Tonnes to be sourced locally.  This material to be pumped overland.)</p>		
Above information implies the following:		
Facility to take deliveries 275 days over the year. 3 Staff over three shifts (08:00-18:00 - 18:00-02:00- 02:00-10:00)		
Assuming Baseline Data obtained by applicant	Arrivals	Departures
Truck Deliveries		
Maximum demand (10,000 tonnes) delivered with 20 tonne trucks 500 truck Deliveries per annum	500	500
Deliveries Per Day (Assuming 275 days of deliveries)	1.18 say 2	1.18 say 2
including 10% sensitivity loading on deliveries (Per Day) (All data rounded up)		3
Assuming Baseline Data obtained by applicant Staff Traffic Generation	Arrivals (Per Shift)	Departures (Per Shift)
Maximum 10 staff 3 staff per shift(1 staff per private vehicle)	3	3
Assuming additional traffic movements (Errands, Lunch, Etc)	3	3
Total Staff Movements per Shift	6	6
Ancillary Trips to and From the Site	Arrivals (Per Shift)	Departures (Per Shift)
Include Post, Visitors, Maintenance, etc	5	5
Total Traffic Generation for AD Facility as from first principles	Arrivals (Per Shift)	Departures (Per Shift)
Assume Maximum traffic during (08:00-18:00 shift) NB: No deliveries of waste materials anticipated during night time shifts.		
Delivery of Waste Material	3	3
Staff	6	6
Ancillary Trips	5	5
Total Traffic Generation per Shift	14	14
Total traffic generation per shift multiplied by a factor of 2 for total traffic generation over 24 hours.		
Total Traffic Generation per Day	24	24

Peak Times on Proposed R156 is between the hours of (08:00-09:00) and (17:00-18:00)		
	Arrivals	Departures
Deliveries shall be evenly distributed throughout the day Worst Case Scenario is to assume: 30% of trip rates between morning AM Peak 40% of trip rates throughout the remainder of the day 30% of trip rates between Evening PM Peak		
AM Peak Flow (@30% Daily total)	7.2 say 8 8	7.2 say 8 8
PM Peak Flow (@30% Daily total)	7.2 say 8 8	7.2 say 8 8
Of the total hourly trip rates 30% of total is large 20 Tonne Delivery Vehicles	3	3

Traffic Generation Data Summary	Arrivals	Departures
<b>AM Peak (08:00-09:00)</b>		
Cars and LGV's	5	5
HGV's	3	3
<b>PM Peak (17:00-18:00)</b>		
Cars and LGV's	5	5
HGV's	3	3

Traffic Generation Data for Anerobic Digestion Power Generation Facility
20,000 Tonnes of Digestate Material to be removed from site (Removal of material over a period of 7 months)
Assumptions based on information from Applicant
Removal of material via 10 tonne liquid tank trucks. Removed over a period of 5.5 days a week, approximately 30 weeks a year (over 7 month period).
Above information implies the following:
Removal of liquid material over 165 days per annum 20,000/10 tonnes= 2000 movements 2000/165 days= 13 daily removal trips 13x2= 26 two-way trips movements a day

Peak Hour Trips for Digestate Material		
Assume 30% AM and PM traffic distribution as previously assumed for worst case scenario.		
8 vehicles two-way movements per AM and PM Peak hour		
	Arrivals	Departures
AM Peak Hour	4	4
PM Peak Hour	4	4

Total Generated Traffic Summary		
Traffic Summary assuming 'Worst Case Scenario' including 7 month removal period.		
	Arrivals	Departures
<b>Total Daily Trip Rate</b>	<b>37</b>	<b>37</b>
<b>AM Peak (08:00-09:00)</b>		
Cars and LGV's	5	5
HGV's/ 20 Tonne/ 10 tonne trucks	7	7
<b>PM Peak (17:00-18:00)</b>		
Cars and LGV's	5	5
HGV's/ 20 Tonne/ 10 tonne trucks	7	7

<b>Junction Capacity for T-Junction on R156 to Proposed Development (Scenario 1)</b>			
<b>2013 Year of Opening AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Killucan (R156)	0.014	98.6	OK
to Proposed Development	0.021	97.9	OK
to N4 (R156)	0.014	98.6	OK
<b>2013 Year of Opening PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Killucan (R156)	0.014	98.6	OK
to Proposed Development	0.021	97.9	OK
to N4 (R156)	0.014	98.6	OK
<b>2018 Mid-Term Year AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Killucan (R156)	0.014	98.6	OK
to Proposed Development	0.021	97.9	OK
to N4 (R156)	0.014	98.6	OK
<b>2018 Mid-Term Year PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Killucan (R156)	0.014	98.6	OK
to Proposed Development	0.021	97.9	OK
to N4 (R156)	0.014	98.6	OK
<b>2028 Future Year AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Killucan (R156)	0.014	98.6	OK
to Proposed Development	0.022	97.8	OK
to N4 (R156)	0.014	98.6	OK
<b>2028 Future Year PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Killucan (R156)	0.014	98.6	OK
to Proposed Development	0.021	97.9	OK
to N4 (R156)	0.014	98.6	OK

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Junction Capacity for Proposed New Roundabout on R156 with Proposed Development (Scenario 2)			
2013 Year of Opening AM Peak	Maximum RFC Value	Reserve Capacity (%)	Status
to Killucan (R156)	0.132	86.8	OK
to Proposed Development and N4	0.084	91.6	OK
R156	0.027	97.3	OK
L5603	0.006	99.4	OK
2013 Year of Opening PM Peak	Maximum RFC Value	Reserve Capacity (%)	Status
to Killucan (R156)	0.079	92.1	OK
to Proposed Development and N4	0.136	86.4	OK
R156	0.017	98.3	OK
L5603	0.004	99.6	OK
2018 Mid-Term Year AM Peak	Maximum RFC Value	Reserve Capacity (%)	Status
to Killucan (R156)	0.140	86	OK
to Proposed Development and N4	0.089	91.1	OK
R156	0.029	97.1	OK
L5603	0.007	99.3	OK
2018 Mid-Term Year PM Peak	Maximum RFC Value	Reserve Capacity (%)	Status
to Killucan (R156)	0.084	91.6	OK
to Proposed Development and N4	0.144	85.6	OK
R156	0.018	98.3	OK
L5603	0.004	99.6	OK
2028 Future Year AM Peak	Maximum RFC Value	Reserve Capacity (%)	Status
to Killucan (R156)	0.152	84.8	OK
to Proposed Development and N4	0.098	90.2	OK
R156	0.031	96.9	OK
L5603	0.008	99.2	OK
2028 Future Year PM Peak	Maximum RFC Value	Reserve Capacity (%)	Status
to Killucan (R156)	0.092	90.8	OK
to Proposed Development and N4	0.157	84.3	OK
R156	0.020	98.0	OK
L5603	0.004	99.6	OK

Junction Capacity for Proposed T-Junction from Proposed Development to New N4 Grade Separate (Scenario 2)			
<b>2013 Year of Opening AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Proposed New Roundabout (R156)	0.013	98.7	OK
to Proposed Development	0.021	97.9	OK
to N4	0.013	98.7	OK
<b>2013 Year of Opening PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Proposed New Roundabout (R156)	0.013	98.7	OK
to Proposed Development	0.021	97.9	OK
to N4	0.013	98.7	OK
<b>2018 Mid-Term Year AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Proposed New Roundabout (R156)	0.013	98.7	OK
to Proposed Development	0.021	97.9	OK
to N4	0.013	98.7	OK
<b>2018 Mid-Term Year PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Proposed New Roundabout (R156)	0.013	98.7	OK
to Proposed Development	0.021	97.9	OK
to N4	0.013	98.7	OK
<b>2028 Future Year AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Proposed New Roundabout (R156)	0.013	98.7	OK
to Proposed Development	0.022	97.8	OK
to N4	0.013	98.7	OK
<b>2028 Future Year PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Proposed New Roundabout (R156)	0.013	98.7	OK
to Proposed Development	0.021	97.9	OK
to N4	0.013	98.7	OK

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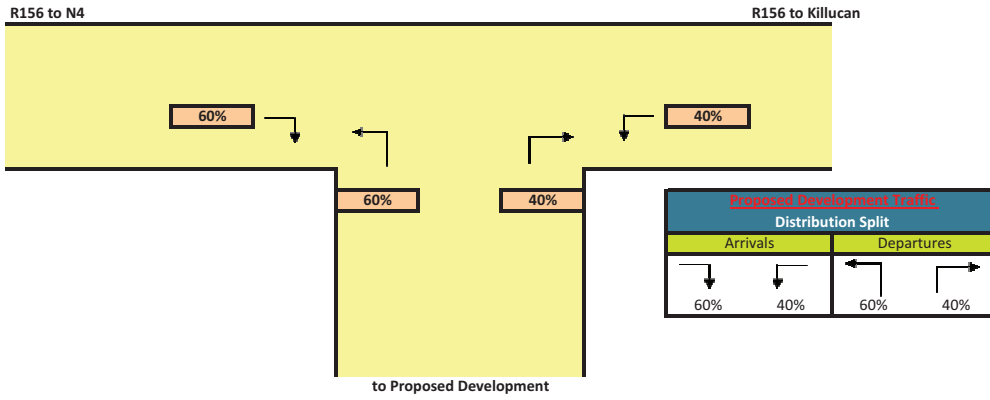
Junction Capacity for Roundabout on New N4 Grade Separate with Proposed Development (Scenario 2)			
<b>2013 Year of Opening AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.012	98.8	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.012	98.8	OK
N4 Off Ramp	0.072	92.8	OK
to R156/Proposed Development	0.114	88.6	OK
<b>2013 Year of Opening PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.018	98.2	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.011	98.9	OK
N4 Off Ramp	0.124	87.6	OK
to R156/Proposed Development	0.069	93.1	OK
<b>2018 Mid-Term Year AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.009	99.1	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.012	98.8	OK
N4 Off Ramp	0.076	92.4	OK
to R156/Proposed Development	0.120	88	OK
<b>2018 Mid-Term Year PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.018	98.2	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.012	98.8	OK
N4 Off Ramp	0.131	86.9	OK
to R156/Proposed Development	0.073	92.7	OK
<b>2028 Future Year AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.010	99	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.013	98.7	OK
N4 Off Ramp	0.082	91.8	OK
to R156/Proposed Development	0.131	86.9	OK
<b>2028 Future Year PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.018	98.2	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.013	98.7	OK
N4 Off Ramp	0.142	85.8	OK
to R156/Proposed Development	0.080	92	OK



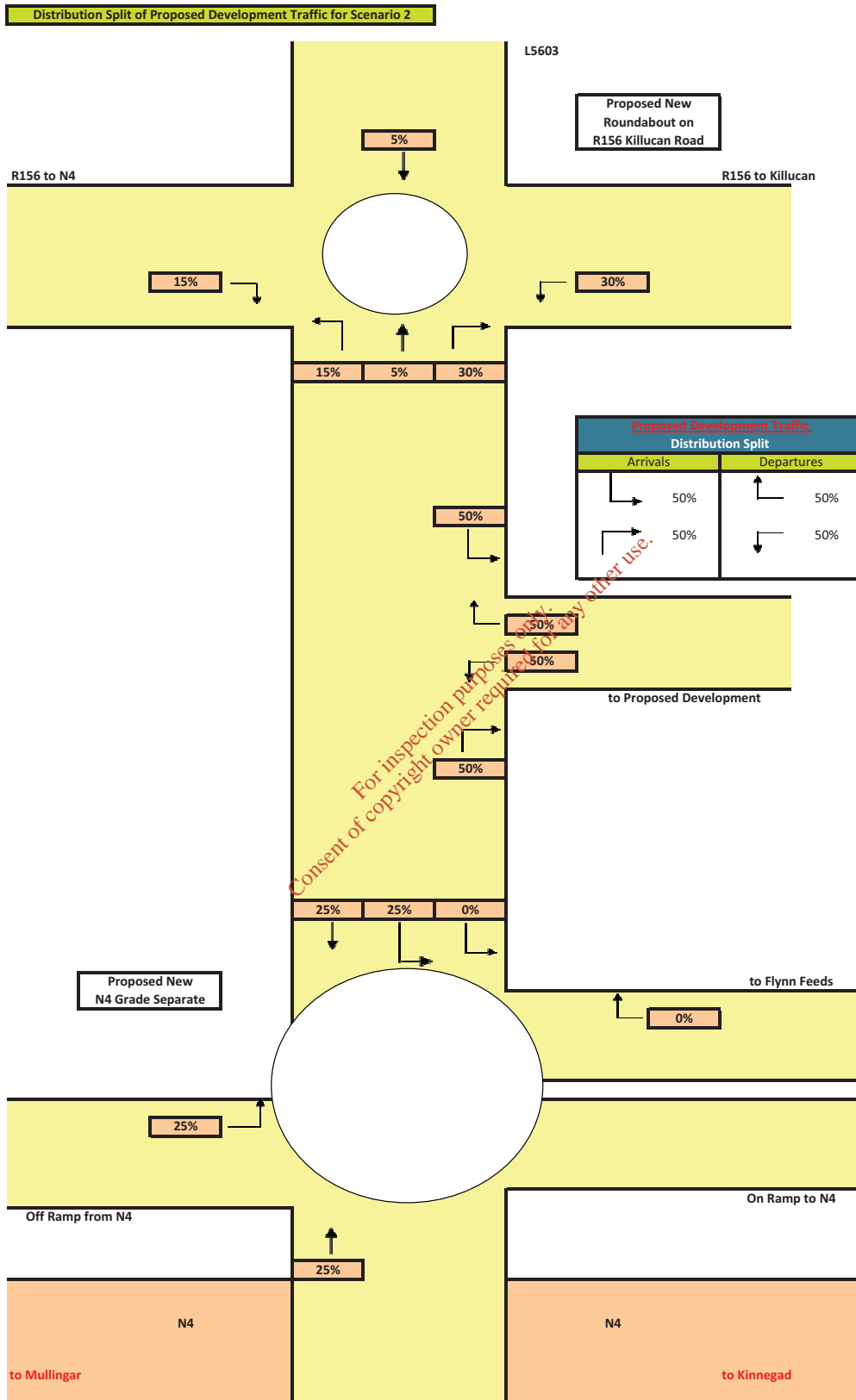
Junction Capacity for Proposed New Roundabout on R156 with No Development (Scenario 3)			
	Maximum RFC Value	Reserve Capacity (%)	Status
<b>2013 Year of Opening AM Peak</b>			
to Killucan (R156)	0.128	87.2	OK
to Proposed Development and N4	0.080	92.0	OK
R156	0.027	97.3	OK
L5603	0.006	99.4	OK
<b>2013 Year of Opening PM Peak</b>			
to Killucan (R156)	0.076	92.4	OK
to Proposed Development and N4	0.132	86.8	OK
R156	0.016	98.4	OK
L5603	0.004	99.6	OK
<b>2018 Mid-Term Year AM Peak</b>			
to Killucan (R156)	0.136	86.4	OK
to Proposed Development and N4	0.085	91.5	OK
R156	0.028	97.2	OK
L5603	0.007	99.3	OK
<b>2018 Mid-Term Year PM Peak</b>			
to Killucan (R156)	0.080	92.0	OK
to Proposed Development and N4	0.140	86.0	OK
R156	0.017	98.3	OK
L5603	0.004	99.6	OK
<b>2028 Future Year AM Peak</b>			
to Killucan (R156)	0.148	85.2	OK
to Proposed Development and N4	0.094	90.6	OK
R156	0.030	97.0	OK
L5603	0.008	99.2	OK
<b>2028 Future Year PM Peak</b>			
to Killucan (R156)	0.088	91.2	OK
to Proposed Development and N4	0.153	84.7	OK
R156	0.018	98.2	OK
L5603	0.004	99.6	OK

