

CLIP – update

- Trends bij uitdagingen ambities laadinfrastructuur parkeergarages
- EPA Toolbox EV's & Fire Safety

NPC - 17 oktober 2024

TRENDS in
PARKEREN

VOLGEN of CREËREN

VEXPAN
NATIONAAL 2024
PARKEERCONGRES

VEXPAN
PLATFORM PARKEREN NEDERLAND

Functionele gebieden

1 Wet - en regelgeving

2 Brandveiligheid

3 Netcapaciteit

4 Verzekerbaarheid

5 Investeringsen & Data

Stakeholders

I&W / NAL / ELaad
Vexpan WG Brandveiligheid

Vexpan werkgroep
Brandveiligheid

Netbeheerders:
Stedin, Liander, Enexis

Verbond van Verzekeringmakelaars
Verzekeraars - Brokers

Parkeereexploitanten
(resultanten 1 - 4)

Werkgroep Scoping, Roadmap, Deliverables

Wet- & Regelgeving

Belangengroepen

Bouwen & Brandveiligheid

Parkeren + EV laden

Net-uitdagingen

Technische optimalisaties

Risk Transfer

Risk Engineering

Investeringsopgave

Datamanagement

Wat is er tot nu toe bereikt?

Dataset dd.	# Laadpunten	# Parkeerplekken	# Locaties	%
15-11-2023				
Commerciële exploitanten	2.039	90.513	187	2,6%
Gemeentelijke exploitanten	1.724	89.919	222	2,0%
Beheer locaties	273	71.821	337	0,2%
Totalen	4.036	252.253	746	1,3%



1. Bij de commerciële exploitanten is nu gemiddeld 2,6% van de parkeerplaatsen uitgerust met laadpunten waarbij de commerciële exploitant in de positie is om laadinfrastructuur aan te brengen.
2. De gemeentelijke exploitanten hebben per midden november 2023 een gemiddelde van 2,0% van hun parkeerplekken uitgerust met laadinfrastructuur.
3. Er zijn een 273 locaties in de dataset die een 337 laadpunten hebben maar waarbij de commerciële exploitanten niet in de positie zijn om zelfstandig te besluiten om laadinfrastructuur aan te brengen.

De Telegraaf **NIEUWS** SPORT ENTERTAINMENT FINANCIËL VROUW LIFESTYLE WAT U ZEGT

Flink tekort aan laadpalen in parkeergarages: overvol stroomnet en brandveiligheid gooien roet in het eten

Door KOEN NEDERHOF
18 jun. 2024 in BINNENLAND





1

Wet - en regelgeving

- BBL - Besluit bouwwerken leefomgeving
- EPBD IV
- BBN – Brandveilig Bouwen Nederland
- Deloitte Brandveiligheid – Mobiliteitstransitie
- Samenwerking EPA - European Parking Association
 - WG EV's & Fire Safety – Toolbox

*De Omgevingswet is sinds
1 januari 2024 van kracht.*



2

Brandveiligheid

BBN - Brandveilig Bouwen Nederland

- Whitepaper over brandveiligheidsrisico's bij parkeergarages onder gestapelde woningbouw
- Whitepapers
- Richtlijnen
- Checklisten
- Essentiele Controlepunten Brandveiligheid

<https://www.bbn.nu/essentiele-controlepunten/informatie/>

2e editie Essentiële Controlepunten Brandveiligheid

- ❑ Gepubliceerd op: 29 maart 2024
- ❑ Van 'Essentiële Controlepunten Brandveiligheid 2024' is een tweede editie verschenen. Daarin zijn de actuele verwijzingen naar de Omgevingswet en het Besluit bouwwerken leefomgeving (Bbl) opgenomen
- ❑ Essentiële Controlepunten Brandveiligheid is een gezamenlijke publicatie van Brandweer Nederland, Vereniging Bouw & Woningtoezicht Nederland en BBN Brandveilig Bouwen Nederland en wordt jaarlijks geactualiseerd uitgebracht om bij te dragen aan de borging van wettelijke eisen brandveiligheid in gebouwen

ESSENTIËLE CONTROLEPUNTEN BRANDVEILIGHEID

De Omgevingswet is sinds 1 januari 2024 van kracht. Daarom zijn in deze 2e editie 2024 van de Essentiële Controlepunten de actuele verwijzingen naar het BBL en de Omgevingswet doorgevoerd.

2024

2

Brandveiligheid

Samenwerking op EU-schaal

- ❑ EPA – WG EV's & fire safety
- ❑ AVERE



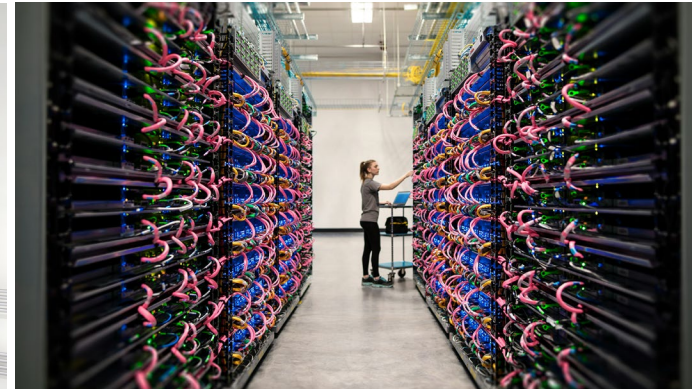
**EUROPEAN
PARKING
ASSOCIATION**
*Positively promoting
parking solutions
for sustainable mobility*



3

Netcapaciteit

- ❑ “Netcongestie gaat nooit meer weg”
 - ❑ De elektrificatie van ons energiesysteem versnelt



3

Netcapaciteit

□ Netcongestie: een tweeledig probleem

- Vraag
- Transport



Stroomnet zo goed als vol: netbeheerders trekken miljarden uit voor uitbreiding

Door Ertan Basekin

18 okt 2023 om 14:04
Update: 4 maanden geleden

1.2K reacties [Delen](#)

Het elektriciteitsnet is in bijna alle provincies grotendeels vol. Steeds meer consumenten en bedrijven maken gebruik van warmtepompen, zonnepanelen en laadpalen. Vanaf 2025 investeren netbeheerders jaarlijks 8 miljard euro om aan de stijgende vraag te voldoen en knelpunten te voorkomen.



