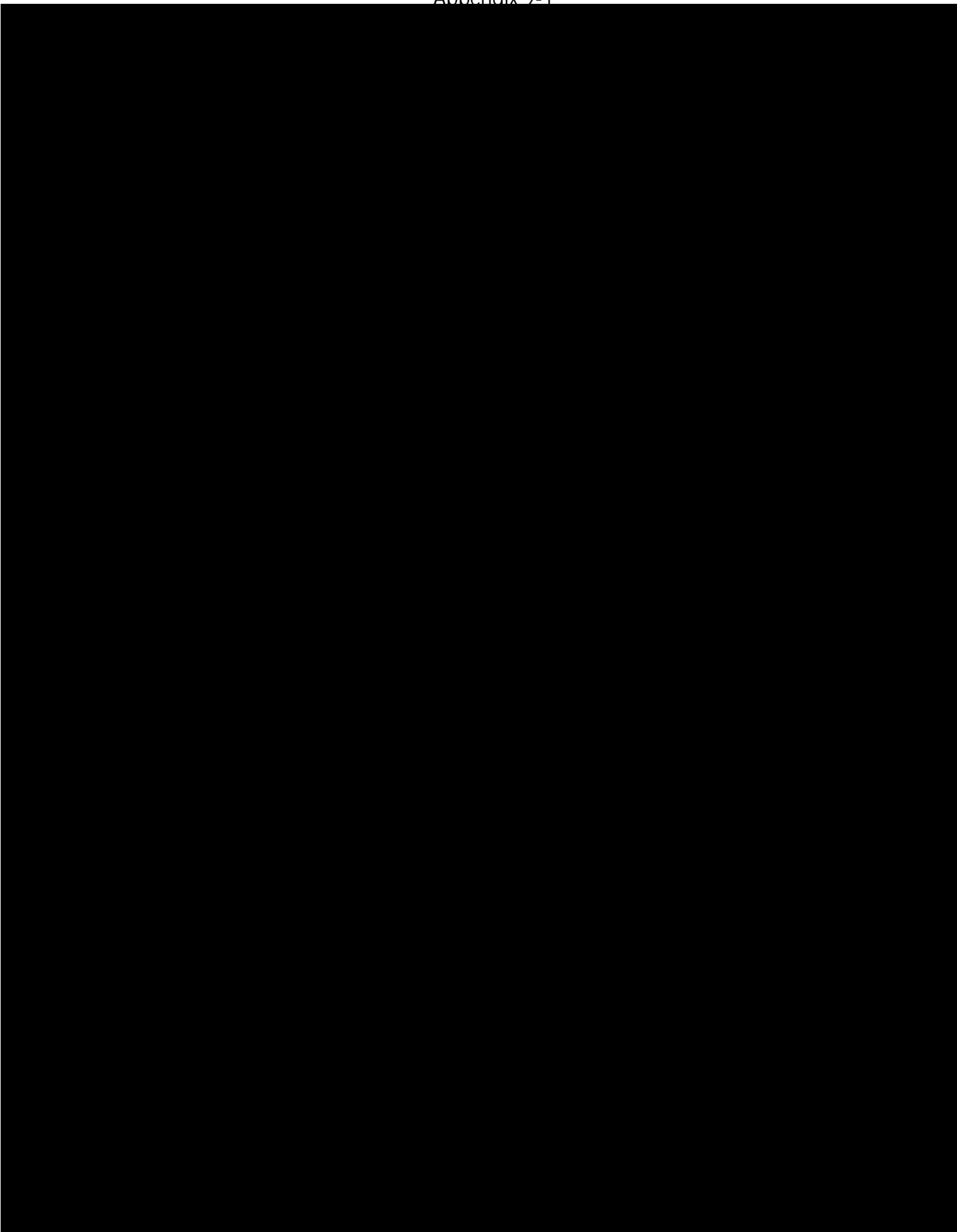


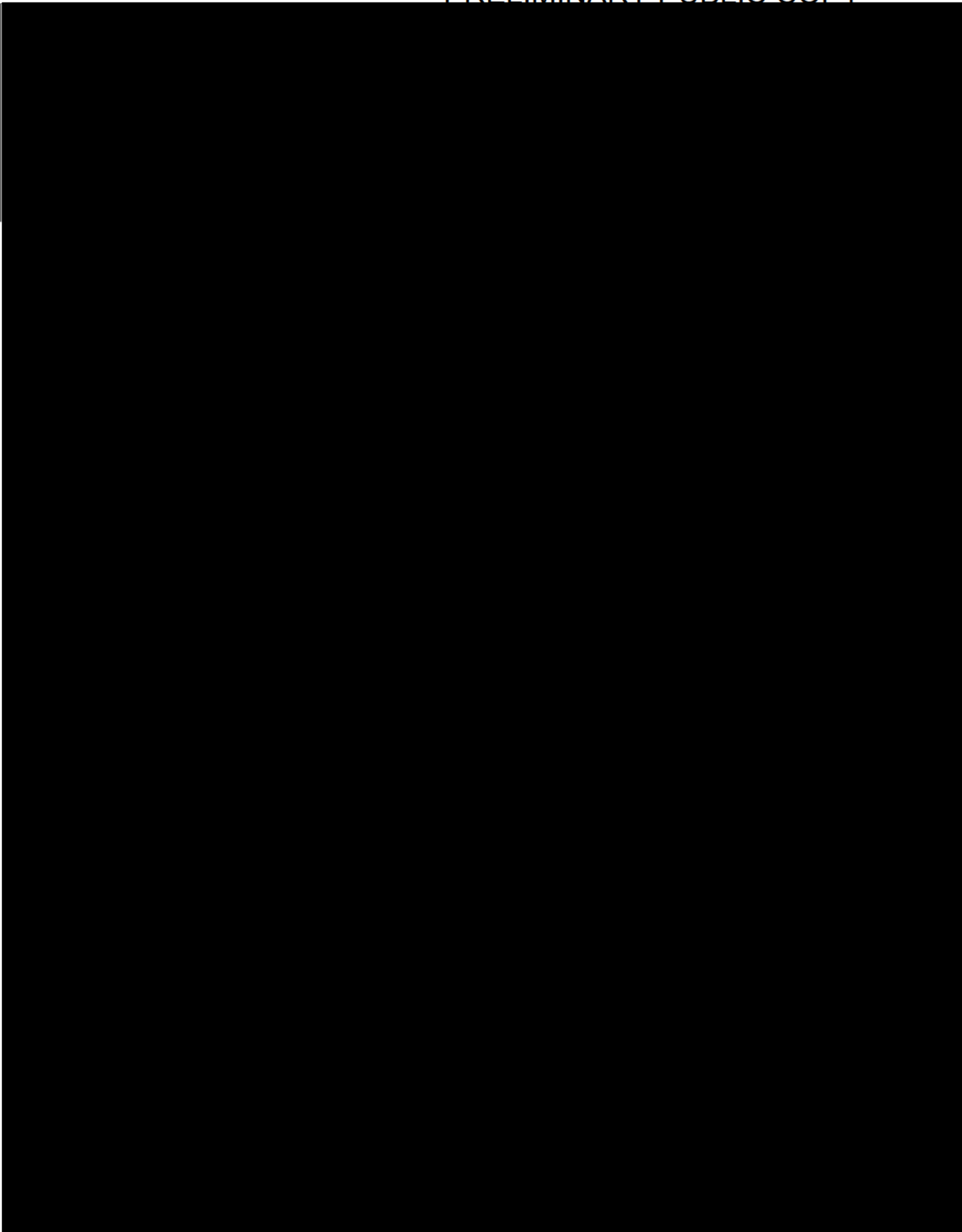


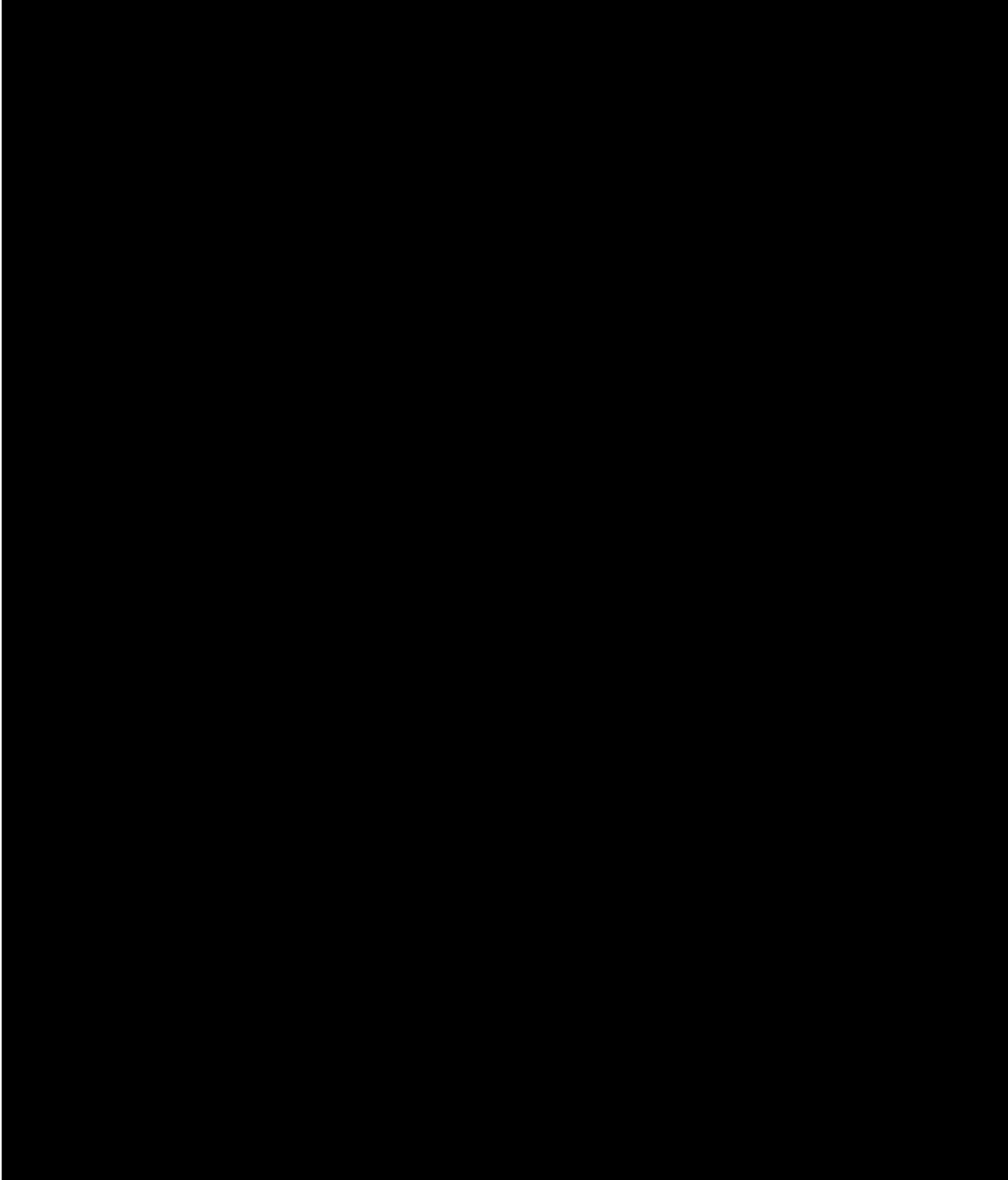
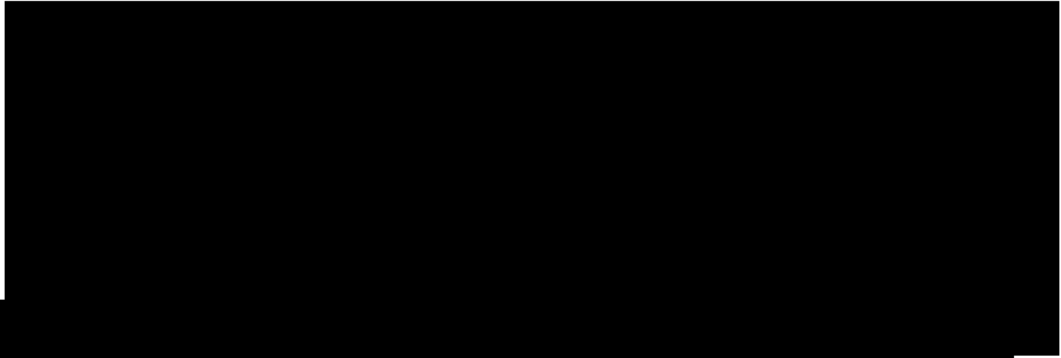
## Section 9: Environmental Protection Plan and Emission Impact

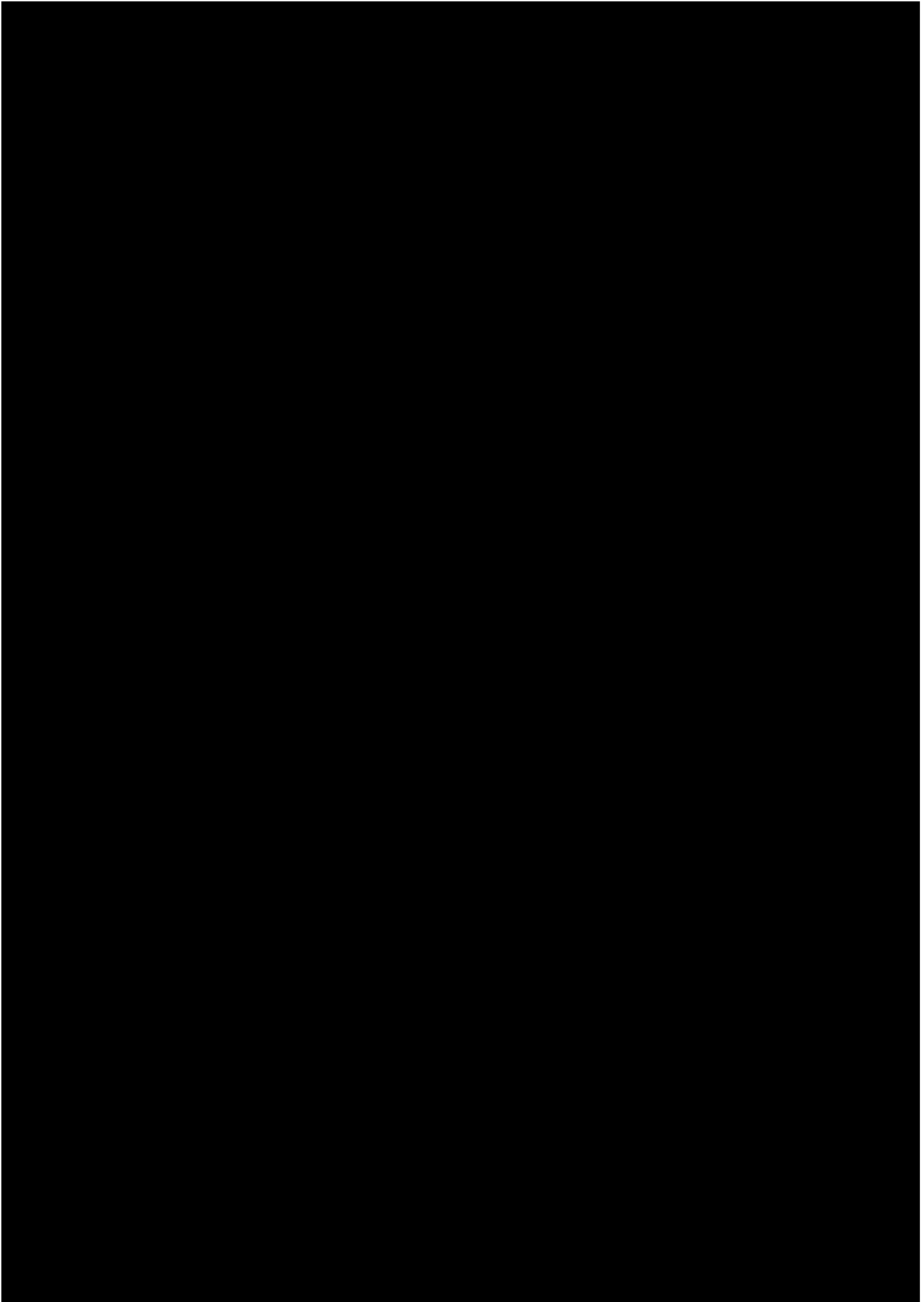
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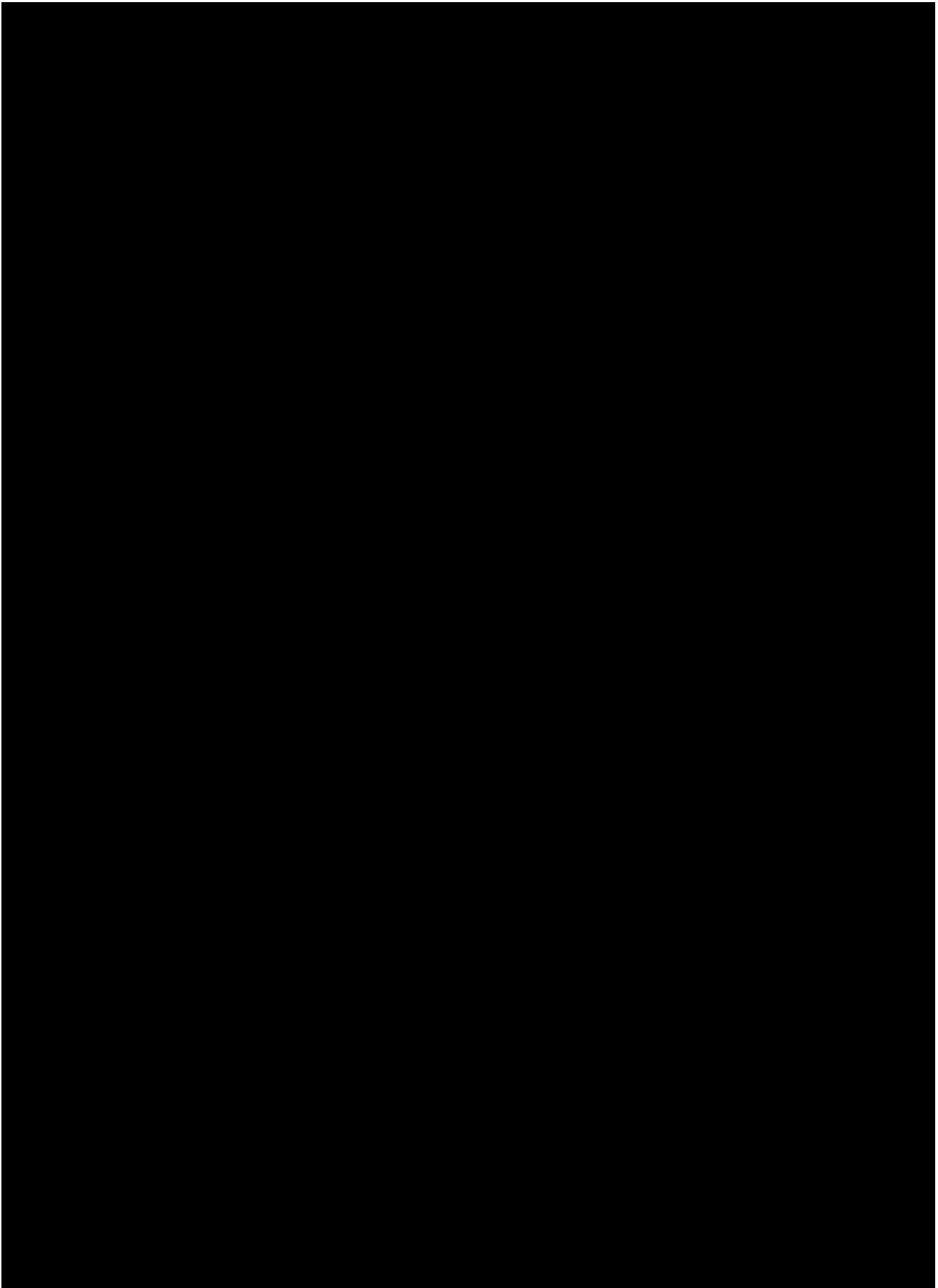
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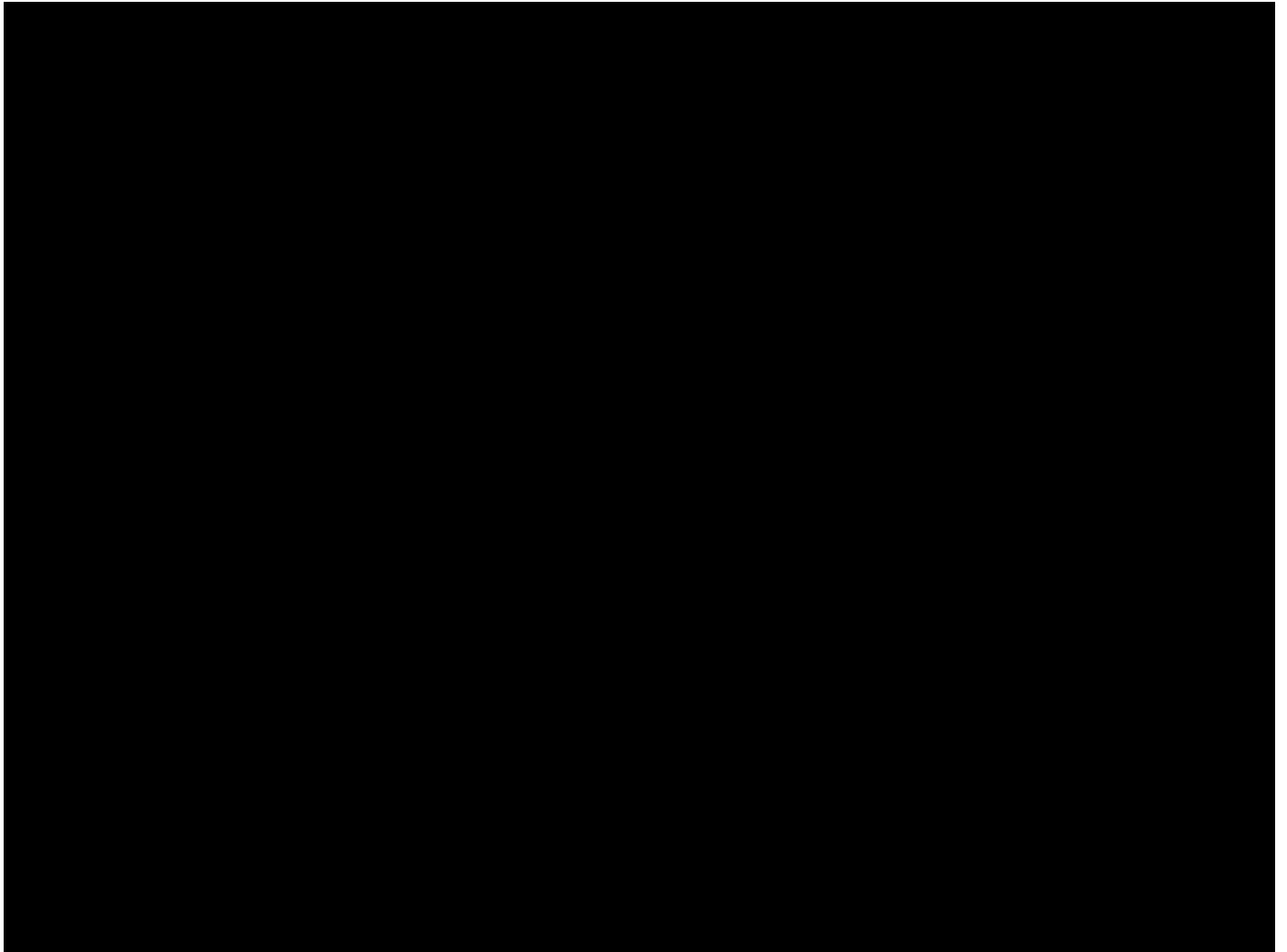


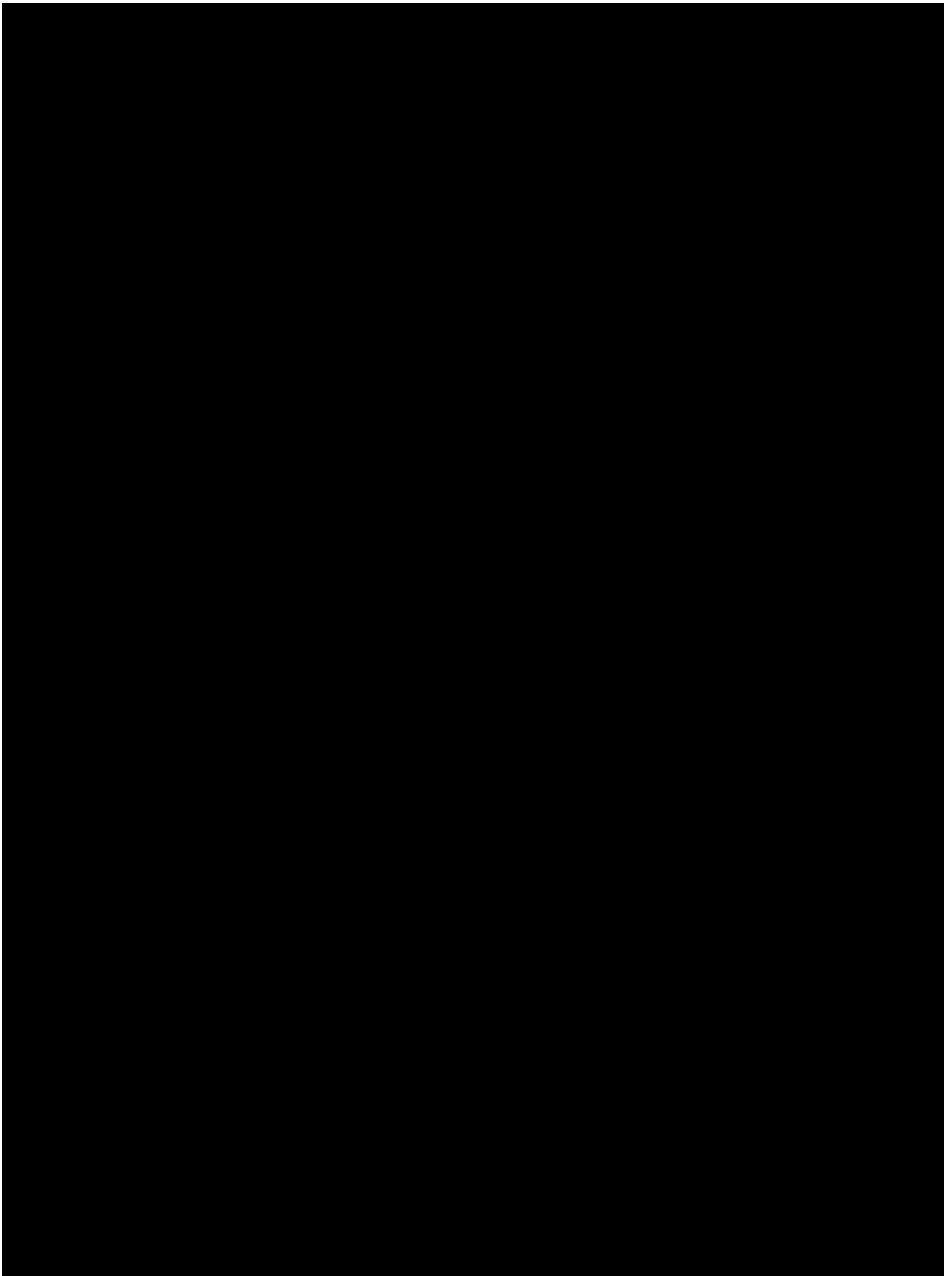






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Appendix 9-2. Representative List of Avian and Bat Species Observed in the Vicinity of the Atlantic Shores Project Area (onshore and offshore)

Type	Common Name	Scientific Name	Family	Order	Source
Avian	Black-bellied Whistling-Duck	<i>Dendrocygna autumnalis</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Snow Goose	<i>Anser caerulescens</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Ross's Goose	<i>Anser rossii</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Greater White-fronted Goose	<i>Anser albifrons</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Pink-footed Goose	<i>Anser brachyrhynchus</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Brant	<i>Branta bernicla</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Barnacle Goose	<i>Branta leucopsis</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Cackling Goose	<i>Branta hutchinsii</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Canada Goose	<i>Branta canadensis</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	goose sp.		Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	NJ Baseline Study
Avian	Mute Swan	<i>Cygnus olor</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Trumpeter Swan	<i>Cygnus buccinator</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Tundra Swan	<i>Cygnus columbianus</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Wood Duck	<i>Aix sponsa</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Blue-winged Teal	<i>Spatula discors</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Northern Shoveler	<i>Spatula clypeata</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Gadwall	<i>Mareca strepera</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Eurasian Wigeon	<i>Mareca penelope</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	American Wigeon	<i>Mareca americana</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Mallard	<i>Anas platyrhynchos</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	American Black Duck	<i>Anas rubripes</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Northern Pintail	<i>Anas acuta</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Green-winged Teal	<i>Anas crecca</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	dabbling duck sp.		Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	NJ Baseline Study
Avian	Canvasback	<i>Aythya valisineria</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Redhead	<i>Aythya americana</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Ring-necked Duck	<i>Aythya collaris</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Tufted Duck	<i>Aythya fuligula</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Greater Scaup	<i>Aythya marila</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Lesser Scaup	<i>Aythya affinis</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Aythya sp.		Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	NJ Baseline Study
Avian	scaup sp.		Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	NJ Baseline Study
Avian	King Eider	<i>Somateria spectabilis</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Common Eider	<i>Somateria mollissima</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Harlequin Duck	<i>Histrionicus histrionicus</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Surf Scoter	<i>Melanitta perspicillata</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	White-winged Scoter	<i>Melanitta deglandi</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Black Scoter	<i>Melanitta americana</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	scoter sp.		Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	NJ Baseline Study
Avian	Long-tailed Duck	<i>Clangula hyemalis</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Bufflehead	<i>Bucephala albeola</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Common Goldeneye	<i>Bucephala clangula</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Hooded Merganser	<i>Lophodytes cucullatus</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Common Merganser	<i>Mergus merganser</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird
Avian	Red-breasted Merganser	<i>Mergus serrator</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	Ruddy Duck	<i>Oxyura jamaicensis</i>	Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	eBird; NJ Baseline Study
Avian	duck sp.		Anatidae (Ducks, Geese, and Waterfowl)	Anseriformes	NJ Baseline Study
Avian	Northern Bobwhite	<i>Colinus virginianus</i>	Odontophoridae (New World Quail)	Galliformes	eBird
Avian	Ring-necked Pheasant	<i>Phasianus colchicus</i>	Phasianidae (Pheasants, Grouse, and Allies)	Galliformes	eBird
Avian	Ruffed Grouse	<i>Bonasa umbellus</i>	Phasianidae (Pheasants, Grouse, and Allies)	Galliformes	eBird
Avian	Wild Turkey	<i>Meleagris gallopavo</i>	Phasianidae (Pheasants, Grouse, and Allies)	Galliformes	eBird
Avian	Pied-billed Grebe	<i>Podilymbus podiceps</i>	Podicipedidae (Grebes)	Podicipediformes	eBird; NJ Baseline Study
Avian	Horned Grebe	<i>Podiceps auritus</i>	Podicipedidae (Grebes)	Podicipediformes	eBird; NJ Baseline Study
Avian	Red-necked Grebe	<i>Podiceps grisegena</i>	Podicipedidae (Grebes)	Podicipediformes	eBird; NJ Baseline Study
Avian	Eared Grebe	<i>Podiceps nigricollis</i>	Podicipedidae (Grebes)	Podicipediformes	eBird
Avian	Rock Pigeon	<i>Columba livia</i>	Columbidae (Pigeons and Doves)	Columbiformes	eBird; NJ Baseline Study
Avian	White-winged Dove	<i>Zenaida asiatica</i>	Columbidae (Pigeons and Doves)	Columbiformes	eBird
Avian	Mourning Dove	<i>Zenaida macroura</i>	Columbidae (Pigeons and Doves)	Columbiformes	eBird; NJ Baseline Study
Avian	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Cuculidae (Cuckoos)	Cuculiformes	eBird
Avian	Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Cuculidae (Cuckoos)	Cuculiformes	eBird
Avian	Common Nighthawk	<i>Chordeiles minor</i>	Caprimulgidae (Nightjars and Allies)	Caprimulgiformes	eBird
Avian	Chuck-will's-widow	<i>Antrostomus carolinensis</i>	Caprimulgidae (Nightjars and Allies)	Caprimulgiformes	eBird
Avian	Eastern Whip-poor-will	<i>Antrastomus vociferus</i>	Caprimulgidae (Nightjars and Allies)	Caprimulgiformes	eBird
Avian	Chimney Swift	<i>Chaetura pelagica</i>	Apodidae (Swifts)	Caprimulgiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Ruby-throated Hummingbird	<i>Archilochus colubris</i>	Trochilidae (Hummingbirds)	Caprimulgiformes	eBird; NJ Baseline Study
Avian	Rufous Hummingbird	<i>Selasphorus rufus</i>	Trochilidae (Hummingbirds)	Caprimulgiformes	eBird
Avian	Allen's Hummingbird	<i>Selasphorus sasin</i>	Trochilidae (Hummingbirds)	Caprimulgiformes	eBird
Avian	King Rail	<i>Rallus elegans</i>	Rallidae (Rails, Gallinules, and Coots)	Gruiformes	eBird
Avian	Clapper Rail	<i>Rallus crepitans</i>	Rallidae (Rails, Gallinules, and Coots)	Gruiformes	eBird
Avian	Virginia Rail	<i>Rallus limicola</i>	Rallidae (Rails, Gallinules, and Coots)	Gruiformes	eBird
Avian	Sora	<i>Porzana carolina</i>	Rallidae (Rails, Gallinules, and Coots)	Gruiformes	eBird
Avian	Common Gallinule	<i>Gallinula galeata</i>	Rallidae (Rails, Gallinules, and Coots)	Gruiformes	eBird
Avian	American Coot	<i>Fulica americana</i>	Rallidae (Rails, Gallinules, and Coots)	Gruiformes	eBird; NJ Baseline Study
Avian	Purple Gallinule	<i>Porphyrio martinica</i>	Rallidae (Rails, Gallinules, and Coots)	Gruiformes	eBird
Avian	Sandhill Crane	<i>Antigone canadensis</i>	Gruidae (Cranes)	Gruiformes	eBird
Avian	Black-necked Stilt	<i>Himantopus mexicanus</i>	Recurvirostridae (Stilts and Avocets)	Charadriiformes	eBird
Avian	American Avocet	<i>Recurvirostra americana</i>	Recurvirostridae (Stilts and Avocets)	Charadriiformes	eBird
Avian	American Oystercatcher	<i>Haematopus palliatus</i>	Haematopodidae (Oystercatchers)	Charadriiformes	eBird; NJ Baseline Study
Avian	Black-bellied Plover	<i>Pluvialis squatarola</i>	Charadriidae (Plovers and Lapwings)	Charadriiformes	eBird; NJ Baseline Study
Avian	European Golden-Plover	<i>Pluvialis apricaria</i>	Charadriidae (Plovers and Lapwings)	Charadriiformes	eBird
Avian	American Golden-Plover	<i>Pluvialis dominica</i>	Charadriidae (Plovers and Lapwings)	Charadriiformes	eBird
Avian	Wilson's Plover	<i>Charadrius wilsonia</i>	Charadriidae (Plovers and Lapwings)	Charadriiformes	eBird
Avian	Semipalmated Plover	<i>Charadrius semipalmatus</i>	Charadriidae (Plovers and Lapwings)	Charadriiformes	eBird; NJ Baseline Study
Avian	Piping Plover	<i>Charadrius melodus</i>	Charadriidae (Plovers and Lapwings)	Charadriiformes	eBird; Loring et al. 2019
Avian	Killdeer	<i>Charadrius vociferus</i>	Charadriidae (Plovers and Lapwings)	Charadriiformes	eBird
Avian	Upland Sandpiper	<i>Bartramia longicauda</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Whimbrel	<i>Numenius phaeopus</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Hudsonian Godwit	<i>Limosa haemastica</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Marbled Godwit	<i>Limosa fedoa</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Ruddy Turnstone	<i>Arenaria interpres</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Red Knot	<i>Calidris canutus</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; Motus
Avian	Ruff	<i>Calidris pugnax</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Stilt Sandpiper	<i>Calidris himantopus</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Curlew Sandpiper	<i>Calidris ferruginea</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Sanderling	<i>Calidris alba</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Dunlin	<i>Calidris alpina</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Purple Sandpiper	<i>Calidris maritima</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Baird's Sandpiper	<i>Calidris bairdii</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Least Sandpiper	<i>Calidris minutilla</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	White-rumped Sandpiper	<i>Calidris fuscicollis</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Buff-breasted Sandpiper	<i>Calidris subruficollis</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Pectoral Sandpiper	<i>Calidris melanotos</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Semipalmated Sandpiper	<i>Calidris pusilla</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Western Sandpiper	<i>Calidris mauri</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	peep sp.		Scolopacidae (Sandpipers and Allies)	Charadriiformes	NJ Baseline Study
Avian	Short-billed Dowitcher	<i>Limnodromus griseus</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Short-billed/Long-billed Dowitcher	<i>Limnodromus griseus/scolopaceus</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	NJ Baseline Study
Avian	American Woodcock	<i>Scolopax minor</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Wilson's Snipe	<i>Gallinago delicata</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Wilson's Phalarope	<i>Phalaropus tricolor</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Red-necked Phalarope	<i>Phalaropus lobatus</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Red Phalarope	<i>Phalaropus fulicarius</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	phalarope sp.		Scolopacidae (Sandpipers and Allies)	Charadriiformes	NJ Baseline Study
Avian	Spotted Sandpiper	<i>Actitis macularius</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Solitary Sandpiper	<i>Tringa solitaria</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Greater Yellowlegs	<i>Tringa melanoleuca</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Common Greenshank	<i>Tringa nebularia</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird
Avian	Willet	<i>Tringa semipalmata</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Lesser Yellowlegs	<i>Tringa flavipes</i>	Scolopacidae (Sandpipers and Allies)	Charadriiformes	eBird; NJ Baseline Study
Avian	Scolopacidae sp.		Scolopacidae (Sandpipers and Allies)	Charadriiformes	NJ Baseline Study

Avian	large shorebird sp.		Scolopacidae (Sandpipers and Allies)	Charadriiformes	NJ Baseline Study
Avian	shorebird sp.			Charadriiformes	NJ Baseline Study
Avian	skua sp.		Stercorariidae (Skuas and Jaegers)	Charadriiformes	NOAA Ecosystem Monitoring
Avian	Pomarine Jaeger	<i>Stercorarius pomarinus</i>	Stercorariidae (Skuas and Jaegers)	Charadriiformes	NJ Baseline Study
Avian	Parasitic Jaeger	<i>Stercorarius parasiticus</i>	Stercorariidae (Skuas and Jaegers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	jaeger sp.		Stercorariidae (Skuas and Jaegers)	Charadriiformes	NJ Baseline Study
Avian	Dovekie	<i>Alle alle</i>	Alcidae (Auks, Murres, and Puffins)	Charadriiformes	eBird; NJ Baseline Study
Avian	Common Murre	<i>Uria aalge</i>	Alcidae (Auks, Murres, and Puffins)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Thick-billed Murre	<i>Uria lomvia</i>	Alcidae (Auks, Murres, and Puffins)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Razorbill	<i>Alca torda</i>	Alcidae (Auks, Murres, and Puffins)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	large alcid sp.		Alcidae (Auks, Murres, and Puffins)	Charadriiformes	NOAA Ecosystem Monitoring
Avian	Black Guillemot	<i>Cephus grylle</i>	Alcidae (Auks, Murres, and Puffins)	Charadriiformes	NJ Baseline Study
Avian	Atlantic Puffin	<i>Fratercula arctica</i>	Alcidae (Auks, Murres, and Puffins)	Charadriiformes	NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	alcid sp.		Alcidae (Auks, Murres, and Puffins)	Charadriiformes	NJ Baseline Study
Avian	Black-legged Kittiwake	<i>Rissa tridactyla</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Sabine's Gull	<i>Xema sabini</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	NJ Baseline Study
Avian	Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird
Avian	Little Gull	<i>Hydrocoloeus minutus</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study
Avian	Laughing Gull	<i>Leucophaeus atricilla</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Ring-billed Gull	<i>Larus delawarensis</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Herring Gull	<i>Larus argentatus</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Iceland Gull	<i>Larus glaucooides</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study
Avian	Lesser Black-backed Gull	<i>Larus fuscus</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Glaucous Gull	<i>Larus hyperboreus</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird
Avian	Great Black-backed Gull	<i>Larus marinus</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	gull sp.		Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	NOAA Ecosystem Monitoring
Avian	small gull sp.		Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	NJ Baseline Study
Avian	large gull sp.		Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Least Tern	<i>Sternula antillarum</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study
Avian	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird
Avian	Caspian Tern	<i>Hydroprogne caspia</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study
Avian	Black Tern	<i>Chlidonias niger</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study
Avian	Roseate Tern	<i>Sterna dougallii</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NOAA Ecosystem Monitoring
Avian	Common Tern	<i>Sterna hirundo</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Arctic Tern	<i>Sterna paradisaea</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird
Avian	Forster's Tern	<i>Sterna forsteri</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study
Avian	Royal Tern	<i>Thalasseus maximus</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Sandwich Tern	<i>Thalasseus sandvicensis</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird; NJ Baseline Study
Avian	Thalasseus sp.		Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	NJ Baseline Study
Avian	tern sp.		Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Black Skimmer	<i>Rynchops niger</i>	Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	eBird
Avian	gull/tern sp.		Laridae (Gulls, Terns, and Skimmers)	Charadriiformes	NJ Baseline Study
Avian	Red-throated Loon	<i>Gavia stellata</i>	Gaviidae (Loons)	Gaviiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Pacific Loon	<i>Gavia pacifica</i>	Gaviidae (Loons)	Gaviiformes	eBird
Avian	Common Loon	<i>Gavia immer</i>	Gaviidae (Loons)	Gaviiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	loon sp.		Gaviidae (Loons)	Gaviiformes	NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Wilson's Storm-Petrel	<i>Oceanites oceanicus</i>	Oceanitidae (Southern Storm-Petrels)	Procellariiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Leach's Storm-petrel	<i>Oceanodroma leucorhoa</i>	Hydrobatidae (Northern Storm-Petrels)	Procellariiformes	NJ Baseline Study
Avian	storm-petrel sp.			Procellariiformes	NJ Baseline Study
Avian	Northern Fulmar	<i>Fulmarus glacialis</i>	Procellariidae (Shearwaters and Petrels)	Procellariiformes	NJ Baseline Study
Avian	Cory's Shearwater	<i>Calonectris diomedea</i>	Procellariidae (Shearwaters and Petrels)	Procellariiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Great Shearwater	<i>Ardenna gravis</i>	Procellariidae (Shearwaters and Petrels)	Procellariiformes	eBird; NJ Baseline Study
Avian	Sooty Shearwater	<i>Ardenna grisea</i>	Procellariidae (Shearwaters and Petrels)	Procellariiformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Manx Shearwater	<i>Puffinus puffinus</i>	Procellariidae (Shearwaters and Petrels)	Procellariiformes	eBird; NJ Baseline Study
Avian	Audubon's Shearwater	<i>Puffinus lherminieri</i>	Procellariidae (Shearwaters and Petrels)	Procellariiformes	NJ Baseline Study
Avian	black-and-white shearwater sp.		Procellariidae (Shearwaters and Petrels)	Procellariiformes	NJ Baseline Study
Avian	Wood Stork	<i>Mycteria americana</i>	Ciconiidae (Storks)	Ciconiiformes	eBird
Avian	Northern Gannet	<i>Morus bassanus</i>	Sulidae (Boobies and Gannets)	Suliformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Great Cormorant	<i>Phalacrocorax carbo</i>	Phalacrocoracidae (Cormorants and Shags)	Suliformes	eBird; NJ Baseline Study
Avian	Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Phalacrocoracidae (Cormorants and Shags)	Suliformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	cormorant sp.		Phalacrocoracidae (Cormorants and Shags)	Suliformes	NJ Baseline Study
Avian	American White Pelican	<i>Pelecanus erythrorhynchos</i>	Pelecanidae (Pelicans)	Pelecaniformes	eBird
Avian	Brown Pelican	<i>Pelecanus occidentalis</i>	Pelecanidae (Pelicans)	Pelecaniformes	eBird; NJ Baseline Study
Avian	American Bittern	<i>Botaurus lentiginosus</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird
Avian	Least Bittern	<i>Ixobrychus exilis</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird
Avian	Great Blue Heron	<i>Ardea herodias</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird; NJ Baseline Study
Avian	Great Egret	<i>Ardea alba</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Snowy Egret	<i>Egretta thula</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird; NJ Baseline Study
Avian	Little Blue Heron	<i>Egretta caerulea</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird
Avian	Tricolored Heron	<i>Egretta tricolor</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird
Avian	Reddish Egret	<i>Egretta rufescens</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird
Avian	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird
Avian	Green Heron	<i>Butorides virescens</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird; NJ Baseline Study
Avian	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird; NJ Baseline Study
Avian	Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	Ardeidae (Herons, Egrets, and Bitterns)	Pelecaniformes	eBird; NJ Baseline Study
Avian	White Ibis	<i>Eudocimus albus</i>	Threskiornithidae (Ibises and Spoonbills)	Pelecaniformes	eBird
Avian	Glossy Ibis	<i>Plegadis falcinellus</i>	Threskiornithidae (Ibises and Spoonbills)	Pelecaniformes	eBird
Avian	White-faced Ibis	<i>Plegadis chihi</i>	Threskiornithidae (Ibises and Spoonbills)	Pelecaniformes	eBird
Avian	Roseate Spoonbill	<i>Platalea ajaja</i>	Threskiornithidae (Ibises and Spoonbills)	Pelecaniformes	eBird
Avian	Black Vulture	<i>Coragyps atratus</i>	Cathartidae (New World Vultures)	Cathartiformes	eBird
Avian	Turkey Vulture	<i>Cathartes aura</i>	Cathartidae (New World Vultures)	Cathartiformes	eBird; NJ Baseline Study
Avian	Osprey	<i>Pandion haliaetus</i>	Pandionidae (Osprey)	Accipitriformes	eBird; NJ Baseline Study
Avian	Swallow-tailed Kite	<i>Elanoides forficatus</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Golden Eagle	<i>Aquila chrysaetos</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Mississippi Kite	<i>Ictinia mississippiensis</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Northern Harrier	<i>Circus hudsonius</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird; NJ Baseline Study
Avian	Sharp-shinned Hawk	<i>Accipiter striatus</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Cooper's Hawk	<i>Accipiter cooperii</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Northern Goshawk	<i>Accipiter gentilis</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird; NJ Baseline Study
Avian	Red-shouldered Hawk	<i>Buteo lineatus</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Broad-winged Hawk	<i>Buteo platypterus</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Red-tailed Hawk	<i>Buteo jamaicensis</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Rough-legged Hawk	<i>Buteo lagopus</i>	Accipitridae (Hawks, Eagles, and Kites)	Accipitriformes	eBird
Avian	Barn Owl	<i>Tyto alba</i>	Tytonidae (Barn-Owls)	Strigiformes	eBird
Avian	Eastern Screech-Owl	<i>Megascops asio</i>	Strigidae (Owls)	Strigiformes	eBird
Avian	Great Horned Owl	<i>Bubo virginianus</i>	Strigidae (Owls)	Strigiformes	eBird
Avian	Snowy Owl	<i>Bubo scandiacus</i>	Strigidae (Owls)	Strigiformes	eBird
Avian	Barred Owl	<i>Strix varia</i>	Strigidae (Owls)	Strigiformes	eBird
Avian	Long-eared Owl	<i>Asio otus</i>	Strigidae (Owls)	Strigiformes	eBird
Avian	Short-eared Owl	<i>Asio flammeus</i>	Strigidae (Owls)	Strigiformes	eBird
Avian	Northern Saw-whet Owl	<i>Aegolius acadicus</i>	Strigidae (Owls)	Strigiformes	eBird
Avian	Belted Kingfisher	<i>Megasceryle alcyon</i>	Alcedinidae (Kingfishers)	Coraciiformes	eBird
Avian	Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	Picidae (Woodpeckers)	Piciformes	eBird
Avian	Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Picidae (Woodpeckers)	Piciformes	eBird
Avian	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	Picidae (Woodpeckers)	Piciformes	eBird
Avian	Downy Woodpecker	<i>Dryobates pubescens</i>	Picidae (Woodpeckers)	Piciformes	eBird
Avian	Hairy Woodpecker	<i>Dryobates villosus</i>	Picidae (Woodpeckers)	Piciformes	eBird
Avian	Pileated Woodpecker	<i>Dryocopus pileatus</i>	Picidae (Woodpeckers)	Piciformes	eBird
Avian	Northern Flicker	<i>Colaptes auratus</i>	Picidae (Woodpeckers)	Piciformes	eBird
Avian	Northern Flicker (Yellow-shafted)	<i>Colaptes auratus auratus/luteus</i>	Picidae (Woodpeckers)	Piciformes	NJ Baseline Study
Avian	Crested Caracara	<i>Caracara cheriway</i>	Falconidae (Falcons and Caracaras)	Falconiformes	eBird
Avian	American Kestrel	<i>Falco sparverius</i>	Falconidae (Falcons and Caracaras)	Falconiformes	eBird
Avian	Merlin	<i>Falco columbarius</i>	Falconidae (Falcons and Caracaras)	Falconiformes	eBird; NJ Baseline Study
Avian	Peregrine Falcon	<i>Falco peregrinus</i>	Falconidae (Falcons and Caracaras)	Falconiformes	eBird; NJ Baseline Study
Avian	Olive-sided Flycatcher	<i>Contopus cooperi</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Eastern Wood-Pewee	<i>Contopus virens</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Acadian Flycatcher	<i>Empidonax virescens</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Alder Flycatcher	<i>Empidonax alnorum</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Willow Flycatcher	<i>Empidonax traillii</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Least Flycatcher	<i>Empidonax minimus</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Empidonax sp.		Tyrannidae (Tyrant Flycatchers)	Passeriformes	NJ Baseline Study
Avian	Eastern Phoebe	<i>Sayornis phoebe</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Great Crested Flycatcher	<i>Myiarchus crinitus</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird

Avian	Western Kingbird	<i>Tyrannus verticalis</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Eastern Kingbird	<i>Tyrannus tyrannus</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	Fork-tailed Flycatcher	<i>Tyrannus savana</i>	Tyrannidae (Tyrant Flycatchers)	Passeriformes	eBird
Avian	White-eyed Vireo	<i>Vireo griseus</i>	Vireonidae (Vireos, Shrike-Babblers, and Erpornis)	Passeriformes	eBird
Avian	Bell's Vireo	<i>Vireo bellii</i>	Vireonidae (Vireos, Shrike-Babblers, and Erpornis)	Passeriformes	eBird
Avian	Yellow-throated Vireo	<i>Vireo flavifrons</i>	Vireonidae (Vireos, Shrike-Babblers, and Erpornis)	Passeriformes	eBird
Avian	Blue-headed Vireo	<i>Vireo solitarius</i>	Vireonidae (Vireos, Shrike-Babblers, and Erpornis)	Passeriformes	eBird
Avian	Philadelphia Vireo	<i>Vireo philadelphicus</i>	Vireonidae (Vireos, Shrike-Babblers, and Erpornis)	Passeriformes	eBird
Avian	Warbling Vireo	<i>Vireo gilvus</i>	Vireonidae (Vireos, Shrike-Babblers, and Erpornis)	Passeriformes	eBird
Avian	Red-eyed Vireo	<i>Vireo olivaceus</i>	Vireonidae (Vireos, Shrike-Babblers, and Erpornis)	Passeriformes	eBird
Avian	Northern Shrike	<i>Lanius borealis</i>	Laniidae (Shrikes)	Passeriformes	eBird
Avian	Blue Jay	<i>Cyanocitta cristata</i>	Corvidae (Crows, Jays, and Magpies)	Passeriformes	eBird
Avian	American Crow	<i>Corvus brachyrhynchos</i>	Corvidae (Crows, Jays, and Magpies)	Passeriformes	eBird; NJ Baseline Study
Avian	Fish Crow	<i>Corvus ossifragus</i>	Corvidae (Crows, Jays, and Magpies)	Passeriformes	eBird; NJ Baseline Study
Avian	Common Raven	<i>Corvus corax</i>	Corvidae (Crows, Jays, and Magpies)	Passeriformes	eBird
Avian	Carolina Chickadee	<i>Poecile carolinensis</i>	Paridae (Tits, Chickadees, and Titmice)	Passeriformes	eBird
Avian	Black-capped Chickadee	<i>Poecile atricapillus</i>	Paridae (Tits, Chickadees, and Titmice)	Passeriformes	eBird
Avian	Tufted Titmouse	<i>Baeolophus bicolor</i>	Paridae (Tits, Chickadees, and Titmice)	Passeriformes	eBird
Avian	Horned Lark	<i>Eremophila alpestris</i>	Alaudidae (Larks)	Passeriformes	eBird
Avian	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Hirundinidae (Swallows)	Passeriformes	eBird
Avian	Purple Martin	<i>Progne subis</i>	Hirundinidae (Swallows)	Passeriformes	eBird; NJ Baseline Study
Avian	Tree Swallow	<i>Tachycineta bicolor</i>	Hirundinidae (Swallows)	Passeriformes	eBird; NJ Baseline Study
Avian	Bank Swallow	<i>Riparia riparia</i>	Hirundinidae (Swallows)	Passeriformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Barn Swallow	<i>Hirundo rustica</i>	Hirundinidae (Swallows)	Passeriformes	eBird; NJ Baseline Study
Avian	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	Hirundinidae (Swallows)	Passeriformes	eBird
Avian	Cave Swallow	<i>Petrochelidon fulva</i>	Hirundinidae (Swallows)	Passeriformes	eBird
Avian	Golden-crowned Kinglet	<i>Regulus satrapa</i>	Regulidae (Kinglets)	Passeriformes	eBird; NJ Baseline Study
Avian	Ruby-crowned Kinglet	<i>Regulus calendula</i>	Regulidae (Kinglets)	Passeriformes	eBird
Avian	Red-breasted Nuthatch	<i>Sitta canadensis</i>	Sittidae (Nuthatches)	Passeriformes	eBird
Avian	White-breasted Nuthatch	<i>Sitta carolinensis</i>	Sittidae (Nuthatches)	Passeriformes	eBird
Avian	Brown Creeper	<i>Certhia americana</i>	Certhiidae (Treecreepers)	Passeriformes	eBird; NJ Baseline Study
Avian	Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	Poliophtilidae (Gnatcatchers)	Passeriformes	eBird
Avian	House Wren	<i>Troglodytes aedon</i>	Troglodytidae (Wrens)	Passeriformes	eBird
Avian	Winter Wren	<i>Troglodytes hiemalis</i>	Troglodytidae (Wrens)	Passeriformes	eBird; NJ Baseline Study
Avian	Sedge Wren	<i>Cistothorus platensis</i>	Troglodytidae (Wrens)	Passeriformes	eBird
Avian	Marsh Wren	<i>Cistothorus palustris</i>	Troglodytidae (Wrens)	Passeriformes	eBird; NJ Baseline Study
Avian	Carolina Wren	<i>Thryothorus ludovicianus</i>	Troglodytidae (Wrens)	Passeriformes	eBird
Avian	European Starling	<i>Sturnus vulgaris</i>	Sturnidae (Starlings)	Passeriformes	eBird; NJ Baseline Study
Avian	Gray Catbird	<i>Dumetella carolinensis</i>	Mimidae (Mockingbirds and Thrashers)	Passeriformes	eBird; NJ Baseline Study
Avian	Brown Thrasher	<i>Toxostoma rufum</i>	Mimidae (Mockingbirds and Thrashers)	Passeriformes	eBird; NJ Baseline Study
Avian	Northern Mockingbird	<i>Mimus polyglottos</i>	Mimidae (Mockingbirds and Thrashers)	Passeriformes	eBird; NJ Baseline Study
Avian	Eastern Bluebird	<i>Sialia sialis</i>	Turdidae (Thrushes and Allies)	Passeriformes	eBird
Avian	Townsend's Solitaire	<i>Myadestes townsendi</i>	Turdidae (Thrushes and Allies)	Passeriformes	eBird
Avian	Veery	<i>Catharus fuscescens</i>	Turdidae (Thrushes and Allies)	Passeriformes	eBird
Avian	Gray-cheeked Thrush	<i>Catharus minimus</i>	Turdidae (Thrushes and Allies)	Passeriformes	eBird
Avian	Swainson's Thrush	<i>Catharus ustulatus</i>	Turdidae (Thrushes and Allies)	Passeriformes	eBird
Avian	Hermit Thrush	<i>Catharus guttatus</i>	Turdidae (Thrushes and Allies)	Passeriformes	eBird
Avian	Wood Thrush	<i>Hylocichla mustelina</i>	Turdidae (Thrushes and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	American Robin	<i>Turdus migratorius</i>	Turdidae (Thrushes and Allies)	Passeriformes	eBird; NJ Baseline Study; NOAA Ecosystem Monitoring
Avian	Cedar Waxwing	<i>Bombycilla cedrorum</i>	Bombycillidae (Waxwings)	Passeriformes	eBird
Avian	House Sparrow	<i>Passer domesticus</i>	Passeridae (Old World Sparrows)	Passeriformes	eBird
Avian	American Pipit	<i>Anthus rubescens</i>	Motacillidae (Wagtails and Pipits)	Passeriformes	eBird
Avian	Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Fringillidae (Finches, Euphonias, and Allies)	Passeriformes	eBird
Avian	House Finch	<i>Haemorhous mexicanus</i>	Fringillidae (Finches, Euphonias, and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Purple Finch	<i>Haemorhous purpureus</i>	Fringillidae (Finches, Euphonias, and Allies)	Passeriformes	eBird
Avian	Red Crossbill	<i>Loxia curvirostra</i>	Fringillidae (Finches, Euphonias, and Allies)	Passeriformes	eBird
Avian	European Goldfinch	<i>Carduelis carduelis</i>	Fringillidae (Finches, Euphonias, and Allies)	Passeriformes	eBird
Avian	Pine Siskin	<i>Spinus pinus</i>	Fringillidae (Finches, Euphonias, and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	American Goldfinch	<i>Spinus tristis</i>	Fringillidae (Finches, Euphonias, and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Lapland Longspur	<i>Calcarius lapponicus</i>	Calcariidae (Longspurs and Snow Buntings)	Passeriformes	eBird
Avian	Snow Bunting	<i>Plectrophenax nivalis</i>	Calcariidae (Longspurs and Snow Buntings)	Passeriformes	eBird
Avian	Grasshopper Sparrow	<i>Ammodramus saviannarum</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Chipping Sparrow	<i>Spizella passerina</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Clay-colored Sparrow	<i>Spizella pallida</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Field Sparrow	<i>Spizella pusilla</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird; NJ Baseline Study
Avian	Lark Sparrow	<i>Chondestes grammacus</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	American Tree Sparrow	<i>Spizelloides arborea</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird; NOAA Ecosystem Monitoring
Avian	Fox Sparrow	<i>Passerella iliaca</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Dark-eyed Junco	<i>Junco hyemalis</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Dark-eyed Junco (Slate-colored)	<i>Junco hyemalis hyemalis/carolinensis</i>	Passerellidae (New World Sparrows)	Passeriformes	NJ Baseline Study
Avian	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Harris's Sparrow	<i>Zonotrichia querula</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	White-throated Sparrow	<i>Zonotrichia albicollis</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird; NJ Baseline Study
Avian	Vesper Sparrow	<i>Pooecetes gramineus</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird; NJ Baseline Study
Avian	Seaside Sparrow	<i>Ammospiza maritima</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Nelson's Sparrow	<i>Ammospiza nelsoni</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Saltmarsh Sparrow	<i>Ammospiza caudacuta</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Savannah Sparrow	<i>Passerculus sandwichensis</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Song Sparrow	<i>Melospiza melodia</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird; NJ Baseline Study
Avian	Lincoln's Sparrow	<i>Melospiza lincolni</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird
Avian	Swamp Sparrow	<i>Melospiza georgiana</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird; NJ Baseline Study
Avian	Eastern Towhee	<i>Pipilo erythrophthalmus</i>	Passerellidae (New World Sparrows)	Passeriformes	eBird; NJ Baseline Study
Avian	Yellow-breasted Chat	<i>Icteria virens</i>	Icteriidae (Yellow-breasted Chat)	Passeriformes	eBird; NJ Baseline Study
Avian	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird
Avian	Bobolink	<i>Dolichonyx oryzivorus</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird
Avian	Eastern Meadowlark	<i>Sturnella magna</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Orchard Oriole	<i>Icterus spurius</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Baltimore Oriole	<i>Icterus galbula</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Brown-headed Cowbird	<i>Molothrus ater</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Rusty Blackbird	<i>Euphagus carolinus</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird
Avian	Common Grackle	<i>Quiscalus quiscula</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird
Avian	Boat-tailed Grackle	<i>Quiscalus major</i>	Icteriidae (Troupials and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Ovenbird	<i>Seiurus aurocapilla</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Worm-eating Warbler	<i>Helminthos vermivorum</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Louisiana Waterthrush	<i>Parkesia motacilla</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Northern Waterthrush	<i>Parkesia noveboracensis</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Golden-winged Warbler	<i>Vermivora chrysoptera</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Blue-winged Warbler	<i>Vermivora cyanoptera</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Black-and-white Warbler	<i>Mniotilta varia</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Prothonotary Warbler	<i>Protonotaria citrea</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Tennessee Warbler	<i>Leiostyris peregrina</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Orange-crowned Warbler	<i>Leiostyris celata</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Nashville Warbler	<i>Leiostyris ruficapilla</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Connecticut Warbler	<i>Oporornis agilis</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Mourning Warbler	<i>Geothlypis philadelphia</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Kentucky Warbler	<i>Geothlypis formosa</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Common Yellowthroat	<i>Geothlypis trichas</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Hooded Warbler	<i>Setophaga citrina</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	American Redstart	<i>Setophaga ruticilla</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Cape May Warbler	<i>Setophaga tigrina</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Cerulean Warbler	<i>Setophaga cerulea</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Northern Parula	<i>Setophaga americana</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Magnolia Warbler	<i>Setophaga magnolia</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Bay-breasted Warbler	<i>Setophaga castanea</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Blackburnian Warbler	<i>Setophaga fusca</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Yellow Warbler	<i>Setophaga petechia</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Blackpoll Warbler	<i>Setophaga striata</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Palm Warbler	<i>Setophaga palmarum</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Palm Warbler (yellow)	<i>Setophaga palmarum hypochrysea</i>	Parulidae (New World Warblers)	Passeriformes	NJ Baseline Study
Avian	Pine Warbler	<i>Setophaga pinus</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Yellow-rumped Warbler	<i>Setophaga coronata</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Yellow-rumped Warbler (Myrtle)	<i>Setophaga coronata coronata</i>	Parulidae (New World Warblers)	Passeriformes	NJ Baseline Study
Avian	Yellow-throated Warbler	<i>Setophaga dominica</i>	Parulidae (New World Warblers)	Passeriformes	eBird

Avian	Prairie Warbler	<i>Setophaga discolor</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Black-throated Gray Warbler	<i>Setophaga nigrescens</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Townsend's Warbler	<i>Setophaga townsendi</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Black-throated Green Warbler	<i>Setophaga virens</i>	Parulidae (New World Warblers)	Passeriformes	eBird; NJ Baseline Study
Avian	Canada Warbler	<i>Cardellina canadensis</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	Wilson's Warbler	<i>Cardellina pusilla</i>	Parulidae (New World Warblers)	Passeriformes	eBird
Avian	warbler sp. (Parulidae sp.)		Parulidae (New World Warblers)	Passeriformes	NJ Baseline Study
Avian	Summer Tanager	<i>Piranga rubra</i>	Cardinalidae (Cardinals and Allies)	Passeriformes	eBird
Avian	Scarlet Tanager	<i>Piranga olivacea</i>	Cardinalidae (Cardinals and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Western Tanager	<i>Piranga ludoviciana</i>	Cardinalidae (Cardinals and Allies)	Passeriformes	eBird
Avian	Northern Cardinal	<i>Cardinalis cardinalis</i>	Cardinalidae (Cardinals and Allies)	Passeriformes	eBird
Avian	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	Cardinalidae (Cardinals and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Blue Grosbeak	<i>Passerina caerulea</i>	Cardinalidae (Cardinals and Allies)	Passeriformes	eBird
Avian	Indigo Bunting	<i>Passerina cyanea</i>	Cardinalidae (Cardinals and Allies)	Passeriformes	eBird; NJ Baseline Study
Avian	Painted Bunting	<i>Passerina ciris</i>	Cardinalidae (Cardinals and Allies)	Passeriformes	eBird
Avian	Dickcissel	<i>Spiza americana</i>	Cardinalidae (Cardinals and Allies)	Passeriformes	eBird
Avian	passerine sp.			Passeriformes	NJ Baseline Study
Bat	Eastern Red Bat	<i>Lasiurus borealis</i>	Vespertilionidae	Chiroptera	NJ Baseline Study
Bat	unknown high frequency bat sp.		Vespertilionidae	Chiroptera	NJ Baseline Study
Bat	Hoary Bat	<i>Lasiurus cinereus</i>	Vespertilionidae	Chiroptera	NJ Baseline Study
Bat	Big-brown Bat/Silver-haired Bat	<i>Eptesicus fuscus/Lasionycteris noctivagans</i>	Vespertilionidae	Chiroptera	NJ Baseline Study
Bat	Myotis sp.		Vespertilionidae	Chiroptera	NJ Baseline Study

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Appendix 9-3

**Appendix 9-3. Federal and State Endangered and Threatened Species that may Occur in the Project Area**

Common Name	Scientific Name	Federal Status	State Status	Known Distribution (relative to Project Area)	Seasonality and Occurrence in Project Area
<b>Birds</b>					
Roseate tern	<i>Sterna dougallii</i>	E		Coastal	Summer. Non-breeding; migrant
Piping plover	<i>Charadrius melodus</i>	E		Coastal; migrates offshore	Summer. Breeding
Red knot	<i>Calidris canutus rufa</i> spp.	T		Coastal; migrates offshore	Fall. Non-breeding; migrant
Black-capped petrel	<i>Pterodroma hasitata</i>	T - Proposed		Offshore	Rare
Eastern black rail	<i>Laterallus jamaicensis ssp. jamaicensis</i>	T (proposed)		Tidal or non-tidal marshes	Rare - No critical habitat in Project Area
Bald eagle	<i>Haliaeetus leucocephalus</i>		NJ-E (BR); NJ-T (Non-BR)	Coastal, inland waters	Year-round; nesting, foraging
Least tern	<i>Sterna antillarum</i>		NJ-E	Coastal	Seasonal. Common
Osprey	<i>Pandion haliaetus</i>		NJ-T	Coastal, inland waters	Year-round
Pied-billed grebe	<i>Podilymbus Podiceps</i>		NJ-E (BR)	Mainly inland waters; coastal bays, inlets, ponds	Rare
Black-crowned night heron	<i>Nycticorax nycticorax</i>		NJ-T (BR)	Mainly inland waters; coastal bays, inlets, ponds	Rare, foraging
Yellow-crowned night heron	<i>Nyctanassa violacea</i>		NJ-T	Coastal, tidal and inland waters	Rare
American kestrel	<i>Falco sparverius</i>		NJ-T	Open, grassy habitats	Occasional; breeding and non-breeding sightings

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Common Name	Scientific Name	Federal Status	State Status	Known Distribution (relative to Project Area)	Seasonality and Occurrence in Project Area
Barred owl	<i>Strix varia</i>		NJ-T	Dense woodland and forests	Occasional; breeding and non-breeding sightings
Black skimmer	<i>Rynchops niger</i>		NJ-E	Nests on open sandy beaches, inlets and island from Sandy Hook to Cape May. Forages in shallow tidal waters.	Occasional; foraging
Horned lark	<i>Eremophila alpestris</i>		NJ-T	Open spaces with bare ground, short sparse grasses	Rare; Non-breeding sighting
<b>Whales</b>					
Humpback Whale	<i>Megaptera novaeangliae</i>		NJ-E	Offshore	Year-round, most frequent in Spring (March - May) through Fall (Sept - Nov)
Fin Whale	<i>Balaenoptera physalus</i>	E	NJ-E	Offshore	Year-round, most frequent in Spring (March - May) through Fall (Sept - Nov)
Sei Whale	<i>Balaenoptera borealis</i>	E	NJ-E	Offshore	Potential, most frequent in Spring (March - May) through Fall (Sept - Nov).
North Atlantic Right Whale	<i>Eubalaena glacialis</i>	E	NJ-E	Offshore	High coastal density in Fall through Spring (especially Nov-April), continental shelf in Summer, New Jersey coastline year-round
Sperm whale	<i>Physeter macrocephalus</i>	E	NJ-E	Offshore	Rare

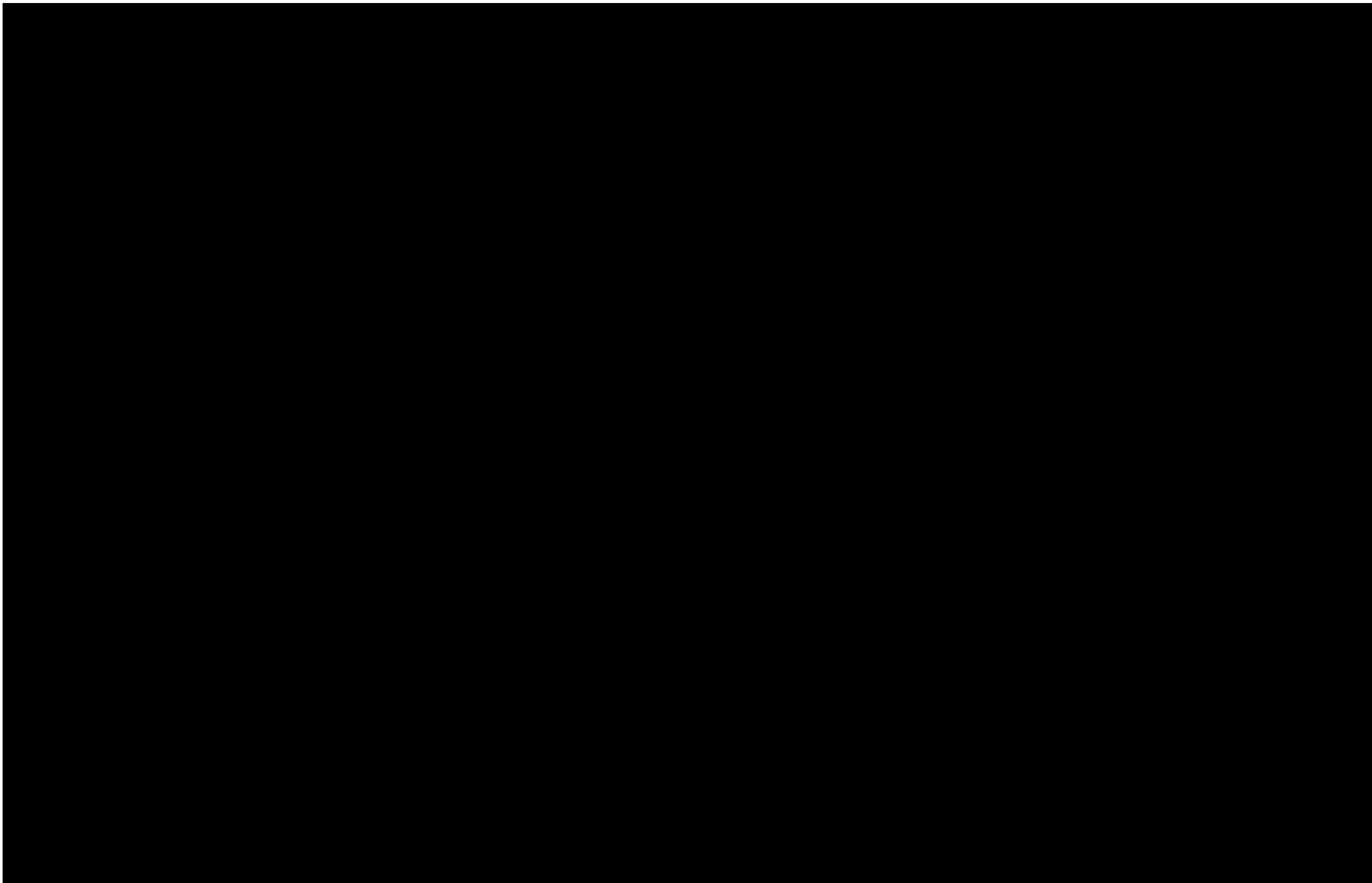
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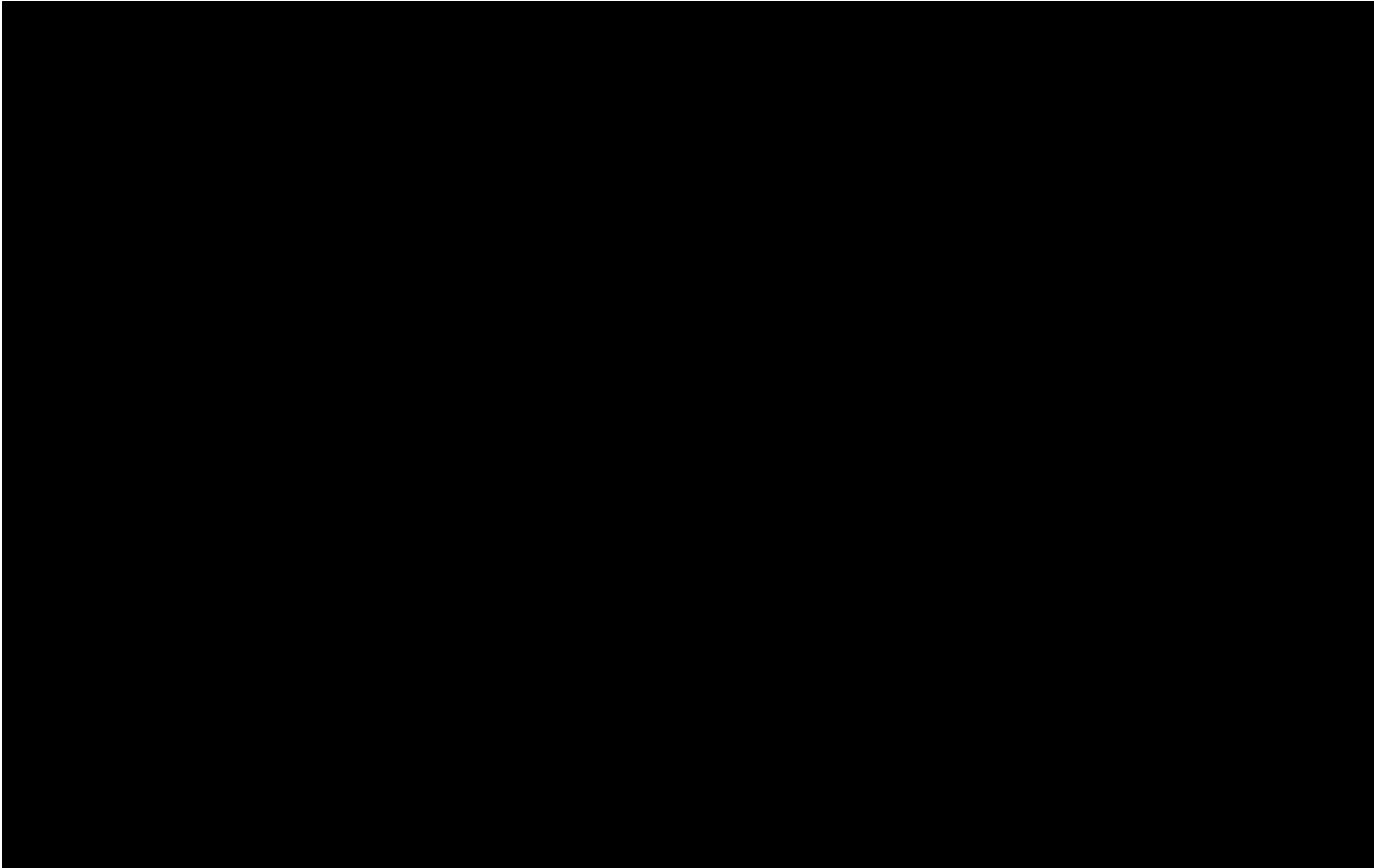
Common Name	Scientific Name	Federal Status	State Status	Known Distribution (relative to Project Area)	Seasonality and Occurrence in Project Area
Blue whale	<i>Balaenoptera musculus</i>	E	NJ-E	Offshore	Rare
<b>Sea Turtles</b>					
Green turtle	<i>Chelonia mydas</i>	T	T	Juveniles - oceanic waters Adults - nearshore areas	Rare
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	E	E	Juveniles - oceanic waters and <i>Sargassum</i> habitats Adults - nearshore areas	Seasonal
Leatherback turtle	<i>Dermochelys coriacea</i>	E	E	Juvenile - oceanic waters Adults - mid-ocean to continental shelf and nearshore waters	Seasonal
Loggerhead turtle	<i>Caretta caretta</i>	T	E	Juveniles - oceanic waters Adults - continental shelf and along break	Seasonal (Summer)
Hawksbill turtle	<i>Eretmochelys imbricata</i>	E	E	Juveniles - oceanic waters Adults - nearshore areas	Rare
Bog turtle	<i>Clemmys muhlenbergii</i>	T		Wet meadows and grassy areas	Rare - No critical habitat in Project Area
<b>Mammals</b>					
Indiana bat	<i>Myotis sodalis</i>				

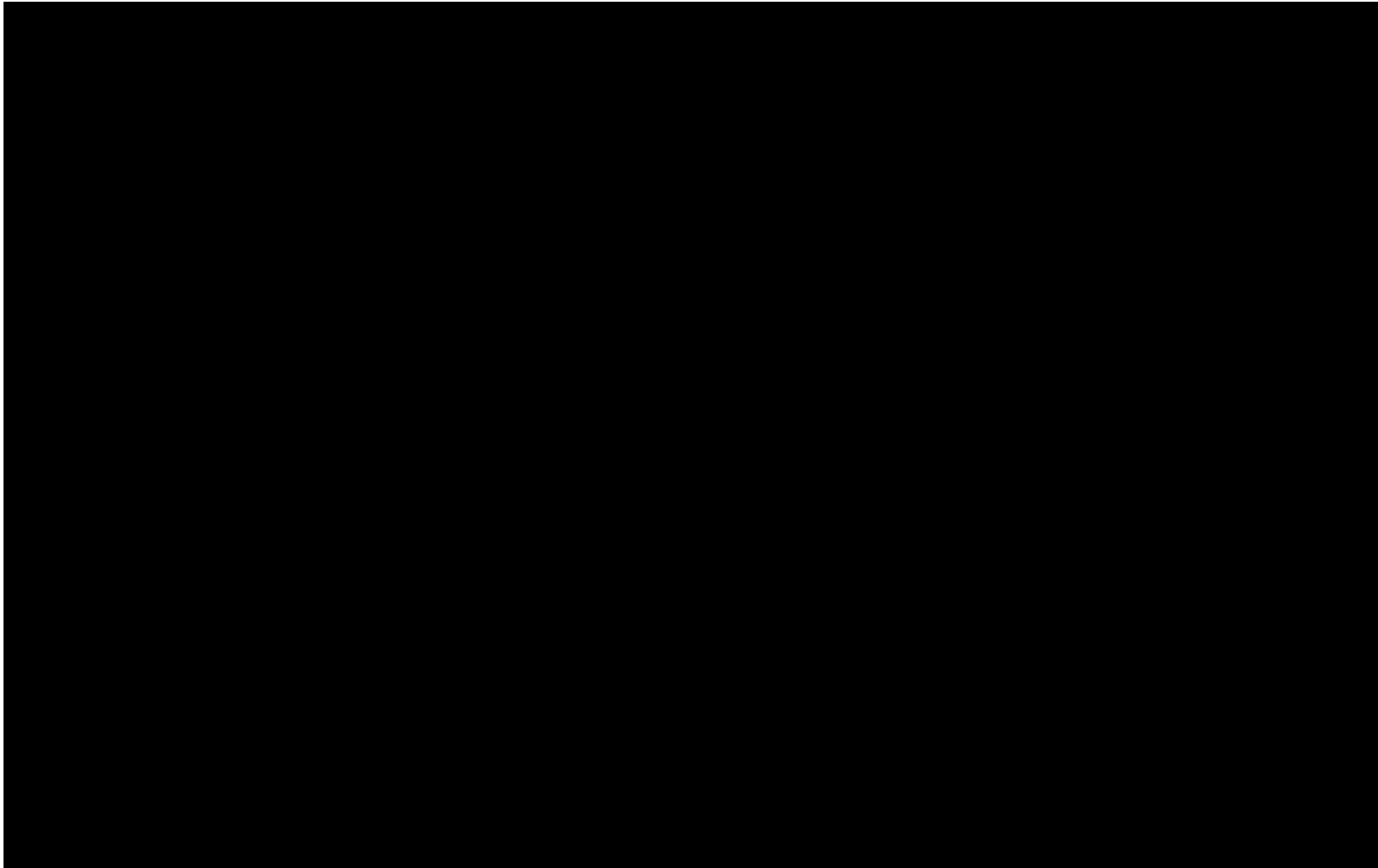
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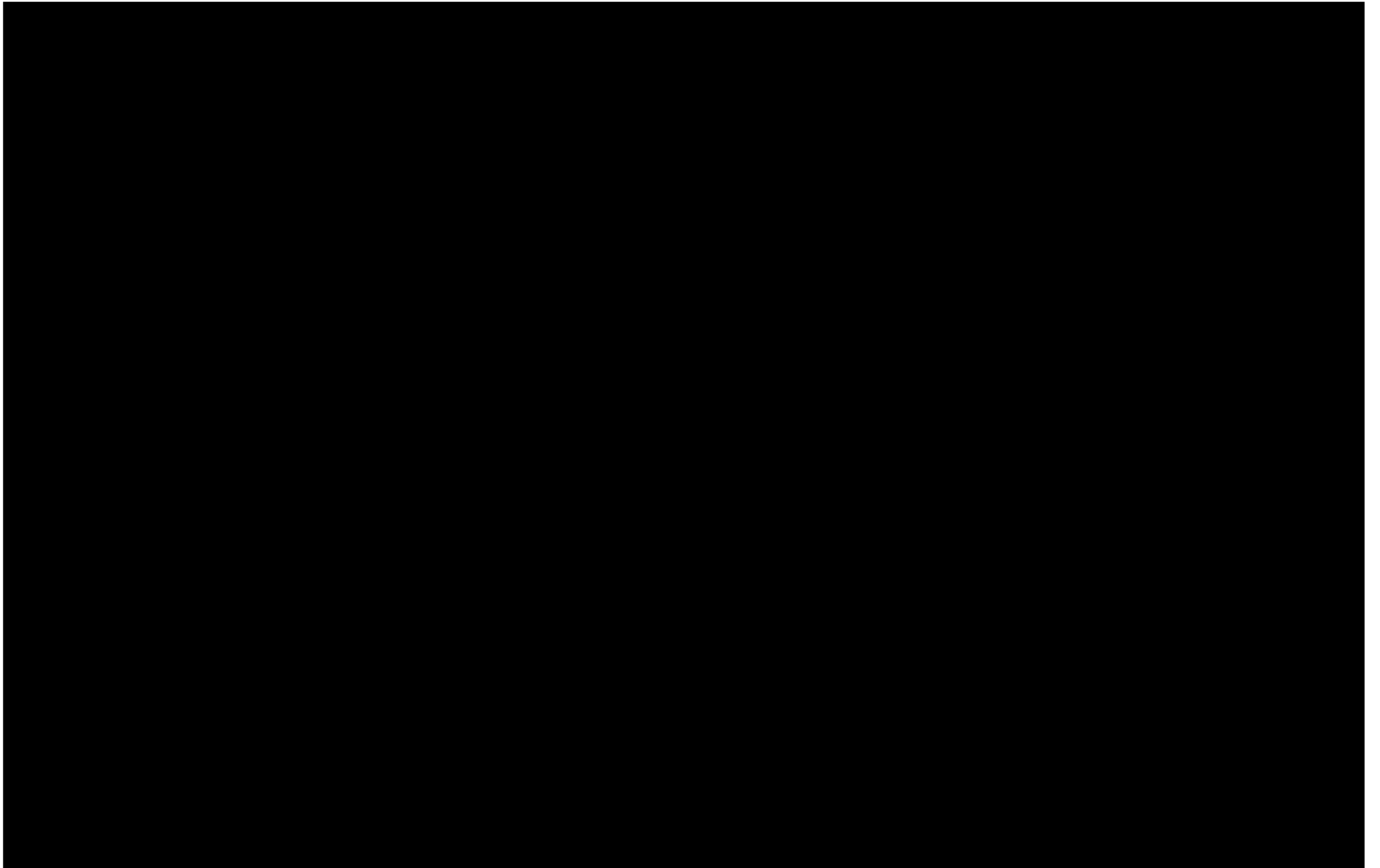
Common Name	Scientific Name	Federal Status	State Status	Known Distribution (relative to Project Area)	Seasonality and Occurrence in Project Area
Northern long-eared bat	<i>Myotis septentrionalis</i>	T	NJ-E	Forested areas, caves, mines. Roosts under tree bark (summer) and caves (winter)	Seasonal sightings - No critical habitat in Project Area
<b>Plants</b>					
Knieskern's beaked-rush	<i>Rhynchospora knieskernii</i>	T		Five counties in the NJ Pine Barrens. Early successional habitats in pitch pine forests	Rare - No critical habitat in Project Area
Seabeach amaranth	<i>Amaranthus pumilus</i>	T		Barrier islands, beachfronts above mean high tide	Rare - No critical habitat in Project Area
Swamp pink	<i>Helonias bullata</i>	T		Swampy forested wetlands	Rare - No critical habitat in Project Area
Sensitive joint-vetch	<i>Aeschynomene virginica</i>	T		Fresh to slightly brackish tidal systems	Rare - No critical habitat in Project Area
E = endangered; T = threatened; BR = breeding; N-BR = non-breeding; N/A = not applicable					