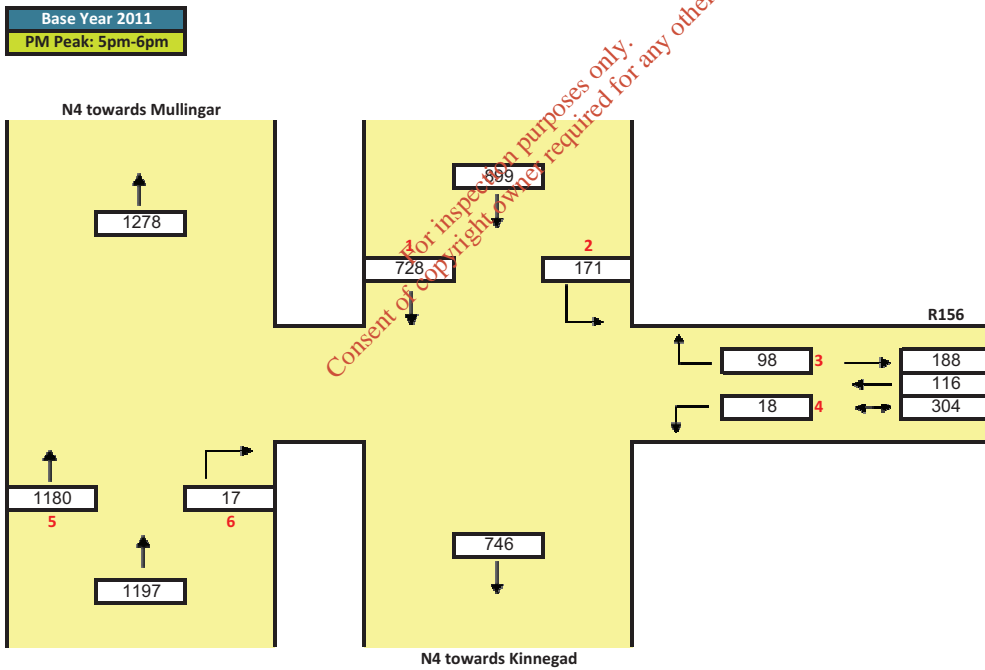
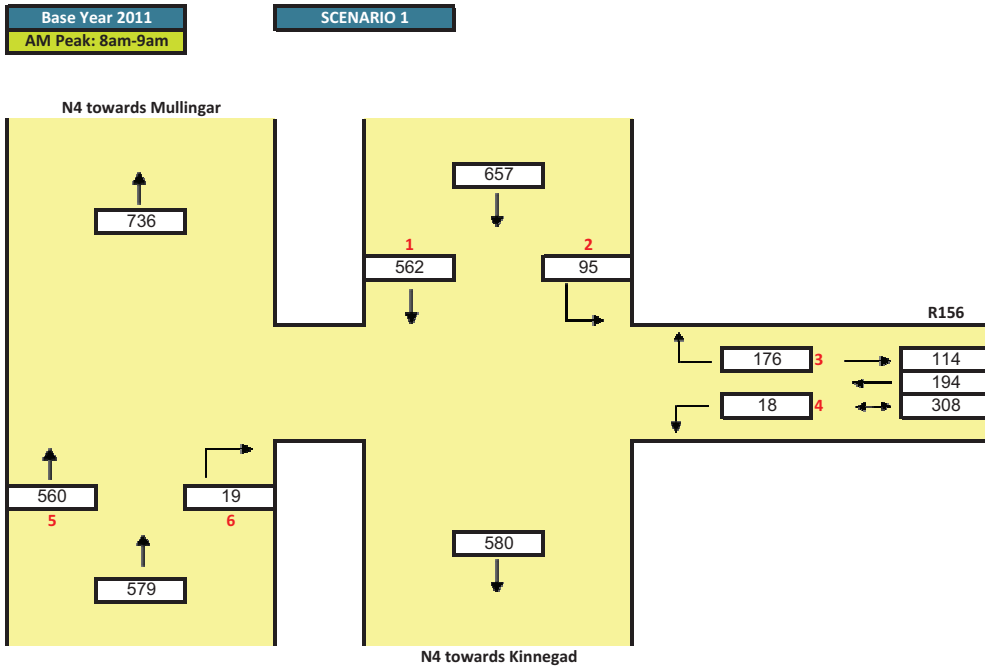
Junction Capacity for Roundabout on New N4 Grade Separate with No Development (Scenario 3)			
<b>2013 Year of Opening AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.009	99.1	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.010	99	OK
N4 Off Ramp	0.070	93	OK
to R156/Proposed Development	0.110	89	OK
<b>2013 Year of Opening PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.018	98.2	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.010	99	OK
N4 Off Ramp	0.122	87.8	OK
to R156/Proposed Development	0.066	93.4	OK
<b>2018 Mid-Term Year AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.009	99.1	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.011	98.9	OK
N4 Off Ramp	0.074	92.6	OK
to R156/Proposed Development	0.117	88.3	OK
<b>2018 Mid-Term Year PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.018	98.2	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.010	99	OK
N4 Off Ramp	0.129	87.1	OK
to R156/Proposed Development	0.069	93.1	OK
<b>2028 Future Year AM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.010	99	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.012	98.8	OK
N4 Off Ramp	0.080	92	OK
to R156/Proposed Development	0.128	87.2	OK
<b>2028 Future Year PM Peak</b>	<b>Maximum RFC Value</b>	<b>Reserve Capacity (%)</b>	<b>Status</b>
to Flynn Feeds	0.018	98.2	OK
N4 On Ramp	-	-	OK
to N4 On Ramp towards Mullingar	0.011	98.9	OK
N4 Off Ramp	0.140	86	OK
to R156/Proposed Development	0.077	92.3	OK

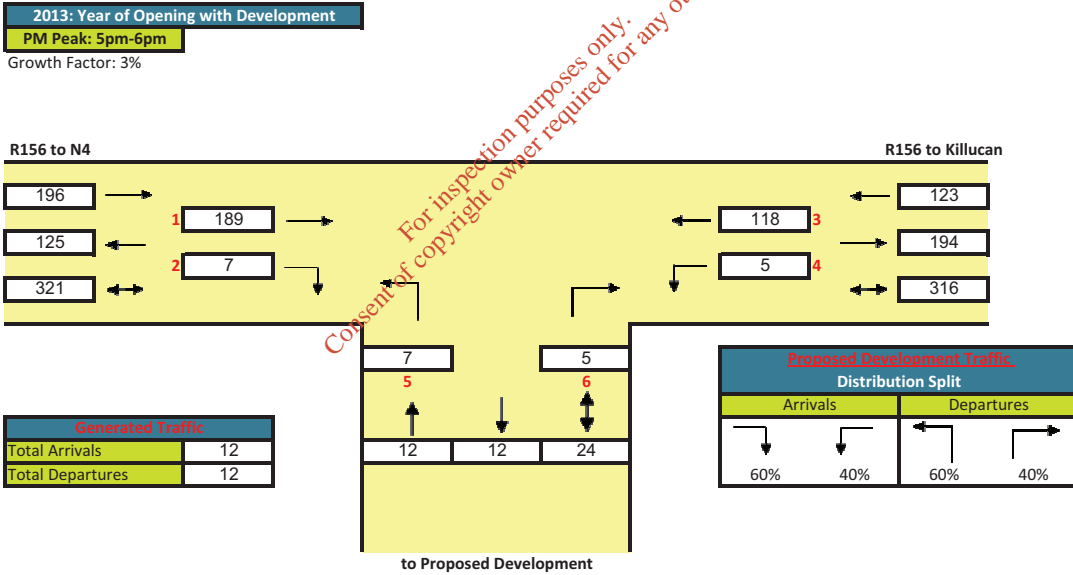
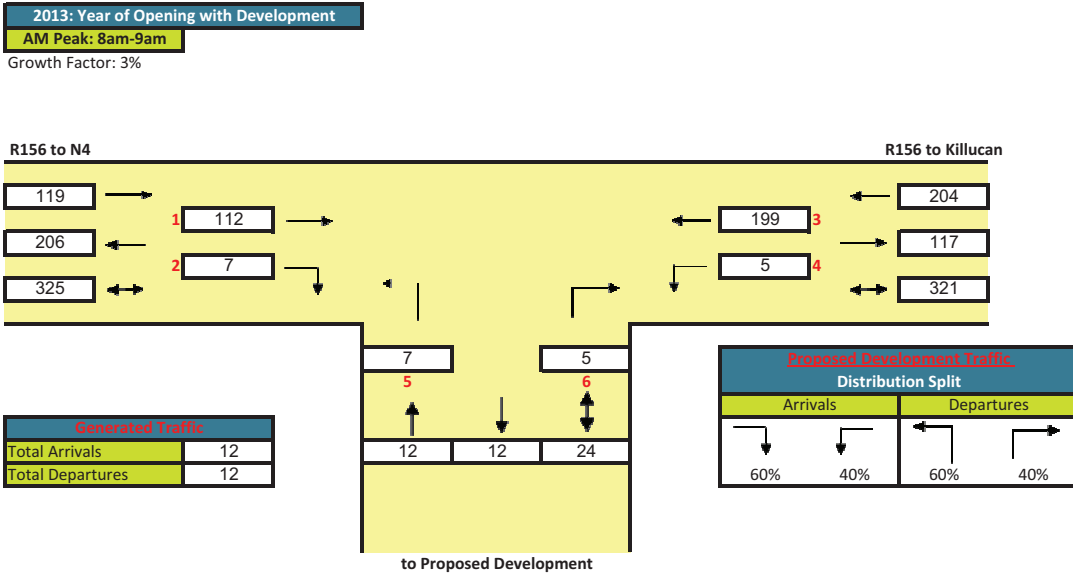
**Distribution Split of Proposed Development Traffic for Scenario 1**



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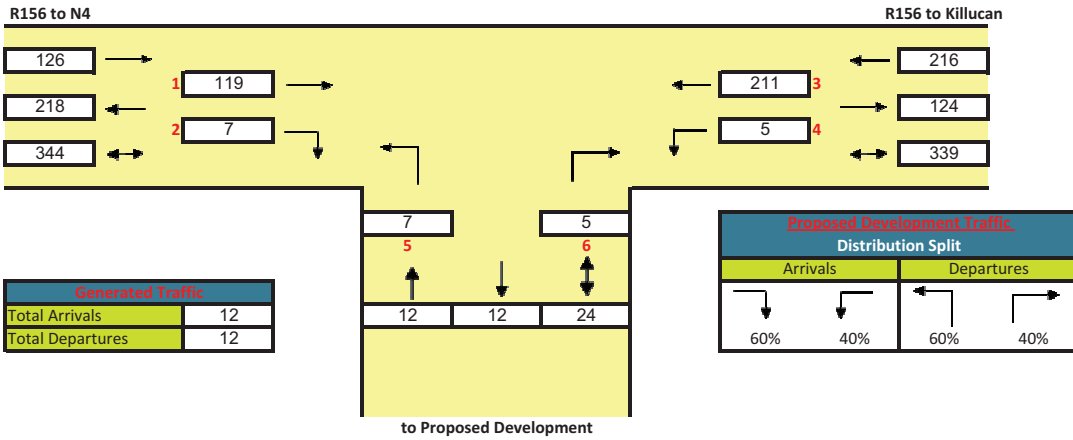