Stroomnet zo goed als vol, kabinet kondigt maatregelen tegen uitval aan



Beeld ANP, Novum RegioFoto

Het elektriciteitsnet is op dit moment in alle provincies grotendeels vol, waarschijnlijk vol of bijna vol, meldt demissionair energieminister Rob Jetten.

Trouw

Stroom? Over een paar jaar misschien. De krapte op het net begint ook scholen en sportclubs te raken



De nieuwbouw van de doornika Broek School Zwanewinkel in Veldhoven krijgt pas in 2028 een stroomaansluiting. Tot die tijd moet een dieselaggregaat uitkomst bieden. Foto: van der Laan / de Persgroep

Stroom uit het stopcontact was een eeuw lang vanzelfsprekend. Tot nu. Doordat het elektriciteitsnet verstopt raakt, krijgen sommige scholen, sportaccommodaties en zelfs woonwijken niet worden aangesloten. De komende tijd wordt het alleen maar erger.

Jurre van den Berg en Peter de Graaf | 21 Nov 2024, 08:00

de Volkskrant

Vol stroomnet bedreigt woningbouw Utrecht: laadpaal 's avonds op halve kracht

22 januari 2024 15:28 • Aangepast 22 januari 2024 19:18



Laadpalen in Utrecht.

Net E
15:57
15:49
15:47
15:43
15:31

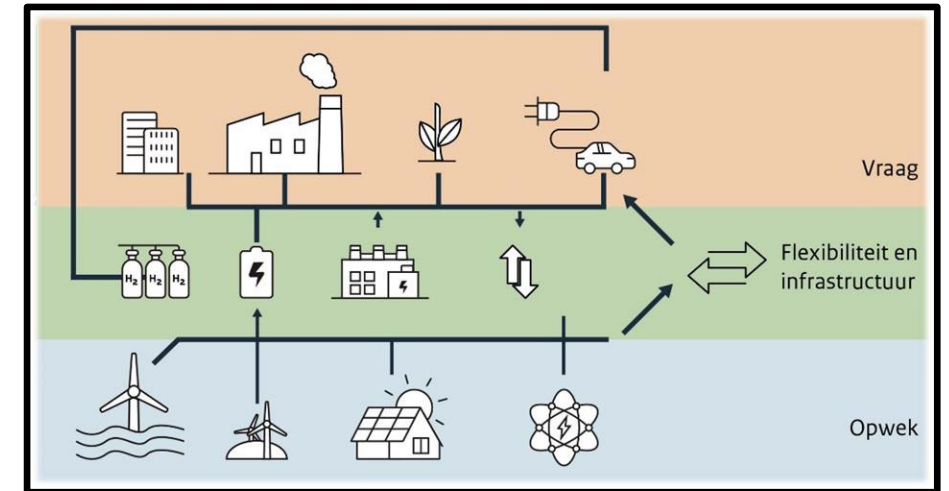
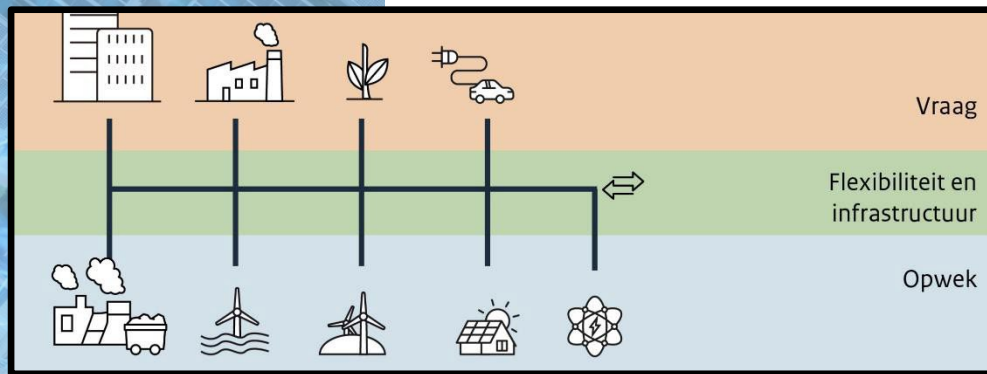
In vrijwel het hele land zit het stroomnet overvol of dreigt dat te gebeuren. De problemen stapelen zich op en zijn zelfs zo groot dat huizen die keihard nodig zijn, niet gebouwd dreigen te worden. In Utrecht hopen ze dat het afsnijpen van publieke laadpalen voor elektrische auto's enige soelaas kan bieden. "De schaarste blijft, daar moeten we aan wennen."