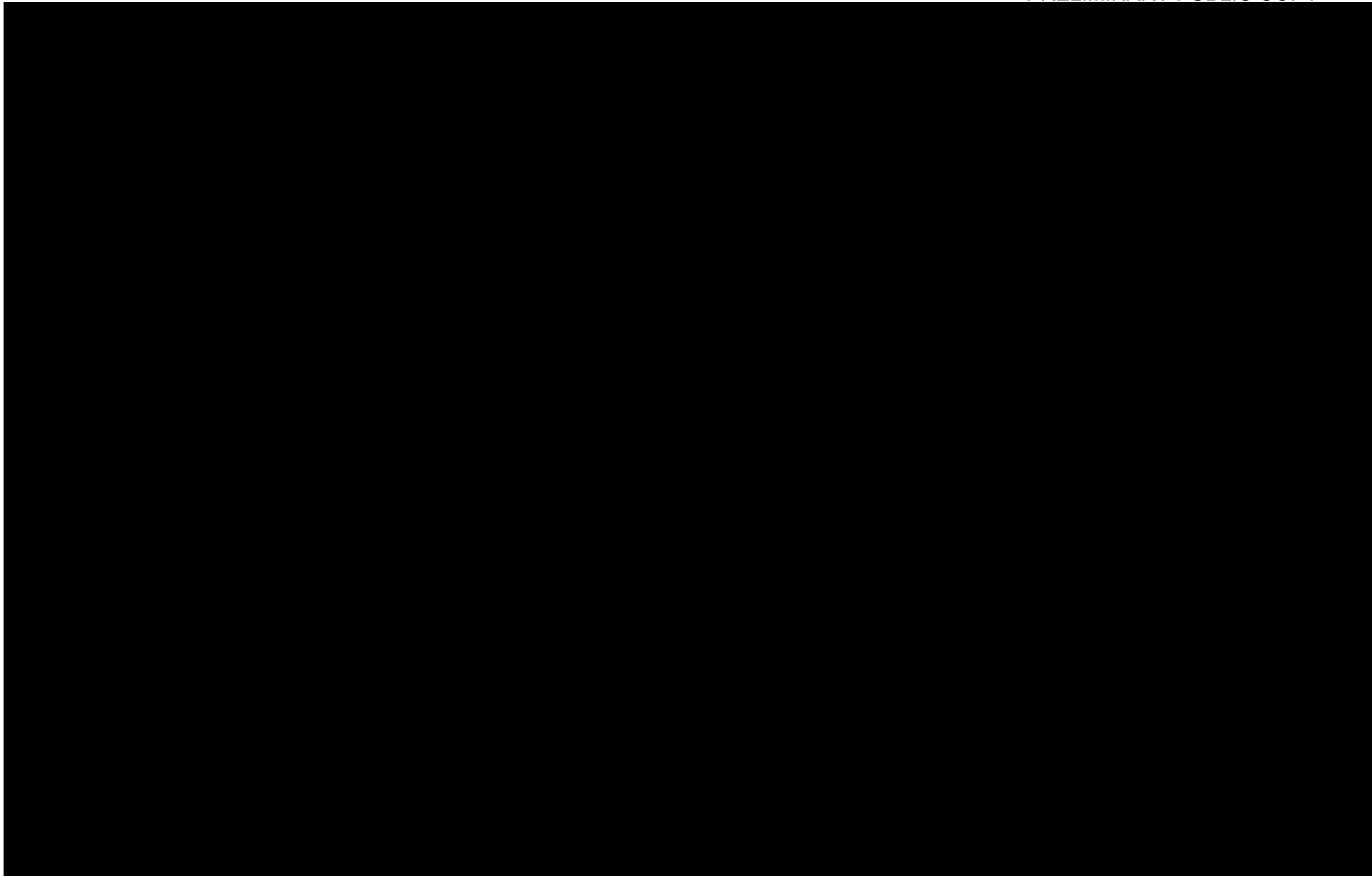


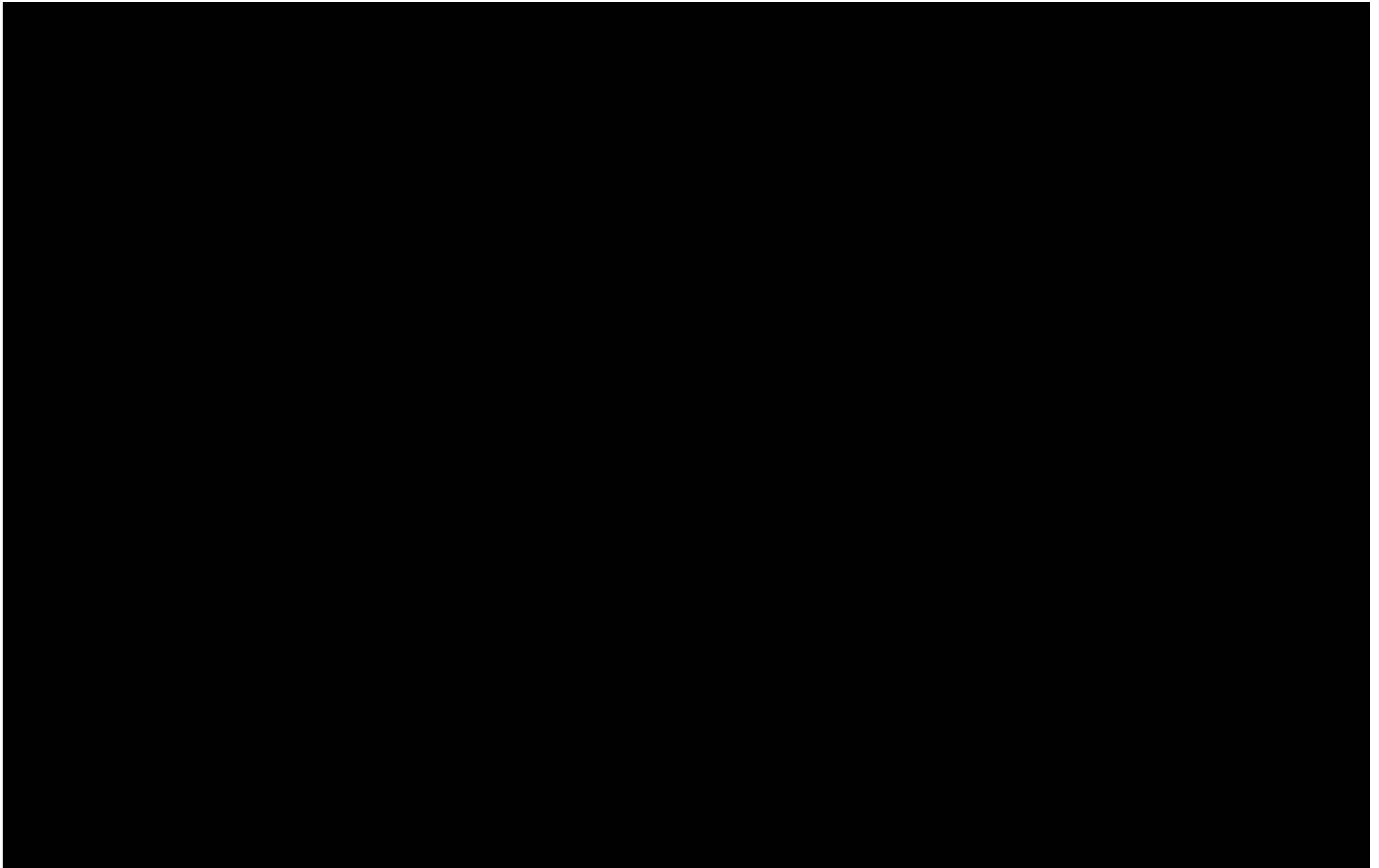


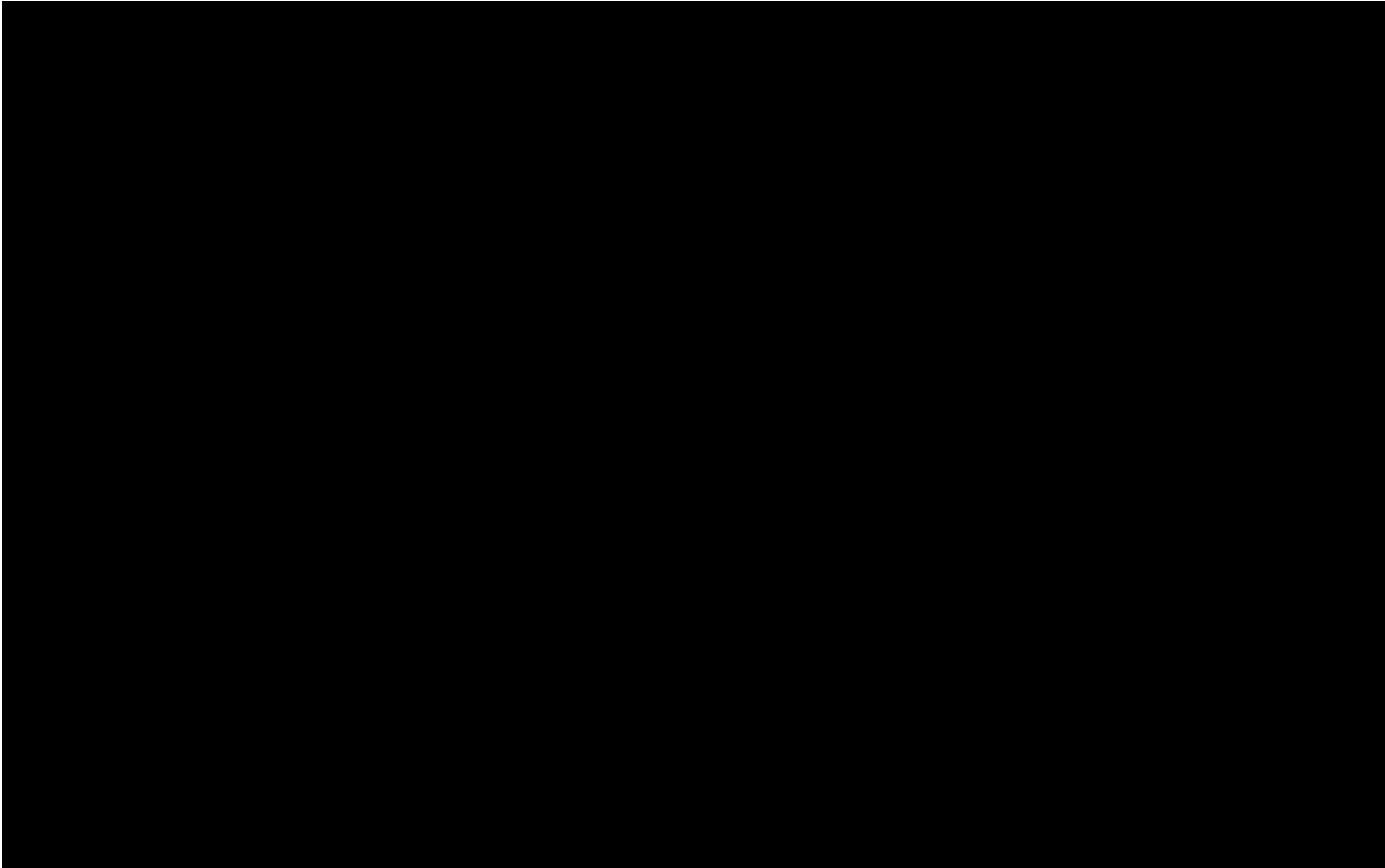


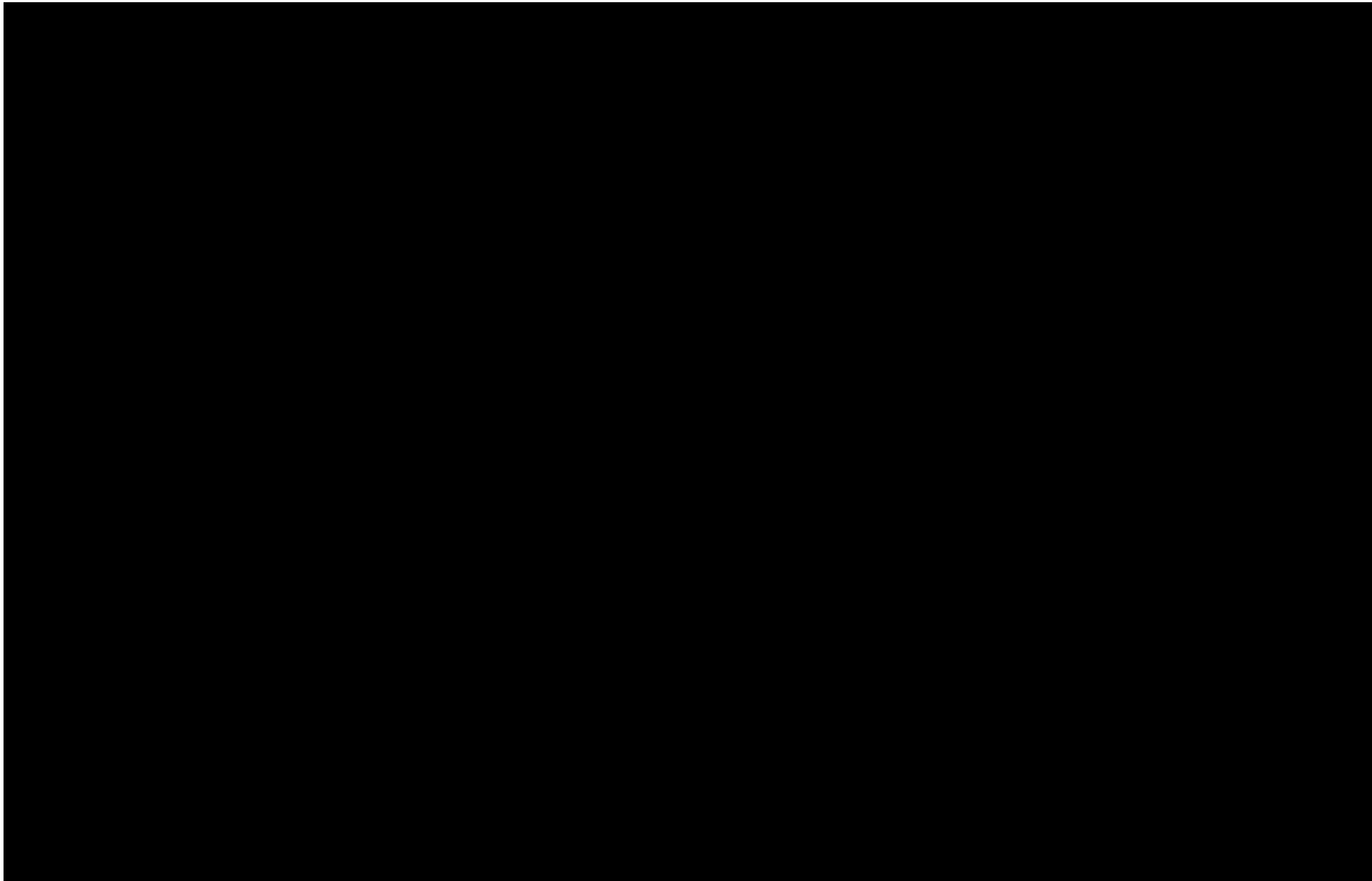




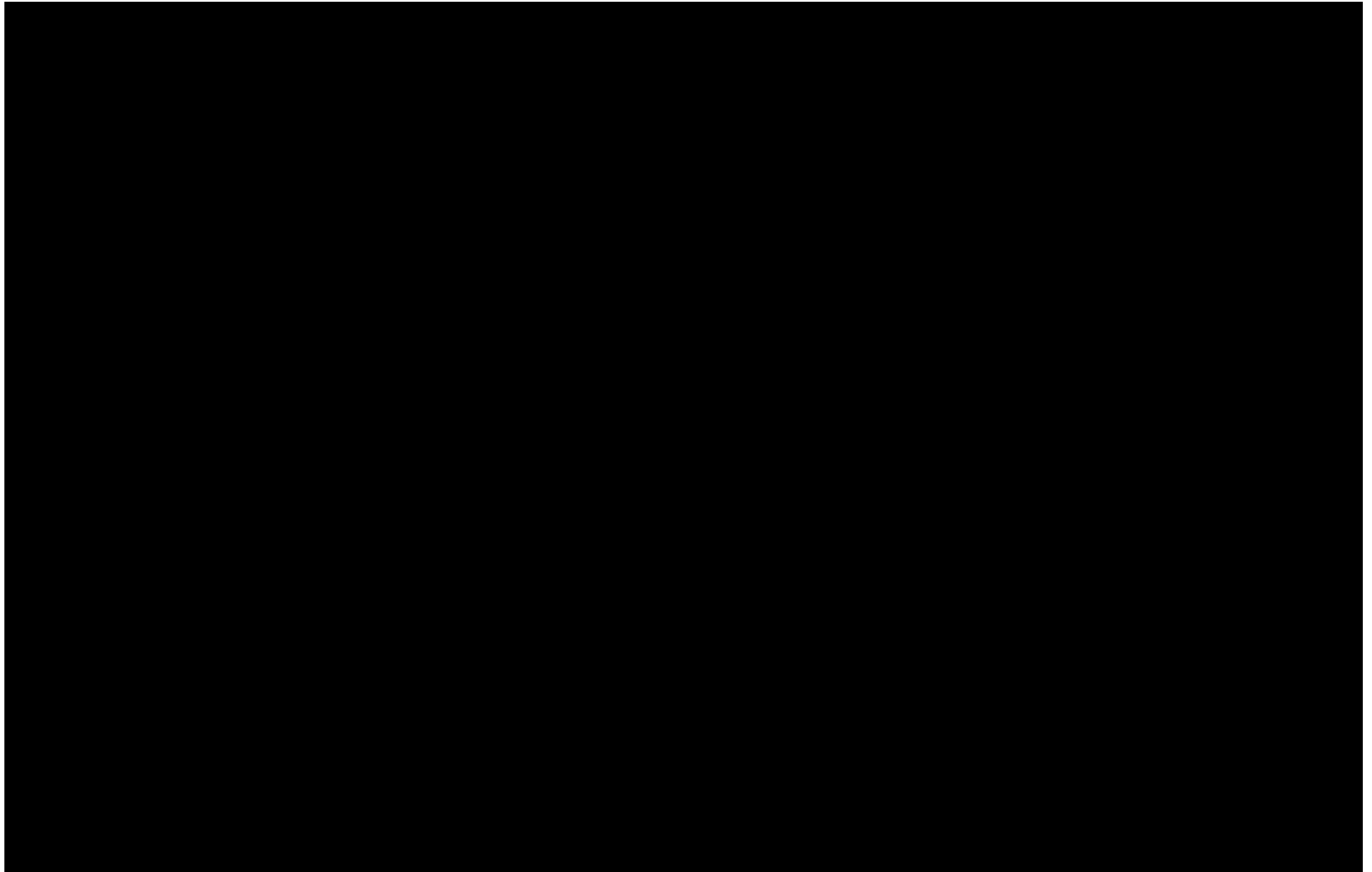


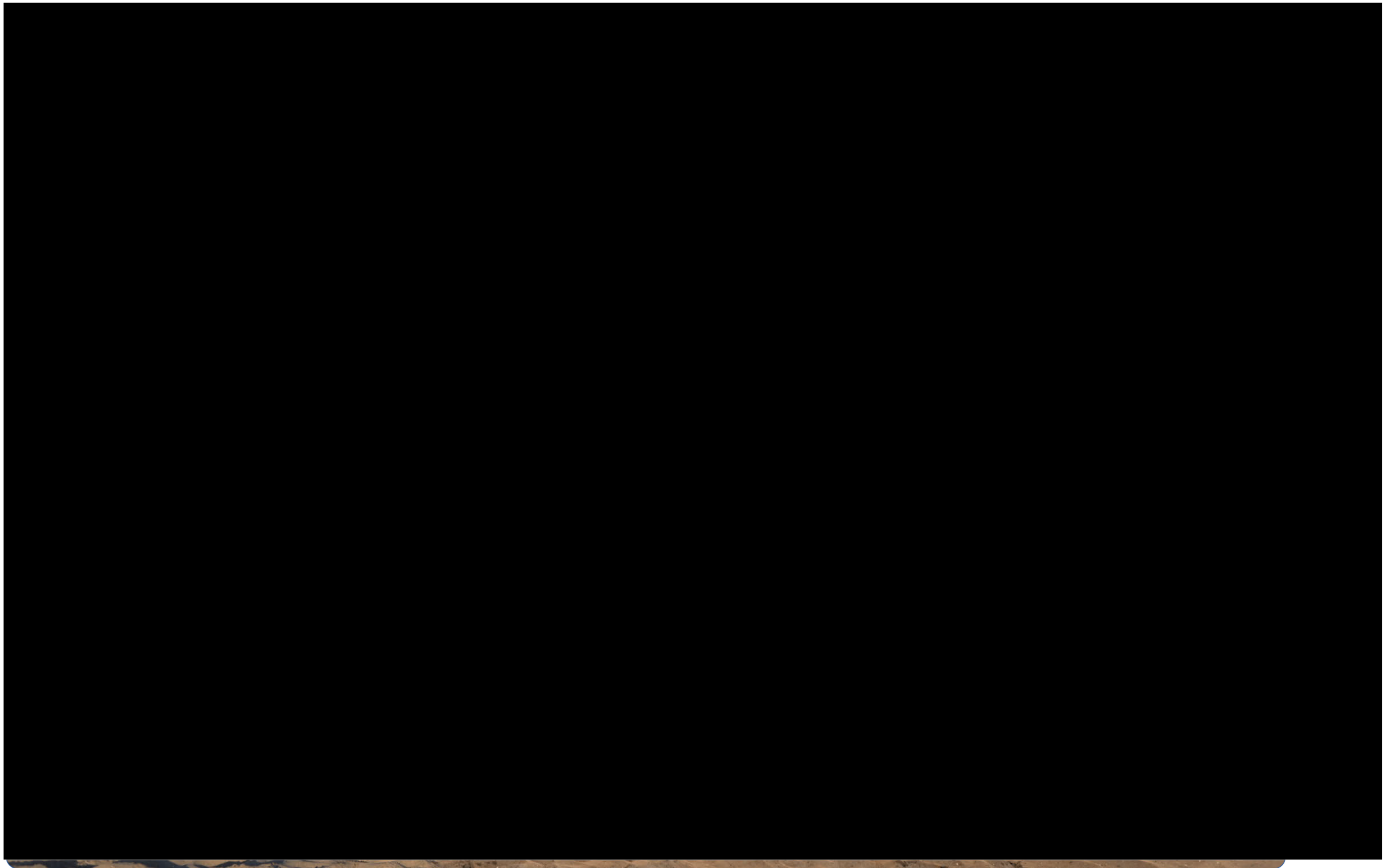


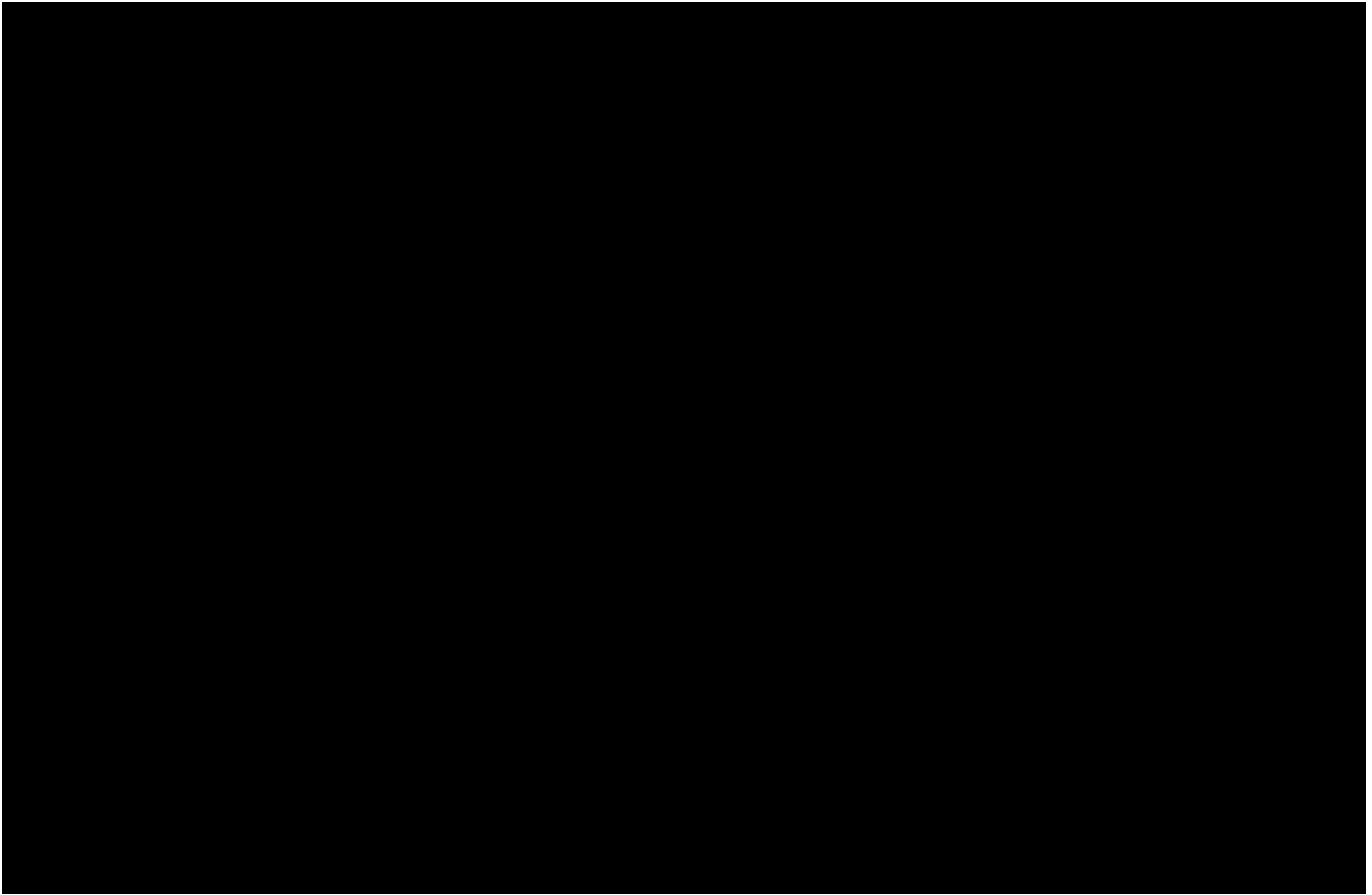


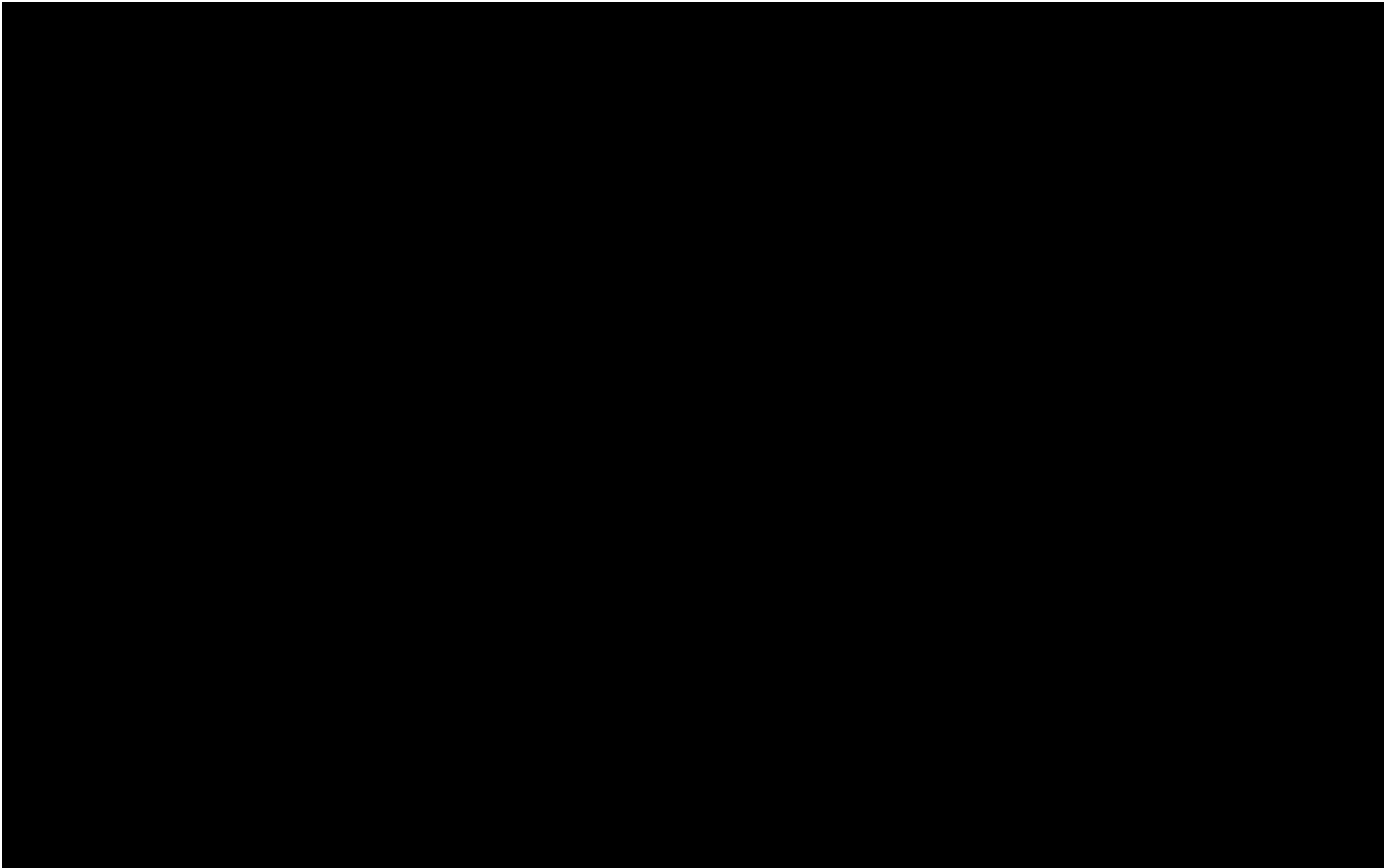


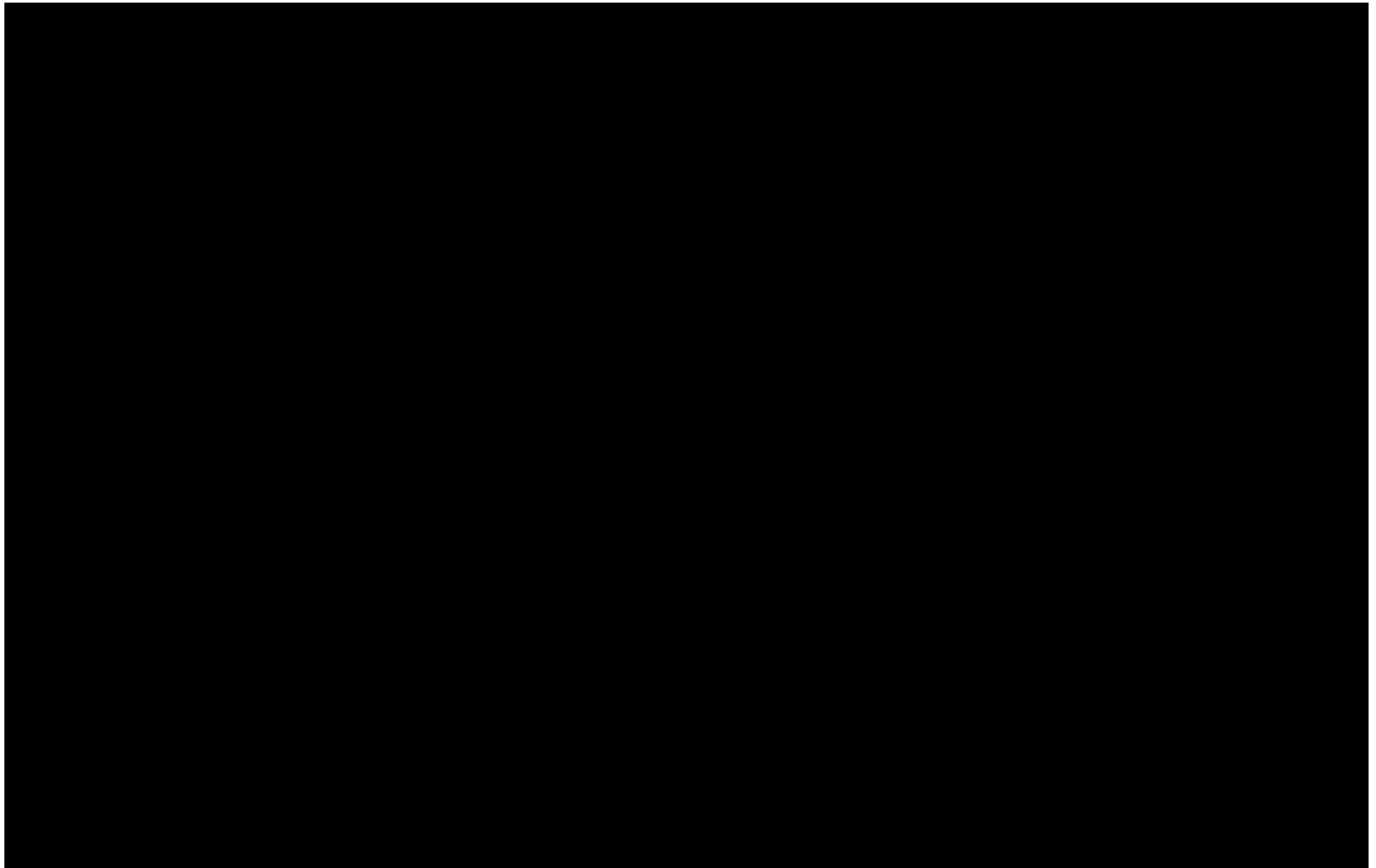


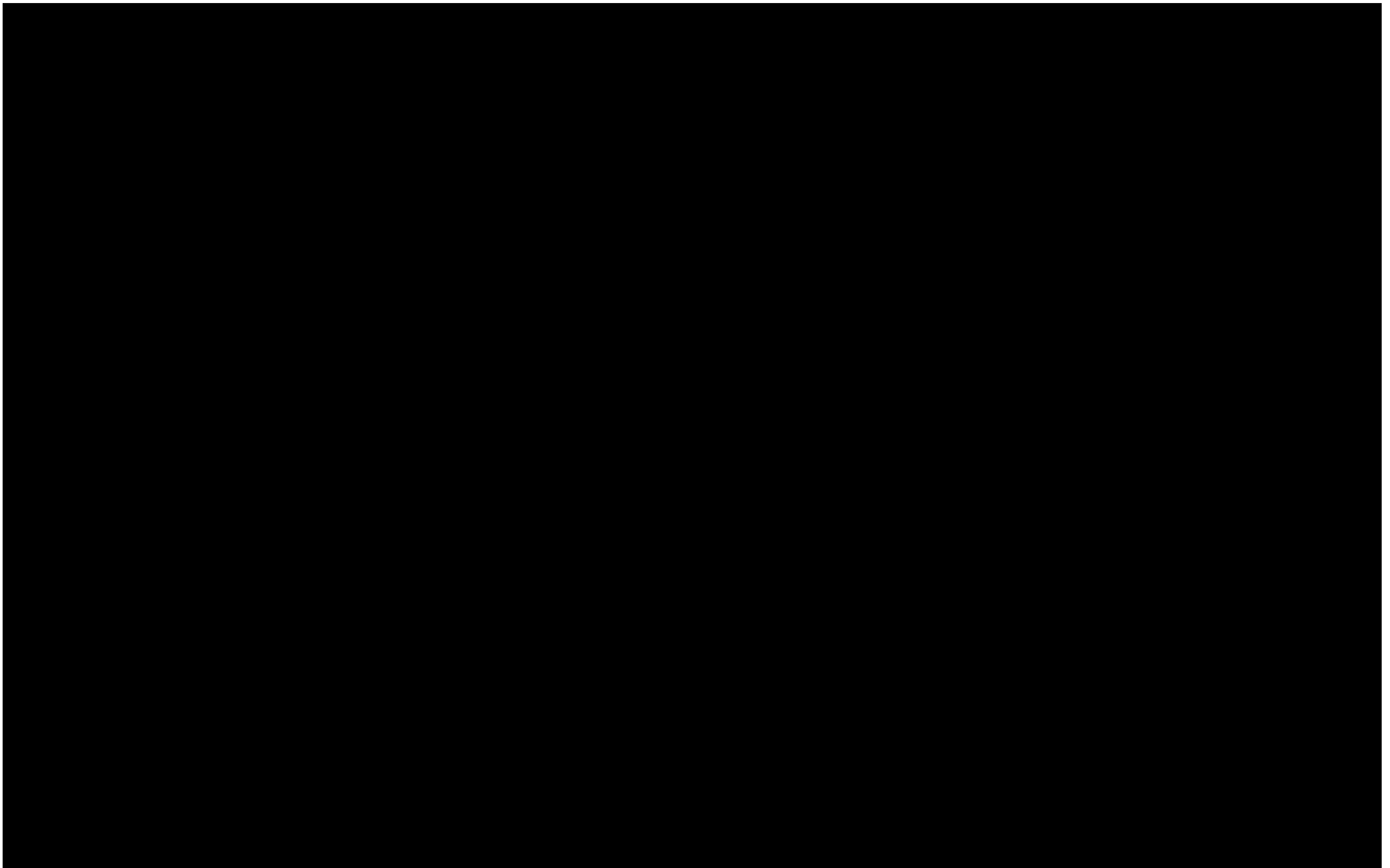


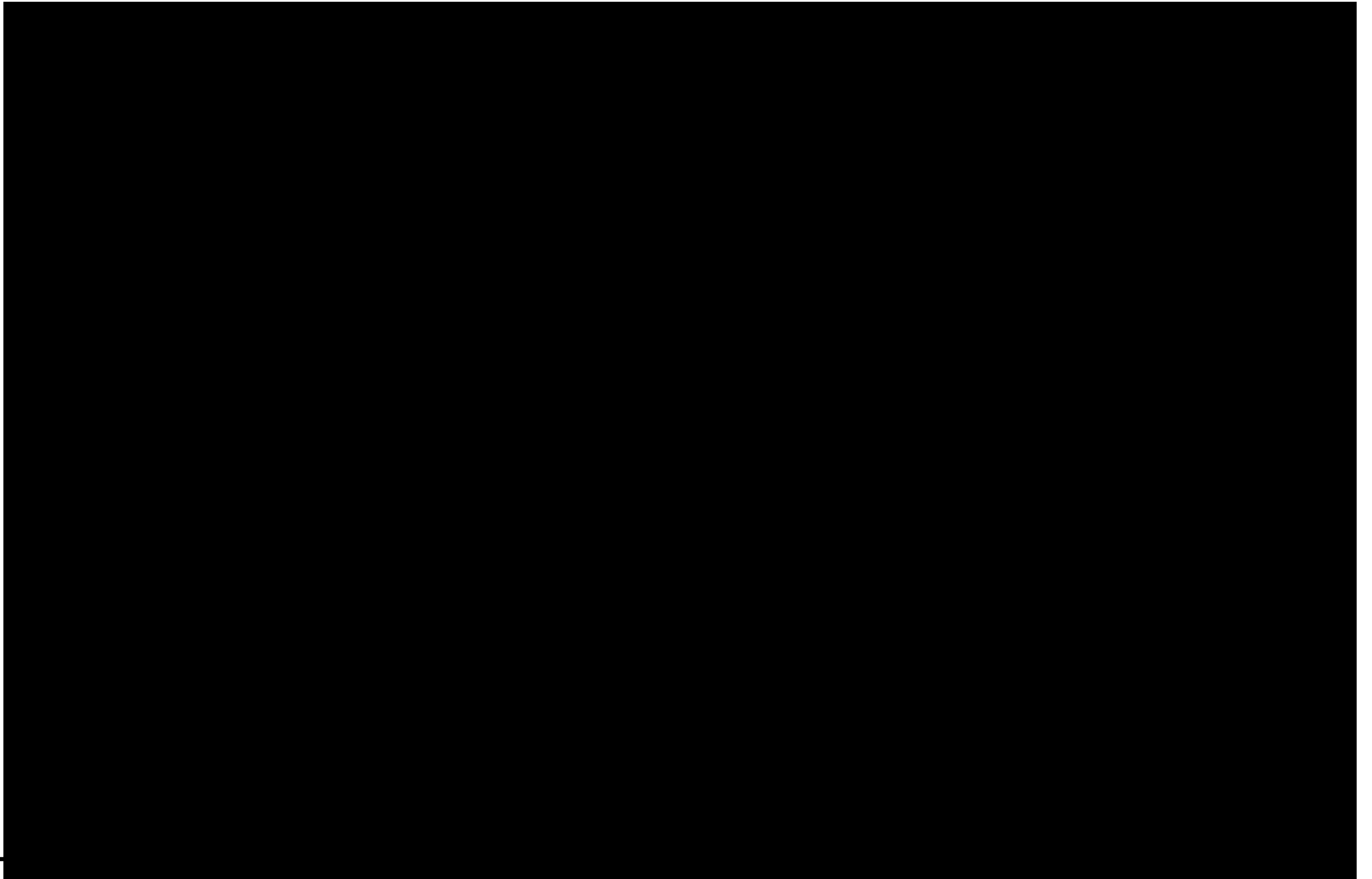


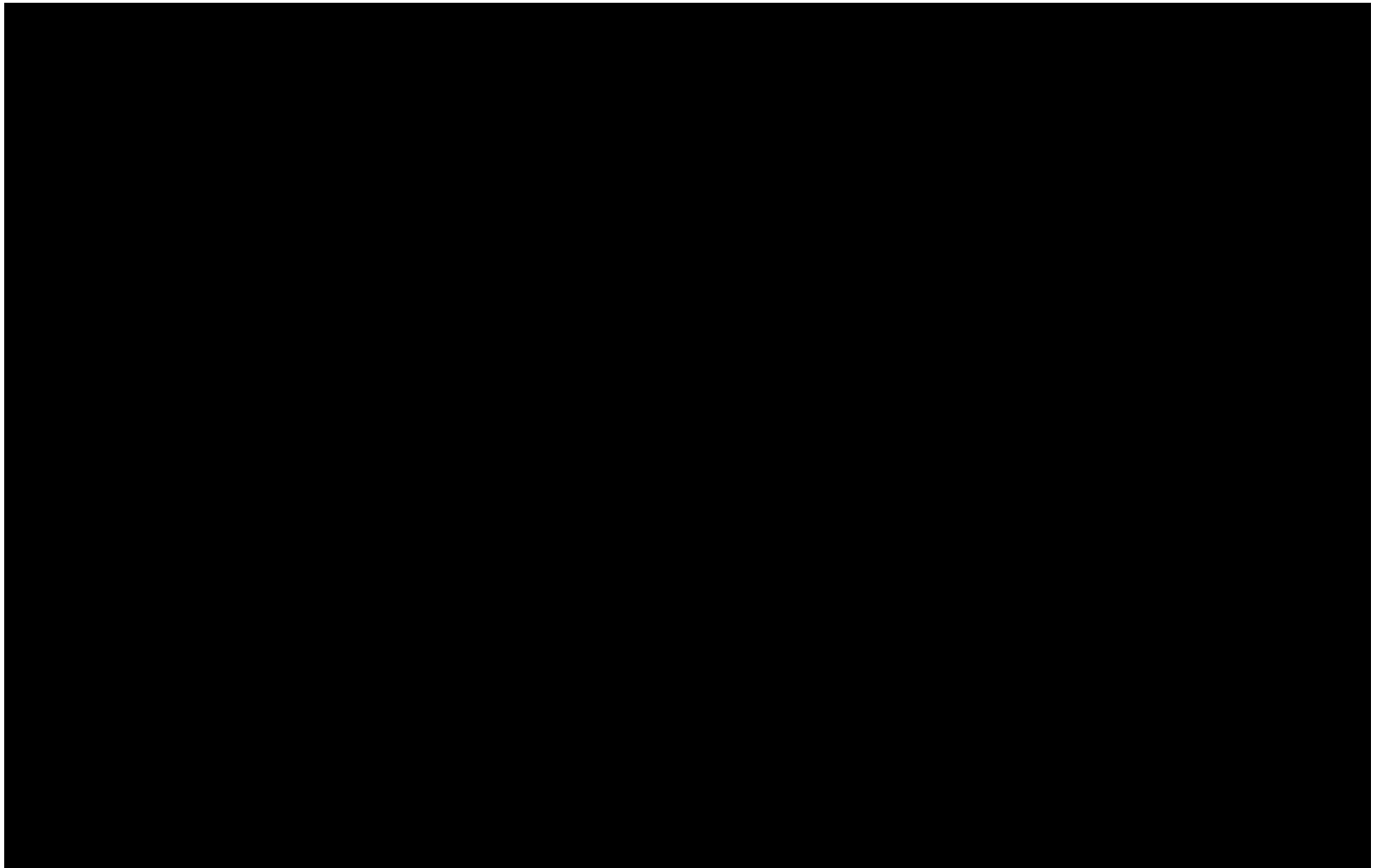




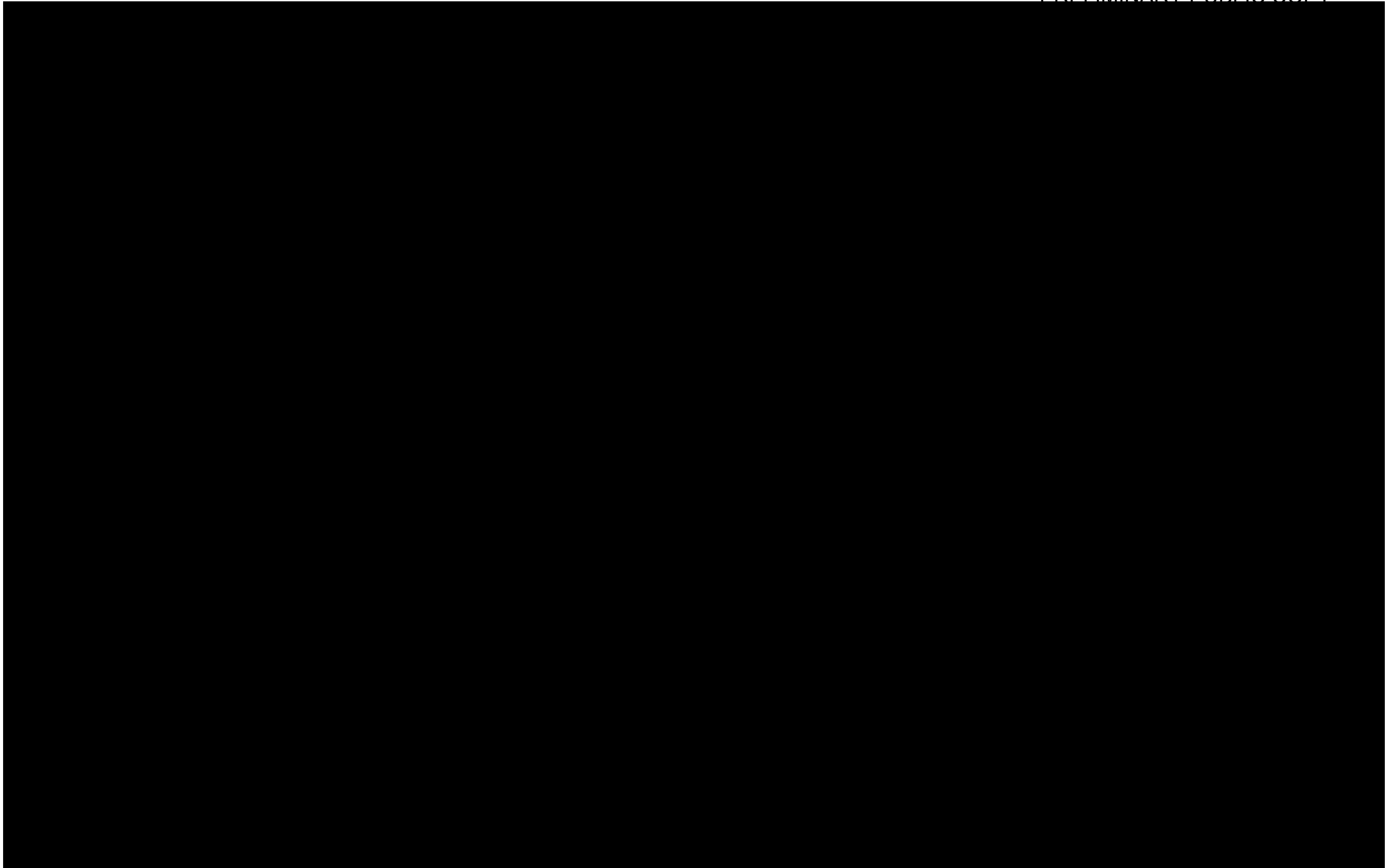


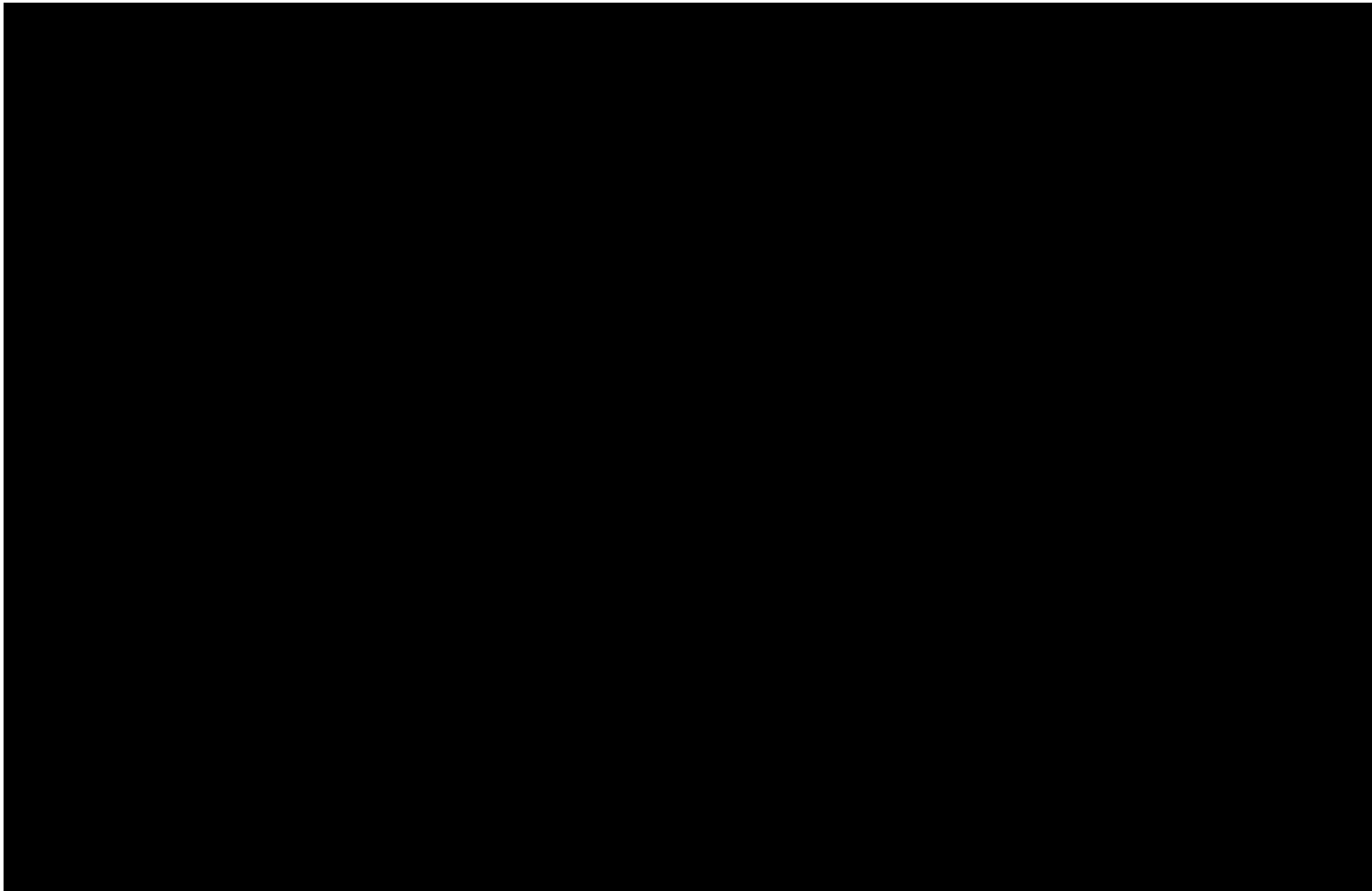


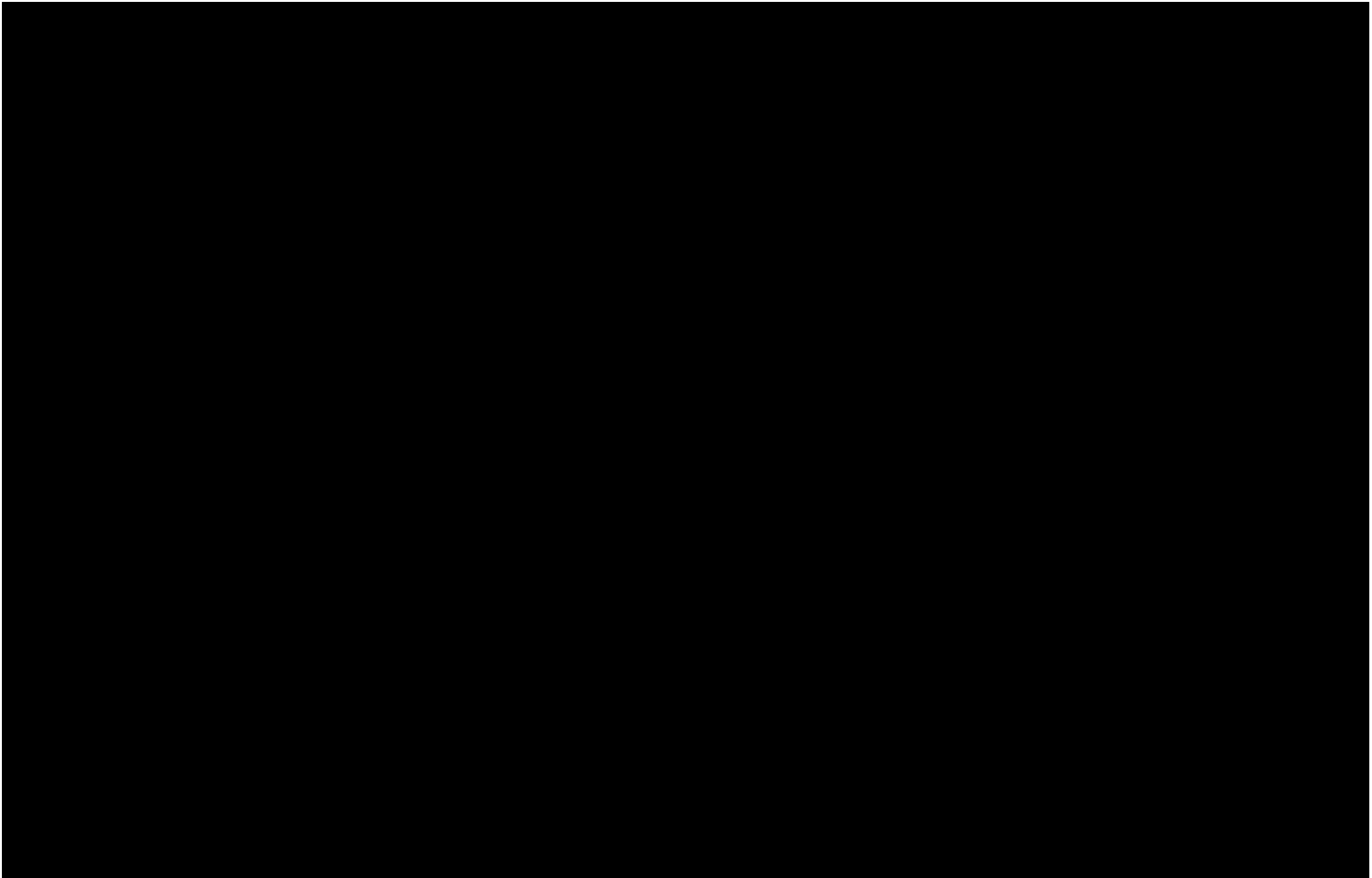


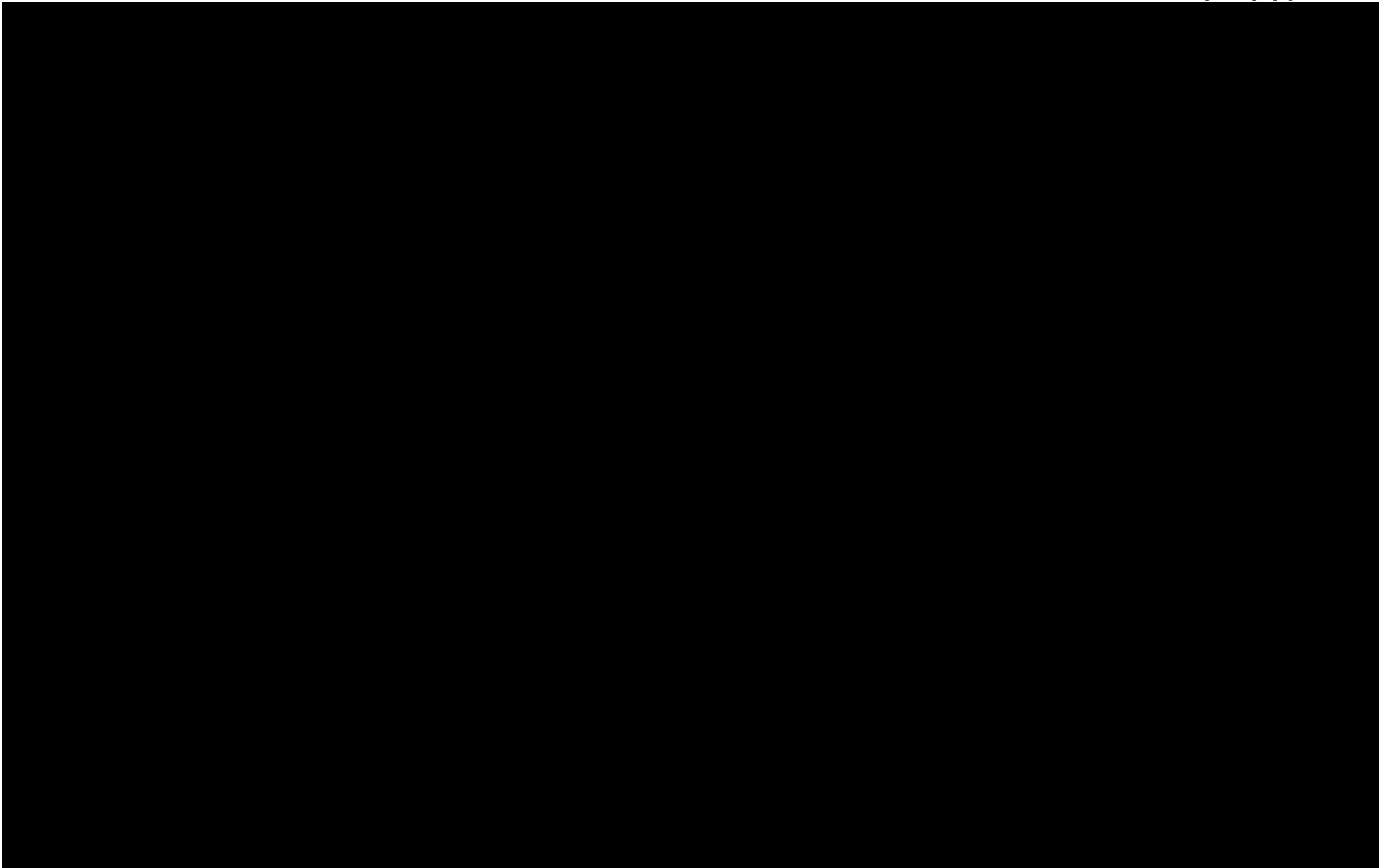


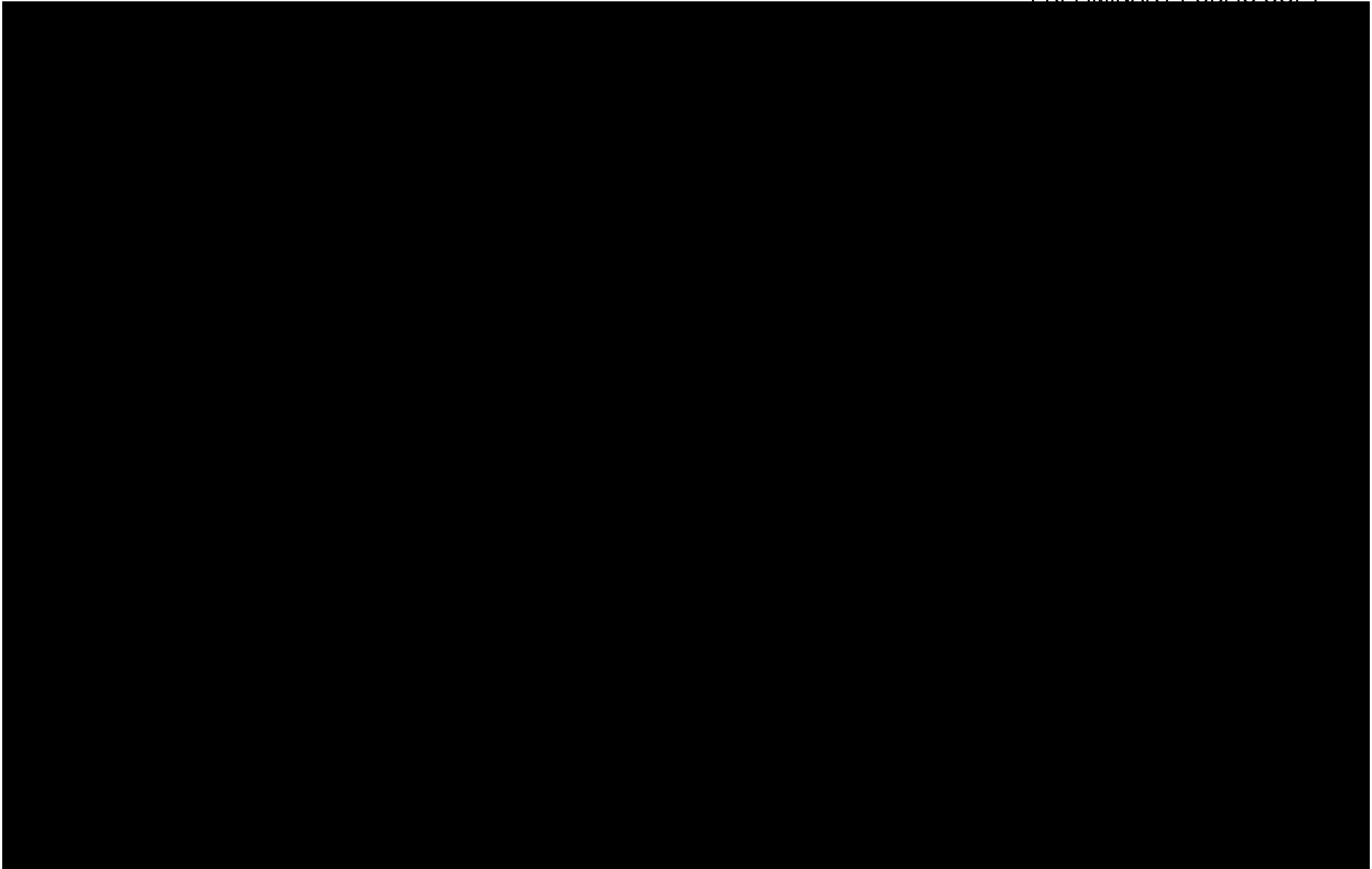


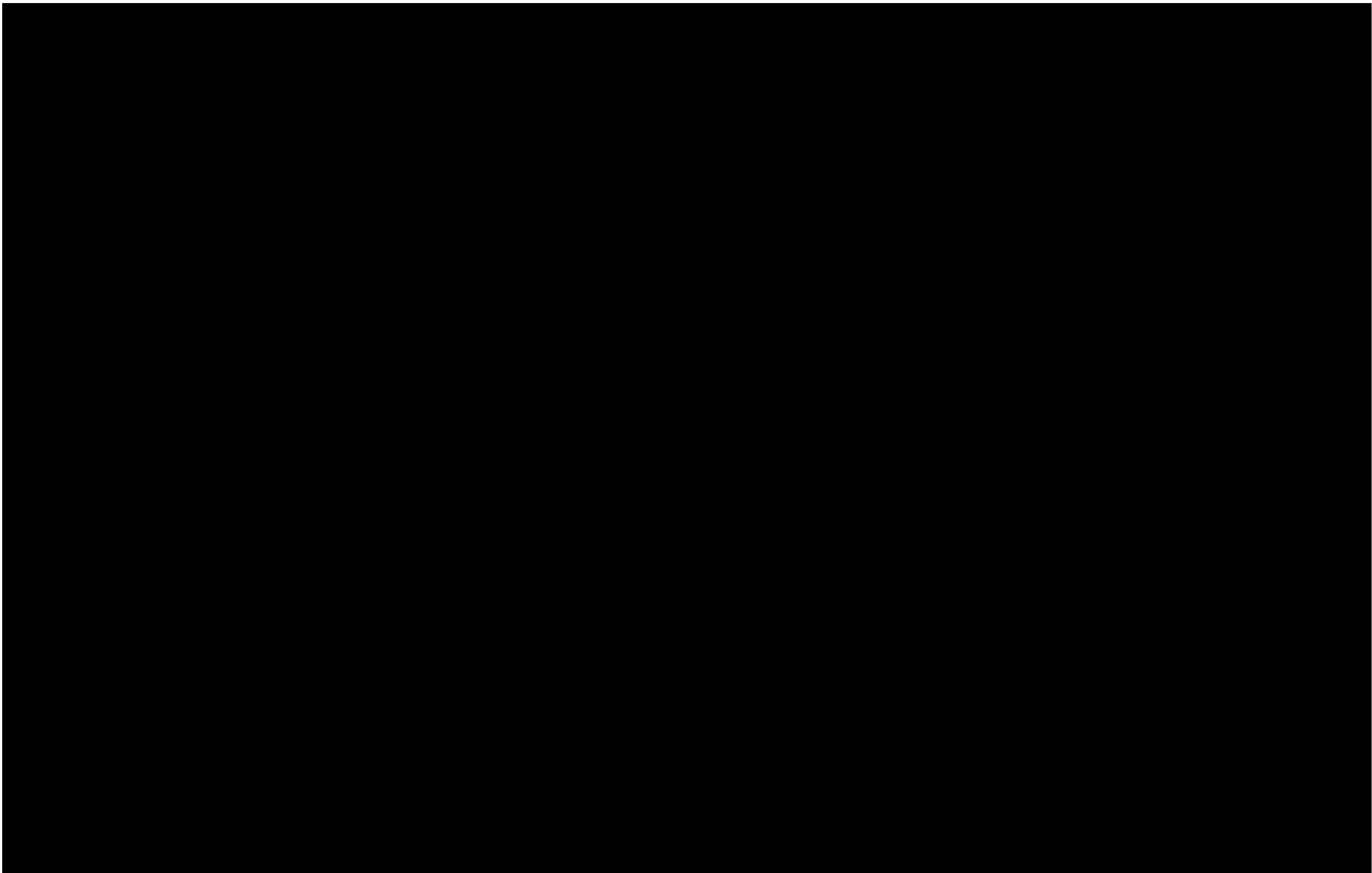




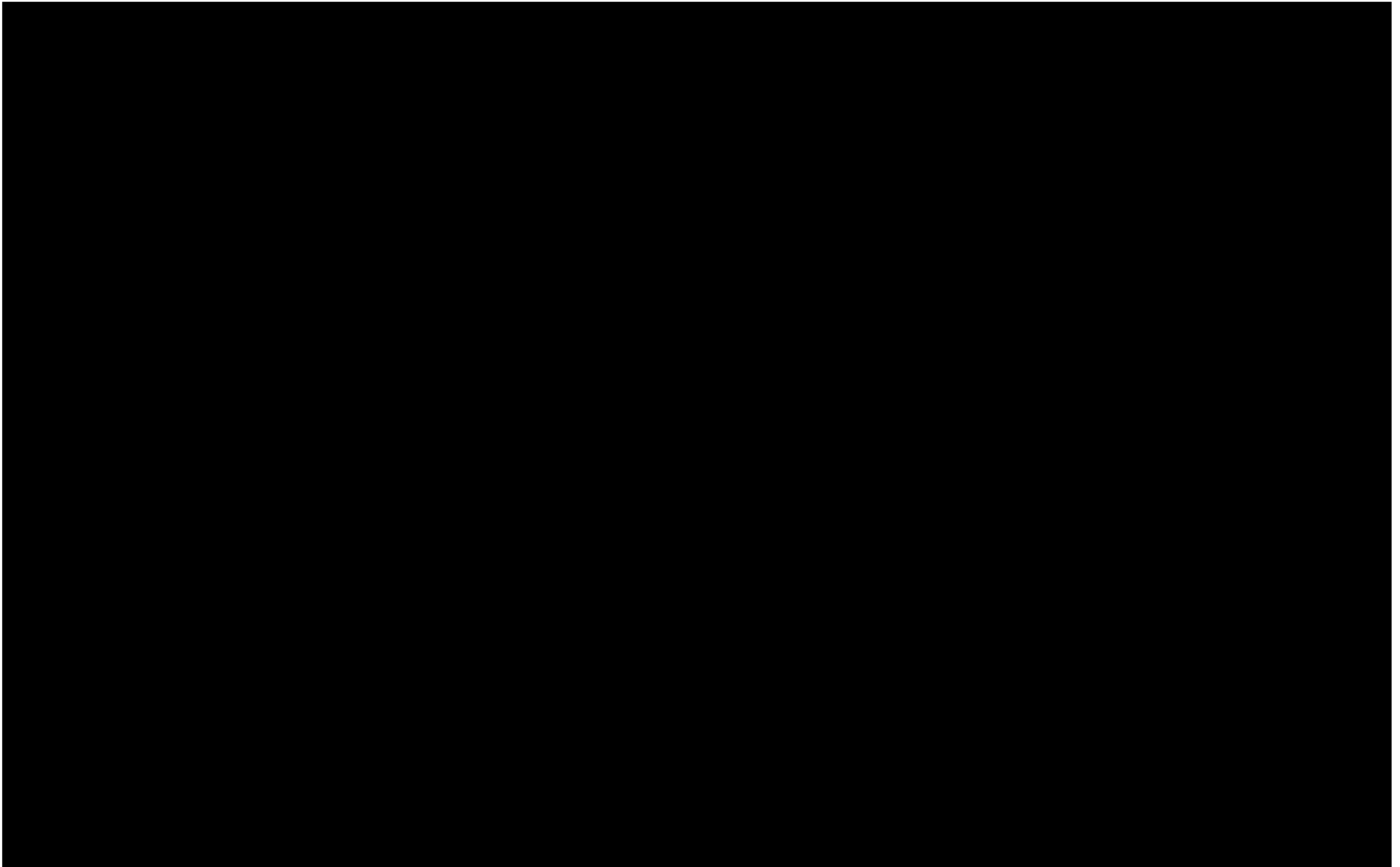




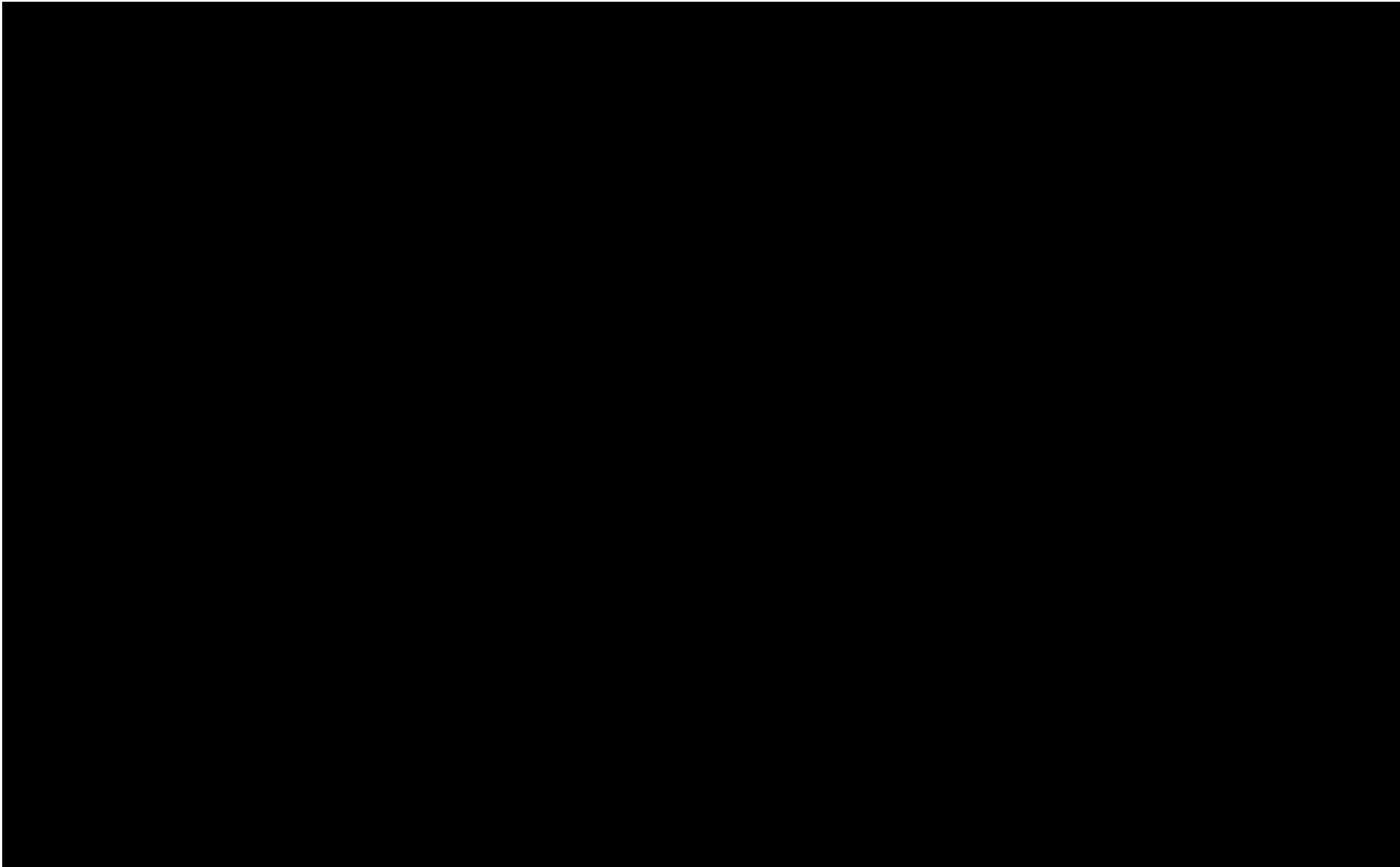




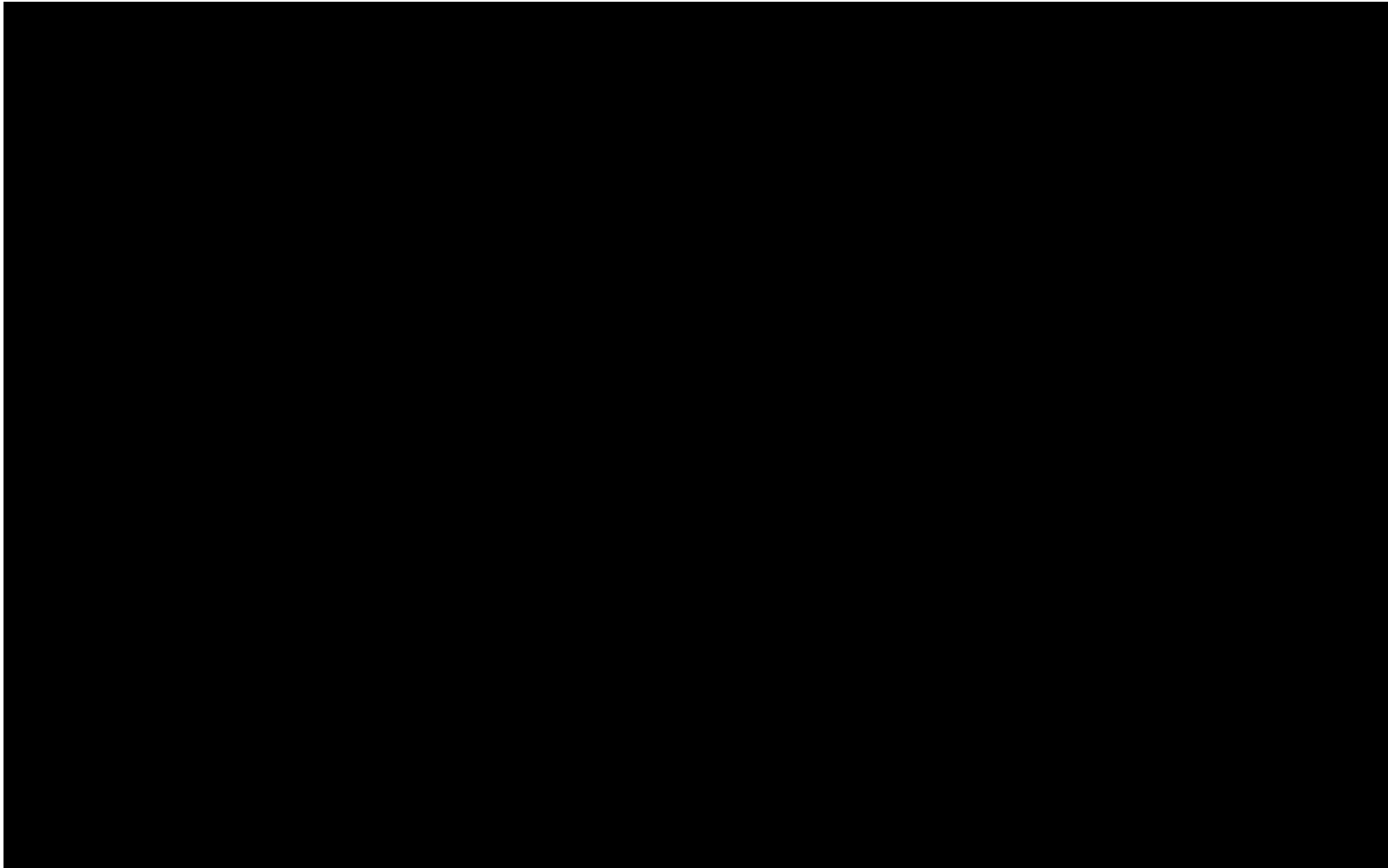


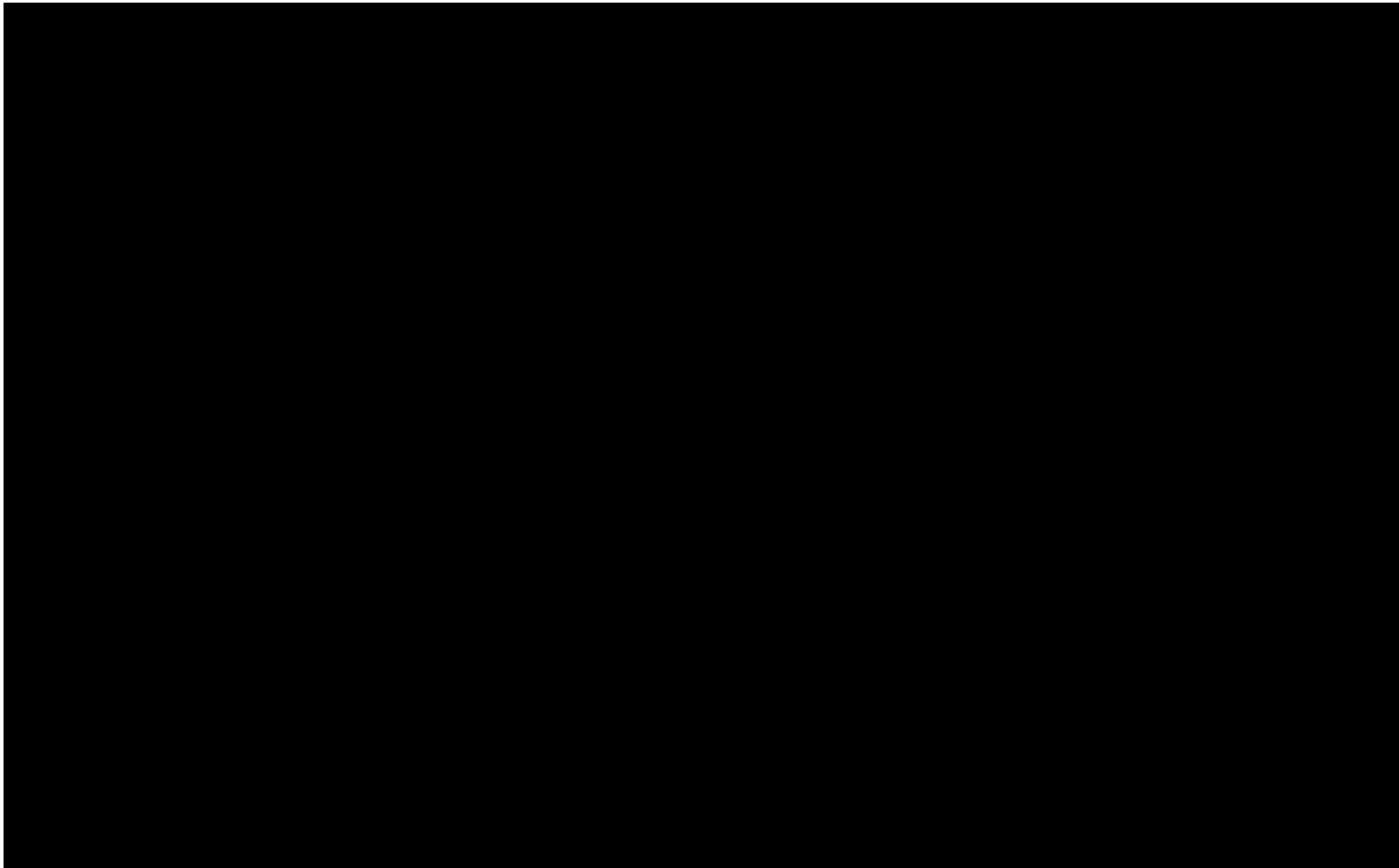


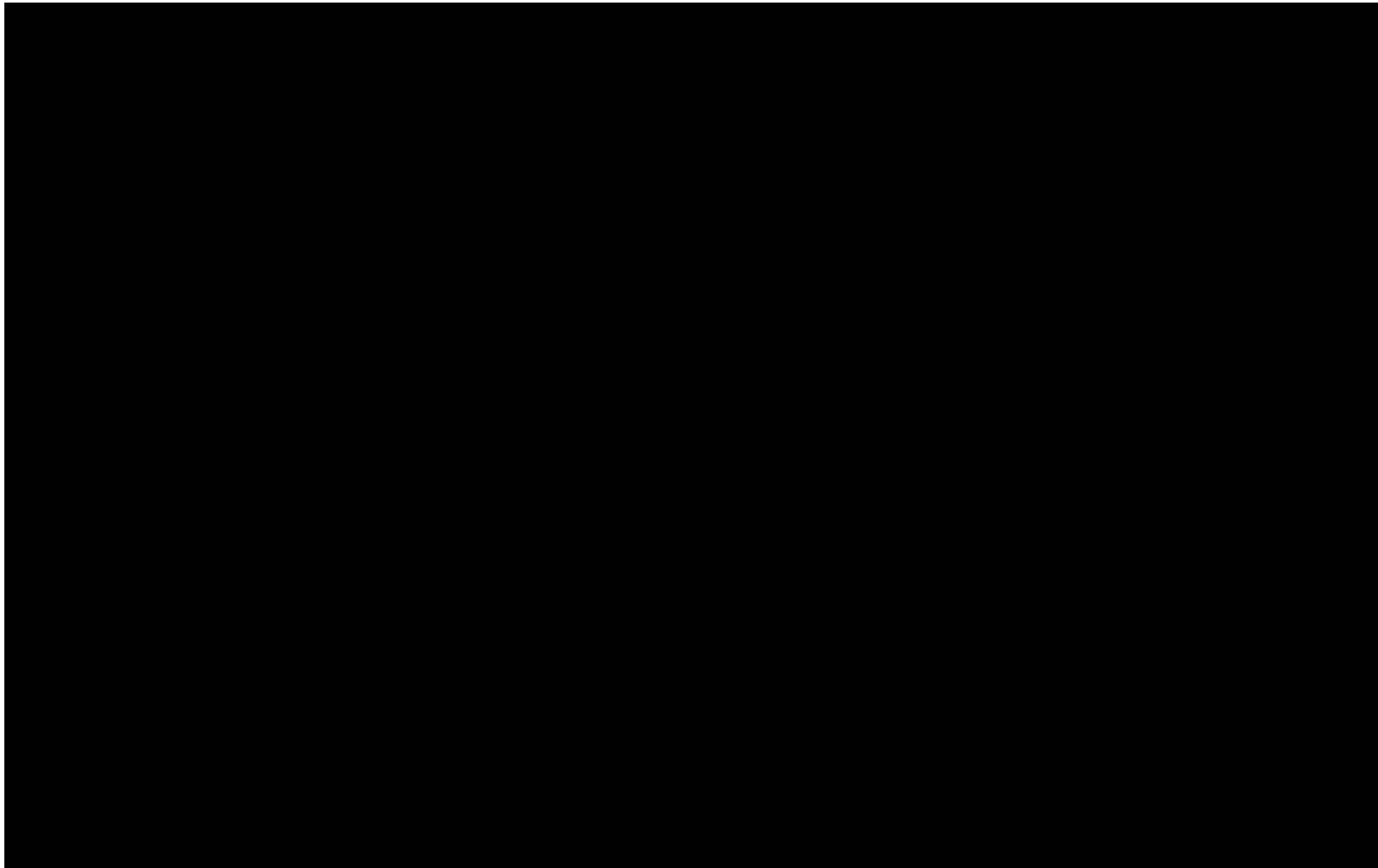




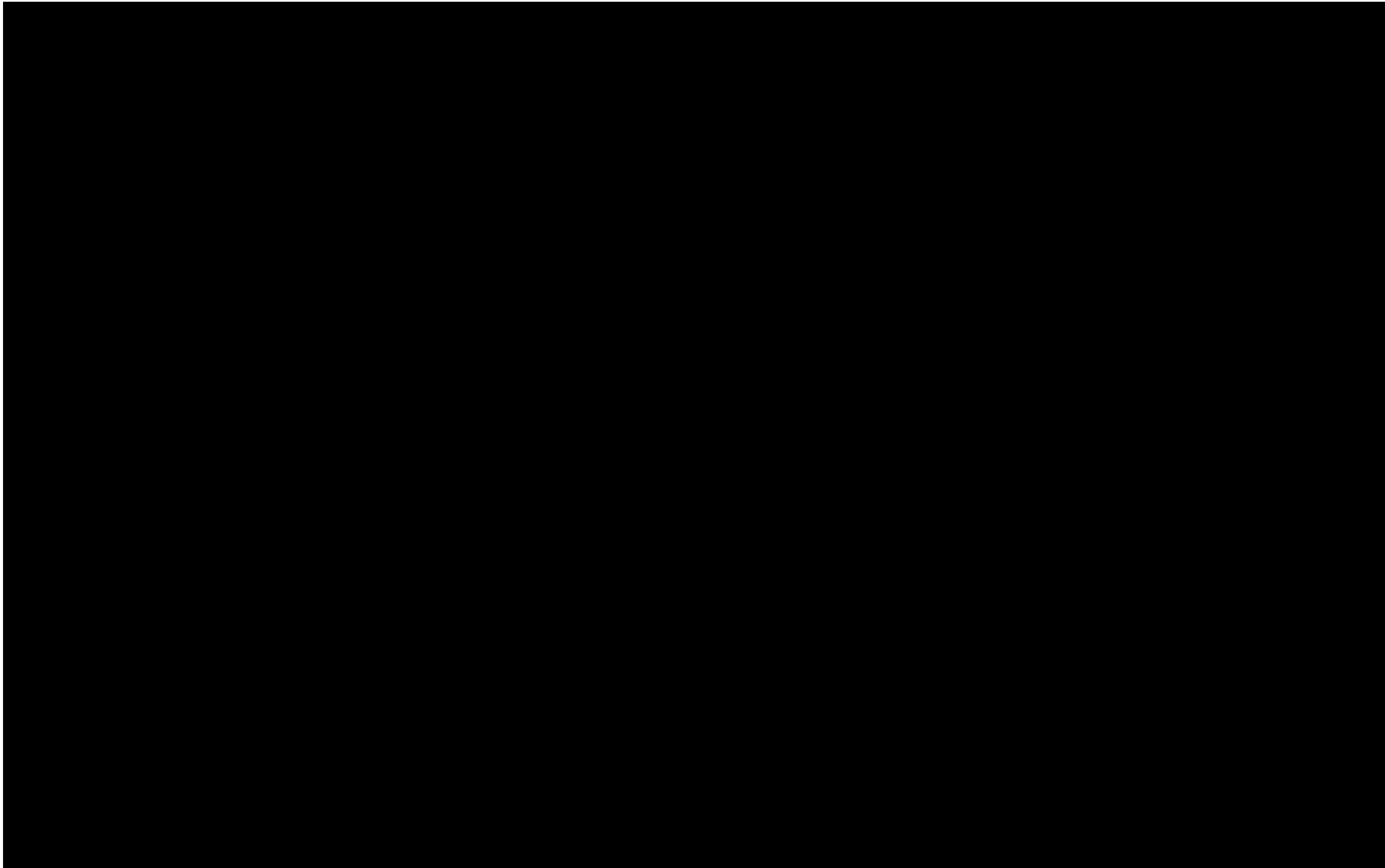


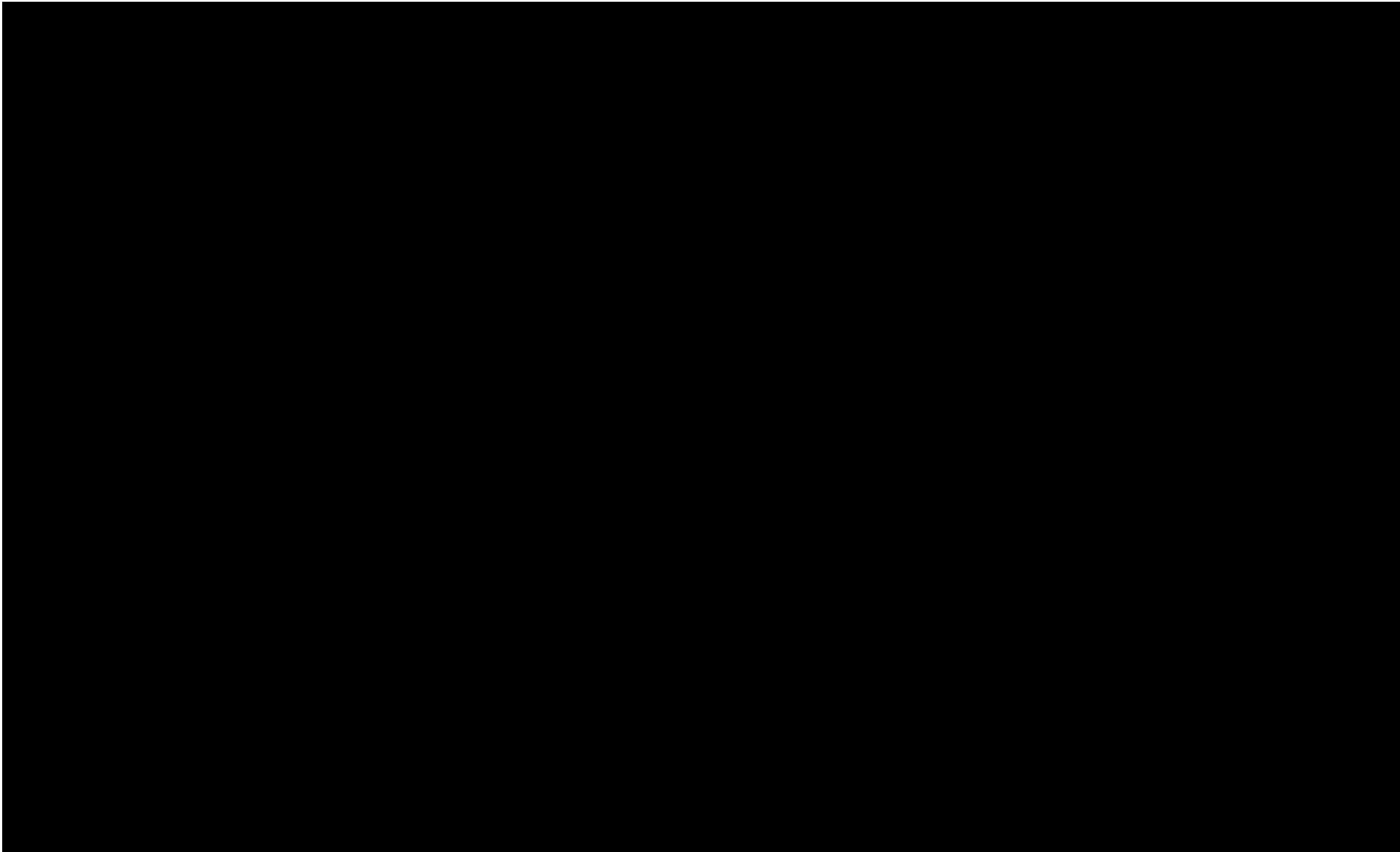




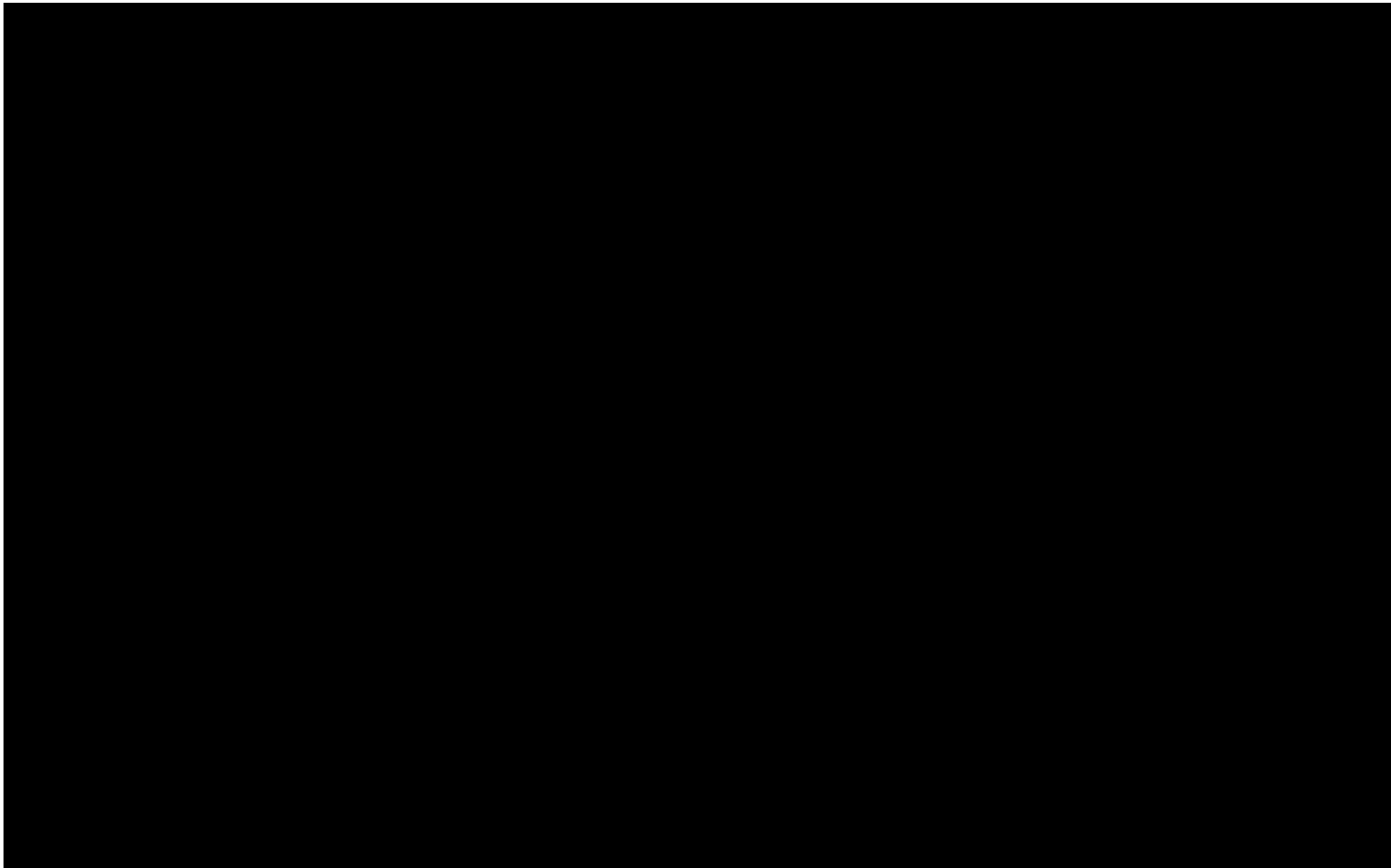


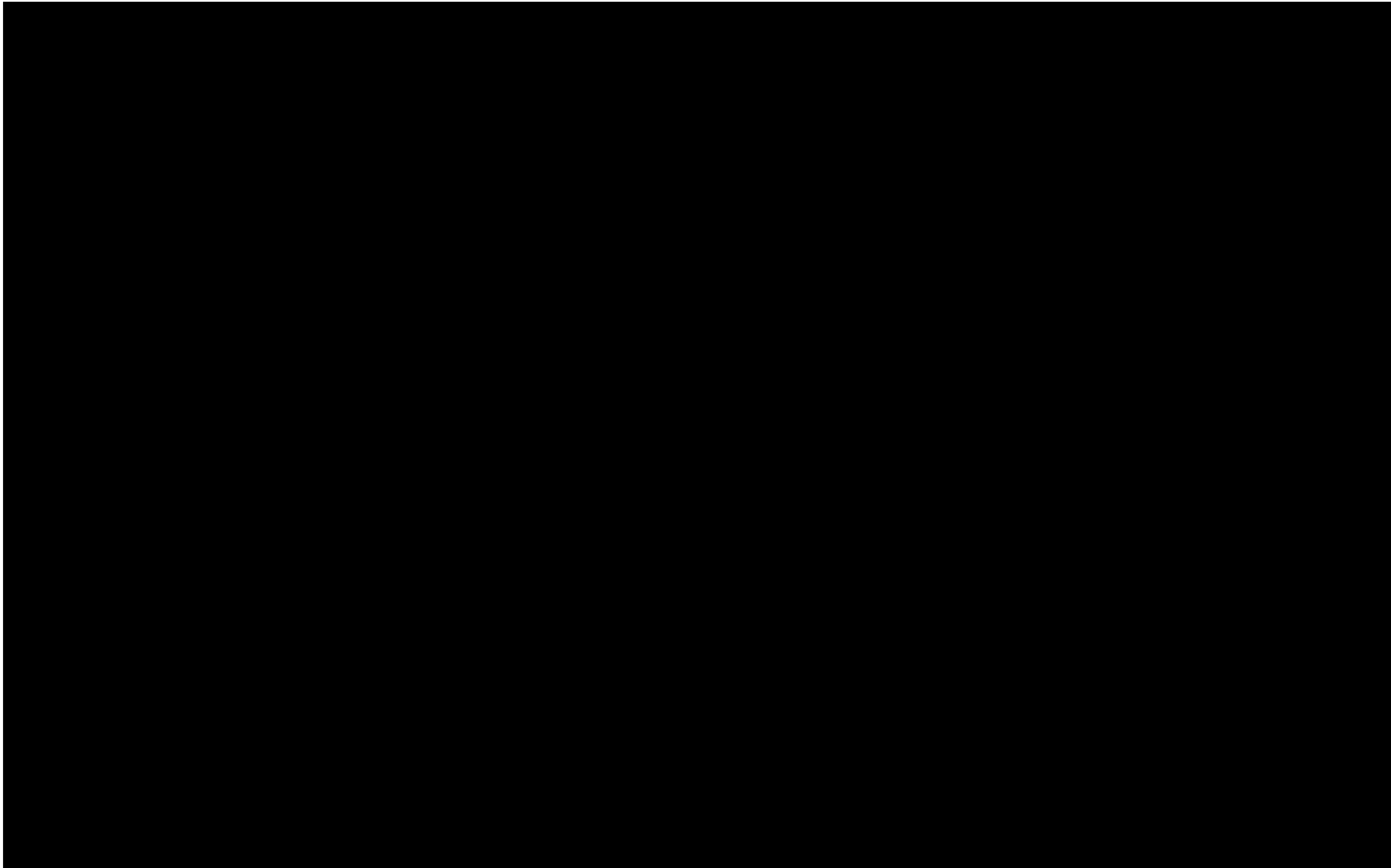


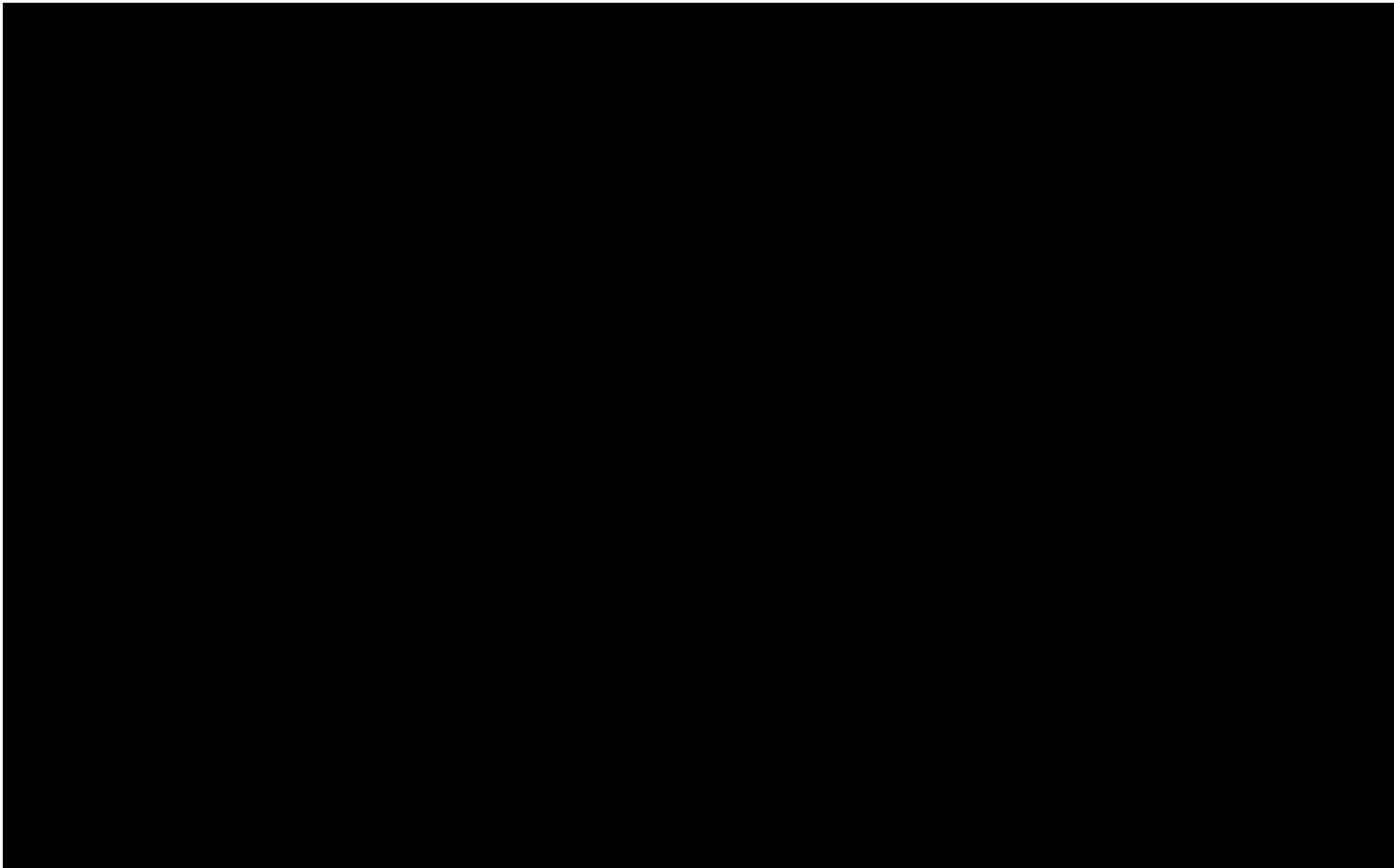


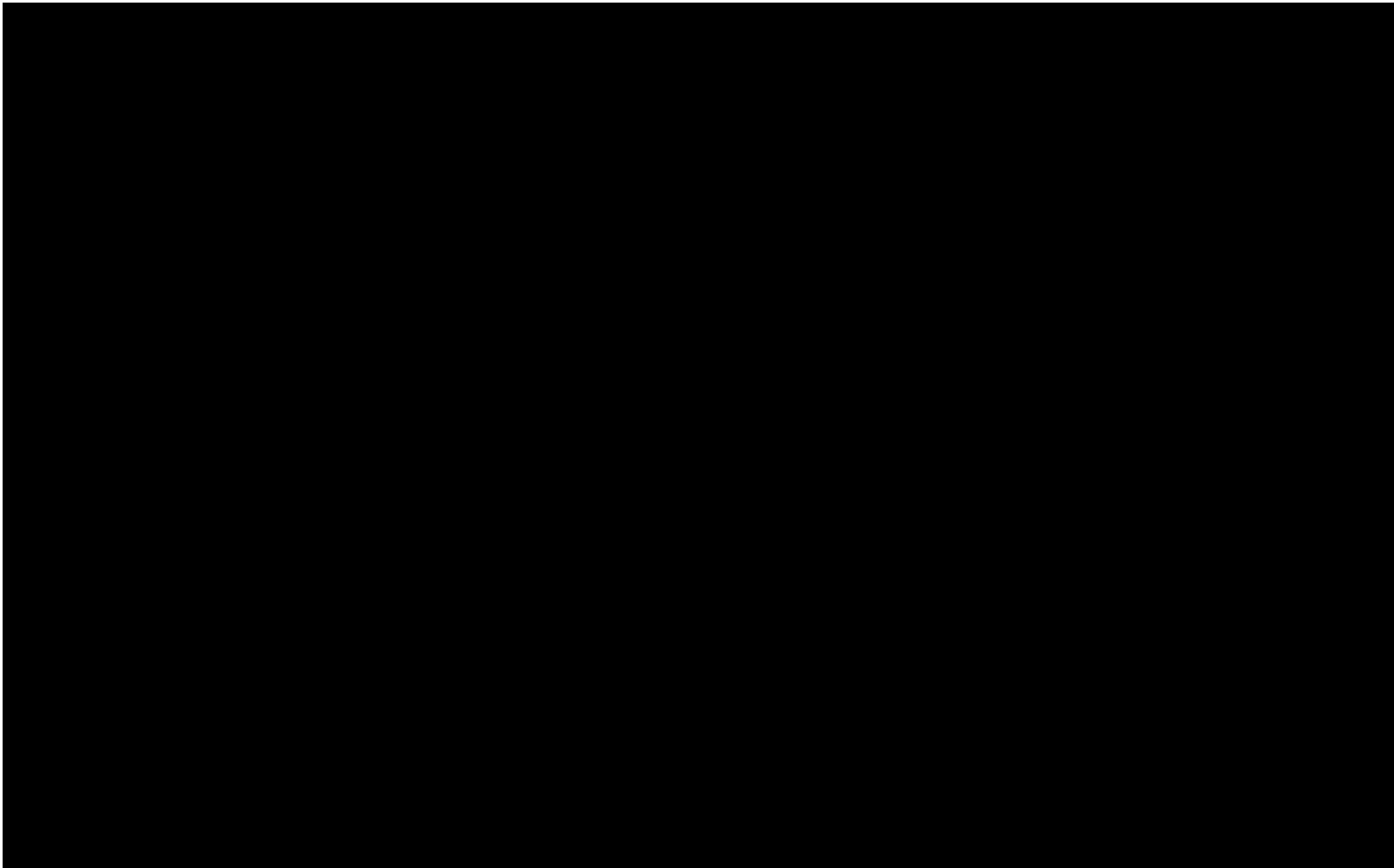


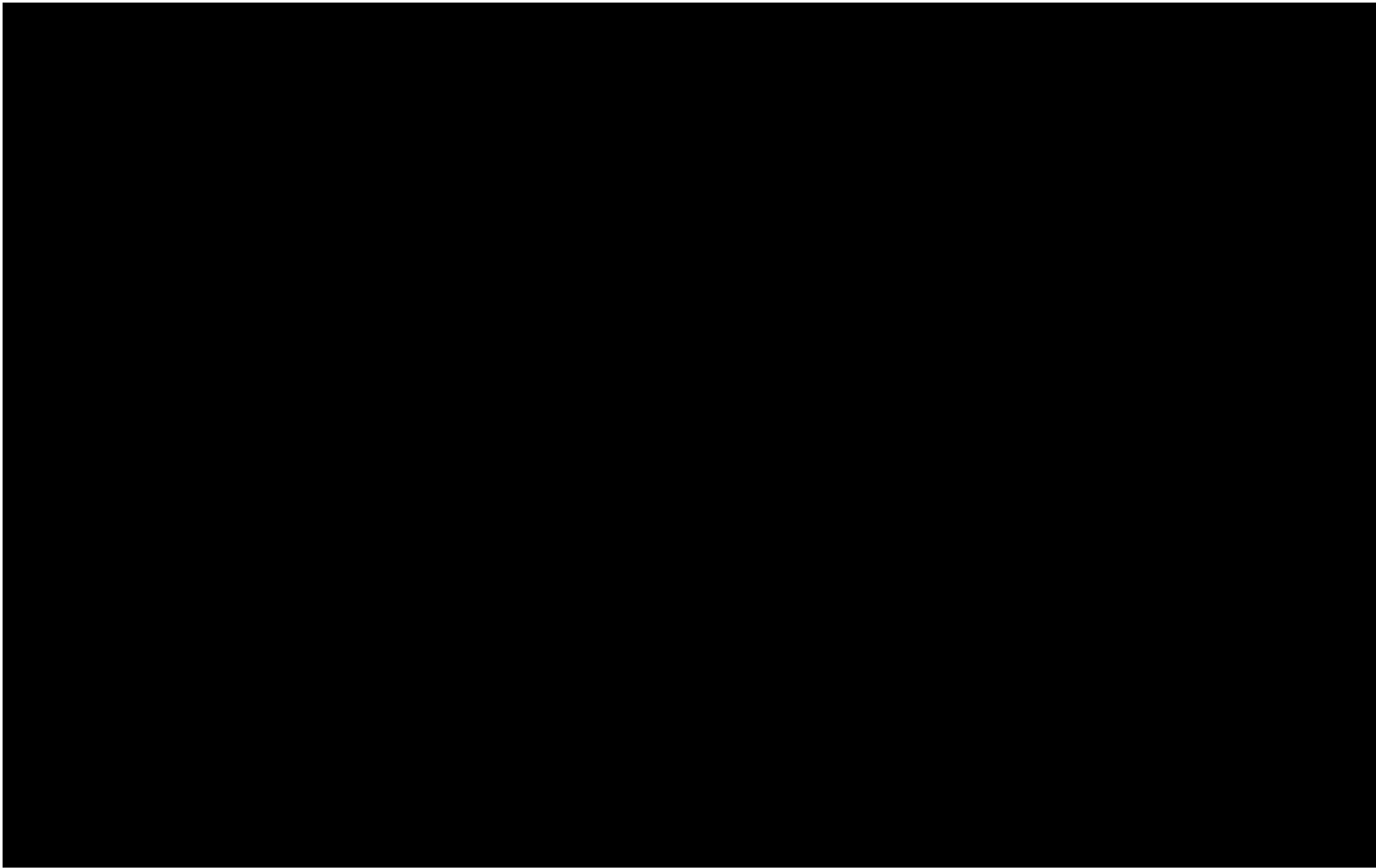


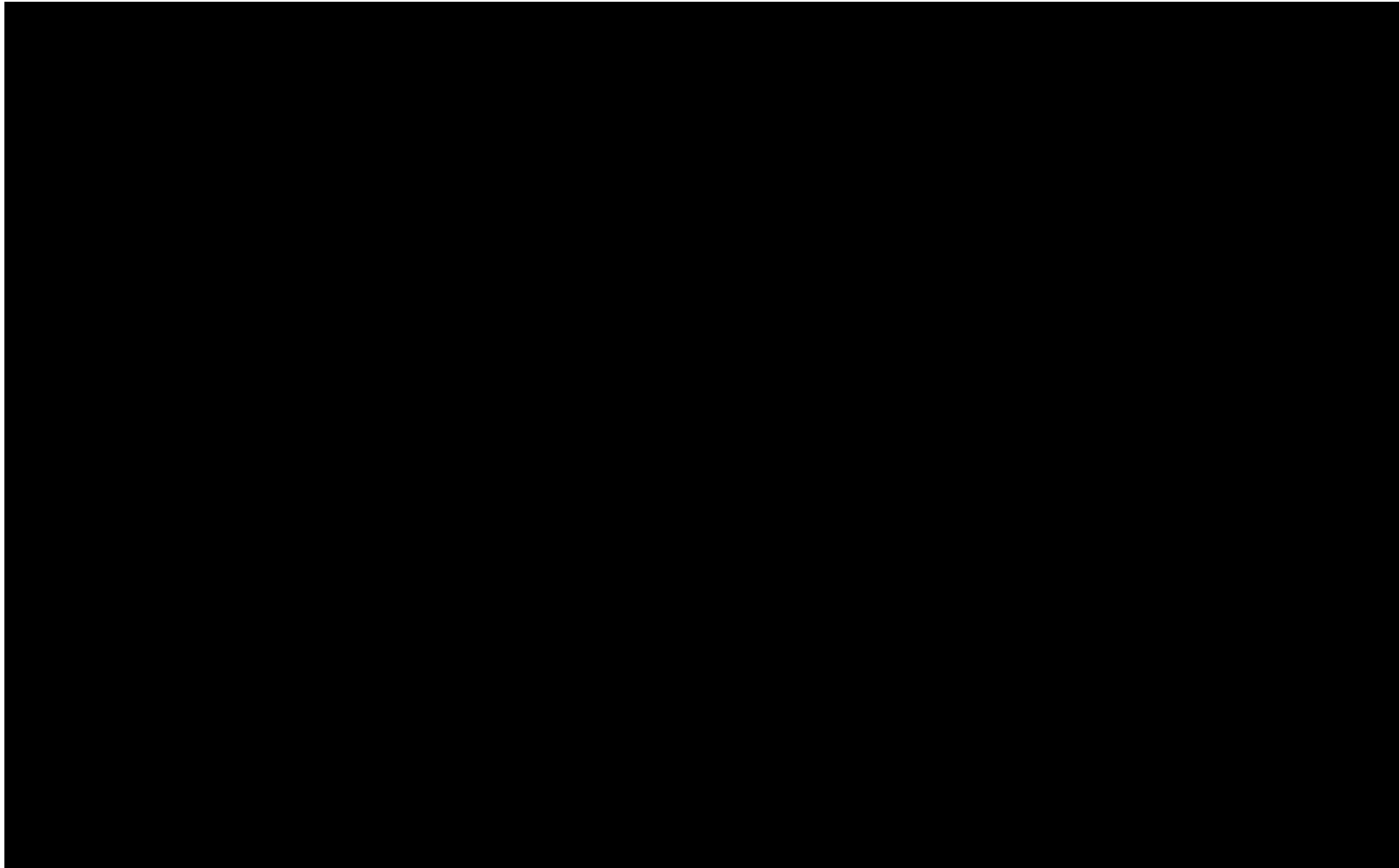


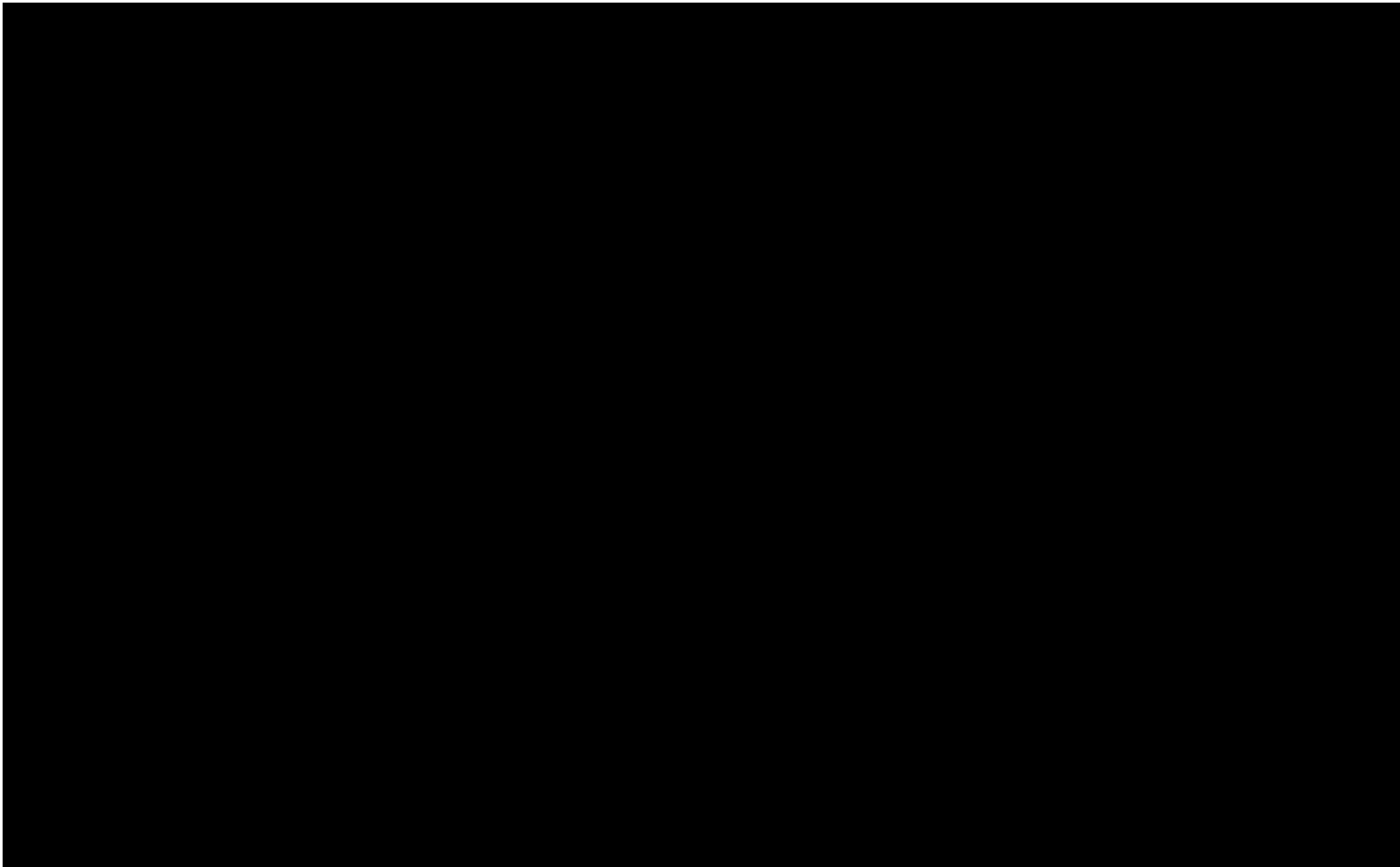


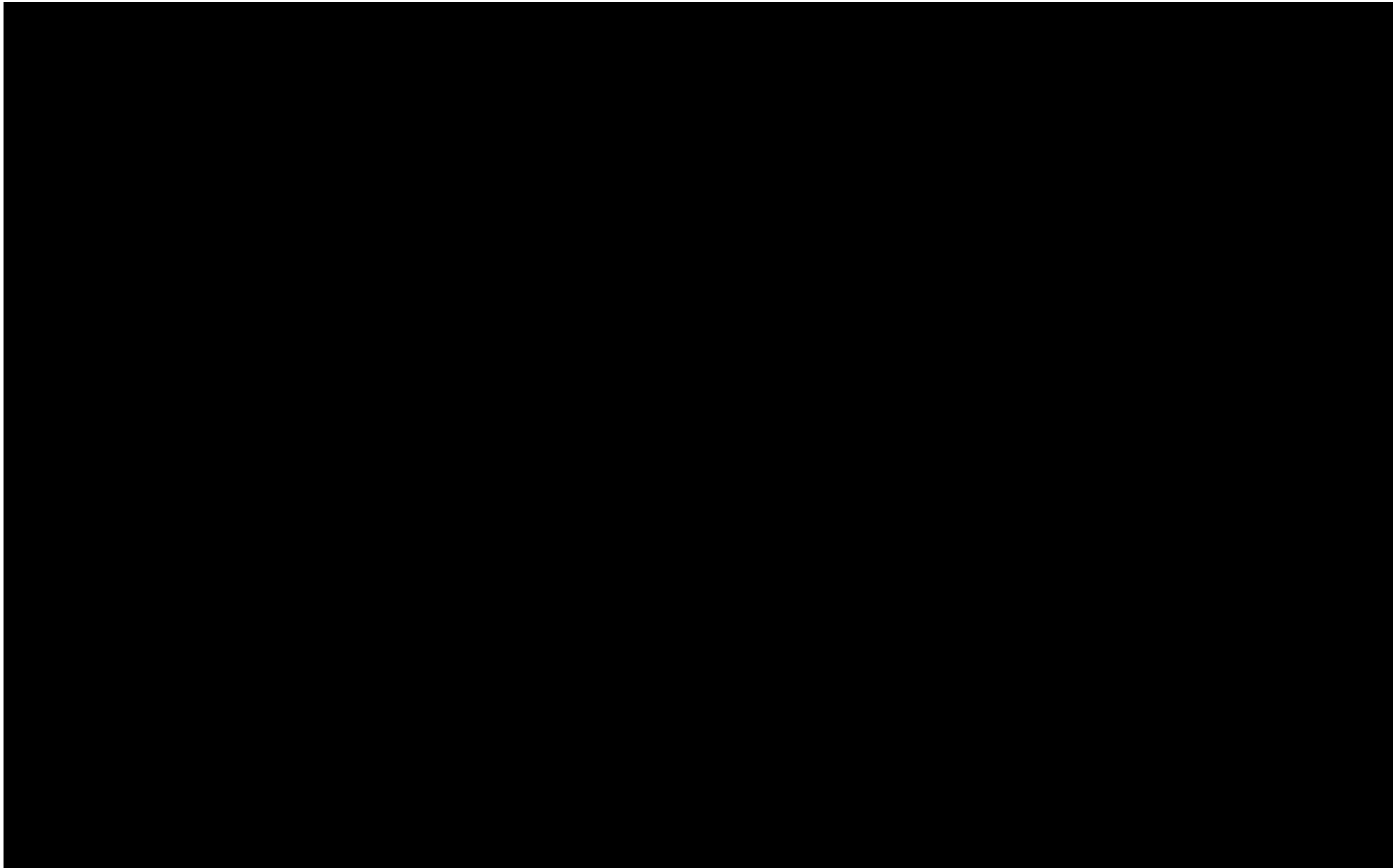




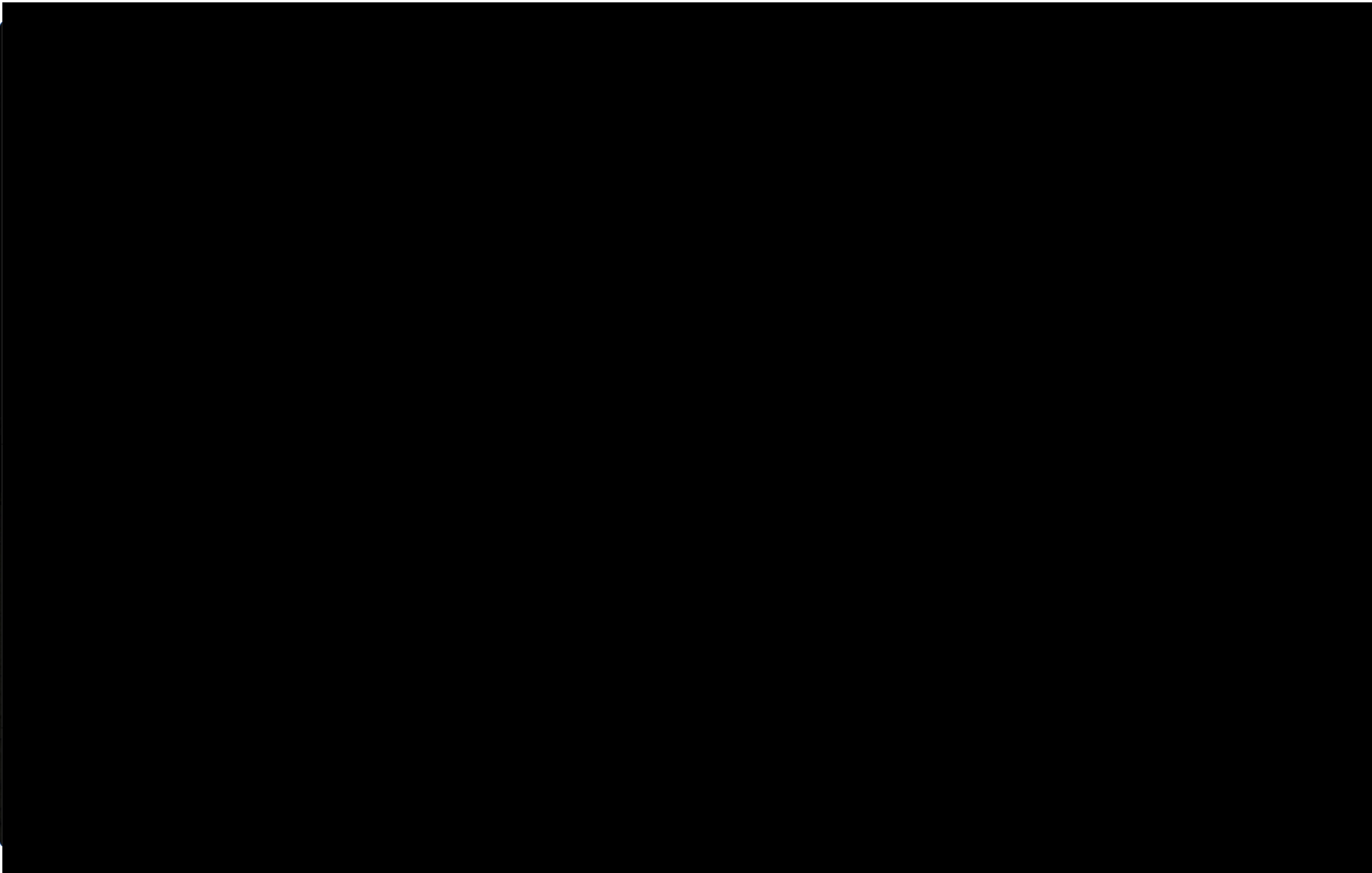


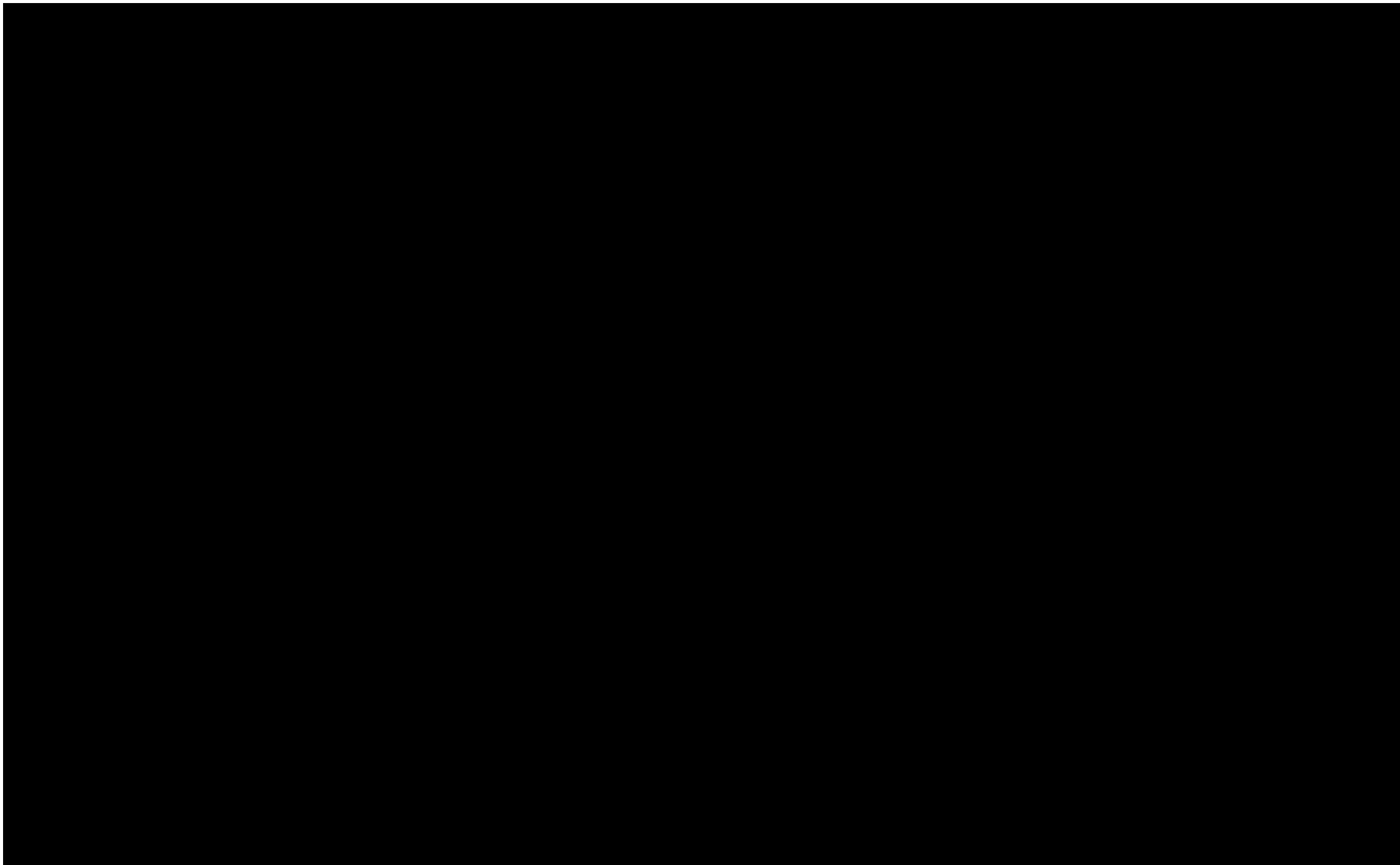




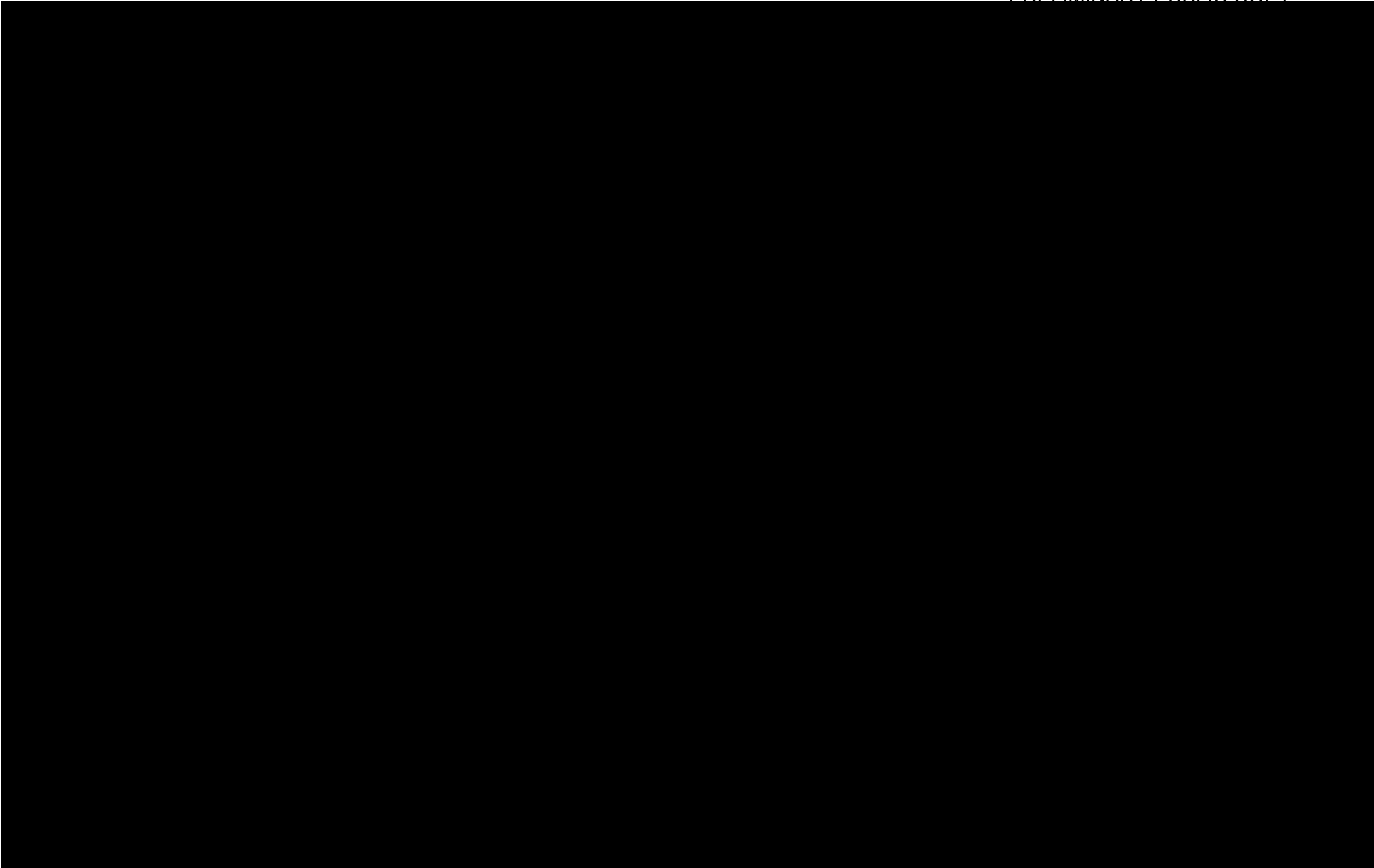


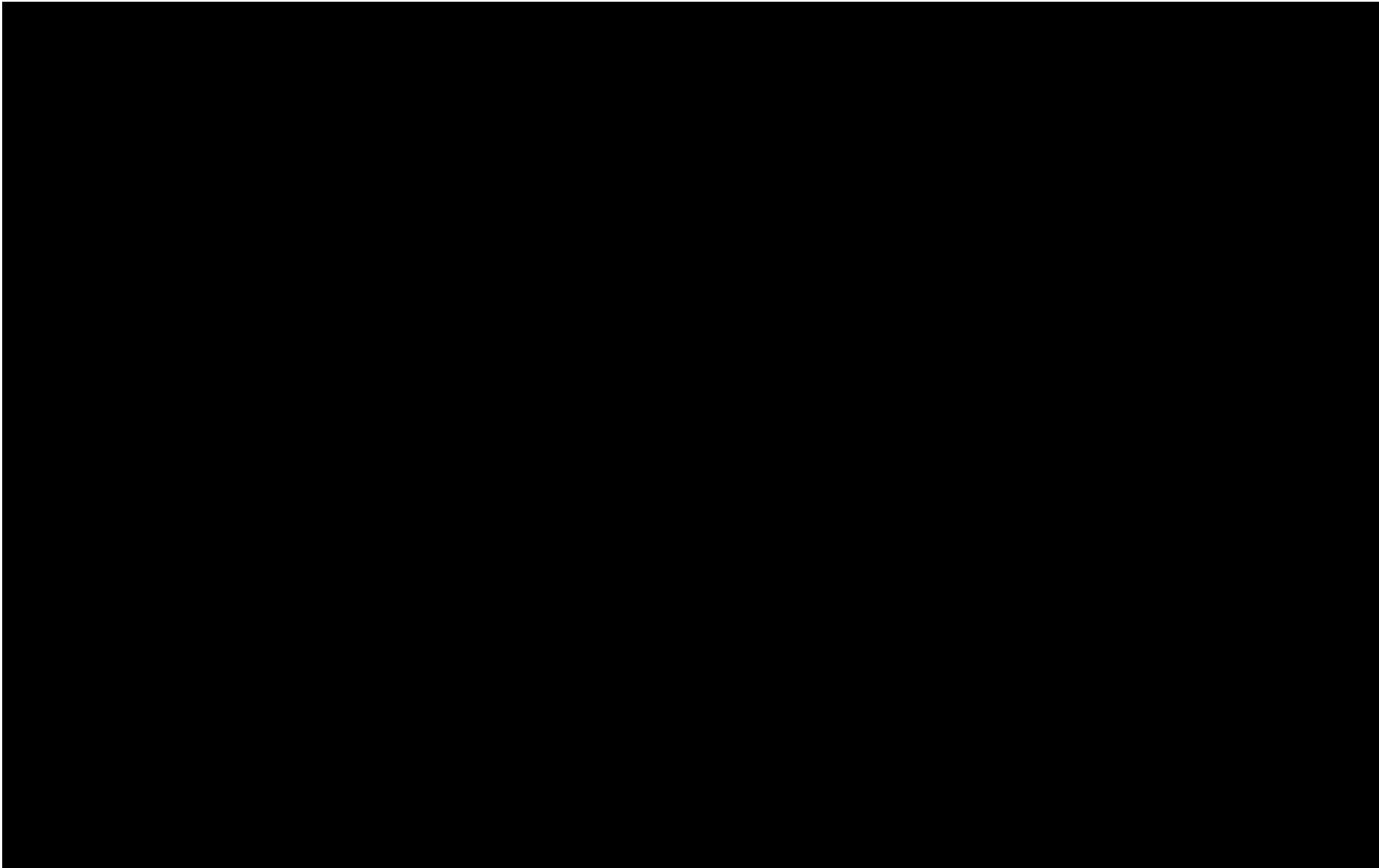


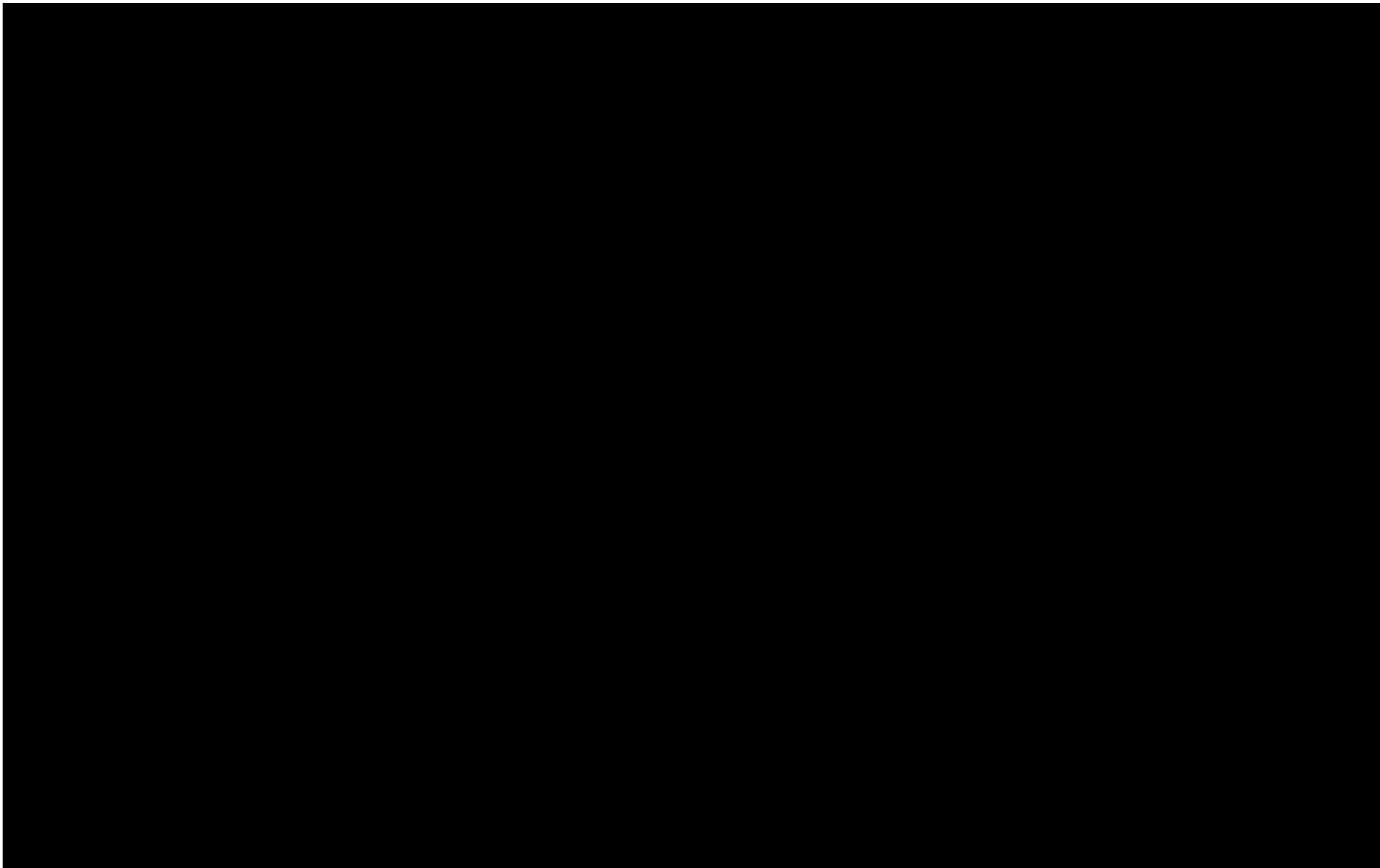




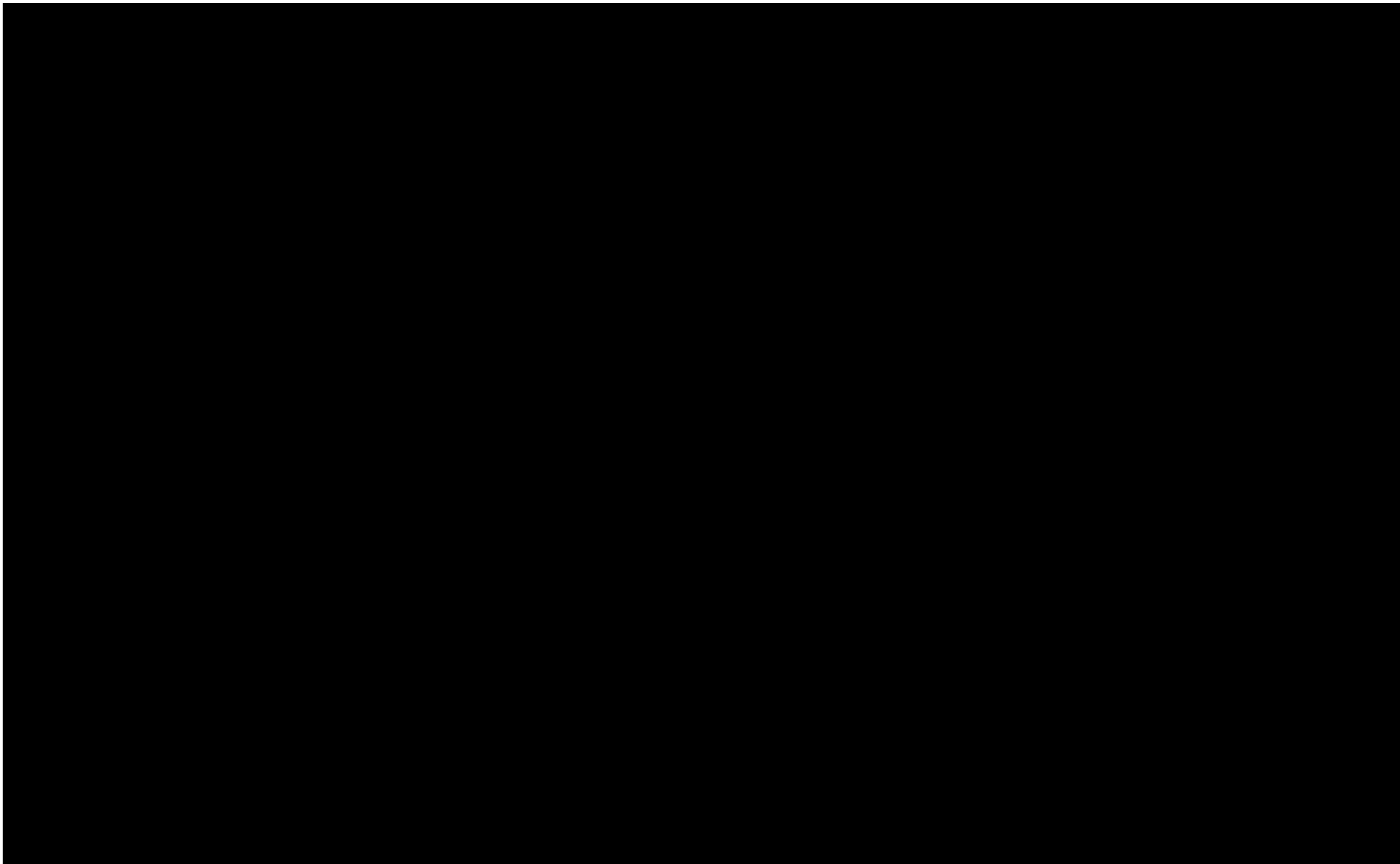




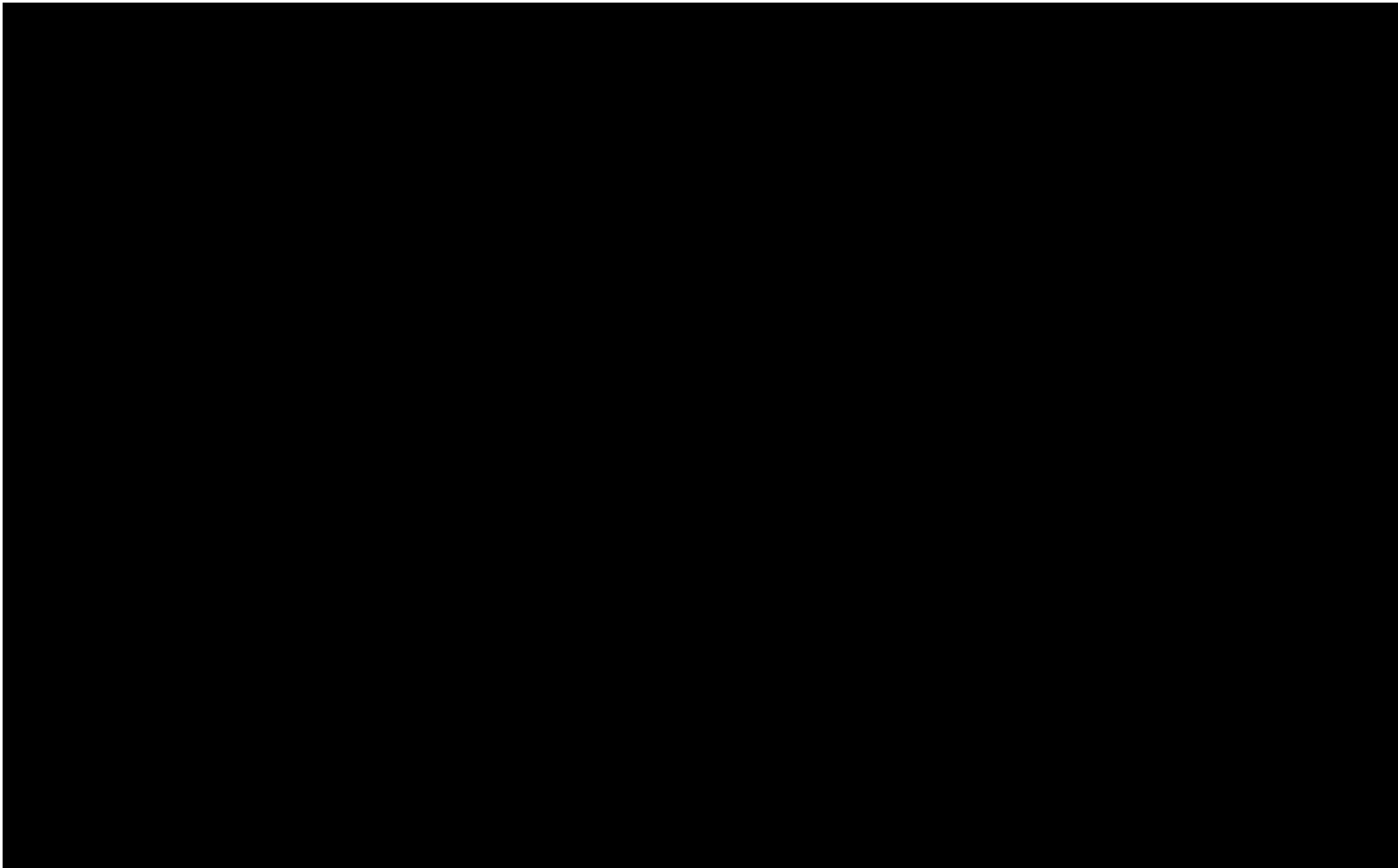


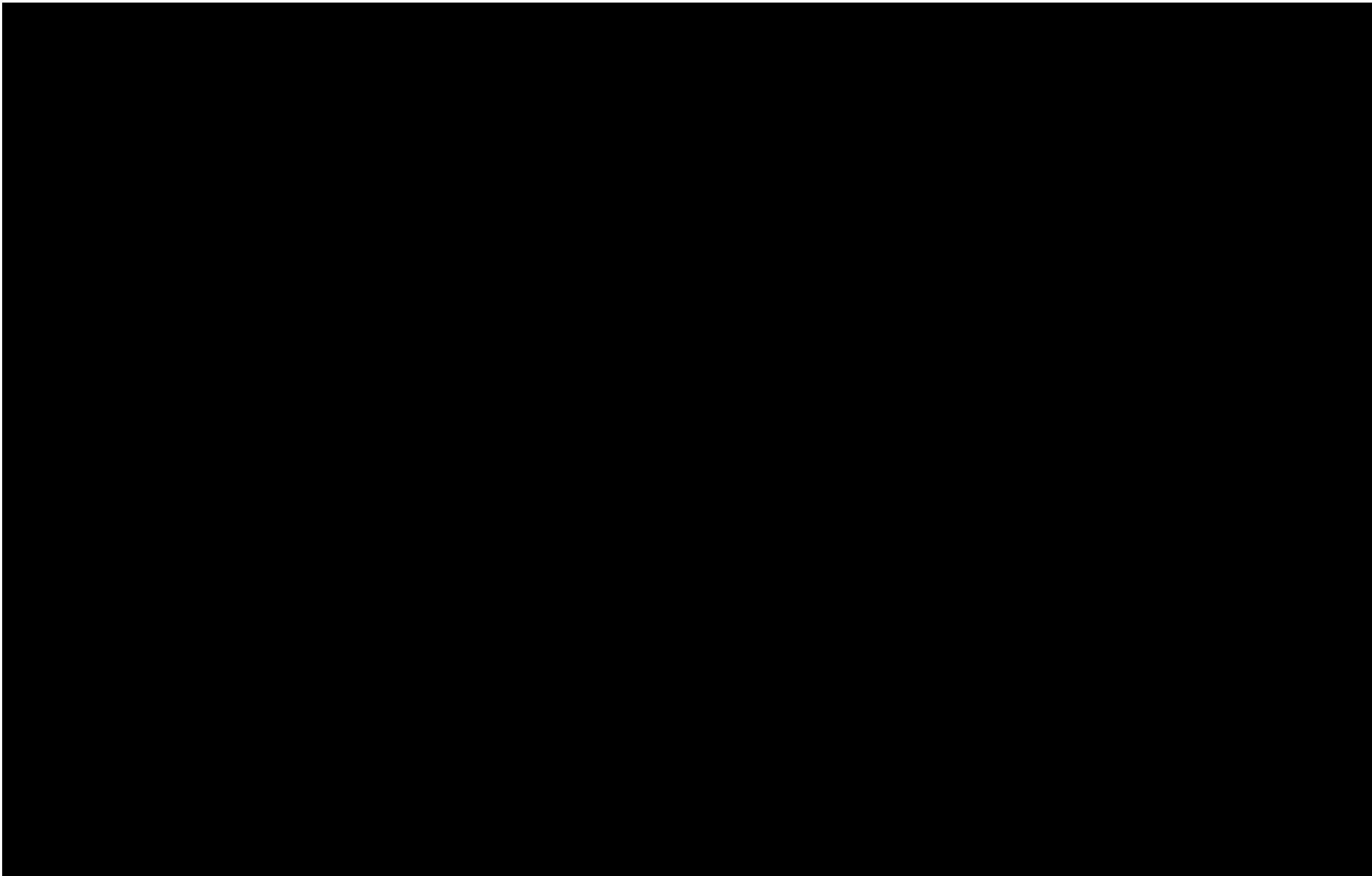


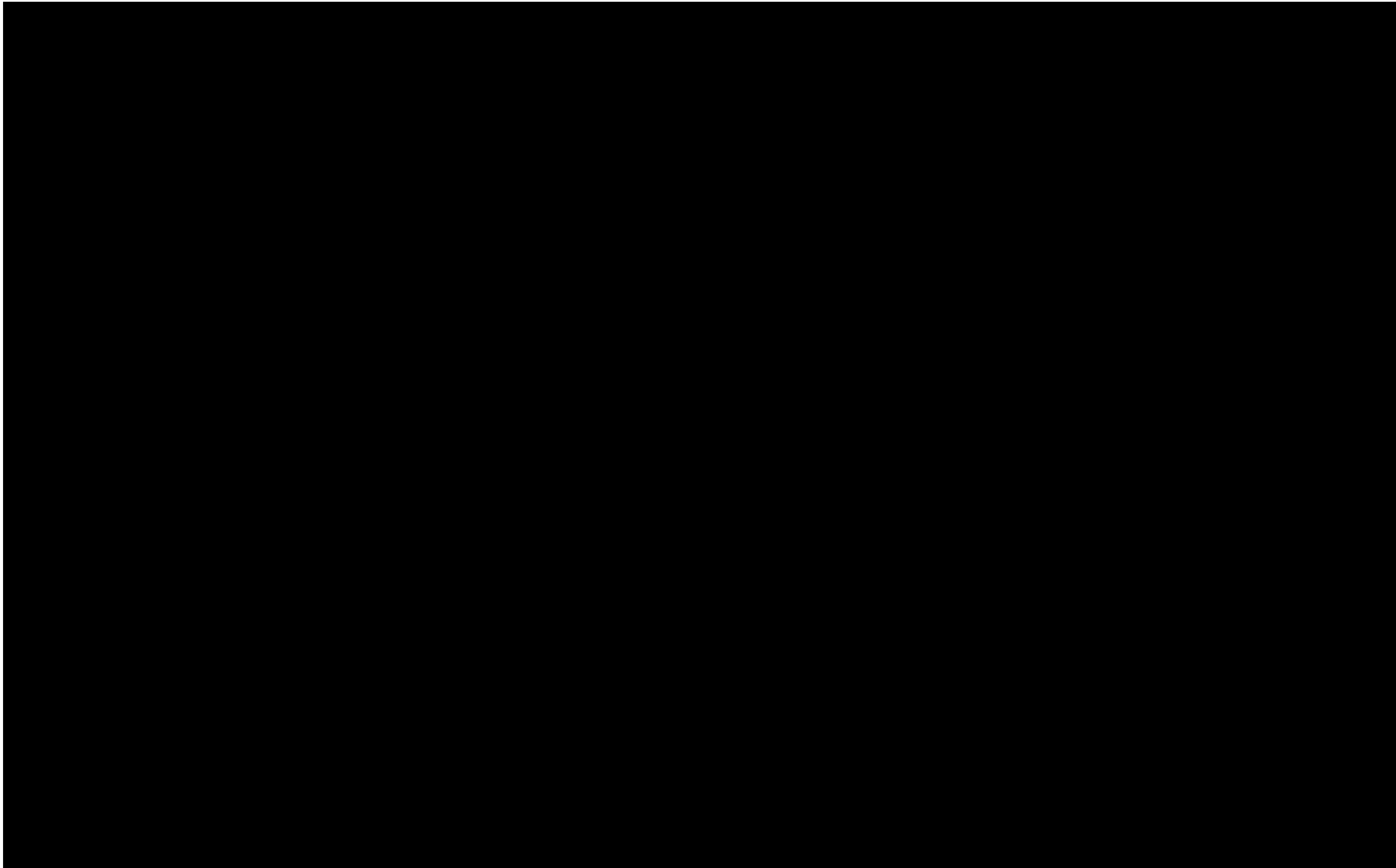


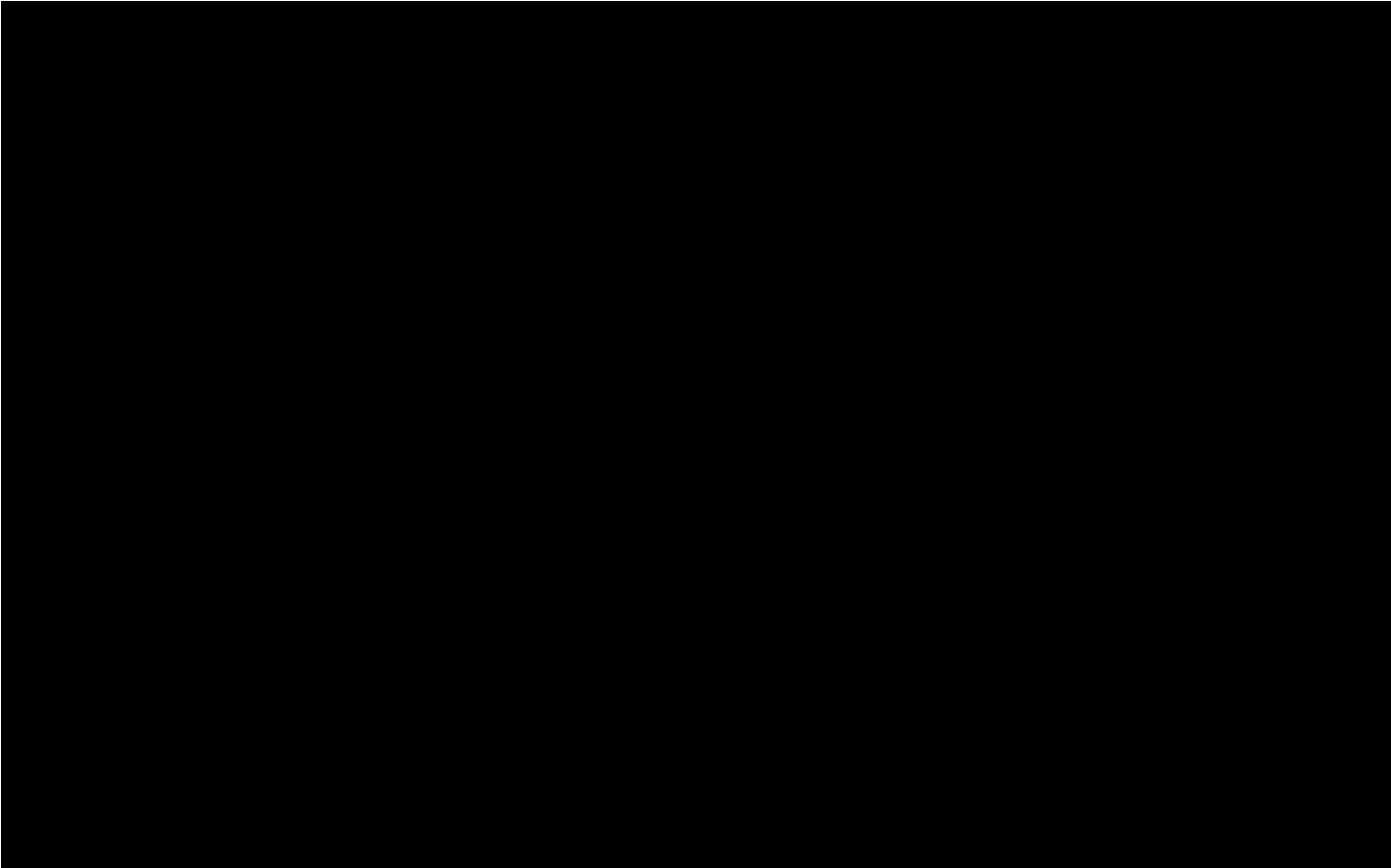


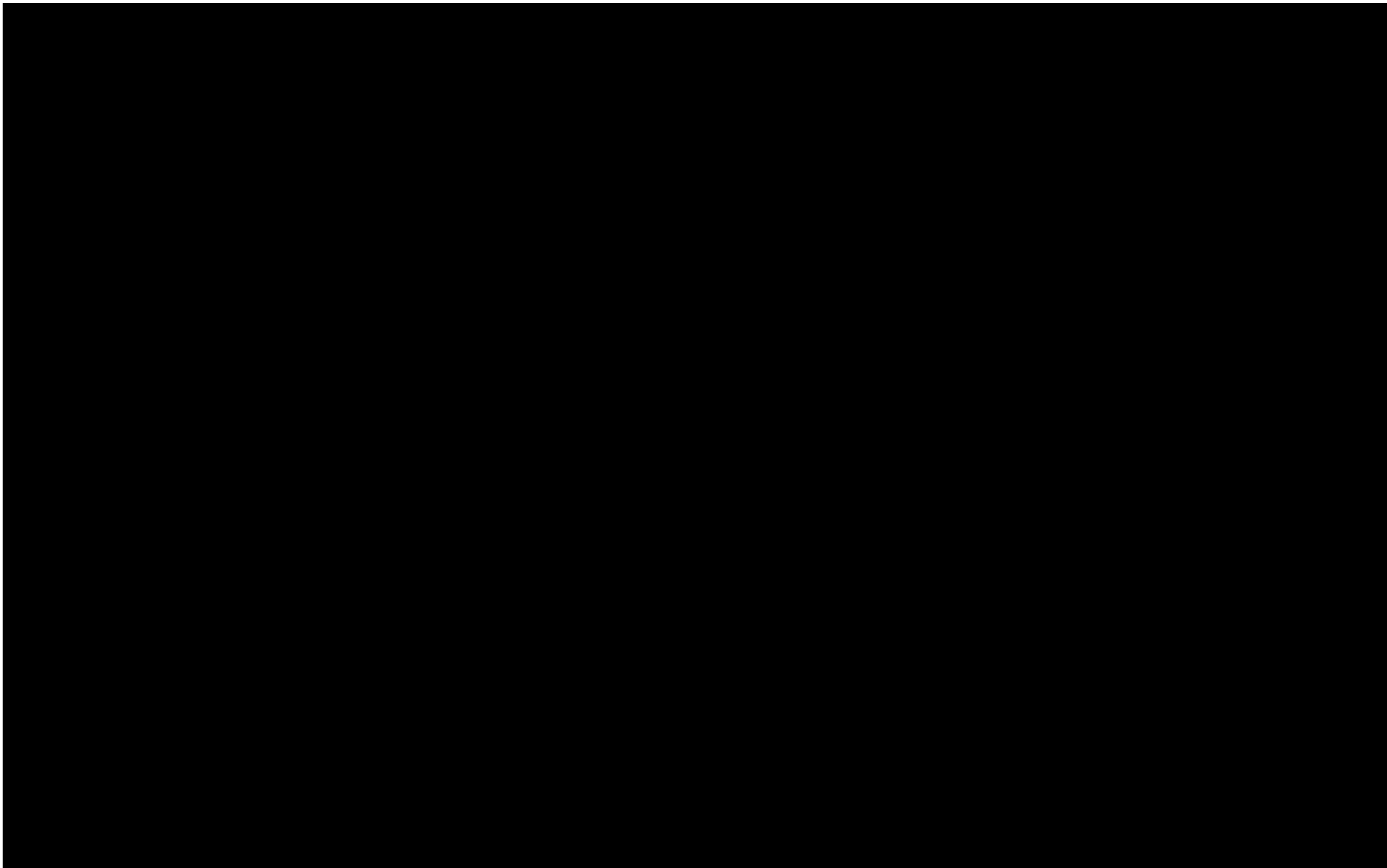


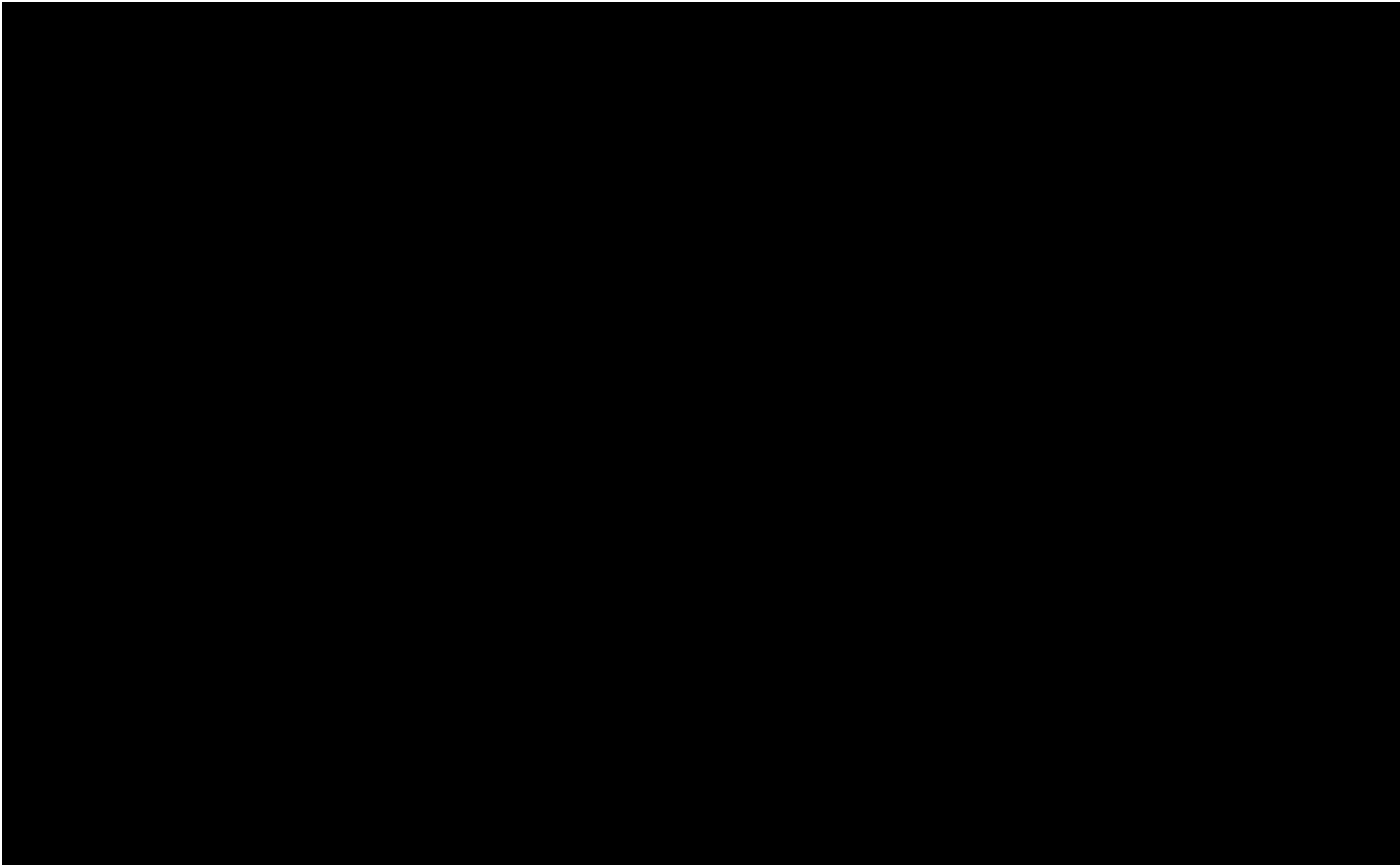


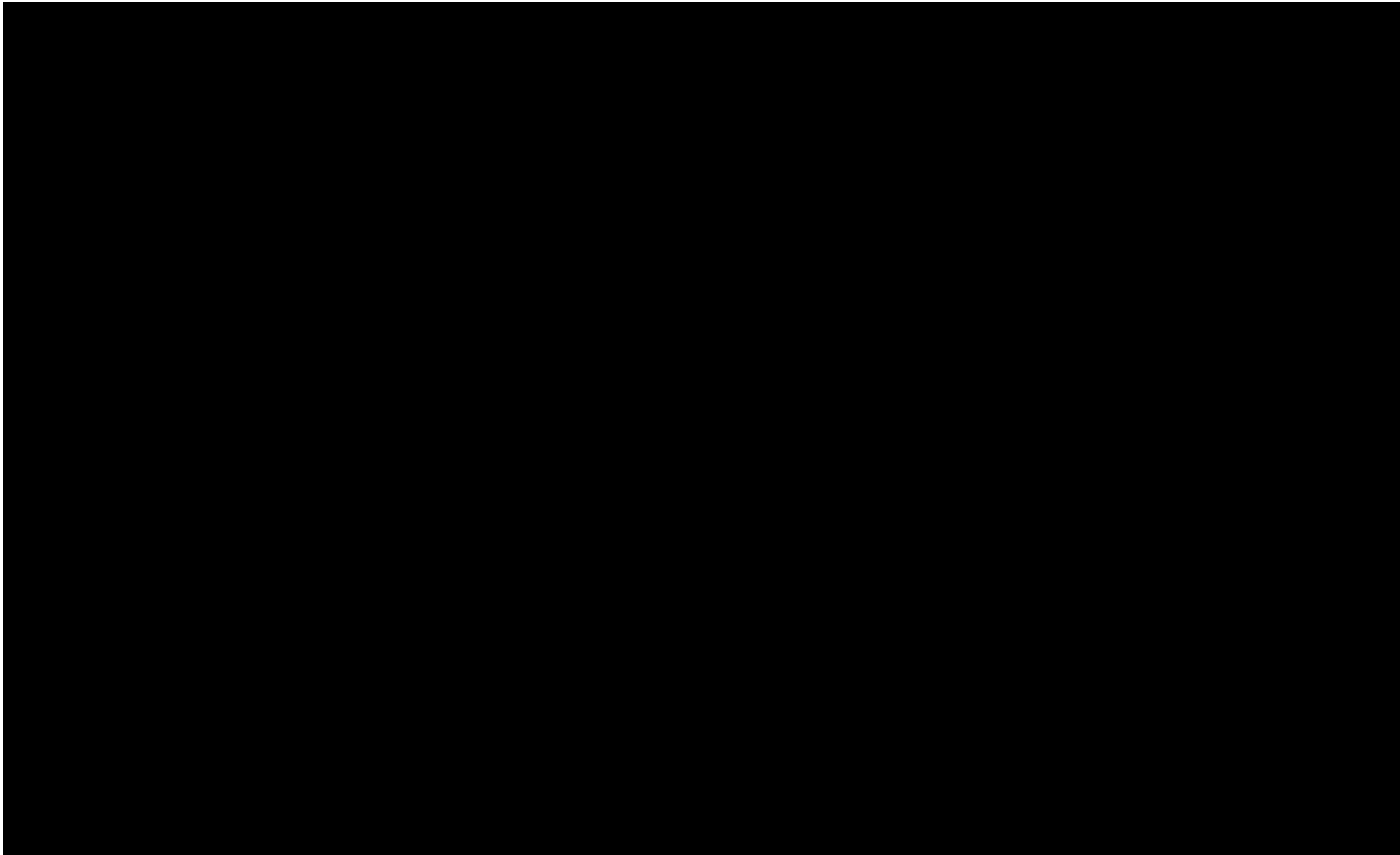


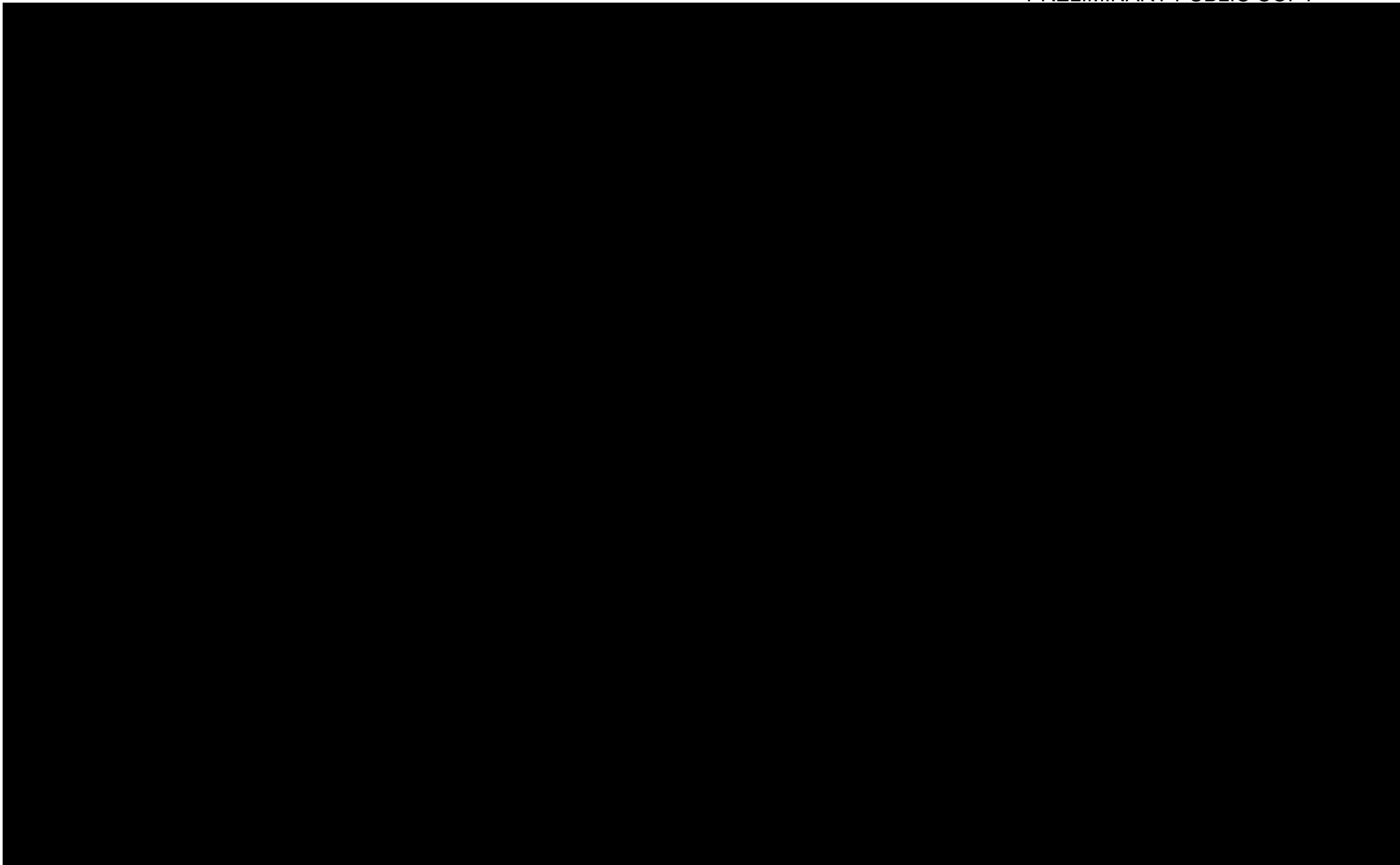




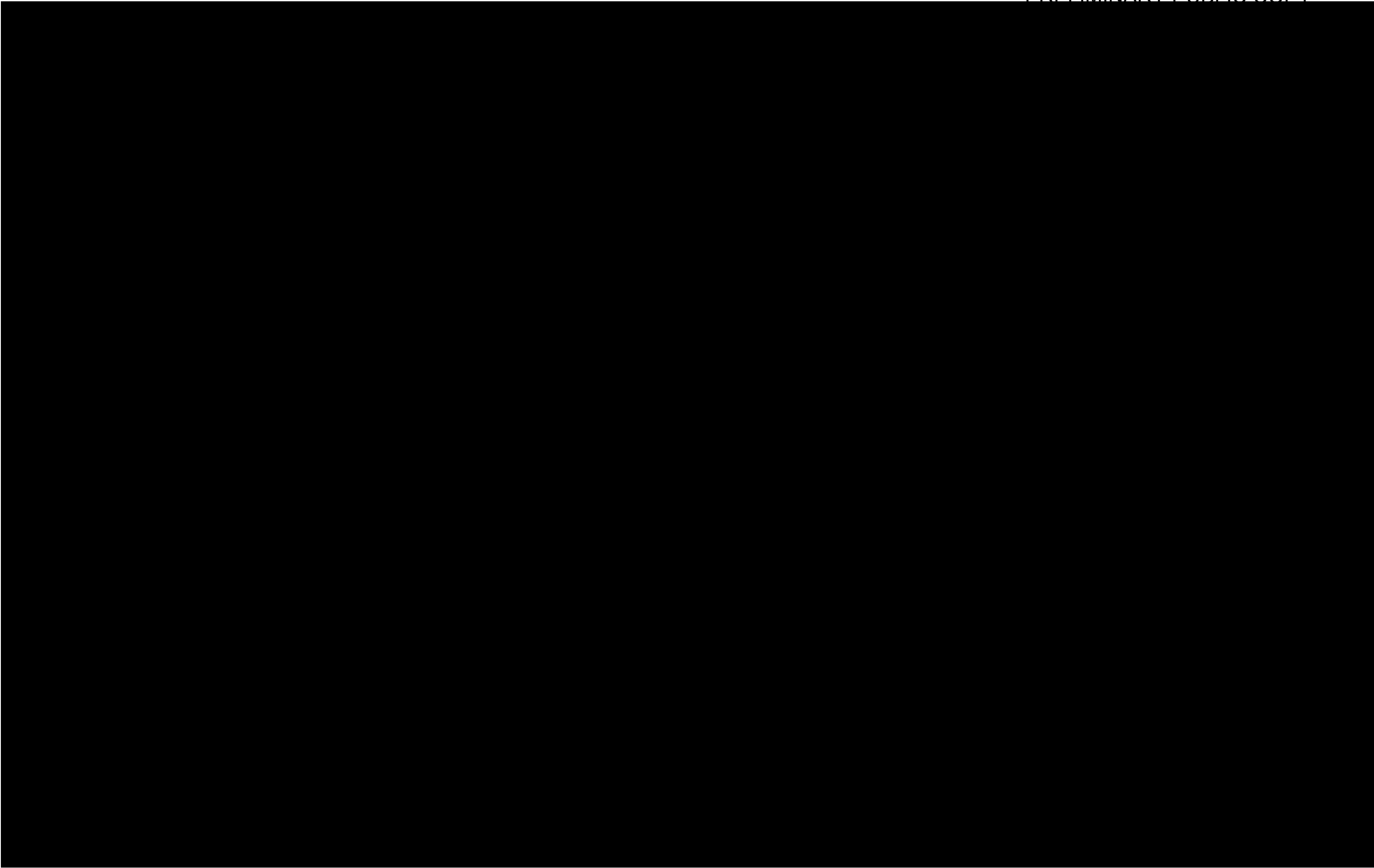


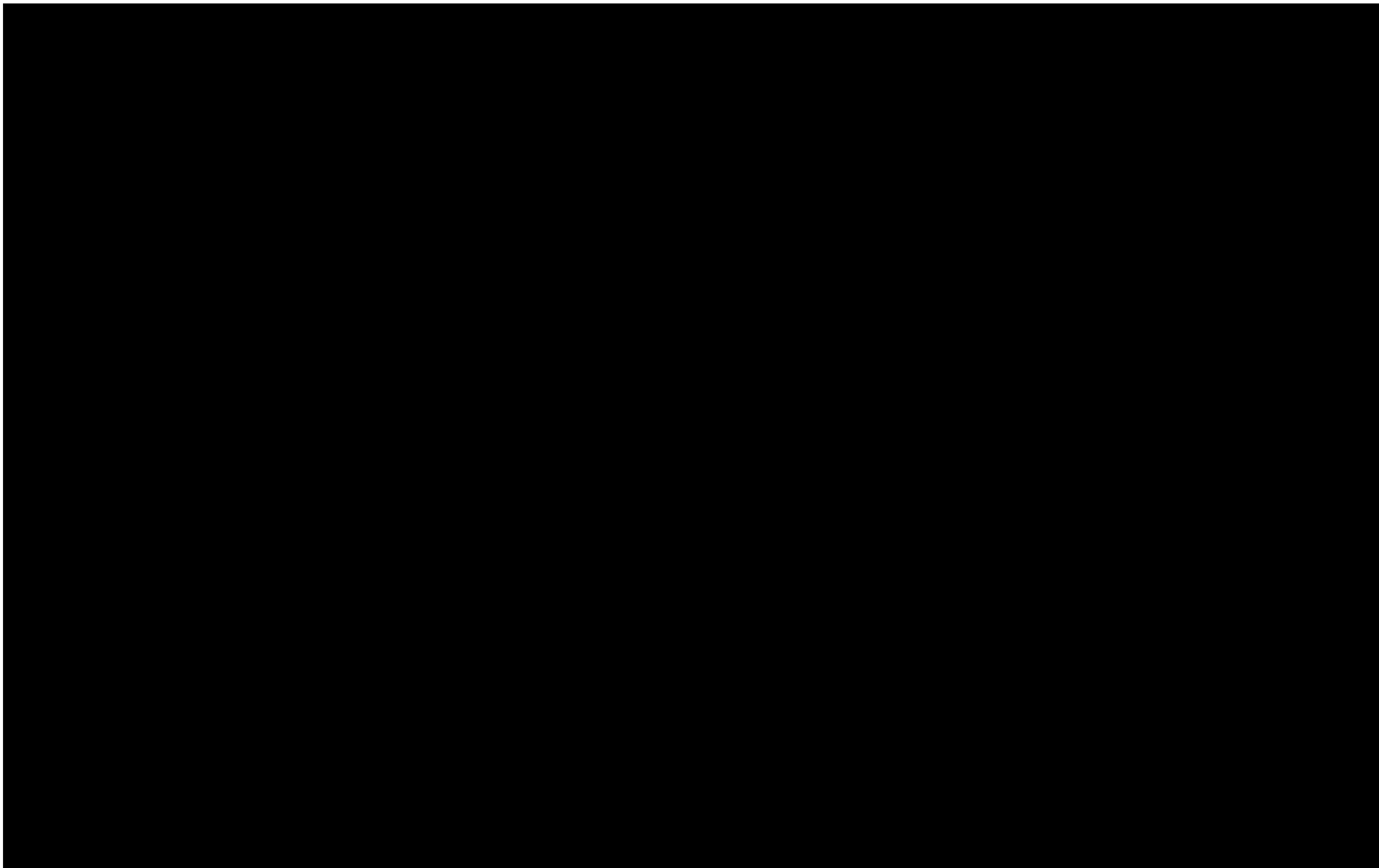


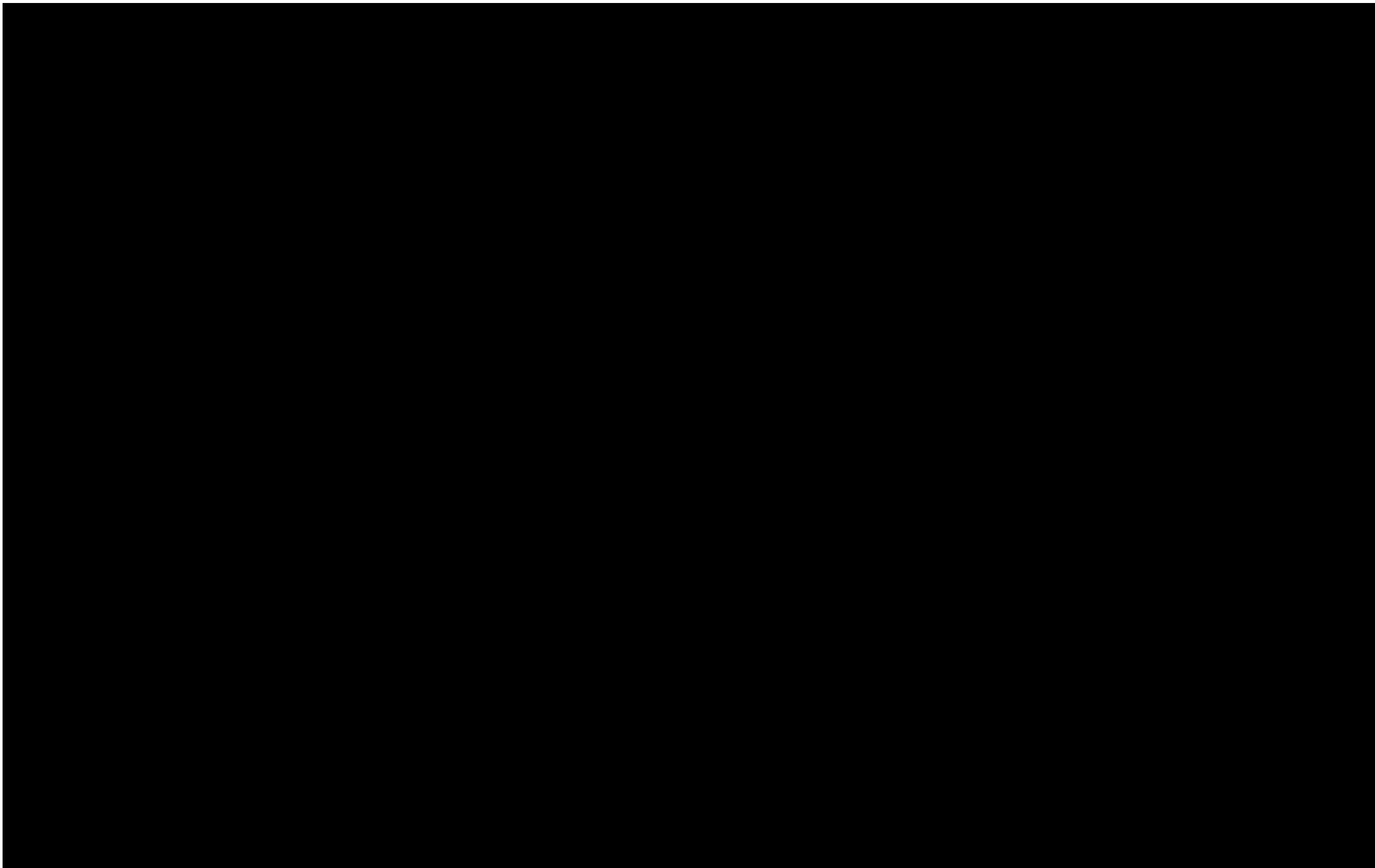






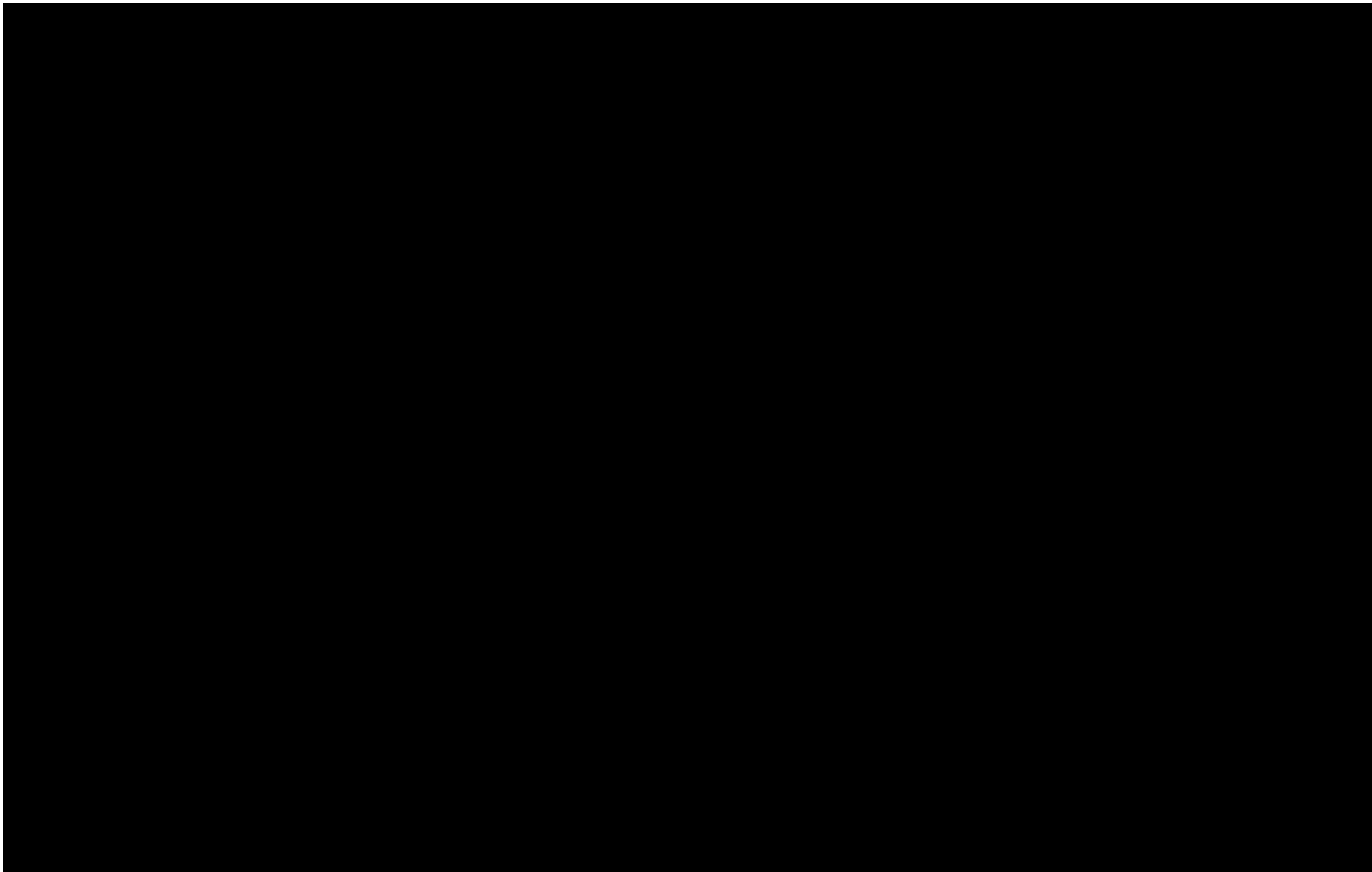


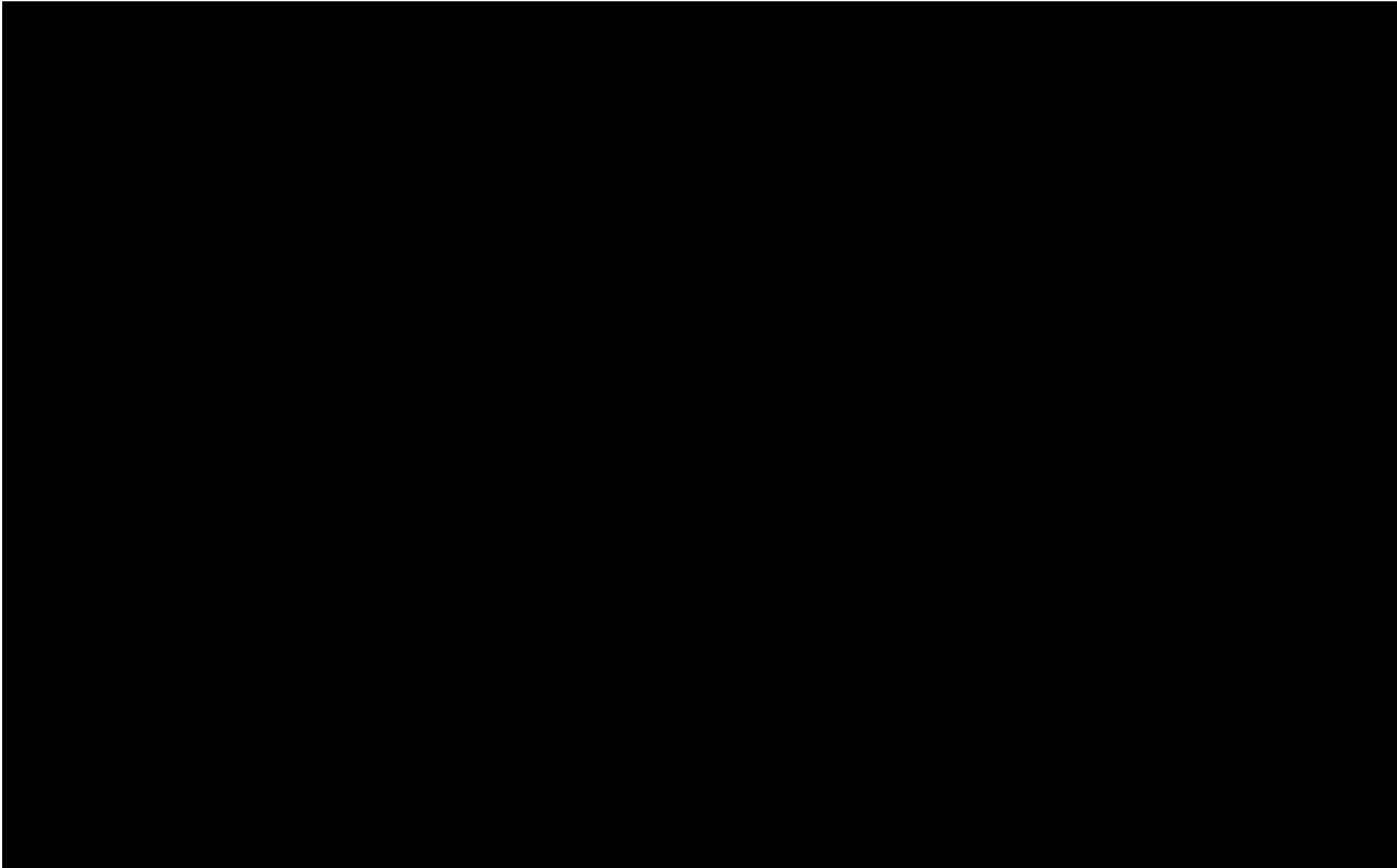


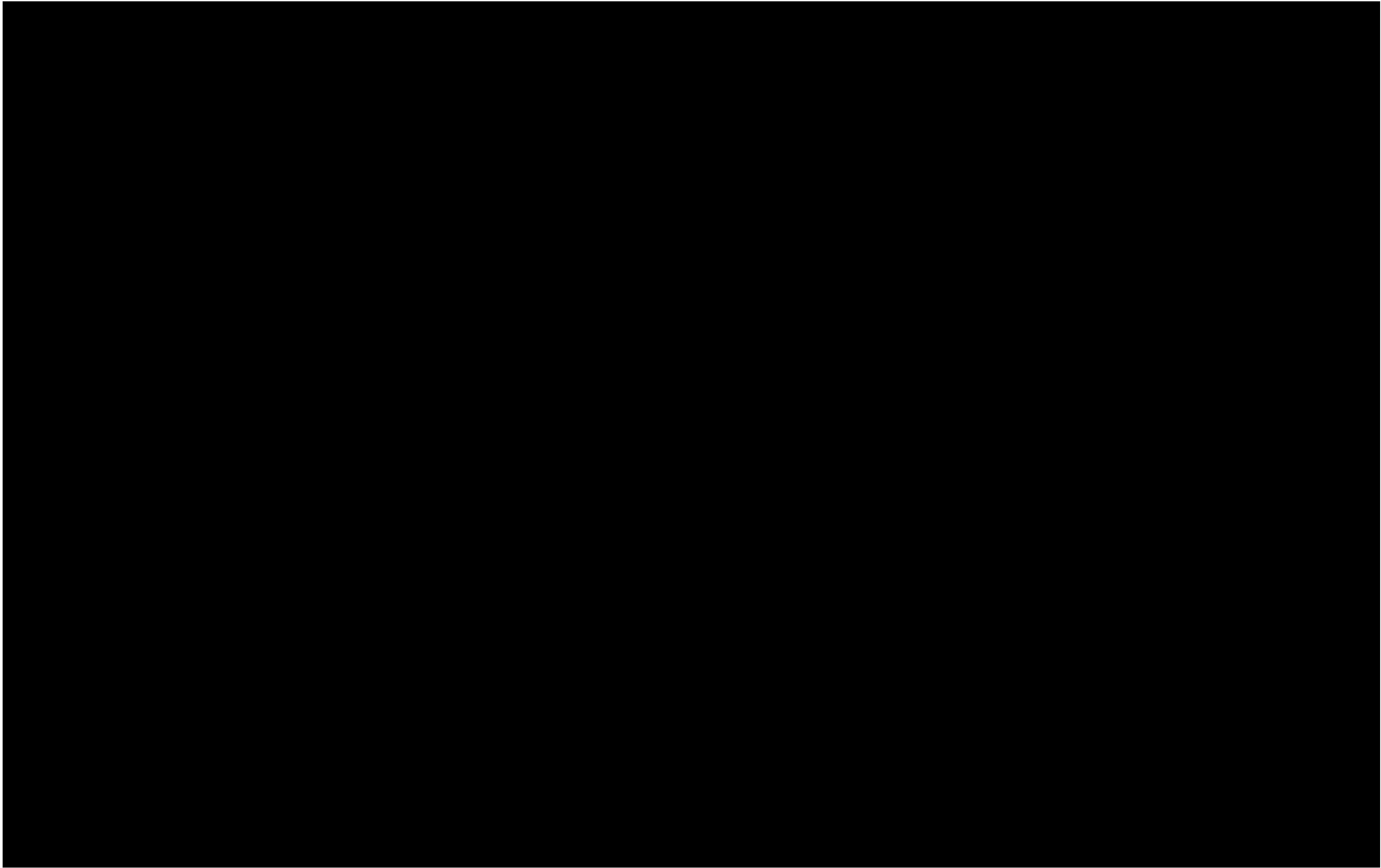






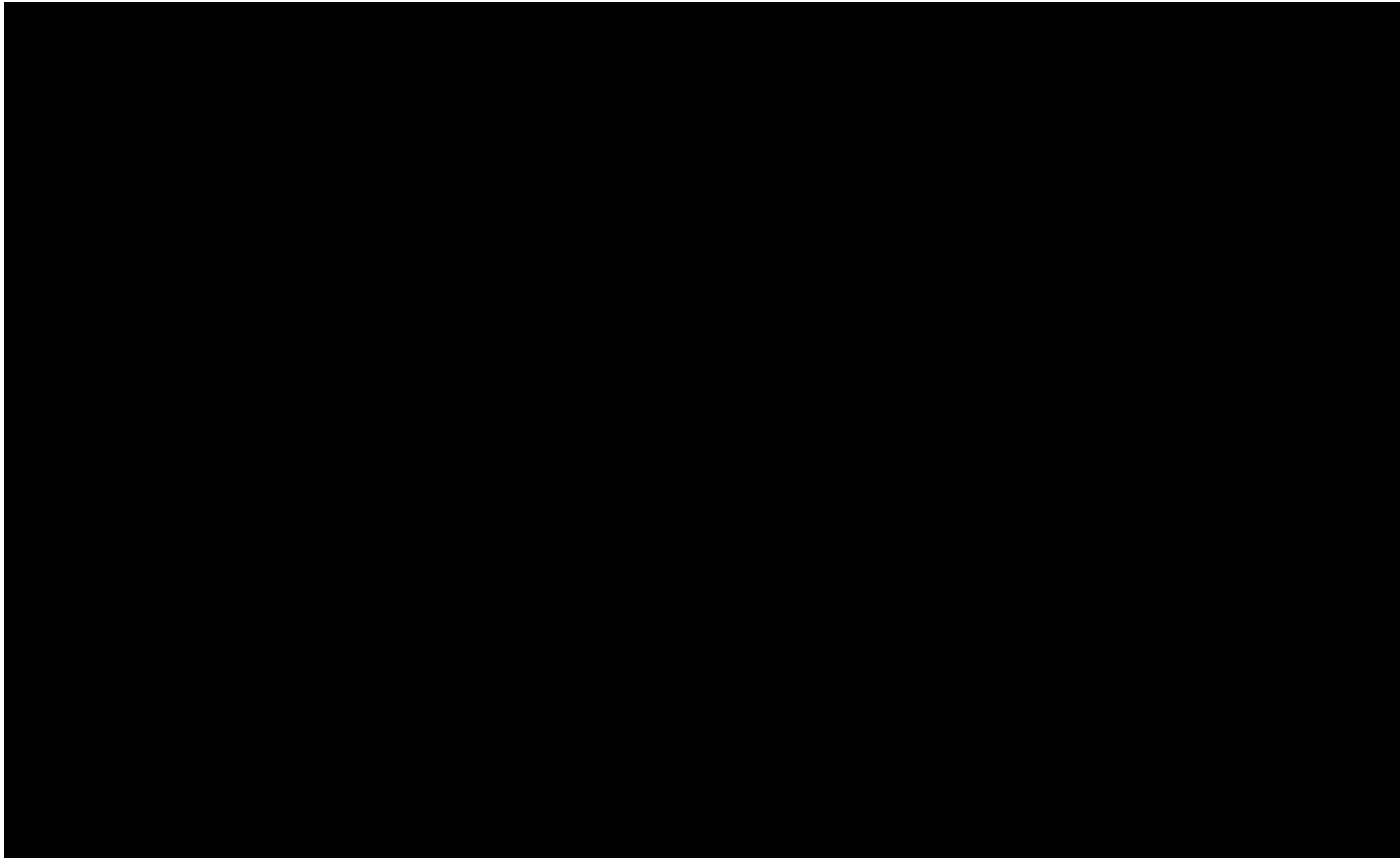


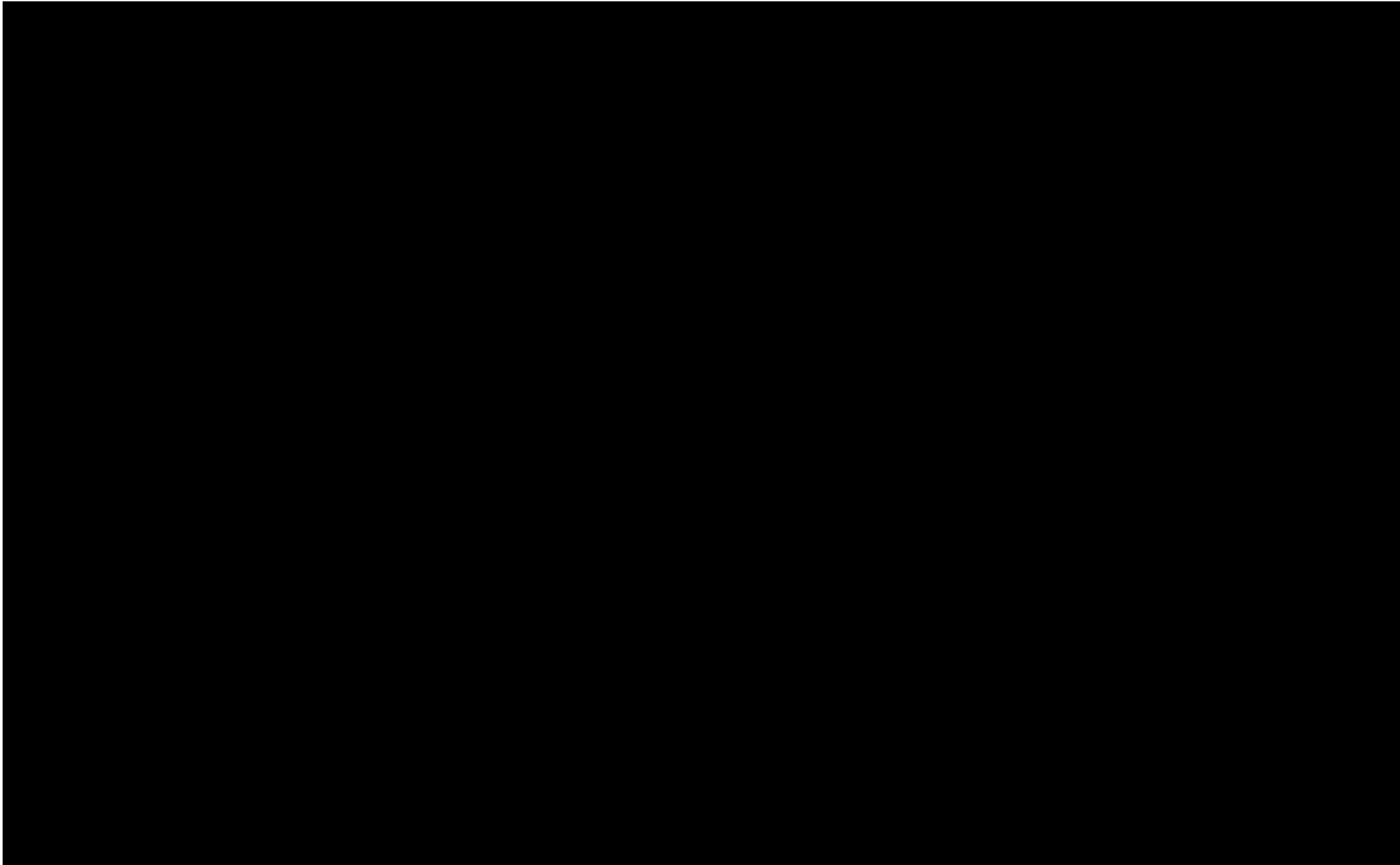


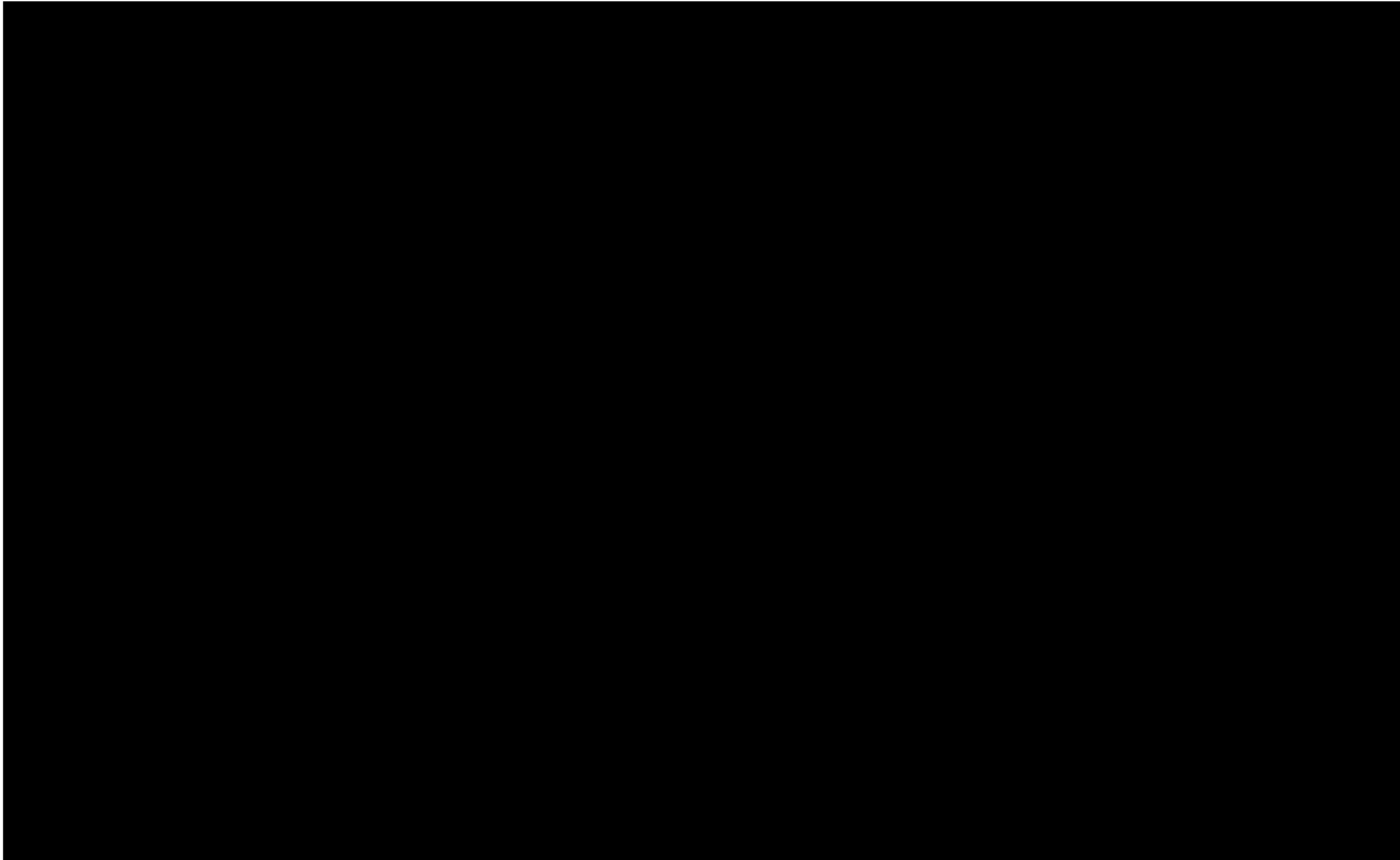


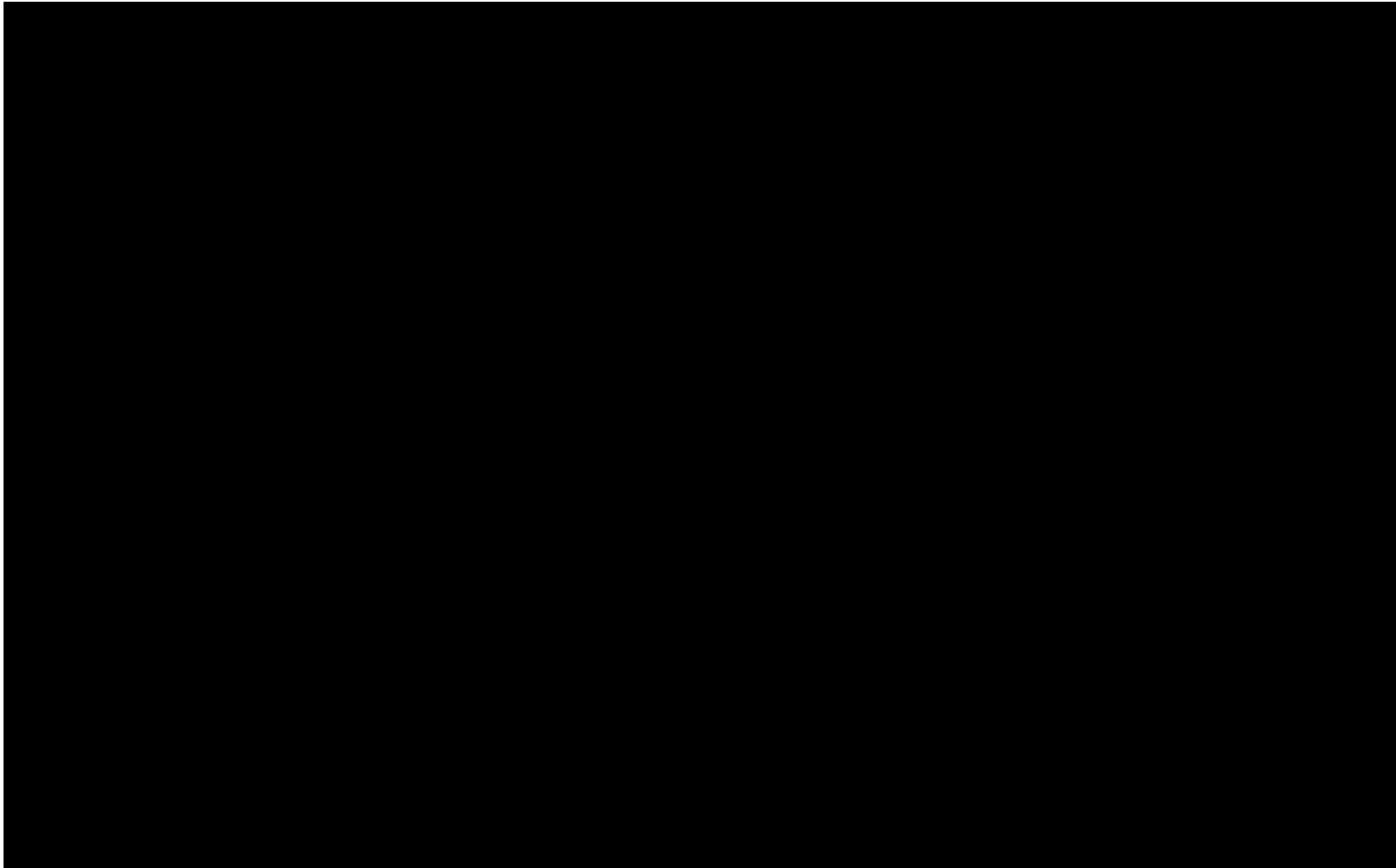


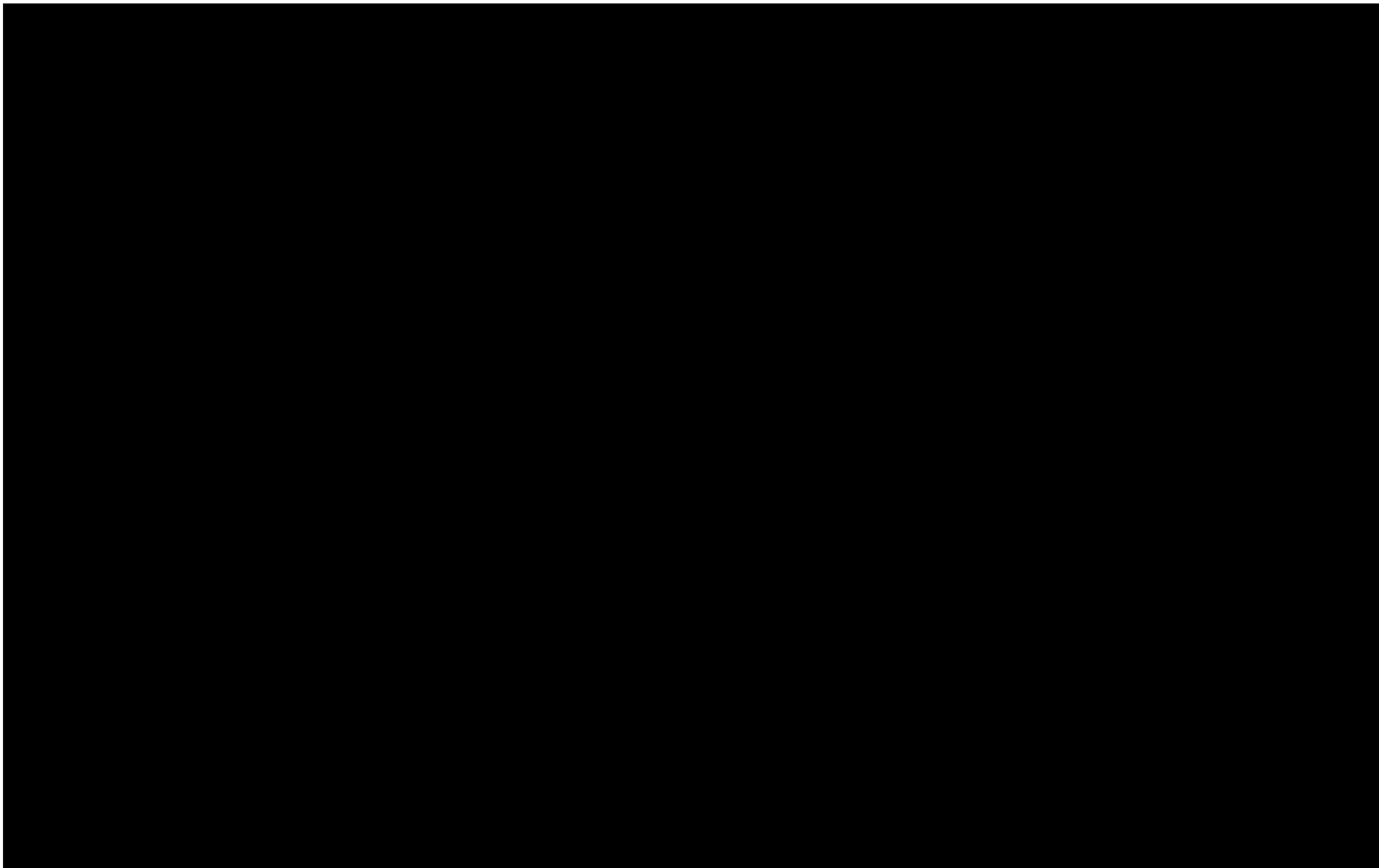


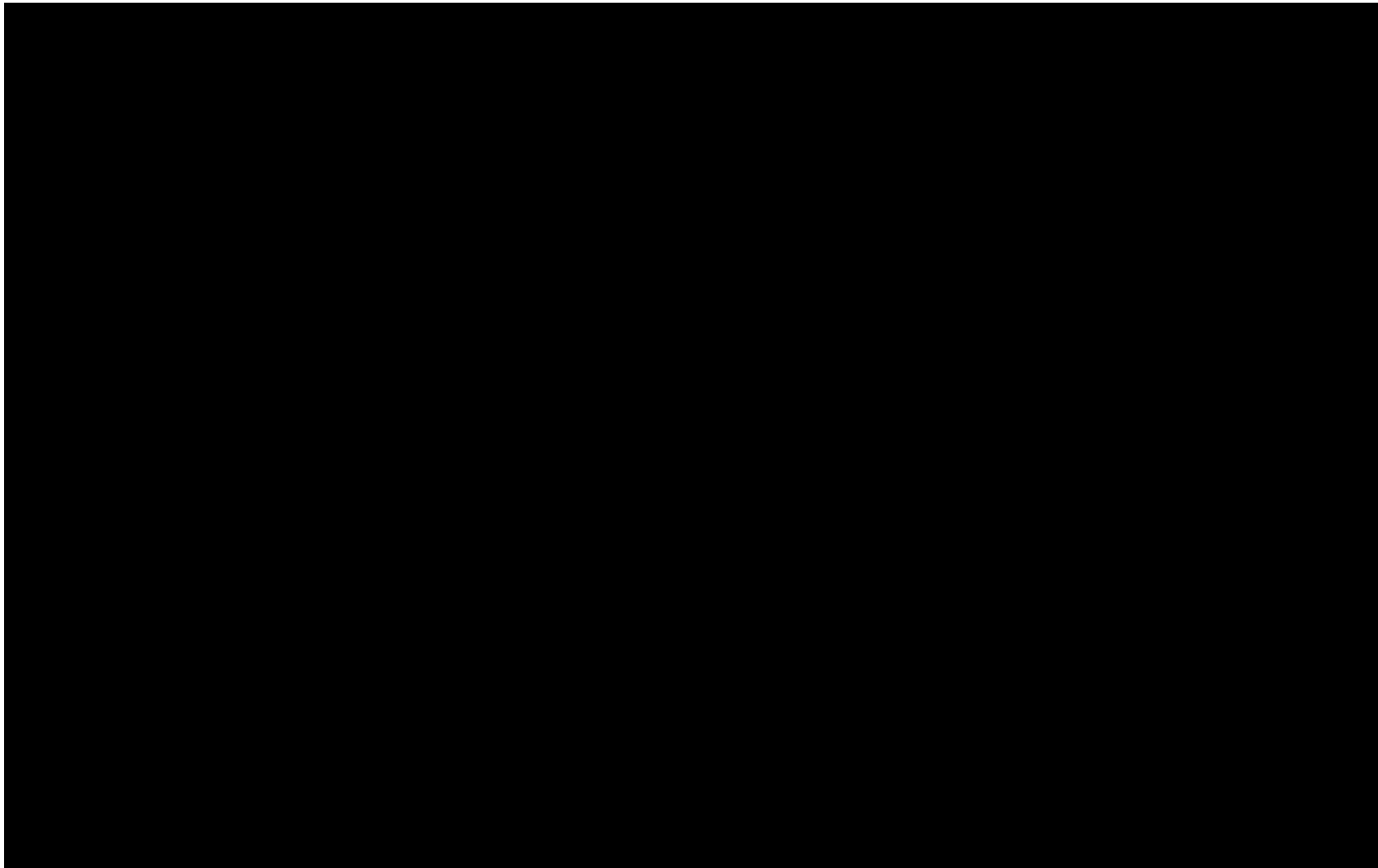


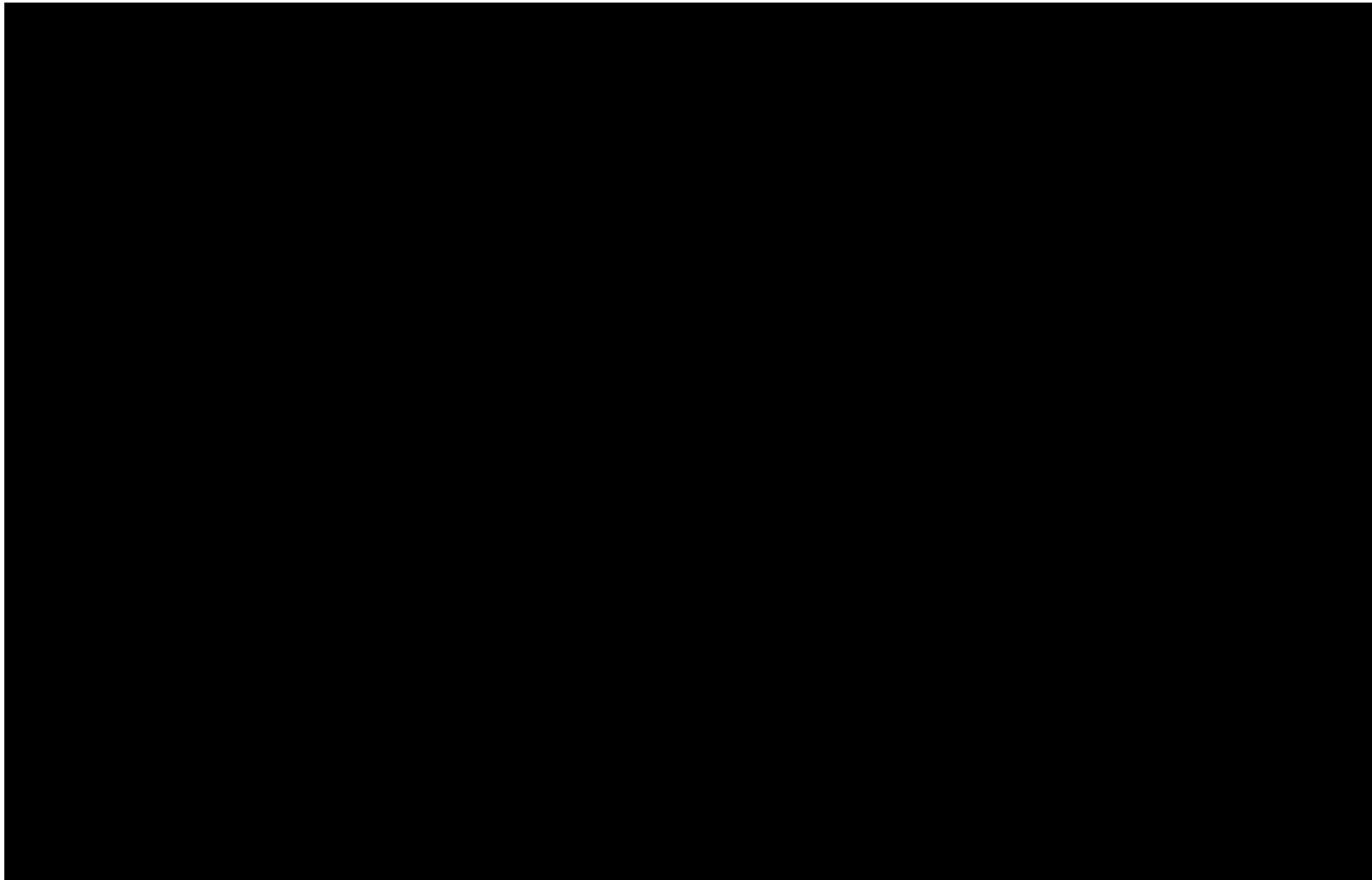




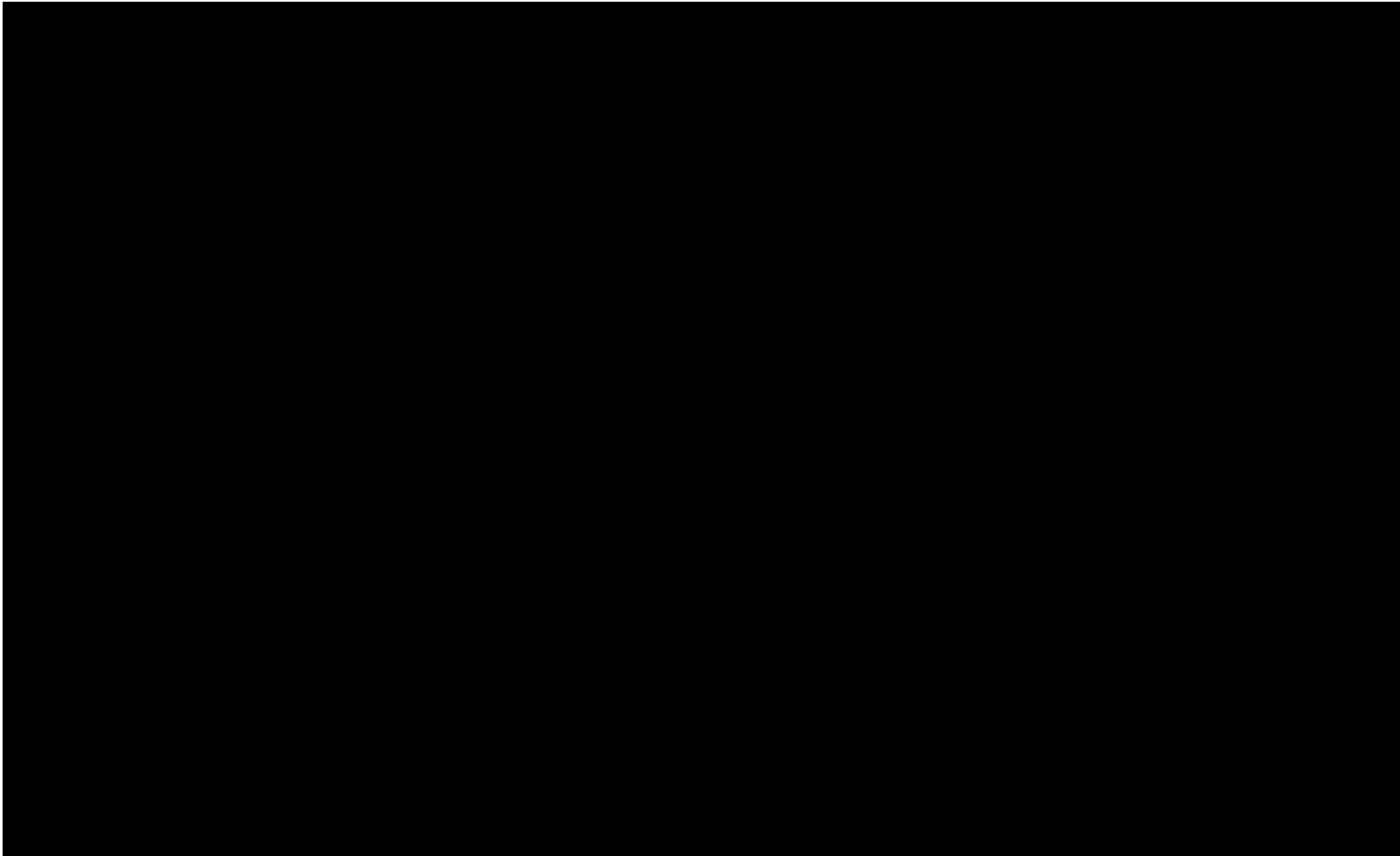


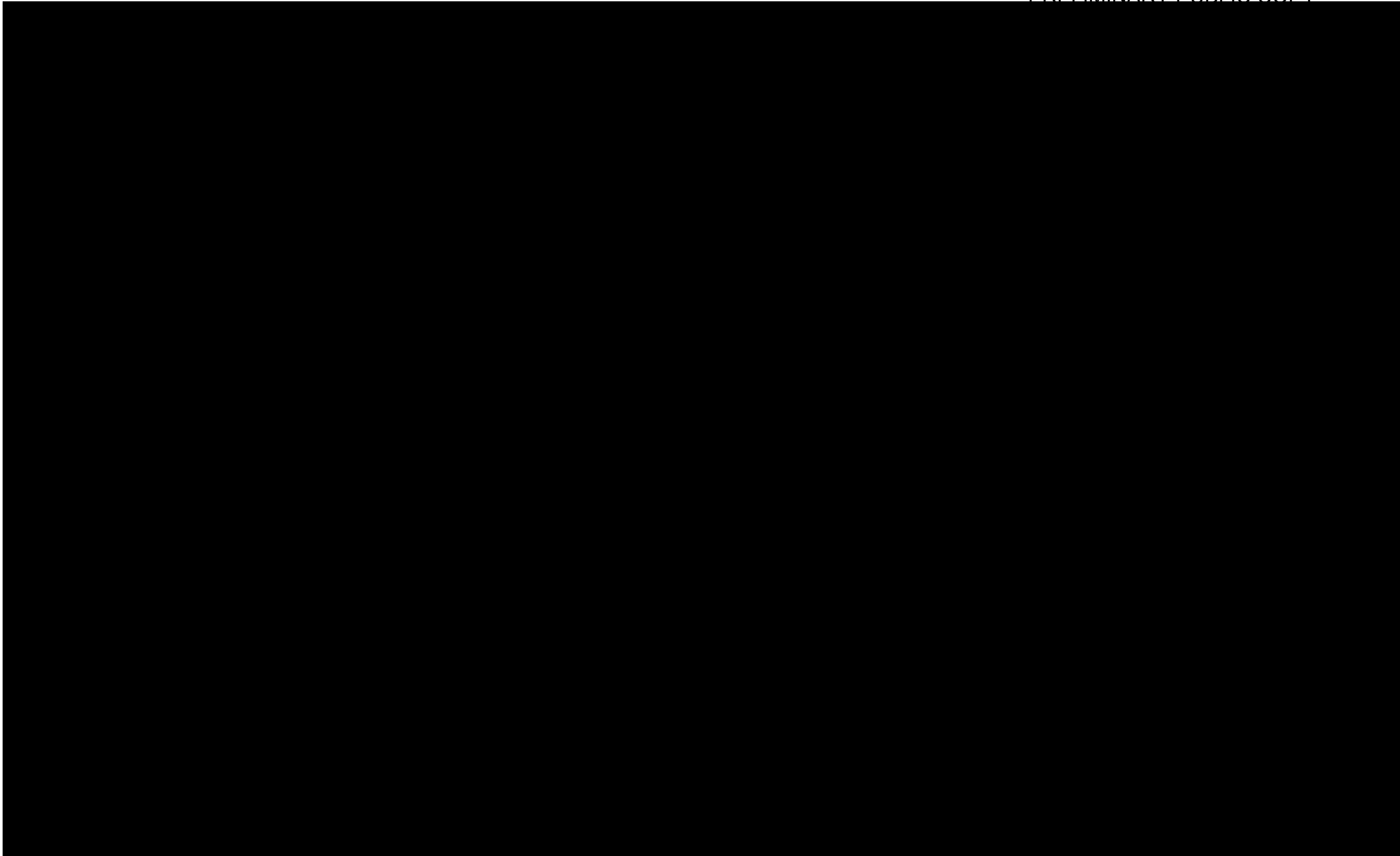


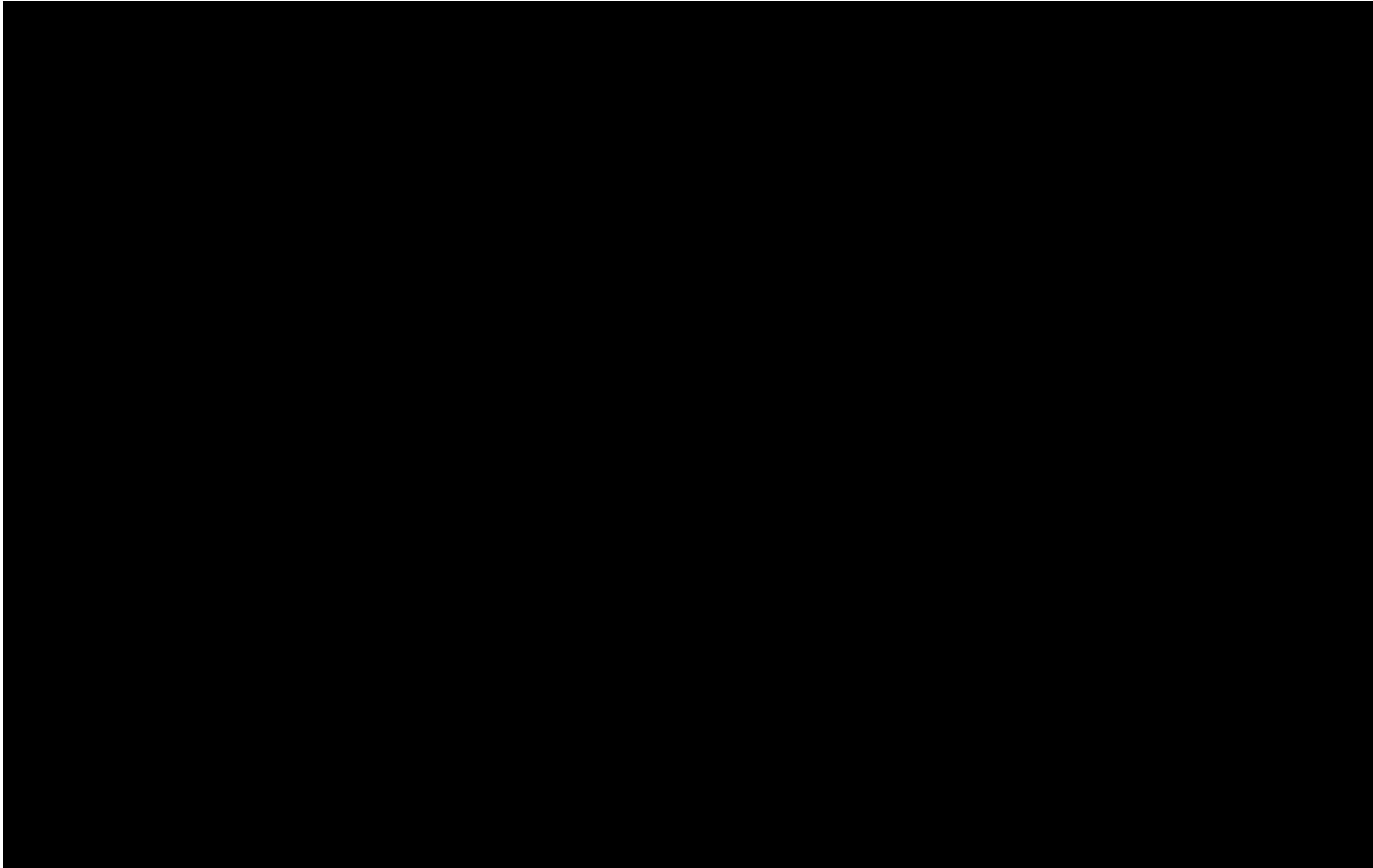


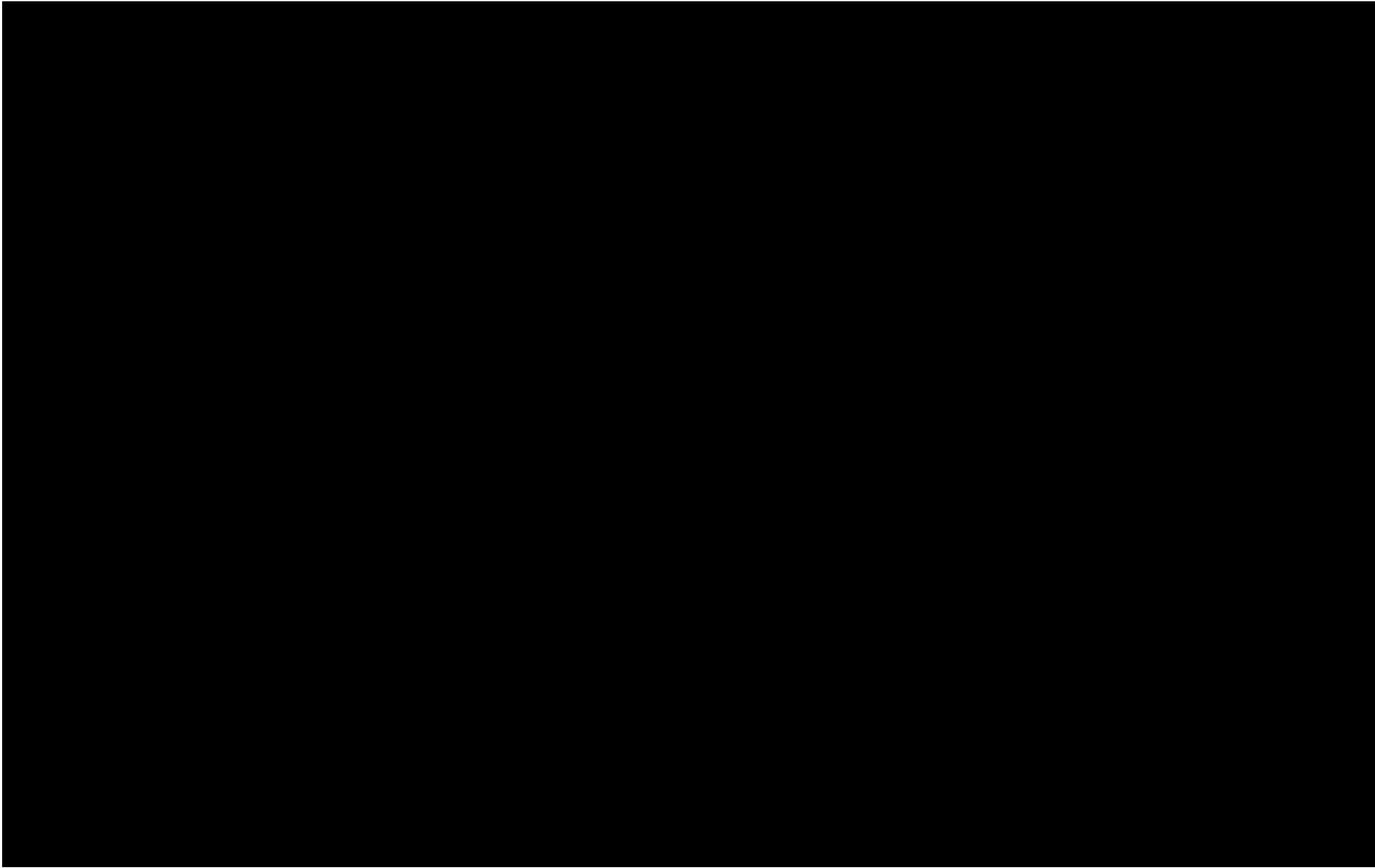


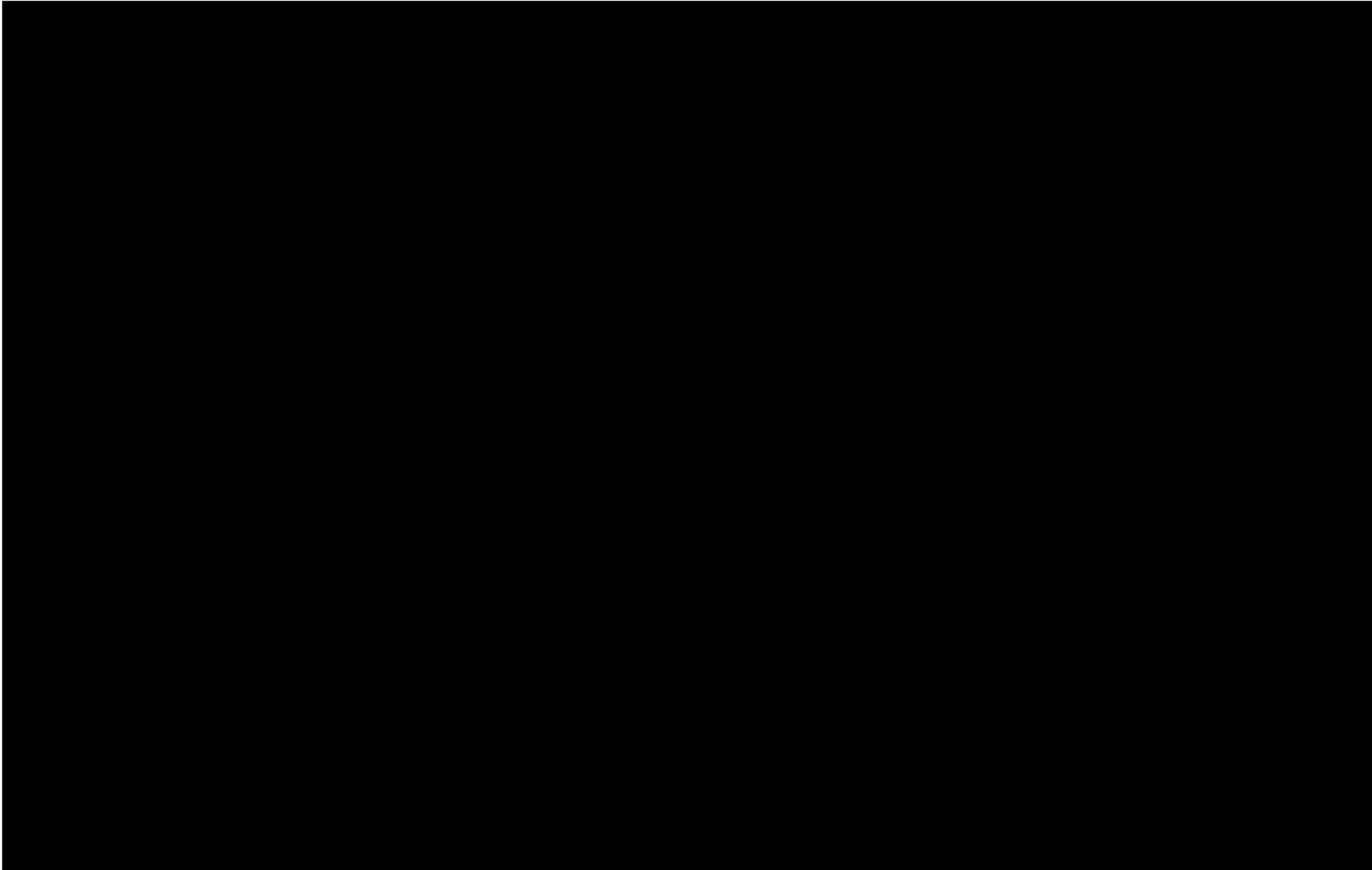


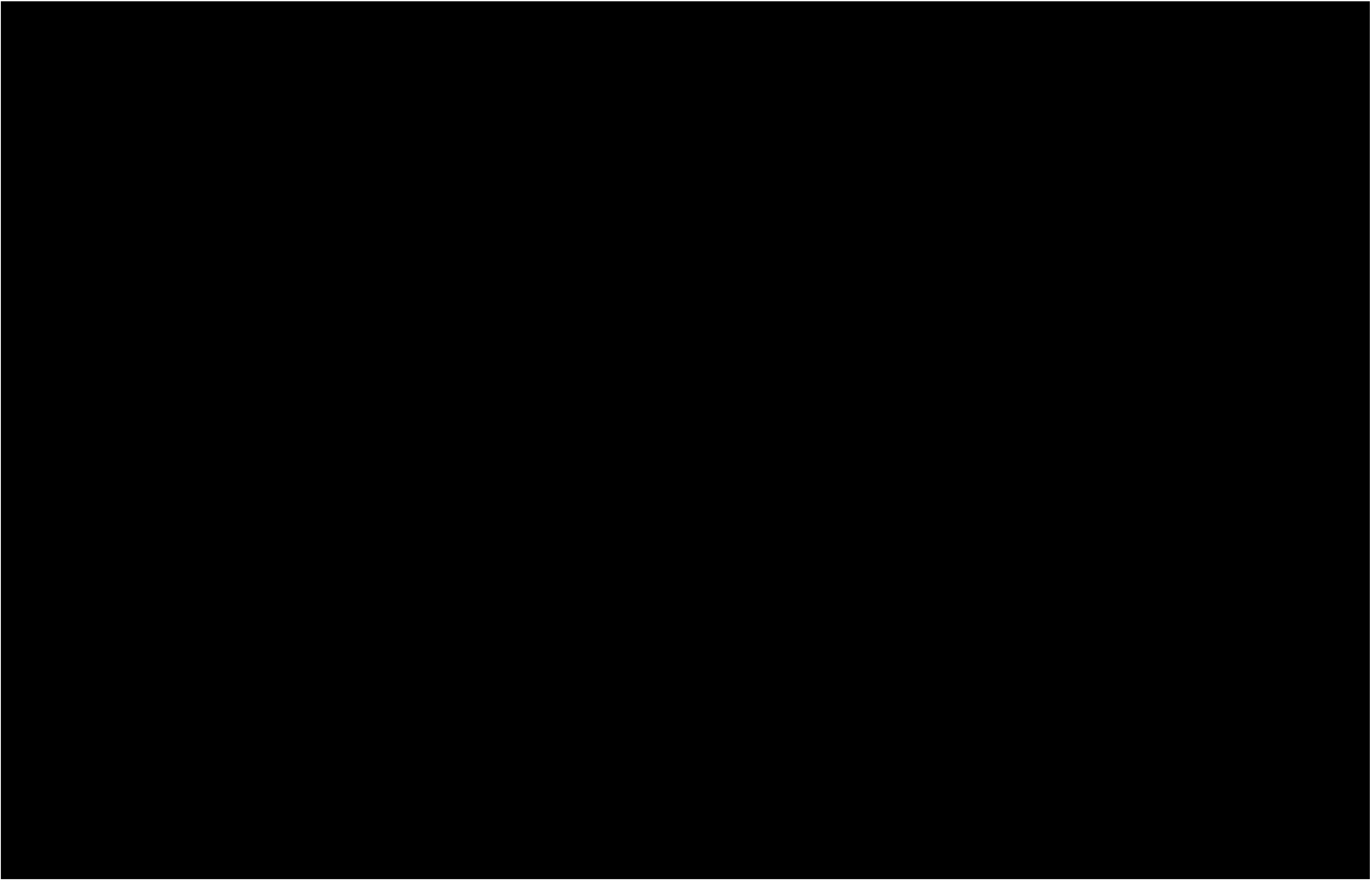




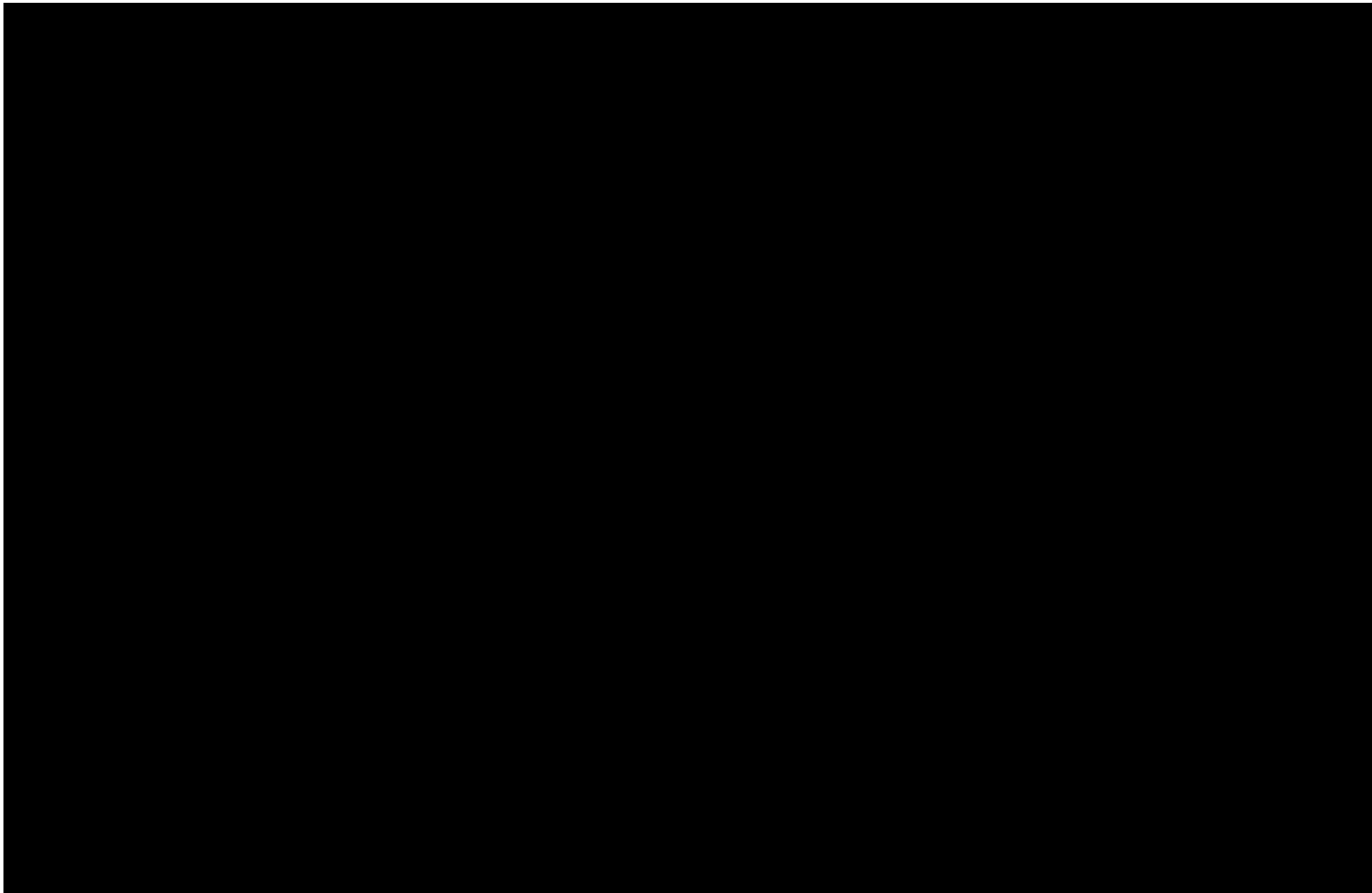






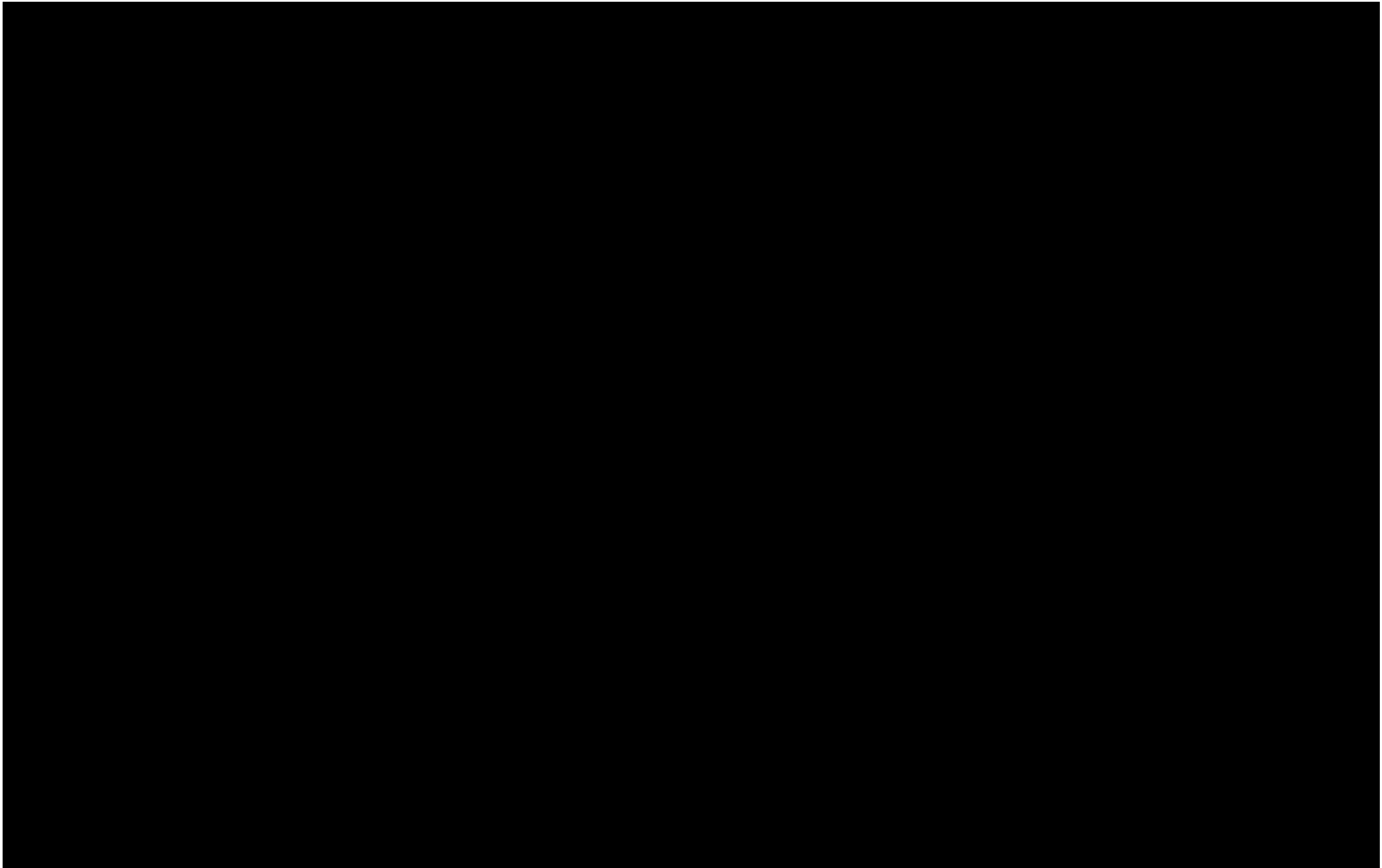


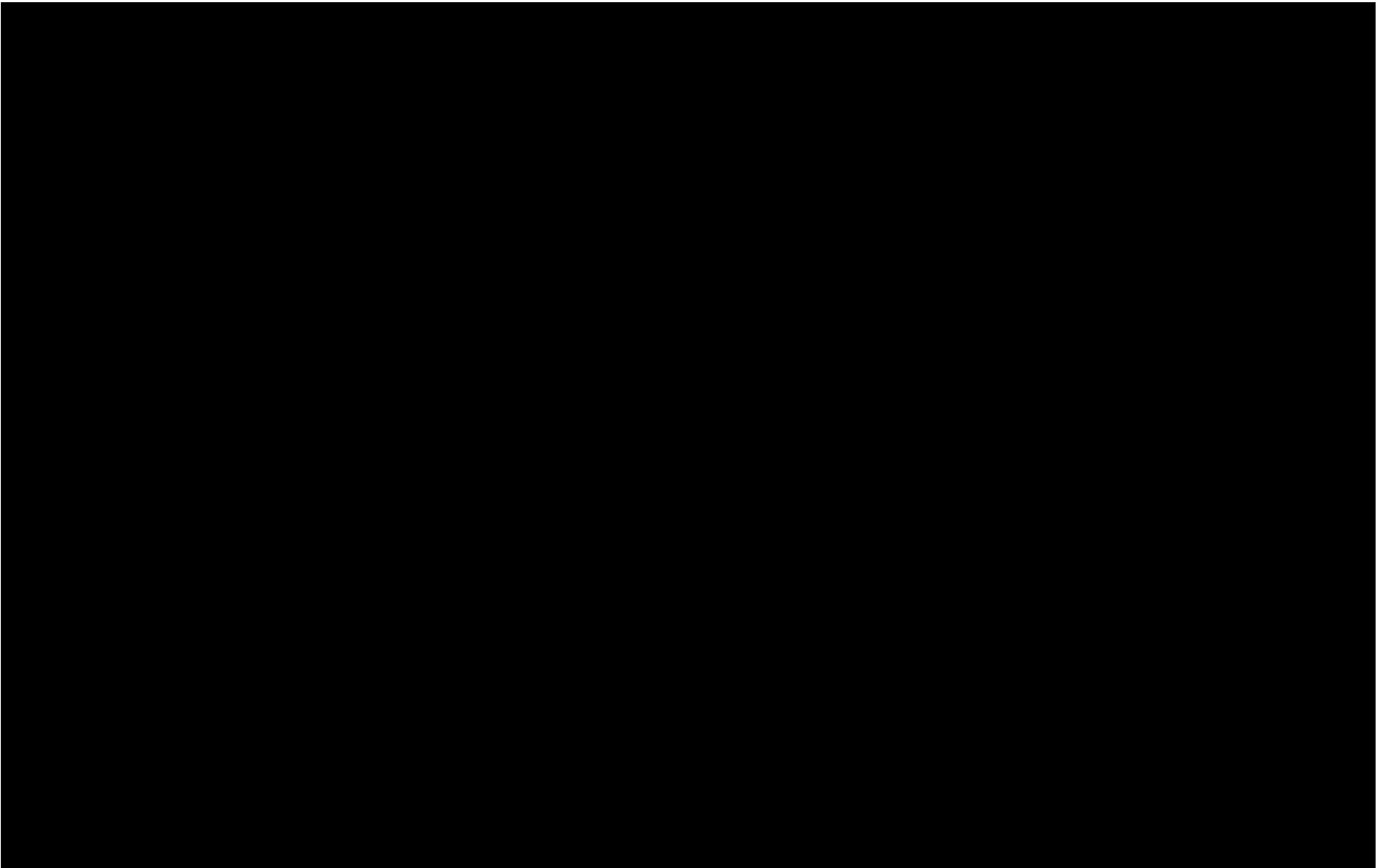


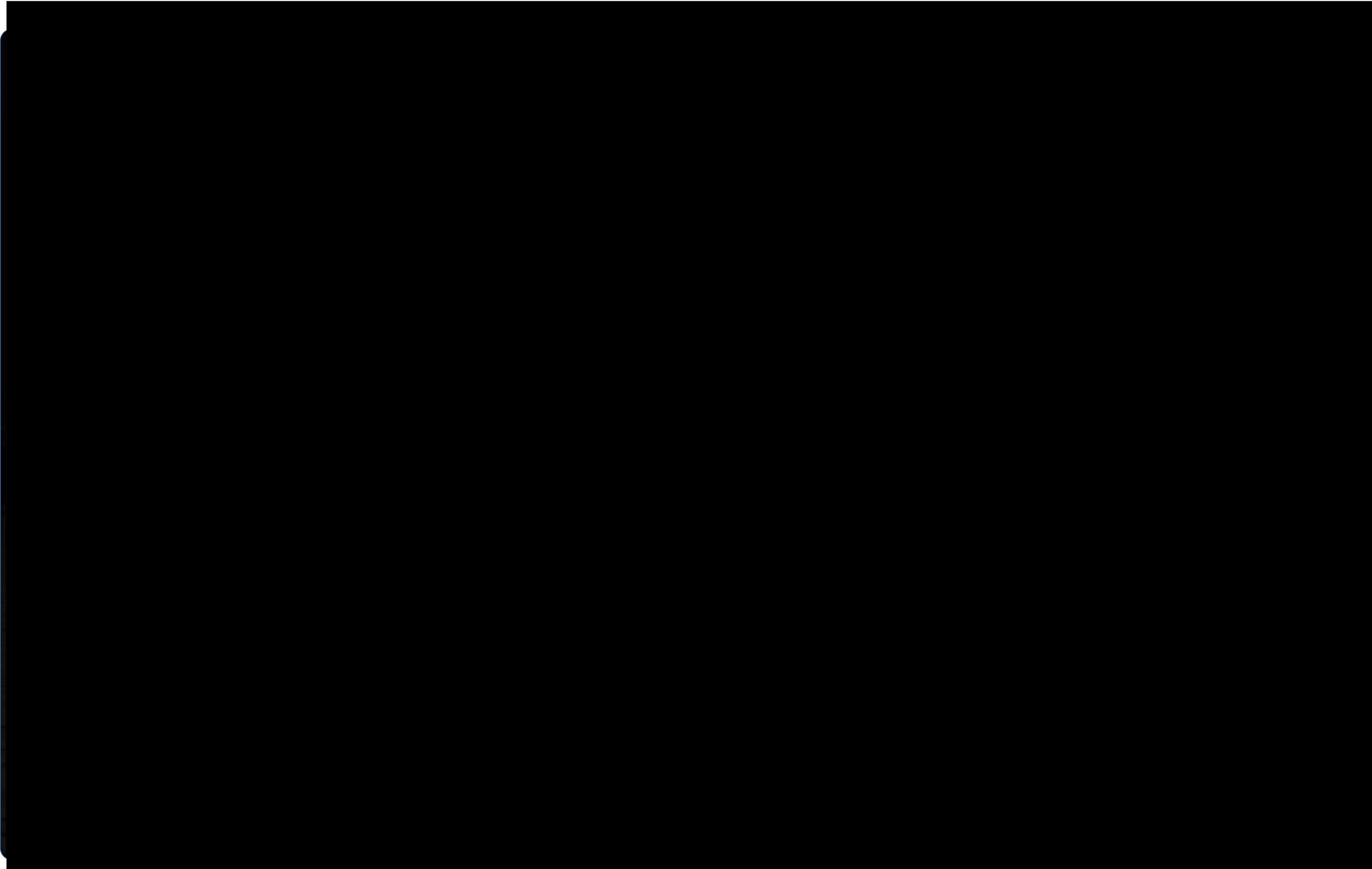


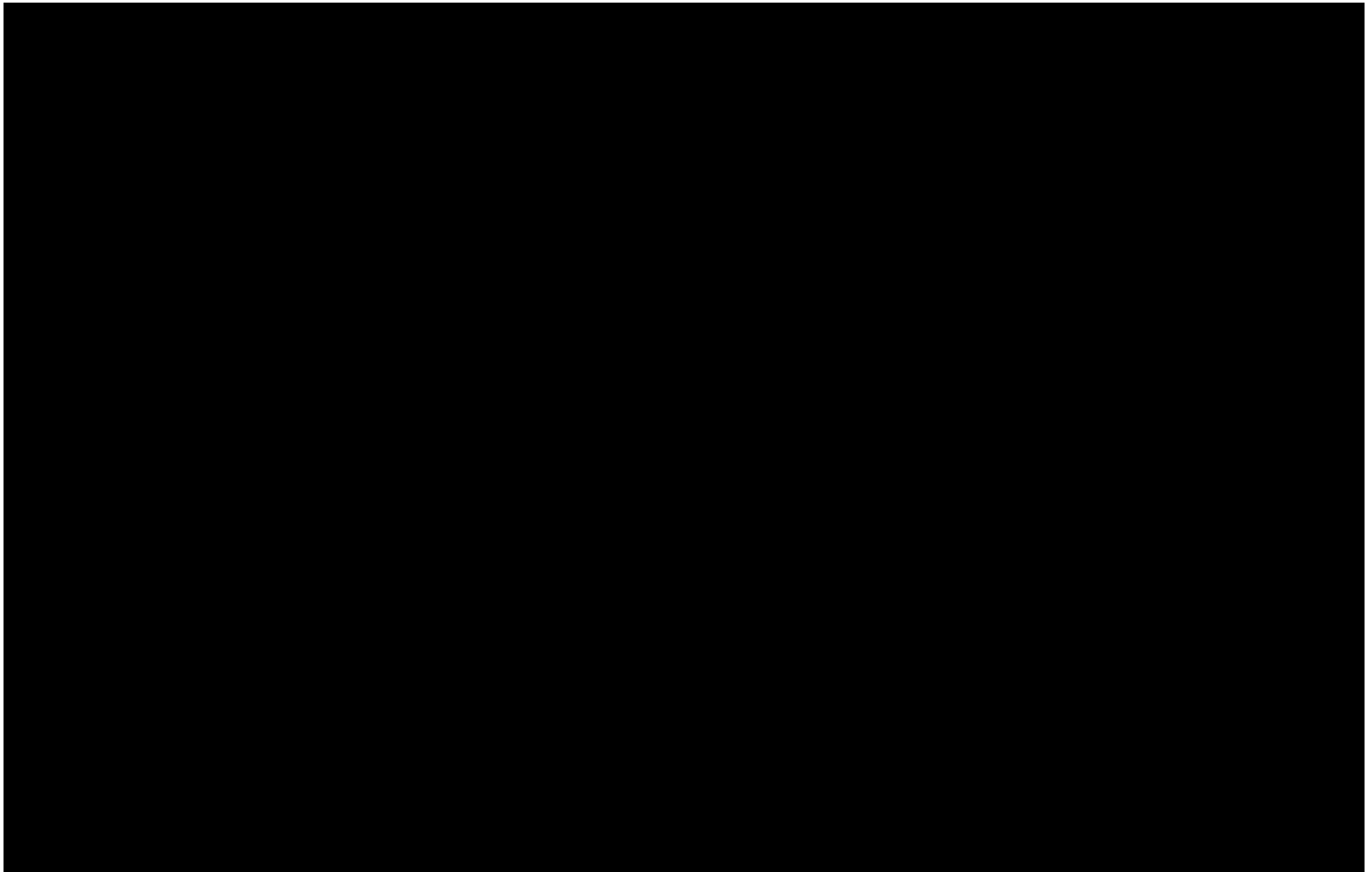


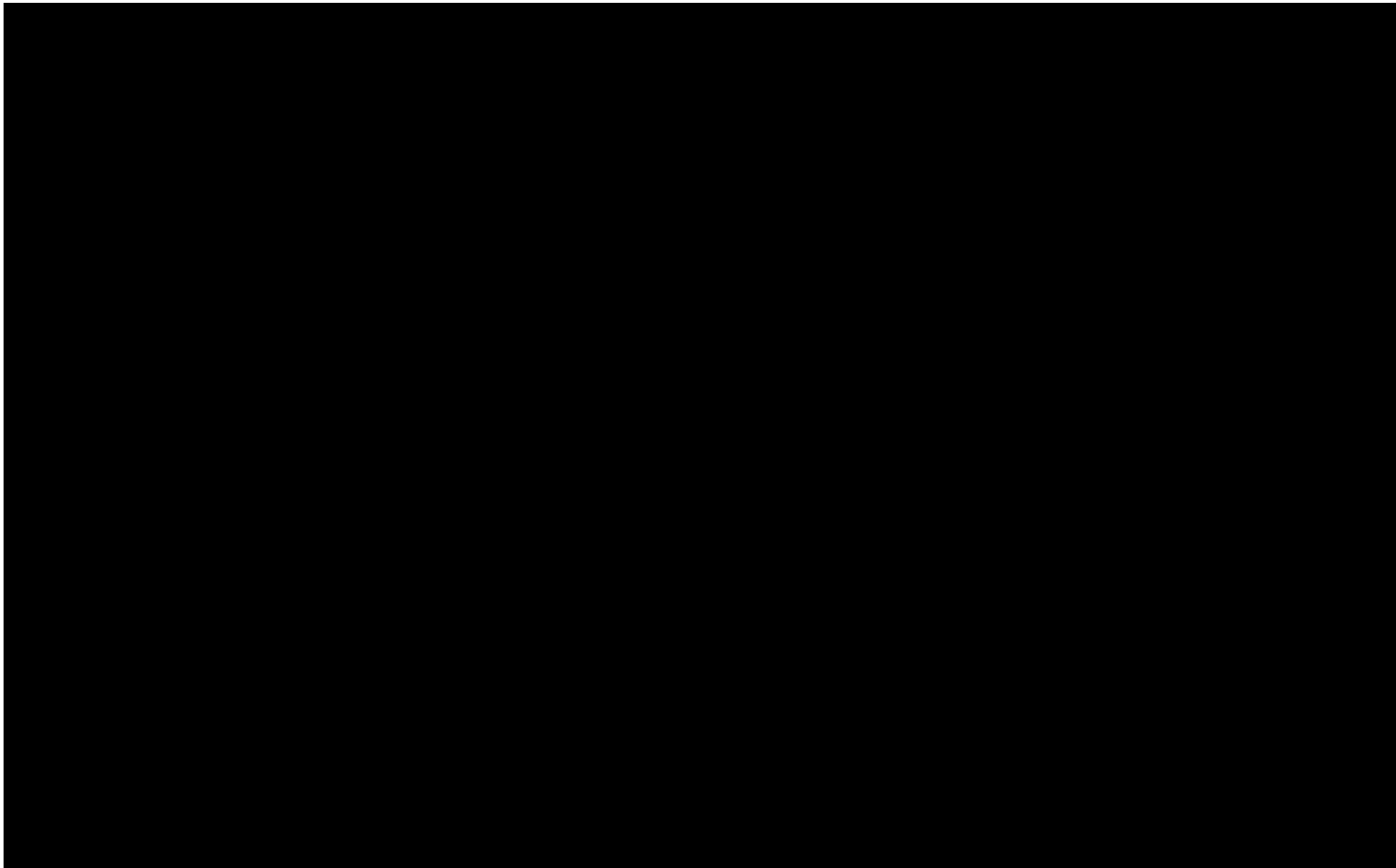


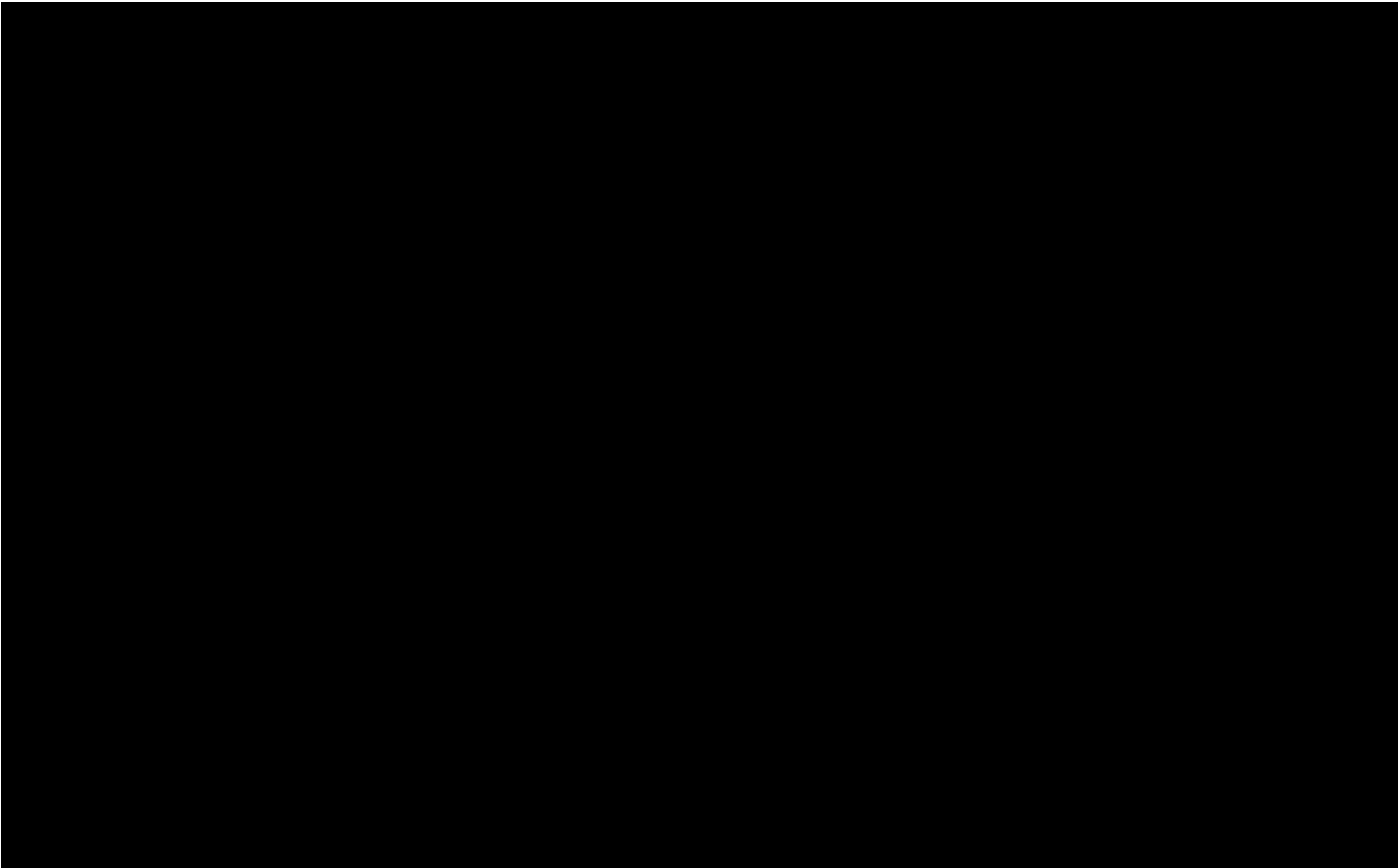


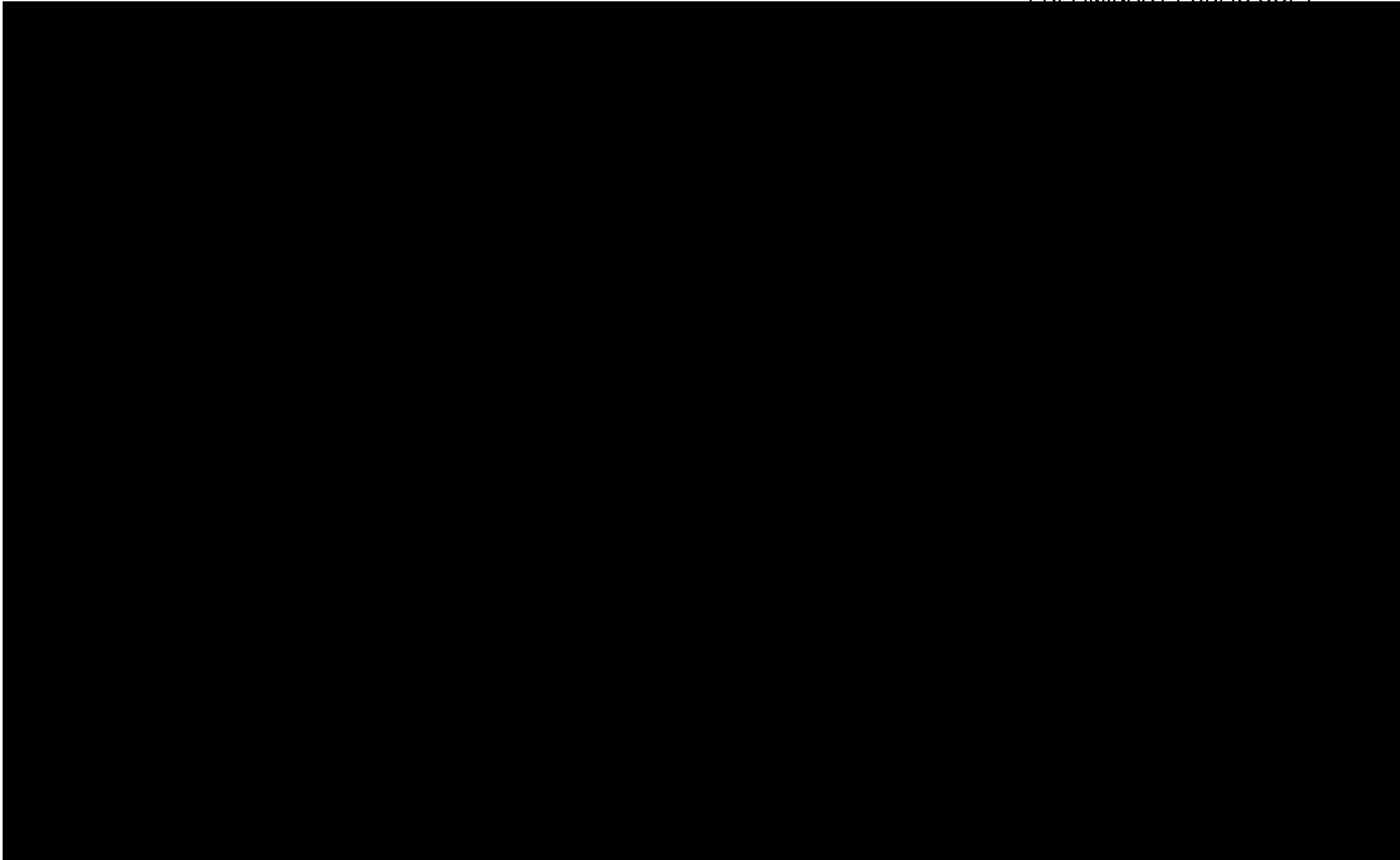




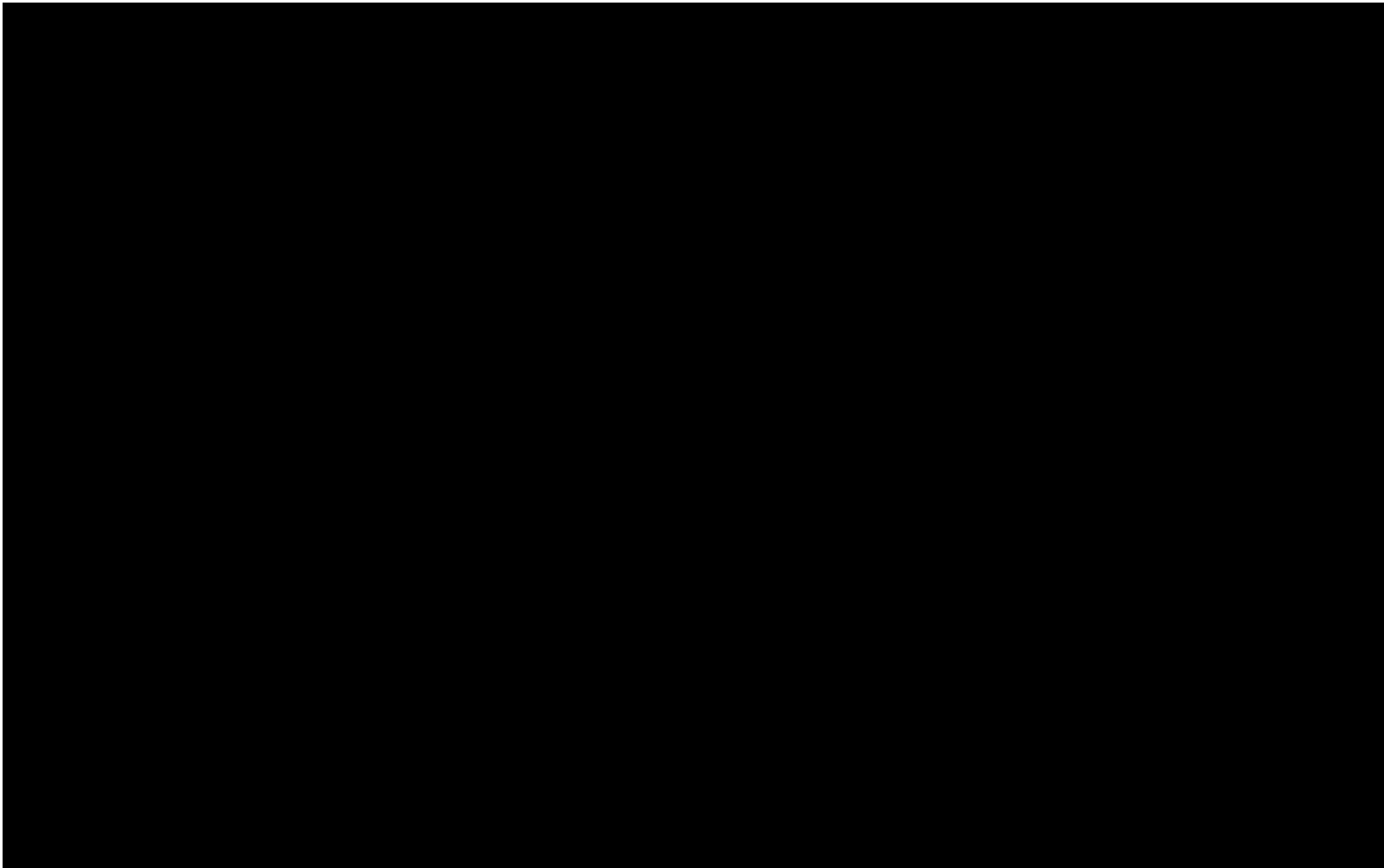


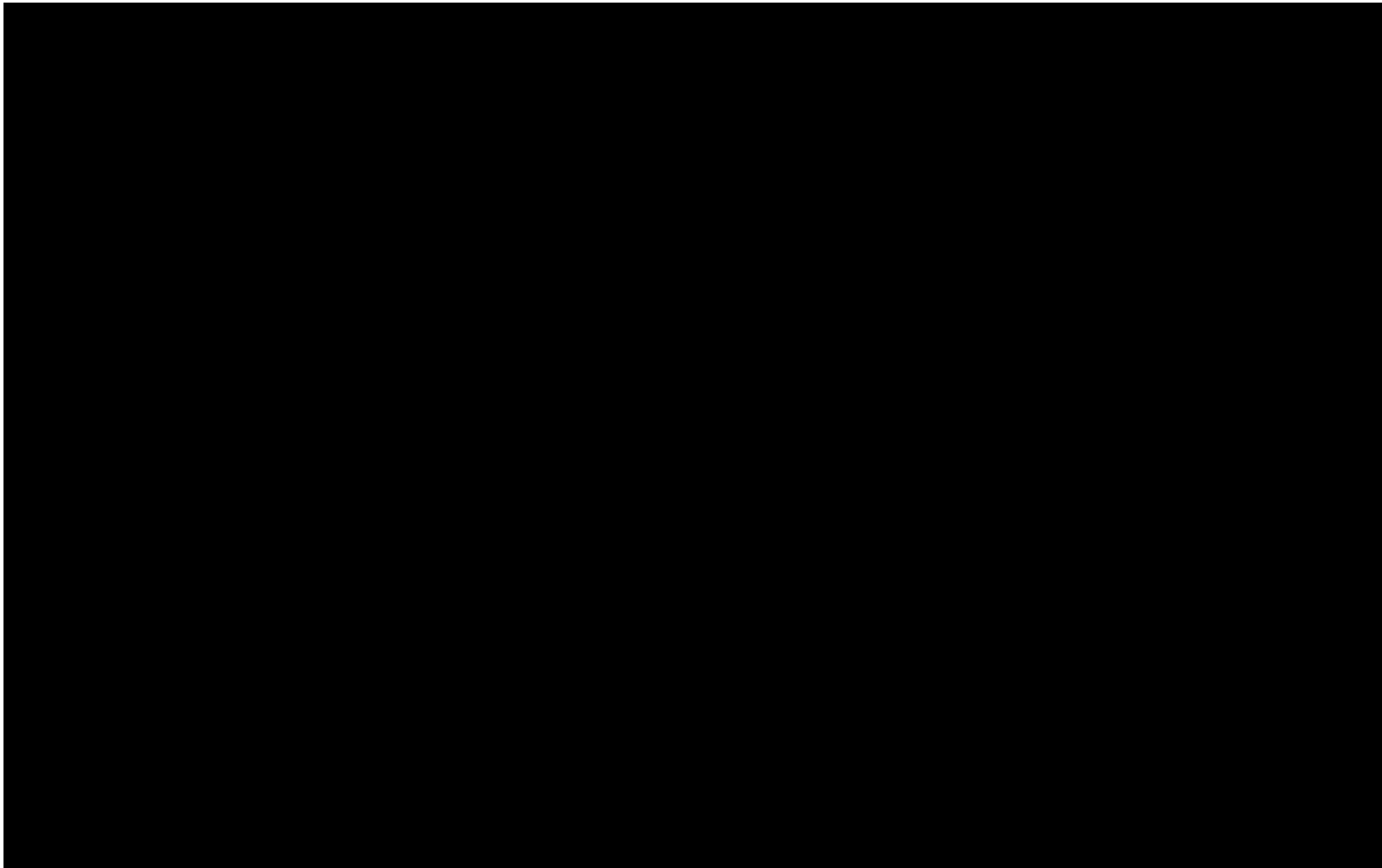


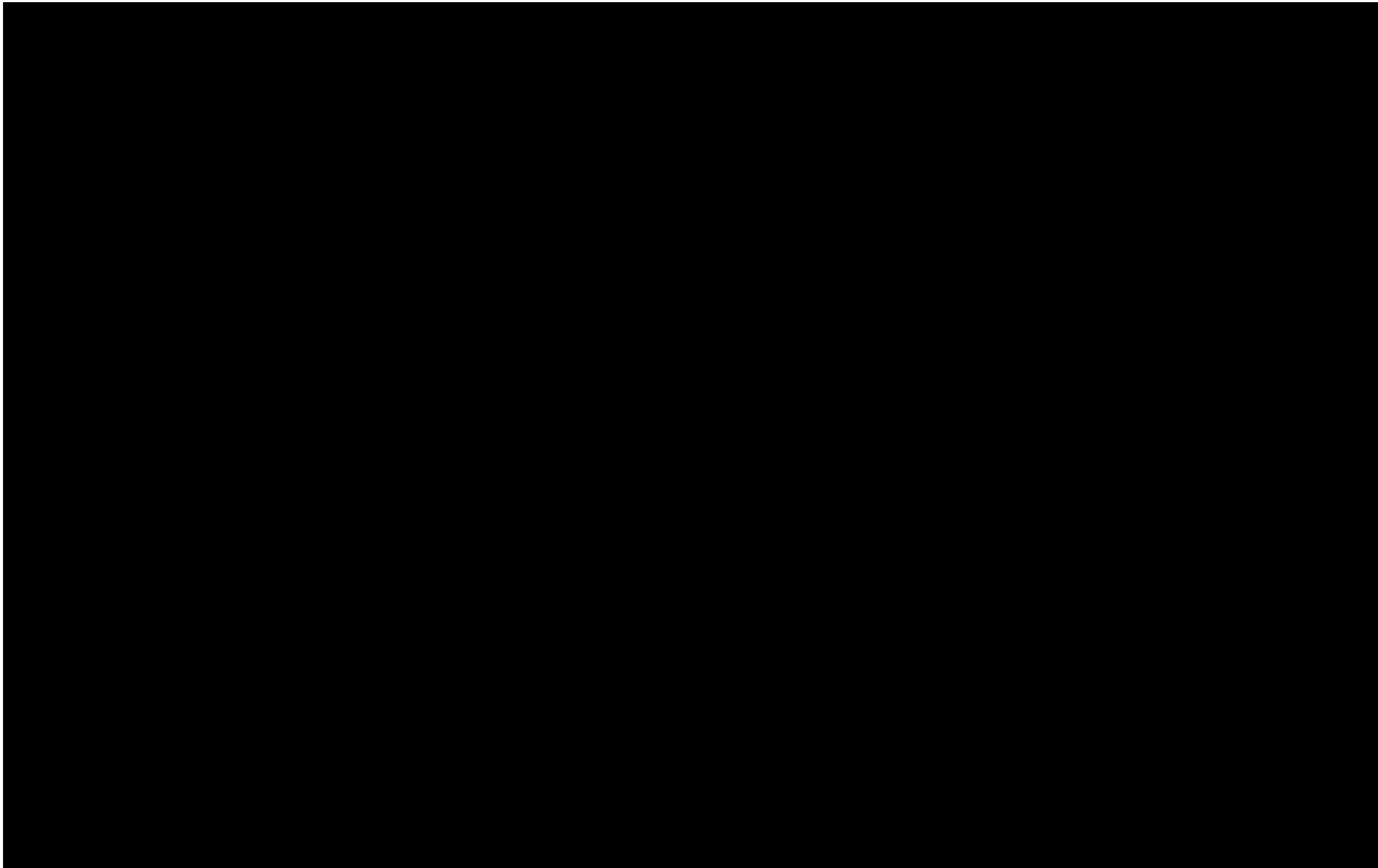


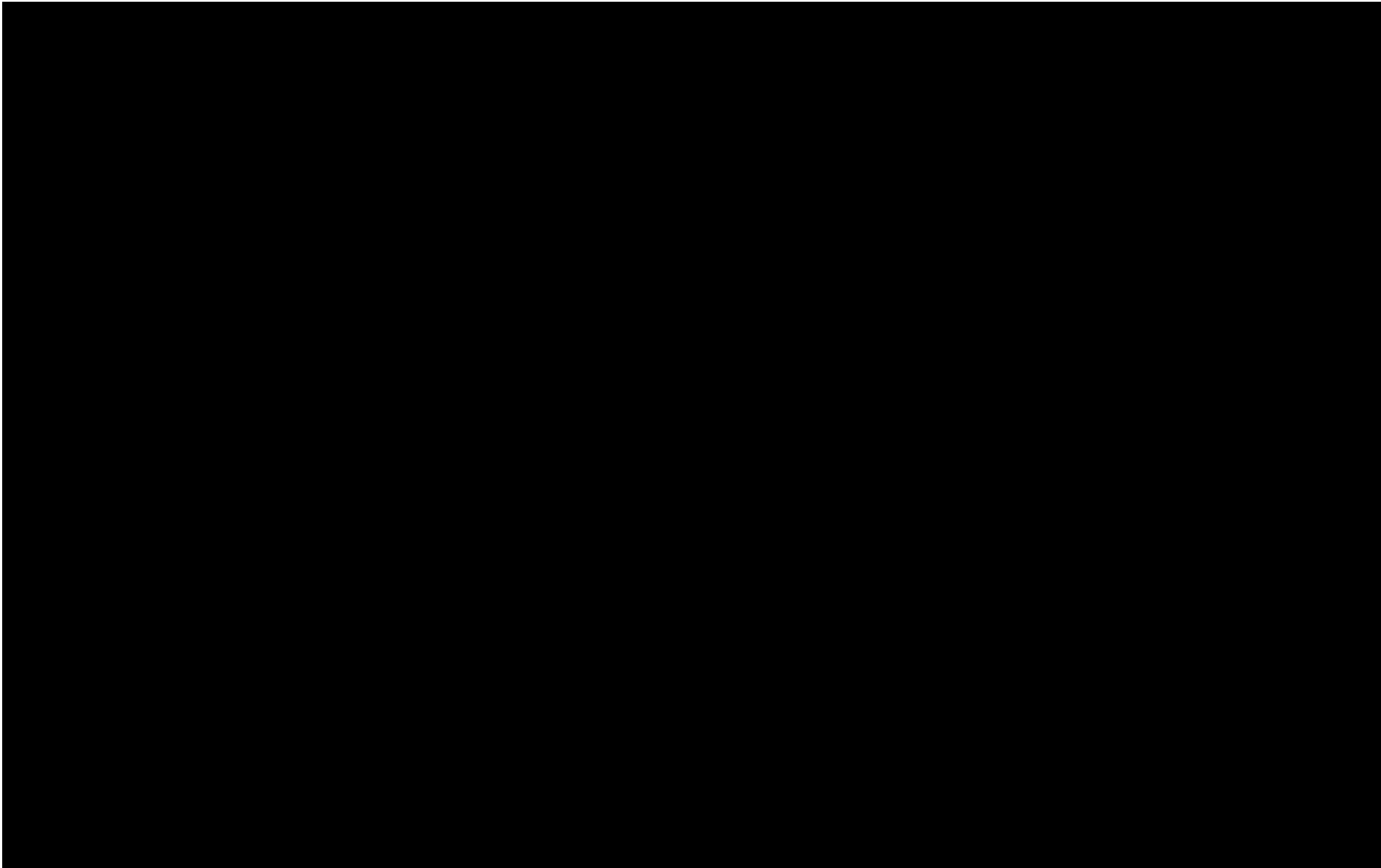


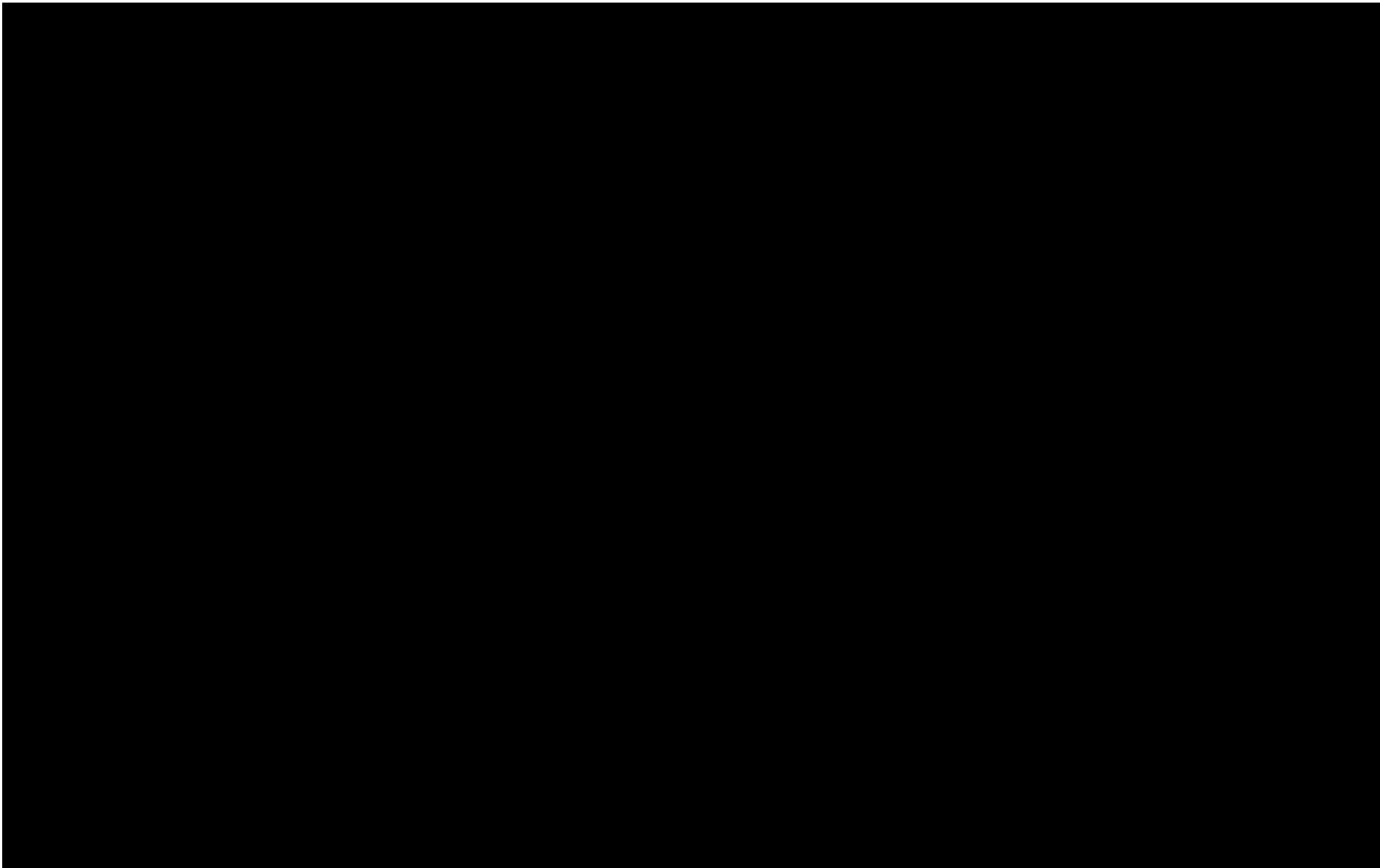






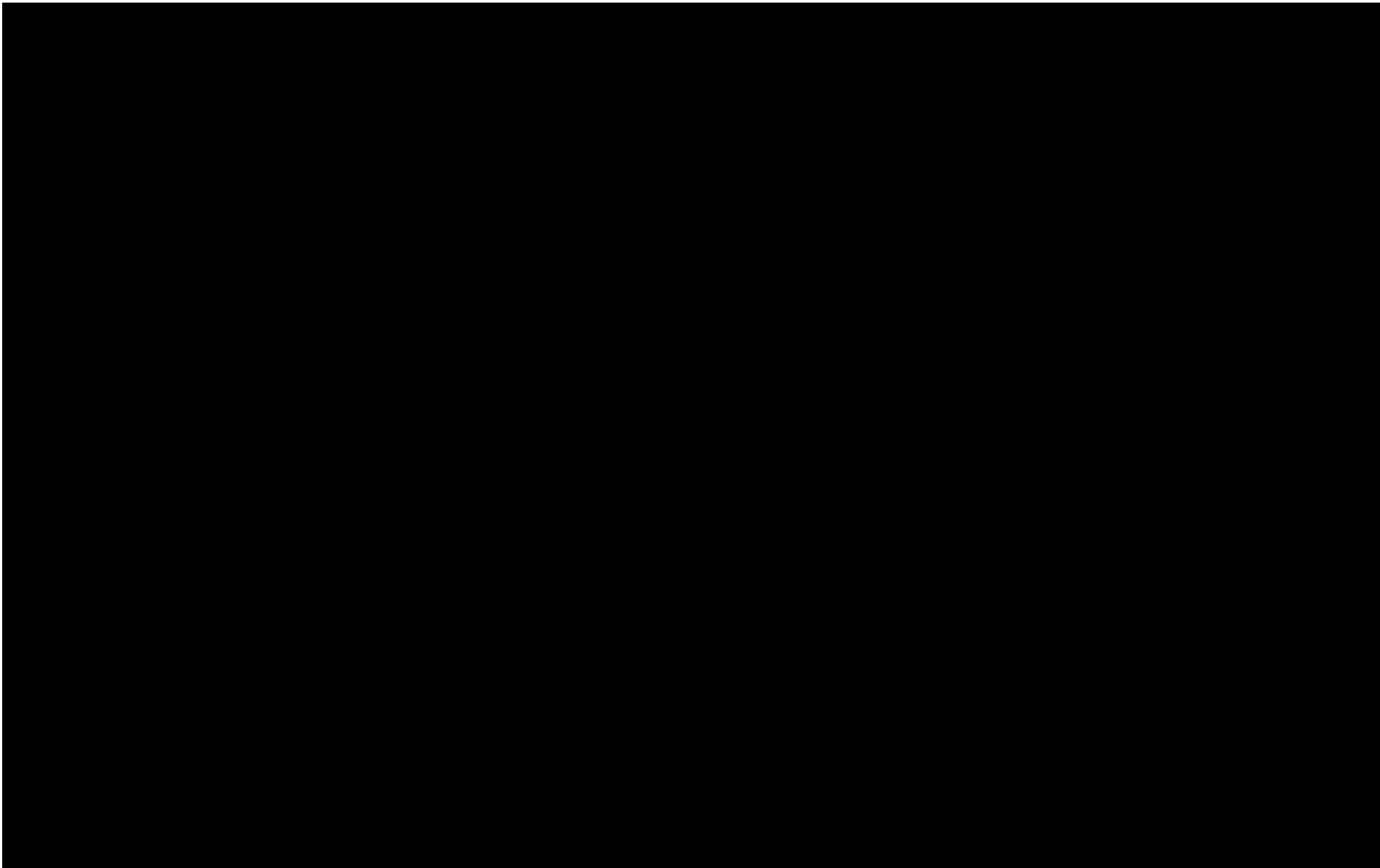




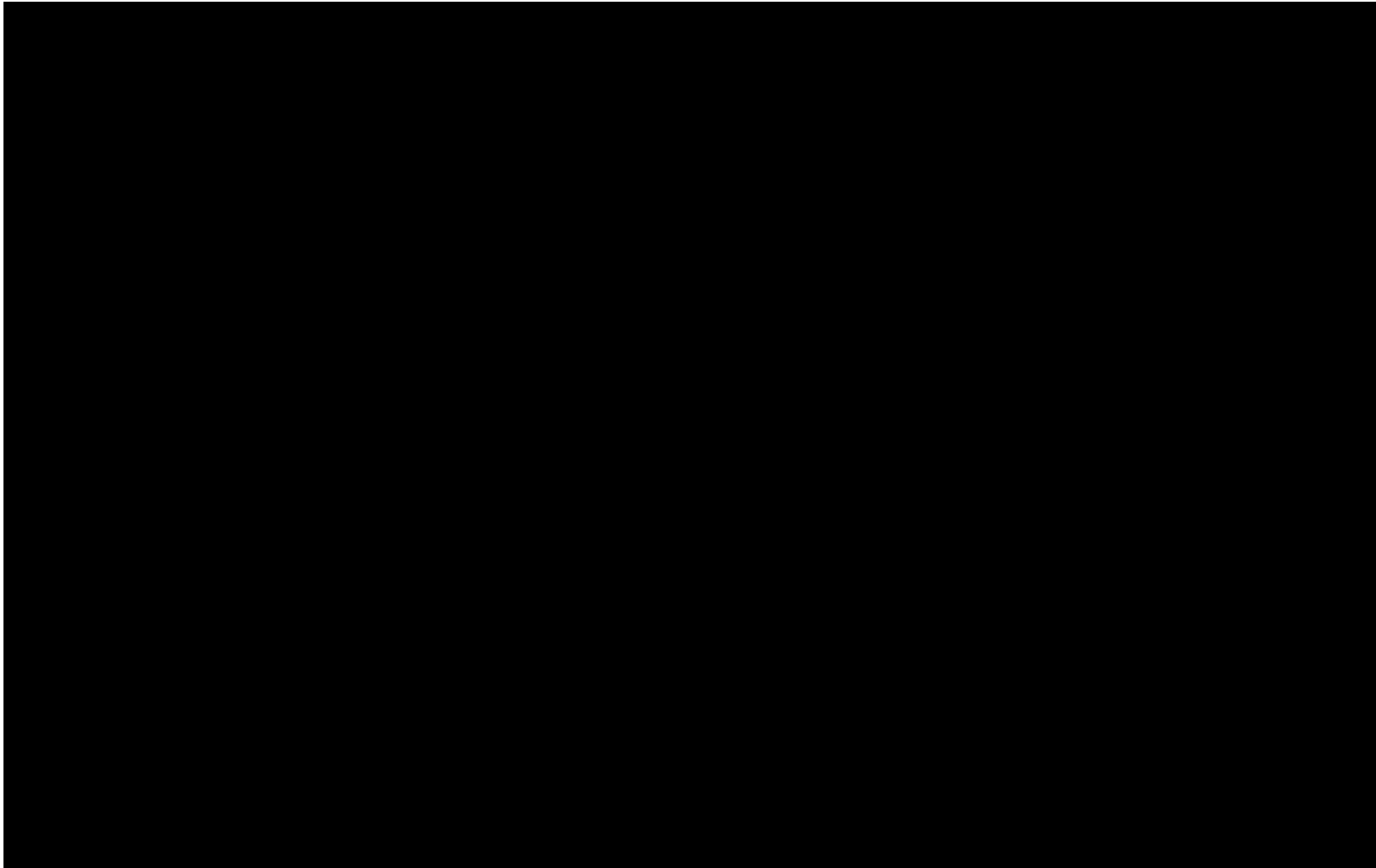


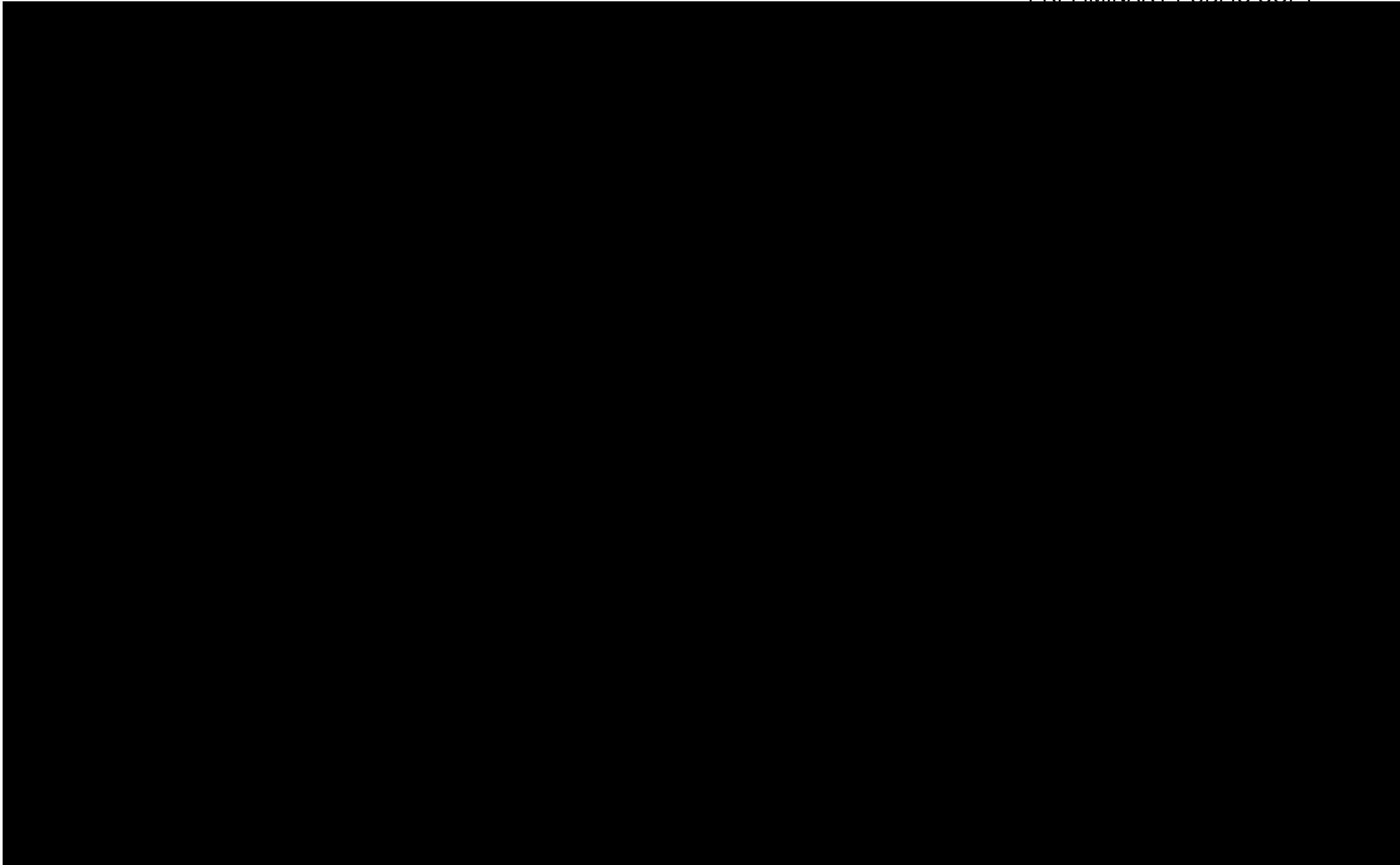


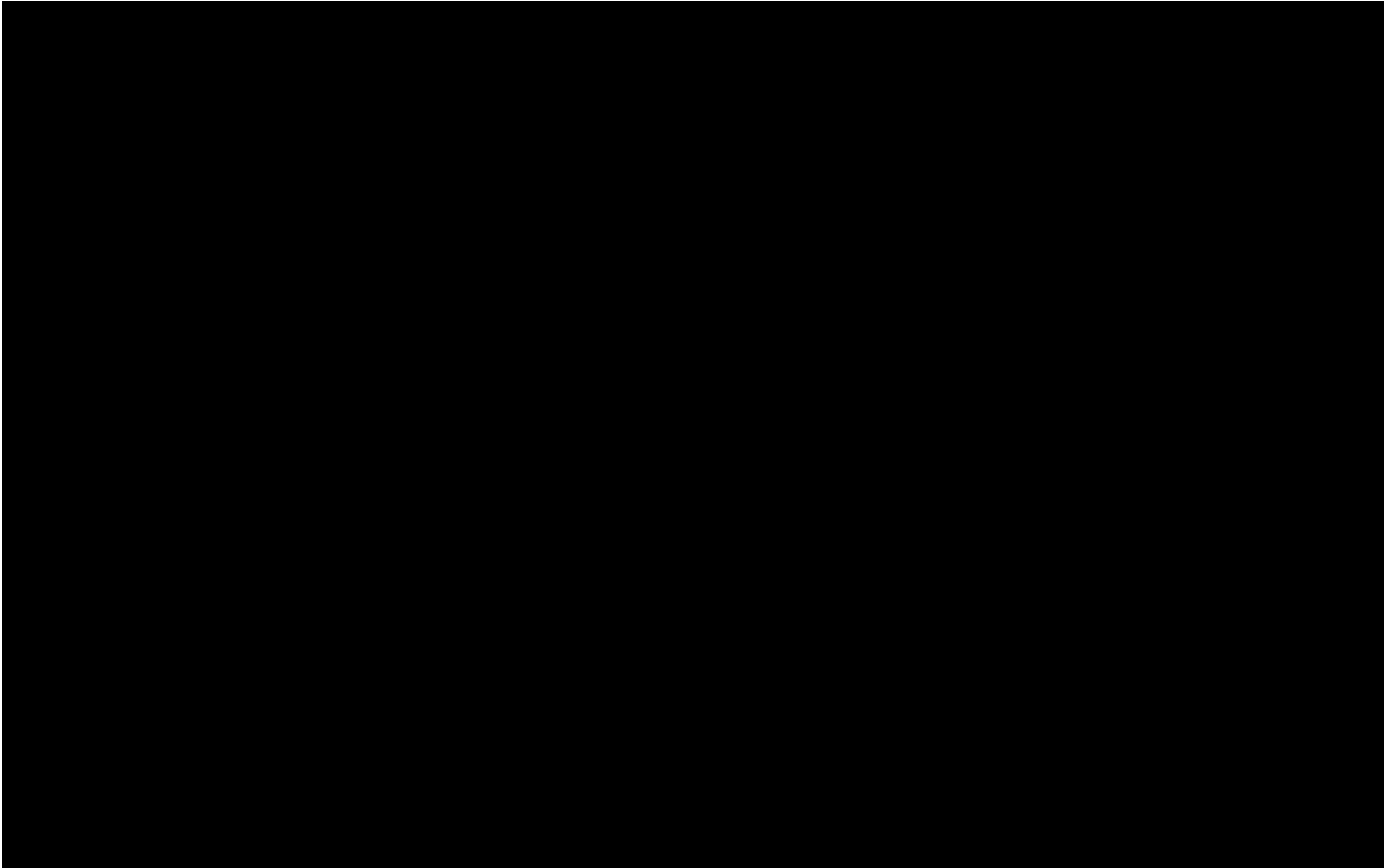


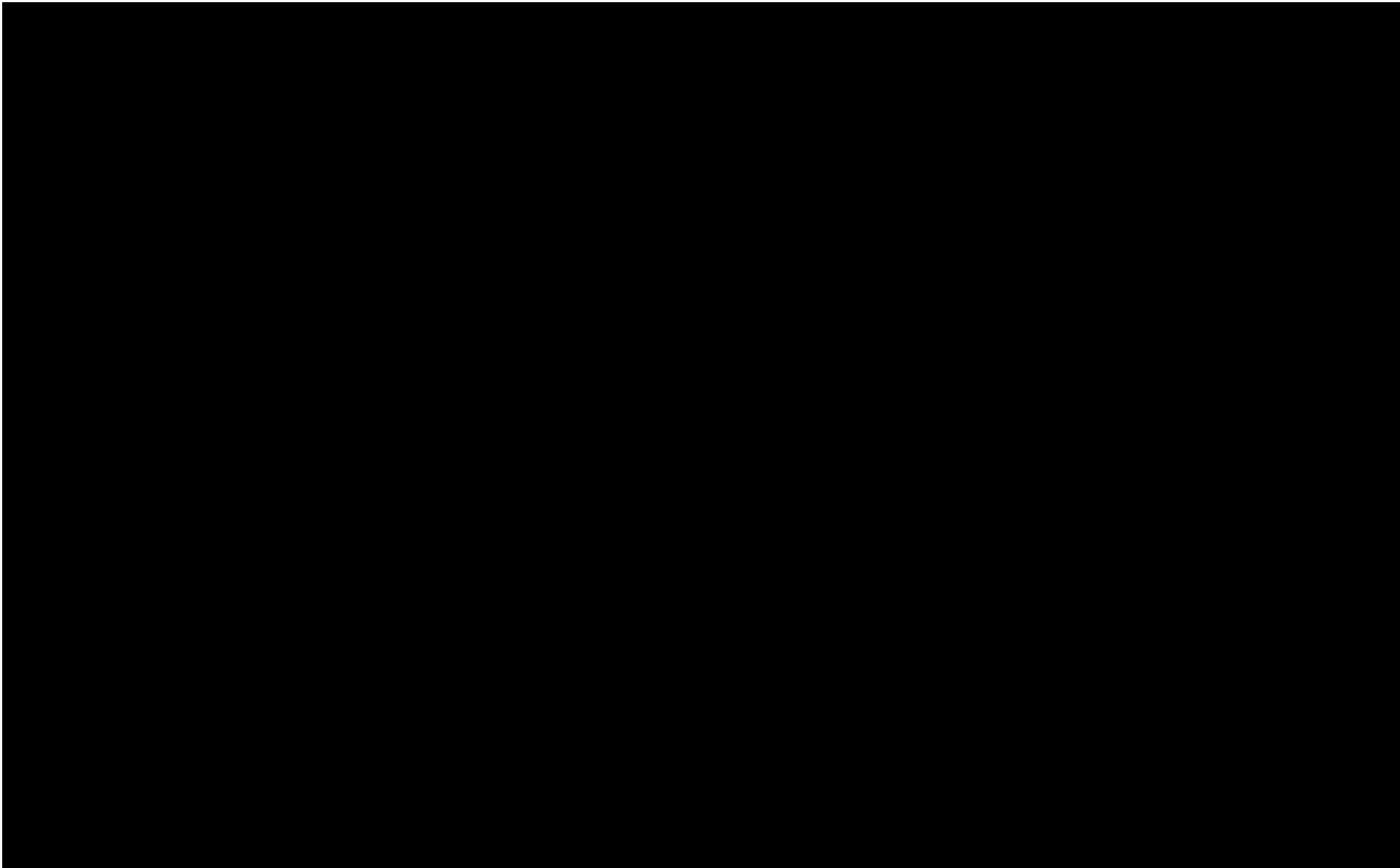


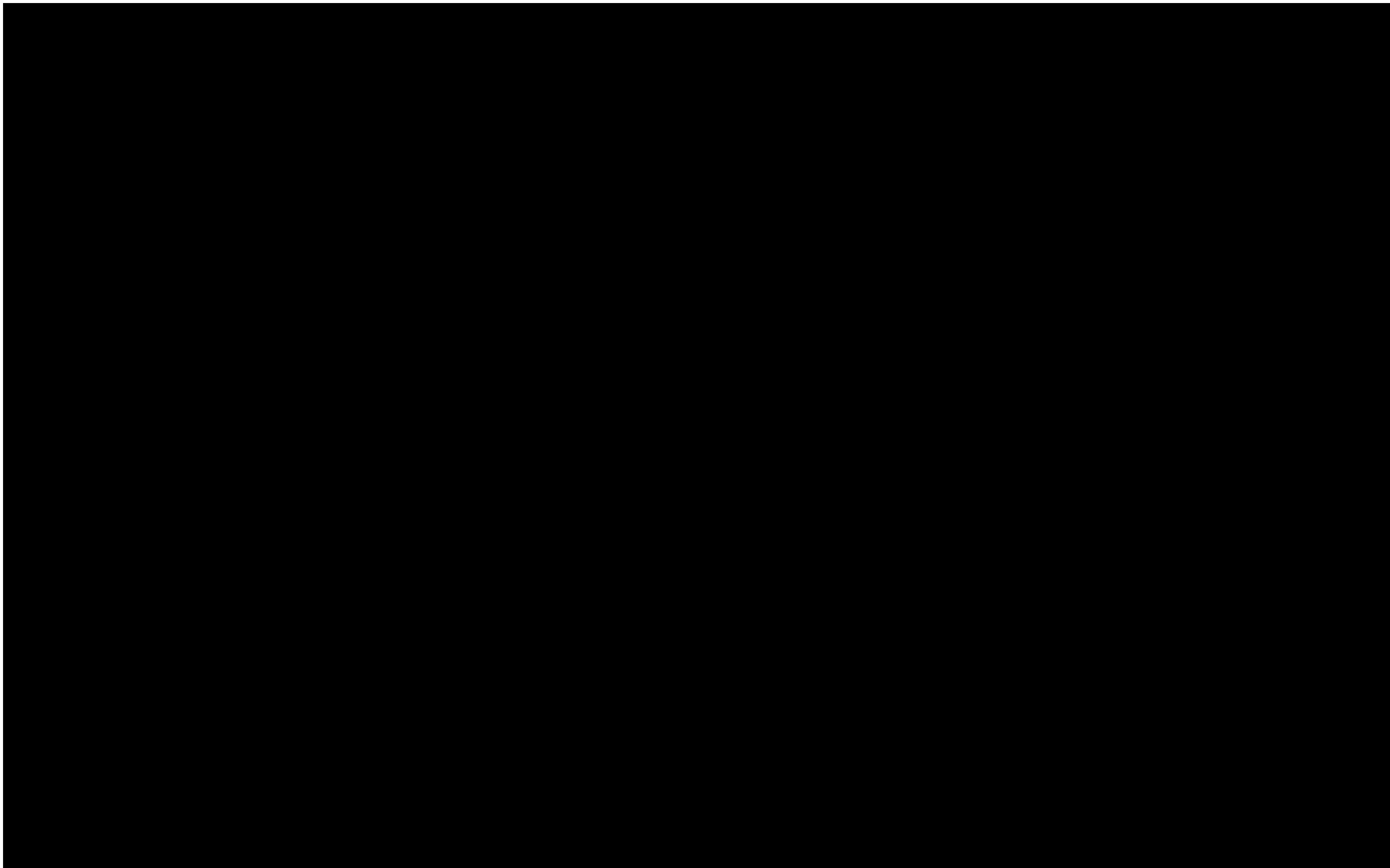


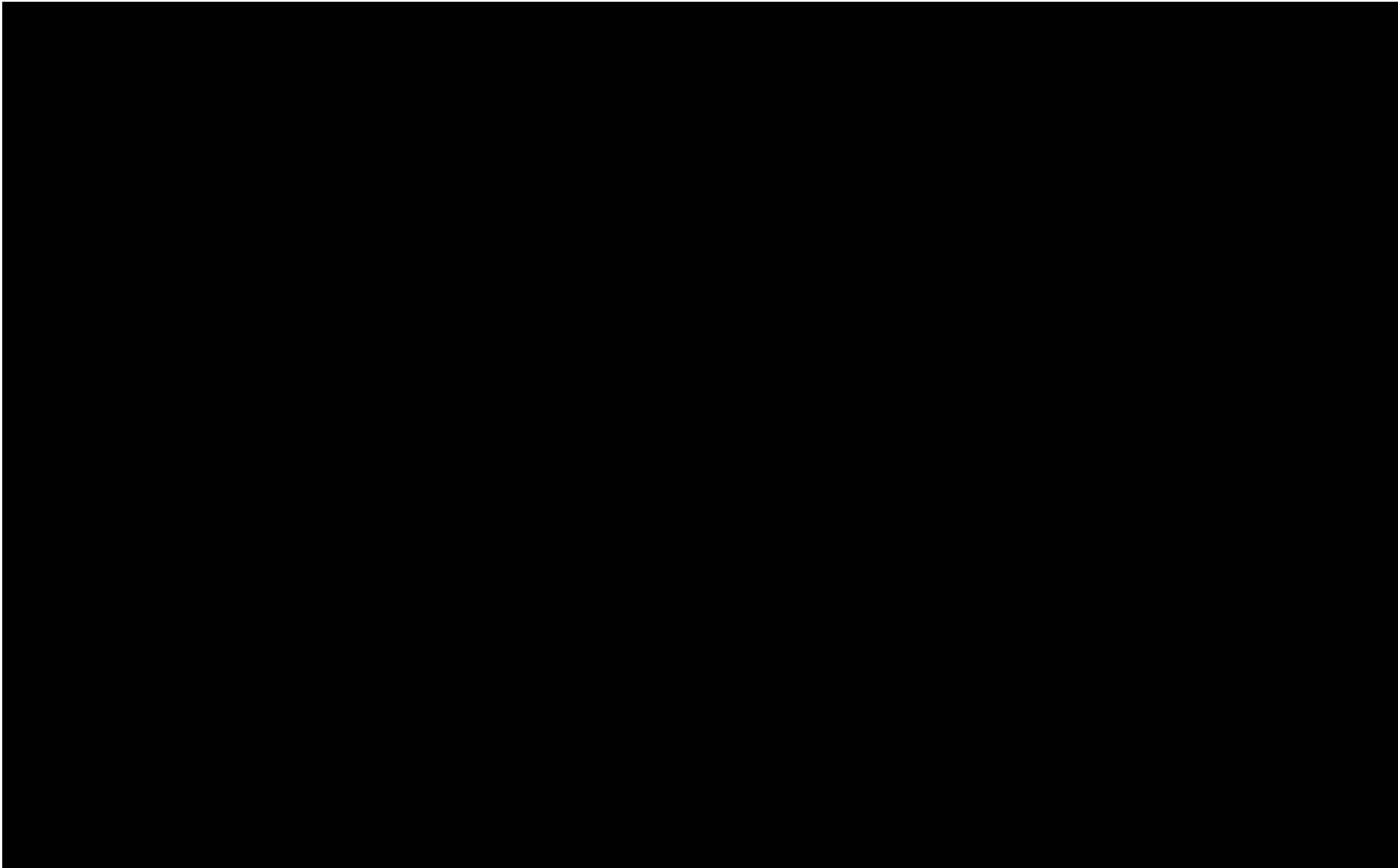


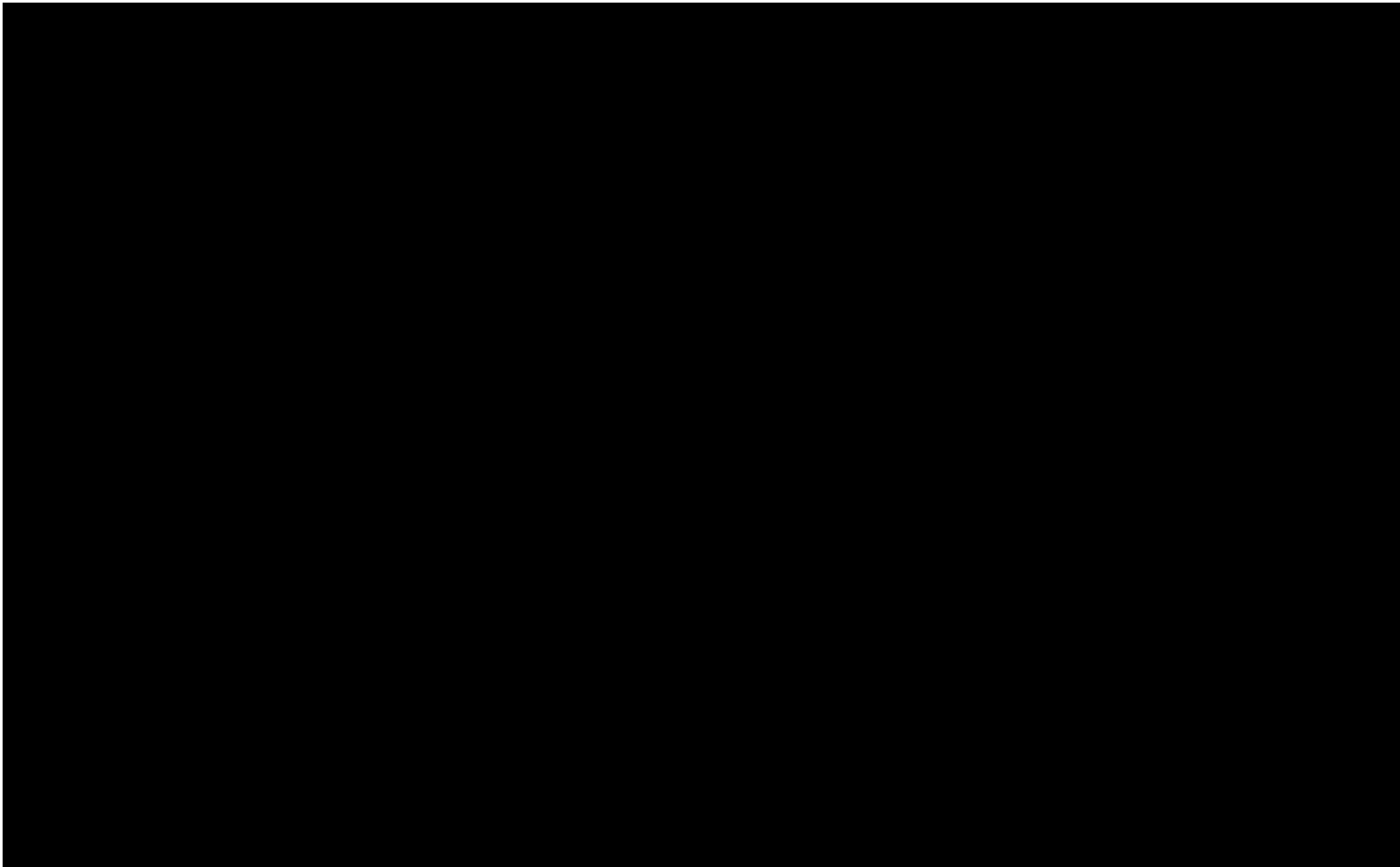


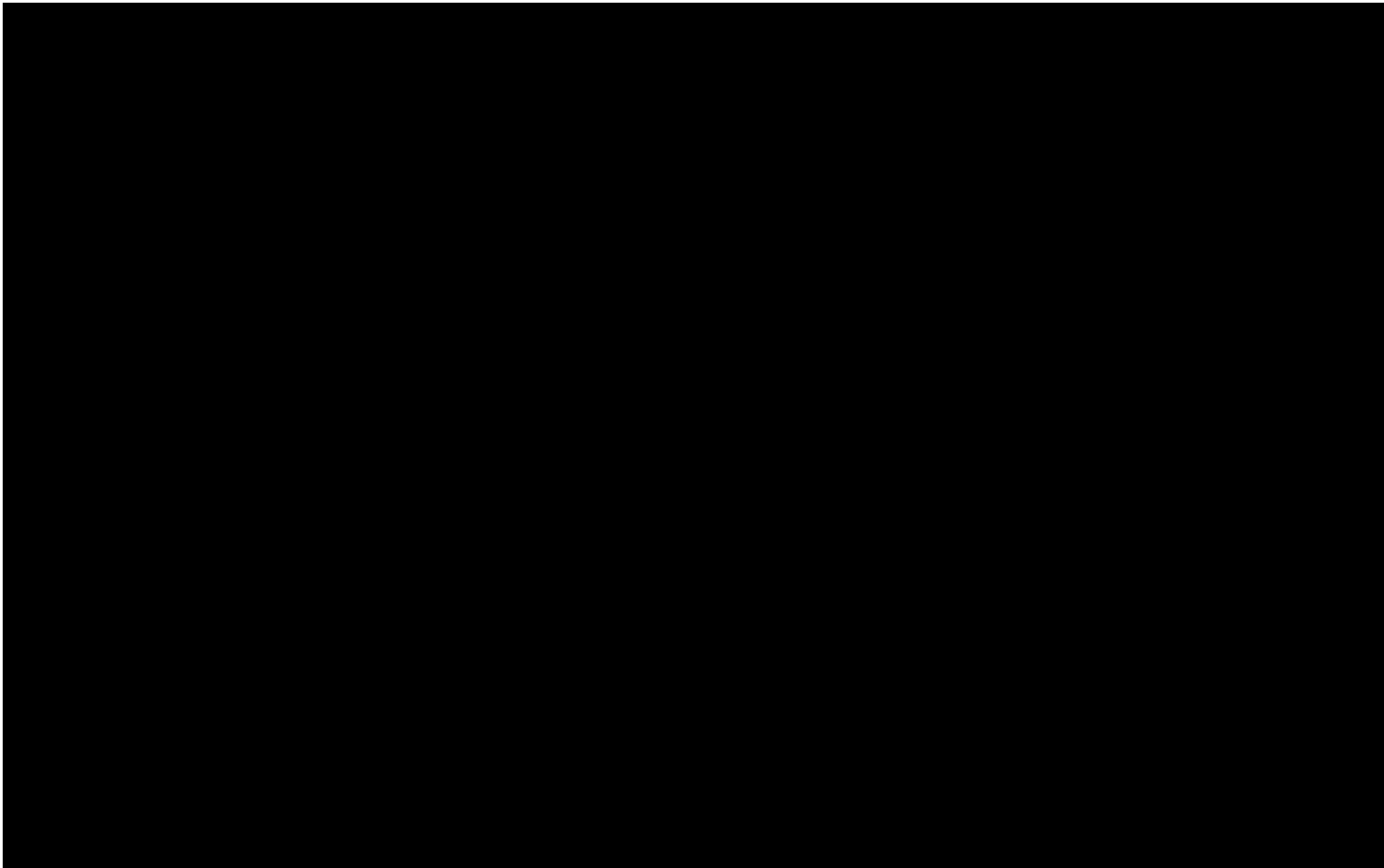




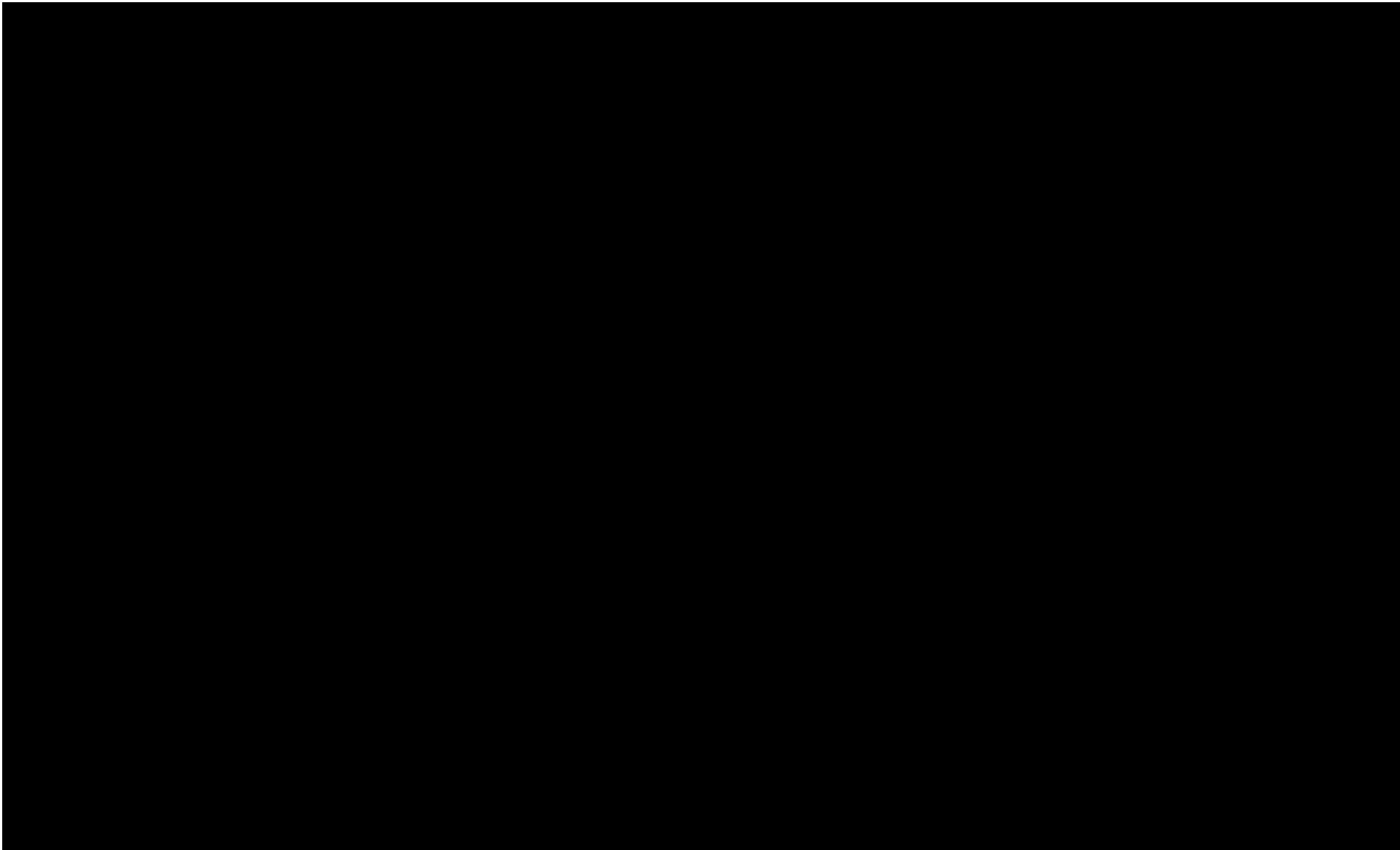












[REDACTED]

**To:** Atlantic Shores **Project No:** 20043  
**From:** [REDACTED]  
**Date:** November 12, 2020  
**Reference:** Appendix 9-8: Visual Simulation Methodology – NJ BPU Bid Simulations

### Field Review

The view of each one of the proposed Project scenarios was simulated in accordance with the weather and time of day variables set forth in the Solicitation Requirements. From a near, representative coastline key observation point (KOP), the view of the Project was simulated assuming clear, partly cloudy, and overcast conditions during early morning, mid-afternoon, and late day, as well as one night time simulation with the turbines lit under clear conditions. Ten simulations from the same KOP were completed for the S, M, and L scenarios for a total of 30 simulations. Ten simulations from two different KOPs were completed for the XL scenario for a total of 20 simulations.