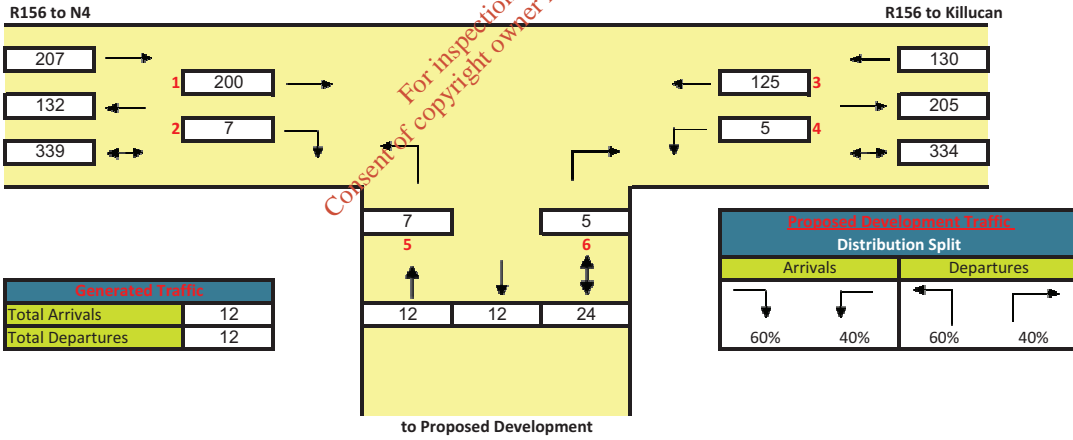


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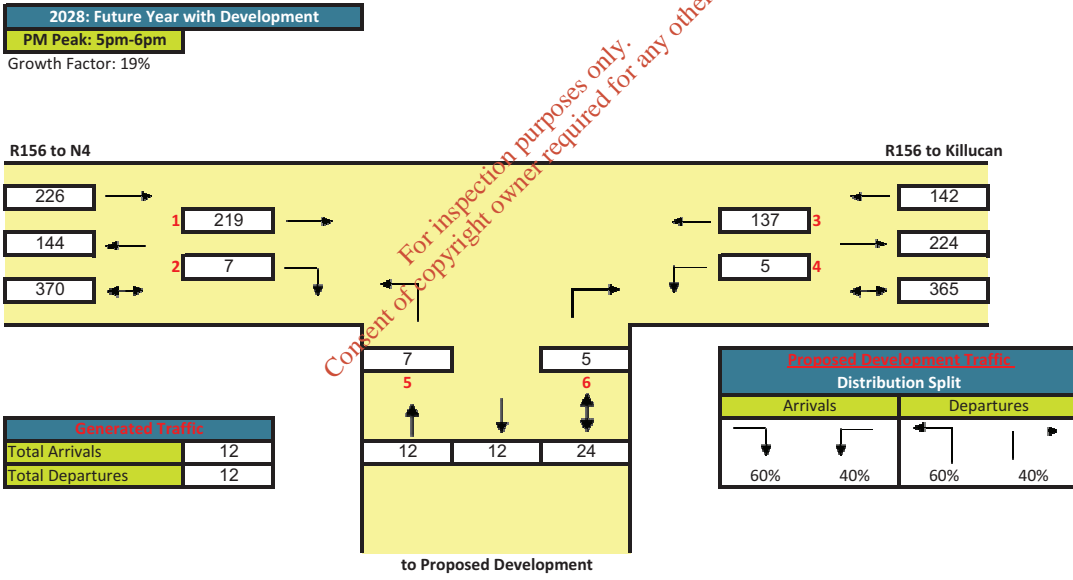
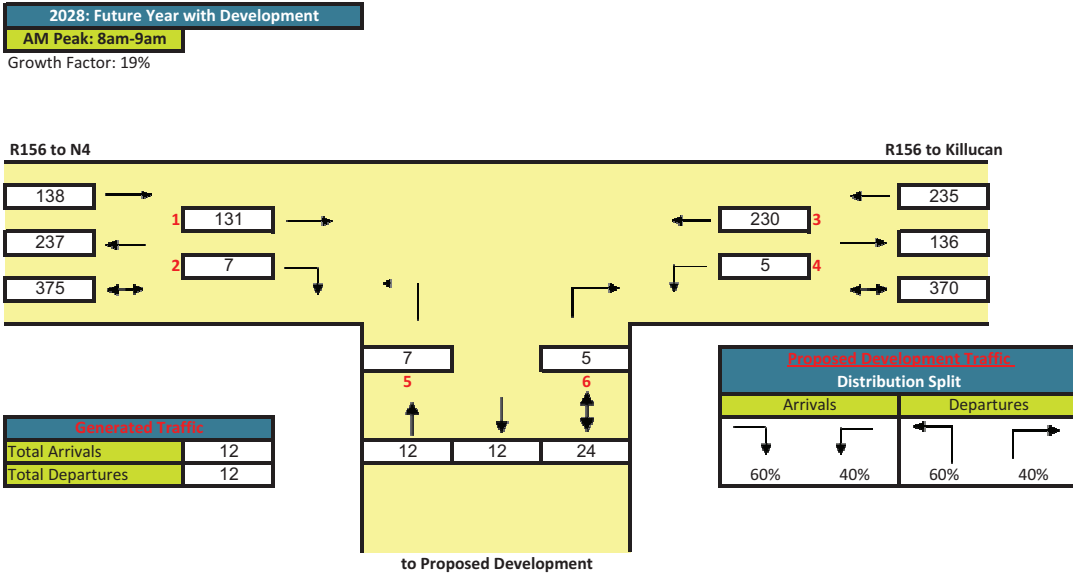
**2018: Mid-Term Year with Development**  
**AM Peak: 8am-9am**  
Growth Factor: 9%



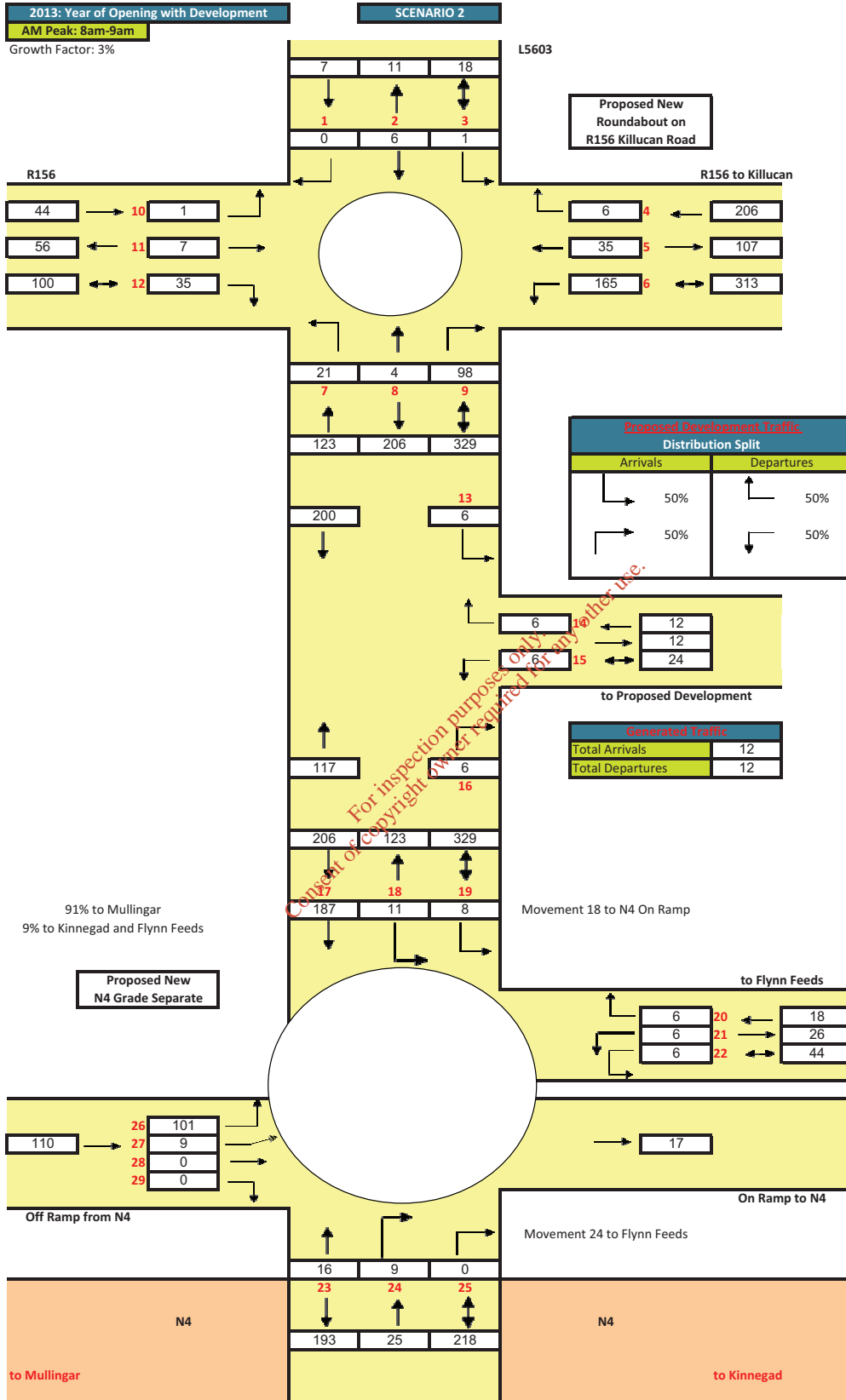
**2018: Mid-Term Year with Development**  
**PM Peak: 5pm-6pm**  
Growth Factor: 9%