RTLnieuws

3

Netcapaciteit

De opgave: van centraal naar decentraal systeem



- ❑ Flexibiliteit is niet tijdelijk, cruciale eigenschap voor toekomstig energiesysteem
 - ❑ Vraag- & Aanbodzijde
- ❑ Accusystemen gebruiken alleen flexibele capaciteit van het systeem
- ❑ Restcapaciteit is beschikbaar gemaakt voor flexibele bedrijven
- ❑ Sturing op bepaalde tijden van bedrijfsprocessen, laadpalen en warmtepompen
- ❑ Netbewust laden EV voertuigen - gebruik en aftoppen opwekpiek (PV)

3

Netcapaciteit

De ontwikkelingen gaan harder dan we kunnen bouwen

Overall zijn werkzaamheden nodig



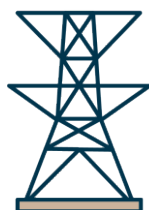
50.000+

wijkstations



100.000+

km kabel
(2,5x de aarde rond)



670+

Hoogspannings-
stations



Duizenden

Km leidingen voor
duurzame gassen

Dat vereist



>20.000

extra technici
tot 2030



1 op 3

straten open



>11.000

voetbalvelden
ruimte in steden
en dorpen



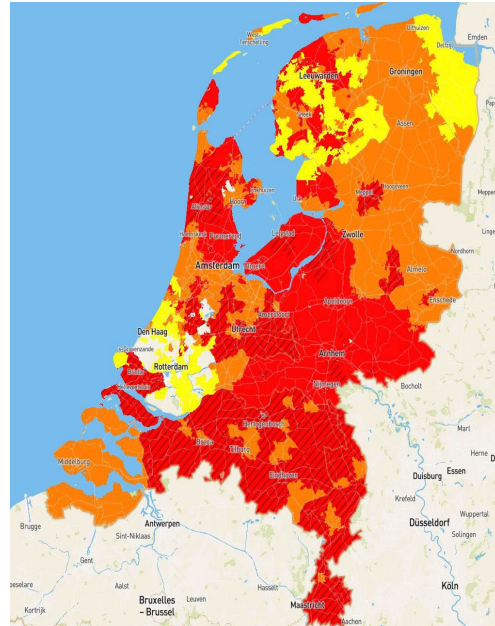
>7-8 mrd

euro investeringen
per jaar in energienetten
vanaf 2025

50.000 wijkstations = 5 á 10 per dag = 100.000 parkeerplaatsen

3

Netcapaciteit



tennet



tennet

- ❑ Circa 10.000 aanvragen op de wachtlijst voor een nieuwe of zwaardere aansluiting voor stroomafname,
- ❑ Circa 10.000 aanvragen op de wachtlijst voor invoeding (teruglevering),
- ❑ Mogelijk sprake van vertroebeling door dubbelingen en niet onderbouwde aanvragen,
- ❑ Het maatschappelijk prioriteren doorkruist de wachtrijen.

3

Netcapaciteit

Hoe nu verder ??

- Energiebesparen !!
 - Spitsmijden : Technische – en/of organisatorische veranderingen (load-balancing)
-

- Decentraal produceren (Solar / wind)
 - Bufferen (Accu's/ Batterijen)
-

Nieuwe contractvormen via de netbeheerder:

- GroepsTransportOvereenkomst (GTO)
- CapaciteitsBeperkendContract (CBC)

- Let op! Codebesluit niet gebruikte transportrechten (GOTORK)

Wat kan de parkeerbranche bijdragen in het kader van netcongestie oplossingen?

Mobility Hubs

Mobiliteit en energie synergetisch bundelen



Energy Hubs

Lokale energieoplossingen
decentrale samenwerking



“Parkeergarage als batterij van de stad”

Bi-directioneel laden (V2X/V2G)

TNO QPARK SWECO TOPSECTOR ENERGIE
Empowering the new economy

RAPPORT

EINDVERSLAG
PARKEERGARAGE ALS BATTERIJ VOOR DE STAD



DATUM: 23-5-2018

Dit is een resultaat in het kader van:
Topsector energie - Systeemintegratiestudies
TESI117013 - Parkeergarage als batterij van de stad

An aerial view of a city with a blue network overlay consisting of glowing nodes and connecting lines, suggesting a smart city or energy network.

3

Netcapaciteit

Conclusies:

- ❑ We zitten midden in een systeemverandering, ...
..... dat gaat nog wel even duren...
- ❑ Vereist andere manier van denken en samenwerken,
- ❑ Gevolg is structureel meer spits- en daluren voor energie,
- ❑ Dat moeten parkeerexploitanten ook zélf meer gaan managen,
- ❑ Energiemanagement kan geld opleveren,
- ❑ Ga niet opnieuw het wiel uitvinden en begin nu!

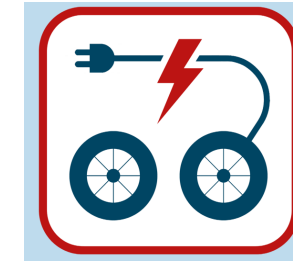
4

Verzekeraarbaarheid

- ❑ Overdracht van een (brand-)risico tegen vooraf overeengekomen voorwaarden en betaling van een overeengekomen risicopremie,
- ❑ Actuarialaat: Berekening risico's en premies in relatie tot te accepteren risico's van de verzekeraar,
- ❑ Risico's = Kans x Effect
 - ❑ “onverwacht en onvoorzien van buitenkomend onheil”,
- ❑ Wet- en regelgeving draagt bij aan risicoreductie, doch willen verzekeraars “meer”,
- ❑ Risk engineering processen: mitigatie en reductie van risico's,
 - ❑ Uitgangspunten voor EV laadpunten: Bouwkundig, Technisch, Organisatorisch
- ❑ Principes brandbestrijding:
 - ❑ Offensieve binneninzet versus, defensieve binnen- of buiteninzet (uitbrandscenario)
- ❑ Historische data “beperkt” aanwezig, NIPV heeft nu 3 jaar dataverzameling over AAV,

4

Verzekerbbaarheid



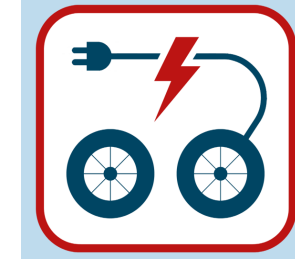
- ❑ Historische data “beperkt” aanwezig,
 - ❑ NIPV heeft nu 3 jaar dataverzameling over AAV, (2021-2022-2023, 2024 lopende)
 - ❑ ‘Database incidenten alternatief aangedreven voertuigen’.