At both of the KOPs identified for the required visibility study, a trained field crew from Atlantic Shores visual resources consultant, [REDACTED] selected an appropriate photo location based on the availability of an open view toward the Project Area, appropriate composition, lighting, and, if possible, the inclusion of distinctive foreground features that allow recognition of the viewpoint by the public. At each viewpoint, a series of overlapping photos of the entire visible seascape was obtained in five-degree increments. A tripod-mounted, full frame digital single lens reflex (SLR) camera with a resolution of 30.4 megapixels and a 50-millimeter lens was used for all photos. This focal length is the standard used in visual simulations because it most closely approximates normal human perception of spatial relationships and scale in the landscape. Additionally, high-resolution video was taken at each of the simulated KOPs for use in video animations demonstrating the WTGs and environment in motion.

For views lacking background alignment features (i.e., identifiable landscape features with known locations), the field crew also utilized global positioning system (GPS) equipment with sub-meter accuracy to document the location of each KOP and foreground reference features (e.g., buildings, fences, flag poles, placed flags) visible in the photos. Precise locations of these features allow accurate camera alignment during the development of visual simulations. It also assures that the resulting simulations have a high degree of accuracy in terms of wind turbine generator (WTG) location and perceived size relative to other landscape features.

KOPs were photographed from recognizable locations that were also the most geographically proximate to the proposed WTGs. The location of the KOP relative to the WTG layouts is provided in Appendixes 9-4, 9-5, 9-6, and 9-7 (Visual Simulations). In addition to being the closest onshore location to the proposed Project scenarios, the selected KOPs also represent visual resources found within the City of Atlantic Shores and the Borough of Ship Bottom on Long Beach Island.

### Visual Simulations

To show anticipated visual changes associated with the proposed Project, high-resolution, georeferenced, three dimensional models (3D) were used to create realistic photographic simulations of the Project for each of the selected

[REDACTED]

KOPs. The photographic simulations were developed by constructing a 3D computer model of the proposed WTGs, Project layout, design specifications and coordinates provided by Atlantic Shores Offshore Wind. A hypothetical WTG model using the largest dimensions under consideration was prepared.

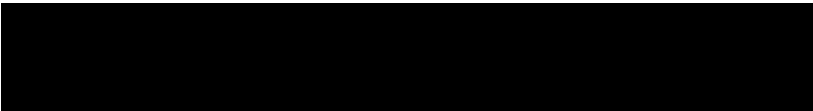
Simulations were created by aligning each photographic viewpoint through a virtual 3D camera, using digitized location data for elements visible in the photograph. This step involves utilizing aerial photographs and GPS data collected in the field to create an AutoCAD® drawing. The 3D AutoCAD data were then imported into 3DS Max®, and additional components (cameras, modeled scene, etc.) were added. These data were superimposed over photographs as seen through the virtual camera from each of the viewpoints, and minor camera changes (height, roll, bearing) were made as necessary to align all known reference points within the view. This process ensures that Project elements are shown in proportion, perspective, and proper relation to the existing landscape elements in the view. Consequently, the alignment, elevation, dimensions, and scale of the modeled Project components are accurate and true in their relationship to other landscape elements in each photo.

The next step involves positioning the Project layout in each of the aligned views at the appropriate distance in front of, at, or below the horizon (depending on the distance from the viewer and curvature of the earth). This was done by first determining the distance to the horizon (ocean/ sky interface) visible in the photograph. This is accomplished by entering the viewer position and elevation into the Haversine Formula, which uses the radius of the earth (corrected for refraction)<sup>1</sup> to calculate the mathematical distance to the horizon, or the point at which the sky meets the water. This distance is then used to draw a horizontal line (virtual horizon) in the 3D model representing the mathematical horizon line, which is visible through the virtual camera. The virtual horizon is then precisely aligned to the visible horizon in the photograph by making minor adjustments to the virtual camera target on the vertical axis. With the virtual horizon aligned to the photographed horizon, the positions of the individual WTGs were all placed relative to this horizon line. The Haversine Formula was then used to determine each turbine's position, relative to the horizon. For example, if the WTG appears in front of the horizon, the returned value is zero and the WTG will be placed at the horizon. If the WTG appears behind the visible horizon, the returned value will be a negative number. This value was then applied to the turbine's vertical position in the model so that it appears on or below the visible horizon.