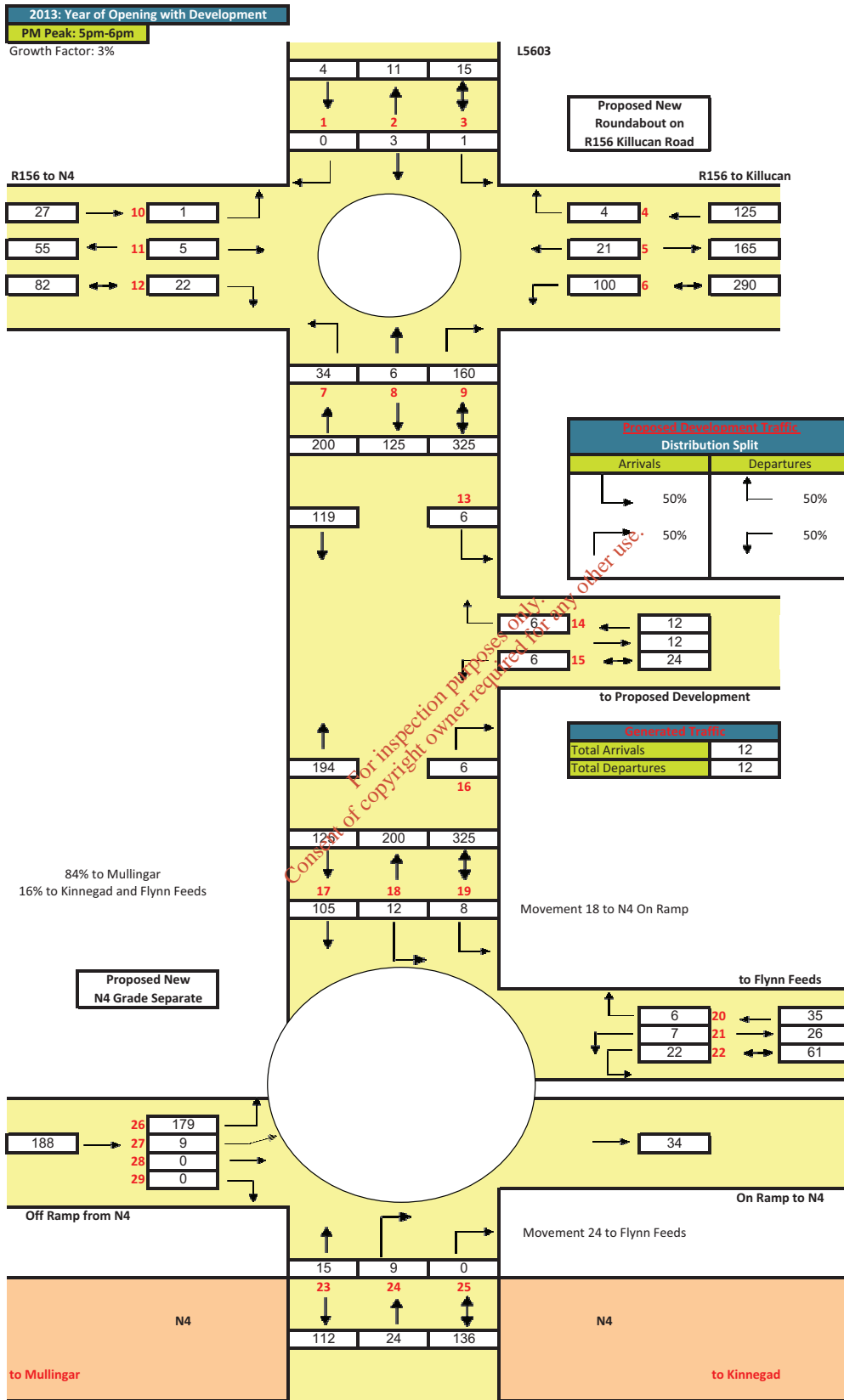


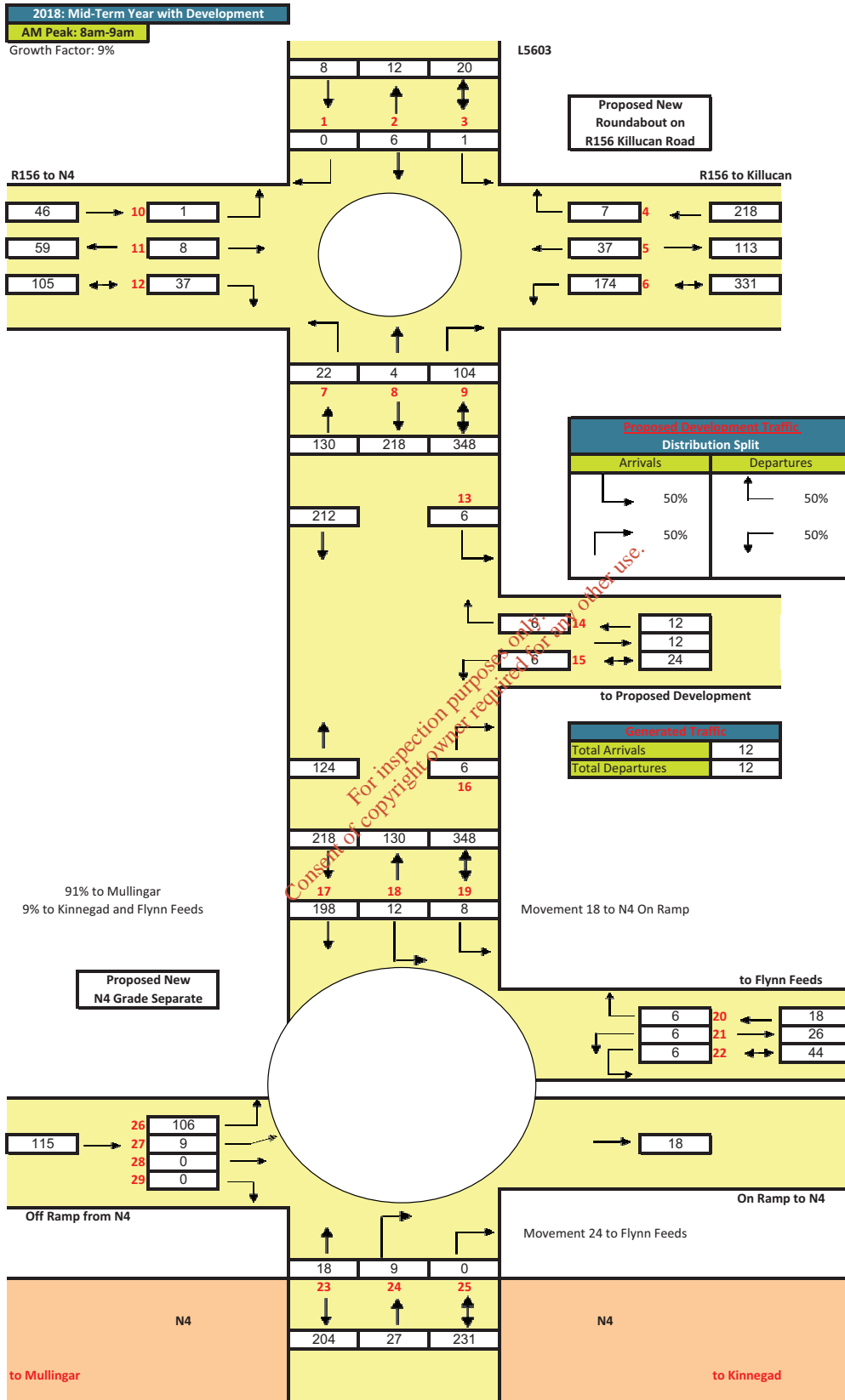
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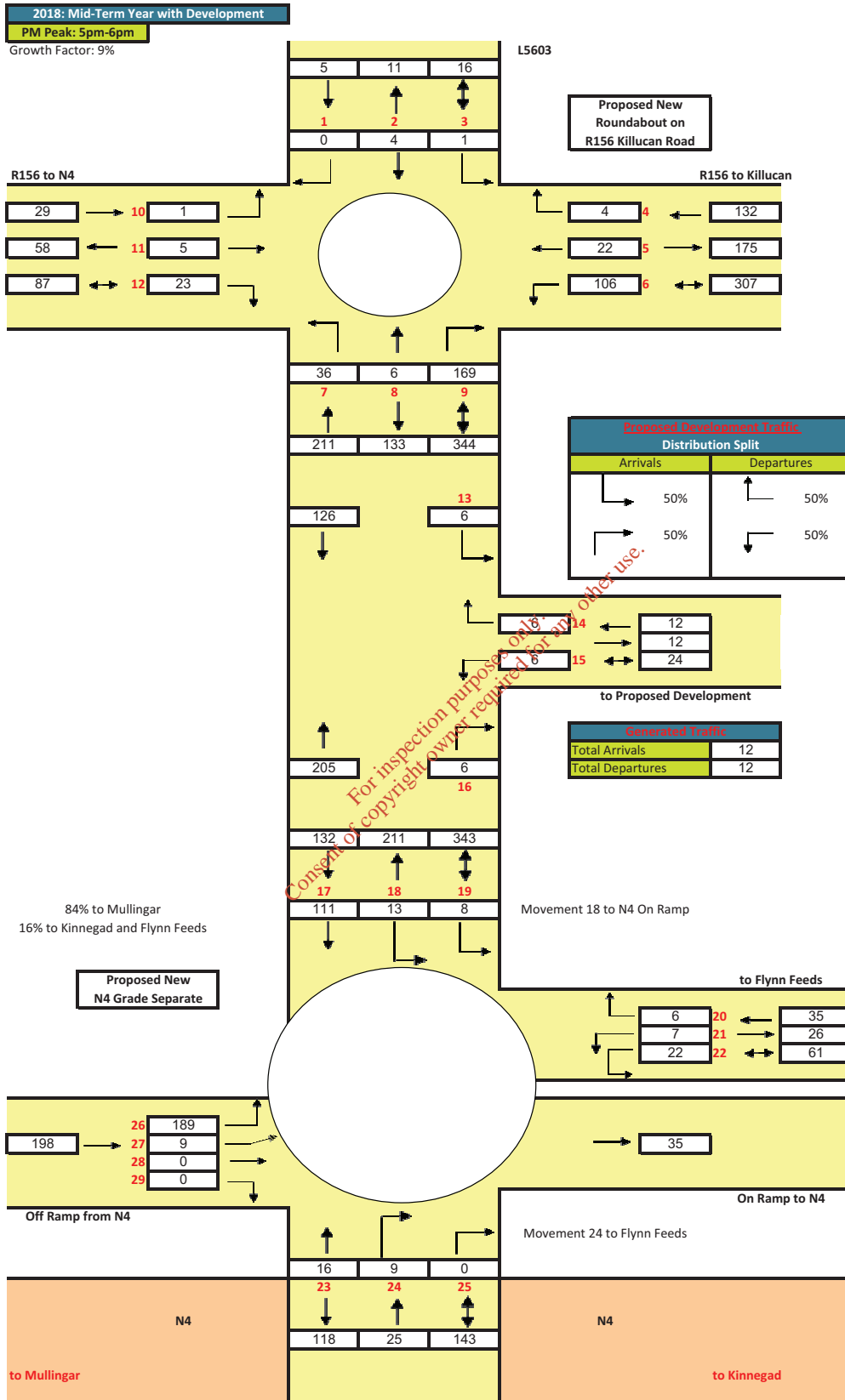