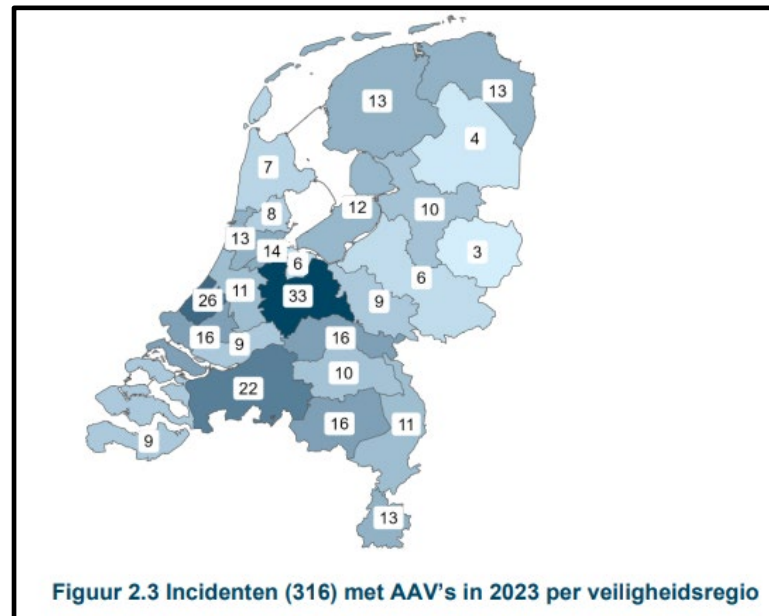
AAV: Alternatief Aangedreven Voertuigen: Full EV, Plug-ins, LNG, CNG, Waterstof,...

4

Verzekerbaarheid

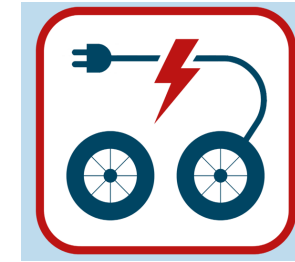


- ❑ Wat valt op in de 2023 rapportage van het NIPV
 - ❑ 152 geregistreerde branden, 163 voertuigen betrokken, 55% Full EV voertuigen,
 - ❑ 39 / 119 AAV branden aan een laadpaal en bij 11 daarvan was sprake van een accubrand (blz. 33),
 - ❑ De betrokkenheid van het accupakket in 2023 aanzienlijk lager was dan in 2022 (blz. 39),
 - ❑ In de jaarrapportage is niet specifiek opgenomen hoeveel incidenten in openbare of niet openbare parkeergarages hebben plaatsgevonden.



4

Verzekerbbaarheid



□ Samenvattend

- “Elektrische auto’s zijn net zo veilig als auto’s op brandstof”.
- “Over het geheel genomen lijken elektrische auto’s geen hoger veiligheidsrisico met zich mee te brengen dan conventionele auto’s”.
 - De jaarrapportages van het NIPV bevestigen de hoofdconclusie uit de RVO publicatie uit 2020:



5

Investeringsen & Data



Doorgaans een kostprijs van +/- 5.000 euro per laadpunt (excl. btw)

De investeringsbegroting zal worden beïnvloed door:

- Lokale uitbreiding en vernieuwingen in de E-installatie
- Netverzwaringen met bijbehorende kosten
- Netcongestiemaatregelen
- Lokale opslag en – productie



EUROPEAN PARKING ASSOCIATION

Positively promoting parking solutions for sustainable mobility

EV's & Fire Safety - Toolbox

Peter Dingemans, VEXPAN Vice President & EPA Board Member, Chair of EPA EV's & Fire Safety WG

Background

- 2022: EU commission set up a Task Force co-led by AVERE , the European Association for Electromobility.
- January 2023: EPA joined the EU Task Force.
- 2023: EPA survey circulated to its members: EV & Fire Safety is high on the agenda of almost all EPA members.
- First step : conduct a survey (from June to September 2023) to map out existing and planned legislations and regulations on fire and EV regulations throughout Europe.
- Kick-off meeting of the EV & Fire Safety working group: 4 April 2023.
- 9 National Associations and 6 Corporate Members joined the first meeting.
- Plan: develop an ‘EPA Toolbox’ that will allow owners, operators and managers of parking facilities to visualise the relevant issues involved in safely implementing EV charging infrastructure and thus make the right choices.
- EPA appointed Arup, expert consultants who, besides other areas, specialise in fire safety in combination with EV’s. On behalf of Arup, Sigurjon (Siggy) Ingolfsson as Senior Engineer specialising in Fire Engineering, is directly involved in the development of the toolbox.

Working Group Structure

In collaboration with: **ARUP**

National Associations



Corporate Members



EV's & Fire Safety - Toolbox

- EPA General Meeting Brussels September 26th, 2024
- Launch - Toolbox V1.0
- [Introduction](#)





EPA Fire Safety

Toolbox

EV charger guideline for fire safety

Toolbox overview

Within the toolbox, two main types of car parks are considered:

Naturally ventilated car parks



Enclosed car parks



Note, the definition for naturally ventilated car parks varies between countries. However, the overall principle is naturally ventilated superstructure.

In addition, two fire safety objectives are considered:

1. **Life Safety** – Considered to be the minimum requirement that building codes aim to achieve. Includes the life safety of building occupants as well as fire-fighters intervening in an incident.
2. **Operational continuity / property protection** – Considered to be the protection of the asset / parking operations or the resilience of the asset against fire beyond the minimum requirements to safeguard life.