At this point, a "wire frame" model of the WTGs and known reference points are shown on each of the photographs. The proposed exterior color/finish of the WTGs was then added to the model, and the appropriate sun angle was simulated based on the specific date, time, and location at which each photo was taken. This information allows the computer to accurately illustrate highlights, shading, and shadows for each individual WTG. All simulations show the WTGs with rotors oriented toward the southwest, which is generally the prevailing wind direction in the area. The simulations show a field of view of 38.7 degrees, which is equivalent to the field of view of a standard 50 mm camera lens.

To prepare nighttime simulations, [REDACTED] obtained data on the proposed aviation obstruction warning lights from the FAA Advisory Circular 70/7460-1L and the *Draft Proposed Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (BOEM, 2019) which set guidelines for the lighting of WTGs (FAA, 2016). Computer modeling and camera alignment for the nighttime photos were conducted in the same manner described for the daytime simulations. It was assumed that all lights will flash in a synchronized manner, as currently set forth by FAA guidelines. Nighttime simulations therefore show all WTGs with their lights on.

<sup>1</sup> Refraction values assume "typical" viewing conditions and do not account for atmospheric anomalies such as the mirage effect which is typically rare and of short duration but may temporarily increase turbine visibility.



### **Visual Impact Assessment**

The Bureau of Ocean Energy Management (BOEM) requires that Atlantic Shores Offshore Wind complete a comprehensive assessment of onshore resources that may be impacted by the Project. This assessment is known as Visual Impact Assessment (VIA). The study will:

- Describe the appearance of the visible components of the proposed Project.
- Define the character and visual quality of the landscapes within the Project's Visual Study Area (VSA).
- Define the types and sensitivity of viewer groups within the VSA.
- Inventory existing visually sensitive public resources within the VSA.
- Evaluate potential Project visibility within the VSA.
- Identify key observation points (KOPs) for visual assessment.
- Illustrate what the Project will look like from representative key observation points (KOPs).
- Assesses the visual impacts associated with the proposed Project.

The VIA will be included in the Project Construction and Operations Plan (COP) which will be available for public consumption and comment during the planning and permitting phase of the Project.



## Air Emissions Calculation Methodology

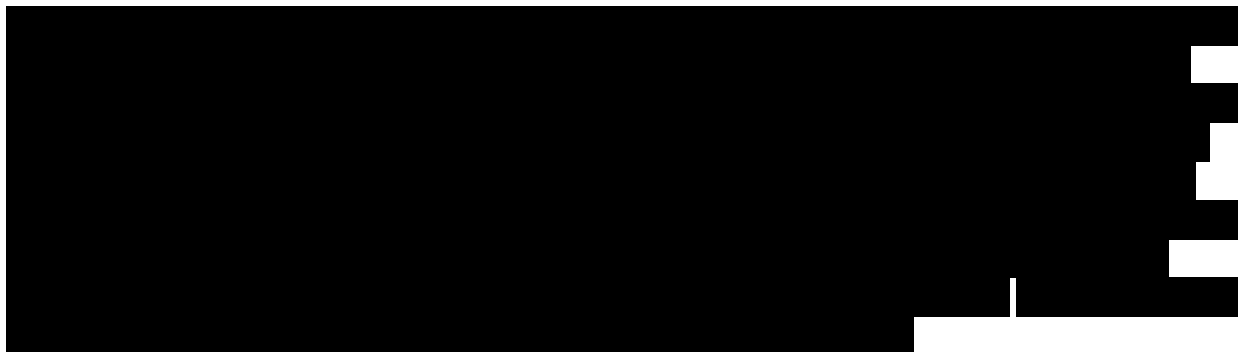
*“Explicit listing of foundations, assumptions, and conditions used in the quantification and monetization of environmental impacts”*

This Appendix presents a description of how the “direct” emissions<sup>1</sup> of the Project, as reported in the Application Form, were calculated, including all assumptions used in preparing estimates of direct emissions. As described in Section 9, the emissions reported in the Application Form are predominantly from internal combustion engines<sup>2</sup>, and are quantified using a three-step process:

1. Detailed plans for each Project activity.
2. Load factors.
3. Emission factors.

Air emissions are broadly calculated as the product of engine rated capacity, hours operating, load factor, and emission factor.

Plans for each project activity



<sup>1</sup> The project has no emissions directly caused by the generation of electricity. These calculations present emissions associated with construction, operation & maintenance, and similar supporting activities.

<sup>2</sup> Helicopters and certain other vessels may be powered by turbines instead of engines, but the calculation methodology is unchanged.

[REDACTED]

[REDACTED]

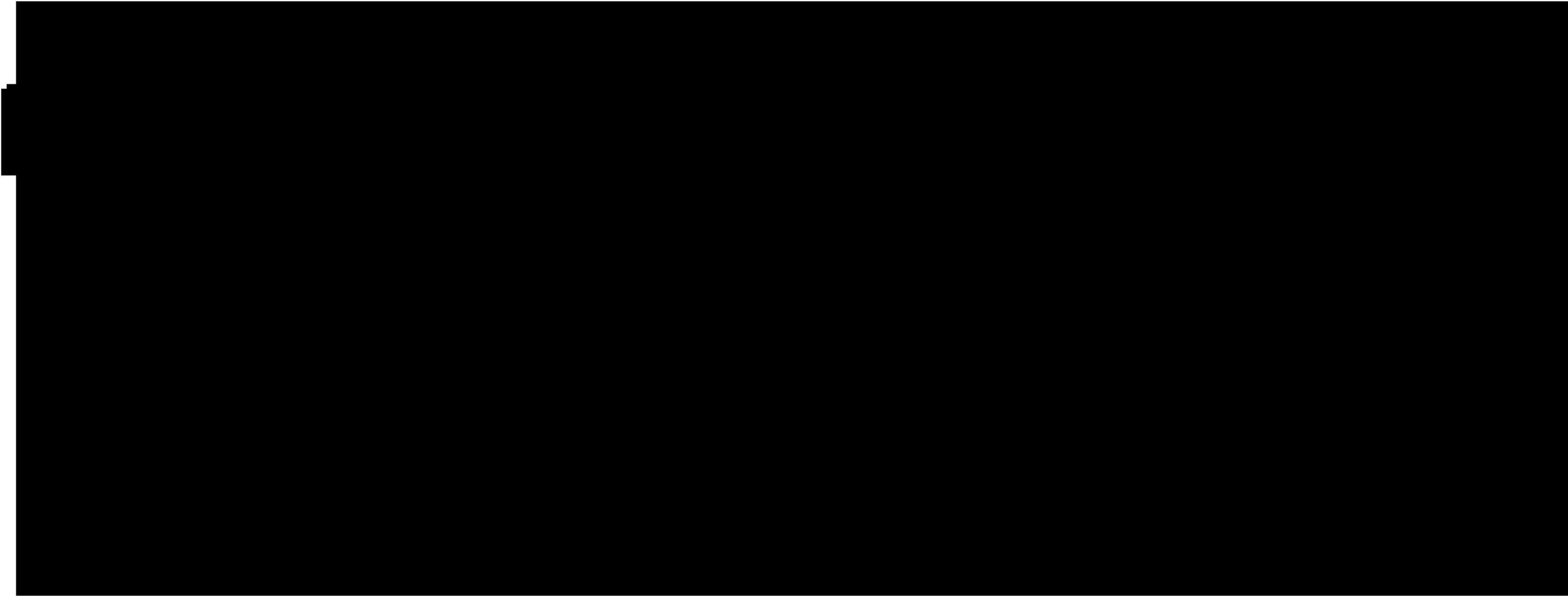
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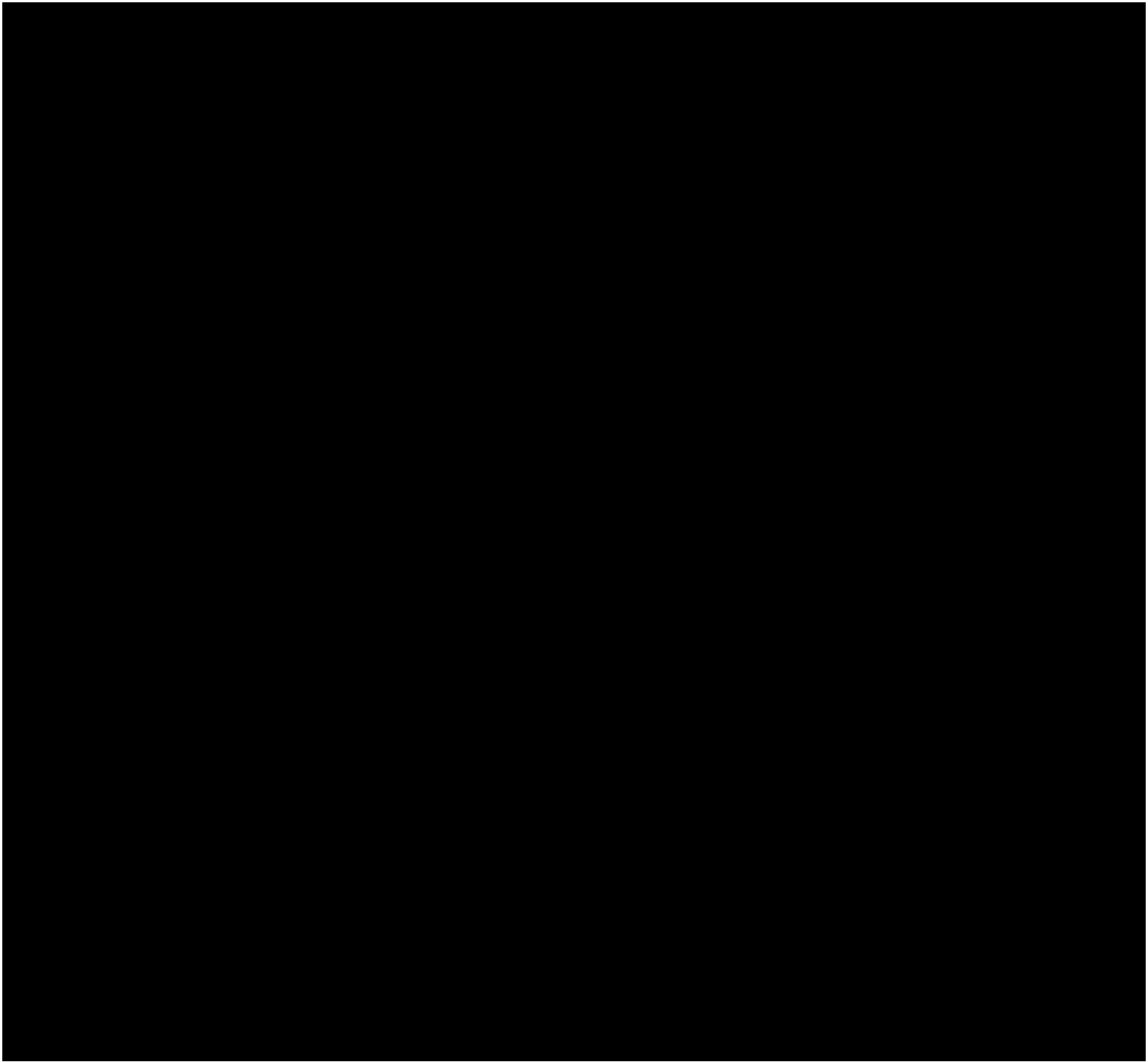
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[REDACTED]

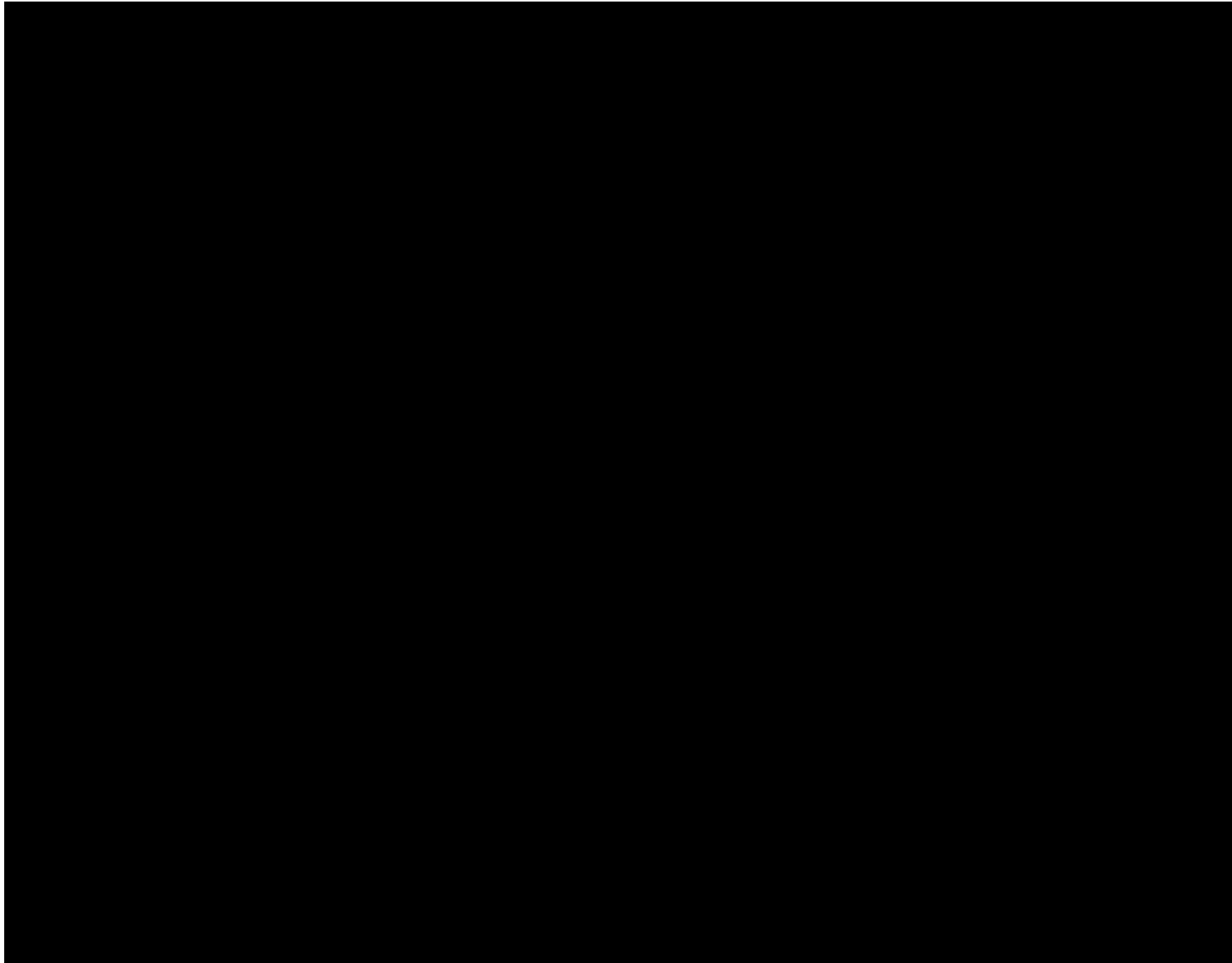
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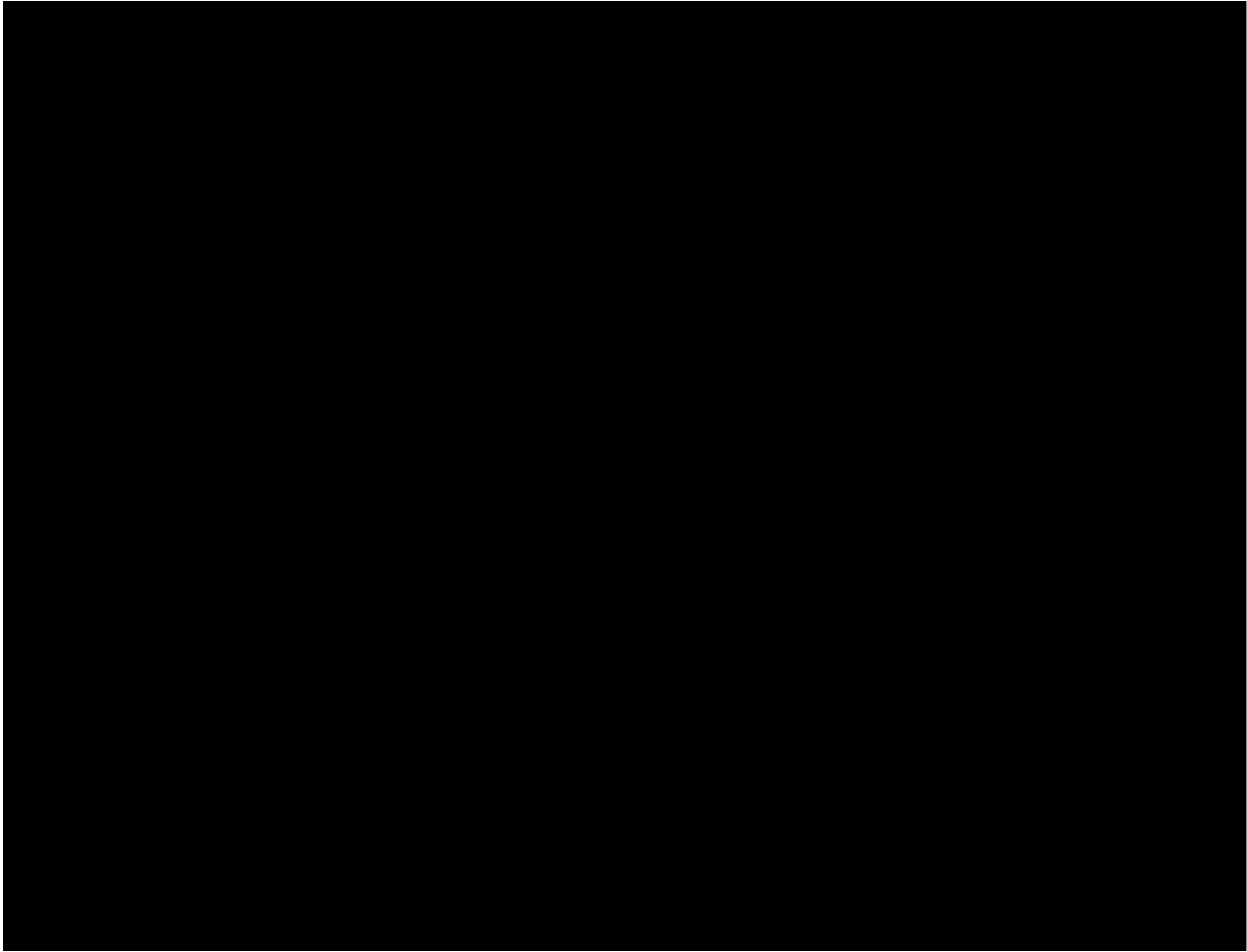
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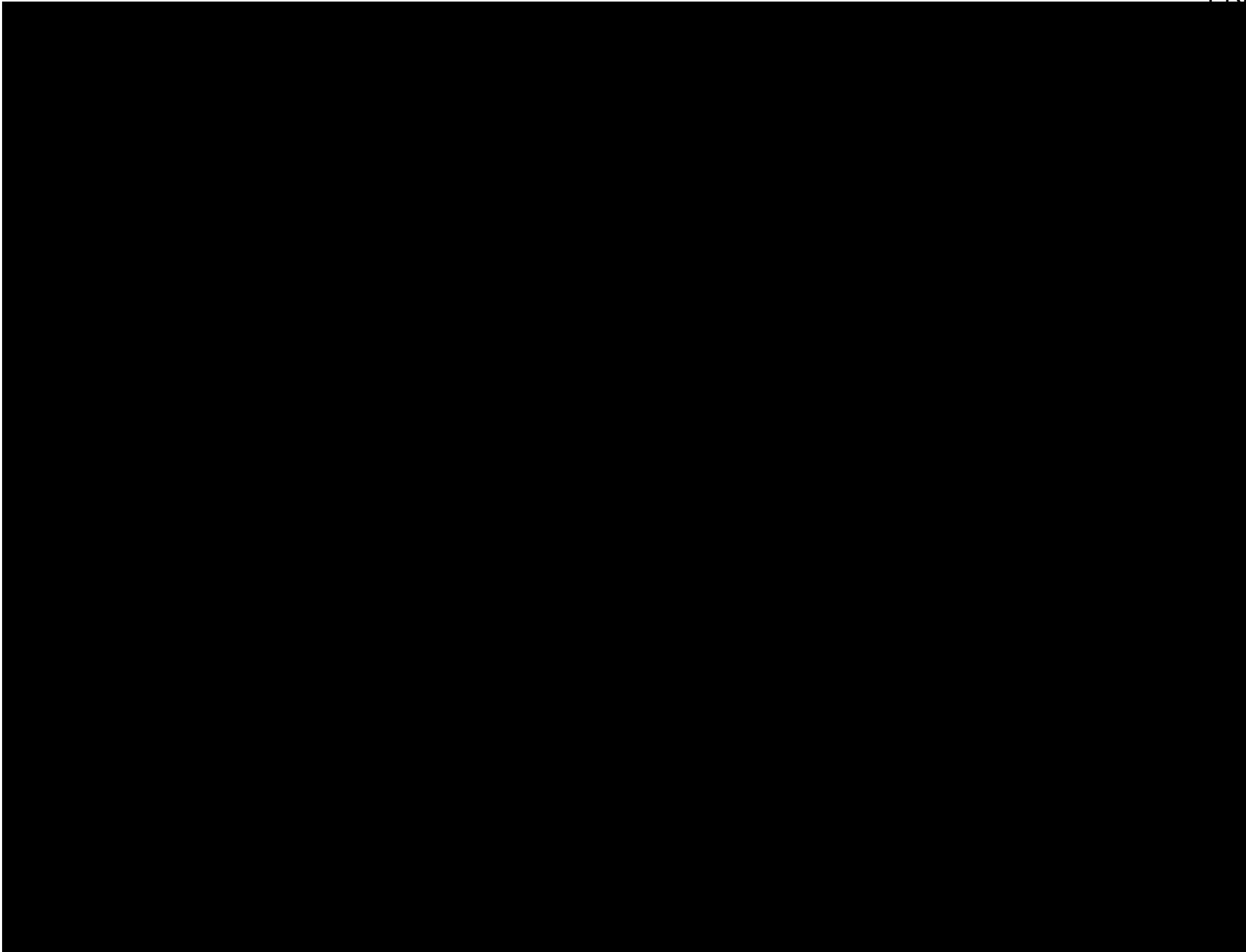


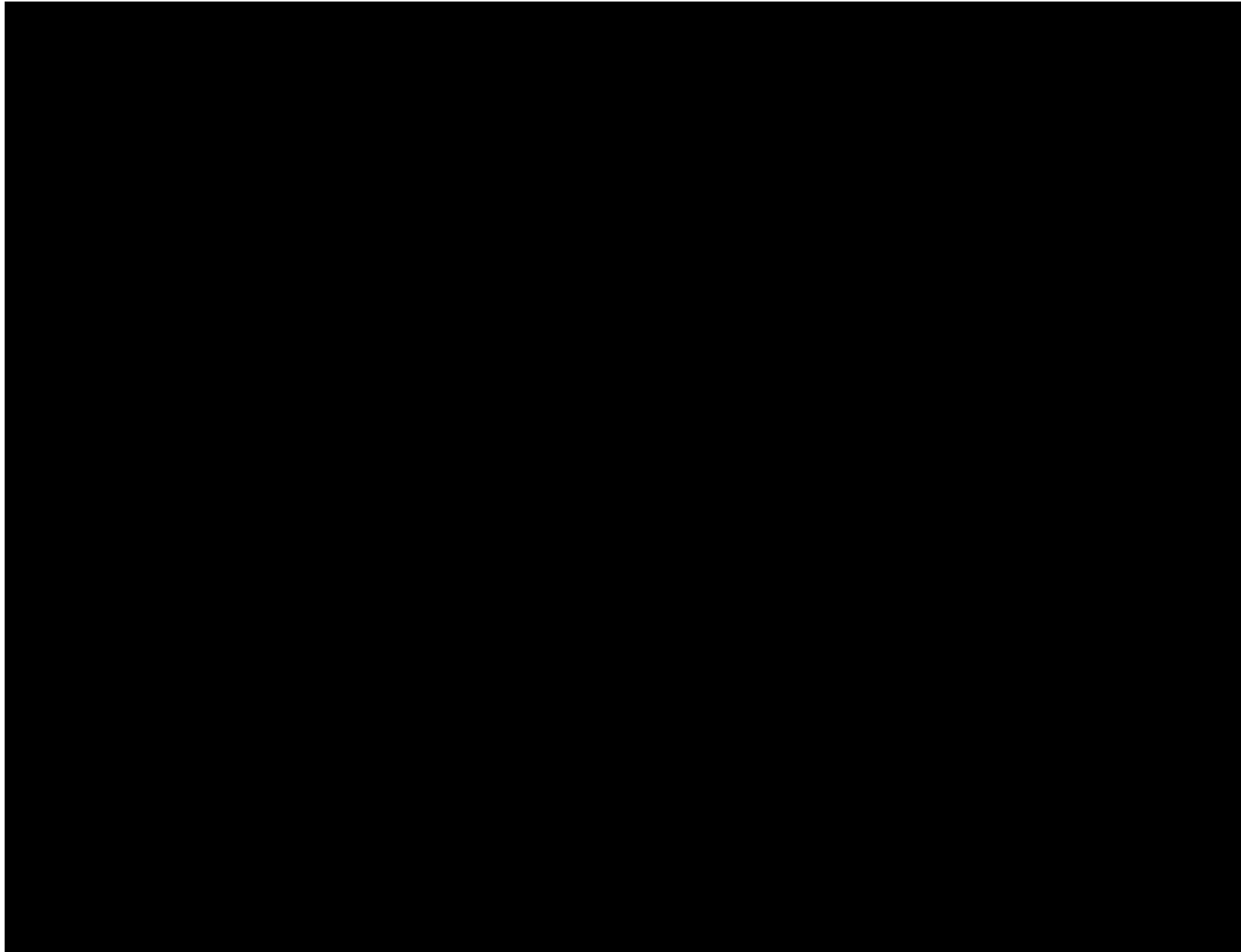


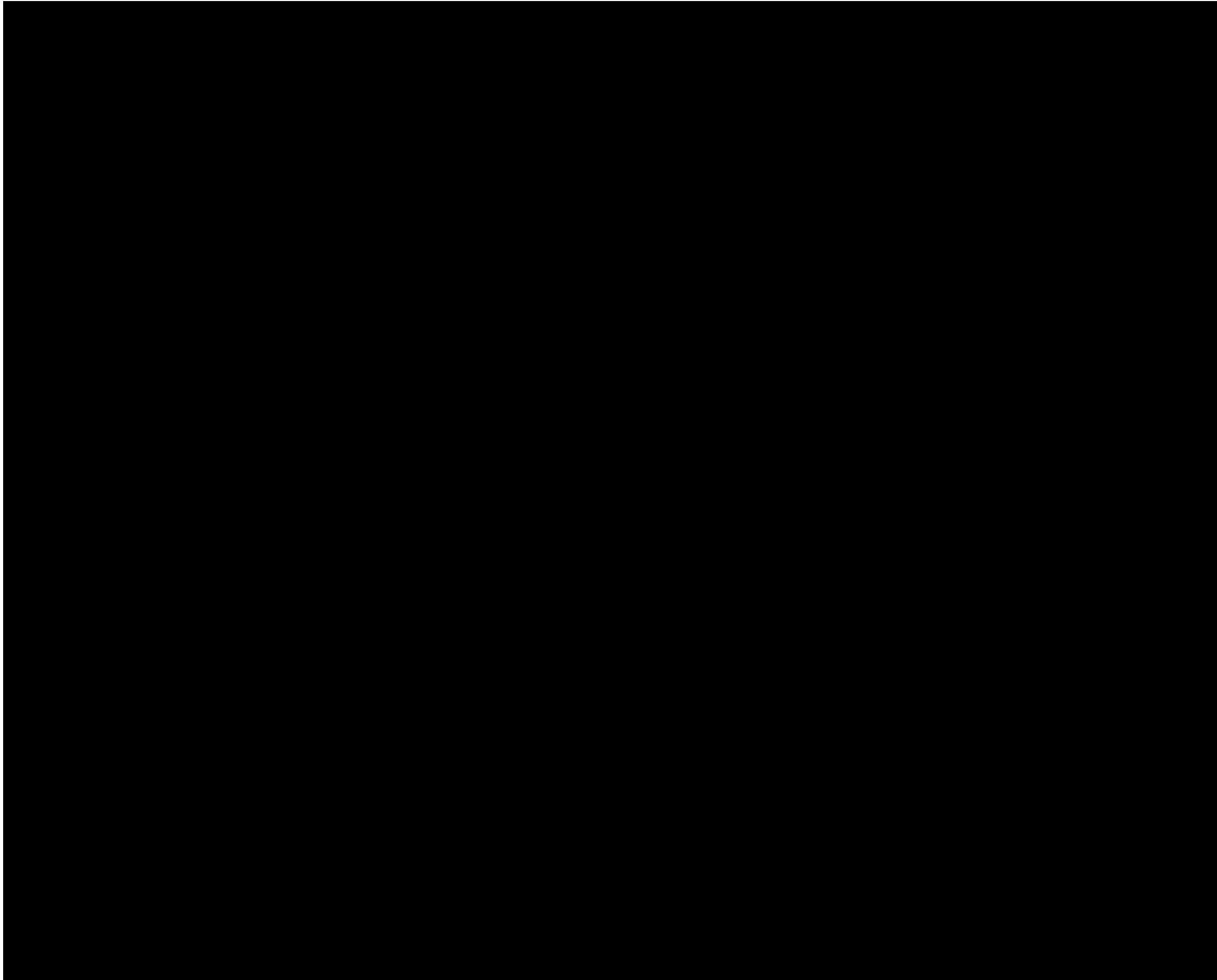


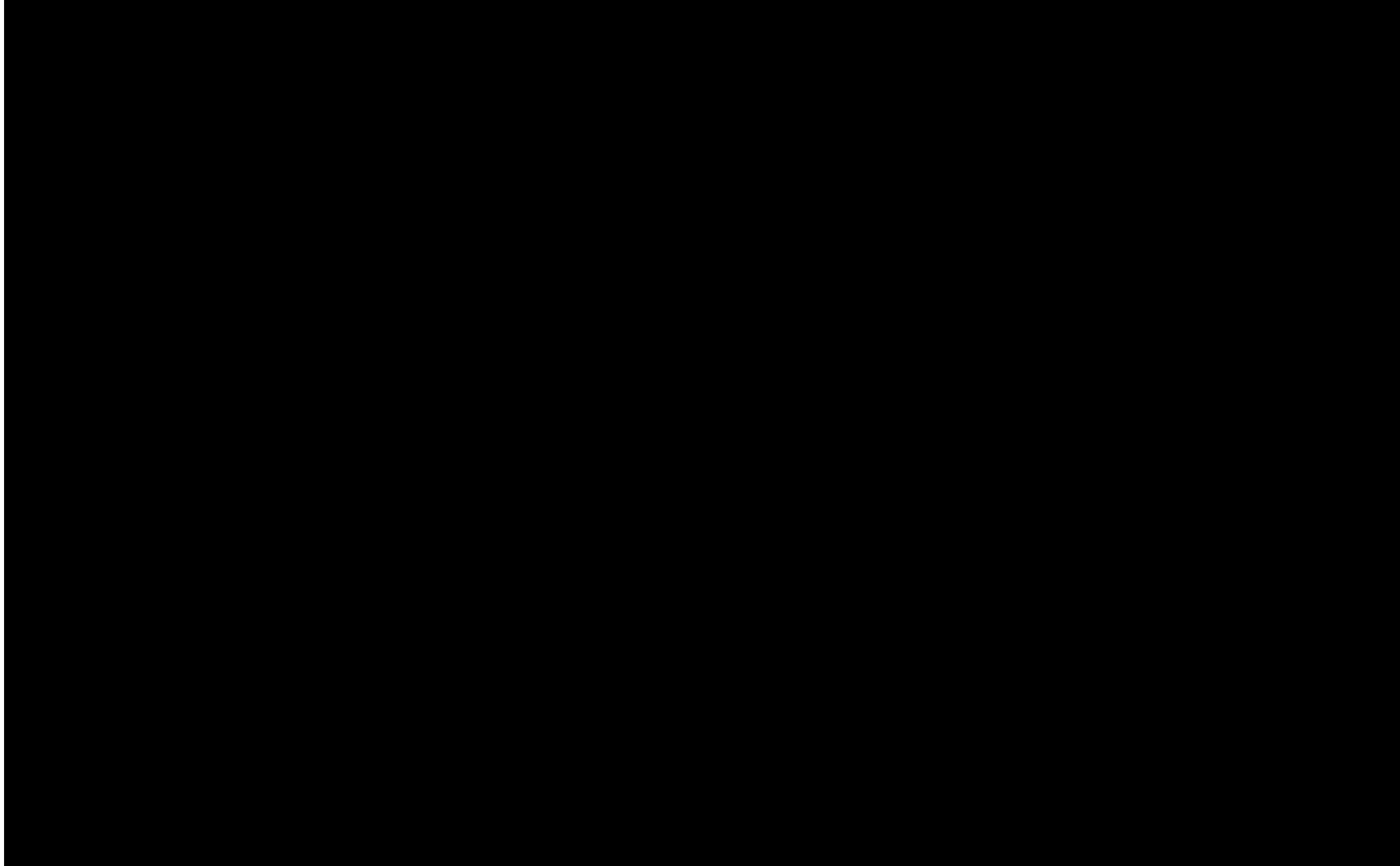


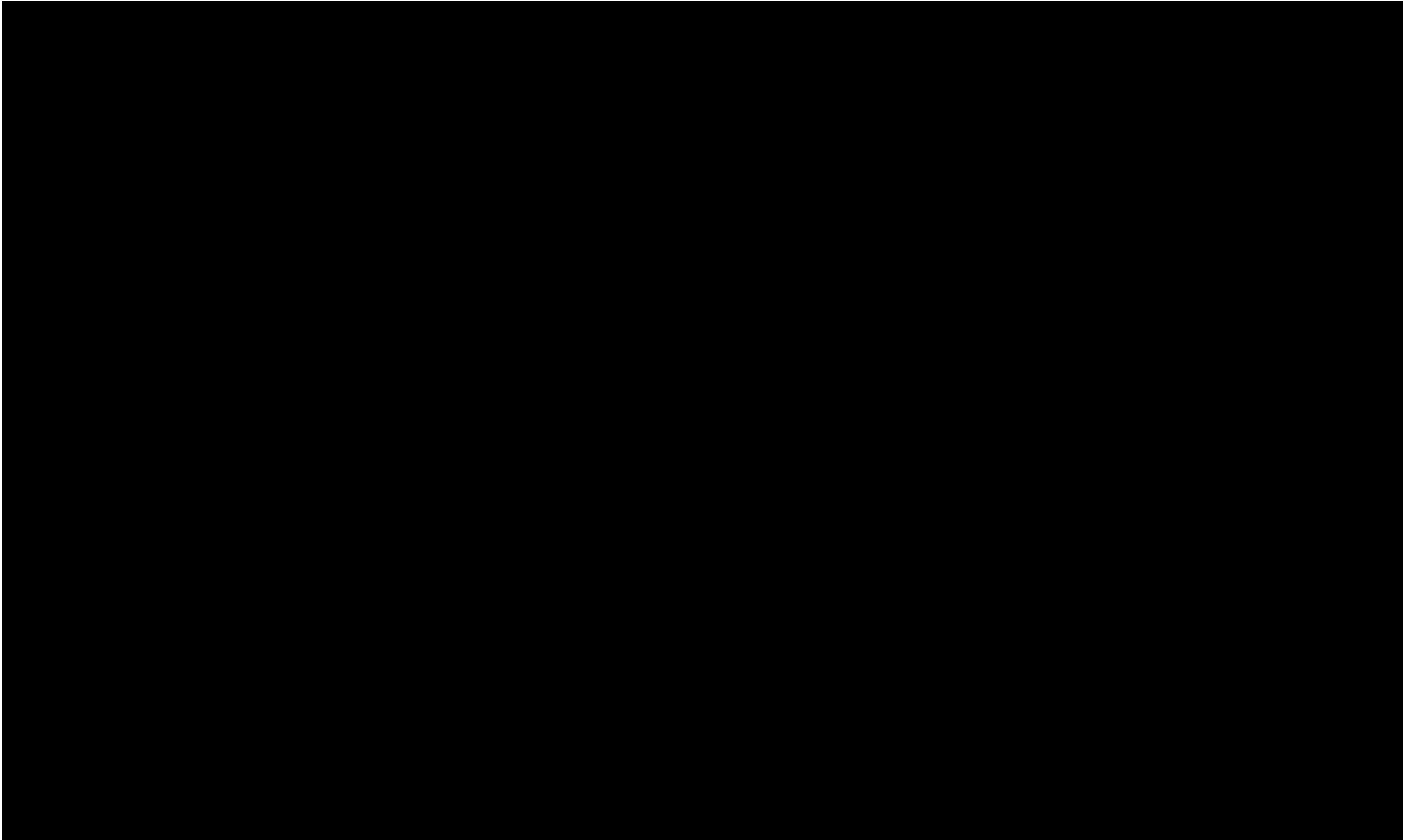






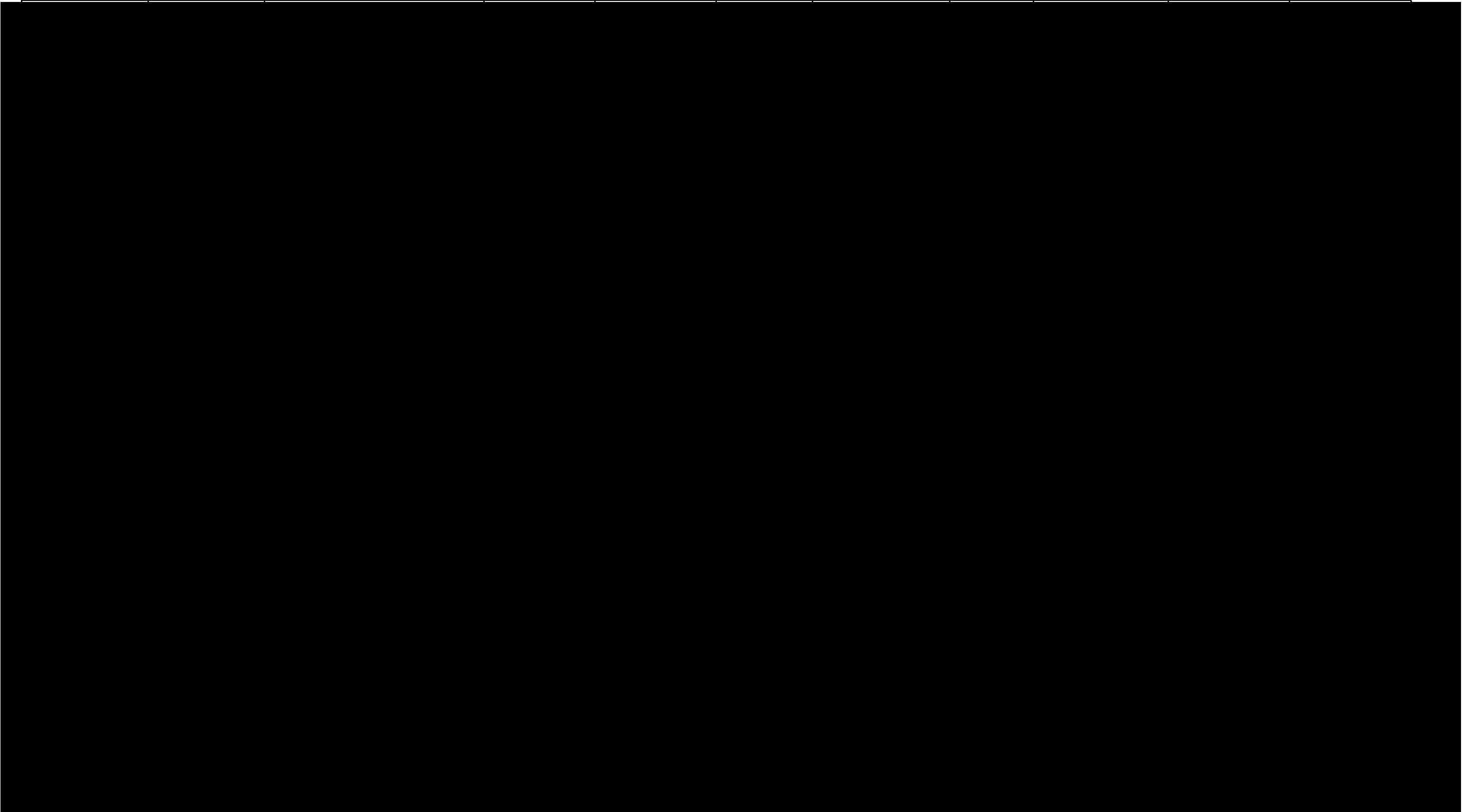






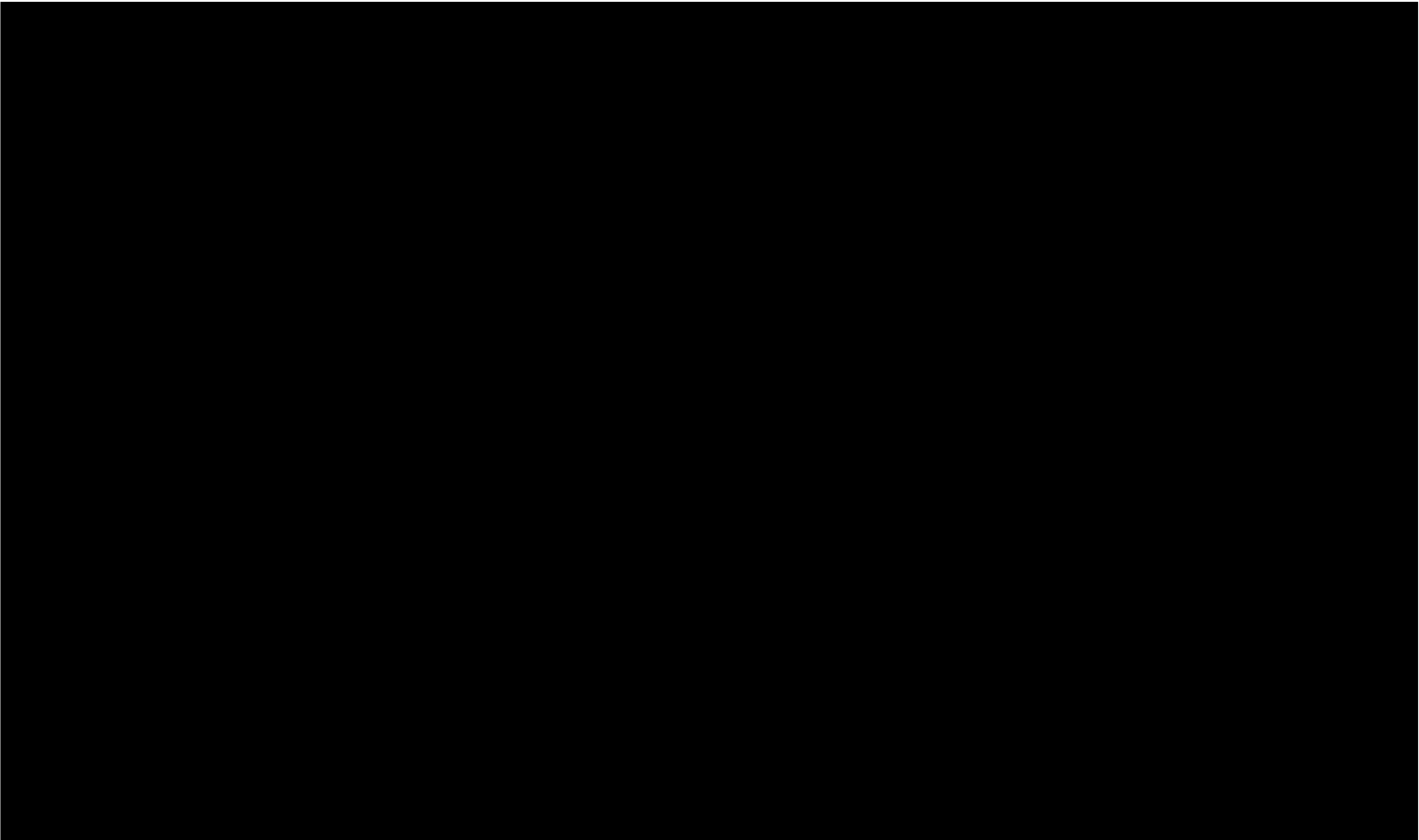
Activity	Representative Vessel Type	Engine Type	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit	Operating Days in WDA	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
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Offshore Substation Installation (OSS)

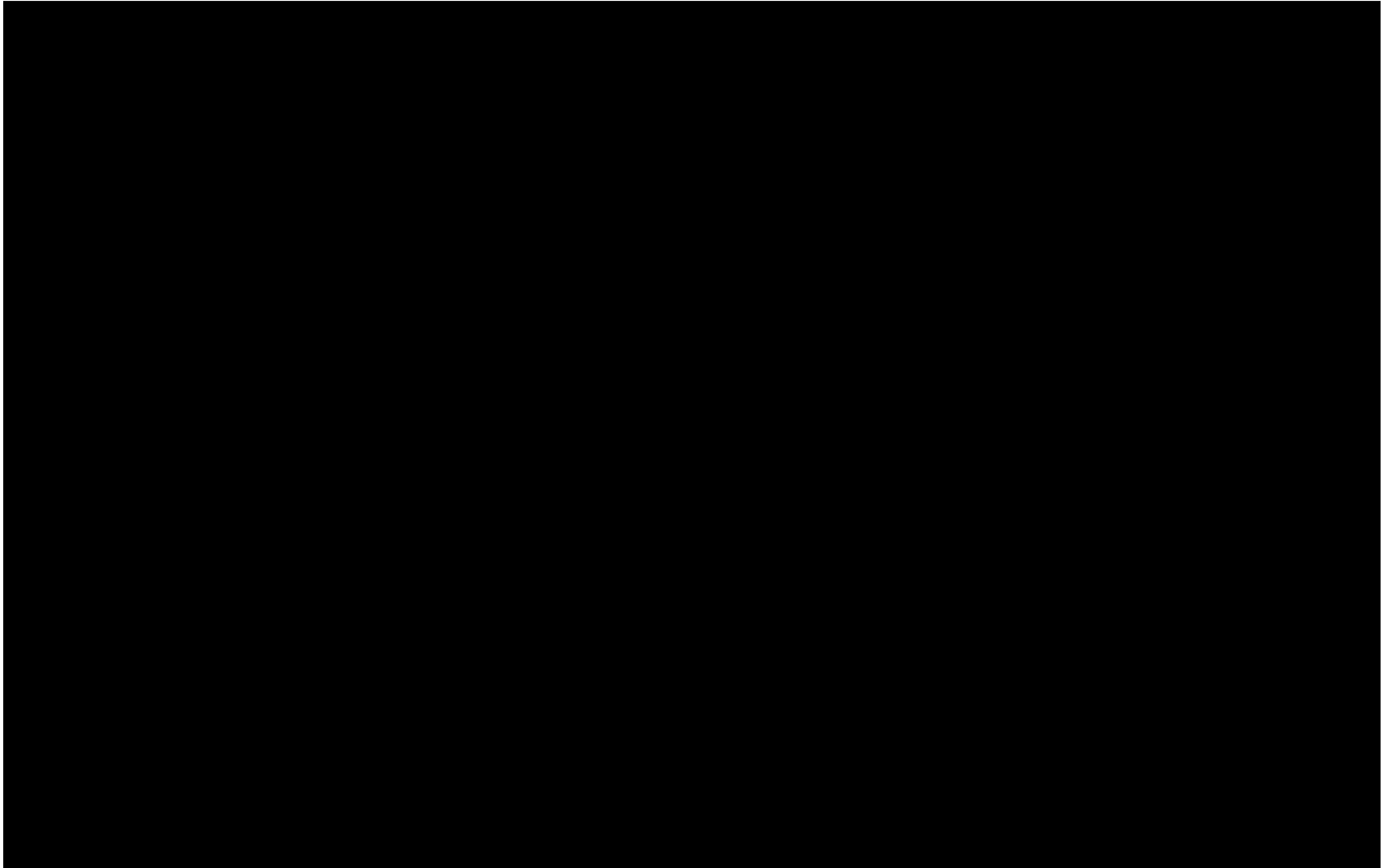


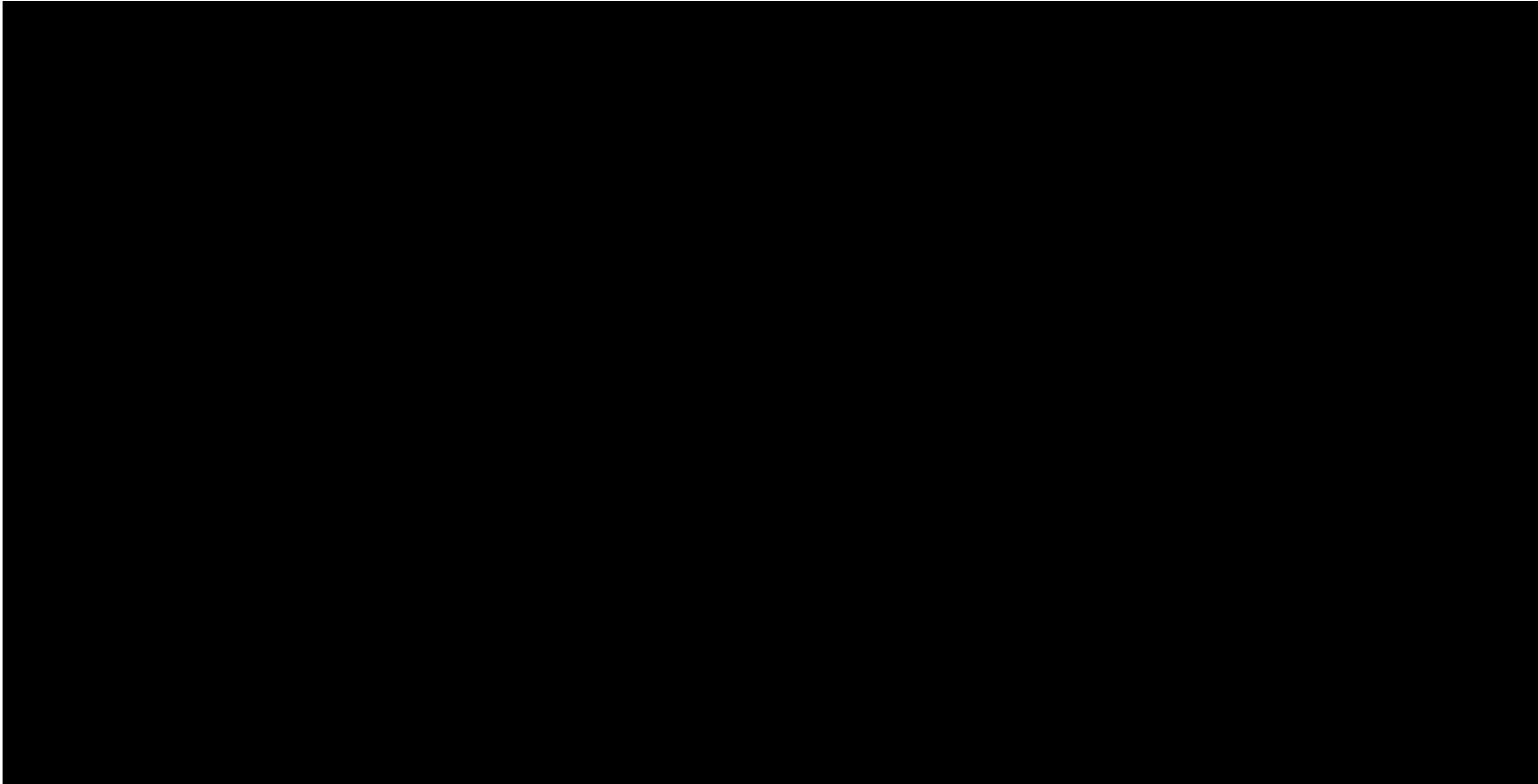
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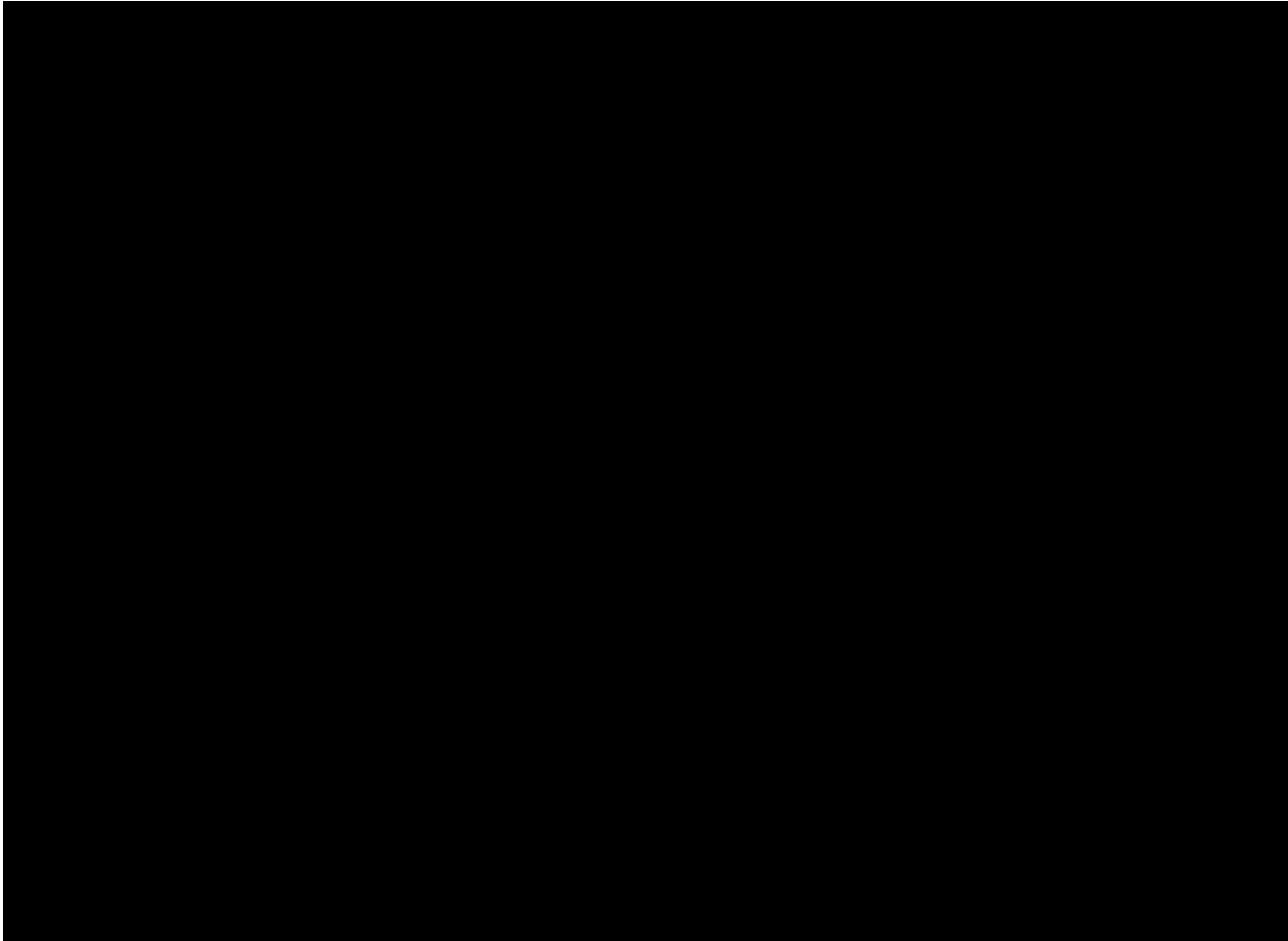