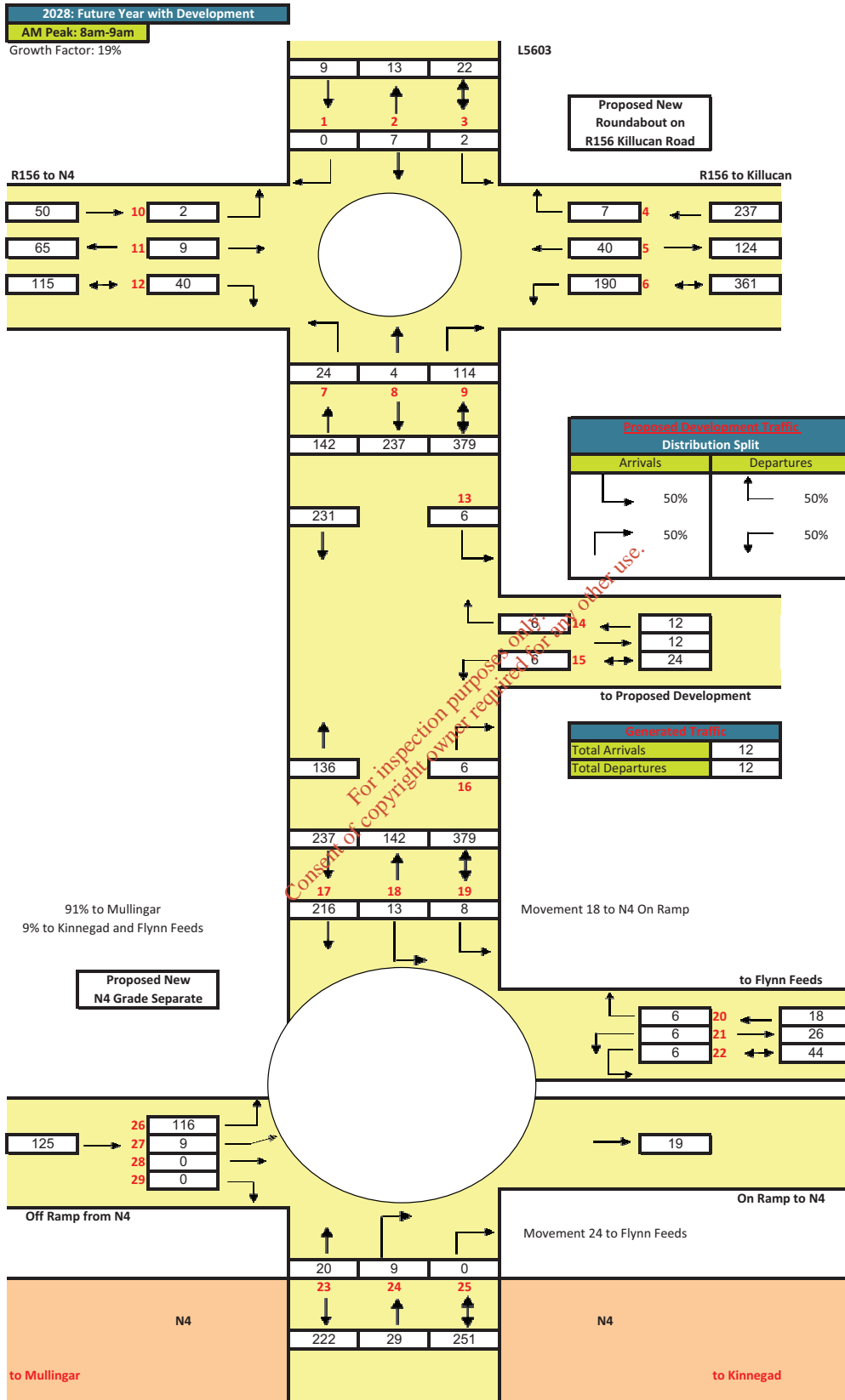


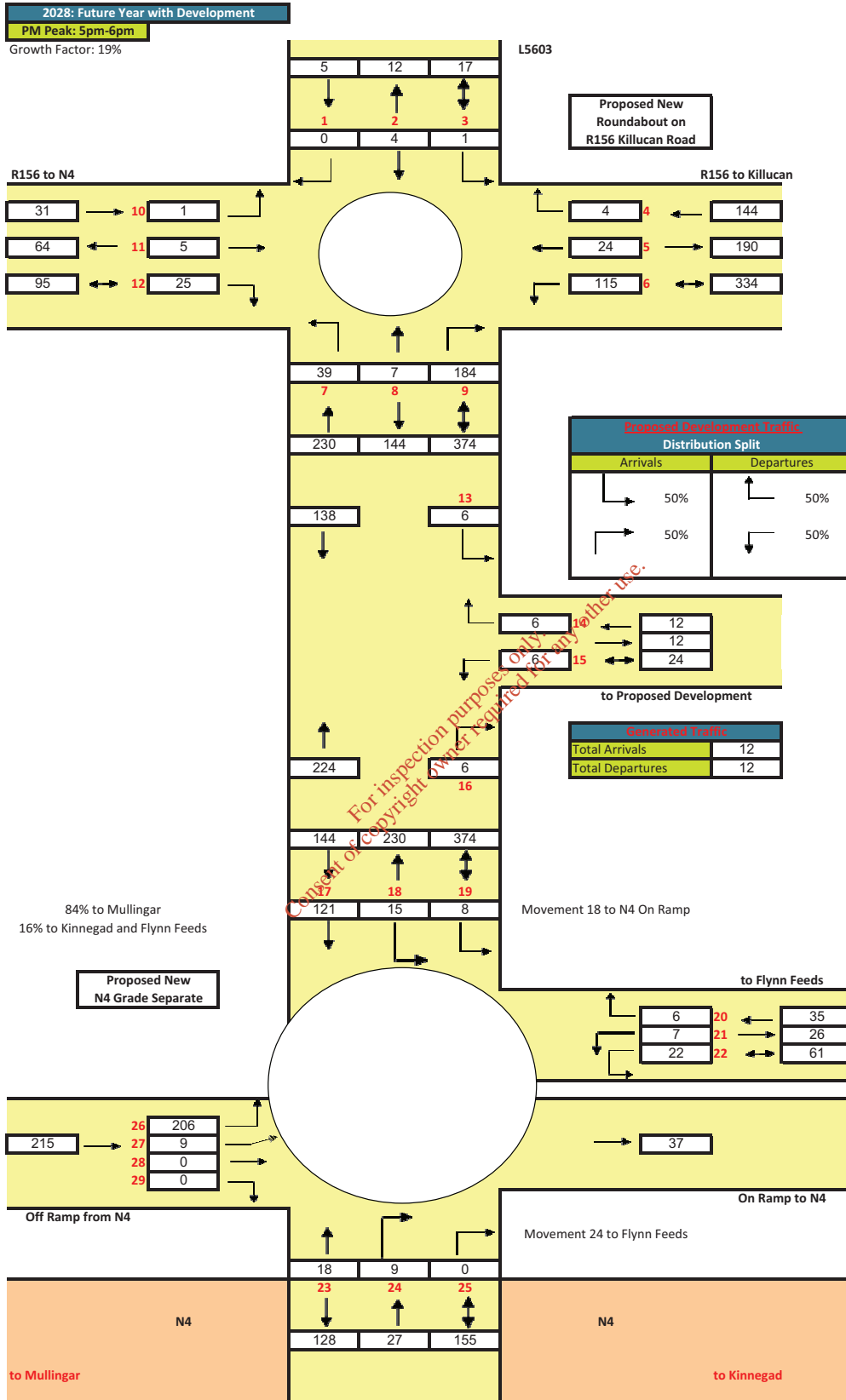


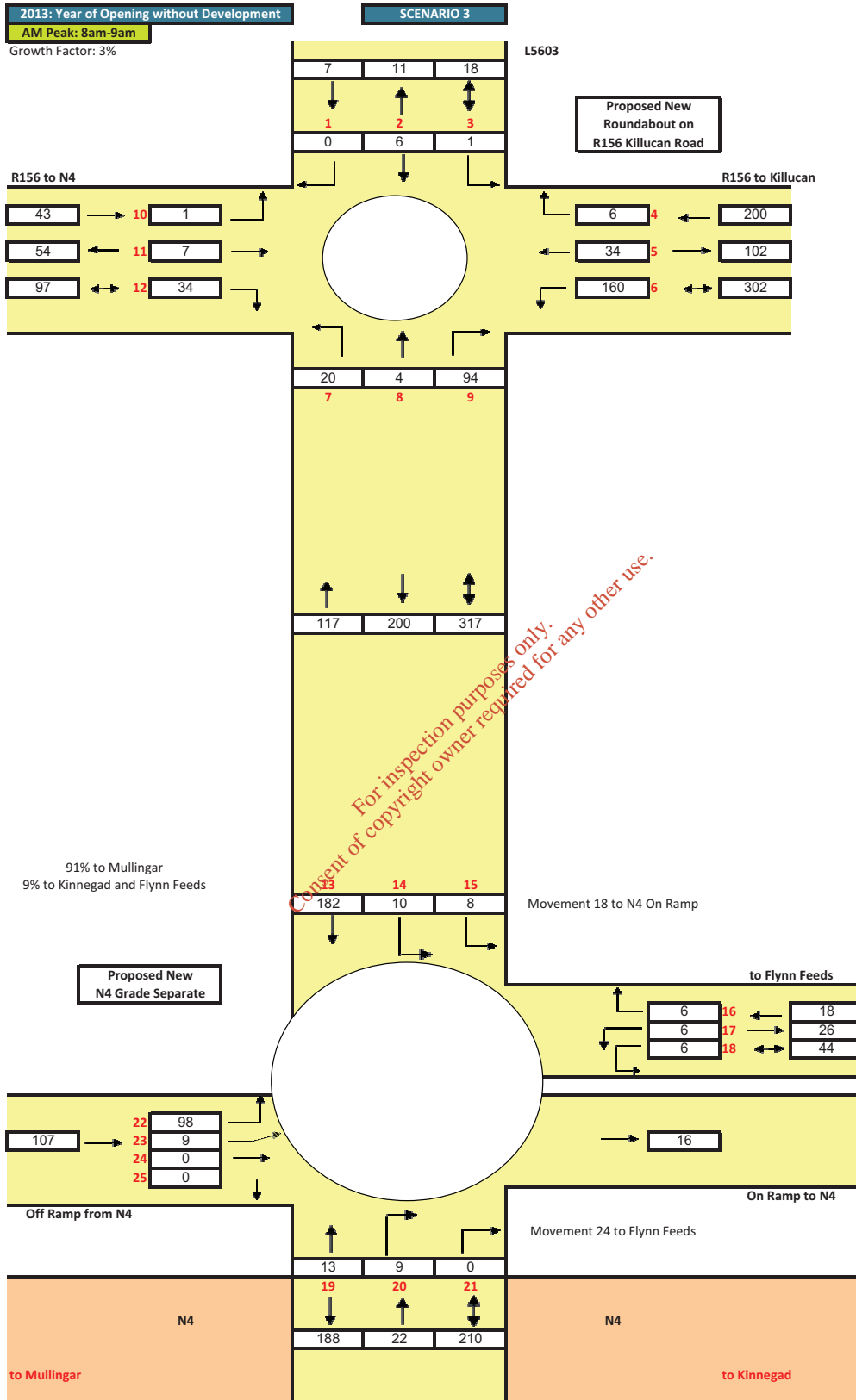


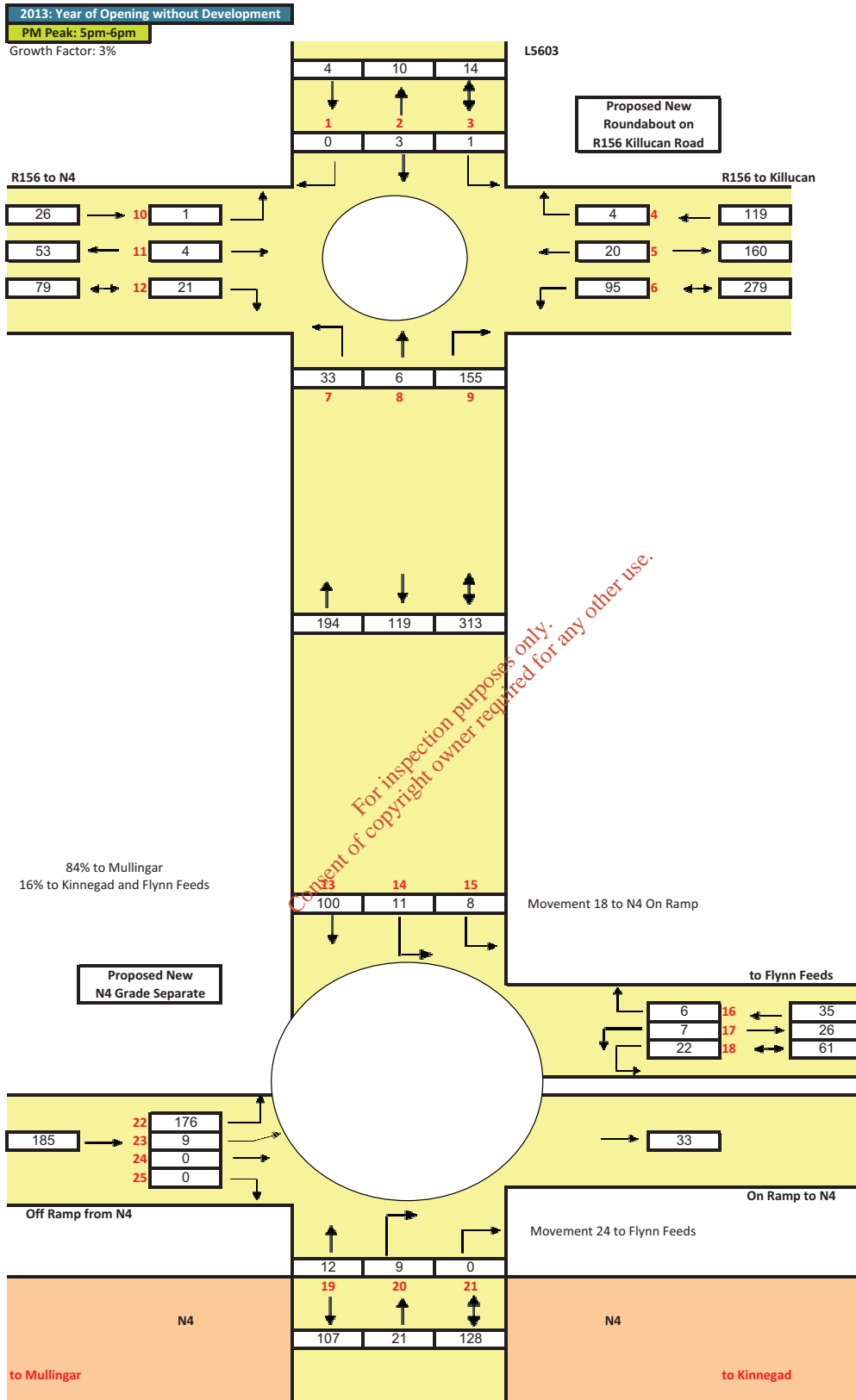




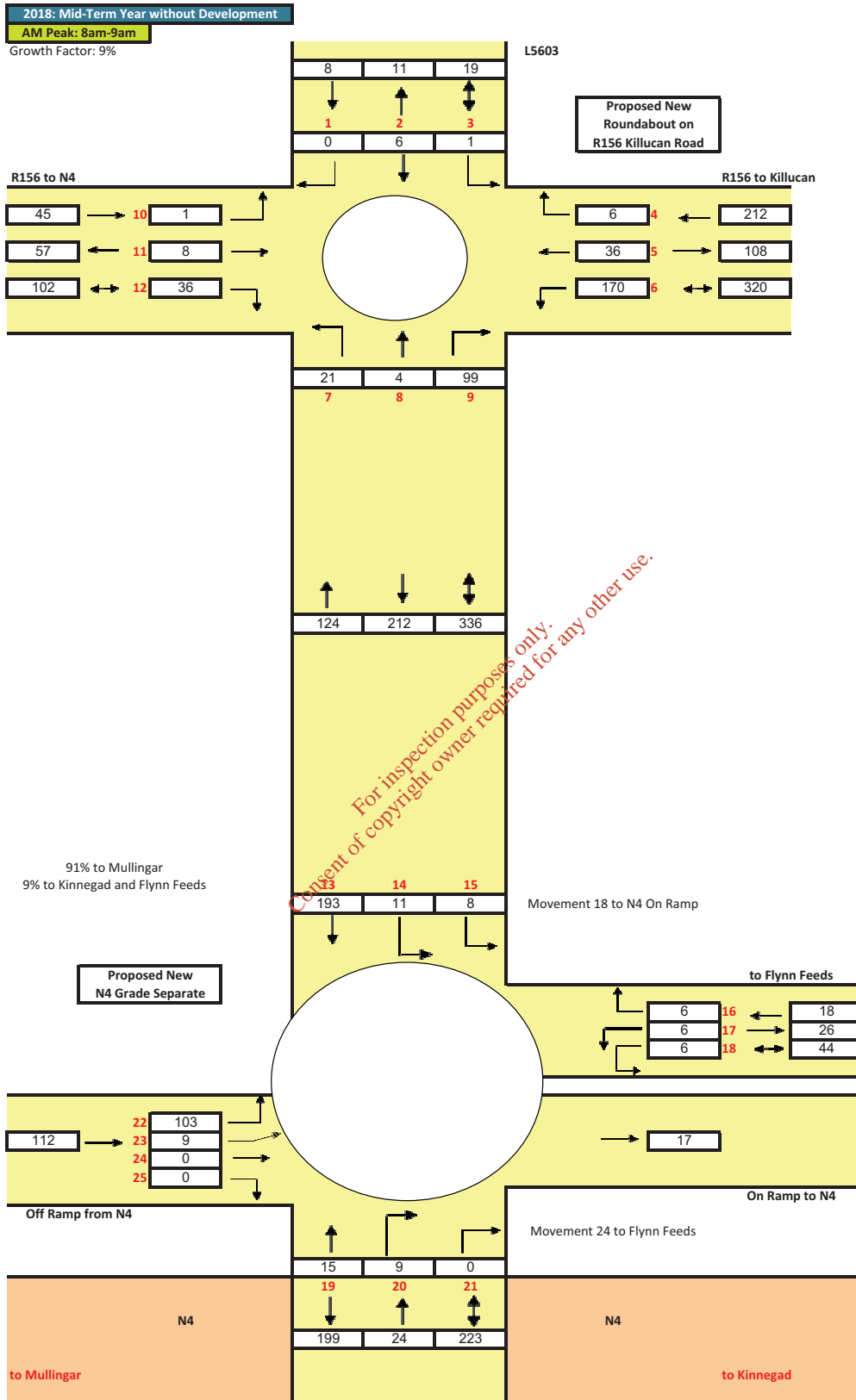


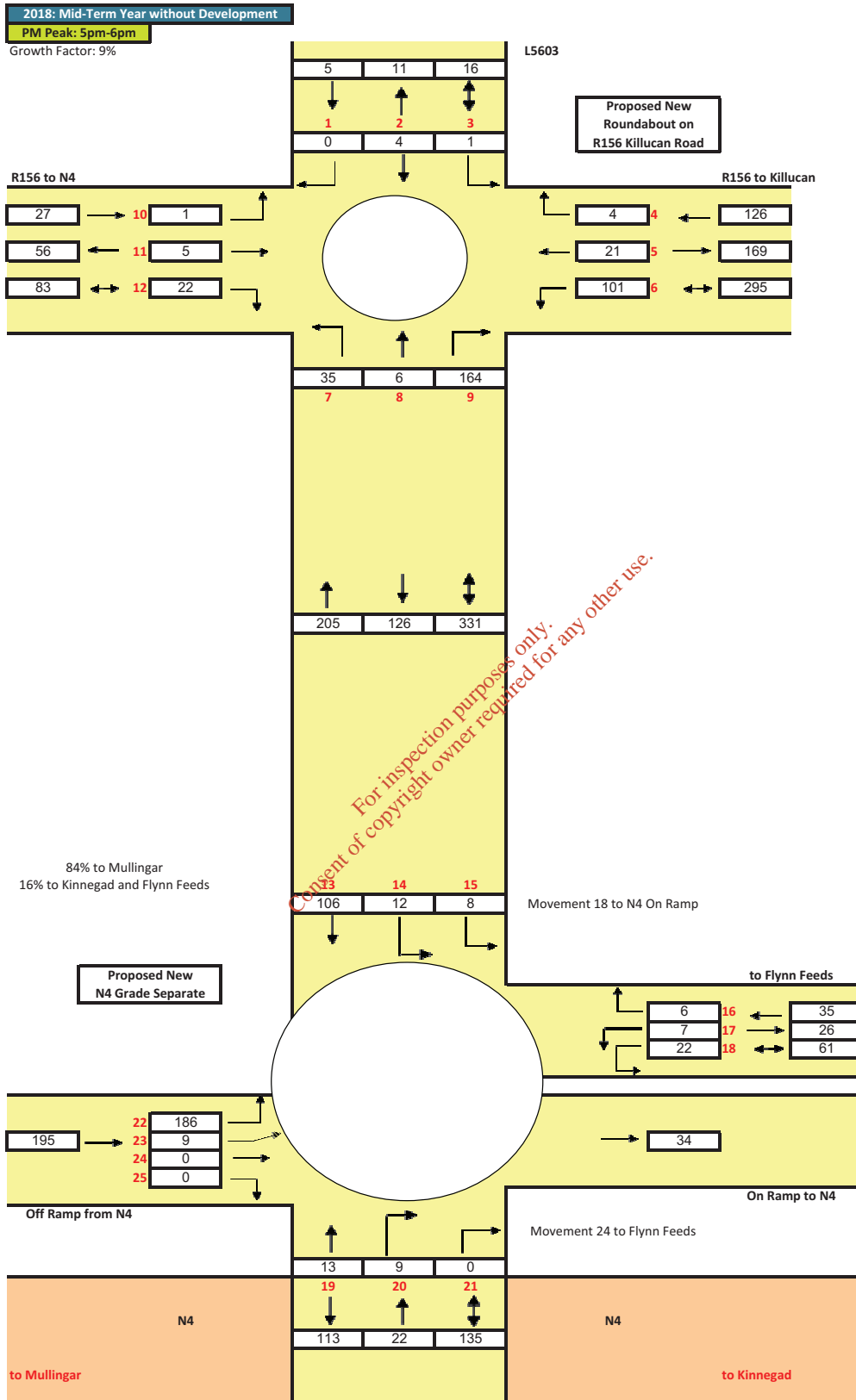


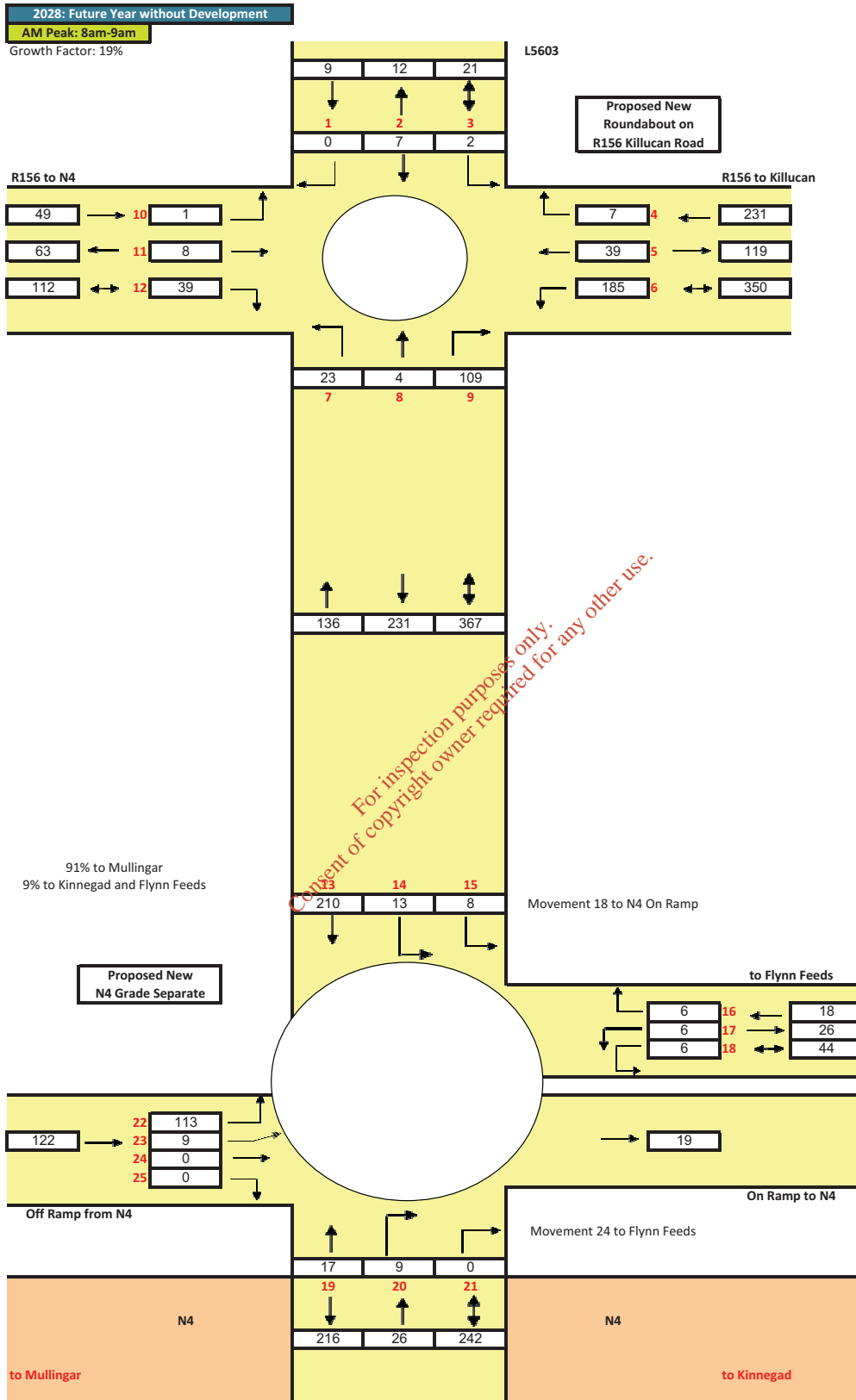


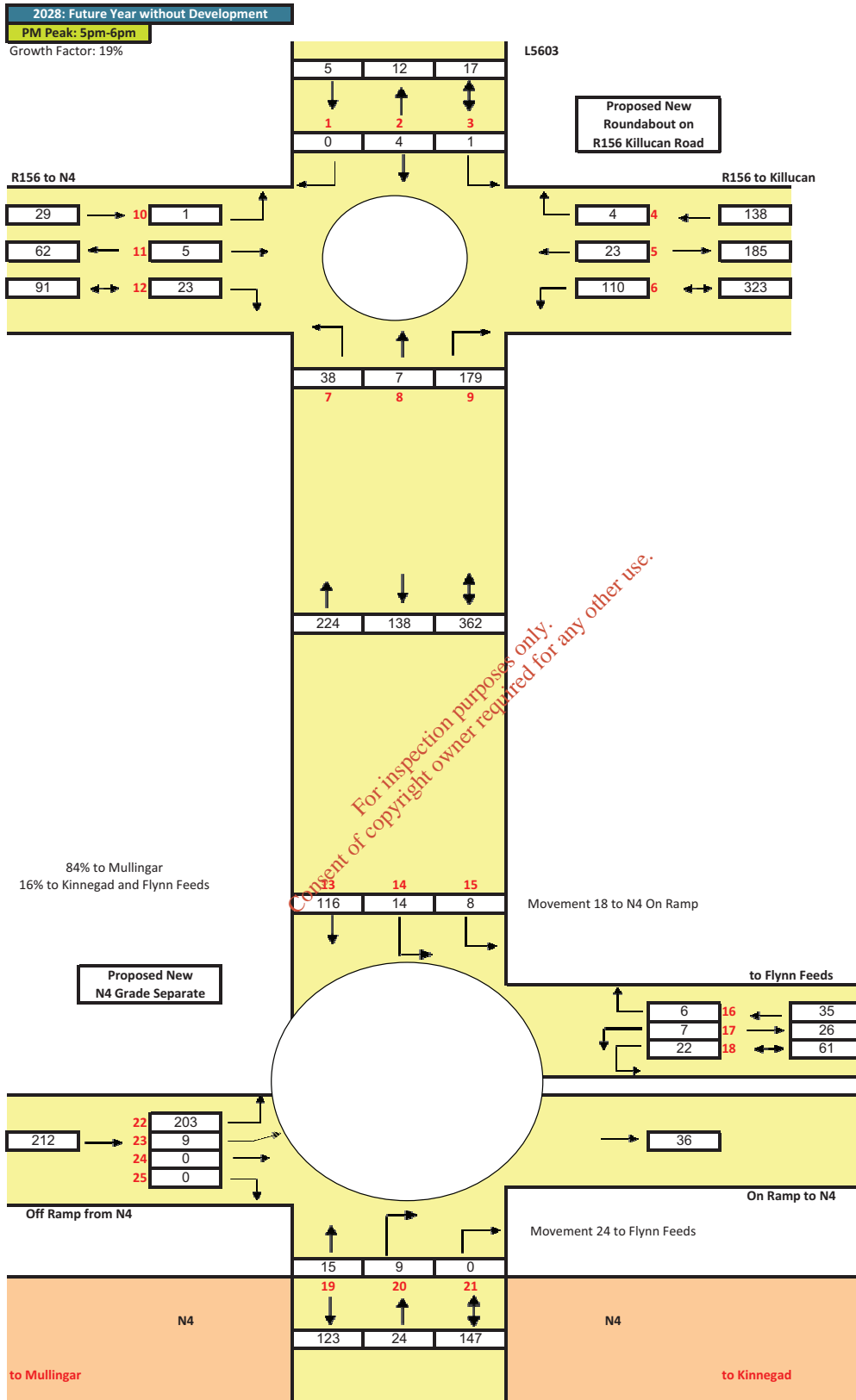








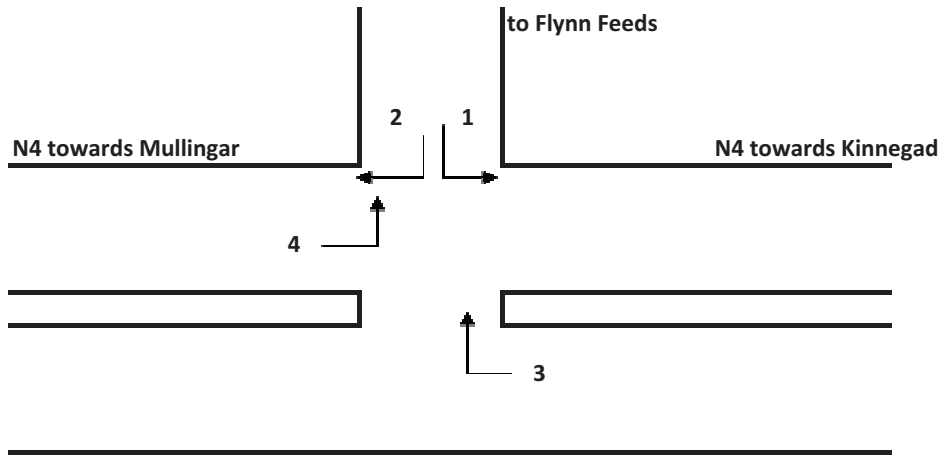




**Manual Classified Traffic Count**

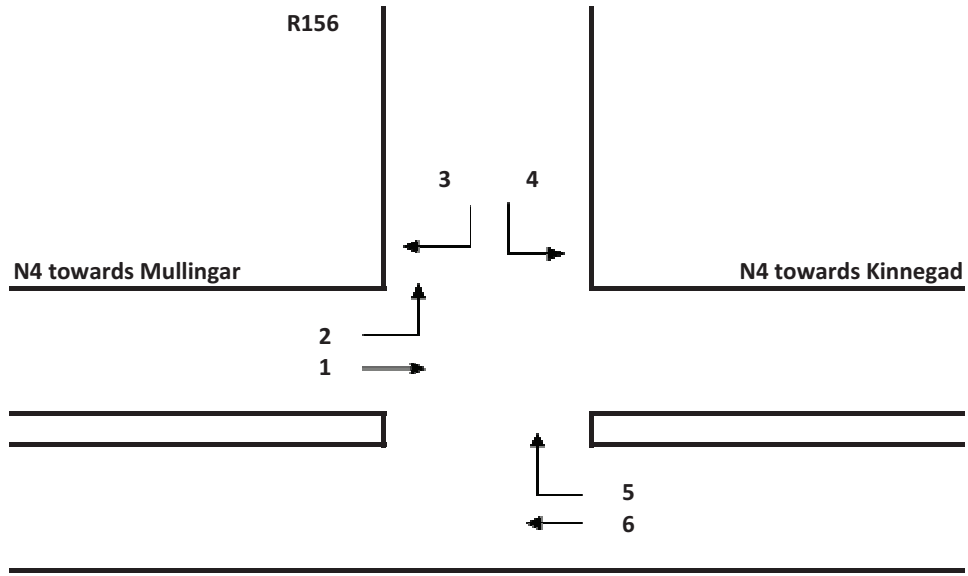
**Location: Junction at N4/Flynn Feeds, The Downs, Mullingar.**

**Date: 11th March 2011**



Time	Movement 1				Movement 2				Movement 3				Movement 4			
	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Car	LGV	HGV	Total