Toolbox

Mitigation Measure Descriptions

Toolbox

Charger Installations



Mitigating Measure	Discussion of mitigating measure	Example countries where measure is a legal requirement (i.e. required by building code)
Charger Installations		
Provide certified and approved electric vehicle charge points	Electric Vehicle Charge points (EVCP) should meet the minimum set of technical regulation and be certified. EVCPs should ideally have overcurrent protection, tilt sensors, damage/fault reporting, temperature sensors and ventilation.	None, Generally recommended by relevant guidance
EVCPs installed by competent persons	EVCPs should be installed by persons with appropriate qualifications.	None, Generally recommended by relevant guidance
Provide a manual isolation switch to cut power supply to EVCPs	Cutting the supply of energy can control and reduce the likelihood of an energised electrical fire. These are primarily intended for firefighting use. However, it is noted that unwanted use of these should be mitigated against with good design. Some examples include locating the switch at the fire alarm panel or placing at height in agreement with local firefighters.	None, Generally recommended by relevant guidance
Provide automatic isolation of power supply linked to detection system / suppression system.	As per above but not linked to manual actuation.	None, Generally recommended by relevant guidance
Provide crash protection to the EVCP	Provides protection from impacts and as a result reduces the likelihood of faults developing in the EVCP. Note this applies primarily to pedestal mounted EV charging stations. Wall mounted stations may not require protection if the charger is mounted at height (~ 1.2 m).	None, Generally recommended by relevant guidance
Position the EVCP so that the charging cable can easily attach to the EV with a minimum length of cable	To reduce the risk of damage to the charging cables.	None, Generally recommended by relevant guidance
Provide security systems to deter deliberate damage	Security cameras and a management strategy can help to deter people deliberately damaging the EVCP.	None
Install Mode 3 or Mode 4 EVCPs (As defined by IEC 61851-1)	Mode 3 and Mode 4 type EVCPs have an in-built interface to monitor faults within the EVCP. Mode 2 chargers are not recommended to be installed. It is noted that Mode 4 EVCPs have potential fire hazards due to high charge-rates and thus place greater emphasis on appropriate installation.	None
Remove any faulty EVCPs or cables out of service	Charging with a faulty EVCP can lead to fires. EVCPs found to be faulty should be rectified before resuming service.	None, Generally recommended by relevant guidance
Consider the location of EVCPs.	The location of EVCPs should be considered in relation to the following factors to provide a balance which best satisfies the competing demands. It is understood that there is no single 'best place' to locate EVCPs: <ul style="list-style-type: none"> • Away from exits. • In areas where firefighters have ready access. • In areas with increased ventilation. 	None, Generally recommended by relevant guidance

Toolbox

Fire Detection & Alarm Systems

Mitigating Measure	Discussion of mitigating measure	Example countries where measure is a legal requirement (i.e. required by building code)
Fire Detection & Alarm Systems		
Provide automatic fire detection and alarm.	<p>Providing automatic fire detection and alarm will alert the occupants of a fire, allowing them to evacuate whilst the fire is in its early stages</p> <p>The provision of automatic fire detection allows early detection of a fire and can help facilitate first-aid firefighting intervention, e.g. by onsite management team (noting that not all car parks are managed by on-site staff), or early notification of the fire and rescue service.</p>	<p>Germany, Denmark</p> <p>Note: Dependent on car park size / other factors</p>
Provide thermal monitoring cameras within the car park.	Monitoring the temperature of the batteries within the EVs may give an indication of the status of the battery as it may detect early increases in temperature.	None
Provide voice alarm (linked to automatic detection) to alert occupants to evacuate.	A voice alarm is able to provide greater communication to occupants within the car park and can encourage occupants to evacuate quicker than a continuous siren, especially in unstaffed car parks. It is noted that voice alarm intelligibility can be difficult to achieve in all locations in some covered car parks which must be considered.	None
Link fire alarm to fire brigade dispatch.	<p>Linking any automatic fire alarm systems to the fire brigade dispatch could provide an enhanced response time. This must be balanced against potential false alarms.</p> <p>It is noted that not all countries permit the direct connection to fire brigade dispatch. It is recommended to consult with the local fire brigade as to the appropriate procedure to minimise call out times for confirmed fires.</p>	None

Toolbox



Construction materials and compartmentation

Mitigating Measure	Discussion of mitigating measure	Example countries where measure is a legal requirement (i.e. required by building code)
Construction materials and compartmentation		
Provide appropriate structural fire resistance within the car park	With the integration of EVs within car parks as well as modern car fuel loads, a minimum of 60 minutes structural fire resistance should be considered, unless additional measures such as water-based suppression is also installed, or extensive fire damage can be tolerated without impacting the life safety of occupants or firefighters.	Netherlands, Denmark.
Maintain existing fire resisting construction (Fire stopping penetrations)	Provision of new penetrations and services can reduce the fire resisting performance of the wall. Prior to installing EVCPs, the location of existing lines of fire resistant construction within the car park should be identified and any penetration openings fire stopped to maintain the level of fire resistance of that element.	Required throughout Europe.
Provide fire resistant construction between parking bays	If a parked car is involved in a fire, providing fire resistant construction between vehicles can reduce the likelihood of fire spread to adjacent vehicles. It is noted that this mitigation option carries substantial investment / effort with it which should be considered carefully.	None
Building envelope design of limited combustibility	As EVs may be parked adjacent to walls, Euro class A1 or A2 classified elements for the façade system are recommended to limit fire spread from a potential EV fire via the external wall to other levels.	None
Increase distance between parked cars	Increased distance between parked cars means that if a parked car is involved in a fire, the adjacent vehicle is exposed to less radiant heat and is therefore less likely to become involved in a fire. It is noted that this mitigation option carries substantial investment / effort with it which should be considered carefully.	None