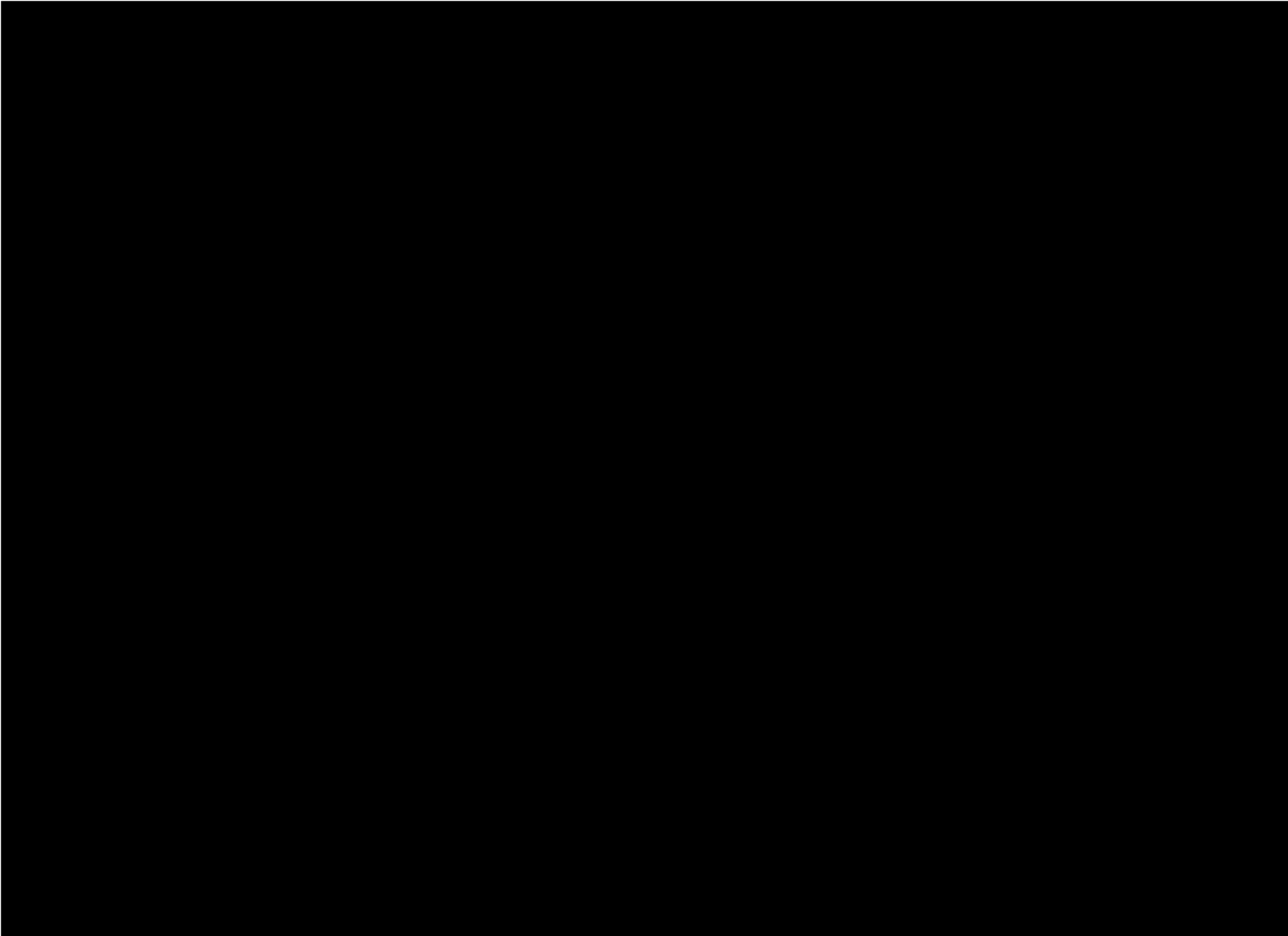


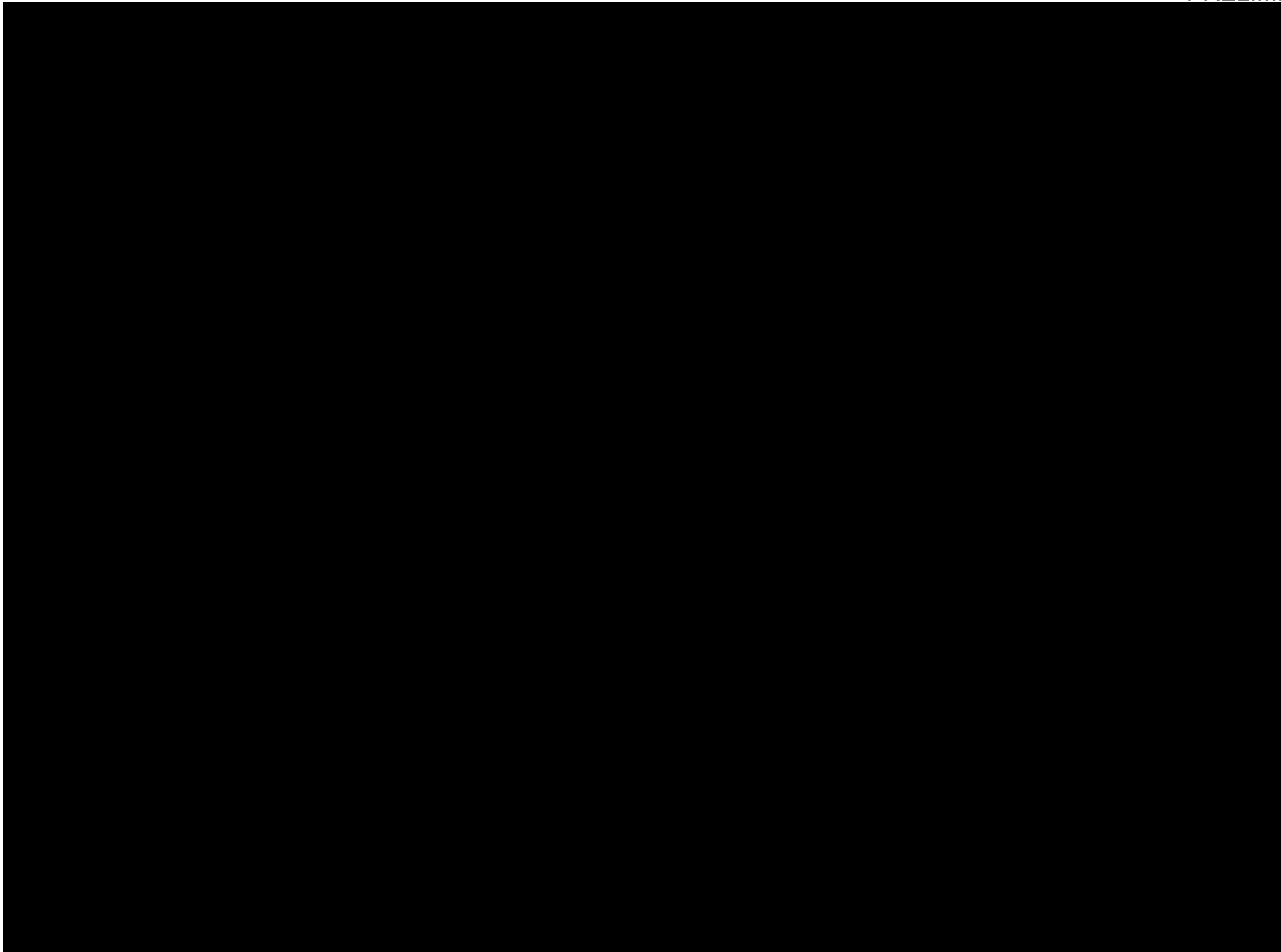


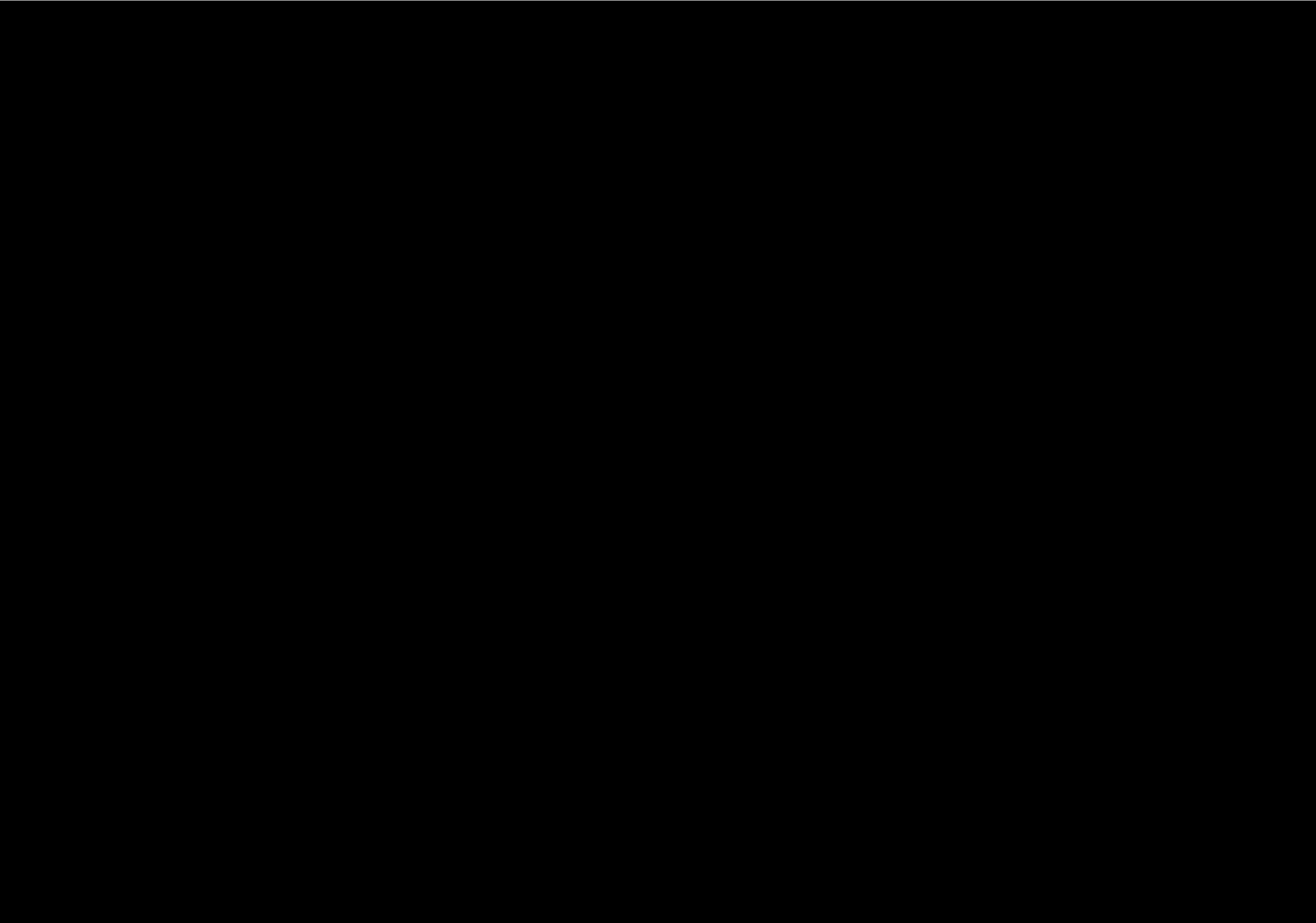




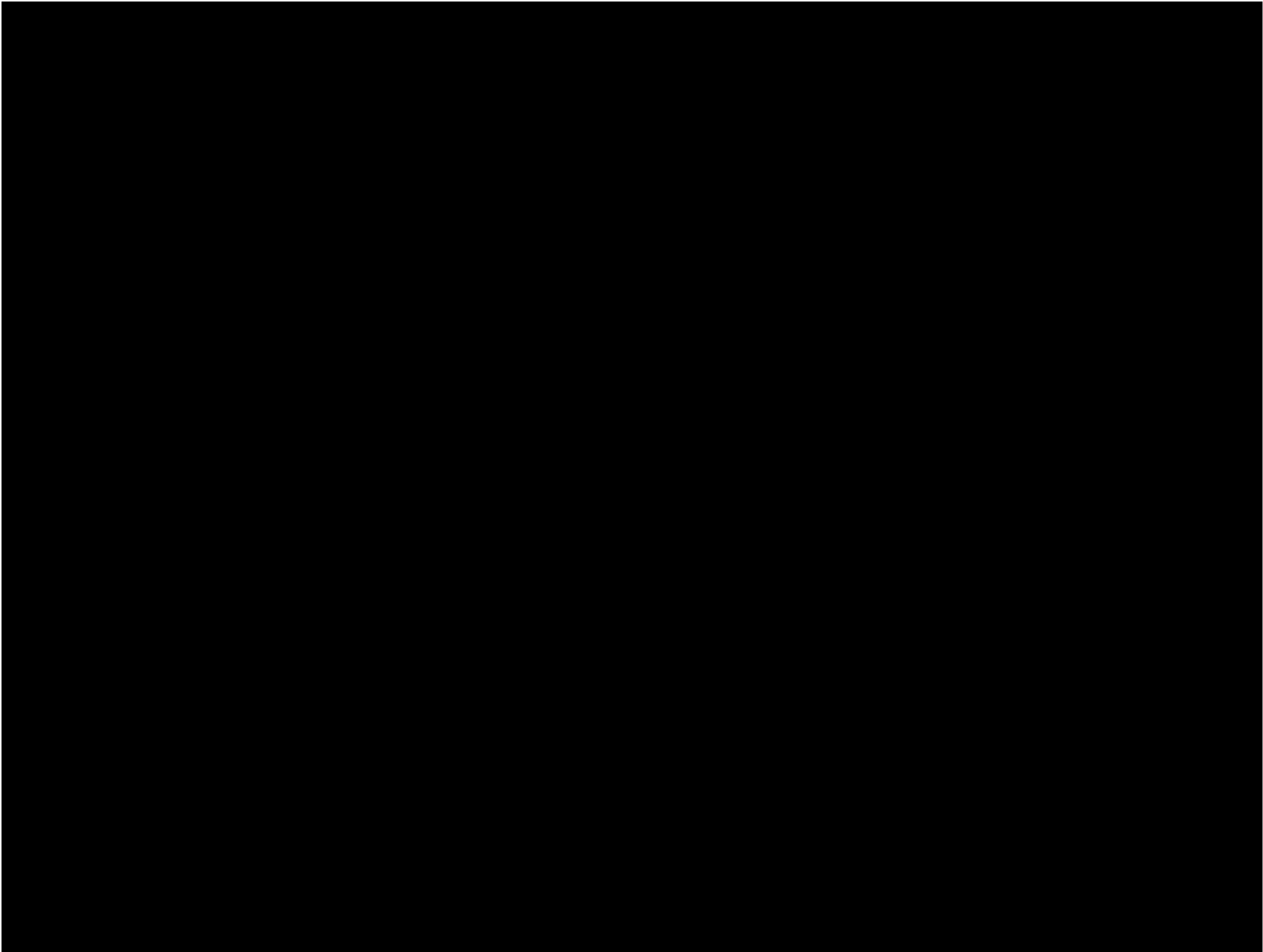


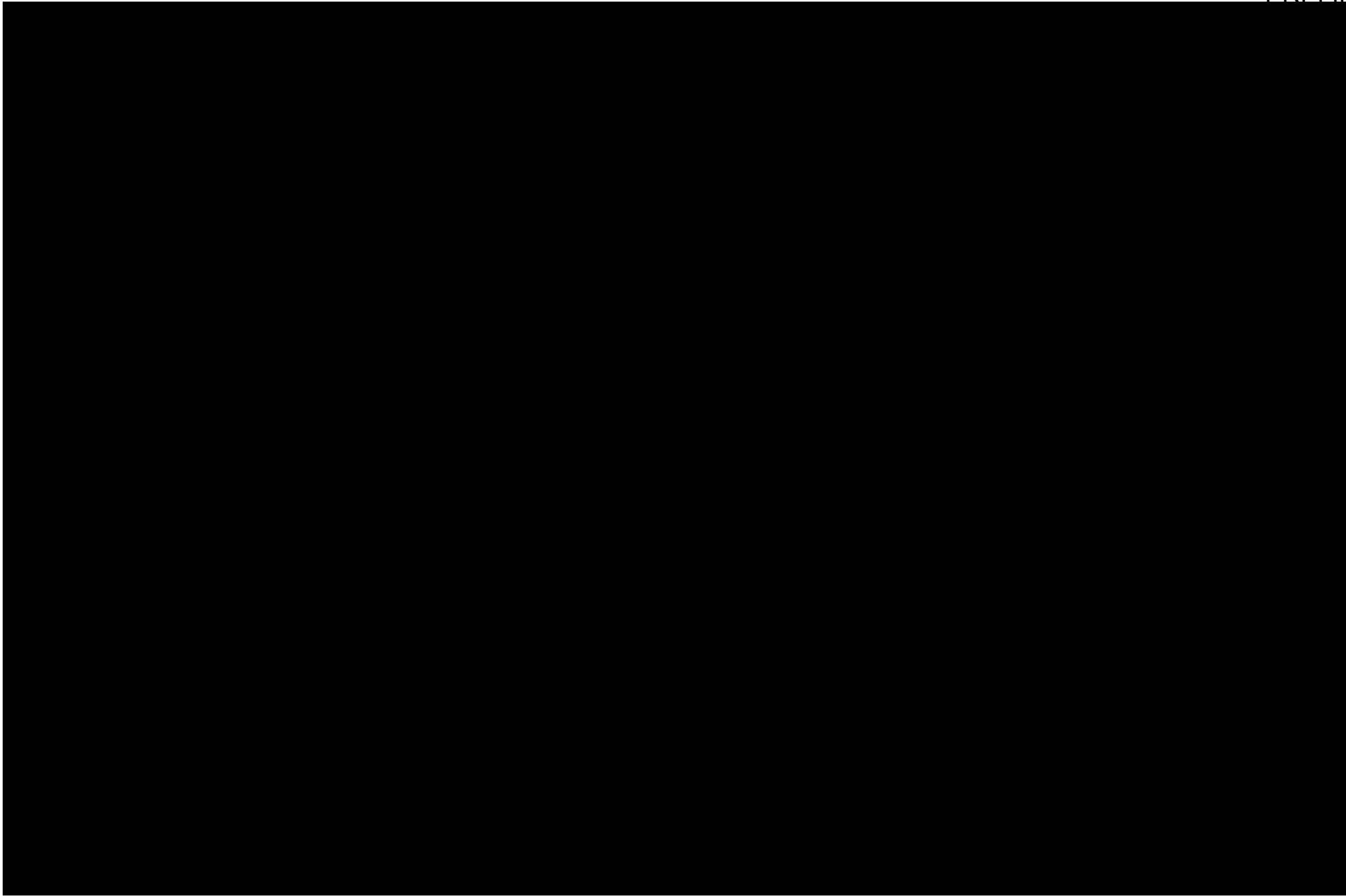


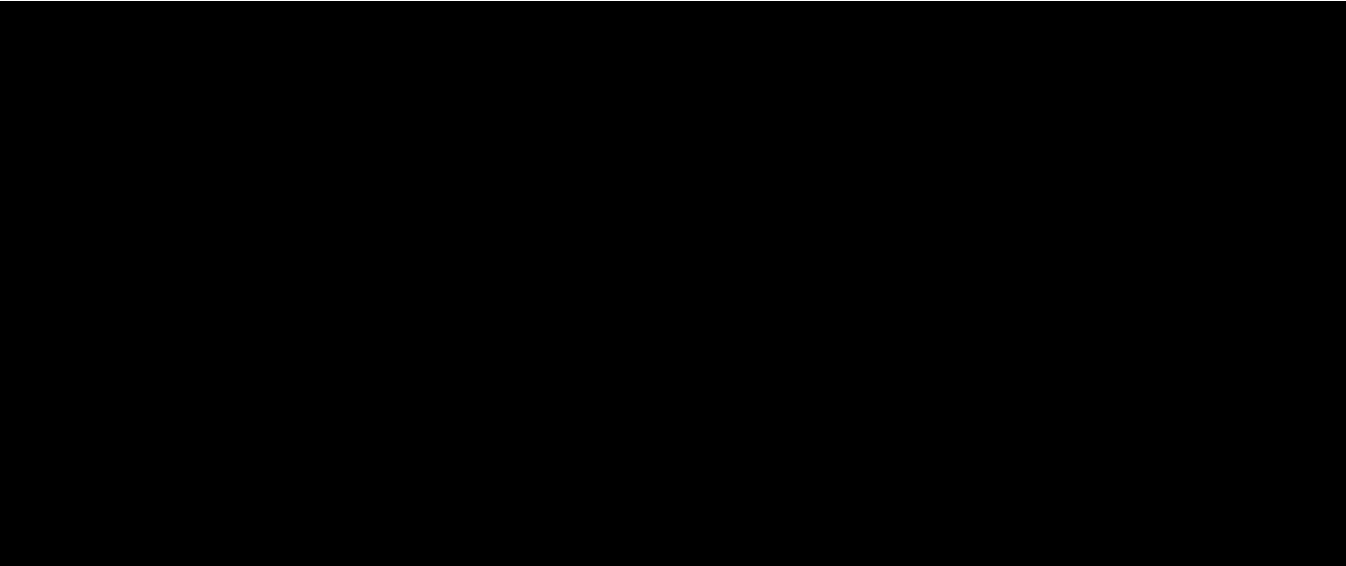


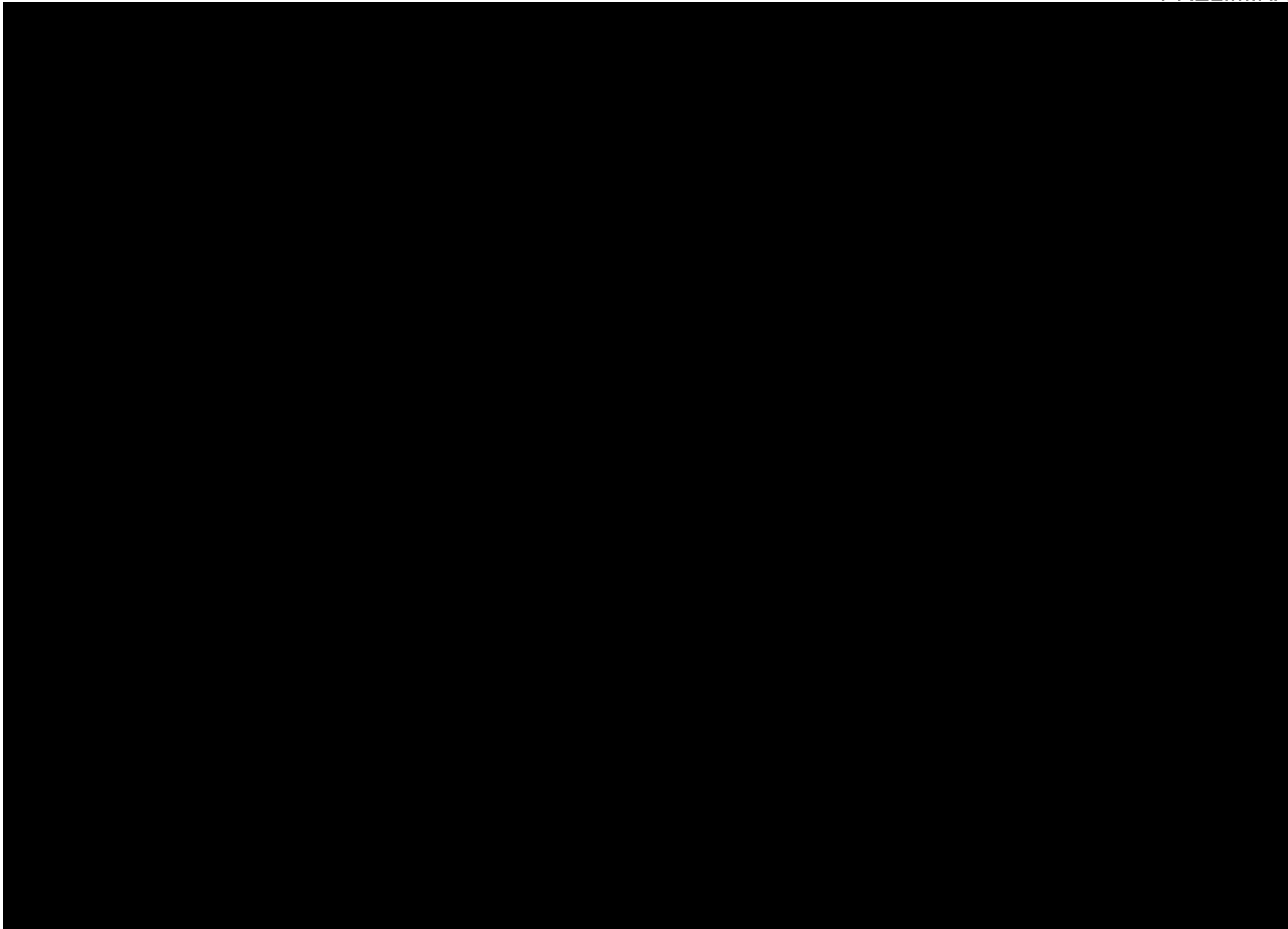


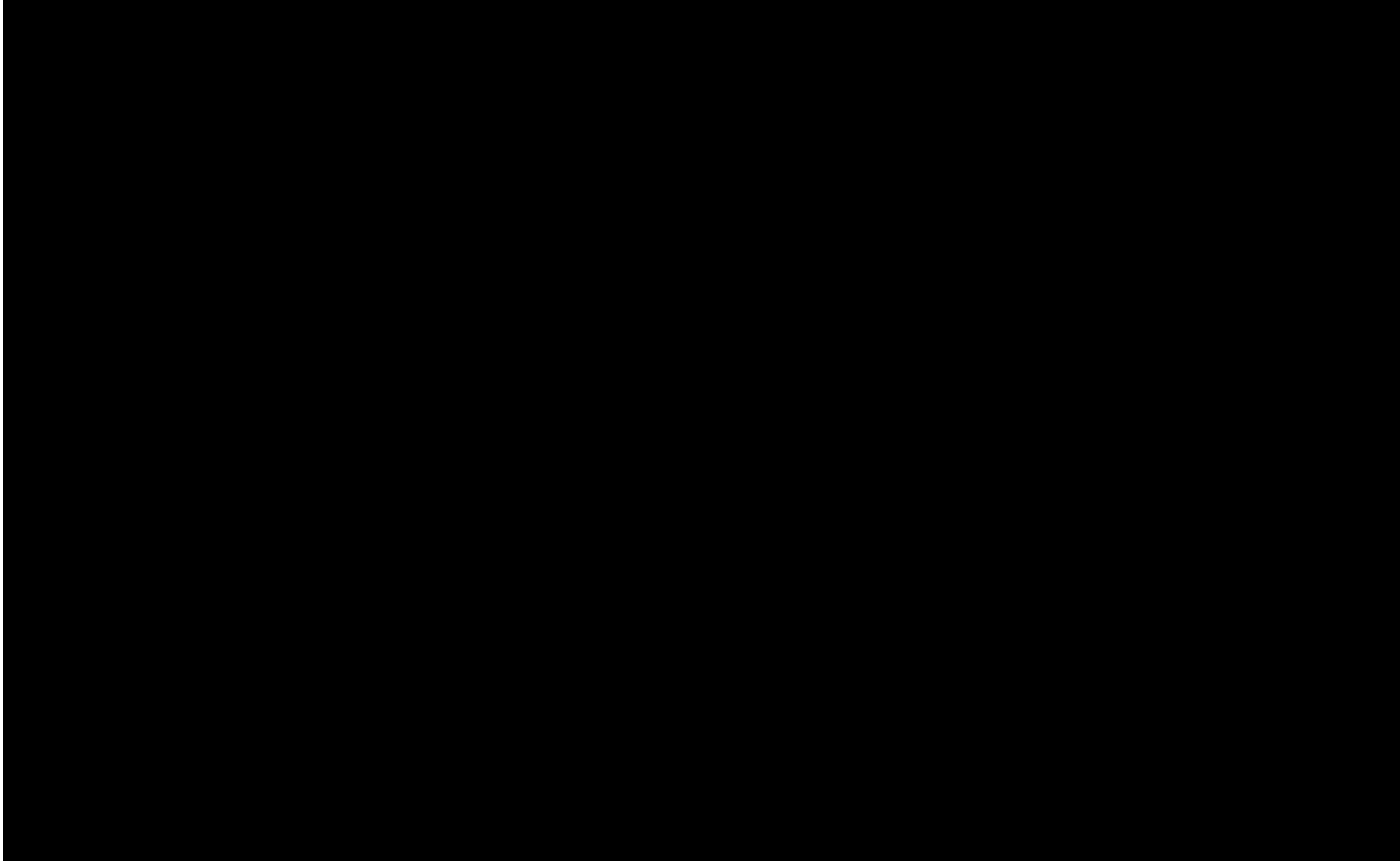


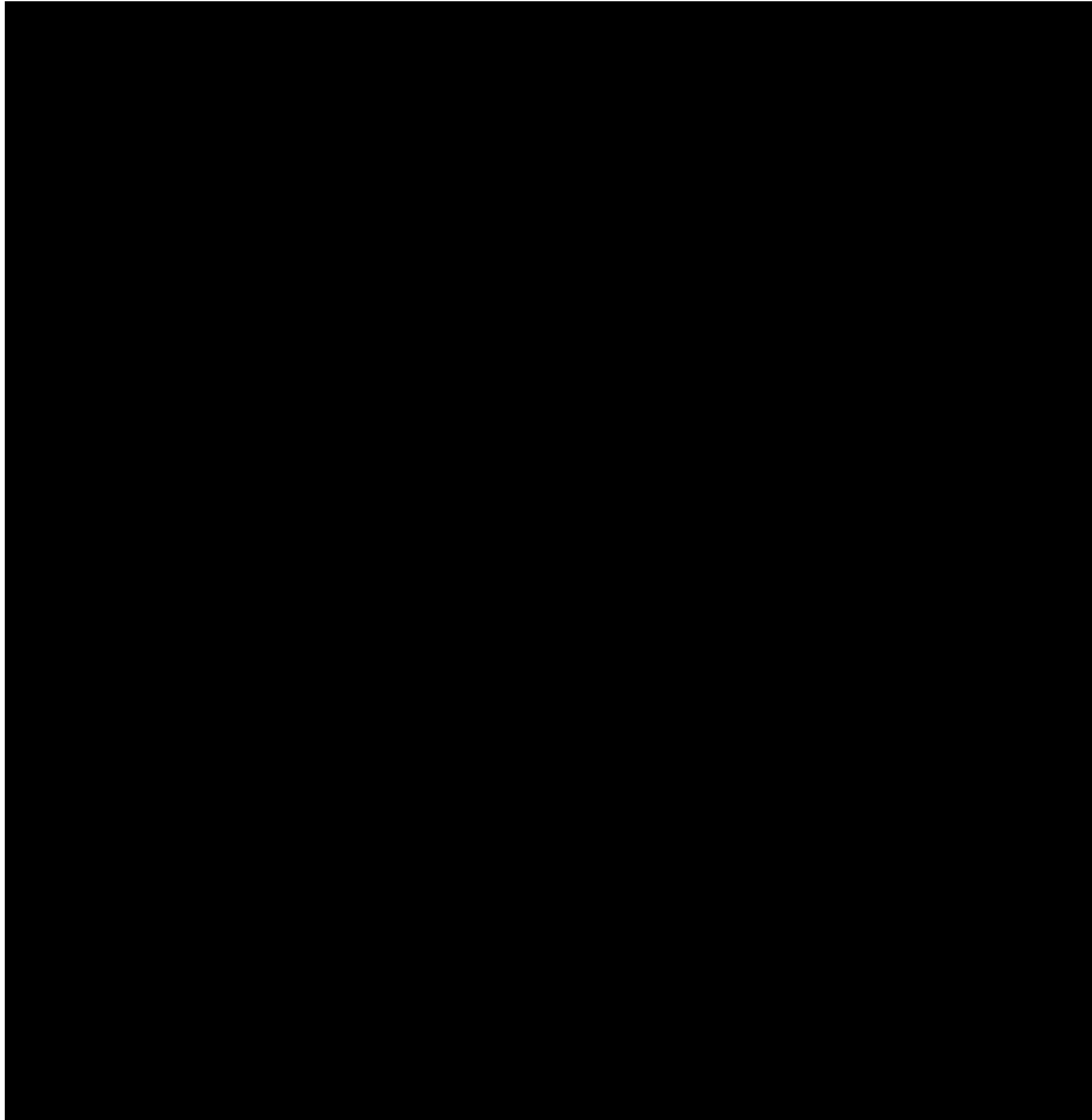




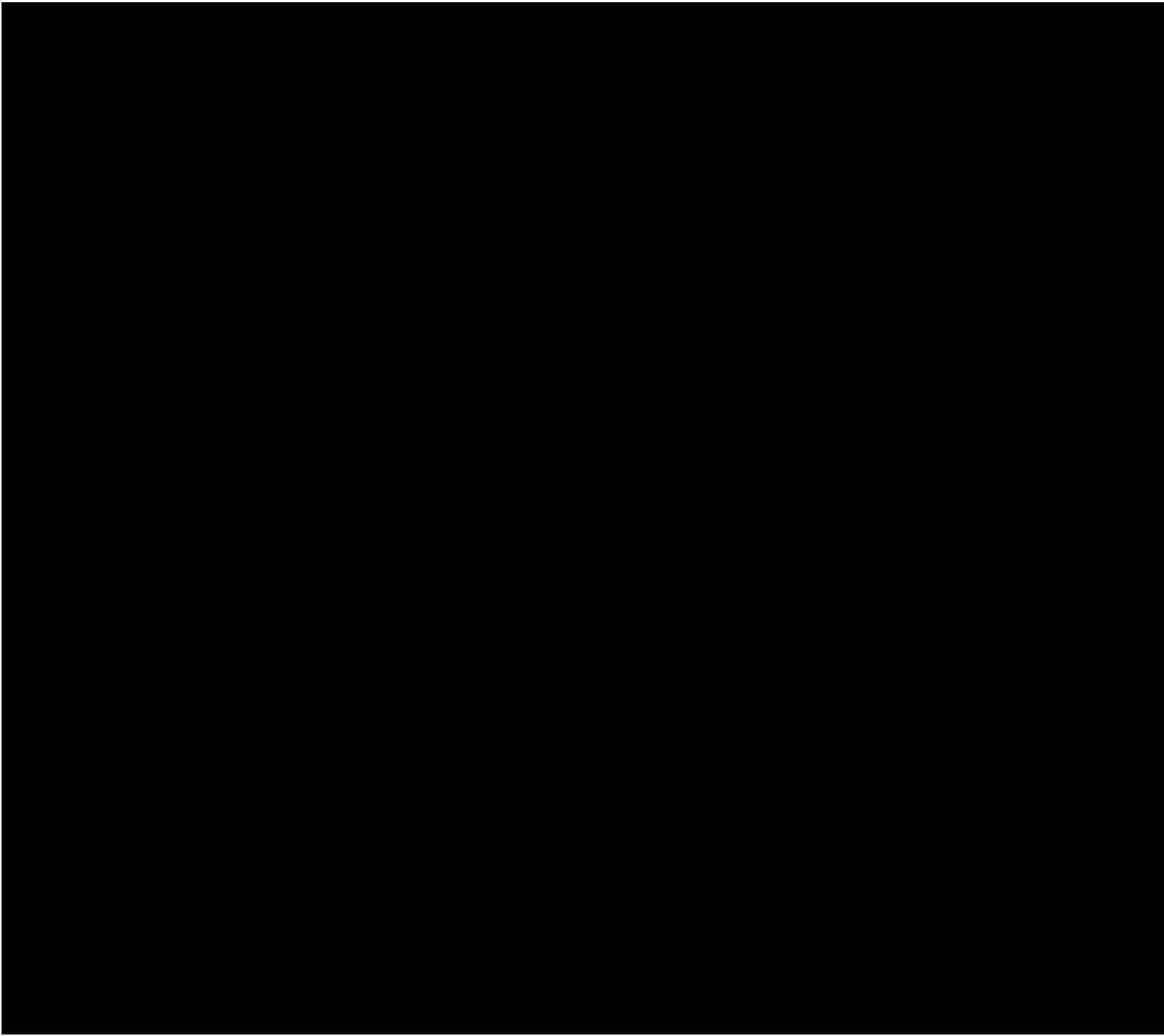




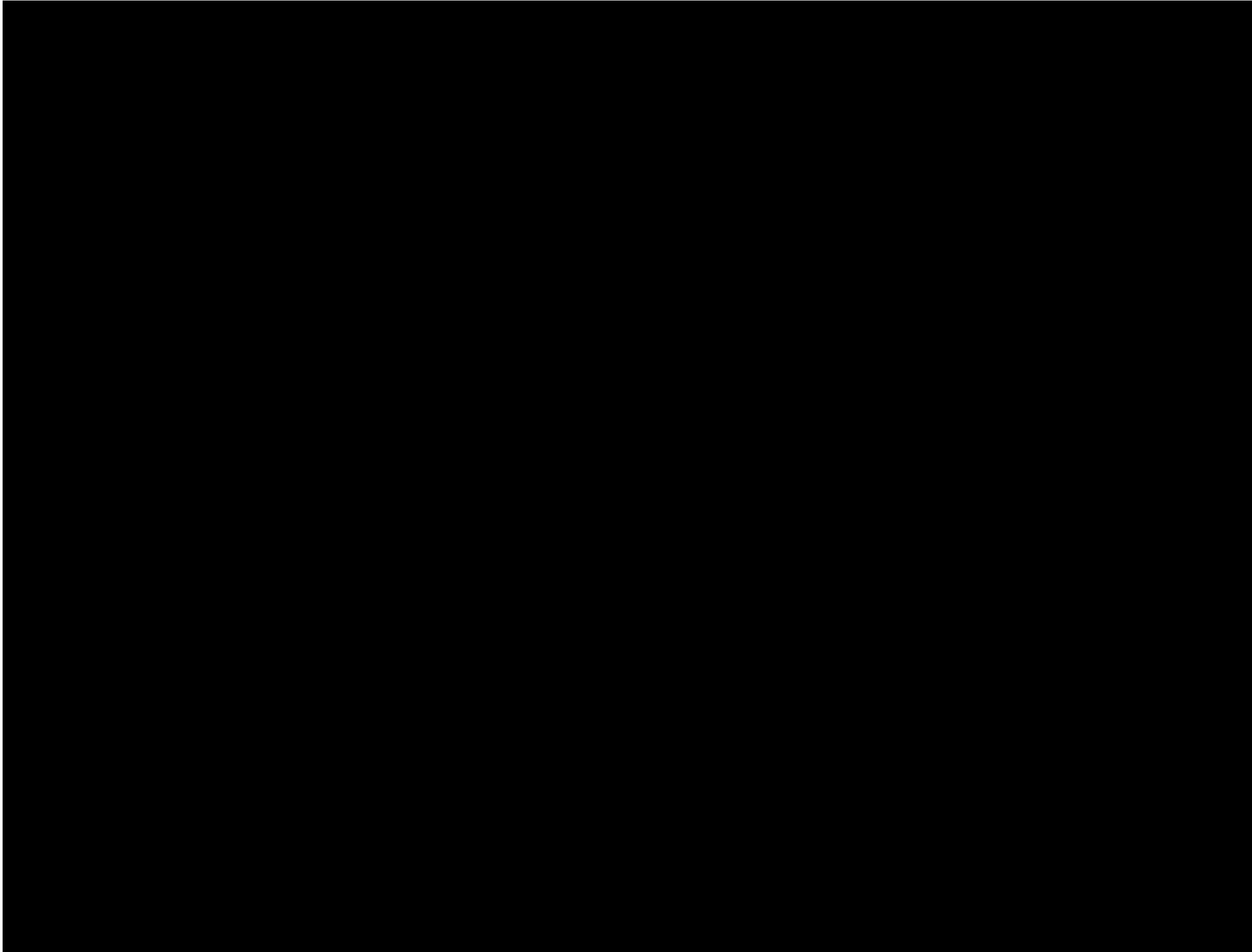


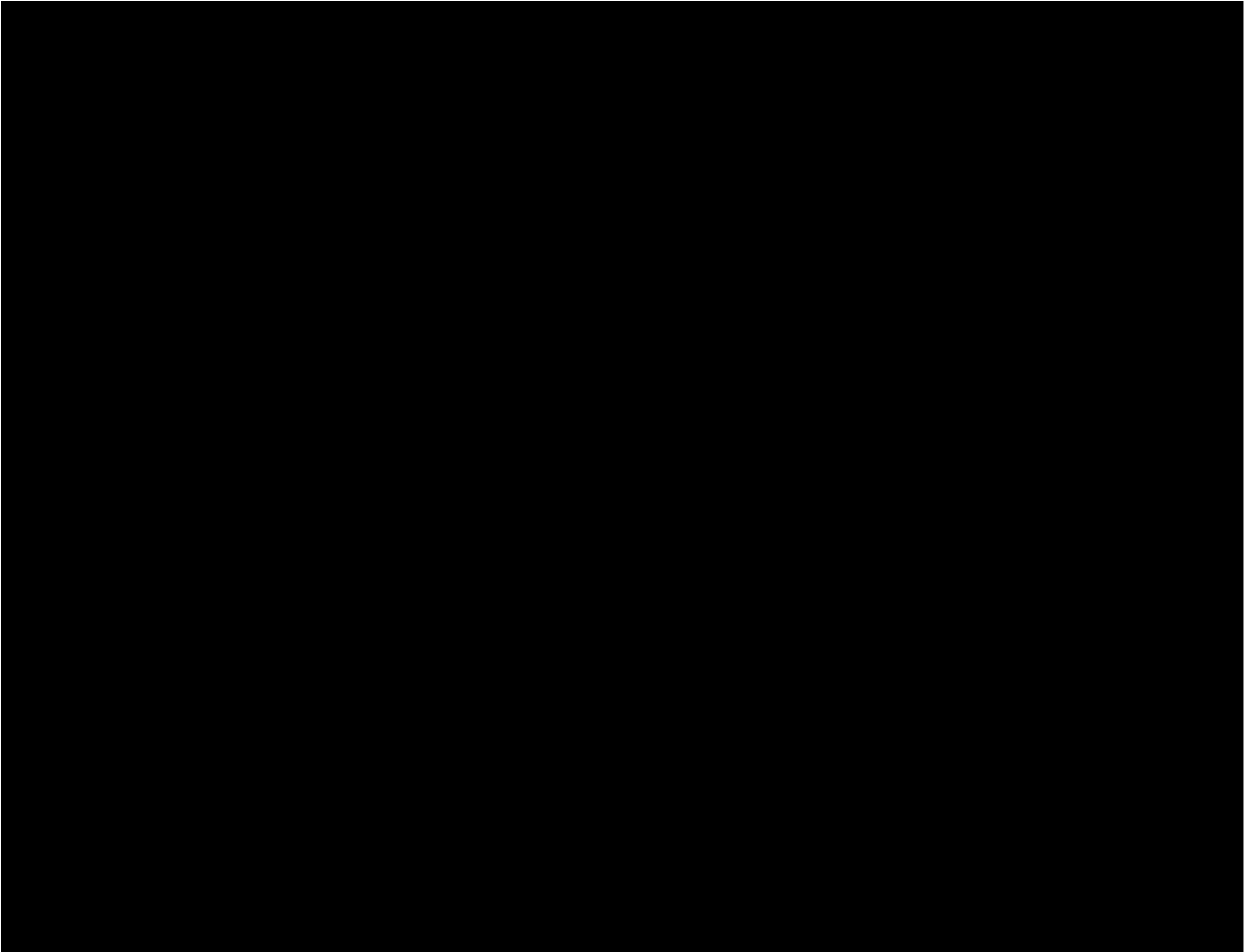


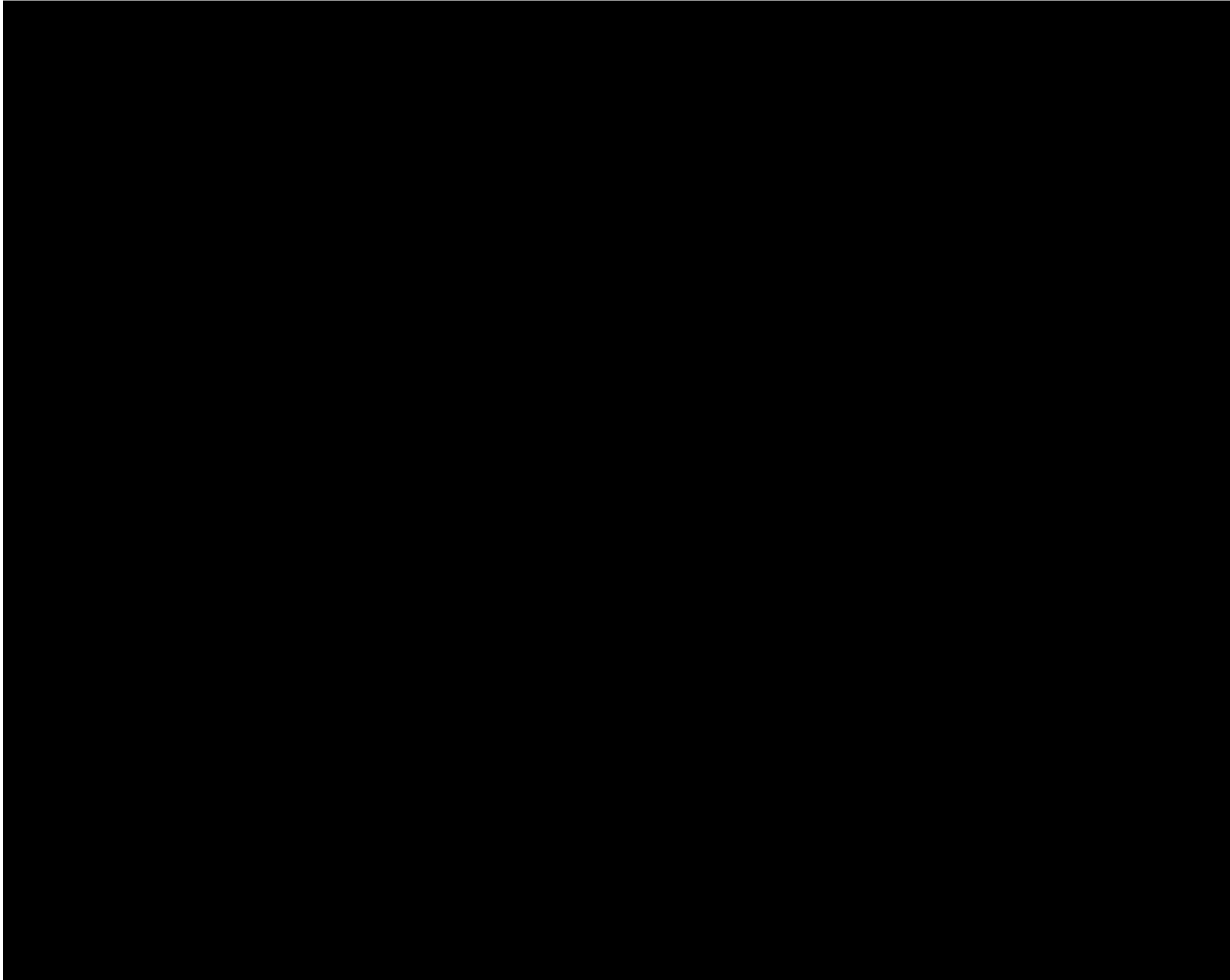


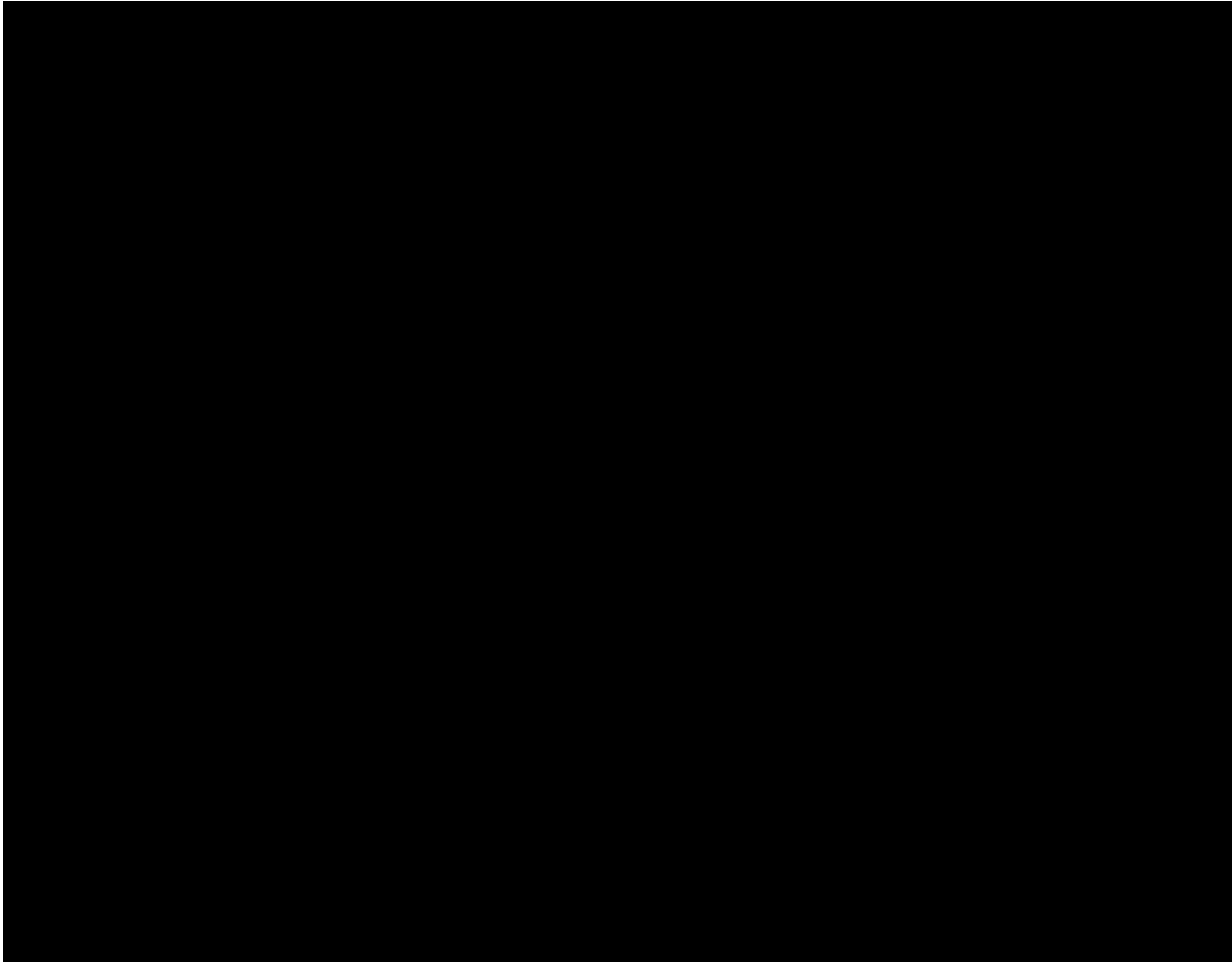


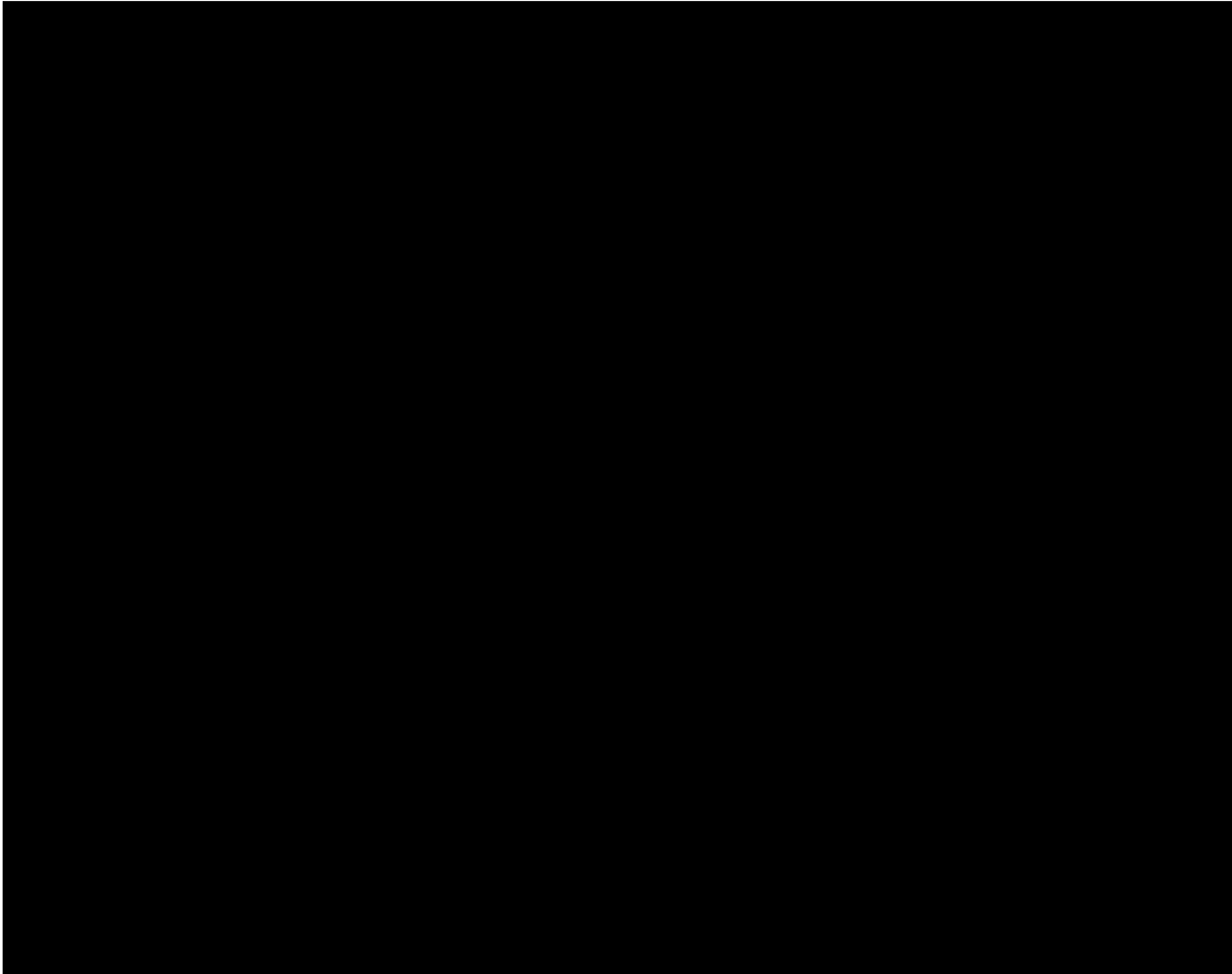


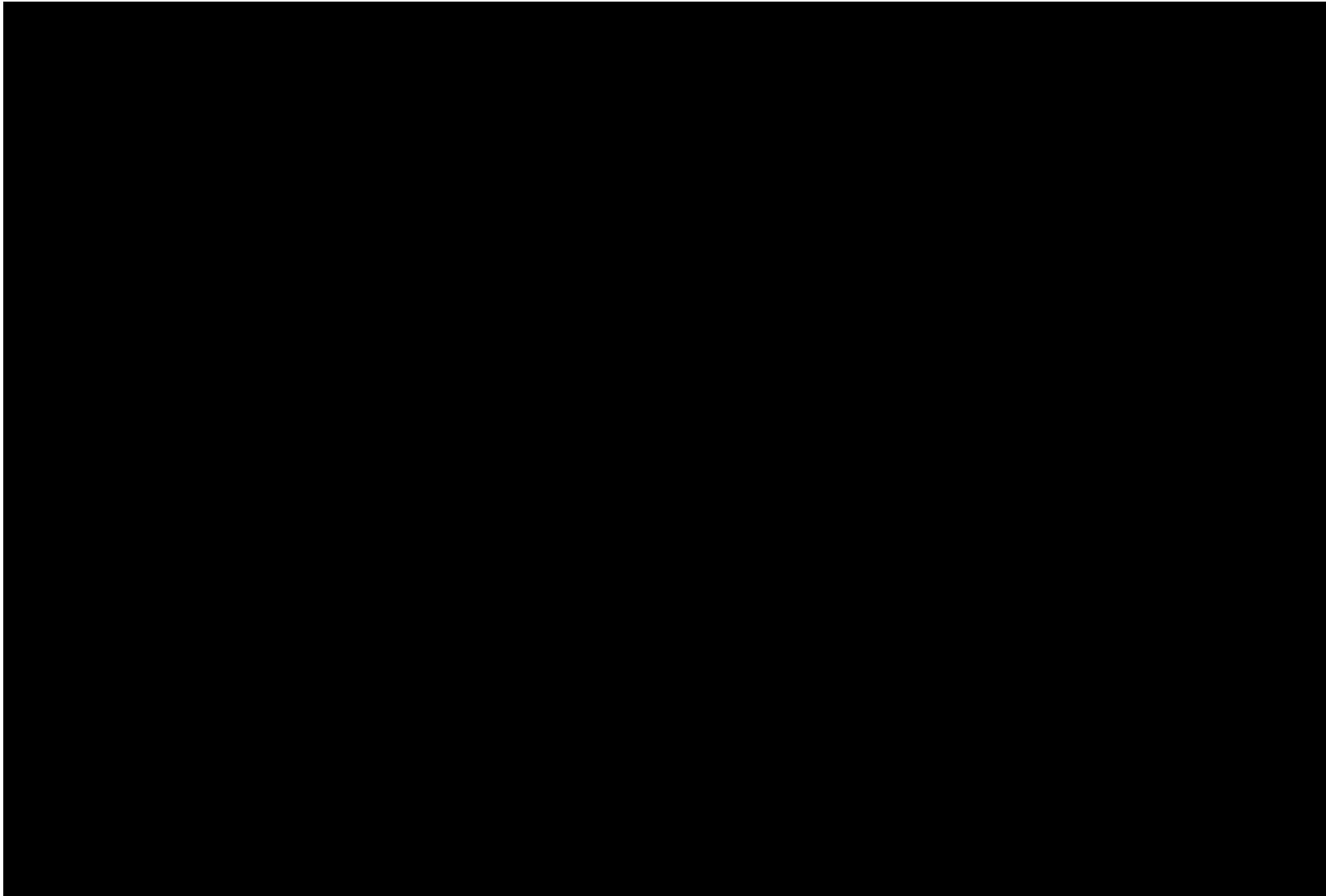


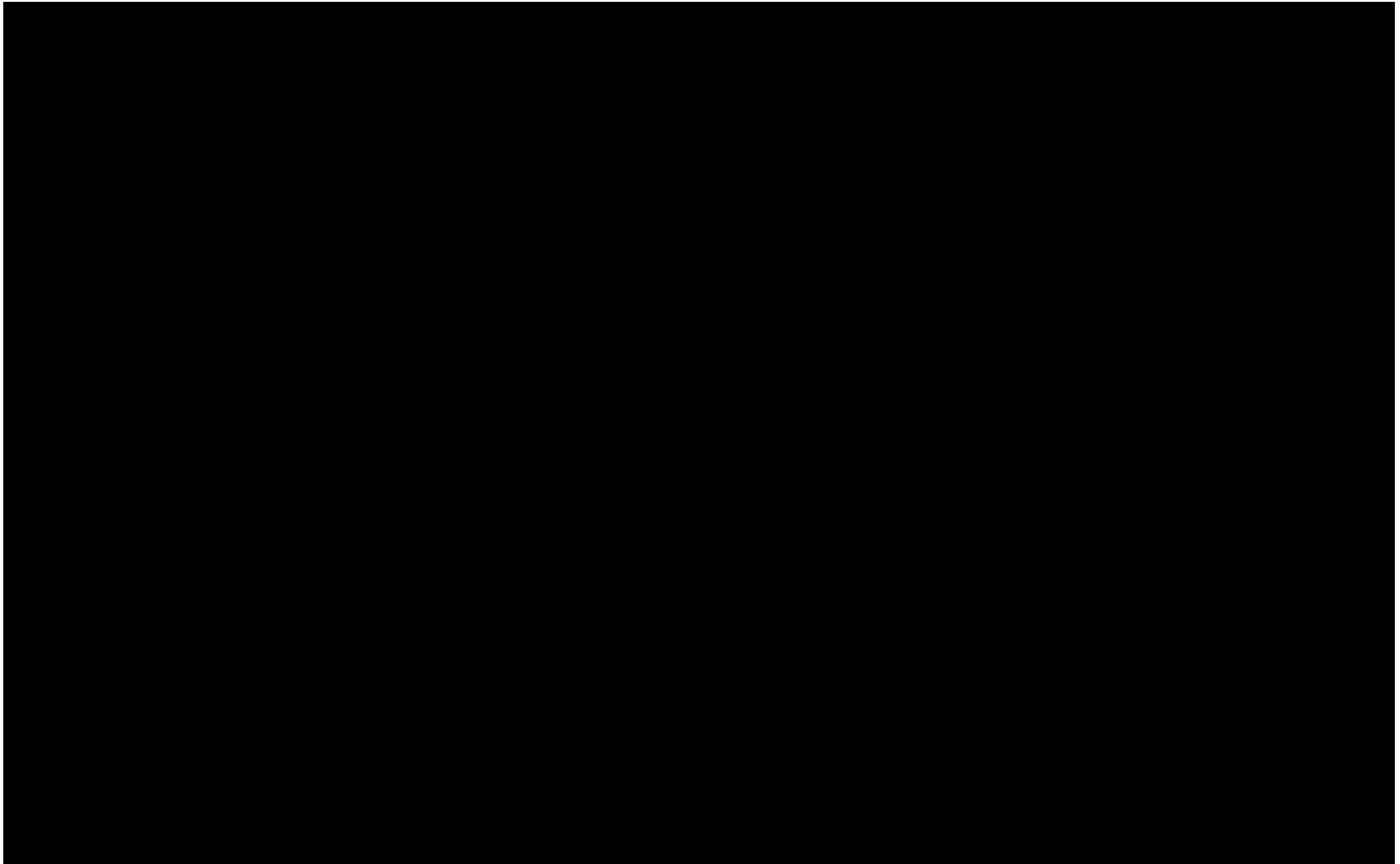


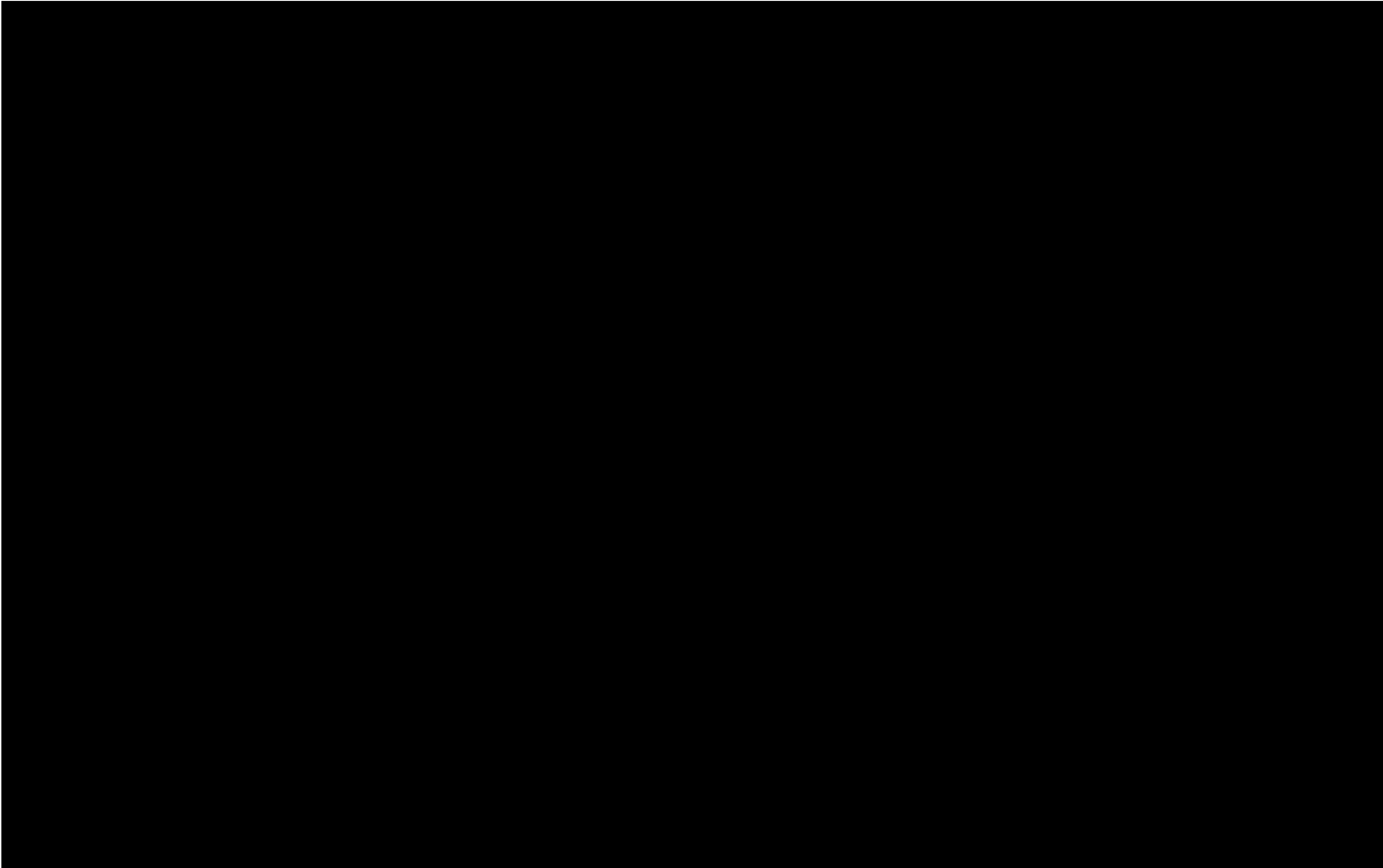




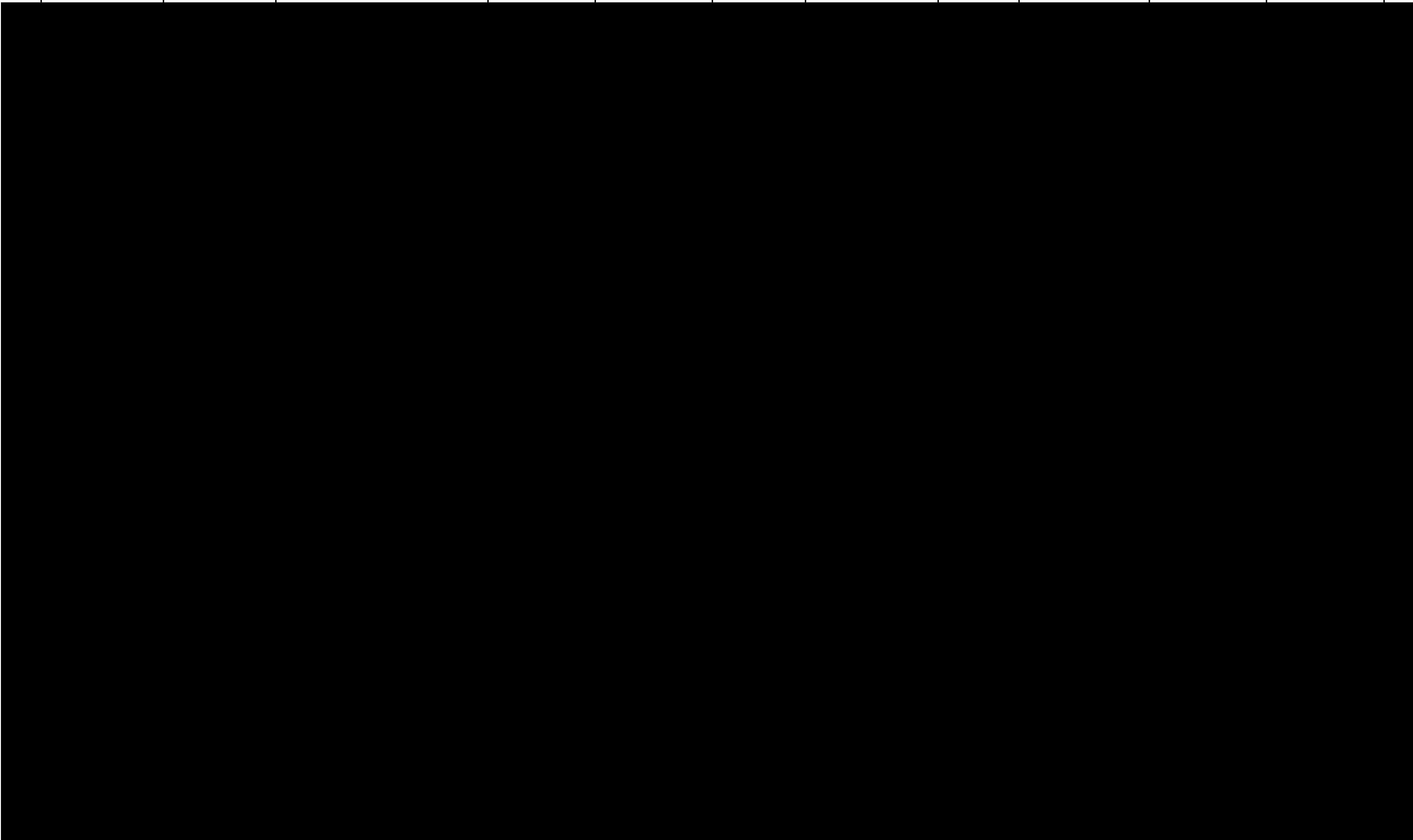


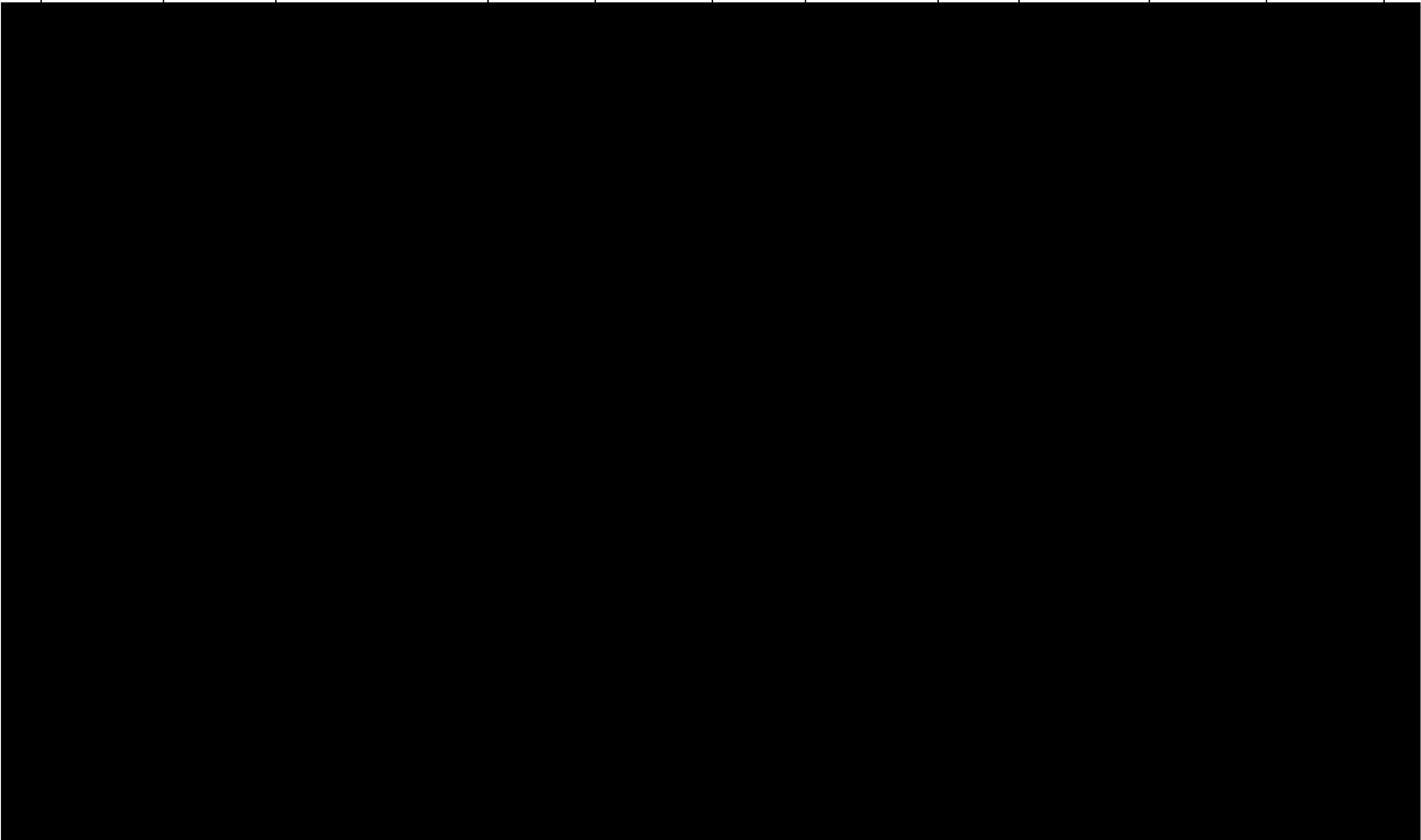


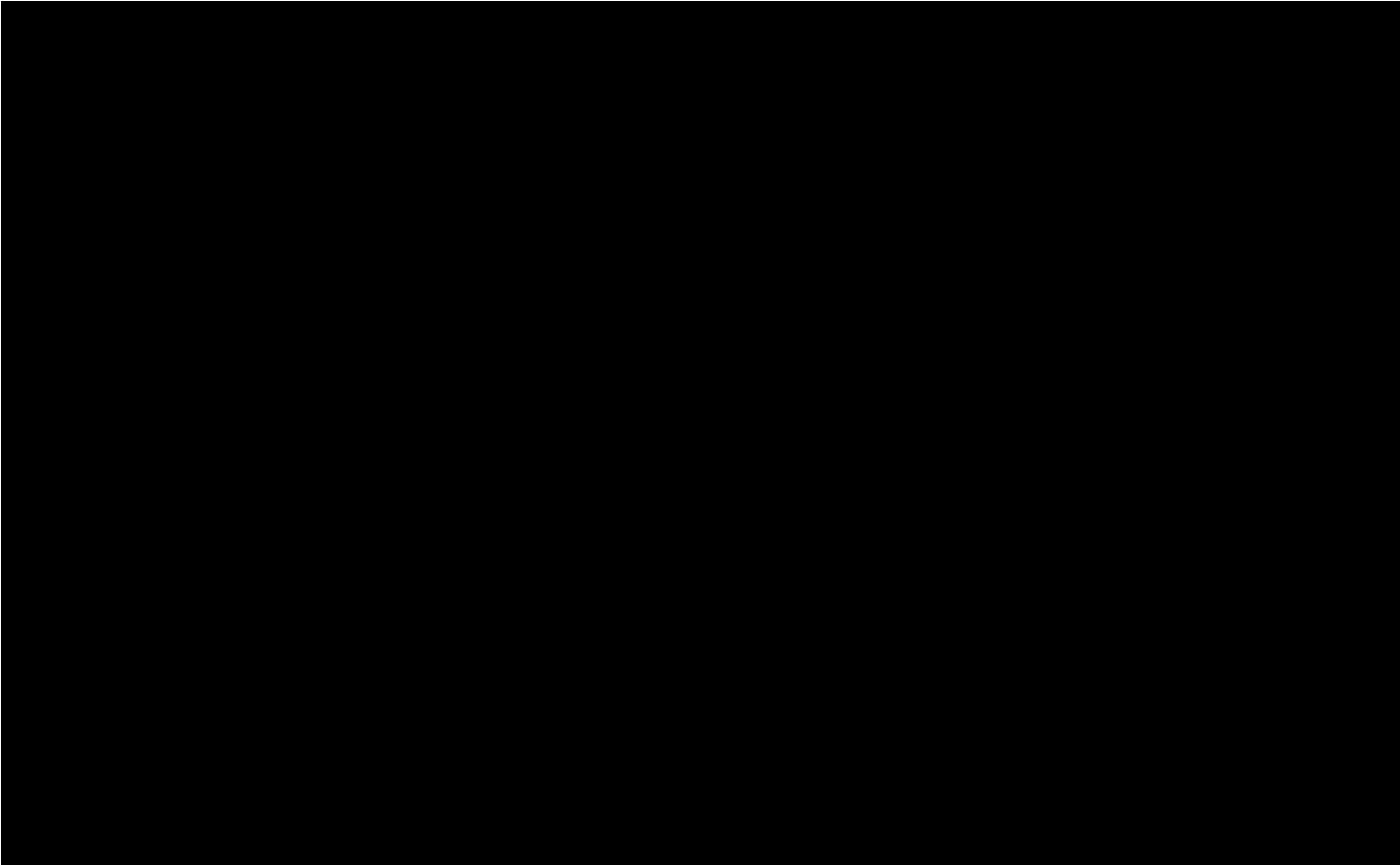


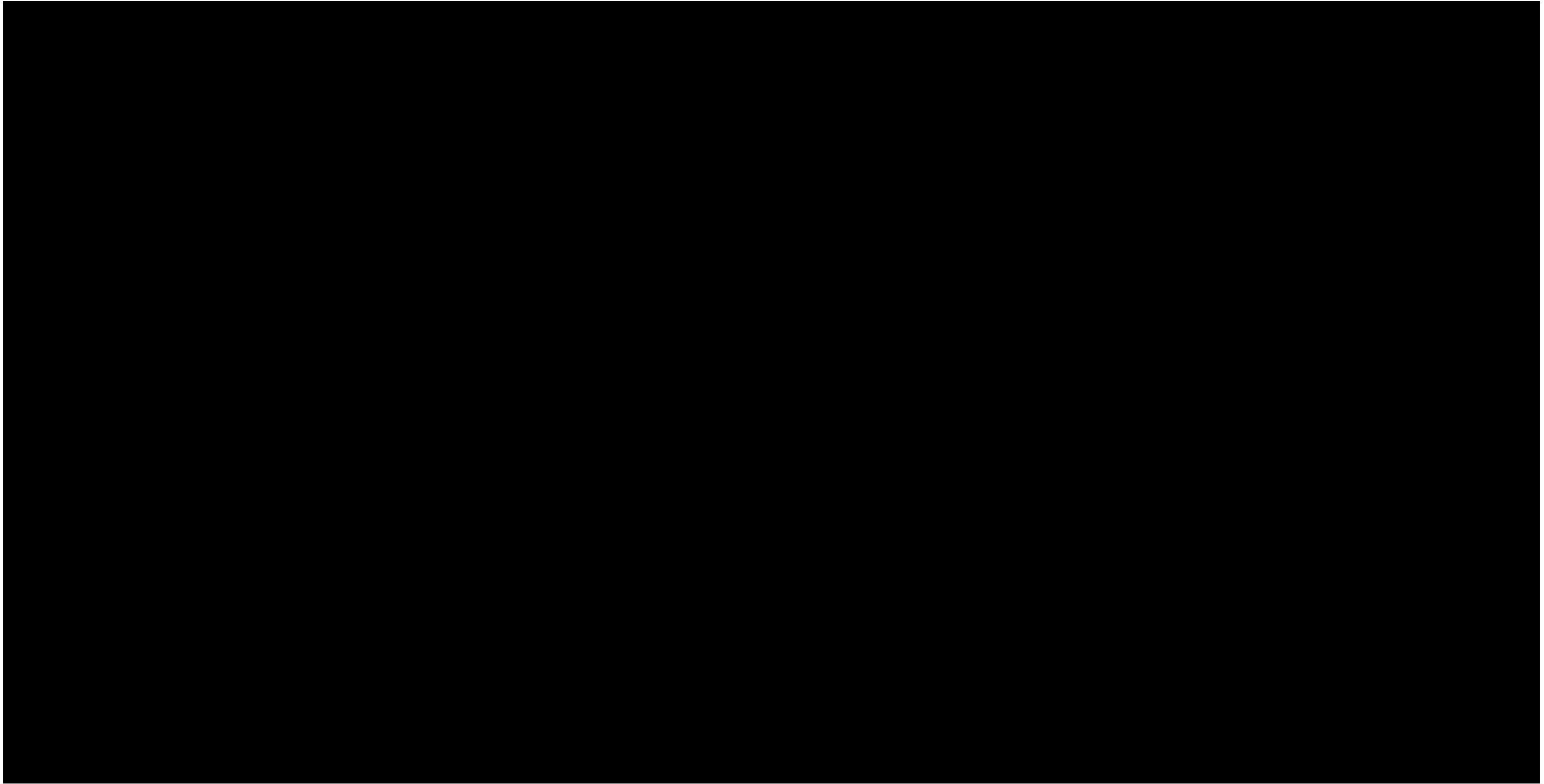


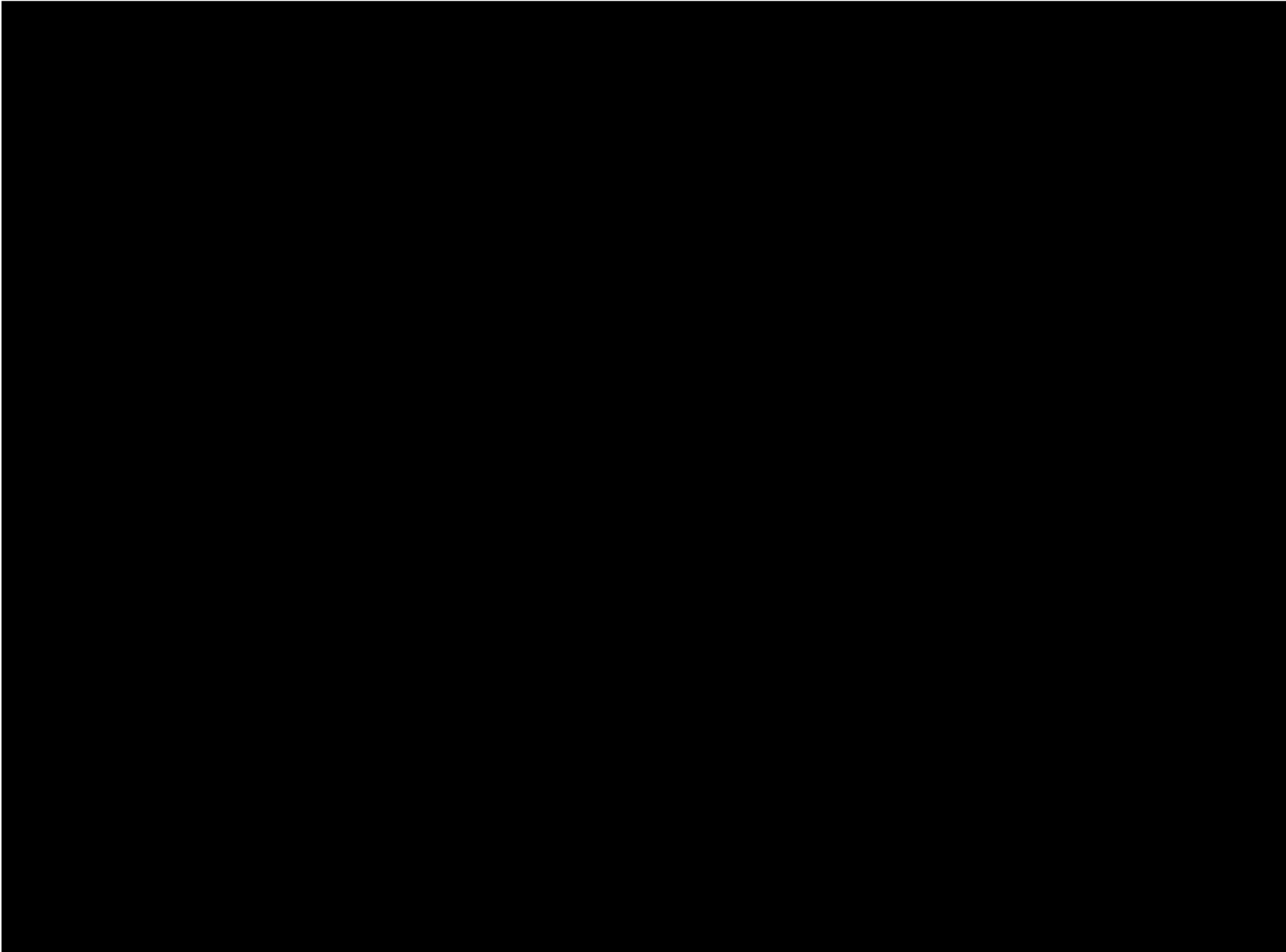


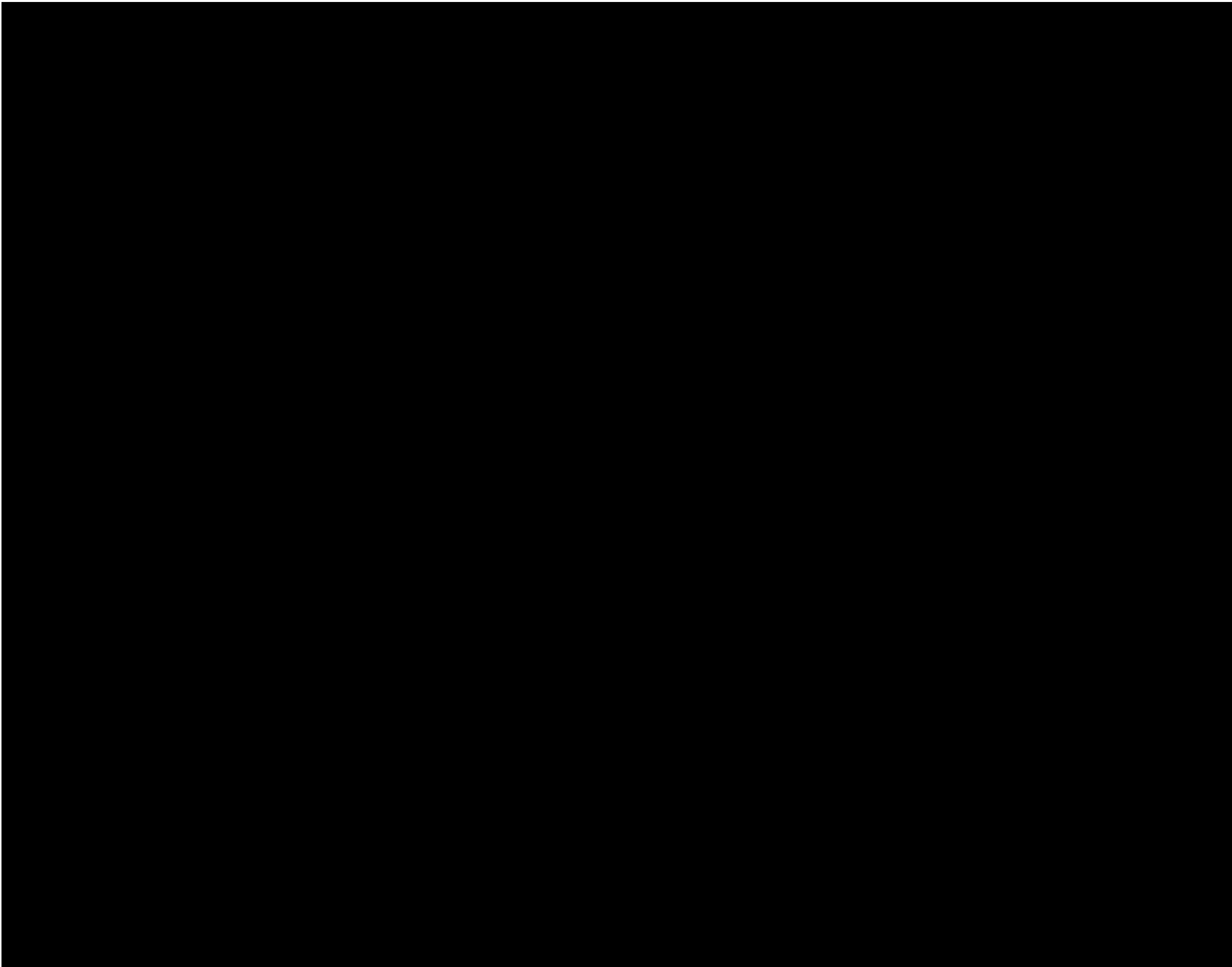


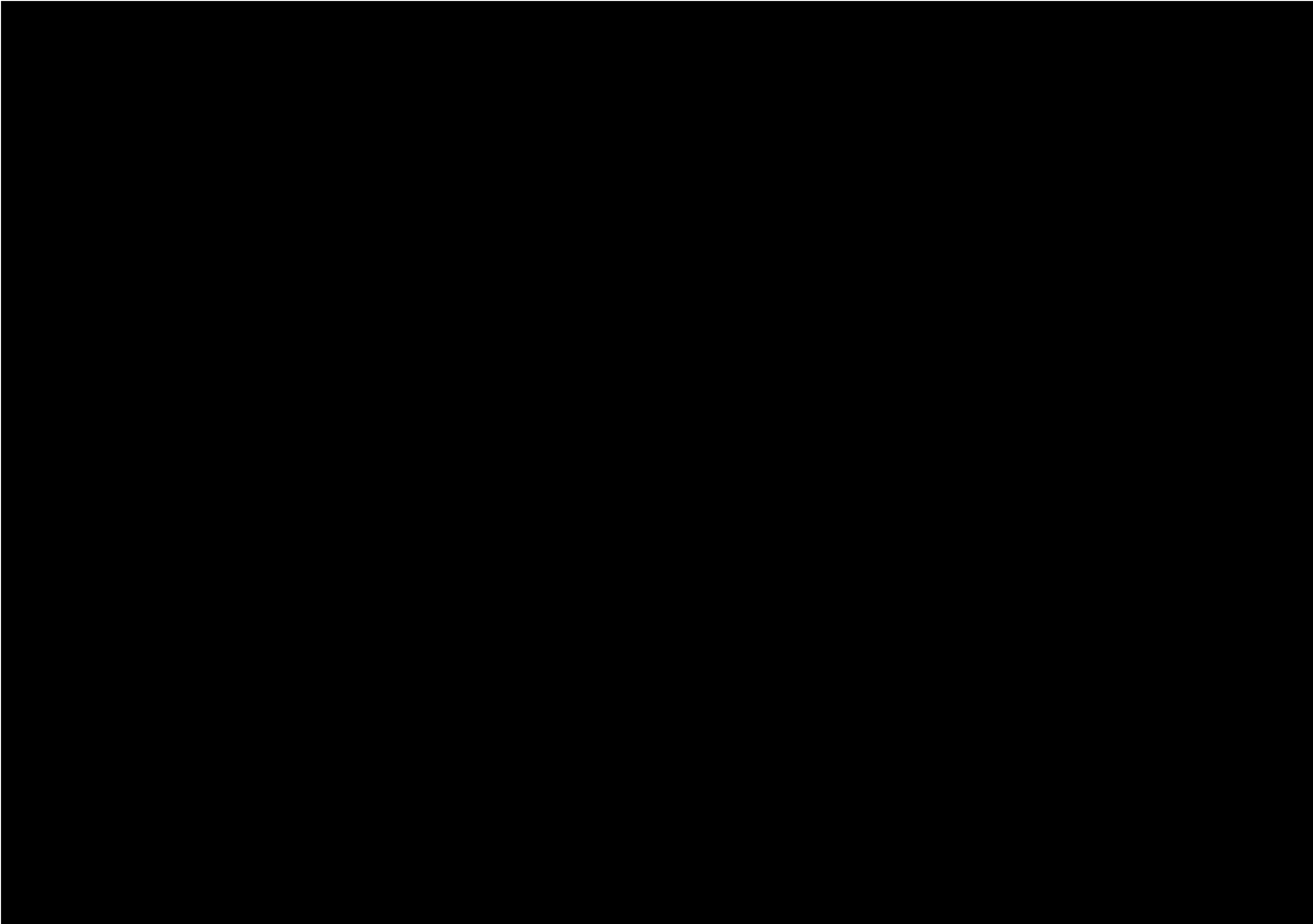


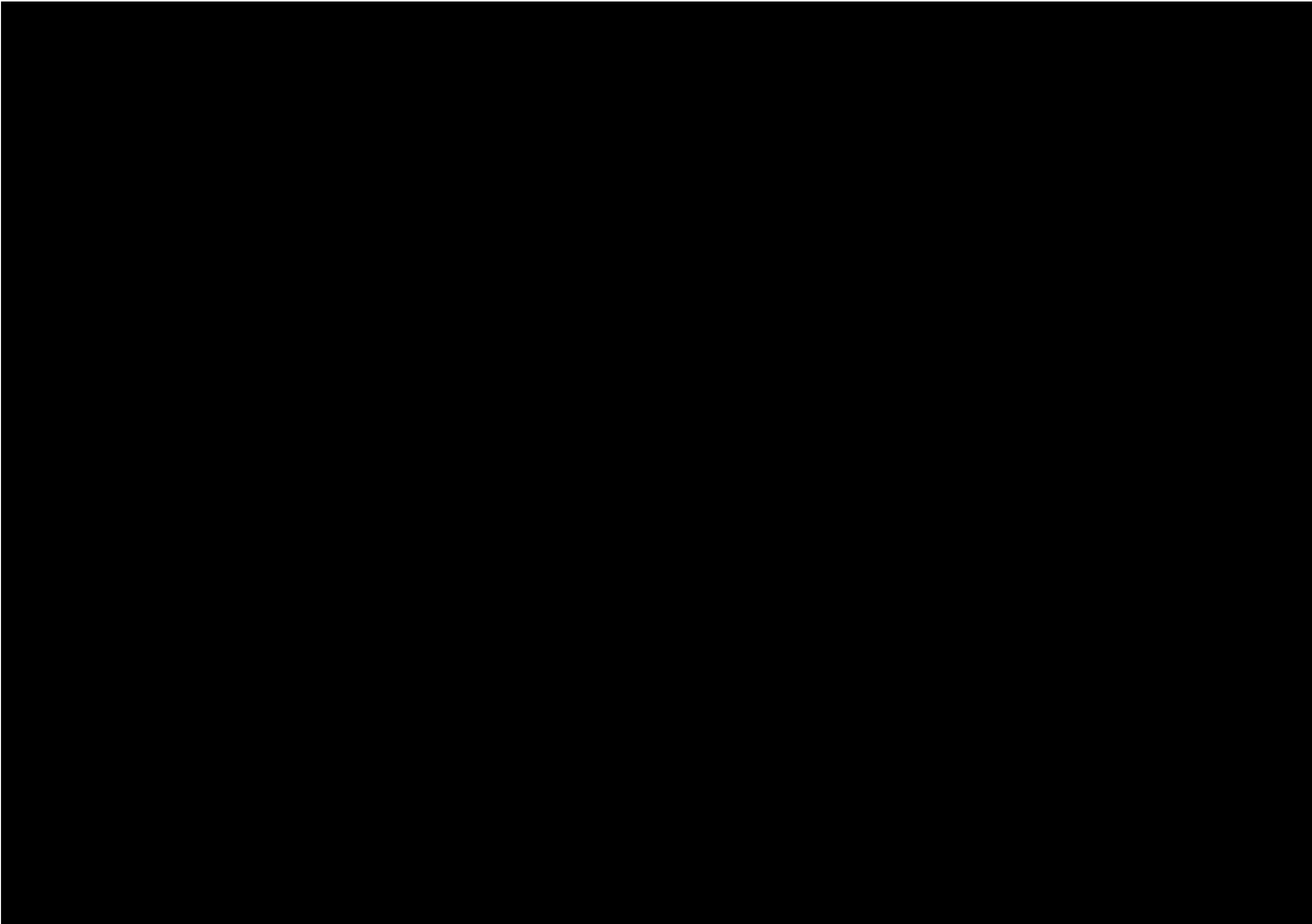




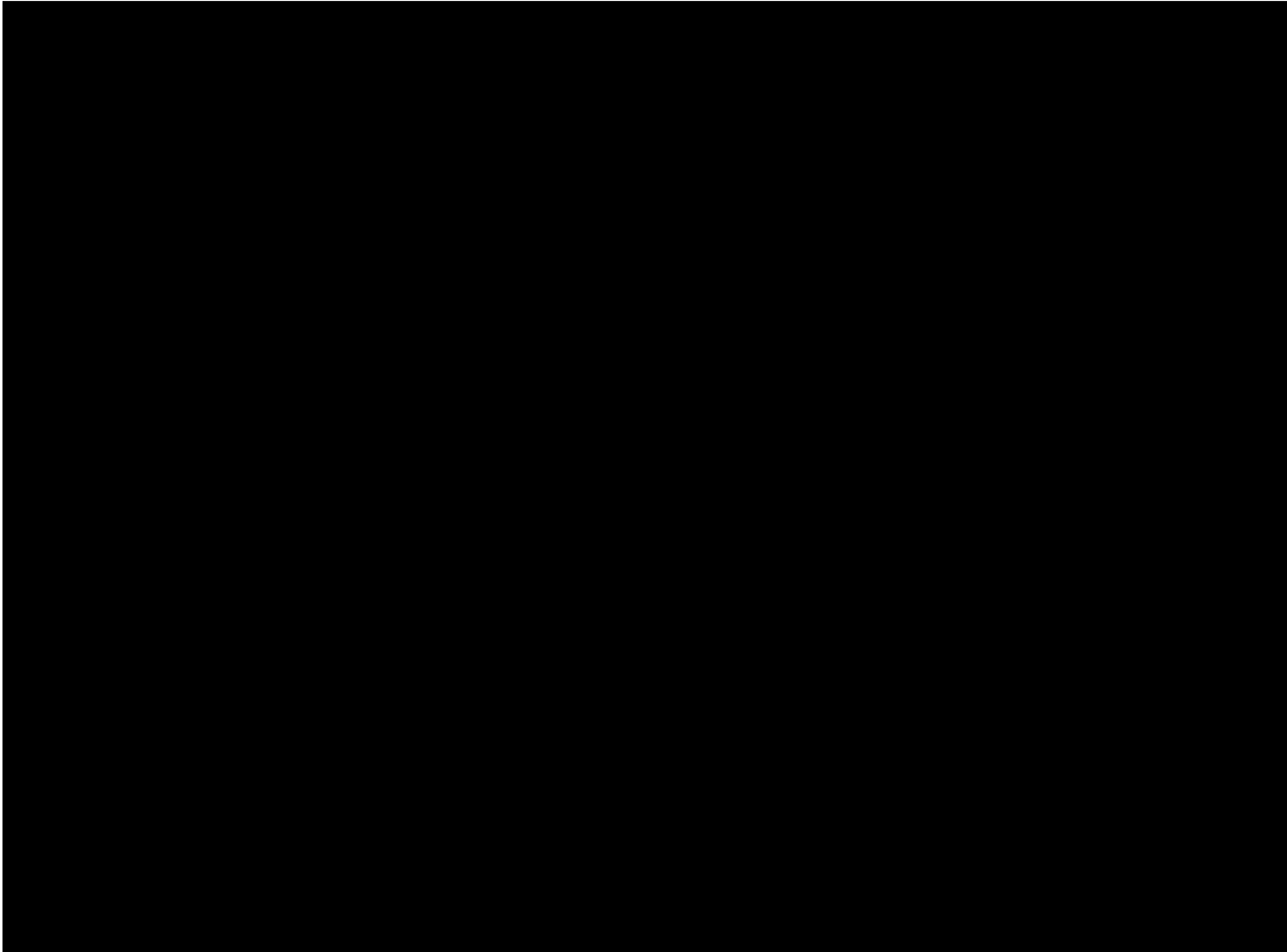


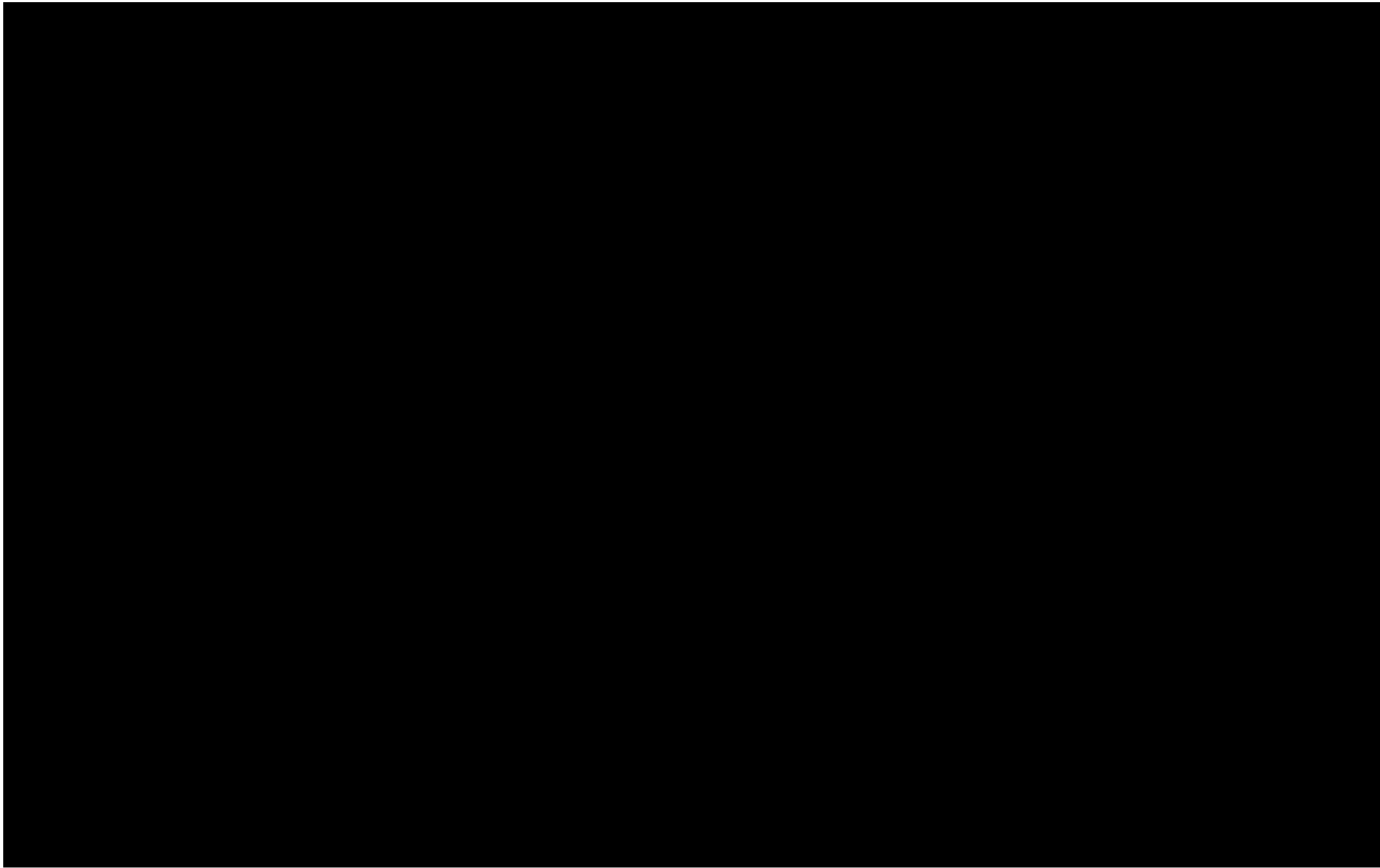


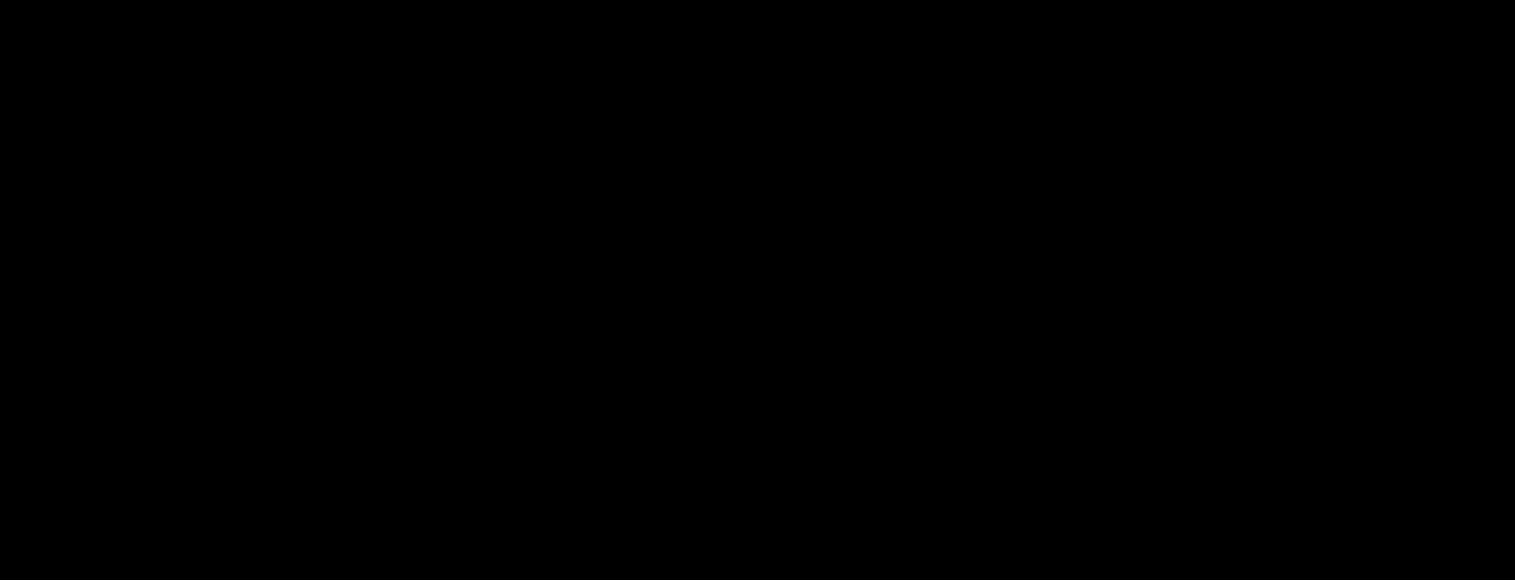


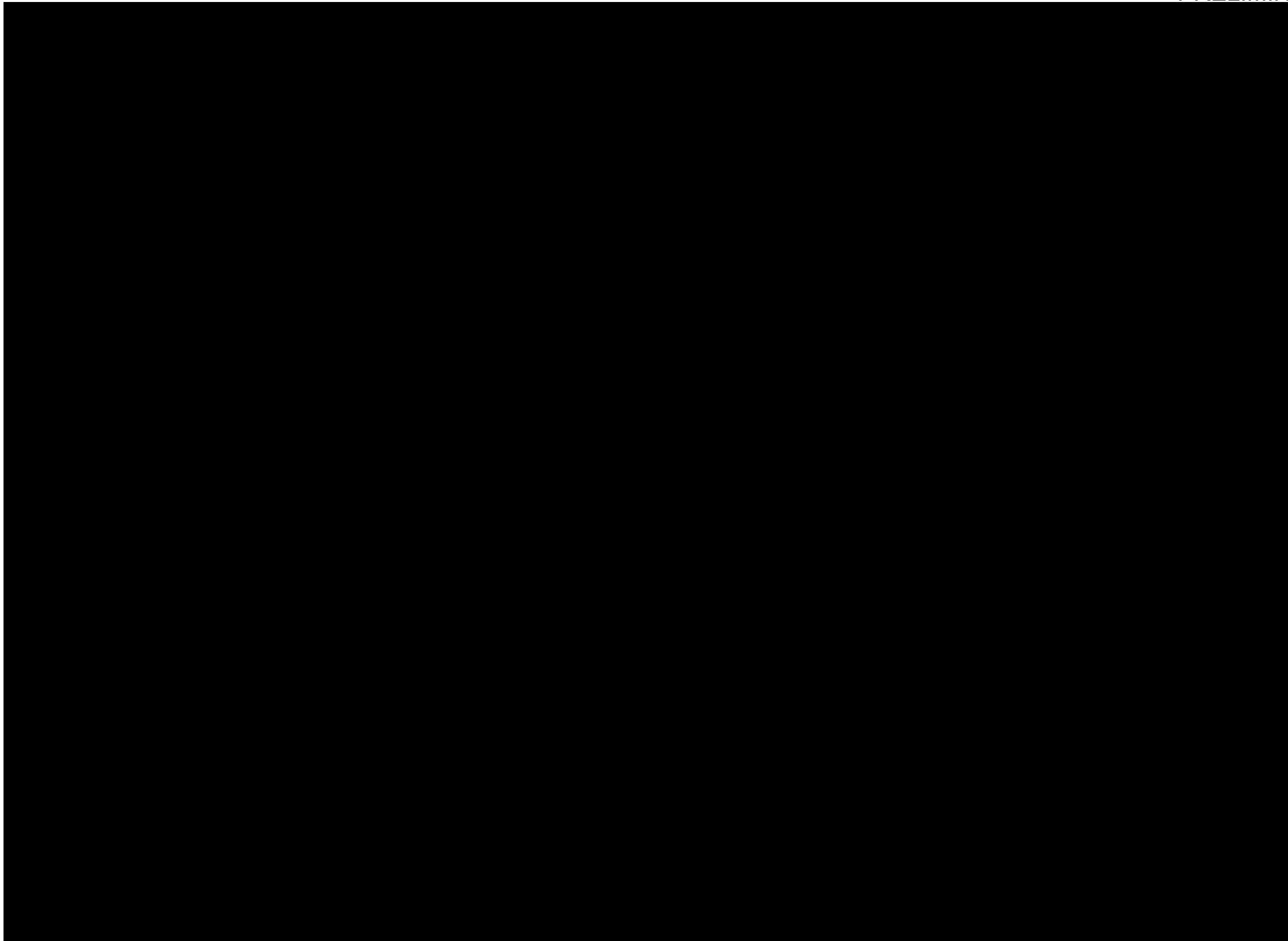


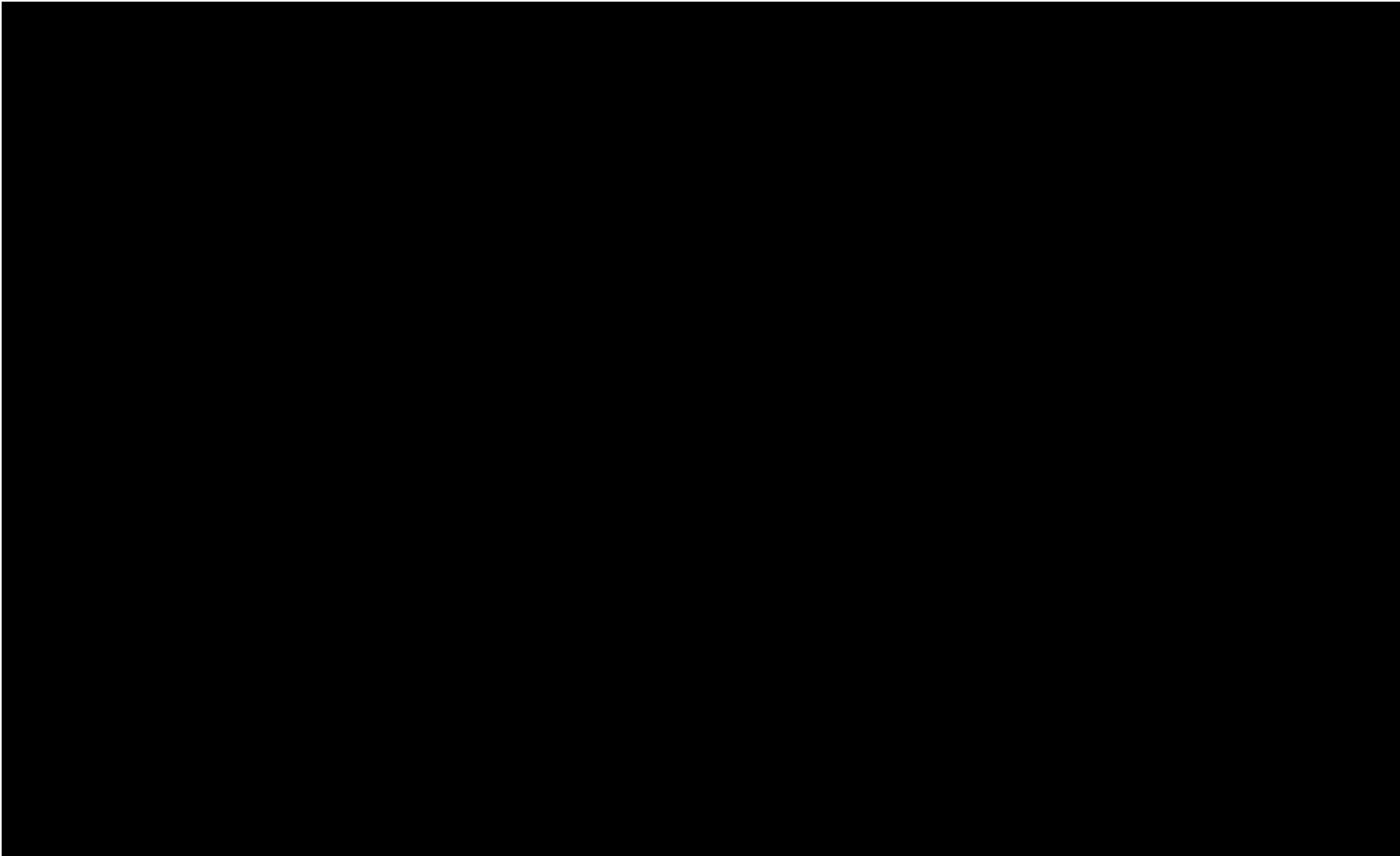


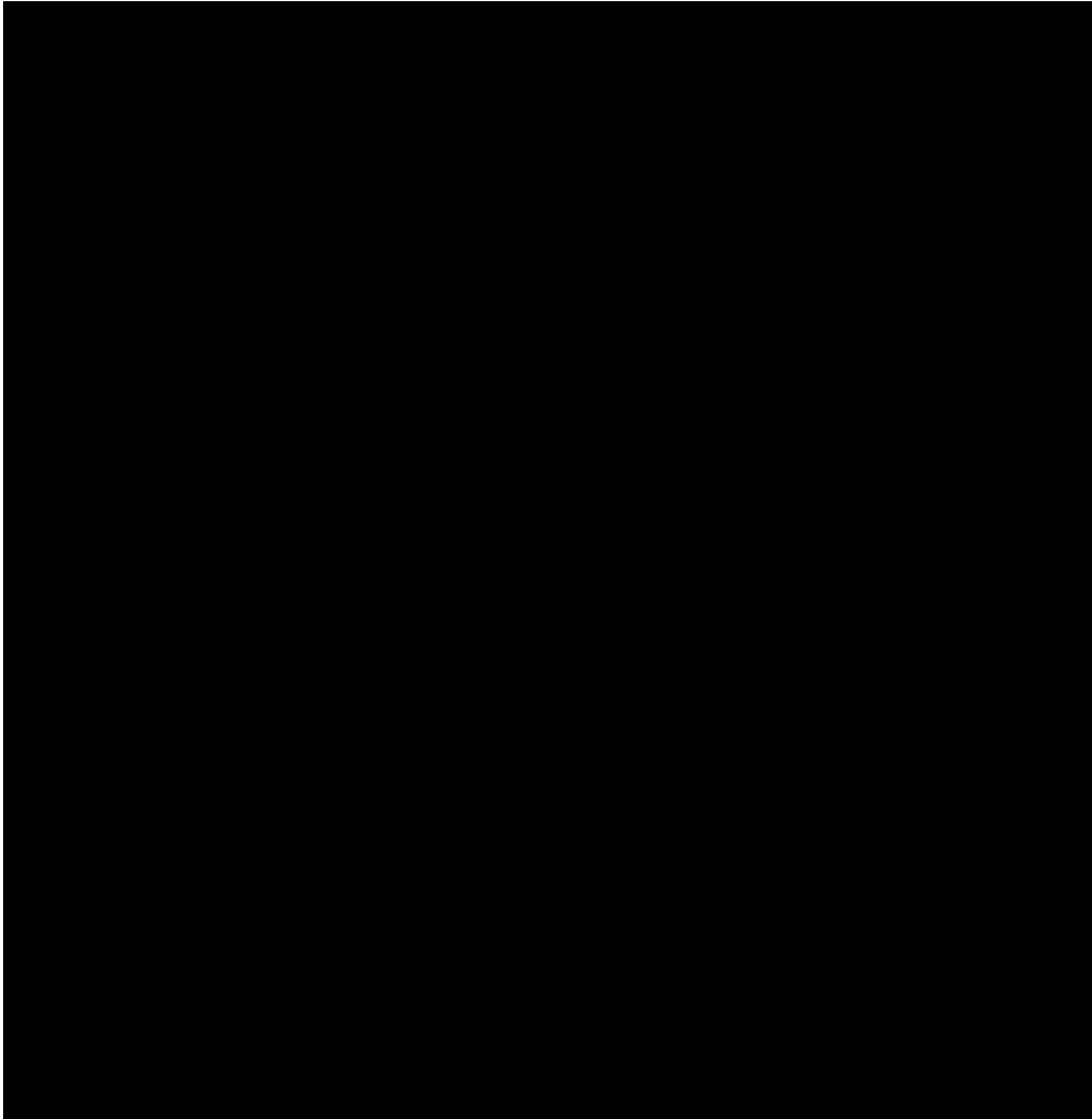




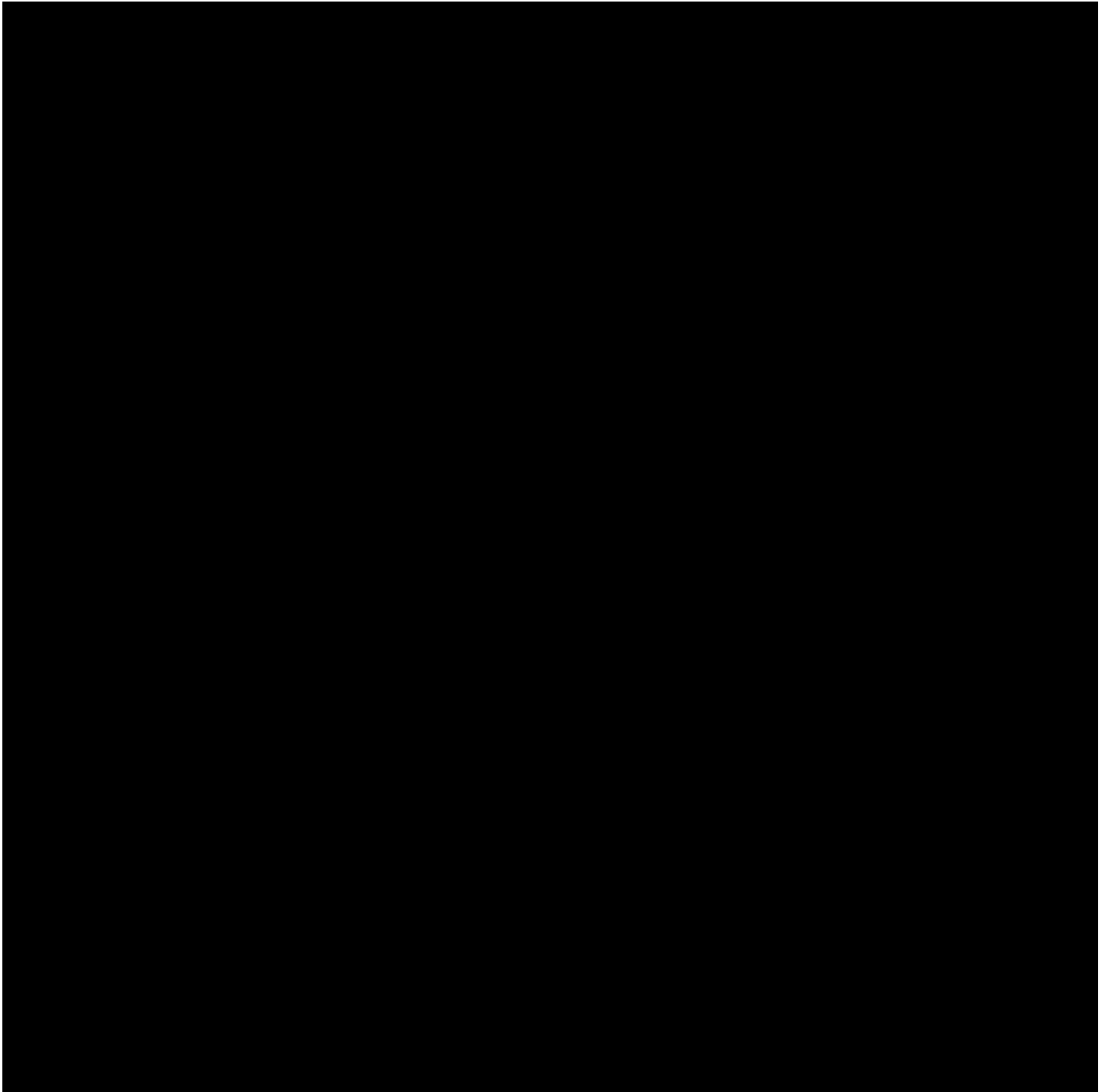




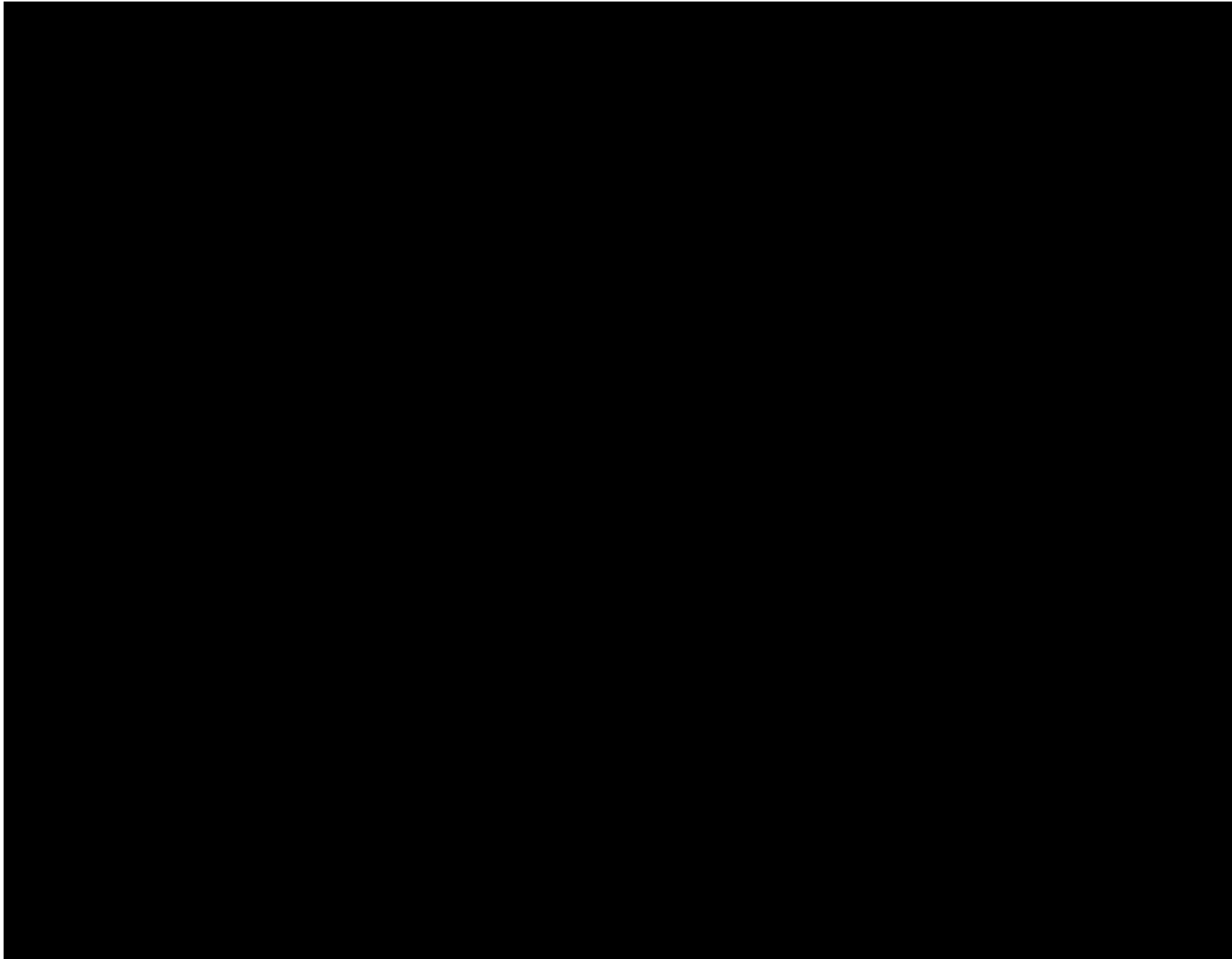


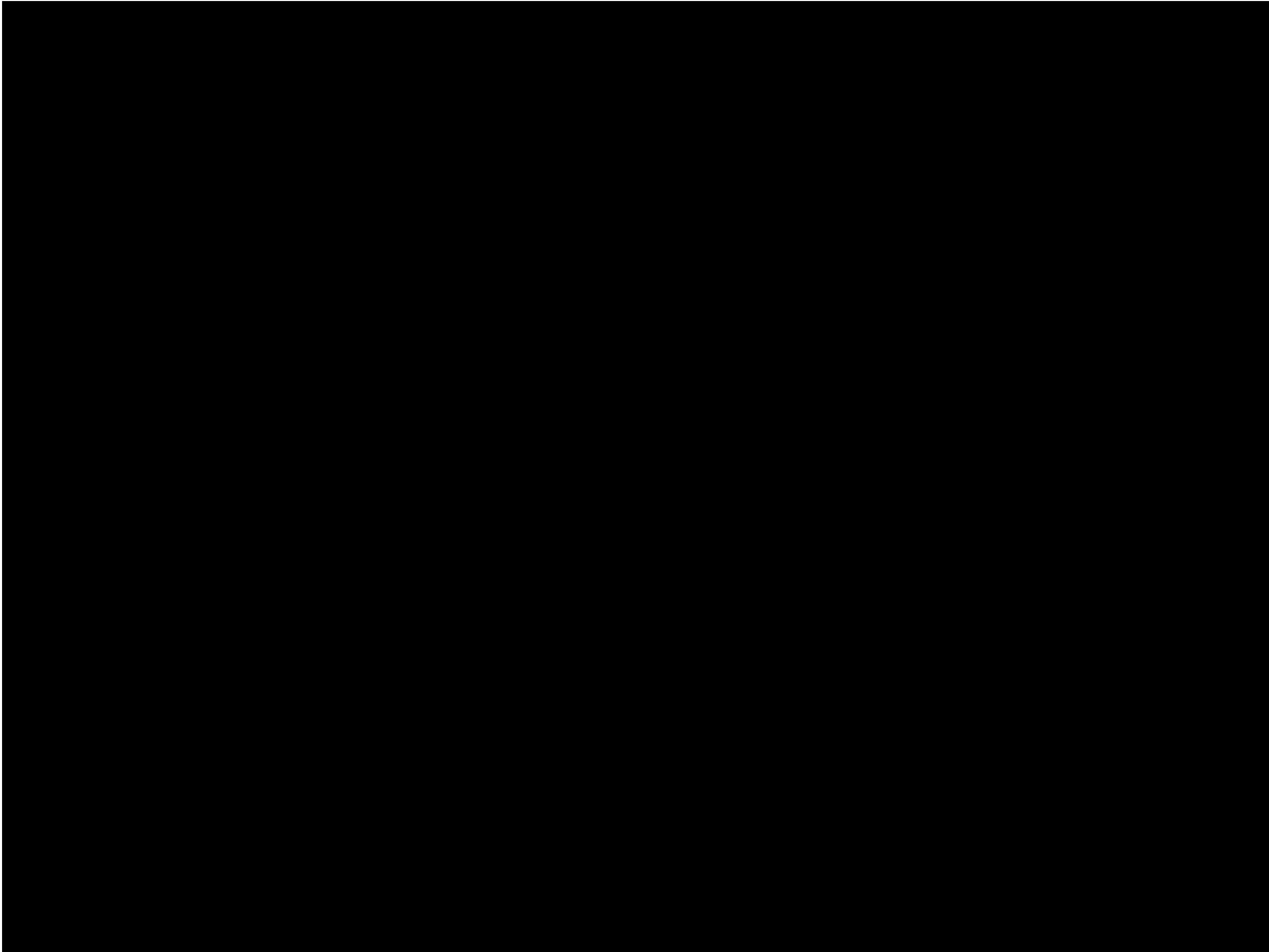


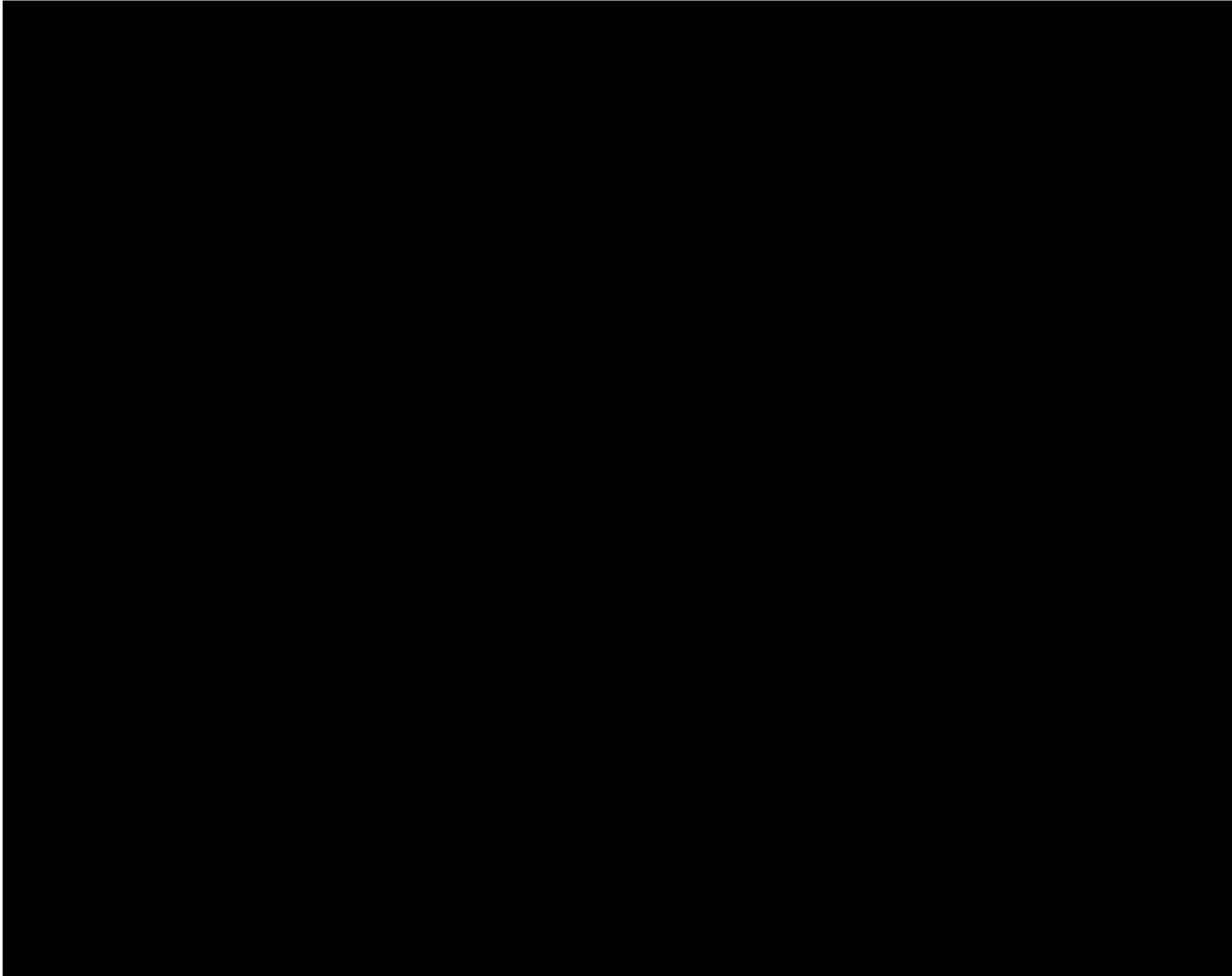


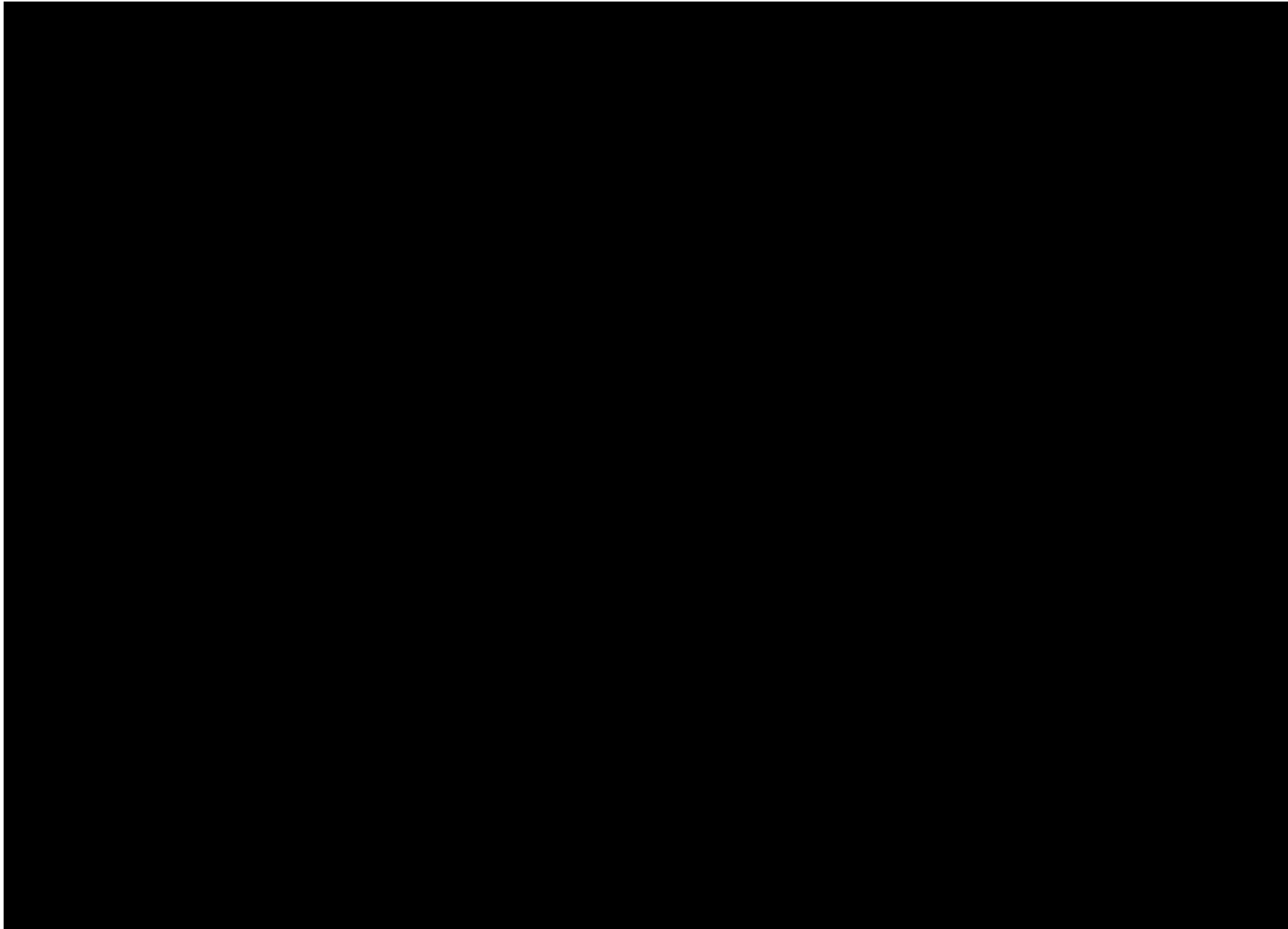


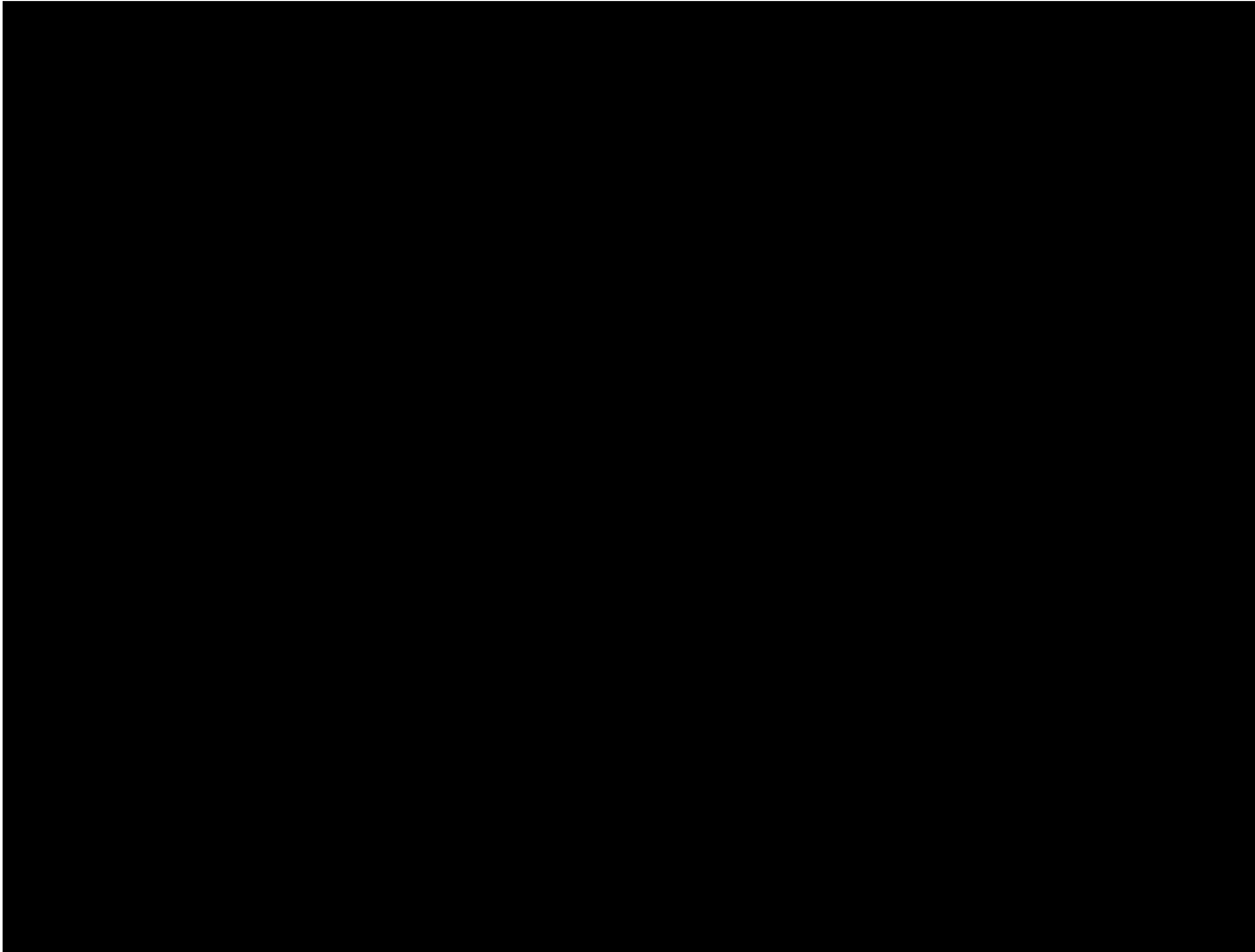


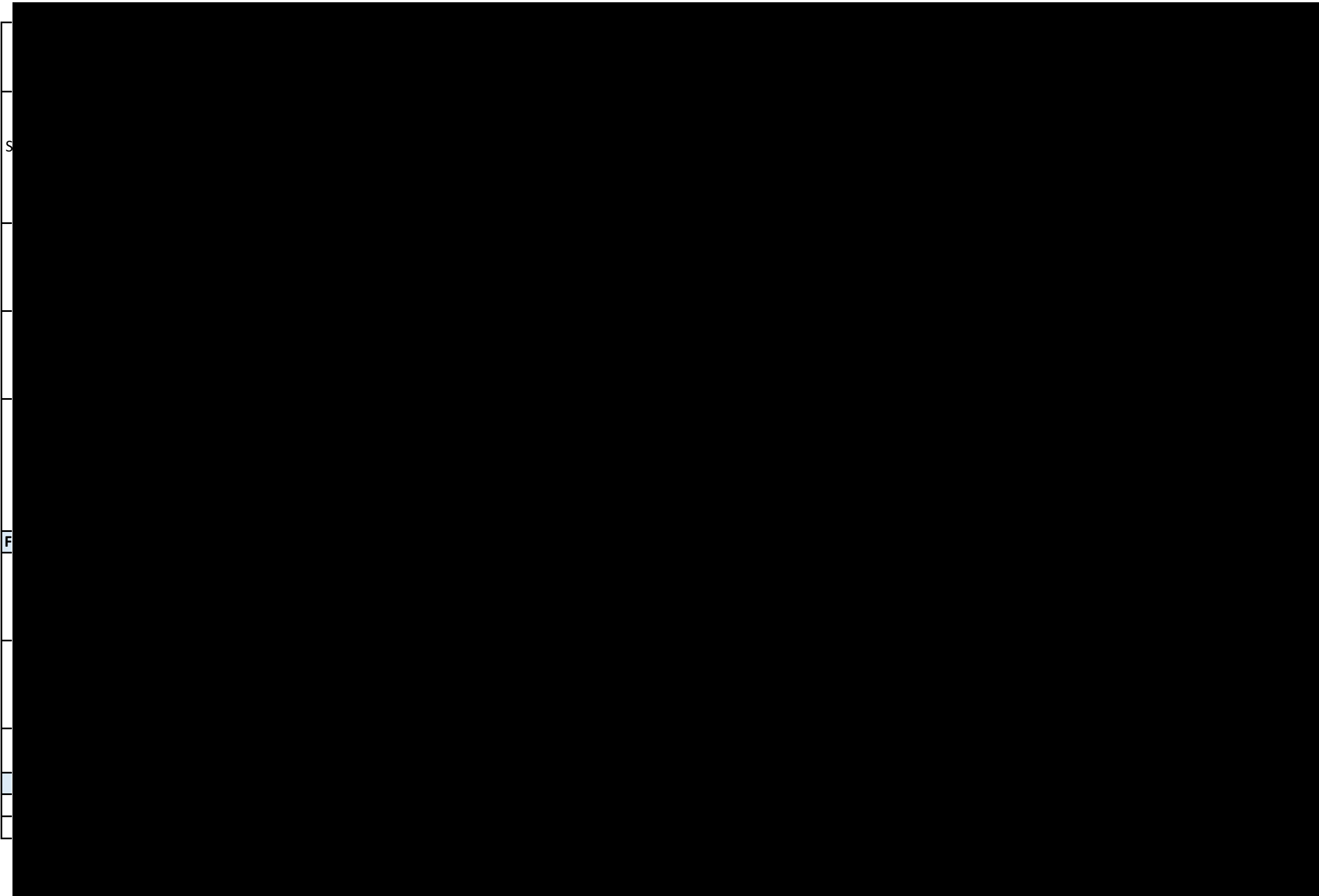








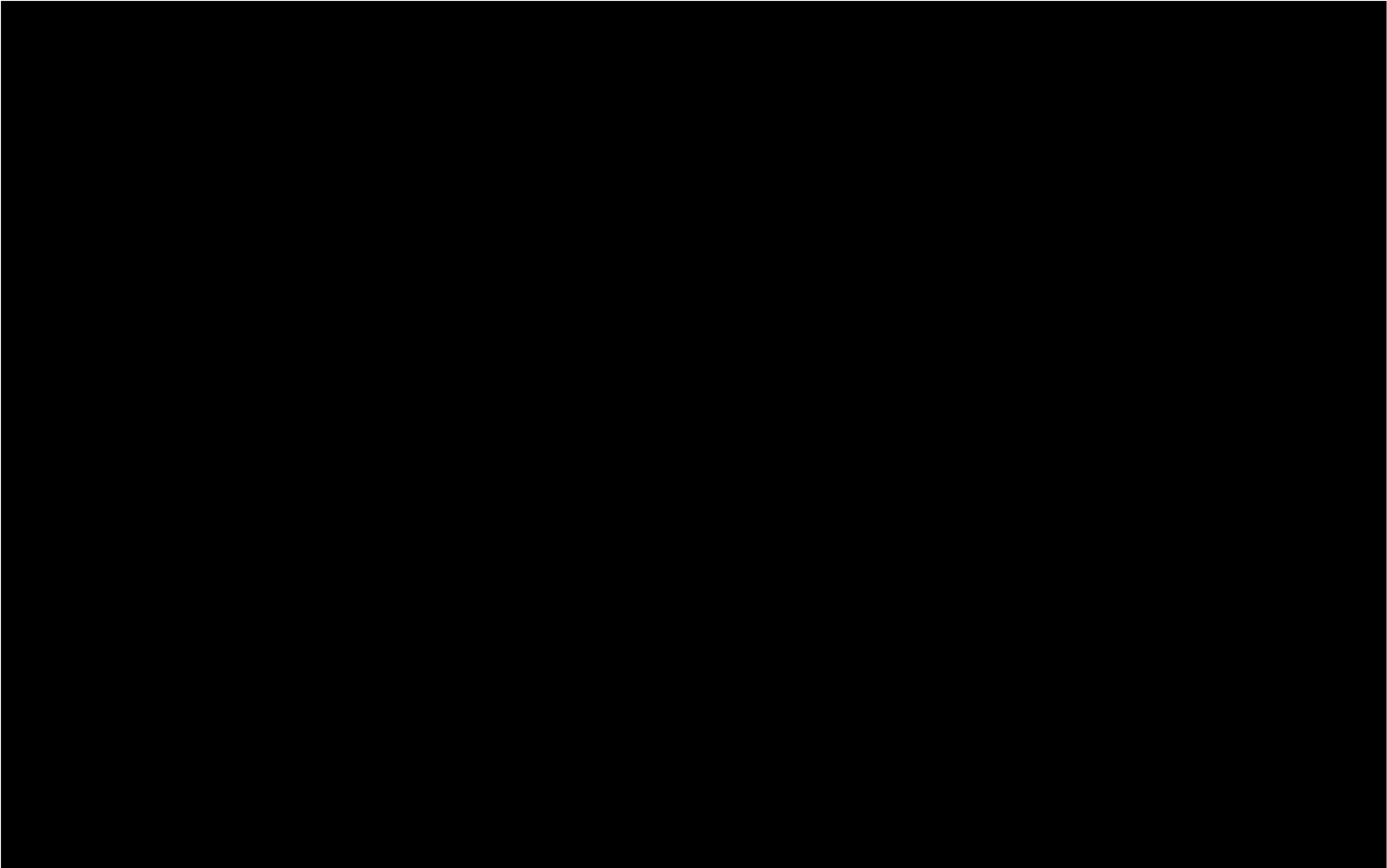




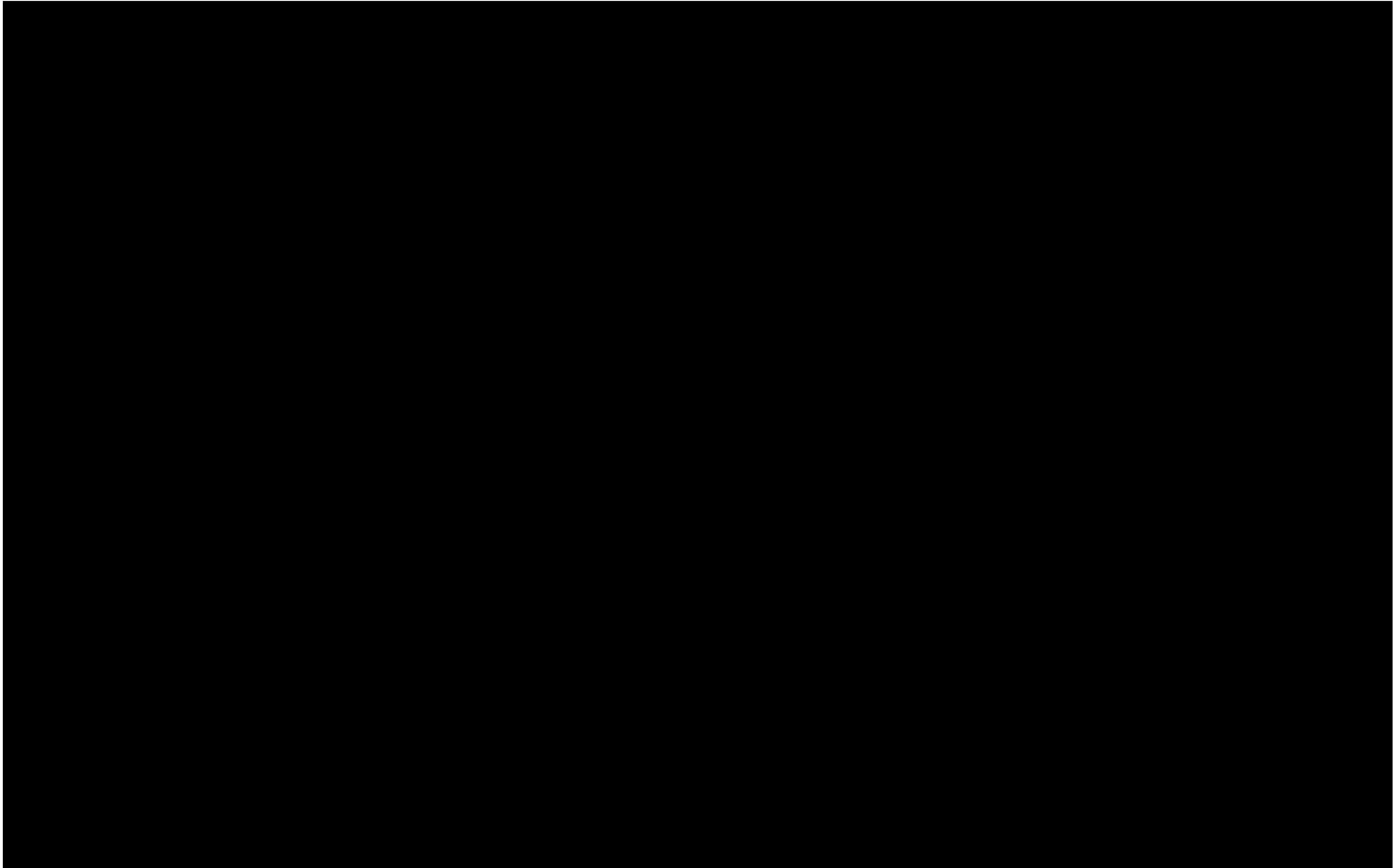
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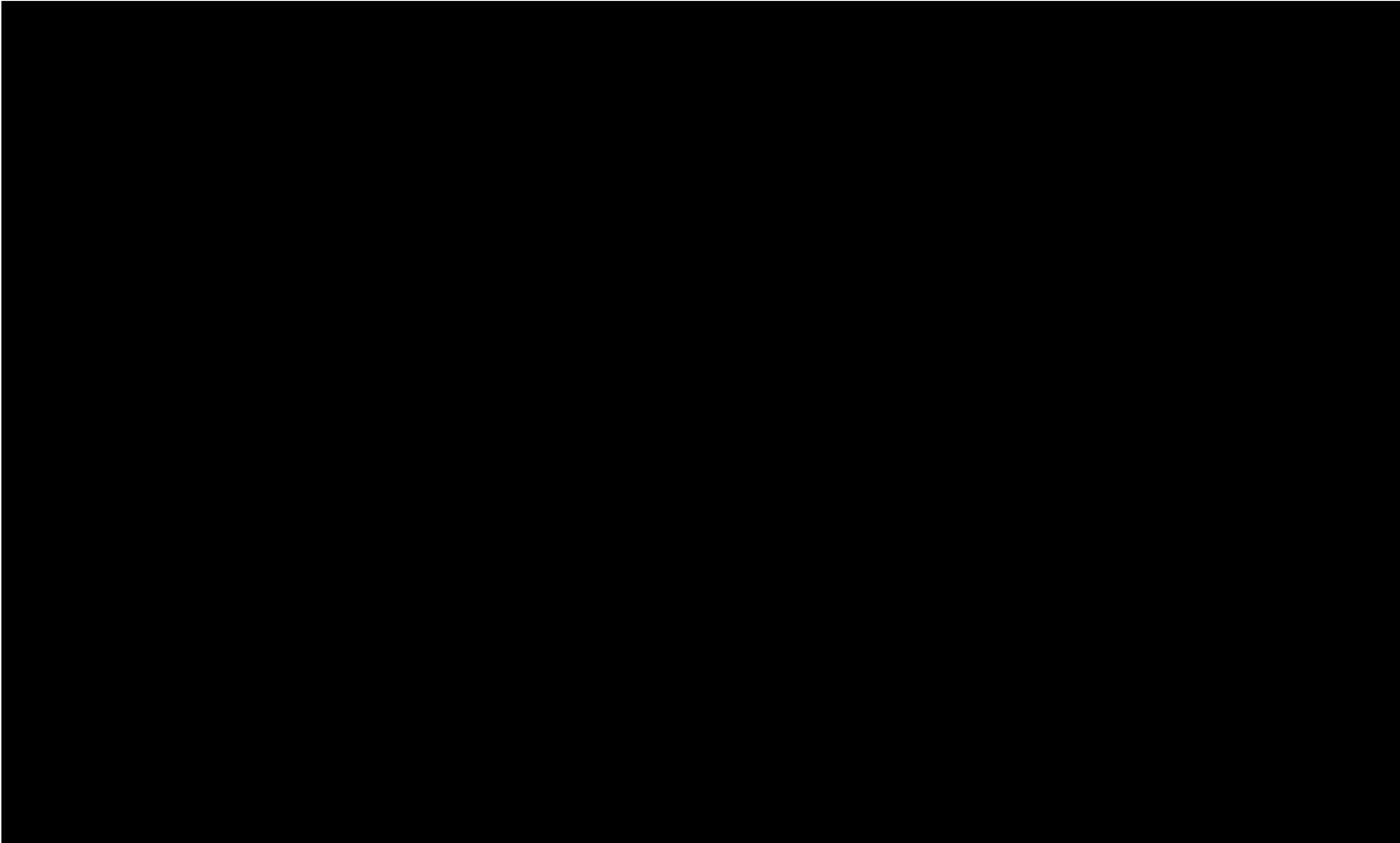


