



Air Quality Studies Dublin Terminal Stations

CONNOLLY AND HEUSTON

Overview

Connolly Station

- Built in 1844
- 4 enclosed terminal roads (Platforms 1-4)
- Open vents at roof peaks, no mechanical ventilation
- Trains: DMUs (Diesel Multiple Units) and Enterprise Locomotive (De Dietrich, Diesel)

Heuston Station

- Built in 1846
- 8 terminal roads – 4 are enclosed (Platforms 2-5)
- Open vents at roof peaks, no mechanical ventilation
- Trains: DMUs (Diesel Multiple Units) and Cork Mark IV Diesel Engine and Generator Van

Photos



Connolly Station



Heuston Station

Studies Profiles

Connolly

- 3 studies
 1. Byrne Environmental - Aug-Oct 2018
 - Particulate Matter (PM) and Nitrogen Dioxide (NO₂) testing over 2 months.
 - Compared against Air Quality Standards in Connolly Platform area and Amien Street
 2. Verde Environmental – December 2019
 - 2 week gaseous test (CO, CO₂, SO₂, NO and NO₂) and Metals/PAHs/VOCs
 - Compared against HSA OELVs for staff safety
 3. Verde Environmental – February 2020
 - 24 hour diesel particulate testing

Heuston

- 2 studies
 1. Verde Environmental – December 2019
 - 2 week gaseous test (CO, CO₂, SO₂, NO and NO₂)
 - Compared against HSA OELVs for staff safety
 2. Verde Environmental – March 2020
 - 24 hour diesel particulate testing

Connolly Station – Study 1 - NO₂ and PM

► Byrne Environmental Study – Aug/Oct 2018

Location	Mean value	Annual Limit*	Difference factor
Platform 4 Walkway	187	40	4.67
Platform 2 Walkway	131	40	3.28
Entrance to Concourse	110	40	2.75
Amiens Street	37	40	below

* The annual limit values above have been specified by Air Quality Standard Regulations 2011 for NO₂ and PM for the protection of human health over a calendar year.

Connolly Station – Study 2 - Gases

► Verde Environmental Study – December 2019

- Averaged results for gases - no exceedances of Occupational Exposure Limit Values (OELVs) as published by HSA guidance documents:

Location	NO	CO	SO2	NO2	CO2
Occupational Exposure Limit Value (OELV)	2	20	0.5	0.5	5000
Platform 4 Northern End of Walkway	0.20	0.00	0.00	0.01	219
Platform 4 Southern End of Walkway	0.38	0.00	0.00	0.01	298
Entrance to Concourse	0.32	0.00	0.00	0.01	272
Enterprise Waiting Area	0.60	0.00	0.00	0.00	357

Connolly Station – Study 3 - Metals

▶ **Verde Environmental Study – December 2019**

- ▶ 1 location on Platform 4 tested for Metals/Dust, Polycyclic Aromatic Hydrocarbons (PAHs) and Volatile Organic Compounds (VOCs).
- ▶ No exceedances of Occupational Exposure Limit Values (OELVs) as published by HSA guidance documents for any parameters, only a few days showed above detectable testing values.

Connolly Station – Diesel Particulates

▶ Verde Environmental Study – February 2020

- ▶ 2 personnel were fitted with personal monitors to record exposure over 8 hours period
- ▶ A static monitor was also installed to measure exposure at staffed validation gates
- ▶ No exceedances of Occupational Exposure Limit Values (OELVs) as published by HSA guidance documents:

Location	8-hr shift exposure, mg/m ³
Occupational Exposure Limit Value (OELV)	50
Personal Monitor 1 – operational staff	20.51
Personal Monitor 2 – operational staff	25.64
Static monitor (at validation gates)	15.38

Heuston Station – Study 1 - Gases

► Verde Environmental Study – December 2019

- Averaged results for gases - no exceedances of Occupational Exposure Limit Values (OELVs) as published by HSA guidance documents:

Location	NO	CO	SO ₂	NO ₂	CO ₂
Occupational Exposure Limit Value (OELV)	2	20	0.5	0.5	5000
Platform Support Service Slab (between platforms 2 & 3)	0.11	0.00	0.00	0.00	216
Platform 2A (top of vending machine)	0.19	0.00	0.00	0.01	282
Entrance Hall of St John's Road	0.06	0.00	0.00	0.2	273
Platform 5 (column between set down area and Platform 5)	0.27	0.00	0.00	0.00	359
Central Concourse (top of vending machine)	0.20	0.00	0.00	0.00	311

Heuston Station – Study 2 – Diesel Particulates

▶ Verde Environmental Study – February 2020

- ▶ 2 personnel were fitted with personal monitors to record exposure over 8 hours period
- ▶ A static monitor was also installed to measure exposure at staffed validation gates
- ▶ No exceedances of Occupational Exposure Limit Values (OELVs) as published by HSA guidance documents:

Location	8-hr shift exposure, mg/m ³
Occupational Exposure Limit Value (OELV)	50
Personal Monitor 1 – operational staff	9.05
Personal Monitor 2 – operational staff	23.81
Static monitor (at validation gates)	11.19

Conclusion

- ▶ Results of the 2018 study compared against Air Quality Standards showed exceedances for NO₂ in Connolly Station.
- ▶ Follow up studies showed that gaseous pollutants were below the Occupational Exposure Limit Value for NO, NO₂, SO₂, CO and CO₂ and diesel particulate matter.
- ▶ However, while no OELV's were exceeded, Irish Rail accepts that there still remains a nuisance and unsightly issue of air emissions build up in the station at peak times which is concerning to the public.

Recommendations

- ▶ The consultant made the following recommendations to improve air quality in the stations:
 - ▶ Maintain diesel engines so they burn efficiently – **current practice, limited options with diesel**
 - ▶ Replace diesel engines where possible with cleaner fuel types – **major improvements forthcoming, see next slide;**
 - ▶ Prevent diesel engines from running for extended periods in close proximity to personnel – **on-going reviews with driver practices;**
 - ▶ Ensure there is adequate ventilation of the railway – **problematic and cost prohibitive in historical stations, still being investigated.**

Tackling Air Emissions at Source

- ▶ A number of fuel efficiency programs are currently in progress / on-trial, which will substantially reduce air emissions at source, particularly in stations:
 - ▶ **DMU Gearbox (Intercity Railcars)** – Replacement of fluid coupling with dual lock-up clutch. Trial Fit-out completed and commissioned.
 - ▶ **Hybrid Drive for Inter City Railcar fleet:** The design intent is that the hybrid pack will collect regenerative energy and store electric energy to permit electric-only running within urban areas and lead to reductions in Fuel and Emissions. Follows on from the Gearbox project – (c.2021). This initiative is supported by €15m funding from the Climate Action Fund. This project will be phased in over 8 – 10 years and will deliver a carbon avoidance of 18,000 tonnes pa.
 - ▶ **Electric Road Vehicles** – 20 Electric/Hybrid Cars and vans have been introduced into the road fleet in 2020.
 - ▶ **Envirox Fuel Additive** (to reduce fuel consumption and keeps DP filters clean in diesel engines) – nationwide implementation commenced in 2019.



Questions?

QUESTIONS?

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