08:00	1	0	0	1	0	0	0	0	1	0	0	1	1	2	0	3
08:15	0	0	0	0	2	0	0	2	0	0	0	0	0	1	0	1
08:30	1	0	0	1	3	3	2	8	4	1	0	5	4	1	0	5
08:45	3	0	1	4	2	0	0	2	3	0	0	3	7	0	1	8
<b>Total</b>	<b>5</b>	<b>0</b>	<b>1</b>	<b>6</b>	<b>7</b>	<b>3</b>	<b>2</b>	<b>12</b>	<b>8</b>	<b>1</b>	<b>0</b>	<b>9</b>	<b>12</b>	<b>4</b>	<b>1</b>	<b>17</b>
17:00	5	0	0	5	3	0	0	3	4	0	0	4	5	0	0	5
17:15	4	0	0	4	3	0	0	3	0	0	0	0	6	0	0	6
17:30	7	0	0	7	5	0	0	5	2	0	1	3	5	0	0	5
17:45	6	0	0	6	2	0	0	2	2	0	0	2	1	0	0	1
<b>Total</b>	<b>22</b>	<b>0</b>	<b>0</b>	<b>22</b>	<b>13</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>8</b>	<b>0</b>	<b>1</b>	<b>9</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>17</b>

Junction at N4/R156, The Downs, Mullingar.