Toolbox



Active systems

Mitigating Measure	Discussion of mitigating measure	Example countries where measure is a legal requirement (i.e. required by building code)
Fire suppression		
Provide water-based fire suppression within the car park	<p>In the case of a vehicle adjacent to EV(s) being on fire, water-based fire suppression provides water coverage to the fire and the surrounding area, cooling to the surrounding environment and reduces the risk of increasing the temperature of the battery within the EV as a result of external heating.</p> <p>The provision of water-based fire suppression should in the event of vehicle fire reduce the rate of fire spread to adjacent vehicles thus minimising the spread of fire across the carpark and reducing the risk of structural damage and increasing the ability of the fire brigade to control the incident.</p> <p>The merits of sprinklers also reduces the risk of operational down time due to full floor or multiple levels being impacted by the fire event. Careful consideration is required for any retro fit of suppression especially in non-weathered naturally ventilated carpark levels where pre-action/dry pipe systems may be required to account for freezing/low temperature conditions.</p>	<p>Denmark</p> <p>Note: Only if car park is defined as enclosed rather than naturally ventilated.</p> <p>France (if more than 2 levels are provided)</p>
Provide manual firefighting measures in the vicinity of chargers	If fire extinguishers and dedicated EV fire blankets are provided near to the EV charging bays, this may allow early intervention.	None
Smoke exhaust		
Provide a smoke management system (within enclosed car parks).	Due to the greater presence of toxic gases released during an EV fire, a smoke clearance system with a set number of air changes per hour for a mechanical system or increased area of ventilation for a natural system could be provided. It is noted that definitions for natural ventilation vary depending on location.	UK, Ireland (Mechanical ventilation)
Firefighting access and facilities		
Provide firefighting water supply	More water is required to tackle an EV fire compared to an ICEV fire. When the battery becomes involved in an EV fire, the increased water supply is required to cool the deep-seated battery pack. It is recommended that local fire brigades are consulted as to their water needs.	Required throughout Europe
Provide premises informational plans to help inform firefighting operations	Additional information allows fire and rescue services to understand what measures are available in the building to protect firefighters and inform firefighting tactics to fight a fire.	None
Provide water run-off control and containment	The firefighting water/suppression used to fight an EV fire may contain higher concentrations of contaminants.	None
Provide access for removal of EVs that have been on fire	To minimise the risk of re-ignition of the battery, the EV that was on fire may need to be physically removed post-fire for monitoring and further extinguishment external to the covered car park.	None

Toolbox

Naturally Ventilated Car Park – Asset / property protection & operational continuity

Toolbox



Naturally ventilated car parking – Asset / property protection & operational continuity

Mitigation measure	Fire safety benefit			Capital cost			Operational cost			Recommendation Category		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Standard	Moderate Effort	Substantial Effort
Charger installations												
Provide certified and approved electric vehicle charge points			X	X			X			X		
EVCPs installed by competent persons			X	X			X			X		
Provide a manual isolation switch to cut power supply of EVCPs		X		X			X			X		
Provide automatic isolation of power supply linked to detection system / suppression system / automatic de-energisation of connection cables		X		X			X			X		
Provide car park layout that reduces the likelihood of collisions		X		X			X			X		
Provide crash protection to the EVCP		X		X			X			X		
Routine inspections by a competent organisation			X	X				X		X		
Position the EVCP so that the charging cable can easily attach to the EV with a minimum length of cable		X		X			X			X		
Provide security systems to deter deliberate damage	X			X			X			X		
Install Mode 3 or Mode 4 EVCPs		X			X		X			X		
Remove any faulty EVCPs out of service		X		X			X			X		
Consider the location of EVCPs		X		X			X			X		

Toolbox



Naturally ventilated car parking – Asset / property protection & operational continuity

Mitigation measure	Fire safety benefit			Capital cost			Operational cost			Recommendation Category		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Standard	Moderate Effort	Substantial Effort
Means of escape and warning												
Provide thermal monitoring cameras within the car park	X				X			X			X	
Provide automatic fire detection and alarm			X		X			X			X	
Provide voice alarm	X				X			X				X
Link fire alarm to fire brigade dispatch		X		X				X		X		
Construction materials and compartmentation												
Provide appropriate structural fire resistance within the car park			X		X		X			X		
Maintain existing fire resisting construction (Fire stopping penetrations)		X		X			X			X		
Provide fire resistant construction between parking bays		X				X	X				X	
Building Envelope design of limited combustibility			X	X			X			X		
Increase distance between parked cars		X				X	X				X	
Fire suppression												
Provide water-based fire suppression within the car park			X			X		X		X		
Provide manual firefighting measures in the vicinity of chargers	X			X			X			X		

Toolbox



Naturally ventilated car parking – Asset / property protection & operational continuity

Mitigation measure	Fire safety benefit			Capital cost			Operational cost			Recommendation Category		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Standard	Moderate Effort	Substantial Effort
Smoke exhaust												
Provide a smoke management system	X				X			X				X
Firefighting access and facilities												
Provide firefighting water supply			X	X			X			X		
Provide premises informational plans to help inform firefighting operations		X		X			X			X		
Provide water run-off control and containment		X				X		X			X (depending on building circumstances)	X (depending on building circumstances)
Provide access for removals of EVs that have been on fire			X			X	X				X	