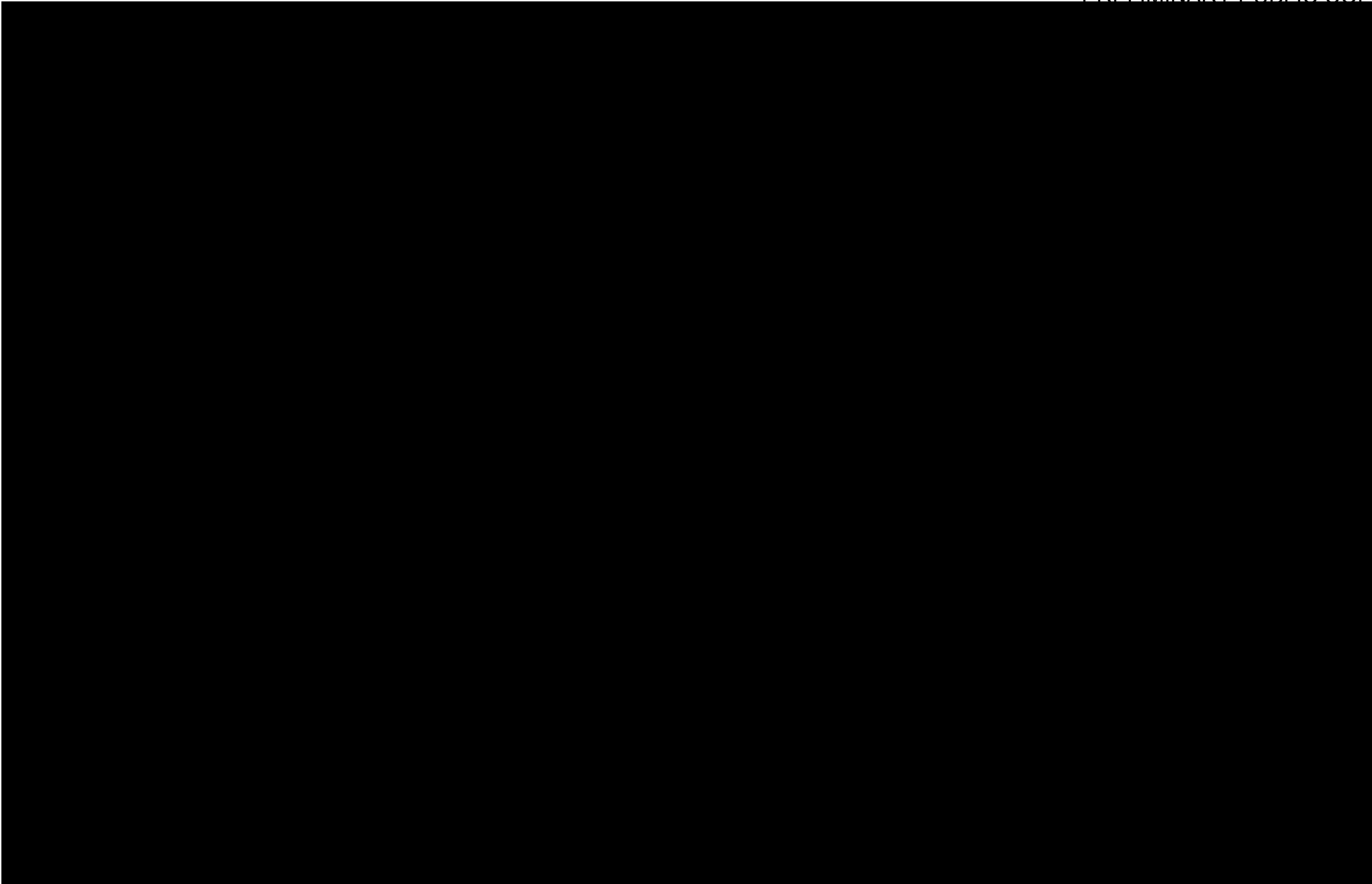


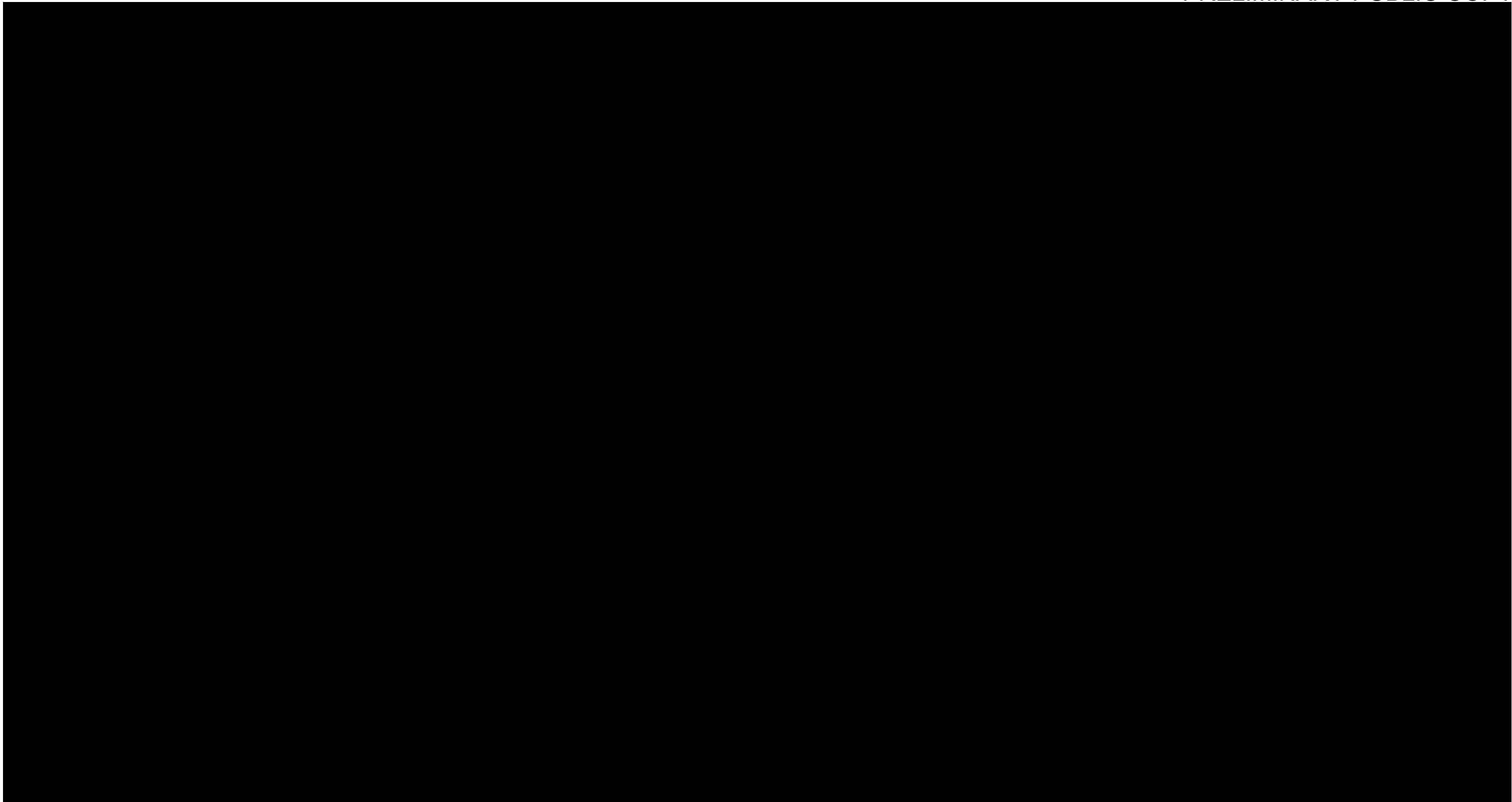


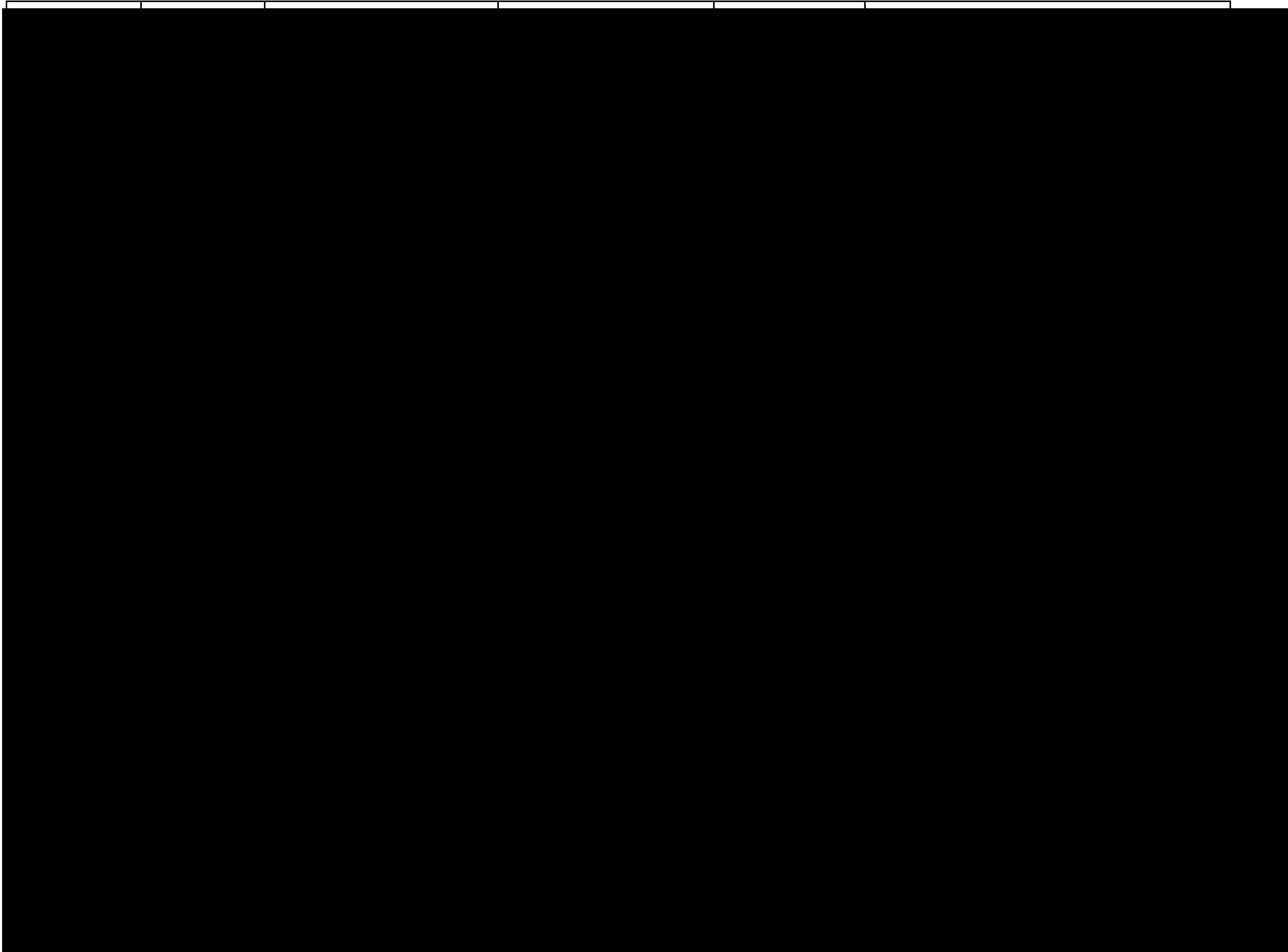


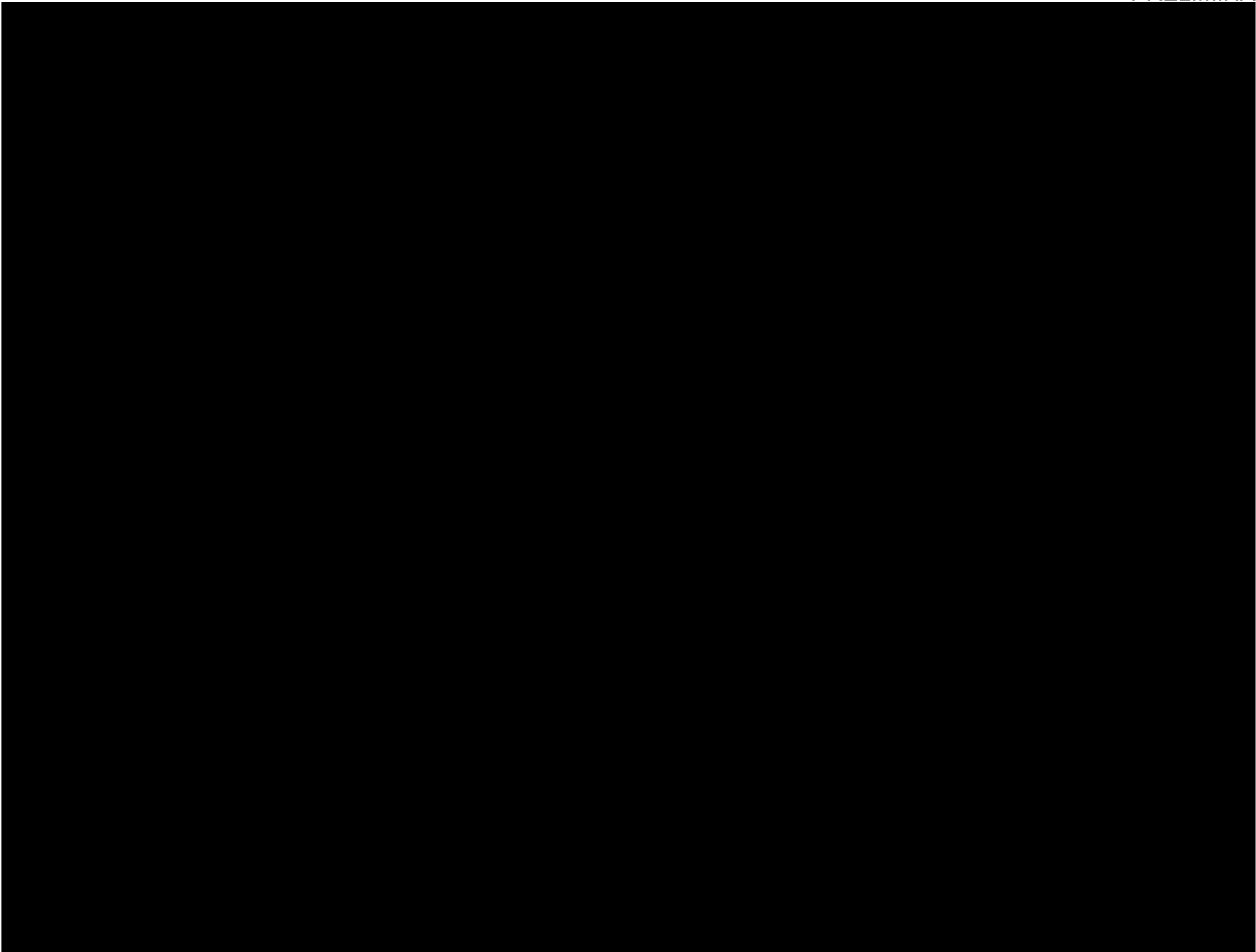


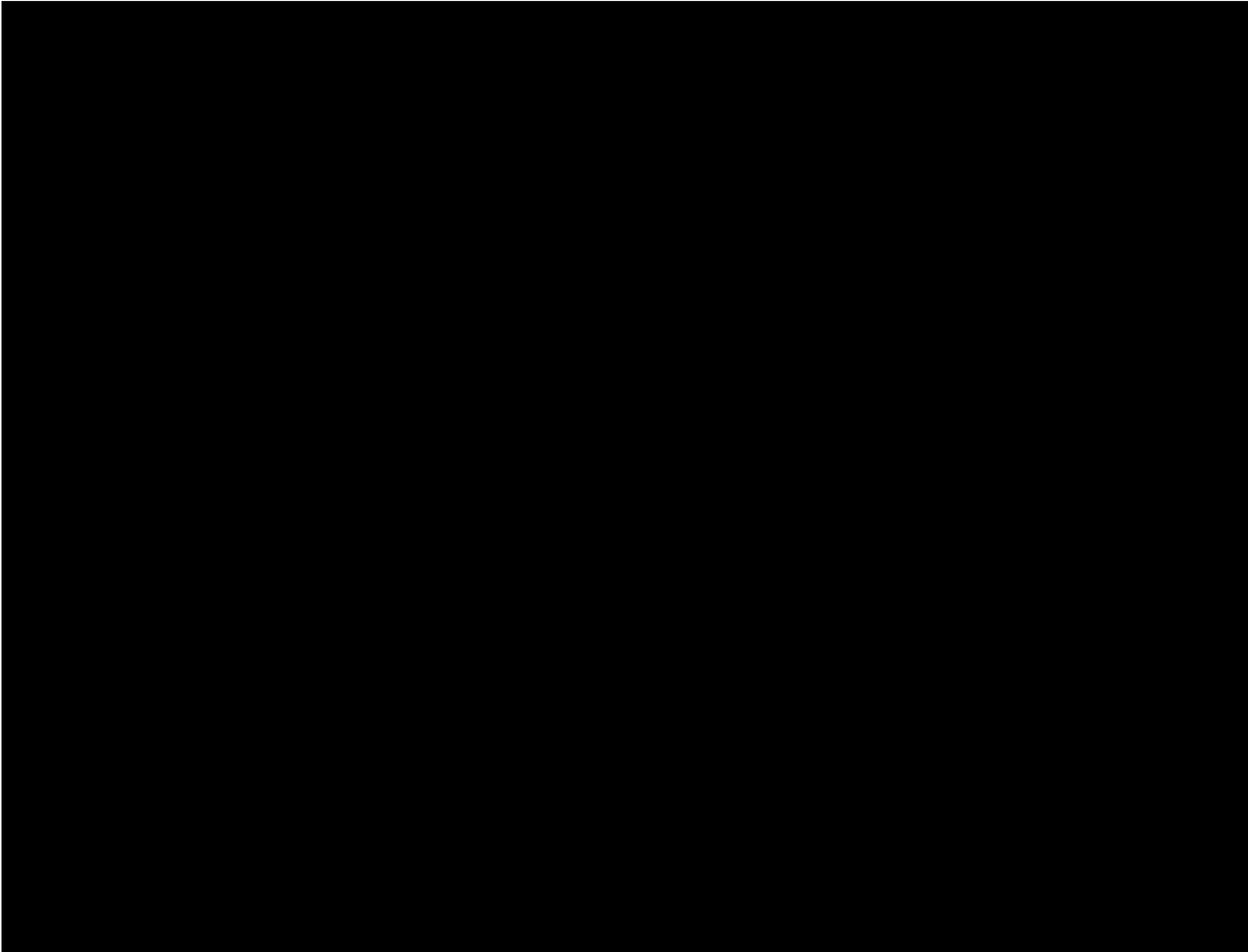


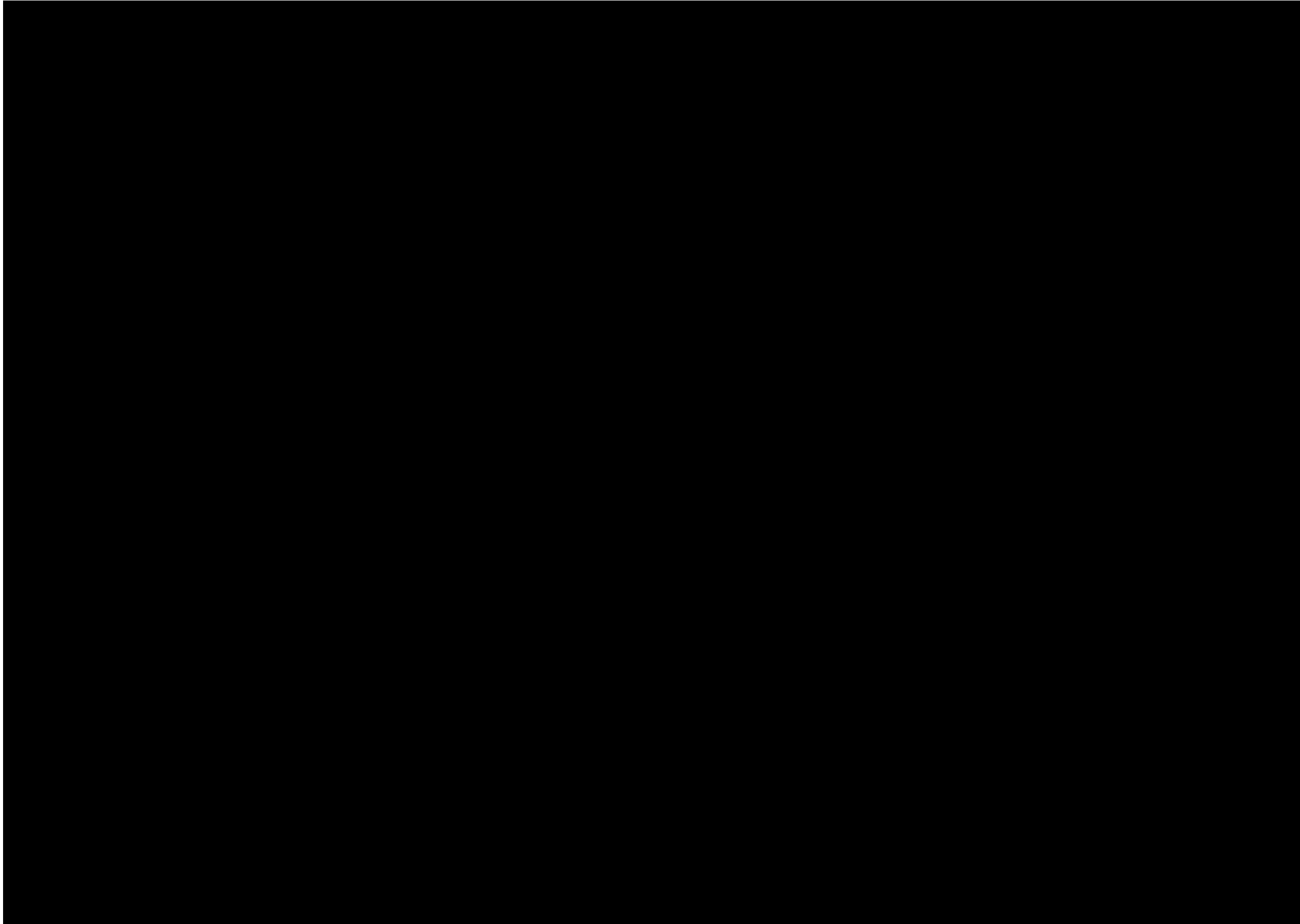




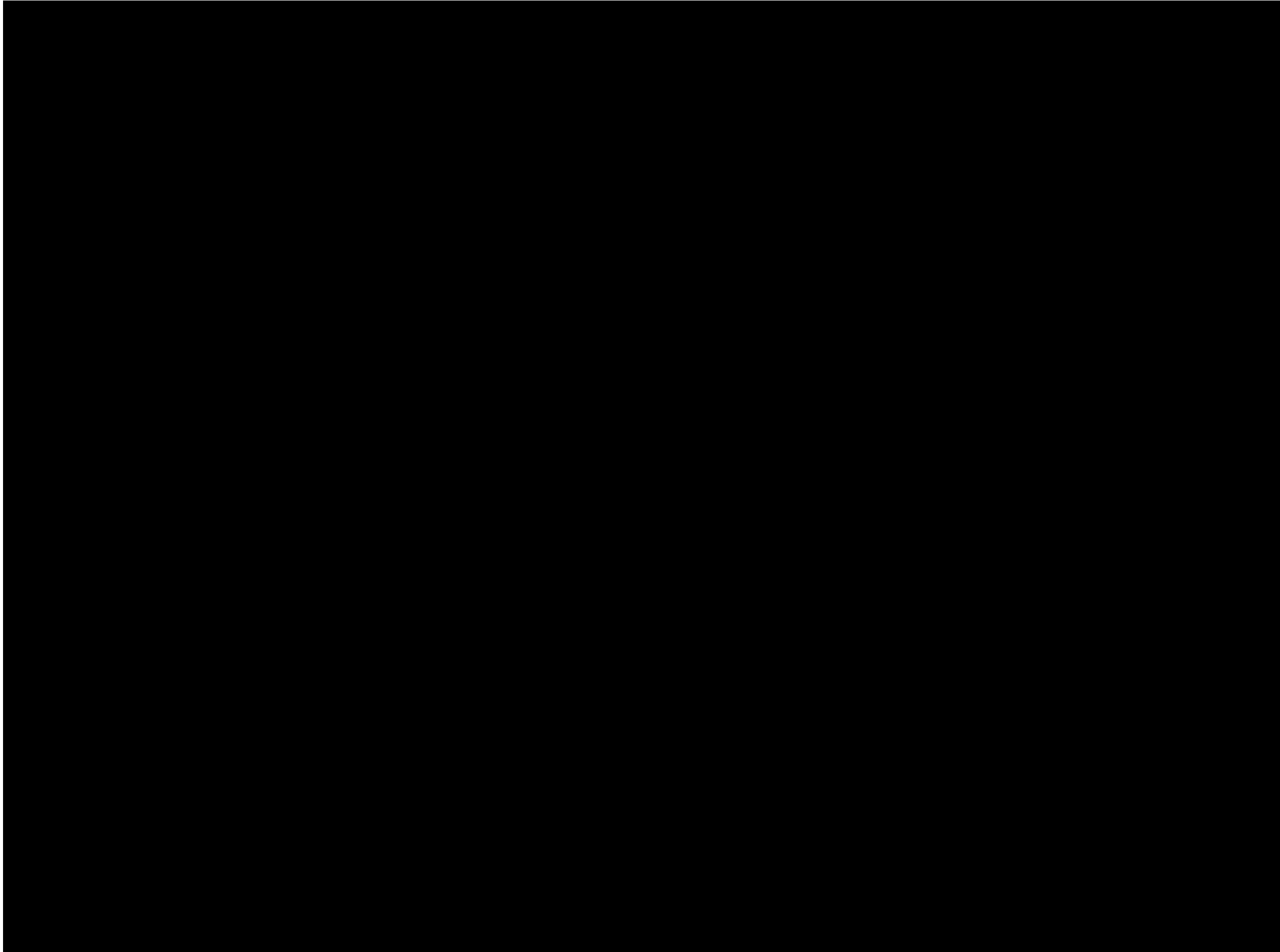


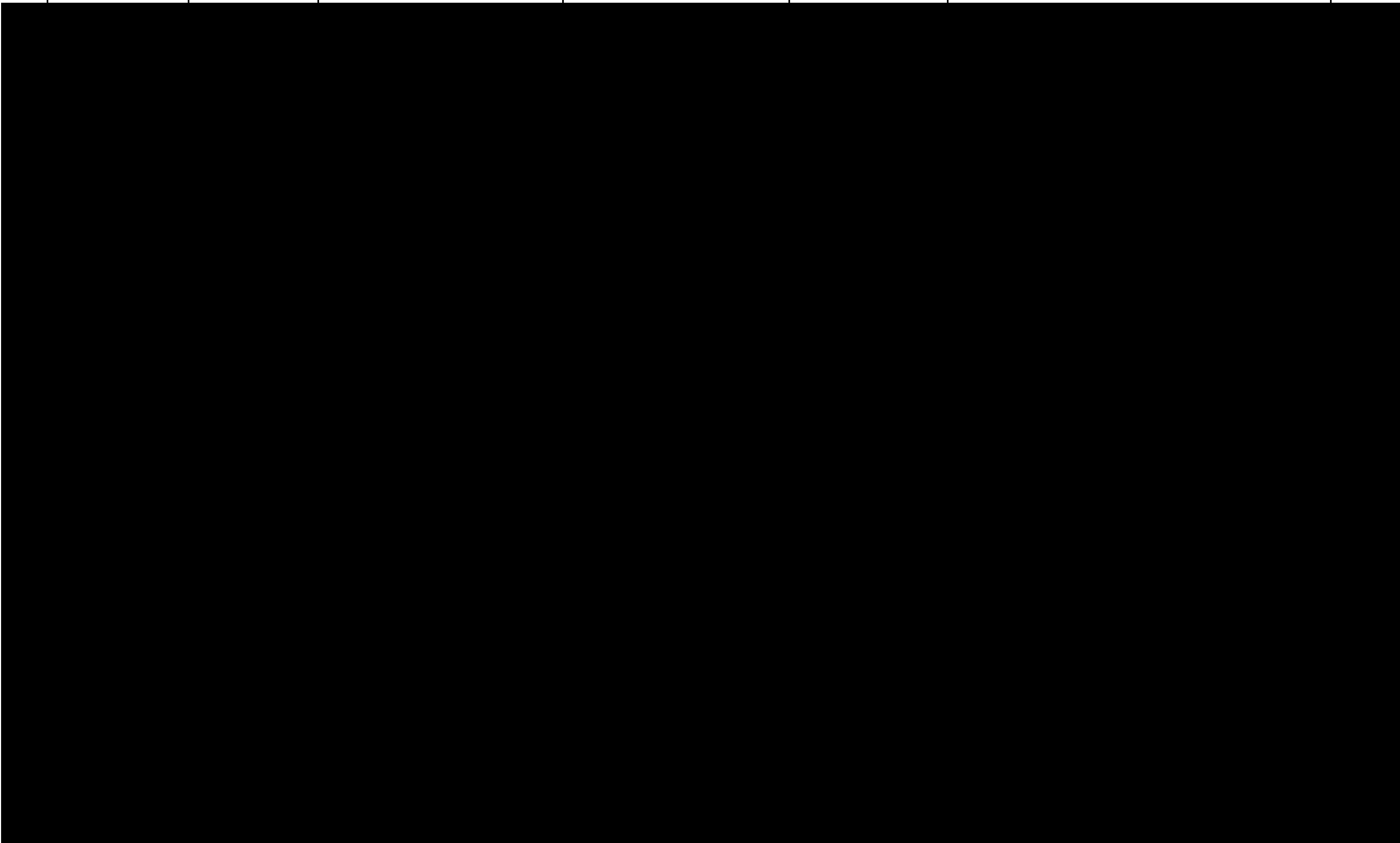


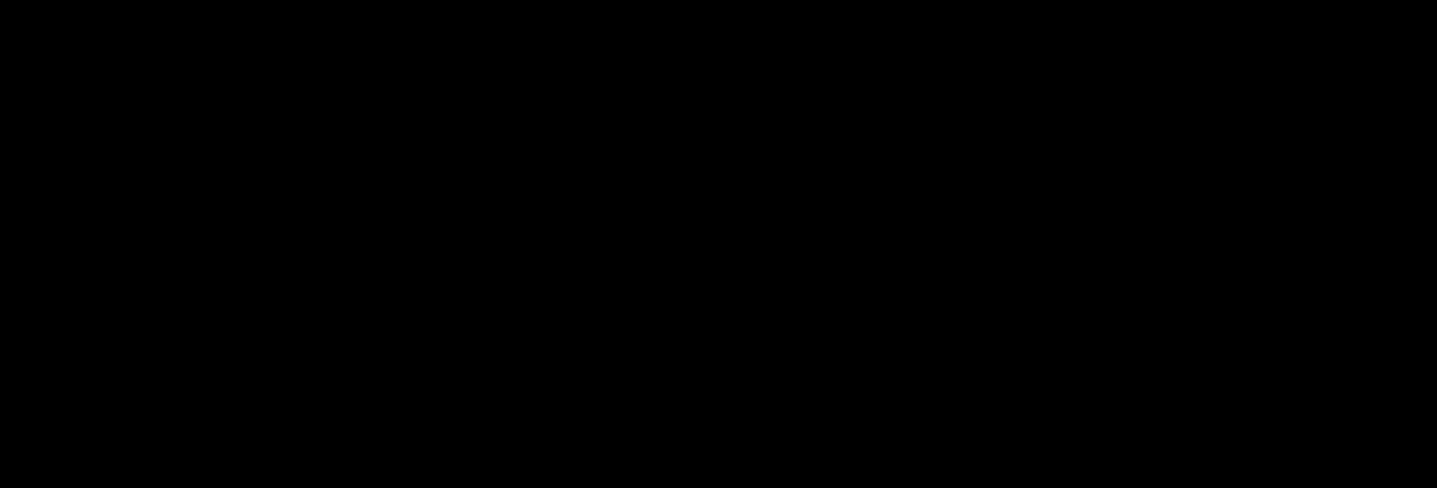


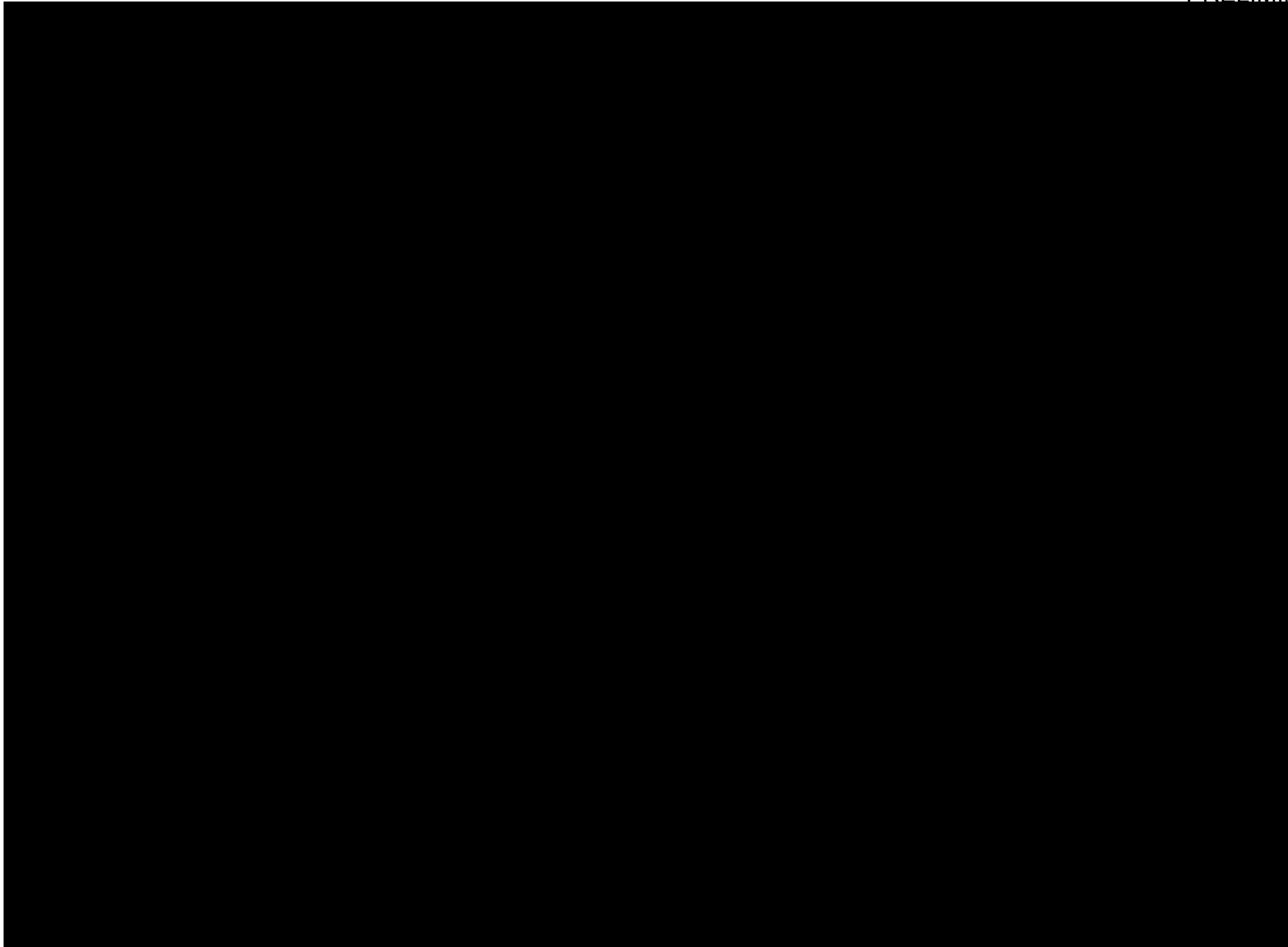


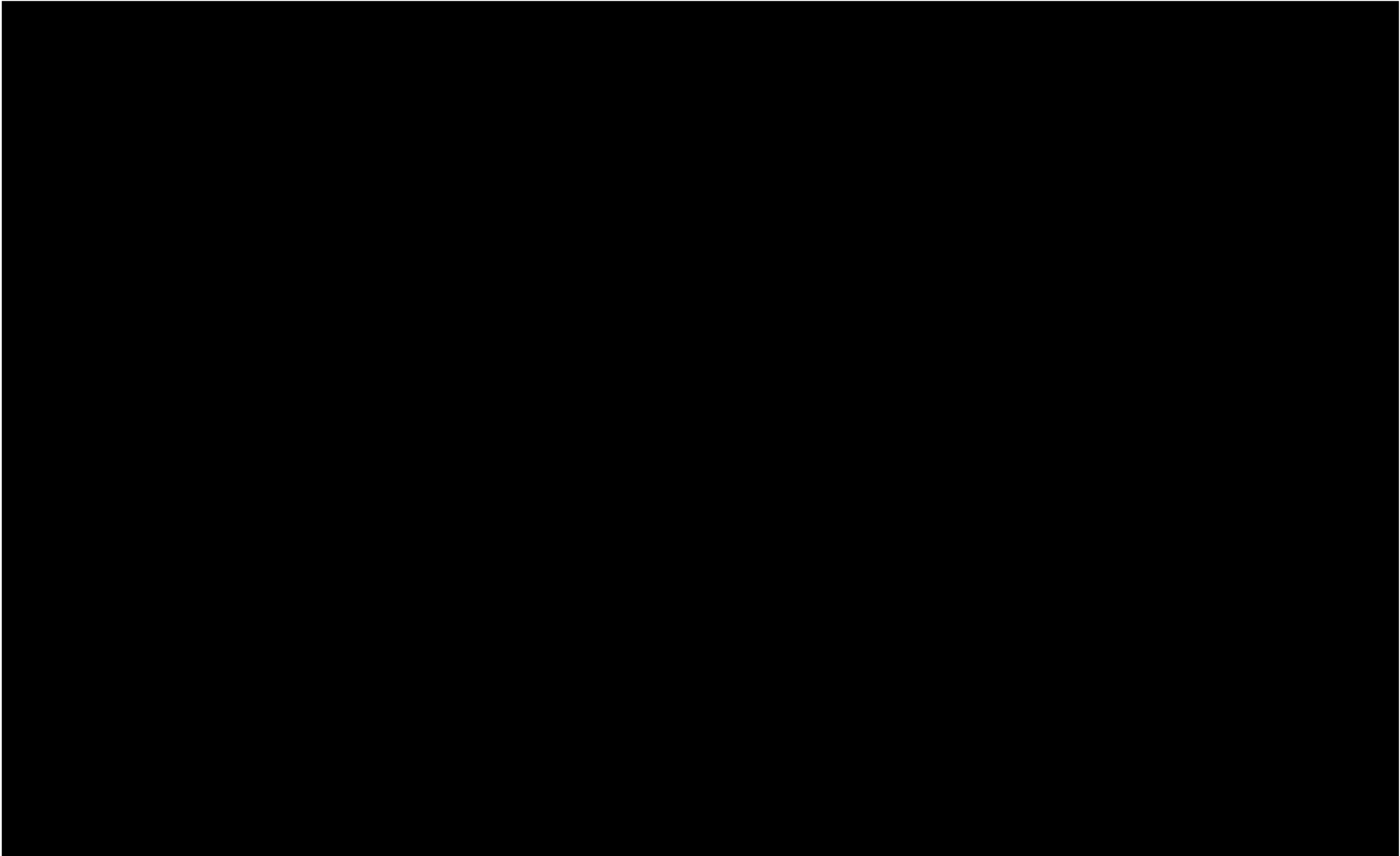


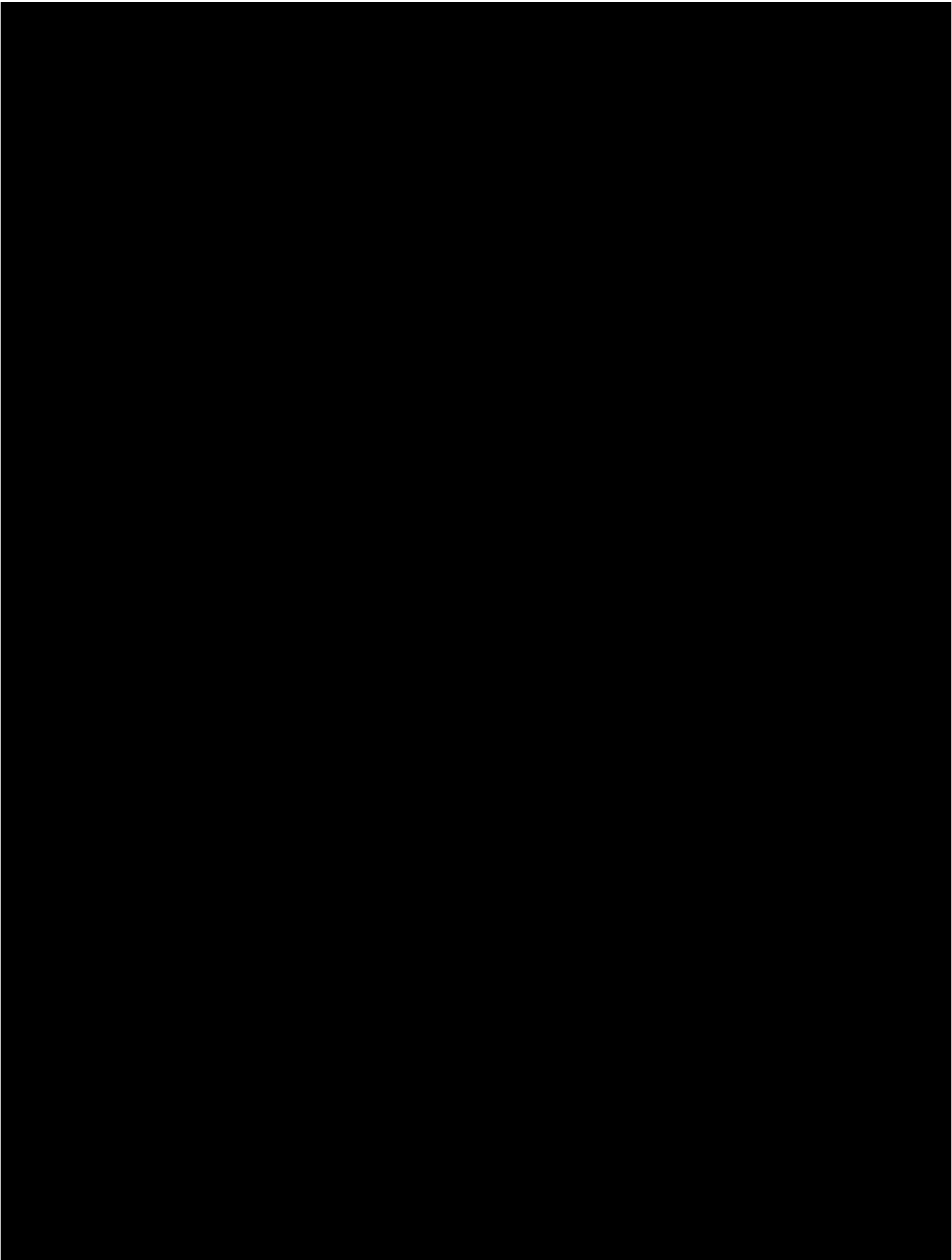


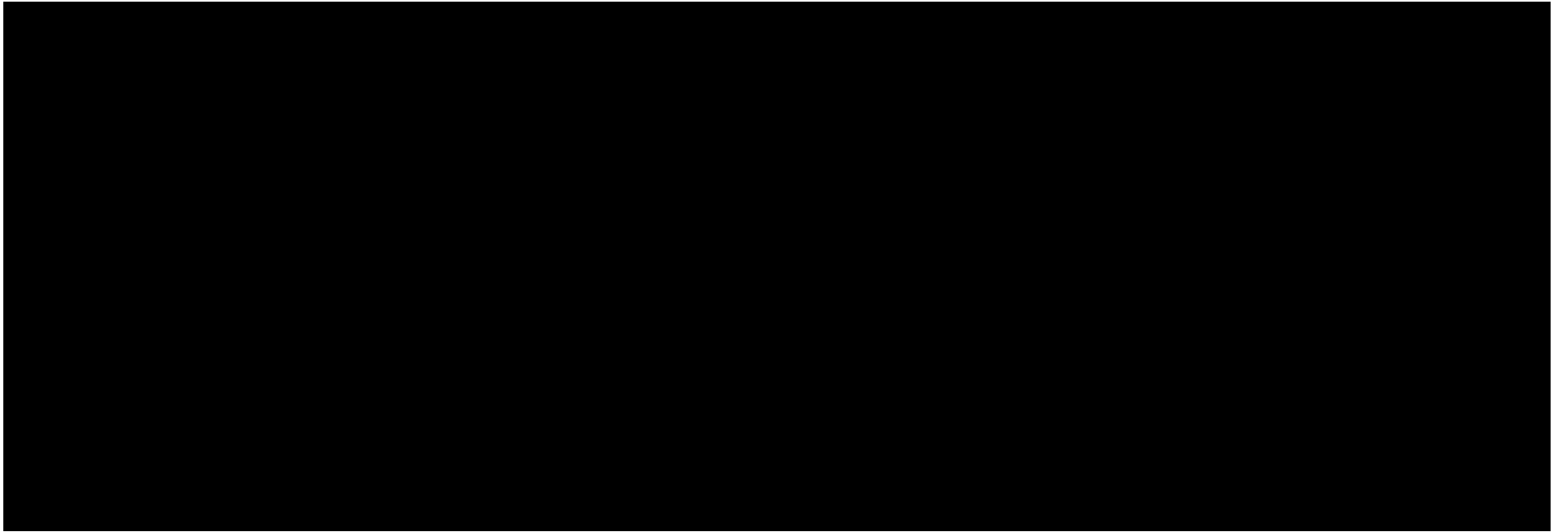


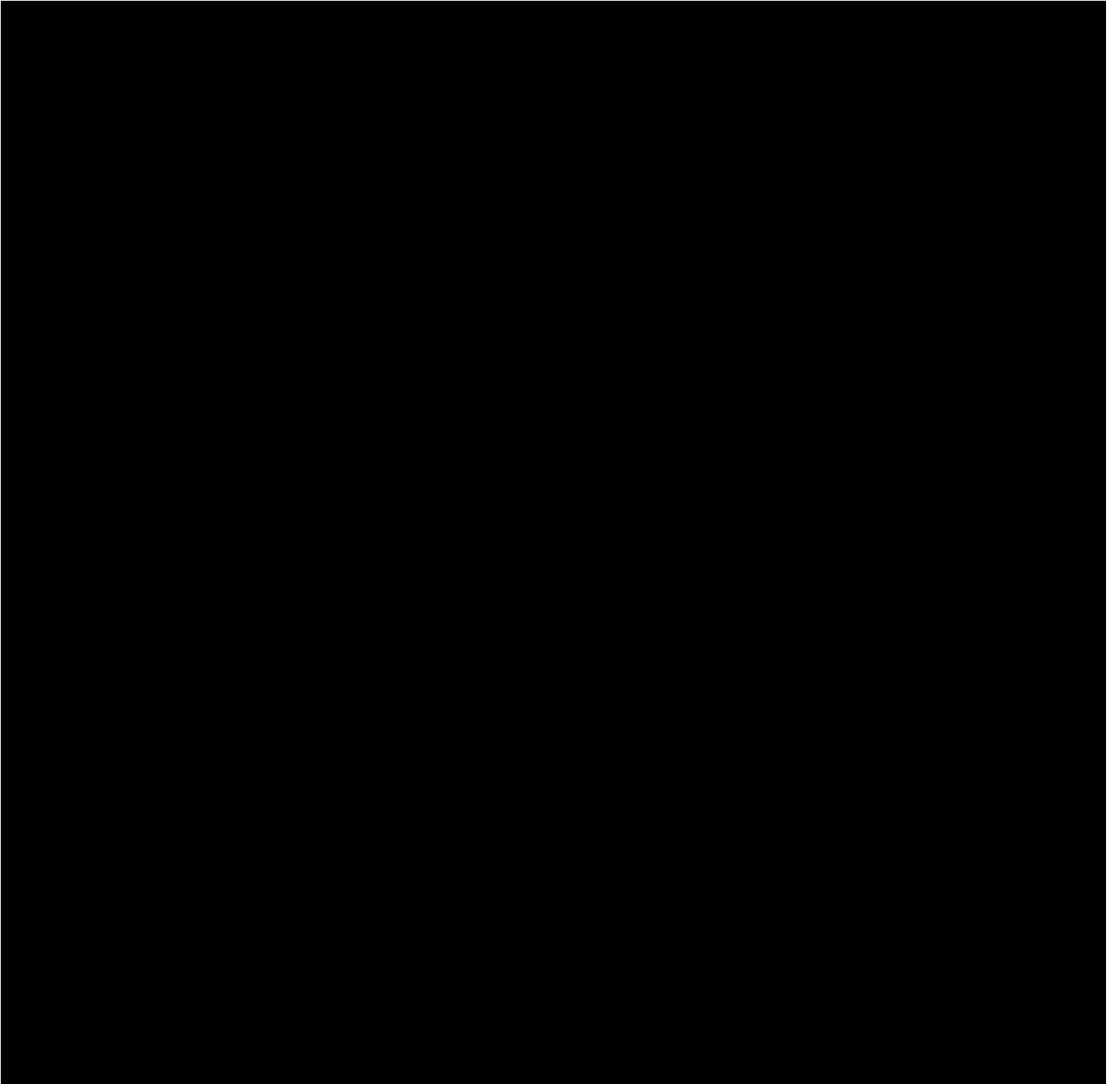




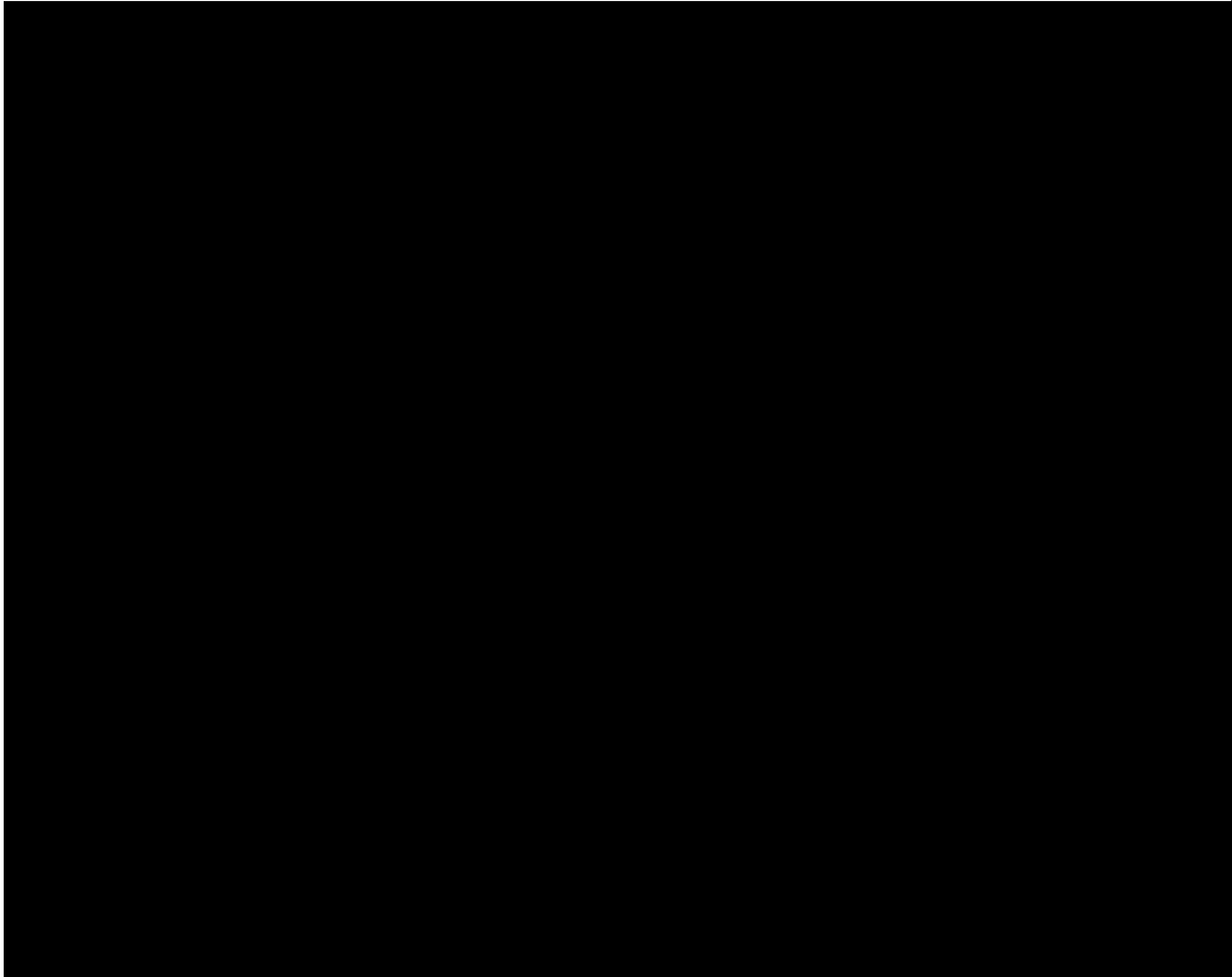


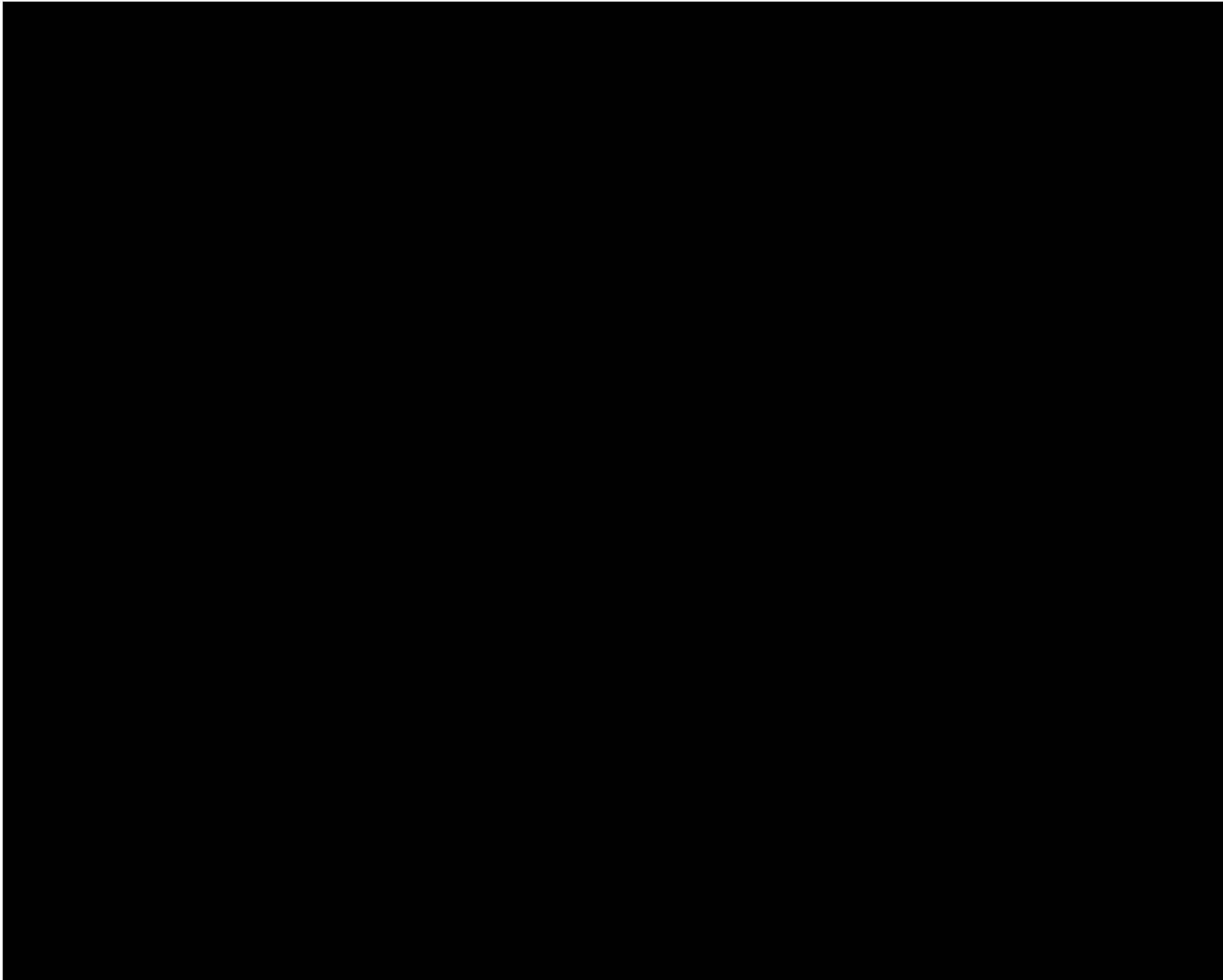


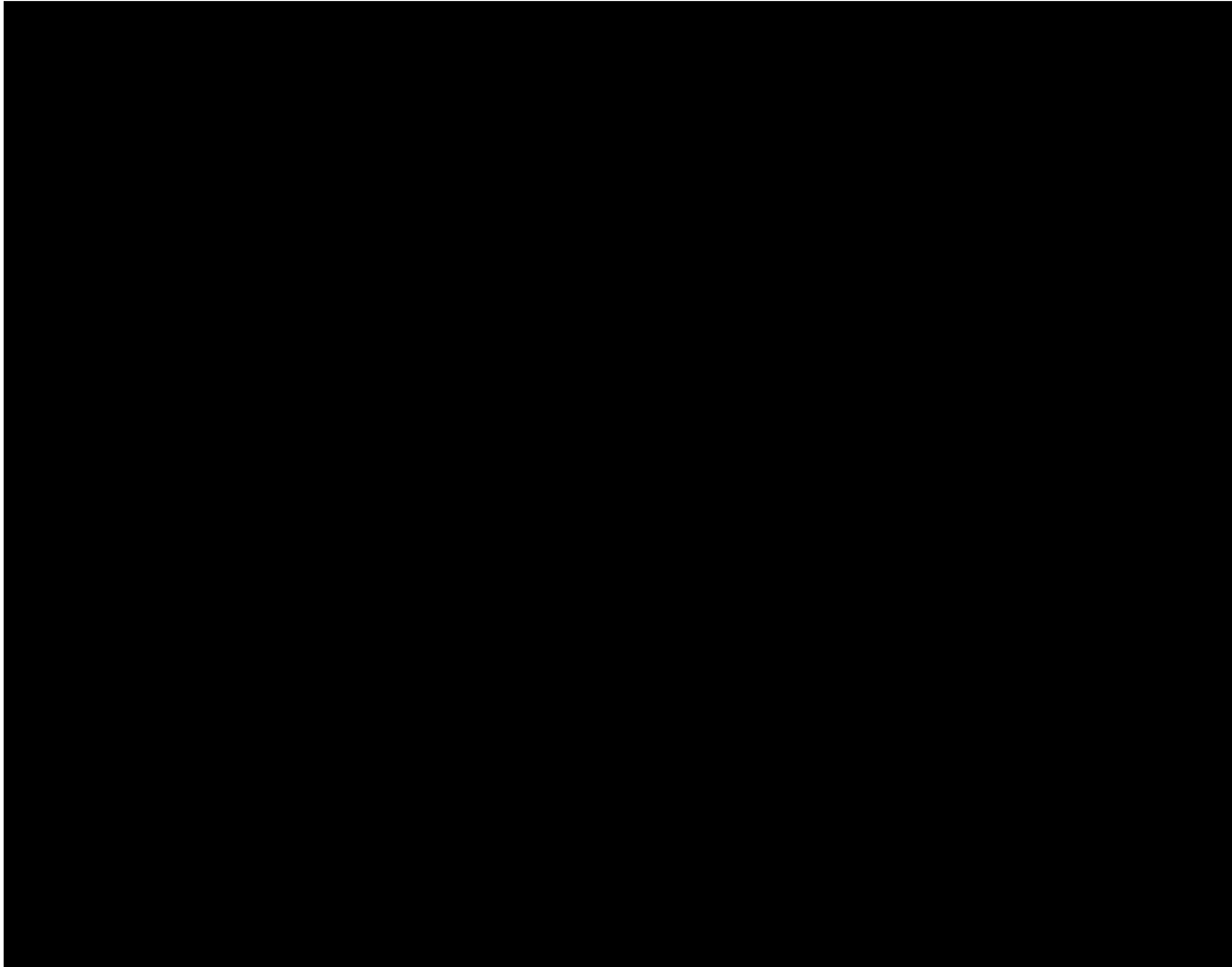


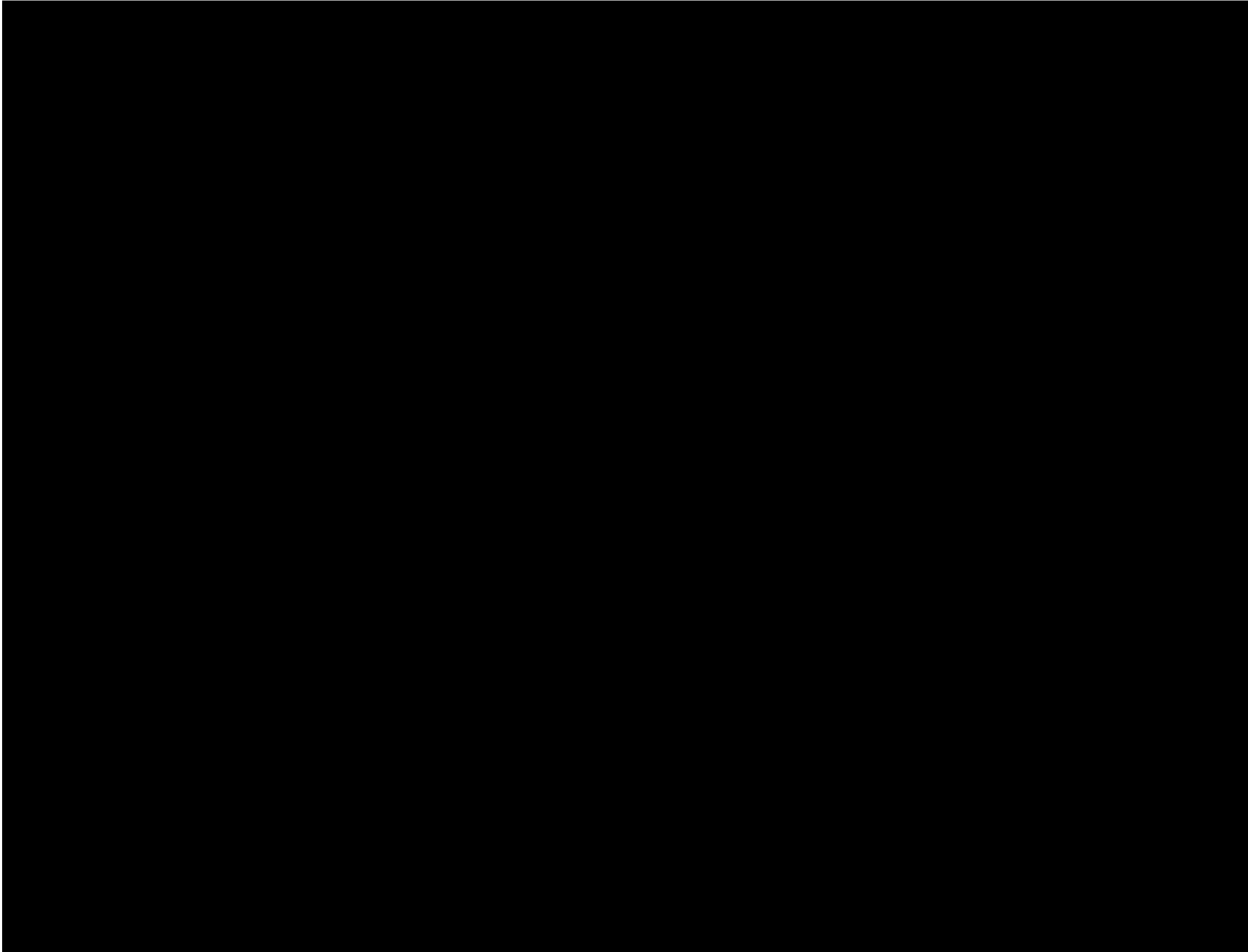


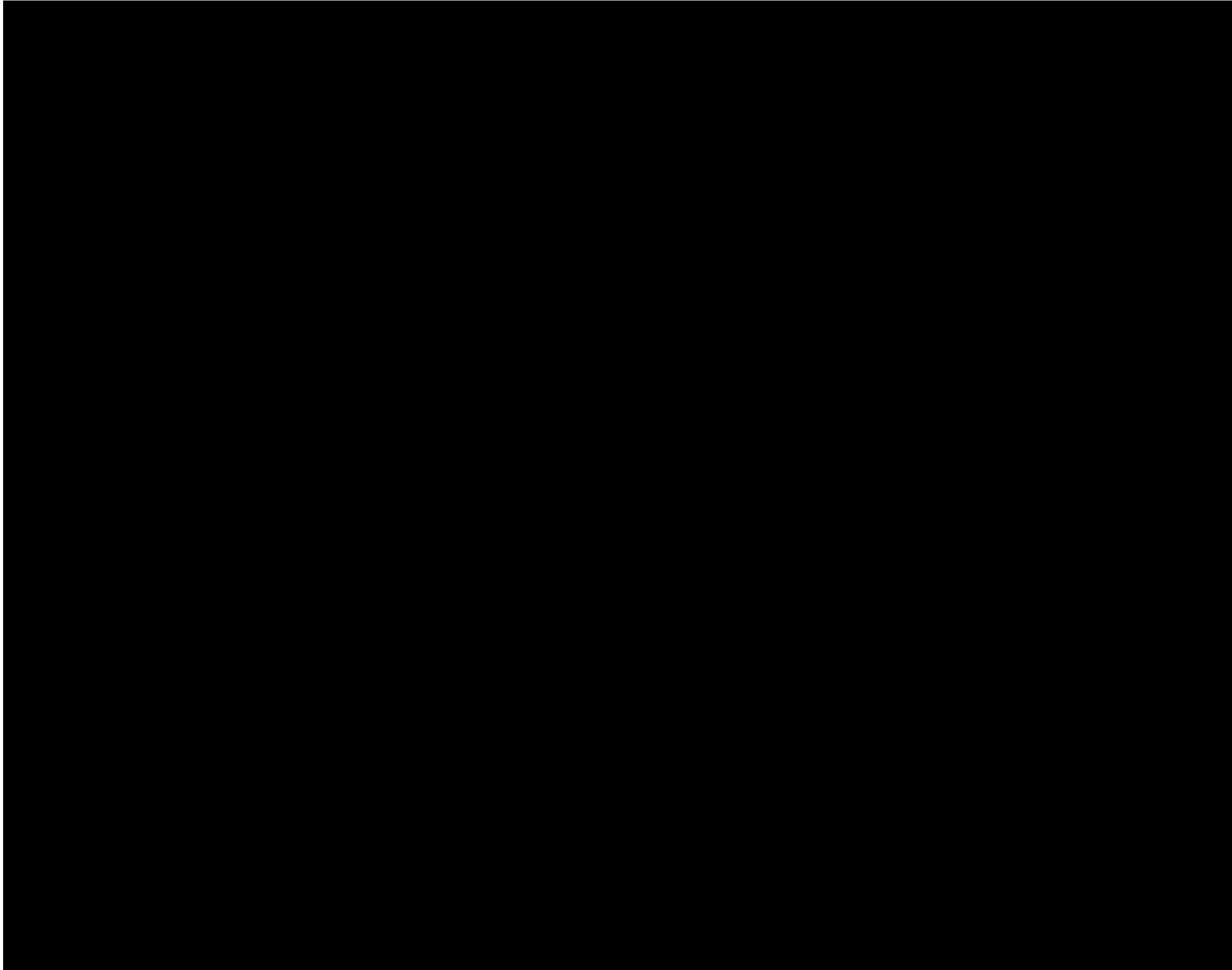


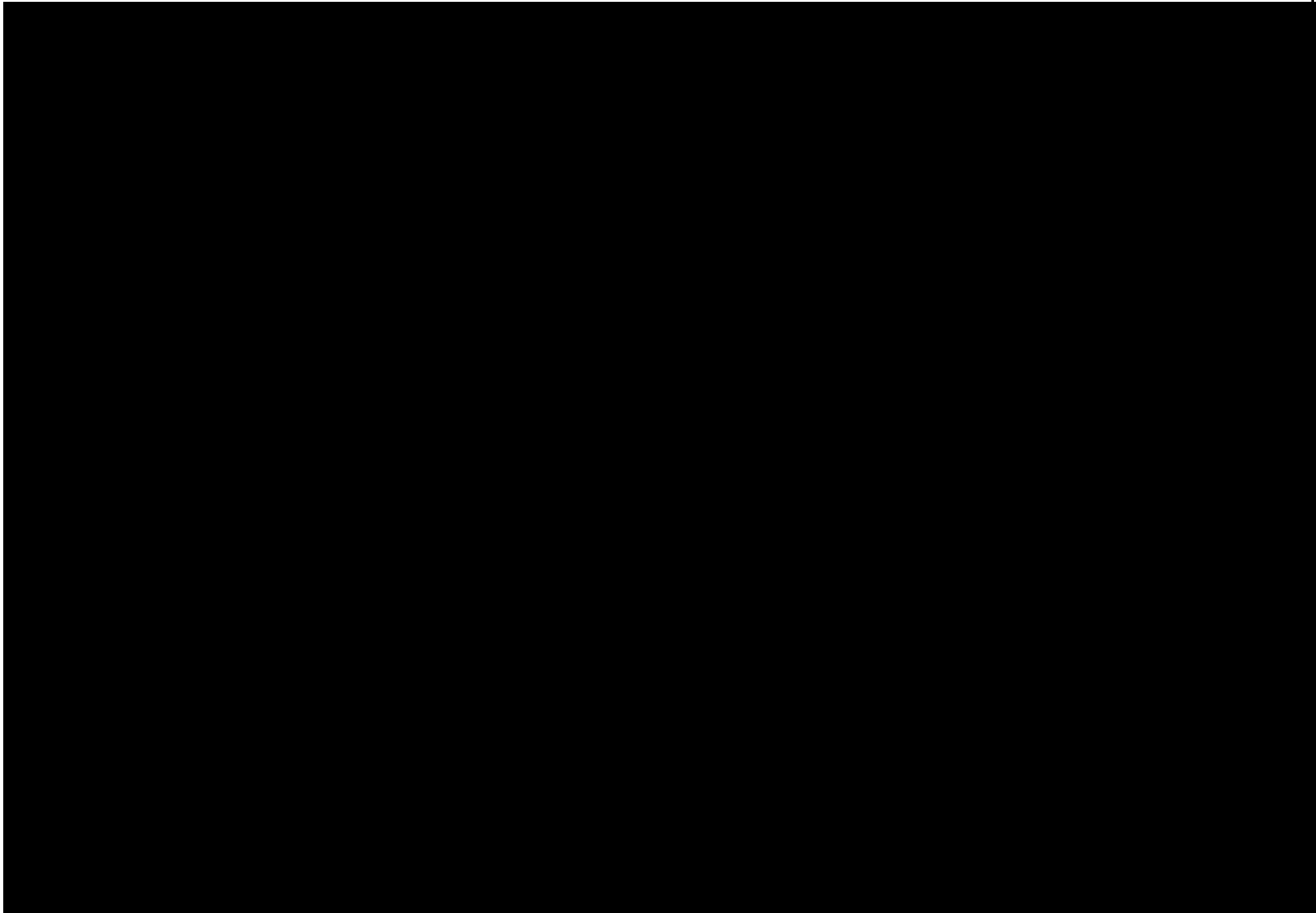


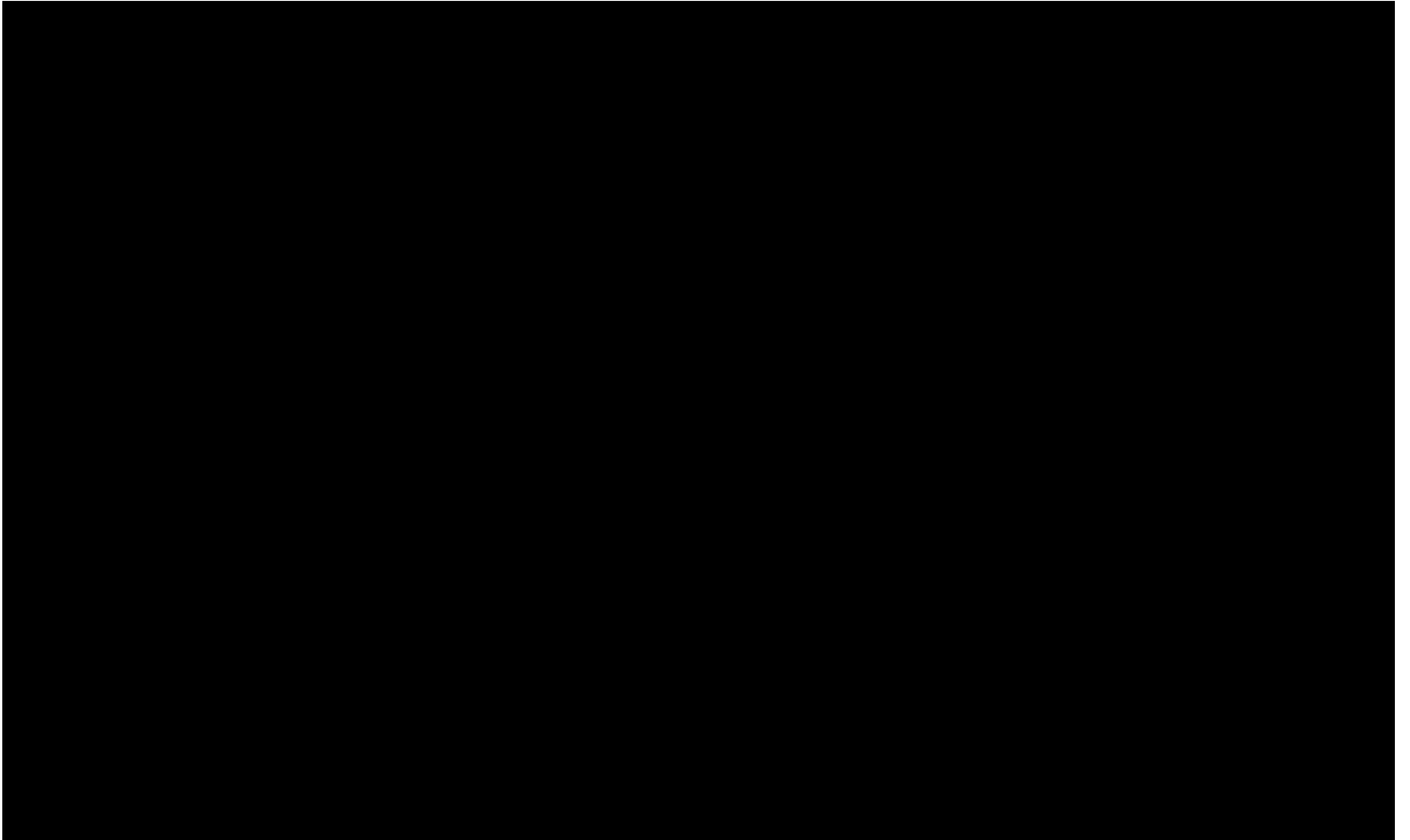








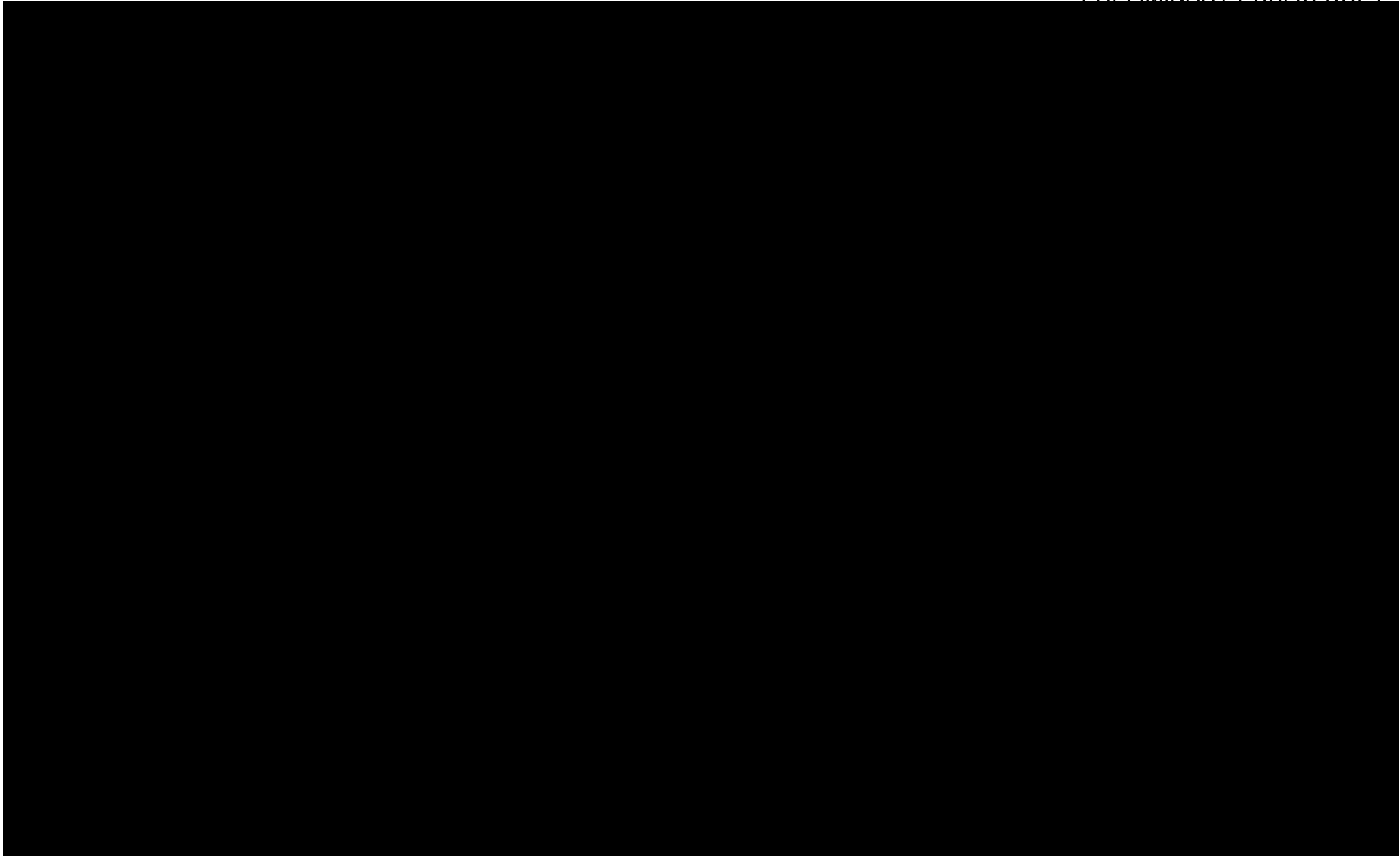


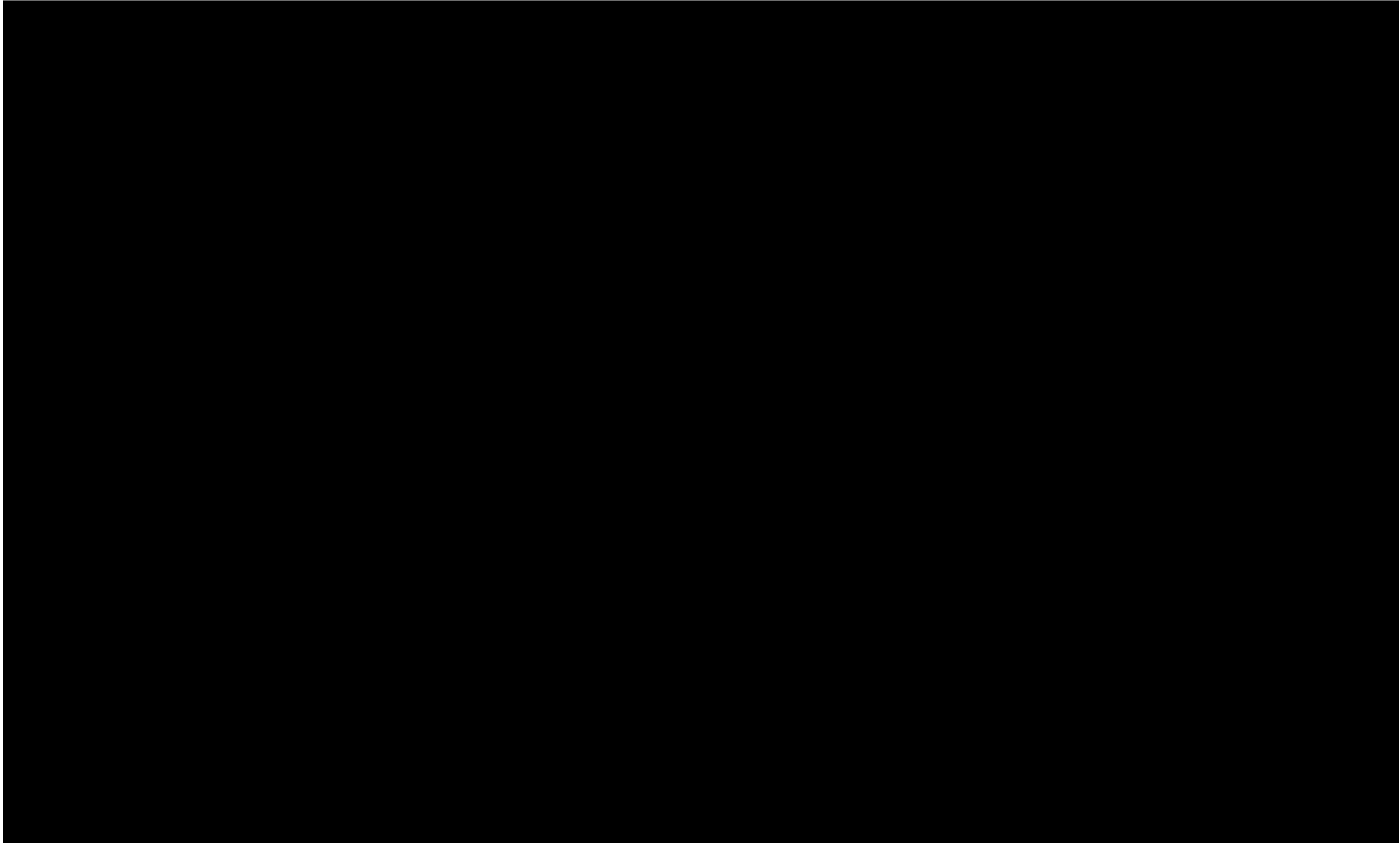


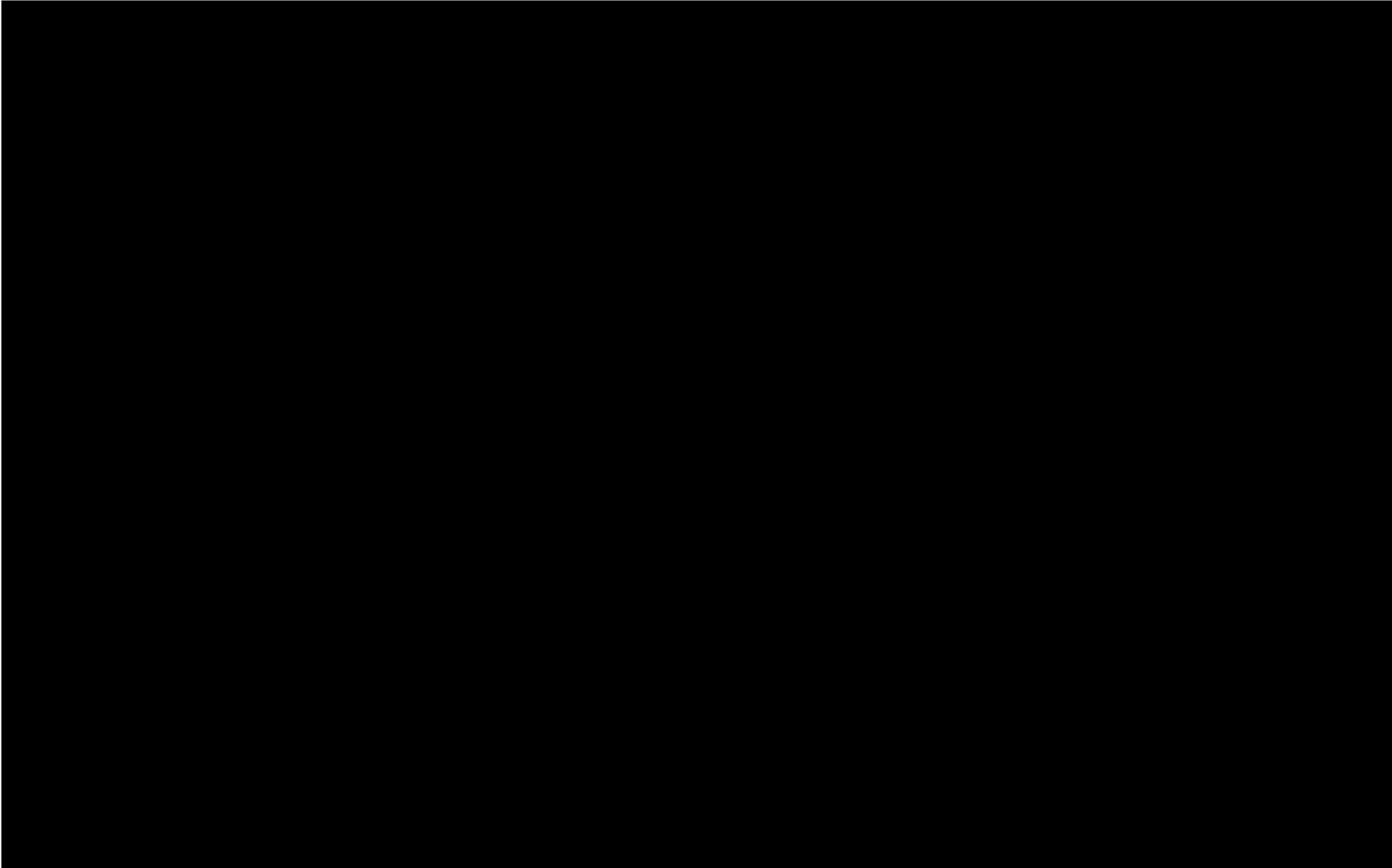


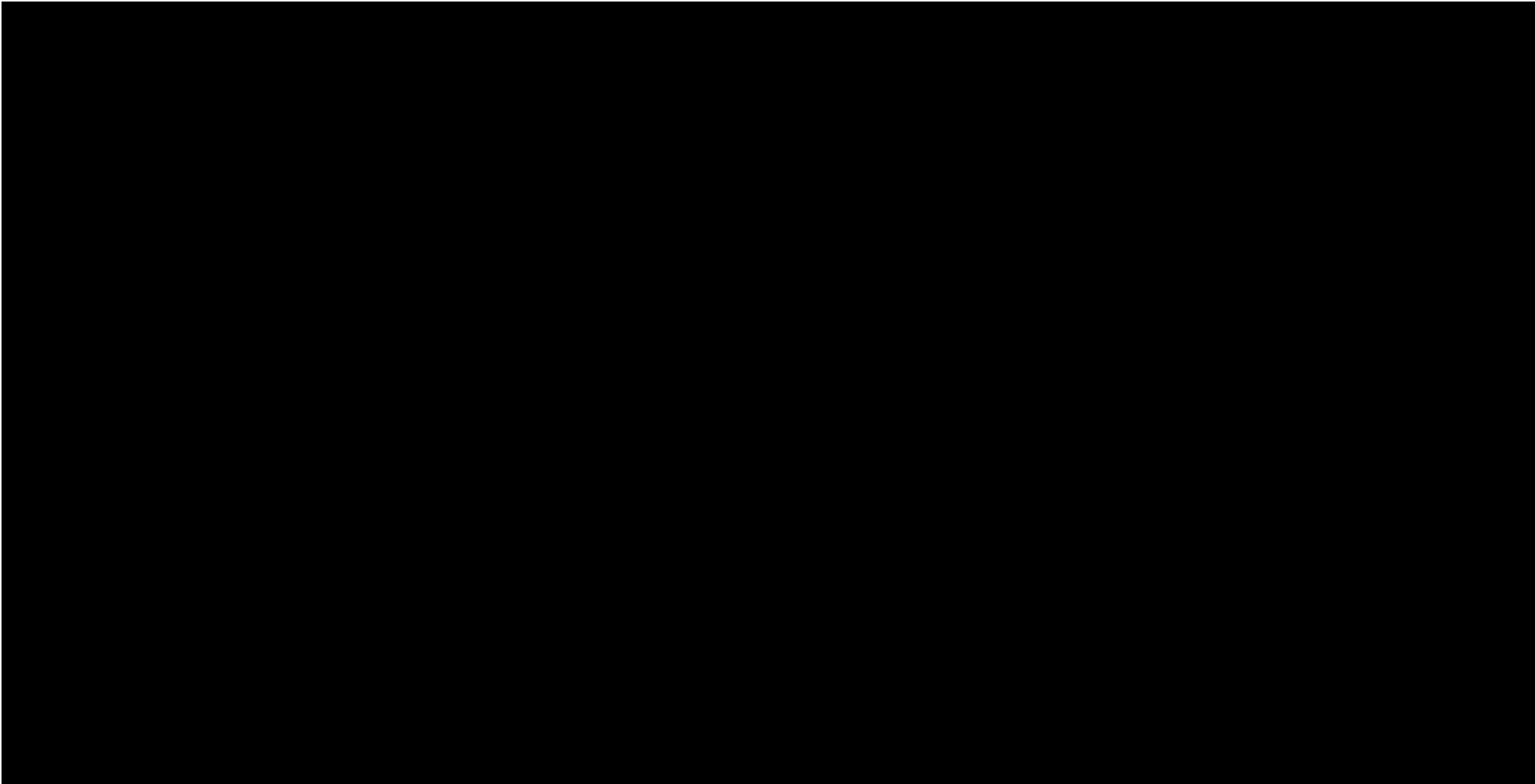
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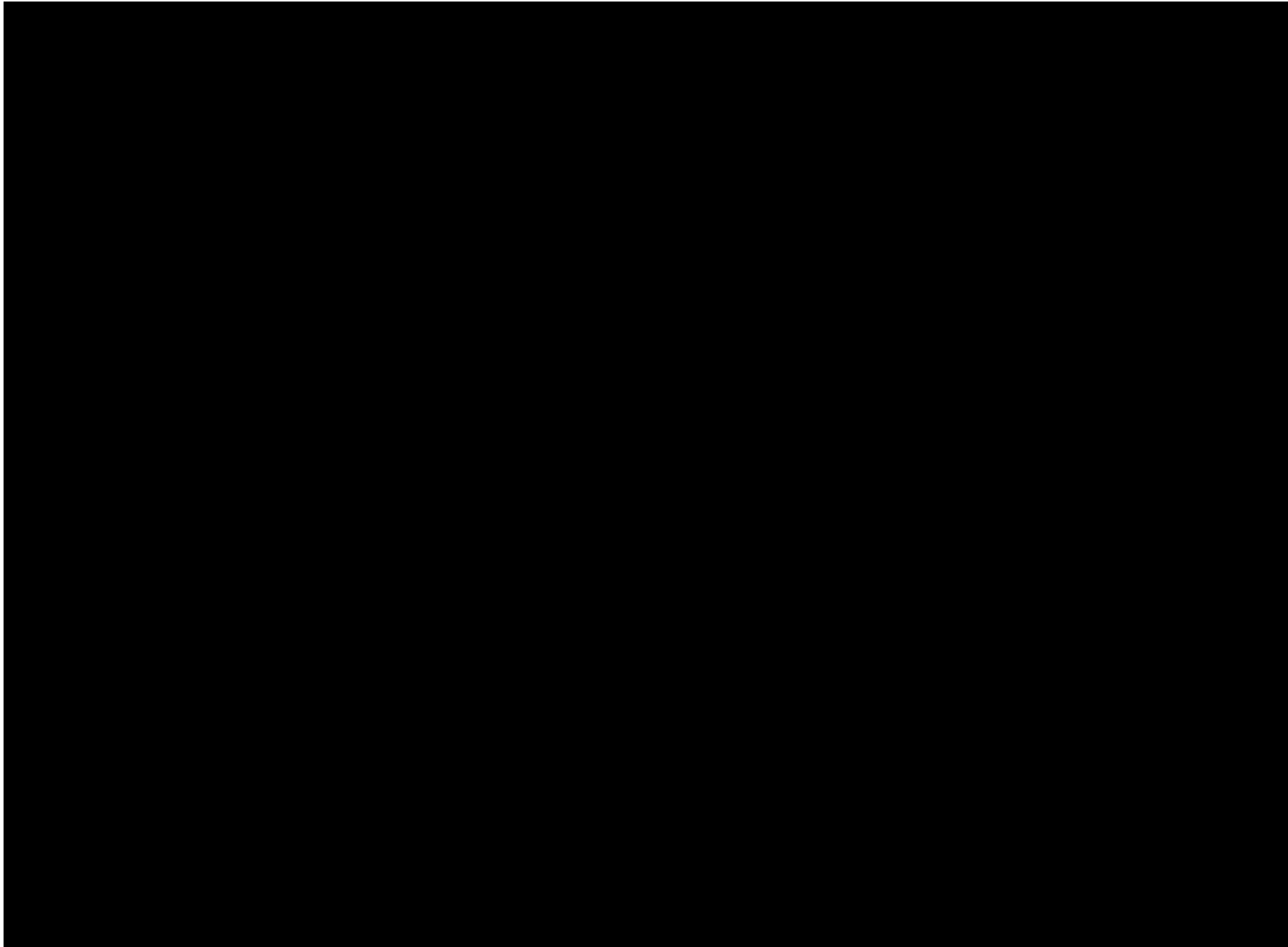