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**ORS CONSULTING ENGINEERS  
N4 THE DOWNS  
TRAFFIC SURVEY**

**SURVEY REPORT  
MARCH 2011**

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PROJECT NO.	1172
CHECKED	P. MURRAY
DATE	08/03/2011
CONTACT	A.CHAMBERS
REVISION	

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Introduction

Junction Turning Count

Diagram 1172-01

Drawing 1172-01

Appendix A – Vehicle Categories

Appendix B – Survey Results - Junction Turning Count

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## INTRODUCTION

Nationwide Data Collection (NDC) was instructed by ORS Consulting Engineers to undertake a Junction Turning Count in Co. Westmeath.

A general location plan is given in Diagram 1172-01

## JUNCTION TURNING COUNT

A Junction Turning Count was undertaken at the following site:

Site No.	Location.	Day / Date
1	R156 / N4(NW) / N4(SE)	Friday 4 <sup>th</sup> March 2011

The site was surveyed using a telescopically mounted video camera from which the information was subsequently extracted. Details of the observed movements are given in Drawing 1172-01

The survey was carried out with survey hours of 07:00 to 19:00. All information was collected in 15 minute intervals and has been tabulated with both hourly and period totals.

Vehicles were classified into the following categories:

- Light Vehicles (**LV**),
- Heavy Vehicles (**HV**),

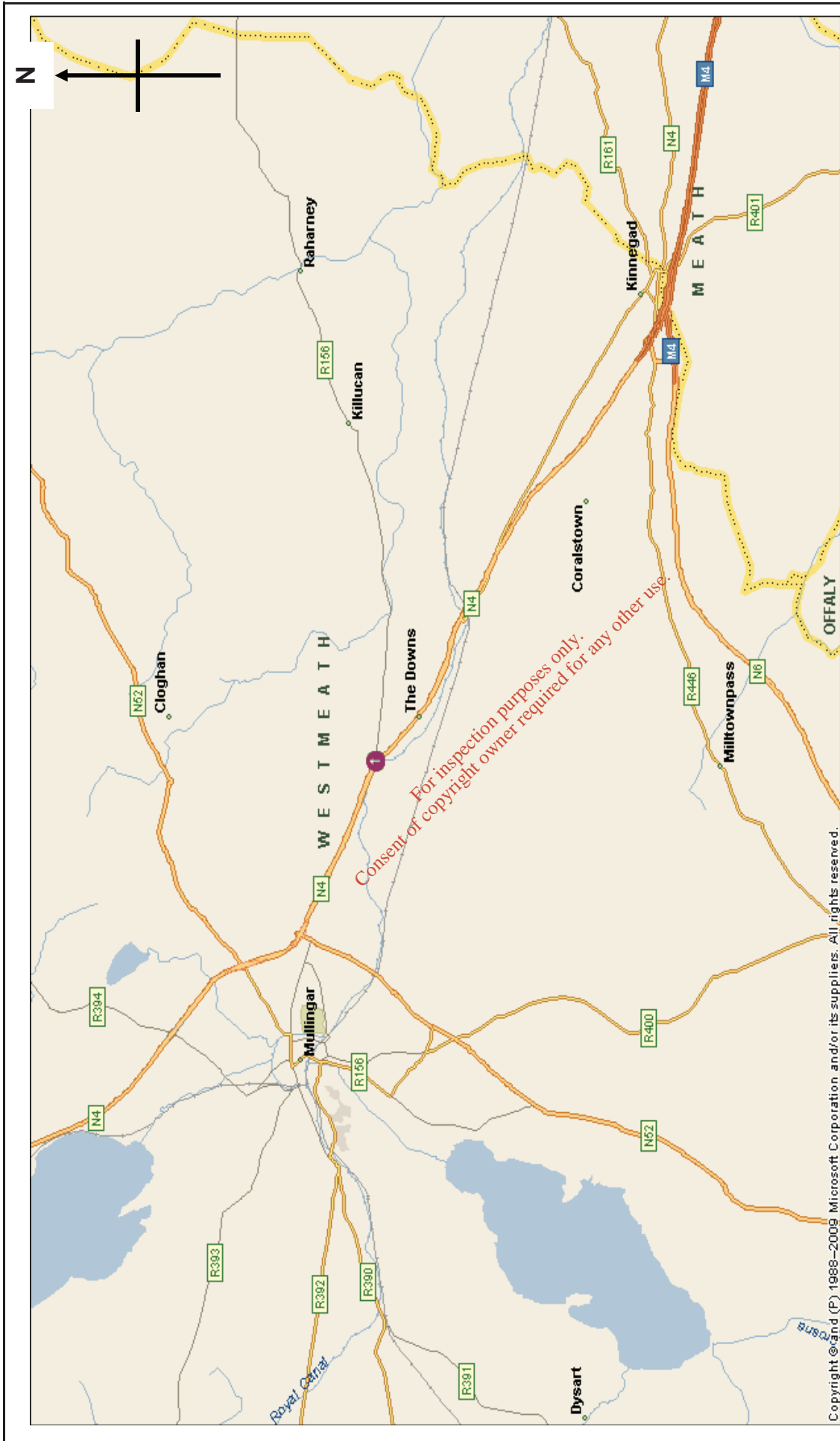
A detailed description of the vehicles included in each category is provided in Appendix A.


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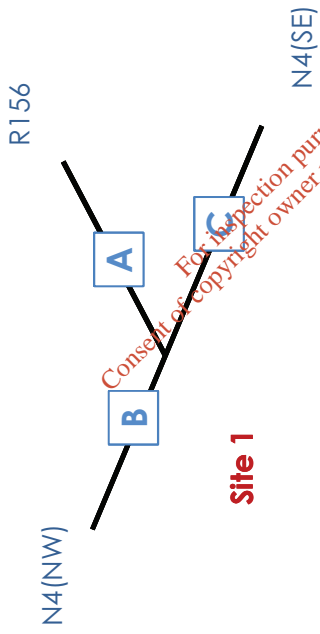
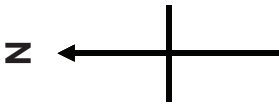
**SITE REPORT**

<b>Weather</b>	Friday 4 <sup>th</sup> March 2011 – Overcast and Foggy in the morning but some sunny spells in the afternoon.
<b>Accidents</b>	None.
<b>Roadworks</b>	None.
<b>Queues</b>	Not recorded.
<b>Pedestrians</b>	Not recorded.


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	<b>Site / Location:</b> 1 / N4 The Downs	<b>Project No:</b> 1172	<b>Diagram No:</b> 1172-01	<b>Drawn By:</b> AC
	<b>Survey Date:</b> Friday 4th March 2011	<b>Project Name:</b> N4 THE DOWNS		
	<b>Survey Times:</b> 07:00 to 19:00	<b>Diagram Title:</b> General Location Plan		



**Site 1**


















	<b>Site / Location:</b> 1 / N4 The Downs	<b>Project No:</b> 1172	<b>Drawing No:</b> 1172-01	<b>Drawn By:</b> AC
	<b>Survey Date:</b> Friday 4th March 2011	<b>Project Name:</b> N4 THE DOWNS		
	<b>Survey Times:</b> 07:00 to 19:00	<b>Drawing Title:</b> Site Layout and Observed Movements		

# APPENDIX A

# VEHICLE CATEGORIES

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**VEHICLE CATEGORIES**

<b>LIGHT VEHICLES (LV)</b>	 SALOON  ESTATE
	 PEOPLE CARRIER  CAR TOWING CARAVAN / TRAILER
	 VAN  >3.5 TONNES – single rear tyres  PICK-UP
<b>HEAVY VEHICLES (HV)</b>	 > 3.5 TONNES – twin rear tyres  2-AXLES RIGID
	 2-AXLES RIGID  3 AXLES-RIGID
	 4 OR MORE AXLES RIGID  3-AXLES ARTIC
	 4 OR MORE AXLES ARTIC  OTHER GOODS VEHICLE WITH TRAILER
	 DOUBLE DECK BUS  SINGLE DECK BUS OR COACH

---

## **VEHICLE CATEGORIES**

### **Definition of Categories**

The various components of traffic have different characteristics in terms of operating costs, growth and occupancy. For the purpose of this survey vehicles types are defined as follows:

Cars and Light Goods Vehicles are grouped together as Light Vehicles (**LV**). All other Goods Vehicles, Buses and Coaches are defined as Heavy Vehicles (**HV**).

### **Cars (CARS)**

Including taxis, estate cars, 'people carriers' and other passenger vehicles (for example, minibuses and camper vans) with a gross vehicle weight of less than 3.5 tonnes, normally ones which can accommodate not more than 15 seats. Three-wheeled cars, motor invalid carriages, Land Rovers, Range Rovers and Jeeps and smaller ambulances are included. Cars towing caravans or trailers are counted as one vehicle unless included as a separate class.

### **Light Goods Vehicles (LGV)**

Includes all goods vehicles up to 3.5 tonnes gross vehicle weight (goods vehicles over 3.5 tonnes have sideguards fitted between axles), including those towing a trailer or caravan. This includes all car delivery vans and those of the next larger carrying capacity such as transit vans. Included here are small pickup vans, three-wheeled goods vehicles, milk floats and pedestrian controlled motor vehicles. Most of this group is delivery vans of one type or another.

### **Other Goods Vehicles (OGV 1)**

Includes all rigid vehicles over 3.5 tonnes gross vehicle weight with two or three axles. Includes larger ambulances, tractors (without trailers), road rollers for tarmac pressing, box vans and similar large vans. A two or three axle motor tractive unit without a trailer is also included.

### **Other Goods Vehicles (OGV 2)**

This category includes all rigid vehicles with four or more axles and all articulated vehicles. Also included in this class are OGV1 goods vehicles towing a caravan or trailer.

### **Buses and Coaches (PSV)**

Includes all public service vehicles and works buses with a gross vehicle weight of 3.5 tonnes or more, usually vehicles with more than 16 seats.

**APPENDIX B**

**SURVEY RESULTS**

**JUNCTION TURNING COUNT**

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Site No. 1  
 Location R156 / N4(NW) / N4(SE)  
 Date Friday 04 March 2011

Time	A to C - R156 to N4(SE)		Veh. Total	A to B - R156 to N4(NW)		Veh. Total
	LV	HV		LV	HV	
07:00	0	0	0	4	1	5
07:15	1	1	2	3	0	3
07:30	1	0	1	23	0	23
07:45	2	0	2	28	4	32
Hour	4	1	5	58	5	63
08:00	3	0	3	33	2	35
08:15	2	0	2	36	3	39
08:30	3	0	3	45	0	45
08:45	10	0	10	56	1	57
Hour	18	0	18	170	6	176
09:00	8	1	9	44	3	47
09:15	2	0	2	31	0	31
09:30	1	1	2	48	1	49
09:45	3	0	3	41	1	42
Hour	14	2	16	164	5	169
10:00	5	1	6	35	1	36
10:15	2	0	2	29	2	31
10:30	0	0	0	28	3	31
10:45	2	1	3	24	0	24
Hour	9	2	11	116	6	122
11:00	0	1	1	28	3	31
11:15	4	0	4	27	1	28
11:30	2	0	2	24	3	27
11:45	4	0	4	23	3	26
Hour	10	1	11	102	10	112
12:00	1	1	2	19	0	19
12:15	1	0	1	18	1	19
12:30	5	0	5	29	1	30
12:45	1	0	1	31	1	32
Hour	8	1	9	97	3	100
13:00	0	1	1	18	1	19
13:15	5	1	6	27	1	28
13:30	6	0	6	38	0	38
13:45	10	0	10	37	1	38
Hour	21	2	23	120	3	123
14:00	1	0	1	37	2	39
14:15	5	0	5	27	0	27
14:30	5	0	5	29	3	32
14:45	14	1	15	53	4	57
Hour	25	1	26	146	9	155
15:00	9	0	9	23	3	26
15:15	2	0	2	38	2	40
15:30	5	0	5	36	1	37
15:45	2	1	3	35	0	35
Hour	18	1	19	132	6	138
16:00	1	0	1	32	1	33
16:15	3	1	4	32	3	35
16:30	5	1	6	24	0	24
16:45	9	2	11	25	0	25
Hour	18	4	22	113	4	117
17:00	4	1	5	20	0	20
17:15	5	0	5	22	1	23
17:30	2	0	2	26	1	27
17:45	5	1	6	28	0	28
Hour	16	2	18	96	2	98
18:00	5	0	5	30	0	30
18:15	5	0	5	28	0	28
18:30	1	0	1	21	0	21
18:45	5	0	5	32	0	32
Hour	16	0	16	111	0	111
Total	177	17	194	1425	59	1484