Toolbox

Case Studies

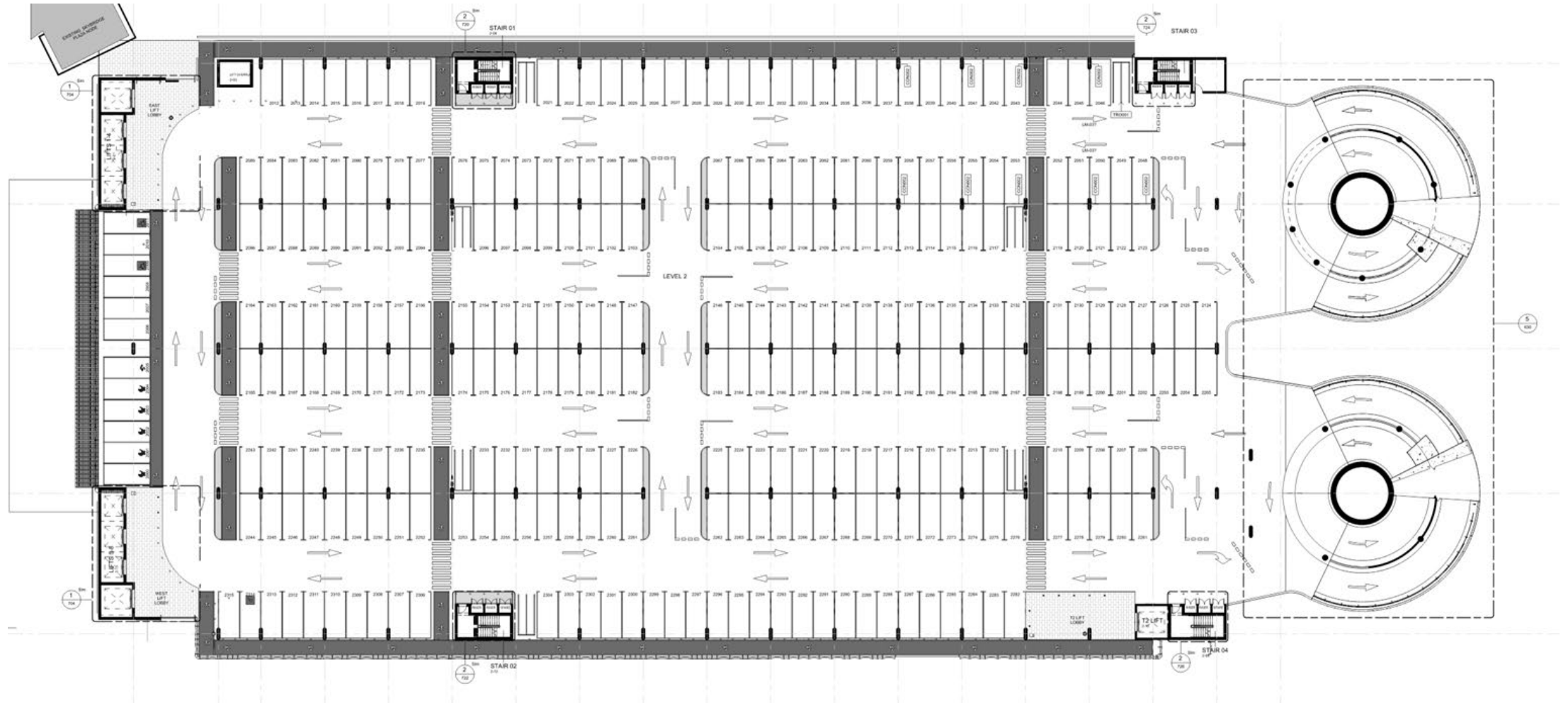
Case Study 1

Background Information

- A naturally ventilated car park (on all sides).
- The car park is multi-storey and standalone.
- EV chargers are to be retrofit into the existing building.
- The study concerns life safety needs.
- The example represents a single potential use of the toolbox to tailor mitigation measures to the fire strategy of the building.
- Commentary has also been provided to inform the reader about considerations that may influence the adoption (or not) of certain mitigation measures.
- This case study does not address fire spread to adjacent buildings which may necessitate additional measures to control fire spread.