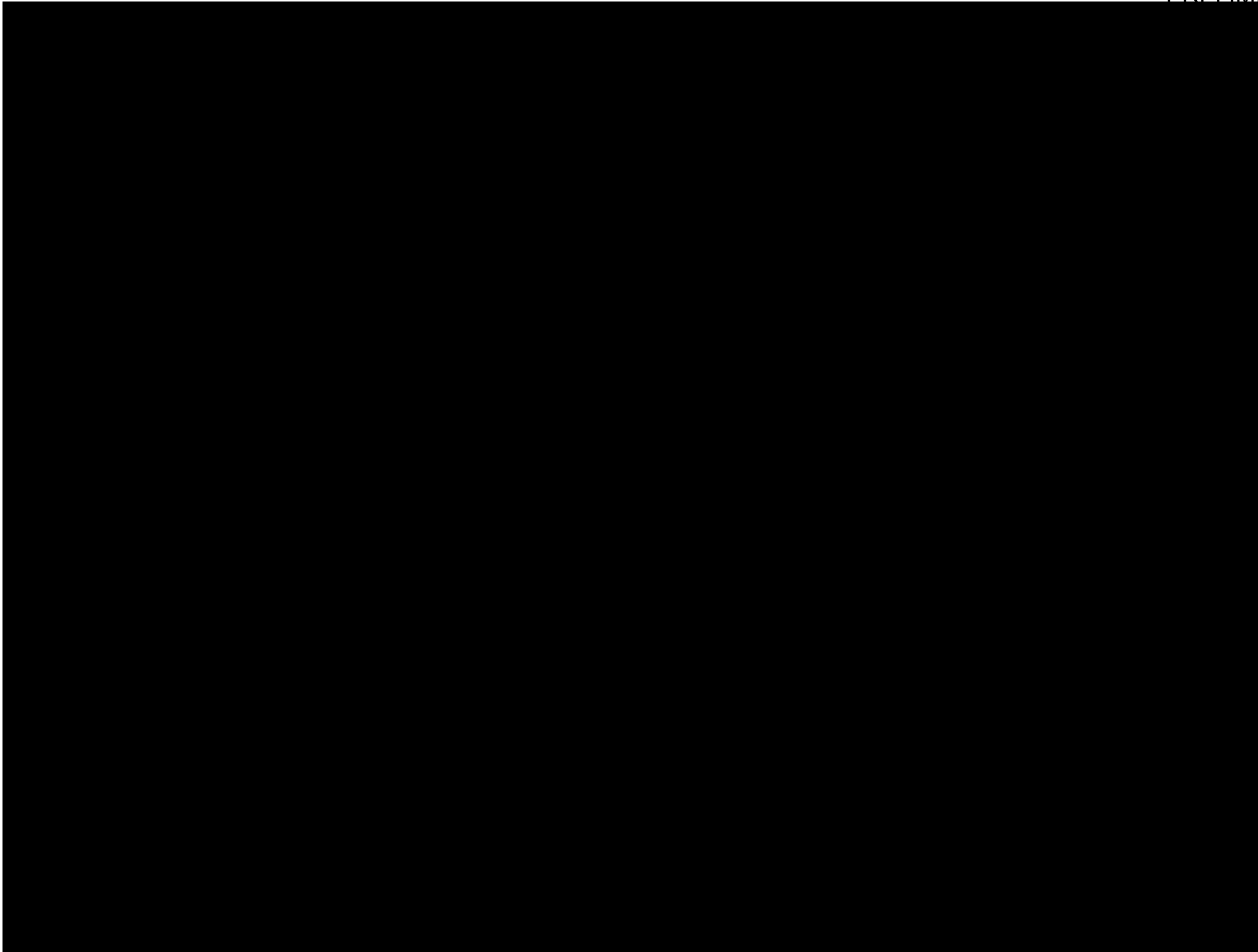


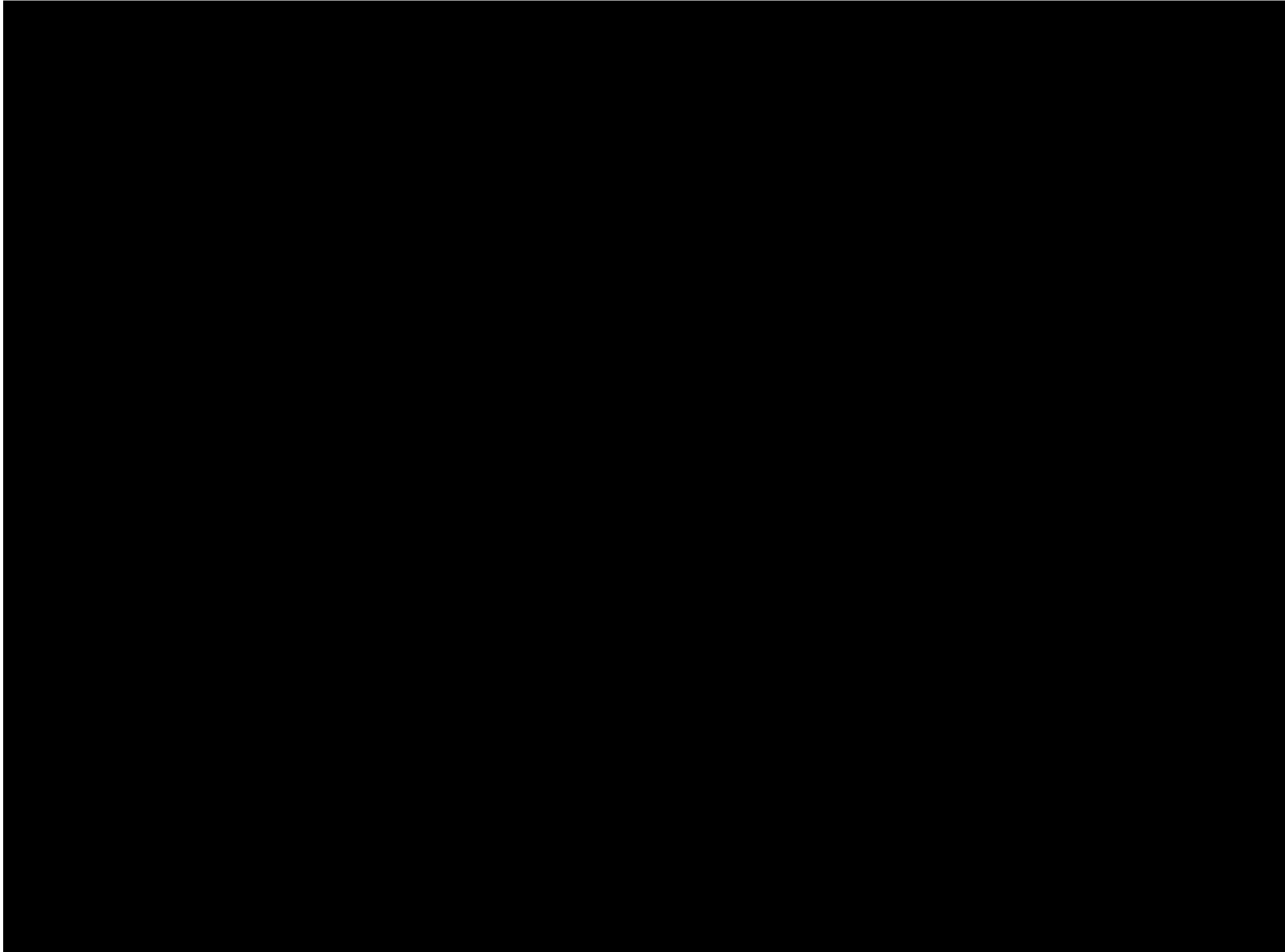


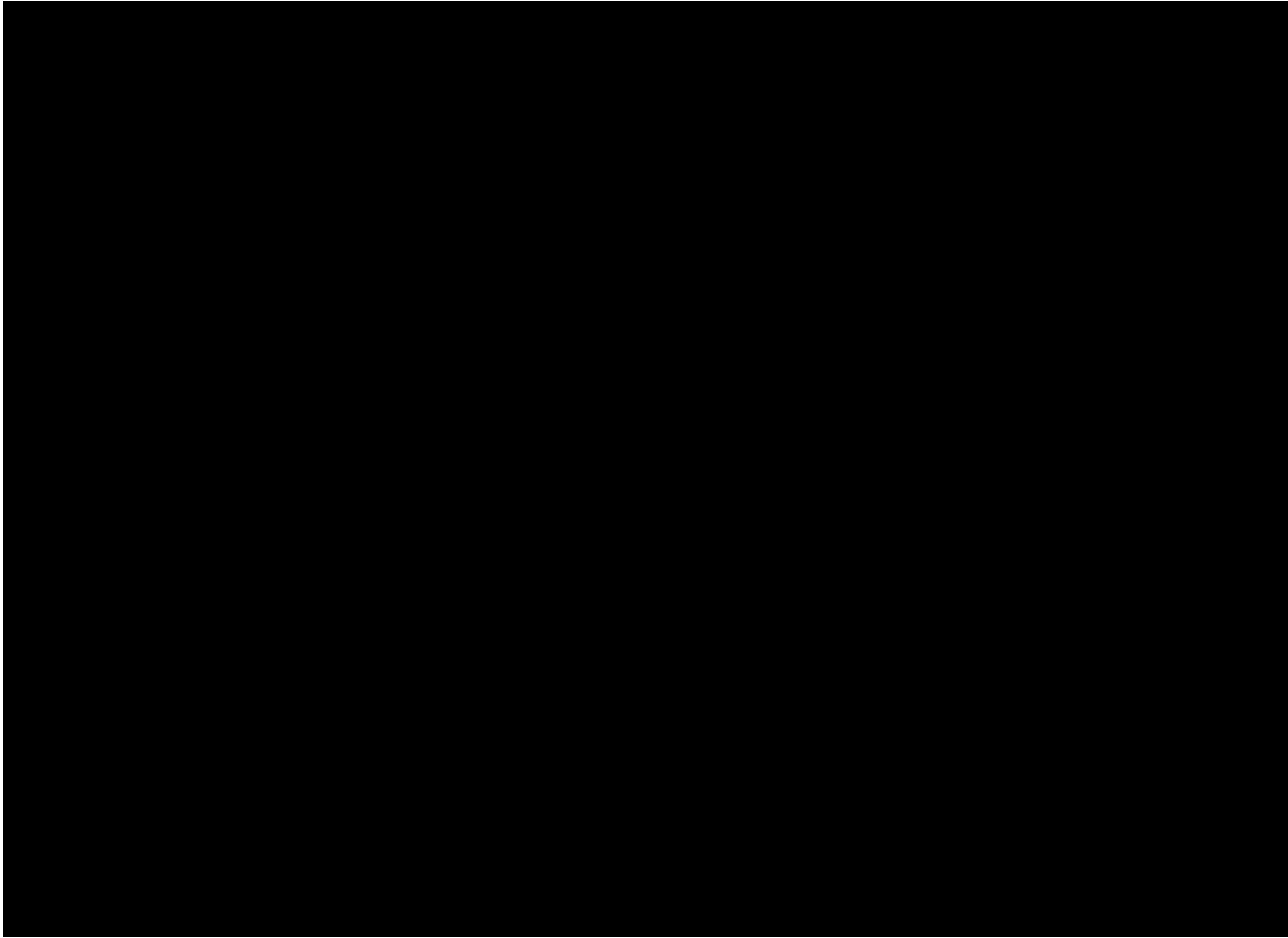




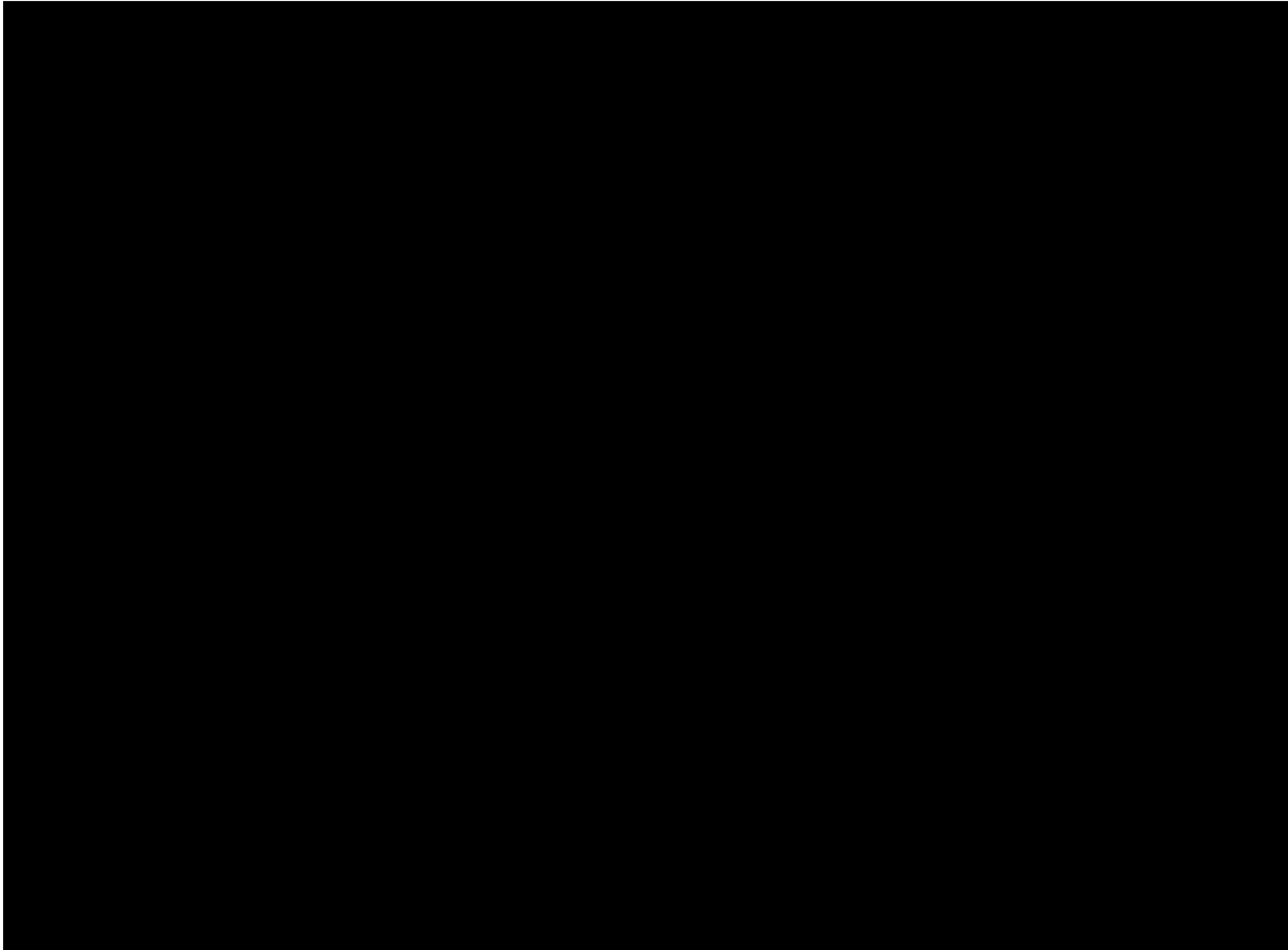


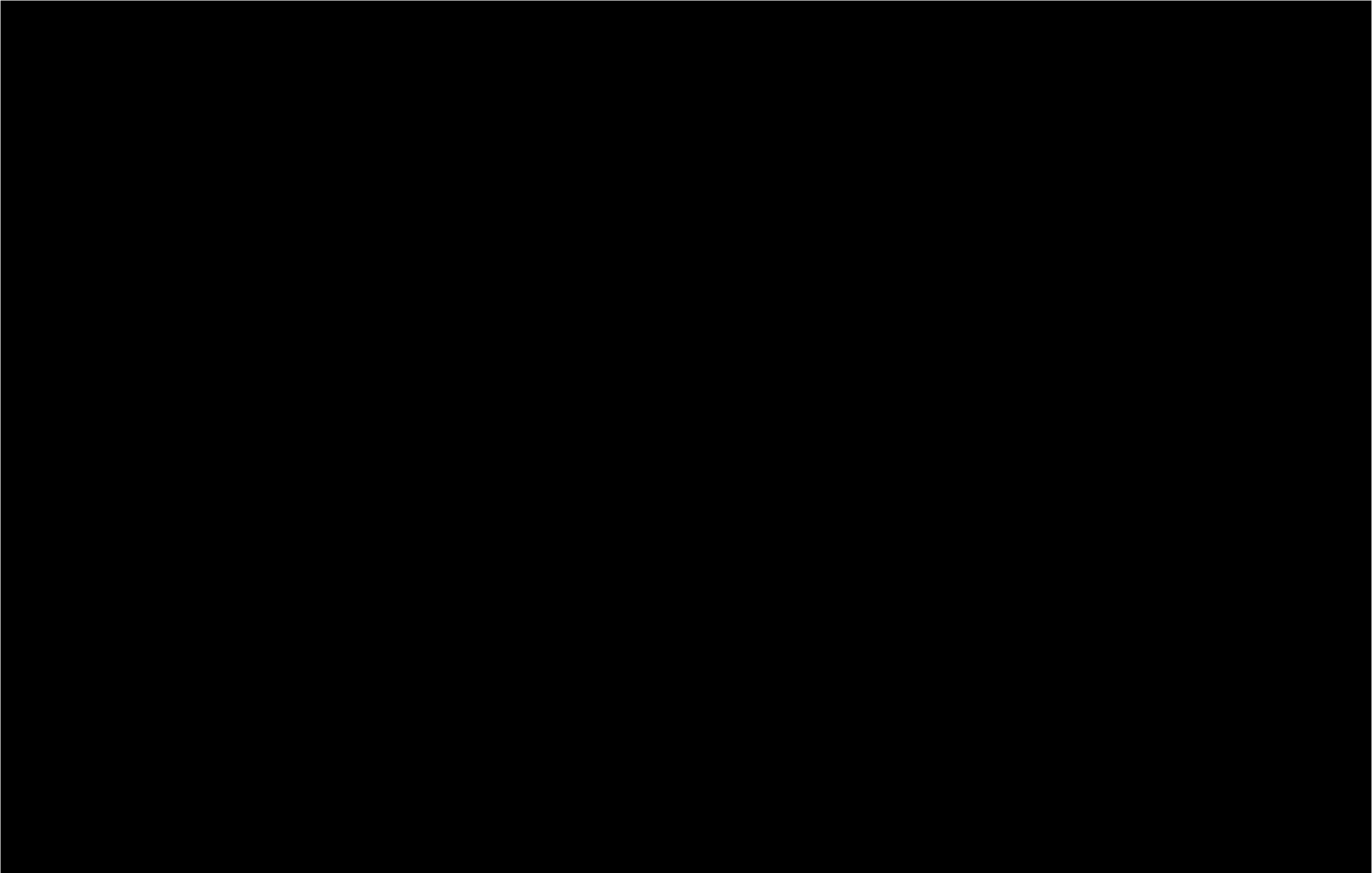


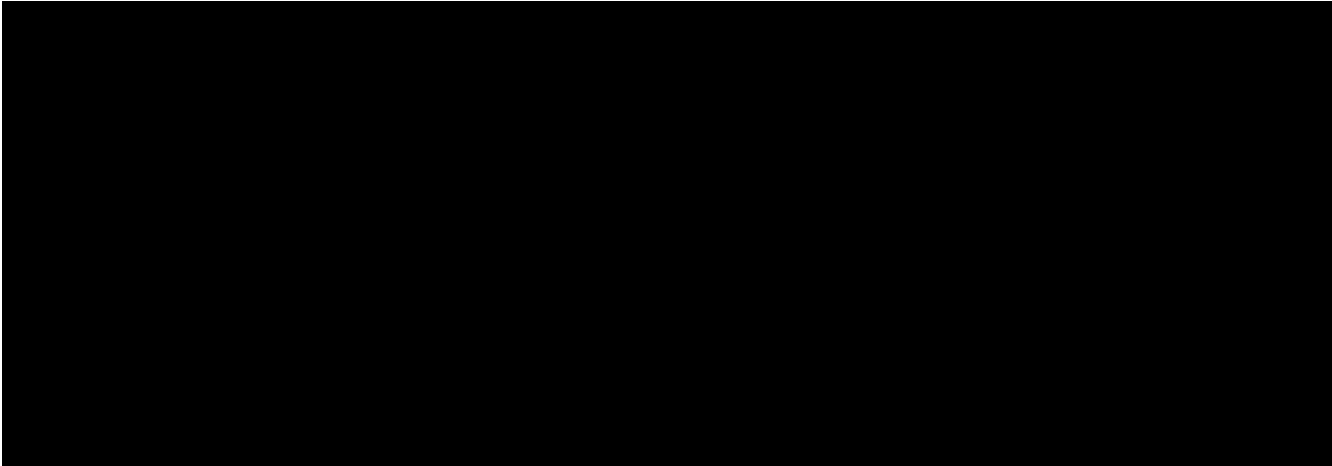


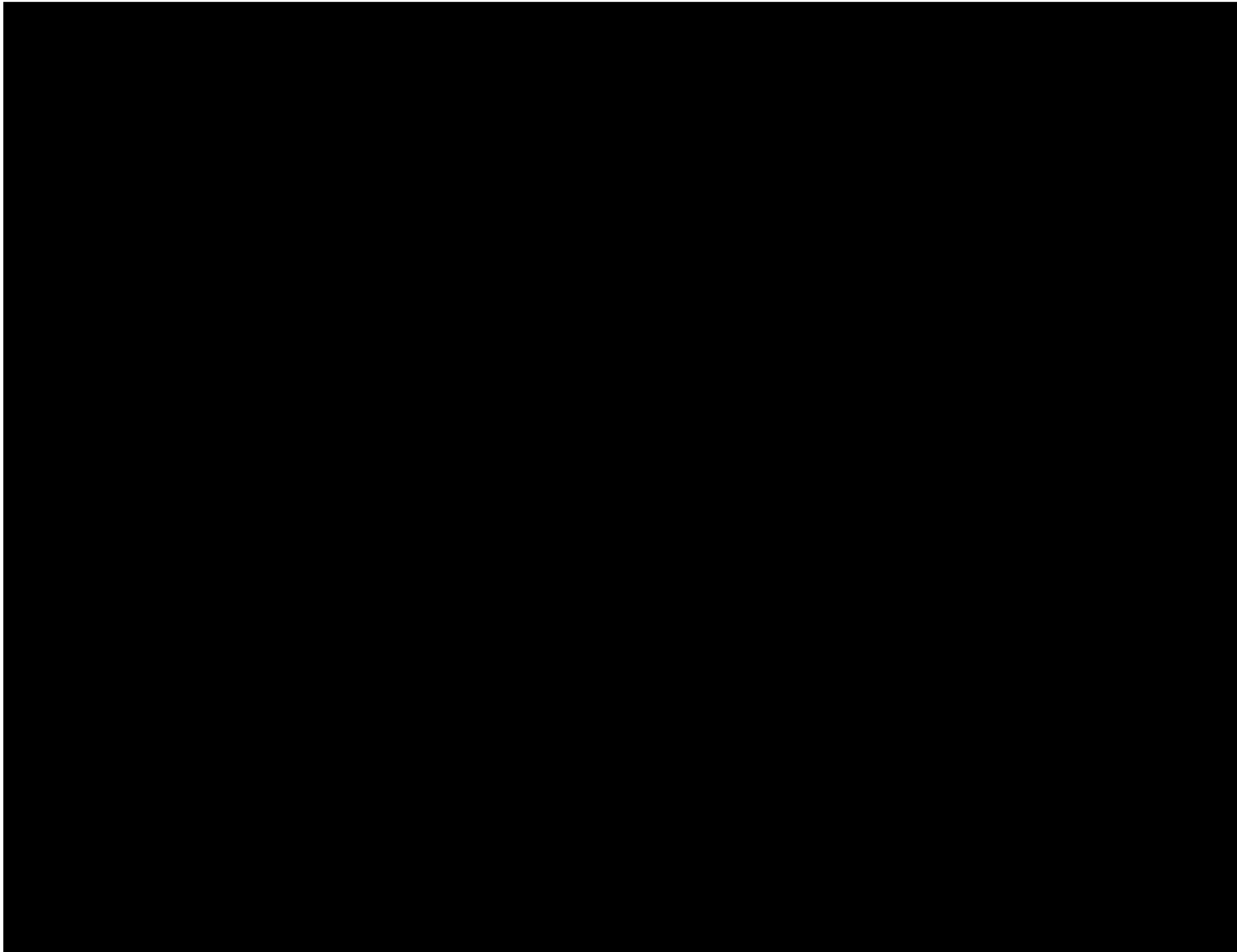


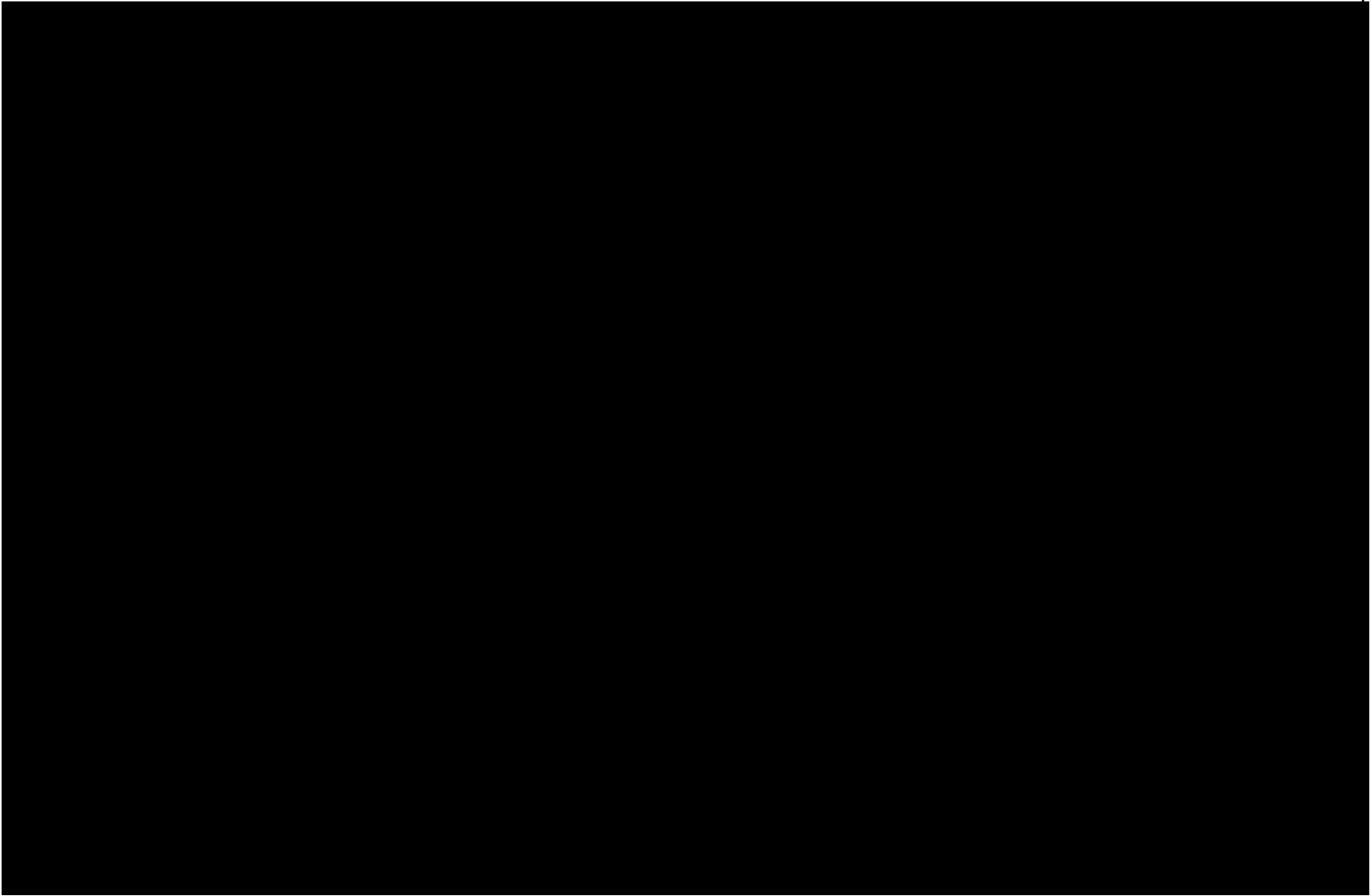


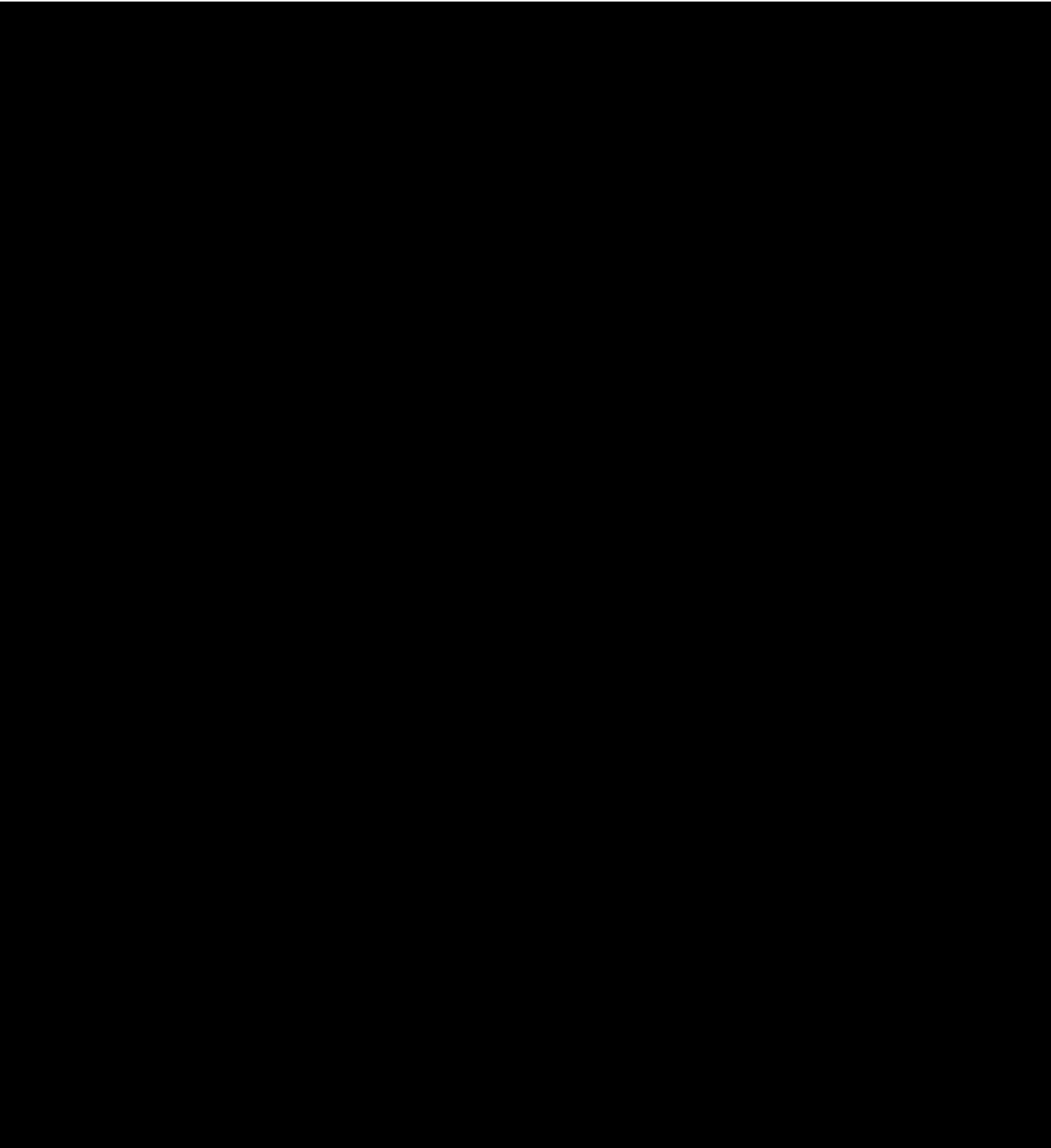


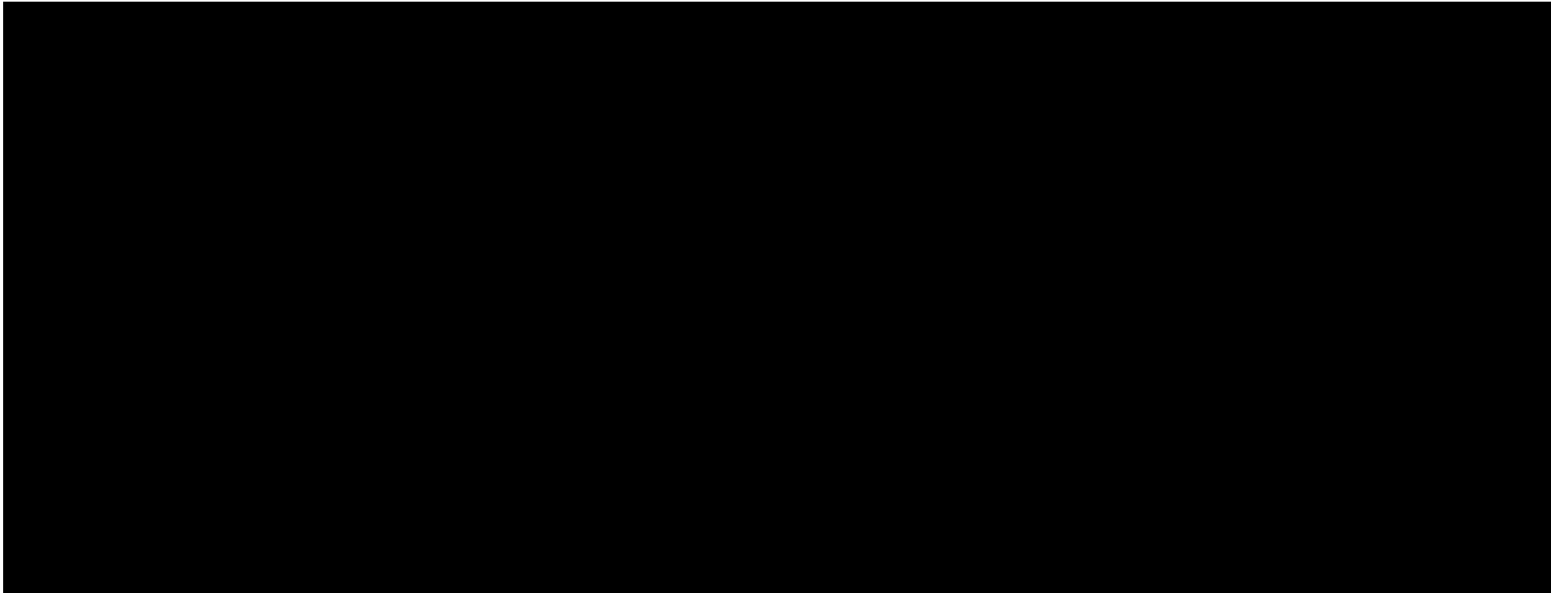


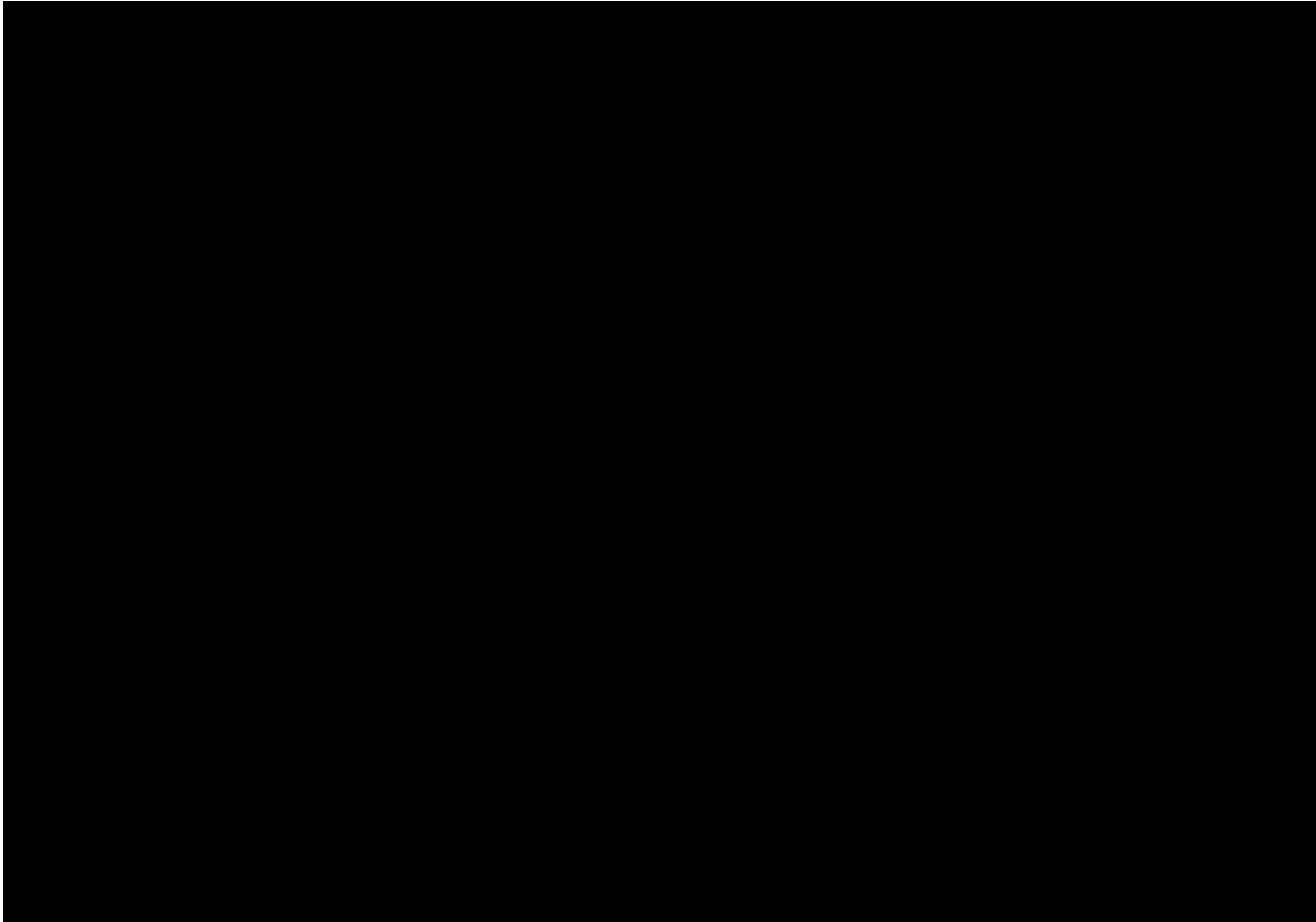




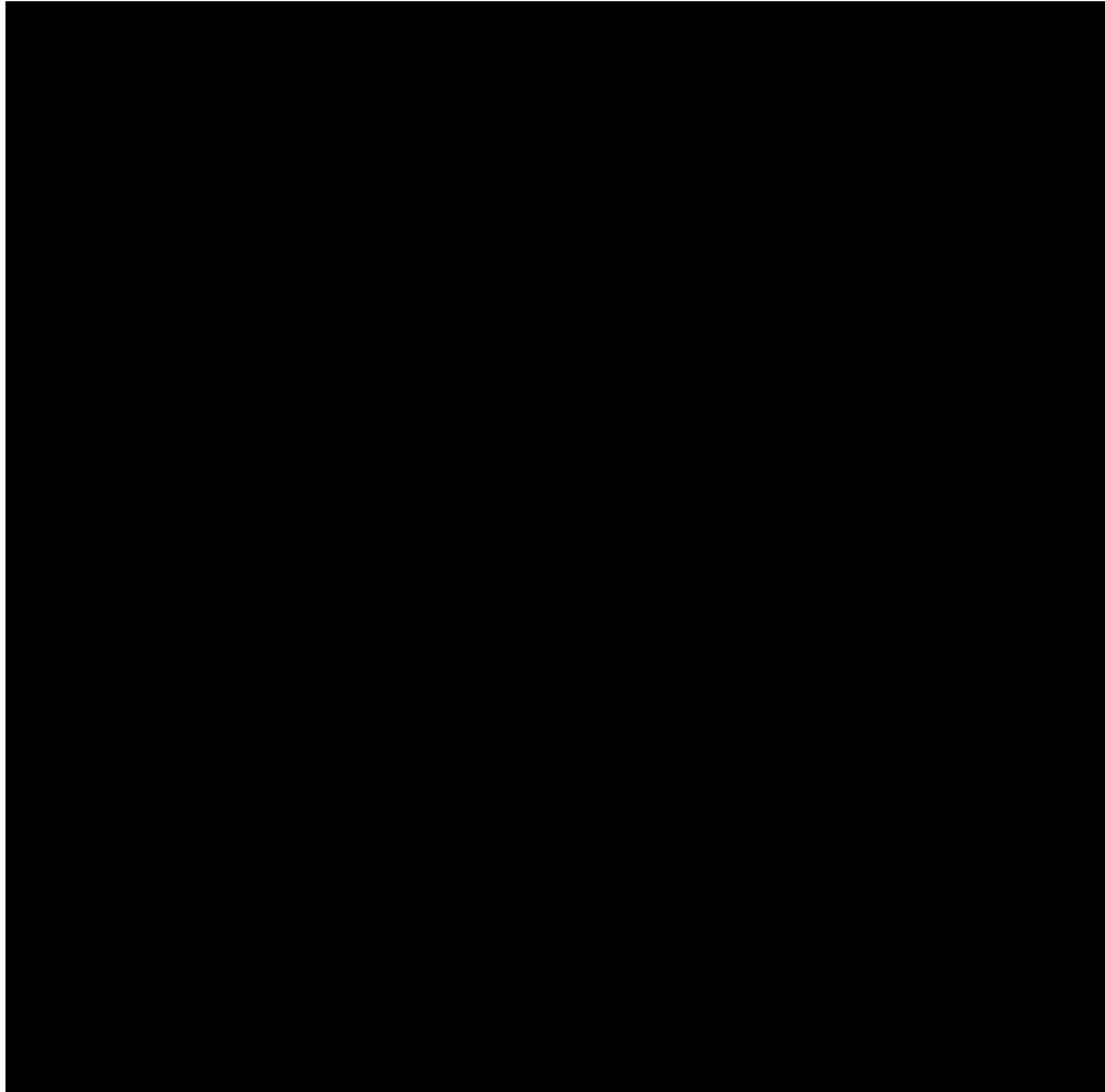


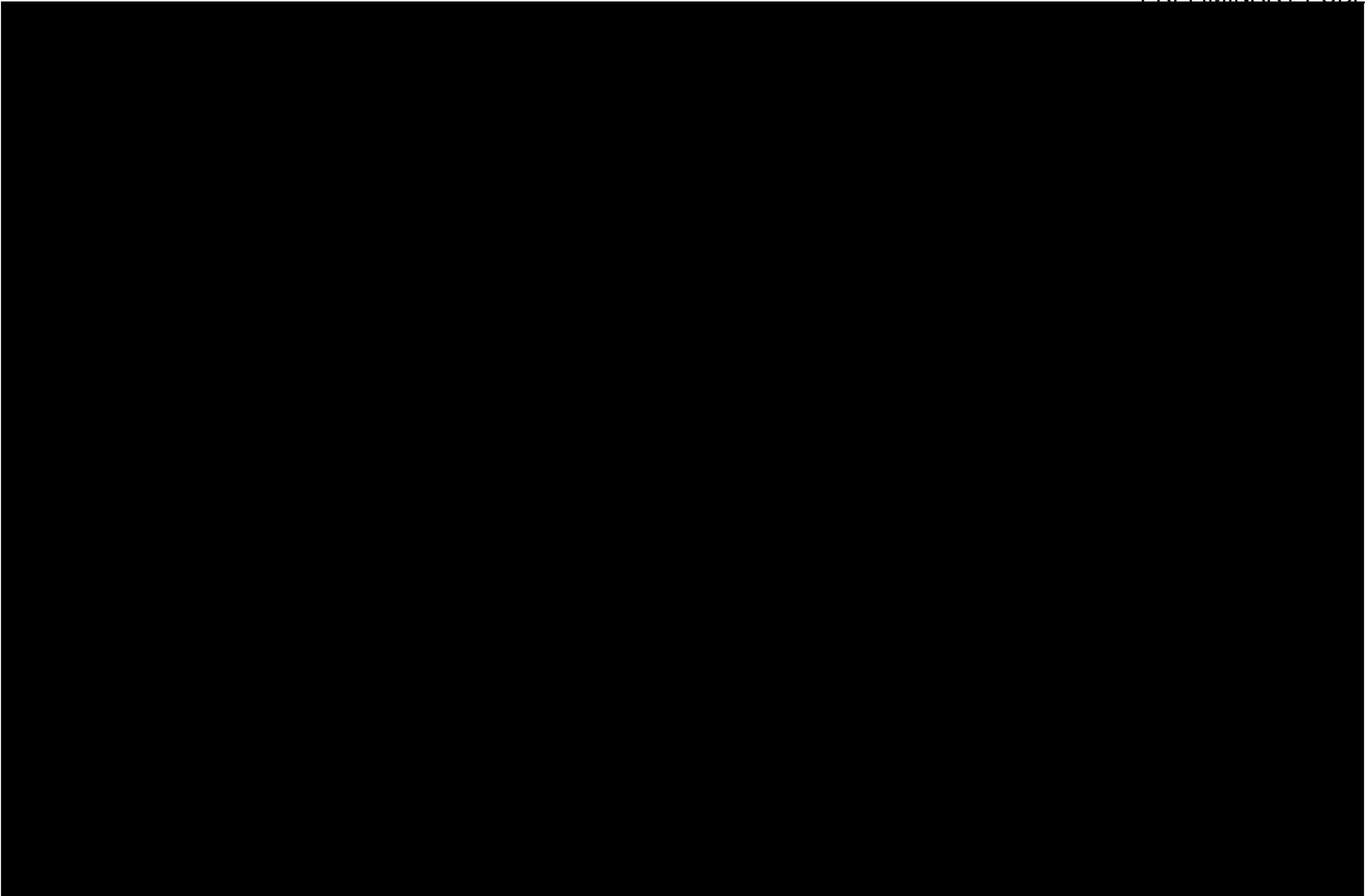


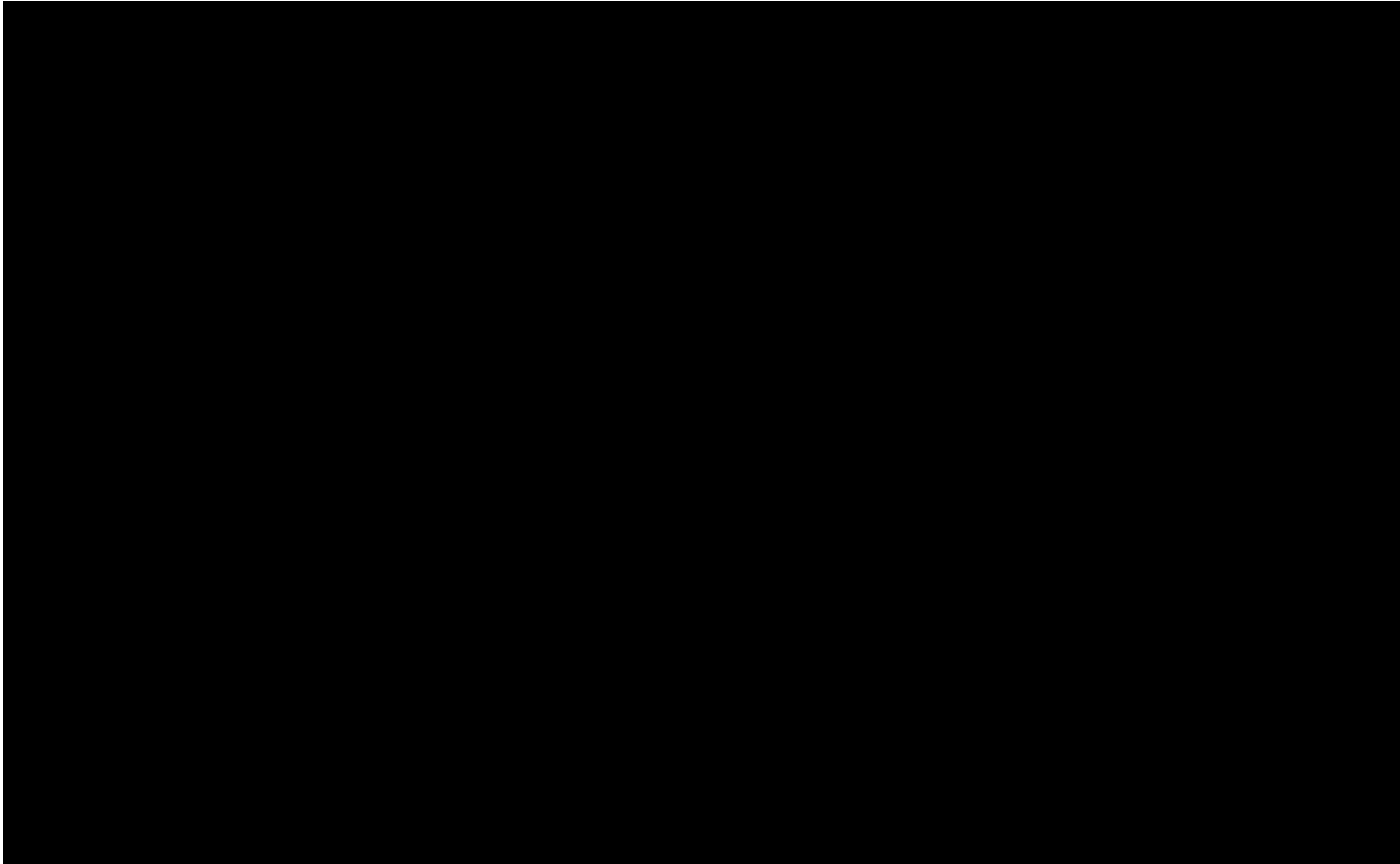


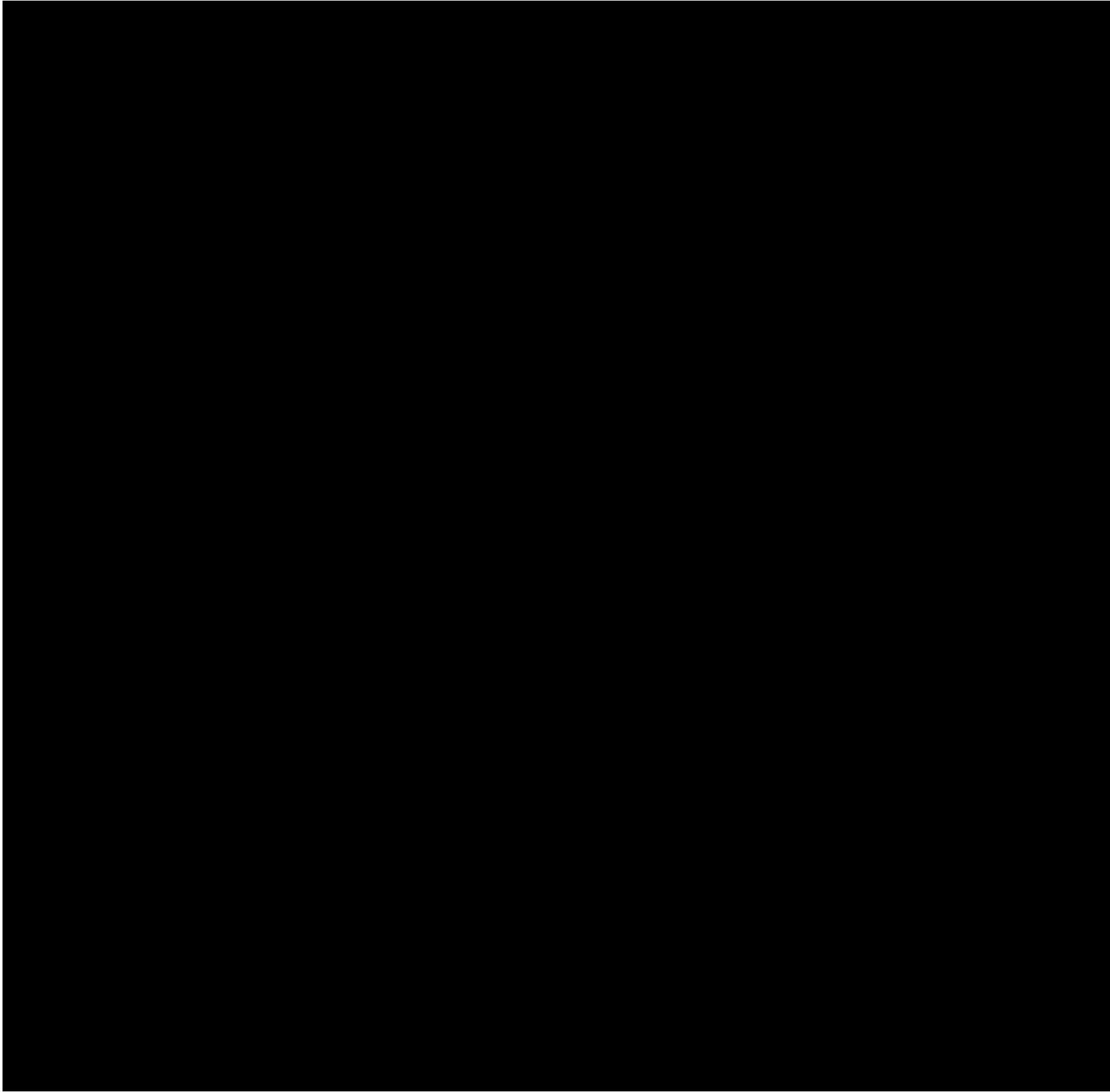


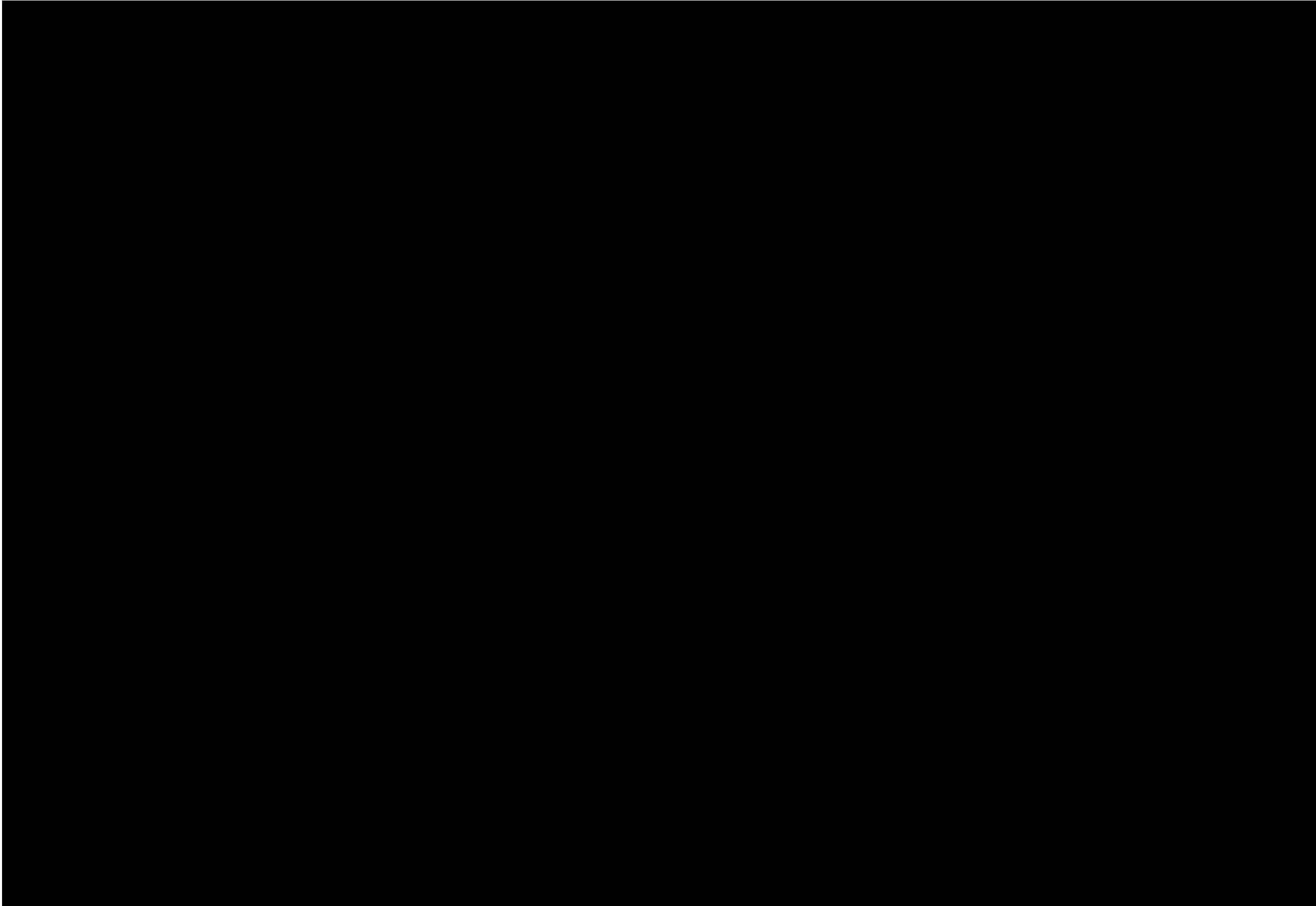


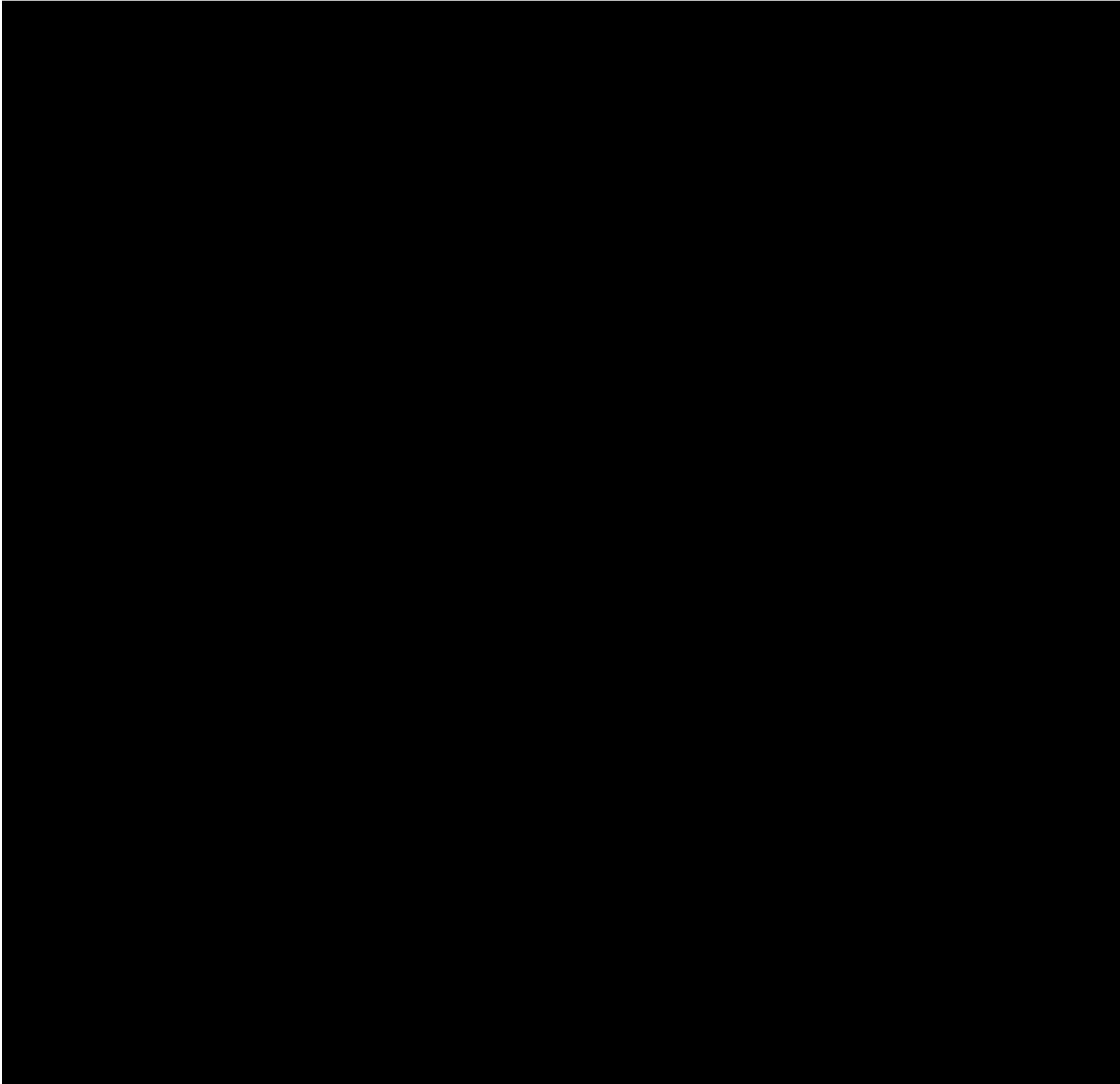


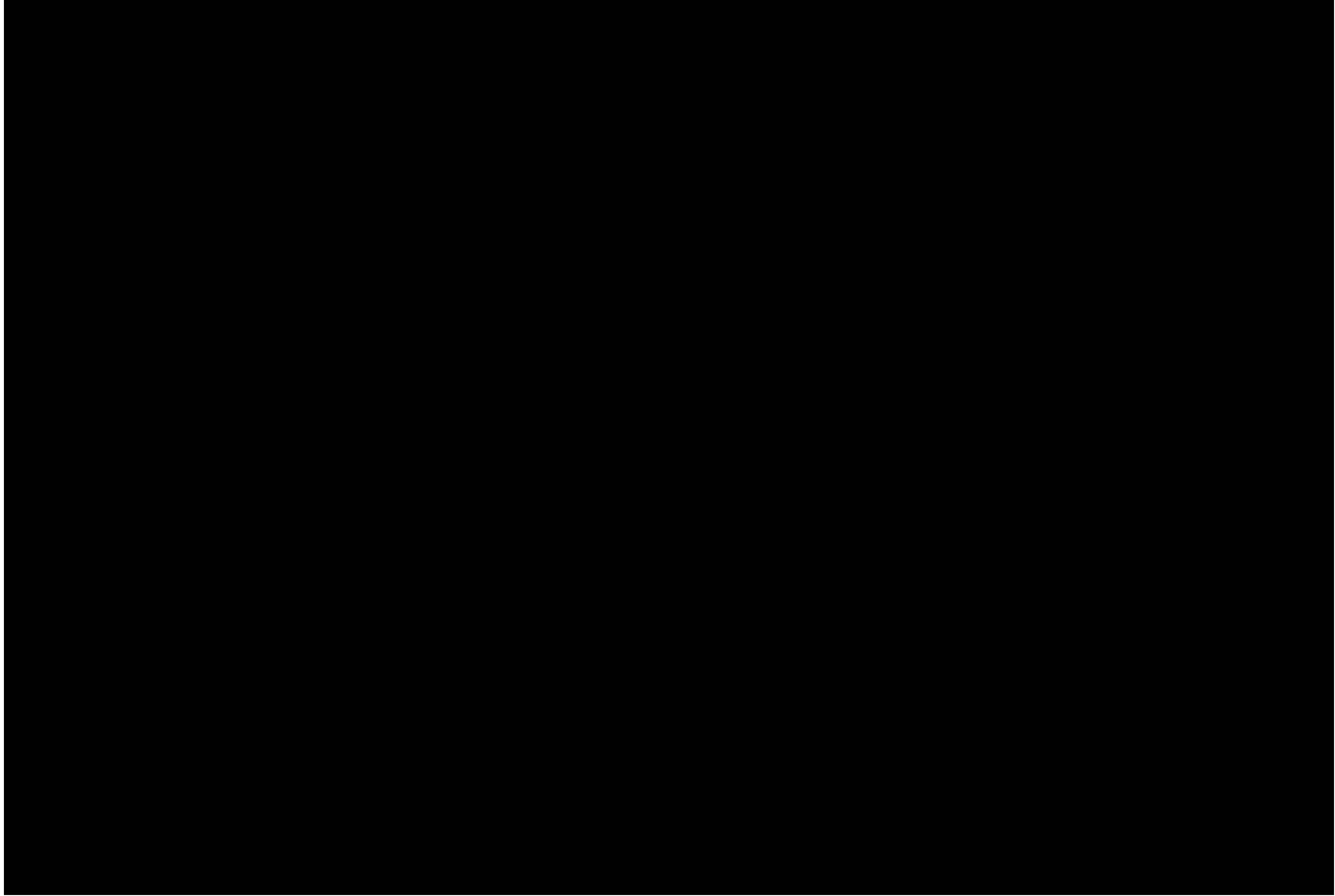


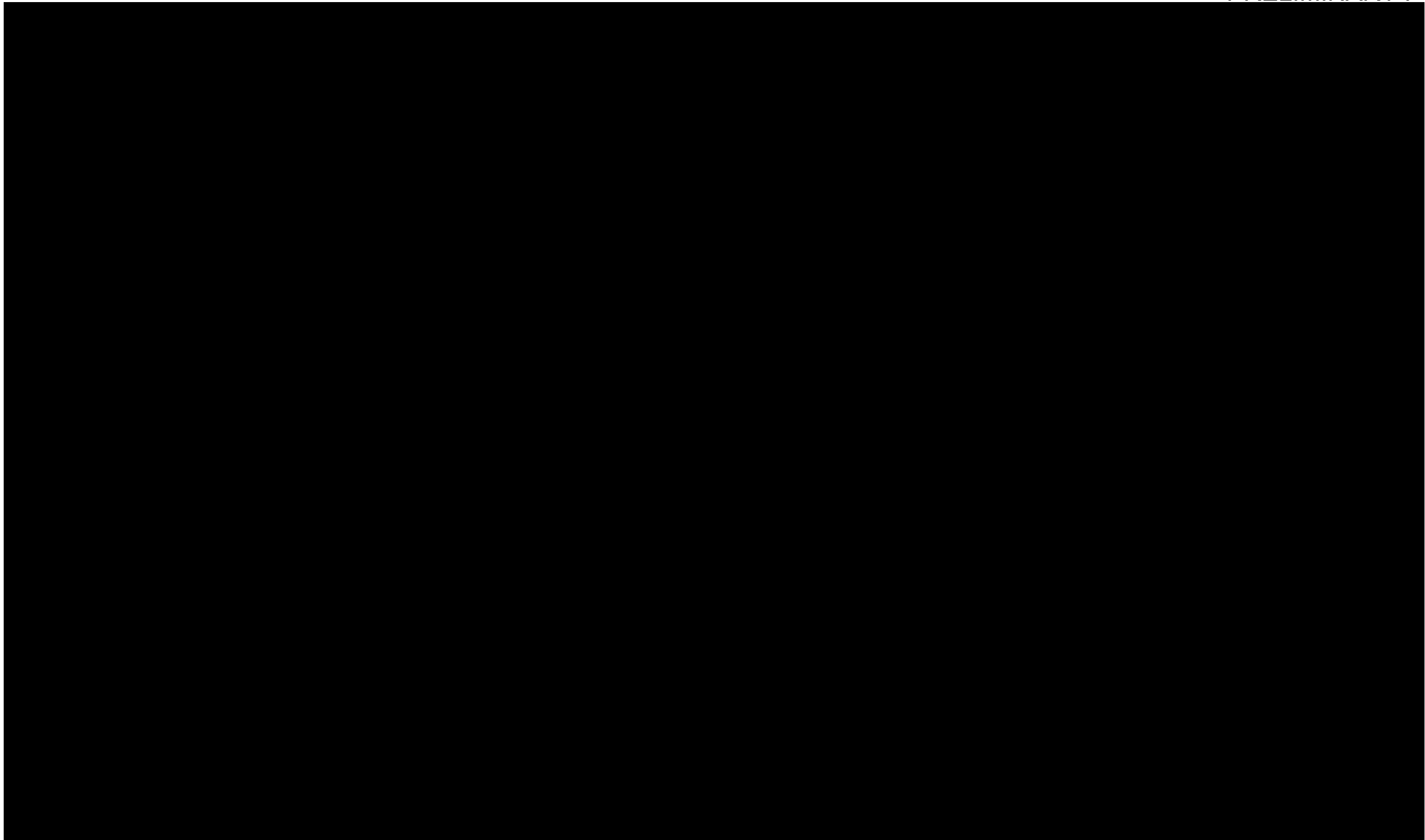




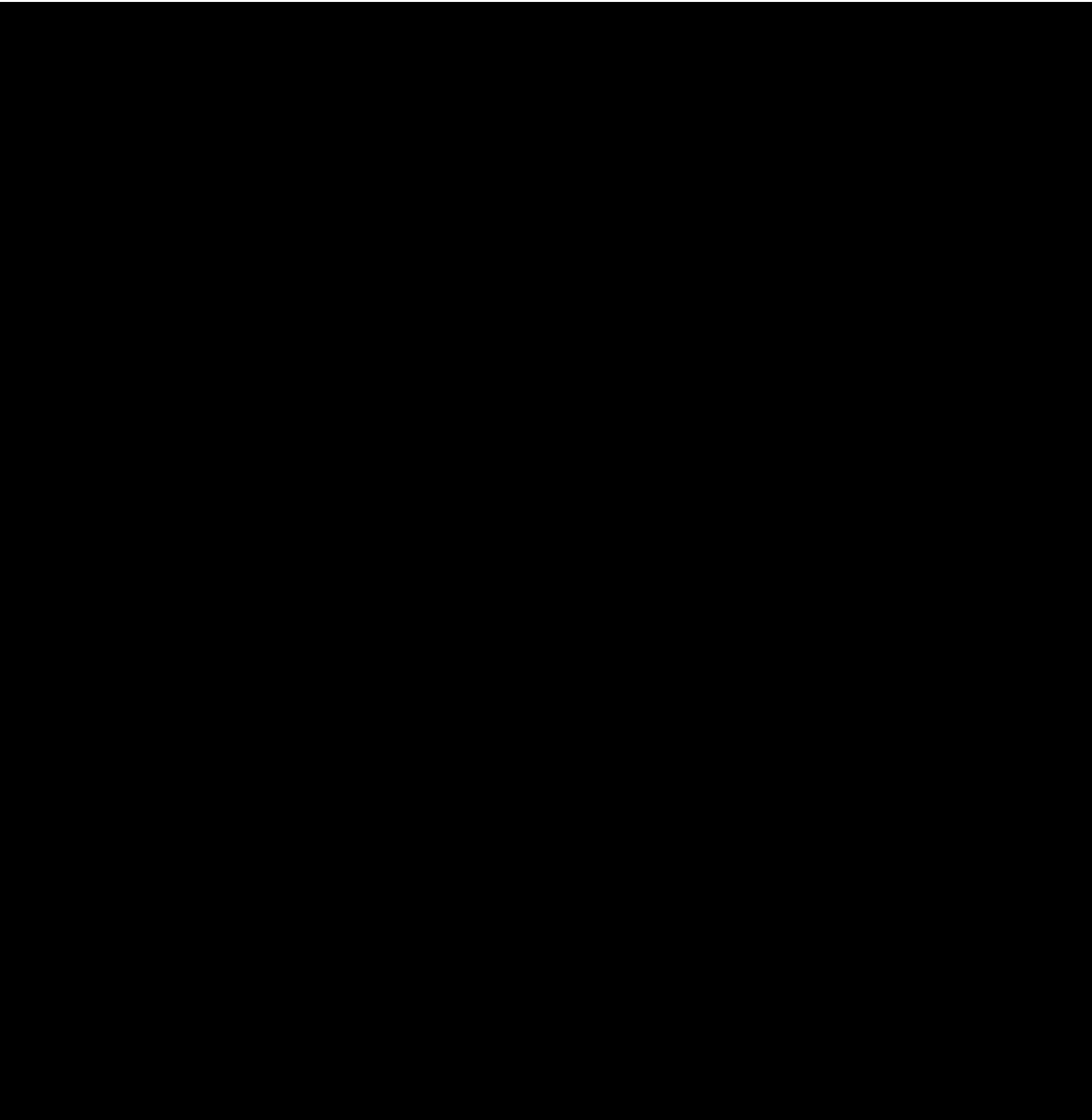


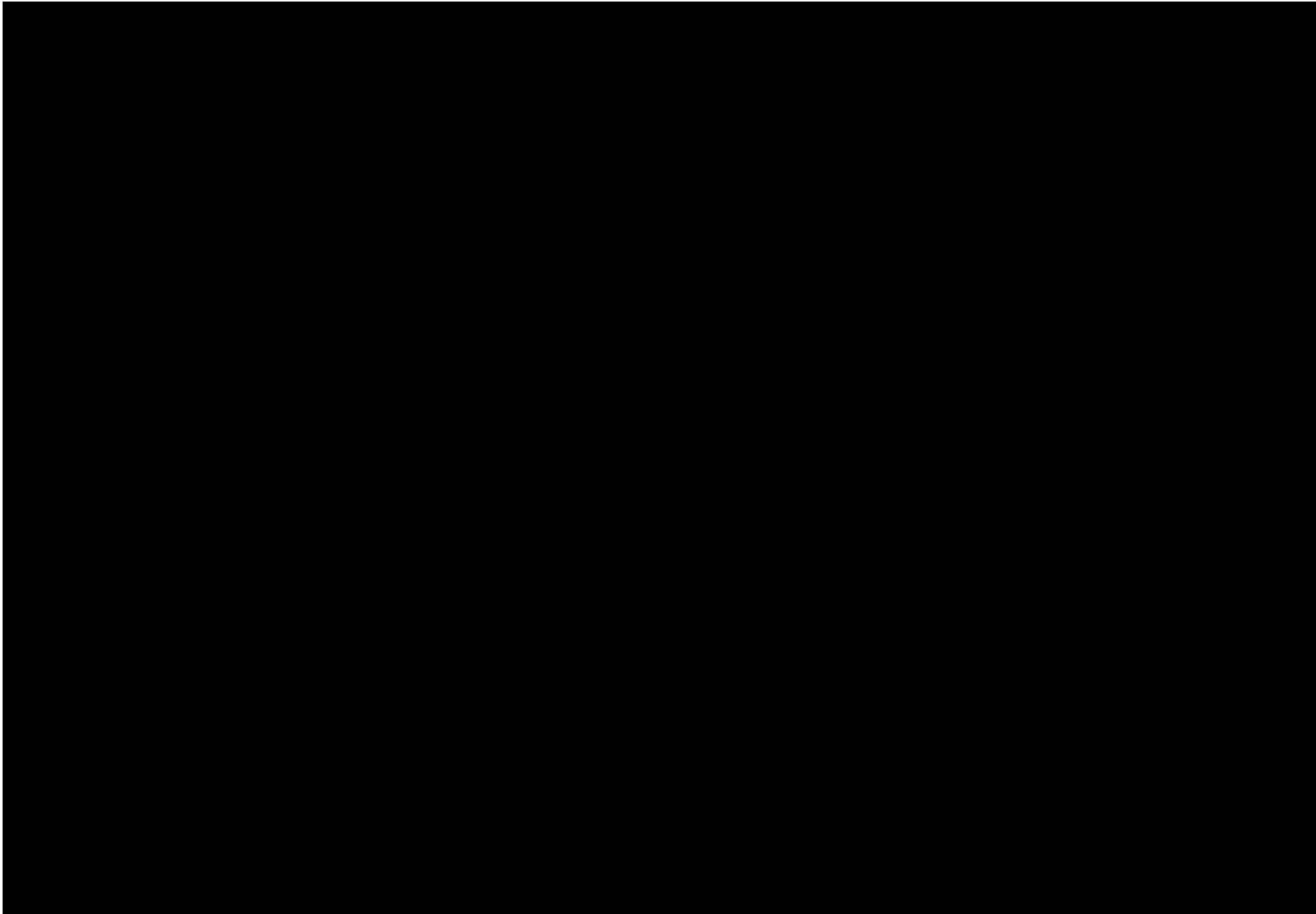


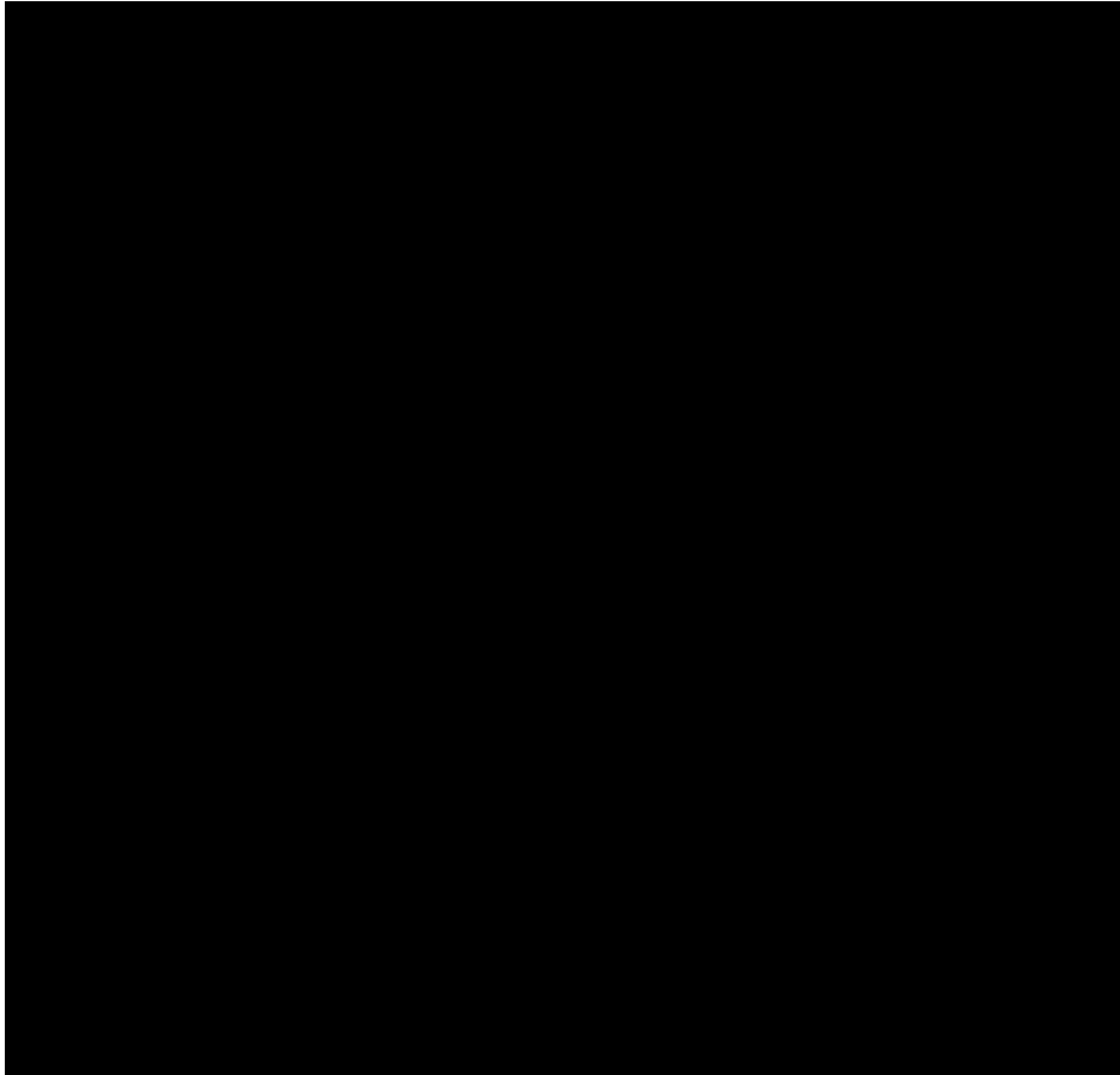


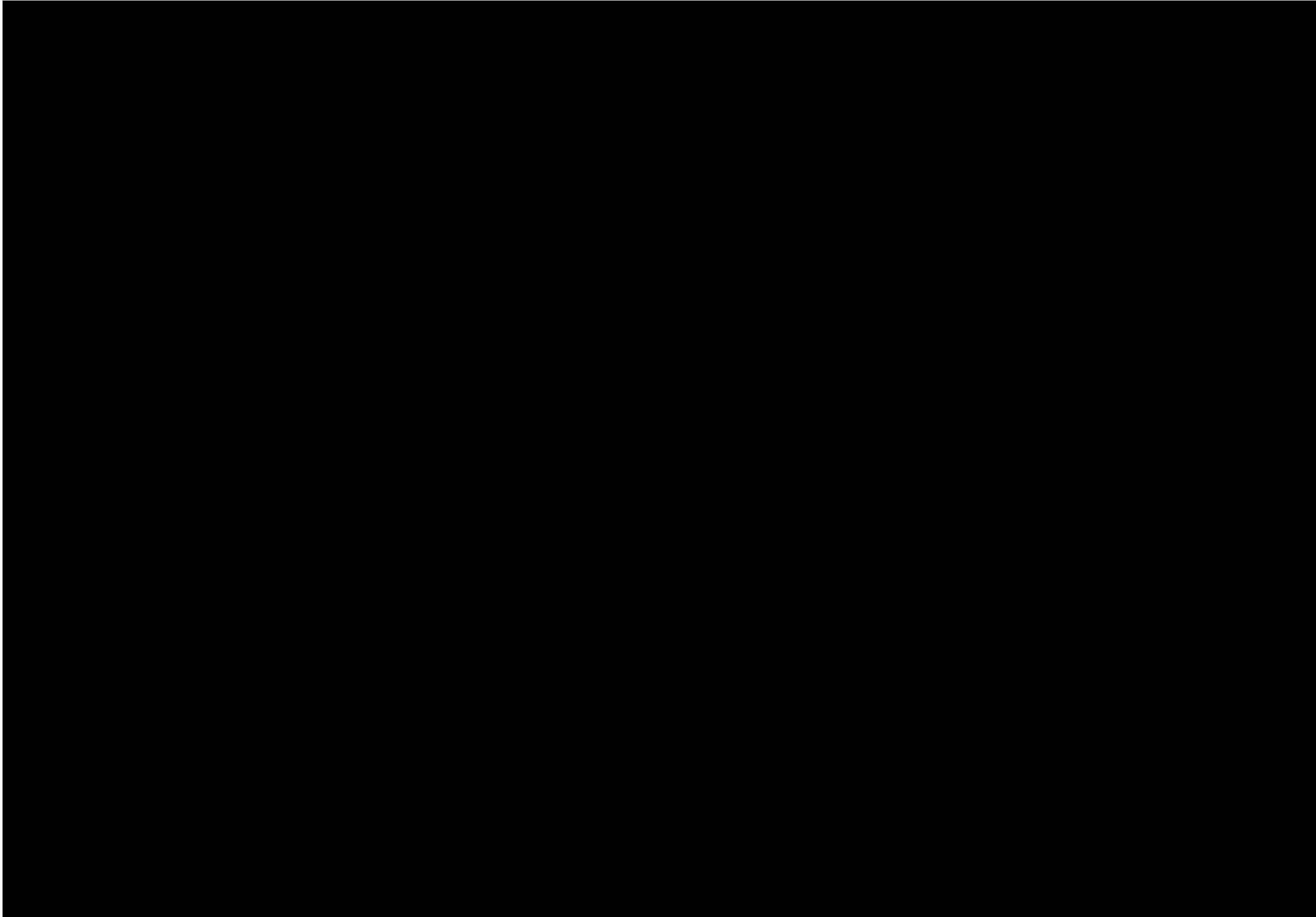


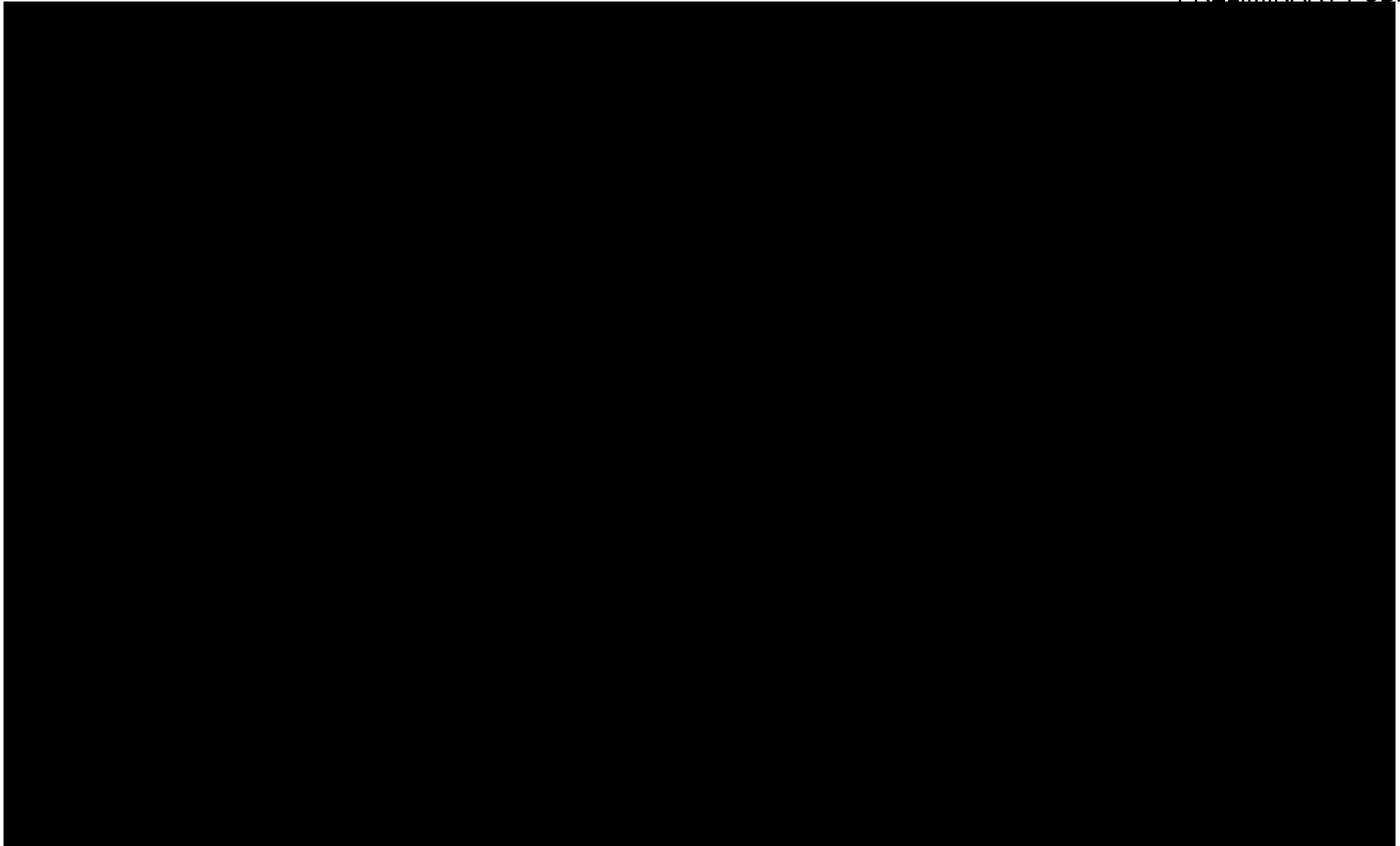


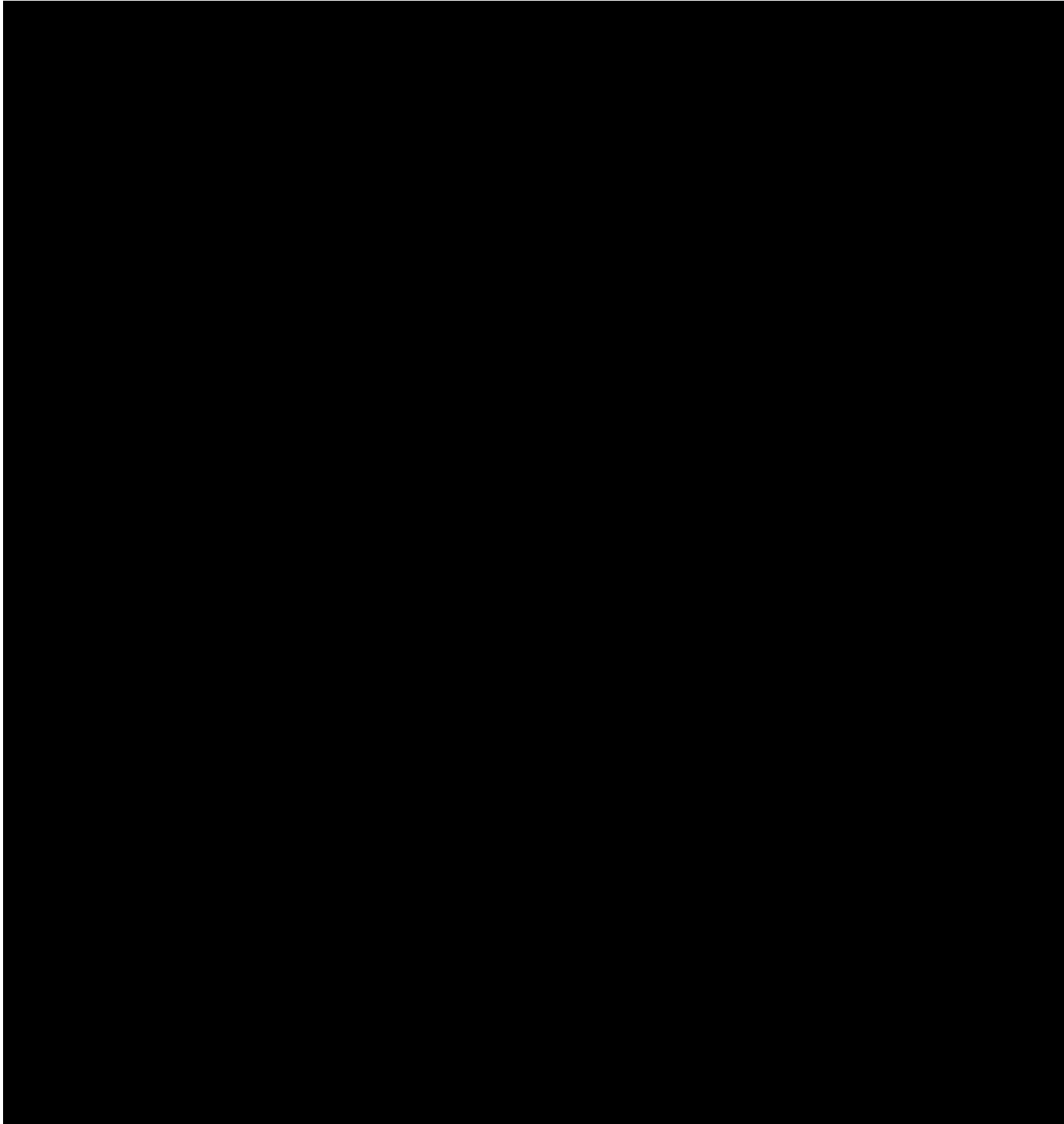


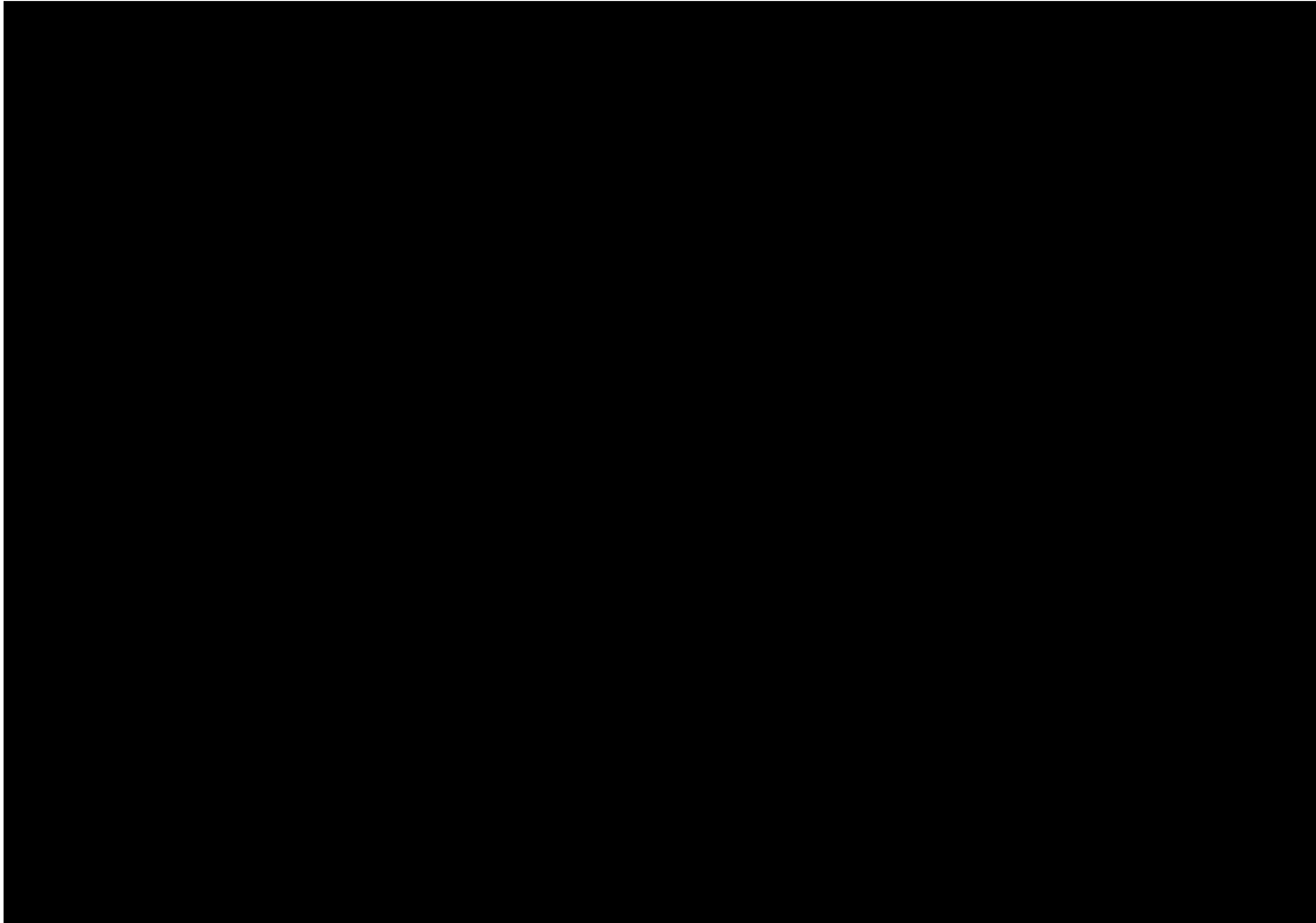


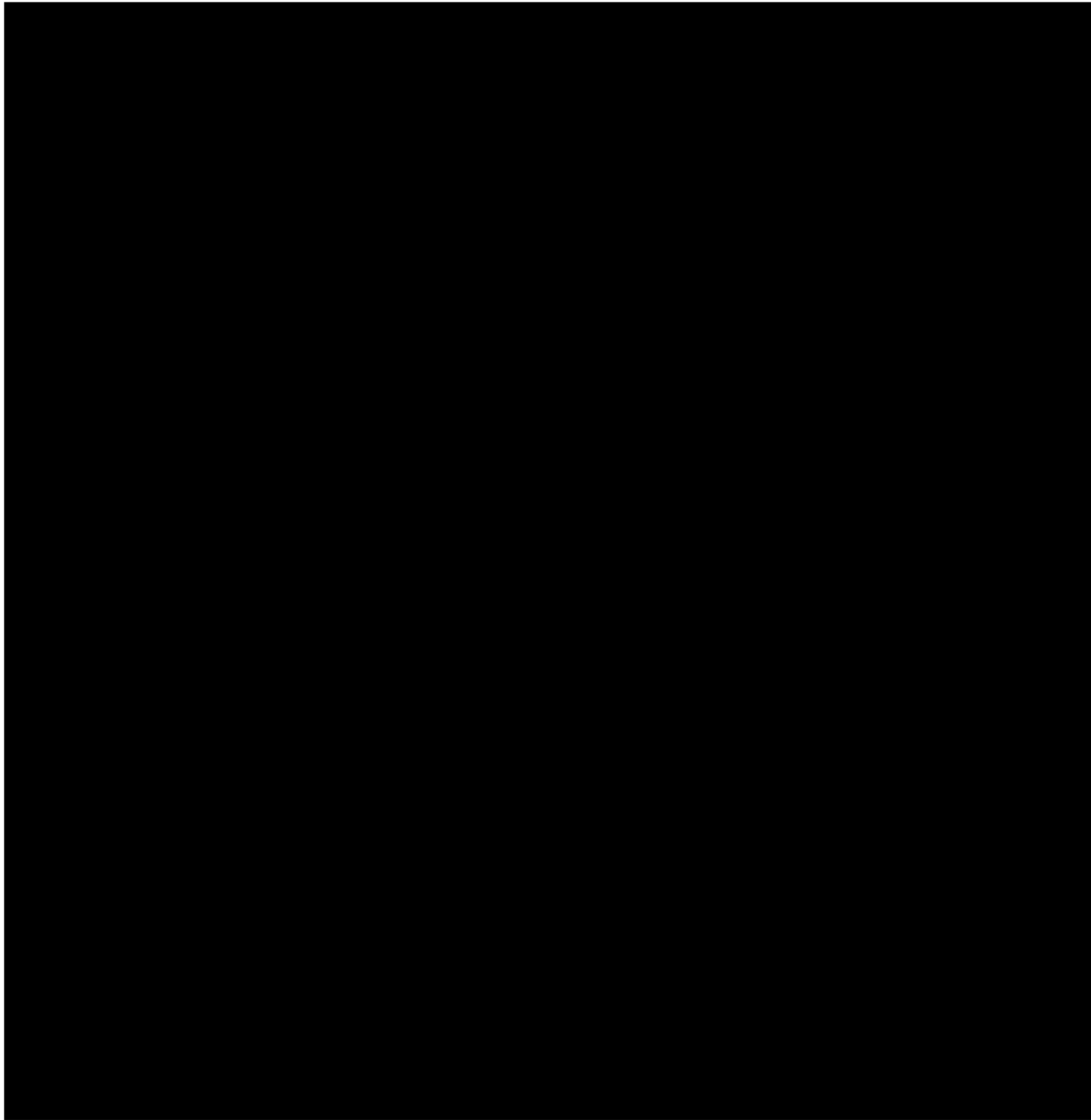




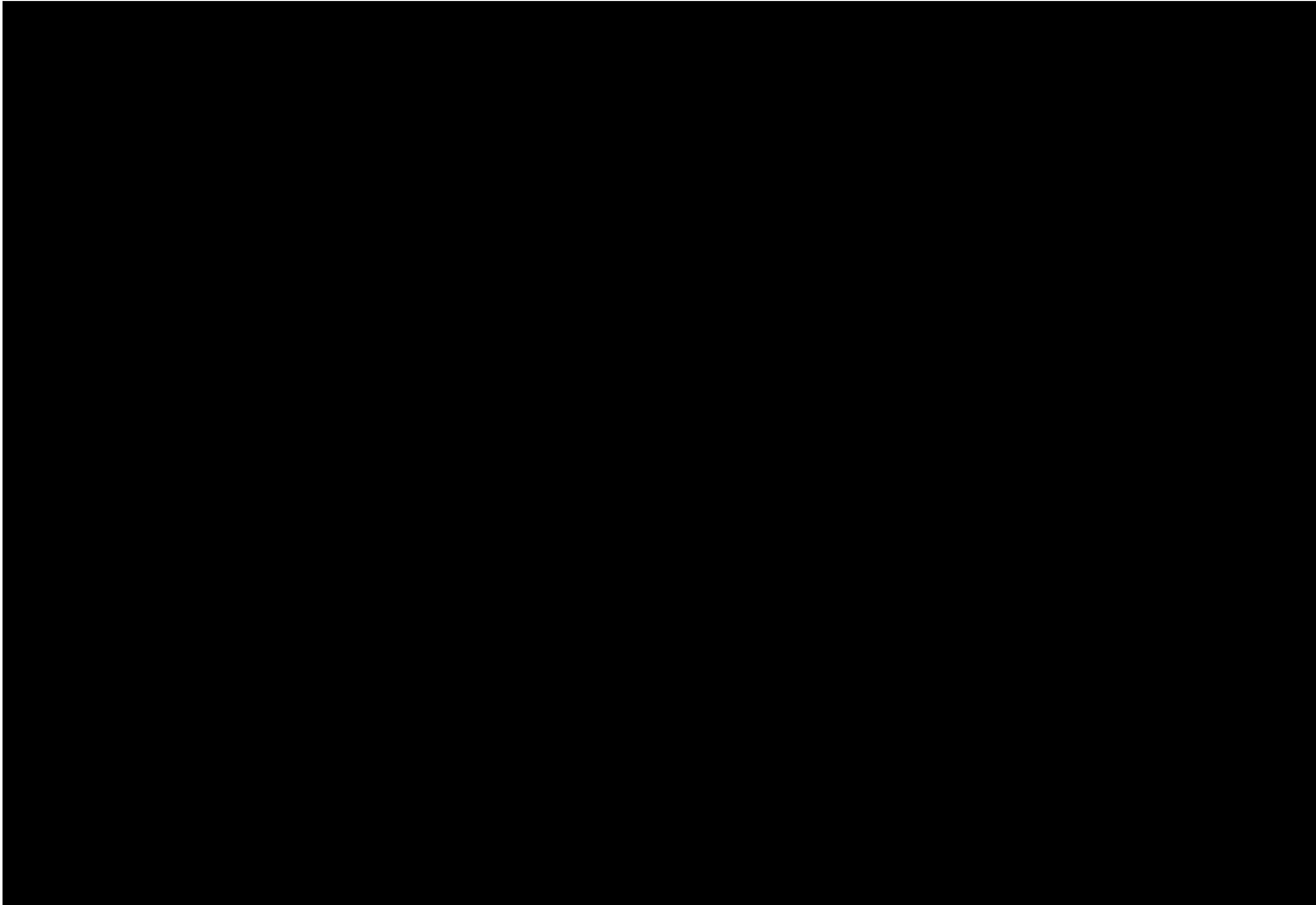


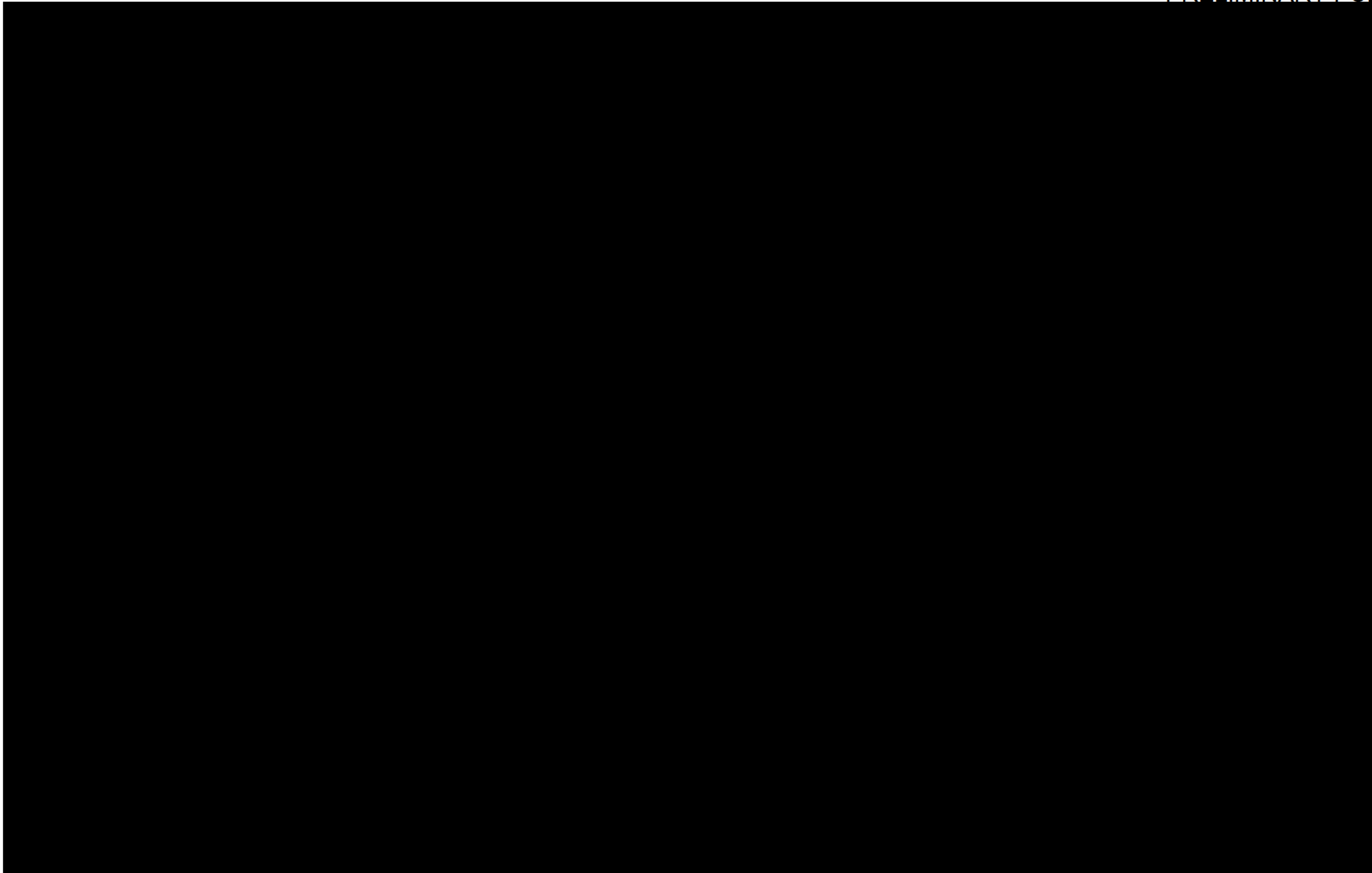


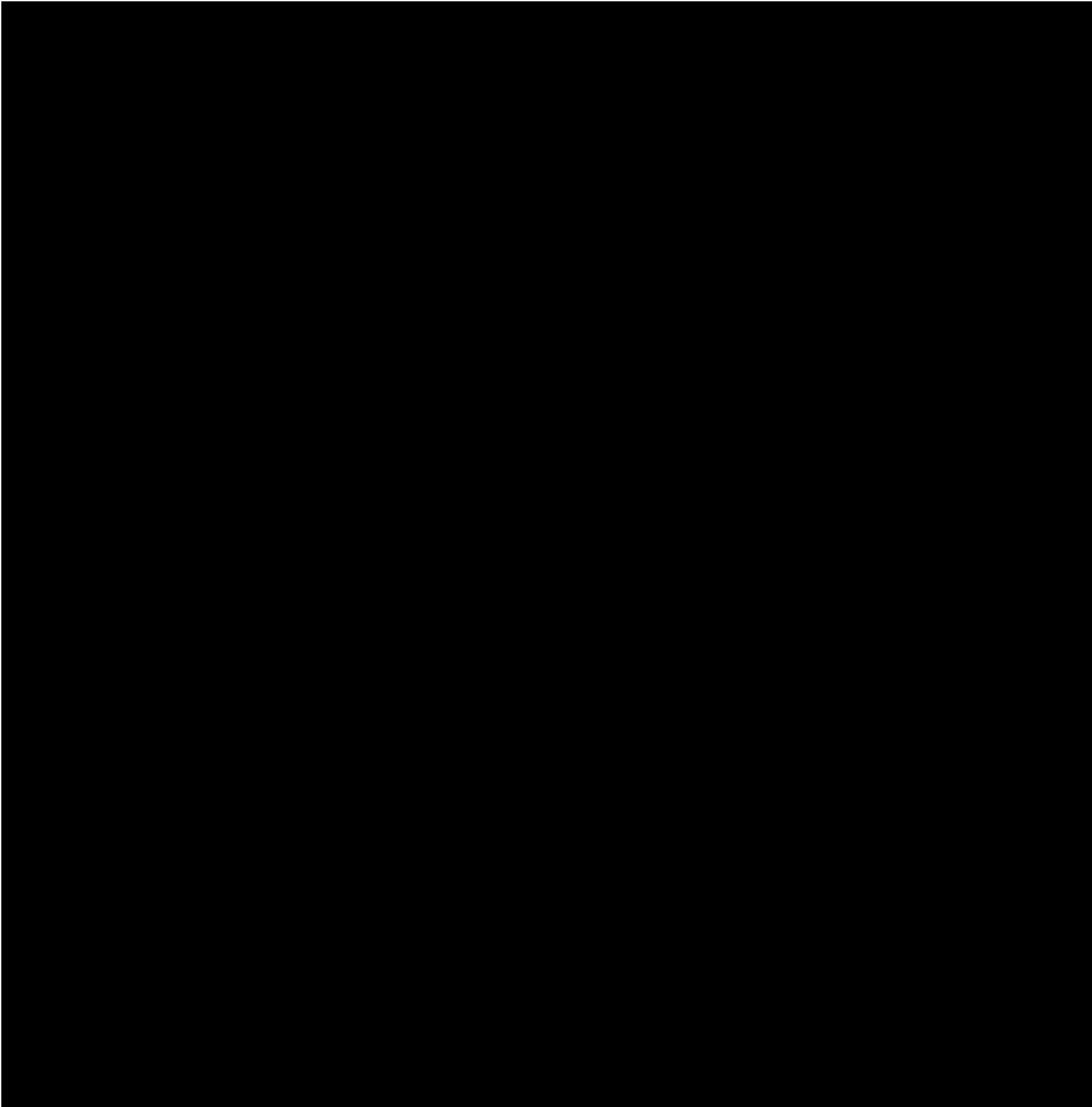


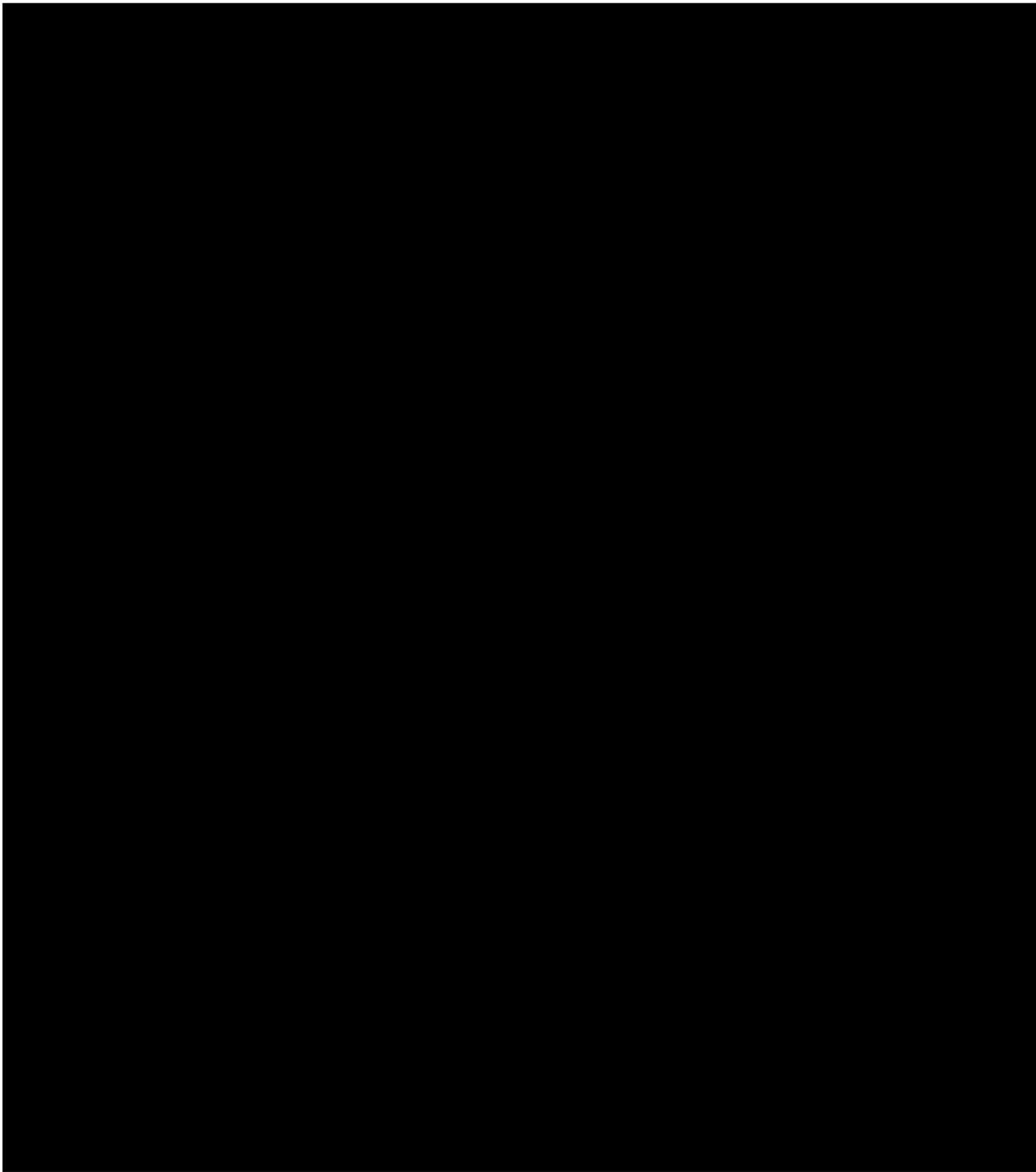


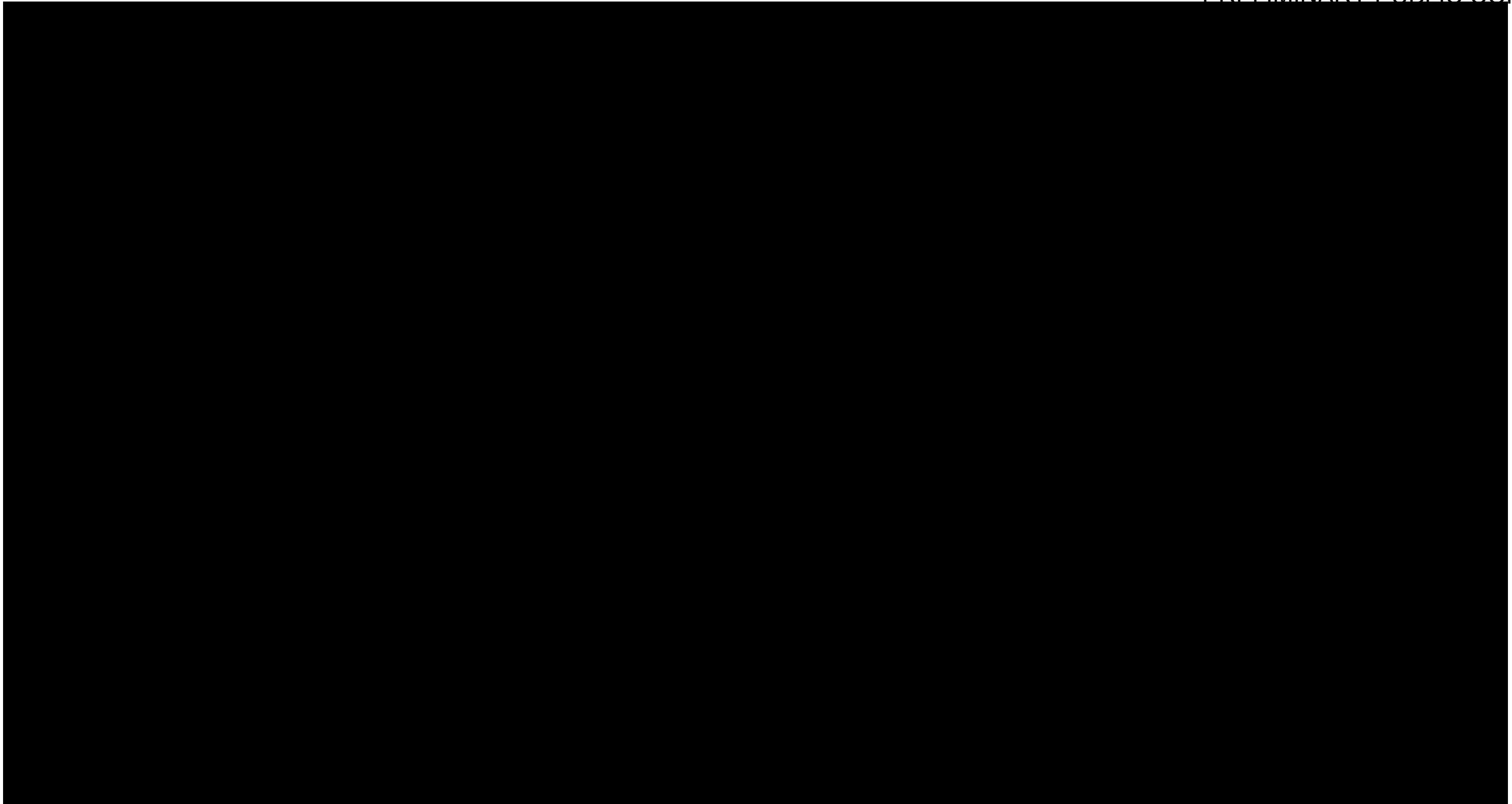


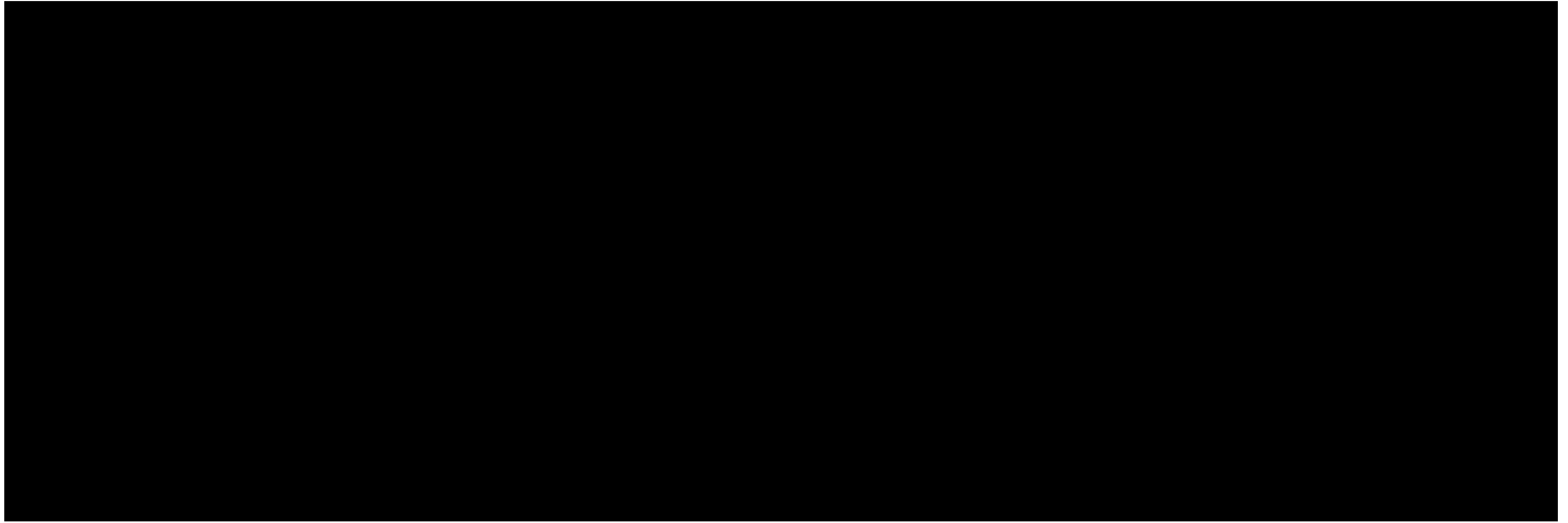


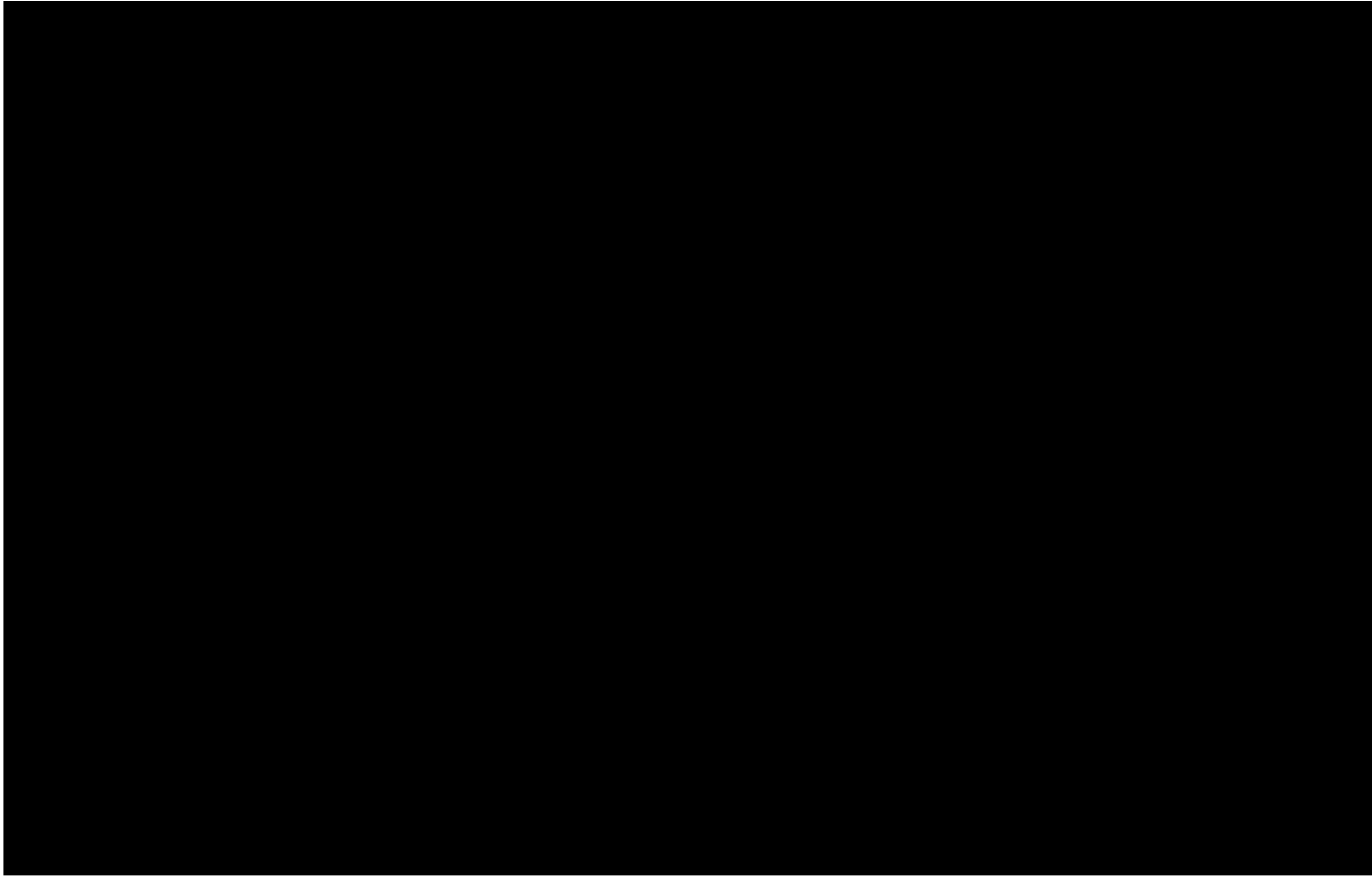


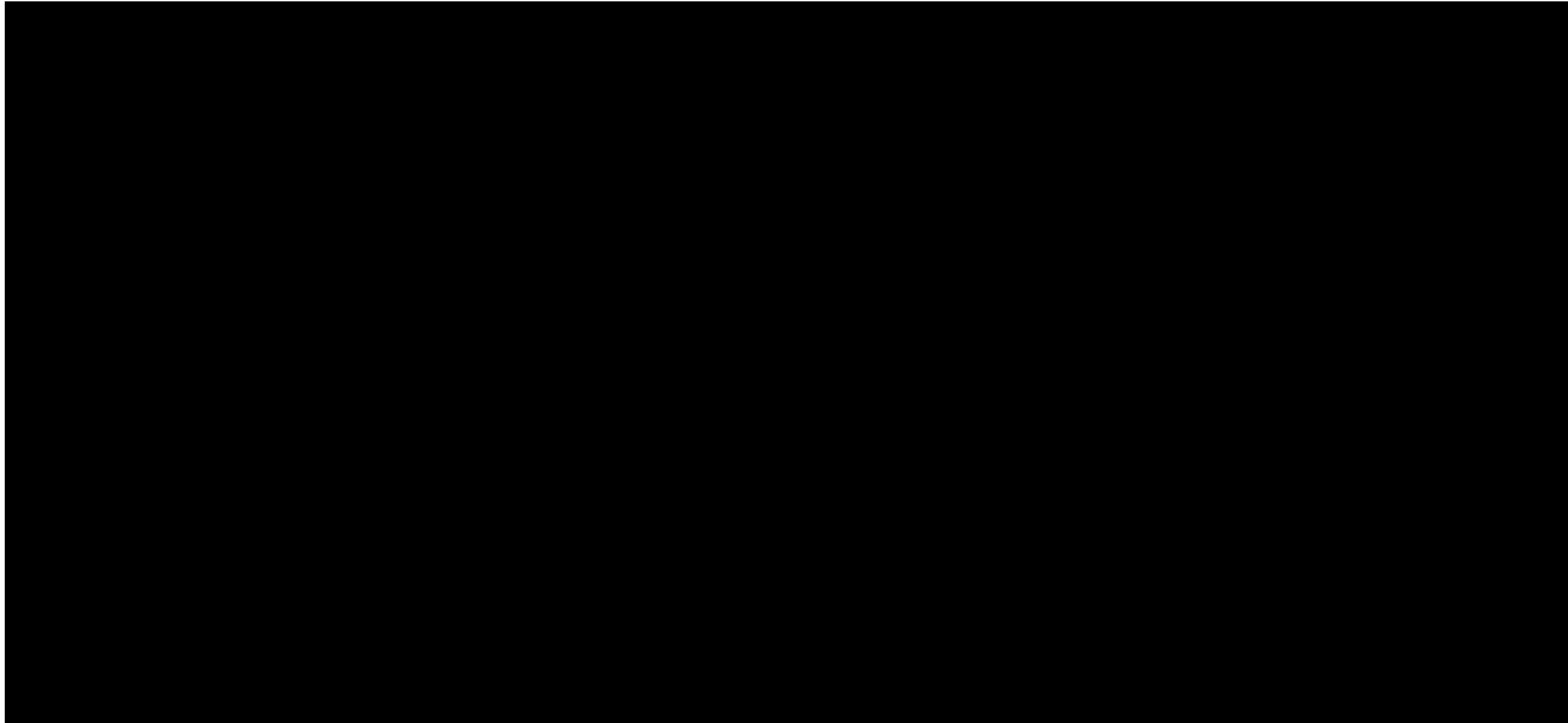




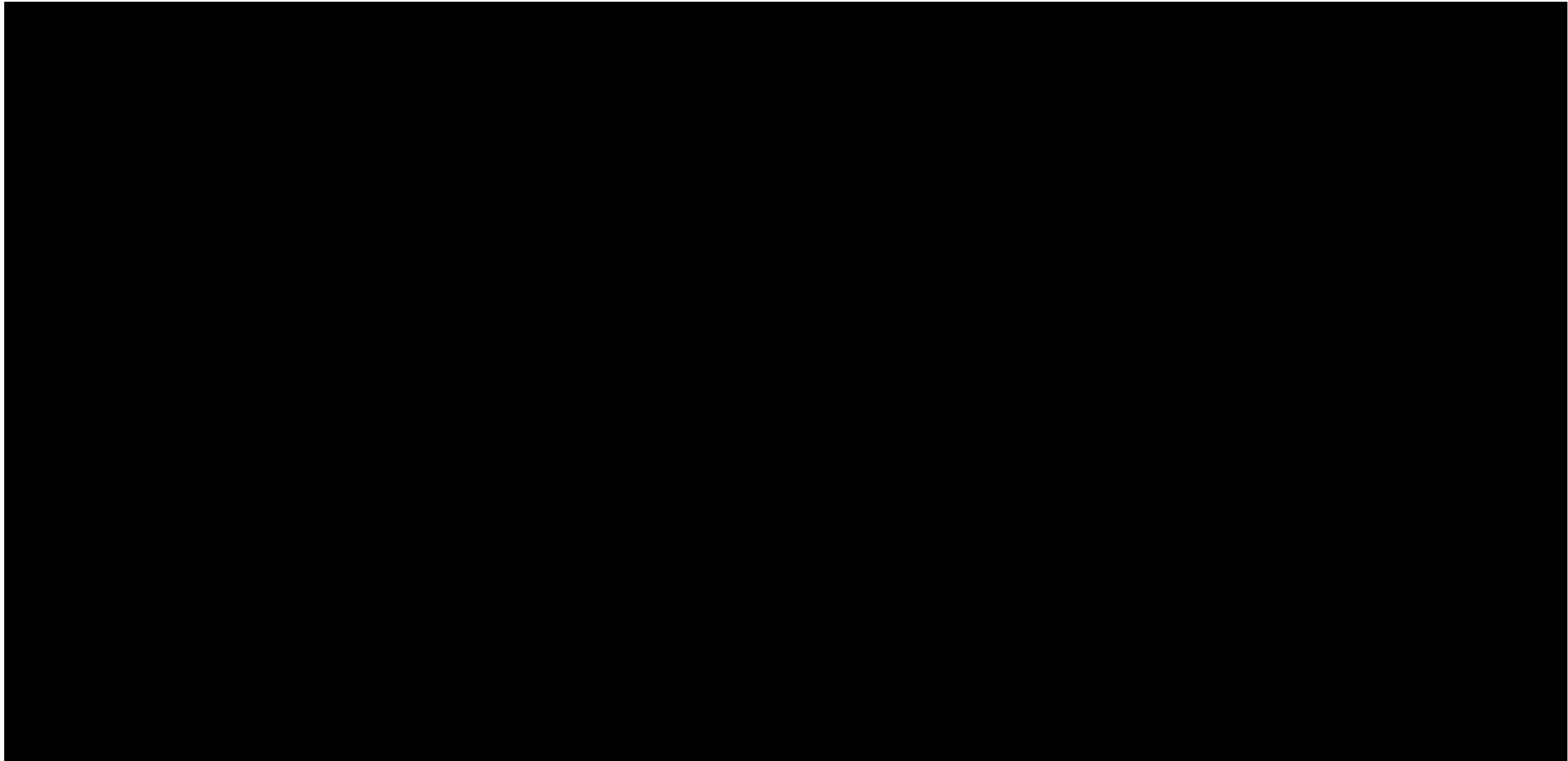


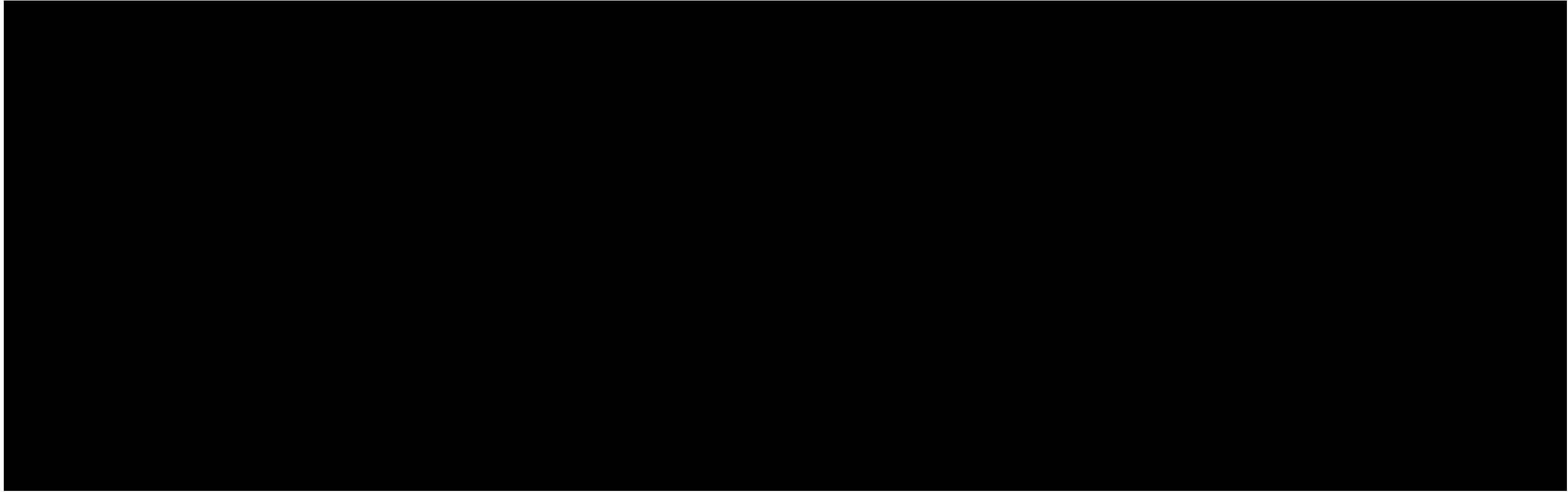


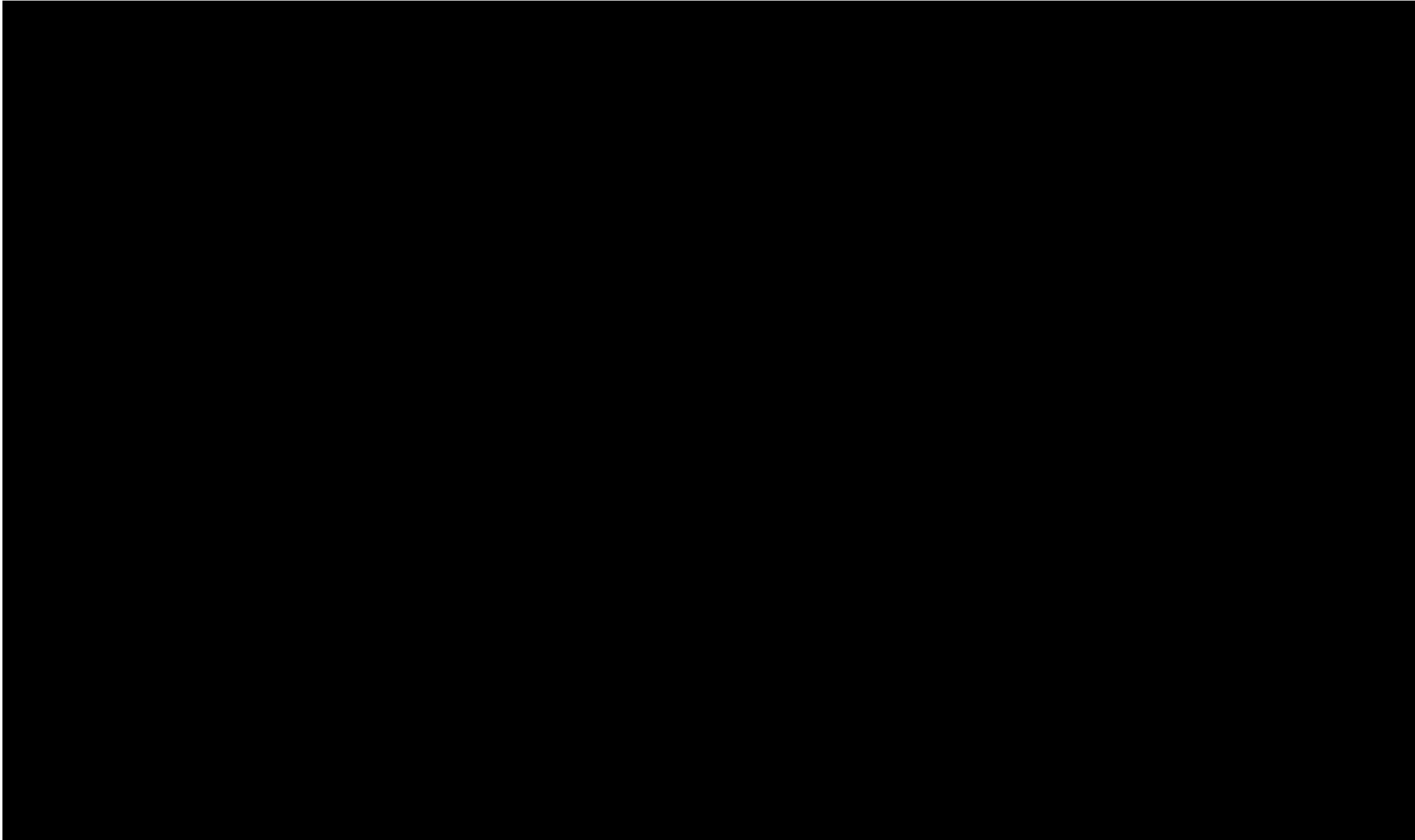


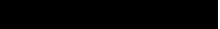
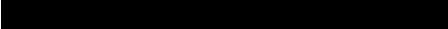
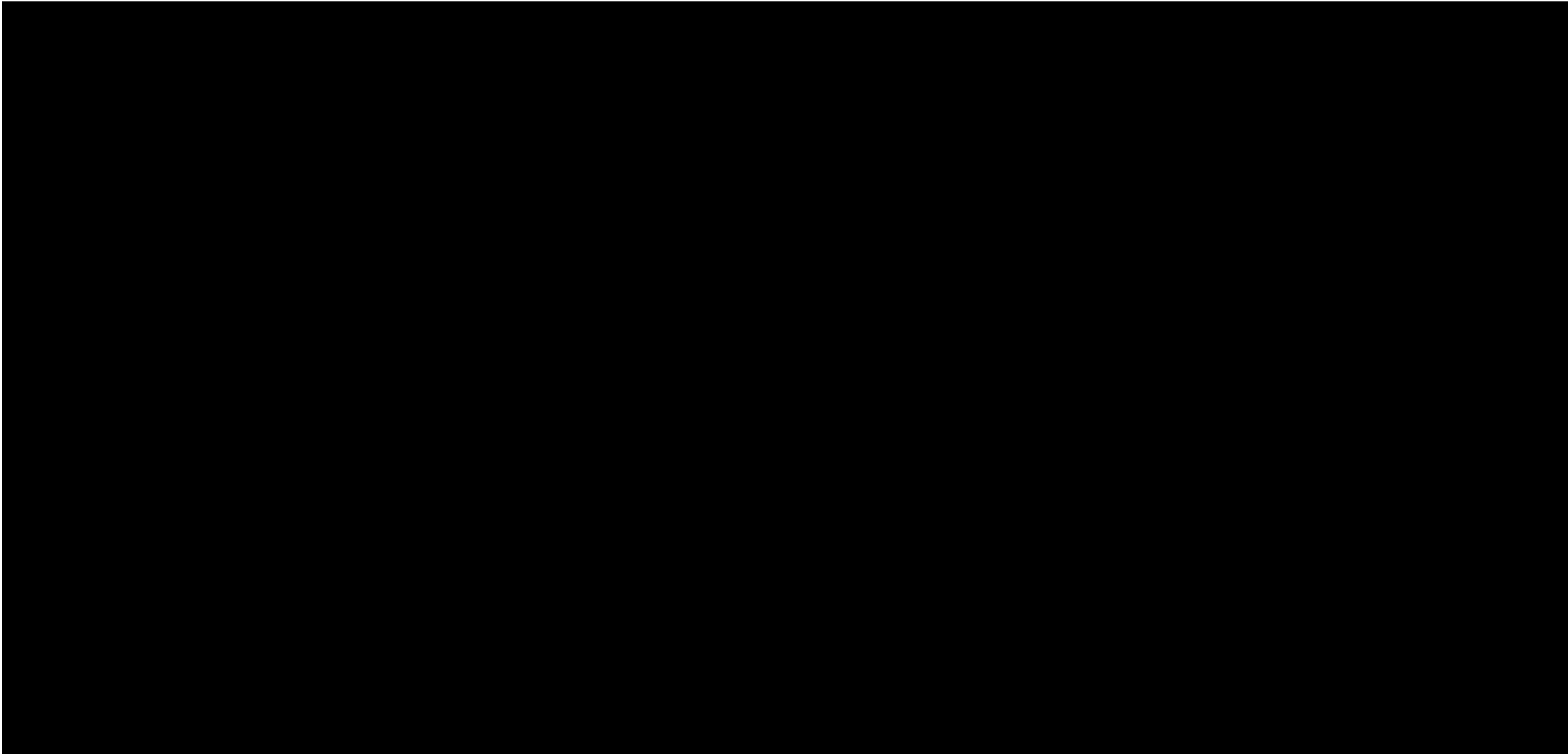