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Site No. 1  
 Location R156 / N4(NW) / N4(SE)  
 Date Friday 04 March 2011

Time	B to A - N4(NW) to R156		Veh. Total	B to C - N4(NW) to N4(SE)		Veh. Total
	LV	HV		LV	HV	
07:00	7	0	7	123	11	134
07:15	9	0	9	142	14	156
07:30	13	0	13	127	15	142
07:45	11	1	12	139	14	153
Hour	40	1	41	531	54	585
08:00	10	1	11	128	14	142
08:15	24	0	24	149	9	158
08:30	19	3	22	123	3	126
08:45	38	0	38	127	9	136
Hour	91	4	95	527	35	562
09:00	31	0	31	129	11	140
09:15	21	1	22	108	19	127
09:30	15	1	16	90	8	98
09:45	15	0	15	108	18	126
Hour	82	2	84	435	56	491
10:00	17	6	23	88	16	104
10:15	21	2	23	99	13	112
10:30	18	0	18	98	14	112
10:45	19	1	20	102	16	118
Hour	75	9	84	387	59	446
11:00	25	1	26	94	18	112
11:15	22	1	23	80	15	95
11:30	32	1	33	95	16	111
11:45	27	2	29	126	13	139
Hour	106	5	111	395	62	457
12:00	23	0	23	96	20	116
12:15	34	2	36	116	22	138
12:30	24	0	24	124	18	142
12:45	24	1	25	115	19	134
Hour	105	3	108	451	79	530
13:00	39	0	39	121	24	145
13:15	31	3	34	109	15	124
13:30	38	2	40	112	12	124
13:45	34	1	35	99	15	114
Hour	142	6	148	441	66	507
14:00	34		35	103	17	120
14:15	33	3	36	135	11	146
14:30	37	1	38	113	13	126
14:45	43	6	49	142	16	158
Hour	147	11	158	493	57	550
15:00	32	3	35	158	21	179
15:15	35	7	42	119	14	133
15:30	32	0	32	133	14	147
15:45	45	1	46	171	15	186
Hour	144	11	155	581	64	645
16:00	41	2	43	149	15	164
16:15	37	1	38	172	12	184
16:30	30	3	33	154	9	163
16:45	29	0	29	127	11	138
Hour	137	6	143	602	47	649
17:00	46	0	46	186	19	205
17:15	42	1	43	153	6	159
17:30	35	1	36	177	7	184
17:45	43	3	46	174	6	180
Hour	166	5	171	690	38	728
18:00	39	0	39	143	14	157
18:15	34	0	34	147	9	156
18:30	16	11	27	123	3	126
18:45	33	1	34	123	12	135
Hour	122	12	134	536	38	574
Total	1357	75	1432	6069	655	6724

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Site No. 1  
 Location R156 / N4(NW) / N4(SE)  
 Date Friday 04 March 2011

Time	C to B - N4(SE) to N4(NW)		Veh. Total	C to A - N4(SE) to R156		Veh. Total
	LV	HV		LV	HV	
07:00	32	12	44	1	0	1
07:15	43	17	60	0	0	0
07:30	65	10	75	2	0	2
07:45	92	14	106	2	0	2
Hour	232	53	285	5	0	5
08:00	101	22	123	1	2	3
08:15	138	14	152	1	0	1
08:30	130	12	142	4	1	5
08:45	128	15	143	9	1	10
Hour	497	63	560	15	4	19
09:00	105	15	120	6	0	6
09:15	106	16	122	1	1	2
09:30	111	19	130	2	1	3
09:45	125	8	133	2	0	2
Hour	447	58	505	11	2	13
10:00	100	15	115	2	1	3
10:15	119	21	140	2	1	3
10:30	98	13	111	2	2	4
10:45	104	15	119	3	0	3
Hour	421	64	485	9	4	13
11:00	106	17	123	2	2	4
11:15	115	11	126	1	0	1
11:30	144	13	157	2	0	2
11:45	116	16	132	1	1	2
Hour	481	57	538	6	3	9
12:00	125	14	139	3	1	4
12:15	97	17	114	3	1	4
12:30	130	13	143	4	1	5
12:45	118	18	136	4	0	4
Hour	470	62	532	14	3	17
13:00	143	6	149	3	0	3
13:15	154	14	168	3	0	3
13:30	138	14	152	6	0	6
13:45	175	16	191	7	0	7
Hour	610	50	660	19	0	19
14:00	154	10	168	5	0	5
14:15	206	10	216	5	0	5
14:30	183	13	196	8	0	8
14:45	191	11	202	1	1	2
Hour	734	48	782	19	1	20
15:00	192	11	203	4	0	4
15:15	218	14	232	2	0	2
15:30	189	8	197	3	0	3
15:45	237	9	246	7	0	7
Hour	836	42	878	16	0	16
16:00	246	16	262	6	0	6
16:15	255	9	264	2	0	2
16:30	258	15	273	4	0	4
16:45	285	9	294	6	1	7
Hour	1044	49	1093	18	1	19
17:00	304	18	322	4	1	5
17:15	296	10	306	4	0	4
17:30	255	9	264	5	0	5
17:45	283	5	288	2	1	3
Hour	1138	42	1180	15	2	17
18:00	302	10	312	2	0	2
18:15	248	6	254	2	1	3
18:30	242	8	250	8	1	9
18:45	226	13	239	2	0	2
Hour	1018	37	1055	14	2	16
Total	7928	625	8553	161	22	183

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Site No. 1  
 Location R156 / N4(NW) / N4(SE)  
 Date Friday 04 March 2011

Time	To Arm A - R156		Veh. Total	From Arm A - R156		Veh. Total
	LV	HV		LV	HV	
07:00	8	0	8	4	1	5
07:15	9	0	9	4	1	5
07:30	15	0	15	24	0	24
07:45	13	1	14	30	4	34
Hour	45	1	46	62	6	68
08:00	11	3	14	36	2	38
08:15	25	0	25	38	3	41
08:30	23	4	27	48	0	48
08:45	47	1	48	66	1	67
Hour	106	8	114	188	6	194
09:00	37	0	37	52	4	56
09:15	22	2	24	33	0	33
09:30	17	2	19	49	2	51
09:45	17	0	17	44	1	45
Hour	93	4	97	178	7	185
10:00	19	7	26	40	2	42
10:15	23	3	26	31	2	33
10:30	20	2	22	28	3	31
10:45	22	1	23	26	1	27
Hour	84	13	97	125	8	133
11:00	27	3	30	28	4	32
11:15	23	1	24	26	1	27
11:30	34	1	35	26	3	29
11:45	28	3	31	27	3	30
Hour	112	8	120	112	11	123
12:00	26	1	27	20	1	21
12:15	37	3	40	19	1	20
12:30	28	1	29	34	1	35
12:45	28	1	29	32	1	33
Hour	119	6	125	105	4	109
13:00	42	0	42	18	2	20
13:15	34	3	37	32	2	34
13:30	44	2	46	44	0	44
13:45	41	1	42	47	1	48
Hour	161	6	167	141	5	146
14:00	39		40	38	2	40
14:15	38	3	41	32	0	32
14:30	45	1	46	34	3	37
14:45	44	7	51	67	5	72
Hour	166	12	178	171	10	181
15:00	36	3	39	32	3	35
15:15	37	7	44	40	2	42
15:30	35	0	35	41	1	42
15:45	52	1	53	37	1	38
Hour	160	11	171	150	7	157
16:00	47	2	49	33	1	34
16:15	39	1	40	35	4	39
16:30	34	3	37	29	1	30
16:45	35	1	36	34	2	36
Hour	155	7	162	131	8	139
17:00	50	1	51	24	1	25
17:15	46	1	47	27	1	28
17:30	40	1	41	28	1	29
17:45	45	4	49	33	1	34
Hour	181	7	188	112	4	116
18:00	41	0	41	35	0	35
18:15	36	1	37	33	0	33
18:30	24	12	36	22	0	22
18:45	35	1	36	37	0	37
Hour	136	14	150	127	0	127
Total	1518	97	1615	1602	76	1678

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Site No. 1  
Location R156 / N4(NW) / N4(SE)  
Date Friday 04 March 2011

Time	To Arm B - N4(NW)		Veh. Total	From Arm B - N4(NW)		Veh. Total
	LV	HV		LV	HV	
07:00	36	13	49	130	11	141
07:15	46	17	63	151	14	165
07:30	88	10	98	140	15	155
07:45	120	18	138	150	15	165
Hour	290	58	348	571	55	626
08:00	134	24	158	138	15	153
08:15	174	17	191	173	9	182
08:30	175	12	187	142	6	148
08:45	184	16	200	165	9	174
Hour	667	69	736	618	39	657
09:00	149	18	167	160	11	171
09:15	137	16	153	129	20	149
09:30	159	20	179	105	9	114
09:45	166	9	175	123	18	141
Hour	611	63	674	517	58	575
10:00	135	16	151	105	22	127
10:15	148	23	171	120	15	135
10:30	126	16	142	116	14	130
10:45	128	15	143	121	17	138
Hour	537	70	607	462	68	530
11:00	134	20	154	119	19	138
11:15	142	12	154	102	16	118
11:30	168	16	184	127	17	144
11:45	139	19	158	153	15	168
Hour	583	67	650	501	67	568
12:00	144	14	158	119	20	139
12:15	115	18	133	150	24	174
12:30	159	14	173	148	18	166
12:45	149	19	168	139	20	159
Hour	567	65	632	556	82	638
13:00	161	7	168	160	24	184
13:15	181	15	196	140	18	158
13:30	176	14	190	150	14	164
13:45	212	17	229	133	16	149
Hour	730	53	783	583	72	655
14:00	191	16	207	137	18	155
14:15	233	10	243	168	14	182
14:30	212	16	228	150	14	164
14:45	244	15	259	185	22	207
Hour	880	57	937	640	68	708
15:00	215	14	229	190	24	214
15:15	256	16	272	154	21	175
15:30	225	9	234	165	14	179
15:45	272	9	281	216	16	232
Hour	968	48	1016	725	75	800
16:00	278	17	295	190	17	207
16:15	287	12	299	209	13	222
16:30	282	15	297	184	12	196
16:45	310	9	319	156	11	167
Hour	1157	53	1210	739	53	792
17:00	324	18	342	232	19	251
17:15	318	11	329	195	7	202
17:30	281	10	291	212	8	220
17:45	311	5	316	217	9	226
Hour	1234	44	1278	856	43	899
18:00	332	10	342	182	14	196
18:15	276	6	282	181	9	190
18:30	263	8	271	139	14	153
18:45	258	13	271	156	13	169
Hour	1129	37	1166	658	50	708
Total	9353	684	10037	7426	730	8156

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Site No. 1  
Location R156 / N4(NW) / N4(SE)  
Date Friday 04 March 2011

Time	To Arm C - N4(SE)		Veh. Total	From Arm C - N4(SE)		Veh. Total
	LV	HV		LV	HV	
07:00	123	11	134	33	12	45
07:15	143	15	158	43	17	60
07:30	128	15	143	67	10	77
07:45	141	14	155	94	14	108
Hour	535	55	590	237	53	290
08:00	131	14	145	102	24	126
08:15	151	9	160	139	14	153
08:30	126	3	129	134	13	147
08:45	137	9	146	137	16	153
Hour	545	35	580	512	67	579
09:00	137	12	149	111	15	126
09:15	110	19	129	107	17	124
09:30	91	9	100	113	20	133
09:45	111	18	129	127	8	135
Hour	449	58	507	458	60	518
10:00	93	17	110	102	16	118
10:15	101	13	114	121	22	143
10:30	98	14	112	100	15	115
10:45	104	17	121	107	15	122
Hour	396	61	457	430	68	498
11:00	94	19	113	108	19	127
11:15	84	15	99	111	11	122
11:30	97	16	113	146	13	159
11:45	130	13	143	117	17	134
Hour	405	63	468	487	60	547
12:00	97	21	118	128	15	143
12:15	117	22	139	100	18	118
12:30	129	18	147	134	14	148
12:45	116	19	135	122	18	140
Hour	459	80	539	484	65	549
13:00	121	25	146	146	6	152
13:15	114	16	130	157	14	171
13:30	118	12	130	144	14	158
13:45	109	15	124	182	16	198
Hour	462	68	530	629	50	679
14:00	104	12	121	159	14	173
14:15	140	11	151	211	10	221
14:30	118	13	131	191	13	204
14:45	156	17	173	192	12	204
Hour	518	58	576	753	49	802
15:00	167	21	188	196	11	207
15:15	121	14	135	220	14	234
15:30	138	14	152	192	8	200
15:45	173	16	189	244	9	253
Hour	599	65	664	852	42	894
16:00	150	15	165	252	16	268
16:15	175	13	188	257	9	266
16:30	159	10	169	262	15	277
16:45	136	13	149	291	10	301
Hour	620	51	671	1062	50	1112
17:00	190	20	210	308	19	327
17:15	158	6	164	300	10	310
17:30	179	7	186	260	9	269
17:45	179	7	186	285	6	291
Hour	706	40	746	1153	44	1197
18:00	148	14	162	304	10	314
18:15	152	9	161	250	7	257
18:30	124	3	127	250	9	259
18:45	128	12	140	228	13	241
Hour	552	38	590	1032	39	1071
Total	6246	672	6918	8089	647	8736

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