Case Study 1

Floorplate Layout



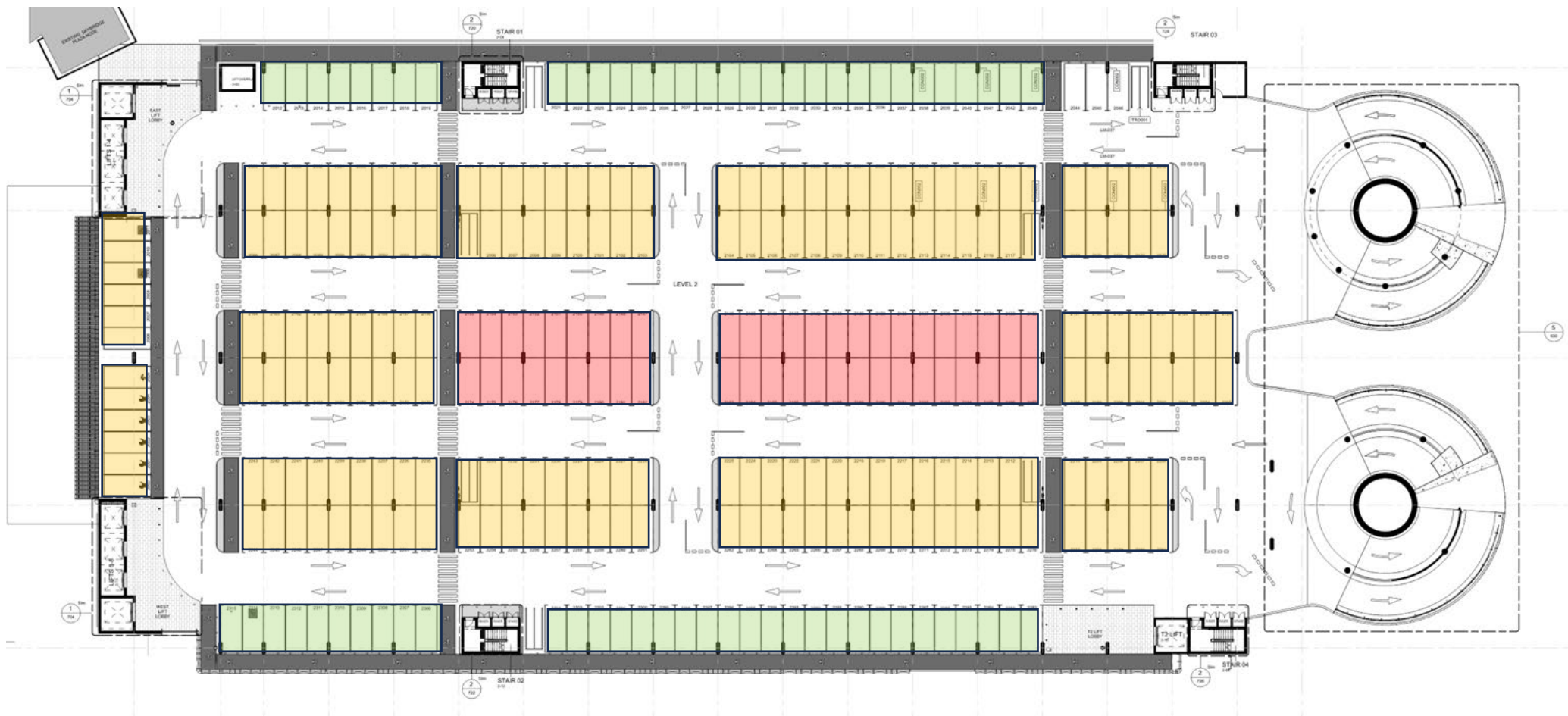
Case Study 1

Standalone - Life safety focus

Mitigation Measure	Recommendation category	Selected for application?	Notes
Charger installations			
Provide certified and approved electric vehicle charge points	Standard	Yes	Charge points according to EN IEC 61851-1:2019 in conjunction with the relevant parts of the EN IEC 61439 series & EN IEC 62208:2023
EVCPs installed by competent persons	Standard	Yes	
Provide a manual isolation switch to cut power supply of EVCPs	Moderate effort	Yes	Should be located in an area easily reachable by firefighters. Within the vicinity of a fire alarm panel (if present).
Provide automatic isolation of power supply linked to detection system / suppression system / automatic de-energisation of connection cables	Standard	Yes	
Provide car park layout that reduces the likelihood of collisions	Standard	Yes	
Provide crash protection to the EVCP	Standard	Yes	
Routine inspections by a responsible organisation	Moderate effort	Yes	Recommended to be implemented as part of good practice for customer service.
Position the EVCP so that the charging cable can easily attach to the EV with a minimum length of cable	Standard	Yes	
Provide security systems to deter deliberate damage	Moderate effort	Yes	Linked to other security measures (e.g. CCTV) provided within the car park.
Install mode 3 or Mode 4 EVCPs	Standard	Yes	Mode 3 chargers considered to have relatively lower risk associated.
Remove any faulty EVCPs out of service	Standard	Yes	Faults can be identified through regular inspections as well as with automatic monitoring.
Consider the location of EVCPs	Standard	Yes	Location recommendations with rationale highlighted on the next page

Case Study 1

Charger locations in order of preference



Notes

Well ventilated (on perimeter), Easily accessed by firefighters (close to fire-fighting stairs), Does not impact on egress routes

Ventilated (but on floorplate), Easily accessed by firefighters (relatively close to fire-fighting stairs), Minor impact on egress routes (alternative routes available)

Ventilated (but on floorplate), challenging fire-fighting access (far from fire-fighting stairs), minor impact on egress routes (alternative routes available)

Case Study 1

Standalone - Life safety focus

Mitigation Measure	Recommendation category	Selected for application?	Notes
Means of egress and warning			
Provide thermal monitoring cameras within the car park	Moderate effort	No	Thermal monitoring cameras could provide an improvement for asset protection / operational continuity by providing means of detecting elevated temperatures prior to onset of thermal runaway.
Provide automatic fire detection and alarm	Moderate effort	Yes	A thermal detection system provided due to car park size. Omission of detection could be considered by the stakeholders.
Provide voice alarm	Substantial effort	No	Achieving sufficient speech intelligibility for voice alarm systems within car parks can prove difficult.
Link fire alarm to fire brigade dispatch	Moderate effort	No	Could be considered by the stakeholders as an improvement for asset protection.
Construction materials and compartmentation			
Provide appropriate structural fire resistance within the car park	Standard	Yes	A minimum of 60-minute fire resistance is considered appropriate.
Maintain existing fire resisting construction (Fire stopping penetrations)	Standard	Yes	Fire separation between floor levels within the sample design is provided via solid floor slabs & external ramp locations.
Provide fire resistant construction between parking bays	Substantial effort	No	For life safety purposes, in this instance, the value of providing fire resistant construction between bays is limited in comparison with the impact on daily usability & cost.
Building Envelope design of limited combustibility	Moderate effort	Yes	Provided to limit potential for fire spread between levels.
Increase distance between parked cars	Substantial effort	No	Gaps between parked banks of cars are provided by this design via the egress routes. However, separation between individual bays was not considered appropriate by the stakeholders. As an existing structure, increasing distance is challenging.

An aerial view of a city with a blue digital network overlay. The network consists of glowing blue nodes connected by thin lines, creating a complex web across the city's layout. The background shows buildings, streets, and a parking lot with several cars. The overall color palette is dominated by blues and greens, with a semi-transparent light green banner in the center.

Dank voor uw aandacht!

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