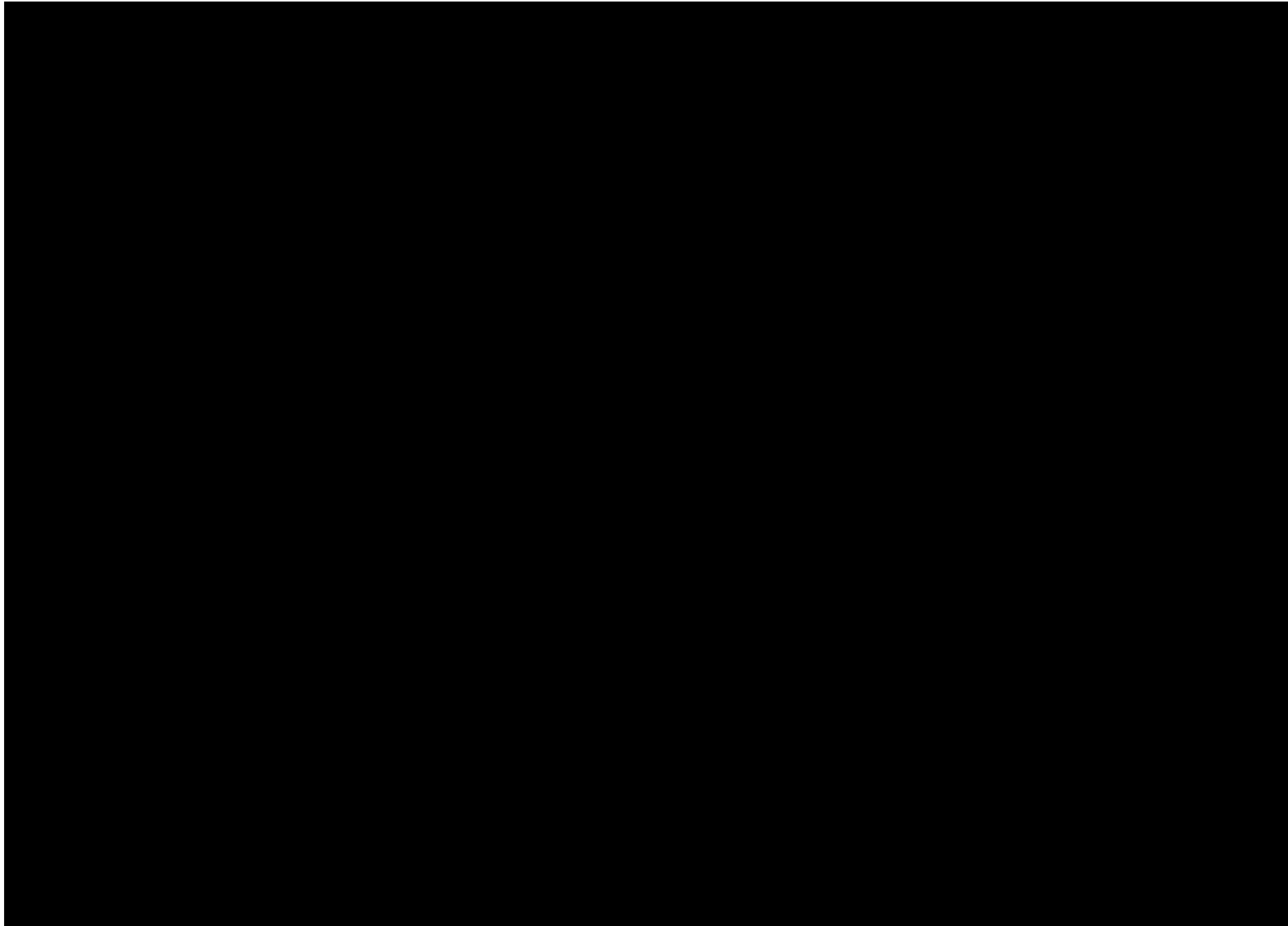


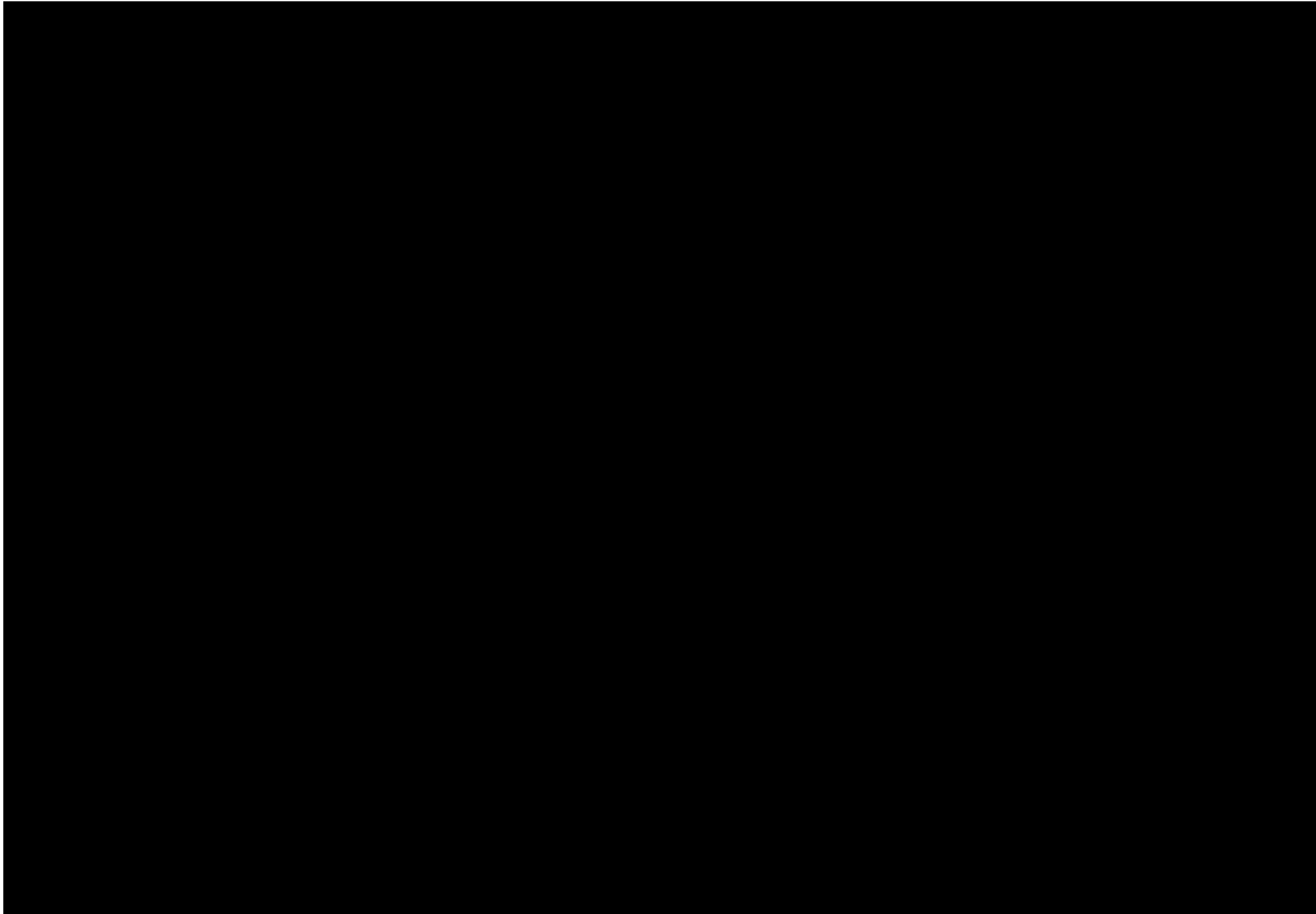




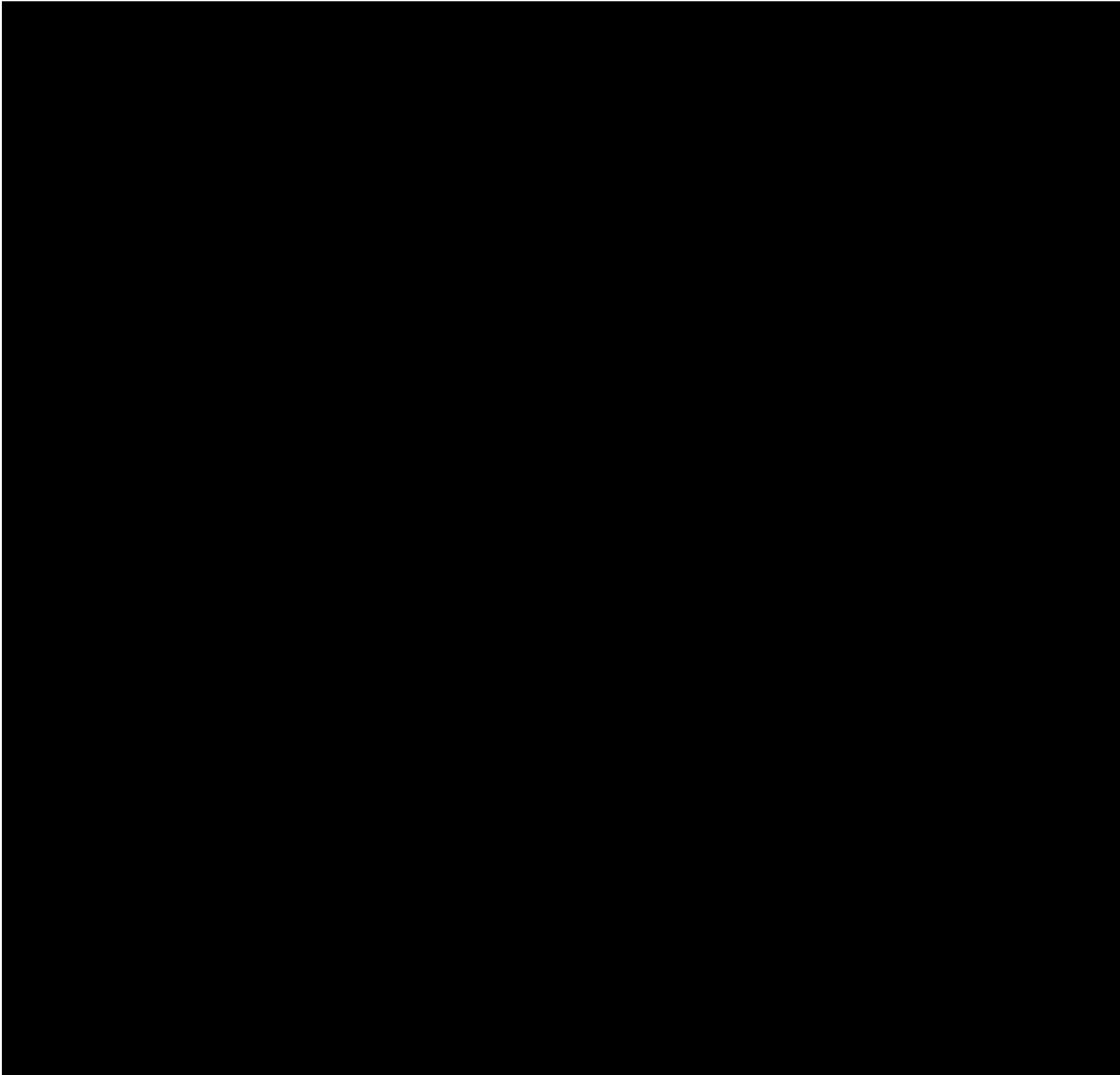


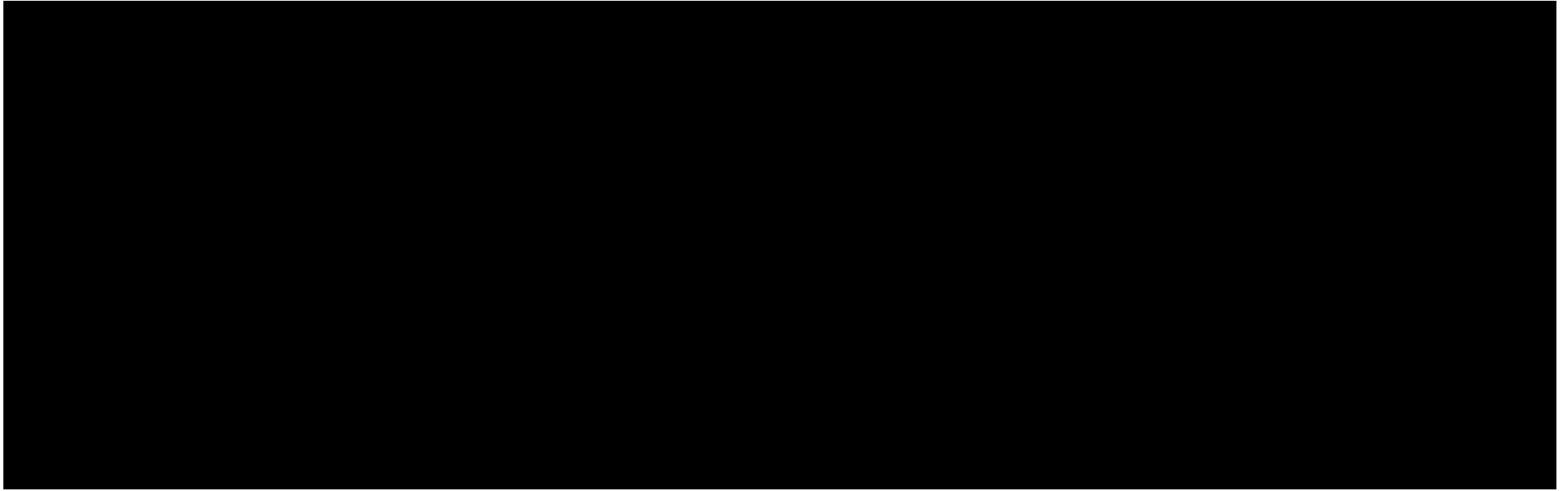




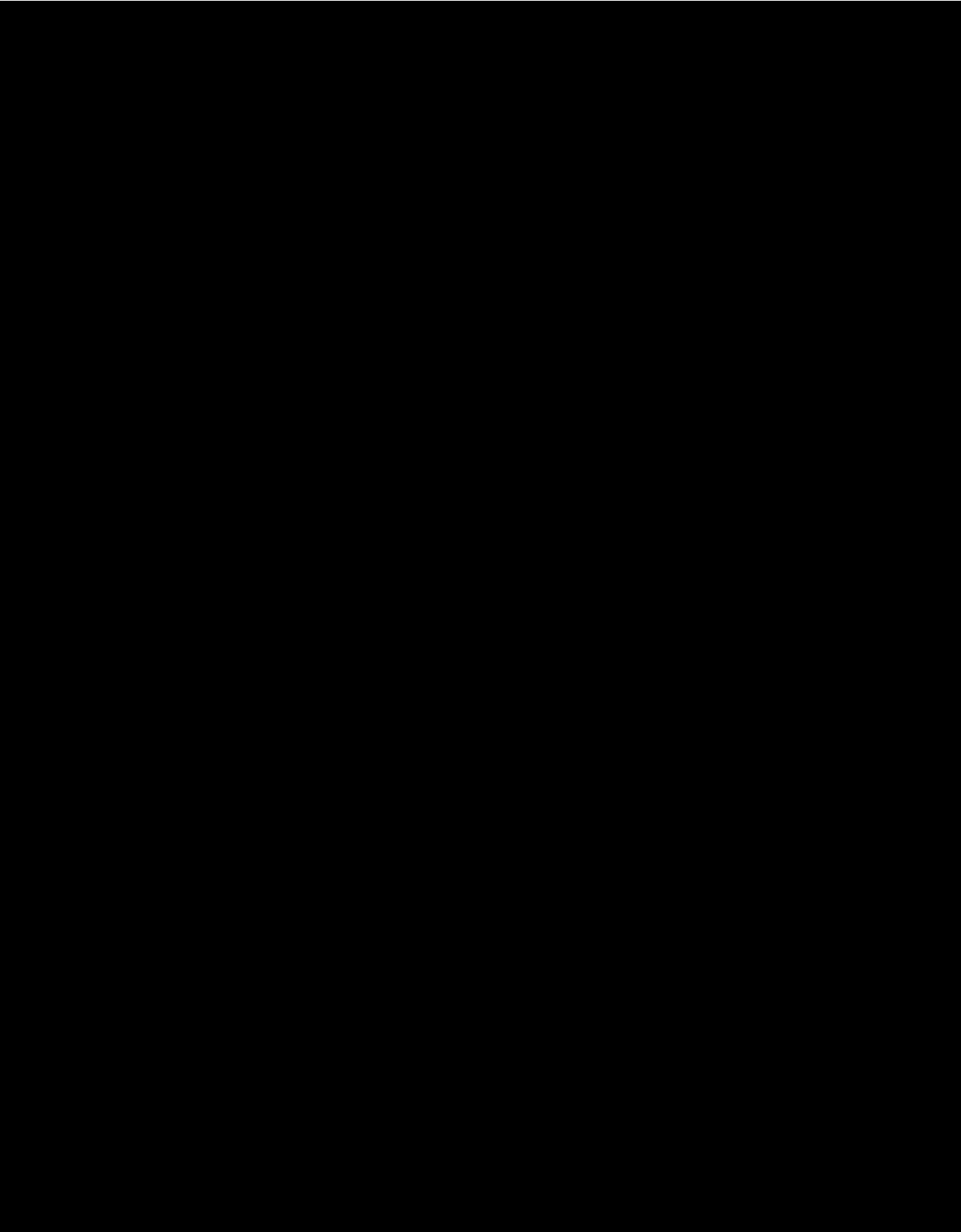


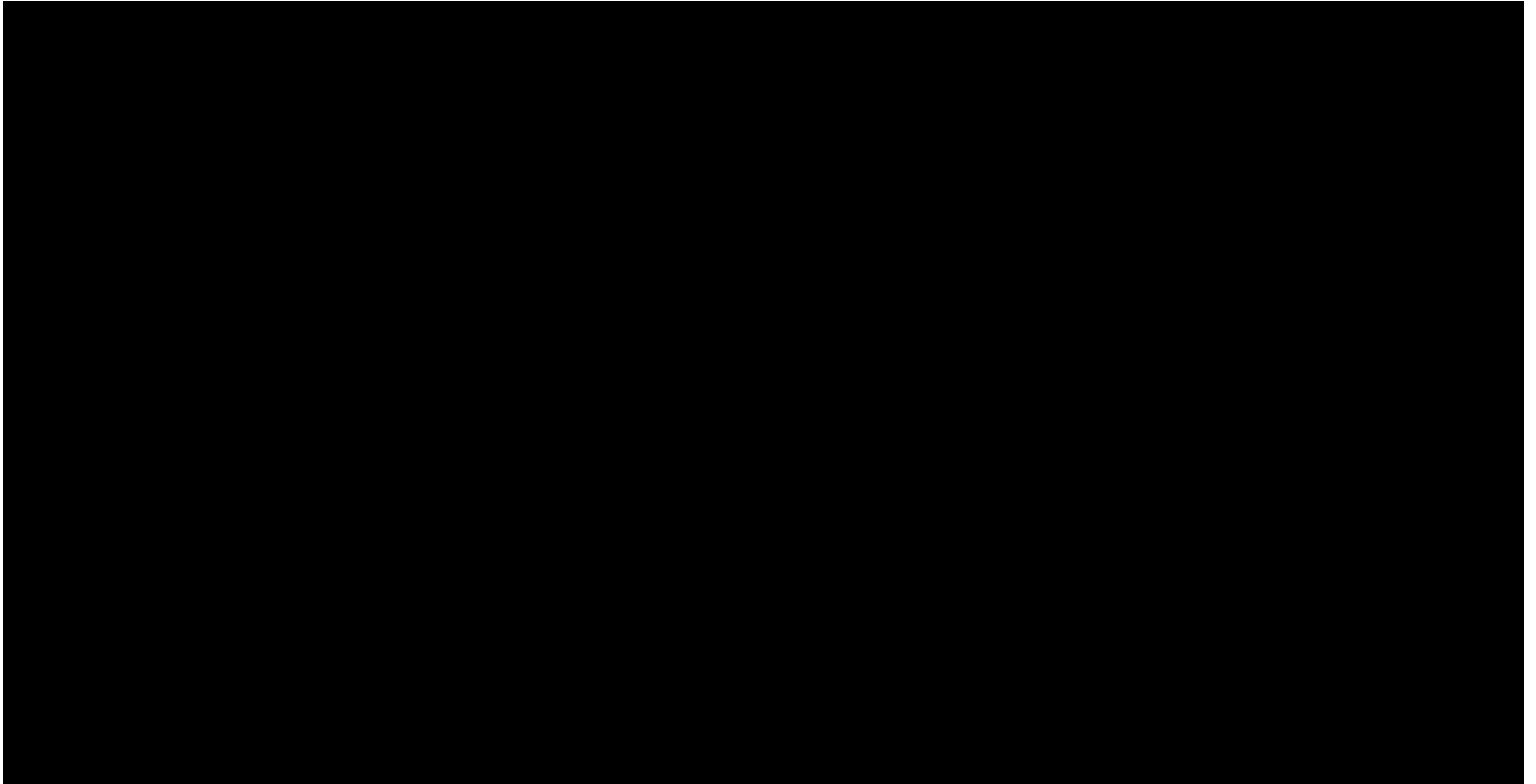
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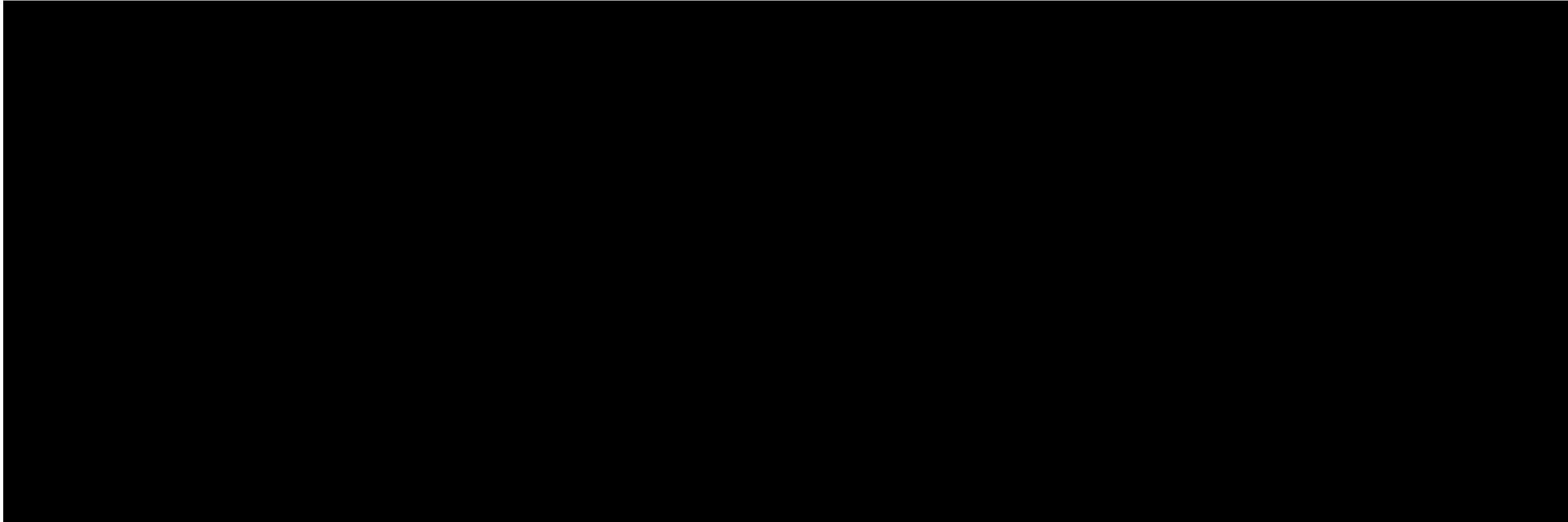


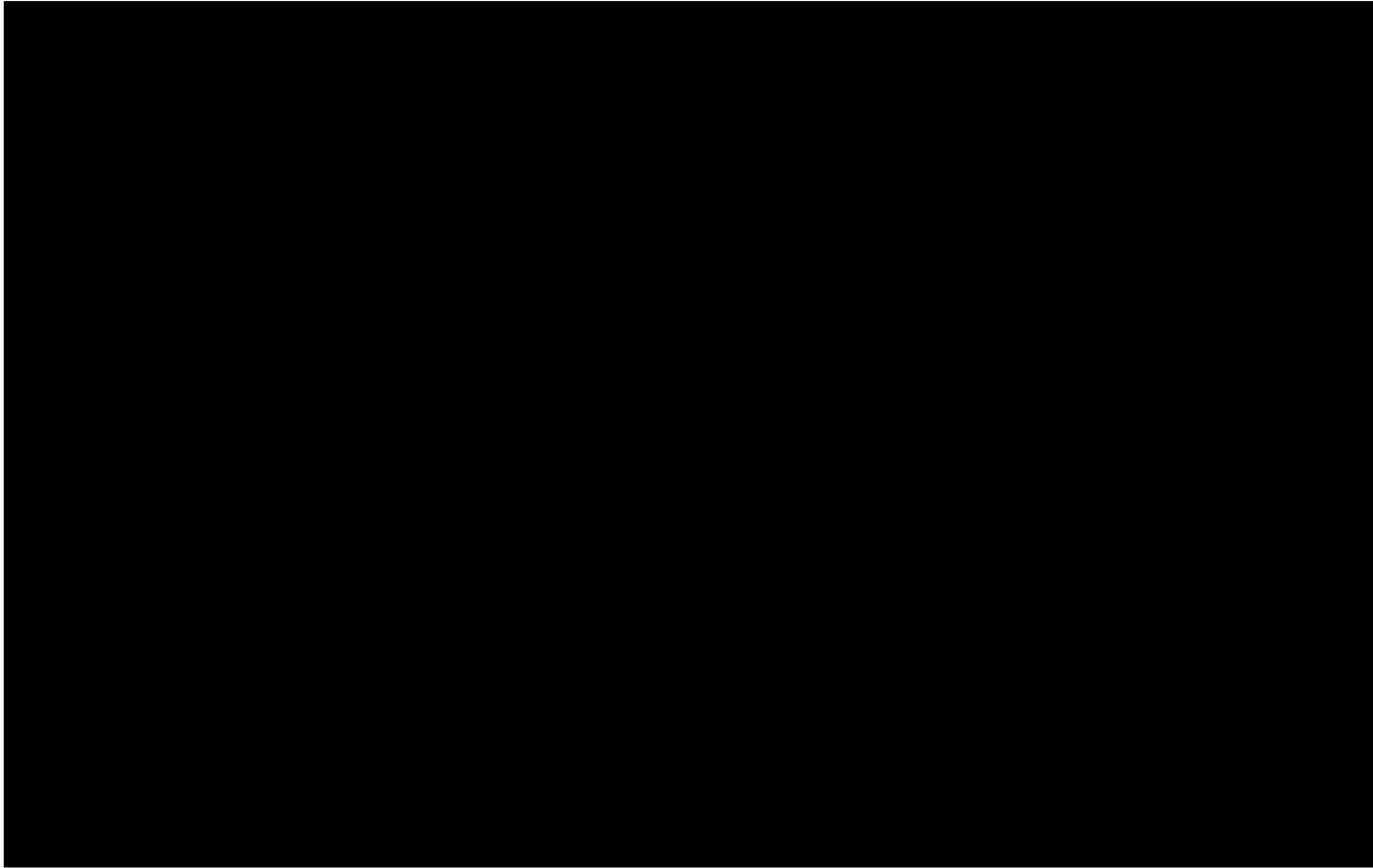


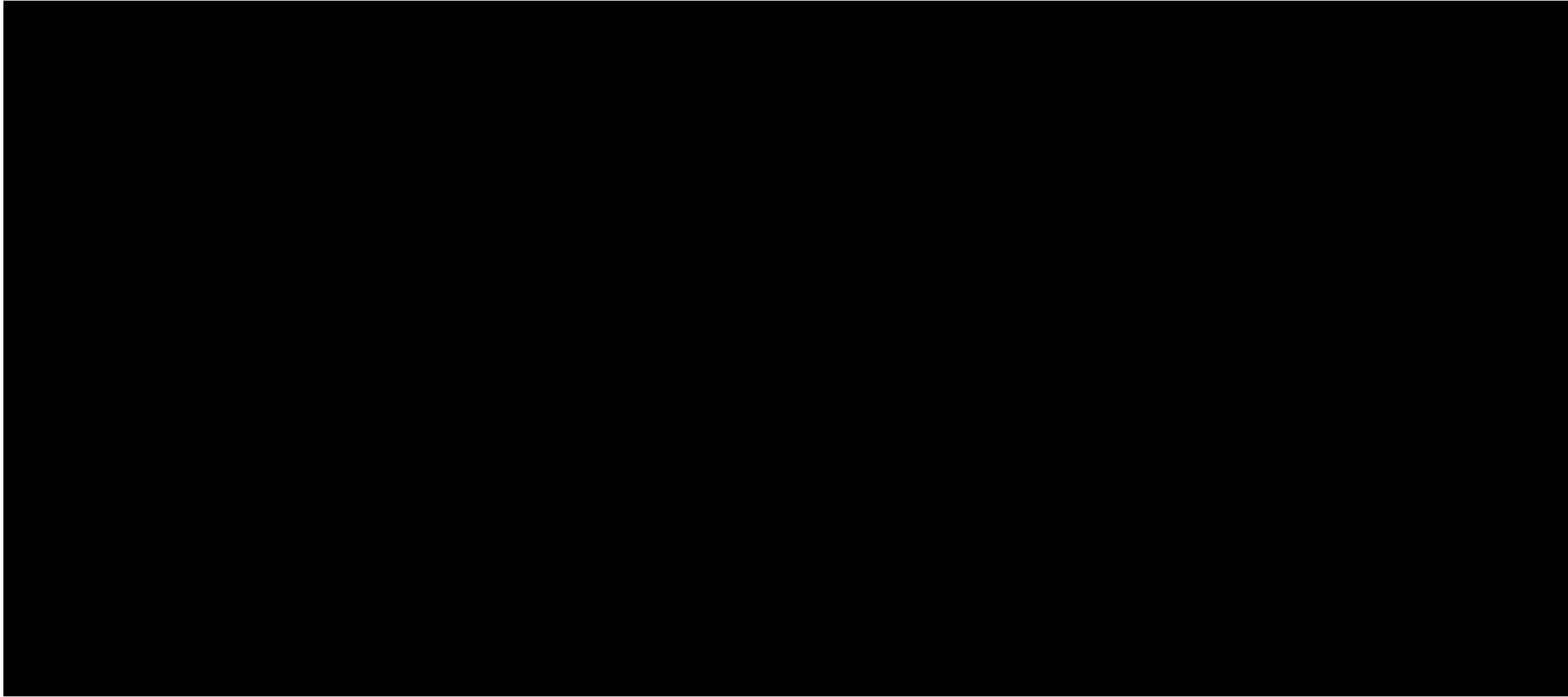


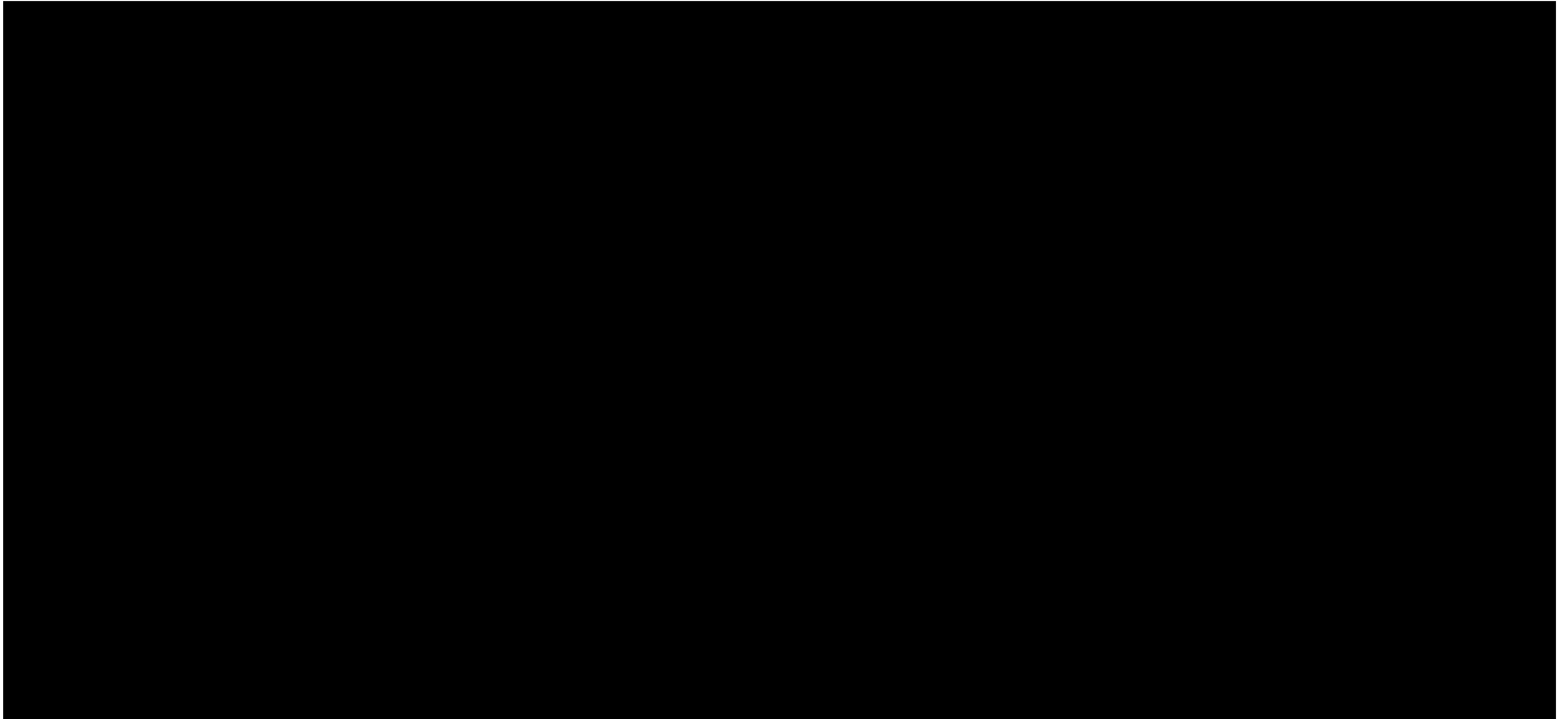


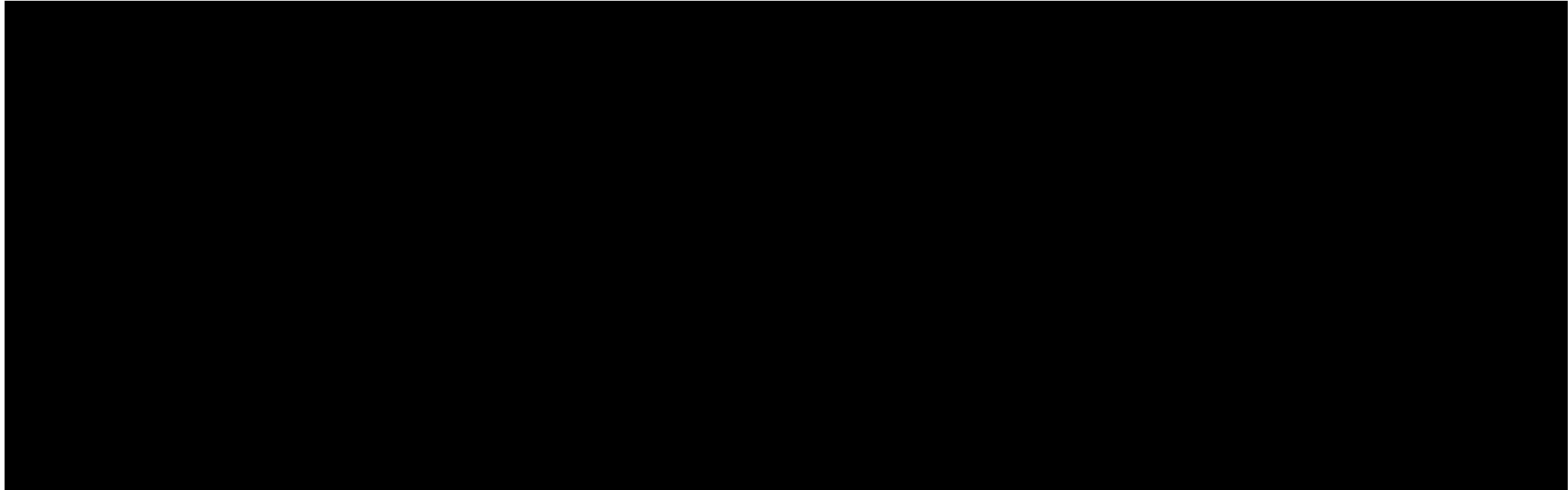


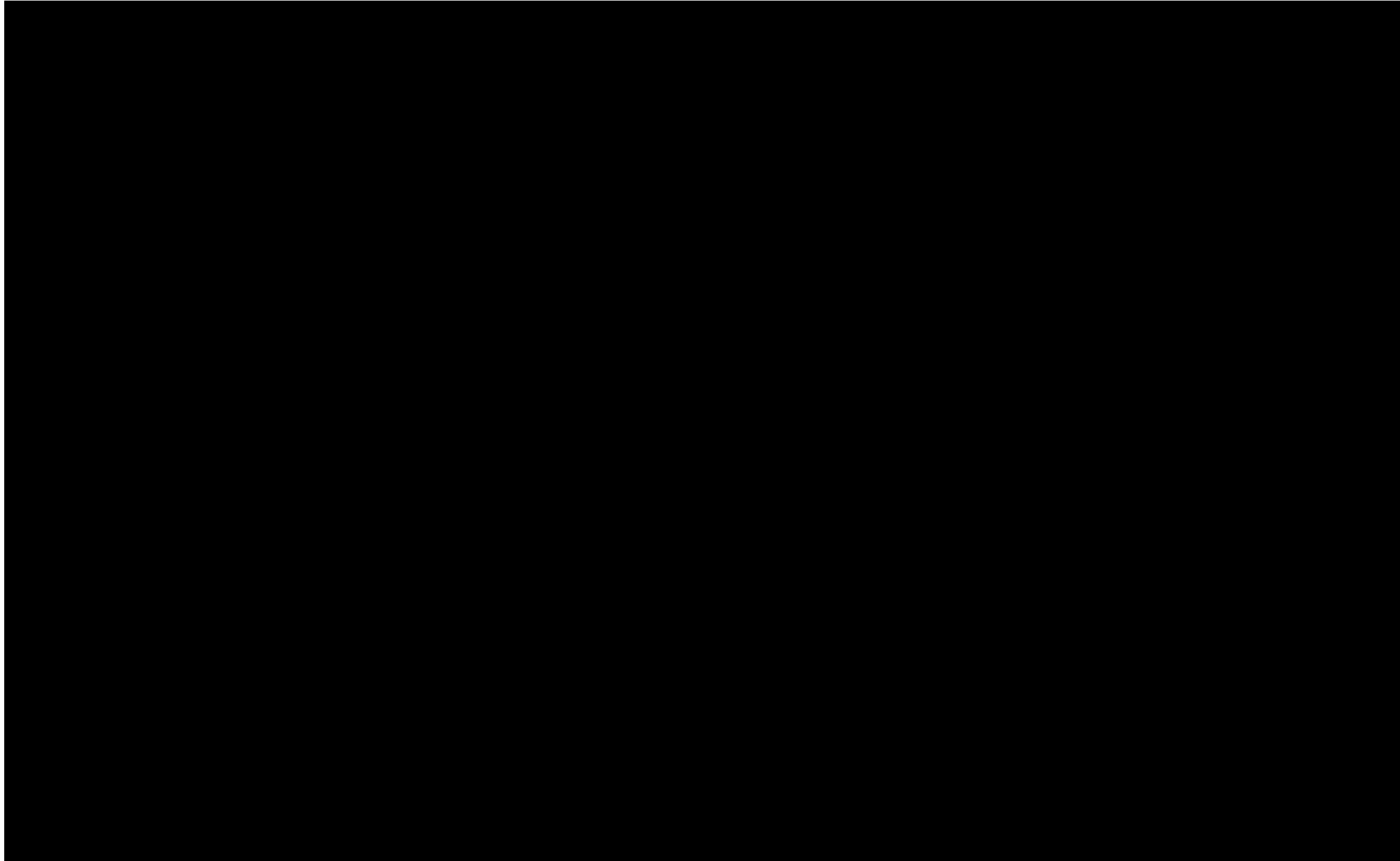




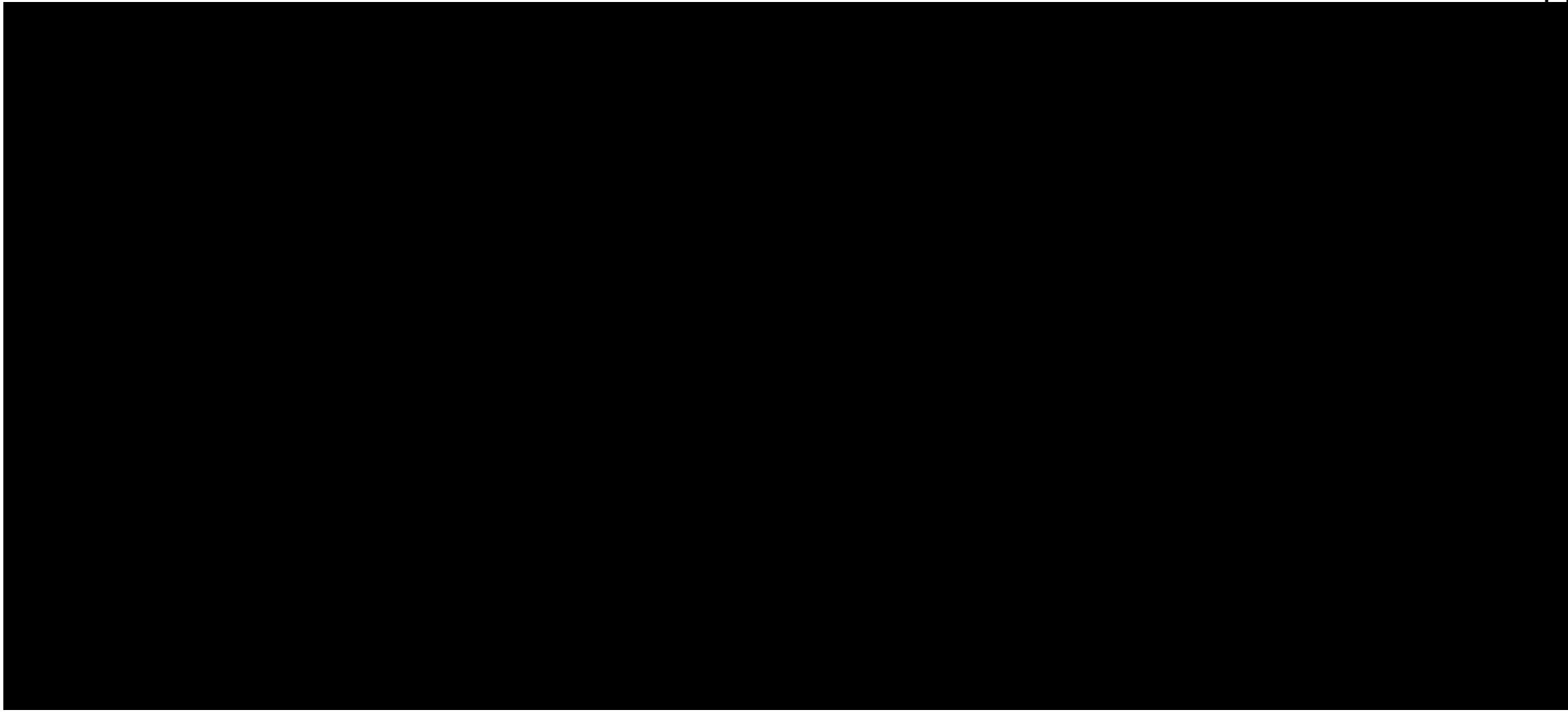


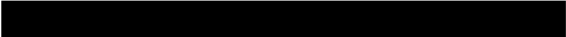
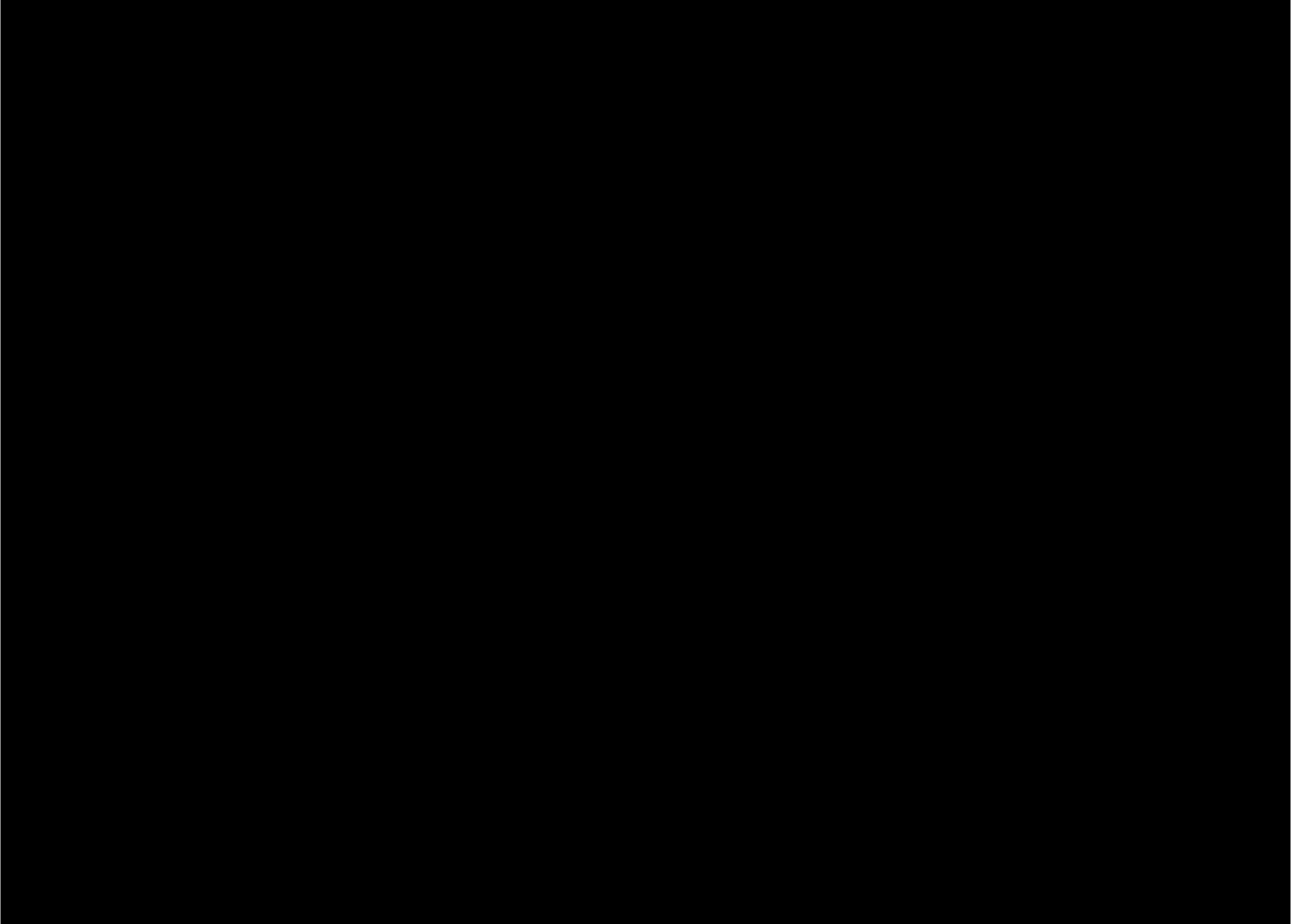




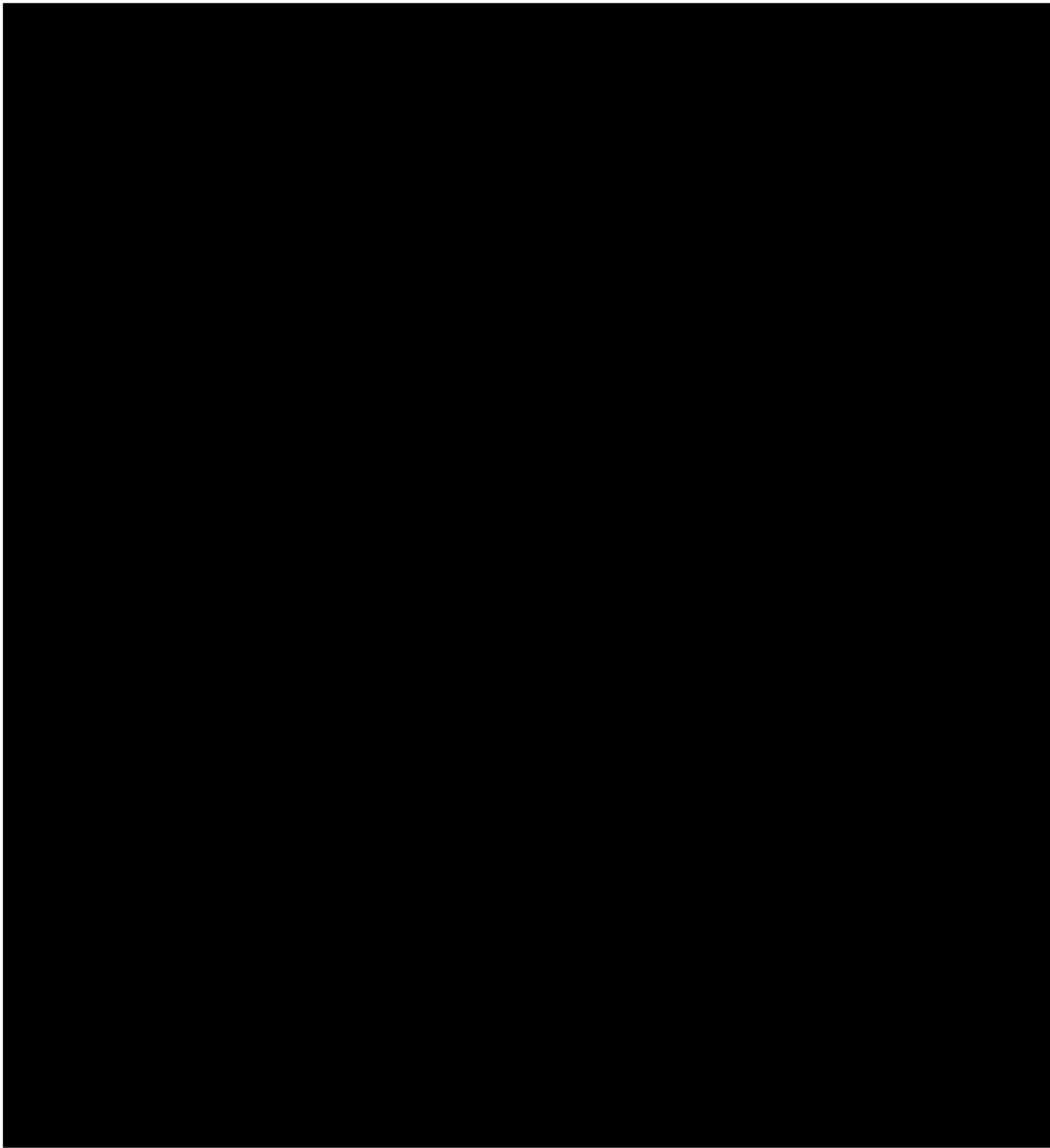


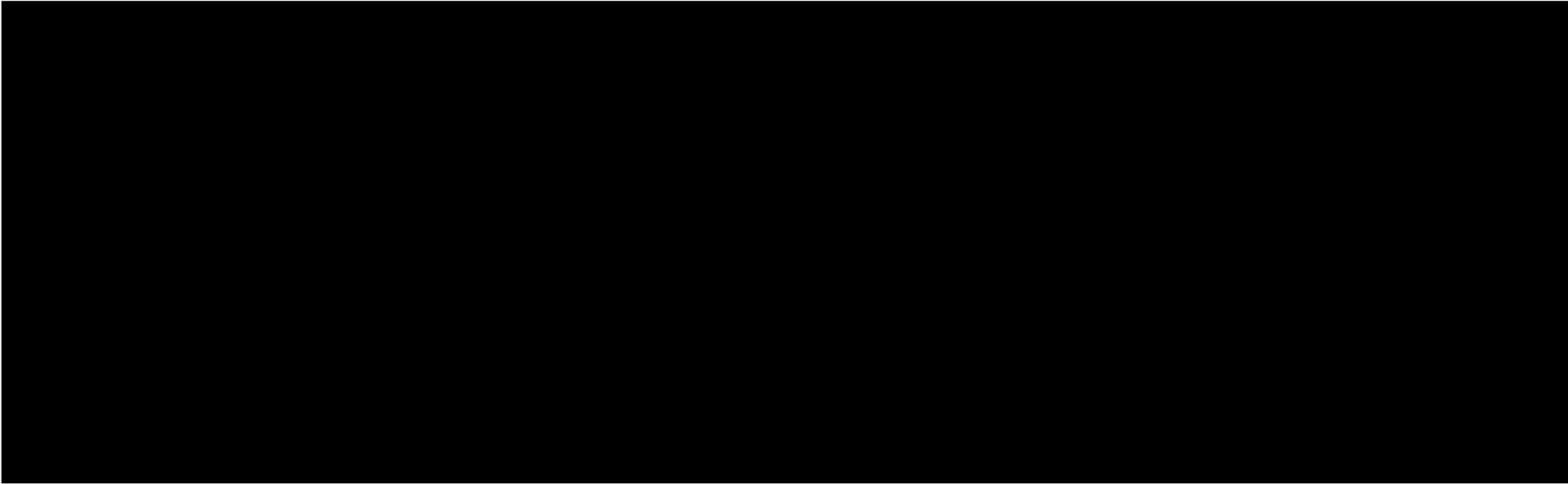


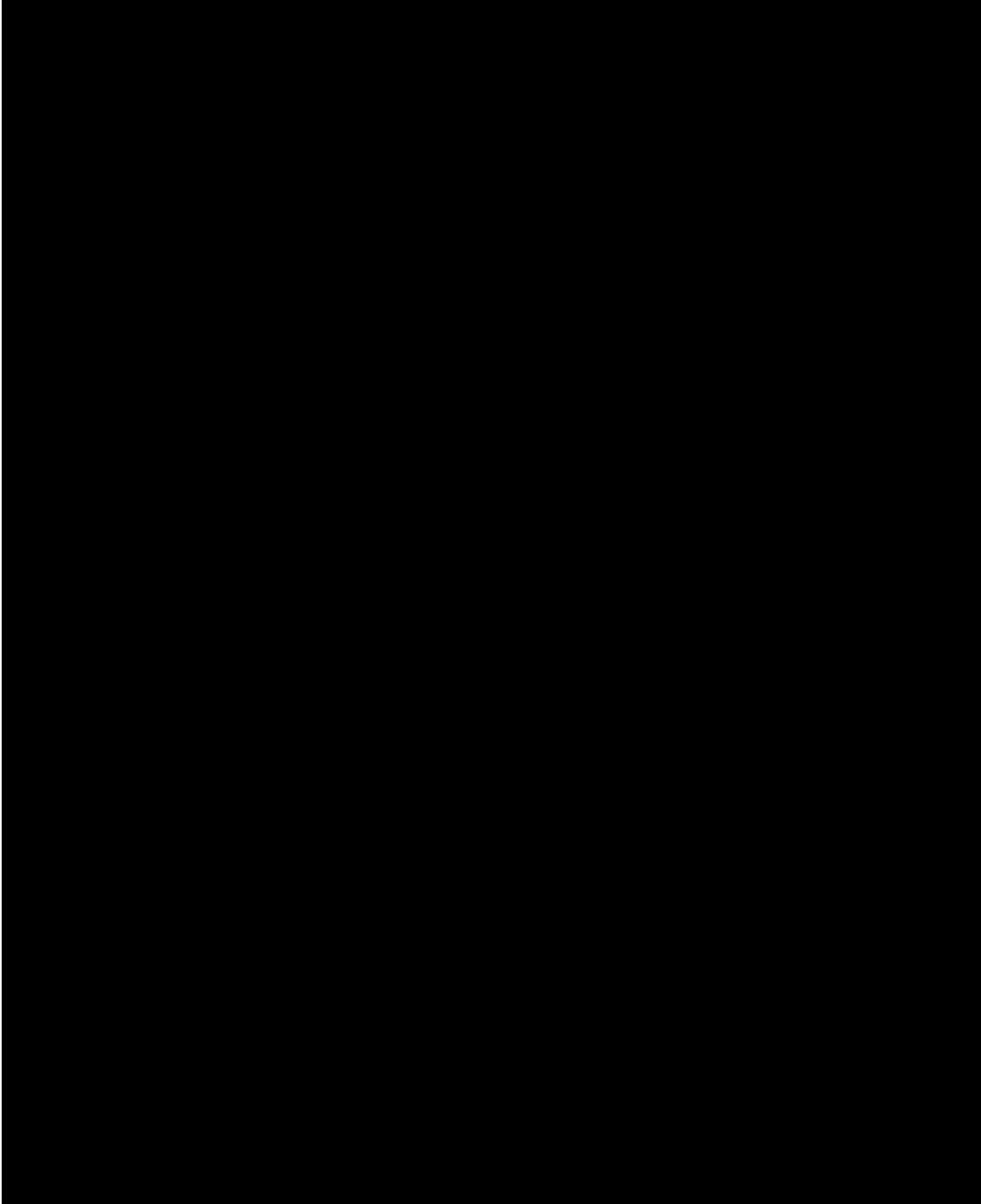


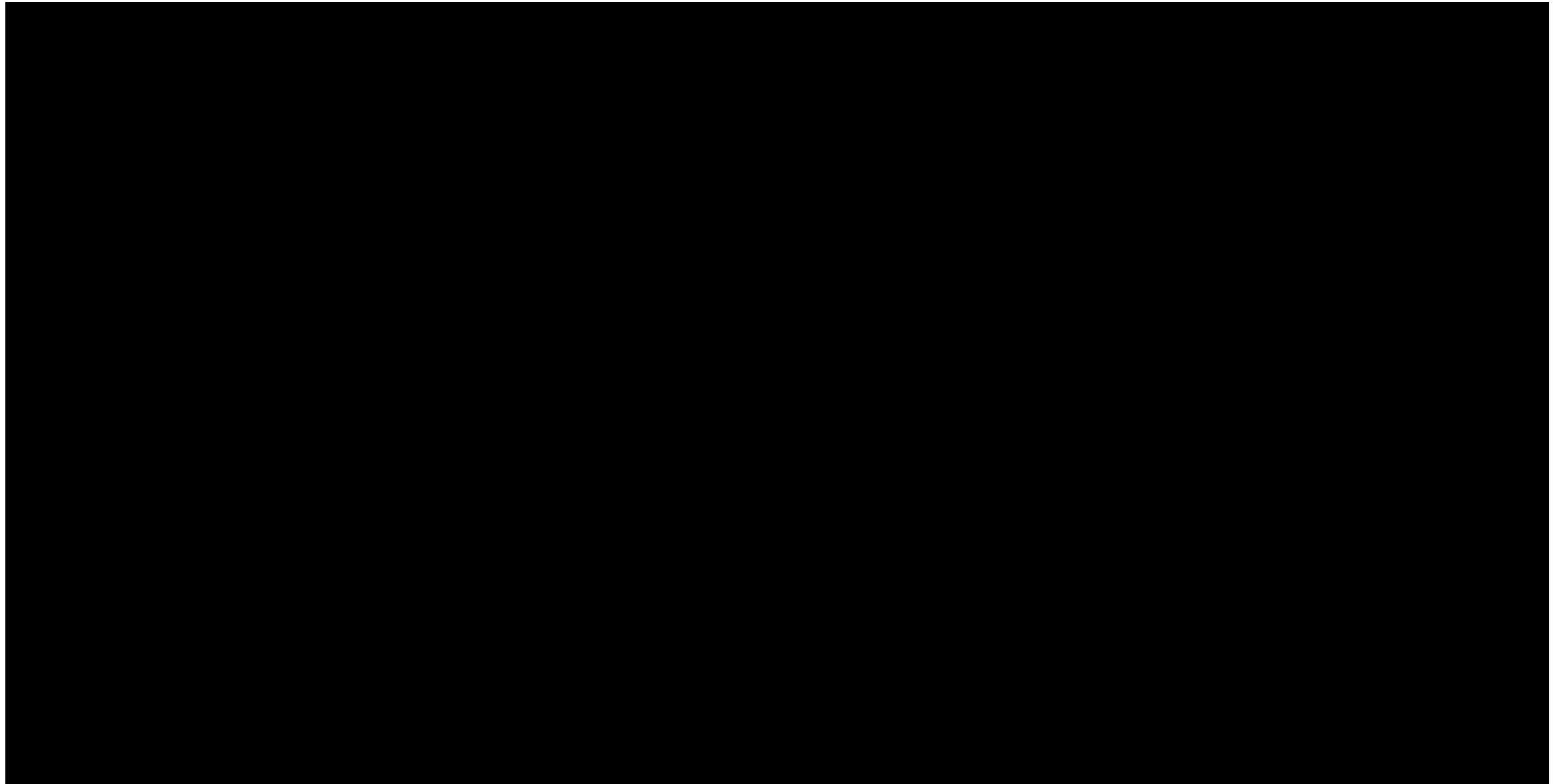


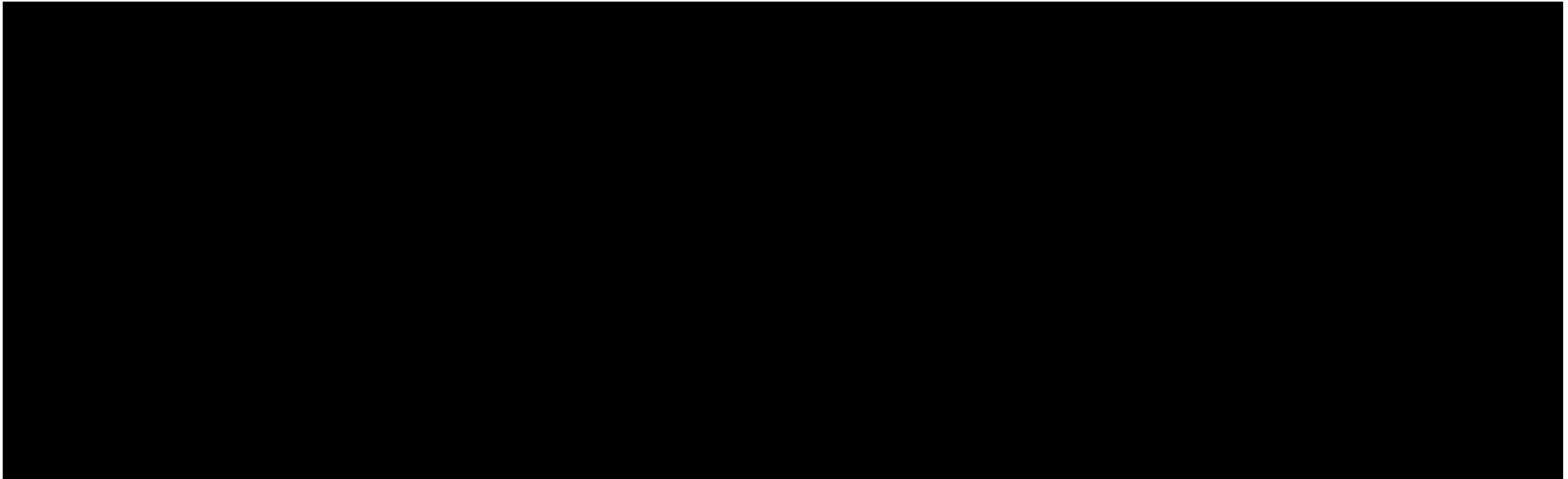






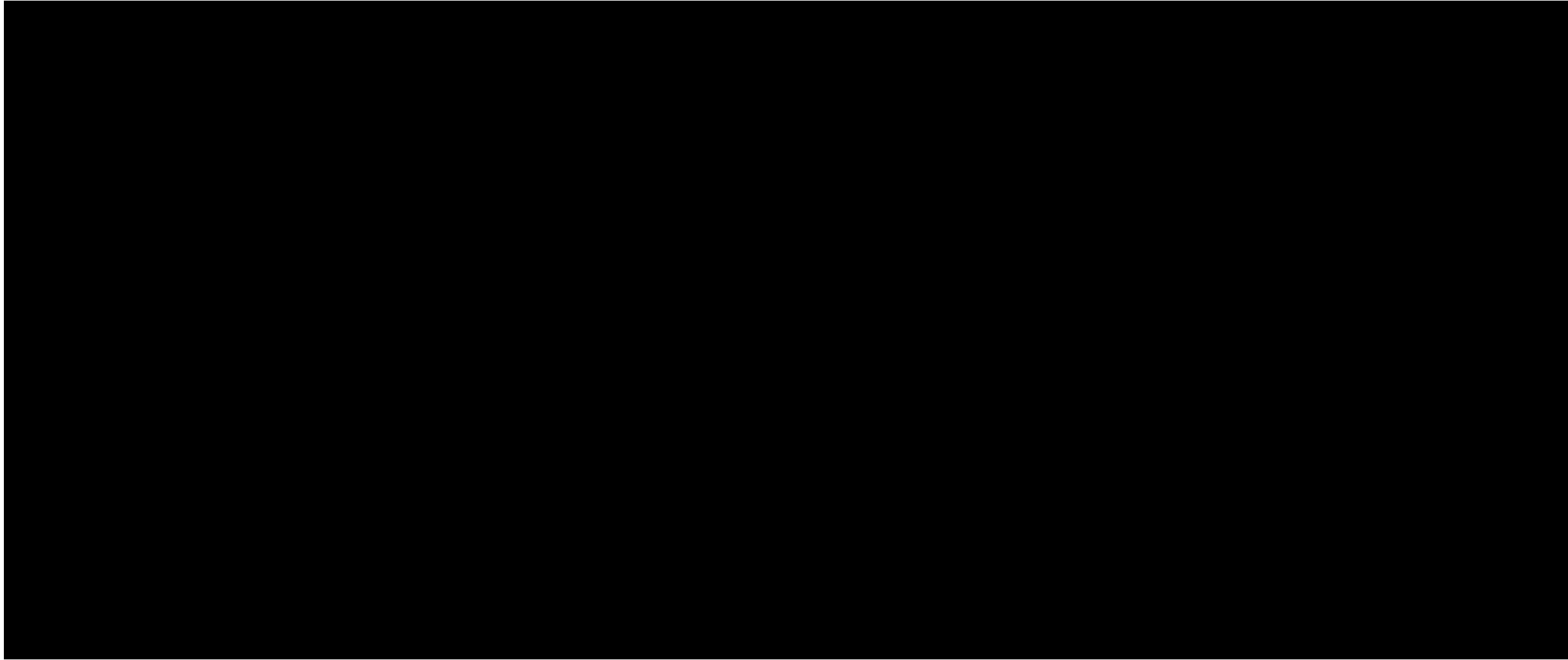


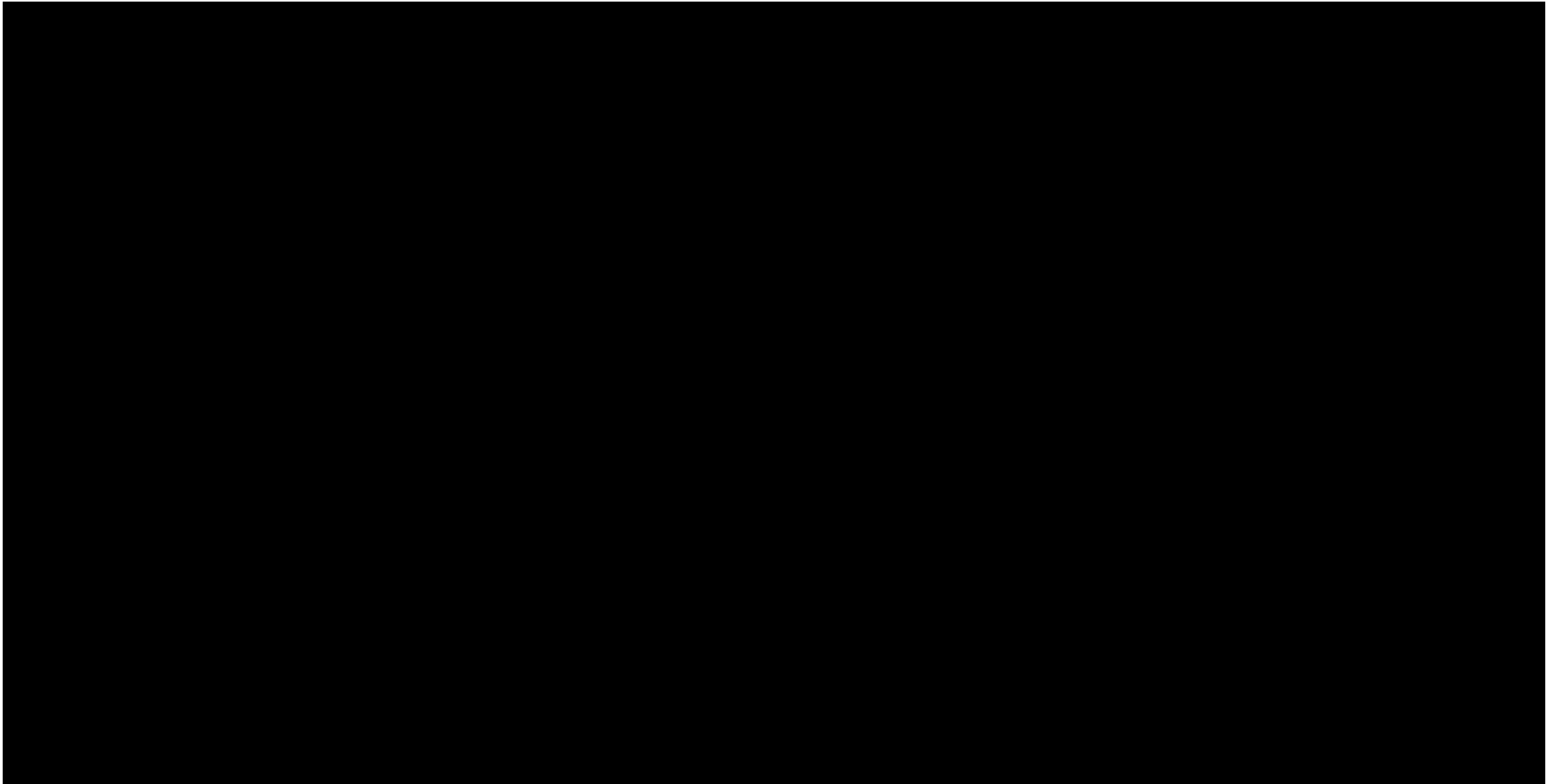




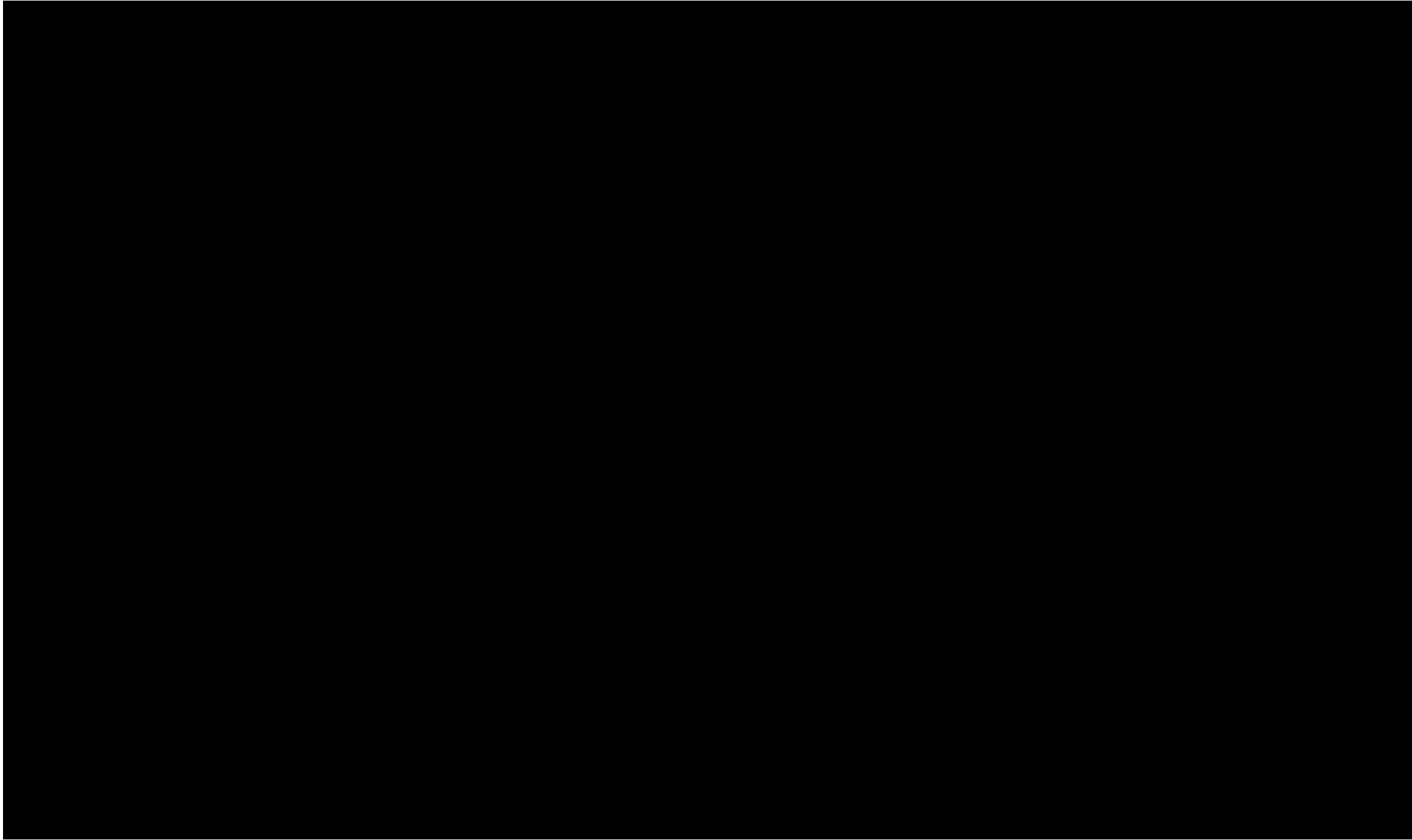


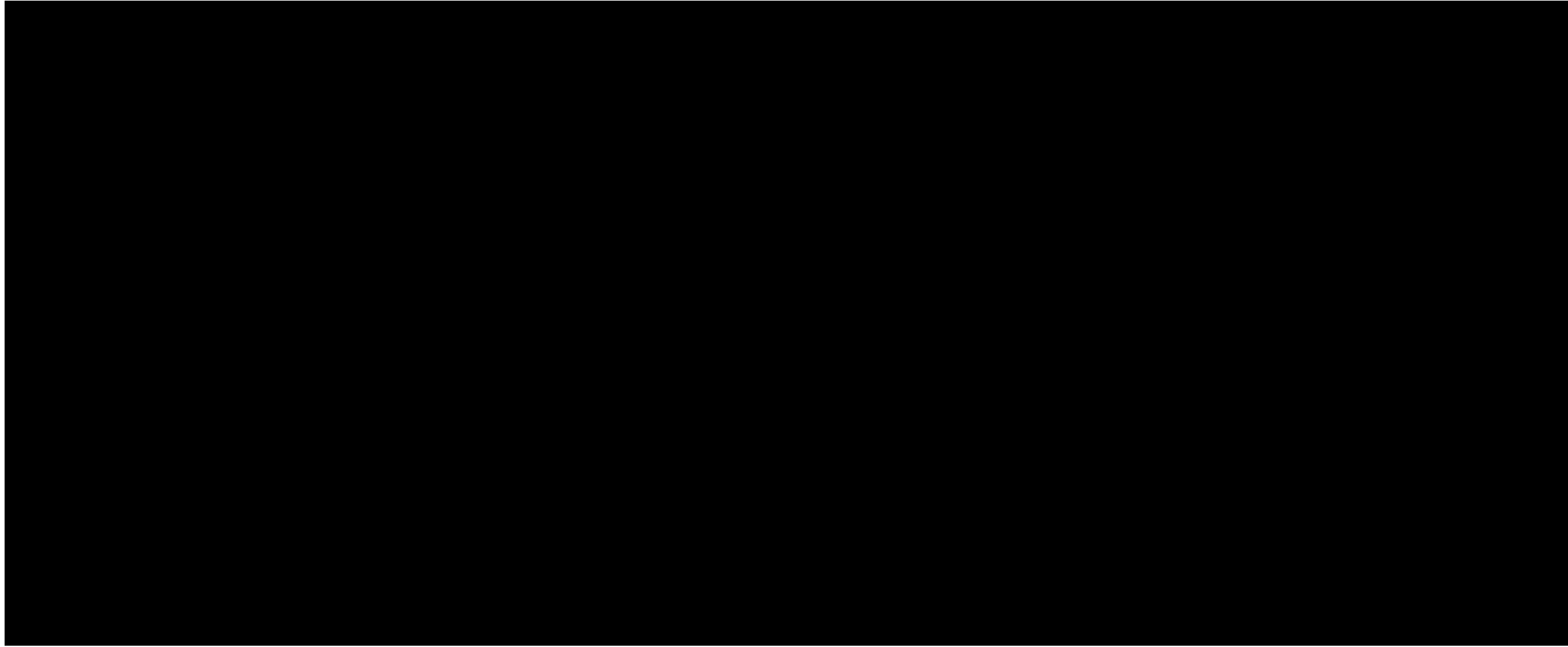


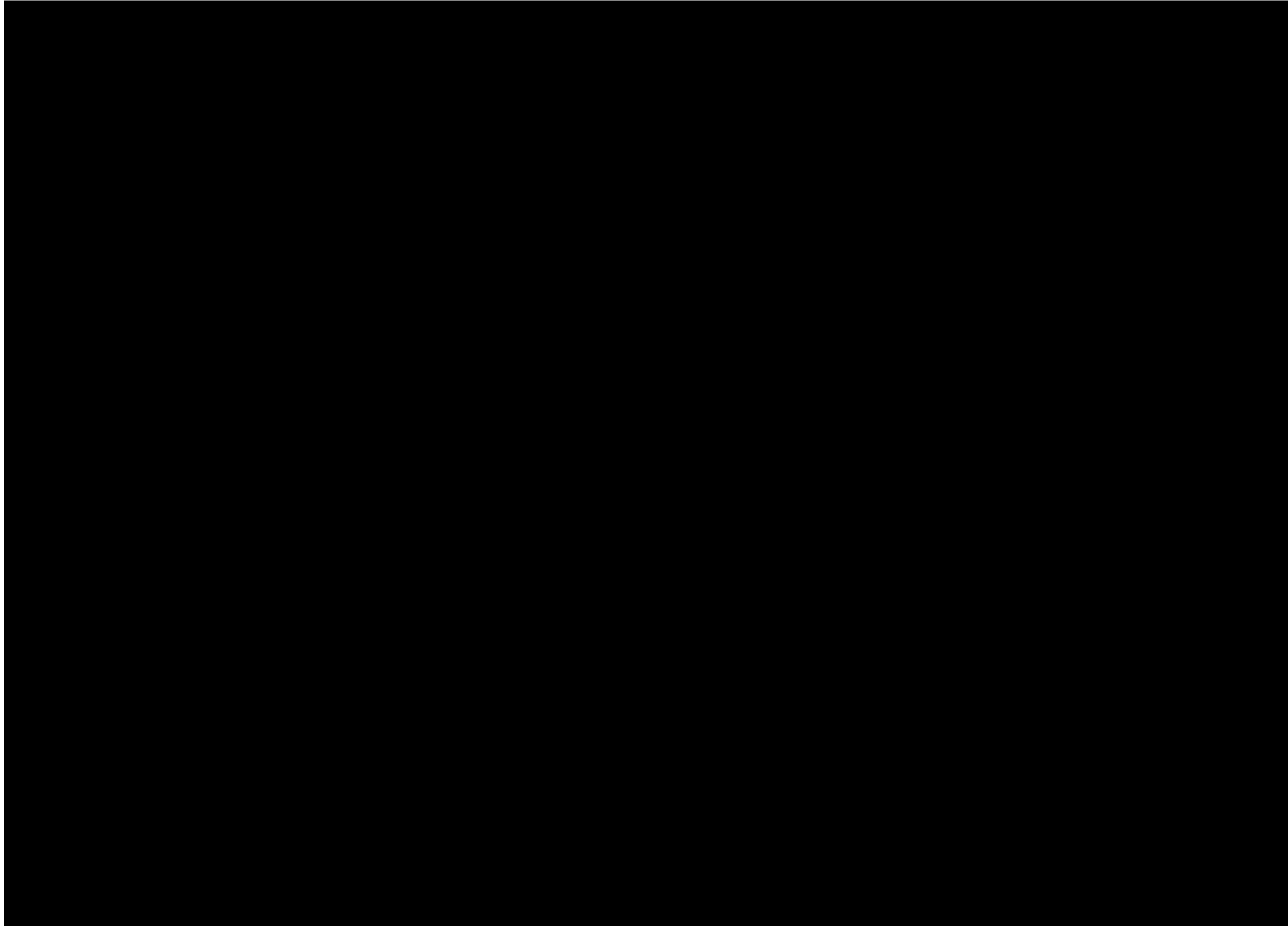


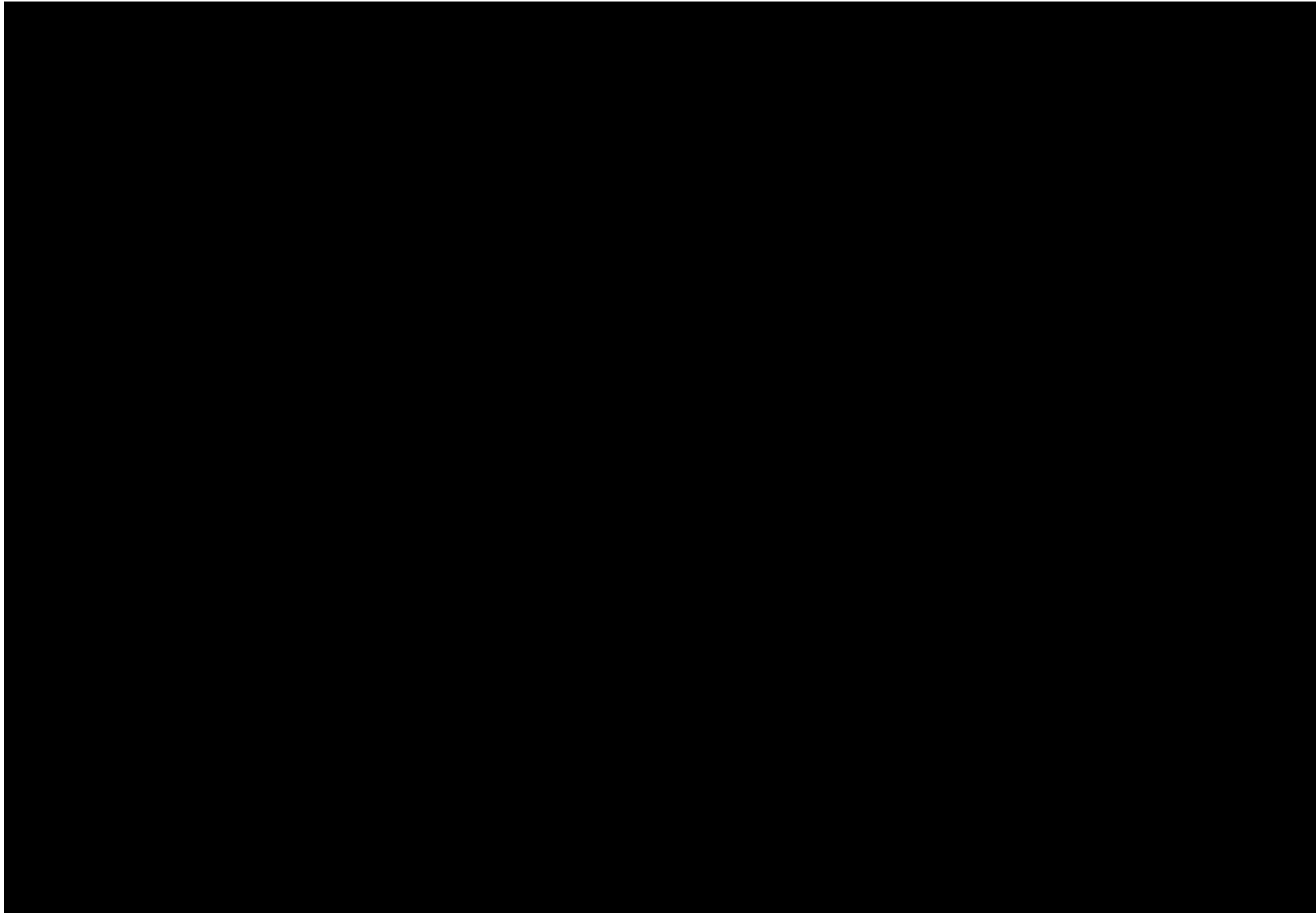




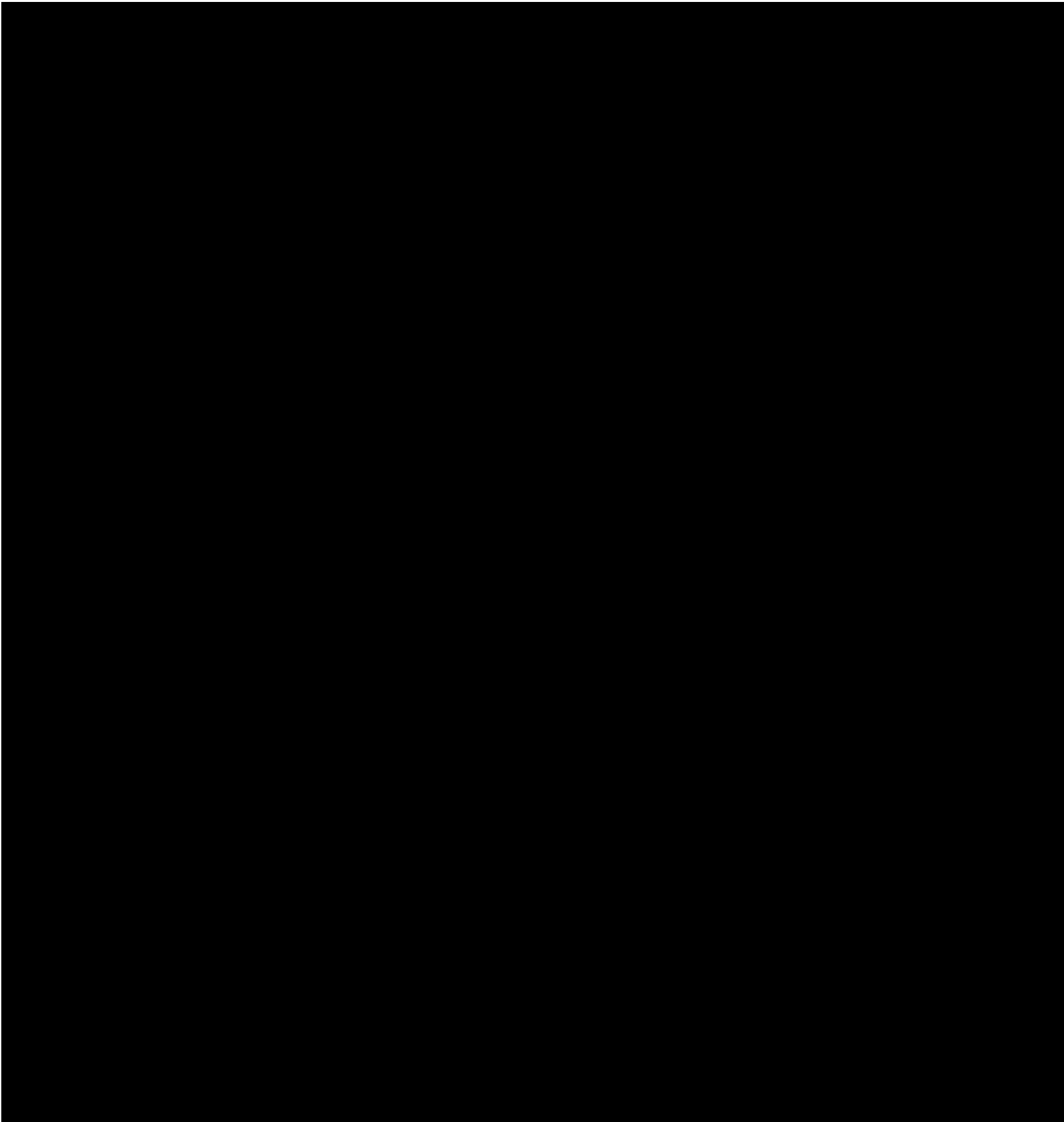


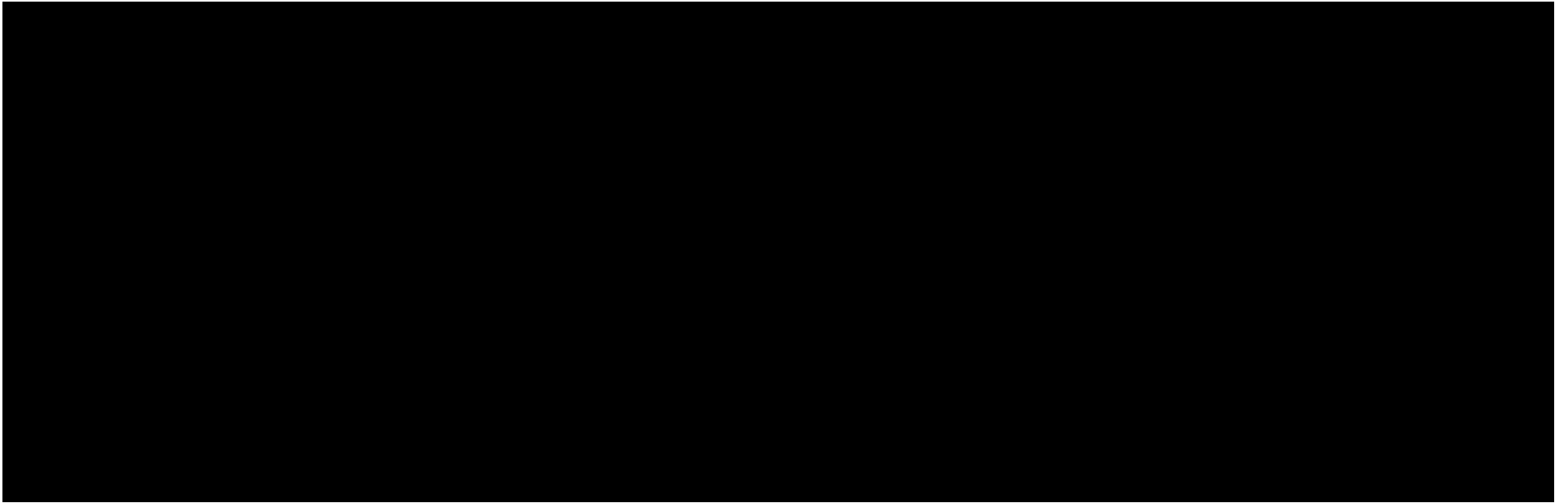


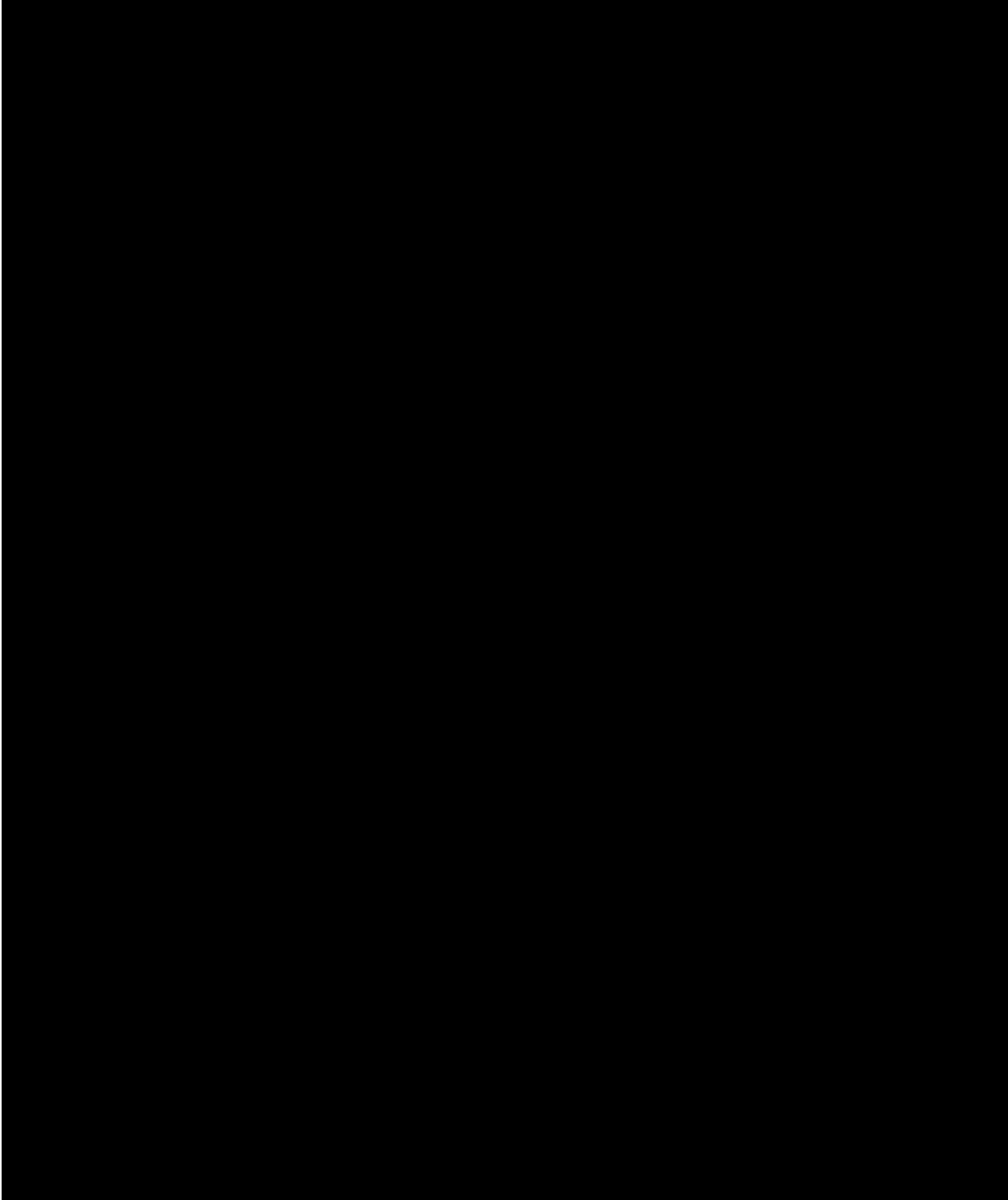


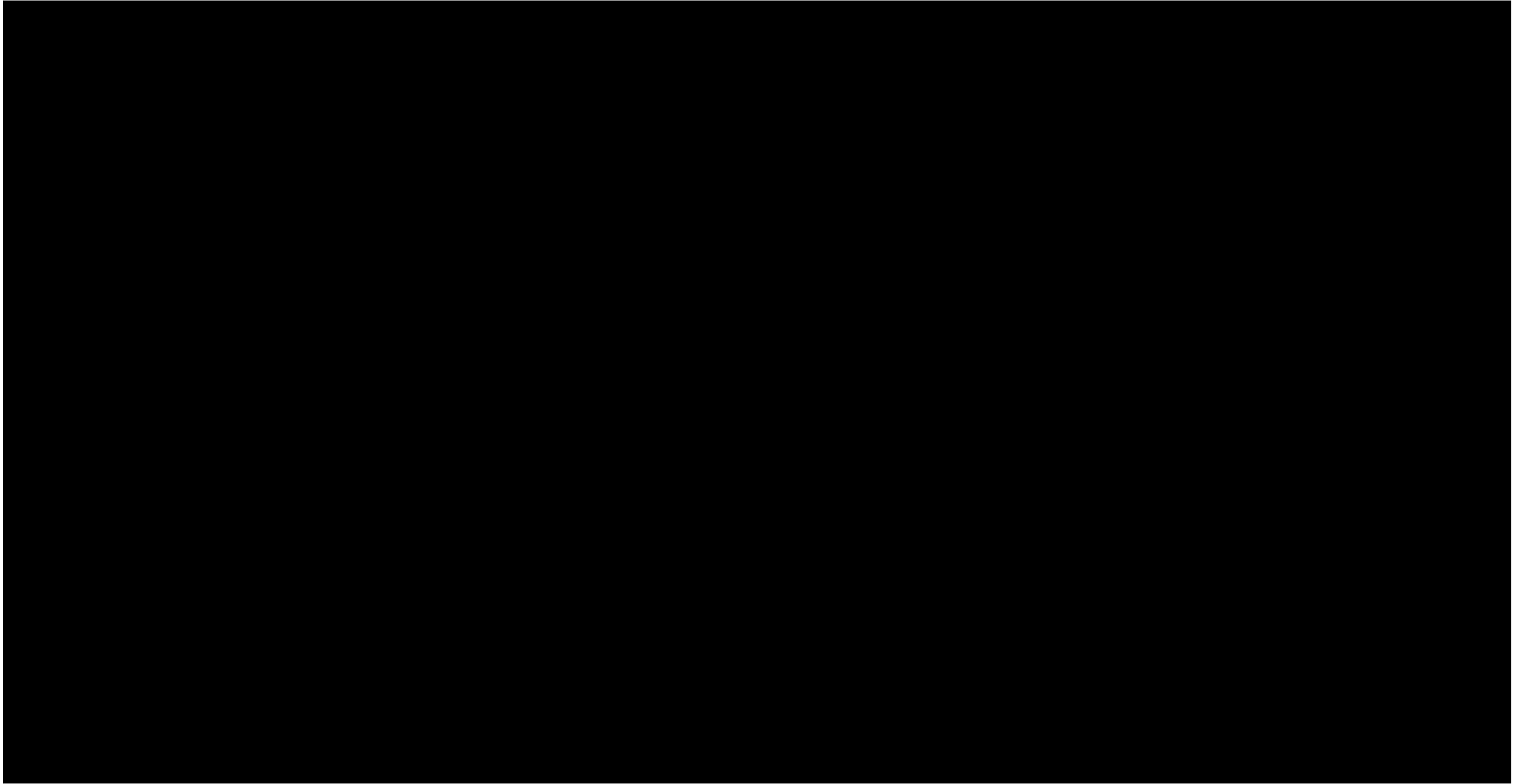


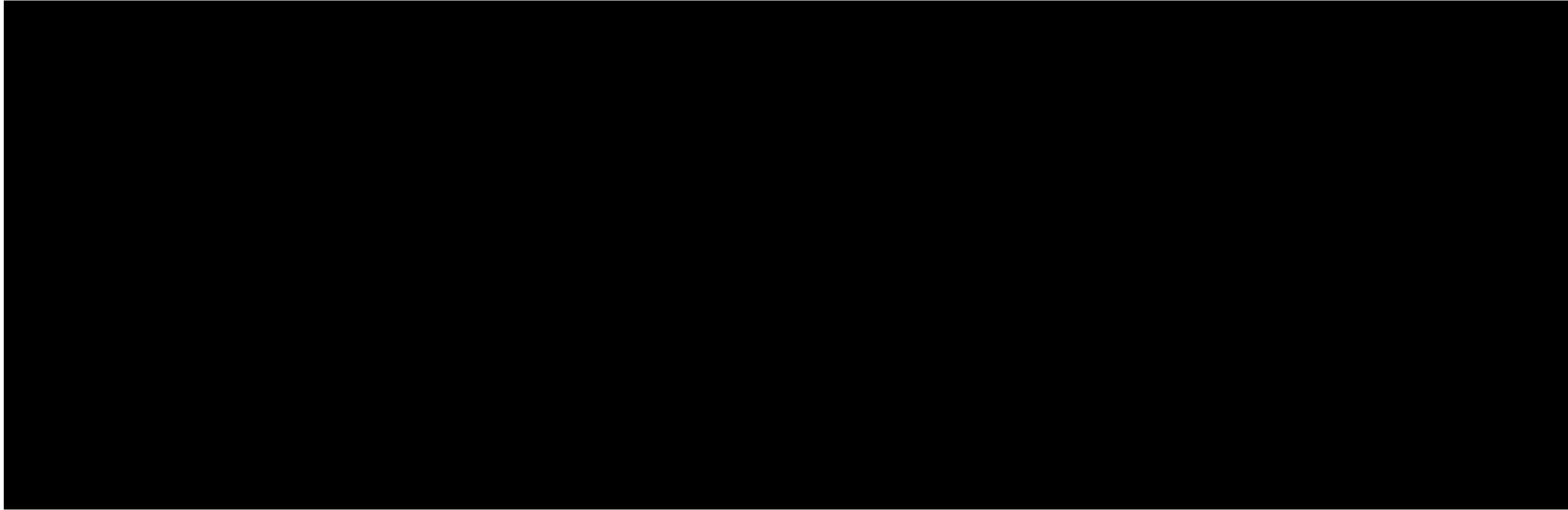


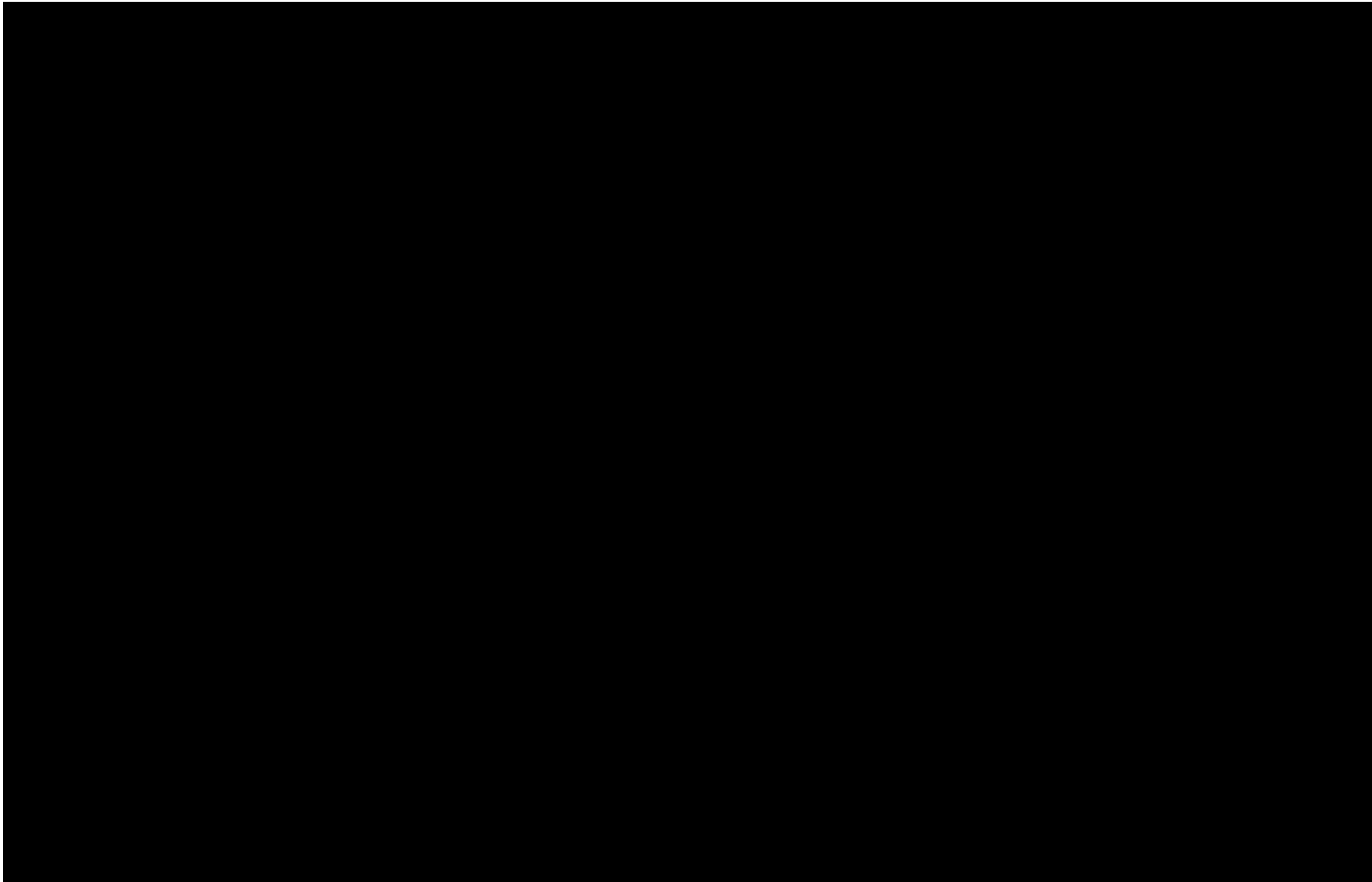


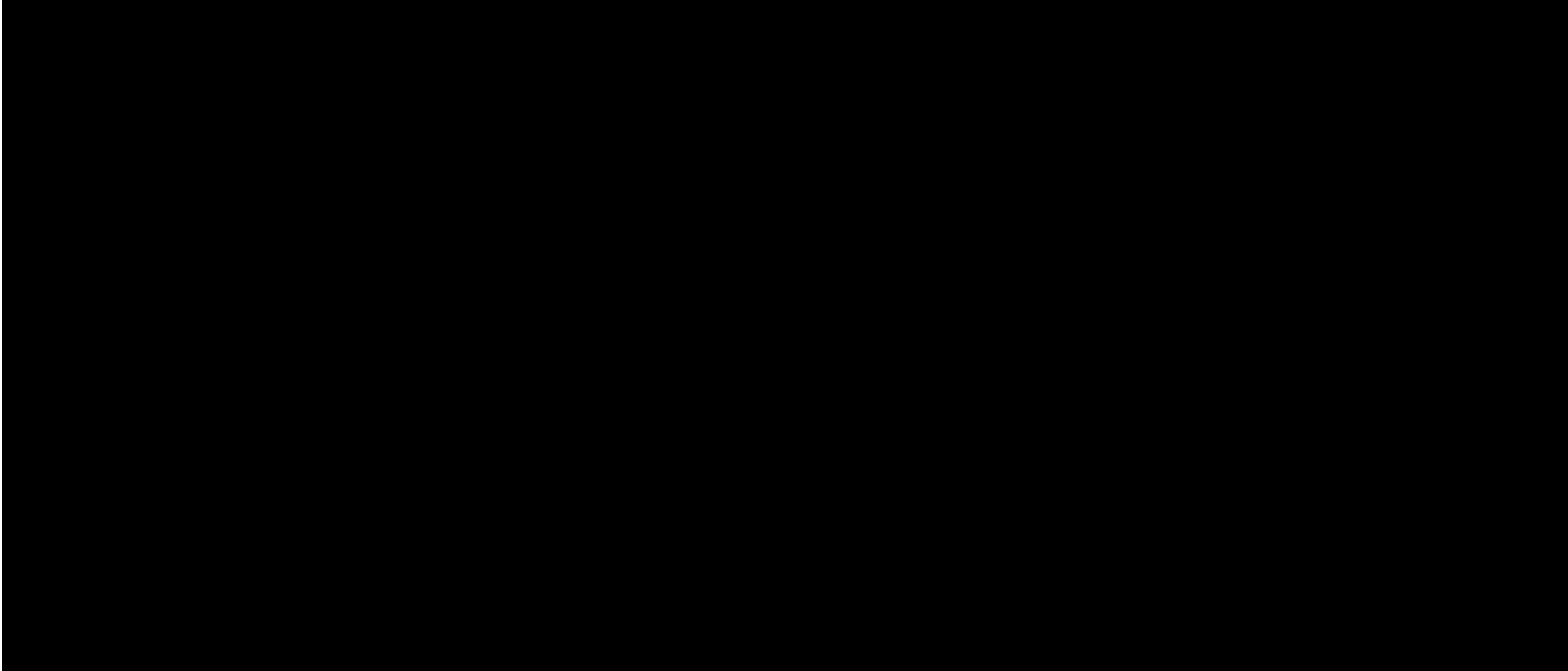


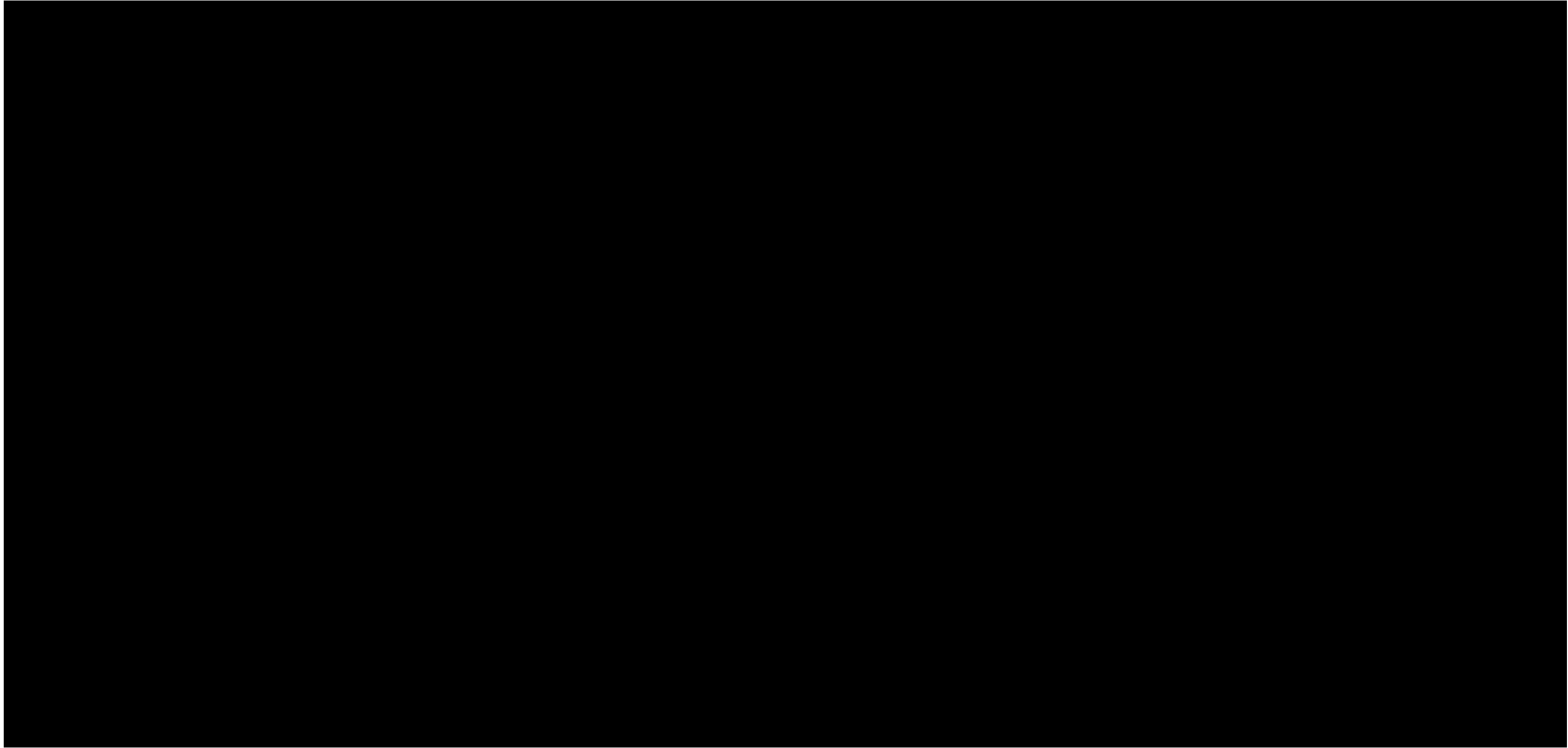




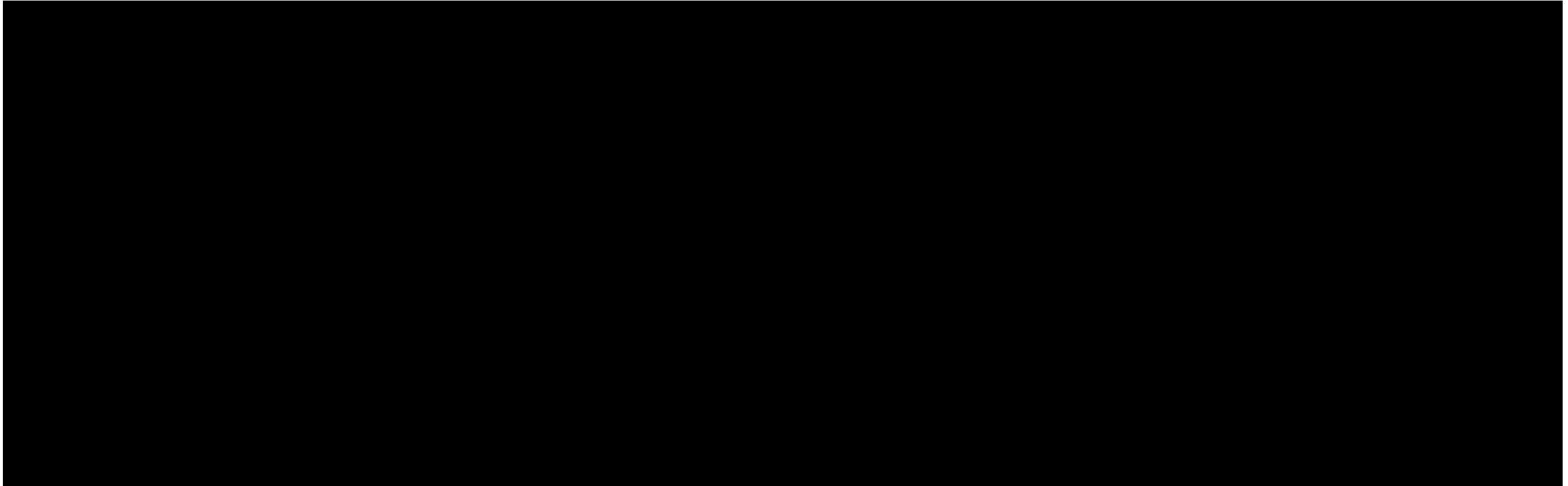


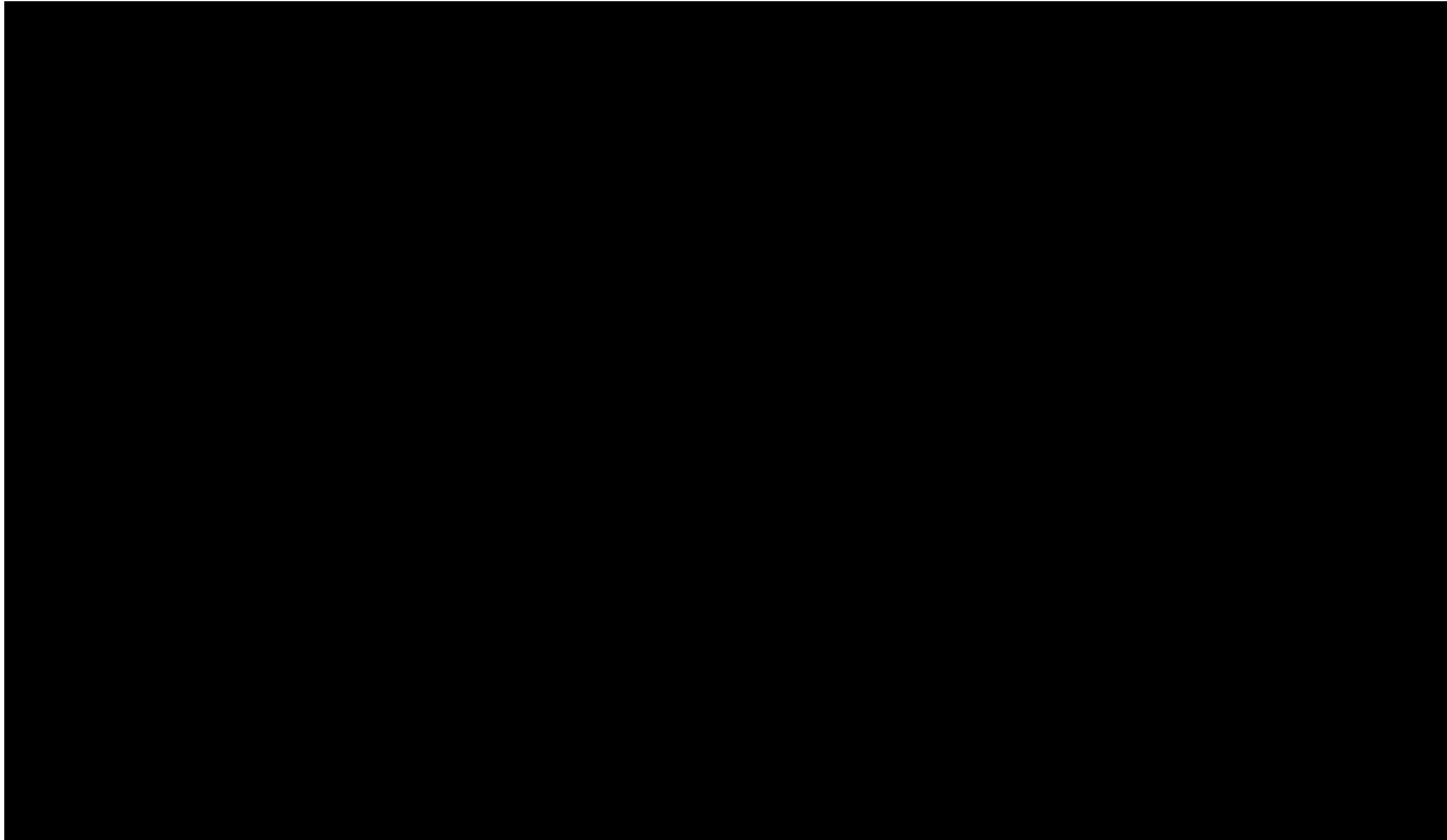


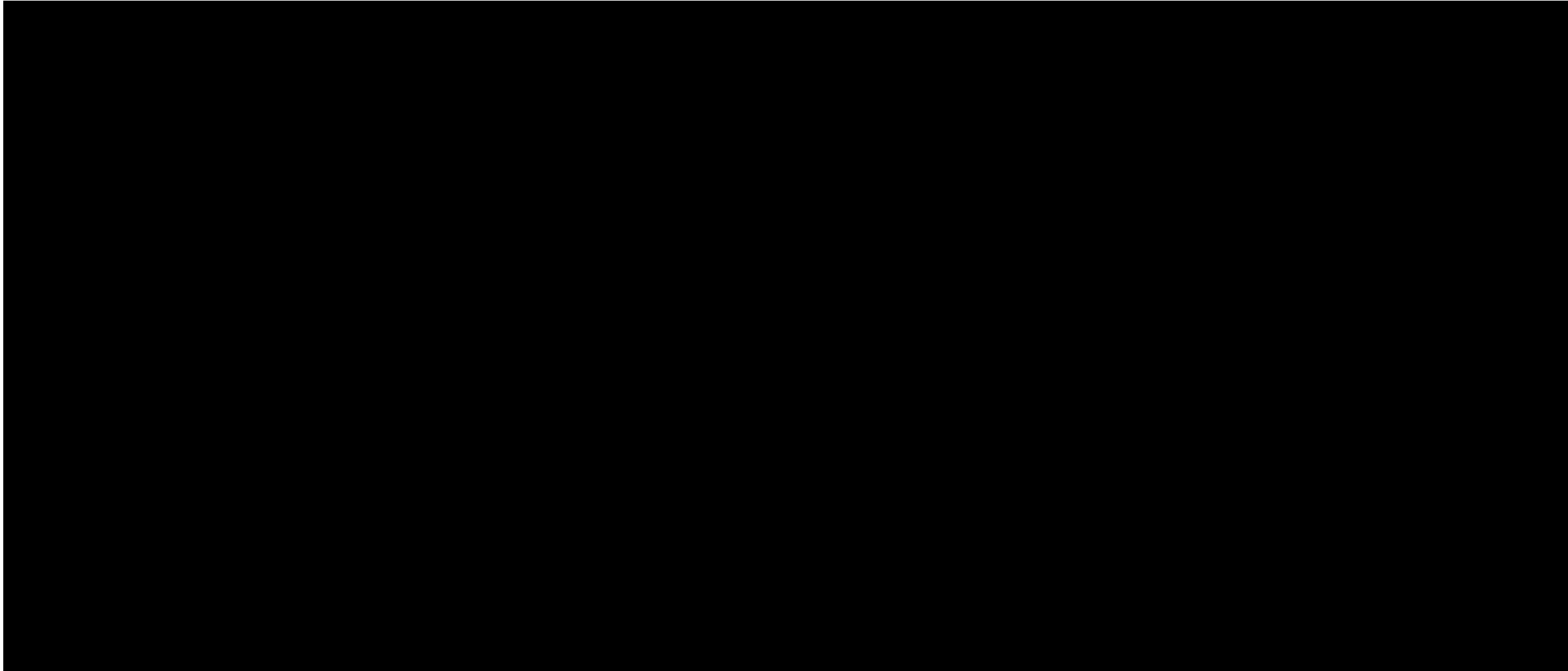


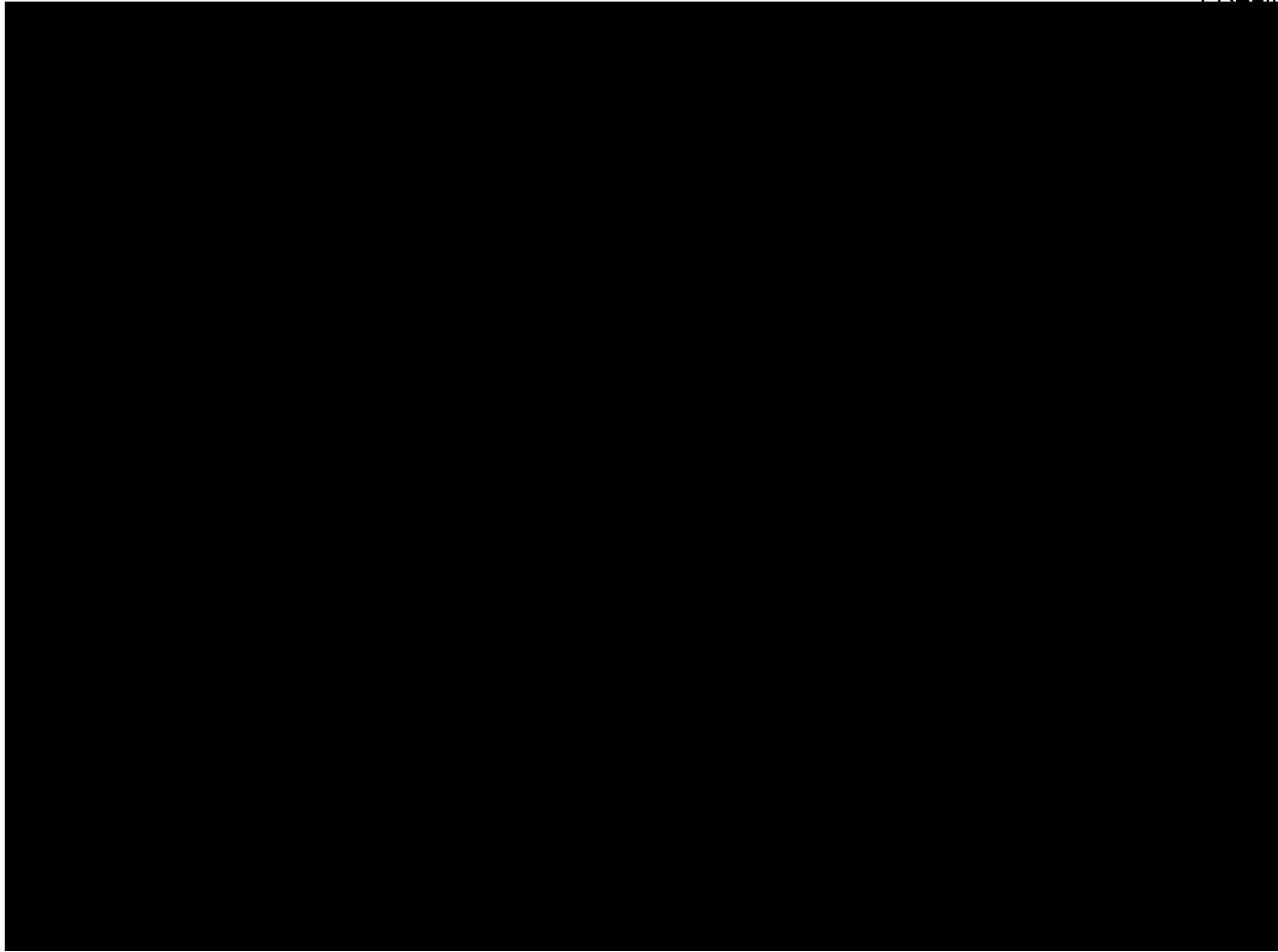


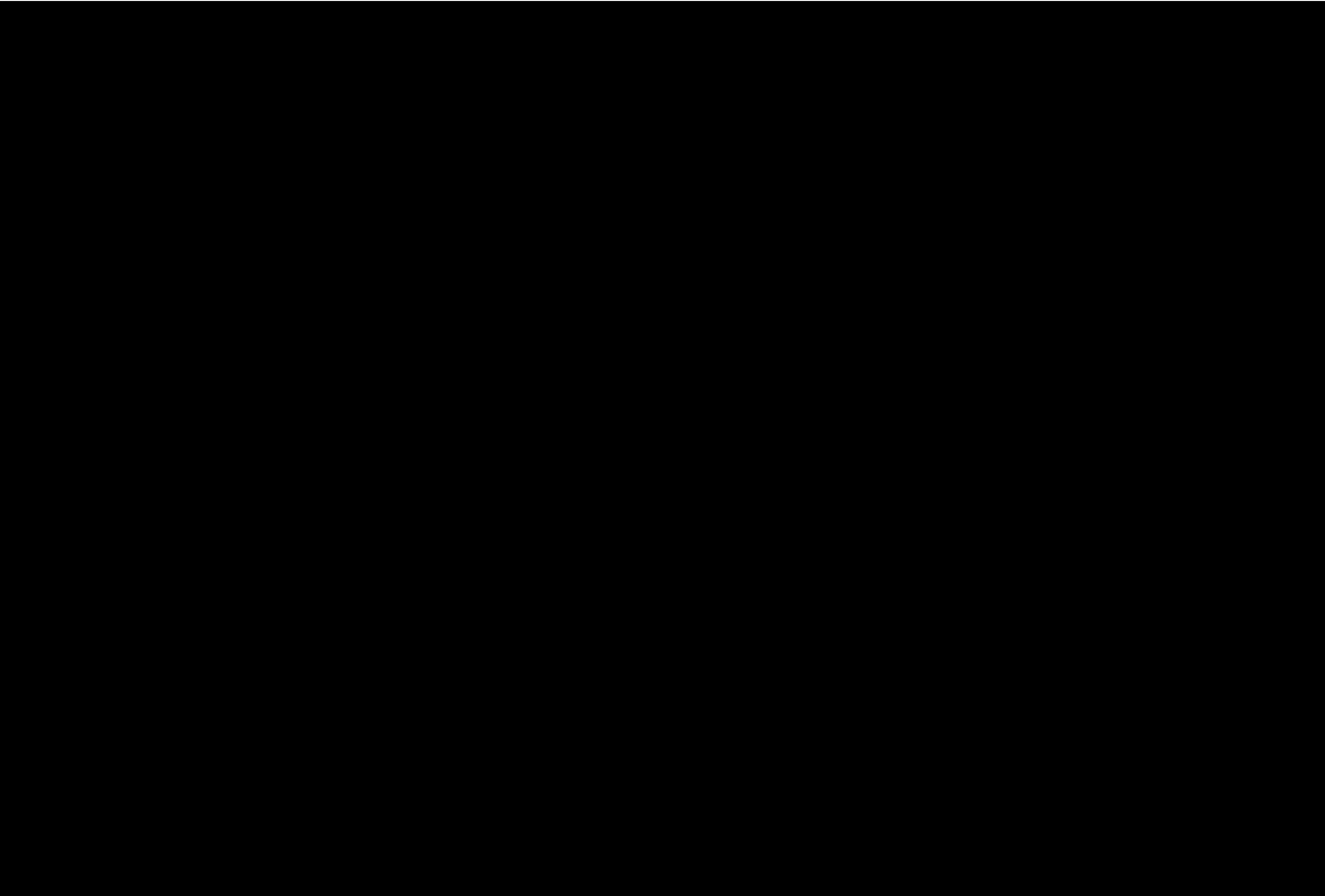


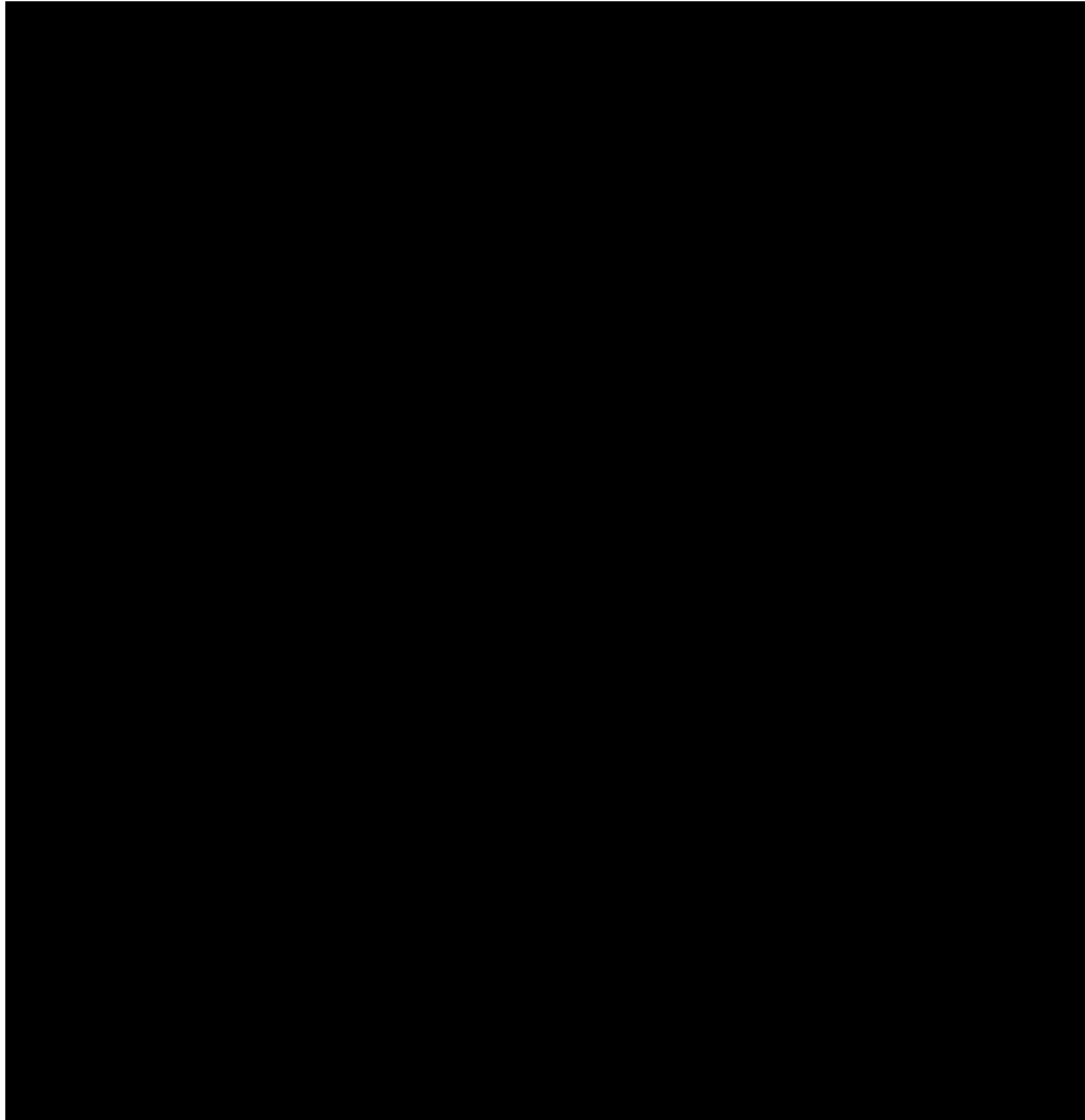














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